Computer algebra independent integration tests

`1_Algebraic_functions/1.2_Trinomial_products/1.2.1Quadratic/1.2.1.9P(x)(d+ex)^m(a+bx`

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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.

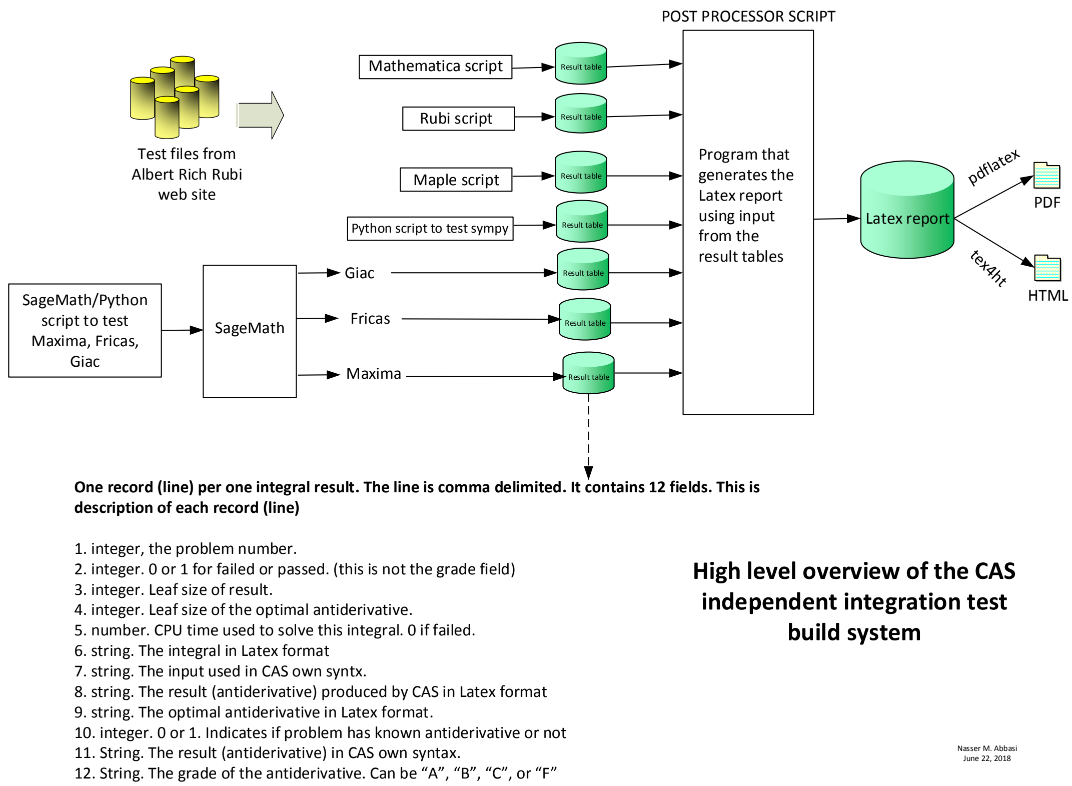
1. Mathematica 11.3 (64 bit).
2. Rubi 4.15.2 in Mathematica 11.3.
3. Rubi in Sympy (Version 1.3) under Python 3.7.0 using Anaconda distribution.
4. Maple 2018.1 (64 bit).
5. Maxima 5.41 Using Lisp ECL 16.1.2.
6. Fricas 1.3.4.
7. Sympy 1.3 under Python 3.7.0 using Anaconda distribution.
8. Giac/Xcas 1.4.9.

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. (400)	% 0. (0)
Rubi in Sympy	% 56. (224)	% 44. (176)
Mathematica	% 98.25 (393)	% 1.75 (7)
Maple	% 97. (388)	% 3. (12)
Maxima	% 54.25 (217)	% 45.75 (183)
Fricas	% 84.75 (339)	% 15.25 (61)
Sympy	% 34.75 (139)	% 65.25 (261)
Giac	% 78.75 (315)	% 21.25 (85)

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.

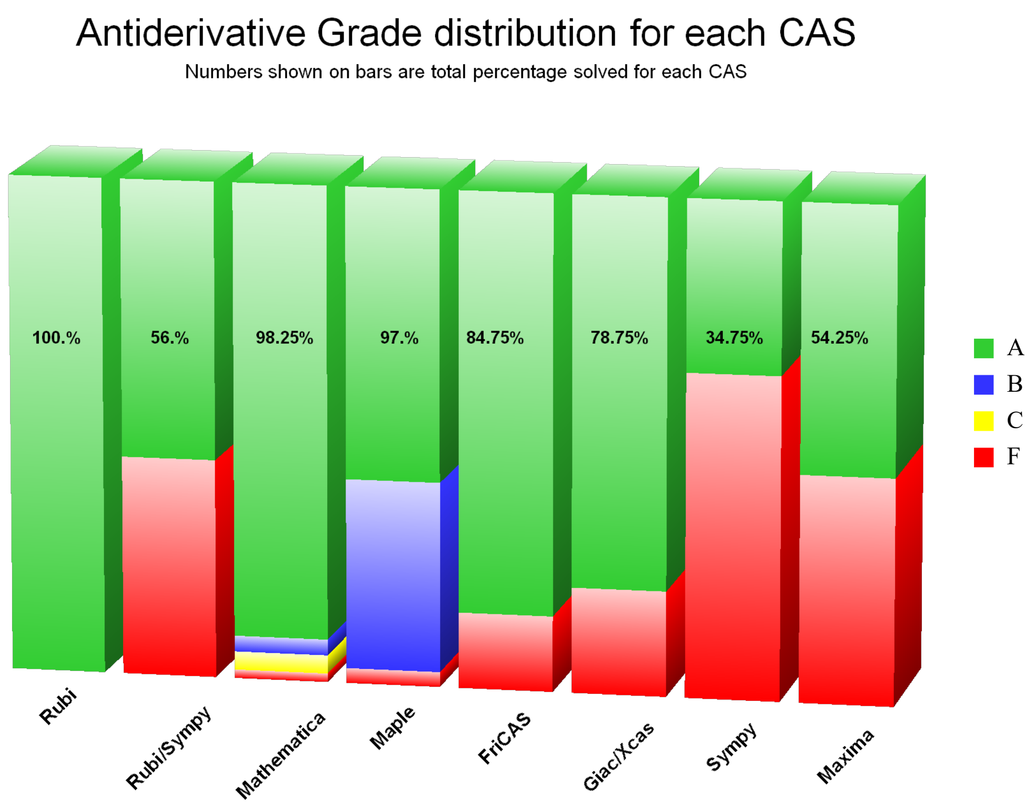
Grading is currently implemented only for for Mathematica, Rubi and Maple results. For all other CAS systems (Maxima, Fricas, Sympy, Giac, Rubi in sympy), the grading function is not yet implemented.

For these systems, a grade of A is assigned if the integrate command completes successfully and a grade of F otherwise.

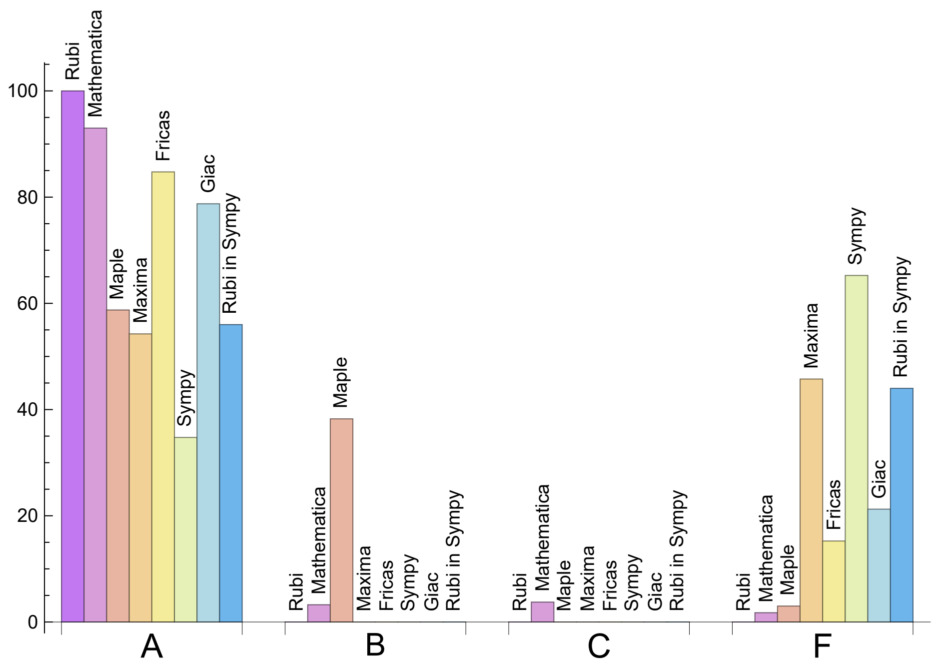
Based on the above, the following table summarizes the grading for this test suite.

System	% A grade	% B grade	% C grade	% F grade
Rubi	100.	0.	0.	0.
Rubi in Sympy	56.	0.	0.	44.
Mathematica	93.	3.25	3.75	1.75
Maple	58.75	38.25	0.	3.
Maxima	54.25	0.	0.	45.75
Fricas	84.75	0.	0.	15.25
Sympy	34.75	0.	0.	65.25
Giac	78.75	0.	0.	21.25

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	1.12	240.82	1.	167.	1.
Rubi in Sympy	49.78	146.44	0.97	121.	0.93
Mathematica	1.38	650.4	1.45	136.	0.93
Maple	0.02	3418.77	6.51	209.	1.46
Maxima	0.76	233.1	2.22	170.	1.35
Fricas	2.08	228.99	1.4	113.	1.3
Sympy	11.02	623.31	3.98	221.	1.43
Giac	0.39	236.05	1.53	134.	1.26

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 {19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 43, 44, 45, 49, 50, 51, 55, 56, 57, 62, 63, 64, 65, 69, 87, 93, 94, 95, 97, 98, 99, 114, 139, 140, 141, 142, 143, 144, 148, 149, 150, 151, 152, 153, 154, 155, 158, 159, 160, 186, 187, 190, 191, 192, 193, 194, 195, 196, 197, 198, 200, 201, 202, 203, 204, 205, 206, 207, 226, 227, 231, 232, 233, 235, 238, 239, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 274, 278, 279, 280, 285, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 315, 316, 317, 318, 319, 322, 323, 326, 327, 328, 329, 330, 331, 332, 333, 336, 337, 338, 339, 340, 341, 342, 343, 346, 347, 348, 349, 350, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 371, 372, 373, 400}

Not solved by Mathematica {136, 137, 138, 272, 273, 274, 371}

Not solved by Maple {136, 137, 138, 139, 272, 273, 274, 370, 371, 398, 399, 400}

Not solved by Maxima {4, 5, 6, 7, 8, 9, 14, 15, 16, 17, 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, 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, 136, 137, 138, 139, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 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, 203, 204, 205, 206, 207, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 280, 281, 282, 283, 284, 285, 286, 287, 288, 365, 366, 367, 368, 369, 370, 371, 372, 373, 378, 379, 384, 385, 390, 391, 396, 397, 398, 399, 400}

Not solved by Fricas {55, 56, 61, 62, 63, 82, 83, 84, 85, 92, 93, 94, 95, 96, 97, 105, 106, 136, 137, 138, 139, 153, 154, 158, 159, 190, 191, 192, 193, 195, 200, 201, 202, 203, 204, 205, 206, 207, 230, 231, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 370, 371, 398, 399, 400}

Not solved by Sympy {4, 5, 6, 7, 8, 9, 14, 15, 16, 17, 47, 48, 49, 54, 55, 56, 57, 58, 61, 62, 63, 64, 65, 66, 67, 82, 83, 84, 85, 86, 87, 92, 93, 94, 95, 96, 97, 98, 99, 105, 106, 107, 108, 109, 112, 113, 114, 117, 121, 122, 123, 124, 125, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 152, 153, 154, 155, 158, 159, 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, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 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, 276, 277, 280, 281, 282, 283, 284, 285, 286, 287, 288, 310, 317, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 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}

Not solved by Giac {4, 5, 8, 14, 83, 93, 96, 106, 113, 114, 122, 128, 134, 136, 137, 138, 139, 190, 191, 192, 200, 201, 202, 203, 204, 205, 213, 219, 225, 230, 231, 238, 239, 244, 250, 256, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 283, 328, 329, 331, 338, 339, 341, 342, 343, 347, 348, 349, 350, 355, 362, 370, 371, 377, 378, 379, 383, 384, 385, 389, 390, 391, 395, 396, 397, 398, 399, 400}

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 {137, 259, 260, 262, 263, 264, 265, 266, 271, 272, 273, 274}

Mathematica {139, 207, 259, 260, 261, 262, 263, 264, 265, 266, 267, 270, 271, 377, 389, 395, 398, 399, 400}

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	236	236	196	371	505	1316	1231	266	236
normalized size	1	1.	0.83	1.57	2.14	5.58	5.22	1.13	1.
time (sec)	N/A	0.824	0.308	0.022	0.797	0.301	28.787	0.273	51.632

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	186	186	158	304	304	1054	670	216	178
normalized size	1	1.	0.85	1.63	1.63	5.67	3.6	1.16	0.96
time (sec)	N/A	0.441	0.244	0.013	0.781	0.297	14.903	0.276	40.768

Problem 3	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	125	125	102	154	188	597	343	115	97
normalized size	1	1.	0.82	1.23	1.5	4.78	2.74	0.92	0.78
time (sec)	N/A	0.152	0.108	0.008	0.791	0.293	9.015	0.274	18.826

Problem 4	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	148	148	103	384	0	559	0	0	128
normalized size	1	1.	0.7	2.59	0.	3.78	0.	0.	0.86
time (sec)	N/A	0.406	0.173	0.017	0.	0.296	0.	0.	36.924

Problem 5	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	F(-1)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	170	170	109	439	0	690	0	0	151
normalized size	1	1.	0.64	2.58	0.	4.06	0.	0.	0.89
time (sec)	N/A	0.464	0.2	0.019	0.	0.298	0.	0.	37.713

Problem 6	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	149	149	114	318	0	748	0	1	131
normalized size	1	1.	0.77	2.13	0.	5.02	0.	0.01	0.88
time (sec)	N/A	0.406	0.196	0.017	0.	0.298	0.	0.317	34.371

Problem 7	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	196	196	112	453	0	711	0	1	139
normalized size	1	1.	0.57	2.31	0.	3.63	0.	0.01	0.71
time (sec)	N/A	0.419	0.287	0.016	0.	0.305	0.	0.321	42.225

Problem 8	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	180	180	109	116	0	647	0	0	165
normalized size	1	1.	0.61	0.64	0.	3.59	0.	0.	0.92
time (sec)	N/A	0.482	0.139	0.012	0.	0.298	0.	0.	38.216

Problem 9	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	234	234	144	152	0	875	0	1	216
normalized size	1	1.	0.62	0.65	0.	3.74	0.	0.	0.92
time (sec)	N/A	0.605	0.168	0.012	0.	0.31	0.	0.542	45.932

Problem 10	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	236	236	170	374	575	1076	1273	224	241
normalized size	1	1.	0.72	1.58	2.44	4.56	5.39	0.95	1.02
time (sec)	N/A	1.174	0.283	0.016	0.788	0.297	29.9	0.287	52.549

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	191	191	139	301	390	837	896	177	192
normalized size	1	1.	0.73	1.58	2.04	4.38	4.69	0.93	1.01
time (sec)	N/A	0.66	0.207	0.014	0.79	0.288	20.387	0.288	45.157

Problem 12	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	143	143	103	234	234	548	490	131	136
normalized size	1	1.	0.72	1.64	1.64	3.83	3.43	0.92	0.95
time (sec)	N/A	0.361	0.166	0.012	0.784	0.286	9.625	0.286	36.767

Problem 13	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	87	87	67	108	126	277	267	70	60
normalized size	1	1.	0.77	1.24	1.45	3.18	3.07	0.8	0.69
time (sec)	N/A	0.11	0.074	0.008	0.788	0.284	4.617	0.289	16.233

Problem 14	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	103	103	83	149	0	379	0	0	85
normalized size	1	1.	0.81	1.45	0.	3.68	0.	0.	0.83
time (sec)	N/A	0.274	0.138	0.015	0.	0.285	0.	0.	30.111

Problem 15	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	163	163	95	355	0	416	0	4	110
normalized size	1	1.	0.58	2.18	0.	2.55	0.	0.02	0.67
time (sec)	N/A	0.38	0.198	0.017	0.	0.289	0.	0.682	39.527

Problem 16	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	180	180	103	116	0	410	0	1	163
normalized size	1	1.	0.57	0.64	0.	2.28	0.	0.01	0.91
time (sec)	N/A	0.495	0.131	0.012	0.	0.283	0.	0.294	38.66

Problem 17	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	234	234	139	152	0	645	0	1	214
normalized size	1	1.	0.59	0.65	0.	2.76	0.	0.	0.91
time (sec)	N/A	0.568	0.167	0.013	0.	0.291	0.	0.303	46.067

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	175	173	208	217	273	1	257	327	173
normalized size	1	0.99	1.19	1.24	1.56	0.01	1.47	1.87	0.99
time (sec)	N/A	0.618	0.164	0.001	0.718	0.245	0.104	0.262	66.803

Problem 19	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	175	173	150	148	190	1	173	231	0
normalized size	1	0.99	0.86	0.85	1.09	0.01	0.99	1.32	0.
time (sec)	N/A	0.478	0.11	0.001	0.709	0.246	0.089	0.261	0.

Problem 20	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	86	86	86	79	108	1	97	135	0
normalized size	1	1.	1.	0.92	1.26	0.01	1.13	1.57	0.
time (sec)	N/A	0.218	0.057	0.002	0.71	0.243	0.074	0.262	0.

Problem 21	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	46	39	51	1	42	54	0
normalized size	1	1.	1.	0.85	1.11	0.02	0.91	1.17	0.
time (sec)	N/A	0.059	0.025	0.001	0.705	0.24	0.051	0.261	0.

Problem 22	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	145	143	136	210	215	217	143	230	0
normalized size	1	0.99	0.94	1.45	1.48	1.5	0.99	1.59	0.
time (sec)	N/A	0.494	0.159	0.006	0.712	0.265	1.363	0.273	0.

Problem 23	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	153	151	142	234	228	338	184	324	0
normalized size	1	0.99	0.93	1.53	1.49	2.21	1.2	2.12	0.
time (sec)	N/A	0.462	0.36	0.013	0.701	0.264	2.932	0.272	0.

Problem 24	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	156	154	176	257	239	369	204	225	0
normalized size	1	0.99	1.13	1.65	1.53	2.37	1.31	1.44	0.
time (sec)	N/A	0.454	0.196	0.018	0.713	0.266	10.44	0.271	0.

Problem 25	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	321	318	335	385	486	1	445	571	345
normalized size	1	0.99	1.04	1.2	1.51	0.	1.39	1.78	1.07
time (sec)	N/A	1.394	0.305	0.002	0.72	0.243	0.145	0.27	164.796

Problem 26	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	321	318	241	268	347	1	311	408	0
normalized size	1	0.99	0.75	0.83	1.08	0.	0.97	1.27	0.
time (sec)	N/A	1.094	0.176	0.001	0.727	0.243	0.122	0.269	0.

Problem 27	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	144	144	144	151	208	1	180	244	0
normalized size	1	1.	1.	1.05	1.44	0.01	1.25	1.69	0.
time (sec)	N/A	0.482	0.102	0.001	0.718	0.241	0.092	0.268	0.

Problem 28	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	67	82	69	75	100	1	83	103	0
normalized size	1	1.22	1.03	1.12	1.49	0.01	1.24	1.54	0.
time (sec)	N/A	0.125	0.059	0.001	0.718	0.243	0.075	0.266	0.

Problem 29	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	297	295	285	490	509	512	350	562	0
normalized size	1	0.99	0.96	1.65	1.71	1.72	1.18	1.89	0.
time (sec)	N/A	1.345	0.494	0.009	0.708	0.266	2.359	0.271	0.

Problem 30	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	292	289	272	527	529	747	411	671	0
normalized size	1	0.99	0.93	1.8	1.81	2.56	1.41	2.3	0.
time (sec)	N/A	1.335	0.794	0.017	0.723	0.271	5.825	0.277	0.

Problem 31	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	295	292	274	563	543	821	471	536	0
normalized size	1	0.99	0.93	1.91	1.84	2.78	1.6	1.82	0.
time (sec)	N/A	1.351	0.273	0.017	0.714	0.27	26.563	0.274	0.

Problem 32	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	502	499	459	553	691	1	646	818	0
normalized size	1	0.99	0.91	1.1	1.38	0.	1.29	1.63	0.
time (sec)	N/A	2.707	0.46	0.002	0.727	0.244	0.179	0.279	0.

Problem 33	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	502	499	329	388	495	1	447	583	0
normalized size	1	0.99	0.66	0.77	0.99	0.	0.89	1.16	0.
time (sec)	N/A	2.074	0.265	0.002	0.727	0.243	0.15	0.268	0.

Problem 34	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	196	196	196	223	300	1	265	352	0
normalized size	1	1.	1.	1.14	1.53	0.01	1.35	1.8	0.
time (sec)	N/A	0.828	0.186	0.002	0.705	0.241	0.11	0.269	0.

Problem 35	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	116	116	100	111	146	1	122	150	0
normalized size	1	1.	0.86	0.96	1.26	0.01	1.05	1.29	0.
time (sec)	N/A	0.195	0.061	0.001	0.699	0.24	0.078	0.268	0.

Problem 36	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	490	487	498	880	907	910	658	1031	0
normalized size	1	0.99	1.02	1.8	1.85	1.86	1.34	2.1	0.
time (sec)	N/A	2.606	2.43	0.011	0.711	0.269	3.713	0.274	0.

Problem 37	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	486	483	641	928	933	1258	731	1	0
normalized size	1	0.99	1.32	1.91	1.92	2.59	1.5	0.	0.
time (sec)	N/A	2.721	0.952	0.022	0.738	0.276	9.727	0.276	0.

Problem 38	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	466	463	438	978	946	1384	799	981	0
normalized size	1	0.99	0.94	2.1	2.03	2.97	1.71	2.11	0.
time (sec)	N/A	2.633	0.493	0.024	0.737	0.276	51.166	0.275	0.

Problem 39	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	17	17	62	76	111	105	75	150	12
normalized size	1	1.	3.65	4.47	6.53	6.18	4.41	8.82	0.71
time (sec)	N/A	0.02	0.047	0.007	0.704	0.263	1.003	0.271	15.618

Problem 40	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	17	17	62	76	111	105	75	150	12
normalized size	1	1.	3.65	4.47	6.53	6.18	4.41	8.82	0.71
time (sec)	N/A	0.017	0.022	0.007	0.708	0.262	1.014	0.271	22.191

Problem 41	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	17	17	90	157	216	162	155	292	12
normalized size	1	1.	5.29	9.24	12.71	9.53	9.12	17.18	0.71
time (sec)	N/A	0.021	0.069	0.008	0.708	0.261	1.465	0.274	18.766

Problem 42	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	17	17	90	157	216	162	155	292	12
normalized size	1	1.	5.29	9.24	12.71	9.53	9.12	17.18	0.71
time (sec)	N/A	0.019	0.04	0.007	0.712	0.263	1.432	0.281	27.376

Problem 43	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	240	237	223	399	0	1	1000	377	0
normalized size	1	0.99	0.93	1.66	0.	0.	4.17	1.57	0.
time (sec)	N/A	0.859	0.532	0.012	0.	0.285	10.238	0.271	0.

Problem 44	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	168	166	155	256	0	1	638	238	0
normalized size	1	0.99	0.92	1.52	0.	0.01	3.8	1.42	0.
time (sec)	N/A	0.528	0.309	0.007	0.	0.28	6.86	0.271	0.

Problem 45	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	93	93	86	133	0	1	335	123	0
normalized size	1	1.	0.92	1.43	0.	0.01	3.6	1.32	0.
time (sec)	N/A	0.236	0.178	0.007	0.	0.277	3.596	0.269	0.

Problem 46	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	55	55	56	59	0	1	156	65	48
normalized size	1	1.	1.02	1.07	0.	0.02	2.84	1.18	0.87
time (sec)	N/A	0.109	0.072	0.004	0.	0.278	1.194	0.271	13.973

Problem 47	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	133	133	120	247	0	1	0	169	119
normalized size	1	1.	0.9	1.86	0.	0.01	0.	1.27	0.89
time (sec)	N/A	0.33	0.198	0.01	0.	7.504	0.	0.271	45.655

Problem 48	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	214	214	188	462	0	1	0	365	211
normalized size	1	1.	0.88	2.16	0.	0.	0.	1.71	0.99
time (sec)	N/A	0.756	0.678	0.014	0.	36.4	0.	0.275	126.057

Problem 49	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	305	305	277	754	0	1	0	660	0
normalized size	1	1.	0.91	2.47	0.	0.	0.	2.16	0.
time (sec)	N/A	1.429	0.694	0.018	0.	130.644	0.	0.276	0.

Problem 50	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	216	216	233	492	0	1	949	390	0
normalized size	1	1.	1.08	2.28	0.	0.	4.39	1.81	0.
time (sec)	N/A	1.011	0.422	0.018	0.	0.278	62.948	0.272	0.

Problem 51	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	146	146	175	327	0	1	593	248	0
normalized size	1	1.	1.2	2.24	0.	0.01	4.06	1.7	0.
time (sec)	N/A	0.504	0.27	0.014	0.	0.268	33.901	0.272	0.

Problem 52	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	97	97	102	137	0	1	318	151	136
normalized size	1	1.	1.05	1.41	0.	0.01	3.28	1.56	1.4
time (sec)	N/A	0.174	0.197	0.013	0.	0.264	12.697	0.271	40.2

Problem 53	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	69	69	68	76	0	1	116	81	54
normalized size	1	1.	0.99	1.1	0.	0.01	1.68	1.17	0.78
time (sec)	N/A	0.086	0.097	0.009	0.	0.266	1.488	0.269	10.223

Problem 54	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	226	226	195	748	0	1	0	473	235
normalized size	1	1.	0.86	3.31	0.	0.	0.	2.09	1.04
time (sec)	N/A	0.933	0.479	0.031	0.	37.541	0.	0.276	69.392

Problem 55	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	374	371	320	1046	0	0	0	821	0
normalized size	1	0.99	0.86	2.8	0.	0.	0.	2.2	0.
time (sec)	N/A	2.04	0.944	0.029	0.	0.	0.	0.282	0.

Problem 56	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	524	524	466	1602	0	0	0	1	0
normalized size	1	1.	0.89	3.06	0.	0.	0.	0.	0.
time (sec)	N/A	4.191	1.429	0.035	0.	0.	0.	0.278	0.

Problem 57	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	209	209	281	409	0	1	0	470	0
normalized size	1	1.	1.34	1.96	0.	0.	0.	2.25	0.
time (sec)	N/A	0.677	0.549	0.018	0.	0.29	0.	0.277	0.

Problem 58	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	156	175	211	283	0	1	0	343	369
normalized size	1	1.12	1.35	1.81	0.	0.01	0.	2.2	2.37
time (sec)	N/A	0.545	0.273	0.012	0.	0.282	0.	0.274	129.717

Problem 59	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	130	130	137	157	0	1	240	205	185
normalized size	1	1.	1.05	1.21	0.	0.01	1.85	1.58	1.42
time (sec)	N/A	0.234	0.203	0.011	0.	0.281	58.698	0.272	44.916

Problem 60	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	98	98	90	96	0	1	156	113	82
normalized size	1	1.	0.92	0.98	0.	0.01	1.59	1.15	0.84
time (sec)	N/A	0.123	0.131	0.011	0.	0.28	2.568	0.27	13.485

Problem 61	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	353	353	321	1610	0	0	0	965	386
normalized size	1	1.	0.91	4.56	0.	0.	0.	2.73	1.09
time (sec)	N/A	1.581	0.948	0.03	0.	0.	0.	0.279	107.759

Problem 62	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	571	566	498	2179	0	0	0	1	0
normalized size	1	0.99	0.87	3.82	0.	0.	0.	0.	0.
time (sec)	N/A	4.879	1.914	0.039	0.	0.	0.	0.288	0.

Problem 63	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	753	753	672	2765	0	0	0	1	0
normalized size	1	1.	0.89	3.67	0.	0.	0.	0.	0.
time (sec)	N/A	9.967	2.718	0.046	0.	0.	0.	0.284	0.

Problem 64	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	234	234	437	647	0	1	0	859	0
normalized size	1	1.	1.87	2.76	0.	0.	0.	3.67	0.
time (sec)	N/A	0.648	0.693	0.016	0.	0.311	0.	0.275	0.

Problem 65	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	254	288	350	464	0	1	0	641	0
normalized size	1	1.13	1.38	1.83	0.	0.	0.	2.52	0.
time (sec)	N/A	1.278	0.631	0.014	0.	0.301	0.	0.274	0.

Problem 66	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	225	225	266	333	0	1	0	443	508
normalized size	1	1.	1.18	1.48	0.	0.	0.	1.97	2.26
time (sec)	N/A	0.736	0.319	0.013	0.	0.303	0.	0.273	151.282

Problem 67	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	165	165	171	182	0	1	0	262	246
normalized size	1	1.	1.04	1.1	0.	0.01	0.	1.59	1.49
time (sec)	N/A	0.293	0.283	0.012	0.	0.295	0.	0.271	52.654

Problem 68	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	126	126	112	113	0	1	196	147	107
normalized size	1	1.	0.89	0.9	0.	0.01	1.56	1.17	0.85
time (sec)	N/A	0.165	0.165	0.011	0.	0.294	4.178	0.271	16.407

Problem 69	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	43	43	29	30	39	62	29	39	0
normalized size	1	1.	0.67	0.7	0.91	1.44	0.67	0.91	0.
time (sec)	N/A	0.097	0.033	0.009	0.797	0.284	0.145	0.27	0.

Problem 70	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	27	24	31	54	20	31	20
normalized size	1	1.	0.9	0.8	1.03	1.8	0.67	1.03	0.67
time (sec)	N/A	0.076	0.018	0.007	0.779	0.281	0.129	0.272	9.835

Problem 71	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	23	24	31	45	20	31	20
normalized size	1	1.	0.79	0.83	1.07	1.55	0.69	1.07	0.69
time (sec)	N/A	0.045	0.015	0.007	0.78	0.281	0.135	0.269	7.504

Problem 72	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	14	14	14	13	16	27	10	16	10
normalized size	1	1.	1.	0.93	1.14	1.93	0.71	1.14	0.71
time (sec)	N/A	0.019	0.012	0.007	0.783	0.279	0.117	0.269	4.192

Problem 73	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	31	31	28	26	34	55	24	35	24
normalized size	1	1.	0.9	0.84	1.1	1.77	0.77	1.13	0.77
time (sec)	N/A	0.082	0.019	0.01	0.787	0.295	0.173	0.271	6.795

Problem 74	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	33	33	33	30	46	66	31	47	26
normalized size	1	1.	1.	0.91	1.39	2.	0.94	1.42	0.79
time (sec)	N/A	0.09	0.027	0.013	0.8	0.29	0.183	0.273	8.368

Problem 75	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	45	45	39	38	55	82	41	58	36
normalized size	1	1.	0.87	0.84	1.22	1.82	0.91	1.29	0.8
time (sec)	N/A	0.101	0.029	0.013	0.797	0.289	0.213	0.272	8.422

Problem 76	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	22	12	13	16	24	8	16	19
normalized size	1	1.83	1.	1.08	1.33	2.	0.67	1.33	1.58
time (sec)	N/A	0.024	0.023	0.007	0.782	0.285	0.125	0.271	4.922

Problem 77	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	21	28	34	19	28	19
normalized size	1	1.	1.	0.78	1.04	1.26	0.7	1.04	0.7
time (sec)	N/A	0.025	0.02	0.008	0.789	0.28	0.137	0.27	5.167

Problem 78	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	390	387	362	661	0	1	1088	641	432
normalized size	1	0.99	0.93	1.69	0.	0.	2.79	1.64	1.11
time (sec)	N/A	1.827	0.604	0.02	0.	0.364	36.32	0.28	133.781

Problem 79	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	280	279	252	446	0	1	738	433	292
normalized size	1	1.	0.9	1.59	0.	0.	2.64	1.55	1.04
time (sec)	N/A	1.042	0.374	0.013	0.	0.356	27.166	0.278	69.268

Problem 80	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	175	175	146	230	0	1	384	243	163
normalized size	1	1.	0.83	1.31	0.	0.01	2.19	1.39	0.93
time (sec)	N/A	0.529	0.213	0.009	0.	0.33	14.018	0.277	30.01

Problem 81	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	106	106	89	111	0	1	170	117	80
normalized size	1	1.	0.84	1.05	0.	0.01	1.6	1.1	0.75
time (sec)	N/A	0.14	0.111	0.007	0.	0.315	8.404	0.276	11.152

Problem 82	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	206	206	245	1265	0	0	0	375	187
normalized size	1	1.	1.19	6.14	0.	0.	0.	1.82	0.91
time (sec)	N/A	0.842	0.301	0.032	0.	0.	0.	0.284	77.084

Problem 83	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	308	303	264	2818	0	0	0	0	299
normalized size	1	0.98	0.86	9.15	0.	0.	0.	0.	0.97
time (sec)	N/A	1.125	0.406	0.024	0.	0.	0.	0.	120.686

Problem 84	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	296	295	318	4432	0	0	0	4	269
normalized size	1	1.	1.07	14.97	0.	0.	0.	0.01	0.91
time (sec)	N/A	1.137	1.135	0.026	0.	0.	0.	0.671	78.707

Problem 85	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	314	314	382	5565	0	0	0	4	323
normalized size	1	1.	1.22	17.72	0.	0.	0.	0.01	1.03
time (sec)	N/A	1.037	2.271	0.028	0.	0.	0.	0.671	121.174

Problem 86	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	313	312	439	7237	0	1	0	1	314
normalized size	1	1.	1.4	23.12	0.	0.	0.	0.	1.
time (sec)	N/A	0.926	3.14	0.034	0.	6.854	0.	2.123	150.393

Problem 87	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	433	432	583	8546	0	1	0	4	0
normalized size	1	1.	1.35	19.74	0.	0.	0.	0.01	0.
time (sec)	N/A	1.796	3.324	0.043	0.	13.607	0.	0.699	0.

Problem 88	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	462	462	481	794	0	1	1916	880	529
normalized size	1	1.	1.04	1.72	0.	0.	4.15	1.9	1.15
time (sec)	N/A	2.423	1.315	0.024	0.	0.358	96.074	0.282	147.255

Problem 89	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	346	345	340	552	0	1	1304	610	376
normalized size	1	1.	0.98	1.6	0.	0.	3.77	1.76	1.09
time (sec)	N/A	1.206	0.65	0.014	0.	0.345	71.583	0.281	76.745

Problem 90	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	213	212	198	287	0	1	768	356	199
normalized size	1	1.	0.93	1.35	0.	0.	3.61	1.67	0.93
time (sec)	N/A	0.579	0.356	0.009	0.	0.311	37.129	0.281	33.669

Problem 91	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	137	137	118	146	0	1	348	174	107
normalized size	1	1.	0.86	1.07	0.	0.01	2.54	1.27	0.78
time (sec)	N/A	0.17	0.152	0.008	0.	0.292	21.926	0.277	13.295

Problem 92	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	326	326	396	2420	0	0	0	744	306
normalized size	1	1.	1.21	7.42	0.	0.	0.	2.28	0.94
time (sec)	N/A	1.676	0.727	0.02	0.	0.	0.	0.29	137.565

Problem 93	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	F(-2)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	432	428	392	5121	0	0	0	0	0
normalized size	1	0.99	0.91	11.85	0.	0.	0.	0.	0.
time (sec)	N/A	2.077	1.218	0.029	0.	0.	0.	0.	0.

Problem 94	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	488	480	435	7817	0	0	0	4	0
normalized size	1	0.98	0.89	16.02	0.	0.	0.	0.01	0.
time (sec)	N/A	2.152	1.194	0.03	0.	0.	0.	0.668	0.

Problem 95	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	475	469	517	9835	0	0	0	4	0
normalized size	1	0.99	1.09	20.71	0.	0.	0.	0.01	0.
time (sec)	N/A	1.961	3.309	0.035	0.	0.	0.	0.66	0.

Problem 96	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	511	511	767	12481	0	0	0	0	564
normalized size	1	1.	1.5	24.42	0.	0.	0.	0.	1.1
time (sec)	N/A	2.461	6.678	0.043	0.	0.	0.	0.	170.365

Problem 97	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	507	507	639	14169	0	0	0	4	0
normalized size	1	1.	1.26	27.95	0.	0.	0.	0.01	0.
time (sec)	N/A	1.978	5.414	0.055	0.	0.	0.	0.691	0.

Problem 98	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	404	403	696	17026	0	1	0	4	0
normalized size	1	1.	1.72	42.14	0.	0.	0.	0.01	0.
time (sec)	N/A	1.348	5.119	0.064	0.	19.604	0.	0.702	0.

Problem 99	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	532	531	863	19093	0	1	0	4	0
normalized size	1	1.	1.62	35.89	0.	0.	0.	0.01	0.
time (sec)	N/A	2.202	4.98	0.085	0.	34.297	0.	0.742	0.

Problem 100	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	168	168	143	181	0	1	510	227	139
normalized size	1	1.	0.85	1.08	0.	0.01	3.04	1.35	0.83
time (sec)	N/A	0.217	0.222	0.011	0.	0.3	44.449	0.281	15.699

Problem 101	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	325	323	252	528	0	1	796	424	354
normalized size	1	0.99	0.78	1.62	0.	0.	2.45	1.3	1.09
time (sec)	N/A	1.5	0.402	0.016	0.	0.31	28.319	0.284	111.872

Problem 102	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	223	222	168	339	0	1	518	278	231
normalized size	1	1.	0.75	1.52	0.	0.	2.32	1.25	1.04
time (sec)	N/A	0.858	0.27	0.012	0.	0.299	18.943	0.283	57.974

Problem 103	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	136	135	99	172	0	1	282	149	124
normalized size	1	0.99	0.73	1.26	0.	0.01	2.07	1.1	0.91
time (sec)	N/A	0.403	0.169	0.008	0.	0.286	8.768	0.281	27.195

Problem 104	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	74	74	68	76	0	1	150	78	53
normalized size	1	1.	0.92	1.03	0.	0.01	2.03	1.05	0.72
time (sec)	N/A	0.102	0.064	0.007	0.	0.281	4.281	0.279	9.361

Problem 105	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	130	130	166	453	0	0	0	186	114
normalized size	1	1.	1.28	3.48	0.	0.	0.	1.43	0.88
time (sec)	N/A	0.389	0.328	0.017	0.	0.	0.	0.285	40.668

Problem 106	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	168	168	218	923	0	0	0	0	153
normalized size	1	1.	1.3	5.49	0.	0.	0.	0.	0.91
time (sec)	N/A	0.537	0.515	0.02	0.	0.	0.	0.	51.798

Problem 107	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	225	224	254	1574	0	1	0	4	218
normalized size	1	1.	1.13	7.	0.	0.	0.	0.02	0.97
time (sec)	N/A	0.672	0.801	0.023	0.	2.776	0.	0.661	96.165

Problem 108	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	229	228	246	516	0	1	0	458	235
normalized size	1	1.	1.07	2.25	0.	0.	0.	2.	1.03
time (sec)	N/A	0.782	0.844	0.017	0.	0.319	0.	0.283	58.659

Problem 109	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	149	149	166	327	0	1	0	296	136
normalized size	1	1.	1.11	2.19	0.	0.01	0.	1.99	0.91
time (sec)	N/A	0.414	0.313	0.013	0.	0.308	0.	0.283	30.041

Problem 110	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	100	100	93	163	0	1	209	157	197
normalized size	1	1.	0.93	1.63	0.	0.01	2.09	1.57	1.97
time (sec)	N/A	0.185	0.202	0.008	0.	0.299	13.222	0.282	44.855

Problem 111	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	61	61	62	69	0	1	87	85	49
normalized size	1	1.	1.02	1.13	0.	0.02	1.43	1.39	0.8
time (sec)	N/A	0.067	0.089	0.007	0.	0.295	6.953	0.281	9.262

Problem 112	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	138	138	175	862	0	1	0	397	122
normalized size	1	1.	1.27	6.25	0.	0.01	0.	2.88	0.88
time (sec)	N/A	0.301	0.344	0.018	0.	0.748	0.	0.281	34.788

Problem 113	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	239	239	293	1663	0	1	0	0	255
normalized size	1	1.	1.23	6.96	0.	0.	0.	0.	1.07
time (sec)	N/A	1.008	0.826	0.024	0.	1.312	0.	0.	101.264

Problem 114	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	F(-2)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	374	372	404	2584	0	1	0	0	0
normalized size	1	0.99	1.08	6.91	0.	0.	0.	0.	0.
time (sec)	N/A	2.509	2.267	0.028	0.	6.209	0.	0.	0.

Problem 115	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	67	67	50	47	112	92	194	65	53
normalized size	1	1.	0.75	0.7	1.67	1.37	2.9	0.97	0.79
time (sec)	N/A	0.081	0.068	0.006	0.702	0.274	27.727	0.278	8.715

Problem 116	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	97	97	71	72	159	139	638	108	82
normalized size	1	1.	0.73	0.74	1.64	1.43	6.58	1.11	0.85
time (sec)	N/A	0.111	0.076	0.006	0.729	0.285	89.174	0.279	11.177

Problem 117	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	127	127	92	96	207	185	0	151	110
normalized size	1	1.	0.72	0.76	1.63	1.46	0.	1.19	0.87
time (sec)	N/A	0.146	0.094	0.007	0.705	0.302	0.	0.28	13.65

Problem 118	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	106	106	54	79	105	92	94	73	95
normalized size	1	1.	0.51	0.75	0.99	0.87	0.89	0.69	0.9
time (sec)	N/A	0.254	0.073	0.017	0.798	0.273	3.155	0.278	20.543

Problem 119	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	82	82	48	65	86	73	75	65	70
normalized size	1	1.	0.59	0.79	1.05	0.89	0.91	0.79	0.85
time (sec)	N/A	0.187	0.054	0.009	0.788	0.271	1.705	0.275	16.115

Problem 120	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	62	62	44	51	68	78	63	59	54
normalized size	1	1.	0.71	0.82	1.1	1.26	1.02	0.95	0.87
time (sec)	N/A	0.102	0.048	0.009	0.788	0.272	0.785	0.276	11.242

Problem 121	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	67	67	74	55	78	146	0	134	60
normalized size	1	1.	1.1	0.82	1.16	2.18	0.	2.	0.9
time (sec)	N/A	0.154	0.076	0.011	0.788	0.277	0.	0.293	14.709

Problem 122	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	71	71	80	65	88	169	0	0	63
normalized size	1	1.	1.13	0.92	1.24	2.38	0.	0.	0.89
time (sec)	N/A	0.152	0.182	0.016	0.8	0.278	0.	0.	14.769

Problem 123	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	77	77	69	74	103	128	0	243	66
normalized size	1	1.	0.9	0.96	1.34	1.66	0.	3.16	0.86
time (sec)	N/A	0.151	0.128	0.015	0.795	0.275	0.	0.296	14.625

Problem 124	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	87	87	54	79	105	112	0	73	78
normalized size	1	1.	0.62	0.91	1.21	1.29	0.	0.84	0.9
time (sec)	N/A	0.16	0.1	0.017	0.783	0.271	0.	0.278	16.956

Problem 125	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	71	71	62	65	86	105	0	66	58
normalized size	1	1.	0.87	0.92	1.21	1.48	0.	0.93	0.82
time (sec)	N/A	0.131	0.074	0.009	0.788	0.27	0.	0.277	12.693

Problem 126	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	55	55	44	51	68	99	114	59	58
normalized size	1	1.	0.8	0.93	1.24	1.8	2.07	1.07	1.05
time (sec)	N/A	0.081	0.075	0.007	0.775	0.269	26.507	0.277	11.631

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	53	53	71	88	78	119	0	111	49
normalized size	1	1.	1.34	1.66	1.47	2.25	0.	2.09	0.92
time (sec)	N/A	0.105	0.079	0.012	0.764	0.268	0.	0.293	12.269

Problem 128	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	75	75	74	98	113	147	0	0	66
normalized size	1	1.	0.99	1.31	1.51	1.96	0.	0.	0.88
time (sec)	N/A	0.16	0.158	0.016	0.767	0.271	0.	0.	14.907

Problem 129	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	97	97	79	107	167	167	0	265	90
normalized size	1	1.	0.81	1.1	1.72	1.72	0.	2.73	0.93
time (sec)	N/A	0.24	0.136	0.015	0.769	0.273	0.	0.296	18.379

Problem 130	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	73	73	53	91	142	126	0	72	76
normalized size	1	1.	0.73	1.25	1.95	1.73	0.	0.99	1.04
time (sec)	N/A	0.134	0.117	0.018	0.777	0.268	0.	0.278	15.701

Problem 131	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	60	60	50	77	123	119	0	65	58
normalized size	1	1.	0.83	1.28	2.05	1.98	0.	1.08	0.97
time (sec)	N/A	0.107	0.115	0.01	0.766	0.27	0.	0.276	12.648

Problem 132	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	41	41	30	27	68	54	0	34	41
normalized size	1	1.	0.73	0.66	1.66	1.32	0.	0.83	1.
time (sec)	N/A	0.072	0.028	0.006	0.692	0.269	0.	0.277	9.99

Problem 133	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F(-1)	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	73	73	72	133	109	146	0	123	65
normalized size	1	1.	0.99	1.82	1.49	2.	0.	1.68	0.89
time (sec)	N/A	0.159	0.234	0.012	0.774	0.273	0.	0.294	15.332

Problem 134	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	95	95	84	143	144	188	0	0	83
normalized size	1	1.	0.88	1.51	1.52	1.98	0.	0.	0.87
time (sec)	N/A	0.241	0.173	0.017	0.775	0.272	0.	0.	19.334

Problem 135	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	117	117	89	140	198	208	0	247	112
normalized size	1	1.	0.76	1.2	1.69	1.78	0.	2.11	0.96
time (sec)	N/A	0.325	0.199	0.017	0.783	0.276	0.	0.297	22.761

Problem 136	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	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	420	417	0	0	0	0	0	0	391
normalized size	1	0.99	0.	0.	0.	0.	0.	0.	0.93
time (sec)	N/A	1.236	1.879	0.121	0.	0.	0.	0.	122.673

Problem 137	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F	F	A
verified	N/A	NO	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	403	401	0	0	0	0	0	0	381
normalized size	1	1.	0.	0.	0.	0.	0.	0.	0.95
time (sec)	N/A	1.478	1.198	0.044	0.	0.	0.	0.	109.008

Problem 138	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	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	474	474	0	0	0	0	0	0	416
normalized size	1	1.	0.	0.	0.	0.	0.	0.	0.88
time (sec)	N/A	1.137	3.33	0.075	0.	0.	0.	0.	101.582

Problem 139	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	F	F	F	F(-1)	F	F(-1)
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	222	222	527	0	0	0	0	0	0
normalized size	1	1.	2.37	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.894	5.959	0.214	0.	0.	0.	0.	0.

Problem 140	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	254	254	256	343	355	1	320	416	0
normalized size	1	1.	1.01	1.35	1.4	0.	1.26	1.64	0.
time (sec)	N/A	0.661	0.156	0.002	0.686	0.234	0.131	0.272	0.

Problem 141	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	161	161	163	223	223	1	197	252	0
normalized size	1	1.	1.01	1.39	1.39	0.01	1.22	1.57	0.
time (sec)	N/A	0.412	0.101	0.001	0.688	0.237	0.101	0.27	0.

Problem 142	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	96	96	96	90	117	1	102	134	0
normalized size	1	1.	1.	0.94	1.22	0.01	1.06	1.4	0.
time (sec)	N/A	0.228	0.06	0.002	0.685	0.237	0.075	0.27	0.

Problem 143	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	46	39	51	1	42	54	0
normalized size	1	1.	1.	0.85	1.11	0.02	0.91	1.17	0.
time (sec)	N/A	0.058	0.018	0.001	0.694	0.234	0.046	0.27	0.

Problem 144	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	81	81	84	140	0	1	413	105	0
normalized size	1	1.	1.04	1.73	0.	0.01	5.1	1.3	0.
time (sec)	N/A	0.205	0.159	0.005	0.	0.271	2.023	0.274	0.

Problem 145	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	100	100	98	146	0	1	376	146	88
normalized size	1	1.	0.98	1.46	0.	0.01	3.76	1.46	0.88
time (sec)	N/A	0.171	0.148	0.009	0.	0.272	2.327	0.275	13.934

Problem 146	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	161	161	160	373	0	1	774	293	150
normalized size	1	1.	0.99	2.32	0.	0.01	4.81	1.82	0.93
time (sec)	N/A	0.273	0.376	0.014	0.	0.272	4.673	0.276	23.024

Problem 147	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	206	206	204	643	0	1	1224	549	194
normalized size	1	1.	0.99	3.12	0.	0.	5.94	2.67	0.94
time (sec)	N/A	0.39	0.646	0.019	0.	0.278	9.146	0.275	31.283

Problem 148	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	591	591	585	1738	0	1	4962	1041	0
normalized size	1	1.	0.99	2.94	0.	0.	8.4	1.76	0.
time (sec)	N/A	3.662	1.505	0.014	0.	1.33	121.821	0.278	0.

Problem 149	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	348	348	345	1028	0	1	2839	575	0
normalized size	1	1.	0.99	2.95	0.	0.	8.16	1.65	0.
time (sec)	N/A	1.399	0.738	0.009	0.	0.569	56.844	0.277	0.

Problem 150	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	177	177	173	510	0	1	1265	271	0
normalized size	1	1.	0.98	2.88	0.	0.01	7.15	1.53	0.
time (sec)	N/A	0.63	0.354	0.007	0.	0.326	19.763	0.273	0.

Problem 151	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	92	92	95	196	0	1	488	120	0
normalized size	1	1.	1.03	2.13	0.	0.01	5.3	1.3	0.
time (sec)	N/A	0.261	0.113	0.005	0.	0.272	3.418	0.275	0.

Problem 152	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	196	196	193	622	0	1	0	275	0
normalized size	1	1.	0.98	3.17	0.	0.01	0.	1.4	0.
time (sec)	N/A	0.732	0.402	0.01	0.	51.764	0.	0.275	0.

Problem 153	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	316	316	281	1125	0	0	0	606	0
normalized size	1	1.	0.89	3.56	0.	0.	0.	1.92	0.
time (sec)	N/A	1.628	1.178	0.017	0.	0.	0.	0.281	0.

Problem 154	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	509	509	504	1945	0	0	0	1	0
normalized size	1	1.	0.99	3.82	0.	0.	0.	0.	0.
time (sec)	N/A	3.575	1.636	0.024	0.	0.	0.	0.284	0.

Problem 155	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	288	288	398	2623	0	1	0	729	0
normalized size	1	1.	1.38	9.11	0.	0.	0.	2.53	0.
time (sec)	N/A	1.483	2.323	0.018	0.	0.576	0.	0.279	0.

Problem 156	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	A	A	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	178	178	225	1073	0	1	1535	385	347
normalized size	1	1.	1.26	6.03	0.	0.01	8.62	2.16	1.95
time (sec)	N/A	0.579	0.907	0.027	0.	0.347	103.559	0.277	115.873

Problem 157	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	118	118	114	194	0	1	459	169	109
normalized size	1	1.	0.97	1.64	0.	0.01	3.89	1.43	0.92
time (sec)	N/A	0.209	0.186	0.009	0.	0.291	4.257	0.274	19.954

Problem 158	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	407	407	405	4373	0	0	0	1	0
normalized size	1	1.	1.	10.74	0.	0.	0.	0.	0.
time (sec)	N/A	2.52	1.97	0.028	0.	0.	0.	0.281	0.

Problem 159	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	673	673	650	6365	0	0	0	1	0
normalized size	1	1.	0.97	9.46	0.	0.	0.	0.	0.
time (sec)	N/A	8.602	4.701	0.04	0.	0.	0.	0.319	0.

Problem 160	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	62	62	60	53	69	112	60	69	0
normalized size	1	1.	0.97	0.85	1.11	1.81	0.97	1.11	0.
time (sec)	N/A	0.131	0.058	0.012	0.763	0.282	0.173	0.274	0.

Problem 161	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	55	55	55	46	62	107	54	62	51
normalized size	1	1.	1.	0.84	1.13	1.95	0.98	1.13	0.93
time (sec)	N/A	0.115	0.044	0.008	0.766	0.281	0.17	0.274	16.796

Problem 162	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	52	52	52	45	58	90	51	58	48
normalized size	1	1.	1.	0.87	1.12	1.73	0.98	1.12	0.92
time (sec)	N/A	0.078	0.032	0.007	0.757	0.278	0.164	0.273	16.218

Problem 163	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	41	41	39	34	43	59	41	43	37
normalized size	1	1.	0.95	0.83	1.05	1.44	1.	1.05	0.9
time (sec)	N/A	0.047	0.034	0.007	0.764	0.275	0.148	0.272	7.273

Problem 164	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	48	63	113	54	65	51
normalized size	1	1.	1.	0.86	1.12	2.02	0.96	1.16	0.91
time (sec)	N/A	0.122	0.046	0.011	0.765	0.285	0.21	0.273	14.867

Problem 165	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	61	61	61	55	73	128	65	74	58
normalized size	1	1.	1.	0.9	1.2	2.1	1.07	1.21	0.95
time (sec)	N/A	0.143	0.041	0.014	0.761	0.286	0.227	0.274	17.018

Problem 166	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	68	68	66	60	85	147	71	85	63
normalized size	1	1.	0.97	0.88	1.25	2.16	1.04	1.25	0.93
time (sec)	N/A	0.155	0.058	0.013	0.762	0.289	0.255	0.273	16.547

Problem 167	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	11	7
normalized size	1	1.	1.	1.1	1.4	1.4	0.7	1.1	0.7
time (sec)	N/A	0.009	0.009	0.006	0.683	0.274	0.096	0.271	4.604

Problem 168	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	31	31	31	28	36	50	36	36	32
normalized size	1	1.	1.	0.9	1.16	1.61	1.16	1.16	1.03
time (sec)	N/A	0.055	0.014	0.006	0.762	0.277	0.102	0.272	7.537

Problem 169	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	23	22	28	28	22	28	22
normalized size	1	1.	1.	0.96	1.22	1.22	0.96	1.22	0.96
time (sec)	N/A	0.052	0.008	0.006	0.759	0.278	0.104	0.272	9.206

Problem 170	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	19	18	23	34	14	24	14
normalized size	1	1.	0.9	0.86	1.1	1.62	0.67	1.14	0.67
time (sec)	N/A	0.031	0.015	0.009	0.697	0.279	0.077	0.273	6.753

Problem 171	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	15	19	19	14	22	14
normalized size	1	1.	1.	0.83	1.06	1.06	0.78	1.22	0.78
time (sec)	N/A	0.035	0.008	0.009	0.696	0.279	0.102	0.273	7.864

Problem 172	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	14	14	14	13	16	16	12	19	12
normalized size	1	1.	1.	0.93	1.14	1.14	0.86	1.36	0.86
time (sec)	N/A	0.032	0.008	0.008	0.682	0.278	0.102	0.271	10.133

Problem 173	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	31	22	28	28	22	28	24
normalized size	1	1.	1.15	0.81	1.04	1.04	0.81	1.04	0.89
time (sec)	N/A	0.051	0.009	0.005	0.759	0.279	0.11	0.272	14.667

Problem 174	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	48	48	48	30	49	86	46	61	51
normalized size	1	1.	1.	0.62	1.02	1.79	0.96	1.27	1.06
time (sec)	N/A	0.094	0.068	0.005	0.763	0.28	0.119	0.273	10.669

Problem 175	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	21	17	26	26	15	26	15
normalized size	1	1.	1.	0.81	1.24	1.24	0.71	1.24	0.71
time (sec)	N/A	0.025	0.013	0.006	0.673	0.272	0.133	0.272	8.129

Problem 176	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	39	39	39	34	41	58	37	41	36
normalized size	1	1.	1.	0.87	1.05	1.49	0.95	1.05	0.92
time (sec)	N/A	0.05	0.044	0.009	0.765	0.277	0.147	0.272	7.184

Problem 177	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	11	11	11	12	45	45	31	15	10
normalized size	1	1.	1.	1.09	4.09	4.09	2.82	1.36	0.91
time (sec)	N/A	0.008	0.011	0.008	0.696	0.27	0.174	0.272	6.567

Problem 178	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	267	267	357	997	0	1	0	651	257
normalized size	1	1.	1.34	3.73	0.	0.	0.	2.44	0.96
time (sec)	N/A	0.483	0.749	0.015	0.	0.42	0.	0.29	30.892

Problem 179	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	212	212	227	613	0	1	0	401	196
normalized size	1	1.	1.07	2.89	0.	0.	0.	1.89	0.92
time (sec)	N/A	0.351	0.421	0.011	0.	0.338	0.	0.286	21.887

Problem 180	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	157	157	142	327	0	1	0	216	139
normalized size	1	1.	0.9	2.08	0.	0.01	0.	1.38	0.89
time (sec)	N/A	0.257	0.181	0.009	0.	0.313	0.	0.287	14.68

Problem 181	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	104	104	84	136	0	1	0	113	83
normalized size	1	1.	0.81	1.31	0.	0.01	0.	1.09	0.8
time (sec)	N/A	0.164	0.197	0.009	0.	0.359	0.	0.289	10.682

Problem 182	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	98	98	102	169	0	1	0	149	90
normalized size	1	1.	1.04	1.72	0.	0.01	0.	1.52	0.92
time (sec)	N/A	0.154	0.268	0.007	0.	0.378	0.	0.292	10.964

Problem 183	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	114	114	107	137	0	327	0	293	109
normalized size	1	1.	0.94	1.2	0.	2.87	0.	2.57	0.96
time (sec)	N/A	0.144	0.157	0.008	0.	0.425	0.	0.285	12.936

Problem 184	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	167	167	148	316	0	760	0	659	168
normalized size	1	1.	0.89	1.89	0.	4.55	0.	3.95	1.01
time (sec)	N/A	0.2	0.572	0.012	0.	0.826	0.	0.288	23.78

Problem 185	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	220	220	199	555	0	1320	0	1152	224
normalized size	1	1.	0.9	2.52	0.	6.	0.	5.24	1.02
time (sec)	N/A	0.264	0.824	0.015	0.	2.351	0.	0.291	33.447

Problem 186	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	930	927	1483	3543	0	1	0	1	0
normalized size	1	1.	1.59	3.81	0.	0.	0.	0.	0.
time (sec)	N/A	7.504	6.287	0.032	0.	1.648	0.	0.29	0.

Problem 187	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	584	581	654	2179	0	1	0	1	0
normalized size	1	0.99	1.12	3.73	0.	0.	0.	0.	0.
time (sec)	N/A	3.198	2.894	0.021	0.	0.928	0.	0.287	0.

Problem 188	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	322	322	342	1117	0	1	0	668	398
normalized size	1	1.	1.06	3.47	0.	0.	0.	2.07	1.24
time (sec)	N/A	1.18	0.993	0.014	0.	0.541	0.	0.287	123.406

Problem 189	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	175	175	171	453	0	1	0	286	160
normalized size	1	1.	0.98	2.59	0.	0.01	0.	1.63	0.91
time (sec)	N/A	0.347	0.279	0.	0.	0.304	0.	0.286	19.941

Problem 190	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	F(-2)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	321	322	364	2549	0	0	0	0	0
normalized size	1	1.	1.13	7.94	0.	0.	0.	0.	0.
time (sec)	N/A	1.65	0.782	0.038	0.	0.	0.	0.	0.

Problem 191	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	F(-1)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	459	453	383	6218	0	0	0	0	0
normalized size	1	0.99	0.83	13.55	0.	0.	0.	0.	0.
time (sec)	N/A	2.348	1.104	0.026	0.	0.	0.	0.	0.

Problem 192	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	F(-2)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	448	446	500	12139	0	0	0	0	0
normalized size	1	1.	1.12	27.1	0.	0.	0.	0.	0.
time (sec)	N/A	2.141	5.271	0.032	0.	0.	0.	0.	0.

Problem 193	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	603	601	1044	19321	0	0	0	4	0
normalized size	1	1.	1.73	32.04	0.	0.	0.	0.01	0.
time (sec)	N/A	4.285	6.622	0.039	0.	0.	0.	13.983	0.

Problem 194	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	497	499	983	29161	0	1	0	1	0
normalized size	1	1.	1.98	58.67	0.	0.	0.	0.	0.
time (sec)	N/A	2.115	6.788	0.051	0.	75.454	0.	10.249	0.

Problem 195	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	824	826	1633	40336	0	0	0	4	0
normalized size	1	1.	1.98	48.95	0.	0.	0.	0.	0.
time (sec)	N/A	6.636	7.35	0.068	0.	0.	0.	0.793	0.

Problem 196	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	1169	1166	2527	5881	0	1	0	1	0
normalized size	1	1.	2.16	5.03	0.	0.	0.	0.	0.
time (sec)	N/A	9.919	6.505	0.04	0.	4.787	0.	0.292	0.

Problem 197	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	753	749	1546	3769	0	1	0	1	0
normalized size	1	0.99	2.05	5.01	0.	0.	0.	0.	0.
time (sec)	N/A	4.649	6.356	0.026	0.	2.551	0.	0.283	0.

Problem 198	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	418	418	598	2026	0	1	0	1	0
normalized size	1	1.	1.43	4.85	0.	0.	0.	0.	0.
time (sec)	N/A	1.464	2.584	0.017	0.	0.843	0.	0.279	0.

Problem 199	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	236	236	290	862	0	1	0	563	223
normalized size	1	1.	1.23	3.65	0.	0.	0.	2.39	0.94
time (sec)	N/A	0.475	0.631	0.	0.	0.349	0.	0.28	30.203

Problem 200	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	F(-2)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	660	660	752	6715	0	0	0	0	0
normalized size	1	1.	1.14	10.17	0.	0.	0.	0.	0.
time (sec)	N/A	5.843	3.843	0.027	0.	0.	0.	0.	0.

Problem 201	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	F(-1)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	754	750	722	14734	0	0	0	0	0
normalized size	1	0.99	0.96	19.54	0.	0.	0.	0.	0.
time (sec)	N/A	7.325	4.654	0.034	0.	0.	0.	0.	0.

Problem 202	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	F(-2)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	824	819	904	26596	0	0	0	0	0
normalized size	1	0.99	1.1	32.28	0.	0.	0.	0.	0.
time (sec)	N/A	5.864	6.621	0.043	0.	0.	0.	0.	0.

Problem 203	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	F(-2)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	833	829	1485	40092	0	0	0	0	0
normalized size	1	1.	1.78	48.13	0.	0.	0.	0.	0.
time (sec)	N/A	6.806	6.981	0.057	0.	0.	0.	0.	0.

Problem 204	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	F(-2)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	1097	1096	1835	57957	0	0	0	0	0
normalized size	1	1.	1.67	52.83	0.	0.	0.	0.	0.
time (sec)	N/A	8.62	7.462	0.081	0.	0.	0.	0.	0.

Problem 205	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F(-1)	F(-1)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	1226	1223	2229	76693	0	0	0	0	0
normalized size	1	1.	1.82	62.56	0.	0.	0.	0.	0.
time (sec)	N/A	11.427	8.031	0.104	0.	0.	0.	0.	0.

Problem 206	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	F(-2)	F(-1)	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	657	660	2022	100754	0	0	0	4	0
normalized size	1	1.	3.08	153.35	0.	0.	0.	0.01	0.
time (sec)	N/A	2.885	8.403	0.151	0.	0.	0.	0.868	0.

Problem 207	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	F(-2)	F(-1)	F(-1)	A	F(-1)
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1062	1062	3059	126612	0	0	0	4	0
normalized size	1	1.	2.88	119.22	0.	0.	0.	0.	0.
time (sec)	N/A	8.32	9.541	0.21	0.	0.	0.	0.924	0.

Problem 208	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	143	143	70	115	170	123	0	105	138
normalized size	1	1.	0.49	0.8	1.19	0.86	0.	0.73	0.97
time (sec)	N/A	0.321	0.106	0.02	0.765	0.29	0.	0.273	35.768

Problem 209	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	118	118	65	98	147	116	0	99	112
normalized size	1	1.	0.55	0.83	1.25	0.98	0.	0.84	0.95
time (sec)	N/A	0.24	0.09	0.011	0.757	0.282	0.	0.269	28.351

Problem 210	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	93	93	60	81	124	109	0	92	94
normalized size	1	1.	0.65	0.87	1.33	1.17	0.	0.99	1.01
time (sec)	N/A	0.141	0.07	0.008	0.765	0.281	0.	0.267	19.573

Problem 211	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	101	101	99	95	130	170	0	170	99
normalized size	1	1.	0.98	0.94	1.29	1.68	0.	1.68	0.98
time (sec)	N/A	0.253	0.137	0.012	0.774	0.298	0.	0.289	33.353

Problem 212	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	104	123	139	204	0	513	102
normalized size	1	1.	0.96	1.14	1.29	1.89	0.	4.75	0.94
time (sec)	N/A	0.266	0.251	0.017	0.768	0.29	0.	0.446	33.072

Problem 213	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	104	125	154	224	0	0	109
normalized size	1	1.	0.9	1.09	1.34	1.95	0.	0.	0.95
time (sec)	N/A	0.266	0.158	0.017	0.771	0.281	0.	0.	32.885

Problem 214	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	158	158	80	134	209	136	0	119	160
normalized size	1	1.	0.51	0.85	1.32	0.86	0.	0.75	1.01
time (sec)	N/A	0.336	0.132	0.021	0.77	0.274	0.	0.269	36.88

Problem 215	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	141	141	75	117	186	130	0	112	134
normalized size	1	1.	0.53	0.83	1.32	0.92	0.	0.79	0.95
time (sec)	N/A	0.261	0.111	0.009	0.76	0.273	0.	0.267	29.31

Problem 216	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	81	100	163	123	0	105	114
normalized size	1	1.	0.7	0.86	1.41	1.06	0.	0.91	0.98
time (sec)	N/A	0.16	0.052	0.008	0.773	0.271	0.	0.268	20.262

Problem 217	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	124	124	109	151	169	184	0	184	119
normalized size	1	1.	0.88	1.22	1.36	1.48	0.	1.48	0.96
time (sec)	N/A	0.321	0.181	0.011	0.776	0.282	0.	0.293	40.327

Problem 218	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	131	131	114	179	178	205	0	770	121
normalized size	1	1.	0.87	1.37	1.36	1.56	0.	5.88	0.92
time (sec)	N/A	0.322	0.31	0.016	0.777	0.286	0.	0.515	40.827

Problem 219	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	138	138	114	162	193	238	0	0	128
normalized size	1	1.	0.83	1.17	1.4	1.72	0.	0.	0.93
time (sec)	N/A	0.328	0.198	0.017	0.778	0.284	0.	0.	40.624

Problem 220	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	189	189	90	153	248	150	0	132	178
normalized size	1	1.	0.48	0.81	1.31	0.79	0.	0.7	0.94
time (sec)	N/A	0.365	0.147	0.022	0.769	0.279	0.	0.268	38.374

Problem 221	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	164	164	85	136	225	143	0	126	155
normalized size	1	1.	0.52	0.83	1.37	0.87	0.	0.77	0.95
time (sec)	N/A	0.287	0.137	0.01	0.768	0.275	0.	0.27	30.623

Problem 222	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	139	139	80	119	203	136	0	119	134
normalized size	1	1.	0.58	0.86	1.46	0.98	0.	0.86	0.96
time (sec)	N/A	0.183	0.096	0.008	0.758	0.27	0.	0.269	21.392

Problem 223	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	147	147	119	207	208	197	0	197	138
normalized size	1	1.	0.81	1.41	1.41	1.34	0.	1.34	0.94
time (sec)	N/A	0.384	0.25	0.012	0.785	0.286	0.	0.296	48.475

Problem 224	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	154	154	124	235	217	219	0	1	139
normalized size	1	1.	0.81	1.53	1.41	1.42	0.	0.01	0.9
time (sec)	N/A	0.39	0.436	0.017	0.78	0.287	0.	0.593	48.427

Problem 225	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	161	161	126	199	232	240	0	0	146
normalized size	1	1.	0.78	1.24	1.44	1.49	0.	0.	0.91
time (sec)	N/A	0.394	0.227	0.018	0.778	0.285	0.	0.	49.025

Problem 226	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	693	692	588	1869	0	1	0	1110	0
normalized size	1	1.	0.85	2.7	0.	0.	0.	1.6	0.
time (sec)	N/A	5.556	1.782	0.024	0.	8.832	0.	0.287	0.

Problem 227	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	420	418	341	1069	0	1	0	617	0
normalized size	1	1.	0.81	2.55	0.	0.	0.	1.47	0.
time (sec)	N/A	2.387	0.765	0.018	0.	6.782	0.	0.287	0.

Problem 228	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	223	223	178	505	0	1	0	284	274
normalized size	1	1.	0.8	2.26	0.	0.	0.	1.27	1.23
time (sec)	N/A	0.671	0.345	0.013	0.	5.228	0.	0.281	88.933

Problem 229	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	116	116	95	185	0	1	0	132	97
normalized size	1	1.	0.82	1.59	0.	0.01	0.	1.14	0.84
time (sec)	N/A	0.213	0.145	0.	0.	0.518	0.	0.28	15.33

Problem 230	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	179	179	213	599	0	0	0	0	163
normalized size	1	1.	1.19	3.35	0.	0.	0.	0.	0.91
time (sec)	N/A	0.589	0.381	0.021	0.	0.	0.	0.	84.39

Problem 231	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	F(-1)	F	F(-2)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	241	239	301	1671	0	0	0	0	0
normalized size	1	0.99	1.25	6.93	0.	0.	0.	0.	0.
time (sec)	N/A	0.878	1.121	0.023	0.	0.	0.	0.	0.

Problem 232	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	336	336	415	3615	0	1	0	4	0
normalized size	1	1.	1.24	10.76	0.	0.	0.	0.01	0.
time (sec)	N/A	1.448	2.979	0.027	0.	29.47	0.	0.632	0.

Problem 233	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	504	502	692	2780	0	1	0	1	0
normalized size	1	1.	1.37	5.52	0.	0.	0.	0.	0.
time (sec)	N/A	2.951	5.141	0.024	0.	10.962	0.	0.286	0.

Problem 234	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	289	288	387	1557	0	1	0	783	332
normalized size	1	1.	1.34	5.39	0.	0.	0.	2.71	1.15
time (sec)	N/A	0.882	1.804	0.017	0.	8.983	0.	0.283	119.038

Problem 235	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	186	186	205	735	0	1	0	366	0
normalized size	1	1.	1.1	3.95	0.	0.01	0.	1.97	0.
time (sec)	N/A	0.462	0.731	0.012	0.	5.771	0.	0.284	0.

Problem 236	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	111	111	113	249	0	1	0	165	105
normalized size	1	1.	1.02	2.24	0.	0.01	0.	1.49	0.95
time (sec)	N/A	0.15	0.335	0.006	0.	0.565	0.	0.282	15.206

Problem 237	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	225	225	262	2079	0	1	0	971	233
normalized size	1	1.	1.16	9.24	0.	0.	0.	4.32	1.04
time (sec)	N/A	0.65	0.935	0.022	0.	6.424	0.	0.28	75.79

Problem 238	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	F(-2)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	421	418	474	4930	0	1	0	0	0
normalized size	1	0.99	1.13	11.71	0.	0.	0.	0.	0.
time (sec)	N/A	1.972	5.782	0.029	0.	11.085	0.	0.	0.

Problem 239	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	F(-2)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	713	707	1070	9126	0	1	0	0	0
normalized size	1	0.99	1.5	12.8	0.	0.	0.	0.	0.
time (sec)	N/A	10.546	7.647	0.037	0.	51.839	0.	0.	0.

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	120	120	60	96	131	109	0	92	117
normalized size	1	1.	0.5	0.8	1.09	0.91	0.	0.77	0.98
time (sec)	N/A	0.317	0.117	0.019	0.771	0.275	0.	0.272	35.547

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	95	95	55	79	108	103	0	85	94
normalized size	1	1.	0.58	0.83	1.14	1.08	0.	0.89	0.99
time (sec)	N/A	0.237	0.075	0.011	0.778	0.277	0.	0.271	27.729

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	70	70	50	62	85	96	0	78	73
normalized size	1	1.	0.71	0.89	1.21	1.37	0.	1.11	1.04
time (sec)	N/A	0.133	0.064	0.008	0.766	0.273	0.	0.27	19.037

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	78	78	87	60	90	167	0	157	80
normalized size	1	1.	1.12	0.77	1.15	2.14	0.	2.01	1.03
time (sec)	N/A	0.208	0.072	0.011	0.77	0.28	0.	0.296	26.119

Problem 244	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	83	83	93	67	100	190	0	0	82
normalized size	1	1.	1.12	0.81	1.2	2.29	0.	0.	0.99
time (sec)	N/A	0.202	0.175	0.016	0.777	0.285	0.	0.	25.954

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	89	89	80	74	111	136	0	275	71
normalized size	1	1.	0.9	0.83	1.25	1.53	0.	3.09	0.8
time (sec)	N/A	0.182	0.122	0.015	0.765	0.275	0.	0.295	24.986

Problem 246	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	103	103	60	115	131	139	0	90	100
normalized size	1	1.	0.58	1.12	1.27	1.35	0.	0.87	0.97
time (sec)	N/A	0.204	0.141	0.018	0.77	0.278	0.	0.272	28.578

Problem 247	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	82	82	55	98	108	131	0	84	78
normalized size	1	1.	0.67	1.2	1.32	1.6	0.	1.02	0.95
time (sec)	N/A	0.165	0.157	0.011	0.762	0.278	0.	0.271	21.28

Problem 248	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	63	63	50	81	85	126	0	77	78
normalized size	1	1.	0.79	1.29	1.35	2.	0.	1.22	1.24
time (sec)	N/A	0.106	0.07	0.008	0.767	0.274	0.	0.271	19.851

Problem 249	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	62	62	73	102	86	136	0	123	53
normalized size	1	1.	1.18	1.65	1.39	2.19	0.	1.98	0.85
time (sec)	N/A	0.126	0.103	0.011	0.764	0.273	0.	0.294	20.702

Problem 250	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	87	87	85	109	130	151	0	0	71
normalized size	1	1.	0.98	1.25	1.49	1.74	0.	0.	0.82
time (sec)	N/A	0.191	0.131	0.016	0.78	0.279	0.	0.	25.588

Problem 251	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	112	112	90	111	196	177	0	301	97
normalized size	1	1.	0.8	0.99	1.75	1.58	0.	2.69	0.87
time (sec)	N/A	0.284	0.156	0.017	0.773	0.28	0.	0.296	31.624

Problem 252	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	86	86	60	163	273	165	0	90	100
normalized size	1	1.	0.7	1.9	3.17	1.92	0.	1.05	1.16
time (sec)	N/A	0.173	0.156	0.02	0.78	0.279	0.	0.273	25.83

Problem 253	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	68	68	55	146	250	158	0	84	78
normalized size	1	1.	0.81	2.15	3.68	2.32	0.	1.24	1.15
time (sec)	N/A	0.139	0.141	0.011	0.771	0.277	0.	0.272	20.989

Problem 254	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	33	30	103	69	0	38	46
normalized size	1	1.	0.7	0.64	2.19	1.47	0.	0.81	0.98
time (sec)	N/A	0.085	0.037	0.006	0.688	0.271	0.	0.27	16.235

Problem 255	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	85	85	85	158	126	176	0	136	71
normalized size	1	1.	1.	1.86	1.48	2.07	0.	1.6	0.84
time (sec)	N/A	0.199	0.155	0.012	0.764	0.278	0.	0.294	26.826

Problem 256	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	110	110	95	165	169	196	0	0	92
normalized size	1	1.	0.86	1.5	1.54	1.78	0.	0.	0.84
time (sec)	N/A	0.29	0.19	0.016	0.774	0.279	0.	0.	33.684

Problem 257	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	135	135	100	148	235	216	0	315	121
normalized size	1	1.	0.74	1.1	1.74	1.6	0.	2.33	0.9
time (sec)	N/A	0.388	0.242	0.019	0.777	0.283	0.	0.297	39.395

Problem 258	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	208	208	221	324	0	628	0	0	202
normalized size	1	1.	1.06	1.56	0.	3.02	0.	0.	0.97
time (sec)	N/A	0.905	0.829	0.016	0.	4.296	0.	0.	133.482

Problem 259	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F	F(-1)	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	906	905	15669	19955	0	0	0	0	0
normalized size	1	1.	17.29	22.03	0.	0.	0.	0.	0.
time (sec)	N/A	8.114	18.086	0.151	0.	0.	0.	0.	0.

Problem 260	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F	F(-1)	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	668	668	9965	12761	0	0	0	0	0
normalized size	1	1.	14.92	19.1	0.	0.	0.	0.	0.
time (sec)	N/A	3.096	16.077	0.07	0.	0.	0.	0.	0.

Problem 261	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F	F(-1)	F(-1)
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	749	746	13240	8221	0	0	0	0	0
normalized size	1	1.	17.68	10.98	0.	0.	0.	0.	0.
time (sec)	N/A	3.69	15.017	0.09	0.	0.	0.	0.	0.

Problem 262	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F	F(-1)	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	712	711	8456	21038	0	0	0	0	0
normalized size	1	1.	11.88	29.55	0.	0.	0.	0.	0.
time (sec)	N/A	3.715	15.492	0.117	0.	0.	0.	0.	0.

Problem 263	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F	F(-1)	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	992	989	12997	48427	0	0	0	0	0
normalized size	1	1.	13.1	48.82	0.	0.	0.	0.	0.
time (sec)	N/A	5.385	16.556	0.205	0.	0.	0.	0.	0.

Problem 264	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F(-1)	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1363	1363	23364	88790	0	0	0	0	0
normalized size	1	1.	17.14	65.14	0.	0.	0.	0.	0.
time (sec)	N/A	13.661	20.332	0.317	0.	0.	0.	0.	0.

Problem 265	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F(-1)	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	1904	1904	34410	153623	0	0	0	0	0
normalized size	1	1.	18.07	80.68	0.	0.	0.	0.	0.
time (sec)	N/A	20.546	23.325	0.495	0.	0.	0.	0.	0.

Problem 266	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F	F(-1)	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	724	724	9972	14084	0	0	0	0	0
normalized size	1	1.	13.77	19.45	0.	0.	0.	0.	0.
time (sec)	N/A	4.025	16.066	0.074	0.	0.	0.	0.	0.

Problem 267	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F	F(-1)	F(-1)
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	557	557	5505	8161	0	0	0	0	0
normalized size	1	1.	9.88	14.65	0.	0.	0.	0.	0.
time (sec)	N/A	2.073	14.346	0.06	0.	0.	0.	0.	0.

Problem 268	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F	F(-1)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	471	470	6180	4251	0	0	0	0	0
normalized size	1	1.	13.12	9.03	0.	0.	0.	0.	0.
time (sec)	N/A	1.285	13.68	0.06	0.	0.	0.	0.	0.

Problem 269	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F	F(-1)	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	508	506	925	6053	0	0	0	0	0
normalized size	1	1.	1.82	11.92	0.	0.	0.	0.	0.
time (sec)	N/A	1.684	13.769	0.072	0.	0.	0.	0.	0.

Problem 270	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F	F(-1)	F(-1)
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	684	680	6924	20481	0	0	0	0	0
normalized size	1	0.99	10.12	29.94	0.	0.	0.	0.	0.
time (sec)	N/A	2.872	14.559	0.118	0.	0.	0.	0.	0.

Problem 271	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F	F	F(-1)	F(-1)	F(-1)
verified	N/A	NO	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	944	942	12295	46695	0	0	0	0	0
normalized size	1	1.	13.02	49.47	0.	0.	0.	0.	0.
time (sec)	N/A	5.934	18.145	0.211	0.	0.	0.	0.	0.

Problem 272	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	NO	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	510	508	0	0	0	0	0	0	481
normalized size	1	1.	0.	0.	0.	0.	0.	0.	0.94
time (sec)	N/A	1.904	2.994	0.185	0.	0.	0.	0.	174.741

Problem 273	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	NO	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	496	494	0	0	0	0	0	0	476
normalized size	1	1.	0.	0.	0.	0.	0.	0.	0.96
time (sec)	N/A	2.098	2.155	0.114	0.	0.	0.	0.	170.755

Problem 274	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	F(-1)
verified	N/A	NO	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	590	588	0	0	0	0	0	0	0
normalized size	1	1.	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	1.739	4.797	0.128	0.	0.	0.	0.	0.

Problem 275	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	41	41	33	36	80	101	221	212	32
normalized size	1	1.	0.8	0.88	1.95	2.46	5.39	5.17	0.78
time (sec)	N/A	0.09	0.063	0.005	0.745	0.279	15.466	0.291	20.728

Problem 276	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	46	46	34	39	89	112	0	282	36
normalized size	1	1.	0.74	0.85	1.93	2.43	0.	6.13	0.78
time (sec)	N/A	0.096	0.077	0.006	0.746	0.282	0.	0.284	25.637

Problem 277	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	57	57	43	51	132	166	0	464	46
normalized size	1	1.	0.75	0.89	2.32	2.91	0.	8.14	0.81
time (sec)	N/A	0.191	0.144	0.006	0.764	0.285	0.	0.29	68.529

Problem 278	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	167	8419	2402	1	2281	1	0
normalized size	1	1.	8.35	420.95	120.1	0.05	114.05	0.05	0.
time (sec)	N/A	0.432	1.118	0.005	0.712	0.242	0.618	0.277	0.

Problem 279	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	26	26	26	19	24	24	20	27	0
normalized size	1	1.	1.	0.73	0.92	0.92	0.77	1.04	0.
time (sec)	N/A	0.05	0.008	0.008	0.696	0.258	0.1	0.27	0.

Problem 280	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	346	346	282	783	0	1	0	446	0
normalized size	1	1.	0.82	2.26	0.	0.	0.	1.29	0.
time (sec)	N/A	1.589	0.569	0.019	0.	2.218	0.	0.29	0.

Problem 281	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	245	245	199	532	0	1	0	308	262
normalized size	1	1.	0.81	2.17	0.	0.	0.	1.26	1.07
time (sec)	N/A	0.82	0.336	0.013	0.	1.855	0.	0.293	139.074

Problem 282	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	177	177	139	333	0	1	0	201	163
normalized size	1	1.	0.79	1.88	0.	0.01	0.	1.14	0.92
time (sec)	N/A	0.427	0.233	0.01	0.	1.511	0.	0.291	61.349

Problem 283	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	155	155	139	220	0	1	0	0	144
normalized size	1	1.	0.9	1.42	0.	0.01	0.	0.	0.93
time (sec)	N/A	0.469	0.805	0.011	0.	2.699	0.	0.	84.084

Problem 284	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	139	139	142	173	0	1	0	4	121
normalized size	1	1.	1.02	1.24	0.	0.01	0.	0.03	0.87
time (sec)	N/A	0.419	1.138	0.014	0.	1.911	0.	0.654	81.584

Problem 285	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	159	159	166	241	0	1	0	4	0
normalized size	1	1.	1.04	1.52	0.	0.01	0.	0.03	0.
time (sec)	N/A	0.445	1.283	0.013	0.	1.456	0.	0.649	0.

Problem 286	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	186	186	194	375	0	1	0	930	216
normalized size	1	1.	1.04	2.02	0.	0.01	0.	5.	1.16
time (sec)	N/A	0.593	0.339	0.017	0.	1.188	0.	0.288	140.519

Problem 287	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	270	270	275	591	0	1	0	1	0
normalized size	1	1.	1.02	2.19	0.	0.	0.	0.	0.
time (sec)	N/A	0.985	0.496	0.019	0.	1.48	0.	0.291	0.

Problem 288	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	371	371	380	859	0	1	0	1	0
normalized size	1	1.	1.02	2.32	0.	0.	0.	0.	0.
time (sec)	N/A	1.818	0.773	0.023	0.	1.78	0.	0.298	0.

Problem 289	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	258	258	212	208	278	1	230	311	0
normalized size	1	1.	0.82	0.81	1.08	0.	0.89	1.21	0.
time (sec)	N/A	0.507	0.069	0.002	0.692	0.234	0.116	0.27	0.

Problem 290	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	260	260	136	146	196	1	158	216	0
normalized size	1	1.	0.52	0.56	0.75	0.	0.61	0.83	0.
time (sec)	N/A	0.415	0.067	0.001	0.7	0.237	0.099	0.268	0.

Problem 291	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	93	93	93	84	107	1	87	122	0
normalized size	1	1.	1.	0.9	1.15	0.01	0.94	1.31	0.
time (sec)	N/A	0.206	0.025	0.001	0.695	0.239	0.074	0.267	0.

Problem 292	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	42	42	42	35	46	1	37	46	0
normalized size	1	1.	1.	0.83	1.1	0.02	0.88	1.1	0.
time (sec)	N/A	0.044	0.003	0.001	0.687	0.232	0.046	0.269	0.

Problem 293	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	228	228	179	286	308	311	221	308	0
normalized size	1	1.	0.79	1.25	1.35	1.36	0.97	1.35	0.
time (sec)	N/A	0.398	0.105	0.007	0.693	0.259	1.052	0.27	0.

Problem 294	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	228	228	223	313	316	431	226	416	0
normalized size	1	1.	0.98	1.37	1.39	1.89	0.99	1.82	0.
time (sec)	N/A	0.428	0.276	0.014	0.69	0.259	1.836	0.275	0.

Problem 295	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	231	231	204	336	324	486	238	292	0
normalized size	1	1.	0.88	1.45	1.4	2.1	1.03	1.26	0.
time (sec)	N/A	0.426	0.125	0.014	0.691	0.257	2.98	0.273	0.

Problem 296	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	391	391	277	264	355	1	298	400	0
normalized size	1	1.	0.71	0.68	0.91	0.	0.76	1.02	0.
time (sec)	N/A	0.76	0.074	0.002	0.691	0.235	0.133	0.27	0.

Problem 297	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	391	391	201	186	250	1	206	278	0
normalized size	1	1.	0.51	0.48	0.64	0.	0.53	0.71	0.
time (sec)	N/A	0.647	0.061	0.002	0.689	0.235	0.116	0.269	0.

Problem 298	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	121	121	121	108	142	1	112	157	0
normalized size	1	1.	1.	0.89	1.17	0.01	0.93	1.3	0.
time (sec)	N/A	0.308	0.031	0.002	0.699	0.237	0.096	0.27	0.

Problem 299	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	60	60	60	45	59	1	56	59	0
normalized size	1	1.	1.	0.75	0.98	0.02	0.93	0.98	0.
time (sec)	N/A	0.063	0.003	0.002	0.677	0.232	0.069	0.268	0.

Problem 300	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	352	352	262	465	494	497	347	510	0
normalized size	1	1.	0.74	1.32	1.4	1.41	0.99	1.45	0.
time (sec)	N/A	0.707	0.294	0.008	0.693	0.256	1.344	0.272	0.

Problem 301	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	353	353	342	500	502	662	367	620	0
normalized size	1	1.	0.97	1.42	1.42	1.88	1.04	1.76	0.
time (sec)	N/A	0.725	0.321	0.016	0.717	0.266	2.559	0.28	0.

Problem 302	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	354	354	311	531	510	736	379	478	0
normalized size	1	1.	0.88	1.5	1.44	2.08	1.07	1.35	0.
time (sec)	N/A	0.778	0.201	0.016	0.73	0.261	4.428	0.273	0.

Problem 303	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	360	360	344	558	527	792	391	466	0
normalized size	1	1.	0.96	1.55	1.46	2.2	1.09	1.29	0.
time (sec)	N/A	0.796	0.36	0.018	0.71	0.259	7.669	0.272	0.

Problem 304	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	221	221	178	291	278	293	450	286	0
normalized size	1	1.	0.81	1.32	1.26	1.33	2.04	1.29	0.
time (sec)	N/A	0.365	0.334	0.011	0.773	0.268	2.186	0.274	0.

Problem 305	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	156	156	130	191	190	205	303	196	0
normalized size	1	1.	0.83	1.22	1.22	1.31	1.94	1.26	0.
time (sec)	N/A	0.302	0.161	0.007	0.764	0.267	1.721	0.271	0.

Problem 306	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	99	99	86	102	113	128	163	119	0
normalized size	1	1.	0.87	1.03	1.14	1.29	1.65	1.2	0.
time (sec)	N/A	0.196	0.087	0.006	0.763	0.264	1.245	0.271	0.

Problem 307	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	56	56	50	44	58	73	61	58	0
normalized size	1	1.	0.89	0.79	1.04	1.3	1.09	1.04	0.
time (sec)	N/A	0.084	0.039	0.005	0.759	0.261	0.14	0.27	0.

Problem 308	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	168	168	146	298	216	246	4106	213	0
normalized size	1	1.	0.87	1.77	1.29	1.46	24.44	1.27	0.
time (sec)	N/A	0.368	0.22	0.014	0.764	0.307	16.149	0.272	0.

Problem 309	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	233	233	233	538	397	578	8391	479	0
normalized size	1	1.	1.	2.31	1.7	2.48	36.01	2.06	0.
time (sec)	N/A	0.477	0.278	0.019	0.771	0.383	28.681	0.282	0.

Problem 310	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	317	317	278	819	672	957	0	548	0
normalized size	1	1.	0.88	2.58	2.12	3.02	0.	1.73	0.
time (sec)	N/A	0.609	1.284	0.02	0.773	0.497	0.	0.283	0.

Problem 311	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	189	189	209	283	286	485	444	278	0
normalized size	1	1.	1.11	1.5	1.51	2.57	2.35	1.47	0.
time (sec)	N/A	0.458	0.3	0.015	0.777	0.265	3.852	0.272	0.

Problem 312	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	140	140	150	189	198	343	298	196	0
normalized size	1	1.	1.07	1.35	1.41	2.45	2.13	1.4	0.
time (sec)	N/A	0.363	0.215	0.012	0.813	0.267	2.825	0.271	0.

Problem 313	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	97	97	96	106	122	211	163	127	121
normalized size	1	1.	0.99	1.09	1.26	2.18	1.68	1.31	1.25
time (sec)	N/A	0.269	0.128	0.013	0.808	0.27	1.845	0.271	124.093

Problem 314	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	63	63	59	51	70	117	63	70	66
normalized size	1	1.	0.94	0.81	1.11	1.86	1.	1.11	1.05
time (sec)	N/A	0.105	0.064	0.01	0.801	0.262	0.204	0.271	48.057

Problem 315	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	224	224	186	691	390	660	8322	383	0
normalized size	1	1.	0.83	3.08	1.74	2.95	37.15	1.71	0.
time (sec)	N/A	0.609	0.284	0.128	0.773	0.359	24.896	0.278	0.

Problem 316	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	313	313	270	986	740	1242	13362	771	0
normalized size	1	1.	0.86	3.15	2.36	3.97	42.69	2.46	0.
time (sec)	N/A	0.949	0.466	0.029	0.78	0.418	38.9	0.284	0.

Problem 317	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	412	412	363	1314	1149	2034	0	803	0
normalized size	1	1.	0.88	3.19	2.79	4.94	0.	1.95	0.
time (sec)	N/A	1.762	0.684	0.033	0.799	0.588	0.	0.292	0.

Problem 318	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	171	171	209	267	300	605	469	271	0
normalized size	1	1.	1.22	1.56	1.75	3.54	2.74	1.58	0.
time (sec)	N/A	0.575	0.399	0.018	0.767	0.27	7.598	0.274	0.

Problem 319	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	A	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	134	134	146	179	209	416	304	194	0
normalized size	1	1.	1.09	1.34	1.56	3.1	2.27	1.45	0.
time (sec)	N/A	0.417	0.353	0.016	0.768	0.266	5.049	0.274	0.

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	103	103	107	102	136	240	163	131	143
normalized size	1	1.	1.04	0.99	1.32	2.33	1.58	1.27	1.39
time (sec)	N/A	0.253	0.169	0.016	0.772	0.273	2.682	0.272	140.074

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	64	64	53	47	76	108	61	62	97
normalized size	1	1.	0.83	0.73	1.19	1.69	0.95	0.97	1.52
time (sec)	N/A	0.087	0.075	0.008	0.764	0.261	0.239	0.27	48.111

Problem 322	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	329	329	282	1437	771	1432	0	621	0
normalized size	1	1.	0.86	4.37	2.34	4.35	0.	1.89	0.
time (sec)	N/A	1.158	0.544	0.029	0.776	0.502	0.	0.283	0.

Problem 323	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	443	443	389	1850	1237	2353	0	1	0
normalized size	1	1.	0.88	4.18	2.79	5.31	0.	0.	0.
time (sec)	N/A	2.293	0.942	0.036	0.793	0.736	0.	0.302	0.

Problem 324	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	143	143	70	115	170	123	0	105	131
normalized size	1	1.	0.49	0.8	1.19	0.86	0.	0.73	0.92
time (sec)	N/A	0.289	0.082	0.009	0.787	0.275	0.	0.276	74.674

Problem 325	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	124	124	65	98	147	116	0	99	112
normalized size	1	1.	0.52	0.79	1.19	0.94	0.	0.8	0.9
time (sec)	N/A	0.165	0.074	0.008	0.799	0.278	0.	0.275	48.733

Problem 326	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	149	104	127	173	178	0	174	0
normalized size	1	1.	0.7	0.85	1.16	1.19	0.	1.17	0.
time (sec)	N/A	0.445	0.218	0.013	0.774	0.286	0.	0.289	0.

Problem 327	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	149	149	109	152	178	201	0	717	0
normalized size	1	1.	0.73	1.02	1.19	1.35	0.	4.81	0.
time (sec)	N/A	0.446	0.34	0.017	0.773	0.29	0.	0.331	0.

Problem 328	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	151	151	99	158	193	221	0	0	0
normalized size	1	1.	0.66	1.05	1.28	1.46	0.	0.	0.
time (sec)	N/A	0.444	0.337	0.018	0.777	0.29	0.	0.	0.

Problem 329	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	158	99	165	216	242	0	0	0
normalized size	1	1.	0.63	1.04	1.37	1.53	0.	0.	0.
time (sec)	N/A	0.438	0.274	0.019	0.78	0.29	0.	0.	0.

Problem 330	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	165	165	99	167	244	262	0	441	0
normalized size	1	1.	0.6	1.01	1.48	1.59	0.	2.67	0.
time (sec)	N/A	0.451	0.274	0.018	0.781	0.289	0.	0.324	0.

Problem 331	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	165	165	101	188	300	282	0	0	0
normalized size	1	1.	0.61	1.14	1.82	1.71	0.	0.	0.
time (sec)	N/A	0.443	0.275	0.02	0.795	0.295	0.	0.	0.

Problem 332	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	169	169	92	195	338	217	0	547	0
normalized size	1	1.	0.54	1.15	2.	1.28	0.	3.24	0.
time (sec)	N/A	0.395	0.244	0.021	0.798	0.284	0.	0.3	0.

Problem 333	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	194	194	97	216	406	238	0	616	0
normalized size	1	1.	0.5	1.11	2.09	1.23	0.	3.18	0.
time (sec)	N/A	0.473	0.253	0.026	0.788	0.285	0.	0.301	0.

Problem 334	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	166	166	80	134	209	136	0	119	151
normalized size	1	1.	0.48	0.81	1.26	0.82	0.	0.72	0.91
time (sec)	N/A	0.316	0.104	0.011	0.773	0.277	0.	0.278	76.427

Problem 335	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	147	147	75	117	186	130	0	112	133
normalized size	1	1.	0.51	0.8	1.27	0.88	0.	0.76	0.9
time (sec)	N/A	0.186	0.096	0.008	0.79	0.28	0.	0.275	49.878

Problem 336	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	172	172	116	183	212	192	0	188	0
normalized size	1	1.	0.67	1.06	1.23	1.12	0.	1.09	0.
time (sec)	N/A	0.508	0.227	0.012	0.808	0.287	0.	0.289	0.

Problem 337	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	172	172	119	208	217	215	0	954	0
normalized size	1	1.	0.69	1.21	1.26	1.25	0.	5.55	0.
time (sec)	N/A	0.515	0.433	0.019	0.777	0.291	0.	0.338	0.

Problem 338	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	174	174	119	214	232	235	0	0	0
normalized size	1	1.	0.68	1.23	1.33	1.35	0.	0.	0.
time (sec)	N/A	0.514	0.44	0.017	0.783	0.3	0.	0.	0.

Problem 339	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	181	181	109	221	255	255	0	0	0
normalized size	1	1.	0.6	1.22	1.41	1.41	0.	0.	0.
time (sec)	N/A	0.513	0.518	0.018	0.784	0.293	0.	0.	0.

Problem 340	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	188	188	109	204	284	275	0	679	0
normalized size	1	1.	0.58	1.09	1.51	1.46	0.	3.61	0.
time (sec)	N/A	0.523	0.321	0.019	0.796	0.304	0.	0.332	0.

Problem 341	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	195	195	111	225	339	296	0	0	0
normalized size	1	1.	0.57	1.15	1.74	1.52	0.	0.	0.
time (sec)	N/A	0.536	0.407	0.022	0.796	0.31	0.	0.	0.

Problem 342	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	195	195	109	246	401	316	0	0	0
normalized size	1	1.	0.56	1.26	2.06	1.62	0.	0.	0.
time (sec)	N/A	0.53	0.291	0.022	0.8	0.295	0.	0.	0.

Problem 343	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	195	195	111	267	470	336	0	0	0
normalized size	1	1.	0.57	1.37	2.41	1.72	0.	0.	0.
time (sec)	N/A	0.528	0.349	0.025	0.795	0.31	0.	0.	0.

Problem 344	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	120	120	60	95	130	109	0	92	107
normalized size	1	1.	0.5	0.79	1.08	0.91	0.	0.77	0.89
time (sec)	N/A	0.269	0.078	0.009	0.761	0.27	0.	0.28	74.209

Problem 345	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	101	101	55	79	108	103	0	85	92
normalized size	1	1.	0.54	0.78	1.07	1.02	0.	0.84	0.91
time (sec)	N/A	0.141	0.058	0.009	0.763	0.278	0.	0.28	49.194

Problem 346	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	126	126	94	92	134	165	0	161	0
normalized size	1	1.	0.75	0.73	1.06	1.31	0.	1.28	0.
time (sec)	N/A	0.384	0.171	0.013	0.789	0.292	0.	0.291	0.

Problem 347	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	126	126	122	96	139	188	0	0	0
normalized size	1	1.	0.97	0.76	1.1	1.49	0.	0.	0.
time (sec)	N/A	0.379	0.218	0.017	0.822	0.282	0.	0.	0.

Problem 348	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	128	128	89	102	154	208	0	0	0
normalized size	1	1.	0.7	0.8	1.2	1.62	0.	0.	0.
time (sec)	N/A	0.382	0.206	0.017	0.785	0.287	0.	0.	0.

Problem 349	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	135	135	89	109	177	228	0	0	0
normalized size	1	1.	0.66	0.81	1.31	1.69	0.	0.	0.
time (sec)	N/A	0.378	0.242	0.019	0.796	0.306	0.	0.	0.

Problem 350	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	139	139	80	116	201	177	0	0	0
normalized size	1	1.	0.58	0.83	1.45	1.27	0.	0.	0.
time (sec)	N/A	0.366	0.214	0.018	0.802	0.302	0.	0.	0.

Problem 351	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	124	124	65	132	154	146	0	97	129
normalized size	1	1.	0.52	1.06	1.24	1.18	0.	0.78	1.04
time (sec)	N/A	0.255	0.185	0.01	0.792	0.294	0.	0.281	107.079

Problem 352	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	103	103	60	115	131	139	0	90	110
normalized size	1	1.	0.58	1.12	1.27	1.35	0.	0.87	1.07
time (sec)	N/A	0.178	0.086	0.009	0.776	0.291	0.	0.282	73.919

Problem 353	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	82	82	55	98	108	132	0	84	92
normalized size	1	1.	0.67	1.2	1.32	1.61	0.	1.02	1.12
time (sec)	N/A	0.106	0.071	0.008	0.775	0.289	0.	0.279	47.781

Problem 354	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	101	101	86	148	134	208	0	159	0
normalized size	1	1.	0.85	1.47	1.33	2.06	0.	1.57	0.
time (sec)	N/A	0.294	0.244	0.012	0.799	0.293	0.	0.292	0.

Problem 355	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	108	108	104	152	157	220	0	0	0
normalized size	1	1.	0.96	1.41	1.45	2.04	0.	0.	0.
time (sec)	N/A	0.308	0.264	0.017	0.785	0.296	0.	0.	0.

Problem 356	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	84	144	201	177	0	297	0
normalized size	1	1.	0.75	1.29	1.79	1.58	0.	2.65	0.
time (sec)	N/A	0.298	0.217	0.017	0.794	0.275	0.	0.293	0.

Problem 357	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	137	137	89	151	293	197	0	366	0
normalized size	1	1.	0.65	1.1	2.14	1.44	0.	2.67	0.
time (sec)	N/A	0.403	0.226	0.018	0.813	0.287	0.	0.295	0.

Problem 358	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	105	65	180	296	173	0	96	0
normalized size	1	1.	0.62	1.71	2.82	1.65	0.	0.91	0.
time (sec)	N/A	0.219	0.236	0.01	0.838	0.282	0.	0.283	0.

Problem 359	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	86	86	60	163	273	166	0	89	0
normalized size	1	1.	0.7	1.9	3.17	1.93	0.	1.03	0.
time (sec)	N/A	0.143	0.074	0.01	0.837	0.284	0.	0.282	0.

Problem 360	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	55	146	250	159	0	84	0
normalized size	1	1.	0.81	2.15	3.68	2.34	0.	1.24	0.
time (sec)	N/A	0.088	0.103	0.01	0.793	0.278	0.	0.278	0.

Problem 361	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	85	85	80	190	149	177	0	124	0
normalized size	1	1.	0.94	2.24	1.75	2.08	0.	1.46	0.
time (sec)	N/A	0.223	0.221	0.013	0.815	0.275	0.	0.289	0.

Problem 362	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F	F	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	110	110	92	194	171	197	0	0	0
normalized size	1	1.	0.84	1.76	1.55	1.79	0.	0.	0.
time (sec)	N/A	0.299	0.254	0.018	0.786	0.278	0.	0.	0.

Problem 363	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	135	135	97	200	240	217	0	308	0
normalized size	1	1.	0.72	1.48	1.78	1.61	0.	2.28	0.
time (sec)	N/A	0.399	0.188	0.018	0.79	0.286	0.	0.295	0.

Problem 364	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	160	160	102	207	332	238	0	377	0
normalized size	1	1.	0.64	1.29	2.08	1.49	0.	2.36	0.
time (sec)	N/A	0.521	0.209	0.02	0.803	0.29	0.	0.298	0.

Problem 365	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	354	354	316	1406	0	1	0	628	0
normalized size	1	1.	0.89	3.97	0.	0.	0.	1.77	0.
time (sec)	N/A	0.763	1.098	0.014	0.	6.752	0.	0.295	0.

Problem 366	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	C	B	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	353	353	319	1453	0	1	0	659	0
normalized size	1	1.	0.9	4.12	0.	0.	0.	1.87	0.
time (sec)	N/A	0.748	1.534	0.025	0.	6.739	0.	0.293	0.

Problem 367	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	588	588	3741	5924	0	6473	0	1	0
normalized size	1	1.	6.36	10.07	0.	11.01	0.	0.	0.
time (sec)	N/A	0.804	6.104	0.054	0.	0.311	0.	0.321	0.

Problem 368	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	B	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	432	432	1476	3222	0	3775	0	1	0
normalized size	1	1.	3.42	7.46	0.	8.74	0.	0.	0.
time (sec)	N/A	0.531	5.078	0.03	0.	0.296	0.	0.292	0.

Problem 369	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	292	292	743	1504	0	1955	0	1	274
normalized size	1	1.	2.54	5.15	0.	6.7	0.	0.	0.94
time (sec)	N/A	0.35	1.984	0.016	0.	0.28	0.	0.277	129.158

Problem 370	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	B	F	F	F	F(-1)	F	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	254	254	621	0	0	0	0	0	202
normalized size	1	1.	2.44	0.	0.	0.	0.	0.	0.8
time (sec)	N/A	0.702	1.233	0.273	0.	0.	0.	0.	120.015

Problem 371	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	F(-1)
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	376	376	0	0	0	0	0	0	0
normalized size	1	1.	0.	0.	0.	0.	0.	0.	0.
time (sec)	N/A	1.904	0.191	0.146	0.	0.	0.	0.	0.

Problem 372	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	528	528	488	2410	0	1	0	887	0
normalized size	1	1.	0.92	4.56	0.	0.	0.	1.68	0.
time (sec)	N/A	2.656	2.782	0.041	0.	0.326	0.	0.282	0.

Problem 373	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	F(-2)	A	F(-1)	A	F(-1)
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	765	765	754	1960	0	1	0	1	0
normalized size	1	1.	0.99	2.56	0.	0.	0.	0.	0.
time (sec)	N/A	8.913	1.633	0.017	0.	0.751	0.	0.274	0.

Problem 374	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	208	208	85	166	239	142	0	124	182
normalized size	1	1.	0.41	0.8	1.15	0.68	0.	0.6	0.88
time (sec)	N/A	0.546	0.13	0.043	0.771	0.285	0.	0.275	106.898

Problem 375	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	166	166	75	132	193	128	0	111	150
normalized size	1	1.	0.45	0.8	1.16	0.77	0.	0.67	0.9
time (sec)	N/A	0.331	0.097	0.012	0.765	0.279	0.	0.277	79.905

Problem 376	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	124	124	65	98	147	115	0	97	114
normalized size	1	1.	0.52	0.79	1.19	0.93	0.	0.78	0.92
time (sec)	N/A	0.197	0.075	0.009	0.77	0.282	0.	0.277	51.766

Problem 377	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F	F(-2)	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	187	187	343	403	675	467	0	0	216
normalized size	1	1.	1.83	2.16	3.61	2.5	0.	0.	1.16
time (sec)	N/A	0.749	1.773	0.081	0.821	0.299	0.	0.	88.93

Problem 378	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	199	199	354	1084	0	506	0	0	223
normalized size	1	1.	1.78	5.45	0.	2.54	0.	0.	1.12
time (sec)	N/A	0.686	1.907	0.043	0.	0.293	0.	0.	89.288

Problem 379	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	213	213	334	2342	0	572	0	0	221
normalized size	1	1.	1.57	11.	0.	2.69	0.	0.	1.04
time (sec)	N/A	0.663	1.614	0.04	0.	0.293	0.	0.	89.491

Problem 380	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	231	231	95	185	278	155	0	138	216
normalized size	1	1.	0.41	0.8	1.2	0.67	0.	0.6	0.94
time (sec)	N/A	0.604	0.16	0.047	0.773	0.279	0.	0.277	134.716

Problem 381	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	189	189	85	151	232	142	0	124	184
normalized size	1	1.	0.45	0.8	1.23	0.75	0.	0.66	0.97
time (sec)	N/A	0.377	0.122	0.012	0.769	0.272	0.	0.277	112.23

Problem 382	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	147	147	75	117	186	128	0	111	148
normalized size	1	1.	0.51	0.8	1.27	0.87	0.	0.76	1.01
time (sec)	N/A	0.227	0.106	0.01	0.773	0.284	0.	0.275	77.727

Problem 383	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F(-1)	F(-2)	A
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	210	210	350	730	722	513	0	0	236
normalized size	1	1.	1.67	3.48	3.44	2.44	0.	0.	1.12
time (sec)	N/A	0.81	1.721	0.024	0.863	0.317	0.	0.	116.393

Problem 384	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	222	222	354	1828	0	594	0	0	245
normalized size	1	1.	1.59	8.23	0.	2.68	0.	0.	1.1
time (sec)	N/A	0.882	1.69	0.029	0.	0.316	0.	0.	113.822

Problem 385	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	234	234	376	3828	0	655	0	0	257
normalized size	1	1.	1.61	16.36	0.	2.8	0.	0.	1.1
time (sec)	N/A	0.851	2.642	0.031	0.	0.351	0.	0.	109.393

Problem 386	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	185	185	75	147	200	128	0	111	150
normalized size	1	1.	0.41	0.79	1.08	0.69	0.	0.6	0.81
time (sec)	N/A	0.517	0.123	0.032	0.776	0.281	0.	0.28	78.179

Problem 387	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	143	143	65	113	154	115	0	97	117
normalized size	1	1.	0.45	0.79	1.08	0.8	0.	0.68	0.82
time (sec)	N/A	0.33	0.103	0.014	0.771	0.285	0.	0.281	55.105

Problem 388	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	101	101	55	79	108	101	0	84	85
normalized size	1	1.	0.54	0.78	1.07	1.	0.	0.83	0.84
time (sec)	N/A	0.183	0.077	0.01	0.768	0.284	0.	0.279	29.227

Problem 389	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	A	A	A	F	F(-2)	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	164	164	189	204	628	475	0	0	194
normalized size	1	1.	1.15	1.24	3.83	2.9	0.	0.	1.18
time (sec)	N/A	0.577	1.908	0.023	0.803	0.299	0.	0.	61.204

Problem 390	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	178	178	313	510	0	497	0	0	189
normalized size	1	1.	1.76	2.87	0.	2.79	0.	0.	1.06
time (sec)	N/A	0.573	1.356	0.028	0.	0.284	0.	0.	59.078

Problem 391	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	227	227	371	1194	0	578	0	0	221
normalized size	1	1.	1.63	5.26	0.	2.55	0.	0.	0.97
time (sec)	N/A	0.751	1.807	0.029	0.	0.308	0.	0.	84.272

Problem 392	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	166	166	75	166	200	158	0	109	150
normalized size	1	1.	0.45	1.	1.2	0.95	0.	0.66	0.9
time (sec)	N/A	0.391	0.151	0.037	0.77	0.28	0.	0.282	79.146

Problem 393	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	124	124	65	132	154	144	0	96	117
normalized size	1	1.	0.52	1.06	1.24	1.16	0.	0.77	0.94
time (sec)	N/A	0.267	0.132	0.01	0.771	0.274	0.	0.28	53.843

Problem 394	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	82	82	55	98	108	131	0	84	83
normalized size	1	1.	0.67	1.2	1.32	1.6	0.	1.02	1.01
time (sec)	N/A	0.154	0.074	0.009	0.766	0.273	0.	0.278	28.517

Problem 395	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	B	A	A	F(-1)	F(-2)	A
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	166	166	278	489	1049	494	0	0	180
normalized size	1	1.	1.67	2.95	6.32	2.98	0.	0.	1.08
time (sec)	N/A	0.49	1.885	0.023	0.812	0.284	0.	0.	59.17

Problem 396	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	215	215	351	1214	0	575	0	0	211
normalized size	1	1.	1.63	5.65	0.	2.67	0.	0.	0.98
time (sec)	N/A	0.863	1.72	0.029	0.	0.304	0.	0.	81.637

Problem 397	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	250	250	381	2600	0	656	0	0	243
normalized size	1	1.	1.52	10.4	0.	2.62	0.	0.	0.97
time (sec)	N/A	0.789	1.8	0.033	0.	0.397	0.	0.	105.5

Problem 398	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	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	166	166	330	0	0	0	0	0	131
normalized size	1	1.	1.99	0.	0.	0.	0.	0.	0.79
time (sec)	N/A	0.415	0.97	0.093	0.	0.	0.	0.	70.92

Problem 399	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	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	167	167	310	0	0	0	0	0	131
normalized size	1	1.	1.86	0.	0.	0.	0.	0.	0.78
time (sec)	N/A	0.386	0.897	0.083	0.	0.	0.	0.	60.413

Problem 400	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Rubi in Sympy
grade	A	A	A	F	F	F	F(-1)	F	F(-1)
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	252	252	465	0	0	0	0	0	0
normalized size	1	1.	1.85	0.	0.	0.	0.	0.	0.
time (sec)	N/A	0.929	1.247	0.117	0.	0.	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 [168] had the largest ratio of [0.3571]

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	7	5	1.	34	0.147
2	A	6	5	1.	32	0.156
3	A	5	5	1.	27	0.185
4	A	5	5	1.	34	0.147
5	A	5	5	1.	34	0.147
6	A	5	5	1.	34	0.147
7	A	8	6	1.	34	0.176
8	A	4	4	1.	34	0.118
9	A	5	4	1.	34	0.118
10	A	7	4	1.	34	0.118
11	A	6	4	1.	34	0.118
12	A	5	4	1.	32	0.125
13	A	4	4	1.	27	0.148
14	A	4	4	1.	34	0.118
15	A	7	5	1.	34	0.147
16	A	4	4	1.	34	0.118
17	A	5	4	1.	34	0.118
18	A	2	1	0.99	25	0.04

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
19	A	2	1	0.99	25	0.04
20	A	2	1	1.	23	0.043
21	A	2	1	1.	18	0.056
22	A	2	1	0.99	25	0.04
23	A	2	1	0.99	25	0.04
24	A	2	1	0.99	25	0.04
25	A	2	1	0.99	27	0.037
26	A	2	1	0.99	27	0.037
27	A	2	1	1.	25	0.04
28	A	2	1	1.22	20	0.05
29	A	2	1	0.99	27	0.037
30	A	2	1	0.99	27	0.037
31	A	2	1	0.99	27	0.037
32	A	2	1	0.99	27	0.037
33	A	2	1	0.99	27	0.037
34	A	2	1	1.	25	0.04
35	A	2	1	1.	20	0.05
36	A	2	1	0.99	27	0.037
37	A	2	1	0.99	27	0.037
38	A	2	1	0.99	27	0.037
39	A	1	1	1.	32	0.031
40	A	1	1	1.	31	0.032
41	A	1	1	1.	34	0.029
42	A	1	1	1.	33	0.03
43	A	5	4	0.99	27	0.148
44	A	5	4	0.99	27	0.148
45	A	5	4	1.	25	0.16
46	A	5	4	1.	20	0.2
47	A	5	4	1.	27	0.148
48	A	5	4	1.	27	0.148
49	A	5	4	1.	27	0.148
50	A	6	5	1.	27	0.185
51	A	5	5	1.	27	0.185
52	A	4	4	1.	25	0.16

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
53	A	3	3	1.	20	0.15
54	A	6	5	1.	27	0.185
55	A	6	5	0.99	27	0.185
56	A	6	5	1.	27	0.185
57	A	5	5	1.	27	0.185
58	A	3	3	1.12	27	0.111
59	A	3	3	1.	25	0.12
60	A	4	4	1.	20	0.2
61	A	7	6	1.	27	0.222
62	A	7	5	0.99	27	0.185
63	A	7	5	1.	27	0.185
64	A	4	4	1.	27	0.148
65	A	4	4	1.13	27	0.148
66	A	4	4	1.	27	0.148
67	A	4	4	1.	25	0.16
68	A	5	4	1.	20	0.2
69	A	6	5	1.	17	0.294
70	A	5	5	1.	17	0.294
71	A	4	4	1.	15	0.267
72	A	3	3	1.	14	0.214
73	A	6	5	1.	17	0.294
74	A	6	5	1.	17	0.294
75	A	6	5	1.	17	0.294
76	A	3	3	1.83	16	0.188
77	A	3	3	1.	18	0.167
78	A	7	6	0.99	29	0.207
79	A	6	6	1.	29	0.207
80	A	5	5	1.	27	0.185
81	A	5	5	1.	22	0.227
82	A	7	6	1.	29	0.207
83	A	7	6	0.98	29	0.207
84	A	7	6	1.	29	0.207
85	A	7	6	1.	29	0.207
86	A	5	5	1.	29	0.172

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
87	A	6	6	1.	29	0.207
88	A	8	6	1.	29	0.207
89	A	7	6	1.	29	0.207
90	A	6	5	1.	27	0.185
91	A	6	5	1.	22	0.227
92	A	8	6	1.	29	0.207
93	A	8	6	0.99	29	0.207
94	A	8	7	0.98	29	0.241
95	A	8	6	0.99	29	0.207
96	A	8	7	1.	29	0.241
97	A	8	6	1.	29	0.207
98	A	6	5	1.	29	0.172
99	A	7	6	1.	29	0.207
100	A	7	5	1.	22	0.227
101	A	6	5	0.99	29	0.172
102	A	5	5	1.	29	0.172
103	A	4	4	0.99	27	0.148
104	A	4	4	1.	22	0.182
105	A	6	5	1.	29	0.172
106	A	6	5	1.	29	0.172
107	A	4	4	1.	29	0.138
108	A	5	5	1.	29	0.172
109	A	4	4	1.	29	0.138
110	A	4	4	1.	27	0.148
111	A	4	4	1.	22	0.182
112	A	4	4	1.	29	0.138
113	A	4	4	1.	29	0.138
114	A	5	5	0.99	29	0.172
115	A	3	3	1.	22	0.136
116	A	4	4	1.	22	0.182
117	A	5	4	1.	22	0.182
118	A	5	4	1.	29	0.138
119	A	4	4	1.	29	0.138
120	A	3	3	1.	27	0.111

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
121	A	5	5	1.	29	0.172
122	A	5	5	1.	29	0.172
123	A	4	4	1.	29	0.138
124	A	5	4	1.	29	0.138
125	A	4	4	1.	29	0.138
126	A	3	3	1.	27	0.111
127	A	4	4	1.	29	0.138
128	A	4	4	1.	29	0.138
129	A	5	5	1.	29	0.172
130	A	4	3	1.	29	0.103
131	A	4	3	1.	29	0.103
132	A	2	2	1.	27	0.074
133	A	5	5	1.	29	0.172
134	A	5	4	1.	29	0.138
135	A	6	5	1.	29	0.172
136	A	6	4	0.99	27	0.148
137	A	6	4	1.	29	0.138
138	A	5	5	1.	31	0.161
139	A	6	6	1.	70	0.086
140	A	2	1	1.	20	0.05
141	A	2	1	1.	20	0.05
142	A	2	1	1.	20	0.05
143	A	2	1	1.	18	0.056
144	A	6	5	1.	20	0.25
145	A	4	4	1.	20	0.2
146	A	5	5	1.	20	0.25
147	A	6	5	1.	20	0.25
148	A	6	5	1.	30	0.167
149	A	6	5	1.	30	0.167
150	A	6	5	1.	28	0.179
151	A	6	5	1.	23	0.217
152	A	6	5	1.	30	0.167
153	A	6	5	1.	30	0.167
154	A	6	5	1.	30	0.167

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
155	A	6	6	1.	30	0.2
156	A	5	5	1.	28	0.179
157	A	4	4	1.	23	0.174
158	A	7	6	1.	30	0.2
159	A	7	6	1.	30	0.2
160	A	7	6	1.	20	0.3
161	A	7	6	1.	20	0.3
162	A	5	5	1.	18	0.278
163	A	4	4	1.	17	0.235
164	A	7	6	1.	20	0.3
165	A	7	6	1.	20	0.3
166	A	7	6	1.	20	0.3
167	A	1	1	1.	16	0.062
168	A	6	5	1.	14	0.357
169	A	6	5	1.	16	0.312
170	A	3	2	1.	18	0.111
171	A	5	3	1.	16	0.188
172	A	5	3	1.	19	0.158
173	A	6	5	1.	23	0.217
174	A	5	3	1.	19	0.158
175	A	2	2	1.	23	0.087
176	A	4	4	1.	17	0.235
177	A	1	1	1.	19	0.053
178	A	7	5	1.	22	0.227
179	A	6	5	1.	22	0.227
180	A	5	5	1.	22	0.227
181	A	4	4	1.	22	0.182
182	A	4	4	1.	22	0.182
183	A	3	3	1.	22	0.136
184	A	4	4	1.	22	0.182
185	A	5	4	1.	22	0.182
186	A	7	6	1.	32	0.188
187	A	6	6	0.99	32	0.188
188	A	5	5	1.	30	0.167

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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
189	A	5	5	1.	25	0.2
190	A	7	6	1.	32	0.188
191	A	7	6	0.99	32	0.188
192	A	7	6	1.	32	0.188
193	A	7	6	1.	32	0.188
194	A	5	5	1.	32	0.156
195	A	6	6	1.	32	0.188
196	A	8	6	1.	32	0.188
197	A	7	6	0.99	32	0.188
198	A	6	5	1.	30	0.167
199	A	6	5	1.	25	0.2
200	A	8	6	1.	32	0.188
201	A	8	6	0.99	32	0.188
202	A	8	7	0.99	32	0.219
203	A	8	6	1.	32	0.188
204	A	8	7	1.	32	0.219
205	A	8	6	1.	32	0.188
206	A	6	5	1.	32	0.156
207	A	7	6	1.	32	0.188
208	A	7	6	1.	32	0.188
209	A	6	6	1.	32	0.188
210	A	5	5	1.	30	0.167
211	A	7	7	1.	32	0.219
212	A	7	7	1.	32	0.219
213	A	7	7	1.	32	0.219
214	A	9	6	1.	32	0.188
215	A	7	6	1.	32	0.188
216	A	6	5	1.	30	0.167
217	A	8	7	1.	32	0.219
218	A	8	7	1.	32	0.219
219	A	8	8	1.	32	0.25
220	A	9	6	1.	32	0.188
221	A	8	6	1.	32	0.188
222	A	7	5	1.	30	0.167

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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
223	A	9	7	1.	32	0.219
224	A	9	7	1.	32	0.219
225	A	9	8	1.	32	0.25
226	A	6	5	1.	32	0.156
227	A	5	5	1.	32	0.156
228	A	4	4	1.	30	0.133
229	A	4	4	1.	25	0.16
230	A	6	5	1.	32	0.156
231	A	6	5	0.99	32	0.156
232	A	4	4	1.	32	0.125
233	A	5	5	1.	32	0.156
234	A	4	4	1.	32	0.125
235	A	4	4	1.	30	0.133
236	A	4	4	1.	25	0.16
237	A	4	4	1.	32	0.125
238	A	4	4	0.99	32	0.125
239	A	5	5	0.99	32	0.156
240	A	6	5	1.	32	0.156
241	A	5	5	1.	32	0.156
242	A	4	4	1.	30	0.133
243	A	6	6	1.	32	0.188
244	A	6	6	1.	32	0.188
245	A	4	4	1.	32	0.125
246	A	6	5	1.	32	0.156
247	A	5	5	1.	32	0.156
248	A	4	4	1.	30	0.133
249	A	4	4	1.	32	0.125
250	A	4	4	1.	32	0.125
251	A	5	5	1.	32	0.156
252	A	5	4	1.	32	0.125
253	A	5	4	1.	32	0.125
254	A	2	2	1.	30	0.067
255	A	5	5	1.	32	0.156
256	A	5	4	1.	32	0.125

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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	number of rules / integrand leaf size
257	A	6	5	1.	32	0.156
258	A	3	3	1.	47	0.064
259	A	8	7	1.	34	0.206
260	A	7	6	1.	34	0.176
261	A	7	6	1.	34	0.176
262	A	7	6	1.	34	0.176
263	A	7	6	1.	34	0.176
264	A	8	7	1.	34	0.206
265	A	9	7	1.	34	0.206
266	A	8	6	1.	34	0.176
267	A	7	6	1.	34	0.176
268	A	6	5	1.	34	0.147
269	A	6	5	1.	34	0.147
270	A	7	6	0.99	34	0.176
271	A	8	6	1.	34	0.176
272	A	6	4	1.	30	0.133
273	A	6	4	1.	32	0.125
274	A	5	5	1.	34	0.147
275	A	3	3	1.	42	0.071
276	A	2	2	1.	46	0.043
277	A	2	2	1.	69	0.029
278	A	2	2	1.	75	0.027
279	A	6	4	1.	16	0.25
280	A	6	5	1.	33	0.152
281	A	5	4	1.	31	0.129
282	A	5	4	1.	30	0.133
283	A	7	5	1.	33	0.152
284	A	7	6	1.	33	0.182
285	A	7	5	1.	33	0.152
286	A	5	4	1.	33	0.121
287	A	6	5	1.	33	0.152
288	A	7	5	1.	33	0.152
289	A	2	1	1.	36	0.028
290	A	2	1	1.	36	0.028

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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
291	A	2	1	1.	34	0.029
292	A	2	1	1.	29	0.034
293	A	2	1	1.	36	0.028
294	A	2	1	1.	36	0.028
295	A	2	1	1.	36	0.028
296	A	2	1	1.	38	0.026
297	A	2	1	1.	38	0.026
298	A	2	1	1.	36	0.028
299	A	2	1	1.	31	0.032
300	A	2	1	1.	38	0.026
301	A	2	1	1.	38	0.026
302	A	2	1	1.	38	0.026
303	A	2	1	1.	38	0.026
304	A	6	5	1.	38	0.132
305	A	6	5	1.	38	0.132
306	A	6	5	1.	36	0.139
307	A	6	5	1.	31	0.161
308	A	6	5	1.	38	0.132
309	A	6	5	1.	38	0.132
310	A	6	5	1.	38	0.132
311	A	7	6	1.	38	0.158
312	A	7	6	1.	38	0.158
313	A	7	6	1.	36	0.167
314	A	7	6	1.	31	0.194
315	A	7	6	1.	38	0.158
316	A	7	6	1.	38	0.158
317	A	7	6	1.	38	0.158
318	A	8	6	1.	38	0.158
319	A	8	6	1.	38	0.158
320	A	6	6	1.	36	0.167
321	A	5	4	1.	31	0.129
322	A	8	6	1.	38	0.158
323	A	8	6	1.	38	0.158
324	A	7	5	1.	38	0.132

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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	number of rules / integrand leaf size
325	A	7	5	1.	33	0.152
326	A	9	7	1.	40	0.175
327	A	9	8	1.	40	0.2
328	A	9	8	1.	40	0.2
329	A	9	7	1.	40	0.175
330	A	9	7	1.	40	0.175
331	A	9	7	1.	40	0.175
332	A	7	5	1.	40	0.125
333	A	8	6	1.	40	0.15
334	A	8	5	1.	38	0.132
335	A	8	5	1.	33	0.152
336	A	10	7	1.	40	0.175
337	A	10	8	1.	40	0.2
338	A	10	8	1.	40	0.2
339	A	10	7	1.	40	0.175
340	A	10	8	1.	40	0.2
341	A	10	7	1.	40	0.175
342	A	10	8	1.	40	0.2
343	A	10	7	1.	40	0.175
344	A	6	4	1.	38	0.105
345	A	6	4	1.	33	0.121
346	A	8	6	1.	40	0.15
347	A	8	7	1.	40	0.175
348	A	8	7	1.	40	0.175
349	A	8	6	1.	40	0.15
350	A	6	4	1.	40	0.1
351	A	7	5	1.	40	0.125
352	A	6	5	1.	38	0.132
353	A	5	5	1.	33	0.152
354	A	7	7	1.	40	0.175
355	A	7	7	1.	40	0.175
356	A	5	5	1.	40	0.125
357	A	6	5	1.	40	0.125
358	A	6	5	1.	40	0.125

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
359	A	5	4	1.	38	0.105
360	A	5	4	1.	33	0.121
361	A	5	4	1.	40	0.1
362	A	5	4	1.	40	0.1
363	A	6	5	1.	40	0.125
364	A	7	5	1.	40	0.125
365	A	5	4	1.	35	0.114
366	A	5	4	1.	36	0.111
367	A	2	1	1.	38	0.026
368	A	2	1	1.	38	0.026
369	A	2	1	1.	36	0.028
370	A	4	2	1.	38	0.053
371	A	5	3	1.	38	0.079
372	A	6	5	1.	38	0.132
373	A	6	5	1.	53	0.094
374	A	11	5	1.	35	0.143
375	A	9	5	1.	35	0.143
376	A	7	5	1.	33	0.152
377	A	9	7	1.	35	0.2
378	A	9	7	1.	35	0.2
379	A	7	5	1.	35	0.143
380	A	12	5	1.	35	0.143
381	A	10	5	1.	35	0.143
382	A	8	5	1.	33	0.152
383	A	10	7	1.	35	0.2
384	A	10	8	1.	35	0.229
385	A	10	7	1.	35	0.2
386	A	10	4	1.	35	0.114
387	A	8	4	1.	35	0.114
388	A	6	4	1.	33	0.121
389	A	8	6	1.	35	0.171
390	A	6	4	1.	35	0.114
391	A	7	4	1.	35	0.114
392	A	9	5	1.	35	0.143

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
393	A	7	5	1.	35	0.143
394	A	5	5	1.	33	0.152
395	A	6	4	1.	35	0.114
396	A	7	4	1.	35	0.114
397	A	8	4	1.	35	0.114
398	A	7	5	1.	26	0.192
399	A	7	6	1.	24	0.25
400	A	11	8	1.	29	0.276

3 Listing of integrals

3.1 $\int (d+ex)^2 \left(A+Bx+Cx^2\right) \sqrt{d^2-e^2x^2}\,dx$

Optimal. Leaf size=236

$$\frac{d^2x\sqrt{d^2-e^2x^2}\left(10Ae^2+4Bde+3Cd^2\right)}{16e^2}-\frac{x\left(d^2-e^2x^2\right)^{3/2}\left(2e(Ae+2Bd)+3Cd^2\right)}{8e^2}-\frac{d\left(d^2-e^2x^2\right)^{3/2}\left(e(10Ae+7Bd)+4Cd^2\right)}{15e^3}+\frac{d^4\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(10Ae^2+4Bde+3Cd^2\right)}{16e^3}-\frac{x^2\left(d^2-e^2x^2\right)^{3/2}(Be+2Cd)}{5e}-\frac{1}{6}Cx^3\left(d^2-e^2x^2\right)^{3/2}$$

```
[Out] (d^2*(3*C*d^2 + 4*B*d*e + 10*A*e^2)*x*Sqrt[d^2 - e^2*x^2])/(16*e^
2) - (d*(4*C*d^2 + e*(7*B*d + 10*A*e))*(d^2 - e^2*x^2)^(3/2))/(15
*e^3) - ((3*C*d^2 + 2*e*(2*B*d + A*e))*x*(d^2 - e^2*x^2)^(3/2))/(
8*e^2) - ((2*C*d + B*e)*x^2*(d^2 - e^2*x^2)^(3/2))/(5*e) - (C*x^3
*(d^2 - e^2*x^2)^(3/2))/6 + (d^4*(3*C*d^2 + 4*B*d*e + 10*A*e^2)*A
rcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(16*e^3)
```

Rubi [A] time = 0.824081, antiderivative size = 236, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.147$

$$\frac{d^2x\sqrt{d^2-e^2x^2}\left(10Ae^2+4Bde+3Cd^2\right)}{16e^2}-\frac{x\left(d^2-e^2x^2\right)^{3/2}\left(2e(Ae+2Bd)+3Cd^2\right)}{8e^2}-\frac{d\left(d^2-e^2x^2\right)^{3/2}\left(e(10Ae+7Bd)+4Cd^2\right)}{15e^3}+\frac{d^4\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(10Ae^2+4Bde+3Cd^2\right)}{16e^3}-\frac{x^2\left(d^2-e^2x^2\right)^{3/2}(Be+2Cd)}{5e}-\frac{1}{6}Cx^3\left(d^2-e^2x^2\right)^{3/2}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)^2*(A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2],x]
```

```
[Out] (d^2*(3*C*d^2 + 4*B*d*e + 10*A*e^2)*x*Sqrt[d^2 - e^2*x^2])/(16*e^
2) - (d*(4*C*d^2 + e*(7*B*d + 10*A*e))*(d^2 - e^2*x^2)^(3/2))/(15
*e^3) - ((3*C*d^2 + 2*e*(2*B*d + A*e))*x*(d^2 - e^2*x^2)^(3/2))/(
8*e^2) - ((2*C*d + B*e)*x^2*(d^2 - e^2*x^2)^(3/2))/(5*e) - (C*x^3
*(d^2 - e^2*x^2)^(3/2))/6 + (d^4*(3*C*d^2 + 4*B*d*e + 10*A*e^2)*A
rcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(16*e^3)
```

Rubi in Sympy [A] time = 51.6321, size = 236, normalized size = 1.

$$-\frac{C(d+ex)^3\left(d^2-e^2x^2\right)^{\frac{3}{2}}}{6e^3}+\frac{d^4\left(10Ae^2+4Bde+3Cd^2\right)\operatorname{atan}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{16e^3}+\frac{d^2x\sqrt{d^2-e^2x^2}\left(10Ae^2+4Bde+3Cd^2\right)}{16e^2}-\frac{d\left(d^2-e^2x^2\right)^{\frac{3}{2}}\left(10Ae^2+4Bde+3Cd^2\right)}{24e^3}-\frac{(d+ex)^2\left(d^2-e^2x^2\right)^{\frac{3}{2}}(2Be-Cd)}{10e^3}-\frac{(d+ex)\left(d^2-e^2x^2\right)^{\frac{3}{2}}\left(10Ae^2+4Bde+3Cd^2\right)}{40e^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x+d)**2*(C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] -C*(d + e*x)**3*(d**2 - e**2*x**2)**(3/2)/(6*e**3) + d**4*(10*A*e
**2 + 4*B*d*e + 3*C*d**2)*atan(e*x/sqrt(d**2 - e**2*x**2))/(16*e*
*3) + d**2*x*sqrt(d**2 - e**2*x**2)*(10*A*e**2 + 4*B*d*e + 3*C*d*
*2)/(16*e**2) - d*(d**2 - e**2*x**2)**(3/2)*(10*A*e**2 + 4*B*d*e
+ 3*C*d**2)/(24*e**3) - (d + e*x)**2*(d**2 - e**2*x**2)**(3/2)*(2
*B*e - C*d)/(10*e**3) - (d + e*x)*(d**2 - e**2*x**2)**(3/2)*(10*A
*e**2 + 4*B*d*e + 3*C*d**2)/(40*e**3)
```

Mathematica [A] time = 0.308115, size = 196, normalized size = 0.83

$$\frac{15d^4\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(2e(5Ae+2Bd)+3Cd^2\right)+\sqrt{d^2-e^2x^2}\left(10e^3x^3\left(6e(Ae+2Bd)+5Cd^2\right)-32de^2x^2\left(Cd^2-e(5Ae+2B\right.\right.}{240e^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x)^2*(A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2],x]
```

```
[Out] (Sqrt[d^2 - e^2*x^2]*(-16*d^3*(4*C*d^2 + e*(7*B*d + 10*A*e)) - 15
*d^2*e*(3*C*d^2 + 4*B*d*e - 6*A*e^2)*x - 32*d*e^2*(C*d^2 - e*(2*B
*d + 5*A*e))*x^2 + 10*e^3*(5*C*d^2 + 6*e*(2*B*d + A*e))*x^3 + 48*
e^4*(2*C*d + B*e)*x^4 + 40*C*e^5*x^5) + 15*d^4*(3*C*d^2 + 2*e*(2*
B*d + 5*A*e))*ArcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(240*e^3)
```

Maple [A] time = 0.022, size = 371, normalized size = 1.6

$$\frac{5 d^{2} A x}{8}\sqrt{-e^{2}x^{2}+d^{2}}+\frac{5 d^{4} A}{8}\arctan\left(x\sqrt{e^{2}}\frac{1}{\sqrt{-e^{2}x^{2}+d^{2}}}\right)\frac{1}{\sqrt{e^{2}}}-\frac{2 A d}{3 e}\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}-\frac{7 B d^{2}}{15 e^{2}}\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}-\frac{x^{2} B}{5}\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}-\frac{2 C d x^{2}}{5 e}\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}-\frac{4 d^{3} C}{15 e^{3}}\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}-\frac{x A}{4}\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}-\frac{B d x}{2 e}\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}-\frac{3 C d^{2} x}{8 e^{2}}\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}+\frac{d^{3} x B}{4 e}\sqrt{-e^{2}x^{2}+d^{2}}+\frac{3 d^{4} x C}{16 e^{2}}\sqrt{-e^{2}x^{2}+d^{2}}+\frac{d^{5} B}{4 e}\arctan\left(x\sqrt{e^{2}}\frac{1}{\sqrt{-e^{2}x^{2}+d^{2}}}\right)\frac{1}{\sqrt{e^{2}}}+\frac{3 d^{6} C}{16 e^{2}}\arctan\left(x\sqrt{e^{2}}\frac{1}{\sqrt{-e^{2}x^{2}+d^{2}}}\right)\frac{1}{\sqrt{e^{2}}}-\frac{C x^{3}}{6}\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((e*x+d)^2*(C*x^2+B*x+A)*(-e^2*x^2+d^2)^(1/2),x)
```

```
[Out] 5/8*d^2*A*x*(-e^2*x^2+d^2)^(1/2)+5/8*d^4*A/(e^2)^(1/2)*arctan((e^
2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))-2/3/e*(-e^2*x^2+d^2)^(3/2)*A*d-7
/15/e^2*(-e^2*x^2+d^2)^(3/2)*B*d^2-1/5*x^2*(-e^2*x^2+d^2)^(3/2)*B
-2/5*x^2*(-e^2*x^2+d^2)^(3/2)/e*d*C-4/15*d^3/e^3*(-e^2*x^2+d^2)^(
3/2)*C-1/4*x*(-e^2*x^2+d^2)^(3/2)*A-1/2*x*(-e^2*x^2+d^2)^(3/2)/e*
B*d-3/8*x*(-e^2*x^2+d^2)^(3/2)/e^2*C*d^2+1/4*d^3/e*x*(-e^2*x^2+d^
2)^(1/2)*B+3/16*d^4/e^2*x*(-e^2*x^2+d^2)^(1/2)*C+1/4*d^5/e/(e^2)^
(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))*B+3/16*d^6/e^2/(
e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))*C-1/6*C*x^3
*(-e^2*x^2+d^2)^(3/2)
```

Maxima [A] time = 0.796864, size = 505, normalized size = 2.14

$$-\frac{1}{6}\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}Cx^{3}+\frac{Ad^{4}\arcsin\left(\frac{e^{2}x}{\sqrt{d^{2}e^{2}}}\right)}{2\sqrt{e^{2}}}+\frac{Cd^{6}\arcsin\left(\frac{e^{2}x}{\sqrt{d^{2}e^{2}}}\right)}{16\sqrt{e^{2}}e^{2}}+\frac{1}{2}\sqrt{-e^{2}x^{2}+d^{2}}Ad^{2}x+\frac{\sqrt{-e^{2}x^{2}+d^{2}}Cd^{4}x}{16 e^{2}}-\frac{\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}Cd^{2}x}{8 e^{2}}+\frac{\left(Cd^{2}+2 Bde+Ae^{2}\right)d^{4}\arcsin\left(\frac{e^{2}x}{\sqrt{d^{2}e^{2}}}\right)}{8\sqrt{e^{2}}e^{2}}-\frac{\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}Bd^{2}}{3 e^{2}}-\frac{2\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}Ad}{3 e}+\frac{\sqrt{-e^{2}x^{2}+d^{2}}\left(Cd^{2}+2 Bde+Ae^{2}\right)d^{2}x}{8 e^{2}}-\frac{\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}\left(2 Cde+Be^{2}\right)x^{2}}{5 e^{2}}-\frac{\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}\left(Cd^{2}+2 Bde+Ae^{2}\right)x}{4 e^{2}}-\frac{2\left(-e^{2}x^{2}+d^{2}\right)^{\frac{3}{2}}\left(2 Cde+Be^{2}\right)d^{2}}{15 e^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)*(e*x + d)^2,x, algorithm="maxima
```

```
[Out] -1/6*(-e^2*x^2 + d^2)^(3/2)*C*x^3 + 1/2*A*d^4*arcsin(e^2*x/sqrt(d
^2*e^2))/sqrt(e^2) + 1/16*C*d^6*arcsin(e^2*x/sqrt(d^2*e^2))/(sqrt
(e^2)*e^2) + 1/2*sqrt(-e^2*x^2 + d^2)*A*d^2*x + 1/16*sqrt(-e^2*x^
2 + d^2)*C*d^4*x/e^2 - 1/8*(-e^2*x^2 + d^2)^(3/2)*C*d^2*x/e^2 + 1
/8*(C*d^2 + 2*B*d*e + A*e^2)*d^4*arcsin(e^2*x/sqrt(d^2*e^2))/(sqr
t(e^2)*e^2) - 1/3*(-e^2*x^2 + d^2)^(3/2)*B*d^2/e^2 - 2/3*(-e^2*x^
2 + d^2)^(3/2)*A*d/e + 1/8*sqrt(-e^2*x^2 + d^2)*(C*d^2 + 2*B*d*e
+ A*e^2)*d^2*x/e^2 - 1/5*(-e^2*x^2 + d^2)^(3/2)*(2*C*d*e + B*e^2)
*x^2/e^2 - 1/4*(-e^2*x^2 + d^2)^(3/2)*(C*d^2 + 2*B*d*e + A*e^2)*x
/e^2 - 2/15*(-e^2*x^2 + d^2)^(3/2)*(2*C*d*e + B*e^2)*d^2/e^4
```

Fricas [A] time = 0.300956, size = 1316, normalized size = 5.58

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)*(e*x + d)^2,x, algorithm="fricas
```

```
[Out] -1/240*(240*C*d*e^11*x^11 + 288*(2*C*d^2*e^10 + B*d*e^11)*x^10 -
20*(61*C*d^3*e^9 - 36*B*d^2*e^10 - 18*A*d*e^11)*x^9 - 480*(8*C*d^
4*e^8 + 3*B*d^3*e^9 - 2*A*d^2*e^10)*x^8 + 30*(13*C*d^5*e^7 - 164*
B*d^4*e^8 - 58*A*d^3*e^9)*x^7 + 80*(88*C*d^6*e^6 + B*d^5*e^7 - 86
*A*d^4*e^8)*x^6 + 30*(121*C*d^7*e^5 + 332*B*d^6*e^6 + 14*A*d^5*e^
7)*x^5 - 960*(4*C*d^8*e^4 - 5*B*d^7*e^5 - 14*A*d^6*e^6)*x^4 - 640
*(7*C*d^9*e^3 + 12*B*d^8*e^4 - 6*A*d^7*e^5)*x^3 - 3840*(B*d^9*e^3
 + 2*A*d^8*e^4)*x^2 + 480*(3*C*d^11*e + 4*B*d^10*e^2 - 6*A*d^9*e^
3)*x - 30*(96*C*d^12 + 128*B*d^11*e + 320*A*d^10*e^2 - (3*C*d^6*e
^6 + 4*B*d^5*e^7 + 10*A*d^4*e^8)*x^6 + 18*(3*C*d^8*e^4 + 4*B*d^7*
e^5 + 10*A*d^6*e^6)*x^4 - 48*(3*C*d^10*e^2 + 4*B*d^9*e^3 + 10*A*d
^8*e^4)*x^2 - 2*(48*C*d^11 + 64*B*d^10*e + 160*A*d^9*e^2 + 3*(3*C
*d^7*e^4 + 4*B*d^6*e^5 + 10*A*d^5*e^6)*x^4 - 16*(3*C*d^9*e^2 + 4*
B*d^8*e^3 + 10*A*d^7*e^4)*x^2)*sqrt(-e^2*x^2 + d^2))*arctan(-(d -
 sqrt(-e^2*x^2 + d^2))/(e*x)) - (40*C*e^11*x^11 + 48*(2*C*d*e^10
+ B*e^11)*x^10 - 10*(67*C*d^2*e^9 - 12*B*d*e^10 - 6*A*e^11)*x^9 -
 160*(11*C*d^3*e^8 + 5*B*d^2*e^9 - A*d*e^10)*x^8 + 15*(65*C*d^4*e
^7 - 148*B*d^3*e^8 - 66*A*d^2*e^9)*x^7 + 80*(64*C*d^5*e^6 + 13*B*
d^4*e^7 - 38*A*d^3*e^8)*x^6 + 10*(193*C*d^6*e^5 + 684*B*d^5*e^6 +
 126*A*d^4*e^7)*x^5 - 960*(4*C*d^7*e^4 - 3*B*d^6*e^5 - 10*A*d^5*e
^6)*x^4 - 80*(47*C*d^8*e^3 + 84*B*d^7*e^4 - 30*A*d^6*e^5)*x^3 - 3
840*(B*d^8*e^3 + 2*A*d^7*e^4)*x^2 + 480*(3*C*d^10*e + 4*B*d^9*e^2
 - 6*A*d^8*e^3)*x)*sqrt(-e^2*x^2 + d^2))/(e^9*x^6 - 18*d^2*e^7*x^
4 + 48*d^4*e^5*x^2 - 32*d^6*e^3 + 2*(3*d*e^7*x^4 - 16*d^3*e^5*x^2
 + 16*d^5*e^3)*sqrt(-e^2*x^2 + d^2))
```

Sympy [A] time = 28.7866, size = 1231, normalized size = 5.22

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**2*(C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] A*d**2*Piecewise((-I*d**2*acosh(e*x/d)/(2*e) - I*d*x/(2*sqrt(-1 +
 e**2*x**2/d**2)) + I*e**2*x**3/(2*d*sqrt(-1 + e**2*x**2/d**2)),
Abs(e**2*x**2/d**2) > 1), (d**2*asin(e*x/d)/(2*e) + d*x*sqrt(1 -
e**2*x**2/d**2)/2, True)) + 2*A*d*e*Piecewise((x**2*sqrt(d**2)/2,
 Eq(e**2, 0)), (-(d**2 - e**2*x**2)**(3/2)/(3*e**2), True)) + A*e
**2*Piecewise((-I*d**4*acosh(e*x/d)/(8*e**3) + I*d**3*x/(8*e**2*s
qrt(-1 + e**2*x**2/d**2)) - 3*I*d*x**3/(8*sqrt(-1 + e**2*x**2/d**
2)) + I*e**2*x**5/(4*d*sqrt(-1 + e**2*x**2/d**2)), Abs(e**2*x**2/
d**2) > 1), (d**4*asin(e*x/d)/(8*e**3) - d**3*x/(8*e**2*sqrt(1 -
e**2*x**2/d**2)) + 3*d*x**3/(8*sqrt(1 - e**2*x**2/d**2)) - e**2*x
**5/(4*d*sqrt(1 - e**2*x**2/d**2)), True)) + B*d**2*Piecewise((x*
*2*sqrt(d**2)/2, Eq(e**2, 0)), (-(d**2 - e**2*x**2)**(3/2)/(3*e**
2), True)) + 2*B*d*e*Piecewise((-I*d**4*acosh(e*x/d)/(8*e**3) + I
*d**3*x/(8*e**2*sqrt(-1 + e**2*x**2/d**2)) - 3*I*d*x**3/(8*sqrt(-
1 + e**2*x**2/d**2)) + I*e**2*x**5/(4*d*sqrt(-1 + e**2*x**2/d**2)
), Abs(e**2*x**2/d**2) > 1), (d**4*asin(e*x/d)/(8*e**3) - d**3*x/
(8*e**2*sqrt(1 - e**2*x**2/d**2)) + 3*d*x**3/(8*sqrt(1 - e**2*x**
2/d**2)) - e**2*x**5/(4*d*sqrt(1 - e**2*x**2/d**2)), True)) + B*e
**2*Piecewise((-2*d**4*sqrt(d**2 - e**2*x**2)/(15*e**4) - d**2*x*
*2*sqrt(d**2 - e**2*x**2)/(15*e**2) + x**4*sqrt(d**2 - e**2*x**2)
/5, Ne(e, 0)), (x**4*sqrt(d**2)/4, True)) + C*d**2*Piecewise((-I*
d**4*acosh(e*x/d)/(8*e**3) + I*d**3*x/(8*e**2*sqrt(-1 + e**2*x**2
/d**2)) - 3*I*d*x**3/(8*sqrt(-1 + e**2*x**2/d**2)) + I*e**2*x**5/
(4*d*sqrt(-1 + e**2*x**2/d**2)), Abs(e**2*x**2/d**2) > 1), (d**4*
asin(e*x/d)/(8*e**3) - d**3*x/(8*e**2*sqrt(1 - e**2*x**2/d**2)) +
 3*d*x**3/(8*sqrt(1 - e**2*x**2/d**2)) - e**2*x**5/(4*d*sqrt(1 -
e**2*x**2/d**2)), True)) + 2*C*d*e*Piecewise((-2*d**4*sqrt(d**2 -
 e**2*x**2)/(15*e**4) - d**2*x**2*sqrt(d**2 - e**2*x**2)/(15*e**2
) + x**4*sqrt(d**2 - e**2*x**2)/5, Ne(e, 0)), (x**4*sqrt(d**2)/4,
 True)) + C*e**2*Piecewise((-I*d**6*acosh(e*x/d)/(16*e**5) + I*d*
*5*x/(16*e**4*sqrt(-1 + e**2*x**2/d**2)) - I*d**3*x**3/(48*e**2*s
qrt(-1 + e**2*x**2/d**2)) - 5*I*d*x**5/(24*sqrt(-1 + e**2*x**2/d*
*2)) + I*e**2*x**7/(6*d*sqrt(-1 + e**2*x**2/d**2)), Abs(e**2*x**2
/d**2) > 1), (d**6*asin(e*x/d)/(16*e**5) - d**5*x/(16*e**4*sqrt(1
 - e**2*x**2/d**2)) + d**3*x**3/(48*e**2*sqrt(1 - e**2*x**2/d**2)
) + 5*d*x**5/(24*sqrt(1 - e**2*x**2/d**2)) - e**2*x**7/(6*d*sqrt(
1 - e**2*x**2/d**2)), True))
```

GIAC/XCAS [A] time = 0.27259, size = 266, normalized size = 1.13

$$\frac{1}{16}\left(3\,Cd^{6}+4\,Bd^{5}e+10\,Ad^{4}e^{2}\right)\arcsin\left(\frac{xe}{d}\right)e^{(-3)}\mathrm{sign}\left(d\right)+\frac{1}{240}\sqrt{-x^{2}e^{2}+d^{2}}\left(\left(2\left(\left(4\left(5\,Cxe^{2}+6\left(2\,Cde^{9}+Be^{10}\right)e^{(-8)}\right)x+5\left(5\,Cd^{2}e^{8}+12\,Bde^{9}+6\,Ae^{10}\right)e^{(-8)}\right)x-16\left(Cd^{3}e^{7}-2\,Bd^{2}e\right.\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)*(e*x + d)^2,x, algorithm="giac")
```

```
[Out] 1/16*(3*C*d^6 + 4*B*d^5*e + 10*A*d^4*e^2)*arcsin(x*e/d)*e^(-3)*si
gn(d) + 1/240*sqrt(-x^2*e^2 + d^2)*((2*((4*(5*C*x*e^2 + 6*(2*C*d*
e^9 + B*e^10)*e^(-8))*x + 5*(5*C*d^2*e^8 + 12*B*d*e^9 + 6*A*e^10)
*e^(-8))*x - 16*(C*d^3*e^7 - 2*B*d^2*e^8 - 5*A*d*e^9)*e^(-8))*x -
 15*(3*C*d^4*e^6 + 4*B*d^3*e^7 - 6*A*d^2*e^8)*e^(-8))*x - 16*(4*C
*d^5*e^5 + 7*B*d^4*e^6 + 10*A*d^3*e^7)*e^(-8))
```

3.2 $\int (d+ex)\left(A+Bx+Cx^2\right)\sqrt{d^2-e^2x^2}\,dx$

Optimal. Leaf size=186

$$\frac{dx\sqrt{d^2-e^2x^2}\left(e(4Ae+Bd)+Cd^2\right)}{8e^2}-\frac{\left(d^2-e^2x^2\right)^{3/2}\left(5e(Ae+Bd)+2Cd^2\right)}{15e^3}+\frac{d^3\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(e(4Ae+Bd)+Cd^2\right)}{8e^3}-\frac{x\left(d^2-e^2x^2\right)^{3/2}(Be+Cd)}{4e^2}-\frac{Cx^2\left(d^2-e^2x^2\right)^{3/2}}{5e}$$

```
[Out] (d*(C*d^2 + e*(B*d + 4*A*e))*x*Sqrt[d^2 - e^2*x^2])/(8*e^2) - ((2
*C*d^2 + 5*e*(B*d + A*e))*(d^2 - e^2*x^2)^(3/2))/(15*e^3) - ((C*d
 + B*e)*x*(d^2 - e^2*x^2)^(3/2))/(4*e^2) - (C*x^2*(d^2 - e^2*x^2)
^(3/2))/(5*e) + (d^3*(C*d^2 + e*(B*d + 4*A*e))*ArcTan[(e*x)/Sqrt[
d^2 - e^2*x^2]])/(8*e^3)
```

Rubi [A] time = 0.440757, antiderivative size = 186, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.156$

$$\frac{dx\sqrt{d^2-e^2x^2}\left(e(4Ae+Bd)+Cd^2\right)}{8e^2}-\frac{\left(d^2-e^2x^2\right)^{3/2}\left(5e(Ae+Bd)+2Cd^2\right)}{15e^3}+\frac{d^3\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(e(4Ae+Bd)+Cd^2\right)}{8e^3}-\frac{x\left(d^2-e^2x^2\right)^{3/2}(Be+Cd)}{4e^2}-\frac{Cx^2\left(d^2-e^2x^2\right)^{3/2}}{5e}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)*(A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2],x]
```

```
[Out] (d*(C*d^2 + e*(B*d + 4*A*e))*x*Sqrt[d^2 - e^2*x^2])/(8*e^2) - ((2
*C*d^2 + 5*e*(B*d + A*e))*(d^2 - e^2*x^2)^(3/2))/(15*e^3) - ((C*d
 + B*e)*x*(d^2 - e^2*x^2)^(3/2))/(4*e^2) - (C*x^2*(d^2 - e^2*x^2)
^(3/2))/(5*e) + (d^3*(C*d^2 + e*(B*d + 4*A*e))*ArcTan[(e*x)/Sqrt[
d^2 - e^2*x^2]])/(8*e^3)
```

Rubi in Sympy [A] time = 40.7685, size = 178, normalized size = 0.96

$$-\frac{C(d+ex)^2\left(d^2-e^2x^2\right)^{\frac{3}{2}}}{5e^3}+\frac{d^3\left(4Ae^2+Bde+Cd^2\right)\operatorname{atan}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{8e^3}+\frac{dx\sqrt{d^2-e^2x^2}\left(4Ae^2+Bde+Cd^2\right)}{8e^2}-\frac{(d+ex)\left(d^2-e^2x^2\right)^{\frac{3}{2}}(5Be-3Cd)}{20e^3}-\frac{\left(d^2-e^2x^2\right)^{\frac{3}{2}}\left(4Ae^2+Bde+Cd^2\right)}{12e^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)*(C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] -C*(d + e*x)**2*(d**2 - e**2*x**2)**(3/2)/(5*e**3) + d**3*(4*A*e*
*2 + B*d*e + C*d**2)*atan(e*x/sqrt(d**2 - e**2*x**2))/(8*e**3) +
d*x*sqrt(d**2 - e**2*x**2)*(4*A*e**2 + B*d*e + C*d**2)/(8*e**2) -
 (d + e*x)*(d**2 - e**2*x**2)**(3/2)*(5*B*e - 3*C*d)/(20*e**3) -
(d**2 - e**2*x**2)**(3/2)*(4*A*e**2 + B*d*e + C*d**2)/(12*e**3)
```

Mathematica [A] time = 0.243868, size = 158, normalized size = 0.85

$$\frac{\sqrt{d^2-e^2x^2}\left(-8e^2x^2\left(Cd^2-5e(Ae+Bd)\right)-15dex\left(e(Bd-4Ae)+Cd^2\right)-8d^2\left(5e(Ae+Bd)+2Cd^2\right)+30e^3x^3(Be+Cd)+2\right.}{120e^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x)*(A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2],x]
```

```
[Out] (Sqrt[d^2 - e^2*x^2]*(-8*d^2*(2*C*d^2 + 5*e*(B*d + A*e)) - 15*d*e
*(C*d^2 + e*(B*d - 4*A*e))*x - 8*e^2*(C*d^2 - 5*e*(B*d + A*e))*x^
2 + 30*e^3*(C*d + B*e)*x^3 + 24*C*e^4*x^4) + 15*d^3*(C*d^2 + e*(B
*d + 4*A*e))*ArcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(120*e^3)
```

Maple [A] time = 0.013, size = 304, normalized size = 1.6

$$\frac{dAx}{2}\sqrt{-e^2x^2+d^2}+\frac{d^3A}{2}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}-\frac{A}{3\,e}\left(-e^2x^2+d^2\right)^{\frac{3}{2}}$$
$$-\frac{Bd}{3\,e^2}\left(-e^2x^2+d^2\right)^{\frac{3}{2}}-\frac{Bx}{4\,e}\left(-e^2x^2+d^2\right)^{\frac{3}{2}}-\frac{Cdx}{4\,e^2}\left(-e^2x^2+d^2\right)^{\frac{3}{2}}$$
$$+\frac{d^2xB}{8\,e}\sqrt{-e^2x^2+d^2}+\frac{Cd^3x}{8\,e^2}\sqrt{-e^2x^2+d^2}+\frac{d^4B}{8\,e}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}$$
$$+\frac{d^5C}{8\,e^2}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}-\frac{Cx^2}{5\,e}\left(-e^2x^2+d^2\right)^{\frac{3}{2}}-\frac{2\,Cd^2}{15\,e^3}\left(-e^2x^2+d^2\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)*(C*x^2+B*x+A)*(-e^2*x^2+d^2)^(1/2),x)
```

```
[Out] 1/2*d*A*x*(-e^2*x^2+d^2)^(1/2)+1/2*d^3*A/(e^2)^(1/2)*arctan((e^2)
^(1/2)*x/(-e^2*x^2+d^2)^(1/2))-1/3/e*(-e^2*x^2+d^2)^(3/2)*A-1/3/e
```

```
^2*(-e^2*x^2+d^2)^(3/2)*B*d-1/4*x*(-e^2*x^2+d^2)^(3/2)/e*B-1/4*x*
(-e^2*x^2+d^2)^(3/2)/e^2*C*d+1/8*d^2/e*x*(-e^2*x^2+d^2)^(1/2)*B+1
/8*d^3/e^2*x*(-e^2*x^2+d^2)^(1/2)*C+1/8*d^4/e/(e^2)^(1/2)*arctan(
(e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))*B+1/8*d^5/e^2/(e^2)^(1/2)*arc
tan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))*C-1/5*C*x^2*(-e^2*x^2+d^2
)^(3/2)/e-2/15/e^3*C*d^2*(-e^2*x^2+d^2)^(3/2)
```

Maxima [A] time = 0.780927, size = 304, normalized size = 1.63

$$\frac{Ad^3\arcsin\left(\frac{e^2x}{\sqrt{d^2e^2}}\right)}{2\sqrt{e^2}}+\frac{1}{2}\sqrt{-e^2x^2+d^2}Adx-\frac{\left(-e^2x^2+d^2\right)^{\frac{3}{2}}Cx^2}{5e}+\frac{(Cd+Be)d^4\arcsin\left(\frac{e^2x}{\sqrt{d^2e^2}}\right)}{8\sqrt{e^2}e^2}+\frac{\sqrt{-e^2x^2+d^2}(Cd+Be)d^2x}{8e^2}-\frac{2\left(-e^2x^2+d^2\right)^{\frac{3}{2}}Cd^2}{15e^3}-\frac{\left(-e^2x^2+d^2\right)^{\frac{3}{2}}Bd}{3e^2}-\frac{\left(-e^2x^2+d^2\right)^{\frac{3}{2}}A}{3e}-\frac{\left(-e^2x^2+d^2\right)^{\frac{3}{2}}(Cd+Be)x}{4e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)*(e*x + d),x, algorithm="maxima")
```

```
[Out] 1/2*A*d^3*arcsin(e^2*x/sqrt(d^2*e^2))/sqrt(e^2) + 1/2*sqrt(-e^2*x
^2 + d^2)*A*d*x - 1/5*(-e^2*x^2 + d^2)^(3/2)*C*x^2/e + 1/8*(C*d +
 B*e)*d^4*arcsin(e^2*x/sqrt(d^2*e^2))/(sqrt(e^2)*e^2) + 1/8*sqrt(
-e^2*x^2 + d^2)*(C*d + B*e)*d^2*x/e^2 - 2/15*(-e^2*x^2 + d^2)^(3/
2)*C*d^2/e^3 - 1/3*(-e^2*x^2 + d^2)^(3/2)*B*d/e^2 - 1/3*(-e^2*x^2
 + d^2)^(3/2)*A/e - 1/4*(-e^2*x^2 + d^2)^(3/2)*(C*d + B*e)*x/e^2
```

Fricas [A] time = 0.296587, size = 1054, normalized size = 5.67

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)*(e*x + d),x, algorithm="fricas")
```

```
[Out] 1/120*(24*C*e^10*x^10 + 30*(C*d*e^9 + B*e^10)*x^9 - 40*(8*C*d^2*e
^8 - B*d*e^9 - A*e^10)*x^8 - 15*(27*C*d^3*e^7 + 27*B*d^2*e^8 - 4*
A*d*e^9)*x^7 + 40*(19*C*d^4*e^6 - 14*B*d^3*e^7 - 14*A*d^2*e^8)*x^
6 + 15*(69*C*d^5*e^5 + 69*B*d^4*e^6 - 52*A*d^3*e^7)*x^5 - 480*(C*
d^6*e^4 - 3*B*d^5*e^5 - 3*A*d^4*e^6)*x^4 - 60*(15*C*d^7*e^3 + 15*
B*d^6*e^4 - 28*A*d^5*e^5)*x^3 - 960*(B*d^7*e^3 + A*d^6*e^4)*x^2 +
 240*(C*d^9*e + B*d^8*e^2 - 4*A*d^7*e^3)*x - 30*(16*C*d^10 + 16*B
```

```
*d^9*e + 64*A*d^8*e^2 + 5*(C*d^6*e^4 + B*d^5*e^5 + 4*A*d^4*e^6)*x
^4 - 20*(C*d^8*e^2 + B*d^7*e^3 + 4*A*d^6*e^4)*x^2 - (16*C*d^9 + 1
6*B*d^8*e + 64*A*d^7*e^2 + (C*d^5*e^4 + B*d^4*e^5 + 4*A*d^3*e^6)*
x^4 - 12*(C*d^7*e^2 + B*d^6*e^3 + 4*A*d^5*e^4)*x^2)*sqrt(-e^2*x^2
 + d^2))*arctan(-(d - sqrt(-e^2*x^2 + d^2))/(e*x)) + 5*(24*C*d*e^
8*x^8 + 30*(C*d^2*e^7 + B*d*e^8)*x^7 - 8*(13*C*d^3*e^6 - 5*B*d^2*
e^7 - 5*A*d*e^8)*x^6 - 15*(9*C*d^4*e^5 + 9*B*d^3*e^6 - 4*A*d^2*e^
7)*x^5 + 96*(C*d^5*e^4 - 2*B*d^4*e^5 - 2*A*d^3*e^6)*x^4 + 12*(13*
C*d^6*e^3 + 13*B*d^5*e^4 - 20*A*d^4*e^5)*x^3 + 192*(B*d^6*e^3 + A
*d^5*e^4)*x^2 - 48*(C*d^8*e + B*d^7*e^2 - 4*A*d^6*e^3)*x)*sqrt(-e
^2*x^2 + d^2))/(5*d*e^7*x^4 - 20*d^3*e^5*x^2 + 16*d^5*e^3 - (e^7*
x^4 - 12*d^2*e^5*x^2 + 16*d^4*e^3)*sqrt(-e^2*x^2 + d^2))
```

Sympy [A] time = 14.9025, size = 670, normalized size = 3.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)*(C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] A*d*Piecewise((-I*d**2*acosh(e*x/d)/(2*e) - I*d*x/(2*sqrt(-1 + e*
*2*x**2/d**2)) + I*e**2*x**3/(2*d*sqrt(-1 + e**2*x**2/d**2)), Abs
(e**2*x**2/d**2) > 1), (d**2*asin(e*x/d)/(2*e) + d*x*sqrt(1 - e**
2*x**2/d**2)/2, True)) + A*e*Piecewise((x**2*sqrt(d**2)/2, Eq(e**
2, 0)), (-(d**2 - e**2*x**2)**(3/2)/(3*e**2), True)) + B*d*Piecew
ise((x**2*sqrt(d**2)/2, Eq(e**2, 0)), (-(d**2 - e**2*x**2)**(3/2)
/(3*e**2), True)) + B*e*Piecewise((-I*d**4*acosh(e*x/d)/(8*e**3)
+ I*d**3*x/(8*e**2*sqrt(-1 + e**2*x**2/d**2)) - 3*I*d*x**3/(8*sqr
t(-1 + e**2*x**2/d**2)) + I*e**2*x**5/(4*d*sqrt(-1 + e**2*x**2/d*
*2)), Abs(e**2*x**2/d**2) > 1), (d**4*asin(e*x/d)/(8*e**3) - d**3
*x/(8*e**2*sqrt(1 - e**2*x**2/d**2)) + 3*d*x**3/(8*sqrt(1 - e**2*
x**2/d**2)) - e**2*x**5/(4*d*sqrt(1 - e**2*x**2/d**2)), True)) +
C*d*Piecewise((-I*d**4*acosh(e*x/d)/(8*e**3) + I*d**3*x/(8*e**2*s
qrt(-1 + e**2*x**2/d**2)) - 3*I*d*x**3/(8*sqrt(-1 + e**2*x**2/d**
2)) + I*e**2*x**5/(4*d*sqrt(-1 + e**2*x**2/d**2)), Abs(e**2*x**2/
d**2) > 1), (d**4*asin(e*x/d)/(8*e**3) - d**3*x/(8*e**2*sqrt(1 -
e**2*x**2/d**2)) + 3*d*x**3/(8*sqrt(1 - e**2*x**2/d**2)) - e**2*x
**5/(4*d*sqrt(1 - e**2*x**2/d**2)), True)) + C*e*Piecewise((-2*d*
*4*sqrt(d**2 - e**2*x**2)/(15*e**4) - d**2*x**2*sqrt(d**2 - e**2*
x**2)/(15*e**2) + x**4*sqrt(d**2 - e**2*x**2)/5, Ne(e, 0)), (x**4
*sqrt(d**2)/4, True))
```

GIAC/XCAS [A] time = 0.275949, size = 216, normalized size = 1.16

$$\frac{1}{8}\left(Cd^5 + Bd^4e + 4\,Ad^3e^2\right)\arcsin\left(\frac{xe}{d}\right)e^{(-3)}\mathrm{sign}\left(d\right) + \frac{1}{120}\sqrt{-x^2e^2 + d^2}\left(\left(2\left(3\left(4\,Cxe + 5\left(Cde^6 + Be^7\right)e^{(-6)}\right)x - 4\left(Cd^2e^5 - 5\,Bde^6 - 5\,Ae^7\right)e^{(-6)}\right)x - 15\left(Cd^3e^4 + Bd^2e^5 - 4\,Ade\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)*(e*x + d),x, algorithm="giac")
```

```
[Out] 1/8*(C*d^5 + B*d^4*e + 4*A*d^3*e^2)*arcsin(x*e/d)*e^(-3)*sign(d)
+ 1/120*sqrt(-x^2*e^2 + d^2)*((2*(3*(4*C*x*e + 5*(C*d*e^6 + B*e^7
)*e^(-6))*x - 4*(C*d^2*e^5 - 5*B*d*e^6 - 5*A*e^7)*e^(-6))*x - 15*
(C*d^3*e^4 + B*d^2*e^5 - 4*A*d*e^6)*e^(-6))*x - 8*(2*C*d^4*e^3 +
5*B*d^3*e^4 + 5*A*d^2*e^5)*e^(-6))
```

3.3 $\int (A+Bx+Cx^2)\sqrt{d^2-e^2x^2}\,dx$

Optimal. Leaf size=125

$$\frac{1}{8}x\sqrt{d^2-e^2x^2}\left(4A+\frac{Cd^2}{e^2}\right)+\frac{d^2\left(4Ae^2+Cd^2\right)\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{8e^3}-\frac{B\left(d^2-e^2x^2\right)^{3/2}}{3e^2}-\frac{Cx\left(d^2-e^2x^2\right)^{3/2}}{4e^2}$$

```
[Out] ((4*A + (C*d^2)/e^2)*x*Sqrt[d^2 - e^2*x^2])/8 - (B*(d^2 - e^2*x^2
)^(3/2))/(3*e^2) - (C*x*(d^2 - e^2*x^2)^(3/2))/(4*e^2) + (d^2*(C*
d^2 + 4*A*e^2)*ArcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(8*e^3)
```

Rubi [A] time = 0.151831, antiderivative size = 125, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{1}{8}x\sqrt{d^2-e^2x^2}\left(4A+\frac{Cd^2}{e^2}\right)+\frac{d^2\left(4Ae^2+Cd^2\right)\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{8e^3}-\frac{B\left(d^2-e^2x^2\right)^{3/2}}{3e^2}-\frac{Cx\left(d^2-e^2x^2\right)^{3/2}}{4e^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2],x]
```

```
[Out] ((4*A + (C*d^2)/e^2)*x*Sqrt[d^2 - e^2*x^2])/8 - (B*(d^2 - e^2*x^2
)^(3/2))/(3*e^2) - (C*x*(d^2 - e^2*x^2)^(3/2))/(4*e^2) + (d^2*(C*
d^2 + 4*A*e^2)*ArcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(8*e^3)
```

Rubi in Sympy [A] time = 18.8261, size = 97, normalized size = 0.78

$$\frac{d^2\left(4Ae^2+Cd^2\right)\operatorname{atan}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{8e^3}+\frac{x\sqrt{d^2-e^2x^2}\left(4Ae^2+Cd^2\right)}{8e^2}-\frac{(4B+3Cx)\left(d^2-e^2x^2\right)^{\frac{3}{2}}}{12e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] d**2*(4*A*e**2 + C*d**2)*atan(e*x/sqrt(d**2 - e**2*x**2))/(8*e**3
) + x*sqrt(d**2 - e**2*x**2)*(4*A*e**2 + C*d**2)/(8*e**2) - (4*B
+ 3*C*x)*(d**2 - e**2*x**2)**(3/2)/(12*e**2)
```

Mathematica [A] time = 0.108389, size = 102, normalized size = 0.82

$$\frac{e\sqrt{d^2-e^2x^2}\left(12Ae^2x-8Bd^2+8Be^2x^2-3Cd^2x+6Ce^2x^3\right)+3d^2\left(4Ae^2+Cd^2\right)\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{24e^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2],x]
```

```
[Out] (e*Sqrt[d^2 - e^2*x^2]*(-8*B*d^2 - 3*C*d^2*x + 12*A*e^2*x + 8*B*e
^2*x^2 + 6*C*e^2*x^3) + 3*d^2*(C*d^2 + 4*A*e^2)*ArcTan[(e*x)/Sqrt
[d^2 - e^2*x^2]])/(24*e^3)
```

Maple [A] time = 0.008, size = 154, normalized size = 1.2

$$\frac{Ax}{2}\sqrt{-e^2x^2+d^2}+\frac{Ad^2}{2}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}-\frac{B}{3\,e^2}\left(-e^2x^2+d^2\right)^{\frac{3}{2}}$$
$$-\frac{Cx}{4\,e^2}\left(-e^2x^2+d^2\right)^{\frac{3}{2}}+\frac{Cd^2x}{8\,e^2}\sqrt{-e^2x^2+d^2}+\frac{Cd^4}{8\,e^2}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)*(-e^2*x^2+d^2)^(1/2),x)
```

```
[Out] 1/2*A*x*(-e^2*x^2+d^2)^(1/2)+1/2*A*d^2/(e^2)^(1/2)*arctan((e^2)^(
1/2)*x/(-e^2*x^2+d^2)^(1/2))-1/3*B*(-e^2*x^2+d^2)^(3/2)/e^2-1/4*C
*x*(-e^2*x^2+d^2)^(3/2)/e^2+1/8*C*d^2/e^2*x*(-e^2*x^2+d^2)^(1/2)+
1/8*C*d^4/e^2/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/
2))
```

Maxima [A] time = 0.790781, size = 188, normalized size = 1.5

$$\frac{Ad^2\arcsin\left(\frac{e^2x}{\sqrt{d^2e^2}}\right)}{2\sqrt{e^2}}+\frac{Cd^4\arcsin\left(\frac{e^2x}{\sqrt{d^2e^2}}\right)}{8\sqrt{e^2}e^2}+\frac{1}{2}\sqrt{-e^2x^2+d^2}Ax$$
$$+\frac{\sqrt{-e^2x^2+d^2}Cd^2x}{8\,e^2}-\frac{\left(-e^2x^2+d^2\right)^{\frac{3}{2}}Cx}{4\,e^2}-\frac{\left(-e^2x^2+d^2\right)^{\frac{3}{2}}B}{3\,e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A),x, algorithm="maxima")
```

```
[Out] 1/2*A*d^2*arcsin(e^2*x/sqrt(d^2*e^2))/sqrt(e^2) + 1/8*C*d^4*arcsi
n(e^2*x/sqrt(d^2*e^2))/(sqrt(e^2)*e^2) + 1/2*sqrt(-e^2*x^2 + d^2)
*A*x + 1/8*sqrt(-e^2*x^2 + d^2)*C*d^2*x/e^2 - 1/4*(-e^2*x^2 + d^2
)^(3/2)*C*x/e^2 - 1/3*(-e^2*x^2 + d^2)^(3/2)*B/e^2
```

Fricas [A] time = 0.29253, size = 597, normalized size = 4.78

$$-\frac{24\,Cde^{7}x^{7} + 32\,Bde^{7}x^{6} - 120\,Bd^{3}e^{5}x^{4} + 96\,Bd^{5}e^{3}x^{2} - 12\left(7\,Cd^{3}e^{5} - 4\,Ade^{7}\right)x^{5} + 12\left(7\,Cd^{5}e^{3} - 12\,Ad^{3}e^{5}\right)x^{3} - 24\left(Cd^{7}e -\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A),x, algorithm="fricas")
```

```
[Out] -1/24*(24*C*d*e^7*x^7 + 32*B*d*e^7*x^6 - 120*B*d^3*e^5*x^4 + 96*B
*d^5*e^3*x^2 - 12*(7*C*d^3*e^5 - 4*A*d*e^7)*x^5 + 12*(7*C*d^5*e^3
 - 12*A*d^3*e^5)*x^3 - 24*(C*d^7*e - 4*A*d^5*e^3)*x + 6*(8*C*d^8
+ 32*A*d^6*e^2 + (C*d^4*e^4 + 4*A*d^2*e^6)*x^4 - 8*(C*d^6*e^2 + 4
*A*d^4*e^4)*x^2 - 4*(2*C*d^7 + 8*A*d^5*e^2 - (C*d^5*e^2 + 4*A*d^3
*e^4)*x^2)*sqrt(-e^2*x^2 + d^2))*arctan(-(d - sqrt(-e^2*x^2 + d^2
))/(e*x)) - (6*C*e^7*x^7 + 8*B*e^7*x^6 - 72*B*d^2*e^5*x^4 + 96*B*
d^4*e^3*x^2 - 3*(17*C*d^2*e^5 - 4*A*e^7)*x^5 + 24*(3*C*d^4*e^3 -
4*A*d^2*e^5)*x^3 - 24*(C*d^6*e - 4*A*d^4*e^3)*x)*sqrt(-e^2*x^2 +
d^2))/(e^7*x^4 - 8*d^2*e^5*x^2 + 8*d^4*e^3 + 4*(d*e^5*x^2 - 2*d^3
*e^3)*sqrt(-e^2*x^2 + d^2))
```

Sympy [A] time = 9.01548, size = 343, normalized size = 2.74

$$A\left(\begin{cases} -\frac{id^{2}\operatorname{acosh}{\left(\frac{ex}{d}\right)}}{2e} - \frac{idx}{2\sqrt{-1+\frac{e^{2}x^{2}}{d^{2}}}} + \frac{ie^{2}x^{3}}{2d\sqrt{-1+\frac{e^{2}x^{2}}{d^{2}}}} & \text{for}\: \left|\frac{e^{2}x^{2}}{d^{2}}\right| > 1 \\ \frac{d^{2}\operatorname{asin}{\left(\frac{ex}{d}\right)}}{2e} + \frac{dx\sqrt{1-\frac{e^{2}x^{2}}{d^{2}}}}{2} & \text{otherwise} \end{cases}\right) + B\left(\begin{cases} \frac{x^{2}\sqrt{d^{2}}}{2} & \text{for}\: e^{2} = 0 \\ -\frac{\left(d^{2}-e^{2}x^{2}\right)^{\frac{3}{2}}}{3e^{2}} & \text{otherwise} \end{cases}\right)$$
$$+ C\left(\begin{cases} -\frac{id^{4}\operatorname{acosh}{\left(\frac{ex}{d}\right)}}{8e^{3}} + \frac{id^{3}x}{8e^{2}\sqrt{-1+\frac{e^{2}x^{2}}{d^{2}}}} - \frac{3idx^{3}}{8\sqrt{-1+\frac{e^{2}x^{2}}{d^{2}}}} + \frac{ie^{2}x^{5}}{4d\sqrt{-1+\frac{e^{2}x^{2}}{d^{2}}}} & \text{for}\: \left|\frac{e^{2}x^{2}}{d^{2}}\right| > 1 \\ \frac{d^{4}\operatorname{asin}{\left(\frac{ex}{d}\right)}}{8e^{3}} - \frac{d^{3}x}{8e^{2}\sqrt{1-\frac{e^{2}x^{2}}{d^{2}}}} + \frac{3dx^{3}}{8\sqrt{1-\frac{e^{2}x^{2}}{d^{2}}}} - \frac{e^{2}x^{5}}{4d\sqrt{1-\frac{e^{2}x^{2}}{d^{2}}}} & \text{otherwise} \end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] A*Piecewise((-I*d**2*acosh(e*x/d)/(2*e) - I*d*x/(2*sqrt(-1 + e**2
*x**2/d**2)) + I*e**2*x**3/(2*d*sqrt(-1 + e**2*x**2/d**2)), Abs(e
**2*x**2/d**2) > 1), (d**2*asin(e*x/d)/(2*e) + d*x*sqrt(1 - e**2*
x**2/d**2)/2, True)) + B*Piecewise((x**2*sqrt(d**2)/2, Eq(e**2, 0
)), (-(d**2 - e**2*x**2)**(3/2)/(3*e**2), True)) + C*Piecewise((-
I*d**4*acosh(e*x/d)/(8*e**3) + I*d**3*x/(8*e**2*sqrt(-1 + e**2*x*
*2/d**2)) - 3*I*d*x**3/(8*sqrt(-1 + e**2*x**2/d**2)) + I*e**2*x**
5/(4*d*sqrt(-1 + e**2*x**2/d**2)), Abs(e**2*x**2/d**2) > 1), (d**
4*asin(e*x/d)/(8*e**3) - d**3*x/(8*e**2*sqrt(1 - e**2*x**2/d**2))
 + 3*d*x**3/(8*sqrt(1 - e**2*x**2/d**2)) - e**2*x**5/(4*d*sqrt(1
- e**2*x**2/d**2)), True))
```

GIAC/XCAS [A] time = 0.274263, size = 115, normalized size = 0.92

$$\frac{1}{8}\left(Cd^4 + 4\,Ad^2e^2\right)\arcsin\left(\frac{xe}{d}\right)e^{(-3)}\operatorname{sign}(d) - \frac{1}{24}\left(8\,Bd^2e^{(-2)} - \left(2\,(3\,Cx + 4\,B)x - 3\left(Cd^2e^2 - 4\,Ae^4\right)e^{(-4)}\right)x\right)\sqrt{-x^2e^2 + d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A),x, algorithm="giac")
```

```
[Out] 1/8*(C*d^4 + 4*A*d^2*e^2)*arcsin(x*e/d)*e^(-3)*sign(d) - 1/24*(8*
B*d^2*e^(-2) - (2*(3*C*x + 4*B)*x - 3*(C*d^2*e^2 - 4*A*e^4)*e^(-4
))*x)*sqrt(-x^2*e^2 + d^2)
```

3.4 $\int \frac{(A+Bx+Cx^2)\sqrt{d^2-e^2x^2}}{d+ex}\,dx$

Optimal. Leaf size=148

$$\frac{\sqrt{d^2-e^2x^2}\,(Cd^2-e(Bd-2Ae))}{2e^3}+\frac{d\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)(Cd^2-e(Bd-2Ae))}{2e^3}+\frac{(d^2-e^2x^2)^{3/2}(Cd-Be)}{2e^3(d+ex)}-\frac{C(d^2-e^2x^2)^{3/2}}{3e^3}$$

```
[Out] ((C*d^2 - e*(B*d - 2*A*e))*Sqrt[d^2 - e^2*x^2])/(2*e^3) - (C*(d^2
 - e^2*x^2)^(3/2))/(3*e^3) + ((C*d - B*e)*(d^2 - e^2*x^2)^(3/2))/
(2*e^3*(d + e*x)) + (d*(C*d^2 - e*(B*d - 2*A*e))*ArcTan[(e*x)/Sqr
t[d^2 - e^2*x^2]])/(2*e^3)
```

Rubi [A] time = 0.406384, antiderivative size = 148, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.147

$$\frac{\sqrt{d^2-e^2x^2}\,(Cd^2-e(Bd-2Ae))}{2e^3}+\frac{d\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)(Cd^2-e(Bd-2Ae))}{2e^3}+\frac{(d^2-e^2x^2)^{3/2}(Cd-Be)}{2e^3(d+ex)}-\frac{C(d^2-e^2x^2)^{3/2}}{3e^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2])/(d + e*x),x]
```

```
[Out] ((C*d^2 - e*(B*d - 2*A*e))*Sqrt[d^2 - e^2*x^2])/(2*e^3) - (C*(d^2
 - e^2*x^2)^(3/2))/(3*e^3) + ((C*d - B*e)*(d^2 - e^2*x^2)^(3/2))/
(2*e^3*(d + e*x)) + (d*(C*d^2 - e*(B*d - 2*A*e))*ArcTan[(e*x)/Sqr
t[d^2 - e^2*x^2]])/(2*e^3)
```

Rubi in Sympy [A] time = 36.9242, size = 128, normalized size = 0.86

$$-\frac{C\left(d^2-e^2x^2\right)^{\frac{3}{2}}}{3e^3}+\frac{d\left(2Ae^2-Bde+Cd^2\right)\operatorname{atan}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{2e^3}+\frac{\sqrt{d^2-e^2x^2}\left(2Ae^2-Bde+Cd^2\right)}{2e^3}-\frac{\left(d^2-e^2x^2\right)^{\frac{3}{2}}(Be-Cd)}{2e^3\,(d+ex)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2)/(e*x+d),x)
```

```
[Out] -C*(d**2 - e**2*x**2)**(3/2)/(3*e**3) + d*(2*A*e**2 - B*d*e + C*d
**2)*atan(e*x/sqrt(d**2 - e**2*x**2))/(2*e**3) + sqrt(d**2 - e**2
*x**2)*(2*A*e**2 - B*d*e + C*d**2)/(2*e**3) - (d**2 - e**2*x**2)*
*(3/2)*(B*e - C*d)/(2*e**3*(d + e*x))
```

Mathematica [A] time = 0.172542, size = 103, normalized size = 0.7

$$\frac{\sqrt{d^2-e^2x^2}\left(3e(2Ae-2Bd+Bex)+C\left(4d^2-3dex+2e^2x^2\right)\right)+3d\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(e(2Ae-Bd)+Cd^2\right)}{6e^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2])/(d + e*x),x]
```

```
[Out] (Sqrt[d^2 - e^2*x^2]*(3*e*(-2*B*d + 2*A*e + B*e*x) + C*(4*d^2 - 3
*d*e*x + 2*e^2*x^2)) + 3*d*(C*d^2 + e*(-(B*d) + 2*A*e))*ArcTan[(e
*x)/Sqrt[d^2 - e^2*x^2]])/(6*e^3)
```

Maple [B] time = 0.017, size = 384, normalized size = 2.6

$$\frac{Bx}{2e}\sqrt{-e^2x^2+d^2}+\frac{Bd^2}{2e}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}-\frac{C}{3e^3}\left(-e^2x^2+d^2\right)^{\frac{3}{2}}$$
$$-\frac{Cdx}{2e^2}\sqrt{-e^2x^2+d^2}-\frac{Cd^3}{2e^2}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}$$
$$+\frac{A}{e}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}-\frac{Bd}{e^2}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}$$
$$+\frac{Cd^2}{e^3}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}+Ad\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}}\right)\frac{1}{\sqrt{e^2}}$$
$$-\frac{Bd^2}{e}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}}\right)\frac{1}{\sqrt{e^2}}$$
$$+\frac{Cd^3}{e^2}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}}\right)\frac{1}{\sqrt{e^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)*(-e^2*x^2+d^2)^(1/2)/(e*x+d),x)
```

```
[Out] 1/2/e*B*x*(-e^2*x^2+d^2)^(1/2)+1/2/e*B*d^2/(e^2)^(1/2)*arctan((e^
2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))-1/3*C*(-e^2*x^2+d^2)^(3/2)/e^3-1
/2/e^2*C*d*x*(-e^2*x^2+d^2)^(1/2)-1/2/e^2*C*d^3/(e^2)^(1/2)*arcta
n((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))+1/e*(-(x+d/e)^2*e^2+2*d*e*(
x+d/e))^(1/2)*A-1/e^2*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2)*B*d+1/
e^3*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2)*C*d^2+d/(e^2)^(1/2)*arct
an((e^2)^(1/2)*x/(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2))*A-1/e*d^2/
(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(
1/2))*B+1/e^2*d^3/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-(x+d/e)^2*e^
2+2*d*e*(x+d/e))^(1/2))*C
```

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(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.296248, size = 559, normalized size = 3.78

$$2\,Ce^{6}x^{6} - 3\left(Cde^{5} - Be^{6}\right)x^{5} - 6\left(Cd^{2}e^{4} + Bde^{5} - Ae^{6}\right)x^{4} + 15\left(Cd^{3}e^{3} - Bd^{2}e^{4}\right)x^{3} + 12\left(Bd^{3}e^{3} - Ad^{2}e^{4}\right)x^{2} - 12\left(Cd^{5}e - Bd\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d),x, algorithm="fricas")
```

```
[Out] 1/6*(2*C*e^6*x^6 - 3*(C*d*e^5 - B*e^6)*x^5 - 6*(C*d^2*e^4 + B*d*e
^5 - A*e^6)*x^4 + 15*(C*d^3*e^3 - B*d^2*e^4)*x^3 + 12*(B*d^3*e^3
- A*d^2*e^4)*x^2 - 12*(C*d^5*e - B*d^4*e^2)*x + 6*(4*C*d^6 - 4*B*
d^5*e + 8*A*d^4*e^2 - 3*(C*d^4*e^2 - B*d^3*e^3 + 2*A*d^2*e^4)*x^2
 - (4*C*d^5 - 4*B*d^4*e + 8*A*d^3*e^2 - (C*d^3*e^2 - B*d^2*e^3 +
2*A*d*e^4)*x^2)*sqrt(-e^2*x^2 + d^2))*arctan(-(d - sqrt(-e^2*x^2
+ d^2))/(e*x)) + 3*(2*C*d*e^4*x^4 - 3*(C*d^2*e^3 - B*d*e^4)*x^3 -
 4*(B*d^2*e^3 - A*d*e^4)*x^2 + 4*(C*d^4*e - B*d^3*e^2)*x)*sqrt(-e
```

```
^2*x^2 + d^2))/(3*d*e^5*x^2 - 4*d^3*e^3 - (e^5*x^2 - 4*d^2*e^3)*s
qrt(-e^2*x^2 + d^2))
```

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

$$\int \frac{\sqrt{-\left(-d+ex\right)\left(d+ex\right)}\left(A+Bx+Cx^2\right)}{d+ex}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2)/(e*x+d),x)
```

```
[Out] Integral(sqrt(-(-d + e*x)*(d + e*x))*(A + B*x + C*x**2)/(d + e*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(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.5 $\int \frac{(A+Bx+Cx^2)\sqrt{d^2-e^2x^2}}{(d+ex)^2}\,dx$

Optimal. Leaf size=170

$$-\frac{(d^2-e^2x^2)^{3/2}(Ae^2-Bde+Cd^2)}{de^3(d+ex)^2}-\frac{\sqrt{d^2-e^2x^2}\,(5Cd^2-2e(2Bd-Ae))}{2de^3}-\frac{\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)(5Cd^2-2e(2Bd-Ae))}{2e^3}-\frac{C(d^2-e^2x^2)^{3/2}}{2e^3(d+ex)}$$

```
[Out] -((5*C*d^2 - 2*e*(2*B*d - A*e))*Sqrt[d^2 - e^2*x^2])/(2*d*e^3) -
((C*d^2 - B*d*e + A*e^2)*(d^2 - e^2*x^2)^(3/2))/(d*e^3*(d + e*x)^
2) - (C*(d^2 - e^2*x^2)^(3/2))/(2*e^3*(d + e*x)) - ((5*C*d^2 - 2*
e*(2*B*d - A*e))*ArcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(2*e^3)
```

Rubi [A] time = 0.464473, antiderivative size = 170, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.147

$$-\frac{(d^2-e^2x^2)^{3/2}(Ae^2-Bde+Cd^2)}{de^3(d+ex)^2}-\frac{\sqrt{d^2-e^2x^2}\,(5Cd^2-2e(2Bd-Ae))}{2de^3}-\frac{\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)(5Cd^2-2e(2Bd-Ae))}{2e^3}-\frac{C(d^2-e^2x^2)^{3/2}}{2e^3(d+ex)}$$

Antiderivative was successfully verified.

```
[In]  Int[((A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2])/(d + e*x)^2,x]
```

```
[Out] -((5*C*d^2 - 2*e*(2*B*d - A*e))*Sqrt[d^2 - e^2*x^2])/(2*d*e^3) -
((C*d^2 - B*d*e + A*e^2)*(d^2 - e^2*x^2)^(3/2))/(d*e^3*(d + e*x)^
2) - (C*(d^2 - e^2*x^2)^(3/2))/(2*e^3*(d + e*x)) - ((5*C*d^2 - 2*
e*(2*B*d - A*e))*ArcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(2*e^3)
```

Rubi in Sympy [A] time = 37.7135, size = 151, normalized size = 0.89

$$-\frac{C(d^2-e^2x^2)^{\frac{3}{2}}}{2e^3(d+ex)}-\frac{(2Ae^2-4Bde+5Cd^2)\operatorname{atan}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{2e^3}-\frac{\sqrt{d^2-e^2x^2}\,(2Ae^2-4Bde+5Cd^2)}{2de^3}-\frac{(d^2-e^2x^2)^{\frac{3}{2}}(Ae^2-Bde+Cd^2)}{de^3(d+ex)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2)/(e*x+d)**2,x)
```

```
[Out] -C*(d**2 - e**2*x**2)**(3/2)/(2*e**3*(d + e*x)) - (2*A*e**2 - 4*B
*d*e + 5*C*d**2)*atan(e*x/sqrt(d**2 - e**2*x**2))/(2*e**3) - sqrt
(d**2 - e**2*x**2)*(2*A*e**2 - 4*B*d*e + 5*C*d**2)/(2*d*e**3) - (
d**2 - e**2*x**2)**(3/2)*(A*e**2 - B*d*e + C*d**2)/(d*e**3*(d + e
*x)**2)
```

Mathematica [A] time = 0.199739, size = 109, normalized size = 0.64

$$\frac{\frac{\sqrt{d^2-e^2x^2}\left(2e(-2Ae+3Bd+Bex)+C\left(-8d^2-3dex+e^2x^2\right)\right)}{d+ex}-\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(2e(Ae-2Bd)+5Cd^2\right)}{2e^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2])/(d + e*x)^2,x]
```

```
[Out] ((Sqrt[d^2 - e^2*x^2]*(2*e*(3*B*d - 2*A*e + B*e*x) + C*(-8*d^2 -
3*d*e*x + e^2*x^2)))/(d + e*x) - (5*C*d^2 + 2*e*(-2*B*d + A*e))*A
rcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(2*e^3)
```

Maple [B] time = 0.019, size = 439, normalized size = 2.6

$$\frac{Cx}{2e^2}\sqrt{-e^2x^2+d^2}+\frac{Cd^2}{2e^2}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}+2\frac{B}{e^2}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}$$
$$-3\frac{dC}{e^3}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}+2\frac{Bd}{e\sqrt{e^2}}\arctan\left(\sqrt{e^2}x\frac{1}{\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}}\right)$$
$$-3\frac{Cd^2}{e^2\sqrt{e^2}}\arctan\left(\sqrt{e^2}x\frac{1}{\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}}\right)$$
$$-\frac{A}{de^3}\left(-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)\right)^{\frac{3}{2}}\left(x+\frac{d}{e}\right)^{-2}$$
$$+\frac{B}{e^4}\left(-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)\right)^{\frac{3}{2}}\left(x+\frac{d}{e}\right)^{-2}$$
$$-\frac{dC}{e^5}\left(-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)\right)^{\frac{3}{2}}\left(x+\frac{d}{e}\right)^{-2}-\frac{A}{de}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}$$
$$-A\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}}\right)\frac{1}{\sqrt{e^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)*(-e^2*x^2+d^2)^(1/2)/(e*x+d)^2,x)
```

```
[Out] 1/2*C*x*(-e^2*x^2+d^2)^(1/2)/e^2+1/2*C/e^2*d^2/(e^2)^(1/2)*arctan
((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))+2/e^2*(-(x+d/e)^2*e^2+2*d*e*
(x+d/e))^(1/2)*B-3/e^3*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2)*d*C+2
/e*d/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-(x+d/e)^2*e^2+2*d*e*(x+d/
e))^(1/2))*B-3/e^2*d^2/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-(x+d/e)
^2*e^2+2*d*e*(x+d/e))^(1/2))*C-1/e^3/d/(x+d/e)^2*(-(x+d/e)^2*e^2+
2*d*e*(x+d/e))^(3/2)*A+1/e^4/(x+d/e)^2*(-(x+d/e)^2*e^2+2*d*e*(x+d
/e))^(3/2)*B-1/e^5*d/(x+d/e)^2*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(3/
2)*C-1/e/d*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2)*A-1/(e^2)^(1/2)*a
rctan((e^2)^(1/2)*x/(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2))*A
```

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(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^2,x, algorithm="maxima
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.29825, size = 690, normalized size = 4.06

$$\frac{Ce^5x^5 - 2\left(3\,Cde^4 - Be^5\right)x^4 - \left(9\,Cd^2e^3 - 6\,Bde^4 + 8\,Ae^5\right)x^3 + 2\left(5\,Cd^3e^2 - 2\,Bd^2e^3\right)x^2 + 4\left(5\,Cd^4e - 4\,Bd^3e^2 + 4\,Ad^2e^3\right)x \cdots}{\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^2,x, algorithm="fricas
```

```
[Out] 1/2*(C*e^5*x^5 - 2*(3*C*d*e^4 - B*e^5)*x^4 - (9*C*d^2*e^3 - 6*B*d
*e^4 + 8*A*e^5)*x^3 + 2*(5*C*d^3*e^2 - 2*B*d^2*e^3)*x^2 + 4*(5*C*
d^4*e - 4*B*d^3*e^2 + 4*A*d^2*e^3)*x - 2*(20*C*d^5 - 16*B*d^4*e +
 8*A*d^3*e^2 - (5*C*d^2*e^3 - 4*B*d*e^4 + 2*A*e^5)*x^3 - 3*(5*C*d
^3*e^2 - 4*B*d^2*e^3 + 2*A*d*e^4)*x^2 + 2*(5*C*d^4*e - 4*B*d^3*e^
2 + 2*A*d^2*e^3)*x - (20*C*d^4 - 16*B*d^3*e + 8*A*d^2*e^2 - (5*C*
d^2*e^2 - 4*B*d*e^3 + 2*A*e^4)*x^2 + 2*(5*C*d^3*e - 4*B*d^2*e^2 +
 2*A*d*e^3)*x)*sqrt(-e^2*x^2 + d^2))*arctan(-(d - sqrt(-e^2*x^2 +
 d^2))/(e*x)) + (C*e^4*x^4 - (C*d*e^3 - 2*B*e^4)*x^3 - 2*(5*C*d^2
*e^2 - 2*B*d*e^3)*x^2 - 4*(5*C*d^3*e - 4*B*d^2*e^2 + 4*A*d*e^3)*x
)*sqrt(-e^2*x^2 + d^2))/(e^6*x^3 + 3*d*e^5*x^2 - 2*d^2*e^4*x - 4*
d^3*e^3 - (e^5*x^2 - 2*d*e^4*x - 4*d^2*e^3)*sqrt(-e^2*x^2 + d^2))
```

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

$$\int \frac{\sqrt{-\left(-d + ex\right)\left(d + ex\right)}\left(A + Bx + Cx^2\right)}{\left(d + ex\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2)/(e*x+d)**2,x)
```

```
[Out] Integral(sqrt(-(-d + e*x)*(d + e*x))*(A + B*x + C*x**2)/(d + e*x)
**2, x)
```

GIAC/XCAS [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^2,x, algorithm="giac")

[Out] Timed out
```

3.6 $\int \frac{(A+Bx+Cx^2)\sqrt{d^2-e^2x^2}}{(d+ex)^3}\,dx$

Optimal. Leaf size=149

$$-\frac{\left(d^2-e^2x^2\right)^{3/2}\left(Ae^2-Bde+Cd^2\right)}{3de^3(d+ex)^3}+\frac{2\sqrt{d^2-e^2x^2}(3Cd-Be)}{e^3(d+ex)}+\frac{(3Cd-Be)\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{e^3}-\frac{C\left(d^2-e^2x^2\right)^{3/2}}{e^3(d+ex)^2}$$

```
[Out] (2*(3*C*d - B*e)*Sqrt[d^2 - e^2*x^2])/(e^3*(d + e*x)) - ((C*d^2 -
 B*d*e + A*e^2)*(d^2 - e^2*x^2)^(3/2))/(3*d*e^3*(d + e*x)^3) - (C
*(d^2 - e^2*x^2)^(3/2))/(e^3*(d + e*x)^2) + ((3*C*d - B*e)*ArcTan
[(e*x)/Sqrt[d^2 - e^2*x^2]])/e^3
```

Rubi [A] time = 0.405592, antiderivative size = 149, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.147

$$-\frac{\left(d^2-e^2x^2\right)^{3/2}\left(Ae^2-Bde+Cd^2\right)}{3de^3(d+ex)^3}+\frac{2\sqrt{d^2-e^2x^2}(3Cd-Be)}{e^3(d+ex)}+\frac{(3Cd-Be)\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{e^3}-\frac{C\left(d^2-e^2x^2\right)^{3/2}}{e^3(d+ex)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2])/(d + e*x)^3,x]
```

```
[Out] (2*(3*C*d - B*e)*Sqrt[d^2 - e^2*x^2])/(e^3*(d + e*x)) - ((C*d^2 -
 B*d*e + A*e^2)*(d^2 - e^2*x^2)^(3/2))/(3*d*e^3*(d + e*x)^3) - (C
*(d^2 - e^2*x^2)^(3/2))/(e^3*(d + e*x)^2) + ((3*C*d - B*e)*ArcTan
[(e*x)/Sqrt[d^2 - e^2*x^2]])/e^3
```

Rubi in Sympy [A] time = 34.371, size = 131, normalized size = 0.88

$$-\frac{C\left(d^2-e^2x^2\right)^{\frac{3}{2}}}{e^3\left(d+ex\right)^2}-\frac{(Be-3Cd)\operatorname{atan}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{e^3}-\frac{2\sqrt{d^2-e^2x^2}\left(Be-3Cd\right)}{e^3\left(d+ex\right)}-\frac{\left(d^2-e^2x^2\right)^{\frac{3}{2}}\left(Ae^2-Bde+Cd^2\right)}{3de^3\left(d+ex\right)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2)/(e*x+d)**3,x)
```

```
[Out] -C*(d**2 - e**2*x**2)**(3/2)/(e**3*(d + e*x)**2) - (B*e - 3*C*d)*
atan(e*x/sqrt(d**2 - e**2*x**2))/e**3 - 2*sqrt(d**2 - e**2*x**2)*
(B*e - 3*C*d)/(e**3*(d + e*x)) - (d**2 - e**2*x**2)**(3/2)*(A*e**
2 - B*d*e + C*d**2)/(3*d*e**3*(d + e*x)**3)
```

Mathematica [A] time = 0.196032, size = 114, normalized size = 0.77

$$\frac{\frac{\sqrt{d^2-e^2x^2}\left(e(Ae(ex-d)-Bd(5d+7ex))+Cd\left(14d^2+19dex+3e^2x^2\right)\right)}{d(d+ex)^2}+3(3Cd-Be)\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{3e^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2])/(d + e*x)^3,x]
```

```
[Out] ((Sqrt[d^2 - e^2*x^2]*(C*d*(14*d^2 + 19*d*e*x + 3*e^2*x^2) + e*(A
*e*(-d + e*x) - B*d*(5*d + 7*e*x))))/(d*(d + e*x)^2) + 3*(3*C*d -
 B*e)*ArcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(3*e^3)
```

Maple [B] time = 0.017, size = 318, normalized size = 2.1

$$3\,\frac{C}{e^3}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2\,de\left(x+\frac{d}{e}\right)}+3\,\frac{Cd}{e^2\sqrt{e^2}}\arctan\left(\sqrt{e^2}x\frac{1}{\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2\,de\left(x+\frac{d}{e}\right)}}\right)$$
$$-\frac{B}{e^4d}\left(-\left(x+\frac{d}{e}\right)^2e^2+2\,de\left(x+\frac{d}{e}\right)\right)^{\frac{3}{2}}\left(x+\frac{d}{e}\right)^{-2}$$
$$+2\,\frac{C}{e^5}\left(-\left(x+\frac{d}{e}\right)^2e^2+2\,de\left(x+\frac{d}{e}\right)\right)^{3/2}\left(x+\frac{d}{e}\right)^{-2}-\frac{B}{e^2d}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2\,de\left(x+\frac{d}{e}\right)}$$
$$-\frac{B}{e}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2\,de\left(x+\frac{d}{e}\right)}}\right)\frac{1}{\sqrt{e^2}}$$
$$-\frac{Ae^2-Bde+Cd^2}{3\,e^6d}\left(-\left(x+\frac{d}{e}\right)^2e^2+2\,de\left(x+\frac{d}{e}\right)\right)^{\frac{3}{2}}\left(x+\frac{d}{e}\right)^{-3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)*(-e^2*x^2+d^2)^(1/2)/(e*x+d)^3,x)
```

```
[Out] 3*C/e^3*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2)+3*C/e^2*d/(e^2)^(1/2
)*arctan((e^2)^(1/2)*x/(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2))-1/e^
4/d/(x+d/e)^2*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(3/2)*B+2/e^5/(x+d/e
)^2*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(3/2)*C-1/e^2/d*(-(x+d/e)^2*e^
2+2*d*e*(x+d/e))^(1/2)*B-1/e/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-(
x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2))*B-1/3*(A*e^2-B*d*e+C*d^2)/e^6/
d/(x+d/e)^3*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(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(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^3,x, algorithm="maxima
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.298475, size = 748, normalized size = 5.02

$$\frac{3\,Cde^5x^5 + 12\left(2\,Cd^2e^4 - Bde^5\right)x^4 + \left(7\,Cd^3e^3 - 4\,Bd^2e^4 - 8\,Ade^5\right)x^3 - 6\left(9\,Cd^4e^2 - 4\,Bd^3e^3\right)x^2 - 12\left(3\,Cd^5e - Bd^4e^2 - Ad\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^3,x, algorithm="fricas
```

```
[Out] 1/3*(3*C*d*e^5*x^5 + 12*(2*C*d^2*e^4 - B*d*e^5)*x^4 + (7*C*d^3*e^
3 - 4*B*d^2*e^4 - 8*A*d*e^5)*x^3 - 6*(9*C*d^4*e^2 - 4*B*d^3*e^3)*
x^2 - 12*(3*C*d^5*e - B*d^4*e^2 - A*d^3*e^3)*x + 6*(12*C*d^6 - 4*
B*d^5*e - (3*C*d^2*e^4 - B*d*e^5)*x^4 - 4*(3*C*d^3*e^3 - B*d^2*e^
4)*x^3 - (3*C*d^4*e^2 - B*d^3*e^3)*x^2 + 6*(3*C*d^5*e - B*d^4*e^2
)*x - (12*C*d^5 - 4*B*d^4*e - (3*C*d^2*e^3 - B*d*e^4)*x^3 + (3*C*
d^3*e^2 - B*d^2*e^3)*x^2 + 6*(3*C*d^4*e - B*d^3*e^2)*x)*sqrt(-e^2
*x^2 + d^2))*arctan(-(d - sqrt(-e^2*x^2 + d^2))/(e*x)) + (3*C*d*e
^4*x^4 + (11*C*d^2*e^3 - 2*B*d*e^4 + 2*A*e^5)*x^3 + 6*(9*C*d^3*e^
2 - 4*B*d^2*e^3)*x^2 + 12*(3*C*d^4*e - B*d^3*e^2 - A*d^2*e^3)*x)*
sqrt(-e^2*x^2 + d^2))/(d*e^7*x^4 + 4*d^2*e^6*x^3 + d^3*e^5*x^2 -
6*d^4*e^4*x - 4*d^5*e^3 - (d*e^6*x^3 - d^2*e^5*x^2 - 6*d^3*e^4*x
- 4*d^4*e^3)*sqrt(-e^2*x^2 + d^2))
```

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

$$\int \frac{\sqrt{-\left(-d+ex\right)\left(d+ex\right)}\left(A+Bx+Cx^2\right)}{\left(d+ex\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2)/(e*x+d)**3,x)
```

```
[Out] Integral(sqrt(-(-d + e*x)*(d + e*x))*(A + B*x + C*x**2)/(d + e*x)
**3, x)
```

GIAC/XCAS [A] time = 0.316693, size = 1, normalized size = 0.01

$$\mathit{Done}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^3,x, algorithm="giac")
```

```
[Out] Done
```

3.7 $\int \frac{(A+Bx+Cx^2)\sqrt{d^2-e^2x^2}}{(d+ex)^4}\,dx$

Optimal. Leaf size=196

$$-\frac{\left(d^2-e^2x^2\right)^{3/2}\left(Ae^2-Bde+Cd^2\right)}{15d^2e^3(d+ex)^3}-\frac{\left(d^2-e^2x^2\right)^{3/2}\left(Ae^2-Bde+Cd^2\right)}{5de^3(d+ex)^4}+\frac{\left(d^2-e^2x^2\right)^{3/2}(2Cd-Be)}{3de^3(d+ex)^3}-\frac{2C\sqrt{d^2-e^2x^2}}{e^3(d+ex)}-\frac{C\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{e^3}$$

```
[Out] (-2*C*Sqrt[d^2 - e^2*x^2])/(e^3*(d + e*x)) - ((C*d^2 - B*d*e + A*
e^2)*(d^2 - e^2*x^2)^(3/2))/(5*d*e^3*(d + e*x)^4) + ((2*C*d - B*e
)*(d^2 - e^2*x^2)^(3/2))/(3*d*e^3*(d + e*x)^3) - ((C*d^2 - B*d*e
+ A*e^2)*(d^2 - e^2*x^2)^(3/2))/(15*d^2*e^3*(d + e*x)^3) - (C*Arc
Tan[(e*x)/Sqrt[d^2 - e^2*x^2]])/e^3
```

Rubi [A] time = 0.418673, antiderivative size = 196, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176

$$-\frac{\left(d^2-e^2x^2\right)^{3/2}\left(Ae^2-Bde+Cd^2\right)}{15d^2e^3(d+ex)^3}-\frac{\left(d^2-e^2x^2\right)^{3/2}\left(Ae^2-Bde+Cd^2\right)}{5de^3(d+ex)^4}+\frac{\left(d^2-e^2x^2\right)^{3/2}(2Cd-Be)}{3de^3(d+ex)^3}-\frac{2C\sqrt{d^2-e^2x^2}}{e^3(d+ex)}-\frac{C\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{e^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2])/(d + e*x)^4,x]
```

```
[Out] (-2*C*Sqrt[d^2 - e^2*x^2])/(e^3*(d + e*x)) - ((C*d^2 - B*d*e + A*
e^2)*(d^2 - e^2*x^2)^(3/2))/(5*d*e^3*(d + e*x)^4) + ((2*C*d - B*e
)*(d^2 - e^2*x^2)^(3/2))/(3*d*e^3*(d + e*x)^3) - ((C*d^2 - B*d*e
+ A*e^2)*(d^2 - e^2*x^2)^(3/2))/(15*d^2*e^3*(d + e*x)^3) - (C*Arc
Tan[(e*x)/Sqrt[d^2 - e^2*x^2]])/e^3
```

Rubi in Sympy [A] time = 42.2249, size = 139, normalized size = 0.71

$$-\frac{C\operatorname{atan}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{e^3}-\frac{2C\sqrt{d^2-e^2x^2}}{e^3\left(d+ex\right)}-\frac{\left(d^2-e^2x^2\right)^{\frac{3}{2}}\left(Ae^2-Bde+Cd^2\right)}{5de^3\left(d+ex\right)^4}-\frac{\left(d^2-e^2x^2\right)^{\frac{3}{2}}\left(Ae^2+4Bde-9Cd^2\right)}{15d^2e^3\left(d+ex\right)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2)/(e*x+d)**4,x)
```

```
[Out] -C*atan(e*x/sqrt(d**2 - e**2*x**2))/e**3 - 2*C*sqrt(d**2 - e**2*x
**2)/(e**3*(d + e*x)) - (d**2 - e**2*x**2)**(3/2)*(A*e**2 - B*d*e
 + C*d**2)/(5*d*e**3*(d + e*x)**4) - (d**2 - e**2*x**2)**(3/2)*(A
*e**2 + 4*B*d*e - 9*C*d**2)/(15*d**2*e**3*(d + e*x)**3)
```

Mathematica [A] time = 0.286595, size = 112, normalized size = 0.57

$$-\frac{\frac{\sqrt{d^2-e^2x^2}\left(e(d-ex)(Ae(4d+ex)+Bd(d+4ex))+3Cd^2\left(8d^2+19dex+13e^2x^2\right)\right)}{d^2(d+ex)^3}+15C\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{15e^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2])/(d + e*x)^4,x]
```

```
[Out] -((Sqrt[d^2 - e^2*x^2]*(3*C*d^2*(8*d^2 + 19*d*e*x + 13*e^2*x^2) +
 e*(d - e*x)*(A*e*(4*d + e*x) + B*d*(d + 4*e*x))))/(d^2*(d + e*x)
^3) + 15*C*ArcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(15*e^3)
```

Maple [B] time = 0.016, size = 453, normalized size = 2.3

$$-\frac{C}{e^{5}d}\left(-\left(x+\frac{d}{e}\right)^{2}e^{2}+2\,de\left(x+\frac{d}{e}\right)\right)^{\frac{3}{2}}\left(x+\frac{d}{e}\right)^{-2}-\frac{C}{de^{3}}\sqrt{-\left(x+\frac{d}{e}\right)^{2}e^{2}+2\,de\left(x+\frac{d}{e}\right)}$$
$$-\frac{C}{e^{2}}\arctan\left(x\sqrt{e^{2}}\frac{1}{\sqrt{-\left(x+\frac{d}{e}\right)^{2}e^{2}+2\,de\left(x+\frac{d}{e}\right)}}\right)\frac{1}{\sqrt{e^{2}}}$$
$$-\frac{Be-2\,Cd}{3\,e^{6}d}\left(-\left(x+\frac{d}{e}\right)^{2}e^{2}+2\,de\left(x+\frac{d}{e}\right)\right)^{\frac{3}{2}}\left(x+\frac{d}{e}\right)^{-3}$$
$$-\frac{A}{5\,e^{5}d}\left(-\left(x+\frac{d}{e}\right)^{2}e^{2}+2\,de\left(x+\frac{d}{e}\right)\right)^{\frac{3}{2}}\left(x+\frac{d}{e}\right)^{-4}$$
$$+\frac{B}{5\,e^{6}}\left(-\left(x+\frac{d}{e}\right)^{2}e^{2}+2\,de\left(x+\frac{d}{e}\right)\right)^{\frac{3}{2}}\left(x+\frac{d}{e}\right)^{-4}$$
$$-\frac{Cd}{5\,e^{7}}\left(-\left(x+\frac{d}{e}\right)^{2}e^{2}+2\,de\left(x+\frac{d}{e}\right)\right)^{\frac{3}{2}}\left(x+\frac{d}{e}\right)^{-4}$$
$$-\frac{A}{15\,d^{2}e^{4}}\left(-\left(x+\frac{d}{e}\right)^{2}e^{2}+2\,de\left(x+\frac{d}{e}\right)\right)^{\frac{3}{2}}\left(x+\frac{d}{e}\right)^{-3}$$
$$+\frac{B}{15\,e^{5}d}\left(-\left(x+\frac{d}{e}\right)^{2}e^{2}+2\,de\left(x+\frac{d}{e}\right)\right)^{\frac{3}{2}}\left(x+\frac{d}{e}\right)^{-3}$$
$$-\frac{C}{15\,e^{6}}\left(-\left(x+\frac{d}{e}\right)^{2}e^{2}+2\,de\left(x+\frac{d}{e}\right)\right)^{\frac{3}{2}}\left(x+\frac{d}{e}\right)^{-3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((C*x^2+B*x+A)*(-e^2*x^2+d^2)^(1/2)/(e*x+d)^4,x)
```

```
[Out] -C/e^5/d/(x+d/e)^2*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(3/2)-C/e^3/d*(
-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2)-C/e^2/(e^2)^(1/2)*arctan((e^2
)^(1/2)*x/(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2))-1/3*(B*e-2*C*d)/e
^6/d/(x+d/e)^3*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(3/2)-1/5/e^5/d/(x+
d/e)^4*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(3/2)*A+1/5/e^6/(x+d/e)^4*(
-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(3/2)*B-1/5/e^7*d/(x+d/e)^4*(-(x+d/
e)^2*e^2+2*d*e*(x+d/e))^(3/2)*C-1/15/e^4/d^2/(x+d/e)^3*(-(x+d/e)^
2*e^2+2*d*e*(x+d/e))^(3/2)*A+1/15/e^5/d/(x+d/e)^3*(-(x+d/e)^2*e^2
+2*d*e*(x+d/e))^(3/2)*B-1/15/e^6/(x+d/e)^3*(-(x+d/e)^2*e^2+2*d*e*
(x+d/e))^(3/2)*C
```

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(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^4,x, algorithm="maxima
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.304715, size = 711, normalized size = 3.63

$$-\frac{3\left(21\,Cd^2e^5 - Bde^6 + Ae^7\right)x^5 + 20\left(3\,Cd^3e^4 + Bd^2e^5 + Ade^6\right)x^4 - 5\left(21\,Cd^4e^3 - Bd^3e^4 - 7\,Ad^2e^5\right)x^3 - 30\left(5\,Cd^5e^2 + Bd^4e\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^4,x, algorithm="fricas
```

```
[Out] -1/15*(3*(21*C*d^2*e^5 - B*d*e^6 + A*e^7)*x^5 + 20*(3*C*d^3*e^4 +
 B*d^2*e^5 + A*d*e^6)*x^4 - 5*(21*C*d^4*e^3 - B*d^3*e^4 - 7*A*d^2
*e^5)*x^3 - 30*(5*C*d^5*e^2 + B*d^4*e^3 + A*d^3*e^4)*x^2 - 60*(C*
d^6*e + A*d^4*e^3)*x - 30*(C*d^2*e^5*x^5 + 5*C*d^3*e^4*x^4 + 5*C*
d^4*e^3*x^3 - 5*C*d^5*e^2*x^2 - 10*C*d^6*e*x - 4*C*d^7 - (C*d^2*e
^4*x^4 - 7*C*d^4*e^2*x^2 - 10*C*d^5*e*x - 4*C*d^6)*sqrt(-e^2*x^2
+ d^2))*arctan(-(d - sqrt(-e^2*x^2 + d^2))/(e*x)) + 5*((3*C*d^2*e
^4 - B*d*e^5 - A*e^6)*x^4 + (27*C*d^3*e^3 - B*d^2*e^4 - A*d*e^5)*
x^3 + 6*(5*C*d^4*e^2 + B*d^3*e^3 + A*d^2*e^4)*x^2 + 12*(C*d^5*e +
 A*d^3*e^3)*x)*sqrt(-e^2*x^2 + d^2))/(d^2*e^8*x^5 + 5*d^3*e^7*x^4
 + 5*d^4*e^6*x^3 - 5*d^5*e^5*x^2 - 10*d^6*e^4*x - 4*d^7*e^3 - (d^
2*e^7*x^4 - 7*d^4*e^5*x^2 - 10*d^5*e^4*x - 4*d^6*e^3)*sqrt(-e^2*x
^2 + d^2))
```

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

$$\int \frac{\sqrt{-\left(-d + ex\right)\left(d + ex\right)}\left(A + Bx + Cx^2\right)}{\left(d + ex\right)^4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2)/(e*x+d)**4,x)
```

```
[Out] Integral(sqrt(-(-d + e*x)*(d + e*x))*(A + B*x + C*x**2)/(d + e*x)
**4, x)
```

GIAC/XCAS [A] time = 0.320546, size = 1, normalized size = 0.01

$$\text{Done}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^4,x, algorithm="giac")
```

```
[Out] Done
```

3.8 $\int \frac{(A+Bx+Cx^2)\sqrt{d^2-e^2x^2}}{(d+ex)^5}\,dx$

Optimal. Leaf size=180

$$-\frac{(d^2-e^2x^2)^{3/2}\,(e(2Ae+5Bd)+23Cd^2)}{35d^2e^3(d+ex)^4}-\frac{(d^2-e^2x^2)^{3/2}\,(Ae^2-Bde+Cd^2)}{7de^3(d+ex)^5}-\frac{(d^2-e^2x^2)^{3/2}\,(e(2Ae+5Bd)+23Cd^2)}{105d^3e^3(d+ex)^3}+\frac{C\,(d^2-e^2x^2)^{3/2}}{e^3(d+ex)^4}$$

```
[Out] -((C*d^2 - B*d*e + A*e^2)*(d^2 - e^2*x^2)^(3/2))/(7*d*e^3*(d + e*
x)^5) + (C*(d^2 - e^2*x^2)^(3/2))/(e^3*(d + e*x)^4) - ((23*C*d^2
+ e*(5*B*d + 2*A*e))*(d^2 - e^2*x^2)^(3/2))/(35*d^2*e^3*(d + e*x)
^4) - ((23*C*d^2 + e*(5*B*d + 2*A*e))*(d^2 - e^2*x^2)^(3/2))/(105
*d^3*e^3*(d + e*x)^3)
```

Rubi [A] time = 0.481799, antiderivative size = 180, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$

$$-\frac{(d^2-e^2x^2)^{3/2}\,(e(2Ae+5Bd)+23Cd^2)}{35d^2e^3(d+ex)^4}-\frac{(d^2-e^2x^2)^{3/2}\,(Ae^2-Bde+Cd^2)}{7de^3(d+ex)^5}-\frac{(d^2-e^2x^2)^{3/2}\,(e(2Ae+5Bd)+23Cd^2)}{105d^3e^3(d+ex)^3}+\frac{C\,(d^2-e^2x^2)^{3/2}}{e^3(d+ex)^4}$$

Antiderivative was successfully verified.

```
[In]  Int[((A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2])/(d + e*x)^5,x]
```

```
[Out] -((C*d^2 - B*d*e + A*e^2)*(d^2 - e^2*x^2)^(3/2))/(7*d*e^3*(d + e*
x)^5) + (C*(d^2 - e^2*x^2)^(3/2))/(e^3*(d + e*x)^4) - ((23*C*d^2
+ e*(5*B*d + 2*A*e))*(d^2 - e^2*x^2)^(3/2))/(35*d^2*e^3*(d + e*x)
^4) - ((23*C*d^2 + e*(5*B*d + 2*A*e))*(d^2 - e^2*x^2)^(3/2))/(105
*d^3*e^3*(d + e*x)^3)
```

Rubi in Sympy [A] time = 38.2162, size = 165, normalized size = 0.92

$$\frac{C\left(d^2-e^2x^2\right)^{\frac{3}{2}}}{e^3\left(d+ex\right)^4}-\frac{\left(d^2-e^2x^2\right)^{\frac{3}{2}}\left(Ae^2-Bde+Cd^2\right)}{7de^3\left(d+ex\right)^5}-\frac{\left(d^2-e^2x^2\right)^{\frac{3}{2}}\left(2Ae^2+5Bde+23Cd^2\right)}{35d^2e^3\left(d+ex\right)^4}-\frac{\left(d^2-e^2x^2\right)^{\frac{3}{2}}\left(2Ae^2+5Bde+23Cd^2\right)}{105d^3e^3\left(d+ex\right)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2)/(e*x+d)**5,x)
```

```
[Out] C*(d**2 - e**2*x**2)**(3/2)/(e**3*(d + e*x)**4) - (d**2 - e**2*x*
*2)**(3/2)*(A*e**2 - B*d*e + C*d**2)/(7*d*e**3*(d + e*x)**5) - (d
**2 - e**2*x**2)**(3/2)*(2*A*e**2 + 5*B*d*e + 23*C*d**2)/(35*d**2
*e**3*(d + e*x)**4) - (d**2 - e**2*x**2)**(3/2)*(2*A*e**2 + 5*B*d
*e + 23*C*d**2)/(105*d**3*e**3*(d + e*x)**3)
```

Mathematica [A] time = 0.139242, size = 109, normalized size = 0.61

$$-\frac{(d-ex)\sqrt{d^2-e^2x^2}\left(e\left(Ae\left(23d^2+10dex+2e^2x^2\right)+5Bd\left(d^2+5dex+e^2x^2\right)\right)+Cd^2\left(2d^2+10dex+23e^2x^2\right)\right)}{105d^3e^3(d+ex)^4}$$

Antiderivative was successfully verified.

```
[In] Integrate[((A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2])/(d + e*x)^5,x]
```

```
[Out] -((d - e*x)*Sqrt[d^2 - e^2*x^2]*(C*d^2*(2*d^2 + 10*d*e*x + 23*e^2
*x^2) + e*(5*B*d*(d^2 + 5*d*e*x + e^2*x^2) + A*e*(23*d^2 + 10*d*e
*x + 2*e^2*x^2))))/(105*d^3*e^3*(d + e*x)^4)
```

Maple [A] time = 0.012, size = 116, normalized size = 0.6

$$-\frac{\left(2\,Ae^4x^2+5\,Bde^3x^2+23\,Cd^2e^2x^2+10\,Ade^3x+25\,Bd^2e^2x+10\,Cd^3ex+23\,Ad^2e^2+5\,Bd^3e+2\,Cd^4\right)(-ex+d)}{105\,(ex+d)^4\,d^3e^3}\sqrt{-e^2x^2+d}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((C*x^2+B*x+A)*(-e^2*x^2+d^2)^(1/2)/(e*x+d)^5,x)
```

```
[Out] -1/105*(-e*x+d)*(2*A*e^4*x^2+5*B*d*e^3*x^2+23*C*d^2*e^2*x^2+10*A*
d*e^3*x+25*B*d^2*e^2*x+10*C*d^3*e*x+23*A*d^2*e^2+5*B*d^3*e+2*C*d^
4)*(-e^2*x^2+d^2)^(1/2)/(e*x+d)^4/d^3/e^3
```

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(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^5,x, algorithm="maxima
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.29849, size = 647, normalized size = 3.59

$$-\frac{840\,Ad^6x + 5\left(5\,Cd^2e^4 + 2\,Bde^5 + 5\,Ae^6\right)x^7 + 7\left(8\,Cd^3e^3 + 5\,Bd^2e^4 + 2\,Ade^5\right)x^6 - 7\left(37\,Cd^4e^2 + 10\,Bd^3e^3 + 43\,Ad^2e^4\right)x^5 -}{105\left(d^3e\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^5,x, algorithm="fricas
```

```
[Out] -1/105*(840*A*d^6*x + 5*(5*C*d^2*e^4 + 2*B*d*e^5 + 5*A*e^6)*x^7 +
 7*(8*C*d^3*e^3 + 5*B*d^2*e^4 + 2*A*d*e^5)*x^6 - 7*(37*C*d^4*e^2
+ 10*B*d^3*e^3 + 43*A*d^2*e^4)*x^5 - 35*(2*C*d^5*e + 11*B*d^4*e^2
 + 20*A*d^3*e^3)*x^4 + 70*(4*C*d^6 + B*d^5*e - 5*A*d^4*e^2)*x^3 +
 420*(B*d^6 + 2*A*d^5*e)*x^2 - 7*(120*A*d^5*x + 3*(C*d^2*e^3 - A*
e^5)*x^6 - (17*C*d^3*e^2 + 5*B*d^2*e^3 + 23*A*d*e^4)*x^5 - 5*(2*C
*d^4*e + 5*B*d^3*e^2 + 8*A*d^2*e^3)*x^4 + 10*(4*C*d^5 + B*d^4*e +
 A*d^3*e^2)*x^3 + 60*(B*d^5 + 2*A*d^4*e)*x^2)*sqrt(-e^2*x^2 + d^2
))/(d^3*e^7*x^7 - 14*d^5*e^5*x^5 - 28*d^6*e^4*x^4 - 7*d^7*e^3*x^3
 + 28*d^8*e^2*x^2 + 28*d^9*e*x + 8*d^10 + (d^3*e^6*x^6 + 7*d^4*e^
5*x^5 + 11*d^5*e^4*x^4 - 7*d^6*e^3*x^3 - 32*d^7*e^2*x^2 - 28*d^8*
e*x - 8*d^9)*sqrt(-e^2*x^2 + d^2))
```

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

$$\int \frac{\sqrt{-\left(-d+ex\right)\left(d+ex\right)}\left(A+Bx+Cx^2\right)}{\left(d+ex\right)^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2)/(e*x+d)**5,x)
```

```
[Out] Integral(sqrt(-(-d + e*x)*(d + e*x))*(A + B*x + C*x**2)/(d + e*x)
**5, 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(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^5,x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.9 $\int \frac{(A+Bx+Cx^2)\sqrt{d^2-e^2x^2}}{(d+ex)^6}\,dx$

Optimal. Leaf size=234

$$-\frac{(d^2-e^2x^2)^{3/2}(2e(Ae+2Bd)+11Cd^2)}{42d^2e^3(d+ex)^5}-\frac{(d^2-e^2x^2)^{3/2}(Ae^2-Bde+Cd^2)}{9de^3(d+ex)^6}-\frac{(d^2-e^2x^2)^{3/2}(2e(Ae+2Bd)+11Cd^2)}{315d^4e^3(d+ex)^3}-\frac{(d^2-e^2x^2)^{3/2}(2e(Ae+2Bd)+11Cd^2)}{105d^3e^3(d+ex)^4}+\frac{C(d^2-e^2x^2)^{3/2}}{2e^3(d+ex)^5}$$

```
[Out] -((C*d^2 - B*d*e + A*e^2)*(d^2 - e^2*x^2)^(3/2))/(9*d*e^3*(d + e*
x)^6) + (C*(d^2 - e^2*x^2)^(3/2))/(2*e^3*(d + e*x)^5) - ((11*C*d^
2 + 2*e*(2*B*d + A*e))*(d^2 - e^2*x^2)^(3/2))/(42*d^2*e^3*(d + e*
x)^5) - ((11*C*d^2 + 2*e*(2*B*d + A*e))*(d^2 - e^2*x^2)^(3/2))/(1
05*d^3*e^3*(d + e*x)^4) - ((11*C*d^2 + 2*e*(2*B*d + A*e))*(d^2 -
e^2*x^2)^(3/2))/(315*d^4*e^3*(d + e*x)^3)
```

Rubi [A] time = 0.604773, antiderivative size = 234, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$

$$-\frac{(d^2-e^2x^2)^{3/2}(2e(Ae+2Bd)+11Cd^2)}{42d^2e^3(d+ex)^5}-\frac{(d^2-e^2x^2)^{3/2}(Ae^2-Bde+Cd^2)}{9de^3(d+ex)^6}-\frac{(d^2-e^2x^2)^{3/2}(2e(Ae+2Bd)+11Cd^2)}{315d^4e^3(d+ex)^3}-\frac{(d^2-e^2x^2)^{3/2}(2e(Ae+2Bd)+11Cd^2)}{105d^3e^3(d+ex)^4}+\frac{C(d^2-e^2x^2)^{3/2}}{2e^3(d+ex)^5}$$

Antiderivative was successfully verified.

```
[In]  Int[((A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2])/(d + e*x)^6,x]
```

```
[Out] -((C*d^2 - B*d*e + A*e^2)*(d^2 - e^2*x^2)^(3/2))/(9*d*e^3*(d + e*
x)^6) + (C*(d^2 - e^2*x^2)^(3/2))/(2*e^3*(d + e*x)^5) - ((11*C*d^
2 + 2*e*(2*B*d + A*e))*(d^2 - e^2*x^2)^(3/2))/(42*d^2*e^3*(d + e*
x)^5) - ((11*C*d^2 + 2*e*(2*B*d + A*e))*(d^2 - e^2*x^2)^(3/2))/(1
05*d^3*e^3*(d + e*x)^4) - ((11*C*d^2 + 2*e*(2*B*d + A*e))*(d^2 -
e^2*x^2)^(3/2))/(315*d^4*e^3*(d + e*x)^3)
```

Rubi in Sympy [A] time = 45.9323, size = 216, normalized size = 0.92

$$\frac{C\left(d^2-e^2x^2\right)^{\frac{3}{2}}}{2e^3\left(d+ex\right)^5}-\frac{\left(d^2-e^2x^2\right)^{\frac{3}{2}}\left(Ae^2-Bde+Cd^2\right)}{9de^3\left(d+ex\right)^6}-\frac{\left(d^2-e^2x^2\right)^{\frac{3}{2}}\left(2Ae^2+4Bde+11Cd^2\right)}{42d^2e^3\left(d+ex\right)^5}-\frac{\left(d^2-e^2x^2\right)^{\frac{3}{2}}\left(2Ae^2+4Bde+11Cd^2\right)}{105d^3e^3\left(d+ex\right)^4}-\frac{\left(d^2-e^2x^2\right)^{\frac{3}{2}}\left(2Ae^2+4Bde+11Cd^2\right)}{315d^4e^3\left(d+ex\right)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2)/(e*x+d)**6,x)
```

```
[Out] C*(d**2 - e**2*x**2)**(3/2)/(2*e**3*(d + e*x)**5) - (d**2 - e**2*
x**2)**(3/2)*(A*e**2 - B*d*e + C*d**2)/(9*d*e**3*(d + e*x)**6) -
(d**2 - e**2*x**2)**(3/2)*(2*A*e**2 + 4*B*d*e + 11*C*d**2)/(42*d*
*2*e**3*(d + e*x)**5) - (d**2 - e**2*x**2)**(3/2)*(2*A*e**2 + 4*B
*d*e + 11*C*d**2)/(105*d**3*e**3*(d + e*x)**4) - (d**2 - e**2*x**
2)**(3/2)*(2*A*e**2 + 4*B*d*e + 11*C*d**2)/(315*d**4*e**3*(d + e*
x)**3)
```

Mathematica [A] time = 0.168275, size = 144, normalized size = 0.62

$$-\frac{(d-ex)\sqrt{d^2-e^2x^2}\left(e\left(Ae\left(58d^3+33d^2ex+12de^2x^2+2e^3x^3\right)+Bd\left(11d^3+66d^2ex+24de^2x^2+4e^3x^3\right)\right)+Cd^2\left(4d^3+24\right.\right.}{315d^4e^3(d+ex)^5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((A + B*x + C*x^2)*Sqrt[d^2 - e^2*x^2])/(d + e*x)^6,x]
```

```
[Out] -((d - e*x)*Sqrt[d^2 - e^2*x^2]*(C*d^2*(4*d^3 + 24*d^2*e*x + 66*d
*e^2*x^2 + 11*e^3*x^3) + e*(A*e*(58*d^3 + 33*d^2*e*x + 12*d*e^2*x
^2 + 2*e^3*x^3) + B*d*(11*d^3 + 66*d^2*e*x + 24*d*e^2*x^2 + 4*e^3
*x^3))))/(315*d^4*e^3*(d + e*x)^5)
```

Maple [A] time = 0.012, size = 152, normalized size = 0.7

$$-\frac{\left(2\,Ae^5x^3+4\,Bde^4x^3+11\,Cd^2e^3x^3+12\,Ade^4x^2+24\,Bd^2e^3x^2+66\,Cd^3e^2x^2+33\,Ad^2e^3x+66\,Bd^3e^2x+24\,Cd^4ex+58\,Ad^3e\right.}{315\,\left(ex+d\right)^5d^4e^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)*(-e^2*x^2+d^2)^(1/2)/(e*x+d)^6,x)
```

```
[Out] -1/315*(-e*x+d)*(2*A*e^5*x^3+4*B*d*e^4*x^3+11*C*d^2*e^3*x^3+12*A*
d*e^4*x^2+24*B*d^2*e^3*x^2+66*C*d^3*e^2*x^2+33*A*d^2*e^3*x+66*B*d
^3*e^2*x+24*C*d^4*e*x+58*A*d^3*e^2+11*B*d^4*e+4*C*d^5)*(-e^2*x^2+
d^2)^(1/2)/(e*x+d)^5/d^4/e^3
```

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(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^6,x, algorithm="maxima
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.309556, size = 875, normalized size = 3.74

$$-\frac{5040\,Ad^8x-7\left(Cd^2e^6-Bde^7-8\,Ae^8\right)x^9+9\left(4\,Cd^3e^5+11\,Bd^2e^6+58\,Ade^7\right)x^8+9\left(53\,Cd^4e^4+32\,Bd^3e^5+121\,Ad^2e^6\right)x^7}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^6,x, algorithm="fricas
```

```
[Out] -1/315*(5040*A*d^8*x - 7*(C*d^2*e^6 - B*d*e^7 - 8*A*e^8)*x^9 + 9*
(4*C*d^3*e^5 + 11*B*d^2*e^6 + 58*A*d*e^7)*x^8 + 9*(53*C*d^4*e^4 +
 32*B*d^3*e^5 + 121*A*d^2*e^6)*x^7 - 21*(2*C*d^5*e^3 - 7*B*d^4*e^
4 + 44*A*d^3*e^5)*x^6 - 63*(32*C*d^6*e^2 + 23*B*d^5*e^3 + 89*A*d^
4*e^4)*x^5 - 1260*(2*B*d^6*e^2 + 5*A*d^5*e^3)*x^4 + 420*(4*C*d^8
+ 3*B*d^7*e + A*d^6*e^2)*x^3 + 2520*(B*d^8 + 3*A*d^7*e)*x^2 - 3*(
1680*A*d^7*x + 5*(C*d^2*e^5 + B*d*e^6 + 4*A*e^7)*x^8 + 3*(11*C*d^
3*e^4 + 4*B*d^2*e^5 + 2*A*d*e^6)*x^7 - 7*(2*C*d^4*e^3 + 8*B*d^3*e
^4 + 59*A*d^2*e^5)*x^6 - 7*(56*C*d^5*e^2 + 39*B*d^4*e^3 + 167*A*d
^3*e^4)*x^5 - 420*(B*d^5*e^2 + 2*A*d^4*e^3)*x^4 + 140*(4*C*d^7 +
3*B*d^6*e + 7*A*d^5*e^2)*x^3 + 840*(B*d^7 + 3*A*d^6*e)*x^2)*sqrt(
-e^2*x^2 + d^2))/(d^4*e^9*x^9 + 9*d^5*e^8*x^8 + 18*d^6*e^7*x^7 -
18*d^7*e^6*x^6 - 99*d^8*e^5*x^5 - 99*d^9*e^4*x^4 + 24*d^10*e^3*x^
3 + 108*d^11*e^2*x^2 + 72*d^12*e*x + 16*d^13 - (d^4*e^8*x^8 - 22*
d^6*e^6*x^6 - 60*d^7*e^5*x^5 - 39*d^8*e^4*x^4 + 60*d^9*e^3*x^3 +
116*d^10*e^2*x^2 + 72*d^11*e*x + 16*d^12)*sqrt(-e^2*x^2 + d^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((C*x**2+B*x+A)*(-e**2*x**2+d**2)**(1/2)/(e*x+d)**6,x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.541976, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(-e^2*x^2 + d^2)*(C*x^2 + B*x + A)/(e*x + d)^6,x, algorithm="giac")

[Out] Done
```

3.10 $\int \frac{(d+ex)^3\left(A+Bx+Cx^2\right)}{\sqrt{d^2-e^2x^2}}\,dx$

Optimal. Leaf size=236

$$-\frac{x^2\sqrt{d^2-e^2x^2}\left(5e(Ae+3Bd)+19Cd^2\right)}{15e}-\frac{dx\sqrt{d^2-e^2x^2}\left(12Ae^2+15Bde+13Cd^2\right)}{8e^2}-\frac{d^2\sqrt{d^2-e^2x^2}\left(55Ae^2+45Bde+38Cd^2\right)}{15e^3}+\frac{d^3\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(20Ae^2+15Bde+13Cd^2\right)}{8e^3}-\frac{1}{4}x^3\sqrt{d^2-e^2x^2}(Be+3Cd)-\frac{1}{5}Cex^4\sqrt{d^2-e^2x^2}$$

```
[Out] -(d^2*(38*C*d^2 + 45*B*d*e + 55*A*e^2)*Sqrt[d^2 - e^2*x^2])/(15*e
^3) - (d*(13*C*d^2 + 15*B*d*e + 12*A*e^2)*x*Sqrt[d^2 - e^2*x^2])/
(8*e^2) - ((19*C*d^2 + 5*e*(3*B*d + A*e))*x^2*Sqrt[d^2 - e^2*x^2]
)/(15*e) - ((3*C*d + B*e)*x^3*Sqrt[d^2 - e^2*x^2])/4 - (C*e*x^4*S
qrt[d^2 - e^2*x^2])/5 + (d^3*(13*C*d^2 + 15*B*d*e + 20*A*e^2)*Arc
Tan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(8*e^3)
```

Rubi [A] time = 1.17419, antiderivative size = 236, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 4, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$

$$-\frac{x^2\sqrt{d^2-e^2x^2}\left(5e(Ae+3Bd)+19Cd^2\right)}{15e}-\frac{dx\sqrt{d^2-e^2x^2}\left(12Ae^2+15Bde+13Cd^2\right)}{8e^2}-\frac{d^2\sqrt{d^2-e^2x^2}\left(55Ae^2+45Bde+38Cd^2\right)}{15e^3}+\frac{d^3\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(20Ae^2+15Bde+13Cd^2\right)}{8e^3}-\frac{1}{4}x^3\sqrt{d^2-e^2x^2}(Be+3Cd)-\frac{1}{5}Cex^4\sqrt{d^2-e^2x^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^3*(A + B*x + C*x^2))/Sqrt[d^2 - e^2*x^2],x]
```

```
[Out] -(d^2*(38*C*d^2 + 45*B*d*e + 55*A*e^2)*Sqrt[d^2 - e^2*x^2])/(15*e
^3) - (d*(13*C*d^2 + 15*B*d*e + 12*A*e^2)*x*Sqrt[d^2 - e^2*x^2])/
(8*e^2) - ((19*C*d^2 + 5*e*(3*B*d + A*e))*x^2*Sqrt[d^2 - e^2*x^2]
)/(15*e) - ((3*C*d + B*e)*x^3*Sqrt[d^2 - e^2*x^2])/4 - (C*e*x^4*S
qrt[d^2 - e^2*x^2])/5 + (d^3*(13*C*d^2 + 15*B*d*e + 20*A*e^2)*Arc
Tan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(8*e^3)
```

Rubi in Sympy [A] time = 52.5494, size = 241, normalized size = 1.02

$$-\frac{C(d+ex)^4\sqrt{d^2-e^2x^2}}{5e^3}+\frac{d^3\left(20Ae^2+15Bde+13Cd^2\right)\operatorname{atan}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{8e^3}-\frac{d^2\sqrt{d^2-e^2x^2}\left(20Ae^2+15Bde+13Cd^2\right)}{8e^3}-\frac{d(d+ex)\sqrt{d^2-e^2x^2}\left(20Ae^2+15Bde+13Cd^2\right)}{24e^3}-\frac{(d+ex)^3\sqrt{d^2-e^2x^2}(5Be-Cd)}{20e^3}-\frac{(d+ex)^2\sqrt{d^2-e^2x^2}\left(20Ae^2+15Bde+13Cd^2\right)}{60e^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x+d)**3*(C*x**2+B*x+A)/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] -C*(d + e*x)**4*sqrt(d**2 - e**2*x**2)/(5*e**3) + d**3*(20*A*e**2
 + 15*B*d*e + 13*C*d**2)*atan(e*x/sqrt(d**2 - e**2*x**2))/(8*e**3
) - d**2*sqrt(d**2 - e**2*x**2)*(20*A*e**2 + 15*B*d*e + 13*C*d**2
)/(8*e**3) - d*(d + e*x)*sqrt(d**2 - e**2*x**2)*(20*A*e**2 + 15*B
*d*e + 13*C*d**2)/(24*e**3) - (d + e*x)**3*sqrt(d**2 - e**2*x**2)
*(5*B*e - C*d)/(20*e**3) - (d + e*x)**2*sqrt(d**2 - e**2*x**2)*(2
0*A*e**2 + 15*B*d*e + 13*C*d**2)/(60*e**3)
```

Mathematica [A] time = 0.283076, size = 170, normalized size = 0.72

$$\frac{15d^3\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(5e(4Ae+3Bd)+13Cd^2\right)-\sqrt{d^2-e^2x^2}\left(8e^2x^2\left(5e(Ae+3Bd)+19Cd^2\right)+15dex\left(3e(4Ae+5Bd)+13\right.\right.}{120e^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)^3*(A + B*x + C*x^2))/Sqrt[d^2 - e^2*x^2],x]
```

```
[Out] (-(Sqrt[d^2 - e^2*x^2]*(8*d^2*(38*C*d^2 + 5*e*(9*B*d + 11*A*e)) +
 15*d*e*(13*C*d^2 + 3*e*(5*B*d + 4*A*e))*x + 8*e^2*(19*C*d^2 + 5*
e*(3*B*d + A*e))*x^2 + 30*e^3*(3*C*d + B*e)*x^3 + 24*C*e^4*x^4))
+ 15*d^3*(13*C*d^2 + 5*e*(3*B*d + 4*A*e))*ArcTan[(e*x)/Sqrt[d^2 -
 e^2*x^2]])/(120*e^3)
```

Maple [A] time = 0.016, size = 374, normalized size = 1.6

$$\frac{5 d^3 A}{2} \arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}} - \frac{11 Ad^2}{3 e}\sqrt{-e^2x^2+d^2} - 3\frac{\sqrt{-e^2x^2+d^2}Bd^3}{e^2} - \frac{x^3eB}{4}\sqrt{-e^2x^2+d^2} - \frac{3 x^3dC}{4}\sqrt{-e^2x^2+d^2} - \frac{15 d^2xB}{8 e}\sqrt{-e^2x^2+d^2} - \frac{13 Cd^3x}{8 e^2}\sqrt{-e^2x^2+d^2} + \frac{15 d^4B}{8 e}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}} + \frac{13 d^5C}{8 e^2}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}} - \frac{ex^2A}{3}\sqrt{-e^2x^2+d^2} - x^2\sqrt{-e^2x^2+d^2}dB - \frac{19 x^2d^2C}{15 e}\sqrt{-e^2x^2+d^2} - \frac{38 d^4C}{15 e^3}\sqrt{-e^2x^2+d^2} - \frac{3 dAx}{2}\sqrt{-e^2x^2+d^2} - \frac{Cex^4}{5}\sqrt{-e^2x^2+d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^3*(C*x^2+B*x+A)/(-e^2*x^2+d^2)^(1/2),x)
```

```
[Out] 5/2*d^3*A/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))-
11/3/e*(-e^2*x^2+d^2)^(1/2)*A*d^2-3/e^2*(-e^2*x^2+d^2)^(1/2)*B*d^
3-1/4*x^3*e*(-e^2*x^2+d^2)^(1/2)*B-3/4*x^3*(-e^2*x^2+d^2)^(1/2)*d
*C-15/8*d^2/e*x*(-e^2*x^2+d^2)^(1/2)*B-13/8*d^3/e^2*x*(-e^2*x^2+d
^2)^(1/2)*C+15/8*d^4/e/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2
+d^2)^(1/2))*B+13/8*d^5/e^2/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^
2*x^2+d^2)^(1/2))*C-1/3*x^2*e*(-e^2*x^2+d^2)^(1/2)*A-x^2*(-e^2*x^
2+d^2)^(1/2)*d*B-19/15*x^2/e*(-e^2*x^2+d^2)^(1/2)*d^2*C-38/15*d^4
/e^3*(-e^2*x^2+d^2)^(1/2)*C-3/2*d*A*x*(-e^2*x^2+d^2)^(1/2)-1/5*C*
e*x^4*(-e^2*x^2+d^2)^(1/2)
```

Maxima [A] time = 0.788051, size = 575, normalized size = 2.44

$$-\frac{1}{5}\sqrt{-e^2x^2+d^2}Cex^4 - \frac{4\sqrt{-e^2x^2+d^2}Cd^2x^2}{15 e} + \frac{Ad^3\arcsin\left(\frac{e^2x}{\sqrt{d^2e^2}}\right)}{\sqrt{e^2}} - \frac{8\sqrt{-e^2x^2+d^2}Cd^4}{15 e^3} - \frac{\sqrt{-e^2x^2+d^2}Bd^3}{e^2} - \frac{3\sqrt{-e^2x^2+d^2}Ad^2}{e} - \frac{\left(3 Cde^2+Be^3\right)\sqrt{-e^2x^2+d^2}x^3}{4 e^2} - \frac{\left(3 Cd^2e+3 Bde^2+Ae^3\right)\sqrt{-e^2x^2+d^2}x^2}{3 e^2} + \frac{3\left(3 Cde^2+Be^3\right)d^4\arcsin\left(\frac{e^2x}{\sqrt{d^2e^2}}\right)}{8\sqrt{e^2}e^4} + \frac{\left(Cd^3+3 Bd^2e+3 Ade^2\right)d^2\arcsin\left(\frac{e^2x}{\sqrt{d^2e^2}}\right)}{2\sqrt{e^2}e^2} - \frac{3\left(3 Cde^2+Be^3\right)\sqrt{-e^2x^2+d^2}d^2x}{8 e^4} - \frac{\left(Cd^3+3 Bd^2e+3 Ade^2\right)\sqrt{-e^2x^2+d^2}x}{2 e^2} - \frac{2\left(3 Cd^2e+3 Bde^2+Ae^3\right)\sqrt{-e^2x^2+d^2}d^2}{3 e^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(e*x + d)^3/sqrt(-e^2*x^2 + d^2),x, algorithm="maxima
```

```
[Out] -1/5*sqrt(-e^2*x^2 + d^2)*C*e*x^4 - 4/15*sqrt(-e^2*x^2 + d^2)*C*d
^2*x^2/e + A*d^3*arcsin(e^2*x/sqrt(d^2*e^2))/sqrt(e^2) - 8/15*sqr
t(-e^2*x^2 + d^2)*C*d^4/e^3 - sqrt(-e^2*x^2 + d^2)*B*d^3/e^2 - 3*
sqrt(-e^2*x^2 + d^2)*A*d^2/e - 1/4*(3*C*d*e^2 + B*e^3)*sqrt(-e^2*
x^2 + d^2)*x^3/e^2 - 1/3*(3*C*d^2*e + 3*B*d*e^2 + A*e^3)*sqrt(-e^
2*x^2 + d^2)*x^2/e^2 + 3/8*(3*C*d*e^2 + B*e^3)*d^4*arcsin(e^2*x/s
qrt(d^2*e^2))/(sqrt(e^2)*e^4) + 1/2*(C*d^3 + 3*B*d^2*e + 3*A*d*e^
2)*d^2*arcsin(e^2*x/sqrt(d^2*e^2))/(sqrt(e^2)*e^2) - 3/8*(3*C*d*e
^2 + B*e^3)*sqrt(-e^2*x^2 + d^2)*d^2*x/e^4 - 1/2*(C*d^3 + 3*B*d^2
*e + 3*A*d*e^2)*sqrt(-e^2*x^2 + d^2)*x/e^2 - 2/3*(3*C*d^2*e + 3*B
*d*e^2 + A*e^3)*sqrt(-e^2*x^2 + d^2)*d^2/e^4
```

Fricas [A] time = 0.297263, size = 1076, normalized size = 4.56

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(e*x + d)^3/sqrt(-e^2*x^2 + d^2),x, algorithm="fricas
```

```
[Out] -1/120*(24*C*e^10*x^10 + 30*(3*C*d*e^9 + B*e^10)*x^9 - 40*(4*C*d^
2*e^8 - 3*B*d*e^9 - A*e^10)*x^8 - 15*(65*C*d^3*e^7 + 11*B*d^2*e^8
 - 12*A*d*e^9)*x^7 - 40*(25*C*d^4*e^6 + 30*B*d^3*e^7 + 2*A*d^2*e^
8)*x^6 - 15*(C*d^5*e^5 + 139*B*d^4*e^6 + 156*A*d^3*e^7)*x^5 + 480
*(3*C*d^6*e^4 + B*d^5*e^5 - 5*A*d^4*e^6)*x^4 + 60*(67*C*d^7*e^3 +
 97*B*d^6*e^4 + 84*A*d^5*e^5)*x^3 + 960*(B*d^7*e^3 + 3*A*d^6*e^4)
*x^2 - 240*(13*C*d^9*e + 15*B*d^8*e^2 + 12*A*d^7*e^3)*x + 30*(208
*C*d^10 + 240*B*d^9*e + 320*A*d^8*e^2 + 5*(13*C*d^6*e^4 + 15*B*d^
5*e^5 + 20*A*d^4*e^6)*x^4 - 20*(13*C*d^8*e^2 + 15*B*d^7*e^3 + 20*
A*d^6*e^4)*x^2 - (208*C*d^9 + 240*B*d^8*e + 320*A*d^7*e^2 + (13*C
*d^5*e^4 + 15*B*d^4*e^5 + 20*A*d^3*e^6)*x^4 - 12*(13*C*d^7*e^2 +
15*B*d^6*e^3 + 20*A*d^5*e^4)*x^2)*sqrt(-e^2*x^2 + d^2))*arctan(-(
d - sqrt(-e^2*x^2 + d^2))/(e*x)) + 5*(24*C*d*e^8*x^8 + 30*(3*C*d^
2*e^7 + B*d*e^8)*x^7 + 8*(7*C*d^3*e^6 + 15*B*d^2*e^7 + 5*A*d*e^8)
*x^6 - 15*(11*C*d^4*e^5 - 7*B*d^3*e^6 - 12*A*d^2*e^7)*x^5 - 96*(3
*C*d^5*e^4 + 2*B*d^4*e^5 - 2*A*d^3*e^6)*x^4 - 12*(41*C*d^6*e^3 +
67*B*d^5*e^4 + 60*A*d^4*e^5)*x^3 - 192*(B*d^6*e^3 + 3*A*d^5*e^4)*
x^2 + 48*(13*C*d^8*e + 15*B*d^7*e^2 + 12*A*d^6*e^3)*x)*sqrt(-e^2*
x^2 + d^2))/(5*d*e^7*x^4 - 20*d^3*e^5*x^2 + 16*d^5*e^3 - (e^7*x^4
 - 12*d^2*e^5*x^2 + 16*d^4*e^3)*sqrt(-e^2*x^2 + d^2))
```

Sympy [A] time = 29.8998, size = 1273, normalized size = 5.39

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**3*(C*x**2+B*x+A)/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] A*d**3*Piecewise((sqrt(d**2/e**2)*asin(x*sqrt(e**2/d**2))/sqrt(d*
*2), (d**2 > 0) & (-e**2 < 0)), (sqrt(-d**2/e**2)*asinh(x*sqrt(-e
**2/d**2))/sqrt(d**2), (d**2 > 0) & (-e**2 > 0)), (sqrt(d**2/e**2
)*acosh(x*sqrt(e**2/d**2))/sqrt(-d**2), (d**2 < 0) & (-e**2 > 0))
) + 3*A*d**2*e*Piecewise((x**2/(2*sqrt(d**2)), Eq(e**2, 0)), (-sq
rt(d**2 - e**2*x**2)/e**2, True)) + 3*A*d*e**2*Piecewise((-I*d**2
*acosh(e*x/d)/(2*e**3) - I*d*x*sqrt(-1 + e**2*x**2/d**2)/(2*e**2)
, Abs(e**2*x**2/d**2) > 1), (d**2*asin(e*x/d)/(2*e**3) - d*x/(2*e
**2*sqrt(1 - e**2*x**2/d**2)) + x**3/(2*d*sqrt(1 - e**2*x**2/d**2
)), True)) + A*e**3*Piecewise((-2*d**2*sqrt(d**2 - e**2*x**2)/(3*
e**4) - x**2*sqrt(d**2 - e**2*x**2)/(3*e**2), Ne(e, 0)), (x**4/(4
*sqrt(d**2)), True)) + B*d**3*Piecewise((x**2/(2*sqrt(d**2)), Eq(
e**2, 0)), (-sqrt(d**2 - e**2*x**2)/e**2, True)) + 3*B*d**2*e*Pie
cewise((-I*d**2*acosh(e*x/d)/(2*e**3) - I*d*x*sqrt(-1 + e**2*x**2
/d**2)/(2*e**2), Abs(e**2*x**2/d**2) > 1), (d**2*asin(e*x/d)/(2*e
**3) - d*x/(2*e**2*sqrt(1 - e**2*x**2/d**2)) + x**3/(2*d*sqrt(1 -
 e**2*x**2/d**2)), True)) + 3*B*d*e**2*Piecewise((-2*d**2*sqrt(d*
*2 - e**2*x**2)/(3*e**4) - x**2*sqrt(d**2 - e**2*x**2)/(3*e**2),
Ne(e, 0)), (x**4/(4*sqrt(d**2)), True)) + B*e**3*Piecewise((-3*I*
d**4*acosh(e*x/d)/(8*e**5) + 3*I*d**3*x/(8*e**4*sqrt(-1 + e**2*x*
*2/d**2)) - I*d*x**3/(8*e**2*sqrt(-1 + e**2*x**2/d**2)) - I*x**5/
(4*d*sqrt(-1 + e**2*x**2/d**2)), Abs(e**2*x**2/d**2) > 1), (3*d**
4*asin(e*x/d)/(8*e**5) - 3*d**3*x/(8*e**4*sqrt(1 - e**2*x**2/d**2
)) + d*x**3/(8*e**2*sqrt(1 - e**2*x**2/d**2)) + x**5/(4*d*sqrt(1
- e**2*x**2/d**2)), True)) + C*d**3*Piecewise((-I*d**2*acosh(e*x/
d)/(2*e**3) - I*d*x*sqrt(-1 + e**2*x**2/d**2)/(2*e**2), Abs(e**2*
x**2/d**2) > 1), (d**2*asin(e*x/d)/(2*e**3) - d*x/(2*e**2*sqrt(1
- e**2*x**2/d**2)) + x**3/(2*d*sqrt(1 - e**2*x**2/d**2)), True))
+ 3*C*d**2*e*Piecewise((-2*d**2*sqrt(d**2 - e**2*x**2)/(3*e**4) -
 x**2*sqrt(d**2 - e**2*x**2)/(3*e**2), Ne(e, 0)), (x**4/(4*sqrt(d
**2)), True)) + 3*C*d*e**2*Piecewise((-3*I*d**4*acosh(e*x/d)/(8*e
**5) + 3*I*d**3*x/(8*e**4*sqrt(-1 + e**2*x**2/d**2)) - I*d*x**3/(
8*e**2*sqrt(-1 + e**2*x**2/d**2)) - I*x**5/(4*d*sqrt(-1 + e**2*x*
*2/d**2)), Abs(e**2*x**2/d**2) > 1), (3*d**4*asin(e*x/d)/(8*e**5)
 - 3*d**3*x/(8*e**4*sqrt(1 - e**2*x**2/d**2)) + d*x**3/(8*e**2*sq
rt(1 - e**2*x**2/d**2)) + x**5/(4*d*sqrt(1 - e**2*x**2/d**2)), Tr
ue)) + C*e**3*Piecewise((-8*d**4*sqrt(d**2 - e**2*x**2)/(15*e**6)
 - 4*d**2*x**2*sqrt(d**2 - e**2*x**2)/(15*e**4) - x**4*sqrt(d**2
- e**2*x**2)/(5*e**2), Ne(e, 0)), (x**6/(6*sqrt(d**2)), True))
```

GIAC/XCAS [A] time = 0.287119, size = 224, normalized size = 0.95

$$\frac{1}{8}\left(13\,Cd^5 + 15\,Bd^4e + 20\,Ad^3e^2\right)\arcsin\left(\frac{xe}{d}\right)e^{(-3)}\mathrm{sign}\left(d\right)$$
$$-\frac{1}{120}\sqrt{-x^2e^2 + d^2}\left(\left(2\left(3\left(4\,Cxe + 5\left(3\,Cde^6 + Be^7\right)e^{(-6)}\right)x + 4\left(19\,Cd^2e^5 + 15\,Bde^6 + 5\,Ae^7\right)e^{(-6)}\right)x + 15\left(13\,Cd^3e^4 + 15\,Bd\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(e*x + d)^3/sqrt(-e^2*x^2 + d^2),x, algorithm="giac")
```

```
[Out] 1/8*(13*C*d^5 + 15*B*d^4*e + 20*A*d^3*e^2)*arcsin(x*e/d)*e^(-3)*s
ign(d) - 1/120*sqrt(-x^2*e^2 + d^2)*((2*(3*(4*C*x*e + 5*(3*C*d*e^
6 + B*e^7)*e^(-6))*x + 4*(19*C*d^2*e^5 + 15*B*d*e^6 + 5*A*e^7)*e^
(-6))*x + 15*(13*C*d^3*e^4 + 15*B*d^2*e^5 + 12*A*d*e^6)*e^(-6))*x
 + 8*(38*C*d^4*e^3 + 45*B*d^3*e^4 + 55*A*d^2*e^5)*e^(-6))
```

3.11 $\int \frac{(d+ex)^2(A+Bx+Cx^2)}{\sqrt{d^2-e^2x^2}}\,dx$

Optimal. Leaf size=191

$$-\frac{x\sqrt{d^2-e^2x^2}\left(4e(Ae+2Bd)+7Cd^2\right)}{8e^2}-\frac{d\sqrt{d^2-e^2x^2}\left(e(6Ae+5Bd)+4Cd^2\right)}{3e^3}+\frac{d^2\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(12Ae^2+8Bde+7Cd^2\right)}{8e^3}-\frac{x^2\sqrt{d^2-e^2x^2}(Be+2Cd)}{3e}-\frac{1}{4}Cx^3\sqrt{d^2-e^2x^2}$$

```
[Out] -(d*(4*C*d^2 + e*(5*B*d + 6*A*e))*Sqrt[d^2 - e^2*x^2])/(3*e^3) -
((7*C*d^2 + 4*e*(2*B*d + A*e))*x*Sqrt[d^2 - e^2*x^2])/(8*e^2) - (
(2*C*d + B*e)*x^2*Sqrt[d^2 - e^2*x^2])/(3*e) - (C*x^3*Sqrt[d^2 -
e^2*x^2])/4 + (d^2*(7*C*d^2 + 8*B*d*e + 12*A*e^2)*ArcTan[(e*x)/Sq
rt[d^2 - e^2*x^2]])/(8*e^3)
```

Rubi [A] time = 0.659583, antiderivative size = 191, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$

$$-\frac{x\sqrt{d^2-e^2x^2}\left(4e(Ae+2Bd)+7Cd^2\right)}{8e^2}-\frac{d\sqrt{d^2-e^2x^2}\left(e(6Ae+5Bd)+4Cd^2\right)}{3e^3}+\frac{d^2\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(12Ae^2+8Bde+7Cd^2\right)}{8e^3}-\frac{x^2\sqrt{d^2-e^2x^2}(Be+2Cd)}{3e}-\frac{1}{4}Cx^3\sqrt{d^2-e^2x^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^2*(A + B*x + C*x^2))/Sqrt[d^2 - e^2*x^2],x]
```

```
[Out] -(d*(4*C*d^2 + e*(5*B*d + 6*A*e))*Sqrt[d^2 - e^2*x^2])/(3*e^3) -
((7*C*d^2 + 4*e*(2*B*d + A*e))*x*Sqrt[d^2 - e^2*x^2])/(8*e^2) - (
(2*C*d + B*e)*x^2*Sqrt[d^2 - e^2*x^2])/(3*e) - (C*x^3*Sqrt[d^2 -
e^2*x^2])/4 + (d^2*(7*C*d^2 + 8*B*d*e + 12*A*e^2)*ArcTan[(e*x)/Sq
rt[d^2 - e^2*x^2]])/(8*e^3)
```

Rubi in Sympy [A] time = 45.1569, size = 192, normalized size = 1.01

$$-\frac{C\,(d+ex)^3\,\sqrt{d^2-e^2x^2}}{4e^3}+\frac{d^2\left(12Ae^2+8Bde+7Cd^2\right)\operatorname{atan}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{8e^3}-\frac{d\sqrt{d^2-e^2x^2}\left(12Ae^2+8Bde+7Cd^2\right)}{8e^3}-\frac{(d+ex)^2\,\sqrt{d^2-e^2x^2}\,(4Be-Cd)}{12e^3}-\frac{(d+ex)\,\sqrt{d^2-e^2x^2}\left(12Ae^2+8Bde+7Cd^2\right)}{24e^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x+d)**2*(C*x**2+B*x+A)/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] -C*(d + e*x)**3*sqrt(d**2 - e**2*x**2)/(4*e**3) + d**2*(12*A*e**2
 + 8*B*d*e + 7*C*d**2)*atan(e*x/sqrt(d**2 - e**2*x**2))/(8*e**3)
- d*sqrt(d**2 - e**2*x**2)*(12*A*e**2 + 8*B*d*e + 7*C*d**2)/(8*e*
*3) - (d + e*x)**2*sqrt(d**2 - e**2*x**2)*(4*B*e - C*d)/(12*e**3)
 - (d + e*x)*sqrt(d**2 - e**2*x**2)*(12*A*e**2 + 8*B*d*e + 7*C*d*
*2)/(24*e**3)
```

Mathematica [A] time = 0.207044, size = 139, normalized size = 0.73

$$\frac{3d^2\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(4e(3Ae+2Bd)+7Cd^2\right)-\sqrt{d^2-e^2x^2}\left(3ex\left(4e(Ae+2Bd)+7Cd^2\right)+8d\left(e(6Ae+5Bd)+4Cd^2\right)+8e^2\cdots\right.}{24e^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)^2*(A + B*x + C*x^2))/Sqrt[d^2 - e^2*x^2],x]
```

```
[Out] (-(Sqrt[d^2 - e^2*x^2]*(8*d*(4*C*d^2 + e*(5*B*d + 6*A*e)) + 3*e*(
7*C*d^2 + 4*e*(2*B*d + A*e))*x + 8*e^2*(2*C*d + B*e)*x^2 + 6*C*e^
3*x^3)) + 3*d^2*(7*C*d^2 + 4*e*(2*B*d + 3*A*e))*ArcTan[(e*x)/Sqrt
[d^2 - e^2*x^2]])/(24*e^3)
```

Maple [A] time = 0.014, size = 301, normalized size = 1.6

$$\frac{3\,d^2A}{2}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}-2\,\frac{\sqrt{-e^2x^2+d^2}Ad}{e}-\frac{5\,Bd^2}{3\,e^2}\sqrt{-e^2x^2+d^2}$$
$$-\frac{x^2B}{3}\sqrt{-e^2x^2+d^2}-\frac{2\,Cdx^2}{3\,e}\sqrt{-e^2x^2+d^2}-\frac{4\,d^3C}{3\,e^3}\sqrt{-e^2x^2+d^2}-\frac{Ax}{2}\sqrt{-e^2x^2+d^2}$$
$$-\frac{Bdx}{e}\sqrt{-e^2x^2+d^2}-\frac{7\,Cd^2x}{8\,e^2}\sqrt{-e^2x^2+d^2}+\frac{Bd^3}{e}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}$$
$$+\frac{7\,Cd^4}{8\,e^2}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}-\frac{Cx^3}{4}\sqrt{-e^2x^2+d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^2*(C*x^2+B*x+A)/(-e^2*x^2+d^2)^(1/2),x)
```

```
[Out] 3/2*A*d^2/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))-
2/e*(-e^2*x^2+d^2)^(1/2)*A*d-5/3/e^2*(-e^2*x^2+d^2)^(1/2)*B*d^2-1
```

```
/3*x^2*(-e^2*x^2+d^2)^(1/2)*B-2/3*x^2/e*(-e^2*x^2+d^2)^(1/2)*d*C-
4/3*d^3/e^3*(-e^2*x^2+d^2)^(1/2)*C-1/2*A*x*(-e^2*x^2+d^2)^(1/2)-x
/e*(-e^2*x^2+d^2)^(1/2)*B*d-7/8*C*d^2/e^2*x*(-e^2*x^2+d^2)^(1/2)+
d^3/e/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))*B+7/
8*C*d^4/e^2/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2)
)-1/4*C*x^3*(-e^2*x^2+d^2)^(1/2)
```

Maxima [A] time = 0.790182, size = 390, normalized size = 2.04

$$-\frac{1}{4}\sqrt{-e^2x^2+d^2}Cx^3+\frac{Ad^2\arcsin\left(\frac{e^2x}{\sqrt{d^2e^2}}\right)}{\sqrt{e^2}}+\frac{3\,Cd^4\arcsin\left(\frac{e^2x}{\sqrt{d^2e^2}}\right)}{8\sqrt{e^2}e^2}-\frac{3\sqrt{-e^2x^2+d^2}Cd^2x}{8\,e^2}-\frac{\sqrt{-e^2x^2+d^2}Bd^2}{e^2}-\frac{2\sqrt{-e^2x^2+d^2}Ad}{e}-\frac{\sqrt{-e^2x^2+d^2}\left(2\,Cde+Be^2\right)x^2}{3\,e^2}+\frac{\left(Cd^2+2\,Bde+Ae^2\right)d^2\arcsin\left(\frac{e^2x}{\sqrt{d^2e^2}}\right)}{2\sqrt{e^2}e^2}-\frac{\sqrt{-e^2x^2+d^2}\left(Cd^2+2\,Bde+Ae^2\right)x}{2\,e^2}-\frac{2\sqrt{-e^2x^2+d^2}\left(2\,Cde+Be^2\right)d^2}{3\,e^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^2/sqrt(-e^2*x^2 + d^2),x, algorithm="maxima
```

```
[Out] -1/4*sqrt(-e^2*x^2 + d^2)*C*x^3 + A*d^2*arcsin(e^2*x/sqrt(d^2*e^2
))/sqrt(e^2) + 3/8*C*d^4*arcsin(e^2*x/sqrt(d^2*e^2))/(sqrt(e^2)*e
^2) - 3/8*sqrt(-e^2*x^2 + d^2)*C*d^2*x/e^2 - sqrt(-e^2*x^2 + d^2)
*B*d^2/e^2 - 2*sqrt(-e^2*x^2 + d^2)*A*d/e - 1/3*sqrt(-e^2*x^2 + d
^2)*(2*C*d*e + B*e^2)*x^2/e^2 + 1/2*(C*d^2 + 2*B*d*e + A*e^2)*d^2
*arcsin(e^2*x/sqrt(d^2*e^2))/(sqrt(e^2)*e^2) - 1/2*sqrt(-e^2*x^2
+ d^2)*(C*d^2 + 2*B*d*e + A*e^2)*x/e^2 - 2/3*sqrt(-e^2*x^2 + d^2)
*(2*C*d*e + B*e^2)*d^2/e^4
```

Fricas [A] time = 0.288089, size = 837, normalized size = 4.38

$$\frac{24\,Cde^7x^7+32\left(2\,Cd^2e^6+Bde^7\right)x^6+12\left(Cd^3e^5+8\,Bd^2e^6+4\,Ade^7\right)x^5-24\left(4\,Cd^4e^4-Bd^3e^5-6\,Ad^2e^6\right)x^4-12\left(17\,Cd^5e^3\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^2/sqrt(-e^2*x^2 + d^2),x, algorithm="fricas
```

```
[Out] 1/24*(24*C*d*e^7*x^7 + 32*(2*C*d^2*e^6 + B*d*e^7)*x^6 + 12*(C*d^3
*e^5 + 8*B*d^2*e^6 + 4*A*d*e^7)*x^5 - 24*(4*C*d^4*e^4 - B*d^3*e^5
 - 6*A*d^2*e^6)*x^4 - 12*(17*C*d^5*e^3 + 24*B*d^4*e^4 + 12*A*d^3*
e^5)*x^3 - 96*(B*d^5*e^3 + 2*A*d^4*e^4)*x^2 + 24*(7*C*d^7*e + 8*B
*d^6*e^2 + 4*A*d^5*e^3)*x - 6*(56*C*d^8 + 64*B*d^7*e + 96*A*d^6*e
^2 + (7*C*d^4*e^4 + 8*B*d^3*e^5 + 12*A*d^2*e^6)*x^4 - 8*(7*C*d^6*
e^2 + 8*B*d^5*e^3 + 12*A*d^4*e^4)*x^2 - 4*(14*C*d^7 + 16*B*d^6*e
+ 24*A*d^5*e^2 - (7*C*d^5*e^2 + 8*B*d^4*e^3 + 12*A*d^3*e^4)*x^2)*
sqrt(-e^2*x^2 + d^2))*arctan(-(d - sqrt(-e^2*x^2 + d^2))/(e*x)) -
 (6*C*e^7*x^7 + 8*(2*C*d*e^6 + B*e^7)*x^6 - 3*(9*C*d^2*e^5 - 8*B*
d*e^6 - 4*A*e^7)*x^5 - 24*(4*C*d^3*e^4 + B*d^2*e^5 - 2*A*d*e^6)*x
^4 - 24*(5*C*d^4*e^3 + 8*B*d^3*e^4 + 4*A*d^2*e^5)*x^3 - 96*(B*d^4
*e^3 + 2*A*d^3*e^4)*x^2 + 24*(7*C*d^6*e + 8*B*d^5*e^2 + 4*A*d^4*e
^3)*x)*sqrt(-e^2*x^2 + d^2))/(e^7*x^4 - 8*d^2*e^5*x^2 + 8*d^4*e^3
 + 4*(d*e^5*x^2 - 2*d^3*e^3)*sqrt(-e^2*x^2 + d^2))
```

Sympy [A] time = 20.3867, size = 896, normalized size = 4.69

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**2*(C*x**2+B*x+A)/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] A*d**2*Piecewise((sqrt(d**2/e**2)*asin(x*sqrt(e**2/d**2))/sqrt(d*
*2), (d**2 > 0) & (-e**2 < 0)), (sqrt(-d**2/e**2)*asinh(x*sqrt(-e
**2/d**2))/sqrt(d**2), (d**2 > 0) & (-e**2 > 0)), (sqrt(d**2/e**2
)*acosh(x*sqrt(e**2/d**2))/sqrt(-d**2), (d**2 < 0) & (-e**2 > 0))
) + 2*A*d*e*Piecewise((x**2/(2*sqrt(d**2)), Eq(e**2, 0)), (-sqrt(
d**2 - e**2*x**2)/e**2, True)) + A*e**2*Piecewise((-I*d**2*acosh(
e*x/d)/(2*e**3) - I*d*x*sqrt(-1 + e**2*x**2/d**2)/(2*e**2), Abs(e
**2*x**2/d**2) > 1), (d**2*asin(e*x/d)/(2*e**3) - d*x/(2*e**2*sqr
t(1 - e**2*x**2/d**2)) + x**3/(2*d*sqrt(1 - e**2*x**2/d**2)), Tru
e)) + B*d**2*Piecewise((x**2/(2*sqrt(d**2)), Eq(e**2, 0)), (-sqrt
(d**2 - e**2*x**2)/e**2, True)) + 2*B*d*e*Piecewise((-I*d**2*acos
h(e*x/d)/(2*e**3) - I*d*x*sqrt(-1 + e**2*x**2/d**2)/(2*e**2), Abs
(e**2*x**2/d**2) > 1), (d**2*asin(e*x/d)/(2*e**3) - d*x/(2*e**2*s
qrt(1 - e**2*x**2/d**2)) + x**3/(2*d*sqrt(1 - e**2*x**2/d**2)), T
rue)) + B*e**2*Piecewise((-2*d**2*sqrt(d**2 - e**2*x**2)/(3*e**4)
 - x**2*sqrt(d**2 - e**2*x**2)/(3*e**2), Ne(e, 0)), (x**4/(4*sqrt
(d**2)), True)) + C*d**2*Piecewise((-I*d**2*acosh(e*x/d)/(2*e**3)
 - I*d*x*sqrt(-1 + e**2*x**2/d**2)/(2*e**2), Abs(e**2*x**2/d**2)
> 1), (d**2*asin(e*x/d)/(2*e**3) - d*x/(2*e**2*sqrt(1 - e**2*x**2
/d**2)) + x**3/(2*d*sqrt(1 - e**2*x**2/d**2)), True)) + 2*C*d*e*P
iecewise((-2*d**2*sqrt(d**2 - e**2*x**2)/(3*e**4) - x**2*sqrt(d**
2 - e**2*x**2)/(3*e**2), Ne(e, 0)), (x**4/(4*sqrt(d**2)), True))
+ C*e**2*Piecewise((-3*I*d**4*acosh(e*x/d)/(8*e**5) + 3*I*d**3*x/
(8*e**4*sqrt(-1 + e**2*x**2/d**2)) - I*d*x**3/(8*e**2*sqrt(-1 + e
**2*x**2/d**2)) - I*x**5/(4*d*sqrt(-1 + e**2*x**2/d**2)), Abs(e**
```

```
2*x**2/d**2) > 1), (3*d**4*asin(e*x/d)/(8*e**5) - 3*d**3*x/(8*e**
4*sqrt(1 - e**2*x**2/d**2)) + d*x**3/(8*e**2*sqrt(1 - e**2*x**2/d
**2)) + x**5/(4*d*sqrt(1 - e**2*x**2/d**2)), True))
```

GIAC/XCAS [A] time = 0.287589, size = 177, normalized size = 0.93

$$\frac{1}{8}\left(7\,Cd^4 + 8\,Bd^3e + 12\,Ad^2e^2\right)\arcsin\left(\frac{xe}{d}\right)e^{(-3)}\mathrm{sign}\left(d\right)$$
$$-\frac{1}{24}\sqrt{-x^2e^2 + d^2}\left(\left(2\left(3\,Cx + 4\left(2\,Cde^4 + Be^5\right)e^{(-5)}\right)x + 3\left(7\,Cd^2e^3 + 8\,Bde^4 + 4\,Ae^5\right)e^{(-5)}\right)x + 8\left(4\,Cd^3e^2 + 5\,Bd^2e^3 + 6\,Ade\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(e*x + d)^2/sqrt(-e^2*x^2 + d^2),x, algorithm="giac")
```

```
[Out] 1/8*(7*C*d^4 + 8*B*d^3*e + 12*A*d^2*e^2)*arcsin(x*e/d)*e^(-3)*sig
n(d) - 1/24*sqrt(-x^2*e^2 + d^2)*((2*(3*C*x + 4*(2*C*d*e^4 + B*e^
5)*e^(-5))*x + 3*(7*C*d^2*e^3 + 8*B*d*e^4 + 4*A*e^5)*e^(-5))*x +
8*(4*C*d^3*e^2 + 5*B*d^2*e^3 + 6*A*d*e^4)*e^(-5))
```

3.12 $\int \frac{(d+ex)(A+Bx+Cx^2)}{\sqrt{d^2-e^2x^2}}\,dx$

Optimal. Leaf size=143

$$-\frac{\sqrt{d^2-e^2x^2}\,\left(3e(Ae+Bd)+2Cd^2\right)}{3e^3}+\frac{d\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(e(2Ae+Bd)+Cd^2\right)}{2e^3}-\frac{x\sqrt{d^2-e^2x^2}(Be+Cd)}{2e^2}-\frac{Cx^2\sqrt{d^2-e^2x^2}}{3e}$$

```
[Out] -((2*C*d^2 + 3*e*(B*d + A*e))*Sqrt[d^2 - e^2*x^2])/(3*e^3) - ((C*
d + B*e)*x*Sqrt[d^2 - e^2*x^2])/(2*e^2) - (C*x^2*Sqrt[d^2 - e^2*x
^2])/(3*e) + (d*(C*d^2 + e*(B*d + 2*A*e))*ArcTan[(e*x)/Sqrt[d^2 -
 e^2*x^2]])/(2*e^3)
```

Rubi [A] time = 0.360729, antiderivative size = 143, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$-\frac{\sqrt{d^2-e^2x^2}\,\left(3e(Ae+Bd)+2Cd^2\right)}{3e^3}+\frac{d\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(e(2Ae+Bd)+Cd^2\right)}{2e^3}-\frac{x\sqrt{d^2-e^2x^2}(Be+Cd)}{2e^2}-\frac{Cx^2\sqrt{d^2-e^2x^2}}{3e}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)*(A + B*x + C*x^2))/Sqrt[d^2 - e^2*x^2],x]
```

```
[Out] -((2*C*d^2 + 3*e*(B*d + A*e))*Sqrt[d^2 - e^2*x^2])/(3*e^3) - ((C*
d + B*e)*x*Sqrt[d^2 - e^2*x^2])/(2*e^2) - (C*x^2*Sqrt[d^2 - e^2*x
^2])/(3*e) + (d*(C*d^2 + e*(B*d + 2*A*e))*ArcTan[(e*x)/Sqrt[d^2 -
 e^2*x^2]])/(2*e^3)
```

Rubi in Sympy [A] time = 36.7668, size = 136, normalized size = 0.95

$$-\frac{C\,(d+ex)^2\,\sqrt{d^2-e^2x^2}}{3e^3}+\frac{d\,\left(2Ae^2+Bde+Cd^2\right)\,\operatorname{atan}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{2e^3}-\frac{(d+ex)\,\sqrt{d^2-e^2x^2}\,(3Be-Cd)}{6e^3}-\frac{\sqrt{d^2-e^2x^2}\,\left(2Ae^2+Bde+Cd^2\right)}{2e^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)*(C*x**2+B*x+A)/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] -C*(d + e*x)**2*sqrt(d**2 - e**2*x**2)/(3*e**3) + d*(2*A*e**2 + B
*d*e + C*d**2)*atan(e*x/sqrt(d**2 - e**2*x**2))/(2*e**3) - (d + e
*x)*sqrt(d**2 - e**2*x**2)*(3*B*e - C*d)/(6*e**3) - sqrt(d**2 - e
**2*x**2)*(2*A*e**2 + B*d*e + C*d**2)/(2*e**3)
```

Mathematica [A] time = 0.166457, size = 103, normalized size = 0.72

$$\frac{3d\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)\left(e(2Ae+Bd)+Cd^2\right)-\sqrt{d^2-e^2x^2}\left(3e(2Ae+2Bd+Bex)+C\left(4d^2+3dex+2e^2x^2\right)\right)}{6e^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)*(A + B*x + C*x^2))/Sqrt[d^2 - e^2*x^2],x]
```

```
[Out] (-(Sqrt[d^2 - e^2*x^2]*(3*e*(2*B*d + 2*A*e + B*e*x) + C*(4*d^2 +
3*d*e*x + 2*e^2*x^2))) + 3*d*(C*d^2 + e*(B*d + 2*A*e))*ArcTan[(e*
x)/Sqrt[d^2 - e^2*x^2]])/(6*e^3)
```

Maple [A] time = 0.012, size = 234, normalized size = 1.6

$$Ad\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}-\frac{A}{e}\sqrt{-e^2x^2+d^2}-\frac{Bd}{e^2}\sqrt{-e^2x^2+d^2}-\frac{Bx}{2\,e}\sqrt{-e^2x^2+d^2}-\frac{Cdx}{2\,e^2}\sqrt{-e^2x^2+d^2}+\frac{Bd^2}{2\,e}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}+\frac{Cd^3}{2\,e^2}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}-\frac{Cx^2}{3\,e}\sqrt{-e^2x^2+d^2}-\frac{2\,Cd^2}{3\,e^3}\sqrt{-e^2x^2+d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)*(C*x^2+B*x+A)/(-e^2*x^2+d^2)^(1/2),x)
```

```
[Out] A*d/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))-1/e*(-
e^2*x^2+d^2)^(1/2)*A-1/e^2*(-e^2*x^2+d^2)^(1/2)*B*d-1/2/e*B*x*(-e
^2*x^2+d^2)^(1/2)-1/2/e^2*C*d*x*(-e^2*x^2+d^2)^(1/2)+1/2/e*B*d^2/
(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))+1/2/e^2*C*
d^3/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))-1/3*C*
x^2*(-e^2*x^2+d^2)^(1/2)/e-2/3/e^3*C*d^2*(-e^2*x^2+d^2)^(1/2)
```

Maxima [A] time = 0.784058, size = 234, normalized size = 1.64

$$-\frac{\sqrt{-e^2x^2+d^2}Cx^2}{3\,e}+\frac{Ad\arcsin\left(\frac{e^2x}{\sqrt{d^2e^2}}\right)}{\sqrt{e^2}}+\frac{(Cd+Be)d^2\arcsin\left(\frac{e^2x}{\sqrt{d^2e^2}}\right)}{2\,\sqrt{e^2}e^2}-\frac{2\,\sqrt{-e^2x^2+d^2}Cd^2}{3\,e^3}-\frac{\sqrt{-e^2x^2+d^2}Bd}{e^2}-\frac{\sqrt{-e^2x^2+d^2}A}{e}-\frac{\sqrt{-e^2x^2+d^2}(Cd+Be)x}{2\,e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/sqrt(-e^2*x^2 + d^2),x, algorithm="maxima")
```

```
[Out] -1/3*sqrt(-e^2*x^2 + d^2)*C*x^2/e + A*d*arcsin(e^2*x/sqrt(d^2*e^2
))/sqrt(e^2) + 1/2*(C*d + B*e)*d^2*arcsin(e^2*x/sqrt(d^2*e^2))/(s
qrt(e^2)*e^2) - 2/3*sqrt(-e^2*x^2 + d^2)*C*d^2/e^3 - sqrt(-e^2*x^
2 + d^2)*B*d/e^2 - sqrt(-e^2*x^2 + d^2)*A/e - 1/2*sqrt(-e^2*x^2 +
 d^2)*(C*d + B*e)*x/e^2
```

Fricas [A] time = 0.286324, size = 548, normalized size = 3.83

$$-\frac{2\,Ce^6x^6+3\left(Cde^5+Be^6\right)x^5-6\left(Cd^2e^4-Bde^5-Ae^6\right)x^4-15\left(Cd^3e^3+Bd^2e^4\right)x^3-12\left(Bd^3e^3+Ad^2e^4\right)x^2+12\left(Cd^5e+B\cdots\right.}{\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/sqrt(-e^2*x^2 + d^2),x, algorithm="fricas")
```

```
[Out] -1/6*(2*C*e^6*x^6 + 3*(C*d*e^5 + B*e^6)*x^5 - 6*(C*d^2*e^4 - B*d*
e^5 - A*e^6)*x^4 - 15*(C*d^3*e^3 + B*d^2*e^4)*x^3 - 12*(B*d^3*e^3
 + A*d^2*e^4)*x^2 + 12*(C*d^5*e + B*d^4*e^2)*x - 6*(4*C*d^6 + 4*B
*d^5*e + 8*A*d^4*e^2 - 3*(C*d^4*e^2 + B*d^3*e^3 + 2*A*d^2*e^4)*x^
2 - (4*C*d^5 + 4*B*d^4*e + 8*A*d^3*e^2 - (C*d^3*e^2 + B*d^2*e^3 +
 2*A*d*e^4)*x^2)*sqrt(-e^2*x^2 + d^2))*arctan(-(d - sqrt(-e^2*x^2
 + d^2))/(e*x)) + 3*(2*C*d*e^4*x^4 + 3*(C*d^2*e^3 + B*d*e^4)*x^3
+ 4*(B*d^2*e^3 + A*d*e^4)*x^2 - 4*(C*d^4*e + B*d^3*e^2)*x)*sqrt(-
e^2*x^2 + d^2))/(3*d*e^5*x^2 - 4*d^3*e^3 - (e^5*x^2 - 4*d^2*e^3)*
sqrt(-e^2*x^2 + d^2))
```

Sympy [A] time = 9.62471, size = 490, normalized size = 3.43

$$Ad\left(\begin{cases}\frac{\sqrt{\frac{d^2}{e^2}}\operatorname{asin}\left(x\sqrt{\frac{e^2}{d^2}}\right)}{\sqrt{d^2}} & \text{for } d^2>0\wedge -e^2<0\\ \frac{\sqrt{-\frac{d^2}{e^2}}\operatorname{asinh}\left(x\sqrt{-\frac{e^2}{d^2}}\right)}{\sqrt{d^2}} & \text{for } d^2>0\wedge -e^2>0\\ \frac{\sqrt{\frac{d^2}{e^2}}\operatorname{acosh}\left(x\sqrt{\frac{e^2}{d^2}}\right)}{\sqrt{-d^2}} & \text{for } -e^2>0\wedge d^2<0\end{cases}\right)+Ae\left(\begin{cases}\frac{x^2}{2\sqrt{d^2}} & \text{for } e^2=0\\ -\frac{\sqrt{d^2-e^2x^2}}{e^2} & \text{otherwise}\end{cases}\right)$$
$$+Bd\left(\begin{cases}\frac{x^2}{2\sqrt{d^2}} & \text{for } e^2=0\\ -\frac{\sqrt{d^2-e^2x^2}}{e^2} & \text{otherwise}\end{cases}\right)+Be\left(\begin{cases}-\frac{id^2\operatorname{acosh}\left(\frac{ex}{d}\right)}{2e^3}-\frac{idx\sqrt{-1+\frac{e^2x^2}{d^2}}}{2e^2} & \text{for } \left|\frac{e^2x^2}{d^2}\right|>1\\ \frac{d^2\operatorname{asin}\left(\frac{ex}{d}\right)}{2e^3}-\frac{dx}{2e^2\sqrt{1-\frac{e^2x^2}{d^2}}}+\frac{x^3}{2d\sqrt{1-\frac{e^2x^2}{d^2}}} & \text{otherwise}\end{cases}\right)$$
$$+Cd\left(\begin{cases}-\frac{id^2\operatorname{acosh}\left(\frac{ex}{d}\right)}{2e^3}-\frac{idx\sqrt{-1+\frac{e^2x^2}{d^2}}}{2e^2} & \text{for } \left|\frac{e^2x^2}{d^2}\right|>1\\ \frac{d^2\operatorname{asin}\left(\frac{ex}{d}\right)}{2e^3}-\frac{dx}{2e^2\sqrt{1-\frac{e^2x^2}{d^2}}}+\frac{x^3}{2d\sqrt{1-\frac{e^2x^2}{d^2}}} & \text{otherwise}\end{cases}\right)$$
$$+Ce\left(\begin{cases}-\frac{2d^2\sqrt{d^2-e^2x^2}}{3e^4}-\frac{x^2\sqrt{d^2-e^2x^2}}{3e^2} & \text{for } e\neq 0\\ \frac{x^4}{4\sqrt{d^2}} & \text{otherwise}\end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)*(C*x**2+B*x+A)/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] A*d*Piecewise((sqrt(d**2/e**2)*asin(x*sqrt(e**2/d**2))/sqrt(d**2)
, (d**2 > 0) & (-e**2 < 0)), (sqrt(-d**2/e**2)*asinh(x*sqrt(-e**2
/d**2))/sqrt(d**2), (d**2 > 0) & (-e**2 > 0)), (sqrt(d**2/e**2)*a
cosh(x*sqrt(e**2/d**2))/sqrt(-d**2), (d**2 < 0) & (-e**2 > 0))) +
 A*e*Piecewise((x**2/(2*sqrt(d**2)), Eq(e**2, 0)), (-sqrt(d**2 -
e**2*x**2)/e**2, True)) + B*d*Piecewise((x**2/(2*sqrt(d**2)), Eq(
e**2, 0)), (-sqrt(d**2 - e**2*x**2)/e**2, True)) + B*e*Piecewise(
(-I*d**2*acosh(e*x/d)/(2*e**3) - I*d*x*sqrt(-1 + e**2*x**2/d**2)/
(2*e**2), Abs(e**2*x**2/d**2) > 1), (d**2*asin(e*x/d)/(2*e**3) -
d*x/(2*e**2*sqrt(1 - e**2*x**2/d**2)) + x**3/(2*d*sqrt(1 - e**2*x
**2/d**2)), True)) + C*d*Piecewise((-I*d**2*acosh(e*x/d)/(2*e**3)
 - I*d*x*sqrt(-1 + e**2*x**2/d**2)/(2*e**2), Abs(e**2*x**2/d**2)
> 1), (d**2*asin(e*x/d)/(2*e**3) - d*x/(2*e**2*sqrt(1 - e**2*x**2
/d**2)) + x**3/(2*d*sqrt(1 - e**2*x**2/d**2)), True)) + C*e*Piece
wise((-2*d**2*sqrt(d**2 - e**2*x**2)/(3*e**4) - x**2*sqrt(d**2 -
e**2*x**2)/(3*e**2), Ne(e, 0)), (x**4/(4*sqrt(d**2)), True))
```

GIAC/XCAS [A] time = 0.286007, size = 131, normalized size = 0.92

$$\frac{1}{2} \left(Cd^3 + Bd^2e + 2\,Ade^2\right) \arcsin\left(\frac{xe}{d}\right) e^{(-3)}\mathrm{sign}\left(d\right) - \frac{1}{6}\,\sqrt{-x^2e^2 + d^2}\left(\left(2\,Cxe^{(-1)} + 3\,\left(Cde^3 + Be^4\right)e^{(-5)}\right)x + 2\,\left(2\,Cd^2e^2 + 3\,Bde^3 + 3\,Ae^4\right)e^{(-5)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/sqrt(-e^2*x^2 + d^2),x, algorithm="giac")
```

```
[Out] 1/2*(C*d^3 + B*d^2*e + 2*A*d*e^2)*arcsin(x*e/d)*e^(-3)*sign(d) -
1/6*sqrt(-x^2*e^2 + d^2)*((2*C*x*e^(-1) + 3*(C*d*e^3 + B*e^4)*e^(
-5))*x + 2*(2*C*d^2*e^2 + 3*B*d*e^3 + 3*A*e^4)*e^(-5))
```

3.13 $\int \frac{A+Bx+Cx^2}{\sqrt{d^2-e^2x^2}}\,dx$

Optimal. Leaf size=87

$$\frac{(2Ae^2+Cd^2)\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{2e^3}-\frac{B\sqrt{d^2-e^2x^2}}{e^2}-\frac{Cx\sqrt{d^2-e^2x^2}}{2e^2}$$

```
[Out] -((B*Sqrt[d^2 - e^2*x^2])/e^2) - (C*x*Sqrt[d^2 - e^2*x^2])/(2*e^2
) + ((C*d^2 + 2*A*e^2)*ArcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(2*e^3)
```

Rubi [A] time = 0.110477, antiderivative size = 87, 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

$$\frac{(2Ae^2+Cd^2)\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{2e^3}-\frac{B\sqrt{d^2-e^2x^2}}{e^2}-\frac{Cx\sqrt{d^2-e^2x^2}}{2e^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/Sqrt[d^2 - e^2*x^2],x]
```

```
[Out] -((B*Sqrt[d^2 - e^2*x^2])/e^2) - (C*x*Sqrt[d^2 - e^2*x^2])/(2*e^2
) + ((C*d^2 + 2*A*e^2)*ArcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/(2*e^3)
```

Rubi in Sympy [A] time = 16.2325, size = 60, normalized size = 0.69

$$-\frac{(2B+Cx)\sqrt{d^2-e^2x^2}}{2e^2}+\frac{(2Ae^2+Cd^2)\operatorname{atan}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{2e^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] -(2*B + C*x)*sqrt(d**2 - e**2*x**2)/(2*e**2) + (2*A*e**2 + C*d**2
)*atan(e*x/sqrt(d**2 - e**2*x**2))/(2*e**3)
```

Mathematica [A] time = 0.0744008, size = 67, normalized size = 0.77

$$\frac{(2Ae^2+Cd^2)\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)-e(2B+Cx)\sqrt{d^2-e^2x^2}}{2e^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/Sqrt[d^2 - e^2*x^2],x]
```

```
[Out] (-(e*(2*B + C*x)*Sqrt[d^2 - e^2*x^2]) + (C*d^2 + 2*A*e^2)*ArcTan[
(e*x)/Sqrt[d^2 - e^2*x^2]])/(2*e^3)
```

Maple [A] time = 0.008, size = 108, normalized size = 1.2

$$A\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}-\frac{B}{e^2}\sqrt{-e^2x^2+d^2}-\frac{Cx}{2\,e^2}\sqrt{-e^2x^2+d^2}+\frac{Cd^2}{2\,e^2}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(-e^2*x^2+d^2)^(1/2),x)
```

```
[Out] A/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))-B*(-e^2*
x^2+d^2)^(1/2)/e^2-1/2*C*x*(-e^2*x^2+d^2)^(1/2)/e^2+1/2*C/e^2*d^2
/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))
```

Maxima [A] time = 0.787862, size = 126, normalized size = 1.45

$$\frac{A\arcsin\left(\frac{e^2x}{\sqrt{d^2e^2}}\right)}{\sqrt{e^2}}+\frac{Cd^2\arcsin\left(\frac{e^2x}{\sqrt{d^2e^2}}\right)}{2\sqrt{e^2}e^2}-\frac{\sqrt{-e^2x^2+d^2}Cx}{2\,e^2}-\frac{\sqrt{-e^2x^2+d^2}B}{e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/sqrt(-e^2*x^2 + d^2),x, algorithm="maxima")
```

```
[Out] A*arcsin(e^2*x/sqrt(d^2*e^2))/sqrt(e^2) + 1/2*C*d^2*arcsin(e^2*x/
sqrt(d^2*e^2))/(sqrt(e^2)*e^2) - 1/2*sqrt(-e^2*x^2 + d^2)*C*x/e^2
 - sqrt(-e^2*x^2 + d^2)*B/e^2
```

Fricas [A] time = 0.284366, size = 277, normalized size = 3.18

$$\frac{2\,Cde^3x^3+2\,Bde^3x^2-2\,Cd^3ex+2\left(2\,Cd^4+4\,Ad^2e^2-\left(Cd^2e^2+2\,Ae^4\right)x^2-2\left(Cd^3+2\,Ade^2\right)\sqrt{-e^2x^2+d^2}\right)\arctan\left(-\frac{d-\sqrt{-}}{e}\right.}{2\left(e^5x^2-2\,d^2e^3+2\sqrt{-e^2x^2+d^2}de^3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/sqrt(-e^2*x^2 + d^2),x, algorithm="fricas")
```

```
[Out] 1/2*(2*C*d*e^3*x^3 + 2*B*d*e^3*x^2 - 2*C*d^3*e*x + 2*(2*C*d^4 + 4
*A*d^2*e^2 - (C*d^2*e^2 + 2*A*e^4)*x^2 - 2*(C*d^3 + 2*A*d*e^2)*sq
rt(-e^2*x^2 + d^2))*arctan(-(d - sqrt(-e^2*x^2 + d^2))/(e*x)) - (
C*e^3*x^3 + 2*B*e^3*x^2 - 2*C*d^2*e*x)*sqrt(-e^2*x^2 + d^2))/(e^5
*x^2 - 2*d^2*e^3 + 2*sqrt(-e^2*x^2 + d^2)*d*e^3)
```

Sympy [A] time = 4.61651, size = 267, normalized size = 3.07

$$A\left(\begin{cases} \frac{\sqrt{\frac{d^2}{e^2}}\operatorname{asin}\left(x\sqrt{\frac{e^2}{d^2}}\right)}{\sqrt{d^2}} & \text{for } d^2>0\wedge -e^2<0 \\ \frac{\sqrt{-\frac{d^2}{e^2}}\operatorname{asinh}\left(x\sqrt{-\frac{e^2}{d^2}}\right)}{\sqrt{d^2}} & \text{for } d^2>0\wedge -e^2>0 \\ \frac{\sqrt{\frac{d^2}{e^2}}\operatorname{acosh}\left(x\sqrt{\frac{e^2}{d^2}}\right)}{\sqrt{-d^2}} & \text{for } -e^2>0\wedge d^2<0 \end{cases}\right)+B\left(\begin{cases} \frac{x^2}{2\sqrt{d^2}} & \text{for } e^2=0 \\ -\frac{\sqrt{d^2-e^2x^2}}{e^2} & \text{otherwise} \end{cases}\right)$$
$$+C\left(\begin{cases} -\frac{id^2\operatorname{acosh}\left(\frac{ex}{d}\right)}{2e^3}-\frac{idx\sqrt{-1+\frac{e^2x^2}{d^2}}}{2e^2} & \text{for } \left|\frac{e^2x^2}{d^2}\right|>1 \\ \frac{d^2\operatorname{asin}\left(\frac{ex}{d}\right)}{2e^3}-\frac{dx}{2e^2\sqrt{1-\frac{e^2x^2}{d^2}}}+\frac{x^3}{2d\sqrt{1-\frac{e^2x^2}{d^2}}} & \text{otherwise} \end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x**2+B*x+A)/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] A*Piecewise((sqrt(d**2/e**2)*asin(x*sqrt(e**2/d**2))/sqrt(d**2),
(d**2 > 0) & (-e**2 < 0)), (sqrt(-d**2/e**2)*asinh(x*sqrt(-e**2/d
**2))/sqrt(d**2), (d**2 > 0) & (-e**2 > 0)), (sqrt(d**2/e**2)*aco
sh(x*sqrt(e**2/d**2))/sqrt(-d**2), (d**2 < 0) & (-e**2 > 0))) + B
*Piecewise((x**2/(2*sqrt(d**2)), Eq(e**2, 0)), (-sqrt(d**2 - e**2
*x**2)/e**2, True)) + C*Piecewise((-I*d**2*acosh(e*x/d)/(2*e**3)
- I*d*x*sqrt(-1 + e**2*x**2/d**2)/(2*e**2), Abs(e**2*x**2/d**2) >
 1), (d**2*asin(e*x/d)/(2*e**3) - d*x/(2*e**2*sqrt(1 - e**2*x**2/
d**2)) + x**3/(2*d*sqrt(1 - e**2*x**2/d**2)), True))
```

GIAC/XCAS [A] time = 0.289044, size = 70, normalized size = 0.8

$$\frac{1}{2}\left(Cd^2+2\,Ae^2\right)\arcsin\left(\frac{xe}{d}\right)e^{(-3)}\operatorname{sign}(d)-\frac{1}{2}\sqrt{-x^2e^2+d^2}\left(Cxe^{(-2)}+2\,Be^{(-2)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/sqrt(-e^2*x^2 + d^2),x, algorithm="giac")
```

```
[Out] 1/2*(C*d^2 + 2*A*e^2)*arcsin(x*e/d)*e^(-3)*sign(d) - 1/2*sqrt(-x^
2*e^2 + d^2)*(C*x*e^(-2) + 2*B*e^(-2))
```

3.14 $\int \frac{A+Bx+Cx^2}{(d+ex)\sqrt{d^2-e^2x^2}}\,dx$

Optimal. Leaf size=103

$$-\frac{\sqrt{d^2-e^2x^2}\left(Ae^2-Bde+Cd^2\right)}{de^3(d+ex)}-\frac{(Cd-Be)\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{e^3}-\frac{C\sqrt{d^2-e^2x^2}}{e^3}$$

```
[Out] -((C*Sqrt[d^2 - e^2*x^2])/e^3) - ((C*d^2 - B*d*e + A*e^2)*Sqrt[d^
2 - e^2*x^2])/(d*e^3*(d + e*x)) - ((C*d - B*e)*ArcTan[(e*x)/Sqrt[
d^2 - e^2*x^2]])/e^3
```

Rubi [A] time = 0.27387, antiderivative size = 103, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$

$$-\frac{\sqrt{d^2-e^2x^2}\left(Ae^2-Bde+Cd^2\right)}{de^3(d+ex)}-\frac{(Cd-Be)\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{e^3}-\frac{C\sqrt{d^2-e^2x^2}}{e^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)*Sqrt[d^2 - e^2*x^2]),x]
```

```
[Out] -((C*Sqrt[d^2 - e^2*x^2])/e^3) - ((C*d^2 - B*d*e + A*e^2)*Sqrt[d^
2 - e^2*x^2])/(d*e^3*(d + e*x)) - ((C*d - B*e)*ArcTan[(e*x)/Sqrt[
d^2 - e^2*x^2]])/e^3
```

Rubi in Sympy [A] time = 30.1113, size = 85, normalized size = 0.83

$$-\frac{C\sqrt{d^2-e^2x^2}}{e^3}+\frac{(Be-Cd)\operatorname{atan}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{e^3}-\frac{\sqrt{d^2-e^2x^2}\left(Ae^2-Bde+Cd^2\right)}{de^3\left(d+ex\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)/(e*x+d)/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] -C*sqrt(d**2 - e**2*x**2)/e**3 + (B*e - C*d)*atan(e*x/sqrt(d**2 -
 e**2*x**2))/e**3 - sqrt(d**2 - e**2*x**2)*(A*e**2 - B*d*e + C*d*
*2)/(d*e**3*(d + e*x))
```

Mathematica [A] time = 0.1384, size = 83, normalized size = 0.81

$$\frac{(Be-Cd)\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)-\frac{\sqrt{d^2-e^2x^2}(e(Ae-Bd)+Cd(2d+ex))}{d(d+ex)}}{e^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/((d + e*x)*Sqrt[d^2 - e^2*x^2]),x]
```

```
[Out] (-((Sqrt[d^2 - e^2*x^2]*(e*(-(B*d) + A*e) + C*d*(2*d + e*x)))/(d*
(d + e*x))) + (-(C*d) + B*e)*ArcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/e
^3
```

Maple [A] time = 0.015, size = 149, normalized size = 1.5

$$\frac{B}{e}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}-\frac{C}{e^3}\sqrt{-e^2x^2+d^2}-\frac{Cd}{e^2}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}-\frac{Ae^2-Bde+Cd^2}{e^4d}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2\,de\left(x+\frac{d}{e}\right)}\left(x+\frac{d}{e}\right)^{-1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)/(-e^2*x^2+d^2)^(1/2),x)
```

```
[Out] 1/e*B/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))-C*(-
e^2*x^2+d^2)^(1/2)/e^3-1/e^2*C*d/(e^2)^(1/2)*arctan((e^2)^(1/2)*x
/(-e^2*x^2+d^2)^(1/2))-(A*e^2-B*d*e+C*d^2)/e^4/d/(x+d/e)*(-(x+d/e
)^2*e^2+2*d*e*(x+d/e))^(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((C*x^2 + B*x + A)/(sqrt(-e^2*x^2 + d^2)*(e*x + d)),x, algorithm="maxima
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.284628, size = 379, normalized size = 3.68

$$\frac{Cde^3x^3 + Cd^2e^2x^2 + 2\left(Cd^3e - Bd^2e^2 + Ade^3\right)x - 2\left(2\,Cd^4 - 2\,Bd^3e - \left(Cd^2e^2 - Bde^3\right)x^2 + \left(Cd^3e - Bd^2e^2\right)x - \left(2\,Cd^3 - 2\,I\right.\right.}{de^5x^2 - d^2e^4x - 2\,d^3e^3 + (de^4x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/(sqrt(-e^2*x^2 + d^2)*(e*x + d)),x, algorithm="fricas
```

```
[Out] (C*d*e^3*x^3 + C*d^2*e^2*x^2 + 2*(C*d^3*e - B*d^2*e^2 + A*d*e^3)*
x - 2*(2*C*d^4 - 2*B*d^3*e - (C*d^2*e^2 - B*d*e^3)*x^2 + (C*d^3*e
 - B*d^2*e^2)*x - (2*C*d^3 - 2*B*d^2*e + (C*d^2*e - B*d*e^2)*x)*s
qrt(-e^2*x^2 + d^2))*arctan(-(d - sqrt(-e^2*x^2 + d^2))/(e*x)) -
(C*d*e^2*x^2 + 2*(C*d^2*e - B*d*e^2 + A*e^3)*x)*sqrt(-e^2*x^2 + d
^2))/(d*e^5*x^2 - d^2*e^4*x - 2*d^3*e^3 + (d*e^4*x + 2*d^2*e^3)*s
qrt(-e^2*x^2 + d^2))
```

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

$$\int \frac{A + Bx + Cx^2}{\sqrt{-\left(-d + ex\right)\left(d + ex\right)}\left(d + ex\right)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)/(e*x+d)/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] Integral((A + B*x + C*x**2)/(sqrt(-(-d + e*x)*(d + e*x))*(d + e*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((C*x^2 + B*x + A)/(sqrt(-e^2*x^2 + d^2)*(e*x + d)),x, algorithm="giac")
```

```
[Out] Exception raised: NotImplementedError
```

3.15 $\int \frac{A+Bx+Cx^2}{(d+ex)^2\sqrt{d^2-e^2x^2}}\,dx$

Optimal. Leaf size=163

$$-\frac{\sqrt{d^2-e^2x^2}\,(Ae^2-Bde+Cd^2)}{3d^2e^3(d+ex)}-\frac{\sqrt{d^2-e^2x^2}\,(Ae^2-Bde+Cd^2)}{3de^3(d+ex)^2}+\frac{\sqrt{d^2-e^2x^2}(2Cd-Be)}{de^3(d+ex)}+\frac{C\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{e^3}$$

```
[Out] -((C*d^2 - B*d*e + A*e^2)*Sqrt[d^2 - e^2*x^2])/(3*d*e^3*(d + e*x)
^2) + ((2*C*d - B*e)*Sqrt[d^2 - e^2*x^2])/(d*e^3*(d + e*x)) - ((C
*d^2 - B*d*e + A*e^2)*Sqrt[d^2 - e^2*x^2])/(3*d^2*e^3*(d + e*x))
+ (C*ArcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/e^3
```

Rubi [A] time = 0.37971, antiderivative size = 163, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.147

$$-\frac{\sqrt{d^2-e^2x^2}\,(Ae^2-Bde+Cd^2)}{3d^2e^3(d+ex)}-\frac{\sqrt{d^2-e^2x^2}\,(Ae^2-Bde+Cd^2)}{3de^3(d+ex)^2}+\frac{\sqrt{d^2-e^2x^2}(2Cd-Be)}{de^3(d+ex)}+\frac{C\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{e^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)^2*Sqrt[d^2 - e^2*x^2]),x]
```

```
[Out] -((C*d^2 - B*d*e + A*e^2)*Sqrt[d^2 - e^2*x^2])/(3*d*e^3*(d + e*x)
^2) + ((2*C*d - B*e)*Sqrt[d^2 - e^2*x^2])/(d*e^3*(d + e*x)) - ((C
*d^2 - B*d*e + A*e^2)*Sqrt[d^2 - e^2*x^2])/(3*d^2*e^3*(d + e*x))
+ (C*ArcTan[(e*x)/Sqrt[d^2 - e^2*x^2]])/e^3
```

Rubi in Sympy [A] time = 39.5266, size = 110, normalized size = 0.67

$$\frac{C\,\mathrm{atan}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{e^3}-\frac{\sqrt{d^2-e^2x^2}\,(Ae^2-Bde+Cd^2)}{3de^3\,(d+ex)^2}-\frac{\sqrt{d^2-e^2x^2}\,(Ae^2+2Bde-5Cd^2)}{3d^2e^3\,(d+ex)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((C*x**2+B*x+A)/(e*x+d)**2/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] C*atan(e*x/sqrt(d**2 - e**2*x**2))/e**3 - sqrt(d**2 - e**2*x**2)*
(A*e**2 - B*d*e + C*d**2)/(3*d*e**3*(d + e*x)**2) - sqrt(d**2 - e
**2*x**2)*(A*e**2 + 2*B*d*e - 5*C*d**2)/(3*d**2*e**3*(d + e*x))
```

Mathematica [A] time = 0.198117, size = 95, normalized size = 0.58

$$\frac{\frac{\sqrt{d^2-e^2x^2}\left(Cd^2(4d+5ex)-e(Ae(2d+ex)+Bd(d+2ex))\right)}{d^2(d+ex)^2}+3C\tan^{-1}\left(\frac{ex}{\sqrt{d^2-e^2x^2}}\right)}{3e^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/((d + e*x)^2*Sqrt[d^2 - e^2*x^2]),x]
```

```
[Out] ((Sqrt[d^2 - e^2*x^2]*(C*d^2*(4*d + 5*e*x) - e*(A*e*(2*d + e*x) +
 B*d*(d + 2*e*x))))/(d^2*(d + e*x)^2) + 3*C*ArcTan[(e*x)/Sqrt[d^2
 - e^2*x^2]])/(3*e^3)
```

Maple [B] time = 0.017, size = 355, normalized size = 2.2

$$\frac{C}{e^2}\arctan\left(x\sqrt{e^2}\frac{1}{\sqrt{-e^2x^2+d^2}}\right)\frac{1}{\sqrt{e^2}}-\frac{Be-2Cd}{e^4d}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}\left(x+\frac{d}{e}\right)^{-1}$$
$$-\frac{A}{3de^3}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}\left(x+\frac{d}{e}\right)^{-2}$$
$$+\frac{B}{3e^4}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}\left(x+\frac{d}{e}\right)^{-2}$$
$$-\frac{Cd}{3e^5}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}\left(x+\frac{d}{e}\right)^{-2}$$
$$-\frac{A}{3d^2e^2}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}\left(x+\frac{d}{e}\right)^{-1}$$
$$+\frac{B}{3de^3}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}\left(x+\frac{d}{e}\right)^{-1}$$
$$-\frac{C}{3e^4}\sqrt{-\left(x+\frac{d}{e}\right)^2e^2+2de\left(x+\frac{d}{e}\right)}\left(x+\frac{d}{e}\right)^{-1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)^2/(-e^2*x^2+d^2)^(1/2),x)
```

```
[Out] C/e^2/(e^2)^(1/2)*arctan((e^2)^(1/2)*x/(-e^2*x^2+d^2)^(1/2))-1/e^
4*(B*e-2*C*d)/d/(x+d/e)*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2)-1/3/
e^3/d/(x+d/e)^2*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2)*A+1/3/e^4/(x
+d/e)^2*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2)*B-1/3/e^5*d/(x+d/e)^
2*(-(x+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2)*C-1/3/e^2/d^2/(x+d/e)*(-(x
+d/e)^2*e^2+2*d*e*(x+d/e))^(1/2)*A+1/3/e^3/d/(x+d/e)*(-(x+d/e)^2*
e^2+2*d*e*(x+d/e))^(1/2)*B-1/3/e^4/(x+d/e)*(-(x+d/e)^2*e^2+2*d*e*
(x+d/e))^(1/2)*C
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/(sqrt(-e^2*x^2 + d^2)*(e*x + d)^2),x, algorithm="maxi
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.288811, size = 416, normalized size = 2.55

$$-\frac{(Cd^2e^3 - Bde^4 + Ae^5)x^3 + 3(3Cd^3e^2 - Bd^2e^3 - Ade^4)x^2 + 6(Cd^4e - Ad^2e^3)x + 6(Cd^2e^3x^3 - 3Cd^4ex - 2Cd^5 + (Cd^2e^2}{3(d^2e^6x^3 - 3d^4e^4x - 2d^5e^3 + (d^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/(sqrt(-e^2*x^2 + d^2)*(e*x + d)^2),x, algorithm="fric
```

```
[Out] -1/3*((C*d^2*e^3 - B*d*e^4 + A*e^5)*x^3 + 3*(3*C*d^3*e^2 - B*d^2*
e^3 - A*d*e^4)*x^2 + 6*(C*d^4*e - A*d^2*e^3)*x + 6*(C*d^2*e^3*x^3
 - 3*C*d^4*e*x - 2*C*d^5 + (C*d^2*e^2*x^2 + 3*C*d^3*e*x + 2*C*d^4
)*sqrt(-e^2*x^2 + d^2))*arctan(-(d - sqrt(-e^2*x^2 + d^2))/(e*x))
 - 3*sqrt(-e^2*x^2 + d^2)*((3*C*d^2*e^2 - B*d*e^3 - A*e^4)*x^2 +
2*(C*d^3*e - A*d*e^3)*x))/(d^2*e^6*x^3 - 3*d^4*e^4*x - 2*d^5*e^3
+ (d^2*e^5*x^2 + 3*d^3*e^4*x + 2*d^4*e^3)*sqrt(-e^2*x^2 + d^2))
```

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

$$\int \frac{A + Bx + Cx^2}{\sqrt{-(-d + ex)(d + ex)}\,(d + ex)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)/(e*x+d)**2/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] Integral((A + B*x + C*x**2)/(sqrt(-(-d + e*x)*(d + e*x))*(d + e*x
)**2), x)
```

GIAC/XCAS [A] time = 0.681648, size = 4, normalized size = 0.02

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/(sqrt(-e^2*x^2 + d^2)*(e*x + d)^2),x, algorithm="giac
```

```
[Out] sage0*x
```

3.16 $\int \frac{A+Bx+Cx^2}{(d+ex)^3\sqrt{d^2-e^2x^2}}\,dx$

Optimal. Leaf size=180

$$-\frac{\sqrt{d^2-e^2x^2}\left(e(2Ae+3Bd)+7Cd^2\right)}{15d^2e^3(d+ex)^2}-\frac{\sqrt{d^2-e^2x^2}\left(Ae^2-Bde+Cd^2\right)}{5de^3(d+ex)^3}-\frac{\sqrt{d^2-e^2x^2}\left(e(2Ae+3Bd)+7Cd^2\right)}{15d^3e^3(d+ex)}+\frac{C\sqrt{d^2-e^2x^2}}{e^3(d+ex)^2}$$

```
[Out] -((C*d^2 - B*d*e + A*e^2)*Sqrt[d^2 - e^2*x^2])/(5*d*e^3*(d + e*x)
^3) + (C*Sqrt[d^2 - e^2*x^2])/(e^3*(d + e*x)^2) - ((7*C*d^2 + e*(
3*B*d + 2*A*e))*Sqrt[d^2 - e^2*x^2])/(15*d^2*e^3*(d + e*x)^2) - (
(7*C*d^2 + e*(3*B*d + 2*A*e))*Sqrt[d^2 - e^2*x^2])/(15*d^3*e^3*(d
 + e*x))
```

Rubi [A] time = 0.494761, antiderivative size = 180, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.118$

$$-\frac{\sqrt{d^2-e^2x^2}\left(e(2Ae+3Bd)+7Cd^2\right)}{15d^2e^3(d+ex)^2}-\frac{\sqrt{d^2-e^2x^2}\left(Ae^2-Bde+Cd^2\right)}{5de^3(d+ex)^3}-\frac{\sqrt{d^2-e^2x^2}\left(e(2Ae+3Bd)+7Cd^2\right)}{15d^3e^3(d+ex)}+\frac{C\sqrt{d^2-e^2x^2}}{e^3(d+ex)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)^3*Sqrt[d^2 - e^2*x^2]),x]
```

```
[Out] -((C*d^2 - B*d*e + A*e^2)*Sqrt[d^2 - e^2*x^2])/(5*d*e^3*(d + e*x)
^3) + (C*Sqrt[d^2 - e^2*x^2])/(e^3*(d + e*x)^2) - ((7*C*d^2 + e*(
3*B*d + 2*A*e))*Sqrt[d^2 - e^2*x^2])/(15*d^2*e^3*(d + e*x)^2) - (
(7*C*d^2 + e*(3*B*d + 2*A*e))*Sqrt[d^2 - e^2*x^2])/(15*d^3*e^3*(d
 + e*x))
```

Rubi in Sympy [A] time = 38.6603, size = 163, normalized size = 0.91

$$\frac{C\sqrt{d^2-e^2x^2}}{e^3\left(d+ex\right)^2}-\frac{\sqrt{d^2-e^2x^2}\left(Ae^2-Bde+Cd^2\right)}{5de^3\left(d+ex\right)^3}-\frac{\sqrt{d^2-e^2x^2}\left(2Ae^2+3Bde+7Cd^2\right)}{15d^2e^3\left(d+ex\right)^2}-\frac{\sqrt{d^2-e^2x^2}\left(2Ae^2+3Bde+7Cd^2\right)}{15d^3e^3\left(d+ex\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((C*x**2+B*x+A)/(e*x+d)**3/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] C*sqrt(d**2 - e**2*x**2)/(e**3*(d + e*x)**2) - sqrt(d**2 - e**2*x
**2)*(A*e**2 - B*d*e + C*d**2)/(5*d*e**3*(d + e*x)**3) - sqrt(d**
2 - e**2*x**2)*(2*A*e**2 + 3*B*d*e + 7*C*d**2)/(15*d**2*e**3*(d +
 e*x)**2) - sqrt(d**2 - e**2*x**2)*(2*A*e**2 + 3*B*d*e + 7*C*d**2
)/(15*d**3*e**3*(d + e*x))
```

Mathematica [A] time = 0.13072, size = 103, normalized size = 0.57

$$-\frac{\sqrt{d^2-e^2x^2}\left(e\left(Ae\left(7d^2+6dex+2e^2x^2\right)+3Bd\left(d^2+3dex+e^2x^2\right)\right)+Cd^2\left(2d^2+6dex+7e^2x^2\right)\right)}{15d^3e^3(d+ex)^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/((d + e*x)^3*Sqrt[d^2 - e^2*x^2]),x]
```

```
[Out] -(Sqrt[d^2 - e^2*x^2]*(C*d^2*(2*d^2 + 6*d*e*x + 7*e^2*x^2) + e*(3
*B*d*(d^2 + 3*d*e*x + e^2*x^2) + A*e*(7*d^2 + 6*d*e*x + 2*e^2*x^2
))))/(15*d^3*e^3*(d + e*x)^3)
```

Maple [A] time = 0.012, size = 116, normalized size = 0.6

$$-\frac{(-ex+d)\left(2\,Ae^4x^2+3\,Bde^3x^2+7\,Cd^2e^2x^2+6\,Ade^3x+9\,Bd^2e^2x+6\,Cd^3ex+7\,Ad^2e^2+3\,Bd^3e+2\,Cd^4\right)}{15\,e^3d^3\,(ex+d)^2}\frac{1}{\sqrt{-e^2x^2+d^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)^3/(-e^2*x^2+d^2)^(1/2),x)
```

```
[Out] -1/15*(-e*x+d)*(2*A*e^4*x^2+3*B*d*e^3*x^2+7*C*d^2*e^2*x^2+6*A*d*e
^3*x+9*B*d^2*e^2*x+6*C*d^3*e*x+7*A*d^2*e^2+3*B*d^3*e+2*C*d^4)/(e*
x+d)^2/d^3/e^3/(-e^2*x^2+d^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((C*x^2 + B*x + A)/(sqrt(-e^2*x^2 + d^2)*(e*x + d)^3),x, algorithm="maxi
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.28318, size = 410, normalized size = 2.28

$$\frac{60\,Ad^4x - 3\left(3\,Cd^2e^2 + 2\,Bde^3 + 3\,Ae^4\right)x^5 + 5\left(Cd^3e - 3\,Bd^2e^2 - 7\,Ade^3\right)x^4 + 5\left(4\,Cd^4 + 3\,Bd^3e - 4\,Ad^2e^2\right)x^3 + 30\left(Bd^4 + 2\right.}{15\left(d^3e^5x^5 + 5\,d^4e^4x^4 + 5\,d^5e^3x^3 - 5\,d^6e^2x^2 - 10\,d^7ex - 4\,d^8 - (\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/(sqrt(-e^2*x^2 + d^2)*(e*x + d)^3),x, algorithm="fric
```

```
[Out] 1/15*(60*A*d^4*x - 3*(3*C*d^2*e^2 + 2*B*d*e^3 + 3*A*e^4)*x^5 + 5*
(C*d^3*e - 3*B*d^2*e^2 - 7*A*d*e^3)*x^4 + 5*(4*C*d^4 + 3*B*d^3*e
- 4*A*d^2*e^2)*x^3 + 30*(B*d^4 + 2*A*d^3*e)*x^2 - 5*(12*A*d^3*x +
 (C*d^2*e - A*e^3)*x^4 + (4*C*d^3 + 3*B*d^2*e + 2*A*d*e^2)*x^3 +
6*(B*d^3 + 2*A*d^2*e)*x^2)*sqrt(-e^2*x^2 + d^2))/(d^3*e^5*x^5 + 5
*d^4*e^4*x^4 + 5*d^5*e^3*x^3 - 5*d^6*e^2*x^2 - 10*d^7*e*x - 4*d^8
 - (d^3*e^4*x^4 - 7*d^5*e^2*x^2 - 10*d^6*e*x - 4*d^7)*sqrt(-e^2*x
^2 + d^2))
```

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

$$\int \frac{A + Bx + Cx^2}{\sqrt{-\left(-d + ex\right)\left(d + ex\right)}\left(d + ex\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)/(e*x+d)**3/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] Integral((A + B*x + C*x**2)/(sqrt(-(-d + e*x)*(d + e*x))*(d + e*x
)**3), x)
```

GIAC/XCAS [A] time = 0.294415, size = 1, normalized size = 0.01

$$Done$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(sqrt(-e^2*x^2 + d^2)*(e*x + d)^3),x, algorithm="giac

[Out] Done
```

3.17 $\int \frac{A+Bx+Cx^2}{(d+ex)^4\sqrt{d^2-e^2x^2}}\,dx$

Optimal. Leaf size=234

$$-\frac{\sqrt{d^2-e^2x^2}\,(6Ae^2+8Bde+13Cd^2)}{70d^2e^3(d+ex)^3}-\frac{\sqrt{d^2-e^2x^2}\,(Ae^2-Bde+Cd^2)}{7de^3(d+ex)^4}-\frac{\sqrt{d^2-e^2x^2}\,(6Ae^2+8Bde+13Cd^2)}{105d^4e^3(d+ex)}-\frac{\sqrt{d^2-e^2x^2}\,(6Ae^2+8Bde+13Cd^2)}{105d^3e^3(d+ex)^2}+\frac{C\sqrt{d^2-e^2x^2}}{2e^3(d+ex)^3}$$

```
[Out] -((C*d^2 - B*d*e + A*e^2)*Sqrt[d^2 - e^2*x^2])/(7*d*e^3*(d + e*x)
^4) + (C*Sqrt[d^2 - e^2*x^2])/(2*e^3*(d + e*x)^3) - ((13*C*d^2 +
8*B*d*e + 6*A*e^2)*Sqrt[d^2 - e^2*x^2])/(70*d^2*e^3*(d + e*x)^3)
- ((13*C*d^2 + 8*B*d*e + 6*A*e^2)*Sqrt[d^2 - e^2*x^2])/(105*d^3*e
^3*(d + e*x)^2) - ((13*C*d^2 + 8*B*d*e + 6*A*e^2)*Sqrt[d^2 - e^2*
x^2])/(105*d^4*e^3*(d + e*x))
```

Rubi [A] time = 0.568459, antiderivative size = 234, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.118

$$-\frac{\sqrt{d^2-e^2x^2}\,(6Ae^2+8Bde+13Cd^2)}{70d^2e^3(d+ex)^3}-\frac{\sqrt{d^2-e^2x^2}\,(Ae^2-Bde+Cd^2)}{7de^3(d+ex)^4}-\frac{\sqrt{d^2-e^2x^2}\,(6Ae^2+8Bde+13Cd^2)}{105d^4e^3(d+ex)}-\frac{\sqrt{d^2-e^2x^2}\,(6Ae^2+8Bde+13Cd^2)}{105d^3e^3(d+ex)^2}+\frac{C\sqrt{d^2-e^2x^2}}{2e^3(d+ex)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)^4*Sqrt[d^2 - e^2*x^2]),x]
```

```
[Out] -((C*d^2 - B*d*e + A*e^2)*Sqrt[d^2 - e^2*x^2])/(7*d*e^3*(d + e*x)
^4) + (C*Sqrt[d^2 - e^2*x^2])/(2*e^3*(d + e*x)^3) - ((13*C*d^2 +
8*B*d*e + 6*A*e^2)*Sqrt[d^2 - e^2*x^2])/(70*d^2*e^3*(d + e*x)^3)
- ((13*C*d^2 + 8*B*d*e + 6*A*e^2)*Sqrt[d^2 - e^2*x^2])/(105*d^3*e
^3*(d + e*x)^2) - ((13*C*d^2 + 8*B*d*e + 6*A*e^2)*Sqrt[d^2 - e^2*
x^2])/(105*d^4*e^3*(d + e*x))
```

Rubi in Sympy [A] time = 46.0672, size = 214, normalized size = 0.91

$$\frac{C\sqrt{d^2-e^2x^2}}{2e^3\left(d+ex\right)^3}-\frac{\sqrt{d^2-e^2x^2}\,(Ae^2-Bde+Cd^2)}{7de^3\left(d+ex\right)^4}-\frac{\sqrt{d^2-e^2x^2}\,(6Ae^2+8Bde+13Cd^2)}{70d^2e^3\left(d+ex\right)^3}-\frac{\sqrt{d^2-e^2x^2}\,(6Ae^2+8Bde+13Cd^2)}{105d^3e^3\left(d+ex\right)^2}-\frac{\sqrt{d^2-e^2x^2}\,(6Ae^2+8Bde+13Cd^2)}{105d^4e^3\left(d+ex\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((C*x**2+B*x+A)/(e*x+d)**4/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] C*sqrt(d**2 - e**2*x**2)/(2*e**3*(d + e*x)**3) - sqrt(d**2 - e**2
*x**2)*(A*e**2 - B*d*e + C*d**2)/(7*d*e**3*(d + e*x)**4) - sqrt(d
**2 - e**2*x**2)*(6*A*e**2 + 8*B*d*e + 13*C*d**2)/(70*d**2*e**3*(
d + e*x)**3) - sqrt(d**2 - e**2*x**2)*(6*A*e**2 + 8*B*d*e + 13*C*
d**2)/(105*d**3*e**3*(d + e*x)**2) - sqrt(d**2 - e**2*x**2)*(6*A*
e**2 + 8*B*d*e + 13*C*d**2)/(105*d**4*e**3*(d + e*x))
```

Mathematica [A] time = 0.167347, size = 139, normalized size = 0.59

$$-\frac{\sqrt{d^2-e^2x^2}\left(e\left(3Ae\left(12d^3+13d^2ex+8de^2x^2+2e^3x^3\right)+Bd\left(13d^3+52d^2ex+32de^2x^2+8e^3x^3\right)\right)+Cd^2\left(8d^3+32d^2ex+5\right.\right.}{105d^4e^3(d+ex)^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/((d + e*x)^4*Sqrt[d^2 - e^2*x^2]),x]
```

```
[Out] -(Sqrt[d^2 - e^2*x^2]*(C*d^2*(8*d^3 + 32*d^2*e*x + 52*d*e^2*x^2 +
 13*e^3*x^3) + e*(3*A*e*(12*d^3 + 13*d^2*e*x + 8*d*e^2*x^2 + 2*e^
3*x^3) + B*d*(13*d^3 + 52*d^2*e*x + 32*d*e^2*x^2 + 8*e^3*x^3))))/
(105*d^4*e^3*(d + e*x)^4)
```

Maple [A] time = 0.013, size = 152, normalized size = 0.7

$$-\frac{(-ex+d)\left(6\,Ae^5x^3+8\,Bde^4x^3+13\,Cd^2e^3x^3+24\,Ade^4x^2+32\,Bd^2e^3x^2+52\,Cd^3e^2x^2+39\,Ad^2e^3x+52\,Bd^3e^2x+32\,Cd^4ex\right.}{105\,e^3d^4\,(ex+d)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)^4/(-e^2*x^2+d^2)^(1/2),x)
```

```
[Out] -1/105*(-e*x+d)*(6*A*e^5*x^3+8*B*d*e^4*x^3+13*C*d^2*e^3*x^3+24*A*
d*e^4*x^2+32*B*d^2*e^3*x^2+52*C*d^3*e^2*x^2+39*A*d^2*e^3*x+52*B*d
^3*e^2*x+32*C*d^4*e*x+36*A*d^3*e^2+13*B*d^4*e+8*C*d^5)/(e*x+d)^3/
d^4/e^3/(-e^2*x^2+d^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((C*x^2 + B*x + A)/(sqrt(-e^2*x^2 + d^2)*(e*x + d)^4),x, algorithm="maxi
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.291261, size = 645, normalized size = 2.76

$$-\frac{840\,Ad^6x-5\left(Cd^2e^4-Bde^5-6\,Ae^6\right)x^7-7\left(13\,Cd^3e^3+8\,Bd^2e^4+6\,Ade^5\right)x^6-7\left(28\,Cd^4e^2+38\,Bd^3e^3+81\,Ad^2e^4\right)x^5+3}{105\left(d^4e\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/(sqrt(-e^2*x^2 + d^2)*(e*x + d)^4),x, algorithm="fric
```

```
[Out] -1/105*(840*A*d^6*x - 5*(C*d^2*e^4 - B*d*e^5 - 6*A*e^6)*x^7 - 7*(
13*C*d^3*e^3 + 8*B*d^2*e^4 + 6*A*d*e^5)*x^6 - 7*(28*C*d^4*e^2 + 3
8*B*d^3*e^3 + 81*A*d^2*e^4)*x^5 + 35*(4*C*d^5*e - 7*B*d^4*e^2 - 2
7*A*d^3*e^3)*x^4 + 70*(4*C*d^6 + 5*B*d^5*e)*x^3 + 420*(B*d^6 + 3*
A*d^5*e)*x^2 - 7*(120*A*d^5*x - 3*(C*d^2*e^3 + B*d*e^4 + 2*A*e^5)
*x^6 - (8*C*d^3*e^2 + 13*B*d^2*e^3 + 36*A*d*e^4)*x^5 + 5*(4*C*d^4
*e - B*d^3*e^2 - 9*A*d^2*e^3)*x^4 + 10*(4*C*d^5 + 5*B*d^4*e + 6*A
*d^3*e^2)*x^3 + 60*(B*d^5 + 3*A*d^4*e)*x^2)*sqrt(-e^2*x^2 + d^2))
/(d^4*e^7*x^7 - 14*d^6*e^5*x^5 - 28*d^7*e^4*x^4 - 7*d^8*e^3*x^3 +
 28*d^9*e^2*x^2 + 28*d^10*e*x + 8*d^11 + (d^4*e^6*x^6 + 7*d^5*e^5
*x^5 + 11*d^6*e^4*x^4 - 7*d^7*e^3*x^3 - 32*d^8*e^2*x^2 - 28*d^9*e
*x - 8*d^10)*sqrt(-e^2*x^2 + d^2))
```

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

$$\int \frac{A+Bx+Cx^2}{\sqrt{-\left(-d+ex\right)\left(d+ex\right)}\left(d+ex\right)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)/(e*x+d)**4/(-e**2*x**2+d**2)**(1/2),x)
```

```
[Out] Integral((A + B*x + C*x**2)/(sqrt(-(-d + e*x)*(d + e*x))*(d + e*x
)**4), x)
```

GIAC/XCAS [A] time = 0.302899, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(sqrt(-e^2*x^2 + d^2)*(e*x + d)^4),x, algorithm="giac
```

```
[Out] Done
```

3.18 $\int (d+ex)^3 \left(a+cx^2\right) \left(A+Bx+Cx^2\right) \, dx$

Optimal. Leaf size=175

$$\frac{(d+ex)^6 \left(aCe^2+c\left(6Cd^2-e(3Bd-Ae)\right)\right)}{6e^5}-\frac{(d+ex)^5 \left(ae^2(2Cd-Be)+cd\left(4Cd^2-e(3Bd-2Ae)\right)\right)}{5e^5}+\frac{(d+ex)^4 \left(ae^2+cd^2\right) \left(Ae^2-Bde+Cd^2\right)}{4e^5}-\frac{c(d+ex)^7(4Cd-Be)}{7e^5}+\frac{cC(d+ex)^8}{8e^5}$$

```
[Out] ((c*d^2 + a*e^2)*(C*d^2 - B*d*e + A*e^2)*(d + e*x)^4)/(4*e^5) - (
(a*e^2*(2*C*d - B*e) + c*d*(4*C*d^2 - e*(3*B*d - 2*A*e)))*(d + e*
x)^5)/(5*e^5) + ((a*C*e^2 + c*(6*C*d^2 - e*(3*B*d - A*e)))*(d + e
*x)^6)/(6*e^5) - (c*(4*C*d - B*e)*(d + e*x)^7)/(7*e^5) + (c*C*(d
+ e*x)^8)/(8*e^5)
```

Rubi [A] time = 0.617773, antiderivative size = 173, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 1, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.04$

$$-\frac{(d+ex)^5 \left(ae^2(2Cd-Be)-cde(3Bd-2Ae)+4cCd^3\right)}{5e^5}+\frac{(d+ex)^6 \left(aCe^2-ce(3Bd-Ae)+6cCd^2\right)}{6e^5}+\frac{(d+ex)^4 \left(ae^2+cd^2\right) \left(Ae^2-Bde+Cd^2\right)}{4e^5}-\frac{c(d+ex)^7(4Cd-Be)}{7e^5}+\frac{cC(d+ex)^8}{8e^5}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)^3*(a + c*x^2)*(A + B*x + C*x^2),x]
```

```
[Out] ((c*d^2 + a*e^2)*(C*d^2 - B*d*e + A*e^2)*(d + e*x)^4)/(4*e^5) - (
(4*c*C*d^3 - c*d*e*(3*B*d - 2*A*e) + a*e^2*(2*C*d - B*e))*(d + e*
x)^5)/(5*e^5) + ((6*c*C*d^2 + a*C*e^2 - c*e*(3*B*d - A*e))*(d + e
*x)^6)/(6*e^5) - (c*(4*C*d - B*e)*(d + e*x)^7)/(7*e^5) + (c*C*(d
+ e*x)^8)/(8*e^5)
```

Rubi in Sympy [A] time = 66.8026, size = 173, normalized size = 0.99

$$\frac{Cc\,(d+ex)^8}{8e^5}+\frac{c\,(d+ex)^7\,(Be-4Cd)}{7e^5}+\frac{(d+ex)^6\left(Ace^2-3Bcde+Cae^2+6Ccd^2\right)}{6e^5}+\frac{(d+ex)^5\left(-2Acde^2+Bae^3+3Bcd^2e-2Cade^2-4Ccd^3\right)}{5e^5}+\frac{(d+ex)^4\left(ae^2+cd^2\right)\left(Ae^2-Bde+Cd^2\right)}{4e^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)**3*(c*x**2+a)*(C*x**2+B*x+A),x)
```

```
[Out] C*c*(d + e*x)**8/(8*e**5) + c*(d + e*x)**7*(B*e - 4*C*d)/(7*e**5)
 + (d + e*x)**6*(A*c*e**2 - 3*B*c*d*e + C*a*e**2 + 6*C*c*d**2)/(6
*e**5) + (d + e*x)**5*(-2*A*c*d*e**2 + B*a*e**3 + 3*B*c*d**2*e -
2*C*a*d*e**2 - 4*C*c*d**3)/(5*e**5) + (d + e*x)**4*(a*e**2 + c*d*
*2)*(A*e**2 - B*d*e + C*d**2)/(4*e**5)
```

Mathematica [A] time = 0.164287, size = 208, normalized size = 1.19

$$\frac{1}{5}x^5\left(ae^2(Be+3Cd)+3cde(Ae+Bd)+cCd^3\right)+\frac{1}{6}ex^6\left(aCe^2+ce(Ae+3Bd)+3cCd^2\right)+\frac{1}{3}dx^3\left(A\left(3ae^2+cd^2\right)+ad(3Be+Cd)\right)+\frac{1}{4}x^4\left(aAe^3+3aBde^2+3aCd^2e+3Acd^2e+Bcd^3\right)+\frac{1}{2}ad^2x^2(3Ae+Bd)+aAd^3x+\frac{1}{7}ce^2x^7(Be+3Cd)+\frac{1}{8}cCe^3x^8$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x)^3*(a + c*x^2)*(A + B*x + C*x^2),x]
```

```
[Out] a*A*d^3*x + (a*d^2*(B*d + 3*A*e)*x^2)/2 + (d*(a*d*(C*d + 3*B*e) +
 A*(c*d^2 + 3*a*e^2))*x^3)/3 + ((B*c*d^3 + 3*A*c*d^2*e + 3*a*C*d^
2*e + 3*a*B*d*e^2 + a*A*e^3)*x^4)/4 + ((c*C*d^3 + 3*c*d*e*(B*d +
A*e) + a*e^2*(3*C*d + B*e))*x^5)/5 + (e*(3*c*C*d^2 + a*C*e^2 + c*
e*(3*B*d + A*e))*x^6)/6 + (c*e^2*(3*C*d + B*e)*x^7)/7 + (c*C*e^3*
x^8)/8
```

Maple [A] time = 0.001, size = 217, normalized size = 1.2

$$\frac{e^3cCx^8}{8}+\frac{\left(e^3cB+3\,e^2dcC\right)x^7}{7}+\frac{\left(\left(e^3a+3\,d^2ec\right)C+3\,e^2dcB+e^3cA\right)x^6}{6}+\frac{\left(\left(3\,e^2da+d^3c\right)C+\left(e^3a+3\,d^2ec\right)B+3\,e^2dcA\right)x^5}{5}+\frac{\left(3\,d^2eaC+\left(3\,e^2da+d^3c\right)B+\left(e^3a+3\,d^2ec\right)A\right)x^4}{4}+\frac{\left(d^3aC+3\,d^2eaB+\left(3\,e^2da+d^3c\right)A\right)x^3}{3}+\frac{\left(3\,d^2eaA+d^3aB\right)x^2}{2}+d^3aAx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^3*(c*x^2+a)*(C*x^2+B*x+A),x)
```

```
[Out] 1/8*e^3*c*C*x^8+1/7*(B*c*e^3+3*C*c*d*e^2)*x^7+1/6*((a*e^3+3*c*d^2
*e)*C+3*e^2*d*c*B+e^3*c*A)*x^6+1/5*((3*a*d*e^2+c*d^3)*C+(a*e^3+3*
c*d^2*e)*B+3*e^2*d*c*A)*x^5+1/4*(3*d^2*e*a*C+(3*a*d*e^2+c*d^3)*B+
(a*e^3+3*c*d^2*e)*A)*x^4+1/3*(d^3*a*C+3*d^2*e*a*B+(3*a*d*e^2+c*d^
3)*A)*x^3+1/2*(3*A*a*d^2*e+B*a*d^3)*x^2+d^3*a*A*x
```

Maxima [A] time = 0.718453, size = 273, normalized size = 1.56

$$\frac{1}{8}Cce^3x^8 + \frac{1}{7}\left(3\,Ccde^2 + Bce^3\right)x^7 + \frac{1}{6}\left(3\,Ccd^2e + 3\,Bcde^2 + (Ca + Ac)e^3\right)x^6 + Aad^3x + \frac{1}{5}\left(Ccd^3 + 3\,Bcd^2e + Bae^3 + 3\,(Ca + Ac)de^2\right)x^5 + \frac{1}{4}\left(Bcd^3 + 3\,Bade^2 + Aae^3 + 3\,(Ca + Ac)d^2e\right)x^4 + \frac{1}{3}\left(3\,Bad^2e + 3\,Aade^2 + (Ca + Ac)d^3\right)x^3 + \frac{1}{2}\left(Bad^3 + 3\,Aad^2e\right)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)*(e*x + d)^3,x, algorithm="maxima")
```

```
[Out] 1/8*C*c*e^3*x^8 + 1/7*(3*C*c*d*e^2 + B*c*e^3)*x^7 + 1/6*(3*C*c*d^
2*e + 3*B*c*d*e^2 + (C*a + A*c)*e^3)*x^6 + A*a*d^3*x + 1/5*(C*c*d
^3 + 3*B*c*d^2*e + B*a*e^3 + 3*(C*a + A*c)*d*e^2)*x^5 + 1/4*(B*c*
d^3 + 3*B*a*d*e^2 + A*a*e^3 + 3*(C*a + A*c)*d^2*e)*x^4 + 1/3*(3*B
*a*d^2*e + 3*A*a*d*e^2 + (C*a + A*c)*d^3)*x^3 + 1/2*(B*a*d^3 + 3*
A*a*d^2*e)*x^2
```

Fricas [A] time = 0.244627, size = 1, normalized size = 0.01

$$\frac{1}{8}x^8e^3cC + \frac{3}{7}x^7e^2dcC + \frac{1}{7}x^7e^3cB + \frac{1}{2}x^6ed^2cC + \frac{1}{6}x^6e^3aC + \frac{1}{2}x^6e^2dcB + \frac{1}{6}x^6e^3cA + \frac{1}{5}x^5d^3cC + \frac{3}{5}x^5e^2daC + \frac{3}{5}x^5ed^2cB + \frac{1}{5}x^5e^3aB + \frac{3}{5}x^5e^2dcA + \frac{3}{4}x^4ed^2aC + \frac{1}{4}x^4d^3cB + \frac{3}{4}x^4e^2daB + \frac{3}{4}x^4ed^2cA + \frac{1}{4}x^4e^3aA + \frac{1}{3}x^3d^3aC + x^3ed^2aB + \frac{1}{3}x^3d^3cA + x^3e^2daA + \frac{1}{2}x^2d^3aB + \frac{3}{2}x^2ed^2aA + xd^3aA$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)*(e*x + d)^3,x, algorithm="fricas")
```

```
[Out] 1/8*x^8*e^3*c*C + 3/7*x^7*e^2*d*c*C + 1/7*x^7*e^3*c*B + 1/2*x^6*e
*d^2*c*C + 1/6*x^6*e^3*a*C + 1/2*x^6*e^2*d*c*B + 1/6*x^6*e^3*c*A
+ 1/5*x^5*d^3*c*C + 3/5*x^5*e^2*d*a*C + 3/5*x^5*e*d^2*c*B + 1/5*x
^5*e^3*a*B + 3/5*x^5*e^2*d*c*A + 3/4*x^4*e*d^2*a*C + 1/4*x^4*d^3*
c*B + 3/4*x^4*e^2*d*a*B + 3/4*x^4*e*d^2*c*A + 1/4*x^4*e^3*a*A + 1
/3*x^3*d^3*a*C + x^3*e*d^2*a*B + 1/3*x^3*d^3*c*A + x^3*e^2*d*a*A
```

```
+ 1/2*x^2*d^3*a*B + 3/2*x^2*e*d^2*a*A + x*d^3*a*A
```

Sympy [A] time = 0.103504, size = 257, normalized size = 1.47

$$Aad^3x + \frac{Cce^3x^8}{8} + x^7\left(\frac{Bce^3}{7} + \frac{3Ccde^2}{7}\right) + x^6\left(\frac{Ace^3}{6} + \frac{Bcde^2}{2} + \frac{Cae^3}{6} + \frac{Ccd^2e}{2}\right) + x^5\left(\frac{3Acde^2}{5} + \frac{Bae^3}{5} + \frac{3Bcd^2e}{5} + \frac{3Cade^2}{5} + \frac{Ccd^3}{5}\right) + x^4\left(\frac{Aae^3}{4} + \frac{3Acd^2e}{4} + \frac{3Bade^2}{4} + \frac{Bcd^3}{4} + \frac{3Cad^2e}{4}\right) + x^3\left(Aade^2 + \frac{Acd^3}{3} + Bad^2e + \frac{Cad^3}{3}\right) + x^2\left(\frac{3Aad^2e}{2} + \frac{Bad^3}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**3*(c*x**2+a)*(C*x**2+B*x+A),x)
```

```
[Out] A*a*d**3*x + C*c*e**3*x**8/8 + x**7*(B*c*e**3/7 + 3*C*c*d*e**2/7)
 + x**6*(A*c*e**3/6 + B*c*d*e**2/2 + C*a*e**3/6 + C*c*d**2*e/2) +
 x**5*(3*A*c*d*e**2/5 + B*a*e**3/5 + 3*B*c*d**2*e/5 + 3*C*a*d*e**
2/5 + C*c*d**3/5) + x**4*(A*a*e**3/4 + 3*A*c*d**2*e/4 + 3*B*a*d*e
**2/4 + B*c*d**3/4 + 3*C*a*d**2*e/4) + x**3*(A*a*d*e**2 + A*c*d**
3/3 + B*a*d**2*e + C*a*d**3/3) + x**2*(3*A*a*d**2*e/2 + B*a*d**3/
2)
```

GIAC/XCAS [A] time = 0.261615, size = 327, normalized size = 1.87

$$\frac{1}{8}Ccx^8e^3 + \frac{3}{7}Ccdx^7e^2 + \frac{1}{2}Ccd^2x^6e + \frac{1}{5}Ccd^3x^5 + \frac{1}{7}Bcx^7e^3 + \frac{1}{2}Bcdx^6e^2 + \frac{3}{5}Bcd^2x^5e + \frac{1}{4}Bcd^3x^4 + \frac{1}{6}Cax^6e^3 + \frac{1}{6}Acx^6e^3 + \frac{3}{5}Cadx^5e^2 + \frac{3}{5}Acdx^5e^2 + \frac{3}{4}Cad^2x^4e + \frac{3}{4}Acd^2x^4e + \frac{1}{3}Cad^3x^3 + \frac{1}{3}Acd^3x^3 + \frac{1}{5}Bax^5e^3 + \frac{3}{4}Badx^4e^2 + Bad^2x^3e + \frac{1}{2}Bad^3x^2 + \frac{1}{4}Aax^4e^3 + Aadx^3e^2 + \frac{3}{2}Aad^2x^2e + Aad^3x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)*(e*x + d)^3,x, algorithm="giac")
```

```
[Out] 1/8*C*c*x^8*e^3 + 3/7*C*c*d*x^7*e^2 + 1/2*C*c*d^2*x^6*e + 1/5*C*c
*d^3*x^5 + 1/7*B*c*x^7*e^3 + 1/2*B*c*d*x^6*e^2 + 3/5*B*c*d^2*x^5*
e + 1/4*B*c*d^3*x^4 + 1/6*C*a*x^6*e^3 + 1/6*A*c*x^6*e^3 + 3/5*C*a
*d*x^5*e^2 + 3/5*A*c*d*x^5*e^2 + 3/4*C*a*d^2*x^4*e + 3/4*A*c*d^2*
x^4*e + 1/3*C*a*d^3*x^3 + 1/3*A*c*d^3*x^3 + 1/5*B*a*x^5*e^3 + 3/4
*B*a*d*x^4*e^2 + B*a*d^2*x^3*e + 1/2*B*a*d^3*x^2 + 1/4*A*a*x^4*e^
3 + A*a*d*x^3*e^2 + 3/2*A*a*d^2*x^2*e + A*a*d^3*x
```

3.19 $\int (d+ex)^2 \left(a+cx^2\right) \left(A+Bx+Cx^2\right) \, dx$

Optimal. Leaf size=175

$$\frac{(d+ex)^5 \left(aCe^2+c\left(6Cd^2-e(3Bd-Ae)\right)\right)}{5e^5}-\frac{(d+ex)^4 \left(ae^2(2Cd-Be)+cd\left(4Cd^2-e(3Bd-2Ae)\right)\right)}{4e^5}+\frac{(d+ex)^3 \left(ae^2+cd^2\right) \left(Ae^2-Bde+Cd^2\right)}{3e^5}-\frac{c(d+ex)^6(4Cd-Be)}{6e^5}+\frac{cC(d+ex)^7}{7e^5}$$

```
[Out] ((c*d^2 + a*e^2)*(C*d^2 - B*d*e + A*e^2)*(d + e*x)^3)/(3*e^5) - (
(a*e^2*(2*C*d - B*e) + c*d*(4*C*d^2 - e*(3*B*d - 2*A*e)))*(d + e*
x)^4)/(4*e^5) + ((a*C*e^2 + c*(6*C*d^2 - e*(3*B*d - A*e)))*(d + e
*x)^5)/(5*e^5) - (c*(4*C*d - B*e)*(d + e*x)^6)/(6*e^5) + (c*C*(d
+ e*x)^7)/(7*e^5)
```

Rubi [A] time = 0.478152, antiderivative size = 173, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 1, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.04$

$$-\frac{(d+ex)^4 \left(ae^2(2Cd-Be)-cde(3Bd-2Ae)+4cCd^3\right)}{4e^5}+\frac{(d+ex)^5 \left(aCe^2-ce(3Bd-Ae)+6cCd^2\right)}{5e^5}+\frac{(d+ex)^3 \left(ae^2+cd^2\right) \left(Ae^2-Bde+Cd^2\right)}{3e^5}-\frac{c(d+ex)^6(4Cd-Be)}{6e^5}+\frac{cC(d+ex)^7}{7e^5}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)^2*(a + c*x^2)*(A + B*x + C*x^2),x]
```

```
[Out] ((c*d^2 + a*e^2)*(C*d^2 - B*d*e + A*e^2)*(d + e*x)^3)/(3*e^5) - (
(4*c*C*d^3 - c*d*e*(3*B*d - 2*A*e) + a*e^2*(2*C*d - B*e))*(d + e*
x)^4)/(4*e^5) + ((6*c*C*d^2 + a*C*e^2 - c*e*(3*B*d - A*e))*(d + e
*x)^5)/(5*e^5) - (c*(4*C*d - B*e)*(d + e*x)^6)/(6*e^5) + (c*C*(d
+ e*x)^7)/(7*e^5)
```

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

$$\frac{Cce^2x^7}{7}+ad^2\int A\,dx+ad\,(2Ae+Bd)\int x\,dx+\frac{cex^6\,(Be+2Cd)}{6}+x^5\left(\frac{Ace^2}{5}+\frac{2Bcde}{5}+\frac{Cae^2}{5}+\frac{Ccd^2}{5}\right)+x^4\left(\frac{Acde}{2}+\frac{Bae^2}{4}+\frac{Bcd^2}{4}+\frac{Cade}{2}\right)+x^3\left(\frac{Aae^2}{3}+\frac{Acd^2}{3}+\frac{2Bade}{3}+\frac{Cad^2}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)**2*(c*x**2+a)*(C*x**2+B*x+A),x)
```

```
[Out] C*c*e**2*x**7/7 + a*d**2*Integral(A, x) + a*d*(2*A*e + B*d)*Integ
ral(x, x) + c*e*x**6*(B*e + 2*C*d)/6 + x**5*(A*c*e**2/5 + 2*B*c*d
*e/5 + C*a*e**2/5 + C*c*d**2/5) + x**4*(A*c*d*e/2 + B*a*e**2/4 +
B*c*d**2/4 + C*a*d*e/2) + x**3*(A*a*e**2/3 + A*c*d**2/3 + 2*B*a*d
*e/3 + C*a*d**2/3)
```

Mathematica [A] time = 0.109904, size = 150, normalized size = 0.86

$$\frac{1}{5}x^5\left(aCe^2+Ace^2+2Bcde+cCd^2\right)+\frac{1}{4}x^4\left(aBe^2+2aCde+2Acde+Bcd^2\right)+\frac{1}{3}x^3\left(aAe^2+2aBde+aCd^2+Acd^2\right)+\frac{1}{2}adx^2(2Ae+Bd)+aAd^2x+\frac{1}{6}cex^6(Be+2Cd)+\frac{1}{7}cCe^2x^7$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x)^2*(a + c*x^2)*(A + B*x + C*x^2),x]
```

```
[Out] a*A*d^2*x + (a*d*(B*d + 2*A*e)*x^2)/2 + ((A*c*d^2 + a*C*d^2 + 2*a
*B*d*e + a*A*e^2)*x^3)/3 + ((B*c*d^2 + 2*A*c*d*e + 2*a*C*d*e + a*
B*e^2)*x^4)/4 + ((c*C*d^2 + 2*B*c*d*e + A*c*e^2 + a*C*e^2)*x^5)/5
 + (c*e*(2*C*d + B*e)*x^6)/6 + (c*C*e^2*x^7)/7
```

Maple [A] time = 0.001, size = 148, normalized size = 0.9

$$\frac{e^2cCx^7}{7}+\frac{\left(e^2cB+2\,cdeC\right)x^6}{6}+\frac{\left(\left(ae^2+cd^2\right)C+2\,Bcde+Ace^2\right)x^5}{5}+\frac{\left(2\,adeC+\left(ae^2+cd^2\right)B+2\,cdeA\right)x^4}{4}+\frac{\left(d^2aC+2\,adeB+\left(ae^2+cd^2\right)A\right)x^3}{3}+\frac{\left(2\,adeA+d^2aB\right)x^2}{2}+d^2aAx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^2*(c*x^2+a)*(C*x^2+B*x+A),x)
```

```
[Out] 1/7*e^2*c*C*x^7+1/6*(B*c*e^2+2*C*c*d*e)*x^6+1/5*((a*e^2+c*d^2)*C+
2*B*c*d*e+A*c*e^2)*x^5+1/4*(2*a*d*e*C+(a*e^2+c*d^2)*B+2*c*d*e*A)*
x^4+1/3*(d^2*a*C+2*a*d*e*B+(a*e^2+c*d^2)*A)*x^3+1/2*(2*A*a*d*e+B*
a*d^2)*x^2+d^2*a*A*x
```

Maxima [A] time = 0.708947, size = 190, normalized size = 1.09

$$\frac{1}{7}\,Cce^2x^7+\frac{1}{6}\,\left(2\,Ccde+Bce^2\right)x^6+\frac{1}{5}\,\left(Ccd^2+2\,Bcde+(Ca+Ac)e^2\right)x^5+Aad^2x+\frac{1}{4}\,\left(Bcd^2+Bae^2+2\,(Ca+Ac)de\right)x^4+\frac{1}{3}\,\left(2\,Bade+Aae^2+(Ca+Ac)d^2\right)x^3+\frac{1}{2}\,\left(Bad^2+2\,Aade\right)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)*(e*x + d)^2,x, algorithm="maxima")
```

```
[Out] 1/7*C*c*e^2*x^7 + 1/6*(2*C*c*d*e + B*c*e^2)*x^6 + 1/5*(C*c*d^2 +
2*B*c*d*e + (C*a + A*c)*e^2)*x^5 + A*a*d^2*x + 1/4*(B*c*d^2 + B*a
*e^2 + 2*(C*a + A*c)*d*e)*x^4 + 1/3*(2*B*a*d*e + A*a*e^2 + (C*a +
 A*c)*d^2)*x^3 + 1/2*(B*a*d^2 + 2*A*a*d*e)*x^2
```

Fricas [A] time = 0.24625, size = 1, normalized size = 0.01

$$\frac{1}{7}x^7e^2cC+\frac{1}{3}x^6edcC+\frac{1}{6}x^6e^2cB+\frac{1}{5}x^5d^2cC+\frac{1}{5}x^5e^2aC+\frac{2}{5}x^5edcB+\frac{1}{5}x^5e^2cA+\frac{1}{2}x^4edaC+\frac{1}{4}x^4d^2cB+\frac{1}{4}x^4e^2aB+\frac{1}{2}x^4edcA+\frac{1}{3}x^3d^2aC+\frac{2}{3}x^3edaB+\frac{1}{3}x^3d^2cA+\frac{1}{3}x^3e^2aA+\frac{1}{2}x^2d^2aB+x^2edaA+xd^2aA$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)*(e*x + d)^2,x, algorithm="fricas")
```

```
[Out] 1/7*x^7*e^2*c*C + 1/3*x^6*e*d*c*C + 1/6*x^6*e^2*c*B + 1/5*x^5*d^2
*c*C + 1/5*x^5*e^2*a*C + 2/5*x^5*e*d*c*B + 1/5*x^5*e^2*c*A + 1/2*
x^4*e*d*a*C + 1/4*x^4*d^2*c*B + 1/4*x^4*e^2*a*B + 1/2*x^4*e*d*c*A
 + 1/3*x^3*d^2*a*C + 2/3*x^3*e*d*a*B + 1/3*x^3*d^2*c*A + 1/3*x^3*
e^2*a*A + 1/2*x^2*d^2*a*B + x^2*e*d*a*A + x*d^2*a*A
```

Sympy [A] time = 0.089282, size = 173, normalized size = 0.99

$$Aad^2x+\frac{Cce^2x^7}{7}+x^6\left(\frac{Bce^2}{6}+\frac{Ccde}{3}\right)+x^5\left(\frac{Ace^2}{5}+\frac{2Bcde}{5}+\frac{Cae^2}{5}+\frac{Ccd^2}{5}\right)+x^4\left(\frac{Acde}{2}+\frac{Bae^2}{4}+\frac{Bcd^2}{4}+\frac{Cade}{2}\right)+x^3\left(\frac{Aae^2}{3}+\frac{Acd^2}{3}+\frac{2Bade}{3}+\frac{Cad^2}{3}\right)+x^2\left(Aade+\frac{Bad^2}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**2*(c*x**2+a)*(C*x**2+B*x+A),x)
```

```
[Out] A*a*d**2*x + C*c*e**2*x**7/7 + x**6*(B*c*e**2/6 + C*c*d*e/3) + x*
*5*(A*c*e**2/5 + 2*B*c*d*e/5 + C*a*e**2/5 + C*c*d**2/5) + x**4*(A
*c*d*e/2 + B*a*e**2/4 + B*c*d**2/4 + C*a*d*e/2) + x**3*(A*a*e**2/
3 + A*c*d**2/3 + 2*B*a*d*e/3 + C*a*d**2/3) + x**2*(A*a*d*e + B*a*
d**2/2)
```

GIAC/XCAS [A] time = 0.260976, size = 231, normalized size = 1.32

$$\frac{1}{7}Ccx^7e^2+\frac{1}{3}Ccdx^6e+\frac{1}{5}Ccd^2x^5+\frac{1}{6}Bcx^6e^2+\frac{2}{5}Bcdx^5e+\frac{1}{4}Bcd^2x^4+\frac{1}{5}Cax^5e^2+\frac{1}{5}Acx^5e^2+\frac{1}{2}Cadx^4e+\frac{1}{2}Acdx^4e+\frac{1}{3}Cad^2x^3+\frac{1}{3}Acd^2x^3+\frac{1}{4}Bax^4e^2+\frac{2}{3}Badx^3e+\frac{1}{2}Bad^2x^2+\frac{1}{3}Aax^3e^2+Aadx^2e+Aad^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)*(e*x + d)^2,x, algorithm="giac")
```

```
[Out] 1/7*C*c*x^7*e^2 + 1/3*C*c*d*x^6*e + 1/5*C*c*d^2*x^5 + 1/6*B*c*x^6
*e^2 + 2/5*B*c*d*x^5*e + 1/4*B*c*d^2*x^4 + 1/5*C*a*x^5*e^2 + 1/5*
A*c*x^5*e^2 + 1/2*C*a*d*x^4*e + 1/2*A*c*d*x^4*e + 1/3*C*a*d^2*x^3
 + 1/3*A*c*d^2*x^3 + 1/4*B*a*x^4*e^2 + 2/3*B*a*d*x^3*e + 1/2*B*a*
d^2*x^2 + 1/3*A*a*x^3*e^2 + A*a*d*x^2*e + A*a*d^2*x
```

3.20 $\int (d+ex)\left(a+cx^2\right)\left(A+Bx+Cx^2\right)\,dx$

Optimal. Leaf size=86

$$\frac{1}{4}x^4(aCe+Ace+Bcd)+\frac{1}{3}x^3(aBe+aCd+Acd)+\frac{1}{2}ax^2(Ae+Bd)+aAdx+\frac{1}{5}cx^5(Be+Cd)+\frac{1}{6}cCex^6$$

```
[Out] a*A*d*x + (a*(B*d + A*e)*x^2)/2 + ((A*c*d + a*C*d + a*B*e)*x^3)/3
 + ((B*c*d + A*c*e + a*C*e)*x^4)/4 + (c*(C*d + B*e)*x^5)/5 + (c*C
*e*x^6)/6
```

Rubi [A] time = 0.218198, antiderivative size = 86, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.043$

$$\frac{1}{4}x^4(aCe+Ace+Bcd)+\frac{1}{3}x^3(aBe+aCd+Acd)+\frac{1}{2}ax^2(Ae+Bd)+aAdx+\frac{1}{5}cx^5(Be+Cd)+\frac{1}{6}cCex^6$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)*(a + c*x^2)*(A + B*x + C*x^2),x]
```

```
[Out] a*A*d*x + (a*(B*d + A*e)*x^2)/2 + ((A*c*d + a*C*d + a*B*e)*x^3)/3
 + ((B*c*d + A*c*e + a*C*e)*x^4)/4 + (c*(C*d + B*e)*x^5)/5 + (c*C
*e*x^6)/6
```

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

$$\frac{Ccex^6}{6}+ad\int A\,dx+a\,(Ae+Bd)\int x\,dx+\frac{cx^5\,(Be+Cd)}{5}+x^4\left(\frac{Ace}{4}+\frac{Bcd}{4}+\frac{Cae}{4}\right)+x^3\left(\frac{Acd}{3}+\frac{Bae}{3}+\frac{Cad}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)*(c*x**2+a)*(C*x**2+B*x+A),x)
```

```
[Out] C*c*e*x**6/6 + a*d*Integral(A, x) + a*(A*e + B*d)*Integral(x, x)
+ c*x**5*(B*e + C*d)/5 + x**4*(A*c*e/4 + B*c*d/4 + C*a*e/4) + x**
3*(A*c*d/3 + B*a*e/3 + C*a*d/3)
```

Mathematica [A] time = 0.0570578, size = 86, normalized size = 1.

$$\frac{1}{4}x^4(aCe+Ace+Bcd)+\frac{1}{3}x^3(aBe+aCd+Acd)+\frac{1}{2}ax^2(Ae+Bd)+aAdx+\frac{1}{5}cx^5(Be+Cd)+\frac{1}{6}cCex^6$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x)*(a + c*x^2)*(A + B*x + C*x^2),x]
```

```
[Out] a*A*d*x + (a*(B*d + A*e)*x^2)/2 + ((A*c*d + a*C*d + a*B*e)*x^3)/3
 + ((B*c*d + A*c*e + a*C*e)*x^4)/4 + (c*(C*d + B*e)*x^5)/5 + (c*C
*e*x^6)/6
```

Maple [A] time = 0.002, size = 79, normalized size = 0.9

$$\frac{cCex^6}{6} + \frac{(ceB + cdC)\,x^5}{5} + \frac{(Ace + Bcd + aCe)\,x^4}{4} + \frac{(Acd + aBe + Cad)\,x^3}{3} + \frac{(aeA + adB)\,x^2}{2} + aAdx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)*(c*x^2+a)*(C*x^2+B*x+A),x)
```

```
[Out] 1/6*c*C*e*x^6+1/5*(B*c*e+C*c*d)*x^5+1/4*(A*c*e+B*c*d+C*a*e)*x^4+1
/3*(A*c*d+B*a*e+C*a*d)*x^3+1/2*(A*a*e+B*a*d)*x^2+a*A*d*x
```

Maxima [A] time = 0.710289, size = 108, normalized size = 1.26

$$\frac{1}{6}\,Ccex^6 + \frac{1}{5}\,(Ccd + Bce)x^5 + \frac{1}{4}\,(Bcd + (Ca + Ac)e)x^4 + Aadx + \frac{1}{3}\,(Bae + (Ca + Ac)d)x^3 + \frac{1}{2}\,(Bad + Aae)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)*(e*x + d),x, algorithm="maxima")
```

```
[Out] 1/6*C*c*e*x^6 + 1/5*(C*c*d + B*c*e)*x^5 + 1/4*(B*c*d + (C*a + A*c
)*e)*x^4 + A*a*d*x + 1/3*(B*a*e + (C*a + A*c)*d)*x^3 + 1/2*(B*a*d
 + A*a*e)*x^2
```

Fricas [A] time = 0.243467, size = 1, normalized size = 0.01

$$\frac{1}{6}x^6ecC + \frac{1}{5}x^5dcC + \frac{1}{5}x^5ecB + \frac{1}{4}x^4eaC + \frac{1}{4}x^4dcB + \frac{1}{4}x^4ecA + \frac{1}{3}x^3daC + \frac{1}{3}x^3eaB + \frac{1}{3}x^3dcA + \frac{1}{2}x^2daB + \frac{1}{2}x^2eaA + xdaA$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)*(e*x + d),x, algorithm="fricas")
```

```
[Out] 1/6*x^6*e*c*C + 1/5*x^5*d*c*C + 1/5*x^5*e*c*B + 1/4*x^4*e*a*C + 1
/4*x^4*d*c*B + 1/4*x^4*e*c*A + 1/3*x^3*d*a*C + 1/3*x^3*e*a*B + 1/
3*x^3*d*c*A + 1/2*x^2*d*a*B + 1/2*x^2*e*a*A + x*d*a*A
```

Sympy [A] time = 0.073591, size = 97, normalized size = 1.13

$$Aadx + \frac{Ccex^6}{6} + x^5\left(\frac{Bce}{5} + \frac{Ccd}{5}\right) + x^4\left(\frac{Ace}{4} + \frac{Bcd}{4} + \frac{Cae}{4}\right) + x^3\left(\frac{Acd}{3} + \frac{Bae}{3} + \frac{Cad}{3}\right) + x^2\left(\frac{Aae}{2} + \frac{Bad}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(c*x**2+a)*(C*x**2+B*x+A),x)
```

```
[Out] A*a*d*x + C*c*e*x**6/6 + x**5*(B*c*e/5 + C*c*d/5) + x**4*(A*c*e/4
 + B*c*d/4 + C*a*e/4) + x**3*(A*c*d/3 + B*a*e/3 + C*a*d/3) + x**2
*(A*a*e/2 + B*a*d/2)
```

GIAC/XCAS [A] time = 0.262359, size = 135, normalized size = 1.57

$$\frac{1}{6}\,Ccx^6e + \frac{1}{5}\,Ccdx^5 + \frac{1}{5}\,Bcx^5e + \frac{1}{4}\,Bcdx^4 + \frac{1}{4}\,Cax^4e + \frac{1}{4}\,Acx^4e + \frac{1}{3}\,Cadx^3 + \frac{1}{3}\,Acdx^3 + \frac{1}{3}\,Bax^3e + \frac{1}{2}\,Badx^2 + \frac{1}{2}\,Aax^2e + Aadx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)*(e*x + d),x, algorithm="giac")
```

```
[Out] 1/6*C*c*x^6*e + 1/5*C*c*d*x^5 + 1/5*B*c*x^5*e + 1/4*B*c*d*x^4 + 1
/4*C*a*x^4*e + 1/4*A*c*x^4*e + 1/3*C*a*d*x^3 + 1/3*A*c*d*x^3 + 1/
3*B*a*x^3*e + 1/2*B*a*d*x^2 + 1/2*A*a*x^2*e + A*a*d*x
```

3.21 $\int (a + cx^2) (A + Bx + Cx^2) \, dx$

Optimal. Leaf size=46

$$\frac{1}{3}x^3(aC + Ac) + aAx + \frac{1}{2}aBx^2 + \frac{1}{4}Bcx^4 + \frac{1}{5}cCx^5$$

```
[Out] a*A*x + (a*B*x^2)/2 + ((A*c + a*C)*x^3)/3 + (B*c*x^4)/4 + (c*C*x^
5)/5
```

Rubi [A] time = 0.0591671, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056

$$\frac{1}{3}x^3(aC + Ac) + aAx + \frac{1}{2}aBx^2 + \frac{1}{4}Bcx^4 + \frac{1}{5}cCx^5$$

Antiderivative was successfully verified.

```
[In]  Int[(a + c*x^2)*(A + B*x + C*x^2),x]
```

```
[Out] a*A*x + (a*B*x^2)/2 + ((A*c + a*C)*x^3)/3 + (B*c*x^4)/4 + (c*C*x^
5)/5
```

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

$$Ba \int x \, dx + \frac{Bcx^4}{4} + \frac{Ccx^5}{5} + a \int A \, dx + x^3 \left(\frac{Ac}{3} + \frac{Ca}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+a)*(C*x**2+B*x+A),x)
```

```
[Out] B*a*Integral(x, x) + B*c*x**4/4 + C*c*x**5/5 + a*Integral(A, x) +
 x**3*(A*c/3 + C*a/3)
```

Mathematica [A] time = 0.0246864, size = 46, normalized size = 1.

$$\frac{1}{3}x^3(aC + Ac) + aAx + \frac{1}{2}aBx^2 + \frac{1}{4}Bcx^4 + \frac{1}{5}cCx^5$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + c*x^2)*(A + B*x + C*x^2),x]
```

```
[Out] a*A*x + (a*B*x^2)/2 + ((A*c + a*C)*x^3)/3 + (B*c*x^4)/4 + (c*C*x^
5)/5
```

Maple [A] time = 0.001, size = 39, normalized size = 0.9

$$aAx + \frac{aBx^2}{2} + \frac{(Ac + aC)\,x^3}{3} + \frac{Bcx^4}{4} + \frac{cCx^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)*(C*x^2+B*x+A),x)
```

```
[Out] a*A*x+1/2*a*B*x^2+1/3*(A*c+C*a)*x^3+1/4*B*c*x^4+1/5*c*C*x^5
```

Maxima [A] time = 0.705156, size = 51, normalized size = 1.11

$$\frac{1}{5}\,Ccx^5 + \frac{1}{4}\,Bcx^4 + \frac{1}{2}\,Bax^2 + \frac{1}{3}\,(Ca + Ac)x^3 + Aax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a),x, algorithm="maxima")
```

```
[Out] 1/5*C*c*x^5 + 1/4*B*c*x^4 + 1/2*B*a*x^2 + 1/3*(C*a + A*c)*x^3 + A
*a*x
```

Fricas [A] time = 0.239573, size = 1, normalized size = 0.02

$$\frac{1}{5}x^5cC + \frac{1}{4}x^4cB + \frac{1}{3}x^3aC + \frac{1}{3}x^3cA + \frac{1}{2}x^2aB + xaA$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a),x, algorithm="fricas")
```

```
[Out] 1/5*x^5*c*C + 1/4*x^4*c*B + 1/3*x^3*a*C + 1/3*x^3*c*A + 1/2*x^2*a
*B + x*a*A
```

Sympy [A] time = 0.05054, size = 42, normalized size = 0.91

$$Aax + \frac{Bax^2}{2} + \frac{Bcx^4}{4} + \frac{Ccx^5}{5} + x^3\left(\frac{Ac}{3} + \frac{Ca}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)*(C*x**2+B*x+A),x)
```

```
[Out] A*a*x + B*a*x**2/2 + B*c*x**4/4 + C*c*x**5/5 + x**3*(A*c/3 + C*a/
3)
```

GIAC/XCAS [A] time = 0.261119, size = 54, normalized size = 1.17

$$\frac{1}{5}Ccx^5 + \frac{1}{4}Bcx^4 + \frac{1}{3}Cax^3 + \frac{1}{3}Acx^3 + \frac{1}{2}Bax^2 + Aax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a),x, algorithm="giac")
```

```
[Out] 1/5*C*c*x^5 + 1/4*B*c*x^4 + 1/3*C*a*x^3 + 1/3*A*c*x^3 + 1/2*B*a*x
^2 + A*a*x
```

3.22 $\int \frac{(a+cx^2)(A+Bx+Cx^2)}{d+ex}\,dx$

Optimal. Leaf size=145

$$\frac{(ae^2+cd^2)\log(d+ex)(Ae^2-Bde+Cd^2)}{e^5}-\frac{x\left(ae^2(Cd-Be)+cd\left(Cd^2-e(Bd-Ae)\right)\right)}{e^4}+\frac{x^2\left(aCe^2+c\left(Cd^2-e(Bd-Ae)\right)\right)}{2e^3}-\frac{cx^3(Cd-Be)}{3e^2}+\frac{cCx^4}{4e}$$

```
[Out] -(((a*e^2*(C*d - B*e) + c*d*(C*d^2 - e*(B*d - A*e)))*x)/e^4) + ((
a*C*e^2 + c*(C*d^2 - e*(B*d - A*e)))*x^2)/(2*e^3) - (c*(C*d - B*e
)*x^3)/(3*e^2) + (c*C*x^4)/(4*e) + ((c*d^2 + a*e^2)*(C*d^2 - B*d*
e + A*e^2)*Log[d + e*x])/e^5
```

Rubi [A] time = 0.49436, antiderivative size = 143, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 1, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.04$

$$-\frac{x\left(ae^2(Cd-Be)-cde(Bd-Ae)+cCd^3\right)}{e^4}+\frac{(ae^2+cd^2)\log(d+ex)(Ae^2-Bde+Cd^2)}{e^5}+\frac{x^2\left(aCe^2-ce(Bd-Ae)+cCd^2\right)}{2e^3}-\frac{cx^3(Cd-Be)}{3e^2}+\frac{cCx^4}{4e}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)*(A + B*x + C*x^2))/(d + e*x),x]
```

```
[Out] -(((c*C*d^3 - c*d*e*(B*d - A*e) + a*e^2*(C*d - B*e))*x)/e^4) + ((
c*C*d^2 + a*C*e^2 - c*e*(B*d - A*e))*x^2)/(2*e^3) - (c*(C*d - B*e
)*x^3)/(3*e^2) + (c*C*x^4)/(4*e) + ((c*d^2 + a*e^2)*(C*d^2 - B*d*
e + A*e^2)*Log[d + e*x])/e^5
```

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

$$\frac{Ccx^4}{4e}+\frac{cx^3(Be-Cd)}{3e^2}+\left(-Acde^2+Bae^3+Bcd^2e-Cade^2-Ccd^3\right)\int\frac{1}{e^4}\,dx+\frac{(Ace^2-Bcde+Cae^2+Ccd^2)\int x\,dx}{e^3}+\frac{(ae^2+cd^2)(Ae^2-Bde+Cd^2)\log(d+ex)}{e^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+a)*(C*x**2+B*x+A)/(e*x+d),x)
```

```
[Out] C*c*x**4/(4*e) + c*x**3*(B*e - C*d)/(3*e**2) + (-A*c*d*e**2 + B*a
*e**3 + B*c*d**2*e - C*a*d*e**2 - C*c*d**3)*Integral(e**(-4), x)
+ (A*c*e**2 - B*c*d*e + C*a*e**2 + C*c*d**2)*Integral(x, x)/e**3
+ (a*e**2 + c*d**2)*(A*e**2 - B*d*e + C*d**2)*log(d + e*x)/e**5
```

Mathematica [A] time = 0.15933, size = 136, normalized size = 0.94

$$\frac{12\left(ae^2+cd^2\right)\log(d+ex)\left(e(Ae-Bd)+Cd^2\right)+ex\left(6ae^2(2Be-2Cd+Cex)+2ce\left(3Ae(ex-2d)+B\left(6d^2-3dex+2e^2x^2\right)\right.\right.}{12e^5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)*(A + B*x + C*x^2))/(d + e*x),x]
```

```
[Out] (e*x*(6*a*e^2*(-2*C*d + 2*B*e + C*e*x) + c*C*(-12*d^3 + 6*d^2*e*x
 - 4*d*e^2*x^2 + 3*e^3*x^3) + 2*c*e*(3*A*e*(-2*d + e*x) + B*(6*d^
2 - 3*d*e*x + 2*e^2*x^2))) + 12*(c*d^2 + a*e^2)*(C*d^2 + e*(-(B*d
) + A*e))*Log[d + e*x])/(12*e^5)
```

Maple [A] time = 0.006, size = 210, normalized size = 1.5

$$\frac{Ccx^4}{4\,e}+\frac{Bx^3c}{3\,e}-\frac{Cx^3cd}{3\,e^2}+\frac{Ax^2c}{2\,e}-\frac{Bx^2cd}{2\,e^2}+\frac{Cx^2a}{2\,e}+\frac{Cx^2cd^2}{2\,e^3}-\frac{Acdx}{e^2}+\frac{aBx}{e}+\frac{cBd^2x}{e^3}-\frac{Cadx}{e^2}-\frac{Ccd^3x}{e^4}+\frac{\ln(ex+d)\,Aa}{e}+\frac{\ln(ex+d)\,Acd^2}{e^3}-\frac{\ln(ex+d)\,Bad}{e^2}-\frac{\ln(ex+d)\,Bcd^3}{e^4}+\frac{\ln(ex+d)\,Cad^2}{e^3}+\frac{\ln(ex+d)\,Ccd^4}{e^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)*(C*x^2+B*x+A)/(e*x+d),x)
```

```
[Out] 1/4*c*C*x^4/e+1/3/e*B*x^3*c-1/3/e^2*C*x^3*c*d+1/2/e*A*x^2*c-1/2/e
^2*B*x^2*c*d+1/2/e*C*x^2*a+1/2/e^3*C*x^2*c*d^2-1/e^2*d*c*A*x+1/e*
a*B*x+1/e^3*B*c*d^2*x-1/e^2*C*a*d*x-1/e^4*C*c*d^3*x+1/e*ln(e*x+d)
*A*a+1/e^3*ln(e*x+d)*A*c*d^2-1/e^2*ln(e*x+d)*B*a*d-1/e^4*ln(e*x+d
)*B*c*d^3+1/e^3*ln(e*x+d)*C*a*d^2+1/e^5*ln(e*x+d)*C*c*d^4
```

Maxima [A] time = 0.711618, size = 215, normalized size = 1.48

$$\frac{3\,Cce^3x^4-4\left(Ccde^2-Bce^3\right)x^3+6\left(Ccd^2e-Bcde^2+(Ca+Ac)e^3\right)x^2-12\left(Ccd^3-Bcd^2e-Bae^3+(Ca+Ac)de^2\right)x}{12\,e^4}+\frac{\left(Ccd^4-Bcd^3e-Bade^3+Aae^4+(Ca+Ac)d^2e^2\right)\log\left(ex+d\right)}{e^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)/(e*x + d),x, algorithm="maxima")
```

```
[Out] 1/12*(3*C*c*e^3*x^4 - 4*(C*c*d*e^2 - B*c*e^3)*x^3 + 6*(C*c*d^2*e
- B*c*d*e^2 + (C*a + A*c)*e^3)*x^2 - 12*(C*c*d^3 - B*c*d^2*e - B*
a*e^3 + (C*a + A*c)*d*e^2)*x)/e^4 + (C*c*d^4 - B*c*d^3*e - B*a*d*
e^3 + A*a*e^4 + (C*a + A*c)*d^2*e^2)*log(e*x + d)/e^5
```

Fricas [A] time = 0.265128, size = 217, normalized size = 1.5

$$\frac{3\,Cce^4x^4-4\left(Ccde^3-Bce^4\right)x^3+6\left(Ccd^2e^2-Bcde^3+(Ca+Ac)e^4\right)x^2-12\left(Ccd^3e-Bcd^2e^2-Bae^4+(Ca+Ac)de^3\right)x+12}{12\,e^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)/(e*x + d),x, algorithm="fricas")
```

```
[Out] 1/12*(3*C*c*e^4*x^4 - 4*(C*c*d*e^3 - B*c*e^4)*x^3 + 6*(C*c*d^2*e^
2 - B*c*d*e^3 + (C*a + A*c)*e^4)*x^2 - 12*(C*c*d^3*e - B*c*d^2*e^
2 - B*a*e^4 + (C*a + A*c)*d*e^3)*x + 12*(C*c*d^4 - B*c*d^3*e - B*
a*d*e^3 + A*a*e^4 + (C*a + A*c)*d^2*e^2)*log(e*x + d))/e^5
```

Sympy [A] time = 1.3634, size = 143, normalized size = 0.99

$$\frac{Ccx^4}{4e}-\frac{x^3\left(-Bce+Ccd\right)}{3e^2}+\frac{x^2\left(Ace^2-Bcde+Cae^2+Ccd^2\right)}{2e^3}-\frac{x\left(Acde^2-Bae^3-Bcd^2e+Cade^2+Ccd^3\right)}{e^4}+\frac{\left(ae^2+cd^2\right)\left(Ae^2-Bde+Cd^2\right)\log\left(d+ex\right)}{e^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)*(C*x**2+B*x+A)/(e*x+d),x)
```

```
[Out] C*c*x**4/(4*e) - x**3*(-B*c*e + C*c*d)/(3*e**2) + x**2*(A*c*e**2
- B*c*d*e + C*a*e**2 + C*c*d**2)/(2*e**3) - x*(A*c*d*e**2 - B*a*e
```

```
**3 - B*c*d**2*e + C*a*d*e**2 + C*c*d**3)/e**4 + (a*e**2 + c*d**2
)*(A*e**2 - B*d*e + C*d**2)*log(d + e*x)/e**5
```

GIAC/XCAS [A] time = 0.272931, size = 230, normalized size = 1.59

$$\left(Ccd^4 - Bcd^3e + Cad^2e^2 + Acd^2e^2 - Bade^3 + Aae^4\right)e^{(-5)}\ln\left(|xe + d|\right) + \frac{1}{12}\left(3\,Ccx^4e^3 - 4\,Ccdx^3e^2 + 6\,Ccd^2x^2e - 12\,Ccd^3x + 4\,Bcx^3e^3 - 6\,Bcdx^2e^2 + 12\,Bcd^2xe + 6\,Cax^2e^3 + 6\,Acx^2e^3 - 12\,Cadxe$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)/(e*x + d),x, algorithm="giac")
```

```
[Out] (C*c*d^4 - B*c*d^3*e + C*a*d^2*e^2 + A*c*d^2*e^2 - B*a*d*e^3 + A*
a*e^4)*e^(-5)*ln(abs(x*e + d)) + 1/12*(3*C*c*x^4*e^3 - 4*C*c*d*x^
3*e^2 + 6*C*c*d^2*x^2*e - 12*C*c*d^3*x + 4*B*c*x^3*e^3 - 6*B*c*d*
x^2*e^2 + 12*B*c*d^2*x*e + 6*C*a*x^2*e^3 + 6*A*c*x^2*e^3 - 12*C*a
*d*x*e^2 - 12*A*c*d*x*e^2 + 12*B*a*x*e^3)*e^(-4)
```

3.23 $\int \frac{(a+cx^2)(A+Bx+Cx^2)}{(d+ex)^2} dx$

Optimal. Leaf size=153

$$-\frac{(ae^2+cd^2)(Ae^2-Bde+Cd^2)}{e^5(d+ex)}-\frac{\log(d+ex)\left(ae^2(2Cd-Be)+cd\left(4Cd^2-e(3Bd-2Ae)\right)\right)}{e^5}+\frac{x\left(aCe^2+c\left(3Cd^2-e(2Bd-Ae)\right)\right)}{e^4}-\frac{cx^2(2Cd-Be)}{2e^3}+\frac{cCx^3}{3e^2}$$

```
[Out] ((a*C*e^2 + c*(3*C*d^2 - e*(2*B*d - A*e)))*x)/e^4 - (c*(2*C*d - B
*e)*x^2)/(2*e^3) + (c*C*x^3)/(3*e^2) - ((c*d^2 + a*e^2)*(C*d^2 -
B*d*e + A*e^2))/(e^5*(d + e*x)) - ((a*e^2*(2*C*d - B*e) + c*d*(4*
C*d^2 - e*(3*B*d - 2*A*e)))*Log[d + e*x])/e^5
```

Rubi [A] time = 0.462004, antiderivative size = 151, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 1, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.04

$$-\frac{\log(d+ex)\left(ae^2(2Cd-Be)-cde(3Bd-2Ae)+4cCd^3\right)}{e^5}-\frac{(ae^2+cd^2)(Ae^2-Bde+Cd^2)}{e^5(d+ex)}+\frac{x\left(aCe^2-ce(2Bd-Ae)+3cCd^2\right)}{e^4}-\frac{cx^2(2Cd-Be)}{2e^3}+\frac{cCx^3}{3e^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)*(A + B*x + C*x^2))/(d + e*x)^2,x]
```

```
[Out] ((3*c*C*d^2 + a*C*e^2 - c*e*(2*B*d - A*e))*x)/e^4 - (c*(2*C*d - B
*e)*x^2)/(2*e^3) + (c*C*x^3)/(3*e^2) - ((c*d^2 + a*e^2)*(C*d^2 -
B*d*e + A*e^2))/(e^5*(d + e*x)) - ((4*c*C*d^3 - c*d*e*(3*B*d - 2*
A*e) + a*e^2*(2*C*d - B*e))*Log[d + e*x])/e^5
```

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

$$\frac{Ccx^3}{3e^2}+\frac{c\,(Be-2Cd)\int x\,dx}{e^3}+\left(Ace^2-2Bcde+Cae^2+3Ccd^2\right)\int\frac{1}{e^4}\,dx+\frac{\left(-2Acde^2+Bae^3+3Bcd^2e-2Cade^2-4Ccd^3\right)\log(d+ex)}{e^5}-\frac{(ae^2+cd^2)(Ae^2-Bde+Cd^2)}{e^5\,(d+ex)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+a)*(C*x**2+B*x+A)/(e*x+d)**2,x)
```

```
[Out] C*c*x**3/(3*e**2) + c*(B*e - 2*C*d)*Integral(x, x)/e**3 + (A*c*e*
*2 - 2*B*c*d*e + C*a*e**2 + 3*C*c*d**2)*Integral(e**(-4), x) + (-
2*A*c*d*e**2 + B*a*e**3 + 3*B*c*d**2*e - 2*C*a*d*e**2 - 4*C*c*d**
3)*log(d + e*x)/e**5 - (a*e**2 + c*d**2)*(A*e**2 - B*d*e + C*d**2
)/(e**5*(d + e*x))
```

Mathematica [A] time = 0.360159, size = 142, normalized size = 0.93

$$\frac{6\log(d+ex)\left(ae^2(Be-2Cd)+cde(3Bd-2Ae)-4cCd^3\right)+6ex\left(aCe^2+ce(Ae-2Bd)+3cCd^2\right)-\frac{6\left(ae^2+cd^2\right)\left(e(Ae-Bd)+Cd^2\right)}{d+ex}}{6e^5}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)*(A + B*x + C*x^2))/(d + e*x)^2,x]
```

```
[Out] (6*e*(3*c*C*d^2 + a*C*e^2 + c*e*(-2*B*d + A*e))*x + 3*c*e^2*(-2*C
*d + B*e)*x^2 + 2*c*C*e^3*x^3 - (6*(c*d^2 + a*e^2)*(C*d^2 + e*(-(
B*d) + A*e)))/(d + e*x) + 6*(-4*c*C*d^3 + c*d*e*(3*B*d - 2*A*e) +
 a*e^2*(-2*C*d + B*e))*Log[d + e*x])/(6*e^5)
```

Maple [A] time = 0.013, size = 234, normalized size = 1.5

$$\frac{Ccx^3}{3\,e^2}+\frac{Bx^2c}{2\,e^2}-\frac{Cx^2cd}{e^3}+\frac{Acx}{e^2}-2\,\frac{Bcdx}{e^3}+\frac{aCx}{e^2}+3\,\frac{Ccd^2x}{e^4}-\frac{Aa}{e\,(ex+d)}-\frac{Acd^2}{e^3\,(ex+d)}+\frac{adB}{e^2\,(ex+d)}+\frac{Bcd^3}{e^4\,(ex+d)}-\frac{d^2aC}{e^3\,(ex+d)}-\frac{Ccd^4}{e^5\,(ex+d)}-2\,\frac{\ln(ex+d)\,dcA}{e^3}+\frac{\ln(ex+d)\,Ba}{e^2}+3\,\frac{\ln(ex+d)\,Bcd^2}{e^4}-2\,\frac{\ln(ex+d)\,Cad}{e^3}-4\,\frac{\ln(ex+d)\,Ccd^3}{e^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)*(C*x^2+B*x+A)/(e*x+d)^2,x)
```

```
[Out] 1/3*c*C*x^3/e^2+1/2/e^2*B*x^2*c-1/e^3*C*x^2*c*d+1/e^2*A*c*x-2/e^3
*B*c*d*x+1/e^2*a*C*x+3/e^4*C*c*d^2*x-1/e/(e*x+d)*A*a-1/e^3/(e*x+d
)*A*c*d^2+1/e^2/(e*x+d)*B*d*a+1/e^4/(e*x+d)*B*c*d^3-1/e^3/(e*x+d)
*C*a*d^2-1/e^5/(e*x+d)*C*c*d^4-2/e^3*ln(e*x+d)*d*c*A+1/e^2*ln(e*x
+d)*B*a+3/e^4*ln(e*x+d)*B*c*d^2-2/e^3*ln(e*x+d)*C*a*d-4/e^5*ln(e*
x+d)*C*c*d^3
```

Maxima [A] time = 0.700661, size = 228, normalized size = 1.49

$$-\frac{Ccd^4 - Bcd^3e - Bade^3 + Aae^4 + (Ca + Ac)d^2e^2}{e^6x + de^5} + \frac{2\,Cce^2x^3 - 3\left(2\,Ccde - Bce^2\right)x^2 + 6\left(3\,Ccd^2 - 2\,Bcde + (Ca + Ac)e^2\right)x}{6\,e^4} - \frac{\left(4\,Ccd^3 - 3\,Bcd^2e - Bae^3 + 2\,(Ca + Ac)de^2\right)\log\left(ex + d\right)}{e^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)/(e*x + d)^2,x, algorithm="maxima")
```

```
[Out] -(C*c*d^4 - B*c*d^3*e - B*a*d*e^3 + A*a*e^4 + (C*a + A*c)*d^2*e^2
)/(e^6*x + d*e^5) + 1/6*(2*C*c*e^2*x^3 - 3*(2*C*c*d*e - B*c*e^2)*
x^2 + 6*(3*C*c*d^2 - 2*B*c*d*e + (C*a + A*c)*e^2)*x)/e^4 - (4*C*c
*d^3 - 3*B*c*d^2*e - B*a*e^3 + 2*(C*a + A*c)*d*e^2)*log(e*x + d)/
e^5
```

Fricas [A] time = 0.263648, size = 338, normalized size = 2.21

$$\frac{2\,Cce^4x^4 - 6\,Ccd^4 + 6\,Bcd^3e + 6\,Bade^3 - 6\,Aae^4 - 6\,(Ca + Ac)d^2e^2 - \left(4\,Ccde^3 - 3\,Bce^4\right)x^3 + 3\left(4\,Ccd^2e^2 - 3\,Bcde^3 + 2\,(Ca\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)/(e*x + d)^2,x, algorithm="fricas")
```

```
[Out] 1/6*(2*C*c*e^4*x^4 - 6*C*c*d^4 + 6*B*c*d^3*e + 6*B*a*d*e^3 - 6*A*
a*e^4 - 6*(C*a + A*c)*d^2*e^2 - (4*C*c*d*e^3 - 3*B*c*e^4)*x^3 + 3
*(4*C*c*d^2*e^2 - 3*B*c*d*e^3 + 2*(C*a + A*c)*e^4)*x^2 + 6*(3*C*c
*d^3*e - 2*B*c*d^2*e^2 + (C*a + A*c)*d*e^3)*x - 6*(4*C*c*d^4 - 3*
B*c*d^3*e - B*a*d*e^3 + 2*(C*a + A*c)*d^2*e^2 + (4*C*c*d^3*e - 3*
B*c*d^2*e^2 - B*a*e^4 + 2*(C*a + A*c)*d*e^3)*x)*log(e*x + d))/(e^
6*x + d*e^5)
```

Sympy [A] time = 2.93159, size = 184, normalized size = 1.2

$$\frac{Ccx^3}{3e^2} - \frac{Aae^4 + Acd^2e^2 - Bade^3 - Bcd^3e + Cad^2e^2 + Ccd^4}{de^5 + e^6x} - \frac{x^2\left(-Bce + 2Ccd\right)}{2e^3} + \frac{x\left(Ace^2 - 2Bcde + Cae^2 + 3Ccd^2\right)}{e^4} - \frac{\left(2Acde^2 - Bae^3 - 3Bcd^2e + 2Cade^2 + 4Ccd^3\right)\log\left(d + ex\right)}{e^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)*(C*x**2+B*x+A)/(e*x+d)**2,x)
```

```
[Out] C*c*x**3/(3*e**2) - (A*a*e**4 + A*c*d**2*e**2 - B*a*d*e**3 - B*c*
d**3*e + C*a*d**2*e**2 + C*c*d**4)/(d*e**5 + e**6*x) - x**2*(-B*c
*e + 2*C*c*d)/(2*e**3) + x*(A*c*e**2 - 2*B*c*d*e + C*a*e**2 + 3*C
*c*d**2)/e**4 - (2*A*c*d*e**2 - B*a*e**3 - 3*B*c*d**2*e + 2*C*a*d
*e**2 + 4*C*c*d**3)*log(d + e*x)/e**5
```

GIAC/XCAS [A] time = 0.27236, size = 324, normalized size = 2.12

$$\frac{1}{6}\left(2\,Cc-\frac{3\left(4\,Ccde-Bce^{2}\right)e^{(-1)}}{xe+d}+\frac{6\left(6\,Ccd^{2}e^{2}-3\,Bcde^{3}+Cae^{4}+Ace^{4}\right)e^{(-2)}}{(xe+d)^{2}}\right)(xe+d)^{3}e^{(-5)}$$
$$+\left(4\,Ccd^{3}-3\,Bcd^{2}e+2\,Cade^{2}+2\,Acde^{2}-Bae^{3}\right)e^{(-5)}\ln\left(\frac{|xe+d|e^{(-1)}}{(xe+d)^{2}}\right)$$
$$-\left(\frac{Ccd^{4}e^{3}}{xe+d}-\frac{Bcd^{3}e^{4}}{xe+d}+\frac{Cad^{2}e^{5}}{xe+d}+\frac{Acd^{2}e^{5}}{xe+d}-\frac{Bade^{6}}{xe+d}+\frac{Aae^{7}}{xe+d}\right)e^{(-8)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)/(e*x + d)^2,x, algorithm="giac")
```

```
[Out] 1/6*(2*C*c - 3*(4*C*c*d*e - B*c*e^2)*e^(-1)/(x*e + d) + 6*(6*C*c*
d^2*e^2 - 3*B*c*d*e^3 + C*a*e^4 + A*c*e^4)*e^(-2)/(x*e + d)^2)*(x
*e + d)^3*e^(-5) + (4*C*c*d^3 - 3*B*c*d^2*e + 2*C*a*d*e^2 + 2*A*c
*d*e^2 - B*a*e^3)*e^(-5)*ln(abs(x*e + d)*e^(-1)/(x*e + d)^2) - (C
*c*d^4*e^3/(x*e + d) - B*c*d^3*e^4/(x*e + d) + C*a*d^2*e^5/(x*e +
 d) + A*c*d^2*e^5/(x*e + d) - B*a*d*e^6/(x*e + d) + A*a*e^7/(x*e
+ d))*e^(-8)
```

3.24 $\int \frac{(a+cx^2)(A+Bx+Cx^2)}{(d+ex)^3} \, dx$

Optimal. Leaf size=156

$$\frac{ae^2(2Cd-Be)+cd\left(4Cd^2-e(3Bd-2Ae)\right)}{e^5(d+ex)}-\frac{\left(ae^2+cd^2\right)\left(Ae^2-Bde+Cd^2\right)}{2e^5(d+ex)^2}+\frac{\log(d+ex)\left(aCe^2+c\left(6Cd^2-e(3Bd-Ae)\right)\right)}{e^5}-\frac{cx(3Cd-Be)}{e^4}+\frac{cCx^2}{2e^3}$$

```
[Out] -((c*(3*C*d - B*e)*x)/e^4) + (c*C*x^2)/(2*e^3) - ((c*d^2 + a*e^2)
*(C*d^2 - B*d*e + A*e^2))/(2*e^5*(d + e*x)^2) + (a*e^2*(2*C*d - B
*e) + c*d*(4*C*d^2 - e*(3*B*d - 2*A*e)))/(e^5*(d + e*x)) + ((a*C*
e^2 + c*(6*C*d^2 - e*(3*B*d - A*e)))*Log[d + e*x])/e^5
```

Rubi [A] time = 0.454058, antiderivative size = 154, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 1, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.04$

$$\frac{ae^2(2Cd-Be)-cde(3Bd-2Ae)+4cCd^3}{e^5(d+ex)}-\frac{\left(ae^2+cd^2\right)\left(Ae^2-Bde+Cd^2\right)}{2e^5(d+ex)^2}+\frac{\log(d+ex)\left(aCe^2-ce(3Bd-Ae)+6cCd^2\right)}{e^5}-\frac{cx(3Cd-Be)}{e^4}+\frac{cCx^2}{2e^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)*(A + B*x + C*x^2))/(d + e*x)^3,x]
```

```
[Out] -((c*(3*C*d - B*e)*x)/e^4) + (c*C*x^2)/(2*e^3) - ((c*d^2 + a*e^2)
*(C*d^2 - B*d*e + A*e^2))/(2*e^5*(d + e*x)^2) + (4*c*C*d^3 - c*d*
e*(3*B*d - 2*A*e) + a*e^2*(2*C*d - B*e))/(e^5*(d + e*x)) + ((6*c*
C*d^2 + a*C*e^2 - c*e*(3*B*d - A*e))*Log[d + e*x])/e^5
```

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

$$\frac{Cc\int x\,dx}{e^3}+\frac{(Be-3Cd)\int c\,dx}{e^4}+\frac{\left(Ace^2-3Bcde+Cae^2+6Ccd^2\right)\log(d+ex)}{e^5}-\frac{-2Acde^2+Bae^3+3Bcd^2e-2Cade^2-4Ccd^3}{e^5(d+ex)}-\frac{\left(ae^2+cd^2\right)\left(Ae^2-Bde+Cd^2\right)}{2e^5(d+ex)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+a)*(C*x**2+B*x+A)/(e*x+d)**3,x)
```

```
[Out] C*c*Integral(x, x)/e**3 + (B*e - 3*C*d)*Integral(c, x)/e**4 + (A*
c*e**2 - 3*B*c*d*e + C*a*e**2 + 6*C*c*d**2)*log(d + e*x)/e**5 - (
-2*A*c*d*e**2 + B*a*e**3 + 3*B*c*d**2*e - 2*C*a*d*e**2 - 4*C*c*d*
*3)/(e**5*(d + e*x)) - (a*e**2 + c*d**2)*(A*e**2 - B*d*e + C*d**2
)/(2*e**5*(d + e*x)**2)
```

Mathematica [A] time = 0.196163, size = 176, normalized size = 1.13

$$\frac{\log(d+ex)\left(aCe^2+Ace^2-3Bcde+6cCd^2\right)}{e^5}+\frac{-aBe^3+2aCde^2+2Acde^2-3Bcd^2e+4cCd^3}{e^5(d+ex)}+\frac{-aAe^4+aBde^3-aCd^2e^2-Acd^2e^2+Bcd^3e-cCd^4}{2e^5(d+ex)^2}+\frac{cx(Be-3Cd)}{e^4}+\frac{cCx^2}{2e^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)*(A + B*x + C*x^2))/(d + e*x)^3,x]
```

```
[Out] (c*(-3*C*d + B*e)*x)/e^4 + (c*C*x^2)/(2*e^3) + (-(c*C*d^4) + B*c*
d^3*e - A*c*d^2*e^2 - a*C*d^2*e^2 + a*B*d*e^3 - a*A*e^4)/(2*e^5*(
d + e*x)^2) + (4*c*C*d^3 - 3*B*c*d^2*e + 2*A*c*d*e^2 + 2*a*C*d*e^
2 - a*B*e^3)/(e^5*(d + e*x)) + ((6*c*C*d^2 - 3*B*c*d*e + A*c*e^2
+ a*C*e^2)*Log[d + e*x])/e^5
```

Maple [A] time = 0.018, size = 257, normalized size = 1.7

$$\frac{Ccx^2}{2\,e^3}+\frac{Bcx}{e^3}-3\,\frac{cdCx}{e^4}+2\,\frac{Acd}{e^3\,(ex+d)}-\frac{aB}{e^2\,(ex+d)}-3\,\frac{Bcd^2}{e^4\,(ex+d)}+2\,\frac{Cad}{e^3\,(ex+d)}+4\,\frac{Ccd^3}{e^5\,(ex+d)}-\frac{Aa}{2\,e\,(ex+d)^2}-\frac{Ad^2c}{2\,e^3\,(ex+d)^2}+\frac{adB}{2\,e^2\,(ex+d)^2}+\frac{Bcd^3}{2\,e^4\,(ex+d)^2}-\frac{d^2aC}{2\,e^3\,(ex+d)^2}-\frac{Ccd^4}{2\,e^5\,(ex+d)^2}+\frac{\ln(ex+d)\,Ac}{e^3}-3\,\frac{\ln(ex+d)\,Bcd}{e^4}+\frac{\ln(ex+d)\,aC}{e^3}+6\,\frac{\ln(ex+d)\,Ccd^2}{e^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)*(C*x^2+B*x+A)/(e*x+d)^3,x)
```

```
[Out] 1/2*c*C*x^2/e^3+c/e^3*B*x-3*c/e^4*C*d*x+2/e^3/(e*x+d)*d*c*A-1/e^2
/(e*x+d)*B*a-3/e^4/(e*x+d)*B*c*d^2+2/e^3/(e*x+d)*C*a*d+4/e^5/(e*x
+d)*C*c*d^3-1/2/e/(e*x+d)^2*A*a-1/2/e^3/(e*x+d)^2*A*d^2*c+1/2/e^2
/(e*x+d)^2*B*d*a+1/2/e^4/(e*x+d)^2*B*c*d^3-1/2/e^3/(e*x+d)^2*C*d^
2*a-1/2/e^5/(e*x+d)^2*C*c*d^4+1/e^3*ln(e*x+d)*A*c-3/e^4*ln(e*x+d)
*B*c*d+1/e^3*ln(e*x+d)*a*C+6/e^5*ln(e*x+d)*C*c*d^2
```

Maxima [A] time = 0.712784, size = 239, normalized size = 1.53

$$\frac{7\,Ccd^4-5\,Bcd^3e-Bade^3-Aae^4+3\,(Ca+Ac)d^2e^2+2\left(4\,Ccd^3e-3\,Bcd^2e^2-Bae^4+2\,(Ca+Ac)de^3\right)x}{2\,(e^7x^2+2\,de^6x+d^2e^5)}+\frac{Ccex^2-2\,(3\,Ccd-Bce)x}{2\,e^4}+\frac{\left(6\,Ccd^2-3\,Bcde+(Ca+Ac)e^2\right)\log\left(ex+d\right)}{e^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)/(e*x + d)^3,x, algorithm="maxima")
```

```
[Out] 1/2*(7*C*c*d^4 - 5*B*c*d^3*e - B*a*d*e^3 - A*a*e^4 + 3*(C*a + A*c
)*d^2*e^2 + 2*(4*C*c*d^3*e - 3*B*c*d^2*e^2 - B*a*e^4 + 2*(C*a + A
*c)*d*e^3)*x)/(e^7*x^2 + 2*d*e^6*x + d^2*e^5) + 1/2*(C*c*e*x^2 -
2*(3*C*c*d - B*c*e)*x)/e^4 + (6*C*c*d^2 - 3*B*c*d*e + (C*a + A*c)
*e^2)*log(e*x + d)/e^5
```

Fricas [A] time = 0.265654, size = 369, normalized size = 2.37

$$\frac{Cce^4x^4+7\,Ccd^4-5\,Bcd^3e-Bade^3-Aae^4+3\,(Ca+Ac)d^2e^2-2\left(2\,Ccde^3-Bce^4\right)x^3-\left(11\,Ccd^2e^2-4\,Bcde^3\right)x^2+2\left(Ccd^3\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)/(e*x + d)^3,x, algorithm="fricas")
```

```
[Out] 1/2*(C*c*e^4*x^4 + 7*C*c*d^4 - 5*B*c*d^3*e - B*a*d*e^3 - A*a*e^4
+ 3*(C*a + A*c)*d^2*e^2 - 2*(2*C*c*d*e^3 - B*c*e^4)*x^3 - (11*C*c
*d^2*e^2 - 4*B*c*d*e^3)*x^2 + 2*(C*c*d^3*e - 2*B*c*d^2*e^2 - B*a*
e^4 + 2*(C*a + A*c)*d*e^3)*x + 2*(6*C*c*d^4 - 3*B*c*d^3*e + (C*a
+ A*c)*d^2*e^2 + (6*C*c*d^2*e^2 - 3*B*c*d*e^3 + (C*a + A*c)*e^4)*
x^2 + 2*(6*C*c*d^3*e - 3*B*c*d^2*e^2 + (C*a + A*c)*d*e^3)*x)*log(
e*x + d))/(e^7*x^2 + 2*d*e^6*x + d^2*e^5)
```

Sympy [A] time = 10.4399, size = 204, normalized size = 1.31

$$\frac{Ccx^2}{2e^3}+\frac{-Aae^4+3Acd^2e^2-Bade^3-5Bcd^3e+3Cad^2e^2+7Ccd^4+x\left(4Acde^3-2Bae^4-6Bcd^2e^2+4Cade^3+8Ccd^3e\right)}{2d^2e^5+4de^6x+2e^7x^2}-\frac{x\left(-Bce+3Ccd\right)}{e^4}+\frac{\left(Ace^2-3Bcde+Cae^2+6Ccd^2\right)\log\left(d+ex\right)}{e^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)*(C*x**2+B*x+A)/(e*x+d)**3,x)
```

```
[Out] C*c*x**2/(2*e**3) + (-A*a*e**4 + 3*A*c*d**2*e**2 - B*a*d*e**3 - 5
*B*c*d**3*e + 3*C*a*d**2*e**2 + 7*C*c*d**4 + x*(4*A*c*d*e**3 - 2*
B*a*e**4 - 6*B*c*d**2*e**2 + 4*C*a*d*e**3 + 8*C*c*d**3*e))/(2*d**
2*e**5 + 4*d*e**6*x + 2*e**7*x**2) - x*(-B*c*e + 3*C*c*d)/e**4 +
(A*c*e**2 - 3*B*c*d*e + C*a*e**2 + 6*C*c*d**2)*log(d + e*x)/e**5
```

GIAC/XCAS [A] time = 0.271059, size = 225, normalized size = 1.44

$$\left(6\,Ccd^{2} - 3\,Bcde + Cae^{2} + Ace^{2}\right)e^{(-5)}\ln\left(|xe + d|\right) + \frac{1}{2}\left(Ccx^{2}e^{3} - 6\,Ccdxe^{2} + 2\,Bcxe^{3}\right)e^{(-6)} + \frac{\left(7\,Ccd^{4} - 5\,Bcd^{3}e + 3\,Cad^{2}e^{2} + 3\,Acd^{2}e^{2} - Bade^{3} - Aae^{4} + 2\left(4\,Ccd^{3}e - 3\,Bcd^{2}e^{2} + 2\,Cade^{3} + 2\,Acde^{3} - Bae^{4}\right)x\right)e^{(-5)}}{2\,(xe + d)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)/(e*x + d)^3,x, algorithm="giac")
```

```
[Out] (6*C*c*d^2 - 3*B*c*d*e + C*a*e^2 + A*c*e^2)*e^(-5)*ln(abs(x*e + d
)) + 1/2*(C*c*x^2*e^3 - 6*C*c*d*x*e^2 + 2*B*c*x*e^3)*e^(-6) + 1/2
*(7*C*c*d^4 - 5*B*c*d^3*e + 3*C*a*d^2*e^2 + 3*A*c*d^2*e^2 - B*a*d
*e^3 - A*a*e^4 + 2*(4*C*c*d^3*e - 3*B*c*d^2*e^2 + 2*C*a*d*e^3 + 2
*A*c*d*e^3 - B*a*e^4)*x)*e^(-5)/(x*e + d)^2
```

3.25 $\int (d+ex)^3 \left(a+cx^2\right)^2 \left(A+Bx+Cx^2\right) \, dx$

Optimal. Leaf size=321

$$\frac{(d+ex)^6 \left(a^2Ce^4+2ace^2 \left(6Cd^2-e(3Bd-Ae)\right)+c^2d^2 \left(15Cd^2-2e(5Bd-3Ae)\right)\right)}{6e^7}+\frac{c(d+ex)^8 \left(2aCe^2+c \left(15Cd^2-e(5Bd-Ae)\right)\right)}{8e^7}-\frac{2c(d+ex)^7 \left(ae^2(4Cd-Be)+cd \left(10Cd^2-e(5Bd-2Ae)\right)\right)}{7e^7}-\frac{(d+ex)^5 \left(ae^2+cd^2\right) \left(ae^2(2Cd-Be)+cd \left(6Cd^2-e(5Bd-4Ae)\right)\right)}{5e^7}+\frac{(d+ex)^4 \left(ae^2+cd^2\right)^2 \left(Ae^2-Bde+Cd^2\right)}{4e^7}-\frac{c^2(d+ex)^9(6Cd-Be)}{9e^7}+\frac{c^2C(d+ex)^{10}}{10e^7}$$

```
[Out] ((c*d^2 + a*e^2)^2*(C*d^2 - B*d*e + A*e^2)*(d + e*x)^4)/(4*e^7) -
 ((c*d^2 + a*e^2)*(a*e^2*(2*C*d - B*e) + c*d*(6*C*d^2 - e*(5*B*d
- 4*A*e)))*(d + e*x)^5)/(5*e^7) + ((a^2*C*e^4 + c^2*d^2*(15*C*d^2
 - 2*e*(5*B*d - 3*A*e)) + 2*a*c*e^2*(6*C*d^2 - e*(3*B*d - A*e)))*
(d + e*x)^6)/(6*e^7) - (2*c*(a*e^2*(4*C*d - B*e) + c*d*(10*C*d^2
- e*(5*B*d - 2*A*e)))*(d + e*x)^7)/(7*e^7) + (c*(2*a*C*e^2 + c*(1
5*C*d^2 - e*(5*B*d - A*e)))*(d + e*x)^8)/(8*e^7) - (c^2*(6*C*d -
B*e)*(d + e*x)^9)/(9*e^7) + (c^2*C*(d + e*x)^10)/(10*e^7)
```

Rubi [A] time = 1.39377, antiderivative size = 318, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 1, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.037$

$$\frac{(d+ex)^6 \left(a^2Ce^4+2ace^2 \left(6Cd^2-e(3Bd-Ae)\right)+c^2 \left(15Cd^4-2d^2e(5Bd-3Ae)\right)\right)}{6e^7}-\frac{2c(d+ex)^7 \left(ae^2(4Cd-Be)-cde(5Bd-2Ae)+10cCd^3\right)}{7e^7}+\frac{c(d+ex)^8 \left(2aCe^2-ce(5Bd-Ae)+15cCd^2\right)}{8e^7}+\frac{(d+ex)^4 \left(ae^2+cd^2\right)^2 \left(Ae^2-Bde+Cd^2\right)}{4e^7}-\frac{(d+ex)^5 \left(ae^2+cd^2\right) \left(ae^2(2Cd-Be)-cde(5Bd-4Ae)+6cCd^3\right)}{5e^7}-\frac{c^2(d+ex)^9(6Cd-Be)}{9e^7}+\frac{c^2C(d+ex)^{10}}{10e^7}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)^3*(a + c*x^2)^2*(A + B*x + C*x^2),x]
```

```
[Out] ((c*d^2 + a*e^2)^2*(C*d^2 - B*d*e + A*e^2)*(d + e*x)^4)/(4*e^7) -
 ((c*d^2 + a*e^2)*(6*c*C*d^3 - c*d*e*(5*B*d - 4*A*e) + a*e^2*(2*C
```

```
*d - B*e))*(d + e*x)^5)/(5*e^7) + ((a^2*C*e^4 + c^2*(15*C*d^4 - 2
*d^2*e*(5*B*d - 3*A*e)) + 2*a*c*e^2*(6*C*d^2 - e*(3*B*d - A*e)))*
(d + e*x)^6)/(6*e^7) - (2*c*(10*c*C*d^3 - c*d*e*(5*B*d - 2*A*e) +
 a*e^2*(4*C*d - B*e))*(d + e*x)^7)/(7*e^7) + (c*(15*c*C*d^2 + 2*a
*C*e^2 - c*e*(5*B*d - A*e))*(d + e*x)^8)/(8*e^7) - (c^2*(6*C*d -
B*e)*(d + e*x)^9)/(9*e^7) + (c^2*C*(d + e*x)^10)/(10*e^7)
```

Rubi in Sympy [A] time = 164.796, size = 345, normalized size = 1.07

$$\frac{Cc^2(d+ex)^{10}}{10e^7}+\frac{c^2(d+ex)^9(Be-6Cd)}{9e^7}+\frac{c(d+ex)^8\left(Ace^2-5Bcde+2Cae^2+15Ccd^2\right)}{8e^7}+\frac{2c(d+ex)^7\left(-2Acde^2+Bae^3+5Bcd^2e-4Cade^2-10Ccd^3\right)}{7e^7}+\frac{(d+ex)^6\left(2Aace^4+6Ac^2d^2e^2-6Bacde^3-10Bc^2d^3e+Ca^2e^4+12Cacd^2e^2+15Cc^2d^4\right)}{6e^7}+\frac{(d+ex)^5\left(ae^2+cd^2\right)\left(-4Acde^2+Bae^3+5Bcd^2e-2Cade^2-6Ccd^3\right)}{5e^7}+\frac{(d+ex)^4\left(ae^2+cd^2\right)^2\left(Ae^2-Bde+Cd^2\right)}{4e^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)**3*(c*x**2+a)**2*(C*x**2+B*x+A),x)
```

```
[Out] C*c**2*(d + e*x)**10/(10*e**7) + c**2*(d + e*x)**9*(B*e - 6*C*d)/
(9*e**7) + c*(d + e*x)**8*(A*c*e**2 - 5*B*c*d*e + 2*C*a*e**2 + 15
*C*c*d**2)/(8*e**7) + 2*c*(d + e*x)**7*(-2*A*c*d*e**2 + B*a*e**3
+ 5*B*c*d**2*e - 4*C*a*d*e**2 - 10*C*c*d**3)/(7*e**7) + (d + e*x)
**6*(2*A*a*c*e**4 + 6*A*c**2*d**2*e**2 - 6*B*a*c*d*e**3 - 10*B*c*
*2*d**3*e + C*a**2*e**4 + 12*C*a*c*d**2*e**2 + 15*C*c**2*d**4)/(6
*e**7) + (d + e*x)**5*(a*e**2 + c*d**2)*(-4*A*c*d*e**2 + B*a*e**3
 + 5*B*c*d**2*e - 2*C*a*d*e**2 - 6*C*c*d**3)/(5*e**7) + (d + e*x)
**4*(a*e**2 + c*d**2)**2*(A*e**2 - B*d*e + C*d**2)/(4*e**7)
```

Mathematica [A] time = 0.305495, size = 335, normalized size = 1.04

$$\frac{1}{2}a^2d^2x^2(3Ae+Bd)+a^2Ad^3x+\frac{1}{7}cx^7\left(2ae^2(Be+3Cd)+3cde(Ae+Bd)+cCd^3\right)+\frac{1}{8}cex^8\left(2aCe^2+ce(Ae+3Bd)+3cCd^2\right)+\frac{1}{6}x^6\left(Ace\left(2ae^2+3cd^2\right)+Bcd\left(6ae^2+cd^2\right)+aCe\left(ae^2+6cd^2\right)\right)+\frac{1}{5}x^5\left(Acd\left(6ae^2+cd^2\right)+a\left(ae^2(Be+3Cd)+2cd^2(3Be+Cd)\right)\right)+\frac{1}{3}adx^3\left(A\left(3ae^2+2cd^2\right)+ad(3Be+Cd)\right)+\frac{1}{4}ax^4\left(aAe^3+3aBde^2+3aCd^2e+6Acd^2e+2Bcd^3\right)+\frac{1}{9}c^2e^2x^9(Be+3Cd)+\frac{1}{10}c^2Ce^3x^{10}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x)^3*(a + c*x^2)^2*(A + B*x + C*x^2),x]
```

```
[Out] a^2*A*d^3*x + (a^2*d^2*(B*d + 3*A*e)*x^2)/2 + (a*d*(a*d*(C*d + 3*
B*e) + A*(2*c*d^2 + 3*a*e^2))*x^3)/3 + (a*(2*B*c*d^3 + 6*A*c*d^2*
e + 3*a*C*d^2*e + 3*a*B*d*e^2 + a*A*e^3)*x^4)/4 + ((A*c*d*(c*d^2
+ 6*a*e^2) + a*(a*e^2*(3*C*d + B*e) + 2*c*d^2*(C*d + 3*B*e)))*x^5
)/5 + ((a*C*e*(6*c*d^2 + a*e^2) + A*c*e*(3*c*d^2 + 2*a*e^2) + B*c
*d*(c*d^2 + 6*a*e^2))*x^6)/6 + (c*(c*C*d^3 + 3*c*d*e*(B*d + A*e)
+ 2*a*e^2*(3*C*d + B*e))*x^7)/7 + (c*e*(3*c*C*d^2 + 2*a*C*e^2 + c
*e*(3*B*d + A*e))*x^8)/8 + (c^2*e^2*(3*C*d + B*e)*x^9)/9 + (c^2*C
*e^3*x^10)/10
```

Maple [A] time = 0.002, size = 385, normalized size = 1.2

$$\frac{e^3c^2Cx^{10}}{10}+\frac{\left(e^3c^2B+3\,e^2dc^2C\right)x^9}{9}+\frac{\left(\left(2\,e^3ac+3\,d^2ec^2\right)C+3\,e^2dc^2B+e^3c^2A\right)x^8}{8}+\frac{\left(\left(6\,acde^2+d^3c^2\right)C+\left(2\,e^3ac+3\,d^2ec^2\right)B+3\,e^2dc^2A\right)x^7}{7}+\frac{\left(\left(a^2e^3+6\,acd^2e\right)C+\left(6\,acde^2+d^3c^2\right)B+\left(2\,e^3ac+3\,d^2ec^2\right)A\right)x^6}{6}+\frac{\left(\left(3\,da^2e^2+2\,d^3ac\right)C+\left(a^2e^3+6\,acd^2e\right)B+\left(6\,acde^2+d^3c^2\right)A\right)x^5}{5}+\frac{\left(3\,d^2ea^2C+\left(3\,da^2e^2+2\,d^3ac\right)B+\left(a^2e^3+6\,acd^2e\right)A\right)x^4}{4}+\frac{\left(d^3a^2C+3\,d^2ea^2B+\left(3\,da^2e^2+2\,d^3ac\right)A\right)x^3}{3}+\frac{\left(3\,d^2ea^2A+d^3a^2B\right)x^2}{2}+d^3a^2Ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^3*(c*x^2+a)^2*(C*x^2+B*x+A),x)
```

```
[Out] 1/10*e^3*c^2*C*x^10+1/9*(B*c^2*e^3+3*C*c^2*d*e^2)*x^9+1/8*((2*a*c
*e^3+3*c^2*d^2*e)*C+3*e^2*d*c^2*B+e^3*c^2*A)*x^8+1/7*((6*a*c*d*e^
2+c^2*d^3)*C+(2*a*c*e^3+3*c^2*d^2*e)*B+3*e^2*d*c^2*A)*x^7+1/6*((a
^2*e^3+6*a*c*d^2*e)*C+(6*a*c*d*e^2+c^2*d^3)*B+(2*a*c*e^3+3*c^2*d^
2*e)*A)*x^6+1/5*((3*a^2*d*e^2+2*a*c*d^3)*C+(a^2*e^3+6*a*c*d^2*e)*
B+(6*a*c*d*e^2+c^2*d^3)*A)*x^5+1/4*(3*d^2*e*a^2*C+(3*a^2*d*e^2+2*
a*c*d^3)*B+(a^2*e^3+6*a*c*d^2*e)*A)*x^4+1/3*(d^3*a^2*C+3*d^2*e*a^
2*B+(3*a^2*d*e^2+2*a*c*d^3)*A)*x^3+1/2*(3*A*a^2*d^2*e+B*a^2*d^3)*
x^2+d^3*a^2*A*x
```

Maxima [A] time = 0.719903, size = 486, normalized size = 1.51

$$\frac{1}{10}\,Cc^2e^3x^{10} + \frac{1}{9}\left(3\,Cc^2de^2 + Bc^2e^3\right)x^9 + \frac{1}{8}\left(3\,Cc^2d^2e + 3\,Bc^2de^2 + \left(2\,Cac + Ac^2\right)e^3\right)x^8 + \frac{1}{7}\left(Cc^2d^3 + 3\,Bc^2d^2e + 2\,Bace^3 + 3\left(2\,Cac + Ac^2\right)de^2\right)x^7 + Aa^2d^3x + \frac{1}{6}\left(Bc^2d^3 + 6\,Bacde^2 + 3\left(2\,Cac + Ac^2\right)d^2e + \left(Ca^2 + 2\,Aac\right)e^3\right)x^6 + \frac{1}{5}\left(6\,Bacd^2e + Ba^2e^3 + \left(2\,Cac + Ac^2\right)d^3 + 3\left(Ca^2 + 2\,Aac\right)de^2\right)x^5 + \frac{1}{4}\left(2\,Bacd^3 + 3\,Ba^2de^2 + Aa^2e^3 + 3\left(Ca^2 + 2\,Aac\right)d^2e\right)x^4 + \frac{1}{3}\left(3\,Ba^2d^2e + 3\,Aa^2de^2 + \left(Ca^2 + 2\,Aac\right)d^3\right)x^3 + \frac{1}{2}\left(Ba^2d^3 + 3\,Aa^2d^2e\right)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2*(e*x + d)^3,x, algorithm="maxima")
```

```
[Out] 1/10*C*c^2*e^3*x^10 + 1/9*(3*C*c^2*d*e^2 + B*c^2*e^3)*x^9 + 1/8*(
3*C*c^2*d^2*e + 3*B*c^2*d*e^2 + (2*C*a*c + A*c^2)*e^3)*x^8 + 1/7*
(C*c^2*d^3 + 3*B*c^2*d^2*e + 2*B*a*c*e^3 + 3*(2*C*a*c + A*c^2)*d*
e^2)*x^7 + A*a^2*d^3*x + 1/6*(B*c^2*d^3 + 6*B*a*c*d*e^2 + 3*(2*C*
a*c + A*c^2)*d^2*e + (C*a^2 + 2*A*a*c)*e^3)*x^6 + 1/5*(6*B*a*c*d^
2*e + B*a^2*e^3 + (2*C*a*c + A*c^2)*d^3 + 3*(C*a^2 + 2*A*a*c)*d*e
^2)*x^5 + 1/4*(2*B*a*c*d^3 + 3*B*a^2*d*e^2 + A*a^2*e^3 + 3*(C*a^2
 + 2*A*a*c)*d^2*e)*x^4 + 1/3*(3*B*a^2*d^2*e + 3*A*a^2*d*e^2 + (C*
a^2 + 2*A*a*c)*d^3)*x^3 + 1/2*(B*a^2*d^3 + 3*A*a^2*d^2*e)*x^2
```

Fricas [A] time = 0.242716, size = 1, normalized size = 0.

$$\frac{1}{10}x^{10}e^3c^2C + \frac{1}{3}x^9e^2dc^2C + \frac{1}{9}x^9e^3c^2B + \frac{3}{8}x^8ed^2c^2C + \frac{1}{4}x^8e^3caC + \frac{3}{8}x^8e^2dc^2B + \frac{1}{8}x^8e^3c^2A + \frac{1}{7}x^7d^3c^2C + \frac{6}{7}x^7e^2dcaC + \frac{3}{7}x^7ed^2c^2B + \frac{2}{7}x^7e^3caB + \frac{3}{7}x^7e^2dc^2A + x^6ed^2caC + \frac{1}{6}x^6e^3a^2C + \frac{1}{6}x^6d^3c^2B + x^6e^2dcaB + \frac{1}{2}x^6ed^2c^2A + \frac{1}{3}x^6e^3caA + \frac{2}{5}x^5d^3caC + \frac{3}{5}x^5e^2da^2C + \frac{6}{5}x^5ed^2caB + \frac{1}{5}x^5e^3a^2B + \frac{1}{5}x^5d^3c^2A + \frac{6}{5}x^5e^2dcaA + \frac{3}{4}x^4ed^2a^2C + \frac{1}{2}x^4d^3caB + \frac{3}{4}x^4e^2da^2B + \frac{3}{2}x^4ed^2caA + \frac{1}{4}x^4e^3a^2A + \frac{1}{3}x^3d^3a^2C + x^3ed^2a^2B + \frac{2}{3}x^3d^3caA + x^3e^2da^2A + \frac{1}{2}x^2d^3a^2B + \frac{3}{2}x^2ed^2a^2A + xd^3a^2A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2*(e*x + d)^3,x, algorithm="fricas")
```

```
[Out] 1/10*x^10*e^3*c^2*C + 1/3*x^9*e^2*d*c^2*C + 1/9*x^9*e^3*c^2*B + 3
/8*x^8*e*d^2*c^2*C + 1/4*x^8*e^3*c*a*C + 3/8*x^8*e^2*d*c^2*B + 1/
8*x^8*e^3*c^2*A + 1/7*x^7*d^3*c^2*C + 6/7*x^7*e^2*d*c*a*C + 3/7*x
^7*e*d^2*c^2*B + 2/7*x^7*e^3*c*a*B + 3/7*x^7*e^2*d*c^2*A + x^6*e*
d^2*c*a*C + 1/6*x^6*e^3*a^2*C + 1/6*x^6*d^3*c^2*B + x^6*e^2*d*c*a
*B + 1/2*x^6*e*d^2*c^2*A + 1/3*x^6*e^3*c*a*A + 2/5*x^5*d^3*c*a*C
+ 3/5*x^5*e^2*d*a^2*C + 6/5*x^5*e*d^2*c*a*B + 1/5*x^5*e^3*a^2*B +
 1/5*x^5*d^3*c^2*A + 6/5*x^5*e^2*d*c*a*A + 3/4*x^4*e*d^2*a^2*C +
1/2*x^4*d^3*c*a*B + 3/4*x^4*e^2*d*a^2*B + 3/2*x^4*e*d^2*c*a*A + 1
/4*x^4*e^3*a^2*A + 1/3*x^3*d^3*a^2*C + x^3*e*d^2*a^2*B + 2/3*x^3*
d^3*c*a*A + x^3*e^2*d*a^2*A + 1/2*x^2*d^3*a^2*B + 3/2*x^2*e*d^2*a
^2*A + x*d^3*a^2*A
```

Sympy [A] time = 0.144964, size = 445, normalized size = 1.39

$$Aa^2d^3x + \frac{Cc^2e^3x^{10}}{10} + x^9\left(\frac{Bc^2e^3}{9} + \frac{Cc^2de^2}{3}\right) + x^8\left(\frac{Ac^2e^3}{8} + \frac{3Bc^2de^2}{8} + \frac{Cace^3}{4} + \frac{3Cc^2d^2e}{8}\right) + x^7\left(\frac{3Ac^2de^2}{7} + \frac{2Bace^3}{7} + \frac{3Bc^2d^2e}{7} + \frac{6Cacde^2}{7} + \frac{Cc^2d^3}{7}\right) + x^6\left(\frac{Aace^3}{3} + \frac{Ac^2d^2e}{2} + Bacde^2 + \frac{Bc^2d^3}{6} + \frac{Ca^2e^3}{6} + Cacd^2e\right) + x^5\left(\frac{6Aacde^2}{5} + \frac{Ac^2d^3}{5} + \frac{Ba^2e^3}{5} + \frac{6Bacd^2e}{5} + \frac{3Ca^2de^2}{5} + \frac{2Cacd^3}{5}\right) + x^4\left(\frac{Aa^2e^3}{4} + \frac{3Aacd^2e}{2} + \frac{3Ba^2de^2}{4} + \frac{Bacd^3}{2} + \frac{3Ca^2d^2e}{4}\right) + x^3\left(Aa^2de^2 + \frac{2Aacd^3}{3} + Ba^2d^2e + \frac{Ca^2d^3}{3}\right) + x^2\left(\frac{3Aa^2d^2e}{2} + \frac{Ba^2d^3}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**3*(c*x**2+a)**2*(C*x**2+B*x+A),x)
```

```
[Out] A*a**2*d**3*x + C*c**2*e**3*x**10/10 + x**9*(B*c**2*e**3/9 + C*c*
*2*d*e**2/3) + x**8*(A*c**2*e**3/8 + 3*B*c**2*d*e**2/8 + C*a*c*e*
*3/4 + 3*C*c**2*d**2*e/8) + x**7*(3*A*c**2*d*e**2/7 + 2*B*a*c*e**
3/7 + 3*B*c**2*d**2*e/7 + 6*C*a*c*d*e**2/7 + C*c**2*d**3/7) + x**
6*(A*a*c*e**3/3 + A*c**2*d**2*e/2 + B*a*c*d*e**2 + B*c**2*d**3/6
+ C*a**2*e**3/6 + C*a*c*d**2*e) + x**5*(6*A*a*c*d*e**2/5 + A*c**2
*d**3/5 + B*a**2*e**3/5 + 6*B*a*c*d**2*e/5 + 3*C*a**2*d*e**2/5 +
2*C*a*c*d**3/5) + x**4*(A*a**2*e**3/4 + 3*A*a*c*d**2*e/2 + 3*B*a*
*2*d*e**2/4 + B*a*c*d**3/2 + 3*C*a**2*d**2*e/4) + x**3*(A*a**2*d*
e**2 + 2*A*a*c*d**3/3 + B*a**2*d**2*e + C*a**2*d**3/3) + x**2*(3*
A*a**2*d**2*e/2 + B*a**2*d**3/2)
```

GIAC/XCAS [A] time = 0.269507, size = 571, normalized size = 1.78

$$\frac{1}{10}Cc^2x^{10}e^3+\frac{1}{3}Cc^2dx^9e^2+\frac{3}{8}Cc^2d^2x^8e+\frac{1}{7}Cc^2d^3x^7+\frac{1}{9}Bc^2x^9e^3+\frac{3}{8}Bc^2dx^8e^2+\frac{3}{7}Bc^2d^2x^7e+\frac{1}{6}Bc^2d^3x^6+\frac{1}{4}Cacx^8e^3+\frac{1}{8}Ac^2x^8e^3+\frac{6}{7}Cacdx^7e^2+\frac{3}{7}Ac^2dx^7e^2+Cacd^2x^6e+\frac{1}{2}Ac^2d^2x^6e+\frac{2}{5}Cacd^3x^5+\frac{1}{5}Ac^2d^3x^5+\frac{2}{7}Bacx^7e^3+Bacdx^6e^2+\frac{6}{5}Bacd^2x^5e+\frac{1}{2}Bacd^3x^4+\frac{1}{6}Ca^2x^6e^3+\frac{1}{3}Aacx^6e^3+\frac{3}{5}Ca^2dx^5e^2+\frac{6}{5}Aacdx^5e^2+\frac{3}{4}Ca^2d^2x^4e+\frac{3}{2}Aacd^2x^4e+\frac{1}{3}Ca^2d^3x^3+\frac{2}{3}Aacd^3x^3+\frac{1}{5}Ba^2x^5e^3+\frac{3}{4}Ba^2dx^4e^2+Ba^2d^2x^3e+\frac{1}{2}Ba^2d^3x^2+\frac{1}{4}Aa^2x^4e^3+Aa^2dx^3e^2+\frac{3}{2}Aa^2d^2x^2e+Aa^2d^3x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2*(e*x + d)^3,x, algorithm="giac")
```

```
[Out] 1/10*C*c^2*x^10*e^3 + 1/3*C*c^2*d*x^9*e^2 + 3/8*C*c^2*d^2*x^8*e +
 1/7*C*c^2*d^3*x^7 + 1/9*B*c^2*x^9*e^3 + 3/8*B*c^2*d*x^8*e^2 + 3/
7*B*c^2*d^2*x^7*e + 1/6*B*c^2*d^3*x^6 + 1/4*C*a*c*x^8*e^3 + 1/8*A
*c^2*x^8*e^3 + 6/7*C*a*c*d*x^7*e^2 + 3/7*A*c^2*d*x^7*e^2 + C*a*c*
d^2*x^6*e + 1/2*A*c^2*d^2*x^6*e + 2/5*C*a*c*d^3*x^5 + 1/5*A*c^2*d
^3*x^5 + 2/7*B*a*c*x^7*e^3 + B*a*c*d*x^6*e^2 + 6/5*B*a*c*d^2*x^5*
e + 1/2*B*a*c*d^3*x^4 + 1/6*C*a^2*x^6*e^3 + 1/3*A*a*c*x^6*e^3 + 3
/5*C*a^2*d*x^5*e^2 + 6/5*A*a*c*d*x^5*e^2 + 3/4*C*a^2*d^2*x^4*e +
3/2*A*a*c*d^2*x^4*e + 1/3*C*a^2*d^3*x^3 + 2/3*A*a*c*d^3*x^3 + 1/5
*B*a^2*x^5*e^3 + 3/4*B*a^2*d*x^4*e^2 + B*a^2*d^2*x^3*e + 1/2*B*a^
2*d^3*x^2 + 1/4*A*a^2*x^4*e^3 + A*a^2*d*x^3*e^2 + 3/2*A*a^2*d^2*x
^2*e + A*a^2*d^3*x
```

3.26 $\int (d+ex)^2 \left(a+cx^2\right)^2 \left(A+Bx+Cx^2\right) \, dx$

Optimal. Leaf size=321

$$\frac{(d+ex)^5 \left(a^2Ce^4+2ace^2 \left(6Cd^2-e(3Bd-Ae)\right)+c^2d^2 \left(15Cd^2-2e(5Bd-3Ae)\right)\right)}{5e^7}+\frac{c(d+ex)^7 \left(2aCe^2+c \left(15Cd^2-e(5Bd-Ae)\right)\right)}{7e^7}-\frac{c(d+ex)^6 \left(ae^2(4Cd-Be)+cd \left(10Cd^2-e(5Bd-2Ae)\right)\right)}{3e^7}-\frac{(d+ex)^4 \left(ae^2+cd^2\right) \left(ae^2(2Cd-Be)+cd \left(6Cd^2-e(5Bd-4Ae)\right)\right)}{4e^7}+\frac{(d+ex)^3 \left(ae^2+cd^2\right)^2 \left(Ae^2-Bde+Cd^2\right)}{3e^7}-\frac{c^2(d+ex)^8(6Cd-Be)}{8e^7}+\frac{c^2C(d+ex)^9}{9e^7}$$

```
[Out] ((c*d^2 + a*e^2)^2*(C*d^2 - B*d*e + A*e^2)*(d + e*x)^3)/(3*e^7) -
 ((c*d^2 + a*e^2)*(a*e^2*(2*C*d - B*e) + c*d*(6*C*d^2 - e*(5*B*d
- 4*A*e)))*(d + e*x)^4)/(4*e^7) + ((a^2*C*e^4 + c^2*d^2*(15*C*d^2
 - 2*e*(5*B*d - 3*A*e)) + 2*a*c*e^2*(6*C*d^2 - e*(3*B*d - A*e)))*
(d + e*x)^5)/(5*e^7) - (c*(a*e^2*(4*C*d - B*e) + c*d*(10*C*d^2 -
e*(5*B*d - 2*A*e)))*(d + e*x)^6)/(3*e^7) + (c*(2*a*C*e^2 + c*(15*
C*d^2 - e*(5*B*d - A*e)))*(d + e*x)^7)/(7*e^7) - (c^2*(6*C*d - B*
e)*(d + e*x)^8)/(8*e^7) + (c^2*C*(d + e*x)^9)/(9*e^7)
```

Rubi [A] time = 1.09421, antiderivative size = 318, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 1, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.037$

$$\frac{(d+ex)^5 \left(a^2Ce^4+2ace^2 \left(6Cd^2-e(3Bd-Ae)\right)+c^2 \left(15Cd^4-2d^2e(5Bd-3Ae)\right)\right)}{5e^7}-\frac{c(d+ex)^6 \left(ae^2(4Cd-Be)-cde(5Bd-2Ae)+10cCd^3\right)}{3e^7}+\frac{c(d+ex)^7 \left(2aCe^2-ce(5Bd-Ae)+15cCd^2\right)}{7e^7}+\frac{(d+ex)^3 \left(ae^2+cd^2\right)^2 \left(Ae^2-Bde+Cd^2\right)}{3e^7}-\frac{(d+ex)^4 \left(ae^2+cd^2\right) \left(ae^2(2Cd-Be)-cde(5Bd-4Ae)+6cCd^3\right)}{4e^7}-\frac{c^2(d+ex)^8(6Cd-Be)}{8e^7}+\frac{c^2C(d+ex)^9}{9e^7}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)^2*(a + c*x^2)^2*(A + B*x + C*x^2),x]
```

```
[Out] ((c*d^2 + a*e^2)^2*(C*d^2 - B*d*e + A*e^2)*(d + e*x)^3)/(3*e^7) -
 ((c*d^2 + a*e^2)*(6*c*C*d^3 - c*d*e*(5*B*d - 4*A*e) + a*e^2*(2*C
```

```
*d - B*e))*(d + e*x)^4)/(4*e^7) + ((a^2*C*e^4 + c^2*(15*C*d^4 - 2
*d^2*e*(5*B*d - 3*A*e)) + 2*a*c*e^2*(6*C*d^2 - e*(3*B*d - A*e)))*
(d + e*x)^5)/(5*e^7) - (c*(10*c*C*d^3 - c*d*e*(5*B*d - 2*A*e) + a
*e^2*(4*C*d - B*e))*(d + e*x)^6)/(3*e^7) + (c*(15*c*C*d^2 + 2*a*C
*e^2 - c*e*(5*B*d - A*e))*(d + e*x)^7)/(7*e^7) - (c^2*(6*C*d - B*
e)*(d + e*x)^8)/(8*e^7) + (c^2*C*(d + e*x)^9)/(9*e^7)
```

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

$$\frac{Cc^2e^2x^9}{9} + a^2d^2\int A\,dx + a^2d\,(2Ae+Bd)\int x\,dx + \frac{ax^4\left(4Acde+Bae^2+2Bcd^2+2Cade\right)}{4} + \frac{ax^3\left(Aae^2+2Acd^2+2Bade+Cad^2\right)}{3} + \frac{c^2ex^8\,(Be+2Cd)}{8} + \frac{cx^7\left(Ace^2+2Bcde+2Cae^2+Ccd^2\right)}{7} + \frac{cx^6\left(2Acde+2Bae^2+Bcd^2+4Cade\right)}{6} + x^5\left(\frac{2Aace^2}{5}+\frac{Ac^2d^2}{5}+\frac{4Bacde}{5}+\frac{Ca^2e^2}{5}+\frac{2Cacd^2}{5}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)**2*(c*x**2+a)**2*(C*x**2+B*x+A),x)
```

```
[Out] C*c**2*e**2*x**9/9 + a**2*d**2*Integral(A, x) + a**2*d*(2*A*e + B
*d)*Integral(x, x) + a*x**4*(4*A*c*d*e + B*a*e**2 + 2*B*c*d**2 +
2*C*a*d*e)/4 + a*x**3*(A*a*e**2 + 2*A*c*d**2 + 2*B*a*d*e + C*a*d*
*2)/3 + c**2*e*x**8*(B*e + 2*C*d)/8 + c*x**7*(A*c*e**2 + 2*B*c*d*
e + 2*C*a*e**2 + C*c*d**2)/7 + c*x**6*(2*A*c*d*e + 2*B*a*e**2 + B
*c*d**2 + 4*C*a*d*e)/6 + x**5*(2*A*a*c*e**2/5 + A*c**2*d**2/5 + 4
*B*a*c*d*e/5 + C*a**2*e**2/5 + 2*C*a*c*d**2/5)
```

Mathematica [A] time = 0.176429, size = 241, normalized size = 0.75

$$\frac{1}{2}a^2dx^2(2Ae+Bd)+a^2Ad^2x+\frac{1}{7}cx^7\left(2aCe^2+ce(Ae+2Bd)+cCd^2\right) + \frac{1}{6}cx^6\left(2aBe^2+4aCde+2Acde+Bcd^2\right)+\frac{1}{5}x^5\left(Ac\left(2ae^2+cd^2\right)+a\left(aCe^2+2cd(2Be+Cd)\right)\right) + \frac{1}{4}ax^4\left(aBe^2+2aCde+4Acde+2Bcd^2\right) + \frac{1}{3}ax^3\left(A\left(ae^2+2cd^2\right)+ad(2Be+Cd)\right)+\frac{1}{8}c^2ex^8(Be+2Cd)+\frac{1}{9}c^2Ce^2x^9$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x)^2*(a + c*x^2)^2*(A + B*x + C*x^2),x]
```

```
[Out] a^2*A*d^2*x + (a^2*d*(B*d + 2*A*e)*x^2)/2 + (a*(a*d*(C*d + 2*B*e)
 + A*(2*c*d^2 + a*e^2))*x^3)/3 + (a*(2*B*c*d^2 + 4*A*c*d*e + 2*a*
C*d*e + a*B*e^2)*x^4)/4 + ((A*c*(c*d^2 + 2*a*e^2) + a*(a*C*e^2 +
2*c*d*(C*d + 2*B*e)))*x^5)/5 + (c*(B*c*d^2 + 2*A*c*d*e + 4*a*C*d*
e + 2*a*B*e^2)*x^6)/6 + (c*(c*C*d^2 + 2*a*C*e^2 + c*e*(2*B*d + A*
e))*x^7)/7 + (c^2*e*(2*C*d + B*e)*x^8)/8 + (c^2*C*e^2*x^9)/9
```

Maple [A] time = 0.001, size = 268, normalized size = 0.8

$$\frac{c^2e^2Cx^9}{9}+\frac{\left(c^2e^2B+2\,dec^2C\right)x^8}{8}+\frac{\left(\left(2\,ace^2+c^2d^2\right)C+2\,dec^2B+c^2e^2A\right)x^7}{7}+\frac{\left(4\,acdeC+\left(2\,ace^2+c^2d^2\right)B+2\,dec^2A\right)x^6}{6}+\frac{\left(\left(a^2e^2+2\,acd^2\right)C+4\,acdeB+\left(2\,ace^2+c^2d^2\right)A\right)x^5}{5}+\frac{\left(2\,dea^2C+\left(a^2e^2+2\,acd^2\right)B+4\,acdeA\right)x^4}{4}+\frac{\left(a^2d^2C+2\,dea^2B+\left(a^2e^2+2\,acd^2\right)A\right)x^3}{3}+\frac{\left(2\,dea^2A+a^2d^2B\right)x^2}{2}+a^2d^2Ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^2*(c*x^2+a)^2*(C*x^2+B*x+A),x)
```

```
[Out] 1/9*c^2*e^2*C*x^9+1/8*(B*c^2*e^2+2*C*c^2*d*e)*x^8+1/7*((2*a*c*e^2
+c^2*d^2)*C+2*d*e*c^2*B+c^2*e^2*A)*x^7+1/6*(4*a*c*d*e*C+(2*a*c*e^
2+c^2*d^2)*B+2*d*e*c^2*A)*x^6+1/5*((a^2*e^2+2*a*c*d^2)*C+4*a*c*d*
e*B+(2*a*c*e^2+c^2*d^2)*A)*x^5+1/4*(2*d*e*a^2*C+(a^2*e^2+2*a*c*d^
2)*B+4*a*c*d*e*A)*x^4+1/3*(a^2*d^2*C+2*d*e*a^2*B+(a^2*e^2+2*a*c*d
^2)*A)*x^3+1/2*(2*A*a^2*d*e+B*a^2*d^2)*x^2+a^2*d^2*A*x
```

Maxima [A] time = 0.727093, size = 347, normalized size = 1.08

$$\frac{1}{9}\,Cc^2e^2x^9+\frac{1}{8}\left(2\,Cc^2de+Bc^2e^2\right)x^8+\frac{1}{7}\left(Cc^2d^2+2\,Bc^2de+\left(2\,Cac+Ac^2\right)e^2\right)x^7+\frac{1}{6}\left(Bc^2d^2+2\,Bace^2+2\left(2\,Cac+Ac^2\right)de\right)x^6+Aa^2d^2x+\frac{1}{5}\left(4\,Bacde+\left(2\,Cac+Ac^2\right)d^2+\left(Ca^2+2\,Aac\right)e^2\right)x^5+\frac{1}{4}\left(2\,Bacd^2+Ba^2e^2+2\left(Ca^2+2\,Aac\right)de\right)x^4+\frac{1}{3}\left(2\,Ba^2de+Aa^2e^2+\left(Ca^2+2\,Aac\right)d^2\right)x^3+\frac{1}{2}\left(Ba^2d^2+2\,Aa^2de\right)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2*(e*x + d)^2,x, algorithm="maxima")
```

```
[Out] 1/9*C*c^2*e^2*x^9 + 1/8*(2*C*c^2*d*e + B*c^2*e^2)*x^8 + 1/7*(C*c^
2*d^2 + 2*B*c^2*d*e + (2*C*a*c + A*c^2)*e^2)*x^7 + 1/6*(B*c^2*d^2
 + 2*B*a*c*e^2 + 2*(2*C*a*c + A*c^2)*d*e)*x^6 + A*a^2*d^2*x + 1/5
*(4*B*a*c*d*e + (2*C*a*c + A*c^2)*d^2 + (C*a^2 + 2*A*a*c)*e^2)*x^
5 + 1/4*(2*B*a*c*d^2 + B*a^2*e^2 + 2*(C*a^2 + 2*A*a*c)*d*e)*x^4 +
 1/3*(2*B*a^2*d*e + A*a^2*e^2 + (C*a^2 + 2*A*a*c)*d^2)*x^3 + 1/2*
(B*a^2*d^2 + 2*A*a^2*d*e)*x^2
```

Fricas [A] time = 0.243136, size = 1, normalized size = 0.

$$\frac{1}{9}x^9e^2c^2C + \frac{1}{4}x^8edc^2C + \frac{1}{8}x^8e^2c^2B + \frac{1}{7}x^7d^2c^2C + \frac{2}{7}x^7e^2caC + \frac{2}{7}x^7edc^2B + \frac{1}{7}x^7e^2c^2A + \frac{2}{3}x^6edcaC + \frac{1}{6}x^6d^2c^2B + \frac{1}{3}x^6e^2caB + \frac{1}{3}x^6edc^2A + \frac{2}{5}x^5d^2caC + \frac{1}{5}x^5e^2a^2C + \frac{4}{5}x^5edcaB + \frac{1}{5}x^5d^2c^2A + \frac{2}{5}x^5e^2caA + \frac{1}{2}x^4eda^2C + \frac{1}{2}x^4d^2caB + \frac{1}{4}x^4e^2a^2B + x^4edcaA + \frac{1}{3}x^3d^2a^2C + \frac{2}{3}x^3eda^2B + \frac{2}{3}x^3d^2caA + \frac{1}{3}x^3e^2a^2A + \frac{1}{2}x^2d^2a^2B + x^2eda^2A + xd^2a^2A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2*(e*x + d)^2,x, algorithm="fricas")
```

```
[Out] 1/9*x^9*e^2*c^2*C + 1/4*x^8*e*d*c^2*C + 1/8*x^8*e^2*c^2*B + 1/7*x
^7*d^2*c^2*C + 2/7*x^7*e^2*c*a*C + 2/7*x^7*e*d*c^2*B + 1/7*x^7*e^
2*c^2*A + 2/3*x^6*e*d*c*a*C + 1/6*x^6*d^2*c^2*B + 1/3*x^6*e^2*c*a
*B + 1/3*x^6*e*d*c^2*A + 2/5*x^5*d^2*c*a*C + 1/5*x^5*e^2*a^2*C +
4/5*x^5*e*d*c*a*B + 1/5*x^5*d^2*c^2*A + 2/5*x^5*e^2*c*a*A + 1/2*x
^4*e*d*a^2*C + 1/2*x^4*d^2*c*a*B + 1/4*x^4*e^2*a^2*B + x^4*e*d*c*
a*A + 1/3*x^3*d^2*a^2*C + 2/3*x^3*e*d*a^2*B + 2/3*x^3*d^2*c*a*A +
 1/3*x^3*e^2*a^2*A + 1/2*x^2*d^2*a^2*B + x^2*e*d*a^2*A + x*d^2*a^
2*A
```

Sympy [A] time = 0.122225, size = 311, normalized size = 0.97

$$Aa^2d^2x + \frac{Cc^2e^2x^9}{9} + x^8\left(\frac{Bc^2e^2}{8} + \frac{Cc^2de}{4}\right) + x^7\left(\frac{Ac^2e^2}{7} + \frac{2Bc^2de}{7} + \frac{2Cace^2}{7} + \frac{Cc^2d^2}{7}\right) + x^6\left(\frac{Ac^2de}{3} + \frac{Bace^2}{3} + \frac{Bc^2d^2}{6} + \frac{2Cacde}{3}\right) + x^5\left(\frac{2Aace^2}{5} + \frac{Ac^2d^2}{5} + \frac{4Bacde}{5} + \frac{Ca^2e^2}{5} + \frac{2Cacd^2}{5}\right) + x^4\left(Aacde + \frac{Ba^2e^2}{4} + \frac{Bacd^2}{2} + \frac{Ca^2de}{2}\right) + x^3\left(\frac{Aa^2e^2}{3} + \frac{2Aacd^2}{3} + \frac{2Ba^2de}{3} + \frac{Ca^2d^2}{3}\right) + x^2\left(Aa^2de + \frac{Ba^2d^2}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**2*(c*x**2+a)**2*(C*x**2+B*x+A),x)
```

```
[Out] A*a**2*d**2*x + C*c**2*e**2*x**9/9 + x**8*(B*c**2*e**2/8 + C*c**2
*d*e/4) + x**7*(A*c**2*e**2/7 + 2*B*c**2*d*e/7 + 2*C*a*c*e**2/7 +
 C*c**2*d**2/7) + x**6*(A*c**2*d*e/3 + B*a*c*e**2/3 + B*c**2*d**2
/6 + 2*C*a*c*d*e/3) + x**5*(2*A*a*c*e**2/5 + A*c**2*d**2/5 + 4*B*
a*c*d*e/5 + C*a**2*e**2/5 + 2*C*a*c*d**2/5) + x**4*(A*a*c*d*e + B
*a**2*e**2/4 + B*a*c*d**2/2 + C*a**2*d*e/2) + x**3*(A*a**2*e**2/3
 + 2*A*a*c*d**2/3 + 2*B*a**2*d*e/3 + C*a**2*d**2/3) + x**2*(A*a**
2*d*e + B*a**2*d**2/2)
```

GIAC/XCAS [A] time = 0.269377, size = 408, normalized size = 1.27

$$\frac{1}{9}Cc^2x^9e^2 + \frac{1}{4}Cc^2dx^8e + \frac{1}{7}Cc^2d^2x^7 + \frac{1}{8}Bc^2x^8e^2 + \frac{2}{7}Bc^2dx^7e + \frac{1}{6}Bc^2d^2x^6 + \frac{2}{7}Cacx^7e^2 + \frac{1}{7}Ac^2x^7e^2 + \frac{2}{3}Cacdx^6e + \frac{1}{3}Ac^2dx^6e + \frac{2}{5}Cacd^2x^5 + \frac{1}{5}Ac^2d^2x^5 + \frac{1}{3}Bacx^6e^2 + \frac{4}{5}Bacdx^5e + \frac{1}{2}Bacd^2x^4 + \frac{1}{5}Ca^2x^5e^2 + \frac{2}{5}Aacx^5e^2 + \frac{1}{2}Ca^2dx^4e + Aacdx^4e + \frac{1}{3}Ca^2d^2x^3 + \frac{2}{3}Aacd^2x^3 + \frac{1}{4}Ba^2x^4e^2 + \frac{2}{3}Ba^2dx^3e + \frac{1}{2}Ba^2d^2x^2 + \frac{1}{3}Aa^2x^3e^2 + Aa^2dx^2e + Aa^2d^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2*(e*x + d)^2,x, algorithm="giac")
```

```
[Out] 1/9*C*c^2*x^9*e^2 + 1/4*C*c^2*d*x^8*e + 1/7*C*c^2*d^2*x^7 + 1/8*B
*c^2*x^8*e^2 + 2/7*B*c^2*d*x^7*e + 1/6*B*c^2*d^2*x^6 + 2/7*C*a*c*
x^7*e^2 + 1/7*A*c^2*x^7*e^2 + 2/3*C*a*c*d*x^6*e + 1/3*A*c^2*d*x^6
*e + 2/5*C*a*c*d^2*x^5 + 1/5*A*c^2*d^2*x^5 + 1/3*B*a*c*x^6*e^2 +
4/5*B*a*c*d*x^5*e + 1/2*B*a*c*d^2*x^4 + 1/5*C*a^2*x^5*e^2 + 2/5*A
*a*c*x^5*e^2 + 1/2*C*a^2*d*x^4*e + A*a*c*d*x^4*e + 1/3*C*a^2*d^2*
x^3 + 2/3*A*a*c*d^2*x^3 + 1/4*B*a^2*x^4*e^2 + 2/3*B*a^2*d*x^3*e +
 1/2*B*a^2*d^2*x^2 + 1/3*A*a^2*x^3*e^2 + A*a^2*d*x^2*e + A*a^2*d^
2*x
```

3.27 $\int (d+ex) \left(a+cx^2\right)^2 \left(A+Bx+Cx^2\right) \, dx$

Optimal. Leaf size=144

$$\frac{1}{2}a^2x^2(Ae+Bd)+a^2Adx+\frac{1}{6}cx^6(2aCe+Ace+Bcd)+\frac{1}{5}cx^5(2a(Be+Cd)+Acd)+\frac{1}{4}ax^4(aCe+2Ace+2Bcd)+\frac{1}{3}ax^3(aBe+aCd+2Acd)+\frac{1}{7}c^2x^7(Be+Cd)+\frac{1}{8}c^2Cex^8$$

```
[Out] a^2*A*d*x + (a^2*(B*d + A*e)*x^2)/2 + (a*(2*A*c*d + a*C*d + a*B*e
)*x^3)/3 + (a*(2*B*c*d + 2*A*c*e + a*C*e)*x^4)/4 + (c*(A*c*d + 2*
a*(C*d + B*e))*x^5)/5 + (c*(B*c*d + A*c*e + 2*a*C*e)*x^6)/6 + (c^
2*(C*d + B*e)*x^7)/7 + (c^2*C*e*x^8)/8
```

Rubi [A] time = 0.481577, antiderivative size = 144, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.04$

$$\frac{1}{2}a^2x^2(Ae+Bd)+a^2Adx+\frac{1}{6}cx^6(2aCe+Ace+Bcd)+\frac{1}{5}cx^5(2a(Be+Cd)+Acd)+\frac{1}{4}ax^4(aCe+2Ace+2Bcd)+\frac{1}{3}ax^3(aBe+aCd+2Acd)+\frac{1}{7}c^2x^7(Be+Cd)+\frac{1}{8}c^2Cex^8$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)*(a + c*x^2)^2*(A + B*x + C*x^2),x]
```

```
[Out] a^2*A*d*x + (a^2*(B*d + A*e)*x^2)/2 + (a*(2*A*c*d + a*C*d + a*B*e
)*x^3)/3 + (a*(2*B*c*d + 2*A*c*e + a*C*e)*x^4)/4 + (c*(A*c*d + 2*
a*(C*d + B*e))*x^5)/5 + (c*(B*c*d + A*c*e + 2*a*C*e)*x^6)/6 + (c^
2*(C*d + B*e)*x^7)/7 + (c^2*C*e*x^8)/8
```

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

$$\frac{Cc^2ex^8}{8}+a^2d\int A\,dx+a^2\left(Ae+Bd\right)\int x\,dx+\frac{ax^4\left(2Ace+2Bcd+Cae\right)}{4}+\frac{ax^3\left(2Acd+Bae+Cad\right)}{3}+\frac{c^2x^7\left(Be+Cd\right)}{7}+\frac{cx^6\left(Ace+Bcd+2Cae\right)}{6}+\frac{cx^5\left(Acd+2Bae+2Cad\right)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)*(c*x**2+a)**2*(C*x**2+B*x+A),x)
```

```
[Out] C*c**2*e*x**8/8 + a**2*d*Integral(A, x) + a**2*(A*e + B*d)*Integr
al(x, x) + a*x**4*(2*A*c*e + 2*B*c*d + C*a*e)/4 + a*x**3*(2*A*c*d
 + B*a*e + C*a*d)/3 + c**2*x**7*(B*e + C*d)/7 + c*x**6*(A*c*e + B
*c*d + 2*C*a*e)/6 + c*x**5*(A*c*d + 2*B*a*e + 2*C*a*d)/5
```

Mathematica [A] time = 0.102359, size = 144, normalized size = 1.

$$\frac{1}{2}a^2x^2(Ae+Bd)+a^2Adx+\frac{1}{6}cx^6(2aCe+Ace+Bcd)+\frac{1}{5}cx^5(2aBe+2aCd+Acd)+\frac{1}{4}ax^4(aCe+2Ace+2Bcd)+\frac{1}{3}ax^3(aBe+aCd+2Acd)+\frac{1}{7}c^2x^7(Be+Cd)+\frac{1}{8}c^2Cex^8$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x)*(a + c*x^2)^2*(A + B*x + C*x^2),x]
```

```
[Out] a^2*A*d*x + (a^2*(B*d + A*e)*x^2)/2 + (a*(2*A*c*d + a*C*d + a*B*e
)*x^3)/3 + (a*(2*B*c*d + 2*A*c*e + a*C*e)*x^4)/4 + (c*(A*c*d + 2*
a*C*d + 2*a*B*e)*x^5)/5 + (c*(B*c*d + A*c*e + 2*a*C*e)*x^6)/6 + (
c^2*(C*d + B*e)*x^7)/7 + (c^2*C*e*x^8)/8
```

Maple [A] time = 0.001, size = 151, normalized size = 1.1

$$\frac{c^2Cex^8}{8}+\frac{\left(c^2eB+c^2dC\right)x^7}{7}+\frac{\left(c^2eA+c^2dB+2\,eacC\right)x^6}{6}+\frac{\left(Ac^2d+2\,Bace+2\,acdC\right)x^5}{5}+\frac{\left(2\,eacA+2\,acdB+ea^2C\right)x^4}{4}+\frac{\left(2\,acdA+ea^2B+da^2C\right)x^3}{3}+\frac{\left(ea^2A+da^2B\right)x^2}{2}+a^2Adx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)*(c*x^2+a)^2*(C*x^2+B*x+A),x)
```

```
[Out] 1/8*c^2*C*e*x^8+1/7*(B*c^2*e+C*c^2*d)*x^7+1/6*(A*c^2*e+B*c^2*d+2*
C*a*c*e)*x^6+1/5*(A*c^2*d+2*B*a*c*e+2*C*a*c*d)*x^5+1/4*(2*A*a*c*e
+2*B*a*c*d+C*a^2*e)*x^4+1/3*(2*A*a*c*d+B*a^2*e+C*a^2*d)*x^3+1/2*(
A*a^2*e+B*a^2*d)*x^2+a^2*A*d*x
```

Maxima [A] time = 0.718475, size = 208, normalized size = 1.44

$$\frac{1}{8}\,Cc^2ex^8+\frac{1}{7}\left(Cc^2d+Bc^2e\right)x^7+\frac{1}{6}\left(Bc^2d+\left(2\,Cac+Ac^2\right)e\right)x^6+\frac{1}{5}\left(2\,Bace+\left(2\,Cac+Ac^2\right)d\right)x^5+Aa^2dx+\frac{1}{4}\left(2\,Bacd+\left(Ca^2+2\,Aac\right)e\right)x^4+\frac{1}{3}\left(Ba^2e+\left(Ca^2+2\,Aac\right)d\right)x^3+\frac{1}{2}\left(Ba^2d+Aa^2e\right)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2*(e*x + d),x, algorithm="maxima")
```

```
[Out] 1/8*C*c^2*e*x^8 + 1/7*(C*c^2*d + B*c^2*e)*x^7 + 1/6*(B*c^2*d + (2
*C*a*c + A*c^2)*e)*x^6 + 1/5*(2*B*a*c*e + (2*C*a*c + A*c^2)*d)*x^
5 + A*a^2*d*x + 1/4*(2*B*a*c*d + (C*a^2 + 2*A*a*c)*e)*x^4 + 1/3*(
B*a^2*e + (C*a^2 + 2*A*a*c)*d)*x^3 + 1/2*(B*a^2*d + A*a^2*e)*x^2
```

Fricas [A] time = 0.240652, size = 1, normalized size = 0.01

$$\frac{1}{8}x^8ec^2C+\frac{1}{7}x^7dc^2C+\frac{1}{7}x^7ec^2B+\frac{1}{3}x^6ecaC+\frac{1}{6}x^6dc^2B+\frac{1}{6}x^6ec^2A+\frac{2}{5}x^5dcaC+\frac{2}{5}x^5ecaB+\frac{1}{5}x^5dc^2A+\frac{1}{4}x^4ea^2C+\frac{1}{2}x^4dcaB+\frac{1}{2}x^4ecaA+\frac{1}{3}x^3da^2C+\frac{1}{3}x^3ea^2B+\frac{2}{3}x^3dcaA+\frac{1}{2}x^2da^2B+\frac{1}{2}x^2ea^2A+xda^2A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2*(e*x + d),x, algorithm="fricas")
```

```
[Out] 1/8*x^8*e*c^2*C + 1/7*x^7*d*c^2*C + 1/7*x^7*e*c^2*B + 1/3*x^6*e*c
*a*C + 1/6*x^6*d*c^2*B + 1/6*x^6*e*c^2*A + 2/5*x^5*d*c*a*C + 2/5*
x^5*e*c*a*B + 1/5*x^5*d*c^2*A + 1/4*x^4*e*a^2*C + 1/2*x^4*d*c*a*B
 + 1/2*x^4*e*c*a*A + 1/3*x^3*d*a^2*C + 1/3*x^3*e*a^2*B + 2/3*x^3*
d*c*a*A + 1/2*x^2*d*a^2*B + 1/2*x^2*e*a^2*A + x*d*a^2*A
```

Sympy [A] time = 0.092181, size = 180, normalized size = 1.25

$$Aa^2dx+\frac{Cc^2ex^8}{8}+x^7\left(\frac{Bc^2e}{7}+\frac{Cc^2d}{7}\right)+x^6\left(\frac{Ac^2e}{6}+\frac{Bc^2d}{6}+\frac{Cace}{3}\right)+x^5\left(\frac{Ac^2d}{5}+\frac{2Bace}{5}+\frac{2Cacd}{5}\right)+x^4\left(\frac{Aace}{2}+\frac{Bacd}{2}+\frac{Ca^2e}{4}\right)+x^3\left(\frac{2Aacd}{3}+\frac{Ba^2e}{3}+\frac{Ca^2d}{3}\right)+x^2\left(\frac{Aa^2e}{2}+\frac{Ba^2d}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(c*x**2+a)**2*(C*x**2+B*x+A),x)
```

```
[Out] A*a**2*d*x + C*c**2*e*x**8/8 + x**7*(B*c**2*e/7 + C*c**2*d/7) + x
**6*(A*c**2*e/6 + B*c**2*d/6 + C*a*c*e/3) + x**5*(A*c**2*d/5 + 2*
B*a*c*e/5 + 2*C*a*c*d/5) + x**4*(A*a*c*e/2 + B*a*c*d/2 + C*a**2*e
/4) + x**3*(2*A*a*c*d/3 + B*a**2*e/3 + C*a**2*d/3) + x**2*(A*a**2
*e/2 + B*a**2*d/2)
```

GIAC/XCAS [A] time = 0.268331, size = 244, normalized size = 1.69

$$\frac{1}{8}\,Cc^2x^8e+\frac{1}{7}\,Cc^2dx^7+\frac{1}{7}\,Bc^2x^7e+\frac{1}{6}\,Bc^2dx^6+\frac{1}{3}\,Cacx^6e+\frac{1}{6}\,Ac^2x^6e+\frac{2}{5}\,Cacdx^5+\frac{1}{5}\,Ac^2dx^5+\frac{2}{5}\,Bacx^5e+\frac{1}{2}\,Bacdx^4+\frac{1}{4}\,Ca^2x^4e+\frac{1}{2}\,Aacx^4e+\frac{1}{3}\,Ca^2dx^3+\frac{2}{3}\,Aacdx^3+\frac{1}{3}\,Ba^2x^3e+\frac{1}{2}\,Ba^2dx^2+\frac{1}{2}\,Aa^2x^2e+Aa^2dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2*(e*x + d),x, algorithm="giac")
```

```
[Out] 1/8*C*c^2*x^8*e + 1/7*C*c^2*d*x^7 + 1/7*B*c^2*x^7*e + 1/6*B*c^2*d
*x^6 + 1/3*C*a*c*x^6*e + 1/6*A*c^2*x^6*e + 2/5*C*a*c*d*x^5 + 1/5*
A*c^2*d*x^5 + 2/5*B*a*c*x^5*e + 1/2*B*a*c*d*x^4 + 1/4*C*a^2*x^4*e
 + 1/2*A*a*c*x^4*e + 1/3*C*a^2*d*x^3 + 2/3*A*a*c*d*x^3 + 1/3*B*a^
2*x^3*e + 1/2*B*a^2*d*x^2 + 1/2*A*a^2*x^2*e + A*a^2*d*x
```

3.28 $\int \left(a+cx^2\right)^2 \left(A+Bx+Cx^2\right) \, dx$

Optimal. Leaf size=67

$$a^2Ax+\frac{1}{5}cx^5(2aC+Ac)+\frac{1}{3}ax^3(aC+2Ac)+\frac{B\left(a+cx^2\right)^3}{6c}+\frac{1}{7}c^2Cx^7$$

```
[Out] a^2*A*x + (a*(2*A*c + a*C)*x^3)/3 + (c*(A*c + 2*a*C)*x^5)/5 + (c^
2*C*x^7)/7 + (B*(a + c*x^2)^3)/(6*c)
```

Rubi [A] time = 0.125151, antiderivative size = 82, normalized size of antiderivative = 1.22, number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$a^2Ax+\frac{1}{2}a^2Bx^2+\frac{1}{5}cx^5(2aC+Ac)+\frac{1}{3}ax^3(aC+2Ac)+\frac{1}{2}aBcx^4+\frac{1}{6}Bc^2x^6+\frac{1}{7}c^2Cx^7$$

Antiderivative was successfully verified.

```
[In]  Int[(a + c*x^2)^2*(A + B*x + C*x^2),x]
```

```
[Out] a^2*A*x + (a^2*B*x^2)/2 + (a*(2*A*c + a*C)*x^3)/3 + (a*B*c*x^4)/2
 + (c*(A*c + 2*a*C)*x^5)/5 + (B*c^2*x^6)/6 + (c^2*C*x^7)/7
```

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

$$\frac{B\left(a+cx^2\right)^3}{6c}+\frac{Cc^2x^7}{7}+a^2\int A\,dx+\frac{ax^3\left(2Ac+Ca\right)}{3}+\frac{cx^5\left(Ac+2Ca\right)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+a)**2*(C*x**2+B*x+A),x)
```

```
[Out] B*(a + c*x**2)**3/(6*c) + C*c**2*x**7/7 + a**2*Integral(A, x) + a
*x**3*(2*A*c + C*a)/3 + c*x**5*(A*c + 2*C*a)/5
```

Mathematica [A] time = 0.0588122, size = 69, normalized size = 1.03

$$\frac{1}{210}x\left(35a^2(6A+x(3B+2Cx))+7acx^2(20A+3x(5B+4Cx))+c^2x^4(42A+5x(7B+6Cx))\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + c*x^2)^2*(A + B*x + C*x^2),x]
```

```
[Out] (x*(35*a^2*(6*A + x*(3*B + 2*C*x)) + 7*a*c*x^2*(20*A + 3*x*(5*B +
 4*C*x)) + c^2*x^4*(42*A + 5*x*(7*B + 6*C*x))))/210
```

Maple [A] time = 0.001, size = 75, normalized size = 1.1

$$\frac{c^2Cx^7}{7}+\frac{Bc^2x^6}{6}+\frac{\left(Ac^2+2\,acC\right)\,x^5}{5}+\frac{aBcx^4}{2}+\frac{\left(2\,acA+a^2C\right)\,x^3}{3}+\frac{a^2Bx^2}{2}+a^2Ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^2*(C*x^2+B*x+A),x)
```

```
[Out] 1/7*c^2*C*x^7+1/6*B*c^2*x^6+1/5*(A*c^2+2*C*a*c)*x^5+1/2*a*B*c*x^4
+1/3*(2*A*a*c+C*a^2)*x^3+1/2*a^2*B*x^2+a^2*A*x
```

Maxima [A] time = 0.717504, size = 100, normalized size = 1.49

$$\frac{1}{7}\,Cc^2x^7+\frac{1}{6}\,Bc^2x^6+\frac{1}{2}\,Bacx^4+\frac{1}{5}\,\left(2\,Cac+Ac^2\right)x^5+\frac{1}{2}\,Ba^2x^2+Aa^2x+\frac{1}{3}\,\left(Ca^2+2\,Aac\right)x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2,x, algorithm="maxima")
```

```
[Out] 1/7*C*c^2*x^7 + 1/6*B*c^2*x^6 + 1/2*B*a*c*x^4 + 1/5*(2*C*a*c + A*
c^2)*x^5 + 1/2*B*a^2*x^2 + A*a^2*x + 1/3*(C*a^2 + 2*A*a*c)*x^3
```

Fricas [A] time = 0.243151, size = 1, normalized size = 0.01

$$\frac{1}{7}x^7c^2C+\frac{1}{6}x^6c^2B+\frac{2}{5}x^5caC+\frac{1}{5}x^5c^2A+\frac{1}{2}x^4caB+\frac{1}{3}x^3a^2C+\frac{2}{3}x^3caA+\frac{1}{2}x^2a^2B+xa^2A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2,x, algorithm="fricas")
```

```
[Out] 1/7*x^7*c^2*C + 1/6*x^6*c^2*B + 2/5*x^5*c*a*C + 1/5*x^5*c^2*A + 1
/2*x^4*c*a*B + 1/3*x^3*a^2*C + 2/3*x^3*c*a*A + 1/2*x^2*a^2*B + x*
a^2*A
```

Sympy [A] time = 0.075314, size = 83, normalized size = 1.24

$$Aa^2x + \frac{Ba^2x^2}{2} + \frac{Bacx^4}{2} + \frac{Bc^2x^6}{6} + \frac{Cc^2x^7}{7} + x^5\left(\frac{Ac^2}{5} + \frac{2Cac}{5}\right) + x^3\left(\frac{2Aac}{3} + \frac{Ca^2}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)**2*(C*x**2+B*x+A),x)
```

```
[Out] A*a**2*x + B*a**2*x**2/2 + B*a*c*x**4/2 + B*c**2*x**6/6 + C*c**2*
x**7/7 + x**5*(A*c**2/5 + 2*C*a*c/5) + x**3*(2*A*a*c/3 + C*a**2/3
)
```

GIAC/XCAS [A] time = 0.266361, size = 103, normalized size = 1.54

$$\frac{1}{7}\,Cc^2x^7 + \frac{1}{6}\,Bc^2x^6 + \frac{2}{5}\,Cacx^5 + \frac{1}{5}\,Ac^2x^5 + \frac{1}{2}\,Bacx^4 + \frac{1}{3}\,Ca^2x^3 + \frac{2}{3}\,Aacx^3 + \frac{1}{2}\,Ba^2x^2 + Aa^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2,x, algorithm="giac")
```

```
[Out] 1/7*C*c^2*x^7 + 1/6*B*c^2*x^6 + 2/5*C*a*c*x^5 + 1/5*A*c^2*x^5 + 1
/2*B*a*c*x^4 + 1/3*C*a^2*x^3 + 2/3*A*a*c*x^3 + 1/2*B*a^2*x^2 + A*
a^2*x
```

3.29 $\int \frac{(a+cx^2)^2(A+Bx+Cx^2)}{d+ex}\,dx$

Optimal. Leaf size=297

$$\frac{x^2\left(a^2Ce^4+2ace^2\left(Cd^2-e(Bd-Ae)\right)+c^2d^2\left(Cd^2-e(Bd-Ae)\right)\right)}{2e^5}-\frac{x\left(a^2e^4(Cd-Be)+2acde^2\left(Cd^2-e(Bd-Ae)\right)+c^2d^3\left(Cd^2-e(Bd-Ae)\right)\right)}{e^6}+\frac{\left(ae^2+cd^2\right)^2\log(d+ex)\left(Ae^2-Bde+Cd^2\right)}{e^7}-\frac{cx^3\left(2ae^2(Cd-Be)+cd\left(Cd^2-e(Bd-Ae)\right)\right)}{3e^4}+\frac{cx^4\left(2aCe^2+c\left(Cd^2-e(Bd-Ae)\right)\right)}{4e^3}-\frac{c^2x^5(Cd-Be)}{5e^2}+\frac{c^2Cx^6}{6e}$$

```
[Out] -(((a^2*e^4*(C*d - B*e) + c^2*d^3*(C*d^2 - e*(B*d - A*e)) + 2*a*c
*d*e^2*(C*d^2 - e*(B*d - A*e)))*x)/e^6) + ((a^2*C*e^4 + c^2*d^2*(
C*d^2 - e*(B*d - A*e)) + 2*a*c*e^2*(C*d^2 - e*(B*d - A*e)))*x^2)/
(2*e^5) - (c*(2*a*e^2*(C*d - B*e) + c*d*(C*d^2 - e*(B*d - A*e)))*
x^3)/(3*e^4) + (c*(2*a*C*e^2 + c*(C*d^2 - e*(B*d - A*e)))*x^4)/(4
*e^3) - (c^2*(C*d - B*e)*x^5)/(5*e^2) + (c^2*C*x^6)/(6*e) + ((c*d
^2 + a*e^2)^2*(C*d^2 - B*d*e + A*e^2)*Log[d + e*x])/e^7
```

Rubi [A] time = 1.34508, antiderivative size = 295, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 1, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.037$

$$\frac{x^2\left(a^2Ce^4+2ace^2\left(Cd^2-e(Bd-Ae)\right)+c^2\left(Cd^4-d^2e(Bd-Ae)\right)\right)}{2e^5}-\frac{x\left(a^2e^4(Cd-Be)+2acde^2\left(Cd^2-e(Bd-Ae)\right)+c^2\left(Cd^5-d^3e(Bd-Ae)\right)\right)}{e^6}-\frac{cx^3\left(2ae^2(Cd-Be)-cde(Bd-Ae)+cCd^3\right)}{3e^4}+\frac{\left(ae^2+cd^2\right)^2\log(d+ex)\left(Ae^2-Bde+Cd^2\right)}{e^7}+\frac{cx^4\left(2aCe^2-ce(Bd-Ae)+cCd^2\right)}{4e^3}-\frac{c^2x^5(Cd-Be)}{5e^2}+\frac{c^2Cx^6}{6e}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)^2*(A + B*x + C*x^2))/(d + e*x),x]
```

```
[Out] -(((a^2*e^4*(C*d - B*e) + 2*a*c*d*e^2*(C*d^2 - e*(B*d - A*e)) + c
^2*(C*d^5 - d^3*e*(B*d - A*e)))*x)/e^6) + ((a^2*C*e^4 + 2*a*c*e^2
*(C*d^2 - e*(B*d - A*e)) + c^2*(C*d^4 - d^2*e*(B*d - A*e)))*x^2)/
(2*e^5) - (c*(c*C*d^3 - c*d*e*(B*d - A*e) + 2*a*e^2*(C*d - B*e))*
x^3)/(3*e^4) + (c*(c*C*d^2 + 2*a*C*e^2 - c*e*(B*d - A*e))*x^4)/(4
*e^3) - (c^2*(C*d - B*e)*x^5)/(5*e^2) + (c^2*C*x^6)/(6*e) + ((c*d
^2 + a*e^2)^2*(C*d^2 - B*d*e + A*e^2)*Log[d + e*x])/e^7
```

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((c*x**2+a)**2*(C*x**2+B*x+A)/(e*x+d),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.49354, size = 285, normalized size = 0.96

$$\frac{ex\left(30a^2e^4(2Be-2Cd+Cex)+10ace^2\left(2e\left(3Ae(ex-2d)+B\left(6d^2-3dex+2e^2x^2\right)\right)+C\left(-12d^3+6d^2ex-4de^2x^2+3e^3x^3\right.\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)^2*(A + B*x + C*x^2))/(d + e*x),x]
```

```
[Out] (e*x*(30*a^2*e^4*(-2*C*d + 2*B*e + C*e*x) + 10*a*c*e^2*(C*(-12*d^
3 + 6*d^2*e*x - 4*d*e^2*x^2 + 3*e^3*x^3) + 2*e*(3*A*e*(-2*d + e*x
) + B*(6*d^2 - 3*d*e*x + 2*e^2*x^2))) + c^2*(C*(-60*d^5 + 30*d^4*
e*x - 20*d^3*e^2*x^2 + 15*d^2*e^3*x^3 - 12*d*e^4*x^4 + 10*e^5*x^5
) + e*(5*A*e*(-12*d^3 + 6*d^2*e*x - 4*d*e^2*x^2 + 3*e^3*x^3) + B*
(60*d^4 - 30*d^3*e*x + 20*d^2*e^2*x^2 - 15*d*e^3*x^3 + 12*e^4*x^4
)))) + 60*(c*d^2 + a*e^2)^2*(C*d^2 + e*(-(B*d) + A*e))*Log[d + e*
x])/(60*e^7)
```

Maple [A] time = 0.009, size = 490, normalized size = 1.7

$$-2\,{\frac{acdAx}{{e}^{2}}}+2\,{\frac{cBa{d}^{2}x}{{e}^{3}}}-{\frac{aB{x}^{2}cd}{{e}^{2}}}+{\frac{C{x}^{2}{a}^{2}}{2\,e}}+{\frac{A{x}^{4}{c}^{2}}{4\,e}}+{\frac{B{a}^{2}x}{e}}+{\frac{\ln \left(ex+d \right) A{a}^{2}}{e}}+{\frac{B{x}^{5}{c}^{2}}{5\,e}}-{\frac{C{x}^{3}{c}^{2}{d}^{3}}{3\,{e}^{4}}}$$
$$+{\frac{B{x}^{3}{c}^{2}{d}^{2}}{3\,{e}^{3}}}+{\frac{2\,B{x}^{3}ac}{3\,e}}-{\frac{B{x}^{4}{c}^{2}d}{4\,{e}^{2}}}-{\frac{C{x}^{5}{c}^{2}d}{5\,{e}^{2}}}+{\frac{C{x}^{4}{c}^{2}{d}^{2}}{4\,{e}^{3}}}+{\frac{C{x}^{4}ac}{2\,e}}-{\frac{A{x}^{3}{c}^{2}d}{3\,{e}^{2}}}-{\frac{d{a}^{2}Cx}{{e}^{2}}}+{\frac{C{x}^{2}{c}^{2}{d}^{4}}{2\,{e}^{5}}}$$
$$-{\frac{A{c}^{2}{d}^{3}x}{{e}^{4}}}+{\frac{A{x}^{2}ac}{e}}-{\frac{C{c}^{2}{d}^{5}x}{{e}^{6}}}-{\frac{B{x}^{2}{c}^{2}{d}^{3}}{2\,{e}^{4}}}+{\frac{A{x}^{2}{c}^{2}{d}^{2}}{2\,{e}^{3}}}+{\frac{\ln \left(ex+d \right) C{c}^{2}{d}^{6}}{{e}^{7}}}-{\frac{\ln \left(ex+d \right) B{a}^{2}d}{{e}^{2}}}$$
$$+{\frac{\ln \left(ex+d \right) A{c}^{2}{d}^{4}}{{e}^{5}}}+{\frac{{c}^{2}B{d}^{4}x}{{e}^{5}}}+2\,{\frac{\ln \left(ex+d \right) Cac{d}^{4}}{{e}^{5}}}+2\,{\frac{\ln \left(ex+d \right) Aac{d}^{2}}{{e}^{3}}}-2\,{\frac{\ln \left(ex+d \right) Bac{d}^{3}}{{e}^{4}}}$$
$$-2\,{\frac{acC{d}^{3}x}{{e}^{4}}}+{\frac{C{x}^{2}ac{d}^{2}}{{e}^{3}}}-{\frac{2\,C{x}^{3}acd}{3\,{e}^{2}}}+{\frac{\ln \left(ex+d \right) C{a}^{2}{d}^{2}}{{e}^{3}}}-{\frac{\ln \left(ex+d \right) B{c}^{2}{d}^{5}}{{e}^{6}}}+{\frac{C{c}^{2}{x}^{6}}{6\,e}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^2*(C*x^2+B*x+A)/(e*x+d),x)
```

```
[Out] -2/e^2*A*a*c*d*x+2/e^3*B*a*c*d^2*x-1/e^2*B*x^2*a*c*d+1/2/e*C*x^2*
a^2+1/4/e*A*x^4*c^2+1/e*B*a^2*x+1/e*ln(e*x+d)*A*a^2+1/5/e*B*x^5*c
^2-1/3/e^4*C*x^3*c^2*d^3+1/3/e^3*B*x^3*c^2*d^2+2/3/e*B*x^3*a*c-1/
4/e^2*B*x^4*c^2*d-1/5/e^2*C*x^5*c^2*d+1/4/e^3*C*x^4*c^2*d^2+1/2/e
*C*x^4*a*c-1/3/e^2*A*x^3*c^2*d-1/e^2*C*a^2*d*x+1/2/e^5*C*x^2*c^2*
d^4-1/e^4*A*c^2*d^3*x+1/e*A*x^2*a*c-1/e^6*C*c^2*d^5*x-1/2/e^4*B*x
^2*c^2*d^3+1/2/e^3*A*x^2*c^2*d^2+1/e^7*ln(e*x+d)*C*c^2*d^6-1/e^2*
ln(e*x+d)*B*a^2*d+1/e^5*ln(e*x+d)*A*c^2*d^4+1/e^5*B*c^2*d^4*x+2/e
^5*ln(e*x+d)*C*a*c*d^4+2/e^3*ln(e*x+d)*A*a*c*d^2-2/e^4*ln(e*x+d)*
B*a*c*d^3-2/e^4*C*a*c*d^3*x+1/e^3*C*x^2*a*c*d^2-2/3/e^2*C*x^3*a*c
*d+1/e^3*ln(e*x+d)*C*a^2*d^2-1/e^6*ln(e*x+d)*B*c^2*d^5+1/6*c^2*C*
x^6/e
```

Maxima [A] time = 0.707911, size = 509, normalized size = 1.71

$$\frac{10\,Cc^2e^5x^6 - 12\left(Cc^2de^4 - Bc^2e^5\right)x^5 + 15\left(Cc^2d^2e^3 - Bc^2de^4 + \left(2\,Cac + Ac^2\right)e^5\right)x^4 - 20\left(Cc^2d^3e^2 - Bc^2d^2e^3 - 2\,Bace^5 + (2\cdots\right.}{\cdots}$$

$$+\frac{\left(Cc^2d^6 - Bc^2d^5e - 2\,Bacd^3e^3 - Ba^2de^5 + Aa^2e^6 + \left(2\,Cac + Ac^2\right)d^4e^2 + \left(Ca^2 + 2\,Aac\right)d^2e^4\right)\log\left(ex+d\right)}{e^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2/(e*x + d),x, algorithm="maxima")
```

```
[Out] 1/60*(10*C*c^2*e^5*x^6 - 12*(C*c^2*d*e^4 - B*c^2*e^5)*x^5 + 15*(C
*c^2*d^2*e^3 - B*c^2*d*e^4 + (2*C*a*c + A*c^2)*e^5)*x^4 - 20*(C*c
^2*d^3*e^2 - B*c^2*d^2*e^3 - 2*B*a*c*e^5 + (2*C*a*c + A*c^2)*d*e^
4)*x^3 + 30*(C*c^2*d^4*e - B*c^2*d^3*e^2 - 2*B*a*c*d*e^4 + (2*C*a
*c + A*c^2)*d^2*e^3 + (C*a^2 + 2*A*a*c)*e^5)*x^2 - 60*(C*c^2*d^5
- B*c^2*d^4*e - 2*B*a*c*d^2*e^3 - B*a^2*e^5 + (2*C*a*c + A*c^2)*d
^3*e^2 + (C*a^2 + 2*A*a*c)*d*e^4)*x)/e^6 + (C*c^2*d^6 - B*c^2*d^5
*e - 2*B*a*c*d^3*e^3 - B*a^2*d*e^5 + A*a^2*e^6 + (2*C*a*c + A*c^2
)*d^4*e^2 + (C*a^2 + 2*A*a*c)*d^2*e^4)*log(e*x + d)/e^7
```

Fricas [A] time = 0.265528, size = 512, normalized size = 1.72

$$\frac{10\,Cc^2e^6x^6 - 12\left(Cc^2de^5 - Bc^2e^6\right)x^5 + 15\left(Cc^2d^2e^4 - Bc^2de^5 + \left(2\,Cac + Ac^2\right)e^6\right)x^4 - 20\left(Cc^2d^3e^3 - Bc^2d^2e^4 - 2\,Bace^6 + (2\cdots\right.}{\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2/(e*x + d),x, algorithm="fricas")
```

```
[Out] 1/60*(10*C*c^2*e^6*x^6 - 12*(C*c^2*d*e^5 - B*c^2*e^6)*x^5 + 15*(C
*c^2*d^2*e^4 - B*c^2*d*e^5 + (2*C*a*c + A*c^2)*e^6)*x^4 - 20*(C*c
^2*d^3*e^3 - B*c^2*d^2*e^4 - 2*B*a*c*e^6 + (2*C*a*c + A*c^2)*d*e^
5)*x^3 + 30*(C*c^2*d^4*e^2 - B*c^2*d^3*e^3 - 2*B*a*c*d*e^5 + (2*C
*a*c + A*c^2)*d^2*e^4 + (C*a^2 + 2*A*a*c)*e^6)*x^2 - 60*(C*c^2*d^
5*e - B*c^2*d^4*e^2 - 2*B*a*c*d^2*e^4 - B*a^2*e^6 + (2*C*a*c + A*
c^2)*d^3*e^3 + (C*a^2 + 2*A*a*c)*d*e^5)*x + 60*(C*c^2*d^6 - B*c^2
*d^5*e - 2*B*a*c*d^3*e^3 - B*a^2*d*e^5 + A*a^2*e^6 + (2*C*a*c + A
*c^2)*d^4*e^2 + (C*a^2 + 2*A*a*c)*d^2*e^4)*log(e*x + d))/e^7
```

Sympy [A] time = 2.35852, size = 350, normalized size = 1.18

$$\frac{Cc^2x^6}{6e} - \frac{x^5\left(-Bc^2e + Cc^2d\right)}{5e^2} + \frac{x^4\left(Ac^2e^2 - Bc^2de + 2Cace^2 + Cc^2d^2\right)}{4e^3} - \frac{x^3\left(Ac^2de^2 - 2Bace^3 - Bc^2d^2e + 2Cacde^2 + Cc^2d^3\right)}{3e^4} + \frac{x^2\left(2Aace^4 + Ac^2d^2e^2 - 2Bacde^3 - Bc^2d^3e + Ca^2e^4 + 2Cacd^2e^2 + Cc^2d^4\right)}{2e^5} - \frac{x\left(2Aacde^4 + Ac^2d^3e^2 - Ba^2e^5 - 2Bacd^2e^3 - Bc^2d^4e + Ca^2de^4 + 2Cacd^3e^2 + Cc^2d^5\right)}{e^6} + \frac{\left(ae^2 + cd^2\right)^2\left(Ae^2 - Bde + Cd^2\right)\log\left(d + ex\right)}{e^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x**2+a)**2*(C*x**2+B*x+A)/(e*x+d),x)
```

```
[Out] C*c**2*x**6/(6*e) - x**5*(-B*c**2*e + C*c**2*d)/(5*e**2) + x**4*(
A*c**2*e**2 - B*c**2*d*e + 2*C*a*c*e**2 + C*c**2*d**2)/(4*e**3) -
 x**3*(A*c**2*d*e**2 - 2*B*a*c*e**3 - B*c**2*d**2*e + 2*C*a*c*d*e
**2 + C*c**2*d**3)/(3*e**4) + x**2*(2*A*a*c*e**4 + A*c**2*d**2*e*
*2 - 2*B*a*c*d*e**3 - B*c**2*d**3*e + C*a**2*e**4 + 2*C*a*c*d**2*
e**2 + C*c**2*d**4)/(2*e**5) - x*(2*A*a*c*d*e**4 + A*c**2*d**3*e*
*2 - B*a**2*e**5 - 2*B*a*c*d**2*e**3 - B*c**2*d**4*e + C*a**2*d*e
**4 + 2*C*a*c*d**3*e**2 + C*c**2*d**5)/e**6 + (a*e**2 + c*d**2)**
2*(A*e**2 - B*d*e + C*d**2)*log(d + e*x)/e**7
```

GIAC/XCAS [A] time = 0.270576, size = 562, normalized size = 1.89

$$\left(Cc^2d^6 - Bc^2d^5e + 2\,Cacd^4e^2 + Ac^2d^4e^2 - 2\,Bacd^3e^3 + Ca^2d^2e^4 + 2\,Aacd^2e^4 - Ba^2de^5 + Aa^2e^6\right)e^{(-7)}\ln\left(|xe + d|\right) + \frac{1}{60}\left(10\,Cc^2x^6e^5 - 12\,Cc^2dx^5e^4 + 15\,Cc^2d^2x^4e^3 - 20\,Cc^2d^3x^3e^2 + 30\,Cc^2d^4x^2e - 60\,Cc^2d^5x + 12\,Bc^2x^5e^5 - 15\,Bc^2dx^4e^4 + 2\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2/(e*x + d),x, algorithm="giac")
```

```
[Out] (C*c^2*d^6 - B*c^2*d^5*e + 2*C*a*c*d^4*e^2 + A*c^2*d^4*e^2 - 2*B*
a*c*d^3*e^3 + C*a^2*d^2*e^4 + 2*A*a*c*d^2*e^4 - B*a^2*d*e^5 + A*a
^2*e^6)*e^(-7)*ln(abs(x*e + d)) + 1/60*(10*C*c^2*x^6*e^5 - 12*C*c
^2*d*x^5*e^4 + 15*C*c^2*d^2*x^4*e^3 - 20*C*c^2*d^3*x^3*e^2 + 30*C
*c^2*d^4*x^2*e - 60*C*c^2*d^5*x + 12*B*c^2*x^5*e^5 - 15*B*c^2*d*x
^4*e^4 + 20*B*c^2*d^2*x^3*e^3 - 30*B*c^2*d^3*x^2*e^2 + 60*B*c^2*d
^4*x*e + 30*C*a*c*x^4*e^5 + 15*A*c^2*x^4*e^5 - 40*C*a*c*d*x^3*e^4
 - 20*A*c^2*d*x^3*e^4 + 60*C*a*c*d^2*x^2*e^3 + 30*A*c^2*d^2*x^2*e
^3 - 120*C*a*c*d^3*x*e^2 - 60*A*c^2*d^3*x*e^2 + 40*B*a*c*x^3*e^5
- 60*B*a*c*d*x^2*e^4 + 120*B*a*c*d^2*x*e^3 + 30*C*a^2*x^2*e^5 + 6
0*A*a*c*x^2*e^5 - 60*C*a^2*d*x*e^4 - 120*A*a*c*d*x*e^4 + 60*B*a^2
*x*e^5)*e^(-6)
```

3.30 $\int \frac{\left(a+cx^2\right)^2\left(A+Bx+Cx^2\right)}{(d+ex)^2}\,dx$

Optimal. Leaf size=292

$$\frac{x\left(a^2Ce^4+2ace^2\left(3Cd^2-e(2Bd-Ae)\right)+c^2d^2\left(5Cd^2-e(4Bd-3Ae)\right)\right)}{e^6}-\frac{\left(ae^2+cd^2\right)^2\left(Ae^2-Bde+Cd^2\right)}{e^7(d+ex)}-\frac{\left(ae^2+cd^2\right)\log(d+ex)\left(ae^2(2Cd-Be)+cd\left(6Cd^2-e(5Bd-4Ae)\right)\right)}{e^7}-\frac{cx^2\left(2ae^2(2Cd-Be)+cd\left(4Cd^2-e(3Bd-2Ae)\right)\right)}{2e^5}+\frac{cx^3\left(2aCe^2+c\left(3Cd^2-e(2Bd-Ae)\right)\right)}{3e^4}-\frac{c^2x^4(2Cd-Be)}{4e^3}+\frac{c^2Cx^5}{5e^2}$$

```
[Out] ((a^2*C*e^4 + c^2*d^2*(5*C*d^2 - e*(4*B*d - 3*A*e)) + 2*a*c*e^2*(
3*C*d^2 - e*(2*B*d - A*e)))*x)/e^6 - (c*(2*a*e^2*(2*C*d - B*e) +
c*d*(4*C*d^2 - e*(3*B*d - 2*A*e)))*x^2)/(2*e^5) + (c*(2*a*C*e^2 +
 c*(3*C*d^2 - e*(2*B*d - A*e)))*x^3)/(3*e^4) - (c^2*(2*C*d - B*e)
*x^4)/(4*e^3) + (c^2*C*x^5)/(5*e^2) - ((c*d^2 + a*e^2)^2*(C*d^2 -
 B*d*e + A*e^2))/(e^7*(d + e*x)) - ((c*d^2 + a*e^2)*(a*e^2*(2*C*d
 - B*e) + c*d*(6*C*d^2 - e*(5*B*d - 4*A*e)))*Log[d + e*x])/e^7
```

Rubi [A] time = 1.33528, antiderivative size = 289, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 1, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.037$

$$\frac{x\left(a^2Ce^4+2ace^2\left(3Cd^2-e(2Bd-Ae)\right)+c^2\left(5Cd^4-d^2e(4Bd-3Ae)\right)\right)}{e^6}-\frac{cx^2\left(2ae^2(2Cd-Be)-cde(3Bd-2Ae)+4cCd^3\right)}{2e^5}-\frac{\left(ae^2+cd^2\right)^2\left(Ae^2-Bde+Cd^2\right)}{e^7(d+ex)}+\frac{cx^3\left(2aCe^2-ce(2Bd-Ae)+3cCd^2\right)}{3e^4}-\frac{\left(ae^2+cd^2\right)\log(d+ex)\left(ae^2(2Cd-Be)-cde(5Bd-4Ae)+6cCd^3\right)}{e^7}-\frac{c^2x^4(2Cd-Be)}{4e^3}+\frac{c^2Cx^5}{5e^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)^2*(A + B*x + C*x^2))/(d + e*x)^2,x]
```

```
[Out] ((a^2*C*e^4 + c^2*(5*C*d^4 - d^2*e*(4*B*d - 3*A*e)) + 2*a*c*e^2*(
3*C*d^2 - e*(2*B*d - A*e)))*x)/e^6 - (c*(4*c*C*d^3 - c*d*e*(3*B*d
 - 2*A*e) + 2*a*e^2*(2*C*d - B*e))*x^2)/(2*e^5) + (c*(3*c*C*d^2 +
 2*a*C*e^2 - c*e*(2*B*d - A*e))*x^3)/(3*e^4) - (c^2*(2*C*d - B*e)
```

```
*x^4)/(4*e^3) + (c^2*C*x^5)/(5*e^2) - ((c*d^2 + a*e^2)^2*(C*d^2 -
 B*d*e + A*e^2))/(e^7*(d + e*x)) - ((c*d^2 + a*e^2)*(6*c*C*d^3 -
c*d*e*(5*B*d - 4*A*e) + a*e^2*(2*C*d - B*e))*Log[d + e*x])/e^7
```

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

$$\frac{Cc^2x^5}{5e^2} + \frac{c^2x^4(Be-2Cd)}{4e^3} + \frac{cx^3(Ace^2-2Bcde+2Cae^2+3Ccd^2)}{3e^4} + \frac{c(-2Acde^2+2Bae^3+3Bcd^2e-4Cade^2-4Ccd^3)\int x\,dx}{e^5} + (2Aace^4+3Ac^2d^2e^2-4Bacde^3-4Bc^2d^3e+Ca^2e^4+6Cacd^2e^2+5Cc^2d^4)\int\frac{1}{e^6}\,dx + \frac{(ae^2+cd^2)(-4Acde^2+Bae^3+5Bcd^2e-2Cade^2-6Ccd^3)\log(d+ex)}{e^7} - \frac{(ae^2+cd^2)^2(Ae^2-Bde+Cd^2)}{e^7(d+ex)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+a)**2*(C*x**2+B*x+A)/(e*x+d)**2,x)
```

```
[Out] C*c**2*x**5/(5*e**2) + c**2*x**4*(B*e - 2*C*d)/(4*e**3) + c*x**3*
(A*c*e**2 - 2*B*c*d*e + 2*C*a*e**2 + 3*C*c*d**2)/(3*e**4) + c*(-2
*A*c*d*e**2 + 2*B*a*e**3 + 3*B*c*d**2*e - 4*C*a*d*e**2 - 4*C*c*d*
*3)*Integral(x, x)/e**5 + (2*A*a*c*e**4 + 3*A*c**2*d**2*e**2 - 4*
B*a*c*d*e**3 - 4*B*c**2*d**3*e + C*a**2*e**4 + 6*C*a*c*d**2*e**2
+ 5*C*c**2*d**4)*Integral(e**(-6), x) + (a*e**2 + c*d**2)*(-4*A*c
*d*e**2 + B*a*e**3 + 5*B*c*d**2*e - 2*C*a*d*e**2 - 6*C*c*d**3)*lo
g(d + e*x)/e**7 - (a*e**2 + c*d**2)**2*(A*e**2 - B*d*e + C*d**2)/
(e**7*(d + e*x))
```

Mathematica [A] time = 0.794283, size = 272, normalized size = 0.93

$$\frac{60ex\left(a^2Ce^4+2ace^2\left(e(Ae-2Bd)+3Cd^2\right)+c^2\left(d^2e(3Ae-4Bd)+5Cd^4\right)\right)-30ce^2x^2\left(-2ae^2(Be-2Cd)+cde(2Ae-3Bd)\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)^2*(A + B*x + C*x^2))/(d + e*x)^2,x]
```

```
[Out] (60*e*(a^2*C*e^4 + 2*a*c*e^2*(3*C*d^2 + e*(-2*B*d + A*e)) + c^2*(
5*C*d^4 + d^2*e*(-4*B*d + 3*A*e)))*x - 30*c*e^2*(4*c*C*d^3 + c*d*
```

```
e*(-3*B*d + 2*A*e) - 2*a*e^2*(-2*C*d + B*e))*x^2 + 20*c*e^3*(3*c*
C*d^2 + 2*a*C*e^2 + c*e*(-2*B*d + A*e))*x^3 + 15*c^2*e^4*(-2*C*d
+ B*e)*x^4 + 12*c^2*C*e^5*x^5 - (60*(c*d^2 + a*e^2)^2*(C*d^2 + e*
(-(B*d) + A*e)))/(d + e*x) - 60*(c*d^2 + a*e^2)*(6*c*C*d^3 + c*d*
e*(-5*B*d + 4*A*e) + a*e^2*(2*C*d - B*e))*Log[d + e*x])/(60*e^7)
```

Maple [A] time = 0.017, size = 527, normalized size = 1.8

$$-8\,{\frac {\ln \left(ex+d \right) Cacd^{3}}{e^{5}}}+6\,{\frac {\ln \left(ex+d \right) Bacd^{2}}{e^{4}}}+{\frac {Ax^{3}c^{2}}{3\,e^{2}}}+{\frac {a^{2}Cx}{e^{2}}}-{\frac {Aa^{2}}{e \left(ex+d \right) }}+{\frac {Bx^{4}c^{2}}{4\,e^{2}}}+{\frac {\ln \left(ex+d \right) Ba^{2}}{e^{2}}}-{\frac {Cc^{2}d^{6}}{e^{7} \left(ex+d \right) }}+5\,{\frac {Cc^{2}d^{4}x}{e^{6}}}-{\frac {Ac^{2}d^{4}}{e^{5} \left(ex+d \right) }}-4\,{\frac {\ln \left(ex+d \right) Ac^{2}d^{3}}{e^{5}}}-2\,{\frac {Cx^{2}c^{2}d^{3}}{e^{5}}}-{\frac {Cx^{4}c^{2}d}{2\,e^{3}}}-{\frac {2\,Bx^{3}c^{2}d}{3\,e^{3}}}-6\,{\frac {\ln \left(ex+d \right) Cc^{2}d^{5}}{e^{7}}}+5\,{\frac {\ln \left(ex+d \right) Bc^{2}d^{4}}{e^{6}}}+3\,{\frac {Ac^{2}d^{2}x}{e^{4}}}+{\frac {2\,Cx^{3}ac}{3\,e^{2}}}+{\frac {Cx^{3}c^{2}d^{2}}{e^{4}}}-{\frac {Ax^{2}c^{2}d}{e^{3}}}+{\frac {aBx^{2}c}{e^{2}}}+{\frac {3\,Bx^{2}c^{2}d^{2}}{2\,e^{4}}}-2\,{\frac {\ln \left(ex+d \right) Ca^{2}d}{e^{3}}}-4\,{\frac {Bc^{2}d^{3}x}{e^{5}}}+{\frac {da^{2}B}{e^{2} \left(ex+d \right) }}+{\frac {Bc^{2}d^{5}}{e^{6} \left(ex+d \right) }}-{\frac {a^{2}d^{2}C}{e^{3} \left(ex+d \right) }}+2\,{\frac {acAx}{e^{2}}}+{\frac {Cc^{2}x^{5}}{5\,e^{2}}}-4\,{\frac {\ln \left(ex+d \right) Aacd}{e^{3}}}-2\,{\frac {Cx^{2}acd}{e^{3}}}-4\,{\frac {acdBx}{e^{3}}}+6\,{\frac {acCd^{2}x}{e^{4}}}-2\,{\frac {acAd^{2}}{e^{3} \left(ex+d \right) }}+2\,{\frac {Bacd^{3}}{e^{4} \left(ex+d \right) }}-2\,{\frac {acCd^{4}}{e^{5} \left(ex+d \right) }}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^2*(C*x^2+B*x+A)/(e*x+d)^2,x)
```

```
[Out] -8/e^5*ln(e*x+d)*C*a*c*d^3+6/e^4*ln(e*x+d)*B*a*c*d^2+1/3/e^2*A*x^
3*c^2+1/e^2*a^2*C*x-1/e/(e*x+d)*A*a^2+1/4/e^2*B*x^4*c^2+1/e^2*ln(
e*x+d)*B*a^2-1/e^7/(e*x+d)*C*c^2*d^6+5/e^6*C*c^2*d^4*x-1/e^5/(e*x
+d)*A*c^2*d^4-4/e^5*ln(e*x+d)*A*c^2*d^3-2/e^5*C*x^2*c^2*d^3-1/2/e
^3*C*x^4*c^2*d-2/3/e^3*B*x^3*c^2*d-6/e^7*ln(e*x+d)*C*c^2*d^5+5/e^
6*ln(e*x+d)*B*c^2*d^4+3/e^4*A*c^2*d^2*x+2/3/e^2*C*x^3*a*c+1/e^4*C
*x^3*c^2*d^2-1/e^3*A*x^2*c^2*d+1/e^2*B*x^2*a*c+3/2/e^4*B*x^2*c^2*
d^2-2/e^3*ln(e*x+d)*C*a^2*d-4/e^5*B*c^2*d^3*x+1/e^2/(e*x+d)*B*d*a
^2+1/e^6/(e*x+d)*B*c^2*d^5-1/e^3/(e*x+d)*C*a^2*d^2+2/e^2*a*c*A*x+
1/5*c^2*C*x^5/e^2-4/e^3*ln(e*x+d)*A*a*c*d-2/e^3*C*x^2*a*c*d-4/e^3
*a*c*d*B*x+6/e^4*C*a*c*d^2*x-2/e^3/(e*x+d)*A*a*c*d^2+2/e^4/(e*x+d
)*B*a*c*d^3-2/e^5/(e*x+d)*C*a*c*d^4
```

Maxima [A] time = 0.72272, size = 529, normalized size = 1.81

$$-\frac{Cc^2d^6 - Bc^2d^5e - 2\,Bacd^3e^3 - Ba^2de^5 + Aa^2e^6 + \left(2\,Cac + Ac^2\right)d^4e^2 + \left(Ca^2 + 2\,Aac\right)d^2e^4}{e^8x + de^7} + \frac{12\,Cc^2e^4x^5 - 15\,\left(2\,Cc^2de^3 - Bc^2e^4\right)x^4 + 20\,\left(3\,Cc^2d^2e^2 - 2\,Bc^2de^3 + \left(2\,Cac + Ac^2\right)e^4\right)x^3 - 30\,\left(4\,Cc^2d^3e - 3\,Bc^2d^2e^2 - 2\,Bc\right.}{60\,e^6} - \frac{\left(6\,Cc^2d^5 - 5\,Bc^2d^4e - 6\,Bacd^2e^3 - Ba^2e^5 + 4\,\left(2\,Cac + Ac^2\right)d^3e^2 + 2\,\left(Ca^2 + 2\,Aac\right)de^4\right)\log\left(ex + d\right)}{e^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2/(e*x + d)^2,x, algorithm="maxima")
```

```
[Out] -(C*c^2*d^6 - B*c^2*d^5*e - 2*B*a*c*d^3*e^3 - B*a^2*d*e^5 + A*a^2
*e^6 + (2*C*a*c + A*c^2)*d^4*e^2 + (C*a^2 + 2*A*a*c)*d^2*e^4)/(e^
8*x + d*e^7) + 1/60*(12*C*c^2*e^4*x^5 - 15*(2*C*c^2*d*e^3 - B*c^2
*e^4)*x^4 + 20*(3*C*c^2*d^2*e^2 - 2*B*c^2*d*e^3 + (2*C*a*c + A*c^
2)*e^4)*x^3 - 30*(4*C*c^2*d^3*e - 3*B*c^2*d^2*e^2 - 2*B*a*c*e^4 +
 2*(2*C*a*c + A*c^2)*d*e^3)*x^2 + 60*(5*C*c^2*d^4 - 4*B*c^2*d^3*e
 - 4*B*a*c*d*e^3 + 3*(2*C*a*c + A*c^2)*d^2*e^2 + (C*a^2 + 2*A*a*c
)*e^4)*x)/e^6 - (6*C*c^2*d^5 - 5*B*c^2*d^4*e - 6*B*a*c*d^2*e^3 -
B*a^2*e^5 + 4*(2*C*a*c + A*c^2)*d^3*e^2 + 2*(C*a^2 + 2*A*a*c)*d*e
^4)*log(e*x + d)/e^7
```

Fricas [A] time = 0.27116, size = 747, normalized size = 2.56

$$\frac{12\,Cc^2e^6x^6 - 60\,Cc^2d^6 + 60\,Bc^2d^5e + 120\,Bacd^3e^3 + 60\,Ba^2de^5 - 60\,Aa^2e^6 - 60\,\left(2\,Cac + Ac^2\right)d^4e^2 - 60\,\left(Ca^2 + 2\,Aac\right)d^2e^4 -}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2/(e*x + d)^2,x, algorithm="fricas")
```

```
[Out] 1/60*(12*C*c^2*e^6*x^6 - 60*C*c^2*d^6 + 60*B*c^2*d^5*e + 120*B*a*
c*d^3*e^3 + 60*B*a^2*d*e^5 - 60*A*a^2*e^6 - 60*(2*C*a*c + A*c^2)*
d^4*e^2 - 60*(C*a^2 + 2*A*a*c)*d^2*e^4 - 3*(6*C*c^2*d*e^5 - 5*B*c
^2*e^6)*x^5 + 5*(6*C*c^2*d^2*e^4 - 5*B*c^2*d*e^5 + 4*(2*C*a*c + A
*c^2)*e^6)*x^4 - 10*(6*C*c^2*d^3*e^3 - 5*B*c^2*d^2*e^4 - 6*B*a*c*
e^6 + 4*(2*C*a*c + A*c^2)*d*e^5)*x^3 + 30*(6*C*c^2*d^4*e^2 - 5*B*
c^2*d^3*e^3 - 6*B*a*c*d*e^5 + 4*(2*C*a*c + A*c^2)*d^2*e^4 + 2*(C*
a^2 + 2*A*a*c)*e^6)*x^2 + 60*(5*C*c^2*d^5*e - 4*B*c^2*d^4*e^2 - 4
*B*a*c*d^2*e^4 + 3*(2*C*a*c + A*c^2)*d^3*e^3 + (C*a^2 + 2*A*a*c)*
d*e^5)*x - 60*(6*C*c^2*d^6 - 5*B*c^2*d^5*e - 6*B*a*c*d^3*e^3 - B*
a^2*d*e^5 + 4*(2*C*a*c + A*c^2)*d^4*e^2 + 2*(C*a^2 + 2*A*a*c)*d^2
*e^4 + (6*C*c^2*d^5*e - 5*B*c^2*d^4*e^2 - 6*B*a*c*d^2*e^4 - B*a^2
*e^6 + 4*(2*C*a*c + A*c^2)*d^3*e^3 + 2*(C*a^2 + 2*A*a*c)*d*e^5)*x
```

```
)*log(e*x + d))/(e^8*x + d*e^7)
```

Sympy [A] time = 5.82468, size = 411, normalized size = 1.41

$$\frac{Cc^2x^5}{5e^2} - \frac{Aa^2e^6 + 2Aacd^2e^4 + Ac^2d^4e^2 - Ba^2de^5 - 2Bacd^3e^3 - Bc^2d^5e + Ca^2d^2e^4 + 2Cacd^4e^2 + Cc^2d^6}{de^7 + e^8x} - \frac{x^4\left(-Bc^2e + 2Cc^2d\right)}{4e^3} + \frac{x^3\left(Ac^2e^2 - 2Bc^2de + 2Cace^2 + 3Cc^2d^2\right)}{3e^4} - \frac{x^2\left(2Ac^2de^2 - 2Bace^3 - 3Bc^2d^2e + 4Cacde^2 + 4Cc^2d^3\right)}{2e^5} + \frac{x\left(2Aace^4 + 3Ac^2d^2e^2 - 4Bacde^3 - 4Bc^2d^3e + Ca^2e^4 + 6Cacd^2e^2 + 5Cc^2d^4\right)}{e^6} - \frac{\left(ae^2 + cd^2\right)\left(4Acde^2 - Bae^3 - 5Bcd^2e + 2Cade^2 + 6Ccd^3\right)\log\left(d + ex\right)}{e^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)**2*(C*x**2+B*x+A)/(e*x+d)**2,x)
```

```
[Out] C*c**2*x**5/(5*e**2) - (A*a**2*e**6 + 2*A*a*c*d**2*e**4 + A*c**2*
d**4*e**2 - B*a**2*d*e**5 - 2*B*a*c*d**3*e**3 - B*c**2*d**5*e + C
*a**2*d**2*e**4 + 2*C*a*c*d**4*e**2 + C*c**2*d**6)/(d*e**7 + e**8
*x) - x**4*(-B*c**2*e + 2*C*c**2*d)/(4*e**3) + x**3*(A*c**2*e**2
- 2*B*c**2*d*e + 2*C*a*c*e**2 + 3*C*c**2*d**2)/(3*e**4) - x**2*(2
*A*c**2*d*e**2 - 2*B*a*c*e**3 - 3*B*c**2*d**2*e + 4*C*a*c*d*e**2
+ 4*C*c**2*d**3)/(2*e**5) + x*(2*A*a*c*e**4 + 3*A*c**2*d**2*e**2
- 4*B*a*c*d*e**3 - 4*B*c**2*d**3*e + C*a**2*e**4 + 6*C*a*c*d**2*e
**2 + 5*C*c**2*d**4)/e**6 - (a*e**2 + c*d**2)*(4*A*c*d*e**2 - B*a
*e**3 - 5*B*c*d**2*e + 2*C*a*d*e**2 + 6*C*c*d**3)*log(d + e*x)/e*
*7
```

GIAC/XCAS [A] time = 0.277211, size = 671, normalized size = 2.3

$$\frac{1}{60}\left(12\,Cc^2 - \frac{15\left(6\,Cc^2de - Bc^2e^2\right)e^{(-1)}}{xe+d} + \frac{20\left(15\,Cc^2d^2e^2 - 5\,Bc^2de^3 + 2\,Cace^4 + Ac^2e^4\right)e^{(-2)}}{(xe+d)^2} - \frac{60\left(10\,Cc^2d^3e^3 - 5\,Bc^2d^2e^4\right.}{}\right.$$

$$+\left(6\,Cc^2d^5 - 5\,Bc^2d^4e + 8\,Cacd^3e^2 + 4\,Ac^2d^3e^2 - 6\,Bacd^2e^3 + 2\,Ca^2de^4 + 4\,Aacde^4 - Ba^2e^5\right)e^{(-7)}\ln\left(\frac{|xe+d|e^{(-1)}}{(xe+d)^2}\right)$$

$$-\left(\frac{Cc^2d^6e^5}{xe+d} - \frac{Bc^2d^5e^6}{xe+d} + \frac{2\,Cacd^4e^7}{xe+d} + \frac{Ac^2d^4e^7}{xe+d} - \frac{2\,Bacd^3e^8}{xe+d} + \frac{Ca^2d^2e^9}{xe+d} + \frac{2\,Aacd^2e^9}{xe+d} - \frac{Ba^2de^{10}}{xe+d} + \frac{Aa^2e^{11}}{xe+d}\right)e^{(-12)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2/(e*x + d)^2,x, algorithm="giac")
```

```
[Out] 1/60*(12*C*c^2 - 15*(6*C*c^2*d*e - B*c^2*e^2)*e^(-1)/(x*e + d) +
20*(15*C*c^2*d^2*e^2 - 5*B*c^2*d*e^3 + 2*C*a*c*e^4 + A*c^2*e^4)*e
^(-2)/(x*e + d)^2 - 60*(10*C*c^2*d^3*e^3 - 5*B*c^2*d^2*e^4 + 4*C*
a*c*d*e^5 + 2*A*c^2*d*e^5 - B*a*c*e^6)*e^(-3)/(x*e + d)^3 + 60*(1
5*C*c^2*d^4*e^4 - 10*B*c^2*d^3*e^5 + 12*C*a*c*d^2*e^6 + 6*A*c^2*d
^2*e^6 - 6*B*a*c*d*e^7 + C*a^2*e^8 + 2*A*a*c*e^8)*e^(-4)/(x*e + d
)^4)*(x*e + d)^5*e^(-7) + (6*C*c^2*d^5 - 5*B*c^2*d^4*e + 8*C*a*c*
d^3*e^2 + 4*A*c^2*d^3*e^2 - 6*B*a*c*d^2*e^3 + 2*C*a^2*d*e^4 + 4*A
*a*c*d*e^4 - B*a^2*e^5)*e^(-7)*ln(abs(x*e + d)*e^(-1)/(x*e + d)^2
) - (C*c^2*d^6*e^5/(x*e + d) - B*c^2*d^5*e^6/(x*e + d) + 2*C*a*c*
d^4*e^7/(x*e + d) + A*c^2*d^4*e^7/(x*e + d) - 2*B*a*c*d^3*e^8/(x*
e + d) + C*a^2*d^2*e^9/(x*e + d) + 2*A*a*c*d^2*e^9/(x*e + d) - B*
a^2*d*e^10/(x*e + d) + A*a^2*e^11/(x*e + d))*e^(-12)
```

3.31 $\int \frac{(a+cx^2)^2(A+Bx+Cx^2)}{(d+ex)^3}\,dx$

Optimal. Leaf size=295

$$\frac{\log(d+ex)\left(a^2Ce^4+2ace^2\left(6Cd^2-e(3Bd-Ae)\right)+c^2d^2\left(15Cd^2-2e(5Bd-3Ae)\right)\right)}{e^7}+\frac{\left(ae^2+cd^2\right)\left(ae^2(2Cd-Be)+cd\left(6Cd^2-e(5Bd-4Ae)\right)\right)}{e^7(d+ex)}-\frac{\left(ae^2+cd^2\right)^2\left(Ae^2-Bde+Cd^2\right)}{2e^7(d+ex)^2}-\frac{cx\left(2ae^2(3Cd-Be)+cd\left(10Cd^2-3e(2Bd-Ae)\right)\right)}{e^6}+\frac{cx^2\left(2aCe^2+c\left(6Cd^2-e(3Bd-Ae)\right)\right)}{2e^5}-\frac{c^2x^3(3Cd-Be)}{3e^4}+\frac{c^2Cx^4}{4e^3}$$

```
[Out] -((c*(2*a*e^2*(3*C*d - B*e) + c*d*(10*C*d^2 - 3*e*(2*B*d - A*e)))
*x)/e^6) + (c*(2*a*C*e^2 + c*(6*C*d^2 - e*(3*B*d - A*e)))*x^2)/(2
*e^5) - (c^2*(3*C*d - B*e)*x^3)/(3*e^4) + (c^2*C*x^4)/(4*e^3) - (
(c*d^2 + a*e^2)^2*(C*d^2 - B*d*e + A*e^2))/(2*e^7*(d + e*x)^2) +
((c*d^2 + a*e^2)*(a*e^2*(2*C*d - B*e) + c*d*(6*C*d^2 - e*(5*B*d -
 4*A*e))))/(e^7*(d + e*x)) + ((a^2*C*e^4 + c^2*d^2*(15*C*d^2 - 2*
e*(5*B*d - 3*A*e)) + 2*a*c*e^2*(6*C*d^2 - e*(3*B*d - A*e)))*Log[d
 + e*x])/e^7
```

Rubi [A] time = 1.35071, antiderivative size = 292, normalized size of antiderivative = 0.99, number of steps used = 2, number of rules used = 1, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.037$

$$\frac{\log(d+ex)\left(a^2Ce^4+2ace^2\left(6Cd^2-e(3Bd-Ae)\right)+c^2\left(15Cd^4-2d^2e(5Bd-3Ae)\right)\right)}{e^7}-\frac{cx\left(2ae^2(3Cd-Be)-3cde(2Bd-Ae)+10cCd^3\right)}{e^6}-\frac{\left(ae^2+cd^2\right)^2\left(Ae^2-Bde+Cd^2\right)}{2e^7(d+ex)^2}+\frac{cx^2\left(2aCe^2-ce(3Bd-Ae)+6cCd^2\right)}{2e^5}+\frac{\left(ae^2+cd^2\right)\left(ae^2(2Cd-Be)-cde(5Bd-4Ae)+6cCd^3\right)}{e^7(d+ex)}-\frac{c^2x^3(3Cd-Be)}{3e^4}+\frac{c^2Cx^4}{4e^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)^2*(A + B*x + C*x^2))/(d + e*x)^3,x]
```

```
[Out] -((c*(10*c*C*d^3 - 3*c*d*e*(2*B*d - A*e) + 2*a*e^2*(3*C*d - B*e))
*x)/e^6) + (c*(6*c*C*d^2 + 2*a*C*e^2 - c*e*(3*B*d - A*e))*x^2)/(2
*e^5) - (c^2*(3*C*d - B*e)*x^3)/(3*e^4) + (c^2*C*x^4)/(4*e^3) - (
(c*d^2 + a*e^2)^2*(C*d^2 - B*d*e + A*e^2))/(2*e^7*(d + e*x)^2) +
((c*d^2 + a*e^2)*(6*c*C*d^3 - c*d*e*(5*B*d - 4*A*e) + a*e^2*(2*C*
```

```
d - B*e)))/(e^7*(d + e*x)) + ((a^2*C*e^4 + c^2*(15*C*d^4 - 2*d^2*
e*(5*B*d - 3*A*e)) + 2*a*c*e^2*(6*C*d^2 - e*(3*B*d - A*e)))*Log[d
 + e*x])/e^7
```

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

$$\frac{Cc^2x^4}{4e^3}+\frac{c^2x^3\left(Be-3Cd\right)}{3e^4}+\frac{c\left(Ace^2-3Bcde+2Cae^2+6Ccd^2\right)\int x\,dx}{e^5}+\frac{\left(-3Acde^2+2Bae^3+6Bcd^2e-6Cade^2-10Ccd^3\right)\int c\,dx}{e^6}+\frac{\left(2Aace^4+6Ac^2d^2e^2-6Bacde^3-10Bc^2d^3e+Ca^2e^4+12Cacd^2e^2+15Cc^2d^4\right)\log\left(d+ex\right)}{e^7}-\frac{\left(ae^2+cd^2\right)\left(-4Acde^2+Bae^3+5Bcd^2e-2Cade^2-6Ccd^3\right)}{e^7\left(d+ex\right)}-\frac{\left(ae^2+cd^2\right)^2\left(Ae^2-Bde+Cd^2\right)}{2e^7\left(d+ex\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+a)**2*(C*x**2+B*x+A)/(e*x+d)**3,x)
```

```
[Out] C*c**2*x**4/(4*e**3) + c**2*x**3*(B*e - 3*C*d)/(3*e**4) + c*(A*c*
e**2 - 3*B*c*d*e + 2*C*a*e**2 + 6*C*c*d**2)*Integral(x, x)/e**5 +
 (-3*A*c*d*e**2 + 2*B*a*e**3 + 6*B*c*d**2*e - 6*C*a*d*e**2 - 10*C
*c*d**3)*Integral(c, x)/e**6 + (2*A*a*c*e**4 + 6*A*c**2*d**2*e**2
 - 6*B*a*c*d*e**3 - 10*B*c**2*d**3*e + C*a**2*e**4 + 12*C*a*c*d**
2*e**2 + 15*C*c**2*d**4)*log(d + e*x)/e**7 - (a*e**2 + c*d**2)*(-
4*A*c*d*e**2 + B*a*e**3 + 5*B*c*d**2*e - 2*C*a*d*e**2 - 6*C*c*d**
3)/(e**7*(d + e*x)) - (a*e**2 + c*d**2)**2*(A*e**2 - B*d*e + C*d*
*2)/(2*e**7*(d + e*x)**2)
```

Mathematica [A] time = 0.272591, size = 274, normalized size = 0.93

$$\frac{12\log(d+ex)\left(a^2Ce^4+2ace^2\left(e(Ae-3Bd)+6Cd^2\right)+c^2\left(2d^2e(3Ae-5Bd)+15Cd^4\right)\right)-12cex\left(-2ae^2(Be-3Cd)+3cde(A\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)^2*(A + B*x + C*x^2))/(d + e*x)^3,x]
```

```
[Out] (-12*c*e*(10*c*C*d^3 + 3*c*d*e*(-2*B*d + A*e) - 2*a*e^2*(-3*C*d +
 B*e))*x + 6*c*e^2*(6*c*C*d^2 + 2*a*C*e^2 + c*e*(-3*B*d + A*e))*x
^2 + 4*c^2*e^3*(-3*C*d + B*e)*x^3 + 3*c^2*C*e^4*x^4 - (6*(c*d^2 +
 a*e^2)^2*(C*d^2 + e*(-(B*d) + A*e)))/(d + e*x)^2 + (12*(c*d^2 +
```

```
a*e^2)*(6*c*C*d^3 + c*d*e*(-5*B*d + 4*A*e) + a*e^2*(2*C*d - B*e))
)/(d + e*x) + 12*(a^2*C*e^4 + 2*a*c*e^2*(6*C*d^2 + e*(-3*B*d + A*
e)) + c^2*(15*C*d^4 + 2*d^2*e*(-5*B*d + 3*A*e)))*Log[d + e*x])/(1
2*e^7)
```

Maple [A] time = 0.017, size = 563, normalized size = 1.9

$$\frac{\ln(ex+d)\,a^2C}{e^3}+\frac{Bc^2x^3}{3\,e^3}+\frac{Ac^2x^2}{2\,e^3}-\frac{Ba^2}{e^2\,(ex+d)}-\frac{Aa^2}{2\,e\,(ex+d)^2}-10\,\frac{Cc^2d^3x}{e^6}+4\,\frac{Ac^2d^3}{e^5\,(ex+d)}$$
$$-5\,\frac{Bc^2d^4}{e^6\,(ex+d)}+2\,\frac{da^2C}{e^3\,(ex+d)}+6\,\frac{Cc^2d^5}{e^7\,(ex+d)}-\frac{Ac^2d^4}{2\,e^5\,(ex+d)^2}+\frac{da^2B}{2\,e^2\,(ex+d)^2}+\frac{Bc^2d^5}{2\,e^6\,(ex+d)^2}$$
$$-\frac{a^2d^2C}{2\,e^3\,(ex+d)^2}-\frac{Cc^2d^6}{2\,e^7\,(ex+d)^2}+2\,\frac{\ln(ex+d)\,Aac}{e^3}+6\,\frac{\ln(ex+d)\,Ac^2d^2}{e^5}-10\,\frac{\ln(ex+d)\,Bc^2d^3}{e^6}$$
$$+15\,\frac{\ln(ex+d)\,Cc^2d^4}{e^7}+\frac{Ccx^2a}{e^3}+3\,\frac{Cc^2x^2d^2}{e^5}-3\,\frac{Ac^2dx}{e^4}-\frac{Cc^2x^3d}{e^4}-\frac{3\,Bc^2x^2d}{2\,e^4}+2\,\frac{Bacx}{e^3}$$
$$+6\,\frac{Bc^2d^2x}{e^5}+\frac{Cc^2x^4}{4\,e^3}-\frac{Ad^2ac}{e^3\,(ex+d)^2}+\frac{Bacd^3}{e^4\,(ex+d)^2}-\frac{acCd^4}{e^5\,(ex+d)^2}-6\,\frac{\ln(ex+d)\,Bacd}{e^4}$$
$$+12\,\frac{\ln(ex+d)\,Cacd^2}{e^5}-6\,\frac{acdCx}{e^4}+4\,\frac{acdA}{e^3\,(ex+d)}-6\,\frac{Bacd^2}{e^4\,(ex+d)}+8\,\frac{acCd^3}{e^5\,(ex+d)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^2*(C*x^2+B*x+A)/(e*x+d)^3,x)
```

```
[Out] 1/e^3*ln(e*x+d)*a^2*C+1/3*c^2/e^3*B*x^3+1/2*c^2/e^3*A*x^2-1/e^2/(
e*x+d)*B*a^2-1/2/e/(e*x+d)^2*A*a^2-10*c^2/e^6*C*d^3*x+4/e^5/(e*x+
d)*A*c^2*d^3-5/e^6/(e*x+d)*B*c^2*d^4+2/e^3/(e*x+d)*C*a^2*d+6/e^7/
(e*x+d)*C*c^2*d^5-1/2/e^5/(e*x+d)^2*A*c^2*d^4+1/2/e^2/(e*x+d)^2*B
*d*a^2+1/2/e^6/(e*x+d)^2*B*c^2*d^5-1/2/e^3/(e*x+d)^2*C*d^2*a^2-1/
2/e^7/(e*x+d)^2*C*c^2*d^6+2/e^3*ln(e*x+d)*A*a*c+6/e^5*ln(e*x+d)*A
*c^2*d^2-10/e^6*ln(e*x+d)*B*c^2*d^3+15/e^7*ln(e*x+d)*C*c^2*d^4+c/
e^3*C*x^2*a+3*c^2/e^5*C*x^2*d^2-3*c^2/e^4*d*A*x-c^2/e^4*C*x^3*d-3
/2*c^2/e^4*B*x^2*d+2*c/e^3*a*B*x+6*c^2/e^5*B*d^2*x+1/4*c^2*C*x^4/
e^3-1/e^3/(e*x+d)^2*A*d^2*a*c+1/e^4/(e*x+d)^2*B*a*c*d^3-1/e^5/(e*
x+d)^2*C*a*c*d^4-6/e^4*ln(e*x+d)*B*a*c*d+12/e^5*ln(e*x+d)*C*a*c*d
^2-6*c/e^4*C*a*d*x+4/e^3/(e*x+d)*A*a*c*d-6/e^4/(e*x+d)*B*a*c*d^2+
8/e^5/(e*x+d)*C*a*c*d^3
```

Maxima [A] time = 0.713886, size = 543, normalized size = 1.84

$$\frac{11\,Cc^2d^6 - 9\,Bc^2d^5e - 10\,Bacd^3e^3 - Ba^2de^5 - Aa^2e^6 + 7\left(2\,Cac + Ac^2\right)d^4e^2 + 3\left(Ca^2 + 2\,Aac\right)d^2e^4 + 2\left(6\,Cc^2d^5e - 5\,Bc^2d^4e\right.}{2\left(e^9x^2 + 2\,de^8x + d^2e^7\right)}$$
$$+\frac{3\,Cc^2e^3x^4 - 4\left(3\,Cc^2de^2 - Bc^2e^3\right)x^3 + 6\left(6\,Cc^2d^2e - 3\,Bc^2de^2 + \left(2\,Cac + Ac^2\right)e^3\right)x^2 - 12\left(10\,Cc^2d^3 - 6\,Bc^2d^2e - 2\,Bace^3 +\right.}{12\,e^6}$$
$$+\frac{\left(15\,Cc^2d^4 - 10\,Bc^2d^3e - 6\,Bacde^3 + 6\left(2\,Cac + Ac^2\right)d^2e^2 + \left(Ca^2 + 2\,Aac\right)e^4\right)\log\left(ex + d\right)}{e^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2/(e*x + d)^3,x, algorithm="maxima")
```

```
[Out] 1/2*(11*C*c^2*d^6 - 9*B*c^2*d^5*e - 10*B*a*c*d^3*e^3 - B*a^2*d*e^
5 - A*a^2*e^6 + 7*(2*C*a*c + A*c^2)*d^4*e^2 + 3*(C*a^2 + 2*A*a*c)
*d^2*e^4 + 2*(6*C*c^2*d^5*e - 5*B*c^2*d^4*e^2 - 6*B*a*c*d^2*e^4 -
 B*a^2*e^6 + 4*(2*C*a*c + A*c^2)*d^3*e^3 + 2*(C*a^2 + 2*A*a*c)*d*
e^5)*x)/(e^9*x^2 + 2*d*e^8*x + d^2*e^7) + 1/12*(3*C*c^2*e^3*x^4 -
 4*(3*C*c^2*d*e^2 - B*c^2*e^3)*x^3 + 6*(6*C*c^2*d^2*e - 3*B*c^2*d
*e^2 + (2*C*a*c + A*c^2)*e^3)*x^2 - 12*(10*C*c^2*d^3 - 6*B*c^2*d^
2*e - 2*B*a*c*e^3 + 3*(2*C*a*c + A*c^2)*d*e^2)*x)/e^6 + (15*C*c^2
*d^4 - 10*B*c^2*d^3*e - 6*B*a*c*d*e^3 + 6*(2*C*a*c + A*c^2)*d^2*e
^2 + (C*a^2 + 2*A*a*c)*e^4)*log(e*x + d)/e^7
```

Fricas [A] time = 0.270434, size = 821, normalized size = 2.78

$$\frac{3\,Cc^2e^6x^6 + 66\,Cc^2d^6 - 54\,Bc^2d^5e - 60\,Bacd^3e^3 - 6\,Ba^2de^5 - 6\,Aa^2e^6 + 42\left(2\,Cac + Ac^2\right)d^4e^2 + 18\left(Ca^2 + 2\,Aac\right)d^2e^4 - 2\left(3\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2/(e*x + d)^3,x, algorithm="fricas")
```

```
[Out] 1/12*(3*C*c^2*e^6*x^6 + 66*C*c^2*d^6 - 54*B*c^2*d^5*e - 60*B*a*c*
d^3*e^3 - 6*B*a^2*d*e^5 - 6*A*a^2*e^6 + 42*(2*C*a*c + A*c^2)*d^4*
e^2 + 18*(C*a^2 + 2*A*a*c)*d^2*e^4 - 2*(3*C*c^2*d*e^5 - 2*B*c^2*e
^6)*x^5 + (15*C*c^2*d^2*e^4 - 10*B*c^2*d*e^5 + 6*(2*C*a*c + A*c^2
)*e^6)*x^4 - 4*(15*C*c^2*d^3*e^3 - 10*B*c^2*d^2*e^4 - 6*B*a*c*e^6
 + 6*(2*C*a*c + A*c^2)*d*e^5)*x^3 - 6*(34*C*c^2*d^4*e^2 - 21*B*c^
2*d^3*e^3 - 8*B*a*c*d*e^5 + 11*(2*C*a*c + A*c^2)*d^2*e^4)*x^2 - 1
2*(4*C*c^2*d^5*e - B*c^2*d^4*e^2 + 4*B*a*c*d^2*e^4 + B*a^2*e^6 -
(2*C*a*c + A*c^2)*d^3*e^3 - 2*(C*a^2 + 2*A*a*c)*d*e^5)*x + 12*(15
*C*c^2*d^6 - 10*B*c^2*d^5*e - 6*B*a*c*d^3*e^3 + 6*(2*C*a*c + A*c^
2)*d^4*e^2 + (C*a^2 + 2*A*a*c)*d^2*e^4 + (15*C*c^2*d^4*e^2 - 10*B
*c^2*d^3*e^3 - 6*B*a*c*d*e^5 + 6*(2*C*a*c + A*c^2)*d^2*e^4 + (C*a
^2 + 2*A*a*c)*e^6)*x^2 + 2*(15*C*c^2*d^5*e - 10*B*c^2*d^4*e^2 - 6
```

```
*B*a*c*d^2*e^4 + 6*(2*C*a*c + A*c^2)*d^3*e^3 + (C*a^2 + 2*A*a*c)*
d*e^5)*x)*log(e*x + d))/(e^9*x^2 + 2*d*e^8*x + d^2*e^7)
```

Sympy [A] time = 26.5634, size = 471, normalized size = 1.6

$$\frac{Cc^2x^4}{4e^3} + \frac{-Aa^2e^6 + 6Aacd^2e^4 + 7Ac^2d^4e^2 - Ba^2de^5 - 10Bacd^3e^3 - 9Bc^2d^5e + 3Ca^2d^2e^4 + 14Cacd^4e^2 + 11Cc^2d^6 + x\left(8Aacde^5 + 8Ac\cdots\right.}{2d^2e^7 + 4de^8x + 2e^9x^2} - \frac{x^3\left(-Bc^2e + 3Cc^2d\right)}{3e^4} + \frac{x^2\left(Ac^2e^2 - 3Bc^2de + 2Cace^2 + 6Cc^2d^2\right)}{2e^5} - \frac{x\left(3Ac^2de^2 - 2Bace^3 - 6Bc^2d^2e + 6Cacde^2 + 10Cc^2d^3\right)}{e^6} + \frac{\left(2Aace^4 + 6Ac^2d^2e^2 - 6Bacde^3 - 10Bc^2d^3e + Ca^2e^4 + 12Cacd^2e^2 + 15Cc^2d^4\right)\log\left(d + ex\right)}{e^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)**2*(C*x**2+B*x+A)/(e*x+d)**3,x)
```

```
[Out] C*c**2*x**4/(4*e**3) + (-A*a**2*e**6 + 6*A*a*c*d**2*e**4 + 7*A*c*
*2*d**4*e**2 - B*a**2*d*e**5 - 10*B*a*c*d**3*e**3 - 9*B*c**2*d**5
*e + 3*C*a**2*d**2*e**4 + 14*C*a*c*d**4*e**2 + 11*C*c**2*d**6 + x
*(8*A*a*c*d*e**5 + 8*A*c**2*d**3*e**3 - 2*B*a**2*e**6 - 12*B*a*c*
d**2*e**4 - 10*B*c**2*d**4*e**2 + 4*C*a**2*d*e**5 + 16*C*a*c*d**3
*e**3 + 12*C*c**2*d**5*e))/(2*d**2*e**7 + 4*d*e**8*x + 2*e**9*x**
2) - x**3*(-B*c**2*e + 3*C*c**2*d)/(3*e**4) + x**2*(A*c**2*e**2 -
 3*B*c**2*d*e + 2*C*a*c*e**2 + 6*C*c**2*d**2)/(2*e**5) - x*(3*A*c
**2*d*e**2 - 2*B*a*c*e**3 - 6*B*c**2*d**2*e + 6*C*a*c*d*e**2 + 10
*C*c**2*d**3)/e**6 + (2*A*a*c*e**4 + 6*A*c**2*d**2*e**2 - 6*B*a*c
*d*e**3 - 10*B*c**2*d**3*e + C*a**2*e**4 + 12*C*a*c*d**2*e**2 + 1
5*C*c**2*d**4)*log(d + e*x)/e**7
```

GIAC/XCAS [A] time = 0.273809, size = 536, normalized size = 1.82

$$\left(15\,Cc^2d^4 - 10\,Bc^2d^3e + 12\,Cacd^2e^2 + 6\,Ac^2d^2e^2 - 6\,Bacde^3 + Ca^2e^4 + 2\,Aace^4\right)e^{(-7)}\ln\left(|xe + d|\right) + \frac{1}{12}\left(3\,Cc^2x^4e^9 - 12\,Cc^2dx^3e^8 + 36\,Cc^2d^2x^2e^7 - 120\,Cc^2d^3xe^6 + 4\,Bc^2x^3e^9 - 18\,Bc^2dx^2e^8 + 72\,Bc^2d^2xe^7 + 12\,Cacx^2e^9 + 6\,A\cdots\right.$$
$$+ \frac{\left(11\,Cc^2d^6 - 9\,Bc^2d^5e + 14\,Cacd^4e^2 + 7\,Ac^2d^4e^2 - 10\,Bacd^3e^3 + 3\,Ca^2d^2e^4 + 6\,Aacd^2e^4 - Ba^2de^5 - Aa^2e^6 + 2\left(6\,Cc^2d^5e - 5\cdots\right.\right.}{2\left(xe + d\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^2/(e*x + d)^3,x, algorithm="giac")
```

```
[Out] (15*C*c^2*d^4 - 10*B*c^2*d^3*e + 12*C*a*c*d^2*e^2 + 6*A*c^2*d^2*e
^2 - 6*B*a*c*d*e^3 + C*a^2*e^4 + 2*A*a*c*e^4)*e^(-7)*ln(abs(x*e +
 d)) + 1/12*(3*C*c^2*x^4*e^9 - 12*C*c^2*d*x^3*e^8 + 36*C*c^2*d^2*
x^2*e^7 - 120*C*c^2*d^3*x*e^6 + 4*B*c^2*x^3*e^9 - 18*B*c^2*d*x^2*
e^8 + 72*B*c^2*d^2*x*e^7 + 12*C*a*c*x^2*e^9 + 6*A*c^2*x^2*e^9 - 7
2*C*a*c*d*x*e^8 - 36*A*c^2*d*x*e^8 + 24*B*a*c*x*e^9)*e^(-12) + 1/
2*(11*C*c^2*d^6 - 9*B*c^2*d^5*e + 14*C*a*c*d^4*e^2 + 7*A*c^2*d^4*
e^2 - 10*B*a*c*d^3*e^3 + 3*C*a^2*d^2*e^4 + 6*A*a*c*d^2*e^4 - B*a^
2*d*e^5 - A*a^2*e^6 + 2*(6*C*c^2*d^5*e - 5*B*c^2*d^4*e^2 + 8*C*a*
c*d^3*e^3 + 4*A*c^2*d^3*e^3 - 6*B*a*c*d^2*e^4 + 2*C*a^2*d*e^5 + 4
*A*a*c*d*e^5 - B*a^2*e^6)*x)*e^(-7)/(x*e + d)^2
```

3.32 $\int (d+ex)^3 \left(a+cx^2\right)^3 \left(A+Bx+Cx^2\right)\, dx$

Optimal. Leaf size=502

$$\frac{c(d+ex)^8 \left(3a^2Ce^4+3ace^2 \left(15Cd^2-e(5Bd-Ae)\right)+5c^2d^2 \left(14Cd^2-e(7Bd-3Ae)\right)\right)}{8e^9}$$
$$+\frac{(d+ex)^6 \left(ae^2+cd^2\right) \left(a^2Ce^4+ace^2 \left(17Cd^2-3e(3Bd-Ae)\right)+c^2d^2 \left(28Cd^2-3e(7Bd-5Ae)\right)\right)}{6e^9}$$
$$-\frac{c(d+ex)^7 \left(3a^2e^4(4Cd-Be)+6acde^2 \left(10Cd^2-e(5Bd-2Ae)\right)+c^2d^3 \left(56Cd^2-5e(7Bd-4Ae)\right)\right)}{7e^9}$$
$$+\frac{c^2(d+ex)^{10} \left(3aCe^2+c \left(28Cd^2-e(7Bd-Ae)\right)\right)}{10e^9}$$
$$-\frac{c^2(d+ex)^9 \left(3ae^2(6Cd-Be)+cd \left(56Cd^2-3e(7Bd-2Ae)\right)\right)}{9e^9}$$
$$-\frac{(d+ex)^5 \left(ae^2+cd^2\right)^2 \left(ae^2(2Cd-Be)+cd \left(8Cd^2-e(7Bd-6Ae)\right)\right)}{5e^9}$$
$$+\frac{(d+ex)^4 \left(ae^2+cd^2\right)^3 \left(Ae^2-Bde+Cd^2\right)}{4e^9}-\frac{c^3(d+ex)^{11}(8Cd-Be)}{11e^9}+\frac{c^3C(d+ex)^{12}}{12e^9}$$

```
[Out] ((c*d^2 + a*e^2)^3*(C*d^2 - B*d*e + A*e^2)*(d + e*x)^4)/(4*e^9) -
 ((c*d^2 + a*e^2)^2*(a*e^2*(2*C*d - B*e) + c*d*(8*C*d^2 - e*(7*B*
d - 6*A*e)))*(d + e*x)^5)/(5*e^9) + ((c*d^2 + a*e^2)*(a^2*C*e^4 +
 c^2*d^2*(28*C*d^2 - 3*e*(7*B*d - 5*A*e)) + a*c*e^2*(17*C*d^2 - 3
*e*(3*B*d - A*e)))*(d + e*x)^6)/(6*e^9) - (c*(3*a^2*e^4*(4*C*d -
B*e) + c^2*d^3*(56*C*d^2 - 5*e*(7*B*d - 4*A*e)) + 6*a*c*d*e^2*(10
*C*d^2 - e*(5*B*d - 2*A*e)))*(d + e*x)^7)/(7*e^9) + (c*(3*a^2*C*e
^4 + 5*c^2*d^2*(14*C*d^2 - e*(7*B*d - 3*A*e)) + 3*a*c*e^2*(15*C*d
^2 - e*(5*B*d - A*e)))*(d + e*x)^8)/(8*e^9) - (c^2*(3*a*e^2*(6*C*
d - B*e) + c*d*(56*C*d^2 - 3*e*(7*B*d - 2*A*e)))*(d + e*x)^9)/(9*
e^9) + (c^2*(3*a*C*e^2 + c*(28*C*d^2 - e*(7*B*d - A*e)))*(d + e*x
)^10)/(10*e^9) - (c^3*(8*C*d - B*e)*(d + e*x)^11)/(11*e^9) + (c^3
*C*(d + e*x)^12)/(12*e^9)
```

Rubi [A] time = 2.70669, antiderivative size = 499, normalized size of antiderivative = 0.99, number

of steps used = 2, number of rules used = 1, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.037$

$$\frac{c(d+ex)^8\left(3a^2Ce^4+3ace^2\left(15Cd^2-e(5Bd-Ae)\right)+5c^2\left(14Cd^4-d^2e(7Bd-3Ae)\right)\right)}{8e^9}+\frac{(d+ex)^6\left(ae^2+cd^2\right)\left(a^2Ce^4+ace^2\left(17Cd^2-3e(3Bd-Ae)\right)+c^2\left(28Cd^4-3d^2e(7Bd-5Ae)\right)\right)}{6e^9}-\frac{c(d+ex)^7\left(3a^2e^4(4Cd-Be)+6acde^2\left(10Cd^2-e(5Bd-2Ae)\right)+c^2\left(56Cd^5-5d^3e(7Bd-4Ae)\right)\right)}{7e^9}-\frac{c^2(d+ex)^9\left(3ae^2(6Cd-Be)-3cde(7Bd-2Ae)+56cCd^3\right)}{9e^9}+\frac{c^2(d+ex)^{10}\left(3aCe^2-ce(7Bd-Ae)+28cCd^2\right)}{10e^9}+\frac{(d+ex)^4\left(ae^2+cd^2\right)^3\left(Ae^2-Bde+Cd^2\right)}{4e^9}-\frac{(d+ex)^5\left(ae^2+cd^2\right)^2\left(ae^2(2Cd-Be)-cde(7Bd-6Ae)+8cCd^3\right)}{5e^9}-\frac{c^3(d+ex)^{11}(8Cd-Be)}{11e^9}+\frac{c^3C(d+ex)^{12}}{12e^9}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)^3*(a + c*x^2)^3*(A + B*x + C*x^2),x]
```

```
[Out] ((c*d^2 + a*e^2)^3*(C*d^2 - B*d*e + A*e^2)*(d + e*x)^4)/(4*e^9) -
 ((c*d^2 + a*e^2)^2*(8*c*C*d^3 - c*d*e*(7*B*d - 6*A*e) + a*e^2*(2
*C*d - B*e))*(d + e*x)^5)/(5*e^9) + ((c*d^2 + a*e^2)*(a^2*C*e^4 +
 c^2*(28*C*d^4 - 3*d^2*e*(7*B*d - 5*A*e)) + a*c*e^2*(17*C*d^2 - 3
*e*(3*B*d - A*e)))*(d + e*x)^6)/(6*e^9) - (c*(3*a^2*e^4*(4*C*d -
B*e) + c^2*(56*C*d^5 - 5*d^3*e*(7*B*d - 4*A*e)) + 6*a*c*d*e^2*(10
*C*d^2 - e*(5*B*d - 2*A*e)))*(d + e*x)^7)/(7*e^9) + (c*(3*a^2*C*e
^4 + 5*c^2*(14*C*d^4 - d^2*e*(7*B*d - 3*A*e)) + 3*a*c*e^2*(15*C*d
^2 - e*(5*B*d - A*e)))*(d + e*x)^8)/(8*e^9) - (c^2*(56*c*C*d^3 -
3*c*d*e*(7*B*d - 2*A*e) + 3*a*e^2*(6*C*d - B*e))*(d + e*x)^9)/(9*
e^9) + (c^2*(28*c*C*d^2 + 3*a*C*e^2 - c*e*(7*B*d - A*e))*(d + e*x
)^10)/(10*e^9) - (c^3*(8*C*d - B*e)*(d + e*x)^11)/(11*e^9) + (c^3
*C*(d + e*x)^12)/(12*e^9)
```

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((e*x+d)**3*(c*x**2+a)**3*(C*x**2+B*x+A),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.45987, size = 459, normalized size = 0.91

$$\frac{1}{2}a^3d^2x^2(3Ae+Bd)+a^3Ad^3x+\frac{1}{3}a^2dx^3\left(3A\left(ae^2+cd^2\right)+ad(3Be+Cd)\right)+\frac{1}{4}a^2x^4\left(aAe^3+3aBde^2+3aCd^2e+9Acd^2e+3Bcd^3\right)+\frac{1}{9}c^2x^9\left(3ae^2(Be+3Cd)+3cde(Ae+Bd)+cCd^3\right)+\frac{1}{10}c^2ex^{10}\left(3aCe^2+ce(Ae+3Bd)+3cCd^2\right)+\frac{1}{8}cx^8\left(3e\left(Ac\left(ae^2+cd^2\right)+aC\left(ae^2+3cd^2\right)\right)+Bcd\left(9ae^2+cd^2\right)\right)+\frac{1}{7}cx^7\left(Acd\left(9ae^2+cd^2\right)+3a\left(ae^2(Be+3Cd)+cd^2(3Be+Cd)\right)\right)+\frac{1}{6}ax^6\left(3Ace\left(ae^2+3cd^2\right)+3Bcd\left(3ae^2+cd^2\right)+aCe\left(ae^2+9cd^2\right)\right)+\frac{1}{5}ax^5\left(3Acd\left(3ae^2+cd^2\right)+a\left(ae^2(Be+3Cd)+3cd^2(3Be+Cd)\right)\right)+\frac{1}{11}c^3e^2x^{11}(Be+3Cd)+\frac{1}{12}c^3Ce^3x^{12}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x)^3*(a + c*x^2)^3*(A + B*x + C*x^2),x]
```

```
[Out] a^3*A*d^3*x + (a^3*d^2*(B*d + 3*A*e)*x^2)/2 + (a^2*d*(a*d*(C*d +
3*B*e) + 3*A*(c*d^2 + a*e^2))*x^3)/3 + (a^2*(3*B*c*d^3 + 9*A*c*d^
2*e + 3*a*C*d^2*e + 3*a*B*d*e^2 + a*A*e^3)*x^4)/4 + (a*(3*A*c*d*(
c*d^2 + 3*a*e^2) + a*(a*e^2*(3*C*d + B*e) + 3*c*d^2*(C*d + 3*B*e)
))*x^5)/5 + (a*(3*A*c*e*(3*c*d^2 + a*e^2) + a*C*e*(9*c*d^2 + a*e^
2) + 3*B*c*d*(c*d^2 + 3*a*e^2))*x^6)/6 + (c*(A*c*d*(c*d^2 + 9*a*e
^2) + 3*a*(a*e^2*(3*C*d + B*e) + c*d^2*(C*d + 3*B*e)))*x^7)/7 + (
c*(B*c*d*(c*d^2 + 9*a*e^2) + 3*e*(A*c*(c*d^2 + a*e^2) + a*C*(3*c*
d^2 + a*e^2)))*x^8)/8 + (c^2*(c*C*d^3 + 3*c*d*e*(B*d + A*e) + 3*a
*e^2*(3*C*d + B*e))*x^9)/9 + (c^2*e*(3*c*C*d^2 + 3*a*C*e^2 + c*e*
(3*B*d + A*e))*x^10)/10 + (c^3*e^2*(3*C*d + B*e)*x^11)/11 + (c^3*
C*e^3*x^12)/12
```

Maple [A] time = 0.002, size = 553, normalized size = 1.1

$$\frac{e^3c^3Cx^{12}}{12}+\frac{\left(e^3c^3B+3\,e^2dc^3C\right)x^{11}}{11}+\frac{\left(\left(3\,e^3ac^2+3\,d^2ec^3\right)C+3\,e^2dc^3B+e^3c^3A\right)x^{10}}{10}+\frac{\left(\left(9\,ac^2de^2+d^3c^3\right)C+\left(3\,e^3ac^2+3\,d^2ec^3\right)B+3\,e^2dc^3A\right)x^9}{9}+\frac{\left(\left(3\,e^3a^2c+9\,d^2eac^2\right)C+\left(9\,ac^2de^2+d^3c^3\right)B+\left(3\,e^3ac^2+3\,d^2ec^3\right)A\right)x^8}{8}+\frac{\left(\left(9\,a^2cde^2+3\,d^3ac^2\right)C+\left(3\,e^3a^2c+9\,d^2eac^2\right)B+\left(9\,ac^2de^2+d^3c^3\right)A\right)x^7}{7}+\frac{\left(\left(e^3a^3+9\,d^2ea^2c\right)C+\left(9\,a^2cde^2+3\,d^3ac^2\right)B+\left(3\,e^3a^2c+9\,d^2eac^2\right)A\right)x^6}{6}+\frac{\left(\left(3\,e^2da^3+3\,d^3a^2c\right)C+\left(e^3a^3+9\,d^2ea^2c\right)B+\left(9\,a^2cde^2+3\,d^3ac^2\right)A\right)x^5}{5}+\frac{\left(3\,d^2ea^3C+\left(3\,e^2da^3+3\,d^3a^2c\right)B+\left(e^3a^3+9\,d^2ea^2c\right)A\right)x^4}{4}+\frac{\left(d^3a^3C+3\,d^2ea^3B+\left(3\,e^2da^3+3\,d^3a^2c\right)A\right)x^3}{3}+\frac{\left(3\,d^2ea^3A+d^3a^3B\right)x^2}{2}+d^3a^3Ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^3*(c*x^2+a)^3*(C*x^2+B*x+A),x)
```

```
[Out] 1/12*e^3*c^3*C*x^12+1/11*(B*c^3*e^3+3*C*c^3*d*e^2)*x^11+1/10*((3*
a*c^2*e^3+3*c^3*d^2*e)*C+3*e^2*d*c^3*B+e^3*c^3*A)*x^10+1/9*((9*a*
c^2*d*e^2+c^3*d^3)*C+(3*a*c^2*e^3+3*c^3*d^2*e)*B+3*e^2*d*c^3*A)*x
^9+1/8*((3*a^2*c*e^3+9*a*c^2*d^2*e)*C+(9*a*c^2*d*e^2+c^3*d^3)*B+(
3*a*c^2*e^3+3*c^3*d^2*e)*A)*x^8+1/7*((9*a^2*c*d*e^2+3*a*c^2*d^3)*
C+(3*a^2*c*e^3+9*a*c^2*d^2*e)*B+(9*a*c^2*d*e^2+c^3*d^3)*A)*x^7+1/
6*((a^3*e^3+9*a^2*c*d^2*e)*C+(9*a^2*c*d*e^2+3*a*c^2*d^3)*B+(3*a^2
*c*e^3+9*a*c^2*d^2*e)*A)*x^6+1/5*((3*a^3*d*e^2+3*a^2*c*d^3)*C+(a^
3*e^3+9*a^2*c*d^2*e)*B+(9*a^2*c*d*e^2+3*a*c^2*d^3)*A)*x^5+1/4*(3*
d^2*e*a^3*C+(3*a^3*d*e^2+3*a^2*c*d^3)*B+(a^3*e^3+9*a^2*c*d^2*e)*A
)*x^4+1/3*(d^3*a^3*C+3*d^2*e*a^3*B+(3*a^3*d*e^2+3*a^2*c*d^3)*A)*x
^3+1/2*(3*A*a^3*d^2*e+B*a^3*d^3)*x^2+d^3*a^3*A*x
```

Maxima [A] time = 0.727334, size = 691, normalized size = 1.38

$$\frac{1}{12}Cc^3e^3x^{12} + \frac{1}{11}\left(3Cc^3de^2 + Bc^3e^3\right)x^{11} + \frac{1}{10}\left(3Cc^3d^2e + 3Bc^3de^2 + \left(3Cac^2 + Ac^3\right)e^3\right)x^{10} + \frac{1}{9}\left(Cc^3d^3 + 3Bc^3d^2e + 3Bac^2e^3 + 3\left(3Cac^2 + Ac^3\right)de^2\right)x^9 + \frac{1}{8}\left(Bc^3d^3 + 9Bac^2de^2 + 3\left(3Cac^2 + Ac^3\right)d^2e + 3\left(Ca^2c + Aac^2\right)e^3\right)x^8 + Aa^3d^3x + \frac{1}{7}\left(9Bac^2d^2e + 3Ba^2ce^3 + \left(3Cac^2 + Ac^3\right)d^3 + 9\left(Ca^2c + Aac^2\right)de^2\right)x^7 + \frac{1}{6}\left(3Bac^2d^3 + 9Ba^2cde^2 + 9\left(Ca^2c + Aac^2\right)d^2e + \left(Ca^3 + 3Aa^2c\right)e^3\right)x^6 + \frac{1}{5}\left(9Ba^2cd^2e + Ba^3e^3 + 3\left(Ca^2c + Aac^2\right)d^3 + 3\left(Ca^3 + 3Aa^2c\right)de^2\right)x^5 + \frac{1}{4}\left(3Ba^2cd^3 + 3Ba^3de^2 + Aa^3e^3 + 3\left(Ca^3 + 3Aa^2c\right)d^2e\right)x^4 + \frac{1}{3}\left(3Ba^3d^2e + 3Aa^3de^2 + \left(Ca^3 + 3Aa^2c\right)d^3\right)x^3 + \frac{1}{2}\left(Ba^3d^3 + 3Aa^3d^2e\right)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3*(e*x + d)^3,x, algorithm="maxima")
```

```
[Out] 1/12*C*c^3*e^3*x^12 + 1/11*(3*C*c^3*d*e^2 + B*c^3*e^3)*x^11 + 1/1
0*(3*C*c^3*d^2*e + 3*B*c^3*d*e^2 + (3*C*a*c^2 + A*c^3)*e^3)*x^10
+ 1/9*(C*c^3*d^3 + 3*B*c^3*d^2*e + 3*B*a*c^2*e^3 + 3*(3*C*a*c^2 +
 A*c^3)*d*e^2)*x^9 + 1/8*(B*c^3*d^3 + 9*B*a*c^2*d*e^2 + 3*(3*C*a*
c^2 + A*c^3)*d^2*e + 3*(C*a^2*c + A*a*c^2)*e^3)*x^8 + A*a^3*d^3*x
 + 1/7*(9*B*a*c^2*d^2*e + 3*B*a^2*c*e^3 + (3*C*a*c^2 + A*c^3)*d^3
 + 9*(C*a^2*c + A*a*c^2)*d*e^2)*x^7 + 1/6*(3*B*a*c^2*d^3 + 9*B*a^
2*c*d*e^2 + 9*(C*a^2*c + A*a*c^2)*d^2*e + (C*a^3 + 3*A*a^2*c)*e^3
)*x^6 + 1/5*(9*B*a^2*c*d^2*e + B*a^3*e^3 + 3*(C*a^2*c + A*a*c^2)*
d^3 + 3*(C*a^3 + 3*A*a^2*c)*d*e^2)*x^5 + 1/4*(3*B*a^2*c*d^3 + 3*B
*a^3*d*e^2 + A*a^3*e^3 + 3*(C*a^3 + 3*A*a^2*c)*d^2*e)*x^4 + 1/3*(
3*B*a^3*d^2*e + 3*A*a^3*d*e^2 + (C*a^3 + 3*A*a^2*c)*d^3)*x^3 + 1/
2*(B*a^3*d^3 + 3*A*a^3*d^2*e)*x^2
```

Fricas [A] time = 0.243553, size = 1, normalized size = 0.

$$\frac{1}{12}x^{12}e^3c^3C + \frac{3}{11}x^{11}e^2dc^3C + \frac{1}{11}x^{11}e^3c^3B + \frac{3}{10}x^{10}ed^2c^3C + \frac{3}{10}x^{10}e^3c^2aC + \frac{3}{10}x^{10}e^2dc^3B + \frac{1}{10}x^{10}e^3c^3A + \frac{1}{9}x^9d^3c^3C + x^9e^2dc^2aC + \frac{1}{3}x^9ed^2c^3B + \frac{1}{3}x^9e^3c^2aB + \frac{1}{3}x^9e^2dc^3A + \frac{9}{8}x^8ed^2c^2aC + \frac{3}{8}x^8e^3ca^2C + \frac{1}{8}x^8d^3c^3B + \frac{9}{8}x^8e^2dc^2aB + \frac{3}{8}x^8ed^2c^3A + \frac{3}{8}x^8e^3c^2aA + \frac{3}{7}x^7d^3c^2aC + \frac{9}{7}x^7e^2dca^2C + \frac{9}{7}x^7ed^2c^2aB + \frac{3}{7}x^7e^3ca^2B + \frac{1}{7}x^7d^3c^3A + \frac{9}{7}x^7e^2dc^2aA + \frac{3}{2}x^6ed^2ca^2C + \frac{1}{6}x^6e^3a^3C + \frac{1}{2}x^6d^3c^2aB + \frac{3}{2}x^6e^2dca^2B + \frac{3}{2}x^6ed^2c^2aA + \frac{1}{2}x^6e^3ca^2A + \frac{3}{5}x^5d^3ca^2C + \frac{3}{5}x^5e^2da^3C + \frac{9}{5}x^5ed^2ca^2B + \frac{1}{5}x^5e^3a^3B + \frac{3}{5}x^5d^3c^2aA + \frac{9}{5}x^5e^2dca^2A + \frac{3}{4}x^4ed^2a^3C + \frac{3}{4}x^4d^3ca^2B + \frac{3}{4}x^4e^2da^3B + \frac{9}{4}x^4ed^2ca^2A + \frac{1}{4}x^4e^3a^3A + \frac{1}{3}x^3d^3a^3C + x^3ed^2a^3B + x^3d^3ca^2A + x^3e^2da^3A + \frac{1}{2}x^2d^3a^3B + \frac{3}{2}x^2ed^2a^3A + xd^3a^3A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3*(e*x + d)^3,x, algorithm="fricas")
```

```
[Out] 1/12*x^12*e^3*c^3*C + 3/11*x^11*e^2*d*c^3*C + 1/11*x^11*e^3*c^3*B
 + 3/10*x^10*e*d^2*c^3*C + 3/10*x^10*e^3*c^2*a*C + 3/10*x^10*e^2*
d*c^3*B + 1/10*x^10*e^3*c^3*A + 1/9*x^9*d^3*c^3*C + x^9*e^2*d*c^2
*a*C + 1/3*x^9*e*d^2*c^3*B + 1/3*x^9*e^3*c^2*a*B + 1/3*x^9*e^2*d*
c^3*A + 9/8*x^8*e*d^2*c^2*a*C + 3/8*x^8*e^3*c*a^2*C + 1/8*x^8*d^3
*c^3*B + 9/8*x^8*e^2*d*c^2*a*B + 3/8*x^8*e*d^2*c^3*A + 3/8*x^8*e^
3*c^2*a*A + 3/7*x^7*d^3*c^2*a*C + 9/7*x^7*e^2*d*c*a^2*C + 9/7*x^7
*e*d^2*c^2*a*B + 3/7*x^7*e^3*c*a^2*B + 1/7*x^7*d^3*c^3*A + 9/7*x^
7*e^2*d*c^2*a*A + 3/2*x^6*e*d^2*c*a^2*C + 1/6*x^6*e^3*a^3*C + 1/2
*x^6*d^3*c^2*a*B + 3/2*x^6*e^2*d*c*a^2*B + 3/2*x^6*e*d^2*c^2*a*A
+ 1/2*x^6*e^3*c*a^2*A + 3/5*x^5*d^3*c*a^2*C + 3/5*x^5*e^2*d*a^3*C
 + 9/5*x^5*e*d^2*c*a^2*B + 1/5*x^5*e^3*a^3*B + 3/5*x^5*d^3*c^2*a*
A + 9/5*x^5*e^2*d*c*a^2*A + 3/4*x^4*e*d^2*a^3*C + 3/4*x^4*d^3*c*a
^2*B + 3/4*x^4*e^2*d*a^3*B + 9/4*x^4*e*d^2*c*a^2*A + 1/4*x^4*e^3*
a^3*A + 1/3*x^3*d^3*a^3*C + x^3*e*d^2*a^3*B + x^3*d^3*c*a^2*A + x
^3*e^2*d*a^3*A + 1/2*x^2*d^3*a^3*B + 3/2*x^2*e*d^2*a^3*A + x*d^3*
a^3*A
```

Sympy [A] time = 0.179225, size = 646, normalized size = 1.29

$$Aa^3d^3x + \frac{Cc^3e^3x^{12}}{12} + x^{11}\left(\frac{Bc^3e^3}{11} + \frac{3Cc^3de^2}{11}\right) + x^{10}\left(\frac{Ac^3e^3}{10} + \frac{3Bc^3de^2}{10} + \frac{3Cac^2e^3}{10} + \frac{3Cc^3d^2e}{10}\right) + x^9\left(\frac{Ac^3de^2}{3} + \frac{Bac^2e^3}{3} + \frac{Bc^3d^2e}{3} + Cac^2de^2 + \frac{Cc^3d^3}{9}\right) + x^8\left(\frac{3Aac^2e^3}{8} + \frac{3Ac^3d^2e}{8} + \frac{9Bac^2de^2}{8} + \frac{Bc^3d^3}{8} + \frac{3Ca^2ce^3}{8} + \frac{9Cac^2d^2e}{8}\right) + x^7\left(\frac{9Aac^2de^2}{7} + \frac{Ac^3d^3}{7} + \frac{3Ba^2ce^3}{7} + \frac{9Bac^2d^2e}{7} + \frac{9Ca^2cde^2}{7} + \frac{3Cac^2d^3}{7}\right) + x^6\left(\frac{Aa^2ce^3}{2} + \frac{3Aac^2d^2e}{2} + \frac{3Ba^2cde^2}{2} + \frac{Bac^2d^3}{2} + \frac{Ca^3e^3}{6} + \frac{3Ca^2cd^2e}{2}\right) + x^5\left(\frac{9Aa^2cde^2}{5} + \frac{3Aac^2d^3}{5} + \frac{Ba^3e^3}{5} + \frac{9Ba^2cd^2e}{5} + \frac{3Ca^3de^2}{5} + \frac{3Ca^2cd^3}{5}\right) + x^4\left(\frac{Aa^3e^3}{4} + \frac{9Aa^2cd^2e}{4} + \frac{3Ba^3de^2}{4} + \frac{3Ba^2cd^3}{4} + \frac{3Ca^3d^2e}{4}\right) + x^3\left(Aa^3de^2 + Aa^2cd^3 + Ba^3d^2e + \frac{Ca^3d^3}{3}\right) + x^2\left(\frac{3Aa^3d^2e}{2} + \frac{Ba^3d^3}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**3*(c*x**2+a)**3*(C*x**2+B*x+A),x)
```

```
[Out] A*a**3*d**3*x + C*c**3*e**3*x**12/12 + x**11*(B*c**3*e**3/11 + 3*
C*c**3*d*e**2/11) + x**10*(A*c**3*e**3/10 + 3*B*c**3*d*e**2/10 +
3*C*a*c**2*e**3/10 + 3*C*c**3*d**2*e/10) + x**9*(A*c**3*d*e**2/3
+ B*a*c**2*e**3/3 + B*c**3*d**2*e/3 + C*a*c**2*d*e**2 + C*c**3*d*
*3/9) + x**8*(3*A*a*c**2*e**3/8 + 3*A*c**3*d**2*e/8 + 9*B*a*c**2*
d*e**2/8 + B*c**3*d**3/8 + 3*C*a**2*c*e**3/8 + 9*C*a*c**2*d**2*e/
8) + x**7*(9*A*a*c**2*d*e**2/7 + A*c**3*d**3/7 + 3*B*a**2*c*e**3/
7 + 9*B*a*c**2*d**2*e/7 + 9*C*a**2*c*d*e**2/7 + 3*C*a*c**2*d**3/7
) + x**6*(A*a**2*c*e**3/2 + 3*A*a*c**2*d**2*e/2 + 3*B*a**2*c*d*e*
*2/2 + B*a*c**2*d**3/2 + C*a**3*e**3/6 + 3*C*a**2*c*d**2*e/2) + x
**5*(9*A*a**2*c*d*e**2/5 + 3*A*a*c**2*d**3/5 + B*a**3*e**3/5 + 9*
B*a**2*c*d**2*e/5 + 3*C*a**3*d*e**2/5 + 3*C*a**2*c*d**3/5) + x**4
*(A*a**3*e**3/4 + 9*A*a**2*c*d**2*e/4 + 3*B*a**3*d*e**2/4 + 3*B*a
**2*c*d**3/4 + 3*C*a**3*d**2*e/4) + x**3*(A*a**3*d*e**2 + A*a**2*
c*d**3 + B*a**3*d**2*e + C*a**3*d**3/3) + x**2*(3*A*a**3*d**2*e/2
 + B*a**3*d**3/2)
```

GIAC/XCAS [A] time = 0.279416, size = 818, normalized size = 1.63

$$\frac{1}{12}Cc^3x^{12}e^3+\frac{3}{11}Cc^3dx^{11}e^2+\frac{3}{10}Cc^3d^2x^{10}e+\frac{1}{9}Cc^3d^3x^9+\frac{1}{11}Bc^3x^{11}e^3+\frac{3}{10}Bc^3dx^{10}e^2+\frac{1}{3}Bc^3d^2x^9e+\frac{1}{8}Bc^3d^3x^8+\frac{3}{10}Cac^2x^{10}e^3+\frac{1}{10}Ac^3x^{10}e^3+Cac^2dx^9e^2+\frac{1}{3}Ac^3dx^9e^2+\frac{9}{8}Cac^2d^2x^8e+\frac{3}{8}Ac^3d^2x^8e+\frac{3}{7}Cac^2d^3x^7+\frac{1}{7}Ac^3d^3x^7+\frac{1}{3}Bac^2x^9e^3+\frac{9}{8}Bac^2dx^8e^2+\frac{9}{7}Bac^2d^2x^7e+\frac{1}{2}Bac^2d^3x^6+\frac{3}{8}Ca^2cx^8e^3+\frac{3}{8}Aac^2x^8e^3+\frac{9}{7}Ca^2cdx^7e^2+\frac{9}{7}Aac^2dx^7e^2+\frac{3}{2}Ca^2cd^2x^6e+\frac{3}{2}Aac^2d^2x^6e+\frac{3}{5}Ca^2cd^3x^5+\frac{3}{5}Aac^2d^3x^5+\frac{3}{7}Ba^2cx^7e^3+\frac{3}{2}Ba^2cdx^6e^2+\frac{9}{5}Ba^2cd^2x^5e+\frac{3}{4}Ba^2cd^3x^4+\frac{1}{6}Ca^3x^6e^3+\frac{1}{2}Aa^2cx^6e^3+\frac{3}{5}Ca^3dx^5e^2+\frac{9}{5}Aa^2cdx^5e^2+\frac{3}{4}Ca^3d^2x^4e+\frac{9}{4}Aa^2cd^2x^4e+\frac{1}{3}Ca^3d^3x^3+Aa^2cd^3x^3+\frac{1}{5}Ba^3x^5e^3+\frac{3}{4}Ba^3dx^4e^2+Ba^3d^2x^3e+\frac{1}{2}Ba^3d^3x^2+\frac{1}{4}Aa^3x^4e^3+Aa^3dx^3e^2+\frac{3}{2}Aa^3d^2x^2e+Aa^3d^3x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3*(e*x + d)^3,x, algorithm="giac")
```

```
[Out] 1/12*C*c^3*x^12*e^3 + 3/11*C*c^3*d*x^11*e^2 + 3/10*C*c^3*d^2*x^10
*e + 1/9*C*c^3*d^3*x^9 + 1/11*B*c^3*x^11*e^3 + 3/10*B*c^3*d*x^10*
e^2 + 1/3*B*c^3*d^2*x^9*e + 1/8*B*c^3*d^3*x^8 + 3/10*C*a*c^2*x^10
*e^3 + 1/10*A*c^3*x^10*e^3 + C*a*c^2*d*x^9*e^2 + 1/3*A*c^3*d*x^9*
e^2 + 9/8*C*a*c^2*d^2*x^8*e + 3/8*A*c^3*d^2*x^8*e + 3/7*C*a*c^2*d
^3*x^7 + 1/7*A*c^3*d^3*x^7 + 1/3*B*a*c^2*x^9*e^3 + 9/8*B*a*c^2*d*
x^8*e^2 + 9/7*B*a*c^2*d^2*x^7*e + 1/2*B*a*c^2*d^3*x^6 + 3/8*C*a^2
*c*x^8*e^3 + 3/8*A*a*c^2*x^8*e^3 + 9/7*C*a^2*c*d*x^7*e^2 + 9/7*A*
a*c^2*d*x^7*e^2 + 3/2*C*a^2*c*d^2*x^6*e + 3/2*A*a*c^2*d^2*x^6*e +
 3/5*C*a^2*c*d^3*x^5 + 3/5*A*a*c^2*d^3*x^5 + 3/7*B*a^2*c*x^7*e^3
+ 3/2*B*a^2*c*d*x^6*e^2 + 9/5*B*a^2*c*d^2*x^5*e + 3/4*B*a^2*c*d^3
*x^4 + 1/6*C*a^3*x^6*e^3 + 1/2*A*a^2*c*x^6*e^3 + 3/5*C*a^3*d*x^5*
e^2 + 9/5*A*a^2*c*d*x^5*e^2 + 3/4*C*a^3*d^2*x^4*e + 9/4*A*a^2*c*d
^2*x^4*e + 1/3*C*a^3*d^3*x^3 + A*a^2*c*d^3*x^3 + 1/5*B*a^3*x^5*e^
3 + 3/4*B*a^3*d*x^4*e^2 + B*a^3*d^2*x^3*e + 1/2*B*a^3*d^3*x^2 + 1
/4*A*a^3*x^4*e^3 + A*a^3*d*x^3*e^2 + 3/2*A*a^3*d^2*x^2*e + A*a^3*
d^3*x
```

3.33 $\int (d+ex)^2 \left(a+cx^2\right)^3 \left(A+Bx+Cx^2\right) \, dx$

Optimal. Leaf size=502

$$\frac{c(d+ex)^7 \left(3a^2Ce^4+3ace^2 \left(15Cd^2-e(5Bd-Ae)\right)+5c^2d^2 \left(14Cd^2-e(7Bd-3Ae)\right)\right)}{7e^9} + \frac{(d+ex)^5 \left(ae^2+cd^2\right) \left(a^2Ce^4+ace^2 \left(17Cd^2-3e(3Bd-Ae)\right)+c^2d^2 \left(28Cd^2-3e(7Bd-5Ae)\right)\right)}{5e^9} - \frac{c(d+ex)^6 \left(3a^2e^4(4Cd-Be)+6acde^2 \left(10Cd^2-e(5Bd-2Ae)\right)+c^2d^3 \left(56Cd^2-5e(7Bd-4Ae)\right)\right)}{6e^9} + \frac{c^2(d+ex)^9 \left(3aCe^2+c \left(28Cd^2-e(7Bd-Ae)\right)\right)}{9e^9} - \frac{c^2(d+ex)^8 \left(3ae^2(6Cd-Be)+cd \left(56Cd^2-3e(7Bd-2Ae)\right)\right)}{8e^9} - \frac{(d+ex)^4 \left(ae^2+cd^2\right)^2 \left(ae^2(2Cd-Be)+cd \left(8Cd^2-e(7Bd-6Ae)\right)\right)}{4e^9} + \frac{(d+ex)^3 \left(ae^2+cd^2\right)^3 \left(Ae^2-Bde+Cd^2\right)}{3e^9} - \frac{c^3(d+ex)^{10}(8Cd-Be)}{10e^9} + \frac{c^3C(d+ex)^{11}}{11e^9}$$

```
[Out] ((c*d^2 + a*e^2)^3*(C*d^2 - B*d*e + A*e^2)*(d + e*x)^3)/(3*e^9) -
 ((c*d^2 + a*e^2)^2*(a*e^2*(2*C*d - B*e) + c*d*(8*C*d^2 - e*(7*B*
d - 6*A*e)))*(d + e*x)^4)/(4*e^9) + ((c*d^2 + a*e^2)*(a^2*C*e^4 +
 c^2*d^2*(28*C*d^2 - 3*e*(7*B*d - 5*A*e)) + a*c*e^2*(17*C*d^2 - 3
*e*(3*B*d - A*e)))*(d + e*x)^5)/(5*e^9) - (c*(3*a^2*e^4*(4*C*d -
B*e) + c^2*d^3*(56*C*d^2 - 5*e*(7*B*d - 4*A*e)) + 6*a*c*d*e^2*(10
*C*d^2 - e*(5*B*d - 2*A*e)))*(d + e*x)^6)/(6*e^9) + (c*(3*a^2*C*e
^4 + 5*c^2*d^2*(14*C*d^2 - e*(7*B*d - 3*A*e)) + 3*a*c*e^2*(15*C*d
^2 - e*(5*B*d - A*e)))*(d + e*x)^7)/(7*e^9) - (c^2*(3*a*e^2*(6*C*
d - B*e) + c*d*(56*C*d^2 - 3*e*(7*B*d - 2*A*e)))*(d + e*x)^8)/(8*
e^9) + (c^2*(3*a*C*e^2 + c*(28*C*d^2 - e*(7*B*d - A*e)))*(d + e*x
)^9)/(9*e^9) - (c^3*(8*C*d - B*e)*(d + e*x)^10)/(10*e^9) + (c^3*C
*(d + e*x)^11)/(11*e^9)
```

Rubi [A] time = 2.07371, antiderivative size = 499, normalized size of antiderivative = 0.99, number

of steps used = 2, number of rules used = 1, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.037$

$$\frac{c(d+ex)^7\left(3a^2Ce^4+3ace^2\left(15Cd^2-e(5Bd-Ae)\right)+5c^2\left(14Cd^4-d^2e(7Bd-3Ae)\right)\right)}{7e^9}$$
$$+\frac{(d+ex)^5\left(ae^2+cd^2\right)\left(a^2Ce^4+ace^2\left(17Cd^2-3e(3Bd-Ae)\right)+c^2\left(28Cd^4-3d^2e(7Bd-5Ae)\right)\right)}{5e^9}$$
$$-\frac{c(d+ex)^6\left(3a^2e^4(4Cd-Be)+6acde^2\left(10Cd^2-e(5Bd-2Ae)\right)+c^2\left(56Cd^5-5d^3e(7Bd-4Ae)\right)\right)}{6e^9}$$
$$-\frac{c^2(d+ex)^8\left(3ae^2(6Cd-Be)-3cde(7Bd-2Ae)+56cCd^3\right)}{8e^9}$$
$$+\frac{c^2(d+ex)^9\left(3aCe^2-ce(7Bd-Ae)+28cCd^2\right)}{9e^9}+\frac{(d+ex)^3\left(ae^2+cd^2\right)^3\left(Ae^2-Bde+Cd^2\right)}{3e^9}$$
$$-\frac{(d+ex)^4\left(ae^2+cd^2\right)^2\left(ae^2(2Cd-Be)-cde(7Bd-6Ae)+8cCd^3\right)}{4e^9}$$
$$-\frac{c^3(d+ex)^{10}(8Cd-Be)}{10e^9}+\frac{c^3C(d+ex)^{11}}{11e^9}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)^2*(a + c*x^2)^3*(A + B*x + C*x^2),x]
```

```
[Out] ((c*d^2 + a*e^2)^3*(C*d^2 - B*d*e + A*e^2)*(d + e*x)^3)/(3*e^9) -
 ((c*d^2 + a*e^2)^2*(8*c*C*d^3 - c*d*e*(7*B*d - 6*A*e) + a*e^2*(2
*C*d - B*e))*(d + e*x)^4)/(4*e^9) + ((c*d^2 + a*e^2)*(a^2*C*e^4 +
 c^2*(28*C*d^4 - 3*d^2*e*(7*B*d - 5*A*e)) + a*c*e^2*(17*C*d^2 - 3
*e*(3*B*d - A*e)))*(d + e*x)^5)/(5*e^9) - (c*(3*a^2*e^4*(4*C*d -
B*e) + c^2*(56*C*d^5 - 5*d^3*e*(7*B*d - 4*A*e)) + 6*a*c*d*e^2*(10
*C*d^2 - e*(5*B*d - 2*A*e)))*(d + e*x)^6)/(6*e^9) + (c*(3*a^2*C*e
^4 + 5*c^2*(14*C*d^4 - d^2*e*(7*B*d - 3*A*e)) + 3*a*c*e^2*(15*C*d
^2 - e*(5*B*d - A*e)))*(d + e*x)^7)/(7*e^9) - (c^2*(56*c*C*d^3 -
3*c*d*e*(7*B*d - 2*A*e) + 3*a*e^2*(6*C*d - B*e))*(d + e*x)^8)/(8*
e^9) + (c^2*(28*c*C*d^2 + 3*a*C*e^2 - c*e*(7*B*d - A*e))*(d + e*x
)^9)/(9*e^9) - (c^3*(8*C*d - B*e)*(d + e*x)^10)/(10*e^9) + (c^3*C
*(d + e*x)^11)/(11*e^9)
```

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

$$\frac{Cc^3e^2x^{11}}{11} + a^3d^2\int A\,dx + a^3d\,(2Ae + Bd)\int x\,dx + \frac{a^2x^4\left(6Acde + Bae^2 + 3Bcd^2 + 2Cade\right)}{4} + \frac{a^2x^3\left(Aae^2 + 3Acd^2 + 2Bade + Cad^2\right)}{3} + \frac{acx^6\left(2Acde + Bae^2 + Bcd^2 + 2Cade\right)}{2} + \frac{ax^5\left(3Aace^2 + 3Ac^2d^2 + 6Bacde + Ca^2e^2 + 3Cacd^2\right)}{5} + \frac{c^3ex^{10}\,(Be + 2Cd)}{10} + \frac{c^2x^9\left(Ace^2 + 2Bcde + 3Cae^2 + Ccd^2\right)}{9} + \frac{c^2x^8\left(2Acde + 3Bae^2 + Bcd^2 + 6Cade\right)}{8} + \frac{cx^7\left(3Aace^2 + Ac^2d^2 + 6Bacde + 3Ca^2e^2 + 3Cacd^2\right)}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)**2*(c*x**2+a)**3*(C*x**2+B*x+A),x)
```

```
[Out] C*c**3*e**2*x**11/11 + a**3*d**2*Integral(A, x) + a**3*d*(2*A*e +
 B*d)*Integral(x, x) + a**2*x**4*(6*A*c*d*e + B*a*e**2 + 3*B*c*d*
*2 + 2*C*a*d*e)/4 + a**2*x**3*(A*a*e**2 + 3*A*c*d**2 + 2*B*a*d*e
+ C*a*d**2)/3 + a*c*x**6*(2*A*c*d*e + B*a*e**2 + B*c*d**2 + 2*C*a
*d*e)/2 + a*x**5*(3*A*a*c*e**2 + 3*A*c**2*d**2 + 6*B*a*c*d*e + C*
a**2*e**2 + 3*C*a*c*d**2)/5 + c**3*e*x**10*(B*e + 2*C*d)/10 + c**
2*x**9*(A*c*e**2 + 2*B*c*d*e + 3*C*a*e**2 + C*c*d**2)/9 + c**2*x*
*8*(2*A*c*d*e + 3*B*a*e**2 + B*c*d**2 + 6*C*a*d*e)/8 + c*x**7*(3*
A*a*c*e**2 + A*c**2*d**2 + 6*B*a*c*d*e + 3*C*a**2*e**2 + 3*C*a*c*
d**2)/7
```

Mathematica [A] time = 0.26525, size = 329, normalized size = 0.66

$$\frac{1}{2}a^3dx^2(2Ae + Bd) + a^3Ad^2x + \frac{1}{4}a^2x^4\left(aBe^2 + 2aCde + 6Acde + 3Bcd^2\right) + \frac{1}{3}a^2x^3\left(A\left(ae^2 + 3cd^2\right) + ad(2Be + Cd)\right) + \frac{1}{9}c^2x^9\left(3aCe^2 + ce(Ae + 2Bd) + cCd^2\right) + \frac{1}{8}c^2x^8\left(3aBe^2 + 6aCde + 2Acde + Bcd^2\right) + \frac{1}{7}cx^7\left(Ac\left(3ae^2 + cd^2\right) + 3a\left(aCe^2 + cd(2Be + Cd)\right)\right) + \frac{1}{2}acx^6\left(2de(aC + Ac) + B\left(ae^2 + cd^2\right)\right) + \frac{1}{5}ax^5\left(3Ac\left(ae^2 + cd^2\right) + a\left(aCe^2 + 3cd(2Be + Cd)\right)\right) + \frac{1}{10}c^3ex^{10}(Be + 2Cd) + \frac{1}{11}c^3Ce^2x^{11}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x)^2*(a + c*x^2)^3*(A + B*x + C*x^2),x]
```

```
[Out] a^3*A*d^2*x + (a^3*d*(B*d + 2*A*e)*x^2)/2 + (a^2*(a*d*(C*d + 2*B*
e) + A*(3*c*d^2 + a*e^2))*x^3)/3 + (a^2*(3*B*c*d^2 + 6*A*c*d*e +
2*a*C*d*e + a*B*e^2)*x^4)/4 + (a*(3*A*c*(c*d^2 + a*e^2) + a*(a*C*
e^2 + 3*c*d*(C*d + 2*B*e)))*x^5)/5 + (a*c*(2*(A*c + a*C)*d*e + B*
(c*d^2 + a*e^2))*x^6)/2 + (c*(A*c*(c*d^2 + 3*a*e^2) + 3*a*(a*C*e^
2 + c*d*(C*d + 2*B*e)))*x^7)/7 + (c^2*(B*c*d^2 + 2*A*c*d*e + 6*a*
C*d*e + 3*a*B*e^2)*x^8)/8 + (c^2*(c*C*d^2 + 3*a*C*e^2 + c*e*(2*B*
d + A*e))*x^9)/9 + (c^3*e*(2*C*d + B*e)*x^10)/10 + (c^3*C*e^2*x^1
1)/11
```

Maple [A] time = 0.002, size = 388, normalized size = 0.8

$$\frac{e^2c^3Cx^{11}}{11}+\frac{\left(e^2c^3B+2\,dec^3C\right)x^{10}}{10}+\frac{\left(\left(3\,e^2ac^2+d^2c^3\right)C+2\,dec^3B+e^2c^3A\right)x^9}{9}+\frac{\left(6\,ac^2deC+\left(3\,e^2ac^2+d^2c^3\right)B+2\,dec^3A\right)x^8}{8}+\frac{\left(\left(3\,a^2ce^2+3\,d^2ac^2\right)C+6\,ac^2deB+\left(3\,e^2ac^2+d^2c^3\right)A\right)x^7}{7}+\frac{\left(6\,dea^2cC+\left(3\,a^2ce^2+3\,d^2ac^2\right)B+6\,ac^2deA\right)x^6}{6}+\frac{\left(\left(e^2a^3+3\,d^2a^2c\right)C+6\,dea^2cB+\left(3\,a^2ce^2+3\,d^2ac^2\right)A\right)x^5}{5}+\frac{\left(2\,dea^3C+\left(e^2a^3+3\,d^2a^2c\right)B+6\,dea^2cA\right)x^4}{4}+\frac{\left(d^2a^3C+2\,dea^3B+\left(e^2a^3+3\,d^2a^2c\right)A\right)x^3}{3}+\frac{\left(2\,dea^3A+d^2a^3B\right)x^2}{2}+d^2a^3Ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^2*(c*x^2+a)^3*(C*x^2+B*x+A),x)
```

```
[Out] 1/11*e^2*c^3*C*x^11+1/10*(B*c^3*e^2+2*C*c^3*d*e)*x^10+1/9*((3*a*c
^2*e^2+c^3*d^2)*C+2*d*e*c^3*B+e^2*c^3*A)*x^9+1/8*(6*a*c^2*d*e*C+(
3*a*c^2*e^2+c^3*d^2)*B+2*d*e*c^3*A)*x^8+1/7*((3*a^2*c*e^2+3*a*c^2
*d^2)*C+6*a*c^2*d*e*B+(3*a*c^2*e^2+c^3*d^2)*A)*x^7+1/6*(6*d*e*a^2
*c*C+(3*a^2*c*e^2+3*a*c^2*d^2)*B+6*a*c^2*d*e*A)*x^6+1/5*((a^3*e^2
+3*a^2*c*d^2)*C+6*d*e*a^2*c*B+(3*a^2*c*e^2+3*a*c^2*d^2)*A)*x^5+1/
4*(2*d*e*a^3*C+(a^3*e^2+3*a^2*c*d^2)*B+6*d*e*a^2*c*A)*x^4+1/3*(d^
2*a^3*C+2*d*e*a^3*B+(a^3*e^2+3*a^2*c*d^2)*A)*x^3+1/2*(2*A*a^3*d*e
+B*a^3*d^2)*x^2+d^2*a^3*A*x
```

Maxima [A] time = 0.726582, size = 495, normalized size = 0.99

$$\frac{1}{11}\,Cc^3e^2x^{11} + \frac{1}{10}\left(2\,Cc^3de + Bc^3e^2\right)x^{10} + \frac{1}{9}\left(Cc^3d^2 + 2\,Bc^3de + \left(3\,Cac^2 + Ac^3\right)e^2\right)x^9 + \frac{1}{8}\left(Bc^3d^2 + 3\,Bac^2e^2 + 2\left(3\,Cac^2 + Ac^3\right)de\right)x^8 + \frac{1}{7}\left(6\,Bac^2de + \left(3\,Cac^2 + Ac^3\right)d^2 + 3\left(Ca^2c + Aac^2\right)e^2\right)x^7 + Aa^3d^2x + \frac{1}{2}\left(Bac^2d^2 + Ba^2ce^2 + 2\left(Ca^2c + Aac^2\right)de\right)x^6 + \frac{1}{5}\left(6\,Ba^2cde + 3\left(Ca^2c + Aac^2\right)d^2 + \left(Ca^3 + 3\,Aa^2c\right)e^2\right)x^5 + \frac{1}{4}\left(3\,Ba^2cd^2 + Ba^3e^2 + 2\left(Ca^3 + 3\,Aa^2c\right)de\right)x^4 + \frac{1}{3}\left(2\,Ba^3de + Aa^3e^2 + \left(Ca^3 + 3\,Aa^2c\right)d^2\right)x^3 + \frac{1}{2}\left(Ba^3d^2 + 2\,Aa^3de\right)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3*(e*x + d)^2,x, algorithm="maxima")
```

```
[Out] 1/11*C*c^3*e^2*x^11 + 1/10*(2*C*c^3*d*e + B*c^3*e^2)*x^10 + 1/9*(
C*c^3*d^2 + 2*B*c^3*d*e + (3*C*a*c^2 + A*c^3)*e^2)*x^9 + 1/8*(B*c
^3*d^2 + 3*B*a*c^2*e^2 + 2*(3*C*a*c^2 + A*c^3)*d*e)*x^8 + 1/7*(6*
B*a*c^2*d*e + (3*C*a*c^2 + A*c^3)*d^2 + 3*(C*a^2*c + A*a*c^2)*e^2
)*x^7 + A*a^3*d^2*x + 1/2*(B*a*c^2*d^2 + B*a^2*c*e^2 + 2*(C*a^2*c
 + A*a*c^2)*d*e)*x^6 + 1/5*(6*B*a^2*c*d*e + 3*(C*a^2*c + A*a*c^2)
*d^2 + (C*a^3 + 3*A*a^2*c)*e^2)*x^5 + 1/4*(3*B*a^2*c*d^2 + B*a^3*
e^2 + 2*(C*a^3 + 3*A*a^2*c)*d*e)*x^4 + 1/3*(2*B*a^3*d*e + A*a^3*e
^2 + (C*a^3 + 3*A*a^2*c)*d^2)*x^3 + 1/2*(B*a^3*d^2 + 2*A*a^3*d*e)
*x^2
```

Fricas [A] time = 0.243384, size = 1, normalized size = 0.

$$\frac{1}{11}x^{11}e^2c^3C + \frac{1}{5}x^{10}edc^3C + \frac{1}{10}x^{10}e^2c^3B + \frac{1}{9}x^9d^2c^3C + \frac{1}{3}x^9e^2c^2aC + \frac{2}{9}x^9edc^3B + \frac{1}{9}x^9e^2c^3A + \frac{3}{4}x^8edc^2aC + \frac{1}{8}x^8d^2c^3B + \frac{3}{8}x^8e^2c^2aB + \frac{1}{4}x^8edc^3A + \frac{3}{7}x^7d^2c^2aC + \frac{3}{7}x^7e^2ca^2C + \frac{6}{7}x^7edc^2aB + \frac{1}{7}x^7d^2c^3A + \frac{3}{7}x^7e^2c^2aA + x^6edca^2C + \frac{1}{2}x^6d^2c^2aB + \frac{1}{2}x^6e^2ca^2B + x^6edc^2aA + \frac{3}{5}x^5d^2ca^2C + \frac{1}{5}x^5e^2a^3C + \frac{6}{5}x^5edca^2B + \frac{3}{5}x^5d^2c^2aA + \frac{3}{5}x^5e^2ca^2A + \frac{1}{2}x^4eda^3C + \frac{3}{4}x^4d^2ca^2B + \frac{1}{4}x^4e^2a^3B + \frac{3}{2}x^4edca^2A + \frac{1}{3}x^3d^2a^3C + \frac{2}{3}x^3eda^3B + x^3d^2ca^2A + \frac{1}{3}x^3e^2a^3A + \frac{1}{2}x^2d^2a^3B + x^2eda^3A + xd^2a^3A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3*(e*x + d)^2,x, algorithm="fricas")
```

```
[Out] 1/11*x^11*e^2*c^3*C + 1/5*x^10*e*d*c^3*C + 1/10*x^10*e^2*c^3*B +
1/9*x^9*d^2*c^3*C + 1/3*x^9*e^2*c^2*a*C + 2/9*x^9*e*d*c^3*B + 1/9
*x^9*e^2*c^3*A + 3/4*x^8*e*d*c^2*a*C + 1/8*x^8*d^2*c^3*B + 3/8*x^
8*e^2*c^2*a*B + 1/4*x^8*e*d*c^3*A + 3/7*x^7*d^2*c^2*a*C + 3/7*x^7
*e^2*c*a^2*C + 6/7*x^7*e*d*c^2*a*B + 1/7*x^7*d^2*c^3*A + 3/7*x^7*
e^2*c^2*a*A + x^6*e*d*c*a^2*C + 1/2*x^6*d^2*c^2*a*B + 1/2*x^6*e^2
*c*a^2*B + x^6*e*d*c^2*a*A + 3/5*x^5*d^2*c*a^2*C + 1/5*x^5*e^2*a^
3*C + 6/5*x^5*e*d*c*a^2*B + 3/5*x^5*d^2*c^2*a*A + 3/5*x^5*e^2*c*a
^2*A + 1/2*x^4*e*d*a^3*C + 3/4*x^4*d^2*c*a^2*B + 1/4*x^4*e^2*a^3*
B + 3/2*x^4*e*d*c*a^2*A + 1/3*x^3*d^2*a^3*C + 2/3*x^3*e*d*a^3*B +
 x^3*d^2*c*a^2*A + 1/3*x^3*e^2*a^3*A + 1/2*x^2*d^2*a^3*B + x^2*e*
d*a^3*A + x*d^2*a^3*A
```

Sympy [A] time = 0.149652, size = 447, normalized size = 0.89

$$Aa^3d^2x + \frac{Cc^3e^2x^{11}}{11} + x^{10}\left(\frac{Bc^3e^2}{10} + \frac{Cc^3de}{5}\right) + x^9\left(\frac{Ac^3e^2}{9} + \frac{2Bc^3de}{9} + \frac{Cac^2e^2}{3} + \frac{Cc^3d^2}{9}\right) + x^8\left(\frac{Ac^3de}{4} + \frac{3Bac^2e^2}{8} + \frac{Bc^3d^2}{8} + \frac{3Cac^2de}{4}\right) + x^7\left(\frac{3Aac^2e^2}{7} + \frac{Ac^3d^2}{7} + \frac{6Bac^2de}{7} + \frac{3Ca^2ce^2}{7} + \frac{3Cac^2d^2}{7}\right) + x^6\left(Aac^2de + \frac{Ba^2ce^2}{2} + \frac{Bac^2d^2}{2} + Ca^2cde\right) + x^5\left(\frac{3Aa^2ce^2}{5} + \frac{3Aac^2d^2}{5} + \frac{6Ba^2cde}{5} + \frac{Ca^3e^2}{5} + \frac{3Ca^2cd^2}{5}\right) + x^4\left(\frac{3Aa^2cde}{2} + \frac{Ba^3e^2}{4} + \frac{3Ba^2cd^2}{4} + \frac{Ca^3de}{2}\right) + x^3\left(\frac{Aa^3e^2}{3} + Aa^2cd^2 + \frac{2Ba^3de}{3} + \frac{Ca^3d^2}{3}\right) + x^2\left(Aa^3de + \frac{Ba^3d^2}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**2*(c*x**2+a)**3*(C*x**2+B*x+A),x)
```

```
[Out] A*a**3*d**2*x + C*c**3*e**2*x**11/11 + x**10*(B*c**3*e**2/10 + C*
c**3*d*e/5) + x**9*(A*c**3*e**2/9 + 2*B*c**3*d*e/9 + C*a*c**2*e**
2/3 + C*c**3*d**2/9) + x**8*(A*c**3*d*e/4 + 3*B*a*c**2*e**2/8 + B
*c**3*d**2/8 + 3*C*a*c**2*d*e/4) + x**7*(3*A*a*c**2*e**2/7 + A*c*
*3*d**2/7 + 6*B*a*c**2*d*e/7 + 3*C*a**2*c*e**2/7 + 3*C*a*c**2*d**
2/7) + x**6*(A*a*c**2*d*e + B*a**2*c*e**2/2 + B*a*c**2*d**2/2 + C
*a**2*c*d*e) + x**5*(3*A*a**2*c*e**2/5 + 3*A*a*c**2*d**2/5 + 6*B*
a**2*c*d*e/5 + C*a**3*e**2/5 + 3*C*a**2*c*d**2/5) + x**4*(3*A*a**
2*c*d*e/2 + B*a**3*e**2/4 + 3*B*a**2*c*d**2/4 + C*a**3*d*e/2) + x
**3*(A*a**3*e**2/3 + A*a**2*c*d**2 + 2*B*a**3*d*e/3 + C*a**3*d**2
/3) + x**2*(A*a**3*d*e + B*a**3*d**2/2)
```

GIAC/XCAS [A] time = 0.268363, size = 583, normalized size = 1.16

$$\frac{1}{11}\,Cc^{3}x^{11}e^{2}+\frac{1}{5}\,Cc^{3}dx^{10}e+\frac{1}{9}\,Cc^{3}d^{2}x^{9}+\frac{1}{10}\,Bc^{3}x^{10}e^{2}+\frac{2}{9}\,Bc^{3}dx^{9}e+\frac{1}{8}\,Bc^{3}d^{2}x^{8}+\frac{1}{3}\,Cac^{2}x^{9}e^{2}+\frac{1}{9}\,Ac^{3}x^{9}e^{2}+\frac{3}{4}\,Cac^{2}dx^{8}e+\frac{1}{4}\,Ac^{3}dx^{8}e+\frac{3}{7}\,Cac^{2}d^{2}x^{7}+\frac{1}{7}\,Ac^{3}d^{2}x^{7}+\frac{3}{8}\,Bac^{2}x^{8}e^{2}+\frac{6}{7}\,Bac^{2}dx^{7}e+\frac{1}{2}\,Bac^{2}d^{2}x^{6}+\frac{3}{7}\,Ca^{2}cx^{7}e^{2}+\frac{3}{7}\,Aac^{2}x^{7}e^{2}+Ca^{2}cdx^{6}e+Aac^{2}dx^{6}e+\frac{3}{5}\,Ca^{2}cd^{2}x^{5}+\frac{3}{5}\,Aac^{2}d^{2}x^{5}+\frac{1}{2}\,Ba^{2}cx^{6}e^{2}+\frac{6}{5}\,Ba^{2}cdx^{5}e+\frac{3}{4}\,Ba^{2}cd^{2}x^{4}+\frac{1}{5}\,Ca^{3}x^{5}e^{2}+\frac{3}{5}\,Aa^{2}cx^{5}e^{2}+\frac{1}{2}\,Ca^{3}dx^{4}e+\frac{3}{2}\,Aa^{2}cdx^{4}e+\frac{1}{3}\,Ca^{3}d^{2}x^{3}+Aa^{2}cd^{2}x^{3}+\frac{1}{4}\,Ba^{3}x^{4}e^{2}+\frac{2}{3}\,Ba^{3}dx^{3}e+\frac{1}{2}\,Ba^{3}d^{2}x^{2}+\frac{1}{3}\,Aa^{3}x^{3}e^{2}+Aa^{3}dx^{2}e+Aa^{3}d^{2}x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3*(e*x + d)^2,x, algorithm="giac")
```

```
[Out] 1/11*C*c^3*x^11*e^2 + 1/5*C*c^3*d*x^10*e + 1/9*C*c^3*d^2*x^9 + 1/
10*B*c^3*x^10*e^2 + 2/9*B*c^3*d*x^9*e + 1/8*B*c^3*d^2*x^8 + 1/3*C
*a*c^2*x^9*e^2 + 1/9*A*c^3*x^9*e^2 + 3/4*C*a*c^2*d*x^8*e + 1/4*A*
c^3*d*x^8*e + 3/7*C*a*c^2*d^2*x^7 + 1/7*A*c^3*d^2*x^7 + 3/8*B*a*c
^2*x^8*e^2 + 6/7*B*a*c^2*d*x^7*e + 1/2*B*a*c^2*d^2*x^6 + 3/7*C*a^
2*c*x^7*e^2 + 3/7*A*a*c^2*x^7*e^2 + C*a^2*c*d*x^6*e + A*a*c^2*d*x
^6*e + 3/5*C*a^2*c*d^2*x^5 + 3/5*A*a*c^2*d^2*x^5 + 1/2*B*a^2*c*x^
6*e^2 + 6/5*B*a^2*c*d*x^5*e + 3/4*B*a^2*c*d^2*x^4 + 1/5*C*a^3*x^5
*e^2 + 3/5*A*a^2*c*x^5*e^2 + 1/2*C*a^3*d*x^4*e + 3/2*A*a^2*c*d*x^
4*e + 1/3*C*a^3*d^2*x^3 + A*a^2*c*d^2*x^3 + 1/4*B*a^3*x^4*e^2 + 2
/3*B*a^3*d*x^3*e + 1/2*B*a^3*d^2*x^2 + 1/3*A*a^3*x^3*e^2 + A*a^3*
d*x^2*e + A*a^3*d^2*x
```

3.34 $\int (d+ex)\left(a+cx^2\right)^3\left(A+Bx+Cx^2\right)\,dx$

Optimal. Leaf size=196

$$\frac{1}{2}a^3x^2(Ae+Bd)+a^3Adx+\frac{1}{4}a^2x^4(aCe+3Ace+3Bcd)+\frac{1}{3}a^2x^3(aBe+aCd+3Acd)+\frac{1}{8}c^2x^8(3aCe+Ace+Bcd)+\frac{1}{7}c^2x^7(3a(Be+Cd)+Acd)+\frac{1}{2}acx^6(aCe+Ace+Bcd)+\frac{3}{5}acx^5(aBe+aCd+Acd)+\frac{1}{9}c^3x^9(Be+Cd)+\frac{1}{10}c^3Cex^{10}$$

```
[Out] a^3*A*d*x + (a^3*(B*d + A*e)*x^2)/2 + (a^2*(3*A*c*d + a*C*d + a*B
*e)*x^3)/3 + (a^2*(3*B*c*d + 3*A*c*e + a*C*e)*x^4)/4 + (3*a*c*(A*
c*d + a*C*d + a*B*e)*x^5)/5 + (a*c*(B*c*d + A*c*e + a*C*e)*x^6)/2
 + (c^2*(A*c*d + 3*a*(C*d + B*e))*x^7)/7 + (c^2*(B*c*d + A*c*e +
3*a*C*e)*x^8)/8 + (c^3*(C*d + B*e)*x^9)/9 + (c^3*C*e*x^10)/10
```

Rubi [A] time = 0.828136, antiderivative size = 196, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.04

$$\frac{1}{2}a^3x^2(Ae+Bd)+a^3Adx+\frac{1}{4}a^2x^4(aCe+3Ace+3Bcd)+\frac{1}{3}a^2x^3(aBe+aCd+3Acd)+\frac{1}{8}c^2x^8(3aCe+Ace+Bcd)+\frac{1}{7}c^2x^7(3a(Be+Cd)+Acd)+\frac{1}{2}acx^6(aCe+Ace+Bcd)+\frac{3}{5}acx^5(aBe+aCd+Acd)+\frac{1}{9}c^3x^9(Be+Cd)+\frac{1}{10}c^3Cex^{10}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)*(a + c*x^2)^3*(A + B*x + C*x^2),x]
```

```
[Out] a^3*A*d*x + (a^3*(B*d + A*e)*x^2)/2 + (a^2*(3*A*c*d + a*C*d + a*B
*e)*x^3)/3 + (a^2*(3*B*c*d + 3*A*c*e + a*C*e)*x^4)/4 + (3*a*c*(A*
c*d + a*C*d + a*B*e)*x^5)/5 + (a*c*(B*c*d + A*c*e + a*C*e)*x^6)/2
 + (c^2*(A*c*d + 3*a*(C*d + B*e))*x^7)/7 + (c^2*(B*c*d + A*c*e +
3*a*C*e)*x^8)/8 + (c^3*(C*d + B*e)*x^9)/9 + (c^3*C*e*x^10)/10
```

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

$$\frac{Cc^3ex^{10}}{10}+a^3d\int A\,dx+a^3\left(Ae+Bd\right)\int x\,dx+\frac{a^2x^4\left(3Ace+3Bcd+Cae\right)}{4}+\frac{a^2x^3\left(3Acd+Bae+Cad\right)}{3}+\frac{acx^6\left(Ace+Bcd+Cae\right)}{2}+\frac{3acx^5\left(Acd+Bae+Cad\right)}{5}+\frac{c^3x^9\left(Be+Cd\right)}{9}+\frac{c^2x^8\left(Ace+Bcd+3Cae\right)}{8}+\frac{c^2x^7\left(Acd+3Bae+3Cad\right)}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)*(c*x**2+a)**3*(C*x**2+B*x+A),x)
```

```
[Out] C*c**3*e*x**10/10 + a**3*d*Integral(A, x) + a**3*(A*e + B*d)*Inte
gral(x, x) + a**2*x**4*(3*A*c*e + 3*B*c*d + C*a*e)/4 + a**2*x**3*
(3*A*c*d + B*a*e + C*a*d)/3 + a*c*x**6*(A*c*e + B*c*d + C*a*e)/2
+ 3*a*c*x**5*(A*c*d + B*a*e + C*a*d)/5 + c**3*x**9*(B*e + C*d)/9
+ c**2*x**8*(A*c*e + B*c*d + 3*C*a*e)/8 + c**2*x**7*(A*c*d + 3*B*
a*e + 3*C*a*d)/7
```

Mathematica [A] time = 0.185925, size = 196, normalized size = 1.

$$\frac{1}{2}a^3x^2(Ae+Bd)+a^3Adx+\frac{1}{4}a^2x^4(aCe+3Ace+3Bcd)+\frac{1}{3}a^2x^3(aBe+aCd+3Acd)+\frac{1}{8}c^2x^8(3aCe+Ace+Bcd)+\frac{1}{7}c^2x^7(3aBe+3aCd+Acd)+\frac{1}{2}acx^6(aCe+Ace+Bcd)+\frac{3}{5}acx^5(aBe+aCd+Acd)+\frac{1}{9}c^3x^9(Be+Cd)+\frac{1}{10}c^3Cex^{10}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x)*(a + c*x^2)^3*(A + B*x + C*x^2),x]
```

```
[Out] a^3*A*d*x + (a^3*(B*d + A*e)*x^2)/2 + (a^2*(3*A*c*d + a*C*d + a*B
*e)*x^3)/3 + (a^2*(3*B*c*d + 3*A*c*e + a*C*e)*x^4)/4 + (3*a*c*(A*
c*d + a*C*d + a*B*e)*x^5)/5 + (a*c*(B*c*d + A*c*e + a*C*e)*x^6)/2
 + (c^2*(A*c*d + 3*a*C*d + 3*a*B*e)*x^7)/7 + (c^2*(B*c*d + A*c*e
+ 3*a*C*e)*x^8)/8 + (c^3*(C*d + B*e)*x^9)/9 + (c^3*C*e*x^10)/10
```

Maple [A] time = 0.002, size = 223, normalized size = 1.1

$$\frac{c^3Cex^{10}}{10}+\frac{\left(ec^3B+c^3dC\right)x^9}{9}+\frac{\left(ec^3A+c^3dB+3\,eac^2C\right)x^8}{8}+\frac{\left(c^3dA+3\,eac^2B+3\,dac^2C\right)x^7}{7}+\frac{\left(3\,eac^2A+3\,dac^2B+3\,ea^2cC\right)x^6}{6}+\frac{\left(3\,dac^2A+3\,ea^2cB+3\,da^2cC\right)x^5}{5}+\frac{\left(3\,ea^2cA+3\,da^2cB+ea^3C\right)x^4}{4}+\frac{\left(3\,da^2cA+ea^3B+da^3C\right)x^3}{3}+\frac{\left(ea^3A+da^3B\right)x^2}{2}+a^3Adx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)*(c*x^2+a)^3*(C*x^2+B*x+A),x)
```

```
[Out] 1/10*c^3*C*e*x^10+1/9*(B*c^3*e+C*c^3*d)*x^9+1/8*(A*c^3*e+B*c^3*d+
3*C*a*c^2*e)*x^8+1/7*(A*c^3*d+3*B*a*c^2*e+3*C*a*c^2*d)*x^7+1/6*(3
*A*a*c^2*e+3*B*a*c^2*d+3*C*a^2*c*e)*x^6+1/5*(3*A*a*c^2*d+3*B*a^2*
c*e+3*C*a^2*c*d)*x^5+1/4*(3*A*a^2*c*e+3*B*a^2*c*d+C*a^3*e)*x^4+1/
3*(3*A*a^2*c*d+B*a^3*e+C*a^3*d)*x^3+1/2*(A*a^3*e+B*a^3*d)*x^2+a^3
*A*d*x
```

Maxima [A] time = 0.705392, size = 300, normalized size = 1.53

$$\frac{1}{10}Cc^3ex^{10}+\frac{1}{9}\left(Cc^3d+Bc^3e\right)x^9+\frac{1}{8}\left(Bc^3d+\left(3\,Cac^2+Ac^3\right)e\right)x^8+\frac{1}{7}\left(3\,Bac^2e+\left(3\,Cac^2+Ac^3\right)d\right)x^7+\frac{1}{2}\left(Bac^2d+\left(Ca^2c+Aac^2\right)e\right)x^6+Aa^3dx+\frac{3}{5}\left(Ba^2ce+\left(Ca^2c+Aac^2\right)d\right)x^5+\frac{1}{4}\left(3\,Ba^2cd+\left(Ca^3+3\,Aa^2c\right)e\right)x^4+\frac{1}{3}\left(Ba^3e+\left(Ca^3+3\,Aa^2c\right)d\right)x^3+\frac{1}{2}\left(Ba^3d+Aa^3e\right)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3*(e*x + d),x, algorithm="maxima")
```

```
[Out] 1/10*C*c^3*e*x^10 + 1/9*(C*c^3*d + B*c^3*e)*x^9 + 1/8*(B*c^3*d +
(3*C*a*c^2 + A*c^3)*e)*x^8 + 1/7*(3*B*a*c^2*e + (3*C*a*c^2 + A*c^
3)*d)*x^7 + 1/2*(B*a*c^2*d + (C*a^2*c + A*a*c^2)*e)*x^6 + A*a^3*d
*x + 3/5*(B*a^2*c*e + (C*a^2*c + A*a*c^2)*d)*x^5 + 1/4*(3*B*a^2*c
*d + (C*a^3 + 3*A*a^2*c)*e)*x^4 + 1/3*(B*a^3*e + (C*a^3 + 3*A*a^2
*c)*d)*x^3 + 1/2*(B*a^3*d + A*a^3*e)*x^2
```

Fricas [A] time = 0.241388, size = 1, normalized size = 0.01

$$\frac{1}{10}x^{10}ec^3C+\frac{1}{9}x^9dc^3C+\frac{1}{9}x^9ec^3B+\frac{3}{8}x^8ec^2aC+\frac{1}{8}x^8dc^3B+\frac{1}{8}x^8ec^3A+\frac{3}{7}x^7dc^2aC+\frac{3}{7}x^7ec^2aB+\frac{1}{7}x^7dc^3A+\frac{1}{2}x^6eca^2C+\frac{1}{2}x^6dc^2aB+\frac{1}{2}x^6ec^2aA+\frac{3}{5}x^5dca^2C+\frac{3}{5}x^5eca^2B+\frac{3}{5}x^5dc^2aA+\frac{1}{4}x^4ea^3C+\frac{3}{4}x^4dca^2B+\frac{3}{4}x^4eca^2A+\frac{1}{3}x^3da^3C+\frac{1}{3}x^3ea^3B+x^3dca^2A+\frac{1}{2}x^2da^3B+\frac{1}{2}x^2ea^3A+xda^3A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3*(e*x + d),x, algorithm="fricas")
```

```
[Out] 1/10*x^10*e*c^3*C + 1/9*x^9*d*c^3*C + 1/9*x^9*e*c^3*B + 3/8*x^8*e
*c^2*a*C + 1/8*x^8*d*c^3*B + 1/8*x^8*e*c^3*A + 3/7*x^7*d*c^2*a*C
+ 3/7*x^7*e*c^2*a*B + 1/7*x^7*d*c^3*A + 1/2*x^6*e*c*a^2*C + 1/2*x
^6*d*c^2*a*B + 1/2*x^6*e*c^2*a*A + 3/5*x^5*d*c*a^2*C + 3/5*x^5*e*
c*a^2*B + 3/5*x^5*d*c^2*a*A + 1/4*x^4*e*a^3*C + 3/4*x^4*d*c*a^2*B
```

```
 + 3/4*x^4*e*c*a^2*A + 1/3*x^3*d*a^3*C + 1/3*x^3*e*a^3*B + x^3*d*
c*a^2*A + 1/2*x^2*d*a^3*B + 1/2*x^2*e*a^3*A + x*d*a^3*A
```

Sympy [A] time = 0.110459, size = 265, normalized size = 1.35

$$Aa^3dx + \frac{Cc^3ex^{10}}{10} + x^9\left(\frac{Bc^3e}{9} + \frac{Cc^3d}{9}\right) + x^8\left(\frac{Ac^3e}{8} + \frac{Bc^3d}{8} + \frac{3Cac^2e}{8}\right) + x^7\left(\frac{Ac^3d}{7} + \frac{3Bac^2e}{7} + \frac{3Cac^2d}{7}\right) + x^6\left(\frac{Aac^2e}{2} + \frac{Bac^2d}{2} + \frac{Ca^2ce}{2}\right) + x^5\left(\frac{3Aac^2d}{5} + \frac{3Ba^2ce}{5} + \frac{3Ca^2cd}{5}\right) + x^4\left(\frac{3Aa^2ce}{4} + \frac{3Ba^2cd}{4} + \frac{Ca^3e}{4}\right) + x^3\left(Aa^2cd + \frac{Ba^3e}{3} + \frac{Ca^3d}{3}\right) + x^2\left(\frac{Aa^3e}{2} + \frac{Ba^3d}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)*(c*x**2+a)**3*(C*x**2+B*x+A),x)
```

```
[Out] A*a**3*d*x + C*c**3*e*x**10/10 + x**9*(B*c**3*e/9 + C*c**3*d/9) +
 x**8*(A*c**3*e/8 + B*c**3*d/8 + 3*C*a*c**2*e/8) + x**7*(A*c**3*d
/7 + 3*B*a*c**2*e/7 + 3*C*a*c**2*d/7) + x**6*(A*a*c**2*e/2 + B*a*
c**2*d/2 + C*a**2*c*e/2) + x**5*(3*A*a*c**2*d/5 + 3*B*a**2*c*e/5
+ 3*C*a**2*c*d/5) + x**4*(3*A*a**2*c*e/4 + 3*B*a**2*c*d/4 + C*a**
3*e/4) + x**3*(A*a**2*c*d + B*a**3*e/3 + C*a**3*d/3) + x**2*(A*a*
*3*e/2 + B*a**3*d/2)
```

GIAC/XCAS [A] time = 0.269347, size = 352, normalized size = 1.8

$$\frac{1}{10}Cc^3x^{10}e + \frac{1}{9}Cc^3dx^9 + \frac{1}{9}Bc^3x^9e + \frac{1}{8}Bc^3dx^8 + \frac{3}{8}Cac^2x^8e + \frac{1}{8}Ac^3x^8e + \frac{3}{7}Cac^2dx^7 + \frac{1}{7}Ac^3dx^7 + \frac{3}{7}Bac^2x^7e + \frac{1}{2}Bac^2dx^6 + \frac{1}{2}Ca^2cx^6e + \frac{1}{2}Aac^2x^6e + \frac{3}{5}Ca^2cdx^5 + \frac{3}{5}Aac^2dx^5 + \frac{3}{5}Ba^2cx^5e + \frac{3}{4}Ba^2cdx^4 + \frac{1}{4}Ca^3x^4e + \frac{3}{4}Aa^2cx^4e + \frac{1}{3}Ca^3dx^3 + Aa^2cdx^3 + \frac{1}{3}Ba^3x^3e + \frac{1}{2}Ba^3dx^2 + \frac{1}{2}Aa^3x^2e + Aa^3dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3*(e*x + d),x, algorithm="giac")
```

```
[Out] 1/10*C*c^3*x^10*e + 1/9*C*c^3*d*x^9 + 1/9*B*c^3*x^9*e + 1/8*B*c^3
*d*x^8 + 3/8*C*a*c^2*x^8*e + 1/8*A*c^3*x^8*e + 3/7*C*a*c^2*d*x^7
+ 1/7*A*c^3*d*x^7 + 3/7*B*a*c^2*x^7*e + 1/2*B*a*c^2*d*x^6 + 1/2*C
*a^2*c*x^6*e + 1/2*A*a*c^2*x^6*e + 3/5*C*a^2*c*d*x^5 + 3/5*A*a*c^
2*d*x^5 + 3/5*B*a^2*c*x^5*e + 3/4*B*a^2*c*d*x^4 + 1/4*C*a^3*x^4*e
 + 3/4*A*a^2*c*x^4*e + 1/3*C*a^3*d*x^3 + A*a^2*c*d*x^3 + 1/3*B*a^
3*x^3*e + 1/2*B*a^3*d*x^2 + 1/2*A*a^3*x^2*e + A*a^3*d*x
```

3.35 $\int \left(a+cx^2\right)^3 \left(A+Bx+Cx^2\right) dx$

Optimal. Leaf size=116

$$a^3Ax+\frac{1}{2}a^3Bx^2+\frac{1}{3}a^2x^3(aC+3Ac)+\frac{3}{4}a^2Bcx^4+\frac{1}{7}c^2x^7(3aC+Ac)+\frac{3}{5}acx^5(aC+Ac)+\frac{1}{2}aBc^2x^6+\frac{1}{8}Bc^3x^8+\frac{1}{9}c^3Cx^9$$

```
[Out] a^3*A*x + (a^3*B*x^2)/2 + (a^2*(3*A*c + a*C)*x^3)/3 + (3*a^2*B*c*
x^4)/4 + (3*a*c*(A*c + a*C)*x^5)/5 + (a*B*c^2*x^6)/2 + (c^2*(A*c
+ 3*a*C)*x^7)/7 + (B*c^3*x^8)/8 + (c^3*C*x^9)/9
```

Rubi [A] time = 0.195438, antiderivative size = 116, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$a^3Ax+\frac{1}{2}a^3Bx^2+\frac{1}{3}a^2x^3(aC+3Ac)+\frac{3}{4}a^2Bcx^4+\frac{1}{7}c^2x^7(3aC+Ac)+\frac{3}{5}acx^5(aC+Ac)+\frac{1}{2}aBc^2x^6+\frac{1}{8}Bc^3x^8+\frac{1}{9}c^3Cx^9$$

Antiderivative was successfully verified.

```
[In]  Int[(a + c*x^2)^3*(A + B*x + C*x^2),x]
```

```
[Out] a^3*A*x + (a^3*B*x^2)/2 + (a^2*(3*A*c + a*C)*x^3)/3 + (3*a^2*B*c*
x^4)/4 + (3*a*c*(A*c + a*C)*x^5)/5 + (a*B*c^2*x^6)/2 + (c^2*(A*c
+ 3*a*C)*x^7)/7 + (B*c^3*x^8)/8 + (c^3*C*x^9)/9
```

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

$$\frac{B\left(a+cx^2\right)^4}{8c}+\frac{Cc^3x^9}{9}+a^3\int A\,dx+\frac{a^2x^3\,(3Ac+Ca)}{3}+\frac{3acx^5\,(Ac+Ca)}{5}+\frac{c^2x^7\,(Ac+3Ca)}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+a)**3*(C*x**2+B*x+A),x)
```

```
[Out] B*(a + c*x**2)**4/(8*c) + C*c**3*x**9/9 + a**3*Integral(A, x) + a
**2*x**3*(3*A*c + C*a)/3 + 3*a*c*x**5*(A*c + C*a)/5 + c**2*x**7*(
A*c + 3*C*a)/7
```

Mathematica [A] time = 0.0614271, size = 100, normalized size = 0.86

$$\frac{1}{6}a^3x(6A+x(3B+2Cx))+\frac{1}{20}a^2cx^3(20A+3x(5B+4Cx))+\frac{1}{70}ac^2x^5(42A+5x(7B+6Cx))+\frac{1}{504}c^3x^7(72A+7x(9B+8Cx))$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + c*x^2)^3*(A + B*x + C*x^2),x]
```

```
[Out] (a^3*x*(6*A + x*(3*B + 2*C*x)))/6 + (a^2*c*x^3*(20*A + 3*x*(5*B +
 4*C*x)))/20 + (a*c^2*x^5*(42*A + 5*x*(7*B + 6*C*x)))/70 + (c^3*x
^7*(72*A + 7*x*(9*B + 8*C*x)))/504
```

Maple [A] time = 0.001, size = 111, normalized size = 1.

$$\frac{c^3Cx^9}{9}+\frac{Bc^3x^8}{8}+\frac{\left(c^3A+3\,ac^2C\right)x^7}{7}+\frac{aBc^2x^6}{2}+\frac{\left(3\,ac^2A+3\,a^2cC\right)x^5}{5}+\frac{3\,a^2Bcx^4}{4}+\frac{\left(3\,a^2cA+a^3C\right)x^3}{3}+\frac{a^3Bx^2}{2}+a^3Ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^3*(C*x^2+B*x+A),x)
```

```
[Out] 1/9*c^3*C*x^9+1/8*B*c^3*x^8+1/7*(A*c^3+3*C*a*c^2)*x^7+1/2*a*B*c^2
*x^6+1/5*(3*A*a*c^2+3*C*a^2*c)*x^5+3/4*a^2*B*c*x^4+1/3*(3*A*a^2*c
+C*a^3)*x^3+1/2*a^3*B*x^2+a^3*A*x
```

Maxima [A] time = 0.698958, size = 146, normalized size = 1.26

$$\frac{1}{9}\,Cc^3x^9+\frac{1}{8}\,Bc^3x^8+\frac{1}{2}\,Bac^2x^6+\frac{3}{4}\,Ba^2cx^4+\frac{1}{7}\left(3\,Cac^2+Ac^3\right)x^7+\frac{1}{2}\,Ba^3x^2+\frac{3}{5}\left(Ca^2c+Aac^2\right)x^5+Aa^3x+\frac{1}{3}\left(Ca^3+3\,Aa^2c\right)x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3,x, algorithm="maxima")
```

```
[Out] 1/9*C*c^3*x^9 + 1/8*B*c^3*x^8 + 1/2*B*a*c^2*x^6 + 3/4*B*a^2*c*x^4
 + 1/7*(3*C*a*c^2 + A*c^3)*x^7 + 1/2*B*a^3*x^2 + 3/5*(C*a^2*c + A
*a*c^2)*x^5 + A*a^3*x + 1/3*(C*a^3 + 3*A*a^2*c)*x^3
```

Fricas [A] time = 0.239932, size = 1, normalized size = 0.01

$$\frac{1}{9}x^9c^3C + \frac{1}{8}x^8c^3B + \frac{3}{7}x^7c^2aC + \frac{1}{7}x^7c^3A + \frac{1}{2}x^6c^2aB + \frac{3}{5}x^5ca^2C + \frac{3}{5}x^5c^2aA + \frac{3}{4}x^4ca^2B + \frac{1}{3}x^3a^3C + x^3ca^2A + \frac{1}{2}x^2a^3B + xa^3A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3,x, algorithm="fricas")
```

```
[Out] 1/9*x^9*c^3*C + 1/8*x^8*c^3*B + 3/7*x^7*c^2*a*C + 1/7*x^7*c^3*A +
 1/2*x^6*c^2*a*B + 3/5*x^5*c*a^2*C + 3/5*x^5*c^2*a*A + 3/4*x^4*c*
a^2*B + 1/3*x^3*a^3*C + x^3*c*a^2*A + 1/2*x^2*a^3*B + x*a^3*A
```

Sympy [A] time = 0.07806, size = 122, normalized size = 1.05

$$Aa^3x + \frac{Ba^3x^2}{2} + \frac{3Ba^2cx^4}{4} + \frac{Bac^2x^6}{2} + \frac{Bc^3x^8}{8} + \frac{Cc^3x^9}{9} + x^7\left(\frac{Ac^3}{7} + \frac{3Cac^2}{7}\right) + x^5\left(\frac{3Aac^2}{5} + \frac{3Ca^2c}{5}\right) + x^3\left(Aa^2c + \frac{Ca^3}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)**3*(C*x**2+B*x+A),x)
```

```
[Out] A*a**3*x + B*a**3*x**2/2 + 3*B*a**2*c*x**4/4 + B*a*c**2*x**6/2 +
B*c**3*x**8/8 + C*c**3*x**9/9 + x**7*(A*c**3/7 + 3*C*a*c**2/7) +
x**5*(3*A*a*c**2/5 + 3*C*a**2*c/5) + x**3*(A*a**2*c + C*a**3/3)
```

GIAC/XCAS [A] time = 0.268352, size = 150, normalized size = 1.29

$$\frac{1}{9}Cc^3x^9 + \frac{1}{8}Bc^3x^8 + \frac{3}{7}Cac^2x^7 + \frac{1}{7}Ac^3x^7 + \frac{1}{2}Bac^2x^6 + \frac{3}{5}Ca^2cx^5 + \frac{3}{5}Aac^2x^5 + \frac{3}{4}Ba^2cx^4 + \frac{1}{3}Ca^3x^3 + Aa^2cx^3 + \frac{1}{2}Ba^3x^2 + Aa^3x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3,x, algorithm="giac")
```

```
[Out] 1/9*C*c^3*x^9 + 1/8*B*c^3*x^8 + 3/7*C*a*c^2*x^7 + 1/7*A*c^3*x^7 +
 1/2*B*a*c^2*x^6 + 3/5*C*a^2*c*x^5 + 3/5*A*a*c^2*x^5 + 3/4*B*a^2*
c*x^4 + 1/3*C*a^3*x^3 + A*a^2*c*x^3 + 1/2*B*a^3*x^2 + A*a^3*x
```

3.36 $\int \frac{(a+cx^2)^3(A+Bx+Cx^2)}{d+ex}\,dx$

Optimal. Leaf size=490

$$\frac{c(d+ex)^4\left(3a^2Ce^4+3ace^2\left(15Cd^2-e(5Bd-Ae)\right)+5c^2d^2\left(14Cd^2-e(7Bd-3Ae)\right)\right)}{4e^9}+\frac{(d+ex)^2\left(ae^2+cd^2\right)\left(a^2Ce^4+ace^2\left(17Cd^2-3e(3Bd-Ae)\right)+c^2d^2\left(28Cd^2-3e(7Bd-5Ae)\right)\right)}{2e^9}-\frac{c(d+ex)^3\left(3a^2e^4(4Cd-Be)+6acde^2\left(10Cd^2-e(5Bd-2Ae)\right)+c^2d^3\left(56Cd^2-5e(7Bd-4Ae)\right)\right)}{3e^9}+\frac{c^2(d+ex)^6\left(3aCe^2+c\left(28Cd^2-e(7Bd-Ae)\right)\right)}{6e^9}-\frac{c^2(d+ex)^5\left(3ae^2(6Cd-Be)+cd\left(56Cd^2-3e(7Bd-2Ae)\right)\right)}{5e^9}+\frac{\left(ae^2+cd^2\right)^3\log(d+ex)\left(Ae^2-Bde+Cd^2\right)}{e^9}-\frac{x\left(ae^2+cd^2\right)^2\left(ae^2(2Cd-Be)+cd\left(8Cd^2-e(7Bd-6Ae)\right)\right)}{e^8}-\frac{c^3(d+ex)^7(8Cd-Be)}{7e^9}+\frac{c^3C(d+ex)^8}{8e^9}$$

```
[Out] -((((c*d^2 + a*e^2)^2*(a*e^2*(2*C*d - B*e) + c*d*(8*C*d^2 - e*(7*B
*d - 6*A*e)))*x)/e^8) + ((c*d^2 + a*e^2)*(a^2*C*e^4 + c^2*d^2*(28
*C*d^2 - 3*e*(7*B*d - 5*A*e)) + a*c*e^2*(17*C*d^2 - 3*e*(3*B*d -
A*e)))*(d + e*x)^2)/(2*e^9) - (c*(3*a^2*e^4*(4*C*d - B*e) + c^2*d
^3*(56*C*d^2 - 5*e*(7*B*d - 4*A*e)) + 6*a*c*d*e^2*(10*C*d^2 - e*(
5*B*d - 2*A*e)))*(d + e*x)^3)/(3*e^9) + (c*(3*a^2*C*e^4 + 5*c^2*d
^2*(14*C*d^2 - e*(7*B*d - 3*A*e)) + 3*a*c*e^2*(15*C*d^2 - e*(5*B*
d - A*e)))*(d + e*x)^4)/(4*e^9) - (c^2*(3*a*e^2*(6*C*d - B*e) + c
*d*(56*C*d^2 - 3*e*(7*B*d - 2*A*e)))*(d + e*x)^5)/(5*e^9) + (c^2*
(3*a*C*e^2 + c*(28*C*d^2 - e*(7*B*d - A*e)))*(d + e*x)^6)/(6*e^9)
 - (c^3*(8*C*d - B*e)*(d + e*x)^7)/(7*e^9) + (c^3*C*(d + e*x)^8)/
(8*e^9) + ((c*d^2 + a*e^2)^3*(C*d^2 - B*d*e + A*e^2)*Log[d + e*x]
)/e^9
```

Rubi [A] time = 2.60599, antiderivative size = 487, normalized size of antiderivative = 0.99, number

of steps used = 2, number of rules used = 1, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.037$

$$\frac{c(d+ex)^4\left(3a^2Ce^4+3ace^2\left(15Cd^2-e(5Bd-Ae)\right)+5c^2\left(14Cd^4-d^2e(7Bd-3Ae)\right)\right)}{4e^9}+\frac{(d+ex)^2\left(ae^2+cd^2\right)\left(a^2Ce^4+ace^2\left(17Cd^2-3e(3Bd-Ae)\right)+c^2\left(28Cd^4-3d^2e(7Bd-5Ae)\right)\right)}{2e^9}-\frac{c(d+ex)^3\left(3a^2e^4(4Cd-Be)+6acde^2\left(10Cd^2-e(5Bd-2Ae)\right)+c^2\left(56Cd^5-5d^3e(7Bd-4Ae)\right)\right)}{3e^9}-\frac{c^2(d+ex)^5\left(3ae^2(6Cd-Be)-3cde(7Bd-2Ae)+56cCd^3\right)}{5e^9}+\frac{c^2(d+ex)^6\left(3aCe^2-ce(7Bd-Ae)+28cCd^2\right)}{6e^9}+\frac{\left(ae^2+cd^2\right)^3\log(d+ex)\left(Ae^2-Bde+Cd^2\right)}{e^9}-\frac{x\left(ae^2+cd^2\right)^2\left(ae^2(2Cd-Be)-cde(7Bd-6Ae)+8cCd^3\right)}{e^8}-\frac{c^3(d+ex)^7(8Cd-Be)}{7e^9}+\frac{c^3C(d+ex)^8}{8e^9}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)^3*(A + B*x + C*x^2))/(d + e*x),x]
```

```
[Out] -((((c*d^2 + a*e^2)^2*(8*c*C*d^3 - c*d*e*(7*B*d - 6*A*e) + a*e^2*(
2*C*d - B*e))*x)/e^8) + ((c*d^2 + a*e^2)*(a^2*C*e^4 + c^2*(28*C*d
^4 - 3*d^2*e*(7*B*d - 5*A*e)) + a*c*e^2*(17*C*d^2 - 3*e*(3*B*d -
A*e)))*(d + e*x)^2)/(2*e^9) - (c*(3*a^2*e^4*(4*C*d - B*e) + c^2*(
56*C*d^5 - 5*d^3*e*(7*B*d - 4*A*e)) + 6*a*c*d*e^2*(10*C*d^2 - e*(
5*B*d - 2*A*e)))*(d + e*x)^3)/(3*e^9) + (c*(3*a^2*C*e^4 + 5*c^2*(
14*C*d^4 - d^2*e*(7*B*d - 3*A*e)) + 3*a*c*e^2*(15*C*d^2 - e*(5*B*
d - A*e)))*(d + e*x)^4)/(4*e^9) - (c^2*(56*c*C*d^3 - 3*c*d*e*(7*B
*d - 2*A*e) + 3*a*e^2*(6*C*d - B*e))*(d + e*x)^5)/(5*e^9) + (c^2*
(28*c*C*d^2 + 3*a*C*e^2 - c*e*(7*B*d - A*e))*(d + e*x)^6)/(6*e^9)
 - (c^3*(8*C*d - B*e)*(d + e*x)^7)/(7*e^9) + (c^3*C*(d + e*x)^8)/
(8*e^9) + ((c*d^2 + a*e^2)^3*(C*d^2 - B*d*e + A*e^2)*Log[d + e*x]
)/e^9
```

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((c*x**2+a)**3*(C*x**2+B*x+A)/(e*x+d),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 2.43044, size = 498, normalized size = 1.02

$$\frac{x \left(420a^3e^6(2Be-2Cd+Cex)+210a^2ce^4 \left(2e \left(3Ae(ex-2d)+B \left(6d^2-3dex+2e^2x^2\right)\right)+C \left(-12d^3+6d^2ex-4de^2x^2+3e^3\right.\right.\right.}{}$$

$$+\frac{\left(ae^2+cd^2\right)^3 \log(d+ex) \left(e(Ae-Bd)+Cd^2\right)}{e^9}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)^3*(A + B*x + C*x^2))/(d + e*x),x]
```

```
[Out] (x*(420*a^3*e^6*(-2*C*d + 2*B*e + C*e*x) + 210*a^2*c*e^4*(C*(-12*
d^3 + 6*d^2*e*x - 4*d*e^2*x^2 + 3*e^3*x^3) + 2*e*(3*A*e*(-2*d + e
*x) + B*(6*d^2 - 3*d*e*x + 2*e^2*x^2))) + 42*a*c^2*e^2*(C*(-60*d^
5 + 30*d^4*e*x - 20*d^3*e^2*x^2 + 15*d^2*e^3*x^3 - 12*d*e^4*x^4 +
 10*e^5*x^5) + e*(5*A*e*(-12*d^3 + 6*d^2*e*x - 4*d*e^2*x^2 + 3*e^
3*x^3) + B*(60*d^4 - 30*d^3*e*x + 20*d^2*e^2*x^2 - 15*d*e^3*x^3 +
 12*e^4*x^4))) + c^3*(C*(-840*d^7 + 420*d^6*e*x - 280*d^5*e^2*x^2
 + 210*d^4*e^3*x^3 - 168*d^3*e^4*x^4 + 140*d^2*e^5*x^5 - 120*d*e^
6*x^6 + 105*e^7*x^7) + 2*e*(7*A*e*(-60*d^5 + 30*d^4*e*x - 20*d^3*
e^2*x^2 + 15*d^2*e^3*x^3 - 12*d*e^4*x^4 + 10*e^5*x^5) + B*(420*d^
6 - 210*d^5*e*x + 140*d^4*e^2*x^2 - 105*d^3*e^3*x^3 + 84*d^2*e^4*
x^4 - 70*d*e^5*x^5 + 60*e^6*x^6)))))/(840*e^8) + ((c*d^2 + a*e^2)
^3*(C*d^2 + e*(-(B*d) + A*e))*Log[d + e*x])/e^9
```

Maple [A] time = 0.011, size = 880, normalized size = 1.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^3*(C*x^2+B*x+A)/(e*x+d),x)
```

```
[Out] 1/6/e*A*x^6*c^3+1/2/e*C*x^2*a^3+1/e*B*a^3*x+1/8/e*C*c^3*x^8+1/e*l
n(e*x+d)*A*a^3+1/7/e*B*x^7*c^3-1/6/e^2*B*x^6*c^3*d+3/4/e*A*x^4*a*
c^2+3/2/e^3*C*x^2*a^2*c*d^2+3/2/e^5*C*x^2*a*c^2*d^4+3/2/e^3*A*x^2
*a*c^2*d^2-3/e^6*C*a*c^2*d^5*x+3/e^5*B*a*c^2*d^4*x-3/2/e^2*B*x^2*
a^2*c*d-3/2/e^4*B*x^2*a*c^2*d^3-1/e^2*A*x^3*a*c^2*d-1/e^4*C*x^3*a
*c^2*d^3+3/4/e^3*C*x^4*a*c^2*d^2-3/4/e^2*B*x^4*a*c^2*d-3/e^2*A*a^
2*c*d*x+3/e^3*B*a^2*c*d^2*x+3/e^3*ln(e*x+d)*A*a^2*c*d^2+3/e^5*ln(
e*x+d)*A*a*c^2*d^4-3/e^4*ln(e*x+d)*B*a^2*c*d^3-3/e^6*ln(e*x+d)*B*
a*c^2*d^5+3/e^5*ln(e*x+d)*C*a^2*c*d^4+3/e^7*ln(e*x+d)*C*a*c^2*d^6
+3/2/e*A*x^2*a^2*c-1/3/e^6*C*x^3*c^3*d^5+1/4/e^3*A*x^4*c^3*d^2+1/
5/e^3*B*x^5*c^3*d^2-1/7/e^2*C*x^7*c^3*d+1/3/e^5*B*x^3*c^3*d^4+1/e
^7*ln(e*x+d)*A*c^3*d^6-1/e^2*ln(e*x+d)*B*a^3*d-1/e^8*ln(e*x+d)*B*
c^3*d^7+1/e^3*ln(e*x+d)*C*a^3*d^2+1/e^9*ln(e*x+d)*C*c^3*d^8+1/e*B
*x^3*a^2*c+1/e^7*B*c^3*d^6*x-1/5/e^4*C*x^5*c^3*d^3-1/3/e^4*A*x^3*
```

```
c^3*d^3+1/4/e^5*C*x^4*c^3*d^4+3/4/e*C*x^4*a^2*c-1/4/e^4*B*x^4*c^3
*d^3+1/2/e*C*x^6*a*c^2+1/6/e^3*C*x^6*c^3*d^2-1/5/e^2*A*x^5*c^3*d-
1/e^6*A*c^3*d^5*x+1/2/e^5*A*x^2*c^3*d^4-1/e^8*C*c^3*d^7*x-1/e^2*C
*a^3*d*x+3/5/e*B*x^5*a*c^2+1/2/e^7*C*x^2*c^3*d^6-1/2/e^6*B*x^2*c^
3*d^5-3/e^4*C*a^2*c*d^3*x-1/e^2*C*x^3*a^2*c*d-3/5/e^2*C*x^5*a*c^2
*d+1/e^3*B*x^3*a*c^2*d^2-3/e^4*A*a*c^2*d^3*x
```

Maxima [A] time = 0.710614, size = 907, normalized size = 1.85

$$\frac{105\,Cc^3e^7x^8 - 120\left(Cc^3de^6 - Bc^3e^7\right)x^7 + 140\left(Cc^3d^2e^5 - Bc^3de^6 + \left(3\,Cac^2 + Ac^3\right)e^7\right)x^6 - 168\left(Cc^3d^3e^4 - Bc^3d^2e^5 - 3\,Bac^2\right.}{}$$

$$+\frac{\left(Cc^3d^8 - Bc^3d^7e - 3\,Bac^2d^5e^3 - 3\,Ba^2cd^3e^5 - Ba^3de^7 + Aa^3e^8 + \left(3\,Cac^2 + Ac^3\right)d^6e^2 + 3\left(Ca^2c + Aac^2\right)d^4e^4 + \left(Ca^3 + 3\,Aa\right.\right.}{e^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3/(e*x + d),x, algorithm="maxima")
```

```
[Out] 1/840*(105*C*c^3*e^7*x^8 - 120*(C*c^3*d*e^6 - B*c^3*e^7)*x^7 + 14
0*(C*c^3*d^2*e^5 - B*c^3*d*e^6 + (3*C*a*c^2 + A*c^3)*e^7)*x^6 - 1
68*(C*c^3*d^3*e^4 - B*c^3*d^2*e^5 - 3*B*a*c^2*e^7 + (3*C*a*c^2 +
A*c^3)*d*e^6)*x^5 + 210*(C*c^3*d^4*e^3 - B*c^3*d^3*e^4 - 3*B*a*c^
2*d*e^6 + (3*C*a*c^2 + A*c^3)*d^2*e^5 + 3*(C*a^2*c + A*a*c^2)*e^7
)*x^4 - 280*(C*c^3*d^5*e^2 - B*c^3*d^4*e^3 - 3*B*a*c^2*d^2*e^5 -
3*B*a^2*c*e^7 + (3*C*a*c^2 + A*c^3)*d^3*e^4 + 3*(C*a^2*c + A*a*c^
2)*d*e^6)*x^3 + 420*(C*c^3*d^6*e - B*c^3*d^5*e^2 - 3*B*a*c^2*d^3*
e^4 - 3*B*a^2*c*d*e^6 + (3*C*a*c^2 + A*c^3)*d^4*e^3 + 3*(C*a^2*c
+ A*a*c^2)*d^2*e^5 + (C*a^3 + 3*A*a^2*c)*e^7)*x^2 - 840*(C*c^3*d^
7 - B*c^3*d^6*e - 3*B*a*c^2*d^4*e^3 - 3*B*a^2*c*d^2*e^5 - B*a^3*e
^7 + (3*C*a*c^2 + A*c^3)*d^5*e^2 + 3*(C*a^2*c + A*a*c^2)*d^3*e^4
+ (C*a^3 + 3*A*a^2*c)*d*e^6)*x)/e^8 + (C*c^3*d^8 - B*c^3*d^7*e -
3*B*a*c^2*d^5*e^3 - 3*B*a^2*c*d^3*e^5 - B*a^3*d*e^7 + A*a^3*e^8 +
 (3*C*a*c^2 + A*c^3)*d^6*e^2 + 3*(C*a^2*c + A*a*c^2)*d^4*e^4 + (C
*a^3 + 3*A*a^2*c)*d^2*e^6)*log(e*x + d)/e^9
```

Fricas [A] time = 0.269187, size = 910, normalized size = 1.86

$$\frac{105\,Cc^3e^8x^8 - 120\left(Cc^3de^7 - Bc^3e^8\right)x^7 + 140\left(Cc^3d^2e^6 - Bc^3de^7 + \left(3\,Cac^2 + Ac^3\right)e^8\right)x^6 - 168\left(Cc^3d^3e^5 - Bc^3d^2e^6 - 3\,Bac^2\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3/(e*x + d),x, algorithm="fricas")
```

```
[Out] 1/840*(105*C*c^3*e^8*x^8 - 120*(C*c^3*d*e^7 - B*c^3*e^8)*x^7 + 14
0*(C*c^3*d^2*e^6 - B*c^3*d*e^7 + (3*C*a*c^2 + A*c^3)*e^8)*x^6 - 1
68*(C*c^3*d^3*e^5 - B*c^3*d^2*e^6 - 3*B*a*c^2*e^8 + (3*C*a*c^2 +
A*c^3)*d*e^7)*x^5 + 210*(C*c^3*d^4*e^4 - B*c^3*d^3*e^5 - 3*B*a*c^
2*d*e^7 + (3*C*a*c^2 + A*c^3)*d^2*e^6 + 3*(C*a^2*c + A*a*c^2)*e^8
)*x^4 - 280*(C*c^3*d^5*e^3 - B*c^3*d^4*e^4 - 3*B*a*c^2*d^2*e^6 -
3*B*a^2*c*e^8 + (3*C*a*c^2 + A*c^3)*d^3*e^5 + 3*(C*a^2*c + A*a*c^
2)*d*e^7)*x^3 + 420*(C*c^3*d^6*e^2 - B*c^3*d^5*e^3 - 3*B*a*c^2*d^
3*e^5 - 3*B*a^2*c*d*e^7 + (3*C*a*c^2 + A*c^3)*d^4*e^4 + 3*(C*a^2*
c + A*a*c^2)*d^2*e^6 + (C*a^3 + 3*A*a^2*c)*e^8)*x^2 - 840*(C*c^3*
d^7*e - B*c^3*d^6*e^2 - 3*B*a*c^2*d^4*e^4 - 3*B*a^2*c*d^2*e^6 - B
*a^3*e^8 + (3*C*a*c^2 + A*c^3)*d^5*e^3 + 3*(C*a^2*c + A*a*c^2)*d^
3*e^5 + (C*a^3 + 3*A*a^2*c)*d*e^7)*x + 840*(C*c^3*d^8 - B*c^3*d^7
*e - 3*B*a*c^2*d^5*e^3 - 3*B*a^2*c*d^3*e^5 - B*a^3*d*e^7 + A*a^3*
e^8 + (3*C*a*c^2 + A*c^3)*d^6*e^2 + 3*(C*a^2*c + A*a*c^2)*d^4*e^4
 + (C*a^3 + 3*A*a^2*c)*d^2*e^6)*log(e*x + d))/e^9
```

Sympy [A] time = 3.71326, size = 658, normalized size = 1.34

$$
\begin{aligned}
&\frac{Cc^3x^8}{8e} - \frac{x^7\left(-Bc^3e + Cc^3d\right)}{7e^2} + \frac{x^6\left(Ac^3e^2 - Bc^3de + 3Cac^2e^2 + Cc^3d^2\right)}{6e^3} \\
&- \frac{x^5\left(Ac^3de^2 - 3Bac^2e^3 - Bc^3d^2e + 3Cac^2de^2 + Cc^3d^3\right)}{5e^4} \\
&+ \frac{x^4\left(3Aac^2e^4 + Ac^3d^2e^2 - 3Bac^2de^3 - Bc^3d^3e + 3Ca^2ce^4 + 3Cac^2d^2e^2 + Cc^3d^4\right)}{4e^5} \\
&- \frac{x^3\left(3Aac^2de^4 + Ac^3d^3e^2 - 3Ba^2ce^5 - 3Bac^2d^2e^3 - Bc^3d^4e + 3Ca^2cde^4 + 3Cac^2d^3e^2 + Cc^3d^5\right)}{3e^6} \\
&+ \frac{x^2\left(3Aa^2ce^6 + 3Aac^2d^2e^4 + Ac^3d^4e^2 - 3Ba^2cde^5 - 3Bac^2d^3e^3 - Bc^3d^5e + Ca^3e^6 + 3Ca^2cd^2e^4 + 3Cac^2d^4e^2 + Cc^3d^6\right)}{2e^7} \\
&- \frac{x\left(3Aa^2cde^6 + 3Aac^2d^3e^4 + Ac^3d^5e^2 - Ba^3e^7 - 3Ba^2cd^2e^5 - 3Bac^2d^4e^3 - Bc^3d^6e + Ca^3de^6 + 3Ca^2cd^3e^4 + 3Cac^2d^5e^2 + Cc\right.}{e^8} \\
&+ \frac{\left(ae^2 + cd^2\right)^3\left(Ae^2 - Bde + Cd^2\right)\log\left(d + ex\right)}{e^9}
\end{aligned}
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)**3*(C*x**2+B*x+A)/(e*x+d),x)
```

```
[Out] C*c**3*x**8/(8*e) - x**7*(-B*c**3*e + C*c**3*d)/(7*e**2) + x**6*(
A*c**3*e**2 - B*c**3*d*e + 3*C*a*c**2*e**2 + C*c**3*d**2)/(6*e**3
) - x**5*(A*c**3*d*e**2 - 3*B*a*c**2*e**3 - B*c**3*d**2*e + 3*C*a
*c**2*d*e**2 + C*c**3*d**3)/(5*e**4) + x**4*(3*A*a*c**2*e**4 + A*
c**3*d**2*e**2 - 3*B*a*c**2*d*e**3 - B*c**3*d**3*e + 3*C*a**2*c*e
**4 + 3*C*a*c**2*d**2*e**2 + C*c**3*d**4)/(4*e**5) - x**3*(3*A*a*
c**2*d*e**4 + A*c**3*d**3*e**2 - 3*B*a**2*c*e**5 - 3*B*a*c**2*d**
2*e**3 - B*c**3*d**4*e + 3*C*a**2*c*d*e**4 + 3*C*a*c**2*d**3*e**2
 + C*c**3*d**5)/(3*e**6) + x**2*(3*A*a**2*c*e**6 + 3*A*a*c**2*d**
```

```
2*e**4 + A*c**3*d**4*e**2 - 3*B*a**2*c*d*e**5 - 3*B*a*c**2*d**3*e
**3 - B*c**3*d**5*e + C*a**3*e**6 + 3*C*a**2*c*d**2*e**4 + 3*C*a*
c**2*d**4*e**2 + C*c**3*d**6)/(2*e**7) - x*(3*A*a**2*c*d*e**6 + 3
*A*a*c**2*d**3*e**4 + A*c**3*d**5*e**2 - B*a**3*e**7 - 3*B*a**2*c
*d**2*e**5 - 3*B*a*c**2*d**4*e**3 - B*c**3*d**6*e + C*a**3*d*e**6
 + 3*C*a**2*c*d**3*e**4 + 3*C*a*c**2*d**5*e**2 + C*c**3*d**7)/e**
8 + (a*e**2 + c*d**2)**3*(A*e**2 - B*d*e + C*d**2)*log(d + e*x)/e
**9
```

GIAC/XCAS [A] time = 0.274247, size = 1031, normalized size = 2.1

$$\left(Cc^3d^8 - Bc^3d^7e + 3\,Cac^2d^6e^2 + Ac^3d^6e^2 - 3\,Bac^2d^5e^3 + 3\,Ca^2cd^4e^4 + 3\,Aac^2d^4e^4 - 3\,Ba^2cd^3e^5 + Ca^3d^2e^6 + 3\,Aa^2cd^2e^6 - B\right.$$
$$+\frac{1}{840}\left(105\,Cc^3x^8e^7 - 120\,Cc^3dx^7e^6 + 140\,Cc^3d^2x^6e^5 - 168\,Cc^3d^3x^5e^4 + 210\,Cc^3d^4x^4e^3 - 280\,Cc^3d^5x^3e^2 + 420\,Cc^3d^6x^2e - 8\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3/(e*x + d),x, algorithm="giac")
```

```
[Out] (C*c^3*d^8 - B*c^3*d^7*e + 3*C*a*c^2*d^6*e^2 + A*c^3*d^6*e^2 - 3*
B*a*c^2*d^5*e^3 + 3*C*a^2*c*d^4*e^4 + 3*A*a*c^2*d^4*e^4 - 3*B*a^2
*c*d^3*e^5 + C*a^3*d^2*e^6 + 3*A*a^2*c*d^2*e^6 - B*a^3*d*e^7 + A*
a^3*e^8)*e^(-9)*ln(abs(x*e + d)) + 1/840*(105*C*c^3*x^8*e^7 - 120
*C*c^3*d*x^7*e^6 + 140*C*c^3*d^2*x^6*e^5 - 168*C*c^3*d^3*x^5*e^4
+ 210*C*c^3*d^4*x^4*e^3 - 280*C*c^3*d^5*x^3*e^2 + 420*C*c^3*d^6*x
^2*e - 840*C*c^3*d^7*x + 120*B*c^3*x^7*e^7 - 140*B*c^3*d*x^6*e^6
+ 168*B*c^3*d^2*x^5*e^5 - 210*B*c^3*d^3*x^4*e^4 + 280*B*c^3*d^4*x
^3*e^3 - 420*B*c^3*d^5*x^2*e^2 + 840*B*c^3*d^6*x*e + 420*C*a*c^2*
x^6*e^7 + 140*A*c^3*x^6*e^7 - 504*C*a*c^2*d*x^5*e^6 - 168*A*c^3*d
*x^5*e^6 + 630*C*a*c^2*d^2*x^4*e^5 + 210*A*c^3*d^2*x^4*e^5 - 840*
C*a*c^2*d^3*x^3*e^4 - 280*A*c^3*d^3*x^3*e^4 + 1260*C*a*c^2*d^4*x^
2*e^3 + 420*A*c^3*d^4*x^2*e^3 - 2520*C*a*c^2*d^5*x*e^2 - 840*A*c^
3*d^5*x*e^2 + 504*B*a*c^2*x^5*e^7 - 630*B*a*c^2*d*x^4*e^6 + 840*B
*a*c^2*d^2*x^3*e^5 - 1260*B*a*c^2*d^3*x^2*e^4 + 2520*B*a*c^2*d^4*
x*e^3 + 630*C*a^2*c*x^4*e^7 + 630*A*a*c^2*x^4*e^7 - 840*C*a^2*c*d
*x^3*e^6 - 840*A*a*c^2*d*x^3*e^6 + 1260*C*a^2*c*d^2*x^2*e^5 + 126
0*A*a*c^2*d^2*x^2*e^5 - 2520*C*a^2*c*d^3*x*e^4 - 2520*A*a*c^2*d^3
*x*e^4 + 840*B*a^2*c*x^3*e^7 - 1260*B*a^2*c*d*x^2*e^6 + 2520*B*a^
2*c*d^2*x*e^5 + 420*C*a^3*x^2*e^7 + 1260*A*a^2*c*x^2*e^7 - 840*C*
a^3*d*x*e^6 - 2520*A*a^2*c*d*x*e^6 + 840*B*a^3*x*e^7)*e^(-8)
```

3.37 $\int \frac{(a+cx^2)^3(A+Bx+Cx^2)}{(d+ex)^2}\,dx$

Optimal. Leaf size=486

$$\frac{cx^3\left(3a^2Ce^4+3ace^2\left(3Cd^2-e(2Bd-Ae)\right)+c^2d^2\left(5Cd^2-e(4Bd-3Ae)\right)\right)}{3e^6} - \frac{cx^2\left(3a^2e^4(2Cd-Be)+3acde^2\left(4Cd^2-e(3Bd-2Ae)\right)+c^2d^3\left(6Cd^2-e(5Bd-4Ae)\right)\right)}{2e^7} + \frac{x\left(a^3Ce^6+3a^2ce^4\left(3Cd^2-e(2Bd-Ae)\right)+3ac^2d^2e^2\left(5Cd^2-e(4Bd-3Ae)\right)+c^3d^4\left(7Cd^2-e(6Bd-5Ae)\right)\right)}{e^8} - \frac{c^2x^4\left(3ae^2(2Cd-Be)+cd\left(4Cd^2-e(3Bd-2Ae)\right)\right)}{4e^5} + \frac{c^2x^5\left(3aCe^2+c\left(3Cd^2-e(2Bd-Ae)\right)\right)}{5e^4} - \frac{\left(ae^2+cd^2\right)^3\left(Ae^2-Bde+Cd^2\right)}{e^9(d+ex)} - \frac{\left(ae^2+cd^2\right)^2\log(d+ex)\left(ae^2(2Cd-Be)+cd\left(8Cd^2-e(7Bd-6Ae)\right)\right)}{e^9} - \frac{c^3x^6(2Cd-Be)}{6e^3} + \frac{c^3Cx^7}{7e^2}$$

```
[Out] ((a^3*C*e^6 + c^3*d^4*(7*C*d^2 - e*(6*B*d - 5*A*e)) + 3*a*c^2*d^2
*e^2*(5*C*d^2 - e*(4*B*d - 3*A*e)) + 3*a^2*c*e^4*(3*C*d^2 - e*(2*
B*d - A*e)))*x)/e^8 - (c*(3*a^2*e^4*(2*C*d - B*e) + c^2*d^3*(6*C*
d^2 - e*(5*B*d - 4*A*e)) + 3*a*c*d*e^2*(4*C*d^2 - e*(3*B*d - 2*A*
e)))*x^2)/(2*e^7) + (c*(3*a^2*C*e^4 + c^2*d^2*(5*C*d^2 - e*(4*B*d
 - 3*A*e)) + 3*a*c*e^2*(3*C*d^2 - e*(2*B*d - A*e)))*x^3)/(3*e^6)
- (c^2*(3*a*e^2*(2*C*d - B*e) + c*d*(4*C*d^2 - e*(3*B*d - 2*A*e))
)*x^4)/(4*e^5) + (c^2*(3*a*C*e^2 + c*(3*C*d^2 - e*(2*B*d - A*e)))
*x^5)/(5*e^4) - (c^3*(2*C*d - B*e)*x^6)/(6*e^3) + (c^3*C*x^7)/(7*
e^2) - ((c*d^2 + a*e^2)^3*(C*d^2 - B*d*e + A*e^2))/(e^9*(d + e*x)
) - ((c*d^2 + a*e^2)^2*(a*e^2*(2*C*d - B*e) + c*d*(8*C*d^2 - e*(7
*B*d - 6*A*e)))*Log[d + e*x])/e^9
```

Rubi [A] time = 2.72128, antiderivative size = 483, normalized size of antiderivative = 0.99, number

of steps used = 2, number of rules used = 1, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.037$

$$\frac{cx^3 \left(3a^2Ce^4 + 3ace^2 \left(3Cd^2 - e(2Bd - Ae)\right) + c^2 \left(5Cd^4 - d^2e(4Bd - 3Ae)\right)\right)}{3e^6} - \frac{cx^2 \left(3a^2e^4(2Cd - Be) + 3acde^2 \left(4Cd^2 - e(3Bd - 2Ae)\right) + c^2 \left(6Cd^5 - d^3e(5Bd - 4Ae)\right)\right)}{2e^7} + \frac{x \left(a^3Ce^6 + 3a^2ce^4 \left(3Cd^2 - e(2Bd - Ae)\right) + 3ac^2d^2e^2 \left(5Cd^2 - e(4Bd - 3Ae)\right) + c^3 \left(7Cd^6 - d^4e(6Bd - 5Ae)\right)\right)}{e^8} - \frac{c^2x^4 \left(3ae^2(2Cd - Be) - cde(3Bd - 2Ae) + 4cCd^3\right)}{4e^5} + \frac{c^2x^5 \left(3aCe^2 - ce(2Bd - Ae) + 3cCd^2\right)}{5e^4} - \frac{\left(ae^2 + cd^2\right)^3 \left(Ae^2 - Bde + Cd^2\right)}{e^9(d + ex)} - \frac{\left(ae^2 + cd^2\right)^2 \log(d + ex) \left(ae^2(2Cd - Be) - cde(7Bd - 6Ae) + 8cCd^3\right)}{e^9} - \frac{c^3x^6(2Cd - Be)}{6e^3} + \frac{c^3Cx^7}{7e^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)^3*(A + B*x + C*x^2))/(d + e*x)^2,x]
```

```
[Out] ((a^3*C*e^6 + c^3*(7*C*d^6 - d^4*e*(6*B*d - 5*A*e)) + 3*a*c^2*d^2
*e^2*(5*C*d^2 - e*(4*B*d - 3*A*e)) + 3*a^2*c*e^4*(3*C*d^2 - e*(2*
B*d - A*e)))*x)/e^8 - (c*(3*a^2*e^4*(2*C*d - B*e) + c^2*(6*C*d^5
- d^3*e*(5*B*d - 4*A*e)) + 3*a*c*d*e^2*(4*C*d^2 - e*(3*B*d - 2*A*
e)))*x^2)/(2*e^7) + (c*(3*a^2*C*e^4 + c^2*(5*C*d^4 - d^2*e*(4*B*d
 - 3*A*e)) + 3*a*c*e^2*(3*C*d^2 - e*(2*B*d - A*e)))*x^3)/(3*e^6)
- (c^2*(4*c*C*d^3 - c*d*e*(3*B*d - 2*A*e) + 3*a*e^2*(2*C*d - B*e)
)*x^4)/(4*e^5) + (c^2*(3*c*C*d^2 + 3*a*C*e^2 - c*e*(2*B*d - A*e))
*x^5)/(5*e^4) - (c^3*(2*C*d - B*e)*x^6)/(6*e^3) + (c^3*C*x^7)/(7*
e^2) - ((c*d^2 + a*e^2)^3*(C*d^2 - B*d*e + A*e^2))/(e^9*(d + e*x)
) - ((c*d^2 + a*e^2)^2*(8*c*C*d^3 - c*d*e*(7*B*d - 6*A*e) + a*e^2
*(2*C*d - B*e))*Log[d + e*x])/e^9
```

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((c*x**2+a)**3*(C*x**2+B*x+A)/(e*x+d)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.952277, size = 641, normalized size = 1.32

$$\frac{420a^3e^6\left(e(Bd-Ae)+C\left(-d^2+dex+e^2x^2\right)\right)+210a^2ce^4\left(3e\left(2Ae\left(-d^2+dex+e^2x^2\right)+B\left(2d^3-4d^2ex-3de^2x^2+e^3x^3\right)\right)\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)^3*(A + B*x + C*x^2))/(d + e*x)^2,x]
```

```
[Out] (420*a^3*e^6*(e*(B*d - A*e) + C*(-d^2 + d*e*x + e^2*x^2)) + 210*a
^2*c*e^4*(2*C*(-3*d^4 + 9*d^3*e*x + 6*d^2*e^2*x^2 - 2*d*e^3*x^3 +
 e^4*x^4) + 3*e*(2*A*e*(-d^2 + d*e*x + e^2*x^2) + B*(2*d^3 - 4*d^
2*e*x - 3*d*e^2*x^2 + e^3*x^3))) + 21*a*c^2*e^2*(-6*C*(10*d^6 - 5
0*d^5*e*x - 30*d^4*e^2*x^2 + 10*d^3*e^3*x^3 - 5*d^2*e^4*x^4 + 3*d
*e^5*x^5 - 2*e^6*x^6) + 5*e*(4*A*e*(-3*d^4 + 9*d^3*e*x + 6*d^2*e^
2*x^2 - 2*d*e^3*x^3 + e^4*x^4) + B*(12*d^5 - 48*d^4*e*x - 30*d^3*
e^2*x^2 + 10*d^2*e^3*x^3 - 5*d*e^4*x^4 + 3*e^5*x^5))) + c^3*(-4*C
*(105*d^8 - 735*d^7*e*x - 420*d^6*e^2*x^2 + 140*d^5*e^3*x^3 - 70*
d^4*e^4*x^4 + 42*d^3*e^5*x^5 - 28*d^2*e^6*x^6 + 20*d*e^7*x^7 - 15
*e^8*x^8) + 7*e*(6*A*e*(-10*d^6 + 50*d^5*e*x + 30*d^4*e^2*x^2 - 1
0*d^3*e^3*x^3 + 5*d^2*e^4*x^4 - 3*d*e^5*x^5 + 2*e^6*x^6) + B*(60*
d^7 - 360*d^6*e*x - 210*d^5*e^2*x^2 + 70*d^4*e^3*x^3 - 35*d^3*e^4
*x^4 + 21*d^2*e^5*x^5 - 14*d*e^6*x^6 + 10*e^7*x^7))) - 420*(c*d^2
 + a*e^2)^2*(8*c*C*d^3 + c*d*e*(-7*B*d + 6*A*e) + a*e^2*(2*C*d -
B*e))*(d + e*x)*Log[d + e*x])/(420*e^9*(d + e*x))
```

Maple [A] time = 0.022, size = 928, normalized size = 1.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^3*(C*x^2+B*x+A)/(e*x+d)^2,x)
```

```
[Out] 1/e^2*a^3*C*x+1/6/e^2*B*x^6*c^3+1/5/e^2*A*x^5*c^3-1/e/(e*x+d)*A*a
^3+1/e^2*ln(e*x+d)*B*a^3+1/7*c^3*C*x^7/e^2-1/2/e^3*A*x^4*c^3*d+3/
4/e^2*B*x^4*a*c^2+3/4/e^4*B*x^4*c^3*d^2-1/e^5*C*x^4*c^3*d^3-4/3/e
^5*B*x^3*c^3*d^3+1/e^2*A*x^3*a*c^2+1/e^4*A*x^3*c^3*d^2+1/e^2*C*x^
3*a^2*c-1/3/e^3*C*x^6*c^3*d-2/5/e^3*B*x^5*c^3*d-1/e^7/(e*x+d)*A*c
^3*d^6-3/e^3*C*x^2*a^2*c*d-6/e^5*C*x^2*a*c^2*d^3+9/e^4*A*a*c^2*d^
2*x-6/e^3*ln(e*x+d)*A*a^2*c*d-12/e^5*ln(e*x+d)*A*a*c^2*d^3+9/e^4*
ln(e*x+d)*B*a^2*c*d^2+15/e^6*ln(e*x+d)*B*a*c^2*d^4-12/e^5*ln(e*x+
d)*C*a^2*c*d^3-18/e^7*ln(e*x+d)*C*a*c^2*d^5-6/e^3*d*a^2*c*B*x-12/
e^5*B*a*c^2*d^3*x+9/e^4*C*a^2*c*d^2*x+3/e^4*C*x^3*a*c^2*d^2-3/e^3
*A*x^2*a*c^2*d+1/e^2/(e*x+d)*B*d*a^3+1/e^8/(e*x+d)*B*c^3*d^7-1/e^
3/(e*x+d)*C*a^3*d^2-1/e^9/(e*x+d)*C*c^3*d^8-6/e^7*ln(e*x+d)*A*c^3
*d^5+7/e^8*ln(e*x+d)*B*c^3*d^6-2/e^3*ln(e*x+d)*C*a^3*d-8/e^9*ln(e
```

```
*x+d)*C*c^3*d^7-2/e^5*A*x^2*c^3*d^3+3/2/e^2*B*x^2*a^2*c+5/2/e^6*B
*x^2*c^3*d^4-3/e^7*C*x^2*c^3*d^5+3/e^2*a^2*c*A*x+5/e^6*A*c^3*d^4*
x-6/e^7*B*c^3*d^5*x+7/e^8*C*c^3*d^6*x+5/3/e^6*C*x^3*c^3*d^4+15/e^
6*C*a*c^2*d^4*x-2/e^3*B*x^3*a*c^2*d-3/2/e^3*C*x^4*a*c^2*d+3/5/e^2
*C*x^5*a*c^2+3/5/e^4*C*x^5*c^3*d^2+9/2/e^4*B*x^2*a*c^2*d^2-3/e^3/
(e*x+d)*A*a^2*c*d^2-3/e^5/(e*x+d)*A*a*c^2*d^4+3/e^4/(e*x+d)*B*a^2
*c*d^3+3/e^6/(e*x+d)*B*a*c^2*d^5-3/e^5/(e*x+d)*C*a^2*c*d^4-3/e^7/
(e*x+d)*C*a*c^2*d^6
```

Maxima [A] time = 0.73782, size = 933, normalized size = 1.92

$$-\frac{Cc^3d^8 - Bc^3d^7e - 3\,Bac^2d^5e^3 - 3\,Ba^2cd^3e^5 - Ba^3de^7 + Aa^3e^8 + \left(3\,Cac^2 + Ac^3\right)d^6e^2 + 3\left(Ca^2c + Aac^2\right)d^4e^4 + \left(Ca^3 + 3\,Aa^2 \cdots\right.}{e^{10}x + de^9}$$
$$+\frac{60\,Cc^3e^6x^7 - 70\left(2\,Cc^3de^5 - Bc^3e^6\right)x^6 + 84\left(3\,Cc^3d^2e^4 - 2\,Bc^3de^5 + \left(3\,Cac^2 + Ac^3\right)e^6\right)x^5 - 105\left(4\,Cc^3d^3e^3 - 3\,Bc^3d^2e^4 - \cdots\right.}{\cdots}$$
$$-\frac{\left(8\,Cc^3d^7 - 7\,Bc^3d^6e - 15\,Bac^2d^4e^3 - 9\,Ba^2cd^2e^5 - Ba^3e^7 + 6\left(3\,Cac^2 + Ac^3\right)d^5e^2 + 12\left(Ca^2c + Aac^2\right)d^3e^4 + 2\left(Ca^3 + 3\,Aa^2 \cdots\right.\right.}{e^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3/(e*x + d)^2,x, algorithm="maxima")
```

```
[Out] -(C*c^3*d^8 - B*c^3*d^7*e - 3*B*a*c^2*d^5*e^3 - 3*B*a^2*c*d^3*e^5
 - B*a^3*d*e^7 + A*a^3*e^8 + (3*C*a*c^2 + A*c^3)*d^6*e^2 + 3*(C*a
^2*c + A*a*c^2)*d^4*e^4 + (C*a^3 + 3*A*a^2*c)*d^2*e^6)/(e^10*x +
d*e^9) + 1/420*(60*C*c^3*e^6*x^7 - 70*(2*C*c^3*d*e^5 - B*c^3*e^6)
*x^6 + 84*(3*C*c^3*d^2*e^4 - 2*B*c^3*d*e^5 + (3*C*a*c^2 + A*c^3)*
e^6)*x^5 - 105*(4*C*c^3*d^3*e^3 - 3*B*c^3*d^2*e^4 - 3*B*a*c^2*e^6
 + 2*(3*C*a*c^2 + A*c^3)*d*e^5)*x^4 + 140*(5*C*c^3*d^4*e^2 - 4*B*
c^3*d^3*e^3 - 6*B*a*c^2*d*e^5 + 3*(3*C*a*c^2 + A*c^3)*d^2*e^4 + 3
*(C*a^2*c + A*a*c^2)*e^6)*x^3 - 210*(6*C*c^3*d^5*e - 5*B*c^3*d^4*
e^2 - 9*B*a*c^2*d^2*e^4 - 3*B*a^2*c*e^6 + 4*(3*C*a*c^2 + A*c^3)*d
^3*e^3 + 6*(C*a^2*c + A*a*c^2)*d*e^5)*x^2 + 420*(7*C*c^3*d^6 - 6*
B*c^3*d^5*e - 12*B*a*c^2*d^3*e^3 - 6*B*a^2*c*d*e^5 + 5*(3*C*a*c^2
 + A*c^3)*d^4*e^2 + 9*(C*a^2*c + A*a*c^2)*d^2*e^4 + (C*a^3 + 3*A*
a^2*c)*e^6)*x)/e^8 - (8*C*c^3*d^7 - 7*B*c^3*d^6*e - 15*B*a*c^2*d^
4*e^3 - 9*B*a^2*c*d^2*e^5 - B*a^3*e^7 + 6*(3*C*a*c^2 + A*c^3)*d^5
*e^2 + 12*(C*a^2*c + A*a*c^2)*d^3*e^4 + 2*(C*a^3 + 3*A*a^2*c)*d*e
^6)*log(e*x + d)/e^9
```

Fricas [A] time = 0.275509, size = 1258, normalized size = 2.59

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3/(e*x + d)^2,x, algorithm="fricas")
```

```
[Out] 1/420*(60*C*c^3*e^8*x^8 - 420*C*c^3*d^8 + 420*B*c^3*d^7*e + 1260*
B*a*c^2*d^5*e^3 + 1260*B*a^2*c*d^3*e^5 + 420*B*a^3*d*e^7 - 420*A*
a^3*e^8 - 420*(3*C*a*c^2 + A*c^3)*d^6*e^2 - 1260*(C*a^2*c + A*a*c
^2)*d^4*e^4 - 420*(C*a^3 + 3*A*a^2*c)*d^2*e^6 - 10*(8*C*c^3*d*e^7
 - 7*B*c^3*e^8)*x^7 + 14*(8*C*c^3*d^2*e^6 - 7*B*c^3*d*e^7 + 6*(3*
C*a*c^2 + A*c^3)*e^8)*x^6 - 21*(8*C*c^3*d^3*e^5 - 7*B*c^3*d^2*e^6
 - 15*B*a*c^2*e^8 + 6*(3*C*a*c^2 + A*c^3)*d*e^7)*x^5 + 35*(8*C*c^
3*d^4*e^4 - 7*B*c^3*d^3*e^5 - 15*B*a*c^2*d*e^7 + 6*(3*C*a*c^2 + A
*c^3)*d^2*e^6 + 12*(C*a^2*c + A*a*c^2)*e^8)*x^4 - 70*(8*C*c^3*d^5
*e^3 - 7*B*c^3*d^4*e^4 - 15*B*a*c^2*d^2*e^6 - 9*B*a^2*c*e^8 + 6*(
3*C*a*c^2 + A*c^3)*d^3*e^5 + 12*(C*a^2*c + A*a*c^2)*d*e^7)*x^3 +
210*(8*C*c^3*d^6*e^2 - 7*B*c^3*d^5*e^3 - 15*B*a*c^2*d^3*e^5 - 9*B
*a^2*c*d*e^7 + 6*(3*C*a*c^2 + A*c^3)*d^4*e^4 + 12*(C*a^2*c + A*a*
c^2)*d^2*e^6 + 2*(C*a^3 + 3*A*a^2*c)*e^8)*x^2 + 420*(7*C*c^3*d^7*
e - 6*B*c^3*d^6*e^2 - 12*B*a*c^2*d^4*e^4 - 6*B*a^2*c*d^2*e^6 + 5*
(3*C*a*c^2 + A*c^3)*d^5*e^3 + 9*(C*a^2*c + A*a*c^2)*d^3*e^5 + (C*
a^3 + 3*A*a^2*c)*d*e^7)*x - 420*(8*C*c^3*d^8 - 7*B*c^3*d^7*e - 15
*B*a*c^2*d^5*e^3 - 9*B*a^2*c*d^3*e^5 - B*a^3*d*e^7 + 6*(3*C*a*c^2
 + A*c^3)*d^6*e^2 + 12*(C*a^2*c + A*a*c^2)*d^4*e^4 + 2*(C*a^3 + 3
*A*a^2*c)*d^2*e^6 + (8*C*c^3*d^7*e - 7*B*c^3*d^6*e^2 - 15*B*a*c^2
*d^4*e^4 - 9*B*a^2*c*d^2*e^6 - B*a^3*e^8 + 6*(3*C*a*c^2 + A*c^3)*
d^5*e^3 + 12*(C*a^2*c + A*a*c^2)*d^3*e^5 + 2*(C*a^3 + 3*A*a^2*c)*
d*e^7)*x)*log(e*x + d))/(e^10*x + d*e^9)
```

Sympy [A] time = 9.72716, size = 731, normalized size = 1.5

$$\frac{Cc^3x^7}{7e^2} - \frac{Aa^3e^8 + 3Aa^2cd^2e^6 + 3Aac^2d^4e^4 + Ac^3d^6e^2 - Ba^3de^7 - 3Ba^2cd^3e^5 - 3Bac^2d^5e^3 - Bc^3d^7e + Ca^3d^2e^6 + 3Ca^2cd^4e^4 + 3Cac^2 \cdots}{de^9 + e^{10}x} - \frac{x^6\left(-Bc^3e + 2Cc^3d\right)}{6e^3} + \frac{x^5\left(Ac^3e^2 - 2Bc^3de + 3Cac^2e^2 + 3Cc^3d^2\right)}{5e^4} - \frac{x^4\left(2Ac^3de^2 - 3Bac^2e^3 - 3Bc^3d^2e + 6Cac^2de^2 + 4Cc^3d^3\right)}{4e^5} + \frac{x^3\left(3Aac^2e^4 + 3Ac^3d^2e^2 - 6Bac^2de^3 - 4Bc^3d^3e + 3Ca^2ce^4 + 9Cac^2d^2e^2 + 5Cc^3d^4\right)}{3e^6} - \frac{x^2\left(6Aac^2de^4 + 4Ac^3d^3e^2 - 3Ba^2ce^5 - 9Bac^2d^2e^3 - 5Bc^3d^4e + 6Ca^2cde^4 + 12Cac^2d^3e^2 + 6Cc^3d^5\right)}{2e^7} + \frac{x\left(3Aa^2ce^6 + 9Aac^2d^2e^4 + 5Ac^3d^4e^2 - 6Ba^2cde^5 - 12Bac^2d^3e^3 - 6Bc^3d^5e + Ca^3e^6 + 9Ca^2cd^2e^4 + 15Cac^2d^4e^2 + 7Cc^3d^6\right)}{e^8} - \frac{\left(ae^2 + cd^2\right)^2\left(6Acde^2 - Bae^3 - 7Bcd^2e + 2Cade^2 + 8Ccd^3\right)\log\left(d + ex\right)}{e^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)**3*(C*x**2+B*x+A)/(e*x+d)**2,x)
```

```
[Out] C*c**3*x**7/(7*e**2) - (A*a**3*e**8 + 3*A*a**2*c*d**2*e**6 + 3*A*
a*c**2*d**4*e**4 + A*c**3*d**6*e**2 - B*a**3*d*e**7 - 3*B*a**2*c*
d**3*e**5 - 3*B*a*c**2*d**5*e**3 - B*c**3*d**7*e + C*a**3*d**2*e*
*6 + 3*C*a**2*c*d**4*e**4 + 3*C*a*c**2*d**6*e**2 + C*c**3*d**8)/(
d*e**9 + e**10*x) - x**6*(-B*c**3*e + 2*C*c**3*d)/(6*e**3) + x**5
*(A*c**3*e**2 - 2*B*c**3*d*e + 3*C*a*c**2*e**2 + 3*C*c**3*d**2)/(
5*e**4) - x**4*(2*A*c**3*d*e**2 - 3*B*a*c**2*e**3 - 3*B*c**3*d**2
*e + 6*C*a*c**2*d*e**2 + 4*C*c**3*d**3)/(4*e**5) + x**3*(3*A*a*c*
*2*e**4 + 3*A*c**3*d**2*e**2 - 6*B*a*c**2*d*e**3 - 4*B*c**3*d**3*
e + 3*C*a**2*c*e**4 + 9*C*a*c**2*d**2*e**2 + 5*C*c**3*d**4)/(3*e*
*6) - x**2*(6*A*a*c**2*d*e**4 + 4*A*c**3*d**3*e**2 - 3*B*a**2*c*e
**5 - 9*B*a*c**2*d**2*e**3 - 5*B*c**3*d**4*e + 6*C*a**2*c*d*e**4
+ 12*C*a*c**2*d**3*e**2 + 6*C*c**3*d**5)/(2*e**7) + x*(3*A*a**2*c
*e**6 + 9*A*a*c**2*d**2*e**4 + 5*A*c**3*d**4*e**2 - 6*B*a**2*c*d*
e**5 - 12*B*a*c**2*d**3*e**3 - 6*B*c**3*d**5*e + C*a**3*e**6 + 9*
C*a**2*c*d**2*e**4 + 15*C*a*c**2*d**4*e**2 + 7*C*c**3*d**6)/e**8
- (a*e**2 + c*d**2)**2*(6*A*c*d*e**2 - B*a*e**3 - 7*B*c*d**2*e +
2*C*a*d*e**2 + 8*C*c*d**3)*log(d + e*x)/e**9
```

GIAC/XCAS [A] time = 0.275922, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3/(e*x + d)^2,x, algorithm="giac")
```

```
[Out] Done
```

3.38 $\int \frac{(a+cx^2)^3 (A+Bx+Cx^2)}{(d+ex)^3} dx$

Optimal. Leaf size=466

$$\frac{(ae^2+cd^2)\log(d+ex)\left(a^2Ce^4+ace^2\left(17Cd^2-3e(3Bd-Ae)\right)+c^2d^2\left(28Cd^2-3e(7Bd-5Ae)\right)\right)}{e^9}+\frac{cx^2\left(3a^2Ce^4+3ace^2\left(6Cd^2-e(3Bd-Ae)\right)+c^2d^2\left(15Cd^2-2e(5Bd-3Ae)\right)\right)}{2e^7}-\frac{cx\left(3a^2e^4(3Cd-Be)+3acde^2\left(10Cd^2-3e(2Bd-Ae)\right)+c^2d^3\left(21Cd^2-5e(3Bd-2Ae)\right)\right)}{e^8}-\frac{c^2x^3\left(3ae^2(3Cd-Be)+cd\left(10Cd^2-3e(2Bd-Ae)\right)\right)}{3e^6}+\frac{c^2x^4\left(3aCe^2+c\left(6Cd^2-e(3Bd-Ae)\right)\right)}{4e^5}+\frac{(ae^2+cd^2)^2\left(ae^2(2Cd-Be)+cd\left(8Cd^2-e(7Bd-6Ae)\right)\right)}{e^9(d+ex)}-\frac{(ae^2+cd^2)^3\left(Ae^2-Bde+Cd^2\right)}{2e^9(d+ex)^2}-\frac{c^3x^5(3Cd-Be)}{5e^4}+\frac{c^3Cx^6}{6e^3}$$

```
[Out] -((c*(3*a^2*e^4*(3*C*d - B*e) + c^2*d^3*(21*C*d^2 - 5*e*(3*B*d -
2*A*e)) + 3*a*c*d*e^2*(10*C*d^2 - 3*e*(2*B*d - A*e)))*x)/e^8) + (
c*(3*a^2*C*e^4 + c^2*d^2*(15*C*d^2 - 2*e*(5*B*d - 3*A*e)) + 3*a*c
*e^2*(6*C*d^2 - e*(3*B*d - A*e)))*x^2)/(2*e^7) - (c^2*(3*a*e^2*(3
*C*d - B*e) + c*d*(10*C*d^2 - 3*e*(2*B*d - A*e)))*x^3)/(3*e^6) +
(c^2*(3*a*C*e^2 + c*(6*C*d^2 - e*(3*B*d - A*e)))*x^4)/(4*e^5) - (
c^3*(3*C*d - B*e)*x^5)/(5*e^4) + (c^3*C*x^6)/(6*e^3) - ((c*d^2 +
a*e^2)^3*(C*d^2 - B*d*e + A*e^2))/(2*e^9*(d + e*x)^2) + ((c*d^2 +
 a*e^2)^2*(a*e^2*(2*C*d - B*e) + c*d*(8*C*d^2 - e*(7*B*d - 6*A*e)
)))/(e^9*(d + e*x)) + ((c*d^2 + a*e^2)*(a^2*C*e^4 + c^2*d^2*(28*C
*d^2 - 3*e*(7*B*d - 5*A*e)) + a*c*e^2*(17*C*d^2 - 3*e*(3*B*d - A*
e)))*Log[d + e*x])/e^9
```

Rubi [A] time = 2.63332, antiderivative size = 463, normalized size of antiderivative = 0.99, number

of steps used = 2, number of rules used = 1, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.037$

$$\frac{(ae^2+cd^2)\log(d+ex)\left(a^2Ce^4+ace^2(17Cd^2-3e(3Bd-Ae))+c^2(28Cd^4-3d^2e(7Bd-5Ae))\right)}{e^9} + \frac{cx^2\left(3a^2Ce^4+3ace^2(6Cd^2-e(3Bd-Ae))+c^2(15Cd^4-2d^2e(5Bd-3Ae))\right)}{2e^7} - \frac{cx\left(3a^2e^4(3Cd-Be)+3acde^2(10Cd^2-3e(2Bd-Ae))+c^2(21Cd^5-5d^3e(3Bd-2Ae))\right)}{e^8} - \frac{c^2x^3(3ae^2(3Cd-Be)-3cde(2Bd-Ae)+10cCd^3)}{3e^6} + \frac{c^2x^4(3aCe^2-ce(3Bd-Ae)+6cCd^2)}{4e^5} - \frac{(ae^2+cd^2)^3(Ae^2-Bde+Cd^2)}{2e^9(d+ex)^2} + \frac{(ae^2+cd^2)^2(ae^2(2Cd-Be)-cde(7Bd-6Ae)+8cCd^3)}{e^9(d+ex)} - \frac{c^3x^5(3Cd-Be)}{5e^4} + \frac{c^3Cx^6}{6e^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)^3*(A + B*x + C*x^2))/(d + e*x)^3,x]
```

```
[Out] -((c*(3*a^2*e^4*(3*C*d - B*e) + c^2*(21*C*d^5 - 5*d^3*e*(3*B*d -
2*A*e)) + 3*a*c*d*e^2*(10*C*d^2 - 3*e*(2*B*d - A*e)))*x)/e^8) + (
c*(3*a^2*C*e^4 + c^2*(15*C*d^4 - 2*d^2*e*(5*B*d - 3*A*e)) + 3*a*c
*e^2*(6*C*d^2 - e*(3*B*d - A*e)))*x^2)/(2*e^7) - (c^2*(10*c*C*d^3
 - 3*c*d*e*(2*B*d - A*e) + 3*a*e^2*(3*C*d - B*e))*x^3)/(3*e^6) +
(c^2*(6*c*C*d^2 + 3*a*C*e^2 - c*e*(3*B*d - A*e))*x^4)/(4*e^5) - (
c^3*(3*C*d - B*e)*x^5)/(5*e^4) + (c^3*C*x^6)/(6*e^3) - ((c*d^2 +
a*e^2)^3*(C*d^2 - B*d*e + A*e^2))/(2*e^9*(d + e*x)^2) + ((c*d^2 +
 a*e^2)^2*(8*c*C*d^3 - c*d*e*(7*B*d - 6*A*e) + a*e^2*(2*C*d - B*e
)))/(e^9*(d + e*x)) + ((c*d^2 + a*e^2)*(a^2*C*e^4 + c^2*(28*C*d^4
 - 3*d^2*e*(7*B*d - 5*A*e)) + a*c*e^2*(17*C*d^2 - 3*e*(3*B*d - A*
e)))*Log[d + e*x])/e^9
```

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((c*x**2+a)**3*(C*x**2+B*x+A)/(e*x+d)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.492893, size = 438, normalized size = 0.94

$$\frac{30ce^2x^2\left(3a^2Ce^4+3ace^2\left(e(Ae-3Bd)+6Cd^2\right)+c^2\left(2d^2e(3Ae-5Bd)+15Cd^4\right)\right)+60\left(ae^2+cd^2\right)\log(d+ex)\left(a^2Ce^4+ace\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)^3*(A + B*x + C*x^2))/(d + e*x)^3,x]
```

```
[Out] (-60*c*e*(-3*a^2*e^4*(-3*C*d + B*e) + 3*a*c*d*e^2*(10*C*d^2 + 3*e
*(-2*B*d + A*e)) + c^2*(21*C*d^5 + 5*d^3*e*(-3*B*d + 2*A*e)))*x +
 30*c*e^2*(3*a^2*C*e^4 + 3*a*c*e^2*(6*C*d^2 + e*(-3*B*d + A*e)) +
 c^2*(15*C*d^4 + 2*d^2*e*(-5*B*d + 3*A*e)))*x^2 - 20*c^2*e^3*(10*
c*C*d^3 + 3*c*d*e*(-2*B*d + A*e) - 3*a*e^2*(-3*C*d + B*e))*x^3 +
15*c^2*e^4*(6*c*C*d^2 + 3*a*C*e^2 + c*e*(-3*B*d + A*e))*x^4 + 12*
c^3*e^5*(-3*C*d + B*e)*x^5 + 10*c^3*C*e^6*x^6 - (30*(c*d^2 + a*e^
2)^3*(C*d^2 + e*(-(B*d) + A*e)))/(d + e*x)^2 + (60*(c*d^2 + a*e^2
)^2*(8*c*C*d^3 + c*d*e*(-7*B*d + 6*A*e) + a*e^2*(2*C*d - B*e)))/(
d + e*x) + 60*(c*d^2 + a*e^2)*(a^2*C*e^4 + a*c*e^2*(17*C*d^2 + 3*
e*(-3*B*d + A*e)) + c^2*(28*C*d^4 + 3*d^2*e*(-7*B*d + 5*A*e)))*Lo
g[d + e*x])/(60*e^9)
```

Maple [B] time = 0.024, size = 978, normalized size = 2.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^3*(C*x^2+B*x+A)/(e*x+d)^3,x)
```

```
[Out] -1/e^2/(e*x+d)*B*a^3-1/2/e/(e*x+d)^2*A*a^3+1/e^3*ln(e*x+d)*a^3*C+
1/4*c^3/e^3*A*x^4+1/5*c^3/e^3*B*x^5-9*c/e^4*C*a^2*d*x-30*c^2/e^6*
C*a*d^3*x+6/e^3/(e*x+d)*A*a^2*c*d+12/e^5/(e*x+d)*A*a*c^2*d^3-15/e
^6/(e*x+d)*B*a*c^2*d^4+12/e^5/(e*x+d)*C*a^2*c*d^3+18/e^7/(e*x+d)*
C*a*c^2*d^5-3/2/e^3/(e*x+d)^2*A*d^2*a^2*c-3/2/e^5/(e*x+d)^2*A*a*c
^2*d^4+3/2/e^4/(e*x+d)^2*B*a^2*c*d^3+3/2/e^6/(e*x+d)^2*B*a*c^2*d^
5-3/2/e^5/(e*x+d)^2*C*a^2*c*d^4-3/2/e^7/(e*x+d)^2*C*a*c^2*d^6+18/
e^5*ln(e*x+d)*A*a*c^2*d^2-9/e^4*ln(e*x+d)*B*a^2*c*d-30/e^6*ln(e*x
+d)*B*a*c^2*d^3+18/e^5*ln(e*x+d)*C*a^2*c*d^2+45/e^7*ln(e*x+d)*C*a
*c^2*d^4-9/e^4/(e*x+d)*B*a^2*c*d^2+1/6*c^3*C*x^6/e^3+18*c^2/e^5*B
*a*d^2*x-9*c^2/e^4*A*a*d*x-9/2*c^2/e^4*B*x^2*a*d-3*c^2/e^4*C*x^3*
a*d+9*c^2/e^5*C*x^2*a*d^2+15/2*c^3/e^7*C*x^2*d^4-10*c^3/e^6*A*d^3
*x+6/e^7/(e*x+d)*A*c^3*d^5-7/e^8/(e*x+d)*B*c^3*d^6+2/e^3/(e*x+d)*
C*a^3*d+8/e^9/(e*x+d)*C*c^3*d^7-1/2/e^7/(e*x+d)^2*A*c^3*d^6+1/2/e
^2/(e*x+d)^2*B*d*a^3+1/2/e^8/(e*x+d)^2*B*c^3*d^7-1/2/e^3/(e*x+d)^
2*C*d^2*a^3+c^2/e^3*B*x^3*a-1/2/e^9/(e*x+d)^2*C*c^3*d^8+3/e^3*ln(
```

```
e*x+d)*A*a^2*c+15/e^7*ln(e*x+d)*A*c^3*d^4-21/e^8*ln(e*x+d)*B*c^3*
d^5-c^3/e^4*A*x^3*d+28/e^9*ln(e*x+d)*C*c^3*d^6+3/2*c^3/e^5*C*x^4*
d^2+3/4*c^2/e^3*C*x^4*a-3/5*c^3/e^4*C*x^5*d-3/4*c^3/e^4*B*x^4*d+3
/2*c^2/e^3*A*x^2*a+3/2*c/e^3*C*x^2*a^2+3*c/e^3*B*a^2*x-21*c^3/e^8
*C*d^5*x-10/3*c^3/e^6*C*x^3*d^3+2*c^3/e^5*B*x^3*d^2-5*c^3/e^6*B*x
^2*d^3+3*c^3/e^5*A*x^2*d^2+15*c^3/e^7*B*d^4*x
```

Maxima [A] time = 0.737094, size = 946, normalized size = 2.03

$$\frac{15\,Cc^3d^8 - 13\,Bc^3d^7e - 27\,Bac^2d^5e^3 - 15\,Ba^2cd^3e^5 - Ba^3de^7 - Aa^3e^8 + 11\left(3\,Cac^2 + Ac^3\right)d^6e^2 + 21\left(Ca^2c + Aac^2\right)d^4e^4 + 3}{}$$
$$+\frac{10\,Cc^3e^5x^6 - 12\left(3\,Cc^3de^4 - Bc^3e^5\right)x^5 + 15\left(6\,Cc^3d^2e^3 - 3\,Bc^3de^4 + \left(3\,Cac^2 + Ac^3\right)e^5\right)x^4 - 20\left(10\,Cc^3d^3e^2 - 6\,Bc^3d^2e^3 -\right.}{}$$
$$+\frac{\left(28\,Cc^3d^6 - 21\,Bc^3d^5e - 30\,Bac^2d^3e^3 - 9\,Ba^2cde^5 + 15\left(3\,Cac^2 + Ac^3\right)d^4e^2 + 18\left(Ca^2c + Aac^2\right)d^2e^4 + \left(Ca^3 + 3\,Aa^2c\right)e^6\right)\,\mathrm{lo}}{e^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3/(e*x + d)^3,x, algorithm="maxima")
```

```
[Out] 1/2*(15*C*c^3*d^8 - 13*B*c^3*d^7*e - 27*B*a*c^2*d^5*e^3 - 15*B*a^
2*c*d^3*e^5 - B*a^3*d*e^7 - A*a^3*e^8 + 11*(3*C*a*c^2 + A*c^3)*d^
6*e^2 + 21*(C*a^2*c + A*a*c^2)*d^4*e^4 + 3*(C*a^3 + 3*A*a^2*c)*d^
2*e^6 + 2*(8*C*c^3*d^7*e - 7*B*c^3*d^6*e^2 - 15*B*a*c^2*d^4*e^4 -
 9*B*a^2*c*d^2*e^6 - B*a^3*e^8 + 6*(3*C*a*c^2 + A*c^3)*d^5*e^3 +
12*(C*a^2*c + A*a*c^2)*d^3*e^5 + 2*(C*a^3 + 3*A*a^2*c)*d*e^7)*x)/
(e^11*x^2 + 2*d*e^10*x + d^2*e^9) + 1/60*(10*C*c^3*e^5*x^6 - 12*(
3*C*c^3*d*e^4 - B*c^3*e^5)*x^5 + 15*(6*C*c^3*d^2*e^3 - 3*B*c^3*d*
e^4 + (3*C*a*c^2 + A*c^3)*e^5)*x^4 - 20*(10*C*c^3*d^3*e^2 - 6*B*c
^3*d^2*e^3 - 3*B*a*c^2*e^5 + 3*(3*C*a*c^2 + A*c^3)*d*e^4)*x^3 + 3
0*(15*C*c^3*d^4*e - 10*B*c^3*d^3*e^2 - 9*B*a*c^2*d*e^4 + 6*(3*C*a
*c^2 + A*c^3)*d^2*e^3 + 3*(C*a^2*c + A*a*c^2)*e^5)*x^2 - 60*(21*C
*c^3*d^5 - 15*B*c^3*d^4*e - 18*B*a*c^2*d^2*e^3 - 3*B*a^2*c*e^5 +
10*(3*C*a*c^2 + A*c^3)*d^3*e^2 + 9*(C*a^2*c + A*a*c^2)*d*e^4)*x)/
e^8 + (28*C*c^3*d^6 - 21*B*c^3*d^5*e - 30*B*a*c^2*d^3*e^3 - 9*B*a
^2*c*d*e^5 + 15*(3*C*a*c^2 + A*c^3)*d^4*e^2 + 18*(C*a^2*c + A*a*c
^2)*d^2*e^4 + (C*a^3 + 3*A*a^2*c)*e^6)*log(e*x + d)/e^9
```

Fricas [A] time = 0.276038, size = 1384, normalized size = 2.97

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3/(e*x + d)^3,x, algorithm="fricas")
```

```
[Out] 1/60*(10*C*c^3*e^8*x^8 + 450*C*c^3*d^8 - 390*B*c^3*d^7*e - 810*B*
a*c^2*d^5*e^3 - 450*B*a^2*c*d^3*e^5 - 30*B*a^3*d*e^7 - 30*A*a^3*e
^8 + 330*(3*C*a*c^2 + A*c^3)*d^6*e^2 + 630*(C*a^2*c + A*a*c^2)*d^
4*e^4 + 90*(C*a^3 + 3*A*a^2*c)*d^2*e^6 - 4*(4*C*c^3*d*e^7 - 3*B*c
^3*e^8)*x^7 + (28*C*c^3*d^2*e^6 - 21*B*c^3*d*e^7 + 15*(3*C*a*c^2
+ A*c^3)*e^8)*x^6 - 2*(28*C*c^3*d^3*e^5 - 21*B*c^3*d^2*e^6 - 30*B
*a*c^2*e^8 + 15*(3*C*a*c^2 + A*c^3)*d*e^7)*x^5 + 5*(28*C*c^3*d^4*
e^4 - 21*B*c^3*d^3*e^5 - 30*B*a*c^2*d*e^7 + 15*(3*C*a*c^2 + A*c^3
)*d^2*e^6 + 18*(C*a^2*c + A*a*c^2)*e^8)*x^4 - 20*(28*C*c^3*d^5*e^
3 - 21*B*c^3*d^4*e^4 - 30*B*a*c^2*d^2*e^6 - 9*B*a^2*c*e^8 + 15*(3
*C*a*c^2 + A*c^3)*d^3*e^5 + 18*(C*a^2*c + A*a*c^2)*d*e^7)*x^3 - 3
0*(69*C*c^3*d^6*e^2 - 50*B*c^3*d^5*e^3 - 63*B*a*c^2*d^3*e^5 - 12*
B*a^2*c*d*e^7 + 34*(3*C*a*c^2 + A*c^3)*d^4*e^4 + 33*(C*a^2*c + A*
a*c^2)*d^2*e^6)*x^2 - 60*(13*C*c^3*d^7*e - 8*B*c^3*d^6*e^2 - 3*B*
a*c^2*d^4*e^4 + 6*B*a^2*c*d^2*e^6 + B*a^3*e^8 + 4*(3*C*a*c^2 + A*
c^3)*d^5*e^3 - 3*(C*a^2*c + A*a*c^2)*d^3*e^5 - 2*(C*a^3 + 3*A*a^2
*c)*d*e^7)*x + 60*(28*C*c^3*d^8 - 21*B*c^3*d^7*e - 30*B*a*c^2*d^5
*e^3 - 9*B*a^2*c*d^3*e^5 + 15*(3*C*a*c^2 + A*c^3)*d^6*e^2 + 18*(C
*a^2*c + A*a*c^2)*d^4*e^4 + (C*a^3 + 3*A*a^2*c)*d^2*e^6 + (28*C*c
^3*d^6*e^2 - 21*B*c^3*d^5*e^3 - 30*B*a*c^2*d^3*e^5 - 9*B*a^2*c*d*
e^7 + 15*(3*C*a*c^2 + A*c^3)*d^4*e^4 + 18*(C*a^2*c + A*a*c^2)*d^2
*e^6 + (C*a^3 + 3*A*a^2*c)*e^8)*x^2 + 2*(28*C*c^3*d^7*e - 21*B*c^
3*d^6*e^2 - 30*B*a*c^2*d^4*e^4 - 9*B*a^2*c*d^2*e^6 + 15*(3*C*a*c^
2 + A*c^3)*d^5*e^3 + 18*(C*a^2*c + A*a*c^2)*d^3*e^5 + (C*a^3 + 3*
A*a^2*c)*d*e^7)*x)*log(e*x + d))/(e^11*x^2 + 2*d*e^10*x + d^2*e^9
)
```

Sympy [A] time = 51.1664, size = 799, normalized size = 1.71

$$\frac{Cc^3x^6}{6e^3} + \frac{-Aa^3e^8 + 9Aa^2cd^2e^6 + 21Aac^2d^4e^4 + 11Ac^3d^6e^2 - Ba^3de^7 - 15Ba^2cd^3e^5 - 27Bac^2d^5e^3 - 13Bc^3d^7e + 3Ca^3d^2e^6 + 21Ca^2cd}{}$$

$$- \frac{x^5\left(-Bc^3e + 3Cc^3d\right)}{5e^4} + \frac{x^4\left(Ac^3e^2 - 3Bc^3de + 3Cac^2e^2 + 6Cc^3d^2\right)}{4e^5}$$

$$- \frac{x^3\left(3Ac^3de^2 - 3Bac^2e^3 - 6Bc^3d^2e + 9Cac^2de^2 + 10Cc^3d^3\right)}{3e^6}$$

$$+ \frac{x^2\left(3Aac^2e^4 + 6Ac^3d^2e^2 - 9Bac^2de^3 - 10Bc^3d^3e + 3Ca^2ce^4 + 18Cac^2d^2e^2 + 15Cc^3d^4\right)}{2e^7}$$

$$- \frac{x\left(9Aac^2de^4 + 10Ac^3d^3e^2 - 3Ba^2ce^5 - 18Bac^2d^2e^3 - 15Bc^3d^4e + 9Ca^2cde^4 + 30Cac^2d^3e^2 + 21Cc^3d^5\right)}{e^8}$$

$$+ \frac{\left(ae^2 + cd^2\right)\left(3Aace^4 + 15Ac^2d^2e^2 - 9Bacde^3 - 21Bc^2d^3e + Ca^2e^4 + 17Cacd^2e^2 + 28Cc^2d^4\right)\log\left(d + ex\right)}{e^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)**3*(C*x**2+B*x+A)/(e*x+d)**3,x)
```

```
[Out] C*c**3*x**6/(6*e**3) + (-A*a**3*e**8 + 9*A*a**2*c*d**2*e**6 + 21*
A*a*c**2*d**4*e**4 + 11*A*c**3*d**6*e**2 - B*a**3*d*e**7 - 15*B*a
**2*c*d**3*e**5 - 27*B*a*c**2*d**5*e**3 - 13*B*c**3*d**7*e + 3*C*
a**3*d**2*e**6 + 21*C*a**2*c*d**4*e**4 + 33*C*a*c**2*d**6*e**2 +
15*C*c**3*d**8 + x*(12*A*a**2*c*d*e**7 + 24*A*a*c**2*d**3*e**5 +
12*A*c**3*d**5*e**3 - 2*B*a**3*e**8 - 18*B*a**2*c*d**2*e**6 - 30*
B*a*c**2*d**4*e**4 - 14*B*c**3*d**6*e**2 + 4*C*a**3*d*e**7 + 24*C
*a**2*c*d**3*e**5 + 36*C*a*c**2*d**5*e**3 + 16*C*c**3*d**7*e))/(2
*d**2*e**9 + 4*d*e**10*x + 2*e**11*x**2) - x**5*(-B*c**3*e + 3*C*
c**3*d)/(5*e**4) + x**4*(A*c**3*e**2 - 3*B*c**3*d*e + 3*C*a*c**2*
e**2 + 6*C*c**3*d**2)/(4*e**5) - x**3*(3*A*c**3*d*e**2 - 3*B*a*c*
*2*e**3 - 6*B*c**3*d**2*e + 9*C*a*c**2*d*e**2 + 10*C*c**3*d**3)/(
3*e**6) + x**2*(3*A*a*c**2*e**4 + 6*A*c**3*d**2*e**2 - 9*B*a*c**2
*d*e**3 - 10*B*c**3*d**3*e + 3*C*a**2*c*e**4 + 18*C*a*c**2*d**2*e
**2 + 15*C*c**3*d**4)/(2*e**7) - x*(9*A*a*c**2*d*e**4 + 10*A*c**3
*d**3*e**2 - 3*B*a**2*c*e**5 - 18*B*a*c**2*d**2*e**3 - 15*B*c**3*
d**4*e + 9*C*a**2*c*d*e**4 + 30*C*a*c**2*d**3*e**2 + 21*C*c**3*d*
*5)/e**8 + (a*e**2 + c*d**2)*(3*A*a*c*e**4 + 15*A*c**2*d**2*e**2
- 9*B*a*c*d*e**3 - 21*B*c**2*d**3*e + C*a**2*e**4 + 17*C*a*c*d**2
*e**2 + 28*C*c**2*d**4)*log(d + e*x)/e**9
```

GIAC/XCAS [A] time = 0.275018, size = 981, normalized size = 2.11

$$\left(28\,Cc^3d^6 - 21\,Bc^3d^5e + 45\,Cac^2d^4e^2 + 15\,Ac^3d^4e^2 - 30\,Bac^2d^3e^3 + 18\,Ca^2cd^2e^4 + 18\,Aac^2d^2e^4 - 9\,Ba^2cde^5 + Ca^3e^6 + 3\,Aa^2 \cdots\right.$$
$$+\frac{1}{60}\left(10\,Cc^3x^6e^{15} - 36\,Cc^3dx^5e^{14} + 90\,Cc^3d^2x^4e^{13} - 200\,Cc^3d^3x^3e^{12} + 450\,Cc^3d^4x^2e^{11} - 1260\,Cc^3d^5xe^{10} + 12\,Bc^3x^5e^{15} - 45 \cdots\right.$$
$$+\frac{\left(15\,Cc^3d^8 - 13\,Bc^3d^7e + 33\,Cac^2d^6e^2 + 11\,Ac^3d^6e^2 - 27\,Bac^2d^5e^3 + 21\,Ca^2cd^4e^4 + 21\,Aac^2d^4e^4 - 15\,Ba^2cd^3e^5 + 3\,Ca^3d^2e^6 \cdots\right.}{\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^3/(e*x + d)^3,x, algorithm="giac")
```

```
[Out] (28*C*c^3*d^6 - 21*B*c^3*d^5*e + 45*C*a*c^2*d^4*e^2 + 15*A*c^3*d^
4*e^2 - 30*B*a*c^2*d^3*e^3 + 18*C*a^2*c*d^2*e^4 + 18*A*a*c^2*d^2*
e^4 - 9*B*a^2*c*d*e^5 + C*a^3*e^6 + 3*A*a^2*c*e^6)*e^(-9)*ln(abs(
x*e + d)) + 1/60*(10*C*c^3*x^6*e^15 - 36*C*c^3*d*x^5*e^14 + 90*C*
c^3*d^2*x^4*e^13 - 200*C*c^3*d^3*x^3*e^12 + 450*C*c^3*d^4*x^2*e^1
1 - 1260*C*c^3*d^5*x*e^10 + 12*B*c^3*x^5*e^15 - 45*B*c^3*d*x^4*e^
14 + 120*B*c^3*d^2*x^3*e^13 - 300*B*c^3*d^3*x^2*e^12 + 900*B*c^3*
d^4*x*e^11 + 45*C*a*c^2*x^4*e^15 + 15*A*c^3*x^4*e^15 - 180*C*a*c^
2*d*x^3*e^14 - 60*A*c^3*d*x^3*e^14 + 540*C*a*c^2*d^2*x^2*e^13 + 1
80*A*c^3*d^2*x^2*e^13 - 1800*C*a*c^2*d^3*x*e^12 - 600*A*c^3*d^3*x
*e^12 + 60*B*a*c^2*x^3*e^15 - 270*B*a*c^2*d*x^2*e^14 + 1080*B*a*c
^2*d^2*x*e^13 + 90*C*a^2*c*x^2*e^15 + 90*A*a*c^2*x^2*e^15 - 540*C
*a^2*c*d*x*e^14 - 540*A*a*c^2*d*x*e^14 + 180*B*a^2*c*x*e^15)*e^(-
18) + 1/2*(15*C*c^3*d^8 - 13*B*c^3*d^7*e + 33*C*a*c^2*d^6*e^2 + 1
1*A*c^3*d^6*e^2 - 27*B*a*c^2*d^5*e^3 + 21*C*a^2*c*d^4*e^4 + 21*A*
a*c^2*d^4*e^4 - 15*B*a^2*c*d^3*e^5 + 3*C*a^3*d^2*e^6 + 9*A*a^2*c*
```

```
d^2*e^6 - B*a^3*d*e^7 - A*a^3*e^8 + 2*(8*C*c^3*d^7*e - 7*B*c^3*d^
6*e^2 + 18*C*a*c^2*d^5*e^3 + 6*A*c^3*d^5*e^3 - 15*B*a*c^2*d^4*e^4
 + 12*C*a^2*c*d^3*e^5 + 12*A*a*c^2*d^3*e^5 - 9*B*a^2*c*d^2*e^6 +
2*C*a^3*d*e^7 + 6*A*a^2*c*d*e^7 - B*a^3*e^8)*x)*e^(-9)/(x*e + d)^
2
```

3.39 $\int \frac{(a+bx^2)(-ad+4bcx+3bdx^2)}{(c+dx)^2} \, dx$

Optimal. Leaf size=17

$$\frac{(a+bx^2)^2}{c+dx}$$

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

Rubi [A] time = 0.0204575, antiderivative size = 17, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.031

$$\frac{(a+bx^2)^2}{c+dx}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^2)*(-(a*d) + 4*b*c*x + 3*b*d*x^2))/(c + d*x)^2,x]

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

Rubi in Sympy [A] time = 15.6177, size = 12, normalized size = 0.71

$$\frac{(a+bx^2)^2}{c+dx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**2+a)*(3*b*d*x**2+4*b*c*x-a*d)/(d*x+c)**2,x)

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

Mathematica [B] time = 0.0468686, size = 62, normalized size = 3.65

$$\frac{a^2d^4 + 2abd^2\left(c^2 + cdx + d^2x^2\right) + b^2\left(c^4 + c^3dx + d^4x^4\right)}{d^4(c+dx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^2)*(-(a*d) + 4*b*c*x + 3*b*d*x^2))/(c + d*x)^2,x]
```

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

Maple [B] time = 0.007, size = 76, normalized size = 4.5

$$\frac{b\left(bd^2x^3 - bcdx^2 + 2\,ad^2x + bc^2x\right)}{d^3} - \frac{-a^2d^4 - 2\,abc^2d^2 - b^2c^4}{d^4\,(dx + c)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x^2+a)*(3*b*d*x^2+4*b*c*x-a*d)/(d*x+c)^2,x)
```

```
[Out] b/d^3*(b*d^2*x^3-b*c*d*x^2+2*a*d^2*x+b*c^2*x)-(-a^2*d^4-2*a*b*c^2
*d^2-b^2*c^4)/d^4/(d*x+c)
```

Maxima [A] time = 0.704056, size = 111, normalized size = 6.53

$$\frac{b^2c^4 + 2\,abc^2d^2 + a^2d^4}{d^5x + cd^4} + \frac{b^2d^2x^3 - b^2cdx^2 + \left(b^2c^2 + 2\,abd^2\right)x}{d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((3*b*d*x^2 + 4*b*c*x - a*d)*(b*x^2 + a)/(d*x + c)^2,x, algorithm="maxim
```

```
[Out] (b^2*c^4 + 2*a*b*c^2*d^2 + a^2*d^4)/(d^5*x + c*d^4) + (b^2*d^2*x^
3 - b^2*c*d*x^2 + (b^2*c^2 + 2*a*b*d^2)*x)/d^3
```

Fricas [A] time = 0.263422, size = 105, normalized size = 6.18

$$\frac{b^2d^4x^4 + 2\,abd^4x^2 + b^2c^4 + 2\,abc^2d^2 + a^2d^4 + \left(b^2c^3d + 2\,abcd^3\right)x}{d^5x + cd^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((3*b*d*x^2 + 4*b*c*x - a*d)*(b*x^2 + a)/(d*x + c)^2,x, algorithm="frica
```

```
[Out] (b^2*d^4*x^4 + 2*a*b*d^4*x^2 + b^2*c^4 + 2*a*b*c^2*d^2 + a^2*d^4
+ (b^2*c^3*d + 2*a*b*c*d^3)*x)/(d^5*x + c*d^4)
```

Sympy [A] time = 1.00344, size = 75, normalized size = 4.41

$$-\frac{b^2cx^2}{d^2}+\frac{b^2x^3}{d}+\frac{a^2d^4+2abc^2d^2+b^2c^4}{cd^4+d^5x}+\frac{x\left(2abd^2+b^2c^2\right)}{d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**2+a)*(3*b*d*x**2+4*b*c*x-a*d)/(d*x+c)**2,x)
```

```
[Out] -b**2*c*x**2/d**2 + b**2*x**3/d + (a**2*d**4 + 2*a*b*c**2*d**2 +
b**2*c**4)/(c*d**4 + d**5*x) + x*(2*a*b*d**2 + b**2*c**2)/d**3
```

GIAC/XCAS [A] time = 0.270542, size = 150, normalized size = 8.82

$$\frac{\left(b^2-\frac{4\,b^2c}{dx+c}+\frac{6\,b^2c^2}{(dx+c)^2}+\frac{2\,abd^2}{(dx+c)^2}\right)(dx+c)^3}{d^4}+\frac{\frac{b^2c^4d^3}{dx+c}+\frac{2\,abc^2d^5}{dx+c}+\frac{a^2d^7}{dx+c}}{d^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((3*b*d*x^2 + 4*b*c*x - a*d)*(b*x^2 + a)/(d*x + c)^2,x, algorithm="giac"
```

```
[Out] (b^2 - 4*b^2*c/(d*x + c) + 6*b^2*c^2/(d*x + c)^2 + 2*a*b*d^2/(d*x
 + c)^2)*(d*x + c)^3/d^4 + (b^2*c^4*d^3/(d*x + c) + 2*a*b*c^2*d^5
/(d*x + c) + a^2*d^7/(d*x + c))/d^7
```

3.40 $\int \frac{(a+bx^2)(-ad+bx(4c+3dx))}{(c+dx)^2} \, dx$

Optimal. Leaf size=17

$$\frac{(a+bx^2)^2}{c+dx}$$

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

Rubi [A] time = 0.0173335, antiderivative size = 17, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.032

$$\frac{(a+bx^2)^2}{c+dx}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^2)*(-(a*d) + b*x*(4*c + 3*d*x)))/(c + d*x)^2,x]

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

Rubi in Sympy [A] time = 22.1913, size = 12, normalized size = 0.71

$$\frac{(a+bx^2)^2}{c+dx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**2+a)*(-a*d+b*x*(3*d*x+4*c))/(d*x+c)**2,x)

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

Mathematica [B] time = 0.0217316, size = 62, normalized size = 3.65

$$\frac{a^2d^4 + 2abd^2(c^2+cdx+d^2x^2) + b^2(c^4+c^3dx+d^4x^4)}{d^4(c+dx)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x^2)*(-(a*d) + b*x*(4*c + 3*d*x)))/(c + d*x)^2,x]
```

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

Maple [B] time = 0.007, size = 76, normalized size = 4.5

$$\frac{b\left(bd^2x^3 - bcdx^2 + 2\,ad^2x + bc^2x\right)}{d^3} - \frac{-a^2d^4 - 2\,abc^2d^2 - b^2c^4}{d^4\,(dx + c)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((b*x^2+a)*(-a*d+b*x*(3*d*x+4*c))/(d*x+c)^2,x)
```

```
[Out] b/d^3*(b*d^2*x^3-b*c*d*x^2+2*a*d^2*x+b*c^2*x)-(-a^2*d^4-2*a*b*c^2
*d^2-b^2*c^4)/d^4/(d*x+c)
```

Maxima [A] time = 0.708273, size = 111, normalized size = 6.53

$$\frac{b^2c^4 + 2\,abc^2d^2 + a^2d^4}{d^5x + cd^4} + \frac{b^2d^2x^3 - b^2cdx^2 + \left(b^2c^2 + 2\,abd^2\right)x}{d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((3*d*x + 4*c)*b*x - a*d)*(b*x^2 + a)/(d*x + c)^2,x, algorithm="maxima"
```

```
[Out] (b^2*c^4 + 2*a*b*c^2*d^2 + a^2*d^4)/(d^5*x + c*d^4) + (b^2*d^2*x^
3 - b^2*c*d*x^2 + (b^2*c^2 + 2*a*b*d^2)*x)/d^3
```

Fricas [A] time = 0.262463, size = 105, normalized size = 6.18

$$\frac{b^2d^4x^4 + 2\,abd^4x^2 + b^2c^4 + 2\,abc^2d^2 + a^2d^4 + \left(b^2c^3d + 2\,abcd^3\right)x}{d^5x + cd^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((3*d*x + 4*c)*b*x - a*d)*(b*x^2 + a)/(d*x + c)^2,x, algorithm="fricas"
```

```
[Out] (b^2*d^4*x^4 + 2*a*b*d^4*x^2 + b^2*c^4 + 2*a*b*c^2*d^2 + a^2*d^4
+ (b^2*c^3*d + 2*a*b*c*d^3)*x)/(d^5*x + c*d^4)
```

Sympy [A] time = 1.01362, size = 75, normalized size = 4.41

$$-\frac{b^2cx^2}{d^2}+\frac{b^2x^3}{d}+\frac{a^2d^4+2abc^2d^2+b^2c^4}{cd^4+d^5x}+\frac{x\left(2abd^2+b^2c^2\right)}{d^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**2+a)*(-a*d+b*x*(3*d*x+4*c))/(d*x+c)**2,x)
```

```
[Out] -b**2*c*x**2/d**2 + b**2*x**3/d + (a**2*d**4 + 2*a*b*c**2*d**2 +
b**2*c**4)/(c*d**4 + d**5*x) + x*(2*a*b*d**2 + b**2*c**2)/d**3
```

GIAC/XCAS [A] time = 0.270982, size = 150, normalized size = 8.82

$$\frac{\left(b^2-\frac{4\,b^2c}{dx+c}+\frac{6\,b^2c^2}{(dx+c)^2}+\frac{2\,abd^2}{(dx+c)^2}\right)(dx+c)^3}{d^4}+\frac{\frac{b^2c^4d^3}{dx+c}+\frac{2\,abc^2d^5}{dx+c}+\frac{a^2d^7}{dx+c}}{d^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(((3*d*x + 4*c)*b*x - a*d)*(b*x^2 + a)/(d*x + c)^2,x, algorithm="giac")
```

```
[Out] (b^2 - 4*b^2*c/(d*x + c) + 6*b^2*c^2/(d*x + c)^2 + 2*a*b*d^2/(d*x
 + c)^2)*(d*x + c)^3/d^4 + (b^2*c^4*d^3/(d*x + c) + 2*a*b*c^2*d^5
/(d*x + c) + a^2*d^7/(d*x + c))/d^7
```

3.41 $\int \frac{(a+bx^2)^2(-ad+6bcx+5bdx^2)}{(c+dx)^2}\,dx$

Optimal. Leaf size=17

$$\frac{(a+bx^2)^3}{c+dx}$$

```
[Out] (a + b*x^2)^3/(c + d*x)
```

Rubi [A] time = 0.0208408, antiderivative size = 17, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.029

$$\frac{(a+bx^2)^3}{c+dx}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^2)^2*(-(a*d) + 6*b*c*x + 5*b*d*x^2))/(c + d*x)^2,x]

[Out] (a + b*x^2)^3/(c + d*x)
```

Rubi in Sympy [A] time = 18.7657, size = 12, normalized size = 0.71

$$\frac{(a+bx^2)^3}{c+dx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((b*x**2+a)**2*(5*b*d*x**2+6*b*c*x-a*d)/(d*x+c)**2,x)

[Out] (a + b*x**2)**3/(c + d*x)
```

Mathematica [B] time = 0.0690677, size = 90, normalized size = 5.29

$$\frac{a^3d^6+3a^2bd^4\left(c^2+cdx+d^2x^2\right)+3ab^2d^2\left(c^4+c^3dx+d^4x^4\right)+b^3\left(c^6+c^5dx+d^6x^6\right)}{d^6(c+dx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^2)^2*(-(a*d) + 6*b*c*x + 5*b*d*x^2))/(c + d*x)^2,x]
```

```
[Out] (a^3*d^6 + 3*a^2*b*d^4*(c^2 + c*d*x + d^2*x^2) + 3*a*b^2*d^2*(c^4
 + c^3*d*x + d^4*x^4) + b^3*(c^6 + c^5*d*x + d^6*x^6))/(d^6*(c +
d*x))
```

Maple [B] time = 0.008, size = 157, normalized size = 9.2

$$\frac{b\left(b^2d^4x^5 - b^2cd^3x^4 + 3\,abd^4x^3 + b^2c^2d^2x^3 - 3\,abcd^3x^2 - b^2c^3dx^2 + 3\,a^2d^4x + 3\,abc^2d^2x + b^2c^4x\right)}{d^5} - \frac{-a^3d^6 - 3\,a^2bc^2d^4 - 3\,ab^2c^4d^2 - b^3c^6}{d^6\,(dx+c)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x^2+a)^2*(5*b*d*x^2+6*b*c*x-a*d)/(d*x+c)^2,x)
```

```
[Out] b/d^5*(b^2*d^4*x^5-b^2*c*d^3*x^4+3*a*b*d^4*x^3+b^2*c^2*d^2*x^3-3*
a*b*c*d^3*x^2-b^2*c^3*d*x^2+3*a^2*d^4*x+3*a*b*c^2*d^2*x+b^2*c^4*x
)-(-a^3*d^6-3*a^2*b*c^2*d^4-3*a*b^2*c^4*d^2-b^3*c^6)/d^6/(d*x+c)
```

Maxima [A] time = 0.707929, size = 216, normalized size = 12.71

$$\frac{b^3c^6 + 3\,ab^2c^4d^2 + 3\,a^2bc^2d^4 + a^3d^6}{d^7x + cd^6} + \frac{b^3d^4x^5 - b^3cd^3x^4 + \left(b^3c^2d^2 + 3\,ab^2d^4\right)x^3 - \left(b^3c^3d + 3\,ab^2cd^3\right)x^2 + \left(b^3c^4 + 3\,ab^2c^2d^2 + 3\,a^2bd^4\right)x}{d^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*b*d*x^2 + 6*b*c*x - a*d)*(b*x^2 + a)^2/(d*x + c)^2,x, algorithm="max
```

```
[Out] (b^3*c^6 + 3*a*b^2*c^4*d^2 + 3*a^2*b*c^2*d^4 + a^3*d^6)/(d^7*x +
c*d^6) + (b^3*d^4*x^5 - b^3*c*d^3*x^4 + (b^3*c^2*d^2 + 3*a*b^2*d^
4)*x^3 - (b^3*c^3*d + 3*a*b^2*c*d^3)*x^2 + (b^3*c^4 + 3*a*b^2*c^2
*d^2 + 3*a^2*b*d^4)*x)/d^5
```

Fricas [A] time = 0.261278, size = 162, normalized size = 9.53

$$\frac{b^3d^6x^6 + 3\,ab^2d^6x^4 + 3\,a^2bd^6x^2 + b^3c^6 + 3\,ab^2c^4d^2 + 3\,a^2bc^2d^4 + a^3d^6 + \left(b^3c^5d + 3\,ab^2c^3d^3 + 3\,a^2bcd^5\right)x}{d^7x + cd^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*b*d*x^2 + 6*b*c*x - a*d)*(b*x^2 + a)^2/(d*x + c)^2,x, algorithm="fri
```

```
[Out] (b^3*d^6*x^6 + 3*a*b^2*d^6*x^4 + 3*a^2*b*d^6*x^2 + b^3*c^6 + 3*a*
b^2*c^4*d^2 + 3*a^2*b*c^2*d^4 + a^3*d^6 + (b^3*c^5*d + 3*a*b^2*c^
3*d^3 + 3*a^2*b*c*d^5)*x)/(d^7*x + c*d^6)
```

Sympy [A] time = 1.46541, size = 155, normalized size = 9.12

$$-\frac{b^3cx^4}{d^2}+\frac{b^3x^5}{d}+\frac{a^3d^6+3a^2bc^2d^4+3ab^2c^4d^2+b^3c^6}{cd^6+d^7x}+\frac{x^3\left(3ab^2d^2+b^3c^2\right)}{d^3}-\frac{x^2\left(3ab^2cd^2+b^3c^3\right)}{d^4}+\frac{x\left(3a^2bd^4+3ab^2c^2d^2+b^3c^4\right)}{d^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((b*x**2+a)**2*(5*b*d*x**2+6*b*c*x-a*d)/(d*x+c)**2,x)
```

```
[Out] -b**3*c*x**4/d**2 + b**3*x**5/d + (a**3*d**6 + 3*a**2*b*c**2*d**4
 + 3*a*b**2*c**4*d**2 + b**3*c**6)/(c*d**6 + d**7*x) + x**3*(3*a*
b**2*d**2 + b**3*c**2)/d**3 - x**2*(3*a*b**2*c*d**2 + b**3*c**3)/
d**4 + x*(3*a**2*b*d**4 + 3*a*b**2*c**2*d**2 + b**3*c**4)/d**5
```

GIAC/XCAS [A] time = 0.273926, size = 292, normalized size = 17.18

$$\frac{\left(b^3-\frac{6\,b^3c}{dx+c}+\frac{15\,b^3c^2}{(dx+c)^2}-\frac{20\,b^3c^3}{(dx+c)^3}+\frac{15\,b^3c^4}{(dx+c)^4}+\frac{3\,ab^2d^2}{(dx+c)^2}-\frac{12\,ab^2cd^2}{(dx+c)^3}+\frac{18\,ab^2c^2d^2}{(dx+c)^4}+\frac{3\,a^2bd^4}{(dx+c)^4}\right)(dx+c)^5}{d^6}+\frac{\frac{b^3c^6d^5}{dx+c}+\frac{3\,ab^2c^4d^7}{dx+c}+\frac{3\,a^2bc^2d^9}{dx+c}+\frac{a^3d^{11}}{dx+c}}{d^{11}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*b*d*x^2 + 6*b*c*x - a*d)*(b*x^2 + a)^2/(d*x + c)^2,x, algorithm="gia
```

```
[Out] (b^3 - 6*b^3*c/(d*x + c) + 15*b^3*c^2/(d*x + c)^2 - 20*b^3*c^3/(d
*x + c)^3 + 15*b^3*c^4/(d*x + c)^4 + 3*a*b^2*d^2/(d*x + c)^2 - 12
*a*b^2*c*d^2/(d*x + c)^3 + 18*a*b^2*c^2*d^2/(d*x + c)^4 + 3*a^2*b
*d^4/(d*x + c)^4)*(d*x + c)^5/d^6 + (b^3*c^6*d^5/(d*x + c) + 3*a*
b^2*c^4*d^7/(d*x + c) + 3*a^2*b*c^2*d^9/(d*x + c) + a^3*d^11/(d*x
 + c))/d^11
```

3.42 $\int \frac{(a+bx^2)^2(-ad+bx(6c+5dx))}{(c+dx)^2} \, dx$

Optimal. Leaf size=17

$$\frac{(a+bx^2)^3}{c+dx}$$

```
[Out] (a + b*x^2)^3/(c + d*x)
```

Rubi [A] time = 0.0190099, antiderivative size = 17, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.03

$$\frac{(a+bx^2)^3}{c+dx}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x^2)^2*(-(a*d) + b*x*(6*c + 5*d*x)))/(c + d*x)^2,x]

[Out] (a + b*x^2)^3/(c + d*x)
```

Rubi in Sympy [A] time = 27.3763, size = 12, normalized size = 0.71

$$\frac{(a+bx^2)^3}{c+dx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((b*x**2+a)**2*(-a*d+b*x*(5*d*x+6*c))/(d*x+c)**2,x)

[Out] (a + b*x**2)**3/(c + d*x)
```

Mathematica [B] time = 0.0401899, size = 90, normalized size = 5.29

$$\frac{a^3d^6 + 3a^2bd^4\left(c^2+cdx+d^2x^2\right) + 3ab^2d^2\left(c^4+c^3dx+d^4x^4\right) + b^3\left(c^6+c^5dx+d^6x^6\right)}{d^6(c+dx)}$$

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x^2)^2*(-(a*d) + b*x*(6*c + 5*d*x)))/(c + d*x)^2,x]
```

```
[Out] (a^3*d^6 + 3*a^2*b*d^4*(c^2 + c*d*x + d^2*x^2) + 3*a*b^2*d^2*(c^4
 + c^3*d*x + d^4*x^4) + b^3*(c^6 + c^5*d*x + d^6*x^6))/(d^6*(c +
d*x))
```

Maple [B] time = 0.007, size = 157, normalized size = 9.2

$$\frac{b\left(b^2d^4x^5 - b^2cd^3x^4 + 3\,abd^4x^3 + b^2c^2d^2x^3 - 3\,abcd^3x^2 - b^2c^3dx^2 + 3\,a^2d^4x + 3\,abc^2d^2x + b^2c^4x\right)}{d^5} - \frac{-a^3d^6 - 3\,a^2bc^2d^4 - 3\,ab^2c^4d^2 - b^3c^6}{d^6\,(dx + c)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((b*x^2+a)^2*(-a*d+b*x*(5*d*x+6*c))/(d*x+c)^2,x)
```

```
[Out] b/d^5*(b^2*d^4*x^5-b^2*c*d^3*x^4+3*a*b*d^4*x^3+b^2*c^2*d^2*x^3-3*
a*b*c*d^3*x^2-b^2*c^3*d*x^2+3*a^2*d^4*x+3*a*b*c^2*d^2*x+b^2*c^4*x
)-(-a^3*d^6-3*a^2*b*c^2*d^4-3*a*b^2*c^4*d^2-b^3*c^6)/d^6/(d*x+c)
```

Maxima [A] time = 0.711735, size = 216, normalized size = 12.71

$$\frac{b^3c^6 + 3\,ab^2c^4d^2 + 3\,a^2bc^2d^4 + a^3d^6}{d^7x + cd^6} + \frac{b^3d^4x^5 - b^3cd^3x^4 + \left(b^3c^2d^2 + 3\,ab^2d^4\right)x^3 - \left(b^3c^3d + 3\,ab^2cd^3\right)x^2 + \left(b^3c^4 + 3\,ab^2c^2d^2 + 3\,a^2bd^4\right)x}{d^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((5*d*x + 6*c)*b*x - a*d)*(b*x^2 + a)^2/(d*x + c)^2,x, algorithm="maxim
```

```
[Out] (b^3*c^6 + 3*a*b^2*c^4*d^2 + 3*a^2*b*c^2*d^4 + a^3*d^6)/(d^7*x +
c*d^6) + (b^3*d^4*x^5 - b^3*c*d^3*x^4 + (b^3*c^2*d^2 + 3*a*b^2*d^
4)*x^3 - (b^3*c^3*d + 3*a*b^2*c*d^3)*x^2 + (b^3*c^4 + 3*a*b^2*c^2
*d^2 + 3*a^2*b*d^4)*x)/d^5
```

Fricas [A] time = 0.262905, size = 162, normalized size = 9.53

$$\frac{b^3d^6x^6 + 3\,ab^2d^6x^4 + 3\,a^2bd^6x^2 + b^3c^6 + 3\,ab^2c^4d^2 + 3\,a^2bc^2d^4 + a^3d^6 + \left(b^3c^5d + 3\,ab^2c^3d^3 + 3\,a^2bcd^5\right)x}{d^7x + cd^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((5*d*x + 6*c)*b*x - a*d)*(b*x^2 + a)^2/(d*x + c)^2,x, algorithm="frica
```

```
[Out] (b^3*d^6*x^6 + 3*a*b^2*d^6*x^4 + 3*a^2*b*d^6*x^2 + b^3*c^6 + 3*a*
b^2*c^4*d^2 + 3*a^2*b*c^2*d^4 + a^3*d^6 + (b^3*c^5*d + 3*a*b^2*c^
3*d^3 + 3*a^2*b*c*d^5)*x)/(d^7*x + c*d^6)
```

Sympy [A] time = 1.43186, size = 155, normalized size = 9.12

$$-\frac{b^3cx^4}{d^2}+\frac{b^3x^5}{d}+\frac{a^3d^6+3a^2bc^2d^4+3ab^2c^4d^2+b^3c^6}{cd^6+d^7x}+\frac{x^3\left(3ab^2d^2+b^3c^2\right)}{d^3}-\frac{x^2\left(3ab^2cd^2+b^3c^3\right)}{d^4}+\frac{x\left(3a^2bd^4+3ab^2c^2d^2+b^3c^4\right)}{d^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((b*x**2+a)**2*(-a*d+b*x*(5*d*x+6*c))/(d*x+c)**2,x)
```

```
[Out] -b**3*c*x**4/d**2 + b**3*x**5/d + (a**3*d**6 + 3*a**2*b*c**2*d**4
 + 3*a*b**2*c**4*d**2 + b**3*c**6)/(c*d**6 + d**7*x) + x**3*(3*a*
b**2*d**2 + b**3*c**2)/d**3 - x**2*(3*a*b**2*c*d**2 + b**3*c**3)/
d**4 + x*(3*a**2*b*d**4 + 3*a*b**2*c**2*d**2 + b**3*c**4)/d**5
```

GIAC/XCAS [A] time = 0.281113, size = 292, normalized size = 17.18

$$\frac{\left(b^3-\frac{6\,b^3c}{dx+c}+\frac{15\,b^3c^2}{(dx+c)^2}-\frac{20\,b^3c^3}{(dx+c)^3}+\frac{15\,b^3c^4}{(dx+c)^4}+\frac{3\,ab^2d^2}{(dx+c)^2}-\frac{12\,ab^2cd^2}{(dx+c)^3}+\frac{18\,ab^2c^2d^2}{(dx+c)^4}+\frac{3\,a^2bd^4}{(dx+c)^4}\right)(dx+c)^5}{d^6}+\frac{\frac{b^3c^6d^5}{dx+c}+\frac{3\,ab^2c^4d^7}{dx+c}+\frac{3\,a^2bc^2d^9}{dx+c}+\frac{a^3d^{11}}{dx+c}}{d^{11}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(((5*d*x + 6*c)*b*x - a*d)*(b*x^2 + a)^2/(d*x + c)^2,x, algorithm="giac"
```

```
[Out] (b^3 - 6*b^3*c/(d*x + c) + 15*b^3*c^2/(d*x + c)^2 - 20*b^3*c^3/(d
*x + c)^3 + 15*b^3*c^4/(d*x + c)^4 + 3*a*b^2*d^2/(d*x + c)^2 - 12
*a*b^2*c*d^2/(d*x + c)^3 + 18*a*b^2*c^2*d^2/(d*x + c)^4 + 3*a^2*b
*d^4/(d*x + c)^4)*(d*x + c)^5/d^6 + (b^3*c^6*d^5/(d*x + c) + 3*a*
b^2*c^4*d^7/(d*x + c) + 3*a^2*b*c^2*d^9/(d*x + c) + a^3*d^11/(d*x
 + c))/d^11
```

3.43 $\int \frac{(d+ex)^3(A+Bx+Cx^2)}{a+cx^2}\,dx$

Optimal. Leaf size=240

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(cd^2-3ae^2\right)+a\left(ae^2(Be+3Cd)-cd^2(3Be+Cd)\right)\right)}{\sqrt{a}c^{5/2}}+\frac{\log\left(a+cx^2\right)\left(e(Ac-aC)\left(3cd^2-ae^2\right)+Bcd\left(cd^2-3ae^2\right)\right)}{2c^3}-\frac{ex^2\left(aCe^2-c\left(e(Ae+3Bd)+3Cd^2\right)\right)}{2c^2}-\frac{x\left(ae^2(Be+3Cd)-cd\left(3e(Ae+Bd)+Cd^2\right)\right)}{c^2}+\frac{e^2x^3(Be+3Cd)}{3c}+\frac{Ce^3x^4}{4c}$$

```
[Out] -(((a*e^2*(3*C*d + B*e) - c*d*(C*d^2 + 3*e*(B*d + A*e)))*x)/c^2)
- (e*(a*C*e^2 - c*(3*C*d^2 + e*(3*B*d + A*e)))*x^2)/(2*c^2) + (e^
2*(3*C*d + B*e)*x^3)/(3*c) + (C*e^3*x^4)/(4*c) + ((A*c*d*(c*d^2 -
 3*a*e^2) + a*(a*e^2*(3*C*d + B*e) - c*d^2*(C*d + 3*B*e)))*ArcTan
[(Sqrt[c]*x)/Sqrt[a]])/(Sqrt[a]*c^(5/2)) + ((B*c*d*(c*d^2 - 3*a*e
^2) + (A*c - a*C)*e*(3*c*d^2 - a*e^2))*Log[a + c*x^2])/(2*c^3)
```

Rubi [A] time = 0.859437, antiderivative size = 237, normalized size of antiderivative = 0.99, number of steps used = 5, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.148$

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(cd^2-3ae^2\right)+a\left(ae^2(Be+3Cd)-cd^2(3Be+Cd)\right)\right)}{\sqrt{a}c^{5/2}}+\frac{\log\left(a+cx^2\right)\left(e(Ac-aC)\left(3cd^2-ae^2\right)+Bcd\left(cd^2-3ae^2\right)\right)}{2c^3}+\frac{x\left(-ae^2(Be+3Cd)+3cde(Ae+Bd)+cCd^3\right)}{c^2}+\frac{ex^2\left(-aCe^2+ce(Ae+3Bd)+3cCd^2\right)}{2c^2}+\frac{e^2x^3(Be+3Cd)}{3c}+\frac{Ce^3x^4}{4c}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^3*(A + B*x + C*x^2))/(a + c*x^2),x]
```

```
[Out] ((c*C*d^3 + 3*c*d*e*(B*d + A*e) - a*e^2*(3*C*d + B*e))*x)/c^2 + (
e*(3*c*C*d^2 - a*C*e^2 + c*e*(3*B*d + A*e))*x^2)/(2*c^2) + (e^2*(
3*C*d + B*e)*x^3)/(3*c) + (C*e^3*x^4)/(4*c) + ((A*c*d*(c*d^2 - 3*
a*e^2) + a*(a*e^2*(3*C*d + B*e) - c*d^2*(C*d + 3*B*e)))*ArcTan[(S
qrt[c]*x)/Sqrt[a]])/(Sqrt[a]*c^(5/2)) + ((B*c*d*(c*d^2 - 3*a*e^2)
 + (A*c - a*C)*e*(3*c*d^2 - a*e^2))*Log[a + c*x^2])/(2*c^3)
```

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

$$\frac{Ce^3x^4}{4c} - \left(-3Acde^2 + Bae^3 - 3Bcd^2e + 3Cade^2 - Ccd^3\right)\int \frac{1}{c^2}\,dx + \frac{e^2x^3\,(Be + 3Cd)}{3c} + \frac{e\left(Ace^2 + 3Bcde - Cae^2 + 3Ccd^2\right)\int x\,dx}{c^2} + \frac{\left(-Aace^3 + 3Ac^2d^2e - 3Bacde^2 + Bc^2d^3 + Ca^2e^3 - 3Cacd^2e\right)\log\left(a + cx^2\right)}{2c^3} + \frac{\left(-3Aacde^2 + Ac^2d^3 + Ba^2e^3 - 3Bacd^2e + 3Ca^2de^2 - Cacd^3\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{\sqrt{a}c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)**3*(C*x**2+B*x+A)/(c*x**2+a),x)
```

```
[Out] C*e**3*x**4/(4*c) - (-3*A*c*d*e**2 + B*a*e**3 - 3*B*c*d**2*e + 3*
C*a*d*e**2 - C*c*d**3)*Integral(c**(-2), x) + e**2*x**3*(B*e + 3*
C*d)/(3*c) + e*(A*c*e**2 + 3*B*c*d*e - C*a*e**2 + 3*C*c*d**2)*Int
egral(x, x)/c**2 + (-A*a*c*e**3 + 3*A*c**2*d**2*e - 3*B*a*c*d*e**
2 + B*c**2*d**3 + C*a**2*e**3 - 3*C*a*c*d**2*e)*log(a + c*x**2)/(
2*c**3) + (-3*A*a*c*d*e**2 + A*c**2*d**3 + B*a**2*e**3 - 3*B*a*c*
d**2*e + 3*C*a**2*d*e**2 - C*a*c*d**3)*atan(sqrt(c)*x/sqrt(a))/(s
qrt(a)*c**(5/2))
```

Mathematica [A] time = 0.531745, size = 223, normalized size = 0.93

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(cd^2 - 3ae^2\right) + a\left(ae^2(Be + 3Cd) - cd^2(3Be + Cd)\right)\right)}{\sqrt{a}c^{5/2}} + \frac{6\log\left(a + cx^2\right)\left(e(Ac - aC)\left(3cd^2 - ae^2\right) + Bcd\left(cd^2 - 3ae^2\right)\right) + cx\left(-6ae^2(2Be + 6Cd + Cex) + 2ce\left(3Ae(6d + ex) + B\left(18a\right.\right.\right.}{12c^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)^3*(A + B*x + C*x^2))/(a + c*x^2),x]
```

```
[Out] ((A*c*d*(c*d^2 - 3*a*e^2) + a*(a*e^2*(3*C*d + B*e) - c*d^2*(C*d +
 3*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(Sqrt[a]*c^(5/2)) + (c*x*(
-6*a*e^2*(6*C*d + 2*B*e + C*e*x) + 3*c*C*(4*d^3 + 6*d^2*e*x + 4*d
*e^2*x^2 + e^3*x^3) + 2*c*e*(3*A*e*(6*d + e*x) + B*(18*d^2 + 9*d*
e*x + 2*e^2*x^2))) + 6*(B*c*d*(c*d^2 - 3*a*e^2) + (A*c - a*C)*e*(
3*c*d^2 - a*e^2))*Log[a + c*x^2])/(12*c^3)
```

Maple [A] time = 0.012, size = 399, normalized size = 1.7

$$\frac{Ce^3x^4}{4c}+\frac{Bx^3e^3}{3c}+\frac{Cx^3de^2}{c}+\frac{Ax^2e^3}{2c}+\frac{3Bx^2de^2}{2c}-\frac{Cx^2ae^3}{2c^2}+\frac{3Cx^2d^2e}{2c}+3\frac{e^2dAx}{c}-\frac{Bae^3x}{c^2}+3\frac{Bd^2ex}{c}-3\frac{Cade^2x}{c^2}+\frac{Cd^3x}{c}-\frac{\ln\left(cx^2+a\right)Aae^3}{2c^2}+\frac{3\ln\left(cx^2+a\right)Ad^2e}{2c}-\frac{3\ln\left(cx^2+a\right)Bade^2}{2c^2}+\frac{\ln\left(cx^2+a\right)Bd^3}{2c}+\frac{\ln\left(cx^2+a\right)Ca^2e^3}{2c^3}-\frac{3\ln\left(cx^2+a\right)Cad^2e}{2c^2}-3\frac{Aade^2}{c\sqrt{ac}}\arctan\left(\frac{cx}{\sqrt{ac}}\right)+Ad^3\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Ba^2e^3}{c^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}-3\frac{d^2eaB}{c\sqrt{ac}}\arctan\left(\frac{cx}{\sqrt{ac}}\right)+3\frac{Ca^2de^2}{c^2\sqrt{ac}}\arctan\left(\frac{cx}{\sqrt{ac}}\right)-\frac{d^3aC}{c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^3*(C*x^2+B*x+A)/(c*x^2+a),x)
```

```
[Out] 1/4*C*e^3*x^4/c+1/3/c*B*x^3*e^3+1/c*C*x^3*d*e^2+1/2/c*A*x^2*e^3+3
/2/c*B*x^2*d*e^2-1/2/c^2*C*x^2*a*e^3+3/2/c*C*x^2*d^2*e+3/c*e^2*d*
A*x-1/c^2*a*B*e^3*x+3/c*B*d^2*e*x-3/c^2*C*a*d*e^2*x+1/c*C*d^3*x-1
/2/c^2*ln(c*x^2+a)*A*a*e^3+3/2/c*ln(c*x^2+a)*A*d^2*e-3/2/c^2*ln(c
*x^2+a)*B*a*d*e^2+1/2/c*ln(c*x^2+a)*B*d^3+1/2/c^3*ln(c*x^2+a)*C*a
^2*e^3-3/2/c^2*ln(c*x^2+a)*C*a*d^2*e-3/c/(a*c)^(1/2)*arctan(c*x/(
a*c)^(1/2))*A*a*d*e^2+1/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*d^3
+1/c^2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*a^2*e^3-3/c/(a*c)^(1
/2)*arctan(c*x/(a*c)^(1/2))*B*a*d^2*e+3/c^2/(a*c)^(1/2)*arctan(c*
x/(a*c)^(1/2))*C*a^2*d*e^2-1/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2)
)*C*a*d^3
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(e*x + d)^3/(c*x^2 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.284508, size = 1, normalized size = 0.

$$\left[-\frac{6\left(3\,Bac^2d^2e - Ba^2ce^3 + \left(Cac^2 - Ac^3\right)d^3 - 3\left(Ca^2c - Aac^2\right)de^2\right)\log\left(\frac{2\,acx + \left(cx^2 - a\right)\sqrt{-ac}}{cx^2 + a}\right) - \left(3\,Cc^2e^3x^4 + 4\left(3\,Cc^2de^2 + Bc\right.\right.}{}\right.$$

$$-\frac{12\left(3\,Bac^2d^2e - Ba^2ce^3 + \left(Cac^2 - Ac^3\right)d^3 - 3\left(Ca^2c - Aac^2\right)de^2\right)\arctan\left(\frac{\sqrt{ac}x}{a}\right) - \left(3\,Cc^2e^3x^4 + 4\left(3\,Cc^2de^2 + Bc^2e^3\right)x^3 +\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^3/(c*x^2 + a),x, algorithm="fricas")
```

```
[Out] [-1/12*(6*(3*B*a*c^2*d^2*e - B*a^2*c*e^3 + (C*a*c^2 - A*c^3)*d^3
- 3*(C*a^2*c - A*a*c^2)*d*e^2)*log((2*a*c*x + (c*x^2 - a)*sqrt(-a
*c))/(c*x^2 + a)) - (3*C*c^2*e^3*x^4 + 4*(3*C*c^2*d*e^2 + B*c^2*e
^3)*x^3 + 6*(3*C*c^2*d^2*e + 3*B*c^2*d*e^2 - (C*a*c - A*c^2)*e^3)
*x^2 + 12*(C*c^2*d^3 + 3*B*c^2*d^2*e - B*a*c*e^3 - 3*(C*a*c - A*c
^2)*d*e^2)*x + 6*(B*c^2*d^3 - 3*B*a*c*d*e^2 - 3*(C*a*c - A*c^2)*d
^2*e + (C*a^2 - A*a*c)*e^3)*log(c*x^2 + a))*sqrt(-a*c))/(sqrt(-a*
c)*c^3), -1/12*(12*(3*B*a*c^2*d^2*e - B*a^2*c*e^3 + (C*a*c^2 - A*
c^3)*d^3 - 3*(C*a^2*c - A*a*c^2)*d*e^2)*arctan(sqrt(a*c)*x/a) - (
3*C*c^2*e^3*x^4 + 4*(3*C*c^2*d*e^2 + B*c^2*e^3)*x^3 + 6*(3*C*c^2*
d^2*e + 3*B*c^2*d*e^2 - (C*a*c - A*c^2)*e^3)*x^2 + 12*(C*c^2*d^3
+ 3*B*c^2*d^2*e - B*a*c*e^3 - 3*(C*a*c - A*c^2)*d*e^2)*x + 6*(B*c
^2*d^3 - 3*B*a*c*d*e^2 - 3*(C*a*c - A*c^2)*d^2*e + (C*a^2 - A*a*c
)*e^3)*log(c*x^2 + a))*sqrt(a*c))/(sqrt(a*c)*c^3)]
```

Sympy [A] time = 10.2377, size = 1000, normalized size = 4.17

$$\frac{Ce^3x^4}{4c}+\left(\frac{-Aace^3+3Ac^2d^2e-3Bacde^2+Bc^2d^3+Ca^2e^3-3Cacd^2e}{2c^3}-\frac{\sqrt{-ac^7}\,(-3Aacde^2+Ac^2d^3+Ba^2e^3-3Bacd^2e+3Ca^2de^2-Cacd^3)}{2ac^6}\right)\log\left(x+\frac{Aa^2ce^3-3Aac^2d^2e+3Ba^2cde^2-Bac^2d^3-\cdots}{\cdots}\right)$$
$$+\left(\frac{-Aace^3+3Ac^2d^2e-3Bacde^2+Bc^2d^3+Ca^2e^3-3Cacd^2e}{2c^3}+\frac{\sqrt{-ac^7}\,(-3Aacde^2+Ac^2d^3+Ba^2e^3-3Bacd^2e+3Ca^2de^2-Cacd^3)}{2ac^6}\right)\log\left(x+\frac{Aa^2ce^3-3Aac^2d^2e+3Ba^2cde^2-Bac^2d^3-\cdots}{\cdots}\right)$$
$$+\frac{x^3(Be^3+3Cde^2)}{3c}-\frac{x^2(-Ace^3-3Bcde^2+Cae^3-3Ccd^2e)}{2c^2}-\frac{x(-3Acde^2+Bae^3-3Bcd^2e+3Cade^2-Ccd^3)}{c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**3*(C*x**2+B*x+A)/(c*x**2+a),x)
```

```
[Out] C*e**3*x**4/(4*c) + ((-A*a*c*e**3 + 3*A*c**2*d**2*e - 3*B*a*c*d*e
**2 + B*c**2*d**3 + C*a**2*e**3 - 3*C*a*c*d**2*e)/(2*c**3) - sqrt
(-a*c**7)*(-3*A*a*c*d*e**2 + A*c**2*d**3 + B*a**2*e**3 - 3*B*a*c*
d**2*e + 3*C*a**2*d*e**2 - C*a*c*d**3)/(2*a*c**6))*log(x + (A*a**
2*c*e**3 - 3*A*a*c**2*d**2*e + 3*B*a**2*c*d*e**2 - B*a*c**2*d**3
- C*a**3*e**3 + 3*C*a**2*c*d**2*e + 2*a*c**3*((-A*a*c*e**3 + 3*A*
c**2*d**2*e - 3*B*a*c*d*e**2 + B*c**2*d**3 + C*a**2*e**3 - 3*C*a*
c*d**2*e)/(2*c**3) - sqrt(-a*c**7)*(-3*A*a*c*d*e**2 + A*c**2*d**3
 + B*a**2*e**3 - 3*B*a*c*d**2*e + 3*C*a**2*d*e**2 - C*a*c*d**3)/(
2*a*c**6)))/(-3*A*a*c**2*d*e**2 + A*c**3*d**3 + B*a**2*c*e**3 - 3
*B*a*c**2*d**2*e + 3*C*a**2*c*d*e**2 - C*a*c**2*d**3)) + ((-A*a*c
*e**3 + 3*A*c**2*d**2*e - 3*B*a*c*d*e**2 + B*c**2*d**3 + C*a**2*e
**3 - 3*C*a*c*d**2*e)/(2*c**3) + sqrt(-a*c**7)*(-3*A*a*c*d*e**2 +
 A*c**2*d**3 + B*a**2*e**3 - 3*B*a*c*d**2*e + 3*C*a**2*d*e**2 - C
*a*c*d**3)/(2*a*c**6))*log(x + (A*a**2*c*e**3 - 3*A*a*c**2*d**2*e
 + 3*B*a**2*c*d*e**2 - B*a*c**2*d**3 - C*a**3*e**3 + 3*C*a**2*c*d
**2*e + 2*a*c**3*((-A*a*c*e**3 + 3*A*c**2*d**2*e - 3*B*a*c*d*e**2
 + B*c**2*d**3 + C*a**2*e**3 - 3*C*a*c*d**2*e)/(2*c**3) + sqrt(-a
*c**7)*(-3*A*a*c*d*e**2 + A*c**2*d**3 + B*a**2*e**3 - 3*B*a*c*d**
2*e + 3*C*a**2*d*e**2 - C*a*c*d**3)/(2*a*c**6)))/(-3*A*a*c**2*d*e
**2 + A*c**3*d**3 + B*a**2*c*e**3 - 3*B*a*c**2*d**2*e + 3*C*a**2*
c*d*e**2 - C*a*c**2*d**3)) + x**3*(B*e**3 + 3*C*d*e**2)/(3*c) - x
**2*(-A*c*e**3 - 3*B*c*d*e**2 + C*a*e**3 - 3*C*c*d**2*e)/(2*c**2)
 - x*(-3*A*c*d*e**2 + B*a*e**3 - 3*B*c*d**2*e + 3*C*a*d*e**2 - C*
```

```
c*d**3)/c**2
```

GIAC/XCAS [A] time = 0.27124, size = 377, normalized size = 1.57

$$-\frac{\left(Cacd^3 - Ac^2d^3 + 3\,Bacd^2e - 3\,Ca^2de^2 + 3\,Aacde^2 - Ba^2e^3\right)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{\sqrt{ac}c^2} + \frac{\left(Bc^2d^3 - 3\,Cacd^2e + 3\,Ac^2d^2e - 3\,Bacde^2 + Ca^2e^3 - Aace^3\right)\ln\left(cx^2 + a\right)}{2\,c^3} + \frac{3\,Cc^3x^4e^3 + 12\,Cc^3dx^3e^2 + 18\,Cc^3d^2x^2e + 12\,Cc^3d^3x + 4\,Bc^3x^3e^3 + 18\,Bc^3dx^2e^2 + 36\,Bc^3d^2xe - 6\,Cac^2x^2e^3 + 6\,Ac^3x^2e^3 - 3}{12\,c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^3/(c*x^2 + a),x, algorithm="giac")
```

```
[Out] -(C*a*c*d^3 - A*c^2*d^3 + 3*B*a*c*d^2*e - 3*C*a^2*d*e^2 + 3*A*a*c
*d*e^2 - B*a^2*e^3)*arctan(c*x/sqrt(a*c))/(sqrt(a*c)*c^2) + 1/2*(
B*c^2*d^3 - 3*C*a*c*d^2*e + 3*A*c^2*d^2*e - 3*B*a*c*d*e^2 + C*a^2
*e^3 - A*a*c*e^3)*ln(c*x^2 + a)/c^3 + 1/12*(3*C*c^3*x^4*e^3 + 12*
C*c^3*d*x^3*e^2 + 18*C*c^3*d^2*x^2*e + 12*C*c^3*d^3*x + 4*B*c^3*x
^3*e^3 + 18*B*c^3*d*x^2*e^2 + 36*B*c^3*d^2*x*e - 6*C*a*c^2*x^2*e^
3 + 6*A*c^3*x^2*e^3 - 36*C*a*c^2*d*x*e^2 + 36*A*c^3*d*x*e^2 - 12*
B*a*c^2*x*e^3)/c^4
```

3.44 $\int \frac{(d+ex)^2(A+Bx+Cx^2)}{a+cx^2}\,dx$

Optimal. Leaf size=168

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Ac\left(cd^2-ae^2\right)+a\left(aCe^2-cd(2Be+Cd)\right)\right)}{\sqrt{a}c^{5/2}}+\frac{\log\left(a+cx^2\right)\left(-aBe^2-2aCde+2Acde+Bcd^2\right)}{2c^2}-\frac{x\left(aCe^2-c\left(e(Ae+2Bd)+Cd^2\right)\right)}{c^2}+\frac{ex^2(Be+2Cd)}{2c}+\frac{Ce^2x^3}{3c}$$

```
[Out] -(((a*C*e^2 - c*(C*d^2 + e*(2*B*d + A*e)))*x)/c^2) + (e*(2*C*d +
B*e)*x^2)/(2*c) + (C*e^2*x^3)/(3*c) + ((A*c*(c*d^2 - a*e^2) + a*(
a*C*e^2 - c*d*(C*d + 2*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(Sqrt[
a]*c^(5/2)) + ((B*c*d^2 + 2*A*c*d*e - 2*a*C*d*e - a*B*e^2)*Log[a
+ c*x^2])/(2*c^2)
```

Rubi [A] time = 0.527556, antiderivative size = 166, normalized size of antiderivative = 0.99, number of steps used = 5, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Ac\left(cd^2-ae^2\right)+a\left(aCe^2-cd(2Be+Cd)\right)\right)}{\sqrt{a}c^{5/2}}+\frac{\log\left(a+cx^2\right)\left(-aBe^2-2aCde+2Acde+Bcd^2\right)}{2c^2}+\frac{x\left(-aCe^2+ce(Ae+2Bd)+cCd^2\right)}{c^2}+\frac{ex^2(Be+2Cd)}{2c}+\frac{Ce^2x^3}{3c}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^2*(A + B*x + C*x^2))/(a + c*x^2),x]
```

```
[Out] ((c*C*d^2 - a*C*e^2 + c*e*(2*B*d + A*e))*x)/c^2 + (e*(2*C*d + B*e
)*x^2)/(2*c) + (C*e^2*x^3)/(3*c) + ((A*c*(c*d^2 - a*e^2) + a*(a*C
*e^2 - c*d*(C*d + 2*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(Sqrt[a]*
c^(5/2)) + ((B*c*d^2 + 2*A*c*d*e - 2*a*C*d*e - a*B*e^2)*Log[a + c
*x^2])/(2*c^2)
```

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

$$\frac{Ce^2x^3}{3c} + \left(Ace^2 + 2Bcde - Cae^2 + Ccd^2\right)\int \frac{1}{c^2}\,dx + \frac{e\left(Be + 2Cd\right)\int x\,dx}{c} - \frac{\left(-Acde + \frac{Bae^2}{2} - \frac{Bcd^2}{2} + Cade\right)\log\left(a + cx^2\right)}{c^2} + \frac{\left(-Aace^2 + Ac^2d^2 - 2Bacde + Ca^2e^2 - Cacd^2\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{\sqrt{a}c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)**2*(C*x**2+B*x+A)/(c*x**2+a),x)
```

```
[Out] C*e**2*x**3/(3*c) + (A*c*e**2 + 2*B*c*d*e - C*a*e**2 + C*c*d**2)*
Integral(c**(-2), x) + e*(B*e + 2*C*d)*Integral(x, x)/c - (-A*c*d
*e + B*a*e**2/2 - B*c*d**2/2 + C*a*d*e)*log(a + c*x**2)/c**2 + (-
A*a*c*e**2 + A*c**2*d**2 - 2*B*a*c*d*e + C*a**2*e**2 - C*a*c*d**2
)*atan(sqrt(c)*x/sqrt(a))/(sqrt(a)*c**(5/2))
```

Mathematica [A] time = 0.308767, size = 155, normalized size = 0.92

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Ac\left(cd^2 - ae^2\right) + a\left(aCe^2 - cd(2Be + Cd)\right)\right)}{\sqrt{a}c^{5/2}} + \frac{x\left(-6aCe^2 + 3ce(2Ae + 4Bd + Bex) + 2cC\left(3d^2 + 3dex + e^2x^2\right)\right) + 3\log\left(a + cx^2\right)\left(-aBe^2 - 2aCde + 2Acde + Bcd^2\right)}{6c^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)^2*(A + B*x + C*x^2))/(a + c*x^2),x]
```

```
[Out] ((A*c*(c*d^2 - a*e^2) + a*(a*C*e^2 - c*d*(C*d + 2*B*e)))*ArcTan[(
Sqrt[c]*x)/Sqrt[a]])/(Sqrt[a]*c^(5/2)) + (x*(-6*a*C*e^2 + 3*c*e*(
4*B*d + 2*A*e + B*e*x) + 2*c*C*(3*d^2 + 3*d*e*x + e^2*x^2)) + 3*(
B*c*d^2 + 2*A*c*d*e - 2*a*C*d*e - a*B*e^2)*Log[a + c*x^2])/(6*c^2
)
```

Maple [A] time = 0.007, size = 256, normalized size = 1.5

$$\frac{Ce^2x^3}{3c}+\frac{Bx^2e^2}{2c}+\frac{Cx^2de}{c}+\frac{Ae^2x}{c}+2\frac{Bdex}{c}-\frac{aCe^2x}{c^2}+\frac{Cd^2x}{c}+\frac{\ln(cx^2+a)\,deA}{c}-\frac{\ln(cx^2+a)\,Bae^2}{2c^2}+\frac{\ln(cx^2+a)\,Bd^2}{2c}-\frac{\ln(cx^2+a)\,adeC}{c^2}-\frac{Aae^2}{c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+Ad^2\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}-2\frac{adeB}{c\sqrt{ac}}\arctan\left(\frac{cx}{\sqrt{ac}}\right)+\frac{a^2Ce^2}{c^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}-\frac{d^2aC}{c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^2*(C*x^2+B*x+A)/(c*x^2+a),x)
```

```
[Out] 1/3*C*e^2*x^3/c+1/2/c*B*x^2*e^2+1/c*C*x^2*d*e+1/c*A*e^2*x+2/c*B*d
*e*x-1/c^2*a*C*e^2*x+1/c*C*d^2*x+1/c*ln(c*x^2+a)*d*e*A-1/2/c^2*ln
(c*x^2+a)*B*a*e^2+1/2/c*ln(c*x^2+a)*B*d^2-1/c^2*ln(c*x^2+a)*a*d*e
*C-1/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*a*e^2+1/(a*c)^(1/2)*
arctan(c*x/(a*c)^(1/2))*A*d^2-2/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1
/2))*a*d*e*B+1/c^2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*a^2*C*e^2-
1/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*a*d^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((C*x^2 + B*x + A)*(e*x + d)^2/(c*x^2 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.28016, size = 1, normalized size = 0.01

$$\left[\frac{3\left(2\,Bacde+\left(Cac-Ac^2\right)d^2-\left(Ca^2-Aac\right)e^2\right)\log\left(-\frac{2\,acx-\left(cx^2-a\right)\sqrt{-ac}}{cx^2+a}\right)+\left(2\,Cce^2x^3+3\left(2\,Ccde+Bce^2\right)x^2+6\left(Ccd^2+2\right.\right.}{6\sqrt{-ac}c^2}\right.$$

$$-\frac{6\left(2\,Bacde+\left(Cac-Ac^2\right)d^2-\left(Ca^2-Aac\right)e^2\right)\arctan\left(\frac{\sqrt{ac}x}{a}\right)-\left(2\,Cce^2x^3+3\left(2\,Ccde+Bce^2\right)x^2+6\left(Ccd^2+2\,Bcde-(C\right.\right.}{6\sqrt{ac}c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^2/(c*x^2 + a),x, algorithm="fricas")
```

```
[Out] [1/6*(3*(2*B*a*c*d*e + (C*a*c - A*c^2)*d^2 - (C*a^2 - A*a*c)*e^2)
*log(-(2*a*c*x - (c*x^2 - a)*sqrt(-a*c))/(c*x^2 + a)) + (2*C*c*e^
2*x^3 + 3*(2*C*c*d*e + B*c*e^2)*x^2 + 6*(C*c*d^2 + 2*B*c*d*e - (C
*a - A*c)*e^2)*x + 3*(B*c*d^2 - B*a*e^2 - 2*(C*a - A*c)*d*e)*log(
c*x^2 + a))*sqrt(-a*c))/(sqrt(-a*c)*c^2), -1/6*(6*(2*B*a*c*d*e +
(C*a*c - A*c^2)*d^2 - (C*a^2 - A*a*c)*e^2)*arctan(sqrt(a*c)*x/a)
- (2*C*c*e^2*x^3 + 3*(2*C*c*d*e + B*c*e^2)*x^2 + 6*(C*c*d^2 + 2*B
*c*d*e - (C*a - A*c)*e^2)*x + 3*(B*c*d^2 - B*a*e^2 - 2*(C*a - A*c
)*d*e)*log(c*x^2 + a))*sqrt(a*c))/(sqrt(a*c)*c^2)]
```

Sympy [A] time = 6.85972, size = 638, normalized size = 3.8

$$\frac{Ce^2x^3}{3c} + \left(-\frac{-2Acde + Bae^2 - Bcd^2 + 2Cade}{2c^2} - \frac{\sqrt{-ac^5}\left(-Aace^2 + Ac^2d^2 - 2Bacde + Ca^2e^2 - Cacd^2\right)}{2ac^5}\right)\log\left(x + \frac{-2Aacde + Ba^2e^2 - Bacd^2 + 2Ca^2de + 2ac^2\left(-\frac{-2Acde+Ba}{}\right.}{-Aace^2 + Ac^2d^2 - 2B}\right.$$

$$+ \left(-\frac{-2Acde + Bae^2 - Bcd^2 + 2Cade}{2c^2} + \frac{\sqrt{-ac^5}\left(-Aace^2 + Ac^2d^2 - 2Bacde + Ca^2e^2 - Cacd^2\right)}{2ac^5}\right)\log\left(x + \frac{-2Aacde + Ba^2e^2 - Bacd^2 + 2Ca^2de + 2ac^2\left(-\frac{-2Acde+Bae}{}\right.}{-Aace^2 + Ac^2d^2 - 2Bc}\right.$$

$$+ \frac{x^2\left(Be^2 + 2Cde\right)}{2c} - \frac{x\left(-Ace^2 - 2Bcde + Cae^2 - Ccd^2\right)}{c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(C*x**2+B*x+A)/(c*x**2+a),x)
```

```
[Out] C*e**2*x**3/(3*c) + (-(-2*A*c*d*e + B*a*e**2 - B*c*d**2 + 2*C*a*d
*e)/(2*c**2) - sqrt(-a*c**5)*(-A*a*c*e**2 + A*c**2*d**2 - 2*B*a*c
*d*e + C*a**2*e**2 - C*a*c*d**2)/(2*a*c**5))*log(x + (-2*A*a*c*d*
e + B*a**2*e**2 - B*a*c*d**2 + 2*C*a**2*d*e + 2*a*c**2*(-(-2*A*c*
d*e + B*a*e**2 - B*c*d**2 + 2*C*a*d*e)/(2*c**2) - sqrt(-a*c**5)*(
-A*a*c*e**2 + A*c**2*d**2 - 2*B*a*c*d*e + C*a**2*e**2 - C*a*c*d**
2)/(2*a*c**5)))/(-A*a*c*e**2 + A*c**2*d**2 - 2*B*a*c*d*e + C*a**2
*e**2 - C*a*c*d**2)) + (-(-2*A*c*d*e + B*a*e**2 - B*c*d**2 + 2*C*
a*d*e)/(2*c**2) + sqrt(-a*c**5)*(-A*a*c*e**2 + A*c**2*d**2 - 2*B*
a*c*d*e + C*a**2*e**2 - C*a*c*d**2)/(2*a*c**5))*log(x + (-2*A*a*c
*d*e + B*a**2*e**2 - B*a*c*d**2 + 2*C*a**2*d*e + 2*a*c**2*(-(-2*A
```

```
*c*d*e + B*a*e**2 - B*c*d**2 + 2*C*a*d*e)/(2*c**2) + sqrt(-a*c**5
)*(-A*a*c*e**2 + A*c**2*d**2 - 2*B*a*c*d*e + C*a**2*e**2 - C*a*c*
d**2)/(2*a*c**5)))/(-A*a*c*e**2 + A*c**2*d**2 - 2*B*a*c*d*e + C*a
**2*e**2 - C*a*c*d**2)) + x**2*(B*e**2 + 2*C*d*e)/(2*c) - x*(-A*c
*e**2 - 2*B*c*d*e + C*a*e**2 - C*c*d**2)/c**2
```

GIAC/XCAS [A] time = 0.270577, size = 238, normalized size = 1.42

$$\frac{\left(Bcd^2 - 2\,Cade + 2\,Acde - Bae^2\right)\ln\left(cx^2 + a\right)}{2\,c^2} - \frac{\left(Cacd^2 - Ac^2d^2 + 2\,Bacde - Ca^2e^2 + Aace^2\right)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{\sqrt{ac}c^2} + \frac{2\,Cc^2x^3e^2 + 6\,Cc^2dx^2e + 6\,Cc^2d^2x + 3\,Bc^2x^2e^2 + 12\,Bc^2dxe - 6\,Cacxe^2 + 6\,Ac^2xe^2}{6\,c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^2/(c*x^2 + a),x, algorithm="giac")
```

```
[Out] 1/2*(B*c*d^2 - 2*C*a*d*e + 2*A*c*d*e - B*a*e^2)*ln(c*x^2 + a)/c^2
 - (C*a*c*d^2 - A*c^2*d^2 + 2*B*a*c*d*e - C*a^2*e^2 + A*a*c*e^2)*
arctan(c*x/sqrt(a*c))/(sqrt(a*c)*c^2) + 1/6*(2*C*c^2*x^3*e^2 + 6*
C*c^2*d*x^2*e + 6*C*c^2*d^2*x + 3*B*c^2*x^2*e^2 + 12*B*c^2*d*x*e
- 6*C*a*c*x*e^2 + 6*A*c^2*x*e^2)/c^3
```

3.45 $\int \frac{(d+ex)(A+Bx+Cx^2)}{a+cx^2}\,dx$

Optimal. Leaf size=93

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)(Acd-a(Be+Cd))}{\sqrt{a}c^{3/2}}+\frac{\log\left(a+cx^2\right)(-aCe+Ace+Bcd)}{2c^2}+\frac{x(Be+Cd)}{c}+\frac{Cex^2}{2c}$$

```
[Out] ((C*d + B*e)*x)/c + (C*e*x^2)/(2*c) + ((A*c*d - a*(C*d + B*e))*Ar
cTan[(Sqrt[c]*x)/Sqrt[a]])/(Sqrt[a]*c^(3/2)) + ((B*c*d + A*c*e -
a*C*e)*Log[a + c*x^2])/(2*c^2)
```

Rubi [A] time = 0.23558, antiderivative size = 93, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.16$

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)(Acd-a(Be+Cd))}{\sqrt{a}c^{3/2}}+\frac{\log\left(a+cx^2\right)(-aCe+Ace+Bcd)}{2c^2}+\frac{x(Be+Cd)}{c}+\frac{Cex^2}{2c}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)*(A + B*x + C*x^2))/(a + c*x^2),x]
```

```
[Out] ((C*d + B*e)*x)/c + (C*e*x^2)/(2*c) + ((A*c*d - a*(C*d + B*e))*Ar
cTan[(Sqrt[c]*x)/Sqrt[a]])/(Sqrt[a]*c^(3/2)) + ((B*c*d + A*c*e -
a*C*e)*Log[a + c*x^2])/(2*c^2)
```

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

$$\frac{Ce\int x\,dx}{c}+(Be+Cd)\int\frac{1}{c}\,dx+\frac{(Ace+Bcd-Cae)\log\left(a+cx^2\right)}{2c^2}+\frac{(Acd-Bae-Cad)\,\mathrm{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{\sqrt{a}c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)*(C*x**2+B*x+A)/(c*x**2+a),x)
```

```
[Out] C*e*Integral(x, x)/c + (B*e + C*d)*Integral(1/c, x) + (A*c*e + B*
c*d - C*a*e)*log(a + c*x**2)/(2*c**2) + (A*c*d - B*a*e - C*a*d)*a
tan(sqrt(c)*x/sqrt(a))/(sqrt(a)*c**(3/2))
```

Mathematica [A] time = 0.17794, size = 86, normalized size = 0.92

$$\frac{\log\left(a+cx^2\right)\left(-aCe+Ace+Bcd\right)-\frac{2\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)(aBe+aCd-Acd)}{\sqrt{a}}+cx(2Be+2Cd+Cex)}{2c^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)*(A + B*x + C*x^2))/(a + c*x^2),x]
```

```
[Out] (c*x*(2*C*d + 2*B*e + C*e*x) - (2*Sqrt[c]*(-(A*c*d) + a*C*d + a*B
*e)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/Sqrt[a] + (B*c*d + A*c*e - a*C*e
)*Log[a + c*x^2])/(2*c^2)
```

Maple [A] time = 0.007, size = 133, normalized size = 1.4

$$\frac{Cex^2}{2\,c}+\frac{Bex}{c}+\frac{Cdx}{c}+\frac{\ln\left(cx^2+a\right)Ae}{2\,c}+\frac{\ln\left(cx^2+a\right)Bd}{2\,c}-\frac{\ln\left(cx^2+a\right)aCe}{2\,c^2}+Ad\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}-\frac{aBe}{c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}-\frac{Cad}{c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)*(C*x^2+B*x+A)/(c*x^2+a),x)
```

```
[Out] 1/2*C*e*x^2/c+1/c*B*e*x+1/c*C*d*x+1/2/c*ln(c*x^2+a)*A*e+1/2/c*ln(
c*x^2+a)*B*d-1/2/c^2*ln(c*x^2+a)*a*C*e+1/(a*c)^(1/2)*arctan(c*x/(
a*c)^(1/2))*A*d-1/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*a*B*e-1/c
/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*a*d
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/(c*x^2 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.276588, size = 1, normalized size = 0.01

$$\left[\frac{\left(Bace + \left(Cac - Ac^2\right)d\right)\log\left(-\frac{2\,acx-\left(cx^2-a\right)\sqrt{-ac}}{cx^2+a}\right) + \left(Ccex^2 + 2\,(Ccd + Bce)x + (Bcd - (Ca - Ac)e)\log\left(cx^2 + a\right)\right)\sqrt{-ac}}{2\,\sqrt{-ac}c^2},\right.$$
$$\left.-\frac{2\left(Bace + \left(Cac - Ac^2\right)d\right)\arctan\left(\frac{\sqrt{ac}x}{a}\right) - \left(Ccex^2 + 2\,(Ccd + Bce)x + (Bcd - (Ca - Ac)e)\log\left(cx^2 + a\right)\right)\sqrt{ac}}{2\,\sqrt{ac}c^2}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/(c*x^2 + a),x, algorithm="fricas")
```

```
[Out] [1/2*((B*a*c*e + (C*a*c - A*c^2)*d)*log(-(2*a*c*x - (c*x^2 - a)*s
qrt(-a*c))/(c*x^2 + a)) + (C*c*e*x^2 + 2*(C*c*d + B*c*e)*x + (B*c
*d - (C*a - A*c)*e)*log(c*x^2 + a))*sqrt(-a*c))/(sqrt(-a*c)*c^2),
 -1/2*(2*(B*a*c*e + (C*a*c - A*c^2)*d)*arctan(sqrt(a*c)*x/a) - (C
*c*e*x^2 + 2*(C*c*d + B*c*e)*x + (B*c*d - (C*a - A*c)*e)*log(c*x^
2 + a))*sqrt(a*c))/(sqrt(a*c)*c^2)]
```

Sympy [A] time = 3.59625, size = 335, normalized size = 3.6

$$\frac{Cex^2}{2c} + \left(-\frac{-Ace - Bcd + Cae}{2c^2} - \frac{\sqrt{-ac^5}\left(-Acd + Bae + Cad\right)}{2ac^4}\right)\log\left(x + \frac{Aace + Bacd - Ca^2e - 2ac^2\left(-\frac{-Ace-Bcd+Cae}{2c^2} - \frac{\sqrt{-ac^5}(-Acd+Bae+Cad)}{2ac^4}\right)}{-Ac^2d + Bace + Cacd}\right)$$
$$+ \left(-\frac{-Ace - Bcd + Cae}{2c^2} + \frac{\sqrt{-ac^5}\left(-Acd + Bae + Cad\right)}{2ac^4}\right)\log\left(x + \frac{Aace + Bacd - Ca^2e - 2ac^2\left(-\frac{-Ace-Bcd+Cae}{2c^2} + \frac{\sqrt{-ac^5}(-Acd+Bae+Cad)}{2ac^4}\right)}{-Ac^2d + Bace + Cacd}\right) + \frac{x\left(Be + Cd\right)}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)*(C*x**2+B*x+A)/(c*x**2+a),x)
```

```
[Out] C*e*x**2/(2*c) + (-(-A*c*e - B*c*d + C*a*e)/(2*c**2) - sqrt(-a*c*
*5)*(-A*c*d + B*a*e + C*a*d)/(2*a*c**4))*log(x + (A*a*c*e + B*a*c
```

```
*d - C*a**2*e - 2*a*c**2*(-(-A*c*e - B*c*d + C*a*e)/(2*c**2) - sq
rt(-a*c**5)*(-A*c*d + B*a*e + C*a*d)/(2*a*c**4)))/(-A*c**2*d + B*
a*c*e + C*a*c*d)) + (-(-A*c*e - B*c*d + C*a*e)/(2*c**2) + sqrt(-a
*c**5)*(-A*c*d + B*a*e + C*a*d)/(2*a*c**4))*log(x + (A*a*c*e + B*
a*c*d - C*a**2*e - 2*a*c**2*(-(-A*c*e - B*c*d + C*a*e)/(2*c**2) +
 sqrt(-a*c**5)*(-A*c*d + B*a*e + C*a*d)/(2*a*c**4)))/(-A*c**2*d +
 B*a*c*e + C*a*c*d)) + x*(B*e + C*d)/c
```

GIAC/XCAS [A] time = 0.269288, size = 123, normalized size = 1.32

$$-\frac{(Cad - Acd + Bae)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{\sqrt{ac}c} + \frac{(Bcd - Cae + Ace)\ln\left(cx^2 + a\right)}{2\,c^2} + \frac{Ccx^2e + 2\,Ccdx + 2\,Bcxe}{2\,c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/(c*x^2 + a),x, algorithm="giac")
```

```
[Out] -(C*a*d - A*c*d + B*a*e)*arctan(c*x/sqrt(a*c))/(sqrt(a*c)*c) + 1/
2*(B*c*d - C*a*e + A*c*e)*ln(c*x^2 + a)/c^2 + 1/2*(C*c*x^2*e + 2*
C*c*d*x + 2*B*c*x*e)/c^2
```

3.46 $\int \frac{A+Bx+Cx^2}{a+cx^2}\,dx$

Optimal. Leaf size=55

$$\frac{(Ac-aC)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{\sqrt{a}c^{3/2}}+\frac{B\log\left(a+cx^2\right)}{2c}+\frac{Cx}{c}$$

```
[Out] (C*x)/c + ((A*c - a*C)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(Sqrt[a]*c^(3
/2)) + (B*Log[a + c*x^2])/(2*c)
```

Rubi [A] time = 0.109326, antiderivative size = 55, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{(Ac-aC)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{\sqrt{a}c^{3/2}}+\frac{B\log\left(a+cx^2\right)}{2c}+\frac{Cx}{c}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/(a + c*x^2),x]
```

```
[Out] (C*x)/c + ((A*c - a*C)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(Sqrt[a]*c^(3
/2)) + (B*Log[a + c*x^2])/(2*c)
```

Rubi in Sympy [A] time = 13.9728, size = 48, normalized size = 0.87

$$\frac{B\log\left(a+cx^2\right)}{2c}+\frac{Cx}{c}+\frac{(Ac-Ca)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{\sqrt{a}c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)/(c*x**2+a),x)
```

```
[Out] B*log(a + c*x**2)/(2*c) + C*x/c + (A*c - C*a)*atan(sqrt(c)*x/sqrt
(a))/(sqrt(a)*c**(3/2))
```

Mathematica [A] time = 0.0722525, size = 56, normalized size = 1.02

$$-\frac{(aC-Ac)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{\sqrt{a}c^{3/2}}+\frac{B\log\left(a+cx^2\right)}{2c}+\frac{Cx}{c}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/(a + c*x^2),x]
```

```
[Out] (C*x)/c - ((-(A*c) + a*C)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(Sqrt[a]*c
^(3/2)) + (B*Log[a + c*x^2])/(2*c)
```

Maple [A] time = 0.004, size = 59, normalized size = 1.1

$$\frac{Cx}{c}+\frac{B\ln\left(cx^{2}+a\right)}{2c}+A\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}-\frac{aC}{c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(c*x^2+a),x)
```

```
[Out] C*x/c+1/2*B*ln(c*x^2+a)/c+1/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A
-1/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*a*C
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.277599, size = 1, normalized size = 0.02

$$\left[-\frac{(Ca-Ac)\log\left(\frac{2\,acx+\left(cx^{2}-a\right)\sqrt{-ac}}{cx^{2}+a}\right)-\sqrt{-ac}\left(2\,Cx+B\log\left(cx^{2}+a\right)\right)}{2\sqrt{-ac}c},\right.$$
$$\left.-\frac{2\,(Ca-Ac)\arctan\left(\frac{\sqrt{ac}x}{a}\right)-\sqrt{ac}\left(2\,Cx+B\log\left(cx^{2}+a\right)\right)}{2\sqrt{ac}c}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a),x, algorithm="fricas")
```

```
[Out] [-1/2*((C*a - A*c)*log((2*a*c*x + (c*x^2 - a)*sqrt(-a*c))/(c*x^2
+ a)) - sqrt(-a*c)*(2*C*x + B*log(c*x^2 + a)))/(sqrt(-a*c)*c), -1
/2*(2*(C*a - A*c)*arctan(sqrt(a*c)*x/a) - sqrt(a*c)*(2*C*x + B*lo
g(c*x^2 + a)))/(sqrt(a*c)*c)]
```

Sympy [A] time = 1.19383, size = 156, normalized size = 2.84

$$\frac{Cx}{c} + \left(\frac{B}{2c} - \frac{\sqrt{-ac^3}\left(-Ac + Ca\right)}{2ac^3}\right)\log\left(x + \frac{Ba - 2ac\left(\frac{B}{2c} - \frac{\sqrt{-ac^3}(-Ac+Ca)}{2ac^3}\right)}{-Ac + Ca}\right) + \left(\frac{B}{2c} + \frac{\sqrt{-ac^3}\left(-Ac + Ca\right)}{2ac^3}\right)\log\left(x + \frac{Ba - 2ac\left(\frac{B}{2c} + \frac{\sqrt{-ac^3}(-Ac+Ca)}{2ac^3}\right)}{-Ac + Ca}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)/(c*x**2+a),x)
```

```
[Out] C*x/c + (B/(2*c) - sqrt(-a*c**3)*(-A*c + C*a)/(2*a*c**3))*log(x +
 (B*a - 2*a*c*(B/(2*c) - sqrt(-a*c**3)*(-A*c + C*a)/(2*a*c**3)))/
(-A*c + C*a)) + (B/(2*c) + sqrt(-a*c**3)*(-A*c + C*a)/(2*a*c**3))
*log(x + (B*a - 2*a*c*(B/(2*c) + sqrt(-a*c**3)*(-A*c + C*a)/(2*a*
c**3)))/(-A*c + C*a))
```

GIAC/XCAS [A] time = 0.270854, size = 65, normalized size = 1.18

$$\frac{Cx}{c} + \frac{B\ln\left(cx^2 + a\right)}{2\,c} - \frac{(Ca - Ac)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{\sqrt{ac}c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a),x, algorithm="giac")
```

```
[Out] C*x/c + 1/2*B*ln(c*x^2 + a)/c - (C*a - A*c)*arctan(c*x/sqrt(a*c))
/(sqrt(a*c)*c)
```

3.47 $\int \frac{A+Bx+Cx^2}{(d+ex)(a+cx^2)}\,dx$

Optimal. Leaf size=133

$$\frac{\log\left(a+cx^2\right)\left(aCe-Ace+Bcd\right)}{2c\left(ae^2+cd^2\right)}+\frac{\log(d+ex)\left(Ae^2-Bde+Cd^2\right)}{e\left(ae^2+cd^2\right)}+\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(aBe-aCd+Acd\right)}{\sqrt{a}\sqrt{c}\left(ae^2+cd^2\right)}$$

```
[Out] ((A*c*d - a*C*d + a*B*e)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(Sqrt[a]*Sq
rt[c]*(c*d^2 + a*e^2)) + ((C*d^2 - B*d*e + A*e^2)*Log[d + e*x])/(
e*(c*d^2 + a*e^2)) + ((B*c*d - A*c*e + a*C*e)*Log[a + c*x^2])/(2*
c*(c*d^2 + a*e^2))
```

Rubi [A] time = 0.330461, antiderivative size = 133, 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

$$\frac{\log\left(a+cx^2\right)\left(aCe-Ace+Bcd\right)}{2c\left(ae^2+cd^2\right)}+\frac{\log(d+ex)\left(Ae^2-Bde+Cd^2\right)}{e\left(ae^2+cd^2\right)}+\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(aBe-aCd+Acd\right)}{\sqrt{a}\sqrt{c}\left(ae^2+cd^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)*(a + c*x^2)),x]
```

```
[Out] ((A*c*d - a*C*d + a*B*e)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(Sqrt[a]*Sq
rt[c]*(c*d^2 + a*e^2)) + ((C*d^2 - B*d*e + A*e^2)*Log[d + e*x])/(
e*(c*d^2 + a*e^2)) + ((B*c*d - A*c*e + a*C*e)*Log[a + c*x^2])/(2*
c*(c*d^2 + a*e^2))
```

Rubi in Sympy [A] time = 45.6553, size = 119, normalized size = 0.89

$$\frac{\left(Ae^2-Bde+Cd^2\right)\log\left(d+ex\right)}{e\left(ae^2+cd^2\right)}-\frac{\left(Ace-Bcd-Cae\right)\log\left(a+cx^2\right)}{2c\left(ae^2+cd^2\right)}+\frac{\left(Acd+Bae-Cad\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{\sqrt{a}\sqrt{c}\left(ae^2+cd^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)/(e*x+d)/(c*x**2+a),x)
```

```
[Out] (A*e**2 - B*d*e + C*d**2)*log(d + e*x)/(e*(a*e**2 + c*d**2)) - (A
*c*e - B*c*d - C*a*e)*log(a + c*x**2)/(2*c*(a*e**2 + c*d**2)) + (
A*c*d + B*a*e - C*a*d)*atan(sqrt(c)*x/sqrt(a))/(sqrt(a)*sqrt(c)*(
```

```
a*e**2 + c*d**2))
```

Mathematica [A] time = 0.197568, size = 120, normalized size = 0.9

$$\frac{\sqrt{a}\left(e\log\left(a+cx^2\right)\left(aCe-Ace+Bcd\right)+2c\log(d+ex)\left(Ae^2-Bde+Cd^2\right)\right)+2\sqrt{c}e\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(aBe-aCd+Acd\right)}{2\sqrt{a}ce\left(ae^2+cd^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/((d + e*x)*(a + c*x^2)),x]
```

```
[Out] (2*Sqrt[c]*e*(A*c*d - a*C*d + a*B*e)*ArcTan[(Sqrt[c]*x)/Sqrt[a]]
+ Sqrt[a]*(2*c*(C*d^2 - B*d*e + A*e^2)*Log[d + e*x] + e*(B*c*d -
A*c*e + a*C*e)*Log[a + c*x^2]))/(2*Sqrt[a]*c*e*(c*d^2 + a*e^2))
```

Maple [A] time = 0.01, size = 247, normalized size = 1.9

$$-\frac{\ln\left(cx^2+a\right)Ae}{2\,ae^2+2\,cd^2}+\frac{\ln\left(cx^2+a\right)Bd}{2\,ae^2+2\,cd^2}+\frac{\ln\left(cx^2+a\right)aCe}{\left(2\,ae^2+2\,cd^2\right)c}$$
$$+\frac{Acd}{ae^2+cd^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{aBe}{ae^2+cd^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$
$$-\frac{Cad}{ae^2+cd^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{e\ln\left(ex+d\right)A}{ae^2+cd^2}-\frac{\ln\left(ex+d\right)Bd}{ae^2+cd^2}+\frac{\ln\left(ex+d\right)Cd^2}{\left(ae^2+cd^2\right)e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)/(c*x^2+a),x)
```

```
[Out] -1/2/(a*e^2+c*d^2)*ln(c*x^2+a)*A*e+1/2/(a*e^2+c*d^2)*ln(c*x^2+a)*
B*d+1/2/(a*e^2+c*d^2)/c*ln(c*x^2+a)*a*C*e+1/(a*e^2+c*d^2)/(a*c)^(
1/2)*arctan(c*x/(a*c)^(1/2))*A*c*d+1/(a*e^2+c*d^2)/(a*c)^(1/2)*ar
ctan(c*x/(a*c)^(1/2))*a*B*e-1/(a*e^2+c*d^2)/(a*c)^(1/2)*arctan(c*
x/(a*c)^(1/2))*C*a*d+1/(a*e^2+c*d^2)*e*ln(e*x+d)*A-1/(a*e^2+c*d^2
)*ln(e*x+d)*B*d+1/(a*e^2+c*d^2)/e*ln(e*x+d)*C*d^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((C*x^2 + B*x + A)/((c*x^2 + a)*(e*x + d)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 7.50409, size = 1, normalized size = 0.01

$$\left[\frac{\left(Bace^2 - \left(Cac - Ac^2\right)de\right)\log\left(\frac{2\,acx + \left(cx^2 - a\right)\sqrt{-ac}}{cx^2 + a}\right) + \sqrt{-ac}\left(\left(Bcde + (Ca - Ac)e^2\right)\log\left(cx^2 + a\right) + 2\left(Ccd^2 - Bcde + Ace^2\right)\right.}{2\left(c^2d^2e + ace^3\right)\sqrt{-ac}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/((c*x^2 + a)*(e*x + d)),x, algorithm="fricas")
```

```
[Out] [1/2*((B*a*c*e^2 - (C*a*c - A*c^2)*d*e)*log((2*a*c*x + (c*x^2 - a
)*sqrt(-a*c))/(c*x^2 + a)) + sqrt(-a*c)*((B*c*d*e + (C*a - A*c)*e
^2)*log(c*x^2 + a) + 2*(C*c*d^2 - B*c*d*e + A*c*e^2)*log(e*x + d)
))/((c^2*d^2*e + a*c*e^3)*sqrt(-a*c)), 1/2*(2*(B*a*c*e^2 - (C*a*c
 - A*c^2)*d*e)*arctan(sqrt(a*c)*x/a) + sqrt(a*c)*((B*c*d*e + (C*a
 - A*c)*e^2)*log(c*x^2 + a) + 2*(C*c*d^2 - B*c*d*e + A*c*e^2)*log
(e*x + d)))/((c^2*d^2*e + a*c*e^3)*sqrt(a*c))]
```

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**2+B*x+A)/(e*x+d)/(c*x**2+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.271286, size = 169, normalized size = 1.27

$$\frac{(Bcd + Cae - Ace)\ln\left(cx^2 + a\right)}{2\left(c^2d^2 + ace^2\right)} + \frac{\left(Cd^2 - Bde + Ae^2\right)\ln\left(|xe + d|\right)}{cd^2e + ae^3} - \frac{(Cad - Acd - Bae)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{\left(cd^2 + ae^2\right)\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/((c*x^2 + a)*(e*x + d)),x, algorithm="giac")
```

```
[Out] 1/2*(B*c*d + C*a*e - A*c*e)*ln(c*x^2 + a)/(c^2*d^2 + a*c*e^2) + (
C*d^2 - B*d*e + A*e^2)*ln(abs(x*e + d))/(c*d^2*e + a*e^3) - (C*a*
d - A*c*d - B*a*e)*arctan(c*x/sqrt(a*c))/((c*d^2 + a*e^2)*sqrt(a*
c))
```

3.48 $\int \frac{A+Bx+Cx^2}{(d+ex)^2(a+cx^2)}\,dx$

Optimal. Leaf size=214

$$\frac{\log(a+cx^2)\left(-aBe^2+2aCde-2Acde+Bcd^2\right)}{2(ae^2+cd^2)^2}-\frac{Ae^2-Bde+Cd^2}{e(d+ex)(ae^2+cd^2)}-\frac{\log(d+ex)\left(-aBe^2+2aCde-2Acde+Bcd^2\right)}{(ae^2+cd^2)^2}+\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Ac\left(cd^2-ae^2\right)+a\left(aCe^2-cd(Cd-2Be)\right)\right)}{\sqrt{a}\sqrt{c}(ae^2+cd^2)^2}$$

```
[Out] -((C*d^2 - B*d*e + A*e^2)/(e*(c*d^2 + a*e^2)*(d + e*x))) + ((A*c*
(c*d^2 - a*e^2) + a*(a*C*e^2 - c*d*(C*d - 2*B*e)))*ArcTan[(Sqrt[c
]*x)/Sqrt[a]])/(Sqrt[a]*Sqrt[c]*(c*d^2 + a*e^2)^2) - ((B*c*d^2 -
2*A*c*d*e + 2*a*C*d*e - a*B*e^2)*Log[d + e*x])/(c*d^2 + a*e^2)^2
+ ((B*c*d^2 - 2*A*c*d*e + 2*a*C*d*e - a*B*e^2)*Log[a + c*x^2])/(2
*(c*d^2 + a*e^2)^2)
```

Rubi [A] time = 0.755615, antiderivative size = 214, 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

$$\frac{\log(a+cx^2)\left(-aBe^2+2aCde-2Acde+Bcd^2\right)}{2(ae^2+cd^2)^2}-\frac{Ae^2-Bde+Cd^2}{e(d+ex)(ae^2+cd^2)}-\frac{\log(d+ex)\left(-aBe^2+2aCde-2Acde+Bcd^2\right)}{(ae^2+cd^2)^2}+\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Ac\left(cd^2-ae^2\right)+a\left(aCe^2-cd(Cd-2Be)\right)\right)}{\sqrt{a}\sqrt{c}(ae^2+cd^2)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)^2*(a + c*x^2)),x]
```


```
[Out] -((C*d^2 - B*d*e + A*e^2)/(e*(c*d^2 + a*e^2)*(d + e*x))) + ((A*c*
(c*d^2 - a*e^2) + a*(a*C*e^2 - c*d*(C*d - 2*B*e)))*ArcTan[(Sqrt[c
]*x)/Sqrt[a]])/(Sqrt[a]*Sqrt[c]*(c*d^2 + a*e^2)^2) - ((B*c*d^2 -
2*A*c*d*e + 2*a*C*d*e - a*B*e^2)*Log[d + e*x])/(c*d^2 + a*e^2)^2
+ ((B*c*d^2 - 2*A*c*d*e + 2*a*C*d*e - a*B*e^2)*Log[a + c*x^2])/(2
*(c*d^2 + a*e^2)^2)
```

Rubi in Sympy [A] time = 126.057, size = 211, normalized size = 0.99

$$-\frac{\left(Acde+\frac{Bae^2}{2}-\frac{Bcd^2}{2}-Cade\right)\log\left(a+cx^2\right)}{\left(ae^2+cd^2\right)^2}+\frac{\left(2Acde+Bae^2-Bcd^2-2Cade\right)\log\left(d+ex\right)}{\left(ae^2+cd^2\right)^2}-\frac{Ae^2-Bde+Cd^2}{e\left(d+ex\right)\left(ae^2+cd^2\right)}+\frac{\left(-Aace^2+Ac^2d^2+2Bacde+Ca^2e^2-Cacd^2\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{\sqrt{a}\sqrt{c}\left(ae^2+cd^2\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)/(e*x+d)**2/(c*x**2+a),x)
```

```
[Out] -(A*c*d*e + B*a*e**2/2 - B*c*d**2/2 - C*a*d*e)*log(a + c*x**2)/(a
*e**2 + c*d**2)**2 + (2*A*c*d*e + B*a*e**2 - B*c*d**2 - 2*C*a*d*e
)*log(d + e*x)/(a*e**2 + c*d**2)**2 - (A*e**2 - B*d*e + C*d**2)/(
e*(d + e*x)*(a*e**2 + c*d**2)) + (-A*a*c*e**2 + A*c**2*d**2 + 2*B
*a*c*d*e + C*a**2*e**2 - C*a*c*d**2)*atan(sqrt(c)*x/sqrt(a))/(sqr
t(a)*sqrt(c)*(a*e**2 + c*d**2)**2)
```

Mathematica [A] time = 0.677877, size = 188, normalized size = 0.88

$$\frac{\log\left(a+cx^2\right)\left(-aBe^2+2aCde-2Acde+Bcd^2\right)-\frac{2\left(ae^2+cd^2\right)\left(e(Ae-Bd)+Cd^2\right)}{e(d+ex)}+\log(d+ex)\left(2aBe^2-4aCde+4Acde-2Bcd^2\right)}{2\left(ae^2+cd^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/((d + e*x)^2*(a + c*x^2)),x]
```

```
[Out] ((-2*(c*d^2 + a*e^2)*(C*d^2 + e*(-(B*d) + A*e)))/(e*(d + e*x)) +
(2*(A*c*(c*d^2 - a*e^2) + a*(a*C*e^2 + c*d*(-(C*d) + 2*B*e)))*Arc
Tan[(Sqrt[c]*x)/Sqrt[a]])/(Sqrt[a]*Sqrt[c]) + (-2*B*c*d^2 + 4*A*c
*d*e - 4*a*C*d*e + 2*a*B*e^2)*Log[d + e*x] + (B*c*d^2 - 2*A*c*d*e
 + 2*a*C*d*e - a*B*e^2)*Log[a + c*x^2])/(2*(c*d^2 + a*e^2)^2)
```

Maple [B] time = 0.014, size = 462, normalized size = 2.2

$$-\frac{c\ln\left(cx^{2}+a\right)deA}{\left(ae^{2}+cd^{2}\right)^{2}}-\frac{\ln\left(cx^{2}+a\right)Bae^{2}}{2\left(ae^{2}+cd^{2}\right)^{2}}+\frac{c\ln\left(cx^{2}+a\right)Bd^{2}}{2\left(ae^{2}+cd^{2}\right)^{2}}+\frac{\ln\left(cx^{2}+a\right)adeC}{\left(ae^{2}+cd^{2}\right)^{2}}-\frac{Aace^{2}}{\left(ae^{2}+cd^{2}\right)^{2}}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Ac^{2}d^{2}}{\left(ae^{2}+cd^{2}\right)^{2}}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+2\frac{acdeB}{\left(ae^{2}+cd^{2}\right)^{2}\sqrt{ac}}\arctan\left(\frac{cx}{\sqrt{ac}}\right)+\frac{a^{2}Ce^{2}}{\left(ae^{2}+cd^{2}\right)^{2}}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}-\frac{Cacd^{2}}{\left(ae^{2}+cd^{2}\right)^{2}}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}-\frac{Ae}{\left(ae^{2}+cd^{2}\right)\left(ex+d\right)}+\frac{Bd}{\left(ae^{2}+cd^{2}\right)\left(ex+d\right)}-\frac{Cd^{2}}{\left(ae^{2}+cd^{2}\right)e\left(ex+d\right)}+2\frac{\ln\left(ex+d\right)cdeA}{\left(ae^{2}+cd^{2}\right)^{2}}+\frac{\ln\left(ex+d\right)Bae^{2}}{\left(ae^{2}+cd^{2}\right)^{2}}-\frac{\ln\left(ex+d\right)Bcd^{2}}{\left(ae^{2}+cd^{2}\right)^{2}}-2\frac{\ln\left(ex+d\right)adeC}{\left(ae^{2}+cd^{2}\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)^2/(c*x^2+a),x)
```

```
[Out] -1/(a*e^2+c*d^2)^2*c*ln(c*x^2+a)*d*e*A-1/2/(a*e^2+c*d^2)^2*ln(c*x
^2+a)*B*a*e^2+1/2/(a*e^2+c*d^2)^2*c*ln(c*x^2+a)*B*d^2+1/(a*e^2+c*
d^2)^2*ln(c*x^2+a)*a*d*e*C-1/(a*e^2+c*d^2)^2/(a*c)^(1/2)*arctan(c
*x/(a*c)^(1/2))*A*a*c*e^2+1/(a*e^2+c*d^2)^2/(a*c)^(1/2)*arctan(c*
x/(a*c)^(1/2))*A*c^2*d^2+2/(a*e^2+c*d^2)^2/(a*c)^(1/2)*arctan(c*x
/(a*c)^(1/2))*a*c*d*e*B+1/(a*e^2+c*d^2)^2/(a*c)^(1/2)*arctan(c*x/
(a*c)^(1/2))*a^2*C*e^2-1/(a*e^2+c*d^2)^2/(a*c)^(1/2)*arctan(c*x/(
a*c)^(1/2))*C*a*c*d^2-1/(a*e^2+c*d^2)*e/(e*x+d)*A+1/(a*e^2+c*d^2)
/(e*x+d)*B*d-1/(a*e^2+c*d^2)/e/(e*x+d)*C*d^2+2/(a*e^2+c*d^2)^2*ln
(e*x+d)*c*d*e*A+1/(a*e^2+c*d^2)^2*ln(e*x+d)*B*a*e^2-1/(a*e^2+c*d^
2)^2*ln(e*x+d)*B*c*d^2-2/(a*e^2+c*d^2)^2*ln(e*x+d)*a*d*e*C
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/((c*x^2 + a)*(e*x + d)^2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 36.4005, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/((c*x^2 + a)*(e*x + d)^2),x, algorithm="fricas")
```

```
[Out] [-1/2*((2*B*a*c*d^2*e^2 - (C*a*c - A*c^2)*d^3*e + (C*a^2 - A*a*c)
*d*e^3 + (2*B*a*c*d*e^3 - (C*a*c - A*c^2)*d^2*e^2 + (C*a^2 - A*a*
c)*e^4)*x)*log(-(2*a*c*x - (c*x^2 - a)*sqrt(-a*c))/(c*x^2 + a)) +
 (2*C*c*d^4 - 2*B*c*d^3*e - 2*B*a*d*e^3 + 2*A*a*e^4 + 2*(C*a + A*
c)*d^2*e^2 - (B*c*d^3*e - B*a*d*e^3 + 2*(C*a - A*c)*d^2*e^2 + (B*
c*d^2*e^2 - B*a*e^4 + 2*(C*a - A*c)*d*e^3)*x)*log(c*x^2 + a) + 2*
(B*c*d^3*e - B*a*d*e^3 + 2*(C*a - A*c)*d^2*e^2 + (B*c*d^2*e^2 - B
*a*e^4 + 2*(C*a - A*c)*d*e^3)*x)*log(e*x + d))*sqrt(-a*c))/((c^2*
d^5*e + 2*a*c*d^3*e^3 + a^2*d*e^5 + (c^2*d^4*e^2 + 2*a*c*d^2*e^4
+ a^2*e^6)*x)*sqrt(-a*c)), 1/2*(2*(2*B*a*c*d^2*e^2 - (C*a*c - A*c
^2)*d^3*e + (C*a^2 - A*a*c)*d*e^3 + (2*B*a*c*d*e^3 - (C*a*c - A*c
^2)*d^2*e^2 + (C*a^2 - A*a*c)*e^4)*x)*arctan(sqrt(a*c)*x/a) - (2*
C*c*d^4 - 2*B*c*d^3*e - 2*B*a*d*e^3 + 2*A*a*e^4 + 2*(C*a + A*c)*d
^2*e^2 - (B*c*d^3*e - B*a*d*e^3 + 2*(C*a - A*c)*d^2*e^2 + (B*c*d^
2*e^2 - B*a*e^4 + 2*(C*a - A*c)*d*e^3)*x)*log(c*x^2 + a) + 2*(B*c
*d^3*e - B*a*d*e^3 + 2*(C*a - A*c)*d^2*e^2 + (B*c*d^2*e^2 - B*a*e
^4 + 2*(C*a - A*c)*d*e^3)*x)*log(e*x + d))*sqrt(a*c))/((c^2*d^5*e
 + 2*a*c*d^3*e^3 + a^2*d*e^5 + (c^2*d^4*e^2 + 2*a*c*d^2*e^4 + a^2
*e^6)*x)*sqrt(a*c))]
```

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**2+B*x+A)/(e*x+d)**2/(c*x**2+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.275265, size = 365, normalized size = 1.71

$$-\frac{\left(Cacd^2e^2 - Ac^2d^2e^2 - 2\,Bacde^3 - Ca^2e^4 + Aace^4\right)\arctan\left(\frac{\left(cd - \frac{cd^2}{xe+d} - \frac{ae^2}{xe+d}\right)e^{(-1)}}{\sqrt{ac}}\right)e^{(-2)}}{\left(c^2d^4 + 2\,acd^2e^2 + a^2e^4\right)\sqrt{ac}} + \frac{\left(Bcd^2 + 2\,Cade - 2\,Acde - Bae^2\right)\ln\left(c - \frac{2\,cd}{xe+d} + \frac{cd^2}{(xe+d)^2} + \frac{ae^2}{(xe+d)^2}\right)}{2\left(c^2d^4 + 2\,acd^2e^2 + a^2e^4\right)} - \frac{\frac{Cd^2e}{xe+d} - \frac{Bde^2}{xe+d} + \frac{Ae^3}{xe+d}}{cd^2e^2 + ae^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/((c*x^2 + a)*(e*x + d)^2),x, algorithm="giac")
```

```
[Out] -(C*a*c*d^2*e^2 - A*c^2*d^2*e^2 - 2*B*a*c*d*e^3 - C*a^2*e^4 + A*a
*c*e^4)*arctan((c*d - c*d^2/(x*e + d) - a*e^2/(x*e + d))*e^(-1)/s
qrt(a*c))*e^(-2)/((c^2*d^4 + 2*a*c*d^2*e^2 + a^2*e^4)*sqrt(a*c))
+ 1/2*(B*c*d^2 + 2*C*a*d*e - 2*A*c*d*e - B*a*e^2)*ln(c - 2*c*d/(x
*e + d) + c*d^2/(x*e + d)^2 + a*e^2/(x*e + d)^2)/(c^2*d^4 + 2*a*c
*d^2*e^2 + a^2*e^4) - (C*d^2*e/(x*e + d) - B*d*e^2/(x*e + d) + A*
e^3/(x*e + d))/(c*d^2*e^2 + a*e^4)
```

3.49 $\int \frac{A+Bx+Cx^2}{(d+ex)^3(a+cx^2)}\,dx$

Optimal. Leaf size=305

$$\frac{\log\left(a+cx^2\right)\left(Bcd\left(cd^2-3ae^2\right)-e(Ac-aC)\left(3cd^2-ae^2\right)\right)}{2\left(ae^2+cd^2\right)^3}-\frac{Ae^2-Bde+Cd^2}{2e(d+ex)^2\left(ae^2+cd^2\right)}+\frac{-aBe^2+2aCde-2Acde+Bcd^2}{(d+ex)\left(ae^2+cd^2\right)^2}-\frac{\log(d+ex)\left(Bcd\left(cd^2-3ae^2\right)-e(Ac-aC)\left(3cd^2-ae^2\right)\right)}{\left(ae^2+cd^2\right)^3}+\frac{\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(cd^2-3ae^2\right)-a\left(cd^2(Cd-3Be)-ae^2(3Cd-Be)\right)\right)}{\sqrt{a}\left(ae^2+cd^2\right)^3}$$

```
[Out] -(C*d^2 - B*d*e + A*e^2)/(2*e*(c*d^2 + a*e^2)*(d + e*x)^2) + (B*c
*d^2 - 2*A*c*d*e + 2*a*C*d*e - a*B*e^2)/((c*d^2 + a*e^2)^2*(d + e
*x)) + (Sqrt[c]*(A*c*d*(c*d^2 - 3*a*e^2) - a*(c*d^2*(C*d - 3*B*e)
 - a*e^2*(3*C*d - B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(Sqrt[a]*(c
*d^2 + a*e^2)^3) - ((B*c*d*(c*d^2 - 3*a*e^2) - (A*c - a*C)*e*(3*c
*d^2 - a*e^2))*Log[d + e*x])/(c*d^2 + a*e^2)^3 + ((B*c*d*(c*d^2 -
 3*a*e^2) - (A*c - a*C)*e*(3*c*d^2 - a*e^2))*Log[a + c*x^2])/(2*(
c*d^2 + a*e^2)^3)
```

Rubi [A] time = 1.42928, antiderivative size = 305, 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

$$\frac{\log\left(a+cx^2\right)\left(Bcd\left(cd^2-3ae^2\right)-e(Ac-aC)\left(3cd^2-ae^2\right)\right)}{2\left(ae^2+cd^2\right)^3}-\frac{Ae^2-Bde+Cd^2}{2e(d+ex)^2\left(ae^2+cd^2\right)}+\frac{-aBe^2+2aCde-2Acde+Bcd^2}{(d+ex)\left(ae^2+cd^2\right)^2}-\frac{\log(d+ex)\left(Bcd\left(cd^2-3ae^2\right)-e(Ac-aC)\left(3cd^2-ae^2\right)\right)}{\left(ae^2+cd^2\right)^3}+\frac{\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(cd^2-3ae^2\right)-a\left(cd^2(Cd-3Be)-ae^2(3Cd-Be)\right)\right)}{\sqrt{a}\left(ae^2+cd^2\right)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)^3*(a + c*x^2)),x]
```

```
[Out] -(C*d^2 - B*d*e + A*e^2)/(2*e*(c*d^2 + a*e^2)*(d + e*x)^2) + (B*c
*d^2 - 2*A*c*d*e + 2*a*C*d*e - a*B*e^2)/((c*d^2 + a*e^2)^2*(d + e
*x)) + (Sqrt[c]*(A*c*d*(c*d^2 - 3*a*e^2) - a*(c*d^2*(C*d - 3*B*e)
 - a*e^2*(3*C*d - B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(Sqrt[a]*(c
*d^2 + a*e^2)^3) - ((B*c*d*(c*d^2 - 3*a*e^2) - (A*c - a*C)*e*(3*c
*d^2 - a*e^2))*Log[d + e*x])/(c*d^2 + a*e^2)^3 + ((B*c*d*(c*d^2 -
 3*a*e^2) - (A*c - a*C)*e*(3*c*d^2 - a*e^2))*Log[a + c*x^2])/(2*(
c*d^2 + a*e^2)^3)
```

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((C*x**2+B*x+A)/(e*x+d)**3/(c*x**2+a),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.69409, size = 277, normalized size = 0.91

$$\frac{\log (a+cx^2) (Bcd (cd^2-3ae^2)-e(Ac-aC)(3cd^2-ae^2)) - \frac{(ae^2+cd^2)^2(e(Ae-Bd)+Cd^2)}{e(d+ex)^2} + \frac{2(ae^2+cd^2)(-aBe^2+2aCde-2Acde+Bcd^2}{d+ex}}{2(ae^2+}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/((d + e*x)^3*(a + c*x^2)),x]
```

```
[Out] (-(((c*d^2 + a*e^2)^2*(C*d^2 + e*(-(B*d) + A*e)))/(e*(d + e*x)^2)
) + (2*(c*d^2 + a*e^2)*(B*c*d^2 - 2*A*c*d*e + 2*a*C*d*e - a*B*e^2
))/(d + e*x) + (2*Sqrt[c]*(A*c*d*(c*d^2 - 3*a*e^2) + a*(a*e^2*(3*
C*d - B*e) + c*d^2*(-(C*d) + 3*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]]
)/Sqrt[a] - 2*(B*c*d*(c*d^2 - 3*a*e^2) - (A*c - a*C)*e*(3*c*d^2 -
 a*e^2))*Log[d + e*x] + (B*c*d*(c*d^2 - 3*a*e^2) - (A*c - a*C)*e*
(3*c*d^2 - a*e^2))*Log[a + c*x^2])/(2*(c*d^2 + a*e^2)^3)
```

Maple [B] time = 0.018, size = 754, normalized size = 2.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)^3/(c*x^2+a),x)
```

```
[Out] -1/2/(a*e^2+c*d^2)*e/(e*x+d)^2*A+1/2/(a*e^2+c*d^2)/(e*x+d)^2*B*d+
3/(a*e^2+c*d^2)^3*c^2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*a*d^2
*e+3/(a*e^2+c*d^2)^3*ln(e*x+d)*B*a*c*d*e^2-3/(a*e^2+c*d^2)^3*ln(e
*x+d)*C*a*c*d^2*e-1/(a*e^2+c*d^2)^3*c/(a*c)^(1/2)*arctan(c*x/(a*c
```

```
)^(1/2))*B*a^2*e^3-1/(a*e^2+c*d^2)^3*c^2/(a*c)^(1/2)*arctan(c*x/(
a*c)^(1/2))*C*a*d^3-1/2/(a*e^2+c*d^2)/e/(e*x+d)^2*C*d^2-1/(a*e^2+
c*d^2)^2/(e*x+d)*B*a*e^2+1/(a*e^2+c*d^2)^2/(e*x+d)*B*c*d^2-1/(a*e
^2+c*d^2)^3*ln(e*x+d)*B*c^2*d^3+1/(a*e^2+c*d^2)^3*ln(e*x+d)*C*a^2
*e^3+1/2/(a*e^2+c*d^2)^3*c*ln(c*x^2+a)*A*a*e^3-3/2/(a*e^2+c*d^2)^
3*c^2*ln(c*x^2+a)*A*d^2*e+1/(a*e^2+c*d^2)^3*c^3/(a*c)^(1/2)*arcta
n(c*x/(a*c)^(1/2))*A*d^3-2/(a*e^2+c*d^2)^2/(e*x+d)*c*d*e*A-3/(a*e
^2+c*d^2)^3*c^2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*a*d*e^2+3/(
a*e^2+c*d^2)^3*c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*a^2*d*e^2+
1/2/(a*e^2+c*d^2)^3*c^2*ln(c*x^2+a)*B*d^3-1/2/(a*e^2+c*d^2)^3*ln(
c*x^2+a)*C*a^2*e^3+2/(a*e^2+c*d^2)^2/(e*x+d)*a*d*e*C-1/(a*e^2+c*d
^2)^3*ln(e*x+d)*A*a*c*e^3+3/(a*e^2+c*d^2)^3*ln(e*x+d)*A*c^2*d^2*e
-3/2/(a*e^2+c*d^2)^3*c*ln(c*x^2+a)*B*a*d*e^2+3/2/(a*e^2+c*d^2)^3*
c*ln(c*x^2+a)*C*a*d^2*e
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/((c*x^2 + a)*(e*x + d)^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 130.644, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/((c*x^2 + a)*(e*x + d)^3),x, algorithm="fricas")
```

```
[Out] [-1/2*(C*c^2*d^6 - 3*B*c^2*d^5*e - 2*B*a*c*d^3*e^3 + B*a^2*d*e^5
+ A*a^2*e^6 - (2*C*a*c - 5*A*c^2)*d^4*e^2 - 3*(C*a^2 - 2*A*a*c)*d
^2*e^4 + (3*B*a*c*d^4*e^2 - B*a^2*d^2*e^4 - (C*a*c - A*c^2)*d^5*e
 + 3*(C*a^2 - A*a*c)*d^3*e^3 + (3*B*a*c*d^2*e^4 - B*a^2*e^6 - (C*
a*c - A*c^2)*d^3*e^3 + 3*(C*a^2 - A*a*c)*d*e^5)*x^2 + 2*(3*B*a*c*
d^3*e^3 - B*a^2*d*e^5 - (C*a*c - A*c^2)*d^4*e^2 + 3*(C*a^2 - A*a*
c)*d^2*e^4)*x)*sqrt(-c/a)*log((c*x^2 - 2*a*x*sqrt(-c/a) - a)/(c*x
^2 + a)) - 2*(B*c^2*d^4*e^2 - B*a^2*e^6 + 2*(C*a*c - A*c^2)*d^3*e
^3 + 2*(C*a^2 - A*a*c)*d*e^5)*x - (B*c^2*d^5*e - 3*B*a*c*d^3*e^3
+ 3*(C*a*c - A*c^2)*d^4*e^2 - (C*a^2 - A*a*c)*d^2*e^4 + (B*c^2*d^
3*e^3 - 3*B*a*c*d*e^5 + 3*(C*a*c - A*c^2)*d^2*e^4 - (C*a^2 - A*a*
c)*e^6)*x^2 + 2*(B*c^2*d^4*e^2 - 3*B*a*c*d^2*e^4 + 3*(C*a*c - A*c
```

```
^2)*d^3*e^3 - (C*a^2 - A*a*c)*d*e^5)*x)*log(c*x^2 + a) + 2*(B*c^2
*d^5*e - 3*B*a*c*d^3*e^3 + 3*(C*a*c - A*c^2)*d^4*e^2 - (C*a^2 - A
*a*c)*d^2*e^4 + (B*c^2*d^3*e^3 - 3*B*a*c*d*e^5 + 3*(C*a*c - A*c^2
)*d^2*e^4 - (C*a^2 - A*a*c)*e^6)*x^2 + 2*(B*c^2*d^4*e^2 - 3*B*a*c
*d^2*e^4 + 3*(C*a*c - A*c^2)*d^3*e^3 - (C*a^2 - A*a*c)*d*e^5)*x)*
log(e*x + d))/(c^3*d^8*e + 3*a*c^2*d^6*e^3 + 3*a^2*c*d^4*e^5 + a^
3*d^2*e^7 + (c^3*d^6*e^3 + 3*a*c^2*d^4*e^5 + 3*a^2*c*d^2*e^7 + a^
3*e^9)*x^2 + 2*(c^3*d^7*e^2 + 3*a*c^2*d^5*e^4 + 3*a^2*c*d^3*e^6 +
 a^3*d*e^8)*x), -1/2*(C*c^2*d^6 - 3*B*c^2*d^5*e - 2*B*a*c*d^3*e^3
 + B*a^2*d*e^5 + A*a^2*e^6 - (2*C*a*c - 5*A*c^2)*d^4*e^2 - 3*(C*a
^2 - 2*A*a*c)*d^2*e^4 - 2*(3*B*a*c*d^4*e^2 - B*a^2*d^2*e^4 - (C*a
*c - A*c^2)*d^5*e + 3*(C*a^2 - A*a*c)*d^3*e^3 + (3*B*a*c*d^2*e^4
- B*a^2*e^6 - (C*a*c - A*c^2)*d^3*e^3 + 3*(C*a^2 - A*a*c)*d*e^5)*
x^2 + 2*(3*B*a*c*d^3*e^3 - B*a^2*d*e^5 - (C*a*c - A*c^2)*d^4*e^2
+ 3*(C*a^2 - A*a*c)*d^2*e^4)*x)*sqrt(c/a)*arctan(c*x/(a*sqrt(c/a)
)) - 2*(B*c^2*d^4*e^2 - B*a^2*e^6 + 2*(C*a*c - A*c^2)*d^3*e^3 + 2
*(C*a^2 - A*a*c)*d*e^5)*x - (B*c^2*d^5*e - 3*B*a*c*d^3*e^3 + 3*(C
*a*c - A*c^2)*d^4*e^2 - (C*a^2 - A*a*c)*d^2*e^4 + (B*c^2*d^3*e^3
- 3*B*a*c*d*e^5 + 3*(C*a*c - A*c^2)*d^2*e^4 - (C*a^2 - A*a*c)*e^6
)*x^2 + 2*(B*c^2*d^4*e^2 - 3*B*a*c*d^2*e^4 + 3*(C*a*c - A*c^2)*d^
3*e^3 - (C*a^2 - A*a*c)*d*e^5)*x)*log(c*x^2 + a) + 2*(B*c^2*d^5*e
 - 3*B*a*c*d^3*e^3 + 3*(C*a*c - A*c^2)*d^4*e^2 - (C*a^2 - A*a*c)*
d^2*e^4 + (B*c^2*d^3*e^3 - 3*B*a*c*d*e^5 + 3*(C*a*c - A*c^2)*d^2*
e^4 - (C*a^2 - A*a*c)*e^6)*x^2 + 2*(B*c^2*d^4*e^2 - 3*B*a*c*d^2*e
^4 + 3*(C*a*c - A*c^2)*d^3*e^3 - (C*a^2 - A*a*c)*d*e^5)*x)*log(e*
x + d))/(c^3*d^8*e + 3*a*c^2*d^6*e^3 + 3*a^2*c*d^4*e^5 + a^3*d^2*
e^7 + (c^3*d^6*e^3 + 3*a*c^2*d^4*e^5 + 3*a^2*c*d^2*e^7 + a^3*e^9)
*x^2 + 2*(c^3*d^7*e^2 + 3*a*c^2*d^5*e^4 + 3*a^2*c*d^3*e^6 + a^3*d
*e^8)*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((C*x**2+B*x+A)/(e*x+d)**3/(c*x**2+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.276132, size = 660, normalized size = 2.16

$$\frac{\left(Bc^2d^3+3\,Cacd^2e-3\,Ac^2d^2e-3\,Bacde^2-Ca^2e^3+Aace^3\right)\ln\left(cx^2+a\right)}{2\left(c^3d^6+3\,ac^2d^4e^2+3\,a^2cd^2e^4+a^3e^6\right)}-\frac{\left(Bc^2d^3e+3\,Cacd^2e^2-3\,Ac^2d^2e^2-3\,Bacde^3-Ca^2e^4+Aace^4\right)\ln\left(|xe+d|\right)}{c^3d^6e+3\,ac^2d^4e^3+3\,a^2cd^2e^5+a^3e^7}-\frac{\left(Cac^2d^3-Ac^3d^3-3\,Bac^2d^2e-3\,Ca^2cde^2+3\,Aac^2de^2+Ba^2ce^3\right)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{\left(c^3d^6+3\,ac^2d^4e^2+3\,a^2cd^2e^4+a^3e^6\right)\sqrt{ac}}-\frac{\left(Cc^2d^6-3\,Bc^2d^5e-2\,Cacd^4e^2+5\,Ac^2d^4e^2-2\,Bacd^3e^3-3\,Ca^2d^2e^4+6\,Aacd^2e^4+Ba^2de^5+Aa^2e^6-2\left(Bc^2d^4e^2+2\,Cacd\right.\right.}{2\left(cd^2+ae^2\right)^3(xe+d)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/((c*x^2 + a)*(e*x + d)^3),x, algorithm="giac")
```

```
[Out] 1/2*(B*c^2*d^3 + 3*C*a*c*d^2*e - 3*A*c^2*d^2*e - 3*B*a*c*d*e^2 -
C*a^2*e^3 + A*a*c*e^3)*ln(c*x^2 + a)/(c^3*d^6 + 3*a*c^2*d^4*e^2 +
 3*a^2*c*d^2*e^4 + a^3*e^6) - (B*c^2*d^3*e + 3*C*a*c*d^2*e^2 - 3*
A*c^2*d^2*e^2 - 3*B*a*c*d*e^3 - C*a^2*e^4 + A*a*c*e^4)*ln(abs(x*e
 + d))/(c^3*d^6*e + 3*a*c^2*d^4*e^3 + 3*a^2*c*d^2*e^5 + a^3*e^7)
- (C*a*c^2*d^3 - A*c^3*d^3 - 3*B*a*c^2*d^2*e - 3*C*a^2*c*d*e^2 +
3*A*a*c^2*d*e^2 + B*a^2*c*e^3)*arctan(c*x/sqrt(a*c))/((c^3*d^6 +
3*a*c^2*d^4*e^2 + 3*a^2*c*d^2*e^4 + a^3*e^6)*sqrt(a*c)) - 1/2*(C*
c^2*d^6 - 3*B*c^2*d^5*e - 2*C*a*c*d^4*e^2 + 5*A*c^2*d^4*e^2 - 2*B
*a*c*d^3*e^3 - 3*C*a^2*d^2*e^4 + 6*A*a*c*d^2*e^4 + B*a^2*d*e^5 +
A*a^2*e^6 - 2*(B*c^2*d^4*e^2 + 2*C*a*c*d^3*e^3 - 2*A*c^2*d^3*e^3
+ 2*C*a^2*d*e^5 - 2*A*a*c*d*e^5 - B*a^2*e^6)*x)*e^(-1)/((c*d^2 +
a*e^2)^3*(x*e + d)^2)
```

3.50 $\int \frac{(d+ex)^3(A+Bx+Cx^2)}{(a+cx^2)^2}\,dx$

Optimal. Leaf size=216

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(3ae^2+cd^2\right)-a\left(3ae^2(Be+3Cd)-cd^2(3Be+Cd)\right)\right)}{2a^{3/2}c^{5/2}} - \frac{e\log\left(a+cx^2\right)\left(2aCe^2-c\left(e(Ae+3Bd)+3Cd^2\right)\right)}{2c^3} - \frac{3e^2x(Acd-a(Be+3Cd))}{2ac^2} - \frac{(d+ex)^3(aB-x(Ac-aC))}{2ac\left(a+cx^2\right)} - \frac{e^3x^2(Ac-2aC)}{2ac^2}$$

```
[Out] (-3*e^2*(A*c*d - a*(3*C*d + B*e))*x)/(2*a*c^2) - ((A*c - 2*a*C)*e
^3*x^2)/(2*a*c^2) - ((a*B - (A*c - a*C)*x)*(d + e*x)^3)/(2*a*c*(a
 + c*x^2)) + ((A*c*d*(c*d^2 + 3*a*e^2) - a*(3*a*e^2*(3*C*d + B*e)
 - c*d^2*(C*d + 3*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3/2)*
c^(5/2)) - (e*(2*a*C*e^2 - c*(3*C*d^2 + e*(3*B*d + A*e)))*Log[a +
 c*x^2])/(2*c^3)
```

Rubi [A] time = 1.01142, antiderivative size = 216, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(3ae^2+cd^2\right)-a\left(3ae^2(Be+3Cd)-cd^2(3Be+Cd)\right)\right)}{2a^{3/2}c^{5/2}} - \frac{e\log\left(a+cx^2\right)\left(2aCe^2-c\left(e(Ae+3Bd)+3Cd^2\right)\right)}{2c^3} - \frac{3e^2x(Acd-a(Be+3Cd))}{2ac^2} - \frac{(d+ex)^3(aB-x(Ac-aC))}{2ac\left(a+cx^2\right)} - \frac{e^3x^2(Ac-2aC)}{2ac^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^3*(A + B*x + C*x^2))/(a + c*x^2)^2,x]
```

```
[Out] (-3*e^2*(A*c*d - a*(3*C*d + B*e))*x)/(2*a*c^2) - ((A*c - 2*a*C)*e
^3*x^2)/(2*a*c^2) - ((a*B - (A*c - a*C)*x)*(d + e*x)^3)/(2*a*c*(a
 + c*x^2)) + ((A*c*d*(c*d^2 + 3*a*e^2) - a*(3*a*e^2*(3*C*d + B*e)
 - c*d^2*(C*d + 3*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3/2)*
c^(5/2)) - (e*(2*a*C*e^2 - c*(3*C*d^2 + e*(3*B*d + A*e)))*Log[a +
 c*x^2])/(2*c^3)
```

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((e*x+d)**3*(C*x**2+B*x+A)/(c*x**2+a)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.42155, size = 233, normalized size = 1.08

$$\frac{\frac{\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(3ae^2+cd^2\right)+a\left(cd^2(3Be+Cd)-3ae^2(Be+3Cd)\right)\right)}{a^{3/2}}+\frac{-a^3Ce^3+a^2ce(e(Ae+3Bd+Bex)+3Cd(d+ex))-ac^2d\left(3Ae(d+ex)+Bd(d+3ex)+Cd^2x\right)}{a(a+cx^2)}}{2c^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)^3*(A + B*x + C*x^2))/(a + c*x^2)^2,x]
```

```
[Out] (2*c*e^2*(3*C*d + B*e)*x + c*C*e^3*x^2 + (-(a^3*C*e^3) + A*c^3*d^
3*x - a*c^2*d*(C*d^2*x + 3*A*e*(d + e*x) + B*d*(d + 3*e*x)) + a^2
*c*e*(3*C*d*(d + e*x) + e*(3*B*d + A*e + B*e*x)))/(a*(a + c*x^2))
 + (Sqrt[c]*(A*c*d*(c*d^2 + 3*a*e^2) + a*(-3*a*e^2*(3*C*d + B*e)
+ c*d^2*(C*d + 3*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/a^(3/2) + e*
(3*c*C*d^2 - 2*a*C*e^2 + c*e*(3*B*d + A*e))*Log[a + c*x^2])/(2*c^
3)
```

Maple [B] time = 0.018, size = 492, normalized size = 2.3

$$\frac{3\,Cade^2x}{2\,c^2\,(cx^2+a)}-\frac{9\,Cade^2}{2\,c^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}-\frac{Bd^3}{2\,c\,(cx^2+a)}+\frac{\ln\left(a\left(cx^2+a\right)\right)Ae^3}{2\,c^2}+\frac{Ce^3x^2}{2\,c^2}+\frac{e^3Bx}{c^2}+\frac{xAd^3}{(2\,cx^2+2\,a)\,a}+3\,\frac{e^2Cdx}{c^2}-\frac{Cd^3x}{2\,c\,(cx^2+a)}+\frac{Aae^3}{2\,c^2\,(cx^2+a)}-\frac{3\,Ad^2e}{2\,c\,(cx^2+a)}-\frac{Ca^2e^3}{2\,c^3\,(cx^2+a)}+\frac{3\,\ln\left(a\left(cx^2+a\right)\right)Bde^2}{2\,c^2}-\frac{a\ln\left(a\left(cx^2+a\right)\right)Ce^3}{c^3}+\frac{3\,\ln\left(a\left(cx^2+a\right)\right)Cd^2e}{2\,c^2}+\frac{Ad^3}{2\,a}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Cd^3}{2\,c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{3\,Ade^2}{2\,c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}-\frac{3\,Ade^2x}{2\,c\,(cx^2+a)}+\frac{Bae^3x}{2\,c^2\,(cx^2+a)}-\frac{3\,Bd^2ex}{2\,c\,(cx^2+a)}+\frac{3\,Bade^2}{2\,c^2\,(cx^2+a)}+\frac{3\,d^2eaC}{2\,c^2\,(cx^2+a)}-\frac{3\,Bae^3}{2\,c^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{3\,Bd^2e}{2\,c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^3*(C*x^2+B*x+A)/(c*x^2+a)^2,x)
```

```
[Out] 3/2/c^2/(c*x^2+a)*C*a*d*e^2*x-9/2/c^2*a/(a*c)^(1/2)*arctan(c*x/(a
*c)^(1/2))*C*d*e^2-1/2/c/(c*x^2+a)*B*d^3+1/2/c^2*ln(a*(c*x^2+a))*
A*e^3+1/2*e^3/c^2*C*x^2+e^3/c^2*B*x+1/2/(c*x^2+a)/a*x*A*d^3+3*e^2
/c^2*C*d*x-1/2/c/(c*x^2+a)*C*d^3*x+1/2/c^2/(c*x^2+a)*A*a*e^3-3/2/
c/(c*x^2+a)*A*d^2*e-1/2/c^3/(c*x^2+a)*C*a^2*e^3+3/2/c^2*ln(a*(c*x
^2+a))*B*d*e^2-1/c^3*a*ln(a*(c*x^2+a))*C*e^3+3/2/c^2*ln(a*(c*x^2+
a))*C*d^2*e+1/2/a/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*d^3+1/2/c
/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*d^3+3/2/c/(a*c)^(1/2)*arct
an(c*x/(a*c)^(1/2))*A*d*e^2-3/2/c/(c*x^2+a)*e^2*d*A*x+1/2/c^2/(c*
x^2+a)*a*B*e^3*x-3/2/c/(c*x^2+a)*B*d^2*e*x+3/2/c^2/(c*x^2+a)*B*a*
d*e^2+3/2/c^2/(c*x^2+a)*d^2*e*a*C-3/2/c^2*a/(a*c)^(1/2)*arctan(c*
x/(a*c)^(1/2))*B*e^3+3/2/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*
d^2*e
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^3/(c*x^2 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.278352, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^3/(c*x^2 + a)^2,x, algorithm="fricas")
```

```
[Out] [-1/4*((3*B*a^2*c^2*d^2*e - 3*B*a^3*c*e^3 + (C*a^2*c^2 + A*a*c^3)
*d^3 - 3*(3*C*a^3*c - A*a^2*c^2)*d*e^2 + (3*B*a*c^3*d^2*e - 3*B*a
^2*c^2*e^3 + (C*a*c^3 + A*c^4)*d^3 - 3*(3*C*a^2*c^2 - A*a*c^3)*d*
e^2)*x^2)*log(-(2*a*c*x - (c*x^2 - a)*sqrt(-a*c))/(c*x^2 + a)) -
2*(C*a*c^2*e^3*x^4 + C*a^2*c*e^3*x^2 - B*a*c^2*d^3 + 3*B*a^2*c*d*
e^2 + 3*(C*a^2*c - A*a*c^2)*d^2*e - (C*a^3 - A*a^2*c)*e^3 + 2*(3*
C*a*c^2*d*e^2 + B*a*c^2*e^3)*x^3 - (3*B*a*c^2*d^2*e - 3*B*a^2*c*e
^3 + (C*a*c^2 - A*c^3)*d^3 - 3*(3*C*a^2*c - A*a*c^2)*d*e^2)*x + (
3*C*a^2*c*d^2*e + 3*B*a^2*c*d*e^2 - (2*C*a^3 - A*a^2*c)*e^3 + (3*
C*a*c^2*d^2*e + 3*B*a*c^2*d*e^2 - (2*C*a^2*c - A*a*c^2)*e^3)*x^2)
```

```
*log(c*x^2 + a))*sqrt(-a*c))/((a*c^4*x^2 + a^2*c^3)*sqrt(-a*c)),
1/2*((3*B*a^2*c^2*d^2*e - 3*B*a^3*c*e^3 + (C*a^2*c^2 + A*a*c^3)*d
^3 - 3*(3*C*a^3*c - A*a^2*c^2)*d*e^2 + (3*B*a*c^3*d^2*e - 3*B*a^2
*c^2*e^3 + (C*a*c^3 + A*c^4)*d^3 - 3*(3*C*a^2*c^2 - A*a*c^3)*d*e^
2)*x^2)*arctan(sqrt(a*c)*x/a) + (C*a*c^2*e^3*x^4 + C*a^2*c*e^3*x^
2 - B*a*c^2*d^3 + 3*B*a^2*c*d*e^2 + 3*(C*a^2*c - A*a*c^2)*d^2*e -
 (C*a^3 - A*a^2*c)*e^3 + 2*(3*C*a*c^2*d*e^2 + B*a*c^2*e^3)*x^3 -
(3*B*a*c^2*d^2*e - 3*B*a^2*c*e^3 + (C*a*c^2 - A*c^3)*d^3 - 3*(3*C
*a^2*c - A*a*c^2)*d*e^2)*x + (3*C*a^2*c*d^2*e + 3*B*a^2*c*d*e^2 -
 (2*C*a^3 - A*a^2*c)*e^3 + (3*C*a*c^2*d^2*e + 3*B*a*c^2*d*e^2 - (
2*C*a^2*c - A*a*c^2)*e^3)*x^2)*log(c*x^2 + a))*sqrt(a*c))/((a*c^4
*x^2 + a^2*c^3)*sqrt(a*c))]
```

Sympy [A] time = 62.9479, size = 949, normalized size = 4.39

$$\frac{Ce^3x^2}{2c^2} + \left(-\frac{e\left(-Ace^2 - 3Bcde + 2Cae^2 - 3Ccd^2\right)}{2c^3} - \frac{\sqrt{-a^3c^7}\left(-3Aacde^2 - Ac^2d^3 + 3Ba^2e^3 - 3Bacd^2e + 9Ca^2de^2 - Cacd^3\right)}{4a^3c^6}\right)\log\left(x + \frac{2Aa^2ce^3 + 6Ba^2cde^2 - 4Ca^3e^3 + 6Ca^2cd\ldots}{-3A\ldots}\right.$$
$$+ \left(-\frac{e\left(-Ace^2 - 3Bcde + 2Cae^2 - 3Ccd^2\right)}{2c^3} + \frac{\sqrt{-a^3c^7}\left(-3Aacde^2 - Ac^2d^3 + 3Ba^2e^3 - 3Bacd^2e + 9Ca^2de^2 - Cacd^3\right)}{4a^3c^6}\right)\log\left(x + \frac{2Aa^2ce^3 + 6Ba^2cde^2 - 4Ca^3e^3 + 6Ca^2cd^2\ldots}{-3A\ldots}\right.$$
$$+ \frac{Aa^2ce^3 - 3Aac^2d^2e + 3Ba^2cde^2 - Bac^2d^3 - Ca^3e^3 + 3Ca^2cd^2e + x\left(-3Aac^2de^2 + Ac^3d^3 + Ba^2ce^3 - 3Bac^2d^2e + 3Ca^2cde^2 - \ldots\right.}{2a^2c^3 + 2ac^4x^2} + \frac{x\left(Be^3 + 3Cde^2\right)}{c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**3*(C*x**2+B*x+A)/(c*x**2+a)**2,x)
```

```
[Out] C*e**3*x**2/(2*c**2) + (-e*(-A*c*e**2 - 3*B*c*d*e + 2*C*a*e**2 -
3*C*c*d**2)/(2*c**3) - sqrt(-a**3*c**7)*(-3*A*a*c*d*e**2 - A*c**2
*d**3 + 3*B*a**2*e**3 - 3*B*a*c*d**2*e + 9*C*a**2*d*e**2 - C*a*c*
d**3)/(4*a**3*c**6))*log(x + (2*A*a**2*c*e**3 + 6*B*a**2*c*d*e**2
 - 4*C*a**3*e**3 + 6*C*a**2*c*d**2*e - 4*a**2*c**3*(-e*(-A*c*e**2
 - 3*B*c*d*e + 2*C*a*e**2 - 3*C*c*d**2)/(2*c**3) - sqrt(-a**3*c**
7)*(-3*A*a*c*d*e**2 - A*c**2*d**3 + 3*B*a**2*e**3 - 3*B*a*c*d**2*
e + 9*C*a**2*d*e**2 - C*a*c*d**3)/(4*a**3*c**6)))/(-3*A*a*c**2*d*
e**2 - A*c**3*d**3 + 3*B*a**2*c*e**3 - 3*B*a*c**2*d**2*e + 9*C*a*
```

```
*2*c*d*e**2 - C*a*c**2*d**3)) + (-e*(-A*c*e**2 - 3*B*c*d*e + 2*C*
a*e**2 - 3*C*c*d**2)/(2*c**3) + sqrt(-a**3*c**7)*(-3*A*a*c*d*e**2
 - A*c**2*d**3 + 3*B*a**2*e**3 - 3*B*a*c*d**2*e + 9*C*a**2*d*e**2
 - C*a*c*d**3)/(4*a**3*c**6))*log(x + (2*A*a**2*c*e**3 + 6*B*a**2
*c*d*e**2 - 4*C*a**3*e**3 + 6*C*a**2*c*d**2*e - 4*a**2*c**3*(-e*(
-A*c*e**2 - 3*B*c*d*e + 2*C*a*e**2 - 3*C*c*d**2)/(2*c**3) + sqrt(
-a**3*c**7)*(-3*A*a*c*d*e**2 - A*c**2*d**3 + 3*B*a**2*e**3 - 3*B*
a*c*d**2*e + 9*C*a**2*d*e**2 - C*a*c*d**3)/(4*a**3*c**6)))/(-3*A*
a*c**2*d*e**2 - A*c**3*d**3 + 3*B*a**2*c*e**3 - 3*B*a*c**2*d**2*e
 + 9*C*a**2*c*d*e**2 - C*a*c**2*d**3)) + (A*a**2*c*e**3 - 3*A*a*c
**2*d**2*e + 3*B*a**2*c*d*e**2 - B*a*c**2*d**3 - C*a**3*e**3 + 3*
C*a**2*c*d**2*e + x*(-3*A*a*c**2*d*e**2 + A*c**3*d**3 + B*a**2*c*
e**3 - 3*B*a*c**2*d**2*e + 3*C*a**2*c*d*e**2 - C*a*c**2*d**3))/(2
*a**2*c**3 + 2*a*c**4*x**2) + x*(B*e**3 + 3*C*d*e**2)/c**2
```

GIAC/XCAS [A] time = 0.272176, size = 390, normalized size = 1.81

$$\frac{\left(3\,Ccd^{2}e+3\,Bcde^{2}-2\,Cae^{3}+Ace^{3}\right)\ln\left(cx^{2}+a\right)}{2\,c^{3}}+\frac{\left(Cacd^{3}+Ac^{2}d^{3}+3\,Bacd^{2}e-9\,Ca^{2}de^{2}+3\,Aacde^{2}-3\,Ba^{2}e^{3}\right)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{2\,\sqrt{ac}ac^{2}}+\frac{Cc^{2}x^{2}e^{3}+6\,Cc^{2}dxe^{2}+2\,Bc^{2}xe^{3}}{2\,c^{4}}-\frac{Bac^{2}d^{3}-3\,Ca^{2}cd^{2}e+3\,Aac^{2}d^{2}e-3\,Ba^{2}cde^{2}+Ca^{3}e^{3}-Aa^{2}ce^{3}+\left(Cac^{2}d^{3}-Ac^{3}d^{3}+3\,Bac^{2}d^{2}e-3\,Ca^{2}cde^{2}+3\,Aac^{2}de^{2}\cdots\right.}{2\,(cx^{2}+a)ac^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^3/(c*x^2 + a)^2,x, algorithm="giac")
```

```
[Out] 1/2*(3*C*c*d^2*e + 3*B*c*d*e^2 - 2*C*a*e^3 + A*c*e^3)*ln(c*x^2 +
a)/c^3 + 1/2*(C*a*c*d^3 + A*c^2*d^3 + 3*B*a*c*d^2*e - 9*C*a^2*d*e
^2 + 3*A*a*c*d*e^2 - 3*B*a^2*e^3)*arctan(c*x/sqrt(a*c))/(sqrt(a*c
)*a*c^2) + 1/2*(C*c^2*x^2*e^3 + 6*C*c^2*d*x*e^2 + 2*B*c^2*x*e^3)/
c^4 - 1/2*(B*a*c^2*d^3 - 3*C*a^2*c*d^2*e + 3*A*a*c^2*d^2*e - 3*B*
a^2*c*d*e^2 + C*a^3*e^3 - A*a^2*c*e^3 + (C*a*c^2*d^3 - A*c^3*d^3
+ 3*B*a*c^2*d^2*e - 3*C*a^2*c*d*e^2 + 3*A*a*c^2*d*e^2 - B*a^2*c*e
^3)*x)/((c*x^2 + a)*a*c^3)
```

3.51 $\int \frac{(d+ex)^2\left(A+Bx+Cx^2\right)}{\left(a+cx^2\right)^2}\,dx$

Optimal. Leaf size=146

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(cd(2aBe+aCd+Acd)+ae^2(Ac-3aC)\right)}{2a^{3/2}c^{5/2}}-\frac{(d+ex)^2(aB-x(Ac-aC))}{2ac\left(a+cx^2\right)}-\frac{e^2x(Ac-3aC)}{2ac^2}+\frac{e\log\left(a+cx^2\right)(Be+2Cd)}{2c^2}$$

```
[Out] -((A*c - 3*a*C)*e^2*x)/(2*a*c^2) - ((a*B - (A*c - a*C)*x)*(d + e*
x)^2)/(2*a*c*(a + c*x^2)) + ((a*(A*c - 3*a*C)*e^2 + c*d*(A*c*d +
a*C*d + 2*a*B*e))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3/2)*c^(5/2)
) + (e*(2*C*d + B*e)*Log[a + c*x^2])/(2*c^2)
```

Rubi [A] time = 0.503912, antiderivative size = 146, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.185

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(cd(2aBe+aCd+Acd)+ae^2(Ac-3aC)\right)}{2a^{3/2}c^{5/2}}-\frac{(d+ex)^2(aB-x(Ac-aC))}{2ac\left(a+cx^2\right)}-\frac{e^2x(Ac-3aC)}{2ac^2}+\frac{e\log\left(a+cx^2\right)(Be+2Cd)}{2c^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^2*(A + B*x + C*x^2))/(a + c*x^2)^2,x]
```


```
[Out] -((A*c - 3*a*C)*e^2*x)/(2*a*c^2) - ((a*B - (A*c - a*C)*x)*(d + e*
x)^2)/(2*a*c*(a + c*x^2)) + ((a*(A*c - 3*a*C)*e^2 + c*d*(A*c*d +
a*C*d + 2*a*B*e))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3/2)*c^(5/2)
) + (e*(2*C*d + B*e)*Log[a + c*x^2])/(2*c^2)
```

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

$$\frac{e^2 \int C\,dx}{c^2} + \frac{e\,(Be + 2Cd)\log\left(a + cx^2\right)}{2c^2} + \frac{a\left(-2Acde + Bae^2 - Bcd^2 + 2Cade\right) + x\left(-Aace^2 + Ac^2d^2 - 2Bacde + Ca^2e^2 - Cacd^2\right)}{2ac^2\,(a + cx^2)} + \frac{\left(Ace^2 + 2Bcde - 2Cae^2 + Ccd^2\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{\sqrt{a}c^{\frac{5}{2}}} + \frac{\left(-Aace^2 + Ac^2d^2 - 2Bacde + Ca^2e^2 - Cacd^2\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)**2*(C*x**2+B*x+A)/(c*x**2+a)**2,x)
```

```
[Out] e**2*Integral(C, x)/c**2 + e*(B*e + 2*C*d)*log(a + c*x**2)/(2*c**
2) + (a*(-2*A*c*d*e + B*a*e**2 - B*c*d**2 + 2*C*a*d*e) + x*(-A*a*
c*e**2 + A*c**2*d**2 - 2*B*a*c*d*e + C*a**2*e**2 - C*a*c*d**2))/(
2*a*c**2*(a + c*x**2)) + (A*c*e**2 + 2*B*c*d*e - 2*C*a*e**2 + C*c
*d**2)*atan(sqrt(c)*x/sqrt(a))/(sqrt(a)*c**(5/2)) + (-A*a*c*e**2
+ A*c**2*d**2 - 2*B*a*c*d*e + C*a**2*e**2 - C*a*c*d**2)*atan(sqrt
(c)*x/sqrt(a))/(2*a**(3/2)*c**(5/2))
```

Mathematica [A] time = 0.269696, size = 175, normalized size = 1.2

$$\frac{\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Ac\left(ae^2+cd^2\right)+a\left(cd(2Be+Cd)-3aCe^2\right)\right)}{a^{3/2}} + \frac{\sqrt{c}\left(a^2e(Be+2Cd+Cex)-ac\left(Ae(2d+ex)+Bd(d+2ex)+Cd^2x\right)+Ac^2d^2x\right)}{a(a+cx^2)} + \sqrt{c}e\log\left(a+cx^2\right)(B}{2c^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)^2*(A + B*x + C*x^2))/(a + c*x^2)^2,x]
```

```
[Out] (2*Sqrt[c]*C*e^2*x + (Sqrt[c]*(A*c^2*d^2*x + a^2*e*(2*C*d + B*e +
 C*e*x) - a*c*(C*d^2*x + A*e*(2*d + e*x) + B*d*(d + 2*e*x))))/(a*
(a + c*x^2)) + ((A*c*(c*d^2 + a*e^2) + a*(-3*a*C*e^2 + c*d*(C*d +
 2*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/a^(3/2) + Sqrt[c]*e*(2*C*d
 + B*e)*Log[a + c*x^2])/(2*c^(5/2))
```

Maple [B] time = 0.014, size = 327, normalized size = 2.2

$$\frac{Ce^2x}{c^2} - \frac{Ae^2x}{2c(cx^2+a)} + \frac{xAd^2}{(2cx^2+2a)a} - \frac{Bdex}{c(cx^2+a)} + \frac{aCe^2x}{2c^2(cx^2+a)} - \frac{Cd^2x}{2c(cx^2+a)} - \frac{deA}{c(cx^2+a)} + \frac{Bae^2}{2c^2(cx^2+a)} - \frac{Bd^2}{2c(cx^2+a)} + \frac{adeC}{c^2(cx^2+a)} + \frac{\ln\left(a\left(cx^2+a\right)\right)Be^2}{2c^2} + \frac{\ln\left(a\left(cx^2+a\right)\right)deC}{c^2} + \frac{Ae^2}{2c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}} + \frac{Ad^2}{2a}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}} + \frac{Bde}{c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}} - \frac{3aCe^2}{2c^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}} + \frac{Cd^2}{2c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^2*(C*x^2+B*x+A)/(c*x^2+a)^2,x)
```

```
[Out] C*e^2/c^2*x-1/2/c/(c*x^2+a)*A*e^2*x+1/2/(c*x^2+a)/a*x*A*d^2-1/c/(
c*x^2+a)*B*d*e*x+1/2/c^2/(c*x^2+a)*a*C*e^2*x-1/2/c/(c*x^2+a)*C*d^
2*x-1/c/(c*x^2+a)*d*e*A+1/2/c^2/(c*x^2+a)*B*a*e^2-1/2/c/(c*x^2+a)
*B*d^2+1/c^2/(c*x^2+a)*a*d*e*C+1/2/c^2*ln(a*(c*x^2+a))*B*e^2+1/c^
2*ln(a*(c*x^2+a))*d*e*C+1/2/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))
*A*e^2+1/2/a/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*d^2+1/c/(a*c)^
(1/2)*arctan(c*x/(a*c)^(1/2))*d*e*B-3/2/c^2*a/(a*c)^(1/2)*arctan(
c*x/(a*c)^(1/2))*C*e^2+1/2/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*
C*d^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((C*x^2 + B*x + A)*(e*x + d)^2/(c*x^2 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.268123, size = 1, normalized size = 0.01

$$\left[\frac{\left(2\,Ba^2cde + \left(Ca^2c + Aac^2\right)d^2 - \left(3\,Ca^3 - Aa^2c\right)e^2 + \left(2\,Bac^2de + \left(Cac^2 + Ac^3\right)d^2 - \left(3\,Ca^2c - Aac^2\right)e^2\right)x^2\right)\log\left(\frac{2\,acx+(cx^2-}{cx^2+}\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(e*x + d)^2/(c*x^2 + a)^2,x, algorithm="fricas")
```

```
[Out] [1/4*((2*B*a^2*c*d*e + (C*a^2*c + A*a*c^2)*d^2 - (3*C*a^3 - A*a^2
*c)*e^2 + (2*B*a*c^2*d*e + (C*a*c^2 + A*c^3)*d^2 - (3*C*a^2*c - A
*a*c^2)*e^2)*x^2)*log((2*a*c*x + (c*x^2 - a)*sqrt(-a*c))/(c*x^2 +
 a)) + 2*(2*C*a*c*e^2*x^3 - B*a*c*d^2 + B*a^2*e^2 + 2*(C*a^2 - A*
a*c)*d*e - (2*B*a*c*d*e + (C*a*c - A*c^2)*d^2 - (3*C*a^2 - A*a*c)
*e^2)*x + (2*C*a^2*d*e + B*a^2*e^2 + (2*C*a*c*d*e + B*a*c*e^2)*x^
2)*log(c*x^2 + a))*sqrt(-a*c))/((a*c^3*x^2 + a^2*c^2)*sqrt(-a*c))
, 1/2*((2*B*a^2*c*d*e + (C*a^2*c + A*a*c^2)*d^2 - (3*C*a^3 - A*a^
2*c)*e^2 + (2*B*a*c^2*d*e + (C*a*c^2 + A*c^3)*d^2 - (3*C*a^2*c -
A*a*c^2)*e^2)*x^2)*arctan(sqrt(a*c)*x/a) + (2*C*a*c*e^2*x^3 - B*a
*c*d^2 + B*a^2*e^2 + 2*(C*a^2 - A*a*c)*d*e - (2*B*a*c*d*e + (C*a*
c - A*c^2)*d^2 - (3*C*a^2 - A*a*c)*e^2)*x + (2*C*a^2*d*e + B*a^2*
e^2 + (2*C*a*c*d*e + B*a*c*e^2)*x^2)*log(c*x^2 + a))*sqrt(a*c))/(
(a*c^3*x^2 + a^2*c^2)*sqrt(a*c))]
```

Sympy [A] time = 33.901, size = 593, normalized size = 4.06

$$\frac{Ce^2x}{c^2} + \left(\frac{e\left(Be + 2Cd\right)}{2c^2} - \frac{\sqrt{-a^3c^5}\left(-Aace^2 - Ac^2d^2 - 2Bacde + 3Ca^2e^2 - Cacd^2\right)}{4a^3c^5}\right)\log\left(x + \frac{2Ba^2e^2 + 4Ca^2de - 4a^2c^2\left(\frac{e(Be+2Cd)}{2c^2} - \frac{\sqrt{-a^3c^5}\left(-Aace^2 - \cdots\right.}{\cdots}\right.}{-Aace^2 - Ac^2d^2 - 2Bacde + 3Ca^2e^2 \cdots}\right.$$

$$+ \left(\frac{e\left(Be + 2Cd\right)}{2c^2} + \frac{\sqrt{-a^3c^5}\left(-Aace^2 - Ac^2d^2 - 2Bacde + 3Ca^2e^2 - Cacd^2\right)}{4a^3c^5}\right)\log\left(x + \frac{2Ba^2e^2 + 4Ca^2de - 4a^2c^2\left(\frac{e(Be+2Cd)}{2c^2} + \frac{\sqrt{-a^3c^5}\left(-Aace^2 - \cdots\right.}{\cdots}\right.}{-Aace^2 - Ac^2d^2 - 2Bacde + 3Ca^2e^2 \cdots}\right.$$

$$+ \frac{-2Aacde + Ba^2e^2 - Bacd^2 + 2Ca^2de + x\left(-Aace^2 + Ac^2d^2 - 2Bacde + Ca^2e^2 - Cacd^2\right)}{2a^2c^2 + 2ac^3x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**2*(C*x**2+B*x+A)/(c*x**2+a)**2,x)
```

```
[Out] C*e**2*x/c**2 + (e*(B*e + 2*C*d)/(2*c**2) - sqrt(-a**3*c**5)*(-A*
a*c*e**2 - A*c**2*d**2 - 2*B*a*c*d*e + 3*C*a**2*e**2 - C*a*c*d**2
)/(4*a**3*c**5))*log(x + (2*B*a**2*e**2 + 4*C*a**2*d*e - 4*a**2*c
**2*(e*(B*e + 2*C*d)/(2*c**2) - sqrt(-a**3*c**5)*(-A*a*c*e**2 - A
*c**2*d**2 - 2*B*a*c*d*e + 3*C*a**2*e**2 - C*a*c*d**2)/(4*a**3*c*
*5)))/(-A*a*c*e**2 - A*c**2*d**2 - 2*B*a*c*d*e + 3*C*a**2*e**2 -
```

```
C*a*c*d**2)) + (e*(B*e + 2*C*d)/(2*c**2) + sqrt(-a**3*c**5)*(-A*a
*c*e**2 - A*c**2*d**2 - 2*B*a*c*d*e + 3*C*a**2*e**2 - C*a*c*d**2)
/(4*a**3*c**5))*log(x + (2*B*a**2*e**2 + 4*C*a**2*d*e - 4*a**2*c*
*2*(e*(B*e + 2*C*d)/(2*c**2) + sqrt(-a**3*c**5)*(-A*a*c*e**2 - A*
c**2*d**2 - 2*B*a*c*d*e + 3*C*a**2*e**2 - C*a*c*d**2)/(4*a**3*c**
5)))/(-A*a*c*e**2 - A*c**2*d**2 - 2*B*a*c*d*e + 3*C*a**2*e**2 - C
*a*c*d**2)) + (-2*A*a*c*d*e + B*a**2*e**2 - B*a*c*d**2 + 2*C*a**2
*d*e + x*(-A*a*c*e**2 + A*c**2*d**2 - 2*B*a*c*d*e + C*a**2*e**2 -
 C*a*c*d**2))/(2*a**2*c**2 + 2*a*c**3*x**2)
```

GIAC/XCAS [A] time = 0.272481, size = 248, normalized size = 1.7

$$\frac{Cxe^2}{c^2}+\frac{\left(2\,Cde+Be^2\right)\ln\left(cx^2+a\right)}{2\,c^2}+\frac{\left(Cacd^2+Ac^2d^2+2\,Bacde-3\,Ca^2e^2+Aace^2\right)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{2\,\sqrt{ac}ac^2}-\frac{Bacd^2-2\,Ca^2de+2\,Aacde-Ba^2e^2+\left(Cacd^2-Ac^2d^2+2\,Bacde-Ca^2e^2+Aace^2\right)x}{2\,(cx^2+a)ac^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^2/(c*x^2 + a)^2,x, algorithm="giac")
```

```
[Out] C*x*e^2/c^2 + 1/2*(2*C*d*e + B*e^2)*ln(c*x^2 + a)/c^2 + 1/2*(C*a*
c*d^2 + A*c^2*d^2 + 2*B*a*c*d*e - 3*C*a^2*e^2 + A*a*c*e^2)*arctan
(c*x/sqrt(a*c))/(sqrt(a*c)*a*c^2) - 1/2*(B*a*c*d^2 - 2*C*a^2*d*e
+ 2*A*a*c*d*e - B*a^2*e^2 + (C*a*c*d^2 - A*c^2*d^2 + 2*B*a*c*d*e
- C*a^2*e^2 + A*a*c*e^2)*x)/((c*x^2 + a)*a*c^2)
```

3.52 $\int \frac{(d+ex)(A+Bx+Cx^2)}{(a+cx^2)^2}\,dx$

Optimal. Leaf size=97

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)(aBe+aCd+Acd)}{2a^{3/2}c^{3/2}}-\frac{(d+ex)(aB-x(Ac-aC))}{2ac\left(a+cx^2\right)}+\frac{Ce\log\left(a+cx^2\right)}{2c^2}$$

```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x))/(2*a*c*(a + c*x^2)) + ((A*c*d
+ a*C*d + a*B*e)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3/2)*c^(3/2))
 + (C*e*Log[a + c*x^2])/(2*c^2)
```

Rubi [A] time = 0.173921, antiderivative size = 97, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.16$

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)(aBe+aCd+Acd)}{2a^{3/2}c^{3/2}}-\frac{(d+ex)(aB-x(Ac-aC))}{2ac\left(a+cx^2\right)}+\frac{Ce\log\left(a+cx^2\right)}{2c^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)*(A + B*x + C*x^2))/(a + c*x^2)^2,x]
```

```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x))/(2*a*c*(a + c*x^2)) + ((A*c*d
+ a*C*d + a*B*e)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3/2)*c^(3/2))
 + (C*e*Log[a + c*x^2])/(2*c^2)
```

Rubi in Sympy [A] time = 40.1996, size = 136, normalized size = 1.4

$$\frac{Ce\log\left(a+cx^2\right)}{2c^2}-\frac{a\left(Ace+Bcd-Cae\right)-cx\left(Acd-Bae-Cad\right)}{2ac^2\left(a+cx^2\right)}+\frac{(Be+Cd)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{\sqrt{a}c^{\frac{3}{2}}}+\frac{(Acd-Bae-Cad)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)*(C*x**2+B*x+A)/(c*x**2+a)**2,x)
```

```
[Out] C*e*log(a + c*x**2)/(2*c**2) - (a*(A*c*e + B*c*d - C*a*e) - c*x*(
A*c*d - B*a*e - C*a*d))/(2*a*c**2*(a + c*x**2)) + (B*e + C*d)*ata
```

```
n(sqrt(c)*x/sqrt(a))/(sqrt(a)*c**(3/2)) + (A*c*d - B*a*e - C*a*d)
*atan(sqrt(c)*x/sqrt(a))/(2*a**(3/2)*c**(3/2))
```

Mathematica [A] time = 0.197155, size = 102, normalized size = 1.05

$$\frac{\frac{\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)(aBe+aCd+Acd)}{a^{3/2}}+\frac{a^2Ce-ac(Ae+B(d+ex)+Cdx)+Ac^2dx}{a(a+cx^2)}+Ce\log\left(a+cx^2\right)}{2c^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)*(A + B*x + C*x^2))/(a + c*x^2)^2,x]
```

```
[Out] ((a^2*C*e + A*c^2*d*x - a*c*(A*e + C*d*x + B*(d + e*x)))/(a*(a +
c*x^2)) + (Sqrt[c]*(A*c*d + a*C*d + a*B*e)*ArcTan[(Sqrt[c]*x)/Sqr
t[a]])/a^(3/2) + C*e*Log[a + c*x^2])/(2*c^2)
```

Maple [A] time = 0.013, size = 137, normalized size = 1.4

$$\frac{1}{cx^2+a}\left(\frac{(Acd-aBe-Cad)\,x}{2\,ac}-\frac{Ace+Bcd-aCe}{2\,c^2}\right)+\frac{Ce\ln\left(ac\left(cx^2+a\right)\right)}{2\,c^2}\\+\frac{Ad}{2\,a}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Be}{2\,c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Cd}{2\,c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)*(C*x^2+B*x+A)/(c*x^2+a)^2,x)
```

```
[Out] (1/2*(A*c*d-B*a*e-C*a*d)/a/c*x-1/2*(A*c*e+B*c*d-C*a*e)/c^2)/(c*x^
2+a)+1/2*C*e/c^2*ln(a*c*(c*x^2+a))+1/2/a/(a*c)^(1/2)*arctan(c*x/(
a*c)^(1/2))*A*d+1/2/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*e+1/2
/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*d
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/(c*x^2 + a)^2,x, algorithm="maxima")
```

[Out] Exception raised: ValueError

Fricas [A] time = 0.26408, size = 1, normalized size = 0.01

$$\left[\frac{\left(Ba^2ce+\left(Bac^2e+\left(Cac^2+Ac^3\right)d\right)x^2+\left(Ca^2c+Aac^2\right)d\right)\log\left(\frac{2\,acx+(cx^2-a)\sqrt{-ac}}{cx^2+a}\right)-2\left(Bacd-\left(Ca^2-Aac\right)e+\left(Bace+\left(C\right.\right.\right.}{4\left(ac^3x^2+a^2c^2\right)\sqrt{-ac}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/(c*x^2 + a)^2,x, algorithm="fricas")
```

```
[Out] [1/4*((B*a^2*c*e + (B*a*c^2*e + (C*a*c^2 + A*c^3)*d)*x^2 + (C*a^2
*c + A*a*c^2)*d)*log((2*a*c*x + (c*x^2 - a)*sqrt(-a*c))/(c*x^2 +
a)) - 2*(B*a*c*d - (C*a^2 - A*a*c)*e + (B*a*c*e + (C*a*c - A*c^2)
*d)*x - (C*a*c*e*x^2 + C*a^2*e)*log(c*x^2 + a))*sqrt(-a*c))/((a*c
^3*x^2 + a^2*c^2)*sqrt(-a*c)), 1/2*((B*a^2*c*e + (B*a*c^2*e + (C*
a*c^2 + A*c^3)*d)*x^2 + (C*a^2*c + A*a*c^2)*d)*arctan(sqrt(a*c)*x
/a) - (B*a*c*d - (C*a^2 - A*a*c)*e + (B*a*c*e + (C*a*c - A*c^2)*d
)*x - (C*a*c*e*x^2 + C*a^2*e)*log(c*x^2 + a))*sqrt(a*c))/((a*c^3*
x^2 + a^2*c^2)*sqrt(a*c))]
```

Sympy [A] time = 12.6969, size = 318, normalized size = 3.28

$$\left(\frac{Ce}{2c^2}-\frac{\sqrt{-a^3c^5}\,(Acd+Bae+Cad)}{4a^3c^4}\right)\log\left(x+\frac{-2Ca^2e+4a^2c^2\left(\frac{Ce}{2c^2}-\frac{\sqrt{-a^3c^5}(Acd+Bae+Cad)}{4a^3c^4}\right)}{Ac^2d+Bace+Cacd}\right)+\left(\frac{Ce}{2c^2}+\frac{\sqrt{-a^3c^5}\,(Acd+Bae+Cad)}{4a^3c^4}\right)\log\left(x+\frac{-2Ca^2e+4a^2c^2\left(\frac{Ce}{2c^2}+\frac{\sqrt{-a^3c^5}(Acd+Bae+Cad)}{4a^3c^4}\right)}{Ac^2d+Bace+Cacd}\right)-\frac{Aace+Bacd-Ca^2e+x\left(-Ac^2d+Bace+Cacd\right)}{2a^2c^2+2ac^3x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)*(C*x**2+B*x+A)/(c*x**2+a)**2,x)
```

```
[Out] (C*e/(2*c**2) - sqrt(-a**3*c**5)*(A*c*d + B*a*e + C*a*d)/(4*a**3*
c**4))*log(x + (-2*C*a**2*e + 4*a**2*c**2*(C*e/(2*c**2) - sqrt(-a
**3*c**5)*(A*c*d + B*a*e + C*a*d)/(4*a**3*c**4)))/(A*c**2*d + B*a
*c*e + C*a*c*d)) + (C*e/(2*c**2) + sqrt(-a**3*c**5)*(A*c*d + B*a*
e + C*a*d)/(4*a**3*c**4))*log(x + (-2*C*a**2*e + 4*a**2*c**2*(C*e
```

```
/(2*c**2) + sqrt(-a**3*c**5)*(A*c*d + B*a*e + C*a*d)/(4*a**3*c**4
)))/(A*c**2*d + B*a*c*e + C*a*c*d)) - (A*a*c*e + B*a*c*d - C*a**2
*e + x*(-A*c**2*d + B*a*c*e + C*a*c*d))/(2*a**2*c**2 + 2*a*c**3*x
**2)
```

GIAC/XCAS [A] time = 0.271193, size = 151, normalized size = 1.56

$$\frac{Ce\ln\left(cx^2+a\right)}{2\,c^2}+\frac{(Cad+Acd+Bae)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{2\,\sqrt{ac}ac}-\frac{(Cad-Acd+Bae)x+\frac{Bacd-Ca^2e+Aace}{c}}{2\,(cx^2+a)ac}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/(c*x^2 + a)^2,x, algorithm="giac")
```

```
[Out] 1/2*C*e*ln(c*x^2 + a)/c^2 + 1/2*(C*a*d + A*c*d + B*a*e)*arctan(c*
x/sqrt(a*c))/(sqrt(a*c)*a*c) - 1/2*((C*a*d - A*c*d + B*a*e)*x + (
B*a*c*d - C*a^2*e + A*a*c*e)/c)/((c*x^2 + a)*a*c)
```

3.53 $\int \frac{A+Bx+Cx^2}{(a+cx^2)^2}\,dx$

Optimal. Leaf size=69

$$\frac{(aC+Ac)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2a^{3/2}c^{3/2}}-\frac{aB-x(Ac-aC)}{2ac\,(a+cx^2)}$$

```
[Out] -(a*B - (A*c - a*C)*x)/(2*a*c*(a + c*x^2)) + ((A*c + a*C)*ArcTan[
(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3/2)*c^(3/2))
```

Rubi [A] time = 0.0864367, antiderivative size = 69, 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

$$\frac{(aC+Ac)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2a^{3/2}c^{3/2}}-\frac{aB-x(Ac-aC)}{2ac\,(a+cx^2)}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/(a + c*x^2)^2,x]
```

```
[Out] -(a*B - (A*c - a*C)*x)/(2*a*c*(a + c*x^2)) + ((A*c + a*C)*ArcTan[
(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3/2)*c^(3/2))
```

Rubi in Sympy [A] time = 10.2234, size = 54, normalized size = 0.78

$$-\frac{Ba-x\,(Ac-Ca)}{2ac\,(a+cx^2)}+\frac{(Ac+Ca)\,\mathrm{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)/(c*x**2+a)**2,x)
```

```
[Out] -(B*a - x*(A*c - C*a))/(2*a*c*(a + c*x**2)) + (A*c + C*a)*atan(sq
rt(c)*x/sqrt(a))/(2*a**(3/2)*c**(3/2))
```

Mathematica [A] time = 0.0969174, size = 68, normalized size = 0.99

$$\frac{(aC+Ac)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2a^{3/2}c^{3/2}}+\frac{-aB-aCx+Acx}{2ac\,(a+cx^2)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/(a + c*x^2)^2,x]
```

```
[Out] (-(a*B) + A*c*x - a*C*x)/(2*a*c*(a + c*x^2)) + ((A*c + a*C)*ArcTa
n[(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3/2)*c^(3/2))
```

Maple [A] time = 0.009, size = 76, normalized size = 1.1

$$\frac{1}{cx^2+a}\left(\frac{(Ac-aC)\,x}{2\,ac}-\frac{B}{2\,c}\right)+\frac{A}{2\,a}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{C}{2\,c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(c*x^2+a)^2,x)
```

```
[Out] (1/2*(A*c-C*a)/a/c*x-1/2*B/c)/(c*x^2+a)+1/2/a/(a*c)^(1/2)*arctan(
c*x/(a*c)^(1/2))*A+1/2/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.265917, size = 1, normalized size = 0.01

$$\left[\frac{\left(Ca^2+Aac+\left(Cac+Ac^2\right)x^2\right)\log\left(\frac{2\,acx+\left(cx^2-a\right)\sqrt{-ac}}{cx^2+a}\right)-2\,(Ba+(Ca-Ac)x)\sqrt{-ac}}{4\,(ac^2x^2+a^2c)\sqrt{-ac}},\ \frac{\left(Ca^2+Aac+\left(Cac+Ac^2\right)x^2\right)\arctan\Big(}{2\,(ac^2x^2+a^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^2,x, algorithm="fricas")
```

```
[Out] [1/4*((C*a^2 + A*a*c + (C*a*c + A*c^2)*x^2)*log((2*a*c*x + (c*x^2
 - a)*sqrt(-a*c))/(c*x^2 + a)) - 2*(B*a + (C*a - A*c)*x)*sqrt(-a*
c))/((a*c^2*x^2 + a^2*c)*sqrt(-a*c)), 1/2*((C*a^2 + A*a*c + (C*a*
c + A*c^2)*x^2)*arctan(sqrt(a*c)*x/a) - (B*a + (C*a - A*c)*x)*sqr
t(a*c))/((a*c^2*x^2 + a^2*c)*sqrt(a*c))]
```

Sympy [A] time = 1.48771, size = 116, normalized size = 1.68

$$-\frac{\sqrt{-\frac{1}{a^3c^3}}\,(Ac+Ca)\log\left(-a^2c\sqrt{-\frac{1}{a^3c^3}}+x\right)}{4}+\frac{\sqrt{-\frac{1}{a^3c^3}}\,(Ac+Ca)\log\left(a^2c\sqrt{-\frac{1}{a^3c^3}}+x\right)}{4}-\frac{Ba+x\,(-Ac+Ca)}{2a^2c+2ac^2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)/(c*x**2+a)**2,x)
```

```
[Out] -sqrt(-1/(a**3*c**3))*(A*c + C*a)*log(-a**2*c*sqrt(-1/(a**3*c**3)
) + x)/4 + sqrt(-1/(a**3*c**3))*(A*c + C*a)*log(a**2*c*sqrt(-1/(a
**3*c**3)) + x)/4 - (B*a + x*(-A*c + C*a))/(2*a**2*c + 2*a*c**2*x
**2)
```

GIAC/XCAS [A] time = 0.26908, size = 81, normalized size = 1.17

$$\frac{(Ca+Ac)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{2\sqrt{ac}ac}-\frac{Cax-Acx+Ba}{2\,(cx^2+a)ac}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^2,x, algorithm="giac")
```

```
[Out] 1/2*(C*a + A*c)*arctan(c*x/sqrt(a*c))/(sqrt(a*c)*a*c) - 1/2*(C*a*
x - A*c*x + B*a)/((c*x^2 + a)*a*c)
```

3.54 $\int \frac{A+Bx+Cx^2}{(d+ex)(a+cx^2)^2} \, dx$

Optimal. Leaf size=226

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(3ae^2+cd^2\right)+a\left(cd^2-ae^2\right)(Cd-Be)\right)}{2a^{3/2}\sqrt{c}\left(ae^2+cd^2\right)^2} - \frac{a(aCe-Ace+Bcd)-cx(aBe-aCd+Acd)}{2ac\left(a+cx^2\right)\left(ae^2+cd^2\right)} - \frac{e\log\left(a+cx^2\right)\left(Ae^2-Bde+Cd^2\right)}{2\left(ae^2+cd^2\right)^2} + \frac{e\log(d+ex)\left(Ae^2-Bde+Cd^2\right)}{\left(ae^2+cd^2\right)^2}$$

```
[Out] -(a*(B*c*d - A*c*e + a*C*e) - c*(A*c*d - a*C*d + a*B*e)*x)/(2*a*c
*(c*d^2 + a*e^2)*(a + c*x^2)) + ((a*(C*d - B*e)*(c*d^2 - a*e^2) +
 A*c*d*(c*d^2 + 3*a*e^2))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3/2)
*Sqrt[c]*(c*d^2 + a*e^2)^2) + (e*(C*d^2 - B*d*e + A*e^2)*Log[d +
e*x])/(c*d^2 + a*e^2)^2 - (e*(C*d^2 - B*d*e + A*e^2)*Log[a + c*x^
2])/(2*(c*d^2 + a*e^2)^2)
```

Rubi [A] time = 0.933357, antiderivative size = 226, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(3ae^2+cd^2\right)+a\left(cd^2-ae^2\right)(Cd-Be)\right)}{2a^{3/2}\sqrt{c}\left(ae^2+cd^2\right)^2} - \frac{a(aCe-Ace+Bcd)-cx(aBe-aCd+Acd)}{2ac\left(a+cx^2\right)\left(ae^2+cd^2\right)} - \frac{e\log\left(a+cx^2\right)\left(Ae^2-Bde+Cd^2\right)}{2\left(ae^2+cd^2\right)^2} + \frac{e\log(d+ex)\left(Ae^2-Bde+Cd^2\right)}{\left(ae^2+cd^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)*(a + c*x^2)^2),x]
```


```
[Out] -(a*(B*c*d - A*c*e + a*C*e) - c*(A*c*d - a*C*d + a*B*e)*x)/(2*a*c
*(c*d^2 + a*e^2)*(a + c*x^2)) + ((a*(C*d - B*e)*(c*d^2 - a*e^2) +
 A*c*d*(c*d^2 + 3*a*e^2))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3/2)
*Sqrt[c]*(c*d^2 + a*e^2)^2) + (e*(C*d^2 - B*d*e + A*e^2)*Log[d +
e*x])/(c*d^2 + a*e^2)^2 - (e*(C*d^2 - B*d*e + A*e^2)*Log[a + c*x^
2])/(2*(c*d^2 + a*e^2)^2)
```

Rubi in Sympy [A] time = 69.392, size = 235, normalized size = 1.04

$$-\frac{e\left(Ae^{2}-Bde+Cd^{2}\right)\log\left(a+cx^{2}\right)}{2\left(ae^{2}+cd^{2}\right)^{2}}+\frac{e\left(Ae^{2}-Bde+Cd^{2}\right)\log\left(d+ex\right)}{\left(ae^{2}+cd^{2}\right)^{2}}+\frac{a\left(Ace-Bcd-Cae\right)+cx\left(Acd+Bae-Cad\right)}{2ac\left(a+cx^{2}\right)\left(ae^{2}+cd^{2}\right)}+\frac{\sqrt{c}d\left(Ae^{2}-Bde+Cd^{2}\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{\sqrt{a}\left(ae^{2}+cd^{2}\right)^{2}}+\frac{\left(Acd+Bae-Cad\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}\sqrt{c}\left(ae^{2}+cd^{2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)/(e*x+d)/(c*x**2+a)**2,x)
```

```
[Out] -e*(A*e**2 - B*d*e + C*d**2)*log(a + c*x**2)/(2*(a*e**2 + c*d**2)
**2) + e*(A*e**2 - B*d*e + C*d**2)*log(d + e*x)/(a*e**2 + c*d**2)
**2 + (a*(A*c*e - B*c*d - C*a*e) + c*x*(A*c*d + B*a*e - C*a*d))/(
2*a*c*(a + c*x**2)*(a*e**2 + c*d**2)) + sqrt(c)*d*(A*e**2 - B*d*e
 + C*d**2)*atan(sqrt(c)*x/sqrt(a))/(sqrt(a)*(a*e**2 + c*d**2)**2)
 + (A*c*d + B*a*e - C*a*d)*atan(sqrt(c)*x/sqrt(a))/(2*a**(3/2)*sq
rt(c)*(a*e**2 + c*d**2))
```

Mathematica [A] time = 0.478959, size = 195, normalized size = 0.86

$$\frac{\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(3ae^{2}+cd^{2}\right)+a\left(cd^{2}-ae^{2}\right)\left(Cd-Be\right)\right)}{a^{3/2}\sqrt{c}}+\frac{\left(ae^{2}+cd^{2}\right)\left(a^{2}(-C)e+ac(Ae-Bd+Bex-Cdx)+Ac^{2}dx\right)}{ac(a+cx^{2})}-e\log\left(a+cx^{2}\right)\left(e(Ae-Bd)+Cd\right.}{2\left(ae^{2}+cd^{2}\right)^{2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/((d + e*x)*(a + c*x^2)^2),x]
```

```
[Out] (((c*d^2 + a*e^2)*(-(a^2*C*e) + A*c^2*d*x + a*c*(-(B*d) + A*e - C
*d*x + B*e*x)))/(a*c*(a + c*x^2)) + ((a*(C*d - B*e)*(c*d^2 - a*e^
2) + A*c*d*(c*d^2 + 3*a*e^2))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(a^(3/
2)*Sqrt[c]) + 2*e*(C*d^2 + e*(-(B*d) + A*e))*Log[d + e*x] - e*(C*
d^2 + e*(-(B*d) + A*e))*Log[a + c*x^2])/(2*(c*d^2 + a*e^2)^2)
```

Maple [B] time = 0.031, size = 748, normalized size = 3.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)/(c*x^2+a)^2,x)
```

```
[Out] 1/2/(a*e^2+c*d^2)^2/(c*x^2+a)*e^2*d*c*A*x+1/2/(a*e^2+c*d^2)^2/(c*
x^2+a)/a*x*A*c^2*d^3+1/2/(a*e^2+c*d^2)^2/(c*x^2+a)*a*B*e^3*x+1/2/
(a*e^2+c*d^2)^2/(c*x^2+a)*B*c*d^2*e*x-1/2/(a*e^2+c*d^2)^2/(c*x^2+
a)*C*a*d*e^2*x-1/2/(a*e^2+c*d^2)^2/(c*x^2+a)*C*c*d^3*x+1/2/(a*e^2
+c*d^2)^2/(c*x^2+a)*A*a*e^3+1/2/(a*e^2+c*d^2)^2/(c*x^2+a)*c*A*d^2
*e-1/2/(a*e^2+c*d^2)^2/(c*x^2+a)*B*a*d*e^2-1/2/(a*e^2+c*d^2)^2/(c
*x^2+a)*c*B*d^3-1/2/(a*e^2+c*d^2)^2/(c*x^2+a)/c*C*a^2*e^3-1/2/(a*
e^2+c*d^2)^2/(c*x^2+a)*d^2*e*a*C-1/2/(a*e^2+c*d^2)^2*ln(a*(c*x^2+
a))*A*e^3+1/2/(a*e^2+c*d^2)^2*ln(a*(c*x^2+a))*B*d*e^2-1/2/(a*e^2+
c*d^2)^2*ln(a*(c*x^2+a))*C*d^2*e+3/2/(a*e^2+c*d^2)^2/(a*c)^(1/2)*
arctan(c*x/(a*c)^(1/2))*A*c*d*e^2+1/2/(a*e^2+c*d^2)^2/a/(a*c)^(1/
2)*arctan(c*x/(a*c)^(1/2))*A*c^2*d^3+1/2/(a*e^2+c*d^2)^2*a/(a*c)^
(1/2)*arctan(c*x/(a*c)^(1/2))*B*e^3-1/2/(a*e^2+c*d^2)^2/(a*c)^(1/
2)*arctan(c*x/(a*c)^(1/2))*B*c*d^2*e-1/2/(a*e^2+c*d^2)^2*a/(a*c)^
(1/2)*arctan(c*x/(a*c)^(1/2))*C*d*e^2+1/2/(a*e^2+c*d^2)^2/(a*c)^(
1/2)*arctan(c*x/(a*c)^(1/2))*C*c*d^3+e^3/(a*e^2+c*d^2)^2*ln(e*x+d
)*A-e^2/(a*e^2+c*d^2)^2*ln(e*x+d)*B*d+e/(a*e^2+c*d^2)^2*ln(e*x+d)
*C*d^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((C*x^2 + B*x + A)/((c*x^2 + a)^2*(e*x + d)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 37.5408, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/((c*x^2 + a)^2*(e*x + d)),x, algorithm="fricas")
```

```
[Out] [-1/4*((B*a^2*c^2*d^2*e - B*a^3*c*e^3 - (C*a^2*c^2 + A*a*c^3)*d^3
 + (C*a^3*c - 3*A*a^2*c^2)*d*e^2 + (B*a*c^3*d^2*e - B*a^2*c^2*e^3
 - (C*a*c^3 + A*c^4)*d^3 + (C*a^2*c^2 - 3*A*a*c^3)*d*e^2)*x^2)*lo
g((2*a*c*x + (c*x^2 - a)*sqrt(-a*c))/(c*x^2 + a)) + 2*(B*a*c^2*d^
3 + B*a^2*c*d*e^2 + (C*a^2*c - A*a*c^2)*d^2*e + (C*a^3 - A*a^2*c)
```

```
*e^3 - (B*a*c^2*d^2*e + B*a^2*c*e^3 - (C*a*c^2 - A*c^3)*d^3 - (C*
a^2*c - A*a*c^2)*d*e^2)*x + (C*a^2*c*d^2*e - B*a^2*c*d*e^2 + A*a^
2*c*e^3 + (C*a*c^2*d^2*e - B*a*c^2*d*e^2 + A*a*c^2*e^3)*x^2)*log(
c*x^2 + a) - 2*(C*a^2*c*d^2*e - B*a^2*c*d*e^2 + A*a^2*c*e^3 + (C*
a*c^2*d^2*e - B*a*c^2*d*e^2 + A*a*c^2*e^3)*x^2)*log(e*x + d))*sqr
t(-a*c))/((a^2*c^3*d^4 + 2*a^3*c^2*d^2*e^2 + a^4*c*e^4 + (a*c^4*d
^4 + 2*a^2*c^3*d^2*e^2 + a^3*c^2*e^4)*x^2)*sqrt(-a*c)), -1/2*((B*
a^2*c^2*d^2*e - B*a^3*c*e^3 - (C*a^2*c^2 + A*a*c^3)*d^3 + (C*a^3*
c - 3*A*a^2*c^2)*d*e^2 + (B*a*c^3*d^2*e - B*a^2*c^2*e^3 - (C*a*c^
3 + A*c^4)*d^3 + (C*a^2*c^2 - 3*A*a*c^3)*d*e^2)*x^2)*arctan(sqrt(
a*c)*x/a) + (B*a*c^2*d^3 + B*a^2*c*d*e^2 + (C*a^2*c - A*a*c^2)*d^
2*e + (C*a^3 - A*a^2*c)*e^3 - (B*a*c^2*d^2*e + B*a^2*c*e^3 - (C*a
*c^2 - A*c^3)*d^3 - (C*a^2*c - A*a*c^2)*d*e^2)*x + (C*a^2*c*d^2*e
 - B*a^2*c*d*e^2 + A*a^2*c*e^3 + (C*a*c^2*d^2*e - B*a*c^2*d*e^2 +
 A*a*c^2*e^3)*x^2)*log(c*x^2 + a) - 2*(C*a^2*c*d^2*e - B*a^2*c*d*
e^2 + A*a^2*c*e^3 + (C*a*c^2*d^2*e - B*a*c^2*d*e^2 + A*a*c^2*e^3)
*x^2)*log(e*x + d))*sqrt(a*c))/((a^2*c^3*d^4 + 2*a^3*c^2*d^2*e^2
+ a^4*c*e^4 + (a*c^4*d^4 + 2*a^2*c^3*d^2*e^2 + a^3*c^2*e^4)*x^2)*
sqrt(a*c))]
```

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**2+B*x+A)/(e*x+d)/(c*x**2+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.275941, size = 473, normalized size = 2.09

$$-\frac{\left(Cd^2e - Bde^2 + Ae^3\right)\ln\left(cx^2 + a\right)}{2\left(c^2d^4 + 2\,acd^2e^2 + a^2e^4\right)} + \frac{\left(Cd^2e^2 - Bde^3 + Ae^4\right)\ln\left(|xe + d|\right)}{c^2d^4e + 2\,acd^2e^3 + a^2e^5} + \frac{\left(Cacd^3 + Ac^2d^3 - Bacd^2e - Ca^2de^2 + 3\,Aacde^2 + Ba^2e^3\right)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{2\left(ac^2d^4 + 2\,a^2cd^2e^2 + a^3e^4\right)\sqrt{ac}} - \frac{Bac^2d^3 + Ca^2cd^2e - Aac^2d^2e + Ba^2cde^2 + Ca^3e^3 - Aa^2ce^3 + \left(Cac^2d^3 - Ac^3d^3 - Bac^2d^2e + Ca^2cde^2 - Aac^2de^2 - Ba^2ce^3\right)}{2\left(cd^2 + ae^2\right)^2\left(cx^2 + a\right)ac}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/((c*x^2 + a)^2*(e*x + d)),x, algorithm="giac")
```

```
[Out] -1/2*(C*d^2*e - B*d*e^2 + A*e^3)*ln(c*x^2 + a)/(c^2*d^4 + 2*a*c*d
^2*e^2 + a^2*e^4) + (C*d^2*e^2 - B*d*e^3 + A*e^4)*ln(abs(x*e + d)
)/(c^2*d^4*e + 2*a*c*d^2*e^3 + a^2*e^5) + 1/2*(C*a*c*d^3 + A*c^2*
d^3 - B*a*c*d^2*e - C*a^2*d*e^2 + 3*A*a*c*d*e^2 + B*a^2*e^3)*arct
an(c*x/sqrt(a*c))/((a*c^2*d^4 + 2*a^2*c*d^2*e^2 + a^3*e^4)*sqrt(a
*c)) - 1/2*(B*a*c^2*d^3 + C*a^2*c*d^2*e - A*a*c^2*d^2*e + B*a^2*c
*d*e^2 + C*a^3*e^3 - A*a^2*c*e^3 + (C*a*c^2*d^3 - A*c^3*d^3 - B*a
*c^2*d^2*e + C*a^2*c*d*e^2 - A*a*c^2*d*e^2 - B*a^2*c*e^3)*x)/((c*
d^2 + a*e^2)^2*(c*x^2 + a)*a*c)
```

3.55 $\int \frac{A+Bx+Cx^2}{(d+ex)^2(a+cx^2)^2}\,dx$

Optimal. Leaf size=374

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Ac\left(-3a^2e^4+6acd^2e^2+c^2d^4\right)+a\left(a^2Ce^4-6acde^2(Cd-Be)+c^2d^3(Cd-2Be)\right)\right)}{2a^{3/2}\sqrt{c}\left(ae^2+cd^2\right)^3} - \frac{a\left(-aBe^2+2aCde-2Acde+Bcd^2\right)-x\left(Ac\left(cd^2-ae^2\right)+a\left(aCe^2-cd(Cd-2Be)\right)\right)}{2a\left(a+cx^2\right)\left(ae^2+cd^2\right)^2} + \frac{e\log\left(a+cx^2\right)\left(ae^2(2Cd-Be)-cd\left(2Cd^2-e(3Bd-4Ae)\right)\right)}{2\left(ae^2+cd^2\right)^3} - \frac{e\left(Ae^2-Bde+Cd^2\right)}{(d+ex)\left(ae^2+cd^2\right)^2} - \frac{e\log(d+ex)\left(ae^2(2Cd-Be)-cd\left(2Cd^2-e(3Bd-4Ae)\right)\right)}{\left(ae^2+cd^2\right)^3}$$

```
[Out] -((e*(C*d^2 - B*d*e + A*e^2))/((c*d^2 + a*e^2)^2*(d + e*x))) - (a
*(B*c*d^2 - 2*A*c*d*e + 2*a*C*d*e - a*B*e^2) - (A*c*(c*d^2 - a*e^
2) + a*(a*C*e^2 - c*d*(C*d - 2*B*e)))*x)/(2*a*(c*d^2 + a*e^2)^2*(
a + c*x^2)) + ((A*c*(c^2*d^4 + 6*a*c*d^2*e^2 - 3*a^2*e^4) + a*(a^
2*C*e^4 + c^2*d^3*(C*d - 2*B*e) - 6*a*c*d*e^2*(C*d - B*e)))*ArcTa
n[(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3/2)*Sqrt[c]*(c*d^2 + a*e^2)^3) - (
e*(a*e^2*(2*C*d - B*e) - c*d*(2*C*d^2 - e*(3*B*d - 4*A*e)))*Log[d
 + e*x])/(c*d^2 + a*e^2)^3 + (e*(a*e^2*(2*C*d - B*e) - c*d*(2*C*d
^2 - e*(3*B*d - 4*A*e)))*Log[a + c*x^2])/(2*(c*d^2 + a*e^2)^3)
```

Rubi [A] time = 2.04011, antiderivative size = 371, normalized size of antiderivative = 0.99, number of steps used = 6, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Ac\left(-3a^2e^4+6acd^2e^2+c^2d^4\right)+a\left(a^2Ce^4-6acde^2(Cd-Be)+c^2d^3(Cd-2Be)\right)\right)}{2a^{3/2}\sqrt{c}\left(ae^2+cd^2\right)^3} - \frac{a\left(-aBe^2+2aCde-2Acde+Bcd^2\right)-x\left(Ac\left(cd^2-ae^2\right)+a\left(aCe^2-cd(Cd-2Be)\right)\right)}{2a\left(a+cx^2\right)\left(ae^2+cd^2\right)^2} - \frac{e\left(Ae^2-Bde+Cd^2\right)}{(d+ex)\left(ae^2+cd^2\right)^2} - \frac{e\log\left(a+cx^2\right)\left(-ae^2(2Cd-Be)-cde(3Bd-4Ae)+2cCd^3\right)}{2\left(ae^2+cd^2\right)^3} + \frac{e\log(d+ex)\left(-ae^2(2Cd-Be)-cde(3Bd-4Ae)+2cCd^3\right)}{\left(ae^2+cd^2\right)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)^2*(a + c*x^2)^2),x]
```

```
[Out] -((e*(C*d^2 - B*d*e + A*e^2))/((c*d^2 + a*e^2)^2*(d + e*x))) - (a
*(B*c*d^2 - 2*A*c*d*e + 2*a*C*d*e - a*B*e^2) - (A*c*(c*d^2 - a*e^
```

```
2) + a*(a*C*e^2 - c*d*(C*d - 2*B*e)))*x)/(2*a*(c*d^2 + a*e^2)^2*(
a + c*x^2)) + ((A*c*(c^2*d^4 + 6*a*c*d^2*e^2 - 3*a^2*e^4) + a*(a^
2*C*e^4 + c^2*d^3*(C*d - 2*B*e) - 6*a*c*d*e^2*(C*d - B*e)))*ArcTa
n[(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3/2)*Sqrt[c]*(c*d^2 + a*e^2)^3) + (
e*(2*c*C*d^3 - c*d*e*(3*B*d - 4*A*e) - a*e^2*(2*C*d - B*e))*Log[d
 + e*x])/(c*d^2 + a*e^2)^3 - (e*(2*c*C*d^3 - c*d*e*(3*B*d - 4*A*e
) - a*e^2*(2*C*d - B*e))*Log[a + c*x^2])/(2*(c*d^2 + a*e^2)^3)
```

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((C*x**2+B*x+A)/(e*x+d)**2/(c*x**2+a)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.943674, size = 320, normalized size = 0.86

$$\frac{\frac{(ae^2+cd^2)\left(a^2e(Be-2Cd+Cex)-ac\left(Ae(ex-2d)+Bd(d-2ex)+Cd^2x\right)+Ac^2d^2x\right)}{a(a+cx^2)}+\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Ac\left(-3a^2e^4+6acd^2e^2+c^2d^4\right)+a\left(a^2Ce^4+6acde^2(Be-Cd)+c^2d\right.\right.}{a^{3/2}\sqrt{c}}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/((d + e*x)^2*(a + c*x^2)^2),x]
```

```
[Out] ((-2*e*(c*d^2 + a*e^2)*(C*d^2 + e*(-(B*d) + A*e)))/(d + e*x) + ((
c*d^2 + a*e^2)*(A*c^2*d^2*x + a^2*e*(-2*C*d + B*e + C*e*x) - a*c*
(C*d^2*x + B*d*(d - 2*e*x) + A*e*(-2*d + e*x))))/(a*(a + c*x^2))
+ ((A*c*(c^2*d^4 + 6*a*c*d^2*e^2 - 3*a^2*e^4) + a*(a^2*C*e^4 + c^
2*d^3*(C*d - 2*B*e) + 6*a*c*d*e^2*(-(C*d) + B*e)))*ArcTan[(Sqrt[c
]*x)/Sqrt[a]])/(a^(3/2)*Sqrt[c]) + 2*e*(2*c*C*d^3 + c*d*e*(-3*B*d
 + 4*A*e) + a*e^2*(-2*C*d + B*e))*Log[d + e*x] - e*(2*c*C*d^3 + c
*d*e*(-3*B*d + 4*A*e) + a*e^2*(-2*C*d + B*e))*Log[a + c*x^2])/(2*
(c*d^2 + a*e^2)^3)
```

Maple [B] time = 0.029, size = 1046, normalized size = 2.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)^2/(c*x^2+a)^2,x)
```

```
[Out] -e^3/(a*e^2+c*d^2)^2/(e*x+d)*A+1/(a*e^2+c*d^2)^3/(c*x^2+a)*a*c*d*
B*e^3*x+1/2/(a*e^2+c*d^2)^3/(c*x^2+a)*B*a^2*e^4-1/2/(a*e^2+c*d^2)
^3/(c*x^2+a)*B*c^2*d^4-1/2/(a*e^2+c*d^2)^3*a*ln(a*(c*x^2+a))*B*e^
4+e^4/(a*e^2+c*d^2)^3*ln(e*x+d)*B*a-3*e^2/(a*e^2+c*d^2)^3*ln(e*x+
d)*B*c*d^2-2*e^3/(a*e^2+c*d^2)^3*ln(e*x+d)*C*a*d+2*e/(a*e^2+c*d^2
)^3*ln(e*x+d)*C*c*d^3+1/2/(a*e^2+c*d^2)^3/(a*c)^(1/2)*arctan(c*x/
(a*c)^(1/2))*C*c^2*d^4+1/2/(a*e^2+c*d^2)^3/(c*x^2+a)*a^2*C*e^4*x-
1/2/(a*e^2+c*d^2)^3/(c*x^2+a)*C*c^2*d^4*x+1/(a*e^2+c*d^2)^3/(c*x^
2+a)*A*c^2*d^3*e-1/(a*e^2+c*d^2)^3/(c*x^2+a)*C*a^2*d*e^3+1/(a*e^2
+c*d^2)^3*a*ln(a*(c*x^2+a))*C*d*e^3-1/(a*e^2+c*d^2)^3*c*ln(a*(c*x
^2+a))*C*d^3*e+1/2/(a*e^2+c*d^2)^3*a^2/(a*c)^(1/2)*arctan(c*x/(a*
c)^(1/2))*C*e^4-2/(a*e^2+c*d^2)^3*c*ln(a*(c*x^2+a))*A*d*e^3+3/2/(
a*e^2+c*d^2)^3*c*ln(a*(c*x^2+a))*B*d^2*e^2+4*e^3/(a*e^2+c*d^2)^3*
ln(e*x+d)*d*c*A+e^2/(a*e^2+c*d^2)^2/(e*x+d)*B*d-e/(a*e^2+c*d^2)^2
/(e*x+d)*C*d^2-1/2/(a*e^2+c*d^2)^3/(c*x^2+a)*a*c*A*e^4*x+1/(a*e^2
+c*d^2)^3/(c*x^2+a)*B*c^2*d^3*e*x-1/(a*e^2+c*d^2)^3/(c*x^2+a)*C*a
*c*d^3*e-1/(a*e^2+c*d^2)^3/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*
c^2*d^3*e+3/(a*e^2+c*d^2)^3/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A
*c^2*d^2*e^2-3/2/(a*e^2+c*d^2)^3*a/(a*c)^(1/2)*arctan(c*x/(a*c)^(
1/2))*A*c*e^4+1/2/(a*e^2+c*d^2)^3/a/(a*c)^(1/2)*arctan(c*x/(a*c)^
(1/2))*A*c^3*d^4+1/2/(a*e^2+c*d^2)^3/(c*x^2+a)/a*x*A*c^3*d^4+1/(a
*e^2+c*d^2)^3/(c*x^2+a)*A*a*c*d*e^3+3/(a*e^2+c*d^2)^3*a/(a*c)^(1/
2)*arctan(c*x/(a*c)^(1/2))*B*c*d*e^3-3/(a*e^2+c*d^2)^3*a/(a*c)^(1
/2)*arctan(c*x/(a*c)^(1/2))*C*c*d^2*e^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((C*x^2 + B*x + A)/((c*x^2 + a)^2*(e*x + d)^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((C*x^2 + B*x + A)/((c*x^2 + a)^2*(e*x + d)^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((C*x**2+B*x+A)/(e*x+d)**2/(c*x**2+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.282228, size = 821, normalized size = 2.2

$$\frac{\left(Cac^2d^4e^2 + Ac^3d^4e^2 - 2\,Bac^2d^3e^3 - 6\,Ca^2cd^2e^4 + 6\,Aac^2d^2e^4 + 6\,Ba^2cde^5 + Ca^3e^6 - 3\,Aa^2ce^6\right)\arctan\left(\frac{\left(cd-\frac{cd^2}{xe+d}-\frac{ae^2}{xe+d}\right)e^{(-1)}}{\sqrt{ac}}\right.}{2\left(ac^3d^6 + 3\,a^2c^2d^4e^2 + 3\,a^3cd^2e^4 + a^4e^6\right)\sqrt{ac}}$$
$$-\frac{\left(2\,Ccd^3e - 3\,Bcd^2e^2 - 2\,Cade^3 + 4\,Acde^3 + Bae^4\right)\ln\left(c - \frac{2\,cd}{xe+d} + \frac{cd^2}{(xe+d)^2} + \frac{ae^2}{(xe+d)^2}\right)}{2\left(c^3d^6 + 3\,ac^2d^4e^2 + 3\,a^2cd^2e^4 + a^3e^6\right)}$$
$$-\frac{\frac{Cd^2e^5}{xe+d} - \frac{Bde^6}{xe+d} + \frac{Ae^7}{xe+d}}{c^2d^4e^4 + 2\,acd^2e^6 + a^2e^8}$$
$$-\frac{\frac{Cac^2d^3e-Ac^3d^3e-3\,Bac^2d^2e^2-3\,Ca^2cde^3+3\,Aac^2de^3+Ba^2ce^4}{cd^2+ae^2} - \frac{\left(Cac^2d^4e^2-Ac^3d^4e^2-4\,Bac^2d^3e^3-6\,Ca^2cd^2e^4+6\,Aac^2d^2e^4+4\,Ba^2cde^5+Ca^3e^6-Aa^2c\right.}{(cd^2+ae^2)(xe+d)}}{2\left(cd^2 + ae^2\right)^2a\left(c - \frac{2\,cd}{xe+d} + \frac{cd^2}{(xe+d)^2} + \frac{ae^2}{(xe+d)^2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/((c*x^2 + a)^2*(e*x + d)^2),x, algorithm="giac")
```

```
[Out] 1/2*(C*a*c^2*d^4*e^2 + A*c^3*d^4*e^2 - 2*B*a*c^2*d^3*e^3 - 6*C*a^
2*c*d^2*e^4 + 6*A*a*c^2*d^2*e^4 + 6*B*a^2*c*d*e^5 + C*a^3*e^6 - 3
*A*a^2*c*e^6)*arctan((c*d - c*d^2/(x*e + d) - a*e^2/(x*e + d))*e^
(-1)/sqrt(a*c))*e^(-2)/((a*c^3*d^6 + 3*a^2*c^2*d^4*e^2 + 3*a^3*c*
d^2*e^4 + a^4*e^6)*sqrt(a*c)) - 1/2*(2*C*c*d^3*e - 3*B*c*d^2*e^2
- 2*C*a*d*e^3 + 4*A*c*d*e^3 + B*a*e^4)*ln(c - 2*c*d/(x*e + d) + c
*d^2/(x*e + d)^2 + a*e^2/(x*e + d)^2)/(c^3*d^6 + 3*a*c^2*d^4*e^2
+ 3*a^2*c*d^2*e^4 + a^3*e^6) - (C*d^2*e^5/(x*e + d) - B*d*e^6/(x*
e + d) + A*e^7/(x*e + d))/(c^2*d^4*e^4 + 2*a*c*d^2*e^6 + a^2*e^8)
```

```
 - 1/2*((C*a*c^2*d^3*e - A*c^3*d^3*e - 3*B*a*c^2*d^2*e^2 - 3*C*a^
2*c*d*e^3 + 3*A*a*c^2*d*e^3 + B*a^2*c*e^4)/(c*d^2 + a*e^2) - (C*a
*c^2*d^4*e^2 - A*c^3*d^4*e^2 - 4*B*a*c^2*d^3*e^3 - 6*C*a^2*c*d^2*
e^4 + 6*A*a*c^2*d^2*e^4 + 4*B*a^2*c*d*e^5 + C*a^3*e^6 - A*a^2*c*e
^6)*e^(-1)/((c*d^2 + a*e^2)*(x*e + d)))/((c*d^2 + a*e^2)^2*a*(c -
 2*c*d/(x*e + d) + c*d^2/(x*e + d)^2 + a*e^2/(x*e + d)^2))
```

3.56 $\int \frac{A+Bx+Cx^2}{(d+ex)^3(a+cx^2)^2}\,dx$

Optimal. Leaf size=524

$$-\frac{e\log\left(a+cx^2\right)\left(a^2Ce^4-2ace^2\left(4Cd^2-e(3Bd-Ae)\right)+c^2d^2\left(3Cd^2-2e(3Bd-5Ae)\right)\right)}{2\left(ae^2+cd^2\right)^4}+\frac{e\log(d+ex)\left(a^2Ce^4-2ace^2\left(4Cd^2-e(3Bd-Ae)\right)+c^2d^2\left(3Cd^2-2e(3Bd-5Ae)\right)\right)}{\left(ae^2+cd^2\right)^4}+\frac{\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(-15a^2e^4+10acd^2e^2+c^2d^4\right)-a\left(-3a^2e^4(3Cd-Be)+2acd^2e^2(7Cd-9Be)-c^2d^4(Cd-3Be)\right)\right)}{2a^{3/2}\left(ae^2+cd^2\right)^4}-\frac{a\left(Bcd\left(cd^2-3ae^2\right)-e(Ac-aC)\left(3cd^2-ae^2\right)\right)-cx\left(Acd\left(cd^2-3ae^2\right)-a\left(cd^2(Cd-3Be)-ae^2(3Cd-Be)\right)\right)}{2a\left(a+cx^2\right)\left(ae^2+cd^2\right)^3}-\frac{e\left(Ae^2-Bde+Cd^2\right)}{2(d+ex)^2\left(ae^2+cd^2\right)^2}+\frac{e\left(ae^2(2Cd-Be)-cd\left(2Cd^2-e(3Bd-4Ae)\right)\right)}{(d+ex)\left(ae^2+cd^2\right)^3}$$

```
[Out] -(e*(C*d^2 - B*d*e + A*e^2))/(2*(c*d^2 + a*e^2)^2*(d + e*x)^2) +
(e*(a*e^2*(2*C*d - B*e) - c*d*(2*C*d^2 - e*(3*B*d - 4*A*e))))/((c
*d^2 + a*e^2)^3*(d + e*x)) - (a*(B*c*d*(c*d^2 - 3*a*e^2) - (A*c -
 a*C)*e*(3*c*d^2 - a*e^2)) - c*(A*c*d*(c*d^2 - 3*a*e^2) - a*(c*d^
2*(C*d - 3*B*e) - a*e^2*(3*C*d - B*e)))*x)/(2*a*(c*d^2 + a*e^2)^3
*(a + c*x^2)) + (Sqrt[c]*(A*c*d*(c^2*d^4 + 10*a*c*d^2*e^2 - 15*a^
2*e^4) - a*(2*a*c*d^2*e^2*(7*C*d - 9*B*e) - c^2*d^4*(C*d - 3*B*e)
 - 3*a^2*e^4*(3*C*d - B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3
/2)*(c*d^2 + a*e^2)^4) + (e*(a^2*C*e^4 + c^2*d^2*(3*C*d^2 - 2*e*(
3*B*d - 5*A*e)) - 2*a*c*e^2*(4*C*d^2 - e*(3*B*d - A*e)))*Log[d +
e*x])/(c*d^2 + a*e^2)^4 - (e*(a^2*C*e^4 + c^2*d^2*(3*C*d^2 - 2*e*
(3*B*d - 5*A*e)) - 2*a*c*e^2*(4*C*d^2 - e*(3*B*d - A*e)))*Log[a +
 c*x^2])/(2*(c*d^2 + a*e^2)^4)
```

Rubi [A] time = 4.19124, antiderivative size = 524, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$

$$-\frac{e\log\left(a+cx^2\right)\left(a^2Ce^4-2ace^2\left(4Cd^2-e(3Bd-Ae)\right)+c^2\left(3Cd^4-2d^2e(3Bd-5Ae)\right)\right)}{2\left(ae^2+cd^2\right)^4}+\frac{e\log(d+ex)\left(a^2Ce^4-2ace^2\left(4Cd^2-e(3Bd-Ae)\right)+c^2\left(3Cd^4-2d^2e(3Bd-5Ae)\right)\right)}{\left(ae^2+cd^2\right)^4}+\frac{\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(-15a^2e^4+10acd^2e^2+c^2d^4\right)-a\left(-3a^2e^4(3Cd-Be)+2acd^2e^2(7Cd-9Be)-c^2d^4(Cd-3Be)\right)\right)}{2a^{3/2}\left(ae^2+cd^2\right)^4}-\frac{a\left(Bcd\left(cd^2-3ae^2\right)-e(Ac-aC)\left(3cd^2-ae^2\right)\right)-cx\left(Acd\left(cd^2-3ae^2\right)-a\left(cd^2(Cd-3Be)-ae^2(3Cd-Be)\right)\right)}{2a\left(a+cx^2\right)\left(ae^2+cd^2\right)^3}-\frac{e\left(Ae^2-Bde+Cd^2\right)}{2(d+ex)^2\left(ae^2+cd^2\right)^2}-\frac{e\left(-ae^2(2Cd-Be)-cde(3Bd-4Ae)+2cCd^3\right)}{(d+ex)\left(ae^2+cd^2\right)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)^3*(a + c*x^2)^2),x]
```

```
[Out] -(e*(C*d^2 - B*d*e + A*e^2))/(2*(c*d^2 + a*e^2)^2*(d + e*x)^2) -
(e*(2*c*C*d^3 - c*d*e*(3*B*d - 4*A*e) - a*e^2*(2*C*d - B*e)))/((c
*d^2 + a*e^2)^3*(d + e*x)) - (a*(B*c*d*(c*d^2 - 3*a*e^2) - (A*c -
 a*C)*e*(3*c*d^2 - a*e^2)) - c*(A*c*d*(c*d^2 - 3*a*e^2) - a*(c*d^
2*(C*d - 3*B*e) - a*e^2*(3*C*d - B*e)))*x)/(2*a*(c*d^2 + a*e^2)^3
*(a + c*x^2)) + (Sqrt[c]*(A*c*d*(c^2*d^4 + 10*a*c*d^2*e^2 - 15*a^
2*e^4) - a*(2*a*c*d^2*e^2*(7*C*d - 9*B*e) - c^2*d^4*(C*d - 3*B*e)
 - 3*a^2*e^4*(3*C*d - B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(2*a^(3
/2)*(c*d^2 + a*e^2)^4) + (e*(a^2*C*e^4 + c^2*(3*C*d^4 - 2*d^2*e*(
3*B*d - 5*A*e)) - 2*a*c*e^2*(4*C*d^2 - e*(3*B*d - A*e)))*Log[d +
e*x])/(c*d^2 + a*e^2)^4 - (e*(a^2*C*e^4 + c^2*(3*C*d^4 - 2*d^2*e*
(3*B*d - 5*A*e)) - 2*a*c*e^2*(4*C*d^2 - e*(3*B*d - A*e)))*Log[a +
 c*x^2])/(2*(c*d^2 + a*e^2)^4)
```

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((C*x**2+B*x+A)/(e*x+d)**3/(c*x**2+a)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.42893, size = 466, normalized size = 0.89

$$\frac{-\log\left(a+cx^2\right)\left(a^2Ce^5-2ace^3\left(e(Ae-3Bd)+4Cd^2\right)+c^2d^2e\left(2e(5Ae-3Bd)+3Cd^2\right)\right)+2\log(d+ex)\left(a^2Ce^5-2ace^3\left(e(A\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/((d + e*x)^3*(a + c*x^2)^2),x]
```

```
[Out] (-((e*(c*d^2 + a*e^2)^2*(C*d^2 + e*(-(B*d) + A*e)))/(d + e*x)^2)
- (2*e*(c*d^2 + a*e^2)*(2*c*C*d^3 + c*d*e*(-3*B*d + 4*A*e) + a*e^
2*(-2*C*d + B*e)))/(d + e*x) + ((c*d^2 + a*e^2)*(a^3*C*e^3 + A*c^
3*d^3*x - a*c^2*d*(C*d^2*x + B*d*(d - 3*e*x) + 3*A*e*(-d + e*x))
- a^2*c*e*(3*C*d*(d - e*x) + e*(-3*B*d + A*e + B*e*x))))/(a*(a +
c*x^2)) + (Sqrt[c]*(A*c*d*(c^2*d^4 + 10*a*c*d^2*e^2 - 15*a^2*e^4)
```

```
 + a*(-2*a*c*d^2*e^2*(7*C*d - 9*B*e) + c^2*d^4*(C*d - 3*B*e) - 3*
a^2*e^4*(-3*C*d + B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/a^(3/2) + 2
*(a^2*C*e^5 - 2*a*c*e^3*(4*C*d^2 + e*(-3*B*d + A*e)) + c^2*d^2*e*
(3*C*d^2 + 2*e*(-3*B*d + 5*A*e)))*Log[d + e*x] - (a^2*C*e^5 - 2*a
*c*e^3*(4*C*d^2 + e*(-3*B*d + A*e)) + c^2*d^2*e*(3*C*d^2 + 2*e*(-
3*B*d + 5*A*e)))*Log[a + c*x^2])/(2*(c*d^2 + a*e^2)^4)
```

Maple [B] time = 0.035, size = 1602, normalized size = 3.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)^3/(c*x^2+a)^2,x)
```

```
[Out] -1/2*e^3/(a*e^2+c*d^2)^2/(e*x+d)^2*A-e^4/(a*e^2+c*d^2)^3/(e*x+d)*
B*a+1/2*e^2/(a*e^2+c*d^2)^2/(e*x+d)^2*B*d-1/2*e/(a*e^2+c*d^2)^2/(
e*x+d)^2*C*d^2+e^5/(a*e^2+c*d^2)^4*ln(e*x+d)*a^2*C+1/2/(a*e^2+c*d
^2)^4/(c*x^2+a)*C*a^3*e^5-3/2/(a*e^2+c*d^2)^4*c^2/(c*x^2+a)*A*a*d
*e^4*x-15/2/(a*e^2+c*d^2)^4*c^2*a/(a*c)^(1/2)*arctan(c*x/(a*c)^(1
/2))*A*d*e^4+9/2/(a*e^2+c*d^2)^4*c*a^2/(a*c)^(1/2)*arctan(c*x/(a*
c)^(1/2))*C*d*e^4+3/2/(a*e^2+c*d^2)^4*c/(c*x^2+a)*C*a^2*d*e^4*x+1
/(a*e^2+c*d^2)^4*c^2/(c*x^2+a)*C*a*d^3*e^2*x+9/(a*e^2+c*d^2)^4*c^
2*a/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*d^2*e^3-7/(a*e^2+c*d^2)
^4*c^2*a/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*d^3*e^2+1/(a*e^2+c
*d^2)^4*c^2/(c*x^2+a)*B*a*d^2*e^3*x+1/2/(a*e^2+c*d^2)^4*c^4/a/(a*
c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*d^5-3/2/(a*e^2+c*d^2)^4*c^3/(a
*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*d^4*e+5/(a*e^2+c*d^2)^4*c^3/(
a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*d^3*e^2-3/2/(a*e^2+c*d^2)^4*
c*a^2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*e^5-3/(a*e^2+c*d^2)^4
*c*a*ln(a*(c*x^2+a))*B*d*e^4+4/(a*e^2+c*d^2)^4*c*a*ln(a*(c*x^2+a)
)*C*d^2*e^3+6*e^4/(a*e^2+c*d^2)^4*ln(e*x+d)*B*a*c*d-8*e^3/(a*e^2+
c*d^2)^4*ln(e*x+d)*C*a*c*d^2-1/2/(a*e^2+c*d^2)^4*c/(c*x^2+a)*B*a^
2*e^5*x+3/2/(a*e^2+c*d^2)^4*c/(c*x^2+a)*B*a^2*d*e^4-1/(a*e^2+c*d^
2)^4*c/(c*x^2+a)*C*a^2*d^2*e^3-1/(a*e^2+c*d^2)^4*c^3/(c*x^2+a)*A*
d^3*e^2*x+1/2/(a*e^2+c*d^2)^4*c^4/(c*x^2+a)/a*x*A*d^5+3/2/(a*e^2+
c*d^2)^4*c^3/(c*x^2+a)*B*d^4*e*x+1/(a*e^2+c*d^2)^4*c^2/(c*x^2+a)*
A*a*d^2*e^3-3/2/(a*e^2+c*d^2)^4*c^2*ln(a*(c*x^2+a))*C*d^4*e+1/2/(
a*e^2+c*d^2)^4*c^3/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*d^5+1/(a
*e^2+c*d^2)^4*c*a*ln(a*(c*x^2+a))*A*e^5-4*e^3/(a*e^2+c*d^2)^3/(e*
x+d)*d*c*A+3*e^2/(a*e^2+c*d^2)^3/(e*x+d)*B*c*d^2+2*e^3/(a*e^2+c*d
^2)^3/(e*x+d)*C*a*d-2*e/(a*e^2+c*d^2)^3/(e*x+d)*C*c*d^3-2*e^5/(a*
e^2+c*d^2)^4*ln(e*x+d)*A*a*c+10*e^3/(a*e^2+c*d^2)^4*ln(e*x+d)*A*c
^2*d^2-6*e^2/(a*e^2+c*d^2)^4*ln(e*x+d)*B*c^2*d^3+3*e/(a*e^2+c*d^2
)^4*ln(e*x+d)*C*c^2*d^4-1/2/(a*e^2+c*d^2)^4*c/(c*x^2+a)*A*a^2*e^5
-1/2/(a*e^2+c*d^2)^4*c^3/(c*x^2+a)*C*d^5*x+3/2/(a*e^2+c*d^2)^4*c^
3/(c*x^2+a)*A*d^4*e-5/(a*e^2+c*d^2)^4*c^2*ln(a*(c*x^2+a))*A*d^2*e
^3+3/(a*e^2+c*d^2)^4*c^2*ln(a*(c*x^2+a))*B*d^3*e^2+1/(a*e^2+c*d^2
)^4*c^2/(c*x^2+a)*B*a*d^3*e^2-3/2/(a*e^2+c*d^2)^4*c^2/(c*x^2+a)*C
```

```
*a*d^4*e-1/2/(a*e^2+c*d^2)^4*c^3/(c*x^2+a)*B*d^5-1/2/(a*e^2+c*d^2
)^4*a^2*ln(a*(c*x^2+a))*C*e^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((C*x^2 + B*x + A)/((c*x^2 + a)^2*(e*x + d)^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((C*x^2 + B*x + A)/((c*x^2 + a)^2*(e*x + d)^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((C*x**2+B*x+A)/(e*x+d)**3/(c*x**2+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.277836, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/((c*x^2 + a)^2*(e*x + d)^3),x, algorithm="giac")
```

```
[Out] Done
```

3.57 $\int \frac{(d+ex)^3\left(A+Bx+Cx^2\right)}{\left(a+cx^2\right)^3}\,dx$

Optimal. Leaf size=209

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(cd^2(3aBe+aCd+3Acd)+3ae^2(aBe+3aCd+Acd)\right)}{8a^{5/2}c^{5/2}} - \frac{(d+ex)\left(ae(3aBe+5aCd+3Acd)-x\left(3Ac^2d^2-a\left(4aCe^2-cd(3Be+Cd)\right)\right)\right)}{8a^2c^2\left(a+cx^2\right)} - \frac{(d+ex)^3(aB-x(Ac-aC))}{4ac\left(a+cx^2\right)^2} + \frac{Ce^3\log\left(a+cx^2\right)}{2c^3}$$

```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x)^3)/(4*a*c*(a + c*x^2)^2) - ((d
+ e*x)*(a*e*(3*A*c*d + 5*a*C*d + 3*a*B*e) - (3*A*c^2*d^2 - a*(4*a
*C*e^2 - c*d*(C*d + 3*B*e)))*x))/(8*a^2*c^2*(a + c*x^2)) + ((3*a*
e^2*(A*c*d + 3*a*C*d + a*B*e) + c*d^2*(3*A*c*d + a*C*d + 3*a*B*e)
)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(8*a^(5/2)*c^(5/2)) + (C*e^3*Log[a
 + c*x^2])/(2*c^3)
```

Rubi [A] time = 0.676899, antiderivative size = 209, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(cd^2(3aBe+aCd+3Acd)+3ae^2(aBe+3aCd+Acd)\right)}{8a^{5/2}c^{5/2}} - \frac{(d+ex)\left(ae(3aBe+5aCd+3Acd)-x\left(3Ac^2d^2-a\left(4aCe^2-cd(3Be+Cd)\right)\right)\right)}{8a^2c^2\left(a+cx^2\right)} - \frac{(d+ex)^3(aB-x(Ac-aC))}{4ac\left(a+cx^2\right)^2} + \frac{Ce^3\log\left(a+cx^2\right)}{2c^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^3*(A + B*x + C*x^2))/(a + c*x^2)^3,x]
```


```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x)^3)/(4*a*c*(a + c*x^2)^2) - ((d
+ e*x)*(a*e*(3*A*c*d + 5*a*C*d + 3*a*B*e) - (3*A*c^2*d^2 - a*(4*a
*C*e^2 - c*d*(C*d + 3*B*e)))*x))/(8*a^2*c^2*(a + c*x^2)) + ((3*a*
e^2*(A*c*d + 3*a*C*d + a*B*e) + c*d^2*(3*A*c*d + a*C*d + 3*a*B*e)
)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(8*a^(5/2)*c^(5/2)) + (C*e^3*Log[a
 + c*x^2])/(2*c^3)
```

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((e*x+d)**3*(C*x**2+B*x+A)/(c*x**2+a)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.548992, size = 281, normalized size = 1.34

$$\frac{\frac{\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(3Acd\left(ae^2+cd^2\right)+a\left(3ae^2(Be+3Cd)+cd^2(3Be+Cd)\right)\right)}{a^{5/2}}+\frac{-2a^3Ce^3+2a^2ce(e(Ae+3Bd+Bex)+3Cd(d+ex))-2ac^2d\left(3Ae(d+ex)+Bd(d+3ex)+Cd^2\right.}{a(a+cx^2)^2}}{8c^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)^3*(A + B*x + C*x^2))/(a + c*x^2)^3,x]
```

```
[Out] ((-2*a^3*C*e^3 + 2*A*c^3*d^3*x - 2*a*c^2*d*(C*d^2*x + 3*A*e*(d +
e*x) + B*d*(d + 3*e*x)) + 2*a^2*c*e*(3*C*d*(d + e*x) + e*(3*B*d +
 A*e + B*e*x)))/(a*(a + c*x^2)^2) + (8*a^3*C*e^3 + 3*A*c^3*d^3*x
+ a*c^2*d*(C*d^2 + 3*e*(B*d + A*e))*x - a^2*c*e*(3*C*d*(4*d + 5*e
*x) + e*(12*B*d + 4*A*e + 5*B*e*x)))/(a^2*(a + c*x^2)) + (Sqrt[c]
*(3*A*c*d*(c*d^2 + a*e^2) + a*(3*a*e^2*(3*C*d + B*e) + c*d^2*(C*d
 + 3*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/a^(5/2) + 4*C*e^3*Log[a
+ c*x^2])/(8*c^3)
```

Maple [B] time = 0.018, size = 409, normalized size = 2.

$$\frac{1}{(cx^2+a)^2}\left(\frac{\left(3\,Aacde^2+3\,Ac^2d^3-5\,Ba^2e^3+3\,Bacd^2e-15\,Ca^2de^2+Cacd^3\right)x^3}{8\,a^2c}-\frac{e\left(Ace^2+3\,Bcde-2\,aCe^2+3\,Ccd^2\right)x^2}{2\,c^2}\right.$$
$$+\frac{Ce^3\ln\left(a^2c^2\left(cx^2+a\right)\right)}{2\,c^3}+\frac{3\,Ade^2}{8\,ac}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{3\,Ad^3}{8\,a^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$
$$+\frac{3\,Be^3}{8\,c^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{3\,Bd^2e}{8\,ac}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$
$$+\frac{9\,Cde^2}{8\,c^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Cd^3}{8\,ac}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^3*(C*x^2+B*x+A)/(c*x^2+a)^3,x)
```

```
[Out] (1/8*(3*A*a*c*d*e^2+3*A*c^2*d^3-5*B*a^2*e^3+3*B*a*c*d^2*e-15*C*a^
2*d*e^2+C*a*c*d^3)/a^2/c*x^3-1/2*e*(A*c*e^2+3*B*c*d*e-2*C*a*e^2+3
*C*c*d^2)/c^2*x^2-1/8*(3*A*a*c*d*e^2-5*A*c^2*d^3+3*B*a^2*e^3+3*B*
a*c*d^2*e+9*C*a^2*d*e^2+C*a*c*d^3)/a/c^2*x-1/4*(A*a*c*e^3+3*A*c^2
*d^2*e+3*B*a*c*d*e^2+B*c^2*d^3-3*C*a^2*e^3+3*C*a*c*d^2*e)/c^3)/(c
*x^2+a)^2+1/2*C*e^3/c^3*ln(a^2*c^2*(c*x^2+a))+3/8/a/c/(a*c)^(1/2)
*arctan(c*x/(a*c)^(1/2))*A*d*e^2+3/8/a^2/(a*c)^(1/2)*arctan(c*x/(
a*c)^(1/2))*A*d^3+3/8/c^2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*e
^3+3/8/a/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*d^2*e+9/8/c^2/(a
*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*d*e^2+1/8/a/c/(a*c)^(1/2)*arc
tan(c*x/(a*c)^(1/2))*C*d^3
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^3/(c*x^2 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.290264, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^3/(c*x^2 + a)^3,x, algorithm="fricas")
```

```
[Out] [1/16*((3*B*a^3*c^2*d^2*e + 3*B*a^4*c*e^3 + (3*B*a*c^4*d^2*e + 3*
B*a^2*c^3*e^3 + (C*a*c^4 + 3*A*c^5)*d^3 + 3*(3*C*a^2*c^3 + A*a*c^
4)*d*e^2)*x^4 + (C*a^3*c^2 + 3*A*a^2*c^3)*d^3 + 3*(3*C*a^4*c + A*
a^3*c^2)*d*e^2 + 2*(3*B*a^2*c^3*d^2*e + 3*B*a^3*c^2*e^3 + (C*a^2*
c^3 + 3*A*a*c^4)*d^3 + 3*(3*C*a^3*c^2 + A*a^2*c^3)*d*e^2)*x^2)*lo
g((2*a*c*x + (c*x^2 - a)*sqrt(-a*c))/(c*x^2 + a)) - 2*(2*B*a^2*c^
2*d^3 + 6*B*a^3*c*d*e^2 + 6*(C*a^3*c + A*a^2*c^2)*d^2*e - 2*(3*C*
a^4 - A*a^3*c)*e^3 - (3*B*a*c^3*d^2*e - 5*B*a^2*c^2*e^3 + (C*a*c^
3 + 3*A*c^4)*d^3 - 3*(5*C*a^2*c^2 - A*a*c^3)*d*e^2)*x^3 + 4*(3*C*
a^2*c^2*d^2*e + 3*B*a^2*c^2*d*e^2 - (2*C*a^3*c - A*a^2*c^2)*e^3)*
x^2 + (3*B*a^2*c^2*d^2*e + 3*B*a^3*c*e^3 + (C*a^2*c^2 - 5*A*a*c^3
)*d^3 + 3*(3*C*a^3*c + A*a^2*c^2)*d*e^2)*x - 4*(C*a^2*c^2*e^3*x^4
```

```
 + 2*C*a^3*c*e^3*x^2 + C*a^4*e^3)*log(c*x^2 + a))*sqrt(-a*c))/((a
^2*c^5*x^4 + 2*a^3*c^4*x^2 + a^4*c^3)*sqrt(-a*c)), 1/8*((3*B*a^3*
c^2*d^2*e + 3*B*a^4*c*e^3 + (3*B*a*c^4*d^2*e + 3*B*a^2*c^3*e^3 +
(C*a*c^4 + 3*A*c^5)*d^3 + 3*(3*C*a^2*c^3 + A*a*c^4)*d*e^2)*x^4 +
(C*a^3*c^2 + 3*A*a^2*c^3)*d^3 + 3*(3*C*a^4*c + A*a^3*c^2)*d*e^2 +
 2*(3*B*a^2*c^3*d^2*e + 3*B*a^3*c^2*e^3 + (C*a^2*c^3 + 3*A*a*c^4)
*d^3 + 3*(3*C*a^3*c^2 + A*a^2*c^3)*d*e^2)*x^2)*arctan(sqrt(a*c)*x
/a) - (2*B*a^2*c^2*d^3 + 6*B*a^3*c*d*e^2 + 6*(C*a^3*c + A*a^2*c^2
)*d^2*e - 2*(3*C*a^4 - A*a^3*c)*e^3 - (3*B*a*c^3*d^2*e - 5*B*a^2*
c^2*e^3 + (C*a*c^3 + 3*A*c^4)*d^3 - 3*(5*C*a^2*c^2 - A*a*c^3)*d*e
^2)*x^3 + 4*(3*C*a^2*c^2*d^2*e + 3*B*a^2*c^2*d*e^2 - (2*C*a^3*c -
 A*a^2*c^2)*e^3)*x^2 + (3*B*a^2*c^2*d^2*e + 3*B*a^3*c*e^3 + (C*a^
2*c^2 - 5*A*a*c^3)*d^3 + 3*(3*C*a^3*c + A*a^2*c^2)*d*e^2)*x - 4*(
C*a^2*c^2*e^3*x^4 + 2*C*a^3*c*e^3*x^2 + C*a^4*e^3)*log(c*x^2 + a)
)*sqrt(a*c))/((a^2*c^5*x^4 + 2*a^3*c^4*x^2 + a^4*c^3)*sqrt(a*c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**3*(C*x**2+B*x+A)/(c*x**2+a)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.276554, size = 470, normalized size = 2.25

$$\frac{Ce^3\ln\left(cx^2+a\right)}{2\,c^3}+\frac{\left(Cacd^3+3\,Ac^2d^3+3\,Bacd^2e+9\,Ca^2de^2+3\,Aacde^2+3\,Ba^2e^3\right)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{8\,\sqrt{ac}a^2c^2}+\frac{\left(Cac^2d^3+3\,Ac^3d^3+3\,Bac^2d^2e-15\,Ca^2cde^2+3\,Aac^2de^2-5\,Ba^2ce^3\right)x^3-4\left(3\,Ca^2cd^2e+3\,Ba^2cde^2-2\,Ca^3e^3+Aa^2ce^3\right)x}{8\,(cx}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^3/(c*x^2 + a)^3,x, algorithm="giac")
```

```
[Out] 1/2*C*e^3*ln(c*x^2 + a)/c^3 + 1/8*(C*a*c*d^3 + 3*A*c^2*d^3 + 3*B*
a*c*d^2*e + 9*C*a^2*d*e^2 + 3*A*a*c*d*e^2 + 3*B*a^2*e^3)*arctan(c
*x/sqrt(a*c))/(sqrt(a*c)*a^2*c^2) + 1/8*((C*a*c^2*d^3 + 3*A*c^3*d
^3 + 3*B*a*c^2*d^2*e - 15*C*a^2*c*d*e^2 + 3*A*a*c^2*d*e^2 - 5*B*a
^2*c*e^3)*x^3 - 4*(3*C*a^2*c*d^2*e + 3*B*a^2*c*d*e^2 - 2*C*a^3*e^
3 + A*a^2*c*e^3)*x^2 - (C*a^2*c*d^3 - 5*A*a*c^2*d^3 + 3*B*a^2*c*d
```

```
^2*e + 9*C*a^3*d*e^2 + 3*A*a^2*c*d*e^2 + 3*B*a^3*e^3)*x - 2*(B*a^
2*c^2*d^3 + 3*C*a^3*c*d^2*e + 3*A*a^2*c^2*d^2*e + 3*B*a^3*c*d*e^2
 - 3*C*a^4*e^3 + A*a^3*c*e^3)/c)/((c*x^2 + a)^2*a^2*c^2)
```

3.58 $\int \frac{(d+ex)^2 (A+Bx+Cx^2)}{(a+cx^2)^3} \, dx$

Optimal. Leaf size=156

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(cd(2aBe+aCd+3Acd)+ae^2(3aC+Ac)\right)}{8a^{5/2}c^{5/2}} - \frac{(d+ex)(ae(3aC+Ac)-cx(2aBe+aCd+3Acd))}{8a^2c^2(a+cx^2)} - \frac{(d+ex)^2(aB-x(Ac-aC))}{4ac(a+cx^2)^2}$$

```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x)^2)/(4*a*c*(a + c*x^2)^2) - ((d
+ e*x)*(a*(A*c + 3*a*C)*e - c*(3*A*c*d + a*C*d + 2*a*B*e)*x))/(8*
a^2*c^2*(a + c*x^2)) + ((a*(A*c + 3*a*C)*e^2 + c*d*(3*A*c*d + a*C
*d + 2*a*B*e))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(8*a^(5/2)*c^(5/2))
```

Rubi [A] time = 0.545188, antiderivative size = 175, normalized size of antiderivative = 1.12, number of steps used = 3, number of rules used = 3, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(cd(2aBe+aCd+3Acd)+ae^2(3aC+Ac)\right)}{8a^{5/2}c^{5/2}} - \frac{x\left(ae^2(3aC+Ac)-cd(2aBe+aCd+3Acd)\right)+2ae(aBe+2aCd+2Acd)}{8a^2c^2(a+cx^2)} - \frac{(d+ex)^2(aB-x(Ac-aC))}{4ac(a+cx^2)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^2*(A + B*x + C*x^2))/(a + c*x^2)^3,x]
```

```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x)^2)/(4*a*c*(a + c*x^2)^2) - (2*a
*e*(2*A*c*d + 2*a*C*d + a*B*e) + (a*(A*c + 3*a*C)*e^2 - c*d*(3*A*
c*d + a*C*d + 2*a*B*e))*x)/(8*a^2*c^2*(a + c*x^2)) + ((a*(A*c + 3
*a*C)*e^2 + c*d*(3*A*c*d + a*C*d + 2*a*B*e))*ArcTan[(Sqrt[c]*x)/S
qrt[a]])/(8*a^(5/2)*c^(5/2))
```

Rubi in Sympy [A] time = 129.717, size = 369, normalized size = 2.37

$$\frac{Ce^2\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{\sqrt{a}c^{\frac{5}{2}}}+\frac{-ae\left(Be+2Cd\right)+x\left(Ace^2+2Bcde-2Cae^2+Ccd^2\right)}{2ac^2\left(a+cx^2\right)}+\frac{a\left(-2Acde+Bae^2-Bcd^2+2Cade\right)+x\left(-Aace^2+Ac^2d^2-2Bacde+Ca^2e^2-Cacd^2\right)}{4ac^2\left(a+cx^2\right)^2}+\frac{3x\left(-Aace^2+Ac^2d^2-2Bacde+Ca^2e^2-Cacd^2\right)}{8a^2c^2\left(a+cx^2\right)}+\frac{\left(Ace^2+2Bcde-2Cae^2+Ccd^2\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}c^{\frac{5}{2}}}+\frac{3\left(-Aace^2+Ac^2d^2-2Bacde+Ca^2e^2-Cacd^2\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{8a^{\frac{5}{2}}c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)**2*(C*x**2+B*x+A)/(c*x**2+a)**3,x)
```

```
[Out] C*e**2*atan(sqrt(c)*x/sqrt(a))/(sqrt(a)*c**(5/2)) + (-a*e*(B*e +
2*C*d) + x*(A*c*e**2 + 2*B*c*d*e - 2*C*a*e**2 + C*c*d**2))/(2*a*c
**2*(a + c*x**2)) + (a*(-2*A*c*d*e + B*a*e**2 - B*c*d**2 + 2*C*a*
d*e) + x*(-A*a*c*e**2 + A*c**2*d**2 - 2*B*a*c*d*e + C*a**2*e**2 -
 C*a*c*d**2))/(4*a*c**2*(a + c*x**2)**2) + 3*x*(-A*a*c*e**2 + A*c
**2*d**2 - 2*B*a*c*d*e + C*a**2*e**2 - C*a*c*d**2)/(8*a**2*c**2*(
a + c*x**2)) + (A*c*e**2 + 2*B*c*d*e - 2*C*a*e**2 + C*c*d**2)*ata
n(sqrt(c)*x/sqrt(a))/(2*a**(3/2)*c**(5/2)) + 3*(-A*a*c*e**2 + A*c
**2*d**2 - 2*B*a*c*d*e + C*a**2*e**2 - C*a*c*d**2)*atan(sqrt(c)*x
/sqrt(a))/(8*a**(5/2)*c**(5/2))
```

Mathematica [A] time = 0.273452, size = 211, normalized size = 1.35

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Ac\left(ae^2+3cd^2\right)+a\left(3aCe^2+cd(2Be+Cd)\right)\right)}{8a^{5/2}c^{5/2}}+\frac{a^2(-e)(4Be+8Cd+5Cex)+acx\left(e(Ae+2Bd)+Cd^2\right)+3Ac^2d^2x}{8a^2c^2\left(a+cx^2\right)}+\frac{a^2e(Be+2Cd+Cex)-ac\left(Ae(2d+ex)+Bd(d+2ex)+Cd^2x\right)+Ac^2d^2x}{4ac^2\left(a+cx^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)^2*(A + B*x + C*x^2))/(a + c*x^2)^3,x]
```

```
[Out] (3*A*c^2*d^2*x + a*c*(C*d^2 + e*(2*B*d + A*e))*x - a^2*e*(8*C*d +
 4*B*e + 5*C*e*x))/(8*a^2*c^2*(a + c*x^2)) + (A*c^2*d^2*x + a^2*e
```

```
*(2*C*d + B*e + C*e*x) - a*c*(C*d^2*x + A*e*(2*d + e*x) + B*d*(d
+ 2*e*x)))/(4*a*c^2*(a + c*x^2)^2) + ((A*c*(3*c*d^2 + a*e^2) + a*
(3*a*C*e^2 + c*d*(C*d + 2*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(8*
a^(5/2)*c^(5/2))
```

Maple [A] time = 0.012, size = 283, normalized size = 1.8

$$\frac{1}{(cx^2+a)^2}\left(\frac{(Aace^2+3Ac^2d^2+2acdeB-5a^2Ce^2+Cacd^2)x^3}{8a^2c}-\frac{e(Be+2Cd)x^2}{2c}-\frac{(Aace^2-5Ac^2d^2+2acdeB+3a^2Ce^2\right.$$
$$+\frac{Ae^2}{8ac}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{3Ad^2}{8a^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Bde}{4ac}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$
$$+\frac{3Ce^2}{8c^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Cd^2}{8ac}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^2*(C*x^2+B*x+A)/(c*x^2+a)^3,x)
```

```
[Out] (1/8*(A*a*c*e^2+3*A*c^2*d^2+2*B*a*c*d*e-5*C*a^2*e^2+C*a*c*d^2)/a^
2/c*x^3-1/2*e*(B*e+2*C*d)*x^2/c-1/8*(A*a*c*e^2-5*A*c^2*d^2+2*B*a*
c*d*e+3*C*a^2*e^2+C*a*c*d^2)/a/c^2*x-1/4*(2*A*c*d*e+B*a*e^2+B*c*d
^2+2*C*a*d*e)/c^2)/(c*x^2+a)^2+1/8/a/c/(a*c)^(1/2)*arctan(c*x/(a*
c)^(1/2))*A*e^2+3/8/a^2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*d^2
+1/4/a/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*d*e*B+3/8/c^2/(a*c)^
(1/2)*arctan(c*x/(a*c)^(1/2))*C*e^2+1/8/a/c/(a*c)^(1/2)*arctan(c*
x/(a*c)^(1/2))*C*d^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((C*x^2 + B*x + A)*(e*x + d)^2/(c*x^2 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.282474, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(e*x + d)^2/(c*x^2 + a)^3,x, algorithm="fricas")
```

```
[Out] [1/16*((2*B*a^3*c*d*e + (2*B*a*c^3*d*e + (C*a*c^3 + 3*A*c^4)*d^2
+ (3*C*a^2*c^2 + A*a*c^3)*e^2)*x^4 + (C*a^3*c + 3*A*a^2*c^2)*d^2
+ (3*C*a^4 + A*a^3*c)*e^2 + 2*(2*B*a^2*c^2*d*e + (C*a^2*c^2 + 3*A
*a*c^3)*d^2 + (3*C*a^3*c + A*a^2*c^2)*e^2)*x^2)*log((2*a*c*x + (c
*x^2 - a)*sqrt(-a*c))/(c*x^2 + a)) - 2*(2*B*a^2*c*d^2 + 2*B*a^3*e
^2 - (2*B*a*c^2*d*e + (C*a*c^2 + 3*A*c^3)*d^2 - (5*C*a^2*c - A*a*
c^2)*e^2)*x^3 + 4*(C*a^3 + A*a^2*c)*d*e + 4*(2*C*a^2*c*d*e + B*a^
2*c*e^2)*x^2 + (2*B*a^2*c*d*e + (C*a^2*c - 5*A*a*c^2)*d^2 + (3*C*
a^3 + A*a^2*c)*e^2)*x)*sqrt(-a*c))/((a^2*c^4*x^4 + 2*a^3*c^3*x^2
+ a^4*c^2)*sqrt(-a*c)), 1/8*((2*B*a^3*c*d*e + (2*B*a*c^3*d*e + (C
*a*c^3 + 3*A*c^4)*d^2 + (3*C*a^2*c^2 + A*a*c^3)*e^2)*x^4 + (C*a^3
*c + 3*A*a^2*c^2)*d^2 + (3*C*a^4 + A*a^3*c)*e^2 + 2*(2*B*a^2*c^2*
d*e + (C*a^2*c^2 + 3*A*a*c^3)*d^2 + (3*C*a^3*c + A*a^2*c^2)*e^2)*
x^2)*arctan(sqrt(a*c)*x/a) - (2*B*a^2*c*d^2 + 2*B*a^3*e^2 - (2*B*
a*c^2*d*e + (C*a*c^2 + 3*A*c^3)*d^2 - (5*C*a^2*c - A*a*c^2)*e^2)*
x^3 + 4*(C*a^3 + A*a^2*c)*d*e + 4*(2*C*a^2*c*d*e + B*a^2*c*e^2)*x
^2 + (2*B*a^2*c*d*e + (C*a^2*c - 5*A*a*c^2)*d^2 + (3*C*a^3 + A*a^
2*c)*e^2)*x)*sqrt(a*c))/((a^2*c^4*x^4 + 2*a^3*c^3*x^2 + a^4*c^2)*
sqrt(a*c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**2*(C*x**2+B*x+A)/(c*x**2+a)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.273664, size = 343, normalized size = 2.2

$$\frac{\left(Cacd^2 + 3\,Ac^2d^2 + 2\,Bacde + 3\,Ca^2e^2 + Aace^2\right)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{8\,\sqrt{ac}a^2c^2} + \frac{Cac^2d^2x^3 + 3\,Ac^3d^2x^3 + 2\,Bac^2dx^3e - 5\,Ca^2cx^3e^2 + Aac^2x^3e^2 - 8\,Ca^2cdx^2e - Ca^2cd^2x + 5\,Aac^2d^2x - 4\,Ba^2cx^2e^2 - 2\,Ba^2c}{8\,(cx^2 + a)^2a^2c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^2/(c*x^2 + a)^3,x, algorithm="giac")
```

```
[Out] 1/8*(C*a*c*d^2 + 3*A*c^2*d^2 + 2*B*a*c*d*e + 3*C*a^2*e^2 + A*a*c*
e^2)*arctan(c*x/sqrt(a*c))/(sqrt(a*c)*a^2*c^2) + 1/8*(C*a*c^2*d^2
*x^3 + 3*A*c^3*d^2*x^3 + 2*B*a*c^2*d*x^3*e - 5*C*a^2*c*x^3*e^2 +
A*a*c^2*x^3*e^2 - 8*C*a^2*c*d*x^2*e - C*a^2*c*d^2*x + 5*A*a*c^2*d
^2*x - 4*B*a^2*c*x^2*e^2 - 2*B*a^2*c*d*x*e - 2*B*a^2*c*d^2 - 3*C*
a^3*x*e^2 - A*a^2*c*x*e^2 - 4*C*a^3*d*e - 4*A*a^2*c*d*e - 2*B*a^3
*e^2)/((c*x^2 + a)^2*a^2*c^2)
```

3.59 $\int \frac{(d+ex)(A+Bx+Cx^2)}{(a+cx^2)^3}\,dx$

Optimal. Leaf size=130

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)(aBe+aCd+3Acd)}{8a^{5/2}c^{3/2}}-\frac{2ae(aC+Ac)-cx(aBe+aCd+3Acd)}{8a^2c^2(a+cx^2)}-\frac{(d+ex)(aB-x(Ac-aC))}{4ac(a+cx^2)^2}$$

```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x))/(4*a*c*(a + c*x^2)^2) - (2*a*(
A*c + a*C)*e - c*(3*A*c*d + a*C*d + a*B*e)*x)/(8*a^2*c^2*(a + c*x
^2)) + ((3*A*c*d + a*C*d + a*B*e)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(8
*a^(5/2)*c^(3/2))
```

Rubi [A] time = 0.234312, antiderivative size = 130, 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

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)(aBe+aCd+3Acd)}{8a^{5/2}c^{3/2}}-\frac{2ae(aC+Ac)-cx(aBe+aCd+3Acd)}{8a^2c^2(a+cx^2)}-\frac{(d+ex)(aB-x(Ac-aC))}{4ac(a+cx^2)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)*(A + B*x + C*x^2))/(a + c*x^2)^3,x]
```

```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x))/(4*a*c*(a + c*x^2)^2) - (2*a*(
A*c + a*C)*e - c*(3*A*c*d + a*C*d + a*B*e)*x)/(8*a^2*c^2*(a + c*x
^2)) + ((3*A*c*d + a*C*d + a*B*e)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(8
*a^(5/2)*c^(3/2))
```

Rubi in Sympy [A] time = 44.9163, size = 185, normalized size = 1.42

$$-\frac{Cae-cx(Be+Cd)}{2ac^2(a+cx^2)}-\frac{a(Ace+Bcd-Cae)-cx(Acd-Bae-Cad)}{4ac^2(a+cx^2)^2}+\frac{3x(Acd-Bae-Cad)}{8a^2c(a+cx^2)}+\frac{(Be+Cd)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}c^{\frac{3}{2}}}+\frac{3(Acd-Bae-Cad)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{8a^{\frac{5}{2}}c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)*(C*x**2+B*x+A)/(c*x**2+a)**3,x)
```

```
[Out] -(C*a*e - c*x*(B*e + C*d))/(2*a*c**2*(a + c*x**2)) - (a*(A*c*e +
B*c*d - C*a*e) - c*x*(A*c*d - B*a*e - C*a*d))/(4*a*c**2*(a + c*x*
*2)**2) + 3*x*(A*c*d - B*a*e - C*a*d)/(8*a**2*c*(a + c*x**2)) + (
B*e + C*d)*atan(sqrt(c)*x/sqrt(a))/(2*a**(3/2)*c**(3/2)) + 3*(A*c
*d - B*a*e - C*a*d)*atan(sqrt(c)*x/sqrt(a))/(8*a**(5/2)*c**(3/2))
```

Mathematica [A] time = 0.203238, size = 137, normalized size = 1.05

$$\frac{\frac{\sqrt{a}(-4a^2Ce+acx(Be+Cd)+3Ac^2dx)}{a+cx^2}+\frac{2a^{3/2}(a^2Ce-ac(Ae+B(d+ex)+Cdx)+Ac^2dx)}{(a+cx^2)^2}+\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)(aBe+aCd+3Acd)}{8a^{5/2}c^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)*(A + B*x + C*x^2))/(a + c*x^2)^3,x]
```

```
[Out] ((Sqrt[a]*(-4*a^2*C*e + 3*A*c^2*d*x + a*c*(C*d + B*e)*x))/(a + c*
x^2) + (2*a^(3/2)*(a^2*C*e + A*c^2*d*x - a*c*(A*e + C*d*x + B*(d
+ e*x))))/(a + c*x^2)^2 + Sqrt[c]*(3*A*c*d + a*C*d + a*B*e)*ArcTa
n[(Sqrt[c]*x)/Sqrt[a]])/(8*a^(5/2)*c^2)
```

Maple [A] time = 0.011, size = 157, normalized size = 1.2

$$\frac{1}{(cx^2+a)^2}\left(\frac{(3\,Acd+aBe+Cad)\,x^3}{8\,a^2}-\frac{Cex^2}{2\,c}+\frac{(5\,Acd-aBe-Cad)\,x}{8\,ac}-\frac{Ace+Bcd+aCe}{4\,c^2}\right)+\frac{3\,Ad}{8\,a^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Be}{8\,ac}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Cd}{8\,ac}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)*(C*x^2+B*x+A)/(c*x^2+a)^3,x)
```

```
[Out] (1/8*(3*A*c*d+B*a*e+C*a*d)/a^2*x^3-1/2*C*e*x^2/c+1/8*(5*A*c*d-B*a
*e-C*a*d)/a/c*x-1/4*(A*c*e+B*c*d+C*a*e)/c^2)/(c*x^2+a)^2+3/8/a^2/
(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*d+1/8/a/c/(a*c)^(1/2)*arcta
n(c*x/(a*c)^(1/2))*B*e+1/8/a/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2)
)*C*d
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/(c*x^2 + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.280561, size = 1, normalized size = 0.01

$$\left[\frac{\left(Ba^3ce + \left(Bac^3e + \left(Cac^3 + 3\,Ac^4\right)d\right)x^4 + 2\,\left(Ba^2c^2e + \left(Ca^2c^2 + 3\,Aac^3\right)d\right)x^2 + \left(Ca^3c + 3\,Aa^2c^2\right)d\right)\log\left(\frac{2\,acx+\left(cx^2-a\right)\sqrt{-ac}}{cx^2+a}\right)}{16\left(a^2c^4x^4 + 2\,a^3c^3x\right.}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/(c*x^2 + a)^3,x, algorithm="fricas")
```

```
[Out] [1/16*((B*a^3*c*e + (B*a*c^3*e + (C*a*c^3 + 3*A*c^4)*d)*x^4 + 2*(
B*a^2*c^2*e + (C*a^2*c^2 + 3*A*a*c^3)*d)*x^2 + (C*a^3*c + 3*A*a^2
*c^2)*d)*log((2*a*c*x + (c*x^2 - a)*sqrt(-a*c))/(c*x^2 + a)) - 2*
(4*C*a^2*c*e*x^2 + 2*B*a^2*c*d - (B*a*c^2*e + (C*a*c^2 + 3*A*c^3)
*d)*x^3 + 2*(C*a^3 + A*a^2*c)*e + (B*a^2*c*e + (C*a^2*c - 5*A*a*c
^2)*d)*x)*sqrt(-a*c))/((a^2*c^4*x^4 + 2*a^3*c^3*x^2 + a^4*c^2)*sq
rt(-a*c)), 1/8*((B*a^3*c*e + (B*a*c^3*e + (C*a*c^3 + 3*A*c^4)*d)*
x^4 + 2*(B*a^2*c^2*e + (C*a^2*c^2 + 3*A*a*c^3)*d)*x^2 + (C*a^3*c
+ 3*A*a^2*c^2)*d)*arctan(sqrt(a*c)*x/a) - (4*C*a^2*c*e*x^2 + 2*B*
a^2*c*d - (B*a*c^2*e + (C*a*c^2 + 3*A*c^3)*d)*x^3 + 2*(C*a^3 + A*
a^2*c)*e + (B*a^2*c*e + (C*a^2*c - 5*A*a*c^2)*d)*x)*sqrt(a*c))/((
a^2*c^4*x^4 + 2*a^3*c^3*x^2 + a^4*c^2)*sqrt(a*c))]
```

Sympy [A] time = 58.6982, size = 240, normalized size = 1.85

$$-\frac{\sqrt{-\frac{1}{a^5c^3}}\,(3Acd + Bae + Cad)\log\left(-a^3c\sqrt{-\frac{1}{a^5c^3}} + x\right)}{16} + \frac{\sqrt{-\frac{1}{a^5c^3}}\,(3Acd + Bae + Cad)\log\left(a^3c\sqrt{-\frac{1}{a^5c^3}} + x\right)}{16} + \frac{-2Aa^2ce - 2Ba^2cd - 2Ca^3e - 4Ca^2cex^2 + x^3\left(3Ac^3d + Bac^2e + Cac^2d\right) + x\left(5Aac^2d - Ba^2ce - Ca^2cd\right)}{8a^4c^2 + 16a^3c^3x^2 + 8a^2c^4x^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)*(C*x**2+B*x+A)/(c*x**2+a)**3,x)
```

```
[Out] -sqrt(-1/(a**5*c**3))*(3*A*c*d + B*a*e + C*a*d)*log(-a**3*c*sqrt(
-1/(a**5*c**3)) + x)/16 + sqrt(-1/(a**5*c**3))*(3*A*c*d + B*a*e +
```

```
 C*a*d)*log(a**3*c*sqrt(-1/(a**5*c**3)) + x)/16 + (-2*A*a**2*c*e
- 2*B*a**2*c*d - 2*C*a**3*e - 4*C*a**2*c*e*x**2 + x**3*(3*A*c**3*
d + B*a*c**2*e + C*a*c**2*d) + x*(5*A*a*c**2*d - B*a**2*c*e - C*a
**2*c*d))/(8*a**4*c**2 + 16*a**3*c**3*x**2 + 8*a**2*c**4*x**4)
```

GIAC/XCAS [A] time = 0.271885, size = 205, normalized size = 1.58

$$\frac{(Cad + 3\,Acd + Bae)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{8\,\sqrt{ac}a^2c} + \frac{Cac^2dx^3 + 3\,Ac^3dx^3 + Bac^2x^3e - 4\,Ca^2cx^2e - Ca^2cdx + 5\,Aac^2dx - Ba^2cxe - 2\,Ba^2cd - 2\,Ca^3e - 2\,Aa^2ce}{8\,(cx^2 + a)^2a^2c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/(c*x^2 + a)^3,x, algorithm="giac")
```

```
[Out] 1/8*(C*a*d + 3*A*c*d + B*a*e)*arctan(c*x/sqrt(a*c))/(sqrt(a*c)*a^
2*c) + 1/8*(C*a*c^2*d*x^3 + 3*A*c^3*d*x^3 + B*a*c^2*x^3*e - 4*C*a
^2*c*x^2*e - C*a^2*c*d*x + 5*A*a*c^2*d*x - B*a^2*c*x*e - 2*B*a^2*
c*d - 2*C*a^3*e - 2*A*a^2*c*e)/((c*x^2 + a)^2*a^2*c^2)
```

3.60 $\int \frac{A+Bx+Cx^2}{(a+cx^2)^3} dx$

Optimal. Leaf size=98

$$\frac{(aC+3Ac)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{8a^{5/2}c^{3/2}}+\frac{x(aC+3Ac)}{8a^2c\,(a+cx^2)}-\frac{aB-x(Ac-aC)}{4ac\,(a+cx^2)^2}$$

```
[Out] -(a*B - (A*c - a*C)*x)/(4*a*c*(a + c*x^2)^2) + ((3*A*c + a*C)*x)/
(8*a^2*c*(a + c*x^2)) + ((3*A*c + a*C)*ArcTan[(Sqrt[c]*x)/Sqrt[a]
])/(8*a^(5/2)*c^(3/2))
```

Rubi [A] time = 0.123357, antiderivative size = 98, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{(aC+3Ac)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{8a^{5/2}c^{3/2}}+\frac{x(aC+3Ac)}{8a^2c\,(a+cx^2)}-\frac{aB-x(Ac-aC)}{4ac\,(a+cx^2)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/(a + c*x^2)^3,x]
```

```
[Out] -(a*B - (A*c - a*C)*x)/(4*a*c*(a + c*x^2)^2) + ((3*A*c + a*C)*x)/
(8*a^2*c*(a + c*x^2)) + ((3*A*c + a*C)*ArcTan[(Sqrt[c]*x)/Sqrt[a]
])/(8*a^(5/2)*c^(3/2))
```

Rubi in Sympy [A] time = 13.4847, size = 82, normalized size = 0.84

$$-\frac{Ba-x\,(Ac-Ca)}{4ac\,(a+cx^2)^2}+\frac{x\,(3Ac+Ca)}{8a^2c\,(a+cx^2)}+\frac{(3Ac+Ca)\,\mathrm{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{8a^{\frac{5}{2}}c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)/(c*x**2+a)**3,x)
```

```
[Out] -(B*a - x*(A*c - C*a))/(4*a*c*(a + c*x**2)**2) + x*(3*A*c + C*a)/
(8*a**2*c*(a + c*x**2)) + (3*A*c + C*a)*atan(sqrt(c)*x/sqrt(a))/(
8*a**(5/2)*c**(3/2))
```

Mathematica [A] time = 0.130592, size = 90, normalized size = 0.92

$$\frac{(aC+3Ac)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{8a^{5/2}c^{3/2}}+\frac{-a^2(2B+Cx)+acx\left(5A+Cx^2\right)+3Ac^2x^3}{8a^2c\left(a+cx^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/(a + c*x^2)^3,x]
```

```
[Out] (3*A*c^2*x^3 - a^2*(2*B + C*x) + a*c*x*(5*A + C*x^2))/(8*a^2*c*(a
 + c*x^2)^2) + ((3*A*c + a*C)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(8*a^(
5/2)*c^(3/2))
```

Maple [A] time = 0.011, size = 96, normalized size = 1.

$$\frac{1}{(cx^2+a)^2}\left(\frac{(3\,Ac+aC)\,x^3}{8\,a^2}+\frac{(5\,Ac-aC)\,x}{8\,ac}-\frac{B}{4\,c}\right)+\frac{3\,A}{8\,a^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{C}{8\,ac}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(c*x^2+a)^3,x)
```

```
[Out] (1/8*(3*A*c+C*a)/a^2*x^3+1/8*(5*A*c-C*a)/a/c*x-1/4*B/c)/(c*x^2+a)
^2+3/8/a^2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A+1/8/a/c/(a*c)^(1
/2)*arctan(c*x/(a*c)^(1/2))*C
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.279739, size = 1, normalized size = 0.01

$$\left[\frac{\left(\left(Cac^{2}+3\,Ac^{3}\right)x^{4}+Ca^{3}+3\,Aa^{2}c+2\,\left(Ca^{2}c+3\,Aac^{2}\right)x^{2}\right)\log\left(\frac{2\,acx+\left(cx^{2}-a\right)\sqrt{-ac}}{cx^{2}+a}\right)+2\,\left(\left(Cac+3\,Ac^{2}\right)x^{3}-2\,Ba^{2}-\left(Ca^{2}-\right.\right.}{16\,\left(a^{2}c^{3}x^{4}+2\,a^{3}c^{2}x^{2}+a^{4}c\right)\sqrt{-ac}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] [1/16*(((C*a*c^2 + 3*A*c^3)*x^4 + C*a^3 + 3*A*a^2*c + 2*(C*a^2*c
+ 3*A*a*c^2)*x^2)*log((2*a*c*x + (c*x^2 - a)*sqrt(-a*c))/(c*x^2 +
 a)) + 2*((C*a*c + 3*A*c^2)*x^3 - 2*B*a^2 - (C*a^2 - 5*A*a*c)*x)*
sqrt(-a*c))/((a^2*c^3*x^4 + 2*a^3*c^2*x^2 + a^4*c)*sqrt(-a*c)), 1
/8*(((C*a*c^2 + 3*A*c^3)*x^4 + C*a^3 + 3*A*a^2*c + 2*(C*a^2*c + 3
*A*a*c^2)*x^2)*arctan(sqrt(a*c)*x/a) + ((C*a*c + 3*A*c^2)*x^3 - 2
*B*a^2 - (C*a^2 - 5*A*a*c)*x)*sqrt(a*c))/((a^2*c^3*x^4 + 2*a^3*c^
2*x^2 + a^4*c)*sqrt(a*c))]
```

Sympy [A] time = 2.56808, size = 156, normalized size = 1.59

$$-\frac{\sqrt{-\frac{1}{a^{5}c^{3}}}\left(3Ac+Ca\right)\log\left(-a^{3}c\sqrt{-\frac{1}{a^{5}c^{3}}}+x\right)}{16}+\frac{\sqrt{-\frac{1}{a^{5}c^{3}}}\left(3Ac+Ca\right)\log\left(a^{3}c\sqrt{-\frac{1}{a^{5}c^{3}}}+x\right)}{16}+\frac{-2Ba^{2}+x^{3}\left(3Ac^{2}+Cac\right)+x\left(5Aac-Ca^{2}\right)}{8a^{4}c+16a^{3}c^{2}x^{2}+8a^{2}c^{3}x^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)/(c*x**2+a)**3,x)
```

```
[Out] -sqrt(-1/(a**5*c**3))*(3*A*c + C*a)*log(-a**3*c*sqrt(-1/(a**5*c**
3)) + x)/16 + sqrt(-1/(a**5*c**3))*(3*A*c + C*a)*log(a**3*c*sqrt(
-1/(a**5*c**3)) + x)/16 + (-2*B*a**2 + x**3*(3*A*c**2 + C*a*c) +
x*(5*A*a*c - C*a**2))/(8*a**4*c + 16*a**3*c**2*x**2 + 8*a**2*c**3
*x**4)
```

GIAC/XCAS [A] time = 0.270492, size = 113, normalized size = 1.15

$$\frac{\left(Ca+3\,Ac\right)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{8\,\sqrt{ac}a^{2}c}+\frac{Cacx^{3}+3\,Ac^{2}x^{3}-Ca^{2}x+5\,Aacx-2\,Ba^{2}}{8\,\left(cx^{2}+a\right)^{2}a^{2}c}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/8*(C*a + 3*A*c)*arctan(c*x/sqrt(a*c))/(sqrt(a*c)*a^2*c) + 1/8*(
C*a*c*x^3 + 3*A*c^2*x^3 - C*a^2*x + 5*A*a*c*x - 2*B*a^2)/((c*x^2
+ a)^2*a^2*c)
```

3.61 $\int \frac{A+Bx+Cx^2}{(d+ex)(a+cx^2)^3}\,dx$

Optimal. Leaf size=353

$$\frac{4a^2e\left(Ae^2-Bde+Cd^2\right)+x\left(Acd\left(7ae^2+3cd^2\right)+a\left(cd^2-3ae^2\right)(Cd-Be)\right)}{8a^2\left(a+cx^2\right)\left(ae^2+cd^2\right)^2}+\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(15a^2e^4+10acd^2e^2+3c^2d^4\right)+a\left(-3a^2e^4+6acd^2e^2+c^2d^4\right)(Cd-Be)\right)}{8a^{5/2}\sqrt{c}\left(ae^2+cd^2\right)^3}-\frac{a(aCe-Ace+Bcd)-cx(aBe-aCd+Acd)}{4ac\left(a+cx^2\right)^2\left(ae^2+cd^2\right)}-\frac{e^3\log\left(a+cx^2\right)\left(Ae^2-Bde+Cd^2\right)}{2\left(ae^2+cd^2\right)^3}+\frac{e^3\log(d+ex)\left(Ae^2-Bde+Cd^2\right)}{\left(ae^2+cd^2\right)^3}$$

```
[Out] -(a*(B*c*d - A*c*e + a*C*e) - c*(A*c*d - a*C*d + a*B*e)*x)/(4*a*c
*(c*d^2 + a*e^2)*(a + c*x^2)^2) + (4*a^2*e*(C*d^2 - B*d*e + A*e^2
) + (a*(C*d - B*e)*(c*d^2 - 3*a*e^2) + A*c*d*(3*c*d^2 + 7*a*e^2))
*x)/(8*a^2*(c*d^2 + a*e^2)^2*(a + c*x^2)) + ((a*(C*d - B*e)*(c^2*
d^4 + 6*a*c*d^2*e^2 - 3*a^2*e^4) + A*c*d*(3*c^2*d^4 + 10*a*c*d^2*
e^2 + 15*a^2*e^4))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(8*a^(5/2)*Sqrt[c
]*(c*d^2 + a*e^2)^3) + (e^3*(C*d^2 - B*d*e + A*e^2)*Log[d + e*x])
/(c*d^2 + a*e^2)^3 - (e^3*(C*d^2 - B*d*e + A*e^2)*Log[a + c*x^2])
/(2*(c*d^2 + a*e^2)^3)
```

Rubi [A] time = 1.58108, antiderivative size = 353, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.222$

$$\frac{4a^2e\left(Ae^2-Bde+Cd^2\right)+x\left(Acd\left(7ae^2+3cd^2\right)+a\left(cd^2-3ae^2\right)(Cd-Be)\right)}{8a^2\left(a+cx^2\right)\left(ae^2+cd^2\right)^2}+\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(15a^2e^4+10acd^2e^2+3c^2d^4\right)+a\left(-3a^2e^4+6acd^2e^2+c^2d^4\right)(Cd-Be)\right)}{8a^{5/2}\sqrt{c}\left(ae^2+cd^2\right)^3}-\frac{a(aCe-Ace+Bcd)-cx(aBe-aCd+Acd)}{4ac\left(a+cx^2\right)^2\left(ae^2+cd^2\right)}-\frac{e^3\log\left(a+cx^2\right)\left(Ae^2-Bde+Cd^2\right)}{2\left(ae^2+cd^2\right)^3}+\frac{e^3\log(d+ex)\left(Ae^2-Bde+Cd^2\right)}{\left(ae^2+cd^2\right)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)*(a + c*x^2)^3),x]
```

```
[Out] -(a*(B*c*d - A*c*e + a*C*e) - c*(A*c*d - a*C*d + a*B*e)*x)/(4*a*c
*(c*d^2 + a*e^2)*(a + c*x^2)^2) + (4*a^2*e*(C*d^2 - B*d*e + A*e^2
```

```
) + (a*(C*d - B*e)*(c*d^2 - 3*a*e^2) + A*c*d*(3*c*d^2 + 7*a*e^2))
*x)/(8*a^2*(c*d^2 + a*e^2)^2*(a + c*x^2)) + ((a*(C*d - B*e)*(c^2*
d^4 + 6*a*c*d^2*e^2 - 3*a^2*e^4) + A*c*d*(3*c^2*d^4 + 10*a*c*d^2*
e^2 + 15*a^2*e^4))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(8*a^(5/2)*Sqrt[c
]*(c*d^2 + a*e^2)^3) + (e^3*(C*d^2 - B*d*e + A*e^2)*Log[d + e*x])
/(c*d^2 + a*e^2)^3 - (e^3*(C*d^2 - B*d*e + A*e^2)*Log[a + c*x^2])
/(2*(c*d^2 + a*e^2)^3)
```

Rubi in Sympy [A] time = 107.759, size = 386, normalized size = 1.09

$$-\frac{e^3\left(Ae^2-Bde+Cd^2\right)\log\left(a+cx^2\right)}{2\left(ae^2+cd^2\right)^3}+\frac{e^3\left(Ae^2-Bde+Cd^2\right)\log\left(d+ex\right)}{\left(ae^2+cd^2\right)^3}+\frac{\left(ae+cdx\right)\left(Ae^2-Bde+Cd^2\right)}{2a\left(a+cx^2\right)\left(ae^2+cd^2\right)^2}+\frac{a\left(Ace-Bcd-Cae\right)+cx\left(Acd+Bae-Cad\right)}{4ac\left(a+cx^2\right)^2\left(ae^2+cd^2\right)}+\frac{3x\left(Acd+Bae-Cad\right)}{8a^2\left(a+cx^2\right)\left(ae^2+cd^2\right)}+\frac{\sqrt{c}de^2\left(Ae^2-Bde+Cd^2\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{\sqrt{a}\left(ae^2+cd^2\right)^3}+\frac{\sqrt{c}d\left(Ae^2-Bde+Cd^2\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}\left(ae^2+cd^2\right)^2}+\frac{3\left(Acd+Bae-Cad\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{8a^{\frac{5}{2}}\sqrt{c}\left(ae^2+cd^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)/(e*x+d)/(c*x**2+a)**3,x)
```

```
[Out] -e**3*(A*e**2 - B*d*e + C*d**2)*log(a + c*x**2)/(2*(a*e**2 + c*d*
*2)**3) + e**3*(A*e**2 - B*d*e + C*d**2)*log(d + e*x)/(a*e**2 + c
*d**2)**3 + (a*e + c*d*x)*(A*e**2 - B*d*e + C*d**2)/(2*a*(a + c*x
**2)*(a*e**2 + c*d**2)**2) + (a*(A*c*e - B*c*d - C*a*e) + c*x*(A*
c*d + B*a*e - C*a*d))/(4*a*c*(a + c*x**2)**2*(a*e**2 + c*d**2)) +
 3*x*(A*c*d + B*a*e - C*a*d)/(8*a**2*(a + c*x**2)*(a*e**2 + c*d**
2)) + sqrt(c)*d*e**2*(A*e**2 - B*d*e + C*d**2)*atan(sqrt(c)*x/sqr
t(a))/(sqrt(a)*(a*e**2 + c*d**2)**3) + sqrt(c)*d*(A*e**2 - B*d*e
+ C*d**2)*atan(sqrt(c)*x/sqrt(a))/(2*a**(3/2)*(a*e**2 + c*d**2)**
2) + 3*(A*c*d + B*a*e - C*a*d)*atan(sqrt(c)*x/sqrt(a))/(8*a**(5/2
)*sqrt(c)*(a*e**2 + c*d**2))
```

Mathematica [A] time = 0.947995, size = 321, normalized size = 0.91

$$\frac{\frac{2\left(ae^2+cd^2\right)^2\left(a^2(-C)e+ac(Ae-Bd+Bex-Cdx)+Ac^2dx\right)}{ac\left(a+cx^2\right)^2}+\frac{\left(ae^2+cd^2\right)\left(a^2e(e(4Ae-4Bd+3Bex)+Cd(4d-3ex))+acdx\left(e(7Ae-Bd)+Cd^2\right)+3Ac^2d^3x\right)}{a^2\left(a+cx^2\right)}+\tan^{-1}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/((d + e*x)*(a + c*x^2)^3),x]
```

```
[Out] ((2*(c*d^2 + a*e^2)^2*(-(a^2*C*e) + A*c^2*d*x + a*c*(-(B*d) + A*e
 - C*d*x + B*e*x)))/(a*c*(a + c*x^2)^2) + ((c*d^2 + a*e^2)*(3*A*c
^2*d^3*x + a*c*d*(C*d^2 + e*(-(B*d) + 7*A*e))*x + a^2*e*(C*d*(4*d
 - 3*e*x) + e*(-4*B*d + 4*A*e + 3*B*e*x))))/(a^2*(a + c*x^2)) + (
(a*(C*d - B*e)*(c^2*d^4 + 6*a*c*d^2*e^2 - 3*a^2*e^4) + A*c*d*(3*c
^2*d^4 + 10*a*c*d^2*e^2 + 15*a^2*e^4))*ArcTan[(Sqrt[c]*x)/Sqrt[a]
])/(a^(5/2)*Sqrt[c]) + 8*e^3*(C*d^2 + e*(-(B*d) + A*e))*Log[d + e
*x] - 4*e^3*(C*d^2 + e*(-(B*d) + A*e))*Log[a + c*x^2])/(8*(c*d^2
+ a*e^2)^3)
```

Maple [B] time = 0.03, size = 1610, normalized size = 4.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)/(c*x^2+a)^3,x)
```

```
[Out] -1/2/(a*e^2+c*d^2)^3*ln(a^2*(c*x^2+a))*A*e^5+e^5/(a*e^2+c*d^2)^3*
ln(e*x+d)*A+5/8/(a*e^2+c*d^2)^3/(c*x^2+a)^2*B*a^2*e^5*x-1/8/(a*e^
2+c*d^2)^3/(c*x^2+a)^2*C*c^2*d^5*x-3/4/(a*e^2+c*d^2)^3/(c*x^2+a)^
2*B*a^2*d*e^4+3/8/(a*e^2+c*d^2)^3*a/(a*c)^(1/2)*arctan(c*x/(a*c)^
(1/2))*B*e^5-1/8/(a*e^2+c*d^2)^3/a/(a*c)^(1/2)*arctan(c*x/(a*c)^(
1/2))*B*c^2*d^4*e+5/4/(a*e^2+c*d^2)^3/a/(a*c)^(1/2)*arctan(c*x/(a
*c)^(1/2))*A*c^2*d^3*e^2-1/8/(a*e^2+c*d^2)^3/(c*x^2+a)^2*c^3/a*x^
3*B*d^4*e-3/4/(a*e^2+c*d^2)^3/(c*x^2+a)^2*C*a*c*d^3*e^2*x-1/2/(a*
e^2+c*d^2)^3/(c*x^2+a)^2*B*x^2*a*c*d*e^4-3/8/(a*e^2+c*d^2)^3/(c*x
^2+a)^2*C*x^3*a*c*d*e^4+1/2/(a*e^2+c*d^2)^3/(c*x^2+a)^2*C*x^2*a*c
*d^2*e^3+3/4/(a*e^2+c*d^2)^3/(c*x^2+a)^2*B*a*c*d^2*e^3*x+9/8/(a*e
^2+c*d^2)^3/(c*x^2+a)^2*A*a*c*d*e^4*x+5/4/(a*e^2+c*d^2)^3/(c*x^2+
a)^2*c^3/a*x^3*A*d^3*e^2-1/(a*e^2+c*d^2)^3/(c*x^2+a)^2*c*B*a*d^3*
e^2+5/8/(a*e^2+c*d^2)^3/(c*x^2+a)^2/a*x*A*c^3*d^5+1/8/(a*e^2+c*d^
2)^3/(c*x^2+a)^2*c^3/a*x^3*C*d^5+1/2/(a*e^2+c*d^2)^3/(c*x^2+a)^2*
C*x^2*c^2*d^4*e+15/8/(a*e^2+c*d^2)^3/(a*c)^(1/2)*arctan(c*x/(a*c)
^(1/2))*A*c*d*e^4+1/4/(a*e^2+c*d^2)^3/(c*x^2+a)^2*c*C*a*d^4*e+1/(
a*e^2+c*d^2)^3/(c*x^2+a)^2*c*A*a*d^2*e^3+1/8/(a*e^2+c*d^2)^3/(c*x
^2+a)^2*B*c^2*d^4*e*x-5/8/(a*e^2+c*d^2)^3/(c*x^2+a)^2*C*a^2*d*e^4
*x+1/2/(a*e^2+c*d^2)^3/(c*x^2+a)^2*A*x^2*c^2*d^2*e^3-1/2/(a*e^2+c
*d^2)^3/(c*x^2+a)^2*B*x^2*c^2*d^3*e^2+1/4/(a*e^2+c*d^2)^3/(c*x^2+
a)^2*B*x^3*c^2*d^2*e^3+3/8/(a*e^2+c*d^2)^3/(c*x^2+a)^2*B*x^3*a*c*
e^5+7/8/(a*e^2+c*d^2)^3/(c*x^2+a)^2*A*x^3*c^2*d*e^4+1/2/(a*e^2+c*
d^2)^3/(c*x^2+a)^2*A*x^2*a*c*e^5+3/4/(a*e^2+c*d^2)^3/(a*c)^(1/2)*
arctan(c*x/(a*c)^(1/2))*C*c*d^3*e^2+1/8/(a*e^2+c*d^2)^3/a/(a*c)^(
1/2)*arctan(c*x/(a*c)^(1/2))*C*c^2*d^5-3/8/(a*e^2+c*d^2)^3*a/(a*c
)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*d*e^4-1/4/(a*e^2+c*d^2)^3/(c*x^
2+a)^2*C*x^3*c^2*d^3*e^2+1/4/(a*e^2+c*d^2)^3/(c*x^2+a)^2*c^2*A*d^
4*e-1/4/(a*e^2+c*d^2)^3/(c*x^2+a)^2/c*C*a^3*e^5+3/8/(a*e^2+c*d^2)
```

```
^3/a^2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*c^3*d^5-3/4/(a*e^2+c
*d^2)^3/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*c*d^2*e^3+7/4/(a*e^
2+c*d^2)^3/(c*x^2+a)^2*A*c^2*d^3*e^2*x+3/8/(a*e^2+c*d^2)^3/(c*x^2
+a)^2*c^4/a^2*x^3*A*d^5+3/4/(a*e^2+c*d^2)^3/(c*x^2+a)^2*A*a^2*e^5
-1/4/(a*e^2+c*d^2)^3/(c*x^2+a)^2*c^2*B*d^5-1/2/(a*e^2+c*d^2)^3*ln
(a^2*(c*x^2+a))*C*d^2*e^3+1/2/(a*e^2+c*d^2)^3*ln(a^2*(c*x^2+a))*B
*d*e^4-e^4/(a*e^2+c*d^2)^3*ln(e*x+d)*B*d+e^3/(a*e^2+c*d^2)^3*ln(e
*x+d)*C*d^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((C*x^2 + B*x + A)/((c*x^2 + a)^3*(e*x + d)),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((C*x^2 + B*x + A)/((c*x^2 + a)^3*(e*x + d)),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((C*x**2+B*x+A)/(e*x+d)/(c*x**2+a)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.278796, size = 965, normalized size = 2.73

$$-\frac{\left(Cd^{2}e^{3}-Bde^{4}+Ae^{5}\right)\ln\left(cx^{2}+a\right)}{2\left(c^{3}d^{6}+3\,ac^{2}d^{4}e^{2}+3\,a^{2}cd^{2}e^{4}+a^{3}e^{6}\right)}+\frac{\left(Cd^{2}e^{4}-Bde^{5}+Ae^{6}\right)\ln\left(|xe+d|\right)}{c^{3}d^{6}e+3\,ac^{2}d^{4}e^{3}+3\,a^{2}cd^{2}e^{5}+a^{3}e^{7}}+\frac{\left(Cac^{2}d^{5}+3\,Ac^{3}d^{5}-Bac^{2}d^{4}e+6\,Ca^{2}cd^{3}e^{2}+10\,Aac^{2}d^{3}e^{2}-6\,Ba^{2}cd^{2}e^{3}-3\,Ca^{3}de^{4}+15\,Aa^{2}cde^{4}+3\,Ba^{3}e^{5}\right)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{8\left(a^{2}c^{3}d^{6}+3\,a^{3}c^{2}d^{4}e^{2}+3\,a^{4}cd^{2}e^{4}+a^{5}e^{6}\right)\sqrt{ac}}-\frac{2\,Ba^{2}c^{3}d^{5}-2\,Ca^{3}c^{2}d^{4}e-2\,Aa^{2}c^{3}d^{4}e+8\,Ba^{3}c^{2}d^{3}e^{2}-8\,Aa^{3}c^{2}d^{2}e^{3}+6\,Ba^{4}cde^{4}+2\,Ca^{5}e^{5}-6\,Aa^{4}ce^{5}-\left(Cac^{4}d^{5}+3\,Ac^{5}d^{5}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/((c*x^2 + a)^3*(e*x + d)),x, algorithm="giac")
```

```
[Out] -1/2*(C*d^2*e^3 - B*d*e^4 + A*e^5)*ln(c*x^2 + a)/(c^3*d^6 + 3*a*c
^2*d^4*e^2 + 3*a^2*c*d^2*e^4 + a^3*e^6) + (C*d^2*e^4 - B*d*e^5 +
A*e^6)*ln(abs(x*e + d))/(c^3*d^6*e + 3*a*c^2*d^4*e^3 + 3*a^2*c*d^
2*e^5 + a^3*e^7) + 1/8*(C*a*c^2*d^5 + 3*A*c^3*d^5 - B*a*c^2*d^4*e
 + 6*C*a^2*c*d^3*e^2 + 10*A*a*c^2*d^3*e^2 - 6*B*a^2*c*d^2*e^3 - 3
*C*a^3*d*e^4 + 15*A*a^2*c*d*e^4 + 3*B*a^3*e^5)*arctan(c*x/sqrt(a*
c))/((a^2*c^3*d^6 + 3*a^3*c^2*d^4*e^2 + 3*a^4*c*d^2*e^4 + a^5*e^6
)*sqrt(a*c)) - 1/8*(2*B*a^2*c^3*d^5 - 2*C*a^3*c^2*d^4*e - 2*A*a^2
*c^3*d^4*e + 8*B*a^3*c^2*d^3*e^2 - 8*A*a^3*c^2*d^2*e^3 + 6*B*a^4*
c*d*e^4 + 2*C*a^5*e^5 - 6*A*a^4*c*e^5 - (C*a*c^4*d^5 + 3*A*c^5*d^
5 - B*a*c^4*d^4*e - 2*C*a^2*c^3*d^3*e^2 + 10*A*a*c^4*d^3*e^2 + 2*
B*a^2*c^3*d^2*e^3 - 3*C*a^3*c^2*d*e^4 + 7*A*a^2*c^3*d*e^4 + 3*B*a
^3*c^2*e^5)*x^3 - 4*(C*a^2*c^3*d^4*e - B*a^2*c^3*d^3*e^2 + C*a^3*
c^2*d^2*e^3 + A*a^2*c^3*d^2*e^3 - B*a^3*c^2*d*e^4 + A*a^3*c^2*e^5
)*x^2 + (C*a^2*c^3*d^5 - 5*A*a*c^4*d^5 - B*a^2*c^3*d^4*e + 6*C*a^
3*c^2*d^3*e^2 - 14*A*a^2*c^3*d^3*e^2 - 6*B*a^3*c^2*d^2*e^3 + 5*C*
a^4*c*d*e^4 - 9*A*a^3*c^2*d*e^4 - 5*B*a^4*c*e^5)*x)/((c*d^2 + a*e
^2)^3*(c*x^2 + a)^2*a^2*c)
```

3.62 $\int \frac{A+Bx+Cx^2}{(d+ex)^2(a+cx^2)^3}\,dx$

Optimal. Leaf size=571

$$-\frac{4a^2e\left(ae^2(2Cd-Be)-cd\left(2Cd^2-e(3Bd-4Ae)\right)\right)-x\left(Ac\left(-7a^2e^4+12acd^2e^2+3c^2d^4\right)+a\left(3a^2Ce^4-2acde^2(6Cd-7Be\right.\right.}{8a^2\left(a+cx^2\right)\left(ae^2+cd^2\right)^3}$$
$$+\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(3Ac\left(-5a^3e^6+15a^2cd^2e^4+5ac^2d^4e^2+c^3d^6\right)+a\left(3a^3Ce^6-3a^2cde^4(11Cd-10Be)+ac^2d^3e^2(13Cd-20Be)\right.\right.}{8a^{5/2}\sqrt{c}\left(ae^2+cd^2\right)^4}$$
$$-\frac{a\left(-aBe^2+2aCde-2Acde+Bcd^2\right)-x\left(Ac\left(cd^2-ae^2\right)+a\left(aCe^2-cd(Cd-2Be)\right)\right)}{4a\left(a+cx^2\right)^2\left(ae^2+cd^2\right)^2}$$
$$+\frac{e^3\log\left(a+cx^2\right)\left(ae^2(2Cd-Be)-cd\left(4Cd^2-e(5Bd-6Ae)\right)\right)}{2\left(ae^2+cd^2\right)^4}-\frac{e^3\left(Ae^2-Bde+Cd^2\right)}{(d+ex)\left(ae^2+cd^2\right)^3}$$
$$-\frac{e^3\log(d+ex)\left(ae^2(2Cd-Be)-cd\left(4Cd^2-e(5Bd-6Ae)\right)\right)}{\left(ae^2+cd^2\right)^4}$$

```
[Out] -((e^3*(C*d^2 - B*d*e + A*e^2))/((c*d^2 + a*e^2)^3*(d + e*x))) -
(a*(B*c*d^2 - 2*A*c*d*e + 2*a*C*d*e - a*B*e^2) - (A*c*(c*d^2 - a*
e^2) + a*(a*C*e^2 - c*d*(C*d - 2*B*e)))*x)/(4*a*(c*d^2 + a*e^2)^2
*(a + c*x^2)^2) - (4*a^2*e*(a*e^2*(2*C*d - B*e) - c*d*(2*C*d^2 -
e*(3*B*d - 4*A*e))) - (A*c*(3*c^2*d^4 + 12*a*c*d^2*e^2 - 7*a^2*e^
4) + a*(3*a^2*C*e^4 - 2*a*c*d*e^2*(6*C*d - 7*B*e) + c^2*d^3*(C*d
- 2*B*e)))*x)/(8*a^2*(c*d^2 + a*e^2)^3*(a + c*x^2)) + ((3*A*c*(c^
3*d^6 + 5*a*c^2*d^4*e^2 + 15*a^2*c*d^2*e^4 - 5*a^3*e^6) + a*(3*a^
3*C*e^6 + a*c^2*d^3*e^2*(13*C*d - 20*B*e) - 3*a^2*c*d*e^4*(11*C*d
 - 10*B*e) + c^3*d^5*(C*d - 2*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])
/(8*a^(5/2)*Sqrt[c]*(c*d^2 + a*e^2)^4) - (e^3*(a*e^2*(2*C*d - B*e
) - c*d*(4*C*d^2 - e*(5*B*d - 6*A*e)))*Log[d + e*x])/(c*d^2 + a*e
^2)^4 + (e^3*(a*e^2*(2*C*d - B*e) - c*d*(4*C*d^2 - e*(5*B*d - 6*A
*e)))*Log[a + c*x^2])/(2*(c*d^2 + a*e^2)^4)
```

Rubi [A] time = 4.87916, antiderivative size = 566, normalized size of antiderivative = 0.99, number

of steps used = 7, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$

$$\frac{x\left(Ac\left(-7a^2e^4+12acd^2e^2+3c^2d^4\right)+a\left(3a^2Ce^4-2acde^2(6Cd-7Be)+c^2d^3(Cd-2Be)\right)\right)+4a^2e\left(-ae^2(2Cd-Be)-cde(3I\right.}{8a^2\left(a+cx^2\right)\left(ae^2+cd^2\right)^3}$$
$$+\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(3Ac\left(-5a^3e^6+15a^2cd^2e^4+5ac^2d^4e^2+c^3d^6\right)+a\left(3a^3Ce^6-3a^2cde^4(11Cd-10Be)+ac^2d^3e^2(13Cd-20Be)\right.\right.}{8a^{5/2}\sqrt{c}\left(ae^2+cd^2\right)^4}$$
$$-\frac{a\left(-aBe^2+2aCde-2Acde+Bcd^2\right)-x\left(Ac\left(cd^2-ae^2\right)+a\left(aCe^2-cd(Cd-2Be)\right)\right)}{4a\left(a+cx^2\right)^2\left(ae^2+cd^2\right)^2}$$
$$-\frac{e^3\left(Ae^2-Bde+Cd^2\right)}{(d+ex)\left(ae^2+cd^2\right)^3}-\frac{e^3\log\left(a+cx^2\right)\left(-ae^2(2Cd-Be)-cde(5Bd-6Ae)+4cCd^3\right)}{2\left(ae^2+cd^2\right)^4}$$
$$+\frac{e^3\log(d+ex)\left(-ae^2(2Cd-Be)-cde(5Bd-6Ae)+4cCd^3\right)}{\left(ae^2+cd^2\right)^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)^2*(a + c*x^2)^3),x]
```

```
[Out] -((e^3*(C*d^2 - B*d*e + A*e^2))/((c*d^2 + a*e^2)^3*(d + e*x))) -
(a*(B*c*d^2 - 2*A*c*d*e + 2*a*C*d*e - a*B*e^2) - (A*c*(c*d^2 - a*
e^2) + a*(a*C*e^2 - c*d*(C*d - 2*B*e)))*x)/(4*a*(c*d^2 + a*e^2)^2
*(a + c*x^2)^2) + (4*a^2*e*(2*c*C*d^3 - c*d*e*(3*B*d - 4*A*e) - a
*e^2*(2*C*d - B*e)) + (A*c*(3*c^2*d^4 + 12*a*c*d^2*e^2 - 7*a^2*e^
4) + a*(3*a^2*C*e^4 - 2*a*c*d*e^2*(6*C*d - 7*B*e) + c^2*d^3*(C*d
- 2*B*e)))*x)/(8*a^2*(c*d^2 + a*e^2)^3*(a + c*x^2)) + ((3*A*c*(c^
3*d^6 + 5*a*c^2*d^4*e^2 + 15*a^2*c*d^2*e^4 - 5*a^3*e^6) + a*(3*a^
3*C*e^6 + a*c^2*d^3*e^2*(13*C*d - 20*B*e) - 3*a^2*c*d*e^4*(11*C*d
 - 10*B*e) + c^3*d^5*(C*d - 2*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])
/(8*a^(5/2)*Sqrt[c]*(c*d^2 + a*e^2)^4) + (e^3*(4*c*C*d^3 - c*d*e*
(5*B*d - 6*A*e) - a*e^2*(2*C*d - B*e))*Log[d + e*x])/(c*d^2 + a*e
^2)^4 - (e^3*(4*c*C*d^3 - c*d*e*(5*B*d - 6*A*e) - a*e^2*(2*C*d -
B*e))*Log[a + c*x^2])/(2*(c*d^2 + a*e^2)^4)
```

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((C*x**2+B*x+A)/(e*x+d)**2/(c*x**2+a)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.91403, size = 498, normalized size = 0.87

$$\frac{\frac{2\left(ae^2+cd^2\right)^2\left(a^2e(Be-2Cd+Cex)-ac\left(Ae(ex-2d)+Bd(d-2ex)+Cd^2x\right)+Ac^2d^2x\right)}{a\left(a+cx^2\right)^2}+\frac{\left(ae^2+cd^2\right)\left(a^3e^3(4Be-8Cd+3Cex)+a^2ce\left(e(Ae(16d-7ex)-2Bd(6d-7ex)\right.\right.}{a^2\left(a+cx^2\right)}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/((d + e*x)^2*(a + c*x^2)^3),x]
```

```
[Out] ((-8*e^3*(c*d^2 + a*e^2)*(C*d^2 + e*(-(B*d) + A*e)))/(d + e*x) +
(2*(c*d^2 + a*e^2)^2*(A*c^2*d^2*x + a^2*e*(-2*C*d + B*e + C*e*x)
- a*c*(C*d^2*x + B*d*(d - 2*e*x) + A*e*(-2*d + e*x))))/(a*(a + c*
x^2)^2) + ((c*d^2 + a*e^2)*(3*A*c^3*d^4*x + a*c^2*d^2*(C*d^2 + 2*
e*(-(B*d) + 6*A*e))*x + a^3*e^3*(-8*C*d + 4*B*e + 3*C*e*x) + a^2*
c*e*(4*C*d^2*(2*d - 3*e*x) + e*(-2*B*d*(6*d - 7*e*x) + A*e*(16*d
- 7*e*x)))))/(a^2*(a + c*x^2)) + ((3*A*c*(c^3*d^6 + 5*a*c^2*d^4*e
^2 + 15*a^2*c*d^2*e^4 - 5*a^3*e^6) + a*(3*a^3*C*e^6 + a*c^2*d^3*e
^2*(13*C*d - 20*B*e) + c^3*d^5*(C*d - 2*B*e) + 3*a^2*c*d*e^4*(-11
*C*d + 10*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(a^(5/2)*Sqrt[c]) +
 8*e^3*(4*c*C*d^3 + c*d*e*(-5*B*d + 6*A*e) + a*e^2*(-2*C*d + B*e)
)*Log[d + e*x] - 4*e^3*(4*c*C*d^3 + c*d*e*(-5*B*d + 6*A*e) + a*e^
2*(-2*C*d + B*e))*Log[a + c*x^2])/(8*(c*d^2 + a*e^2)^4)
```

Maple [B] time = 0.039, size = 2179, normalized size = 3.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)^2/(c*x^2+a)^3,x)
```

```
[Out] -e^5/(a*e^2+c*d^2)^3/(e*x+d)*A-13/8/(a*e^2+c*d^2)^4/(c*x^2+a)^2*C
*a*c^2*d^4*e^2*x+15/8/(a*e^2+c*d^2)^4/a/(a*c)^(1/2)*arctan(c*x/(a
*c)^(1/2))*A*c^3*d^4*e^2-1/4/(a*e^2+c*d^2)^4/(c*x^2+a)^2*c^4/a*x^
3*B*d^5*e+7/4/(a*e^2+c*d^2)^4/(c*x^2+a)^2*B*x^3*a*c^2*d*e^5-1/(a*
e^2+c*d^2)^4/(c*x^2+a)^2*C*x^2*a^2*c*d*e^5+3/8/(a*e^2+c*d^2)^4/(c
*x^2+a)^2*A*a*c^2*d^2*e^4*x+9/4/(a*e^2+c*d^2)^4/(c*x^2+a)^2*d*a^2
*c*B*e^5*x+5/2/(a*e^2+c*d^2)^4/(c*x^2+a)^2*B*a*c^2*d^3*e^3*x-7/8/
(a*e^2+c*d^2)^4/(c*x^2+a)^2*C*a^2*c*d^2*e^4*x-9/8/(a*e^2+c*d^2)^4
/(c*x^2+a)^2*C*x^3*a*c^2*d^2*e^4+2/(a*e^2+c*d^2)^4/(c*x^2+a)^2*A*
x^2*a*c^2*d*e^5-1/(a*e^2+c*d^2)^4/(c*x^2+a)^2*B*x^2*a*c^2*d^2*e^4
+15/8/(a*e^2+c*d^2)^4/(c*x^2+a)^2*c^4/a*x^3*A*d^4*e^2+3/8/(a*e^2+
c*d^2)^4/(c*x^2+a)^2*C*x^3*a^2*c*e^6+5/2/(a*e^2+c*d^2)^4/(c*x^2+a
)^2*A*a^2*c*d*e^5+3/(a*e^2+c*d^2)^4/(c*x^2+a)^2*A*a*c^2*d^3*e^3-3
/4/(a*e^2+c*d^2)^4/(c*x^2+a)^2*B*a^2*c*d^2*e^4+2/(a*e^2+c*d^2)^4/
(c*x^2+a)^2*A*x^2*c^3*d^3*e^3+1/2/(a*e^2+c*d^2)^4/(c*x^2+a)^2*B*x
```

```
^2*a^2*c*e^6-3/2/(a*e^2+c*d^2)^4/(c*x^2+a)^2*B*x^2*c^3*d^4*e^2+1/
(a*e^2+c*d^2)^4/(c*x^2+a)^2*C*x^2*c^3*d^5*e-9/8/(a*e^2+c*d^2)^4/(
c*x^2+a)^2*a^2*c*A*e^6*x+17/8/(a*e^2+c*d^2)^4/(c*x^2+a)^2*A*c^3*d
^4*e^2*x+1/4/(a*e^2+c*d^2)^4/(c*x^2+a)^2*B*c^3*d^5*e*x+3/2/(a*e^2
+c*d^2)^4/(c*x^2+a)^2*B*x^3*c^3*d^3*e^3+3/8/(a*e^2+c*d^2)^4/(c*x^
2+a)^2*c^5/a^2*x^3*A*d^6+1/8/(a*e^2+c*d^2)^4/(c*x^2+a)^2*c^4/a*x^
3*C*d^6+5/8/(a*e^2+c*d^2)^4/(c*x^2+a)^2/a*x*A*c^4*d^6-1/4/(a*e^2+
c*d^2)^4/a/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*c^3*d^5*e-33/8/(
a*e^2+c*d^2)^4*a/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*c*d^2*e^4-
1/(a*e^2+c*d^2)^4/(c*x^2+a)^2*C*a^2*c*d^3*e^3+1/2/(a*e^2+c*d^2)^4
/(c*x^2+a)^2*C*a*c^2*d^5*e+45/8/(a*e^2+c*d^2)^4/(a*c)^(1/2)*arcta
n(c*x/(a*c)^(1/2))*A*c^2*d^2*e^4-5/2/(a*e^2+c*d^2)^4/(a*c)^(1/2)*
arctan(c*x/(a*c)^(1/2))*B*c^2*d^3*e^3+13/8/(a*e^2+c*d^2)^4/(a*c)^
(1/2)*arctan(c*x/(a*c)^(1/2))*C*c^2*d^4*e^2-15/8/(a*e^2+c*d^2)^4*
a/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*c*e^6+3/8/(a*e^2+c*d^2)^4
/a^2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*c^4*d^6+1/8/(a*e^2+c*d
^2)^4/a/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*c^3*d^6-7/8/(a*e^2+
c*d^2)^4/(c*x^2+a)^2*A*x^3*a*c^2*e^6+5/8/(a*e^2+c*d^2)^4/(c*x^2+a
)^2*A*x^3*c^3*d^2*e^4+15/4/(a*e^2+c*d^2)^4*a/(a*c)^(1/2)*arctan(c
*x/(a*c)^(1/2))*B*c*d*e^5-11/8/(a*e^2+c*d^2)^4/(c*x^2+a)^2*C*x^3*
c^3*d^4*e^2-7/4/(a*e^2+c*d^2)^4/(c*x^2+a)^2*B*a*c^2*d^4*e^2+1/2/(
a*e^2+c*d^2)^4/(c*x^2+a)^2*A*c^3*d^5*e-3/2/(a*e^2+c*d^2)^4/(c*x^2
+a)^2*C*a^3*d*e^5+5/8/(a*e^2+c*d^2)^4/(c*x^2+a)^2*a^3*C*e^6*x-1/8
/(a*e^2+c*d^2)^4/(c*x^2+a)^2*C*c^3*d^6*x+3/8/(a*e^2+c*d^2)^4*a^2/
(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*e^6+1/(a*e^2+c*d^2)^4*a*ln(
a^2*(c*x^2+a))*C*d*e^5-2/(a*e^2+c*d^2)^4*c*ln(a^2*(c*x^2+a))*C*d^
3*e^3-3/(a*e^2+c*d^2)^4*c*ln(a^2*(c*x^2+a))*A*d*e^5+5/2/(a*e^2+c*
d^2)^4*c*ln(a^2*(c*x^2+a))*B*d^2*e^4+6*e^5/(a*e^2+c*d^2)^4*ln(e*x
+d)*d*c*A-5*e^4/(a*e^2+c*d^2)^4*ln(e*x+d)*B*c*d^2-2*e^5/(a*e^2+c*
d^2)^4*ln(e*x+d)*C*a*d+4*e^3/(a*e^2+c*d^2)^4*ln(e*x+d)*C*c*d^3-1/
4/(a*e^2+c*d^2)^4/(c*x^2+a)^2*B*c^3*d^6+3/4/(a*e^2+c*d^2)^4/(c*x^
2+a)^2*B*a^3*e^6-1/2/(a*e^2+c*d^2)^4*a*ln(a^2*(c*x^2+a))*B*e^6+e^
6/(a*e^2+c*d^2)^4*ln(e*x+d)*B*a+e^4/(a*e^2+c*d^2)^3/(e*x+d)*B*d-e
^3/(a*e^2+c*d^2)^3/(e*x+d)*C*d^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((C*x^2 + B*x + A)/((c*x^2 + a)^3*(e*x + d)^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((C*x^2 + B*x + A)/((c*x^2 + a)^3*(e*x + d)^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((C*x**2+B*x+A)/(e*x+d)**2/(c*x**2+a)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.287884, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/((c*x^2 + a)^3*(e*x + d)^2),x, algorithm="giac")
```

```
[Out] Done
```

3.63 $\int \frac{A+Bx+Cx^2}{(d+ex)^3(a+cx^2)^3}\,dx$

Optimal. Leaf size=753

$$-\frac{e^3\log\left(a+cx^2\right)\left(a^2Ce^4-ace^2\left(3Ae^2-9Bde+13Cd^2\right)+c^2d^2\left(10Cd^2-3e(5Bd-7Ae)\right)\right)}{2\left(ae^2+cd^2\right)^5}$$
$$+\frac{e^3\log(d+ex)\left(a^2Ce^4-ace^2\left(3Ae^2-9Bde+13Cd^2\right)+c^2d^2\left(10Cd^2-3e(5Bd-7Ae)\right)\right)}{\left(ae^2+cd^2\right)^5}$$
$$+\frac{4a^2e\left(a^2Ce^4-2ace^2\left(4Cd^2-e(3Bd-Ae)\right)+c^2d^2\left(3Cd^2-2e(3Bd-5Ae)\right)\right)+cx\left(3Acd\left(-11a^2e^4+6acd^2e^2+c^2d^4\right)-a\left(\cdots\right.\right.}{8a^2\left(a+cx^2\right)\left(ae^2+cd^2\right)^4}$$
$$+\frac{\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(3Acd\left(-35a^3e^6+35a^2cd^2e^4+7ac^2d^4e^2+c^3d^6\right)+a\left(15a^3e^6(3Cd-Be)-5a^2cd^2e^4(25Cd-27Be)+ac^2d^4\cdots\right.\right.}{8a^{5/2}\left(ae^2+cd^2\right)^5}$$
$$-\frac{a\left(Bcd\left(cd^2-3ae^2\right)-e(Ac-aC)\left(3cd^2-ae^2\right)\right)-cx\left(Acd\left(cd^2-3ae^2\right)-a\left(cd^2(Cd-3Be)-ae^2(3Cd-Be)\right)\right)}{4a\left(a+cx^2\right)^2\left(ae^2+cd^2\right)^3}$$
$$+\frac{e^3\left(ae^2(2Cd-Be)-cd\left(4Cd^2-e(5Bd-6Ae)\right)\right)}{(d+ex)\left(ae^2+cd^2\right)^4}-\frac{e^3\left(Ae^2-Bde+Cd^2\right)}{2(d+ex)^2\left(ae^2+cd^2\right)^3}$$

```
[Out] -(e^3*(C*d^2 - B*d*e + A*e^2))/(2*(c*d^2 + a*e^2)^3*(d + e*x)^2)
+ (e^3*(a*e^2*(2*C*d - B*e) - c*d*(4*C*d^2 - e*(5*B*d - 6*A*e))))
/((c*d^2 + a*e^2)^4*(d + e*x)) - (a*(B*c*d*(c*d^2 - 3*a*e^2) - (A
*c - a*C)*e*(3*c*d^2 - a*e^2)) - c*(A*c*d*(c*d^2 - 3*a*e^2) - a*(
c*d^2*(C*d - 3*B*e) - a*e^2*(3*C*d - B*e)))*x)/(4*a*(c*d^2 + a*e^
2)^3*(a + c*x^2)^2) + (4*a^2*e*(a^2*C*e^4 + c^2*d^2*(3*C*d^2 - 2*
e*(3*B*d - 5*A*e)) - 2*a*c*e^2*(4*C*d^2 - e*(3*B*d - A*e))) + c*(
3*A*c*d*(c^2*d^4 + 6*a*c*d^2*e^2 - 11*a^2*e^4) - a*(2*a*c*d^2*e^2
*(13*C*d - 19*B*e) - c^2*d^4*(C*d - 3*B*e) - 7*a^2*e^4*(3*C*d - B
*e)))*x)/(8*a^2*(c*d^2 + a*e^2)^4*(a + c*x^2)) + (Sqrt[c]*(3*A*c*
d*(c^3*d^6 + 7*a*c^2*d^4*e^2 + 35*a^2*c*d^2*e^4 - 35*a^3*e^6) + a
*(a*c^2*d^4*e^2*(23*C*d - 45*B*e) - 5*a^2*c*d^2*e^4*(25*C*d - 27*
B*e) + c^3*d^6*(C*d - 3*B*e) + 15*a^3*e^6*(3*C*d - B*e)))*ArcTan[
(Sqrt[c]*x)/Sqrt[a]])/(8*a^(5/2)*(c*d^2 + a*e^2)^5) + (e^3*(a^2*C
*e^4 - a*c*e^2*(13*C*d^2 - 9*B*d*e + 3*A*e^2) + c^2*d^2*(10*C*d^2
 - 3*e*(5*B*d - 7*A*e)))*Log[d + e*x])/(c*d^2 + a*e^2)^5 - (e^3*(
a^2*C*e^4 - a*c*e^2*(13*C*d^2 - 9*B*d*e + 3*A*e^2) + c^2*d^2*(10*
C*d^2 - 3*e*(5*B*d - 7*A*e)))*Log[a + c*x^2])/(2*(c*d^2 + a*e^2)^
5)
```

Rubi [A] time = 9.96671, antiderivative size = 753, normalized size of antiderivative = 1., number of

steps used = 7, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$

$$\frac{cx\left(3Acd\left(-11a^2e^4+6acd^2e^2+c^2d^4\right)-a\left(-7a^2e^4(3Cd-Be)+2acd^2e^2(13Cd-19Be)-c^2d^4(Cd-3Be)\right)\right)+4a^2e\left(a^2Ce^4-\right.}{8a^2\left(a+cx^2\right)\left(ae^2+cd^2\right)^4}$$
$$-\frac{e^3\log\left(a+cx^2\right)\left(a^2Ce^4-ace^2\left(3Ae^2-9Bde+13Cd^2\right)+c^2\left(10Cd^4-3d^2e(5Bd-7Ae)\right)\right)}{2\left(ae^2+cd^2\right)^5}$$
$$+\frac{e^3\log(d+ex)\left(a^2Ce^4-ace^2\left(3Ae^2-9Bde+13Cd^2\right)+c^2\left(10Cd^4-3d^2e(5Bd-7Ae)\right)\right)}{\left(ae^2+cd^2\right)^5}$$
$$+\frac{\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(3Acd\left(-35a^3e^6+35a^2cd^2e^4+7ac^2d^4e^2+c^3d^6\right)+a\left(15a^3e^6(3Cd-Be)-5a^2cd^2e^4(25Cd-27Be)+ac^2d^4\right.\right.}{8a^{5/2}\left(ae^2+cd^2\right)^5}$$
$$-\frac{a\left(Bcd\left(cd^2-3ae^2\right)-e(Ac-aC)\left(3cd^2-ae^2\right)\right)-cx\left(Acd\left(cd^2-3ae^2\right)-a\left(cd^2(Cd-3Be)-ae^2(3Cd-Be)\right)\right)}{4a\left(a+cx^2\right)^2\left(ae^2+cd^2\right)^3}$$
$$-\frac{e^3\left(Ae^2-Bde+Cd^2\right)}{2(d+ex)^2\left(ae^2+cd^2\right)^3}-\frac{e^3\left(-ae^2(2Cd-Be)-cde(5Bd-6Ae)+4cCd^3\right)}{(d+ex)\left(ae^2+cd^2\right)^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)^3*(a + c*x^2)^3),x]
```

```
[Out] -(e^3*(C*d^2 - B*d*e + A*e^2))/(2*(c*d^2 + a*e^2)^3*(d + e*x)^2)
- (e^3*(4*c*C*d^3 - c*d*e*(5*B*d - 6*A*e) - a*e^2*(2*C*d - B*e)))
/((c*d^2 + a*e^2)^4*(d + e*x)) - (a*(B*c*d*(c*d^2 - 3*a*e^2) - (A
*c - a*C)*e*(3*c*d^2 - a*e^2)) - c*(A*c*d*(c*d^2 - 3*a*e^2) - a*(
c*d^2*(C*d - 3*B*e) - a*e^2*(3*C*d - B*e)))*x)/(4*a*(c*d^2 + a*e^
2)^3*(a + c*x^2)^2) + (4*a^2*e*(a^2*C*e^4 + c^2*(3*C*d^4 - 2*d^2*
e*(3*B*d - 5*A*e)) - 2*a*c*e^2*(4*C*d^2 - e*(3*B*d - A*e))) + c*(
3*A*c*d*(c^2*d^4 + 6*a*c*d^2*e^2 - 11*a^2*e^4) - a*(2*a*c*d^2*e^2
*(13*C*d - 19*B*e) - c^2*d^4*(C*d - 3*B*e) - 7*a^2*e^4*(3*C*d - B
*e)))*x)/(8*a^2*(c*d^2 + a*e^2)^4*(a + c*x^2)) + (Sqrt[c]*(3*A*c*
d*(c^3*d^6 + 7*a*c^2*d^4*e^2 + 35*a^2*c*d^2*e^4 - 35*a^3*e^6) + a
*(a*c^2*d^4*e^2*(23*C*d - 45*B*e) - 5*a^2*c*d^2*e^4*(25*C*d - 27*
B*e) + c^3*d^6*(C*d - 3*B*e) + 15*a^3*e^6*(3*C*d - B*e)))*ArcTan[
(Sqrt[c]*x)/Sqrt[a]])/(8*a^(5/2)*(c*d^2 + a*e^2)^5) + (e^3*(a^2*C
*e^4 - a*c*e^2*(13*C*d^2 - 9*B*d*e + 3*A*e^2) + c^2*(10*C*d^4 - 3
*d^2*e*(5*B*d - 7*A*e)))*Log[d + e*x])/(c*d^2 + a*e^2)^5 - (e^3*(
a^2*C*e^4 - a*c*e^2*(13*C*d^2 - 9*B*d*e + 3*A*e^2) + c^2*(10*C*d^
4 - 3*d^2*e*(5*B*d - 7*A*e)))*Log[a + c*x^2])/(2*(c*d^2 + a*e^2)^
5)
```

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((C*x**2+B*x+A)/(e*x+d)**3/(c*x**2+a)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 2.7179, size = 672, normalized size = 0.89

$$\frac{-4\log\left(a+cx^2\right)\left(a^2Ce^7+ace^5\left(-3Ae^2+9Bde-13Cd^2\right)+c^2d^2e^3\left(3e(7Ae-5Bd)+10Cd^2\right)\right)+8\log(d+ex)\left(a^2Ce^7+ace^5\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/((d + e*x)^3*(a + c*x^2)^3),x]
```

```
[Out] ((-4*e^3*(c*d^2 + a*e^2)^2*(C*d^2 + e*(-(B*d) + A*e)))/(d + e*x)^
2 - (8*e^3*(c*d^2 + a*e^2)*(4*c*C*d^3 + c*d*e*(-5*B*d + 6*A*e) +
a*e^2*(-2*C*d + B*e)))/(d + e*x) + (2*(c*d^2 + a*e^2)^2*(a^3*C*e^
3 + A*c^3*d^3*x - a*c^2*d*(C*d^2*x + B*d*(d - 3*e*x) + 3*A*e*(-d
+ e*x)) - a^2*c*e*(3*C*d*(d - e*x) + e*(-3*B*d + A*e + B*e*x))))/
(a*(a + c*x^2)^2) + ((c*d^2 + a*e^2)*(4*a^4*C*e^5 + 3*A*c^4*d^5*x
 + a*c^3*d^3*(C*d^2 + 3*e*(-(B*d) + 6*A*e))*x + a^3*c*e^3*(C*d*(-
32*d + 21*e*x) + e*(24*B*d - 8*A*e - 7*B*e*x)) + a^2*c^2*d*e*(2*C
*d^2*(6*d - 13*e*x) + e*(-24*B*d^2 + 40*A*d*e + 38*B*d*e*x - 33*A
*e^2*x))))/(a^2*(a + c*x^2)) + (Sqrt[c]*(3*A*c*d*(c^3*d^6 + 7*a*c
^2*d^4*e^2 + 35*a^2*c*d^2*e^4 - 35*a^3*e^6) + a*(a*c^2*d^4*e^2*(2
3*C*d - 45*B*e) - 5*a^2*c*d^2*e^4*(25*C*d - 27*B*e) + c^3*d^6*(C*
d - 3*B*e) - 15*a^3*e^6*(-3*C*d + B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[
a]])/a^(5/2) + 8*(a^2*C*e^7 + a*c*e^5*(-13*C*d^2 + 9*B*d*e - 3*A*
e^2) + c^2*d^2*e^3*(10*C*d^2 + 3*e*(-5*B*d + 7*A*e)))*Log[d + e*x
] - 4*(a^2*C*e^7 + a*c*e^5*(-13*C*d^2 + 9*B*d*e - 3*A*e^2) + c^2*
d^2*e^3*(10*C*d^2 + 3*e*(-5*B*d + 7*A*e)))*Log[a + c*x^2])/(8*(c*
d^2 + a*e^2)^5)
```

Maple [B] time = 0.046, size = 2765, normalized size = 3.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)^3/(c*x^2+a)^3,x)
```

```
[Out] -3/8*c^4/(a*e^2+c*d^2)^5/a/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*
d^6*e-1/2*e^5/(a*e^2+c*d^2)^3/(e*x+d)^2*A+21/8*c^2/(a*e^2+c*d^2)^
```

5/(c*x^2+a)^2*C*x^3*a^2*d*e^6-5/8*c^3/(a*e^2+c*d^2)^5/(c*x^2+a)^2
*C*x^3*a*d^3*e^4+45/8*c/(a*e^2+c*d^2)^5*a^2/(a*c)^(1/2)*arctan(c*
x/(a*c)^(1/2))*C*d*e^6-105/8*c^2/(a*e^2+c*d^2)^5*a/(a*c)^(1/2)*ar
ctan(c*x/(a*c)^(1/2))*A*d*e^6+21/8*c^4/(a*e^2+c*d^2)^5/a/(a*c)^(1
/2)*arctan(c*x/(a*c)^(1/2))*A*d^5*e^2+135/8*c^2/(a*e^2+c*d^2)^5*a
/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*d^2*e^5-125/8*c^2/(a*e^2+c
*d^2)^5*a/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*d^3*e^4+27/8*c/(a
*e^2+c*d^2)^5/(c*x^2+a)^2*C*a^3*d*e^6*x+21/8*c^5/(a*e^2+c*d^2)^5/
(c*x^2+a)^2/a*x^3*A*d^5*e^2-3/8*c^5/(a*e^2+c*d^2)^5/(c*x^2+a)^2/a
*x^3*B*d^6*e+31/8*c^3/(a*e^2+c*d^2)^5/(c*x^2+a)^2*B*x^3*a*d^2*e^5
+5/8*c^2/(a*e^2+c*d^2)^5/(c*x^2+a)^2*C*a^2*d^3*e^4*x-23/8*c^3/(a*
e^2+c*d^2)^5/(c*x^2+a)^2*C*a*d^5*e^2*x+45/8*c^3/(a*e^2+c*d^2)^5/(
c*x^2+a)^2*B*a*d^4*e^3*x+33/8*c^2/(a*e^2+c*d^2)^5/(c*x^2+a)^2*B*a
^2*d^2*e^5*x-39/8*c^2/(a*e^2+c*d^2)^5/(c*x^2+a)^2*A*a^2*d*e^6*x-2
5/8*c^3/(a*e^2+c*d^2)^5/(c*x^2+a)^2*A*a*d^3*e^4*x-7/2*c^2/(a*e^2+
c*d^2)^5/(c*x^2+a)^2*C*x^2*a^2*d^2*e^5-5/2*c^3/(a*e^2+c*d^2)^5/(c
*x^2+a)^2*C*x^2*a*d^4*e^3+4*c^3/(a*e^2+c*d^2)^5/(c*x^2+a)^2*A*x^2
*a*d^2*e^5+3*c^2/(a*e^2+c*d^2)^5/(c*x^2+a)^2*B*x^2*a^2*d*e^6-33/8
*c^3/(a*e^2+c*d^2)^5/(c*x^2+a)^2*A*x^3*a*d*e^6-5/4*c/(a*e^2+c*d^2
)^5/(c*x^2+a)^2*A*a^3*e^7+3/4*c^4/(a*e^2+c*d^2)^5/(c*x^2+a)^2*A*d
^6*e-1/8*c^4/(a*e^2+c*d^2)^5/(c*x^2+a)^2*C*d^7*x+15/2*c^2/(a*e^2+
c*d^2)^5*ln(a^2*(c*x^2+a))*B*d^3*e^4-5*c^2/(a*e^2+c*d^2)^5*ln(a^2
*(c*x^2+a))*C*d^4*e^3+3/2*c/(a*e^2+c*d^2)^5*a*ln(a^2*(c*x^2+a))*A
*e^7-21/2*c^2/(a*e^2+c*d^2)^5*ln(a^2*(c*x^2+a))*A*d^2*e^5-6*e^5/(
a*e^2+c*d^2)^4/(e*x+d)*d*c*A+5*e^4/(a*e^2+c*d^2)^4/(e*x+d)*B*c*d^
2+2*e^5/(a*e^2+c*d^2)^4/(e*x+d)*C*a*d-4*e^3/(a*e^2+c*d^2)^4/(e*x+
d)*C*c*d^3-3*e^7/(a*e^2+c*d^2)^5*ln(e*x+d)*A*a*c+21*e^5/(a*e^2+c*
d^2)^5*ln(e*x+d)*A*c^2*d^2-15*e^4/(a*e^2+c*d^2)^5*ln(e*x+d)*B*c^2
*d^3+10*e^3/(a*e^2+c*d^2)^5*ln(e*x+d)*C*c^2*d^4+17/4*c^2/(a*e^2+c
*d^2)^5/(c*x^2+a)^2*A*a^2*d^2*e^5+25/4*c^3/(a*e^2+c*d^2)^5/(c*x^2
+a)^2*A*a*d^4*e^3+5/4*c^2/(a*e^2+c*d^2)^5/(c*x^2+a)^2*B*a^2*d^3*e
^4-11/4*c^3/(a*e^2+c*d^2)^5/(c*x^2+a)^2*B*a*d^5*e^2-15/4*c^2/(a*e
^2+c*d^2)^5/(c*x^2+a)^2*C*a^2*d^4*e^3+3/4*c^3/(a*e^2+c*d^2)^5/(c*
x^2+a)^2*C*a*d^6*e+3/8*c^6/(a*e^2+c*d^2)^5/(c*x^2+a)^2/a^2*x^3*A*
d^7+1/8*c^5/(a*e^2+c*d^2)^5/(c*x^2+a)^2/a*x^3*C*d^7+5/8*c^5/(a*e^
2+c*d^2)^5/(c*x^2+a)^2/a*x*A*d^7-3*c^4/(a*e^2+c*d^2)^5/(c*x^2+a)^
2*B*x^2*d^5*e^2+3/2*c^4/(a*e^2+c*d^2)^5/(c*x^2+a)^2*C*x^2*d^6*e+1
9/8*c^4/(a*e^2+c*d^2)^5/(c*x^2+a)^2*A*d^5*e^2*x+1/2*c/(a*e^2+c*d^
2)^5/(c*x^2+a)^2*C*x^2*a^3*e^7-9/8*c/(a*e^2+c*d^2)^5/(c*x^2+a)^2*
B*a^3*e^7*x+15/4*c/(a*e^2+c*d^2)^5/(c*x^2+a)^2*B*a^3*d*e^6-15/4*c
/(a*e^2+c*d^2)^5/(c*x^2+a)^2*C*a^3*d^2*e^5+13/2*c/(a*e^2+c*d^2)^5
*a*ln(a^2*(c*x^2+a))*C*d^2*e^5+3/8*c^5/(a*e^2+c*d^2)^5/a^2/(a*c)^
(1/2)*arctan(c*x/(a*c)^(1/2))*A*d^7+1/8*c^4/(a*e^2+c*d^2)^5/a/(a*
c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*d^7+105/8*c^3/(a*e^2+c*d^2)^5/
(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*d^3*e^4-45/8*c^3/(a*e^2+c*d
^2)^5/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*d^4*e^3+23/8*c^3/(a*e
^2+c*d^2)^5/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*d^5*e^2-15/8*c/
(a*e^2+c*d^2)^5*a^2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*e^7-9/2
*c/(a*e^2+c*d^2)^5*a*ln(a^2*(c*x^2+a))*B*d*e^6+9*e^6/(a*e^2+c*d^2
)^5*ln(e*x+d)*B*a*c*d-13*e^5/(a*e^2+c*d^2)^5*ln(e*x+d)*C*a*c*d^2+
3/8*c^4/(a*e^2+c*d^2)^5/(c*x^2+a)^2*B*d^6*e*x+5*c^4/(a*e^2+c*d^2)
^5/(c*x^2+a)^2*A*x^2*d^4*e^3+35/8*c^4/(a*e^2+c*d^2)^5/(c*x^2+a)^2
*B*x^3*d^4*e^3-25/8*c^4/(a*e^2+c*d^2)^5/(c*x^2+a)^2*C*x^3*d^5*e^2
-c^2/(a*e^2+c*d^2)^5/(c*x^2+a)^2*A*x^2*a^2*e^7-15/8*c^4/(a*e^2+c*

```
d^2)^5/(c*x^2+a)^2*A*x^3*d^3*e^4-7/8*c^2/(a*e^2+c*d^2)^5/(c*x^2+a
)^2*B*x^3*a^2*e^7-1/4*c^4/(a*e^2+c*d^2)^5/(c*x^2+a)^2*B*d^7+3/4/(
a*e^2+c*d^2)^5/(c*x^2+a)^2*C*a^4*e^7-1/2/(a*e^2+c*d^2)^5*a^2*ln(a
^2*(c*x^2+a))*C*e^7-e^6/(a*e^2+c*d^2)^4/(e*x+d)*B*a+1/2*e^4/(a*e^
2+c*d^2)^3/(e*x+d)^2*B*d-1/2*e^3/(a*e^2+c*d^2)^3/(e*x+d)^2*C*d^2+
e^7/(a*e^2+c*d^2)^5*ln(e*x+d)*a^2*C
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/((c*x^2 + a)^3*(e*x + d)^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((C*x^2 + B*x + A)/((c*x^2 + a)^3*(e*x + d)^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((C*x**2+B*x+A)/(e*x+d)**3/(c*x**2+a)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.283639, size = 1, normalized size = 0.

$$Done$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/((c*x^2 + a)^3*(e*x + d)^3),x, algorithm="giac")
```

```
[Out] Done
```

3.64 $\int \frac{(d+ex)^4(A+Bx+Cx^2)}{(a+cx^2)^4}\,dx$

Optimal. Leaf size=234

$$\frac{(ae^2+cd^2)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(cd(4aBe+aCd+5Acd)+ae^2(5aC+Ac)\right)}{16a^{7/2}c^{7/2}} - \frac{(d+ex)(ae-cdx)\left(cd(4aBe+aCd+5Acd)+ae^2(5aC+Ac)\right)}{16a^3c^3(a+cx^2)} - \frac{(d+ex)^3(ae(5aC+Ac)-cx(4aBe+aCd+5Acd))}{24a^2c^2(a+cx^2)^2} - \frac{(d+ex)^4(aB-x(Ac-aC))}{6ac(a+cx^2)^3}$$

```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x)^4)/(6*a*c*(a + c*x^2)^3) - ((d
+ e*x)^3*(a*(A*c + 5*a*C)*e - c*(5*A*c*d + a*C*d + 4*a*B*e)*x))/(
24*a^2*c^2*(a + c*x^2)^2) - ((a*(A*c + 5*a*C)*e^2 + c*d*(5*A*c*d
+ a*C*d + 4*a*B*e))*(a*e - c*d*x)*(d + e*x))/(16*a^3*c^3*(a + c*x
^2)) + ((c*d^2 + a*e^2)*(a*(A*c + 5*a*C)*e^2 + c*d*(5*A*c*d + a*C
*d + 4*a*B*e))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(16*a^(7/2)*c^(7/2))
```

Rubi [A] time = 0.647679, antiderivative size = 234, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.148$

$$\frac{(ae^2+cd^2)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(cd(4aBe+aCd+5Acd)+ae^2(5aC+Ac)\right)}{16a^{7/2}c^{7/2}} - \frac{(d+ex)(ae-cdx)\left(cd(4aBe+aCd+5Acd)+ae^2(5aC+Ac)\right)}{16a^3c^3(a+cx^2)} - \frac{(d+ex)^3(ae(5aC+Ac)-cx(4aBe+aCd+5Acd))}{24a^2c^2(a+cx^2)^2} - \frac{(d+ex)^4(aB-x(Ac-aC))}{6ac(a+cx^2)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^4*(A + B*x + C*x^2))/(a + c*x^2)^4,x]
```

```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x)^4)/(6*a*c*(a + c*x^2)^3) - ((d
+ e*x)^3*(a*(A*c + 5*a*C)*e - c*(5*A*c*d + a*C*d + 4*a*B*e)*x))/(
24*a^2*c^2*(a + c*x^2)^2) - ((a*(A*c + 5*a*C)*e^2 + c*d*(5*A*c*d
+ a*C*d + 4*a*B*e))*(a*e - c*d*x)*(d + e*x))/(16*a^3*c^3*(a + c*x
^2)) + ((c*d^2 + a*e^2)*(a*(A*c + 5*a*C)*e^2 + c*d*(5*A*c*d + a*C
*d + 4*a*B*e))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(16*a^(7/2)*c^(7/2))
```

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((e*x+d)**4*(C*x**2+B*x+A)/(c*x**2+a)**4,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.692721, size = 437, normalized size = 1.87

$$\frac{\left(ae^2+cd^2\right)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Ac\left(ae^2+5cd^2\right)+a\left(5aCe^2+cd(4Be+Cd)\right)\right)}{16a^{7/2}c^{7/2}}+\frac{-a^3e^3(8Be+32Cd+11Cex)+a^2ce^2x\left(e(Ae+4Bd)+6Cd^2\right)+ac^2d^2x\left(6Ae^2+4Bde+Cd^2\right)+5Ac^3d^4x}{16a^3c^3\left(a+cx^2\right)}+\frac{-a^3e^3(Be+4Cd+Cex)+a^2ce\left(e(Ae(4d+ex)+2Bd(3d+2ex))+2Cd^2(2d+3ex)\right)-ac^2d^2\left(4Ade+6Ae^2x+Bd(d+4ex)+\right.}{6ac^3\left(a+cx^2\right)^3}+\frac{a^3e^3(12Be+48Cd+13Cex)-a^2ce\left(e(Ae(24d+7ex)+4Bd(9d+7ex))+6Cd^2(4d+7ex)\right)+ac^2d^2x\left(6Ae^2+4Bde+Cd^2\right)+}{24a^2c^3\left(a+cx^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)^4*(A + B*x + C*x^2))/(a + c*x^2)^4,x]
```

```
[Out] (5*A*c^3*d^4*x + a*c^2*d^2*(C*d^2 + 4*B*d*e + 6*A*e^2)*x + a^2*c*
e^2*(6*C*d^2 + e*(4*B*d + A*e))*x - a^3*e^3*(32*C*d + 8*B*e + 11*
C*e*x))/(16*a^3*c^3*(a + c*x^2)) + (A*c^3*d^4*x - a^3*e^3*(4*C*d
+ B*e + C*e*x) - a*c^2*d^2*(4*A*d*e + C*d^2*x + 6*A*e^2*x + B*d*(
d + 4*e*x)) + a^2*c*e*(2*C*d^2*(2*d + 3*e*x) + e*(A*e*(4*d + e*x)
 + 2*B*d*(3*d + 2*e*x))))/(6*a*c^3*(a + c*x^2)^3) + (5*A*c^3*d^4*
x + a*c^2*d^2*(C*d^2 + 4*B*d*e + 6*A*e^2)*x + a^3*e^3*(48*C*d + 1
2*B*e + 13*C*e*x) - a^2*c*e*(6*C*d^2*(4*d + 7*e*x) + e*(4*B*d*(9*
d + 7*e*x) + A*e*(24*d + 7*e*x))))/(24*a^2*c^3*(a + c*x^2)^2) + (
(c*d^2 + a*e^2)*(A*c*(5*c*d^2 + a*e^2) + a*(5*a*C*e^2 + c*d*(C*d
+ 4*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(16*a^(7/2)*c^(7/2))
```

Maple [B] time = 0.016, size = 647, normalized size = 2.8

$$\frac{1}{(cx^2+a)^3}\left(\frac{(Aa^2ce^4+6\,Aac^2d^2e^2+5\,Ac^3d^4+4\,Ba^2cde^3+4\,Bac^2d^3e-11\,a^3Ce^4+6\,Ca^2cd^2e^2+Cac^2d^4)\,x^5}{16\,a^3c}-\frac{e^3\,(Be+4\,Cd}{2\,c}\right.$$
$$+\frac{Ae^4}{16\,ac^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{3\,Ad^2e^2}{8\,a^2c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{5\,Ad^4}{16\,a^3}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$
$$+\frac{Bde^3}{4\,ac^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Bd^3e}{4\,a^2c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{5\,Ce^4}{16\,c^3}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$
$$+\frac{3\,Cd^2e^2}{8\,ac^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Cd^4}{16\,a^2c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^4*(C*x^2+B*x+A)/(c*x^2+a)^4,x)
```

```
[Out] (1/16*(A*a^2*c*e^4+6*A*a*c^2*d^2*e^2+5*A*c^3*d^4+4*B*a^2*c*d*e^3+
4*B*a*c^2*d^3*e-11*C*a^3*e^4+6*C*a^2*c*d^2*e^2+C*a*c^2*d^4)/a^3/c
*x^5-1/2*e^3*(B*e+4*C*d)/c*x^4-1/6*(A*a^2*c*e^4-6*A*a*c^2*d^2*e^2
-5*A*c^3*d^4+4*B*a^2*c*d*e^3-4*B*a*c^2*d^3*e+5*C*a^3*e^4+6*C*a^2*
c*d^2*e^2-C*a*c^2*d^4)/a^2/c^2*x^3-1/2*e*(2*A*c*d*e^2+B*a*e^3+3*B
*c*d^2*e+4*C*a*d*e^2+2*C*c*d^3)/c^2*x^2-1/16*(A*a^2*c*e^4+6*A*a*c
^2*d^2*e^2-11*A*c^3*d^4+4*B*a^2*c*d*e^3+4*B*a*c^2*d^3*e+5*C*a^3*e
^4+6*C*a^2*c*d^2*e^2+C*a*c^2*d^4)/a/c^3*x-1/6*(2*A*a*c*d*e^3+4*A*
c^2*d^3*e+B*a^2*e^4+3*B*a*c*d^2*e^2+B*c^2*d^4+4*C*a^2*d*e^3+2*C*a
*c*d^3*e)/c^3)/(c*x^2+a)^3+1/16/a/c^2/(a*c)^(1/2)*arctan(c*x/(a*c
)^(1/2))*A*e^4+3/8/a^2/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*d^
2*e^2+5/16/a^3/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*d^4+1/4/a/c^
2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*d*e^3+1/4/a^2/c/(a*c)^(1/
2)*arctan(c*x/(a*c)^(1/2))*B*d^3*e+5/16/c^3/(a*c)^(1/2)*arctan(c*
x/(a*c)^(1/2))*C*e^4+3/8/a/c^2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2)
)*C*d^2*e^2+1/16/a^2/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*d^4
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^4/(c*x^2 + a)^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.31083, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^4/(c*x^2 + a)^4,x, algorithm="fricas")
```

```
[Out] [1/96*(3*(4*B*a^4*c^2*d^3*e + 4*B*a^5*c*d*e^3 + (4*B*a*c^5*d^3*e
+ 4*B*a^2*c^4*d*e^3 + (C*a*c^5 + 5*A*c^6)*d^4 + 6*(C*a^2*c^4 + A*
a*c^5)*d^2*e^2 + (5*C*a^3*c^3 + A*a^2*c^4)*e^4)*x^6 + (C*a^4*c^2
+ 5*A*a^3*c^3)*d^4 + 6*(C*a^5*c + A*a^4*c^2)*d^2*e^2 + (5*C*a^6 +
 A*a^5*c)*e^4 + 3*(4*B*a^2*c^4*d^3*e + 4*B*a^3*c^3*d*e^3 + (C*a^2
*c^4 + 5*A*a*c^5)*d^4 + 6*(C*a^3*c^3 + A*a^2*c^4)*d^2*e^2 + (5*C*
a^4*c^2 + A*a^3*c^3)*e^4)*x^4 + 3*(4*B*a^3*c^3*d^3*e + 4*B*a^4*c^
2*d*e^3 + (C*a^3*c^3 + 5*A*a^2*c^4)*d^4 + 6*(C*a^4*c^2 + A*a^3*c^
3)*d^2*e^2 + (5*C*a^5*c + A*a^4*c^2)*e^4)*x^2)*log((2*a*c*x + (c*
x^2 - a)*sqrt(-a*c))/(c*x^2 + a)) - 2*(8*B*a^3*c^2*d^4 + 24*B*a^4
*c*d^2*e^2 + 8*B*a^5*e^4 - 3*(4*B*a*c^4*d^3*e + 4*B*a^2*c^3*d*e^3
 + (C*a*c^4 + 5*A*c^5)*d^4 + 6*(C*a^2*c^3 + A*a*c^4)*d^2*e^2 - (1
1*C*a^3*c^2 - A*a^2*c^3)*e^4)*x^5 + 16*(C*a^4*c + 2*A*a^3*c^2)*d^
3*e + 16*(2*C*a^5 + A*a^4*c)*d*e^3 + 24*(4*C*a^3*c^2*d*e^3 + B*a^
3*c^2*e^4)*x^4 - 8*(4*B*a^2*c^3*d^3*e - 4*B*a^3*c^2*d*e^3 + (C*a^
2*c^3 + 5*A*a*c^4)*d^4 - 6*(C*a^3*c^2 - A*a^2*c^3)*d^2*e^2 - (5*C
*a^4*c + A*a^3*c^2)*e^4)*x^3 + 24*(2*C*a^3*c^2*d^3*e + 3*B*a^3*c^
2*d^2*e^2 + B*a^4*c*e^4 + 2*(2*C*a^4*c + A*a^3*c^2)*d*e^3)*x^2 +
3*(4*B*a^3*c^2*d^3*e + 4*B*a^4*c*d*e^3 + (C*a^3*c^2 - 11*A*a^2*c^
3)*d^4 + 6*(C*a^4*c + A*a^3*c^2)*d^2*e^2 + (5*C*a^5 + A*a^4*c)*e^
4)*x)*sqrt(-a*c))/((a^3*c^6*x^6 + 3*a^4*c^5*x^4 + 3*a^5*c^4*x^2 +
 a^6*c^3)*sqrt(-a*c)), 1/48*(3*(4*B*a^4*c^2*d^3*e + 4*B*a^5*c*d*e
^3 + (4*B*a*c^5*d^3*e + 4*B*a^2*c^4*d*e^3 + (C*a*c^5 + 5*A*c^6)*d
^4 + 6*(C*a^2*c^4 + A*a*c^5)*d^2*e^2 + (5*C*a^3*c^3 + A*a^2*c^4)*
e^4)*x^6 + (C*a^4*c^2 + 5*A*a^3*c^3)*d^4 + 6*(C*a^5*c + A*a^4*c^2
)*d^2*e^2 + (5*C*a^6 + A*a^5*c)*e^4 + 3*(4*B*a^2*c^4*d^3*e + 4*B*
a^3*c^3*d*e^3 + (C*a^2*c^4 + 5*A*a*c^5)*d^4 + 6*(C*a^3*c^3 + A*a^
2*c^4)*d^2*e^2 + (5*C*a^4*c^2 + A*a^3*c^3)*e^4)*x^4 + 3*(4*B*a^3*
c^3*d^3*e + 4*B*a^4*c^2*d*e^3 + (C*a^3*c^3 + 5*A*a^2*c^4)*d^4 + 6
*(C*a^4*c^2 + A*a^3*c^3)*d^2*e^2 + (5*C*a^5*c + A*a^4*c^2)*e^4)*x
^2)*arctan(sqrt(a*c)*x/a) - (8*B*a^3*c^2*d^4 + 24*B*a^4*c*d^2*e^2
 + 8*B*a^5*e^4 - 3*(4*B*a*c^4*d^3*e + 4*B*a^2*c^3*d*e^3 + (C*a*c^
4 + 5*A*c^5)*d^4 + 6*(C*a^2*c^3 + A*a*c^4)*d^2*e^2 - (11*C*a^3*c^
2 - A*a^2*c^3)*e^4)*x^5 + 16*(C*a^4*c + 2*A*a^3*c^2)*d^3*e + 16*(
2*C*a^5 + A*a^4*c)*d*e^3 + 24*(4*C*a^3*c^2*d*e^3 + B*a^3*c^2*e^4)
*x^4 - 8*(4*B*a^2*c^3*d^3*e - 4*B*a^3*c^2*d*e^3 + (C*a^2*c^3 + 5*
A*a*c^4)*d^4 - 6*(C*a^3*c^2 - A*a^2*c^3)*d^2*e^2 - (5*C*a^4*c + A
*a^3*c^2)*e^4)*x^3 + 24*(2*C*a^3*c^2*d^3*e + 3*B*a^3*c^2*d^2*e^2
+ B*a^4*c*e^4 + 2*(2*C*a^4*c + A*a^3*c^2)*d*e^3)*x^2 + 3*(4*B*a^3
*c^2*d^3*e + 4*B*a^4*c*d*e^3 + (C*a^3*c^2 - 11*A*a^2*c^3)*d^4 + 6
*(C*a^4*c + A*a^3*c^2)*d^2*e^2 + (5*C*a^5 + A*a^4*c)*e^4)*x)*sqrt
(a*c))/((a^3*c^6*x^6 + 3*a^4*c^5*x^4 + 3*a^5*c^4*x^2 + a^6*c^3)*s
qrt(a*c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**4*(C*x**2+B*x+A)/(c*x**2+a)**4,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.275106, size = 859, normalized size = 3.67

$$\frac{\left(Cac^2d^4 + 5\,Ac^3d^4 + 4\,Bac^2d^3e + 6\,Ca^2cd^2e^2 + 6\,Aac^2d^2e^2 + 4\,Ba^2cde^3 + 5\,Ca^3e^4 + Aa^2ce^4\right)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{16\,\sqrt{ac}a^3c^3} + \frac{3\,Cac^4d^4x^5 + 15\,Ac^5d^4x^5 + 12\,Bac^4d^3x^5e + 18\,Ca^2c^3d^2x^5e^2 + 18\,Aac^4d^2x^5e^2 + 8\,Ca^2c^3d^4x^3 + 40\,Aac^4d^4x^3 + 12\,Ba^2c^3dx^5e^3}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(e*x + d)^4/(c*x^2 + a)^4,x, algorithm="giac")
```

```
[Out] 1/16*(C*a*c^2*d^4 + 5*A*c^3*d^4 + 4*B*a*c^2*d^3*e + 6*C*a^2*c*d^2
*e^2 + 6*A*a*c^2*d^2*e^2 + 4*B*a^2*c*d*e^3 + 5*C*a^3*e^4 + A*a^2*
c*e^4)*arctan(c*x/sqrt(a*c))/(sqrt(a*c)*a^3*c^3) + 1/48*(3*C*a*c^
4*d^4*x^5 + 15*A*c^5*d^4*x^5 + 12*B*a*c^4*d^3*x^5*e + 18*C*a^2*c^
3*d^2*x^5*e^2 + 18*A*a*c^4*d^2*x^5*e^2 + 8*C*a^2*c^3*d^4*x^3 + 40
*A*a*c^4*d^4*x^3 + 12*B*a^2*c^3*d*x^5*e^3 + 32*B*a^2*c^3*d^3*x^3*
e - 33*C*a^3*c^2*x^5*e^4 + 3*A*a^2*c^3*x^5*e^4 - 96*C*a^3*c^2*d*x
^4*e^3 - 48*C*a^3*c^2*d^2*x^3*e^2 + 48*A*a^2*c^3*d^2*x^3*e^2 - 48
*C*a^3*c^2*d^3*x^2*e - 3*C*a^3*c^2*d^4*x + 33*A*a^2*c^3*d^4*x - 2
4*B*a^3*c^2*x^4*e^4 - 32*B*a^3*c^2*d*x^3*e^3 - 72*B*a^3*c^2*d^2*x
^2*e^2 - 12*B*a^3*c^2*d^3*x*e - 8*B*a^3*c^2*d^4 - 40*C*a^4*c*x^3*
e^4 - 8*A*a^3*c^2*x^3*e^4 - 96*C*a^4*c*d*x^2*e^3 - 48*A*a^3*c^2*d
*x^2*e^3 - 18*C*a^4*c*d^2*x*e^2 - 18*A*a^3*c^2*d^2*x*e^2 - 16*C*a
^4*c*d^3*e - 32*A*a^3*c^2*d^3*e - 24*B*a^4*c*x^2*e^4 - 12*B*a^4*c
*d*x*e^3 - 24*B*a^4*c*d^2*e^2 - 15*C*a^5*x*e^4 - 3*A*a^4*c*x*e^4
- 32*C*a^5*d*e^3 - 16*A*a^4*c*d*e^3 - 8*B*a^5*e^4)/((c*x^2 + a)^3
*a^3*c^3)
```

3.65 $\int \frac{(d+ex)^3(A+Bx+Cx^2)}{(a+cx^2)^4}\,dx$

Optimal. Leaf size=254

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(3ae^2+5cd^2\right)+a\left(ae^2(Be+3Cd)+cd^2(3Be+Cd)\right)\right)}{16a^{7/2}c^{5/2}} - \frac{(d+ex)\left(ae(3aBe+aCd+5Acd)-x\left(3cd(3aBe+aCd+5Acd)+4ae^2(2aC+Ac)\right)\right)}{48a^3c^2\left(a+cx^2\right)} - \frac{(d+ex)^2(2ae(2aC+Ac)-cx(3aBe+aCd+5Acd))}{24a^2c^2\left(a+cx^2\right)^2} - \frac{(d+ex)^3(aB-x(Ac-aC))}{6ac\left(a+cx^2\right)^3}$$

```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x)^3)/(6*a*c*(a + c*x^2)^3) - ((d
+ e*x)^2*(2*a*(A*c + 2*a*C)*e - c*(5*A*c*d + a*C*d + 3*a*B*e)*x))
/(24*a^2*c^2*(a + c*x^2)^2) - ((d + e*x)*(a*e*(5*A*c*d + a*C*d +
3*a*B*e) - (4*a*(A*c + 2*a*C)*e^2 + 3*c*d*(5*A*c*d + a*C*d + 3*a*
B*e))*x))/(48*a^3*c^2*(a + c*x^2)) + ((A*c*d*(5*c*d^2 + 3*a*e^2)
+ a*(a*e^2*(3*C*d + B*e) + c*d^2*(C*d + 3*B*e)))*ArcTan[(Sqrt[c]*
x)/Sqrt[a]])/(16*a^(7/2)*c^(5/2))
```

Rubi [A] time = 1.27754, antiderivative size = 288, normalized size of antiderivative = 1.13, number of steps used = 4, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.148$

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Acd\left(3ae^2+5cd^2\right)+a\left(ae^2(Be+3Cd)+cd^2(3Be+Cd)\right)\right)}{16a^{7/2}c^{5/2}} - \frac{4ae\left(Ac\left(ae^2+5cd^2\right)+a\left(2aCe^2+cd(3Be+Cd)\right)\right)-cx\left(Acd\left(15cd^2-ae^2\right)+a\left(ae^2(7Cd-3Be)+3cd^2(3Be+Cd)\right)\right)}{48a^3c^3\left(a+cx^2\right)} - \frac{(d+ex)^2(2ae(2aC+Ac)-cx(3aBe+aCd+5Acd))}{24a^2c^2\left(a+cx^2\right)^2} - \frac{(d+ex)^3(aB-x(Ac-aC))}{6ac\left(a+cx^2\right)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^3*(A + B*x + C*x^2))/(a + c*x^2)^4,x]
```

```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x)^3)/(6*a*c*(a + c*x^2)^3) - ((d
+ e*x)^2*(2*a*(A*c + 2*a*C)*e - c*(5*A*c*d + a*C*d + 3*a*B*e)*x))
/(24*a^2*c^2*(a + c*x^2)^2) - (4*a*e*(A*c*(5*c*d^2 + a*e^2) + a*(
2*a*C*e^2 + c*d*(C*d + 3*B*e))) - c*(A*c*d*(15*c*d^2 - a*e^2) + a
*(a*e^2*(7*C*d - 3*B*e) + 3*c*d^2*(C*d + 3*B*e)))*x)/(48*a^3*c^3*
(a + c*x^2)) + ((A*c*d*(5*c*d^2 + 3*a*e^2) + a*(a*e^2*(3*C*d + B*
e) + c*d^2*(C*d + 3*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(16*a^(7/
2)*c^(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((e*x+d)**3*(C*x**2+B*x+A)/(c*x**2+a)**4,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.630557, size = 350, normalized size = 1.38

$$\frac{-\frac{3\sqrt{a}\left(8a^3Ce^3-a^2ce^2x(Be+3Cd)-ac^2dx\left(3e(Ae+Bd)+Cd^2\right)-5Ac^3d^3x\right)}{a+cx^2}-\frac{8a^{5/2}\left(a^3Ce^3-a^2ce(e(Ae+3Bd+Bex)+3Cd(d+ex))+ac^2d\left(3Ae(d+ex)+Bd(d+3ex\right.\right.}{\left(a+cx^2\right)^3}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)^3*(A + B*x + C*x^2))/(a + c*x^2)^4,x]
```

```
[Out] ((-3*Sqrt[a]*(8*a^3*C*e^3 - 5*A*c^3*d^3*x - a^2*c*e^2*(3*C*d + B*
e)*x - a*c^2*d*(C*d^2 + 3*e*(B*d + A*e))*x))/(a + c*x^2) - (8*a^(
5/2)*(a^3*C*e^3 - A*c^3*d^3*x + a*c^2*d*(C*d^2*x + 3*A*e*(d + e*x
) + B*d*(d + 3*e*x)) - a^2*c*e*(3*C*d*(d + e*x) + e*(3*B*d + A*e
+ B*e*x))))/(a + c*x^2)^3 + (2*a^(3/2)*(12*a^3*C*e^3 + 5*A*c^3*d^
3*x + a*c^2*d*(C*d^2 + 3*e*(B*d + A*e))*x - a^2*c*e*(3*C*d*(6*d +
 7*e*x) + e*(18*B*d + 6*A*e + 7*B*e*x))))/(a + c*x^2)^2 + 3*Sqrt[
c]*(A*c*d*(5*c*d^2 + 3*a*e^2) + a*(a*e^2*(3*C*d + B*e) + c*d^2*(C
*d + 3*B*e)))*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(48*a^(7/2)*c^3)
```

Maple [A] time = 0.014, size = 464, normalized size = 1.8

$$\frac{1}{\left(cx^2+a\right)^3}\left(\frac{\left(3\,Aacde^2+5\,Ac^2d^3+Ba^2e^3+3\,Bacd^2e+3\,Ca^2de^2+Cacd^3\right)x^5}{16\,a^3}-\frac{Ce^3x^4}{2\,c}+\frac{\left(3\,Aacde^2+5\,Ac^2d^3-Ba^2e^3+3\,B\right.}{6\,a^2c}\right.$$
$$+\frac{3\,Ade^2}{16\,a^2c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{5\,Ad^3}{16\,a^3}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Be^3}{16\,ac^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$
$$+\frac{3\,Bd^2e}{16\,a^2c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{3\,Cde^2}{16\,ac^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Cd^3}{16\,a^2c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^3*(C*x^2+B*x+A)/(c*x^2+a)^4,x)
```

```
[Out] (1/16*(3*A*a*c*d*e^2+5*A*c^2*d^3+B*a^2*e^3+3*B*a*c*d^2*e+3*C*a^2*
d*e^2+C*a*c*d^3)/a^3*x^5-1/2*C*e^3*x^4/c+1/6*(3*A*a*c*d*e^2+5*A*c
^2*d^3-B*a^2*e^3+3*B*a*c*d^2*e-3*C*a^2*d*e^2+C*a*c*d^3)/a^2/c*x^3
-1/4*e*(A*c*e^2+3*B*c*d*e+2*C*a*e^2+3*C*c*d^2)/c^2*x^2-1/16*(3*A*
a*c*d*e^2-11*A*c^2*d^3+B*a^2*e^3+3*B*a*c*d^2*e+3*C*a^2*d*e^2+C*a*
c*d^3)/a/c^2*x-1/12*(A*a*c*e^3+6*A*c^2*d^2*e+3*B*a*c*d*e^2+2*B*c^
2*d^3+2*C*a^2*e^3+3*C*a*c*d^2*e)/c^3)/(c*x^2+a)^3+3/16/a^2/c/(a*c
)^(1/2)*arctan(c*x/(a*c)^(1/2))*A*d*e^2+5/16/a^3/(a*c)^(1/2)*arct
an(c*x/(a*c)^(1/2))*A*d^3+1/16/a/c^2/(a*c)^(1/2)*arctan(c*x/(a*c)
^(1/2))*B*e^3+3/16/a^2/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*B*d^
2*e+3/16/a/c^2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*d*e^2+1/16/a
^2/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*d^3
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^3/(c*x^2 + a)^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.301055, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^3/(c*x^2 + a)^4,x, algorithm="fricas")
```

```
[Out] [1/96*(3*(3*B*a^4*c^2*d^2*e + B*a^5*c*e^3 + (3*B*a*c^5*d^2*e + B*
a^2*c^4*e^3 + (C*a*c^5 + 5*A*c^6)*d^3 + 3*(C*a^2*c^4 + A*a*c^5)*d
*e^2)*x^6 + 3*(3*B*a^2*c^4*d^2*e + B*a^3*c^3*e^3 + (C*a^2*c^4 + 5
*A*a*c^5)*d^3 + 3*(C*a^3*c^3 + A*a^2*c^4)*d*e^2)*x^4 + (C*a^4*c^2
 + 5*A*a^3*c^3)*d^3 + 3*(C*a^5*c + A*a^4*c^2)*d*e^2 + 3*(3*B*a^3*
c^3*d^2*e + B*a^4*c^2*e^3 + (C*a^3*c^3 + 5*A*a^2*c^4)*d^3 + 3*(C*
a^4*c^2 + A*a^3*c^3)*d*e^2)*x^2)*log((2*a*c*x + (c*x^2 - a)*sqrt(
-a*c))/(c*x^2 + a)) - 2*(24*C*a^3*c^2*e^3*x^4 + 8*B*a^3*c^2*d^3 +
 12*B*a^4*c*d*e^2 - 3*(3*B*a*c^4*d^2*e + B*a^2*c^3*e^3 + (C*a*c^4
 + 5*A*c^5)*d^3 + 3*(C*a^2*c^3 + A*a*c^4)*d*e^2)*x^5 + 12*(C*a^4*
c + 2*A*a^3*c^2)*d^2*e + 4*(2*C*a^5 + A*a^4*c)*e^3 - 8*(3*B*a^2*c
^3*d^2*e - B*a^3*c^2*e^3 + (C*a^2*c^3 + 5*A*a*c^4)*d^3 - 3*(C*a^3
*c^2 - A*a^2*c^3)*d*e^2)*x^3 + 12*(3*C*a^3*c^2*d^2*e + 3*B*a^3*c^
2*d*e^2 + (2*C*a^4*c + A*a^3*c^2)*e^3)*x^2 + 3*(3*B*a^3*c^2*d^2*e
```

```
 + B*a^4*c*e^3 + (C*a^3*c^2 - 11*A*a^2*c^3)*d^3 + 3*(C*a^4*c + A*
a^3*c^2)*d*e^2)*x)*sqrt(-a*c))/((a^3*c^6*x^6 + 3*a^4*c^5*x^4 + 3*
a^5*c^4*x^2 + a^6*c^3)*sqrt(-a*c)), 1/48*(3*(3*B*a^4*c^2*d^2*e +
B*a^5*c*e^3 + (3*B*a*c^5*d^2*e + B*a^2*c^4*e^3 + (C*a*c^5 + 5*A*c
^6)*d^3 + 3*(C*a^2*c^4 + A*a*c^5)*d*e^2)*x^6 + 3*(3*B*a^2*c^4*d^2
*e + B*a^3*c^3*e^3 + (C*a^2*c^4 + 5*A*a*c^5)*d^3 + 3*(C*a^3*c^3 +
 A*a^2*c^4)*d*e^2)*x^4 + (C*a^4*c^2 + 5*A*a^3*c^3)*d^3 + 3*(C*a^5
*c + A*a^4*c^2)*d*e^2 + 3*(3*B*a^3*c^3*d^2*e + B*a^4*c^2*e^3 + (C
*a^3*c^3 + 5*A*a^2*c^4)*d^3 + 3*(C*a^4*c^2 + A*a^3*c^3)*d*e^2)*x^
2)*arctan(sqrt(a*c)*x/a) - (24*C*a^3*c^2*e^3*x^4 + 8*B*a^3*c^2*d^
3 + 12*B*a^4*c*d*e^2 - 3*(3*B*a*c^4*d^2*e + B*a^2*c^3*e^3 + (C*a*
c^4 + 5*A*c^5)*d^3 + 3*(C*a^2*c^3 + A*a*c^4)*d*e^2)*x^5 + 12*(C*a
^4*c + 2*A*a^3*c^2)*d^2*e + 4*(2*C*a^5 + A*a^4*c)*e^3 - 8*(3*B*a^
2*c^3*d^2*e - B*a^3*c^2*e^3 + (C*a^2*c^3 + 5*A*a*c^4)*d^3 - 3*(C*
a^3*c^2 - A*a^2*c^3)*d*e^2)*x^3 + 12*(3*C*a^3*c^2*d^2*e + 3*B*a^3
*c^2*d*e^2 + (2*C*a^4*c + A*a^3*c^2)*e^3)*x^2 + 3*(3*B*a^3*c^2*d^
2*e + B*a^4*c*e^3 + (C*a^3*c^2 - 11*A*a^2*c^3)*d^3 + 3*(C*a^4*c +
 A*a^3*c^2)*d*e^2)*x)*sqrt(a*c))/((a^3*c^6*x^6 + 3*a^4*c^5*x^4 +
3*a^5*c^4*x^2 + a^6*c^3)*sqrt(a*c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**3*(C*x**2+B*x+A)/(c*x**2+a)**4,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.274133, size = 641, normalized size = 2.52

$$\frac{\left(Cacd^3 + 5\,Ac^2d^3 + 3\,Bacd^2e + 3\,Ca^2de^2 + 3\,Aacde^2 + Ba^2e^3\right)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{16\,\sqrt{ac}a^3c^2} + \frac{3\,Cac^4d^3x^5 + 15\,Ac^5d^3x^5 + 9\,Bac^4d^2x^5e + 9\,Ca^2c^3dx^5e^2 + 9\,Aac^4dx^5e^2 + 8\,Ca^2c^3d^3x^3 + 40\,Aac^4d^3x^3 + 3\,Ba^2c^3x^5e^3 + 24\,Ba}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(e*x + d)^3/(c*x^2 + a)^4,x, algorithm="giac")
```

```
[Out] 1/16*(C*a*c*d^3 + 5*A*c^2*d^3 + 3*B*a*c*d^2*e + 3*C*a^2*d*e^2 + 3
*A*a*c*d*e^2 + B*a^2*e^3)*arctan(c*x/sqrt(a*c))/(sqrt(a*c)*a^3*c^
```

```
2) + 1/48*(3*C*a*c^4*d^3*x^5 + 15*A*c^5*d^3*x^5 + 9*B*a*c^4*d^2*x
^5*e + 9*C*a^2*c^3*d*x^5*e^2 + 9*A*a*c^4*d*x^5*e^2 + 8*C*a^2*c^3*
d^3*x^3 + 40*A*a*c^4*d^3*x^3 + 3*B*a^2*c^3*x^5*e^3 + 24*B*a^2*c^3
*d^2*x^3*e - 24*C*a^3*c^2*x^4*e^3 - 24*C*a^3*c^2*d*x^3*e^2 + 24*A
*a^2*c^3*d*x^3*e^2 - 36*C*a^3*c^2*d^2*x^2*e - 3*C*a^3*c^2*d^3*x +
 33*A*a^2*c^3*d^3*x - 8*B*a^3*c^2*x^3*e^3 - 36*B*a^3*c^2*d*x^2*e^
2 - 9*B*a^3*c^2*d^2*x*e - 8*B*a^3*c^2*d^3 - 24*C*a^4*c*x^2*e^3 -
12*A*a^3*c^2*x^2*e^3 - 9*C*a^4*c*d*x*e^2 - 9*A*a^3*c^2*d*x*e^2 -
12*C*a^4*c*d^2*e - 24*A*a^3*c^2*d^2*e - 3*B*a^4*c*x*e^3 - 12*B*a^
4*c*d*e^2 - 8*C*a^5*e^3 - 4*A*a^4*c*e^3)/((c*x^2 + a)^3*a^3*c^3)
```

3.66 $\int \frac{(d+ex)^2(A+Bx+Cx^2)}{(a+cx^2)^4}\,dx$

Optimal. Leaf size=225

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(cd(2aBe+aCd+5Acd)+ae^2(aC+Ac)\right)}{16a^{7/2}c^{5/2}}+\frac{x\left(cd(2aBe+aCd+5Acd)+ae^2(aC+Ac)\right)}{16a^3c^2(a+cx^2)}-\frac{x\left(3ae^2(aC+Ac)-cd(2aBe+aCd+5Acd)\right)+2ae(aBe+2aCd+4Acd)}{24a^2c^2(a+cx^2)^2}-\frac{(d+ex)^2(aB-x(Ac-aC))}{6ac(a+cx^2)^3}$$

```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x)^2)/(6*a*c*(a + c*x^2)^3) - (2*a
*e*(4*A*c*d + 2*a*C*d + a*B*e) + (3*a*(A*c + a*C)*e^2 - c*d*(5*A*
c*d + a*C*d + 2*a*B*e))*x)/(24*a^2*c^2*(a + c*x^2)^2) + ((a*(A*c
+ a*C)*e^2 + c*d*(5*A*c*d + a*C*d + 2*a*B*e))*x)/(16*a^3*c^2*(a +
 c*x^2)) + ((a*(A*c + a*C)*e^2 + c*d*(5*A*c*d + a*C*d + 2*a*B*e))
*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(16*a^(7/2)*c^(5/2))
```

Rubi [A] time = 0.735804, antiderivative size = 225, 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

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(cd(2aBe+aCd+5Acd)+ae^2(aC+Ac)\right)}{16a^{7/2}c^{5/2}}+\frac{x\left(cd(2aBe+aCd+5Acd)+ae^2(aC+Ac)\right)}{16a^3c^2(a+cx^2)}-\frac{x\left(3ae^2(aC+Ac)-cd(2aBe+aCd+5Acd)\right)+2ae(aBe+2aCd+4Acd)}{24a^2c^2(a+cx^2)^2}-\frac{(d+ex)^2(aB-x(Ac-aC))}{6ac(a+cx^2)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^2*(A + B*x + C*x^2))/(a + c*x^2)^4,x]
```


```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x)^2)/(6*a*c*(a + c*x^2)^3) - (2*a
*e*(4*A*c*d + 2*a*C*d + a*B*e) + (3*a*(A*c + a*C)*e^2 - c*d*(5*A*
c*d + a*C*d + 2*a*B*e))*x)/(24*a^2*c^2*(a + c*x^2)^2) + ((a*(A*c
+ a*C)*e^2 + c*d*(5*A*c*d + a*C*d + 2*a*B*e))*x)/(16*a^3*c^2*(a +
 c*x^2)) + ((a*(A*c + a*C)*e^2 + c*d*(5*A*c*d + a*C*d + 2*a*B*e))
```

```
*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(16*a^(7/2)*c^(5/2))
```

Rubi in Sympy [A] time = 151.282, size = 508, normalized size = 2.26

$$\frac{Ce^2x}{2ac^2(a+cx^2)}+\frac{Ce^2\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2a^{\frac{3}{2}}c^{\frac{5}{2}}}+\frac{-ae(Be+2Cd)+x\left(Ace^2+2Bcde-2Cae^2+Ccd^2\right)}{4ac^2(a+cx^2)^2}+\frac{a\left(-2Acde+Bae^2-Bcd^2+2Cade\right)+x\left(-Aace^2+Ac^2d^2-2Bacde+Ca^2e^2-Cacd^2\right)}{6ac^2(a+cx^2)^3}+\frac{3x\left(Ace^2+2Bcde-2Cae^2+Ccd^2\right)}{8a^2c^2(a+cx^2)}+\frac{5x\left(-Aace^2+Ac^2d^2-2Bacde+Ca^2e^2-Cacd^2\right)}{24a^2c^2(a+cx^2)^2}+\frac{5x\left(-Aace^2+Ac^2d^2-2Bacde+Ca^2e^2-Cacd^2\right)}{16a^3c^2(a+cx^2)}+\frac{3\left(Ace^2+2Bcde-2Cae^2+Ccd^2\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{8a^{\frac{5}{2}}c^{\frac{5}{2}}}+\frac{5\left(-Aace^2+Ac^2d^2-2Bacde+Ca^2e^2-Cacd^2\right)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{16a^{\frac{7}{2}}c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)**2*(C*x**2+B*x+A)/(c*x**2+a)**4,x)
```

```
[Out] C*e**2*x/(2*a*c**2*(a + c*x**2)) + C*e**2*atan(sqrt(c)*x/sqrt(a))
/(2*a**(3/2)*c**(5/2)) + (-a*e*(B*e + 2*C*d) + x*(A*c*e**2 + 2*B*
c*d*e - 2*C*a*e**2 + C*c*d**2))/(4*a*c**2*(a + c*x**2)**2) + (a*(
-2*A*c*d*e + B*a*e**2 - B*c*d**2 + 2*C*a*d*e) + x*(-A*a*c*e**2 +
A*c**2*d**2 - 2*B*a*c*d*e + C*a**2*e**2 - C*a*c*d**2))/(6*a*c**2*
(a + c*x**2)**3) + 3*x*(A*c*e**2 + 2*B*c*d*e - 2*C*a*e**2 + C*c*d
**2)/(8*a**2*c**2*(a + c*x**2)) + 5*x*(-A*a*c*e**2 + A*c**2*d**2
- 2*B*a*c*d*e + C*a**2*e**2 - C*a*c*d**2)/(24*a**2*c**2*(a + c*x*
*2)**2) + 5*x*(-A*a*c*e**2 + A*c**2*d**2 - 2*B*a*c*d*e + C*a**2*e
**2 - C*a*c*d**2)/(16*a**3*c**2*(a + c*x**2)) + 3*(A*c*e**2 + 2*B
*c*d*e - 2*C*a*e**2 + C*c*d**2)*atan(sqrt(c)*x/sqrt(a))/(8*a**(5/
2)*c**(5/2)) + 5*(-A*a*c*e**2 + A*c**2*d**2 - 2*B*a*c*d*e + C*a**
2*e**2 - C*a*c*d**2)*atan(sqrt(c)*x/sqrt(a))/(16*a**(7/2)*c**(5/2
))
```

Mathematica [A] time = 0.319203, size = 266, normalized size = 1.18

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)\left(Ac\left(ae^2+5cd^2\right)+a\left(aCe^2+cd(2Be+Cd)\right)\right)}{16a^{7/2}c^{5/2}}+\frac{x\left(Ac\left(ae^2+5cd^2\right)+a\left(aCe^2+cd(2Be+Cd)\right)\right)}{16a^3c^2\left(a+cx^2\right)}+\frac{a^2(-e)(6Be+12Cd+7Cex)+acx\left(e(Ae+2Bd)+Cd^2\right)+5Ac^2d^2x}{24a^2c^2\left(a+cx^2\right)^2}+\frac{a^2e(Be+2Cd+Cex)-ac\left(Ae(2d+ex)+Bd(d+2ex)+Cd^2x\right)+Ac^2d^2x}{6ac^2\left(a+cx^2\right)^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)^2*(A + B*x + C*x^2))/(a + c*x^2)^4,x]
```

```
[Out] ((A*c*(5*c*d^2 + a*e^2) + a*(a*C*e^2 + c*d*(C*d + 2*B*e)))*x)/(16
*a^3*c^2*(a + c*x^2)) + (5*A*c^2*d^2*x + a*c*(C*d^2 + e*(2*B*d +
A*e))*x - a^2*e*(12*C*d + 6*B*e + 7*C*e*x))/(24*a^2*c^2*(a + c*x^
2)^2) + (A*c^2*d^2*x + a^2*e*(2*C*d + B*e + C*e*x) - a*c*(C*d^2*x
 + A*e*(2*d + e*x) + B*d*(d + 2*e*x)))/(6*a*c^2*(a + c*x^2)^3) +
((A*c*(5*c*d^2 + a*e^2) + a*(a*C*e^2 + c*d*(C*d + 2*B*e)))*ArcTan
[(Sqrt[c]*x)/Sqrt[a]])/(16*a^(7/2)*c^(5/2))
```

Maple [A] time = 0.013, size = 333, normalized size = 1.5

$$\frac{1}{\left(cx^2+a\right)^3}\left(\frac{\left(Aace^2+5\,Ac^2d^2+2\,acdeB+a^2Ce^2+Cacd^2\right)x^5}{16\,a^3}+\frac{\left(Aace^2+5\,Ac^2d^2+2\,acdeB-a^2Ce^2+Cacd^2\right)x^3}{6\,a^2c}-\frac{e\,(Be+\right.$$
$$+\frac{Ae^2}{16\,a^2c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{5\,Ad^2}{16\,a^3}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Bde}{8\,a^2c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$
$$+\frac{Ce^2}{16\,ac^2}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Cd^2}{16\,a^2c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^2*(C*x^2+B*x+A)/(c*x^2+a)^4,x)
```

```
[Out] (1/16*(A*a*c*e^2+5*A*c^2*d^2+2*B*a*c*d*e+C*a^2*e^2+C*a*c*d^2)/a^3
*x^5+1/6*(A*a*c*e^2+5*A*c^2*d^2+2*B*a*c*d*e-C*a^2*e^2+C*a*c*d^2)/
a^2/c*x^3-1/4*e*(B*e+2*C*d)*x^2/c-1/16*(A*a*c*e^2-11*A*c^2*d^2+2*
B*a*c*d*e+C*a^2*e^2+C*a*c*d^2)/a/c^2*x-1/12*(4*A*c*d*e+B*a*e^2+2*
B*c*d^2+2*C*a*d*e)/c^2)/(c*x^2+a)^3+1/16/a^2/c/(a*c)^(1/2)*arctan
(c*x/(a*c)^(1/2))*A*e^2+5/16/a^3/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/
2))*A*d^2+1/8/a^2/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*d*e*B+1/1
```

```
6/a/c^2/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*e^2+1/16/a^2/c/(a*c
)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*d^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((C*x^2 + B*x + A)*(e*x + d)^2/(c*x^2 + a)^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.302905, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^2/(c*x^2 + a)^4,x, algorithm="fricas")
```

```
[Out] [1/96*(3*(2*B*a^4*c*d*e + (2*B*a*c^4*d*e + (C*a*c^4 + 5*A*c^5)*d^
2 + (C*a^2*c^3 + A*a*c^4)*e^2)*x^6 + 3*(2*B*a^2*c^3*d*e + (C*a^2*
c^3 + 5*A*a*c^4)*d^2 + (C*a^3*c^2 + A*a^2*c^3)*e^2)*x^4 + (C*a^4*
c + 5*A*a^3*c^2)*d^2 + (C*a^5 + A*a^4*c)*e^2 + 3*(2*B*a^3*c^2*d*e
 + (C*a^3*c^2 + 5*A*a^2*c^3)*d^2 + (C*a^4*c + A*a^3*c^2)*e^2)*x^2
)*log((2*a*c*x + (c*x^2 - a)*sqrt(-a*c))/(c*x^2 + a)) - 2*(8*B*a^
3*c*d^2 + 4*B*a^4*e^2 - 3*(2*B*a*c^3*d*e + (C*a*c^3 + 5*A*c^4)*d^
2 + (C*a^2*c^2 + A*a*c^3)*e^2)*x^5 - 8*(2*B*a^2*c^2*d*e + (C*a^2*
c^2 + 5*A*a*c^3)*d^2 - (C*a^3*c - A*a^2*c^2)*e^2)*x^3 + 8*(C*a^4
+ 2*A*a^3*c)*d*e + 12*(2*C*a^3*c*d*e + B*a^3*c*e^2)*x^2 + 3*(2*B*
a^3*c*d*e + (C*a^3*c - 11*A*a^2*c^2)*d^2 + (C*a^4 + A*a^3*c)*e^2)
*x)*sqrt(-a*c))/((a^3*c^5*x^6 + 3*a^4*c^4*x^4 + 3*a^5*c^3*x^2 + a
^6*c^2)*sqrt(-a*c)), 1/48*(3*(2*B*a^4*c*d*e + (2*B*a*c^4*d*e + (C
*a*c^4 + 5*A*c^5)*d^2 + (C*a^2*c^3 + A*a*c^4)*e^2)*x^6 + 3*(2*B*a
^2*c^3*d*e + (C*a^2*c^3 + 5*A*a*c^4)*d^2 + (C*a^3*c^2 + A*a^2*c^3
)*e^2)*x^4 + (C*a^4*c + 5*A*a^3*c^2)*d^2 + (C*a^5 + A*a^4*c)*e^2
+ 3*(2*B*a^3*c^2*d*e + (C*a^3*c^2 + 5*A*a^2*c^3)*d^2 + (C*a^4*c +
 A*a^3*c^2)*e^2)*x^2)*arctan(sqrt(a*c)*x/a) - (8*B*a^3*c*d^2 + 4*
B*a^4*e^2 - 3*(2*B*a*c^3*d*e + (C*a*c^3 + 5*A*c^4)*d^2 + (C*a^2*c
^2 + A*a*c^3)*e^2)*x^5 - 8*(2*B*a^2*c^2*d*e + (C*a^2*c^2 + 5*A*a*
c^3)*d^2 - (C*a^3*c - A*a^2*c^2)*e^2)*x^3 + 8*(C*a^4 + 2*A*a^3*c)
*d*e + 12*(2*C*a^3*c*d*e + B*a^3*c*e^2)*x^2 + 3*(2*B*a^3*c*d*e +
(C*a^3*c - 11*A*a^2*c^2)*d^2 + (C*a^4 + A*a^3*c)*e^2)*x)*sqrt(a*c
))/((a^3*c^5*x^6 + 3*a^4*c^4*x^4 + 3*a^5*c^3*x^2 + a^6*c^2)*sqrt(
```

```
a*c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**2*(C*x**2+B*x+A)/(c*x**2+a)**4,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.273243, size = 443, normalized size = 1.97

$$\frac{\left(Cacd^2 + 5\,Ac^2d^2 + 2\,Bacde + Ca^2e^2 + Aace^2\right)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{16\,\sqrt{ac}a^3c^2} + \frac{3\,Cac^3d^2x^5 + 15\,Ac^4d^2x^5 + 6\,Bac^3dx^5e + 3\,Ca^2c^2x^5e^2 + 3\,Aac^3x^5e^2 + 8\,Ca^2c^2d^2x^3 + 40\,Aac^3d^2x^3 + 16\,Ba^2c^2dx^3e - 8\,Ca^3c}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^2/(c*x^2 + a)^4,x, algorithm="giac")
```

```
[Out] 1/16*(C*a*c*d^2 + 5*A*c^2*d^2 + 2*B*a*c*d*e + C*a^2*e^2 + A*a*c*e
^2)*arctan(c*x/sqrt(a*c))/(sqrt(a*c)*a^3*c^2) + 1/48*(3*C*a*c^3*d
^2*x^5 + 15*A*c^4*d^2*x^5 + 6*B*a*c^3*d*x^5*e + 3*C*a^2*c^2*x^5*e
^2 + 3*A*a*c^3*x^5*e^2 + 8*C*a^2*c^2*d^2*x^3 + 40*A*a*c^3*d^2*x^3
 + 16*B*a^2*c^2*d*x^3*e - 8*C*a^3*c*x^3*e^2 + 8*A*a^2*c^2*x^3*e^2
 - 24*C*a^3*c*d*x^2*e - 3*C*a^3*c*d^2*x + 33*A*a^2*c^2*d^2*x - 12
*B*a^3*c*x^2*e^2 - 6*B*a^3*c*d*x*e - 8*B*a^3*c*d^2 - 3*C*a^4*x*e^
2 - 3*A*a^3*c*x*e^2 - 8*C*a^4*d*e - 16*A*a^3*c*d*e - 4*B*a^4*e^2)
/((c*x^2 + a)^3*a^3*c^2)
```

3.67 $\int \frac{(d+ex)(A+Bx+Cx^2)}{(a+cx^2)^4}\,dx$

Optimal. Leaf size=165

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)(aBe+aCd+5Acd)}{16a^{7/2}c^{3/2}}+\frac{x(aBe+aCd+5Acd)}{16a^3c\,(a+cx^2)}-\frac{2ae(aC+2Ac)-cx(aBe+aCd+5Acd)}{24a^2c^2\,(a+cx^2)^2}-\frac{(d+ex)(aB-x(Ac-aC))}{6ac\,(a+cx^2)^3}$$

```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x))/(6*a*c*(a + c*x^2)^3) - (2*a*(
2*A*c + a*C)*e - c*(5*A*c*d + a*C*d + a*B*e)*x)/(24*a^2*c^2*(a +
c*x^2)^2) + ((5*A*c*d + a*C*d + a*B*e)*x)/(16*a^3*c*(a + c*x^2))
+ ((5*A*c*d + a*C*d + a*B*e)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(16*a^(
7/2)*c^(3/2))
```

Rubi [A] time = 0.293187, antiderivative size = 165, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.16$

$$\frac{\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)(aBe+aCd+5Acd)}{16a^{7/2}c^{3/2}}+\frac{x(aBe+aCd+5Acd)}{16a^3c\,(a+cx^2)}-\frac{2ae(aC+2Ac)-cx(aBe+aCd+5Acd)}{24a^2c^2\,(a+cx^2)^2}-\frac{(d+ex)(aB-x(Ac-aC))}{6ac\,(a+cx^2)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)*(A + B*x + C*x^2))/(a + c*x^2)^4,x]
```

```
[Out] -((a*B - (A*c - a*C)*x)*(d + e*x))/(6*a*c*(a + c*x^2)^3) - (2*a*(
2*A*c + a*C)*e - c*(5*A*c*d + a*C*d + a*B*e)*x)/(24*a^2*c^2*(a +
c*x^2)^2) + ((5*A*c*d + a*C*d + a*B*e)*x)/(16*a^3*c*(a + c*x^2))
+ ((5*A*c*d + a*C*d + a*B*e)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(16*a^(
7/2)*c^(3/2))
```

Rubi in Sympy [A] time = 52.6535, size = 246, normalized size = 1.49

$$-\frac{Cae-cx\,(Be+Cd)}{4ac^2\,(a+cx^2)^2}-\frac{a\,(Ace+Bcd-Cae)-cx\,(Acd-Bae-Cad)}{6ac^2\,(a+cx^2)^3}+\frac{3x\,(Be+Cd)}{8a^2c\,(a+cx^2)}+\frac{5x\,(Acd-Bae-Cad)}{24a^2c\,(a+cx^2)^2}+\frac{5x\,(Acd-Bae-Cad)}{16a^3c\,(a+cx^2)}+\frac{3\,(Be+Cd)\,\mathrm{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{8a^{\frac{5}{2}}c^{\frac{3}{2}}}+\frac{5\,(Acd-Bae-Cad)\,\mathrm{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{16a^{\frac{7}{2}}c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)*(C*x**2+B*x+A)/(c*x**2+a)**4,x)
```

```
[Out] -(C*a*e - c*x*(B*e + C*d))/(4*a*c**2*(a + c*x**2)**2) - (a*(A*c*e
 + B*c*d - C*a*e) - c*x*(A*c*d - B*a*e - C*a*d))/(6*a*c**2*(a + c
*x**2)**3) + 3*x*(B*e + C*d)/(8*a**2*c*(a + c*x**2)) + 5*x*(A*c*d
 - B*a*e - C*a*d)/(24*a**2*c*(a + c*x**2)**2) + 5*x*(A*c*d - B*a*
e - C*a*d)/(16*a**3*c*(a + c*x**2)) + 3*(B*e + C*d)*atan(sqrt(c)*
x/sqrt(a))/(8*a**(5/2)*c**(3/2)) + 5*(A*c*d - B*a*e - C*a*d)*atan
(sqrt(c)*x/sqrt(a))/(16*a**(7/2)*c**(3/2))
```

Mathematica [A] time = 0.283481, size = 171, normalized size = 1.04

$$\frac{\frac{8a^{5/2}\left(a^2Ce-ac(Ae+B(d+ex)+Cdx)+Ac^2dx\right)}{(a+cx^2)^3}+\frac{2a^{3/2}\left(-6a^2Ce+acx(Be+Cd)+5Ac^2dx\right)}{(a+cx^2)^2}+\frac{3\sqrt{a}cx(aBe+aCd+5Acd)}{a+cx^2}+3\sqrt{c}\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)(aBe+aC}{48a^{7/2}c^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)*(A + B*x + C*x^2))/(a + c*x^2)^4,x]
```

```
[Out] ((2*a^(3/2)*(-6*a^2*C*e + 5*A*c^2*d*x + a*c*(C*d + B*e)*x))/(a +
c*x^2)^2 + (3*Sqrt[a]*c*(5*A*c*d + a*C*d + a*B*e)*x)/(a + c*x^2)
+ (8*a^(5/2)*(a^2*C*e + A*c^2*d*x - a*c*(A*e + C*d*x + B*(d + e*x
))))/(a + c*x^2)^3 + 3*Sqrt[c]*(5*A*c*d + a*C*d + a*B*e)*ArcTan[(
Sqrt[c]*x)/Sqrt[a]])/(48*a^(7/2)*c^2)
```

Maple [A] time = 0.012, size = 182, normalized size = 1.1

$$\frac{1}{(cx^2+a)^3}\left(\frac{(5\,Acd+aBe+Cad)\,cx^5}{16\,a^3}+\frac{(5\,Acd+aBe+Cad)\,x^3}{6\,a^2}-\frac{Cex^2}{4\,c}+\frac{(11\,Acd-aBe-Cad)\,x}{16\,ac}-\frac{2\,Ace+2\,Bcd+aCe}{12\,c^2}\right)+\frac{5\,Ad}{16\,a^3}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Be}{16\,a^2c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{Cd}{16\,a^2c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)*(C*x^2+B*x+A)/(c*x^2+a)^4,x)
```

```
[Out] (1/16*(5*A*c*d+B*a*e+C*a*d)/a^3*c*x^5+1/6/a^2*(5*A*c*d+B*a*e+C*a*
d)*x^3-1/4*C*e*x^2/c+1/16*(11*A*c*d-B*a*e-C*a*d)/a/c*x-1/12*(2*A*
c*e+2*B*c*d+C*a*e)/c^2)/(c*x^2+a)^3+5/16/a^3/(a*c)^(1/2)*arctan(c
*x/(a*c)^(1/2))*A*d+1/16/a^2/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2)
```

```
)*B*e+1/16/a^2/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C*d
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/(c*x^2 + a)^4,x, algorithm="maxima")

[Out] Exception raised: ValueError
```

Fricas [A] time = 0.295123, size = 1, normalized size = 0.01

$$\left[\frac{3\left(Ba^4ce+\left(Bac^4e+\left(Cac^4+5\,Ac^5\right)d\right)x^6+3\left(Ba^2c^3e+\left(Ca^2c^3+5\,Aac^4\right)d\right)x^4+3\left(Ba^3c^2e+\left(Ca^3c^2+5\,Aa^2c^3\right)d\right)x^2+\left(Ca^4\right.\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/(c*x^2 + a)^4,x, algorithm="fricas")

[Out] [1/96*(3*(B*a^4*c*e + (B*a*c^4*e + (C*a*c^4 + 5*A*c^5)*d)*x^6 + 3
*(B*a^2*c^3*e + (C*a^2*c^3 + 5*A*a*c^4)*d)*x^4 + 3*(B*a^3*c^2*e +
 (C*a^3*c^2 + 5*A*a^2*c^3)*d)*x^2 + (C*a^4*c + 5*A*a^3*c^2)*d)*lo
g((2*a*c*x + (c*x^2 - a)*sqrt(-a*c))/(c*x^2 + a)) - 2*(12*C*a^3*c
*e*x^2 + 8*B*a^3*c*d - 3*(B*a*c^3*e + (C*a*c^3 + 5*A*c^4)*d)*x^5
- 8*(B*a^2*c^2*e + (C*a^2*c^2 + 5*A*a*c^3)*d)*x^3 + 4*(C*a^4 + 2*
A*a^3*c)*e + 3*(B*a^3*c*e + (C*a^3*c - 11*A*a^2*c^2)*d)*x)*sqrt(-
a*c))/((a^3*c^5*x^6 + 3*a^4*c^4*x^4 + 3*a^5*c^3*x^2 + a^6*c^2)*sq
rt(-a*c)), 1/48*(3*(B*a^4*c*e + (B*a*c^4*e + (C*a*c^4 + 5*A*c^5)*
d)*x^6 + 3*(B*a^2*c^3*e + (C*a^2*c^3 + 5*A*a*c^4)*d)*x^4 + 3*(B*a
^3*c^2*e + (C*a^3*c^2 + 5*A*a^2*c^3)*d)*x^2 + (C*a^4*c + 5*A*a^3*
c^2)*d)*arctan(sqrt(a*c)*x/a) - (12*C*a^3*c*e*x^2 + 8*B*a^3*c*d -
 3*(B*a*c^3*e + (C*a*c^3 + 5*A*c^4)*d)*x^5 - 8*(B*a^2*c^2*e + (C*
a^2*c^2 + 5*A*a*c^3)*d)*x^3 + 4*(C*a^4 + 2*A*a^3*c)*e + 3*(B*a^3*
c*e + (C*a^3*c - 11*A*a^2*c^2)*d)*x)*sqrt(a*c))/((a^3*c^5*x^6 + 3
*a^4*c^4*x^4 + 3*a^5*c^3*x^2 + a^6*c^2)*sqrt(a*c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)*(C*x**2+B*x+A)/(c*x**2+a)**4,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.271029, size = 262, normalized size = 1.59

$$\frac{(Cad + 5\,Acd + Bae)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{16\,\sqrt{ac}a^3c} + \frac{3\,Cac^3dx^5 + 15\,Ac^4dx^5 + 3\,Bac^3x^5e + 8\,Ca^2c^2dx^3 + 40\,Aac^3dx^3 + 8\,Ba^2c^2x^3e - 12\,Ca^3cx^2e - 3\,Ca^3cdx + 33\,Aa^2c^2dx - 3\,B}{48\,(cx^2+a)^3a^3c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)/(c*x^2 + a)^4,x, algorithm="giac")
```

```
[Out] 1/16*(C*a*d + 5*A*c*d + B*a*e)*arctan(c*x/sqrt(a*c))/(sqrt(a*c)*a
^3*c) + 1/48*(3*C*a*c^3*d*x^5 + 15*A*c^4*d*x^5 + 3*B*a*c^3*x^5*e
+ 8*C*a^2*c^2*d*x^3 + 40*A*a*c^3*d*x^3 + 8*B*a^2*c^2*x^3*e - 12*C
*a^3*c*x^2*e - 3*C*a^3*c*d*x + 33*A*a^2*c^2*d*x - 3*B*a^3*c*x*e -
 8*B*a^3*c*d - 4*C*a^4*e - 8*A*a^3*c*e)/((c*x^2 + a)^3*a^3*c^2)
```

3.68 $\int \frac{A+Bx+Cx^2}{(a+cx^2)^4} dx$

Optimal. Leaf size=126

$$\frac{(aC+5Ac)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{16a^{7/2}c^{3/2}}+\frac{x(aC+5Ac)}{16a^3c(a+cx^2)}+\frac{x(aC+5Ac)}{24a^2c(a+cx^2)^2}-\frac{aB-x(Ac-aC)}{6ac(a+cx^2)^3}$$

```
[Out] -(a*B - (A*c - a*C)*x)/(6*a*c*(a + c*x^2)^3) + ((5*A*c + a*C)*x)/
(24*a^2*c*(a + c*x^2)^2) + ((5*A*c + a*C)*x)/(16*a^3*c*(a + c*x^2
)) + ((5*A*c + a*C)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(16*a^(7/2)*c^(3
/2))
```

Rubi [A] time = 0.164567, antiderivative size = 126, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{(aC+5Ac)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{16a^{7/2}c^{3/2}}+\frac{x(aC+5Ac)}{16a^3c(a+cx^2)}+\frac{x(aC+5Ac)}{24a^2c(a+cx^2)^2}-\frac{aB-x(Ac-aC)}{6ac(a+cx^2)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/(a + c*x^2)^4,x]
```

```
[Out] -(a*B - (A*c - a*C)*x)/(6*a*c*(a + c*x^2)^3) + ((5*A*c + a*C)*x)/
(24*a^2*c*(a + c*x^2)^2) + ((5*A*c + a*C)*x)/(16*a^3*c*(a + c*x^2
)) + ((5*A*c + a*C)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(16*a^(7/2)*c^(3
/2))
```

Rubi in Sympy [A] time = 16.4073, size = 107, normalized size = 0.85

$$-\frac{Ba-x(Ac-Ca)}{6ac(a+cx^2)^3}+\frac{x(5Ac+Ca)}{24a^2c(a+cx^2)^2}+\frac{x(5Ac+Ca)}{16a^3c(a+cx^2)}+\frac{(5Ac+Ca)\operatorname{atan}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{16a^{\frac{7}{2}}c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)/(c*x**2+a)**4,x)
```

```
[Out] -(B*a - x*(A*c - C*a))/(6*a*c*(a + c*x**2)**3) + x*(5*A*c + C*a)/
(24*a**2*c*(a + c*x**2)**2) + x*(5*A*c + C*a)/(16*a**3*c*(a + c*x
**2)) + (5*A*c + C*a)*atan(sqrt(c)*x/sqrt(a))/(16*a**(7/2)*c**(3/
```

```
2))
```

Mathematica [A] time = 0.165196, size = 112, normalized size = 0.89

$$\frac{(aC+5Ac)\tan^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{16a^{7/2}c^{3/2}}+\frac{-a^3(8B+3Cx)+a^2cx\left(33A+8Cx^2\right)+ac^2x^3\left(40A+3Cx^2\right)+15Ac^3x^5}{48a^3c\left(a+cx^2\right)^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/(a + c*x^2)^4,x]
```

```
[Out] (15*A*c^3*x^5 - a^3*(8*B + 3*C*x) + a*c^2*x^3*(40*A + 3*C*x^2) +
a^2*c*x*(33*A + 8*C*x^2))/(48*a^3*c*(a + c*x^2)^3) + ((5*A*c + a*
C)*ArcTan[(Sqrt[c]*x)/Sqrt[a]])/(16*a^(7/2)*c^(3/2))
```

Maple [A] time = 0.011, size = 113, normalized size = 0.9

$$\frac{1}{\left(cx^2+a\right)^3}\left(\frac{(5\,Ac+aC)\,cx^5}{16\,a^3}+\frac{(5\,Ac+aC)\,x^3}{6\,a^2}+\frac{(11\,Ac-aC)\,x}{16\,ac}-\frac{B}{6\,c}\right)+\frac{5\,A}{16\,a^3}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}+\frac{C}{16\,a^2c}\arctan\left(cx\frac{1}{\sqrt{ac}}\right)\frac{1}{\sqrt{ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(c*x^2+a)^4,x)
```

```
[Out] (1/16*(5*A*c+C*a)/a^3*c*x^5+1/6/a^2*(5*A*c+C*a)*x^3+1/16*(11*A*c-
C*a)/a/c*x-1/6*B/c)/(c*x^2+a)^3+5/16/a^3/(a*c)^(1/2)*arctan(c*x/(
a*c)^(1/2))*A+1/16/a^2/c/(a*c)^(1/2)*arctan(c*x/(a*c)^(1/2))*C
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.294262, size = 1, normalized size = 0.01

$$\left[\frac{3\left(\left(Cac^{3}+5\,Ac^{4}\right)x^{6}+Ca^{4}+5\,Aa^{3}c+3\left(Ca^{2}c^{2}+5\,Aac^{3}\right)x^{4}+3\left(Ca^{3}c+5\,Aa^{2}c^{2}\right)x^{2}\right)\log\left(\frac{2\,acx+\left(cx^{2}-a\right)\sqrt{-ac}}{cx^{2}+a}\right)+2\left(3\left(Cac^{2}\right.\right.}{96\left(a^{3}c^{4}x^{6}+3\,a^{4}c^{3}x^{4}+3\,a^{5}c^{2}x^{2}+a^{6}c\right)\sqrt{-ac}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^4,x, algorithm="fricas")
```

```
[Out] [1/96*(3*((C*a*c^3 + 5*A*c^4)*x^6 + C*a^4 + 5*A*a^3*c + 3*(C*a^2*
c^2 + 5*A*a*c^3)*x^4 + 3*(C*a^3*c + 5*A*a^2*c^2)*x^2)*log((2*a*c*
x + (c*x^2 - a)*sqrt(-a*c))/(c*x^2 + a)) + 2*(3*(C*a*c^2 + 5*A*c^
3)*x^5 - 8*B*a^3 + 8*(C*a^2*c + 5*A*a*c^2)*x^3 - 3*(C*a^3 - 11*A*
a^2*c)*x)*sqrt(-a*c))/((a^3*c^4*x^6 + 3*a^4*c^3*x^4 + 3*a^5*c^2*x
^2 + a^6*c)*sqrt(-a*c)), 1/48*(3*((C*a*c^3 + 5*A*c^4)*x^6 + C*a^4
 + 5*A*a^3*c + 3*(C*a^2*c^2 + 5*A*a*c^3)*x^4 + 3*(C*a^3*c + 5*A*a
^2*c^2)*x^2)*arctan(sqrt(a*c)*x/a) + (3*(C*a*c^2 + 5*A*c^3)*x^5 -
 8*B*a^3 + 8*(C*a^2*c + 5*A*a*c^2)*x^3 - 3*(C*a^3 - 11*A*a^2*c)*x
)*sqrt(a*c))/((a^3*c^4*x^6 + 3*a^4*c^3*x^4 + 3*a^5*c^2*x^2 + a^6*
c)*sqrt(a*c))]
```

Sympy [A] time = 4.17807, size = 196, normalized size = 1.56

$$-\frac{\sqrt{-\frac{1}{a^{7}c^{3}}}\left(5Ac+Ca\right)\log\left(-a^{4}c\sqrt{-\frac{1}{a^{7}c^{3}}}+x\right)}{32}+\frac{\sqrt{-\frac{1}{a^{7}c^{3}}}\left(5Ac+Ca\right)\log\left(a^{4}c\sqrt{-\frac{1}{a^{7}c^{3}}}+x\right)}{32}+\frac{-8Ba^{3}+x^{5}\left(15Ac^{3}+3Cac^{2}\right)+x^{3}\left(40Aac^{2}+8Ca^{2}c\right)+x\left(33Aa^{2}c-3Ca^{3}\right)}{48a^{6}c+144a^{5}c^{2}x^{2}+144a^{4}c^{3}x^{4}+48a^{3}c^{4}x^{6}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)/(c*x**2+a)**4,x)
```

```
[Out] -sqrt(-1/(a**7*c**3))*(5*A*c + C*a)*log(-a**4*c*sqrt(-1/(a**7*c**
3)) + x)/32 + sqrt(-1/(a**7*c**3))*(5*A*c + C*a)*log(a**4*c*sqrt(
-1/(a**7*c**3)) + x)/32 + (-8*B*a**3 + x**5*(15*A*c**3 + 3*C*a*c*
*2) + x**3*(40*A*a*c**2 + 8*C*a**2*c) + x*(33*A*a**2*c - 3*C*a**3
))/(48*a**6*c + 144*a**5*c**2*x**2 + 144*a**4*c**3*x**4 + 48*a**3
*c**4*x**6)
```

<u>GIAC/XCAS</u> [A] time = 0.271338, size = 147, normalized size = 1.17

$$\frac{(Ca + 5\,Ac)\arctan\left(\frac{cx}{\sqrt{ac}}\right)}{16\,\sqrt{ac}a^3c} + \frac{3\,Cac^2x^5 + 15\,Ac^3x^5 + 8\,Ca^2cx^3 + 40\,Aac^2x^3 - 3\,Ca^3x + 33\,Aa^2cx - 8\,Ba^3}{48\,(cx^2 + a)^3a^3c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^4,x, algorithm="giac")
```

```
[Out] 1/16*(C*a + 5*A*c)*arctan(c*x/sqrt(a*c))/(sqrt(a*c)*a^3*c) + 1/48
*(3*C*a*c^2*x^5 + 15*A*c^3*x^5 + 8*C*a^2*c*x^3 + 40*A*a*c^2*x^3 -
 3*C*a^3*x + 33*A*a^2*c*x - 8*B*a^3)/((c*x^2 + a)^3*a^3*c)
```

3.69 $\int \frac{x^3(1+x+x^2)}{(1+x^2)^2} \, dx$

Optimal. Leaf size=43

$$\frac{x^2}{2} - \frac{1}{2}\log\left(x^2+1\right) - \frac{x^3}{2(x^2+1)} + \frac{3x}{2} - \frac{3}{2}\tan^{-1}(x)$$

```
[Out] (3*x)/2 + x^2/2 - x^3/(2*(1 + x^2)) - (3*ArcTan[x])/2 - Log[1 + x
^2]/2
```

Rubi [A] time = 0.0973935, antiderivative size = 43, 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

$$\frac{x^2}{2} - \frac{1}{2}\log\left(x^2+1\right) - \frac{x^3}{2(x^2+1)} + \frac{3x}{2} - \frac{3}{2}\tan^{-1}(x)$$

Antiderivative was successfully verified.

```
[In] Int[(x^3*(1 + x + x^2))/(1 + x^2)^2,x]
```

```
[Out] (3*x)/2 + x^2/2 - x^3/(2*(1 + x^2)) - (3*ArcTan[x])/2 - Log[1 + x
^2]/2
```

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

$$x + \frac{x}{2(x^2+1)} - \frac{\log\left(x^2+1\right)}{2} - \frac{3\,\mathrm{atan}\,(x)}{2} + \int x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate(x**3*(x**2+x+1)/(x**2+1)**2,x)
```

```
[Out] x + x/(2*(x**2 + 1)) - log(x**2 + 1)/2 - 3*atan(x)/2 + Integral(x
, x)
```

Mathematica [A] time = 0.0326399, size = 29, normalized size = 0.67

$$\frac{1}{2}\left(x\left(\frac{1}{x^2+1}+x+2\right) - \log\left(x^2+1\right) - 3\tan^{-1}(x)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^3*(1 + x + x^2))/(1 + x^2)^2,x]
```

```
[Out] (x*(2 + x + (1 + x^2)^(-1)) - 3*ArcTan[x] - Log[1 + x^2])/2
```

Maple [A] time = 0.009, size = 30, normalized size = 0.7

$$x+\frac{x^{2}}{2}+\frac{x}{2\,x^{2}+2}-\frac{\ln\left(x^{2}+1\right)}{2}-\frac{3\,\arctan\left(x\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(x^2+x+1)/(x^2+1)^2,x)
```

```
[Out] x+1/2*x^2+1/2*x/(x^2+1)-1/2*ln(x^2+1)-3/2*arctan(x)
```

Maxima [A] time = 0.796946, size = 39, normalized size = 0.91

$$\frac{1}{2}\,x^{2}+x+\frac{x}{2\,(x^{2}+1)}-\frac{3}{2}\,\arctan\left(x\right)-\frac{1}{2}\,\log\left(x^{2}+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x^3/(x^2 + 1)^2,x, algorithm="maxima")
```

```
[Out] 1/2*x^2 + x + 1/2*x/(x^2 + 1) - 3/2*arctan(x) - 1/2*log(x^2 + 1)
```

Fricas [A] time = 0.28393, size = 62, normalized size = 1.44

$$\frac{x^{4}+2\,x^{3}+x^{2}-3\left(x^{2}+1\right)\,\arctan\left(x\right)-\left(x^{2}+1\right)\,\log\left(x^{2}+1\right)+3\,x}{2\,(x^{2}+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x^3/(x^2 + 1)^2,x, algorithm="fricas")
```

```
[Out] 1/2*(x^4 + 2*x^3 + x^2 - 3*(x^2 + 1)*arctan(x) - (x^2 + 1)*log(x^
2 + 1) + 3*x)/(x^2 + 1)
```

Sympy [A] time = 0.144554, size = 29, normalized size = 0.67

$$\frac{x^2}{2} + x + \frac{x}{2x^2 + 2} - \frac{\log(x^2 + 1)}{2} - \frac{3\,\mathrm{atan}(x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(x**2+x+1)/(x**2+1)**2,x)
```

```
[Out] x**2/2 + x + x/(2*x**2 + 2) - log(x**2 + 1)/2 - 3*atan(x)/2
```

GIAC/XCAS [A] time = 0.269761, size = 39, normalized size = 0.91

$$\frac{1}{2}\,x^2 + x + \frac{x}{2\,(x^2 + 1)} - \frac{3}{2}\,\arctan(x) - \frac{1}{2}\ln(x^2 + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x^3/(x^2 + 1)^2,x, algorithm="giac")
```

```
[Out] 1/2*x^2 + x + 1/2*x/(x^2 + 1) - 3/2*arctan(x) - 1/2*ln(x^2 + 1)
```

3.70 $\int \frac{x^2(1+x+x^2)}{(1+x^2)^2} \, dx$

Optimal. Leaf size=30

$$-\frac{x^2}{2(x^2+1)}+\frac{1}{2}\log\left(x^2+1\right)+x-\tan^{-1}(x)$$

```
[Out] x - x^2/(2*(1 + x^2)) - ArcTan[x] + Log[1 + x^2]/2
```

Rubi [A] time = 0.0757745, antiderivative size = 30, 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

$$-\frac{x^2}{2(x^2+1)}+\frac{1}{2}\log\left(x^2+1\right)+x-\tan^{-1}(x)$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*(1 + x + x^2))/(1 + x^2)^2,x]

[Out] x - x^2/(2*(1 + x^2)) - ArcTan[x] + Log[1 + x^2]/2
```

Rubi in Sympy [A] time = 9.83541, size = 20, normalized size = 0.67

$$x+\frac{\log\left(x^2+1\right)}{2}-\operatorname{atan}(x)+\frac{1}{2(x^2+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(x**2+x+1)/(x**2+1)**2,x)

[Out] x + log(x**2 + 1)/2 - atan(x) + 1/(2*(x**2 + 1))
```

Mathematica [A] time = 0.0183181, size = 27, normalized size = 0.9

$$\frac{1}{2(x^2+1)}+\frac{1}{2}\log\left(x^2+1\right)+x-\tan^{-1}(x)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*(1 + x + x^2))/(1 + x^2)^2,x]

[Out] x + 1/(2*(1 + x^2)) - ArcTan[x] + Log[1 + x^2]/2
```

Maple [A] time = 0.007, size = 24, normalized size = 0.8

$$x+\frac{1}{2x^2+2}+\frac{\ln\left(x^2+1\right)}{2}-\arctan\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(x^2+x+1)/(x^2+1)^2,x)

[Out] x+1/2/(x^2+1)+1/2*ln(x^2+1)-arctan(x)
```

Maxima [A] time = 0.779386, size = 31, normalized size = 1.03

$$x+\frac{1}{2\left(x^2+1\right)}-\arctan\left(x\right)+\frac{1}{2}\log\left(x^2+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x^2/(x^2 + 1)^2,x, algorithm="maxima")

[Out] x + 1/2/(x^2 + 1) - arctan(x) + 1/2*log(x^2 + 1)
```

Fricas [A] time = 0.281031, size = 54, normalized size = 1.8

$$\frac{2x^3-2\left(x^2+1\right)\arctan\left(x\right)+\left(x^2+1\right)\log\left(x^2+1\right)+2x+1}{2\left(x^2+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x^2/(x^2 + 1)^2,x, algorithm="fricas")

[Out] 1/2*(2*x^3 - 2*(x^2 + 1)*arctan(x) + (x^2 + 1)*log(x^2 + 1) + 2*x
 + 1)/(x^2 + 1)
```

Sympy [A] time = 0.129391, size = 20, normalized size = 0.67

$$x + \frac{\log\left(x^2 + 1\right)}{2} - \operatorname{atan}(x) + \frac{1}{2x^2 + 2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(x**2+x+1)/(x**2+1)**2,x)
```

```
[Out] x + log(x**2 + 1)/2 - atan(x) + 1/(2*x**2 + 2)
```

GIAC/XCAS [A] time = 0.271665, size = 31, normalized size = 1.03

$$x + \frac{1}{2\left(x^2 + 1\right)} - \arctan(x) + \frac{1}{2}\ln\left(x^2 + 1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x^2/(x^2 + 1)^2,x, algorithm="giac")
```

```
[Out] x + 1/2/(x^2 + 1) - arctan(x) + 1/2*ln(x^2 + 1)
```

3.71 $\int \frac{x(1+x+x^2)}{(1+x^2)^2}\,dx$

Optimal. Leaf size=29

$$-\frac{x}{2(x^2+1)}+\frac{1}{2}\log\left(x^2+1\right)+\frac{1}{2}\tan^{-1}(x)$$

```
[Out] -x/(2*(1 + x^2)) + ArcTan[x]/2 + Log[1 + x^2]/2
```

Rubi [A] time = 0.0447995, antiderivative size = 29, 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

$$-\frac{x}{2(x^2+1)}+\frac{1}{2}\log\left(x^2+1\right)+\frac{1}{2}\tan^{-1}(x)$$

Antiderivative was successfully verified.

```
[In]  Int[(x*(1 + x + x^2))/(1 + x^2)^2,x]
```

```
[Out] -x/(2*(1 + x^2)) + ArcTan[x]/2 + Log[1 + x^2]/2
```

Rubi in Sympy [A] time = 7.50411, size = 20, normalized size = 0.69

$$-\frac{x}{2(x^2+1)}+\frac{\log\left(x^2+1\right)}{2}+\frac{\operatorname{atan}(x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(x**2+x+1)/(x**2+1)**2,x)
```

```
[Out] -x/(2*(x**2 + 1)) + log(x**2 + 1)/2 + atan(x)/2
```

Mathematica [A] time = 0.0152251, size = 23, normalized size = 0.79

$$\frac{1}{2}\left(-\frac{x}{x^2+1}+\log\left(x^2+1\right)+\tan^{-1}(x)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x*(1 + x + x^2))/(1 + x^2)^2,x]
```

```
[Out] (-(x/(1 + x^2)) + ArcTan[x] + Log[1 + x^2])/2
```

Maple [A] time = 0.007, size = 24, normalized size = 0.8

$$-\frac{x}{2\,x^{2}+2}+\frac{\arctan\left(x\right)}{2}+\frac{\ln\left(x^{2}+1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(x^2+x+1)/(x^2+1)^2,x)
```

```
[Out] -1/2*x/(x^2+1)+1/2*arctan(x)+1/2*ln(x^2+1)
```

Maxima [A] time = 0.780218, size = 31, normalized size = 1.07

$$-\frac{x}{2\,(x^{2}+1)}+\frac{1}{2}\,\arctan\left(x\right)+\frac{1}{2}\,\log\left(x^{2}+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x/(x^2 + 1)^2,x, algorithm="maxima")
```

```
[Out] -1/2*x/(x^2 + 1) + 1/2*arctan(x) + 1/2*log(x^2 + 1)
```

Fricas [A] time = 0.281121, size = 45, normalized size = 1.55

$$\frac{\left(x^{2}+1\right)\,\arctan\left(x\right)+\left(x^{2}+1\right)\,\log\left(x^{2}+1\right)-x}{2\,(x^{2}+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x/(x^2 + 1)^2,x, algorithm="fricas")
```

```
[Out] 1/2*((x^2 + 1)*arctan(x) + (x^2 + 1)*log(x^2 + 1) - x)/(x^2 + 1)
```

Sympy [A] time = 0.134836, size = 20, normalized size = 0.69

$$-\frac{x}{2x^2+2}+\frac{\log\left(x^2+1\right)}{2}+\frac{\operatorname{atan}(x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(x**2+x+1)/(x**2+1)**2,x)
```

```
[Out] -x/(2*x**2 + 2) + log(x**2 + 1)/2 + atan(x)/2
```

GIAC/XCAS [A] time = 0.269496, size = 31, normalized size = 1.07

$$-\frac{x}{2\left(x^2+1\right)}+\frac{1}{2}\arctan(x)+\frac{1}{2}\ln\left(x^2+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x/(x^2 + 1)^2,x, algorithm="giac")
```

```
[Out] -1/2*x/(x^2 + 1) + 1/2*arctan(x) + 1/2*ln(x^2 + 1)
```

3.72 $\int \frac{1+x+x^2}{(1+x^2)^2}\,dx$

Optimal. Leaf size=14

$$\tan^{-1}(x) - \frac{1}{2\left(x^2+1\right)}$$

```
[Out] -1/(2*(1 + x^2)) + ArcTan[x]
```

Rubi [A] time = 0.0193567, antiderivative size = 14, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}} = 0.214$

$$\tan^{-1}(x) - \frac{1}{2\left(x^2+1\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + x + x^2)/(1 + x^2)^2,x]

[Out] -1/(2*(1 + x^2)) + ArcTan[x]
```

Rubi in Sympy [A] time = 4.19229, size = 10, normalized size = 0.71

$$\operatorname{atan}(x) - \frac{1}{2\left(x^2+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2+x+1)/(x**2+1)**2,x)

[Out] atan(x) - 1/(2*(x**2 + 1))
```

Mathematica [A] time = 0.0122166, size = 14, normalized size = 1.

$$\tan^{-1}(x) - \frac{1}{2\left(x^2+1\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + x + x^2)/(1 + x^2)^2,x]

[Out] -1/(2*(1 + x^2)) + ArcTan[x]
```

Maple [A] time = 0.007, size = 13, normalized size = 0.9

$$-\frac{1}{2\,x^2+2}+\arctan\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+x+1)/(x^2+1)^2,x)

[Out] -1/2/(x^2+1)+arctan(x)
```

Maxima [A] time = 0.783228, size = 16, normalized size = 1.14

$$-\frac{1}{2\left(x^2+1\right)}+\arctan\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/(x^2 + 1)^2,x, algorithm="maxima")

[Out] -1/2/(x^2 + 1) + arctan(x)
```

Fricas [A] time = 0.27916, size = 27, normalized size = 1.93

$$\frac{2\left(x^2+1\right)\arctan\left(x\right)-1}{2\left(x^2+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/(x^2 + 1)^2,x, algorithm="fricas")

[Out] 1/2*(2*(x^2 + 1)*arctan(x) - 1)/(x^2 + 1)
```

Sympy [A] time = 0.116624, size = 10, normalized size = 0.71

$$\operatorname{atan}(x) - \frac{1}{2x^2 + 2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+x+1)/(x**2+1)**2,x)
```

```
[Out] atan(x) - 1/(2*x**2 + 2)
```

GIAC/XCAS [A] time = 0.268733, size = 16, normalized size = 1.14

$$-\frac{1}{2(x^2 + 1)} + \arctan(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/(x^2 + 1)^2,x, algorithm="giac")
```

```
[Out] -1/2/(x^2 + 1) + arctan(x)
```

3.73 $\int \frac{1+x+x^2}{x(1+x^2)^2} \, dx$

Optimal. Leaf size=31

$$\frac{x}{2(x^2+1)} - \frac{1}{2}\log\left(x^2+1\right) + \log(x) + \frac{1}{2}\tan^{-1}(x)$$

```
[Out] x/(2*(1 + x^2)) + ArcTan[x]/2 + Log[x] - Log[1 + x^2]/2
```

Rubi [A] time = 0.0815873, antiderivative size = 31, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.294$

$$\frac{x}{2(x^2+1)} - \frac{1}{2}\log\left(x^2+1\right) + \log(x) + \frac{1}{2}\tan^{-1}(x)$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + x + x^2)/(x*(1 + x^2)^2),x]
```

```
[Out] x/(2*(1 + x^2)) + ArcTan[x]/2 + Log[x] - Log[1 + x^2]/2
```

Rubi in Sympy [A] time = 6.79452, size = 24, normalized size = 0.77

$$\frac{x}{2(x^2+1)} + \log(x) - \frac{\log\left(x^2+1\right)}{2} + \frac{\operatorname{atan}(x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2+x+1)/x/(x**2+1)**2,x)
```

```
[Out] x/(2*(x**2 + 1)) + log(x) - log(x**2 + 1)/2 + atan(x)/2
```

Mathematica [A] time = 0.018519, size = 28, normalized size = 0.9

$$\frac{1}{2}\left(\frac{x}{x^2+1} - \log\left(x^2+1\right) + 2\log(x) + \tan^{-1}(x)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + x + x^2)/(x*(1 + x^2)^2),x]

[Out] (x/(1 + x^2) + ArcTan[x] + 2*Log[x] - Log[1 + x^2])/2
```

Maple [A] time = 0.01, size = 26, normalized size = 0.8

$$\frac{x}{2x^2+2}+\frac{\arctan(x)}{2}+\ln(x)-\frac{\ln(x^2+1)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+x+1)/x/(x^2+1)^2,x)

[Out] 1/2*x/(x^2+1)+1/2*arctan(x)+ln(x)-1/2*ln(x^2+1)
```

Maxima [A] time = 0.787446, size = 34, normalized size = 1.1

$$\frac{x}{2(x^2+1)}+\frac{1}{2}\arctan(x)-\frac{1}{2}\log(x^2+1)+\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 + 1)^2*x),x, algorithm="maxima")

[Out] 1/2*x/(x^2 + 1) + 1/2*arctan(x) - 1/2*log(x^2 + 1) + log(x)
```

Fricas [A] time = 0.295254, size = 55, normalized size = 1.77

$$\frac{(x^2+1)\arctan(x)-(x^2+1)\log(x^2+1)+2(x^2+1)\log(x)+x}{2(x^2+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 + 1)^2*x),x, algorithm="fricas")

[Out] 1/2*((x^2 + 1)*arctan(x) - (x^2 + 1)*log(x^2 + 1) + 2*(x^2 + 1)*l
og(x) + x)/(x^2 + 1)
```

Sympy [A] time = 0.172515, size = 24, normalized size = 0.77

$$\frac{x}{2x^2+2}+\log(x)-\frac{\log(x^2+1)}{2}+\frac{\operatorname{atan}(x)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+x+1)/x/(x**2+1)**2,x)
```

```
[Out] x/(2*x**2 + 2) + log(x) - log(x**2 + 1)/2 + atan(x)/2
```

GIAC/XCAS [A] time = 0.271095, size = 35, normalized size = 1.13

$$\frac{x}{2(x^2+1)}+\frac{1}{2}\arctan(x)-\frac{1}{2}\ln(x^2+1)+\ln(|x|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 + 1)^2*x),x, algorithm="giac")
```

```
[Out] 1/2*x/(x^2 + 1) + 1/2*arctan(x) - 1/2*ln(x^2 + 1) + ln(abs(x))
```

3.74 $\int \frac{1+x+x^2}{x^2(1+x^2)^2} \, dx$

Optimal. Leaf size=33

$$\frac{1}{2(x^2+1)} - \frac{1}{2}\log\left(x^2+1\right) - \frac{1}{x} + \log(x) - \tan^{-1}(x)$$

```
[Out] -x^(-1) + 1/(2*(1 + x^2)) - ArcTan[x] + Log[x] - Log[1 + x^2]/2
```

Rubi [A] time = 0.0898051, antiderivative size = 33, 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

$$\frac{1}{2(x^2+1)} - \frac{1}{2}\log\left(x^2+1\right) - \frac{1}{x} + \log(x) - \tan^{-1}(x)$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + x + x^2)/(x^2*(1 + x^2)^2),x]

[Out] -x^(-1) + 1/(2*(1 + x^2)) - ArcTan[x] + Log[x] - Log[1 + x^2]/2
```

Rubi in Sympy [A] time = 8.36786, size = 26, normalized size = 0.79

$$\log(x) - \frac{\log\left(x^2+1\right)}{2} - \operatorname{atan}(x) + \frac{1}{2(x^2+1)} - \frac{1}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2+x+1)/x**2/(x**2+1)**2,x)

[Out] log(x) - log(x**2 + 1)/2 - atan(x) + 1/(2*(x**2 + 1)) - 1/x
```

Mathematica [A] time = 0.0267186, size = 33, normalized size = 1.

$$\frac{1}{2(x^2+1)} - \frac{1}{2}\log\left(x^2+1\right) - \frac{1}{x} + \log(x) - \tan^{-1}(x)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + x + x^2)/(x^2*(1 + x^2)^2),x]

[Out] -x^(-1) + 1/(2*(1 + x^2)) - ArcTan[x] + Log[x] - Log[1 + x^2]/2
```

Maple [A] time = 0.013, size = 30, normalized size = 0.9

$$-x^{-1}+\frac{1}{2x^{2}+2}-\arctan(x)+\ln(x)-\frac{\ln(x^{2}+1)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+x+1)/x^2/(x^2+1)^2,x)

[Out] -1/x+1/2/(x^2+1)-arctan(x)+ln(x)-1/2*ln(x^2+1)
```

Maxima [A] time = 0.799966, size = 46, normalized size = 1.39

$$-\frac{2x^{2}-x+2}{2(x^{3}+x)}-\arctan(x)-\frac{1}{2}\log(x^{2}+1)+\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 + 1)^2*x^2),x, algorithm="maxima")

[Out] -1/2*(2*x^2 - x + 2)/(x^3 + x) - arctan(x) - 1/2*log(x^2 + 1) + l
og(x)
```

Fricas [A] time = 0.290372, size = 66, normalized size = 2.

$$-\frac{2x^{2}+2(x^{3}+x)\arctan(x)+(x^{3}+x)\log(x^{2}+1)-2(x^{3}+x)\log(x)-x+2}{2(x^{3}+x)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 + 1)^2*x^2),x, algorithm="fricas")

[Out] -1/2*(2*x^2 + 2*(x^3 + x)*arctan(x) + (x^3 + x)*log(x^2 + 1) - 2*
(x^3 + x)*log(x) - x + 2)/(x^3 + x)
```

Sympy [A] time = 0.18304, size = 31, normalized size = 0.94

$$\log(x) - \frac{\log(x^2+1)}{2} - \operatorname{atan}(x) - \frac{2x^2-x+2}{2x^3+2x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+x+1)/x**2/(x**2+1)**2,x)
```

```
[Out] log(x) - log(x**2 + 1)/2 - atan(x) - (2*x**2 - x + 2)/(2*x**3 + 2
*x)
```

GIAC/XCAS [A] time = 0.272513, size = 47, normalized size = 1.42

$$-\frac{2\,x^2-x+2}{2\,(x^3+x)} - \arctan(x) - \frac{1}{2}\ln\left(x^2+1\right) + \ln(|x|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 + 1)^2*x^2),x, algorithm="giac")
```

```
[Out] -1/2*(2*x^2 - x + 2)/(x^3 + x) - arctan(x) - 1/2*ln(x^2 + 1) + ln
(abs(x))
```

3.75 $\int \frac{1+x+x^2}{x^3(1+x^2)^2} dx$

Optimal. Leaf size=45

$$-\frac{x}{2(x^2+1)}-\frac{1}{2x^2}+\frac{1}{2}\log\left(x^2+1\right)-\frac{1}{x}-\log(x)-\frac{3}{2}\tan^{-1}(x)$$

```
[Out] -1/(2*x^2) - x^(-1) - x/(2*(1 + x^2)) - (3*ArcTan[x])/2 - Log[x]
+ Log[1 + x^2]/2
```

Rubi [A] time = 0.100648, antiderivative size = 45, 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

$$-\frac{x}{2(x^2+1)}-\frac{1}{2x^2}+\frac{1}{2}\log\left(x^2+1\right)-\frac{1}{x}-\log(x)-\frac{3}{2}\tan^{-1}(x)$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + x + x^2)/(x^3*(1 + x^2)^2),x]
```

```
[Out] -1/(2*x^2) - x^(-1) - x/(2*(1 + x^2)) - (3*ArcTan[x])/2 - Log[x]
+ Log[1 + x^2]/2
```

Rubi in Sympy [A] time = 8.42227, size = 36, normalized size = 0.8

$$-\frac{x}{2(x^2+1)}-\log(x)+\frac{\log\left(x^2+1\right)}{2}-\frac{3\,\text{atan}(x)}{2}-\frac{1}{x}-\frac{1}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2+x+1)/x**3/(x**2+1)**2,x)
```

```
[Out] -x/(2*(x**2 + 1)) - log(x) + log(x**2 + 1)/2 - 3*atan(x)/2 - 1/x
- 1/(2*x**2)
```

Mathematica [A] time = 0.0293418, size = 39, normalized size = 0.87

$$\frac{1}{2}\left(-\frac{x}{x^2+1}-\frac{1}{x^2}+\log\left(x^2+1\right)-\frac{2}{x}-2\log(x)-3\tan^{-1}(x)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + x + x^2)/(x^3*(1 + x^2)^2),x]
```

```
[Out] (-x^(-2) - 2/x - x/(1 + x^2) - 3*ArcTan[x] - 2*Log[x] + Log[1 + x
^2])/2
```

Maple [A] time = 0.013, size = 38, normalized size = 0.8

$$-\frac{1}{2\,x^{2}}-x^{-1}-\frac{x}{2\,x^{2}+2}-\frac{3\;\arctan\left(x\right)}{2}-\ln\left(x\right)+\frac{\ln\left(x^{2}+1\right)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+x+1)/x^3/(x^2+1)^2,x)
```

```
[Out] -1/2/x^2-1/x-1/2*x/(x^2+1)-3/2*arctan(x)-ln(x)+1/2*ln(x^2+1)
```

Maxima [A] time = 0.797424, size = 55, normalized size = 1.22

$$-\frac{3\,x^{3}+x^{2}+2\,x+1}{2\,(x^{4}+x^{2})}-\frac{3}{2}\,\arctan\left(x\right)+\frac{1}{2}\,\log\left(x^{2}+1\right)-\log\left(x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 + 1)^2*x^3),x, algorithm="maxima")
```

```
[Out] -1/2*(3*x^3 + x^2 + 2*x + 1)/(x^4 + x^2) - 3/2*arctan(x) + 1/2*lo
g(x^2 + 1) - log(x)
```

Fricas [A] time = 0.289038, size = 82, normalized size = 1.82

$$-\frac{3\,x^{3}+x^{2}+3\,\left(x^{4}+x^{2}\right)\,\arctan\left(x\right)-\left(x^{4}+x^{2}\right)\,\log\left(x^{2}+1\right)+2\,\left(x^{4}+x^{2}\right)\,\log\left(x\right)+2\,x+1}{2\,(x^{4}+x^{2})}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 + 1)^2*x^3),x, algorithm="fricas")
```

```
[Out] -1/2*(3*x^3 + x^2 + 3*(x^4 + x^2)*arctan(x) - (x^4 + x^2)*log(x^2
 + 1) + 2*(x^4 + x^2)*log(x) + 2*x + 1)/(x^4 + x^2)
```

Sympy [A] time = 0.212864, size = 41, normalized size = 0.91

$$-\log(x) + \frac{\log(x^2+1)}{2} - \frac{3\,\mathrm{atan}(x)}{2} - \frac{3x^3+x^2+2x+1}{2x^4+2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+x+1)/x**3/(x**2+1)**2,x)
```

```
[Out] -log(x) + log(x**2 + 1)/2 - 3*atan(x)/2 - (3*x**3 + x**2 + 2*x +
1)/(2*x**4 + 2*x**2)
```

GIAC/XCAS [A] time = 0.271884, size = 58, normalized size = 1.29

$$-\frac{3\,x^3+x^2+2\,x+1}{2\,(x^2+1)x^2} - \frac{3}{2}\arctan(x) + \frac{1}{2}\ln(x^2+1) - \ln(|x|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 + 1)^2*x^3),x, algorithm="giac")
```

```
[Out] -1/2*(3*x^3 + x^2 + 2*x + 1)/((x^2 + 1)*x^2) - 3/2*arctan(x) + 1/
2*ln(x^2 + 1) - ln(abs(x))
```

3.76 $\int \frac{1+2x+x^2}{(1+x^2)^2} \, dx$

Optimal. Leaf size=12

$$\tan^{-1}(x) - \frac{1}{x^2+1}$$

```
[Out] -(1 + x^2)^(-1) + ArcTan[x]
```

Rubi [A] time = 0.0239418, antiderivative size = 22, normalized size of antiderivative = 1.83, number of steps used = 3, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$\tan^{-1}(x) - \frac{(1-x)(x+1)}{2(x^2+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 2*x + x^2)/(1 + x^2)^2,x]

[Out] -((1 - x)*(1 + x))/(2*(1 + x^2)) + ArcTan[x]
```

Rubi in Sympy [A] time = 4.92186, size = 19, normalized size = 1.58

$$-\frac{(-2x+2)(2x+2)}{8(x^2+1)} + \operatorname{atan}(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2+2*x+1)/(x**2+1)**2,x)

[Out] -(-2*x + 2)*(2*x + 2)/(8*(x**2 + 1)) + atan(x)
```

Mathematica [A] time = 0.0226775, size = 12, normalized size = 1.

$$\tan^{-1}(x) - \frac{1}{x^2+1}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 2*x + x^2)/(1 + x^2)^2,x]

[Out] -(1 + x^2)^(-1) + ArcTan[x]
```

Maple [A] time = 0.007, size = 13, normalized size = 1.1

$$-\left(x^2+1\right)^{-1}+\arctan(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+2*x+1)/(x^2+1)^2,x)

[Out] -1/(x^2+1)+arctan(x)
```

Maxima [A] time = 0.781864, size = 16, normalized size = 1.33

$$-\frac{1}{x^2+1}+\arctan(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + 2*x + 1)/(x^2 + 1)^2,x, algorithm="maxima")

[Out] -1/(x^2 + 1) + arctan(x)
```

Fricas [A] time = 0.284883, size = 24, normalized size = 2.

$$\frac{\left(x^2+1\right)\arctan(x)-1}{x^2+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + 2*x + 1)/(x^2 + 1)^2,x, algorithm="fricas")

[Out] ((x^2 + 1)*arctan(x) - 1)/(x^2 + 1)
```

Sympy [A] time = 0.125202, size = 8, normalized size = 0.67

$$\operatorname{atan}(x) - \frac{1}{x^2 + 1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+2*x+1)/(x**2+1)**2,x)
```

```
[Out] atan(x) - 1/(x**2 + 1)
```

GIAC/XCAS [A] time = 0.271438, size = 16, normalized size = 1.33

$$-\frac{1}{x^2 + 1} + \arctan(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + 2*x + 1)/(x^2 + 1)^2,x, algorithm="giac")
```

```
[Out] -1/(x^2 + 1) + arctan(x)
```

3.77 $\int \frac{2+12x+3x^2}{(4+x^2)^2}\,dx$

Optimal. Leaf size=27

$$\frac{7}{8}\tan^{-1}\left(\frac{x}{2}\right)-\frac{5x+24}{4\left(x^2+4\right)}$$

```
[Out] -(24 + 5*x)/(4*(4 + x^2)) + (7*ArcTan[x/2])/8
```

Rubi [A] time = 0.0250294, antiderivative size = 27, 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

$$\frac{7}{8}\tan^{-1}\left(\frac{x}{2}\right)-\frac{5x+24}{4\left(x^2+4\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + 12*x + 3*x^2)/(4 + x^2)^2,x]

[Out] -(24 + 5*x)/(4*(4 + x^2)) + (7*ArcTan[x/2])/8
```

Rubi in Sympy [A] time = 5.16671, size = 19, normalized size = 0.7

$$-\frac{10x+48}{8\left(x^2+4\right)}+\frac{7\,\mathrm{atan}\left(\frac{x}{2}\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((3*x**2+12*x+2)/(x**2+4)**2,x)

[Out] -(10*x + 48)/(8*(x**2 + 4)) + 7*atan(x/2)/8
```

Mathematica [A] time = 0.0195436, size = 27, normalized size = 1.

$$\frac{-5x-24}{4\left(x^2+4\right)}+\frac{7}{8}\tan^{-1}\left(\frac{x}{2}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(2 + 12*x + 3*x^2)/(4 + x^2)^2,x]

[Out] (-24 - 5*x)/(4*(4 + x^2)) + (7*ArcTan[x/2])/8
```

Maple [A] time = 0.008, size = 21, normalized size = 0.8

$$\frac{1}{x^2+4}\left(-\frac{5x}{4}-6\right)+\frac{7}{8}\arctan\left(\frac{x}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((3*x^2+12*x+2)/(x^2+4)^2,x)

[Out] (-5/4*x-6)/(x^2+4)+7/8*arctan(1/2*x)
```

Maxima [A] time = 0.788545, size = 28, normalized size = 1.04

$$-\frac{5x+24}{4(x^2+4)}+\frac{7}{8}\arctan\left(\frac{1}{2}x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x^2 + 12*x + 2)/(x^2 + 4)^2,x, algorithm="maxima")

[Out] -1/4*(5*x + 24)/(x^2 + 4) + 7/8*arctan(1/2*x)
```

Fricas [A] time = 0.279566, size = 34, normalized size = 1.26

$$\frac{7\left(x^2+4\right)\arctan\left(\frac{1}{2}x\right)-10x-48}{8(x^2+4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x^2 + 12*x + 2)/(x^2 + 4)^2,x, algorithm="fricas")

[Out] 1/8*(7*(x^2 + 4)*arctan(1/2*x) - 10*x - 48)/(x^2 + 4)
```

Sympy [A] time = 0.136662, size = 19, normalized size = 0.7

$$-\frac{5x+24}{4x^2+16}+\frac{7\operatorname{atan}\left(\frac{x}{2}\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x**2+12*x+2)/(x**2+4)**2,x)
```

```
[Out] -(5*x + 24)/(4*x**2 + 16) + 7*atan(x/2)/8
```

GIAC/XCAS [A] time = 0.270148, size = 28, normalized size = 1.04

$$-\frac{5\,x+24}{4\,(x^2+4)}+\frac{7}{8}\,\arctan\left(\frac{1}{2}\,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x^2 + 12*x + 2)/(x^2 + 4)^2,x, algorithm="giac")
```

```
[Out] -1/4*(5*x + 24)/(x^2 + 4) + 7/8*arctan(1/2*x)
```

3.78 $\int (g+hx)^3\sqrt{a+cx^2}\left(d+ex+fx^2\right)\,dx$

Optimal. Leaf size=390

$$\frac{x\sqrt{a+cx^2}\left(a^2h^2(eh+3fg)-2acg\left(3h(dh+eg)+fg^2\right)+8c^2dg^3\right)}{16c^2}+\frac{a\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(a^2h^2(eh+3fg)-2acg\left(3h(dh+eg)+fg^2\right)+8c^2dg^3\right)}{16c^{5/2}}+\frac{\left(a+cx^2\right)^{3/2}\left(8\left(8a^2fh^4-2ach^2\left(7h(dh+3eg)+15fg^2\right)-c^2g^2\left(3fg^2-7h(12dh+eg)\right)\right)-3chx\left(ah^2(35eh+41fg)+2cg\right.\right.}{840c^3h}-\frac{\left(a+cx^2\right)^{3/2}(g+hx)^2\left(8afh^2+c\left(3fg^2-7h(2dh+eg)\right)\right)}{70c^2h}-\frac{\left(a+cx^2\right)^{3/2}(g+hx)^3(3fg-7eh)}{42ch}+\frac{f\left(a+cx^2\right)^{3/2}(g+hx)^4}{7ch}$$

```
[Out] ((8*c^2*d*g^3 + a^2*h^2*(3*f*g + e*h) - 2*a*c*g*(f*g^2 + 3*h*(e*g
 + d*h)))*x*Sqrt[a + c*x^2])/(16*c^2) - ((8*a*f*h^2 + c*(3*f*g^2
- 7*h*(e*g + 2*d*h)))*(g + h*x)^2*(a + c*x^2)^(3/2))/(70*c^2*h) -
 ((3*f*g - 7*e*h)*(g + h*x)^3*(a + c*x^2)^(3/2))/(42*c*h) + (f*(g
 + h*x)^4*(a + c*x^2)^(3/2))/(7*c*h) + ((8*(8*a^2*f*h^4 - 2*a*c*h
^2*(15*f*g^2 + 7*h*(3*e*g + d*h)) - c^2*g^2*(3*f*g^2 - 7*h*(e*g +
 12*d*h))) - 3*c*h*(a*h^2*(41*f*g + 35*e*h) + 2*c*g*(3*f*g^2 - 7*
h*(e*g + 7*d*h)))*x)*(a + c*x^2)^(3/2))/(840*c^3*h) + (a*(8*c^2*d
*g^3 + a^2*h^2*(3*f*g + e*h) - 2*a*c*g*(f*g^2 + 3*h*(e*g + d*h)))
*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(16*c^(5/2))
```

Rubi [A] time = 1.82744, antiderivative size = 387, normalized size of antiderivative = 0.99, number of steps used = 7, number of rules used = 6, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.207$

$$\frac{x\sqrt{a+cx^2}\left(a^2h^2(eh+3fg)-2acg\left(3h(dh+eg)+fg^2\right)+8c^2dg^3\right)}{16c^2}+\frac{a\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(a^2h^2(eh+3fg)-2acg\left(3h(dh+eg)+fg^2\right)+8c^2dg^3\right)}{16c^{5/2}}+\frac{\left(a+cx^2\right)^{3/2}\left(8\left(8a^2fh^4-2ach^2\left(7h(dh+3eg)+15fg^2\right)-c^2\left(3fg^4-7g^2h(12dh+eg)\right)\right)-3chx\left(ah^2(35eh+41fg)-14c\right.\right.}{840c^3h}-\frac{\left(a+cx^2\right)^{3/2}(g+hx)^2\left(8afh^2-7ch(2dh+eg)+3cfg^2\right)}{70c^2h}-\frac{\left(a+cx^2\right)^{3/2}(g+hx)^3(3fg-7eh)}{42ch}+\frac{f\left(a+cx^2\right)^{3/2}(g+hx)^4}{7ch}$$

Antiderivative was successfully verified.

```
[In]  Int[(g + h*x)^3*Sqrt[a + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] ((8*c^2*d*g^3 + a^2*h^2*(3*f*g + e*h) - 2*a*c*g*(f*g^2 + 3*h*(e*g
 + d*h)))*x*Sqrt[a + c*x^2])/(16*c^2) - ((3*c*f*g^2 + 8*a*f*h^2 -
 7*c*h*(e*g + 2*d*h))*(g + h*x)^2*(a + c*x^2)^(3/2))/(70*c^2*h) -
 ((3*f*g - 7*e*h)*(g + h*x)^3*(a + c*x^2)^(3/2))/(42*c*h) + (f*(g
 + h*x)^4*(a + c*x^2)^(3/2))/(7*c*h) + ((8*(8*a^2*f*h^4 - 2*a*c*h
^2*(15*f*g^2 + 7*h*(3*e*g + d*h)) - c^2*(3*f*g^4 - 7*g^2*h*(e*g +
 12*d*h))) - 3*c*h*(6*c*f*g^3 - 14*c*g*h*(e*g + 7*d*h) + a*h^2*(4
1*f*g + 35*e*h))*x)*(a + c*x^2)^(3/2))/(840*c^3*h) + (a*(8*c^2*d*
g^3 + a^2*h^2*(3*f*g + e*h) - 2*a*c*g*(f*g^2 + 3*h*(e*g + d*h)))*
ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(16*c^(5/2))
```

Rubi in Sympy [A] time = 133.781, size = 432, normalized size = 1.11

$$\frac{a\left(a^2eh^3+3a^2fgh^2-6acdgh^2-6aceg^2h-2acfg^3+8c^2dg^3\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{16c^{\frac{5}{2}}}+\frac{f\left(a+cx^2\right)^{\frac{3}{2}}(g+hx)^4}{7ch}+\frac{\left(a+cx^2\right)^{\frac{3}{2}}(g+hx)^3(7eh-3fg)}{42ch}+\frac{x\sqrt{a+cx^2}\left(a^2eh^3+3a^2fgh^2-6acdgh^2-6aceg^2h-2acfg^3+8c^2dg^3\right)}{16c^2}-\frac{\left(a+cx^2\right)^{\frac{3}{2}}(g+hx)^2\left(-cg(7eh-3fg)+h^2(8af-14cd)\right)}{70c^2h}+\frac{\left(a+cx^2\right)^{\frac{3}{2}}\left(192a^2fh^4-336acdh^4-1008acegh^3-720acfg^2h^2+2016c^2dg^2h^2+168c^2eg^3h-72c^2fg^4-9chx\left(35aeh^3+4\right.\right.}{2520c^3h}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)**3*(f*x**2+e*x+d)*(c*x**2+a)**(1/2),x)
```

```
[Out] a*(a**2*e*h**3 + 3*a**2*f*g*h**2 - 6*a*c*d*g*h**2 - 6*a*c*e*g**2*
h - 2*a*c*f*g**3 + 8*c**2*d*g**3)*atanh(sqrt(c)*x/sqrt(a + c*x**2
))/(16*c**(5/2)) + f*(a + c*x**2)**(3/2)*(g + h*x)**4/(7*c*h) + (
a + c*x**2)**(3/2)*(g + h*x)**3*(7*e*h - 3*f*g)/(42*c*h) + x*sqrt
(a + c*x**2)*(a**2*e*h**3 + 3*a**2*f*g*h**2 - 6*a*c*d*g*h**2 - 6*
a*c*e*g**2*h - 2*a*c*f*g**3 + 8*c**2*d*g**3)/(16*c**2) - (a + c*x
**2)**(3/2)*(g + h*x)**2*(-c*g*(7*e*h - 3*f*g) + h**2*(8*a*f - 14
*c*d))/(70*c**2*h) + (a + c*x**2)**(3/2)*(192*a**2*f*h**4 - 336*a
*c*d*h**4 - 1008*a*c*e*g*h**3 - 720*a*c*f*g**2*h**2 + 2016*c**2*d
*g**2*h**2 + 168*c**2*e*g**3*h - 72*c**2*f*g**4 - 9*c*h*x*(35*a*e
*h**3 + 41*a*f*g*h**2 - 98*c*d*g*h**2 - 14*c*e*g**2*h + 6*c*f*g**
3))/(2520*c**3*h)
```

Mathematica [A] time = 0.603511, size = 362, normalized size = 0.93

$$\frac{105a\sqrt{c}\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)\left(a^2h^2(eh+3fg)-2acg\left(3h(dh+eg)+fg^2\right)+8c^2dg^3\right)+\sqrt{a+cx^2}\left(16cx^2\left(-4a^2fh^3+7ach\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(g + h*x)^3*Sqrt[a + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] (Sqrt[a + c*x^2]*(16*a*(8*a^2*f*h^3 + 35*c^2*g^2*(e*g + 3*d*h) -
14*a*c*h*(3*f*g^2 + h*(3*e*g + d*h))) + 105*c*(8*c^2*d*g^3 - a^2*
h^2*(3*f*g + e*h) + 2*a*c*g*(f*g^2 + 3*h*(e*g + d*h)))*x + 16*c*(
-4*a^2*f*h^3 + 35*c^2*g^2*(e*g + 3*d*h) + 7*a*c*h*(3*f*g^2 + h*(3
*e*g + d*h)))*x^2 + 70*c^2*(a*h^2*(3*f*g + e*h) + 6*c*(f*g^3 + 3*
g*h*(e*g + d*h)))*x^3 + 48*c^2*h*(a*f*h^2 + 7*c*(3*f*g^2 + h*(3*e
*g + d*h)))*x^4 + 280*c^3*h^2*(3*f*g + e*h)*x^5 + 240*c^3*f*h^3*x
^6) + 105*a*Sqrt[c]*(8*c^2*d*g^3 + a^2*h^2*(3*f*g + e*h) - 2*a*c*
g*(f*g^2 + 3*h*(e*g + d*h)))*Log[c*x + Sqrt[c]*Sqrt[a + c*x^2]])/
(1680*c^3)
```

Maple [A] time = 0.02, size = 661, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^3*(f*x^2+e*x+d)*(c*x^2+a)^(1/2),x)
```

```
[Out] 1/2*d*g^3*a/c^(1/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))+1/3*(c*x^2+a)^(
3/2)/c*e*g^3+1/2*d*g^3*x*(c*x^2+a)^(1/2)+3/4*x*(c*x^2+a)^(3/2)/c*
e*g^2*h+3/16/c^2*a^2*x*(c*x^2+a)^(1/2)*f*g*h^2-3/8/c*a*x*(c*x^2+a
)^(1/2)*d*g*h^2-3/8/c*a*x*(c*x^2+a)^(1/2)*e*g^2*h+1/2*x^3*(c*x^2+
a)^(3/2)/c*f*g*h^2-1/8/c^2*a*x*(c*x^2+a)^(3/2)*e*h^3+(c*x^2+a)^(3
/2)/c*d*g^2*h-1/8/c^(3/2)*a^2*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*f*g^3
+1/5*x^2*(c*x^2+a)^(3/2)/c*d*h^3-2/15*a/c^2*(c*x^2+a)^(3/2)*d*h^3
+1/4*x*(c*x^2+a)^(3/2)/c*f*g^3+1/6*x^3*(c*x^2+a)^(3/2)/c*e*h^3+1/
7*f*h^3*x^4*(c*x^2+a)^(3/2)/c+8/105*f*h^3/c^3*a^2*(c*x^2+a)^(3/2)
+1/16/c^(5/2)*a^3*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*e*h^3-3/8/c^2*a*x
*(c*x^2+a)^(3/2)*f*g*h^2+1/16/c^2*a^2*x*(c*x^2+a)^(1/2)*e*h^3+3/1
6/c^(5/2)*a^3*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*f*g*h^2-3/8/c^(3/2)*a
^2*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*e*g^2*h-1/8/c*a*x*(c*x^2+a)^(1/2
)*f*g^3-3/8/c^(3/2)*a^2*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*d*g*h^2+3/4
*x*(c*x^2+a)^(3/2)/c*d*g*h^2-2/5*a/c^2*(c*x^2+a)^(3/2)*e*g*h^2-2/
5*a/c^2*(c*x^2+a)^(3/2)*f*g^2*h-4/35*f*h^3/c^2*a*x^2*(c*x^2+a)^(3
/2)+3/5*x^2*(c*x^2+a)^(3/2)/c*e*g*h^2+3/5*x^2*(c*x^2+a)^(3/2)/c*f
*g^2*h
```

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(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.364389, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g)^3,x, algorithm="fricas")
```

```
[Out] [1/3360*(2*(240*c^3*f*h^3*x^6 + 560*a*c^2*e*g^3 - 672*a^2*c*e*g*h
^2 + 280*(3*c^3*f*g*h^2 + c^3*e*h^3)*x^5 + 48*(21*c^3*f*g^2*h + 2
1*c^3*e*g*h^2 + (7*c^3*d + a*c^2*f)*h^3)*x^4 + 336*(5*a*c^2*d - 2
*a^2*c*f)*g^2*h - 32*(7*a^2*c*d - 4*a^3*f)*h^3 + 70*(6*c^3*f*g^3
+ 18*c^3*e*g^2*h + a*c^2*e*h^3 + 3*(6*c^3*d + a*c^2*f)*g*h^2)*x^3
 + 16*(35*c^3*e*g^3 + 21*a*c^2*e*g*h^2 + 21*(5*c^3*d + a*c^2*f)*g
^2*h + (7*a*c^2*d - 4*a^2*c*f)*h^3)*x^2 + 105*(6*a*c^2*e*g^2*h -
a^2*c*e*h^3 + 2*(4*c^3*d + a*c^2*f)*g^3 + 3*(2*a*c^2*d - a^2*c*f)
*g*h^2)*x)*sqrt(c*x^2 + a)*sqrt(c) - 105*(6*a^2*c^2*e*g^2*h - a^3
*c*e*h^3 - 2*(4*a*c^3*d - a^2*c^2*f)*g^3 + 3*(2*a^2*c^2*d - a^3*c
*f)*g*h^2)*log(-2*sqrt(c*x^2 + a)*c*x - (2*c*x^2 + a)*sqrt(c)))/c
^(7/2), 1/1680*((240*c^3*f*h^3*x^6 + 560*a*c^2*e*g^3 - 672*a^2*c*
e*g*h^2 + 280*(3*c^3*f*g*h^2 + c^3*e*h^3)*x^5 + 48*(21*c^3*f*g^2*
h + 21*c^3*e*g*h^2 + (7*c^3*d + a*c^2*f)*h^3)*x^4 + 336*(5*a*c^2*
d - 2*a^2*c*f)*g^2*h - 32*(7*a^2*c*d - 4*a^3*f)*h^3 + 70*(6*c^3*f
*g^3 + 18*c^3*e*g^2*h + a*c^2*e*h^3 + 3*(6*c^3*d + a*c^2*f)*g*h^2
)*x^3 + 16*(35*c^3*e*g^3 + 21*a*c^2*e*g*h^2 + 21*(5*c^3*d + a*c^2
*f)*g^2*h + (7*a*c^2*d - 4*a^2*c*f)*h^3)*x^2 + 105*(6*a*c^2*e*g^2
*h - a^2*c*e*h^3 + 2*(4*c^3*d + a*c^2*f)*g^3 + 3*(2*a*c^2*d - a^2
*c*f)*g*h^2)*x)*sqrt(c*x^2 + a)*sqrt(-c) - 105*(6*a^2*c^2*e*g^2*h
 - a^3*c*e*h^3 - 2*(4*a*c^3*d - a^2*c^2*f)*g^3 + 3*(2*a^2*c^2*d -
 a^3*c*f)*g*h^2)*arctan(sqrt(-c)*x/sqrt(c*x^2 + a)))/(sqrt(-c)*c^
3)]
```

Sympy [A] time = 36.3197, size = 1088, normalized size = 2.79

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**3*(f*x**2+e*x+d)*(c*x**2+a)**(1/2),x)
```

```
[Out] -a**(5/2)*e*h**3*x/(16*c**2*sqrt(1 + c*x**2/a)) - 3*a**(5/2)*f*g*
h**2*x/(16*c**2*sqrt(1 + c*x**2/a)) + 3*a**(3/2)*d*g*h**2*x/(8*c*
sqrt(1 + c*x**2/a)) + 3*a**(3/2)*e*g**2*h*x/(8*c*sqrt(1 + c*x**2/
a)) - a**(3/2)*e*h**3*x**3/(48*c*sqrt(1 + c*x**2/a)) + a**(3/2)*f
*g**3*x/(8*c*sqrt(1 + c*x**2/a)) - a**(3/2)*f*g*h**2*x**3/(16*c*s
qrt(1 + c*x**2/a)) + sqrt(a)*d*g**3*x*sqrt(1 + c*x**2/a)/2 + 9*sq
rt(a)*d*g*h**2*x**3/(8*sqrt(1 + c*x**2/a)) + 9*sqrt(a)*e*g**2*h*x
**3/(8*sqrt(1 + c*x**2/a)) + 5*sqrt(a)*e*h**3*x**5/(24*sqrt(1 + c
*x**2/a)) + 3*sqrt(a)*f*g**3*x**3/(8*sqrt(1 + c*x**2/a)) + 5*sqrt
(a)*f*g*h**2*x**5/(8*sqrt(1 + c*x**2/a)) + a**3*e*h**3*asinh(sqrt
(c)*x/sqrt(a))/(16*c**(5/2)) + 3*a**3*f*g*h**2*asinh(sqrt(c)*x/sq
rt(a))/(16*c**(5/2)) - 3*a**2*d*g*h**2*asinh(sqrt(c)*x/sqrt(a))/(
8*c**(3/2)) - 3*a**2*e*g**2*h*asinh(sqrt(c)*x/sqrt(a))/(8*c**(3/2
)) - a**2*f*g**3*asinh(sqrt(c)*x/sqrt(a))/(8*c**(3/2)) + a*d*g**3
*asinh(sqrt(c)*x/sqrt(a))/(2*sqrt(c)) + 3*d*g**2*h*Piecewise((sqr
t(a)*x**2/2, Eq(c, 0)), ((a + c*x**2)**(3/2)/(3*c), True)) + d*h*
*3*Piecewise((-2*a**2*sqrt(a + c*x**2)/(15*c**2) + a*x**2*sqrt(a
+ c*x**2)/(15*c) + x**4*sqrt(a + c*x**2)/5, Ne(c, 0)), (sqrt(a)*x
**4/4, True)) + e*g**3*Piecewise((sqrt(a)*x**2/2, Eq(c, 0)), ((a
+ c*x**2)**(3/2)/(3*c), True)) + 3*e*g*h**2*Piecewise((-2*a**2*sq
rt(a + c*x**2)/(15*c**2) + a*x**2*sqrt(a + c*x**2)/(15*c) + x**4*
sqrt(a + c*x**2)/5, Ne(c, 0)), (sqrt(a)*x**4/4, True)) + 3*f*g**2
*h*Piecewise((-2*a**2*sqrt(a + c*x**2)/(15*c**2) + a*x**2*sqrt(a
+ c*x**2)/(15*c) + x**4*sqrt(a + c*x**2)/5, Ne(c, 0)), (sqrt(a)*x
**4/4, True)) + f*h**3*Piecewise((8*a**3*sqrt(a + c*x**2)/(105*c*
*3) - 4*a**2*x**2*sqrt(a + c*x**2)/(105*c**2) + a*x**4*sqrt(a + c
*x**2)/(35*c) + x**6*sqrt(a + c*x**2)/7, Ne(c, 0)), (sqrt(a)*x**6
/6, True)) + 3*c*d*g*h**2*x**5/(4*sqrt(a)*sqrt(1 + c*x**2/a)) + 3
*c*e*g**2*h*x**5/(4*sqrt(a)*sqrt(1 + c*x**2/a)) + c*e*h**3*x**7/(
6*sqrt(a)*sqrt(1 + c*x**2/a)) + c*f*g**3*x**5/(4*sqrt(a)*sqrt(1 +
 c*x**2/a)) + c*f*g*h**2*x**7/(2*sqrt(a)*sqrt(1 + c*x**2/a))
```

GIAC/XCAS [A] time = 0.27993, size = 641, normalized size = 1.64

$$\frac{1}{1680}\sqrt{cx^2+a}\left(\left(2\left(\left(4\left(5\left(6\,fh^3x+\frac{7\,(3\,c^5fgh^2+c^5h^3e)}{c^5}\right)x+\frac{6\,(21\,c^5fg^2h+7\,c^5dh^3+ac^4fh^3+21\,c^5gh^2e)}{c^5}\right)x+\frac{35\,(6\,c^5f\cdots\right.\right.\right.\right.$$

$$-\frac{\left(8\,ac^2dg^3-2\,a^2cfg^3-6\,a^2cdgh^2+3\,a^3fgh^2-6\,a^2cg^2he+a^3h^3e\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{16\,c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g)^3,x, algorithm="giac")
```

```
[Out] 1/1680*sqrt(c*x^2 + a)*((2*((4*(5*(6*f*h^3*x + 7*(3*c^5*f*g*h^2 +
 c^5*h^3*e)/c^5)*x + 6*(21*c^5*f*g^2*h + 7*c^5*d*h^3 + a*c^4*f*h^
3 + 21*c^5*g*h^2*e)/c^5)*x + 35*(6*c^5*f*g^3 + 18*c^5*d*g*h^2 + 3
*a*c^4*f*g*h^2 + 18*c^5*g^2*h*e + a*c^4*h^3*e)/c^5)*x + 8*(105*c^
5*d*g^2*h + 21*a*c^4*f*g^2*h + 7*a*c^4*d*h^3 - 4*a^2*c^3*f*h^3 +
35*c^5*g^3*e + 21*a*c^4*g*h^2*e)/c^5)*x + 105*(8*c^5*d*g^3 + 2*a*
c^4*f*g^3 + 6*a*c^4*d*g*h^2 - 3*a^2*c^3*f*g*h^2 + 6*a*c^4*g^2*h*e
 - a^2*c^3*h^3*e)/c^5)*x + 16*(105*a*c^4*d*g^2*h - 42*a^2*c^3*f*g
^2*h - 14*a^2*c^3*d*h^3 + 8*a^3*c^2*f*h^3 + 35*a*c^4*g^3*e - 42*a
^2*c^3*g*h^2*e)/c^5) - 1/16*(8*a*c^2*d*g^3 - 2*a^2*c*f*g^3 - 6*a^
2*c*d*g*h^2 + 3*a^3*f*g*h^2 - 6*a^2*c*g^2*h*e + a^3*h^3*e)*ln(abs
(-sqrt(c)*x + sqrt(c*x^2 + a)))/c^(5/2)
```

3.79 $\int (g+hx)^2\sqrt{a+cx^2}\left(d+ex+fx^2\right)\,dx$

Optimal. Leaf size=280

$$\frac{x\sqrt{a+cx^2}\left(a^2fh^2-2ac\left(h(dh+2eg)+fg^2\right)+8c^2dg^2\right)}{16c^2}+\frac{a\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(a^2fh^2-2ac\left(h(dh+2eg)+fg^2\right)+8c^2dg^2\right)}{16c^{5/2}}-\frac{\left(a+cx^2\right)^{3/2}\left(8\left(2ah^2(eh+2fg)+cg\left(fg^2-2h(5dh+eg)\right)\right)-3hx\left(5h^2(2cd-af)-2cg(fg-2eh)\right)\right)}{120c^2h}-\frac{\left(a+cx^2\right)^{3/2}(g+hx)^2(fg-2eh)}{10ch}+\frac{f\left(a+cx^2\right)^{3/2}(g+hx)^3}{6ch}$$

```
[Out] ((8*c^2*d*g^2 + a^2*f*h^2 - 2*a*c*(f*g^2 + h*(2*e*g + d*h)))*x*Sq
rt[a + c*x^2])/(16*c^2) - ((f*g - 2*e*h)*(g + h*x)^2*(a + c*x^2)^
(3/2))/(10*c*h) + (f*(g + h*x)^3*(a + c*x^2)^(3/2))/(6*c*h) - ((8
*(2*a*h^2*(2*f*g + e*h) + c*g*(f*g^2 - 2*h*(e*g + 5*d*h))) - 3*h*
(5*(2*c*d - a*f)*h^2 - 2*c*g*(f*g - 2*e*h))*x)*(a + c*x^2)^(3/2))
/(120*c^2*h) + (a*(8*c^2*d*g^2 + a^2*f*h^2 - 2*a*c*(f*g^2 + h*(2*
e*g + d*h)))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(16*c^(5/2))
```

Rubi [A] time = 1.04246, antiderivative size = 279, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.207

$$\frac{x\sqrt{a+cx^2}\left(a^2fh^2-2ac\left(h(dh+2eg)+fg^2\right)+8c^2dg^2\right)}{16c^2}+\frac{a\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(a^2fh^2-2ac\left(h(dh+2eg)+fg^2\right)+8c^2dg^2\right)}{16c^{5/2}}-\frac{\left(a+cx^2\right)^{3/2}\left(8\left(2ah^2(eh+2fg)-2cgh(5dh+eg)+cfg^3\right)-3hx\left(5h^2(2cd-af)-2cg(fg-2eh)\right)\right)}{120c^2h}-\frac{\left(a+cx^2\right)^{3/2}(g+hx)^2(fg-2eh)}{10ch}+\frac{f\left(a+cx^2\right)^{3/2}(g+hx)^3}{6ch}$$

Antiderivative was successfully verified.

```
[In]  Int[(g + h*x)^2*Sqrt[a + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] ((8*c^2*d*g^2 + a^2*f*h^2 - 2*a*c*(f*g^2 + h*(2*e*g + d*h)))*x*Sq
rt[a + c*x^2])/(16*c^2) - ((f*g - 2*e*h)*(g + h*x)^2*(a + c*x^2)^
(3/2))/(10*c*h) + (f*(g + h*x)^3*(a + c*x^2)^(3/2))/(6*c*h) - ((8
*(c*f*g^3 - 2*c*g*h*(e*g + 5*d*h) + 2*a*h^2*(2*f*g + e*h)) - 3*h*
(5*(2*c*d - a*f)*h^2 - 2*c*g*(f*g - 2*e*h))*x)*(a + c*x^2)^(3/2))
/(120*c^2*h) + (a*(8*c^2*d*g^2 + a^2*f*h^2 - 2*a*c*(f*g^2 + h*(2*
```

```
e*g + d*h)))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(16*c^(5/2))
```

Rubi in Sympy [A] time = 69.2677, size = 292, normalized size = 1.04

$$\frac{a\left(a^2fh^2-2acdh^2-4acegh-2acfg^2+8c^2dg^2\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{16c^{\frac{5}{2}}}+\frac{f\left(a+cx^2\right)^{\frac{3}{2}}(g+hx)^3}{6ch}$$
$$+\frac{\left(a+cx^2\right)^{\frac{3}{2}}(g+hx)^2(2eh-fg)}{10ch}+\frac{x\sqrt{a+cx^2}\left(a^2fh^2-2acdh^2-4acegh-2acfg^2+8c^2dg^2\right)}{16c^2}$$
$$-\frac{\left(a+cx^2\right)^{\frac{3}{2}}\left(48aeh^3+96afgh^2-240cdgh^2-48ceg^2h+24cfg^3+9hx\left(-2cg(2eh-fg)+5h^2(af-2cd)\right)\right)}{360c^2h}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)**2*(f*x**2+e*x+d)*(c*x**2+a)**(1/2),x)
```

```
[Out] a*(a**2*f*h**2 - 2*a*c*d*h**2 - 4*a*c*e*g*h - 2*a*c*f*g**2 + 8*c*
*2*d*g**2)*atanh(sqrt(c)*x/sqrt(a + c*x**2))/(16*c**(5/2)) + f*(a
 + c*x**2)**(3/2)*(g + h*x)**3/(6*c*h) + (a + c*x**2)**(3/2)*(g +
 h*x)**2*(2*e*h - f*g)/(10*c*h) + x*sqrt(a + c*x**2)*(a**2*f*h**2
 - 2*a*c*d*h**2 - 4*a*c*e*g*h - 2*a*c*f*g**2 + 8*c**2*d*g**2)/(16
*c**2) - (a + c*x**2)**(3/2)*(48*a*e*h**3 + 96*a*f*g*h**2 - 240*c
*d*g*h**2 - 48*c*e*g**2*h + 24*c*f*g**3 + 9*h*x*(-2*c*g*(2*e*h -
f*g) + 5*h**2*(a*f - 2*c*d)))/(360*c**2*h)
```

Mathematica [A] time = 0.373587, size = 252, normalized size = 0.9

$$15a\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)\left(a^2fh^2-2ac\left(h(dh+2eg)+fg^2\right)+8c^2dg^2\right)+\sqrt{c}\sqrt{a+cx^2}\left(15x\left(-a^2fh^2+2ac\left(h(dh+2eg)+\right.\right.\right.$$

Antiderivative was successfully verified.

```
[In]  Integrate[(g + h*x)^2*Sqrt[a + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] (Sqrt[c]*Sqrt[a + c*x^2]*(16*a*(5*c*g*(e*g + 2*d*h) - 2*a*h*(2*f*
g + e*h)) + 15*(8*c^2*d*g^2 - a^2*f*h^2 + 2*a*c*(f*g^2 + h*(2*e*g
 + d*h)))*x + 16*c*(5*c*g*(e*g + 2*d*h) + a*h*(2*f*g + e*h))*x^2
+ 10*c*(a*f*h^2 + 6*c*(f*g^2 + h*(2*e*g + d*h)))*x^3 + 48*c^2*h*(
2*f*g + e*h)*x^4 + 40*c^2*f*h^2*x^5) + 15*a*(8*c^2*d*g^2 + a^2*f*
h^2 - 2*a*c*(f*g^2 + h*(2*e*g + d*h)))*Log[c*x + Sqrt[c]*Sqrt[a +
 c*x^2]])/(240*c^(5/2))
```

Maple [A] time = 0.013, size = 446, normalized size = 1.6

$$\frac{dg^2x}{2}\sqrt{cx^2+a}+\frac{dg^2a}{2}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)\frac{1}{\sqrt{c}}+\frac{2\,dgh}{3\,c}\left(cx^2+a\right)^{\frac{3}{2}}+\frac{eg^2}{3\,c}\left(cx^2+a\right)^{\frac{3}{2}}$$
$$+\frac{ex^2h^2}{5\,c}\left(cx^2+a\right)^{\frac{3}{2}}+\frac{2\,x^2fgh}{5\,c}\left(cx^2+a\right)^{\frac{3}{2}}-\frac{2\,aeh^2}{15\,c^2}\left(cx^2+a\right)^{\frac{3}{2}}-\frac{4\,fagh}{15\,c^2}\left(cx^2+a\right)^{\frac{3}{2}}$$
$$+\frac{dxh^2}{4\,c}\left(cx^2+a\right)^{\frac{3}{2}}+\frac{egxh}{2\,c}\left(cx^2+a\right)^{\frac{3}{2}}+\frac{fxg^2}{4\,c}\left(cx^2+a\right)^{\frac{3}{2}}-\frac{axdh^2}{8\,c}\sqrt{cx^2+a}$$
$$-\frac{axegh}{4\,c}\sqrt{cx^2+a}-\frac{axfg^2}{8\,c}\sqrt{cx^2+a}-\frac{a^2dh^2}{8}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}$$
$$-\frac{a^2egh}{4}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}-\frac{a^2fg^2}{8}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}+\frac{fh^2x^3}{6\,c}\left(cx^2+a\right)^{\frac{3}{2}}$$
$$-\frac{afh^2x}{8\,c^2}\left(cx^2+a\right)^{\frac{3}{2}}+\frac{a^2fh^2x}{16\,c^2}\sqrt{cx^2+a}+\frac{fh^2a^3}{16}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^2*(f*x^2+e*x+d)*(c*x^2+a)^(1/2),x)
```

```
[Out] 1/2*d*g^2*x*(c*x^2+a)^(1/2)+1/2*d*g^2*a/c^(1/2)*ln(x*c^(1/2)+(c*x
^2+a)^(1/2))+2/3*(c*x^2+a)^(3/2)/c*d*g*h+1/3*(c*x^2+a)^(3/2)/c*e*
g^2+1/5*x^2*(c*x^2+a)^(3/2)/c*e*h^2+2/5*x^2*(c*x^2+a)^(3/2)/c*f*g
*h-2/15*a/c^2*(c*x^2+a)^(3/2)*e*h^2-4/15*a/c^2*(c*x^2+a)^(3/2)*f*
g*h+1/4*x*(c*x^2+a)^(3/2)/c*d*h^2+1/2*x*(c*x^2+a)^(3/2)/c*e*g*h+1
/4*x*(c*x^2+a)^(3/2)/c*f*g^2-1/8/c*a*x*(c*x^2+a)^(1/2)*d*h^2-1/4/
c*a*x*(c*x^2+a)^(1/2)*e*g*h-1/8/c*a*x*(c*x^2+a)^(1/2)*f*g^2-1/8/c
^(3/2)*a^2*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*d*h^2-1/4/c^(3/2)*a^2*ln
(x*c^(1/2)+(c*x^2+a)^(1/2))*e*g*h-1/8/c^(3/2)*a^2*ln(x*c^(1/2)+(c
*x^2+a)^(1/2))*f*g^2+1/6*f*h^2*x^3*(c*x^2+a)^(3/2)/c-1/8*f*h^2/c^
2*a*x*(c*x^2+a)^(3/2)+1/16*f*h^2/c^2*a^2*x*(c*x^2+a)^(1/2)+1/16*f
*h^2/c^(5/2)*a^3*ln(x*c^(1/2)+(c*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(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.355543, size = 1, normalized size = 0.

$$\left[\frac{2\left(40\,c^2fh^2x^5+80\,aceg^2-32\,a^2eh^2+48\left(2\,c^2fgh+c^2eh^2\right)x^4+10\left(6\,c^2fg^2+12\,c^2egh+\left(6\,c^2d+acf\right)h^2\right)x^3+32\left(5\,acd-\right.\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g)^2,x, algorithm="fricas")
```

```
[Out] [1/480*(2*(40*c^2*f*h^2*x^5 + 80*a*c*e*g^2 - 32*a^2*e*h^2 + 48*(2
*c^2*f*g*h + c^2*e*h^2)*x^4 + 10*(6*c^2*f*g^2 + 12*c^2*e*g*h + (6
*c^2*d + a*c*f)*h^2)*x^3 + 32*(5*a*c*d - 2*a^2*f)*g*h + 16*(5*c^2
*e*g^2 + a*c*e*h^2 + 2*(5*c^2*d + a*c*f)*g*h)*x^2 + 15*(4*a*c*e*g
*h + 2*(4*c^2*d + a*c*f)*g^2 + (2*a*c*d - a^2*f)*h^2)*x)*sqrt(c*x
^2 + a)*sqrt(c) - 15*(4*a^2*c*e*g*h - 2*(4*a*c^2*d - a^2*c*f)*g^2
 + (2*a^2*c*d - a^3*f)*h^2)*log(-2*sqrt(c*x^2 + a)*c*x - (2*c*x^2
 + a)*sqrt(c)))/c^(5/2), 1/240*((40*c^2*f*h^2*x^5 + 80*a*c*e*g^2
- 32*a^2*e*h^2 + 48*(2*c^2*f*g*h + c^2*e*h^2)*x^4 + 10*(6*c^2*f*g
^2 + 12*c^2*e*g*h + (6*c^2*d + a*c*f)*h^2)*x^3 + 32*(5*a*c*d - 2*
a^2*f)*g*h + 16*(5*c^2*e*g^2 + a*c*e*h^2 + 2*(5*c^2*d + a*c*f)*g*
h)*x^2 + 15*(4*a*c*e*g*h + 2*(4*c^2*d + a*c*f)*g^2 + (2*a*c*d - a
^2*f)*h^2)*x)*sqrt(c*x^2 + a)*sqrt(-c) - 15*(4*a^2*c*e*g*h - 2*(4
*a*c^2*d - a^2*c*f)*g^2 + (2*a^2*c*d - a^3*f)*h^2)*arctan(sqrt(-c
)*x/sqrt(c*x^2 + a)))/(sqrt(-c)*c^2)]
```

Sympy [A] time = 27.1664, size = 738, normalized size = 2.64

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x+g)**2*(f*x**2+e*x+d)*(c*x**2+a)**(1/2),x)
```

```
[Out] -a**(5/2)*f*h**2*x/(16*c**2*sqrt(1 + c*x**2/a)) + a**(3/2)*d*h**2
*x/(8*c*sqrt(1 + c*x**2/a)) + a**(3/2)*e*g*h*x/(4*c*sqrt(1 + c*x*
*2/a)) + a**(3/2)*f*g**2*x/(8*c*sqrt(1 + c*x**2/a)) - a**(3/2)*f*
h**2*x**3/(48*c*sqrt(1 + c*x**2/a)) + sqrt(a)*d*g**2*x*sqrt(1 + c
*x**2/a)/2 + 3*sqrt(a)*d*h**2*x**3/(8*sqrt(1 + c*x**2/a)) + 3*sqr
t(a)*e*g*h*x**3/(4*sqrt(1 + c*x**2/a)) + 3*sqrt(a)*f*g**2*x**3/(8
*sqrt(1 + c*x**2/a)) + 5*sqrt(a)*f*h**2*x**5/(24*sqrt(1 + c*x**2/
a)) + a**3*f*h**2*asinh(sqrt(c)*x/sqrt(a))/(16*c**(5/2)) - a**2*d
*h**2*asinh(sqrt(c)*x/sqrt(a))/(8*c**(3/2)) - a**2*e*g*h*asinh(sq
rt(c)*x/sqrt(a))/(4*c**(3/2)) - a**2*f*g**2*asinh(sqrt(c)*x/sqrt(
a))/(8*c**(3/2)) + a*d*g**2*asinh(sqrt(c)*x/sqrt(a))/(2*sqrt(c))
+ 2*d*g*h*Piecewise((sqrt(a)*x**2/2, Eq(c, 0)), ((a + c*x**2)**(3
```

```
/2)/(3*c), True)) + e*g**2*Piecewise((sqrt(a)*x**2/2, Eq(c, 0)),
((a + c*x**2)**(3/2)/(3*c), True)) + e*h**2*Piecewise((-2*a**2*sq
rt(a + c*x**2)/(15*c**2) + a*x**2*sqrt(a + c*x**2)/(15*c) + x**4*
sqrt(a + c*x**2)/5, Ne(c, 0)), (sqrt(a)*x**4/4, True)) + 2*f*g*h*
Piecewise((-2*a**2*sqrt(a + c*x**2)/(15*c**2) + a*x**2*sqrt(a + c
*x**2)/(15*c) + x**4*sqrt(a + c*x**2)/5, Ne(c, 0)), (sqrt(a)*x**4
/4, True)) + c*d*h**2*x**5/(4*sqrt(a)*sqrt(1 + c*x**2/a)) + c*e*g
*h*x**5/(2*sqrt(a)*sqrt(1 + c*x**2/a)) + c*f*g**2*x**5/(4*sqrt(a)
*sqrt(1 + c*x**2/a)) + c*f*h**2*x**7/(6*sqrt(a)*sqrt(1 + c*x**2/a
))
```

GIAC/XCAS [A] time = 0.278094, size = 433, normalized size = 1.55

$$\frac{1}{240}\sqrt{cx^2+a}\left(\left(2\left(\left(4\left(5\,fh^2x+\frac{6\left(2\,c^4fgh+c^4h^2e\right)}{c^4}\right)x+\frac{5\left(6\,c^4fg^2+6\,c^4dh^2+ac^3fh^2+12\,c^4ghe\right)}{c^4}\right)x+\frac{8\left(10\,c^4dgh+2\,ac\right.}{}\right.\right.\right.$$
$$-\frac{\left(8\,ac^2dg^2-2\,a^2cfg^2-2\,a^2cdh^2+a^3fh^2-4\,a^2cghe\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{16\,c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g)^2,x, algorithm="giac")
```

```
[Out] 1/240*sqrt(c*x^2 + a)*((2*((4*(5*f*h^2*x + 6*(2*c^4*f*g*h + c^4*h
^2*e)/c^4)*x + 5*(6*c^4*f*g^2 + 6*c^4*d*h^2 + a*c^3*f*h^2 + 12*c^
4*g*h*e)/c^4)*x + 8*(10*c^4*d*g*h + 2*a*c^3*f*g*h + 5*c^4*g^2*e +
 a*c^3*h^2*e)/c^4)*x + 15*(8*c^4*d*g^2 + 2*a*c^3*f*g^2 + 2*a*c^3*
d*h^2 - a^2*c^2*f*h^2 + 4*a*c^3*g*h*e)/c^4)*x + 16*(10*a*c^3*d*g*
h - 4*a^2*c^2*f*g*h + 5*a*c^3*g^2*e - 2*a^2*c^2*h^2*e)/c^4) - 1/1
6*(8*a*c^2*d*g^2 - 2*a^2*c*f*g^2 - 2*a^2*c*d*h^2 + a^3*f*h^2 - 4*
a^2*c*g*h*e)*ln(abs(-sqrt(c)*x + sqrt(c*x^2 + a)))/c^(5/2)
```

3.80 $\int (g+hx)\sqrt{a+cx^2}\left(d+ex+fx^2\right)\,dx$

Optimal. Leaf size=175

$$\frac{a\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(-aeh-afg+4cdg)}{8c^{3/2}}-\frac{\left(a+cx^2\right)^{3/2}\left(4\left(2afh^2+c\left(3fg^2-5h(dh+eg)\right)\right)+3chx(3fg-5eh)\right)}{60c^2h}+\frac{x\sqrt{a+cx^2}(4cdg-a(eh+fg))}{8c}+\frac{f\left(a+cx^2\right)^{3/2}(g+hx)^2}{5ch}$$

```
[Out] ((4*c*d*g - a*(f*g + e*h))*x*Sqrt[a + c*x^2])/(8*c) + (f*(g + h*x
)^2*(a + c*x^2)^(3/2))/(5*c*h) - ((4*(2*a*f*h^2 + c*(3*f*g^2 - 5*
h*(e*g + d*h))) + 3*c*h*(3*f*g - 5*e*h)*x)*(a + c*x^2)^(3/2))/(60
*c^2*h) + (a*(4*c*d*g - a*f*g - a*e*h)*ArcTanh[(Sqrt[c]*x)/Sqrt[a
 + c*x^2]])/(8*c^(3/2))
```

Rubi [A] time = 0.529389, antiderivative size = 175, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$

$$\frac{a\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(-aeh-afg+4cdg)}{8c^{3/2}}-\frac{\left(a+cx^2\right)^{3/2}\left(4\left(2afh^2+c\left(3fg^2-5h(dh+eg)\right)\right)+3chx(3fg-5eh)\right)}{60c^2h}+\frac{x\sqrt{a+cx^2}(4cdg-a(eh+fg))}{8c}+\frac{f\left(a+cx^2\right)^{3/2}(g+hx)^2}{5ch}$$

Antiderivative was successfully verified.

```
[In]  Int[(g + h*x)*Sqrt[a + c*x^2]*(d + e*x + f*x^2),x]
```


```
[Out] ((4*c*d*g - a*(f*g + e*h))*x*Sqrt[a + c*x^2])/(8*c) + (f*(g + h*x
)^2*(a + c*x^2)^(3/2))/(5*c*h) - ((4*(2*a*f*h^2 + c*(3*f*g^2 - 5*
h*(e*g + d*h))) + 3*c*h*(3*f*g - 5*e*h)*x)*(a + c*x^2)^(3/2))/(60
*c^2*h) + (a*(4*c*d*g - a*f*g - a*e*h)*ArcTanh[(Sqrt[c]*x)/Sqrt[a
 + c*x^2]])/(8*c^(3/2))
```

Rubi in Sympy [A] time = 30.0105, size = 163, normalized size = 0.93

$$-\frac{a(aeh+afg-4cdg)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{8c^{\frac{3}{2}}}+\frac{f\left(a+cx^2\right)^{\frac{3}{2}}(g+hx)^2}{5ch}-\frac{x\sqrt{a+cx^2}\,(aeh+afg-4cdg)}{8c}-\frac{\left(a+cx^2\right)^{\frac{3}{2}}\left(-4cg(5eh-3fg)-3chx(5eh-3fg)+4h^2(2af-5cd)\right)}{60c^2h}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)*(f*x**2+e*x+d)*(c*x**2+a)**(1/2),x)
```

```
[Out] -a*(a*e*h + a*f*g - 4*c*d*g)*atanh(sqrt(c)*x/sqrt(a + c*x**2))/(8
*c**(3/2)) + f*(a + c*x**2)**(3/2)*(g + h*x)**2/(5*c*h) - x*sqrt(
a + c*x**2)*(a*e*h + a*f*g - 4*c*d*g)/(8*c) - (a + c*x**2)**(3/2)
*(-4*c*g*(5*e*h - 3*f*g) - 3*c*h*x*(5*e*h - 3*f*g) + 4*h**2*(2*a*
f - 5*c*d))/(60*c**2*h)
```

Mathematica [A] time = 0.21268, size = 146, normalized size = 0.83

$$\frac{\sqrt{a+cx^2}\left(-16a^2fh+ac(40dh+5e(8g+3hx)+fx(15g+8hx))+2c^2x(10d(3g+2hx)+x(5e(4g+3hx)+3fx(5g+4hx)))\right)+}{120c^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(g + h*x)*Sqrt[a + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] (Sqrt[a + c*x^2]*(-16*a^2*f*h + a*c*(40*d*h + 5*e*(8*g + 3*h*x) +
 f*x*(15*g + 8*h*x)) + 2*c^2*x*(10*d*(3*g + 2*h*x) + x*(5*e*(4*g
+ 3*h*x) + 3*f*x*(5*g + 4*h*x)))) - 15*a*Sqrt[c]*(-4*c*d*g + a*f*
g + a*e*h)*Log[c*x + Sqrt[c]*Sqrt[a + c*x^2]])/(120*c^2)
```

Maple [A] time = 0.009, size = 230, normalized size = 1.3

$$\frac{dgx}{2}\sqrt{cx^2+a}+\frac{adg}{2}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)\frac{1}{\sqrt{c}}+\frac{dh}{3\,c}\left(cx^2+a\right)^{\frac{3}{2}}+\frac{eg}{3\,c}\left(cx^2+a\right)^{\frac{3}{2}}+\frac{ehx}{4\,c}\left(cx^2+a\right)^{\frac{3}{2}}+\frac{fgx}{4\,c}\left(cx^2+a\right)^{\frac{3}{2}}-\frac{aehx}{8\,c}\sqrt{cx^2+a}-\frac{afgx}{8\,c}\sqrt{cx^2+a}-\frac{a^2eh}{8}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}-\frac{a^2fg}{8}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}+\frac{fhx^2}{5\,c}\left(cx^2+a\right)^{\frac{3}{2}}-\frac{2\,afh}{15\,c^2}\left(cx^2+a\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)*(f*x^2+e*x+d)*(c*x^2+a)^(1/2),x)
```

```
[Out] 1/2*d*g*x*(c*x^2+a)^(1/2)+1/2*d*g*a/c^(1/2)*ln(x*c^(1/2)+(c*x^2+a
)^(1/2))+1/3*(c*x^2+a)^(3/2)/c*d*h+1/3*(c*x^2+a)^(3/2)/c*e*g+1/4*
x*(c*x^2+a)^(3/2)/c*e*h+1/4*x*(c*x^2+a)^(3/2)/c*f*g-1/8/c*a*x*(c*
x^2+a)^(1/2)*e*h-1/8/c*a*x*(c*x^2+a)^(1/2)*f*g-1/8/c^(3/2)*a^2*ln
(x*c^(1/2)+(c*x^2+a)^(1/2))*e*h-1/8/c^(3/2)*a^2*ln(x*c^(1/2)+(c*x
^2+a)^(1/2))*f*g+1/5*h*f*x^2*(c*x^2+a)^(3/2)/c-2/15*h*f*a/c^2*(c*
x^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(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.329531, size = 1, normalized size = 0.01

$$\left[\frac{2\left(24\,c^2fhx^4 + 40\,aceg + 30\left(c^2fg + c^2eh\right)x^3 + 8\left(5\,c^2eg + \left(5\,c^2d + acf\right)h\right)x^2 + 8\left(5\,acd - 2\,a^2f\right)h + 15\left(aceh + \left(4\,c^2d + a\right.\right.\right.}{240\,c^{\frac{5}{2}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g),x, algorithm="fricas")
```

```
[Out] [1/240*(2*(24*c^2*f*h*x^4 + 40*a*c*e*g + 30*(c^2*f*g + c^2*e*h)*x
^3 + 8*(5*c^2*e*g + (5*c^2*d + a*c*f)*h)*x^2 + 8*(5*a*c*d - 2*a^2
*f)*h + 15*(a*c*e*h + (4*c^2*d + a*c*f)*g)*x)*sqrt(c*x^2 + a)*sqr
t(c) + 15*(a^2*c*e*h - (4*a*c^2*d - a^2*c*f)*g)*log(2*sqrt(c*x^2
+ a)*c*x - (2*c*x^2 + a)*sqrt(c)))/c^(5/2), 1/120*((24*c^2*f*h*x^
4 + 40*a*c*e*g + 30*(c^2*f*g + c^2*e*h)*x^3 + 8*(5*c^2*e*g + (5*c
^2*d + a*c*f)*h)*x^2 + 8*(5*a*c*d - 2*a^2*f)*h + 15*(a*c*e*h + (4
*c^2*d + a*c*f)*g)*x)*sqrt(c*x^2 + a)*sqrt(-c) - 15*(a^2*c*e*h -
(4*a*c^2*d - a^2*c*f)*g)*arctan(sqrt(-c)*x/sqrt(c*x^2 + a)))/(sqr
t(-c)*c^2)]
```

Sympy [A] time = 14.0183, size = 384, normalized size = 2.19

$$\frac{a^{\frac{3}{2}}ehx}{8c\sqrt{1+\frac{cx^2}{a}}}+\frac{a^{\frac{3}{2}}fgx}{8c\sqrt{1+\frac{cx^2}{a}}}+\frac{\sqrt{a}dgx\sqrt{1+\frac{cx^2}{a}}}{2}+\frac{3\sqrt{a}ehx^3}{8\sqrt{1+\frac{cx^2}{a}}}+\frac{3\sqrt{a}fgx^3}{8\sqrt{1+\frac{cx^2}{a}}} -\frac{a^2eh\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{8c^{\frac{3}{2}}}-\frac{a^2fg\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{8c^{\frac{3}{2}}}+\frac{adg\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2\sqrt{c}} +dh\left(\begin{cases}\frac{\sqrt{a}x^2}{2} & \text{for } c=0\\ \frac{(a+cx^2)^{\frac{3}{2}}}{3c} & \text{otherwise}\end{cases}\right)+eg\left(\begin{cases}\frac{\sqrt{a}x^2}{2} & \text{for } c=0\\ \frac{(a+cx^2)^{\frac{3}{2}}}{3c} & \text{otherwise}\end{cases}\right) +fh\left(\begin{cases}-\frac{2a^2\sqrt{a+cx^2}}{15c^2}+\frac{ax^2\sqrt{a+cx^2}}{15c}+\frac{x^4\sqrt{a+cx^2}}{5} & \text{for } c\neq 0\\ \frac{\sqrt{a}x^4}{4} & \text{otherwise}\end{cases}\right)+\frac{cehx^5}{4\sqrt{a}\sqrt{1+\frac{cx^2}{a}}}+\frac{cfgx^5}{4\sqrt{a}\sqrt{1+\frac{cx^2}{a}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)*(f*x**2+e*x+d)*(c*x**2+a)**(1/2),x)
```

```
[Out] a**(3/2)*e*h*x/(8*c*sqrt(1 + c*x**2/a)) + a**(3/2)*f*g*x/(8*c*sqr
t(1 + c*x**2/a)) + sqrt(a)*d*g*x*sqrt(1 + c*x**2/a)/2 + 3*sqrt(a)
*e*h*x**3/(8*sqrt(1 + c*x**2/a)) + 3*sqrt(a)*f*g*x**3/(8*sqrt(1 +
 c*x**2/a)) - a**2*e*h*asinh(sqrt(c)*x/sqrt(a))/(8*c**(3/2)) - a*
*2*f*g*asinh(sqrt(c)*x/sqrt(a))/(8*c**(3/2)) + a*d*g*asinh(sqrt(c
)*x/sqrt(a))/(2*sqrt(c)) + d*h*Piecewise((sqrt(a)*x**2/2, Eq(c, 0
)), ((a + c*x**2)**(3/2)/(3*c), True)) + e*g*Piecewise((sqrt(a)*x
**2/2, Eq(c, 0)), ((a + c*x**2)**(3/2)/(3*c), True)) + f*h*Piecew
ise((-2*a**2*sqrt(a + c*x**2)/(15*c**2) + a*x**2*sqrt(a + c*x**2)
/(15*c) + x**4*sqrt(a + c*x**2)/5, Ne(c, 0)), (sqrt(a)*x**4/4, Tr
ue)) + c*e*h*x**5/(4*sqrt(a)*sqrt(1 + c*x**2/a)) + c*f*g*x**5/(4*
sqrt(a)*sqrt(1 + c*x**2/a))
```

GIAC/XCAS [A] time = 0.276881, size = 243, normalized size = 1.39

$$\frac{1}{120}\sqrt{cx^2+a}\left(\left(2\left(3\left(4\,fhx+\frac{5\left(c^3fg+c^3he\right)}{c^3}\right)x+\frac{4\left(5\,c^3dh+ac^2fh+5\,c^3ge\right)}{c^3}\right)x+\frac{15\left(4\,c^3dg+ac^2fg+ac^2he\right)}{c^3}\right)x+\frac{8\,(5 \right. - \frac{\left(4\,acdg-a^2fg-a^2he\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{8\,c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g),x, algorithm="giac")
```

```
[Out] 1/120*sqrt(c*x^2 + a)*((2*(3*(4*f*h*x + 5*(c^3*f*g + c^3*h*e)/c^3
)*x + 4*(5*c^3*d*h + a*c^2*f*h + 5*c^3*g*e)/c^3)*x + 15*(4*c^3*d*
g + a*c^2*f*g + a*c^2*h*e)/c^3)*x + 8*(5*a*c^2*d*h - 2*a^2*c*f*h
+ 5*a*c^2*g*e)/c^3) - 1/8*(4*a*c*d*g - a^2*f*g - a^2*h*e)*ln(abs(
-sqrt(c)*x + sqrt(c*x^2 + a)))/c^(3/2)
```

3.81 $\int \sqrt{a+cx^2}\left(d+ex+fx^2\right)\,dx$

Optimal. Leaf size=106

$$\frac{a(4cd-af)\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{8c^{3/2}}+\frac{x\sqrt{a+cx^2}(4cd-af)}{8c}+\frac{e\left(a+cx^2\right)^{3/2}}{3c}+\frac{fx\left(a+cx^2\right)^{3/2}}{4c}$$

```
[Out] ((4*c*d - a*f)*x*Sqrt[a + c*x^2])/(8*c) + (e*(a + c*x^2)^(3/2))/(
3*c) + (f*x*(a + c*x^2)^(3/2))/(4*c) + (a*(4*c*d - a*f)*ArcTanh[(
Sqrt[c]*x)/Sqrt[a + c*x^2]])/(8*c^(3/2))
```

Rubi [A] time = 0.139564, antiderivative size = 106, 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

$$\frac{a(4cd-af)\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{8c^{3/2}}+\frac{x\sqrt{a+cx^2}(4cd-af)}{8c}+\frac{e\left(a+cx^2\right)^{3/2}}{3c}+\frac{fx\left(a+cx^2\right)^{3/2}}{4c}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] ((4*c*d - a*f)*x*Sqrt[a + c*x^2])/(8*c) + (e*(a + c*x^2)^(3/2))/(
3*c) + (f*x*(a + c*x^2)^(3/2))/(4*c) + (a*(4*c*d - a*f)*ArcTanh[(
Sqrt[c]*x)/Sqrt[a + c*x^2]])/(8*c^(3/2))
```

Rubi in Sympy [A] time = 11.1517, size = 80, normalized size = 0.75

$$-\frac{a\left(af-4cd\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{8c^{\frac{3}{2}}}-\frac{x\sqrt{a+cx^2}\left(af-4cd\right)}{8c}+\frac{\left(a+cx^2\right)^{\frac{3}{2}}\left(4e+3fx\right)}{12c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)*(c*x**2+a)**(1/2),x)
```

```
[Out] -a*(a*f - 4*c*d)*atanh(sqrt(c)*x/sqrt(a + c*x**2))/(8*c**(3/2)) -
 x*sqrt(a + c*x**2)*(a*f - 4*c*d)/(8*c) + (a + c*x**2)**(3/2)*(4*
e + 3*f*x)/(12*c)
```

Mathematica [A] time = 0.110728, size = 89, normalized size = 0.84

$$\frac{\sqrt{c}\sqrt{a+cx^2}\left(a(8e+3fx)+2cx\left(6d+4ex+3fx^2\right)\right)-3a(af-4cd)\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)}{24c^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] (Sqrt[c]*Sqrt[a + c*x^2]*(a*(8*e + 3*f*x) + 2*c*x*(6*d + 4*e*x +
3*f*x^2)) - 3*a*(-4*c*d + a*f)*Log[c*x + Sqrt[c]*Sqrt[a + c*x^2]]
)/(24*c^(3/2))
```

Maple [A] time = 0.007, size = 111, normalized size = 1.1

$$\frac{dx}{2}\sqrt{cx^2+a}+\frac{ad}{2}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)\frac{1}{\sqrt{c}}+\frac{e}{3\,c}\left(cx^2+a\right)^{\frac{3}{2}}+\frac{fx}{4\,c}\left(cx^2+a\right)^{\frac{3}{2}}-\frac{afx}{8\,c}\sqrt{cx^2+a}-\frac{a^2f}{8}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)*(c*x^2+a)^(1/2),x)
```

```
[Out] 1/2*d*x*(c*x^2+a)^(1/2)+1/2*d*a/c^(1/2)*ln(x*c^(1/2)+(c*x^2+a)^(1
/2))+1/3*e*(c*x^2+a)^(3/2)/c+1/4*f*x*(c*x^2+a)^(3/2)/c-1/8*f/c*a*
x*(c*x^2+a)^(1/2)-1/8*f/c^(3/2)*a^2*ln(x*c^(1/2)+(c*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(c*x^2 + a)*(f*x^2 + e*x + d),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.315174, size = 1, normalized size = 0.01

$$\left[\frac{2\left(6\,cfx^3+8\,cex^2+8\,ae+3\,(4\,cd+af)x\right)\sqrt{cx^2+a}\sqrt{c}-3\left(4\,acd-a^2f\right)\log\left(2\sqrt{cx^2+a}cx-\left(2\,cx^2+a\right)\sqrt{c}\right)}{48\,c^{\frac{3}{2}}},\ \frac{\left(6\,cfx^3+8\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d),x, algorithm="fricas")
```

```
[Out] [1/48*(2*(6*c*f*x^3 + 8*c*e*x^2 + 8*a*e + 3*(4*c*d + a*f)*x)*sqrt
(c*x^2 + a)*sqrt(c) - 3*(4*a*c*d - a^2*f)*log(2*sqrt(c*x^2 + a)*c
*x - (2*c*x^2 + a)*sqrt(c)))/c^(3/2), 1/24*((6*c*f*x^3 + 8*c*e*x^
2 + 8*a*e + 3*(4*c*d + a*f)*x)*sqrt(c*x^2 + a)*sqrt(-c) + 3*(4*a*
c*d - a^2*f)*arctan(sqrt(-c)*x/sqrt(c*x^2 + a)))/(sqrt(-c)*c)]
```

Sympy [A] time = 8.40369, size = 170, normalized size = 1.6

$$\frac{a^{\frac{3}{2}}fx}{8c\sqrt{1+\frac{cx^2}{a}}}+\frac{\sqrt{a}dx\sqrt{1+\frac{cx^2}{a}}}{2}+\frac{3\sqrt{a}fx^3}{8\sqrt{1+\frac{cx^2}{a}}}-\frac{a^2f\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{8c^{\frac{3}{2}}}+\frac{ad\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2\sqrt{c}}+e\left(\begin{cases}\frac{\sqrt{a}x^2}{2} & \text{for}\ c=0\\ \frac{(a+cx^2)^{\frac{3}{2}}}{3c} & \text{otherwise}\end{cases}\right)+\frac{cfx^5}{4\sqrt{a}\sqrt{1+\frac{cx^2}{a}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)*(c*x**2+a)**(1/2),x)
```

```
[Out] a**(3/2)*f*x/(8*c*sqrt(1 + c*x**2/a)) + sqrt(a)*d*x*sqrt(1 + c*x*
*2/a)/2 + 3*sqrt(a)*f*x**3/(8*sqrt(1 + c*x**2/a)) - a**2*f*asinh(
sqrt(c)*x/sqrt(a))/(8*c**(3/2)) + a*d*asinh(sqrt(c)*x/sqrt(a))/(2
*sqrt(c)) + e*Piecewise((sqrt(a)*x**2/2, Eq(c, 0)), ((a + c*x**2)
**(3/2)/(3*c), True)) + c*f*x**5/(4*sqrt(a)*sqrt(1 + c*x**2/a))
```

GIAC/XCAS [A] time = 0.275912, size = 117, normalized size = 1.1

$$\frac{1}{24}\sqrt{cx^2+a}\left(\left(2\,(3\,fx+4\,e)x+\frac{3\left(4\,c^2d+acf\right)}{c^2}\right)x+\frac{8\,ae}{c}\right)-\frac{\left(4\,acd-a^2f\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{8\,c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d),x, algorithm="giac")
```

```
[Out] 1/24*sqrt(c*x^2 + a)*((2*(3*f*x + 4*e)*x + 3*(4*c^2*d + a*c*f)/c^
2)*x + 8*a*e/c) - 1/8*(4*a*c*d - a^2*f)*ln(abs(-sqrt(c)*x + sqrt(
c*x^2 + a)))/c^(3/2)
```

3.82 $\int \frac{\sqrt{a+cx^2}(d+ex+fx^2)}{g+hx}\,dx$

Optimal. Leaf size=206

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left((ah^2+2cg^2)(fg-eh)+2cdgh^2\right)}{2\sqrt{c}h^4}-\frac{\sqrt{ah^2+cg^2}\,(dh^2-egh+fg^2)\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{h^4}+\frac{\sqrt{a+cx^2}\,(2(dh^2-egh+fg^2)-hx(fg-eh))}{2h^3}+\frac{f(a+cx^2)^{3/2}}{3ch}$$

```
[Out] ((2*(f*g^2 - e*g*h + d*h^2) - h*(f*g - e*h)*x)*Sqrt[a + c*x^2])/(
2*h^3) + (f*(a + c*x^2)^(3/2))/(3*c*h) - ((2*c*d*g*h^2 + (f*g - e
*h)*(2*c*g^2 + a*h^2))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(2*S
qrt[c]*h^4) - (Sqrt[c*g^2 + a*h^2]*(f*g^2 - e*g*h + d*h^2)*ArcTan
h[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/h^4
```

Rubi [A] time = 0.842194, antiderivative size = 206, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.207$

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left((ah^2+2cg^2)(fg-eh)+2cdgh^2\right)}{2\sqrt{c}h^4}-\frac{\sqrt{ah^2+cg^2}\,(dh^2-egh+fg^2)\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{h^4}+\frac{\sqrt{a+cx^2}\,(2(dh^2-egh+fg^2)-hx(fg-eh))}{2h^3}+\frac{f(a+cx^2)^{3/2}}{3ch}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + c*x^2]*(d + e*x + f*x^2))/(g + h*x),x]
```

```
[Out] ((2*(f*g^2 - e*g*h + d*h^2) - h*(f*g - e*h)*x)*Sqrt[a + c*x^2])/(
2*h^3) + (f*(a + c*x^2)^(3/2))/(3*c*h) - ((2*c*d*g*h^2 + (f*g - e
*h)*(2*c*g^2 + a*h^2))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(2*S
qrt[c]*h^4) - (Sqrt[c*g^2 + a*h^2]*(f*g^2 - e*g*h + d*h^2)*ArcTan
h[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/h^4
```

Rubi in Sympy [A] time = 77.0841, size = 187, normalized size = 0.91

$$\frac{\sqrt{a+cx^2}\left(6dh^2-6egh+6fg^2+3hx\left(eh-fg\right)\right)}{6h^3}-\frac{\sqrt{ah^2+cg^2}\left(dh^2-egh+fg^2\right)\operatorname{atanh}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{h^4}+\frac{f\left(a+cx^2\right)^{\frac{3}{2}}}{3ch}+\frac{\left(-2cdgh^2+\left(ah^2+2cg^2\right)\left(eh-fg\right)\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{2\sqrt{c}h^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)*(c*x**2+a)**(1/2)/(h*x+g),x)
```

```
[Out] sqrt(a + c*x**2)*(6*d*h**2 - 6*e*g*h + 6*f*g**2 + 3*h*x*(e*h - f*
g))/(6*h**3) - sqrt(a*h**2 + c*g**2)*(d*h**2 - e*g*h + f*g**2)*at
anh((a*h - c*g*x)/(sqrt(a + c*x**2)*sqrt(a*h**2 + c*g**2)))/h**4
+ f*(a + c*x**2)**(3/2)/(3*c*h) + (-2*c*d*g*h**2 + (a*h**2 + 2*c*
g**2)*(e*h - f*g))*atanh(sqrt(c)*x/sqrt(a + c*x**2))/(2*sqrt(c)*h
**4)
```

Mathematica [A] time = 0.301012, size = 245, normalized size = 1.19

$$-3\sqrt{c}\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)\left(ah^2(fg-eh)+2c\left(gh(dh-eg)+fg^3\right)\right)+h\sqrt{a+cx^2}\left(2afh^2+3ch(2dh-2eg+ehx)+cf\left(6\right.\right.$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + c*x^2]*(d + e*x + f*x^2))/(g + h*x),x]
```

```
[Out] (h*Sqrt[a + c*x^2]*(2*a*f*h^2 + 3*c*h*(-2*e*g + 2*d*h + e*h*x) +
c*f*(6*g^2 - 3*g*h*x + 2*h^2*x^2)) + 6*c*Sqrt[c*g^2 + a*h^2]*(f*g
^2 + h*(-(e*g) + d*h))*Log[g + h*x] - 3*Sqrt[c]*(a*h^2*(f*g - e*h
) + 2*c*(f*g^3 + g*h*(-(e*g) + d*h)))*Log[c*x + Sqrt[c]*Sqrt[a +
c*x^2]] - 6*c*Sqrt[c*g^2 + a*h^2]*(f*g^2 + h*(-(e*g) + d*h))*Log[
a*h - c*g*x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]])/(6*c*h^4)
```

Maple [B] time = 0.032, size = 1265, normalized size = 6.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)*(c*x^2+a)^(1/2)/(h*x+g),x)
```

```
[Out] 1/2/h*e*x*(c*x^2+a)^(1/2)+1/2/h*e*a/c^(1/2)*ln(x*c^(1/2)+(c*x^2+a
)^(1/2))+1/3*f*(c*x^2+a)^(3/2)/c/h-1/2/h^2*f*g*x*(c*x^2+a)^(1/2)-
1/2/h^2*f*g*a/c^(1/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))+1/h*((x+1/h*g
)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*d-1/h^2*((x+1/h*
g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*e*g+1/h^3*((x+1
/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*f*g^2-1/h^2*
c^(1/2)*g*ln((-c*g/h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*
(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))*d+1/h^3*c^(1/2)*g^2*ln((-c*g/
h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*
g^2)/h^2)^(1/2))*e-1/h^4*c^(1/2)*g^3*ln((-c*g/h+c*(x+1/h*g))/c^(1
/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))*f-
1/h/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+
1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*
g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*a*d+1/h^2/((a*h^2+c*g^2)/
h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*
g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^
2)^(1/2))/(x+1/h*g))*a*e*g-1/h^3/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*
(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*(
(x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*
g))*a*f*g^2-1/h^3/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h
^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2
*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*c*g^2*d+1/h
^4/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1
/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g
)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*c*g^3*e-1/h^5/((a*h^2+c*g^
2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2
+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)
/h^2)^(1/2))/(x+1/h*g))*c*g^4*f
```

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(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g),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(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g),x, algorithm="fricas")
```

```
[Out] Timed out
```

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

$$\int \frac{\sqrt{a+cx^2}\left(d+ex+fx^2\right)}{g+hx}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)*(c*x**2+a)**(1/2)/(h*x+g),x)
```

```
[Out] Integral(sqrt(a + c*x**2)*(d + e*x + f*x**2)/(g + h*x), x)
```

GIAC/XCAS [A] time = 0.284321, size = 375, normalized size = 1.82

$$\frac{1}{6}\sqrt{cx^2+a}\left(\left(\frac{2\,fx}{h}-\frac{3\left(cfgh^8-ch^9e\right)}{ch^{10}}\right)x+\frac{2\left(3\,cfg^2h^7+3\,cdh^9+afh^9-3\,cgh^8e\right)}{ch^{10}}\right)$$
$$+\frac{2\left(cfg^4+cdg^2h^2+afg^2h^2+adh^4-cg^3he-agh^3e\right)\arctan\left(-\frac{\left(\sqrt{c}x-\sqrt{cx^2+a}\right)h+\sqrt{c}g}{\sqrt{-cg^2-ah^2}}\right)}{\sqrt{-cg^2-ah^2}h^4}$$
$$+\frac{\left(2\,c^{\frac{3}{2}}fg^3+2\,c^{\frac{3}{2}}dgh^2+a\sqrt{c}fgh^2-2\,c^{\frac{3}{2}}g^2he-a\sqrt{c}h^3e\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{2\,ch^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g),x, algorithm="giac")
```

```
[Out] 1/6*sqrt(c*x^2 + a)*((2*f*x/h - 3*(c*f*g*h^8 - c*h^9*e)/(c*h^10))
*x + 2*(3*c*f*g^2*h^7 + 3*c*d*h^9 + a*f*h^9 - 3*c*g*h^8*e)/(c*h^1
0)) + 2*(c*f*g^4 + c*d*g^2*h^2 + a*f*g^2*h^2 + a*d*h^4 - c*g^3*h*
e - a*g*h^3*e)*arctan(-((sqrt(c)*x - sqrt(c*x^2 + a))*h + sqrt(c)
*g)/sqrt(-c*g^2 - a*h^2))/(sqrt(-c*g^2 - a*h^2)*h^4) + 1/2*(2*c^(
3/2)*f*g^3 + 2*c^(3/2)*d*g*h^2 + a*sqrt(c)*f*g*h^2 - 2*c^(3/2)*g^
2*h*e - a*sqrt(c)*h^3*e)*ln(abs(-sqrt(c)*x + sqrt(c*x^2 + a)))/(c
*h^4)
```

3.83 $\int \frac{\sqrt{a+cx^2}(d+ex+fx^2)}{(g+hx)^2}\,dx$

Optimal. Leaf size=308

$$-\frac{(a+cx^2)^{3/2}(dh^2-egh+fg^2)}{h(g+hx)(ah^2+cg^2)}+\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(afh^2+2c(3fg^2-h(2eg-dh)))}{2\sqrt{c}h^4}+\frac{\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)(ah^2(2fg-eh)+cg(3fg^2-h(2eg-dh)))}{h^4\sqrt{ah^2+cg^2}}-\frac{\sqrt{a+cx^2}\,(2(ah^2(2fg-eh)+cg(3fg^2-h(2eg-dh)))-hx(afh^2+c(3fg^2-2h(eg-dh))))}{2h^3(ah^2+cg^2)}$$

```
[Out] -((2*(a*h^2*(2*f*g - e*h) + c*g*(3*f*g^2 - h*(2*e*g - d*h))) - h*
(a*f*h^2 + c*(3*f*g^2 - 2*h*(e*g - d*h)))*x)*Sqrt[a + c*x^2])/(2*
h^3*(c*g^2 + a*h^2)) - ((f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(3/2)
)/(h*(c*g^2 + a*h^2)*(g + h*x)) + ((a*f*h^2 + 2*c*(3*f*g^2 - h*(2
*e*g - d*h)))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(2*Sqrt[c]*h^
4) + ((a*h^2*(2*f*g - e*h) + c*g*(3*f*g^2 - h*(2*e*g - d*h)))*Arc
Tanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(h^4*S
qrt[c*g^2 + a*h^2])
```

Rubi [A] time = 1.12504, antiderivative size = 303, normalized size of antiderivative = 0.98, number of steps used = 7, number of rules used = 6, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.207$

$$-\frac{(a+cx^2)^{3/2}(dh^2-egh+fg^2)}{h(g+hx)(ah^2+cg^2)}+\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(afh^2-2ch(2eg-dh)+6cfg^2)}{2\sqrt{c}h^4}+\frac{\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)(ah^2(2fg-eh)-cgh(2eg-dh)+3cfg^3)}{h^4\sqrt{ah^2+cg^2}}-\frac{\sqrt{a+cx^2}\,(2(ah^2(2fg-eh)-cgh(2eg-dh)+3cfg^3)-hx(afh^2-2ch(eg-dh)+3cfg^2))}{2h^3(ah^2+cg^2)}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^2,x]
```

```
[Out] -((2*(3*c*f*g^3 - c*g*h*(2*e*g - d*h) + a*h^2*(2*f*g - e*h)) - h*
(3*c*f*g^2 + a*f*h^2 - 2*c*h*(e*g - d*h))*x)*Sqrt[a + c*x^2])/(2*
h^3*(c*g^2 + a*h^2)) - ((f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(3/2)
)/(h*(c*g^2 + a*h^2)*(g + h*x)) + ((6*c*f*g^2 + a*f*h^2 - 2*c*h*(
2*e*g - d*h))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(2*Sqrt[c]*h^
```

```
4) + ((3*c*f*g^3 - c*g*h*(2*e*g - d*h) + a*h^2*(2*f*g - e*h))*Arc
Tanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(h^4*S
qrt[c*g^2 + a*h^2])
```

Rubi in Sympy [A] time = 120.686, size = 299, normalized size = 0.97

$$-\frac{\left(a+cx^2\right)^{\frac{3}{2}}\left(dh^2-egh+fg^2\right)}{h\left(g+hx\right)\left(ah^2+cg^2\right)}+\frac{\sqrt{a+cx^2}\left(2aeh^3-4afgh^2-2cdgh^2+4ceg^2h-6cfg^3+hx\left(afh^2+c\left(3fg^2+2h\left(dh-eg\right)\right)\right)\right)}{2h^3\left(ah^2+cg^2\right)}-\frac{\left(aeh^3-2afgh^2-cdgh^2+2ceg^2h-3cfg^3\right)\operatorname{atanh}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{h^4\sqrt{ah^2+cg^2}}+\frac{\left(afh^2+2cdh^2-4cegh+6cfg^2\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{2\sqrt{c}h^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)*(c*x**2+a)**(1/2)/(h*x+g)**2,x)
```

```
[Out] -(a + c*x**2)**(3/2)*(d*h**2 - e*g*h + f*g**2)/(h*(g + h*x)*(a*h*
*2 + c*g**2)) + sqrt(a + c*x**2)*(2*a*e*h**3 - 4*a*f*g*h**2 - 2*c
*d*g*h**2 + 4*c*e*g**2*h - 6*c*f*g**3 + h*x*(a*f*h**2 + c*(3*f*g*
*2 + 2*h*(d*h - e*g))))/(2*h**3*(a*h**2 + c*g**2)) - (a*e*h**3 -
2*a*f*g*h**2 - c*d*g*h**2 + 2*c*e*g**2*h - 3*c*f*g**3)*atanh((a*h
 - c*g*x)/(sqrt(a + c*x**2)*sqrt(a*h**2 + c*g**2)))/(h**4*sqrt(a*
h**2 + c*g**2)) + (a*f*h**2 + 2*c*d*h**2 - 4*c*e*g*h + 6*c*f*g**2
)*atanh(sqrt(c)*x/sqrt(a + c*x**2))/(2*sqrt(c)*h**4)
```

Mathematica [A] time = 0.406485, size = 264, normalized size = 0.86

$$\frac{\frac{h\sqrt{a+cx^2}\left(2h(-dh+2eg+ehx)+f\left(-6g^2-3ghx+h^2x^2\right)\right)}{g+hx}+\frac{\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)\left(afh^2+2ch(dh-2eg)+6cfg^2\right)}{\sqrt{c}}+\frac{2\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)\left(ah^2(2fg-\cdots\right.}{\sqrt{ah^2+cg^2}}}{2h^4}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^2,x]
```

```
[Out] ((h*Sqrt[a + c*x^2]*(2*h*(2*e*g - d*h + e*h*x) + f*(-6*g^2 - 3*g*
h*x + h^2*x^2)))/(g + h*x) - (2*(3*c*f*g^3 + c*g*h*(-2*e*g + d*h)
```

```
 + a*h^2*(2*f*g - e*h))*Log[g + h*x])/Sqrt[c*g^2 + a*h^2] + ((6*c
*f*g^2 + a*f*h^2 + 2*c*h*(-2*e*g + d*h))*Log[c*x + Sqrt[c]*Sqrt[a
 + c*x^2]])/Sqrt[c] + (2*(3*c*f*g^3 + c*g*h*(-2*e*g + d*h) + a*h^
2*(2*f*g - e*h))*Log[a*h - c*g*x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c
*x^2]])/Sqrt[c*g^2 + a*h^2])/(2*h^4)
```

Maple [B] time = 0.024, size = 2818, normalized size = 9.2

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)*(c*x^2+a)^(1/2)/(h*x+g)^2,x)
```

```
[Out] -1/(a*h^2+c*g^2)/(x+1/h*g)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^
2+c*g^2)/h^2)^(3/2)*d-2/h^3*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h
^2+c*g^2)/h^2)^(1/2)*f*g+1/2*f/h^2*x*(c*x^2+a)^(1/2)+1/h^2*((x+1/
h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*e+c/(a*h^2+c*
g^2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*x*
d+c^(1/2)/(a*h^2+c*g^2)*ln((-c*g/h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g
)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))*a*d+1/h*c*g/(a*
h^2+c*g^2)/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*
g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*
(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*a*d+1/h^2*c/(a*h^2
+c*g^2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)
*x*f*g^2-1/h^4*c^2*g^4/(a*h^2+c*g^2)/((a*h^2+c*g^2)/h^2)^(1/2)*ln
((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/
2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+
1/h*g))*e+1/h^5*c^2*g^5/(a*h^2+c*g^2)/((a*h^2+c*g^2)/h^2)^(1/2)*l
n((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1
/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x
+1/h*g))*f-1/h*c/(a*h^2+c*g^2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(
a*h^2+c*g^2)/h^2)^(1/2)*x*e*g+1/h^3*c^2*g^3/(a*h^2+c*g^2)/((a*h^2
+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((
a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c
*g^2)/h^2)^(1/2))/(x+1/h*g))*d+1/h^2*c^(1/2)/(a*h^2+c*g^2)*ln((-c
*g/h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2
+c*g^2)/h^2)^(1/2))*a*f*g^2-1/h*c^(1/2)/(a*h^2+c*g^2)*ln((-c*g/h+
c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^
2)/h^2)^(1/2))*a*e*g-1/h^2*c*g^2/(a*h^2+c*g^2)/((a*h^2+c*g^2)/h^2
)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2
)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^
(1/2))/(x+1/h*g))*a*e+1/h^3*c*g^3/(a*h^2+c*g^2)/((a*h^2+c*g^2)/h^
2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^
2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)
^(1/2))/(x+1/h*g))*a*f+2/h^3/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h
^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1
/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*
a*f*g-1/h^4/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c
```

```
*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h
*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*c*g^2*e+2/h^5/((a
*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+
2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h
^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*c*g^3*f+1/h/(a*h^2+c*g^2)/(x+1/h
*g)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(3/2)*e*g
-1/h^2/(a*h^2+c*g^2)/(x+1/h*g)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(
a*h^2+c*g^2)/h^2)^(3/2)*f*g^2-1/h*c*g/(a*h^2+c*g^2)*((x+1/h*g)^2*
c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*d+1/h^2*c*g^2/(a*h^2
+c*g^2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)
*e-1/h^3*c*g^3/(a*h^2+c*g^2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*
h^2+c*g^2)/h^2)^(1/2)*f+1/h^2*c^(3/2)*g^2/(a*h^2+c*g^2)*ln((-c*g/
h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*
g^2)/h^2)^(1/2))*d-1/h^3*c^(3/2)*g^3/(a*h^2+c*g^2)*ln((-c*g/h+c*(
x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/
h^2)^(1/2))*e+1/h^4*c^(3/2)*g^4/(a*h^2+c*g^2)*ln((-c*g/h+c*(x+1/h
*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^
(1/2))*f-1/h^3*c^(1/2)*g*ln((-c*g/h+c*(x+1/h*g))/c^(1/2)+((x+1/h*
g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))*e+2/h^4*c^(1/2
)*g^2*ln((-c*g/h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1
/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))*f-1/h^2/((a*h^2+c*g^2)/h^2)^(1/2)
*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^
(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/
(x+1/h*g))*a*e+1/2*f/h^2*a/c^(1/2)*ln(x*c^(1/2)+(c*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(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^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(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^2,x, algorithm="fricas")

[Out] Timed out
```

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

$$\int \frac{\sqrt{a+cx^2}\,(d+ex+fx^2)}{(g+hx)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)*(c*x**2+a)**(1/2)/(h*x+g)**2,x)
```

```
[Out] Integral(sqrt(a + c*x**2)*(d + e*x + f*x**2)/(g + h*x)**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(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^2,x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.84 $\int \frac{\sqrt{a+cx^2}\left(d+ex+fx^2\right)}{(g+hx)^3} \, dx$

Optimal. Leaf size=296

$$-\frac{\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(2a^2fh^4+ach^2\left(9fg^2-h(3eg-dh)\right)+2c^2g^3(3fg-eh)\right)}{2h^4\left(ah^2+cg^2\right)^{3/2}}-\frac{\left(a+cx^2\right)^{3/2}\left(dh^2-egh+fg^2\right)}{2h(g+hx)^2\left(ah^2+cg^2\right)}+\frac{\sqrt{a+cx^2}\left(hx\left(2afh^2+c\left(3fg^2-h(eg-dh)\right)\right)+2\left(ah^2+cg^2\right)(3fg-eh)\right)}{2h^3(g+hx)\left(ah^2+cg^2\right)}-\frac{\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(3fg-eh)}{h^4}$$

```
[Out] ((2*(3*f*g - e*h)*(c*g^2 + a*h^2) + h*(2*a*f*h^2 + c*(3*f*g^2 - h
*(e*g - d*h)))*x)*Sqrt[a + c*x^2])/(2*h^3*(c*g^2 + a*h^2)*(g + h*
x)) - ((f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(3/2))/(2*h*(c*g^2 + a
*h^2)*(g + h*x)^2) - (Sqrt[c]*(3*f*g - e*h)*ArcTanh[(Sqrt[c]*x)/S
qrt[a + c*x^2]])/h^4 - ((2*a^2*f*h^4 + 2*c^2*g^3*(3*f*g - e*h) +
a*c*h^2*(9*f*g^2 - h*(3*e*g - d*h)))*ArcTanh[(a*h - c*g*x)/(Sqrt[
c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(2*h^4*(c*g^2 + a*h^2)^(3/2))
```

Rubi [A] time = 1.13699, antiderivative size = 295, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.207$

$$-\frac{\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(2a^2fh^4+ach^2\left(9fg^2-h(3eg-dh)\right)+2c^2g^3(3fg-eh)\right)}{2h^4\left(ah^2+cg^2\right)^{3/2}}-\frac{\left(a+cx^2\right)^{3/2}\left(dh^2-egh+fg^2\right)}{2h(g+hx)^2\left(ah^2+cg^2\right)}+\frac{\sqrt{a+cx^2}\left(hx\left(2afh^2-ch(eg-dh)+3cfg^2\right)+2\left(ah^2+cg^2\right)(3fg-eh)\right)}{2h^3(g+hx)\left(ah^2+cg^2\right)}-\frac{\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(3fg-eh)}{h^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^3,x]
```

```
[Out] ((2*(3*f*g - e*h)*(c*g^2 + a*h^2) + h*(3*c*f*g^2 + 2*a*f*h^2 - c*
h*(e*g - d*h))*x)*Sqrt[a + c*x^2])/(2*h^3*(c*g^2 + a*h^2)*(g + h*
```

```
x)) - ((f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(3/2))/(2*h*(c*g^2 + a
*h^2)*(g + h*x)^2) - (Sqrt[c]*(3*f*g - e*h)*ArcTanh[(Sqrt[c]*x)/S
qrt[a + c*x^2]])/h^4 - ((2*a^2*f*h^4 + 2*c^2*g^3*(3*f*g - e*h) +
a*c*h^2*(9*f*g^2 - h*(3*e*g - d*h)))*ArcTanh[(a*h - c*g*x)/(Sqrt[
c*g^2 + a*h^2]*Sqrt[a + c*x^2]])])/(2*h^4*(c*g^2 + a*h^2)^(3/2))
```

Rubi in Sympy [A] time = 78.7066, size = 269, normalized size = 0.91

$$\frac{\sqrt{c}\left(eh-3fg\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^{2}}}\right)}{h^{4}}-\frac{\left(a+cx^{2}\right)^{\frac{3}{2}}\left(dh^{2}-egh+fg^{2}\right)}{2h\left(g+hx\right)^{2}\left(ah^{2}+cg^{2}\right)}-\frac{\sqrt{a+cx^{2}}\left(-hx\left(2afh^{2}+c\left(3fg^{2}+h\left(dh-eg\right)\right)\right)+\left(2ah^{2}+2cg^{2}\right)\left(eh-3fg\right)\right)}{2h^{3}\left(g+hx\right)\left(ah^{2}+cg^{2}\right)}-\frac{\left(ah^{2}\left(2afh^{2}+c\left(3fg^{2}+h\left(dh-eg\right)\right)\right)-2cg\left(ah^{2}+cg^{2}\right)\left(eh-3fg\right)\right)\operatorname{atanh}\left(\frac{ah-cgx}{\sqrt{a+cx^{2}}\sqrt{ah^{2}+cg^{2}}}\right)}{2h^{4}\left(ah^{2}+cg^{2}\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)*(c*x**2+a)**(1/2)/(h*x+g)**3,x)
```

```
[Out] sqrt(c)*(e*h - 3*f*g)*atanh(sqrt(c)*x/sqrt(a + c*x**2))/h**4 - (a
 + c*x**2)**(3/2)*(d*h**2 - e*g*h + f*g**2)/(2*h*(g + h*x)**2*(a*
h**2 + c*g**2)) - sqrt(a + c*x**2)*(-h*x*(2*a*f*h**2 + c*(3*f*g**
2 + h*(d*h - e*g))) + (2*a*h**2 + 2*c*g**2)*(e*h - 3*f*g))/(2*h**
3*(g + h*x)*(a*h**2 + c*g**2)) - (a*h**2*(2*a*f*h**2 + c*(3*f*g**
2 + h*(d*h - e*g))) - 2*c*g*(a*h**2 + c*g**2)*(e*h - 3*f*g))*atan
h((a*h - c*g*x)/(sqrt(a + c*x**2)*sqrt(a*h**2 + c*g**2)))/(2*h**4
*(a*h**2 + c*g**2)**(3/2))
```

Mathematica [A] time = 1.13544, size = 318, normalized size = 1.07

$$\frac{-\frac{\log\left(\sqrt{a+cx^{2}}\sqrt{ah^{2}+cg^{2}}+ah-cgx\right)\left(2a^{2}fh^{4}+ach^{2}\left(h(dh-3eg)+9fg^{2}\right)+2c^{2}g^{3}(3fg-eh)\right)}{\left(ah^{2}+cg^{2}\right)^{3/2}}+\frac{\log(g+hx)\left(2a^{2}fh^{4}+ach^{2}\left(h(dh-3eg)+9fg^{2}\right)+2c^{2}g^{3}(3fg-eh)\right)}{\left(ah^{2}+cg^{2}\right)^{3/2}}+}{2h^{4}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^3,x]
```

```
[Out] (h*Sqrt[a + c*x^2]*(2*f + (-(f*g^2) + h*(e*g - d*h))/(g + h*x)^2
+ (5*c*f*g^3 + c*g*h*(-3*e*g + d*h) - 2*a*h^2*(-2*f*g + e*h))/((c
*g^2 + a*h^2)*(g + h*x))) + ((2*a^2*f*h^4 + 2*c^2*g^3*(3*f*g - e*
```

```
h) + a*c*h^2*(9*f*g^2 + h*(-3*e*g + d*h)))*Log[g + h*x])/(c*g^2 +
 a*h^2)^(3/2) + 2*Sqrt[c]*(-3*f*g + e*h)*Log[c*x + Sqrt[c]*Sqrt[a
 + c*x^2]] - ((2*a^2*f*h^4 + 2*c^2*g^3*(3*f*g - e*h) + a*c*h^2*(9
*f*g^2 + h*(-3*e*g + d*h)))*Log[a*h - c*g*x + Sqrt[c*g^2 + a*h^2]
*Sqrt[a + c*x^2]])/(c*g^2 + a*h^2)^(3/2))/(2*h^4)
```

Maple [B] time = 0.026, size = 4432, normalized size = 15.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)*(c*x^2+a)^(1/2)/(h*x+g)^3,x)
```

```
[Out] 2/h^2/(a*h^2+c*g^2)/(x+1/h*g)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a
*h^2+c*g^2)/h^2)^(3/2)*f*g-3/2/h^2*c*g/(a*h^2+c*g^2)*((x+1/h*g)^2
*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*e-f/h^5/((a*h^2+c*g
^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^
2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2
)/h^2)^(1/2))/(x+1/h*g))*c*g^2+1/2/h^4*c^(5/2)*g^5/(a*h^2+c*g^2)^
2*ln((-c*g/h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g
)+(a*h^2+c*g^2)/h^2)^(1/2))*f-1/2/h^2*c^(3/2)/(a*h^2+c*g^2)*g*ln(
(-c*g/h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*
h^2+c*g^2)/h^2)^(1/2))*d+1/2*c^2*g/(a*h^2+c*g^2)^2*((x+1/h*g)^2*c
-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*x*d-1/2*c*g/(a*h^2+c*
g^2)^2/(x+1/h*g)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h
^2)^(3/2)*d+1/2*c^(3/2)*g/(a*h^2+c*g^2)^2*ln((-c*g/h+c*(x+1/h*g))
/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2
))*a*d+1/2/h^2/(a*h^2+c*g^2)/(x+1/h*g)^2*((x+1/h*g)^2*c-2*c*g/h*(
x+1/h*g)+(a*h^2+c*g^2)/h^2)^(3/2)*e*g-1/2/h^3/(a*h^2+c*g^2)/(x+1/
h*g)^2*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(3/2)*
f*g^2-1/2/h*c^2*g^2/(a*h^2+c*g^2)^2*((x+1/h*g)^2*c-2*c*g/h*(x+1/h
*g)+(a*h^2+c*g^2)/h^2)^(1/2)*d+1/2/h^2*c^2*g^3/(a*h^2+c*g^2)^2*((
x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*e-1/2/h^3
*c^2*g^4/(a*h^2+c*g^2)^2*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+
c*g^2)/h^2)^(1/2)*f+1/2/h^2*c^(5/2)*g^3/(a*h^2+c*g^2)^2*ln((-c*g/
h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*
g^2)/h^2)^(1/2))*d-1/2/h^2*c^2*g^3/(a*h^2+c*g^2)^2/((a*h^2+c*g^2)
/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c
*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h
^2)^(1/2))/(x+1/h*g))*a*e+f/h^3*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+
(a*h^2+c*g^2)/h^2)^(1/2)-1/h/(a*h^2+c*g^2)/(x+1/h*g)*((x+1/h*g)^2
*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(3/2)*e+1/2/h*c*g^2/(a*h^
2+c*g^2)^2/(x+1/h*g)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^
2)/h^2)^(3/2)*e-1/2/h^2*c*g^3/(a*h^2+c*g^2)^2/(x+1/h*g)*((x+1/h*g
)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(3/2)*f-1/2/h*c^2*g^2/
(a*h^2+c*g^2)^2*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^
2)^(1/2)*x*e+1/2/h^2*c^2*g^3/(a*h^2+c*g^2)^2*((x+1/h*g)^2*c-2*c*g
/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*x*f+3/2/h^2*c*g/(a*h^2+c*g^
```

2)/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1
/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g
)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*a*e-5/2/h^3*c*g^2/(a*h^2+c
*g^2)/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(
x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/
h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*a*f+1/2/h^3*c^2*g^4/(a*
h^2+c*g^2)^2/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*
c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/
h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*a*f+1/2/h*c^2*g^
2/(a*h^2+c*g^2)^2/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h
^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2
*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*a*d-1/2/h^3
*c^(5/2)*g^4/(a*h^2+c*g^2)^2*ln((-c*g/h+c*(x+1/h*g))/c^(1/2)+((x+
1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))*e-5/2/h^4*
c^(3/2)*g^3/(a*h^2+c*g^2)*ln((-c*g/h+c*(x+1/h*g))/c^(1/2)+((x+1/h
*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))*f+1/h*c/(a*h^
2+c*g^2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2
)*x*e+1/h*c^(1/2)/(a*h^2+c*g^2)*ln((-c*g/h+c*(x+1/h*g))/c^(1/2)+(
(x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))*a*e+5/2
/h^3*c*g^2/(a*h^2+c*g^2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+
c*g^2)/h^2)^(1/2)*f+3/2/h^3*c^(3/2)*g^2/(a*h^2+c*g^2)*ln((-c*g/h+
c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^
2)/h^2)^(1/2))*e-1/2/h*c^(3/2)*g^2/(a*h^2+c*g^2)^2*ln((-c*g/h+c*(
x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/
h^2)^(1/2))*a*e-1/2/h*c/(a*h^2+c*g^2)/((a*h^2+c*g^2)/h^2)^(1/2)*l
n((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1
/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x
+1/h*g))*a*d-1/2/h^3*c^2/(a*h^2+c*g^2)/((a*h^2+c*g^2)/h^2)^(1/2)*
ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(
1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(
x+1/h*g))*g^2*d+1/2/h^3*c^3*g^4/(a*h^2+c*g^2)^2/((a*h^2+c*g^2)/h^
2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^
2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)
^(1/2))/(x+1/h*g))*d-1/2/h^4*c^3*g^5/(a*h^2+c*g^2)^2/((a*h^2+c*g^
2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2
+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)
/h^2)^(1/2))/(x+1/h*g))*e+1/2/h^5*c^3*g^6/(a*h^2+c*g^2)^2/((a*h^2
+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((
a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c
*g^2)/h^2)^(1/2))/(x+1/h*g))*f+1/2/h^2*c^(3/2)*g^3/(a*h^2+c*g^2)^
2*ln((-c*g/h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g
)+(a*h^2+c*g^2)/h^2)^(1/2))*a*f+3/2/h^4*c^2*g^3/(a*h^2+c*g^2)/((a
*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+
2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h
^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*e-5/2/h^5*c^2*g^4/(a*h^2+c*g^2)/
((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*
g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(
a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*f-2/h^2*c/(a*h^2+c*g^2)*((x+1
/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*x*f*g-2/h^2*
c^(1/2)/(a*h^2+c*g^2)*ln((-c*g/h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^
2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))*a*f*g-f/h^3/((a*h
^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*
((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2
+c*g^2)/h^2)^(1/2))/(x+1/h*g))*a-1/2/h/(a*h^2+c*g^2)/(x+1/h*g)^2*

```
((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(3/2)*d+1/2/h
*c/(a*h^2+c*g^2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h
^2)^(1/2)*d-f/h^4*c^(1/2)*g*ln((-c*g/h+c*(x+1/h*g))/c^(1/2)+((x+1
/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^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(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^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(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^3,x, algorithm="fricas")
```

```
[Out] Timed out
```

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

$$\int \frac{\sqrt{a + cx^2}\left(d + ex + fx^2\right)}{(g + hx)^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)*(c*x**2+a)**(1/2)/(h*x+g)**3,x)
```

```
[Out] Integral(sqrt(a + c*x**2)*(d + e*x + f*x**2)/(g + h*x)**3, x)
```

GIAC/XCAS [A] time = 0.670568, size = 4, normalized size = 0.01

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^3,x, algorithm="giac")
```

```
[Out] sage0*x
```

3.85 $\int \frac{\sqrt{a+cx^2}\left(d+ex+fx^2\right)}{(g+hx)^4}\,dx$

Optimal. Leaf size=314

$$\frac{c\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(a^2h^4(4fg-eh)+acgh^2\left(5fg^2-dh^2\right)+2c^2fg^5\right)}{2h^4\left(ah^2+cg^2\right)^{5/2}}-\frac{\sqrt{a+cx^2}\left(hx\left(2a^2fh^4+acgh^2(6fg-eh)+c^2\left(3fg^4-dg^2h^2\right)\right)+a^2eh^5+acgh^2\left(dh^2+3fg^2\right)+2c^2fg^5\right)}{2h^3(g+hx)^2\left(ah^2+cg^2\right)^2}-\frac{\left(a+cx^2\right)^{3/2}\left(dh^2-egh+fg^2\right)}{3h(g+hx)^3\left(ah^2+cg^2\right)}+\frac{\sqrt{c}f\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{h^4}$$

```
[Out] -((2*c^2*f*g^5 + a^2*e*h^5 + a*c*g*h^2*(3*f*g^2 + d*h^2) + h*(2*a
^2*f*h^4 + a*c*g*h^2*(6*f*g - e*h) + c^2*(3*f*g^4 - d*g^2*h^2))*x
)*Sqrt[a + c*x^2])/(2*h^3*(c*g^2 + a*h^2)^2*(g + h*x)^2) - ((f*g^
2 - e*g*h + d*h^2)*(a + c*x^2)^(3/2))/(3*h*(c*g^2 + a*h^2)*(g + h
*x)^3) + (Sqrt[c]*f*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/h^4 + (
c*(2*c^2*f*g^5 + a^2*h^4*(4*f*g - e*h) + a*c*g*h^2*(5*f*g^2 - d*h
^2))*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])]
)/(2*h^4*(c*g^2 + a*h^2)^(5/2))
```

Rubi [A] time = 1.03742, antiderivative size = 314, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.207

$$\frac{c\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(a^2h^4(4fg-eh)+acgh^2\left(5fg^2-dh^2\right)+2c^2fg^5\right)}{2h^4\left(ah^2+cg^2\right)^{5/2}}-\frac{\sqrt{a+cx^2}\left(hx\left(2a^2fh^4+acgh^2(6fg-eh)+c^2\left(3fg^4-dg^2h^2\right)\right)+a^2eh^5+acgh^2\left(dh^2+3fg^2\right)+2c^2fg^5\right)}{2h^3(g+hx)^2\left(ah^2+cg^2\right)^2}-\frac{\left(a+cx^2\right)^{3/2}\left(dh^2-egh+fg^2\right)}{3h(g+hx)^3\left(ah^2+cg^2\right)}+\frac{\sqrt{c}f\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{h^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^4,x]
```


```
[Out] -((2*c^2*f*g^5 + a^2*e*h^5 + a*c*g*h^2*(3*f*g^2 + d*h^2) + h*(2*a
^2*f*h^4 + a*c*g*h^2*(6*f*g - e*h) + c^2*(3*f*g^4 - d*g^2*h^2))*x
)*Sqrt[a + c*x^2])/(2*h^3*(c*g^2 + a*h^2)^2*(g + h*x)^2) - ((f*g^
2 - e*g*h + d*h^2)*(a + c*x^2)^(3/2))/(3*h*(c*g^2 + a*h^2)*(g + h
*x)^3) + (Sqrt[c]*f*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/h^4 + (
```

```
c*(2*c^2*f*g^5 + a^2*h^4*(4*f*g - e*h) + a*c*g*h^2*(5*f*g^2 - d*h
^2))*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])]
)/(2*h^4*(c*g^2 + a*h^2)^(5/2))
```

Rubi in Sympy [A] time = 121.174, size = 323, normalized size = 1.03

$$\frac{\sqrt{c}f\,\text{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{h^4}-\frac{c\left(a^2eh^5-4a^2fgh^4+acdgh^4-5acfg^3h^2-2c^2fg^5\right)\text{atanh}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{2h^4\left(ah^2+cg^2\right)^{\frac{5}{2}}}-\frac{\left(a+cx^2\right)^{\frac{3}{2}}\left(dh^2-egh+fg^2\right)}{3h\left(g+hx\right)^3\left(ah^2+cg^2\right)}-\frac{\sqrt{a+cx^2}\left(3a^2eh^5+3acdgh^4+9acfg^3h^2+6c^2fg^5+3hx\left(2a^2fh^4-acegh^3+6acfg^2h^2-c^2dg^2h^2+3c^2fg^4\right)\right)}{6h^3\left(g+hx\right)^2\left(ah^2+cg^2\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)*(c*x**2+a)**(1/2)/(h*x+g)**4,x)
```

```
[Out] sqrt(c)*f*atanh(sqrt(c)*x/sqrt(a + c*x**2))/h**4 - c*(a**2*e*h**5
 - 4*a**2*f*g*h**4 + a*c*d*g*h**4 - 5*a*c*f*g**3*h**2 - 2*c**2*f*
g**5)*atanh((a*h - c*g*x)/(sqrt(a + c*x**2)*sqrt(a*h**2 + c*g**2)
))/(2*h**4*(a*h**2 + c*g**2)**(5/2)) - (a + c*x**2)**(3/2)*(d*h**
2 - e*g*h + f*g**2)/(3*h*(g + h*x)**3*(a*h**2 + c*g**2)) - sqrt(a
 + c*x**2)*(3*a**2*e*h**5 + 3*a*c*d*g*h**4 + 9*a*c*f*g**3*h**2 +
6*c**2*f*g**5 + 3*h*x*(2*a**2*f*h**4 - a*c*e*g*h**3 + 6*a*c*f*g**
2*h**2 - c**2*d*g**2*h**2 + 3*c**2*f*g**4))/(6*h**3*(g + h*x)**2*
(a*h**2 + c*g**2)**2)
```

Mathematica [A] time = 2.27126, size = 382, normalized size = 1.22

$$\frac{\frac{3c\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)\left(a^2h^4(4fg-eh)+acgh^2\left(5fg^2-dh^2\right)+2c^2fg^5\right)}{\left(ah^2+cg^2\right)^{5/2}}-\frac{3c\log(g+hx)\left(a^2h^4(4fg-eh)+acgh^2\left(5fg^2-dh^2\right)+2c^2fg^5\right)}{\left(ah^2+cg^2\right)^{5/2}}+\frac{h\sqrt{a+cx^2}}{}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^4,x]
```

```
[Out] ((h*Sqrt[a + c*x^2]*(-2*(f*g^2 + h*(-(e*g) + d*h)) + ((7*c*f*g^3
+ c*g*h*(-4*e*g + d*h) - 3*a*h^2*(-2*f*g + e*h))*(g + h*x))/(c*g^
2 + a*h^2) - ((6*a^2*f*h^4 + c^2*(11*f*g^4 - g^2*h*(2*e*g + d*h))
```

```
 + a*c*h^2*(20*f*g^2 + h*(-5*e*g + 2*d*h)))*(g + h*x)^2)/(c*g^2 +
 a*h^2)^2))/(g + h*x)^3 - (3*c*(2*c^2*f*g^5 + a^2*h^4*(4*f*g - e*
h) + a*c*g*h^2*(5*f*g^2 - d*h^2))*Log[g + h*x])/(c*g^2 + a*h^2)^(
5/2) + 6*Sqrt[c]*f*Log[c*x + Sqrt[c]*Sqrt[a + c*x^2]] + (3*c*(2*c
^2*f*g^5 + a^2*h^4*(4*f*g - e*h) + a*c*g*h^2*(5*f*g^2 - d*h^2))*L
og[a*h - c*g*x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]])/(c*g^2 + a
*h^2)^(5/2))/(6*h^4)
```

Maple [B] time = 0.028, size = 5565, normalized size = 17.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)*(c*x^2+a)^(1/2)/(h*x+g)^4,x)
```

```
[Out] result too large to display
```

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(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^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(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^4,x, algorithm="fricas")
```

```
[Out] Timed out
```

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

$$\int \frac{\sqrt{a+cx^2}\,(d+ex+fx^2)}{(g+hx)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)*(c*x**2+a)**(1/2)/(h*x+g)**4,x)
```

```
[Out] Integral(sqrt(a + c*x**2)*(d + e*x + f*x**2)/(g + h*x)**4, x)
```

GIAC/XCAS [A] time = 0.670878, size = 4, normalized size = 0.01

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^4,x, algorithm="giac")
```

```
[Out] sage0*x
```

3.86 $\int \frac{\sqrt{a+cx^2}\left(d+ex+fx^2\right)}{(g+hx)^5}\,dx$

Optimal. Leaf size=313

$$-\frac{\sqrt{a+cx^2}(ah-cgx)\left(4a^2fh^2-ac\left(fg^2-h(5eg-dh)\right)+4c^2dg^2\right)}{8(g+hx)^2\left(ah^2+cg^2\right)^3}-\frac{ac\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(4a^2fh^2-ac\left(fg^2-h(5eg-dh)\right)+4c^2dg^2\right)}{8\left(ah^2+cg^2\right)^{7/2}}+\frac{\left(a+cx^2\right)^{3/2}\left(4ah^2(2fg-eh)+cg\left(h(eg-5dh)+3fg^2\right)\right)}{12h(g+hx)^3\left(ah^2+cg^2\right)^2}-\frac{\left(a+cx^2\right)^{3/2}\left(dh^2-egh+fg^2\right)}{4h(g+hx)^4\left(ah^2+cg^2\right)}$$

```
[Out] -((4*c^2*d*g^2 + 4*a^2*f*h^2 - a*c*(f*g^2 - h*(5*e*g - d*h)))*(a*
h - c*g*x)*Sqrt[a + c*x^2])/(8*(c*g^2 + a*h^2)^3*(g + h*x)^2) - (
(f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(3/2))/(4*h*(c*g^2 + a*h^2)*(
g + h*x)^4) + ((4*a*h^2*(2*f*g - e*h) + c*g*(3*f*g^2 + h*(e*g - 5
*d*h)))*(a + c*x^2)^(3/2))/(12*h*(c*g^2 + a*h^2)^2*(g + h*x)^3) -
 (a*c*(4*c^2*d*g^2 + 4*a^2*f*h^2 - a*c*(f*g^2 - h*(5*e*g - d*h)))
*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(8
*(c*g^2 + a*h^2)^(7/2))
```

Rubi [A] time = 0.926351, antiderivative size = 312, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.172

$$-\frac{\sqrt{a+cx^2}(ah-cgx)\left(4a^2fh^2-ac\left(fg^2-h(5eg-dh)\right)+4c^2dg^2\right)}{8(g+hx)^2\left(ah^2+cg^2\right)^3}-\frac{ac\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(4a^2fh^2-ac\left(fg^2-h(5eg-dh)\right)+4c^2dg^2\right)}{8\left(ah^2+cg^2\right)^{7/2}}-\frac{\left(a+cx^2\right)^{3/2}\left(dh^2-egh+fg^2\right)}{4h(g+hx)^4\left(ah^2+cg^2\right)}+\frac{\left(a+cx^2\right)^{3/2}\left(4ah^2(2fg-eh)+cgh(eg-5dh)+3cfg^3\right)}{12h(g+hx)^3\left(ah^2+cg^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^5,x]
```

```
[Out] -((4*c^2*d*g^2 + 4*a^2*f*h^2 - a*c*(f*g^2 - h*(5*e*g - d*h)))*(a*
h - c*g*x)*Sqrt[a + c*x^2])/(8*(c*g^2 + a*h^2)^3*(g + h*x)^2) - (
(f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(3/2))/(4*h*(c*g^2 + a*h^2)*(
g + h*x)^4) + ((3*c*f*g^3 + c*g*h*(e*g - 5*d*h) + 4*a*h^2*(2*f*g
- e*h))*(a + c*x^2)^(3/2))/(12*h*(c*g^2 + a*h^2)^2*(g + h*x)^3) -
 (a*c*(4*c^2*d*g^2 + 4*a^2*f*h^2 - a*c*(f*g^2 - h*(5*e*g - d*h)))
```

```
*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(8
*(c*g^2 + a*h^2)^(7/2))
```

Rubi in Sympy [A] time = 150.393, size = 314, normalized size = 1.

$$-\frac{ac\left(4a^2fh^2-acdh^2+5acegh-acfg^2+4c^2dg^2\right)\operatorname{atanh}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{8\left(ah^2+cg^2\right)^{\frac{7}{2}}}-\frac{\sqrt{a+cx^2}\left(2ah-2cgx\right)\left(4a^2fh^2-acdh^2+5acegh-acfg^2+4c^2dg^2\right)}{16\left(g+hx\right)^2\left(ah^2+cg^2\right)^3}-\frac{\left(a+cx^2\right)^{\frac{3}{2}}\left(4aeh^3-8afgh^2+5cdgh^2-ceg^2h-3cfg^3\right)}{12h\left(g+hx\right)^3\left(ah^2+cg^2\right)^2}-\frac{\left(a+cx^2\right)^{\frac{3}{2}}\left(dh^2-egh+fg^2\right)}{4h\left(g+hx\right)^4\left(ah^2+cg^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)*(c*x**2+a)**(1/2)/(h*x+g)**5,x)
```

```
[Out] -a*c*(4*a**2*f*h**2 - a*c*d*h**2 + 5*a*c*e*g*h - a*c*f*g**2 + 4*c
**2*d*g**2)*atanh((a*h - c*g*x)/(sqrt(a + c*x**2)*sqrt(a*h**2 + c
*g**2)))/(8*(a*h**2 + c*g**2)**(7/2)) - sqrt(a + c*x**2)*(2*a*h -
 2*c*g*x)*(4*a**2*f*h**2 - a*c*d*h**2 + 5*a*c*e*g*h - a*c*f*g**2
+ 4*c**2*d*g**2)/(16*(g + h*x)**2*(a*h**2 + c*g**2)**3) - (a + c*
x**2)**(3/2)*(4*a*e*h**3 - 8*a*f*g*h**2 + 5*c*d*g*h**2 - c*e*g**2
*h - 3*c*f*g**3)/(12*h*(g + h*x)**3*(a*h**2 + c*g**2)**2) - (a +
c*x**2)**(3/2)*(d*h**2 - e*g*h + f*g**2)/(4*h*(g + h*x)**4*(a*h**
2 + c*g**2))
```

Mathematica [A] time = 3.13959, size = 439, normalized size = 1.4

$$\frac{1}{24}\left(-\frac{3ac\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)\left(4a^2fh^2-ac\left(h(dh-5eg)+fg^2\right)+4c^2dg^2\right)}{\left(ah^2+cg^2\right)^{7/2}}\right.$$
$$+\frac{3ac\log(g+hx)\left(4a^2fh^2-ac\left(h(dh-5eg)+fg^2\right)+4c^2dg^2\right)}{\left(ah^2+cg^2\right)^{7/2}}$$
$$-\frac{\sqrt{a+cx^2}\left(\left(g+hx\right)^2\left(ah^2+cg^2\right)\left(12a^2fh^4+ach^2\left(h(3dh-7eg)+35fg^2\right)+2c^2\left(9fg^4-g^2h(dh+eg)\right)\right)-c(g+hx)^3\left(4a^2\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^5,x]
```

```
[Out] (-((Sqrt[a + c*x^2]*(6*(c*g^2 + a*h^2)^3*(f*g^2 + h*(-(e*g) + d*h
)) - 2*(c*g^2 + a*h^2)^2*(9*c*f*g^3 + c*g*h*(-5*e*g + d*h) - 4*a*
h^2*(-2*f*g + e*h))*(g + h*x) + (c*g^2 + a*h^2)*(12*a^2*f*h^4 + 2
*c^2*(9*f*g^4 - g^2*h*(e*g + d*h)) + a*c*h^2*(35*f*g^2 + h*(-7*e*
g + 3*d*h)))*(g + h*x)^2 - c*(4*a^2*h^4*(7*f*g - 2*e*h) + a*c*g*h
^2*(19*f*g^2 + h*(9*e*g - 13*d*h)) + 2*c^2*(3*f*g^5 + g^3*h*(e*g
+ d*h)))*(g + h*x)^3))/((c*g^2*h + a*h^3)^3*(g + h*x)^4)) + (3*a*
c*(4*c^2*d*g^2 + 4*a^2*f*h^2 - a*c*(f*g^2 + h*(-5*e*g + d*h)))*Lo
g[g + h*x])/(c*g^2 + a*h^2)^(7/2) - (3*a*c*(4*c^2*d*g^2 + 4*a^2*f
*h^2 - a*c*(f*g^2 + h*(-5*e*g + d*h)))*Log[a*h - c*g*x + Sqrt[c*g
^2 + a*h^2]*Sqrt[a + c*x^2]])/(c*g^2 + a*h^2)^(7/2))/24
```

Maple [B] time = 0.034, size = 7237, normalized size = 23.1

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)*(c*x^2+a)^(1/2)/(h*x+g)^5,x)
```

```
[Out] result too large to display
```

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(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^5,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 6.85375, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^5,x, algorithm="fricas")
```

```
[Out] [1/48*(2*(8*a*c^2*e*g^5 - 9*a^2*c*e*g^3*h^2 - 2*a^3*e*g*h^4 - 6*a
^3*d*h^5 - (28*a*c^2*d - 13*a^2*c*f)*g^4*h - (19*a^2*c*d + 2*a^3*
f)*g^2*h^3 + (6*c^3*f*g^5 + 2*c^3*e*g^4*h + 9*a*c^2*e*g^2*h^3 - 8
*a^2*c*e*h^5 + (2*c^3*d + 19*a*c^2*f)*g^3*h^2 - (13*a*c^2*d - 28*
a^2*c*f)*g*h^4)*x^3 + (8*c^3*e*g^5 + 36*a*c^2*e*g^3*h^2 - 17*a^2*
c*e*g*h^4 + 4*(2*c^3*d + a*c^2*f)*g^4*h - (40*a*c^2*d - 37*a^2*c*
f)*g^2*h^3 - 3*(a^2*c*d + 4*a^3*f)*h^5)*x^2 + (17*a*c^2*e*g^4*h -
 36*a^2*c*e*g^2*h^3 - 8*a^3*e*h^5 + 3*(4*c^3*d + a*c^2*f)*g^5 - (
37*a*c^2*d - 40*a^2*c*f)*g^3*h^2 - 4*(a^2*c*d + 2*a^3*f)*g*h^4)*x
)*sqrt(c*g^2 + a*h^2)*sqrt(c*x^2 + a) + 3*(5*a^2*c^2*e*g^5*h + (4
*a*c^3*d - a^2*c^2*f)*g^6 - (a^2*c^2*d - 4*a^3*c*f)*g^4*h^2 + (5*
a^2*c^2*e*g*h^5 + (4*a*c^3*d - a^2*c^2*f)*g^2*h^4 - (a^2*c^2*d -
4*a^3*c*f)*h^6)*x^4 + 4*(5*a^2*c^2*e*g^2*h^4 + (4*a*c^3*d - a^2*c
^2*f)*g^3*h^3 - (a^2*c^2*d - 4*a^3*c*f)*g*h^5)*x^3 + 6*(5*a^2*c^2
*e*g^3*h^3 + (4*a*c^3*d - a^2*c^2*f)*g^4*h^2 - (a^2*c^2*d - 4*a^3
*c*f)*g^2*h^4)*x^2 + 4*(5*a^2*c^2*e*g^4*h^2 + (4*a*c^3*d - a^2*c^
2*f)*g^5*h - (a^2*c^2*d - 4*a^3*c*f)*g^3*h^3)*x)*log(((2*a*c*g*h*
x - a*c*g^2 - 2*a^2*h^2 - (2*c^2*g^2 + a*c*h^2)*x^2)*sqrt(c*g^2 +
 a*h^2) + 2*(a*c*g^2*h + a^2*h^3 - (c^2*g^3 + a*c*g*h^2)*x)*sqrt(
c*x^2 + a))/(h^2*x^2 + 2*g*h*x + g^2)))/((c^3*g^10 + 3*a*c^2*g^8*
h^2 + 3*a^2*c*g^6*h^4 + a^3*g^4*h^6 + (c^3*g^6*h^4 + 3*a*c^2*g^4*
h^6 + 3*a^2*c*g^2*h^8 + a^3*h^10)*x^4 + 4*(c^3*g^7*h^3 + 3*a*c^2*
g^5*h^5 + 3*a^2*c*g^3*h^7 + a^3*g*h^9)*x^3 + 6*(c^3*g^8*h^2 + 3*a
*c^2*g^6*h^4 + 3*a^2*c*g^4*h^6 + a^3*g^2*h^8)*x^2 + 4*(c^3*g^9*h
+ 3*a*c^2*g^7*h^3 + 3*a^2*c*g^5*h^5 + a^3*g^3*h^7)*x)*sqrt(c*g^2
+ a*h^2)), 1/24*((8*a*c^2*e*g^5 - 9*a^2*c*e*g^3*h^2 - 2*a^3*e*g*h
^4 - 6*a^3*d*h^5 - (28*a*c^2*d - 13*a^2*c*f)*g^4*h - (19*a^2*c*d
+ 2*a^3*f)*g^2*h^3 + (6*c^3*f*g^5 + 2*c^3*e*g^4*h + 9*a*c^2*e*g^2
*h^3 - 8*a^2*c*e*h^5 + (2*c^3*d + 19*a*c^2*f)*g^3*h^2 - (13*a*c^2
*d - 28*a^2*c*f)*g*h^4)*x^3 + (8*c^3*e*g^5 + 36*a*c^2*e*g^3*h^2 -
 17*a^2*c*e*g*h^4 + 4*(2*c^3*d + a*c^2*f)*g^4*h - (40*a*c^2*d - 3
7*a^2*c*f)*g^2*h^3 - 3*(a^2*c*d + 4*a^3*f)*h^5)*x^2 + (17*a*c^2*e
*g^4*h - 36*a^2*c*e*g^2*h^3 - 8*a^3*e*h^5 + 3*(4*c^3*d + a*c^2*f)
*g^5 - (37*a*c^2*d - 40*a^2*c*f)*g^3*h^2 - 4*(a^2*c*d + 2*a^3*f)*
g*h^4)*x)*sqrt(-c*g^2 - a*h^2)*sqrt(c*x^2 + a) + 3*(5*a^2*c^2*e*g
^5*h + (4*a*c^3*d - a^2*c^2*f)*g^6 - (a^2*c^2*d - 4*a^3*c*f)*g^4*
h^2 + (5*a^2*c^2*e*g*h^5 + (4*a*c^3*d - a^2*c^2*f)*g^2*h^4 - (a^2
*c^2*d - 4*a^3*c*f)*h^6)*x^4 + 4*(5*a^2*c^2*e*g^2*h^4 + (4*a*c^3*
d - a^2*c^2*f)*g^3*h^3 - (a^2*c^2*d - 4*a^3*c*f)*g*h^5)*x^3 + 6*(
5*a^2*c^2*e*g^3*h^3 + (4*a*c^3*d - a^2*c^2*f)*g^4*h^2 - (a^2*c^2*
d - 4*a^3*c*f)*g^2*h^4)*x^2 + 4*(5*a^2*c^2*e*g^4*h^2 + (4*a*c^3*d
 - a^2*c^2*f)*g^5*h - (a^2*c^2*d - 4*a^3*c*f)*g^3*h^3)*x)*arctan(
sqrt(-c*g^2 - a*h^2)*(c*g*x - a*h)/((c*g^2 + a*h^2)*sqrt(c*x^2 +
a))))/((c^3*g^10 + 3*a*c^2*g^8*h^2 + 3*a^2*c*g^6*h^4 + a^3*g^4*h^
6 + (c^3*g^6*h^4 + 3*a*c^2*g^4*h^6 + 3*a^2*c*g^2*h^8 + a^3*h^10)*
x^4 + 4*(c^3*g^7*h^3 + 3*a*c^2*g^5*h^5 + 3*a^2*c*g^3*h^7 + a^3*g*
h^9)*x^3 + 6*(c^3*g^8*h^2 + 3*a*c^2*g^6*h^4 + 3*a^2*c*g^4*h^6 + a
^3*g^2*h^8)*x^2 + 4*(c^3*g^9*h + 3*a*c^2*g^7*h^3 + 3*a^2*c*g^5*h^
5 + a^3*g^3*h^7)*x)*sqrt(-c*g^2 - a*h^2))]
```

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

$$\int \frac{\sqrt{a+cx^2}\,(d+ex+fx^2)}{(g+hx)^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)*(c*x**2+a)**(1/2)/(h*x+g)**5,x)
```

```
[Out] Integral(sqrt(a + c*x**2)*(d + e*x + f*x**2)/(g + h*x)**5, x)
```

GIAC/XCAS [A] time = 2.12311, size = 1, normalized size = 0.

$$\mathit{Done}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^5,x, algorithm="giac")
```

```
[Out] Done
```

3.87 $\int \frac{\sqrt{a+cx^2}\left(d+ex+fx^2\right)}{(g+hx)^6}\,dx$

Optimal. Leaf size=433

$$-\frac{\left(a+cx^2\right)^{3/2}\left(20a^2fh^4-ach^2\left(18fg^2-h(33eg-8dh)\right)-c^2g^2\left(h(2eg-27dh)+3fg^2\right)\right)}{60h(g+hx)^3\left(ah^2+cg^2\right)^3}-\frac{c\sqrt{a+cx^2}(ah-cgx)\left(a^2h^2(6fg-eh)-acg\left(fg^2-3h(2eg-dh)\right)+4c^2dg^3\right)}{8(g+hx)^2\left(ah^2+cg^2\right)^4}-\frac{ac^2\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(a^2h^2(6fg-eh)-acg\left(fg^2-3h(2eg-dh)\right)+4c^2dg^3\right)}{8\left(ah^2+cg^2\right)^{9/2}}+\frac{\left(a+cx^2\right)^{3/2}\left(5ah^2(2fg-eh)+cg\left(h(2eg-7dh)+3fg^2\right)\right)}{20h(g+hx)^4\left(ah^2+cg^2\right)^2}-\frac{\left(a+cx^2\right)^{3/2}\left(dh^2-egh+fg^2\right)}{5h(g+hx)^5\left(ah^2+cg^2\right)}$$

```
[Out] -(c*(4*c^2*d*g^3 + a^2*h^2*(6*f*g - e*h) - a*c*g*(f*g^2 - 3*h*(2*
e*g - d*h)))*(a*h - c*g*x)*Sqrt[a + c*x^2])/(8*(c*g^2 + a*h^2)^4*
(g + h*x)^2) - ((f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(3/2))/(5*h*(
c*g^2 + a*h^2)*(g + h*x)^5) + ((5*a*h^2*(2*f*g - e*h) + c*g*(3*f*
g^2 + h*(2*e*g - 7*d*h)))*(a + c*x^2)^(3/2))/(20*h*(c*g^2 + a*h^2
)^2*(g + h*x)^4) - ((20*a^2*f*h^4 - c^2*g^2*(3*f*g^2 + h*(2*e*g -
 27*d*h)) - a*c*h^2*(18*f*g^2 - h*(33*e*g - 8*d*h)))*(a + c*x^2)^
(3/2))/(60*h*(c*g^2 + a*h^2)^3*(g + h*x)^3) - (a*c^2*(4*c^2*d*g^3
 + a^2*h^2*(6*f*g - e*h) - a*c*g*(f*g^2 - 3*h*(2*e*g - d*h)))*Arc
Tanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(8*(c*
g^2 + a*h^2)^(9/2))
```

Rubi [A] time = 1.79555, antiderivative size = 432, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.207$

$$-\frac{\left(a+cx^2\right)^{3/2}\left(20a^2fh^4-ach^2\left(18fg^2-h(33eg-8dh)\right)-c^2\left(g^2h(2eg-27dh)+3fg^4\right)\right)}{60h(g+hx)^3\left(ah^2+cg^2\right)^3}-\frac{c\sqrt{a+cx^2}(ah-cgx)\left(a^2h^2(6fg-eh)-acg\left(fg^2-3h(2eg-dh)\right)+4c^2dg^3\right)}{8(g+hx)^2\left(ah^2+cg^2\right)^4}-\frac{ac^2\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(a^2h^2(6fg-eh)-acg\left(fg^2-3h(2eg-dh)\right)+4c^2dg^3\right)}{8\left(ah^2+cg^2\right)^{9/2}}-\frac{\left(a+cx^2\right)^{3/2}\left(dh^2-egh+fg^2\right)}{5h(g+hx)^5\left(ah^2+cg^2\right)}+\frac{\left(a+cx^2\right)^{3/2}\left(5ah^2(2fg-eh)+cgh(2eg-7dh)+3cfg^3\right)}{20h(g+hx)^4\left(ah^2+cg^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^6,x]
```

```
[Out] -(c*(4*c^2*d*g^3 + a^2*h^2*(6*f*g - e*h) - a*c*g*(f*g^2 - 3*h*(2*
e*g - d*h)))*(a*h - c*g*x)*Sqrt[a + c*x^2])/(8*(c*g^2 + a*h^2)^4*
(g + h*x)^2) - ((f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(3/2))/(5*h*(
c*g^2 + a*h^2)*(g + h*x)^5) + ((3*c*f*g^3 + c*g*h*(2*e*g - 7*d*h)
 + 5*a*h^2*(2*f*g - e*h))*(a + c*x^2)^(3/2))/(20*h*(c*g^2 + a*h^2
)^2*(g + h*x)^4) - ((20*a^2*f*h^4 - c^2*(3*f*g^4 + g^2*h*(2*e*g -
 27*d*h)) - a*c*h^2*(18*f*g^2 - h*(33*e*g - 8*d*h)))*(a + c*x^2)^
(3/2))/(60*h*(c*g^2 + a*h^2)^3*(g + h*x)^3) - (a*c^2*(4*c^2*d*g^3
 + a^2*h^2*(6*f*g - e*h) - a*c*g*(f*g^2 - 3*h*(2*e*g - d*h)))*Arc
Tanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(8*(c*
g^2 + a*h^2)^(9/2))
```

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((f*x**2+e*x+d)*(c*x**2+a)**(1/2)/(h*x+g)**6,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 3.32425, size = 583, normalized size = 1.35

$$-\frac{ac^2\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)\left(a^2h^2(6fg-eh)-acg\left(3h(dh-2eg)+fg^2\right)+4c^2dg^3\right)}{8\left(ah^2+cg^2\right)^{9/2}}$$
$$+\frac{ac^2\log(g+hx)\left(a^2h^2(6fg-eh)-acg\left(3h(dh-2eg)+fg^2\right)+4c^2dg^3\right)}{8\left(ah^2+cg^2\right)^{9/2}}$$
$$-\frac{\sqrt{a+cx^2}\left(2(g+hx)^2\left(ah^2+cg^2\right)^2\left(20a^2fh^4+ach^2\left(h(4dh-9eg)+54fg^2\right)+c^2\left(27fg^4-g^2h(3dh+2eg)\right)\right)-c(g+hx)^3\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^6,x]
```

```
[Out] -(Sqrt[a + c*x^2]*(24*(c*g^2 + a*h^2)^4*(f*g^2 + h*(-(e*g) + d*h)
) - 6*(c*g^2 + a*h^2)^3*(11*c*f*g^3 + c*g*h*(-6*e*g + d*h) - 5*a*
h^2*(-2*f*g + e*h))*(g + h*x) + 2*(c*g^2 + a*h^2)^2*(20*a^2*f*h^4
 + c^2*(27*f*g^4 - g^2*h*(2*e*g + 3*d*h)) + a*c*h^2*(54*f*g^2 + h
```

```
*(-9*e*g + 4*d*h)))*(g + h*x)^2 - c*(c*g^2 + a*h^2)*(5*a^2*h^4*(1
0*f*g - 3*e*h) + a*c*g*h^2*(21*f*g^2 + h*(24*e*g - 29*d*h)) + c^2
*(6*f*g^5 + 2*g^3*h*(2*e*g + 3*d*h)))*(g + h*x)^3 - c*(-40*a^3*f*
h^6 + a*c^2*g^2*h^2*(27*f*g^2 + h*(28*e*g - 83*d*h)) + c^3*(6*f*g
^6 + 2*g^4*h*(2*e*g + 3*d*h)) + a^2*c*h^4*(86*f*g^2 + h*(-81*e*g
+ 16*d*h)))*(g + h*x)^4))/(120*h^3*(c*g^2 + a*h^2)^4*(g + h*x)^5)
 + (a*c^2*(4*c^2*d*g^3 + a^2*h^2*(6*f*g - e*h) - a*c*g*(f*g^2 + 3
*h*(-2*e*g + d*h)))*Log[g + h*x])/(8*(c*g^2 + a*h^2)^(9/2)) - (a*
c^2*(4*c^2*d*g^3 + a^2*h^2*(6*f*g - e*h) - a*c*g*(f*g^2 + 3*h*(-2
*e*g + d*h)))*Log[a*h - c*g*x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^
2]])/(8*(c*g^2 + a*h^2)^(9/2))
```

Maple [B] time = 0.043, size = 8546, normalized size = 19.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)*(c*x^2+a)^(1/2)/(h*x+g)^6,x)
```

```
[Out] result too large to display
```

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(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^6,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 13.6074, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^6,x, algorithm="fricas")
```

```
[Out] [1/240*(2*(40*a*c^3*e*g^7 - 86*a^2*c^2*e*g^5*h^2 - 27*a^3*c*e*g^3
*h^4 - 6*a^4*e*g*h^6 - 24*a^4*d*h^7 - 9*(20*a*c^3*d - 9*a^2*c^2*f
)*g^6*h - (149*a^2*c^2*d + 28*a^3*c*f)*g^4*h^3 - 2*(49*a^3*c*d +
2*a^4*f)*g^2*h^5 + (6*c^4*f*g^6*h + 4*c^4*e*g^5*h^2 + 28*a*c^3*e*
g^3*h^4 - 81*a^2*c^2*e*g*h^6 + 3*(2*c^4*d + 9*a*c^3*f)*g^4*h^3 -
(83*a*c^3*d - 86*a^2*c^2*f)*g^2*h^5 + 8*(2*a^2*c^2*d - 5*a^3*c*f)
*h^7)*x^4 + 5*(6*c^4*f*g^7 + 4*c^4*e*g^6*h + 28*a*c^3*e*g^4*h^3 -
 63*a^2*c^2*e*g^2*h^5 - 3*a^3*c*e*h^7 + 3*(2*c^4*d + 9*a*c^3*f)*g
^5*h^2 - (71*a*c^3*d - 83*a^2*c^2*f)*g^3*h^4 + (7*a^2*c^2*d - 22*
a^3*c*f)*g*h^6)*x^3 + (40*c^4*e*g^7 + 278*a*c^3*e*g^5*h^2 - 419*a
^2*c^2*e*g^3*h^4 - 27*a^3*c*e*g*h^6 + 3*(20*c^4*d + 9*a*c^3*f)*g^
6*h - (563*a*c^3*d - 419*a^2*c^2*f)*g^4*h^3 - (a^2*c^2*d + 278*a^
3*c*f)*g^2*h^5 - 8*(a^3*c*d + 5*a^4*f)*h^7)*x^2 + 5*(22*a*c^3*e*g
^6*h - 83*a^2*c^2*e*g^4*h^3 - 27*a^3*c*e*g^2*h^5 - 6*a^4*e*h^7 +
3*(4*c^4*d + a*c^3*f)*g^7 - 3*(25*a*c^3*d - 21*a^2*c^2*f)*g^5*h^2
 - (5*a^2*c^2*d + 28*a^3*c*f)*g^3*h^4 - 2*(a^3*c*d + 2*a^4*f)*g*h
^6)*x)*sqrt(c*g^2 + a*h^2)*sqrt(c*x^2 + a) - 15*(6*a^2*c^3*e*g^7*
h - a^3*c^2*e*g^5*h^3 + (4*a*c^4*d - a^2*c^3*f)*g^8 - 3*(a^2*c^3*
d - 2*a^3*c^2*f)*g^6*h^2 + (6*a^2*c^3*e*g^2*h^6 - a^3*c^2*e*h^8 +
 (4*a*c^4*d - a^2*c^3*f)*g^3*h^5 - 3*(a^2*c^3*d - 2*a^3*c^2*f)*g*
h^7)*x^5 + 5*(6*a^2*c^3*e*g^3*h^5 - a^3*c^2*e*g*h^7 + (4*a*c^4*d
- a^2*c^3*f)*g^4*h^4 - 3*(a^2*c^3*d - 2*a^3*c^2*f)*g^2*h^6)*x^4 +
 10*(6*a^2*c^3*e*g^4*h^4 - a^3*c^2*e*g^2*h^6 + (4*a*c^4*d - a^2*c
^3*f)*g^5*h^3 - 3*(a^2*c^3*d - 2*a^3*c^2*f)*g^3*h^5)*x^3 + 10*(6*
a^2*c^3*e*g^5*h^3 - a^3*c^2*e*g^3*h^5 + (4*a*c^4*d - a^2*c^3*f)*g
^6*h^2 - 3*(a^2*c^3*d - 2*a^3*c^2*f)*g^4*h^4)*x^2 + 5*(6*a^2*c^3*
e*g^6*h^2 - a^3*c^2*e*g^4*h^4 + (4*a*c^4*d - a^2*c^3*f)*g^7*h - 3
*(a^2*c^3*d - 2*a^3*c^2*f)*g^5*h^3)*x)*log(((2*a*c*g*h*x - a*c*g^
2 - 2*a^2*h^2 - (2*c^2*g^2 + a*c*h^2)*x^2)*sqrt(c*g^2 + a*h^2) -
2*(a*c*g^2*h + a^2*h^3 - (c^2*g^3 + a*c*g*h^2)*x)*sqrt(c*x^2 + a)
)/(h^2*x^2 + 2*g*h*x + g^2)))/((c^4*g^13 + 4*a*c^3*g^11*h^2 + 6*a
^2*c^2*g^9*h^4 + 4*a^3*c*g^7*h^6 + a^4*g^5*h^8 + (c^4*g^8*h^5 + 4
*a*c^3*g^6*h^7 + 6*a^2*c^2*g^4*h^9 + 4*a^3*c*g^2*h^11 + a^4*h^13)
*x^5 + 5*(c^4*g^9*h^4 + 4*a*c^3*g^7*h^6 + 6*a^2*c^2*g^5*h^8 + 4*a
^3*c*g^3*h^10 + a^4*g*h^12)*x^4 + 10*(c^4*g^10*h^3 + 4*a*c^3*g^8*
h^5 + 6*a^2*c^2*g^6*h^7 + 4*a^3*c*g^4*h^9 + a^4*g^2*h^11)*x^3 + 1
0*(c^4*g^11*h^2 + 4*a*c^3*g^9*h^4 + 6*a^2*c^2*g^7*h^6 + 4*a^3*c*g
^5*h^8 + a^4*g^3*h^10)*x^2 + 5*(c^4*g^12*h + 4*a*c^3*g^10*h^3 + 6
*a^2*c^2*g^8*h^5 + 4*a^3*c*g^6*h^7 + a^4*g^4*h^9)*x)*sqrt(c*g^2 +
 a*h^2)), 1/120*((40*a*c^3*e*g^7 - 86*a^2*c^2*e*g^5*h^2 - 27*a^3*
c*e*g^3*h^4 - 6*a^4*e*g*h^6 - 24*a^4*d*h^7 - 9*(20*a*c^3*d - 9*a^
2*c^2*f)*g^6*h - (149*a^2*c^2*d + 28*a^3*c*f)*g^4*h^3 - 2*(49*a^3
*c*d + 2*a^4*f)*g^2*h^5 + (6*c^4*f*g^6*h + 4*c^4*e*g^5*h^2 + 28*a
*c^3*e*g^3*h^4 - 81*a^2*c^2*e*g*h^6 + 3*(2*c^4*d + 9*a*c^3*f)*g^4
*h^3 - (83*a*c^3*d - 86*a^2*c^2*f)*g^2*h^5 + 8*(2*a^2*c^2*d - 5*a
^3*c*f)*h^7)*x^4 + 5*(6*c^4*f*g^7 + 4*c^4*e*g^6*h + 28*a*c^3*e*g^
4*h^3 - 63*a^2*c^2*e*g^2*h^5 - 3*a^3*c*e*h^7 + 3*(2*c^4*d + 9*a*c
^3*f)*g^5*h^2 - (71*a*c^3*d - 83*a^2*c^2*f)*g^3*h^4 + (7*a^2*c^2*
d - 22*a^3*c*f)*g*h^6)*x^3 + (40*c^4*e*g^7 + 278*a*c^3*e*g^5*h^2
- 419*a^2*c^2*e*g^3*h^4 - 27*a^3*c*e*g*h^6 + 3*(20*c^4*d + 9*a*c^
3*f)*g^6*h - (563*a*c^3*d - 419*a^2*c^2*f)*g^4*h^3 - (a^2*c^2*d +
 278*a^3*c*f)*g^2*h^5 - 8*(a^3*c*d + 5*a^4*f)*h^7)*x^2 + 5*(22*a*
c^3*e*g^6*h - 83*a^2*c^2*e*g^4*h^3 - 27*a^3*c*e*g^2*h^5 - 6*a^4*e
*h^7 + 3*(4*c^4*d + a*c^3*f)*g^7 - 3*(25*a*c^3*d - 21*a^2*c^2*f)*
```

```
g^5*h^2 - (5*a^2*c^2*d + 28*a^3*c*f)*g^3*h^4 - 2*(a^3*c*d + 2*a^4
*f)*g*h^6)*x)*sqrt(-c*g^2 - a*h^2)*sqrt(c*x^2 + a) + 15*(6*a^2*c^
3*e*g^7*h - a^3*c^2*e*g^5*h^3 + (4*a*c^4*d - a^2*c^3*f)*g^8 - 3*(
a^2*c^3*d - 2*a^3*c^2*f)*g^6*h^2 + (6*a^2*c^3*e*g^2*h^6 - a^3*c^2
*e*h^8 + (4*a*c^4*d - a^2*c^3*f)*g^3*h^5 - 3*(a^2*c^3*d - 2*a^3*c
^2*f)*g*h^7)*x^5 + 5*(6*a^2*c^3*e*g^3*h^5 - a^3*c^2*e*g*h^7 + (4*
a*c^4*d - a^2*c^3*f)*g^4*h^4 - 3*(a^2*c^3*d - 2*a^3*c^2*f)*g^2*h^
6)*x^4 + 10*(6*a^2*c^3*e*g^4*h^4 - a^3*c^2*e*g^2*h^6 + (4*a*c^4*d
 - a^2*c^3*f)*g^5*h^3 - 3*(a^2*c^3*d - 2*a^3*c^2*f)*g^3*h^5)*x^3
+ 10*(6*a^2*c^3*e*g^5*h^3 - a^3*c^2*e*g^3*h^5 + (4*a*c^4*d - a^2*
c^3*f)*g^6*h^2 - 3*(a^2*c^3*d - 2*a^3*c^2*f)*g^4*h^4)*x^2 + 5*(6*
a^2*c^3*e*g^6*h^2 - a^3*c^2*e*g^4*h^4 + (4*a*c^4*d - a^2*c^3*f)*g
^7*h - 3*(a^2*c^3*d - 2*a^3*c^2*f)*g^5*h^3)*x)*arctan(sqrt(-c*g^2
 - a*h^2)*(c*g*x - a*h)/((c*g^2 + a*h^2)*sqrt(c*x^2 + a))))/((c^4
*g^13 + 4*a*c^3*g^11*h^2 + 6*a^2*c^2*g^9*h^4 + 4*a^3*c*g^7*h^6 +
a^4*g^5*h^8 + (c^4*g^8*h^5 + 4*a*c^3*g^6*h^7 + 6*a^2*c^2*g^4*h^9
+ 4*a^3*c*g^2*h^11 + a^4*h^13)*x^5 + 5*(c^4*g^9*h^4 + 4*a*c^3*g^7
*h^6 + 6*a^2*c^2*g^5*h^8 + 4*a^3*c*g^3*h^10 + a^4*g*h^12)*x^4 + 1
0*(c^4*g^10*h^3 + 4*a*c^3*g^8*h^5 + 6*a^2*c^2*g^6*h^7 + 4*a^3*c*g
^4*h^9 + a^4*g^2*h^11)*x^3 + 10*(c^4*g^11*h^2 + 4*a*c^3*g^9*h^4 +
 6*a^2*c^2*g^7*h^6 + 4*a^3*c*g^5*h^8 + a^4*g^3*h^10)*x^2 + 5*(c^4
*g^12*h + 4*a*c^3*g^10*h^3 + 6*a^2*c^2*g^8*h^5 + 4*a^3*c*g^6*h^7
+ a^4*g^4*h^9)*x)*sqrt(-c*g^2 - a*h^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((f*x**2+e*x+d)*(c*x**2+a)**(1/2)/(h*x+g)**6,x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.69939, size = 4, normalized size = 0.01

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)/(h*x + g)^6,x, algorithm="giac")

[Out] sage0*x
```

3.88 $\int (g+hx)^3 \left(a+cx^2\right)^{3/2} \left(d+ex+fx^2\right) \, dx$

Optimal. Leaf size=462

$$\frac{x\left(a+cx^2\right)^{3/2}\left(3a^2h^2(eh+3fg)-8acg\left(3h(dh+eg)+fg^2\right)+48c^2dg^3\right)}{192c^2}$$
$$+\frac{ax\sqrt{a+cx^2}\left(3a^2h^2(eh+3fg)-8acg\left(3h(dh+eg)+fg^2\right)+48c^2dg^3\right)}{128c^2}$$
$$+\frac{a^2\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3a^2h^2(eh+3fg)-8acg\left(3h(dh+eg)+fg^2\right)+48c^2dg^3\right)}{128c^{5/2}}$$
$$+\frac{\left(a+cx^2\right)^{5/2}\left(4\left(32a^2fh^4-8ach^2\left(9h(dh+3eg)+17fg^2\right)-3c^2g^2\left(5fg^2-3h(64dh+3eg)\right)\right)-5chx\left(ah^2(63eh+61fg)+\right.\right.}{5040c^3h}$$
$$+\frac{\left(a+cx^2\right)^{5/2}(g+hx)^2\left(8h^2(9cd-4af)-3cg(5fg-9eh)\right)}{504c^2h}$$
$$-\frac{\left(a+cx^2\right)^{5/2}(g+hx)^3(5fg-9eh)}{72ch}+\frac{f\left(a+cx^2\right)^{5/2}(g+hx)^4}{9ch}$$

```
[Out] (a*(48*c^2*d*g^3 + 3*a^2*h^2*(3*f*g + e*h) - 8*a*c*g*(f*g^2 + 3*h
*(e*g + d*h)))*x*Sqrt[a + c*x^2])/(128*c^2) + ((48*c^2*d*g^3 + 3*
a^2*h^2*(3*f*g + e*h) - 8*a*c*g*(f*g^2 + 3*h*(e*g + d*h)))*x*(a +
 c*x^2)^(3/2))/(192*c^2) + ((8*(9*c*d - 4*a*f)*h^2 - 3*c*g*(5*f*g
 - 9*e*h))*(g + h*x)^2*(a + c*x^2)^(5/2))/(504*c^2*h) - ((5*f*g -
 9*e*h)*(g + h*x)^3*(a + c*x^2)^(5/2))/(72*c*h) + (f*(g + h*x)^4*
(a + c*x^2)^(5/2))/(9*c*h) + ((4*(32*a^2*f*h^4 - 8*a*c*h^2*(17*f*
g^2 + 9*h*(3*e*g + d*h)) - 3*c^2*g^2*(5*f*g^2 - 3*h*(3*e*g + 64*d
*h))) - 5*c*h*(a*h^2*(61*f*g + 63*e*h) + 2*c*g*(5*f*g^2 - 9*h*(e*
g + 12*d*h)))*x)*(a + c*x^2)^(5/2))/(5040*c^3*h) + (a^2*(48*c^2*d
*g^3 + 3*a^2*h^2*(3*f*g + e*h) - 8*a*c*g*(f*g^2 + 3*h*(e*g + d*h)
))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(128*c^(5/2))
```

Rubi [A] time = 2.4229, antiderivative size = 462, normalized size of antiderivative = 1., number of

steps used = 8, number of rules used = 6, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.207$

$$\frac{x\left(a+cx^2\right)^{3/2}\left(3a^2h^2(eh+3fg)-8acg\left(3h(dh+eg)+fg^2\right)+48c^2dg^3\right)}{192c^2}$$
$$+\frac{ax\sqrt{a+cx^2}\left(3a^2h^2(eh+3fg)-8acg\left(3h(dh+eg)+fg^2\right)+48c^2dg^3\right)}{128c^2}$$
$$+\frac{a^2\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3a^2h^2(eh+3fg)-8acg\left(3h(dh+eg)+fg^2\right)+48c^2dg^3\right)}{128c^{5/2}}$$
$$+\frac{\left(a+cx^2\right)^{5/2}\left(4\left(32a^2fh^4-8ach^2\left(9h(dh+3eg)+17fg^2\right)-c^2\left(15fg^4-9g^2h(64dh+3eg)\right)\right)-5chx\left(ah^2(63eh+61fg)+\right.}{5040c^3h}$$
$$+\frac{\left(a+cx^2\right)^{5/2}(g+hx)^2\left(8h^2(9cd-4af)-3cg(5fg-9eh)\right)}{504c^2h}$$
$$-\frac{\left(a+cx^2\right)^{5/2}(g+hx)^3(5fg-9eh)}{72ch}+\frac{f\left(a+cx^2\right)^{5/2}(g+hx)^4}{9ch}$$

Antiderivative was successfully verified.

```
[In]  Int[(g + h*x)^3*(a + c*x^2)^(3/2)*(d + e*x + f*x^2),x]
```

```
[Out] (a*(48*c^2*d*g^3 + 3*a^2*h^2*(3*f*g + e*h) - 8*a*c*g*(f*g^2 + 3*h
*(e*g + d*h)))*x*Sqrt[a + c*x^2])/(128*c^2) + ((48*c^2*d*g^3 + 3*
a^2*h^2*(3*f*g + e*h) - 8*a*c*g*(f*g^2 + 3*h*(e*g + d*h)))*x*(a +
 c*x^2)^(3/2))/(192*c^2) + ((8*(9*c*d - 4*a*f)*h^2 - 3*c*g*(5*f*g
 - 9*e*h))*(g + h*x)^2*(a + c*x^2)^(5/2))/(504*c^2*h) - ((5*f*g -
 9*e*h)*(g + h*x)^3*(a + c*x^2)^(5/2))/(72*c*h) + (f*(g + h*x)^4*
(a + c*x^2)^(5/2))/(9*c*h) + ((4*(32*a^2*f*h^4 - 8*a*c*h^2*(17*f*
g^2 + 9*h*(3*e*g + d*h)) - c^2*(15*f*g^4 - 9*g^2*h*(3*e*g + 64*d*
h))) - 5*c*h*(a*h^2*(61*f*g + 63*e*h) + 2*c*(5*f*g^3 - 9*g*h*(e*g
 + 12*d*h)))*x)*(a + c*x^2)^(5/2))/(5040*c^3*h) + (a^2*(48*c^2*d*
g^3 + 3*a^2*h^2*(3*f*g + e*h) - 8*a*c*g*(f*g^2 + 3*h*(e*g + d*h))
)*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(128*c^(5/2))
```

Rubi in Sympy [A] time = 147.255, size = 529, normalized size = 1.15

$$\frac{a^2\left(3a^2eh^3+9a^2fgh^2-24acdgh^2-24aceg^2h-8acfg^3+48c^2dg^3\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{128c^{\frac{5}{2}}}+\frac{ax\sqrt{a+cx^2}\left(3a^2eh^3+9a^2fgh^2-24acdgh^2-24aceg^2h-8acfg^3+48c^2dg^3\right)}{128c^2}+\frac{f\left(a+cx^2\right)^{\frac{5}{2}}(g+hx)^4}{9ch}+\frac{\left(a+cx^2\right)^{\frac{5}{2}}(g+hx)^3(9eh-5fg)}{72ch}+\frac{x\left(a+cx^2\right)^{\frac{3}{2}}\left(3a^2eh^3+9a^2fgh^2-24acdgh^2-24aceg^2h-8acfg^3+48c^2dg^3\right)}{192c^2}-\frac{\left(a+cx^2\right)^{\frac{5}{2}}(g+hx)^2\left(32afh^2-72cdh^2-27cegh+15cfg^2\right)}{504c^2h}+\frac{\left(a+cx^2\right)^{\frac{5}{2}}\left(384a^2fh^4-864acdh^4-2592acegh^3-1632acfg^2h^2+6912c^2dg^2h^2+324c^2eg^3h-180c^2fg^4-15chx\left(63aeh^3\right.\right.}{15120c^3h}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)**3*(c*x**2+a)**(3/2)*(f*x**2+e*x+d),x)
```

```
[Out] a**2*(3*a**2*e*h**3 + 9*a**2*f*g*h**2 - 24*a*c*d*g*h**2 - 24*a*c*
e*g**2*h - 8*a*c*f*g**3 + 48*c**2*d*g**3)*atanh(sqrt(c)*x/sqrt(a
+ c*x**2))/(128*c**(5/2)) + a*x*sqrt(a + c*x**2)*(3*a**2*e*h**3 +
 9*a**2*f*g*h**2 - 24*a*c*d*g*h**2 - 24*a*c*e*g**2*h - 8*a*c*f*g*
*3 + 48*c**2*d*g**3)/(128*c**2) + f*(a + c*x**2)**(5/2)*(g + h*x)
**4/(9*c*h) + (a + c*x**2)**(5/2)*(g + h*x)**3*(9*e*h - 5*f*g)/(7
2*c*h) + x*(a + c*x**2)**(3/2)*(3*a**2*e*h**3 + 9*a**2*f*g*h**2 -
 24*a*c*d*g*h**2 - 24*a*c*e*g**2*h - 8*a*c*f*g**3 + 48*c**2*d*g**
3)/(192*c**2) - (a + c*x**2)**(5/2)*(g + h*x)**2*(32*a*f*h**2 - 7
2*c*d*h**2 - 27*c*e*g*h + 15*c*f*g**2)/(504*c**2*h) + (a + c*x**2
)**(5/2)*(384*a**2*f*h**4 - 864*a*c*d*h**4 - 2592*a*c*e*g*h**3 -
1632*a*c*f*g**2*h**2 + 6912*c**2*d*g**2*h**2 + 324*c**2*e*g**3*h
- 180*c**2*f*g**4 - 15*c*h*x*(63*a*e*h**3 + 61*a*f*g*h**2 - 216*c
*d*g*h**2 - 18*c*e*g**2*h + 10*c*f*g**3))/(15120*c**3*h)
```

Mathematica [A] time = 1.3152, size = 481, normalized size = 1.04

$$\frac{315a^2\sqrt{c}\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)\left(3a^2h^2(eh+3fg)-8acg\left(3h(dh+eg)+fg^2\right)+48c^2dg^3\right)+\sqrt{a+cx^2}\left(384c^2x^4\left(a^2fh^3+24\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(g + h*x)^3*(a + c*x^2)^(3/2)*(d + e*x + f*x^2),x]
```

```
[Out] (Sqrt[a + c*x^2]*(128*a^2*(8*a^2*f*h^3 + 63*c^2*g^2*(e*g + 3*d*h)
 - 18*a*c*h*(3*f*g^2 + h*(3*e*g + d*h))) + 315*a*c*(80*c^2*d*g^3
- 3*a^2*h^2*(3*f*g + e*h) + 8*a*c*g*(f*g^2 + 3*h*(e*g + d*h)))*x
+ 128*a*c*(-4*a^2*f*h^3 + 126*c^2*g^2*(e*g + 3*d*h) + 9*a*c*h*(3*
f*g^2 + h*(3*e*g + d*h)))*x^2 + 210*c^2*(48*c^2*d*g^3 + 3*a^2*h^2
*(3*f*g + e*h) + 56*a*c*g*(f*g^2 + 3*h*(e*g + d*h)))*x^3 + 384*c^
2*(a^2*f*h^3 + 21*c^2*g^2*(e*g + 3*d*h) + 24*a*c*h*(3*f*g^2 + h*(
3*e*g + d*h)))*x^4 + 840*c^3*(9*a*h^2*(3*f*g + e*h) + 8*c*(f*g^3
+ 3*g*h*(e*g + d*h)))*x^5 + 640*c^3*h*(10*a*f*h^2 + 9*c*(3*f*g^2
+ h*(3*e*g + d*h)))*x^6 + 5040*c^4*h^2*(3*f*g + e*h)*x^7 + 4480*c
^4*f*h^3*x^8) + 315*a^2*Sqrt[c]*(48*c^2*d*g^3 + 3*a^2*h^2*(3*f*g
+ e*h) - 8*a*c*g*(f*g^2 + 3*h*(e*g + d*h)))*Log[c*x + Sqrt[c]*Sqr
t[a + c*x^2]])/(40320*c^3)
```

Maple [A] time = 0.024, size = 794, normalized size = 1.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^3*(c*x^2+a)^(3/2)*(f*x^2+e*x+d),x)
```

```
[Out] 1/5/c*(c*x^2+a)^(5/2)*e*g^3+1/4*d*g^3*x*(c*x^2+a)^(3/2)+3/8*x^3*(
c*x^2+a)^(5/2)/c*f*g*h^2-1/16/c^2*a*x*(c*x^2+a)^(5/2)*e*h^3+1/64/
c^2*a^2*x*(c*x^2+a)^(3/2)*e*h^3+3/128/c^2*a^3*x*(c*x^2+a)^(1/2)*e
*h^3+9/128/c^(5/2)*a^4*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*f*g*h^2+3/7*
x^2*(c*x^2+a)^(5/2)/c*e*g*h^2+3/7*x^2*(c*x^2+a)^(5/2)/c*f*g^2*h-6
/35*a/c^2*(c*x^2+a)^(5/2)*e*g*h^2-6/35*a/c^2*(c*x^2+a)^(5/2)*f*g^
2*h-4/63*f*h^3/c^2*a*x^2*(c*x^2+a)^(5/2)-1/24/c*a*x*(c*x^2+a)^(3/
2)*f*g^3-1/16/c*a^2*x*(c*x^2+a)^(1/2)*f*g^3-3/16/c^(3/2)*a^3*ln(x
*c^(1/2)+(c*x^2+a)^(1/2))*d*g*h^2-3/16/c^(3/2)*a^3*ln(x*c^(1/2)+(
c*x^2+a)^(1/2))*e*g^2*h+1/2*x*(c*x^2+a)^(5/2)/c*d*g*h^2+1/2*x*(c*
x^2+a)^(5/2)/c*e*g^2*h+3/8*d*g^3*a^2/c^(1/2)*ln(x*c^(1/2)+(c*x^2+
a)^(1/2))+3/8*d*g^3*a*x*(c*x^2+a)^(1/2)-3/16/c^2*a*x*(c*x^2+a)^(5
/2)*f*g*h^2+3/64/c^2*a^2*x*(c*x^2+a)^(3/2)*f*g*h^2+9/128/c^2*a^3*
x*(c*x^2+a)^(1/2)*f*g*h^2-1/8/c*a*x*(c*x^2+a)^(3/2)*d*g*h^2-1/8/c
*a*x*(c*x^2+a)^(3/2)*e*g^2*h-3/16/c*a^2*x*(c*x^2+a)^(1/2)*d*g*h^2
-3/16/c*a^2*x*(c*x^2+a)^(1/2)*e*g^2*h+1/6*x*(c*x^2+a)^(5/2)/c*f*g
^3-1/16/c^(3/2)*a^3*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*f*g^3+3/128/c^(
5/2)*a^4*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*e*h^3+1/8*x^3*(c*x^2+a)^(5
/2)/c*e*h^3+1/7*x^2*(c*x^2+a)^(5/2)/c*d*h^3-2/35*a/c^2*(c*x^2+a)^
(5/2)*d*h^3+3/5/c*(c*x^2+a)^(5/2)*d*g^2*h+1/9*f*h^3*x^4*(c*x^2+a)
^(5/2)/c+8/315*f*h^3/c^3*a^2*(c*x^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((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.358404, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g)^3,x, algorithm="fricas")
```

```
[Out] [1/80640*(2*(4480*c^4*f*h^3*x^8 + 8064*a^2*c^2*e*g^3 - 6912*a^3*c
*e*g*h^2 + 5040*(3*c^4*f*g*h^2 + c^4*e*h^3)*x^7 + 640*(27*c^4*f*g
^2*h + 27*c^4*e*g*h^2 + (9*c^4*d + 10*a*c^3*f)*h^3)*x^6 + 840*(8*
c^4*f*g^3 + 24*c^4*e*g^2*h + 9*a*c^3*e*h^3 + 3*(8*c^4*d + 9*a*c^3
*f)*g*h^2)*x^5 + 384*(21*c^4*e*g^3 + 72*a*c^3*e*g*h^2 + 9*(7*c^4*
d + 8*a*c^3*f)*g^2*h + (24*a*c^3*d + a^2*c^2*f)*h^3)*x^4 + 3456*(
7*a^2*c^2*d - 2*a^3*c*f)*g^2*h - 256*(9*a^3*c*d - 4*a^4*f)*h^3 +
210*(168*a*c^3*e*g^2*h + 3*a^2*c^2*e*h^3 + 8*(6*c^4*d + 7*a*c^3*f
)*g^3 + 3*(56*a*c^3*d + 3*a^2*c^2*f)*g*h^2)*x^3 + 128*(126*a*c^3*
e*g^3 + 27*a^2*c^2*e*g*h^2 + 27*(14*a*c^3*d + a^2*c^2*f)*g^2*h +
(9*a^2*c^2*d - 4*a^3*c*f)*h^3)*x^2 + 315*(24*a^2*c^2*e*g^2*h - 3*
a^3*c*e*h^3 + 8*(10*a*c^3*d + a^2*c^2*f)*g^3 + 3*(8*a^2*c^2*d - 3
*a^3*c*f)*g*h^2)*x)*sqrt(c*x^2 + a)*sqrt(c) - 315*(24*a^3*c^2*e*g
^2*h - 3*a^4*c*e*h^3 - 8*(6*a^2*c^3*d - a^3*c^2*f)*g^3 + 3*(8*a^3
*c^2*d - 3*a^4*c*f)*g*h^2)*log(-2*sqrt(c*x^2 + a)*c*x - (2*c*x^2
+ a)*sqrt(c)))/c^(7/2), 1/40320*((4480*c^4*f*h^3*x^8 + 8064*a^2*c
^2*e*g^3 - 6912*a^3*c*e*g*h^2 + 5040*(3*c^4*f*g*h^2 + c^4*e*h^3)*
x^7 + 640*(27*c^4*f*g^2*h + 27*c^4*e*g*h^2 + (9*c^4*d + 10*a*c^3*
f)*h^3)*x^6 + 840*(8*c^4*f*g^3 + 24*c^4*e*g^2*h + 9*a*c^3*e*h^3 +
 3*(8*c^4*d + 9*a*c^3*f)*g*h^2)*x^5 + 384*(21*c^4*e*g^3 + 72*a*c^
3*e*g*h^2 + 9*(7*c^4*d + 8*a*c^3*f)*g^2*h + (24*a*c^3*d + a^2*c^2
*f)*h^3)*x^4 + 3456*(7*a^2*c^2*d - 2*a^3*c*f)*g^2*h - 256*(9*a^3*
c*d - 4*a^4*f)*h^3 + 210*(168*a*c^3*e*g^2*h + 3*a^2*c^2*e*h^3 + 8
*(6*c^4*d + 7*a*c^3*f)*g^3 + 3*(56*a*c^3*d + 3*a^2*c^2*f)*g*h^2)*
x^3 + 128*(126*a*c^3*e*g^3 + 27*a^2*c^2*e*g*h^2 + 27*(14*a*c^3*d
+ a^2*c^2*f)*g^2*h + (9*a^2*c^2*d - 4*a^3*c*f)*h^3)*x^2 + 315*(24
*a^2*c^2*e*g^2*h - 3*a^3*c*e*h^3 + 8*(10*a*c^3*d + a^2*c^2*f)*g^3
 + 3*(8*a^2*c^2*d - 3*a^3*c*f)*g*h^2)*x)*sqrt(c*x^2 + a)*sqrt(-c)
 - 315*(24*a^3*c^2*e*g^2*h - 3*a^4*c*e*h^3 - 8*(6*a^2*c^3*d - a^3
*c^2*f)*g^3 + 3*(8*a^3*c^2*d - 3*a^4*c*f)*g*h^2)*arctan(sqrt(-c)*
x/sqrt(c*x^2 + a)))/(sqrt(-c)*c^3)]
```

Sympy [A] time = 96.0741, size = 1916, normalized size = 4.15

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**3*(c*x**2+a)**(3/2)*(f*x**2+e*x+d),x)
```

```
[Out] -3*a**(7/2)*e*h**3*x/(128*c**2*sqrt(1 + c*x**2/a)) - 9*a**(7/2)*f
*g*h**2*x/(128*c**2*sqrt(1 + c*x**2/a)) + 3*a**(5/2)*d*g*h**2*x/(
16*c*sqrt(1 + c*x**2/a)) + 3*a**(5/2)*e*g**2*h*x/(16*c*sqrt(1 + c
*x**2/a)) - a**(5/2)*e*h**3*x**3/(128*c*sqrt(1 + c*x**2/a)) + a**
(5/2)*f*g**3*x/(16*c*sqrt(1 + c*x**2/a)) - 3*a**(5/2)*f*g*h**2*x*
*3/(128*c*sqrt(1 + c*x**2/a)) + a**(3/2)*d*g**3*x*sqrt(1 + c*x**2
/a)/2 + a**(3/2)*d*g**3*x/(8*sqrt(1 + c*x**2/a)) + 17*a**(3/2)*d*
g*h**2*x**3/(16*sqrt(1 + c*x**2/a)) + 17*a**(3/2)*e*g**2*h*x**3/(
16*sqrt(1 + c*x**2/a)) + 13*a**(3/2)*e*h**3*x**5/(64*sqrt(1 + c*x
**2/a)) + 17*a**(3/2)*f*g**3*x**3/(48*sqrt(1 + c*x**2/a)) + 39*a*
*(3/2)*f*g*h**2*x**5/(64*sqrt(1 + c*x**2/a)) + 3*sqrt(a)*c*d*g**3
*x**3/(8*sqrt(1 + c*x**2/a)) + 11*sqrt(a)*c*d*g*h**2*x**5/(8*sqrt
(1 + c*x**2/a)) + 11*sqrt(a)*c*e*g**2*h*x**5/(8*sqrt(1 + c*x**2/a
)) + 5*sqrt(a)*c*e*h**3*x**7/(16*sqrt(1 + c*x**2/a)) + 11*sqrt(a)
*c*f*g**3*x**5/(24*sqrt(1 + c*x**2/a)) + 15*sqrt(a)*c*f*g*h**2*x*
*7/(16*sqrt(1 + c*x**2/a)) + 3*a**4*e*h**3*asinh(sqrt(c)*x/sqrt(a
))/(128*c**(5/2)) + 9*a**4*f*g*h**2*asinh(sqrt(c)*x/sqrt(a))/(128
*c**(5/2)) - 3*a**3*d*g*h**2*asinh(sqrt(c)*x/sqrt(a))/(16*c**(3/2
)) - 3*a**3*e*g**2*h*asinh(sqrt(c)*x/sqrt(a))/(16*c**(3/2)) - a**
3*f*g**3*asinh(sqrt(c)*x/sqrt(a))/(16*c**(3/2)) + 3*a**2*d*g**3*a
sinh(sqrt(c)*x/sqrt(a))/(8*sqrt(c)) + 3*a*d*g**2*h*Piecewise((sqr
t(a)*x**2/2, Eq(c, 0)), ((a + c*x**2)**(3/2)/(3*c), True)) + a*d*
h**3*Piecewise((-2*a**2*sqrt(a + c*x**2)/(15*c**2) + a*x**2*sqrt(
a + c*x**2)/(15*c) + x**4*sqrt(a + c*x**2)/5, Ne(c, 0)), (sqrt(a)
*x**4/4, True)) + a*e*g**3*Piecewise((sqrt(a)*x**2/2, Eq(c, 0)),
((a + c*x**2)**(3/2)/(3*c), True)) + 3*a*e*g*h**2*Piecewise((-2*a
**2*sqrt(a + c*x**2)/(15*c**2) + a*x**2*sqrt(a + c*x**2)/(15*c) +
 x**4*sqrt(a + c*x**2)/5, Ne(c, 0)), (sqrt(a)*x**4/4, True)) + 3*
a*f*g**2*h*Piecewise((-2*a**2*sqrt(a + c*x**2)/(15*c**2) + a*x**2
*sqrt(a + c*x**2)/(15*c) + x**4*sqrt(a + c*x**2)/5, Ne(c, 0)), (s
qrt(a)*x**4/4, True)) + a*f*h**3*Piecewise((8*a**3*sqrt(a + c*x**
2)/(105*c**3) - 4*a**2*x**2*sqrt(a + c*x**2)/(105*c**2) + a*x**4*
sqrt(a + c*x**2)/(35*c) + x**6*sqrt(a + c*x**2)/7, Ne(c, 0)), (sq
rt(a)*x**6/6, True)) + 3*c*d*g**2*h*Piecewise((-2*a**2*sqrt(a + c
*x**2)/(15*c**2) + a*x**2*sqrt(a + c*x**2)/(15*c) + x**4*sqrt(a +
 c*x**2)/5, Ne(c, 0)), (sqrt(a)*x**4/4, True)) + c*d*h**3*Piecewi
se((8*a**3*sqrt(a + c*x**2)/(105*c**3) - 4*a**2*x**2*sqrt(a + c*x
**2)/(105*c**2) + a*x**4*sqrt(a + c*x**2)/(35*c) + x**6*sqrt(a +
c*x**2)/7, Ne(c, 0)), (sqrt(a)*x**6/6, True)) + c*e*g**3*Piecewis
e((-2*a**2*sqrt(a + c*x**2)/(15*c**2) + a*x**2*sqrt(a + c*x**2)/(
15*c) + x**4*sqrt(a + c*x**2)/5, Ne(c, 0)), (sqrt(a)*x**4/4, True
)) + 3*c*e*g*h**2*Piecewise((8*a**3*sqrt(a + c*x**2)/(105*c**3) -
 4*a**2*x**2*sqrt(a + c*x**2)/(105*c**2) + a*x**4*sqrt(a + c*x**2
)/(35*c) + x**6*sqrt(a + c*x**2)/7, Ne(c, 0)), (sqrt(a)*x**6/6, T
```

```
rue)) + 3*c*f*g**2*h*Piecewise((8*a**3*sqrt(a + c*x**2)/(105*c**3
) - 4*a**2*x**2*sqrt(a + c*x**2)/(105*c**2) + a*x**4*sqrt(a + c*x
**2)/(35*c) + x**6*sqrt(a + c*x**2)/7, Ne(c, 0)), (sqrt(a)*x**6/6
, True)) + c*f*h**3*Piecewise((-16*a**4*sqrt(a + c*x**2)/(315*c**
4) + 8*a**3*x**2*sqrt(a + c*x**2)/(315*c**3) - 2*a**2*x**4*sqrt(a
 + c*x**2)/(105*c**2) + a*x**6*sqrt(a + c*x**2)/(63*c) + x**8*sqr
t(a + c*x**2)/9, Ne(c, 0)), (sqrt(a)*x**8/8, True)) + c**2*d*g**3
*x**5/(4*sqrt(a)*sqrt(1 + c*x**2/a)) + c**2*d*g*h**2*x**7/(2*sqrt
(a)*sqrt(1 + c*x**2/a)) + c**2*e*g**2*h*x**7/(2*sqrt(a)*sqrt(1 +
c*x**2/a)) + c**2*e*h**3*x**9/(8*sqrt(a)*sqrt(1 + c*x**2/a)) + c*
*2*f*g**3*x**7/(6*sqrt(a)*sqrt(1 + c*x**2/a)) + 3*c**2*f*g*h**2*x
**9/(8*sqrt(a)*sqrt(1 + c*x**2/a))
```

GIAC/XCAS [A] time = 0.281905, size = 880, normalized size = 1.9

$$\frac{1}{40320}\sqrt{cx^2+a}\left(\left(2\left(\left(4\left(5\left(2\left(7\left(8\,cfh^3x+\frac{9\left(3\,c^8fgh^2+c^8h^3e\right)}{c^7}\right)x+\frac{8\left(27\,c^8fg^2h+9\,c^8dh^3+10\,ac^7fh^3+27\,c^8gh^2e\right)}{c^7}\right)x\right.\right.\right.\right.\right.\right.$$

$$-\frac{\left(48\,a^2c^2dg^3-8\,a^3cfg^3-24\,a^3cdgh^2+9\,a^4fgh^2-24\,a^3cg^2he+3\,a^4h^3e\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{128\,c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g)^3,x, algorithm="giac")
```

```
[Out] 1/40320*sqrt(c*x^2 + a)*((2*((4*(5*(2*(7*(8*c*f*h^3*x + 9*(3*c^8*
f*g*h^2 + c^8*h^3*e)/c^7)*x + 8*(27*c^8*f*g^2*h + 9*c^8*d*h^3 + 1
0*a*c^7*f*h^3 + 27*c^8*g*h^2*e)/c^7)*x + 21*(8*c^8*f*g^3 + 24*c^8
*d*g*h^2 + 27*a*c^7*f*g*h^2 + 24*c^8*g^2*h*e + 9*a*c^7*h^3*e)/c^7
)*x + 48*(63*c^8*d*g^2*h + 72*a*c^7*f*g^2*h + 24*a*c^7*d*h^3 + a^
2*c^6*f*h^3 + 21*c^8*g^3*e + 72*a*c^7*g*h^2*e)/c^7)*x + 105*(48*c
^8*d*g^3 + 56*a*c^7*f*g^3 + 168*a*c^7*d*g*h^2 + 9*a^2*c^6*f*g*h^2
 + 168*a*c^7*g^2*h*e + 3*a^2*c^6*h^3*e)/c^7)*x + 64*(378*a*c^7*d*
g^2*h + 27*a^2*c^6*f*g^2*h + 9*a^2*c^6*d*h^3 - 4*a^3*c^5*f*h^3 +
126*a*c^7*g^3*e + 27*a^2*c^6*g*h^2*e)/c^7)*x + 315*(80*a*c^7*d*g^
3 + 8*a^2*c^6*f*g^3 + 24*a^2*c^6*d*g*h^2 - 9*a^3*c^5*f*g*h^2 + 24
*a^2*c^6*g^2*h*e - 3*a^3*c^5*h^3*e)/c^7)*x + 128*(189*a^2*c^6*d*g
^2*h - 54*a^3*c^5*f*g^2*h - 18*a^3*c^5*d*h^3 + 8*a^4*c^4*f*h^3 +
63*a^2*c^6*g^3*e - 54*a^3*c^5*g*h^2*e)/c^7) - 1/128*(48*a^2*c^2*d
*g^3 - 8*a^3*c*f*g^3 - 24*a^3*c*d*g*h^2 + 9*a^4*f*g*h^2 - 24*a^3*
c*g^2*h*e + 3*a^4*h^3*e)*ln(abs(-sqrt(c)*x + sqrt(c*x^2 + a)))/c^
(5/2)
```

3.89 $\int (g+hx)^2 \left(a+cx^2\right)^{3/2} \left(d+ex+fx^2\right)\,dx$

Optimal. Leaf size=346

$$\frac{x\left(a+cx^2\right)^{3/2}\left(3a^2fh^2-8ac\left(h(dh+2eg)+fg^2\right)+48c^2dg^2\right)}{192c^2}+\frac{ax\sqrt{a+cx^2}\left(3a^2fh^2-8ac\left(h(dh+2eg)+fg^2\right)+48c^2dg^2\right)}{128c^2}+\frac{a^2\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3a^2fh^2-8ac\left(h(dh+2eg)+fg^2\right)+48c^2dg^2\right)}{128c^{5/2}}-\frac{\left(a+cx^2\right)^{5/2}\left(12\left(8ah^2(eh+2fg)+cg\left(5fg^2-8h(7dh+eg)\right)\right)-5hx\left(7h^2(8cd-3af)-2cg(5fg-8eh)\right)\right)}{1680c^2h}-\frac{\left(a+cx^2\right)^{5/2}(g+hx)^2(5fg-8eh)}{56ch}+\frac{f\left(a+cx^2\right)^{5/2}(g+hx)^3}{8ch}$$

```
[Out] (a*(48*c^2*d*g^2 + 3*a^2*f*h^2 - 8*a*c*(f*g^2 + h*(2*e*g + d*h)))
*x*Sqrt[a + c*x^2])/(128*c^2) + ((48*c^2*d*g^2 + 3*a^2*f*h^2 - 8*
a*c*(f*g^2 + h*(2*e*g + d*h)))*x*(a + c*x^2)^(3/2))/(192*c^2) - (
(5*f*g - 8*e*h)*(g + h*x)^2*(a + c*x^2)^(5/2))/(56*c*h) + (f*(g +
 h*x)^3*(a + c*x^2)^(5/2))/(8*c*h) - ((12*(8*a*h^2*(2*f*g + e*h)
+ c*g*(5*f*g^2 - 8*h*(e*g + 7*d*h))) - 5*h*(7*(8*c*d - 3*a*f)*h^2
 - 2*c*g*(5*f*g - 8*e*h))*x)*(a + c*x^2)^(5/2))/(1680*c^2*h) + (a
^2*(48*c^2*d*g^2 + 3*a^2*f*h^2 - 8*a*c*(f*g^2 + h*(2*e*g + d*h)))
*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(128*c^(5/2))
```

Rubi [A] time = 1.20632, antiderivative size = 345, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.207$

$$\frac{x\left(a+cx^2\right)^{3/2}\left(3a^2fh^2-8ac\left(h(dh+2eg)+fg^2\right)+48c^2dg^2\right)}{192c^2}+\frac{ax\sqrt{a+cx^2}\left(3a^2fh^2-8ac\left(h(dh+2eg)+fg^2\right)+48c^2dg^2\right)}{128c^2}+\frac{a^2\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3a^2fh^2-8ac\left(h(dh+2eg)+fg^2\right)+48c^2dg^2\right)}{128c^{5/2}}-\frac{\left(a+cx^2\right)^{5/2}\left(12\left(8ah^2(eh+2fg)-8cgh(7dh+eg)+5cfg^3\right)-5hx\left(7h^2(8cd-3af)-2cg(5fg-8eh)\right)\right)}{1680c^2h}-\frac{\left(a+cx^2\right)^{5/2}(g+hx)^2(5fg-8eh)}{56ch}+\frac{f\left(a+cx^2\right)^{5/2}(g+hx)^3}{8ch}$$

Antiderivative was successfully verified.

```
[In]  Int[(g + h*x)^2*(a + c*x^2)^(3/2)*(d + e*x + f*x^2),x]
```

```
[Out] (a*(48*c^2*d*g^2 + 3*a^2*f*h^2 - 8*a*c*(f*g^2 + h*(2*e*g + d*h)))
*x*Sqrt[a + c*x^2])/(128*c^2) + ((48*c^2*d*g^2 + 3*a^2*f*h^2 - 8*
a*c*(f*g^2 + h*(2*e*g + d*h)))*x*(a + c*x^2)^(3/2))/(192*c^2) - (
(5*f*g - 8*e*h)*(g + h*x)^2*(a + c*x^2)^(5/2))/(56*c*h) + (f*(g +
 h*x)^3*(a + c*x^2)^(5/2))/(8*c*h) - ((12*(5*c*f*g^3 - 8*c*g*h*(e
*g + 7*d*h) + 8*a*h^2*(2*f*g + e*h)) - 5*h*(7*(8*c*d - 3*a*f)*h^2
 - 2*c*g*(5*f*g - 8*e*h))*x)*(a + c*x^2)^(5/2))/(1680*c^2*h) + (a
^2*(48*c^2*d*g^2 + 3*a^2*f*h^2 - 8*a*c*(f*g^2 + h*(2*e*g + d*h)))
*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(128*c^(5/2))
```

Rubi in Sympy [A] time = 76.7447, size = 376, normalized size = 1.09

$$\frac{a^2\left(3a^2fh^2-8acdh^2-16acegh-8acfg^2+48c^2dg^2\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{128c^{\frac{5}{2}}}+\frac{ax\sqrt{a+cx^2}\left(3a^2fh^2-8acdh^2-16acegh-8acfg^2+48c^2dg^2\right)}{128c^2}+\frac{f\left(a+cx^2\right)^{\frac{5}{2}}(g+hx)^3}{8ch}+\frac{\left(a+cx^2\right)^{\frac{5}{2}}(g+hx)^2(8eh-5fg)}{56ch}+\frac{x\left(a+cx^2\right)^{\frac{3}{2}}\left(3a^2fh^2-8acdh^2-16acegh-8acfg^2+48c^2dg^2\right)}{192c^2}-\frac{\left(a+cx^2\right)^{\frac{5}{2}}\left(96aeh^3+192afgh^2-672cdgh^2-96ceg^2h+60cfg^3+5hx\left(21afh^2-56cdh^2-16cegh+10cfg^2\right)\right)}{1680c^2h}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)**2*(c*x**2+a)**(3/2)*(f*x**2+e*x+d),x)
```

```
[Out] a**2*(3*a**2*f*h**2 - 8*a*c*d*h**2 - 16*a*c*e*g*h - 8*a*c*f*g**2
+ 48*c**2*d*g**2)*atanh(sqrt(c)*x/sqrt(a + c*x**2))/(128*c**(5/2)
) + a*x*sqrt(a + c*x**2)*(3*a**2*f*h**2 - 8*a*c*d*h**2 - 16*a*c*e
*g*h - 8*a*c*f*g**2 + 48*c**2*d*g**2)/(128*c**2) + f*(a + c*x**2)
**(5/2)*(g + h*x)**3/(8*c*h) + (a + c*x**2)**(5/2)*(g + h*x)**2*(
8*e*h - 5*f*g)/(56*c*h) + x*(a + c*x**2)**(3/2)*(3*a**2*f*h**2 -
8*a*c*d*h**2 - 16*a*c*e*g*h - 8*a*c*f*g**2 + 48*c**2*d*g**2)/(192
*c**2) - (a + c*x**2)**(5/2)*(96*a*e*h**3 + 192*a*f*g*h**2 - 672*
c*d*g*h**2 - 96*c*e*g**2*h + 60*c*f*g**3 + 5*h*x*(21*a*f*h**2 - 5
6*c*d*h**2 - 16*c*e*g*h + 10*c*f*g**2))/(1680*c**2*h)
```

Mathematica [A] time = 0.650316, size = 340, normalized size = 0.98

$$105a^2\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)\left(3a^2fh^2-8ac\left(h(dh+2eg)+fg^2\right)+48c^2dg^2\right)+\sqrt{c}\sqrt{a+cx^2}\left(70cx^3\left(3a^2fh^2+56ac\left(h(dh+\right.\right.\right.$$

Antiderivative was successfully verified.

```
[In]  Integrate[(g + h*x)^2*(a + c*x^2)^(3/2)*(d + e*x + f*x^2),x]
```

```
[Out] (Sqrt[c]*Sqrt[a + c*x^2]*(384*a^2*(7*c*g*(e*g + 2*d*h) - 2*a*h*(2
*f*g + e*h)) + 105*a*(80*c^2*d*g^2 - 3*a^2*f*h^2 + 8*a*c*(f*g^2 +
 h*(2*e*g + d*h)))*x + 384*a*c*(14*c*g*(e*g + 2*d*h) + a*h*(2*f*g
 + e*h))*x^2 + 70*c*(48*c^2*d*g^2 + 3*a^2*f*h^2 + 56*a*c*(f*g^2 +
 h*(2*e*g + d*h)))*x^3 + 384*c^2*(7*c*g*(e*g + 2*d*h) + 8*a*h*(2*
f*g + e*h))*x^4 + 280*c^2*(9*a*f*h^2 + 8*c*(f*g^2 + h*(2*e*g + d*
h)))*x^5 + 1920*c^3*h*(2*f*g + e*h)*x^6 + 1680*c^3*f*h^2*x^7) + 1
05*a^2*(48*c^2*d*g^2 + 3*a^2*f*h^2 - 8*a*c*(f*g^2 + h*(2*e*g + d*
h)))*Log[c*x + Sqrt[c]*Sqrt[a + c*x^2]])/(13440*c^(5/2))
```

Maple [A] time = 0.014, size = 552, normalized size = 1.6

$$
\begin{aligned}
&-\frac{a^2xfg^2}{16\,c}\sqrt{cx^2+a}+\frac{2\,dgh}{5\,c}\left(cx^2+a\right)^{\frac{5}{2}}+\frac{eg^2}{5\,c}\left(cx^2+a\right)^{\frac{5}{2}}+\frac{dg^2x}{4}\left(cx^2+a\right)^{\frac{3}{2}}+\frac{egxh}{3\,c}\left(cx^2+a\right)^{\frac{5}{2}}\\
&-\frac{axdh^2}{24\,c}\left(cx^2+a\right)^{\frac{3}{2}}-\frac{axfg^2}{24\,c}\left(cx^2+a\right)^{\frac{3}{2}}+\frac{2\,x^2fgh}{7\,c}\left(cx^2+a\right)^{\frac{5}{2}}-\frac{axegh}{12\,c}\left(cx^2+a\right)^{\frac{3}{2}}\\
&-\frac{a^2xegh}{8\,c}\sqrt{cx^2+a}-\frac{a^2xdh^2}{16\,c}\sqrt{cx^2+a}-\frac{afh^2x}{16\,c^2}\left(cx^2+a\right)^{\frac{5}{2}}+\frac{a^2fh^2x}{64\,c^2}\left(cx^2+a\right)^{\frac{3}{2}}\\
&+\frac{3\,fh^2a^3x}{128\,c^2}\sqrt{cx^2+a}-\frac{a^3egh}{8}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}+\frac{dxh^2}{6\,c}\left(cx^2+a\right)^{\frac{5}{2}}\\
&+\frac{fh^2x^3}{8\,c}\left(cx^2+a\right)^{\frac{5}{2}}+\frac{fxg^2}{6\,c}\left(cx^2+a\right)^{\frac{5}{2}}+\frac{3\,dg^2ax}{8}\sqrt{cx^2+a}+\frac{ex^2h^2}{7\,c}\left(cx^2+a\right)^{\frac{5}{2}}\\
&-\frac{2\,aeh^2}{35\,c^2}\left(cx^2+a\right)^{\frac{5}{2}}+\frac{3\,dg^2a^2}{8}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)\frac{1}{\sqrt{c}}-\frac{a^3dh^2}{16}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}\\
&-\frac{4\,fagh}{35\,c^2}\left(cx^2+a\right)^{\frac{5}{2}}-\frac{a^3fg^2}{16}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}+\frac{3\,fh^2a^4}{128}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{5}{2}}
\end{aligned}
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^2*(c*x^2+a)^(3/2)*(f*x^2+e*x+d),x)
```

```
[Out] -1/16/c*a^2*x*(c*x^2+a)^(1/2)*f*g^2+2/5/c*(c*x^2+a)^(5/2)*d*g*h+1
/5/c*(c*x^2+a)^(5/2)*e*g^2+1/4*d*g^2*x*(c*x^2+a)^(3/2)+1/3*x*(c*x
^2+a)^(5/2)/c*e*g*h-1/24/c*a*x*(c*x^2+a)^(3/2)*d*h^2-1/24/c*a*x*(
c*x^2+a)^(3/2)*f*g^2+2/7*x^2*(c*x^2+a)^(5/2)/c*f*g*h-1/12/c*a*x*(
c*x^2+a)^(3/2)*e*g*h-1/8/c*a^2*x*(c*x^2+a)^(1/2)*e*g*h-1/16/c*a^2
*x*(c*x^2+a)^(1/2)*d*h^2-1/16*f*h^2/c^2*a*x*(c*x^2+a)^(5/2)+1/64*
f*h^2/c^2*a^2*x*(c*x^2+a)^(3/2)+3/128*f*h^2/c^2*a^3*x*(c*x^2+a)^(
1/2)-1/8/c^(3/2)*a^3*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*e*g*h+1/6*x*(c
*x^2+a)^(5/2)/c*d*h^2+1/8*f*h^2*x^3*(c*x^2+a)^(5/2)/c+1/6*x*(c*x^
2+a)^(5/2)/c*f*g^2+3/8*d*g^2*a*x*(c*x^2+a)^(1/2)+1/7*x^2*(c*x^2+a
)^(5/2)/c*e*h^2-2/35*a/c^2*(c*x^2+a)^(5/2)*e*h^2+3/8*d*g^2*a^2/c^
(1/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))-1/16/c^(3/2)*a^3*ln(x*c^(1/2)
+(c*x^2+a)^(1/2))*d*h^2-4/35*a/c^2*(c*x^2+a)^(5/2)*f*g*h-1/16/c^(
3/2)*a^3*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*f*g^2+3/128*f*h^2/c^(5/2)*
```

```
a^4*ln(x*c^(1/2)+(c*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((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.345415, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g)^2,x, algorithm="fricas")
```

```
[Out] [1/26880*(2*(1680*c^3*f*h^2*x^7 + 1920*(2*c^3*f*g*h + c^3*e*h^2)*
x^6 + 2688*a^2*c*e*g^2 - 768*a^3*e*h^2 + 280*(8*c^3*f*g^2 + 16*c^
3*e*g*h + (8*c^3*d + 9*a*c^2*f)*h^2)*x^5 + 384*(7*c^3*e*g^2 + 8*a
*c^2*e*h^2 + 2*(7*c^3*d + 8*a*c^2*f)*g*h)*x^4 + 70*(112*a*c^2*e*g
*h + 8*(6*c^3*d + 7*a*c^2*f)*g^2 + (56*a*c^2*d + 3*a^2*c*f)*h^2)*
x^3 + 768*(7*a^2*c*d - 2*a^3*f)*g*h + 384*(14*a*c^2*e*g^2 + a^2*c
*e*h^2 + 2*(14*a*c^2*d + a^2*c*f)*g*h)*x^2 + 105*(16*a^2*c*e*g*h
+ 8*(10*a*c^2*d + a^2*c*f)*g^2 + (8*a^2*c*d - 3*a^3*f)*h^2)*x)*sq
rt(c*x^2 + a)*sqrt(c) - 105*(16*a^3*c*e*g*h - 8*(6*a^2*c^2*d - a^
3*c*f)*g^2 + (8*a^3*c*d - 3*a^4*f)*h^2)*log(-2*sqrt(c*x^2 + a)*c*
x - (2*c*x^2 + a)*sqrt(c)))/c^(5/2), 1/13440*((1680*c^3*f*h^2*x^7
 + 1920*(2*c^3*f*g*h + c^3*e*h^2)*x^6 + 2688*a^2*c*e*g^2 - 768*a^
3*e*h^2 + 280*(8*c^3*f*g^2 + 16*c^3*e*g*h + (8*c^3*d + 9*a*c^2*f)
*h^2)*x^5 + 384*(7*c^3*e*g^2 + 8*a*c^2*e*h^2 + 2*(7*c^3*d + 8*a*c
^2*f)*g*h)*x^4 + 70*(112*a*c^2*e*g*h + 8*(6*c^3*d + 7*a*c^2*f)*g^
2 + (56*a*c^2*d + 3*a^2*c*f)*h^2)*x^3 + 768*(7*a^2*c*d - 2*a^3*f)
*g*h + 384*(14*a*c^2*e*g^2 + a^2*c*e*h^2 + 2*(14*a*c^2*d + a^2*c*
f)*g*h)*x^2 + 105*(16*a^2*c*e*g*h + 8*(10*a*c^2*d + a^2*c*f)*g^2
+ (8*a^2*c*d - 3*a^3*f)*h^2)*x)*sqrt(c*x^2 + a)*sqrt(-c) - 105*(1
6*a^3*c*e*g*h - 8*(6*a^2*c^2*d - a^3*c*f)*g^2 + (8*a^3*c*d - 3*a^
4*f)*h^2)*arctan(sqrt(-c)*x/sqrt(c*x^2 + a)))/(sqrt(-c)*c^2)]
```

Sympy [A] time = 71.5826, size = 1304, normalized size = 3.77

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**2*(c*x**2+a)**(3/2)*(f*x**2+e*x+d),x)
```

```
[Out] -3*a**(7/2)*f*h**2*x/(128*c**2*sqrt(1 + c*x**2/a)) + a**(5/2)*d*h
**2*x/(16*c*sqrt(1 + c*x**2/a)) + a**(5/2)*e*g*h*x/(8*c*sqrt(1 +
c*x**2/a)) + a**(5/2)*f*g**2*x/(16*c*sqrt(1 + c*x**2/a)) - a**(5/
2)*f*h**2*x**3/(128*c*sqrt(1 + c*x**2/a)) + a**(3/2)*d*g**2*x*sqr
t(1 + c*x**2/a)/2 + a**(3/2)*d*g**2*x/(8*sqrt(1 + c*x**2/a)) + 17
*a**(3/2)*d*h**2*x**3/(48*sqrt(1 + c*x**2/a)) + 17*a**(3/2)*e*g*h
*x**3/(24*sqrt(1 + c*x**2/a)) + 17*a**(3/2)*f*g**2*x**3/(48*sqrt(
1 + c*x**2/a)) + 13*a**(3/2)*f*h**2*x**5/(64*sqrt(1 + c*x**2/a))
+ 3*sqrt(a)*c*d*g**2*x**3/(8*sqrt(1 + c*x**2/a)) + 11*sqrt(a)*c*d
*h**2*x**5/(24*sqrt(1 + c*x**2/a)) + 11*sqrt(a)*c*e*g*h*x**5/(12*
sqrt(1 + c*x**2/a)) + 11*sqrt(a)*c*f*g**2*x**5/(24*sqrt(1 + c*x**
2/a)) + 5*sqrt(a)*c*f*h**2*x**7/(16*sqrt(1 + c*x**2/a)) + 3*a**4*
f*h**2*asinh(sqrt(c)*x/sqrt(a))/(128*c**(5/2)) - a**3*d*h**2*asin
h(sqrt(c)*x/sqrt(a))/(16*c**(3/2)) - a**3*e*g*h*asinh(sqrt(c)*x/s
qrt(a))/(8*c**(3/2)) - a**3*f*g**2*asinh(sqrt(c)*x/sqrt(a))/(16*c
**(3/2)) + 3*a**2*d*g**2*asinh(sqrt(c)*x/sqrt(a))/(8*sqrt(c)) + 2
*a*d*g*h*Piecewise((sqrt(a)*x**2/2, Eq(c, 0)), ((a + c*x**2)**(3/
2)/(3*c), True)) + a*e*g**2*Piecewise((sqrt(a)*x**2/2, Eq(c, 0)),
 ((a + c*x**2)**(3/2)/(3*c), True)) + a*e*h**2*Piecewise((-2*a**2
*sqrt(a + c*x**2)/(15*c**2) + a*x**2*sqrt(a + c*x**2)/(15*c) + x*
*4*sqrt(a + c*x**2)/5, Ne(c, 0)), (sqrt(a)*x**4/4, True)) + 2*a*f
*g*h*Piecewise((-2*a**2*sqrt(a + c*x**2)/(15*c**2) + a*x**2*sqrt(
a + c*x**2)/(15*c) + x**4*sqrt(a + c*x**2)/5, Ne(c, 0)), (sqrt(a)
*x**4/4, True)) + 2*c*d*g*h*Piecewise((-2*a**2*sqrt(a + c*x**2)/(
15*c**2) + a*x**2*sqrt(a + c*x**2)/(15*c) + x**4*sqrt(a + c*x**2)
/5, Ne(c, 0)), (sqrt(a)*x**4/4, True)) + c*e*g**2*Piecewise((-2*a
**2*sqrt(a + c*x**2)/(15*c**2) + a*x**2*sqrt(a + c*x**2)/(15*c) +
 x**4*sqrt(a + c*x**2)/5, Ne(c, 0)), (sqrt(a)*x**4/4, True)) + c*
e*h**2*Piecewise((8*a**3*sqrt(a + c*x**2)/(105*c**3) - 4*a**2*x**
2*sqrt(a + c*x**2)/(105*c**2) + a*x**4*sqrt(a + c*x**2)/(35*c) +
x**6*sqrt(a + c*x**2)/7, Ne(c, 0)), (sqrt(a)*x**6/6, True)) + 2*c
*f*g*h*Piecewise((8*a**3*sqrt(a + c*x**2)/(105*c**3) - 4*a**2*x**
2*sqrt(a + c*x**2)/(105*c**2) + a*x**4*sqrt(a + c*x**2)/(35*c) +
x**6*sqrt(a + c*x**2)/7, Ne(c, 0)), (sqrt(a)*x**6/6, True)) + c**
2*d*g**2*x**5/(4*sqrt(a)*sqrt(1 + c*x**2/a)) + c**2*d*h**2*x**7/(
6*sqrt(a)*sqrt(1 + c*x**2/a)) + c**2*e*g*h*x**7/(3*sqrt(a)*sqrt(1
 + c*x**2/a)) + c**2*f*g**2*x**7/(6*sqrt(a)*sqrt(1 + c*x**2/a)) +
 c**2*f*h**2*x**9/(8*sqrt(a)*sqrt(1 + c*x**2/a))
```

GIAC/XCAS [A] time = 0.281168, size = 610, normalized size = 1.76

$$\frac{1}{13440}\sqrt{cx^2+a}\Bigg(\Bigg(2\Bigg(\Bigg(4\Bigg(5\Bigg(6\Bigg(7\,cfh^2x+\frac{8\,(2\,c^7fgh+c^7h^2e)}{c^6}\Bigg)x+\frac{7\,(8\,c^7fg^2+8\,c^7dh^2+9\,ac^6fh^2+16\,c^7ghe)}{c^6}\Bigg)x+\frac{48\,(14$$
$$-\frac{(48\,a^2c^2dg^2-8\,a^3cfg^2-8\,a^3cdh^2+3\,a^4fh^2-16\,a^3cghe)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{128\,c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g)^2,x, algorithm="giac")
```

```
[Out] 1/13440*sqrt(c*x^2 + a)*((2*((4*(5*(6*(7*c*f*h^2*x + 8*(2*c^7*f*g
*h + c^7*h^2*e)/c^6)*x + 7*(8*c^7*f*g^2 + 8*c^7*d*h^2 + 9*a*c^6*f
*h^2 + 16*c^7*g*h*e)/c^6)*x + 48*(14*c^7*d*g*h + 16*a*c^6*f*g*h +
 7*c^7*g^2*e + 8*a*c^6*h^2*e)/c^6)*x + 35*(48*c^7*d*g^2 + 56*a*c^
6*f*g^2 + 56*a*c^6*d*h^2 + 3*a^2*c^5*f*h^2 + 112*a*c^6*g*h*e)/c^6
)*x + 192*(28*a*c^6*d*g*h + 2*a^2*c^5*f*g*h + 14*a*c^6*g^2*e + a^
2*c^5*h^2*e)/c^6)*x + 105*(80*a*c^6*d*g^2 + 8*a^2*c^5*f*g^2 + 8*a
^2*c^5*d*h^2 - 3*a^3*c^4*f*h^2 + 16*a^2*c^5*g*h*e)/c^6)*x + 384*(
14*a^2*c^5*d*g*h - 4*a^3*c^4*f*g*h + 7*a^2*c^5*g^2*e - 2*a^3*c^4*
h^2*e)/c^6) - 1/128*(48*a^2*c^2*d*g^2 - 8*a^3*c*f*g^2 - 8*a^3*c*d
*h^2 + 3*a^4*f*h^2 - 16*a^3*c*g*h*e)*ln(abs(-sqrt(c)*x + sqrt(c*x
^2 + a)))/c^(5/2)
```

3.90 $\int (g+hx)\left(a+cx^2\right)^{3/2}\left(d+ex+fx^2\right)\,dx$

Optimal. Leaf size=213

$$\frac{a^2\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(-aeh-afg+6cdg)}{16c^{3/2}}-\frac{\left(a+cx^2\right)^{5/2}\left(6\left(2afh^2+c\left(5fg^2-7h(dh+eg)\right)\right)+5chx(5fg-7eh)\right)}{210c^2h}+\frac{x\left(a+cx^2\right)^{3/2}(6cdg-a(eh+fg))}{24c}+\frac{ax\sqrt{a+cx^2}(-aeh-afg+6cdg)}{16c}+\frac{f\left(a+cx^2\right)^{5/2}(g+hx)^2}{7ch}$$

```
[Out] (a*(6*c*d*g - a*f*g - a*e*h)*x*Sqrt[a + c*x^2])/(16*c) + ((6*c*d*
g - a*(f*g + e*h))*x*(a + c*x^2)^(3/2))/(24*c) + (f*(g + h*x)^2*(
a + c*x^2)^(5/2))/(7*c*h) - ((6*(2*a*f*h^2 + c*(5*f*g^2 - 7*h*(e*
g + d*h))) + 5*c*h*(5*f*g - 7*e*h)*x)*(a + c*x^2)^(5/2))/(210*c^2
*h) + (a^2*(6*c*d*g - a*f*g - a*e*h)*ArcTanh[(Sqrt[c]*x)/Sqrt[a +
 c*x^2]])/(16*c^(3/2))
```

Rubi [A] time = 0.578691, antiderivative size = 212, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.185$

$$\frac{a^2\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(-aeh-afg+6cdg)}{16c^{3/2}}-\frac{\left(a+cx^2\right)^{5/2}\left(6\left(2afh^2-7ch(dh+eg)+5cfg^2\right)+5chx(5fg-7eh)\right)}{210c^2h}+\frac{x\left(a+cx^2\right)^{3/2}(6cdg-a(eh+fg))}{24c}+\frac{ax\sqrt{a+cx^2}(-aeh-afg+6cdg)}{16c}+\frac{f\left(a+cx^2\right)^{5/2}(g+hx)^2}{7ch}$$

Antiderivative was successfully verified.

```
[In]  Int[(g + h*x)*(a + c*x^2)^(3/2)*(d + e*x + f*x^2),x]
```

```
[Out] (a*(6*c*d*g - a*f*g - a*e*h)*x*Sqrt[a + c*x^2])/(16*c) + ((6*c*d*
g - a*(f*g + e*h))*x*(a + c*x^2)^(3/2))/(24*c) + (f*(g + h*x)^2*(
a + c*x^2)^(5/2))/(7*c*h) - ((6*(5*c*f*g^2 + 2*a*f*h^2 - 7*c*h*(e
*g + d*h)) + 5*c*h*(5*f*g - 7*e*h)*x)*(a + c*x^2)^(5/2))/(210*c^2
*h) + (a^2*(6*c*d*g - a*f*g - a*e*h)*ArcTanh[(Sqrt[c]*x)/Sqrt[a +
 c*x^2]])/(16*c^(3/2))
```

Rubi in Sympy [A] time = 33.669, size = 199, normalized size = 0.93

$$-\frac{a^2(aeh+afg-6cdg)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{16c^{\frac{3}{2}}}-\frac{ax\sqrt{a+cx^2}(aeh+afg-6cdg)}{16c}+\frac{f(a+cx^2)^{\frac{5}{2}}(g+hx)^2}{7ch}-\frac{x(a+cx^2)^{\frac{3}{2}}(aeh+afg-6cdg)}{24c}-\frac{(a+cx^2)^{\frac{5}{2}}\left(-6cg(7eh-5fg)-5chx(7eh-5fg)+6h^2(2af-7cd)\right)}{210c^2h}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)*(c*x**2+a)**(3/2)*(f*x**2+e*x+d),x)
```

```
[Out] -a**2*(a*e*h + a*f*g - 6*c*d*g)*atanh(sqrt(c)*x/sqrt(a + c*x**2))
/(16*c**(3/2)) - a*x*sqrt(a + c*x**2)*(a*e*h + a*f*g - 6*c*d*g)/(
16*c) + f*(a + c*x**2)**(5/2)*(g + h*x)**2/(7*c*h) - x*(a + c*x**
2)**(3/2)*(a*e*h + a*f*g - 6*c*d*g)/(24*c) - (a + c*x**2)**(5/2)*
(-6*c*g*(7*e*h - 5*f*g) - 5*c*h*x*(7*e*h - 5*f*g) + 6*h**2*(2*a*f
 - 7*c*d))/(210*c**2*h)
```

Mathematica [A] time = 0.356126, size = 198, normalized size = 0.93

$$\sqrt{a+cx^2}\left(-96a^3fh+3a^2c(112dh+7e(16g+5hx)+fx(35g+16hx))+2ac^2x(21d(25g+16hx)+x(7e(48g+35hx)+fx(24\right.$$

Antiderivative was successfully verified.

```
[In]  Integrate[(g + h*x)*(a + c*x^2)^(3/2)*(d + e*x + f*x^2),x]
```

```
[Out] (Sqrt[a + c*x^2]*(-96*a^3*f*h + 3*a^2*c*(112*d*h + 7*e*(16*g + 5*
h*x) + f*x*(35*g + 16*h*x)) + 4*c^3*x^3*(21*d*(5*g + 4*h*x) + 2*x
*(7*e*(6*g + 5*h*x) + 5*f*x*(7*g + 6*h*x))) + 2*a*c^2*x*(21*d*(25
*g + 16*h*x) + x*(7*e*(48*g + 35*h*x) + f*x*(245*g + 192*h*x))))
- 105*a^2*Sqrt[c]*(-6*c*d*g + a*f*g + a*e*h)*Log[c*x + Sqrt[c]*Sq
rt[a + c*x^2]])/(1680*c^2)
```

Maple [A] time = 0.009, size = 287, normalized size = 1.4

$$\frac{dgx}{4}\left(cx^{2}+a\right)^{\frac{3}{2}}+\frac{3\,adgx}{8}\sqrt{cx^{2}+a}+\frac{3\,dga^{2}}{8}\ln\left(x\sqrt{c}+\sqrt{cx^{2}+a}\right)\frac{1}{\sqrt{c}}+\frac{dh}{5\,c}\left(cx^{2}+a\right)^{\frac{5}{2}}+\frac{eg}{5\,c}\left(cx^{2}+a\right)^{\frac{5}{2}}+\frac{ehx}{6\,c}\left(cx^{2}+a\right)^{\frac{5}{2}}+\frac{fgx}{6\,c}\left(cx^{2}+a\right)^{\frac{5}{2}}-\frac{aehx}{24\,c}\left(cx^{2}+a\right)^{\frac{3}{2}}-\frac{afgx}{24\,c}\left(cx^{2}+a\right)^{\frac{3}{2}}-\frac{a^{2}xeh}{16\,c}\sqrt{cx^{2}+a}-\frac{a^{2}xfg}{16\,c}\sqrt{cx^{2}+a}-\frac{a^{3}eh}{16}\ln\left(x\sqrt{c}+\sqrt{cx^{2}+a}\right)c^{-\frac{3}{2}}-\frac{a^{3}fg}{16}\ln\left(x\sqrt{c}+\sqrt{cx^{2}+a}\right)c^{-\frac{3}{2}}+\frac{fhx^{2}}{7\,c}\left(cx^{2}+a\right)^{\frac{5}{2}}-\frac{2\,afh}{35\,c^{2}}\left(cx^{2}+a\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)*(c*x^2+a)^(3/2)*(f*x^2+e*x+d),x)
```

```
[Out] 1/4*d*g*x*(c*x^2+a)^(3/2)+3/8*d*g*a*x*(c*x^2+a)^(1/2)+3/8*d*g*a^2
/c^(1/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))+1/5/c*(c*x^2+a)^(5/2)*d*h+
1/5/c*(c*x^2+a)^(5/2)*e*g+1/6*x*(c*x^2+a)^(5/2)/c*e*h+1/6*x*(c*x^
2+a)^(5/2)/c*f*g-1/24/c*a*x*(c*x^2+a)^(3/2)*e*h-1/24/c*a*x*(c*x^2
+a)^(3/2)*f*g-1/16/c*a^2*x*(c*x^2+a)^(1/2)*e*h-1/16/c*a^2*x*(c*x^
2+a)^(1/2)*f*g-1/16/c^(3/2)*a^3*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*e*h
-1/16/c^(3/2)*a^3*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*f*g+1/7*h*f*x^2*(
c*x^2+a)^(5/2)/c-2/35*h*f*a/c^2*(c*x^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((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.31114, size = 1, normalized size = 0.

$$\left[\frac{2\left(240\,c^{3}fhx^{6}+280\left(c^{3}fg+c^{3}eh\right)x^{5}+336\,a^{2}ceg+48\left(7\,c^{3}eg+\left(7\,c^{3}d+8\,ac^{2}f\right)h\right)x^{4}+70\left(7\,ac^{2}eh+\left(6\,c^{3}d+7\,ac^{2}f\right)g\right)x^{3}\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g),x, algorithm="fricas")
```

```
[Out] [1/3360*(2*(240*c^3*f*h*x^6 + 280*(c^3*f*g + c^3*e*h)*x^5 + 336*a
^2*c*e*g + 48*(7*c^3*e*g + (7*c^3*d + 8*a*c^2*f)*h)*x^4 + 70*(7*a
*c^2*e*h + (6*c^3*d + 7*a*c^2*f)*g)*x^3 + 48*(14*a*c^2*e*g + (14*
a*c^2*d + a^2*c*f)*h)*x^2 + 48*(7*a^2*c*d - 2*a^3*f)*h + 105*(a^2
*c*e*h + (10*a*c^2*d + a^2*c*f)*g)*x)*sqrt(c*x^2 + a)*sqrt(c) + 1
05*(a^3*c*e*h - (6*a^2*c^2*d - a^3*c*f)*g)*log(2*sqrt(c*x^2 + a)*
c*x - (2*c*x^2 + a)*sqrt(c)))/c^(5/2), 1/1680*((240*c^3*f*h*x^6 +
 280*(c^3*f*g + c^3*e*h)*x^5 + 336*a^2*c*e*g + 48*(7*c^3*e*g + (7
*c^3*d + 8*a*c^2*f)*h)*x^4 + 70*(7*a*c^2*e*h + (6*c^3*d + 7*a*c^2
*f)*g)*x^3 + 48*(14*a*c^2*e*g + (14*a*c^2*d + a^2*c*f)*h)*x^2 + 4
8*(7*a^2*c*d - 2*a^3*f)*h + 105*(a^2*c*e*h + (10*a*c^2*d + a^2*c*
f)*g)*x)*sqrt(c*x^2 + a)*sqrt(-c) - 105*(a^3*c*e*h - (6*a^2*c^2*d
 - a^3*c*f)*g)*arctan(sqrt(-c)*x/sqrt(c*x^2 + a)))/(sqrt(-c)*c^2)
]
```

Sympy [A] time = 37.1293, size = 768, normalized size = 3.61

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)*(c*x**2+a)**(3/2)*(f*x**2+e*x+d),x)
```

```
[Out] a**(5/2)*e*h*x/(16*c*sqrt(1 + c*x**2/a)) + a**(5/2)*f*g*x/(16*c*s
qrt(1 + c*x**2/a)) + a**(3/2)*d*g*x*sqrt(1 + c*x**2/a)/2 + a**(3/
2)*d*g*x/(8*sqrt(1 + c*x**2/a)) + 17*a**(3/2)*e*h*x**3/(48*sqrt(1
 + c*x**2/a)) + 17*a**(3/2)*f*g*x**3/(48*sqrt(1 + c*x**2/a)) + 3*
sqrt(a)*c*d*g*x**3/(8*sqrt(1 + c*x**2/a)) + 11*sqrt(a)*c*e*h*x**5
/(24*sqrt(1 + c*x**2/a)) + 11*sqrt(a)*c*f*g*x**5/(24*sqrt(1 + c*x
**2/a)) - a**3*e*h*asinh(sqrt(c)*x/sqrt(a))/(16*c**(3/2)) - a**3*
f*g*asinh(sqrt(c)*x/sqrt(a))/(16*c**(3/2)) + 3*a**2*d*g*asinh(sqr
t(c)*x/sqrt(a))/(8*sqrt(c)) + a*d*h*Piecewise((sqrt(a)*x**2/2, Eq
(c, 0)), ((a + c*x**2)**(3/2)/(3*c), True)) + a*e*g*Piecewise((sq
rt(a)*x**2/2, Eq(c, 0)), ((a + c*x**2)**(3/2)/(3*c), True)) + a*f
*h*Piecewise((-2*a**2*sqrt(a + c*x**2)/(15*c**2) + a*x**2*sqrt(a
+ c*x**2)/(15*c) + x**4*sqrt(a + c*x**2)/5, Ne(c, 0)), (sqrt(a)*x
**4/4, True)) + c*d*h*Piecewise((-2*a**2*sqrt(a + c*x**2)/(15*c**
2) + a*x**2*sqrt(a + c*x**2)/(15*c) + x**4*sqrt(a + c*x**2)/5, Ne
(c, 0)), (sqrt(a)*x**4/4, True)) + c*e*g*Piecewise((-2*a**2*sqrt(
a + c*x**2)/(15*c**2) + a*x**2*sqrt(a + c*x**2)/(15*c) + x**4*sqr
t(a + c*x**2)/5, Ne(c, 0)), (sqrt(a)*x**4/4, True)) + c*f*h*Piece
wise((8*a**3*sqrt(a + c*x**2)/(105*c**3) - 4*a**2*x**2*sqrt(a + c
*x**2)/(105*c**2) + a*x**4*sqrt(a + c*x**2)/(35*c) + x**6*sqrt(a
+ c*x**2)/7, Ne(c, 0)), (sqrt(a)*x**6/6, True)) + c**2*d*g*x**5/(
4*sqrt(a)*sqrt(1 + c*x**2/a)) + c**2*e*h*x**7/(6*sqrt(a)*sqrt(1 +
 c*x**2/a)) + c**2*f*g*x**7/(6*sqrt(a)*sqrt(1 + c*x**2/a))
```

GIAC/XCAS [A] time = 0.280554, size = 356, normalized size = 1.67

$$\frac{1}{1680}\sqrt{cx^2+a}\left(\left(2\left(\left(4\left(5\left(6\,cfhx+\frac{7\left(c^6fg+c^6he\right)}{c^5}\right)x+\frac{6\left(7\,c^6dh+8\,ac^5fh+7\,c^6ge\right)}{c^5}\right)x+\frac{35\left(6\,c^6dg+7\,ac^5fg+7\,ac^5he\right.}{c^5}\right.\right.\right.\right.$$
$$-\frac{\left(6\,a^2cdg-a^3fg-a^3he\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{16\,c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g),x, algorithm="giac")
```

```
[Out] 1/1680*sqrt(c*x^2 + a)*((2*((4*(5*(6*c*f*h*x + 7*(c^6*f*g + c^6*h
*e)/c^5)*x + 6*(7*c^6*d*h + 8*a*c^5*f*h + 7*c^6*g*e)/c^5)*x + 35*
(6*c^6*d*g + 7*a*c^5*f*g + 7*a*c^5*h*e)/c^5)*x + 24*(14*a*c^5*d*h
 + a^2*c^4*f*h + 14*a*c^5*g*e)/c^5)*x + 105*(10*a*c^5*d*g + a^2*c
^4*f*g + a^2*c^4*h*e)/c^5)*x + 48*(7*a^2*c^4*d*h - 2*a^3*c^3*f*h
+ 7*a^2*c^4*g*e)/c^5) - 1/16*(6*a^2*c*d*g - a^3*f*g - a^3*h*e)*ln
(abs(-sqrt(c)*x + sqrt(c*x^2 + a)))/c^(3/2)
```

3.91 $\int \left(a+cx^2\right)^{3/2} \left(d+ex+fx^2\right) \, dx$

Optimal. Leaf size=137

$$\frac{a^2(6cd-af)\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{16c^{3/2}}+\frac{x\left(a+cx^2\right)^{3/2}(6cd-af)}{24c}+\frac{ax\sqrt{a+cx^2}(6cd-af)}{16c}+\frac{e\left(a+cx^2\right)^{5/2}}{5c}+\frac{fx\left(a+cx^2\right)^{5/2}}{6c}$$

```
[Out] (a*(6*c*d - a*f)*x*Sqrt[a + c*x^2])/(16*c) + ((6*c*d - a*f)*x*(a
+ c*x^2)^(3/2))/(24*c) + (e*(a + c*x^2)^(5/2))/(5*c) + (f*x*(a +
c*x^2)^(5/2))/(6*c) + (a^2*(6*c*d - a*f)*ArcTanh[(Sqrt[c]*x)/Sqrt
[a + c*x^2]])/(16*c^(3/2))
```

Rubi [A] time = 0.170442, antiderivative size = 137, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.227

$$\frac{a^2(6cd-af)\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{16c^{3/2}}+\frac{x\left(a+cx^2\right)^{3/2}(6cd-af)}{24c}+\frac{ax\sqrt{a+cx^2}(6cd-af)}{16c}+\frac{e\left(a+cx^2\right)^{5/2}}{5c}+\frac{fx\left(a+cx^2\right)^{5/2}}{6c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + c*x^2)^(3/2)*(d + e*x + f*x^2),x]
```

```
[Out] (a*(6*c*d - a*f)*x*Sqrt[a + c*x^2])/(16*c) + ((6*c*d - a*f)*x*(a
+ c*x^2)^(3/2))/(24*c) + (e*(a + c*x^2)^(5/2))/(5*c) + (f*x*(a +
c*x^2)^(5/2))/(6*c) + (a^2*(6*c*d - a*f)*ArcTanh[(Sqrt[c]*x)/Sqrt
[a + c*x^2]])/(16*c^(3/2))
```

Rubi in Sympy [A] time = 13.2949, size = 107, normalized size = 0.78

$$-\frac{a^2(af-6cd)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{16c^{\frac{3}{2}}}-\frac{ax\sqrt{a+cx^2}(af-6cd)}{16c}-\frac{x\left(a+cx^2\right)^{\frac{3}{2}}(af-6cd)}{24c}+\frac{\left(a+cx^2\right)^{\frac{5}{2}}(6e+5fx)}{30c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+a)**(3/2)*(f*x**2+e*x+d),x)
```

```
[Out] -a**2*(a*f - 6*c*d)*atanh(sqrt(c)*x/sqrt(a + c*x**2))/(16*c**(3/2
)) - a*x*sqrt(a + c*x**2)*(a*f - 6*c*d)/(16*c) - x*(a + c*x**2)**
(3/2)*(a*f - 6*c*d)/(24*c) + (a + c*x**2)**(5/2)*(6*e + 5*f*x)/(3
0*c)
```

Mathematica [A] time = 0.152362, size = 118, normalized size = 0.86

$$\frac{\sqrt{c}\sqrt{a+cx^2}\left(3a^2(16e+5fx)+2acx(75d+x(48e+35fx))+4c^2x^3(15d+2x(6e+5fx))\right)-15a^2(af-6cd)\log\left(\sqrt{c}\sqrt{a+cx^2}\right.}{240c^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + c*x^2)^(3/2)*(d + e*x + f*x^2),x]
```

```
[Out] (Sqrt[c]*Sqrt[a + c*x^2]*(3*a^2*(16*e + 5*f*x) + 4*c^2*x^3*(15*d
+ 2*x*(6*e + 5*f*x)) + 2*a*c*x*(75*d + x*(48*e + 35*f*x))) - 15*a
^2*(-6*c*d + a*f)*Log[c*x + Sqrt[c]*Sqrt[a + c*x^2]])/(240*c^(3/2
))
```

Maple [A] time = 0.008, size = 146, normalized size = 1.1

$$\frac{dx}{4}\left(cx^2+a\right)^{\frac{3}{2}}+\frac{3\,adx}{8}\sqrt{cx^2+a}+\frac{3\,da^2}{8}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)\frac{1}{\sqrt{c}}+\frac{e}{5\,c}\left(cx^2+a\right)^{\frac{5}{2}}+\frac{fx}{6\,c}\left(cx^2+a\right)^{\frac{5}{2}}-\frac{afx}{24\,c}\left(cx^2+a\right)^{\frac{3}{2}}-\frac{a^2fx}{16\,c}\sqrt{cx^2+a}-\frac{fa^3}{16}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^(3/2)*(f*x^2+e*x+d),x)
```

```
[Out] 1/4*d*x*(c*x^2+a)^(3/2)+3/8*d*a*x*(c*x^2+a)^(1/2)+3/8*d*a^2/c^(1/
2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))+1/5*e*(c*x^2+a)^(5/2)/c+1/6*f*x*
(c*x^2+a)^(5/2)/c-1/24*f/c*a*x*(c*x^2+a)^(3/2)-1/16*f/c*a^2*x*(c*
x^2+a)^(1/2)-1/16*f/c^(3/2)*a^3*ln(x*c^(1/2)+(c*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((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.291819, size = 1, normalized size = 0.01

$$\left[\frac{2\left(40\,c^2 f x^5+48\,c^2 e x^4+96\,acex^2+10\left(6\,c^2 d+7\,acf\right)x^3+48\,a^2 e+15\left(10\,acd+a^2 f\right)x\right)\sqrt{cx^2+a}\sqrt{c}-15\left(6\,a^2 cd-a^3 f\right)\mathrm{l}}{480\,c^{\frac{3}{2}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] [1/480*(2*(40*c^2*f*x^5 + 48*c^2*e*x^4 + 96*a*c*e*x^2 + 10*(6*c^2
*d + 7*a*c*f)*x^3 + 48*a^2*e + 15*(10*a*c*d + a^2*f)*x)*sqrt(c*x^
2 + a)*sqrt(c) - 15*(6*a^2*c*d - a^3*f)*log(2*sqrt(c*x^2 + a)*c*x
 - (2*c*x^2 + a)*sqrt(c)))/c^(3/2), 1/240*((40*c^2*f*x^5 + 48*c^2
*e*x^4 + 96*a*c*e*x^2 + 10*(6*c^2*d + 7*a*c*f)*x^3 + 48*a^2*e + 1
5*(10*a*c*d + a^2*f)*x)*sqrt(c*x^2 + a)*sqrt(-c) + 15*(6*a^2*c*d
- a^3*f)*arctan(sqrt(-c)*x/sqrt(c*x^2 + a)))/(sqrt(-c)*c)]
```

Sympy [A] time = 21.9263, size = 348, normalized size = 2.54

$$\frac{a^{\frac{5}{2}}fx}{16c\sqrt{1+\frac{cx^2}{a}}}+\frac{a^{\frac{3}{2}}dx\sqrt{1+\frac{cx^2}{a}}}{2}+\frac{a^{\frac{3}{2}}dx}{8\sqrt{1+\frac{cx^2}{a}}}+\frac{17a^{\frac{3}{2}}fx^3}{48\sqrt{1+\frac{cx^2}{a}}}+\frac{3\sqrt{a}cdx^3}{8\sqrt{1+\frac{cx^2}{a}}}+\frac{11\sqrt{a}cfx^5}{24\sqrt{1+\frac{cx^2}{a}}}$$
$$-\frac{a^3 f\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{16c^{\frac{3}{2}}}+\frac{3a^2 d\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{8\sqrt{c}}+ae\left(\begin{cases}\frac{\sqrt{a}x^2}{2} & \text{for } c=0\\ \frac{\left(a+cx^2\right)^{\frac{3}{2}}}{3c} & \text{otherwise}\end{cases}\right)$$
$$+ce\left(\begin{cases}-\frac{2a^2\sqrt{a+cx^2}}{15c^2}+\frac{ax^2\sqrt{a+cx^2}}{15c}+\frac{x^4\sqrt{a+cx^2}}{5} & \text{for } c\neq 0\\ \frac{\sqrt{a}x^4}{4} & \text{otherwise}\end{cases}\right)+\frac{c^2dx^5}{4\sqrt{a}\sqrt{1+\frac{cx^2}{a}}}+\frac{c^2fx^7}{6\sqrt{a}\sqrt{1+\frac{cx^2}{a}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)**(3/2)*(f*x**2+e*x+d),x)
```

```
[Out] a**(5/2)*f*x/(16*c*sqrt(1 + c*x**2/a)) + a**(3/2)*d*x*sqrt(1 + c*
x**2/a)/2 + a**(3/2)*d*x/(8*sqrt(1 + c*x**2/a)) + 17*a**(3/2)*f*x
**3/(48*sqrt(1 + c*x**2/a)) + 3*sqrt(a)*c*d*x**3/(8*sqrt(1 + c*x*
```

```
*2/a)) + 11*sqrt(a)*c*f*x**5/(24*sqrt(1 + c*x**2/a)) - a**3*f*asi
nh(sqrt(c)*x/sqrt(a))/(16*c**(3/2)) + 3*a**2*d*asinh(sqrt(c)*x/sq
rt(a))/(8*sqrt(c)) + a*e*Piecewise((sqrt(a)*x**2/2, Eq(c, 0)), ((
a + c*x**2)**(3/2)/(3*c), True)) + c*e*Piecewise((-2*a**2*sqrt(a
+ c*x**2)/(15*c**2) + a*x**2*sqrt(a + c*x**2)/(15*c) + x**4*sqrt(
a + c*x**2)/5, Ne(c, 0)), (sqrt(a)*x**4/4, True)) + c**2*d*x**5/(
4*sqrt(a)*sqrt(1 + c*x**2/a)) + c**2*f*x**7/(6*sqrt(a)*sqrt(1 + c
*x**2/a))
```

GIAC/XCAS [A] time = 0.276916, size = 174, normalized size = 1.27

$$\frac{1}{240}\sqrt{cx^2+a}\left(\left(2\left(\left(4\left(5\,cfx+6\,ce\right)x+\frac{5\left(6\,c^5d+7\,ac^4f\right)}{c^4}\right)x+48\,ae\right)x+\frac{15\left(10\,ac^4d+a^2c^3f\right)}{c^4}\right)x+\frac{48\,a^2e}{c}\right)-\frac{\left(6\,a^2cd-a^3f\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{16\,c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/240*sqrt(c*x^2 + a)*((2*((4*(5*c*f*x + 6*c*e)*x + 5*(6*c^5*d +
7*a*c^4*f)/c^4)*x + 48*a*e)*x + 15*(10*a*c^4*d + a^2*c^3*f)/c^4)*
x + 48*a^2*e/c) - 1/16*(6*a^2*c*d - a^3*f)*ln(abs(-sqrt(c)*x + sq
rt(c*x^2 + a)))/c^(3/2)
```

3.92 $\int \frac{(a+cx^2)^{3/2}(d+ex+fx^2)}{g+hx}\,dx$

Optimal. Leaf size=326

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3a^2h^4(fg-eh)+12acgh^2\left(fg^2-h(eg-dh)\right)+8c^2g^3\left(fg^2-h(eg-dh)\right)\right)}{8\sqrt{c}h^6}-\frac{\left(ah^2+cg^2\right)^{3/2}\left(dh^2-egh+fg^2\right)\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{h^6}+\frac{\sqrt{a+cx^2}\left(8\left(ah^2+cg^2\right)\left(dh^2-egh+fg^2\right)-hx\left(\left(3ah^2+4cg^2\right)(fg-eh)+4cdgh^2\right)\right)}{8h^5}+\frac{\left(a+cx^2\right)^{3/2}\left(4\left(dh^2-egh+fg^2\right)-3hx(fg-eh)\right)}{12h^3}+\frac{f\left(a+cx^2\right)^{5/2}}{5ch}$$

```
[Out] ((8*(c*g^2 + a*h^2)*(f*g^2 - e*g*h + d*h^2) - h*(4*c*d*g*h^2 + (f
*g - e*h)*(4*c*g^2 + 3*a*h^2))*x)*Sqrt[a + c*x^2])/(8*h^5) + ((4*
(f*g^2 - e*g*h + d*h^2) - 3*h*(f*g - e*h)*x)*(a + c*x^2)^(3/2))/(
12*h^3) + (f*(a + c*x^2)^(5/2))/(5*c*h) - ((3*a^2*h^4*(f*g - e*h)
 + 8*c^2*g^3*(f*g^2 - h*(e*g - d*h)) + 12*a*c*g*h^2*(f*g^2 - h*(e
*g - d*h)))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(8*Sqrt[c]*h^6)
 - ((c*g^2 + a*h^2)^(3/2)*(f*g^2 - e*g*h + d*h^2)*ArcTanh[(a*h -
c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/h^6
```

Rubi [A] time = 1.67598, antiderivative size = 326, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.207$

$$-\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3a^2h^4(fg-eh)+12acgh^2\left(fg^2-h(eg-dh)\right)+8c^2\left(fg^5-g^3h(eg-dh)\right)\right)}{8\sqrt{c}h^6}-\frac{\left(ah^2+cg^2\right)^{3/2}\left(dh^2-egh+fg^2\right)\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{h^6}+\frac{\sqrt{a+cx^2}\left(8\left(ah^2+cg^2\right)\left(dh^2-egh+fg^2\right)-hx\left(\left(3ah^2+4cg^2\right)(fg-eh)+4cdgh^2\right)\right)}{8h^5}+\frac{\left(a+cx^2\right)^{3/2}\left(4\left(dh^2-egh+fg^2\right)-3hx(fg-eh)\right)}{12h^3}+\frac{f\left(a+cx^2\right)^{5/2}}{5ch}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x),x]
```

```
[Out] ((8*(c*g^2 + a*h^2)*(f*g^2 - e*g*h + d*h^2) - h*(4*c*d*g*h^2 + (f
*g - e*h)*(4*c*g^2 + 3*a*h^2))*x)*Sqrt[a + c*x^2])/(8*h^5) + ((4*
```

```
(f*g^2 - e*g*h + d*h^2) - 3*h*(f*g - e*h)*x)*(a + c*x^2)^(3/2))/(
12*h^3) + (f*(a + c*x^2)^(5/2))/(5*c*h) - ((3*a^2*h^4*(f*g - e*h)
 + 12*a*c*g*h^2*(f*g^2 - h*(e*g - d*h)) + 8*c^2*(f*g^5 - g^3*h*(e
*g - d*h)))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(8*Sqrt[c]*h^6)
 - ((c*g^2 + a*h^2)^(3/2)*(f*g^2 - e*g*h + d*h^2)*ArcTanh[(a*h -
c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/h^6
```

Rubi in Sympy [A] time = 137.565, size = 306, normalized size = 0.94

$$\frac{\left(a+cx^2\right)^{\frac{3}{2}}\left(20dh^2-20egh+20fg^2+15hx\left(eh-fg\right)\right)}{60h^3}+\frac{\sqrt{a+cx^2}\left(5hx\left(-4cdgh^2+\left(3ah^2+4cg^2\right)\left(eh-fg\right)\right)+\left(40ah^2+40cg^2\right)\left(dh^2-egh+fg^2\right)\right)}{40h^5}-\frac{\left(ah^2+cg^2\right)^{\frac{3}{2}}\left(dh^2-egh+fg^2\right)\operatorname{atanh}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{h^6}+\frac{f\left(a+cx^2\right)^{\frac{5}{2}}}{5ch}+\frac{\left(-2acgh^2\left(4dh^2-g\left(eh-fg\right)\right)+\left(ah^2+2cg^2\right)\left(-4cdgh^2+\left(3ah^2+4cg^2\right)\left(eh-fg\right)\right)\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{8\sqrt{c}h^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g),x)
```

```
[Out] (a + c*x**2)**(3/2)*(20*d*h**2 - 20*e*g*h + 20*f*g**2 + 15*h*x*(e
*h - f*g))/(60*h**3) + sqrt(a + c*x**2)*(5*h*x*(-4*c*d*g*h**2 + (
3*a*h**2 + 4*c*g**2)*(e*h - f*g)) + (40*a*h**2 + 40*c*g**2)*(d*h*
*2 - e*g*h + f*g**2))/(40*h**5) - (a*h**2 + c*g**2)**(3/2)*(d*h**
2 - e*g*h + f*g**2)*atanh((a*h - c*g*x)/(sqrt(a + c*x**2)*sqrt(a*
h**2 + c*g**2)))/h**6 + f*(a + c*x**2)**(5/2)/(5*c*h) + (-2*a*c*g
*h**2*(4*d*h**2 - g*(e*h - f*g)) + (a*h**2 + 2*c*g**2)*(-4*c*d*g*
h**2 + (3*a*h**2 + 4*c*g**2)*(e*h - f*g)))*atanh(sqrt(c)*x/sqrt(a
 + c*x**2))/(8*sqrt(c)*h**6)
```

Mathematica [A] time = 0.726507, size = 396, normalized size = 1.21

$$\frac{-15\sqrt{c}\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)\left(3a^2h^4(fg-eh)+12acgh^2\left(h(dh-eg)+fg^2\right)+8c^2\left(g^3h(dh-eg)+fg^5\right)\right)+h\sqrt{a+cx^2}\left(8\left(\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x),x]
```

```
[Out] (h*Sqrt[a + c*x^2]*(8*(3*a^2*f*h^4 + 20*a*c*h^2*(f*g^2 + h*(-(e*g
) + d*h)) + 15*c^2*(f*g^4 + g^2*h*(-(e*g) + d*h))) - 15*c*h*(5*a*
h^2*(f*g - e*h) + 4*c*(f*g^3 + g*h*(-(e*g) + d*h)))*x + 8*c*h^2*(
6*a*f*h^2 + 5*c*(f*g^2 + h*(-(e*g) + d*h)))*x^2 + 30*c^2*h^3*(-(f
*g) + e*h)*x^3 + 24*c^2*f*h^4*x^4) + 120*c*(c*g^2 + a*h^2)^(3/2)*
(f*g^2 + h*(-(e*g) + d*h))*Log[g + h*x] - 15*Sqrt[c]*(3*a^2*h^4*(
f*g - e*h) + 12*a*c*g*h^2*(f*g^2 + h*(-(e*g) + d*h)) + 8*c^2*(f*g
^5 + g^3*h*(-(e*g) + d*h)))*Log[c*x + Sqrt[c]*Sqrt[a + c*x^2]] -
120*c*(c*g^2 + a*h^2)^(3/2)*(f*g^2 + h*(-(e*g) + d*h))*Log[a*h -
c*g*x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]])/(120*c*h^6)
```

Maple [B] time = 0.02, size = 2420, normalized size = 7.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g),x)
```

```
[Out] 1/5*f*(c*x^2+a)^(5/2)/c/h-3/2/h^2*c^(1/2)*g*ln((-c*g/h+c*(x+1/h*g
))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1
/2))*a*d+3/2/h^3*c^(1/2)*g^2*ln((-c*g/h+c*(x+1/h*g))/c^(1/2)+((x+
1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))*a*e-1/2/h^
2*c*g*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*x
*d+1/2/h^3*c*g^2*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h
^2)^(1/2)*x*e-1/2/h^4*c*g^3*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h
^2+c*g^2)/h^2)^(1/2)*x*f-3/2/h^4*c^(1/2)*g^3*ln((-c*g/h+c*(x+1/h*
g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(
1/2))*a*f+1/h^2/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2
-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c
*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*a^2*e*g-1/h^7
/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h
*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+
(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*c^2*g^6*f-1/h^5/((a*h^2+c*g^
2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2
+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)
/h^2)^(1/2))/(x+1/h*g))*c^2*g^4*d+1/h^6/((a*h^2+c*g^2)/h^2)^(1/2)
*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^
(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/
(x+1/h*g))*c^2*g^5*e-1/h^3/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2
+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h
*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*a^
2*f*g^2-1/3/h^2*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^
2)^(3/2)*e*g+1/h*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h
^2)^(1/2)*a*d+1/3/h^3*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g
^2)/h^2)^(3/2)*f*g^2+1/4/h*e*x*(c*x^2+a)^(3/2)+3/8/h*e*a*x*(c*x^2
+a)^(1/2)+1/3/h*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^
2)^(3/2)*d-2/h^3/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^
2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*
```

```
c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*a*c*g^2*d-2/
h^5/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+
1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*
g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*a*c*g^4*f+3/8/h*e*a^2/c^(
1/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))-3/8/h^2*f*g*a*x*(c*x^2+a)^(1/2
)-3/8/h^2*f*g*a^2/c^(1/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))+2/h^4/((a
*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+
2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h
^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*a*c*g^3*e-1/4/h^2*f*g*x*(c*x^2+a
)^(3/2)+1/h^3*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)
^(1/2)*a*f*g^2-1/h^2*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^
2)/h^2)^(1/2)*a*e*g+1/h^3*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2
+c*g^2)/h^2)^(1/2)*c*g^2*d-1/h^4*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)
+(a*h^2+c*g^2)/h^2)^(1/2)*c*g^3*e+1/h^5*((x+1/h*g)^2*c-2*c*g/h*(x
+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*c*g^4*f-1/h^4*c^(3/2)*g^3*ln((-c
*g/h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2
+c*g^2)/h^2)^(1/2))*d+1/h^5*c^(3/2)*g^4*ln((-c*g/h+c*(x+1/h*g))/c
^(1/2)+((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))
*e-1/h^6*c^(3/2)*g^5*ln((-c*g/h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2
*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))*f-1/h/((a*h^2+c*g^
2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2
+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)
/h^2)^(1/2))/(x+1/h*g))*a^2*d
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g),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((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g),x, algorithm="fricas")

[Out] Timed out
```

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

$$\int \frac{\left(a+cx^2\right)^{\frac{3}{2}}\left(d+ex+fx^2\right)}{g+hx}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g),x)
```

```
[Out] Integral((a + c*x**2)**(3/2)*(d + e*x + f*x**2)/(g + h*x), x)
```

GIAC/XCAS [A] time = 0.290472, size = 744, normalized size = 2.28

$$\frac{1}{120}\sqrt{cx^2+a}\left(\left(2\left(3\left(\frac{4cfx}{h}-\frac{5\left(c^4fgh^{19}-c^4h^{20}e\right)}{c^3h^{21}}\right)x+\frac{4\left(5c^4fg^2h^{18}+5c^4dh^{20}+6ac^3fh^{20}-5c^4gh^{19}e\right)}{c^3h^{21}}\right)x-\frac{15\left(4c^4fg\right.}{}\right.\right.$$
$$+\frac{2\left(c^2fg^6+c^2dg^4h^2+2acfg^4h^2+2acdg^2h^4+a^2fg^2h^4+a^2dh^6-c^2g^5he-2acg^3h^3e-a^2gh^5e\right)\arctan\left(-\frac{\left(\sqrt{c}x-\sqrt{cx^2+a}\right)h+\sqrt{}}{\sqrt{-cg^2-ah^2}}\right.}{\sqrt{-cg^2-ah^2}h^6}$$
$$+\frac{\left(8c^{\frac{5}{2}}fg^5+8c^{\frac{5}{2}}dg^3h^2+12ac^{\frac{3}{2}}fg^3h^2+12ac^{\frac{3}{2}}dgh^4+3a^2\sqrt{c}fgh^4-8c^{\frac{5}{2}}g^4he-12ac^{\frac{3}{2}}g^2h^3e-3a^2\sqrt{c}h^5e\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx}\right.\right.}{8ch^6}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g),x, algorithm="giac")
```

```
[Out] 1/120*sqrt(c*x^2 + a)*((2*(3*(4*c*f*x/h - 5*(c^4*f*g*h^19 - c^4*h
^20*e)/(c^3*h^21))*x + 4*(5*c^4*f*g^2*h^18 + 5*c^4*d*h^20 + 6*a*c
^3*f*h^20 - 5*c^4*g*h^19*e)/(c^3*h^21))*x - 15*(4*c^4*f*g^3*h^17
+ 4*c^4*d*g*h^19 + 5*a*c^3*f*g*h^19 - 4*c^4*g^2*h^18*e - 5*a*c^3*
h^20*e)/(c^3*h^21))*x + 8*(15*c^4*f*g^4*h^16 + 15*c^4*d*g^2*h^18
+ 20*a*c^3*f*g^2*h^18 + 20*a*c^3*d*h^20 + 3*a^2*c^2*f*h^20 - 15*c
^4*g^3*h^17*e - 20*a*c^3*g*h^19*e)/(c^3*h^21)) + 2*(c^2*f*g^6 + c
^2*d*g^4*h^2 + 2*a*c*f*g^4*h^2 + 2*a*c*d*g^2*h^4 + a^2*f*g^2*h^4
+ a^2*d*h^6 - c^2*g^5*h*e - 2*a*c*g^3*h^3*e - a^2*g*h^5*e)*arctan
(-((sqrt(c)*x - sqrt(c*x^2 + a))*h + sqrt(c)*g)/sqrt(-c*g^2 - a*h
^2))/(sqrt(-c*g^2 - a*h^2)*h^6) + 1/8*(8*c^(5/2)*f*g^5 + 8*c^(5/2
)*d*g^3*h^2 + 12*a*c^(3/2)*f*g^3*h^2 + 12*a*c^(3/2)*d*g*h^4 + 3*a
^2*sqrt(c)*f*g*h^4 - 8*c^(5/2)*g^4*h*e - 12*a*c^(3/2)*g^2*h^3*e -
 3*a^2*sqrt(c)*h^5*e)*ln(abs(-sqrt(c)*x + sqrt(c*x^2 + a)))/(c*h^
6)
```

3.93 $\int \frac{\left(a+cx^2\right)^{3/2}\left(d+ex+fx^2\right)}{(g+hx)^2}\,dx$

Optimal. Leaf size=432

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3a^2fh^4+12ach^2\left(3fg^2-h(2eg-dh)\right)+8c^2g^2\left(5fg^2-h(4eg-3dh)\right)\right)}{8\sqrt{c}h^6}$$
$$-\frac{\left(a+cx^2\right)^{5/2}\left(dh^2-egh+fg^2\right)}{h(g+hx)\left(ah^2+cg^2\right)}$$
$$+\frac{\sqrt{ah^2+cg^2}\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(ah^2(2fg-eh)+cg\left(5fg^2-h(4eg-3dh)\right)\right)}{h^6}$$
$$-\frac{\sqrt{a+cx^2}\left(8\left(ah^2(2fg-eh)+cg\left(5fg^2-h(4eg-3dh)\right)\right)-hx\left(3afh^2+12cdh^2-16cegh+20cfg^2\right)\right)}{8h^5}$$
$$-\frac{\left(a+cx^2\right)^{3/2}\left(4\left(ah^2(2fg-eh)+cg\left(5fg^2-h(4eg-3dh)\right)\right)-3hx\left(afh^2+c\left(5fg^2-4h(eg-dh)\right)\right)\right)}{12h^3\left(ah^2+cg^2\right)}$$

```
[Out] -((8*(a*h^2*(2*f*g - e*h) + c*g*(5*f*g^2 - h*(4*e*g - 3*d*h))) -
h*(20*c*f*g^2 - 16*c*e*g*h + 12*c*d*h^2 + 3*a*f*h^2)*x)*Sqrt[a +
c*x^2])/(8*h^5) - ((4*(a*h^2*(2*f*g - e*h) + c*g*(5*f*g^2 - h*(4*
e*g - 3*d*h))) - 3*h*(a*f*h^2 + c*(5*f*g^2 - 4*h*(e*g - d*h)))*x)
*(a + c*x^2)^(3/2))/(12*h^3*(c*g^2 + a*h^2)) - ((f*g^2 - e*g*h +
d*h^2)*(a + c*x^2)^(5/2))/(h*(c*g^2 + a*h^2)*(g + h*x)) + ((3*a^2
*f*h^4 + 8*c^2*g^2*(5*f*g^2 - h*(4*e*g - 3*d*h)) + 12*a*c*h^2*(3*
f*g^2 - h*(2*e*g - d*h)))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(
8*Sqrt[c]*h^6) + (Sqrt[c*g^2 + a*h^2]*(a*h^2*(2*f*g - e*h) + c*g*
(5*f*g^2 - h*(4*e*g - 3*d*h)))*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2
+ a*h^2]*Sqrt[a + c*x^2])])/h^6
```

Rubi [A] time = 2.07703, antiderivative size = 428, normalized size of antiderivative = 0.99, number of steps used = 8, number of rules used = 6, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.207$

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3a^2fh^4+12ach^2\left(3fg^2-h(2eg-dh)\right)+8c^2\left(5fg^4-g^2h(4eg-3dh)\right)\right)}{8\sqrt{c}h^6}$$
$$-\frac{\left(a+cx^2\right)^{5/2}\left(dh^2-egh+fg^2\right)}{h(g+hx)\left(ah^2+cg^2\right)}$$
$$+\frac{\sqrt{ah^2+cg^2}\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(ah^2(2fg-eh)-cgh(4eg-3dh)+5cfg^3\right)}{h^6}$$
$$-\frac{\sqrt{a+cx^2}\left(8\left(ah^2(2fg-eh)-cgh(4eg-3dh)+5cfg^3\right)-hx\left(3afh^2+12cdh^2-16cegh+20cfg^2\right)\right)}{8h^5}$$
$$-\frac{\left(a+cx^2\right)^{3/2}\left(4\left(ah^2(2fg-eh)-cgh(4eg-3dh)+5cfg^3\right)-3hx\left(afh^2-4ch(eg-dh)+5cfg^2\right)\right)}{12h^3\left(ah^2+cg^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^2,x]
```

```
[Out] -((8*(5*c*f*g^3 - c*g*h*(4*e*g - 3*d*h) + a*h^2*(2*f*g - e*h)) -
h*(20*c*f*g^2 - 16*c*e*g*h + 12*c*d*h^2 + 3*a*f*h^2)*x)*Sqrt[a +
c*x^2])/(8*h^5) - ((4*(5*c*f*g^3 - c*g*h*(4*e*g - 3*d*h) + a*h^2*
(2*f*g - e*h)) - 3*h*(5*c*f*g^2 + a*f*h^2 - 4*c*h*(e*g - d*h))*x)
*(a + c*x^2)^(3/2))/(12*h^3*(c*g^2 + a*h^2)) - ((f*g^2 - e*g*h +
d*h^2)*(a + c*x^2)^(5/2))/(h*(c*g^2 + a*h^2)*(g + h*x)) + ((3*a^2
*f*h^4 + 8*c^2*(5*f*g^4 - g^2*h*(4*e*g - 3*d*h)) + 12*a*c*h^2*(3*
f*g^2 - h*(2*e*g - d*h)))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(
8*Sqrt[c]*h^6) + (Sqrt[c*g^2 + a*h^2]*(5*c*f*g^3 - c*g*h*(4*e*g -
 3*d*h) + a*h^2*(2*f*g - e*h))*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2
+ a*h^2]*Sqrt[a + c*x^2])])/h^6
```

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((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.21834, size = 392, normalized size = 0.91

$$\frac{\frac{3\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)\left(3a^2fh^4+12ach^2\left(h(dh-2eg)+3fg^2\right)+8c^2\left(g^2h(3dh-4eg)+5fg^4\right)\right)}{\sqrt{c}}+24\sqrt{ah^2+cg^2}\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^2,x]
```

```
[Out] (h*Sqrt[a + c*x^2]*(8*(4*a*h^2*(-2*f*g + e*h) - 3*c*(4*f*g^3 + g*
h*(-3*e*g + 2*d*h))) + 3*h*(5*a*f*h^2 + 4*c*(3*f*g^2 + h*(-2*e*g
+ d*h)))*x + 8*c*h^2*(-2*f*g + e*h)*x^2 + 6*c*f*h^3*x^3 - (24*(c*
g^2 + a*h^2)*(f*g^2 + h*(-(e*g) + d*h)))/(g + h*x)) - 24*Sqrt[c*g
^2 + a*h^2]*(5*c*f*g^3 + c*g*h*(-4*e*g + 3*d*h) + a*h^2*(2*f*g -
e*h))*Log[g + h*x] + (3*(3*a^2*f*h^4 + 12*a*c*h^2*(3*f*g^2 + h*(-
2*e*g + d*h)) + 8*c^2*(5*f*g^4 + g^2*h*(-4*e*g + 3*d*h)))*Log[c*x
 + Sqrt[c]*Sqrt[a + c*x^2]])/Sqrt[c] + 24*Sqrt[c*g^2 + a*h^2]*(5*
```

```
c*f*g^3 + c*g*h*(-4*e*g + 3*d*h) + a*h^2*(2*f*g - e*h))*Log[a*h -
 c*g*x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]])/(24*h^6)
```

Maple [B] time = 0.029, size = 5121, normalized size = 11.9

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^2,x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^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((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

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

$$\int \frac{\left(a + cx^{2}\right)^{\frac{3}{2}} \left(d + ex + fx^{2}\right)}{\left(g + hx\right)^{2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**2,x)
```

```
[Out] Integral((a + c*x**2)**(3/2)*(d + e*x + f*x**2)/(g + h*x)**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((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^2,x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.94 $\int \frac{(a+cx^2)^{3/2}(d+ex+fx^2)}{(g+hx)^3}\,dx$

Optimal. Leaf size=488

$$-\frac{\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(2a^2fh^4+ach^2\left(19fg^2-3h(3eg-dh)\right)+2c^2g^2\left(10fg^2-3h(2eg-dh)\right)\right)}{2h^6\sqrt{ah^2+cg^2}}$$
$$+\frac{\sqrt{a+cx^2}\left(2a^2fh^4-chx\left(ah^2(7fg-3eh)+cg\left(10fg^2-3h(2eg-dh)\right)\right)+ach^2\left(19fg^2-3h(3eg-dh)\right)+2c^2g^2\left(10fg^2-\right.\right.}{2h^5\left(ah^2+cg^2\right)}$$
$$-\frac{\left(a+cx^2\right)^{5/2}\left(dh^2-egh+fg^2\right)}{2h(g+hx)^2\left(ah^2+cg^2\right)}$$
$$-\frac{\left(a+cx^2\right)^{3/2}\left(2\left(cg\left(-3dh+6eg-\frac{10fg^2}{h}\right)-ah(7fg-3eh)\right)-x\left(2afh^2+c\left(5fg^2-3h(eg-dh)\right)\right)\right)}{6h^2(g+hx)\left(ah^2+cg^2\right)}$$
$$-\frac{\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3ah^2(3fg-eh)+2cg\left(10fg^2-3h(2eg-dh)\right)\right)}{2h^6}$$

```
[Out] ((2*a^2*f*h^4 + 2*c^2*g^2*(10*f*g^2 - 3*h*(2*e*g - d*h)) + a*c*h^
2*(19*f*g^2 - 3*h*(3*e*g - d*h)) - c*h*(a*h^2*(7*f*g - 3*e*h) + c
*g*(10*f*g^2 - 3*h*(2*e*g - d*h)))*x)*Sqrt[a + c*x^2])/(2*h^5*(c*
g^2 + a*h^2)) - ((2*(c*g*(6*e*g - (10*f*g^2)/h - 3*d*h) - a*h*(7*
f*g - 3*e*h)) - (2*a*f*h^2 + c*(5*f*g^2 - 3*h*(e*g - d*h)))*x)*(a
 + c*x^2)^(3/2))/(6*h^2*(c*g^2 + a*h^2)*(g + h*x)) - ((f*g^2 - e*
g*h + d*h^2)*(a + c*x^2)^(5/2))/(2*h*(c*g^2 + a*h^2)*(g + h*x)^2)
 - (Sqrt[c]*(3*a*h^2*(3*f*g - e*h) + 2*c*g*(10*f*g^2 - 3*h*(2*e*g
 - d*h)))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(2*h^6) - ((2*a^2
*f*h^4 + 2*c^2*g^2*(10*f*g^2 - 3*h*(2*e*g - d*h)) + a*c*h^2*(19*f
*g^2 - 3*h*(3*e*g - d*h)))*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*
h^2]*Sqrt[a + c*x^2])])/(2*h^6*Sqrt[c*g^2 + a*h^2])
```

Rubi [A] time = 2.15205, antiderivative size = 480, normalized size of antiderivative = 0.98, number

of steps used = 8, number of rules used = 7, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.241$

$$-\frac{\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(2a^2fh^4+ach^2\left(19fg^2-3h(3eg-dh)\right)+2c^2\left(10fg^4-3g^2h(2eg-dh)\right)\right)}{2h^6\sqrt{ah^2+cg^2}}$$
$$+\frac{\sqrt{a+cx^2}\left(2a^2fh^3-cx\left(ah^2(7fg-3eh)-3cgh(2eg-dh)+10cfg^3\right)+ach\left(19fg^2-3h(3eg-dh)\right)-2c^2g^2\left(-3dh+6eg\right.\right.}{2h^4\left(ah^2+cg^2\right)}$$
$$-\frac{\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3ah^2(3fg-eh)-6cgh(2eg-dh)+20cfg^3\right)}{2h^6}-\frac{\left(a+cx^2\right)^{5/2}\left(dh^2-egh+fg^2\right)}{2h(g+hx)^2\left(ah^2+cg^2\right)}$$
$$-\frac{\left(a+cx^2\right)^{3/2}\left(2\left(cg\left(-3dh+6eg-\frac{10fg^2}{h}\right)-ah(7fg-3eh)\right)-x\left(2afh^2-3ch(eg-dh)+5cfg^2\right)\right)}{6h^2(g+hx)\left(ah^2+cg^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^3,x]
```

```
[Out] ((2*a^2*f*h^3 - 2*c^2*g^2*(6*e*g - (10*f*g^2)/h - 3*d*h) + a*c*h*
(19*f*g^2 - 3*h*(3*e*g - d*h)) - c*(10*c*f*g^3 - 3*c*g*h*(2*e*g -
 d*h) + a*h^2*(7*f*g - 3*e*h))*x)*Sqrt[a + c*x^2])/(2*h^4*(c*g^2
+ a*h^2)) - ((2*(c*g*(6*e*g - (10*f*g^2)/h - 3*d*h) - a*h*(7*f*g
- 3*e*h)) - (5*c*f*g^2 + 2*a*f*h^2 - 3*c*h*(e*g - d*h))*x)*(a + c
*x^2)^(3/2))/(6*h^2*(c*g^2 + a*h^2)*(g + h*x)) - ((f*g^2 - e*g*h
+ d*h^2)*(a + c*x^2)^(5/2))/(2*h*(c*g^2 + a*h^2)*(g + h*x)^2) - (
Sqrt[c]*(20*c*f*g^3 - 6*c*g*h*(2*e*g - d*h) + 3*a*h^2*(3*f*g - e*
h))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(2*h^6) - ((2*a^2*f*h^4
 + 2*c^2*(10*f*g^4 - 3*g^2*h*(2*e*g - d*h)) + a*c*h^2*(19*f*g^2 -
 3*h*(3*e*g - d*h)))*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*S
qrt[a + c*x^2])])/(2*h^6*Sqrt[c*g^2 + a*h^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((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.19376, size = 435, normalized size = 0.89

$$\frac{-\frac{3\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)\left(2a^2fh^4+ach^2\left(3h(dh-3eg)+19fg^2\right)+2c^2\left(3g^2h(dh-2eg)+10fg^4\right)\right)}{\sqrt{ah^2+cg^2}}+\frac{3\log(g+hx)\left(2a^2fh^4+ach^2\left(3h(dh-3eg)+19fg^2\right)+2\right.}{\sqrt{ah^2+cg^2}}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^3,x]
```

```
[Out] ((h*Sqrt[a + c*x^2]*(a*h^2*(-3*h*(e*g + d*h + 2*e*h*x) + f*(17*g^
2 + 28*g*h*x + 8*h^2*x^2)) + c*(f*(60*g^4 + 90*g^3*h*x + 20*g^2*h
^2*x^2 - 5*g*h^3*x^3 + 2*h^4*x^4) + 3*h*(d*h*(6*g^2 + 9*g*h*x + 2
*h^2*x^2) + e*(-12*g^3 - 18*g^2*h*x - 4*g*h^2*x^2 + h^3*x^3)))))/
(g + h*x)^2 + (3*(2*a^2*f*h^4 + a*c*h^2*(19*f*g^2 + 3*h*(-3*e*g +
 d*h)) + 2*c^2*(10*f*g^4 + 3*g^2*h*(-2*e*g + d*h)))*Log[g + h*x])
/Sqrt[c*g^2 + a*h^2] - 3*Sqrt[c]*(20*c*f*g^3 + 6*c*g*h*(-2*e*g +
d*h) - 3*a*h^2*(-3*f*g + e*h))*Log[c*x + Sqrt[c]*Sqrt[a + c*x^2]]
 - (3*(2*a^2*f*h^4 + a*c*h^2*(19*f*g^2 + 3*h*(-3*e*g + d*h)) + 2*
c^2*(10*f*g^4 + 3*g^2*h*(-2*e*g + d*h)))*Log[a*h - c*g*x + Sqrt[c
*g^2 + a*h^2]*Sqrt[a + c*x^2]])/Sqrt[c*g^2 + a*h^2])/(6*h^6)
```

Maple [B] time = 0.03, size = 7817, normalized size = 16.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^3,x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^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((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^3,x, algorithm="fricas")
```

```
[Out] Timed out
```

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

$$\int \frac{\left(a + cx^{2}\right)^{\frac{3}{2}} \left(d + ex + fx^{2}\right)}{\left(g + hx\right)^{3}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**3,x)
```

```
[Out] Integral((a + c*x**2)**(3/2)*(d + e*x + f*x**2)/(g + h*x)**3, x)
```

GIAC/XCAS [A] time = 0.667976, size = 4, normalized size = 0.01

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^3,x, algorithm="giac")
```

```
[Out] sage0*x
```

3.95 $\int \frac{(a+cx^2)^{3/2}(d+ex+fx^2)}{(g+hx)^4} dx$

Optimal. Leaf size=475

$$\frac{c\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(3a^2h^4(4fg-eh)+3acgh^2\left(11fg^2-h(4eg-dh)\right)+2c^2g^3\left(10fg^2-h(4eg-dh)\right)\right)}{2h^6\left(ah^2+cg^2\right)^{3/2}}$$
$$-\frac{\left(a+cx^2\right)^{5/2}\left(dh^2-egh+fg^2\right)}{3h(g+hx)^3\left(ah^2+cg^2\right)}$$
$$-\frac{\left(a+cx^2\right)^{3/2}\left(-x\left(3afh^2+c\left(5fg^2-2h(eg-dh)\right)\right)-3ah(3fg-eh)+cg\left(-dh+4eg-\frac{10fg^2}{h}\right)\right)}{6h^2(g+hx)^2\left(ah^2+cg^2\right)}$$
$$+\frac{\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3afh^2+2c\left(10fg^2-h(4eg-dh)\right)\right)}{2h^6}$$
$$-\frac{\sqrt{a+cx^2}\left(chx\left(3ah^2(3fg-eh)+cg\left(10fg^2-h(4eg-dh)\right)\right)+\left(ah^2+cg^2\right)\left(3afh^2+2c\left(10fg^2-h(4eg-dh)\right)\right)\right)}{2h^5(g+hx)\left(ah^2+cg^2\right)}$$

```
[Out] -((((c*g^2 + a*h^2)*(3*a*f*h^2 + 2*c*(10*f*g^2 - h*(4*e*g - d*h)))
 + c*h*(3*a*h^2*(3*f*g - e*h) + c*g*(10*f*g^2 - h*(4*e*g - d*h)))
*x)*Sqrt[a + c*x^2])/(2*h^5*(c*g^2 + a*h^2)*(g + h*x)) - ((c*g*(4
*e*g - (10*f*g^2)/h - d*h) - 3*a*h*(3*f*g - e*h) - (3*a*f*h^2 + c
*(5*f*g^2 - 2*h*(e*g - d*h)))*x)*(a + c*x^2)^(3/2))/(6*h^2*(c*g^2
 + a*h^2)*(g + h*x)^2) - ((f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(5/
2))/(3*h*(c*g^2 + a*h^2)*(g + h*x)^3) + (Sqrt[c]*(3*a*f*h^2 + 2*c
*(10*f*g^2 - h*(4*e*g - d*h)))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2
]])/(2*h^6) + (c*(3*a^2*h^4*(4*f*g - e*h) + 2*c^2*g^3*(10*f*g^2 -
 h*(4*e*g - d*h)) + 3*a*c*g*h^2*(11*f*g^2 - h*(4*e*g - d*h)))*Arc
Tanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(2*h^6
*(c*g^2 + a*h^2)^(3/2))
```

Rubi [A] time = 1.96111, antiderivative size = 469, normalized size of antiderivative = 0.99, number

of steps used = 8, number of rules used = 6, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.207$

$$\frac{c\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(3a^2h^4(4fg-eh)+3acgh^2\left(11fg^2-h(4eg-dh)\right)+2c^2\left(10fg^5-g^3h(4eg-dh)\right)\right)}{2h^6\left(ah^2+cg^2\right)^{3/2}}-\frac{\left(a+cx^2\right)^{5/2}\left(dh^2-egh+fg^2\right)}{3h(g+hx)^3\left(ah^2+cg^2\right)}-\frac{\left(a+cx^2\right)^{3/2}\left(-x\left(3afh^2-2ch(eg-dh)+5cfg^2\right)-3ah(3fg-eh)+cg\left(-dh+4eg-\frac{10fg^2}{h}\right)\right)}{6h^2(g+hx)^2\left(ah^2+cg^2\right)}+\frac{\sqrt{c}\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3afh^2-2ch(4eg-dh)+20cfg^2\right)}{2h^6}-\frac{\sqrt{a+cx^2}\left(chx\left(3ah^2(3fg-eh)-cgh(4eg-dh)+10cfg^3\right)+\left(ah^2+cg^2\right)\left(3afh^2-2ch(4eg-dh)+20cfg^2\right)\right)}{2h^5(g+hx)\left(ah^2+cg^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^4,x]
```

```
[Out] -(((c*g^2 + a*h^2)*(20*c*f*g^2 + 3*a*f*h^2 - 2*c*h*(4*e*g - d*h))
 + c*h*(10*c*f*g^3 - c*g*h*(4*e*g - d*h) + 3*a*h^2*(3*f*g - e*h))
*x)*Sqrt[a + c*x^2])/(2*h^5*(c*g^2 + a*h^2)*(g + h*x)) - ((c*g*(4
*e*g - (10*f*g^2)/h - d*h) - 3*a*h*(3*f*g - e*h) - (5*c*f*g^2 + 3
*a*f*h^2 - 2*c*h*(e*g - d*h))*x)*(a + c*x^2)^(3/2))/(6*h^2*(c*g^2
 + a*h^2)*(g + h*x)^2) - ((f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(5/
2))/(3*h*(c*g^2 + a*h^2)*(g + h*x)^3) + (Sqrt[c]*(20*c*f*g^2 + 3*
a*f*h^2 - 2*c*h*(4*e*g - d*h))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2
]])/(2*h^6) + (c*(3*a^2*h^4*(4*f*g - e*h) + 3*a*c*g*h^2*(11*f*g^2
 - h*(4*e*g - d*h)) + 2*c^2*(10*f*g^5 - g^3*h*(4*e*g - d*h)))*Arc
Tanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(2*h^6
*(c*g^2 + a*h^2)^(3/2))
```

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((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**4,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 3.30887, size = 517, normalized size = 1.09

$$\frac{\frac{3c\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)\left(-3a^2h^4(eh-4fg)+3acgh^2\left(h(dh-4eg)+11fg^2\right)+2c^2\left(g^3h(dh-4eg)+10fg^5\right)\right)}{(ah^2+cg^2)^{3/2}}-\frac{3c\log(g+hx)\left(-3a^2h^4(eh-4fg)+3acgh^2\left(\right.\right.}{(a}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^4,x]
```

```
[Out] (-((h*Sqrt[a + c*x^2]*(2*(c*g^2 + a*h^2)^2*(f*g^2 + h*(-(e*g) + d
*h)) - (c*g^2 + a*h^2)*(13*c*f*g^3 + c*g*h*(-10*e*g + 7*d*h) - 3*
a*h^2*(-2*f*g + e*h))*(g + h*x) + (6*a^2*f*h^4 + a*c*h^2*(50*f*g^
2 + h*(-23*e*g + 8*d*h)) + c^2*(47*f*g^4 + g^2*h*(-26*e*g + 11*d*
h)))*(g + h*x)^2 + 6*c*(4*f*g - e*h)*(c*g^2 + a*h^2)*(g + h*x)^3
- 3*c*f*h*(c*g^2 + a*h^2)*x*(g + h*x)^3))/((c*g^2 + a*h^2)*(g + h
*x)^3)) - (3*c*(-3*a^2*h^4*(-4*f*g + e*h) + 3*a*c*g*h^2*(11*f*g^2
 + h*(-4*e*g + d*h)) + 2*c^2*(10*f*g^5 + g^3*h*(-4*e*g + d*h)))*L
og[g + h*x])/(c*g^2 + a*h^2)^(3/2) + 3*Sqrt[c]*(20*c*f*g^2 + 3*a*
f*h^2 + 2*c*h*(-4*e*g + d*h))*Log[c*x + Sqrt[c]*Sqrt[a + c*x^2]]
+ (3*c*(-3*a^2*h^4*(-4*f*g + e*h) + 3*a*c*g*h^2*(11*f*g^2 + h*(-4
*e*g + d*h)) + 2*c^2*(10*f*g^5 + g^3*h*(-4*e*g + d*h)))*Log[a*h -
 c*g*x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]])/(c*g^2 + a*h^2)^(3
/2))/(6*h^6)
```

Maple [B] time = 0.035, size = 9835, normalized size = 20.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^4,x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^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((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^4,x, algorithm="fricas")
```

```
[Out] Timed out
```

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

$$\int \frac{\left(a+cx^2\right)^{\frac{3}{2}}\left(d+ex+fx^2\right)}{(g+hx)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**4,x)
```

```
[Out] Integral((a + c*x**2)**(3/2)*(d + e*x + f*x**2)/(g + h*x)**4, x)
```

GIAC/XCAS [A] time = 0.659652, size = 4, normalized size = 0.01

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^4,x, algorithm="giac")
```

```
[Out] sage0*x
```

3.96 $\int \frac{(a+cx^2)^{3/2}(d+ex+fx^2)}{(g+hx)^5}\,dx$

Optimal. Leaf size=511

$$\frac{(a+cx^2)^{3/2}\left(-3hx\left(4a^2fh^4+ach^2\left(17fg^2-h(5eg-dh)\right)+2c^2g^2\left(5fg^2-h(dh+eg)\right)\right)+4a^2h^4(fg-2eh)-acgh^2\left(25fg^2\right.\right.}{24h^3(g+hx)^3\left(ah^2+cg^2\right)^2}$$

$$+\frac{c\sqrt{a+cx^2}\left(hx\left(12a^2fh^4+ach^2\left(35fg^2-h(7eg-3dh)\right)+4c^2g^3(5fg-eh)\right)+8\left(ah^2+cg^2\right)^2(5fg-eh)\right)}{8h^5(g+hx)\left(ah^2+cg^2\right)^2}$$

$$-\frac{c\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(12a^3fh^6+3a^2ch^4\left(25fg^2-h(5eg-dh)\right)+20ac^2g^3h^2(5fg-eh)+8c^3g^5(5fg-eh)\right)}{8h^6\left(ah^2+cg^2\right)^{5/2}}$$

$$-\frac{c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(5fg-eh)}{h^6}-\frac{\left(a+cx^2\right)^{5/2}\left(dh^2-egh+fg^2\right)}{4h(g+hx)^4\left(ah^2+cg^2\right)}$$

```
[Out] (c*(8*(5*f*g - e*h)*(c*g^2 + a*h^2)^2 + h*(12*a^2*f*h^4 + 4*c^2*g
^3*(5*f*g - e*h) + a*c*h^2*(35*f*g^2 - h*(7*e*g - 3*d*h)))*x)*Sqr
t[a + c*x^2])/(8*h^5*(c*g^2 + a*h^2)^2*(g + h*x)) + ((4*a^2*h^4*(
f*g - 2*e*h) - 4*c^2*g^4*(5*f*g - e*h) - a*c*g*h^2*(25*f*g^2 - h*
(5*e*g - 9*d*h)) - 3*h*(4*a^2*f*h^4 + a*c*h^2*(17*f*g^2 - h*(5*e*
g - d*h)) + 2*c^2*g^2*(5*f*g^2 - h*(e*g + d*h)))*x)*(a + c*x^2)^(
3/2))/(24*h^3*(c*g^2 + a*h^2)^2*(g + h*x)^3) - ((f*g^2 - e*g*h +
d*h^2)*(a + c*x^2)^(5/2))/(4*h*(c*g^2 + a*h^2)*(g + h*x)^4) - (c^
(3/2)*(5*f*g - e*h)*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/h^6 - (
c*(12*a^3*f*h^6 + 8*c^3*g^5*(5*f*g - e*h) + 20*a*c^2*g^3*h^2*(5*f
*g - e*h) + 3*a^2*c*h^4*(25*f*g^2 - h*(5*e*g - d*h)))*ArcTanh[(a*
h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(8*h^6*(c*g^2
+ a*h^2)^(5/2))
```

Rubi [A] time = 2.46127, antiderivative size = 511, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.241

$$\frac{(a+cx^2)^{3/2}\left(-3x\left(4a^2fh^4+ach^2\left(17fg^2-h(5eg-dh)\right)+2c^2\left(5fg^4-g^2h(dh+eg)\right)\right)+4a^2h^3(fg-2eh)-acgh\left(25fg^2-\right.\right.}{24h^2(g+hx)^3\left(ah^2+cg^2\right)^2}$$

$$+\frac{c\sqrt{a+cx^2}\left(hx\left(12a^2fh^4+ach^2\left(35fg^2-h(7eg-3dh)\right)+4c^2g^3(5fg-eh)\right)+8\left(ah^2+cg^2\right)^2(5fg-eh)\right)}{8h^5(g+hx)\left(ah^2+cg^2\right)^2}$$

$$-\frac{c\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(12a^3fh^6+3a^2ch^4\left(25fg^2-h(5eg-dh)\right)+20ac^2g^3h^2(5fg-eh)+8c^3g^5(5fg-eh)\right)}{8h^6\left(ah^2+cg^2\right)^{5/2}}$$

$$-\frac{c^{3/2}\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(5fg-eh)}{h^6}-\frac{\left(a+cx^2\right)^{5/2}\left(dh^2-egh+fg^2\right)}{4h(g+hx)^4\left(ah^2+cg^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^5,x]
```

```
[Out] (c*(8*(5*f*g - e*h)*(c*g^2 + a*h^2)^2 + h*(12*a^2*f*h^4 + 4*c^2*g
^3*(5*f*g - e*h) + a*c*h^2*(35*f*g^2 - h*(7*e*g - 3*d*h)))*x)*Sqr
t[a + c*x^2])/(8*h^5*(c*g^2 + a*h^2)^2*(g + h*x)) + ((4*a^2*h^3*(
f*g - 2*e*h) - (4*c^2*g^4*(5*f*g - e*h))/h - a*c*g*h*(25*f*g^2 -
h*(5*e*g - 9*d*h)) - 3*(4*a^2*f*h^4 + a*c*h^2*(17*f*g^2 - h*(5*e*
g - d*h)) + 2*c^2*(5*f*g^4 - g^2*h*(e*g + d*h)))*x)*(a + c*x^2)^(
3/2))/(24*h^2*(c*g^2 + a*h^2)^2*(g + h*x)^3) - ((f*g^2 - e*g*h +
d*h^2)*(a + c*x^2)^(5/2))/(4*h*(c*g^2 + a*h^2)*(g + h*x)^4) - (c^
(3/2)*(5*f*g - e*h)*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/h^6 - (
c*(12*a^3*f*h^6 + 8*c^3*g^5*(5*f*g - e*h) + 20*a*c^2*g^3*h^2*(5*f
*g - e*h) + 3*a^2*c*h^4*(25*f*g^2 - h*(5*e*g - d*h)))*ArcTanh[(a*
h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(8*h^6*(c*g^2
+ a*h^2)^(5/2))
```

Rubi in Sympy [A] time = 170.365, size = 564, normalized size = 1.1

$$\frac{c^{\frac{3}{2}}\left(eh-5fg\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^{2}}}\right)}{h^{6}} - \frac{c\sqrt{a+cx^{2}}\left(-2hx\left(12a^{2}fh^{4}+3acdh^{4}-7acegh^{3}+35acfg^{2}h^{2}-4c^{2}eg^{3}h+20c^{2}fg^{4}\right)+16\left(ah^{2}+cg^{2}\right)^{2}\left(eh-5fg\right)\right)}{16h^{5}\left(g+hx\right)\left(ah^{2}+cg^{2}\right)^{2}} - \frac{c\left(ah^{2}\left(12a^{2}fh^{4}+3acdh^{4}-7acegh^{3}+35acfg^{2}h^{2}-4c^{2}eg^{3}h+20c^{2}fg^{4}\right)-8cg\left(ah^{2}+cg^{2}\right)^{2}\left(eh-5fg\right)\right)\operatorname{atanh}\left(\frac{ah-c\cdots}{\sqrt{a+cx^{2}}\sqrt{a\cdots}}\right.}{8h^{6}\left(ah^{2}+cg^{2}\right)^{\frac{5}{2}}} - \frac{\left(a+cx^{2}\right)^{\frac{5}{2}}\left(dh^{2}-egh+fg^{2}\right)}{4h\left(g+hx\right)^{4}\left(ah^{2}+cg^{2}\right)} - \frac{\left(a+cx^{2}\right)^{\frac{3}{2}}\left(8a^{2}eh^{5}-4a^{2}fgh^{4}+9acdgh^{4}-5aceg^{2}h^{3}+25acfg^{3}h^{2}-4c^{2}eg^{4}h+20c^{2}fg^{5}+3hx\left(4a^{2}fh^{4}+acdh^{4}-5acegh\cdots\right.\right.}{24h^{3}\left(g+hx\right)^{3}\left(ah^{2}+cg^{2}\right)^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**5,x)
```

```
[Out] c**(3/2)*(e*h - 5*f*g)*atanh(sqrt(c)*x/sqrt(a + c*x**2))/h**6 - c
*sqrt(a + c*x**2)*(-2*h*x*(12*a**2*f*h**4 + 3*a*c*d*h**4 - 7*a*c*
e*g*h**3 + 35*a*c*f*g**2*h**2 - 4*c**2*e*g**3*h + 20*c**2*f*g**4)
 + 16*(a*h**2 + c*g**2)**2*(e*h - 5*f*g))/(16*h**5*(g + h*x)*(a*h
**2 + c*g**2)**2) - c*(a*h**2*(12*a**2*f*h**4 + 3*a*c*d*h**4 - 7*
a*c*e*g*h**3 + 35*a*c*f*g**2*h**2 - 4*c**2*e*g**3*h + 20*c**2*f*g
**4) - 8*c*g*(a*h**2 + c*g**2)**2*(e*h - 5*f*g))*atanh((a*h - c*g
*x)/(sqrt(a + c*x**2)*sqrt(a*h**2 + c*g**2)))/(8*h**6*(a*h**2 + c
```

```
*g**2)**(5/2)) - (a + c*x**2)**(5/2)*(d*h**2 - e*g*h + f*g**2)/(4
*h*(g + h*x)**4*(a*h**2 + c*g**2)) - (a + c*x**2)**(3/2)*(8*a**2*
e*h**5 - 4*a**2*f*g*h**4 + 9*a*c*d*g*h**4 - 5*a*c*e*g**2*h**3 + 2
5*a*c*f*g**3*h**2 - 4*c**2*e*g**4*h + 20*c**2*f*g**5 + 3*h*x*(4*a
**2*f*h**4 + a*c*d*h**4 - 5*a*c*e*g*h**3 + 17*a*c*f*g**2*h**2 - 2
*c**2*d*g**2*h**2 - 2*c**2*e*g**3*h + 10*c**2*f*g**4))/(24*h**3*(
g + h*x)**3*(a*h**2 + c*g**2)**2)
```

Mathematica [A] time = 6.67822, size = 767, normalized size = 1.5

$$\sqrt{a+cx^2}\left(\frac{-12a^2fh^4-15acdh^4+43acegh^3-95acfg^2h^2-18c^2dg^2h^2+46c^2eg^3h-86c^2fg^4}{24h^5(g+hx)^2\left(ah^2+cg^2\right)}\right.$$
$$-\frac{c\left(32a^2eh^5-124a^2fgh^4-15acdgh^4+91aceg^2h^3-287acfg^3h^2-6c^2dg^3h^2+50c^2eg^4h-154c^2fg^5\right)}{24h^5(g+hx)\left(ah^2+cg^2\right)^2}$$
$$\left.-\frac{\left(ah^2+cg^2\right)\left(dh^2-egh+fg^2\right)}{4h^5(g+hx)^4}+\frac{-4aeh^3+8afgh^2+9cdgh^2-13ceg^2h+17cfg^3}{12h^5(g+hx)^3}+\frac{cf}{h^5}\right)$$
$$+\frac{\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)\left(\frac{a^2c^2e}{h\left(ah^2+cg^2\right)^2}-\frac{5a^2c^2fg}{h^2\left(ah^2+cg^2\right)^2}+\frac{c^4eg^4}{h^5\left(ah^2+cg^2\right)^2}-\frac{5c^4fg^5}{h^6\left(ah^2+cg^2\right)^2}+\frac{2ac^3eg^2}{h^3\left(ah^2+cg^2\right)^2}-\frac{10ac^3fg^3}{h^4\left(ah^2+cg^2\right)^2}\right)}{\sqrt{c}}$$
$$-\frac{c\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)\left(12a^3fh^6+3a^2cdh^6-15a^2cegh^5+75a^2cfg^2h^4-20ac^2eg^3h^3+100ac^2fg^4h^2-8\right.}{8h^6\left(ah^2+cg^2\right)^{5/2}}$$
$$+\frac{c\log(g+hx)\left(12a^3fh^6+3a^2cdh^6-15a^2cegh^5+75a^2cfg^2h^4-20ac^2eg^3h^3+100ac^2fg^4h^2-8c^3eg^5h+40c^3fg^6\right)}{8h^6\left(ah^2+cg^2\right)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^5,x]
```

```
[Out] Sqrt[a + c*x^2]*((c*f)/h^5 - ((c*g^2 + a*h^2)*(f*g^2 - e*g*h + d*
h^2))/(4*h^5*(g + h*x)^4) + (17*c*f*g^3 - 13*c*e*g^2*h + 9*c*d*g*
h^2 + 8*a*f*g*h^2 - 4*a*e*h^3)/(12*h^5*(g + h*x)^3) + (-86*c^2*f*
g^4 + 46*c^2*e*g^3*h - 18*c^2*d*g^2*h^2 - 95*a*c*f*g^2*h^2 + 43*a
*c*e*g*h^3 - 15*a*c*d*h^4 - 12*a^2*f*h^4)/(24*h^5*(c*g^2 + a*h^2)
*(g + h*x)^2) - (c*(-154*c^2*f*g^5 + 50*c^2*e*g^4*h - 6*c^2*d*g^3
*h^2 - 287*a*c*f*g^3*h^2 + 91*a*c*e*g^2*h^3 - 15*a*c*d*g*h^4 - 12
4*a^2*f*g*h^4 + 32*a^2*e*h^5))/(24*h^5*(c*g^2 + a*h^2)^2*(g + h*x
))) + (c*(40*c^3*f*g^6 - 8*c^3*e*g^5*h + 100*a*c^2*f*g^4*h^2 - 20
*a*c^2*e*g^3*h^3 + 75*a^2*c*f*g^2*h^4 - 15*a^2*c*e*g*h^5 + 3*a^2*
c*d*h^6 + 12*a^3*f*h^6)*Log[g + h*x])/(8*h^6*(c*g^2 + a*h^2)^(5/2
)) + (((-5*c^4*f*g^5)/(h^6*(c*g^2 + a*h^2)^2) + (c^4*e*g^4)/(h^5*
(c*g^2 + a*h^2)^2) - (10*a*c^3*f*g^3)/(h^4*(c*g^2 + a*h^2)^2) + (
2*a*c^3*e*g^2)/(h^3*(c*g^2 + a*h^2)^2) - (5*a^2*c^2*f*g)/(h^2*(c*
g^2 + a*h^2)^2) + (a^2*c^2*e)/(h*(c*g^2 + a*h^2)^2))*Log[c*x + Sq
rt[c]*Sqrt[a + c*x^2]])/Sqrt[c] - (c*(40*c^3*f*g^6 - 8*c^3*e*g^5*
h + 100*a*c^2*f*g^4*h^2 - 20*a*c^2*e*g^3*h^3 + 75*a^2*c*f*g^2*h^4
 - 15*a^2*c*e*g*h^5 + 3*a^2*c*d*h^6 + 12*a^3*f*h^6)*Log[a*h - c*g
```

```
*x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]])/(8*h^6*(c*g^2 + a*h^2)
^(5/2))
```

Maple [B] time = 0.043, size = 12481, normalized size = 24.4

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^5,x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^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((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^5,x, algorithm="fricas")
```

```
[Out] Timed out
```

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

$$\int \frac{\left(a + cx^{2}\right)^{\frac{3}{2}} \left(d + ex + fx^{2}\right)}{\left(g + hx\right)^{5}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**5,x)
```

```
[Out] Integral((a + c*x**2)**(3/2)*(d + e*x + f*x**2)/(g + h*x)**5, 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((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^5,x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.97 $\int \frac{(a+cx^2)^{3/2}(d+ex+fx^2)}{(g+hx)^6}\,dx$

Optimal. Leaf size=507

$$-\frac{(a+cx^2)^{3/2}\left(hx\left(4a^2fh^4+acgh^2(14fg-3eh)+c^2\left(7fg^4-3dg^2h^2\right)\right)-a^2h^4(2fg-3eh)+acgh^2\left(3dh^2+5fg^2\right)+4c^2fg^5\right.}{12h^3(g+hx)^4\left(ah^2+cg^2\right)^2}$$
$$+\frac{c^2\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(3a^3h^6(6fg-eh)+a^2cgh^4\left(35fg^2-3dh^2\right)+28ac^2fg^5h^2+8c^3fg^7\right)}{8h^6\left(ah^2+cg^2\right)^{7/2}}$$
$$-\frac{c\sqrt{a+cx^2}\left(-a^3h^6(2fg-3eh)+a^2cgh^4\left(3dh^2+13fg^2\right)+hx\left(8a^3fh^6+a^2cgh^4(34fg-3eh)+ac^2g^2h^2\left(35fg^2-3dh^2\right)+\right.\right.}{8h^5(g+hx)^2\left(ah^2+cg^2\right)^3}$$
$$+\frac{c^{3/2}f\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{h^6}-\frac{(a+cx^2)^{5/2}\left(dh^2-egh+fg^2\right)}{5h(g+hx)^5\left(ah^2+cg^2\right)}$$

```
[Out] -(c*(8*c^3*f*g^7 + 20*a*c^2*f*g^5*h^2 - a^3*h^6*(2*f*g - 3*e*h) +
 a^2*c*g*h^4*(13*f*g^2 + 3*d*h^2) + h*(12*c^3*f*g^6 + 8*a^3*f*h^6
 + a^2*c*g*h^4*(34*f*g - 3*e*h) + a*c^2*g^2*h^2*(35*f*g^2 - 3*d*h
^2))*x)*Sqrt[a + c*x^2])/(8*h^5*(c*g^2 + a*h^2)^3*(g + h*x)^2) -
((4*c^2*f*g^5 - a^2*h^4*(2*f*g - 3*e*h) + a*c*g*h^2*(5*f*g^2 + 3*
d*h^2) + h*(4*a^2*f*h^4 + a*c*g*h^2*(14*f*g - 3*e*h) + c^2*(7*f*g
^4 - 3*d*g^2*h^2))*x)*(a + c*x^2)^(3/2))/(12*h^3*(c*g^2 + a*h^2)^
2*(g + h*x)^4) - ((f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(5/2))/(5*h
*(c*g^2 + a*h^2)*(g + h*x)^5) + (c^(3/2)*f*ArcTanh[(Sqrt[c]*x)/Sq
rt[a + c*x^2]])/h^6 + (c^2*(8*c^3*f*g^7 + 28*a*c^2*f*g^5*h^2 + 3*
a^3*h^6*(6*f*g - e*h) + a^2*c*g*h^4*(35*f*g^2 - 3*d*h^2))*ArcTanh
[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(8*h^6*(c*
g^2 + a*h^2)^(7/2))
```

Rubi [A] time = 1.97834, antiderivative size = 507, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.207

$$-\frac{(a+cx^2)^{3/2}\left(hx\left(4a^2fh^4+acgh^2(14fg-3eh)+c^2\left(7fg^4-3dg^2h^2\right)\right)-a^2h^4(2fg-3eh)+acgh^2\left(3dh^2+5fg^2\right)+4c^2fg^5\right.}{12h^3(g+hx)^4\left(ah^2+cg^2\right)^2}$$
$$+\frac{c^2\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(3a^3h^6(6fg-eh)+a^2cgh^4\left(35fg^2-3dh^2\right)+28ac^2fg^5h^2+8c^3fg^7\right)}{8h^6\left(ah^2+cg^2\right)^{7/2}}$$
$$-\frac{c\sqrt{a+cx^2}\left(-a^3h^6(2fg-3eh)+a^2cgh^4\left(3dh^2+13fg^2\right)+hx\left(8a^3fh^6+a^2cgh^4(34fg-3eh)+ac^2g^2h^2\left(35fg^2-3dh^2\right)+\right.\right.}{8h^5(g+hx)^2\left(ah^2+cg^2\right)^3}$$
$$+\frac{c^{3/2}f\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{h^6}-\frac{(a+cx^2)^{5/2}\left(dh^2-egh+fg^2\right)}{5h(g+hx)^5\left(ah^2+cg^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^6,x]
```

```
[Out] -(c*(8*c^3*f*g^7 + 20*a*c^2*f*g^5*h^2 - a^3*h^6*(2*f*g - 3*e*h) +
 a^2*c*g*h^4*(13*f*g^2 + 3*d*h^2) + h*(12*c^3*f*g^6 + 8*a^3*f*h^6
 + a^2*c*g*h^4*(34*f*g - 3*e*h) + a*c^2*g^2*h^2*(35*f*g^2 - 3*d*h
^2))*x)*Sqrt[a + c*x^2])/(8*h^5*(c*g^2 + a*h^2)^3*(g + h*x)^2) -
((4*c^2*f*g^5 - a^2*h^4*(2*f*g - 3*e*h) + a*c*g*h^2*(5*f*g^2 + 3*
d*h^2) + h*(4*a^2*f*h^4 + a*c*g*h^2*(14*f*g - 3*e*h) + c^2*(7*f*g
^4 - 3*d*g^2*h^2))*x)*(a + c*x^2)^(3/2))/(12*h^3*(c*g^2 + a*h^2)^
2*(g + h*x)^4) - ((f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(5/2))/(5*h
*(c*g^2 + a*h^2)*(g + h*x)^5) + (c^(3/2)*f*ArcTanh[(Sqrt[c]*x)/Sq
rt[a + c*x^2]])/h^6 + (c^2*(8*c^3*f*g^7 + 28*a*c^2*f*g^5*h^2 + 3*
a^3*h^6*(6*f*g - e*h) + a^2*c*g*h^4*(35*f*g^2 - 3*d*h^2))*ArcTanh
[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(8*h^6*(c*
g^2 + a*h^2)^(7/2))
```

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((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**6,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 5.41351, size = 639, normalized size = 1.26

$$\frac{\frac{15c^2\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)\left(-3a^3h^6(eh-6fg)+a^2cgh^4\left(35fg^2-3dh^2\right)+28ac^2fg^5h^2+8c^3fg^7\right)}{\left(ah^2+cg^2\right)^{7/2}}-\frac{15c^2\log(g+hx)\left(-3a^3h^6(eh-6fg)+a^2cgh^4\left(35fg^2-\right.\right.}{\left(ah^2+cg^2\right)^{7/2}}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^6,x]
```

```
[Out] (-((h*Sqrt[a + c*x^2]*(24*(c*g^2 + a*h^2)^4*(f*g^2 + h*(-(e*g) +
d*h)) - 6*(c*g^2 + a*h^2)^3*(21*c*f*g^3 + c*g*h*(-16*e*g + 11*d*h
) - 5*a*h^2*(-2*f*g + e*h))*(g + h*x) + 2*(c*g^2 + a*h^2)^2*(20*a
^2*f*h^4 + c^2*(137*f*g^4 + 9*g^2*h*(-8*e*g + 3*d*h)) + a*c*h^2*(
154*f*g^2 + 3*h*(-23*e*g + 8*d*h)))*(g + h*x)^2 - c*(c*g^2 + a*h^
2)*(5*a^2*h^4*(58*f*g - 15*e*h) + c^2*(326*f*g^5 + 6*g^3*h*(-16*e
```

```
*g + d*h)) + a*c*g*h^2*(631*f*g^2 + 3*h*(-62*e*g + 7*d*h)))*(g +
h*x)^3 + c*(160*a^3*f*h^6 + c^3*(274*f*g^6 - 6*g^4*h*(4*e*g + d*h
)) + 3*a^2*c*h^4*(238*f*g^2 + h*(-33*e*g + 8*d*h)) + 3*a*c^2*g^2*
h^2*(261*f*g^2 - h*(26*e*g + 9*d*h)))*(g + h*x)^4))/((c*g^2 + a*h
^2)^3*(g + h*x)^5)) - (15*c^2*(8*c^3*f*g^7 + 28*a*c^2*f*g^5*h^2 -
 3*a^3*h^6*(-6*f*g + e*h) + a^2*c*g*h^4*(35*f*g^2 - 3*d*h^2))*Log
[g + h*x])/(c*g^2 + a*h^2)^(7/2) + 120*c^(3/2)*f*Log[c*x + Sqrt[c
]*Sqrt[a + c*x^2]] + (15*c^2*(8*c^3*f*g^7 + 28*a*c^2*f*g^5*h^2 -
3*a^3*h^6*(-6*f*g + e*h) + a^2*c*g*h^4*(35*f*g^2 - 3*d*h^2))*Log[
a*h - c*g*x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]])/(c*g^2 + a*h^
2)^(7/2))/(120*h^6)
```

Maple [B] time = 0.055, size = 14169, normalized size = 28.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^6,x)

[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^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((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^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((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**6,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.690772, size = 4, normalized size = 0.01

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^6,x, algorithm="giac")
```

```
[Out] sage0*x
```

3.98 $\int \frac{(a+cx^2)^{3/2}(d+ex+fx^2)}{(g+hx)^7} \, dx$

Optimal. Leaf size=404

$$-\frac{(a+cx^2)^{3/2}(ah-cgx)\left(6a^2fh^2-ac\left(fg^2-h(7eg-dh)\right)+6c^2dg^2\right)}{24(g+hx)^4(ah^2+cg^2)^3}-\frac{ac\sqrt{a+cx^2}(ah-cgx)\left(6a^2fh^2-ac\left(fg^2-h(7eg-dh)\right)+6c^2dg^2\right)}{16(g+hx)^2(ah^2+cg^2)^4}-\frac{a^2c^2\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(6a^2fh^2-ac\left(fg^2-h(7eg-dh)\right)+6c^2dg^2\right)}{16(ah^2+cg^2)^{9/2}}+\frac{(a+cx^2)^{5/2}\left(6ah^2(2fg-eh)+cg\left(h(eg-7dh)+5fg^2\right)\right)}{30h(g+hx)^5(ah^2+cg^2)^2}-\frac{(a+cx^2)^{5/2}(dh^2-egh+fg^2)}{6h(g+hx)^6(ah^2+cg^2)}$$

```
[Out] -(a*c*(6*c^2*d*g^2 + 6*a^2*f*h^2 - a*c*(f*g^2 - h*(7*e*g - d*h)))
*(a*h - c*g*x)*Sqrt[a + c*x^2])/(16*(c*g^2 + a*h^2)^4*(g + h*x)^2
) - ((6*c^2*d*g^2 + 6*a^2*f*h^2 - a*c*(f*g^2 - h*(7*e*g - d*h)))*
(a*h - c*g*x)*(a + c*x^2)^(3/2))/(24*(c*g^2 + a*h^2)^3*(g + h*x)^
4) - ((f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(5/2))/(6*h*(c*g^2 + a*
h^2)*(g + h*x)^6) + ((6*a*h^2*(2*f*g - e*h) + c*g*(5*f*g^2 + h*(e
*g - 7*d*h)))*(a + c*x^2)^(5/2))/(30*h*(c*g^2 + a*h^2)^2*(g + h*x
)^5) - (a^2*c^2*(6*c^2*d*g^2 + 6*a^2*f*h^2 - a*c*(f*g^2 - h*(7*e*
g - d*h)))*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*
x^2])])/(16*(c*g^2 + a*h^2)^(9/2))
```

Rubi [A] time = 1.34809, antiderivative size = 403, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.172$

$$-\frac{(a+cx^2)^{3/2}(ah-cgx)\left(6a^2fh^2-ac\left(fg^2-h(7eg-dh)\right)+6c^2dg^2\right)}{24(g+hx)^4(ah^2+cg^2)^3}-\frac{ac\sqrt{a+cx^2}(ah-cgx)\left(6a^2fh^2-ac\left(fg^2-h(7eg-dh)\right)+6c^2dg^2\right)}{16(g+hx)^2(ah^2+cg^2)^4}-\frac{a^2c^2\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(6a^2fh^2-ac\left(fg^2-h(7eg-dh)\right)+6c^2dg^2\right)}{16(ah^2+cg^2)^{9/2}}-\frac{(a+cx^2)^{5/2}(dh^2-egh+fg^2)}{6h(g+hx)^6(ah^2+cg^2)}+\frac{(a+cx^2)^{5/2}\left(6ah^2(2fg-eh)+cgh(eg-7dh)+5cfg^3\right)}{30h(g+hx)^5(ah^2+cg^2)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^7,x]
```

```
[Out] -(a*c*(6*c^2*d*g^2 + 6*a^2*f*h^2 - a*c*(f*g^2 - h*(7*e*g - d*h)))
*(a*h - c*g*x)*Sqrt[a + c*x^2])/(16*(c*g^2 + a*h^2)^4*(g + h*x)^2
) - ((6*c^2*d*g^2 + 6*a^2*f*h^2 - a*c*(f*g^2 - h*(7*e*g - d*h)))*
(a*h - c*g*x)*(a + c*x^2)^(3/2))/(24*(c*g^2 + a*h^2)^3*(g + h*x)^
4) - ((f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(5/2))/(6*h*(c*g^2 + a*
h^2)*(g + h*x)^6) + ((5*c*f*g^3 + c*g*h*(e*g - 7*d*h) + 6*a*h^2*(
2*f*g - e*h))*(a + c*x^2)^(5/2))/(30*h*(c*g^2 + a*h^2)^2*(g + h*x
)^5) - (a^2*c^2*(6*c^2*d*g^2 + 6*a^2*f*h^2 - a*c*(f*g^2 - h*(7*e*
g - d*h)))*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*
x^2])])/(16*(c*g^2 + a*h^2)^(9/2))
```

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((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**7,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 5.11918, size = 696, normalized size = 1.72

$$\frac{1}{240}\left(-\frac{15a^2c^2\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)\left(6a^2fh^2-ac\left(h(dh-7eg)+fg^2\right)+6c^2dg^2\right)}{\left(ah^2+cg^2\right)^{9/2}}\right.$$
$$+\frac{15a^2c^2\log(g+hx)\left(6a^2fh^2-ac\left(h(dh-7eg)+fg^2\right)+6c^2dg^2\right)}{\left(ah^2+cg^2\right)^{9/2}}$$
$$-\frac{\sqrt{a+cx^2}\left(2(g+hx)^2\left(ah^2+cg^2\right)^3\left(30a^2fh^4+ach^2\left(h(35dh-101eg)+227fg^2\right)+2c^2\left(g^2h(19dh-52eg)+100fg^4\right)\right)-2\ldots\right.}{\ldots}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^7,x]
```

```
[Out] (-((Sqrt[a + c*x^2]*(40*(c*g^2 + a*h^2)^5*(f*g^2 + h*(-(e*g) + d*
h)) - 8*(c*g^2 + a*h^2)^4*(25*c*f*g^3 + c*g*h*(-19*e*g + 13*d*h)
- 6*a*h^2*(-2*f*g + e*h))*(g + h*x) + 2*(c*g^2 + a*h^2)^3*(30*a^2
```

```
*f*h^4 + 2*c^2*(100*f*g^4 + g^2*h*(-52*e*g + 19*d*h)) + a*c*h^2*(
227*f*g^2 + h*(-101*e*g + 35*d*h)))*(g + h*x)^2 - 2*c*(c*g^2 + a*
h^2)^2*(6*a^2*h^4*(31*f*g - 8*e*h) + 2*c^2*(100*f*g^5 + g^3*h*(-2
8*e*g + d*h)) + 3*a*c*g*h^2*(131*f*g^2 + h*(-37*e*g + 3*d*h)))*(g
 + h*x)^3 + c*(c*g^2 + a*h^2)*(150*a^3*f*h^6 + 4*c^3*(50*f*g^6 -
g^4*h*(2*e*g + d*h)) + 6*a*c^2*g^2*h^2*(99*f*g^2 - h*(5*e*g + 4*d
*h)) + 3*a^2*c*h^4*(193*f*g^2 + h*(-19*e*g + 5*d*h)))*(g + h*x)^4
 - c^2*(6*a^3*h^6*(41*f*g - 8*e*h) + 3*a^2*c*g*h^4*(89*f*g^2 + h*
(29*e*g - 27*d*h)) + 4*c^3*(10*f*g^7 + g^5*h*(2*e*g + d*h)) + 2*a
*c^2*g^3*h^2*(83*f*g^2 + h*(19*e*g + 14*d*h)))*(g + h*x)^5))/(h^5
*(c*g^2 + a*h^2)^4*(g + h*x)^6)) + (15*a^2*c^2*(6*c^2*d*g^2 + 6*a
^2*f*h^2 - a*c*(f*g^2 + h*(-7*e*g + d*h)))*Log[g + h*x])/(c*g^2 +
 a*h^2)^(9/2) - (15*a^2*c^2*(6*c^2*d*g^2 + 6*a^2*f*h^2 - a*c*(f*g
^2 + h*(-7*e*g + d*h)))*Log[a*h - c*g*x + Sqrt[c*g^2 + a*h^2]*Sqr
t[a + c*x^2]])/(c*g^2 + a*h^2)^(9/2))/240
```

Maple [B] time = 0.064, size = 17026, normalized size = 42.1

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^7,x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^7,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 19.604, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^7,x, algorithm="fricas")

[Out] [1/480*(2*(48*a^2*c^3*e*g^7 - 87*a^3*c^2*e*g^5*h^2 - 38*a^4*c*e*g
^3*h^4 - 8*a^5*e*g*h^6 - 40*a^5*d*h^7 - 3*(82*a^2*c^3*d - 27*a^3*
c^2*f)*g^6*h - (267*a^3*c^2*d + 28*a^4*c*f)*g^4*h^3 - 2*(83*a^4*c
*d + 2*a^5*f)*g^2*h^5 + (40*c^5*f*g^7 + 8*c^5*e*g^6*h + 38*a*c^4*
e*g^4*h^3 + 87*a^2*c^3*e*g^2*h^5 - 48*a^3*c^2*e*h^7 + 2*(2*c^5*d
+ 83*a*c^4*f)*g^5*h^2 + (28*a*c^4*d + 267*a^2*c^3*f)*g^3*h^4 - 3*
(27*a^2*c^3*d - 82*a^3*c^2*f)*g*h^6)*x^5 + 3*(16*c^5*e*g^7 + 76*a
*c^4*e*g^5*h^2 + 174*a^2*c^3*e*g^3*h^4 - 61*a^3*c^2*e*g*h^6 + 4*(
2*c^5*d + 3*a*c^4*f)*g^6*h + 2*(28*a*c^4*d + 27*a^2*c^3*f)*g^4*h^
3 - (132*a^2*c^3*d - 167*a^3*c^2*f)*g^2*h^5 - 5*(a^3*c^2*d + 10*a
^4*c*f)*h^7)*x^4 + 2*(43*a*c^4*e*g^6*h + 283*a^2*c^3*e*g^4*h^3 -
333*a^3*c^2*e*g^2*h^5 - 48*a^4*c*e*h^7 + 5*(6*c^5*d + 7*a*c^4*f)*
g^7 + (209*a*c^4*d + 161*a^2*c^3*f)*g^5*h^2 - (367*a^2*c^3*d - 53
7*a^3*c^2*f)*g^3*h^4 - 3*(7*a^3*c^2*d + 38*a^4*c*f)*g*h^6)*x^3 +
2*(48*a*c^4*e*g^7 + 333*a^2*c^3*e*g^5*h^2 - 283*a^3*c^2*e*g^3*h^4
 - 43*a^4*c*e*g*h^6 + 3*(38*a*c^4*d + 7*a^2*c^3*f)*g^6*h - (537*a
^2*c^3*d - 367*a^3*c^2*f)*g^4*h^3 - (161*a^3*c^2*d + 209*a^4*c*f)
*g^2*h^5 - 5*(7*a^4*c*d + 6*a^5*f)*h^7)*x^2 + 3*(61*a^2*c^3*e*g^6
*h - 174*a^3*c^2*e*g^4*h^3 - 76*a^4*c*e*g^2*h^5 - 16*a^5*e*h^7 +
5*(10*a*c^4*d + a^2*c^3*f)*g^7 - (167*a^2*c^3*d - 132*a^3*c^2*f)*
g^5*h^2 - 2*(27*a^3*c^2*d + 28*a^4*c*f)*g^3*h^4 - 4*(3*a^4*c*d +
2*a^5*f)*g*h^6)*x)*sqrt(c*g^2 + a*h^2)*sqrt(c*x^2 + a) + 15*(7*a^
3*c^3*e*g^7*h + (6*a^2*c^4*d - a^3*c^3*f)*g^8 - (a^3*c^3*d - 6*a^
4*c^2*f)*g^6*h^2 + (7*a^3*c^3*e*g*h^7 + (6*a^2*c^4*d - a^3*c^3*f)
*g^2*h^6 - (a^3*c^3*d - 6*a^4*c^2*f)*h^8)*x^6 + 6*(7*a^3*c^3*e*g^
2*h^6 + (6*a^2*c^4*d - a^3*c^3*f)*g^3*h^5 - (a^3*c^3*d - 6*a^4*c^
2*f)*g*h^7)*x^5 + 15*(7*a^3*c^3*e*g^3*h^5 + (6*a^2*c^4*d - a^3*c^
3*f)*g^4*h^4 - (a^3*c^3*d - 6*a^4*c^2*f)*g^2*h^6)*x^4 + 20*(7*a^3
*c^3*e*g^4*h^4 + (6*a^2*c^4*d - a^3*c^3*f)*g^5*h^3 - (a^3*c^3*d -
 6*a^4*c^2*f)*g^3*h^5)*x^3 + 15*(7*a^3*c^3*e*g^5*h^3 + (6*a^2*c^4
*d - a^3*c^3*f)*g^6*h^2 - (a^3*c^3*d - 6*a^4*c^2*f)*g^4*h^4)*x^2
+ 6*(7*a^3*c^3*e*g^6*h^2 + (6*a^2*c^4*d - a^3*c^3*f)*g^7*h - (a^3
*c^3*d - 6*a^4*c^2*f)*g^5*h^3)*x)*log(((2*a*c*g*h*x - a*c*g^2 - 2
*a^2*h^2 - (2*c^2*g^2 + a*c*h^2)*x^2)*sqrt(c*g^2 + a*h^2) + 2*(a*
c*g^2*h + a^2*h^3 - (c^2*g^3 + a*c*g*h^2)*x)*sqrt(c*x^2 + a))/(h^
2*x^2 + 2*g*h*x + g^2)))/((c^4*g^14 + 4*a*c^3*g^12*h^2 + 6*a^2*c^
2*g^10*h^4 + 4*a^3*c*g^8*h^6 + a^4*g^6*h^8 + (c^4*g^8*h^6 + 4*a*c
^3*g^6*h^8 + 6*a^2*c^2*g^4*h^10 + 4*a^3*c*g^2*h^12 + a^4*h^14)*x^
6 + 6*(c^4*g^9*h^5 + 4*a*c^3*g^7*h^7 + 6*a^2*c^2*g^5*h^9 + 4*a^3*
c*g^3*h^11 + a^4*g*h^13)*x^5 + 15*(c^4*g^10*h^4 + 4*a*c^3*g^8*h^6
 + 6*a^2*c^2*g^6*h^8 + 4*a^3*c*g^4*h^10 + a^4*g^2*h^12)*x^4 + 20*
(c^4*g^11*h^3 + 4*a*c^3*g^9*h^5 + 6*a^2*c^2*g^7*h^7 + 4*a^3*c*g^5
*h^9 + a^4*g^3*h^11)*x^3 + 15*(c^4*g^12*h^2 + 4*a*c^3*g^10*h^4 +
6*a^2*c^2*g^8*h^6 + 4*a^3*c*g^6*h^8 + a^4*g^4*h^10)*x^2 + 6*(c^4*
g^13*h + 4*a*c^3*g^11*h^3 + 6*a^2*c^2*g^9*h^5 + 4*a^3*c*g^7*h^7 +
 a^4*g^5*h^9)*x)*sqrt(c*g^2 + a*h^2)), 1/240*((48*a^2*c^3*e*g^7 -
 87*a^3*c^2*e*g^5*h^2 - 38*a^4*c*e*g^3*h^4 - 8*a^5*e*g*h^6 - 40*a
^5*d*h^7 - 3*(82*a^2*c^3*d - 27*a^3*c^2*f)*g^6*h - (267*a^3*c^2*d
 + 28*a^4*c*f)*g^4*h^3 - 2*(83*a^4*c*d + 2*a^5*f)*g^2*h^5 + (40*c
^5*f*g^7 + 8*c^5*e*g^6*h + 38*a*c^4*e*g^4*h^3 + 87*a^2*c^3*e*g^2*
h^5 - 48*a^3*c^2*e*h^7 + 2*(2*c^5*d + 83*a*c^4*f)*g^5*h^2 + (28*a
```

```
*c^4*d + 267*a^2*c^3*f)*g^3*h^4 - 3*(27*a^2*c^3*d - 82*a^3*c^2*f)
*g*h^6)*x^5 + 3*(16*c^5*e*g^7 + 76*a*c^4*e*g^5*h^2 + 174*a^2*c^3*
e*g^3*h^4 - 61*a^3*c^2*e*g*h^6 + 4*(2*c^5*d + 3*a*c^4*f)*g^6*h +
2*(28*a*c^4*d + 27*a^2*c^3*f)*g^4*h^3 - (132*a^2*c^3*d - 167*a^3*
c^2*f)*g^2*h^5 - 5*(a^3*c^2*d + 10*a^4*c*f)*h^7)*x^4 + 2*(43*a*c^
4*e*g^6*h + 283*a^2*c^3*e*g^4*h^3 - 333*a^3*c^2*e*g^2*h^5 - 48*a^
4*c*e*h^7 + 5*(6*c^5*d + 7*a*c^4*f)*g^7 + (209*a*c^4*d + 161*a^2*
c^3*f)*g^5*h^2 - (367*a^2*c^3*d - 537*a^3*c^2*f)*g^3*h^4 - 3*(7*a
^3*c^2*d + 38*a^4*c*f)*g*h^6)*x^3 + 2*(48*a*c^4*e*g^7 + 333*a^2*c
^3*e*g^5*h^2 - 283*a^3*c^2*e*g^3*h^4 - 43*a^4*c*e*g*h^6 + 3*(38*a
*c^4*d + 7*a^2*c^3*f)*g^6*h - (537*a^2*c^3*d - 367*a^3*c^2*f)*g^4
*h^3 - (161*a^3*c^2*d + 209*a^4*c*f)*g^2*h^5 - 5*(7*a^4*c*d + 6*a
^5*f)*h^7)*x^2 + 3*(61*a^2*c^3*e*g^6*h - 174*a^3*c^2*e*g^4*h^3 -
76*a^4*c*e*g^2*h^5 - 16*a^5*e*h^7 + 5*(10*a*c^4*d + a^2*c^3*f)*g^
7 - (167*a^2*c^3*d - 132*a^3*c^2*f)*g^5*h^2 - 2*(27*a^3*c^2*d + 2
8*a^4*c*f)*g^3*h^4 - 4*(3*a^4*c*d + 2*a^5*f)*g*h^6)*x)*sqrt(-c*g^
2 - a*h^2)*sqrt(c*x^2 + a) + 15*(7*a^3*c^3*e*g^7*h + (6*a^2*c^4*d
 - a^3*c^3*f)*g^8 - (a^3*c^3*d - 6*a^4*c^2*f)*g^6*h^2 + (7*a^3*c^
3*e*g*h^7 + (6*a^2*c^4*d - a^3*c^3*f)*g^2*h^6 - (a^3*c^3*d - 6*a^
4*c^2*f)*h^8)*x^6 + 6*(7*a^3*c^3*e*g^2*h^6 + (6*a^2*c^4*d - a^3*c
^3*f)*g^3*h^5 - (a^3*c^3*d - 6*a^4*c^2*f)*g*h^7)*x^5 + 15*(7*a^3*
c^3*e*g^3*h^5 + (6*a^2*c^4*d - a^3*c^3*f)*g^4*h^4 - (a^3*c^3*d -
6*a^4*c^2*f)*g^2*h^6)*x^4 + 20*(7*a^3*c^3*e*g^4*h^4 + (6*a^2*c^4*
d - a^3*c^3*f)*g^5*h^3 - (a^3*c^3*d - 6*a^4*c^2*f)*g^3*h^5)*x^3 +
 15*(7*a^3*c^3*e*g^5*h^3 + (6*a^2*c^4*d - a^3*c^3*f)*g^6*h^2 - (a
^3*c^3*d - 6*a^4*c^2*f)*g^4*h^4)*x^2 + 6*(7*a^3*c^3*e*g^6*h^2 + (
6*a^2*c^4*d - a^3*c^3*f)*g^7*h - (a^3*c^3*d - 6*a^4*c^2*f)*g^5*h^
3)*x)*arctan(sqrt(-c*g^2 - a*h^2)*(c*g*x - a*h)/((c*g^2 + a*h^2)*
sqrt(c*x^2 + a))))/((c^4*g^14 + 4*a*c^3*g^12*h^2 + 6*a^2*c^2*g^10
*h^4 + 4*a^3*c*g^8*h^6 + a^4*g^6*h^8 + (c^4*g^8*h^6 + 4*a*c^3*g^6
*h^8 + 6*a^2*c^2*g^4*h^10 + 4*a^3*c*g^2*h^12 + a^4*h^14)*x^6 + 6*
(c^4*g^9*h^5 + 4*a*c^3*g^7*h^7 + 6*a^2*c^2*g^5*h^9 + 4*a^3*c*g^3*
h^11 + a^4*g*h^13)*x^5 + 15*(c^4*g^10*h^4 + 4*a*c^3*g^8*h^6 + 6*a
^2*c^2*g^6*h^8 + 4*a^3*c*g^4*h^10 + a^4*g^2*h^12)*x^4 + 20*(c^4*g
^11*h^3 + 4*a*c^3*g^9*h^5 + 6*a^2*c^2*g^7*h^7 + 4*a^3*c*g^5*h^9 +
 a^4*g^3*h^11)*x^3 + 15*(c^4*g^12*h^2 + 4*a*c^3*g^10*h^4 + 6*a^2*
c^2*g^8*h^6 + 4*a^3*c*g^6*h^8 + a^4*g^4*h^10)*x^2 + 6*(c^4*g^13*h
 + 4*a*c^3*g^11*h^3 + 6*a^2*c^2*g^9*h^5 + 4*a^3*c*g^7*h^7 + a^4*g
^5*h^9)*x)*sqrt(-c*g^2 - a*h^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((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**7,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.702104, size = 4, normalized size = 0.01

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^7,x, algorithm="giac")
```

```
[Out] sage0*x
```

3.99 $\int \frac{(a+cx^2)^{3/2}(d+ex+fx^2)}{(g+hx)^8}\,dx$

Optimal. Leaf size=532

$$-\frac{(a+cx^2)^{5/2}\left(42a^2fh^4-ach^2\left(26fg^2-h(61eg-12dh)\right)-c^2g^2\left(h(2eg-51dh)+5fg^2\right)\right)}{210h(g+hx)^5\left(ah^2+cg^2\right)^3}$$
$$-\frac{ac^2\sqrt{a+cx^2}(ah-cgx)\left(a^2h^2(8fg-eh)-acg\left(fg^2-h(8eg-3dh)\right)+6c^2dg^3\right)}{16(g+hx)^2\left(ah^2+cg^2\right)^5}$$
$$-\frac{c\left(a+cx^2\right)^{3/2}(ah-cgx)\left(a^2h^2(8fg-eh)-acg\left(fg^2-h(8eg-3dh)\right)+6c^2dg^3\right)}{24(g+hx)^4\left(ah^2+cg^2\right)^4}$$
$$-\frac{a^2c^3\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(a^2h^2(8fg-eh)-acg\left(fg^2-h(8eg-3dh)\right)+6c^2dg^3\right)}{16\left(ah^2+cg^2\right)^{11/2}}$$
$$+\frac{\left(a+cx^2\right)^{5/2}\left(7ah^2(2fg-eh)+cg\left(h(2eg-9dh)+5fg^2\right)\right)}{42h(g+hx)^6\left(ah^2+cg^2\right)^2}-\frac{\left(a+cx^2\right)^{5/2}\left(dh^2-egh+fg^2\right)}{7h(g+hx)^7\left(ah^2+cg^2\right)}$$

```
[Out] -(a*c^2*(6*c^2*d*g^3 + a^2*h^2*(8*f*g - e*h) - a*c*g*(f*g^2 - h*(
8*e*g - 3*d*h)))*(a*h - c*g*x)*Sqrt[a + c*x^2])/(16*(c*g^2 + a*h^
2)^5*(g + h*x)^2) - (c*(6*c^2*d*g^3 + a^2*h^2*(8*f*g - e*h) - a*c
*g*(f*g^2 - h*(8*e*g - 3*d*h)))*(a*h - c*g*x)*(a + c*x^2)^(3/2))/
(24*(c*g^2 + a*h^2)^4*(g + h*x)^4) - ((f*g^2 - e*g*h + d*h^2)*(a
+ c*x^2)^(5/2))/(7*h*(c*g^2 + a*h^2)*(g + h*x)^7) + ((7*a*h^2*(2*
f*g - e*h) + c*g*(5*f*g^2 + h*(2*e*g - 9*d*h)))*(a + c*x^2)^(5/2)
)/(42*h*(c*g^2 + a*h^2)^2*(g + h*x)^6) - ((42*a^2*f*h^4 - c^2*g^2
*(5*f*g^2 + h*(2*e*g - 51*d*h)) - a*c*h^2*(26*f*g^2 - h*(61*e*g -
 12*d*h)))*(a + c*x^2)^(5/2))/(210*h*(c*g^2 + a*h^2)^3*(g + h*x)^
5) - (a^2*c^3*(6*c^2*d*g^3 + a^2*h^2*(8*f*g - e*h) - a*c*g*(f*g^2
 - h*(8*e*g - 3*d*h)))*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]
*Sqrt[a + c*x^2])])/(16*(c*g^2 + a*h^2)^(11/2))
```

Rubi [A] time = 2.20222, antiderivative size = 531, normalized size of antiderivative = 1., number of

steps used = 7, number of rules used = 6, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.207$

$$-\frac{(a+cx^2)^{5/2}\left(42a^2fh^4-ach^2\left(26fg^2-h(61eg-12dh)\right)-c^2\left(g^2h(2eg-51dh)+5fg^4\right)\right)}{210h(g+hx)^5\left(ah^2+cg^2\right)^3}-\frac{ac^2\sqrt{a+cx^2}(ah-cgx)\left(a^2h^2(8fg-eh)-acg\left(fg^2-h(8eg-3dh)\right)+6c^2dg^3\right)}{16(g+hx)^2\left(ah^2+cg^2\right)^5}-\frac{c\left(a+cx^2\right)^{3/2}(ah-cgx)\left(a^2h^2(8fg-eh)-acg\left(fg^2-h(8eg-3dh)\right)+6c^2dg^3\right)}{24(g+hx)^4\left(ah^2+cg^2\right)^4}-\frac{a^2c^3\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(a^2h^2(8fg-eh)-acg\left(fg^2-h(8eg-3dh)\right)+6c^2dg^3\right)}{16\left(ah^2+cg^2\right)^{11/2}}-\frac{\left(a+cx^2\right)^{5/2}\left(dh^2-egh+fg^2\right)}{7h(g+hx)^7\left(ah^2+cg^2\right)}+\frac{\left(a+cx^2\right)^{5/2}\left(7ah^2(2fg-eh)+cgh(2eg-9dh)+5cfg^3\right)}{42h(g+hx)^6\left(ah^2+cg^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^8,x]
```

```
[Out] -(a*c^2*(6*c^2*d*g^3 + a^2*h^2*(8*f*g - e*h) - a*c*g*(f*g^2 - h*(
8*e*g - 3*d*h)))*(a*h - c*g*x)*Sqrt[a + c*x^2])/(16*(c*g^2 + a*h^
2)^5*(g + h*x)^2) - (c*(6*c^2*d*g^3 + a^2*h^2*(8*f*g - e*h) - a*c
*g*(f*g^2 - h*(8*e*g - 3*d*h)))*(a*h - c*g*x)*(a + c*x^2)^(3/2))/
(24*(c*g^2 + a*h^2)^4*(g + h*x)^4) - ((f*g^2 - e*g*h + d*h^2)*(a
+ c*x^2)^(5/2))/(7*h*(c*g^2 + a*h^2)*(g + h*x)^7) + ((5*c*f*g^3 +
 c*g*h*(2*e*g - 9*d*h) + 7*a*h^2*(2*f*g - e*h))*(a + c*x^2)^(5/2)
)/(42*h*(c*g^2 + a*h^2)^2*(g + h*x)^6) - ((42*a^2*f*h^4 - c^2*(5*
f*g^4 + g^2*h*(2*e*g - 51*d*h)) - a*c*h^2*(26*f*g^2 - h*(61*e*g -
 12*d*h)))*(a + c*x^2)^(5/2))/(210*h*(c*g^2 + a*h^2)^3*(g + h*x)^
5) - (a^2*c^3*(6*c^2*d*g^3 + a^2*h^2*(8*f*g - e*h) - a*c*g*(f*g^2
 - h*(8*e*g - 3*d*h)))*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]
*Sqrt[a + c*x^2])])/(16*(c*g^2 + a*h^2)^(11/2))
```

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((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**8,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 4.98036, size = 863, normalized size = 1.62

$$\frac{a^2\left(6c^2dg^3-ac\left(fg^2+h(3dh-8eg)\right)g+a^2h^2(8fg-eh)\right)\log(g+hx)c^3}{16\left(cg^2+ah^2\right)^{11/2}}-\frac{a^2\left(6c^2dg^3-ac\left(fg^2+h(3dh-8eg)\right)g+a^2h^2(8fg-eh)\right)\log\left(ah-cgx+\sqrt{cg^2+ah^2}\sqrt{cx^2+a}\right)c^3}{16\left(cg^2+ah^2\right)^{11/2}}-\frac{\sqrt{cx^2+a}\left(240\left(fg^2+h(dh-eg)\right)\left(cg^2+ah^2\right)^6-40\left(29cfg^3+ch(15dh-22eg)g-7ah^2(eh-2fg)\right)(g+hx)\left(cg^2+ah^2\right)^5\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^8,x]
```

```
[Out] -(Sqrt[a + c*x^2]*(240*(c*g^2 + a*h^2)^6*(f*g^2 + h*(-(e*g) + d*h
)) - 40*(c*g^2 + a*h^2)^5*(29*c*f*g^3 + c*g*h*(-22*e*g + 15*d*h)
- 7*a*h^2*(-2*f*g + e*h))*(g + h*x) + 8*(c*g^2 + a*h^2)^4*(42*a^2
*f*h^4 + a*c*h^2*(314*f*g^2 + h*(-139*e*g + 48*d*h)) + c^2*(275*f
*g^4 + g^2*h*(-142*e*g + 51*d*h)))*(g + h*x)^2 - 2*c*(c*g^2 + a*h
^2)^3*(7*a^2*h^4*(136*f*g - 35*e*h) + 2*c^2*(500*f*g^5 + g^3*h*(-
136*e*g + 3*d*h)) + a*c*g*h^2*(1979*f*g^2 + h*(-544*e*g + 33*d*h)
))*(g + h*x)^3 + 2*c*(c*g^2 + a*h^2)^2*(336*a^3*f*h^6 + c^3*(400*
f*g^6 - 2*g^4*h*(4*e*g + 3*d*h)) + 3*a^2*c*h^4*(400*f*g^2 + h*(-2
9*e*g + 8*d*h)) + a*c^2*g^2*h^2*(1201*f*g^2 - h*(32*e*g + 45*d*h)
))*(g + h*x)^4 - c^2*(c*g^2 + a*h^2)*(21*a^3*h^6*(24*f*g - 5*e*h)
 + 2*a*c^2*g^3*h^2*(89*f*g^2 + 44*e*g*h + 54*d*h^2) + 3*a^2*c*g*h
^4*(109*f*g^2 + h*(94*e*g - 73*d*h)) + 4*c^3*(10*f*g^7 + g^5*h*(4
*e*g + 3*d*h)))*(g + h*x)^5 - c^2*(-336*a^4*f*h^8 + 2*a*c^3*g^4*h
^2*(109*f*g^2 + 52*e*g*h + 60*d*h^2) + a^2*c^2*g^2*h^4*(505*f*g^2
 + h*(370*e*g - 741*d*h)) + 4*c^4*(10*f*g^8 + g^6*h*(4*e*g + 3*d*
h)) + 3*a^3*c*h^6*(312*f*g^2 + h*(-221*e*g + 32*d*h)))*(g + h*x)^
6))/(1680*(c*g^2*h + a*h^3)^5*(g + h*x)^7) + (a^2*c^3*(6*c^2*d*g^
3 + a^2*h^2*(8*f*g - e*h) - a*c*g*(f*g^2 + h*(-8*e*g + 3*d*h)))*L
og[g + h*x])/(16*(c*g^2 + a*h^2)^(11/2)) - (a^2*c^3*(6*c^2*d*g^3
+ a^2*h^2*(8*f*g - e*h) - a*c*g*(f*g^2 + h*(-8*e*g + 3*d*h)))*Log
[a*h - c*g*x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]])/(16*(c*g^2 +
 a*h^2)^(11/2))
```

Maple [B] time = 0.085, size = 19093, normalized size = 35.9

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^8,x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^8,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 34.2971, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^8,x, algorithm="fricas")
```

```
[Out] [1/3360*(2*(336*a^2*c^4*e*g^9 - 936*a^3*c^3*e*g^7*h^2 - 505*a^4*c
^2*e*g^5*h^4 - 218*a^5*c*e*g^3*h^6 - 40*a^6*e*g*h^8 - 240*a^6*d*h
^9 - 3*(686*a^2*c^4*d - 221*a^3*c^3*f)*g^8*h - 5*(531*a^3*c^3*d +
 74*a^4*c^2*f)*g^6*h^3 - 2*(1263*a^4*c^2*d + 52*a^5*c*f)*g^4*h^5
- 8*(153*a^5*c*d + 2*a^6*f)*g^2*h^7 + (40*c^6*f*g^8*h + 16*c^6*e*
g^7*h^2 + 104*a*c^5*e*g^5*h^4 + 370*a^2*c^4*e*g^3*h^6 - 663*a^3*c
^3*e*g*h^8 + 2*(6*c^6*d + 109*a*c^5*f)*g^6*h^3 + 5*(24*a*c^5*d +
101*a^2*c^4*f)*g^4*h^5 - 39*(19*a^2*c^4*d - 24*a^3*c^3*f)*g^2*h^7
 + 48*(2*a^3*c^3*d - 7*a^4*c^2*f)*h^9)*x^6 + 7*(40*c^6*f*g^9 + 16
*c^6*e*g^8*h + 104*a*c^5*e*g^6*h^3 + 370*a^2*c^4*e*g^4*h^5 - 543*
a^3*c^3*e*g^2*h^7 - 15*a^4*c^2*e*h^9 + 2*(6*c^6*d + 109*a*c^5*f)*
g^7*h^2 + 5*(24*a*c^5*d + 101*a^2*c^4*f)*g^5*h^4 - 3*(217*a^2*c^4
*d - 307*a^3*c^3*f)*g^3*h^6 + 3*(17*a^3*c^3*d - 72*a^4*c^2*f)*g*h
^8)*x^5 + (336*c^6*e*g^9 + 2176*a*c^5*e*g^7*h^2 + 7718*a^2*c^4*e*
g^5*h^4 - 8648*a^3*c^3*e*g^3*h^6 - 351*a^4*c^2*e*g*h^8 + 2*(126*c
^6*d + 179*a*c^5*f)*g^8*h + 2*(1257*a*c^5*d + 1048*a^2*c^4*f)*g^6
*h^3 - (11526*a^2*c^4*d - 10321*a^3*c^3*f)*g^4*h^5 + 3*(113*a^3*c
^3*d - 2088*a^4*c^2*f)*g^2*h^7 - 48*(a^4*c^2*d + 14*a^5*c*f)*h^9)
*x^4 + 14*(56*a*c^5*e*g^8*h + 499*a^2*c^4*e*g^6*h^3 - 1080*a^3*c^
3*e*g^4*h^5 - 208*a^4*c^2*e*g^2*h^7 - 35*a^5*c*e*h^9 + 5*(6*c^6*d
 + 7*a*c^5*f)*g^9 + (297*a*c^5*d + 208*a^2*c^4*f)*g^7*h^2 - 1080*
(a^2*c^4*d - a^3*c^3*f)*g^5*h^4 - (6*a^3*c^3*d + 499*a^4*c^2*f)*g
^3*h^6 - (9*a^4*c^2*d + 56*a^5*c*f)*g*h^8)*x^3 + (672*a*c^5*e*g^9
 + 6264*a^2*c^4*e*g^7*h^2 - 10321*a^3*c^3*e*g^5*h^4 - 2096*a^4*c^
2*e*g^3*h^6 - 358*a^5*c*e*g*h^8 + 3*(658*a*c^5*d + 117*a^2*c^4*f)
```

*g^8*h - (14643*a^2*c^4*d - 8648*a^3*c^3*f)*g^6*h^3 - 2*(2046*a^3
*c^3*d + 3859*a^4*c^2*f)*g^4*h^5 - 2*(1017*a^4*c^2*d + 1088*a^5*c
*f)*g^2*h^7 - 48*(8*a^5*c*d + 7*a^6*f)*h^9)*x^2 + 7*(216*a^2*c^4*
e*g^8*h - 921*a^3*c^3*e*g^6*h^3 - 505*a^4*c^2*e*g^4*h^5 - 218*a^5
*c*e*g^2*h^7 - 40*a^6*e*h^9 + 15*(10*a*c^5*d + a^2*c^4*f)*g^9 - 3
*(271*a^2*c^4*d - 181*a^3*c^3*f)*g^7*h^2 - 5*(51*a^3*c^3*d + 74*a
^4*c^2*f)*g^5*h^4 - 2*(63*a^4*c^2*d + 52*a^5*c*f)*g^3*h^6 - 8*(3*
a^5*c*d + 2*a^6*f)*g*h^8)*x)*sqrt(c*g^2 + a*h^2)*sqrt(c*x^2 + a)
- 105*(8*a^3*c^4*e*g^9*h - a^4*c^3*e*g^7*h^3 + (6*a^2*c^5*d - a^3
*c^4*f)*g^10 - (3*a^3*c^4*d - 8*a^4*c^3*f)*g^8*h^2 + (8*a^3*c^4*e
*g^2*h^8 - a^4*c^3*e*h^10 + (6*a^2*c^5*d - a^3*c^4*f)*g^3*h^7 - (
3*a^3*c^4*d - 8*a^4*c^3*f)*g*h^9)*x^7 + 7*(8*a^3*c^4*e*g^3*h^7 -
a^4*c^3*e*g*h^9 + (6*a^2*c^5*d - a^3*c^4*f)*g^4*h^6 - (3*a^3*c^4*
d - 8*a^4*c^3*f)*g^2*h^8)*x^6 + 21*(8*a^3*c^4*e*g^4*h^6 - a^4*c^3
*e*g^2*h^8 + (6*a^2*c^5*d - a^3*c^4*f)*g^5*h^5 - (3*a^3*c^4*d - 8
*a^4*c^3*f)*g^3*h^7)*x^5 + 35*(8*a^3*c^4*e*g^5*h^5 - a^4*c^3*e*g^
3*h^7 + (6*a^2*c^5*d - a^3*c^4*f)*g^6*h^4 - (3*a^3*c^4*d - 8*a^4*
c^3*f)*g^4*h^6)*x^4 + 35*(8*a^3*c^4*e*g^6*h^4 - a^4*c^3*e*g^4*h^6
 + (6*a^2*c^5*d - a^3*c^4*f)*g^7*h^3 - (3*a^3*c^4*d - 8*a^4*c^3*f
)*g^5*h^5)*x^3 + 21*(8*a^3*c^4*e*g^7*h^3 - a^4*c^3*e*g^5*h^5 + (6
*a^2*c^5*d - a^3*c^4*f)*g^8*h^2 - (3*a^3*c^4*d - 8*a^4*c^3*f)*g^6
*h^4)*x^2 + 7*(8*a^3*c^4*e*g^8*h^2 - a^4*c^3*e*g^6*h^4 + (6*a^2*c
^5*d - a^3*c^4*f)*g^9*h - (3*a^3*c^4*d - 8*a^4*c^3*f)*g^7*h^3)*x)
*log(((2*a*c*g*h*x - a*c*g^2 - 2*a^2*h^2 - (2*c^2*g^2 + a*c*h^2)*
x^2)*sqrt(c*g^2 + a*h^2) - 2*(a*c*g^2*h + a^2*h^3 - (c^2*g^3 + a*
c*g*h^2)*x)*sqrt(c*x^2 + a))/(h^2*x^2 + 2*g*h*x + g^2)))/((c^5*g^
17 + 5*a*c^4*g^15*h^2 + 10*a^2*c^3*g^13*h^4 + 10*a^3*c^2*g^11*h^6
 + 5*a^4*c*g^9*h^8 + a^5*g^7*h^10 + (c^5*g^10*h^7 + 5*a*c^4*g^8*h
^9 + 10*a^2*c^3*g^6*h^11 + 10*a^3*c^2*g^4*h^13 + 5*a^4*c*g^2*h^15
 + a^5*h^17)*x^7 + 7*(c^5*g^11*h^6 + 5*a*c^4*g^9*h^8 + 10*a^2*c^3
*g^7*h^10 + 10*a^3*c^2*g^5*h^12 + 5*a^4*c*g^3*h^14 + a^5*g*h^16)*
x^6 + 21*(c^5*g^12*h^5 + 5*a*c^4*g^10*h^7 + 10*a^2*c^3*g^8*h^9 +
10*a^3*c^2*g^6*h^11 + 5*a^4*c*g^4*h^13 + a^5*g^2*h^15)*x^5 + 35*(
c^5*g^13*h^4 + 5*a*c^4*g^11*h^6 + 10*a^2*c^3*g^9*h^8 + 10*a^3*c^2
*g^7*h^10 + 5*a^4*c*g^5*h^12 + a^5*g^3*h^14)*x^4 + 35*(c^5*g^14*h
^3 + 5*a*c^4*g^12*h^5 + 10*a^2*c^3*g^10*h^7 + 10*a^3*c^2*g^8*h^9
+ 5*a^4*c*g^6*h^11 + a^5*g^4*h^13)*x^3 + 21*(c^5*g^15*h^2 + 5*a*c
^4*g^13*h^4 + 10*a^2*c^3*g^11*h^6 + 10*a^3*c^2*g^9*h^8 + 5*a^4*c*
g^7*h^10 + a^5*g^5*h^12)*x^2 + 7*(c^5*g^16*h + 5*a*c^4*g^14*h^3 +
 10*a^2*c^3*g^12*h^5 + 10*a^3*c^2*g^10*h^7 + 5*a^4*c*g^8*h^9 + a^
5*g^6*h^11)*x)*sqrt(c*g^2 + a*h^2)), 1/1680*((336*a^2*c^4*e*g^9 -
 936*a^3*c^3*e*g^7*h^2 - 505*a^4*c^2*e*g^5*h^4 - 218*a^5*c*e*g^3*
h^6 - 40*a^6*e*g*h^8 - 240*a^6*d*h^9 - 3*(686*a^2*c^4*d - 221*a^3
*c^3*f)*g^8*h - 5*(531*a^3*c^3*d + 74*a^4*c^2*f)*g^6*h^3 - 2*(126
3*a^4*c^2*d + 52*a^5*c*f)*g^4*h^5 - 8*(153*a^5*c*d + 2*a^6*f)*g^2
*h^7 + (40*c^6*f*g^8*h + 16*c^6*e*g^7*h^2 + 104*a*c^5*e*g^5*h^4 +
 370*a^2*c^4*e*g^3*h^6 - 663*a^3*c^3*e*g*h^8 + 2*(6*c^6*d + 109*a
*c^5*f)*g^6*h^3 + 5*(24*a*c^5*d + 101*a^2*c^4*f)*g^4*h^5 - 39*(19
*a^2*c^4*d - 24*a^3*c^3*f)*g^2*h^7 + 48*(2*a^3*c^3*d - 7*a^4*c^2*
f)*h^9)*x^6 + 7*(40*c^6*f*g^9 + 16*c^6*e*g^8*h + 104*a*c^5*e*g^6*
h^3 + 370*a^2*c^4*e*g^4*h^5 - 543*a^3*c^3*e*g^2*h^7 - 15*a^4*c^2*
e*h^9 + 2*(6*c^6*d + 109*a*c^5*f)*g^7*h^2 + 5*(24*a*c^5*d + 101*a
^2*c^4*f)*g^5*h^4 - 3*(217*a^2*c^4*d - 307*a^3*c^3*f)*g^3*h^6 + 3
*(17*a^3*c^3*d - 72*a^4*c^2*f)*g*h^8)*x^5 + (336*c^6*e*g^9 + 2176

*a*c^5*e*g^7*h^2 + 7718*a^2*c^4*e*g^5*h^4 - 8648*a^3*c^3*e*g^3*h^
6 - 351*a^4*c^2*e*g*h^8 + 2*(126*c^6*d + 179*a*c^5*f)*g^8*h + 2*(
1257*a*c^5*d + 1048*a^2*c^4*f)*g^6*h^3 - (11526*a^2*c^4*d - 10321
*a^3*c^3*f)*g^4*h^5 + 3*(113*a^3*c^3*d - 2088*a^4*c^2*f)*g^2*h^7
- 48*(a^4*c^2*d + 14*a^5*c*f)*h^9)*x^4 + 14*(56*a*c^5*e*g^8*h + 4
99*a^2*c^4*e*g^6*h^3 - 1080*a^3*c^3*e*g^4*h^5 - 208*a^4*c^2*e*g^2
*h^7 - 35*a^5*c*e*h^9 + 5*(6*c^6*d + 7*a*c^5*f)*g^9 + (297*a*c^5*
d + 208*a^2*c^4*f)*g^7*h^2 - 1080*(a^2*c^4*d - a^3*c^3*f)*g^5*h^4
 - (6*a^3*c^3*d + 499*a^4*c^2*f)*g^3*h^6 - (9*a^4*c^2*d + 56*a^5*
c*f)*g*h^8)*x^3 + (672*a*c^5*e*g^9 + 6264*a^2*c^4*e*g^7*h^2 - 103
21*a^3*c^3*e*g^5*h^4 - 2096*a^4*c^2*e*g^3*h^6 - 358*a^5*c*e*g*h^8
 + 3*(658*a*c^5*d + 117*a^2*c^4*f)*g^8*h - (14643*a^2*c^4*d - 864
8*a^3*c^3*f)*g^6*h^3 - 2*(2046*a^3*c^3*d + 3859*a^4*c^2*f)*g^4*h^
5 - 2*(1017*a^4*c^2*d + 1088*a^5*c*f)*g^2*h^7 - 48*(8*a^5*c*d + 7
*a^6*f)*h^9)*x^2 + 7*(216*a^2*c^4*e*g^8*h - 921*a^3*c^3*e*g^6*h^3
 - 505*a^4*c^2*e*g^4*h^5 - 218*a^5*c*e*g^2*h^7 - 40*a^6*e*h^9 + 1
5*(10*a*c^5*d + a^2*c^4*f)*g^9 - 3*(271*a^2*c^4*d - 181*a^3*c^3*f
)*g^7*h^2 - 5*(51*a^3*c^3*d + 74*a^4*c^2*f)*g^5*h^4 - 2*(63*a^4*c
^2*d + 52*a^5*c*f)*g^3*h^6 - 8*(3*a^5*c*d + 2*a^6*f)*g*h^8)*x)*sq
rt(-c*g^2 - a*h^2)*sqrt(c*x^2 + a) + 105*(8*a^3*c^4*e*g^9*h - a^4
*c^3*e*g^7*h^3 + (6*a^2*c^5*d - a^3*c^4*f)*g^10 - (3*a^3*c^4*d -
8*a^4*c^3*f)*g^8*h^2 + (8*a^3*c^4*e*g^2*h^8 - a^4*c^3*e*h^10 + (6
*a^2*c^5*d - a^3*c^4*f)*g^3*h^7 - (3*a^3*c^4*d - 8*a^4*c^3*f)*g*h
^9)*x^7 + 7*(8*a^3*c^4*e*g^3*h^7 - a^4*c^3*e*g*h^9 + (6*a^2*c^5*d
 - a^3*c^4*f)*g^4*h^6 - (3*a^3*c^4*d - 8*a^4*c^3*f)*g^2*h^8)*x^6
+ 21*(8*a^3*c^4*e*g^4*h^6 - a^4*c^3*e*g^2*h^8 + (6*a^2*c^5*d - a^
3*c^4*f)*g^5*h^5 - (3*a^3*c^4*d - 8*a^4*c^3*f)*g^3*h^7)*x^5 + 35*
(8*a^3*c^4*e*g^5*h^5 - a^4*c^3*e*g^3*h^7 + (6*a^2*c^5*d - a^3*c^4
*f)*g^6*h^4 - (3*a^3*c^4*d - 8*a^4*c^3*f)*g^4*h^6)*x^4 + 35*(8*a^
3*c^4*e*g^6*h^4 - a^4*c^3*e*g^4*h^6 + (6*a^2*c^5*d - a^3*c^4*f)*g
^7*h^3 - (3*a^3*c^4*d - 8*a^4*c^3*f)*g^5*h^5)*x^3 + 21*(8*a^3*c^4
*e*g^7*h^3 - a^4*c^3*e*g^5*h^5 + (6*a^2*c^5*d - a^3*c^4*f)*g^8*h^
2 - (3*a^3*c^4*d - 8*a^4*c^3*f)*g^6*h^4)*x^2 + 7*(8*a^3*c^4*e*g^8
*h^2 - a^4*c^3*e*g^6*h^4 + (6*a^2*c^5*d - a^3*c^4*f)*g^9*h - (3*a
^3*c^4*d - 8*a^4*c^3*f)*g^7*h^3)*x)*arctan(sqrt(-c*g^2 - a*h^2)*(
c*g*x - a*h)/((c*g^2 + a*h^2)*sqrt(c*x^2 + a))))/((c^5*g^17 + 5*a
*c^4*g^15*h^2 + 10*a^2*c^3*g^13*h^4 + 10*a^3*c^2*g^11*h^6 + 5*a^4
*c*g^9*h^8 + a^5*g^7*h^10 + (c^5*g^10*h^7 + 5*a*c^4*g^8*h^9 + 10*
a^2*c^3*g^6*h^11 + 10*a^3*c^2*g^4*h^13 + 5*a^4*c*g^2*h^15 + a^5*h
^17)*x^7 + 7*(c^5*g^11*h^6 + 5*a*c^4*g^9*h^8 + 10*a^2*c^3*g^7*h^1
0 + 10*a^3*c^2*g^5*h^12 + 5*a^4*c*g^3*h^14 + a^5*g*h^16)*x^6 + 21
*(c^5*g^12*h^5 + 5*a*c^4*g^10*h^7 + 10*a^2*c^3*g^8*h^9 + 10*a^3*c
^2*g^6*h^11 + 5*a^4*c*g^4*h^13 + a^5*g^2*h^15)*x^5 + 35*(c^5*g^13
*h^4 + 5*a*c^4*g^11*h^6 + 10*a^2*c^3*g^9*h^8 + 10*a^3*c^2*g^7*h^1
0 + 5*a^4*c*g^5*h^12 + a^5*g^3*h^14)*x^4 + 35*(c^5*g^14*h^3 + 5*a
*c^4*g^12*h^5 + 10*a^2*c^3*g^10*h^7 + 10*a^3*c^2*g^8*h^9 + 5*a^4*
c*g^6*h^11 + a^5*g^4*h^13)*x^3 + 21*(c^5*g^15*h^2 + 5*a*c^4*g^13*
h^4 + 10*a^2*c^3*g^11*h^6 + 10*a^3*c^2*g^9*h^8 + 5*a^4*c*g^7*h^10
 + a^5*g^5*h^12)*x^2 + 7*(c^5*g^16*h + 5*a*c^4*g^14*h^3 + 10*a^2*
c^3*g^12*h^5 + 10*a^3*c^2*g^10*h^7 + 5*a^4*c*g^8*h^9 + a^5*g^6*h^
11)*x)*sqrt(-c*g^2 - a*h^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((c*x**2+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**8,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.742085, size = 4, normalized size = 0.01

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x^2 + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^8,x, algorithm="giac")
```

```
[Out] sage0*x
```

3.100 $\int \left(a+cx^2\right)^{5/2} \left(A+Bx+Cx^2\right) \, dx$

Optimal. Leaf size=168

$$\frac{5a^3(8Ac-aC)\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{128c^{3/2}}+\frac{5a^2x\sqrt{a+cx^2}(8Ac-aC)}{128c}+\frac{x\left(a+cx^2\right)^{5/2}(8Ac-aC)}{48c}+\frac{5ax\left(a+cx^2\right)^{3/2}(8Ac-aC)}{192c}+\frac{B\left(a+cx^2\right)^{7/2}}{7c}+\frac{Cx\left(a+cx^2\right)^{7/2}}{8c}$$

```
[Out] (5*a^2*(8*A*c - a*C)*x*Sqrt[a + c*x^2])/(128*c) + (5*a*(8*A*c - a
*C)*x*(a + c*x^2)^(3/2))/(192*c) + ((8*A*c - a*C)*x*(a + c*x^2)^(
5/2))/(48*c) + (B*(a + c*x^2)^(7/2))/(7*c) + (C*x*(a + c*x^2)^(7/
2))/(8*c) + (5*a^3*(8*A*c - a*C)*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x
^2]])/(128*c^(3/2))
```

Rubi [A] time = 0.217109, antiderivative size = 168, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$\frac{5a^3(8Ac-aC)\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{128c^{3/2}}+\frac{5a^2x\sqrt{a+cx^2}(8Ac-aC)}{128c}+\frac{x\left(a+cx^2\right)^{5/2}(8Ac-aC)}{48c}+\frac{5ax\left(a+cx^2\right)^{3/2}(8Ac-aC)}{192c}+\frac{B\left(a+cx^2\right)^{7/2}}{7c}+\frac{Cx\left(a+cx^2\right)^{7/2}}{8c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + c*x^2)^(5/2)*(A + B*x + C*x^2),x]
```

```
[Out] (5*a^2*(8*A*c - a*C)*x*Sqrt[a + c*x^2])/(128*c) + (5*a*(8*A*c - a
*C)*x*(a + c*x^2)^(3/2))/(192*c) + ((8*A*c - a*C)*x*(a + c*x^2)^(
5/2))/(48*c) + (B*(a + c*x^2)^(7/2))/(7*c) + (C*x*(a + c*x^2)^(7/
2))/(8*c) + (5*a^3*(8*A*c - a*C)*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x
^2]])/(128*c^(3/2))
```

Rubi in Sympy [A] time = 15.699, size = 139, normalized size = 0.83

$$\frac{5a^3\left(8Ac-Ca\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{128c^{\frac{3}{2}}}+\frac{5a^2x\sqrt{a+cx^2}\left(8Ac-Ca\right)}{128c}+\frac{5ax\left(a+cx^2\right)^{\frac{3}{2}}\left(8Ac-Ca\right)}{192c}+\frac{x\left(a+cx^2\right)^{\frac{5}{2}}\left(8Ac-Ca\right)}{48c}+\frac{\left(8B+7Cx\right)\left(a+cx^2\right)^{\frac{7}{2}}}{56c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+a)**(5/2)*(C*x**2+B*x+A),x)
```

```
[Out] 5*a**3*(8*A*c - C*a)*atanh(sqrt(c)*x/sqrt(a + c*x**2))/(128*c**(3
/2)) + 5*a**2*x*sqrt(a + c*x**2)*(8*A*c - C*a)/(128*c) + 5*a*x*(a
 + c*x**2)**(3/2)*(8*A*c - C*a)/(192*c) + x*(a + c*x**2)**(5/2)*(
8*A*c - C*a)/(48*c) + (8*B + 7*C*x)*(a + c*x**2)**(7/2)/(56*c)
```

Mathematica [A] time = 0.222095, size = 143, normalized size = 0.85

$$\frac{\sqrt{c}\sqrt{a+cx^2}\left(3a^3(128B+35Cx)+2a^2cx(924A+x(576B+413Cx))+8ac^2x^3(182A+x(144B+119Cx))+16c^3x^5(28A+3x(8\ldots\right.}{2688c^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + c*x^2)^(5/2)*(A + B*x + C*x^2),x]
```

```
[Out] (Sqrt[c]*Sqrt[a + c*x^2]*(3*a^3*(128*B + 35*C*x) + 16*c^3*x^5*(28
*A + 3*x*(8*B + 7*C*x)) + 8*a*c^2*x^3*(182*A + x*(144*B + 119*C*x
)) + 2*a^2*c*x*(924*A + x*(576*B + 413*C*x))) - 105*a^3*(-8*A*c +
 a*C)*Log[c*x + Sqrt[c]*Sqrt[a + c*x^2]])/(2688*c^(3/2))
```

Maple [A] time = 0.011, size = 181, normalized size = 1.1

$$\frac{Ax}{6}\left(cx^2+a\right)^{\frac{5}{2}}+\frac{5\,aAx}{24}\left(cx^2+a\right)^{\frac{3}{2}}+\frac{5\,a^2Ax}{16}\sqrt{cx^2+a}+\frac{5\,Aa^3}{16}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)\frac{1}{\sqrt{c}}+\frac{B}{7\,c}\left(cx^2+a\right)^{\frac{7}{2}}+\frac{Cx}{8\,c}\left(cx^2+a\right)^{\frac{7}{2}}-\frac{Cax}{48\,c}\left(cx^2+a\right)^{\frac{5}{2}}-\frac{5\,a^2Cx}{192\,c}\left(cx^2+a\right)^{\frac{3}{2}}-\frac{5\,Ca^3x}{128\,c}\sqrt{cx^2+a}-\frac{5\,Ca^4}{128}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^(5/2)*(C*x^2+B*x+A),x)
```

```
[Out] 1/6*A*x*(c*x^2+a)^(5/2)+5/24*A*a*x*(c*x^2+a)^(3/2)+5/16*A*a^2*x*(
c*x^2+a)^(1/2)+5/16*A*a^3/c^(1/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))+1
/7*B*(c*x^2+a)^(7/2)/c+1/8*C*x*(c*x^2+a)^(7/2)/c-1/48*C/c*a*x*(c*
x^2+a)^(5/2)-5/192*C/c*a^2*x*(c*x^2+a)^(3/2)-5/128*C/c*a^3*x*(c*x
^2+a)^(1/2)-5/128*C/c^(3/2)*a^4*ln(x*c^(1/2)+(c*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((C*x^2 + B*x + A)*(c*x^2 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.300473, size = 1, normalized size = 0.01

$$\left[\frac{2\left(336\,Cc^3x^7+384\,Bc^3x^6+1152\,Bac^2x^4+1152\,Ba^2cx^2+56\left(17\,Cac^2+8\,Ac^3\right)x^5+384\,Ba^3+14\left(59\,Ca^2c+104\,Aac^2\right)x^3+\right.}{5376\,c^{\frac{3}{2}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] [1/5376*(2*(336*C*c^3*x^7 + 384*B*c^3*x^6 + 1152*B*a*c^2*x^4 + 11
52*B*a^2*c*x^2 + 56*(17*C*a*c^2 + 8*A*c^3)*x^5 + 384*B*a^3 + 14*(
59*C*a^2*c + 104*A*a*c^2)*x^3 + 21*(5*C*a^3 + 88*A*a^2*c)*x)*sqrt
(c*x^2 + a)*sqrt(c) - 105*(C*a^4 - 8*A*a^3*c)*log(-2*sqrt(c*x^2 +
 a)*c*x - (2*c*x^2 + a)*sqrt(c)))/c^(3/2), 1/2688*((336*C*c^3*x^7
 + 384*B*c^3*x^6 + 1152*B*a*c^2*x^4 + 1152*B*a^2*c*x^2 + 56*(17*C
*a*c^2 + 8*A*c^3)*x^5 + 384*B*a^3 + 14*(59*C*a^2*c + 104*A*a*c^2)
*x^3 + 21*(5*C*a^3 + 88*A*a^2*c)*x)*sqrt(c*x^2 + a)*sqrt(-c) - 10
5*(C*a^4 - 8*A*a^3*c)*arctan(sqrt(-c)*x/sqrt(c*x^2 + a)))/(sqrt(-
c)*c)]
```

Sympy [A] time = 44.4492, size = 510, normalized size = 3.04

$$\frac{Aa^{\frac{5}{2}}x\sqrt{1+\frac{cx^2}{a}}}{2}+\frac{3Aa^{\frac{5}{2}}x}{16\sqrt{1+\frac{cx^2}{a}}}+\frac{35Aa^{\frac{3}{2}}cx^3}{48\sqrt{1+\frac{cx^2}{a}}}+\frac{17A\sqrt{a}c^2x^5}{24\sqrt{1+\frac{cx^2}{a}}}+\frac{5Aa^3\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{16\sqrt{c}}+\frac{Ac^3x^7}{6\sqrt{a}\sqrt{1+\frac{cx^2}{a}}}$$
$$+Ba^2\left(\begin{cases}\frac{\sqrt{a}x^2}{2} & \text{for } c=0\\ \frac{(a+cx^2)^{\frac{3}{2}}}{3c} & \text{otherwise}\end{cases}\right)+2Bac\left(\begin{cases}-\frac{2a^2\sqrt{a+cx^2}}{15c^2}+\frac{ax^2\sqrt{a+cx^2}}{15c}+\frac{x^4\sqrt{a+cx^2}}{5} & \text{for } c\neq 0\\ \frac{\sqrt{a}x^4}{4} & \text{otherwise}\end{cases}\right)$$
$$+Bc^2\left(\begin{cases}\frac{8a^3\sqrt{a+cx^2}}{105c^3}-\frac{4a^2x^2\sqrt{a+cx^2}}{105c^2}+\frac{ax^4\sqrt{a+cx^2}}{35c}+\frac{x^6\sqrt{a+cx^2}}{7} & \text{for } c\neq 0\\ \frac{\sqrt{a}x^6}{6} & \text{otherwise}\end{cases}\right)+\frac{5Ca^{\frac{7}{2}}x}{128c\sqrt{1+\frac{cx^2}{a}}}$$
$$+\frac{133Ca^{\frac{5}{2}}x^3}{384\sqrt{1+\frac{cx^2}{a}}}+\frac{127Ca^{\frac{3}{2}}cx^5}{192\sqrt{1+\frac{cx^2}{a}}}+\frac{23C\sqrt{a}c^2x^7}{48\sqrt{1+\frac{cx^2}{a}}}-\frac{5Ca^4\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{128c^{\frac{3}{2}}}+\frac{Cc^3x^9}{8\sqrt{a}\sqrt{1+\frac{cx^2}{a}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+a)**(5/2)*(C*x**2+B*x+A),x)
```

```
[Out] A*a**(5/2)*x*sqrt(1 + c*x**2/a)/2 + 3*A*a**(5/2)*x/(16*sqrt(1 + c
*x**2/a)) + 35*A*a**(3/2)*c*x**3/(48*sqrt(1 + c*x**2/a)) + 17*A*s
qrt(a)*c**2*x**5/(24*sqrt(1 + c*x**2/a)) + 5*A*a**3*asinh(sqrt(c)
*x/sqrt(a))/(16*sqrt(c)) + A*c**3*x**7/(6*sqrt(a)*sqrt(1 + c*x**2
/a)) + B*a**2*Piecewise((sqrt(a)*x**2/2, Eq(c, 0)), ((a + c*x**2)
**(3/2)/(3*c), True)) + 2*B*a*c*Piecewise((-2*a**2*sqrt(a + c*x**
2)/(15*c**2) + a*x**2*sqrt(a + c*x**2)/(15*c) + x**4*sqrt(a + c*x
**2)/5, Ne(c, 0)), (sqrt(a)*x**4/4, True)) + B*c**2*Piecewise((8*
a**3*sqrt(a + c*x**2)/(105*c**3) - 4*a**2*x**2*sqrt(a + c*x**2)/(
105*c**2) + a*x**4*sqrt(a + c*x**2)/(35*c) + x**6*sqrt(a + c*x**2
)/7, Ne(c, 0)), (sqrt(a)*x**6/6, True)) + 5*C*a**(7/2)*x/(128*c*s
qrt(1 + c*x**2/a)) + 133*C*a**(5/2)*x**3/(384*sqrt(1 + c*x**2/a))
 + 127*C*a**(3/2)*c*x**5/(192*sqrt(1 + c*x**2/a)) + 23*C*sqrt(a)*
c**2*x**7/(48*sqrt(1 + c*x**2/a)) - 5*C*a**4*asinh(sqrt(c)*x/sqrt
(a))/(128*c**(3/2)) + C*c**3*x**9/(8*sqrt(a)*sqrt(1 + c*x**2/a))
```

GIAC/XCAS [A] time = 0.280747, size = 227, normalized size = 1.35

$$\frac{1}{2688}\left(\frac{384\,Ba^3}{c}+\left(2\left(576\,Ba^2+\left(4\left(144\,Bac+\left(6\left(7\,Cc^2x+8\,Bc^2\right)x+\frac{7\left(17\,Cac^7+8\,Ac^8\right)}{c^6}\right)x\right)x+\frac{7\left(59\,Ca^2c^6+104\,Aac^7\right)}{c^6}\right.\right.\right.\right.$$
$$+\frac{5\left(Ca^4-8\,Aa^3c\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{128\,c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^(5/2),x, algorithm="giac")
```

```
[Out] 1/2688*(384*B*a^3/c + (2*(576*B*a^2 + (4*(144*B*a*c + (6*(7*C*c^2
*x + 8*B*c^2)*x + 7*(17*C*a*c^7 + 8*A*c^8)/c^6)*x)*x + 7*(59*C*a^
2*c^6 + 104*A*a*c^7)/c^6)*x)*x + 21*(5*C*a^3*c^5 + 88*A*a^2*c^6)/
c^6)*x)*sqrt(c*x^2 + a) + 5/128*(C*a^4 - 8*A*a^3*c)*ln(abs(-sqrt(
c)*x + sqrt(c*x^2 + a)))/c^(3/2)
```

3.101 $\int \frac{(g+hx)^3(d+ex+fx^2)}{\sqrt{a+cx^2}}\,dx$

Optimal. Leaf size=325

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3a^2h^2(eh+3fg)-4acg\left(3h(dh+eg)+fg^2\right)+8c^2dg^3\right)}{8c^{5/2}}$$
$$+\frac{\sqrt{a+cx^2}\left(4\left(16a^2fh^4-4ach^2\left(5h(dh+3eg)+13fg^2\right)-c^2g^2\left(3fg^2-5h(16dh+3eg)\right)\right)-chx\left(ah^2(45eh+71fg)+2cg\left(3\right.\right.\right.}{120c^3h}$$
$$+\frac{\sqrt{a+cx^2}(g+hx)^2\left(4h^2(5cd-4af)-3cg(fg-5eh)\right)}{60c^2h}$$
$$-\frac{\sqrt{a+cx^2}(g+hx)^3(fg-5eh)}{20ch}+\frac{f\sqrt{a+cx^2}(g+hx)^4}{5ch}$$

```
[Out] ((4*(5*c*d - 4*a*f)*h^2 - 3*c*g*(f*g - 5*e*h))*(g + h*x)^2*Sqrt[a
 + c*x^2])/(60*c^2*h) - ((f*g - 5*e*h)*(g + h*x)^3*Sqrt[a + c*x^2
])/(20*c*h) + (f*(g + h*x)^4*Sqrt[a + c*x^2])/(5*c*h) + ((4*(16*a
^2*f*h^4 - 4*a*c*h^2*(13*f*g^2 + 5*h*(3*e*g + d*h)) - c^2*g^2*(3*
f*g^2 - 5*h*(3*e*g + 16*d*h))) - c*h*(a*h^2*(71*f*g + 45*e*h) + 2
*c*g*(3*f*g^2 - 5*h*(3*e*g + 10*d*h)))*x)*Sqrt[a + c*x^2])/(120*c
^3*h) + ((8*c^2*d*g^3 + 3*a^2*h^2*(3*f*g + e*h) - 4*a*c*g*(f*g^2
+ 3*h*(e*g + d*h)))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(8*c^(5
/2))
```

Rubi [A] time = 1.50035, antiderivative size = 323, normalized size of antiderivative = 0.99, number of steps used = 6, number of rules used = 5, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.172$

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3a^2h^2(eh+3fg)-4acg\left(3h(dh+eg)+fg^2\right)+8c^2dg^3\right)}{8c^{5/2}}$$
$$+\frac{\sqrt{a+cx^2}\left(4\left(16a^2fh^4-4ach^2\left(5h(dh+3eg)+13fg^2\right)-c^2g^2\left(3fg^2-5h(16dh+3eg)\right)\right)-chx\left(ah^2(45eh+71fg)-10cgh\right.\right.}{120c^3h}$$
$$+\frac{\sqrt{a+cx^2}(g+hx)^2\left(4h^2(5cd-4af)-3cg(fg-5eh)\right)}{60c^2h}$$
$$-\frac{\sqrt{a+cx^2}(g+hx)^3(fg-5eh)}{20ch}+\frac{f\sqrt{a+cx^2}(g+hx)^4}{5ch}$$

Antiderivative was successfully verified.

```
[In]  Int[((g + h*x)^3*(d + e*x + f*x^2))/Sqrt[a + c*x^2],x]
```

```
[Out] ((4*(5*c*d - 4*a*f)*h^2 - 3*c*g*(f*g - 5*e*h))*(g + h*x)^2*Sqrt[a
 + c*x^2])/(60*c^2*h) - ((f*g - 5*e*h)*(g + h*x)^3*Sqrt[a + c*x^2
])/(20*c*h) + (f*(g + h*x)^4*Sqrt[a + c*x^2])/(5*c*h) + ((4*(16*a
```

```
^2*f*h^4 - 4*a*c*h^2*(13*f*g^2 + 5*h*(3*e*g + d*h)) - c^2*g^2*(3*
f*g^2 - 5*h*(3*e*g + 16*d*h))) - c*h*(6*c*f*g^3 - 10*c*g*h*(3*e*g
 + 10*d*h) + a*h^2*(71*f*g + 45*e*h))*x)*Sqrt[a + c*x^2])/(120*c^
3*h) + ((8*c^2*d*g^3 + 3*a^2*h^2*(3*f*g + e*h) - 4*a*c*g*(f*g^2 +
 3*h*(e*g + d*h)))*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(8*c^(5/
2))
```

Rubi in Sympy [A] time = 111.872, size = 354, normalized size = 1.09

$$\frac{f\sqrt{a+cx^2}\,(g+hx)^4}{5ch}+\frac{\sqrt{a+cx^2}\,(g+hx)^3\,(5eh-fg)}{20ch}$$
$$-\frac{\sqrt{a+cx^2}\,(g+hx)^2\left(16afh^2-20cdh^2-15cegh+3cfg^2\right)}{60c^2h}$$
$$+\frac{\sqrt{a+cx^2}\left(64a^2fh^4-80acdh^4-240acegh^3-208acfg^2h^2+320c^2dg^2h^2+60c^2eg^3h-12c^2fg^4-chx\left(45aeh^3+71afgh^2\right.\right.}{120c^3h}$$
$$+\frac{\left(3a^2eh^3+9a^2fgh^2-12acdgh^2-12aceg^2h-4acfg^3+8c^2dg^3\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{8c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)**3*(f*x**2+e*x+d)/(c*x**2+a)**(1/2),x)
```

```
[Out] f*sqrt(a + c*x**2)*(g + h*x)**4/(5*c*h) + sqrt(a + c*x**2)*(g + h
*x)**3*(5*e*h - f*g)/(20*c*h) - sqrt(a + c*x**2)*(g + h*x)**2*(16
*a*f*h**2 - 20*c*d*h**2 - 15*c*e*g*h + 3*c*f*g**2)/(60*c**2*h) +
sqrt(a + c*x**2)*(64*a**2*f*h**4 - 80*a*c*d*h**4 - 240*a*c*e*g*h*
*3 - 208*a*c*f*g**2*h**2 + 320*c**2*d*g**2*h**2 + 60*c**2*e*g**3*
h - 12*c**2*f*g**4 - c*h*x*(45*a*e*h**3 + 71*a*f*g*h**2 - 100*c*d
*g*h**2 - 30*c*e*g**2*h + 6*c*f*g**3))/(120*c**3*h) + (3*a**2*e*h
**3 + 9*a**2*f*g*h**2 - 12*a*c*d*g*h**2 - 12*a*c*e*g**2*h - 4*a*c
*f*g**3 + 8*c**2*d*g**3)*atanh(sqrt(c)*x/sqrt(a + c*x**2))/(8*c**
(5/2))
```

Mathematica [A] time = 0.401519, size = 252, normalized size = 0.78

$$\frac{15\sqrt{c}\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)\left(3a^2h^2(eh+3fg)-4acg\left(3h(dh+eg)+fg^2\right)+8c^2dg^3\right)+\sqrt{a+cx^2}\left(8\left(8a^2fh^3-10ach\left(h(dh\right.\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((g + h*x)^3*(d + e*x + f*x^2))/Sqrt[a + c*x^2],x]
```

```
[Out] (Sqrt[a + c*x^2]*(8*(8*a^2*f*h^3 + 15*c^2*g^2*(e*g + 3*d*h) - 10*
a*c*h*(3*f*g^2 + h*(3*e*g + d*h))) + 15*c*(-3*a*h^2*(3*f*g + e*h)
 + 4*c*(f*g^3 + 3*g*h*(e*g + d*h)))*x + 8*c*h*(-4*a*f*h^2 + 5*c*(
3*f*g^2 + h*(3*e*g + d*h)))*x^2 + 30*c^2*h^2*(3*f*g + e*h)*x^3 +
24*c^2*f*h^3*x^4) + 15*Sqrt[c]*(8*c^2*d*g^3 + 3*a^2*h^2*(3*f*g +
e*h) - 4*a*c*g*(f*g^2 + 3*h*(e*g + d*h)))*Log[c*x + Sqrt[c]*Sqrt[
a + c*x^2]])/(120*c^3)
```

Maple [A] time = 0.016, size = 528, normalized size = 1.6

$$g^3 d \ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)\frac{1}{\sqrt{c}}+3\,\frac{\sqrt{cx^2+a}\,g^2hd}{c}+\frac{g^3e}{c}\sqrt{cx^2+a}$$
$$+\frac{x^3h^3e}{4\,c}\sqrt{cx^2+a}+\frac{3\,x^3gh^2f}{4\,c}\sqrt{cx^2+a}-\frac{3\,axh^3e}{8\,c^2}\sqrt{cx^2+a}-\frac{9\,axgh^2f}{8\,c^2}\sqrt{cx^2+a}$$
$$+\frac{3\,a^2eh^3}{8}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{5}{2}}+\frac{9\,a^2gh^2f}{8}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{5}{2}}$$
$$+\frac{x^2h^3d}{3\,c}\sqrt{cx^2+a}+\frac{x^2gh^2e}{c}\sqrt{cx^2+a}+\frac{g^2x^2hf}{c}\sqrt{cx^2+a}-\frac{2\,ah^3d}{3\,c^2}\sqrt{cx^2+a}$$
$$-2\,\frac{a\sqrt{cx^2+a}\,agh^2e}{c^2}-2\,\frac{a\sqrt{cx^2+a}\,ag^2hf}{c^2}+\frac{3\,gxh^2d}{2\,c}\sqrt{cx^2+a}+\frac{3\,xg^2he}{2\,c}\sqrt{cx^2+a}$$
$$+\frac{xg^3f}{2\,c}\sqrt{cx^2+a}-\frac{3\,agh^2d}{2}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}-\frac{3\,ag^2he}{2}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}$$
$$-\frac{ag^3f}{2}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}+\frac{h^3fx^4}{5\,c}\sqrt{cx^2+a}-\frac{4\,ah^3fx^2}{15\,c^2}\sqrt{cx^2+a}+\frac{8\,a^2fh^3}{15\,c^3}\sqrt{cx^2+a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^3*(f*x^2+e*x+d)/(c*x^2+a)^(1/2),x)
```

```
[Out] g^3*d*ln(x*c^(1/2)+(c*x^2+a)^(1/2))/c^(1/2)+3/c*(c*x^2+a)^(1/2)*g
^2*h*d+1/c*(c*x^2+a)^(1/2)*g^3*e+1/4*x^3/c*(c*x^2+a)^(1/2)*h^3*e+
3/4*x^3/c*(c*x^2+a)^(1/2)*g*h^2*f-3/8/c^2*a*x*(c*x^2+a)^(1/2)*h^3
*e-9/8/c^2*a*x*(c*x^2+a)^(1/2)*g*h^2*f+3/8/c^(5/2)*a^2*ln(x*c^(1/
2)+(c*x^2+a)^(1/2))*h^3*e+9/8/c^(5/2)*a^2*ln(x*c^(1/2)+(c*x^2+a)^
(1/2))*g*h^2*f+1/3*x^2/c*(c*x^2+a)^(1/2)*h^3*d+x^2/c*(c*x^2+a)^(1
/2)*g*h^2*e+x^2/c*(c*x^2+a)^(1/2)*g^2*h*f-2/3*a/c^2*(c*x^2+a)^(1/
2)*h^3*d-2*a/c^2*(c*x^2+a)^(1/2)*g*h^2*e-2*a/c^2*(c*x^2+a)^(1/2)*
g^2*h*f+3/2*x/c*(c*x^2+a)^(1/2)*g*h^2*d+3/2*x/c*(c*x^2+a)^(1/2)*g
^2*h*e+1/2*x/c*(c*x^2+a)^(1/2)*g^3*f-3/2*a/c^(3/2)*ln(x*c^(1/2)+(
c*x^2+a)^(1/2))*g*h^2*d-3/2*a/c^(3/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2
))*g^2*h*e-1/2*a/c^(3/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*g^3*f+1/5*
h^3*f*x^4/c*(c*x^2+a)^(1/2)-4/15*h^3*f/c^2*a*x^2*(c*x^2+a)^(1/2)+
8/15*h^3*f/c^3*a^2*(c*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((f*x^2 + e*x + d)*(h*x + g)^3/sqrt(c*x^2 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.310315, size = 1, normalized size = 0.

$$\left[\frac{2\left(24\,c^2 f h^3 x^4 + 120\,c^2 e g^3 - 240\,acegh^2 + 120\left(3\,c^2 d - 2\,acf\right) g^2 h - 16\left(5\,acd - 4\,a^2 f\right) h^3 + 30\left(3\,c^2 f g h^2 + c^2 e h^3\right) x^3 + 8\left(1\right.\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)^3/sqrt(c*x^2 + a),x, algorithm="fricas")
```

```
[Out] [1/240*(2*(24*c^2*f*h^3*x^4 + 120*c^2*e*g^3 - 240*a*c*e*g*h^2 + 1
20*(3*c^2*d - 2*a*c*f)*g^2*h - 16*(5*a*c*d - 4*a^2*f)*h^3 + 30*(3
*c^2*f*g*h^2 + c^2*e*h^3)*x^3 + 8*(15*c^2*f*g^2*h + 15*c^2*e*g*h^
2 + (5*c^2*d - 4*a*c*f)*h^3)*x^2 + 15*(4*c^2*f*g^3 + 12*c^2*e*g^2
*h - 3*a*c*e*h^3 + 3*(4*c^2*d - 3*a*c*f)*g*h^2)*x)*sqrt(c*x^2 + a
)*sqrt(c) - 15*(12*a*c^2*e*g^2*h - 3*a^2*c*e*h^3 - 4*(2*c^3*d - a
*c^2*f)*g^3 + 3*(4*a*c^2*d - 3*a^2*c*f)*g*h^2)*log(-2*sqrt(c*x^2
+ a)*c*x - (2*c*x^2 + a)*sqrt(c)))/c^(7/2), 1/120*((24*c^2*f*h^3*
x^4 + 120*c^2*e*g^3 - 240*a*c*e*g*h^2 + 120*(3*c^2*d - 2*a*c*f)*g
^2*h - 16*(5*a*c*d - 4*a^2*f)*h^3 + 30*(3*c^2*f*g*h^2 + c^2*e*h^3
)*x^3 + 8*(15*c^2*f*g^2*h + 15*c^2*e*g*h^2 + (5*c^2*d - 4*a*c*f)*
h^3)*x^2 + 15*(4*c^2*f*g^3 + 12*c^2*e*g^2*h - 3*a*c*e*h^3 + 3*(4*
c^2*d - 3*a*c*f)*g*h^2)*x)*sqrt(c*x^2 + a)*sqrt(-c) - 15*(12*a*c^
2*e*g^2*h - 3*a^2*c*e*h^3 - 4*(2*c^3*d - a*c^2*f)*g^3 + 3*(4*a*c^
2*d - 3*a^2*c*f)*g*h^2)*arctan(sqrt(-c)*x/sqrt(c*x^2 + a)))/(sqrt
(-c)*c^3)]
```

Sympy [A] time = 28.3192, size = 796, normalized size = 2.45

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**3*(f*x**2+e*x+d)/(c*x**2+a)**(1/2),x)
```

```
[Out] -3*a**(3/2)*e*h**3*x/(8*c**2*sqrt(1 + c*x**2/a)) - 9*a**(3/2)*f*g
*h**2*x/(8*c**2*sqrt(1 + c*x**2/a)) + 3*sqrt(a)*d*g*h**2*x*sqrt(1
 + c*x**2/a)/(2*c) + 3*sqrt(a)*e*g**2*h*x*sqrt(1 + c*x**2/a)/(2*c
) - sqrt(a)*e*h**3*x**3/(8*c*sqrt(1 + c*x**2/a)) + sqrt(a)*f*g**3
*x*sqrt(1 + c*x**2/a)/(2*c) - 3*sqrt(a)*f*g*h**2*x**3/(8*c*sqrt(1
 + c*x**2/a)) + 3*a**2*e*h**3*asinh(sqrt(c)*x/sqrt(a))/(8*c**(5/2
)) + 9*a**2*f*g*h**2*asinh(sqrt(c)*x/sqrt(a))/(8*c**(5/2)) - 3*a*
d*g*h**2*asinh(sqrt(c)*x/sqrt(a))/(2*c**(3/2)) - 3*a*e*g**2*h*asi
nh(sqrt(c)*x/sqrt(a))/(2*c**(3/2)) - a*f*g**3*asinh(sqrt(c)*x/sqr
t(a))/(2*c**(3/2)) + d*g**3*Piecewise((sqrt(-a/c)*asin(x*sqrt(-c/
a))/sqrt(a), (a > 0) & (c < 0)), (sqrt(a/c)*asinh(x*sqrt(c/a))/sq
rt(a), (a > 0) & (c > 0)), (sqrt(-a/c)*acosh(x*sqrt(-c/a))/sqrt(-
a), (c > 0) & (a < 0))) + 3*d*g**2*h*Piecewise((x**2/(2*sqrt(a)),
 Eq(c, 0)), (sqrt(a + c*x**2)/c, True)) + d*h**3*Piecewise((-2*a*
sqrt(a + c*x**2)/(3*c**2) + x**2*sqrt(a + c*x**2)/(3*c), Ne(c, 0)
), (x**4/(4*sqrt(a)), True)) + e*g**3*Piecewise((x**2/(2*sqrt(a))
, Eq(c, 0)), (sqrt(a + c*x**2)/c, True)) + 3*e*g*h**2*Piecewise((
-2*a*sqrt(a + c*x**2)/(3*c**2) + x**2*sqrt(a + c*x**2)/(3*c), Ne(
c, 0)), (x**4/(4*sqrt(a)), True)) + 3*f*g**2*h*Piecewise((-2*a*sq
rt(a + c*x**2)/(3*c**2) + x**2*sqrt(a + c*x**2)/(3*c), Ne(c, 0)),
 (x**4/(4*sqrt(a)), True)) + f*h**3*Piecewise((8*a**2*sqrt(a + c*
x**2)/(15*c**3) - 4*a*x**2*sqrt(a + c*x**2)/(15*c**2) + x**4*sqrt
(a + c*x**2)/(5*c), Ne(c, 0)), (x**6/(6*sqrt(a)), True)) + e*h**3
*x**5/(4*sqrt(a)*sqrt(1 + c*x**2/a)) + 3*f*g*h**2*x**5/(4*sqrt(a)
*sqrt(1 + c*x**2/a))
```

GIAC/XCAS [A] time = 0.28409, size = 424, normalized size = 1.3

$$\frac{1}{120}\sqrt{cx^2+a}\left(\left(2\left(3\left(\frac{4fh^3x}{c}+\frac{5\left(3c^4fgh^2+c^4h^3e\right)}{c^5}\right)x+\frac{4\left(15c^4fg^2h+5c^4dh^3-4ac^3fh^3+15c^4gh^2e\right)}{c^5}\right)x+\frac{15\left(4c^4fg^3\right.}{}\right.\right.$$
$$-\frac{\left(8c^2dg^3-4acfg^3-12acdgh^2+9a^2fgh^2-12acg^2he+3a^2h^3e\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{8c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(h*x + g)^3/sqrt(c*x^2 + a),x, algorithm="giac")
```

```
[Out] 1/120*sqrt(c*x^2 + a)*((2*(3*(4*f*h^3*x/c + 5*(3*c^4*f*g*h^2 + c^
4*h^3*e)/c^5)*x + 4*(15*c^4*f*g^2*h + 5*c^4*d*h^3 - 4*a*c^3*f*h^3
 + 15*c^4*g*h^2*e)/c^5)*x + 15*(4*c^4*f*g^3 + 12*c^4*d*g*h^2 - 9*
a*c^3*f*g*h^2 + 12*c^4*g^2*h*e - 3*a*c^3*h^3*e)/c^5)*x + 8*(45*c^
4*d*g^2*h - 30*a*c^3*f*g^2*h - 10*a*c^3*d*h^3 + 8*a^2*c^2*f*h^3 +
 15*c^4*g^3*e - 30*a*c^3*g*h^2*e)/c^5) - 1/8*(8*c^2*d*g^3 - 4*a*c
*f*g^3 - 12*a*c*d*g*h^2 + 9*a^2*f*g*h^2 - 12*a*c*g^2*h*e + 3*a^2*
h^3*e)*ln(abs(-sqrt(c)*x + sqrt(c*x^2 + a)))/c^(5/2)
```

3.102 $\int \frac{(g+hx)^2(d+ex+fx^2)}{\sqrt{a+cx^2}}\,dx$

Optimal. Leaf size=223

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3a^2fh^2-4ac\left(h(dh+2eg)+fg^2\right)+8c^2dg^2\right)}{8c^{5/2}}-\frac{\sqrt{a+cx^2}\left(4\left(4ah^2(eh+2fg)+cg\left(fg^2-4h(3dh+eg)\right)\right)-hx\left(3h^2(4cd-3af)-2cg(fg-4eh)\right)\right)}{24c^2h}-\frac{\sqrt{a+cx^2}(g+hx)^2(fg-4eh)}{12ch}+\frac{f\sqrt{a+cx^2}(g+hx)^3}{4ch}$$

```
[Out] -((f*g - 4*e*h)*(g + h*x)^2*Sqrt[a + c*x^2])/(12*c*h) + (f*(g + h
*x)^3*Sqrt[a + c*x^2])/(4*c*h) - ((4*(4*a*h^2*(2*f*g + e*h) + c*g
*(f*g^2 - 4*h*(e*g + 3*d*h))) - h*(3*(4*c*d - 3*a*f)*h^2 - 2*c*g*
(f*g - 4*e*h))*x)*Sqrt[a + c*x^2])/(24*c^2*h) + ((8*c^2*d*g^2 + 3
*a^2*f*h^2 - 4*a*c*(f*g^2 + h*(2*e*g + d*h)))*ArcTanh[(Sqrt[c]*x)
/Sqrt[a + c*x^2]])/(8*c^(5/2))
```

Rubi [A] time = 0.85784, antiderivative size = 222, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.172$

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3a^2fh^2-4ac\left(h(dh+2eg)+fg^2\right)+8c^2dg^2\right)}{8c^{5/2}}-\frac{\sqrt{a+cx^2}\left(4\left(4ah^2(eh+2fg)-4cgh(3dh+eg)+cfg^3\right)-hx\left(3h^2(4cd-3af)-2cg(fg-4eh)\right)\right)}{24c^2h}-\frac{\sqrt{a+cx^2}(g+hx)^2(fg-4eh)}{12ch}+\frac{f\sqrt{a+cx^2}(g+hx)^3}{4ch}$$

Antiderivative was successfully verified.

```
[In]  Int[((g + h*x)^2*(d + e*x + f*x^2))/Sqrt[a + c*x^2],x]
```

```
[Out] -((f*g - 4*e*h)*(g + h*x)^2*Sqrt[a + c*x^2])/(12*c*h) + (f*(g + h
*x)^3*Sqrt[a + c*x^2])/(4*c*h) - ((4*(c*f*g^3 - 4*c*g*h*(e*g + 3*
d*h) + 4*a*h^2*(2*f*g + e*h)) - h*(3*(4*c*d - 3*a*f)*h^2 - 2*c*g*
(f*g - 4*e*h))*x)*Sqrt[a + c*x^2])/(24*c^2*h) + ((8*c^2*d*g^2 + 3
*a^2*f*h^2 - 4*a*c*(f*g^2 + h*(2*e*g + d*h)))*ArcTanh[(Sqrt[c]*x)
/Sqrt[a + c*x^2]])/(8*c^(5/2))
```

Rubi in Sympy [A] time = 57.9743, size = 231, normalized size = 1.04

$$\frac{f\sqrt{a+cx^2}\,(g+hx)^3}{4ch}+\frac{\sqrt{a+cx^2}\,(g+hx)^2\,(4eh-fg)}{12ch}-\frac{\sqrt{a+cx^2}\left(16aeh^3+32afgh^2-48cdgh^2-16ceg^2h+4cfg^3+hx\left(9afh^2-12cdh^2-8cegh+2cfg^2\right)\right)}{24c^2h}+\frac{\left(3a^2fh^2-4acdh^2-8acegh-4acfg^2+8c^2dg^2\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{8c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)**2*(f*x**2+e*x+d)/(c*x**2+a)**(1/2),x)
```

```
[Out] f*sqrt(a + c*x**2)*(g + h*x)**3/(4*c*h) + sqrt(a + c*x**2)*(g + h
*x)**2*(4*e*h - f*g)/(12*c*h) - sqrt(a + c*x**2)*(16*a*e*h**3 + 3
2*a*f*g*h**2 - 48*c*d*g*h**2 - 16*c*e*g**2*h + 4*c*f*g**3 + h*x*(
9*a*f*h**2 - 12*c*d*h**2 - 8*c*e*g*h + 2*c*f*g**2))/(24*c**2*h) +
 (3*a**2*f*h**2 - 4*a*c*d*h**2 - 8*a*c*e*g*h - 4*a*c*f*g**2 + 8*c
**2*d*g**2)*atanh(sqrt(c)*x/sqrt(a + c*x**2))/(8*c**(5/2))
```

Mathematica [A] time = 0.269533, size = 168, normalized size = 0.75

$$\frac{3\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)\left(3a^2fh^2-4ac\left(h(dh+2eg)+fg^2\right)+8c^2dg^2\right)+\sqrt{c}\sqrt{a+cx^2}\left(-16ah(eh+2fg)-9afh^2x+12cx\right(}{24c^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((g + h*x)^2*(d + e*x + f*x^2))/Sqrt[a + c*x^2],x]
```

```
[Out] (Sqrt[c]*Sqrt[a + c*x^2]*(24*c*g*(e*g + 2*d*h) - 16*a*h*(2*f*g +
e*h) - 9*a*f*h^2*x + 12*c*(f*g^2 + h*(2*e*g + d*h))*x + 8*c*h*(2*
f*g + e*h)*x^2 + 6*c*f*h^2*x^3) + 3*(8*c^2*d*g^2 + 3*a^2*f*h^2 -
4*a*c*(f*g^2 + h*(2*e*g + d*h)))*Log[c*x + Sqrt[c]*Sqrt[a + c*x^2
]])/(24*c^(5/2))
```

Maple [A] time = 0.012, size = 339, normalized size = 1.5

$$g^{2}d\ln\left(x\sqrt{c}+\sqrt{cx^{2}+a}\right)\frac{1}{\sqrt{c}}+2\,\frac{\sqrt{cx^{2}+a}\,aghd}{c}+\frac{eg^{2}}{c}\sqrt{cx^{2}+a}+\frac{h^{2}x^{2}e}{3\,c}\sqrt{cx^{2}+a}$$
$$+\frac{2\,x^{2}ghf}{3\,c}\sqrt{cx^{2}+a}-\frac{2\,ah^{2}e}{3\,c^{2}}\sqrt{cx^{2}+a}-\frac{4\,aghf}{3\,c^{2}}\sqrt{cx^{2}+a}+\frac{dxh^{2}}{2\,c}\sqrt{cx^{2}+a}$$
$$+\frac{egxh}{c}\sqrt{cx^{2}+a}+\frac{fxg^{2}}{2\,c}\sqrt{cx^{2}+a}-\frac{adh^{2}}{2}\ln\left(x\sqrt{c}+\sqrt{cx^{2}+a}\right)c^{-\frac{3}{2}}$$
$$-aegh\ln\left(x\sqrt{c}+\sqrt{cx^{2}+a}\right)c^{-\frac{3}{2}}-\frac{fag^{2}}{2}\ln\left(x\sqrt{c}+\sqrt{cx^{2}+a}\right)c^{-\frac{3}{2}}$$
$$+\frac{h^{2}fx^{3}}{4\,c}\sqrt{cx^{2}+a}-\frac{3\,afh^{2}x}{8\,c^{2}}\sqrt{cx^{2}+a}+\frac{3\,a^{2}fh^{2}}{8}\ln\left(x\sqrt{c}+\sqrt{cx^{2}+a}\right)c^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^2*(f*x^2+e*x+d)/(c*x^2+a)^(1/2),x)
```

```
[Out] g^2*d*ln(x*c^(1/2)+(c*x^2+a)^(1/2))/c^(1/2)+2/c*(c*x^2+a)^(1/2)*g
*h*d+1/c*(c*x^2+a)^(1/2)*e*g^2+1/3*x^2/c*(c*x^2+a)^(1/2)*h^2*e+2/
3*x^2/c*(c*x^2+a)^(1/2)*g*h*f-2/3*a/c^2*(c*x^2+a)^(1/2)*h^2*e-4/3
*a/c^2*(c*x^2+a)^(1/2)*g*h*f+1/2*x/c*(c*x^2+a)^(1/2)*d*h^2+x/c*(c
*x^2+a)^(1/2)*e*g*h+1/2*x/c*(c*x^2+a)^(1/2)*f*g^2-1/2*a/c^(3/2)*l
n(x*c^(1/2)+(c*x^2+a)^(1/2))*d*h^2-a/c^(3/2)*ln(x*c^(1/2)+(c*x^2+
a)^(1/2))*e*g*h-1/2*a/c^(3/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*f*g^2
+1/4*h^2*f*x^3/c*(c*x^2+a)^(1/2)-3/8*h^2*f/c^2*a*x*(c*x^2+a)^(1/2
)+3/8*h^2*f/c^(5/2)*a^2*ln(x*c^(1/2)+(c*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((f*x^2 + e*x + d)*(h*x + g)^2/sqrt(c*x^2 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.29927, size = 1, normalized size = 0.

$$\left[\frac{2\left(6\,cfh^{2}x^{3}+24\,ceg^{2}-16\,aeh^{2}+16\,(3\,cd-2\,af)gh+8\left(2\,cfgh+ceh^{2}\right)x^{2}+3\left(4\,cfg^{2}+8\,cegh+(4\,cd-3\,af)h^{2}\right)x\right)\sqrt{cx^{2}}}{48\,c^{\frac{5}{2}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(h*x + g)^2/sqrt(c*x^2 + a),x, algorithm="fricas")
```

```
[Out] [1/48*(2*(6*c*f*h^2*x^3 + 24*c*e*g^2 - 16*a*e*h^2 + 16*(3*c*d - 2
*a*f)*g*h + 8*(2*c*f*g*h + c*e*h^2)*x^2 + 3*(4*c*f*g^2 + 8*c*e*g*
h + (4*c*d - 3*a*f)*h^2)*x)*sqrt(c*x^2 + a)*sqrt(c) - 3*(8*a*c*e*
g*h - 4*(2*c^2*d - a*c*f)*g^2 + (4*a*c*d - 3*a^2*f)*h^2)*log(-2*s
qrt(c*x^2 + a)*c*x - (2*c*x^2 + a)*sqrt(c)))/c^(5/2), 1/24*((6*c*
f*h^2*x^3 + 24*c*e*g^2 - 16*a*e*h^2 + 16*(3*c*d - 2*a*f)*g*h + 8*
(2*c*f*g*h + c*e*h^2)*x^2 + 3*(4*c*f*g^2 + 8*c*e*g*h + (4*c*d - 3
*a*f)*h^2)*x)*sqrt(c*x^2 + a)*sqrt(-c) - 3*(8*a*c*e*g*h - 4*(2*c^
2*d - a*c*f)*g^2 + (4*a*c*d - 3*a^2*f)*h^2)*arctan(sqrt(-c)*x/sqr
t(c*x^2 + a)))/(sqrt(-c)*c^2)]
```

Sympy [A] time = 18.9433, size = 518, normalized size = 2.32

$$- \frac{3 a^{\frac{3}{2}} f h^{2} x}{8 c^{2} \sqrt{1 + \frac{c x^{2}}{a}}} + \frac{\sqrt{a} d h^{2} x \sqrt{1 + \frac{c x^{2}}{a}}}{2 c} + \frac{\sqrt{a} e g h x \sqrt{1 + \frac{c x^{2}}{a}}}{c} + \frac{\sqrt{a} f g^{2} x \sqrt{1 + \frac{c x^{2}}{a}}}{2 c} - \frac{\sqrt{a} f h^{2} x^{3}}{8 c \sqrt{1 + \frac{c x^{2}}{a}}} + \frac{3 a^{2} f h^{2} \operatorname{asinh}{\left(\frac{\sqrt{c} x}{\sqrt{a}} \right)}}{8 c^{\frac{5}{2}}} - \frac{a d h^{2} \operatorname{asinh}{\left(\frac{\sqrt{c} x}{\sqrt{a}} \right)}}{2 c^{\frac{3}{2}}} - \frac{a e g h \operatorname{asinh}{\left(\frac{\sqrt{c} x}{\sqrt{a}} \right)}}{c^{\frac{3}{2}}} - \frac{a f g^{2} \operatorname{asinh}{\left(\frac{\sqrt{c} x}{\sqrt{a}} \right)}}{2 c^{\frac{3}{2}}} + d g^{2} \left(\begin{cases} \frac{\sqrt{- \frac{a}{c}} \operatorname{asin}{\left(x \sqrt{- \frac{c}{a}} \right)}}{\sqrt{a}} & \text{for}\: a > 0 \wedge c < 0 \\ \frac{\sqrt{\frac{a}{c}} \operatorname{asinh}{\left(x \sqrt{\frac{c}{a}} \right)}}{\sqrt{a}} & \text{for}\: a > 0 \wedge c > 0 \\ \frac{\sqrt{- \frac{a}{c}} \operatorname{acosh}{\left(x \sqrt{- \frac{c}{a}} \right)}}{\sqrt{- a}} & \text{for}\: c > 0 \wedge a < 0 \end{cases}\right) + 2 d g h \left(\begin{cases} \frac{x^{2}}{2 \sqrt{a}} & \text{for}\: c = 0 \\ \frac{\sqrt{a + c x^{2}}}{c} & \text{otherwise} \end{cases}\right) + e g^{2} \left(\begin{cases} \frac{x^{2}}{2 \sqrt{a}} & \text{for}\: c = 0 \\ \frac{\sqrt{a + c x^{2}}}{c} & \text{otherwise} \end{cases}\right) + e h^{2} \left(\begin{cases} - \frac{2 a \sqrt{a + c x^{2}}}{3 c^{2}} + \frac{x^{2} \sqrt{a + c x^{2}}}{3 c} & \text{for}\: c \neq 0 \\ \frac{x^{4}}{4 \sqrt{a}} & \text{otherwise} \end{cases}\right) + 2 f g h \left(\begin{cases} - \frac{2 a \sqrt{a + c x^{2}}}{3 c^{2}} + \frac{x^{2} \sqrt{a + c x^{2}}}{3 c} & \text{for}\: c \neq 0 \\ \frac{x^{4}}{4 \sqrt{a}} & \text{otherwise} \end{cases}\right) + \frac{f h^{2} x^{5}}{4 \sqrt{a} \sqrt{1 + \frac{c x^{2}}{a}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**2*(f*x**2+e*x+d)/(c*x**2+a)**(1/2),x)
```

```
[Out] -3*a**(3/2)*f*h**2*x/(8*c**2*sqrt(1 + c*x**2/a)) + sqrt(a)*d*h**2
*x*sqrt(1 + c*x**2/a)/(2*c) + sqrt(a)*e*g*h*x*sqrt(1 + c*x**2/a)/
c + sqrt(a)*f*g**2*x*sqrt(1 + c*x**2/a)/(2*c) - sqrt(a)*f*h**2*x*
*3/(8*c*sqrt(1 + c*x**2/a)) + 3*a**2*f*h**2*asinh(sqrt(c)*x/sqrt(
a))/(8*c**(5/2)) - a*d*h**2*asinh(sqrt(c)*x/sqrt(a))/(2*c**(3/2))
 - a*e*g*h*asinh(sqrt(c)*x/sqrt(a))/c**(3/2) - a*f*g**2*asinh(sqr
```

```
t(c)*x/sqrt(a))/(2*c**(3/2)) + d*g**2*Piecewise((sqrt(-a/c)*asin(
x*sqrt(-c/a))/sqrt(a), (a > 0) & (c < 0)), (sqrt(a/c)*asinh(x*sqr
t(c/a))/sqrt(a), (a > 0) & (c > 0)), (sqrt(-a/c)*acosh(x*sqrt(-c/
a))/sqrt(-a), (c > 0) & (a < 0))) + 2*d*g*h*Piecewise((x**2/(2*sq
rt(a)), Eq(c, 0)), (sqrt(a + c*x**2)/c, True)) + e*g**2*Piecewise
((x**2/(2*sqrt(a)), Eq(c, 0)), (sqrt(a + c*x**2)/c, True)) + e*h*
*2*Piecewise((-2*a*sqrt(a + c*x**2)/(3*c**2) + x**2*sqrt(a + c*x*
*2)/(3*c), Ne(c, 0)), (x**4/(4*sqrt(a)), True)) + 2*f*g*h*Piecewi
se((-2*a*sqrt(a + c*x**2)/(3*c**2) + x**2*sqrt(a + c*x**2)/(3*c),
 Ne(c, 0)), (x**4/(4*sqrt(a)), True)) + f*h**2*x**5/(4*sqrt(a)*sq
rt(1 + c*x**2/a))
```

GIAC/XCAS [A] time = 0.282549, size = 278, normalized size = 1.25

$$\frac{1}{24}\sqrt{cx^2+a}\left(\left(2\left(\frac{3fh^2x}{c}+\frac{4\left(2c^3fgh+c^3h^2e\right)}{c^4}\right)x+\frac{3\left(4c^3fg^2+4c^3dh^2-3ac^2fh^2+8c^3ghe\right)}{c^4}\right)x+\frac{8\left(6c^3dgh-4ac^2fgh\right.}{c}\right.$$
$$-\frac{\left(8c^2dg^2-4acfg^2-4acdh^2+3a^2fh^2-8acghe\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{8c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)^2/sqrt(c*x^2 + a),x, algorithm="giac")
```

```
[Out] 1/24*sqrt(c*x^2 + a)*((2*(3*f*h^2*x/c + 4*(2*c^3*f*g*h + c^3*h^2*
e)/c^4)*x + 3*(4*c^3*f*g^2 + 4*c^3*d*h^2 - 3*a*c^2*f*h^2 + 8*c^3*
g*h*e)/c^4)*x + 8*(6*c^3*d*g*h - 4*a*c^2*f*g*h + 3*c^3*g^2*e - 2*
a*c^2*h^2*e)/c^4) - 1/8*(8*c^2*d*g^2 - 4*a*c*f*g^2 - 4*a*c*d*h^2
+ 3*a^2*f*h^2 - 8*a*c*g*h*e)*ln(abs(-sqrt(c)*x + sqrt(c*x^2 + a))
)/c^(5/2)
```

3.103 $\int \frac{(g+hx)(d+ex+fx^2)}{\sqrt{a+cx^2}}\,dx$

Optimal. Leaf size=136

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(2cdg-a(eh+fg))}{2c^{3/2}}-\frac{\sqrt{a+cx^2}\left(2\left(2afh^2+c\left(fg^2-3h(dh+eg)\right)\right)+chx(fg-3eh)\right)}{6c^2h}+\frac{f\sqrt{a+cx^2}(g+hx)^2}{3ch}$$

```
[Out] (f*(g + h*x)^2*Sqrt[a + c*x^2])/(3*c*h) - ((2*(2*a*f*h^2 + c*(f*g
^2 - 3*h*(e*g + d*h))) + c*h*(f*g - 3*e*h)*x)*Sqrt[a + c*x^2])/(6
*c^2*h) + ((2*c*d*g - a*(f*g + e*h))*ArcTanh[(Sqrt[c]*x)/Sqrt[a +
 c*x^2]])/(2*c^(3/2))
```

Rubi [A] time = 0.402703, antiderivative size = 135, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.148

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(2cdg-a(eh+fg))}{2c^{3/2}}-\frac{\sqrt{a+cx^2}\left(2\left(2afh^2-3ch(dh+eg)+cfg^2\right)+chx(fg-3eh)\right)}{6c^2h}+\frac{f\sqrt{a+cx^2}(g+hx)^2}{3ch}$$

Antiderivative was successfully verified.

```
[In]  Int[((g + h*x)*(d + e*x + f*x^2))/Sqrt[a + c*x^2],x]
```

```
[Out] (f*(g + h*x)^2*Sqrt[a + c*x^2])/(3*c*h) - ((2*(c*f*g^2 + 2*a*f*h^
2 - 3*c*h*(e*g + d*h)) + c*h*(f*g - 3*e*h)*x)*Sqrt[a + c*x^2])/(6
*c^2*h) + ((2*c*d*g - a*(f*g + e*h))*ArcTanh[(Sqrt[c]*x)/Sqrt[a +
 c*x^2]])/(2*c^(3/2))
```

Rubi in Sympy [A] time = 27.195, size = 124, normalized size = 0.91

$$\frac{f\sqrt{a+cx^2}\,(g+hx)^2}{3ch}-\frac{\sqrt{a+cx^2}\,\left(-2cg\,(3eh-fg)-chx\,(3eh-fg)+2h^2\,(2af-3cd)\right)}{6c^2h}-\frac{(aeh+afg-2cdg)\,\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{2c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)*(f*x**2+e*x+d)/(c*x**2+a)**(1/2),x)
```

```
[Out] f*sqrt(a + c*x**2)*(g + h*x)**2/(3*c*h) - sqrt(a + c*x**2)*(-2*c*
g*(3*e*h - f*g) - c*h*x*(3*e*h - f*g) + 2*h**2*(2*a*f - 3*c*d))/(
6*c**2*h) - (a*e*h + a*f*g - 2*c*d*g)*atanh(sqrt(c)*x/sqrt(a + c*
x**2))/(2*c**(3/2))
```

Mathematica [A] time = 0.168906, size = 99, normalized size = 0.73

$$\frac{\sqrt{a+cx^2}\left(c\left(6dh+6eg+3ehx+3fgx+2fhx^2\right)-4afh\right)+3\sqrt{c}\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)(2cdg-a(eh+fg))}{6c^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((g + h*x)*(d + e*x + f*x^2))/Sqrt[a + c*x^2],x]
```

```
[Out] (Sqrt[a + c*x^2]*(-4*a*f*h + c*(6*e*g + 6*d*h + 3*f*g*x + 3*e*h*x
 + 2*f*h*x^2)) + 3*Sqrt[c]*(2*c*d*g - a*(f*g + e*h))*Log[c*x + Sq
rt[c]*Sqrt[a + c*x^2]])/(6*c^2)
```

Maple [A] time = 0.008, size = 172, normalized size = 1.3

$$dg\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)\frac{1}{\sqrt{c}}+\frac{dh}{c}\sqrt{cx^2+a}+\frac{eg}{c}\sqrt{cx^2+a}+\frac{ehx}{2\,c}\sqrt{cx^2+a}+\frac{fgx}{2\,c}\sqrt{cx^2+a}$$
$$-\frac{aeh}{2}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}-\frac{fag}{2}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}+\frac{fhx^2}{3\,c}\sqrt{cx^2+a}-\frac{2\,afh}{3\,c^2}\sqrt{cx^2+a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)*(f*x^2+e*x+d)/(c*x^2+a)^(1/2),x)
```

```
[Out] d*g*ln(x*c^(1/2)+(c*x^2+a)^(1/2))/c^(1/2)+1/c*(c*x^2+a)^(1/2)*d*h
+1/c*(c*x^2+a)^(1/2)*e*g+1/2*x/c*(c*x^2+a)^(1/2)*e*h+1/2*x/c*(c*x
^2+a)^(1/2)*f*g-1/2*a/c^(3/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*e*h-1
/2*a/c^(3/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*f*g+1/3*h*f*x^2/c*(c*x
^2+a)^(1/2)-2/3*h*f*a/c^2*(c*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((f*x^2 + e*x + d)*(h*x + g)/sqrt(c*x^2 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.285589, size = 1, normalized size = 0.01

$$\left[\frac{2\left(2\,cfhx^2+6\,ceg+2\,(3\,cd-2\,af)h+3\,(cfg+ceh)x\right)\sqrt{cx^2+a}\sqrt{c}+3\left(aceh-\left(2\,c^2d-acf\right)g\right)\log\left(2\sqrt{cx^2+a}cx-(2\,cx\right.}{12\,c^{\frac{5}{2}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)/sqrt(c*x^2 + a),x, algorithm="fricas")
```

```
[Out] [1/12*(2*(2*c*f*h*x^2 + 6*c*e*g + 2*(3*c*d - 2*a*f)*h + 3*(c*f*g
+ c*e*h)*x)*sqrt(c*x^2 + a)*sqrt(c) + 3*(a*c*e*h - (2*c^2*d - a*c
*f)*g)*log(2*sqrt(c*x^2 + a)*c*x - (2*c*x^2 + a)*sqrt(c)))/c^(5/2
), 1/6*((2*c*f*h*x^2 + 6*c*e*g + 2*(3*c*d - 2*a*f)*h + 3*(c*f*g +
 c*e*h)*x)*sqrt(c*x^2 + a)*sqrt(-c) - 3*(a*c*e*h - (2*c^2*d - a*c
*f)*g)*arctan(sqrt(-c)*x/sqrt(c*x^2 + a)))/(sqrt(-c)*c^2)]
```

Sympy [A] time = 8.76828, size = 282, normalized size = 2.07

$$\frac{\sqrt{a}ehx\sqrt{1+\frac{cx^2}{a}}}{2c}+\frac{\sqrt{a}fgx\sqrt{1+\frac{cx^2}{a}}}{2c}-\frac{aeh\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2c^{\frac{3}{2}}}-\frac{afg\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2c^{\frac{3}{2}}}$$
$$+dg\left(\begin{cases}\frac{\sqrt{-\frac{a}{c}}\operatorname{asin}\left(x\sqrt{-\frac{c}{a}}\right)}{\sqrt{a}} & \text{for}\ a>0\wedge c<0\\ \frac{\sqrt{\frac{a}{c}}\operatorname{asinh}\left(x\sqrt{\frac{c}{a}}\right)}{\sqrt{a}} & \text{for}\ a>0\wedge c>0\\ \frac{\sqrt{-\frac{a}{c}}\operatorname{acosh}\left(x\sqrt{-\frac{c}{a}}\right)}{\sqrt{-a}} & \text{for}\ c>0\wedge a<0\end{cases}\right)+dh\left(\begin{cases}\frac{x^2}{2\sqrt{a}} & \text{for}\ c=0\\ \frac{\sqrt{a+cx^2}}{c} & \text{otherwise}\end{cases}\right)$$
$$+eg\left(\begin{cases}\frac{x^2}{2\sqrt{a}} & \text{for}\ c=0\\ \frac{\sqrt{a+cx^2}}{c} & \text{otherwise}\end{cases}\right)+fh\left(\begin{cases}-\frac{2a\sqrt{a+cx^2}}{3c^2}+\frac{x^2\sqrt{a+cx^2}}{3c} & \text{for}\ c\neq 0\\ \frac{x^4}{4\sqrt{a}} & \text{otherwise}\end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)*(f*x**2+e*x+d)/(c*x**2+a)**(1/2),x)
```

```
[Out] sqrt(a)*e*h*x*sqrt(1 + c*x**2/a)/(2*c) + sqrt(a)*f*g*x*sqrt(1 + c
*x**2/a)/(2*c) - a*e*h*asinh(sqrt(c)*x/sqrt(a))/(2*c**(3/2)) - a*
f*g*asinh(sqrt(c)*x/sqrt(a))/(2*c**(3/2)) + d*g*Piecewise((sqrt(-
a/c)*asin(x*sqrt(-c/a))/sqrt(a), (a > 0) & (c < 0)), (sqrt(a/c)*a
sinh(x*sqrt(c/a))/sqrt(a), (a > 0) & (c > 0)), (sqrt(-a/c)*acosh(
x*sqrt(-c/a))/sqrt(-a), (c > 0) & (a < 0))) + d*h*Piecewise((x**2
/(2*sqrt(a)), Eq(c, 0)), (sqrt(a + c*x**2)/c, True)) + e*g*Piecew
ise((x**2/(2*sqrt(a)), Eq(c, 0)), (sqrt(a + c*x**2)/c, True)) + f
*h*Piecewise((-2*a*sqrt(a + c*x**2)/(3*c**2) + x**2*sqrt(a + c*x*
*2)/(3*c), Ne(c, 0)), (x**4/(4*sqrt(a)), True))
```

GIAC/XCAS [A] time = 0.280718, size = 149, normalized size = 1.1

$$\frac{1}{6}\sqrt{cx^2+a}\left(\left(\frac{2\,fhx}{c}+\frac{3\left(c^2fg+c^2he\right)}{c^3}\right)x+\frac{2\left(3\,c^2dh-2\,acfh+3\,c^2ge\right)}{c^3}\right)-\frac{(2\,cdg-afg-ahe)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{2\,c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)/sqrt(c*x^2 + a),x, algorithm="giac")
```

```
[Out] 1/6*sqrt(c*x^2 + a)*((2*f*h*x/c + 3*(c^2*f*g + c^2*h*e)/c^3)*x +
2*(3*c^2*d*h - 2*a*c*f*h + 3*c^2*g*e)/c^3) - 1/2*(2*c*d*g - a*f*g
 - a*h*e)*ln(abs(-sqrt(c)*x + sqrt(c*x^2 + a)))/c^(3/2)
```

3.104 $\int \frac{d+ex+fx^2}{\sqrt{a+cx^2}}\,dx$

Optimal. Leaf size=74

$$\frac{(2cd-af)\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{2c^{3/2}}+\frac{e\sqrt{a+cx^2}}{c}+\frac{fx\sqrt{a+cx^2}}{2c}$$

```
[Out] (e*Sqrt[a + c*x^2])/c + (f*x*Sqrt[a + c*x^2])/(2*c) + ((2*c*d - a
*f)*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(2*c^(3/2))
```

Rubi [A] time = 0.102164, antiderivative size = 74, 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

$$\frac{(2cd-af)\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{2c^{3/2}}+\frac{e\sqrt{a+cx^2}}{c}+\frac{fx\sqrt{a+cx^2}}{2c}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/Sqrt[a + c*x^2],x]
```

```
[Out] (e*Sqrt[a + c*x^2])/c + (f*x*Sqrt[a + c*x^2])/(2*c) + ((2*c*d - a
*f)*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(2*c^(3/2))
```

Rubi in Sympy [A] time = 9.36055, size = 53, normalized size = 0.72

$$\frac{\sqrt{a+cx^2}\,(2e+fx)}{2c}-\frac{(af-2cd)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{2c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)/(c*x**2+a)**(1/2),x)
```

```
[Out] sqrt(a + c*x**2)*(2*e + f*x)/(2*c) - (a*f - 2*c*d)*atanh(sqrt(c)*
x/sqrt(a + c*x**2))/(2*c**(3/2))
```

Mathematica [A] time = 0.0640235, size = 68, normalized size = 0.92

$$\frac{(2cd-af)\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)}{2c^{3/2}}+\sqrt{a+cx^2}\left(\frac{e}{c}+\frac{fx}{2c}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/Sqrt[a + c*x^2],x]
```

```
[Out] (e/c + (f*x)/(2*c))*Sqrt[a + c*x^2] + ((2*c*d - a*f)*Log[c*x + Sq
rt[c]*Sqrt[a + c*x^2]])/(2*c^(3/2))
```

Maple [A] time = 0.007, size = 76, normalized size = 1.

$$d\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)\frac{1}{\sqrt{c}}+\frac{e}{c}\sqrt{cx^2+a}+\frac{fx}{2c}\sqrt{cx^2+a}-\frac{fa}{2}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(c*x^2+a)^(1/2),x)
```

```
[Out] d*ln(x*c^(1/2)+(c*x^2+a)^(1/2))/c^(1/2)+e*(c*x^2+a)^(1/2)/c+1/2*f
*x*(c*x^2+a)^(1/2)/c-1/2*f*a/c^(3/2)*ln(x*c^(1/2)+(c*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((f*x^2 + e*x + d)/sqrt(c*x^2 + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.2811, size = 1, normalized size = 0.01

$$\left[\frac{2\sqrt{cx^2+a}(fx+2e)\sqrt{c}-(2cd-af)\log\left(2\sqrt{cx^2+a}cx-\left(2cx^2+a\right)\sqrt{c}\right)}{4c^{\frac{3}{2}}},\frac{\sqrt{cx^2+a}(fx+2e)\sqrt{-c}+(2cd-af)\arctan\left(\right.}{2\sqrt{-c}c}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)/sqrt(c*x^2 + a),x, algorithm="fricas")
```

```
[Out] [1/4*(2*sqrt(c*x^2 + a)*(f*x + 2*e)*sqrt(c) - (2*c*d - a*f)*log(2
*sqrt(c*x^2 + a)*c*x - (2*c*x^2 + a)*sqrt(c)))/c^(3/2), 1/2*(sqrt
(c*x^2 + a)*(f*x + 2*e)*sqrt(-c) + (2*c*d - a*f)*arctan(sqrt(-c)*
x/sqrt(c*x^2 + a)))/(sqrt(-c)*c)]
```

Sympy [A] time = 4.2812, size = 150, normalized size = 2.03

$$\frac{\sqrt{a}fx\sqrt{1+\frac{cx^2}{a}}}{2c}-\frac{af\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{2c^{\frac{3}{2}}}+d\left(\begin{cases}\frac{\sqrt{-\frac{a}{c}}\operatorname{asin}\left(x\sqrt{-\frac{c}{a}}\right)}{\sqrt{a}} & \text{for } a>0\wedge c<0\\ \frac{\sqrt{\frac{a}{c}}\operatorname{asinh}\left(x\sqrt{\frac{c}{a}}\right)}{\sqrt{a}} & \text{for } a>0\wedge c>0\\ \frac{\sqrt{-\frac{a}{c}}\operatorname{acosh}\left(x\sqrt{-\frac{c}{a}}\right)}{\sqrt{-a}} & \text{for } c>0\wedge a<0\end{cases}\right)+e\left(\begin{cases}\frac{x^2}{2\sqrt{a}} & \text{for } c=0\\ \frac{\sqrt{a+cx^2}}{c} & \text{otherwise}\end{cases}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)/(c*x**2+a)**(1/2),x)
```

```
[Out] sqrt(a)*f*x*sqrt(1 + c*x**2/a)/(2*c) - a*f*asinh(sqrt(c)*x/sqrt(a
))/(2*c**(3/2)) + d*Piecewise((sqrt(-a/c)*asin(x*sqrt(-c/a))/sqrt
(a), (a > 0) & (c < 0)), (sqrt(a/c)*asinh(x*sqrt(c/a))/sqrt(a), (
a > 0) & (c > 0)), (sqrt(-a/c)*acosh(x*sqrt(-c/a))/sqrt(-a), (c >
 0) & (a < 0))) + e*Piecewise((x**2/(2*sqrt(a)), Eq(c, 0)), (sqrt
(a + c*x**2)/c, True))
```

GIAC/XCAS [A] time = 0.27891, size = 78, normalized size = 1.05

$$\frac{1}{2}\sqrt{cx^2+a}\left(\frac{fx}{c}+\frac{2e}{c}\right)-\frac{(2cd-af)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{2c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)/sqrt(c*x^2 + a),x, algorithm="giac")
```

```
[Out] 1/2*sqrt(c*x^2 + a)*(f*x/c + 2*e/c) - 1/2*(2*c*d - a*f)*ln(abs(-s
qrt(c)*x + sqrt(c*x^2 + a)))/c^(3/2)
```

3.105 $\int \frac{d+ex+fx^2}{(g+hx)\sqrt{a+cx^2}}\,dx$

Optimal. Leaf size=130

$$-\frac{\left(dh^2-egh+fg^2\right)\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{h^2\sqrt{ah^2+cg^2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(fg-eh)}{\sqrt{c}h^2}+\frac{f\sqrt{a+cx^2}}{ch}$$

```
[Out] (f*Sqrt[a + c*x^2])/(c*h) - ((f*g - e*h)*ArcTanh[(Sqrt[c]*x)/Sqrt
[a + c*x^2]])/(Sqrt[c]*h^2) - ((f*g^2 - e*g*h + d*h^2)*ArcTanh[(a
*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(h^2*Sqrt[c*g
^2 + a*h^2])
```

Rubi [A] time = 0.388729, antiderivative size = 130, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.172

$$-\frac{\left(dh^2-egh+fg^2\right)\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{h^2\sqrt{ah^2+cg^2}}-\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(fg-eh)}{\sqrt{c}h^2}+\frac{f\sqrt{a+cx^2}}{ch}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/((g + h*x)*Sqrt[a + c*x^2]),x]
```

```
[Out] (f*Sqrt[a + c*x^2])/(c*h) - ((f*g - e*h)*ArcTanh[(Sqrt[c]*x)/Sqrt
[a + c*x^2]])/(Sqrt[c]*h^2) - ((f*g^2 - e*g*h + d*h^2)*ArcTanh[(a
*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(h^2*Sqrt[c*g
^2 + a*h^2])
```

Rubi in Sympy [A] time = 40.6682, size = 114, normalized size = 0.88

$$-\frac{\left(dh^2-egh+fg^2\right)\operatorname{atanh}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{h^2\sqrt{ah^2+cg^2}}+\frac{f\sqrt{a+cx^2}}{ch}+\frac{(eh-fg)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{\sqrt{c}h^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)/(h*x+g)/(c*x**2+a)**(1/2),x)
```

```
[Out] -(d*h**2 - e*g*h + f*g**2)*atanh((a*h - c*g*x)/(sqrt(a + c*x**2)*
sqrt(a*h**2 + c*g**2)))/(h**2*sqrt(a*h**2 + c*g**2)) + f*sqrt(a +
```

```
 c*x**2)/(c*h) + (e*h - f*g)*atanh(sqrt(c)*x/sqrt(a + c*x**2))/(s
qrt(c)*h**2)
```

Mathematica [A] time = 0.327844, size = 166, normalized size = 1.28

$$\frac{-\frac{(h(dh-eg)+fg^2)\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)}{\sqrt{ah^2+cg^2}}+\frac{\log(g+hx)(h(dh-eg)+fg^2)}{\sqrt{ah^2+cg^2}}+\frac{\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)(eh-fg)}{\sqrt{c}}+\frac{fh\sqrt{a+cx^2}}{c}}{h^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/((g + h*x)*Sqrt[a + c*x^2]),x]
```

```
[Out] ((f*h*Sqrt[a + c*x^2])/c + ((f*g^2 + h*(-(e*g) + d*h))*Log[g + h*
x])/Sqrt[c*g^2 + a*h^2] + ((-(f*g) + e*h)*Log[c*x + Sqrt[c]*Sqrt[
a + c*x^2]])/Sqrt[c] - ((f*g^2 + h*(-(e*g) + d*h))*Log[a*h - c*g*
x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]])/Sqrt[c*g^2 + a*h^2])/h^
2
```

Maple [B] time = 0.017, size = 453, normalized size = 3.5

$$\frac{e}{h}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)\frac{1}{\sqrt{c}}+\frac{f}{ch}\sqrt{cx^2+a}-\frac{fg}{h^2}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)\frac{1}{\sqrt{c}}$$
$$-\frac{d}{h}\ln\left(1\left(2\frac{ah^2+cg^2}{h^2}-2\frac{cg}{h}\left(x+\frac{g}{h}\right)+2\sqrt{\frac{ah^2+cg^2}{h^2}}\sqrt{\left(x+\frac{g}{h}\right)^2c-2\frac{cg}{h}\left(x+\frac{g}{h}\right)+\frac{ah^2+cg^2}{h^2}}\right)\left(x+\frac{g}{h}\right)^{-1}\right)\frac{1}{\sqrt{\frac{ah^2+cg^2}{h^2}}}$$
$$+\frac{eg}{h^2}\ln\left(1\left(2\frac{ah^2+cg^2}{h^2}-2\frac{cg}{h}\left(x+\frac{g}{h}\right)+2\sqrt{\frac{ah^2+cg^2}{h^2}}\sqrt{\left(x+\frac{g}{h}\right)^2c-2\frac{cg}{h}\left(x+\frac{g}{h}\right)+\frac{ah^2+cg^2}{h^2}}\right)\left(x+\frac{g}{h}\right)^{-1}\right)\frac{1}{\sqrt{\frac{ah^2+cg^2}{h^2}}}$$
$$-\frac{fg^2}{h^3}\ln\left(1\left(2\frac{ah^2+cg^2}{h^2}-2\frac{cg}{h}\left(x+\frac{g}{h}\right)+2\sqrt{\frac{ah^2+cg^2}{h^2}}\sqrt{\left(x+\frac{g}{h}\right)^2c-2\frac{cg}{h}\left(x+\frac{g}{h}\right)+\frac{ah^2+cg^2}{h^2}}\right)\left(x+\frac{g}{h}\right)^{-1}\right)\frac{1}{\sqrt{\frac{ah^2+cg^2}{h^2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(h*x+g)/(c*x^2+a)^(1/2),x)
```

```
[Out] 1/h*e*ln(x*c^(1/2)+(c*x^2+a)^(1/2))/c^(1/2)+f*(c*x^2+a)^(1/2)/c/h
-1/h^2*f*g*ln(x*c^(1/2)+(c*x^2+a)^(1/2))/c^(1/2)-1/h/((a*h^2+c*g^
2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2
+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)
/h^2)^(1/2))/(x+1/h*g))*d+1/h^2/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(
a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((
```

```
x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g
))*e*g-1/h^3/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*
c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/
h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*f*g^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((f*x^2 + e*x + d)/(sqrt(c*x^2 + a)*(h*x + g)),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((f*x^2 + e*x + d)/(sqrt(c*x^2 + a)*(h*x + g)),x, algorithm="fricas")
```

```
[Out] Timed out
```

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

$$\int \frac{d + ex + fx^2}{\sqrt{a + cx^2}\,(g + hx)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)/(h*x+g)/(c*x**2+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2)/(sqrt(a + c*x**2)*(g + h*x)), x)
```

GIAC/XCAS [A] time = 0.284956, size = 186, normalized size = 1.43

$$\frac{\sqrt{cx^2+a}f}{ch}+\frac{2\left(fg^2+dh^2-ghe\right)\arctan\left(-\frac{\left(\sqrt{c}x-\sqrt{cx^2+a}\right)h+\sqrt{c}g}{\sqrt{-cg^2-ah^2}}\right)}{\sqrt{-cg^2-ah^2}h^2}+\frac{\left(\sqrt{c}fg-\sqrt{c}he\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{ch^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/(sqrt(c*x^2 + a)*(h*x + g)),x, algorithm="giac")
```

```
[Out] sqrt(c*x^2 + a)*f/(c*h) + 2*(f*g^2 + d*h^2 - g*h*e)*arctan(-((sqr
t(c)*x - sqrt(c*x^2 + a))*h + sqrt(c)*g)/sqrt(-c*g^2 - a*h^2))/(s
qrt(-c*g^2 - a*h^2)*h^2) + (sqrt(c)*f*g - sqrt(c)*h*e)*ln(abs(-sq
rt(c)*x + sqrt(c*x^2 + a)))/(c*h^2)
```

3.106 $\int \frac{d+ex+fx^2}{(g+hx)^2\sqrt{a+cx^2}}\,dx$

Optimal. Leaf size=168

$$-\frac{\sqrt{a+cx^2}\left(dh^2-egh+fg^2\right)}{h(g+hx)\left(ah^2+cg^2\right)}+\frac{\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(ah^2(2fg-eh)+c\left(fg^3-dgh^2\right)\right)}{h^2\left(ah^2+cg^2\right)^{3/2}}+\frac{f\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{\sqrt{c}h^2}$$

```
[Out] -(((f*g^2 - e*g*h + d*h^2)*Sqrt[a + c*x^2])/(h*(c*g^2 + a*h^2)*(g
 + h*x))) + (f*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(Sqrt[c]*h^2
) + ((a*h^2*(2*f*g - e*h) + c*(f*g^3 - d*g*h^2))*ArcTanh[(a*h - c
*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(h^2*(c*g^2 + a*h^2
)^(3/2))
```

Rubi [A] time = 0.537271, antiderivative size = 168, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.172$

$$-\frac{\sqrt{a+cx^2}\left(dh^2-egh+fg^2\right)}{h(g+hx)\left(ah^2+cg^2\right)}+\frac{\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(ah^2(2fg-eh)+c\left(fg^3-dgh^2\right)\right)}{h^2\left(ah^2+cg^2\right)^{3/2}}+\frac{f\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{\sqrt{c}h^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/((g + h*x)^2*Sqrt[a + c*x^2]),x]
```

```
[Out] -(((f*g^2 - e*g*h + d*h^2)*Sqrt[a + c*x^2])/(h*(c*g^2 + a*h^2)*(g
 + h*x))) + (f*ArcTanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(Sqrt[c]*h^2
) + ((a*h^2*(2*f*g - e*h) + c*(f*g^3 - d*g*h^2))*ArcTanh[(a*h - c
*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(h^2*(c*g^2 + a*h^2
)^(3/2))
```

Rubi in Sympy [A] time = 51.7983, size = 153, normalized size = 0.91

$$-\frac{\sqrt{a+cx^2}\left(dh^2-egh+fg^2\right)}{h\left(g+hx\right)\left(ah^2+cg^2\right)} - \frac{\left(aeh^3-2afgh^2+cdgh^2-cfg^3\right)\operatorname{atanh}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{h^2\left(ah^2+cg^2\right)^{\frac{3}{2}}} + \frac{f\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{\sqrt{c}h^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)/(h*x+g)**2/(c*x**2+a)**(1/2),x)
```

```
[Out] -sqrt(a + c*x**2)*(d*h**2 - e*g*h + f*g**2)/(h*(g + h*x)*(a*h**2
+ c*g**2)) - (a*e*h**3 - 2*a*f*g*h**2 + c*d*g*h**2 - c*f*g**3)*at
anh((a*h - c*g*x)/(sqrt(a + c*x**2)*sqrt(a*h**2 + c*g**2)))/(h**2
*(a*h**2 + c*g**2)**(3/2)) + f*atanh(sqrt(c)*x/sqrt(a + c*x**2))/
(sqrt(c)*h**2)
```

Mathematica [A] time = 0.514724, size = 218, normalized size = 1.3

$$\frac{-\frac{h\sqrt{a+cx^2}(h(dh-eg)+fg^2)}{(g+hx)(ah^2+cg^2)}+\frac{\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)\left(ah^2(2fg-eh)+c\left(fg^3-dgh^2\right)\right)}{(ah^2+cg^2)^{3/2}}+\frac{\log(g+hx)\left(ah^2(eh-2fg)+c\left(dgh^2-fg^3\right)\right)}{(ah^2+cg^2)^{3/2}}+\frac{f\log\left(\sqrt{c}\sqrt{\cdots}\right.}{\sqrt{\cdots}}}{h^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/((g + h*x)^2*Sqrt[a + c*x^2]),x]
```

```
[Out] (-((h*(f*g^2 + h*(-(e*g) + d*h))*Sqrt[a + c*x^2])/((c*g^2 + a*h^2
)*(g + h*x))) + ((a*h^2*(-2*f*g + e*h) + c*(-(f*g^3) + d*g*h^2))*
Log[g + h*x])/(c*g^2 + a*h^2)^(3/2) + (f*Log[c*x + Sqrt[c]*Sqrt[a
 + c*x^2]])/Sqrt[c] + ((a*h^2*(2*f*g - e*h) + c*(f*g^3 - d*g*h^2)
)*Log[a*h - c*g*x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]])/(c*g^2
+ a*h^2)^(3/2))/h^2
```

Maple [B] time = 0.02, size = 923, normalized size = 5.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(h*x+g)^2/(c*x^2+a)^(1/2),x)
```

```
[Out] f/h^2*ln(x*c^(1/2)+(c*x^2+a)^(1/2))/c^(1/2)-1/h^2/((a*h^2+c*g^2)/
h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*
g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^
2)^(1/2))/(x+1/h*g))*e+2/h^3/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h
^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1
/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*
f*g-1/(a*h^2+c*g^2)/(x+1/h*g)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a
*h^2+c*g^2)/h^2)^(1/2)*d+1/h/(a*h^2+c*g^2)/(x+1/h*g)*((x+1/h*g)^2
*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*e*g-1/h^2/(a*h^2+c*
g^2)/(x+1/h*g)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2
)^(1/2)*f*g^2-1/h*c*g/(a*h^2+c*g^2)/((a*h^2+c*g^2)/h^2)^(1/2)*ln(
(2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2
)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1
/h*g))*d+1/h^2*c*g^2/(a*h^2+c*g^2)/((a*h^2+c*g^2)/h^2)^(1/2)*ln((
2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)
*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/
h*g))*e-1/h^3*c*g^3/(a*h^2+c*g^2)/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2
*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*
((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h
*g))*f
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/(sqrt(c*x^2 + a)*(h*x + g)^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((f*x^2 + e*x + d)/(sqrt(c*x^2 + a)*(h*x + g)^2),x, algorithm="fricas")
```

```
[Out] Timed out
```

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

$$\int \frac{d + ex + fx^2}{\sqrt{a + cx^2} (g + hx)^2} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)/(h*x+g)**2/(c*x**2+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2)/(sqrt(a + c*x**2)*(g + h*x)**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((f*x^2 + e*x + d)/(sqrt(c*x^2 + a)*(h*x + g)^2),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.107 $\int \frac{d+ex+fx^2}{(g+hx)^3\sqrt{a+cx^2}}\,dx$

Optimal. Leaf size=225

$$-\frac{\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(2a^2fh^2-ac\left(fg^2-h(3eg-dh)\right)+2c^2dg^2\right)}{2\left(ah^2+cg^2\right)^{5/2}}-\frac{\sqrt{a+cx^2}\left(dh^2-egh+fg^2\right)}{2h(g+hx)^2\left(ah^2+cg^2\right)}+\frac{\sqrt{a+cx^2}\left(2ah^2(2fg-eh)+cg\left(h(eg-3dh)+fg^2\right)\right)}{2h(g+hx)\left(ah^2+cg^2\right)^2}$$

```
[Out] -((f*g^2 - e*g*h + d*h^2)*Sqrt[a + c*x^2])/(2*h*(c*g^2 + a*h^2)*(
g + h*x)^2) + ((2*a*h^2*(2*f*g - e*h) + c*g*(f*g^2 + h*(e*g - 3*d
*h)))*Sqrt[a + c*x^2])/(2*h*(c*g^2 + a*h^2)^2*(g + h*x)) - ((2*c^
2*d*g^2 + 2*a^2*f*h^2 - a*c*(f*g^2 - h*(3*e*g - d*h)))*ArcTanh[(a
*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(2*(c*g^2 + a
*h^2)^(5/2))
```

Rubi [A] time = 0.671642, antiderivative size = 224, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.138$

$$-\frac{\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(2a^2fh^2-ac\left(fg^2-h(3eg-dh)\right)+2c^2dg^2\right)}{2\left(ah^2+cg^2\right)^{5/2}}-\frac{\sqrt{a+cx^2}\left(dh^2-egh+fg^2\right)}{2h(g+hx)^2\left(ah^2+cg^2\right)}+\frac{\sqrt{a+cx^2}\left(2ah^2(2fg-eh)+cgh(eg-3dh)+cfg^3\right)}{2h(g+hx)\left(ah^2+cg^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/((g + h*x)^3*Sqrt[a + c*x^2]),x]
```

```
[Out] -((f*g^2 - e*g*h + d*h^2)*Sqrt[a + c*x^2])/(2*h*(c*g^2 + a*h^2)*(
g + h*x)^2) + ((c*f*g^3 + c*g*h*(e*g - 3*d*h) + 2*a*h^2*(2*f*g -
e*h))*Sqrt[a + c*x^2])/(2*h*(c*g^2 + a*h^2)^2*(g + h*x)) - ((2*c^
2*d*g^2 + 2*a^2*f*h^2 - a*c*(f*g^2 - h*(3*e*g - d*h)))*ArcTanh[(a
*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(2*(c*g^2 + a
*h^2)^(5/2))
```

Rubi in Sympy [A] time = 96.1653, size = 218, normalized size = 0.97

$$-\frac{\left(2a^2fh^2-acdh^2+3acegh-acfg^2+2c^2dg^2\right)\operatorname{atanh}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{2\left(ah^2+cg^2\right)^{\frac{5}{2}}}-\frac{\sqrt{a+cx^2}\left(2aeh^3-4afgh^2+3cdgh^2-ceg^2h-cfg^3\right)}{2h\left(g+hx\right)\left(ah^2+cg^2\right)^2}-\frac{\sqrt{a+cx^2}\left(dh^2-egh+fg^2\right)}{2h\left(g+hx\right)^2\left(ah^2+cg^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)/(h*x+g)**3/(c*x**2+a)**(1/2),x)
```

```
[Out] -(2*a**2*f*h**2 - a*c*d*h**2 + 3*a*c*e*g*h - a*c*f*g**2 + 2*c**2*
d*g**2)*atanh((a*h - c*g*x)/(sqrt(a + c*x**2)*sqrt(a*h**2 + c*g**
2)))/(2*(a*h**2 + c*g**2)**(5/2)) - sqrt(a + c*x**2)*(2*a*e*h**3
- 4*a*f*g*h**2 + 3*c*d*g*h**2 - c*e*g**2*h - c*f*g**3)/(2*h*(g +
h*x)*(a*h**2 + c*g**2)**2) - sqrt(a + c*x**2)*(d*h**2 - e*g*h + f
*g**2)/(2*h*(g + h*x)**2*(a*h**2 + c*g**2))
```

Mathematica [A] time = 0.800647, size = 254, normalized size = 1.13

$$\frac{(g+hx)^2\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)\left(-2a^2fh^2+ac\left(h(dh-3eg)+fg^2\right)-2c^2dg^2\right)+(g+hx)^2\log(g+hx)\left(2a^2f\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/((g + h*x)^3*Sqrt[a + c*x^2]),x]
```

```
[Out] (Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]*(c*g*(f*g^2*x + e*g*(2*g + h
*x) - d*h*(4*g + 3*h*x)) - a*h*(-(f*g*(3*g + 4*h*x)) + h*(d*h + e
*(g + 2*h*x)))) + (2*c^2*d*g^2 + 2*a^2*f*h^2 - a*c*(f*g^2 + h*(-3
*e*g + d*h)))*(g + h*x)^2*Log[g + h*x] + (-2*c^2*d*g^2 - 2*a^2*f*
h^2 + a*c*(f*g^2 + h*(-3*e*g + d*h)))*(g + h*x)^2*Log[a*h - c*g*x
 + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]])/(2*(c*g^2 + a*h^2)^(5/2)
*(g + h*x)^2)
```

Maple [B] time = 0.023, size = 1574, normalized size = 7.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(h*x+g)^3/(c*x^2+a)^(1/2),x)
```

```
[Out] -f/h^3/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*
(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1
/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))-1/h/(a*h^2+c*g^2)/(x+1
/h*g)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*e
+2/h^2/(a*h^2+c*g^2)/(x+1/h*g)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(
a*h^2+c*g^2)/h^2)^(1/2)*f*g-3/2/h^2*c*g/(a*h^2+c*g^2)/((a*h^2+c*g
^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^
2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2
)/h^2)^(1/2))/(x+1/h*g))*e+5/2/h^3*c*g^2/(a*h^2+c*g^2)/((a*h^2+c*
g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h
^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^
2)/h^2)^(1/2))/(x+1/h*g))*f-1/2/h/(a*h^2+c*g^2)/(x+1/h*g)^2*((x+1
/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*d+1/2/h^2/(a
*h^2+c*g^2)/(x+1/h*g)^2*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c
*g^2)/h^2)^(1/2)*e*g-1/2/h^3/(a*h^2+c*g^2)/(x+1/h*g)^2*((x+1/h*g)
^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*f*g^2-3/2*c*g/(a*
h^2+c*g^2)^2/(x+1/h*g)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*
g^2)/h^2)^(1/2)*d+3/2/h*c*g^2/(a*h^2+c*g^2)^2/(x+1/h*g)*((x+1/h*g
)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*e-3/2/h^2*c*g^3/
(a*h^2+c*g^2)^2/(x+1/h*g)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2
+c*g^2)/h^2)^(1/2)*f-3/2/h*c^2*g^2/(a*h^2+c*g^2)^2/((a*h^2+c*g^2)
/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c
*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h
^2)^(1/2))/(x+1/h*g))*d+3/2/h^2*c^2*g^3/(a*h^2+c*g^2)^2/((a*h^2+c
*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*
h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g
^2)/h^2)^(1/2))/(x+1/h*g))*e-3/2/h^3*c^2*g^4/(a*h^2+c*g^2)^2/((a*
h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2
*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^
2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*f+1/2/h*c/(a*h^2+c*g^2)/((a*h^2+c
*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*
h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g
^2)/h^2)^(1/2))/(x+1/h*g))*d
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)/(sqrt(c*x^2 + a)*(h*x + g)^3),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 2.77609, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/(sqrt(c*x^2 + a)*(h*x + g)^3),x, algorithm="fricas")
```

```
[Out] [1/4*(2*(2*c*e*g^3 - a*e*g*h^2 - a*d*h^3 - (4*c*d - 3*a*f)*g^2*h
+ (c*f*g^3 + c*e*g^2*h - 2*a*e*h^3 - (3*c*d - 4*a*f)*g*h^2)*x)*sq
rt(c*g^2 + a*h^2)*sqrt(c*x^2 + a) + (3*a*c*e*g^3*h + (2*c^2*d - a
*c*f)*g^4 - (a*c*d - 2*a^2*f)*g^2*h^2 + (3*a*c*e*g*h^3 + (2*c^2*d
 - a*c*f)*g^2*h^2 - (a*c*d - 2*a^2*f)*h^4)*x^2 + 2*(3*a*c*e*g^2*h
^2 + (2*c^2*d - a*c*f)*g^3*h - (a*c*d - 2*a^2*f)*g*h^3)*x)*log(((
2*a*c*g*h*x - a*c*g^2 - 2*a^2*h^2 - (2*c^2*g^2 + a*c*h^2)*x^2)*sq
rt(c*g^2 + a*h^2) + 2*(a*c*g^2*h + a^2*h^3 - (c^2*g^3 + a*c*g*h^2
)*x)*sqrt(c*x^2 + a))/(h^2*x^2 + 2*g*h*x + g^2)))/((c^2*g^6 + 2*a
*c*g^4*h^2 + a^2*g^2*h^4 + (c^2*g^4*h^2 + 2*a*c*g^2*h^4 + a^2*h^6
)*x^2 + 2*(c^2*g^5*h + 2*a*c*g^3*h^3 + a^2*g*h^5)*x)*sqrt(c*g^2 +
 a*h^2)), 1/2*((2*c*e*g^3 - a*e*g*h^2 - a*d*h^3 - (4*c*d - 3*a*f)
*g^2*h + (c*f*g^3 + c*e*g^2*h - 2*a*e*h^3 - (3*c*d - 4*a*f)*g*h^2
)*x)*sqrt(-c*g^2 - a*h^2)*sqrt(c*x^2 + a) + (3*a*c*e*g^3*h + (2*c
^2*d - a*c*f)*g^4 - (a*c*d - 2*a^2*f)*g^2*h^2 + (3*a*c*e*g*h^3 +
(2*c^2*d - a*c*f)*g^2*h^2 - (a*c*d - 2*a^2*f)*h^4)*x^2 + 2*(3*a*c
*e*g^2*h^2 + (2*c^2*d - a*c*f)*g^3*h - (a*c*d - 2*a^2*f)*g*h^3)*x
)*arctan(sqrt(-c*g^2 - a*h^2)*(c*g*x - a*h)/((c*g^2 + a*h^2)*sqrt
(c*x^2 + a))))/((c^2*g^6 + 2*a*c*g^4*h^2 + a^2*g^2*h^4 + (c^2*g^4
*h^2 + 2*a*c*g^2*h^4 + a^2*h^6)*x^2 + 2*(c^2*g^5*h + 2*a*c*g^3*h^
3 + a^2*g*h^5)*x)*sqrt(-c*g^2 - a*h^2))]
```

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

$$\int \frac{d + ex + fx^2}{\sqrt{a + cx^2}\,(g + hx)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)/(h*x+g)**3/(c*x**2+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2)/(sqrt(a + c*x**2)*(g + h*x)**3), x)
```

GIAC/XCAS [A] time = 0.660643, size = 4, normalized size = 0.02

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/(sqrt(c*x^2 + a)*(h*x + g)^3),x, algorithm="giac")
```

```
[Out] sage0*x
```

3.108 $\int \frac{(g+hx)^3 (d+ex+fx^2)}{(a+cx^2)^{3/2}} \, dx$

Optimal. Leaf size=229

$$-\frac{h\sqrt{a+cx^2}\left(4\left(4a^2fh^2-ac\left(3h(dh+3eg)+7fg^2\right)+3c^2dg^2\right)+chx(-9aeh-11afg+6cdg)\right)}{6ac^3}-\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(3ah^2(eh+3fg)-2cg\left(3h(dh+eg)+fg^2\right)\right)}{2c^{5/2}}-\frac{h\sqrt{a+cx^2}(g+hx)^2(3cd-4af)}{3ac^2}-\frac{(g+hx)^3(ae-x(cd-af))}{ac\sqrt{a+cx^2}}$$

```
[Out] -(((a*e - (c*d - a*f)*x)*(g + h*x)^3)/(a*c*Sqrt[a + c*x^2])) - ((
3*c*d - 4*a*f)*h*(g + h*x)^2*Sqrt[a + c*x^2])/(3*a*c^2) - (h*(4*(
3*c^2*d*g^2 + 4*a^2*f*h^2 - a*c*(7*f*g^2 + 3*h*(3*e*g + d*h))) +
c*h*(6*c*d*g - 11*a*f*g - 9*a*e*h)*x)*Sqrt[a + c*x^2])/(6*a*c^3)
- ((3*a*h^2*(3*f*g + e*h) - 2*c*g*(f*g^2 + 3*h*(e*g + d*h)))*ArcT
anh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(2*c^(5/2))
```

Rubi [A] time = 0.782373, antiderivative size = 228, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.172$

$$-\frac{h\sqrt{a+cx^2}\left(4\left(4a^2fh^2-ac\left(3h(dh+3eg)+7fg^2\right)+3c^2dg^2\right)+chx(-9aeh-11afg+6cdg)\right)}{6ac^3}+\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(-3ah^2(eh+3fg)+6cgh(dh+eg)+2cfg^3\right)}{2c^{5/2}}-\frac{h\sqrt{a+cx^2}(g+hx)^2(3cd-4af)}{3ac^2}-\frac{(g+hx)^3(ae-x(cd-af))}{ac\sqrt{a+cx^2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((g + h*x)^3*(d + e*x + f*x^2))/(a + c*x^2)^(3/2),x]
```

```
[Out] -(((a*e - (c*d - a*f)*x)*(g + h*x)^3)/(a*c*Sqrt[a + c*x^2])) - ((
3*c*d - 4*a*f)*h*(g + h*x)^2*Sqrt[a + c*x^2])/(3*a*c^2) - (h*(4*(
3*c^2*d*g^2 + 4*a^2*f*h^2 - a*c*(7*f*g^2 + 3*h*(3*e*g + d*h))) +
c*h*(6*c*d*g - 11*a*f*g - 9*a*e*h)*x)*Sqrt[a + c*x^2])/(6*a*c^3)
+ ((2*c*f*g^3 + 6*c*g*h*(e*g + d*h) - 3*a*h^2*(3*f*g + e*h))*ArcT
anh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(2*c^(5/2))
```

Rubi in Sympy [A] time = 58.6586, size = 235, normalized size = 1.03

$$-\frac{\left(3aeh^3+9afgh^2-6cdgh^2-6ceg^2h-2cfg^3\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{2c^{\frac{5}{2}}}-\frac{(g+hx)^3\left(ae+x\left(af-cd\right)\right)}{ac\sqrt{a+cx^2}}+\frac{h\sqrt{a+cx^2}\left(g+hx\right)^2\left(4af-3cd\right)}{3ac^2}-\frac{h\sqrt{a+cx^2}\left(16a^2fh^2-12acdh^2-36acegh-28acfg^2+12c^2dg^2-chx\left(9aeh+11afg-6cdg\right)\right)}{6ac^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)**3*(f*x**2+e*x+d)/(c*x**2+a)**(3/2),x)
```

```
[Out] -(3*a*e*h**3 + 9*a*f*g*h**2 - 6*c*d*g*h**2 - 6*c*e*g**2*h - 2*c*f
*g**3)*atanh(sqrt(c)*x/sqrt(a + c*x**2))/(2*c**(5/2)) - (g + h*x)
**3*(a*e + x*(a*f - c*d))/(a*c*sqrt(a + c*x**2)) + h*sqrt(a + c*x
**2)*(g + h*x)**2*(4*a*f - 3*c*d)/(3*a*c**2) - h*sqrt(a + c*x**2)
*(16*a**2*f*h**2 - 12*a*c*d*h**2 - 36*a*c*e*g*h - 28*a*c*f*g**2 +
 12*c**2*d*g**2 - c*h*x*(9*a*e*h + 11*a*f*g - 6*c*d*g))/(6*a*c**3
)
```

Mathematica [A] time = 0.844468, size = 246, normalized size = 1.07

$$\frac{\frac{-16a^3fh^3+a^2ch\left(3h(4dh+3e(4g+hx))+f\left(36g^2+27ghx-8h^2x^2\right)\right)+ac^2\left(6dh\left(-3g^2-3ghx+h^2x^2\right)-3e\left(2g^3+6g^2hx-6gh^2x^2-h^3x^3\right)+fx\left(-6g^3+18g^2hx+9gh^2x^2+2h\right.\right.}{a\sqrt{a+cx^2}}}{6c^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((g + h*x)^3*(d + e*x + f*x^2))/(a + c*x^2)^(3/2),x]
```

```
[Out] ((-16*a^3*f*h^3 + 6*c^3*d*g^3*x + a*c^2*(6*d*h*(-3*g^2 - 3*g*h*x
+ h^2*x^2) - 3*e*(2*g^3 + 6*g^2*h*x - 6*g*h^2*x^2 - h^3*x^3) + f*
x*(-6*g^3 + 18*g^2*h*x + 9*g*h^2*x^2 + 2*h^3*x^3)) + a^2*c*h*(f*(
36*g^2 + 27*g*h*x - 8*h^2*x^2) + 3*h*(4*d*h + 3*e*(4*g + h*x))))/
(a*Sqrt[a + c*x^2]) + 3*Sqrt[c]*(2*c*f*g^3 + 6*c*g*h*(e*g + d*h)
- 3*a*h^2*(3*f*g + e*h))*Log[c*x + Sqrt[c]*Sqrt[a + c*x^2]])/(6*c
^3)
```

Maple [B] time = 0.017, size = 516, normalized size = 2.3

$$\frac{g^3dx}{a}\frac{1}{\sqrt{cx^2+a}}-3\frac{g^2hd}{c\sqrt{cx^2+a}}-\frac{g^3e}{c}\frac{1}{\sqrt{cx^2+a}}+\frac{x^3h^3e}{2c}\frac{1}{\sqrt{cx^2+a}}+\frac{3x^3gh^2f}{2c}\frac{1}{\sqrt{cx^2+a}}+\frac{3axh^3e}{2c^2}\frac{1}{\sqrt{cx^2+a}}+\frac{9axgh^2f}{2c^2}\frac{1}{\sqrt{cx^2+a}}-\frac{3aeh^3}{2}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{5}{2}}-\frac{9agh^2f}{2}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{5}{2}}+\frac{x^2h^3d}{c}\frac{1}{\sqrt{cx^2+a}}+3\frac{x^2gh^2e}{c\sqrt{cx^2+a}}+3\frac{g^2x^2hf}{c\sqrt{cx^2+a}}+2\frac{ah^3d}{c^2\sqrt{cx^2+a}}+6\frac{agh^2e}{c^2\sqrt{cx^2+a}}+6\frac{ag^2hf}{c^2\sqrt{cx^2+a}}-3\frac{gxh^2d}{c\sqrt{cx^2+a}}-3\frac{xg^2he}{c\sqrt{cx^2+a}}-\frac{xg^3f}{c}\frac{1}{\sqrt{cx^2+a}}+3\frac{\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)gh^2d}{c^{3/2}}+3\frac{\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)g^2he}{c^{3/2}}+g^3f\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}+\frac{h^3fx^4}{3c}\frac{1}{\sqrt{cx^2+a}}-\frac{4ah^3fx^2}{3c^2}\frac{1}{\sqrt{cx^2+a}}-\frac{8a^2fh^3}{3c^3}\frac{1}{\sqrt{cx^2+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^3*(f*x^2+e*x+d)/(c*x^2+a)^(3/2),x)
```

```
[Out] g^3*d*x/a/(c*x^2+a)^(1/2)-3/c/(c*x^2+a)^(1/2)*g^2*h*d-1/c/(c*x^2+
a)^(1/2)*g^3*e+1/2*x^3/c/(c*x^2+a)^(1/2)*h^3*e+3/2*x^3/c/(c*x^2+a
)^(1/2)*g*h^2*f+3/2/c^2*a*x/(c*x^2+a)^(1/2)*h^3*e+9/2/c^2*a*x/(c*
x^2+a)^(1/2)*g*h^2*f-3/2/c^(5/2)*a*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*
h^3*e-9/2/c^(5/2)*a*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*g*h^2*f+x^2/c/(
c*x^2+a)^(1/2)*h^3*d+3*x^2/c/(c*x^2+a)^(1/2)*g*h^2*e+3*x^2/c/(c*x
^2+a)^(1/2)*g^2*h*f+2*a/c^2/(c*x^2+a)^(1/2)*h^3*d+6*a/c^2/(c*x^2+
a)^(1/2)*g*h^2*e+6*a/c^2/(c*x^2+a)^(1/2)*g^2*h*f-3*x/c/(c*x^2+a)^
(1/2)*g*h^2*d-3*x/c/(c*x^2+a)^(1/2)*g^2*h*e-x/c/(c*x^2+a)^(1/2)*g
^3*f+3/c^(3/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*g*h^2*d+3/c^(3/2)*ln
(x*c^(1/2)+(c*x^2+a)^(1/2))*g^2*h*e+1/c^(3/2)*ln(x*c^(1/2)+(c*x^2
+a)^(1/2))*g^3*f+1/3*h^3*f*x^4/c/(c*x^2+a)^(1/2)-4/3*h^3*f/c^2*a*
x^2/(c*x^2+a)^(1/2)-8/3*h^3*f/c^3*a^2/(c*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((f*x^2 + e*x + d)*(h*x + g)^3/(c*x^2 + a)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.319236, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(h*x + g)^3/(c*x^2 + a)^(3/2),x, algorithm="fricas")
```

```
[Out] [1/12*(2*(2*a*c^2*f*h^3*x^4 - 6*a*c^2*e*g^3 + 36*a^2*c*e*g*h^2 -
18*(a*c^2*d - 2*a^2*c*f)*g^2*h + 4*(3*a^2*c*d - 4*a^3*f)*h^3 + 3*
(3*a*c^2*f*g*h^2 + a*c^2*e*h^3)*x^3 + 2*(9*a*c^2*f*g^2*h + 9*a*c^
2*e*g*h^2 + (3*a*c^2*d - 4*a^2*c*f)*h^3)*x^2 - 3*(6*a*c^2*e*g^2*h
 - 3*a^2*c*e*h^3 - 2*(c^3*d - a*c^2*f)*g^3 + 3*(2*a*c^2*d - 3*a^2
*c*f)*g*h^2)*x)*sqrt(c*x^2 + a)*sqrt(c) - 3*(2*a^2*c^2*f*g^3 + 6*
a^2*c^2*e*g^2*h - 3*a^3*c*e*h^3 + 3*(2*a^2*c^2*d - 3*a^3*c*f)*g*h
^2 + (2*a*c^3*f*g^3 + 6*a*c^3*e*g^2*h - 3*a^2*c^2*e*h^3 + 3*(2*a*
c^3*d - 3*a^2*c^2*f)*g*h^2)*x^2)*log(2*sqrt(c*x^2 + a)*c*x - (2*c
*x^2 + a)*sqrt(c)))/((a*c^4*x^2 + a^2*c^3)*sqrt(c)), 1/6*((2*a*c^
2*f*h^3*x^4 - 6*a*c^2*e*g^3 + 36*a^2*c*e*g*h^2 - 18*(a*c^2*d - 2*
a^2*c*f)*g^2*h + 4*(3*a^2*c*d - 4*a^3*f)*h^3 + 3*(3*a*c^2*f*g*h^2
 + a*c^2*e*h^3)*x^3 + 2*(9*a*c^2*f*g^2*h + 9*a*c^2*e*g*h^2 + (3*a
*c^2*d - 4*a^2*c*f)*h^3)*x^2 - 3*(6*a*c^2*e*g^2*h - 3*a^2*c*e*h^3
 - 2*(c^3*d - a*c^2*f)*g^3 + 3*(2*a*c^2*d - 3*a^2*c*f)*g*h^2)*x)*
sqrt(c*x^2 + a)*sqrt(-c) + 3*(2*a^2*c^2*f*g^3 + 6*a^2*c^2*e*g^2*h
 - 3*a^3*c*e*h^3 + 3*(2*a^2*c^2*d - 3*a^3*c*f)*g*h^2 + (2*a*c^3*f
*g^3 + 6*a*c^3*e*g^2*h - 3*a^2*c^2*e*h^3 + 3*(2*a*c^3*d - 3*a^2*c
^2*f)*g*h^2)*x^2)*arctan(sqrt(-c)*x/sqrt(c*x^2 + a)))/((a*c^4*x^2
 + a^2*c^3)*sqrt(-c))]
```

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

$$\int \frac{(g + hx)^3 \left(d + ex + fx^2\right)}{(a + cx^2)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**3*(f*x**2+e*x+d)/(c*x**2+a)**(3/2),x)
```

```
[Out] Integral((g + h*x)**3*(d + e*x + f*x**2)/(a + c*x**2)**(3/2), x)
```

GIAC/XCAS [A] time = 0.282664, size = 458, normalized size = 2.

$$\frac{\left(\left(\left(\frac{2\,fh^3x}{c}+\frac{3\,\left(3\,ac^4fgh^2+ac^4h^3e\right)}{ac^5}\right)x+\frac{2\,\left(9\,ac^4fg^2h+3\,ac^4dh^3-4\,a^2c^3fh^3+9\,ac^4gh^2e\right)}{ac^5}\right)x+\frac{3\,\left(2\,c^5dg^3-2\,ac^4fg^3-6\,ac^4dgh^2+9\,a^2c^3fgh^2-6\,ac^4g^2he}{ac^5}}{6\,\sqrt{cx^2+a}}$$

$$-\frac{\left(2\,cfg^3+6\,cdgh^2-9\,afgh^2+6\,cg^2he-3\,ah^3e\right)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{2\,c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)^3/(c*x^2 + a)^(3/2),x, algorithm="giac")
```

```
[Out] 1/6*((((2*f*h^3*x/c + 3*(3*a*c^4*f*g*h^2 + a*c^4*h^3*e)/(a*c^5))*
x + 2*(9*a*c^4*f*g^2*h + 3*a*c^4*d*h^3 - 4*a^2*c^3*f*h^3 + 9*a*c^
4*g*h^2*e)/(a*c^5))*x + 3*(2*c^5*d*g^3 - 2*a*c^4*f*g^3 - 6*a*c^4*
d*g*h^2 + 9*a^2*c^3*f*g*h^2 - 6*a*c^4*g^2*h*e + 3*a^2*c^3*h^3*e)/
(a*c^5))*x - 2*(9*a*c^4*d*g^2*h - 18*a^2*c^3*f*g^2*h - 6*a^2*c^3*
d*h^3 + 8*a^3*c^2*f*h^3 + 3*a*c^4*g^3*e - 18*a^2*c^3*g*h^2*e)/(a*
c^5))/sqrt(c*x^2 + a) - 1/2*(2*c*f*g^3 + 6*c*d*g*h^2 - 9*a*f*g*h^
2 + 6*c*g^2*h*e - 3*a*h^3*e)*ln(abs(-sqrt(c)*x + sqrt(c*x^2 + a))
)/c^(5/2)
```

3.109 $\int \frac{(g+hx)^2\left(d+ex+fx^2\right)}{\left(a+cx^2\right)^{3/2}}\,dx$

Optimal. Leaf size=149

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(h^2(2cd-3af)+2cg(2eh+fg)\right)}{2c^{5/2}}-\frac{h\sqrt{a+cx^2}(4(cdg-a(eh+2fg))+hx(2cd-3af))}{2ac^2}-\frac{(g+hx)^2(ae-x(cd-af))}{ac\sqrt{a+cx^2}}$$

```
[Out] -(((a*e - (c*d - a*f)*x)*(g + h*x)^2)/(a*c*Sqrt[a + c*x^2])) - (h
*(4*(c*d*g - a*(2*f*g + e*h)) + (2*c*d - 3*a*f)*h*x)*Sqrt[a + c*x
^2])/(2*a*c^2) + (((2*c*d - 3*a*f)*h^2 + 2*c*g*(f*g + 2*e*h))*Arc
Tanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(2*c^(5/2))
```

Rubi [A] time = 0.414323, antiderivative size = 149, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.138$

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)\left(h^2(2cd-3af)+2cg(2eh+fg)\right)}{2c^{5/2}}-\frac{h\sqrt{a+cx^2}(4(cdg-a(eh+2fg))+hx(2cd-3af))}{2ac^2}-\frac{(g+hx)^2(ae-x(cd-af))}{ac\sqrt{a+cx^2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((g + h*x)^2*(d + e*x + f*x^2))/(a + c*x^2)^(3/2),x]
```

```
[Out] -(((a*e - (c*d - a*f)*x)*(g + h*x)^2)/(a*c*Sqrt[a + c*x^2])) - (h
*(4*(c*d*g - a*(2*f*g + e*h)) + (2*c*d - 3*a*f)*h*x)*Sqrt[a + c*x
^2])/(2*a*c^2) + (((2*c*d - 3*a*f)*h^2 + 2*c*g*(f*g + 2*e*h))*Arc
Tanh[(Sqrt[c]*x)/Sqrt[a + c*x^2]])/(2*c^(5/2))
```

Rubi in Sympy [A] time = 30.0409, size = 136, normalized size = 0.91

$$-\frac{\left(-2cg\left(2eh+fg\right)+h^2\left(3af-2cd\right)\right)\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{2c^{\frac{5}{2}}}-\frac{(g+hx)^2\left(ae+x\left(af-cd\right)\right)}{ac\sqrt{a+cx^2}}+\frac{h\sqrt{a+cx^2}\left(4aeh+8afg-4cdg+hx\left(3af-2cd\right)\right)}{2ac^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)**2*(f*x**2+e*x+d)/(c*x**2+a)**(3/2),x)
```

```
[Out] -(-2*c*g*(2*e*h + f*g) + h**2*(3*a*f - 2*c*d))*atanh(sqrt(c)*x/sq
rt(a + c*x**2))/(2*c**(5/2)) - (g + h*x)**2*(a*e + x*(a*f - c*d))
/(a*c*sqrt(a + c*x**2)) + h*sqrt(a + c*x**2)*(4*a*e*h + 8*a*f*g -
 4*c*d*g + h*x*(3*a*f - 2*c*d))/(2*a*c**2)
```

Mathematica [A] time = 0.31279, size = 166, normalized size = 1.11

$$\frac{\frac{\sqrt{c}\left(a^2h(4eh+8fg+3fhx)+ac\left(-2dh(2g+hx)-2e\left(g^2+2ghx-h^2x^2\right)+fx\left(-2g^2+4ghx+h^2x^2\right)\right)+2c^2dg^2x\right)}{a\sqrt{a+cx^2}}+\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)\left(2c\left(h(dh+2eg)\right.\right.}{2c^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((g + h*x)^2*(d + e*x + f*x^2))/(a + c*x^2)^(3/2),x]
```

```
[Out] ((Sqrt[c]*(2*c^2*d*g^2*x + a^2*h*(8*f*g + 4*e*h + 3*f*h*x) + a*c*
(-2*d*h*(2*g + h*x) - 2*e*(g^2 + 2*g*h*x - h^2*x^2) + f*x*(-2*g^2
 + 4*g*h*x + h^2*x^2))))/(a*Sqrt[a + c*x^2]) + (-3*a*f*h^2 + 2*c*
(f*g^2 + h*(2*e*g + d*h)))*Log[c*x + Sqrt[c]*Sqrt[a + c*x^2]])/(2
*c^(5/2))
```

Maple [B] time = 0.013, size = 327, normalized size = 2.2

$$\frac{g^2dx}{a}\frac{1}{\sqrt{cx^2+a}}-2\frac{ghd}{c\sqrt{cx^2+a}}-\frac{eg^2}{c}\frac{1}{\sqrt{cx^2+a}}+\frac{h^2x^2e}{c}\frac{1}{\sqrt{cx^2+a}}+2\frac{x^2ghf}{c\sqrt{cx^2+a}}$$
$$+2\frac{ah^2e}{c^2\sqrt{cx^2+a}}+4\frac{aghf}{c^2\sqrt{cx^2+a}}-\frac{dxh^2}{c}\frac{1}{\sqrt{cx^2+a}}-2\frac{egxh}{c\sqrt{cx^2+a}}-\frac{fxg^2}{c}\frac{1}{\sqrt{cx^2+a}}$$
$$+dh^2\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}+2\frac{\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)egh}{c^{3/2}}+fg^2\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}$$
$$+\frac{h^2fx^3}{2c}\frac{1}{\sqrt{cx^2+a}}+\frac{3afh^2x}{2c^2}\frac{1}{\sqrt{cx^2+a}}-\frac{3afh^2}{2}\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^2*(f*x^2+e*x+d)/(c*x^2+a)^(3/2),x)
```

```
[Out] g^2*d*x/a/(c*x^2+a)^(1/2)-2/c/(c*x^2+a)^(1/2)*g*h*d-1/c/(c*x^2+a)
^(1/2)*e*g^2+x^2/c/(c*x^2+a)^(1/2)*h^2*e+2*x^2/c/(c*x^2+a)^(1/2)*
g*h*f+2*a/c^2/(c*x^2+a)^(1/2)*h^2*e+4*a/c^2/(c*x^2+a)^(1/2)*g*h*f
-x/c/(c*x^2+a)^(1/2)*d*h^2-2*x/c/(c*x^2+a)^(1/2)*e*g*h-x/c/(c*x^2
```

```
+a)^(1/2)*f*g^2+1/c^(3/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*d*h^2+2/c
^(3/2)*ln(x*c^(1/2)+(c*x^2+a)^(1/2))*e*g*h+1/c^(3/2)*ln(x*c^(1/2)
+(c*x^2+a)^(1/2))*f*g^2+1/2*h^2*f*x^3/c/(c*x^2+a)^(1/2)+3/2*h^2*f
/c^2*a*x/(c*x^2+a)^(1/2)-3/2*h^2*f/c^(5/2)*a*ln(x*c^(1/2)+(c*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((f*x^2 + e*x + d)*(h*x + g)^2/(c*x^2 + a)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.308398, size = 1, normalized size = 0.01

$$\left[\frac{2\left(acfh^2x^3 - 2\,aceg^2 + 4\,a^2eh^2 - 4\left(acd - 2\,a^2f\right)gh + 2\left(2\,acfgh + aceh^2\right)x^2 - \left(4\,acegh - 2\left(c^2d - acf\right)g^2 + \left(2\,acd - 3\,a\right.\right.\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)^2/(c*x^2 + a)^(3/2),x, algorithm="fricas")
```

```
[Out] [1/4*(2*(a*c*f*h^2*x^3 - 2*a*c*e*g^2 + 4*a^2*e*h^2 - 4*(a*c*d - 2
*a^2*f)*g*h + 2*(2*a*c*f*g*h + a*c*e*h^2)*x^2 - (4*a*c*e*g*h - 2*
(c^2*d - a*c*f)*g^2 + (2*a*c*d - 3*a^2*f)*h^2)*x)*sqrt(c*x^2 + a)
*sqrt(c) - (2*a^2*c*f*g^2 + 4*a^2*c*e*g*h + (2*a^2*c*d - 3*a^3*f)
*h^2 + (2*a*c^2*f*g^2 + 4*a*c^2*e*g*h + (2*a*c^2*d - 3*a^2*c*f)*h
^2)*x^2)*log(2*sqrt(c*x^2 + a)*c*x - (2*c*x^2 + a)*sqrt(c)))/((a*
c^3*x^2 + a^2*c^2)*sqrt(c)), 1/2*((a*c*f*h^2*x^3 - 2*a*c*e*g^2 +
4*a^2*e*h^2 - 4*(a*c*d - 2*a^2*f)*g*h + 2*(2*a*c*f*g*h + a*c*e*h^
2)*x^2 - (4*a*c*e*g*h - 2*(c^2*d - a*c*f)*g^2 + (2*a*c*d - 3*a^2*
f)*h^2)*x)*sqrt(c*x^2 + a)*sqrt(-c) + (2*a^2*c*f*g^2 + 4*a^2*c*e*
g*h + (2*a^2*c*d - 3*a^3*f)*h^2 + (2*a*c^2*f*g^2 + 4*a*c^2*e*g*h
+ (2*a*c^2*d - 3*a^2*c*f)*h^2)*x^2)*arctan(sqrt(-c)*x/sqrt(c*x^2
+ a)))/((a*c^3*x^2 + a^2*c^2)*sqrt(-c))]
```

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

$$\int \frac{(g+hx)^2 (d+ex+fx^2)}{(a+cx^2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**2*(f*x**2+e*x+d)/(c*x**2+a)**(3/2),x)
```

```
[Out] Integral((g + h*x)**2*(d + e*x + f*x**2)/(a + c*x**2)**(3/2), x)
```

GIAC/XCAS [A] time = 0.282858, size = 296, normalized size = 1.99

$$\frac{\left(\left(\frac{fh^2x}{c}+\frac{2\,(2\,ac^3fgh+ac^3h^2e)}{ac^4}\right)x+\frac{2\,c^4dg^2-2\,ac^3fg^2-2\,ac^3dh^2+3\,a^2c^2fh^2-4\,ac^3ghe}{ac^4}\right)x-\frac{2\,(2\,ac^3dgh-4\,a^2c^2fgh+ac^3g^2e-2\,a^2c^2h^2e)}{ac^4}}{2\sqrt{cx^2+a}}-\frac{(2\,cfg^2+2\,cdh^2-3\,afh^2+4\,cghe)\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{2\,c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(h*x + g)^2/(c*x^2 + a)^(3/2),x, algorithm="giac")
```

```
[Out] 1/2*(((f*h^2*x/c + 2*(2*a*c^3*f*g*h + a*c^3*h^2*e)/(a*c^4))*x + (
2*c^4*d*g^2 - 2*a*c^3*f*g^2 - 2*a*c^3*d*h^2 + 3*a^2*c^2*f*h^2 - 4
*a*c^3*g*h*e)/(a*c^4))*x - 2*(2*a*c^3*d*g*h - 4*a^2*c^2*f*g*h + a
*c^3*g^2*e - 2*a^2*c^2*h^2*e)/(a*c^4))/sqrt(c*x^2 + a) - 1/2*(2*c
*f*g^2 + 2*c*d*h^2 - 3*a*f*h^2 + 4*c*g*h*e)*ln(abs(-sqrt(c)*x + s
qrt(c*x^2 + a)))/c^(5/2)
```

3.110 $\int \frac{(g+hx)(d+ex+fx^2)}{(a+cx^2)^{3/2}}\,dx$

Optimal. Leaf size=100

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(eh+fg)}{c^{3/2}}-\frac{h\sqrt{a+cx^2}(cd-2af)}{ac^2}-\frac{(g+hx)(ae-x(cd-af))}{ac\sqrt{a+cx^2}}$$

```
[Out] -(((a*e - (c*d - a*f)*x)*(g + h*x))/(a*c*Sqrt[a + c*x^2])) - ((c*
d - 2*a*f)*h*Sqrt[a + c*x^2])/(a*c^2) + ((f*g + e*h)*ArcTanh[(Sqr
t[c]*x)/Sqrt[a + c*x^2]])/c^(3/2)
```

Rubi [A] time = 0.185099, antiderivative size = 100, 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

$$\frac{\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)(eh+fg)}{c^{3/2}}-\frac{h\sqrt{a+cx^2}(cd-2af)}{ac^2}-\frac{(g+hx)(ae-x(cd-af))}{ac\sqrt{a+cx^2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((g + h*x)*(d + e*x + f*x^2))/(a + c*x^2)^(3/2),x]
```

```
[Out] -(((a*e - (c*d - a*f)*x)*(g + h*x))/(a*c*Sqrt[a + c*x^2])) - ((c*
d - 2*a*f)*h*Sqrt[a + c*x^2])/(a*c^2) + ((f*g + e*h)*ArcTanh[(Sqr
t[c]*x)/Sqrt[a + c*x^2]])/c^(3/2)
```

Rubi in Sympy [A] time = 44.855, size = 197, normalized size = 1.97

$$\frac{(eh+fg)\,\mathrm{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{c^{\frac{3}{2}}}-\frac{(g+hx)^2\,(a\,(afh-cdh+ceg)-cx\,(aeh-afg+cdg))}{ac\sqrt{a+cx^2}\,(ah^2+cg^2)}+\frac{h\sqrt{a+cx^2}\,\left(4a^2fh^2-2acdh^2-2acegh+6acfg^2-4c^2dg^2-2chx\,(aeh-afg+cdg)\right)}{2ac^2\,(ah^2+cg^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)*(f*x**2+e*x+d)/(c*x**2+a)**(3/2),x)
```

```
[Out] (e*h + f*g)*atanh(sqrt(c)*x/sqrt(a + c*x**2))/c**(3/2) - (g + h*x
)**2*(a*(a*f*h - c*d*h + c*e*g) - c*x*(a*e*h - a*f*g + c*d*g))/(a
```

```
*c*sqrt(a + c*x**2)*(a*h**2 + c*g**2)) + h*sqrt(a + c*x**2)*(4*a*
*2*f*h**2 - 2*a*c*d*h**2 - 2*a*c*e*g*h + 6*a*c*f*g**2 - 4*c**2*d*
g**2 - 2*c*h*x*(a*e*h - a*f*g + c*d*g))/(2*a*c**2*(a*h**2 + c*g**
2))
```

Mathematica [A] time = 0.201866, size = 93, normalized size = 0.93

$$\frac{2a^2fh - ac(dh + e(g + hx) + fx(g - hx)) + c^2dgx}{ac^2\sqrt{a + cx^2}} + \frac{\log\left(\sqrt{c}\sqrt{a + cx^2} + cx\right)(eh + fg)}{c^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((g + h*x)*(d + e*x + f*x^2))/(a + c*x^2)^(3/2),x]
```

```
[Out] (2*a^2*f*h + c^2*d*g*x - a*c*(d*h + f*x*(g - h*x) + e*(g + h*x)))
/(a*c^2*Sqrt[a + c*x^2]) + ((f*g + e*h)*Log[c*x + Sqrt[c]*Sqrt[a
+ c*x^2]])/c^(3/2)
```

Maple [A] time = 0.008, size = 163, normalized size = 1.6

$$\frac{dgx}{a}\frac{1}{\sqrt{cx^2+a}} - \frac{dh}{c}\frac{1}{\sqrt{cx^2+a}} - \frac{eg}{c}\frac{1}{\sqrt{cx^2+a}} - \frac{ehx}{c}\frac{1}{\sqrt{cx^2+a}} - \frac{fgx}{c}\frac{1}{\sqrt{cx^2+a}} + eh\ln\left(x\sqrt{c} + \sqrt{cx^2+a}\right)c^{-\frac{3}{2}} + fg\ln\left(x\sqrt{c} + \sqrt{cx^2+a}\right)c^{-\frac{3}{2}} + \frac{fhx^2}{c}\frac{1}{\sqrt{cx^2+a}} + 2\frac{afh}{c^2\sqrt{cx^2+a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)*(f*x^2+e*x+d)/(c*x^2+a)^(3/2),x)
```

```
[Out] d*g*x/a/(c*x^2+a)^(1/2)-1/c/(c*x^2+a)^(1/2)*d*h-1/c/(c*x^2+a)^(1/
2)*e*g-x/c/(c*x^2+a)^(1/2)*e*h-x/c/(c*x^2+a)^(1/2)*f*g+1/c^(3/2)*
ln(x*c^(1/2)+(c*x^2+a)^(1/2))*e*h+1/c^(3/2)*ln(x*c^(1/2)+(c*x^2+a
)^(1/2))*f*g+h*f*x^2/c/(c*x^2+a)^(1/2)+2*h*f*a/c^2/(c*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((f*x^2 + e*x + d)*(h*x + g)/(c*x^2 + a)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.298942, size = 1, normalized size = 0.01

$$\left[\frac{2\left(acfhx^2 - aceg - \left(acd - 2a^2f\right)h - \left(aceh - \left(c^2d - acf\right)g\right)x\right)\sqrt{cx^2 + a}\sqrt{c} + \left(a^2cfg + a^2ceh + \left(ac^2fg + ac^2eh\right)x^2\right)\log\left(\right.}{2\left(ac^3x^2 + a^2c^2\right)\sqrt{c}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)/(c*x^2 + a)^(3/2),x, algorithm="fricas")
```

```
[Out] [1/2*(2*(a*c*f*h*x^2 - a*c*e*g - (a*c*d - 2*a^2*f)*h - (a*c*e*h -
 (c^2*d - a*c*f)*g)*x)*sqrt(c*x^2 + a)*sqrt(c) + (a^2*c*f*g + a^2
*c*e*h + (a*c^2*f*g + a*c^2*e*h)*x^2)*log(-2*sqrt(c*x^2 + a)*c*x
- (2*c*x^2 + a)*sqrt(c)))/((a*c^3*x^2 + a^2*c^2)*sqrt(c)), ((a*c*
f*h*x^2 - a*c*e*g - (a*c*d - 2*a^2*f)*h - (a*c*e*h - (c^2*d - a*c
*f)*g)*x)*sqrt(c*x^2 + a)*sqrt(-c) + (a^2*c*f*g + a^2*c*e*h + (a*
c^2*f*g + a*c^2*e*h)*x^2)*arctan(sqrt(-c)*x/sqrt(c*x^2 + a)))/((a
*c^3*x^2 + a^2*c^2)*sqrt(-c))]
```

Sympy [A] time = 13.2223, size = 209, normalized size = 2.09

$$dh\left(\begin{cases} -\frac{1}{c\sqrt{a+cx^2}} & \text{for}\ c \neq 0 \\ \frac{x^2}{2a^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right) + eg\left(\begin{cases} -\frac{1}{c\sqrt{a+cx^2}} & \text{for}\ c \neq 0 \\ \frac{x^2}{2a^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right) + eh\left(\frac{\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{c^{\frac{3}{2}}} - \frac{x}{\sqrt{a}c\sqrt{1 + \frac{cx^2}{a}}}\right) + fg\left(\frac{\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{c^{\frac{3}{2}}} - \frac{x}{\sqrt{a}c\sqrt{1 + \frac{cx^2}{a}}}\right) + fh\left(\begin{cases} \frac{2a}{c^2\sqrt{a+cx^2}} + \frac{x^2}{c\sqrt{a+cx^2}} & \text{for}\ c \neq 0 \\ \frac{x^4}{4a^{\frac{3}{2}}} & \text{otherwise} \end{cases}\right) + \frac{dgx}{a^{\frac{3}{2}}\sqrt{1 + \frac{cx^2}{a}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)*(f*x**2+e*x+d)/(c*x**2+a)**(3/2),x)
```

```
[Out] d*h*Piecewise((-1/(c*sqrt(a + c*x**2)), Ne(c, 0)), (x**2/(2*a**(3
/2)), True)) + e*g*Piecewise((-1/(c*sqrt(a + c*x**2)), Ne(c, 0)),
 (x**2/(2*a**(3/2)), True)) + e*h*(asinh(sqrt(c)*x/sqrt(a))/c**(3
/2) - x/(sqrt(a)*c*sqrt(1 + c*x**2/a))) + f*g*(asinh(sqrt(c)*x/sq
rt(a))/c**(3/2) - x/(sqrt(a)*c*sqrt(1 + c*x**2/a))) + f*h*Piecewi
```

```
se((2*a/(c**2*sqrt(a + c*x**2)) + x**2/(c*sqrt(a + c*x**2)), Ne(c
, 0)), (x**4/(4*a**(3/2)), True)) + d*g*x/(a**(3/2)*sqrt(1 + c*x*
*2/a))
```

GIAC/XCAS [A] time = 0.281759, size = 157, normalized size = 1.57

$$\frac{\left(\frac{fhx}{c} + \frac{c^3dg - ac^2fg - ac^2he}{ac^3}\right)x - \frac{ac^2dh - 2\,a^2cfh + ac^2ge}{ac^3}}{\sqrt{cx^2 + a}} - \frac{(fg + he)\ln\left(\left|-\sqrt{c}x + \sqrt{cx^2 + a}\right|\right)}{c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)/(c*x^2 + a)^(3/2),x, algorithm="giac")
```

```
[Out] ((f*h*x/c + (c^3*d*g - a*c^2*f*g - a*c^2*h*e)/(a*c^3))*x - (a*c^2
*d*h - 2*a^2*c*f*h + a*c^2*g*e)/(a*c^3))/sqrt(c*x^2 + a) - (f*g +
 h*e)*ln(abs(-sqrt(c)*x + sqrt(c*x^2 + a)))/c^(3/2)
```

3.111 $\int \frac{d+ex+fx^2}{(a+cx^2)^{3/2}}\,dx$

Optimal. Leaf size=61

$$\frac{f\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{c^{3/2}}-\frac{ae-x(cd-af)}{ac\sqrt{a+cx^2}}$$

```
[Out] -((a*e - (c*d - a*f)*x)/(a*c*Sqrt[a + c*x^2])) + (f*ArcTanh[(Sqrt
[c]*x)/Sqrt[a + c*x^2]])/c^(3/2)
```

Rubi [A] time = 0.067423, antiderivative size = 61, 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

$$\frac{f\tanh^{-1}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{c^{3/2}}-\frac{ae-x(cd-af)}{ac\sqrt{a+cx^2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/(a + c*x^2)^(3/2),x]
```

```
[Out] -((a*e - (c*d - a*f)*x)/(a*c*Sqrt[a + c*x^2])) + (f*ArcTanh[(Sqrt
[c]*x)/Sqrt[a + c*x^2]])/c^(3/2)
```

Rubi in Sympy [A] time = 9.26162, size = 49, normalized size = 0.8

$$\frac{f\,\operatorname{atanh}\left(\frac{\sqrt{c}x}{\sqrt{a+cx^2}}\right)}{c^{\frac{3}{2}}}-\frac{ae+x\,(af-cd)}{ac\sqrt{a+cx^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)/(c*x**2+a)**(3/2),x)
```

```
[Out] f*atanh(sqrt(c)*x/sqrt(a + c*x**2))/c**(3/2) - (a*e + x*(a*f - c*
d))/(a*c*sqrt(a + c*x**2))
```

Mathematica [A] time = 0.0887284, size = 62, normalized size = 1.02

$$\frac{f\log\left(\sqrt{c}\sqrt{a+cx^2}+cx\right)}{c^{3/2}}+\frac{-ae-afx+cdx}{ac\sqrt{a+cx^2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/(a + c*x^2)^(3/2),x]
```

```
[Out] (-(a*e) + c*d*x - a*f*x)/(a*c*Sqrt[a + c*x^2]) + (f*Log[c*x + Sqr
t[c]*Sqrt[a + c*x^2]])/c^(3/2)
```

Maple [A] time = 0.007, size = 69, normalized size = 1.1

$$\frac{dx}{a}\frac{1}{\sqrt{cx^2+a}}-\frac{e}{c}\frac{1}{\sqrt{cx^2+a}}-\frac{fx}{c}\frac{1}{\sqrt{cx^2+a}}+f\ln\left(x\sqrt{c}+\sqrt{cx^2+a}\right)c^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(c*x^2+a)^(3/2),x)
```

```
[Out] d*x/a/(c*x^2+a)^(1/2)-e/c/(c*x^2+a)^(1/2)-f*x/c/(c*x^2+a)^(1/2)+f
/c^(3/2)*ln(x*c^(1/2)+(c*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((f*x^2 + e*x + d)/(c*x^2 + a)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.295002, size = 1, normalized size = 0.02

$$\left[-\frac{2\sqrt{cx^2+a}(ae-(cd-af)x)\sqrt{c}-\left(acfx^2+a^2f\right)\log\left(-2\sqrt{cx^2+a}cx-\left(2cx^2+a\right)\sqrt{c}\right)}{2\left(ac^2x^2+a^2c\right)\sqrt{c}},\right.$$
$$\left.-\frac{\sqrt{cx^2+a}(ae-(cd-af)x)\sqrt{-c}-\left(acfx^2+a^2f\right)\arctan\left(\frac{\sqrt{-c}x}{\sqrt{cx^2+a}}\right)}{\left(ac^2x^2+a^2c\right)\sqrt{-c}}\right]$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] [-1/2*(2*sqrt(c*x^2 + a)*(a*e - (c*d - a*f)*x)*sqrt(c) - (a*c*f*x
^2 + a^2*f)*log(-2*sqrt(c*x^2 + a)*c*x - (2*c*x^2 + a)*sqrt(c)))/
((a*c^2*x^2 + a^2*c)*sqrt(c)), -(sqrt(c*x^2 + a)*(a*e - (c*d - a*
f)*x)*sqrt(-c) - (a*c*f*x^2 + a^2*f)*arctan(sqrt(-c)*x/sqrt(c*x^2
 + a)))/((a*c^2*x^2 + a^2*c)*sqrt(-c))]
```

Sympy [A] time = 6.95292, size = 87, normalized size = 1.43

$$e\left(\begin{cases}-\frac{1}{c\sqrt{a+cx^2}} & \text{for } c\neq 0\\ \frac{x^2}{2a^{\frac{3}{2}}} & \text{otherwise}\end{cases}\right)+f\left(\frac{\operatorname{asinh}\left(\frac{\sqrt{c}x}{\sqrt{a}}\right)}{c^{\frac{3}{2}}}-\frac{x}{\sqrt{a}c\sqrt{1+\frac{cx^2}{a}}}\right)+\frac{dx}{a^{\frac{3}{2}}\sqrt{1+\frac{cx^2}{a}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)/(c*x**2+a)**(3/2),x)
```

```
[Out] e*Piecewise((-1/(c*sqrt(a + c*x**2)), Ne(c, 0)), (x**2/(2*a**(3/2
)), True)) + f*(asinh(sqrt(c)*x/sqrt(a))/c**(3/2) - x/(sqrt(a)*c*
sqrt(1 + c*x**2/a))) + d*x/(a**(3/2)*sqrt(1 + c*x**2/a))
```

GIAC/XCAS [A] time = 0.280542, size = 85, normalized size = 1.39

$$-\frac{\frac{e}{c}-\frac{\left(c^2d-acf\right)x}{ac^2}}{\sqrt{cx^2+a}}-\frac{f\ln\left(\left|-\sqrt{c}x+\sqrt{cx^2+a}\right|\right)}{c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -(e/c - (c^2*d - a*c*f)*x/(a*c^2))/sqrt(c*x^2 + a) - f*ln(abs(-sq
rt(c)*x + sqrt(c*x^2 + a)))/c^(3/2)
```

3.112 $\int \frac{d+ex+fx^2}{(g+hx)(a+cx^2)^{3/2}}\,dx$

Optimal. Leaf size=138

$$-\frac{a(afh-cdh+ceg)-cx(aeh-afg+cdg)}{ac\sqrt{a+cx^2}\,(ah^2+cg^2)}-\frac{(dh^2-egh+fg^2)\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{(ah^2+cg^2)^{3/2}}$$

```
[Out] -((a*(c*e*g - c*d*h + a*f*h) - c*(c*d*g - a*f*g + a*e*h)*x)/(a*c*
(c*g^2 + a*h^2)*Sqrt[a + c*x^2])) - ((f*g^2 - e*g*h + d*h^2)*ArcT
anh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(c*g^2
+ a*h^2)^(3/2)
```

Rubi [A] time = 0.301023, antiderivative size = 138, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.138

$$-\frac{a(afh-cdh+ceg)-cx(aeh-afg+cdg)}{ac\sqrt{a+cx^2}\,(ah^2+cg^2)}-\frac{(dh^2-egh+fg^2)\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{(ah^2+cg^2)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/((g + h*x)*(a + c*x^2)^(3/2)),x]
```

```
[Out] -((a*(c*e*g - c*d*h + a*f*h) - c*(c*d*g - a*f*g + a*e*h)*x)/(a*c*
(c*g^2 + a*h^2)*Sqrt[a + c*x^2])) - ((f*g^2 - e*g*h + d*h^2)*ArcT
anh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2])])/(c*g^2
+ a*h^2)^(3/2)
```

Rubi in Sympy [A] time = 34.7883, size = 122, normalized size = 0.88

$$-\frac{(dh^2-egh+fg^2)\,\mathrm{atanh}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{(ah^2+cg^2)^{\frac{3}{2}}}-\frac{a\,(afh-cdh+ceg)-cx\,(aeh-afg+cdg)}{ac\sqrt{a+cx^2}\,(ah^2+cg^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)/(h*x+g)/(c*x**2+a)**(3/2),x)
```

```
[Out] -(d*h**2 - e*g*h + f*g**2)*atanh((a*h - c*g*x)/(sqrt(a + c*x**2)*
sqrt(a*h**2 + c*g**2)))/(a*h**2 + c*g**2)**(3/2) - (a*(a*f*h - c*
```

```
d*h + c*e*g) - c*x*(a*e*h - a*f*g + c*d*g))/(a*c*sqrt(a + c*x**2)
*(a*h**2 + c*g**2))
```

Mathematica [A] time = 0.344317, size = 175, normalized size = 1.27

$$\frac{a^2(-f)h + ac(dh - eg + ehx - fgx) + c^2dgx}{ac\sqrt{a+cx^2}\,(ah^2+cg^2)} - \frac{\left(h(dh-eg)+fg^2\right)\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)}{\left(ah^2+cg^2\right)^{3/2}} + \frac{\log(g+hx)\left(h(dh-eg)+fg^2\right)}{\left(ah^2+cg^2\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/((g + h*x)*(a + c*x^2)^(3/2)),x]
```

```
[Out] (-(a^2*f*h) + c^2*d*g*x + a*c*(-(e*g) + d*h - f*g*x + e*h*x))/(a*
c*(c*g^2 + a*h^2)*Sqrt[a + c*x^2]) + ((f*g^2 + h*(-(e*g) + d*h))*
Log[g + h*x])/(c*g^2 + a*h^2)^(3/2) - ((f*g^2 + h*(-(e*g) + d*h))
*Log[a*h - c*g*x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]])/(c*g^2 +
 a*h^2)^(3/2)
```

Maple [B] time = 0.018, size = 862, normalized size = 6.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(h*x+g)/(c*x^2+a)^(3/2),x)
```

```
[Out] 1/h*e*x/a/(c*x^2+a)^(1/2)-1/h*f/c/(c*x^2+a)^(1/2)-1/h^2*f*g*x/a/(
c*x^2+a)^(1/2)+h/(a*h^2+c*g^2)/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(
a*h^2+c*g^2)/h^2)^(1/2)*d-1/(a*h^2+c*g^2)/((x+1/h*g)^2*c-2*c*g/h*
(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*e*g+1/h/(a*h^2+c*g^2)/((x+1/h*
g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*f*g^2+g/(a*h^2+
c*g^2)/a/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2
)*c*x*d-1/h*g^2/(a*h^2+c*g^2)/a/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+
(a*h^2+c*g^2)/h^2)^(1/2)*c*x*e+1/h^2*g^3/(a*h^2+c*g^2)/a/((x+1/h*
g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*c*x*f-h/(a*h^2+
c*g^2)/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*
(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1
/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*d+1/(a*h^2+c*g^2)/((a*
h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2
*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^
2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*e*g-1/h/(a*h^2+c*g^2)/((a*h^2+c*g
```

```
^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^
2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2
)/h^2)^(1/2))/(x+1/h*g))*f*g^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((f*x^2 + e*x + d)/((c*x^2 + a)^(3/2)*(h*x + g)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.747866, size = 1, normalized size = 0.01

$$\left[-\frac{2\left(aceg-\left(acd-a^2f\right)h-\left(aceh+\left(c^2d-acf\right)g\right)x\right)\sqrt{cg^2+ah^2}\sqrt{cx^2+a}-\left(a^2cfg^2-a^2cegh+a^2cdh^2+\left(ac^2fg^2-ac^2e\right.\right.}{2\left(a^2c^2g^2+a^3ch^2+\left(ac^3g^2+a^2c^2h^2\right)\right.}\right.$$

$$-\frac{\left(aceg-\left(acd-a^2f\right)h-\left(aceh+\left(c^2d-acf\right)g\right)x\right)\sqrt{-cg^2-ah^2}\sqrt{cx^2+a}-\left(a^2cfg^2-a^2cegh+a^2cdh^2+\left(ac^2fg^2-ac^2eg\right.\right.}{(a^2c^2g^2+a^3ch^2+(ac^3g^2+a^2c^2h^2)x^2)\sqrt{-cg^2-ah^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/((c*x^2 + a)^(3/2)*(h*x + g)),x, algorithm="fricas")
```

```
[Out] [-1/2*(2*(a*c*e*g - (a*c*d - a^2*f)*h - (a*c*e*h + (c^2*d - a*c*f
)*g)*x)*sqrt(c*g^2 + a*h^2)*sqrt(c*x^2 + a) - (a^2*c*f*g^2 - a^2*
c*e*g*h + a^2*c*d*h^2 + (a*c^2*f*g^2 - a*c^2*e*g*h + a*c^2*d*h^2)
*x^2)*log(((2*a*c*g*h*x - a*c*g^2 - 2*a^2*h^2 - (2*c^2*g^2 + a*c*
h^2)*x^2)*sqrt(c*g^2 + a*h^2) + 2*(a*c*g^2*h + a^2*h^3 - (c^2*g^3
 + a*c*g*h^2)*x)*sqrt(c*x^2 + a))/(h^2*x^2 + 2*g*h*x + g^2)))/((a
^2*c^2*g^2 + a^3*c*h^2 + (a*c^3*g^2 + a^2*c^2*h^2)*x^2)*sqrt(c*g^
2 + a*h^2)), -((a*c*e*g - (a*c*d - a^2*f)*h - (a*c*e*h + (c^2*d -
 a*c*f)*g)*x)*sqrt(-c*g^2 - a*h^2)*sqrt(c*x^2 + a) - (a^2*c*f*g^2
 - a^2*c*e*g*h + a^2*c*d*h^2 + (a*c^2*f*g^2 - a*c^2*e*g*h + a*c^2
*d*h^2)*x^2)*arctan(sqrt(-c*g^2 - a*h^2)*(c*g*x - a*h)/((c*g^2 +
a*h^2)*sqrt(c*x^2 + a))))/((a^2*c^2*g^2 + a^3*c*h^2 + (a*c^3*g^2
+ a^2*c^2*h^2)*x^2)*sqrt(-c*g^2 - a*h^2))]
```

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

$$\int \frac{d + ex + fx^2}{(a + cx^2)^{\frac{3}{2}} (g + hx)} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)/(h*x+g)/(c*x**2+a)**(3/2),x)
```

```
[Out] Integral((d + e*x + f*x**2)/((a + c*x**2)**(3/2)*(g + h*x)), x)
```

GIAC/XCAS [A] time = 0.281187, size = 397, normalized size = 2.88

$$\frac{\frac{\left(c^3dg^3-ac^2fg^3+ac^2dgh^2-a^2cfgh^2+ac^2g^2he+a^2ch^3e\right)x}{ac^3g^4+2\,a^2c^2g^2h^2+a^3ch^4}+\frac{ac^2dg^2h-a^2cfg^2h+a^2cdh^3-a^3fh^3-ac^2g^3e-a^2cgh^2e}{ac^3g^4+2\,a^2c^2g^2h^2+a^3ch^4}}{\sqrt{cx^2+a}} - \frac{2\left(fg^2+dh^2-ghe\right)\arctan\left(\frac{\left(\sqrt{c}x-\sqrt{cx^2+a}\right)h+\sqrt{c}g}{\sqrt{-cg^2-ah^2}}\right)}{(cg^2+ah^2)\sqrt{-cg^2-ah^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)/((c*x^2 + a)^(3/2)*(h*x + g)),x, algorithm="giac")
```

```
[Out] ((c^3*d*g^3 - a*c^2*f*g^3 + a*c^2*d*g*h^2 - a^2*c*f*g*h^2 + a*c^2
*g^2*h*e + a^2*c*h^3*e)*x/(a*c^3*g^4 + 2*a^2*c^2*g^2*h^2 + a^3*c*
h^4) + (a*c^2*d*g^2*h - a^2*c*f*g^2*h + a^2*c*d*h^3 - a^3*f*h^3 -
 a*c^2*g^3*e - a^2*c*g*h^2*e)/(a*c^3*g^4 + 2*a^2*c^2*g^2*h^2 + a^
3*c*h^4))/sqrt(c*x^2 + a) - 2*(f*g^2 + d*h^2 - g*h*e)*arctan(((sq
rt(c)*x - sqrt(c*x^2 + a))*h + sqrt(c)*g)/sqrt(-c*g^2 - a*h^2))/(
(c*g^2 + a*h^2)*sqrt(-c*g^2 - a*h^2))
```

3.113 $\int \frac{d+ex+fx^2}{(g+hx)^2(a+cx^2)^{3/2}} dx$

Optimal. Leaf size=239

$$-\frac{a(ah(2fg-eh)+cg(eg-2dh))-x\left(a^2fh^2-ac\left(fg^2-h(2eg-dh)\right)+c^2dg^2\right)}{a\sqrt{a+cx^2}\left(ah^2+cg^2\right)^2}-\frac{h\sqrt{a+cx^2}\left(dh^2-egh+fg^2\right)}{(g+hx)\left(ah^2+cg^2\right)^2}+\frac{\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(ah^2(2fg-eh)-cg\left(fg^2-h(2eg-3dh)\right)\right)}{\left(ah^2+cg^2\right)^{5/2}}$$

```
[Out] -((a*(c*g*(e*g - 2*d*h) + a*h*(2*f*g - e*h)) - (c^2*d*g^2 + a^2*f
*h^2 - a*c*(f*g^2 - h*(2*e*g - d*h)))*x)/(a*(c*g^2 + a*h^2)^2*Sqr
t[a + c*x^2])) - (h*(f*g^2 - e*g*h + d*h^2)*Sqrt[a + c*x^2])/((c*
g^2 + a*h^2)^2*(g + h*x)) + ((a*h^2*(2*f*g - e*h) - c*g*(f*g^2 -
h*(2*e*g - 3*d*h)))*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sq
rt[a + c*x^2])])/(c*g^2 + a*h^2)^(5/2)
```

Rubi [A] time = 1.00831, antiderivative size = 239, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.138$

$$-\frac{a(ah(2fg-eh)+cg(eg-2dh))-x\left(a^2fh^2-ac\left(fg^2-h(2eg-dh)\right)+c^2dg^2\right)}{a\sqrt{a+cx^2}\left(ah^2+cg^2\right)^2}-\frac{h\sqrt{a+cx^2}\left(dh^2-egh+fg^2\right)}{(g+hx)\left(ah^2+cg^2\right)^2}-\frac{\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(-ah^2(2fg-eh)-cgh(2eg-3dh)+cfg^3\right)}{\left(ah^2+cg^2\right)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/((g + h*x)^2*(a + c*x^2)^(3/2)),x]
```

```
[Out] -((a*(c*g*(e*g - 2*d*h) + a*h*(2*f*g - e*h)) - (c^2*d*g^2 + a^2*f
*h^2 - a*c*(f*g^2 - h*(2*e*g - d*h)))*x)/(a*(c*g^2 + a*h^2)^2*Sqr
t[a + c*x^2])) - (h*(f*g^2 - e*g*h + d*h^2)*Sqrt[a + c*x^2])/((c*
g^2 + a*h^2)^2*(g + h*x)) - ((c*f*g^3 - c*g*h*(2*e*g - 3*d*h) - a
*h^2*(2*f*g - e*h))*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*h^2]*Sq
rt[a + c*x^2])])/(c*g^2 + a*h^2)^(5/2)
```

Rubi in Sympy [A] time = 101.264, size = 255, normalized size = 1.07

$$-\frac{\left(aeh^3-2afgh^2+3cdgh^2-2ceg^2h+cfg^3\right)\operatorname{atanh}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)}{\left(ah^2+cg^2\right)^{\frac{5}{2}}}-\frac{dh^2-egh+fg^2}{h\sqrt{a+cx^2}\left(g+hx\right)\left(ah^2+cg^2\right)}+\frac{a\left(aeh^3-2afgh^2+3cdgh^2-2ceg^2h+cfg^3\right)+hx\left(a^2fh^2-2acdh^2+3acegh-2acfg^2+c^2dg^2\right)}{ah\sqrt{a+cx^2}\left(ah^2+cg^2\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)/(h*x+g)**2/(c*x**2+a)**(3/2),x)
```

```
[Out] -(a*e*h**3 - 2*a*f*g*h**2 + 3*c*d*g*h**2 - 2*c*e*g**2*h + c*f*g**
3)*atanh((a*h - c*g*x)/(sqrt(a + c*x**2)*sqrt(a*h**2 + c*g**2)))/
(a*h**2 + c*g**2)**(5/2) - (d*h**2 - e*g*h + f*g**2)/(h*sqrt(a +
c*x**2)*(g + h*x)*(a*h**2 + c*g**2)) + (a*(a*e*h**3 - 2*a*f*g*h**
2 + 3*c*d*g*h**2 - 2*c*e*g**2*h + c*f*g**3) + h*x*(a**2*f*h**2 -
2*a*c*d*h**2 + 3*a*c*e*g*h - 2*a*c*f*g**2 + c**2*d*g**2))/(a*h*sq
rt(a + c*x**2)*(a*h**2 + c*g**2)**2)
```

Mathematica [A] time = 0.825562, size = 293, normalized size = 1.23

$$\frac{a^2h\left(h(-dh+2eg+ehx)+f\left(-3g^2-ghx+h^2x^2\right)\right)+ac\left(dh\left(2g^2+ghx-2h^2x^2\right)+eg\left(-g^2+ghx+3h^2x^2\right)-fg^2x(g+2h\right.}{a\sqrt{a+cx^2}(g+hx)\left(ah^2+cg^2\right)^2}-\frac{\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)\left(ah^2(eh-2fg)+cgh(3dh-2eg)+cfg^3\right)}{\left(ah^2+cg^2\right)^{5/2}}+\frac{\log(g+hx)\left(ah^2(eh-2fg)+cgh(3dh-2eg)+cfg^3\right)}{\left(ah^2+cg^2\right)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/((g + h*x)^2*(a + c*x^2)^(3/2)),x]
```

```
[Out] (c^2*d*g^2*x*(g + h*x) + a^2*h*(h*(2*e*g - d*h + e*h*x) + f*(-3*g
^2 - g*h*x + h^2*x^2)) + a*c*(-(f*g^2*x*(g + 2*h*x)) + d*h*(2*g^2
 + g*h*x - 2*h^2*x^2) + e*g*(-g^2 + g*h*x + 3*h^2*x^2)))/(a*(c*g^
2 + a*h^2)^2*(g + h*x)*Sqrt[a + c*x^2]) + ((c*f*g^3 + c*g*h*(-2*e
*g + 3*d*h) + a*h^2*(-2*f*g + e*h))*Log[g + h*x])/(c*g^2 + a*h^2)
^(5/2) - ((c*f*g^3 + c*g*h*(-2*e*g + 3*d*h) + a*h^2*(-2*f*g + e*h
))*Log[a*h - c*g*x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]])/(c*g^2
```

```
+ a*h^2)^(5/2)
```

Maple [B] time = 0.024, size = 1663, normalized size = 7.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(h*x+g)^2/(c*x^2+a)^(3/2),x)
```

```
[Out] f/h^2*x/a/(c*x^2+a)^(1/2)+1/(a*h^2+c*g^2)/((x+1/h*g)^2*c-2*c*g/h*
(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*e-2/h/(a*h^2+c*g^2)/((x+1/h*g)
^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*f*g+3/h*g/(a*h^2+
c*g^2)/a/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2
)*c*x*e-4/h^2*g^2/(a*h^2+c*g^2)/a/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g
)+(a*h^2+c*g^2)/h^2)^(1/2)*c*x*f-1/(a*h^2+c*g^2)/((a*h^2+c*g^2)/h
^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g
^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2
)^(1/2))/(x+1/h*g))*e+2/h/(a*h^2+c*g^2)/((a*h^2+c*g^2)/h^2)^(1/2)
*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^
(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/
(x+1/h*g))*f*g-1/(a*h^2+c*g^2)/(x+1/h*g)/((x+1/h*g)^2*c-2*c*g/h*(
x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*d+1/h/(a*h^2+c*g^2)/(x+1/h*g)/(
(x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*e*g-1/h^
2/(a*h^2+c*g^2)/(x+1/h*g)/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2
+c*g^2)/h^2)^(1/2)*f*g^2+3*h*c*g/(a*h^2+c*g^2)^2/((x+1/h*g)^2*c-2
*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*d-3*c*g^2/(a*h^2+c*g^2)
^2/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*e+3/
h*c*g^3/(a*h^2+c*g^2)^2/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c
*g^2)/h^2)^(1/2)*f+3*c^2*g^2/(a*h^2+c*g^2)^2/a/((x+1/h*g)^2*c-2*c
*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*x*d-3/h*c^2*g^3/(a*h^2+c*
g^2)^2/a/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2
)*x*e+3/h^2*c^2*g^4/(a*h^2+c*g^2)^2/a/((x+1/h*g)^2*c-2*c*g/h*(x+1
/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*x*f-3*h*c*g/(a*h^2+c*g^2)^2/((a*h^
2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*(
(a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+
c*g^2)/h^2)^(1/2))/(x+1/h*g))*d+3*c*g^2/(a*h^2+c*g^2)^2/((a*h^2+c
*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*
h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g
^2)/h^2)^(1/2))/(x+1/h*g))*e-3/h*c*g^3/(a*h^2+c*g^2)^2/((a*h^2+c*
g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h
^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^
2)/h^2)^(1/2))/(x+1/h*g))*f-2/(a*h^2+c*g^2)/a/((x+1/h*g)^2*c-2*c*
g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*c*x*d
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/((c*x^2 + a)^(3/2)*(h*x + g)^2),x, algorithm="maxima"
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 1.31208, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/((c*x^2 + a)^(3/2)*(h*x + g)^2),x, algorithm="fricas"
```

```
[Out] [-1/2*(2*(a*c*e*g^3 - 2*a^2*e*g*h^2 + a^2*d*h^3 - (2*a*c*d - 3*a^
2*f)*g^2*h - (3*a*c*e*g*h^2 + (c^2*d - 2*a*c*f)*g^2*h - (2*a*c*d
- a^2*f)*h^3)*x^2 - (a*c*e*g^2*h + a^2*e*h^3 + (c^2*d - a*c*f)*g^
3 + (a*c*d - a^2*f)*g*h^2)*x)*sqrt(c*g^2 + a*h^2)*sqrt(c*x^2 + a)
 + (a^2*c*f*g^4 - 2*a^2*c*e*g^3*h + a^3*e*g*h^3 + (3*a^2*c*d - 2*
a^3*f)*g^2*h^2 + (a*c^2*f*g^3*h - 2*a*c^2*e*g^2*h^2 + a^2*c*e*h^4
 + (3*a*c^2*d - 2*a^2*c*f)*g*h^3)*x^3 + (a*c^2*f*g^4 - 2*a*c^2*e*
g^3*h + a^2*c*e*g*h^3 + (3*a*c^2*d - 2*a^2*c*f)*g^2*h^2)*x^2 + (a
^2*c*f*g^3*h - 2*a^2*c*e*g^2*h^2 + a^3*e*h^4 + (3*a^2*c*d - 2*a^3
*f)*g*h^3)*x)*log(((2*a*c*g*h*x - a*c*g^2 - 2*a^2*h^2 - (2*c^2*g^
2 + a*c*h^2)*x^2)*sqrt(c*g^2 + a*h^2) - 2*(a*c*g^2*h + a^2*h^3 -
(c^2*g^3 + a*c*g*h^2)*x)*sqrt(c*x^2 + a))/(h^2*x^2 + 2*g*h*x + g^
2)))/((a^2*c^2*g^5 + 2*a^3*c*g^3*h^2 + a^4*g*h^4 + (a*c^3*g^4*h +
 2*a^2*c^2*g^2*h^3 + a^3*c*h^5)*x^3 + (a*c^3*g^5 + 2*a^2*c^2*g^3*
h^2 + a^3*c*g*h^4)*x^2 + (a^2*c^2*g^4*h + 2*a^3*c*g^2*h^3 + a^4*h
^5)*x)*sqrt(c*g^2 + a*h^2)), -((a*c*e*g^3 - 2*a^2*e*g*h^2 + a^2*d
*h^3 - (2*a*c*d - 3*a^2*f)*g^2*h - (3*a*c*e*g*h^2 + (c^2*d - 2*a*
c*f)*g^2*h - (2*a*c*d - a^2*f)*h^3)*x^2 - (a*c*e*g^2*h + a^2*e*h^
3 + (c^2*d - a*c*f)*g^3 + (a*c*d - a^2*f)*g*h^2)*x)*sqrt(-c*g^2 -
 a*h^2)*sqrt(c*x^2 + a) - (a^2*c*f*g^4 - 2*a^2*c*e*g^3*h + a^3*e*
g*h^3 + (3*a^2*c*d - 2*a^3*f)*g^2*h^2 + (a*c^2*f*g^3*h - 2*a*c^2*
e*g^2*h^2 + a^2*c*e*h^4 + (3*a*c^2*d - 2*a^2*c*f)*g*h^3)*x^3 + (a
*c^2*f*g^4 - 2*a*c^2*e*g^3*h + a^2*c*e*g*h^3 + (3*a*c^2*d - 2*a^2
*c*f)*g^2*h^2)*x^2 + (a^2*c*f*g^3*h - 2*a^2*c*e*g^2*h^2 + a^3*e*h
^4 + (3*a^2*c*d - 2*a^3*f)*g*h^3)*x)*arctan(sqrt(-c*g^2 - a*h^2)*
(c*g*x - a*h)/((c*g^2 + a*h^2)*sqrt(c*x^2 + a))))/((a^2*c^2*g^5 +
 2*a^3*c*g^3*h^2 + a^4*g*h^4 + (a*c^3*g^4*h + 2*a^2*c^2*g^2*h^3 +
 a^3*c*h^5)*x^3 + (a*c^3*g^5 + 2*a^2*c^2*g^3*h^2 + a^3*c*g*h^4)*x
^2 + (a^2*c^2*g^4*h + 2*a^3*c*g^2*h^3 + a^4*h^5)*x)*sqrt(-c*g^2 -
```

```
a*h^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((f*x**2+e*x+d)/(h*x+g)**2/(c*x**2+a)**(3/2),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((f*x^2 + e*x + d)/((c*x^2 + a)^(3/2)*(h*x + g)^2),x, algorithm="giac")

[Out] Exception raised: TypeError
```

3.114 $\int \frac{d+ex+fx^2}{(g+hx)^3(a+cx^2)^{3/2}}\,dx$

Optimal. Leaf size=374

$$-\frac{\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(2a^2fh^4-ach^2\left(3dh^2-9egh+11fg^2\right)+2c^2g^2\left(6dh^2-3egh+fg^2\right)\right)}{2\left(ah^2+cg^2\right)^{7/2}}+\frac{a\left(a^2fh^3-ach\left(3fg^2-h(3eg-dh)\right)-c^2g^2(eg-3dh)\right)+cx\left(a^2h^2(3fg-eh)-acg\left(fg^2-3h(eg-dh)\right)+c^2dg^3\right)}{a\sqrt{a+cx^2}\left(ah^2+cg^2\right)^3}-\frac{h\sqrt{a+cx^2}\left(dh^2-egh+fg^2\right)}{2(g+hx)^2\left(ah^2+cg^2\right)^2}+\frac{h\sqrt{a+cx^2}\left(2ah^2(2fg-eh)-cg\left(3fg^2-h(5eg-7dh)\right)\right)}{2(g+hx)\left(ah^2+cg^2\right)^3}$$

```
[Out] (a*(a^2*f*h^3 - c^2*g^2*(e*g - 3*d*h) - a*c*h*(3*f*g^2 - h*(3*e*g
 - d*h))) + c*(c^2*d*g^3 + a^2*h^2*(3*f*g - e*h) - a*c*g*(f*g^2 -
 3*h*(e*g - d*h)))*x)/(a*(c*g^2 + a*h^2)^3*Sqrt[a + c*x^2]) - (h*
(f*g^2 - e*g*h + d*h^2)*Sqrt[a + c*x^2])/(2*(c*g^2 + a*h^2)^2*(g
+ h*x)^2) + (h*(2*a*h^2*(2*f*g - e*h) - c*g*(3*f*g^2 - h*(5*e*g -
 7*d*h)))*Sqrt[a + c*x^2])/(2*(c*g^2 + a*h^2)^3*(g + h*x)) - ((2*
a^2*f*h^4 - a*c*h^2*(11*f*g^2 - 9*e*g*h + 3*d*h^2) + 2*c^2*g^2*(f
*g^2 - 3*e*g*h + 6*d*h^2))*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*
h^2]*Sqrt[a + c*x^2])])/(2*(c*g^2 + a*h^2)^(7/2))
```

Rubi [A] time = 2.50857, antiderivative size = 372, normalized size of antiderivative = 0.99, number of steps used = 5, number of rules used = 5, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.172$

$$-\frac{\tanh^{-1}\left(\frac{ah-cgx}{\sqrt{a+cx^2}\sqrt{ah^2+cg^2}}\right)\left(2a^2fh^4-ach^2\left(3dh^2-9egh+11fg^2\right)+2c^2g^2\left(6dh^2-3egh+fg^2\right)\right)}{2\left(ah^2+cg^2\right)^{7/2}}+\frac{a\left(a^2fh^3-ach\left(3fg^2-h(3eg-dh)\right)-c^2g^2(eg-3dh)\right)+cx\left(a^2h^2(3fg-eh)-acg\left(fg^2-3h(eg-dh)\right)+c^2dg^3\right)}{a\sqrt{a+cx^2}\left(ah^2+cg^2\right)^3}-\frac{h\sqrt{a+cx^2}\left(dh^2-egh+fg^2\right)}{2(g+hx)^2\left(ah^2+cg^2\right)^2}-\frac{h\sqrt{a+cx^2}\left(-2ah^2(2fg-eh)-cgh(5eg-7dh)+3cfg^3\right)}{2(g+hx)\left(ah^2+cg^2\right)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/((g + h*x)^3*(a + c*x^2)^(3/2)),x]
```

```
[Out] (a*(a^2*f*h^3 - c^2*g^2*(e*g - 3*d*h) - a*c*h*(3*f*g^2 - h*(3*e*g
 - d*h))) + c*(c^2*d*g^3 + a^2*h^2*(3*f*g - e*h) - a*c*g*(f*g^2 -
 3*h*(e*g - d*h)))*x)/(a*(c*g^2 + a*h^2)^3*Sqrt[a + c*x^2]) - (h*
(f*g^2 - e*g*h + d*h^2)*Sqrt[a + c*x^2])/(2*(c*g^2 + a*h^2)^2*(g
+ h*x)^2) - (h*(3*c*f*g^3 - c*g*h*(5*e*g - 7*d*h) - 2*a*h^2*(2*f*
```

```
g - e*h))*Sqrt[a + c*x^2])/(2*(c*g^2 + a*h^2)^3*(g + h*x)) - ((2*
a^2*f*h^4 - a*c*h^2*(11*f*g^2 - 9*e*g*h + 3*d*h^2) + 2*c^2*g^2*(f
*g^2 - 3*e*g*h + 6*d*h^2))*ArcTanh[(a*h - c*g*x)/(Sqrt[c*g^2 + a*
h^2]*Sqrt[a + c*x^2])])/(2*(c*g^2 + a*h^2)^(7/2))
```

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((f*x**2+e*x+d)/(h*x+g)**3/(c*x**2+a)**(3/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 2.26743, size = 404, normalized size = 1.08

$$\frac{1}{2}\left(-\frac{\log\left(\sqrt{a+cx^2}\sqrt{ah^2+cg^2}+ah-cgx\right)\left(2a^2fh^4+ach^2\left(-3dh^2+9egh-11fg^2\right)+2c^2g^2\left(6dh^2-3egh+fg^2\right)\right)}{\left(ah^2+cg^2\right)^{7/2}}\right.$$
$$+\frac{\log(g+hx)\left(2a^2fh^4+ach^2\left(-3dh^2+9egh-11fg^2\right)+2c^2g^2\left(6dh^2-3egh+fg^2\right)\right)}{\left(ah^2+cg^2\right)^{7/2}}$$
$$-\frac{\sqrt{a+cx^2}\left(\frac{2\left(-a^3fh^3+a^2ch(h(dh-3eg+ehx)+3fg(g-hx))+ac^2g\left(3dh(hx-g)+eg(g-3hx)+fg^2x\right)-c^3dg^3x\right)}{a\left(a+cx^2\right)}+\frac{h\left(2ah^2(eh-2fg)+cgh(7dh-5eg)+3cfg^3\right)}{g+hx}\right.}{\left(ah^2+cg^2\right)^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/((g + h*x)^3*(a + c*x^2)^(3/2)),x]
```

```
[Out] (-((Sqrt[a + c*x^2]*((h*(c*g^2 + a*h^2)*(f*g^2 + h*(-(e*g) + d*h)
))/(g + h*x)^2 + (h*(3*c*f*g^3 + c*g*h*(-5*e*g + 7*d*h) + 2*a*h^2
*(-2*f*g + e*h)))/(g + h*x) + (2*(-(a^3*f*h^3) - c^3*d*g^3*x + a*
c^2*g*(f*g^2*x + e*g*(g - 3*h*x) + 3*d*h*(-g + h*x)) + a^2*c*h*(3
*f*g*(g - h*x) + h*(-3*e*g + d*h + e*h*x))))/(a*(a + c*x^2))))/(c
*g^2 + a*h^2)^3) + ((2*a^2*f*h^4 + a*c*h^2*(-11*f*g^2 + 9*e*g*h -
 3*d*h^2) + 2*c^2*g^2*(f*g^2 - 3*e*g*h + 6*d*h^2))*Log[g + h*x])/
(c*g^2 + a*h^2)^(7/2) - ((2*a^2*f*h^4 + a*c*h^2*(-11*f*g^2 + 9*e*
g*h - 3*d*h^2) + 2*c^2*g^2*(f*g^2 - 3*e*g*h + 6*d*h^2))*Log[a*h -
 c*g*x + Sqrt[c*g^2 + a*h^2]*Sqrt[a + c*x^2]])/(c*g^2 + a*h^2)^(7
/2))/2
```

Maple [B] time = 0.028, size = 2584, normalized size = 6.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(h*x+g)^3/(c*x^2+a)^(3/2),x)
```

```
[Out] f/h/(a*h^2+c*g^2)/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/
h^2)^(1/2)+15/2/h^2*c^3*g^5/(a*h^2+c*g^2)^3/a/((x+1/h*g)^2*c-2*c*
g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*x*f+19/2/h*c^2*g^2/(a*h^2+
c*g^2)^2/a/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1
/2)*x*e-25/2/h^2*c^2*g^3/(a*h^2+c*g^2)^2/a/((x+1/h*g)^2*c-2*c*g/h
*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*x*f+5*f/h^2*g/(a*h^2+c*g^2)/a
/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*c*x+2/
h^2/(a*h^2+c*g^2)/(x+1/h*g)/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h
^2+c*g^2)/h^2)^(1/2)*f*g-15/2/h*c*g^2/(a*h^2+c*g^2)^2/((x+1/h*g)^
2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*f-9/2*c*g/(a*h^2+c
*g^2)^2/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h
*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+
1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*e-1/2/h^3/(a*h^2+c*g^
2)/(x+1/h*g)^2/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2
)^(1/2)*f*g^2+15/2*c^3*g^3/(a*h^2+c*g^2)^3/a/((x+1/h*g)^2*c-2*c*g
/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*x*d-15/2*h*c^2*g^2/(a*h^2+c
*g^2)^3/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h
*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+
1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*d-15/2/h*c^2*g^4/(a*h
^2+c*g^2)^3/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c
*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h
*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*f-13/2*c^2*g/(a*h
^2+c*g^2)^2/a/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)
^(1/2)*x*d+15/2/h*c*g^2/(a*h^2+c*g^2)^2/((a*h^2+c*g^2)/h^2)^(1/2)
*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)/h^2)^
(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2))/
(x+1/h*g))*f-2/h/(a*h^2+c*g^2)/a/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)
+(a*h^2+c*g^2)/h^2)^(1/2)*c*x*e-15/2/h*c^3*g^4/(a*h^2+c*g^2)^3/a/
((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*x*e-1/h
/(a*h^2+c*g^2)/(x+1/h*g)/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+
c*g^2)/h^2)^(1/2)*e+5/2/h*c*g^2/(a*h^2+c*g^2)^2/(x+1/h*g)/((x+1/h
*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*e-5/2/h^2*c*g^
3/(a*h^2+c*g^2)^2/(x+1/h*g)/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h
^2+c*g^2)/h^2)^(1/2)*f-5/2*c*g/(a*h^2+c*g^2)^2/(x+1/h*g)/((x+1/h*
g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*d+15/2*h*c^2*g^
2/(a*h^2+c*g^2)^3/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/
h^2)^(1/2)*d+15/2/h*c^2*g^4/(a*h^2+c*g^2)^3/((x+1/h*g)^2*c-2*c*g/
h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*f+15/2*c^2*g^3/(a*h^2+c*g^2)
^3/((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1
/h*g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g
)+(a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*e+3/2*h*c/(a*h^2+c*g^2)^2/
((a*h^2+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*
```

```
g)+2*((a*h^2+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(
a*h^2+c*g^2)/h^2)^(1/2))/(x+1/h*g))*d+1/2/h^2/(a*h^2+c*g^2)/(x+1/
h*g)^2/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*
e*g+9/2*c*g/(a*h^2+c*g^2)^2/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h
^2+c*g^2)/h^2)^(1/2)*e-1/2/h/(a*h^2+c*g^2)/(x+1/h*g)^2/((x+1/h*g)
^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(1/2)*d-15/2*c^2*g^3/(a
*h^2+c*g^2)^3/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)
^(1/2)*e-3/2*h*c/(a*h^2+c*g^2)^2/((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)
+(a*h^2+c*g^2)/h^2)^(1/2)*d-f/h/(a*h^2+c*g^2)/((a*h^2+c*g^2)/h^2)
^(1/2)*ln((2*(a*h^2+c*g^2)/h^2-2*c*g/h*(x+1/h*g)+2*((a*h^2+c*g^2)
/h^2)^(1/2)*((x+1/h*g)^2*c-2*c*g/h*(x+1/h*g)+(a*h^2+c*g^2)/h^2)^(
1/2))/(x+1/h*g))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/((c*x^2 + a)^(3/2)*(h*x + g)^3),x, algorithm="maxima"

[Out] Exception raised: ValueError
```

Fricas [A] time = 6.20933, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/((c*x^2 + a)^(3/2)*(h*x + g)^3),x, algorithm="fricas"

[Out] [-1/4*(2*(2*a*c^2*e*g^5 - 12*a^2*c*e*g^3*h^2 + a^3*e*g*h^4 + a^3*
d*h^5 - 2*(3*a*c^2*d - 5*a^2*c*f)*g^4*h + 5*(2*a^2*c*d - a^3*f)*g
^2*h^3 - (11*a*c^2*e*g^2*h^3 - 4*a^2*c*e*h^5 + (2*c^3*d - 5*a*c^2
*f)*g^3*h^2 - (13*a*c^2*d - 10*a^2*c*f)*g*h^4)*x^3 - (16*a*c^2*e*
g^3*h^2 + a^2*c*e*g*h^4 + 4*(c^3*d - 2*a*c^2*f)*g^4*h - (14*a*c^2
*d - 9*a^2*c*f)*g^2*h^3 - (3*a^2*c*d - 2*a^3*f)*h^5)*x^2 - (2*a*c
^2*e*g^4*h + 15*a^2*c*e*g^2*h^3 - 2*a^3*e*h^5 + 2*(c^3*d - a*c^2*
f)*g^5 + 3*(2*a*c^2*d - 3*a^2*c*f)*g^3*h^2 - (11*a^2*c*d - 8*a^3*
f)*g*h^4)*x)*sqrt(c*g^2 + a*h^2)*sqrt(c*x^2 + a) - (2*a^2*c^2*f*g
^6 - 6*a^2*c^2*e*g^5*h + 9*a^3*c*e*g^3*h^3 + (12*a^2*c^2*d - 11*a
^3*c*f)*g^4*h^2 - (3*a^3*c*d - 2*a^4*f)*g^2*h^4 + (2*a*c^3*f*g^4*
h^2 - 6*a*c^3*e*g^3*h^3 + 9*a^2*c^2*e*g*h^5 + (12*a*c^3*d - 11*a^
2*c^2*f)*g^2*h^4 - (3*a^2*c^2*d - 2*a^3*c*f)*h^6)*x^4 + 2*(2*a*c^
3*f*g^5*h - 6*a*c^3*e*g^4*h^2 + 9*a^2*c^2*e*g^2*h^4 + (12*a*c^3*d
```

```
 - 11*a^2*c^2*f)*g^3*h^3 - (3*a^2*c^2*d - 2*a^3*c*f)*g*h^5)*x^3 +
 (2*a*c^3*f*g^6 - 6*a*c^3*e*g^5*h + 3*a^2*c^2*e*g^3*h^3 + 9*a^3*c
*e*g*h^5 + 3*(4*a*c^3*d - 3*a^2*c^2*f)*g^4*h^2 + 9*(a^2*c^2*d - a
^3*c*f)*g^2*h^4 - (3*a^3*c*d - 2*a^4*f)*h^6)*x^2 + 2*(2*a^2*c^2*f
*g^5*h - 6*a^2*c^2*e*g^4*h^2 + 9*a^3*c*e*g^2*h^4 + (12*a^2*c^2*d
- 11*a^3*c*f)*g^3*h^3 - (3*a^3*c*d - 2*a^4*f)*g*h^5)*x)*log(((2*a
*c*g*h*x - a*c*g^2 - 2*a^2*h^2 - (2*c^2*g^2 + a*c*h^2)*x^2)*sqrt(
c*g^2 + a*h^2) + 2*(a*c*g^2*h + a^2*h^3 - (c^2*g^3 + a*c*g*h^2)*x
)*sqrt(c*x^2 + a))/(h^2*x^2 + 2*g*h*x + g^2)))/((a^2*c^3*g^8 + 3*
a^3*c^2*g^6*h^2 + 3*a^4*c*g^4*h^4 + a^5*g^2*h^6 + (a*c^4*g^6*h^2
+ 3*a^2*c^3*g^4*h^4 + 3*a^3*c^2*g^2*h^6 + a^4*c*h^8)*x^4 + 2*(a*c
^4*g^7*h + 3*a^2*c^3*g^5*h^3 + 3*a^3*c^2*g^3*h^5 + a^4*c*g*h^7)*x
^3 + (a*c^4*g^8 + 4*a^2*c^3*g^6*h^2 + 6*a^3*c^2*g^4*h^4 + 4*a^4*c
*g^2*h^6 + a^5*h^8)*x^2 + 2*(a^2*c^3*g^7*h + 3*a^3*c^2*g^5*h^3 +
3*a^4*c*g^3*h^5 + a^5*g*h^7)*x)*sqrt(c*g^2 + a*h^2)), -1/2*((2*a*
c^2*e*g^5 - 12*a^2*c*e*g^3*h^2 + a^3*e*g*h^4 + a^3*d*h^5 - 2*(3*a
*c^2*d - 5*a^2*c*f)*g^4*h + 5*(2*a^2*c*d - a^3*f)*g^2*h^3 - (11*a
*c^2*e*g^2*h^3 - 4*a^2*c*e*h^5 + (2*c^3*d - 5*a*c^2*f)*g^3*h^2 -
(13*a*c^2*d - 10*a^2*c*f)*g*h^4)*x^3 - (16*a*c^2*e*g^3*h^2 + a^2*
c*e*g*h^4 + 4*(c^3*d - 2*a*c^2*f)*g^4*h - (14*a*c^2*d - 9*a^2*c*f
)*g^2*h^3 - (3*a^2*c*d - 2*a^3*f)*h^5)*x^2 - (2*a*c^2*e*g^4*h + 1
5*a^2*c*e*g^2*h^3 - 2*a^3*e*h^5 + 2*(c^3*d - a*c^2*f)*g^5 + 3*(2*
a*c^2*d - 3*a^2*c*f)*g^3*h^2 - (11*a^2*c*d - 8*a^3*f)*g*h^4)*x)*s
qrt(-c*g^2 - a*h^2)*sqrt(c*x^2 + a) - (2*a^2*c^2*f*g^6 - 6*a^2*c^
2*e*g^5*h + 9*a^3*c*e*g^3*h^3 + (12*a^2*c^2*d - 11*a^3*c*f)*g^4*h
^2 - (3*a^3*c*d - 2*a^4*f)*g^2*h^4 + (2*a*c^3*f*g^4*h^2 - 6*a*c^3
*e*g^3*h^3 + 9*a^2*c^2*e*g*h^5 + (12*a*c^3*d - 11*a^2*c^2*f)*g^2*
h^4 - (3*a^2*c^2*d - 2*a^3*c*f)*h^6)*x^4 + 2*(2*a*c^3*f*g^5*h - 6
*a*c^3*e*g^4*h^2 + 9*a^2*c^2*e*g^2*h^4 + (12*a*c^3*d - 11*a^2*c^2
*f)*g^3*h^3 - (3*a^2*c^2*d - 2*a^3*c*f)*g*h^5)*x^3 + (2*a*c^3*f*g
^6 - 6*a*c^3*e*g^5*h + 3*a^2*c^2*e*g^3*h^3 + 9*a^3*c*e*g*h^5 + 3*
(4*a*c^3*d - 3*a^2*c^2*f)*g^4*h^2 + 9*(a^2*c^2*d - a^3*c*f)*g^2*h
^4 - (3*a^3*c*d - 2*a^4*f)*h^6)*x^2 + 2*(2*a^2*c^2*f*g^5*h - 6*a^
2*c^2*e*g^4*h^2 + 9*a^3*c*e*g^2*h^4 + (12*a^2*c^2*d - 11*a^3*c*f)
*g^3*h^3 - (3*a^3*c*d - 2*a^4*f)*g*h^5)*x)*arctan(sqrt(-c*g^2 - a
*h^2)*(c*g*x - a*h)/((c*g^2 + a*h^2)*sqrt(c*x^2 + a))))/((a^2*c^3
*g^8 + 3*a^3*c^2*g^6*h^2 + 3*a^4*c*g^4*h^4 + a^5*g^2*h^6 + (a*c^4
*g^6*h^2 + 3*a^2*c^3*g^4*h^4 + 3*a^3*c^2*g^2*h^6 + a^4*c*h^8)*x^4
 + 2*(a*c^4*g^7*h + 3*a^2*c^3*g^5*h^3 + 3*a^3*c^2*g^3*h^5 + a^4*c
*g*h^7)*x^3 + (a*c^4*g^8 + 4*a^2*c^3*g^6*h^2 + 6*a^3*c^2*g^4*h^4
+ 4*a^4*c*g^2*h^6 + a^5*h^8)*x^2 + 2*(a^2*c^3*g^7*h + 3*a^3*c^2*g
^5*h^3 + 3*a^4*c*g^3*h^5 + a^5*g*h^7)*x)*sqrt(-c*g^2 - a*h^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((f*x**2+e*x+d)/(h*x+g)**3/(c*x**2+a)**(3/2),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((f*x^2 + e*x + d)/((c*x^2 + a)^(3/2)*(h*x + g)^3),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.115 $\int \frac{A+Bx+Cx^2}{(a+cx^2)^{5/2}}\,dx$

Optimal. Leaf size=67

$$\frac{x(aC+2Ac)}{3a^2c\sqrt{a+cx^2}}-\frac{aB-x(Ac-aC)}{3ac\,(a+cx^2)^{3/2}}$$

```
[Out] -(a*B - (A*c - a*C)*x)/(3*a*c*(a + c*x^2)^(3/2)) + ((2*A*c + a*C)
*x)/(3*a^2*c*Sqrt[a + c*x^2])
```

Rubi [A] time = 0.0806447, antiderivative size = 67, 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

$$\frac{x(aC+2Ac)}{3a^2c\sqrt{a+cx^2}}-\frac{aB-x(Ac-aC)}{3ac\,(a+cx^2)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/(a + c*x^2)^(5/2),x]
```

```
[Out] -(a*B - (A*c - a*C)*x)/(3*a*c*(a + c*x^2)^(3/2)) + ((2*A*c + a*C)
*x)/(3*a^2*c*Sqrt[a + c*x^2])
```

Rubi in Sympy [A] time = 8.71535, size = 53, normalized size = 0.79

$$-\frac{Ba-x\,(Ac-Ca)}{3ac\,(a+cx^2)^{\frac{3}{2}}}+\frac{x\,(2Ac+Ca)}{3a^2c\sqrt{a+cx^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)/(c*x**2+a)**(5/2),x)
```

```
[Out] -(B*a - x*(A*c - C*a))/(3*a*c*(a + c*x**2)**(3/2)) + x*(2*A*c + C
*a)/(3*a**2*c*sqrt(a + c*x**2))
```

Mathematica [A] time = 0.0680437, size = 50, normalized size = 0.75

$$\frac{-a^2B+acx\left(3A+Cx^2\right)+2Ac^2x^3}{3a^2c\,(a+cx^2)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/(a + c*x^2)^(5/2),x]
```

```
[Out] (-(a^2*B) + 2*A*c^2*x^3 + a*c*x*(3*A + C*x^2))/(3*a^2*c*(a + c*x^
2)^(3/2))
```

Maple [A] time = 0.006, size = 47, normalized size = 0.7

$$\frac{2\,Ac^2x^3+Cacx^3+3\,Axac-Ba^2}{3\,a^2c}\left(cx^2+a\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(c*x^2+a)^(5/2),x)
```

```
[Out] 1/3*(2*A*c^2*x^3+C*a*c*x^3+3*A*a*c*x-B*a^2)/(c*x^2+a)^(3/2)/a^2/c
```

Maxima [A] time = 0.70232, size = 112, normalized size = 1.67

$$\frac{2\,Ax}{3\,\sqrt{cx^2+a}a^2}+\frac{Ax}{3\,(cx^2+a)^{\frac{3}{2}}a}-\frac{Cx}{3\,(cx^2+a)^{\frac{3}{2}}c}+\frac{Cx}{3\,\sqrt{cx^2+a}ac}-\frac{B}{3\,(cx^2+a)^{\frac{3}{2}}c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^(5/2),x, algorithm="maxima")
```

```
[Out] 2/3*A*x/(sqrt(c*x^2 + a)*a^2) + 1/3*A*x/((c*x^2 + a)^(3/2)*a) - 1
/3*C*x/((c*x^2 + a)^(3/2)*c) + 1/3*C*x/(sqrt(c*x^2 + a)*a*c) - 1/
3*B/((c*x^2 + a)^(3/2)*c)
```

Fricas [A] time = 0.273841, size = 92, normalized size = 1.37

$$\frac{\left(3\,Aacx+\left(Cac+2\,Ac^2\right)x^3-Ba^2\right)\sqrt{cx^2+a}}{3\,(a^2c^3x^4+2\,a^3c^2x^2+a^4c)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^(5/2),x, algorithm="fricas")
```

```
[Out] 1/3*(3*A*a*c*x + (C*a*c + 2*A*c^2)*x^3 - B*a^2)*sqrt(c*x^2 + a)/(
a^2*c^3*x^4 + 2*a^3*c^2*x^2 + a^4*c)
```

Sympy [A] time = 27.7267, size = 194, normalized size = 2.9

$$A\left(\frac{3ax}{3a^{\frac{7}{2}}\sqrt{1+\frac{cx^2}{a}}+3a^{\frac{5}{2}}cx^2\sqrt{1+\frac{cx^2}{a}}}+\frac{2cx^3}{3a^{\frac{7}{2}}\sqrt{1+\frac{cx^2}{a}}+3a^{\frac{5}{2}}cx^2\sqrt{1+\frac{cx^2}{a}}}\right)+B\left(\begin{cases}-\frac{1}{3ac\sqrt{a+cx^2}+3c^2x^2\sqrt{a+cx^2}} & \text{for } c\neq 0\\ \frac{x^2}{2a^{\frac{5}{2}}} & \text{otherwise}\end{cases}\right)+\frac{Cx^3}{3a^{\frac{5}{2}}\sqrt{1+\frac{cx^2}{a}}+3a^{\frac{3}{2}}cx^2\sqrt{1+\frac{cx^2}{a}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)/(c*x**2+a)**(5/2),x)
```

```
[Out] A*(3*a*x/(3*a**(7/2)*sqrt(1 + c*x**2/a) + 3*a**(5/2)*c*x**2*sqrt(
1 + c*x**2/a)) + 2*c*x**3/(3*a**(7/2)*sqrt(1 + c*x**2/a) + 3*a**(
5/2)*c*x**2*sqrt(1 + c*x**2/a))) + B*Piecewise((-1/(3*a*c*sqrt(a
+ c*x**2) + 3*c**2*x**2*sqrt(a + c*x**2)), Ne(c, 0)), (x**2/(2*a*
*(5/2)), True)) + C*x**3/(3*a**(5/2)*sqrt(1 + c*x**2/a) + 3*a**(3
/2)*c*x**2*sqrt(1 + c*x**2/a))
```

GIAC/XCAS [A] time = 0.277649, size = 65, normalized size = 0.97

$$\frac{x\left(\frac{3A}{a}+\frac{(Cac+2Ac^2)x^2}{a^2c}\right)-\frac{B}{c}}{3\,(cx^2+a)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^(5/2),x, algorithm="giac")
```

```
[Out] 1/3*(x*(3*A/a + (C*a*c + 2*A*c^2)*x^2/(a^2*c)) - B/c)/(c*x^2 + a)
^(3/2)
```

3.116 $\int \frac{A+Bx+Cx^2}{(a+cx^2)^{7/2}}\,dx$

Optimal. Leaf size=97

$$\frac{2x(aC+4Ac)}{15a^3c\sqrt{a+cx^2}}+\frac{x(aC+4Ac)}{15a^2c\,(a+cx^2)^{3/2}}-\frac{aB-x(Ac-aC)}{5ac\,(a+cx^2)^{5/2}}$$

```
[Out] -(a*B - (A*c - a*C)*x)/(5*a*c*(a + c*x^2)^(5/2)) + ((4*A*c + a*C)
*x)/(15*a^2*c*(a + c*x^2)^(3/2)) + (2*(4*A*c + a*C)*x)/(15*a^3*c*
Sqrt[a + c*x^2])
```

Rubi [A] time = 0.110902, antiderivative size = 97, 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

$$\frac{2x(aC+4Ac)}{15a^3c\sqrt{a+cx^2}}+\frac{x(aC+4Ac)}{15a^2c\,(a+cx^2)^{3/2}}-\frac{aB-x(Ac-aC)}{5ac\,(a+cx^2)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/(a + c*x^2)^(7/2),x]
```

```
[Out] -(a*B - (A*c - a*C)*x)/(5*a*c*(a + c*x^2)^(5/2)) + ((4*A*c + a*C)
*x)/(15*a^2*c*(a + c*x^2)^(3/2)) + (2*(4*A*c + a*C)*x)/(15*a^3*c*
Sqrt[a + c*x^2])
```

Rubi in Sympy [A] time = 11.1773, size = 82, normalized size = 0.85

$$-\frac{Ba-x\,(Ac-Ca)}{5ac\,(a+cx^2)^{\frac{5}{2}}}+\frac{x\,(4Ac+Ca)}{15a^2c\,(a+cx^2)^{\frac{3}{2}}}+\frac{2x\,(4Ac+Ca)}{15a^3c\sqrt{a+cx^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)/(c*x**2+a)**(7/2),x)
```

```
[Out] -(B*a - x*(A*c - C*a))/(5*a*c*(a + c*x**2)**(5/2)) + x*(4*A*c + C
*a)/(15*a**2*c*(a + c*x**2)**(3/2)) + 2*x*(4*A*c + C*a)/(15*a**3*
c*sqrt(a + c*x**2))
```

Mathematica [A] time = 0.0764923, size = 71, normalized size = 0.73

$$\frac{-3a^3B+5a^2cx\left(3A+Cx^2\right)+2ac^2x^3\left(10A+Cx^2\right)+8Ac^3x^5}{15a^3c\left(a+cx^2\right)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/(a + c*x^2)^(7/2),x]
```

```
[Out] (-3*a^3*B + 8*A*c^3*x^5 + 5*a^2*c*x*(3*A + C*x^2) + 2*a*c^2*x^3*(
10*A + C*x^2))/(15*a^3*c*(a + c*x^2)^(5/2))
```

Maple [A] time = 0.006, size = 72, normalized size = 0.7

$$\frac{8\,Ac^3x^5+2\,Cac^2x^5+20\,Aac^2x^3+5\,Ca^2cx^3+15\,Axa^2c-3\,Ba^3}{15\,a^3c}\left(cx^2+a\right)^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(c*x^2+a)^(7/2),x)
```

```
[Out] 1/15*(8*A*c^3*x^5+2*C*a*c^2*x^5+20*A*a*c^2*x^3+5*C*a^2*c*x^3+15*A
*a^2*c*x-3*B*a^3)/(c*x^2+a)^(5/2)/a^3/c
```

Maxima [A] time = 0.728973, size = 159, normalized size = 1.64

$$\frac{8\,Ax}{15\,\sqrt{cx^2+a}a^3}+\frac{4\,Ax}{15\,(cx^2+a)^{\frac{3}{2}}a^2}+\frac{Ax}{5\,(cx^2+a)^{\frac{5}{2}}a}-\frac{Cx}{5\,(cx^2+a)^{\frac{5}{2}}c}+\frac{2\,Cx}{15\,\sqrt{cx^2+a}a^2c}+\frac{Cx}{15\,(cx^2+a)^{\frac{3}{2}}ac}-\frac{B}{5\,(cx^2+a)^{\frac{5}{2}}c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^(7/2),x, algorithm="maxima")
```

```
[Out] 8/15*A*x/(sqrt(c*x^2 + a)*a^3) + 4/15*A*x/((c*x^2 + a)^(3/2)*a^2)
 + 1/5*A*x/((c*x^2 + a)^(5/2)*a) - 1/5*C*x/((c*x^2 + a)^(5/2)*c)
+ 2/15*C*x/(sqrt(c*x^2 + a)*a^2*c) + 1/15*C*x/((c*x^2 + a)^(3/2)*
a*c) - 1/5*B/((c*x^2 + a)^(5/2)*c)
```

Fricas [A] time = 0.284547, size = 139, normalized size = 1.43

$$\frac{\left(2\left(Cac^{2}+4Ac^{3}\right)x^{5}+15Aa^{2}cx-3Ba^{3}+5\left(Ca^{2}c+4Aac^{2}\right)x^{3}\right)\sqrt{cx^{2}+a}}{15\left(a^{3}c^{4}x^{6}+3a^{4}c^{3}x^{4}+3a^{5}c^{2}x^{2}+a^{6}c\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^(7/2),x, algorithm="fricas")
```

```
[Out] 1/15*(2*(C*a*c^2 + 4*A*c^3)*x^5 + 15*A*a^2*c*x - 3*B*a^3 + 5*(C*a
^2*c + 4*A*a*c^2)*x^3)*sqrt(c*x^2 + a)/(a^3*c^4*x^6 + 3*a^4*c^3*x
^4 + 3*a^5*c^2*x^2 + a^6*c)
```

Sympy [A] time = 89.1737, size = 638, normalized size = 6.58

$$A\left(\frac{15a^{5}x}{15a^{\frac{17}{2}}\sqrt{1+\frac{cx^{2}}{a}}+45a^{\frac{15}{2}}cx^{2}\sqrt{1+\frac{cx^{2}}{a}}+45a^{\frac{13}{2}}c^{2}x^{4}\sqrt{1+\frac{cx^{2}}{a}}+15a^{\frac{11}{2}}c^{3}x^{6}\sqrt{1+\frac{cx^{2}}{a}}}+\frac{35a^{4}cx^{3}}{15a^{\frac{17}{2}}\sqrt{1+\frac{cx^{2}}{a}}+45a^{\frac{15}{2}}cx^{2}\sqrt{1+\frac{cx^{2}}{a}}+45a^{\frac{13}{2}}c^{2}x^{4}\sqrt{1+\frac{cx^{2}}{a}}+15a^{\frac{11}{2}}c^{3}x^{6}\sqrt{1+\frac{cx^{2}}{a}}}+\frac{28a^{3}c^{2}x^{5}}{15a^{\frac{17}{2}}\sqrt{1+\frac{cx^{2}}{a}}+45a^{\frac{15}{2}}cx^{2}\sqrt{1+\frac{cx^{2}}{a}}+45a^{\frac{13}{2}}c^{2}x^{4}\sqrt{1+\frac{cx^{2}}{a}}+15a^{\frac{11}{2}}c^{3}x^{6}\sqrt{1+\frac{cx^{2}}{a}}}+\frac{8a^{2}c^{3}x^{7}}{15a^{\frac{17}{2}}\sqrt{1+\frac{cx^{2}}{a}}+45a^{\frac{15}{2}}cx^{2}\sqrt{1+\frac{cx^{2}}{a}}+45a^{\frac{13}{2}}c^{2}x^{4}\sqrt{1+\frac{cx^{2}}{a}}+15a^{\frac{11}{2}}c^{3}x^{6}\sqrt{1+\frac{cx^{2}}{a}}}\right)+B\left(\begin{cases}-\frac{1}{5a^{2}c\sqrt{a+cx^{2}}+10ac^{2}x^{2}\sqrt{a+cx^{2}}+5c^{3}x^{4}\sqrt{a+cx^{2}}} & \text{for } c\neq 0\\ \frac{x^{2}}{2a^{\frac{7}{2}}} & \text{otherwise}\end{cases}\right)+C\left(\frac{5ax^{3}}{15a^{\frac{9}{2}}\sqrt{1+\frac{cx^{2}}{a}}+30a^{\frac{7}{2}}cx^{2}\sqrt{1+\frac{cx^{2}}{a}}+15a^{\frac{5}{2}}c^{2}x^{4}\sqrt{1+\frac{cx^{2}}{a}}}+\frac{2cx^{5}}{15a^{\frac{9}{2}}\sqrt{1+\frac{cx^{2}}{a}}+30a^{\frac{7}{2}}cx^{2}\sqrt{1+\frac{cx^{2}}{a}}+15a^{\frac{5}{2}}c^{2}x^{4}\sqrt{1+\frac{cx^{2}}{a}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)/(c*x**2+a)**(7/2),x)
```

```
[Out] A*(15*a**5*x/(15*a**(17/2)*sqrt(1 + c*x**2/a) + 45*a**(15/2)*c*x*
*2*sqrt(1 + c*x**2/a) + 45*a**(13/2)*c**2*x**4*sqrt(1 + c*x**2/a)
```

```
 + 15*a**(11/2)*c**3*x**6*sqrt(1 + c*x**2/a)) + 35*a**4*c*x**3/(1
5*a**(17/2)*sqrt(1 + c*x**2/a) + 45*a**(15/2)*c*x**2*sqrt(1 + c*x
**2/a) + 45*a**(13/2)*c**2*x**4*sqrt(1 + c*x**2/a) + 15*a**(11/2)
*c**3*x**6*sqrt(1 + c*x**2/a)) + 28*a**3*c**2*x**5/(15*a**(17/2)*
sqrt(1 + c*x**2/a) + 45*a**(15/2)*c*x**2*sqrt(1 + c*x**2/a) + 45*
a**(13/2)*c**2*x**4*sqrt(1 + c*x**2/a) + 15*a**(11/2)*c**3*x**6*s
qrt(1 + c*x**2/a)) + 8*a**2*c**3*x**7/(15*a**(17/2)*sqrt(1 + c*x*
*2/a) + 45*a**(15/2)*c*x**2*sqrt(1 + c*x**2/a) + 45*a**(13/2)*c**
2*x**4*sqrt(1 + c*x**2/a) + 15*a**(11/2)*c**3*x**6*sqrt(1 + c*x**
2/a))) + B*Piecewise((-1/(5*a**2*c*sqrt(a + c*x**2) + 10*a*c**2*x
**2*sqrt(a + c*x**2) + 5*c**3*x**4*sqrt(a + c*x**2)), Ne(c, 0)),
(x**2/(2*a**(7/2)), True)) + C*(5*a*x**3/(15*a**(9/2)*sqrt(1 + c*
x**2/a) + 30*a**(7/2)*c*x**2*sqrt(1 + c*x**2/a) + 15*a**(5/2)*c**
2*x**4*sqrt(1 + c*x**2/a)) + 2*c*x**5/(15*a**(9/2)*sqrt(1 + c*x**
2/a) + 30*a**(7/2)*c*x**2*sqrt(1 + c*x**2/a) + 15*a**(5/2)*c**2*x
**4*sqrt(1 + c*x**2/a)))
```

GIAC/XCAS [A] time = 0.279308, size = 108, normalized size = 1.11

$$\frac{\left(x^2\left(\frac{2\left(Cac^3+4\,Ac^4\right)x^2}{a^3c^2}+\frac{5\left(Ca^2c^2+4\,Aac^3\right)}{a^3c^2}\right)+\frac{15\,A}{a}\right)x-\frac{3\,B}{c}}{15\left(cx^2+a\right)^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^(7/2),x, algorithm="giac")
```

```
[Out] 1/15*((x^2*(2*(C*a*c^3 + 4*A*c^4)*x^2/(a^3*c^2) + 5*(C*a^2*c^2 +
4*A*a*c^3)/(a^3*c^2)) + 15*A/a)*x - 3*B/c)/(c*x^2 + a)^(5/2)
```

3.117 $\int \frac{A+Bx+Cx^2}{(a+cx^2)^{9/2}} \, dx$

Optimal. Leaf size=127

$$\frac{8x(aC+6Ac)}{105a^4c\sqrt{a+cx^2}}+\frac{4x(aC+6Ac)}{105a^3c\,(a+cx^2)^{3/2}}+\frac{x(aC+6Ac)}{35a^2c\,(a+cx^2)^{5/2}}-\frac{aB-x(Ac-aC)}{7ac\,(a+cx^2)^{7/2}}$$

```
[Out] -(a*B - (A*c - a*C)*x)/(7*a*c*(a + c*x^2)^(7/2)) + ((6*A*c + a*C)
*x)/(35*a^2*c*(a + c*x^2)^(5/2)) + (4*(6*A*c + a*C)*x)/(105*a^3*c
*(a + c*x^2)^(3/2)) + (8*(6*A*c + a*C)*x)/(105*a^4*c*Sqrt[a + c*x
^2])
```

Rubi [A] time = 0.145519, antiderivative size = 127, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$

$$\frac{8x(aC+6Ac)}{105a^4c\sqrt{a+cx^2}}+\frac{4x(aC+6Ac)}{105a^3c\,(a+cx^2)^{3/2}}+\frac{x(aC+6Ac)}{35a^2c\,(a+cx^2)^{5/2}}-\frac{aB-x(Ac-aC)}{7ac\,(a+cx^2)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/(a + c*x^2)^(9/2),x]
```

```
[Out] -(a*B - (A*c - a*C)*x)/(7*a*c*(a + c*x^2)^(7/2)) + ((6*A*c + a*C)
*x)/(35*a^2*c*(a + c*x^2)^(5/2)) + (4*(6*A*c + a*C)*x)/(105*a^3*c
*(a + c*x^2)^(3/2)) + (8*(6*A*c + a*C)*x)/(105*a^4*c*Sqrt[a + c*x
^2])
```

Rubi in Sympy [A] time = 13.6503, size = 110, normalized size = 0.87

$$-\frac{Ba-x\,(Ac-Ca)}{7ac\,(a+cx^2)^{\frac{7}{2}}}+\frac{x\,(6Ac+Ca)}{35a^2c\,(a+cx^2)^{\frac{5}{2}}}+\frac{4x\,(6Ac+Ca)}{105a^3c\,(a+cx^2)^{\frac{3}{2}}}+\frac{8x\,(6Ac+Ca)}{105a^4c\sqrt{a+cx^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+B*x+A)/(c*x**2+a)**(9/2),x)
```

```
[Out] -(B*a - x*(A*c - C*a))/(7*a*c*(a + c*x**2)**(7/2)) + x*(6*A*c + C
*a)/(35*a**2*c*(a + c*x**2)**(5/2)) + 4*x*(6*A*c + C*a)/(105*a**3
*c*(a + c*x**2)**(3/2)) + 8*x*(6*A*c + C*a)/(105*a**4*c*sqrt(a +
c*x**2))
```

Mathematica [A] time = 0.0936961, size = 92, normalized size = 0.72

$$\frac{-15a^4B+35a^3cx\left(3A+Cx^2\right)+14a^2c^2x^3\left(15A+2Cx^2\right)+8ac^3x^5\left(21A+Cx^2\right)+48Ac^4x^7}{105a^4c\left(a+cx^2\right)^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/(a + c*x^2)^(9/2),x]
```

```
[Out] (-15*a^4*B + 48*A*c^4*x^7 + 35*a^3*c*x*(3*A + C*x^2) + 8*a*c^3*x^
5*(21*A + C*x^2) + 14*a^2*c^2*x^3*(15*A + 2*C*x^2))/(105*a^4*c*(a
 + c*x^2)^(7/2))
```

Maple [A] time = 0.007, size = 96, normalized size = 0.8

$$\frac{48\,Ac^4x^7+8\,Cac^3x^7+168\,Aac^3x^5+28\,Ca^2c^2x^5+210\,Aa^2c^2x^3+35\,Ca^3cx^3+105\,Axa^3c-15\,Ba^4}{105\,a^4c}\left(cx^2+a\right)^{-\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(c*x^2+a)^(9/2),x)
```

```
[Out] 1/105*(48*A*c^4*x^7+8*C*a*c^3*x^7+168*A*a*c^3*x^5+28*C*a^2*c^2*x^
5+210*A*a^2*c^2*x^3+35*C*a^3*c*x^3+105*A*a^3*c*x-15*B*a^4)/(c*x^2
+a)^(7/2)/a^4/c
```

Maxima [A] time = 0.705444, size = 207, normalized size = 1.63

$$\frac{16\,Ax}{35\,\sqrt{cx^2+a}a^4}+\frac{8\,Ax}{35\,(cx^2+a)^{\frac{3}{2}}a^3}+\frac{6\,Ax}{35\,(cx^2+a)^{\frac{5}{2}}a^2}+\frac{Ax}{7\,(cx^2+a)^{\frac{7}{2}}a}-\frac{Cx}{7\,(cx^2+a)^{\frac{7}{2}}c}+\frac{8\,Cx}{105\,\sqrt{cx^2+a}a^3c}+\frac{4\,Cx}{105\,(cx^2+a)^{\frac{3}{2}}a^2c}+\frac{Cx}{35\,(cx^2+a)^{\frac{5}{2}}ac}-\frac{B}{7\,(cx^2+a)^{\frac{7}{2}}c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^(9/2),x, algorithm="maxima")
```

```
[Out] 16/35*A*x/(sqrt(c*x^2 + a)*a^4) + 8/35*A*x/((c*x^2 + a)^(3/2)*a^3
) + 6/35*A*x/((c*x^2 + a)^(5/2)*a^2) + 1/7*A*x/((c*x^2 + a)^(7/2)
```

```
*a) - 1/7*C*x/((c*x^2 + a)^(7/2)*c) + 8/105*C*x/(sqrt(c*x^2 + a)*
a^3*c) + 4/105*C*x/((c*x^2 + a)^(3/2)*a^2*c) + 1/35*C*x/((c*x^2 +
 a)^(5/2)*a*c) - 1/7*B/((c*x^2 + a)^(7/2)*c)
```

Fricas [A] time = 0.301706, size = 185, normalized size = 1.46

$$\frac{\left(8\left(Cac^3+6\,Ac^4\right)x^7+105\,Aa^3cx+28\left(Ca^2c^2+6\,Aac^3\right)x^5-15\,Ba^4+35\left(Ca^3c+6\,Aa^2c^2\right)x^3\right)\sqrt{cx^2+a}}{105\left(a^4c^5x^8+4\,a^5c^4x^6+6\,a^6c^3x^4+4\,a^7c^2x^2+a^8c\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^(9/2),x, algorithm="fricas")
```

```
[Out] 1/105*(8*(C*a*c^3 + 6*A*c^4)*x^7 + 105*A*a^3*c*x + 28*(C*a^2*c^2
+ 6*A*a*c^3)*x^5 - 15*B*a^4 + 35*(C*a^3*c + 6*A*a^2*c^2)*x^3)*sqr
t(c*x^2 + a)/(a^4*c^5*x^8 + 4*a^5*c^4*x^6 + 6*a^6*c^3*x^4 + 4*a^7
*c^2*x^2 + a^8*c)
```

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**2+B*x+A)/(c*x**2+a)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.279812, size = 151, normalized size = 1.19

$$\frac{\left(\left(4\,x^2\left(\frac{2\left(Cac^5+6\,Ac^6\right)x^2}{a^4c^3}+\frac{7\left(Ca^2c^4+6\,Aac^5\right)}{a^4c^3}\right)+\frac{35\left(Ca^3c^3+6\,Aa^2c^4\right)}{a^4c^3}\right)x^2+\frac{105\,A}{a}\right)x-\frac{15\,B}{c}}{105\left(cx^2+a\right)^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(c*x^2 + a)^(9/2),x, algorithm="giac")
```

```
[Out] 1/105*(((4*x^2*(2*(C*a*c^5 + 6*A*c^6)*x^2/(a^4*c^3) + 7*(C*a^2*c^
4 + 6*A*a*c^5)/(a^4*c^3)) + 35*(C*a^3*c^3 + 6*A*a^2*c^4)/(a^4*c^3
))*x^2 + 105*A/a)*x - 15*B/c)/(c*x^2 + a)^(7/2)
```

3.118 $\int \frac{(1+2x)^3(1+3x+4x^2)}{\sqrt{2+3x^2}}\,dx$

Optimal. Leaf size=106

$$\frac{2}{15}\sqrt{3x^2+2}(2x+1)^4+\frac{13}{60}\sqrt{3x^2+2}(2x+1)^3-\frac{19}{540}\sqrt{3x^2+2}(2x+1)^2-\frac{1}{810}(2073x+3937)\sqrt{3x^2+2}+\frac{5\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{3\sqrt{3}}$$

```
[Out] (-19*(1 + 2*x)^2*Sqrt[2 + 3*x^2])/540 + (13*(1 + 2*x)^3*Sqrt[2 +
3*x^2])/60 + (2*(1 + 2*x)^4*Sqrt[2 + 3*x^2])/15 - ((3937 + 2073*x
)*Sqrt[2 + 3*x^2])/810 + (5*ArcSinh[Sqrt[3/2]*x])/(3*Sqrt[3])
```

Rubi [A] time = 0.25434, antiderivative size = 106, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.138

$$\frac{2}{15}\sqrt{3x^2+2}(2x+1)^4+\frac{13}{60}\sqrt{3x^2+2}(2x+1)^3-\frac{19}{540}\sqrt{3x^2+2}(2x+1)^2-\frac{1}{810}(2073x+3937)\sqrt{3x^2+2}+\frac{5\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)^3*(1 + 3*x + 4*x^2))/Sqrt[2 + 3*x^2],x]
```

```
[Out] (-19*(1 + 2*x)^2*Sqrt[2 + 3*x^2])/540 + (13*(1 + 2*x)^3*Sqrt[2 +
3*x^2])/60 + (2*(1 + 2*x)^4*Sqrt[2 + 3*x^2])/15 - ((3937 + 2073*x
)*Sqrt[2 + 3*x^2])/810 + (5*ArcSinh[Sqrt[3/2]*x])/(3*Sqrt[3])
```

Rubi in Sympy [A] time = 20.543, size = 95, normalized size = 0.9

$$\frac{2\left(2x+1\right)^4\sqrt{3x^2+2}}{15}+\frac{13\left(2x+1\right)^3\sqrt{3x^2+2}}{60}-\frac{19\left(2x+1\right)^2\sqrt{3x^2+2}}{540}-\frac{\left(49752x+94488\right)\sqrt{3x^2+2}}{19440}+\frac{5\sqrt{3}\,\mathrm{asinh}\left(\frac{\sqrt{6}x}{2}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**3*(4*x**2+3*x+1)/(3*x**2+2)**(1/2),x)
```

```
[Out] 2*(2*x + 1)**4*sqrt(3*x**2 + 2)/15 + 13*(2*x + 1)**3*sqrt(3*x**2
+ 2)/60 - 19*(2*x + 1)**2*sqrt(3*x**2 + 2)/540 - (49752*x + 94488
)*sqrt(3*x**2 + 2)/19440 + 5*sqrt(3)*asinh(sqrt(6)*x/2)/9
```

Mathematica [A] time = 0.0726262, size = 54, normalized size = 0.51

$$\frac{1}{405}\left(\sqrt{3x^2+2}\left(864x^4+2430x^3+2292x^2-135x-1841\right)+225\sqrt{3}\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)^3*(1 + 3*x + 4*x^2))/Sqrt[2 + 3*x^2],x]
```

```
[Out] (Sqrt[2 + 3*x^2]*(-1841 - 135*x + 2292*x^2 + 2430*x^3 + 864*x^4)
+ 225*Sqrt[3]*ArcSinh[Sqrt[3/2]*x])/405
```

Maple [A] time = 0.017, size = 79, normalized size = 0.8

$$\frac{5\sqrt{3}}{9}Arcsinh\left(\frac{x\sqrt{6}}{2}\right)-\frac{1841}{405}\sqrt{3x^2+2}-\frac{x}{3}\sqrt{3x^2+2}+\frac{764x^2}{135}\sqrt{3x^2+2}+6x^3\sqrt{3x^2+2}+\frac{32x^4}{15}\sqrt{3x^2+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^3*(4*x^2+3*x+1)/(3*x^2+2)^(1/2),x)
```

```
[Out] 5/9*arcsinh(1/2*x*6^(1/2))*3^(1/2)-1841/405*(3*x^2+2)^(1/2)-1/3*x
*(3*x^2+2)^(1/2)+764/135*x^2*(3*x^2+2)^(1/2)+6*x^3*(3*x^2+2)^(1/2
)+32/15*x^4*(3*x^2+2)^(1/2)
```

Maxima [A] time = 0.797964, size = 105, normalized size = 0.99

$$\frac{32}{15}\sqrt{3x^2+2}x^4+6\sqrt{3x^2+2}x^3+\frac{764}{135}\sqrt{3x^2+2}x^2-\frac{1}{3}\sqrt{3x^2+2}x+\frac{5}{9}\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{2}\sqrt{6}x\right)-\frac{1841}{405}\sqrt{3x^2+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/sqrt(3*x^2 + 2),x, algorithm="maxima")
```

```
[Out] 32/15*sqrt(3*x^2 + 2)*x^4 + 6*sqrt(3*x^2 + 2)*x^3 + 764/135*sqrt(
3*x^2 + 2)*x^2 - 1/3*sqrt(3*x^2 + 2)*x + 5/9*sqrt(3)*arcsinh(1/2*
sqrt(6)*x) - 1841/405*sqrt(3*x^2 + 2)
```

Fricas [A] time = 0.272765, size = 92, normalized size = 0.87

$$\frac{1}{2430}\sqrt{3}\left(2\sqrt{3}\left(864\,x^4+2430\,x^3+2292\,x^2-135\,x-1841\right)\sqrt{3\,x^2+2}+675\,\log\left(-\sqrt{3}\left(3\,x^2+1\right)-3\,\sqrt{3\,x^2+2}x\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/sqrt(3*x^2 + 2),x, algorithm="fricas")
```

```
[Out] 1/2430*sqrt(3)*(2*sqrt(3)*(864*x^4 + 2430*x^3 + 2292*x^2 - 135*x
- 1841)*sqrt(3*x^2 + 2) + 675*log(-sqrt(3)*(3*x^2 + 1) - 3*sqrt(3
*x^2 + 2)*x))
```

Sympy [A] time = 3.15513, size = 94, normalized size = 0.89

$$\frac{32x^4\sqrt{3x^2+2}}{15}+6x^3\sqrt{3x^2+2}+\frac{764x^2\sqrt{3x^2+2}}{135}-\frac{x\sqrt{3x^2+2}}{3}-\frac{1841\sqrt{3x^2+2}}{405}+\frac{5\sqrt{3}\operatorname{asinh}\left(\frac{\sqrt{6}x}{2}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)**3*(4*x**2+3*x+1)/(3*x**2+2)**(1/2),x)
```

```
[Out] 32*x**4*sqrt(3*x**2 + 2)/15 + 6*x**3*sqrt(3*x**2 + 2) + 764*x**2*
sqrt(3*x**2 + 2)/135 - x*sqrt(3*x**2 + 2)/3 - 1841*sqrt(3*x**2 +
2)/405 + 5*sqrt(3)*asinh(sqrt(6)*x/2)/9
```

GIAC/XCAS [A] time = 0.277875, size = 73, normalized size = 0.69

$$\frac{1}{405}\left(3\left(2\left(9\left(16\,x+45\right)x+382\right)x-45\right)x-1841\right)\sqrt{3\,x^2+2}-\frac{5}{9}\,\sqrt{3}\ln\left(-\sqrt{3}x+\sqrt{3\,x^2+2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/sqrt(3*x^2 + 2),x, algorithm="giac")
```

```
[Out] 1/405*(3*(2*(9*(16*x + 45)*x + 382)*x - 45)*x - 1841)*sqrt(3*x^2
+ 2) - 5/9*sqrt(3)*ln(-sqrt(3)*x + sqrt(3*x^2 + 2))
```

3.119 $\int \frac{(1+2x)^2(1+3x+4x^2)}{\sqrt{2+3x^2}}\,dx$

Optimal. Leaf size=82

$$\frac{1}{6}\sqrt{3x^2+2}(2x+1)^3+\frac{5}{18}\sqrt{3x^2+2}(2x+1)^2-\frac{1}{27}(3x+61)\sqrt{3x^2+2}-\sqrt{3}\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)$$

```
[Out] (5*(1 + 2*x)^2*Sqrt[2 + 3*x^2])/18 + ((1 + 2*x)^3*Sqrt[2 + 3*x^2]
)/6 - ((61 + 3*x)*Sqrt[2 + 3*x^2])/27 - Sqrt[3]*ArcSinh[Sqrt[3/2]
*x]
```

Rubi [A] time = 0.187192, antiderivative size = 82, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.138

$$\frac{1}{6}\sqrt{3x^2+2}(2x+1)^3+\frac{5}{18}\sqrt{3x^2+2}(2x+1)^2-\frac{1}{27}(3x+61)\sqrt{3x^2+2}-\sqrt{3}\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)^2*(1 + 3*x + 4*x^2))/Sqrt[2 + 3*x^2],x]
```

```
[Out] (5*(1 + 2*x)^2*Sqrt[2 + 3*x^2])/18 + ((1 + 2*x)^3*Sqrt[2 + 3*x^2]
)/6 - ((61 + 3*x)*Sqrt[2 + 3*x^2])/27 - Sqrt[3]*ArcSinh[Sqrt[3/2]
*x]
```

Rubi in Sympy [A] time = 16.115, size = 70, normalized size = 0.85

$$\frac{(2x+1)^3\sqrt{3x^2+2}}{6}+\frac{5(2x+1)^2\sqrt{3x^2+2}}{18}-\frac{(144x+2928)\sqrt{3x^2+2}}{1296}-\sqrt{3}\,\text{asinh}\left(\frac{\sqrt{6}x}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**2*(4*x**2+3*x+1)/(3*x**2+2)**(1/2),x)
```

```
[Out] (2*x + 1)**3*sqrt(3*x**2 + 2)/6 + 5*(2*x + 1)**2*sqrt(3*x**2 + 2)
/18 - (144*x + 2928)*sqrt(3*x**2 + 2)/1296 - sqrt(3)*asinh(sqrt(6
)*x/2)
```

Mathematica [A] time = 0.0541318, size = 48, normalized size = 0.59

$$\frac{1}{27}\sqrt{3x^2+2}\left(36x^3+84x^2+54x-49\right)-\sqrt{3}\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)^2*(1 + 3*x + 4*x^2))/Sqrt[2 + 3*x^2],x]
```

```
[Out] (Sqrt[2 + 3*x^2]*(-49 + 54*x + 84*x^2 + 36*x^3))/27 - Sqrt[3]*Arc
Sinh[Sqrt[3/2]*x]
```

Maple [A] time = 0.009, size = 65, normalized size = 0.8

$$-Arcsinh\left(\frac{x\sqrt{6}}{2}\right)\sqrt{3}-\frac{49}{27}\sqrt{3x^2+2}+2x\sqrt{3x^2+2}+\frac{28x^2}{9}\sqrt{3x^2+2}+\frac{4x^3}{3}\sqrt{3x^2+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^2*(4*x^2+3*x+1)/(3*x^2+2)^(1/2),x)
```

```
[Out] -arcsinh(1/2*x*6^(1/2))*3^(1/2)-49/27*(3*x^2+2)^(1/2)+2*x*(3*x^2+
2)^(1/2)+28/9*x^2*(3*x^2+2)^(1/2)+4/3*x^3*(3*x^2+2)^(1/2)
```

Maxima [A] time = 0.788076, size = 86, normalized size = 1.05

$$\frac{4}{3}\sqrt{3x^2+2}x^3+\frac{28}{9}\sqrt{3x^2+2}x^2+2\sqrt{3x^2+2}x-\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{2}\sqrt{6}x\right)-\frac{49}{27}\sqrt{3x^2+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/sqrt(3*x^2 + 2),x, algorithm="maxima")
```

```
[Out] 4/3*sqrt(3*x^2 + 2)*x^3 + 28/9*sqrt(3*x^2 + 2)*x^2 + 2*sqrt(3*x^2
 + 2)*x - sqrt(3)*arcsinh(1/2*sqrt(6)*x) - 49/27*sqrt(3*x^2 + 2)
```

Fricas [A] time = 0.271468, size = 73, normalized size = 0.89

$$\frac{1}{27}\left(36x^3+84x^2+54x-49\right)\sqrt{3x^2+2}+\frac{1}{2}\sqrt{3}\log\left(\sqrt{3}\sqrt{3x^2+2}x-3x^2-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/sqrt(3*x^2 + 2),x, algorithm="fricas")
```

```
[Out] 1/27*(36*x^3 + 84*x^2 + 54*x - 49)*sqrt(3*x^2 + 2) + 1/2*sqrt(3)*
log(sqrt(3)*sqrt(3*x^2 + 2)*x - 3*x^2 - 1)
```

Sympy [A] time = 1.70494, size = 75, normalized size = 0.91

$$\frac{4x^3\sqrt{3x^2+2}}{3}+\frac{28x^2\sqrt{3x^2+2}}{9}+2x\sqrt{3x^2+2}-\frac{49\sqrt{3x^2+2}}{27}-\sqrt{3}\operatorname{asinh}\left(\frac{\sqrt{6}x}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)**2*(4*x**2+3*x+1)/(3*x**2+2)**(1/2),x)
```

```
[Out] 4*x**3*sqrt(3*x**2 + 2)/3 + 28*x**2*sqrt(3*x**2 + 2)/9 + 2*x*sqrt
(3*x**2 + 2) - 49*sqrt(3*x**2 + 2)/27 - sqrt(3)*asinh(sqrt(6)*x/2
)
```

GIAC/XCAS [A] time = 0.27521, size = 65, normalized size = 0.79

$$\frac{1}{27}\left(6\left(2\left(3\,x+7\right)x+9\right)x-49\right)\sqrt{3\,x^2+2}+\sqrt{3}\ln\left(-\sqrt{3}x+\sqrt{3\,x^2+2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/sqrt(3*x^2 + 2),x, algorithm="giac")
```

```
[Out] 1/27*(6*(2*(3*x + 7)*x + 9)*x - 49)*sqrt(3*x^2 + 2) + sqrt(3)*ln(
-sqrt(3)*x + sqrt(3*x^2 + 2))
```

3.120 $\int \frac{(1+2x)(1+3x+4x^2)}{\sqrt{2+3x^2}}\,dx$

Optimal. Leaf size=62

$$\frac{2}{9}\sqrt{3x^2+2}(2x+1)^2+\frac{7}{27}(3x+1)\sqrt{3x^2+2}-\frac{7\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{3\sqrt{3}}$$

```
[Out] (2*(1 + 2*x)^2*Sqrt[2 + 3*x^2])/9 + (7*(1 + 3*x)*Sqrt[2 + 3*x^2])
/27 - (7*ArcSinh[Sqrt[3/2]*x])/(3*Sqrt[3])
```

Rubi [A] time = 0.102439, 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

$$\frac{2}{9}\sqrt{3x^2+2}(2x+1)^2+\frac{7}{27}(3x+1)\sqrt{3x^2+2}-\frac{7\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)*(1 + 3*x + 4*x^2))/Sqrt[2 + 3*x^2],x]
```

```
[Out] (2*(1 + 2*x)^2*Sqrt[2 + 3*x^2])/9 + (7*(1 + 3*x)*Sqrt[2 + 3*x^2])
/27 - (7*ArcSinh[Sqrt[3/2]*x])/(3*Sqrt[3])
```

Rubi in Sympy [A] time = 11.2421, size = 54, normalized size = 0.87

$$\frac{2(2x+1)^2\sqrt{3x^2+2}}{9}+\frac{(84x+28)\sqrt{3x^2+2}}{108}-\frac{7\sqrt{3}\operatorname{asinh}\left(\frac{\sqrt{6}x}{2}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)*(4*x**2+3*x+1)/(3*x**2+2)**(1/2),x)
```

```
[Out] 2*(2*x + 1)**2*sqrt(3*x**2 + 2)/9 + (84*x + 28)*sqrt(3*x**2 + 2)/
108 - 7*sqrt(3)*asinh(sqrt(6)*x/2)/9
```

Mathematica [A] time = 0.0480202, size = 44, normalized size = 0.71

$$\frac{1}{27}\left(\sqrt{3x^2+2}\left(24x^2+45x+13\right)-21\sqrt{3}\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)*(1 + 3*x + 4*x^2))/Sqrt[2 + 3*x^2],x]
```

```
[Out] (Sqrt[2 + 3*x^2]*(13 + 45*x + 24*x^2) - 21*Sqrt[3]*ArcSinh[Sqrt[3
/2]*x])/27
```

Maple [A] time = 0.009, size = 51, normalized size = 0.8

$$-\frac{7\sqrt{3}}{9}Arcsinh\left(\frac{x\sqrt{6}}{2}\right)+\frac{13}{27}\sqrt{3x^2+2}+\frac{5x}{3}\sqrt{3x^2+2}+\frac{8x^2}{9}\sqrt{3x^2+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)*(4*x^2+3*x+1)/(3*x^2+2)^(1/2),x)
```

```
[Out] -7/9*arcsinh(1/2*x*6^(1/2))*3^(1/2)+13/27*(3*x^2+2)^(1/2)+5/3*x*(
3*x^2+2)^(1/2)+8/9*x^2*(3*x^2+2)^(1/2)
```

Maxima [A] time = 0.788146, size = 68, normalized size = 1.1

$$\frac{8}{9}\sqrt{3x^2+2}x^2+\frac{5}{3}\sqrt{3x^2+2}x-\frac{7}{9}\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{2}\sqrt{6}x\right)+\frac{13}{27}\sqrt{3x^2+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)/sqrt(3*x^2 + 2),x, algorithm="maxima")
```

```
[Out] 8/9*sqrt(3*x^2 + 2)*x^2 + 5/3*sqrt(3*x^2 + 2)*x - 7/9*sqrt(3)*arc
sinh(1/2*sqrt(6)*x) + 13/27*sqrt(3*x^2 + 2)
```

Fricas [A] time = 0.27158, size = 78, normalized size = 1.26

$$\frac{1}{162}\sqrt{3}\left(2\sqrt{3}\left(24x^2+45x+13\right)\sqrt{3x^2+2}+63\log\left(-\sqrt{3}\left(3x^2+1\right)+3\sqrt{3x^2+2}x\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(2*x + 1)/sqrt(3*x^2 + 2),x, algorithm="fricas")
```

```
[Out] 1/162*sqrt(3)*(2*sqrt(3)*(24*x^2 + 45*x + 13)*sqrt(3*x^2 + 2) + 6
3*log(-sqrt(3)*(3*x^2 + 1) + 3*sqrt(3*x^2 + 2)*x))
```

Sympy [A] time = 0.784807, size = 63, normalized size = 1.02

$$\frac{8x^2\sqrt{3x^2+2}}{9}+\frac{5x\sqrt{3x^2+2}}{3}+\frac{13\sqrt{3x^2+2}}{27}-\frac{7\sqrt{3}\operatorname{asinh}\left(\frac{\sqrt{6}x}{2}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)*(4*x**2+3*x+1)/(3*x**2+2)**(1/2),x)
```

```
[Out] 8*x**2*sqrt(3*x**2 + 2)/9 + 5*x*sqrt(3*x**2 + 2)/3 + 13*sqrt(3*x*
*2 + 2)/27 - 7*sqrt(3)*asinh(sqrt(6)*x/2)/9
```

GIAC/XCAS [A] time = 0.276014, size = 59, normalized size = 0.95

$$\frac{1}{27}\left(3\left(8x+15\right)x+13\right)\sqrt{3x^2+2}+\frac{7}{9}\sqrt{3}\ln\left(-\sqrt{3}x+\sqrt{3x^2+2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(2*x + 1)/sqrt(3*x^2 + 2),x, algorithm="giac")
```

```
[Out] 1/27*(3*(8*x + 15)*x + 13)*sqrt(3*x^2 + 2) + 7/9*sqrt(3)*ln(-sqrt
(3)*x + sqrt(3*x^2 + 2))
```

3.121 $\int \frac{1+3x+4x^2}{(1+2x)\sqrt{2+3x^2}}\,dx$

Optimal. Leaf size=67

$$\frac{2}{3}\sqrt{3x^2+2}-\frac{\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{2\sqrt{11}}+\frac{\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{2\sqrt{3}}$$

```
[Out] (2*Sqrt[2 + 3*x^2])/3 + ArcSinh[Sqrt[3/2]*x]/(2*Sqrt[3]) - ArcTan
h[(4 - 3*x)/(Sqrt[11]*Sqrt[2 + 3*x^2])]/(2*Sqrt[11])
```

Rubi [A] time = 0.154429, antiderivative size = 67, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.172

$$\frac{2}{3}\sqrt{3x^2+2}-\frac{\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{2\sqrt{11}}+\frac{\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{2\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)*Sqrt[2 + 3*x^2]),x]
```

```
[Out] (2*Sqrt[2 + 3*x^2])/3 + ArcSinh[Sqrt[3/2]*x]/(2*Sqrt[3]) - ArcTan
h[(4 - 3*x)/(Sqrt[11]*Sqrt[2 + 3*x^2])]/(2*Sqrt[11])
```

Rubi in Sympy [A] time = 14.7094, size = 60, normalized size = 0.9

$$\frac{2\sqrt{3x^2+2}}{3}+\frac{\sqrt{3}\operatorname{asinh}\left(\frac{\sqrt{6}x}{2}\right)}{6}-\frac{\sqrt{11}\operatorname{atanh}\left(\frac{\sqrt{11}(-3x+4)}{11\sqrt{3x^2+2}}\right)}{22}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)/(3*x**2+2)**(1/2),x)
```

```
[Out] 2*sqrt(3*x**2 + 2)/3 + sqrt(3)*asinh(sqrt(6)*x/2)/6 - sqrt(11)*at
anh(sqrt(11)*(-3*x + 4)/(11*sqrt(3*x**2 + 2)))/22
```

Mathematica [A] time = 0.0760753, size = 74, normalized size = 1.1

$$\frac{1}{66}\left(44\sqrt{3x^2+2}-3\sqrt{11}\log\left(2\sqrt{33x^2+22}-6x+8\right)+3\sqrt{11}\log(2x+1)+11\sqrt{3}\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)*Sqrt[2 + 3*x^2]),x]
```

```
[Out] (44*Sqrt[2 + 3*x^2] + 11*Sqrt[3]*ArcSinh[Sqrt[3/2]*x] + 3*Sqrt[11
]*Log[1 + 2*x] - 3*Sqrt[11]*Log[8 - 6*x + 2*Sqrt[22 + 33*x^2]])/6
6
```

Maple [A] time = 0.011, size = 55, normalized size = 0.8

$$\frac{\sqrt{3}}{6}Arcsinh\left(\frac{x\sqrt{6}}{2}\right)+\frac{2}{3}\sqrt{3\,x^2+2}-\frac{\sqrt{11}}{22}Artanh\left(\frac{(8-6\,x)\sqrt{11}}{11}\frac{1}{\sqrt{12\,(1/2+x)^2-12\,x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)/(3*x^2+2)^(1/2),x)
```

```
[Out] 1/6*arcsinh(1/2*x*6^(1/2))*3^(1/2)+2/3*(3*x^2+2)^(1/2)-1/22*11^(1
/2)*arctanh(2/11*(4-3*x)*11^(1/2)/(12*(1/2+x)^2-12*x+5)^(1/2))
```

Maxima [A] time = 0.787576, size = 78, normalized size = 1.16

$$\frac{1}{6}\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{2}\sqrt{6}x\right)+\frac{1}{22}\sqrt{11}\,\mathrm{arsinh}\left(\frac{\sqrt{6}x}{2\,|2\,x+1|}-\frac{2\sqrt{6}}{3\,|2\,x+1|}\right)+\frac{2}{3}\sqrt{3\,x^2+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 + 2)*(2*x + 1)),x, algorithm="maxima")
```

```
[Out] 1/6*sqrt(3)*arcsinh(1/2*sqrt(6)*x) + 1/22*sqrt(11)*arcsinh(1/2*sq
rt(6)*x/abs(2*x + 1) - 2/3*sqrt(6)/abs(2*x + 1)) + 2/3*sqrt(3*x^2
 + 2)
```

Fricas [A] time = 0.277194, size = 146, normalized size = 2.18

$$\frac{1}{396}\sqrt{11}\sqrt{3}\left(8\sqrt{11}\sqrt{3}\sqrt{3x^2+2}+3\sqrt{11}\log\left(-\sqrt{3}\left(3x^2+1\right)-3\sqrt{3x^2+2}x\right)+3\sqrt{3}\log\left(-\frac{\sqrt{11}\left(21x^2-12x+19\right)+11\sqrt{3x^2+2}(3x-4)}{4x^2+4x+1}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 + 2)*(2*x + 1)),x, algorithm="fricas")
```

```
[Out] 1/396*sqrt(11)*sqrt(3)*(8*sqrt(11)*sqrt(3)*sqrt(3*x^2 + 2) + 3*sq
rt(11)*log(-sqrt(3)*(3*x^2 + 1) - 3*sqrt(3*x^2 + 2)*x) + 3*sqrt(3
)*log(-(sqrt(11)*(21*x^2 - 12*x + 19) + 11*sqrt(3*x^2 + 2)*(3*x -
 4))/(4*x^2 + 4*x + 1)))
```

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

$$\int \frac{4x^2+3x+1}{(2x+1)\sqrt{3x^2+2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**2+3*x+1)/(1+2*x)/(3*x**2+2)**(1/2),x)
```

```
[Out] Integral((4*x**2 + 3*x + 1)/((2*x + 1)*sqrt(3*x**2 + 2)), x)
```

GIAC/XCAS [A] time = 0.292557, size = 134, normalized size = 2.

$$-\frac{1}{6}\sqrt{3}\ln\left(-\sqrt{3}x+\sqrt{3x^2+2}\right)+\frac{1}{22}\sqrt{11}\ln\left(-\frac{\left|-2\sqrt{3}x-\sqrt{11}-\sqrt{3}+2\sqrt{3x^2+2}\right|}{2\sqrt{3}x-\sqrt{11}+\sqrt{3}-2\sqrt{3x^2+2}}\right)+\frac{2}{3}\sqrt{3x^2+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 + 2)*(2*x + 1)),x, algorithm="giac")
```

```
[Out] -1/6*sqrt(3)*ln(-sqrt(3)*x + sqrt(3*x^2 + 2)) + 1/22*sqrt(11)*ln(
-abs(-2*sqrt(3)*x - sqrt(11) - sqrt(3) + 2*sqrt(3*x^2 + 2))/(2*sq
rt(3)*x - sqrt(11) + sqrt(3) - 2*sqrt(3*x^2 + 2))) + 2/3*sqrt(3*x
^2 + 2)
```

3.122 $\int \frac{1+3x+4x^2}{(1+2x)^2\sqrt{2+3x^2}}\,dx$

Optimal. Leaf size=71

$$-\frac{\sqrt{3x^2+2}}{11(2x+1)}+\frac{4\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{11\sqrt{11}}+\frac{\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{\sqrt{3}}$$

```
[Out] -Sqrt[2 + 3*x^2]/(11*(1 + 2*x)) + ArcSinh[Sqrt[3/2]*x]/Sqrt[3] +
(4*ArcTanh[(4 - 3*x)/(Sqrt[11]*Sqrt[2 + 3*x^2])])/(11*Sqrt[11])
```

Rubi [A] time = 0.15188, antiderivative size = 71, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.172

$$-\frac{\sqrt{3x^2+2}}{11(2x+1)}+\frac{4\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{11\sqrt{11}}+\frac{\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)^2*Sqrt[2 + 3*x^2]),x]
```

```
[Out] -Sqrt[2 + 3*x^2]/(11*(1 + 2*x)) + ArcSinh[Sqrt[3/2]*x]/Sqrt[3] +
(4*ArcTanh[(4 - 3*x)/(Sqrt[11]*Sqrt[2 + 3*x^2])])/(11*Sqrt[11])
```

Rubi in Sympy [A] time = 14.7689, size = 63, normalized size = 0.89

$$\frac{\sqrt{3}\operatorname{asinh}\left(\frac{\sqrt{6}x}{2}\right)}{3}+\frac{4\sqrt{11}\operatorname{atanh}\left(\frac{\sqrt{11}(-3x+4)}{11\sqrt{3x^2+2}}\right)}{121}-\frac{\sqrt{3x^2+2}}{11\,(2x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)**2/(3*x**2+2)**(1/2),x)
```

```
[Out] sqrt(3)*asinh(sqrt(6)*x/2)/3 + 4*sqrt(11)*atanh(sqrt(11)*(-3*x +
4)/(11*sqrt(3*x**2 + 2)))/121 - sqrt(3*x**2 + 2)/(11*(2*x + 1))
```

Mathematica [A] time = 0.181803, size = 80, normalized size = 1.13

$$-\frac{\sqrt{3x^2+2}}{22x+11}+\frac{4\log\left(2\sqrt{33x^2+22}-6x+8\right)}{11\sqrt{11}}-\frac{4\log(2x+1)}{11\sqrt{11}}+\frac{\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)^2*Sqrt[2 + 3*x^2]),x]
```

```
[Out] -(Sqrt[2 + 3*x^2]/(11 + 22*x)) + ArcSinh[Sqrt[3/2]*x]/Sqrt[3] - (
4*Log[1 + 2*x])/(11*Sqrt[11]) + (4*Log[8 - 6*x + 2*Sqrt[22 + 33*x
^2]])/(11*Sqrt[11])
```

Maple [A] time = 0.016, size = 65, normalized size = 0.9

$$\frac{\sqrt{3}}{3}\mathit{Arcsinh}\left(\frac{x\sqrt{6}}{2}\right)-\frac{1}{22}\sqrt{3\,(1/2+x)^2-3\,x+\frac{5}{4}}\left(\frac{1}{2}+x\right)^{-1}+\frac{4\,\sqrt{11}}{121}\mathit{Artanh}\left(\frac{(8-6\,x)\,\sqrt{11}}{11}\frac{1}{\sqrt{12\,(1/2+x)^2-12\,x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)^2/(3*x^2+2)^(1/2),x)
```

```
[Out] 1/3*arcsinh(1/2*x*6^(1/2))*3^(1/2)-1/22/(1/2+x)*(3*(1/2+x)^2-3*x+
5/4)^(1/2)+4/121*11^(1/2)*arctanh(2/11*(4-3*x)*11^(1/2)/(12*(1/2+
x)^2-12*x+5)^(1/2))
```

Maxima [A] time = 0.800481, size = 88, normalized size = 1.24

$$\frac{1}{3}\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{2}\sqrt{6}x\right)-\frac{4}{121}\sqrt{11}\,\mathrm{arsinh}\left(\frac{\sqrt{6}x}{2\,|2\,x+1|}-\frac{2\,\sqrt{6}}{3\,|2\,x+1|}\right)-\frac{\sqrt{3\,x^2+2}}{11\,(2\,x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 + 2)*(2*x + 1)^2),x, algorithm="maxima")
```

```
[Out] 1/3*sqrt(3)*arcsinh(1/2*sqrt(6)*x) - 4/121*sqrt(11)*arcsinh(1/2*s
qrt(6)*x/abs(2*x + 1) - 2/3*sqrt(6)/abs(2*x + 1)) - 1/11*sqrt(3*x
```

```
^2 + 2)/(2*x + 1)
```

Fricas [A] time = 0.277856, size = 169, normalized size = 2.38

$$\frac{\sqrt{11}\sqrt{3}\left(11\sqrt{11}(2x+1)\log\left(-\sqrt{3}(3x^2+1)-3\sqrt{3x^2+2}x\right)+4\sqrt{3}(2x+1)\log\left(-\frac{\sqrt{11}(21x^2-12x+19)-11\sqrt{3x^2+2}(3x-4)}{4x^2+4x+1}\right)-2\sqrt{1}\right.}{726(2x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 + 2)*(2*x + 1)^2),x, algorithm="fricas")
```

```
[Out] 1/726*sqrt(11)*sqrt(3)*(11*sqrt(11)*(2*x + 1)*log(-sqrt(3)*(3*x^2
 + 1) - 3*sqrt(3*x^2 + 2)*x) + 4*sqrt(3)*(2*x + 1)*log(-(sqrt(11)
*(21*x^2 - 12*x + 19) - 11*sqrt(3*x^2 + 2)*(3*x - 4))/(4*x^2 + 4*
x + 1)) - 2*sqrt(11)*sqrt(3)*sqrt(3*x^2 + 2))/(2*x + 1)
```

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

$$\int \frac{4x^2+3x+1}{(2x+1)^2\sqrt{3x^2+2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**2+3*x+1)/(1+2*x)**2/(3*x**2+2)**(1/2),x)
```

```
[Out] Integral((4*x**2 + 3*x + 1)/((2*x + 1)**2*sqrt(3*x**2 + 2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{4x^2+3x+1}{\sqrt{3x^2+2}(2x+1)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 + 2)*(2*x + 1)^2),x, algorithm="giac")
```

```
[Out] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 + 2)*(2*x + 1)^2), x)
```

3.123 $\int \frac{1+3x+4x^2}{(1+2x)^3\sqrt{2+3x^2}}\,dx$

Optimal. Leaf size=77

$$\frac{13\sqrt{3x^2+2}}{242(2x+1)}-\frac{\sqrt{3x^2+2}}{22(2x+1)^2}-\frac{103\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{121\sqrt{11}}$$

```
[Out] -Sqrt[2 + 3*x^2]/(22*(1 + 2*x)^2) + (13*Sqrt[2 + 3*x^2])/(242*(1
+ 2*x)) - (103*ArcTanh[(4 - 3*x)/(Sqrt[11]*Sqrt[2 + 3*x^2])])/(12
1*Sqrt[11])
```

Rubi [A] time = 0.151317, antiderivative size = 77, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.138

$$\frac{13\sqrt{3x^2+2}}{242(2x+1)}-\frac{\sqrt{3x^2+2}}{22(2x+1)^2}-\frac{103\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{121\sqrt{11}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)^3*Sqrt[2 + 3*x^2]),x]
```

```
[Out] -Sqrt[2 + 3*x^2]/(22*(1 + 2*x)^2) + (13*Sqrt[2 + 3*x^2])/(242*(1
+ 2*x)) - (103*ArcTanh[(4 - 3*x)/(Sqrt[11]*Sqrt[2 + 3*x^2])])/(12
1*Sqrt[11])
```

Rubi in Sympy [A] time = 14.6251, size = 66, normalized size = 0.86

$$-\frac{103\sqrt{11}\,\operatorname{atanh}\left(\frac{\sqrt{11}(-3x+4)}{11\sqrt{3x^2+2}}\right)}{1331}+\frac{13\sqrt{3x^2+2}}{242\,(2x+1)}-\frac{\sqrt{3x^2+2}}{22\,(2x+1)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)**3/(3*x**2+2)**(1/2),x)
```

```
[Out] -103*sqrt(11)*atanh(sqrt(11)*(-3*x + 4)/(11*sqrt(3*x**2 + 2)))/13
31 + 13*sqrt(3*x**2 + 2)/(242*(2*x + 1)) - sqrt(3*x**2 + 2)/(22*(
2*x + 1)**2)
```

Mathematica [A] time = 0.128394, size = 69, normalized size = 0.9

$$\frac{\frac{11\sqrt{3x^2+2}(13x+1)}{(2x+1)^2} - 103\sqrt{11}\log\left(2\sqrt{33x^2+22} - 6x + 8\right) + 103\sqrt{11}\log(2x+1)}{1331}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)^3*Sqrt[2 + 3*x^2]),x]
```

```
[Out] ((11*(1 + 13*x)*Sqrt[2 + 3*x^2])/(1 + 2*x)^2 + 103*Sqrt[11]*Log[1
 + 2*x] - 103*Sqrt[11]*Log[8 - 6*x + 2*Sqrt[22 + 33*x^2]])/1331
```

Maple [A] time = 0.015, size = 74, normalized size = 1.

$$-\frac{103\sqrt{11}}{1331}Artanh\left(\frac{(8-6x)\sqrt{11}}{11}\frac{1}{\sqrt{12(1/2+x)^2-12x+5}}\right) - \frac{1}{88}\sqrt{3(1/2+x)^2-3x+\frac{5}{4}}\left(\frac{1}{2}+x\right)^{-2} + \frac{13}{484}\sqrt{3(1/2+x)^2-3x+\frac{5}{4}}\left(\frac{1}{2}+x\right)^{-1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)^3/(3*x^2+2)^(1/2),x)
```

```
[Out] -103/1331*11^(1/2)*arctanh(2/11*(4-3*x)*11^(1/2)/(12*(1/2+x)^2-12
*x+5)^(1/2))-1/88/(1/2+x)^2*(3*(1/2+x)^2-3*x+5/4)^(1/2)+13/484/(1
/2+x)*(3*(1/2+x)^2-3*x+5/4)^(1/2)
```

Maxima [A] time = 0.795216, size = 103, normalized size = 1.34

$$\frac{103}{1331}\sqrt{11}\,\text{arsinh}\left(\frac{\sqrt{6}x}{2\,|2\,x+1|} - \frac{2\,\sqrt{6}}{3\,|2\,x+1|}\right) - \frac{\sqrt{3\,x^2+2}}{22\,(4\,x^2+4\,x+1)} + \frac{13\,\sqrt{3\,x^2+2}}{242\,(2\,x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 + 2)*(2*x + 1)^3),x, algorithm="maxima")
```

```
[Out] 103/1331*sqrt(11)*arcsinh(1/2*sqrt(6)*x/abs(2*x + 1) - 2/3*sqrt(6
)/abs(2*x + 1)) - 1/22*sqrt(3*x^2 + 2)/(4*x^2 + 4*x + 1) + 13/242
*sqrt(3*x^2 + 2)/(2*x + 1)
```

Fricas [A] time = 0.275346, size = 128, normalized size = 1.66

$$\frac{\sqrt{11}\left(2\sqrt{11}\sqrt{3x^2+2}(13x+1)+103\left(4x^2+4x+1\right)\log\left(-\frac{\sqrt{11}\left(21x^2-12x+19\right)+11\sqrt{3x^2+2}(3x-4)}{4x^2+4x+1}\right)\right)}{2662\left(4x^2+4x+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 + 2)*(2*x + 1)^3),x, algorithm="fricas")
```

```
[Out] 1/2662*sqrt(11)*(2*sqrt(11)*sqrt(3*x^2 + 2)*(13*x + 1) + 103*(4*x
^2 + 4*x + 1)*log(-(sqrt(11)*(21*x^2 - 12*x + 19) + 11*sqrt(3*x^2
 + 2)*(3*x - 4))/(4*x^2 + 4*x + 1)))/(4*x^2 + 4*x + 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((4*x**2+3*x+1)/(1+2*x)**3/(3*x**2+2)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.295726, size = 243, normalized size = 3.16

$$\frac{103}{1331}\sqrt{11}\ln\left(-\frac{\left|-2\sqrt{3}x-\sqrt{11}-\sqrt{3}+2\sqrt{3x^2+2}\right|}{2\sqrt{3}x-\sqrt{11}+\sqrt{3}-2\sqrt{3x^2+2}}\right)$$
$$+\frac{72\left(\sqrt{3}x-\sqrt{3x^2+2}\right)^3-13\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2+2}\right)^2-168\sqrt{3}x+104\sqrt{3}+168\sqrt{3x^2+2}}{484\left(\left(\sqrt{3}x-\sqrt{3x^2+2}\right)^2+\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2+2}\right)-2\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 + 2)*(2*x + 1)^3),x, algorithm="giac")
```

```
[Out] 103/1331*sqrt(11)*ln(-abs(-2*sqrt(3)*x - sqrt(11) - sqrt(3) + 2*s
qrt(3*x^2 + 2))/(2*sqrt(3)*x - sqrt(11) + sqrt(3) - 2*sqrt(3*x^2
```

```
+ 2))) + 1/484*(72*(sqrt(3)*x - sqrt(3*x^2 + 2))^3 - 13*sqrt(3)*(
sqrt(3)*x - sqrt(3*x^2 + 2))^2 - 168*sqrt(3)*x + 104*sqrt(3) + 16
8*sqrt(3*x^2 + 2))/((sqrt(3)*x - sqrt(3*x^2 + 2))^2 + sqrt(3)*(sq
rt(3)*x - sqrt(3*x^2 + 2)) - 2)^2
```

3.124 $\int \frac{(1+2x)^3(1+3x+4x^2)}{(2+3x^2)^{3/2}}\,dx$

Optimal. Leaf size=87

$$\frac{32}{27}\sqrt{3x^2+2}x^2+4\sqrt{3x^2+2}x+\frac{292}{81}\sqrt{3x^2+2}+\frac{279x+398}{54\sqrt{3x^2+2}}-\frac{38\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{3\sqrt{3}}$$

```
[Out] (398 + 279*x)/(54*Sqrt[2 + 3*x^2]) + (292*Sqrt[2 + 3*x^2])/81 + 4
*x*Sqrt[2 + 3*x^2] + (32*x^2*Sqrt[2 + 3*x^2])/27 - (38*ArcSinh[Sq
rt[3/2]*x])/(3*Sqrt[3])
```

Rubi [A] time = 0.160399, antiderivative size = 87, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.138

$$\frac{32}{27}\sqrt{3x^2+2}x^2+4\sqrt{3x^2+2}x+\frac{292}{81}\sqrt{3x^2+2}+\frac{279x+398}{54\sqrt{3x^2+2}}-\frac{38\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)^3*(1 + 3*x + 4*x^2))/(2 + 3*x^2)^(3/2),x]
```

```
[Out] (398 + 279*x)/(54*Sqrt[2 + 3*x^2]) + (292*Sqrt[2 + 3*x^2])/81 + 4
*x*Sqrt[2 + 3*x^2] + (32*x^2*Sqrt[2 + 3*x^2])/27 - (38*ArcSinh[Sq
rt[3/2]*x])/(3*Sqrt[3])
```

Rubi in Sympy [A] time = 16.9562, size = 78, normalized size = 0.9

$$-\frac{(2x+1)^3(5x+6)}{6\sqrt{3x^2+2}}+\frac{23(2x+1)^2\sqrt{3x^2+2}}{27}+\frac{(2136x+2248)\sqrt{3x^2+2}}{324}-\frac{38\sqrt{3}\operatorname{asinh}\left(\frac{\sqrt{6}x}{2}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**3*(4*x**2+3*x+1)/(3*x**2+2)**(3/2),x)
```

```
[Out] -(2*x + 1)**3*(5*x + 6)/(6*sqrt(3*x**2 + 2)) + 23*(2*x + 1)**2*sq
rt(3*x**2 + 2)/27 + (2136*x + 2248)*sqrt(3*x**2 + 2)/324 - 38*sqr
t(3)*asinh(sqrt(6)*x/2)/9
```

Mathematica [A] time = 0.099628, size = 54, normalized size = 0.62

$$\frac{1}{162}\left(\frac{576x^4+1944x^3+2136x^2+2133x+2362}{\sqrt{3x^2+2}}-684\sqrt{3}\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)^3*(1 + 3*x + 4*x^2))/(2 + 3*x^2)^(3/2),x]
```

```
[Out] ((2362 + 2133*x + 2136*x^2 + 1944*x^3 + 576*x^4)/Sqrt[2 + 3*x^2]
- 684*Sqrt[3]*ArcSinh[Sqrt[3/2]*x])/162
```

Maple [A] time = 0.017, size = 79, normalized size = 0.9

$$\frac{79\,x}{6}\frac{1}{\sqrt{3\,x^2+2}}+\frac{1181}{81}\frac{1}{\sqrt{3\,x^2+2}}-\frac{38\,\sqrt{3}}{9}Arcsinh\left(\frac{x\sqrt{6}}{2}\right)+\frac{356\,x^2}{27}\frac{1}{\sqrt{3\,x^2+2}}+12\frac{x^3}{\sqrt{3\,x^2+2}}+\frac{32\,x^4}{9}\frac{1}{\sqrt{3\,x^2+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^3*(4*x^2+3*x+1)/(3*x^2+2)^(3/2),x)
```

```
[Out] 79/6*x/(3*x^2+2)^(1/2)+1181/81/(3*x^2+2)^(1/2)-38/9*arcsinh(1/2*x
*6^(1/2))*3^(1/2)+356/27*x^2/(3*x^2+2)^(1/2)+12*x^3/(3*x^2+2)^(1/
2)+32/9*x^4/(3*x^2+2)^(1/2)
```

Maxima [A] time = 0.783072, size = 105, normalized size = 1.21

$$\frac{32\,x^4}{9\,\sqrt{3\,x^2+2}}+\frac{12\,x^3}{\sqrt{3\,x^2+2}}+\frac{356\,x^2}{27\,\sqrt{3\,x^2+2}}-\frac{38}{9}\,\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{2}\,\sqrt{6}x\right)+\frac{79\,x}{6\,\sqrt{3\,x^2+2}}+\frac{1181}{81\,\sqrt{3\,x^2+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/(3*x^2 + 2)^(3/2),x, algorithm="maxima")
```

```
[Out] 32/9*x^4/sqrt(3*x^2 + 2) + 12*x^3/sqrt(3*x^2 + 2) + 356/27*x^2/sq
rt(3*x^2 + 2) - 38/9*sqrt(3)*arcsinh(1/2*sqrt(6)*x) + 79/6*x/sqrt
(3*x^2 + 2) + 1181/81/sqrt(3*x^2 + 2)
```

Fricas [A] time = 0.270703, size = 112, normalized size = 1.29

$$\frac{\sqrt{3}\left(\sqrt{3}\left(576\,x^{4}+1944\,x^{3}+2136\,x^{2}+2133\,x+2362\right)\sqrt{3\,x^{2}+2}+1026\,\left(3\,x^{2}+2\right)\,\log\left(-\sqrt{3}\left(3\,x^{2}+1\right)+3\,\sqrt{3\,x^{2}+2}x\right)\right)}{486\,\left(3\,x^{2}+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/(3*x^2 + 2)^(3/2),x, algorithm="fricas")
```

```
[Out] 1/486*sqrt(3)*(sqrt(3)*(576*x^4 + 1944*x^3 + 2136*x^2 + 2133*x +
2362)*sqrt(3*x^2 + 2) + 1026*(3*x^2 + 2)*log(-sqrt(3)*(3*x^2 + 1)
 + 3*sqrt(3*x^2 + 2)*x))/(3*x^2 + 2)
```

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

$$\int \frac{(2x+1)^{3}\left(4x^{2}+3x+1\right)}{(3x^{2}+2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)**3*(4*x**2+3*x+1)/(3*x**2+2)**(3/2),x)
```

```
[Out] Integral((2*x + 1)**3*(4*x**2 + 3*x + 1)/(3*x**2 + 2)**(3/2), x)
```

GIAC/XCAS [A] time = 0.278039, size = 73, normalized size = 0.84

$$\frac{38}{9}\,\sqrt{3}\ln\left(-\sqrt{3}x+\sqrt{3\,x^{2}+2}\right)+\frac{3\,(8\,(3\,(8\,x+27)x+89)x+711)x+2362}{162\,\sqrt{3\,x^{2}+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/(3*x^2 + 2)^(3/2),x, algorithm="giac")
```

```
[Out] 38/9*sqrt(3)*ln(-sqrt(3)*x + sqrt(3*x^2 + 2)) + 1/162*(3*(8*(3*(8
*x + 27)*x + 89)*x + 711)*x + 2362)/sqrt(3*x^2 + 2)
```

3.125 $\int \frac{(1+2x)^2(1+3x+4x^2)}{(2+3x^2)^{3/2}} dx$

Optimal. Leaf size=71

$$\frac{70-47x}{18\sqrt{3x^2+2}}+\frac{8}{9}x\sqrt{3x^2+2}+\frac{28}{9}\sqrt{3x^2+2}+\frac{4\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{3\sqrt{3}}$$

```
[Out] (70 - 47*x)/(18*Sqrt[2 + 3*x^2]) + (28*Sqrt[2 + 3*x^2])/9 + (8*x*
Sqrt[2 + 3*x^2])/9 + (4*ArcSinh[Sqrt[3/2]*x])/(3*Sqrt[3])
```

Rubi [A] time = 0.131246, antiderivative size = 71, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.138

$$\frac{70-47x}{18\sqrt{3x^2+2}}+\frac{8}{9}x\sqrt{3x^2+2}+\frac{28}{9}\sqrt{3x^2+2}+\frac{4\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)^2*(1 + 3*x + 4*x^2))/(2 + 3*x^2)^(3/2),x]
```

```
[Out] (70 - 47*x)/(18*Sqrt[2 + 3*x^2]) + (28*Sqrt[2 + 3*x^2])/9 + (8*x*
Sqrt[2 + 3*x^2])/9 + (4*ArcSinh[Sqrt[3/2]*x])/(3*Sqrt[3])
```

Rubi in Sympy [A] time = 12.6934, size = 58, normalized size = 0.82

$$-\frac{(2x+1)^2(5x+6)}{6\sqrt{3x^2+2}}+\frac{(72x+200)\sqrt{3x^2+2}}{36}+\frac{4\sqrt{3}\operatorname{asinh}\left(\frac{\sqrt{6}x}{2}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**2*(4*x**2+3*x+1)/(3*x**2+2)**(3/2),x)
```

```
[Out] -(2*x + 1)**2*(5*x + 6)/(6*sqrt(3*x**2 + 2)) + (72*x + 200)*sqrt(
3*x**2 + 2)/36 + 4*sqrt(3)*asinh(sqrt(6)*x/2)/9
```

Mathematica [A] time = 0.0736694, size = 62, normalized size = 0.87

$$\frac{8\sqrt{3}\left(3x^2+2\right)\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)+\sqrt{3x^2+2}\left(48x^3+168x^2-15x+182\right)}{54x^2+36}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)^2*(1 + 3*x + 4*x^2))/(2 + 3*x^2)^(3/2),x]
```

```
[Out] (Sqrt[2 + 3*x^2]*(182 - 15*x + 168*x^2 + 48*x^3) + 8*Sqrt[3]*(2 +
 3*x^2)*ArcSinh[Sqrt[3/2]*x])/(36 + 54*x^2)
```

Maple [A] time = 0.009, size = 65, normalized size = 0.9

$$-\frac{5\,x}{6}\frac{1}{\sqrt{3\,x^2+2}}+\frac{91}{9}\frac{1}{\sqrt{3\,x^2+2}}+\frac{4\sqrt{3}}{9}Arcsinh\left(\frac{x\sqrt{6}}{2}\right)+\frac{28\,x^2}{3}\frac{1}{\sqrt{3\,x^2+2}}+\frac{8\,x^3}{3}\frac{1}{\sqrt{3\,x^2+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^2*(4*x^2+3*x+1)/(3*x^2+2)^(3/2),x)
```

```
[Out] -5/6*x/(3*x^2+2)^(1/2)+91/9/(3*x^2+2)^(1/2)+4/9*arcsinh(1/2*x*6^(
1/2))*3^(1/2)+28/3*x^2/(3*x^2+2)^(1/2)+8/3*x^3/(3*x^2+2)^(1/2)
```

Maxima [A] time = 0.788454, size = 86, normalized size = 1.21

$$\frac{8\,x^3}{3\,\sqrt{3\,x^2+2}}+\frac{28\,x^2}{3\,\sqrt{3\,x^2+2}}+\frac{4}{9}\,\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{2}\,\sqrt{6}x\right)-\frac{5\,x}{6\,\sqrt{3\,x^2+2}}+\frac{91}{9\,\sqrt{3\,x^2+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/(3*x^2 + 2)^(3/2),x, algorithm="maxima")
```

```
[Out] 8/3*x^3/sqrt(3*x^2 + 2) + 28/3*x^2/sqrt(3*x^2 + 2) + 4/9*sqrt(3)*
arcsinh(1/2*sqrt(6)*x) - 5/6*x/sqrt(3*x^2 + 2) + 91/9/sqrt(3*x^2
+ 2)
```

Fricas [A] time = 0.269708, size = 105, normalized size = 1.48

$$\frac{\sqrt{3}\left(\sqrt{3}\left(48\,x^{3}+168\,x^{2}-15\,x+182\right)\sqrt{3\,x^{2}+2}+12\,\left(3\,x^{2}+2\right)\,\log\left(-\sqrt{3}\left(3\,x^{2}+1\right)-3\,\sqrt{3\,x^{2}+2}x\right)\right)}{54\,\left(3\,x^{2}+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/(3*x^2 + 2)^(3/2),x, algorithm="fricas")
```

```
[Out] 1/54*sqrt(3)*(sqrt(3)*(48*x^3 + 168*x^2 - 15*x + 182)*sqrt(3*x^2
+ 2) + 12*(3*x^2 + 2)*log(-sqrt(3)*(3*x^2 + 1) - 3*sqrt(3*x^2 + 2
)*x))/(3*x^2 + 2)
```

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

$$\int \frac{(2x+1)^{2}\left(4x^{2}+3x+1\right)}{(3x^{2}+2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)**2*(4*x**2+3*x+1)/(3*x**2+2)**(3/2),x)
```

```
[Out] Integral((2*x + 1)**2*(4*x**2 + 3*x + 1)/(3*x**2 + 2)**(3/2), x)
```

GIAC/XCAS [A] time = 0.276896, size = 66, normalized size = 0.93

$$-\frac{4}{9}\,\sqrt{3}\ln\left(-\sqrt{3}x+\sqrt{3\,x^{2}+2}\right)+\frac{3\,(8\,(2\,x+7)x-5)x+182}{18\,\sqrt{3\,x^{2}+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/(3*x^2 + 2)^(3/2),x, algorithm="giac")
```

```
[Out] -4/9*sqrt(3)*ln(-sqrt(3)*x + sqrt(3*x^2 + 2)) + 1/18*(3*(8*(2*x +
 7)*x - 5)*x + 182)/sqrt(3*x^2 + 2)
```

3.126 $\int \frac{(1+2x)(1+3x+4x^2)}{(2+3x^2)^{3/2}}\,dx$

Optimal. Leaf size=55

$$\frac{2-51x}{18\sqrt{3x^2+2}}+\frac{8}{9}\sqrt{3x^2+2}+\frac{10\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{3\sqrt{3}}$$

```
[Out] (2 - 51*x)/(18*Sqrt[2 + 3*x^2]) + (8*Sqrt[2 + 3*x^2])/9 + (10*Arc
Sinh[Sqrt[3/2]*x])/(3*Sqrt[3])
```

Rubi [A] time = 0.0808447, antiderivative size = 55, 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

$$\frac{2-51x}{18\sqrt{3x^2+2}}+\frac{8}{9}\sqrt{3x^2+2}+\frac{10\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)*(1 + 3*x + 4*x^2))/(2 + 3*x^2)^(3/2),x]
```

```
[Out] (2 - 51*x)/(18*Sqrt[2 + 3*x^2]) + (8*Sqrt[2 + 3*x^2])/9 + (10*Arc
Sinh[Sqrt[3/2]*x])/(3*Sqrt[3])
```

Rubi in Sympy [A] time = 11.6311, size = 58, normalized size = 1.05

$$\frac{(-168x+488)\sqrt{3x^2+2}}{396}-\frac{(-21x+38)(2x+1)^2}{66\sqrt{3x^2+2}}+\frac{10\sqrt{3}\,\operatorname{asinh}\left(\frac{\sqrt{6}x}{2}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)*(4*x**2+3*x+1)/(3*x**2+2)**(3/2),x)
```

```
[Out] (-168*x + 488)*sqrt(3*x**2 + 2)/396 - (-21*x + 38)*(2*x + 1)**2/(
66*sqrt(3*x**2 + 2)) + 10*sqrt(3)*asinh(sqrt(6)*x/2)/9
```

Mathematica [A] time = 0.0751394, size = 44, normalized size = 0.8

$$\frac{1}{18}\left(\frac{48x^2-51x+34}{\sqrt{3x^2+2}}+20\sqrt{3}\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)*(1 + 3*x + 4*x^2))/(2 + 3*x^2)^(3/2),x]
```

```
[Out] ((34 - 51*x + 48*x^2)/Sqrt[2 + 3*x^2] + 20*Sqrt[3]*ArcSinh[Sqrt[3
/2]*x])/18
```

Maple [A] time = 0.007, size = 51, normalized size = 0.9

$$-\frac{17\,x}{6}\frac{1}{\sqrt{3\,x^2+2}}+\frac{17}{9}\frac{1}{\sqrt{3\,x^2+2}}+\frac{10\,\sqrt{3}}{9}Arcsinh\left(\frac{x\sqrt{6}}{2}\right)+\frac{8\,x^2}{3}\frac{1}{\sqrt{3\,x^2+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)*(4*x^2+3*x+1)/(3*x^2+2)^(3/2),x)
```

```
[Out] -17/6*x/(3*x^2+2)^(1/2)+17/9/(3*x^2+2)^(1/2)+10/9*arcsinh(1/2*x*6
^(1/2))*3^(1/2)+8/3*x^2/(3*x^2+2)^(1/2)
```

Maxima [A] time = 0.774521, size = 68, normalized size = 1.24

$$\frac{8\,x^2}{3\,\sqrt{3\,x^2+2}}+\frac{10}{9}\,\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{2}\,\sqrt{6}x\right)-\frac{17\,x}{6\,\sqrt{3\,x^2+2}}+\frac{17}{9\,\sqrt{3\,x^2+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(2*x + 1)/(3*x^2 + 2)^(3/2),x, algorithm="maxima")
```

```
[Out] 8/3*x^2/sqrt(3*x^2 + 2) + 10/9*sqrt(3)*arcsinh(1/2*sqrt(6)*x) - 1
7/6*x/sqrt(3*x^2 + 2) + 17/9/sqrt(3*x^2 + 2)
```

Fricas [A] time = 0.269449, size = 99, normalized size = 1.8

$$\frac{\sqrt{3}\left(\sqrt{3}\left(48\,x^2-51\,x+34\right)\sqrt{3\,x^2+2}+30\,\left(3\,x^2+2\right)\,\log\left(-\sqrt{3}\left(3\,x^2+1\right)-3\,\sqrt{3\,x^2+2}x\right)\right)}{54\,\left(3\,x^2+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)/(3*x^2 + 2)^(3/2),x, algorithm="fricas")
```

```
[Out] 1/54*sqrt(3)*(sqrt(3)*(48*x^2 - 51*x + 34)*sqrt(3*x^2 + 2) + 30*(
3*x^2 + 2)*log(-sqrt(3)*(3*x^2 + 1) - 3*sqrt(3*x^2 + 2)*x))/(3*x^
2 + 2)
```

Sympy [A] time = 26.5069, size = 114, normalized size = 2.07

$$\frac{30\sqrt{3}x^2\operatorname{asinh}\left(\frac{\sqrt{6}x}{2}\right)}{27x^2+18}+\frac{8x^2}{3\sqrt{3x^2+2}}-\frac{30x\sqrt{3x^2+2}}{27x^2+18}+\frac{x}{2\sqrt{3x^2+2}}+\frac{20\sqrt{3}\operatorname{asinh}\left(\frac{\sqrt{6}x}{2}\right)}{27x^2+18}+\frac{17}{9\sqrt{3x^2+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((1+2*x)*(4*x**2+3*x+1)/(3*x**2+2)**(3/2),x)
```

```
[Out] 30*sqrt(3)*x**2*asinh(sqrt(6)*x/2)/(27*x**2 + 18) + 8*x**2/(3*sqr
t(3*x**2 + 2)) - 30*x*sqrt(3*x**2 + 2)/(27*x**2 + 18) + x/(2*sqrt
(3*x**2 + 2)) + 20*sqrt(3)*asinh(sqrt(6)*x/2)/(27*x**2 + 18) + 17
/(9*sqrt(3*x**2 + 2))
```

GIAC/XCAS [A] time = 0.277093, size = 59, normalized size = 1.07

$$-\frac{10}{9}\sqrt{3}\ln\left(-\sqrt{3}x+\sqrt{3x^2+2}\right)+\frac{3(16x-17)x+34}{18\sqrt{3x^2+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)/(3*x^2 + 2)^(3/2),x, algorithm="giac")
```

```
[Out] -10/9*sqrt(3)*ln(-sqrt(3)*x + sqrt(3*x^2 + 2)) + 1/18*(3*(16*x -
17)*x + 34)/sqrt(3*x^2 + 2)
```

3.127 $\int \frac{1+3x+4x^2}{(1+2x)(2+3x^2)^{3/2}}\,dx$

Optimal. Leaf size=53

$$-\frac{38-21x}{66\sqrt{3x^2+2}}-\frac{2\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{11\sqrt{11}}$$

```
[Out] -(38 - 21*x)/(66*Sqrt[2 + 3*x^2]) - (2*ArcTanh[(4 - 3*x)/(Sqrt[11
]*Sqrt[2 + 3*x^2])])/(11*Sqrt[11])
```

Rubi [A] time = 0.104981, antiderivative size = 53, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.138$

$$-\frac{38-21x}{66\sqrt{3x^2+2}}-\frac{2\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{11\sqrt{11}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)*(2 + 3*x^2)^(3/2)),x]
```

```
[Out] -(38 - 21*x)/(66*Sqrt[2 + 3*x^2]) - (2*ArcTanh[(4 - 3*x)/(Sqrt[11
]*Sqrt[2 + 3*x^2])])/(11*Sqrt[11])
```

Rubi in Sympy [A] time = 12.2693, size = 49, normalized size = 0.92

$$-\frac{-21x+38}{66\sqrt{3x^2+2}}-\frac{2\sqrt{11}\,\mathrm{atanh}\left(\frac{\sqrt{11}(-3x+4)}{11\sqrt{3x^2+2}}\right)}{121}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)/(3*x**2+2)**(3/2),x)
```

```
[Out] -(-21*x + 38)/(66*sqrt(3*x**2 + 2)) - 2*sqrt(11)*atanh(sqrt(11)*(
-3*x + 4)/(11*sqrt(3*x**2 + 2)))/121
```

Mathematica [A] time = 0.0790297, size = 71, normalized size = 1.34

$$\frac{12\sqrt{33x^2+22}\log(2x+1)-12\sqrt{33x^2+22}\log\left(2\sqrt{33x^2+22}-6x+8\right)+231x-418}{726\sqrt{3x^2+2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)*(2 + 3*x^2)^(3/2)),x]
```

```
[Out] (-418 + 231*x + 12*Sqrt[22 + 33*x^2]*Log[1 + 2*x] - 12*Sqrt[22 +
33*x^2]*Log[8 - 6*x + 2*Sqrt[22 + 33*x^2]])/(726*Sqrt[2 + 3*x^2])
```

Maple [B] time = 0.012, size = 88, normalized size = 1.7

$$\frac{x}{4}\frac{1}{\sqrt{3x^2+2}}-\frac{2}{3}\frac{1}{\sqrt{3x^2+2}}+\frac{1}{11}\frac{1}{\sqrt{3(1/2+x)^2-3x+\frac{5}{4}}}+\frac{3x}{44}\frac{1}{\sqrt{3(1/2+x)^2-3x+\frac{5}{4}}}$$
$$-\frac{2\sqrt{11}}{121}\mathit{Artanh}\left(\frac{(8-6x)\sqrt{11}}{11}\frac{1}{\sqrt{12(1/2+x)^2-12x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)/(3*x^2+2)^(3/2),x)
```

```
[Out] 1/4*x/(3*x^2+2)^(1/2)-2/3/(3*x^2+2)^(1/2)+1/11/(3*(1/2+x)^2-3*x+5
/4)^(1/2)+3/44*x/(3*(1/2+x)^2-3*x+5/4)^(1/2)-2/121*11^(1/2)*arcta
nh(2/11*(4-3*x)*11^(1/2)/(12*(1/2+x)^2-12*x+5)^(1/2))
```

Maxima [A] time = 0.764047, size = 78, normalized size = 1.47

$$\frac{2}{121}\sqrt{11}\,\mathrm{arsinh}\left(\frac{\sqrt{6}x}{2\,|2x+1|}-\frac{2\sqrt{6}}{3\,|2x+1|}\right)+\frac{7x}{22\sqrt{3x^2+2}}-\frac{19}{33\sqrt{3x^2+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(3/2)*(2*x + 1)),x, algorithm="maxima")
```

```
[Out] 2/121*sqrt(11)*arcsinh(1/2*sqrt(6)*x/abs(2*x + 1) - 2/3*sqrt(6)/a
bs(2*x + 1)) + 7/22*x/sqrt(3*x^2 + 2) - 19/33/sqrt(3*x^2 + 2)
```

Fricas [A] time = 0.268289, size = 119, normalized size = 2.25

$$\frac{\sqrt{11}\left(\sqrt{11}\sqrt{3\,x^2+2}(21\,x-38)+6\left(3\,x^2+2\right)\log\left(-\frac{\sqrt{11}(21\,x^2-12\,x+19)+11\,\sqrt{3\,x^2+2}(3\,x-4)}{4\,x^2+4\,x+1}\right)\right)}{726\,(3\,x^2+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(3/2)*(2*x + 1)),x, algorithm="fricas")
```

```
[Out] 1/726*sqrt(11)*(sqrt(11)*sqrt(3*x^2 + 2)*(21*x - 38) + 6*(3*x^2 +
 2)*log(-(sqrt(11)*(21*x^2 - 12*x + 19) + 11*sqrt(3*x^2 + 2)*(3*x
 - 4))/(4*x^2 + 4*x + 1)))/(3*x^2 + 2)
```

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

$$\int \frac{4x^2+3x+1}{(2x+1)\,(3x^2+2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**2+3*x+1)/(1+2*x)/(3*x**2+2)**(3/2),x)
```

```
[Out] Integral((4*x**2 + 3*x + 1)/((2*x + 1)*(3*x**2 + 2)**(3/2)), x)
```

GIAC/XCAS [A] time = 0.293207, size = 111, normalized size = 2.09

$$\frac{2}{121}\,\sqrt{11}\ln\left(-\frac{\left|-2\,\sqrt{3}x-\sqrt{11}-\sqrt{3}+2\,\sqrt{3\,x^2+2}\right|}{2\,\sqrt{3}x-\sqrt{11}+\sqrt{3}-2\,\sqrt{3\,x^2+2}}\right)+\frac{21\,x-38}{66\,\sqrt{3\,x^2+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(3/2)*(2*x + 1)),x, algorithm="giac")
```

```
[Out] 2/121*sqrt(11)*ln(-abs(-2*sqrt(3)*x - sqrt(11) - sqrt(3) + 2*sqrt
(3*x^2 + 2))/(2*sqrt(3)*x - sqrt(11) + sqrt(3) - 2*sqrt(3*x^2 + 2
))) + 1/66*(21*x - 38)/sqrt(3*x^2 + 2)
```

3.128 $\int \frac{1+3x+4x^2}{(1+2x)^2(2+3x^2)^{3/2}}\,dx$

Optimal. Leaf size=75

$$-\frac{10-97x}{242\sqrt{3x^2+2}}-\frac{4\sqrt{3x^2+2}}{121(2x+1)}+\frac{4\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{121\sqrt{11}}$$

```
[Out] -(10 - 97*x)/(242*Sqrt[2 + 3*x^2]) - (4*Sqrt[2 + 3*x^2])/(121*(1
+ 2*x)) + (4*ArcTanh[(4 - 3*x)/(Sqrt[11]*Sqrt[2 + 3*x^2])])/(121*
Sqrt[11])
```

Rubi [A] time = 0.159797, antiderivative size = 75, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.138$

$$-\frac{10-97x}{242\sqrt{3x^2+2}}-\frac{4\sqrt{3x^2+2}}{121(2x+1)}+\frac{4\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{121\sqrt{11}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)^2*(2 + 3*x^2)^(3/2)),x]
```

```
[Out] -(10 - 97*x)/(242*Sqrt[2 + 3*x^2]) - (4*Sqrt[2 + 3*x^2])/(121*(1
+ 2*x)) + (4*ArcTanh[(4 - 3*x)/(Sqrt[11]*Sqrt[2 + 3*x^2])])/(121*
Sqrt[11])
```

Rubi in Sympy [A] time = 14.9073, size = 66, normalized size = 0.88

$$-\frac{-510x+24}{1452\sqrt{3x^2+2}}+\frac{4\sqrt{11}\,\mathrm{atanh}\left(\frac{\sqrt{11}(-3x+4)}{11\sqrt{3x^2+2}}\right)}{1331}-\frac{1}{11\,(2x+1)\,\sqrt{3x^2+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)**2/(3*x**2+2)**(3/2),x)
```

```
[Out] -(-510*x + 24)/(1452*sqrt(3*x**2 + 2)) + 4*sqrt(11)*atanh(sqrt(11
)*(-3*x + 4)/(11*sqrt(3*x**2 + 2)))/1331 - 1/(11*(2*x + 1)*sqrt(3
*x**2 + 2))
```

Mathematica [A] time = 0.158093, size = 74, normalized size = 0.99

$$\frac{\frac{11(170x^2+77x-26)}{(2x+1)\sqrt{3x^2+2}}+8\sqrt{11}\log\left(2\sqrt{33x^2+22}-6x+8\right)-8\sqrt{11}\log(2x+1)}{2662}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)^2*(2 + 3*x^2)^(3/2)),x]
```

```
[Out] ((11*(-26 + 77*x + 170*x^2))/((1 + 2*x)*Sqrt[2 + 3*x^2]) - 8*Sqrt
[11]*Log[1 + 2*x] + 8*Sqrt[11]*Log[8 - 6*x + 2*Sqrt[22 + 33*x^2]]
)/2662
```

Maple [A] time = 0.016, size = 98, normalized size = 1.3

$$\frac{x}{2}\frac{1}{\sqrt{3x^2+2}}-\frac{1}{22}\left(\frac{1}{2}+x\right)^{-1}\frac{1}{\sqrt{3\left(1/2+x\right)^2-3x+\frac{5}{4}}}-\frac{2}{121}\frac{1}{\sqrt{3\left(1/2+x\right)^2-3x+\frac{5}{4}}}-\frac{18x}{121}\frac{1}{\sqrt{3\left(1/2+x\right)^2-3x+\frac{5}{4}}}+\frac{4\sqrt{11}}{1331}\mathit{Artanh}\left(\frac{(8-6x)\sqrt{11}}{11}\frac{1}{\sqrt{12\left(1/2+x\right)^2-12x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)^2/(3*x^2+2)^(3/2),x)
```

```
[Out] 1/2*x/(3*x^2+2)^(1/2)-1/22/(1/2+x)/(3*(1/2+x)^2-3*x+5/4)^(1/2)-2/
121/(3*(1/2+x)^2-3*x+5/4)^(1/2)-18/121*x/(3*(1/2+x)^2-3*x+5/4)^(1
/2)+4/1331*11^(1/2)*arctanh(2/11*(4-3*x)*11^(1/2)/(12*(1/2+x)^2-1
2*x+5)^(1/2))
```

Maxima [A] time = 0.767245, size = 113, normalized size = 1.51

$$-\frac{4}{1331}\sqrt{11}\operatorname{arsinh}\left(\frac{\sqrt{6}x}{2\left|2x+1\right|}-\frac{2\sqrt{6}}{3\left|2x+1\right|}\right)+\frac{85x}{242\sqrt{3x^2+2}}-\frac{2}{121\sqrt{3x^2+2}}-\frac{1}{11\left(2\sqrt{3x^2+2}x+\sqrt{3x^2+2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(3/2)*(2*x + 1)^2),x, algorithm="maxima"
```

```
[Out] -4/1331*sqrt(11)*arcsinh(1/2*sqrt(6)*x/abs(2*x + 1) - 2/3*sqrt(6)
/abs(2*x + 1)) + 85/242*x/sqrt(3*x^2 + 2) - 2/121/sqrt(3*x^2 + 2)
 - 1/11/(2*sqrt(3*x^2 + 2)*x + sqrt(3*x^2 + 2))
```

Fricas [A] time = 0.270754, size = 147, normalized size = 1.96

$$\frac{\sqrt{11}\left(\sqrt{11}\left(170\,x^2+77\,x-26\right)\sqrt{3\,x^2+2}+4\left(6\,x^3+3\,x^2+4\,x+2\right)\log\left(-\frac{\sqrt{11}\left(21\,x^2-12\,x+19\right)-11\,\sqrt{3\,x^2+2}(3\,x-4)}{4\,x^2+4\,x+1}\right)\right)}{2662\left(6\,x^3+3\,x^2+4\,x+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(3/2)*(2*x + 1)^2),x, algorithm="fricas"
```

```
[Out] 1/2662*sqrt(11)*(sqrt(11)*(170*x^2 + 77*x - 26)*sqrt(3*x^2 + 2) +
 4*(6*x^3 + 3*x^2 + 4*x + 2)*log(-(sqrt(11)*(21*x^2 - 12*x + 19)
- 11*sqrt(3*x^2 + 2)*(3*x - 4))/(4*x^2 + 4*x + 1)))/(6*x^3 + 3*x^
2 + 4*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((4*x**2+3*x+1)/(1+2*x)**2/(3*x**2+2)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{4\,x^2+3\,x+1}{\left(3\,x^2+2\right)^{\frac{3}{2}}\left(2\,x+1\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(3/2)*(2*x + 1)^2),x, algorithm="giac")
```

```
[Out] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(3/2)*(2*x + 1)^2), x)
```

3.129 $\int \frac{1+3x+4x^2}{(1+2x)^3(2+3x^2)^{3/2}}\,dx$

Optimal. Leaf size=97

$$\frac{351x+358}{2662\sqrt{3x^2+2}}+\frac{2\sqrt{3x^2+2}}{1331(2x+1)}-\frac{2\sqrt{3x^2+2}}{121(2x+1)^2}-\frac{322\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{1331\sqrt{11}}$$

```
[Out] (358 + 351*x)/(2662*Sqrt[2 + 3*x^2]) - (2*Sqrt[2 + 3*x^2])/(121*(
1 + 2*x)^2) + (2*Sqrt[2 + 3*x^2])/(1331*(1 + 2*x)) - (322*ArcTanh
[(4 - 3*x)/(Sqrt[11]*Sqrt[2 + 3*x^2])])/(1331*Sqrt[11])
```

Rubi [A] time = 0.239754, antiderivative size = 97, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.172

$$\frac{351x+358}{2662\sqrt{3x^2+2}}+\frac{2\sqrt{3x^2+2}}{1331(2x+1)}-\frac{2\sqrt{3x^2+2}}{121(2x+1)^2}-\frac{322\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{1331\sqrt{11}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)^3*(2 + 3*x^2)^(3/2)),x]
```

```
[Out] (358 + 351*x)/(2662*Sqrt[2 + 3*x^2]) - (2*Sqrt[2 + 3*x^2])/(121*(
1 + 2*x)^2) + (2*Sqrt[2 + 3*x^2])/(1331*(1 + 2*x)) - (322*ArcTanh
[(4 - 3*x)/(Sqrt[11]*Sqrt[2 + 3*x^2])])/(1331*Sqrt[11])
```

Rubi in Sympy [A] time = 18.3789, size = 90, normalized size = 0.93

$$-\frac{-1092x+84}{2904\,(2x+1)\,\sqrt{3x^2+2}}-\frac{322\sqrt{11}\,\mathrm{atanh}\left(\frac{\sqrt{11}(-3x+4)}{11\sqrt{3x^2+2}}\right)}{14641}+\frac{119\sqrt{3x^2+2}}{1331\,(2x+1)}-\frac{1}{22\,(2x+1)^2\,\sqrt{3x^2+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)**3/(3*x**2+2)**(3/2),x)
```

```
[Out] -(-1092*x + 84)/(2904*(2*x + 1)*sqrt(3*x**2 + 2)) - 322*sqrt(11)*
atanh(sqrt(11)*(-3*x + 4)/(11*sqrt(3*x**2 + 2)))/14641 + 119*sqrt
(3*x**2 + 2)/(1331*(2*x + 1)) - 1/(22*(2*x + 1)**2*sqrt(3*x**2 +
2))
```

Mathematica [A] time = 0.136064, size = 79, normalized size = 0.81

$$\frac{-644\sqrt{11}\log\left(2\sqrt{33x^2+22}-6x+8\right)+\frac{11(1428x^3+2716x^2+1799x+278)}{(2x+1)^2\sqrt{3x^2+2}}+644\sqrt{11}\log(2x+1)}{29282}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)^3*(2 + 3*x^2)^(3/2)),x]
```

```
[Out] ((11*(278 + 1799*x + 2716*x^2 + 1428*x^3))/((1 + 2*x)^2*Sqrt[2 +
3*x^2]) + 644*Sqrt[11]*Log[1 + 2*x] - 644*Sqrt[11]*Log[8 - 6*x +
2*Sqrt[22 + 33*x^2]])/29282
```

Maple [A] time = 0.015, size = 107, normalized size = 1.1

$$\frac{161}{1331}\frac{1}{\sqrt{3\,(1/2+x)^2-3\,x+\frac{5}{4}}}+\frac{357\,x}{2662}\frac{1}{\sqrt{3\,(1/2+x)^2-3\,x+\frac{5}{4}}}-\frac{322\,\sqrt{11}}{14641}Artanh\left(\frac{(8-6\,x)\,\sqrt{11}}{11}\frac{1}{\sqrt{12\,(1/2+x)^2-12\,x+5}}\right)-\frac{1}{88}\left(\frac{1}{2}+x\right)^{-2}\frac{1}{\sqrt{3\,(1/2+x)^2-3\,x+\frac{5}{4}}}+\frac{7}{484}\left(\frac{1}{2}+x\right)^{-1}\frac{1}{\sqrt{3\,(1/2+x)^2-3\,x+\frac{5}{4}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)^3/(3*x^2+2)^(3/2),x)
```

```
[Out] 161/1331/(3*(1/2+x)^2-3*x+5/4)^(1/2)+357/2662*x/(3*(1/2+x)^2-3*x+
5/4)^(1/2)-322/14641*11^(1/2)*arctanh(2/11*(4-3*x)*11^(1/2)/(12*(
1/2+x)^2-12*x+5)^(1/2))-1/88/(1/2+x)^2/(3*(1/2+x)^2-3*x+5/4)^(1/2
)+7/484/(1/2+x)/(3*(1/2+x)^2-3*x+5/4)^(1/2)
```

Maxima [A] time = 0.769355, size = 167, normalized size = 1.72

$$\frac{322}{14641}\sqrt{11}\,\text{arsinh}\left(\frac{\sqrt{6}x}{2\,|2\,x+1|}-\frac{2\,\sqrt{6}}{3\,|2\,x+1|}\right)+\frac{357\,x}{2662\,\sqrt{3\,x^2+2}}+\frac{161}{1331\,\sqrt{3\,x^2+2}}-\frac{1}{22\left(4\,\sqrt{3\,x^2+2}x^2+4\,\sqrt{3\,x^2+2}x+\sqrt{3\,x^2+2}\right)}+\frac{7}{242\left(2\,\sqrt{3\,x^2+2}x+\sqrt{3\,x^2+2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(3/2)*(2*x + 1)^3),x, algorithm="maxima"
```

```
[Out] 322/14641*sqrt(11)*arcsinh(1/2*sqrt(6)*x/abs(2*x + 1) - 2/3*sqrt(
6)/abs(2*x + 1)) + 357/2662*x/sqrt(3*x^2 + 2) + 161/1331/sqrt(3*x
^2 + 2) - 1/22/(4*sqrt(3*x^2 + 2)*x^2 + 4*sqrt(3*x^2 + 2)*x + sqr
t(3*x^2 + 2)) + 7/242/(2*sqrt(3*x^2 + 2)*x + sqrt(3*x^2 + 2))
```

Fricas [A] time = 0.273114, size = 167, normalized size = 1.72

$$\frac{\sqrt{11}\left(\sqrt{11}\left(1428\,x^3+2716\,x^2+1799\,x+278\right)\sqrt{3\,x^2+2}+322\left(12\,x^4+12\,x^3+11\,x^2+8\,x+2\right)\log\left(-\frac{\sqrt{11}\left(21\,x^2-12\,x+19\right)+11\,\sqrt{3\,x^2}}{4\,x^2+4\,x+1}\right.\right.}{29282\left(12\,x^4+12\,x^3+11\,x^2+8\,x+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(3/2)*(2*x + 1)^3),x, algorithm="fricas"
```

```
[Out] 1/29282*sqrt(11)*(sqrt(11)*(1428*x^3 + 2716*x^2 + 1799*x + 278)*s
qrt(3*x^2 + 2) + 322*(12*x^4 + 12*x^3 + 11*x^2 + 8*x + 2)*log(-(s
qrt(11)*(21*x^2 - 12*x + 19) + 11*sqrt(3*x^2 + 2)*(3*x - 4))/(4*x
^2 + 4*x + 1)))/(12*x^4 + 12*x^3 + 11*x^2 + 8*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((4*x**2+3*x+1)/(1+2*x)**3/(3*x**2+2)**(3/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.29634, size = 265, normalized size = 2.73

$$\frac{322}{14641}\sqrt{11}\ln\left(-\frac{\left|-2\sqrt{3}x-\sqrt{11}-\sqrt{3}+2\sqrt{3x^2+2}\right|}{2\sqrt{3}x-\sqrt{11}+\sqrt{3}-2\sqrt{3x^2+2}}\right)+\frac{351x+358}{2662\sqrt{3x^2+2}}+\frac{36\left(\sqrt{3}x-\sqrt{3x^2+2}\right)^3-\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2+2}\right)^2+48\sqrt{3}x+8\sqrt{3}-48\sqrt{3x^2+2}}{1331\left(\left(\sqrt{3}x-\sqrt{3x^2+2}\right)^2+\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2+2}\right)-2\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(3/2)*(2*x + 1)^3),x, algorithm="giac")
```

```
[Out] 322/14641*sqrt(11)*ln(-abs(-2*sqrt(3)*x - sqrt(11) - sqrt(3) + 2*
sqrt(3*x^2 + 2))/(2*sqrt(3)*x - sqrt(11) + sqrt(3) - 2*sqrt(3*x^2
 + 2))) + 1/2662*(351*x + 358)/sqrt(3*x^2 + 2) + 1/1331*(36*(sqrt
(3)*x - sqrt(3*x^2 + 2))^3 - sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 + 2)
)^2 + 48*sqrt(3)*x + 8*sqrt(3) - 48*sqrt(3*x^2 + 2))/((sqrt(3)*x
- sqrt(3*x^2 + 2))^2 + sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 + 2)) - 2)
^2
```

3.130 $\int \frac{(1+2x)^3\left(1+3x+4x^2\right)}{\left(2+3x^2\right)^{5/2}}\,dx$

Optimal. Leaf size=73

$$\frac{279x+398}{162\left(3x^2+2\right)^{3/2}}+\frac{32}{27}\sqrt{3x^2+2}-\frac{465x+152}{54\sqrt{3x^2+2}}+\frac{8\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{\sqrt{3}}$$

```
[Out] (398 + 279*x)/(162*(2 + 3*x^2)^(3/2)) - (152 + 465*x)/(54*Sqrt[2
+ 3*x^2]) + (32*Sqrt[2 + 3*x^2])/27 + (8*ArcSinh[Sqrt[3/2]*x])/Sq
rt[3]
```

Rubi [A] time = 0.134237, antiderivative size = 73, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.103

$$\frac{279x+398}{162\left(3x^2+2\right)^{3/2}}+\frac{32}{27}\sqrt{3x^2+2}-\frac{465x+152}{54\sqrt{3x^2+2}}+\frac{8\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)^3*(1 + 3*x + 4*x^2))/(2 + 3*x^2)^(5/2),x]
```

```
[Out] (398 + 279*x)/(162*(2 + 3*x^2)^(3/2)) - (152 + 465*x)/(54*Sqrt[2
+ 3*x^2]) + (32*Sqrt[2 + 3*x^2])/27 + (8*ArcSinh[Sqrt[3/2]*x])/Sq
rt[3]
```

Rubi in Sympy [A] time = 15.7007, size = 76, normalized size = 1.04

$$-\frac{(2x+1)^3(5x+6)}{18\left(3x^2+2\right)^{\frac{3}{2}}}-\frac{(2x+1)(164x+632)}{216\sqrt{3x^2+2}}+\frac{157\sqrt{3x^2+2}}{81}+\frac{8\sqrt{3}\operatorname{asinh}\left(\frac{\sqrt{6}x}{2}\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**3*(4*x**2+3*x+1)/(3*x**2+2)**(5/2),x)
```

```
[Out] -(2*x + 1)**3*(5*x + 6)/(18*(3*x**2 + 2)**(3/2)) - (2*x + 1)*(164
*x + 632)/(216*sqrt(3*x**2 + 2)) + 157*sqrt(3*x**2 + 2)/81 + 8*sq
rt(3)*asinh(sqrt(6)*x/2)/3
```

Mathematica [A] time = 0.117315, size = 53, normalized size = 0.73

$$\frac{1728x^4 - 4185x^3 + 936x^2 - 2511x + 254}{162\left(3x^2 + 2\right)^{3/2}} + \frac{8\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)^3*(1 + 3*x + 4*x^2))/(2 + 3*x^2)^(5/2),x]
```

```
[Out] (254 - 2511*x + 936*x^2 - 4185*x^3 + 1728*x^4)/(162*(2 + 3*x^2)^(
3/2)) + (8*ArcSinh[Sqrt[3/2]*x])/Sqrt[3]
```

Maple [A] time = 0.018, size = 91, normalized size = 1.3

$$-\frac{65\,x}{18}\left(3\,x^2+2\right)^{-\frac{3}{2}} - \frac{107\,x}{18}\frac{1}{\sqrt{3\,x^2+2}} + \frac{127}{81}\left(3\,x^2+2\right)^{-\frac{3}{2}} + \frac{52\,x^2}{9}\left(3\,x^2+2\right)^{-\frac{3}{2}} - 8\,\frac{x^3}{\left(3\,x^2+2\right)^{3/2}} + \frac{8\sqrt{3}}{3}Arcsinh\left(\frac{x\sqrt{6}}{2}\right) + \frac{32\,x^4}{3}\left(3\,x^2+2\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^3*(4*x^2+3*x+1)/(3*x^2+2)^(5/2),x)
```

```
[Out] -65/18*x/(3*x^2+2)^(3/2)-107/18*x/(3*x^2+2)^(1/2)+127/81/(3*x^2+2
)^(3/2)+52/9*x^2/(3*x^2+2)^(3/2)-8*x^3/(3*x^2+2)^(3/2)+8/3*arcsin
h(1/2*x*6^(1/2))*3^(1/2)+32/3*x^4/(3*x^2+2)^(3/2)
```

Maxima [A] time = 0.776631, size = 142, normalized size = 1.95

$$\frac{32\,x^4}{3\left(3\,x^2+2\right)^{\frac{3}{2}}} - \frac{8}{3}\,x\left(\frac{9\,x^2}{\left(3\,x^2+2\right)^{\frac{3}{2}}} + \frac{4}{\left(3\,x^2+2\right)^{\frac{3}{2}}}\right) + \frac{8}{3}\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{2}\sqrt{6}x\right) - \frac{11\,x}{18\sqrt{3\,x^2+2}} + \frac{52\,x^2}{9\left(3\,x^2+2\right)^{\frac{3}{2}}} - \frac{65\,x}{18\left(3\,x^2+2\right)^{\frac{3}{2}}} + \frac{127}{81\left(3\,x^2+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/(3*x^2 + 2)^(5/2),x, algorithm="maxima")
```

```
[Out] 32/3*x^4/(3*x^2 + 2)^(3/2) - 8/3*x*(9*x^2/(3*x^2 + 2)^(3/2) + 4/(
3*x^2 + 2)^(3/2)) + 8/3*sqrt(3)*arcsinh(1/2*sqrt(6)*x) - 11/18*x/
sqrt(3*x^2 + 2) + 52/9*x^2/(3*x^2 + 2)^(3/2) - 65/18*x/(3*x^2 + 2
)^(3/2) + 127/81/(3*x^2 + 2)^(3/2)
```

Fricas [A] time = 0.268462, size = 126, normalized size = 1.73

$$\frac{\sqrt{3}\left(\sqrt{3}\left(1728\,x^4-4185\,x^3+936\,x^2-2511\,x+254\right)\sqrt{3\,x^2+2}+648\left(9\,x^4+12\,x^2+4\right)\log\left(-\sqrt{3}\left(3\,x^2+1\right)-3\,\sqrt{3\,x^2+2}x\right)\right)}{486\left(9\,x^4+12\,x^2+4\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/(3*x^2 + 2)^(5/2),x, algorithm="fricas")
```

```
[Out] 1/486*sqrt(3)*(sqrt(3)*(1728*x^4 - 4185*x^3 + 936*x^2 - 2511*x +
254)*sqrt(3*x^2 + 2) + 648*(9*x^4 + 12*x^2 + 4)*log(-sqrt(3)*(3*x
^2 + 1) - 3*sqrt(3*x^2 + 2)*x))/(9*x^4 + 12*x^2 + 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+2*x)**3*(4*x**2+3*x+1)/(3*x**2+2)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.277581, size = 72, normalized size = 0.99

$$-\frac{8}{3}\,\sqrt{3}\ln\left(-\sqrt{3}x+\sqrt{3\,x^2+2}\right)+\frac{9\left(\left(3\left(64\,x-155\right)x+104\right)x-279\right)x+254}{162\left(3\,x^2+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/(3*x^2 + 2)^(5/2),x, algorithm="giac")
```

```
[Out] -8/3*sqrt(3)*ln(-sqrt(3)*x + sqrt(3*x^2 + 2)) + 1/162*(9*((3*(64*
x - 155)*x + 104)*x - 279)*x + 254)/(3*x^2 + 2)^(3/2)
```

3.131 $\int \frac{(1+2x)^2(1+3x+4x^2)}{(2+3x^2)^{5/2}}\, dx$

Optimal. Leaf size=60

$$\frac{70-47x}{54\left(3x^2+2\right)^{3/2}}-\frac{59x+168}{54\sqrt{3x^2+2}}+\frac{16\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{9\sqrt{3}}$$

```
[Out] (70 - 47*x)/(54*(2 + 3*x^2)^(3/2)) - (168 + 59*x)/(54*Sqrt[2 + 3*
x^2]) + (16*ArcSinh[Sqrt[3/2]*x])/(9*Sqrt[3])
```

Rubi [A] time = 0.106611, antiderivative size = 60, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 3, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.103

$$\frac{70-47x}{54\left(3x^2+2\right)^{3/2}}-\frac{59x+168}{54\sqrt{3x^2+2}}+\frac{16\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)}{9\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)^2*(1 + 3*x + 4*x^2))/(2 + 3*x^2)^(5/2),x]
```

```
[Out] (70 - 47*x)/(54*(2 + 3*x^2)^(3/2)) - (168 + 59*x)/(54*Sqrt[2 + 3*
x^2]) + (16*ArcSinh[Sqrt[3/2]*x])/(9*Sqrt[3])
```

Rubi in Sympy [A] time = 12.6482, size = 58, normalized size = 0.97

$$-\frac{(2x+1)^2(5x+6)}{18\left(3x^2+2\right)^{\frac{3}{2}}}-\frac{78x+248}{108\sqrt{3x^2+2}}+\frac{16\sqrt{3}\operatorname{asinh}\left(\frac{\sqrt{6}x}{2}\right)}{27}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**2*(4*x**2+3*x+1)/(3*x**2+2)**(5/2),x)
```

```
[Out] -(2*x + 1)**2*(5*x + 6)/(18*(3*x**2 + 2)**(3/2)) - (78*x + 248)/(
108*sqrt(3*x**2 + 2)) + 16*sqrt(3)*asinh(sqrt(6)*x/2)/27
```

Mathematica [A] time = 0.114997, size = 50, normalized size = 0.83

$$\frac{1}{54}\left(32\sqrt{3}\sinh^{-1}\left(\sqrt{\frac{3}{2}}x\right)-\frac{177x^3+504x^2+165x+266}{(3x^2+2)^{3/2}}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)^2*(1 + 3*x + 4*x^2))/(2 + 3*x^2)^(5/2),x]
```

```
[Out] (-((266 + 165*x + 504*x^2 + 177*x^3)/(2 + 3*x^2)^(3/2)) + 32*Sqrt
[3]*ArcSinh[Sqrt[3/2]*x])/54
```

Maple [A] time = 0.01, size = 77, normalized size = 1.3

$$-\frac{37\,x}{18}\left(3\,x^2+2\right)^{-\frac{3}{2}}-\frac{x}{2}\frac{1}{\sqrt{3\,x^2+2}}-\frac{133}{27}\left(3\,x^2+2\right)^{-\frac{3}{2}}-\frac{28\,x^2}{3}\left(3\,x^2+2\right)^{-\frac{3}{2}}-\frac{16\,x^3}{9}\left(3\,x^2+2\right)^{-\frac{3}{2}}+\frac{16\,\sqrt{3}}{27}Arcsinh\left(\frac{x\sqrt{6}}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^2*(4*x^2+3*x+1)/(3*x^2+2)^(5/2),x)
```

```
[Out] -37/18*x/(3*x^2+2)^(3/2)-1/2*x/(3*x^2+2)^(1/2)-133/27/(3*x^2+2)^(
3/2)-28/3*x^2/(3*x^2+2)^(3/2)-16/9*x^3/(3*x^2+2)^(3/2)+16/27*arcs
inh(1/2*x*6^(1/2))*3^(1/2)
```

Maxima [A] time = 0.766082, size = 123, normalized size = 2.05

$$-\frac{16}{27}\,x\left(\frac{9\,x^2}{(3\,x^2+2)^{\frac{3}{2}}}+\frac{4}{(3\,x^2+2)^{\frac{3}{2}}}\right)+\frac{16}{27}\,\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{2}\,\sqrt{6}x\right)+\frac{37\,x}{54\,\sqrt{3\,x^2+2}}-\frac{28\,x^2}{3\,(3\,x^2+2)^{\frac{3}{2}}}-\frac{37\,x}{18\,(3\,x^2+2)^{\frac{3}{2}}}-\frac{133}{27\,(3\,x^2+2)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/(3*x^2 + 2)^(5/2),x, algorithm="maxima")
```

```
[Out] -16/27*x*(9*x^2/(3*x^2 + 2)^(3/2) + 4/(3*x^2 + 2)^(3/2)) + 16/27*
sqrt(3)*arcsinh(1/2*sqrt(6)*x) + 37/54*x/sqrt(3*x^2 + 2) - 28/3*x
```

```
^2/(3*x^2 + 2)^(3/2) - 37/18*x/(3*x^2 + 2)^(3/2) - 133/27/(3*x^2
+ 2)^(3/2)
```

Fricas [A] time = 0.269594, size = 119, normalized size = 1.98

$$-\frac{\sqrt{3}\left(\sqrt{3}\left(177\,x^3+504\,x^2+165\,x+266\right)\sqrt{3\,x^2+2}-48\left(9\,x^4+12\,x^2+4\right)\log\left(-\sqrt{3}\left(3\,x^2+1\right)-3\,\sqrt{3\,x^2+2}x\right)\right)}{162\left(9\,x^4+12\,x^2+4\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/(3*x^2 + 2)^(5/2),x, algorithm="fricas")
```

```
[Out] -1/162*sqrt(3)*(sqrt(3)*(177*x^3 + 504*x^2 + 165*x + 266)*sqrt(3*
x^2 + 2) - 48*(9*x^4 + 12*x^2 + 4)*log(-sqrt(3)*(3*x^2 + 1) - 3*s
qrt(3*x^2 + 2)*x))/(9*x^4 + 12*x^2 + 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+2*x)**2*(4*x**2+3*x+1)/(3*x**2+2)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.276219, size = 65, normalized size = 1.08

$$-\frac{16}{27}\,\sqrt{3}\ln\left(-\sqrt{3}x+\sqrt{3\,x^2+2}\right)-\frac{3\,((59\,x+168)x+55)x+266}{54\left(3\,x^2+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/(3*x^2 + 2)^(5/2),x, algorithm="giac")
```

```
[Out] -16/27*sqrt(3)*ln(-sqrt(3)*x + sqrt(3*x^2 + 2)) - 1/54*(3*((59*x
+ 168)*x + 55)*x + 266)/(3*x^2 + 2)^(3/2)
```

3.132 $\int \frac{(1+2x)(1+3x+4x^2)}{(2+3x^2)^{5/2}}\,dx$

Optimal. Leaf size=41

$$\frac{2-51x}{54\left(3x^2+2\right)^{3/2}}-\frac{16-13x}{18\sqrt{3x^2+2}}$$

```
[Out] (2 - 51*x)/(54*(2 + 3*x^2)^(3/2)) - (16 - 13*x)/(18*Sqrt[2 + 3*x^
2])
```

Rubi [A] time = 0.0722816, antiderivative size = 41, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.074$

$$\frac{2-51x}{54\left(3x^2+2\right)^{3/2}}-\frac{16-13x}{18\sqrt{3x^2+2}}$$

Antiderivative was successfully verified.

```
[In] Int[((1 + 2*x)*(1 + 3*x + 4*x^2))/(2 + 3*x^2)^(5/2),x]
```

```
[Out] (2 - 51*x)/(54*(2 + 3*x^2)^(3/2)) - (16 - 13*x)/(18*Sqrt[2 + 3*x^
2])
```

Rubi in Sympy [A] time = 9.99022, size = 41, normalized size = 1.

$$-\frac{(-21x+38)(2x+1)^2}{198\left(3x^2+2\right)^{\frac{3}{2}}}-\frac{115(-3x+4)}{594\sqrt{3x^2+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((1+2*x)*(4*x**2+3*x+1)/(3*x**2+2)**(5/2),x)
```

```
[Out] -(-21*x + 38)*(2*x + 1)**2/(198*(3*x**2 + 2)**(3/2)) - 115*(-3*x
+ 4)/(594*sqrt(3*x**2 + 2))
```

Mathematica [A] time = 0.0282734, size = 30, normalized size = 0.73

$$\frac{117x^3-144x^2+27x-94}{54\left(3x^2+2\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)*(1 + 3*x + 4*x^2))/(2 + 3*x^2)^(5/2),x]
```

```
[Out] (-94 + 27*x - 144*x^2 + 117*x^3)/(54*(2 + 3*x^2)^(3/2))
```

Maple [A]   time = 0.006, size = 27, normalized size = 0.7

$$\frac{117\,x^{3}-144\,x^{2}+27\,x-94}{54}\left(3\,x^{2}+2\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)*(4*x^2+3*x+1)/(3*x^2+2)^(5/2),x)
```

```
[Out] 1/54*(117*x^3-144*x^2+27*x-94)/(3*x^2+2)^(3/2)
```

Maxima [A]   time = 0.691743, size = 68, normalized size = 1.66

$$\frac{13\,x}{18\,\sqrt{3\,x^{2}+2}}-\frac{8\,x^{2}}{3\,\left(3\,x^{2}+2\right)^{\frac{3}{2}}}-\frac{17\,x}{18\,\left(3\,x^{2}+2\right)^{\frac{3}{2}}}-\frac{47}{27\,\left(3\,x^{2}+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)/(3*x^2 + 2)^(5/2),x, algorithm="maxima")
```

```
[Out] 13/18*x/sqrt(3*x^2 + 2) - 8/3*x^2/(3*x^2 + 2)^(3/2) - 17/18*x/(3*
x^2 + 2)^(3/2) - 47/27/(3*x^2 + 2)^(3/2)
```

Fricas [A]   time = 0.268543, size = 54, normalized size = 1.32

$$\frac{\left(117\,x^{3}-144\,x^{2}+27\,x-94\right)\sqrt{3\,x^{2}+2}}{54\,\left(9\,x^{4}+12\,x^{2}+4\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)/(3*x^2 + 2)^(5/2),x, algorithm="fricas")
```

```
[Out] 1/54*(117*x^3 - 144*x^2 + 27*x - 94)*sqrt(3*x^2 + 2)/(9*x^4 + 12*
x^2 + 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+2*x)*(4*x**2+3*x+1)/(3*x**2+2)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.277374, size = 34, normalized size = 0.83

$$\frac{9\left((13\,x-16)x+3\right)x-94}{54\left(3\,x^2+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)/(3*x^2 + 2)^(5/2),x, algorithm="giac")
```

```
[Out] 1/54*(9*((13*x - 16)*x + 3)*x - 94)/(3*x^2 + 2)^(3/2)
```

3.133 $\int \frac{1+3x+4x^2}{(1+2x)(2+3x^2)^{5/2}}\,dx$

Optimal. Leaf size=73

$$-\frac{38-21x}{198\left(3x^2+2\right)^{3/2}}+\frac{95x+24}{726\sqrt{3x^2+2}}-\frac{8\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{121\sqrt{11}}$$

```
[Out] -(38 - 21*x)/(198*(2 + 3*x^2)^(3/2)) + (24 + 95*x)/(726*Sqrt[2 +
3*x^2]) - (8*ArcTanh[(4 - 3*x)/(Sqrt[11]*Sqrt[2 + 3*x^2])])/(121*
Sqrt[11])
```

Rubi [A] time = 0.159137, antiderivative size = 73, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.172

$$-\frac{38-21x}{198\left(3x^2+2\right)^{3/2}}+\frac{95x+24}{726\sqrt{3x^2+2}}-\frac{8\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{121\sqrt{11}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)*(2 + 3*x^2)^(5/2)),x]
```

```
[Out] -(38 - 21*x)/(198*(2 + 3*x^2)^(3/2)) + (24 + 95*x)/(726*Sqrt[2 +
3*x^2]) - (8*ArcTanh[(4 - 3*x)/(Sqrt[11]*Sqrt[2 + 3*x^2])])/(121*
Sqrt[11])
```

Rubi in Sympy [A] time = 15.3316, size = 65, normalized size = 0.89

$$-\frac{-21x+38}{198\left(3x^2+2\right)^{\frac{3}{2}}}+\frac{1710x+432}{13068\sqrt{3x^2+2}}-\frac{8\sqrt{11}\operatorname{atanh}\left(\frac{\sqrt{11}(-3x+4)}{11\sqrt{3x^2+2}}\right)}{1331}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)/(3*x**2+2)**(5/2),x)
```

```
[Out] -(-21*x + 38)/(198*(3*x**2 + 2)**(3/2)) + (1710*x + 432)/(13068*s
qrt(3*x**2 + 2)) - 8*sqrt(11)*atanh(sqrt(11)*(-3*x + 4)/(11*sqrt(
3*x**2 + 2)))/1331
```

Mathematica [A] time = 0.234135, size = 72, normalized size = 0.99

$$\frac{-144\sqrt{11}\log\left(2\sqrt{33x^2+22}-6x+8\right)+\frac{11(855x^3+216x^2+801x-274)}{(3x^2+2)^{3/2}}+144\sqrt{11}\log(2x+1)}{23958}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)*(2 + 3*x^2)^(5/2)),x]
```

```
[Out] ((11*(-274 + 801*x + 216*x^2 + 855*x^3))/(2 + 3*x^2)^(3/2) + 144*
Sqrt[11]*Log[1 + 2*x] - 144*Sqrt[11]*Log[8 - 6*x + 2*Sqrt[22 + 33
*x^2]])/23958
```

Maple [B] time = 0.012, size = 133, normalized size = 1.8

$$\frac{x}{12}\left(3x^2+2\right)^{-\frac{3}{2}}+\frac{x}{12}\frac{1}{\sqrt{3x^2+2}}-\frac{2}{9}\left(3x^2+2\right)^{-\frac{3}{2}}+\frac{1}{33}\left(3\,(1/2+x)^2-3x+\frac{5}{4}\right)^{-\frac{3}{2}}$$
$$+\frac{x}{44}\left(3\,(1/2+x)^2-3x+\frac{5}{4}\right)^{-\frac{3}{2}}+\frac{23x}{484}\frac{1}{\sqrt{3\,(1/2+x)^2-3x+\frac{5}{4}}}$$
$$+\frac{4}{121}\frac{1}{\sqrt{3\,(1/2+x)^2-3x+\frac{5}{4}}}-\frac{8\sqrt{11}}{1331}Artanh\left(\frac{(8-6x)\sqrt{11}}{11}\frac{1}{\sqrt{12\,(1/2+x)^2-12x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)/(3*x^2+2)^(5/2),x)
```

```
[Out] 1/12*x/(3*x^2+2)^(3/2)+1/12*x/(3*x^2+2)^(1/2)-2/9/(3*x^2+2)^(3/2)
+1/33/(3*(1/2+x)^2-3*x+5/4)^(3/2)+1/44*x/(3*(1/2+x)^2-3*x+5/4)^(3
/2)+23/484*x/(3*(1/2+x)^2-3*x+5/4)^(1/2)+4/121/(3*(1/2+x)^2-3*x+5
/4)^(1/2)-8/1331*11^(1/2)*arctanh(2/11*(4-3*x)*11^(1/2)/(12*(1/2+
x)^2-12*x+5)^(1/2))
```

Maxima [A] time = 0.774382, size = 109, normalized size = 1.49

$$\frac{8}{1331}\sqrt{11}\,\mathrm{arsinh}\left(\frac{\sqrt{6}x}{2\,|2x+1|}-\frac{2\sqrt{6}}{3\,|2x+1|}\right)+\frac{95x}{726\sqrt{3x^2+2}}+\frac{4}{121\sqrt{3x^2+2}}+\frac{7x}{66\,(3x^2+2)^{\frac{3}{2}}}-\frac{19}{99\,(3x^2+2)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(5/2)*(2*x + 1)),x, algorithm="maxima")
```

```
[Out] 8/1331*sqrt(11)*arcsinh(1/2*sqrt(6)*x/abs(2*x + 1) - 2/3*sqrt(6)/
abs(2*x + 1)) + 95/726*x/sqrt(3*x^2 + 2) + 4/121/sqrt(3*x^2 + 2)
+ 7/66*x/(3*x^2 + 2)^(3/2) - 19/99/(3*x^2 + 2)^(3/2)
```

Fricas [A] time = 0.27313, size = 146, normalized size = 2.

$$\frac{\sqrt{11}\left(\sqrt{11}\left(855\,x^3+216\,x^2+801\,x-274\right)\sqrt{3\,x^2+2}+72\left(9\,x^4+12\,x^2+4\right)\log\left(-\frac{\sqrt{11}\left(21\,x^2-12\,x+19\right)+11\,\sqrt{3\,x^2+2}(3\,x-4)}{4\,x^2+4\,x+1}\right)\right)}{23958\left(9\,x^4+12\,x^2+4\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(5/2)*(2*x + 1)),x, algorithm="fricas")
```

```
[Out] 1/23958*sqrt(11)*(sqrt(11)*(855*x^3 + 216*x^2 + 801*x - 274)*sqrt
(3*x^2 + 2) + 72*(9*x^4 + 12*x^2 + 4)*log(-(sqrt(11)*(21*x^2 - 12
*x + 19) + 11*sqrt(3*x^2 + 2)*(3*x - 4))/(4*x^2 + 4*x + 1)))/(9*x
^4 + 12*x^2 + 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((4*x**2+3*x+1)/(1+2*x)/(3*x**2+2)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.294342, size = 123, normalized size = 1.68

$$\frac{8}{1331}\,\sqrt{11}\ln\left(-\frac{\left|-2\,\sqrt{3}x-\sqrt{11}-\sqrt{3}+2\,\sqrt{3\,x^2+2}\right|}{2\,\sqrt{3}x-\sqrt{11}+\sqrt{3}-2\,\sqrt{3\,x^2+2}}\right)+\frac{9\left((95\,x+24)x+89\right)x-274}{2178\left(3\,x^2+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(5/2)*(2*x + 1)),x, algorithm="giac")
```

```
[Out] 8/1331*sqrt(11)*ln(-abs(-2*sqrt(3)*x - sqrt(11) - sqrt(3) + 2*sqr
t(3*x^2 + 2))/(2*sqrt(3)*x - sqrt(11) + sqrt(3) - 2*sqrt(3*x^2 +
2))) + 1/2178*(9*((95*x + 24)*x + 89)*x - 274)/(3*x^2 + 2)^(3/2)
```

3.134 $\int \frac{1+3x+4x^2}{(1+2x)^2(2+3x^2)^{5/2}}\, dx$

Optimal. Leaf size=95

$$-\frac{10-97x}{726\left(3x^2+2\right)^{3/2}}-\frac{16\sqrt{3x^2+2}}{1331(2x+1)}+\frac{887x+24}{7986\sqrt{3x^2+2}}-\frac{32\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{1331\sqrt{11}}$$

```
[Out] -(10 - 97*x)/(726*(2 + 3*x^2)^(3/2)) + (24 + 887*x)/(7986*Sqrt[2
+ 3*x^2]) - (16*Sqrt[2 + 3*x^2])/(1331*(1 + 2*x)) - (32*ArcTanh[(
4 - 3*x)/(Sqrt[11]*Sqrt[2 + 3*x^2])])/(1331*Sqrt[11])
```

Rubi [A] time = 0.24137, antiderivative size = 95, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.138

$$-\frac{10-97x}{726\left(3x^2+2\right)^{3/2}}-\frac{16\sqrt{3x^2+2}}{1331(2x+1)}+\frac{887x+24}{7986\sqrt{3x^2+2}}-\frac{32\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{1331\sqrt{11}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)^2*(2 + 3*x^2)^(5/2)),x]
```

```
[Out] -(10 - 97*x)/(726*(2 + 3*x^2)^(3/2)) + (24 + 887*x)/(7986*Sqrt[2
+ 3*x^2]) - (16*Sqrt[2 + 3*x^2])/(1331*(1 + 2*x)) - (32*ArcTanh[(
4 - 3*x)/(Sqrt[11]*Sqrt[2 + 3*x^2])])/(1331*Sqrt[11])
```

Rubi in Sympy [A] time = 19.3341, size = 83, normalized size = 0.87

$$\frac{366x+48}{4356\left(3x^2+2\right)^{\frac{3}{2}}}+\frac{26748x+3456}{287496\sqrt{3x^2+2}}-\frac{32\sqrt{11}\operatorname{atanh}\left(\frac{\sqrt{11}(-3x+4)}{11\sqrt{3x^2+2}}\right)}{14641}-\frac{1}{11\left(2x+1\right)\left(3x^2+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)**2/(3*x**2+2)**(5/2),x)
```

```
[Out] (366*x + 48)/(4356*(3*x**2 + 2)**(3/2)) + (26748*x + 3456)/(28749
6*sqrt(3*x**2 + 2)) - 32*sqrt(11)*atanh(sqrt(11)*(-3*x + 4)/(11*s
qrt(3*x**2 + 2)))/14641 - 1/(11*(2*x + 1)*(3*x**2 + 2)**(3/2))
```

Mathematica [A] time = 0.173276, size = 84, normalized size = 0.88

$$\frac{-192\sqrt{11}\log\left(2\sqrt{33x^2+22}-6x+8\right)+\frac{11(4458x^4+2805x^3+4602x^2+2717x-446)}{(2x+1)(3x^2+2)^{3/2}}+192\sqrt{11}\log(2x+1)}{87846}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)^2*(2 + 3*x^2)^(5/2)),x]
```

```
[Out] ((11*(-446 + 2717*x + 4602*x^2 + 2805*x^3 + 4458*x^4))/((1 + 2*x)
*(2 + 3*x^2)^(3/2)) + 192*Sqrt[11]*Log[1 + 2*x] - 192*Sqrt[11]*Lo
g[8 - 6*x + 2*Sqrt[22 + 33*x^2]])/87846
```

Maple [A] time = 0.017, size = 143, normalized size = 1.5

$$\frac{x}{6}\left(3x^2+2\right)^{-\frac{3}{2}}+\frac{x}{6}\frac{1}{\sqrt{3x^2+2}}-\frac{1}{22}\left(\frac{1}{2}+x\right)^{-1}\left(3\,(1/2+x)^2-3x+\frac{5}{4}\right)^{-\frac{3}{2}}$$
$$+\frac{4}{363}\left(3\,(1/2+x)^2-3x+\frac{5}{4}\right)^{-\frac{3}{2}}-\frac{10x}{121}\left(3\,(1/2+x)^2-3x+\frac{5}{4}\right)^{-\frac{3}{2}}-\frac{98x}{1331}\frac{1}{\sqrt{3\,(1/2+x)^2-3x+\frac{5}{4}}}$$
$$+\frac{16}{1331}\frac{1}{\sqrt{3\,(1/2+x)^2-3x+\frac{5}{4}}}-\frac{32\sqrt{11}}{14641}Artanh\left(\frac{(8-6x)\sqrt{11}}{11}\frac{1}{\sqrt{12\,(1/2+x)^2-12x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)^2/(3*x^2+2)^(5/2),x)
```

```
[Out] 1/6*x/(3*x^2+2)^(3/2)+1/6*x/(3*x^2+2)^(1/2)-1/22/(1/2+x)/(3*(1/2+
x)^2-3*x+5/4)^(3/2)+4/363/(3*(1/2+x)^2-3*x+5/4)^(3/2)-10/121*x/(3
*(1/2+x)^2-3*x+5/4)^(3/2)-98/1331*x/(3*(1/2+x)^2-3*x+5/4)^(1/2)+1
6/1331/(3*(1/2+x)^2-3*x+5/4)^(1/2)-32/14641*11^(1/2)*arctanh(2/11
*(4-3*x)*11^(1/2)/(12*(1/2+x)^2-12*x+5)^(1/2))
```

Maxima [A] time = 0.774608, size = 144, normalized size = 1.52

$$\frac{32}{14641}\sqrt{11}\,\mathrm{arsinh}\left(\frac{\sqrt{6}x}{2\,|2x+1|}-\frac{2\sqrt{6}}{3\,|2x+1|}\right)+\frac{743x}{7986\sqrt{3x^2+2}}+\frac{16}{1331\sqrt{3x^2+2}}$$
$$+\frac{61x}{726\left(3x^2+2\right)^{\frac{3}{2}}}-\frac{1}{11\left(2\left(3x^2+2\right)^{\frac{3}{2}}x+\left(3x^2+2\right)^{\frac{3}{2}}\right)}+\frac{4}{363\left(3x^2+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(5/2)*(2*x + 1)^2),x, algorithm="maxima"
```

```
[Out] 32/14641*sqrt(11)*arcsinh(1/2*sqrt(6)*x/abs(2*x + 1) - 2/3*sqrt(6
)/abs(2*x + 1)) + 743/7986*x/sqrt(3*x^2 + 2) + 16/1331/sqrt(3*x^2
 + 2) + 61/726*x/(3*x^2 + 2)^(3/2) - 1/11/(2*(3*x^2 + 2)^(3/2)*x
+ (3*x^2 + 2)^(3/2)) + 4/363/(3*x^2 + 2)^(3/2)
```

Fricas [A] time = 0.272284, size = 188, normalized size = 1.98

$$\frac{\sqrt{11}\left(\sqrt{11}\left(4458\,x^4+2805\,x^3+4602\,x^2+2717\,x-446\right)\sqrt{3\,x^2+2}+96\left(18\,x^5+9\,x^4+24\,x^3+12\,x^2+8\,x+4\right)\log\left(-\frac{\sqrt{11}(21\,x^2}{}\right.\right.}{87846\left(18\,x^5+9\,x^4+24\,x^3+12\,x^2+8\,x+4\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(5/2)*(2*x + 1)^2),x, algorithm="fricas"
```

```
[Out] 1/87846*sqrt(11)*(sqrt(11)*(4458*x^4 + 2805*x^3 + 4602*x^2 + 2717
*x - 446)*sqrt(3*x^2 + 2) + 96*(18*x^5 + 9*x^4 + 24*x^3 + 12*x^2
+ 8*x + 4)*log(-(sqrt(11)*(21*x^2 - 12*x + 19) + 11*sqrt(3*x^2 +
2)*(3*x - 4))/(4*x^2 + 4*x + 1)))/(18*x^5 + 9*x^4 + 24*x^3 + 12*x
^2 + 8*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((4*x**2+3*x+1)/(1+2*x)**2/(3*x**2+2)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{4\,x^2+3\,x+1}{(3\,x^2+2)^{\frac{5}{2}}(2\,x+1)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(5/2)*(2*x + 1)^2),x, algorithm="giac")
```

```
[Out] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(5/2)*(2*x + 1)^2), x)
```

3.135 $\int \frac{1+3x+4x^2}{(1+2x)^3(2+3x^2)^{5/2}}\,dx$

Optimal. Leaf size=117

$$\frac{351x+358}{7986\left(3x^2+2\right)^{3/2}}-\frac{8\sqrt{3x^2+2}}{1331(2x+1)}-\frac{8\sqrt{3x^2+2}}{1331(2x+1)^2}+\frac{2133x+1216}{29282\sqrt{3x^2+2}}-\frac{1216\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{14641\sqrt{11}}$$

```
[Out] (358 + 351*x)/(7986*(2 + 3*x^2)^(3/2)) + (1216 + 2133*x)/(29282*S
qrt[2 + 3*x^2]) - (8*Sqrt[2 + 3*x^2])/(1331*(1 + 2*x)^2) - (8*Sqr
t[2 + 3*x^2])/(1331*(1 + 2*x)) - (1216*ArcTanh[(4 - 3*x)/(Sqrt[11
]*Sqrt[2 + 3*x^2])])/(14641*Sqrt[11])
```

Rubi [A] time = 0.324673, antiderivative size = 117, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.172

$$\frac{351x+358}{7986\left(3x^2+2\right)^{3/2}}-\frac{8\sqrt{3x^2+2}}{1331(2x+1)}-\frac{8\sqrt{3x^2+2}}{1331(2x+1)^2}+\frac{2133x+1216}{29282\sqrt{3x^2+2}}-\frac{1216\tanh^{-1}\left(\frac{4-3x}{\sqrt{11}\sqrt{3x^2+2}}\right)}{14641\sqrt{11}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)^3*(2 + 3*x^2)^(5/2)),x]
```

```
[Out] (358 + 351*x)/(7986*(2 + 3*x^2)^(3/2)) + (1216 + 2133*x)/(29282*S
qrt[2 + 3*x^2]) - (8*Sqrt[2 + 3*x^2])/(1331*(1 + 2*x)^2) - (8*Sqr
t[2 + 3*x^2])/(1331*(1 + 2*x)) - (1216*ArcTanh[(4 - 3*x)/(Sqrt[11
]*Sqrt[2 + 3*x^2])])/(14641*Sqrt[11])
```

Rubi in Sympy [A] time = 22.7611, size = 112, normalized size = 0.96

$$-\frac{-84456x+12528}{574992\left(2x+1\right)\sqrt{3x^2+2}}-\frac{-948x+12}{8712\left(2x+1\right)\left(3x^2+2\right)^{\frac{3}{2}}}-\frac{1216\sqrt{11}\,\mathrm{atanh}\left(\frac{\sqrt{11}(-3x+4)}{11\sqrt{3x^2+2}}\right)}{161051}+\frac{623\sqrt{3x^2+2}}{14641\left(2x+1\right)}-\frac{1}{22\left(2x+1\right)^2\left(3x^2+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)**3/(3*x**2+2)**(5/2),x)
```

```
[Out] -(-84456*x + 12528)/(574992*(2*x + 1)*sqrt(3*x**2 + 2)) - (-948*x
 + 12)/(8712*(2*x + 1)*(3*x**2 + 2)**(3/2)) - 1216*sqrt(11)*atanh
(sqrt(11)*(-3*x + 4)/(11*sqrt(3*x**2 + 2)))/161051 + 623*sqrt(3*x
**2 + 2)/(14641*(2*x + 1)) - 1/(22*(2*x + 1)**2*(3*x**2 + 2)**(3/
2))
```

Mathematica [A] time = 0.198716, size = 89, normalized size = 0.76

$$\frac{-7296\sqrt{11}\log\left(2\sqrt{33x^2+22}-6x+8\right)+\frac{11\left(67284x^5+111060x^4+116937x^3+109844x^2+57371x+7010\right)}{(2x+1)^2(3x^2+2)^{3/2}}+7296\sqrt{11}\log(2x+1)}{966306}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)^3*(2 + 3*x^2)^(5/2)),x]
```

```
[Out] ((11*(7010 + 57371*x + 109844*x^2 + 116937*x^3 + 111060*x^4 + 672
84*x^5))/((1 + 2*x)^2*(2 + 3*x^2)^(3/2)) + 7296*Sqrt[11]*Log[1 +
2*x] - 7296*Sqrt[11]*Log[8 - 6*x + 2*Sqrt[22 + 33*x^2]])/966306
```

Maple [A] time = 0.017, size = 140, normalized size = 1.2

$$\frac{152}{3993}\left(3\,(1/2+x)^2-3\,x+\frac{5}{4}\right)^{-\frac{3}{2}}+\frac{87\,x}{2662}\left(3\,(1/2+x)^2-3\,x+\frac{5}{4}\right)^{-\frac{3}{2}}+\frac{1869\,x}{29282}\frac{1}{\sqrt{3\,(1/2+x)^2-3\,x+\frac{5}{4}}}+\frac{608}{14641}\frac{1}{\sqrt{3\,(1/2+x)^2-3\,x+\frac{5}{4}}}-\frac{1216\,\sqrt{11}}{161051}\mathit{Artanh}\left(\frac{(8-6\,x)\,\sqrt{11}}{11}\frac{1}{\sqrt{12\,(1/2+x)^2-12\,x+5}}\right)-\frac{1}{88}\left(\frac{1}{2}+x\right)^{-2}\left(3\,(1/2+x)^2-3\,x+\frac{5}{4}\right)^{-\frac{3}{2}}+\frac{1}{484}\left(\frac{1}{2}+x\right)^{-1}\left(3\,(1/2+x)^2-3\,x+\frac{5}{4}\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)^3/(3*x^2+2)^(5/2),x)
```

```
[Out] 152/3993/(3*(1/2+x)^2-3*x+5/4)^(3/2)+87/2662*x/(3*(1/2+x)^2-3*x+5
/4)^(3/2)+1869/29282*x/(3*(1/2+x)^2-3*x+5/4)^(1/2)+608/14641/(3*(
1/2+x)^2-3*x+5/4)^(1/2)-1216/161051*11^(1/2)*arctanh(2/11*(4-3*x)
*11^(1/2)/(12*(1/2+x)^2-12*x+5)^(1/2))-1/88/(1/2+x)^2/(3*(1/2+x)^
2-3*x+5/4)^(3/2)+1/484/(1/2+x)/(3*(1/2+x)^2-3*x+5/4)^(3/2)
```

Maxima [A] time = 0.782984, size = 198, normalized size = 1.69

$$\frac{1216}{161051}\sqrt{11}\,\operatorname{arsinh}\left(\frac{\sqrt{6}x}{2\,|2\,x+1|}-\frac{2\,\sqrt{6}}{3\,|2\,x+1|}\right)+\frac{1869\,x}{29282\,\sqrt{3\,x^2+2}}+\frac{608}{14641\,\sqrt{3\,x^2+2}}+\frac{87\,x}{2662\,(3\,x^2+2)^{\frac{3}{2}}}-\frac{1}{22\left(4\,(3\,x^2+2)^{\frac{3}{2}}x^2+4\,(3\,x^2+2)^{\frac{3}{2}}x+(3\,x^2+2)^{\frac{3}{2}}\right)}+\frac{1}{242\left(2\,(3\,x^2+2)^{\frac{3}{2}}x+(3\,x^2+2)^{\frac{3}{2}}\right)}+\frac{152}{3993\,(3\,x^2+2)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(5/2)*(2*x + 1)^3),x, algorithm="maxima"
```

```
[Out] 1216/161051*sqrt(11)*arcsinh(1/2*sqrt(6)*x/abs(2*x + 1) - 2/3*sqr
t(6)/abs(2*x + 1)) + 1869/29282*x/sqrt(3*x^2 + 2) + 608/14641/sqr
t(3*x^2 + 2) + 87/2662*x/(3*x^2 + 2)^(3/2) - 1/22/(4*(3*x^2 + 2)^
(3/2)*x^2 + 4*(3*x^2 + 2)^(3/2)*x + (3*x^2 + 2)^(3/2)) + 1/242/(2
*(3*x^2 + 2)^(3/2)*x + (3*x^2 + 2)^(3/2)) + 152/3993/(3*x^2 + 2)^
(3/2)
```

Fricas [A] time = 0.276168, size = 208, normalized size = 1.78

$$\frac{\sqrt{11}\left(\sqrt{11}\left(67284\,x^5+111060\,x^4+116937\,x^3+109844\,x^2+57371\,x+7010\right)\sqrt{3\,x^2+2}+3648\,\left(36\,x^6+36\,x^5+57\,x^4+48\,x^3+\right.\right.}{966306\,(36\,x^6+36\,x^5+57\,x^4+48\,x^3+28\,x^2+16\,x+4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(5/2)*(2*x + 1)^3),x, algorithm="fricas"
```

```
[Out] 1/966306*sqrt(11)*(sqrt(11)*(67284*x^5 + 111060*x^4 + 116937*x^3
+ 109844*x^2 + 57371*x + 7010)*sqrt(3*x^2 + 2) + 3648*(36*x^6 + 3
6*x^5 + 57*x^4 + 48*x^3 + 28*x^2 + 16*x + 4)*log(-(sqrt(11)*(21*x
^2 - 12*x + 19) + 11*sqrt(3*x^2 + 2)*(3*x - 4))/(4*x^2 + 4*x + 1)
))/(36*x^6 + 36*x^5 + 57*x^4 + 48*x^3 + 28*x^2 + 16*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((4*x**2+3*x+1)/(1+2*x)**3/(3*x**2+2)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.297291, size = 247, normalized size = 2.11

$$\frac{1216}{161051}\sqrt{11}\ln\left(-\frac{\left|-2\sqrt{3}x-\sqrt{11}-\sqrt{3}+2\sqrt{3x^2+2}\right|}{2\sqrt{3}x-\sqrt{11}+\sqrt{3}-2\sqrt{3x^2+2}}\right)+\frac{9\left(\left(2133x+1216\right)x+1851\right)x+11234}{87846\left(3x^2+2\right)^{\frac{3}{2}}}+\frac{4\left(\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2+2}\right)^2+24\sqrt{3}x-8\sqrt{3}-24\sqrt{3x^2+2}\right)}{1331\left(\left(\sqrt{3}x-\sqrt{3x^2+2}\right)^2+\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2+2}\right)-2\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)/((3*x^2 + 2)^(5/2)*(2*x + 1)^3),x, algorithm="giac")
```

```
[Out] 1216/161051*sqrt(11)*ln(-abs(-2*sqrt(3)*x - sqrt(11) - sqrt(3) +
2*sqrt(3*x^2 + 2))/(2*sqrt(3)*x - sqrt(11) + sqrt(3) - 2*sqrt(3*x
^2 + 2))) + 1/87846*(9*((2133*x + 1216)*x + 1851)*x + 11234)/(3*x
^2 + 2)^(3/2) + 4/1331*(sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 + 2))^2 +
 24*sqrt(3)*x - 8*sqrt(3) - 24*sqrt(3*x^2 + 2))/((sqrt(3)*x - sqr
t(3*x^2 + 2))^2 + sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 + 2)) - 2)^2
```

3.136 $\int (g+hx)^m \left(a+cx^2\right)^p \left(d+ex+fx^2\right)\,dx$

Optimal. Leaf size=420

$$-\frac{\left(a+cx^2\right)^p (g+hx)^{m+1} \left(1-\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}}\right)^{-p} \left(1-\frac{g+hx}{\frac{\sqrt{-a}h}{\sqrt{c}}+g}\right)^{-p} F_1\left(m+1;-p,-p;m+2;\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}},\frac{g+hx}{g+\frac{\sqrt{-a}h}{\sqrt{c}}}\right) \left(afh^2(m+1)-c\left(2fg\right.\right.}{ch^3(m+1)(m+2p+3)}$$
$$-\frac{\left(a+cx^2\right)^p (g+hx)^{m+2} \left(1-\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}}\right)^{-p} \left(1-\frac{g+hx}{\frac{\sqrt{-a}h}{\sqrt{c}}+g}\right)^{-p} (2fg(p+1)-eh(m+2p+3))F_1\left(m+2;-p,-p;m+3;\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}},\frac{g}{g+}\right.}{h^3(m+2)(m+2p+3)}$$
$$+\frac{f\left(a+cx^2\right)^{p+1}(g+hx)^{m+1}}{ch(m+2p+3)}$$

```
[Out] (f*(g + h*x)^(1 + m)*(a + c*x^2)^(1 + p))/(c*h*(3 + m + 2*p)) - (
(a*f*h^2*(1 + m) - c*(2*f*g^2*(1 + p) - h*(e*g - d*h)*(3 + m + 2*
p)))*(g + h*x)^(1 + m)*(a + c*x^2)^p*AppellF1[1 + m, -p, -p, 2 +
m, (g + h*x)/(g - (Sqrt[-a]*h)/Sqrt[c]), (g + h*x)/(g + (Sqrt[-a]
*h)/Sqrt[c])])/(c*h^3*(1 + m)*(3 + m + 2*p)*(1 - (g + h*x)/(g - (
Sqrt[-a]*h)/Sqrt[c]))^p*(1 - (g + h*x)/(g + (Sqrt[-a]*h)/Sqrt[c])
)^p) - ((2*f*g*(1 + p) - e*h*(3 + m + 2*p))*(g + h*x)^(2 + m)*(a
+ c*x^2)^p*AppellF1[2 + m, -p, -p, 3 + m, (g + h*x)/(g - (Sqrt[-a
]*h)/Sqrt[c]), (g + h*x)/(g + (Sqrt[-a]*h)/Sqrt[c])])/(h^3*(2 + m
)*(3 + m + 2*p)*(1 - (g + h*x)/(g - (Sqrt[-a]*h)/Sqrt[c]))^p*(1 -
 (g + h*x)/(g + (Sqrt[-a]*h)/Sqrt[c]))^p)
```

Rubi [A] time = 1.23634, antiderivative size = 417, normalized size of antiderivative = 0.99, number of steps used = 6, number of rules used = 4, integrand size = 27, $\frac{\text{number of rules}}{\text{integrand size}} = 0.148$

$$-\frac{\left(a+cx^2\right)^p (g+hx)^{m+1} \left(1-\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}}\right)^{-p} \left(1-\frac{g+hx}{\frac{\sqrt{-a}h}{\sqrt{c}}+g}\right)^{-p} F_1\left(m+1;-p,-p;m+2;\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}},\frac{g+hx}{g+\frac{\sqrt{-a}h}{\sqrt{c}}}\right) \left(afh^2(m+1)+ch(m+\right.}{ch^3(m+1)(m+2p+3)}$$
$$-\frac{\left(a+cx^2\right)^p (g+hx)^{m+2} \left(1-\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}}\right)^{-p} \left(1-\frac{g+hx}{\frac{\sqrt{-a}h}{\sqrt{c}}+g}\right)^{-p} (2fg(p+1)-eh(m+2p+3))F_1\left(m+2;-p,-p;m+3;\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}},\frac{g}{g+}\right.}{h^3(m+2)(m+2p+3)}$$
$$+\frac{f\left(a+cx^2\right)^{p+1}(g+hx)^{m+1}}{ch(m+2p+3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(g + h*x)^m*(a + c*x^2)^p*(d + e*x + f*x^2),x]
```

```
[Out] (f*(g + h*x)^(1 + m)*(a + c*x^2)^(1 + p))/(c*h*(3 + m + 2*p)) - (
(a*f*h^2*(1 + m) - 2*c*f*g^2*(1 + p) + c*h*(e*g - d*h)*(3 + m + 2
*p))*(g + h*x)^(1 + m)*(a + c*x^2)^p*AppellF1[1 + m, -p, -p, 2 +
m, (g + h*x)/(g - (Sqrt[-a]*h)/Sqrt[c]), (g + h*x)/(g + (Sqrt[-a]
*h)/Sqrt[c])])/(c*h^3*(1 + m)*(3 + m + 2*p)*(1 - (g + h*x)/(g - (
Sqrt[-a]*h)/Sqrt[c]))^p*(1 - (g + h*x)/(g + (Sqrt[-a]*h)/Sqrt[c])
)^p) - ((2*f*g*(1 + p) - e*h*(3 + m + 2*p))*(g + h*x)^(2 + m)*(a
+ c*x^2)^p*AppellF1[2 + m, -p, -p, 3 + m, (g + h*x)/(g - (Sqrt[-a
]*h)/Sqrt[c]), (g + h*x)/(g + (Sqrt[-a]*h)/Sqrt[c])])/(h^3*(2 + m
)*(3 + m + 2*p)*(1 - (g + h*x)/(g - (Sqrt[-a]*h)/Sqrt[c]))^p*(1 -
 (g + h*x)/(g + (Sqrt[-a]*h)/Sqrt[c]))^p)
```

Rubi in Sympy [A] time = 122.673, size = 391, normalized size = 0.93

$$\frac{\left(a+cx^2\right)^p(g+hx)^{m+2}\left(\frac{\sqrt{c}(-g-hx)}{\sqrt{c}g-h\sqrt{-a}}+1\right)^{-p}\left(\frac{\sqrt{c}(-g-hx)}{\sqrt{c}g+h\sqrt{-a}}+1\right)^{-p}(eh(m+2p+3)-2fg(p+1))\operatorname{appellf}_1\left(m+2,-p,-p,m+3,\right.}{h^3(m+2)(m+2p+3)}$$
$$+\frac{f\left(a+cx^2\right)^{p+1}(g+hx)^{m+1}}{ch(m+2p+3)}$$
$$-\frac{\left(a+cx^2\right)^p(g+hx)^{m+1}\left(\frac{\sqrt{c}(-g-hx)}{\sqrt{c}g-h\sqrt{-a}}+1\right)^{-p}\left(\frac{\sqrt{c}(-g-hx)}{\sqrt{c}g+h\sqrt{-a}}+1\right)^{-p}\left(cg(eh(m+2p+3)-2fg(p+1))+h^2(af(m+1)-cd(m+\right.}{ch^3(m+1)(m+2p+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)**m*(c*x**2+a)**p*(f*x**2+e*x+d),x)
```

```
[Out] (a + c*x**2)**p*(g + h*x)**(m + 2)*(sqrt(c)*(-g - h*x)/(sqrt(c)*g
 - h*sqrt(-a)) + 1)**(-p)*(sqrt(c)*(-g - h*x)/(sqrt(c)*g + h*sqrt
(-a)) + 1)**(-p)*(e*h*(m + 2*p + 3) - 2*f*g*(p + 1))*appellf1(m +
 2, -p, -p, m + 3, sqrt(c)*(g + h*x)/(sqrt(c)*g - h*sqrt(-a)), sq
rt(c)*(g + h*x)/(sqrt(c)*g + h*sqrt(-a)))/(h**3*(m + 2)*(m + 2*p
+ 3)) + f*(a + c*x**2)**(p + 1)*(g + h*x)**(m + 1)/(c*h*(m + 2*p
+ 3)) - (a + c*x**2)**p*(g + h*x)**(m + 1)*(sqrt(c)*(-g - h*x)/(s
qrt(c)*g - h*sqrt(-a)) + 1)**(-p)*(sqrt(c)*(-g - h*x)/(sqrt(c)*g
+ h*sqrt(-a)) + 1)**(-p)*(c*g*(e*h*(m + 2*p + 3) - 2*f*g*(p + 1))
 + h**2*(a*f*(m + 1) - c*d*(m + 2*p + 3)))*appellf1(m + 1, -p, -p
, m + 2, sqrt(c)*(g + h*x)/(sqrt(c)*g - h*sqrt(-a)), sqrt(c)*(g +
 h*x)/(sqrt(c)*g + h*sqrt(-a)))/(c*h**3*(m + 1)*(m + 2*p + 3))
```

Mathematica [A] time = 1.87913, size = 0, normalized size = 0.

$$\int (g+hx)^m\left(a+cx^2\right)^p\left(d+ex+fx^2\right)\,dx$$

Verification is Not applicable to the result.

```
[In]  Integrate[(g + h*x)^m*(a + c*x^2)^p*(d + e*x + f*x^2),x]

[Out] Integrate[(g + h*x)^m*(a + c*x^2)^p*(d + e*x + f*x^2), x]
```

Maple [F] time = 0.121, size = 0, normalized size = 0.

$$\int (hx+g)^m \left(cx^2+a\right)^p \left(f\,x^2+ex+d\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^m*(c*x^2+a)^p*(f*x^2+e*x+d),x)

[Out] int((h*x+g)^m*(c*x^2+a)^p*(f*x^2+e*x+d),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(f\,x^2+ex+d\right)\left(cx^2+a\right)^p (hx+g)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(c*x^2 + a)^p*(h*x + g)^m,x, algorithm="maxima")

[Out] integrate((f*x^2 + e*x + d)*(c*x^2 + a)^p*(h*x + g)^m, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\left(f\,x^2+ex+d\right)\left(cx^2+a\right)^p (hx+g)^m, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(c*x^2 + a)^p*(h*x + g)^m,x, algorithm="fricas")

[Out] integral((f*x^2 + e*x + d)*(c*x^2 + a)^p*(h*x + g)^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((h*x+g)**m*(c*x**2+a)**p*(f*x**2+e*x+d),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (fx^2 + ex + d)(cx^2 + a)^p (hx + g)^m \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(c*x^2 + a)^p*(h*x + g)^m,x, algorithm="giac")
```

```
[Out] integrate((f*x^2 + e*x + d)*(c*x^2 + a)^p*(h*x + g)^m, x)
```

3.137 $\int (g+hx)^m \sqrt{a+cx^2} \left(d+ex+fx^2\right) dx$

Optimal. Leaf size=403

$$-\frac{\sqrt{a+cx^2}(g+hx)^{m+1}F_1\left(m+1;-\frac{1}{2},-\frac{1}{2};m+2;\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}},\frac{g+hx}{g+\frac{\sqrt{-a}h}{\sqrt{c}}}\right)\left(afh^2(m+1)-c\left(3fg^2-h(m+4)(eg-dh)\right)\right)}{ch^3(m+1)(m+4)\sqrt{1-\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}}}\sqrt{1-\frac{g+hx}{\frac{\sqrt{-a}h}{\sqrt{c}}+g}}}-\frac{\sqrt{a+cx^2}(g+hx)^{m+2}(3fg-eh(m+4))F_1\left(m+2;-\frac{1}{2},-\frac{1}{2};m+3;\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}},\frac{g+hx}{g+\frac{\sqrt{-a}h}{\sqrt{c}}}\right)}{h^3(m+2)(m+4)\sqrt{1-\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}}}\sqrt{1-\frac{g+hx}{\frac{\sqrt{-a}h}{\sqrt{c}}+g}}}+\frac{f\left(a+cx^2\right)^{3/2}(g+hx)^{m+1}}{ch(m+4)}$$

```
[Out] (f*(g + h*x)^(1 + m)*(a + c*x^2)^(3/2))/(c*h*(4 + m)) - ((a*f*h^2
*(1 + m) - c*(3*f*g^2 - h*(e*g - d*h)*(4 + m)))*(g + h*x)^(1 + m)
*Sqrt[a + c*x^2]*AppellF1[1 + m, -1/2, -1/2, 2 + m, (g + h*x)/(g
- (Sqrt[-a]*h)/Sqrt[c]), (g + h*x)/(g + (Sqrt[-a]*h)/Sqrt[c])])/(
c*h^3*(1 + m)*(4 + m)*Sqrt[1 - (g + h*x)/(g - (Sqrt[-a]*h)/Sqrt[c
])]*Sqrt[1 - (g + h*x)/(g + (Sqrt[-a]*h)/Sqrt[c])]) - ((3*f*g - e
*h*(4 + m))*(g + h*x)^(2 + m)*Sqrt[a + c*x^2]*AppellF1[2 + m, -1/
2, -1/2, 3 + m, (g + h*x)/(g - (Sqrt[-a]*h)/Sqrt[c]), (g + h*x)/(
g + (Sqrt[-a]*h)/Sqrt[c])])/(h^3*(2 + m)*(4 + m)*Sqrt[1 - (g + h*
x)/(g - (Sqrt[-a]*h)/Sqrt[c])]*Sqrt[1 - (g + h*x)/(g + (Sqrt[-a]*
h)/Sqrt[c])])
```

Rubi [A] time = 1.47761, antiderivative size = 401, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}} = 0.138$

$$\frac{\sqrt{a+cx^2}(g+hx)^{m+1}F_1\left(m+1;-\frac{1}{2},-\frac{1}{2};m+2;\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}},\frac{g+hx}{g+\frac{\sqrt{-a}h}{\sqrt{c}}}\right)\left(-afh^2(m+1)-ch(m+4)(eg-dh)+3cfg^2\right)}{ch^3(m+1)(m+4)\sqrt{1-\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}}}\sqrt{1-\frac{g+hx}{\frac{\sqrt{-a}h}{\sqrt{c}}+g}}}-\frac{\sqrt{a+cx^2}(g+hx)^{m+2}(3fg-eh(m+4))F_1\left(m+2;-\frac{1}{2},-\frac{1}{2};m+3;\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}},\frac{g+hx}{g+\frac{\sqrt{-a}h}{\sqrt{c}}}\right)}{h^3(m+2)(m+4)\sqrt{1-\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}}}\sqrt{1-\frac{g+hx}{\frac{\sqrt{-a}h}{\sqrt{c}}+g}}}+\frac{f\left(a+cx^2\right)^{3/2}(g+hx)^{m+1}}{ch(m+4)}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(g + h*x)^m*Sqrt[a + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] (f*(g + h*x)^(1 + m)*(a + c*x^2)^(3/2))/(c*h*(4 + m)) + ((3*c*f*g
^2 - a*f*h^2*(1 + m) - c*h*(e*g - d*h)*(4 + m))*(g + h*x)^(1 + m)
*Sqrt[a + c*x^2]*AppellF1[1 + m, -1/2, -1/2, 2 + m, (g + h*x)/(g
- (Sqrt[-a]*h)/Sqrt[c]), (g + h*x)/(g + (Sqrt[-a]*h)/Sqrt[c])])/(
c*h^3*(1 + m)*(4 + m)*Sqrt[1 - (g + h*x)/(g - (Sqrt[-a]*h)/Sqrt[c
])]*Sqrt[1 - (g + h*x)/(g + (Sqrt[-a]*h)/Sqrt[c])]) - ((3*f*g - e
*h*(4 + m))*(g + h*x)^(2 + m)*Sqrt[a + c*x^2]*AppellF1[2 + m, -1/
2, -1/2, 3 + m, (g + h*x)/(g - (Sqrt[-a]*h)/Sqrt[c]), (g + h*x)/(
g + (Sqrt[-a]*h)/Sqrt[c])])/(h^3*(2 + m)*(4 + m)*Sqrt[1 - (g + h*
x)/(g - (Sqrt[-a]*h)/Sqrt[c])]*Sqrt[1 - (g + h*x)/(g + (Sqrt[-a]*
h)/Sqrt[c])])
```

Rubi in Sympy [A] time = 109.008, size = 381, normalized size = 0.95

$$-\frac{\sqrt{a+cx^2}\,(g+hx)^{m+2}\,(-eh\,(m+4)+3fg)\,\mathrm{appellf}_1\left(m+2,-\frac{1}{2},-\frac{1}{2},m+3,\frac{\sqrt{c}(g+hx)}{\sqrt{c}g-h\sqrt{-a}},\frac{\sqrt{c}(g+hx)}{\sqrt{c}g+h\sqrt{-a}}\right)}{h^3\,(m+2)\,(m+4)\sqrt{\frac{\sqrt{c}(-g-hx)}{\sqrt{c}g-h\sqrt{-a}}+1}\sqrt{\frac{\sqrt{c}(-g-hx)}{\sqrt{c}g+h\sqrt{-a}}+1}}$$
$$+\frac{f\left(a+cx^2\right)^{\frac{3}{2}}(g+hx)^{m+1}}{ch\,(m+4)}$$
$$-\frac{\sqrt{a+cx^2}\,(g+hx)^{m+1}\left(-cg\,(-eh\,(m+4)+3fg)+h^2\,(af\,(m+1)-cd\,(m+4))\right)\mathrm{appellf}_1\left(m+1,-\frac{1}{2},-\frac{1}{2},m+2,\frac{\sqrt{c}(g+hx)}{\sqrt{c}g-h\sqrt{-a}},\ldots\right.}{ch^3\,(m+1)\,(m+4)\sqrt{\frac{\sqrt{c}(-g-hx)}{\sqrt{c}g-h\sqrt{-a}}+1}\sqrt{\frac{\sqrt{c}(-g-hx)}{\sqrt{c}g+h\sqrt{-a}}+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)**m*(f*x**2+e*x+d)*(c*x**2+a)**(1/2),x)
```

```
[Out] -sqrt(a + c*x**2)*(g + h*x)**(m + 2)*(-e*h*(m + 4) + 3*f*g)*appel
lf1(m + 2, -1/2, -1/2, m + 3, sqrt(c)*(g + h*x)/(sqrt(c)*g - h*sq
rt(-a)), sqrt(c)*(g + h*x)/(sqrt(c)*g + h*sqrt(-a)))/(h**3*(m + 2
)*(m + 4)*sqrt(sqrt(c)*(-g - h*x)/(sqrt(c)*g - h*sqrt(-a)) + 1)*s
qrt(sqrt(c)*(-g - h*x)/(sqrt(c)*g + h*sqrt(-a)) + 1)) + f*(a + c*
x**2)**(3/2)*(g + h*x)**(m + 1)/(c*h*(m + 4)) - sqrt(a + c*x**2)*
(g + h*x)**(m + 1)*(-c*g*(-e*h*(m + 4) + 3*f*g) + h**2*(a*f*(m +
1) - c*d*(m + 4)))*appellf1(m + 1, -1/2, -1/2, m + 2, sqrt(c)*(g
+ h*x)/(sqrt(c)*g - h*sqrt(-a)), sqrt(c)*(g + h*x)/(sqrt(c)*g + h
*sqrt(-a)))/(c*h**3*(m + 1)*(m + 4)*sqrt(sqrt(c)*(-g - h*x)/(sqrt
(c)*g - h*sqrt(-a)) + 1)*sqrt(sqrt(c)*(-g - h*x)/(sqrt(c)*g + h*s
qrt(-a)) + 1))
```

Mathematica [A] time = 1.19806, size = 0, normalized size = 0.

$$\int (g+hx)^m\sqrt{a+cx^2}\left(d+ex+fx^2\right)\,dx$$

Verification is Not applicable to the result.

```
[In]  Integrate[(g + h*x)^m*Sqrt[a + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] Integrate[(g + h*x)^m*Sqrt[a + c*x^2]*(d + e*x + f*x^2), x]
```

Maple [F] time = 0.044, size = 0, normalized size = 0.

$$\int (hx+g)^m\left(fx^2+ex+d\right)\sqrt{cx^2+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^m*(f*x^2+e*x+d)*(c*x^2+a)^(1/2),x)
```

```
[Out] int((h*x+g)^m*(f*x^2+e*x+d)*(c*x^2+a)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{cx^2+a}\left(fx^2+ex+d\right)(hx+g)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g)^m,x, algorithm="maxima")
```

```
[Out] integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g)^m, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\sqrt{cx^2+a}\left(fx^2+ex+d\right)(hx+g)^m,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g)^m,x, algorithm="fricas")
```

```
[Out] integral(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g)^m, x)
```

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

$$\int \sqrt{a+cx^2}\,(g+hx)^m\left(d+ex+fx^2\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x+g)**m*(f*x**2+e*x+d)*(c*x**2+a)**(1/2),x)
```

```
[Out] Integral(sqrt(a + c*x**2)*(g + h*x)**m*(d + e*x + f*x**2), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{cx^2+a}\left(fx^2+ex+d\right)(hx+g)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g)^m,x, algorithm="giac")
```

```
[Out] integrate(sqrt(c*x^2 + a)*(f*x^2 + e*x + d)*(h*x + g)^m, x)
```

3.138 $\int (g+hx)^{-3-2p} \left(a+cx^2\right)^p \left(d+ex+fx^2\right) \, dx$

Optimal. Leaf size=474

$$-\frac{f\left(a+cx^2\right)^p (g+hx)^{-2p} \left(1-\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}}\right)^{-p} \left(1-\frac{g+hx}{\frac{\sqrt{-a}h}{\sqrt{c}}+g}\right)^{-p} F_1\left(-2p;-p,-p;1-2p;\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}},\frac{g+hx}{g+\frac{\sqrt{-a}h}{\sqrt{c}}}\right)}{2h^3p} - \frac{\left(a+cx^2\right)^{p+1} (g+hx)^{-2(p+1)} \left(dh^2-egh+fg^2\right)}{2h(p+1)\left(ah^2+cg^2\right)} + \frac{\left(\sqrt{-a}-\sqrt{c}x\right)\left(a+cx^2\right)^p (g+hx)^{-2p-1} \left(-\frac{\left(\sqrt{-a}+\sqrt{c}x\right)\left(\sqrt{-a}h+\sqrt{c}g\right)}{\left(\sqrt{-a}-\sqrt{c}x\right)\left(\sqrt{c}g-\sqrt{-a}h\right)}\right)^{-p} \left(ah^2(2fg-eh)+c\left(fg^3-dgh^2\right)\right) {}_2F_1\left(-2p-1,-p;-\right.}{h^2(2p+1)\left(\sqrt{-a}h+\sqrt{c}g\right)\left(ah^2+cg^2\right)}$$

```
[Out] -((f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(1 + p))/(2*h*(c*g^2 + a*h^
2)*(1 + p)*(g + h*x)^(2*(1 + p))) - (f*(a + c*x^2)^p*AppellF1[-2*
p, -p, -p, 1 - 2*p, (g + h*x)/(g - (Sqrt[-a]*h)/Sqrt[c]), (g + h*
x)/(g + (Sqrt[-a]*h)/Sqrt[c])])/(2*h^3*p*(g + h*x)^(2*p)*(1 - (g
+ h*x)/(g - (Sqrt[-a]*h)/Sqrt[c]))^p*(1 - (g + h*x)/(g + (Sqrt[-a
]*h)/Sqrt[c]))^p) + ((a*h^2*(2*f*g - e*h) + c*(f*g^3 - d*g*h^2))*
(Sqrt[-a] - Sqrt[c]*x)*(g + h*x)^(-1 - 2*p)*(a + c*x^2)^p*Hyperge
ometric2F1[-1 - 2*p, -p, -2*p, (2*Sqrt[-a]*Sqrt[c]*(g + h*x))/((S
qrt[c]*g - Sqrt[-a]*h)*(Sqrt[-a] - Sqrt[c]*x))])/(h^2*(Sqrt[c]*g
+ Sqrt[-a]*h)*(c*g^2 + a*h^2)*(1 + 2*p)*(-(((Sqrt[c]*g + Sqrt[-a]
*h)*(Sqrt[-a] + Sqrt[c]*x))/((Sqrt[c]*g - Sqrt[-a]*h)*(Sqrt[-a] -
 Sqrt[c]*x))))^p)
```

Rubi [A] time = 1.13703, antiderivative size = 474, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.161$

$$-\frac{f\left(a+cx^2\right)^p (g+hx)^{-2p} \left(1-\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}}\right)^{-p} \left(1-\frac{g+hx}{\frac{\sqrt{-a}h}{\sqrt{c}}+g}\right)^{-p} F_1\left(-2p;-p,-p;1-2p;\frac{g+hx}{g-\frac{\sqrt{-a}h}{\sqrt{c}}},\frac{g+hx}{g+\frac{\sqrt{-a}h}{\sqrt{c}}}\right)}{2h^3p} - \frac{\left(a+cx^2\right)^{p+1} (g+hx)^{-2(p+1)} \left(dh^2-egh+fg^2\right)}{2h(p+1)\left(ah^2+cg^2\right)} + \frac{\left(\sqrt{-a}-\sqrt{c}x\right)\left(a+cx^2\right)^p (g+hx)^{-2p-1} \left(-\frac{\left(\sqrt{-a}+\sqrt{c}x\right)\left(\sqrt{-a}h+\sqrt{c}g\right)}{\left(\sqrt{-a}-\sqrt{c}x\right)\left(\sqrt{c}g-\sqrt{-a}h\right)}\right)^{-p} \left(ah^2(2fg-eh)+c\left(fg^3-dgh^2\right)\right) {}_2F_1\left(-2p-1,-p;-\right.}{h^2(2p+1)\left(\sqrt{-a}h+\sqrt{c}g\right)\left(ah^2+cg^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(g + h*x)^(-3 - 2*p)*(a + c*x^2)^p*(d + e*x + f*x^2),x]
```

```
[Out] -((f*g^2 - e*g*h + d*h^2)*(a + c*x^2)^(1 + p))/(2*h*(c*g^2 + a*h^
2)*(1 + p)*(g + h*x)^(2*(1 + p))) - (f*(a + c*x^2)^p*AppellF1[-2*
```

```
p, -p, -p, 1 - 2*p, (g + h*x)/(g - (Sqrt[-a]*h)/Sqrt[c]), (g + h*
x)/(g + (Sqrt[-a]*h)/Sqrt[c])])/(2*h^3*p*(g + h*x)^(2*p)*(1 - (g
+ h*x)/(g - (Sqrt[-a]*h)/Sqrt[c]))^p*(1 - (g + h*x)/(g + (Sqrt[-a
]*h)/Sqrt[c]))^p) + ((a*h^2*(2*f*g - e*h) + c*(f*g^3 - d*g*h^2))*
(Sqrt[-a] - Sqrt[c]*x)*(g + h*x)^(-1 - 2*p)*(a + c*x^2)^p*Hyperge
ometric2F1[-1 - 2*p, -p, -2*p, (2*Sqrt[-a]*Sqrt[c]*(g + h*x))/((S
qrt[c]*g - Sqrt[-a]*h)*(Sqrt[-a] - Sqrt[c]*x))])/(h^2*(Sqrt[c]*g
+ Sqrt[-a]*h)*(c*g^2 + a*h^2)*(1 + 2*p)*(-(((Sqrt[c]*g + Sqrt[-a]
*h)*(Sqrt[-a] + Sqrt[c]*x))/((Sqrt[c]*g - Sqrt[-a]*h)*(Sqrt[-a] -
 Sqrt[c]*x))))^p)
```

Rubi in Sympy [A] time = 101.582, size = 416, normalized size = 0.88

$$-\frac{f\left(a+cx^2\right)^p(g+hx)^{-2p}\left(\frac{\sqrt{c}(-g-hx)}{\sqrt{c}g-h\sqrt{-a}}+1\right)^{-p}\left(\frac{\sqrt{c}(-g-hx)}{\sqrt{c}g+h\sqrt{-a}}+1\right)^{-p}\operatorname{appellf}_1\left(-2p,-p,-p,-2p+1,\frac{\sqrt{c}(g+hx)}{\sqrt{c}g-h\sqrt{-a}},\frac{\sqrt{c}(g+hx)}{\sqrt{c}g+h\sqrt{-a}}\right)}{2h^3p}-\frac{\left(a+cx^2\right)^{p+1}(g+hx)^{-2p-2}\left(dh^2-egh+fg^2\right)}{2h(p+1)\left(ah^2+cg^2\right)}-\frac{\left(\frac{\left(\sqrt{c}g+h\sqrt{-a}\right)\left(\sqrt{c}x+\sqrt{-a}\right)}{\left(\sqrt{c}g-h\sqrt{-a}\right)\left(\sqrt{c}x-\sqrt{-a}\right)}\right)^{-p}\left(a+cx^2\right)^p(g+hx)^{-2p-1}\left(-\sqrt{c}x+\sqrt{-a}\right)\left(ah^2(eh-2fg)+cg\left(dh^2-fg^2\right)\right){}_2F_1\left(\begin{matrix}-2p-1,-p\\-2p\end{matrix}\middle|\ldots\right)}{h^2(2p+1)\left(ah^2+cg^2\right)\left(\sqrt{c}g+h\sqrt{-a}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)**(-3-2*p)*(c*x**2+a)**p*(f*x**2+e*x+d),x)
```

```
[Out] -f*(a + c*x**2)**p*(g + h*x)**(-2*p)*(sqrt(c)*(-g - h*x)/(sqrt(c)
*g - h*sqrt(-a)) + 1)**(-p)*(sqrt(c)*(-g - h*x)/(sqrt(c)*g + h*sq
rt(-a)) + 1)**(-p)*appellf1(-2*p, -p, -p, -2*p + 1, sqrt(c)*(g +
h*x)/(sqrt(c)*g - h*sqrt(-a)), sqrt(c)*(g + h*x)/(sqrt(c)*g + h*s
qrt(-a)))/(2*h**3*p) - (a + c*x**2)**(p + 1)*(g + h*x)**(-2*p - 2
)*(d*h**2 - e*g*h + f*g**2)/(2*h*(p + 1)*(a*h**2 + c*g**2)) - ((s
qrt(c)*g + h*sqrt(-a))*(sqrt(c)*x + sqrt(-a))/((sqrt(c)*g - h*sqr
t(-a))*(sqrt(c)*x - sqrt(-a))))**(-p)*(a + c*x**2)**p*(g + h*x)**
(-2*p - 1)*(-sqrt(c)*x + sqrt(-a))*(a*h**2*(e*h - 2*f*g) + c*g*(d
*h**2 - f*g**2))*hyper((-2*p - 1, -p), (-2*p,), 2*sqrt(c)*sqrt(-a
)*(g + h*x)/((sqrt(c)*g - h*sqrt(-a))*(-sqrt(c)*x + sqrt(-a))))/(
h**2*(2*p + 1)*(a*h**2 + c*g**2)*(sqrt(c)*g + h*sqrt(-a)))
```

Mathematica [A] time = 3.32975, size = 0, normalized size = 0.

$$\int (g+hx)^{-3-2p}\left(a+cx^2\right)^p\left(d+ex+fx^2\right)\,dx$$

Verification is Not applicable to the result.

```
[In]  Integrate[(g + h*x)^(-3 - 2*p)*(a + c*x^2)^p*(d + e*x + f*x^2),x]
```

```
[Out] Integrate[(g + h*x)^(-3 - 2*p)*(a + c*x^2)^p*(d + e*x + f*x^2), x
]
```

Maple [F] time = 0.075, size = 0, normalized size = 0.

$$\int (hx+g)^{-3-2p} \left(c x^2+a\right)^p \left(f x^2+e x+d\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^(-3-2*p)*(c*x^2+a)^p*(f*x^2+e*x+d),x)
```

```
[Out] int((h*x+g)^(-3-2*p)*(c*x^2+a)^p*(f*x^2+e*x+d),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(f x^2+e x+d\right) \left(c x^2+a\right)^p (hx+g)^{-2p-3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(c*x^2 + a)^p*(h*x + g)^(-2*p - 3),x, algorithm="maxim
```

```
[Out] integrate((f*x^2 + e*x + d)*(c*x^2 + a)^p*(h*x + g)^(-2*p - 3), x
)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(f x^2+e x+d\right) \left(c x^2+a\right)^p (hx+g)^{-2p-3}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(c*x^2 + a)^p*(h*x + g)^(-2*p - 3),x, algorithm="frica
```

```
[Out] integral((f*x^2 + e*x + d)*(c*x^2 + a)^p*(h*x + g)^(-2*p - 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((h*x+g)**(-3-2*p)*(c*x**2+a)**p*(f*x**2+e*x+d),x)

[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (fx^2 + ex + d)(cx^2 + a)^p (hx + g)^{-2p-3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(c*x^2 + a)^p*(h*x + g)^(-2*p - 3),x, algorithm="giac'

[Out] integrate((f*x^2 + e*x + d)*(c*x^2 + a)^p*(h*x + g)^(-2*p - 3), x
)
```

3.139 $\int (d+ex)^m \left(-cd^2+bde+be^2x+ce^2x^2\right)^p \left(-(cd-be)f+(cef-cdg$

Optimal. Leaf size=222

$$\frac{g(d+ex)^{m-1}\left(-d(cd-be)+be^2x+ce^2x^2\right)^{p+2}}{ce^2(m+2p+3)} - \frac{(d+ex)^m(-be+cd-cex)^2\left(-d(cd-be)+be^2x+ce^2x^2\right)^p\left(\frac{c(d+ex)}{2cd-be}\right)^{-m-p}(beg(m+p+1)+c(dg(1-m)-ef(m+2p+3)}{c^2e^2(p+2)(m+2p+3)}$$

```
[Out] (g*(d + e*x)^(-1 + m)*(-(d*(c*d - b*e)) + b*e^2*x + c*e^2*x^2)^(2
 + p))/(c*e^2*(3 + m + 2*p)) - ((b*e*g*(1 + m + p) + c*(d*g*(1 -
m) - e*f*(3 + m + 2*p)))*(d + e*x)^m*((c*(d + e*x))/(2*c*d - b*e)
)^(-m - p)*(c*d - b*e - c*e*x)^2*(-(d*(c*d - b*e)) + b*e^2*x + c*
e^2*x^2)^p*Hypergeometric2F1[-m - p, 2 + p, 3 + p, (c*d - b*e - c
*e*x)/(2*c*d - b*e)])/(c^2*e^2*(2 + p)*(3 + m + 2*p))
```

Rubi [A] time = 0.894277, antiderivative size = 222, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 70, $\frac{\text{number of rules}}{\text{integrand size}} = 0.086$

$$\frac{g(d+ex)^{m-1}\left(-d(cd-be)+be^2x+ce^2x^2\right)^{p+2}}{ce^2(m+2p+3)} - \frac{(d+ex)^m(-be+cd-cex)^2\left(-d(cd-be)+be^2x+ce^2x^2\right)^p\left(\frac{c(d+ex)}{2cd-be}\right)^{-m-p}(beg(m+p+1)+cdg(1-m)-cef(m+2p+3)}{c^2e^2(p+2)(m+2p+3)}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)^m*(-(c*d^2) + b*d*e + b*e^2*x + c*e^2*x^2)^p*(-
((c*d - b*e)*f) + (c*e*f - c*d*g + b*e*g)*x + c*e*g*x^2),x]
```

```
[Out] (g*(d + e*x)^(-1 + m)*(-(d*(c*d - b*e)) + b*e^2*x + c*e^2*x^2)^(2
 + p))/(c*e^2*(3 + m + 2*p)) - ((c*d*g*(1 - m) + b*e*g*(1 + m + p
) - c*e*f*(3 + m + 2*p))*(d + e*x)^m*((c*(d + e*x))/(2*c*d - b*e)
)^(-m - p)*(c*d - b*e - c*e*x)^2*(-(d*(c*d - b*e)) + b*e^2*x + c*
e^2*x^2)^p*Hypergeometric2F1[-m - p, 2 + p, 3 + p, (c*d - b*e - c
*e*x)/(2*c*d - b*e)])/(c^2*e^2*(2 + p)*(3 + m + 2*p))
```

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((e*x+d)**m*(c*e**2*x**2+b*e**2*x+b*d*e-c*d**2)**p*(-
(-b*e+c*d)*f+(b*e*g-c*d*g+c*e*f)*x+c*e*g*x**2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 5.95884, size = 527, normalized size = 2.37

$$\frac{1}{3}(d+ex)^m(-(d+ex)(c(d-ex)-be))^p\left(\frac{9dx^2(cd-be)(-beg+cdg-cef)F_1\left(2;-m-p,-p;3;-\frac{ex}{d},\frac{cex}{cd-be}\right)}{2\left(3d(be-cd)F_1\left(2;-m-p,-p;3;-\frac{ex}{d},\frac{cex}{cd-be}\right)+ex\left(cdpF_1\left(3;-m-p,1-p;4;-\frac{ex}{d},\frac{cex}{cd-be}\right)-(m+p)(cd-be)F_1\right.\right.}+\frac{4cdegx^3(be-cd)F_1\left(3;-m-p,-p;4;-\frac{ex}{d},\frac{cex}{cd-be}\right)}{4d(be-cd)F_1\left(3;-m-p,-p;4;-\frac{ex}{d},\frac{cex}{cd-be}\right)+ex\left(cdpF_1\left(4;-m-p,1-p;5;-\frac{ex}{d},\frac{cex}{cd-be}\right)-(m+p)(cd-be)F_1\left(4;-m-\right.\right.}-\frac{3f(cd-be)(be-cd+cex)\left(\frac{c(d+ex)}{2cd-be}\right)^{-m-p}{}_2F_1\left(-m-p,p+1;p+2;\frac{-cd+be+cex}{be-2cd}\right)}{ce(p+1)}\right)$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(d + e*x)^m*(-(c*d^2) + b*d*e + b*e^2*x + c*e^2*x^2)^p*(-
((c*d - b*e)*f) + (c*e*f - c*d*g + b*e*g)*x + c*e*g*x^2),x]
```

```
[Out] ((d + e*x)^m*(-((d + e*x)*(-(b*e) + c*(d - e*x))))^p*((9*d*(c*d -
 b*e)*(-(c*e*f) + c*d*g - b*e*g)*x^2*AppellF1[2, -m - p, -p, 3, -
((e*x)/d), (c*e*x)/(c*d - b*e)])/(2*(3*d*(-(c*d) + b*e)*AppellF1[
2, -m - p, -p, 3, -((e*x)/d), (c*e*x)/(c*d - b*e)] + e*x*(c*d*p*A
ppellF1[3, -m - p, 1 - p, 4, -((e*x)/d), (c*e*x)/(c*d - b*e)] - (
c*d - b*e)*(m + p)*AppellF1[3, 1 - m - p, -p, 4, -((e*x)/d), (c*e
*x)/(c*d - b*e)]))) + (4*c*d*e*(-(c*d) + b*e)*g*x^3*AppellF1[3, -
m - p, -p, 4, -((e*x)/d), (c*e*x)/(c*d - b*e)])/(4*d*(-(c*d) + b*
e)*AppellF1[3, -m - p, -p, 4, -((e*x)/d), (c*e*x)/(c*d - b*e)] +
e*x*(c*d*p*AppellF1[4, -m - p, 1 - p, 5, -((e*x)/d), (c*e*x)/(c*d
 - b*e)] - (c*d - b*e)*(m + p)*AppellF1[4, 1 - m - p, -p, 5, -((e
*x)/d), (c*e*x)/(c*d - b*e)])) - (3*(c*d - b*e)*f*((c*(d + e*x))/
(2*c*d - b*e))^(-m - p)*(-(c*d) + b*e + c*e*x)*Hypergeometric2F1[
-m - p, 1 + p, 2 + p, (-(c*d) + b*e + c*e*x)/(-2*c*d + b*e)])/(c*
e*(1 + p))))/3
```

Maple [F] time = 0.214, size = 0, normalized size = 0.

$$\int (ex+d)^m\left(ce^2x^2+be^2x+bde-cd^2\right)^p\left(-(-be+cd)f+(beg-dgc+cef)x+cegx^2\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^m*(c*e^2*x^2+b*e^2*x+b*d*e-c*d^2)^p*(-(-b*e+c*d)*f+(b*e*g-
c*d*g+c*e*f)*x+c*e*g*x^2),x)
```

```
[Out] int((e*x+d)^m*(c*e^2*x^2+b*e^2*x+b*d*e-c*d^2)^p*(-(-b*e+c*d)*f+(b
*e*g-c*d*g+c*e*f)*x+c*e*g*x^2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(cegx^2 - (cd - be)f + (cef - cdg + beg)x\right)\left(ce^2x^2 + be^2x - cd^2 + bde\right)^p (ex + d)^m \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*e*g*x^2 - (c*d - b*e)*f + (c*e*f - c*d*g + b*e*g)*x)*(c*e^2*x^2 + b*e
```

```
[Out] integrate((c*e*g*x^2 - (c*d - b*e)*f + (c*e*f - c*d*g + b*e*g)*x)
*(c*e^2*x^2 + b*e^2*x - c*d^2 + b*d*e)^p*(e*x + d)^m, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(cegx^2 - (cd - be)f + (cef - (cd - be)g)x\right)\left(ce^2x^2 + be^2x - cd^2 + bde\right)^p (ex + d)^m, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*e*g*x^2 - (c*d - b*e)*f + (c*e*f - c*d*g + b*e*g)*x)*(c*e^2*x^2 + b*e
```

```
[Out] integral((c*e*g*x^2 - (c*d - b*e)*f + (c*e*f - (c*d - b*e)*g)*x)*
(c*e^2*x^2 + b*e^2*x - c*d^2 + b*d*e)^p*(e*x + d)^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((e*x+d)**m*(c*e**2*x**2+b*e**2*x+b*d*e-c*d**2)**p*(-(-
b*e+c*d)*f+(b*e*g-c*d*g+c*e*f)*x+c*e*g*x**2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(cegx^2 - (cd - be)f + (cef - cdg + beg)x\right)\left(ce^2x^2 + be^2x - cd^2 + bde\right)^p (ex + d)^m \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*e*g*x^2 - (c*d - b*e)*f + (c*e*f - c*d*g + b*e*g)*x)*(c*e^2*x^2 + b*e
```

```
[Out] integrate((c*e*g*x^2 - (c*d - b*e)*f + (c*e*f - c*d*g + b*e*g)*x)
*(c*e^2*x^2 + b*e^2*x - c*d^2 + b*d*e)^p*(e*x + d)^m, x)
```

3.140 $\int \left(a+b x+c x^2\right)^4 \left(A+C x^2\right) \, dx$

Optimal. Leaf size=254

$$a^4 A x+2 a^3 A b x^2+a b x^4 \left(a^2 C+A \left(3 a c+b^2\right)\right)+\frac{1}{3} a^2 x^3 \left(a^2 C+4 a A c+6 A b^2\right)+\frac{1}{7} x^7 \left(C \left(6 a^2 c^2+12 a b^2 c+b^4\right)+2 A c^2 \left(2 a c+3 b^2\right)\right)+\frac{1}{5} x^5 \left(A \left(6 a^2 c^2+12 a b^2 c+b^4\right)+2 a^2 C \left(2 a c+3 b^2\right)\right)+\frac{1}{9} c^2 x^9 \left(4 a c C+A c^2+6 b^2 C\right)+\frac{1}{2} b c x^8 \left(C \left(3 a c+b^2\right)+A c^2\right)+\frac{2}{3} b x^6 \left(3 a c+b^2\right) (a C+A c)+\frac{2}{5} b c^3 C x^{10}+\frac{1}{11} c^4 C x^{11}$$

```
[Out] a^4*A*x + 2*a^3*A*b*x^2 + (a^2*(6*A*b^2 + 4*a*A*c + a^2*C)*x^3)/3
 + a*b*(A*(b^2 + 3*a*c) + a^2*C)*x^4 + ((A*(b^4 + 12*a*b^2*c + 6*
a^2*c^2) + 2*a^2*(3*b^2 + 2*a*c)*C)*x^5)/5 + (2*b*(b^2 + 3*a*c)*(
A*c + a*C)*x^6)/3 + ((2*A*c^2*(3*b^2 + 2*a*c) + (b^4 + 12*a*b^2*c
 + 6*a^2*c^2)*C)*x^7)/7 + (b*c*(A*c^2 + (b^2 + 3*a*c)*C)*x^8)/2 +
 (c^2*(A*c^2 + 6*b^2*C + 4*a*c*C)*x^9)/9 + (2*b*c^3*C*x^10)/5 + (
c^4*C*x^11)/11
```

Rubi [A] time = 0.661411, antiderivative size = 254, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.05

$$a^4 A x+2 a^3 A b x^2+a b x^4 \left(a^2 C+A \left(3 a c+b^2\right)\right)+\frac{1}{3} a^2 x^3 \left(a^2 C+4 a A c+6 A b^2\right)+\frac{1}{7} x^7 \left(C \left(6 a^2 c^2+12 a b^2 c+b^4\right)+2 A c^2 \left(2 a c+3 b^2\right)\right)+\frac{1}{5} x^5 \left(A \left(6 a^2 c^2+12 a b^2 c+b^4\right)+2 a^2 C \left(2 a c+3 b^2\right)\right)+\frac{1}{9} c^2 x^9 \left(4 a c C+A c^2+6 b^2 C\right)+\frac{1}{2} b c x^8 \left(C \left(3 a c+b^2\right)+A c^2\right)+\frac{2}{3} b x^6 \left(3 a c+b^2\right) (a C+A c)+\frac{2}{5} b c^3 C x^{10}+\frac{1}{11} c^4 C x^{11}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b*x + c*x^2)^4*(A + C*x^2),x]
```


```
[Out] a^4*A*x + 2*a^3*A*b*x^2 + (a^2*(6*A*b^2 + 4*a*A*c + a^2*C)*x^3)/3
 + a*b*(A*(b^2 + 3*a*c) + a^2*C)*x^4 + ((A*(b^4 + 12*a*b^2*c + 6*
a^2*c^2) + 2*a^2*(3*b^2 + 2*a*c)*C)*x^5)/5 + (2*b*(b^2 + 3*a*c)*(
A*c + a*C)*x^6)/3 + ((2*A*c^2*(3*b^2 + 2*a*c) + (b^4 + 12*a*b^2*c
 + 6*a^2*c^2)*C)*x^7)/7 + (b*c*(A*c^2 + (b^2 + 3*a*c)*C)*x^8)/2 +
 (c^2*(A*c^2 + 6*b^2*C + 4*a*c*C)*x^9)/9 + (2*b*c^3*C*x^10)/5 + (
c^4*C*x^11)/11
```

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

$$4Aa^3b\int x\,dx+\frac{2Cbc^3x^{10}}{5}+\frac{Cc^4x^{11}}{11}+a^4\int A\,dx+\frac{a^2x^3\left(4Aac+6Ab^2+Ca^2\right)}{3}+abx^4\left(3Aac+Ab^2+Ca^2\right)+\frac{bcx^8\left(Ac^2+3Cac+Cb^2\right)}{2}+\frac{2bx^6\left(Ac+Ca\right)\left(3ac+b^2\right)}{3}+\frac{c^2x^9\left(Ac^2+4Cac+6Cb^2\right)}{9}+x^7\left(\frac{4Aac^3}{7}+\frac{6Ab^2c^2}{7}+\frac{6Ca^2c^2}{7}+\frac{12Cab^2c}{7}+\frac{Cb^4}{7}\right)+x^5\left(\frac{6Aa^2c^2}{5}+\frac{12Aab^2c}{5}+\frac{Ab^4}{5}+\frac{4Ca^3c}{5}+\frac{6Ca^2b^2}{5}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+b*x+a)**4*(C*x**2+A),x)
```

```
[Out] 4*A*a**3*b*Integral(x, x) + 2*C*b*c**3*x**10/5 + C*c**4*x**11/11
+ a**4*Integral(A, x) + a**2*x**3*(4*A*a*c + 6*A*b**2 + C*a**2)/3
 + a*b*x**4*(3*A*a*c + A*b**2 + C*a**2) + b*c*x**8*(A*c**2 + 3*C*
a*c + C*b**2)/2 + 2*b*x**6*(A*c + C*a)*(3*a*c + b**2)/3 + c**2*x*
*9*(A*c**2 + 4*C*a*c + 6*C*b**2)/9 + x**7*(4*A*a*c**3/7 + 6*A*b**
2*c**2/7 + 6*C*a**2*c**2/7 + 12*C*a*b**2*c/7 + C*b**4/7) + x**5*(
6*A*a**2*c**2/5 + 12*A*a*b**2*c/5 + A*b**4/5 + 4*C*a**3*c/5 + 6*C
*a**2*b**2/5)
```

Mathematica [A] time = 0.155676, size = 256, normalized size = 1.01

$$a^4Ax+2a^3Abx^2+abx^4\left(a^2C+3aAc+Ab^2\right)+\frac{1}{3}a^2x^3\left(a^2C+4aAc+6Ab^2\right)+\frac{1}{7}x^7\left(6a^2c^2C+4aAc^3+12ab^2cC+6Ab^2c^2+b^4C\right)+\frac{1}{5}x^5\left(4a^3cC+6a^2Ac^2+6a^2b^2C+12aAb^2c+Ab^4\right)+\frac{1}{9}c^2x^9\left(4acC+Ac^2+6b^2C\right)+\frac{1}{2}bcx^8\left(3acC+Ac^2+b^2C\right)+\frac{2}{3}bx^6\left(3ac+b^2\right)\left(aC+Ac\right)+\frac{2}{5}bc^3Cx^{10}+\frac{1}{11}c^4Cx^{11}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b*x + c*x^2)^4*(A + C*x^2),x]
```

```
[Out] a^4*A*x + 2*a^3*A*b*x^2 + (a^2*(6*A*b^2 + 4*a*A*c + a^2*C)*x^3)/3
 + a*b*(A*b^2 + 3*a*A*c + a^2*C)*x^4 + ((A*b^4 + 12*a*A*b^2*c + 6
*a^2*A*c^2 + 6*a^2*b^2*C + 4*a^3*c*C)*x^5)/5 + (2*b*(b^2 + 3*a*c)
*(A*c + a*C)*x^6)/3 + ((6*A*b^2*c^2 + 4*a*A*c^3 + b^4*C + 12*a*b^
2*c*C + 6*a^2*c^2*C)*x^7)/7 + (b*c*(A*c^2 + b^2*C + 3*a*c*C)*x^8)
/2 + (c^2*(A*c^2 + 6*b^2*C + 4*a*c*C)*x^9)/9 + (2*b*c^3*C*x^10)/5
```

```
+ (c^4*C*x^11)/11
```

Maple [A] time = 0.002, size = 343, normalized size = 1.4

$$\frac{c^4Cx^{11}}{11}+\frac{2\,bc^3Cx^{10}}{5}+\frac{\left(\left(2\,\left(2\,ac+b^2\right)c^2+4\,b^2c^2\right)C+c^4A\right)x^9}{9}+\frac{\left(\left(4\,abc^2+4\,\left(2\,ac+b^2\right)bc\right)C+4\,bc^3A\right)x^8}{8}+\frac{\left(\left(2\,a^2c^2+8\,ab^2c+\left(2\,ac+b^2\right)^2\right)C+\left(2\,\left(2\,ac+b^2\right)c^2+4\,b^2c^2\right)A\right)x^7}{7}+\frac{\left(\left(4\,a^2bc+4\,ab\left(2\,ac+b^2\right)\right)C+\left(4\,abc^2+4\,\left(2\,ac+b^2\right)bc\right)A\right)x^6}{6}+\frac{\left(\left(2\,a^2\left(2\,ac+b^2\right)+4\,a^2b^2\right)C+\left(2\,a^2c^2+8\,ab^2c+\left(2\,ac+b^2\right)^2\right)A\right)x^5}{5}+\frac{\left(4\,a^3bC+\left(4\,a^2bc+4\,ab\left(2\,ac+b^2\right)\right)A\right)x^4}{4}+\frac{\left(a^4C+\left(2\,a^2\left(2\,ac+b^2\right)+4\,a^2b^2\right)A\right)x^3}{3}+2\,a^3Abx^2+a^4Ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+b*x+a)^4*(C*x^2+A),x)
```

```
[Out] 1/11*c^4*C*x^11+2/5*b*c^3*C*x^10+1/9*((2*(2*a*c+b^2)*c^2+4*b^2*c^
2)*C+c^4*A)*x^9+1/8*((4*a*b*c^2+4*(2*a*c+b^2)*b*c)*C+4*b*c^3*A)*x
^8+1/7*((2*a^2*c^2+8*a*b^2*c+(2*a*c+b^2)^2)*C+(2*(2*a*c+b^2)*c^2+
4*b^2*c^2)*A)*x^7+1/6*((4*a^2*b*c+4*a*b*(2*a*c+b^2))*C+(4*a*b*c^2
+4*(2*a*c+b^2)*b*c)*A)*x^6+1/5*((2*a^2*(2*a*c+b^2)+4*a^2*b^2)*C+(
2*a^2*c^2+8*a*b^2*c+(2*a*c+b^2)^2)*A)*x^5+1/4*(4*a^3*b*C+(4*a^2*b
*c+4*a*b*(2*a*c+b^2))*A)*x^4+1/3*(a^4*C+(2*a^2*(2*a*c+b^2)+4*a^2*
b^2)*A)*x^3+2*a^3*A*b*x^2+a^4*A*x
```

Maxima [A] time = 0.685868, size = 355, normalized size = 1.4

$$\frac{1}{11}\,Cc^4x^{11}+\frac{2}{5}\,Cbc^3x^{10}+\frac{1}{9}\left(6\,Cb^2c^2+4\,Cac^3+Ac^4\right)x^9+\frac{1}{2}\left(Cb^3c+3\,Cabc^2+Abc^3\right)x^8+\frac{1}{7}\left(Cb^4+12\,Cab^2c+4\,Aac^3+6\left(Ca^2+Ab^2\right)c^2\right)x^7+2\,Aa^3bx^2+\frac{2}{3}\left(Cab^3+3\,Aabc^2+\left(3\,Ca^2b+Ab^3\right)c\right)x^6+Aa^4x+\frac{1}{5}\left(6\,Ca^2b^2+Ab^4+6\,Aa^2c^2+4\left(Ca^3+3\,Aab^2\right)c\right)x^5+\left(Ca^3b+Aab^3+3\,Aa^2bc\right)x^4+\frac{1}{3}\left(Ca^4+6\,Aa^2b^2+4\,Aa^3c\right)x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)*(c*x^2 + b*x + a)^4,x, algorithm="maxima")
```

```
[Out] 1/11*C*c^4*x^11 + 2/5*C*b*c^3*x^10 + 1/9*(6*C*b^2*c^2 + 4*C*a*c^3
 + A*c^4)*x^9 + 1/2*(C*b^3*c + 3*C*a*b*c^2 + A*b*c^3)*x^8 + 1/7*(
C*b^4 + 12*C*a*b^2*c + 4*A*a*c^3 + 6*(C*a^2 + A*b^2)*c^2)*x^7 + 2
*A*a^3*b*x^2 + 2/3*(C*a*b^3 + 3*A*a*b*c^2 + (3*C*a^2*b + A*b^3)*c
)*x^6 + A*a^4*x + 1/5*(6*C*a^2*b^2 + A*b^4 + 6*A*a^2*c^2 + 4*(C*a
^3 + 3*A*a*b^2)*c)*x^5 + (C*a^3*b + A*a*b^3 + 3*A*a^2*b*c)*x^4 +
1/3*(C*a^4 + 6*A*a^2*b^2 + 4*A*a^3*c)*x^3
```

Fricas [A] time = 0.233676, size = 1, normalized size = 0.

$$\frac{1}{11}x^{11}c^4C + \frac{2}{5}x^{10}c^3bC + \frac{2}{3}x^9c^2b^2C + \frac{4}{9}x^9c^3aC + \frac{1}{9}x^9c^4A + \frac{1}{2}x^8cb^3C + \frac{3}{2}x^8c^2baC + \frac{1}{2}x^8c^3bA + \frac{1}{7}x^7b^4C + \frac{12}{7}x^7cb^2aC + \frac{6}{7}x^7c^2a^2C + \frac{6}{7}x^7c^2b^2A + \frac{4}{7}x^7c^3aA + \frac{2}{3}x^6b^3aC + 2x^6cba^2C + \frac{2}{3}x^6cb^3A + 2x^6c^2baA + \frac{6}{5}x^5b^2a^2C + \frac{4}{5}x^5ca^3C + \frac{1}{5}x^5b^4A + \frac{12}{5}x^5cb^2aA + \frac{6}{5}x^5c^2a^2A + x^4ba^3C + x^4b^3aA + 3x^4cba^2A + \frac{1}{3}x^3a^4C + 2x^3b^2a^2A + \frac{4}{3}x^3ca^3A + 2x^2ba^3A + xa^4A$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)*(c*x^2 + b*x + a)^4,x, algorithm="fricas")
```

```
[Out] 1/11*x^11*c^4*C + 2/5*x^10*c^3*b*C + 2/3*x^9*c^2*b^2*C + 4/9*x^9*
c^3*a*C + 1/9*x^9*c^4*A + 1/2*x^8*c*b^3*C + 3/2*x^8*c^2*b*a*C + 1
/2*x^8*c^3*b*A + 1/7*x^7*b^4*C + 12/7*x^7*c*b^2*a*C + 6/7*x^7*c^2
*a^2*C + 6/7*x^7*c^2*b^2*A + 4/7*x^7*c^3*a*A + 2/3*x^6*b^3*a*C +
2*x^6*c*b*a^2*C + 2/3*x^6*c*b^3*A + 2*x^6*c^2*b*a*A + 6/5*x^5*b^2
*a^2*C + 4/5*x^5*c*a^3*C + 1/5*x^5*b^4*A + 12/5*x^5*c*b^2*a*A + 6
/5*x^5*c^2*a^2*A + x^4*b*a^3*C + x^4*b^3*a*A + 3*x^4*c*b*a^2*A +
1/3*x^3*a^4*C + 2*x^3*b^2*a^2*A + 4/3*x^3*c*a^3*A + 2*x^2*b*a^3*A
 + x*a^4*A
```

Sympy [A] time = 0.131123, size = 320, normalized size = 1.26

$$Aa^4x + 2Aa^3bx^2 + \frac{2Cbc^3x^{10}}{5} + \frac{Cc^4x^{11}}{11} + x^9\left(\frac{Ac^4}{9} + \frac{4Cac^3}{9} + \frac{2Cb^2c^2}{3}\right) + x^8\left(\frac{Abc^3}{2} + \frac{3Cabc^2}{2} + \frac{Cb^3c}{2}\right) + x^7\left(\frac{4Aac^3}{7} + \frac{6Ab^2c^2}{7} + \frac{6Ca^2c^2}{7} + \frac{12Cab^2c}{7} + \frac{Cb^4}{7}\right) + x^6\left(2Aabc^2 + \frac{2Ab^3c}{3} + 2Ca^2bc + \frac{2Cab^3}{3}\right) + x^5\left(\frac{6Aa^2c^2}{5} + \frac{12Aab^2c}{5} + \frac{Ab^4}{5} + \frac{4Ca^3c}{5} + \frac{6Ca^2b^2}{5}\right) + x^4\left(3Aa^2bc + Aab^3 + Ca^3b\right) + x^3\left(\frac{4Aa^3c}{3} + 2Aa^2b^2 + \frac{Ca^4}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+b*x+a)**4*(C*x**2+A),x)
```

```
[Out] A*a**4*x + 2*A*a**3*b*x**2 + 2*C*b*c**3*x**10/5 + C*c**4*x**11/11
 + x**9*(A*c**4/9 + 4*C*a*c**3/9 + 2*C*b**2*c**2/3) + x**8*(A*b*c
**3/2 + 3*C*a*b*c**2/2 + C*b**3*c/2) + x**7*(4*A*a*c**3/7 + 6*A*b
**2*c**2/7 + 6*C*a**2*c**2/7 + 12*C*a*b**2*c/7 + C*b**4/7) + x**6
*(2*A*a*b*c**2 + 2*A*b**3*c/3 + 2*C*a**2*b*c + 2*C*a*b**3/3) + x*
*5*(6*A*a**2*c**2/5 + 12*A*a*b**2*c/5 + A*b**4/5 + 4*C*a**3*c/5 +
 6*C*a**2*b**2/5) + x**4*(3*A*a**2*b*c + A*a*b**3 + C*a**3*b) + x
**3*(4*A*a**3*c/3 + 2*A*a**2*b**2 + C*a**4/3)
```

GIAC/XCAS [A] time = 0.27224, size = 416, normalized size = 1.64

$$\frac{1}{11}Cc^4x^{11} + \frac{2}{5}Cbc^3x^{10} + \frac{2}{3}Cb^2c^2x^9 + \frac{4}{9}Cac^3x^9 + \frac{1}{9}Ac^4x^9 + \frac{1}{2}Cb^3cx^8 + \frac{3}{2}Cabc^2x^8 + \frac{1}{2}Abc^3x^8 + \frac{1}{7}Cb^4x^7 + \frac{12}{7}Cab^2cx^7 + \frac{6}{7}Ca^2c^2x^7 + \frac{6}{7}Ab^2c^2x^7 + \frac{4}{7}Aac^3x^7 + \frac{2}{3}Cab^3x^6 + 2\,Ca^2bcx^6 + \frac{2}{3}Ab^3cx^6 + 2\,Aabc^2x^6 + \frac{6}{5}Ca^2b^2x^5 + \frac{1}{5}Ab^4x^5 + \frac{4}{5}Ca^3cx^5 + \frac{12}{5}Aab^2cx^5 + \frac{6}{5}Aa^2c^2x^5 + Ca^3bx^4 + Aab^3x^4 + 3\,Aa^2bcx^4 + \frac{1}{3}Ca^4x^3 + 2\,Aa^2b^2x^3 + \frac{4}{3}Aa^3cx^3 + 2\,Aa^3bx^2 + Aa^4x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)*(c*x^2 + b*x + a)^4,x, algorithm="giac")
```

```
[Out] 1/11*C*c^4*x^11 + 2/5*C*b*c^3*x^10 + 2/3*C*b^2*c^2*x^9 + 4/9*C*a*
c^3*x^9 + 1/9*A*c^4*x^9 + 1/2*C*b^3*c*x^8 + 3/2*C*a*b*c^2*x^8 + 1
/2*A*b*c^3*x^8 + 1/7*C*b^4*x^7 + 12/7*C*a*b^2*c*x^7 + 6/7*C*a^2*c
^2*x^7 + 6/7*A*b^2*c^2*x^7 + 4/7*A*a*c^3*x^7 + 2/3*C*a*b^3*x^6 +
2*C*a^2*b*c*x^6 + 2/3*A*b^3*c*x^6 + 2*A*a*b*c^2*x^6 + 6/5*C*a^2*b
^2*x^5 + 1/5*A*b^4*x^5 + 4/5*C*a^3*c*x^5 + 12/5*A*a*b^2*c*x^5 + 6
```

```
/5*A*a^2*c^2*x^5 + C*a^3*b*x^4 + A*a*b^3*x^4 + 3*A*a^2*b*c*x^4 +
1/3*C*a^4*x^3 + 2*A*a^2*b^2*x^3 + 4/3*A*a^3*c*x^3 + 2*A*a^3*b*x^2
 + A*a^4*x
```

3.141 $\int \left(a+bx+cx^2\right)^3 \left(A+Cx^2\right)\, dx$

Optimal. Leaf size=161

$$a^3Ax+\frac{1}{4}bx^4\left(3a^2C+A\left(6ac+b^2\right)\right)+\frac{1}{3}ax^3\left(a^2C+3A\left(ac+b^2\right)\right)+\frac{3}{2}a^2Abx^2+\frac{1}{7}cx^7\left(3C\left(ac+b^2\right)+Ac^2\right)+\frac{1}{6}bx^6\left(C\left(6ac+b^2\right)+3Ac^2\right)+\frac{3}{5}x^5\left(ac+b^2\right)(aC+Ac)+\frac{3}{8}bc^2Cx^8+\frac{1}{9}c^3Cx^9$$

```
[Out] a^3*A*x + (3*a^2*A*b*x^2)/2 + (a*(3*A*(b^2 + a*c) + a^2*C)*x^3)/3
 + (b*(A*(b^2 + 6*a*c) + 3*a^2*C)*x^4)/4 + (3*(b^2 + a*c)*(A*c +
a*C)*x^5)/5 + (b*(3*A*c^2 + (b^2 + 6*a*c)*C)*x^6)/6 + (c*(A*c^2 +
 3*(b^2 + a*c)*C)*x^7)/7 + (3*b*c^2*C*x^8)/8 + (c^3*C*x^9)/9
```

Rubi [A] time = 0.412377, antiderivative size = 161, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.05$

$$a^3Ax+\frac{1}{4}bx^4\left(3a^2C+A\left(6ac+b^2\right)\right)+\frac{1}{3}ax^3\left(a^2C+3A\left(ac+b^2\right)\right)+\frac{3}{2}a^2Abx^2+\frac{1}{7}cx^7\left(3C\left(ac+b^2\right)+Ac^2\right)+\frac{1}{6}bx^6\left(C\left(6ac+b^2\right)+3Ac^2\right)+\frac{3}{5}x^5\left(ac+b^2\right)(aC+Ac)+\frac{3}{8}bc^2Cx^8+\frac{1}{9}c^3Cx^9$$

Antiderivative was successfully verified.

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

```
[Out] a^3*A*x + (3*a^2*A*b*x^2)/2 + (a*(3*A*(b^2 + a*c) + a^2*C)*x^3)/3
 + (b*(A*(b^2 + 6*a*c) + 3*a^2*C)*x^4)/4 + (3*(b^2 + a*c)*(A*c +
a*C)*x^5)/5 + (b*(3*A*c^2 + (b^2 + 6*a*c)*C)*x^6)/6 + (c*(A*c^2 +
 3*(b^2 + a*c)*C)*x^7)/7 + (3*b*c^2*C*x^8)/8 + (c^3*C*x^9)/9
```

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

$$3Aa^2b\int x\,dx+\frac{3Cbc^2x^8}{8}+\frac{Cc^3x^9}{9}+a^3\int A\,dx+\frac{ax^3\left(3Aac+3Ab^2+Ca^2\right)}{3}+\frac{bx^6\left(3Ac^2+6Cac+Cb^2\right)}{6}+\frac{bx^4\left(6Aac+Ab^2+3Ca^2\right)}{4}+\frac{cx^7\left(Ac^2+3Cac+3Cb^2\right)}{7}+\frac{3x^5(Ac+Ca)\left(ac+b^2\right)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 3*A*a**2*b*Integral(x, x) + 3*C*b*c**2*x**8/8 + C*c**3*x**9/9 + a
**3*Integral(A, x) + a*x**3*(3*A*a*c + 3*A*b**2 + C*a**2)/3 + b*x
**6*(3*A*c**2 + 6*C*a*c + C*b**2)/6 + b*x**4*(6*A*a*c + A*b**2 +
3*C*a**2)/4 + c*x**7*(A*c**2 + 3*C*a*c + 3*C*b**2)/7 + 3*x**5*(A*
c + C*a)*(a*c + b**2)/5
```

Mathematica [A] time = 0.100889, size = 163, normalized size = 1.01

$$a^3Ax+\frac{1}{4}bx^4\left(3a^2C+6aAc+Ab^2\right)+\frac{1}{3}ax^3\left(a^2C+3aAc+3Ab^2\right)+\frac{3}{2}a^2Abx^2+\frac{1}{7}cx^7\left(3acC+Ac^2+3b^2C\right)+\frac{1}{6}bx^6\left(6acC+3Ac^2+b^2C\right)+\frac{3}{5}x^5\left(ac+b^2\right)(aC+Ac)+\frac{3}{8}bc^2Cx^8+\frac{1}{9}c^3Cx^9$$

Antiderivative was successfully verified.

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

```
[Out] a^3*A*x + (3*a^2*A*b*x^2)/2 + (a*(3*A*b^2 + 3*a*A*c + a^2*C)*x^3)
/3 + (b*(A*b^2 + 6*a*A*c + 3*a^2*C)*x^4)/4 + (3*(b^2 + a*c)*(A*c
+ a*C)*x^5)/5 + (b*(3*A*c^2 + b^2*C + 6*a*c*C)*x^6)/6 + (c*(A*c^2
 + 3*b^2*C + 3*a*c*C)*x^7)/7 + (3*b*c^2*C*x^8)/8 + (c^3*C*x^9)/9
```

Maple [A] time = 0.001, size = 223, normalized size = 1.4

$$\frac{c^3Cx^9}{9}+\frac{3\,bc^2Cx^8}{8}+\frac{\left(\left(ac^2+2\,b^2c+c\left(2\,ac+b^2\right)\right)C+c^3A\right)x^7}{7}+\frac{\left(\left(4\,abc+b\left(2\,ac+b^2\right)\right)C+3\,bc^2A\right)x^6}{6}+\frac{\left(\left(a\left(2\,ac+b^2\right)+2\,ab^2+a^2c\right)C+\left(ac^2+2\,b^2c+c\left(2\,ac+b^2\right)\right)A\right)x^5}{5}+\frac{\left(3\,a^2bC+\left(4\,abc+b\left(2\,ac+b^2\right)\right)A\right)x^4}{4}+\frac{\left(a^3C+\left(a\left(2\,ac+b^2\right)+2\,ab^2+a^2c\right)A\right)x^3}{3}+\frac{3\,a^2Abx^2}{2}+a^3Ax$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/9*c^3*C*x^9+3/8*b*c^2*C*x^8+1/7*((a*c^2+2*b^2*c+c*(2*a*c+b^2))*
C+c^3*A)*x^7+1/6*((4*a*b*c+b*(2*a*c+b^2))*C+3*b*c^2*A)*x^6+1/5*((
a*(2*a*c+b^2)+2*a*b^2+a^2*c)*C+(a*c^2+2*b^2*c+c*(2*a*c+b^2))*A)*x
^5+1/4*(3*a^2*b*C+(4*a*b*c+b*(2*a*c+b^2))*A)*x^4+1/3*(a^3*C+(a*(2
```

```
*a*c+b^2)+2*a*b^2+a^2*c)*A)*x^3+3/2*a^2*A*b*x^2+a^3*A*x
```

Maxima [A] time = 0.688353, size = 223, normalized size = 1.39

$$\frac{1}{9}Cc^3x^9 + \frac{3}{8}Cbc^2x^8 + \frac{1}{7}\left(3\,Cb^2c + 3\,Cac^2 + Ac^3\right)x^7 + \frac{1}{6}\left(Cb^3 + 6\,Cabc + 3\,Abc^2\right)x^6 + \frac{3}{2}Aa^2bx^2 + \frac{3}{5}\left(Cab^2 + Aac^2 + \left(Ca^2 + Ab^2\right)c\right)x^5 + Aa^3x + \frac{1}{4}\left(3\,Ca^2b + Ab^3 + 6\,Aabc\right)x^4 + \frac{1}{3}\left(Ca^3 + 3\,Aab^2 + 3\,Aa^2c\right)x^3$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/9*C*c^3*x^9 + 3/8*C*b*c^2*x^8 + 1/7*(3*C*b^2*c + 3*C*a*c^2 + A*
c^3)*x^7 + 1/6*(C*b^3 + 6*C*a*b*c + 3*A*b*c^2)*x^6 + 3/2*A*a^2*b*
x^2 + 3/5*(C*a*b^2 + A*a*c^2 + (C*a^2 + A*b^2)*c)*x^5 + A*a^3*x +
 1/4*(3*C*a^2*b + A*b^3 + 6*A*a*b*c)*x^4 + 1/3*(C*a^3 + 3*A*a*b^2
 + 3*A*a^2*c)*x^3
```

Fricas [A] time = 0.236652, size = 1, normalized size = 0.01

$$\frac{1}{9}x^9c^3C + \frac{3}{8}x^8c^2bC + \frac{3}{7}x^7cb^2C + \frac{3}{7}x^7c^2aC + \frac{1}{7}x^7c^3A + \frac{1}{6}x^6b^3C + x^6cbaC + \frac{1}{2}x^6c^2bA + \frac{3}{5}x^5b^2aC + \frac{3}{5}x^5ca^2C + \frac{3}{5}x^5cb^2A + \frac{3}{5}x^5c^2aA + \frac{3}{4}x^4ba^2C + \frac{1}{4}x^4b^3A + \frac{3}{2}x^4cbaA + \frac{1}{3}x^3a^3C + x^3b^2aA + x^3ca^2A + \frac{3}{2}x^2ba^2A + xa^3A$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/9*x^9*c^3*C + 3/8*x^8*c^2*b*C + 3/7*x^7*c*b^2*C + 3/7*x^7*c^2*a
*C + 1/7*x^7*c^3*A + 1/6*x^6*b^3*C + x^6*c*b*a*C + 1/2*x^6*c^2*b*
A + 3/5*x^5*b^2*a*C + 3/5*x^5*c*a^2*C + 3/5*x^5*c*b^2*A + 3/5*x^5
*c^2*a*A + 3/4*x^4*b*a^2*C + 1/4*x^4*b^3*A + 3/2*x^4*c*b*a*A + 1/
3*x^3*a^3*C + x^3*b^2*a*A + x^3*c*a^2*A + 3/2*x^2*b*a^2*A + x*a^3
*A
```

Sympy [A] time = 0.100586, size = 197, normalized size = 1.22

$$Aa^3x + \frac{3Aa^2bx^2}{2} + \frac{3Cbc^2x^8}{8} + \frac{Cc^3x^9}{9} + x^7\left(\frac{Ac^3}{7} + \frac{3Cac^2}{7} + \frac{3Cb^2c}{7}\right) + x^6\left(\frac{Abc^2}{2} + Cabc + \frac{Cb^3}{6}\right) + x^5\left(\frac{3Aac^2}{5} + \frac{3Ab^2c}{5} + \frac{3Ca^2c}{5} + \frac{3Cab^2}{5}\right) + x^4\left(\frac{3Aabc}{2} + \frac{Ab^3}{4} + \frac{3Ca^2b}{4}\right) + x^3\left(Aa^2c + Aab^2 + \frac{Ca^3}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] A*a**3*x + 3*A*a**2*b*x**2/2 + 3*C*b*c**2*x**8/8 + C*c**3*x**9/9
+ x**7*(A*c**3/7 + 3*C*a*c**2/7 + 3*C*b**2*c/7) + x**6*(A*b*c**2/
2 + C*a*b*c + C*b**3/6) + x**5*(3*A*a*c**2/5 + 3*A*b**2*c/5 + 3*C
*a**2*c/5 + 3*C*a*b**2/5) + x**4*(3*A*a*b*c/2 + A*b**3/4 + 3*C*a*
*2*b/4) + x**3*(A*a**2*c + A*a*b**2 + C*a**3/3)
```

GIAC/XCAS [A] time = 0.269824, size = 252, normalized size = 1.57

$$\frac{1}{9}Cc^3x^9 + \frac{3}{8}Cbc^2x^8 + \frac{3}{7}Cb^2cx^7 + \frac{3}{7}Cac^2x^7 + \frac{1}{7}Ac^3x^7 + \frac{1}{6}Cb^3x^6 + Cabcx^6 + \frac{1}{2}Abc^2x^6 + \frac{3}{5}Cab^2x^5 + \frac{3}{5}Ca^2cx^5 + \frac{3}{5}Ab^2cx^5 + \frac{3}{5}Aac^2x^5 + \frac{3}{4}Ca^2bx^4 + \frac{1}{4}Ab^3x^4 + \frac{3}{2}Aabcx^4 + \frac{1}{3}Ca^3x^3 + Aab^2x^3 + Aa^2cx^3 + \frac{3}{2}Aa^2bx^2 + Aa^3x$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/9*C*c^3*x^9 + 3/8*C*b*c^2*x^8 + 3/7*C*b^2*c*x^7 + 3/7*C*a*c^2*x
^7 + 1/7*A*c^3*x^7 + 1/6*C*b^3*x^6 + C*a*b*c*x^6 + 1/2*A*b*c^2*x^
6 + 3/5*C*a*b^2*x^5 + 3/5*C*a^2*c*x^5 + 3/5*A*b^2*c*x^5 + 3/5*A*a
*c^2*x^5 + 3/4*C*a^2*b*x^4 + 1/4*A*b^3*x^4 + 3/2*A*a*b*c*x^4 + 1/
3*C*a^3*x^3 + A*a*b^2*x^3 + A*a^2*c*x^3 + 3/2*A*a^2*b*x^2 + A*a^3
*x
```

3.142 $\int \left(a+bx+cx^2\right)^2 \left(A+Cx^2\right) \, dx$

Optimal. Leaf size=96

$$\frac{1}{3}x^3 \left(a^2C+A\left(2ac+b^2\right)\right)+a^2Ax+\frac{1}{5}x^5 \left(C\left(2ac+b^2\right)+Ac^2\right)+\frac{1}{2}bx^4(aC+Ac)+aAbx^2+\frac{1}{3}bcCx^6+\frac{1}{7}c^2Cx^7$$

```
[Out] a^2*A*x + a*A*b*x^2 + ((A*(b^2 + 2*a*c) + a^2*C)*x^3)/3 + (b*(A*c
 + a*C)*x^4)/2 + ((A*c^2 + (b^2 + 2*a*c)*C)*x^5)/5 + (b*c*C*x^6)/
3 + (c^2*C*x^7)/7
```

Rubi [A] time = 0.228293, antiderivative size = 96, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.05$

$$\frac{1}{3}x^3 \left(a^2C+A\left(2ac+b^2\right)\right)+a^2Ax+\frac{1}{5}x^5 \left(C\left(2ac+b^2\right)+Ac^2\right)+\frac{1}{2}bx^4(aC+Ac)+aAbx^2+\frac{1}{3}bcCx^6+\frac{1}{7}c^2Cx^7$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b*x + c*x^2)^2*(A + C*x^2),x]
```

```
[Out] a^2*A*x + a*A*b*x^2 + ((A*(b^2 + 2*a*c) + a^2*C)*x^3)/3 + (b*(A*c
 + a*C)*x^4)/2 + ((A*c^2 + (b^2 + 2*a*c)*C)*x^5)/5 + (b*c*C*x^6)/
3 + (c^2*C*x^7)/7
```

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

$$2Aab \int x \, dx + \frac{Cbcx^6}{3} + \frac{Cc^2x^7}{7} + a^2 \int A \, dx + \frac{bx^4 (Ac+Ca)}{2} + x^5 \left(\frac{Ac^2}{5} + \frac{2Cac}{5} + \frac{Cb^2}{5}\right) + x^3 \left(\frac{2Aac}{3} + \frac{Ab^2}{3} + \frac{Ca^2}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+b*x+a)**2*(C*x**2+A),x)
```

```
[Out] 2*A*a*b*Integral(x, x) + C*b*c*x**6/3 + C*c**2*x**7/7 + a**2*Inte
gral(A, x) + b*x**4*(A*c + C*a)/2 + x**5*(A*c**2/5 + 2*C*a*c/5 +
C*b**2/5) + x**3*(2*A*a*c/3 + A*b**2/3 + C*a**2/3)
```

Mathematica [A] time = 0.0598682, size = 96, normalized size = 1.

$$\frac{1}{3}x^3\left(a^2C+2aAc+Ab^2\right)+a^2Ax+\frac{1}{5}x^5\left(2acC+Ac^2+b^2C\right)+\frac{1}{2}bx^4(aC+Ac)+aAbx^2+\frac{1}{3}bcCx^6+\frac{1}{7}c^2Cx^7$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b*x + c*x^2)^2*(A + C*x^2),x]
```

```
[Out] a^2*A*x + a*A*b*x^2 + ((A*b^2 + 2*a*A*c + a^2*C)*x^3)/3 + (b*(A*c
 + a*C)*x^4)/2 + ((A*c^2 + b^2*C + 2*a*c*C)*x^5)/5 + (b*c*C*x^6)/
3 + (c^2*C*x^7)/7
```

Maple [A] time = 0.002, size = 90, normalized size = 0.9

$$\frac{c^2Cx^7}{7}+\frac{bcCx^6}{3}+\frac{\left(Ac^2+\left(2\,ac+b^2\right)C\right)x^5}{5}+\frac{(2\,bcA+2\,abC)\,x^4}{4}+\frac{\left(A\left(2\,ac+b^2\right)+a^2C\right)x^3}{3}+aAbx^2+a^2Ax$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+b*x+a)^2*(C*x^2+A),x)
```

```
[Out] 1/7*c^2*C*x^7+1/3*b*c*C*x^6+1/5*(A*c^2+(2*a*c+b^2)*C)*x^5+1/4*(2*
A*b*c+2*C*a*b)*x^4+1/3*(A*(2*a*c+b^2)+a^2*C)*x^3+a*A*b*x^2+a^2*A*
x
```

Maxima [A] time = 0.684974, size = 117, normalized size = 1.22

$$\frac{1}{7}\,Cc^2x^7+\frac{1}{3}\,Cbcx^6+\frac{1}{5}\left(Cb^2+2\,Cac+Ac^2\right)x^5+Aabx^2+\frac{1}{2}\,(Cab+Abc)x^4+Aa^2x+\frac{1}{3}\left(Ca^2+Ab^2+2\,Aac\right)x^3$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/7*C*c^2*x^7 + 1/3*C*b*c*x^6 + 1/5*(C*b^2 + 2*C*a*c + A*c^2)*x^5
 + A*a*b*x^2 + 1/2*(C*a*b + A*b*c)*x^4 + A*a^2*x + 1/3*(C*a^2 + A
*b^2 + 2*A*a*c)*x^3
```

Fricas [A] time = 0.236878, size = 1, normalized size = 0.01

$$\frac{1}{7}x^7c^2C + \frac{1}{3}x^6cbC + \frac{1}{5}x^5b^2C + \frac{2}{5}x^5caC + \frac{1}{5}x^5c^2A + \frac{1}{2}x^4baC + \frac{1}{2}x^4cbA + \frac{1}{3}x^3a^2C + \frac{1}{3}x^3b^2A + \frac{2}{3}x^3caA + x^2baA + xa^2A$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/7*x^7*c^2*C + 1/3*x^6*c*b*C + 1/5*x^5*b^2*C + 2/5*x^5*c*a*C + 1
/5*x^5*c^2*A + 1/2*x^4*b*a*C + 1/2*x^4*c*b*A + 1/3*x^3*a^2*C + 1/
3*x^3*b^2*A + 2/3*x^3*c*a*A + x^2*b*a*A + x*a^2*A
```

Sympy [A] time = 0.075129, size = 102, normalized size = 1.06

$$Aa^2x + Aabx^2 + \frac{Cbcx^6}{3} + \frac{Cc^2x^7}{7} + x^5\left(\frac{Ac^2}{5} + \frac{2Cac}{5} + \frac{Cb^2}{5}\right) + x^4\left(\frac{Abc}{2} + \frac{Cab}{2}\right) + x^3\left(\frac{2Aac}{3} + \frac{Ab^2}{3} + \frac{Ca^2}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+b*x+a)**2*(C*x**2+A),x)
```

```
[Out] A*a**2*x + A*a*b*x**2 + C*b*c*x**6/3 + C*c**2*x**7/7 + x**5*(A*c*
*2/5 + 2*C*a*c/5 + C*b**2/5) + x**4*(A*b*c/2 + C*a*b/2) + x**3*(2
*A*a*c/3 + A*b**2/3 + C*a**2/3)
```

GIAC/XCAS [A] time = 0.270173, size = 134, normalized size = 1.4

$$\frac{1}{7}Cc^2x^7 + \frac{1}{3}Cbcx^6 + \frac{1}{5}Cb^2x^5 + \frac{2}{5}Cacx^5 + \frac{1}{5}Ac^2x^5 + \frac{1}{2}Cabx^4 + \frac{1}{2}Abcx^4 + \frac{1}{3}Ca^2x^3 + \frac{1}{3}Ab^2x^3 + \frac{2}{3}Aacx^3 + Aabx^2 + Aa^2x$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/7*C*c^2*x^7 + 1/3*C*b*c*x^6 + 1/5*C*b^2*x^5 + 2/5*C*a*c*x^5 + 1
/5*A*c^2*x^5 + 1/2*C*a*b*x^4 + 1/2*A*b*c*x^4 + 1/3*C*a^2*x^3 + 1/
3*A*b^2*x^3 + 2/3*A*a*c*x^3 + A*a*b*x^2 + A*a^2*x
```

3.143 $\int \left(a+bx+cx^2\right)\left(A+Cx^2\right)\,dx$

Optimal. Leaf size=46

$$\frac{1}{3}x^3(aC+Ac)+aAx+\frac{1}{2}Abx^2+\frac{1}{4}bCx^4+\frac{1}{5}cCx^5$$

```
[Out] a*A*x + (A*b*x^2)/2 + ((A*c + a*C)*x^3)/3 + (b*C*x^4)/4 + (c*C*x^
5)/5
```

Rubi [A] time = 0.0579627, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.056

$$\frac{1}{3}x^3(aC+Ac)+aAx+\frac{1}{2}Abx^2+\frac{1}{4}bCx^4+\frac{1}{5}cCx^5$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b*x + c*x^2)*(A + C*x^2),x]
```

```
[Out] a*A*x + (A*b*x^2)/2 + ((A*c + a*C)*x^3)/3 + (b*C*x^4)/4 + (c*C*x^
5)/5
```

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

$$Ab\int x\,dx+\frac{Cbx^4}{4}+\frac{Ccx^5}{5}+a\int A\,dx+x^3\left(\frac{Ac}{3}+\frac{Ca}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+b*x+a)*(C*x**2+A),x)
```

```
[Out] A*b*Integral(x, x) + C*b*x**4/4 + C*c*x**5/5 + a*Integral(A, x) +
 x**3*(A*c/3 + C*a/3)
```

Mathematica [A] time = 0.0177571, size = 46, normalized size = 1.

$$\frac{1}{3}x^3(aC+Ac)+aAx+\frac{1}{2}Abx^2+\frac{1}{4}bCx^4+\frac{1}{5}cCx^5$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b*x + c*x^2)*(A + C*x^2),x]
```

```
[Out] a*A*x + (A*b*x^2)/2 + ((A*c + a*C)*x^3)/3 + (b*C*x^4)/4 + (c*C*x^
5)/5
```

Maple [A] time = 0.001, size = 39, normalized size = 0.9

$$aAx + \frac{Abx^2}{2} + \frac{(Ac + aC)\,x^3}{3} + \frac{bCx^4}{4} + \frac{cCx^5}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+b*x+a)*(C*x^2+A),x)
```

```
[Out] a*A*x+1/2*A*b*x^2+1/3*(A*c+C*a)*x^3+1/4*b*C*x^4+1/5*c*C*x^5
```

Maxima [A] time = 0.693852, size = 51, normalized size = 1.11

$$\frac{1}{5}\,Ccx^5 + \frac{1}{4}\,Cbx^4 + \frac{1}{2}\,Abx^2 + \frac{1}{3}\,(Ca + Ac)x^3 + Aax$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/5*C*c*x^5 + 1/4*C*b*x^4 + 1/2*A*b*x^2 + 1/3*(C*a + A*c)*x^3 + A
*a*x
```

Fricas [A] time = 0.234215, size = 1, normalized size = 0.02

$$\frac{1}{5}x^5cC + \frac{1}{4}x^4bC + \frac{1}{3}x^3aC + \frac{1}{3}x^3cA + \frac{1}{2}x^2bA + xaA$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/5*x^5*c*C + 1/4*x^4*b*C + 1/3*x^3*a*C + 1/3*x^3*c*A + 1/2*x^2*b
*A + x*a*A
```

Sympy [A] time = 0.045794, size = 42, normalized size = 0.91

$$Aax + \frac{Abx^2}{2} + \frac{Cbx^4}{4} + \frac{Ccx^5}{5} + x^3\left(\frac{Ac}{3} + \frac{Ca}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+b*x+a)*(C*x**2+A),x)
```

```
[Out] A*a*x + A*b*x**2/2 + C*b*x**4/4 + C*c*x**5/5 + x**3*(A*c/3 + C*a/
3)
```

GIAC/XCAS [A] time = 0.269891, size = 54, normalized size = 1.17

$$\frac{1}{5}\,Ccx^5 + \frac{1}{4}\,Cbx^4 + \frac{1}{3}\,Cax^3 + \frac{1}{3}\,Acx^3 + \frac{1}{2}\,Abx^2 + Aax$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/5*C*c*x^5 + 1/4*C*b*x^4 + 1/3*C*a*x^3 + 1/3*A*c*x^3 + 1/2*A*b*x
^2 + A*a*x
```

3.144 $\int \frac{A+Cx^2}{a+bx+cx^2} \, dx$

Optimal. Leaf size=81

$$-\frac{\left(C\left(b^2-2ac\right)+2Ac^2\right)\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)}{c^2\sqrt{b^2-4ac}}-\frac{bC\log\left(a+bx+cx^2\right)}{2c^2}+\frac{Cx}{c}$$

```
[Out] (C*x)/c - ((2*A*c^2 + (b^2 - 2*a*c)*C)*ArcTanh[(b + 2*c*x)/Sqrt[b
^2 - 4*a*c]])/(c^2*Sqrt[b^2 - 4*a*c]) - (b*C*Log[a + b*x + c*x^2]
)/(2*c^2)
```

Rubi [A] time = 0.204936, antiderivative size = 81, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{\left(C\left(b^2-2ac\right)+2Ac^2\right)\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)}{c^2\sqrt{b^2-4ac}}-\frac{bC\log\left(a+bx+cx^2\right)}{2c^2}+\frac{Cx}{c}$$

Antiderivative was successfully verified.

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

```
[Out] (C*x)/c - ((2*A*c^2 + (b^2 - 2*a*c)*C)*ArcTanh[(b + 2*c*x)/Sqrt[b
^2 - 4*a*c]])/(c^2*Sqrt[b^2 - 4*a*c]) - (b*C*Log[a + b*x + c*x^2]
)/(2*c^2)
```

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

$$-\frac{Cb\log\left(a+bx+cx^2\right)}{2c^2}+\frac{\int C\,dx}{c}-\frac{\left(Cb^2+2c\left(Ac-Ca\right)\right)\operatorname{atanh}\left(\frac{b+2cx}{\sqrt{-4ac+b^2}}\right)}{c^2\sqrt{-4ac+b^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+A)/(c*x**2+b*x+a),x)
```

```
[Out] -C*b*log(a + b*x + c*x**2)/(2*c**2) + Integral(C, x)/c - (C*b**2
+ 2*c*(A*c - C*a))*atanh((b + 2*c*x)/sqrt(-4*a*c + b**2))/(c**2*s
qrt(-4*a*c + b**2))
```

Mathematica [A] time = 0.1592, size = 84, normalized size = 1.04

$$\frac{\left(-2acC+2Ac^2+b^2C\right)\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)}{c^2\sqrt{4ac-b^2}}-\frac{bC\log\left(a+bx+cx^2\right)}{2c^2}+\frac{Cx}{c}$$

Antiderivative was successfully verified.

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

```
[Out] (C*x)/c + ((2*A*c^2 + b^2*C - 2*a*c*C)*ArcTan[(b + 2*c*x)/Sqrt[-b
^2 + 4*a*c]])/(c^2*Sqrt[-b^2 + 4*a*c]) - (b*C*Log[a + b*x + c*x^2
])/(2*c^2)
```

Maple [A] time = 0.005, size = 140, normalized size = 1.7

$$\frac{Cx}{c}-\frac{Cb\ln\left(cx^2+bx+a\right)}{2c^2}+2\frac{A}{\sqrt{4ac-b^2}}\arctan\left(\frac{2cx+b}{\sqrt{4ac-b^2}}\right)$$
$$-2\frac{aC}{c\sqrt{4ac-b^2}}\arctan\left(\frac{2cx+b}{\sqrt{4ac-b^2}}\right)+\frac{Cb^2}{c^2}\arctan\left((2cx+b)\frac{1}{\sqrt{4ac-b^2}}\right)\frac{1}{\sqrt{4ac-b^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] C*x/c-1/2*b*C*ln(c*x^2+b*x+a)/c^2+2/(4*a*c-b^2)^(1/2)*arctan((2*c
*x+b)/(4*a*c-b^2)^(1/2))*A-2/c/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)
/(4*a*c-b^2)^(1/2))*a*C+1/c^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/
(4*a*c-b^2)^(1/2))*b^2*C
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.270546, size = 1, normalized size = 0.01

$$\left[\frac{\left(Cb^2-2\,Cac+2\,Ac^2\right)\log\left(-\frac{b^3-4\,abc+2\,\left(b^2c-4\,ac^2\right)x-\left(2\,c^2x^2+2\,bcx+b^2-2\,ac\right)\sqrt{b^2-4\,ac}}{cx^2+bx+a}\right)+\left(2\,Ccx-Cb\log\left(cx^2+bx+a\right)\right)\sqrt{b^2-4}}{2\,\sqrt{b^2-4\,ac}c^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] [1/2*((C*b^2 - 2*C*a*c + 2*A*c^2)*log(-(b^3 - 4*a*b*c + 2*(b^2*c
- 4*a*c^2)*x - (2*c^2*x^2 + 2*b*c*x + b^2 - 2*a*c)*sqrt(b^2 - 4*a
*c))/(c*x^2 + b*x + a)) + (2*C*c*x - C*b*log(c*x^2 + b*x + a))*sq
rt(b^2 - 4*a*c))/(sqrt(b^2 - 4*a*c)*c^2), 1/2*(2*(C*b^2 - 2*C*a*c
 + 2*A*c^2)*arctan(-sqrt(-b^2 + 4*a*c)*(2*c*x + b)/(b^2 - 4*a*c))
 + (2*C*c*x - C*b*log(c*x^2 + b*x + a))*sqrt(-b^2 + 4*a*c))/(sqrt
(-b^2 + 4*a*c)*c^2)]
```

Sympy [A] time = 2.02349, size = 413, normalized size = 5.1

$$\frac{Cx}{c}+\left(-\frac{Cb}{2c^2}-\frac{\sqrt{-4ac+b^2}\left(-2Ac^2+2Cac-Cb^2\right)}{2c^2\left(4ac-b^2\right)}\right)\log\left(x+\frac{-Abc-Cab-4ac^2\left(-\frac{Cb}{2c^2}-\frac{\sqrt{-4ac+b^2}\left(-2Ac^2+2Cac-Cb^2\right)}{2c^2(4ac-b^2)}\right)+b^2c\left(-\frac{Cb}{2c^2}-\frac{\sqrt{-4a}}{}\right.}{-2Ac^2+2Cac-Cb^2}\right.$$

$$+\left(-\frac{Cb}{2c^2}+\frac{\sqrt{-4ac+b^2}\left(-2Ac^2+2Cac-Cb^2\right)}{2c^2\left(4ac-b^2\right)}\right)\log\left(x+\frac{-Abc-Cab-4ac^2\left(-\frac{Cb}{2c^2}+\frac{\sqrt{-4ac+b^2}\left(-2Ac^2+2Cac-Cb^2\right)}{2c^2(4ac-b^2)}\right)+b^2c\left(-\frac{Cb}{2c^2}+\frac{\sqrt{-4ac}}{}\right.}{-2Ac^2+2Cac-Cb^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+A)/(c*x**2+b*x+a),x)
```

```
[Out] C*x/c + (-C*b/(2*c**2) - sqrt(-4*a*c + b**2)*(-2*A*c**2 + 2*C*a*c
 - C*b**2)/(2*c**2*(4*a*c - b**2)))*log(x + (-A*b*c - C*a*b - 4*a
*c**2*(-C*b/(2*c**2) - sqrt(-4*a*c + b**2)*(-2*A*c**2 + 2*C*a*c -
 C*b**2)/(2*c**2*(4*a*c - b**2))) + b**2*c*(-C*b/(2*c**2) - sqrt(
-4*a*c + b**2)*(-2*A*c**2 + 2*C*a*c - C*b**2)/(2*c**2*(4*a*c - b*
```

```
*2))))/(-2*A*c**2 + 2*C*a*c - C*b**2)) + (-C*b/(2*c**2) + sqrt(-4
*a*c + b**2)*(-2*A*c**2 + 2*C*a*c - C*b**2)/(2*c**2*(4*a*c - b**2
)))*log(x + (-A*b*c - C*a*b - 4*a*c**2*(-C*b/(2*c**2) + sqrt(-4*a
*c + b**2)*(-2*A*c**2 + 2*C*a*c - C*b**2)/(2*c**2*(4*a*c - b**2))
) + b**2*c*(-C*b/(2*c**2) + sqrt(-4*a*c + b**2)*(-2*A*c**2 + 2*C*
a*c - C*b**2)/(2*c**2*(4*a*c - b**2))))/(-2*A*c**2 + 2*C*a*c - C*
b**2))
```

GIAC/XCAS [A] time = 0.274364, size = 105, normalized size = 1.3

$$\frac{Cx}{c} - \frac{Cb\ln\left(cx^2 + bx + a\right)}{2\,c^2} + \frac{\left(Cb^2 - 2\,Cac + 2\,Ac^2\right)\arctan\left(\frac{2\,cx+b}{\sqrt{-b^2+4\,ac}}\right)}{\sqrt{-b^2 + 4\,ac}c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] C*x/c - 1/2*C*b*ln(c*x^2 + b*x + a)/c^2 + (C*b^2 - 2*C*a*c + 2*A*
c^2)*arctan((2*c*x + b)/sqrt(-b^2 + 4*a*c))/(sqrt(-b^2 + 4*a*c)*c
^2)
```

3.145 $\int \frac{A+Cx^2}{(a+bx+cx^2)^2}\,dx$

Optimal. Leaf size=100

$$\frac{4(aC+Ac)\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)}{(b^2-4ac)^{3/2}}-\frac{x\left(C\left(b^2-2ac\right)+2Ac^2\right)+bc\left(\frac{aC}{c}+A\right)}{c\left(b^2-4ac\right)\left(a+bx+cx^2\right)}$$

```
[Out] -((b*c*(A + (a*C)/c) + (2*A*c^2 + (b^2 - 2*a*c)*C)*x)/(c*(b^2 - 4
*a*c)*(a + b*x + c*x^2))) + (4*(A*c + a*C)*ArcTanh[(b + 2*c*x)/Sq
rt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(3/2)
```

Rubi [A] time = 0.171091, antiderivative size = 100, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$\frac{4(aC+Ac)\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)}{(b^2-4ac)^{3/2}}-\frac{x\left(C\left(b^2-2ac\right)+2Ac^2\right)+b(aC+Ac)}{c\left(b^2-4ac\right)\left(a+bx+cx^2\right)}$$

Antiderivative was successfully verified.

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

```
[Out] -((b*(A*c + a*C) + (2*A*c^2 + (b^2 - 2*a*c)*C)*x)/(c*(b^2 - 4*a*c
)*(a + b*x + c*x^2))) + (4*(A*c + a*C)*ArcTanh[(b + 2*c*x)/Sqrt[b
^2 - 4*a*c]])/(b^2 - 4*a*c)^(3/2)
```

Rubi in Sympy [A] time = 13.9339, size = 88, normalized size = 0.88

$$\frac{4\left(Ac+Ca\right)\operatorname{atanh}\left(\frac{b+2cx}{\sqrt{-4ac+b^2}}\right)}{\left(-4ac+b^2\right)^{\frac{3}{2}}}-\frac{b\left(Ac+Ca\right)+x\left(2Ac^2-2Cac+Cb^2\right)}{c\left(-4ac+b^2\right)\left(a+bx+cx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+A)/(c*x**2+b*x+a)**2,x)
```

```
[Out] 4*(A*c + C*a)*atanh((b + 2*c*x)/sqrt(-4*a*c + b**2))/(-4*a*c + b*
*2)**(3/2) - (b*(A*c + C*a) + x*(2*A*c**2 - 2*C*a*c + C*b**2))/(c
*(-4*a*c + b**2)*(a + b*x + c*x**2))
```

Mathematica [A] time = 0.147866, size = 98, normalized size = 0.98

$$\frac{aC(b-2cx)+Ac(b+2cx)+b^2Cx}{c\left(4ac-b^2\right)\left(a+x(b+cx)\right)}+\frac{4(aC+Ac)\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)}{\left(4ac-b^2\right)^{3/2}}$$

Antiderivative was successfully verified.

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

```
[Out] (b^2*C*x + a*C*(b - 2*c*x) + A*c*(b + 2*c*x))/(c*(-b^2 + 4*a*c)*(
a + x*(b + c*x))) + (4*(A*c + a*C)*ArcTan[(b + 2*c*x)/Sqrt[-b^2 +
 4*a*c]])/(-b^2 + 4*a*c)^(3/2)
```

Maple [A] time = 0.009, size = 146, normalized size = 1.5

$$\frac{1}{cx^2+bx+a}\left(\frac{\left(2\,Ac^2-2\,Cac+Cb^2\right)x}{c\left(4\,ac-b^2\right)}+\frac{b\left(Ac+aC\right)}{c\left(4\,ac-b^2\right)}\right)+4\,\frac{Ac}{\left(4\,ac-b^2\right)^{3/2}}\arctan\left(\frac{2\,cx+b}{\sqrt{4\,ac-b^2}}\right)+4\,\frac{aC}{\left(4\,ac-b^2\right)^{3/2}}\arctan\left(\frac{2\,cx+b}{\sqrt{4\,ac-b^2}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] ((2*A*c^2-2*C*a*c+C*b^2)/c/(4*a*c-b^2)*x+b/c*(A*c+C*a)/(4*a*c-b^2
))/(c*x^2+b*x+a)+4/(4*a*c-b^2)^(3/2)*arctan((2*c*x+b)/(4*a*c-b^2)
^(1/2))*A*c+4/(4*a*c-b^2)^(3/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2
))*a*C
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.271505, size = 1, normalized size = 0.01

$$\left[-\frac{2\left(Ca^2c + Aac^2 + \left(Cac^2 + Ac^3\right)x^2 + \left(Cabc + Abc^2\right)x\right)\log\left(-\frac{b^3-4\,abc+2\,(b^2c-4\,ac^2)\,x-(2\,c^2x^2+2\,bcx+b^2-2\,ac)\,\sqrt{b^2-4\,ac}}{cx^2+bx+a}\right) + \left(Cab + \right.}{(ab^2c - 4\,a^2c^2 + (b^2c^2 - 4\,ac^3)x^2 + (b^3c - 4\,abc^2)x)\sqrt{b^2 - 4\,ac}}\right.$$

$$-\frac{4\left(Ca^2c + Aac^2 + \left(Cac^2 + Ac^3\right)x^2 + \left(Cabc + Abc^2\right)x\right)\arctan\left(-\frac{\sqrt{-b^2+4\,ac}(2\,cx+b)}{b^2-4\,ac}\right) + \left(Cab + Abc + \left(Cb^2 - 2\,Cac + 2\,Ac^2\right)x\right)}{(ab^2c - 4\,a^2c^2 + (b^2c^2 - 4\,ac^3)x^2 + (b^3c - 4\,abc^2)x)\sqrt{-b^2 + 4\,ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] [-(2*(C*a^2*c + A*a*c^2 + (C*a*c^2 + A*c^3)*x^2 + (C*a*b*c + A*b*
c^2)*x)*log(-(b^3 - 4*a*b*c + 2*(b^2*c - 4*a*c^2)*x - (2*c^2*x^2
+ 2*b*c*x + b^2 - 2*a*c)*sqrt(b^2 - 4*a*c))/(c*x^2 + b*x + a)) +
(C*a*b + A*b*c + (C*b^2 - 2*C*a*c + 2*A*c^2)*x)*sqrt(b^2 - 4*a*c)
)/((a*b^2*c - 4*a^2*c^2 + (b^2*c^2 - 4*a*c^3)*x^2 + (b^3*c - 4*a*
b*c^2)*x)*sqrt(b^2 - 4*a*c)), -(4*(C*a^2*c + A*a*c^2 + (C*a*c^2 +
 A*c^3)*x^2 + (C*a*b*c + A*b*c^2)*x)*arctan(-sqrt(-b^2 + 4*a*c)*(
2*c*x + b)/(b^2 - 4*a*c)) + (C*a*b + A*b*c + (C*b^2 - 2*C*a*c + 2
*A*c^2)*x)*sqrt(-b^2 + 4*a*c))/((a*b^2*c - 4*a^2*c^2 + (b^2*c^2 -
 4*a*c^3)*x^2 + (b^3*c - 4*a*b*c^2)*x)*sqrt(-b^2 + 4*a*c))]
```

Sympy [A] time = 2.32732, size = 376, normalized size = 3.76

$$-2\sqrt{-\frac{1}{\left(4ac - b^2\right)^3}}\left(Ac + Ca\right)\log\left(x + \frac{2Abc + 2Cab - 32a^2c^2\sqrt{-\frac{1}{\left(4ac-b^2\right)^3}}\left(Ac + Ca\right) + 16ab^2c\sqrt{-\frac{1}{\left(4ac-b^2\right)^3}}\left(Ac + Ca\right) - 2b^4\sqrt{-\frac{1}{\left(4ac-b^2\right)^3}}\left(Ac + Ca\right)}{4Ac^2 + 4Cac}\right)$$
$$+ 2\sqrt{-\frac{1}{\left(4ac - b^2\right)^3}}\left(Ac + Ca\right)\log\left(x + \frac{2Abc + 2Cab + 32a^2c^2\sqrt{-\frac{1}{\left(4ac-b^2\right)^3}}\left(Ac + Ca\right) - 16ab^2c\sqrt{-\frac{1}{\left(4ac-b^2\right)^3}}\left(Ac + Ca\right) + 2b^4\sqrt{-\frac{1}{\left(4ac-b^2\right)^3}}\left(Ac + Ca\right)}{4Ac^2 + 4Cac}\right)$$
$$-\frac{-Abc - Cab + x\left(-2Ac^2 + 2Cac - Cb^2\right)}{4a^2c^2 - ab^2c + x^2\left(4ac^3 - b^2c^2\right) + x\left(4abc^2 - b^3c\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+A)/(c*x**2+b*x+a)**2,x)
```

```
[Out] -2*sqrt(-1/(4*a*c - b**2)**3)*(A*c + C*a)*log(x + (2*A*b*c + 2*C*
a*b - 32*a**2*c**2*sqrt(-1/(4*a*c - b**2)**3)*(A*c + C*a) + 16*a*
b**2*c*sqrt(-1/(4*a*c - b**2)**3)*(A*c + C*a) - 2*b**4*sqrt(-1/(4
*a*c - b**2)**3)*(A*c + C*a))/(4*A*c**2 + 4*C*a*c)) + 2*sqrt(-1/(
4*a*c - b**2)**3)*(A*c + C*a)*log(x + (2*A*b*c + 2*C*a*b + 32*a**
2*c**2*sqrt(-1/(4*a*c - b**2)**3)*(A*c + C*a) - 16*a*b**2*c*sqrt(
-1/(4*a*c - b**2)**3)*(A*c + C*a) + 2*b**4*sqrt(-1/(4*a*c - b**2)
**3)*(A*c + C*a))/(4*A*c**2 + 4*C*a*c)) - (-A*b*c - C*a*b + x*(-2
*A*c**2 + 2*C*a*c - C*b**2))/(4*a**2*c**2 - a*b**2*c + x**2*(4*a*
c**3 - b**2*c**2) + x*(4*a*b*c**2 - b**3*c))
```

GIAC/XCAS [A] time = 0.275287, size = 146, normalized size = 1.46

$$-\frac{4\,(Ca + Ac)\arctan\left(\frac{2\,cx+b}{\sqrt{-b^2+4\,ac}}\right)}{(b^2 - 4\,ac)\sqrt{-b^2 + 4\,ac}} - \frac{Cb^2x - 2\,Cacx + 2\,Ac^2x + Cab + Abc}{(b^2c - 4\,ac^2)(cx^2 + bx + a)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -4*(C*a + A*c)*arctan((2*c*x + b)/sqrt(-b^2 + 4*a*c))/((b^2 - 4*a
*c)*sqrt(-b^2 + 4*a*c)) - (C*b^2*x - 2*C*a*c*x + 2*A*c^2*x + C*a*
b + A*b*c)/((b^2*c - 4*a*c^2)*(c*x^2 + b*x + a))
```

3.146 $\int \frac{A+Cx^2}{(a+bx+cx^2)^3} dx$

Optimal. Leaf size=161

$$-\frac{x\left(C\left(b^2-2ac\right)+2Ac^2\right)+bc\left(\frac{aC}{c}+A\right)}{2c\left(b^2-4ac\right)\left(a+bx+cx^2\right)^2}-\frac{2\left(C\left(2ac+b^2\right)+6Ac^2\right)\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)}{\left(b^2-4ac\right)^{5/2}}+\frac{(b+2cx)\left(2aC+6Ac+\frac{b^2C}{c}\right)}{2\left(b^2-4ac\right)^2\left(a+bx+cx^2\right)}$$

```
[Out] -(b*c*(A + (a*C)/c) + (2*A*c^2 + (b^2 - 2*a*c)*C)*x)/(2*c*(b^2 -
4*a*c)*(a + b*x + c*x^2)^2) + ((6*A*c + 2*a*C + (b^2*C)/c)*(b + 2
*c*x))/(2*(b^2 - 4*a*c)^2*(a + b*x + c*x^2)) - (2*(6*A*c^2 + (b^2
 + 2*a*c)*C)*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c
)^(5/2)
```

Rubi [A] time = 0.27315, antiderivative size = 161, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$-\frac{x\left(C\left(b^2-2ac\right)+2Ac^2\right)+b(aC+Ac)}{2c\left(b^2-4ac\right)\left(a+bx+cx^2\right)^2}-\frac{2\left(C\left(2ac+b^2\right)+6Ac^2\right)\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)}{\left(b^2-4ac\right)^{5/2}}+\frac{(b+2cx)\left(2aC+6Ac+\frac{b^2C}{c}\right)}{2\left(b^2-4ac\right)^2\left(a+bx+cx^2\right)}$$

Antiderivative was successfully verified.

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

```
[Out] -(b*(A*c + a*C) + (2*A*c^2 + (b^2 - 2*a*c)*C)*x)/(2*c*(b^2 - 4*a*
c)*(a + b*x + c*x^2)^2) + ((6*A*c + 2*a*C + (b^2*C)/c)*(b + 2*c*x
))/(2*(b^2 - 4*a*c)^2*(a + b*x + c*x^2)) - (2*(6*A*c^2 + (b^2 + 2
*a*c)*C)*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(5
/2)
```

Rubi in Sympy [A] time = 23.0244, size = 150, normalized size = 0.93

$$-\frac{2\left(6Ac^2+C\left(2ac+b^2\right)\right)\operatorname{atanh}\left(\frac{b+2cx}{\sqrt{-4ac+b^2}}\right)}{\left(-4ac+b^2\right)^{\frac{5}{2}}}+\frac{(b+2cx)\left(6Ac^2+C\left(2ac+b^2\right)\right)}{2c\left(-4ac+b^2\right)^2\left(a+bx+cx^2\right)}-\frac{b\left(Ac+Ca\right)+x\left(2Ac^2-2Cac+Cb^2\right)}{2c\left(-4ac+b^2\right)\left(a+bx+cx^2\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -2*(6*A*c**2 + C*(2*a*c + b**2))*atanh((b + 2*c*x)/sqrt(-4*a*c +
b**2))/(-4*a*c + b**2)**(5/2) + (b + 2*c*x)*(6*A*c**2 + C*(2*a*c
+ b**2))/(2*c*(-4*a*c + b**2)**2*(a + b*x + c*x**2)) - (b*(A*c +
C*a) + x*(2*A*c**2 - 2*C*a*c + C*b**2))/(2*c*(-4*a*c + b**2)*(a +
 b*x + c*x**2)**2)
```

Mathematica [A] time = 0.376189, size = 160, normalized size = 0.99

$$\frac{1}{2}\left(\frac{(b+2cx)\left(C\left(2ac+b^2\right)+6Ac^2\right)}{c\left(b^2-4ac\right)^2(a+x(b+cx))}+\frac{4\left(C\left(2ac+b^2\right)+6Ac^2\right)\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)}{\left(4ac-b^2\right)^{5/2}}+\frac{aC(b-2cx)+Ac(b+2cx)+b^2Cx}{c\left(4ac-b^2\right)(a+x(b+cx))^2}\right)$$

Antiderivative was successfully verified.

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

```
[Out] (((6*A*c^2 + (b^2 + 2*a*c)*C)*(b + 2*c*x))/(c*(b^2 - 4*a*c)^2*(a
+ x*(b + c*x))) + (b^2*C*x + a*C*(b - 2*c*x) + A*c*(b + 2*c*x))/(
c*(-b^2 + 4*a*c)*(a + x*(b + c*x))^2) + (4*(6*A*c^2 + (b^2 + 2*a*
c)*C)*ArcTan[(b + 2*c*x)/Sqrt[-b^2 + 4*a*c]])/(-b^2 + 4*a*c)^(5/2
))/2
```

Maple [B] time = 0.014, size = 373, normalized size = 2.3

$$\frac{1}{\left(cx^2+bx+a\right)^2}\left(\frac{c\left(6\,Ac^2+2\,Cac+Cb^2\right)x^3}{16\,a^2c^2-8\,ab^2c+b^4}+\frac{3\,b\left(6\,Ac^2+2\,Cac+Cb^2\right)x^2}{32\,a^2c^2-16\,ab^2c+2\,b^4}+\frac{\left(10\,Aac^2+2\,Ab^2c-2\,Ca^2c+5\,Cab^2\right)x}{16\,a^2c^2-8\,ab^2c+b^4}+\frac{b\,(}{32}\right.$$
$$+12\,\frac{Ac^2}{\left(16\,a^2c^2-8\,ab^2c+b^4\right)\sqrt{4\,ac-b^2}}\arctan\left(\frac{2\,cx+b}{\sqrt{4\,ac-b^2}}\right)$$
$$+4\,\frac{Cac}{\left(16\,a^2c^2-8\,ab^2c+b^4\right)\sqrt{4\,ac-b^2}}\arctan\left(\frac{2\,cx+b}{\sqrt{4\,ac-b^2}}\right)$$
$$+2\,\frac{Cb^2}{\left(16\,a^2c^2-8\,ab^2c+b^4\right)\sqrt{4\,ac-b^2}}\arctan\left(\frac{2\,cx+b}{\sqrt{4\,ac-b^2}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] (c*(6*A*c^2+2*C*a*c+C*b^2)/(16*a^2*c^2-8*a*b^2*c+b^4)*x^3+3/2*b*(
6*A*c^2+2*C*a*c+C*b^2)/(16*a^2*c^2-8*a*b^2*c+b^4)*x^2+(10*A*a*c^2
+2*A*b^2*c-2*C*a^2*c+5*C*a*b^2)/(16*a^2*c^2-8*a*b^2*c+b^4)*x+1/2*
b*(10*A*a*c-A*b^2+6*C*a^2)/(16*a^2*c^2-8*a*b^2*c+b^4))/(c*x^2+b*x
+a)^2+12/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)^(1/2)*arctan((2*c
*x+b)/(4*a*c-b^2)^(1/2))*A*c^2+4/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*
c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*C*a*c+2/(16*a^2*
c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)
^(1/2))*C*b^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((C*x^2 + A)/(c*x^2 + b*x + a)^3,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.271711, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] [1/2*(2*(C*a^2*b^2 + 2*C*a^3*c + 6*A*a^2*c^2 + (C*b^2*c^2 + 2*C*a
*c^3 + 6*A*c^4)*x^4 + 2*(C*b^3*c + 2*C*a*b*c^2 + 6*A*b*c^3)*x^3 +
 (C*b^4 + 4*C*a*b^2*c + 12*A*a*c^3 + 2*(2*C*a^2 + 3*A*b^2)*c^2)*x
^2 + 2*(C*a*b^3 + 2*C*a^2*b*c + 6*A*a*b*c^2)*x)*log(-(b^3 - 4*a*b
*c + 2*(b^2*c - 4*a*c^2)*x - (2*c^2*x^2 + 2*b*c*x + b^2 - 2*a*c)*
sqrt(b^2 - 4*a*c))/(c*x^2 + b*x + a)) + (6*C*a^2*b - A*b^3 + 10*A
*a*b*c + 2*(C*b^2*c + 2*C*a*c^2 + 6*A*c^3)*x^3 + 3*(C*b^3 + 2*C*a
*b*c + 6*A*b*c^2)*x^2 + 2*(5*C*a*b^2 + 10*A*a*c^2 - 2*(C*a^2 - A*
b^2)*c)*x)*sqrt(b^2 - 4*a*c))/((a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^
2 + (b^4*c^2 - 8*a*b^2*c^3 + 16*a^2*c^4)*x^4 + 2*(b^5*c - 8*a*b^3
*c^2 + 16*a^2*b*c^3)*x^3 + (b^6 - 6*a*b^4*c + 32*a^3*c^3)*x^2 + 2
*(a*b^5 - 8*a^2*b^3*c + 16*a^3*b*c^2)*x)*sqrt(b^2 - 4*a*c)), 1/2*
(4*(C*a^2*b^2 + 2*C*a^3*c + 6*A*a^2*c^2 + (C*b^2*c^2 + 2*C*a*c^3
+ 6*A*c^4)*x^4 + 2*(C*b^3*c + 2*C*a*b*c^2 + 6*A*b*c^3)*x^3 + (C*b
```

```
^4 + 4*C*a*b^2*c + 12*A*a*c^3 + 2*(2*C*a^2 + 3*A*b^2)*c^2)*x^2 +
2*(C*a*b^3 + 2*C*a^2*b*c + 6*A*a*b*c^2)*x)*arctan(-sqrt(-b^2 + 4*
a*c)*(2*c*x + b)/(b^2 - 4*a*c)) + (6*C*a^2*b - A*b^3 + 10*A*a*b*c
 + 2*(C*b^2*c + 2*C*a*c^2 + 6*A*c^3)*x^3 + 3*(C*b^3 + 2*C*a*b*c +
 6*A*b*c^2)*x^2 + 2*(5*C*a*b^2 + 10*A*a*c^2 - 2*(C*a^2 - A*b^2)*c
)*x)*sqrt(-b^2 + 4*a*c))/((a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2 + (
b^4*c^2 - 8*a*b^2*c^3 + 16*a^2*c^4)*x^4 + 2*(b^5*c - 8*a*b^3*c^2
+ 16*a^2*b*c^3)*x^3 + (b^6 - 6*a*b^4*c + 32*a^3*c^3)*x^2 + 2*(a*b
^5 - 8*a^2*b^3*c + 16*a^3*b*c^2)*x)*sqrt(-b^2 + 4*a*c))]
```

Sympy [A] time = 4.67265, size = 774, normalized size = 4.81

$$-\sqrt{-\frac{1}{(4ac-b^2)^5}}\left(6Ac^2+2Cac+Cb^2\right)\log\left(x+\frac{6Abc^2+2Cabc+Cb^3-64a^3c^3\sqrt{-\frac{1}{(4ac-b^2)^5}}\left(6Ac^2+2Cac+Cb^2\right)+48a^2b^2c^2\sqrt{-\frac{1}{(4ac-b^2)^5}}\left(6Ac^2+2Cac+Cb^2\right)\cdots}{12Ac^3+4Cac^2+2Cb^2c}\right)$$
$$+\sqrt{-\frac{1}{(4ac-b^2)^5}}\left(6Ac^2+2Cac+Cb^2\right)\log\left(x+\frac{6Abc^2+2Cabc+Cb^3+64a^3c^3\sqrt{-\frac{1}{(4ac-b^2)^5}}\left(6Ac^2+2Cac+Cb^2\right)-48a^2b^2c^2\sqrt{-\frac{1}{(4ac-b^2)^5}}\left(6Ac^2+2Cac+Cb^2\right)\cdots}{12Ac^3+4Cac^2+2Cb^2c}\right)$$
$$+\frac{10Aabc-Ab^3+6Ca^2b+x^3\left(12Ac^3+4Cac^2+2Cb^2c\right)+x^2\left(18Abc^2+6Cabc+3Cb^3\right)+x\left(20Aac^2+4Ab^2c-\cdots\right)}{32a^4c^2-16a^3b^2c+2a^2b^4+x^4\left(32a^2c^4-16ab^2c^3+2b^4c^2\right)+x^3\left(64a^2bc^3-32ab^3c^2+4b^5c\right)+x^2\left(64a^3c^3-12ab^4c+2b^6\right)+\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -sqrt(-1/(4*a*c - b**2)**5)*(6*A*c**2 + 2*C*a*c + C*b**2)*log(x +
 (6*A*b*c**2 + 2*C*a*b*c + C*b**3 - 64*a**3*c**3*sqrt(-1/(4*a*c -
 b**2)**5)*(6*A*c**2 + 2*C*a*c + C*b**2) + 48*a**2*b**2*c**2*sqrt
(-1/(4*a*c - b**2)**5)*(6*A*c**2 + 2*C*a*c + C*b**2) - 12*a*b**4*
c*sqrt(-1/(4*a*c - b**2)**5)*(6*A*c**2 + 2*C*a*c + C*b**2) + b**6
*sqrt(-1/(4*a*c - b**2)**5)*(6*A*c**2 + 2*C*a*c + C*b**2))/(12*A*
c**3 + 4*C*a*c**2 + 2*C*b**2*c)) + sqrt(-1/(4*a*c - b**2)**5)*(6*
A*c**2 + 2*C*a*c + C*b**2)*log(x + (6*A*b*c**2 + 2*C*a*b*c + C*b*
*3 + 64*a**3*c**3*sqrt(-1/(4*a*c - b**2)**5)*(6*A*c**2 + 2*C*a*c
+ C*b**2) - 48*a**2*b**2*c**2*sqrt(-1/(4*a*c - b**2)**5)*(6*A*c**
2 + 2*C*a*c + C*b**2) + 12*a*b**4*c*sqrt(-1/(4*a*c - b**2)**5)*(6
*A*c**2 + 2*C*a*c + C*b**2) - b**6*sqrt(-1/(4*a*c - b**2)**5)*(6*
A*c**2 + 2*C*a*c + C*b**2))/(12*A*c**3 + 4*C*a*c**2 + 2*C*b**2*c)
) + (10*A*a*b*c - A*b**3 + 6*C*a**2*b + x**3*(12*A*c**3 + 4*C*a*c
**2 + 2*C*b**2*c) + x**2*(18*A*b*c**2 + 6*C*a*b*c + 3*C*b**3) + x
*(20*A*a*c**2 + 4*A*b**2*c - 4*C*a**2*c + 10*C*a*b**2))/(32*a**4*
```

```
c**2 - 16*a**3*b**2*c + 2*a**2*b**4 + x**4*(32*a**2*c**4 - 16*a*b
**2*c**3 + 2*b**4*c**2) + x**3*(64*a**2*b*c**3 - 32*a*b**3*c**2 +
 4*b**5*c) + x**2*(64*a**3*c**3 - 12*a*b**4*c + 2*b**6) + x*(64*a
**3*b*c**2 - 32*a**2*b**3*c + 4*a*b**5))
```

GIAC/XCAS [A] time = 0.275657, size = 293, normalized size = 1.82

$$\frac{2\left(Cb^2 + 2\,Cac + 6\,Ac^2\right)\arctan\left(\frac{2\,cx+b}{\sqrt{-b^2+4\,ac}}\right)}{(b^4 - 8\,ab^2c + 16\,a^2c^2)\sqrt{-b^2 + 4\,ac}} + \frac{2\,Cb^2cx^3 + 4\,Cac^2x^3 + 12\,Ac^3x^3 + 3\,Cb^3x^2 + 6\,Cabcx^2 + 18\,Abc^2x^2 + 10\,Cab^2x - 4\,Ca^2cx + 4\,Ab^2cx + 20\,Aac^2x + 6\,Ca^2b -}{2\,(b^4 - 8\,ab^2c + 16\,a^2c^2)(cx^2 + bx + a)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 2*(C*b^2 + 2*C*a*c + 6*A*c^2)*arctan((2*c*x + b)/sqrt(-b^2 + 4*a*
c))/((b^4 - 8*a*b^2*c + 16*a^2*c^2)*sqrt(-b^2 + 4*a*c)) + 1/2*(2*
C*b^2*c*x^3 + 4*C*a*c^2*x^3 + 12*A*c^3*x^3 + 3*C*b^3*x^2 + 6*C*a*
b*c*x^2 + 18*A*b*c^2*x^2 + 10*C*a*b^2*x - 4*C*a^2*c*x + 4*A*b^2*c
*x + 20*A*a*c^2*x + 6*C*a^2*b - A*b^3 + 10*A*a*b*c)/((b^4 - 8*a*b
^2*c + 16*a^2*c^2)*(c*x^2 + b*x + a)^2)
```

3.147 $\int \frac{A+Cx^2}{(a+bx+cx^2)^4} \, dx$

Optimal. Leaf size=206

$$-\frac{2(b+2cx)\left(C\left(ac+b^2\right)+5Ac^2\right)}{\left(b^2-4ac\right)^3\left(a+bx+cx^2\right)}-\frac{x\left(C\left(b^2-2ac\right)+2Ac^2\right)+bc\left(\frac{aC}{c}+A\right)}{3c\left(b^2-4ac\right)\left(a+bx+cx^2\right)^3}+\frac{8c\left(C\left(ac+b^2\right)+5Ac^2\right)\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)}{\left(b^2-4ac\right)^{7/2}}+\frac{(b+2cx)\left(C\left(a+\frac{b^2}{c}\right)+5Ac\right)}{3\left(b^2-4ac\right)^2\left(a+bx+cx^2\right)^2}$$

```
[Out] -(b*c*(A + (a*C)/c) + (2*A*c^2 + (b^2 - 2*a*c)*C)*x)/(3*c*(b^2 -
4*a*c)*(a + b*x + c*x^2)^3) + ((5*A*c + (a + b^2/c)*C)*(b + 2*c*x
))/(3*(b^2 - 4*a*c)^2*(a + b*x + c*x^2)^2) - (2*(5*A*c^2 + (b^2 +
 a*c)*C)*(b + 2*c*x))/((b^2 - 4*a*c)^3*(a + b*x + c*x^2)) + (8*c*
(5*A*c^2 + (b^2 + a*c)*C)*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])
/(b^2 - 4*a*c)^(7/2)
```

Rubi [A] time = 0.389792, antiderivative size = 206, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{2(b+2cx)\left(C\left(ac+b^2\right)+5Ac^2\right)}{\left(b^2-4ac\right)^3\left(a+bx+cx^2\right)}-\frac{x\left(C\left(b^2-2ac\right)+2Ac^2\right)+b(aC+Ac)}{3c\left(b^2-4ac\right)\left(a+bx+cx^2\right)^3}+\frac{8c\left(C\left(ac+b^2\right)+5Ac^2\right)\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)}{\left(b^2-4ac\right)^{7/2}}+\frac{(b+2cx)\left(C\left(a+\frac{b^2}{c}\right)+5Ac\right)}{3\left(b^2-4ac\right)^2\left(a+bx+cx^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + C*x^2)/(a + b*x + c*x^2)^4,x]
```

```
[Out] -(b*(A*c + a*C) + (2*A*c^2 + (b^2 - 2*a*c)*C)*x)/(3*c*(b^2 - 4*a*
c)*(a + b*x + c*x^2)^3) + ((5*A*c + (a + b^2/c)*C)*(b + 2*c*x))/(
3*(b^2 - 4*a*c)^2*(a + b*x + c*x^2)^2) - (2*(5*A*c^2 + (b^2 + a*c
)*C)*(b + 2*c*x))/((b^2 - 4*a*c)^3*(a + b*x + c*x^2)) + (8*c*(5*A
*c^2 + (b^2 + a*c)*C)*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(b^
2 - 4*a*c)^(7/2)
```

Rubi in Sympy [A] time = 31.2826, size = 194, normalized size = 0.94

$$\frac{8c\left(5Ac^2+C\left(ac+b^2\right)\right)\operatorname{atanh}\left(\frac{b+2cx}{\sqrt{-4ac+b^2}}\right)}{\left(-4ac+b^2\right)^{\frac{7}{2}}}-\frac{2\left(b+2cx\right)\left(5Ac^2+C\left(ac+b^2\right)\right)}{\left(-4ac+b^2\right)^3\left(a+bx+cx^2\right)}+\frac{\left(b+2cx\right)\left(5Ac^2+C\left(ac+b^2\right)\right)}{3c\left(-4ac+b^2\right)^2\left(a+bx+cx^2\right)^2}-\frac{b\left(Ac+Ca\right)+x\left(2Ac^2-2Cac+Cb^2\right)}{3c\left(-4ac+b^2\right)\left(a+bx+cx^2\right)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+A)/(c*x**2+b*x+a)**4,x)
```

```
[Out] 8*c*(5*A*c**2 + C*(a*c + b**2))*atanh((b + 2*c*x)/sqrt(-4*a*c + b
**2))/(-4*a*c + b**2)**(7/2) - 2*(b + 2*c*x)*(5*A*c**2 + C*(a*c +
 b**2))/((-4*a*c + b**2)**3*(a + b*x + c*x**2)) + (b + 2*c*x)*(5*
A*c**2 + C*(a*c + b**2))/(3*c*(-4*a*c + b**2)**2*(a + b*x + c*x**
2)**2) - (b*(A*c + C*a) + x*(2*A*c**2 - 2*C*a*c + C*b**2))/(3*c*(
-4*a*c + b**2)*(a + b*x + c*x**2)**3)
```

Mathematica [A] time = 0.645986, size = 204, normalized size = 0.99

$$\frac{1}{3}\left(-\frac{6(b+2cx)\left(C\left(ac+b^2\right)+5Ac^2\right)}{\left(b^2-4ac\right)^3\left(a+x(b+cx)\right)}+\frac{(b+2cx)\left(C\left(ac+b^2\right)+5Ac^2\right)}{c\left(b^2-4ac\right)^2\left(a+x(b+cx)\right)^2}+\frac{24c\left(C\left(ac+b^2\right)+5Ac^2\right)\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)}{\left(4ac-b^2\right)^{7/2}}+\frac{aC(b-2cx)+Ac(b+2cx)+b^2Cx}{c\left(4ac-b^2\right)\left(a+x(b+cx)\right)^3}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + C*x^2)/(a + b*x + c*x^2)^4,x]
```

```
[Out] (((5*A*c^2 + (b^2 + a*c)*C)*(b + 2*c*x))/(c*(b^2 - 4*a*c)^2*(a +
x*(b + c*x))^2) - (6*(5*A*c^2 + (b^2 + a*c)*C)*(b + 2*c*x))/((b^2
 - 4*a*c)^3*(a + x*(b + c*x))) + (b^2*C*x + a*C*(b - 2*c*x) + A*c
*(b + 2*c*x))/(c*(-b^2 + 4*a*c)*(a + x*(b + c*x))^3) + (24*c*(5*A
*c^2 + (b^2 + a*c)*C)*ArcTan[(b + 2*c*x)/Sqrt[-b^2 + 4*a*c]])/(-b
^2 + 4*a*c)^(7/2))/3
```

Maple [B] time = 0.019, size = 643, normalized size = 3.1

$$\frac{1}{(cx^2+bx+a)^3}\left(4\,\frac{c^3\left(5\,Ac^2+Cac+Cb^2\right)x^5}{64\,a^3c^3-48\,a^2b^2c^2+12\,ab^4c-b^6}+10\,\frac{bc^2\left(5\,Ac^2+Cac+Cb^2\right)x^4}{64\,a^3c^3-48\,a^2b^2c^2+12\,ab^4c-b^6}+\frac{\left(32\,ac+22\,b^2\right)c\left(5\,Ac^2+C\right.}{192\,a^3c^3-144\,a^2b^2c^2+36}\right.$$
$$+40\,\frac{c^3A}{\left(64\,a^3c^3-48\,a^2b^2c^2+12\,ab^4c-b^6\right)\sqrt{4\,ac-b^2}}\arctan\left(\frac{2\,cx+b}{\sqrt{4\,ac-b^2}}\right)$$
$$+8\,\frac{Cac^2}{\left(64\,a^3c^3-48\,a^2b^2c^2+12\,ab^4c-b^6\right)\sqrt{4\,ac-b^2}}\arctan\left(\frac{2\,cx+b}{\sqrt{4\,ac-b^2}}\right)$$
$$+8\,\frac{Cb^2c}{\left(64\,a^3c^3-48\,a^2b^2c^2+12\,ab^4c-b^6\right)\sqrt{4\,ac-b^2}}\arctan\left(\frac{2\,cx+b}{\sqrt{4\,ac-b^2}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+A)/(c*x^2+b*x+a)^4,x)
```

```
[Out] (4*c^3*(5*A*c^2+C*a*c+C*b^2)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*
c-b^6)*x^5+10*b*c^2*(5*A*c^2+C*a*c+C*b^2)/(64*a^3*c^3-48*a^2*b^2*
c^2+12*a*b^4*c-b^6)*x^4+2/3*(16*a*c+11*b^2)*c*(5*A*c^2+C*a*c+C*b^
2)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)*x^3+b*(16*a*c+b^2)*
(5*A*c^2+C*a*c+C*b^2)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)*
x^2+(44*A*a^2*c^3+18*A*a*b^2*c^2-A*b^4*c-4*C*a^3*c^2+22*C*a^2*b^2
*c+C*a*b^4)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)*x+1/3*(66*
A*a^2*c^2-13*A*a*b^2*c+A*b^4+26*C*a^3*c+C*a^2*b^2)*b/(64*a^3*c^3-
48*a^2*b^2*c^2+12*a*b^4*c-b^6))/(c*x^2+b*x+a)^3+40*c^3/(64*a^3*c^
3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)/(4*a*c-b^2)^(1/2)*arctan((2*c*x+
b)/(4*a*c-b^2)^(1/2))*A+8*c^2/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4
*c-b^6)/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*C*a
+8*c/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)/(4*a*c-b^2)^(1/2)
*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*C*b^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((C*x^2 + A)/(c*x^2 + b*x + a)^4,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.277826, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)/(c*x^2 + b*x + a)^4,x, algorithm="fricas")
```

```
[Out] [-1/3*(12*(C*a^3*b^2*c + C*a^4*c^2 + 5*A*a^3*c^3 + (C*b^2*c^4 + C
*a*c^5 + 5*A*c^6)*x^6 + 3*(C*b^3*c^3 + C*a*b*c^4 + 5*A*b*c^5)*x^5
 + 3*(C*b^4*c^2 + 2*C*a*b^2*c^3 + 5*A*a*c^5 + (C*a^2 + 5*A*b^2)*c
^4)*x^4 + (C*b^5*c + 7*C*a*b^3*c^2 + 30*A*a*b*c^4 + (6*C*a^2*b +
5*A*b^3)*c^3)*x^3 + 3*(C*a*b^4*c + 2*C*a^2*b^2*c^2 + 5*A*a^2*c^4
+ (C*a^3 + 5*A*a*b^2)*c^3)*x^2 + 3*(C*a^2*b^3*c + C*a^3*b*c^2 + 5
*A*a^2*b*c^3)*x)*log(-(b^3 - 4*a*b*c + 2*(b^2*c - 4*a*c^2)*x - (2
*c^2*x^2 + 2*b*c*x + b^2 - 2*a*c)*sqrt(b^2 - 4*a*c))/(c*x^2 + b*x
 + a)) + (C*a^2*b^3 + A*b^5 + 66*A*a^2*b*c^2 + 12*(C*b^2*c^3 + C*
a*c^4 + 5*A*c^5)*x^5 + 30*(C*b^3*c^2 + C*a*b*c^3 + 5*A*b*c^4)*x^4
 + 2*(11*C*b^4*c + 27*C*a*b^2*c^2 + 80*A*a*c^4 + (16*C*a^2 + 55*A
*b^2)*c^3)*x^3 + 3*(C*b^5 + 17*C*a*b^3*c + 80*A*a*b*c^3 + (16*C*a
^2*b + 5*A*b^3)*c^2)*x^2 + 13*(2*C*a^3*b - A*a*b^3)*c + 3*(C*a*b^
4 + 44*A*a^2*c^3 - 2*(2*C*a^3 - 9*A*a*b^2)*c^2 + (22*C*a^2*b^2 -
A*b^4)*c)*x)*sqrt(b^2 - 4*a*c))/((a^3*b^6 - 12*a^4*b^4*c + 48*a^5
*b^2*c^2 - 64*a^6*c^3 + (b^6*c^3 - 12*a*b^4*c^4 + 48*a^2*b^2*c^5
- 64*a^3*c^6)*x^6 + 3*(b^7*c^2 - 12*a*b^5*c^3 + 48*a^2*b^3*c^4 -
64*a^3*b*c^5)*x^5 + 3*(b^8*c - 11*a*b^6*c^2 + 36*a^2*b^4*c^3 - 16
*a^3*b^2*c^4 - 64*a^4*c^5)*x^4 + (b^9 - 6*a*b^7*c - 24*a^2*b^5*c^
2 + 224*a^3*b^3*c^3 - 384*a^4*b*c^4)*x^3 + 3*(a*b^8 - 11*a^2*b^6*
c + 36*a^3*b^4*c^2 - 16*a^4*b^2*c^3 - 64*a^5*c^4)*x^2 + 3*(a^2*b^
7 - 12*a^3*b^5*c + 48*a^4*b^3*c^2 - 64*a^5*b*c^3)*x)*sqrt(b^2 - 4
*a*c)), -1/3*(24*(C*a^3*b^2*c + C*a^4*c^2 + 5*A*a^3*c^3 + (C*b^2*
c^4 + C*a*c^5 + 5*A*c^6)*x^6 + 3*(C*b^3*c^3 + C*a*b*c^4 + 5*A*b*c
^5)*x^5 + 3*(C*b^4*c^2 + 2*C*a*b^2*c^3 + 5*A*a*c^5 + (C*a^2 + 5*A
*b^2)*c^4)*x^4 + (C*b^5*c + 7*C*a*b^3*c^2 + 30*A*a*b*c^4 + (6*C*a
^2*b + 5*A*b^3)*c^3)*x^3 + 3*(C*a*b^4*c + 2*C*a^2*b^2*c^2 + 5*A*a
^2*c^4 + (C*a^3 + 5*A*a*b^2)*c^3)*x^2 + 3*(C*a^2*b^3*c + C*a^3*b*
c^2 + 5*A*a^2*b*c^3)*x)*arctan(-sqrt(-b^2 + 4*a*c)*(2*c*x + b)/(b
^2 - 4*a*c)) + (C*a^2*b^3 + A*b^5 + 66*A*a^2*b*c^2 + 12*(C*b^2*c^
3 + C*a*c^4 + 5*A*c^5)*x^5 + 30*(C*b^3*c^2 + C*a*b*c^3 + 5*A*b*c^
4)*x^4 + 2*(11*C*b^4*c + 27*C*a*b^2*c^2 + 80*A*a*c^4 + (16*C*a^2
+ 55*A*b^2)*c^3)*x^3 + 3*(C*b^5 + 17*C*a*b^3*c + 80*A*a*b*c^3 + (
16*C*a^2*b + 5*A*b^3)*c^2)*x^2 + 13*(2*C*a^3*b - A*a*b^3)*c + 3*(
C*a*b^4 + 44*A*a^2*c^3 - 2*(2*C*a^3 - 9*A*a*b^2)*c^2 + (22*C*a^2*
b^2 - A*b^4)*c)*x)*sqrt(-b^2 + 4*a*c))/((a^3*b^6 - 12*a^4*b^4*c +
 48*a^5*b^2*c^2 - 64*a^6*c^3 + (b^6*c^3 - 12*a*b^4*c^4 + 48*a^2*b
^2*c^5 - 64*a^3*c^6)*x^6 + 3*(b^7*c^2 - 12*a*b^5*c^3 + 48*a^2*b^3
*c^4 - 64*a^3*b*c^5)*x^5 + 3*(b^8*c - 11*a*b^6*c^2 + 36*a^2*b^4*c
^3 - 16*a^3*b^2*c^4 - 64*a^4*c^5)*x^4 + (b^9 - 6*a*b^7*c - 24*a^2
*b^5*c^2 + 224*a^3*b^3*c^3 - 384*a^4*b*c^4)*x^3 + 3*(a*b^8 - 11*a
^2*b^6*c + 36*a^3*b^4*c^2 - 16*a^4*b^2*c^3 - 64*a^5*c^4)*x^2 + 3*
(a^2*b^7 - 12*a^3*b^5*c + 48*a^4*b^3*c^2 - 64*a^5*b*c^3)*x)*sqrt(
-b^2 + 4*a*c))]
```

Sympy [A] time = 9.14611, size = 1224, normalized size = 5.94

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+A)/(c*x**2+b*x+a)**4,x)
```

```
[Out] -4*c*sqrt(-1/(4*a*c - b**2)**7)*(5*A*c**2 + C*a*c + C*b**2)*log(x
 + (20*A*b*c**3 + 4*C*a*b*c**2 + 4*C*b**3*c - 1024*a**4*c**5*sqrt
(-1/(4*a*c - b**2)**7)*(5*A*c**2 + C*a*c + C*b**2) + 1024*a**3*b*
*2*c**4*sqrt(-1/(4*a*c - b**2)**7)*(5*A*c**2 + C*a*c + C*b**2) -
384*a**2*b**4*c**3*sqrt(-1/(4*a*c - b**2)**7)*(5*A*c**2 + C*a*c +
 C*b**2) + 64*a*b**6*c**2*sqrt(-1/(4*a*c - b**2)**7)*(5*A*c**2 +
C*a*c + C*b**2) - 4*b**8*c*sqrt(-1/(4*a*c - b**2)**7)*(5*A*c**2 +
 C*a*c + C*b**2))/(40*A*c**4 + 8*C*a*c**3 + 8*C*b**2*c**2)) + 4*c
*sqrt(-1/(4*a*c - b**2)**7)*(5*A*c**2 + C*a*c + C*b**2)*log(x + (
20*A*b*c**3 + 4*C*a*b*c**2 + 4*C*b**3*c + 1024*a**4*c**5*sqrt(-1/
(4*a*c - b**2)**7)*(5*A*c**2 + C*a*c + C*b**2) - 1024*a**3*b**2*c
**4*sqrt(-1/(4*a*c - b**2)**7)*(5*A*c**2 + C*a*c + C*b**2) + 384*
a**2*b**4*c**3*sqrt(-1/(4*a*c - b**2)**7)*(5*A*c**2 + C*a*c + C*b
**2) - 64*a*b**6*c**2*sqrt(-1/(4*a*c - b**2)**7)*(5*A*c**2 + C*a*
c + C*b**2) + 4*b**8*c*sqrt(-1/(4*a*c - b**2)**7)*(5*A*c**2 + C*a
*c + C*b**2))/(40*A*c**4 + 8*C*a*c**3 + 8*C*b**2*c**2)) + (66*A*a
**2*b*c**2 - 13*A*a*b**3*c + A*b**5 + 26*C*a**3*b*c + C*a**2*b**3
 + x**5*(60*A*c**5 + 12*C*a*c**4 + 12*C*b**2*c**3) + x**4*(150*A*
b*c**4 + 30*C*a*b*c**3 + 30*C*b**3*c**2) + x**3*(160*A*a*c**4 + 1
10*A*b**2*c**3 + 32*C*a**2*c**3 + 54*C*a*b**2*c**2 + 22*C*b**4*c)
 + x**2*(240*A*a*b*c**3 + 15*A*b**3*c**2 + 48*C*a**2*b*c**2 + 51*
C*a*b**3*c + 3*C*b**5) + x*(132*A*a**2*c**3 + 54*A*a*b**2*c**2 -
3*A*b**4*c - 12*C*a**3*c**2 + 66*C*a**2*b**2*c + 3*C*a*b**4))/(19
2*a**6*c**3 - 144*a**5*b**2*c**2 + 36*a**4*b**4*c - 3*a**3*b**6 +
 x**6*(192*a**3*c**6 - 144*a**2*b**2*c**5 + 36*a*b**4*c**4 - 3*b*
*6*c**3) + x**5*(576*a**3*b*c**5 - 432*a**2*b**3*c**4 + 108*a*b**
5*c**3 - 9*b**7*c**2) + x**4*(576*a**4*c**5 + 144*a**3*b**2*c**4
- 324*a**2*b**4*c**3 + 99*a*b**6*c**2 - 9*b**8*c) + x**3*(1152*a*
*4*b*c**4 - 672*a**3*b**3*c**3 + 72*a**2*b**5*c**2 + 18*a*b**7*c
- 3*b**9) + x**2*(576*a**5*c**4 + 144*a**4*b**2*c**3 - 324*a**3*b
**4*c**2 + 99*a**2*b**6*c - 9*a*b**8) + x*(576*a**5*b*c**3 - 432*
a**4*b**3*c**2 + 108*a**3*b**5*c - 9*a**2*b**7))
```

GIAC/XCAS [A] time = 0.275254, size = 549, normalized size = 2.67

$$-\frac{8\,\left(Cb^2c + Cac^2 + 5\,Ac^3\right)\arctan\left(\frac{2\,cx+b}{\sqrt{-b^2+4\,ac}}\right)}{\left(b^6 - 12\,ab^4c + 48\,a^2b^2c^2 - 64\,a^3c^3\right)\sqrt{-b^2+4\,ac}} - \frac{12\,Cb^2c^3x^5 + 12\,Cac^4x^5 + 60\,Ac^5x^5 + 30\,Cb^3c^2x^4 + 30\,Cabc^3x^4 + 150\,Abc^4x^4 + 22\,Cb^4cx^3 + 54\,Cab^2c^2x^3 + 32\,Ca^2c^3x^3 + 1}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)/(c*x^2 + b*x + a)^4,x, algorithm="giac")
```

```
[Out] -8*(C*b^2*c + C*a*c^2 + 5*A*c^3)*arctan((2*c*x + b)/sqrt(-b^2 + 4
*a*c))/((b^6 - 12*a*b^4*c + 48*a^2*b^2*c^2 - 64*a^3*c^3)*sqrt(-b^
2 + 4*a*c)) - 1/3*(12*C*b^2*c^3*x^5 + 12*C*a*c^4*x^5 + 60*A*c^5*x
^5 + 30*C*b^3*c^2*x^4 + 30*C*a*b*c^3*x^4 + 150*A*b*c^4*x^4 + 22*C
*b^4*c*x^3 + 54*C*a*b^2*c^2*x^3 + 32*C*a^2*c^3*x^3 + 110*A*b^2*c^
3*x^3 + 160*A*a*c^4*x^3 + 3*C*b^5*x^2 + 51*C*a*b^3*c*x^2 + 48*C*a
^2*b*c^2*x^2 + 15*A*b^3*c^2*x^2 + 240*A*a*b*c^3*x^2 + 3*C*a*b^4*x
 + 66*C*a^2*b^2*c*x - 3*A*b^4*c*x - 12*C*a^3*c^2*x + 54*A*a*b^2*c
^2*x + 132*A*a^2*c^3*x + C*a^2*b^3 + A*b^5 + 26*C*a^3*b*c - 13*A*
a*b^3*c + 66*A*a^2*b*c^2)/((b^6 - 12*a*b^4*c + 48*a^2*b^2*c^2 - 6
4*a^3*c^3)*(c*x^2 + b*x + a)^3)
```

3.148 $\int \frac{(d+ex)^3(f+gx+hx^2)}{a+bx+cx^2}\,dx$

Optimal. Leaf size=591

$$\frac{\log\left(a+bx+cx^2\right)\left(c^2e\left(a^2e^2h+2abe(3dh+eg)+b^2\left(3d^2h+3deg+e^2f\right)\right)-b^2ce^2(3aeh+3bdh+beg)-c^3\left(ae\left(3d^2h+3d\right.\right.}{2c^5}$$

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(c^3\left(2a^2e^2(3dh+eg)+3abe\left(3d^2h+3deg+e^2f\right)+b^2d\left(d^2h+3deg+3e^2f\right)\right)-bc^2e\left(5a^2e^2h+4abe(3d\right.\right.}{}$$

$$-\frac{x\left(c^2e\left(ae(3dh+eg)+b\left(3d^2h+3deg+e^2f\right)\right)-bce^2(2aeh+3bdh+beg)+b^3e^3h+c^3(-d)\left(d^2h+3deg+3e^2f\right)\right)}{c^4}$$

$$+\frac{ex^2\left(-ce(aeh+3bdh+beg)+b^2e^2h+c^2\left(3d^2h+3deg+e^2f\right)\right)}{2c^3}+\frac{e^2x^3(-beh+3cdh+ceg)}{3c^2}+\frac{e^3hx^4}{4c}$$

```
[Out] -(((b^3*e^3*h - c^3*d*(3*e^2*f + 3*d*e*g + d^2*h) - b*c*e^2*(b*e*
g + 3*b*d*h + 2*a*e*h) + c^2*e*(a*e*(e*g + 3*d*h) + b*(e^2*f + 3*
d*e*g + 3*d^2*h)))*x)/c^4) + (e*(b^2*e^2*h + c^2*(e^2*f + 3*d*e*g
 + 3*d^2*h) - c*e*(b*e*g + 3*b*d*h + a*e*h))*x^2)/(2*c^3) + (e^2*
(c*e*g + 3*c*d*h - b*e*h)*x^3)/(3*c^2) + (e^3*h*x^4)/(4*c) - ((2*
c^5*d^3*f - b^5*e^3*h + b^3*c*e^2*(b*e*g + 3*b*d*h + 5*a*e*h) - c
^4*d*(b*d*(3*e*f + d*g) + 2*a*(3*e^2*f + 3*d*e*g + d^2*h)) - b*c^
2*e*(5*a^2*e^2*h + 4*a*b*e*(e*g + 3*d*h) + b^2*(e^2*f + 3*d*e*g +
 3*d^2*h)) + c^3*(2*a^2*e^2*(e*g + 3*d*h) + b^2*d*(3*e^2*f + 3*d*
e*g + d^2*h) + 3*a*b*e*(e^2*f + 3*d*e*g + 3*d^2*h)))*ArcTanh[(b +
 2*c*x)/Sqrt[b^2 - 4*a*c]])/(c^5*Sqrt[b^2 - 4*a*c]) + ((c^4*d^2*(
3*e*f + d*g) + b^4*e^3*h - b^2*c*e^2*(b*e*g + 3*b*d*h + 3*a*e*h)
+ c^2*e*(a^2*e^2*h + 2*a*b*e*(e*g + 3*d*h) + b^2*(e^2*f + 3*d*e*g
 + 3*d^2*h)) - c^3*(b*d*(3*e^2*f + 3*d*e*g + d^2*h) + a*e*(e^2*f
+ 3*d*e*g + 3*d^2*h)))*Log[a + b*x + c*x^2])/(2*c^5)
```

Rubi [A] time = 3.66163, antiderivative size = 591, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$\frac{\log\left(a+bx+cx^2\right)\left(c^2e\left(a^2e^2h+2abe(3dh+eg)+b^2\left(3d^2h+3deg+e^2f\right)\right)-b^2ce^2(3aeh+3bdh+beg)-c^3\left(ae\left(3d^2h+3d\right.\right.}{2c^5}$$

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(c^3\left(2a^2e^2(3dh+eg)+3abe\left(3d^2h+3deg+e^2f\right)+b^2d\left(d^2h+3deg+3e^2f\right)\right)-bc^2e\left(5a^2e^2h+4abe(3d\right.\right.}{}$$

$$-\frac{x\left(c^2e\left(ae(3dh+eg)+b\left(3d^2h+3deg+e^2f\right)\right)-bce^2(2aeh+3bdh+beg)+b^3e^3h+c^3(-d)\left(d^2h+3deg+3e^2f\right)\right)}{c^4}$$

$$+\frac{ex^2\left(-ce(aeh+3bdh+beg)+b^2e^2h+c^2\left(3d^2h+3deg+e^2f\right)\right)}{2c^3}+\frac{e^2x^3(-beh+3cdh+ceg)}{3c^2}+\frac{e^3hx^4}{4c}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^3*(f + g*x + h*x^2))/(a + b*x + c*x^2),x]
```

```
[Out] -(((b^3*e^3*h - c^3*d*(3*e^2*f + 3*d*e*g + d^2*h) - b*c*e^2*(b*e*
g + 3*b*d*h + 2*a*e*h) + c^2*e*(a*e*(e*g + 3*d*h) + b*(e^2*f + 3*
d*e*g + 3*d^2*h)))*x)/c^4) + (e*(b^2*e^2*h + c^2*(e^2*f + 3*d*e*g
 + 3*d^2*h) - c*e*(b*e*g + 3*b*d*h + a*e*h))*x^2)/(2*c^3) + (e^2*
(c*e*g + 3*c*d*h - b*e*h)*x^3)/(3*c^2) + (e^3*h*x^4)/(4*c) - ((2*
c^5*d^3*f - b^5*e^3*h + b^3*c*e^2*(b*e*g + 3*b*d*h + 5*a*e*h) - c
^4*d*(b*d*(3*e*f + d*g) + 2*a*(3*e^2*f + 3*d*e*g + d^2*h)) - b*c^
2*e*(5*a^2*e^2*h + 4*a*b*e*(e*g + 3*d*h) + b^2*(e^2*f + 3*d*e*g +
 3*d^2*h)) + c^3*(2*a^2*e^2*(e*g + 3*d*h) + b^2*d*(3*e^2*f + 3*d*
e*g + d^2*h) + 3*a*b*e*(e^2*f + 3*d*e*g + 3*d^2*h)))*ArcTanh[(b +
 2*c*x)/Sqrt[b^2 - 4*a*c]])/(c^5*Sqrt[b^2 - 4*a*c]) + ((c^4*d^2*(
3*e*f + d*g) + b^4*e^3*h - b^2*c*e^2*(b*e*g + 3*b*d*h + 3*a*e*h)
+ c^2*e*(a^2*e^2*h + 2*a*b*e*(e*g + 3*d*h) + b^2*(e^2*f + 3*d*e*g
 + 3*d^2*h)) - c^3*(b*d*(3*e^2*f + 3*d*e*g + d^2*h) + a*e*(e^2*f
+ 3*d*e*g + 3*d^2*h)))*Log[a + b*x + c*x^2])/(2*c^5)
```

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((e*x+d)**3*(h*x**2+g*x+f)/(c*x**2+b*x+a),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.50541, size = 585, normalized size = 0.99

$$\frac{6\log(a+x(b+cx))\left(c^2e\left(a^2e^2h+2abe(3dh+eg)+b^2\left(3d^2h+3deg+e^2f\right)\right)-b^2ce^2(3aeh+3bdh+beg)-c^3\left(ae\left(3d^2h+3d\right.\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)^3*(f + g*x + h*x^2))/(a + b*x + c*x^2),x]
```

```
[Out] (12*c*(-(b^3*e^3*h) + c^3*d*(3*e^2*f + 3*d*e*g + d^2*h) + b*c*e^2
*(b*e*g + 3*b*d*h + 2*a*e*h) - c^2*e*(a*e*(e*g + 3*d*h) + b*(e^2*
f + 3*d*e*g + 3*d^2*h)))*x + 6*c^2*e*(b^2*e^2*h + c^2*(e^2*f + 3*
d*e*g + 3*d^2*h) - c*e*(b*e*g + 3*b*d*h + a*e*h))*x^2 + 4*c^3*e^2
*(c*e*g + 3*c*d*h - b*e*h)*x^3 + 3*c^4*e^3*h*x^4 + (12*(2*c^5*d^3
```

```
*f - b^5*e^3*h + b^3*c*e^2*(b*e*g + 3*b*d*h + 5*a*e*h) - c^4*d*(b
*d*(3*e*f + d*g) + 2*a*(3*e^2*f + 3*d*e*g + d^2*h)) - b*c^2*e*(5*
a^2*e^2*h + 4*a*b*e*(e*g + 3*d*h) + b^2*(e^2*f + 3*d*e*g + 3*d^2*
h)) + c^3*(2*a^2*e^2*(e*g + 3*d*h) + b^2*d*(3*e^2*f + 3*d*e*g + d
^2*h) + 3*a*b*e*(e^2*f + 3*d*e*g + 3*d^2*h)))*ArcTan[(b + 2*c*x)/
Sqrt[-b^2 + 4*a*c]])/Sqrt[-b^2 + 4*a*c] + 6*(c^4*d^2*(3*e*f + d*g
) + b^4*e^3*h - b^2*c*e^2*(b*e*g + 3*b*d*h + 3*a*e*h) + c^2*e*(a^
2*e^2*h + 2*a*b*e*(e*g + 3*d*h) + b^2*(e^2*f + 3*d*e*g + 3*d^2*h)
) - c^3*(b*d*(3*e^2*f + 3*d*e*g + d^2*h) + a*e*(e^2*f + 3*d*e*g +
 3*d^2*h)))*Log[a + x*(b + c*x)])/(12*c^5)
```

Maple [B] time = 0.014, size = 1738, normalized size = 2.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^3*(h*x^2+g*x+f)/(c*x^2+b*x+a),x)
```

```
[Out] 9/c^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*b*d
^2*e*h+1/2/c*ln(c*x^2+b*x+a)*d^3*g+2/(4*a*c-b^2)^(1/2)*arctan((2*
c*x+b)/(4*a*c-b^2)^(1/2))*d^3*f+1/3/c*x^3*e^3*g+1/2/c*x^2*e^3*f+1
/c*d^3*h*x+9/c^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(
1/2))*a*b*d*e^2*g+1/4*e^3*h*x^4/c-3/c^2*b*d^2*e*h*x-3/c^2*b*d*e^2
*g*x-3/c^2*a*d*e^2*h*x-1/2/c^2*x^2*a*e^3*h+1/2/c^3*x^2*b^2*e^3*h+
3/c^3*b^2*d*e^2*h*x-12/c^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*
a*c-b^2)^(1/2))*a*b^2*d*e^2*h+1/c^2/(4*a*c-b^2)^(1/2)*arctan((2*c
*x+b)/(4*a*c-b^2)^(1/2))*b^2*d^3*h-1/c/(4*a*c-b^2)^(1/2)*arctan((
2*c*x+b)/(4*a*c-b^2)^(1/2))*b*d^3*g-3/2/c^4*ln(c*x^2+b*x+a)*b^3*d
*e^2*h-1/c^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2)
)*b^3*e^3*f+2/c^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^
(1/2))*a^2*e^3*g+1/c^3*ln(c*x^2+b*x+a)*a*b*e^3*g-3/2/c^2*ln(c*x^2
+b*x+a)*a*d^2*e*h+1/c^3*b^2*e^3*g*x-1/c^2*b*e^3*f*x-1/c^4*b^3*e^3
*h*x-1/2/c^4*ln(c*x^2+b*x+a)*b^3*e^3*g+1/2/c^3*ln(c*x^2+b*x+a)*b^
2*e^3*f+3/2/c*ln(c*x^2+b*x+a)*d^2*e*f+1/c*x^3*d*e^2*h+1/2/c^5*ln(
c*x^2+b*x+a)*b^4*e^3*h+3/c*d*e^2*f*x-1/3/c^2*x^3*b*e^3*h-1/2/c^2*
ln(c*x^2+b*x+a)*a*e^3*f+3/c*d^2*e*g*x+3/2/c*x^2*d*e^2*g-1/c^2*a*e
^3*g*x+1/2/c^3*ln(c*x^2+b*x+a)*a^2*e^3*h-1/2/c^2*ln(c*x^2+b*x+a)*
b*d^3*h+3/2/c*x^2*d^2*e*h-1/2/c^2*x^2*b*e^3*g-3/c^3/(4*a*c-b^2)^(
1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b^3*d*e^2*g-3/c^3/(4*a*c
-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b^3*d^2*e*h+3/c^4
/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b^4*d*e^2*
h+5/c^4/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*b
^3*e^3*h+3/c^3*ln(c*x^2+b*x+a)*a*b*d*e^2*h-4/c^3/(4*a*c-b^2)^(1/2
)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*b^2*e^3*g-5/c^3/(4*a*c-b^
2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a^2*b*e^3*h+6/c^2/(4
*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a^2*d*e^2*h+3
/c^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b^2*d*
e^2*f-3/c/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b
```

```
*d^2*e*f+3/c^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/
2))*b^2*d^2*e*g-6/c/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2
)^(1/2))*a*d*e^2*f+3/c^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*
c-b^2)^(1/2))*a*b*e^3*f-6/c/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4
*a*c-b^2)^(1/2))*a*d^2*e*g+2/c^3*a*b*e^3*h*x-3/2/c^2*ln(c*x^2+b*x
+a)*a*d*e^2*g+3/2/c^3*ln(c*x^2+b*x+a)*b^2*d*e^2*g-3/2/c^2*ln(c*x^
2+b*x+a)*b*d^2*e*g-1/c^5/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*
c-b^2)^(1/2))*b^5*e^3*h-3/2/c^4*ln(c*x^2+b*x+a)*a*b^2*e^3*h+1/c^4
/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b^4*e^3*g-
3/2/c^2*ln(c*x^2+b*x+a)*b*d*e^2*f-2/c/(4*a*c-b^2)^(1/2)*arctan((2
*c*x+b)/(4*a*c-b^2)^(1/2))*a*d^3*h+3/2/c^3*ln(c*x^2+b*x+a)*b^2*d^
2*e*h-3/2/c^2*x^2*b*d*e^2*h
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)*(e*x + d)^3/(c*x^2 + b*x + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 1.3299, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)*(e*x + d)^3/(c*x^2 + b*x + a),x, algorithm="fricas")
```

```
[Out] [-1/12*(6*((2*c^5*d^3 - 3*b*c^4*d^2*e + 3*(b^2*c^3 - 2*a*c^4)*d*e
^2 - (b^3*c^2 - 3*a*b*c^3)*e^3)*f - (b*c^4*d^3 - 3*(b^2*c^3 - 2*a
*c^4)*d^2*e + 3*(b^3*c^2 - 3*a*b*c^3)*d*e^2 - (b^4*c - 4*a*b^2*c^
2 + 2*a^2*c^3)*e^3)*g + ((b^2*c^3 - 2*a*c^4)*d^3 - 3*(b^3*c^2 - 3
*a*b*c^3)*d^2*e + 3*(b^4*c - 4*a*b^2*c^2 + 2*a^2*c^3)*d*e^2 - (b^
5 - 5*a*b^3*c + 5*a^2*b*c^2)*e^3)*h)*log((b^3 - 4*a*b*c + 2*(b^2*
c - 4*a*c^2)*x + (2*c^2*x^2 + 2*b*c*x + b^2 - 2*a*c)*sqrt(b^2 - 4
*a*c))/(c*x^2 + b*x + a)) - (3*c^4*e^3*h*x^4 + 4*(c^4*e^3*g + (3*
c^4*d*e^2 - b*c^3*e^3)*h)*x^3 + 6*(c^4*e^3*f + (3*c^4*d*e^2 - b*c
^3*e^3)*g + (3*c^4*d^2*e - 3*b*c^3*d*e^2 + (b^2*c^2 - a*c^3)*e^3)
*h)*x^2 + 12*((3*c^4*d*e^2 - b*c^3*e^3)*f + (3*c^4*d^2*e - 3*b*c^
3*d*e^2 + (b^2*c^2 - a*c^3)*e^3)*g + (c^4*d^3 - 3*b*c^3*d^2*e + 3
*(b^2*c^2 - a*c^3)*d*e^2 - (b^3*c - 2*a*b*c^2)*e^3)*h)*x + 6*((3*
c^4*d^2*e - 3*b*c^3*d*e^2 + (b^2*c^2 - a*c^3)*e^3)*f + (c^4*d^3 -
```

```
 3*b*c^3*d^2*e + 3*(b^2*c^2 - a*c^3)*d*e^2 - (b^3*c - 2*a*b*c^2)*
e^3)*g - (b*c^3*d^3 - 3*(b^2*c^2 - a*c^3)*d^2*e + 3*(b^3*c - 2*a*
b*c^2)*d*e^2 - (b^4 - 3*a*b^2*c + a^2*c^2)*e^3)*h)*log(c*x^2 + b*
x + a))*sqrt(b^2 - 4*a*c))/(sqrt(b^2 - 4*a*c)*c^5), 1/12*(12*((2*
c^5*d^3 - 3*b*c^4*d^2*e + 3*(b^2*c^3 - 2*a*c^4)*d*e^2 - (b^3*c^2
- 3*a*b*c^3)*e^3)*f - (b*c^4*d^3 - 3*(b^2*c^3 - 2*a*c^4)*d^2*e +
3*(b^3*c^2 - 3*a*b*c^3)*d*e^2 - (b^4*c - 4*a*b^2*c^2 + 2*a^2*c^3)
*e^3)*g + ((b^2*c^3 - 2*a*c^4)*d^3 - 3*(b^3*c^2 - 3*a*b*c^3)*d^2*
e + 3*(b^4*c - 4*a*b^2*c^2 + 2*a^2*c^3)*d*e^2 - (b^5 - 5*a*b^3*c
+ 5*a^2*b*c^2)*e^3)*h)*arctan(-sqrt(-b^2 + 4*a*c)*(2*c*x + b)/(b^
2 - 4*a*c)) + (3*c^4*e^3*h*x^4 + 4*(c^4*e^3*g + (3*c^4*d*e^2 - b*
c^3*e^3)*h)*x^3 + 6*(c^4*e^3*f + (3*c^4*d*e^2 - b*c^3*e^3)*g + (3
*c^4*d^2*e - 3*b*c^3*d*e^2 + (b^2*c^2 - a*c^3)*e^3)*h)*x^2 + 12*(
(3*c^4*d*e^2 - b*c^3*e^3)*f + (3*c^4*d^2*e - 3*b*c^3*d*e^2 + (b^2
*c^2 - a*c^3)*e^3)*g + (c^4*d^3 - 3*b*c^3*d^2*e + 3*(b^2*c^2 - a*
c^3)*d*e^2 - (b^3*c - 2*a*b*c^2)*e^3)*h)*x + 6*((3*c^4*d^2*e - 3*
b*c^3*d*e^2 + (b^2*c^2 - a*c^3)*e^3)*f + (c^4*d^3 - 3*b*c^3*d^2*e
 + 3*(b^2*c^2 - a*c^3)*d*e^2 - (b^3*c - 2*a*b*c^2)*e^3)*g - (b*c^
3*d^3 - 3*(b^2*c^2 - a*c^3)*d^2*e + 3*(b^3*c - 2*a*b*c^2)*d*e^2 -
 (b^4 - 3*a*b^2*c + a^2*c^2)*e^3)*h)*log(c*x^2 + b*x + a))*sqrt(-
b^2 + 4*a*c))/(sqrt(-b^2 + 4*a*c)*c^5)]
```

Sympy [A] time = 121.821, size = 4962, normalized size = 8.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**3*(h*x**2+g*x+f)/(c*x**2+b*x+a),x)
```

```
[Out] (-sqrt(-4*a*c + b**2)*(5*a**2*b*c**2*e**3*h - 6*a**2*c**3*d*e**2*
h - 2*a**2*c**3*e**3*g - 5*a*b**3*c*e**3*h + 12*a*b**2*c**2*d*e**
2*h + 4*a*b**2*c**2*e**3*g - 9*a*b*c**3*d**2*e*h - 9*a*b*c**3*d*e
**2*g - 3*a*b*c**3*e**3*f + 2*a*c**4*d**3*h + 6*a*c**4*d**2*e*g +
 6*a*c**4*d*e**2*f + b**5*e**3*h - 3*b**4*c*d*e**2*h - b**4*c*e**
3*g + 3*b**3*c**2*d**2*e*h + 3*b**3*c**2*d*e**2*g + b**3*c**2*e**
3*f - b**2*c**3*d**3*h - 3*b**2*c**3*d**2*e*g - 3*b**2*c**3*d*e**
2*f + b*c**4*d**3*g + 3*b*c**4*d**2*e*f - 2*c**5*d**3*f)/(2*c**5*
(4*a*c - b**2)) + (a**2*c**2*e**3*h - 3*a*b**2*c*e**3*h + 6*a*b*c
**2*d*e**2*h + 2*a*b*c**2*e**3*g - 3*a*c**3*d**2*e*h - 3*a*c**3*d
*e**2*g - a*c**3*e**3*f + b**4*e**3*h - 3*b**3*c*d*e**2*h - b**3*
c*e**3*g + 3*b**2*c**2*d**2*e*h + 3*b**2*c**2*d*e**2*g + b**2*c**
2*e**3*f - b*c**3*d**3*h - 3*b*c**3*d**2*e*g - 3*b*c**3*d*e**2*f
+ c**4*d**3*g + 3*c**4*d**2*e*f)/(2*c**5))*log(x + (2*a**3*c**2*e
**3*h - 4*a**2*b**2*c*e**3*h + 9*a**2*b*c**2*d*e**2*h + 3*a**2*b*
c**2*e**3*g - 6*a**2*c**3*d**2*e*h - 6*a**2*c**3*d*e**2*g - 2*a**
2*c**3*e**3*f + a*b**4*e**3*h - 3*a*b**3*c*d*e**2*h - a*b**3*c*e*
*3*g + 3*a*b**2*c**2*d**2*e*h + 3*a*b**2*c**2*d*e**2*g + a*b**2*c
**2*e**3*f - a*b*c**3*d**3*h - 3*a*b*c**3*d**2*e*g - 3*a*b*c**3*d
```

```
*e**2*f - 4*a*c**5*(-sqrt(-4*a*c + b**2)*(5*a**2*b*c**2*e**3*h -
6*a**2*c**3*d*e**2*h - 2*a**2*c**3*e**3*g - 5*a*b**3*c*e**3*h + 1
2*a*b**2*c**2*d*e**2*h + 4*a*b**2*c**2*e**3*g - 9*a*b*c**3*d**2*e
*h - 9*a*b*c**3*d*e**2*g - 3*a*b*c**3*e**3*f + 2*a*c**4*d**3*h +
6*a*c**4*d**2*e*g + 6*a*c**4*d*e**2*f + b**5*e**3*h - 3*b**4*c*d*
e**2*h - b**4*c*e**3*g + 3*b**3*c**2*d**2*e*h + 3*b**3*c**2*d*e**
2*g + b**3*c**2*e**3*f - b**2*c**3*d**3*h - 3*b**2*c**3*d**2*e*g
- 3*b**2*c**3*d*e**2*f + b*c**4*d**3*g + 3*b*c**4*d**2*e*f - 2*c*
*5*d**3*f)/(2*c**5*(4*a*c - b**2)) + (a**2*c**2*e**3*h - 3*a*b**2
*c*e**3*h + 6*a*b*c**2*d*e**2*h + 2*a*b*c**2*e**3*g - 3*a*c**3*d*
*2*e*h - 3*a*c**3*d*e**2*g - a*c**3*e**3*f + b**4*e**3*h - 3*b**3
*c*d*e**2*h - b**3*c*e**3*g + 3*b**2*c**2*d**2*e*h + 3*b**2*c**2*
d*e**2*g + b**2*c**2*e**3*f - b*c**3*d**3*h - 3*b*c**3*d**2*e*g -
 3*b*c**3*d*e**2*f + c**4*d**3*g + 3*c**4*d**2*e*f)/(2*c**5)) + 2
*a*c**4*d**3*g + 6*a*c**4*d**2*e*f + b**2*c**4*(-sqrt(-4*a*c + b*
*2)*(5*a**2*b*c**2*e**3*h - 6*a**2*c**3*d*e**2*h - 2*a**2*c**3*e*
*3*g - 5*a*b**3*c*e**3*h + 12*a*b**2*c**2*d*e**2*h + 4*a*b**2*c**
2*e**3*g - 9*a*b*c**3*d**2*e*h - 9*a*b*c**3*d*e**2*g - 3*a*b*c**3
*e**3*f + 2*a*c**4*d**3*h + 6*a*c**4*d**2*e*g + 6*a*c**4*d*e**2*f
 + b**5*e**3*h - 3*b**4*c*d*e**2*h - b**4*c*e**3*g + 3*b**3*c**2*
d**2*e*h + 3*b**3*c**2*d*e**2*g + b**3*c**2*e**3*f - b**2*c**3*d*
*3*h - 3*b**2*c**3*d**2*e*g - 3*b**2*c**3*d*e**2*f + b*c**4*d**3*
g + 3*b*c**4*d**2*e*f - 2*c**5*d**3*f)/(2*c**5*(4*a*c - b**2)) +
(a**2*c**2*e**3*h - 3*a*b**2*c*e**3*h + 6*a*b*c**2*d*e**2*h + 2*a
*b*c**2*e**3*g - 3*a*c**3*d**2*e*h - 3*a*c**3*d*e**2*g - a*c**3*e
**3*f + b**4*e**3*h - 3*b**3*c*d*e**2*h - b**3*c*e**3*g + 3*b**2*
c**2*d**2*e*h + 3*b**2*c**2*d*e**2*g + b**2*c**2*e**3*f - b*c**3*
d**3*h - 3*b*c**3*d**2*e*g - 3*b*c**3*d*e**2*f + c**4*d**3*g + 3*
c**4*d**2*e*f)/(2*c**5)) - b*c**4*d**3*f)/(5*a**2*b*c**2*e**3*h -
 6*a**2*c**3*d*e**2*h - 2*a**2*c**3*e**3*g - 5*a*b**3*c*e**3*h +
12*a*b**2*c**2*d*e**2*h + 4*a*b**2*c**2*e**3*g - 9*a*b*c**3*d**2*
e*h - 9*a*b*c**3*d*e**2*g - 3*a*b*c**3*e**3*f + 2*a*c**4*d**3*h +
 6*a*c**4*d**2*e*g + 6*a*c**4*d*e**2*f + b**5*e**3*h - 3*b**4*c*d
*e**2*h - b**4*c*e**3*g + 3*b**3*c**2*d**2*e*h + 3*b**3*c**2*d*e*
*2*g + b**3*c**2*e**3*f - b**2*c**3*d**3*h - 3*b**2*c**3*d**2*e*g
 - 3*b**2*c**3*d*e**2*f + b*c**4*d**3*g + 3*b*c**4*d**2*e*f - 2*c
**5*d**3*f)) + (sqrt(-4*a*c + b**2)*(5*a**2*b*c**2*e**3*h - 6*a**
2*c**3*d*e**2*h - 2*a**2*c**3*e**3*g - 5*a*b**3*c*e**3*h + 12*a*b
**2*c**2*d*e**2*h + 4*a*b**2*c**2*e**3*g - 9*a*b*c**3*d**2*e*h -
9*a*b*c**3*d*e**2*g - 3*a*b*c**3*e**3*f + 2*a*c**4*d**3*h + 6*a*c
**4*d**2*e*g + 6*a*c**4*d*e**2*f + b**5*e**3*h - 3*b**4*c*d*e**2*
h - b**4*c*e**3*g + 3*b**3*c**2*d**2*e*h + 3*b**3*c**2*d*e**2*g +
 b**3*c**2*e**3*f - b**2*c**3*d**3*h - 3*b**2*c**3*d**2*e*g - 3*b
**2*c**3*d*e**2*f + b*c**4*d**3*g + 3*b*c**4*d**2*e*f - 2*c**5*d*
*3*f)/(2*c**5*(4*a*c - b**2)) + (a**2*c**2*e**3*h - 3*a*b**2*c*e*
*3*h + 6*a*b*c**2*d*e**2*h + 2*a*b*c**2*e**3*g - 3*a*c**3*d**2*e*
h - 3*a*c**3*d*e**2*g - a*c**3*e**3*f + b**4*e**3*h - 3*b**3*c*d*
e**2*h - b**3*c*e**3*g + 3*b**2*c**2*d**2*e*h + 3*b**2*c**2*d*e**
2*g + b**2*c**2*e**3*f - b*c**3*d**3*h - 3*b*c**3*d**2*e*g - 3*b*
c**3*d*e**2*f + c**4*d**3*g + 3*c**4*d**2*e*f)/(2*c**5))*log(x +
(2*a**3*c**2*e**3*h - 4*a**2*b**2*c*e**3*h + 9*a**2*b*c**2*d*e**2
*h + 3*a**2*b*c**2*e**3*g - 6*a**2*c**3*d**2*e*h - 6*a**2*c**3*d*
e**2*g - 2*a**2*c**3*e**3*f + a*b**4*e**3*h - 3*a*b**3*c*d*e**2*h
 - a*b**3*c*e**3*g + 3*a*b**2*c**2*d**2*e*h + 3*a*b**2*c**2*d*e**
```

```
2*g + a*b**2*c**2*e**3*f - a*b*c**3*d**3*h - 3*a*b*c**3*d**2*e*g
- 3*a*b*c**3*d*e**2*f - 4*a*c**5*(sqrt(-4*a*c + b**2)*(5*a**2*b*c
**2*e**3*h - 6*a**2*c**3*d*e**2*h - 2*a**2*c**3*e**3*g - 5*a*b**3
*c*e**3*h + 12*a*b**2*c**2*d*e**2*h + 4*a*b**2*c**2*e**3*g - 9*a*
b*c**3*d**2*e*h - 9*a*b*c**3*d*e**2*g - 3*a*b*c**3*e**3*f + 2*a*c
**4*d**3*h + 6*a*c**4*d**2*e*g + 6*a*c**4*d*e**2*f + b**5*e**3*h
- 3*b**4*c*d*e**2*h - b**4*c*e**3*g + 3*b**3*c**2*d**2*e*h + 3*b*
*3*c**2*d*e**2*g + b**3*c**2*e**3*f - b**2*c**3*d**3*h - 3*b**2*c
**3*d**2*e*g - 3*b**2*c**3*d*e**2*f + b*c**4*d**3*g + 3*b*c**4*d*
*2*e*f - 2*c**5*d**3*f)/(2*c**5*(4*a*c - b**2)) + (a**2*c**2*e**3
*h - 3*a*b**2*c*e**3*h + 6*a*b*c**2*d*e**2*h + 2*a*b*c**2*e**3*g
- 3*a*c**3*d**2*e*h - 3*a*c**3*d*e**2*g - a*c**3*e**3*f + b**4*e*
*3*h - 3*b**3*c*d*e**2*h - b**3*c*e**3*g + 3*b**2*c**2*d**2*e*h +
 3*b**2*c**2*d*e**2*g + b**2*c**2*e**3*f - b*c**3*d**3*h - 3*b*c*
*3*d**2*e*g - 3*b*c**3*d*e**2*f + c**4*d**3*g + 3*c**4*d**2*e*f)/
(2*c**5)) + 2*a*c**4*d**3*g + 6*a*c**4*d**2*e*f + b**2*c**4*(sqrt
(-4*a*c + b**2)*(5*a**2*b*c**2*e**3*h - 6*a**2*c**3*d*e**2*h - 2*
a**2*c**3*e**3*g - 5*a*b**3*c*e**3*h + 12*a*b**2*c**2*d*e**2*h +
4*a*b**2*c**2*e**3*g - 9*a*b*c**3*d**2*e*h - 9*a*b*c**3*d*e**2*g
- 3*a*b*c**3*e**3*f + 2*a*c**4*d**3*h + 6*a*c**4*d**2*e*g + 6*a*c
**4*d*e**2*f + b**5*e**3*h - 3*b**4*c*d*e**2*h - b**4*c*e**3*g +
3*b**3*c**2*d**2*e*h + 3*b**3*c**2*d*e**2*g + b**3*c**2*e**3*f -
b**2*c**3*d**3*h - 3*b**2*c**3*d**2*e*g - 3*b**2*c**3*d*e**2*f +
b*c**4*d**3*g + 3*b*c**4*d**2*e*f - 2*c**5*d**3*f)/(2*c**5*(4*a*c
 - b**2)) + (a**2*c**2*e**3*h - 3*a*b**2*c*e**3*h + 6*a*b*c**2*d*
e**2*h + 2*a*b*c**2*e**3*g - 3*a*c**3*d**2*e*h - 3*a*c**3*d*e**2*
g - a*c**3*e**3*f + b**4*e**3*h - 3*b**3*c*d*e**2*h - b**3*c*e**3
*g + 3*b**2*c**2*d**2*e*h + 3*b**2*c**2*d*e**2*g + b**2*c**2*e**3
*f - b*c**3*d**3*h - 3*b*c**3*d**2*e*g - 3*b*c**3*d*e**2*f + c**4
*d**3*g + 3*c**4*d**2*e*f)/(2*c**5)) - b*c**4*d**3*f)/(5*a**2*b*c
**2*e**3*h - 6*a**2*c**3*d*e**2*h - 2*a**2*c**3*e**3*g - 5*a*b**3
*c*e**3*h + 12*a*b**2*c**2*d*e**2*h + 4*a*b**2*c**2*e**3*g - 9*a*
b*c**3*d**2*e*h - 9*a*b*c**3*d*e**2*g - 3*a*b*c**3*e**3*f + 2*a*c
**4*d**3*h + 6*a*c**4*d**2*e*g + 6*a*c**4*d*e**2*f + b**5*e**3*h
- 3*b**4*c*d*e**2*h - b**4*c*e**3*g + 3*b**3*c**2*d**2*e*h + 3*b*
*3*c**2*d*e**2*g + b**3*c**2*e**3*f - b**2*c**3*d**3*h - 3*b**2*c
**3*d**2*e*g - 3*b**2*c**3*d*e**2*f + b*c**4*d**3*g + 3*b*c**4*d*
*2*e*f - 2*c**5*d**3*f)) + e**3*h*x**4/(4*c) - x**3*(b*e**3*h - 3
*c*d*e**2*h - c*e**3*g)/(3*c**2) - x**2*(a*c*e**3*h - b**2*e**3*h
 + 3*b*c*d*e**2*h + b*c*e**3*g - 3*c**2*d**2*e*h - 3*c**2*d*e**2*
g - c**2*e**3*f)/(2*c**3) + x*(2*a*b*c*e**3*h - 3*a*c**2*d*e**2*h
 - a*c**2*e**3*g - b**3*e**3*h + 3*b**2*c*d*e**2*h + b**2*c*e**3*
g - 3*b*c**2*d**2*e*h - 3*b*c**2*d*e**2*g - b*c**2*e**3*f + c**3*
d**3*h + 3*c**3*d**2*e*g + 3*c**3*d*e**2*f)/c**4
```

GIAC/XCAS [A] time = 0.277523, size = 1041, normalized size = 1.76

$$\frac{3\,c^3hx^4e^3 + 12\,c^3dhx^3e^2 + 18\,c^3d^2hx^2e + 12\,c^3d^3hx + 4\,c^3gx^3e^3 - 4\,bc^2hx^3e^3 + 18\,c^3dgx^2e^2 - 18\,bc^2dhx^2e^2 + 36\,c^3d^2gxe - 3}{}$$
$$+\frac{\left(c^4d^3g - bc^3d^3h + 3\,c^4d^2fe - 3\,bc^3d^2ge + 3\,b^2c^2d^2he - 3\,ac^3d^2he - 3\,bc^3dfe^2 + 3\,b^2c^2dge^2 - 3\,ac^3dge^2 - 3\,b^3cdhe^2 + 6\,ab\right.}{2\,c^5}$$
$$+\frac{\left(2\,c^5d^3f - bc^4d^3g + b^2c^3d^3h - 2\,ac^4d^3h - 3\,bc^4d^2fe + 3\,b^2c^3d^2ge - 6\,ac^4d^2ge - 3\,b^3c^2d^2he + 9\,abc^3d^2he + 3\,b^2c^3dfe^2 - 6\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)*(e*x + d)^3/(c*x^2 + b*x + a),x, algorithm="giac")
```

```
[Out] 1/12*(3*c^3*h*x^4*e^3 + 12*c^3*d*h*x^3*e^2 + 18*c^3*d^2*h*x^2*e +
 12*c^3*d^3*h*x + 4*c^3*g*x^3*e^3 - 4*b*c^2*h*x^3*e^3 + 18*c^3*d*
g*x^2*e^2 - 18*b*c^2*d*h*x^2*e^2 + 36*c^3*d^2*g*x*e - 36*b*c^2*d^
2*h*x*e + 6*c^3*f*x^2*e^3 - 6*b*c^2*g*x^2*e^3 + 6*b^2*c*h*x^2*e^3
 - 6*a*c^2*h*x^2*e^3 + 36*c^3*d*f*x*e^2 - 36*b*c^2*d*g*x*e^2 + 36
*b^2*c*d*h*x*e^2 - 36*a*c^2*d*h*x*e^2 - 12*b*c^2*f*x*e^3 + 12*b^2
*c*g*x*e^3 - 12*a*c^2*g*x*e^3 - 12*b^3*h*x*e^3 + 24*a*b*c*h*x*e^3
)/c^4 + 1/2*(c^4*d^3*g - b*c^3*d^3*h + 3*c^4*d^2*f*e - 3*b*c^3*d^
2*g*e + 3*b^2*c^2*d^2*h*e - 3*a*c^3*d^2*h*e - 3*b*c^3*d*f*e^2 + 3
*b^2*c^2*d*g*e^2 - 3*a*c^3*d*g*e^2 - 3*b^3*c*d*h*e^2 + 6*a*b*c^2*
d*h*e^2 + b^2*c^2*f*e^3 - a*c^3*f*e^3 - b^3*c*g*e^3 + 2*a*b*c^2*g
*e^3 + b^4*h*e^3 - 3*a*b^2*c*h*e^3 + a^2*c^2*h*e^3)*ln(c*x^2 + b*
x + a)/c^5 + (2*c^5*d^3*f - b*c^4*d^3*g + b^2*c^3*d^3*h - 2*a*c^4
*d^3*h - 3*b*c^4*d^2*f*e + 3*b^2*c^3*d^2*g*e - 6*a*c^4*d^2*g*e -
3*b^3*c^2*d^2*h*e + 9*a*b*c^3*d^2*h*e + 3*b^2*c^3*d*f*e^2 - 6*a*c
^4*d*f*e^2 - 3*b^3*c^2*d*g*e^2 + 9*a*b*c^3*d*g*e^2 + 3*b^4*c*d*h*
e^2 - 12*a*b^2*c^2*d*h*e^2 + 6*a^2*c^3*d*h*e^2 - b^3*c^2*f*e^3 +
3*a*b*c^3*f*e^3 + b^4*c*g*e^3 - 4*a*b^2*c^2*g*e^3 + 2*a^2*c^3*g*e
^3 - b^5*h*e^3 + 5*a*b^3*c*h*e^3 - 5*a^2*b*c^2*h*e^3)*arctan((2*c
*x + b)/sqrt(-b^2 + 4*a*c))/(sqrt(-b^2 + 4*a*c)*c^5)
```

3.149 $\int \frac{(d+ex)^2(f+gx+hx^2)}{a+bx+cx^2}\,dx$

Optimal. Leaf size=348

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(c^2\left(2a^2e^2h+3abe(2dh+eg)+b^2\left(d^2h+2deg+e^2f\right)\right)-b^2ce(4aeh+2bdh+beg)-c^3\left(2a\left(d^2h+2deg\right.\right.\right.}{c^4\sqrt{b^2-4ac}}$$
$$+\frac{\log\left(a+bx+cx^2\right)\left(-c^2\left(ae(2dh+eg)+b\left(d^2h+2deg+e^2f\right)\right)+bce(2aeh+2bdh+beg)+b^3\left(-e^2\right)h+c^3d(dg+2ef)\right)}{2c^4}$$
$$+\frac{x\left(-ce(aeh+2bdh+beg)+b^2e^2h+c^2\left(d^2h+2deg+e^2f\right)\right)}{c^3}+\frac{ex^2(-beh+2cdh+ceg)}{2c^2}+\frac{e^2hx^3}{3c}$$

```
[Out] ((b^2*e^2*h + c^2*(e^2*f + 2*d*e*g + d^2*h) - c*e*(b*e*g + 2*b*d*
h + a*e*h))*x)/c^3 + (e*(c*e*g + 2*c*d*h - b*e*h)*x^2)/(2*c^2) +
(e^2*h*x^3)/(3*c) - ((2*c^4*d^2*f + b^4*e^2*h - b^2*c*e*(b*e*g +
2*b*d*h + 4*a*e*h) - c^3*(b*d*(2*e*f + d*g) + 2*a*(e^2*f + 2*d*e*
g + d^2*h)) + c^2*(2*a^2*e^2*h + 3*a*b*e*(e*g + 2*d*h) + b^2*(e^2
*f + 2*d*e*g + d^2*h)))*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(
c^4*Sqrt[b^2 - 4*a*c]) + ((c^3*d*(2*e*f + d*g) - b^3*e^2*h + b*c*
e*(b*e*g + 2*b*d*h + 2*a*e*h) - c^2*(a*e*(e*g + 2*d*h) + b*(e^2*f
 + 2*d*e*g + d^2*h)))*Log[a + b*x + c*x^2])/(2*c^4)
```

Rubi [A] time = 1.39908, antiderivative size = 348, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(c^2\left(2a^2e^2h+3abe(2dh+eg)+b^2\left(d^2h+2deg+e^2f\right)\right)-b^2ce(4aeh+2bdh+beg)-c^3\left(2a\left(d^2h+2deg\right.\right.\right.}{c^4\sqrt{b^2-4ac}}$$
$$+\frac{\log\left(a+bx+cx^2\right)\left(-c^2\left(ae(2dh+eg)+b\left(d^2h+2deg+e^2f\right)\right)+bce(2aeh+2bdh+beg)+b^3\left(-e^2\right)h+c^3d(dg+2ef)\right)}{2c^4}$$
$$+\frac{x\left(-ce(aeh+2bdh+beg)+b^2e^2h+c^2\left(d^2h+2deg+e^2f\right)\right)}{c^3}+\frac{ex^2(-beh+2cdh+ceg)}{2c^2}+\frac{e^2hx^3}{3c}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^2*(f + g*x + h*x^2))/(a + b*x + c*x^2),x]
```


```
[Out] ((b^2*e^2*h + c^2*(e^2*f + 2*d*e*g + d^2*h) - c*e*(b*e*g + 2*b*d*
h + a*e*h))*x)/c^3 + (e*(c*e*g + 2*c*d*h - b*e*h)*x^2)/(2*c^2) +
(e^2*h*x^3)/(3*c) - ((2*c^4*d^2*f + b^4*e^2*h - b^2*c*e*(b*e*g +
2*b*d*h + 4*a*e*h) - c^3*(b*d*(2*e*f + d*g) + 2*a*(e^2*f + 2*d*e*
g + d^2*h)) + c^2*(2*a^2*e^2*h + 3*a*b*e*(e*g + 2*d*h) + b^2*(e^2
*f + 2*d*e*g + d^2*h)))*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(
c^4*Sqrt[b^2 - 4*a*c]) + ((c^3*d*(2*e*f + d*g) - b^3*e^2*h + b*c*
e*(b*e*g + 2*b*d*h + 2*a*e*h) - c^2*(a*e*(e*g + 2*d*h) + b*(e^2*f
```

```
 + 2*d*e*g + d^2*h)))*Log[a + b*x + c*x^2])/(2*c^4)
```

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((e*x+d)**2*(h*x**2+g*x+f)/(c*x**2+b*x+a),x)
```

```
[Out] Timed out
```

Mathematica [A]   time = 0.737595, size = 345, normalized size = 0.99

$$\frac{\frac{6\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)\left(c^2\left(2a^2e^2h+3abe(2dh+eg)+b^2\left(d^2h+2deg+e^2f\right)\right)-b^2ce(4aeh+2bdh+beg)-c^3\left(2a\left(d^2h+2deg+e^2f\right)+bd(dg+2ef)\right)+b^4e^2h+2c^4d^2f\right)}{\sqrt{4ac-b^2}}+3\,\mathrm{lo}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)^2*(f + g*x + h*x^2))/(a + b*x + c*x^2),x]
```

```
[Out] (6*c*(b^2*e^2*h + c^2*(e^2*f + 2*d*e*g + d^2*h) - c*e*(b*e*g + 2*
b*d*h + a*e*h))*x + 3*c^2*e*(c*e*g + 2*c*d*h - b*e*h)*x^2 + 2*c^3
*e^2*h*x^3 + (6*(2*c^4*d^2*f + b^4*e^2*h - b^2*c*e*(b*e*g + 2*b*d
*h + 4*a*e*h) - c^3*(b*d*(2*e*f + d*g) + 2*a*(e^2*f + 2*d*e*g + d
^2*h)) + c^2*(2*a^2*e^2*h + 3*a*b*e*(e*g + 2*d*h) + b^2*(e^2*f +
2*d*e*g + d^2*h)))*ArcTan[(b + 2*c*x)/Sqrt[-b^2 + 4*a*c]])/Sqrt[-
b^2 + 4*a*c] + 3*(c^3*d*(2*e*f + d*g) - b^3*e^2*h + b*c*e*(b*e*g
+ 2*b*d*h + 2*a*e*h) - c^2*(a*e*(e*g + 2*d*h) + b*(e^2*f + 2*d*e*
g + d^2*h)))*Log[a + x*(b + c*x)])/(6*c^4)
```

Maple [B]   time = 0.009, size = 1028, normalized size = 3.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^2*(h*x^2+g*x+f)/(c*x^2+b*x+a),x)
```

```
[Out] -1/2/c^2*ln(c*x^2+b*x+a)*b*e^2*f-1/2/c^4*ln(c*x^2+b*x+a)*b^3*e^2*
h-4/c/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*d*e
*g-4/c^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*
b^2*e^2*h-2/c^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1
/2))*b^3*d*e*h+1/2/c*x^2*e^2*g+1/c*d^2*h*x+1/c*e^2*f*x+2/(4*a*c-b
^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*d^2*f+1/2/c*ln(c*x^
2+b*x+a)*d^2*g+1/c*ln(c*x^2+b*x+a)*d*e*f+6/c^2/(4*a*c-b^2)^(1/2)*
arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*b*d*e*h-2/c^2*b*d*e*h*x-1/c
^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b^3*e^2*
g-2/c/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*e^2
*f+1/c^4/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b^
4*e^2*h+1/c^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2
))*b^2*d^2*h+1/3*e^2*h*x^3/c+2/c*d*e*g*x-1/2/c^2*ln(c*x^2+b*x+a)*
a*e^2*g+3/c^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2
))*a*b*e^2*g+2/c^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)
^(1/2))*b^2*d*e*g-2/c/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b
^2)^(1/2))*b*d*e*f-1/2/c^2*ln(c*x^2+b*x+a)*b*d^2*h-1/c^2*a*e^2*h*
x+1/c^3*b^2*e^2*h*x-1/c^2*b*e^2*g*x-1/2/c^2*x^2*b*e^2*h+1/c*x^2*d
*e*h+1/2/c^3*ln(c*x^2+b*x+a)*b^2*e^2*g+2/c^2/(4*a*c-b^2)^(1/2)*ar
ctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a^2*e^2*h-1/c/(4*a*c-b^2)^(1/2)
*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b*d^2*g-2/c/(4*a*c-b^2)^(1/2
)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*d^2*h+1/c^2/(4*a*c-b^2)^(
1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b^2*e^2*f+1/c^3*ln(c*x^2
+b*x+a)*b^2*d*e*h-1/c^2*ln(c*x^2+b*x+a)*a*d*e*h+1/c^3*ln(c*x^2+b*
x+a)*a*b*e^2*h-1/c^2*ln(c*x^2+b*x+a)*b*d*e*g
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)*(e*x + d)^2/(c*x^2 + b*x + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.568694, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)*(e*x + d)^2/(c*x^2 + b*x + a),x, algorithm="fricas")
```

```
[Out] [1/6*(3*((2*c^4*d^2 - 2*b*c^3*d*e + (b^2*c^2 - 2*a*c^3)*e^2)*f -
(b*c^3*d^2 - 2*(b^2*c^2 - 2*a*c^3)*d*e + (b^3*c - 3*a*b*c^2)*e^2)
```

```
*g + ((b^2*c^2 - 2*a*c^3)*d^2 - 2*(b^3*c - 3*a*b*c^2)*d*e + (b^4
- 4*a*b^2*c + 2*a^2*c^2)*e^2)*h)*log(-(b^3 - 4*a*b*c + 2*(b^2*c -
 4*a*c^2)*x - (2*c^2*x^2 + 2*b*c*x + b^2 - 2*a*c)*sqrt(b^2 - 4*a*
c))/(c*x^2 + b*x + a)) + (2*c^3*e^2*h*x^3 + 3*(c^3*e^2*g + (2*c^3
*d*e - b*c^2*e^2)*h)*x^2 + 6*(c^3*e^2*f + (2*c^3*d*e - b*c^2*e^2)
*g + (c^3*d^2 - 2*b*c^2*d*e + (b^2*c - a*c^2)*e^2)*h)*x + 3*((2*c
^3*d*e - b*c^2*e^2)*f + (c^3*d^2 - 2*b*c^2*d*e + (b^2*c - a*c^2)*
e^2)*g - (b*c^2*d^2 - 2*(b^2*c - a*c^2)*d*e + (b^3 - 2*a*b*c)*e^2
)*h)*log(c*x^2 + b*x + a))*sqrt(b^2 - 4*a*c))/(sqrt(b^2 - 4*a*c)*
c^4), 1/6*(6*((2*c^4*d^2 - 2*b*c^3*d*e + (b^2*c^2 - 2*a*c^3)*e^2)
*f - (b*c^3*d^2 - 2*(b^2*c^2 - 2*a*c^3)*d*e + (b^3*c - 3*a*b*c^2)
*e^2)*g + ((b^2*c^2 - 2*a*c^3)*d^2 - 2*(b^3*c - 3*a*b*c^2)*d*e +
(b^4 - 4*a*b^2*c + 2*a^2*c^2)*e^2)*h)*arctan(-sqrt(-b^2 + 4*a*c)*
(2*c*x + b)/(b^2 - 4*a*c)) + (2*c^3*e^2*h*x^3 + 3*(c^3*e^2*g + (2
*c^3*d*e - b*c^2*e^2)*h)*x^2 + 6*(c^3*e^2*f + (2*c^3*d*e - b*c^2*
e^2)*g + (c^3*d^2 - 2*b*c^2*d*e + (b^2*c - a*c^2)*e^2)*h)*x + 3*(
(2*c^3*d*e - b*c^2*e^2)*f + (c^3*d^2 - 2*b*c^2*d*e + (b^2*c - a*c
^2)*e^2)*g - (b*c^2*d^2 - 2*(b^2*c - a*c^2)*d*e + (b^3 - 2*a*b*c)
*e^2)*h)*log(c*x^2 + b*x + a))*sqrt(-b^2 + 4*a*c))/(sqrt(-b^2 + 4
*a*c)*c^4)]
```

Sympy [A] time = 56.844, size = 2839, normalized size = 8.16

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**2*(h*x**2+g*x+f)/(c*x**2+b*x+a),x)
```

```
[Out] (-sqrt(-4*a*c + b**2)*(2*a**2*c**2*e**2*h - 4*a*b**2*c*e**2*h + 6
*a*b*c**2*d*e*h + 3*a*b*c**2*e**2*g - 2*a*c**3*d**2*h - 4*a*c**3*
d*e*g - 2*a*c**3*e**2*f + b**4*e**2*h - 2*b**3*c*d*e*h - b**3*c*e
**2*g + b**2*c**2*d**2*h + 2*b**2*c**2*d*e*g + b**2*c**2*e**2*f -
 b*c**3*d**2*g - 2*b*c**3*d*e*f + 2*c**4*d**2*f)/(2*c**4*(4*a*c -
 b**2)) + (2*a*b*c*e**2*h - 2*a*c**2*d*e*h - a*c**2*e**2*g - b**3
*e**2*h + 2*b**2*c*d*e*h + b**2*c*e**2*g - b*c**2*d**2*h - 2*b*c*
*2*d*e*g - b*c**2*e**2*f + c**3*d**2*g + 2*c**3*d*e*f)/(2*c**4))*
log(x + (-3*a**2*b*c*e**2*h + 4*a**2*c**2*d*e*h + 2*a**2*c**2*e**
2*g + a*b**3*e**2*h - 2*a*b**2*c*d*e*h - a*b**2*c*e**2*g + a*b*c*
*2*d**2*h + 2*a*b*c**2*d*e*g + a*b*c**2*e**2*f + 4*a*c**4*(-sqrt(
-4*a*c + b**2)*(2*a**2*c**2*e**2*h - 4*a*b**2*c*e**2*h + 6*a*b*c*
*2*d*e*h + 3*a*b*c**2*e**2*g - 2*a*c**3*d**2*h - 4*a*c**3*d*e*g -
 2*a*c**3*e**2*f + b**4*e**2*h - 2*b**3*c*d*e*h - b**3*c*e**2*g +
 b**2*c**2*d**2*h + 2*b**2*c**2*d*e*g + b**2*c**2*e**2*f - b*c**3
*d**2*g - 2*b*c**3*d*e*f + 2*c**4*d**2*f)/(2*c**4*(4*a*c - b**2))
 + (2*a*b*c*e**2*h - 2*a*c**2*d*e*h - a*c**2*e**2*g - b**3*e**2*h
 + 2*b**2*c*d*e*h + b**2*c*e**2*g - b*c**2*d**2*h - 2*b*c**2*d*e*
g - b*c**2*e**2*f + c**3*d**2*g + 2*c**3*d*e*f)/(2*c**4)) - 2*a*c
**3*d**2*g - 4*a*c**3*d*e*f - b**2*c**3*(-sqrt(-4*a*c + b**2)*(2*
```

```
a**2*c**2*e**2*h - 4*a*b**2*c*e**2*h + 6*a*b*c**2*d*e*h + 3*a*b*c
**2*e**2*g - 2*a*c**3*d**2*h - 4*a*c**3*d*e*g - 2*a*c**3*e**2*f +
 b**4*e**2*h - 2*b**3*c*d*e*h - b**3*c*e**2*g + b**2*c**2*d**2*h
+ 2*b**2*c**2*d*e*g + b**2*c**2*e**2*f - b*c**3*d**2*g - 2*b*c**3
*d*e*f + 2*c**4*d**2*f)/(2*c**4*(4*a*c - b**2)) + (2*a*b*c*e**2*h
 - 2*a*c**2*d*e*h - a*c**2*e**2*g - b**3*e**2*h + 2*b**2*c*d*e*h
+ b**2*c*e**2*g - b*c**2*d**2*h - 2*b*c**2*d*e*g - b*c**2*e**2*f
+ c**3*d**2*g + 2*c**3*d*e*f)/(2*c**4)) + b*c**3*d**2*f)/(2*a**2*
c**2*e**2*h - 4*a*b**2*c*e**2*h + 6*a*b*c**2*d*e*h + 3*a*b*c**2*e
**2*g - 2*a*c**3*d**2*h - 4*a*c**3*d*e*g - 2*a*c**3*e**2*f + b**4
*e**2*h - 2*b**3*c*d*e*h - b**3*c*e**2*g + b**2*c**2*d**2*h + 2*b
**2*c**2*d*e*g + b**2*c**2*e**2*f - b*c**3*d**2*g - 2*b*c**3*d*e*
f + 2*c**4*d**2*f)) + (sqrt(-4*a*c + b**2)*(2*a**2*c**2*e**2*h -
4*a*b**2*c*e**2*h + 6*a*b*c**2*d*e*h + 3*a*b*c**2*e**2*g - 2*a*c*
*3*d**2*h - 4*a*c**3*d*e*g - 2*a*c**3*e**2*f + b**4*e**2*h - 2*b*
*3*c*d*e*h - b**3*c*e**2*g + b**2*c**2*d**2*h + 2*b**2*c**2*d*e*g
 + b**2*c**2*e**2*f - b*c**3*d**2*g - 2*b*c**3*d*e*f + 2*c**4*d**
2*f)/(2*c**4*(4*a*c - b**2)) + (2*a*b*c*e**2*h - 2*a*c**2*d*e*h -
 a*c**2*e**2*g - b**3*e**2*h + 2*b**2*c*d*e*h + b**2*c*e**2*g - b
*c**2*d**2*h - 2*b*c**2*d*e*g - b*c**2*e**2*f + c**3*d**2*g + 2*c
**3*d*e*f)/(2*c**4))*log(x + (-3*a**2*b*c*e**2*h + 4*a**2*c**2*d*
e*h + 2*a**2*c**2*e**2*g + a*b**3*e**2*h - 2*a*b**2*c*d*e*h - a*b
**2*c*e**2*g + a*b*c**2*d**2*h + 2*a*b*c**2*d*e*g + a*b*c**2*e**2
*f + 4*a*c**4*(sqrt(-4*a*c + b**2)*(2*a**2*c**2*e**2*h - 4*a*b**2
*c*e**2*h + 6*a*b*c**2*d*e*h + 3*a*b*c**2*e**2*g - 2*a*c**3*d**2*
h - 4*a*c**3*d*e*g - 2*a*c**3*e**2*f + b**4*e**2*h - 2*b**3*c*d*e
*h - b**3*c*e**2*g + b**2*c**2*d**2*h + 2*b**2*c**2*d*e*g + b**2*
c**2*e**2*f - b*c**3*d**2*g - 2*b*c**3*d*e*f + 2*c**4*d**2*f)/(2*
c**4*(4*a*c - b**2)) + (2*a*b*c*e**2*h - 2*a*c**2*d*e*h - a*c**2*
e**2*g - b**3*e**2*h + 2*b**2*c*d*e*h + b**2*c*e**2*g - b*c**2*d*
*2*h - 2*b*c**2*d*e*g - b*c**2*e**2*f + c**3*d**2*g + 2*c**3*d*e*
f)/(2*c**4)) - 2*a*c**3*d**2*g - 4*a*c**3*d*e*f - b**2*c**3*(sqrt
(-4*a*c + b**2)*(2*a**2*c**2*e**2*h - 4*a*b**2*c*e**2*h + 6*a*b*c
**2*d*e*h + 3*a*b*c**2*e**2*g - 2*a*c**3*d**2*h - 4*a*c**3*d*e*g
- 2*a*c**3*e**2*f + b**4*e**2*h - 2*b**3*c*d*e*h - b**3*c*e**2*g
+ b**2*c**2*d**2*h + 2*b**2*c**2*d*e*g + b**2*c**2*e**2*f - b*c**
3*d**2*g - 2*b*c**3*d*e*f + 2*c**4*d**2*f)/(2*c**4*(4*a*c - b**2)
) + (2*a*b*c*e**2*h - 2*a*c**2*d*e*h - a*c**2*e**2*g - b**3*e**2*
h + 2*b**2*c*d*e*h + b**2*c*e**2*g - b*c**2*d**2*h - 2*b*c**2*d*e
*g - b*c**2*e**2*f + c**3*d**2*g + 2*c**3*d*e*f)/(2*c**4)) + b*c*
*3*d**2*f)/(2*a**2*c**2*e**2*h - 4*a*b**2*c*e**2*h + 6*a*b*c**2*d
*e*h + 3*a*b*c**2*e**2*g - 2*a*c**3*d**2*h - 4*a*c**3*d*e*g - 2*a
*c**3*e**2*f + b**4*e**2*h - 2*b**3*c*d*e*h - b**3*c*e**2*g + b**
2*c**2*d**2*h + 2*b**2*c**2*d*e*g + b**2*c**2*e**2*f - b*c**3*d**
2*g - 2*b*c**3*d*e*f + 2*c**4*d**2*f)) + e**2*h*x**3/(3*c) - x**2
*(b*e**2*h - 2*c*d*e*h - c*e**2*g)/(2*c**2) - x*(a*c*e**2*h - b**
2*e**2*h + 2*b*c*d*e*h + b*c*e**2*g - c**2*d**2*h - 2*c**2*d*e*g
- c**2*e**2*f)/c**3
```

GIAC/XCAS [A] time = 0.276614, size = 575, normalized size = 1.65

$$\frac{2\,c^2hx^3e^2 + 6\,c^2dhx^2e + 6\,c^2d^2hx + 3\,c^2gx^2e^2 - 3\,bchx^2e^2 + 12\,c^2dgxe - 12\,bcdhxe + 6\,c^2fxe^2 - 6\,bcgxe^2 + 6\,b^2hxe^2 - 6\,ac}{6\,c^3}$$
$$+\frac{\left(c^3d^2g - bc^2d^2h + 2\,c^3dfe - 2\,bc^2dge + 2\,b^2cdhe - 2\,ac^2dhe - bc^2fe^2 + b^2cge^2 - ac^2ge^2 - b^3he^2 + 2\,abche^2\right)\ln\left(cx^2 + bx\right.}{2\,c^4}$$
$$+\frac{\left(2\,c^4d^2f - bc^3d^2g + b^2c^2d^2h - 2\,ac^3d^2h - 2\,bc^3dfe + 2\,b^2c^2dge - 4\,ac^3dge - 2\,b^3cdhe + 6\,abc^2dhe + b^2c^2fe^2 - 2\,ac^3fe^2\right.}{\sqrt{-b^2 + 4\,ac}c^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)*(e*x + d)^2/(c*x^2 + b*x + a),x, algorithm="giac")
```

```
[Out] 1/6*(2*c^2*h*x^3*e^2 + 6*c^2*d*h*x^2*e + 6*c^2*d^2*h*x + 3*c^2*g*
x^2*e^2 - 3*b*c*h*x^2*e^2 + 12*c^2*d*g*x*e - 12*b*c*d*h*x*e + 6*c
^2*f*x*e^2 - 6*b*c*g*x*e^2 + 6*b^2*h*x*e^2 - 6*a*c*h*x*e^2)/c^3 +
 1/2*(c^3*d^2*g - b*c^2*d^2*h + 2*c^3*d*f*e - 2*b*c^2*d*g*e + 2*b
^2*c*d*h*e - 2*a*c^2*d*h*e - b*c^2*f*e^2 + b^2*c*g*e^2 - a*c^2*g*
e^2 - b^3*h*e^2 + 2*a*b*c*h*e^2)*ln(c*x^2 + b*x + a)/c^4 + (2*c^4
*d^2*f - b*c^3*d^2*g + b^2*c^2*d^2*h - 2*a*c^3*d^2*h - 2*b*c^3*d*
f*e + 2*b^2*c^2*d*g*e - 4*a*c^3*d*g*e - 2*b^3*c*d*h*e + 6*a*b*c^2
*d*h*e + b^2*c^2*f*e^2 - 2*a*c^3*f*e^2 - b^3*c*g*e^2 + 3*a*b*c^2*
g*e^2 + b^4*h*e^2 - 4*a*b^2*c*h*e^2 + 2*a^2*c^2*h*e^2)*arctan((2*
c*x + b)/sqrt(-b^2 + 4*a*c))/(sqrt(-b^2 + 4*a*c)*c^4)
```

3.150 $\int \frac{(d+ex)\left(f+gx+hx^2\right)}{a+bx+cx^2}\,dx$

Optimal. Leaf size=177

$$\frac{\log\left(a+bx+cx^2\right)\left(-c(aeh+bdh+beg)+b^2eh+c^2(dg+ef)\right)}{2c^3} - \frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(-c^2(2adh+2aeg+bdg+bef)+bc(3aeh+bdh+beg)+b^3(-e)h+2c^3df\right)}{c^3\sqrt{b^2-4ac}} + \frac{x(-beh+cdh+ceg)}{c^2} + \frac{ehx^2}{2c}$$

```
[Out] ((c*e*g + c*d*h - b*e*h)*x)/c^2 + (e*h*x^2)/(2*c) - ((2*c^3*d*f -
 b^3*e*h - c^2*(b*e*f + b*d*g + 2*a*e*g + 2*a*d*h) + b*c*(b*e*g +
 b*d*h + 3*a*e*h))*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(c^3*S
qrt[b^2 - 4*a*c]) + ((c^2*(e*f + d*g) + b^2*e*h - c*(b*e*g + b*d*
h + a*e*h))*Log[a + b*x + c*x^2])/(2*c^3)
```

Rubi [A] time = 0.630214, antiderivative size = 177, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}} = 0.179$

$$\frac{\log\left(a+bx+cx^2\right)\left(-c(aeh+bdh+beg)+b^2eh+c^2(dg+ef)\right)}{2c^3} - \frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(-c^2(2adh+2aeg+bdg+bef)+bc(3aeh+bdh+beg)+b^3(-e)h+2c^3df\right)}{c^3\sqrt{b^2-4ac}} + \frac{x(-beh+cdh+ceg)}{c^2} + \frac{ehx^2}{2c}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)*(f + g*x + h*x^2))/(a + b*x + c*x^2),x]
```

```
[Out] ((c*e*g + c*d*h - b*e*h)*x)/c^2 + (e*h*x^2)/(2*c) - ((2*c^3*d*f -
 b^3*e*h - c^2*(b*e*f + b*d*g + 2*a*e*g + 2*a*d*h) + b*c*(b*e*g +
 b*d*h + 3*a*e*h))*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(c^3*S
qrt[b^2 - 4*a*c]) + ((c^2*(e*f + d*g) + b^2*e*h - c*(b*e*g + b*d*
h + a*e*h))*Log[a + b*x + c*x^2])/(2*c^3)
```

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

$$-(beh-cdh-ceg)\int\frac{1}{c^2}\,dx+\frac{eh\int x\,dx}{c}+\frac{\left(-aceh+b^2eh-bcdh-bceg+c^2dg+c^2ef\right)\log\left(a+bx+cx^2\right)}{2c^3}+\frac{\left(b\left(-aceh+b^2eh-bcdh-bceg+c^2dg+c^2ef\right)-2c\left(abeh-acdh-aceg+c^2df\right)\right)\operatorname{atanh}\left(\frac{b+2cx}{\sqrt{-4ac+b^2}}\right)}{c^3\sqrt{-4ac+b^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)*(h*x**2+g*x+f)/(c*x**2+b*x+a),x)
```

```
[Out] -(b*e*h - c*d*h - c*e*g)*Integral(c**(-2), x) + e*h*Integral(x, x
)/c + (-a*c*e*h + b**2*e*h - b*c*d*h - b*c*e*g + c**2*d*g + c**2*
e*f)*log(a + b*x + c*x**2)/(2*c**3) + (b*(-a*c*e*h + b**2*e*h - b
*c*d*h - b*c*e*g + c**2*d*g + c**2*e*f) - 2*c*(a*b*e*h - a*c*d*h
- a*c*e*g + c**2*d*f))*atanh((b + 2*c*x)/sqrt(-4*a*c + b**2))/(c*
*3*sqrt(-4*a*c + b**2))
```

Mathematica [A] time = 0.354361, size = 173, normalized size = 0.98

$$\frac{\log(a+x(b+cx))\left(-c(aeh+bdh+beg)+b^2eh+c^2(dg+ef)\right)-\frac{2\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)\left(c^2(2adh+2aeg+bdg+bef)-bc(3aeh+bdh+beg)+b^3eh-\right.}{\sqrt{4ac-b^2}}}{2c^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)*(f + g*x + h*x^2))/(a + b*x + c*x^2),x]
```

```
[Out] (2*c*(c*e*g + c*d*h - b*e*h)*x + c^2*e*h*x^2 - (2*(-2*c^3*d*f + b
^3*e*h + c^2*(b*e*f + b*d*g + 2*a*e*g + 2*a*d*h) - b*c*(b*e*g + b
*d*h + 3*a*e*h))*ArcTan[(b + 2*c*x)/Sqrt[-b^2 + 4*a*c]])/Sqrt[-b^
2 + 4*a*c] + (c^2*(e*f + d*g) + b^2*e*h - c*(b*e*g + b*d*h + a*e*
h))*Log[a + x*(b + c*x)])/(2*c^3)
```

Maple [B] time = 0.007, size = 510, normalized size = 2.9

$$\frac{ehx^2}{2c} - \frac{behx}{c^2} + \frac{dhx}{c} + \frac{egx}{c} - \frac{\ln(cx^2+bx+a)\,aeh}{2c^2} + \frac{\ln(cx^2+bx+a)\,b^2eh}{2c^3} - \frac{\ln(cx^2+bx+a)\,bdh}{2c^2} - \frac{\ln(cx^2+bx+a)\,beg}{2c^2} + \frac{\ln(cx^2+bx+a)\,dg}{2c} + \frac{\ln(cx^2+bx+a)\,ef}{2c} + 3\frac{abeh}{c^2\sqrt{4ac-b^2}}\arctan\left(\frac{2cx+b}{\sqrt{4ac-b^2}}\right) - 2\frac{adh}{c\sqrt{4ac-b^2}}\arctan\left(\frac{2cx+b}{\sqrt{4ac-b^2}}\right) - 2\frac{aeg}{c\sqrt{4ac-b^2}}\arctan\left(\frac{2cx+b}{\sqrt{4ac-b^2}}\right) + 2\frac{df}{\sqrt{4ac-b^2}}\arctan\left(\frac{2cx+b}{\sqrt{4ac-b^2}}\right) - \frac{b^3eh}{c^3}\arctan\left((2cx+b)\frac{1}{\sqrt{4ac-b^2}}\right)\frac{1}{\sqrt{4ac-b^2}} + \frac{b^2dh}{c^2}\arctan\left((2cx+b)\frac{1}{\sqrt{4ac-b^2}}\right)\frac{1}{\sqrt{4ac-b^2}} + \frac{b^2eg}{c^2}\arctan\left((2cx+b)\frac{1}{\sqrt{4ac-b^2}}\right)\frac{1}{\sqrt{4ac-b^2}} - \frac{bdg}{c}\arctan\left((2cx+b)\frac{1}{\sqrt{4ac-b^2}}\right)\frac{1}{\sqrt{4ac-b^2}} - \frac{bef}{c}\arctan\left((2cx+b)\frac{1}{\sqrt{4ac-b^2}}\right)\frac{1}{\sqrt{4ac-b^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)*(h*x^2+g*x+f)/(c*x^2+b*x+a),x)
```

```
[Out] 1/2*e*h*x^2/c-1/c^2*b*e*h*x+1/c*d*h*x+1/c*e*g*x-1/2/c^2*ln(c*x^2+
b*x+a)*a*e*h+1/2/c^3*ln(c*x^2+b*x+a)*b^2*e*h-1/2/c^2*ln(c*x^2+b*x
+a)*b*d*h-1/2/c^2*ln(c*x^2+b*x+a)*b*e*g+1/2/c*ln(c*x^2+b*x+a)*d*g
+1/2/c*ln(c*x^2+b*x+a)*e*f+3/c^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+
b)/(4*a*c-b^2)^(1/2))*a*b*e*h-2/c/(4*a*c-b^2)^(1/2)*arctan((2*c*x
+b)/(4*a*c-b^2)^(1/2))*a*d*h-2/c/(4*a*c-b^2)^(1/2)*arctan((2*c*x+
b)/(4*a*c-b^2)^(1/2))*a*e*g+2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/
(4*a*c-b^2)^(1/2))*d*f-1/c^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(
4*a*c-b^2)^(1/2))*b^3*e*h+1/c^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b
)/(4*a*c-b^2)^(1/2))*b^2*d*h+1/c^2/(4*a*c-b^2)^(1/2)*arctan((2*c*
x+b)/(4*a*c-b^2)^(1/2))*b^2*e*g-1/c/(4*a*c-b^2)^(1/2)*arctan((2*c
*x+b)/(4*a*c-b^2)^(1/2))*b*d*g-1/c/(4*a*c-b^2)^(1/2)*arctan((2*c*
x+b)/(4*a*c-b^2)^(1/2))*b*e*f
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)*(e*x + d)/(c*x^2 + b*x + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.325932, size = 1, normalized size = 0.01

$$\left[\frac{\left(\left(2\,c^3 d - bc^2 e\right) f - \left(bc^2 d - \left(b^2 c - 2\,ac^2\right) e\right) g + \left(\left(b^2 c - 2\,ac^2\right) d - \left(b^3 - 3\,abc\right) e\right) h\right) \log\left(-\frac{b^3 - 4\,abc + 2\,\left(b^2 c - 4\,ac^2\right) x - \left(2\,c^2 x^2 + 2\,bc\right.}{cx^2 + bx + a}\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)*(e*x + d)/(c*x^2 + b*x + a),x, algorithm="fricas")
```

```
[Out] [1/2*((((2*c^3*d - b*c^2*e)*f - (b*c^2*d - (b^2*c - 2*a*c^2)*e)*g
+ ((b^2*c - 2*a*c^2)*d - (b^3 - 3*a*b*c)*e)*h)*log(-(b^3 - 4*a*b*
c + 2*(b^2*c - 4*a*c^2)*x - (2*c^2*x^2 + 2*b*c*x + b^2 - 2*a*c)*s
qrt(b^2 - 4*a*c))/(c*x^2 + b*x + a)) + (c^2*e*h*x^2 + 2*(c^2*e*g
+ (c^2*d - b*c*e)*h)*x + (c^2*e*f + (c^2*d - b*c*e)*g - (b*c*d -
(b^2 - a*c)*e)*h)*log(c*x^2 + b*x + a))*sqrt(b^2 - 4*a*c))/(sqrt(
b^2 - 4*a*c)*c^3), 1/2*(2*((2*c^3*d - b*c^2*e)*f - (b*c^2*d - (b^
2*c - 2*a*c^2)*e)*g + ((b^2*c - 2*a*c^2)*d - (b^3 - 3*a*b*c)*e)*h
)*arctan(-sqrt(-b^2 + 4*a*c)*(2*c*x + b)/(b^2 - 4*a*c)) + (c^2*e*
h*x^2 + 2*(c^2*e*g + (c^2*d - b*c*e)*h)*x + (c^2*e*f + (c^2*d - b
*c*e)*g - (b*c*d - (b^2 - a*c)*e)*h)*log(c*x^2 + b*x + a))*sqrt(-
b^2 + 4*a*c))/(sqrt(-b^2 + 4*a*c)*c^3)]
```

Sympy [A] time = 19.7631, size = 1265, normalized size = 7.15

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(h*x**2+g*x+f)/(c*x**2+b*x+a),x)
```

```
[Out] (-sqrt(-4*a*c + b**2)*(3*a*b*c*e*h - 2*a*c**2*d*h - 2*a*c**2*e*g
- b**3*e*h + b**2*c*d*h + b**2*c*e*g - b*c**2*d*g - b*c**2*e*f +
2*c**3*d*f)/(2*c**3*(4*a*c - b**2)) - (a*c*e*h - b**2*e*h + b*c*d
*h + b*c*e*g - c**2*d*g - c**2*e*f)/(2*c**3))*log(x + (2*a**2*c*e
*h - a*b**2*e*h + a*b*c*d*h + a*b*c*e*g + 4*a*c**3*(-sqrt(-4*a*c
+ b**2)*(3*a*b*c*e*h - 2*a*c**2*d*h - 2*a*c**2*e*g - b**3*e*h + b
**2*c*d*h + b**2*c*e*g - b*c**2*d*g - b*c**2*e*f + 2*c**3*d*f)/(2
```

```
*c**3*(4*a*c - b**2)) - (a*c*e*h - b**2*e*h + b*c*d*h + b*c*e*g -
 c**2*d*g - c**2*e*f)/(2*c**3)) - 2*a*c**2*d*g - 2*a*c**2*e*f - b
**2*c**2*(-sqrt(-4*a*c + b**2)*(3*a*b*c*e*h - 2*a*c**2*d*h - 2*a*
c**2*e*g - b**3*e*h + b**2*c*d*h + b**2*c*e*g - b*c**2*d*g - b*c*
*2*e*f + 2*c**3*d*f)/(2*c**3*(4*a*c - b**2)) - (a*c*e*h - b**2*e*
h + b*c*d*h + b*c*e*g - c**2*d*g - c**2*e*f)/(2*c**3)) + b*c**2*d
*f)/(3*a*b*c*e*h - 2*a*c**2*d*h - 2*a*c**2*e*g - b**3*e*h + b**2*
c*d*h + b**2*c*e*g - b*c**2*d*g - b*c**2*e*f + 2*c**3*d*f)) + (sq
rt(-4*a*c + b**2)*(3*a*b*c*e*h - 2*a*c**2*d*h - 2*a*c**2*e*g - b*
*3*e*h + b**2*c*d*h + b**2*c*e*g - b*c**2*d*g - b*c**2*e*f + 2*c*
*3*d*f)/(2*c**3*(4*a*c - b**2)) - (a*c*e*h - b**2*e*h + b*c*d*h +
 b*c*e*g - c**2*d*g - c**2*e*f)/(2*c**3))*log(x + (2*a**2*c*e*h -
 a*b**2*e*h + a*b*c*d*h + a*b*c*e*g + 4*a*c**3*(sqrt(-4*a*c + b**
2)*(3*a*b*c*e*h - 2*a*c**2*d*h - 2*a*c**2*e*g - b**3*e*h + b**2*c
*d*h + b**2*c*e*g - b*c**2*d*g - b*c**2*e*f + 2*c**3*d*f)/(2*c**3
*(4*a*c - b**2)) - (a*c*e*h - b**2*e*h + b*c*d*h + b*c*e*g - c**2
*d*g - c**2*e*f)/(2*c**3)) - 2*a*c**2*d*g - 2*a*c**2*e*f - b**2*c
**2*(sqrt(-4*a*c + b**2)*(3*a*b*c*e*h - 2*a*c**2*d*h - 2*a*c**2*e
*g - b**3*e*h + b**2*c*d*h + b**2*c*e*g - b*c**2*d*g - b*c**2*e*f
 + 2*c**3*d*f)/(2*c**3*(4*a*c - b**2)) - (a*c*e*h - b**2*e*h + b*
c*d*h + b*c*e*g - c**2*d*g - c**2*e*f)/(2*c**3)) + b*c**2*d*f)/(3
*a*b*c*e*h - 2*a*c**2*d*h - 2*a*c**2*e*g - b**3*e*h + b**2*c*d*h
+ b**2*c*e*g - b*c**2*d*g - b*c**2*e*f + 2*c**3*d*f)) + e*h*x**2/
(2*c) - x*(b*e*h - c*d*h - c*e*g)/c**2
```

GIAC/XCAS [A] time = 0.273461, size = 271, normalized size = 1.53

$$\frac{chx^2e + 2\,cdhx + 2\,cgxe - 2\,bhxe}{2\,c^2} + \frac{\left(c^2dg - bcdh + c^2fe - bcge + b^2he - ache\right)\ln\left(cx^2 + bx + a\right)}{2\,c^3} + \frac{\left(2\,c^3df - bc^2dg + b^2cdh - 2\,ac^2dh - bc^2fe + b^2cge - 2\,ac^2ge - b^3he + 3\,abche\right)\arctan\left(\frac{2\,cx+b}{\sqrt{-b^2+4\,ac}}\right)}{\sqrt{-b^2 + 4\,ac}c^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)*(e*x + d)/(c*x^2 + b*x + a),x, algorithm="giac")
```

```
[Out] 1/2*(c*h*x^2*e + 2*c*d*h*x + 2*c*g*x*e - 2*b*h*x*e)/c^2 + 1/2*(c^
2*d*g - b*c*d*h + c^2*f*e - b*c*g*e + b^2*h*e - a*c*h*e)*ln(c*x^2
 + b*x + a)/c^3 + (2*c^3*d*f - b*c^2*d*g + b^2*c*d*h - 2*a*c^2*d*
h - b*c^2*f*e + b^2*c*g*e - 2*a*c^2*g*e - b^3*h*e + 3*a*b*c*h*e)*
arctan((2*c*x + b)/sqrt(-b^2 + 4*a*c))/(sqrt(-b^2 + 4*a*c)*c^3)
```

3.151 $\int \frac{f+gx+hx^2}{a+bx+cx^2} \, dx$

Optimal. Leaf size=92

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(-2ach+b^2h-bcg+2c^2f\right)}{c^2\sqrt{b^2-4ac}}+\frac{(cg-bh)\log\left(a+bx+cx^2\right)}{2c^2}+\frac{hx}{c}$$

```
[Out] (h*x)/c - ((2*c^2*f - b*c*g + b^2*h - 2*a*c*h)*ArcTanh[(b + 2*c*x
)/Sqrt[b^2 - 4*a*c]])/(c^2*Sqrt[b^2 - 4*a*c]) + ((c*g - b*h)*Log[
a + b*x + c*x^2])/(2*c^2)
```

Rubi [A] time = 0.260525, antiderivative size = 92, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.217

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(-2ach+b^2h-bcg+2c^2f\right)}{c^2\sqrt{b^2-4ac}}+\frac{(cg-bh)\log\left(a+bx+cx^2\right)}{2c^2}+\frac{hx}{c}$$

Antiderivative was successfully verified.

```
[In]  Int[(f + g*x + h*x^2)/(a + b*x + c*x^2),x]
```

```
[Out] (h*x)/c - ((2*c^2*f - b*c*g + b^2*h - 2*a*c*h)*ArcTanh[(b + 2*c*x
)/Sqrt[b^2 - 4*a*c]])/(c^2*Sqrt[b^2 - 4*a*c]) + ((c*g - b*h)*Log[
a + b*x + c*x^2])/(2*c^2)
```

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

$$\frac{\int h\,dx}{c}-\frac{(bh-cg)\log\left(a+bx+cx^2\right)}{2c^2}-\frac{\left(-2ach+b^2h-bcg+2c^2f\right)\operatorname{atanh}\left(\frac{b+2cx}{\sqrt{-4ac+b^2}}\right)}{c^2\sqrt{-4ac+b^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x**2+g*x+f)/(c*x**2+b*x+a),x)
```

```
[Out] Integral(h, x)/c - (b*h - c*g)*log(a + b*x + c*x**2)/(2*c**2) - (
-2*a*c*h + b**2*h - b*c*g + 2*c**2*f)*atanh((b + 2*c*x)/sqrt(-4*a
*c + b**2))/(c**2*sqrt(-4*a*c + b**2))
```

Mathematica [A] time = 0.113437, size = 95, normalized size = 1.03

$$\frac{\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)\left(-2ach+b^2h-bcg+2c^2f\right)}{c^2\sqrt{4ac-b^2}}+\frac{(cg-bh)\log\left(a+bx+cx^2\right)}{2c^2}+\frac{hx}{c}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(f + g*x + h*x^2)/(a + b*x + c*x^2),x]
```

```
[Out] (h*x)/c + ((2*c^2*f - b*c*g + b^2*h - 2*a*c*h)*ArcTan[(b + 2*c*x)
/Sqrt[-b^2 + 4*a*c]])/(c^2*Sqrt[-b^2 + 4*a*c]) + ((c*g - b*h)*Log
[a + b*x + c*x^2])/(2*c^2)
```

Maple [B] time = 0.005, size = 196, normalized size = 2.1

$$\frac{hx}{c}-\frac{\ln\left(cx^2+bx+a\right)bh}{2c^2}+\frac{\ln\left(cx^2+bx+a\right)g}{2c}-2\frac{ah}{c\sqrt{4ac-b^2}}\arctan\left(\frac{2cx+b}{\sqrt{4ac-b^2}}\right)+2\frac{f}{\sqrt{4ac-b^2}}\arctan\left(\frac{2cx+b}{\sqrt{4ac-b^2}}\right)+\frac{b^2h}{c^2}\arctan\left((2cx+b)\frac{1}{\sqrt{4ac-b^2}}\right)\frac{1}{\sqrt{4ac-b^2}}-\frac{bg}{c}\arctan\left((2cx+b)\frac{1}{\sqrt{4ac-b^2}}\right)\frac{1}{\sqrt{4ac-b^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x^2+g*x+f)/(c*x^2+b*x+a),x)
```

```
[Out] h*x/c-1/2/c^2*ln(c*x^2+b*x+a)*b*h+1/2/c*ln(c*x^2+b*x+a)*g-2/c/(4*
a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*h+2/(4*a*c-b
^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*f+1/c^2/(4*a*c-b^2)
^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b^2*h-1/c/(4*a*c-b^2)^
(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b*g
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.272318, size = 1, normalized size = 0.01

$$\left[-\frac{\left(2\,c^2 f - bcg + \left(b^2 - 2\,ac\right)h\right)\log\left(\frac{b^3 - 4\,abc + 2\,\left(b^2 c - 4\,ac^2\right)x + \left(2\,c^2 x^2 + 2\,bcx + b^2 - 2\,ac\right)\sqrt{b^2 - 4\,ac}}{cx^2 + bx + a}\right) - \left(2\,chx + (cg - bh)\log\left(cx^2 + bx +\right.\right.}{2\,\sqrt{b^2 - 4\,ac}c^2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] [-1/2*((2*c^2*f - b*c*g + (b^2 - 2*a*c)*h)*log((b^3 - 4*a*b*c + 2
*(b^2*c - 4*a*c^2)*x + (2*c^2*x^2 + 2*b*c*x + b^2 - 2*a*c)*sqrt(b
^2 - 4*a*c))/(c*x^2 + b*x + a)) - (2*c*h*x + (c*g - b*h)*log(c*x^
2 + b*x + a))*sqrt(b^2 - 4*a*c))/(sqrt(b^2 - 4*a*c)*c^2), 1/2*(2*
(2*c^2*f - b*c*g + (b^2 - 2*a*c)*h)*arctan(-sqrt(-b^2 + 4*a*c)*(2
*c*x + b)/(b^2 - 4*a*c)) + (2*c*h*x + (c*g - b*h)*log(c*x^2 + b*x
 + a))*sqrt(-b^2 + 4*a*c))/(sqrt(-b^2 + 4*a*c)*c^2)]
```

Sympy [A] time = 3.41835, size = 488, normalized size = 5.3

$$\left(-\frac{\sqrt{-4ac + b^2}\left(2ach - b^2h + bcg - 2c^2f\right)}{2c^2\left(4ac - b^2\right)} - \frac{bh - cg}{2c^2}\right)\log\left(x + \frac{-abh - 4ac^2\left(-\frac{\sqrt{-4ac+b^2}(2ach-b^2h+bcg-2c^2f)}{2c^2(4ac-b^2)} - \frac{bh-cg}{2c^2}\right) + 2acg + b^2c\left(-\frac{\sqrt{-4ac+b^2}(2ach-b^2h+bcg-2c^2f)}{2c^2(4ac-b^2)} - \frac{bh}{}\right.}{2ach - b^2h + bcg - 2c^2f}\right.$$
$$+\left(\frac{\sqrt{-4ac + b^2}\left(2ach - b^2h + bcg - 2c^2f\right)}{2c^2\left(4ac - b^2\right)} - \frac{bh - cg}{2c^2}\right)\log\left(x + \frac{-abh - 4ac^2\left(\frac{\sqrt{-4ac+b^2}(2ach-b^2h+bcg-2c^2f)}{2c^2(4ac-b^2)} - \frac{bh-cg}{2c^2}\right) + 2acg + b^2c\left(\frac{\sqrt{-4ac+b^2}(2ach-b^2h+bcg-2c^2f)}{2c^2(4ac-b^2)} - \frac{bh-c}{2c^2}\right.}{2ach - b^2h + bcg - 2c^2f}\right.$$
$$+\frac{hx}{c}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x**2+g*x+f)/(c*x**2+b*x+a),x)
```

```
[Out] (-sqrt(-4*a*c + b**2)*(2*a*c*h - b**2*h + b*c*g - 2*c**2*f)/(2*c*
*2*(4*a*c - b**2)) - (b*h - c*g)/(2*c**2))*log(x + (-a*b*h - 4*a*
c**2*(-sqrt(-4*a*c + b**2)*(2*a*c*h - b**2*h + b*c*g - 2*c**2*f)/
(2*c**2*(4*a*c - b**2)) - (b*h - c*g)/(2*c**2)) + 2*a*c*g + b**2*
c*(-sqrt(-4*a*c + b**2)*(2*a*c*h - b**2*h + b*c*g - 2*c**2*f)/(2*
c**2*(4*a*c - b**2)) - (b*h - c*g)/(2*c**2)) - b*c*f)/(2*a*c*h -
b**2*h + b*c*g - 2*c**2*f)) + (sqrt(-4*a*c + b**2)*(2*a*c*h - b**
2*h + b*c*g - 2*c**2*f)/(2*c**2*(4*a*c - b**2)) - (b*h - c*g)/(2*
c**2))*log(x + (-a*b*h - 4*a*c**2*(sqrt(-4*a*c + b**2)*(2*a*c*h -
 b**2*h + b*c*g - 2*c**2*f)/(2*c**2*(4*a*c - b**2)) - (b*h - c*g)
/(2*c**2)) + 2*a*c*g + b**2*c*(sqrt(-4*a*c + b**2)*(2*a*c*h - b**
2*h + b*c*g - 2*c**2*f)/(2*c**2*(4*a*c - b**2)) - (b*h - c*g)/(2*
c**2)) - b*c*f)/(2*a*c*h - b**2*h + b*c*g - 2*c**2*f)) + h*x/c
```

GIAC/XCAS [A] time = 0.274651, size = 120, normalized size = 1.3

$$\frac{hx}{c}+\frac{(cg-bh)\ln\left(cx^2+bx+a\right)}{2\,c^2}+\frac{\left(2\,c^2f-bcg+b^2h-2\,ach\right)\arctan\left(\frac{2\,cx+b}{\sqrt{-b^2+4\,ac}}\right)}{\sqrt{-b^2+4\,ac}c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] h*x/c + 1/2*(c*g - b*h)*ln(c*x^2 + b*x + a)/c^2 + (2*c^2*f - b*c*
g + b^2*h - 2*a*c*h)*arctan((2*c*x + b)/sqrt(-b^2 + 4*a*c))/(sqrt
(-b^2 + 4*a*c)*c^2)
```

3.152 $\int \frac{f+gx+hx^2}{(d+ex)(a+bx+cx^2)}\,dx$

Optimal. Leaf size=196

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(-c(2adh-2aeg+bdg+bef)+bh(bd-ae)+2c^2df\right)}{c\sqrt{b^2-4ac}\,(ae^2-bde+cd^2)}-\frac{\log\left(a+bx+cx^2\right)(-aeh+bdh-cdg+cef)}{2c\,(ae^2-bde+cd^2)}+\frac{\log(d+ex)\left(d^2h-deg+e^2f\right)}{e\,(ae^2-bde+cd^2)}$$

```
[Out] -(((2*c^2*d*f + b*(b*d - a*e)*h - c*(b*e*f + b*d*g - 2*a*e*g + 2*
a*d*h))*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(c*Sqrt[b^2 - 4*a
*c]*(c*d^2 - b*d*e + a*e^2))) + ((e^2*f - d*e*g + d^2*h)*Log[d +
e*x])/(e*(c*d^2 - b*d*e + a*e^2)) - ((c*e*f - c*d*g + b*d*h - a*e
*h)*Log[a + b*x + c*x^2])/(2*c*(c*d^2 - b*d*e + a*e^2))
```

Rubi [A] time = 0.732041, antiderivative size = 196, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(-c(2adh-2aeg+bdg+bef)+bh(bd-ae)+2c^2df\right)}{c\sqrt{b^2-4ac}\,(ae^2-bde+cd^2)}-\frac{\log\left(a+bx+cx^2\right)(-aeh+bdh-cdg+cef)}{2c\,(ae^2-bde+cd^2)}+\frac{\log(d+ex)\left(d^2h-deg+e^2f\right)}{e\,(ae^2-bde+cd^2)}$$

Antiderivative was successfully verified.

```
[In]  Int[(f + g*x + h*x^2)/((d + e*x)*(a + b*x + c*x^2)),x]
```

```
[Out] -(((2*c^2*d*f + b*(b*d - a*e)*h - c*(b*e*f + b*d*g - 2*a*e*g + 2*
a*d*h))*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(c*Sqrt[b^2 - 4*a
*c]*(c*d^2 - b*d*e + a*e^2))) + ((e^2*f - d*e*g + d^2*h)*Log[d +
e*x])/(e*(c*d^2 - b*d*e + a*e^2)) - ((c*e*f - c*d*g + b*d*h - a*e
*h)*Log[a + b*x + c*x^2])/(2*c*(c*d^2 - b*d*e + a*e^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((h*x**2+g*x+f)/(e*x+d)/(c*x**2+b*x+a),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.402351, size = 193, normalized size = 0.98

$$\frac{-2e\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)\left(c(2adh-2aeg+bdg+bef)+bh(ae-bd)-2c^2df\right)+2c\sqrt{4ac-b^2}\log(d+ex)\left(d^2h-deg+e^2f\right)-}{2ce\sqrt{4ac-b^2}\left(e(ae-bd)+cd^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(f + g*x + h*x^2)/((d + e*x)*(a + b*x + c*x^2)),x]
```

```
[Out] (-2*e*(-2*c^2*d*f + b*(-(b*d) + a*e)*h + c*(b*e*f + b*d*g - 2*a*e
*g + 2*a*d*h))*ArcTan[(b + 2*c*x)/Sqrt[-b^2 + 4*a*c]] + 2*c*Sqrt[
-b^2 + 4*a*c]*(e^2*f - d*e*g + d^2*h)*Log[d + e*x] - Sqrt[-b^2 +
4*a*c]*e*(c*e*f - c*d*g + b*d*h - a*e*h)*Log[a + x*(b + c*x)])/(2
*c*Sqrt[-b^2 + 4*a*c]*e*(c*d^2 + e*(-(b*d) + a*e)))
```

Maple [B] time = 0.01, size = 622, normalized size = 3.2

$$\frac{\ln\left(cx^2+bx+a\right)aeh}{(2\,ae^2-2\,bde+2\,cd^2)\,c}-\frac{\ln\left(cx^2+bx+a\right)bdh}{(2\,ae^2-2\,bde+2\,cd^2)\,c}+\frac{\ln\left(cx^2+bx+a\right)dg}{2\,ae^2-2\,bde+2\,cd^2}$$
$$-\frac{\ln\left(cx^2+bx+a\right)ef}{2\,ae^2-2\,bde+2\,cd^2}-2\,\frac{adh}{(ae^2-bde+cd^2)\sqrt{4\,ac-b^2}}\arctan\left(\frac{2\,cx+b}{\sqrt{4\,ac-b^2}}\right)$$
$$+2\,\frac{aeg}{(ae^2-bde+cd^2)\sqrt{4\,ac-b^2}}\arctan\left(\frac{2\,cx+b}{\sqrt{4\,ac-b^2}}\right)$$
$$-\frac{bef}{ae^2-bde+cd^2}\arctan\left((2\,cx+b)\frac{1}{\sqrt{4\,ac-b^2}}\right)\frac{1}{\sqrt{4\,ac-b^2}}$$
$$+2\,\frac{cdf}{(ae^2-bde+cd^2)\sqrt{4\,ac-b^2}}\arctan\left(\frac{2\,cx+b}{\sqrt{4\,ac-b^2}}\right)$$
$$-\frac{abeh}{(ae^2-bde+cd^2)\,c}\arctan\left((2\,cx+b)\frac{1}{\sqrt{4\,ac-b^2}}\right)\frac{1}{\sqrt{4\,ac-b^2}}$$
$$+\frac{b^2dh}{(ae^2-bde+cd^2)\,c}\arctan\left((2\,cx+b)\frac{1}{\sqrt{4\,ac-b^2}}\right)\frac{1}{\sqrt{4\,ac-b^2}}$$
$$-\frac{bdg}{ae^2-bde+cd^2}\arctan\left((2\,cx+b)\frac{1}{\sqrt{4\,ac-b^2}}\right)\frac{1}{\sqrt{4\,ac-b^2}}$$
$$+\frac{\ln(ex+d)\,d^2h}{(ae^2-bde+cd^2)\,e}-\frac{\ln(ex+d)\,dg}{ae^2-bde+cd^2}+\frac{e\ln(ex+d)\,f}{ae^2-bde+cd^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x^2+g*x+f)/(e*x+d)/(c*x^2+b*x+a),x)
```

```
[Out] 1/2/(a*e^2-b*d*e+c*d^2)/c*ln(c*x^2+b*x+a)*a*e*h-1/2/(a*e^2-b*d*e+
c*d^2)/c*ln(c*x^2+b*x+a)*b*d*h+1/2/(a*e^2-b*d*e+c*d^2)*ln(c*x^2+b
*x+a)*d*g-1/2/(a*e^2-b*d*e+c*d^2)*ln(c*x^2+b*x+a)*e*f-2/(a*e^2-b*
d*e+c*d^2)/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*
a*d*h+2/(a*e^2-b*d*e+c*d^2)/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4
*a*c-b^2)^(1/2))*a*e*g-1/(a*e^2-b*d*e+c*d^2)/(4*a*c-b^2)^(1/2)*ar
ctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b*e*f+2/(a*e^2-b*d*e+c*d^2)/(4*
a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*c*d*f-1/(a*e^2
-b*d*e+c*d^2)/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2
))*b/c*a*e*h+1/(a*e^2-b*d*e+c*d^2)/(4*a*c-b^2)^(1/2)*arctan((2*c*
x+b)/(4*a*c-b^2)^(1/2))*b^2/c*d*h-1/(a*e^2-b*d*e+c*d^2)/(4*a*c-b^
2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b*d*g+1/(a*e^2-b*d*e
+c*d^2)/e*ln(e*x+d)*d^2*h-1/(a*e^2-b*d*e+c*d^2)*ln(e*x+d)*d*g+1/(
a*e^2-b*d*e+c*d^2)*e*ln(e*x+d)*f
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)/((c*x^2 + b*x + a)*(e*x + d)),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 51.7637, size = 1, normalized size = 0.01

$$\left[-\frac{\left(\left(2\,c^2de - bce^2\right)f - \left(bcde - 2\,ace^2\right)g - \left(abe^2 - \left(b^2 - 2\,ac\right)de\right)h\right)\log\left(\frac{b^3-4\,abc+2\,\left(b^2c-4\,ac^2\right)x+\left(2\,c^2x^2+2\,bcx+b^2-2\,ac\right)\sqrt{b^2-4\,ac}}{cx^2+bx+a}\right.}{2\left(c^2d^2e - bcde^2 + ace^3\right)\sqrt{}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)/((c*x^2 + b*x + a)*(e*x + d)),x, algorithm="fricas")
```

```
[Out] [-1/2*(((2*c^2*d*e - b*c*e^2)*f - (b*c*d*e - 2*a*c*e^2)*g - (a*b*
e^2 - (b^2 - 2*a*c)*d*e)*h)*log((b^3 - 4*a*b*c + 2*(b^2*c - 4*a*c
^2)*x + (2*c^2*x^2 + 2*b*c*x + b^2 - 2*a*c)*sqrt(b^2 - 4*a*c))/(c
*x^2 + b*x + a)) + sqrt(b^2 - 4*a*c)*((c*e^2*f - c*d*e*g + (b*d*e
 - a*e^2)*h)*log(c*x^2 + b*x + a) - 2*(c*e^2*f - c*d*e*g + c*d^2*
h)*log(e*x + d)))/((c^2*d^2*e - b*c*d*e^2 + a*c*e^3)*sqrt(b^2 - 4
```

```
*a*c)), 1/2*(2*((2*c^2*d*e - b*c*e^2)*f - (b*c*d*e - 2*a*c*e^2)*g
 - (a*b*e^2 - (b^2 - 2*a*c)*d*e)*h)*arctan(-sqrt(-b^2 + 4*a*c)*(2
*c*x + b)/(b^2 - 4*a*c)) - sqrt(-b^2 + 4*a*c)*((c*e^2*f - c*d*e*g
 + (b*d*e - a*e^2)*h)*log(c*x^2 + b*x + a) - 2*(c*e^2*f - c*d*e*g
 + c*d^2*h)*log(e*x + d)))/((c^2*d^2*e - b*c*d*e^2 + a*c*e^3)*sqr
t(-b^2 + 4*a*c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x**2+g*x+f)/(e*x+d)/(c*x**2+b*x+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.274643, size = 275, normalized size = 1.4

$$\frac{(cdg - bdh - cfe + ahe)\ln\left(cx^2 + bx + a\right)}{2\left(c^2d^2 - bcde + ace^2\right)} + \frac{\left(d^2h - dge + fe^2\right)\ln\left(|xe + d|\right)}{cd^2e - bde^2 + ae^3} + \frac{\left(2\,c^2df - bcdg + b^2dh - 2\,acdh - bcfe + 2\,acge - abhe\right)\arctan\left(\frac{2\,cx+b}{\sqrt{-b^2+4\,ac}}\right)}{\left(c^2d^2 - bcde + ace^2\right)\sqrt{-b^2 + 4\,ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)/((c*x^2 + b*x + a)*(e*x + d)),x, algorithm="giac")
```

```
[Out] 1/2*(c*d*g - b*d*h - c*f*e + a*h*e)*ln(c*x^2 + b*x + a)/(c^2*d^2
- b*c*d*e + a*c*e^2) + (d^2*h - d*g*e + f*e^2)*ln(abs(x*e + d))/(
c*d^2*e - b*d*e^2 + a*e^3) + (2*c^2*d*f - b*c*d*g + b^2*d*h - 2*a
*c*d*h - b*c*f*e + 2*a*c*g*e - a*b*h*e)*arctan((2*c*x + b)/sqrt(-
b^2 + 4*a*c))/((c^2*d^2 - b*c*d*e + a*c*e^2)*sqrt(-b^2 + 4*a*c))
```

3.153 $\int \frac{f+gx+hx^2}{(d+ex)^2(a+bx+cx^2)}\,dx$

Optimal. Leaf size=316

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(2a^2e^2h-c\left(2a\left(d^2h-2deg+e^2f\right)+bd(dg+2ef)\right)-abe(2dh+eg)+b^2\left(d^2h+e^2f\right)+2c^2d^2f\right)}{\sqrt{b^2-4ac}\,(ae^2-bde+cd^2)^2}-\frac{\log\left(a+bx+cx^2\right)\left(ae(eg-2dh)-b\left(e^2f-d^2h\right)+cd(2ef-dg)\right)}{2\,(ae^2-bde+cd^2)^2}-\frac{d^2h-deg+e^2f}{e(d+ex)\,(ae^2-bde+cd^2)}+\frac{\log(d+ex)\left(ae(eg-2dh)-b\left(e^2f-d^2h\right)+cd(2ef-dg)\right)}{(ae^2-bde+cd^2)^2}$$

```
[Out] -((e^2*f - d*e*g + d^2*h)/(e*(c*d^2 - b*d*e + a*e^2)*(d + e*x)))
- ((2*c^2*d^2*f + 2*a^2*e^2*h - a*b*e*(e*g + 2*d*h) + b^2*(e^2*f
+ d^2*h) - c*(b*d*(2*e*f + d*g) + 2*a*(e^2*f - 2*d*e*g + d^2*h)))
*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(Sqrt[b^2 - 4*a*c]*(c*d^
2 - b*d*e + a*e^2)^2) + ((c*d*(2*e*f - d*g) + a*e*(e*g - 2*d*h) -
 b*(e^2*f - d^2*h))*Log[d + e*x])/(c*d^2 - b*d*e + a*e^2)^2 - ((c
*d*(2*e*f - d*g) + a*e*(e*g - 2*d*h) - b*(e^2*f - d^2*h))*Log[a +
 b*x + c*x^2])/(2*(c*d^2 - b*d*e + a*e^2)^2)
```

Rubi [A] time = 1.6278, antiderivative size = 316, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(2a^2e^2h-c\left(2a\left(d^2h-2deg+e^2f\right)+bd(dg+2ef)\right)-abe(2dh+eg)+b^2\left(d^2h+e^2f\right)+2c^2d^2f\right)}{\sqrt{b^2-4ac}\,(ae^2-bde+cd^2)^2}-\frac{\log\left(a+bx+cx^2\right)\left(ae(eg-2dh)-b\left(e^2f-d^2h\right)+cd(2ef-dg)\right)}{2\,(ae^2-bde+cd^2)^2}-\frac{d^2h-deg+e^2f}{e(d+ex)\,(ae^2-bde+cd^2)}+\frac{\log(d+ex)\left(ae(eg-2dh)-b\left(e^2f-d^2h\right)+cd(2ef-dg)\right)}{(ae^2-bde+cd^2)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(f + g*x + h*x^2)/((d + e*x)^2*(a + b*x + c*x^2)),x]
```


```
[Out] -((e^2*f - d*e*g + d^2*h)/(e*(c*d^2 - b*d*e + a*e^2)*(d + e*x)))
- ((2*c^2*d^2*f + 2*a^2*e^2*h - a*b*e*(e*g + 2*d*h) + b^2*(e^2*f
+ d^2*h) - c*(b*d*(2*e*f + d*g) + 2*a*(e^2*f - 2*d*e*g + d^2*h)))
*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(Sqrt[b^2 - 4*a*c]*(c*d^
2 - b*d*e + a*e^2)^2) + ((c*d*(2*e*f - d*g) + a*e*(e*g - 2*d*h) -
 b*(e^2*f - d^2*h))*Log[d + e*x])/(c*d^2 - b*d*e + a*e^2)^2 - ((c
*d*(2*e*f - d*g) + a*e*(e*g - 2*d*h) - b*(e^2*f - d^2*h))*Log[a +
 b*x + c*x^2])/(2*(c*d^2 - b*d*e + a*e^2)^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((h*x**2+g*x+f)/(e*x+d)**2/(c*x**2+b*x+a),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.17814, size = 281, normalized size = 0.89

$$\frac{\frac{2\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)\left(2a^2e^2h-c\left(2a\left(d^2h-2deg+e^2f\right)+bd(dg+2ef)\right)-abe(2dh+eg)+b^2\left(d^2h+e^2f\right)+2c^2d^2f\right)}{\sqrt{4ac-b^2}}-\frac{2\left(e(ae-bd)+cd^2\right)\left(d^2h-deg+e^2f\right)}{e(d+ex)}+2\log(d \cdots}{2\left(e(ae-bd \cdots\right.}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(f + g*x + h*x^2)/((d + e*x)^2*(a + b*x + c*x^2)),x]
```

```
[Out] ((-2*(c*d^2 + e*(-(b*d) + a*e))*(e^2*f - d*e*g + d^2*h))/(e*(d +
e*x)) + (2*(2*c^2*d^2*f + 2*a^2*e^2*h - a*b*e*(e*g + 2*d*h) + b^2
*(e^2*f + d^2*h) - c*(b*d*(2*e*f + d*g) + 2*a*(e^2*f - 2*d*e*g +
d^2*h)))*ArcTan[(b + 2*c*x)/Sqrt[-b^2 + 4*a*c]])/Sqrt[-b^2 + 4*a*
c] + 2*(c*d*(2*e*f - d*g) + a*e*(e*g - 2*d*h) + b*(-(e^2*f) + d^2
*h))*Log[d + e*x] + (c*d*(-2*e*f + d*g) + a*e*(-(e*g) + 2*d*h) +
b*(e^2*f - d^2*h))*Log[a + x*(b + c*x)])/(2*(c*d^2 + e*(-(b*d) +
a*e))^2)
```

Maple [B] time = 0.017, size = 1125, normalized size = 3.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x^2+g*x+f)/(e*x+d)^2/(c*x^2+b*x+a),x)
```

```
[Out] -1/(a*e^2-b*d*e+c*d^2)*e/(e*x+d)*f+1/(a*e^2-b*d*e+c*d^2)/(e*x+d)*
d*g-2/(a*e^2-b*d*e+c*d^2)^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4
*a*c-b^2)^(1/2))*a*b*d*e*h-1/(a*e^2-b*d*e+c*d^2)^2/(4*a*c-b^2)^(1
```

```
/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*b*e^2*g-1/(a*e^2-b*d*e+
c*d^2)^2*ln(e*x+d)*b*e^2*f+4/(a*e^2-b*d*e+c*d^2)^2/(4*a*c-b^2)^(1
/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*c*d*e*g-2/(a*e^2-b*d*e+
c*d^2)^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b*
c*d*e*f-1/(a*e^2-b*d*e+c*d^2)^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b
)/(4*a*c-b^2)^(1/2))*b*c*d^2*g-2/(a*e^2-b*d*e+c*d^2)^2/(4*a*c-b^2
)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*c*e^2*f-2/(a*e^2-b*
d*e+c*d^2)^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2)
)*a*c*d^2*h-1/(a*e^2-b*d*e+c*d^2)^2*ln(e*x+d)*c*d^2*g-1/(a*e^2-b*
d*e+c*d^2)/e/(e*x+d)*d^2*h-1/2/(a*e^2-b*d*e+c*d^2)^2*ln(c*x^2+b*x
+a)*b*d^2*h+1/2/(a*e^2-b*d*e+c*d^2)^2*ln(c*x^2+b*x+a)*b*e^2*f+1/2
/(a*e^2-b*d*e+c*d^2)^2*c*ln(c*x^2+b*x+a)*d^2*g-1/2/(a*e^2-b*d*e+c
*d^2)^2*ln(c*x^2+b*x+a)*a*e^2*g-2/(a*e^2-b*d*e+c*d^2)^2*ln(e*x+d)
*a*d*e*h+1/(a*e^2-b*d*e+c*d^2)^2*ln(e*x+d)*a*e^2*g+1/(a*e^2-b*d*e
+c*d^2)^2*ln(e*x+d)*b*d^2*h+2/(a*e^2-b*d*e+c*d^2)^2*ln(e*x+d)*d*e
*c*f+1/(a*e^2-b*d*e+c*d^2)^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(
4*a*c-b^2)^(1/2))*b^2*d^2*h+1/(a*e^2-b*d*e+c*d^2)^2/(4*a*c-b^2)^(
1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*b^2*e^2*f+2/(a*e^2-b*d*e
+c*d^2)^2/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*c
^2*d^2*f+1/(a*e^2-b*d*e+c*d^2)^2*ln(c*x^2+b*x+a)*a*d*e*h-1/(a*e^2
-b*d*e+c*d^2)^2*c*ln(c*x^2+b*x+a)*d*e*f+2/(a*e^2-b*d*e+c*d^2)^2/(
4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a^2*e^2*h
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)/((c*x^2 + b*x + a)*(e*x + d)^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((h*x^2 + g*x + f)/((c*x^2 + b*x + a)*(e*x + d)^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((h*x**2+g*x+f)/(e*x+d)**2/(c*x**2+b*x+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.28103, size = 606, normalized size = 1.92

$$\frac{\left(2\,c^{2}d^{2}fe^{2}-bcd^{2}ge^{2}+b^{2}d^{2}he^{2}-2\,acd^{2}he^{2}-2\,bcdfe^{3}+4\,acdge^{3}-2\,abdhe^{3}+b^{2}fe^{4}-2\,acfe^{4}-abge^{4}+2\,a^{2}he^{4}\right)\arctan}{\left(c^{2}d^{4}-2\,bcd^{3}e+b^{2}d^{2}e^{2}+2\,acd^{2}e^{2}-2\,abde^{3}+a^{2}e^{4}\right)\sqrt{-b^{2}+4\,ac}}$$
$$+\frac{\left(cd^{2}g-bd^{2}h-2\,cdfe+2\,adhe+bfe^{2}-age^{2}\right)\ln\left(c-\frac{2\,cd}{xe+d}+\frac{cd^{2}}{(xe+d)^{2}}+\frac{be}{xe+d}-\frac{bde}{(xe+d)^{2}}+\frac{ae^{2}}{(xe+d)^{2}}\right)}{2\left(c^{2}d^{4}-2\,bcd^{3}e+b^{2}d^{2}e^{2}+2\,acd^{2}e^{2}-2\,abde^{3}+a^{2}e^{4}\right)}$$
$$-\frac{\frac{d^{2}he}{xe+d}-\frac{dge^{2}}{xe+d}+\frac{fe^{3}}{xe+d}}{cd^{2}e^{2}-bde^{3}+ae^{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x^2 + g*x + f)/((c*x^2 + b*x + a)*(e*x + d)^2),x, algorithm="giac")
```

```
[Out] (2*c^2*d^2*f*e^2 - b*c*d^2*g*e^2 + b^2*d^2*h*e^2 - 2*a*c*d^2*h*e^
2 - 2*b*c*d*f*e^3 + 4*a*c*d*g*e^3 - 2*a*b*d*h*e^3 + b^2*f*e^4 - 2
*a*c*f*e^4 - a*b*g*e^4 + 2*a^2*h*e^4)*arctan((2*c*d - 2*c*d^2/(x*
e + d) - b*e + 2*b*d*e/(x*e + d) - 2*a*e^2/(x*e + d))*e^(-1)/sqrt
(-b^2 + 4*a*c))*e^(-2)/((c^2*d^4 - 2*b*c*d^3*e + b^2*d^2*e^2 + 2*
a*c*d^2*e^2 - 2*a*b*d*e^3 + a^2*e^4)*sqrt(-b^2 + 4*a*c)) + 1/2*(c
*d^2*g - b*d^2*h - 2*c*d*f*e + 2*a*d*h*e + b*f*e^2 - a*g*e^2)*ln(
c - 2*c*d/(x*e + d) + c*d^2/(x*e + d)^2 + b*e/(x*e + d) - b*d*e/(
x*e + d)^2 + a*e^2/(x*e + d)^2)/(c^2*d^4 - 2*b*c*d^3*e + b^2*d^2*
e^2 + 2*a*c*d^2*e^2 - 2*a*b*d*e^3 + a^2*e^4) - (d^2*h*e/(x*e + d)
 - d*g*e^2/(x*e + d) + f*e^3/(x*e + d))/(c*d^2*e^2 - b*d*e^3 + a*
e^4)
```

3.154 $\int \frac{f+gx+hx^2}{(d+ex)^3(a+bx+cx^2)} \, dx$

Optimal. Leaf size=509

$$-\frac{\log\left(a+bx+cx^2\right)\left(e^3\left(a^2h-abg+b^2f\right)-c\left(ae\left(3d^2h-3deg+e^2f\right)+b\left(3de^2f-d^3h\right)\right)+c^2d^2(3ef-dg)\right)}{2\left(ae^2-bde+cd^2\right)^3}$$
$$+\frac{\log(d+ex)\left(e^3\left(a^2h-abg+b^2f\right)-c\left(ae\left(3d^2h-3deg+e^2f\right)+b\left(3de^2f-d^3h\right)\right)+c^2d^2(3ef-dg)\right)}{\left(ae^2-bde+cd^2\right)^3}$$
$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(-c\left(2a^2e^2(eg-3dh)-3abe\left(d^2(-h)-deg+e^2f\right)+b^2\left(-\left(d^3h+3de^2f\right)\right)\right)-be^3\left(a^2h-abg+b^2f\right)-\right.}{\sqrt{b^2-4ac}\left(ae^2-bde+cd^2\right)^3}$$
$$-\frac{d^2h-deg+e^2f}{2e(d+ex)^2\left(ae^2-bde+cd^2\right)}-\frac{ae(eg-2dh)-b\left(e^2f-d^2h\right)+cd(2ef-dg)}{(d+ex)\left(ae^2-bde+cd^2\right)^2}$$

```
[Out] -(e^2*f - d*e*g + d^2*h)/(2*e*(c*d^2 - b*d*e + a*e^2)*(d + e*x)^2
) - (c*d*(2*e*f - d*g) + a*e*(e*g - 2*d*h) - b*(e^2*f - d^2*h))/(
(c*d^2 - b*d*e + a*e^2)^2*(d + e*x)) - ((2*c^3*d^3*f - b*e^3*(b^2
*f - a*b*g + a^2*h) - c^2*d*(b*d*(3*e*f + d*g) + 2*a*(3*e^2*f - 3
*d*e*g + d^2*h)) - c*(2*a^2*e^2*(e*g - 3*d*h) - 3*a*b*e*(e^2*f -
d*e*g - d^2*h) - b^2*(3*d*e^2*f + d^3*h)))*ArcTanh[(b + 2*c*x)/Sq
rt[b^2 - 4*a*c]])/(Sqrt[b^2 - 4*a*c]*(c*d^2 - b*d*e + a*e^2)^3) +
 ((c^2*d^2*(3*e*f - d*g) + e^3*(b^2*f - a*b*g + a^2*h) - c*(a*e*(
e^2*f - 3*d*e*g + 3*d^2*h) + b*(3*d*e^2*f - d^3*h)))*Log[d + e*x]
)/(c*d^2 - b*d*e + a*e^2)^3 - ((c^2*d^2*(3*e*f - d*g) + e^3*(b^2*
f - a*b*g + a^2*h) - c*(a*e*(e^2*f - 3*d*e*g + 3*d^2*h) + b*(3*d*
e^2*f - d^3*h)))*Log[a + b*x + c*x^2])/(2*(c*d^2 - b*d*e + a*e^2)
^3)
```

Rubi [A] time = 3.57523, antiderivative size = 509, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$-\frac{\log\left(a+bx+cx^2\right)\left(e^3\left(a^2h-abg+b^2f\right)-ace\left(3d^2h-3deg+e^2f\right)-bc\left(3de^2f-d^3h\right)+c^2d^2(3ef-dg)\right)}{2\left(ae^2-bde+cd^2\right)^3}$$
$$+\frac{\log(d+ex)\left(e^3\left(a^2h-abg+b^2f\right)-ace\left(3d^2h-3deg+e^2f\right)-bc\left(3de^2f-d^3h\right)+c^2d^2(3ef-dg)\right)}{\left(ae^2-bde+cd^2\right)^3}$$
$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(-c\left(2a^2e^2(eg-3dh)-3abe\left(d^2(-h)-deg+e^2f\right)+b^2\left(-\left(d^3h+3de^2f\right)\right)\right)-be^3\left(a^2h-abg+b^2f\right)-\right.}{\sqrt{b^2-4ac}\left(ae^2-bde+cd^2\right)^3}$$
$$-\frac{d^2h-deg+e^2f}{2e(d+ex)^2\left(ae^2-bde+cd^2\right)}-\frac{ae(eg-2dh)-b\left(e^2f-d^2h\right)+cd(2ef-dg)}{(d+ex)\left(ae^2-bde+cd^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(f + g*x + h*x^2)/((d + e*x)^3*(a + b*x + c*x^2)),x]
```

```
[Out] -(e^2*f - d*e*g + d^2*h)/(2*e*(c*d^2 - b*d*e + a*e^2)*(d + e*x)^2
) - (c*d*(2*e*f - d*g) + a*e*(e*g - 2*d*h) - b*(e^2*f - d^2*h))/(
(c*d^2 - b*d*e + a*e^2)^2*(d + e*x)) - ((2*c^3*d^3*f - b*e^3*(b^2
*f - a*b*g + a^2*h) - c^2*d*(b*d*(3*e*f + d*g) + 2*a*(3*e^2*f - 3
*d*e*g + d^2*h)) - c*(2*a^2*e^2*(e*g - 3*d*h) - 3*a*b*e*(e^2*f -
d*e*g - d^2*h) - b^2*(3*d*e^2*f + d^3*h)))*ArcTanh[(b + 2*c*x)/Sq
rt[b^2 - 4*a*c]])/(Sqrt[b^2 - 4*a*c]*(c*d^2 - b*d*e + a*e^2)^3) +
 ((c^2*d^2*(3*e*f - d*g) + e^3*(b^2*f - a*b*g + a^2*h) - a*c*e*(e
^2*f - 3*d*e*g + 3*d^2*h) - b*c*(3*d*e^2*f - d^3*h))*Log[d + e*x]
)/(c*d^2 - b*d*e + a*e^2)^3 - ((c^2*d^2*(3*e*f - d*g) + e^3*(b^2*
f - a*b*g + a^2*h) - a*c*e*(e^2*f - 3*d*e*g + 3*d^2*h) - b*c*(3*d
*e^2*f - d^3*h))*Log[a + b*x + c*x^2])/(2*(c*d^2 - b*d*e + a*e^2)
^3)
```

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((h*x**2+g*x+f)/(e*x+d)**3/(c*x**2+b*x+a),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.63606, size = 504, normalized size = 0.99

$$-\frac{\log(d+ex)\left(e^3\left(-\left(a^2h-abg+b^2f\right)\right)+ace\left(3d^2h-3deg+e^2f\right)+bc\left(3de^2f-d^3h\right)+c^2d^2(dg-3ef)\right)}{\left(e(ae-bd)+cd^2\right)^3}+\frac{\log(a+x(b+cx))\left(e^3\left(-\left(a^2h-abg+b^2f\right)\right)+ace\left(3d^2h-3deg+e^2f\right)+bc\left(3de^2f-d^3h\right)+c^2d^2(dg-3ef)\right)}{2\left(e(ae-bd)+cd^2\right)^3}+\frac{\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)\left(-c\left(-2a^2e^2(eg-3dh)+3abe\left(d^2(-h)-deg+e^2f\right)+b^2\left(d^3h+3de^2f\right)\right)+be^3\left(a^2h-abg+b^2f\right)+c^2d\left(\right.\right.}{\sqrt{4ac-b^2}\left(e(bd-ae)-cd^2\right)^3}-\frac{d^2h-deg+e^2f}{2e(d+ex)^2\left(e(ae-bd)+cd^2\right)}+\frac{ae(2dh-eg)+b\left(e^2f-d^2h\right)+cd(dg-2ef)}{(d+ex)\left(e(ae-bd)+cd^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(f + g*x + h*x^2)/((d + e*x)^3*(a + b*x + c*x^2)),x]
```

```
[Out] -(e^2*f - d*e*g + d^2*h)/(2*e*(c*d^2 + e*(-(b*d) + a*e))*(d + e*x
)^2) + (c*d*(-2*e*f + d*g) + a*e*(-(e*g) + 2*d*h) + b*(e^2*f - d^
2*h))/((c*d^2 + e*(-(b*d) + a*e))^2*(d + e*x)) + ((-2*c^3*d^3*f +
 b*e^3*(b^2*f - a*b*g + a^2*h) + c^2*d*(b*d*(3*e*f + d*g) + 2*a*(
3*e^2*f - 3*d*e*g + d^2*h)) - c*(-2*a^2*e^2*(e*g - 3*d*h) + 3*a*b
*e*(e^2*f - d*e*g - d^2*h) + b^2*(3*d*e^2*f + d^3*h)))*ArcTan[(b
+ 2*c*x)/Sqrt[-b^2 + 4*a*c]])/(Sqrt[-b^2 + 4*a*c]*(-(c*d^2) + e*(
b*d - a*e))^3) - ((c^2*d^2*(-3*e*f + d*g) - e^3*(b^2*f - a*b*g +
a^2*h) + a*c*e*(e^2*f - 3*d*e*g + 3*d^2*h) + b*c*(3*d*e^2*f - d^3
*h))*Log[d + e*x])/(c*d^2 + e*(-(b*d) + a*e))^3 + ((c^2*d^2*(-3*e
*f + d*g) - e^3*(b^2*f - a*b*g + a^2*h) + a*c*e*(e^2*f - 3*d*e*g
+ 3*d^2*h) + b*c*(3*d*e^2*f - d^3*h))*Log[a + x*(b + c*x)])/(2*(c
*d^2 + e*(-(b*d) + a*e))^3)
```

Maple [B] time = 0.024, size = 1945, normalized size = 3.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x^2+g*x+f)/(e*x+d)^3/(c*x^2+b*x+a),x)
```

```
[Out] 3/(a*e^2-b*d*e+c*d^2)^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c
-b^2)^(1/2))*b^2*c*d*e^2*f-1/2/(a*e^2-b*d*e+c*d^2)*e/(e*x+d)^2*f+
1/2/(a*e^2-b*d*e+c*d^2)/(e*x+d)^2*d*g-3/(a*e^2-b*d*e+c*d^2)^3/(4*
a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*b*c*d*e^2*g-
1/(a*e^2-b*d*e+c*d^2)^3*ln(e*x+d)*a*b*e^3*g+2/(a*e^2-b*d*e+c*d^2)
^2/(e*x+d)*a*d*e*h-2/(a*e^2-b*d*e+c*d^2)^2/(e*x+d)*d*e*c*f-3/(a*e
^2-b*d*e+c*d^2)^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^
(1/2))*b*c^2*d^2*e*f+6/(a*e^2-b*d*e+c*d^2)^3/(4*a*c-b^2)^(1/2)*ar
ctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a^2*c*d*e^2*h+3/(a*e^2-b*d*e+c*
d^2)^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*b*
c*e^3*f+6/(a*e^2-b*d*e+c*d^2)^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b
)/(4*a*c-b^2)^(1/2))*a*c^2*d^2*e*g-6/(a*e^2-b*d*e+c*d^2)^3/(4*a*c
-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*c^2*d*e^2*f-3/(
a*e^2-b*d*e+c*d^2)^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^
2)^(1/2))*a*b*c*d^2*e*h-1/2/(a*e^2-b*d*e+c*d^2)^3*ln(c*x^2+b*x+a)
*b^2*e^3*f-1/2/(a*e^2-b*d*e+c*d^2)/e/(e*x+d)^2*d^2*h+1/(a*e^2-b*d
*e+c*d^2)^3*ln(e*x+d)*a^2*e^3*h+1/(a*e^2-b*d*e+c*d^2)^3*ln(e*x+d)
*b^2*e^3*f-1/(a*e^2-b*d*e+c*d^2)^3*ln(e*x+d)*c^2*d^3*g-1/(a*e^2-b
*d*e+c*d^2)^2/(e*x+d)*a*e^2*g-1/(a*e^2-b*d*e+c*d^2)^2/(e*x+d)*b*d
^2*h+1/(a*e^2-b*d*e+c*d^2)^2/(e*x+d)*b*e^2*f+1/(a*e^2-b*d*e+c*d^2
)^2/(e*x+d)*c*d^2*g+3/(a*e^2-b*d*e+c*d^2)^3*ln(e*x+d)*c^2*d^2*e*f
+1/(a*e^2-b*d*e+c*d^2)^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*
c-b^2)^(1/2))*b^2*c*d^3*h-2/(a*e^2-b*d*e+c*d^2)^3/(4*a*c-b^2)^(1/
2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*c^2*d^3*h+1/2/(a*e^2-b*d
*e+c*d^2)^3*c*ln(c*x^2+b*x+a)*a*e^3*f-1/2/(a*e^2-b*d*e+c*d^2)^3*c
*ln(c*x^2+b*x+a)*b*d^3*h-3/2/(a*e^2-b*d*e+c*d^2)^3*c^2*ln(c*x^2+b
*x+a)*d^2*e*f-1/(a*e^2-b*d*e+c*d^2)^3/(4*a*c-b^2)^(1/2)*arctan((2
```

```
*c*x+b)/(4*a*c-b^2)^(1/2))*b^3*e^3*f+2/(a*e^2-b*d*e+c*d^2)^3/(4*a
*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*c^3*d^3*f+1/2/(
a*e^2-b*d*e+c*d^2)^3*ln(c*x^2+b*x+a)*a*b*e^3*g-1/(a*e^2-b*d*e+c*d
^2)^3*ln(e*x+d)*a*c*e^3*f+1/(a*e^2-b*d*e+c*d^2)^3*ln(e*x+d)*b*c*d
^3*h-1/(a*e^2-b*d*e+c*d^2)^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(
4*a*c-b^2)^(1/2))*b*c^2*d^3*g-2/(a*e^2-b*d*e+c*d^2)^3/(4*a*c-b^2)
^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a^2*c*e^3*g-3/2/(a*e^2
-b*d*e+c*d^2)^3*c*ln(c*x^2+b*x+a)*a*d*e^2*g+1/(a*e^2-b*d*e+c*d^2)
^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*b^2*e^
3*g-1/(a*e^2-b*d*e+c*d^2)^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4
*a*c-b^2)^(1/2))*a^2*b*e^3*h-3/(a*e^2-b*d*e+c*d^2)^3*ln(e*x+d)*a*
c*d^2*e*h+3/(a*e^2-b*d*e+c*d^2)^3*ln(e*x+d)*a*c*d*e^2*g-3/(a*e^2-
b*d*e+c*d^2)^3*ln(e*x+d)*b*c*d*e^2*f+3/2/(a*e^2-b*d*e+c*d^2)^3*c*
ln(c*x^2+b*x+a)*b*d*e^2*f+3/2/(a*e^2-b*d*e+c*d^2)^3*c*ln(c*x^2+b*
x+a)*a*d^2*e*h+1/2/(a*e^2-b*d*e+c*d^2)^3*c^2*ln(c*x^2+b*x+a)*d^3*
g-1/2/(a*e^2-b*d*e+c*d^2)^3*ln(c*x^2+b*x+a)*a^2*e^3*h
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)/((c*x^2 + b*x + a)*(e*x + d)^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((h*x^2 + g*x + f)/((c*x^2 + b*x + a)*(e*x + d)^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((h*x**2+g*x+f)/(e*x+d)**3/(c*x**2+b*x+a),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.284175, size = 1, normalized size = 0.

$$Done$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)/((c*x^2 + b*x + a)*(e*x + d)^3),x, algorithm="giac")
```

```
[Out] Done
```

3.155 $\int \frac{(d+ex)^2(f+gx+hx^2)}{(a+bx+cx^2)^2}\,dx$

Optimal. Leaf size=288

$$\frac{(d+ex)^2\left(c\left(2ag-b\left(\frac{ah}{c}+f\right)\right)-x\left(-2ach+b^2h-bcg+2c^2f\right)\right)}{c\left(b^2-4ac\right)\left(a+bx+cx^2\right)}+\frac{e^2x\left(-6ach+2b^2h-bcg+2c^2f\right)}{c^2\left(b^2-4ac\right)}$$
$$+\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(b^2ce(12aeh+2bdh+beg)-c^3\left(2bd(dg+2ef)-4a\left(d^2h+2deg+e^2f\right)\right)-6ac^2e(2aeh+2bdh+beg)-\right.}{c^3\left(b^2-4ac\right)^{3/2}}$$
$$+\frac{e\log\left(a+bx+cx^2\right)(-2beh+2cdh+ceg)}{2c^3}$$

```
[Out] (e^2*(2*c^2*f - b*c*g + 2*b^2*h - 6*a*c*h)*x)/(c^2*(b^2 - 4*a*c))
 + ((d + e*x)^2*(c*(2*a*g - b*(f + (a*h)/c)) - (2*c^2*f - b*c*g +
 b^2*h - 2*a*c*h)*x))/(c*(b^2 - 4*a*c)*(a + b*x + c*x^2)) + ((4*c
^4*d^2*f - 2*b^4*e^2*h - 6*a*c^2*e*(b*e*g + 2*b*d*h + 2*a*e*h) +
b^2*c*e*(b*e*g + 2*b*d*h + 12*a*e*h) - c^3*(2*b*d*(2*e*f + d*g) -
 4*a*(e^2*f + 2*d*e*g + d^2*h)))*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4
*a*c]])/(c^3*(b^2 - 4*a*c)^(3/2)) + (e*(c*e*g + 2*c*d*h - 2*b*e*h
)*Log[a + b*x + c*x^2])/(2*c^3)
```

Rubi [A] time = 1.48276, antiderivative size = 288, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$\frac{(d+ex)^2\left(-x\left(-2ach+b^2h-bcg+2c^2f\right)-b(ah+cf)+2acg\right)}{c\left(b^2-4ac\right)\left(a+bx+cx^2\right)}+\frac{e^2x\left(-c(6ah+bg)+2b^2h+2c^2f\right)}{c^2\left(b^2-4ac\right)}$$
$$+\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(b^2ce(12aeh+2bdh+beg)-c^3\left(2bd(dg+2ef)-4a\left(d^2h+2deg+e^2f\right)\right)-6ac^2e(2aeh+2bdh+beg)-\right.}{c^3\left(b^2-4ac\right)^{3/2}}$$
$$+\frac{e\log\left(a+bx+cx^2\right)(-2beh+2cdh+ceg)}{2c^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^2*(f + g*x + h*x^2))/(a + b*x + c*x^2)^2,x]
```

```
[Out] (e^2*(2*c^2*f + 2*b^2*h - c*(b*g + 6*a*h))*x)/(c^2*(b^2 - 4*a*c))
 + ((d + e*x)^2*(2*a*c*g - b*(c*f + a*h) - (2*c^2*f - b*c*g + b^2
*h - 2*a*c*h)*x))/(c*(b^2 - 4*a*c)*(a + b*x + c*x^2)) + ((4*c^4*d
^2*f - 2*b^4*e^2*h - 6*a*c^2*e*(b*e*g + 2*b*d*h + 2*a*e*h) + b^2*
c*e*(b*e*g + 2*b*d*h + 12*a*e*h) - c^3*(2*b*d*(2*e*f + d*g) - 4*a
*(e^2*f + 2*d*e*g + d^2*h)))*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c
]])/(c^3*(b^2 - 4*a*c)^(3/2)) + (e*(c*e*g + 2*c*d*h - 2*b*e*h)*Lo
g[a + b*x + c*x^2])/(2*c^3)
```

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((e*x+d)**2*(h*x**2+g*x+f)/(c*x**2+b*x+a)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 2.32273, size = 398, normalized size = 1.38

$$-\frac{\frac{2\left(bc\left(-3a^2e^2h+ac\left(d^2h+2de(g+3hx)+e^2(f+3gx)\right)+c^2d(d(f-gx)-2efx)\right)+2c^2\left(a^2e(2dh+e(g+hx))-ac\left(d^2(g+hx)+2de(f+gx)+e^2fx\right)+c^2d^2fx\right)+b^3e(aeh-cx}{(b^2-4ac)(a+x(b+cx))}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)^2*(f + g*x + h*x^2))/(a + b*x + c*x^2)^2,x]
```

```
[Out] (2*c*e^2*h*x - (2*(b^4*e^2*h*x + b^3*e*(a*e*h - c*(e*g + 2*d*h)*x
) + b^2*c*(c*(e^2*f + 2*d*e*g + d^2*h)*x - a*e*(e*g + 2*d*h + 4*e
*h*x)) + 2*c^2*(c^2*d^2*f*x - a*c*(e^2*f*x + 2*d*e*(f + g*x) + d^
2*(g + h*x)) + a^2*e*(2*d*h + e*(g + h*x))) + b*c*(-3*a^2*e^2*h +
 c^2*d*(-2*e*f*x + d*(f - g*x)) + a*c*(d^2*h + e^2*(f + 3*g*x) +
2*d*e*(g + 3*h*x)))))/((b^2 - 4*a*c)*(a + x*(b + c*x))) + (2*(4*c
^4*d^2*f - 2*b^4*e^2*h - 6*a*c^2*e*(b*e*g + 2*b*d*h + 2*a*e*h) +
b^2*c*e*(b*e*g + 2*b*d*h + 12*a*e*h) + c^3*(-2*b*d*(2*e*f + d*g)
+ 4*a*(e^2*f + 2*d*e*g + d^2*h)))*ArcTan[(b + 2*c*x)/Sqrt[-b^2 +
4*a*c]])/(-b^2 + 4*a*c)^(3/2) + e*(c*e*g + 2*c*d*h - 2*b*e*h)*Log
[a + x*(b + c*x)])/(2*c^3)
```

Maple [B] time = 0.018, size = 2623, normalized size = 9.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^2*(h*x^2+g*x+f)/(c*x^2+b*x+a)^2,x)
```

```
[Out] -2/c^2/(c*x^2+b*x+a)/(4*a*c-b^2)*a*b^2*d*e*h+e^2*h/c^2*x+6/c/(c*x
^2+b*x+a)/(4*a*c-b^2)*x*a*b*d*e*h-1/c^2/(c*x^2+b*x+a)/(4*a*c-b^2)
*x*b^3*e^2*g-3/c^2/(c*x^2+b*x+a)/(4*a*c-b^2)*a^2*b*e^2*h+1/c^3/(c
*x^2+b*x+a)/(4*a*c-b^2)*a*b^3*e^2*h+1/c/(c*x^2+b*x+a)/(4*a*c-b^2)
*a*b*d^2*h+1/c/(c*x^2+b*x+a)/(4*a*c-b^2)*a*b*e^2*f+2/c/(c*x^2+b*x
+a)/(4*a*c-b^2)*x*a^2*e^2*h-1/c^2/(4*a*c-b^2)*ln((4*a*c-b^2)*(c*x
^2+b*x+a))*b^2*d*e*h-4/c^2/(4*a*c-b^2)*ln((4*a*c-b^2)*(c*x^2+b*x+
a))*a*b*e^2*h+2/c^2/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1
/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*b
^2*c^2+12*a*b^4*c-b^6)^(1/2))*b^3*d*e*h+4/c/(c*x^2+b*x+a)/(4*a*c-
b^2)*a^2*d*e*h-1/c^2/(c*x^2+b*x+a)/(4*a*c-b^2)*a*b^2*e^2*g-12/c/(
64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-
b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6
)^(1/2))*a*b*d*e*h+2/c/(c*x^2+b*x+a)/(4*a*c-b^2)*x*b^2*d*e*g+2/c/
(c*x^2+b*x+a)/(4*a*c-b^2)*a*b*d*e*g-2/c^2/(c*x^2+b*x+a)/(4*a*c-b^
2)*x*b^3*d*e*h-2/(c*x^2+b*x+a)/(4*a*c-b^2)*x*a*e^2*f-4/(64*a^3*c^
3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+
(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*
b*d*e*f-12/c/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arc
tan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+
12*a*b^4*c-b^6)^(1/2))*a^2*e^2*h+1/c^3/(4*a*c-b^2)*ln((4*a*c-b^2)
*(c*x^2+b*x+a))*b^3*e^2*h-1/2/c^2/(4*a*c-b^2)*ln((4*a*c-b^2)*(c*x
^2+b*x+a))*b^2*e^2*g+1/c^2/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-
b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-4
8*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*b^3*e^2*g+2/c/(c*x^2+b*x+a)/
(4*a*c-b^2)*a^2*e^2*g+2*c/(c*x^2+b*x+a)/(4*a*c-b^2)*x*d^2*f-2/c^3
/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*
c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b
^6)^(1/2))*b^4*e^2*h+8/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)
^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^
2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*a*d*e*g-2/(c*x^2+b*x+a)/(4*a*c-b
^2)*x*a*d^2*h-4/c^2/(c*x^2+b*x+a)/(4*a*c-b^2)*x*a*b^2*e^2*h+1/c^3
/(c*x^2+b*x+a)/(4*a*c-b^2)*x*b^4*e^2*h+1/c/(c*x^2+b*x+a)/(4*a*c-b
^2)*x*b^2*d^2*h+12/c^2/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)
^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^
2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*a*b^2*e^2*h-2/(c*x^2+b*x+a)/(4*a
*c-b^2)*x*b*d*e*f+1/c/(c*x^2+b*x+a)/(4*a*c-b^2)*x*b^2*e^2*f+3/c/(
c*x^2+b*x+a)/(4*a*c-b^2)*x*a*b*e^2*g-2/(64*a^3*c^3-48*a^2*b^2*c^2
+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(
64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*b*d^2*g+4/(64*a^
3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-b^2)*
c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/
2))*a*e^2*f-2/(c*x^2+b*x+a)/(4*a*c-b^2)*a*d^2*g+1/(c*x^2+b*x+a)/(
4*a*c-b^2)*b*d^2*f+4/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(
1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*
b^2*c^2+12*a*b^4*c-b^6)^(1/2))*a*d^2*h+4*c/(64*a^3*c^3-48*a^2*b^2
*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*
b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*d^2*f-6/c/(6
4*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-b
^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)
^(1/2))*a*b*e^2*g+4/c/(4*a*c-b^2)*ln((4*a*c-b^2)*(c*x^2+b*x+a))*a
*d*e*h-4/(c*x^2+b*x+a)/(4*a*c-b^2)*x*a*d*e*g+2/c/(4*a*c-b^2)*ln((
4*a*c-b^2)*(c*x^2+b*x+a))*a*e^2*g-1/(c*x^2+b*x+a)/(4*a*c-b^2)*x*b
*d^2*g-4/(c*x^2+b*x+a)/(4*a*c-b^2)*a*d*e*f
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)*(e*x + d)^2/(c*x^2 + b*x + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.575665, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)*(e*x + d)^2/(c*x^2 + b*x + a)^2,x, algorithm="fricas")
```

```
[Out] [1/2*(((4*(c^5*d^2 - b*c^4*d*e + a*c^4*e^2)*f - (2*b*c^4*d^2 - 8*
a*c^4*d*e - (b^3*c^2 - 6*a*b*c^3)*e^2)*g + 2*(2*a*c^4*d^2 + (b^3*
c^2 - 6*a*b*c^3)*d*e - (b^4*c - 6*a*b^2*c^2 + 6*a^2*c^3)*e^2)*h)*
x^2 + 4*(a*c^4*d^2 - a*b*c^3*d*e + a^2*c^3*e^2)*f - (2*a*b*c^3*d^
2 - 8*a^2*c^3*d*e - (a*b^3*c - 6*a^2*b*c^2)*e^2)*g + 2*(2*a^2*c^3
*d^2 + (a*b^3*c - 6*a^2*b*c^2)*d*e - (a*b^4 - 6*a^2*b^2*c + 6*a^3
*c^2)*e^2)*h + (4*(b*c^4*d^2 - b^2*c^3*d*e + a*b*c^3*e^2)*f - (2*
b^2*c^3*d^2 - 8*a*b*c^3*d*e - (b^4*c - 6*a*b^2*c^2)*e^2)*g + 2*(2
*a*b*c^3*d^2 + (b^4*c - 6*a*b^2*c^2)*d*e - (b^5 - 6*a*b^3*c + 6*a
^2*b*c^2)*e^2)*h)*x)*log((b^3 - 4*a*b*c + 2*(b^2*c - 4*a*c^2)*x +
 (2*c^2*x^2 + 2*b*c*x + b^2 - 2*a*c)*sqrt(b^2 - 4*a*c))/(c*x^2 +
b*x + a)) + (2*(b^2*c^2 - 4*a*c^3)*e^2*h*x^3 + 2*(b^3*c - 4*a*b*c
^2)*e^2*h*x^2 - 2*(b*c^3*d^2 - 4*a*c^3*d*e + a*b*c^2*e^2)*f + 2*(
2*a*c^3*d^2 - 2*a*b*c^2*d*e + (a*b^2*c - 2*a^2*c^2)*e^2)*g - 2*(a
*b*c^2*d^2 - 2*(a*b^2*c - 2*a^2*c^2)*d*e + (a*b^3 - 3*a^2*b*c)*e^
2)*h - 2*((2*c^4*d^2 - 2*b*c^3*d*e + (b^2*c^2 - 2*a*c^3)*e^2)*f -
 (b*c^3*d^2 - 2*(b^2*c^2 - 2*a*c^3)*d*e + (b^3*c - 3*a*b*c^2)*e^2
)*g + ((b^2*c^2 - 2*a*c^3)*d^2 - 2*(b^3*c - 3*a*b*c^2)*d*e + (b^4
 - 5*a*b^2*c + 6*a^2*c^2)*e^2)*h)*x + ((a*b^2*c - 4*a^2*c^2)*e^2*
g + ((b^2*c^2 - 4*a*c^3)*e^2*g + 2*((b^2*c^2 - 4*a*c^3)*d*e - (b^
3*c - 4*a*b*c^2)*e^2)*h)*x^2 + 2*((a*b^2*c - 4*a^2*c^2)*d*e - (a*
b^3 - 4*a^2*b*c)*e^2)*h + ((b^3*c - 4*a*b*c^2)*e^2*g + 2*((b^3*c
- 4*a*b*c^2)*d*e - (b^4 - 4*a*b^2*c)*e^2)*h)*x)*log(c*x^2 + b*x +
 a))*sqrt(b^2 - 4*a*c))/((a*b^2*c^3 - 4*a^2*c^4 + (b^2*c^4 - 4*a*
c^5)*x^2 + (b^3*c^3 - 4*a*b*c^4)*x)*sqrt(b^2 - 4*a*c)), -1/2*(2*(
(4*(c^5*d^2 - b*c^4*d*e + a*c^4*e^2)*f - (2*b*c^4*d^2 - 8*a*c^4*d
```

```
*e - (b^3*c^2 - 6*a*b*c^3)*e^2)*g + 2*(2*a*c^4*d^2 + (b^3*c^2 - 6
*a*b*c^3)*d*e - (b^4*c - 6*a*b^2*c^2 + 6*a^2*c^3)*e^2)*h)*x^2 + 4
*(a*c^4*d^2 - a*b*c^3*d*e + a^2*c^3*e^2)*f - (2*a*b*c^3*d^2 - 8*a
^2*c^3*d*e - (a*b^3*c - 6*a^2*b*c^2)*e^2)*g + 2*(2*a^2*c^3*d^2 +
(a*b^3*c - 6*a^2*b*c^2)*d*e - (a*b^4 - 6*a^2*b^2*c + 6*a^3*c^2)*e
^2)*h + (4*(b*c^4*d^2 - b^2*c^3*d*e + a*b*c^3*e^2)*f - (2*b^2*c^3
*d^2 - 8*a*b*c^3*d*e - (b^4*c - 6*a*b^2*c^2)*e^2)*g + 2*(2*a*b*c^
3*d^2 + (b^4*c - 6*a*b^2*c^2)*d*e - (b^5 - 6*a*b^3*c + 6*a^2*b*c^
2)*e^2)*h)*x)*arctan(-sqrt(-b^2 + 4*a*c)*(2*c*x + b)/(b^2 - 4*a*c
)) - (2*(b^2*c^2 - 4*a*c^3)*e^2*h*x^3 + 2*(b^3*c - 4*a*b*c^2)*e^2
*h*x^2 - 2*(b*c^3*d^2 - 4*a*c^3*d*e + a*b*c^2*e^2)*f + 2*(2*a*c^3
*d^2 - 2*a*b*c^2*d*e + (a*b^2*c - 2*a^2*c^2)*e^2)*g - 2*(a*b*c^2*
d^2 - 2*(a*b^2*c - 2*a^2*c^2)*d*e + (a*b^3 - 3*a^2*b*c)*e^2)*h -
2*((2*c^4*d^2 - 2*b*c^3*d*e + (b^2*c^2 - 2*a*c^3)*e^2)*f - (b*c^3
*d^2 - 2*(b^2*c^2 - 2*a*c^3)*d*e + (b^3*c - 3*a*b*c^2)*e^2)*g + (
(b^2*c^2 - 2*a*c^3)*d^2 - 2*(b^3*c - 3*a*b*c^2)*d*e + (b^4 - 5*a*
b^2*c + 6*a^2*c^2)*e^2)*h)*x + ((a*b^2*c - 4*a^2*c^2)*e^2*g + ((b
^2*c^2 - 4*a*c^3)*e^2*g + 2*((b^2*c^2 - 4*a*c^3)*d*e - (b^3*c - 4
*a*b*c^2)*e^2)*h)*x^2 + 2*((a*b^2*c - 4*a^2*c^2)*d*e - (a*b^3 - 4
*a^2*b*c)*e^2)*h + ((b^3*c - 4*a*b*c^2)*e^2*g + 2*((b^3*c - 4*a*b
*c^2)*d*e - (b^4 - 4*a*b^2*c)*e^2)*h)*x)*log(c*x^2 + b*x + a))*sq
rt(-b^2 + 4*a*c))/((a*b^2*c^3 - 4*a^2*c^4 + (b^2*c^4 - 4*a*c^5)*x
^2 + (b^3*c^3 - 4*a*b*c^4)*x)*sqrt(-b^2 + 4*a*c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**2*(h*x**2+g*x+f)/(c*x**2+b*x+a)**2,x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.278777, size = 729, normalized size = 2.53

$$\frac{hxe^2}{c^2} - \frac{\left(4\,c^4d^2f - 2\,bc^3d^2g + 4\,ac^3d^2h - 4\,bc^3dfe + 8\,ac^3dge + 2\,b^3cdhe - 12\,abc^2dhe + 4\,ac^3fe^2 + b^3cge^2 - 6\,abc^2ge^2 - 2\,b^4he^2 \cdots}{(b^2c^3 - 4\,ac^4)\sqrt{-b^2 + 4\,ac}} + \frac{\left(2\,cdhe + cge^2 - 2\,bhe^2\right)\ln\left(cx^2 + bx + a\right)}{2\,c^3} - \frac{\frac{\left(2\,c^4d^2f - bc^3d^2g + b^2c^2d^2h - 2\,ac^3d^2h - 2\,bc^3dfe + 2\,b^2c^2dge - 4\,ac^3dge - 2\,b^3cdhe + 6\,abc^2dhe + b^2c^2fe^2 - 2\,ac^3fe^2 - b^3cge^2 + 3\,abc^2ge^2 + b^4he^2 - 4\,ab^2che^2 + \cdots}{c}}{(cx^2 + bx + a)(b^2 \cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x^2 + g*x + f)*(e*x + d)^2/(c*x^2 + b*x + a)^2,x, algorithm="giac")
```

```
[Out] h*x*e^2/c^2 - (4*c^4*d^2*f - 2*b*c^3*d^2*g + 4*a*c^3*d^2*h - 4*b*
c^3*d*f*e + 8*a*c^3*d*g*e + 2*b^3*c*d*h*e - 12*a*b*c^2*d*h*e + 4*
a*c^3*f*e^2 + b^3*c*g*e^2 - 6*a*b*c^2*g*e^2 - 2*b^4*h*e^2 + 12*a*
b^2*c*h*e^2 - 12*a^2*c^2*h*e^2)*arctan((2*c*x + b)/sqrt(-b^2 + 4*
a*c))/((b^2*c^3 - 4*a*c^4)*sqrt(-b^2 + 4*a*c)) + 1/2*(2*c*d*h*e +
 c*g*e^2 - 2*b*h*e^2)*ln(c*x^2 + b*x + a)/c^3 - ((2*c^4*d^2*f - b
*c^3*d^2*g + b^2*c^2*d^2*h - 2*a*c^3*d^2*h - 2*b*c^3*d*f*e + 2*b^
2*c^2*d*g*e - 4*a*c^3*d*g*e - 2*b^3*c*d*h*e + 6*a*b*c^2*d*h*e + b
^2*c^2*f*e^2 - 2*a*c^3*f*e^2 - b^3*c*g*e^2 + 3*a*b*c^2*g*e^2 + b^
4*h*e^2 - 4*a*b^2*c*h*e^2 + 2*a^2*c^2*h*e^2)*x/c + (b*c^3*d^2*f -
 2*a*c^3*d^2*g + a*b*c^2*d^2*h - 4*a*c^3*d*f*e + 2*a*b*c^2*d*g*e
- 2*a*b^2*c*d*h*e + 4*a^2*c^2*d*h*e + a*b*c^2*f*e^2 - a*b^2*c*g*e
^2 + 2*a^2*c^2*g*e^2 + a*b^3*h*e^2 - 3*a^2*b*c*h*e^2)/c)/((c*x^2
+ b*x + a)*(b^2 - 4*a*c)*c^2)
```

3.156 $\int \frac{(d+ex)(f+gx+hx^2)}{(a+bx+cx^2)^2}\,dx$

Optimal. Leaf size=178

$$\frac{(d+ex)\left(c\left(2ag-b\left(\frac{ah}{c}+f\right)\right)-x\left(-2ach+b^2h-bcg+2c^2f\right)\right)}{c\left(b^2-4ac\right)\left(a+bx+cx^2\right)}+\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(-2c^2(b(dg+ef)-2a(dh+eg))-6abceh+b^3eh+4c^3df\right)}{c^2\left(b^2-4ac\right)^{3/2}}+\frac{eh\log\left(a+bx+cx^2\right)}{2c^2}$$

```
[Out] ((d + e*x)*(c*(2*a*g - b*(f + (a*h)/c)) - (2*c^2*f - b*c*g + b^2*
h - 2*a*c*h)*x))/(c*(b^2 - 4*a*c)*(a + b*x + c*x^2)) + ((4*c^3*d*
f + b^3*e*h - 6*a*b*c*e*h - 2*c^2*(b*(e*f + d*g) - 2*a*(e*g + d*h
)))*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(c^2*(b^2 - 4*a*c)^(3
/2)) + (e*h*Log[a + b*x + c*x^2])/(2*c^2)
```

Rubi [A] time = 0.578721, antiderivative size = 178, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}} = 0.179$

$$\frac{(d+ex)\left(-x\left(-2ach+b^2h-bcg+2c^2f\right)-b(ah+cf)+2acg\right)}{c\left(b^2-4ac\right)\left(a+bx+cx^2\right)}+\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(-2c^2(b(dg+ef)-2a(dh+eg))-6abceh+b^3eh+4c^3df\right)}{c^2\left(b^2-4ac\right)^{3/2}}+\frac{eh\log\left(a+bx+cx^2\right)}{2c^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)*(f + g*x + h*x^2))/(a + b*x + c*x^2)^2,x]
```

```
[Out] ((d + e*x)*(2*a*c*g - b*(c*f + a*h) - (2*c^2*f - b*c*g + b^2*h -
2*a*c*h)*x))/(c*(b^2 - 4*a*c)*(a + b*x + c*x^2)) + ((4*c^3*d*f +
b^3*e*h - 6*a*b*c*e*h - 2*c^2*(b*(e*f + d*g) - 2*a*(e*g + d*h)))*
ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(c^2*(b^2 - 4*a*c)^(3/2))
 + (e*h*Log[a + b*x + c*x^2])/(2*c^2)
```

Rubi in Sympy [A] time = 115.873, size = 347, normalized size = 1.95

$$\frac{eh\log\left(a+bx+cx^2\right)}{2c^2}+\frac{-2a^2ceh+ab^2eh-abcdh-abceg+2ac^2dg+2ac^2ef-bc^2df+x\left(b\left(-aceh+b^2eh-bcdh-bceg+c^2dg+c^2ef\right)-2c\left(\ldots\right.\right.}{c^2\left(-4ac+b^2\right)\left(a+bx+cx^2\right)}+\frac{\left(3beh-2cdh-2ceg\right)\operatorname{atanh}\left(\frac{b+2cx}{\sqrt{-4ac+b^2}}\right)}{c^2\sqrt{-4ac+b^2}}-\frac{2\left(b\left(-aceh+b^2eh-bcdh-bceg+c^2dg+c^2ef\right)-2c\left(abeh-acdh-aceg+c^2df\right)\right)\operatorname{atanh}\left(\frac{b+2cx}{\sqrt{-4ac+b^2}}\right)}{c^2\left(-4ac+b^2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((e*x+d)*(h*x**2+g*x+f)/(c*x**2+b*x+a)**2,x)
```

```
[Out] e*h*log(a + b*x + c*x**2)/(2*c**2) + (-2*a**2*c*e*h + a*b**2*e*h
- a*b*c*d*h - a*b*c*e*g + 2*a*c**2*d*g + 2*a*c**2*e*f - b*c**2*d*
f + x*(b*(-a*c*e*h + b**2*e*h - b*c*d*h - b*c*e*g + c**2*d*g + c*
*2*e*f) - 2*c*(a*b*e*h - a*c*d*h - a*c*e*g + c**2*d*f)))/(c**2*(-
4*a*c + b**2)*(a + b*x + c*x**2)) + (3*b*e*h - 2*c*d*h - 2*c*e*g)
*atanh((b + 2*c*x)/sqrt(-4*a*c + b**2))/(c**2*sqrt(-4*a*c + b**2)
) - 2*(b*(-a*c*e*h + b**2*e*h - b*c*d*h - b*c*e*g + c**2*d*g + c*
*2*e*f) - 2*c*(a*b*e*h - a*c*d*h - a*c*e*g + c**2*d*f))*atanh((b
+ 2*c*x)/sqrt(-4*a*c + b**2))/(c**2*(-4*a*c + b**2)**(3/2))
```

Mathematica [A] time = 0.907078, size = 225, normalized size = 1.26

$$\frac{-\frac{2\left(2c\left(a^2eh-ac(d(g+hx)+e(f+gx))+c^2dfx\right)+b^2(cx(dh+eg)-aeh)+bc(adh+ae(g+3hx)+cd(f-gx)-cefx)+b^3(-e)hx\right)}{\left(b^2-4ac\right)(a+x(b+cx))}+\frac{2\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)\left(-2c^2(b(dg+ef)\ldots\right.}{(4ac\ldots}}{2c^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((d + e*x)*(f + g*x + h*x^2))/(a + b*x + c*x^2)^2,x]
```

```
[Out] ((-2*(-(b^3*e*h*x) + b^2*(-(a*e*h) + c*(e*g + d*h)*x) + b*c*(a*d*
h - c*e*f*x + c*d*(f - g*x) + a*e*(g + 3*h*x)) + 2*c*(a^2*e*h + c
^2*d*f*x - a*c*(e*(f + g*x) + d*(g + h*x)))))/((b^2 - 4*a*c)*(a +
 x*(b + c*x))) + (2*(4*c^3*d*f + b^3*e*h - 6*a*b*c*e*h - 2*c^2*(b
*(e*f + d*g) - 2*a*(e*g + d*h)))*ArcTan[(b + 2*c*x)/Sqrt[-b^2 + 4
*a*c]])/(-b^2 + 4*a*c)^(3/2) + e*h*Log[a + x*(b + c*x)])/(2*c^2)
```

Maple [B] time = 0.027, size = 1073, normalized size = 6.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(h*x^2+g*x+f)/(c*x^2+b*x+a)^2,x)
```

```
[Out] ((3*a*b*c*e*h-2*a*c^2*d*h-2*a*c^2*e*g-b^3*e*h+b^2*c*d*h+b^2*c*e*g
-b*c^2*d*g-b*c^2*e*f+2*c^3*d*f)/c^2/(4*a*c-b^2)*x+(2*a^2*c*e*h-a*
b^2*e*h+a*b*c*d*h+a*b*c*e*g-2*a*c^2*d*g-2*a*c^2*e*f+b*c^2*d*f)/(4
*a*c-b^2)/c^2)/(c*x^2+b*x+a)+2/c/(4*a*c-b^2)*ln(c*(4*a*c-b^2)*(c*
x^2+b*x+a))*a*e*h-1/2/c^2/(4*a*c-b^2)*ln(c*(4*a*c-b^2)*(c*x^2+b*x
+a))*b^2*e*h-6/(64*a^3*c^5-48*a^2*b^2*c^4+12*a*b^4*c^3-b^6*c^2)^(
1/2)*arctan((2*c^2*(4*a*c-b^2)*x+c*(4*a*c-b^2)*b)/(64*a^3*c^5-48*
a^2*b^2*c^4+12*a*b^4*c^3-b^6*c^2)^(1/2))*a*b*e*h+4/(64*a^3*c^5-48
*a^2*b^2*c^4+12*a*b^4*c^3-b^6*c^2)^(1/2)*arctan((2*c^2*(4*a*c-b^2
)*x+c*(4*a*c-b^2)*b)/(64*a^3*c^5-48*a^2*b^2*c^4+12*a*b^4*c^3-b^6*
c^2)^(1/2))*a*c*d*h+4/(64*a^3*c^5-48*a^2*b^2*c^4+12*a*b^4*c^3-b^6
*c^2)^(1/2)*arctan((2*c^2*(4*a*c-b^2)*x+c*(4*a*c-b^2)*b)/(64*a^3*
c^5-48*a^2*b^2*c^4+12*a*b^4*c^3-b^6*c^2)^(1/2))*a*c*e*g-2/(64*a^3
*c^5-48*a^2*b^2*c^4+12*a*b^4*c^3-b^6*c^2)^(1/2)*arctan((2*c^2*(4*
a*c-b^2)*x+c*(4*a*c-b^2)*b)/(64*a^3*c^5-48*a^2*b^2*c^4+12*a*b^4*c
^3-b^6*c^2)^(1/2))*b*c*d*g-2/(64*a^3*c^5-48*a^2*b^2*c^4+12*a*b^4*
c^3-b^6*c^2)^(1/2)*arctan((2*c^2*(4*a*c-b^2)*x+c*(4*a*c-b^2)*b)/(
64*a^3*c^5-48*a^2*b^2*c^4+12*a*b^4*c^3-b^6*c^2)^(1/2))*b*c*e*f+4/
(64*a^3*c^5-48*a^2*b^2*c^4+12*a*b^4*c^3-b^6*c^2)^(1/2)*arctan((2*
c^2*(4*a*c-b^2)*x+c*(4*a*c-b^2)*b)/(64*a^3*c^5-48*a^2*b^2*c^4+12*
a*b^4*c^3-b^6*c^2)^(1/2))*c^2*d*f+1/(64*a^3*c^5-48*a^2*b^2*c^4+12
*a*b^4*c^3-b^6*c^2)^(1/2)*arctan((2*c^2*(4*a*c-b^2)*x+c*(4*a*c-b^
2)*b)/(64*a^3*c^5-48*a^2*b^2*c^4+12*a*b^4*c^3-b^6*c^2)^(1/2))*b^3
/c*e*h
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)*(e*x + d)/(c*x^2 + b*x + a)^2,x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.347335, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)*(e*x + d)/(c*x^2 + b*x + a)^2,x, algorithm="fricas")
```

```
[Out] [1/2*(((2*(2*c^4*d - b*c^3*e)*f - 2*(b*c^3*d - 2*a*c^3*e)*g + (4*
a*c^3*d + (b^3*c - 6*a*b*c^2)*e)*h)*x^2 + 2*(2*a*c^3*d - a*b*c^2*
e)*f - 2*(a*b*c^2*d - 2*a^2*c^2*e)*g + (4*a^2*c^2*d + (a*b^3 - 6*
a^2*b*c)*e)*h + (2*(2*b*c^3*d - b^2*c^2*e)*f - 2*(b^2*c^2*d - 2*a
*b*c^2*e)*g + (4*a*b*c^2*d + (b^4 - 6*a*b^2*c)*e)*h)*x)*log((b^3
- 4*a*b*c + 2*(b^2*c - 4*a*c^2)*x + (2*c^2*x^2 + 2*b*c*x + b^2 -
2*a*c)*sqrt(b^2 - 4*a*c))/(c*x^2 + b*x + a)) - sqrt(b^2 - 4*a*c)*
(2*(b*c^2*d - 2*a*c^2*e)*f - 2*(2*a*c^2*d - a*b*c*e)*g + 2*(a*b*c
*d - (a*b^2 - 2*a^2*c)*e)*h + 2*((2*c^3*d - b*c^2*e)*f - (b*c^2*d
 - (b^2*c - 2*a*c^2)*e)*g + ((b^2*c - 2*a*c^2)*d - (b^3 - 3*a*b*c
)*e)*h)*x - ((b^2*c - 4*a*c^2)*e*h*x^2 + (b^3 - 4*a*b*c)*e*h*x +
(a*b^2 - 4*a^2*c)*e*h)*log(c*x^2 + b*x + a)))/((a*b^2*c^2 - 4*a^2
*c^3 + (b^2*c^3 - 4*a*c^4)*x^2 + (b^3*c^2 - 4*a*b*c^3)*x)*sqrt(b^
2 - 4*a*c)), -1/2*(2*((2*(2*c^4*d - b*c^3*e)*f - 2*(b*c^3*d - 2*a
*c^3*e)*g + (4*a*c^3*d + (b^3*c - 6*a*b*c^2)*e)*h)*x^2 + 2*(2*a*c
^3*d - a*b*c^2*e)*f - 2*(a*b*c^2*d - 2*a^2*c^2*e)*g + (4*a^2*c^2*
d + (a*b^3 - 6*a^2*b*c)*e)*h + (2*(2*b*c^3*d - b^2*c^2*e)*f - 2*(
b^2*c^2*d - 2*a*b*c^2*e)*g + (4*a*b*c^2*d + (b^4 - 6*a*b^2*c)*e)*
h)*x)*arctan(-sqrt(-b^2 + 4*a*c)*(2*c*x + b)/(b^2 - 4*a*c)) + sqr
t(-b^2 + 4*a*c)*(2*(b*c^2*d - 2*a*c^2*e)*f - 2*(2*a*c^2*d - a*b*c
*e)*g + 2*(a*b*c*d - (a*b^2 - 2*a^2*c)*e)*h + 2*((2*c^3*d - b*c^2
*e)*f - (b*c^2*d - (b^2*c - 2*a*c^2)*e)*g + ((b^2*c - 2*a*c^2)*d
- (b^3 - 3*a*b*c)*e)*h)*x - ((b^2*c - 4*a*c^2)*e*h*x^2 + (b^3 - 4
*a*b*c)*e*h*x + (a*b^2 - 4*a^2*c)*e*h)*log(c*x^2 + b*x + a)))/((a
*b^2*c^2 - 4*a^2*c^3 + (b^2*c^3 - 4*a*c^4)*x^2 + (b^3*c^2 - 4*a*b
*c^3)*x)*sqrt(-b^2 + 4*a*c))]
```

Sympy [A] time = 103.559, size = 1535, normalized size = 8.62

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(h*x**2+g*x+f)/(c*x**2+b*x+a)**2,x)
```

```
[Out] (e*h/(2*c**2) - sqrt(-(4*a*c - b**2)**3)*(6*a*b*c*e*h - 4*a*c**2*
d*h - 4*a*c**2*e*g - b**3*e*h + 2*b*c**2*d*g + 2*b*c**2*e*f - 4*c
**3*d*f)/(2*c**2*(64*a**3*c**3 - 48*a**2*b**2*c**2 + 12*a*b**4*c
- b**6)))*log(x + (-16*a**2*c**3*(e*h/(2*c**2) - sqrt(-(4*a*c - b
**2)**3)*(6*a*b*c*e*h - 4*a*c**2*d*h - 4*a*c**2*e*g - b**3*e*h +
2*b*c**2*d*g + 2*b*c**2*e*f - 4*c**3*d*f)/(2*c**2*(64*a**3*c**3 -
 48*a**2*b**2*c**2 + 12*a*b**4*c - b**6))) + 8*a**2*c*e*h + 8*a*b
**2*c**2*(e*h/(2*c**2) - sqrt(-(4*a*c - b**2)**3)*(6*a*b*c*e*h -
4*a*c**2*d*h - 4*a*c**2*e*g - b**3*e*h + 2*b*c**2*d*g + 2*b*c**2*
```

```
e*f - 4*c**3*d*f)/(2*c**2*(64*a**3*c**3 - 48*a**2*b**2*c**2 + 12*
a*b**4*c - b**6))) - a*b**2*e*h - 2*a*b*c*d*h - 2*a*b*c*e*g - b**
4*c*(e*h/(2*c**2) - sqrt(-(4*a*c - b**2)**3)*(6*a*b*c*e*h - 4*a*c
**2*d*h - 4*a*c**2*e*g - b**3*e*h + 2*b*c**2*d*g + 2*b*c**2*e*f -
 4*c**3*d*f)/(2*c**2*(64*a**3*c**3 - 48*a**2*b**2*c**2 + 12*a*b**
4*c - b**6))) + b**2*c*d*g + b**2*c*e*f - 2*b*c**2*d*f)/(6*a*b*c*
e*h - 4*a*c**2*d*h - 4*a*c**2*e*g - b**3*e*h + 2*b*c**2*d*g + 2*b
*c**2*e*f - 4*c**3*d*f)) + (e*h/(2*c**2) + sqrt(-(4*a*c - b**2)**
3)*(6*a*b*c*e*h - 4*a*c**2*d*h - 4*a*c**2*e*g - b**3*e*h + 2*b*c*
*2*d*g + 2*b*c**2*e*f - 4*c**3*d*f)/(2*c**2*(64*a**3*c**3 - 48*a*
*2*b**2*c**2 + 12*a*b**4*c - b**6)))*log(x + (-16*a**2*c**3*(e*h/
(2*c**2) + sqrt(-(4*a*c - b**2)**3)*(6*a*b*c*e*h - 4*a*c**2*d*h -
 4*a*c**2*e*g - b**3*e*h + 2*b*c**2*d*g + 2*b*c**2*e*f - 4*c**3*d
*f)/(2*c**2*(64*a**3*c**3 - 48*a**2*b**2*c**2 + 12*a*b**4*c - b**
6))) + 8*a**2*c*e*h + 8*a*b**2*c**2*(e*h/(2*c**2) + sqrt(-(4*a*c
- b**2)**3)*(6*a*b*c*e*h - 4*a*c**2*d*h - 4*a*c**2*e*g - b**3*e*h
 + 2*b*c**2*d*g + 2*b*c**2*e*f - 4*c**3*d*f)/(2*c**2*(64*a**3*c**
3 - 48*a**2*b**2*c**2 + 12*a*b**4*c - b**6))) - a*b**2*e*h - 2*a*
b*c*d*h - 2*a*b*c*e*g - b**4*c*(e*h/(2*c**2) + sqrt(-(4*a*c - b**
2)**3)*(6*a*b*c*e*h - 4*a*c**2*d*h - 4*a*c**2*e*g - b**3*e*h + 2*
b*c**2*d*g + 2*b*c**2*e*f - 4*c**3*d*f)/(2*c**2*(64*a**3*c**3 - 4
8*a**2*b**2*c**2 + 12*a*b**4*c - b**6))) + b**2*c*d*g + b**2*c*e*
f - 2*b*c**2*d*f)/(6*a*b*c*e*h - 4*a*c**2*d*h - 4*a*c**2*e*g - b*
*3*e*h + 2*b*c**2*d*g + 2*b*c**2*e*f - 4*c**3*d*f)) + (2*a**2*c*e
*h - a*b**2*e*h + a*b*c*d*h + a*b*c*e*g - 2*a*c**2*d*g - 2*a*c**2
*e*f + b*c**2*d*f + x*(3*a*b*c*e*h - 2*a*c**2*d*h - 2*a*c**2*e*g
- b**3*e*h + b**2*c*d*h + b**2*c*e*g - b*c**2*d*g - b*c**2*e*f +
2*c**3*d*f))/(4*a**2*c**3 - a*b**2*c**2 + x**2*(4*a*c**4 - b**2*c
**3) + x*(4*a*b*c**3 - b**3*c**2))
```

GIAC/XCAS [A] time = 0.276577, size = 385, normalized size = 2.16

$$\frac{he\ln\left(cx^2+bx+a\right)}{2\,c^2} - \frac{\left(4\,c^3df-2\,bc^2dg+4\,ac^2dh-2\,bc^2fe+4\,ac^2ge+b^3he-6\,abche\right)\arctan\left(\frac{2\,cx+b}{\sqrt{-b^2+4\,ac}}\right)}{(b^2c^2-4\,ac^3)\sqrt{-b^2+4\,ac}} - \frac{bc^2df-2\,ac^2dg+abcdh-2\,ac^2fe+abcge-ab^2he+2\,a^2che+\left(2\,c^3df-bc^2dg+b^2cdh-2\,ac^2dh-bc^2fe+b^2cge-2\right.}{(cx^2+bx+a)(b^2-4\,ac)c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)*(e*x + d)/(c*x^2 + b*x + a)^2,x, algorithm="giac")
```

```
[Out] 1/2*h*e*ln(c*x^2 + b*x + a)/c^2 - (4*c^3*d*f - 2*b*c^2*d*g + 4*a*
c^2*d*h - 2*b*c^2*f*e + 4*a*c^2*g*e + b^3*h*e - 6*a*b*c*h*e)*arct
an((2*c*x + b)/sqrt(-b^2 + 4*a*c))/((b^2*c^2 - 4*a*c^3)*sqrt(-b^2
 + 4*a*c)) - (b*c^2*d*f - 2*a*c^2*d*g + a*b*c*d*h - 2*a*c^2*f*e +
 a*b*c*g*e - a*b^2*h*e + 2*a^2*c*h*e + (2*c^3*d*f - b*c^2*d*g + b
```

```
^2*c*d*h - 2*a*c^2*d*h - b*c^2*f*e + b^2*c*g*e - 2*a*c^2*g*e - b^
3*h*e + 3*a*b*c*h*e)*x)/((c*x^2 + b*x + a)*(b^2 - 4*a*c)*c^2)
```

3.157 $\int \frac{f+gx+hx^2}{(a+bx+cx^2)^2}\,dx$

Optimal. Leaf size=118

$$\frac{c\left(2ag-b\left(\frac{ah}{c}+f\right)\right)-x\left(-2ach+b^2h-bcg+2c^2f\right)}{c\left(b^2-4ac\right)\left(a+bx+cx^2\right)}+\frac{2\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)(2ah-bg+2cf)}{\left(b^2-4ac\right)^{3/2}}$$

```
[Out] (c*(2*a*g - b*(f + (a*h)/c)) - (2*c^2*f - b*c*g + b^2*h - 2*a*c*h
)*x)/(c*(b^2 - 4*a*c)*(a + b*x + c*x^2)) + (2*(2*c*f - b*g + 2*a*
h)*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(3/2)
```

Rubi [A] time = 0.209166, antiderivative size = 118, 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

$$\frac{-x\left(-2ach+b^2h-bcg+2c^2f\right)-b(ah+cf)+2acg}{c\left(b^2-4ac\right)\left(a+bx+cx^2\right)}+\frac{2\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)(2ah-bg+2cf)}{\left(b^2-4ac\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(f + g*x + h*x^2)/(a + b*x + c*x^2)^2,x]
```

```
[Out] (2*a*c*g - b*(c*f + a*h) - (2*c^2*f - b*c*g + b^2*h - 2*a*c*h)*x)
/(c*(b^2 - 4*a*c)*(a + b*x + c*x^2)) + (2*(2*c*f - b*g + 2*a*h)*A
rcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(3/2)
```

Rubi in Sympy [A] time = 19.954, size = 109, normalized size = 0.92

$$\frac{2\left(2ah-bg+2cf\right)\operatorname{atanh}\left(\frac{b+2cx}{\sqrt{-4ac+b^2}}\right)}{\left(-4ac+b^2\right)^{\frac{3}{2}}}-\frac{abh-2acg+bcf+x\left(-2ach+b^2h-bcg+2c^2f\right)}{c\left(-4ac+b^2\right)\left(a+bx+cx^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x**2+g*x+f)/(c*x**2+b*x+a)**2,x)
```

```
[Out] 2*(2*a*h - b*g + 2*c*f)*atanh((b + 2*c*x)/sqrt(-4*a*c + b**2))/(-
4*a*c + b**2)**(3/2) - (a*b*h - 2*a*c*g + b*c*f + x*(-2*a*c*h + b
**2*h - b*c*g + 2*c**2*f))/(c*(-4*a*c + b**2)*(a + b*x + c*x**2))
```

Mathematica [A] time = 0.18571, size = 114, normalized size = 0.97

$$\frac{abh-2ac(g+hx)+b^2hx+bc(f-gx)+2c^2fx}{c(4ac-b^2)(a+x(b+cx))}-\frac{2\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)(-2ah+bg-2cf)}{(4ac-b^2)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(f + g*x + h*x^2)/(a + b*x + c*x^2)^2,x]
```

```
[Out] (a*b*h + 2*c^2*f*x + b^2*h*x + b*c*(f - g*x) - 2*a*c*(g + h*x))/(
c*(-b^2 + 4*a*c)*(a + x*(b + c*x))) - (2*(-2*c*f + b*g - 2*a*h)*A
rcTan[(b + 2*c*x)/Sqrt[-b^2 + 4*a*c]])/(-b^2 + 4*a*c)^(3/2)
```

Maple [A] time = 0.009, size = 194, normalized size = 1.6

$$\frac{1}{cx^2+bx+a}\left(-\frac{\left(2\,ach-b^2h+bcg-2\,c^2f\right)x}{c\,(4\,ac-b^2)}+\frac{abh-2\,acg+bcf}{c\,(4\,ac-b^2)}\right)+4\,\frac{ah}{(4\,ac-b^2)^{3/2}}\arctan\left(\frac{2\,cx+b}{\sqrt{4\,ac-b^2}}\right)-2\,\frac{bg}{(4\,ac-b^2)^{3/2}}\arctan\left(\frac{2\,cx+b}{\sqrt{4\,ac-b^2}}\right)+4\,\frac{cf}{(4\,ac-b^2)^{3/2}}\arctan\left(\frac{2\,cx+b}{\sqrt{4\,ac-b^2}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x^2+g*x+f)/(c*x^2+b*x+a)^2,x)
```

```
[Out] (-(2*a*c*h-b^2*h+b*c*g-2*c^2*f)/c/(4*a*c-b^2)*x+1/c*(a*b*h-2*a*c*
g+b*c*f)/(4*a*c-b^2))/(c*x^2+b*x+a)+4/(4*a*c-b^2)^(3/2)*arctan((2
*c*x+b)/(4*a*c-b^2)^(1/2))*a*h-2/(4*a*c-b^2)^(3/2)*arctan((2*c*x+
b)/(4*a*c-b^2)^(1/2))*b*g+4/(4*a*c-b^2)^(3/2)*arctan((2*c*x+b)/(4
*a*c-b^2)^(1/2))*c*f
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.290609, size = 1, normalized size = 0.01

$$\left[-\frac{\left(2\,ac^2f - abcg + 2\,a^2ch + \left(2\,c^3f - bc^2g + 2\,ac^2h\right)x^2 + \left(2\,bc^2f - b^2cg + 2\,abch\right)x\right)\log\left(-\frac{b^3-4\,abc+2\,\left(b^2c-4\,ac^2\right)x-\left(2\,c^2x^2+2\,b\right)}{cx^2+bx+a}\right)}{(ab^2c - 4\,a^2c^2 + (b^2c^2 - 4\,ac^3)x^2 + (b^3c - 4\,abc^2)}\right.$$

$$-\frac{2\left(2\,ac^2f - abcg + 2\,a^2ch + \left(2\,c^3f - bc^2g + 2\,ac^2h\right)x^2 + \left(2\,bc^2f - b^2cg + 2\,abch\right)x\right)\arctan\left(-\frac{\sqrt{-b^2+4\,ac}(2\,cx+b)}{b^2-4\,ac}\right) + \left(bcf -\right.}{(ab^2c - 4\,a^2c^2 + (b^2c^2 - 4\,ac^3)x^2 + (b^3c - 4\,abc^2)x)\sqrt{-b^2 + 4\,ac}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] [-((2*a*c^2*f - a*b*c*g + 2*a^2*c*h + (2*c^3*f - b*c^2*g + 2*a*c^
2*h)*x^2 + (2*b*c^2*f - b^2*c*g + 2*a*b*c*h)*x)*log(-(b^3 - 4*a*b
*c + 2*(b^2*c - 4*a*c^2)*x - (2*c^2*x^2 + 2*b*c*x + b^2 - 2*a*c)*
sqrt(b^2 - 4*a*c))/(c*x^2 + b*x + a)) + (b*c*f - 2*a*c*g + a*b*h
+ (2*c^2*f - b*c*g + (b^2 - 2*a*c)*h)*x)*sqrt(b^2 - 4*a*c))/((a*b
^2*c - 4*a^2*c^2 + (b^2*c^2 - 4*a*c^3)*x^2 + (b^3*c - 4*a*b*c^2)*
x)*sqrt(b^2 - 4*a*c)), -(2*(2*a*c^2*f - a*b*c*g + 2*a^2*c*h + (2*
c^3*f - b*c^2*g + 2*a*c^2*h)*x^2 + (2*b*c^2*f - b^2*c*g + 2*a*b*c
*h)*x)*arctan(-sqrt(-b^2 + 4*a*c)*(2*c*x + b)/(b^2 - 4*a*c)) + (b
*c*f - 2*a*c*g + a*b*h + (2*c^2*f - b*c*g + (b^2 - 2*a*c)*h)*x)*s
qrt(-b^2 + 4*a*c))/((a*b^2*c - 4*a^2*c^2 + (b^2*c^2 - 4*a*c^3)*x^
2 + (b^3*c - 4*a*b*c^2)*x)*sqrt(-b^2 + 4*a*c))]
```

Sympy [A] time = 4.25727, size = 459, normalized size = 3.89

$$-\sqrt{-\frac{1}{(4ac-b^2)^3}}(2ah-bg+2cf)\log\left(x+\frac{-16a^2c^2\sqrt{-\frac{1}{(4ac-b^2)^3}}(2ah-bg+2cf)+8ab^2c\sqrt{-\frac{1}{(4ac-b^2)^3}}(2ah-bg+2cf)+2abh-b^4\sqrt{-\frac{1}{(4ac-b^2)^3}}(2ah-\ldots}{4ach-2bcg+4c^2f}\right.$$
$$+\sqrt{-\frac{1}{(4ac-b^2)^3}}(2ah-bg+2cf)\log\left(x+\frac{16a^2c^2\sqrt{-\frac{1}{(4ac-b^2)^3}}(2ah-bg+2cf)-8ab^2c\sqrt{-\frac{1}{(4ac-b^2)^3}}(2ah-bg+2cf)+2abh+b^4\sqrt{-\frac{1}{(4ac-b^2)^3}}(2ah-bg\ldots}{4ach-2bcg+4c^2f}\right.$$
$$-\frac{-abh+2acg-bcf+x(2ach-b^2h+bcg-2c^2f)}{4a^2c^2-ab^2c+x^2(4ac^3-b^2c^2)+x(4abc^2-b^3c)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x**2+g*x+f)/(c*x**2+b*x+a)**2,x)
```

```
[Out] -sqrt(-1/(4*a*c - b**2)**3)*(2*a*h - b*g + 2*c*f)*log(x + (-16*a*
*2*c**2*sqrt(-1/(4*a*c - b**2)**3)*(2*a*h - b*g + 2*c*f) + 8*a*b*
*2*c*sqrt(-1/(4*a*c - b**2)**3)*(2*a*h - b*g + 2*c*f) + 2*a*b*h -
 b**4*sqrt(-1/(4*a*c - b**2)**3)*(2*a*h - b*g + 2*c*f) - b**2*g +
 2*b*c*f)/(4*a*c*h - 2*b*c*g + 4*c**2*f)) + sqrt(-1/(4*a*c - b**2
)**3)*(2*a*h - b*g + 2*c*f)*log(x + (16*a**2*c**2*sqrt(-1/(4*a*c
- b**2)**3)*(2*a*h - b*g + 2*c*f) - 8*a*b**2*c*sqrt(-1/(4*a*c - b
**2)**3)*(2*a*h - b*g + 2*c*f) + 2*a*b*h + b**4*sqrt(-1/(4*a*c -
b**2)**3)*(2*a*h - b*g + 2*c*f) - b**2*g + 2*b*c*f)/(4*a*c*h - 2*
b*c*g + 4*c**2*f)) - (-a*b*h + 2*a*c*g - b*c*f + x*(2*a*c*h - b**
2*h + b*c*g - 2*c**2*f))/(4*a**2*c**2 - a*b**2*c + x**2*(4*a*c**3
 - b**2*c**2) + x*(4*a*b*c**2 - b**3*c))
```

GIAC/XCAS [A] time = 0.274292, size = 169, normalized size = 1.43

$$-\frac{2(2cf-bg+2ah)\arctan\left(\frac{2cx+b}{\sqrt{-b^2+4ac}}\right)}{(b^2-4ac)\sqrt{-b^2+4ac}}-\frac{2c^2fx-bcgx+b^2hx-2achx+bcf-2acg+abh}{(b^2c-4ac^2)(cx^2+bx+a)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -2*(2*c*f - b*g + 2*a*h)*arctan((2*c*x + b)/sqrt(-b^2 + 4*a*c))/(
(b^2 - 4*a*c)*sqrt(-b^2 + 4*a*c)) - (2*c^2*f*x - b*c*g*x + b^2*h*
```

```
x - 2*a*c*h*x + b*c*f - 2*a*c*g + a*b*h)/((b^2*c - 4*a*c^2)*(c*x^
2 + b*x + a))
```

3.158 $\int \frac{f+gx+hx^2}{(d+ex)(a+bx+cx^2)^2}\,dx$

Optimal. Leaf size=407

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(2ce\left(2a^2e(eg-dh)-ab\left(d^2h+deg+3e^2f\right)+2b^2d^2g\right)+be\left(-2a^2e^2h+4abdeh+b^2\left(d^2(-h)-deg+e^2\right.\right.\right.}{\left(b^2-4ac\right)^{3/2}\left(ae^2-bde+cd^2\right)^2}$$
$$+\frac{-x\left(-c(2adh-2aeg+bdg+bef)+bh(bd-ae)+2c^2df\right)-b(adh+aeg+cdf)-2a(-aeh-cdg+cef)+b^2ef}{\left(b^2-4ac\right)\left(a+bx+cx^2\right)\left(ae^2-bde+cd^2\right)}$$
$$-\frac{e\log\left(a+bx+cx^2\right)\left(d^2h-deg+e^2f\right)}{2\left(ae^2-bde+cd^2\right)^2}+\frac{e\log(d+ex)\left(d^2h-deg+e^2f\right)}{\left(ae^2-bde+cd^2\right)^2}$$

```
[Out] (b^2*e*f - b*(c*d*f + a*e*g + a*d*h) - 2*a*(c*e*f - c*d*g - a*e*h
) - (2*c^2*d*f + b*(b*d - a*e)*h - c*(b*e*f + b*d*g - 2*a*e*g + 2
*a*d*h))*x)/((b^2 - 4*a*c)*(c*d^2 - b*d*e + a*e^2)*(a + b*x + c*x
^2)) + ((4*c^3*d^3*f + b*e*(4*a*b*d*e*h - 2*a^2*e^2*h + b^2*(e^2*
f - d*e*g - d^2*h)) - 2*c^2*d*(b*d*(3*e*f + d*g) - 2*a*(3*e^2*f -
 d*e*g + d^2*h)) + 2*c*e*(2*b^2*d^2*g + 2*a^2*e*(e*g - d*h) - a*b
*(3*e^2*f + d*e*g + d^2*h)))*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c
]])/((b^2 - 4*a*c)^(3/2)*(c*d^2 - b*d*e + a*e^2)^2) + (e*(e^2*f -
 d*e*g + d^2*h)*Log[d + e*x])/(c*d^2 - b*d*e + a*e^2)^2 - (e*(e^2
*f - d*e*g + d^2*h)*Log[a + b*x + c*x^2])/(2*(c*d^2 - b*d*e + a*e
^2)^2)
```

Rubi [A] time = 2.51961, antiderivative size = 407, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(2ce\left(2a^2e(eg-dh)-ab\left(d^2h+deg+3e^2f\right)+2b^2d^2g\right)+be\left(-2a^2e^2h+4abdeh+b^2\left(d^2(-h)-deg+e^2\right.\right.\right.}{\left(b^2-4ac\right)^{3/2}\left(ae^2-bde+cd^2\right)^2}$$
$$+\frac{-x\left(-c(2adh-2aeg+bdg+bef)+bh(bd-ae)+2c^2df\right)-b(adh+aeg+cdf)-2a(-aeh-cdg+cef)+b^2ef}{\left(b^2-4ac\right)\left(a+bx+cx^2\right)\left(ae^2-bde+cd^2\right)}$$
$$-\frac{e\log\left(a+bx+cx^2\right)\left(d^2h-deg+e^2f\right)}{2\left(ae^2-bde+cd^2\right)^2}+\frac{e\log(d+ex)\left(d^2h-deg+e^2f\right)}{\left(ae^2-bde+cd^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(f + g*x + h*x^2)/((d + e*x)*(a + b*x + c*x^2)^2),x]
```

```
[Out] (b^2*e*f - b*(c*d*f + a*e*g + a*d*h) - 2*a*(c*e*f - c*d*g - a*e*h
) - (2*c^2*d*f + b*(b*d - a*e)*h - c*(b*e*f + b*d*g - 2*a*e*g + 2
*a*d*h))*x)/((b^2 - 4*a*c)*(c*d^2 - b*d*e + a*e^2)*(a + b*x + c*x
^2)) + ((4*c^3*d^3*f + b*e*(4*a*b*d*e*h - 2*a^2*e^2*h + b^2*(e^2*
f - d*e*g - d^2*h)) - 2*c^2*d*(b*d*(3*e*f + d*g) - 2*a*(3*e^2*f -
```

```
d*e*g + d^2*h)) + 2*c*e*(2*b^2*d^2*g + 2*a^2*e*(e*g - d*h) - a*b
*(3*e^2*f + d*e*g + d^2*h)))*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c
]])/((b^2 - 4*a*c)^(3/2)*(c*d^2 - b*d*e + a*e^2)^2) + (e*(e^2*f -
 d*e*g + d^2*h)*Log[d + e*x])/(c*d^2 - b*d*e + a*e^2)^2 - (e*(e^2
*f - d*e*g + d^2*h)*Log[a + b*x + c*x^2])/(2*(c*d^2 - b*d*e + a*e
^2)^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((h*x**2+g*x+f)/(e*x+d)/(c*x**2+b*x+a)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.96981, size = 405, normalized size = 1.

$$\frac{-2a^2eh+ab(dh+e(g-hx))+2ac(e(f+gx)-d(g+hx))+b^2(dhx-ef)+bc(d(f-gx)-efx)+2c^2dfx}{(b^2-4ac)(a+x(b+cx))(e(bd-ae)-cd^2)}-\frac{\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)\left(2ce\left(2a^2e(dh-eg)+ab\left(d^2h+deg+3e^2f\right)-2b^2d^2g\right)+be\left(2a^2e^2h-4abdeh+b^2\left(d^2h+deg-e^2f\right)\right)\right)}{(4ac-b^2)^{3/2}(e(ae-bd)+cd^2)^2}+\frac{e\log(d+ex)\left(d^2h-deg+e^2f\right)}{(e(ae-bd)+cd^2)^2}-\frac{e\log(a+x(b+cx))\left(d^2h-deg+e^2f\right)}{2\left(e(ae-bd)+cd^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(f + g*x + h*x^2)/((d + e*x)*(a + b*x + c*x^2)^2),x]
```

```
[Out] (-2*a^2*e*h + 2*c^2*d*f*x + b^2*(-(e*f) + d*h*x) + b*c*(-(e*f*x)
+ d*(f - g*x)) + a*b*(d*h + e*(g - h*x)) + 2*a*c*(e*(f + g*x) - d
*(g + h*x)))/((b^2 - 4*a*c)*(-(c*d^2) + e*(b*d - a*e))*(a + x*(b
+ c*x))) - ((-4*c^3*d^3*f + 2*c^2*d*(b*d*(3*e*f + d*g) - 2*a*(3*e
^2*f - d*e*g + d^2*h)) + b*e*(-4*a*b*d*e*h + 2*a^2*e^2*h + b^2*(-
(e^2*f) + d*e*g + d^2*h)) + 2*c*e*(-2*b^2*d^2*g + 2*a^2*e*(-(e*g)
 + d*h) + a*b*(3*e^2*f + d*e*g + d^2*h)))*ArcTan[(b + 2*c*x)/Sqrt
[-b^2 + 4*a*c]])/((-b^2 + 4*a*c)^(3/2)*(c*d^2 + e*(-(b*d) + a*e))
^2) + (e*(e^2*f - d*e*g + d^2*h)*Log[d + e*x])/(c*d^2 + e*(-(b*d)
 + a*e))^2 - (e*(e^2*f - d*e*g + d^2*h)*Log[a + x*(b + c*x)])/(2*
(c*d^2 + e*(-(b*d) + a*e))^2)
```

Maple [B] time = 0.028, size = 4373, normalized size = 10.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x^2+g*x+f)/(e*x+d)/(c*x^2+b*x+a)^2,x)
```

```
[Out] e^3/(a*e^2-b*d*e+c*d^2)^2*ln(e*x+d)*f-1/(a*e^2-b*d*e+c*d^2)^2/(c*
x^2+b*x+a)/(4*a*c-b^2)*a*b^2*d*e^2*g-3/(a*e^2-b*d*e+c*d^2)^2/(c*x
^2+b*x+a)/(4*a*c-b^2)*x*a*b*c*d*e^2*g+1/(a*e^2-b*d*e+c*d^2)^2/(c*
x^2+b*x+a)/(4*a*c-b^2)*x*a*b*c*d^2*e*h-4/(a*e^2-b*d*e+c*d^2)^2/(6
4*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-b
^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)
^(1/2))*a*c^2*d^2*e*g+e/(a*e^2-b*d*e+c*d^2)^2*ln(e*x+d)*d^2*h-e^2
/(a*e^2-b*d*e+c*d^2)^2*ln(e*x+d)*d*g-2/(a*e^2-b*d*e+c*d^2)^2/(c*x
^2+b*x+a)/(4*a*c-b^2)*x*a^2*c*d*e^2*h+1/(a*e^2-b*d*e+c*d^2)^2/(c*
x^2+b*x+a)/(4*a*c-b^2)*x*b^2*c*d*e^2*f-3/(a*e^2-b*d*e+c*d^2)^2/(c
*x^2+b*x+a)/(4*a*c-b^2)*x*b*c^2*d^2*e*f+3/(a*e^2-b*d*e+c*d^2)^2/(
c*x^2+b*x+a)/(4*a*c-b^2)*a*b*c*d^2*e*g-1/(a*e^2-b*d*e+c*d^2)^2/(c
*x^2+b*x+a)/(4*a*c-b^2)*a*b*c*d*e^2*f-2/(a*e^2-b*d*e+c*d^2)^2/(64
*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-b^
2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^
(1/2))*a*b*c*d^2*e*h-2/(a*e^2-b*d*e+c*d^2)^2/(64*a^3*c^3-48*a^2*b
^2*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2
)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*a*b*c*d*e^
2*g+2/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*x*a*b^2*d*e
^2*h-1/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*x*a*b*c*e^
3*f+2/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*x*a*c^2*d^2
*e*g+2/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*x*a*c^2*d*
e^2*f+1/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*x*b^2*c*d
^2*e*g+1/2/(a*e^2-b*d*e+c*d^2)^2/(4*a*c-b^2)*ln((4*a*c-b^2)*(c*x^
2+b*x+a))*b^2*d^2*e*h+4/(a*e^2-b*d*e+c*d^2)^2/(64*a^3*c^3-48*a^2*
b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^
2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*a*c^2*d^3
*h-1/(a*e^2-b*d*e+c*d^2)^2/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-
b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-4
8*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*b^3*d^2*e*h-2/(a*e^2-b*d*e+c
*d^2)^2/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((
2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*
b^4*c-b^6)^(1/2))*a^2*b*e^3*h+4/(a*e^2-b*d*e+c*d^2)^2/(64*a^3*c^3
-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(
4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*a
^2*c*e^3*g-2/(a*e^2-b*d*e+c*d^2)^2/(64*a^3*c^3-48*a^2*b^2*c^2+12*
a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a
^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*b*c^2*d^3*g-4/(a*e^2
-b*d*e+c*d^2)^2/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*
arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*b^2*c
^2+12*a*b^4*c-b^6)^(1/2))*a^2*c*d*e^2*h+4/(a*e^2-b*d*e+c*d^2)^2/(
64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-
```

```
b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6
)^(1/2))*a*b^2*d*e^2*h-6/(a*e^2-b*d*e+c*d^2)^2/(64*a^3*c^3-48*a^2
*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b
^2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*a*b*c*e^
3*f-6/(a*e^2-b*d*e+c*d^2)^2/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c
-b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-
48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*b*c^2*d^2*e*f+1/(a*e^2-b*d*
e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*a*b*c*d^3*h+2/(a*e^2-b*d*e+c
*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*a*c^2*d^2*e*f+2/(a*e^2-b*d*e+c*
d^2)^2/(4*a*c-b^2)*c*ln((4*a*c-b^2)*(c*x^2+b*x+a))*a*d*e^2*g-2/(a
*e^2-b*d*e+c*d^2)^2/(4*a*c-b^2)*c*ln((4*a*c-b^2)*(c*x^2+b*x+a))*a
*d^2*e*h-2/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*a^2*c*
d*e^2*g-1/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*a*b^2*d
^2*e*h-2/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*x*a*c^2*
d^3*h-1/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*x*b^3*d^2
*e*h+1/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*x*b^2*c*d^
3*h+12/(a*e^2-b*d*e+c*d^2)^2/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*
c-b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3
-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*a*c^2*d*e^2*f+4/(a*e^2-b*d
*e+c*d^2)^2/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arct
an((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+1
2*a*b^4*c-b^6)^(1/2))*b^2*c*d^2*e*g+2/(a*e^2-b*d*e+c*d^2)^2/(c*x^
2+b*x+a)/(4*a*c-b^2)*x*a^2*c*e^3*g-1/(a*e^2-b*d*e+c*d^2)^2/(c*x^2
+b*x+a)/(4*a*c-b^2)*x*a^2*b*e^3*h-2/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+
b*x+a)/(4*a*c-b^2)*a^2*c*d^2*e*h-1/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+b
*x+a)/(4*a*c-b^2)*x*b*c^2*d^3*g-2/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+b*
x+a)/(4*a*c-b^2)*b^2*c*d^2*e*f+3/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+b*x
+a)/(4*a*c-b^2)*a^2*b*d*e^2*h-2/(a*e^2-b*d*e+c*d^2)^2/(c*x^2+b*x+
a)/(4*a*c-b^2)*a^3*e^3*h+4/(a*e^2-b*d*e+c*d^2)^2/(64*a^3*c^3-48*a
^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c
-b^2)*b)/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*c^3*d^
3*f+1/2/(a*e^2-b*d*e+c*d^2)^2/(4*a*c-b^2)*ln((4*a*c-b^2)*(c*x^2+b
*x+a))*b^2*e^3*f+1/(a*e^2-b*d*e+c*d^2)^2/(64*a^3*c^3-48*a^2*b^2*c
^2+12*a*b^4*c-b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)
/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*b^3*e^3*f-1/(a
*e^2-b*d*e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*a*b^2*e^3*f+2/(a*e^
2-b*d*e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*x*c^3*d^3*f-2/(a*e^2-b
*d*e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*a*c^2*d^3*g+1/(a*e^2-b*d*
e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*b^3*d*e^2*f+1/(a*e^2-b*d*e+c
*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*b*c^2*d^3*f-1/2/(a*e^2-b*d*e+c*
d^2)^2/(4*a*c-b^2)*ln((4*a*c-b^2)*(c*x^2+b*x+a))*b^2*d*e^2*g-2/(a
*e^2-b*d*e+c*d^2)^2/(4*a*c-b^2)*c*ln((4*a*c-b^2)*(c*x^2+b*x+a))*a
*e^3*f-1/(a*e^2-b*d*e+c*d^2)^2/(64*a^3*c^3-48*a^2*b^2*c^2+12*a*b^
4*c-b^6)^(1/2)*arctan((2*(4*a*c-b^2)*c*x+(4*a*c-b^2)*b)/(64*a^3*c
^3-48*a^2*b^2*c^2+12*a*b^4*c-b^6)^(1/2))*b^3*d*e^2*g+1/(a*e^2-b*d
*e+c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*a^2*b*e^3*g+2/(a*e^2-b*d*e+
c*d^2)^2/(c*x^2+b*x+a)/(4*a*c-b^2)*a^2*c*e^3*f
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)/((c*x^2 + b*x + a)^2*(e*x + d)),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((h*x^2 + g*x + f)/((c*x^2 + b*x + a)^2*(e*x + d)),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((h*x**2+g*x+f)/(e*x+d)/(c*x**2+b*x+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.280938, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)/((c*x^2 + b*x + a)^2*(e*x + d)),x, algorithm="giac")
```

```
[Out] Done
```

3.159 $\int \frac{f+gx+hx^2}{(d+ex)^2(a+bx+cx^2)^2}\,dx$

Optimal. Leaf size=673

$$-\frac{cx\left(2a^2e^2h-c\left(2a\left(d^2h-2deg+e^2f\right)+bd(dg+2ef)\right)-abe(2dh+eg)+b^2\left(d^2h+e^2f\right)+2c^2d^2f\right)+b\left(a^2e^2h-ac\left(d^2(\right.\right.}{(b^2-4ac)\left(a+bx+cx^2\right)\left(ae^2-bde\right.}$$
$$+\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(-6c^2e\left(2a^2e\left(2d^2h-2deg+e^2f\right)+4abde^2f-b^2d^3g\right)-ce\left(-4a^3e^3h+6a^2be^3g-6ab^2e\left(2d^2h-deg+\right.\right.\right.}{(b^2-4a}$$
$$+\frac{e\log\left(a+bx+cx^2\right)\left(e^2(2adh-aeg-bdg+2bef)-cd\left(2d^2h-3deg+4e^2f\right)\right)}{2\left(ae^2-bde+cd^2\right)^3}$$
$$-\frac{e\left(d^2h-deg+e^2f\right)}{(d+ex)\left(ae^2-bde+cd^2\right)^2}-\frac{e\log(d+ex)\left(e^2(2adh-aeg-bdg+2bef)-cd\left(2d^2h-3deg+4e^2f\right)\right)}{\left(ae^2-bde+cd^2\right)^3}$$

```
[Out] -((e*(e^2*f - d*e*g + d^2*h))/((c*d^2 - b*d*e + a*e^2)^2*(d + e*x
))) - (b^3*e^2*f - b^2*e*(2*c*d*f + a*e*g) + 2*a*c*(c*d*(2*e*f -
d*g) + a*e*(e*g - 2*d*h)) + b*(c^2*d^2*f + a^2*e^2*h - a*c*(3*e^2
*f - 2*d*e*g - d^2*h)) + c*(2*c^2*d^2*f + 2*a^2*e^2*h - a*b*e*(e*
g + 2*d*h) + b^2*(e^2*f + d^2*h) - c*(b*d*(2*e*f + d*g) + 2*a*(e^
2*f - 2*d*e*g + d^2*h)))*x)/((b^2 - 4*a*c)*(c*d^2 - b*d*e + a*e^2
)^2*(a + b*x + c*x^2)) + ((4*c^4*d^4*f - b^3*e^3*(2*b*e*f - b*d*g
 - a*e*g + 2*a*d*h) - 2*c^3*d^2*(b*d*(4*e*f + d*g) - 2*a*(6*e^2*f
 - 2*d*e*g + d^2*h)) - 6*c^2*e*(4*a*b*d*e^2*f - b^2*d^3*g + 2*a^2
*e*(e^2*f - 2*d*e*g + 2*d^2*h)) - c*e*(6*a^2*b*e^3*g - 4*a^3*e^3*
h - b^3*d*(4*e^2*f - 3*d*e*g - 2*d^2*h) - 6*a*b^2*e*(2*e^2*f - d*
e*g + 2*d^2*h)))*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/((b^2 -
4*a*c)^(3/2)*(c*d^2 - b*d*e + a*e^2)^3) - (e*(e^2*(2*b*e*f - b*d*
g - a*e*g + 2*a*d*h) - c*d*(4*e^2*f - 3*d*e*g + 2*d^2*h))*Log[d +
 e*x])/(c*d^2 - b*d*e + a*e^2)^3 + (e*(e^2*(2*b*e*f - b*d*g - a*e
*g + 2*a*d*h) - c*d*(4*e^2*f - 3*d*e*g + 2*d^2*h))*Log[a + b*x +
c*x^2])/(2*(c*d^2 - b*d*e + a*e^2)^3)
```

Rubi [A] time = 8.60188, antiderivative size = 673, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$-\frac{cx\left(2a^2e^2h-c\left(2a\left(d^2h-2deg+e^2f\right)+bd(dg+2ef)\right)-abe(2dh+eg)+b^2\left(d^2h+e^2f\right)+2c^2d^2f\right)+b\left(a^2e^2h-ac\left(d^2(\right.\right.}{(b^2-4ac)\left(a+bx+cx^2\right)\left(ae^2-bde\right.}$$
$$+\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(-6c^2e\left(2a^2e\left(2d^2h-2deg+e^2f\right)+4abde^2f-b^2d^3g\right)-ce\left(-4a^3e^3h+6a^2be^3g-6ab^2e\left(2d^2h-deg+\right.\right.\right.}{(b^2-4a}$$
$$+\frac{e\log\left(a+bx+cx^2\right)\left(e^2(2adh-aeg-bdg+2bef)-cd\left(2d^2h-3deg+4e^2f\right)\right)}{2\left(ae^2-bde+cd^2\right)^3}$$
$$-\frac{e\left(d^2h-deg+e^2f\right)}{(d+ex)\left(ae^2-bde+cd^2\right)^2}-\frac{e\log(d+ex)\left(e^2(2adh-aeg-bdg+2bef)-cd\left(2d^2h-3deg+4e^2f\right)\right)}{\left(ae^2-bde+cd^2\right)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(f + g*x + h*x^2)/((d + e*x)^2*(a + b*x + c*x^2)^2),x]
```

```
[Out] -((e*(e^2*f - d*e*g + d^2*h))/((c*d^2 - b*d*e + a*e^2)^2*(d + e*x
))) - (b^3*e^2*f - b^2*e*(2*c*d*f + a*e*g) + 2*a*c*(c*d*(2*e*f -
d*g) + a*e*(e*g - 2*d*h)) + b*(c^2*d^2*f + a^2*e^2*h - a*c*(3*e^2
*f - 2*d*e*g - d^2*h)) + c*(2*c^2*d^2*f + 2*a^2*e^2*h - a*b*e*(e*
g + 2*d*h) + b^2*(e^2*f + d^2*h) - c*(b*d*(2*e*f + d*g) + 2*a*(e^
2*f - 2*d*e*g + d^2*h)))*x)/((b^2 - 4*a*c)*(c*d^2 - b*d*e + a*e^2
)^2*(a + b*x + c*x^2)) + ((4*c^4*d^4*f - b^3*e^3*(2*b*e*f - b*d*g
 - a*e*g + 2*a*d*h) - 2*c^3*d^2*(b*d*(4*e*f + d*g) - 2*a*(6*e^2*f
 - 2*d*e*g + d^2*h)) - 6*c^2*e*(4*a*b*d*e^2*f - b^2*d^3*g + 2*a^2
*e*(e^2*f - 2*d*e*g + 2*d^2*h)) - c*e*(6*a^2*b*e^3*g - 4*a^3*e^3*
h - b^3*d*(4*e^2*f - 3*d*e*g - 2*d^2*h) - 6*a*b^2*e*(2*e^2*f - d*
e*g + 2*d^2*h)))*ArcTanh[(b + 2*c*x)/Sqrt[b^2 - 4*a*c]])/((b^2 -
4*a*c)^(3/2)*(c*d^2 - b*d*e + a*e^2)^3) - (e*(e^2*(2*b*e*f - b*d*
g - a*e*g + 2*a*d*h) - c*d*(4*e^2*f - 3*d*e*g + 2*d^2*h))*Log[d +
 e*x])/(c*d^2 - b*d*e + a*e^2)^3 + (e*(e^2*(2*b*e*f - b*d*g - a*e
*g + 2*a*d*h) - c*d*(4*e^2*f - 3*d*e*g + 2*d^2*h))*Log[a + b*x +
c*x^2])/(2*(c*d^2 - b*d*e + a*e^2)^3)
```

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((h*x**2+g*x+f)/(e*x+d)**2/(c*x**2+b*x+a)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 4.70083, size = 650, normalized size = 0.97

$$\frac{b\left(-a^2e^2h+ac\left(d^2(-h)-2de(g-hx)+e^2(3f+gx)\right)+c^2d(-df+dgx+2efx)\right)+2c\left(a^2(-e)(e(g+hx)-2dh)+ac\left(d^2(g+\right.\right.}{\left(b^2-4ac\right)\left(a+x(b+cx)\right)\left(e(ae-bd)+\right.}$$

$$-\frac{\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)\left(-6c^2e\left(2a^2e\left(2d^2h-2deg+e^2f\right)+4abde^2f-b^2d^3g\right)+ce\left(4a^3e^3h-6a^2be^3g+6ab^2e\left(2d^2h-deg+2e\right.\right.\right.}{\left(4ac-b^2\right)^3}$$

$$-\frac{e\left(d^2h-deg+e^2f\right)}{(d+ex)\left(e(ae-bd)+cd^2\right)^2}+\frac{\log(d+ex)\left(e^3(-2adh+aeg+bdg-2bef)+cde\left(2d^2h-3deg+4e^2f\right)\right)}{\left(e(ae-bd)+cd^2\right)^3}$$

$$-\frac{\log(a+x(b+cx))\left(e^3(-2adh+aeg+bdg-2bef)+cde\left(2d^2h-3deg+4e^2f\right)\right)}{2\left(e(ae-bd)+cd^2\right)^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(f + g*x + h*x^2)/((d + e*x)^2*(a + b*x + c*x^2)^2),x]
```

```
[Out] -((e*(e^2*f - d*e*g + d^2*h))/((c*d^2 + e*(-(b*d) + a*e))^2*(d +
e*x))) + (-(b^3*e^2*f) + b^2*(a*e^2*g - c*(-2*d*e*f + e^2*f*x + d
^2*h*x)) + b*(-(a^2*e^2*h) + c^2*d*(-(d*f) + 2*e*f*x + d*g*x) + a
*c*(-(d^2*h) + e^2*(3*f + g*x) - 2*d*e*(g - h*x))) + 2*c*(-(c^2*d
^2*f*x) + a*c*(e^2*f*x - 2*d*e*(f + g*x) + d^2*(g + h*x)) - a^2*e
*(-2*d*h + e*(g + h*x))))/((b^2 - 4*a*c)*(c*d^2 + e*(-(b*d) + a*e
))^2*(a + x*(b + c*x))) - ((4*c^4*d^4*f + b^3*e^3*(-2*b*e*f + b*d
*g + a*e*g - 2*a*d*h) - 2*c^3*d^2*(b*d*(4*e*f + d*g) - 2*a*(6*e^2
*f - 2*d*e*g + d^2*h)) - 6*c^2*e*(4*a*b*d*e^2*f - b^2*d^3*g + 2*a
^2*e*(e^2*f - 2*d*e*g + 2*d^2*h)) + c*e*(-6*a^2*b*e^3*g + 4*a^3*e
^3*h + b^3*d*(4*e^2*f - 3*d*e*g - 2*d^2*h) + 6*a*b^2*e*(2*e^2*f -
 d*e*g + 2*d^2*h)))*ArcTan[(b + 2*c*x)/Sqrt[-b^2 + 4*a*c]])/((-b^
2 + 4*a*c)^(3/2)*(-(c*d^2) + e*(b*d - a*e))^3) + ((e^3*(-2*b*e*f
+ b*d*g + a*e*g - 2*a*d*h) + c*d*e*(4*e^2*f - 3*d*e*g + 2*d^2*h))
*Log[d + e*x])/(c*d^2 + e*(-(b*d) + a*e))^3 - ((e^3*(-2*b*e*f + b
*d*g + a*e*g - 2*a*d*h) + c*d*e*(4*e^2*f - 3*d*e*g + 2*d^2*h))*Lo
g[a + x*(b + c*x)])/(2*(c*d^2 + e*(-(b*d) + a*e))^3)
```

Maple [B] time = 0.04, size = 6365, normalized size = 9.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x^2+g*x+f)/(e*x+d)^2/(c*x^2+b*x+a)^2,x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)/((c*x^2 + b*x + a)^2*(e*x + d)^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((h*x^2 + g*x + f)/((c*x^2 + b*x + a)^2*(e*x + d)^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((h*x**2+g*x+f)/(e*x+d)**2/(c*x**2+b*x+a)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.318709, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^2 + g*x + f)/((c*x^2 + b*x + a)^2*(e*x + d)^2),x, algorithm="giac")
```

```
[Out] Done
```

3.160 $\int \frac{x^3(1+x+x^2)}{(1-x+x^2)^2} dx$

Optimal. Leaf size=62

$$\frac{x^2}{2}+\frac{2(2-x)}{3(x^2-x+1)}+2\log(x^2-x+1)+3x+\frac{10\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}$$

```
[Out] 3*x + x^2/2 + (2*(2 - x))/(3*(1 - x + x^2)) + (10*ArcTan[(1 - 2*x
)/Sqrt[3]])/(3*Sqrt[3]) + 2*Log[1 - x + x^2]
```

Rubi [A] time = 0.13071, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3

$$\frac{x^2}{2}+\frac{2(2-x)}{3(x^2-x+1)}+2\log(x^2-x+1)+3x+\frac{10\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^3*(1 + x + x^2))/(1 - x + x^2)^2,x]
```

```
[Out] 3*x + x^2/2 + (2*(2 - x))/(3*(1 - x + x^2)) + (10*ArcTan[(1 - 2*x
)/Sqrt[3]])/(3*Sqrt[3]) + 2*Log[1 - x + x^2]
```

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

$$3x+\frac{2(-x+2)}{3(x^2-x+1)}+2\log(x^2-x+1)-\frac{10\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2x}{3}-\frac{1}{3}\right)\right)}{9}+\int x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**3*(x**2+x+1)/(x**2-x+1)**2,x)
```

```
[Out] 3*x + 2*(-x + 2)/(3*(x**2 - x + 1)) + 2*log(x**2 - x + 1) - 10*sq
rt(3)*atan(sqrt(3)*(2*x/3 - 1/3))/9 + Integral(x, x)
```

Mathematica [A] time = 0.0582107, size = 60, normalized size = 0.97

$$\frac{x^2}{2}-\frac{2(x-2)}{3\left(x^2-x+1\right)}+2\log\left(x^2-x+1\right)+3x-\frac{10\tan^{-1}\left(\frac{2x-1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^3*(1 + x + x^2))/(1 - x + x^2)^2,x]
```

```
[Out] 3*x + x^2/2 - (2*(-2 + x))/(3*(1 - x + x^2)) - (10*ArcTan[(-1 + 2
*x)/Sqrt[3]])/(3*Sqrt[3]) + 2*Log[1 - x + x^2]
```

Maple [A] time = 0.012, size = 53, normalized size = 0.9

$$\frac{x^2}{2}+3\,x+\frac{1}{x^2-x+1}\left(-\frac{2\,x}{3}+\frac{4}{3}\right)+2\,\ln\left(x^2-x+1\right)-\frac{10\,\sqrt{3}}{9}\arctan\left(\frac{(2\,x-1)\,\sqrt{3}}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^3*(x^2+x+1)/(x^2-x+1)^2,x)
```

```
[Out] 1/2*x^2+3*x+(-2/3*x+4/3)/(x^2-x+1)+2*ln(x^2-x+1)-10/9*3^(1/2)*arc
tan(1/3*(2*x-1)*3^(1/2))
```

Maxima [A] time = 0.763416, size = 69, normalized size = 1.11

$$\frac{1}{2}\,x^2-\frac{10}{9}\,\sqrt{3}\arctan\left(\frac{1}{3}\,\sqrt{3}(2\,x-1)\right)+3\,x-\frac{2\,(x-2)}{3\,(x^2-x+1)}+2\,\log\left(x^2-x+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x^3/(x^2 - x + 1)^2,x, algorithm="maxima")
```

```
[Out] 1/2*x^2 - 10/9*sqrt(3)*arctan(1/3*sqrt(3)*(2*x - 1)) + 3*x - 2/3*
(x - 2)/(x^2 - x + 1) + 2*log(x^2 - x + 1)
```

Fricas [A] time = 0.282202, size = 112, normalized size = 1.81

$$\frac{\sqrt{3}\left(12\,\sqrt{3}\left(x^2-x+1\right)\,\log\left(x^2-x+1\right)-20\,\left(x^2-x+1\right)\,\arctan\left(\frac{1}{3}\,\sqrt{3}(2\,x-1)\right)+\sqrt{3}\left(3\,x^4+15\,x^3-15\,x^2+14\,x+8\right)\right)}{18\,\left(x^2-x+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x^3/(x^2 - x + 1)^2,x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(12*sqrt(3)*(x^2 - x + 1)*log(x^2 - x + 1) - 20*(x^2
 - x + 1)*arctan(1/3*sqrt(3)*(2*x - 1)) + sqrt(3)*(3*x^4 + 15*x^3
 - 15*x^2 + 14*x + 8))/(x^2 - x + 1)
```

Sympy [A] time = 0.173116, size = 60, normalized size = 0.97

$$\frac{x^2}{2} + 3x - \frac{2x-4}{3x^2-3x+3} + 2\log\left(x^2-x+1\right) - \frac{10\sqrt{3}\operatorname{atan}\left(\frac{2\sqrt{3}x}{3} - \frac{\sqrt{3}}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**3*(x**2+x+1)/(x**2-x+1)**2,x)
```

```
[Out] x**2/2 + 3*x - (2*x - 4)/(3*x**2 - 3*x + 3) + 2*log(x**2 - x + 1)
 - 10*sqrt(3)*atan(2*sqrt(3)*x/3 - sqrt(3)/3)/9
```

GIAC/XCAS [A] time = 0.27432, size = 69, normalized size = 1.11

$$\frac{1}{2}\,x^2 - \frac{10}{9}\,\sqrt{3}\arctan\left(\frac{1}{3}\,\sqrt{3}(2\,x-1)\right) + 3\,x - \frac{2\,(x-2)}{3\,(x^2-x+1)} + 2\ln\left(x^2-x+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x^3/(x^2 - x + 1)^2,x, algorithm="giac")
```

```
[Out] 1/2*x^2 - 10/9*sqrt(3)*arctan(1/3*sqrt(3)*(2*x - 1)) + 3*x - 2/3*
(x - 2)/(x^2 - x + 1) + 2*ln(x^2 - x + 1)
```

3.161 $\int \frac{x^2(1+x+x^2)}{(1-x+x^2)^2}\,dx$

Optimal. Leaf size=55

$$\frac{2(1-2x)}{3(x^2-x+1)}+\frac{3}{2}\log\left(x^2-x+1\right)+x-\frac{7\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}$$

```
[Out] x + (2*(1 - 2*x))/(3*(1 - x + x^2)) - (7*ArcTan[(1 - 2*x)/Sqrt[3]
])/(3*Sqrt[3]) + (3*Log[1 - x + x^2])/2
```

Rubi [A] time = 0.11515, antiderivative size = 55, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3

$$\frac{2(1-2x)}{3(x^2-x+1)}+\frac{3}{2}\log\left(x^2-x+1\right)+x-\frac{7\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*(1 + x + x^2))/(1 - x + x^2)^2,x]
```

```
[Out] x + (2*(1 - 2*x))/(3*(1 - x + x^2)) - (7*ArcTan[(1 - 2*x)/Sqrt[3]
])/(3*Sqrt[3]) + (3*Log[1 - x + x^2])/2
```

Rubi in Sympy [A] time = 16.7961, size = 51, normalized size = 0.93

$$x+\frac{2(-2x+1)}{3(x^2-x+1)}+\frac{3\log\left(x^2-x+1\right)}{2}+\frac{7\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2x}{3}-\frac{1}{3}\right)\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x**2*(x**2+x+1)/(x**2-x+1)**2,x)
```

```
[Out] x + 2*(-2*x + 1)/(3*(x**2 - x + 1)) + 3*log(x**2 - x + 1)/2 + 7*s
qrt(3)*atan(sqrt(3)*(2*x/3 - 1/3))/9
```

Mathematica [A] time = 0.0441525, size = 55, normalized size = 1.

$$-\frac{2(2x-1)}{3(x^2-x+1)}+\frac{3}{2}\log\left(x^2-x+1\right)+x+\frac{7\tan^{-1}\left(\frac{2x-1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*(1 + x + x^2))/(1 - x + x^2)^2,x]
```

```
[Out] x - (2*(-1 + 2*x))/(3*(1 - x + x^2)) + (7*ArcTan[(-1 + 2*x)/Sqrt[
3]])/(3*Sqrt[3]) + (3*Log[1 - x + x^2])/2
```

Maple [A] time = 0.008, size = 46, normalized size = 0.8

$$x+\frac{1}{x^2-x+1}\left(-\frac{4x}{3}+\frac{2}{3}\right)+\frac{3\ln\left(x^2-x+1\right)}{2}+\frac{7\sqrt{3}}{9}\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(x^2+x+1)/(x^2-x+1)^2,x)
```

```
[Out] x+(-4/3*x+2/3)/(x^2-x+1)+3/2*ln(x^2-x+1)+7/9*3^(1/2)*arctan(1/3*(
2*x-1)*3^(1/2))
```

Maxima [A] time = 0.765918, size = 62, normalized size = 1.13

$$\frac{7}{9}\sqrt{3}\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+x-\frac{2(2x-1)}{3(x^2-x+1)}+\frac{3}{2}\log\left(x^2-x+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x^2/(x^2 - x + 1)^2,x, algorithm="maxima")
```

```
[Out] 7/9*sqrt(3)*arctan(1/3*sqrt(3)*(2*x - 1)) + x - 2/3*(2*x - 1)/(x^
2 - x + 1) + 3/2*log(x^2 - x + 1)
```

Fricas [A] time = 0.280615, size = 107, normalized size = 1.95

$$\frac{\sqrt{3}\left(9\sqrt{3}\left(x^2-x+1\right)\log\left(x^2-x+1\right)+14\left(x^2-x+1\right)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+2\sqrt{3}\left(3x^3-3x^2-x+2\right)\right)}{18\left(x^2-x+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x^2/(x^2 - x + 1)^2,x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(9*sqrt(3)*(x^2 - x + 1)*log(x^2 - x + 1) + 14*(x^2
- x + 1)*arctan(1/3*sqrt(3)*(2*x - 1)) + 2*sqrt(3)*(3*x^3 - 3*x^2
 - x + 2))/(x^2 - x + 1)
```

Sympy [A] time = 0.170472, size = 54, normalized size = 0.98

$$x - \frac{4x - 2}{3x^2 - 3x + 3} + \frac{3\log\left(x^2 - x + 1\right)}{2} + \frac{7\sqrt{3}\,\mathrm{atan}\left(\frac{2\sqrt{3}x}{3} - \frac{\sqrt{3}}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(x**2+x+1)/(x**2-x+1)**2,x)
```

```
[Out] x - (4*x - 2)/(3*x**2 - 3*x + 3) + 3*log(x**2 - x + 1)/2 + 7*sqrt
(3)*atan(2*sqrt(3)*x/3 - sqrt(3)/3)/9
```

GIAC/XCAS [A] time = 0.273522, size = 62, normalized size = 1.13

$$\frac{7}{9}\sqrt{3}\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + x - \frac{2(2x - 1)}{3(x^2 - x + 1)} + \frac{3}{2}\ln\left(x^2 - x + 1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x^2/(x^2 - x + 1)^2,x, algorithm="giac")
```

```
[Out] 7/9*sqrt(3)*arctan(1/3*sqrt(3)*(2*x - 1)) + x - 2/3*(2*x - 1)/(x^
2 - x + 1) + 3/2*ln(x^2 - x + 1)
```

3.162 $\int \frac{x(1+x+x^2)}{(1-x+x^2)^2} \, dx$

Optimal. Leaf size=52

$$-\frac{2(x+1)}{3(x^2-x+1)}+\frac{1}{2}\log\left(x^2-x+1\right)-\frac{11\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}$$

```
[Out] (-2*(1 + x))/(3*(1 - x + x^2)) - (11*ArcTan[(1 - 2*x)/Sqrt[3]])/(
3*Sqrt[3]) + Log[1 - x + x^2]/2
```

Rubi [A] time = 0.078177, antiderivative size = 52, 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

$$-\frac{2(x+1)}{3(x^2-x+1)}+\frac{1}{2}\log\left(x^2-x+1\right)-\frac{11\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*(1 + x + x^2))/(1 - x + x^2)^2,x]
```

```
[Out] (-2*(1 + x))/(3*(1 - x + x^2)) - (11*ArcTan[(1 - 2*x)/Sqrt[3]])/(
3*Sqrt[3]) + Log[1 - x + x^2]/2
```

Rubi in Sympy [A] time = 16.2183, size = 48, normalized size = 0.92

$$-\frac{2(x+1)}{3(x^2-x+1)}+\frac{\log\left(x^2-x+1\right)}{2}+\frac{11\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2x}{3}-\frac{1}{3}\right)\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(x**2+x+1)/(x**2-x+1)**2,x)
```

```
[Out] -2*(x + 1)/(3*(x**2 - x + 1)) + log(x**2 - x + 1)/2 + 11*sqrt(3)*
atan(sqrt(3)*(2*x/3 - 1/3))/9
```

Mathematica [A] time = 0.0316274, size = 52, normalized size = 1.

$$-\frac{2(x+1)}{3(x^2-x+1)}+\frac{1}{2}\log\left(x^2-x+1\right)+\frac{11\tan^{-1}\left(\frac{2x-1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x*(1 + x + x^2))/(1 - x + x^2)^2,x]
```

```
[Out] (-2*(1 + x))/(3*(1 - x + x^2)) + (11*ArcTan[(-1 + 2*x)/Sqrt[3]])/
(3*Sqrt[3]) + Log[1 - x + x^2]/2
```

Maple [A] time = 0.007, size = 45, normalized size = 0.9

$$\frac{1}{x^2-x+1}\left(-\frac{2x}{3}-\frac{2}{3}\right)+\frac{\ln\left(x^2-x+1\right)}{2}+\frac{11\sqrt{3}}{9}\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(x^2+x+1)/(x^2-x+1)^2,x)
```

```
[Out] (-2/3*x-2/3)/(x^2-x+1)+1/2*ln(x^2-x+1)+11/9*3^(1/2)*arctan(1/3*(2
*x-1)*3^(1/2))
```

Maxima [A] time = 0.756971, size = 58, normalized size = 1.12

$$\frac{11}{9}\sqrt{3}\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)-\frac{2(x+1)}{3(x^2-x+1)}+\frac{1}{2}\log\left(x^2-x+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x/(x^2 - x + 1)^2,x, algorithm="maxima")
```

```
[Out] 11/9*sqrt(3)*arctan(1/3*sqrt(3)*(2*x - 1)) - 2/3*(x + 1)/(x^2 - x
 + 1) + 1/2*log(x^2 - x + 1)
```

Fricas [A] time = 0.278082, size = 90, normalized size = 1.73

$$\frac{\sqrt{3}\left(3\sqrt{3}(x^2-x+1)\log\left(x^2-x+1\right)+22\left(x^2-x+1\right)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)-4\sqrt{3}(x+1)\right)}{18\left(x^2-x+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x/(x^2 - x + 1)^2,x, algorithm="fricas")
```

```
[Out] 1/18*sqrt(3)*(3*sqrt(3)*(x^2 - x + 1)*log(x^2 - x + 1) + 22*(x^2
- x + 1)*arctan(1/3*sqrt(3)*(2*x - 1)) - 4*sqrt(3)*(x + 1))/(x^2
- x + 1)
```

Sympy [A] time = 0.163915, size = 51, normalized size = 0.98

$$-\frac{2x+2}{3x^2-3x+3}+\frac{\log\left(x^2-x+1\right)}{2}+\frac{11\sqrt{3}\,\mathrm{atan}\left(\frac{2\sqrt{3}x}{3}-\frac{\sqrt{3}}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x*(x**2+x+1)/(x**2-x+1)**2,x)
```

```
[Out] -(2*x + 2)/(3*x**2 - 3*x + 3) + log(x**2 - x + 1)/2 + 11*sqrt(3)*
atan(2*sqrt(3)*x/3 - sqrt(3)/3)/9
```

GIAC/XCAS [A] time = 0.272948, size = 58, normalized size = 1.12

$$\frac{11}{9}\sqrt{3}\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)-\frac{2(x+1)}{3(x^2-x+1)}+\frac{1}{2}\ln\left(x^2-x+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)*x/(x^2 - x + 1)^2,x, algorithm="giac")
```

```
[Out] 11/9*sqrt(3)*arctan(1/3*sqrt(3)*(2*x - 1)) - 2/3*(x + 1)/(x^2 - x
 + 1) + 1/2*ln(x^2 - x + 1)
```

3.163 $\int \frac{1+x+x^2}{(1-x+x^2)^2} \, dx$

Optimal. Leaf size=41

$$-\frac{2(2-x)}{3(x^2-x+1)} - \frac{10\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}$$

```
[Out] (-2*(2 - x))/(3*(1 - x + x^2)) - (10*ArcTan[(1 - 2*x)/Sqrt[3]])/(
3*Sqrt[3])
```

Rubi [A] time = 0.0469793, antiderivative size = 41, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 17, $\frac{\text{number of rules}}{\text{integrand size}} = 0.235$

$$-\frac{2(2-x)}{3(x^2-x+1)} - \frac{10\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In] Int[(1 + x + x^2)/(1 - x + x^2)^2,x]
```

```
[Out] (-2*(2 - x))/(3*(1 - x + x^2)) - (10*ArcTan[(1 - 2*x)/Sqrt[3]])/(
3*Sqrt[3])
```

Rubi in Sympy [A] time = 7.27273, size = 37, normalized size = 0.9

$$-\frac{-2x+4}{3(x^2-x+1)} + \frac{10\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2x}{3}-\frac{1}{3}\right)\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((x**2+x+1)/(x**2-x+1)**2,x)
```

```
[Out] -(-2*x + 4)/(3*(x**2 - x + 1)) + 10*sqrt(3)*atan(sqrt(3)*(2*x/3 -
 1/3))/9
```

Mathematica [A] time = 0.0343908, size = 39, normalized size = 0.95

$$\frac{2(x-2)}{3(x^2-x+1)}+\frac{10\tan^{-1}\left(\frac{2x-1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + x + x^2)/(1 - x + x^2)^2,x]
```

```
[Out] (2*(-2 + x))/(3*(1 - x + x^2)) + (10*ArcTan[(-1 + 2*x)/Sqrt[3]])/
(3*Sqrt[3])
```

Maple [A] time = 0.007, size = 34, normalized size = 0.8

$$\frac{1}{x^2-x+1}\left(\frac{2x}{3}-\frac{4}{3}\right)+\frac{10\sqrt{3}}{9}\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+x+1)/(x^2-x+1)^2,x)
```

```
[Out] (2/3*x-4/3)/(x^2-x+1)+10/9*3^(1/2)*arctan(1/3*(2*x-1)*3^(1/2))
```

Maxima [A] time = 0.763527, size = 43, normalized size = 1.05

$$\frac{10}{9}\sqrt{3}\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\frac{2(x-2)}{3(x^2-x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/(x^2 - x + 1)^2,x, algorithm="maxima")
```

```
[Out] 10/9*sqrt(3)*arctan(1/3*sqrt(3)*(2*x - 1)) + 2/3*(x - 2)/(x^2 - x
 + 1)
```

Fricas [A] time = 0.275302, size = 59, normalized size = 1.44

$$\frac{2\sqrt{3}\left(5\left(x^2-x+1\right)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\sqrt{3}(x-2)\right)}{9(x^2-x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/(x^2 - x + 1)^2,x, algorithm="fricas")
```

```
[Out] 2/9*sqrt(3)*(5*(x^2 - x + 1)*arctan(1/3*sqrt(3)*(2*x - 1)) + sqrt
(3)*(x - 2))/(x^2 - x + 1)
```

Sympy [A] time = 0.147966, size = 41, normalized size = 1.

$$\frac{2x-4}{3x^2-3x+3}+\frac{10\sqrt{3}\,\mathrm{atan}\left(\frac{2\sqrt{3}x}{3}-\frac{\sqrt{3}}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+x+1)/(x**2-x+1)**2,x)
```

```
[Out] (2*x - 4)/(3*x**2 - 3*x + 3) + 10*sqrt(3)*atan(2*sqrt(3)*x/3 - sq
rt(3)/3)/9
```

GIAC/XCAS [A] time = 0.271736, size = 43, normalized size = 1.05

$$\frac{10}{9}\sqrt{3}\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\frac{2(x-2)}{3(x^2-x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/(x^2 - x + 1)^2,x, algorithm="giac")
```

```
[Out] 10/9*sqrt(3)*arctan(1/3*sqrt(3)*(2*x - 1)) + 2/3*(x - 2)/(x^2 - x
 + 1)
```

3.164 $\int \frac{1+x+x^2}{x(1-x+x^2)^2}\,dx$

Optimal. Leaf size=56

$$-\frac{2(1-2x)}{3\left(x^2-x+1\right)}-\frac{1}{2}\log\left(x^2-x+1\right)+\log(x)-\frac{11\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}$$

```
[Out] (-2*(1 - 2*x))/(3*(1 - x + x^2)) - (11*ArcTan[(1 - 2*x)/Sqrt[3]])
/(3*Sqrt[3]) + Log[x] - Log[1 - x + x^2]/2
```

Rubi [A] time = 0.121625, antiderivative size = 56, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3

$$-\frac{2(1-2x)}{3\left(x^2-x+1\right)}-\frac{1}{2}\log\left(x^2-x+1\right)+\log(x)-\frac{11\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + x + x^2)/(x*(1 - x + x^2)^2),x]
```

```
[Out] (-2*(1 - 2*x))/(3*(1 - x + x^2)) - (11*ArcTan[(1 - 2*x)/Sqrt[3]])
/(3*Sqrt[3]) + Log[x] - Log[1 - x + x^2]/2
```

Rubi in Sympy [A] time = 14.8675, size = 51, normalized size = 0.91

$$-\frac{2\left(-2x+1\right)}{3\left(x^2-x+1\right)}+\log\left(x\right)-\frac{\log\left(x^2-x+1\right)}{2}+\frac{11\sqrt{3}\operatorname{atan}\left(\sqrt{3}\left(\frac{2x}{3}-\frac{1}{3}\right)\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2+x+1)/x/(x**2-x+1)**2,x)
```

```
[Out] -2*(-2*x + 1)/(3*(x**2 - x + 1)) + log(x) - log(x**2 - x + 1)/2 +
 11*sqrt(3)*atan(sqrt(3)*(2*x/3 - 1/3))/9
```

Mathematica [A] time = 0.0456945, size = 56, normalized size = 1.

$$\frac{2(2x-1)}{3(x^2-x+1)}-\frac{1}{2}\log\left(x^2-x+1\right)+\log(x)+\frac{11\tan^{-1}\left(\frac{2x-1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + x + x^2)/(x*(1 - x + x^2)^2),x]
```

```
[Out] (2*(-1 + 2*x))/(3*(1 - x + x^2)) + (11*ArcTan[(-1 + 2*x)/Sqrt[3]]
)/(3*Sqrt[3]) + Log[x] - Log[1 - x + x^2]/2
```

Maple [A] time = 0.011, size = 48, normalized size = 0.9

$$\ln(x)-\frac{1}{x^2-x+1}\left(-\frac{4x}{3}+\frac{2}{3}\right)-\frac{\ln(x^2-x+1)}{2}+\frac{11\sqrt{3}}{9}\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+x+1)/x/(x^2-x+1)^2,x)
```

```
[Out] ln(x)-(-4/3*x+2/3)/(x^2-x+1)-1/2*ln(x^2-x+1)+11/9*3^(1/2)*arctan(
1/3*(2*x-1)*3^(1/2))
```

Maxima [A] time = 0.764612, size = 63, normalized size = 1.12

$$\frac{11}{9}\sqrt{3}\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\frac{2(2x-1)}{3(x^2-x+1)}-\frac{1}{2}\log\left(x^2-x+1\right)+\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 - x + 1)^2*x),x, algorithm="maxima")
```

```
[Out] 11/9*sqrt(3)*arctan(1/3*sqrt(3)*(2*x - 1)) + 2/3*(2*x - 1)/(x^2 -
 x + 1) - 1/2*log(x^2 - x + 1) + log(x)
```

Fricas [A] time = 0.284746, size = 113, normalized size = 2.02

$$-\frac{\sqrt{3}\left(3\sqrt{3}\left(x^2-x+1\right)\log\left(x^2-x+1\right)-6\sqrt{3}\left(x^2-x+1\right)\log(x)-22\left(x^2-x+1\right)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)-4\sqrt{3}(2x-1\right.}{18\left(x^2-x+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 - x + 1)^2*x),x, algorithm="fricas")
```

```
[Out] -1/18*sqrt(3)*(3*sqrt(3)*(x^2 - x + 1)*log(x^2 - x + 1) - 6*sqrt(
3)*(x^2 - x + 1)*log(x) - 22*(x^2 - x + 1)*arctan(1/3*sqrt(3)*(2*
x - 1)) - 4*sqrt(3)*(2*x - 1))/(x^2 - x + 1)
```

Sympy [A] time = 0.210461, size = 54, normalized size = 0.96

$$\frac{4x-2}{3x^2-3x+3}+\log(x)-\frac{\log\left(x^2-x+1\right)}{2}+\frac{11\sqrt{3}\,\mathrm{atan}\left(\frac{2\sqrt{3}x}{3}-\frac{\sqrt{3}}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+x+1)/x/(x**2-x+1)**2,x)
```

```
[Out] (4*x - 2)/(3*x**2 - 3*x + 3) + log(x) - log(x**2 - x + 1)/2 + 11*
sqrt(3)*atan(2*sqrt(3)*x/3 - sqrt(3)/3)/9
```

GIAC/XCAS [A] time = 0.273366, size = 65, normalized size = 1.16

$$\frac{11}{9}\sqrt{3}\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+\frac{2(2x-1)}{3(x^2-x+1)}-\frac{1}{2}\ln\left(x^2-x+1\right)+\ln\left(|x|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 - x + 1)^2*x),x, algorithm="giac")
```

```
[Out] 11/9*sqrt(3)*arctan(1/3*sqrt(3)*(2*x - 1)) + 2/3*(2*x - 1)/(x^2 -
 x + 1) - 1/2*ln(x^2 - x + 1) + ln(abs(x))
```

3.165 $\int \frac{1+x+x^2}{x^2(1-x+x^2)^2} dx$

Optimal. Leaf size=61

$$\frac{2(x+1)}{3(x^2-x+1)} - \frac{3}{2}\log\left(x^2-x+1\right) - \frac{1}{x} + 3\log(x) - \frac{7\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}$$

```
[Out] -x^(-1) + (2*(1 + x))/(3*(1 - x + x^2)) - (7*ArcTan[(1 - 2*x)/Sqr
t[3]])/(3*Sqrt[3]) + 3*Log[x] - (3*Log[1 - x + x^2])/2
```

Rubi [A] time = 0.142718, antiderivative size = 61, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3

$$\frac{2(x+1)}{3(x^2-x+1)} - \frac{3}{2}\log\left(x^2-x+1\right) - \frac{1}{x} + 3\log(x) - \frac{7\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + x + x^2)/(x^2*(1 - x + x^2)^2),x]
```

```
[Out] -x^(-1) + (2*(1 + x))/(3*(1 - x + x^2)) - (7*ArcTan[(1 - 2*x)/Sqr
t[3]])/(3*Sqrt[3]) + 3*Log[x] - (3*Log[1 - x + x^2])/2
```

Rubi in Sympy [A] time = 17.0177, size = 58, normalized size = 0.95

$$\frac{2(x+1)}{3(x^2-x+1)} + 3\log(x) - \frac{3\log\left(x^2-x+1\right)}{2} + \frac{7\sqrt{3}\,\text{atan}\left(\sqrt{3}\left(\frac{2x}{3}-\frac{1}{3}\right)\right)}{9} - \frac{1}{x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2+x+1)/x**2/(x**2-x+1)**2,x)
```

```
[Out] 2*(x + 1)/(3*(x**2 - x + 1)) + 3*log(x) - 3*log(x**2 - x + 1)/2 +
 7*sqrt(3)*atan(sqrt(3)*(2*x/3 - 1/3))/9 - 1/x
```

Mathematica [A] time = 0.0412996, size = 61, normalized size = 1.

$$\frac{2(x+1)}{3(x^2-x+1)}-\frac{3}{2}\log\left(x^2-x+1\right)-\frac{1}{x}+3\log(x)+\frac{7\tan^{-1}\left(\frac{2x-1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + x + x^2)/(x^2*(1 - x + x^2)^2),x]
```

```
[Out] -x^(-1) + (2*(1 + x))/(3*(1 - x + x^2)) + (7*ArcTan[(-1 + 2*x)/Sq
rt[3]])/(3*Sqrt[3]) + 3*Log[x] - (3*Log[1 - x + x^2])/2
```

Maple [A] time = 0.014, size = 55, normalized size = 0.9

$$-x^{-1}+3\ln(x)-\frac{1}{x^2-x+1}\left(-\frac{2x}{3}-\frac{2}{3}\right)-\frac{3\ln\left(x^2-x+1\right)}{2}+\frac{7\sqrt{3}}{9}\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+x+1)/x^2/(x^2-x+1)^2,x)
```

```
[Out] -1/x+3*ln(x)-(-2/3*x-2/3)/(x^2-x+1)-3/2*ln(x^2-x+1)+7/9*3^(1/2)*a
rctan(1/3*(2*x-1)*3^(1/2))
```

Maxima [A] time = 0.760604, size = 73, normalized size = 1.2

$$\frac{7}{9}\sqrt{3}\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)-\frac{x^2-5x+3}{3(x^3-x^2+x)}-\frac{3}{2}\log\left(x^2-x+1\right)+3\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 - x + 1)^2*x^2),x, algorithm="maxima")
```

```
[Out] 7/9*sqrt(3)*arctan(1/3*sqrt(3)*(2*x - 1)) - 1/3*(x^2 - 5*x + 3)/(
x^3 - x^2 + x) - 3/2*log(x^2 - x + 1) + 3*log(x)
```

Fricas [A] time = 0.286367, size = 128, normalized size = 2.1

$$-\frac{\sqrt{3}\left(9\sqrt{3}(x^3-x^2+x)\log\left(x^2-x+1\right)-18\sqrt{3}(x^3-x^2+x)\log(x)-14\left(x^3-x^2+x\right)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)+2\sqrt{3}(x^2\right.}{18\left(x^3-x^2+x\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 - x + 1)^2*x^2),x, algorithm="fricas")
```

```
[Out] -1/18*sqrt(3)*(9*sqrt(3)*(x^3 - x^2 + x)*log(x^2 - x + 1) - 18*sq
rt(3)*(x^3 - x^2 + x)*log(x) - 14*(x^3 - x^2 + x)*arctan(1/3*sqrt
(3)*(2*x - 1)) + 2*sqrt(3)*(x^2 - 5*x + 3))/(x^3 - x^2 + x)
```

Sympy [A] time = 0.227417, size = 65, normalized size = 1.07

$$-\frac{x^2-5x+3}{3x^3-3x^2+3x}+3\log\left(x\right)-\frac{3\log\left(x^2-x+1\right)}{2}+\frac{7\sqrt{3}\operatorname{atan}\left(\frac{2\sqrt{3}x}{3}-\frac{\sqrt{3}}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+x+1)/x**2/(x**2-x+1)**2,x)
```

```
[Out] -(x**2 - 5*x + 3)/(3*x**3 - 3*x**2 + 3*x) + 3*log(x) - 3*log(x**2
 - x + 1)/2 + 7*sqrt(3)*atan(2*sqrt(3)*x/3 - sqrt(3)/3)/9
```

GIAC/XCAS [A] time = 0.274338, size = 74, normalized size = 1.21

$$\frac{7}{9}\sqrt{3}\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)-\frac{x^2-5x+3}{3\left(x^3-x^2+x\right)}-\frac{3}{2}\ln\left(x^2-x+1\right)+3\ln\left(|x|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 - x + 1)^2*x^2),x, algorithm="giac")
```

```
[Out] 7/9*sqrt(3)*arctan(1/3*sqrt(3)*(2*x - 1)) - 1/3*(x^2 - 5*x + 3)/(
x^3 - x^2 + x) - 3/2*ln(x^2 - x + 1) + 3*ln(abs(x))
```

3.166 $\int \frac{1+x+x^2}{x^3(1-x+x^2)^2}\,dx$

Optimal. Leaf size=68

$$\frac{2(2-x)}{3(x^2-x+1)}-\frac{1}{2x^2}-2\log\left(x^2-x+1\right)-\frac{3}{x}+4\log(x)+\frac{10\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}$$

```
[Out] -1/(2*x^2) - 3/x + (2*(2 - x))/(3*(1 - x + x^2)) + (10*ArcTan[(1
- 2*x)/Sqrt[3]])/(3*Sqrt[3]) + 4*Log[x] - 2*Log[1 - x + x^2]
```

Rubi [A] time = 0.154672, antiderivative size = 68, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.3

$$\frac{2(2-x)}{3(x^2-x+1)}-\frac{1}{2x^2}-2\log\left(x^2-x+1\right)-\frac{3}{x}+4\log(x)+\frac{10\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + x + x^2)/(x^3*(1 - x + x^2)^2),x]
```

```
[Out] -1/(2*x^2) - 3/x + (2*(2 - x))/(3*(1 - x + x^2)) + (10*ArcTan[(1
- 2*x)/Sqrt[3]])/(3*Sqrt[3]) + 4*Log[x] - 2*Log[1 - x + x^2]
```

Rubi in Sympy [A] time = 16.5467, size = 63, normalized size = 0.93

$$\frac{2(-x+2)}{3(x^2-x+1)}+4\log(x)-2\log\left(x^2-x+1\right)-\frac{10\sqrt{3}\,\text{atan}\left(\sqrt{3}\left(\frac{2x}{3}-\frac{1}{3}\right)\right)}{9}-\frac{3}{x}-\frac{1}{2x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2+x+1)/x**3/(x**2-x+1)**2,x)
```

```
[Out] 2*(-x + 2)/(3*(x**2 - x + 1)) + 4*log(x) - 2*log(x**2 - x + 1) -
10*sqrt(3)*atan(sqrt(3)*(2*x/3 - 1/3))/9 - 3/x - 1/(2*x**2)
```

Mathematica [A] time = 0.0578347, size = 66, normalized size = 0.97

$$-\frac{2(x-2)}{3\left(x^2-x+1\right)}-\frac{1}{2x^2}-2\log\left(x^2-x+1\right)-\frac{3}{x}+4\log(x)-\frac{10\tan^{-1}\left(\frac{2x-1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + x + x^2)/(x^3*(1 - x + x^2)^2),x]
```

```
[Out] -1/(2*x^2) - 3/x - (2*(-2 + x))/(3*(1 - x + x^2)) - (10*ArcTan[(-
1 + 2*x)/Sqrt[3]])/(3*Sqrt[3]) + 4*Log[x] - 2*Log[1 - x + x^2]
```

Maple [A] time = 0.013, size = 60, normalized size = 0.9

$$-\frac{1}{2\,x^2}-3\,x^{-1}+4\,\ln(x)-\frac{1}{x^2-x+1}\left(\frac{2\,x}{3}-\frac{4}{3}\right)-2\,\ln\left(x^2-x+1\right)-\frac{10\,\sqrt{3}}{9}\arctan\left(\frac{(2\,x-1)\,\sqrt{3}}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+x+1)/x^3/(x^2-x+1)^2,x)
```

```
[Out] -1/2/x^2-3/x+4*ln(x)-(2/3*x-4/3)/(x^2-x+1)-2*ln(x^2-x+1)-10/9*3^(
1/2)*arctan(1/3*(2*x-1)*3^(1/2))
```

Maxima [A] time = 0.76151, size = 85, normalized size = 1.25

$$-\frac{10}{9}\,\sqrt{3}\arctan\left(\frac{1}{3}\,\sqrt{3}(2\,x-1)\right)-\frac{22\,x^3-23\,x^2+15\,x+3}{6\,(x^4-x^3+x^2)}-2\,\log\left(x^2-x+1\right)+4\,\log(x)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 - x + 1)^2*x^3),x, algorithm="maxima")
```

```
[Out] -10/9*sqrt(3)*arctan(1/3*sqrt(3)*(2*x - 1)) - 1/6*(22*x^3 - 23*x^
2 + 15*x + 3)/(x^4 - x^3 + x^2) - 2*log(x^2 - x + 1) + 4*log(x)
```

Fricas [A] time = 0.288976, size = 147, normalized size = 2.16

$$-\frac{\sqrt{3}\Big(12\,\sqrt{3}\left(x^4-x^3+x^2\right)\,\log\left(x^2-x+1\right)-24\,\sqrt{3}\left(x^4-x^3+x^2\right)\log(x)+20\,\left(x^4-x^3+x^2\right)\,\arctan\left(\frac{1}{3}\,\sqrt{3}(2\,x-1)\right)+\sqrt{3}(}{18\,(x^4-x^3+x^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 - x + 1)^2*x^3),x, algorithm="fricas")
```

```
[Out] -1/18*sqrt(3)*(12*sqrt(3)*(x^4 - x^3 + x^2)*log(x^2 - x + 1) - 24
*sqrt(3)*(x^4 - x^3 + x^2)*log(x) + 20*(x^4 - x^3 + x^2)*arctan(1
/3*sqrt(3)*(2*x - 1)) + sqrt(3)*(22*x^3 - 23*x^2 + 15*x + 3))/(x^
4 - x^3 + x^2)
```

Sympy [A] time = 0.254867, size = 71, normalized size = 1.04

$$4\log(x) - 2\log\left(x^2 - x + 1\right) - \frac{10\sqrt{3}\operatorname{atan}\left(\frac{2\sqrt{3}x}{3} - \frac{\sqrt{3}}{3}\right)}{9} - \frac{22x^3 - 23x^2 + 15x + 3}{6x^4 - 6x^3 + 6x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+x+1)/x**3/(x**2-x+1)**2,x)
```

```
[Out] 4*log(x) - 2*log(x**2 - x + 1) - 10*sqrt(3)*atan(2*sqrt(3)*x/3 -
sqrt(3)/3)/9 - (22*x**3 - 23*x**2 + 15*x + 3)/(6*x**4 - 6*x**3 +
6*x**2)
```

GIAC/XCAS [A] time = 0.273039, size = 85, normalized size = 1.25

$$-\frac{10}{9}\sqrt{3}\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) - \frac{22x^3 - 23x^2 + 15x + 3}{6(x^2 - x + 1)x^2} - 2\ln\left(x^2 - x + 1\right) + 4\ln(|x|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/((x^2 - x + 1)^2*x^3),x, algorithm="giac")
```

```
[Out] -10/9*sqrt(3)*arctan(1/3*sqrt(3)*(2*x - 1)) - 1/6*(22*x^3 - 23*x^
2 + 15*x + 3)/((x^2 - x + 1)*x^2) - 2*ln(x^2 - x + 1) + 4*ln(abs(
x))
```

3.167 $\int \frac{1-x^2}{(1+x+x^2)^2} \, dx$

Optimal. Leaf size=10

$$\frac{x}{x^2+x+1}$$

```
[Out] x/(1 + x + x^2)
```

Rubi [A] time = 0.00871826, antiderivative size = 10, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.062$

$$\frac{x}{x^2+x+1}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 - x^2)/(1 + x + x^2)^2,x]

[Out] x/(1 + x + x^2)
```

Rubi in Sympy [A] time = 4.60354, size = 7, normalized size = 0.7

$$\frac{x}{x^2+x+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((-x**2+1)/(x**2+x+1)**2,x)

[Out] x/(x**2 + x + 1)
```

Mathematica [A] time = 0.0090744, size = 10, normalized size = 1.

$$\frac{x}{x^2+x+1}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 - x^2)/(1 + x + x^2)^2,x]
```

```
[Out] x/(1 + x + x^2)
```

Maple [A] time = 0.006, size = 11, normalized size = 1.1

$$\frac{x}{x^2 + x + 1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((-x^2+1)/(x^2+x+1)^2,x)
```

```
[Out] x/(x^2+x+1)
```

Maxima [A] time = 0.682738, size = 14, normalized size = 1.4

$$\frac{x}{x^2 + x + 1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(x^2 - 1)/(x^2 + x + 1)^2,x, algorithm="maxima")
```

```
[Out] x/(x^2 + x + 1)
```

Fricas [A] time = 0.274138, size = 14, normalized size = 1.4

$$\frac{x}{x^2 + x + 1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(x^2 - 1)/(x^2 + x + 1)^2,x, algorithm="fricas")
```

```
[Out] x/(x^2 + x + 1)
```

Sympy [A] time = 0.095603, size = 7, normalized size = 0.7

$$\frac{x}{x^2 + x + 1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-x**2+1)/(x**2+x+1)**2,x)

[Out] x/(x**2 + x + 1)
```

GIAC/XCAS [A] time = 0.270572, size = 11, normalized size = 1.1

$$\frac{1}{x + \frac{1}{x} + 1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(x^2 - 1)/(x^2 + x + 1)^2,x, algorithm="giac")

[Out] 1/(x + 1/x + 1)
```

3.168 $\int \frac{1+x^2}{1+x+x^2}\,dx$

Optimal. Leaf size=31

$$-\frac{1}{2}\log\left(x^2+x+1\right)+x+\frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{\sqrt{3}}$$

```
[Out] x + ArcTan[(1 + 2*x)/Sqrt[3]]/Sqrt[3] - Log[1 + x + x^2]/2
```

Rubi [A] time = 0.0548659, antiderivative size = 31, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 14, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.357

$$-\frac{1}{2}\log\left(x^2+x+1\right)+x+\frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + x^2)/(1 + x + x^2),x]
```

```
[Out] x + ArcTan[(1 + 2*x)/Sqrt[3]]/Sqrt[3] - Log[1 + x + x^2]/2
```

Rubi in Sympy [A] time = 7.53687, size = 32, normalized size = 1.03

$$x-\frac{\log\left(x^2+x+1\right)}{2}+\frac{\sqrt{3}\,\mathrm{atan}\left(\sqrt{3}\left(\frac{2x}{3}+\frac{1}{3}\right)\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2+1)/(x**2+x+1),x)
```

```
[Out] x - log(x**2 + x + 1)/2 + sqrt(3)*atan(sqrt(3)*(2*x/3 + 1/3))/3
```

Mathematica [A] time = 0.0136009, size = 31, normalized size = 1.

$$-\frac{1}{2}\log\left(x^2+x+1\right)+x+\frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + x^2)/(1 + x + x^2),x]
```

```
[Out] x + ArcTan[(1 + 2*x)/Sqrt[3]]/Sqrt[3] - Log[1 + x + x^2]/2
```

Maple [A] time = 0.006, size = 28, normalized size = 0.9

$$x-\frac{\ln\left(x^{2}+x+1\right)}{2}+\frac{\sqrt{3}}{3}\arctan\left(\frac{\left(1+2x\right)\sqrt{3}}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+1)/(x^2+x+1),x)
```

```
[Out] x-1/2*ln(x^2+x+1)+1/3*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)
```

Maxima [A] time = 0.761787, size = 36, normalized size = 1.16

$$\frac{1}{3}\sqrt{3}\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right)+x-\frac{1}{2}\log\left(x^{2}+x+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + 1)/(x^2 + x + 1),x, algorithm="maxima")
```

```
[Out] 1/3*sqrt(3)*arctan(1/3*sqrt(3)*(2*x + 1)) + x - 1/2*log(x^2 + x +
 1)
```

Fricas [A] time = 0.277499, size = 50, normalized size = 1.61

$$\frac{1}{6}\sqrt{3}\left(2\sqrt{3}x-\sqrt{3}\log\left(x^{2}+x+1\right)+2\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + 1)/(x^2 + x + 1),x, algorithm="fricas")
```

```
[Out] 1/6*sqrt(3)*(2*sqrt(3)*x - sqrt(3)*log(x^2 + x + 1) + 2*arctan(1/
3*sqrt(3)*(2*x + 1)))
```

Sympy [A] time = 0.101681, size = 36, normalized size = 1.16

$$x - \frac{\log\left(x^2 + x + 1\right)}{2} + \frac{\sqrt{3}\,\mathrm{atan}\left(\frac{2\sqrt{3}x}{3} + \frac{\sqrt{3}}{3}\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+1)/(x**2+x+1),x)
```

```
[Out] x - log(x**2 + x + 1)/2 + sqrt(3)*atan(2*sqrt(3)*x/3 + sqrt(3)/3)
/3
```

GIAC/XCAS [A] time = 0.272408, size = 36, normalized size = 1.16

$$\frac{1}{3}\sqrt{3}\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + x - \frac{1}{2}\ln\left(x^2 + x + 1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + 1)/(x^2 + x + 1),x, algorithm="giac")
```

```
[Out] 1/3*sqrt(3)*arctan(1/3*sqrt(3)*(2*x + 1)) + x - 1/2*ln(x^2 + x +
1)
```

3.169 $\int \frac{-1+x^2}{25-6x+x^2} \, dx$

Optimal. Leaf size=23

$$3 \log \left(x^2-6x+25\right)+x-2 \tan^{-1}\left(\frac{x-3}{4}\right)$$

```
[Out] x - 2*ArcTan[(-3 + x)/4] + 3*Log[25 - 6*x + x^2]
```

Rubi [A] time = 0.0523419, antiderivative size = 23, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.312

$$3 \log \left(x^2-6x+25\right)+x-2 \tan^{-1}\left(\frac{x-3}{4}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(-1 + x^2)/(25 - 6*x + x^2),x]

[Out] x - 2*ArcTan[(-3 + x)/4] + 3*Log[25 - 6*x + x^2]
```

Rubi in Sympy [A] time = 9.20571, size = 22, normalized size = 0.96

$$x+3 \log \left(x^2-6x+25\right)-2 \operatorname{atan}\left(\frac{x}{4}-\frac{3}{4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2-1)/(x**2-6*x+25),x)

[Out] x + 3*log(x**2 - 6*x + 25) - 2*atan(x/4 - 3/4)
```

Mathematica [A] time = 0.00834772, size = 23, normalized size = 1.

$$3 \log \left(x^2-6x+25\right)+x-2 \tan^{-1}\left(\frac{x-3}{4}\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(-1 + x^2)/(25 - 6*x + x^2),x]
```

```
[Out] x - 2*ArcTan[(-3 + x)/4] + 3*Log[25 - 6*x + x^2]
```

Maple [A] time = 0.006, size = 22, normalized size = 1.

$$x-2\arctan(-3/4+x/4)+3\ln\left(x^2-6x+25\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2-1)/(x^2-6*x+25),x)
```

```
[Out] x-2*arctan(-3/4+1/4*x)+3*ln(x^2-6*x+25)
```

Maxima [A] time = 0.758657, size = 28, normalized size = 1.22

$$x-2\arctan\left(\frac{1}{4}x-\frac{3}{4}\right)+3\log\left(x^2-6x+25\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 - 1)/(x^2 - 6*x + 25),x, algorithm="maxima")
```

```
[Out] x - 2*arctan(1/4*x - 3/4) + 3*log(x^2 - 6*x + 25)
```

Fricas [A] time = 0.277701, size = 28, normalized size = 1.22

$$x-2\arctan\left(\frac{1}{4}x-\frac{3}{4}\right)+3\log\left(x^2-6x+25\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 - 1)/(x^2 - 6*x + 25),x, algorithm="fricas")
```

```
[Out] x - 2*arctan(1/4*x - 3/4) + 3*log(x^2 - 6*x + 25)
```

Sympy [A] time = 0.104055, size = 22, normalized size = 0.96

$$x + 3\log\left(x^2 - 6x + 25\right) - 2\,\mathrm{atan}\left(\frac{x}{4} - \frac{3}{4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2-1)/(x**2-6*x+25),x)
```

```
[Out] x + 3*log(x**2 - 6*x + 25) - 2*atan(x/4 - 3/4)
```

GIAC/XCAS [A] time = 0.272427, size = 28, normalized size = 1.22

$$x - 2\,\arctan\left(\frac{1}{4}\,x - \frac{3}{4}\right) + 3\ln\left(x^2 - 6\,x + 25\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 - 1)/(x^2 - 6*x + 25),x, algorithm="giac")
```

```
[Out] x - 2*arctan(1/4*x - 3/4) + 3*ln(x^2 - 6*x + 25)
```

3.170 $\int \frac{-10+3x^2}{4-4x+x^2} \, dx$

Optimal. Leaf size=21

$$3x + \frac{2}{2-x} + 12\log(2-x)$$

```
[Out] 2/(2 - x) + 3*x + 12*Log[2 - x]
```

Rubi [A] time = 0.0314447, antiderivative size = 21, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 2, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$

$$3x + \frac{2}{2-x} + 12\log(2-x)$$

Antiderivative was successfully verified.

```
[In]  Int[(-10 + 3*x^2)/(4 - 4*x + x^2),x]
```

```
[Out] 2/(2 - x) + 3*x + 12*Log[2 - x]
```

Rubi in Sympy [A] time = 6.75311, size = 14, normalized size = 0.67

$$3x + 12\log(-x+2) + \frac{2}{-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((3*x**2-10)/(x**2-4*x+4),x)
```

```
[Out] 3*x + 12*log(-x + 2) + 2/(-x + 2)
```

Mathematica [A] time = 0.0148968, size = 19, normalized size = 0.9

$$3(x-2) - \frac{2}{x-2} + 12\log(x-2)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(-10 + 3*x^2)/(4 - 4*x + x^2),x]
```

```
[Out] -2/(-2 + x) + 3*(-2 + x) + 12*Log[-2 + x]
```

Maple [A] time = 0.009, size = 18, normalized size = 0.9

$$3x - 2\,(x-2)^{-1} + 12\,\ln(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((3*x^2-10)/(x^2-4*x+4),x)

[Out] 3*x-2/(x-2)+12*ln(x-2)
```

Maxima [A] time = 0.69678, size = 23, normalized size = 1.1

$$3x - \frac{2}{x-2} + 12\,\log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x^2 - 10)/(x^2 - 4*x + 4),x, algorithm="maxima")

[Out] 3*x - 2/(x - 2) + 12*log(x - 2)
```

Fricas [A] time = 0.279245, size = 34, normalized size = 1.62

$$\frac{3x^2 + 12(x-2)\log(x-2) - 6x - 2}{x-2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x^2 - 10)/(x^2 - 4*x + 4),x, algorithm="fricas")

[Out] (3*x^2 + 12*(x - 2)*log(x - 2) - 6*x - 2)/(x - 2)
```

Sympy [A] time = 0.076759, size = 14, normalized size = 0.67

$$3x + 12\log(x-2) - \frac{2}{x-2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x**2-10)/(x**2-4*x+4),x)

[Out] 3*x + 12*log(x - 2) - 2/(x - 2)
```

GIAC/XCAS [A] time = 0.272703, size = 24, normalized size = 1.14

$$3x - \frac{2}{x-2} + 12\ln\left(|x-2|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x^2 - 10)/(x^2 - 4*x + 4),x, algorithm="giac")

[Out] 3*x - 2/(x - 2) + 12*ln(abs(x - 2))
```

3.171 $\int \frac{8+x^2}{6-5x+x^2}\,dx$

Optimal. Leaf size=18

$$x-12\log(2-x)+17\log(3-x)$$

```
[Out] x - 12*Log[2 - x] + 17*Log[3 - x]
```

Rubi [A] time = 0.0346289, antiderivative size = 18, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.188

$$x-12\log(2-x)+17\log(3-x)$$

Antiderivative was successfully verified.

```
[In]  Int[(8 + x^2)/(6 - 5*x + x^2),x]

[Out] x - 12*Log[2 - x] + 17*Log[3 - x]
```

Rubi in Sympy [A] time = 7.8645, size = 14, normalized size = 0.78

$$x-12\log\left(-x+2\right)+17\log\left(-x+3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2+8)/(x**2-5*x+6),x)

[Out] x - 12*log(-x + 2) + 17*log(-x + 3)
```

Mathematica [A] time = 0.00800341, size = 18, normalized size = 1.

$$x-12\log(2-x)+17\log(3-x)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(8 + x^2)/(6 - 5*x + x^2),x]

[Out] x - 12*Log[2 - x] + 17*Log[3 - x]
```

Maple [A] time = 0.009, size = 15, normalized size = 0.8

$$x + 17 \ln(-3 + x) - 12 \ln(x - 2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+8)/(x^2-5*x+6),x)
```

```
[Out] x+17*ln(-3+x)-12*ln(x-2)
```

Maxima [A] time = 0.695914, size = 19, normalized size = 1.06

$$x - 12 \log(x - 2) + 17 \log(x - 3)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + 8)/(x^2 - 5*x + 6),x, algorithm="maxima")
```

```
[Out] x - 12*log(x - 2) + 17*log(x - 3)
```

Fricas [A] time = 0.279146, size = 19, normalized size = 1.06

$$x - 12 \log(x - 2) + 17 \log(x - 3)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + 8)/(x^2 - 5*x + 6),x, algorithm="fricas")
```

```
[Out] x - 12*log(x - 2) + 17*log(x - 3)
```

Sympy [A] time = 0.10183, size = 14, normalized size = 0.78

$$x + 17 \log(x - 3) - 12 \log(x - 2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+8)/(x**2-5*x+6),x)
```

```
[Out] x + 17*log(x - 3) - 12*log(x - 2)
```

GIAC/XCAS [A] time = 0.2728, size = 22, normalized size = 1.22

$$x - 12\ln\left(|x - 2|\right) + 17\ln\left(|x - 3|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + 8)/(x^2 - 5*x + 6),x, algorithm="giac")
```

```
[Out] x - 12*ln(abs(x - 2)) + 17*ln(abs(x - 3))
```

3.172 $\int \frac{-4+3x+x^2}{-8-2x+x^2} \, dx$

Optimal. Leaf size=14

$$x + 4\log(4 - x) + \log(x + 2)$$

```
[Out] x + 4*Log[4 - x] + Log[2 + x]
```

Rubi [A] time = 0.0323368, antiderivative size = 14, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$x + 4\log(4 - x) + \log(x + 2)$$

Antiderivative was successfully verified.

```
[In]  Int[(-4 + 3*x + x^2)/(-8 - 2*x + x^2),x]

[Out] x + 4*Log[4 - x] + Log[2 + x]
```

Rubi in Sympy [A] time = 10.1334, size = 12, normalized size = 0.86

$$x + 4\log\left(-x + 4\right) + \log\left(x + 2\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2+3*x-4)/(x**2-2*x-8),x)

[Out] x + 4*log(-x + 4) + log(x + 2)
```

Mathematica [A] time = 0.0082322, size = 14, normalized size = 1.

$$x + 4\log(4 - x) + \log(x + 2)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(-4 + 3*x + x^2)/(-8 - 2*x + x^2),x]

[Out] x + 4*Log[4 - x] + Log[2 + x]
```

Maple [A] time = 0.008, size = 13, normalized size = 0.9

$$x+\ln(2+x)+4\ln(x-4)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+3*x-4)/(x^2-2*x-8),x)

[Out] x+ln(2+x)+4*ln(x-4)
```

Maxima [A] time = 0.681895, size = 16, normalized size = 1.14

$$x+\log(x+2)+4\log(x-4)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + 3*x - 4)/(x^2 - 2*x - 8),x, algorithm="maxima")

[Out] x + log(x + 2) + 4*log(x - 4)
```

Fricas [A] time = 0.277723, size = 16, normalized size = 1.14

$$x+\log(x+2)+4\log(x-4)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + 3*x - 4)/(x^2 - 2*x - 8),x, algorithm="fricas")

[Out] x + log(x + 2) + 4*log(x - 4)
```

Sympy [A] time = 0.102326, size = 12, normalized size = 0.86

$$x+4\log(x-4)+\log(x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+3*x-4)/(x**2-2*x-8),x)
```

```
[Out] x + 4*log(x - 4) + log(x + 2)
```

GIAC/XCAS [A] time = 0.271047, size = 19, normalized size = 1.36

$$x + \ln(|x + 2|) + 4\ln(|x - 4|)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + 3*x - 4)/(x^2 - 2*x - 8),x, algorithm="giac")
```

```
[Out] x + ln(abs(x + 2)) + 4*ln(abs(x - 4))
```

3.173 $\int \frac{7+5x+4x^2}{5+4x+4x^2}\,dx$

Optimal. Leaf size=27

$$\frac{1}{8}\log\left(4x^2+4x+5\right)+x+\frac{3}{8}\tan^{-1}\left(x+\frac{1}{2}\right)$$

```
[Out] x + (3*ArcTan[1/2 + x])/8 + Log[5 + 4*x + 4*x^2]/8
```

Rubi [A] time = 0.0510805, antiderivative size = 27, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.217

$$\frac{1}{8}\log\left(4x^2+4x+5\right)+x+\frac{3}{8}\tan^{-1}\left(x+\frac{1}{2}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(7 + 5*x + 4*x^2)/(5 + 4*x + 4*x^2),x]
```

```
[Out] x + (3*ArcTan[1/2 + x])/8 + Log[5 + 4*x + 4*x^2]/8
```

Rubi in Sympy [A] time = 14.6674, size = 24, normalized size = 0.89

$$x+\frac{\log\left(4x^2+4x+5\right)}{8}+\frac{3\,\mathrm{atan}\left(x+\frac{1}{2}\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+5*x+7)/(4*x**2+4*x+5),x)
```

```
[Out] x + log(4*x**2 + 4*x + 5)/8 + 3*atan(x + 1/2)/8
```

Mathematica [A] time = 0.00931471, size = 31, normalized size = 1.15

$$\frac{1}{8}\log\left(4x^2+4x+5\right)+x+\frac{3}{8}\tan^{-1}\left(\frac{1}{2}(2x+1)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(7 + 5*x + 4*x^2)/(5 + 4*x + 4*x^2),x]

[Out] x + (3*ArcTan[(1 + 2*x)/2])/8 + Log[5 + 4*x + 4*x^2]/8
```

Maple [A] time = 0.005, size = 22, normalized size = 0.8

$$x+\frac{3}{8}\arctan\left(\frac{1}{2}+x\right)+\frac{\ln\left(4x^2+4x+5\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+5*x+7)/(4*x^2+4*x+5),x)

[Out] x+3/8*arctan(1/2+x)+1/8*ln(4*x^2+4*x+5)
```

Maxima [A] time = 0.759475, size = 28, normalized size = 1.04

$$x+\frac{3}{8}\arctan\left(x+\frac{1}{2}\right)+\frac{1}{8}\log\left(4x^2+4x+5\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 5*x + 7)/(4*x^2 + 4*x + 5),x, algorithm="maxima")

[Out] x + 3/8*arctan(x + 1/2) + 1/8*log(4*x^2 + 4*x + 5)
```

Fricas [A] time = 0.279353, size = 28, normalized size = 1.04

$$x+\frac{3}{8}\arctan\left(x+\frac{1}{2}\right)+\frac{1}{8}\log\left(4x^2+4x+5\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 5*x + 7)/(4*x^2 + 4*x + 5),x, algorithm="fricas")

[Out] x + 3/8*arctan(x + 1/2) + 1/8*log(4*x^2 + 4*x + 5)
```

Sympy [A] time = 0.110288, size = 22, normalized size = 0.81

$$x + \frac{\log\left(x^2 + x + \frac{5}{4}\right)}{8} + \frac{3\,\mathrm{atan}\left(x + \frac{1}{2}\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**2+5*x+7)/(4*x**2+4*x+5),x)
```

```
[Out] x + log(x**2 + x + 5/4)/8 + 3*atan(x + 1/2)/8
```

GIAC/XCAS [A] time = 0.272099, size = 28, normalized size = 1.04

$$x + \frac{3}{8}\arctan\left(x + \frac{1}{2}\right) + \frac{1}{8}\ln\left(4\,x^2 + 4\,x + 5\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 5*x + 7)/(4*x^2 + 4*x + 5),x, algorithm="giac")
```

```
[Out] x + 3/8*arctan(x + 1/2) + 1/8*ln(4*x^2 + 4*x + 5)
```

3.174 $\int \frac{2-x+x^2}{-5+2x+x^2} \, dx$

Optimal. Leaf size=48

$$x-\frac{1}{6}\left(9-5\sqrt{6}\right)\log\left(x-\sqrt{6}+1\right)-\frac{1}{6}\left(9+5\sqrt{6}\right)\log\left(x+\sqrt{6}+1\right)$$

```
[Out] x - ((9 - 5*Sqrt[6])*Log[1 - Sqrt[6] + x])/6 - ((9 + 5*Sqrt[6])*L
og[1 + Sqrt[6] + x])/6
```

Rubi [A] time = 0.0941137, antiderivative size = 48, 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

$$x-\frac{1}{6}\left(9-5\sqrt{6}\right)\log\left(x-\sqrt{6}+1\right)-\frac{1}{6}\left(9+5\sqrt{6}\right)\log\left(x+\sqrt{6}+1\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(2 - x + x^2)/(-5 + 2*x + x^2),x]
```

```
[Out] x - ((9 - 5*Sqrt[6])*Log[1 - Sqrt[6] + x])/6 - ((9 + 5*Sqrt[6])*L
og[1 + Sqrt[6] + x])/6
```

Rubi in Sympy [A] time = 10.6691, size = 51, normalized size = 1.06

$$x-\frac{\sqrt{6}\left(3\sqrt{6}+10\right)\log\left(x+1+\sqrt{6}\right)}{12}+\frac{\sqrt{6}\left(-3\sqrt{6}+10\right)\log\left(x-\sqrt{6}+1\right)}{12}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2-x+2)/(x**2+2*x-5),x)
```

```
[Out] x - sqrt(6)*(3*sqrt(6) + 10)*log(x + 1 + sqrt(6))/12 + sqrt(6)*(-
3*sqrt(6) + 10)*log(x - sqrt(6) + 1)/12
```

Mathematica [A] time = 0.067551, size = 48, normalized size = 1.

$$x+\frac{1}{6}\left(5\sqrt{6}-9\right)\log\left(-x+\sqrt{6}-1\right)+\frac{1}{6}\left(-9-5\sqrt{6}\right)\log\left(x+\sqrt{6}+1\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(2 - x + x^2)/(-5 + 2*x + x^2),x]
```

```
[Out] x + ((-9 + 5*Sqrt[6])*Log[-1 + Sqrt[6] - x])/6 + ((-9 - 5*Sqrt[6]
)*Log[1 + Sqrt[6] + x])/6
```

Maple [A] time = 0.005, size = 30, normalized size = 0.6

$$x - \frac{3\ln\left(x^2+2x-5\right)}{2} - \frac{5\sqrt{6}}{3}\mathit{Artanh}\left(\frac{(2x+2)\sqrt{6}}{12}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2-x+2)/(x^2+2*x-5),x)
```

```
[Out] x-3/2*ln(x^2+2*x-5)-5/3*6^(1/2)*arctanh(1/12*(2*x+2)*6^(1/2))
```

Maxima [A] time = 0.762721, size = 49, normalized size = 1.02

$$\frac{5}{6}\sqrt{6}\log\left(\frac{x-\sqrt{6}+1}{x+\sqrt{6}+1}\right) + x - \frac{3}{2}\log\left(x^2+2x-5\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 - x + 2)/(x^2 + 2*x - 5),x, algorithm="maxima")
```

```
[Out] 5/6*sqrt(6)*log((x - sqrt(6) + 1)/(x + sqrt(6) + 1)) + x - 3/2*lo
g(x^2 + 2*x - 5)
```

Fricas [A] time = 0.28015, size = 86, normalized size = 1.79

$$\frac{1}{6}\sqrt{3}\left(2\sqrt{3}x - 3\sqrt{3}\log\left(x^2+2x-5\right) + 5\sqrt{2}\log\left(\frac{\sqrt{3}\left(x^2+2x+7\right)-6\sqrt{2}(x+1)}{x^2+2x-5}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 - x + 2)/(x^2 + 2*x - 5),x, algorithm="fricas")
```

```
[Out] 1/6*sqrt(3)*(2*sqrt(3)*x - 3*sqrt(3)*log(x^2 + 2*x - 5) + 5*sqrt(
2)*log((sqrt(3)*(x^2 + 2*x + 7) - 6*sqrt(2)*(x + 1))/(x^2 + 2*x -
 5)))
```

Sympy [A] time = 0.119212, size = 46, normalized size = 0.96

$$x + \left(-\frac{5\sqrt{6}}{6} - \frac{3}{2}\right)\log\left(x + 1 + \sqrt{6}\right) + \left(-\frac{3}{2} + \frac{5\sqrt{6}}{6}\right)\log\left(x - \sqrt{6} + 1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2-x+2)/(x**2+2*x-5),x)
```

```
[Out] x + (-5*sqrt(6)/6 - 3/2)*log(x + 1 + sqrt(6)) + (-3/2 + 5*sqrt(6)
/6)*log(x - sqrt(6) + 1)
```

GIAC/XCAS [A] time = 0.272719, size = 61, normalized size = 1.27

$$\frac{5}{6}\sqrt{6}\ln\left(\frac{\left|2\,x - 2\,\sqrt{6} + 2\right|}{\left|2\,x + 2\,\sqrt{6} + 2\right|}\right) + x - \frac{3}{2}\ln\left(\left|x^2 + 2\,x - 5\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 - x + 2)/(x^2 + 2*x - 5),x, algorithm="giac")
```

```
[Out] 5/6*sqrt(6)*ln(abs(2*x - 2*sqrt(6) + 2)/abs(2*x + 2*sqrt(6) + 2))
 + x - 3/2*ln(abs(x^2 + 2*x - 5))
```

3.175 $\int \frac{1+4x+3x^2}{(4+7x+2x^2)^2}\,dx$

Optimal. Leaf size=21

$$-\frac{3x+2}{2\,(2x^2+7x+4)}$$

```
[Out] -(2 + 3*x)/(2*(4 + 7*x + 2*x^2))
```

Rubi [A] time = 0.0247395, antiderivative size = 21, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$

$$-\frac{3x+2}{2\,(2x^2+7x+4)}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 4*x + 3*x^2)/(4 + 7*x + 2*x^2)^2,x]

[Out] -(2 + 3*x)/(2*(4 + 7*x + 2*x^2))
```

Rubi in Sympy [A] time = 8.12947, size = 15, normalized size = 0.71

$$-\frac{12x+8}{8\,(2x^2+7x+4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((3*x**2+4*x+1)/(2*x**2+7*x+4)**2,x)

[Out] -(12*x + 8)/(8*(2*x**2 + 7*x + 4))
```

Mathematica [A] time = 0.0131993, size = 21, normalized size = 1.

$$\frac{-3x-2}{2\,(2x^2+7x+4)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 4*x + 3*x^2)/(4 + 7*x + 2*x^2)^2,x]

[Out] (-2 - 3*x)/(2*(4 + 7*x + 2*x^2))
```

Maple [A] time = 0.006, size = 17, normalized size = 0.8

$$1\left(-\frac{3\,x}{4}-\frac{1}{2}\right)\left(x^{2}+\frac{7\,x}{2}+2\right)^{-1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((3*x^2+4*x+1)/(2*x^2+7*x+4)^2,x)

[Out] (-3/4*x-1/2)/(x^2+7/2*x+2)
```

Maxima [A] time = 0.673279, size = 26, normalized size = 1.24

$$-\frac{3\,x+2}{2\,(2\,x^{2}+7\,x+4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x^2 + 4*x + 1)/(2*x^2 + 7*x + 4)^2,x, algorithm="maxima")

[Out] -1/2*(3*x + 2)/(2*x^2 + 7*x + 4)
```

Fricas [A] time = 0.272351, size = 26, normalized size = 1.24

$$-\frac{3\,x+2}{2\,(2\,x^{2}+7\,x+4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x^2 + 4*x + 1)/(2*x^2 + 7*x + 4)^2,x, algorithm="fricas")

[Out] -1/2*(3*x + 2)/(2*x^2 + 7*x + 4)
```

Sympy [A] time = 0.132626, size = 15, normalized size = 0.71

$$-\frac{3x+2}{4x^2+14x+8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x**2+4*x+1)/(2*x**2+7*x+4)**2,x)
```

```
[Out] -(3*x + 2)/(4*x**2 + 14*x + 8)
```

GIAC/XCAS [A] time = 0.27158, size = 26, normalized size = 1.24

$$-\frac{3\,x+2}{2\,(2\,x^2+7\,x+4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x^2 + 4*x + 1)/(2*x^2 + 7*x + 4)^2,x, algorithm="giac")
```

```
[Out] -1/2*(3*x + 2)/(2*x^2 + 7*x + 4)
```

3.176 $\int \frac{1+x+x^2}{(3+2x+x^2)^2}\, dx$

Optimal. Leaf size=39

$$\frac{1-x}{4(x^2+2x+3)}+\frac{3\tan^{-1}\left(\frac{x+1}{\sqrt{2}}\right)}{4\sqrt{2}}$$

```
[Out] (1 - x)/(4*(3 + 2*x + x^2)) + (3*ArcTan[(1 + x)/Sqrt[2]])/(4*Sqrt
[2])
```

Rubi [A] time = 0.0502383, antiderivative size = 39, 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

$$\frac{1-x}{4(x^2+2x+3)}+\frac{3\tan^{-1}\left(\frac{x+1}{\sqrt{2}}\right)}{4\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + x + x^2)/(3 + 2*x + x^2)^2,x]
```

```
[Out] (1 - x)/(4*(3 + 2*x + x^2)) + (3*ArcTan[(1 + x)/Sqrt[2]])/(4*Sqrt
[2])
```

Rubi in Sympy [A] time = 7.18393, size = 36, normalized size = 0.92

$$\frac{-2x+2}{8(x^2+2x+3)}+\frac{3\sqrt{2}\,\text{atan}\left(\sqrt{2}\left(\frac{x}{2}+\frac{1}{2}\right)\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2+x+1)/(x**2+2*x+3)**2,x)
```

```
[Out] (-2*x + 2)/(8*(x**2 + 2*x + 3)) + 3*sqrt(2)*atan(sqrt(2)*(x/2 + 1
/2))/8
```

Mathematica [A] time = 0.0438214, size = 39, normalized size = 1.

$$\frac{1-x}{4\left(x^2+2x+3\right)}+\frac{3\tan^{-1}\left(\frac{x+1}{\sqrt{2}}\right)}{4\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + x + x^2)/(3 + 2*x + x^2)^2,x]
```

```
[Out] (1 - x)/(4*(3 + 2*x + x^2)) + (3*ArcTan[(1 + x)/Sqrt[2]])/(4*Sqrt
[2])
```

Maple [A] time = 0.009, size = 34, normalized size = 0.9

$$\frac{1}{x^2+2x+3}\left(-\frac{x}{4}+\frac{1}{4}\right)+\frac{3\sqrt{2}}{8}\arctan\left(\frac{(2x+2)\sqrt{2}}{4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+x+1)/(x^2+2*x+3)^2,x)
```

```
[Out] (-1/4*x+1/4)/(x^2+2*x+3)+3/8*2^(1/2)*arctan(1/4*(2*x+2)*2^(1/2))
```

Maxima [A] time = 0.765356, size = 41, normalized size = 1.05

$$\frac{3}{8}\sqrt{2}\arctan\left(\frac{1}{2}\sqrt{2}(x+1)\right)-\frac{x-1}{4\left(x^2+2x+3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/(x^2 + 2*x + 3)^2,x, algorithm="maxima")
```

```
[Out] 3/8*sqrt(2)*arctan(1/2*sqrt(2)*(x + 1)) - 1/4*(x - 1)/(x^2 + 2*x
+ 3)
```

Fricas [A] time = 0.277272, size = 58, normalized size = 1.49

$$\frac{\sqrt{2}\left(3\left(x^2+2x+3\right)\arctan\left(\frac{1}{2}\sqrt{2}(x+1)\right)-\sqrt{2}(x-1)\right)}{8\left(x^2+2x+3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/(x^2 + 2*x + 3)^2,x, algorithm="fricas")
```

```
[Out] 1/8*sqrt(2)*(3*(x^2 + 2*x + 3)*arctan(1/2*sqrt(2)*(x + 1)) - sqrt
(2)*(x - 1))/(x^2 + 2*x + 3)
```

Sympy [A] time = 0.146702, size = 37, normalized size = 0.95

$$-\frac{x-1}{4x^2+8x+12}+\frac{3\sqrt{2}\operatorname{atan}\left(\frac{\sqrt{2}x}{2}+\frac{\sqrt{2}}{2}\right)}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+x+1)/(x**2+2*x+3)**2,x)
```

```
[Out] -(x - 1)/(4*x**2 + 8*x + 12) + 3*sqrt(2)*atan(sqrt(2)*x/2 + sqrt(
2)/2)/8
```

GIAC/XCAS [A] time = 0.271782, size = 41, normalized size = 1.05

$$\frac{3}{8}\sqrt{2}\arctan\left(\frac{1}{2}\sqrt{2}(x+1)\right)-\frac{x-1}{4\left(x^2+2x+3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + x + 1)/(x^2 + 2*x + 3)^2,x, algorithm="giac")
```

```
[Out] 3/8*sqrt(2)*arctan(1/2*sqrt(2)*(x + 1)) - 1/4*(x - 1)/(x^2 + 2*x
+ 3)
```

3.177 $\int \frac{-1+2x+5x^2}{(1+x+x^2)^4} dx$

Optimal. Leaf size=11

$$-\frac{x}{(x^2+x+1)^3}$$

```
[Out] -(x/(1 + x + x^2)^3)
```

Rubi [A] time = 0.00846355, antiderivative size = 11, normalized size of antiderivative = 1., number of steps used = 1, number of rules used = 1, integrand size = 19, $\frac{\text{number of rules}}{\text{integrand size}} = 0.053$

$$-\frac{x}{(x^2+x+1)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(-1 + 2*x + 5*x^2)/(1 + x + x^2)^4,x]

[Out] -(x/(1 + x + x^2)^3)
```

Rubi in Sympy [A] time = 6.56698, size = 10, normalized size = 0.91

$$-\frac{x}{(x^2+x+1)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((5*x**2+2*x-1)/(x**2+x+1)**4,x)

[Out] -x/(x**2 + x + 1)**3
```

Mathematica [A] time = 0.0107527, size = 11, normalized size = 1.

$$-\frac{x}{(x^2+x+1)^3}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(-1 + 2*x + 5*x^2)/(1 + x + x^2)^4,x]

[Out] -(x/(1 + x + x^2)^3)
```

Maple [A] time = 0.008, size = 12, normalized size = 1.1

$$-\frac{x}{\left(x^{2}+x+1\right)^{3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^2+2*x-1)/(x^2+x+1)^4,x)

[Out] -x/(x^2+x+1)^3
```

Maxima [A] time = 0.696387, size = 45, normalized size = 4.09

$$-\frac{x}{x^{6}+3\,x^{5}+6\,x^{4}+7\,x^{3}+6\,x^{2}+3\,x+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x^2 + 2*x - 1)/(x^2 + x + 1)^4,x, algorithm="maxima")

[Out] -x/(x^6 + 3*x^5 + 6*x^4 + 7*x^3 + 6*x^2 + 3*x + 1)
```

Fricas [A] time = 0.269817, size = 45, normalized size = 4.09

$$-\frac{x}{x^{6}+3\,x^{5}+6\,x^{4}+7\,x^{3}+6\,x^{2}+3\,x+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x^2 + 2*x - 1)/(x^2 + x + 1)^4,x, algorithm="fricas")

[Out] -x/(x^6 + 3*x^5 + 6*x^4 + 7*x^3 + 6*x^2 + 3*x + 1)
```

Sympy [A] time = 0.174365, size = 31, normalized size = 2.82

$$-\frac{x}{x^6+3x^5+6x^4+7x^3+6x^2+3x+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x**2+2*x-1)/(x**2+x+1)**4,x)
```

```
[Out] -x/(x**6 + 3*x**5 + 6*x**4 + 7*x**3 + 6*x**2 + 3*x + 1)
```

GIAC/XCAS [A] time = 0.271502, size = 15, normalized size = 1.36

$$-\frac{x}{(x^2+x+1)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x^2 + 2*x - 1)/(x^2 + x + 1)^4,x, algorithm="giac")
```

```
[Out] -x/(x^2 + x + 1)^3
```

3.178 $\int \left(a+bx+cx^2\right)^{5/2} \left(A+Cx^2\right)\, dx$

Optimal. Leaf size=267

$$-\frac{5\left(b^2-4ac\right)^3\left(-4acC+32Ac^2+9b^2C\right)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{32768c^{11/2}}+\frac{5\left(b^2-4ac\right)^2(b+2cx)\sqrt{a+bx+cx^2}\left(-4acC+32Ac^2+9b^2C\right)}{16384c^5}-\frac{5\left(b^2-4ac\right)(b+2cx)\left(a+bx+cx^2\right)^{3/2}\left(-4acC+32Ac^2+9b^2C\right)}{6144c^4}+\frac{(b+2cx)\left(a+bx+cx^2\right)^{5/2}\left(-4acC+32Ac^2+9b^2C\right)}{384c^3}-\frac{9bC\left(a+bx+cx^2\right)^{7/2}}{112c^2}+\frac{Cx\left(a+bx+cx^2\right)^{7/2}}{8c}$$

```
[Out] (5*(b^2 - 4*a*c)^2*(32*A*c^2 + 9*b^2*C - 4*a*c*C)*(b + 2*c*x)*Sqr
t[a + b*x + c*x^2])/(16384*c^5) - (5*(b^2 - 4*a*c)*(32*A*c^2 + 9*
b^2*C - 4*a*c*C)*(b + 2*c*x)*(a + b*x + c*x^2)^(3/2))/(6144*c^4)
+ ((32*A*c^2 + 9*b^2*C - 4*a*c*C)*(b + 2*c*x)*(a + b*x + c*x^2)^(
5/2))/(384*c^3) - (9*b*C*(a + b*x + c*x^2)^(7/2))/(112*c^2) + (C*
x*(a + b*x + c*x^2)^(7/2))/(8*c) - (5*(b^2 - 4*a*c)^3*(32*A*c^2 +
 9*b^2*C - 4*a*c*C)*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x +
 c*x^2])])/(32768*c^(11/2))
```

Rubi [A] time = 0.482614, antiderivative size = 267, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$-\frac{5\left(b^2-4ac\right)^3\left(-4acC+32Ac^2+9b^2C\right)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{32768c^{11/2}}+\frac{5\left(b^2-4ac\right)^2(b+2cx)\sqrt{a+bx+cx^2}\left(-4acC+32Ac^2+9b^2C\right)}{16384c^5}-\frac{5\left(b^2-4ac\right)(b+2cx)\left(a+bx+cx^2\right)^{3/2}\left(-4acC+32Ac^2+9b^2C\right)}{6144c^4}+\frac{(b+2cx)\left(a+bx+cx^2\right)^{5/2}\left(-4acC+32Ac^2+9b^2C\right)}{384c^3}-\frac{9bC\left(a+bx+cx^2\right)^{7/2}}{112c^2}+\frac{Cx\left(a+bx+cx^2\right)^{7/2}}{8c}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + b*x + c*x^2)^(5/2)*(A + C*x^2),x]
```

```
[Out] (5*(b^2 - 4*a*c)^2*(32*A*c^2 + 9*b^2*C - 4*a*c*C)*(b + 2*c*x)*Sqr
t[a + b*x + c*x^2])/(16384*c^5) - (5*(b^2 - 4*a*c)*(32*A*c^2 + 9*
b^2*C - 4*a*c*C)*(b + 2*c*x)*(a + b*x + c*x^2)^(3/2))/(6144*c^4)
+ ((32*A*c^2 + 9*b^2*C - 4*a*c*C)*(b + 2*c*x)*(a + b*x + c*x^2)^(
5/2))/(384*c^3) - (9*b*C*(a + b*x + c*x^2)^(7/2))/(112*c^2) + (C*
x*(a + b*x + c*x^2)^(7/2))/(8*c) - (5*(b^2 - 4*a*c)^3*(32*A*c^2 +
 9*b^2*C - 4*a*c*C)*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x +
 c*x^2])])/(32768*c^(11/2))
```

Rubi in Sympy [A] time = 30.8925, size = 257, normalized size = 0.96

$$-\frac{C\left(\frac{9b}{2}-7cx\right)\left(a+bx+cx^2\right)^{\frac{7}{2}}}{56c^2}+\frac{(b+2cx)\left(a+bx+cx^2\right)^{\frac{5}{2}}\left(32Ac^2-4Cac+9Cb^2\right)}{384c^3}-\frac{5(b+2cx)\left(-4ac+b^2\right)\left(a+bx+cx^2\right)^{\frac{3}{2}}\left(32Ac^2-4Cac+9Cb^2\right)}{6144c^4}+\frac{5(b+2cx)\left(-4ac+b^2\right)^2\sqrt{a+bx+cx^2}\left(32Ac^2-4Cac+9Cb^2\right)}{16384c^5}-\frac{5\left(-4ac+b^2\right)^3\left(32Ac^2-4Cac+9Cb^2\right)\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{32768c^{\frac{11}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+b*x+a)**(5/2)*(C*x**2+A),x)
```

```
[Out] -C*(9*b/2 - 7*c*x)*(a + b*x + c*x**2)**(7/2)/(56*c**2) + (b + 2*c
*x)*(a + b*x + c*x**2)**(5/2)*(32*A*c**2 - 4*C*a*c + 9*C*b**2)/(3
84*c**3) - 5*(b + 2*c*x)*(-4*a*c + b**2)*(a + b*x + c*x**2)**(3/2
)*(32*A*c**2 - 4*C*a*c + 9*C*b**2)/(6144*c**4) + 5*(b + 2*c*x)*(-
4*a*c + b**2)**2*sqrt(a + b*x + c*x**2)*(32*A*c**2 - 4*C*a*c + 9*
C*b**2)/(16384*c**5) - 5*(-4*a*c + b**2)**3*(32*A*c**2 - 4*C*a*c
+ 9*C*b**2)*atanh((b + 2*c*x)/(2*sqrt(c)*sqrt(a + b*x + c*x**2)))
/(32768*c**(11/2))
```

Mathematica [A] time = 0.749235, size = 357, normalized size = 1.34

$$\frac{2\sqrt{c}\sqrt{a+x(b+cx)}\left(224Ac^2(b+2cx)\left(16c^2\left(33a^2+26acx^2+8c^2x^4\right)+8b^2c\left(11cx^2-20a\right)+32bc^2x\left(13a+8cx^2\right)+15b^4-4\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(a + b*x + c*x^2)^(5/2)*(A + C*x^2),x]
```

```
[Out] (2*Sqrt[c]*Sqrt[a + x*(b + c*x)]*(224*A*c^2*(b + 2*c*x)*(15*b^4 -
 40*b^3*c*x + 32*b*c^2*x*(13*a + 8*c*x^2) + 8*b^2*c*(-20*a + 11*c
*x^2) + 16*c^2*(33*a^2 + 26*a*c*x^2 + 8*c^2*x^4)) + C*(945*b^7 -
630*b^6*c*x + 8*b^4*c^2*x*(791*a - 54*c*x^2) + 84*b^5*c*(-125*a +
 6*c*x^2) + 16*b^3*c^2*(2359*a^2 - 284*a*c*x^2 + 24*c^2*x^4) + 96
*b^2*c^3*x*(-199*a^2 + 36*a*c*x^2 + 648*c^2*x^4) + 896*c^4*x*(15*
a^3 + 118*a^2*c*x^2 + 136*a*c^2*x^4 + 48*c^3*x^6) + 64*b*c^3*(-66
3*a^3 + 174*a^2*c*x^2 + 2456*a*c^2*x^4 + 1584*c^3*x^6))) - 105*(b
^2 - 4*a*c)^3*(32*A*c^2 + 9*b^2*C - 4*a*c*C)*Log[b + 2*c*x + 2*Sq
rt[c]*Sqrt[a + x*(b + c*x)]])/(688128*c^(11/2))
```

Maple [B] time = 0.015, size = 997, normalized size = 3.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((c*x^2+b*x+a)^(5/2)*(C*x^2+A),x)
```

```
[Out] 3/128*C*b^3/c^3*(c*x^2+b*x+a)^(5/2)-15/2048*C*b^5/c^4*(c*x^2+b*x+
a)^(3/2)+45/16384*C*b^7/c^5*(c*x^2+b*x+a)^(1/2)+5/16*A*(c*x^2+b*x
+a)^(1/2)*x*a^2+5/512*A/c^3*(c*x^2+b*x+a)^(1/2)*b^5+5/16*A/c^(1/2
)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a^3-5/1024*A/c^(7/2
)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*b^6-5/192*A/c^2*(c*
x^2+b*x+a)^(3/2)*b^3+1/12*A/c*(c*x^2+b*x+a)^(5/2)*b+5/24*A*(c*x^2
+b*x+a)^(3/2)*x*a-5/128*C/c^(3/2)*a^4*ln((1/2*b+c*x)/c^(1/2)+(c*x
^2+b*x+a)^(1/2))-45/32768*C*b^8/c^(11/2)*ln((1/2*b+c*x)/c^(1/2)+(
c*x^2+b*x+a)^(1/2))+1/6*A*(c*x^2+b*x+a)^(5/2)*x-5/384*C/c^2*a^2*(
c*x^2+b*x+a)^(3/2)*b+25/768*C*b^3/c^3*(c*x^2+b*x+a)^(3/2)*a+3/64*
C*b^2/c^2*(c*x^2+b*x+a)^(5/2)*x-1/96*C/c^2*a*(c*x^2+b*x+a)^(5/2)*
b-5/192*C/c*a^2*(c*x^2+b*x+a)^(3/2)*x-5/64*A/c^2*(c*x^2+b*x+a)^(1
/2)*b^3*a-15/64*A/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1
/2))*b^2*a^2+15/256*A/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a
)^(1/2))*b^4*a+5/32*A/c*(c*x^2+b*x+a)^(1/2)*b*a^2+5/256*A/c^2*(c*
x^2+b*x+a)^(1/2)*x*b^4-5/96*A/c*(c*x^2+b*x+a)^(3/2)*x*b^2+5/48*A/
c*(c*x^2+b*x+a)^(3/2)*b*a+55/1024*C*b^3/c^3*(c*x^2+b*x+a)^(1/2)*a
^2-15/1024*C*b^4/c^3*(c*x^2+b*x+a)^(3/2)*x-9/112*b*C*(c*x^2+b*x+a
)^(7/2)/c^2+1/8*C*x*(c*x^2+b*x+a)^(7/2)/c+25/384*C*b^2/c^2*(c*x^2
+b*x+a)^(3/2)*x*a-95/2048*C*b^4/c^3*(c*x^2+b*x+a)^(1/2)*x*a-5/32*
A/c*(c*x^2+b*x+a)^(1/2)*x*a*b^2+55/512*C*b^2/c^2*(c*x^2+b*x+a)^(1
/2)*x*a^2+45/8192*C*b^6/c^4*(c*x^2+b*x+a)^(1/2)*x-75/1024*C*b^4/c
^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a^2+35/2048*C*
b^6/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a-1/48*C/
c*a*(c*x^2+b*x+a)^(5/2)*x-5/256*C/c^2*a^3*(c*x^2+b*x+a)^(1/2)*b+1
5/128*C*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a
^3-5/128*C/c*a^3*(c*x^2+b*x+a)^(1/2)*x-95/4096*C*b^5/c^4*(c*x^2+b
*x+a)^(1/2)*a
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)*(c*x^2 + b*x + a)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.419597, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)*(c*x^2 + b*x + a)^(5/2),x, algorithm="fricas")
```

```
[Out] [1/1376256*(4*(43008*C*c^7*x^7 + 101376*C*b*c^6*x^6 + 945*C*b^7 -
 10500*C*a*b^5*c + 118272*A*a^2*b*c^4 + 256*(243*C*b^2*c^5 + 476*
C*a*c^6 + 224*A*c^7)*x^5 + 128*(3*C*b^3*c^4 + 1228*C*a*b*c^5 + 11
20*A*b*c^6)*x^4 - 64*(663*C*a^3*b + 560*A*a*b^3)*c^3 - 16*(27*C*b
^4*c^3 - 216*C*a*b^2*c^4 - 11648*A*a*c^6 - 112*(59*C*a^2 + 54*A*b
^2)*c^5)*x^3 + 112*(337*C*a^2*b^3 + 30*A*b^5)*c^2 + 8*(63*C*b^5*c
^2 - 568*C*a*b^3*c^3 + 34944*A*a*b*c^5 + 16*(87*C*a^2*b + 14*A*b^
3)*c^4)*x^2 - 2*(315*C*b^6*c - 3164*C*a*b^4*c^2 - 118272*A*a^2*c^
5 - 1344*(5*C*a^3 + 8*A*a*b^2)*c^4 + 16*(597*C*a^2*b^2 + 70*A*b^4
)*c^3)*x)*sqrt(c*x^2 + b*x + a)*sqrt(c) + 105*(9*C*b^8 - 112*C*a*
b^6*c - 2048*A*a^3*c^5 + 256*(C*a^4 + 6*A*a^2*b^2)*c^4 - 384*(2*C
*a^3*b^2 + A*a*b^4)*c^3 + 32*(15*C*a^2*b^4 + A*b^6)*c^2)*log(4*(2
*c^2*x + b*c)*sqrt(c*x^2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2
+ 4*a*c)*sqrt(c)))/c^(11/2), 1/688128*(2*(43008*C*c^7*x^7 + 10137
6*C*b*c^6*x^6 + 945*C*b^7 - 10500*C*a*b^5*c + 118272*A*a^2*b*c^4
+ 256*(243*C*b^2*c^5 + 476*C*a*c^6 + 224*A*c^7)*x^5 + 128*(3*C*b^
3*c^4 + 1228*C*a*b*c^5 + 1120*A*b*c^6)*x^4 - 64*(663*C*a^3*b + 56
0*A*a*b^3)*c^3 - 16*(27*C*b^4*c^3 - 216*C*a*b^2*c^4 - 11648*A*a*c
^6 - 112*(59*C*a^2 + 54*A*b^2)*c^5)*x^3 + 112*(337*C*a^2*b^3 + 30
*A*b^5)*c^2 + 8*(63*C*b^5*c^2 - 568*C*a*b^3*c^3 + 34944*A*a*b*c^5
 + 16*(87*C*a^2*b + 14*A*b^3)*c^4)*x^2 - 2*(315*C*b^6*c - 3164*C*
a*b^4*c^2 - 118272*A*a^2*c^5 - 1344*(5*C*a^3 + 8*A*a*b^2)*c^4 + 1
6*(597*C*a^2*b^2 + 70*A*b^4)*c^3)*x)*sqrt(c*x^2 + b*x + a)*sqrt(-
c) - 105*(9*C*b^8 - 112*C*a*b^6*c - 2048*A*a^3*c^5 + 256*(C*a^4 +
 6*A*a^2*b^2)*c^4 - 384*(2*C*a^3*b^2 + A*a*b^4)*c^3 + 32*(15*C*a^
2*b^4 + A*b^6)*c^2)*arctan(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 +
 b*x + a)*c)))/(sqrt(-c)*c^5)]
```

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

$$\int (A+Cx^2)\left(a+bx+cx^2\right)^{\frac{5}{2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+b*x+a)**(5/2)*(C*x**2+A),x)
```

```
[Out] Integral((A + C*x**2)*(a + b*x + c*x**2)**(5/2), x)
```

GIAC/XCAS [A] time = 0.290284, size = 651, normalized size = 2.44

$$\frac{1}{344064}\sqrt{cx^2+bx+a}\left(2\left(4\left(2\left(8\left(2\left(12\left(14\,Cc^2x+33\,Cbc\right)x+\frac{243\,Cb^2c^7+476\,Cac^8+224\,Ac^9}{c^7}\right)x+\frac{3\,Cb^3c^6+1228\,Cabc^7}{c^7}\right.\right.\right.\right.\right.$$
$$+\frac{5\left(9\,Cb^8-112\,Cab^6c+480\,Ca^2b^4c^2+32\,Ab^6c^2-768\,Ca^3b^2c^3-384\,Aab^4c^3+256\,Ca^4c^4+1536\,Aa^2b^2c^4-2048\,Aa^3c^5\right)\ln\left(\right.}{32768\,c^{\frac{11}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)*(c*x^2 + b*x + a)^(5/2),x, algorithm="giac")
```

```
[Out] 1/344064*sqrt(c*x^2 + b*x + a)*(2*(4*(2*(8*(2*(12*(14*C*c^2*x + 3
3*C*b*c)*x + (243*C*b^2*c^7 + 476*C*a*c^8 + 224*A*c^9)/c^7)*x + (
3*C*b^3*c^6 + 1228*C*a*b*c^7 + 1120*A*b*c^8)/c^7)*x - (27*C*b^4*c
^5 - 216*C*a*b^2*c^6 - 6608*C*a^2*c^7 - 6048*A*b^2*c^7 - 11648*A*
a*c^8)/c^7)*x + (63*C*b^5*c^4 - 568*C*a*b^3*c^5 + 1392*C*a^2*b*c^
6 + 224*A*b^3*c^6 + 34944*A*a*b*c^7)/c^7)*x - (315*C*b^6*c^3 - 31
64*C*a*b^4*c^4 + 9552*C*a^2*b^2*c^5 + 1120*A*b^4*c^5 - 6720*C*a^3
*c^6 - 10752*A*a*b^2*c^6 - 118272*A*a^2*c^7)/c^7)*x + (945*C*b^7*
c^2 - 10500*C*a*b^5*c^3 + 37744*C*a^2*b^3*c^4 + 3360*A*b^5*c^4 -
42432*C*a^3*b*c^5 - 35840*A*a*b^3*c^5 + 118272*A*a^2*b*c^6)/c^7)
+ 5/32768*(9*C*b^8 - 112*C*a*b^6*c + 480*C*a^2*b^4*c^2 + 32*A*b^6
*c^2 - 768*C*a^3*b^2*c^3 - 384*A*a*b^4*c^3 + 256*C*a^4*c^4 + 1536
*A*a^2*b^2*c^4 - 2048*A*a^3*c^5)*ln(abs(-2*(sqrt(c)*x - sqrt(c*x^
2 + b*x + a))*sqrt(c) - b))/c^(11/2)
```

3.179 $\int \left(a+bx+cx^2\right)^{3/2} \left(A+Cx^2\right) \, dx$

Optimal. Leaf size=212

$$\frac{\left(b^2-4ac\right)^2 \left(-4acC+24Ac^2+7b^2C\right) \tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{1024c^{9/2}} - \frac{\left(b^2-4ac\right)(b+2cx)\sqrt{a+bx+cx^2}\left(-4acC+24Ac^2+7b^2C\right)}{512c^4} + \frac{(b+2cx)\left(a+bx+cx^2\right)^{3/2}\left(-4acC+24Ac^2+7b^2C\right)}{192c^3} - \frac{7bC\left(a+bx+cx^2\right)^{5/2}}{60c^2} + \frac{Cx\left(a+bx+cx^2\right)^{5/2}}{6c}$$

```
[Out] -((b^2 - 4*a*c)*(24*A*c^2 + 7*b^2*C - 4*a*c*C)*(b + 2*c*x)*Sqrt[a
 + b*x + c*x^2])/(512*c^4) + ((24*A*c^2 + 7*b^2*C - 4*a*c*C)*(b +
 2*c*x)*(a + b*x + c*x^2)^(3/2))/(192*c^3) - (7*b*C*(a + b*x + c*
x^2)^(5/2))/(60*c^2) + (C*x*(a + b*x + c*x^2)^(5/2))/(6*c) + ((b^
2 - 4*a*c)^2*(24*A*c^2 + 7*b^2*C - 4*a*c*C)*ArcTanh[(b + 2*c*x)/(
2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(1024*c^(9/2))
```

Rubi [A] time = 0.351413, antiderivative size = 212, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.227$

$$\frac{\left(b^2-4ac\right)^2 \left(-4acC+24Ac^2+7b^2C\right) \tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{1024c^{9/2}} - \frac{\left(b^2-4ac\right)(b+2cx)\sqrt{a+bx+cx^2}\left(-4acC+24Ac^2+7b^2C\right)}{512c^4} + \frac{(b+2cx)\left(a+bx+cx^2\right)^{3/2}\left(-4acC+24Ac^2+7b^2C\right)}{192c^3} - \frac{7bC\left(a+bx+cx^2\right)^{5/2}}{60c^2} + \frac{Cx\left(a+bx+cx^2\right)^{5/2}}{6c}$$

Antiderivative was successfully verified.

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


```
[Out] -((b^2 - 4*a*c)*(24*A*c^2 + 7*b^2*C - 4*a*c*C)*(b + 2*c*x)*Sqrt[a
 + b*x + c*x^2])/(512*c^4) + ((24*A*c^2 + 7*b^2*C - 4*a*c*C)*(b +
 2*c*x)*(a + b*x + c*x^2)^(3/2))/(192*c^3) - (7*b*C*(a + b*x + c*
x^2)^(5/2))/(60*c^2) + (C*x*(a + b*x + c*x^2)^(5/2))/(6*c) + ((b^
2 - 4*a*c)^2*(24*A*c^2 + 7*b^2*C - 4*a*c*C)*ArcTanh[(b + 2*c*x)/(
2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(1024*c^(9/2))
```

Rubi in Sympy [A] time = 21.8867, size = 196, normalized size = 0.92

$$-\frac{C\left(\frac{7b}{2}-5cx\right)\left(a+bx+cx^2\right)^{\frac{5}{2}}}{30c^2}+\frac{(b+2cx)\left(a+bx+cx^2\right)^{\frac{3}{2}}\left(24Ac^2-4Cac+7Cb^2\right)}{192c^3}-\frac{(b+2cx)\left(-4ac+b^2\right)\sqrt{a+bx+cx^2}\left(24Ac^2-4Cac+7Cb^2\right)}{512c^4}+\frac{\left(-4ac+b^2\right)^2\left(24Ac^2-4Cac+7Cb^2\right)\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{1024c^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -C*(7*b/2 - 5*c*x)*(a + b*x + c*x**2)**(5/2)/(30*c**2) + (b + 2*c
*x)*(a + b*x + c*x**2)**(3/2)*(24*A*c**2 - 4*C*a*c + 7*C*b**2)/(1
92*c**3) - (b + 2*c*x)*(-4*a*c + b**2)*sqrt(a + b*x + c*x**2)*(24
*A*c**2 - 4*C*a*c + 7*C*b**2)/(512*c**4) + (-4*a*c + b**2)**2*(24
*A*c**2 - 4*C*a*c + 7*C*b**2)*atanh((b + 2*c*x)/(2*sqrt(c)*sqrt(a
 + b*x + c*x**2)))/(1024*c**(9/2))
```

Mathematica [A] time = 0.420574, size = 227, normalized size = 1.07

$$\frac{15\left(b^2-4ac\right)^2\left(-4acC+24Ac^2+7b^2C\right)\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)-2\sqrt{c}\sqrt{a+x(b+cx)}\left(C\left(-16bc^2\left(-81a^2+18a\right.\right.\right.}{}$$

Antiderivative was successfully verified.

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

```
[Out] (-2*Sqrt[c]*Sqrt[a + x*(b + c*x)]*(-120*A*c^2*(b + 2*c*x)*(-3*b^2
 + 8*b*c*x + 4*c*(5*a + 2*c*x^2)) + C*(105*b^5 - 70*b^4*c*x - 48*
b^2*c^2*x*(-9*a + c*x^2) + 8*b^3*c*(-95*a + 7*c*x^2) - 160*c^3*x*
(3*a^2 + 14*a*c*x^2 + 8*c^2*x^4) - 16*b*c^2*(-81*a^2 + 18*a*c*x^2
 + 104*c^2*x^4))) + 15*(b^2 - 4*a*c)^2*(24*A*c^2 + 7*b^2*C - 4*a*
c*C)*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]])/(15360*c^(
9/2))
```

Maple [B] time = 0.011, size = 613, normalized size = 2.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/8*C*b^2/c^2*(c*x^2+b*x+a)^(1/2)*x*a-3/64*A/c^2*(c*x^2+b*x+a)^(1
/2)*b^3+7/1024*C*b^6/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)
^(1/2))-1/16*C/c^(3/2)*a^3*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(
1/2))+7/192*C*b^3/c^3*(c*x^2+b*x+a)^(3/2)-7/512*C*b^5/c^4*(c*x^2+
b*x+a)^(1/2)+3/8*A/c^(1/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(
1/2))*a^2+3/128*A/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1
/2))*b^4+1/8*A/c*(c*x^2+b*x+a)^(3/2)*b+3/8*A*(c*x^2+b*x+a)^(1/2)*
x*a-1/16*C/c*a^2*(c*x^2+b*x+a)^(1/2)*x+1/4*A*(c*x^2+b*x+a)^(3/2)*
x-1/32*C/c^2*a^2*(c*x^2+b*x+a)^(1/2)*b-1/48*C/c^2*a*(c*x^2+b*x+a)
^(3/2)*b-7/256*C*b^4/c^3*(c*x^2+b*x+a)^(1/2)*x+1/16*C*b^3/c^3*(c*
x^2+b*x+a)^(1/2)*a+9/64*C*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x
^2+b*x+a)^(1/2))*a^2-15/256*C*b^4/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+
(c*x^2+b*x+a)^(1/2))*a-1/24*C/c*a*(c*x^2+b*x+a)^(3/2)*x-7/60*b*C*
(c*x^2+b*x+a)^(5/2)/c^2+1/6*C*x*(c*x^2+b*x+a)^(5/2)/c-3/32*A/c*(c
*x^2+b*x+a)^(1/2)*x*b^2+7/96*C*b^2/c^2*(c*x^2+b*x+a)^(3/2)*x-3/16
*A/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*b^2*a+3/16
*A/c*(c*x^2+b*x+a)^(1/2)*b*a
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.338017, size = 1, normalized size = 0.

$$\left[\frac{4\left(1280\,Cc^5x^5 + 1664\,Cbc^4x^4 - 105\,Cb^5 + 760\,Cab^3c + 2400\,Aabc^3 + 16\left(3\,Cb^2c^3 + 140\,Cac^4 + 120\,Ac^5\right)x^3 - 72\left(18\,Ca^2b + \right.\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] [1/30720*(4*(1280*C*c^5*x^5 + 1664*C*b*c^4*x^4 - 105*C*b^5 + 760*
C*a*b^3*c + 2400*A*a*b*c^3 + 16*(3*C*b^2*c^3 + 140*C*a*c^4 + 120*
```

```
A*c^5)*x^3 - 72*(18*C*a^2*b + 5*A*b^3)*c^2 - 8*(7*C*b^3*c^2 - 36*
C*a*b*c^3 - 360*A*b*c^4)*x^2 + 2*(35*C*b^4*c - 216*C*a*b^2*c^2 +
2400*A*a*c^4 + 120*(2*C*a^2 + A*b^2)*c^3)*x)*sqrt(c*x^2 + b*x + a
)*sqrt(c) + 15*(7*C*b^6 - 60*C*a*b^4*c + 384*A*a^2*c^4 - 64*(C*a^
3 + 3*A*a*b^2)*c^3 + 24*(6*C*a^2*b^2 + A*b^4)*c^2)*log(-4*(2*c^2*
x + b*c)*sqrt(c*x^2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a
*c)*sqrt(c)))/c^(9/2), 1/15360*(2*(1280*C*c^5*x^5 + 1664*C*b*c^4*
x^4 - 105*C*b^5 + 760*C*a*b^3*c + 2400*A*a*b*c^3 + 16*(3*C*b^2*c^
3 + 140*C*a*c^4 + 120*A*c^5)*x^3 - 72*(18*C*a^2*b + 5*A*b^3)*c^2
- 8*(7*C*b^3*c^2 - 36*C*a*b*c^3 - 360*A*b*c^4)*x^2 + 2*(35*C*b^4*
c - 216*C*a*b^2*c^2 + 2400*A*a*c^4 + 120*(2*C*a^2 + A*b^2)*c^3)*x
)*sqrt(c*x^2 + b*x + a)*sqrt(-c) + 15*(7*C*b^6 - 60*C*a*b^4*c + 3
84*A*a^2*c^4 - 64*(C*a^3 + 3*A*a*b^2)*c^3 + 24*(6*C*a^2*b^2 + A*b
^4)*c^2)*arctan(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c
)))/(sqrt(-c)*c^4)]
```

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

$$\int (A + Cx^2) (a + bx + cx^2)^{\frac{3}{2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((A + C*x**2)*(a + b*x + c*x**2)**(3/2), x)
```

GIAC/XCAS [A] time = 0.285937, size = 401, normalized size = 1.89

$$\frac{1}{7680}\sqrt{cx^2+bx+a}\left(2\left(4\left(2\left(8\,(10\,Ccx+13\,Cb)x+\frac{3\,Cb^2c^4+140\,Cac^5+120\,Ac^6}{c^5}\right)x-\frac{7\,Cb^3c^3-36\,Cabc^4-360\,Abc^5}{c^5}\right)x+\right.\right.$$
$$-\frac{\left(7\,Cb^6-60\,Cab^4c+144\,Ca^2b^2c^2+24\,Ab^4c^2-64\,Ca^3c^3-192\,Aab^2c^3+384\,Aa^2c^4\right)\ln\left(\left|-2\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right)\sqrt{c}-b\right.\right.}{1024\,c^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/7680*sqrt(c*x^2 + b*x + a)*(2*(4*(2*(8*(10*C*c*x + 13*C*b)*x +
(3*C*b^2*c^4 + 140*C*a*c^5 + 120*A*c^6)/c^5)*x - (7*C*b^3*c^3 - 3
6*C*a*b*c^4 - 360*A*b*c^5)/c^5)*x + (35*C*b^4*c^2 - 216*C*a*b^2*c
^3 + 240*C*a^2*c^4 + 120*A*b^2*c^4 + 2400*A*a*c^5)/c^5)*x - (105*
C*b^5*c - 760*C*a*b^3*c^2 + 1296*C*a^2*b*c^3 + 360*A*b^3*c^3 - 24
```

```
00*A*a*b*c^4)/c^5) - 1/1024*(7*C*b^6 - 60*C*a*b^4*c + 144*C*a^2*b
^2*c^2 + 24*A*b^4*c^2 - 64*C*a^3*c^3 - 192*A*a*b^2*c^3 + 384*A*a^
2*c^4)*ln(abs(-2*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))*sqrt(c) - b)
)/c^(9/2)
```

3.180 $\int \sqrt{a+bx+cx^2}\left(A+Cx^2\right)\,dx$

Optimal. Leaf size=157

$$-\frac{\left(b^2-4ac\right)\left(-4acC+16Ac^2+5b^2C\right)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{128c^{7/2}}+\frac{(b+2cx)\sqrt{a+bx+cx^2}\left(-4acC+16Ac^2+5b^2C\right)}{64c^3}-\frac{5bC\left(a+bx+cx^2\right)^{3/2}}{24c^2}+\frac{Cx\left(a+bx+cx^2\right)^{3/2}}{4c}$$

```
[Out] ((16*A*c^2 + 5*b^2*C - 4*a*c*C)*(b + 2*c*x)*Sqrt[a + b*x + c*x^2]
)/(64*c^3) - (5*b*C*(a + b*x + c*x^2)^(3/2))/(24*c^2) + (C*x*(a +
 b*x + c*x^2)^(3/2))/(4*c) - ((b^2 - 4*a*c)*(16*A*c^2 + 5*b^2*C -
 4*a*c*C)*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])
/(128*c^(7/2))
```

Rubi [A] time = 0.257447, antiderivative size = 157, 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

$$-\frac{\left(b^2-4ac\right)\left(-4acC+16Ac^2+5b^2C\right)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{128c^{7/2}}+\frac{(b+2cx)\sqrt{a+bx+cx^2}\left(-4acC+16Ac^2+5b^2C\right)}{64c^3}-\frac{5bC\left(a+bx+cx^2\right)^{3/2}}{24c^2}+\frac{Cx\left(a+bx+cx^2\right)^{3/2}}{4c}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a + b*x + c*x^2]*(A + C*x^2),x]
```

```
[Out] ((16*A*c^2 + 5*b^2*C - 4*a*c*C)*(b + 2*c*x)*Sqrt[a + b*x + c*x^2]
)/(64*c^3) - (5*b*C*(a + b*x + c*x^2)^(3/2))/(24*c^2) + (C*x*(a +
 b*x + c*x^2)^(3/2))/(4*c) - ((b^2 - 4*a*c)*(16*A*c^2 + 5*b^2*C -
 4*a*c*C)*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])
/(128*c^(7/2))
```

Rubi in Sympy [A] time = 14.6798, size = 139, normalized size = 0.89

$$-\frac{C\left(\frac{5b}{2}-3cx\right)\left(a+bx+cx^2\right)^{\frac{3}{2}}}{12c^2}+\frac{(b+2cx)\sqrt{a+bx+cx^2}\left(16Ac^2-4Cac+5Cb^2\right)}{64c^3}-\frac{\left(-4ac+b^2\right)\left(16Ac^2-4Cac+5Cb^2\right)\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{128c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+b*x+a)**(1/2)*(C*x**2+A),x)
```

```
[Out] -C*(5*b/2 - 3*c*x)*(a + b*x + c*x**2)**(3/2)/(12*c**2) + (b + 2*c
*x)*sqrt(a + b*x + c*x**2)*(16*A*c**2 - 4*C*a*c + 5*C*b**2)/(64*c
**3) - (-4*a*c + b**2)*(16*A*c**2 - 4*C*a*c + 5*C*b**2)*atanh((b
+ 2*c*x)/(2*sqrt(c)*sqrt(a + b*x + c*x**2)))/(128*c**(7/2))
```

Mathematica [A] time = 0.181001, size = 142, normalized size = 0.9

$$\frac{2\sqrt{c}\sqrt{a+x(b+cx)}\left(C\left(b\left(8c^2x^2-52ac\right)+24c^2x\left(a+2cx^2\right)+15b^3-10b^2cx\right)+48Ac^2(b+2cx)\right)-3\left(b^2-4ac\right)\left(-4acC+\right.}{384c^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a + b*x + c*x^2]*(A + C*x^2),x]
```

```
[Out] (2*Sqrt[c]*Sqrt[a + x*(b + c*x)]*(48*A*c^2*(b + 2*c*x) + C*(15*b^
3 - 10*b^2*c*x + 24*c^2*x*(a + 2*c*x^2) + b*(-52*a*c + 8*c^2*x^2)
)) - 3*(b^2 - 4*a*c)*(16*A*c^2 + 5*b^2*C - 4*a*c*C)*Log[b + 2*c*x
 + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]])/(384*c^(7/2))
```

Maple [B] time = 0.009, size = 327, normalized size = 2.1

$$\frac{Ax}{2}\sqrt{cx^2+bx+a}+\frac{Ab}{4\,c}\sqrt{cx^2+bx+a}+\frac{Aa}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)\frac{1}{\sqrt{c}}$$
$$-\frac{Ab^2}{8}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}+\frac{Cx}{4\,c}\left(cx^2+bx+a\right)^{\frac{3}{2}}-\frac{5\,bC}{24\,c^2}\left(cx^2+bx+a\right)^{\frac{3}{2}}$$
$$+\frac{5\,Cb^2x}{32\,c^2}\sqrt{cx^2+bx+a}+\frac{5\,Cb^3}{64\,c^3}\sqrt{cx^2+bx+a}+\frac{3\,Cb^2a}{16}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{5}{2}}$$
$$-\frac{5\,Cb^4}{128}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{7}{2}}-\frac{Cax}{8\,c}\sqrt{cx^2+bx+a}$$
$$-\frac{abC}{16\,c^2}\sqrt{cx^2+bx+a}-\frac{a^2C}{8}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+b*x+a)^(1/2)*(C*x^2+A),x)
```

```
[Out] 1/2*A*(c*x^2+b*x+a)^(1/2)*x+1/4*A/c*(c*x^2+b*x+a)^(1/2)*b+1/2*A/c
^(1/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a-1/8*A/c^(3/2
)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*b^2+1/4*C*x*(c*x^2+
b*x+a)^(3/2)/c-5/24*b*C*(c*x^2+b*x+a)^(3/2)/c^2+5/32*C*b^2/c^2*(c
*x^2+b*x+a)^(1/2)*x+5/64*C*b^3/c^3*(c*x^2+b*x+a)^(1/2)+3/16*C*b^2
/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a-5/128*C*b^
4/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))-1/8*C/c*a*(
c*x^2+b*x+a)^(1/2)*x-1/16*C/c^2*a*(c*x^2+b*x+a)^(1/2)*b-1/8*C/c^(
3/2)*a^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^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((C*x^2 + A)*sqrt(c*x^2 + b*x + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.312667, size = 1, normalized size = 0.01

$$\left[\frac{4\left(48\,Cc^3x^3+8\,Cbc^2x^2+15\,Cb^3-52\,Cabc+48\,Abc^2-2\left(5\,Cb^2c-12\,Cac^2-48\,Ac^3\right)x\right)\sqrt{cx^2+bx+a}\sqrt{c}-3\left(5\,Cb^4-24\right.}{768\,c^{\frac{7}{2}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)*sqrt(c*x^2 + b*x + a),x, algorithm="fricas")
```

```
[Out] [1/768*(4*(48*C*c^3*x^3 + 8*C*b*c^2*x^2 + 15*C*b^3 - 52*C*a*b*c +
 48*A*b*c^2 - 2*(5*C*b^2*c - 12*C*a*c^2 - 48*A*c^3)*x)*sqrt(c*x^2
 + b*x + a)*sqrt(c) - 3*(5*C*b^4 - 24*C*a*b^2*c - 64*A*a*c^3 + 16
*(C*a^2 + A*b^2)*c^2)*log(-4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x + a
) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))/c^(7/2), 1/384*
(2*(48*C*c^3*x^3 + 8*C*b*c^2*x^2 + 15*C*b^3 - 52*C*a*b*c + 48*A*b
*c^2 - 2*(5*C*b^2*c - 12*C*a*c^2 - 48*A*c^3)*x)*sqrt(c*x^2 + b*x
+ a)*sqrt(-c) - 3*(5*C*b^4 - 24*C*a*b^2*c - 64*A*a*c^3 + 16*(C*a^
2 + A*b^2)*c^2)*arctan(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 + b*x
 + a)*c)))/(sqrt(-c)*c^3)]
```

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

$$\int \left(A+Cx^2\right)\sqrt{a+bx+cx^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x**2+b*x+a)**(1/2)*(C*x**2+A),x)
```

```
[Out] Integral((A + C*x**2)*sqrt(a + b*x + c*x**2), x)
```

GIAC/XCAS [A] time = 0.286695, size = 216, normalized size = 1.38

$$\frac{1}{192}\sqrt{cx^2+bx+a}\left(2\left(4\left(6\,Cx+\frac{Cb}{c}\right)x-\frac{5\,Cb^2c-12\,Cac^2-48\,Ac^3}{c^3}\right)x+\frac{15\,Cb^3-52\,Cabc+48\,Abc^2}{c^3}\right)+\frac{\left(5\,Cb^4-24\,Cab^2c+16\,Ca^2c^2+16\,Ab^2c^2-64\,Aac^3\right)\ln\left(\left|-2\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right)\sqrt{c}-b\right|\right)}{128\,c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)*sqrt(c*x^2 + b*x + a),x, algorithm="giac")
```

```
[Out] 1/192*sqrt(c*x^2 + b*x + a)*(2*(4*(6*C*x + C*b/c)*x - (5*C*b^2*c
- 12*C*a*c^2 - 48*A*c^3)/c^3)*x + (15*C*b^3 - 52*C*a*b*c + 48*A*b
*c^2)/c^3) + 1/128*(5*C*b^4 - 24*C*a*b^2*c + 16*C*a^2*c^2 + 16*A*
b^2*c^2 - 64*A*a*c^3)*ln(abs(-2*(sqrt(c)*x - sqrt(c*x^2 + b*x + a
))*sqrt(c) - b))/c^(7/2)
```

3.181 $\int \frac{A+Cx^2}{\sqrt{a+bx+cx^2}} \, dx$

Optimal. Leaf size=104

$$\frac{\left(-4acC+8Ac^2+3b^2C\right)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{8c^{5/2}}-\frac{3bC\sqrt{a+bx+cx^2}}{4c^2}+\frac{Cx\sqrt{a+bx+cx^2}}{2c}$$

```
[Out] (-3*b*C*Sqrt[a + b*x + c*x^2])/(4*c^2) + (C*x*Sqrt[a + b*x + c*x^
2])/(2*c) + ((8*A*c^2 + 3*b^2*C - 4*a*c*C)*ArcTanh[(b + 2*c*x)/(2
*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(8*c^(5/2))
```

Rubi [A] time = 0.164019, antiderivative size = 104, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$

$$\frac{\left(-4acC+8Ac^2+3b^2C\right)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{8c^{5/2}}-\frac{3bC\sqrt{a+bx+cx^2}}{4c^2}+\frac{Cx\sqrt{a+bx+cx^2}}{2c}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + C*x^2)/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] (-3*b*C*Sqrt[a + b*x + c*x^2])/(4*c^2) + (C*x*Sqrt[a + b*x + c*x^
2])/(2*c) + ((8*A*c^2 + 3*b^2*C - 4*a*c*C)*ArcTanh[(b + 2*c*x)/(2
*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(8*c^(5/2))
```

Rubi in Sympy [A] time = 10.682, size = 83, normalized size = 0.8

$$-\frac{C\left(\frac{3b}{2}-cx\right)\sqrt{a+bx+cx^2}}{2c^2}+\frac{\left(8Ac^2-4Cac+3Cb^2\right)\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{8c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+A)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] -C*(3*b/2 - c*x)*sqrt(a + b*x + c*x**2)/(2*c**2) + (8*A*c**2 - 4*
C*a*c + 3*C*b**2)*atanh((b + 2*c*x)/(2*sqrt(c)*sqrt(a + b*x + c*x
**2)))/(8*c**(5/2))
```

Mathematica [A] time = 0.197034, size = 84, normalized size = 0.81

$$\frac{\left(-4acC+8Ac^2+3b^2C\right)\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)}{8c^{5/2}}+\frac{C(2cx-3b)\sqrt{a+x(b+cx)}}{4c^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + C*x^2)/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] (C*(-3*b + 2*c*x)*Sqrt[a + x*(b + c*x)])/(4*c^2) + ((8*A*c^2 + 3*
b^2*C - 4*a*c*C)*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]]
)/(8*c^(5/2))
```

Maple [A] time = 0.009, size = 136, normalized size = 1.3

$$A\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)\frac{1}{\sqrt{c}}+\frac{Cx}{2c}\sqrt{cx^2+bx+a}-\frac{3bC}{4c^2}\sqrt{cx^2+bx+a}+\frac{3Cb^2}{8}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{5}{2}}-\frac{aC}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+A)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] A*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))/c^(1/2)+1/2*C*x*(c*
x^2+b*x+a)^(1/2)/c-3/4*b*C*(c*x^2+b*x+a)^(1/2)/c^2+3/8*C*b^2/c^(5
/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))-1/2*C*a/c^(3/2)*l
n((1/2*b+c*x)/c^(1/2)+(c*x^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((C*x^2 + A)/sqrt(c*x^2 + b*x + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.358671, size = 1, normalized size = 0.01

$$\left[\frac{4\,(2\,Ccx-3\,Cb)\sqrt{cx^2+bx+a}\sqrt{c}+\left(3\,Cb^2-4\,Cac+8\,Ac^2\right)\log\left(-4\left(2\,c^2x+bc\right)\sqrt{cx^2+bx+a}-\left(8\,c^2x^2+8\,bcx+b^2+4\,a\right.\right.}{16\,c^{\frac{5}{2}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] [1/16*(4*(2*C*c*x - 3*C*b)*sqrt(c*x^2 + b*x + a)*sqrt(c) + (3*C*b
^2 - 4*C*a*c + 8*A*c^2)*log(-4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x +
 a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))/c^(5/2), 1/8*
(2*(2*C*c*x - 3*C*b)*sqrt(c*x^2 + b*x + a)*sqrt(-c) + (3*C*b^2 -
4*C*a*c + 8*A*c^2)*arctan(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 +
b*x + a)*c)))/(sqrt(-c)*c^2)]
```

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

$$\int \frac{A+Cx^2}{\sqrt{a+bx+cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+A)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((A + C*x**2)/sqrt(a + b*x + c*x**2), x)
```

GIAC/XCAS [A] time = 0.28871, size = 113, normalized size = 1.09

$$\frac{1}{4}\sqrt{cx^2+bx+a}\left(\frac{2\,Cx}{c}-\frac{3\,Cb}{c^2}\right)-\frac{\left(3\,Cb^2-4\,Cac+8\,Ac^2\right)\ln\left(\left|-2\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right)\sqrt{c}-b\right|\right)}{8\,c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/4*sqrt(c*x^2 + b*x + a)*(2*C*x/c - 3*C*b/c^2) - 1/8*(3*C*b^2 -
4*C*a*c + 8*A*c^2)*ln(abs(-2*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))*
sqrt(c) - b))/c^(5/2)
```

3.182 $\int \frac{A+Cx^2}{(a+bx+cx^2)^{3/2}}\, dx$

Optimal. Leaf size=98

$$\frac{C\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{c^{3/2}}-\frac{2\left(x\left(C\left(b^2-2ac\right)+2Ac^2\right)+bc\left(\frac{aC}{c}+A\right)\right)}{c\left(b^2-4ac\right)\sqrt{a+bx+cx^2}}$$

```
[Out] (-2*(b*c*(A + (a*C)/c) + (2*A*c^2 + (b^2 - 2*a*c)*C)*x))/(c*(b^2
- 4*a*c)*Sqrt[a + b*x + c*x^2]) + (C*ArcTanh[(b + 2*c*x)/(2*Sqrt[
c]*Sqrt[a + b*x + c*x^2])])/c^(3/2)
```

Rubi [A] time = 0.153834, antiderivative size = 98, 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

$$\frac{C\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{c^{3/2}}-\frac{2\left(x\left(C\left(b^2-2ac\right)+2Ac^2\right)+b(aC+Ac)\right)}{c\left(b^2-4ac\right)\sqrt{a+bx+cx^2}}$$

Antiderivative was successfully verified.

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

```
[Out] (-2*(b*(A*c + a*C) + (2*A*c^2 + (b^2 - 2*a*c)*C)*x))/(c*(b^2 - 4*
a*c)*Sqrt[a + b*x + c*x^2]) + (C*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*S
qrt[a + b*x + c*x^2])])/c^(3/2)
```

Rubi in Sympy [A] time = 10.9638, size = 90, normalized size = 0.92

$$\frac{C\,\mathrm{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{c^{\frac{3}{2}}}-\frac{2\left(b\left(Ac+Ca\right)+x\left(2Ac^2-2Cac+Cb^2\right)\right)}{c\left(-4ac+b^2\right)\sqrt{a+bx+cx^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] C*atanh((b + 2*c*x)/(2*sqrt(c)*sqrt(a + b*x + c*x**2)))/c**(3/2)
- 2*(b*(A*c + C*a) + x*(2*A*c**2 - 2*C*a*c + C*b**2))/(c*(-4*a*c
+ b**2)*sqrt(a + b*x + c*x**2))
```

Mathematica [A] time = 0.26796, size = 102, normalized size = 1.04

$$\frac{\frac{2\sqrt{c}\left(aC(b-2cx)+Ac(b+2cx)+b^2Cx\right)}{\sqrt{a+x(b+cx)}}-C\left(b^2-4ac\right)\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)}{c^{3/2}\left(4ac-b^2\right)}$$

Antiderivative was successfully verified.

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

```
[Out] ((2*Sqrt[c]*(b^2*C*x + a*C*(b - 2*c*x) + A*c*(b + 2*c*x)))/Sqrt[a
 + x*(b + c*x)] - (b^2 - 4*a*c)*C*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[
a + x*(b + c*x)]])/(c^(3/2)*(-b^2 + 4*a*c))
```

Maple [A] time = 0.007, size = 169, normalized size = 1.7

$$2\frac{A(2cx+b)}{(4ac-b^2)\sqrt{cx^2+bx+a}}-\frac{Cx}{c}\frac{1}{\sqrt{cx^2+bx+a}}+\frac{Cb}{2c^2}\frac{1}{\sqrt{cx^2+bx+a}}+\frac{Cb^2x}{c(4ac-b^2)}\frac{1}{\sqrt{cx^2+bx+a}}+\frac{Cb^3}{2c^2(4ac-b^2)}\frac{1}{\sqrt{cx^2+bx+a}}+C\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 2*A*(2*c*x+b)/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)-C*x/c/(c*x^2+b*x+a)
^(1/2)+1/2*C*b/c^2/(c*x^2+b*x+a)^(1/2)+C*b^2/c/(4*a*c-b^2)/(c*x^2
+b*x+a)^(1/2)*x+1/2*C*b^3/c^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)+C/c
^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^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((C*x^2 + A)/(c*x^2 + b*x + a)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.378438, size = 1, normalized size = 0.01

$$\left[-\frac{4\left(Cab + Abc + \left(Cb^2 - 2\,Cac + 2\,Ac^2\right)x\right)\sqrt{cx^2 + bx + a}\sqrt{c} - \left(Cab^2 - 4\,Ca^2c + \left(Cb^2c - 4\,Cac^2\right)x^2 + \left(Cb^3 - 4\,Cabc\right)x\right)\log\cdots}{2\,(ab^2c - 4\,a^2c^2 + (b^2c^2 - 4\,ac^3)x^2 + (b^3c - 4\,abc^2)x)\sqrt{\cdots}}\right.$$

$$-\frac{2\left(Cab + Abc + \left(Cb^2 - 2\,Cac + 2\,Ac^2\right)x\right)\sqrt{cx^2 + bx + a}\sqrt{-c} - \left(Cab^2 - 4\,Ca^2c + \left(Cb^2c - 4\,Cac^2\right)x^2 + \left(Cb^3 - 4\,Cabc\right)x\right)\mathrm{ar}\cdots}{(ab^2c - 4\,a^2c^2 + (b^2c^2 - 4\,ac^3)x^2 + (b^3c - 4\,abc^2)x)\sqrt{-c}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] [-1/2*(4*(C*a*b + A*b*c + (C*b^2 - 2*C*a*c + 2*A*c^2)*x)*sqrt(c*x
^2 + b*x + a)*sqrt(c) - (C*a*b^2 - 4*C*a^2*c + (C*b^2*c - 4*C*a*c
^2)*x^2 + (C*b^3 - 4*C*a*b*c)*x)*log(-4*(2*c^2*x + b*c)*sqrt(c*x^
2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))/((a*
b^2*c - 4*a^2*c^2 + (b^2*c^2 - 4*a*c^3)*x^2 + (b^3*c - 4*a*b*c^2)
*x)*sqrt(c)), -(2*(C*a*b + A*b*c + (C*b^2 - 2*C*a*c + 2*A*c^2)*x)
*sqrt(c*x^2 + b*x + a)*sqrt(-c) - (C*a*b^2 - 4*C*a^2*c + (C*b^2*c
 - 4*C*a*c^2)*x^2 + (C*b^3 - 4*C*a*b*c)*x)*arctan(1/2*(2*c*x + b)
*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))/((a*b^2*c - 4*a^2*c^2 + (b^
2*c^2 - 4*a*c^3)*x^2 + (b^3*c - 4*a*b*c^2)*x)*sqrt(-c))]
```

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

$$\int \frac{A + Cx^2}{(a + bx + cx^2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((A + C*x**2)/(a + b*x + c*x**2)**(3/2), x)
```

GIAC/XCAS [A] time = 0.291801, size = 149, normalized size = 1.52

$$-\frac{2\left(\frac{\left(Cb^2-2\,Cac+2\,Ac^2\right)x}{b^2c-4\,ac^2} + \frac{Cab+Abc}{b^2c-4\,ac^2}\right)}{\sqrt{cx^2 + bx + a}} - \frac{C\ln\left(\left|-2\left(\sqrt{c}x - \sqrt{cx^2 + bx + a}\right)\sqrt{c} - b\right|\right)}{c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -2*((C*b^2 - 2*C*a*c + 2*A*c^2)*x/(b^2*c - 4*a*c^2) + (C*a*b + A*
b*c)/(b^2*c - 4*a*c^2))/sqrt(c*x^2 + b*x + a) - C*ln(abs(-2*(sqrt
(c)*x - sqrt(c*x^2 + b*x + a))*sqrt(c) - b))/c^(3/2)
```

3.183 $\int \frac{A+Cx^2}{(a+bx+cx^2)^{5/2}}\,dx$

Optimal. Leaf size=114

$$\frac{2(b+2cx)\left(4aC+8Ac+\frac{b^2C}{c}\right)}{3\left(b^2-4ac\right)^2\sqrt{a+bx+cx^2}}-\frac{2\left(x\left(C\left(b^2-2ac\right)+2Ac^2\right)+bc\left(\frac{aC}{c}+A\right)\right)}{3c\left(b^2-4ac\right)\left(a+bx+cx^2\right)^{3/2}}$$

```
[Out] (-2*(b*c*(A + (a*C)/c) + (2*A*c^2 + (b^2 - 2*a*c)*C)*x))/(3*c*(b^
2 - 4*a*c)*(a + b*x + c*x^2)^(3/2)) + (2*(8*A*c + 4*a*C + (b^2*C)
/c)*(b + 2*c*x))/(3*(b^2 - 4*a*c)^2*Sqrt[a + b*x + c*x^2])
```

Rubi [A] time = 0.143595, antiderivative size = 114, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.136$

$$\frac{2(b+2cx)\left(4aC+8Ac+\frac{b^2C}{c}\right)}{3\left(b^2-4ac\right)^2\sqrt{a+bx+cx^2}}-\frac{2\left(x\left(C\left(b^2-2ac\right)+2Ac^2\right)+b(aC+Ac)\right)}{3c\left(b^2-4ac\right)\left(a+bx+cx^2\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + C*x^2)/(a + b*x + c*x^2)^(5/2),x]
```

```
[Out] (-2*(b*(A*c + a*C) + (2*A*c^2 + (b^2 - 2*a*c)*C)*x))/(3*c*(b^2 -
4*a*c)*(a + b*x + c*x^2)^(3/2)) + (2*(8*A*c + 4*a*C + (b^2*C)/c)*
(b + 2*c*x))/(3*(b^2 - 4*a*c)^2*Sqrt[a + b*x + c*x^2])
```

Rubi in Sympy [A] time = 12.9357, size = 109, normalized size = 0.96

$$\frac{(2b+4cx)\left(8Ac^2+C\left(4ac+b^2\right)\right)}{3c\left(-4ac+b^2\right)^2\sqrt{a+bx+cx^2}}-\frac{2\left(b\left(Ac+Ca\right)+x\left(2Ac^2-2Cac+Cb^2\right)\right)}{3c\left(-4ac+b^2\right)\left(a+bx+cx^2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+A)/(c*x**2+b*x+a)**(5/2),x)
```

```
[Out] (2*b + 4*c*x)*(8*A*c**2 + C*(4*a*c + b**2))/(3*c*(-4*a*c + b**2)*
*2*sqrt(a + b*x + c*x**2)) - 2*(b*(A*c + C*a) + x*(2*A*c**2 - 2*C
*a*c + C*b**2))/(3*c*(-4*a*c + b**2)*(a + b*x + c*x**2)**(3/2))
```

Mathematica [A] time = 0.157078, size = 107, normalized size = 0.94

$$\frac{2C\left(8a^2b+4ax\left(3b^2+3bcx+2c^2x^2\right)+b^2x^2(3b+2cx)\right)-2A(b+2cx)\left(-4c\left(3a+2cx^2\right)+b^2-8bcx\right)}{3\left(b^2-4ac\right)^2(a+x(b+cx))^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + C*x^2)/(a + b*x + c*x^2)^(5/2),x]
```

```
[Out] (-2*A*(b + 2*c*x)*(b^2 - 8*b*c*x - 4*c*(3*a + 2*c*x^2)) + 2*C*(8*
a^2*b + b^2*x^2*(3*b + 2*c*x) + 4*a*x*(3*b^2 + 3*b*c*x + 2*c^2*x^
2)))/(3*(b^2 - 4*a*c)^2*(a + x*(b + c*x))^(3/2))
```

Maple [A] time = 0.008, size = 137, normalized size = 1.2

$$\frac{32\,Ac^3x^3+16\,Cac^2x^3+4\,Cb^2cx^3+48\,Abc^2x^2+24\,Cabcx^2+6\,Cb^3x^2+48\,Aac^2x+12\,Ab^2cx+24\,Cab^2x+24\,Aabc-2\,Ab^3}{48\,a^2c^2-24\,ab^2c+3\,b^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+A)/(c*x^2+b*x+a)^(5/2),x)
```

```
[Out] 2/3/(c*x^2+b*x+a)^(3/2)*(16*A*c^3*x^3+8*C*a*c^2*x^3+2*C*b^2*c*x^3
+24*A*b*c^2*x^2+12*C*a*b*c*x^2+3*C*b^3*x^2+24*A*a*c^2*x+6*A*b^2*c
*x+12*C*a*b^2*x+12*A*a*b*c-A*b^3+8*C*a^2*b)/(16*a^2*c^2-8*a*b^2*c
+b^4)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)/(c*x^2 + b*x + a)^(5/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.425215, size = 327, normalized size = 2.87

$$\frac{2\left(8\,Ca^2b-Ab^3+12\,Aabc+2\left(Cb^2c+4\,Cac^2+8\,Ac^3\right)x^3+3\left(Cb^3+4\,Cabc+8\,Abc^2\right)x^2+6\left(2\,Cab^2+Ab^2c+4\,Aac^2\right.}{3\,(a^2b^4-8\,a^3b^2c+16\,a^4c^2+(b^4c^2-8\,ab^2c^3+16\,a^2c^4)x^4+2\,(b^5c-8\,ab^3c^2+16\,a^2bc^3)x^3+(b^6-6\,ab^4c+32\,a^3c^3)x^2+2\,(ab}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)/(c*x^2 + b*x + a)^(5/2),x, algorithm="fricas")
```

```
[Out] 2/3*(8*C*a^2*b - A*b^3 + 12*A*a*b*c + 2*(C*b^2*c + 4*C*a*c^2 + 8*
A*c^3)*x^3 + 3*(C*b^3 + 4*C*a*b*c + 8*A*b*c^2)*x^2 + 6*(2*C*a*b^2
 + A*b^2*c + 4*A*a*c^2)*x)*sqrt(c*x^2 + b*x + a)/(a^2*b^4 - 8*a^3
*b^2*c + 16*a^4*c^2 + (b^4*c^2 - 8*a*b^2*c^3 + 16*a^2*c^4)*x^4 +
2*(b^5*c - 8*a*b^3*c^2 + 16*a^2*b*c^3)*x^3 + (b^6 - 6*a*b^4*c + 3
2*a^3*c^3)*x^2 + 2*(a*b^5 - 8*a^2*b^3*c + 16*a^3*b*c^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((C*x**2+A)/(c*x**2+b*x+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.285243, size = 293, normalized size = 2.57

$$\frac{\left(\left(\frac{2\left(Cb^2c+4\,Cac^2+8\,Ac^3\right)x}{b^4c^2-8\,ab^2c^3+16\,a^2c^4}+\frac{3\left(Cb^3+4\,Cabc+8\,Abc^2\right)}{b^4c^2-8\,ab^2c^3+16\,a^2c^4}\right)x+\frac{6\left(2\,Cab^2+Ab^2c+4\,Aac^2\right)}{b^4c^2-8\,ab^2c^3+16\,a^2c^4}\right)x+\frac{8\,Ca^2b-Ab^3+12\,Aabc}{b^4c^2-8\,ab^2c^3+16\,a^2c^4}}{3\left(cx^2+bx+a\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)/(c*x^2 + b*x + a)^(5/2),x, algorithm="giac")
```

```
[Out] 1/3*(((2*(C*b^2*c + 4*C*a*c^2 + 8*A*c^3)*x/(b^4*c^2 - 8*a*b^2*c^3
 + 16*a^2*c^4) + 3*(C*b^3 + 4*C*a*b*c + 8*A*b*c^2)/(b^4*c^2 - 8*a
*b^2*c^3 + 16*a^2*c^4))*x + 6*(2*C*a*b^2 + A*b^2*c + 4*A*a*c^2)/(
b^4*c^2 - 8*a*b^2*c^3 + 16*a^2*c^4))*x + (8*C*a^2*b - A*b^3 + 12*
A*a*b*c)/(b^4*c^2 - 8*a*b^2*c^3 + 16*a^2*c^4))/(c*x^2 + b*x + a)^
(3/2)
```

3.184 $\int \frac{A+Cx^2}{(a+bx+cx^2)^{7/2}}\,dx$

Optimal. Leaf size=167

$$-\frac{16(b+2cx)\left(4acC+16Ac^2+3b^2C\right)}{15\left(b^2-4ac\right)^3\sqrt{a+bx+cx^2}}-\frac{2\left(x\left(C\left(b^2-2ac\right)+2Ac^2\right)+bc\left(\frac{aC}{c}+A\right)\right)}{5c\left(b^2-4ac\right)\left(a+bx+cx^2\right)^{5/2}}+\frac{2(b+2cx)\left(4aC+16Ac+\frac{3b^2C}{c}\right)}{15\left(b^2-4ac\right)^2\left(a+bx+cx^2\right)^{3/2}}$$

```
[Out] (-2*(b*c*(A + (a*C)/c) + (2*A*c^2 + (b^2 - 2*a*c)*C)*x))/(5*c*(b^
2 - 4*a*c)*(a + b*x + c*x^2)^(5/2)) + (2*(16*A*c + 4*a*C + (3*b^2
*C)/c)*(b + 2*c*x))/(15*(b^2 - 4*a*c)^2*(a + b*x + c*x^2)^(3/2))
- (16*(16*A*c^2 + 3*b^2*C + 4*a*c*C)*(b + 2*c*x))/(15*(b^2 - 4*a*
c)^3*Sqrt[a + b*x + c*x^2])
```

Rubi [A] time = 0.200381, antiderivative size = 167, 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

$$-\frac{16(b+2cx)\left(4acC+16Ac^2+3b^2C\right)}{15\left(b^2-4ac\right)^3\sqrt{a+bx+cx^2}}-\frac{2\left(x\left(C\left(b^2-2ac\right)+2Ac^2\right)+b(aC+Ac)\right)}{5c\left(b^2-4ac\right)\left(a+bx+cx^2\right)^{5/2}}+\frac{2(b+2cx)\left(4aC+16Ac+\frac{3b^2C}{c}\right)}{15\left(b^2-4ac\right)^2\left(a+bx+cx^2\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + C*x^2)/(a + b*x + c*x^2)^(7/2),x]
```

```
[Out] (-2*(b*(A*c + a*C) + (2*A*c^2 + (b^2 - 2*a*c)*C)*x))/(5*c*(b^2 -
4*a*c)*(a + b*x + c*x^2)^(5/2)) + (2*(16*A*c + 4*a*C + (3*b^2*C)/
c)*(b + 2*c*x))/(15*(b^2 - 4*a*c)^2*(a + b*x + c*x^2)^(3/2)) - (1
6*(16*A*c^2 + 3*b^2*C + 4*a*c*C)*(b + 2*c*x))/(15*(b^2 - 4*a*c)^3
*Sqrt[a + b*x + c*x^2])
```

Rubi in Sympy [A] time = 23.7797, size = 168, normalized size = 1.01

$$-\frac{8\left(2b+4cx\right)\left(16Ac^2+4Cac+3Cb^2\right)}{15\left(-4ac+b^2\right)^3\sqrt{a+bx+cx^2}}+\frac{2\left(b+2cx\right)\left(16Ac^2+4Cac+3Cb^2\right)}{15c\left(-4ac+b^2\right)^2\left(a+bx+cx^2\right)^{\frac{3}{2}}}-\frac{2\left(b\left(Ac+Ca\right)+x\left(2Ac^2-2Cac+Cb^2\right)\right)}{5c\left(-4ac+b^2\right)\left(a+bx+cx^2\right)^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+A)/(c*x**2+b*x+a)**(7/2),x)
```

```
[Out] -8*(2*b + 4*c*x)*(16*A*c**2 + 4*C*a*c + 3*C*b**2)/(15*(-4*a*c + b
**2)**3*sqrt(a + b*x + c*x**2)) + 2*(b + 2*c*x)*(16*A*c**2 + 4*C*
a*c + 3*C*b**2)/(15*c*(-4*a*c + b**2)**2*(a + b*x + c*x**2)**(3/2
)) - 2*(b*(A*c + C*a) + x*(2*A*c**2 - 2*C*a*c + C*b**2))/(5*c*(-4
*a*c + b**2)*(a + b*x + c*x**2)**(5/2))
```

Mathematica [A]   time = 0.572027, size = 148, normalized size = 0.89

$$\frac{2\left(\left(b^2-4ac\right)(b+2cx)(a+x(b+cx))\left(4acC+16Ac^2+3b^2C\right)-8c(b+2cx)(a+x(b+cx))^2\left(4acC+16Ac^2+3b^2C\right)-3\left(b^2\right.}{15c\left(b^2-4ac\right)^3(a+x(b+cx))^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + C*x^2)/(a + b*x + c*x^2)^(7/2),x]
```

```
[Out] (2*((b^2 - 4*a*c)*(16*A*c^2 + 3*b^2*C + 4*a*c*C)*(b + 2*c*x)*(a +
 x*(b + c*x)) - 8*c*(16*A*c^2 + 3*b^2*C + 4*a*c*C)*(b + 2*c*x)*(a
 + x*(b + c*x))^2 - 3*(b^2 - 4*a*c)^2*(b^2*C*x + a*C*(b - 2*c*x)
+ A*c*(b + 2*c*x))))/(15*c*(b^2 - 4*a*c)^3*(a + x*(b + c*x))^(5/2
))
```

Maple [B]   time = 0.012, size = 316, normalized size = 1.9

$$\frac{512\,Ac^5x^5+128\,Cac^4x^5+96\,Cb^2c^3x^5+1280\,Abc^4x^4+320\,Cabc^3x^4+240\,Cb^3c^2x^4+1280\,Aac^4x^3+960\,Ab^2c^3x^3+320\,Ca^2c}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+A)/(c*x^2+b*x+a)^(7/2),x)
```

```
[Out] 2/15/(c*x^2+b*x+a)^(5/2)*(256*A*c^5*x^5+64*C*a*c^4*x^5+48*C*b^2*c
^3*x^5+640*A*b*c^4*x^4+160*C*a*b*c^3*x^4+120*C*b^3*c^2*x^4+640*A*
a*c^4*x^3+480*A*b^2*c^3*x^3+160*C*a^2*c^3*x^3+240*C*a*b^2*c^2*x^3
+90*C*b^4*c*x^3+960*A*a*b*c^3*x^2+80*A*b^3*c^2*x^2+240*C*a^2*b*c^
2*x^2+200*C*a*b^3*c*x^2+15*C*b^5*x^2+480*A*a^2*c^3*x+240*A*a*b^2*
c^2*x-10*A*b^4*c*x+240*C*a^2*b^2*c*x+20*C*a*b^4*x+240*A*a^2*b*c^2
-40*A*a*b^3*c+3*A*b^5+96*C*a^3*b*c+8*C*a^2*b^3)/(64*a^3*c^3-48*a^
2*b^2*c^2+12*a*b^4*c-b^6)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)/(c*x^2 + b*x + a)^(7/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.825973, size = 760, normalized size = 4.55

$$-\frac{2\,(8\,Ca^2b^3+3\,Ab^5+240\,Aa^2bc^2+16\,(3\,Cb^2c^3+4\,Cac^4+16\,Ac^5)\,x^5+40\,(3\,Cb^3c^2+4\,Cabc^3+16\,Abc^4)\,x^4+10\,(9}{15\,(a^3b^6-12\,a^4b^4c+48\,a^5b^2c^2-64\,a^6c^3+(b^6c^3-12\,ab^4c^4+48\,a^2b^2c^5-64\,a^3c^6)x^6+3\,(b^7c^2-12\,ab^5c^3+48\,a^2b^3c^4-64}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)/(c*x^2 + b*x + a)^(7/2),x, algorithm="fricas")
```

```
[Out] -2/15*(8*C*a^2*b^3 + 3*A*b^5 + 240*A*a^2*b*c^2 + 16*(3*C*b^2*c^3
+ 4*C*a*c^4 + 16*A*c^5)*x^5 + 40*(3*C*b^3*c^2 + 4*C*a*b*c^3 + 16*
A*b*c^4)*x^4 + 10*(9*C*b^4*c + 24*C*a*b^2*c^2 + 64*A*a*c^4 + 16*(
C*a^2 + 3*A*b^2)*c^3)*x^3 + 5*(3*C*b^5 + 40*C*a*b^3*c + 192*A*a*b
*c^3 + 16*(3*C*a^2*b + A*b^3)*c^2)*x^2 + 8*(12*C*a^3*b - 5*A*a*b^
3)*c + 10*(2*C*a*b^4 + 24*A*a*b^2*c^2 + 48*A*a^2*c^3 + (24*C*a^2*
b^2 - A*b^4)*c)*x)*sqrt(c*x^2 + b*x + a)/(a^3*b^6 - 12*a^4*b^4*c
+ 48*a^5*b^2*c^2 - 64*a^6*c^3 + (b^6*c^3 - 12*a*b^4*c^4 + 48*a^2*
b^2*c^5 - 64*a^3*c^6)*x^6 + 3*(b^7*c^2 - 12*a*b^5*c^3 + 48*a^2*b^
3*c^4 - 64*a^3*b*c^5)*x^5 + 3*(b^8*c - 11*a*b^6*c^2 + 36*a^2*b^4*
c^3 - 16*a^3*b^2*c^4 - 64*a^4*c^5)*x^4 + (b^9 - 6*a*b^7*c - 24*a^
2*b^5*c^2 + 224*a^3*b^3*c^3 - 384*a^4*b*c^4)*x^3 + 3*(a*b^8 - 11*
a^2*b^6*c + 36*a^3*b^4*c^2 - 16*a^4*b^2*c^3 - 64*a^5*c^4)*x^2 + 3
*(a^2*b^7 - 12*a^3*b^5*c + 48*a^4*b^3*c^2 - 64*a^5*b*c^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((C*x**2+A)/(c*x**2+b*x+a)**(7/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.287963, size = 659, normalized size = 3.95

$$-\frac{\left(\left(2\left(4\left(\frac{2\left(3\,Cb^{2}c^{3}+4\,Cac^{4}+16\,Ac^{5}\right)x}{b^{6}c^{3}-12\,ab^{4}c^{4}+48\,a^{2}b^{2}c^{5}-64\,a^{3}c^{6}}+\frac{5\left(3\,Cb^{3}c^{2}+4\,Cabc^{3}+16\,Abc^{4}\right)}{b^{6}c^{3}-12\,ab^{4}c^{4}+48\,a^{2}b^{2}c^{5}-64\,a^{3}c^{6}}\right)x+\frac{5\left(9\,Cb^{4}c+24\,Cab^{2}c^{2}+16\,Ca^{2}c^{3}+48\,Ab^{2}c^{3}+64\,Aac^{4}\right)}{b^{6}c^{3}-12\,ab^{4}c^{4}+48\,a^{2}b^{2}c^{5}-64\,a^{3}c^{6}}\right)x+\frac{5\left(3\,C\cdots\right.}{\cdots}}{15\,(cx\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)/(c*x^2 + b*x + a)^(7/2),x, algorithm="giac")
```

```
[Out] -1/15*(((2*(4*(2*(3*C*b^2*c^3 + 4*C*a*c^4 + 16*A*c^5)*x/(b^6*c^3
- 12*a*b^4*c^4 + 48*a^2*b^2*c^5 - 64*a^3*c^6) + 5*(3*C*b^3*c^2 +
4*C*a*b*c^3 + 16*A*b*c^4)/(b^6*c^3 - 12*a*b^4*c^4 + 48*a^2*b^2*c^
5 - 64*a^3*c^6))*x + 5*(9*C*b^4*c + 24*C*a*b^2*c^2 + 16*C*a^2*c^3
 + 48*A*b^2*c^3 + 64*A*a*c^4)/(b^6*c^3 - 12*a*b^4*c^4 + 48*a^2*b^
2*c^5 - 64*a^3*c^6))*x + 5*(3*C*b^5 + 40*C*a*b^3*c + 48*C*a^2*b*c
^2 + 16*A*b^3*c^2 + 192*A*a*b*c^3)/(b^6*c^3 - 12*a*b^4*c^4 + 48*a
^2*b^2*c^5 - 64*a^3*c^6))*x + 10*(2*C*a*b^4 + 24*C*a^2*b^2*c - A*
b^4*c + 24*A*a*b^2*c^2 + 48*A*a^2*c^3)/(b^6*c^3 - 12*a*b^4*c^4 +
48*a^2*b^2*c^5 - 64*a^3*c^6))*x + (8*C*a^2*b^3 + 3*A*b^5 + 96*C*a
^3*b*c - 40*A*a*b^3*c + 240*A*a^2*b*c^2)/(b^6*c^3 - 12*a*b^4*c^4
+ 48*a^2*b^2*c^5 - 64*a^3*c^6))/(c*x^2 + b*x + a)^(5/2)
```

3.185 $\int \frac{A+Cx^2}{(a+bx+cx^2)^{9/2}} \, dx$

Optimal. Leaf size=220

$$\frac{256c(b+2cx)\left(4acC+24Ac^2+5b^2C\right)}{105\left(b^2-4ac\right)^4\sqrt{a+bx+cx^2}}-\frac{32(b+2cx)\left(4acC+24Ac^2+5b^2C\right)}{105\left(b^2-4ac\right)^3\left(a+bx+cx^2\right)^{3/2}}-\frac{2\left(x\left(C\left(b^2-2ac\right)+2Ac^2\right)+bc\left(\frac{aC}{c}+A\right)\right)}{7c\left(b^2-4ac\right)\left(a+bx+cx^2\right)^{7/2}}+\frac{2(b+2cx)\left(4aC+24Ac+\frac{5b^2C}{c}\right)}{35\left(b^2-4ac\right)^2\left(a+bx+cx^2\right)^{5/2}}$$

```
[Out] (-2*(b*c*(A + (a*C)/c) + (2*A*c^2 + (b^2 - 2*a*c)*C)*x))/(7*c*(b^
2 - 4*a*c)*(a + b*x + c*x^2)^(7/2)) + (2*(24*A*c + 4*a*C + (5*b^2
*C)/c)*(b + 2*c*x))/(35*(b^2 - 4*a*c)^2*(a + b*x + c*x^2)^(5/2))
- (32*(24*A*c^2 + 5*b^2*C + 4*a*c*C)*(b + 2*c*x))/(105*(b^2 - 4*a
*c)^3*(a + b*x + c*x^2)^(3/2)) + (256*c*(24*A*c^2 + 5*b^2*C + 4*a
*c*C)*(b + 2*c*x))/(105*(b^2 - 4*a*c)^4*Sqrt[a + b*x + c*x^2])
```

Rubi [A] time = 0.263814, antiderivative size = 220, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 22, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$

$$\frac{256c(b+2cx)\left(4acC+24Ac^2+5b^2C\right)}{105\left(b^2-4ac\right)^4\sqrt{a+bx+cx^2}}-\frac{32(b+2cx)\left(4acC+24Ac^2+5b^2C\right)}{105\left(b^2-4ac\right)^3\left(a+bx+cx^2\right)^{3/2}}-\frac{2\left(x\left(C\left(b^2-2ac\right)+2Ac^2\right)+b(aC+Ac)\right)}{7c\left(b^2-4ac\right)\left(a+bx+cx^2\right)^{7/2}}+\frac{2(b+2cx)\left(4aC+24Ac+\frac{5b^2C}{c}\right)}{35\left(b^2-4ac\right)^2\left(a+bx+cx^2\right)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + C*x^2)/(a + b*x + c*x^2)^(9/2),x]
```

```
[Out] (-2*(b*(A*c + a*C) + (2*A*c^2 + (b^2 - 2*a*c)*C)*x))/(7*c*(b^2 -
4*a*c)*(a + b*x + c*x^2)^(7/2)) + (2*(24*A*c + 4*a*C + (5*b^2*C)/
c)*(b + 2*c*x))/(35*(b^2 - 4*a*c)^2*(a + b*x + c*x^2)^(5/2)) - (3
2*(24*A*c^2 + 5*b^2*C + 4*a*c*C)*(b + 2*c*x))/(105*(b^2 - 4*a*c)^
3*(a + b*x + c*x^2)^(3/2)) + (256*c*(24*A*c^2 + 5*b^2*C + 4*a*c*C
)*(b + 2*c*x))/(105*(b^2 - 4*a*c)^4*Sqrt[a + b*x + c*x^2])
```

Rubi in Sympy [A] time = 33.447, size = 224, normalized size = 1.02

$$\frac{128c\left(2b+4cx\right)\left(24Ac^2+4Cac+5Cb^2\right)}{105\left(-4ac+b^2\right)^4\sqrt{a+bx+cx^2}}-\frac{32\left(b+2cx\right)\left(24Ac^2+4Cac+5Cb^2\right)}{105\left(-4ac+b^2\right)^3\left(a+bx+cx^2\right)^{\frac{3}{2}}}+\frac{2\left(b+2cx\right)\left(24Ac^2+4Cac+5Cb^2\right)}{35c\left(-4ac+b^2\right)^2\left(a+bx+cx^2\right)^{\frac{5}{2}}}-\frac{2\left(b\left(Ac+Ca\right)+x\left(2Ac^2-2Cac+Cb^2\right)\right)}{7c\left(-4ac+b^2\right)\left(a+bx+cx^2\right)^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((C*x**2+A)/(c*x**2+b*x+a)**(9/2),x)
```

```
[Out] 128*c*(2*b + 4*c*x)*(24*A*c**2 + 4*C*a*c + 5*C*b**2)/(105*(-4*a*c
 + b**2)**4*sqrt(a + b*x + c*x**2)) - 32*(b + 2*c*x)*(24*A*c**2 +
 4*C*a*c + 5*C*b**2)/(105*(-4*a*c + b**2)**3*(a + b*x + c*x**2)**
(3/2)) + 2*(b + 2*c*x)*(24*A*c**2 + 4*C*a*c + 5*C*b**2)/(35*c*(-4
*a*c + b**2)**2*(a + b*x + c*x**2)**(5/2)) - 2*(b*(A*c + C*a) + x
*(2*A*c**2 - 2*C*a*c + C*b**2))/(7*c*(-4*a*c + b**2)*(a + b*x + c
*x**2)**(7/2))
```

Mathematica [A] time = 0.823539, size = 199, normalized size = 0.9

$$\frac{2\left(3\left(b^2-4ac\right)^2(b+2cx)(a+x(b+cx))\left(4acC+24Ac^2+5b^2C\right)-16c\left(b^2-4ac\right)(b+2cx)(a+x(b+cx))^2\left(4acC+24Ac^2+\right.\right.}{105c\left(b^2-4ac\right)^4(a}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + C*x^2)/(a + b*x + c*x^2)^(9/2),x]
```

```
[Out] (2*(3*(b^2 - 4*a*c)^2*(24*A*c^2 + 5*b^2*C + 4*a*c*C)*(b + 2*c*x)*
(a + x*(b + c*x)) - 16*c*(b^2 - 4*a*c)*(24*A*c^2 + 5*b^2*C + 4*a*
c*C)*(b + 2*c*x)*(a + x*(b + c*x))^2 + 128*c^2*(24*A*c^2 + 5*b^2*
C + 4*a*c*C)*(b + 2*c*x)*(a + x*(b + c*x))^3 - 15*(b^2 - 4*a*c)^3
*(b^2*C*x + a*C*(b - 2*c*x) + A*c*(b + 2*c*x))))/(105*c*(b^2 - 4*
a*c)^4*(a + x*(b + c*x))^(7/2))
```

Maple [B] time = 0.015, size = 555, normalized size = 2.5

$$\frac{12288\,Ac^7x^7+2048\,Cac^6x^7+2560\,Cb^2c^5x^7+43008\,Abc^6x^6+7168\,Cabc^5x^6+8960\,Cb^3c^4x^6+43008\,Aac^6x^5+53760\,Ab^2c^5}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+A)/(c*x^2+b*x+a)^(9/2),x)
```

```
[Out] 2/105/(c*x^2+b*x+a)^(7/2)*(6144*A*c^7*x^7+1024*C*a*c^6*x^7+1280*C
*b^2*c^5*x^7+21504*A*b*c^6*x^6+3584*C*a*b*c^5*x^6+4480*C*b^3*c^4*
x^6+21504*A*a*c^6*x^5+26880*A*b^2*c^5*x^5+3584*C*a^2*c^5*x^5+8960
*C*a*b^2*c^4*x^5+5600*C*b^4*c^3*x^5+53760*A*a*b*c^5*x^4+13440*A*b
^3*c^4*x^4+8960*C*a^2*b*c^4*x^4+13440*C*a*b^3*c^3*x^4+2800*C*b^5*
c^2*x^4+26880*A*a^2*c^5*x^3+40320*A*a*b^2*c^4*x^3+1680*A*b^4*c^3*
```

```
x^3+4480*C*a^3*c^4*x^3+12320*C*a^2*b^2*c^3*x^3+8680*C*a*b^4*c^2*x
^3+350*C*b^6*c*x^3+40320*A*a^2*b*c^4*x^2+6720*A*a*b^3*c^3*x^2-168
*A*b^5*c^2*x^2+6720*C*a^3*b*c^3*x^2+9520*C*a^2*b^3*c^2*x^2+1372*C
*a*b^5*c*x^2-35*C*b^7*x^2+13440*A*a^3*c^4*x+10080*A*a^2*b^2*c^3*x
-840*A*a*b^4*c^2*x+42*A*b^6*c*x+6720*C*a^3*b^2*c^2*x+1120*C*a^2*b
^4*c*x-28*C*a*b^6*x+6720*A*a^3*b*c^3-1680*A*a^2*b^3*c^2+252*A*a*b
^5*c-15*A*b^7+1920*C*a^4*b*c^2+320*C*a^3*b^3*c-8*C*a^2*b^5)/(256*
a^4*c^4-256*a^3*b^2*c^3+96*a^2*b^4*c^2-16*a*b^6*c+b^8)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)/(c*x^2 + b*x + a)^(9/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 2.35107, size = 1320, normalized size = 6.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)/(c*x^2 + b*x + a)^(9/2),x, algorithm="fricas")
```

```
[Out] -2/105*(8*C*a^2*b^5 + 15*A*b^7 - 6720*A*a^3*b*c^3 - 256*(5*C*b^2*
c^5 + 4*C*a*c^6 + 24*A*c^7)*x^7 - 896*(5*C*b^3*c^4 + 4*C*a*b*c^5
+ 24*A*b*c^6)*x^6 - 224*(25*C*b^4*c^3 + 40*C*a*b^2*c^4 + 96*A*a*c
^6 + 8*(2*C*a^2 + 15*A*b^2)*c^5)*x^5 - 560*(5*C*b^5*c^2 + 24*C*a*
b^3*c^3 + 96*A*a*b*c^5 + 8*(2*C*a^2*b + 3*A*b^3)*c^4)*x^4 - 70*(5
*C*b^6*c + 124*C*a*b^4*c^2 + 384*A*a^2*c^5 + 64*(C*a^3 + 9*A*a*b^
2)*c^4 + 8*(22*C*a^2*b^2 + 3*A*b^4)*c^3)*x^3 - 240*(8*C*a^4*b - 7
*A*a^2*b^3)*c^2 + 7*(5*C*b^7 - 196*C*a*b^5*c - 5760*A*a^2*b*c^4 -
 960*(C*a^3*b + A*a*b^3)*c^3 - 8*(170*C*a^2*b^3 - 3*A*b^5)*c^2)*x
^2 - 4*(80*C*a^3*b^3 + 63*A*a*b^5)*c + 14*(2*C*a*b^6 - 720*A*a^2*
b^2*c^3 - 960*A*a^3*c^4 - 60*(8*C*a^3*b^2 - A*a*b^4)*c^2 - (80*C*
a^2*b^4 + 3*A*b^6)*c)*x)*sqrt(c*x^2 + b*x + a)/(a^4*b^8 - 16*a^5*
b^6*c + 96*a^6*b^4*c^2 - 256*a^7*b^2*c^3 + 256*a^8*c^4 + (b^8*c^4
 - 16*a*b^6*c^5 + 96*a^2*b^4*c^6 - 256*a^3*b^2*c^7 + 256*a^4*c^8)
*x^8 + 4*(b^9*c^3 - 16*a*b^7*c^4 + 96*a^2*b^5*c^5 - 256*a^3*b^3*c
^6 + 256*a^4*b*c^7)*x^7 + 2*(3*b^10*c^2 - 46*a*b^8*c^3 + 256*a^2*
b^6*c^4 - 576*a^3*b^4*c^5 + 256*a^4*b^2*c^6 + 512*a^5*c^7)*x^6 +
4*(b^11*c - 13*a*b^9*c^2 + 48*a^2*b^7*c^3 + 32*a^3*b^5*c^4 - 512*
```

```
a^4*b^3*c^5 + 768*a^5*b*c^6)*x^5 + (b^12 - 4*a*b^10*c - 90*a^2*b^
8*c^2 + 800*a^3*b^6*c^3 - 2240*a^4*b^4*c^4 + 1536*a^5*b^2*c^5 + 1
536*a^6*c^6)*x^4 + 4*(a*b^11 - 13*a^2*b^9*c + 48*a^3*b^7*c^2 + 32
*a^4*b^5*c^3 - 512*a^5*b^3*c^4 + 768*a^6*b*c^5)*x^3 + 2*(3*a^2*b^
10 - 46*a^3*b^8*c + 256*a^4*b^6*c^2 - 576*a^5*b^4*c^3 + 256*a^6*b
^2*c^4 + 512*a^7*c^5)*x^2 + 4*(a^3*b^9 - 16*a^4*b^7*c + 96*a^5*b^
5*c^2 - 256*a^6*b^3*c^3 + 256*a^7*b*c^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((C*x**2+A)/(c*x**2+b*x+a)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.291131, size = 1152, normalized size = 5.24

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)/(c*x^2 + b*x + a)^(9/2),x, algorithm="giac")
```

```
[Out] 1/105*(((2*(8*(2*(4*(2*(5*C*b^2*c^5 + 4*C*a*c^6 + 24*A*c^7)*x/(b^
8*c^4 - 16*a*b^6*c^5 + 96*a^2*b^4*c^6 - 256*a^3*b^2*c^7 + 256*a^4
*c^8) + 7*(5*C*b^3*c^4 + 4*C*a*b*c^5 + 24*A*b*c^6)/(b^8*c^4 - 16*
a*b^6*c^5 + 96*a^2*b^4*c^6 - 256*a^3*b^2*c^7 + 256*a^4*c^8))*x +
7*(25*C*b^4*c^3 + 40*C*a*b^2*c^4 + 16*C*a^2*c^5 + 120*A*b^2*c^5 +
 96*A*a*c^6)/(b^8*c^4 - 16*a*b^6*c^5 + 96*a^2*b^4*c^6 - 256*a^3*b
^2*c^7 + 256*a^4*c^8))*x + 35*(5*C*b^5*c^2 + 24*C*a*b^3*c^3 + 16*
C*a^2*b*c^4 + 24*A*b^3*c^4 + 96*A*a*b*c^5)/(b^8*c^4 - 16*a*b^6*c^
5 + 96*a^2*b^4*c^6 - 256*a^3*b^2*c^7 + 256*a^4*c^8))*x + 35*(5*C*
b^6*c + 124*C*a*b^4*c^2 + 176*C*a^2*b^2*c^3 + 24*A*b^4*c^3 + 64*C
*a^3*c^4 + 576*A*a*b^2*c^4 + 384*A*a^2*c^5)/(b^8*c^4 - 16*a*b^6*c
^5 + 96*a^2*b^4*c^6 - 256*a^3*b^2*c^7 + 256*a^4*c^8))*x - 7*(5*C*
b^7 - 196*C*a*b^5*c - 1360*C*a^2*b^3*c^2 + 24*A*b^5*c^2 - 960*C*a
^3*b*c^3 - 960*A*a*b^3*c^3 - 5760*A*a^2*b*c^4)/(b^8*c^4 - 16*a*b^
6*c^5 + 96*a^2*b^4*c^6 - 256*a^3*b^2*c^7 + 256*a^4*c^8))*x - 14*(
2*C*a*b^6 - 80*C*a^2*b^4*c - 3*A*b^6*c - 480*C*a^3*b^2*c^2 + 60*A
*a*b^4*c^2 - 720*A*a^2*b^2*c^3 - 960*A*a^3*c^4)/(b^8*c^4 - 16*a*b
^6*c^5 + 96*a^2*b^4*c^6 - 256*a^3*b^2*c^7 + 256*a^4*c^8))*x - (8*
C*a^2*b^5 + 15*A*b^7 - 320*C*a^3*b^3*c - 252*A*a*b^5*c - 1920*C*a
```

```
^4*b*c^2 + 1680*A*a^2*b^3*c^2 - 6720*A*a^3*b*c^3)/(b^8*c^4 - 16*a
*b^6*c^5 + 96*a^2*b^4*c^6 - 256*a^3*b^2*c^7 + 256*a^4*c^8))/(c*x^
2 + b*x + a)^(7/2)
```

3.186 $\int (g+hx)^3\sqrt{a+bx+cx^2}\left(d+ex+fx^2\right)\,dx$

Optimal. Leaf size=930

$$\frac{f\left(cx^2+bx+a\right)^{3/2}(g+hx)^4}{7ch}-\frac{(6cfg-14ceh+11bfh)\left(cx^2+bx+a\right)^{3/2}(g+hx)^3}{84c^2h}$$

$$+\frac{\left(-4\left(3fg^2-7h(eg+2dh)\right)c^2-2h(8bfg+21beh+16afh)c+33b^2fh^2\right)\left(cx^2+bx+a\right)^{3/2}(g+hx)^2}{280c^3h}$$

$$+\frac{\left(-128g^2\left(3fg^2-7h(eg+12dh)\right)c^4-16h\left(16ah\left(15fg^2+7h(3eg+dh)\right)+bg\left(17fg^2+21h(19eg+25dh)\right)\right)c^3+8h^2\left(\left(537\right.\right.\cdots}{\cdots}$$

$$-\frac{\left(b^2-4ac\right)\left(-33fh^3b^5+6ch^2(20afh+7b(3fg+eh))b^3-8c^2h\left(7\left(3fg^2+3ehg+dh^2\right)b^2+14ah(3fg+eh)b+10a^2fh^2\right)\cdots}{\cdots}$$

$$+\frac{\left(-33fh^3b^5+6ch^2(20afh+7b(3fg+eh))b^3-8c^2h\left(7\left(3fg^2+3ehg+dh^2\right)b^2+14ah(3fg+eh)b+10a^2fh^2\right)b+256c^5dg\cdots}{\cdots}$$

```
[Out] ((256*c^5*d*g^3 - 33*b^5*f*h^3 + 6*b^3*c*h^2*(20*a*f*h + 7*b*(3*f
*g + e*h)) - 8*b*c^2*h*(10*a^2*f*h^2 + 14*a*b*h*(3*f*g + e*h) + 7
*b^2*(3*f*g^2 + 3*e*g*h + d*h^2)) - 64*c^4*g*(2*b*g*(e*g + 3*d*h)
 + a*(f*g^2 + 3*h*(e*g + d*h))) + 16*c^3*(2*a^2*h^2*(3*f*g + e*h)
 + 5*b^2*g*(f*g^2 + 3*h*(e*g + d*h)) + 6*a*b*h*(3*f*g^2 + h*(3*e*
g + d*h))))*(b + 2*c*x)*Sqrt[a + b*x + c*x^2])/(1024*c^6) + ((33*
b^2*f*h^2 - 2*c*h*(8*b*f*g + 21*b*e*h + 16*a*f*h) - 4*c^2*(3*f*g^
2 - 7*h*(e*g + 2*d*h)))*(g + h*x)^2*(a + b*x + c*x^2)^(3/2))/(280
*c^3*h) - ((6*c*f*g - 14*c*e*h + 11*b*f*h)*(g + h*x)^3*(a + b*x +
 c*x^2)^(3/2))/(84*c^2*h) + (f*(g + h*x)^4*(a + b*x + c*x^2)^(3/2
))/(7*c*h) + ((1155*b^4*f*h^4 - 128*c^4*g^2*(3*f*g^2 - 7*h*(e*g +
 12*d*h)) - 42*b^2*c*h^3*(78*a*f*h + 35*b*(3*f*g + e*h)) + 8*c^2*
h^2*(128*a^2*f*h^2 + 343*a*b*h*(3*f*g + e*h) + b^2*(537*f*g^2 + 2
45*h*(3*e*g + d*h))) - 16*c^3*h*(16*a*h*(15*f*g^2 + 7*h*(3*e*g +
d*h)) + b*g*(17*f*g^2 + 21*h*(19*e*g + 25*d*h))) - 6*c*h*(231*b^3
*f*h^3 - 6*b*c*h^2*(59*b*f*g + 49*b*e*h + 74*a*f*h) + 16*c^3*g*(3
*f*g^2 - 7*h*(e*g + 7*d*h)) + 8*c^2*h*(a*h*(41*f*g + 35*e*h) + b*
(5*f*g^2 + 7*h*(9*e*g + 7*d*h))))*x)*(a + b*x + c*x^2)^(3/2))/(13
440*c^5*h) - ((b^2 - 4*a*c)*(256*c^5*d*g^3 - 33*b^5*f*h^3 + 6*b^3
*c*h^2*(20*a*f*h + 7*b*(3*f*g + e*h)) - 8*b*c^2*h*(10*a^2*f*h^2 +
 14*a*b*h*(3*f*g + e*h) + 7*b^2*(3*f*g^2 + 3*e*g*h + d*h^2)) - 64
*c^4*g*(2*b*g*(e*g + 3*d*h) + a*(f*g^2 + 3*h*(e*g + d*h))) + 16*c
^3*(2*a^2*h^2*(3*f*g + e*h) + 5*b^2*g*(f*g^2 + 3*h*(e*g + d*h)) +
 6*a*b*h*(3*f*g^2 + h*(3*e*g + d*h))))*ArcTanh[(b + 2*c*x)/(2*Sqr
t[c]*Sqrt[a + b*x + c*x^2])])/(2048*c^(13/2))
```

Rubi [A] time = 7.50378, antiderivative size = 927, normalized size of antiderivative = 1., number of

steps used = 7, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$\frac{f\left(cx^2+bx+a\right)^{3/2}(g+hx)^4}{7ch}-\frac{(6cfg-14ceh+11bfh)\left(cx^2+bx+a\right)^{3/2}(g+hx)^3}{84c^2h}$$
$$+\frac{\left(-4\left(3fg^2-7h(eg+2dh)\right)c^2-2h(8bfg+21beh+16afh)c+33b^2fh^2\right)\left(cx^2+bx+a\right)^{3/2}(g+hx)^2}{280c^3h}$$
$$+\frac{\left(-128\left(3fg^4-7g^2h(eg+12dh)\right)c^4-16h\left(16ah\left(15fg^2+7h(3eg+dh)\right)+bg\left(17fg^2+21h(19eg+25dh)\right)\right)c^3+8h^2\left(\left(537\cdots\right.\right.}{\cdots}$$
$$-\frac{\left(b^2-4ac\right)\left(-33fh^3b^5+6ch^2(20afh+7b(3fg+eh))b^3-8c^2h\left(7\left(3fg^2+3ehg+dh^2\right)b^2+14ah(3fg+eh)b+10a^2fh^2\right)\cdots\right.}{\cdots}$$
$$+\frac{\left(-33fh^3b^5+6ch^2(20afh+7b(3fg+eh))b^3-8c^2h\left(7\left(3fg^2+3ehg+dh^2\right)b^2+14ah(3fg+eh)b+10a^2fh^2\right)b+256c^5dg\cdots\right.}{\cdots}$$

Antiderivative was successfully verified.

```
[In]  Int[(g + h*x)^3*Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] ((256*c^5*d*g^3 - 33*b^5*f*h^3 - 64*c^4*g*(a*f*g^2 + 3*a*h*(e*g +
 d*h) + 2*b*g*(e*g + 3*d*h)) + 6*b^3*c*h^2*(20*a*f*h + 7*b*(3*f*g
 + e*h)) - 8*b*c^2*h*(10*a^2*f*h^2 + 14*a*b*h*(3*f*g + e*h) + 7*b
^2*(3*f*g^2 + 3*e*g*h + d*h^2)) + 16*c^3*(2*a^2*h^2*(3*f*g + e*h)
 + 5*b^2*g*(f*g^2 + 3*h*(e*g + d*h)) + 6*a*b*h*(3*f*g^2 + h*(3*e*
g + d*h))))*(b + 2*c*x)*Sqrt[a + b*x + c*x^2])/(1024*c^6) + ((33*
b^2*f*h^2 - 2*c*h*(8*b*f*g + 21*b*e*h + 16*a*f*h) - 4*c^2*(3*f*g^
2 - 7*h*(e*g + 2*d*h)))*(g + h*x)^2*(a + b*x + c*x^2)^(3/2))/(280
*c^3*h) - ((6*c*f*g - 14*c*e*h + 11*b*f*h)*(g + h*x)^3*(a + b*x +
 c*x^2)^(3/2))/(84*c^2*h) + (f*(g + h*x)^4*(a + b*x + c*x^2)^(3/2
))/(7*c*h) + ((1155*b^4*f*h^4 - 128*c^4*(3*f*g^4 - 7*g^2*h*(e*g +
 12*d*h)) - 42*b^2*c*h^3*(78*a*f*h + 35*b*(3*f*g + e*h)) + 8*c^2*
h^2*(128*a^2*f*h^2 + 343*a*b*h*(3*f*g + e*h) + b^2*(537*f*g^2 + 2
45*h*(3*e*g + d*h))) - 16*c^3*h*(16*a*h*(15*f*g^2 + 7*h*(3*e*g +
d*h)) + b*g*(17*f*g^2 + 21*h*(19*e*g + 25*d*h))) - 6*c*h*(231*b^3
*f*h^3 - 6*b*c*h^2*(59*b*f*g + 49*b*e*h + 74*a*f*h) + 16*c^3*(3*f
*g^3 - 7*g*h*(e*g + 7*d*h)) + 8*c^2*h*(5*b*f*g^2 + 7*b*h*(9*e*g +
 7*d*h) + a*h*(41*f*g + 35*e*h)))*x)*(a + b*x + c*x^2)^(3/2))/(13
440*c^5*h) - ((b^2 - 4*a*c)*(256*c^5*d*g^3 - 33*b^5*f*h^3 - 64*c^
4*g*(a*f*g^2 + 3*a*h*(e*g + d*h) + 2*b*g*(e*g + 3*d*h)) + 6*b^3*c
*h^2*(20*a*f*h + 7*b*(3*f*g + e*h)) - 8*b*c^2*h*(10*a^2*f*h^2 + 1
4*a*b*h*(3*f*g + e*h) + 7*b^2*(3*f*g^2 + 3*e*g*h + d*h^2)) + 16*c
^3*(2*a^2*h^2*(3*f*g + e*h) + 5*b^2*g*(f*g^2 + 3*h*(e*g + d*h)) +
 6*a*b*h*(3*f*g^2 + h*(3*e*g + d*h))))*ArcTanh[(b + 2*c*x)/(2*Sqr
t[c]*Sqrt[a + b*x + c*x^2])])/(2048*c^(13/2))
```

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((h*x+g)**3*(f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 6.28681, size = 1483, normalized size = 1.59

$$\sqrt{a+x(b+cx)}\left(\frac{1}{7}fh^3x^6+\frac{h^2(42cfg+14ceh+bfh)x^5}{84c}\right.$$
$$+\frac{h\left(504fg^2c^2+168dh^2c^2+504eghc^2+14beh^2c+24afh^2c+42bfghc-11b^2fh^2\right)x^4}{840c^2}$$
$$+\frac{\left(1680fg^3c^3+5040dgh^2c^3+5040eg^2hc^3+168bdh^3c^2+280aeh^3c^2+504begh^2c^2+840afgh^2c^2+504bfg^2hc^2-126b^2eh^3c\right.}{6720c^3}$$
$$+\frac{\left(-231fh^3b^4+294ceh^3b^3+882cfgh^2b^3-392c^2dh^3b^2+972acfh^3b^2-1176c^2egh^2b^2-1176c^2fg^2hb^2+560c^3fg^3b-952a\right.}{}$$
$$+\frac{\left(1155fh^3b^5-1470ceh^3b^4-4410cfgh^2b^4+1960c^2dh^3b^3-6048acfh^3b^3+5880c^2egh^2b^3+5880c^2fg^2hb^3-2800c^3fg^3b^2\right.}{}$$
$$+\frac{-3465fh^3b^6+4410ceh^3b^5+13230cfgh^2b^5-5880c^2dh^3b^4+21840acfh^3b^4-17640c^2egh^2b^4-17640c^2fg^2hb^4+8400c^3f}{}$$
$$+\frac{\left(4ac-b^2\right)\left(-33fh^3b^5+42ceh^3b^4+126cfgh^2b^4-56c^2dh^3b^3+120acfh^3b^3-168c^2egh^2b^3-168c^2fg^2hb^3+80c^3fg^3b^2-\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(g + h*x)^3*Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] ((26880*b*c^5*d*g^3 - 13440*b^2*c^4*e*g^3 + 35840*a*c^5*e*g^3 + 8
400*b^3*c^3*f*g^3 - 29120*a*b*c^4*f*g^3 - 40320*b^2*c^4*d*g^2*h +
 107520*a*c^5*d*g^2*h + 25200*b^3*c^3*e*g^2*h - 87360*a*b*c^4*e*g
^2*h - 17640*b^4*c^2*f*g^2*h + 77280*a*b^2*c^3*f*g^2*h - 43008*a^
2*c^4*f*g^2*h + 25200*b^3*c^3*d*g*h^2 - 87360*a*b*c^4*d*g*h^2 - 1
7640*b^4*c^2*e*g*h^2 + 77280*a*b^2*c^3*e*g*h^2 - 43008*a^2*c^4*e*
g*h^2 + 13230*b^5*c*f*g*h^2 - 70560*a*b^3*c^2*f*g*h^2 + 75936*a^2
*b*c^3*f*g*h^2 - 5880*b^4*c^2*d*h^3 + 25760*a*b^2*c^3*d*h^3 - 143
36*a^2*c^4*d*h^3 + 4410*b^5*c*e*h^3 - 23520*a*b^3*c^2*e*h^3 + 253
12*a^2*b*c^3*e*h^3 - 3465*b^6*f*h^3 + 21840*a*b^4*c*f*h^3 - 34608
*a^2*b^2*c^2*f*h^3 + 8192*a^3*c^3*f*h^3)/(107520*c^6) + ((26880*c
^5*d*g^3 + 4480*b*c^4*e*g^3 - 2800*b^2*c^3*f*g^3 + 6720*a*c^4*f*g
^3 + 13440*b*c^4*d*g^2*h - 8400*b^2*c^3*e*g^2*h + 20160*a*c^4*e*g
^2*h + 5880*b^3*c^2*f*g^2*h - 19488*a*b*c^3*f*g^2*h - 8400*b^2*c^
3*d*g*h^2 + 20160*a*c^4*d*g*h^2 + 5880*b^3*c^2*e*g*h^2 - 19488*a*
b*c^3*e*g*h^2 - 4410*b^4*c*f*g*h^2 + 18816*a*b^2*c^2*f*g*h^2 - 10
080*a^2*c^3*f*g*h^2 + 1960*b^3*c^2*d*h^3 - 6496*a*b*c^3*d*h^3 - 1
470*b^4*c*e*h^3 + 6272*a*b^2*c^2*e*h^3 - 3360*a^2*c^3*e*h^3 + 115
```

```
5*b^5*f*h^3 - 6048*a*b^3*c*f*h^3 + 6352*a^2*b*c^2*f*h^3)*x)/(5376
0*c^5) + ((4480*c^4*e*g^3 + 560*b*c^3*f*g^3 + 13440*c^4*d*g^2*h +
 1680*b*c^3*e*g^2*h - 1176*b^2*c^2*f*g^2*h + 2688*a*c^3*f*g^2*h +
 1680*b*c^3*d*g*h^2 - 1176*b^2*c^2*e*g*h^2 + 2688*a*c^3*e*g*h^2 +
 882*b^3*c*f*g*h^2 - 2856*a*b*c^2*f*g*h^2 - 392*b^2*c^2*d*h^3 + 8
96*a*c^3*d*h^3 + 294*b^3*c*e*h^3 - 952*a*b*c^2*e*h^3 - 231*b^4*f*
h^3 + 972*a*b^2*c*f*h^3 - 512*a^2*c^2*f*h^3)*x^2)/(13440*c^4) + (
(1680*c^3*f*g^3 + 5040*c^3*e*g^2*h + 504*b*c^2*f*g^2*h + 5040*c^3
*d*g*h^2 + 504*b*c^2*e*g*h^2 - 378*b^2*c*f*g*h^2 + 840*a*c^2*f*g*
h^2 + 168*b*c^2*d*h^3 - 126*b^2*c*e*h^3 + 280*a*c^2*e*h^3 + 99*b^
3*f*h^3 - 316*a*b*c*f*h^3)*x^3)/(6720*c^3) + (h*(504*c^2*f*g^2 +
504*c^2*e*g*h + 42*b*c*f*g*h + 168*c^2*d*h^2 + 14*b*c*e*h^2 - 11*
b^2*f*h^2 + 24*a*c*f*h^2)*x^4)/(840*c^2) + (h^2*(42*c*f*g + 14*c*
e*h + b*f*h)*x^5)/(84*c) + (f*h^3*x^6)/7)*Sqrt[a + x*(b + c*x)] +
 ((-b^2 + 4*a*c)*(256*c^5*d*g^3 - 128*b*c^4*e*g^3 + 80*b^2*c^3*f*
g^3 - 64*a*c^4*f*g^3 - 384*b*c^4*d*g^2*h + 240*b^2*c^3*e*g^2*h -
192*a*c^4*e*g^2*h - 168*b^3*c^2*f*g^2*h + 288*a*b*c^3*f*g^2*h + 2
40*b^2*c^3*d*g*h^2 - 192*a*c^4*d*g*h^2 - 168*b^3*c^2*e*g*h^2 + 28
8*a*b*c^3*e*g*h^2 + 126*b^4*c*f*g*h^2 - 336*a*b^2*c^2*f*g*h^2 + 9
6*a^2*c^3*f*g*h^2 - 56*b^3*c^2*d*h^3 + 96*a*b*c^3*d*h^3 + 42*b^4*
c*e*h^3 - 112*a*b^2*c^2*e*h^3 + 32*a^2*c^3*e*h^3 - 33*b^5*f*h^3 +
 120*a*b^3*c*f*h^3 - 80*a^2*b*c^2*f*h^3)*Sqrt[a + x*(b + c*x)]*Lo
g[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + b*x + c*x^2]])/(2048*c^(13/2)*Sq
rt[a + b*x + c*x^2])
```

Maple [B] time = 0.032, size = 3543, normalized size = 3.8

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^3*(f*x^2+e*x+d)*(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] 1/3*(c*x^2+b*x+a)^(3/2)/c*e*g^3+1/2*d*g^3*(c*x^2+b*x+a)^(1/2)*x+1
/16/c^2*a^2*(c*x^2+b*x+a)^(1/2)*x*e*h^3+1/32/c^3*a^2*(c*x^2+b*x+a
)^(1/2)*b*e*h^3+63/512*b^5/c^5*(c*x^2+b*x+a)^(1/2)*f*g*h^2-3/20*b
/c^2*x^2*(c*x^2+b*x+a)^(3/2)*e*h^3+21/160*b^2/c^3*x*(c*x^2+b*x+a)
^(3/2)*e*h^3-21/64*b^3/c^4*(c*x^2+b*x+a)^(3/2)*f*g*h^2+21/256*b^4
/c^4*(c*x^2+b*x+a)^(1/2)*x*e*h^3+35/256*b^4/c^(9/2)*ln((1/2*b+c*x
)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*e*h^3-3/8*b^2/c^2*(c*x^2+b*x+a)^
(1/2)*d*g^2*h-1/4*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^
(1/2))*a*e*g^3+3/16*b^3/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x
+a)^(1/2))*d*g^2*h-1/4*b/c*(c*x^2+b*x+a)^(1/2)*x*e*g^3-39/160*f*h
^3*b^2/c^4*a*(c*x^2+b*x+a)^(3/2)-5/64*f*h^3*b^2/c^4*a^2*(c*x^2+b*
x+a)^(1/2)-63/512*f*h^3*b^5/c^(11/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^
2+b*x+a)^(1/2))*a+35/128*f*h^3*b^3/c^(9/2)*a^2*ln((1/2*b+c*x)/c^(
1/2)+(c*x^2+b*x+a)^(1/2))-5/32*f*h^3*b/c^(7/2)*a^3*ln((1/2*b+c*x)
/c^(1/2)+(c*x^2+b*x+a)^(1/2))-15/128*b^4/c^(7/2)*ln((1/2*b+c*x)/c
^(1/2)+(c*x^2+b*x+a)^(1/2))*d*g*h^2+3/16/c^2*a^2*(c*x^2+b*x+a)^(1
```

/2)*x*f*g*h^2+3/32/c^3*a^2*(c*x^2+b*x+a)^(1/2)*b*f*g*h^2-3/4*b/c^
(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*d*g^2*h+9/16*
b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*e*g^2*h
-3/8/c*a*(c*x^2+b*x+a)^(1/2)*x*d*g*h^2-3/8/c*a*(c*x^2+b*x+a)^(1/2
)*x*e*g^2*h-3/16/c^2*a*(c*x^2+b*x+a)^(1/2)*b*d*g*h^2-3/16/c^2*a*(
c*x^2+b*x+a)^(1/2)*b*e*g^2*h+15/64*f*h^3*b^3/c^4*a*(c*x^2+b*x+a)^
(1/2)*x+9/16*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/
2))*a*d*g*h^2+111/560*f*h^3*b/c^3*a*x*(c*x^2+b*x+a)^(3/2)+15/128*
f*h^3*b^4/c^5*a*(c*x^2+b*x+a)^(1/2)+1/2*x^3*(c*x^2+b*x+a)^(3/2)/c
*f*g*h^2+49/240*b/c^3*a*(c*x^2+b*x+a)^(3/2)*e*h^3-63/1024*b^6/c^(
11/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g*h^2+3/16/c^
(5/2)*a^3*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g*h^2-1/8
/c^2*a*x*(c*x^2+b*x+a)^(3/2)*e*h^3-15/128*b^4/c^(7/2)*ln((1/2*b+c
*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*g^2*h-1/8/c*a*(c*x^2+b*x+a)^(1
/2)*x*f*g^3-1/16/c^2*a*(c*x^2+b*x+a)^(1/2)*b*f*g^3-21/32*b^2/c^3*
a*(c*x^2+b*x+a)^(1/2)*x*f*g*h^2-5/32*f*h^3*b/c^3*a^2*(c*x^2+b*x+a
)^(1/2)*x+9/32*b^2/c^3*a*(c*x^2+b*x+a)^(1/2)*f*g^2*h+9/16*b/c^(5/
2)*a^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*g*h^2+9/16*b
/c^(5/2)*a^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g^2*h-
21/40*b/c^2*x*(c*x^2+b*x+a)^(3/2)*e*g*h^2-21/40*b/c^2*x*(c*x^2+b*
x+a)^(3/2)*f*g^2*h-21/64*b^3/c^3*(c*x^2+b*x+a)^(1/2)*x*e*g*h^2-21
/64*b^3/c^3*(c*x^2+b*x+a)^(1/2)*x*f*g^2*h-15/32*b^3/c^(7/2)*ln((1
/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*e*g*h^2-15/32*b^3/c^(7/2
)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*f*g^2*h+3/16*b/c^
2*a*(c*x^2+b*x+a)^(1/2)*x*d*h^3+9/32*b^2/c^3*a*(c*x^2+b*x+a)^(1/2
)*e*g*h^2+33/2048*f*h^3*b^7/c^(13/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^
2+b*x+a)^(1/2))-7/64*b^3/c^4*a*(c*x^2+b*x+a)^(1/2)*e*h^3+9/16*b/c
^2*a*(c*x^2+b*x+a)^(1/2)*x*e*g*h^2+9/16*b/c^2*a*(c*x^2+b*x+a)^(1/
2)*x*f*g^2*h-3/4*b/c*(c*x^2+b*x+a)^(1/2)*x*d*g^2*h-15/64*b^2/c^(7
/2)*a^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*h^3-4/35*f*
h^3/c^2*a*x^2*(c*x^2+b*x+a)^(3/2)-11/84*f*h^3*b/c^2*x^3*(c*x^2+b*
x+a)^(3/2)+33/280*f*h^3*b^2/c^3*x^2*(c*x^2+b*x+a)^(3/2)-33/320*f*
h^3*b^3/c^4*x*(c*x^2+b*x+a)^(3/2)-33/512*f*h^3*b^5/c^5*(c*x^2+b*x
+a)^(1/2)*x+5/64*b^3/c^3*(c*x^2+b*x+a)^(1/2)*f*g^3-5/128*b^4/c^(7
/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g^3-1/8/c^(3/2)
*a^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g^3+1/4*x*(c*x
^2+b*x+a)^(3/2)/c*f*g^3-5/24*b/c^2*(c*x^2+b*x+a)^(3/2)*f*g^3-7/64
b^3/c^4(c*x^2+b*x+a)^(3/2)*e*h^3+21/512*b^5/c^5*(c*x^2+b*x+a)^(
1/2)*e*h^3-21/1024*b^6/c^(11/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x
+a)^(1/2))*e*h^3+1/16/c^(5/2)*a^3*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b
*x+a)^(1/2))*e*h^3+1/6*x^3*(c*x^2+b*x+a)^(3/2)/c*e*h^3+1/5*x^2*(c
*x^2+b*x+a)^(3/2)/c*d*h^3+7/48*b^2/c^3*(c*x^2+b*x+a)^(3/2)*d*h^3-
7/128*b^4/c^4*(c*x^2+b*x+a)^(1/2)*d*h^3+7/256*b^5/c^(9/2)*ln((1/2
*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*d*h^3+1/4*d*g^3/c*(c*x^2+b*x
+a)^(1/2)*b+1/2*d*g^3/c^(1/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a
)^(1/2))*a+(c*x^2+b*x+a)^(3/2)/c*d*g^2*h-1/8*b^2/c^2*(c*x^2+b*x+a
)^(1/2)*e*g^3+1/16*b^3/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+
a)^(1/2))*e*g^3+1/7*f*h^3*x^4*(c*x^2+b*x+a)^(3/2)/c-3/8/c^(3/2)*a
^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*d*g*h^2-3/8/c^(3/2
)*a^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*g^2*h-21/128*
b^4/c^4*(c*x^2+b*x+a)^(1/2)*f*g^2*h-5/32*b^3/c^(7/2)*ln((1/2*b+c*
x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*d*h^3+21/256*b^5/c^(9/2)*ln((1/
2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*g*h^2+21/256*b^5/c^(9/2)*
ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g^2*h+3/32*b^2/c^3*

```
a*(c*x^2+b*x+a)^(1/2)*d*h^3+3/16*b/c^(5/2)*a^2*ln((1/2*b+c*x)/c^(
1/2)+(c*x^2+b*x+a)^(1/2))*d*h^3-2/5/c^2*a*(c*x^2+b*x+a)^(3/2)*e*g
*h^2-2/5/c^2*a*(c*x^2+b*x+a)^(3/2)*f*g^2*h+3/4*x*(c*x^2+b*x+a)^(3
/2)/c*d*g*h^2+3/4*x*(c*x^2+b*x+a)^(3/2)/c*e*g^2*h-5/8*b/c^2*(c*x^
2+b*x+a)^(3/2)*d*g*h^2-5/8*b/c^2*(c*x^2+b*x+a)^(3/2)*e*g^2*h+5/32
*b^2/c^2*(c*x^2+b*x+a)^(1/2)*x*f*g^3+15/64*b^3/c^3*(c*x^2+b*x+a)^
(1/2)*d*g*h^2+15/64*b^3/c^3*(c*x^2+b*x+a)^(1/2)*e*g^2*h+3/16*b^2/
c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*f*g^3+3/5*x
^2*(c*x^2+b*x+a)^(3/2)/c*e*g*h^2+3/5*x^2*(c*x^2+b*x+a)^(3/2)/c*f*
g^2*h-7/40*b/c^2*x*(c*x^2+b*x+a)^(3/2)*d*h^3+7/16*b^2/c^3*(c*x^2+
b*x+a)^(3/2)*e*g*h^2+7/16*b^2/c^3*(c*x^2+b*x+a)^(3/2)*f*g^2*h-7/6
4*b^3/c^3*(c*x^2+b*x+a)^(1/2)*x*d*h^3-21/128*b^4/c^4*(c*x^2+b*x+a
)^(1/2)*e*g*h^2-1/8*d*g^3/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b
*x+a)^(1/2))*b^2-2/15/c^2*a*(c*x^2+b*x+a)^(3/2)*d*h^3+11/128*f*h^
3*b^4/c^5*(c*x^2+b*x+a)^(3/2)-33/1024*f*h^3*b^6/c^6*(c*x^2+b*x+a)
^(1/2)+15/32*b^2/c^2*(c*x^2+b*x+a)^(1/2)*x*d*g*h^2+15/32*b^2/c^2*
(c*x^2+b*x+a)^(1/2)*x*e*g^2*h+63/256*b^4/c^4*(c*x^2+b*x+a)^(1/2)*
x*f*g*h^2-9/20*b/c^2*x^2*(c*x^2+b*x+a)^(3/2)*f*g*h^2+63/160*b^2/c
^3*x*(c*x^2+b*x+a)^(3/2)*f*g*h^2-21/64*b^3/c^4*a*(c*x^2+b*x+a)^(1
/2)*f*g*h^2-45/64*b^2/c^(7/2)*a^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b
*x+a)^(1/2))*f*g*h^2+105/256*b^4/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(
c*x^2+b*x+a)^(1/2))*a*f*g*h^2-7/32*b^2/c^3*a*(c*x^2+b*x+a)^(1/2)*
x*e*h^3+49/80*b/c^3*a*(c*x^2+b*x+a)^(3/2)*f*g*h^2-3/8/c^2*a*x*(c*
x^2+b*x+a)^(3/2)*f*g*h^2+8/105*f*h^3/c^3*a^2*(c*x^2+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(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g)^3,x, algorithm="maxima

[Out] Exception raised: ValueError
```

Fricas [A] time = 1.64791, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g)^3,x, algorithm="fricas

[Out] [1/430080*(4*(15360*c^6*f*h^3*x^6 + 1280*(42*c^6*f*g*h^2 + (14*c^
6*e + b*c^5*f)*h^3)*x^5 + 128*(504*c^6*f*g^2*h + 42*(12*c^6*e + b
```

```
*c^5*f)*g*h^2 + (168*c^6*d + 14*b*c^5*e - (11*b^2*c^4 - 24*a*c^5)
*f)*h^3)*x^4 + 560*(48*b*c^5*d - 8*(3*b^2*c^4 - 8*a*c^5)*e + (15*
b^3*c^3 - 52*a*b*c^4)*f)*g^3 - 168*(80*(3*b^2*c^4 - 8*a*c^5)*d -
10*(15*b^3*c^3 - 52*a*b*c^4)*e + (105*b^4*c^2 - 460*a*b^2*c^3 + 2
56*a^2*c^4)*f)*g^2*h + 42*(40*(15*b^3*c^3 - 52*a*b*c^4)*d - 4*(10
5*b^4*c^2 - 460*a*b^2*c^3 + 256*a^2*c^4)*e + (315*b^5*c - 1680*a*
b^3*c^2 + 1808*a^2*b*c^3)*f)*g*h^2 - (56*(105*b^4*c^2 - 460*a*b^2
*c^3 + 256*a^2*c^4)*d - 14*(315*b^5*c - 1680*a*b^3*c^2 + 1808*a^2
*b*c^3)*e + (3465*b^6 - 21840*a*b^4*c + 34608*a^2*b^2*c^2 - 8192*
a^3*c^3)*f)*h^3 + 16*(1680*c^6*f*g^3 + 504*(10*c^6*e + b*c^5*f)*g
^2*h + 42*(120*c^6*d + 12*b*c^5*e - (9*b^2*c^4 - 20*a*c^5)*f)*g*h
^2 + (168*b*c^5*d - 14*(9*b^2*c^4 - 20*a*c^5)*e + (99*b^3*c^3 - 3
16*a*b*c^4)*f)*h^3)*x^3 + 8*(560*(8*c^6*e + b*c^5*f)*g^3 + 168*(8
0*c^6*d + 10*b*c^5*e - (7*b^2*c^4 - 16*a*c^5)*f)*g^2*h + 42*(40*b
*c^5*d - 4*(7*b^2*c^4 - 16*a*c^5)*e + (21*b^3*c^3 - 68*a*b*c^4)*f
)*g*h^2 - (56*(7*b^2*c^4 - 16*a*c^5)*d - 14*(21*b^3*c^3 - 68*a*b*
c^4)*e + (231*b^4*c^2 - 972*a*b^2*c^3 + 512*a^2*c^4)*f)*h^3)*x^2
+ 2*(560*(48*c^6*d + 8*b*c^5*e - (5*b^2*c^4 - 12*a*c^5)*f)*g^3 +
168*(80*b*c^5*d - 10*(5*b^2*c^4 - 12*a*c^5)*e + (35*b^3*c^3 - 116
*a*b*c^4)*f)*g^2*h - 42*(40*(5*b^2*c^4 - 12*a*c^5)*d - 4*(35*b^3*
c^3 - 116*a*b*c^4)*e + (105*b^4*c^2 - 448*a*b^2*c^3 + 240*a^2*c^4
)*f)*g*h^2 + (56*(35*b^3*c^3 - 116*a*b*c^4)*d - 14*(105*b^4*c^2 -
 448*a*b^2*c^3 + 240*a^2*c^4)*e + (1155*b^5*c - 6048*a*b^3*c^2 +
6352*a^2*b*c^3)*f)*h^3)*x)*sqrt(c*x^2 + b*x + a)*sqrt(c) + 105*(1
6*(16*(b^2*c^5 - 4*a*c^6)*d - 8*(b^3*c^4 - 4*a*b*c^5)*e + (5*b^4*
c^3 - 24*a*b^2*c^4 + 16*a^2*c^5)*f)*g^3 - 24*(16*(b^3*c^4 - 4*a*b
*c^5)*d - 2*(5*b^4*c^3 - 24*a*b^2*c^4 + 16*a^2*c^5)*e + (7*b^5*c^
2 - 40*a*b^3*c^3 + 48*a^2*b*c^4)*f)*g^2*h + 6*(8*(5*b^4*c^3 - 24*
a*b^2*c^4 + 16*a^2*c^5)*d - 4*(7*b^5*c^2 - 40*a*b^3*c^3 + 48*a^2*
b*c^4)*e + (21*b^6*c - 140*a*b^4*c^2 + 240*a^2*b^2*c^3 - 64*a^3*c
^4)*f)*g*h^2 - (8*(7*b^5*c^2 - 40*a*b^3*c^3 + 48*a^2*b*c^4)*d - 2
*(21*b^6*c - 140*a*b^4*c^2 + 240*a^2*b^2*c^3 - 64*a^3*c^4)*e + (3
3*b^7 - 252*a*b^5*c + 560*a^2*b^3*c^2 - 320*a^3*b*c^3)*f)*h^3)*lo
g(4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x
+ b^2 + 4*a*c)*sqrt(c)))/c^(13/2), 1/215040*(2*(15360*c^6*f*h^3*x
^6 + 1280*(42*c^6*f*g*h^2 + (14*c^6*e + b*c^5*f)*h^3)*x^5 + 128*(
504*c^6*f*g^2*h + 42*(12*c^6*e + b*c^5*f)*g*h^2 + (168*c^6*d + 14
*b*c^5*e - (11*b^2*c^4 - 24*a*c^5)*f)*h^3)*x^4 + 560*(48*b*c^5*d
- 8*(3*b^2*c^4 - 8*a*c^5)*e + (15*b^3*c^3 - 52*a*b*c^4)*f)*g^3 -
168*(80*(3*b^2*c^4 - 8*a*c^5)*d - 10*(15*b^3*c^3 - 52*a*b*c^4)*e
+ (105*b^4*c^2 - 460*a*b^2*c^3 + 256*a^2*c^4)*f)*g^2*h + 42*(40*(
15*b^3*c^3 - 52*a*b*c^4)*d - 4*(105*b^4*c^2 - 460*a*b^2*c^3 + 256
*a^2*c^4)*e + (315*b^5*c - 1680*a*b^3*c^2 + 1808*a^2*b*c^3)*f)*g*
h^2 - (56*(105*b^4*c^2 - 460*a*b^2*c^3 + 256*a^2*c^4)*d - 14*(315
*b^5*c - 1680*a*b^3*c^2 + 1808*a^2*b*c^3)*e + (3465*b^6 - 21840*a
*b^4*c + 34608*a^2*b^2*c^2 - 8192*a^3*c^3)*f)*h^3 + 16*(1680*c^6*
f*g^3 + 504*(10*c^6*e + b*c^5*f)*g^2*h + 42*(120*c^6*d + 12*b*c^5
*e - (9*b^2*c^4 - 20*a*c^5)*f)*g*h^2 + (168*b*c^5*d - 14*(9*b^2*c
^4 - 20*a*c^5)*e + (99*b^3*c^3 - 316*a*b*c^4)*f)*h^3)*x^3 + 8*(56
0*(8*c^6*e + b*c^5*f)*g^3 + 168*(80*c^6*d + 10*b*c^5*e - (7*b^2*c
^4 - 16*a*c^5)*f)*g^2*h + 42*(40*b*c^5*d - 4*(7*b^2*c^4 - 16*a*c^
5)*e + (21*b^3*c^3 - 68*a*b*c^4)*f)*g*h^2 - (56*(7*b^2*c^4 - 16*a
*c^5)*d - 14*(21*b^3*c^3 - 68*a*b*c^4)*e + (231*b^4*c^2 - 972*a*b
^2*c^3 + 512*a^2*c^4)*f)*h^3)*x^2 + 2*(560*(48*c^6*d + 8*b*c^5*e
```

```
- (5*b^2*c^4 - 12*a*c^5)*f)*g^3 + 168*(80*b*c^5*d - 10*(5*b^2*c^4
 - 12*a*c^5)*e + (35*b^3*c^3 - 116*a*b*c^4)*f)*g^2*h - 42*(40*(5*
b^2*c^4 - 12*a*c^5)*d - 4*(35*b^3*c^3 - 116*a*b*c^4)*e + (105*b^4
*c^2 - 448*a*b^2*c^3 + 240*a^2*c^4)*f)*g*h^2 + (56*(35*b^3*c^3 -
116*a*b*c^4)*d - 14*(105*b^4*c^2 - 448*a*b^2*c^3 + 240*a^2*c^4)*e
 + (1155*b^5*c - 6048*a*b^3*c^2 + 6352*a^2*b*c^3)*f)*h^3)*x)*sqrt
(c*x^2 + b*x + a)*sqrt(-c) - 105*(16*(16*(b^2*c^5 - 4*a*c^6)*d -
8*(b^3*c^4 - 4*a*b*c^5)*e + (5*b^4*c^3 - 24*a*b^2*c^4 + 16*a^2*c^
5)*f)*g^3 - 24*(16*(b^3*c^4 - 4*a*b*c^5)*d - 2*(5*b^4*c^3 - 24*a*
b^2*c^4 + 16*a^2*c^5)*e + (7*b^5*c^2 - 40*a*b^3*c^3 + 48*a^2*b*c^
4)*f)*g^2*h + 6*(8*(5*b^4*c^3 - 24*a*b^2*c^4 + 16*a^2*c^5)*d - 4*
(7*b^5*c^2 - 40*a*b^3*c^3 + 48*a^2*b*c^4)*e + (21*b^6*c - 140*a*b
^4*c^2 + 240*a^2*b^2*c^3 - 64*a^3*c^4)*f)*g*h^2 - (8*(7*b^5*c^2 -
 40*a*b^3*c^3 + 48*a^2*b*c^4)*d - 2*(21*b^6*c - 140*a*b^4*c^2 + 2
40*a^2*b^2*c^3 - 64*a^3*c^4)*e + (33*b^7 - 252*a*b^5*c + 560*a^2*
b^3*c^2 - 320*a^3*b*c^3)*f)*h^3)*arctan(1/2*(2*c*x + b)*sqrt(-c)/
(sqrt(c*x^2 + b*x + a)*c)))/(sqrt(-c)*c^6)]
```

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

$$\int (g+hx)^3 \sqrt{a+bx+cx^2} \left(d+ex+fx^2\right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**3*(f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((g + h*x)**3*sqrt(a + b*x + c*x**2)*(d + e*x + f*x**2),
x)
```

GIAC/XCAS [A] time = 0.289569, size = 1, normalized size = 0.

$$Done$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g)^3,x, algorithm="giac")
```

```
[Out] Done
```

3.187 $\int (g+hx)^2\sqrt{a+bx+cx^2}\left(d+ex+fx^2\right)\,dx$

Optimal. Leaf size=584

$$-\frac{\left(b^2-4ac\right)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(8c^2\left(2a^2fh^2+6abh(eh+2fg)+5b^2\left(dh^2+2egh+fg^2\right)\right)-28b^2ch(2afh+beh+2bf}{1024c^{11/2}}$$
$$+\frac{(b+2cx)\sqrt{a+bx+cx^2}\left(8c^2\left(2a^2fh^2+6abh(eh+2fg)+5b^2\left(dh^2+2egh+fg^2\right)\right)-28b^2ch(2afh+beh+2bfg)-32c^3\left(a\right.}{512c^5}$$
$$-\frac{\left(a+bx+cx^2\right)^{3/2}\left(-6chx\left(-4ch(5afh+7beh+2bfg)+21b^2fh^2-8c^2\left(fg^2-h(5dh+2eg)\right)\right)+8c^2h\left(16ah(eh+2fg)+\right.}{960c^4h}$$
$$-\frac{(g+hx)^2\left(a+bx+cx^2\right)^{3/2}(3bfh-4ceh+2cfg)}{20c^2h}+\frac{f(g+hx)^3\left(a+bx+cx^2\right)^{3/2}}{6ch}$$

```
[Out] ((128*c^4*d*g^2 + 21*b^4*f*h^2 - 28*b^2*c*h*(2*b*f*g + b*e*h + 2*
a*f*h) - 32*c^3*(2*b*g*(e*g + 2*d*h) + a*(f*g^2 + 2*e*g*h + d*h^2
)) + 8*c^2*(2*a^2*f*h^2 + 6*a*b*h*(2*f*g + e*h) + 5*b^2*(f*g^2 +
2*e*g*h + d*h^2)))*(b + 2*c*x)*Sqrt[a + b*x + c*x^2])/(512*c^5) -
 ((2*c*f*g - 4*c*e*h + 3*b*f*h)*(g + h*x)^2*(a + b*x + c*x^2)^(3/
2))/(20*c^2*h) + (f*(g + h*x)^3*(a + b*x + c*x^2)^(3/2))/(6*c*h)
- ((105*b^3*f*h^3 + 64*c^3*g*(f*g^2 - 2*h*(e*g + 5*d*h)) - 28*b*c
*h^2*(7*a*f*h + 5*b*(2*f*g + e*h)) + 8*c^2*h*(16*a*h*(2*f*g + e*h
) + b*(7*f*g^2 + 25*h*(2*e*g + d*h))) - 6*c*h*(21*b^2*f*h^2 - 4*c
*h*(2*b*f*g + 7*b*e*h + 5*a*f*h) - 8*c^2*(f*g^2 - h*(2*e*g + 5*d*
h)))*x)*(a + b*x + c*x^2)^(3/2))/(960*c^4*h) - ((b^2 - 4*a*c)*(12
8*c^4*d*g^2 + 21*b^4*f*h^2 - 28*b^2*c*h*(2*b*f*g + b*e*h + 2*a*f*
h) - 32*c^3*(2*b*g*(e*g + 2*d*h) + a*(f*g^2 + 2*e*g*h + d*h^2)) +
 8*c^2*(2*a^2*f*h^2 + 6*a*b*h*(2*f*g + e*h) + 5*b^2*(f*g^2 + 2*e*
g*h + d*h^2)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^
2])])/(1024*c^(11/2))
```

Rubi [A] time = 3.19772, antiderivative size = 581, normalized size of antiderivative = 0.99, number of steps used = 6, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$-\frac{\left(b^2-4ac\right)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(8c^2\left(2a^2fh^2+6abh(eh+2fg)+5b^2\left(h(dh+2eg)+fg^2\right)\right)-28b^2ch(2afh+beh+2b\right.}{1024c^{11/2}}$$
$$+\frac{(b+2cx)\sqrt{a+bx+cx^2}\left(8c^2\left(2a^2fh^2+6abh(eh+2fg)+5b^2\left(h(dh+2eg)+fg^2\right)\right)-28b^2ch(2afh+beh+2bfg)-32c^3\left(\right.}{512c^5}$$
$$-\frac{\left(a+bx+cx^2\right)^{3/2}\left(-6chx\left(-4ch(5afh+7beh+2bfg)+21b^2fh^2-8c^2\left(fg^2-h(5dh+2eg)\right)\right)+8c^2h\left(16ah(eh+2fg)+\right.}{960c^4h}$$
$$-\frac{(g+hx)^2\left(a+bx+cx^2\right)^{3/2}(3bfh-4ceh+2cfg)}{20c^2h}+\frac{f(g+hx)^3\left(a+bx+cx^2\right)^{3/2}}{6ch}$$

Antiderivative was successfully verified.

```
[In]  Int[(g + h*x)^2*Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] ((128*c^4*d*g^2 + 21*b^4*f*h^2 - 28*b^2*c*h*(2*b*f*g + b*e*h + 2*
a*f*h) - 32*c^3*(a*f*g^2 + a*h*(2*e*g + d*h) + 2*b*g*(e*g + 2*d*h
)) + 8*c^2*(2*a^2*f*h^2 + 6*a*b*h*(2*f*g + e*h) + 5*b^2*(f*g^2 +
h*(2*e*g + d*h))))*(b + 2*c*x)*Sqrt[a + b*x + c*x^2])/(512*c^5) -
 ((2*c*f*g - 4*c*e*h + 3*b*f*h)*(g + h*x)^2*(a + b*x + c*x^2)^(3/
2))/(20*c^2*h) + (f*(g + h*x)^3*(a + b*x + c*x^2)^(3/2))/(6*c*h)
- ((105*b^3*f*h^3 + 64*c^3*(f*g^3 - 2*g*h*(e*g + 5*d*h)) - 28*b*c
*h^2*(7*a*f*h + 5*b*(2*f*g + e*h)) + 8*c^2*h*(7*b*f*g^2 + 25*b*h*
(2*e*g + d*h) + 16*a*h*(2*f*g + e*h)) - 6*c*h*(21*b^2*f*h^2 - 4*c
*h*(2*b*f*g + 7*b*e*h + 5*a*f*h) - 8*c^2*(f*g^2 - h*(2*e*g + 5*d*
h)))*x)*(a + b*x + c*x^2)^(3/2))/(960*c^4*h) - ((b^2 - 4*a*c)*(12
8*c^4*d*g^2 + 21*b^4*f*h^2 - 28*b^2*c*h*(2*b*f*g + b*e*h + 2*a*f*
h) - 32*c^3*(a*f*g^2 + a*h*(2*e*g + d*h) + 2*b*g*(e*g + 2*d*h)) +
 8*c^2*(2*a^2*f*h^2 + 6*a*b*h*(2*f*g + e*h) + 5*b^2*(f*g^2 + h*(2
*e*g + d*h))))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^
2])])/(1024*c^(11/2))
```

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((h*x+g)**2*(f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 2.89402, size = 654, normalized size = 1.12

$$\frac{2\sqrt{c}\sqrt{a+x(b+cx)}\left(16bc^2\left(113a^2fh^2-2ac\left(h(65dh+130eg+29ehx)+f\left(65g^2+58ghx+17h^2x^2\right)\right)+4c^2\left(5d\left(6g^2+4ghx\right.\right.\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(g + h*x)^2*Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] (2*Sqrt[c]*Sqrt[a + x*(b + c*x)]*(315*b^5*f*h^2 - 210*b^4*c*h*(4*
f*g + 2*e*h + f*h*x) + 8*b^3*c*(-210*a*f*h^2 + 5*c*h*(30*e*g + 15
*d*h + 7*e*h*x) + c*f*(75*g^2 + 70*g*h*x + 21*h^2*x^2)) - 16*b^2*
c^2*(-(a*h*(230*f*g + 115*e*h + 56*f*h*x)) + c*(5*d*h*(24*g + 5*h
*x) + 2*e*(30*g^2 + 25*g*h*x + 7*h^2*x^2) + f*x*(25*g^2 + 28*g*h*
```

```
x + 9*h^2*x^2))) + 16*b*c^2*(113*a^2*f*h^2 - 2*a*c*(h*(130*e*g +
65*d*h + 29*e*h*x) + f*(65*g^2 + 58*g*h*x + 17*h^2*x^2)) + 4*c^2*
(5*d*(6*g^2 + 4*g*h*x + h^2*x^2) + x*(f*x*(5*g^2 + 6*g*h*x + 2*h^
2*x^2) + e*(10*g^2 + 10*g*h*x + 3*h^2*x^2)))) - 32*c^3*(a^2*h*(64
*f*g + 32*e*h + 15*f*h*x) - 2*a*c*(5*d*h*(16*g + 3*h*x) + f*x*(15
*g^2 + 16*g*h*x + 5*h^2*x^2) + e*(40*g^2 + 30*g*h*x + 8*h^2*x^2))
 - 4*c^2*x*(5*d*(6*g^2 + 8*g*h*x + 3*h^2*x^2) + x*(2*e*(10*g^2 +
15*g*h*x + 6*h^2*x^2) + f*x*(15*g^2 + 24*g*h*x + 10*h^2*x^2)))))
- 15*(b^2 - 4*a*c)*(128*c^4*d*g^2 + 21*b^4*f*h^2 - 28*b^2*c*h*(2*
b*f*g + b*e*h + 2*a*f*h) - 32*c^3*(a*f*g^2 + a*h*(2*e*g + d*h) +
2*b*g*(e*g + 2*d*h)) + 8*c^2*(2*a^2*f*h^2 + 6*a*b*h*(2*f*g + e*h)
 + 5*b^2*(f*g^2 + h*(2*e*g + d*h))))*Log[b + 2*c*x + 2*Sqrt[c]*Sq
rt[a + x*(b + c*x)]])/(15360*c^(11/2))
```

Maple [B] time = 0.021, size = 2179, normalized size = 3.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^2*(f*x^2+e*x+d)*(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] 1/8*b^3/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*d*g*h
-1/4*b^2/c^2*(c*x^2+b*x+a)^(1/2)*d*g*h+1/3*(c*x^2+b*x+a)^(3/2)/c*
e*g^2+1/2*d*g^2*(c*x^2+b*x+a)^(1/2)*x+2/5*x^2*(c*x^2+b*x+a)^(3/2)
/c*f*g*h-7/40*b/c^2*x*(c*x^2+b*x+a)^(3/2)*e*h^2+7/24*b^2/c^3*(c*x
^2+b*x+a)^(3/2)*f*g*h+3/8*b/c^2*a*(c*x^2+b*x+a)^(1/2)*x*f*g*h+3/3
2*b^2/c^3*a*(c*x^2+b*x+a)^(1/2)*e*h^2+3/16*b/c^(5/2)*a^2*ln((1/2*
b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*h^2-4/15/c^2*a*(c*x^2+b*x+a
)^(3/2)*f*g*h+5/32*b^3/c^3*(c*x^2+b*x+a)^(1/2)*e*g*h+3/16*b^2/c^(
5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*d*h^2+1/2*x*(c
*x^2+b*x+a)^(3/2)/c*e*g*h-5/12*b/c^2*(c*x^2+b*x+a)^(3/2)*e*g*h+5/
32*b^2/c^2*(c*x^2+b*x+a)^(1/2)*x*d*h^2+5/32*b^2/c^2*(c*x^2+b*x+a)
^(1/2)*x*f*g^2+3/16*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x
+a)^(1/2))*a*f*g^2-5/64*b^4/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2
+b*x+a)^(1/2))*e*g*h-1/8/c*a*(c*x^2+b*x+a)^(1/2)*x*d*h^2-1/8/c*a*
(c*x^2+b*x+a)^(1/2)*x*f*g^2-1/16/c^2*a*(c*x^2+b*x+a)^(1/2)*b*d*h^
2-1/16/c^2*a*(c*x^2+b*x+a)^(1/2)*b*f*g^2-1/4*b/c*(c*x^2+b*x+a)^(1
/2)*x*e*g^2+1/32*f*h^2/c^3*a^2*(c*x^2+b*x+a)^(1/2)*b-3/20*f*h^2*b
/c^2*x^2*(c*x^2+b*x+a)^(3/2)+21/160*f*h^2*b^2/c^3*x*(c*x^2+b*x+a)
^(3/2)+21/256*f*h^2*b^4/c^4*(c*x^2+b*x+a)^(1/2)*x+35/256*f*h^2*b^
4/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a-7/64*f*h^
2*b^3/c^4*a*(c*x^2+b*x+a)^(1/2)-15/64*f*h^2*b^2/c^(7/2)*a^2*ln((1
/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+49/240*f*h^2*b/c^3*a*(c*x^
2+b*x+a)^(3/2)-1/8*f*h^2/c^2*a*x*(c*x^2+b*x+a)^(3/2)+7/128*b^5/c^
(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g*h-1/4/c^(3/
2)*a^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*g*h+1/6*f*h^
2*x^3*(c*x^2+b*x+a)^(3/2)/c-7/64*f*h^2*b^3/c^4*(c*x^2+b*x+a)^(3/2
)-1/2*b/c*(c*x^2+b*x+a)^(1/2)*x*d*g*h-1/4/c*a*(c*x^2+b*x+a)^(1/2)
```

```
*x*e*g*h-7/32*f*h^2*b^2/c^3*a*(c*x^2+b*x+a)^(1/2)*x+5/16*b^2/c^2*
(c*x^2+b*x+a)^(1/2)*x*e*g*h+3/8*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2
)+(c*x^2+b*x+a)^(1/2))*a*e*g*h-1/2*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/
2)+(c*x^2+b*x+a)^(1/2))*a*d*g*h-7/64*b^3/c^3*(c*x^2+b*x+a)^(1/2)*
x*e*h^2+1/16*f*h^2/c^2*a^2*(c*x^2+b*x+a)^(1/2)*x-7/64*b^4/c^4*(c*
x^2+b*x+a)^(1/2)*f*g*h-5/32*b^3/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c
*x^2+b*x+a)^(1/2))*a*e*h^2-1/4*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(
c*x^2+b*x+a)^(1/2))*a*e*g^2-1/8/c^2*a*(c*x^2+b*x+a)^(1/2)*b*e*g*h
-7/20*b/c^2*x*(c*x^2+b*x+a)^(3/2)*f*g*h-7/32*b^3/c^3*(c*x^2+b*x+a
)^(1/2)*x*f*g*h-5/16*b^3/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*
x+a)^(1/2))*a*f*g*h+3/16*b/c^2*a*(c*x^2+b*x+a)^(1/2)*x*e*h^2+3/16
*b^2/c^3*a*(c*x^2+b*x+a)^(1/2)*f*g*h+3/8*b/c^(5/2)*a^2*ln((1/2*b+
c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g*h+21/512*f*h^2*b^5/c^5*(c*x
^2+b*x+a)^(1/2)-21/1024*f*h^2*b^6/c^(11/2)*ln((1/2*b+c*x)/c^(1/2)
+(c*x^2+b*x+a)^(1/2))-2/15/c^2*a*(c*x^2+b*x+a)^(3/2)*e*h^2+5/64*b
^3/c^3*(c*x^2+b*x+a)^(1/2)*f*g^2-5/128*b^4/c^(7/2)*ln((1/2*b+c*x)
/c^(1/2)+(c*x^2+b*x+a)^(1/2))*d*h^2-5/128*b^4/c^(7/2)*ln((1/2*b+c
*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g^2-1/8/c^(3/2)*a^2*ln((1/2*b+
c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*d*h^2-1/8/c^(3/2)*a^2*ln((1/2*b
+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g^2+2/3*(c*x^2+b*x+a)^(3/2)/
c*d*g*h+1/4*d*g^2/c*(c*x^2+b*x+a)^(1/2)*b+1/2*d*g^2/c^(1/2)*ln((1
/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a-1/8*d*g^2/c^(3/2)*ln((1/
2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*b^2+1/16*b^3/c^(5/2)*ln((1/
2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*g^2-1/8*b^2/c^2*(c*x^2+b*
x+a)^(1/2)*e*g^2-5/24*b/c^2*(c*x^2+b*x+a)^(3/2)*f*g^2+1/5*x^2*(c*
x^2+b*x+a)^(3/2)/c*e*h^2+7/48*b^2/c^3*(c*x^2+b*x+a)^(3/2)*e*h^2-7
/128*b^4/c^4*(c*x^2+b*x+a)^(1/2)*e*h^2+7/256*b^5/c^(9/2)*ln((1/2*
b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*h^2+1/16*f*h^2/c^(5/2)*a^3*
ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+5/64*b^3/c^3*(c*x^2+b
*x+a)^(1/2)*d*h^2+1/4*x*(c*x^2+b*x+a)^(3/2)/c*d*h^2+1/4*x*(c*x^2+
b*x+a)^(3/2)/c*f*g^2-5/24*b/c^2*(c*x^2+b*x+a)^(3/2)*d*h^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(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g)^2,x, algorithm="maxima

[Out] Exception raised: ValueError
```

Fricas [A] time = 0.928493, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g)^2,x, algorithm="fricas
```

```
[Out] [1/30720*(4*(1280*c^5*f*h^2*x^5 + 128*(24*c^5*f*g*h + (12*c^5*e +
 b*c^4*f)*h^2)*x^4 + 16*(120*c^5*f*g^2 + 24*(10*c^5*e + b*c^4*f)*
g*h + (120*c^5*d + 12*b*c^4*e - (9*b^2*c^3 - 20*a*c^4)*f)*h^2)*x^
3 + 40*(48*b*c^4*d - 8*(3*b^2*c^3 - 8*a*c^4)*e + (15*b^3*c^2 - 52
*a*b*c^3)*f)*g^2 - 8*(80*(3*b^2*c^3 - 8*a*c^4)*d - 10*(15*b^3*c^2
 - 52*a*b*c^3)*e + (105*b^4*c - 460*a*b^2*c^2 + 256*a^2*c^3)*f)*g
*h + (40*(15*b^3*c^2 - 52*a*b*c^3)*d - 4*(105*b^4*c - 460*a*b^2*c
^2 + 256*a^2*c^3)*e + (315*b^5 - 1680*a*b^3*c + 1808*a^2*b*c^2)*f
)*h^2 + 8*(40*(8*c^5*e + b*c^4*f)*g^2 + 8*(80*c^5*d + 10*b*c^4*e
- (7*b^2*c^3 - 16*a*c^4)*f)*g*h + (40*b*c^4*d - 4*(7*b^2*c^3 - 16
*a*c^4)*e + (21*b^3*c^2 - 68*a*b*c^3)*f)*h^2)*x^2 + 2*(40*(48*c^5
*d + 8*b*c^4*e - (5*b^2*c^3 - 12*a*c^4)*f)*g^2 + 8*(80*b*c^4*d -
10*(5*b^2*c^3 - 12*a*c^4)*e + (35*b^3*c^2 - 116*a*b*c^3)*f)*g*h -
 (40*(5*b^2*c^3 - 12*a*c^4)*d - 4*(35*b^3*c^2 - 116*a*b*c^3)*e +
(105*b^4*c - 448*a*b^2*c^2 + 240*a^2*c^3)*f)*h^2)*x)*sqrt(c*x^2 +
 b*x + a)*sqrt(c) - 15*(8*(16*(b^2*c^4 - 4*a*c^5)*d - 8*(b^3*c^3
- 4*a*b*c^4)*e + (5*b^4*c^2 - 24*a*b^2*c^3 + 16*a^2*c^4)*f)*g^2 -
 8*(16*(b^3*c^3 - 4*a*b*c^4)*d - 2*(5*b^4*c^2 - 24*a*b^2*c^3 + 16
*a^2*c^4)*e + (7*b^5*c - 40*a*b^3*c^2 + 48*a^2*b*c^3)*f)*g*h + (8
*(5*b^4*c^2 - 24*a*b^2*c^3 + 16*a^2*c^4)*d - 4*(7*b^5*c - 40*a*b^
3*c^2 + 48*a^2*b*c^3)*e + (21*b^6 - 140*a*b^4*c + 240*a^2*b^2*c^2
 - 64*a^3*c^3)*f)*h^2)*log(-4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x +
a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))/c^(11/2), 1/15
360*(2*(1280*c^5*f*h^2*x^5 + 128*(24*c^5*f*g*h + (12*c^5*e + b*c^
4*f)*h^2)*x^4 + 16*(120*c^5*f*g^2 + 24*(10*c^5*e + b*c^4*f)*g*h +
 (120*c^5*d + 12*b*c^4*e - (9*b^2*c^3 - 20*a*c^4)*f)*h^2)*x^3 + 4
0*(48*b*c^4*d - 8*(3*b^2*c^3 - 8*a*c^4)*e + (15*b^3*c^2 - 52*a*b*
c^3)*f)*g^2 - 8*(80*(3*b^2*c^3 - 8*a*c^4)*d - 10*(15*b^3*c^2 - 52
*a*b*c^3)*e + (105*b^4*c - 460*a*b^2*c^2 + 256*a^2*c^3)*f)*g*h +
(40*(15*b^3*c^2 - 52*a*b*c^3)*d - 4*(105*b^4*c - 460*a*b^2*c^2 +
256*a^2*c^3)*e + (315*b^5 - 1680*a*b^3*c + 1808*a^2*b*c^2)*f)*h^2
 + 8*(40*(8*c^5*e + b*c^4*f)*g^2 + 8*(80*c^5*d + 10*b*c^4*e - (7*
b^2*c^3 - 16*a*c^4)*f)*g*h + (40*b*c^4*d - 4*(7*b^2*c^3 - 16*a*c^
4)*e + (21*b^3*c^2 - 68*a*b*c^3)*f)*h^2)*x^2 + 2*(40*(48*c^5*d +
8*b*c^4*e - (5*b^2*c^3 - 12*a*c^4)*f)*g^2 + 8*(80*b*c^4*d - 10*(5
*b^2*c^3 - 12*a*c^4)*e + (35*b^3*c^2 - 116*a*b*c^3)*f)*g*h - (40*
(5*b^2*c^3 - 12*a*c^4)*d - 4*(35*b^3*c^2 - 116*a*b*c^3)*e + (105*
b^4*c - 448*a*b^2*c^2 + 240*a^2*c^3)*f)*h^2)*x)*sqrt(c*x^2 + b*x
+ a)*sqrt(-c) - 15*(8*(16*(b^2*c^4 - 4*a*c^5)*d - 8*(b^3*c^3 - 4*
a*b*c^4)*e + (5*b^4*c^2 - 24*a*b^2*c^3 + 16*a^2*c^4)*f)*g^2 - 8*(
16*(b^3*c^3 - 4*a*b*c^4)*d - 2*(5*b^4*c^2 - 24*a*b^2*c^3 + 16*a^2
*c^4)*e + (7*b^5*c - 40*a*b^3*c^2 + 48*a^2*b*c^3)*f)*g*h + (8*(5*
b^4*c^2 - 24*a*b^2*c^3 + 16*a^2*c^4)*d - 4*(7*b^5*c - 40*a*b^3*c^
2 + 48*a^2*b*c^3)*e + (21*b^6 - 140*a*b^4*c + 240*a^2*b^2*c^2 - 6
4*a^3*c^3)*f)*h^2)*arctan(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 +
b*x + a)*c)))/(sqrt(-c)*c^5)]
```

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

$$\int (g+hx)^2\sqrt{a+bx+cx^2}\left(d+ex+fx^2\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**2*(f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((g + h*x)**2*sqrt(a + b*x + c*x**2)*(d + e*x + f*x**2),
x)
```

GIAC/XCAS [A] time = 0.287093, size = 1, normalized size = 0.

$$Done$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g)^2,x, algorithm="giac")
```

```
[Out] Done
```

3.188 $\int (g+hx)\sqrt{a+bx+cx^2}\left(d+ex+fx^2\right)\,dx$

Optimal. Leaf size=322

$$\frac{(b+2cx)\sqrt{a+bx+cx^2}\left(-8c^2(aeh+afg+2bdh+2beg)+2bc(6afh+5b(eh+fg))-7b^3fh+32c^3dg\right)}{128c^4}+\frac{\left(a+bx+cx^2\right)^{3/2}\left(-2ch(16afh+25b(eh+fg))+35b^2fh^2-6chx(7bfh-10ceh+6cfg)-16c^2\left(3fg^2-5h(dh+eg)\right)\right)}{240c^3h}-\frac{\left(b^2-4ac\right)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-8c^2(aeh+afg+2bdh+2beg)+2bc(6afh+5b(eh+fg))-7b^3fh+32c^3dg\right)}{256c^{9/2}}+\frac{f(g+hx)^2\left(a+bx+cx^2\right)^{3/2}}{5ch}$$

```
[Out] ((32*c^3*d*g - 7*b^3*f*h - 8*c^2*(2*b*e*g + a*f*g + 2*b*d*h + a*e
*h) + 2*b*c*(6*a*f*h + 5*b*(f*g + e*h)))*(b + 2*c*x)*Sqrt[a + b*x
 + c*x^2])/(128*c^4) + (f*(g + h*x)^2*(a + b*x + c*x^2)^(3/2))/(5
*c*h) + ((35*b^2*f*h^2 - 16*c^2*(3*f*g^2 - 5*h*(e*g + d*h)) - 2*c
*h*(16*a*f*h + 25*b*(f*g + e*h)) - 6*c*h*(6*c*f*g - 10*c*e*h + 7*
b*f*h)*x)*(a + b*x + c*x^2)^(3/2))/(240*c^3*h) - ((b^2 - 4*a*c)*(
32*c^3*d*g - 7*b^3*f*h - 8*c^2*(2*b*e*g + a*f*g + 2*b*d*h + a*e*h
) + 2*b*c*(6*a*f*h + 5*b*(f*g + e*h)))*ArcTanh[(b + 2*c*x)/(2*Sqr
t[c]*Sqrt[a + b*x + c*x^2])])/(256*c^(9/2))
```

Rubi [A] time = 1.1799, antiderivative size = 322, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$\frac{(b+2cx)\sqrt{a+bx+cx^2}\left(-8c^2(aeh+afg+2bdh+2beg)+2bc(6afh+5b(eh+fg))-7b^3fh+32c^3dg\right)}{128c^4}+\frac{\left(a+bx+cx^2\right)^{3/2}\left(-2ch(16afh+25b(eh+fg))+35b^2fh^2-6chx(7bfh-10ceh+6cfg)+c^2\left(-\left(48fg^2-80h(dh+eg)\right)\right)\right)}{240c^3h}-\frac{\left(b^2-4ac\right)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-8c^2(aeh+afg+2bdh+2beg)+2bc(6afh+5b(eh+fg))-7b^3fh+32c^3dg\right)}{256c^{9/2}}+\frac{f(g+hx)^2\left(a+bx+cx^2\right)^{3/2}}{5ch}$$

Antiderivative was successfully verified.

```
[In]  Int[(g + h*x)*Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] ((32*c^3*d*g - 7*b^3*f*h - 8*c^2*(2*b*e*g + a*f*g + 2*b*d*h + a*e
*h) + 2*b*c*(6*a*f*h + 5*b*(f*g + e*h)))*(b + 2*c*x)*Sqrt[a + b*x
 + c*x^2])/(128*c^4) + (f*(g + h*x)^2*(a + b*x + c*x^2)^(3/2))/(5
```

```
*c*h) + ((35*b^2*f*h^2 - c^2*(48*f*g^2 - 80*h*(e*g + d*h)) - 2*c*
h*(16*a*f*h + 25*b*(f*g + e*h)) - 6*c*h*(6*c*f*g - 10*c*e*h + 7*b
*f*h)*x)*(a + b*x + c*x^2)^(3/2))/(240*c^3*h) - ((b^2 - 4*a*c)*(3
2*c^3*d*g - 7*b^3*f*h - 8*c^2*(2*b*e*g + a*f*g + 2*b*d*h + a*e*h)
 + 2*b*c*(6*a*f*h + 5*b*(f*g + e*h)))*ArcTanh[(b + 2*c*x)/(2*Sqrt
[c]*Sqrt[a + b*x + c*x^2]])])/(256*c^(9/2))
```

Rubi in Sympy [A] time = 123.406, size = 398, normalized size = 1.24

$$\frac{f(g+hx)^2\left(a+bx+cx^2\right)^{\frac{3}{2}}}{5ch}+\frac{\left(a+bx+cx^2\right)^{\frac{3}{2}}\left(-8acfh^2+\frac{35b^2fh^2}{4}-\frac{25bceh^2}{2}-\frac{25bcfgh}{2}+20c^2dh^2+20c^2egh-12c^2fg^2-\frac{3chx(7bfh-10ceh+6cfg)}{2}\right)}{60c^3h}-\frac{(b+2cx)\sqrt{a+bx+cx^2}\left(-12abcfh+8ac^2eh+8ac^2fg+7b^3fh-10b^2ceh-10b^2cfg+16bc^2dh+16bc^2eg-32c^3dg\right)}{128c^4}+\frac{\left(-4ac+b^2\right)\left(-12abcfh+8ac^2eh+8ac^2fg+7b^3fh-10b^2ceh-10b^2cfg+16bc^2dh+16bc^2eg-32c^3dg\right)\operatorname{atanh}\left(\frac{b+2}{2\sqrt{c}\sqrt{a+}}\right)}{256c^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)*(f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] f*(g + h*x)**2*(a + b*x + c*x**2)**(3/2)/(5*c*h) + (a + b*x + c*x
**2)**(3/2)*(-8*a*c*f*h**2 + 35*b**2*f*h**2/4 - 25*b*c*e*h**2/2 -
 25*b*c*f*g*h/2 + 20*c**2*d*h**2 + 20*c**2*e*g*h - 12*c**2*f*g**2
 - 3*c*h*x*(7*b*f*h - 10*c*e*h + 6*c*f*g)/2)/(60*c**3*h) - (b + 2
*c*x)*sqrt(a + b*x + c*x**2)*(-12*a*b*c*f*h + 8*a*c**2*e*h + 8*a*
c**2*f*g + 7*b**3*f*h - 10*b**2*c*e*h - 10*b**2*c*f*g + 16*b*c**2
*d*h + 16*b*c**2*e*g - 32*c**3*d*g)/(128*c**4) + (-4*a*c + b**2)*
(-12*a*b*c*f*h + 8*a*c**2*e*h + 8*a*c**2*f*g + 7*b**3*f*h - 10*b*
*2*c*e*h - 10*b**2*c*f*g + 16*b*c**2*d*h + 16*b*c**2*e*g - 32*c**
3*d*g)*atanh((b + 2*c*x)/(2*sqrt(c)*sqrt(a + b*x + c*x**2)))/(256
*c**(9/2))
```

Mathematica [A] time = 0.992798, size = 342, normalized size = 1.06

$$\frac{2\sqrt{c}\sqrt{a+x(b+cx)}\left(16c^2\left(-16a^2fh+ac(40dh+5e(8g+3hx)+fx(15g+8hx))+2c^2x(10d(3g+2hx)+x(5e(4g+3hx)+3f\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(g + h*x)*Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] (2*Sqrt[c]*Sqrt[a + x*(b + c*x)]*(-105*b^4*f*h + 10*b^3*c*(15*f*g
 + 15*e*h + 7*f*h*x) - 4*b^2*c*(-115*a*f*h + c*(60*e*g + 60*d*h +
 25*f*g*x + 25*e*h*x + 14*f*h*x^2)) + 8*b*c^2*(20*c*d*(3*g + h*x)
 - a*(65*f*g + 65*e*h + 29*f*h*x) + 2*c*x*(5*e*(2*g + h*x) + f*x*
(5*g + 3*h*x))) + 16*c^2*(-16*a^2*f*h + a*c*(40*d*h + 5*e*(8*g +
3*h*x) + f*x*(15*g + 8*h*x)) + 2*c^2*x*(10*d*(3*g + 2*h*x) + x*(5
*e*(4*g + 3*h*x) + 3*f*x*(5*g + 4*h*x))))) + 15*(b^2 - 4*a*c)*(-3
2*c^3*d*g + 7*b^3*f*h + 8*c^2*(2*b*e*g + a*f*g + 2*b*d*h + a*e*h)
 - 2*b*c*(6*a*f*h + 5*b*(f*g + e*h)))*Log[b + 2*c*x + 2*Sqrt[c]*S
qrt[a + x*(b + c*x)]])/(3840*c^(9/2))
```

Maple [B] time = 0.014, size = 1117, normalized size = 3.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)*(f*x^2+e*x+d)*(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] 1/3*(c*x^2+b*x+a)^(3/2)/c*d*h+1/2*d*g*(c*x^2+b*x+a)^(1/2)*x+1/3*e
*g*(c*x^2+b*x+a)^(3/2)/c+1/16*b^3/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+
(c*x^2+b*x+a)^(1/2))*d*h+5/64*b^3/c^3*(c*x^2+b*x+a)^(1/2)*f*g-5/1
28*b^4/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*h-5/
128*b^4/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g-1
/8/c^(3/2)*a^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*h+1/
4*x*(c*x^2+b*x+a)^(3/2)/c*e*h+1/4*x*(c*x^2+b*x+a)^(3/2)/c*f*g-5/2
4*b/c^2*(c*x^2+b*x+a)^(3/2)*e*h-1/8/c^(3/2)*a^2*ln((1/2*b+c*x)/c^
(1/2)+(c*x^2+b*x+a)^(1/2))*f*g-1/8*d*g/c^(3/2)*ln((1/2*b+c*x)/c^(
1/2)+(c*x^2+b*x+a)^(1/2))*b^2+1/16*e*g*b^3/c^(5/2)*ln((1/2*b+c*x)
/c^(1/2)+(c*x^2+b*x+a)^(1/2))+1/5*h*f*x^2*(c*x^2+b*x+a)^(3/2)/c+7
/48*h*f*b^2/c^3*(c*x^2+b*x+a)^(3/2)-7/128*h*f*b^4/c^4*(c*x^2+b*x+
a)^(1/2)+7/256*h*f*b^5/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+
a)^(1/2))-2/15*h*f/c^2*a*(c*x^2+b*x+a)^(3/2)-1/8*b^2/c^2*(c*x^2+b
*x+a)^(1/2)*d*h+3/16*h*f*b/c^2*a*(c*x^2+b*x+a)^(1/2)*x-1/8/c*a*(c
*x^2+b*x+a)^(1/2)*x*f*g+5/32*b^2/c^2*(c*x^2+b*x+a)^(1/2)*x*f*g+3/
16*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*e*h+
3/16*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*f*
g-1/8/c*a*(c*x^2+b*x+a)^(1/2)*x*e*h-1/4*e*g*b/c*(c*x^2+b*x+a)^(1/
2)*x-1/4*e*g*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2)
)*a+5/32*b^2/c^2*(c*x^2+b*x+a)^(1/2)*x*e*h+1/4*d*g/c*(c*x^2+b*x+a
)^(1/2)*b+1/2*d*g/c^(1/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1
/2))*a-1/8*e*g*b^2/c^2*(c*x^2+b*x+a)^(1/2)-5/24*b/c^2*(c*x^2+b*x+
a)^(3/2)*f*g+5/64*b^3/c^3*(c*x^2+b*x+a)^(1/2)*e*h-1/4*b/c^(3/2)*l
n((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*d*h-1/4*b/c*(c*x^2+b
*x+a)^(1/2)*x*d*h-5/32*h*f*b^3/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*
x^2+b*x+a)^(1/2))*a+3/32*h*f*b^2/c^3*a*(c*x^2+b*x+a)^(1/2)-7/40*h
*f*b/c^2*x*(c*x^2+b*x+a)^(3/2)-7/64*h*f*b^3/c^3*(c*x^2+b*x+a)^(1/
2)*x+3/16*h*f*b/c^(5/2)*a^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^
(1/2))-1/16/c^2*a*(c*x^2+b*x+a)^(1/2)*b*f*g-1/16/c^2*a*(c*x^2+b*x
```

```
+a)^(1/2)*b*e*h
```

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(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g),x, algorithm="maxima")

[Out] Exception raised: ValueError
```

Fricas [A] time = 0.541135, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g),x, algorithm="fricas")

[Out] [1/7680*(4*(384*c^4*f*h*x^4 + 48*(10*c^4*f*g + (10*c^4*e + b*c^3*
f)*h)*x^3 + 8*(10*(8*c^4*e + b*c^3*f)*g + (80*c^4*d + 10*b*c^3*e
- (7*b^2*c^2 - 16*a*c^3)*f)*h)*x^2 + 10*(48*b*c^3*d - 8*(3*b^2*c^
2 - 8*a*c^3)*e + (15*b^3*c - 52*a*b*c^2)*f)*g - (80*(3*b^2*c^2 -
8*a*c^3)*d - 10*(15*b^3*c - 52*a*b*c^2)*e + (105*b^4 - 460*a*b^2*
c + 256*a^2*c^2)*f)*h + 2*(10*(48*c^4*d + 8*b*c^3*e - (5*b^2*c^2
- 12*a*c^3)*f)*g + (80*b*c^3*d - 10*(5*b^2*c^2 - 12*a*c^3)*e + (3
5*b^3*c - 116*a*b*c^2)*f)*h)*x)*sqrt(c*x^2 + b*x + a)*sqrt(c) - 1
5*(2*(16*(b^2*c^3 - 4*a*c^4)*d - 8*(b^3*c^2 - 4*a*b*c^3)*e + (5*b
^4*c - 24*a*b^2*c^2 + 16*a^2*c^3)*f)*g - (16*(b^3*c^2 - 4*a*b*c^3
)*d - 2*(5*b^4*c - 24*a*b^2*c^2 + 16*a^2*c^3)*e + (7*b^5 - 40*a*b
^3*c + 48*a^2*b*c^2)*f)*h)*log(-4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*
x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))/c^(9/2), 1
/3840*(2*(384*c^4*f*h*x^4 + 48*(10*c^4*f*g + (10*c^4*e + b*c^3*f)
*h)*x^3 + 8*(10*(8*c^4*e + b*c^3*f)*g + (80*c^4*d + 10*b*c^3*e -
(7*b^2*c^2 - 16*a*c^3)*f)*h)*x^2 + 10*(48*b*c^3*d - 8*(3*b^2*c^2
- 8*a*c^3)*e + (15*b^3*c - 52*a*b*c^2)*f)*g - (80*(3*b^2*c^2 - 8*
a*c^3)*d - 10*(15*b^3*c - 52*a*b*c^2)*e + (105*b^4 - 460*a*b^2*c
+ 256*a^2*c^2)*f)*h + 2*(10*(48*c^4*d + 8*b*c^3*e - (5*b^2*c^2 -
12*a*c^3)*f)*g + (80*b*c^3*d - 10*(5*b^2*c^2 - 12*a*c^3)*e + (35*
b^3*c - 116*a*b*c^2)*f)*h)*x)*sqrt(c*x^2 + b*x + a)*sqrt(-c) - 15
*(2*(16*(b^2*c^3 - 4*a*c^4)*d - 8*(b^3*c^2 - 4*a*b*c^3)*e + (5*b^
4*c - 24*a*b^2*c^2 + 16*a^2*c^3)*f)*g - (16*(b^3*c^2 - 4*a*b*c^3)
*d - 2*(5*b^4*c - 24*a*b^2*c^2 + 16*a^2*c^3)*e + (7*b^5 - 40*a*b^
3*c + 48*a^2*b*c^2)*f)*h)*arctan(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c
```

```
*x^2 + b*x + a)*c)))/(sqrt(-c)*c^4)]
```

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

$$\int (g + hx)\sqrt{a + bx + cx^2}\left(d + ex + fx^2\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)*(f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((g + h*x)*sqrt(a + b*x + c*x**2)*(d + e*x + f*x**2), x)
```

GIAC/XCAS [A] time = 0.287312, size = 668, normalized size = 2.07

$$\frac{1}{1920}\sqrt{cx^2 + bx + a}\left(2\left(4\left(6\left(8\, fhx + \frac{10\, c^4 fg + bc^3 fh + 10\, c^4 he}{c^4}\right)x + \frac{10\, bc^3 fg + 80\, c^4 dh - 7\, b^2c^2 fh + 16\, ac^3 fh + 80\, c^4 ge}{c^4}\right.\right.\right.$$
$$+\frac{\left(32\, b^2c^3 dg - 128\, ac^4 dg + 10\, b^4 cfg - 48\, ab^2c^2 fg + 32\, a^2c^3 fg - 16\, b^3c^2 dh + 64\, abc^3 dh - 7\, b^5 fh + 40\, ab^3 cfh - 48\, a^2bc^2 fh\right.}{256\, c^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g),x, algorithm="giac")
```

```
[Out] 1/1920*sqrt(c*x^2 + b*x + a)*(2*(4*(6*(8*f*h*x + (10*c^4*f*g + b*
c^3*f*h + 10*c^4*h*e)/c^4)*x + (10*b*c^3*f*g + 80*c^4*d*h - 7*b^2
*c^2*f*h + 16*a*c^3*f*h + 80*c^4*g*e + 10*b*c^3*h*e)/c^4)*x + (48
0*c^4*d*g - 50*b^2*c^2*f*g + 120*a*c^3*f*g + 80*b*c^3*d*h + 35*b^
3*c*f*h - 116*a*b*c^2*f*h + 80*b*c^3*g*e - 50*b^2*c^2*h*e + 120*a
*c^3*h*e)/c^4)*x + (480*b*c^3*d*g + 150*b^3*c*f*g - 520*a*b*c^2*f
*g - 240*b^2*c^2*d*h + 640*a*c^3*d*h - 105*b^4*f*h + 460*a*b^2*c*
f*h - 256*a^2*c^2*f*h - 240*b^2*c^2*g*e + 640*a*c^3*g*e + 150*b^3
*c*h*e - 520*a*b*c^2*h*e)/c^4) + 1/256*(32*b^2*c^3*d*g - 128*a*c^
4*d*g + 10*b^4*c*f*g - 48*a*b^2*c^2*f*g + 32*a^2*c^3*f*g - 16*b^3
*c^2*d*h + 64*a*b*c^3*d*h - 7*b^5*f*h + 40*a*b^3*c*f*h - 48*a^2*b
*c^2*f*h - 16*b^3*c^2*g*e + 64*a*b*c^3*g*e + 10*b^4*c*h*e - 48*a*
b^2*c^2*h*e + 32*a^2*c^3*h*e)*ln(abs(-2*(sqrt(c)*x - sqrt(c*x^2 +
 b*x + a))*sqrt(c) - b))/c^(9/2)
```

3.189 $\int \sqrt{a+bx+cx^2}\left(d+ex+fx^2\right)\,dx$

Optimal. Leaf size=175

$$-\frac{\left(b^2-4ac\right)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-4c(af+2be)+5b^2f+16c^2d\right)}{128c^{7/2}}+\frac{(b+2cx)\sqrt{a+bx+cx^2}\left(-4acf+5b^2f-8bce+16c^2d\right)}{64c^3}+\frac{\left(a+bx+cx^2\right)^{3/2}(8ce-5bf)}{24c^2}+\frac{fx\left(a+bx+cx^2\right)^{3/2}}{4c}$$

```
[Out] ((16*c^2*d - 8*b*c*e + 5*b^2*f - 4*a*c*f)*(b + 2*c*x)*Sqrt[a + b*
x + c*x^2])/(64*c^3) + ((8*c*e - 5*b*f)*(a + b*x + c*x^2)^(3/2))/
(24*c^2) + (f*x*(a + b*x + c*x^2)^(3/2))/(4*c) - ((b^2 - 4*a*c)*(
16*c^2*d + 5*b^2*f - 4*c*(2*b*e + a*f))*ArcTanh[(b + 2*c*x)/(2*Sq
rt[c]*Sqrt[a + b*x + c*x^2])])/(128*c^(7/2))
```

Rubi [A] time = 0.34726, antiderivative size = 175, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$-\frac{\left(b^2-4ac\right)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-4c(af+2be)+5b^2f+16c^2d\right)}{128c^{7/2}}+\frac{(b+2cx)\sqrt{a+bx+cx^2}\left(-4acf+5b^2f-8bce+16c^2d\right)}{64c^3}+\frac{\left(a+bx+cx^2\right)^{3/2}(8ce-5bf)}{24c^2}+\frac{fx\left(a+bx+cx^2\right)^{3/2}}{4c}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] ((16*c^2*d - 8*b*c*e + 5*b^2*f - 4*a*c*f)*(b + 2*c*x)*Sqrt[a + b*
x + c*x^2])/(64*c^3) + ((8*c*e - 5*b*f)*(a + b*x + c*x^2)^(3/2))/
(24*c^2) + (f*x*(a + b*x + c*x^2)^(3/2))/(4*c) - ((b^2 - 4*a*c)*(
16*c^2*d + 5*b^2*f - 4*c*(2*b*e + a*f))*ArcTanh[(b + 2*c*x)/(2*Sq
rt[c]*Sqrt[a + b*x + c*x^2])])/(128*c^(7/2))
```

Rubi in Sympy [A] time = 19.9408, size = 160, normalized size = 0.91

$$-\frac{\left(a+bx+cx^2\right)^{\frac{3}{2}}\left(\frac{5bf}{2}-4ce-3cfx\right)}{12c^2}+\frac{(b+2cx)\sqrt{a+bx+cx^2}\left(-4acf+5b^2f-8bce+16c^2d\right)}{64c^3}-\frac{\left(-4ac+b^2\right)\left(-4acf+5b^2f-8bce+16c^2d\right)\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{128c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+b*x+a)**(1/2)*(f*x**2+e*x+d),x)
```

```
[Out] -(a + b*x + c*x**2)**(3/2)*(5*b*f/2 - 4*c*e - 3*c*f*x)/(12*c**2)
+ (b + 2*c*x)*sqrt(a + b*x + c*x**2)*(-4*a*c*f + 5*b**2*f - 8*b*c
*e + 16*c**2*d)/(64*c**3) - (-4*a*c + b**2)*(-4*a*c*f + 5*b**2*f
- 8*b*c*e + 16*c**2*d)*atanh((b + 2*c*x)/(2*sqrt(c)*sqrt(a + b*x
+ c*x**2)))/(128*c**(7/2))
```

Mathematica [A] time = 0.279292, size = 171, normalized size = 0.98

$$\frac{2\sqrt{c}\sqrt{a+x(b+cx)}\left(4bc\left(2c\left(6d+2ex+fx^2\right)-13af\right)+8c^2\left(a(8e+3fx)+2cx\left(6d+4ex+3fx^2\right)\right)+15b^3f-2b^2c(12e+}{384c^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] (2*Sqrt[c]*Sqrt[a + x*(b + c*x)]*(15*b^3*f - 2*b^2*c*(12*e + 5*f*
x) + 4*b*c*(-13*a*f + 2*c*(6*d + 2*e*x + f*x^2)) + 8*c^2*(a*(8*e
+ 3*f*x) + 2*c*x*(6*d + 4*e*x + 3*f*x^2))) - 3*(b^2 - 4*a*c)*(16*
c^2*d + 5*b^2*f - 4*c*(2*b*e + a*f))*Log[b + 2*c*x + 2*Sqrt[c]*Sq
rt[a + x*(b + c*x)]])/(384*c^(7/2))
```

Maple [B] time = 0., size = 453, normalized size = 2.6

$$\frac{dx}{2}\sqrt{cx^{2}+bx+a}+\frac{bd}{4c}\sqrt{cx^{2}+bx+a}+\frac{ad}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)\frac{1}{\sqrt{c}}$$
$$-\frac{b^{2}d}{8}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)c^{-\frac{3}{2}}+\frac{e}{3c}\left(cx^{2}+bx+a\right)^{\frac{3}{2}}$$
$$-\frac{bex}{4c}\sqrt{cx^{2}+bx+a}-\frac{b^{2}e}{8c^{2}}\sqrt{cx^{2}+bx+a}-\frac{abe}{4}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)c^{-\frac{3}{2}}$$
$$+\frac{eb^{3}}{16}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)c^{-\frac{5}{2}}+\frac{fx}{4c}\left(cx^{2}+bx+a\right)^{\frac{3}{2}}$$
$$-\frac{5\,bf}{24\,c^{2}}\left(cx^{2}+bx+a\right)^{\frac{3}{2}}+\frac{5\,b^{2}fx}{32\,c^{2}}\sqrt{cx^{2}+bx+a}+\frac{5\,fb^{3}}{64\,c^{3}}\sqrt{cx^{2}+bx+a}$$
$$+\frac{3\,b^{2}fa}{16}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)c^{-\frac{5}{2}}$$
$$-\frac{5\,fb^{4}}{128}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)c^{-\frac{7}{2}}-\frac{fax}{8c}\sqrt{cx^{2}+bx+a}$$
$$-\frac{abf}{16\,c^{2}}\sqrt{cx^{2}+bx+a}-\frac{a^{2}f}{8}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)c^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+b*x+a)^(1/2)*(f*x^2+e*x+d),x)
```

```
[Out] 1/2*d*(c*x^2+b*x+a)^(1/2)*x+1/4*d/c*(c*x^2+b*x+a)^(1/2)*b+1/2*d/c
^(1/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a-1/8*d/c^(3/2
)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*b^2+1/3*e*(c*x^2+b*
x+a)^(3/2)/c-1/4*e*b/c*(c*x^2+b*x+a)^(1/2)*x-1/8*e*b^2/c^2*(c*x^2
+b*x+a)^(1/2)-1/4*e*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a
)^(1/2))*a+1/16*e*b^3/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a
)^(1/2))+1/4*f*x*(c*x^2+b*x+a)^(3/2)/c-5/24*f*b/c^2*(c*x^2+b*x+a)
^(3/2)+5/32*f*b^2/c^2*(c*x^2+b*x+a)^(1/2)*x+5/64*f*b^3/c^3*(c*x^2
+b*x+a)^(1/2)+3/16*f*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*
x+a)^(1/2))*a-5/128*f*b^4/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b
*x+a)^(1/2))-1/8*f/c*a*(c*x^2+b*x+a)^(1/2)*x-1/16*f/c^2*a*(c*x^2+
b*x+a)^(1/2)*b-1/8*f/c^(3/2)*a^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^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(c*x^2 + b*x + a)*(f*x^2 + e*x + d),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.303682, size = 1, normalized size = 0.01

$$\left[\frac{4\left(48\,c^3fx^3+48\,bc^2d+8\left(8\,c^3e+bc^2f\right)x^2-8\left(3\,b^2c-8\,ac^2\right)e+\left(15\,b^3-52\,abc\right)f+2\left(48\,c^3d+8\,bc^2e-\left(5\,b^2c-12\,ac^2\right)\right.\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d),x, algorithm="fricas")
```

```
[Out] [1/768*(4*(48*c^3*f*x^3 + 48*b*c^2*d + 8*(8*c^3*e + b*c^2*f)*x^2
- 8*(3*b^2*c - 8*a*c^2)*e + (15*b^3 - 52*a*b*c)*f + 2*(48*c^3*d +
 8*b*c^2*e - (5*b^2*c - 12*a*c^2)*f)*x)*sqrt(c*x^2 + b*x + a)*sqr
t(c) + 3*(16*(b^2*c^2 - 4*a*c^3)*d - 8*(b^3*c - 4*a*b*c^2)*e + (5
*b^4 - 24*a*b^2*c + 16*a^2*c^2)*f)*log(4*(2*c^2*x + b*c)*sqrt(c*x
^2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))/c^(
7/2), 1/384*(2*(48*c^3*f*x^3 + 48*b*c^2*d + 8*(8*c^3*e + b*c^2*f)
*x^2 - 8*(3*b^2*c - 8*a*c^2)*e + (15*b^3 - 52*a*b*c)*f + 2*(48*c^
3*d + 8*b*c^2*e - (5*b^2*c - 12*a*c^2)*f)*x)*sqrt(c*x^2 + b*x + a
)*sqrt(-c) - 3*(16*(b^2*c^2 - 4*a*c^3)*d - 8*(b^3*c - 4*a*b*c^2)*
e + (5*b^4 - 24*a*b^2*c + 16*a^2*c^2)*f)*arctan(1/2*(2*c*x + b)*s
qrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))/(sqrt(-c)*c^3)]
```

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

$$\int \sqrt{a+bx+cx^2}\left(d+ex+fx^2\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x**2+b*x+a)**(1/2)*(f*x**2+e*x+d),x)
```

```
[Out] Integral(sqrt(a + b*x + c*x**2)*(d + e*x + f*x**2), x)
```

GIAC/XCAS [A] time = 0.286154, size = 286, normalized size = 1.63

$$\frac{1}{192}\sqrt{cx^2+bx+a}\left(2\left(4\left(6\,fx+\frac{bc^2f+8\,c^3e}{c^3}\right)x+\frac{48\,c^3d-5\,b^2cf+12\,ac^2f+8\,bc^2e}{c^3}\right)x+\frac{48\,bc^2d+15\,b^3f-52\,abcf-24\right.$$
$$+\frac{\left(16\,b^2c^2d-64\,ac^3d+5\,b^4f-24\,ab^2cf+16\,a^2c^2f-8\,b^3ce+32\,abc^2e\right)\ln\left(\left|-2\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right)\sqrt{c}-b\right|\right)}{128\,c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d),x, algorithm="giac")
```

```
[Out] 1/192*sqrt(c*x^2 + b*x + a)*(2*(4*(6*f*x + (b*c^2*f + 8*c^3*e)/c^
3)*x + (48*c^3*d - 5*b^2*c*f + 12*a*c^2*f + 8*b*c^2*e)/c^3)*x + (
48*b*c^2*d + 15*b^3*f - 52*a*b*c*f - 24*b^2*c*e + 64*a*c^2*e)/c^3
) + 1/128*(16*b^2*c^2*d - 64*a*c^3*d + 5*b^4*f - 24*a*b^2*c*f + 1
6*a^2*c^2*f - 8*b^3*c*e + 32*a*b*c^2*e)*ln(abs(-2*(sqrt(c)*x - sq
rt(c*x^2 + b*x + a))*sqrt(c) - b))/c^(7/2)
```

3.190 $\int \frac{\sqrt{a+bx+cx^2}\left(d+ex+fx^2\right)}{g+hx}\,dx$

Optimal. Leaf size=321

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(4ch(2cg-bh)(bfg-2cdh)-\left(-4ch(bg-ah)-b^2h^2+8c^2g^2\right)(bfh-2ceh+2cfg)\right)}{16c^{5/2}h^4}-\frac{\sqrt{a+bx+cx^2}(4ch(bfg-2cdh)+2chx(bfh-2ceh+2cfg)-(4cg-bh)(bfh-2ceh+2cfg))}{8c^2h^3}+\frac{\sqrt{ah^2-bgh+cg^2}\left(dh^2-egh+fg^2\right)\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)}{h^4}+\frac{f\left(a+bx+cx^2\right)^{3/2}}{3ch}$$

```
[Out] -((4*c*h*(b*f*g - 2*c*d*h) - (4*c*g - b*h)*(2*c*f*g - 2*c*e*h + b
*f*h) + 2*c*h*(2*c*f*g - 2*c*e*h + b*f*h)*x)*Sqrt[a + b*x + c*x^2
])/(8*c^2*h^3) + (f*(a + b*x + c*x^2)^(3/2))/(3*c*h) + ((4*c*h*(2
*c*g - b*h)*(b*f*g - 2*c*d*h) - (2*c*f*g - 2*c*e*h + b*f*h)*(8*c^
2*g^2 - b^2*h^2 - 4*c*h*(b*g - a*h)))*ArcTanh[(b + 2*c*x)/(2*Sqrt
[c]*Sqrt[a + b*x + c*x^2]])])/(16*c^(5/2)*h^4) + (Sqrt[c*g^2 - b*g
*h + a*h^2]*(f*g^2 - e*g*h + d*h^2)*ArcTanh[(b*g - 2*a*h + (2*c*g
 - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])]
)/h^4
```

Rubi [A] time = 1.65007, antiderivative size = 322, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(4ch(2cg-bh)(bfg-2cdh)-\left(-4ch(bg-ah)-b^2h^2+8c^2g^2\right)(bfh-2ceh+2cfg)\right)}{16c^{5/2}h^4}-\frac{\sqrt{a+bx+cx^2}(4ch(bfg-2cdh)+2chx(bfh-2ceh+2cfg)-(4cg-bh)(bfh-2ceh+2cfg))}{8c^2h^3}+\frac{\sqrt{ah^2-bgh+cg^2}\left(fg^2-h(eg-dh)\right)\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)}{h^4}+\frac{f\left(a+bx+cx^2\right)^{3/2}}{3ch}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2))/(g + h*x),x]
```

```
[Out] -((4*c*h*(b*f*g - 2*c*d*h) - (4*c*g - b*h)*(2*c*f*g - 2*c*e*h + b
*f*h) + 2*c*h*(2*c*f*g - 2*c*e*h + b*f*h)*x)*Sqrt[a + b*x + c*x^2
])/(8*c^2*h^3) + (f*(a + b*x + c*x^2)^(3/2))/(3*c*h) + ((4*c*h*(2
*c*g - b*h)*(b*f*g - 2*c*d*h) - (2*c*f*g - 2*c*e*h + b*f*h)*(8*c^
2*g^2 - b^2*h^2 - 4*c*h*(b*g - a*h)))*ArcTanh[(b + 2*c*x)/(2*Sqrt
[c]*Sqrt[a + b*x + c*x^2]])])/(16*c^(5/2)*h^4) + (Sqrt[c*g^2 - b*g
```

```
*h + a*h^2]*(f*g^2 - h*(e*g - d*h))*ArcTanh[(b*g - 2*a*h + (2*c*g
 - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])]
)/h^4
```

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((f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2)/(h*x+g),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.781891, size = 364, normalized size = 1.13

$$-\frac{\frac{3\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)\left(-8c^2h\left(ah(eh-fg)+bh(dh-eg)+bfg^2\right)+2bch^2(2afh+beh-bfg)-b^3fh^3+16c^3\left(gh(dh-eg)+fg^3\right)\right)}{c^{5/2}}+\frac{2h\sqrt{a+x(b+cx)}(2ch(\cdots}{\cdots}}{\cdots}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2))/(g + h*x),x]
```

```
[Out] ((2*h*Sqrt[a + x*(b + c*x)]*(-3*b^2*f*h^2 + 2*c*h*(4*a*f*h + b*(-
3*f*g + 3*e*h + f*h*x)) + 4*c^2*(3*h*(-2*e*g + 2*d*h + e*h*x) + f
*(6*g^2 - 3*g*h*x + 2*h^2*x^2))))/c^2 + 48*Sqrt[c*g^2 + h*(-(b*g)
 + a*h)]*(f*g^2 + h*(-(e*g) + d*h))*Log[g + h*x] - (3*(-(b^3*f*h^
3) + 2*b*c*h^2*(-(b*f*g) + b*e*h + 2*a*f*h) + 16*c^3*(f*g^3 + g*h
*(-(e*g) + d*h)) - 8*c^2*h*(b*f*g^2 + b*h*(-(e*g) + d*h) + a*h*(-
(f*g) + e*h)))*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]])/
c^(5/2) - 48*Sqrt[c*g^2 + h*(-(b*g) + a*h)]*(f*g^2 + h*(-(e*g) +
d*h))*Log[-(b*g) + 2*a*h - 2*c*g*x + b*h*x + 2*Sqrt[c*g^2 + h*(-(
b*g) + a*h)]*Sqrt[a + x*(b + c*x)]])/(48*h^4)
```

Maple [B] time = 0.038, size = 2549, normalized size = 7.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)*(c*x^2+b*x+a)^(1/2)/(h*x+g),x)
```

```
[Out] -1/h^2*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)
/h^2)^(1/2)*e*g+1/h^3*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h
^2-b*g*h+c*g^2)/h^2)^(1/2)*f*g^2+1/2/h*e*(c*x^2+b*x+a)^(1/2)*x-1/
8/h*e/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*b^2-1/8
/h*f*b^2/c^2*(c*x^2+b*x+a)^(1/2)+1/16/h*f*b^3/c^(5/2)*ln((1/2*b+c
*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))-1/2/h^2*f*g*(c*x^2+b*x+a)^(1/2)*
x+1/2/h*ln((1/2*(b*h-2*c*g)/h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2*c
+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/c^(1/2)*
b*d-1/h^2*ln((1/2*(b*h-2*c*g)/h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)^2
*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))*c^(1/2
)*g*d+1/h^3*ln((1/2*(b*h-2*c*g)/h+c*(x+1/h*g))/c^(1/2)+((x+1/h*g)
^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))*c^(1
/2)*g^2*e-1/h^4*ln((1/2*(b*h-2*c*g)/h+c*(x+1/h*g))/c^(1/2)+((x+1/
h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))*
c^(1/2)*g^3*f-1/h/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*
g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2
)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2
)/h^2)^(1/2))/(x+1/h*g))*a*d+1/3*f*(c*x^2+b*x+a)^(3/2)/c/h+1/h*((
x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/
2)*d+1/4/h*e/c*(c*x^2+b*x+a)^(1/2)*b+1/2/h*e/c^(1/2)*ln((1/2*b+c*
x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a-1/h^3/((a*h^2-b*g*h+c*g^2)/h^2)
^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((
a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h
*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*c*g^2*d+1/h^4/((a*
h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*
c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c
+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g
))*c*g^3*e-1/2/h^2*ln((1/2*(b*h-2*c*g)/h+c*(x+1/h*g))/c^(1/2)+((x
+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2
))/c^(1/2)*b*e*g+1/2/h^3*ln((1/2*(b*h-2*c*g)/h+c*(x+1/h*g))/c^(1/
2)+((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2
)^(1/2))/c^(1/2)*b*f*g^2+1/h^2/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln
((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g
*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^
2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*a*e*g-1/h^3/((a*h^2-b*g*h+c
*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1
/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g
)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*a*f*g^2+
1/h^2/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h
^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+
1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)
)/(x+1/h*g))*b*g*d-1/h^3/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a
*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g
^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*
h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*b*g^2*e-1/4/h*f*b/c*(c*x^2+b*x+a)
^(1/2)*x-1/4/h*f*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(
1/2))*a-1/4/h^2*f*g/c*(c*x^2+b*x+a)^(1/2)*b-1/2/h^2*f*g/c^(1/2)*l
n((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a+1/8/h^2*f*g/c^(3/2)*
ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*b^2-1/h^5/((a*h^2-b*g
*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*
(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2
```

```
*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*c*g^
4*f+1/h^4/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^
2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*
((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(
1/2))/(x+1/h*g))*b*g^3*f
```

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(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g),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(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g),x, algorithm="fricas")
```

```
[Out] Timed out
```

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

$$\int \frac{\sqrt{a + bx + cx^2}\left(d + ex + fx^2\right)}{g + hx}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2)/(h*x+g),x)
```

```
[Out] Integral(sqrt(a + b*x + c*x**2)*(d + e*x + f*x**2)/(g + h*x), 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(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.191 $\int \frac{\sqrt{a+bx+cx^2}\left(d+ex+fx^2\right)}{(g+hx)^2}\,dx$

Optimal. Leaf size=459

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(4ch(-afh-beh+2bfg)+b^2fh^2-8c^2\left(3fg^2-h(2eg-dh)\right)\right)}{8c^{3/2}h^4}-\frac{\sqrt{a+bx+cx^2}\left(2ch^2x\left(-afh+bfg-2cdh+2ceg-\frac{3cfg^2}{h}\right)+ch\left(4ah(2fg-eh)-b\left(4dh^2-8egh+13fg^2\right)\right)+bfh^2(bg\right.}{4ch^3\left(ah^2-bgh+cg^2\right)}-\frac{\left(a+bx+cx^2\right)^{3/2}\left(fg^2-h(eg-dh)\right)}{h(g+hx)\left(ah^2-bgh+cg^2\right)}-\frac{\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(h\left(2ah(2fg-eh)-b\left(dh^2-3egh+5fg^2\right)\right)+2cg\left(3fg^2-h(2eg-dh)\right)\right)}{2h^4\sqrt{ah^2-bgh+cg^2}}$$

```
[Out] -((b*f*h^2*(b*g - a*h) + 4*c^2*g*(3*f*g^2 - h*(2*e*g - d*h)) + c*
h*(4*a*h*(2*f*g - e*h) - b*(13*f*g^2 - 8*e*g*h + 4*d*h^2)) + 2*c*
h^2*(2*c*e*g + b*f*g - (3*c*f*g^2)/h - 2*c*d*h - a*f*h)*x)*Sqrt[a
 + b*x + c*x^2])/(4*c*h^3*(c*g^2 - b*g*h + a*h^2)) - ((f*g^2 - h*
(e*g - d*h))*(a + b*x + c*x^2)^(3/2))/(h*(c*g^2 - b*g*h + a*h^2)*
(g + h*x)) - ((b^2*f*h^2 + 4*c*h*(2*b*f*g - b*e*h - a*f*h) - 8*c^
2*(3*f*g^2 - h*(2*e*g - d*h)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqr
t[a + b*x + c*x^2])])/(8*c^(3/2)*h^4) - ((2*c*g*(3*f*g^2 - h*(2*e
*g - d*h)) + h*(2*a*h*(2*f*g - e*h) - b*(5*f*g^2 - 3*e*g*h + d*h^
2)))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*
h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(2*h^4*Sqrt[c*g^2 - b*g*h + a
*h^2])
```

Rubi [A] time = 2.34804, antiderivative size = 453, normalized size of antiderivative = 0.99, number of steps used = 7, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(4ch(-afh-beh+2bfg)+b^2fh^2-8c^2\left(3fg^2-h(2eg-dh)\right)\right)}{8c^{3/2}h^4}-\frac{\sqrt{a+bx+cx^2}\left(2chx\left(-afh+bfg-2cdh+2ceg-\frac{3cfg^2}{h}\right)+bfh(bg-ah)+4ach(2fg-eh)-bc\left(4dh^2-8egh+13fg^2\right)\right.}{4ch^2\left(ah^2-bgh+cg^2\right)}-\frac{\left(a+bx+cx^2\right)^{3/2}\left(fg^2-h(eg-dh)\right)}{h(g+hx)\left(ah^2-bgh+cg^2\right)}-\frac{\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(2c\left(3fg^3-gh(2eg-dh)\right)-h\left(-2ah(2fg-eh)-bh(3eg-dh)+5bfg^2\right)\right)}{2h^4\sqrt{ah^2-bgh+cg^2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^2,x]
```

```
[Out] -((b*f*h*(b*g - a*h) - 4*c^2*g*(2*e*g - (3*f*g^2)/h - d*h) + 4*a*
c*h*(2*f*g - e*h) - b*c*(13*f*g^2 - 8*e*g*h + 4*d*h^2) + 2*c*h*(2
*c*e*g + b*f*g - (3*c*f*g^2)/h - 2*c*d*h - a*f*h)*x)*Sqrt[a + b*x
 + c*x^2])/(4*c*h^2*(c*g^2 - b*g*h + a*h^2)) - ((f*g^2 - h*(e*g -
 d*h))*(a + b*x + c*x^2)^(3/2))/(h*(c*g^2 - b*g*h + a*h^2)*(g + h
*x)) - ((b^2*f*h^2 + 4*c*h*(2*b*f*g - b*e*h - a*f*h) - 8*c^2*(3*f
*g^2 - h*(2*e*g - d*h)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a +
b*x + c*x^2])])/(8*c^(3/2)*h^4) - ((2*c*(3*f*g^3 - g*h*(2*e*g - d
*h)) - h*(5*b*f*g^2 - b*h*(3*e*g - d*h) - 2*a*h*(2*f*g - e*h)))*A
rcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*
h^2]*Sqrt[a + b*x + c*x^2])])/(2*h^4*Sqrt[c*g^2 - b*g*h + a*h^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((f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2)/(h*x+g)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.10387, size = 383, normalized size = 0.83

$$\frac{\frac{\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)\left(4ch(afh+beh-2bfg)-b^2fh^2+8c^2\left(h(dh-2eg)+3fg^2\right)\right)}{c^{3/2}}+\frac{2h\sqrt{a+x(b+cx)}\left(bfh(g+hx)+4ch(-dh+2eg+ehx)-2cf\left(6g^2+3ghx-\right.\right.}{c(g+hx)}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^2,x]
```

```
[Out] ((2*h*Sqrt[a + x*(b + c*x)]*(b*f*h*(g + h*x) + 4*c*h*(2*e*g - d*h
 + e*h*x) - 2*c*f*(6*g^2 + 3*g*h*x - h^2*x^2)))/(c*(g + h*x)) - (
4*(2*c*(3*f*g^3 + g*h*(-2*e*g + d*h)) - h*(5*b*f*g^2 + b*h*(-3*e*
g + d*h) + 2*a*h*(-2*f*g + e*h)))*Log[g + h*x])/Sqrt[c*g^2 + h*(-
(b*g) + a*h)] + ((-(b^2*f*h^2) + 4*c*h*(-2*b*f*g + b*e*h + a*f*h)
 + 8*c^2*(3*f*g^2 + h*(-2*e*g + d*h)))*Log[b + 2*c*x + 2*Sqrt[c]*
Sqrt[a + x*(b + c*x)]])/c^(3/2) + (4*(2*c*(3*f*g^3 + g*h*(-2*e*g
+ d*h)) - h*(5*b*f*g^2 + b*h*(-3*e*g + d*h) + 2*a*h*(-2*f*g + e*h
)))*Log[-(b*g) + 2*a*h - 2*c*g*x + b*h*x + 2*Sqrt[c*g^2 + h*(-(b*
g) + a*h)]*Sqrt[a + x*(b + c*x)]])/Sqrt[c*g^2 + h*(-(b*g) + a*h)]
```

```
)/(8*h^4)
```

Maple [B] time = 0.026, size = 6218, normalized size = 13.6

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)*(c*x^2+b*x+a)^(1/2)/(h*x+g)^2,x)

[Out] result too large to display
```

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(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^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(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^2,x, algorithm="fricas

[Out] Timed out
```

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

$$\int \frac{\sqrt{a + bx + cx^2}\left(d + ex + fx^2\right)}{(g + hx)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2)/(h*x+g)**2,x)
```

```
[Out] Integral(sqrt(a + b*x + c*x**2)*(d + e*x + f*x**2)/(g + h*x)**2,
x)
```

GIAC/XCAS [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^2,x, algorithm="giac")
```

```
[Out] Timed out
```

3.192 $\int \frac{\sqrt{a+bx+cx^2}\left(d+ex+fx^2\right)}{(g+hx)^3}\,dx$

Optimal. Leaf size=448

$$\frac{\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(h^2\left(8a^2fh^2-4abh(6fg-eh)+b^2\left(15fg^2-h(dh+3eg)\right)\right)-4ch\left(bg^2(10fg-3eh)-ah\right.\right.}{8h^4\left(ah^2-bgh+cg^2\right)^{3/2}}$$
$$-\frac{\left(a+bx+cx^2\right)^{3/2}\left(fg^2-h(eg-dh)\right)}{2h(g+hx)^2\left(ah^2-bgh+cg^2\right)}$$
$$+\frac{\sqrt{a+bx+cx^2}\left(-2hx\left(-2afh+2bfg-cdh+ceg-\frac{3cfg^2}{h}\right)+4ah(3fg-eh)-b\left(-dh^2-3egh+11fg^2\right)+\frac{4cg^2(3fg-eh)}{h}\right)}{4h^2(g+hx)\left(ah^2-bgh+cg^2\right)}$$
$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)(-bfh-2ceh+6cfg)}{2\sqrt{c}h^4}$$

```
[Out] (((4*c*g^2*(3*f*g - e*h))/h + 4*a*h*(3*f*g - e*h) - b*(11*f*g^2 -
 3*e*g*h - d*h^2) - 2*h*(c*e*g + 2*b*f*g - (3*c*f*g^2)/h - c*d*h
- 2*a*f*h)*x)*Sqrt[a + b*x + c*x^2])/(4*h^2*(c*g^2 - b*g*h + a*h^
2)*(g + h*x)) - ((f*g^2 - h*(e*g - d*h))*(a + b*x + c*x^2)^(3/2))
/(2*h*(c*g^2 - b*g*h + a*h^2)*(g + h*x)^2) - ((6*c*f*g - 2*c*e*h
- b*f*h)*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/
(2*Sqrt[c]*h^4) + ((8*c^2*g^3*(3*f*g - e*h) - 4*c*h*(b*g^2*(10*f*
g - 3*e*h) - a*h*(9*f*g^2 - 3*e*g*h + d*h^2)) + h^2*(8*a^2*f*h^2
- 4*a*b*h*(6*f*g - e*h) + b^2*(15*f*g^2 - h*(3*e*g + d*h))))*ArcT
anh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2
]*Sqrt[a + b*x + c*x^2])])/(8*h^4*(c*g^2 - b*g*h + a*h^2)^(3/2))
```

Rubi [A] time = 2.14052, antiderivative size = 446, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$\frac{\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(h^2\left(8a^2fh^2-4abh(6fg-eh)+b^2\left(15fg^2-h(dh+3eg)\right)\right)-4ch\left(bg^2(10fg-3eh)-ah\right.\right.}{8h^4\left(ah^2-bgh+cg^2\right)^{3/2}}$$
$$-\frac{\left(a+bx+cx^2\right)^{3/2}\left(fg^2-h(eg-dh)\right)}{2h(g+hx)^2\left(ah^2-bgh+cg^2\right)}$$
$$-\frac{\sqrt{a+bx+cx^2}\left(2hx\left(-2afh+2bfg-cdh+ceg-\frac{3cfg^2}{h}\right)-4ah(3fg-eh)-bh(dh+3eg)+11bfg^2-\frac{4cg^2(3fg-eh)}{h}\right)}{4h^2(g+hx)\left(ah^2-bgh+cg^2\right)}$$
$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)(-bfh-2ceh+6cfg)}{2\sqrt{c}h^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^3,x]
```

```
[Out] -((11*b*f*g^2 - b*h*(3*e*g + d*h) - (4*c*g^2*(3*f*g - e*h))/h - 4
*a*h*(3*f*g - e*h) + 2*h*(c*e*g + 2*b*f*g - (3*c*f*g^2)/h - c*d*h
 - 2*a*f*h)*x)*Sqrt[a + b*x + c*x^2])/(4*h^2*(c*g^2 - b*g*h + a*h
^2)*(g + h*x)) - ((f*g^2 - h*(e*g - d*h))*(a + b*x + c*x^2)^(3/2)
)/(2*h*(c*g^2 - b*g*h + a*h^2)*(g + h*x)^2) - ((6*c*f*g - 2*c*e*h
 - b*f*h)*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])
/(2*Sqrt[c]*h^4) + ((8*c^2*g^3*(3*f*g - e*h) - 4*c*h*(b*g^2*(10*f
*g - 3*e*h) - a*h*(9*f*g^2 - 3*e*g*h + d*h^2)) + h^2*(8*a^2*f*h^2
 - 4*a*b*h*(6*f*g - e*h) + b^2*(15*f*g^2 - h*(3*e*g + d*h))))*Arc
Tanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^
2]*Sqrt[a + b*x + c*x^2])])/(8*h^4*(c*g^2 - b*g*h + a*h^2)^(3/2))
```

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((f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2)/(h*x+g)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 5.27106, size = 500, normalized size = 1.12

$$\frac{\frac{\log(g+hx)\left(h^2\left(8a^2fh^2+4abh(eh-6fg)+b^2\left(15fg^2-h(dh+3eg)\right)\right)+4ch\left(ah\left(dh^2-3egh+9fg^2\right)+bg^2(3eh-10fg)\right)+8c^2g^3(3fg-eh)\right)}{\left(h(ah-bg)+cg^2\right)^{3/2}}-\frac{\log\left(2\sqrt{a+x(b+cx)}\sqrt{h(ah-\right.}}{}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^3,x]
```

```
[Out] (2*h*Sqrt[a + x*(b + c*x)]*(4*f - (2*(f*g^2 + h*(-(e*g) + d*h)))/
(g + h*x)^2 + (2*c*(5*f*g^3 + g*h*(-3*e*g + d*h)) - h*(9*b*f*g^2
+ b*h*(-5*e*g + d*h) + 4*a*h*(-2*f*g + e*h)))/((c*g^2 + h*(-(b*g)
 + a*h))*(g + h*x))) + ((8*c^2*g^3*(3*f*g - e*h) + 4*c*h*(b*g^2*(
-10*f*g + 3*e*h) + a*h*(9*f*g^2 - 3*e*g*h + d*h^2)) + h^2*(8*a^2*
f*h^2 + 4*a*b*h*(-6*f*g + e*h) + b^2*(15*f*g^2 - h*(3*e*g + d*h))
))*Log[g + h*x])/(c*g^2 + h*(-(b*g) + a*h))^(3/2) - (4*(6*c*f*g -
 2*c*e*h - b*f*h)*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]
])/Sqrt[c] - ((8*c^2*g^3*(3*f*g - e*h) + 4*c*h*(b*g^2*(-10*f*g +
3*e*h) + a*h*(9*f*g^2 - 3*e*g*h + d*h^2)) + h^2*(8*a^2*f*h^2 + 4*
```

```
a*b*h*(-6*f*g + e*h) + b^2*(15*f*g^2 - h*(3*e*g + d*h))))*Log[-(b
*g) + 2*a*h - 2*c*g*x + b*h*x + 2*Sqrt[c*g^2 + h*(-(b*g) + a*h)]*
Sqrt[a + x*(b + c*x)]])/(c*g^2 + h*(-(b*g) + a*h))^(3/2))/(8*h^4)
```

Maple [B] time = 0.032, size = 12139, normalized size = 27.1

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)*(c*x^2+b*x+a)^(1/2)/(h*x+g)^3,x)
```

```
[Out] result too large to display
```

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(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^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(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^3,x, algorithm="fricas
```

```
[Out] Timed out
```

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

$$\int \frac{\sqrt{a + bx + cx^2}\left(d + ex + fx^2\right)}{(g + hx)^3}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2)/(h*x+g)**3,x)
```

```
[Out] Integral(sqrt(a + b*x + c*x**2)*(d + e*x + f*x**2)/(g + h*x)**3,
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(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^3,x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.193 $\int \frac{\sqrt{a+bx+cx^2}(d+ex+fx^2)}{(g+hx)^4}\,dx$

Optimal. Leaf size=603

$$-\frac{\sqrt{a+bx+cx^2}\left(hx\left(h^2\left(8a^2fh^2-2abh(10fg-eh)+b^2\left(11fg^2-h(dh+eg)\right)\right)+2cgh\left(2ah(6fg-eh)-b\left(12fg^2-h(2dh\right.\right.\right.\right.}{}$$

$$-\frac{\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(2ch^2\left(4a^2h^2(4fg-eh)-2abh\left(-dh^2-egh+15fg^2\right)+b^2\left(dgh^2+15fg^3\right)\right)-bh^3\left(8a^2\right.\right.}{16h^4\left(ah^2-bgh+cg^2\right)^{5/2}}$$

$$-\frac{\left(a+bx+cx^2\right)^{3/2}\left(fg^2-h(eg-dh)\right)}{3h(g+hx)^3\left(ah^2-bgh+cg^2\right)}+\frac{\sqrt{c}f\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{h^4}$$

```
[Out] -((8*c^2*f*g^5 - 2*c*g*h*(7*b*f*g^3 - 6*a*f*g^2*h + b*d*g*h^2 - 2
*a*d*h^3) + h^2*(4*a^2*e*h^3 + b^2*g*(5*f*g^2 + e*g*h + d*h^2) -
2*a*b*h*(3*f*g^2 + 2*e*g*h + d*h^2)) + h*(4*c^2*(3*f*g^4 - d*g^2*
h^2) + h^2*(8*a^2*f*h^2 - 2*a*b*h*(10*f*g - e*h) + b^2*(11*f*g^2
- h*(e*g + d*h))) + 2*c*g*h*(2*a*h*(6*f*g - e*h) - b*(12*f*g^2 -
h*(e*g + 2*d*h))))*x)*Sqrt[a + b*x + c*x^2])/(8*h^3*(c*g^2 - b*g*
h + a*h^2)^2*(g + h*x)^2) - ((f*g^2 - h*(e*g - d*h))*(a + b*x + c
*x^2)^(3/2))/(3*h*(c*g^2 - b*g*h + a*h^2)*(g + h*x)^3) + (Sqrt[c]
*f*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/h^4 -
((16*c^3*f*g^5 - 8*c^2*g*h*(5*b*f*g^3 - 5*a*f*g^2*h + a*d*h^3) -
b*h^3*(8*a^2*f*h^2 - 2*a*b*h*(6*f*g + e*h) + b^2*(5*f*g^2 + e*g*h
 + d*h^2)) + 2*c*h^2*(4*a^2*h^2*(4*f*g - e*h) - 2*a*b*h*(15*f*g^2
 - e*g*h - d*h^2) + b^2*(15*f*g^3 + d*g*h^2)))*ArcTanh[(b*g - 2*a
*h + (2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x
 + c*x^2])])/(16*h^4*(c*g^2 - b*g*h + a*h^2)^(5/2))
```

Rubi [A] time = 4.28536, antiderivative size = 601, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$-\frac{\sqrt{a+bx+cx^2}\left(hx\left(8a^2fh^3-2b\left(ah^2(10fg-eh)-cgh(2dh+eg)+12cfg^3\right)+4acgh(6fg-eh)+b^2h\left(11fg^2-h(dh+e\right.\right.\right.}{8h}$$

$$-\frac{\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(2ch^2\left(4a^2h^2(4fg-eh)-2abh\left(-dh^2-egh+15fg^2\right)+b^2\left(dgh^2+15fg^3\right)\right)-bh^3\left(8a^2\right.\right.}{16h^4\left(ah^2-bgh+cg^2\right)^{5/2}}$$

$$-\frac{\left(a+bx+cx^2\right)^{3/2}\left(fg^2-h(eg-dh)\right)}{3h(g+hx)^3\left(ah^2-bgh+cg^2\right)}+\frac{\sqrt{c}f\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{h^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^4,x]
```

```
[Out] -(((8*c^2*f*g^5)/h + 4*a^2*e*h^4 + 4*a*c*g*h*(3*f*g^2 + d*h^2) +
b^2*g*h*(5*f*g^2 + h*(e*g + d*h)) - 2*b*(a*h^2*(3*f*g^2 + 2*e*g*h
 + d*h^2) + c*(7*f*g^4 + d*g^2*h^2)) + h*(8*a^2*f*h^3 + 4*a*c*g*h
*(6*f*g - e*h) + c^2*((12*f*g^4)/h - 4*d*g^2*h) + b^2*h*(11*f*g^2
 - h*(e*g + d*h)) - 2*b*(12*c*f*g^3 - c*g*h*(e*g + 2*d*h) + a*h^2
*(10*f*g - e*h)))*x)*Sqrt[a + b*x + c*x^2])/(8*h^2*(c*g^2 - b*g*h
 + a*h^2)^2*(g + h*x)^2) - ((f*g^2 - h*(e*g - d*h))*(a + b*x + c*
x^2)^(3/2))/(3*h*(c*g^2 - b*g*h + a*h^2)*(g + h*x)^3) + (Sqrt[c]*
f*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/h^4 - (
(16*c^3*f*g^5 - 8*c^2*g*h*(5*b*f*g^3 - 5*a*f*g^2*h + a*d*h^3) - b
*h^3*(8*a^2*f*h^2 - 2*a*b*h*(6*f*g + e*h) + b^2*(5*f*g^2 + e*g*h
+ d*h^2)) + 2*c*h^2*(4*a^2*h^2*(4*f*g - e*h) - 2*a*b*h*(15*f*g^2
- e*g*h - d*h^2) + b^2*(15*f*g^3 + d*g*h^2)))*ArcTanh[(b*g - 2*a*
h + (2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x
+ c*x^2])])/(16*h^4*(c*g^2 - b*g*h + a*h^2)^(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((f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2)/(h*x+g)**4,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 6.62157, size = 1044, normalized size = 1.73

$$\sqrt{a+x(b+cx)}\left(\frac{-fg^2+ehg-dh^2}{3h^3(g+hx)^3}\right.$$

$$+\frac{-44c^2fg^4+8c^2ehg^3+80bcfhg^3+4c^2dh^2g^2-14bceh^2g^2-33b^2fh^2g^2-80acfh^2g^2-4bcdh^3g+3b^2eh^3g+20aceh^3g+6\cdots}{24h^3\left(cg^2-bhg+ah^2\right)^2(g+hx)}$$

$$\left.+\frac{14cfg^3-8cehg^2-13bfhg^2+2cdh^2g+7beh^2g+12afh^2g-bdh^3-6aeh^3}{12h^3\left(cg^2-bhg+ah^2\right)(g+hx)^2}\right)$$

$$+\frac{\left(-16c^3fg^5+40bc^2fhg^4-40ac^2fh^2g^3-30b^2cfh^2g^3+5b^3fh^3g^2+60abcfh^3g^2+8ac^2dh^4g-2b^2cdh^4g+b^3eh^4g-4abce\cdots\right.}{16h^4\left(cg^2-bhg+ah^2\right)^{5/2}\cdots}$$

$$+\frac{\left(\frac{c^3fg^4}{h^4(cg^2-bhg+ah^2)^2}-\frac{2bc^2fg^3}{h^3(cg^2-bhg+ah^2)^2}+\frac{c(b^2+2ac)fg^2}{h^2(cg^2-bhg+ah^2)^2}+\frac{a^2cfh-2abcfg}{h(cg^2-bhg+ah^2)^2}\right)\sqrt{a+x(b+cx)}\log\left(b+2cx+2\sqrt{c}\sqrt{cx^2+bx+a}\right)\cdots}{\sqrt{c}\sqrt{cx^2+bx+a}}$$

$$-\frac{\left(-16c^3fg^5+40bc^2fhg^4-40ac^2fh^2g^3-30b^2cfh^2g^3+5b^3fh^3g^2+60abcfh^3g^2+8ac^2dh^4g-2b^2cdh^4g+b^3eh^4g-4abce\cdots\right.}{\cdots}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^4,x]
```

```
[Out] Sqrt[a + x*(b + c*x)]*((-(f*g^2) + e*g*h - d*h^2)/(3*h^3*(g + h*x
)^3) + (14*c*f*g^3 - 8*c*e*g^2*h - 13*b*f*g^2*h + 2*c*d*g*h^2 + 7
*b*e*g*h^2 + 12*a*f*g*h^2 - b*d*h^3 - 6*a*e*h^3)/(12*h^3*(c*g^2 -
 b*g*h + a*h^2)*(g + h*x)^2) + (-44*c^2*f*g^4 + 8*c^2*e*g^3*h + 8
0*b*c*f*g^3*h + 4*c^2*d*g^2*h^2 - 14*b*c*e*g^2*h^2 - 33*b^2*f*g^2
*h^2 - 80*a*c*f*g^2*h^2 - 4*b*c*d*g*h^3 + 3*b^2*e*g*h^3 + 20*a*c*
e*g*h^3 + 60*a*b*f*g*h^3 + 3*b^2*d*h^4 - 8*a*c*d*h^4 - 6*a*b*e*h^
4 - 24*a^2*f*h^4)/(24*h^3*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x))) +
 ((-16*c^3*f*g^5 + 40*b*c^2*f*g^4*h - 30*b^2*c*f*g^3*h^2 - 40*a*c
^2*f*g^3*h^2 + 5*b^3*f*g^2*h^3 + 60*a*b*c*f*g^2*h^3 - 2*b^2*c*d*g
*h^4 + 8*a*c^2*d*g*h^4 + b^3*e*g*h^4 - 4*a*b*c*e*g*h^4 - 12*a*b^2
*f*g*h^4 - 32*a^2*c*f*g*h^4 + b^3*d*h^5 - 4*a*b*c*d*h^5 - 2*a*b^2
*e*h^5 + 8*a^2*c*e*h^5 + 8*a^2*b*f*h^5)*Sqrt[a + x*(b + c*x)]*Log
[g + h*x])/(16*h^4*(c*g^2 - b*g*h + a*h^2)^(5/2)*Sqrt[a + b*x + c
*x^2]) + (((c^3*f*g^4)/(h^4*(c*g^2 - b*g*h + a*h^2)^2) - (2*b*c^2
*f*g^3)/(h^3*(c*g^2 - b*g*h + a*h^2)^2) + (c*(b^2 + 2*a*c)*f*g^2)
/(h^2*(c*g^2 - b*g*h + a*h^2)^2) + (-2*a*b*c*f*g + a^2*c*f*h)/(h*
(c*g^2 - b*g*h + a*h^2)^2))*Sqrt[a + x*(b + c*x)]*Log[b + 2*c*x +
 2*Sqrt[c]*Sqrt[a + b*x + c*x^2]])/(Sqrt[c]*Sqrt[a + b*x + c*x^2]
) - ((-16*c^3*f*g^5 + 40*b*c^2*f*g^4*h - 30*b^2*c*f*g^3*h^2 - 40*
a*c^2*f*g^3*h^2 + 5*b^3*f*g^2*h^3 + 60*a*b*c*f*g^2*h^3 - 2*b^2*c*
d*g*h^4 + 8*a*c^2*d*g*h^4 + b^3*e*g*h^4 - 4*a*b*c*e*g*h^4 - 12*a*
b^2*f*g*h^4 - 32*a^2*c*f*g*h^4 + b^3*d*h^5 - 4*a*b*c*d*h^5 - 2*a*
b^2*e*h^5 + 8*a^2*c*e*h^5 + 8*a^2*b*f*h^5)*Sqrt[a + x*(b + c*x)]*
Log[-(b*g) + 2*a*h - 2*c*g*x + b*h*x + 2*Sqrt[c*g^2 - b*g*h + a*h
^2]*Sqrt[a + b*x + c*x^2]])/(16*h^4*(c*g^2 - b*g*h + a*h^2)^(5/2)
*Sqrt[a + b*x + c*x^2])
```

Maple [B] time = 0.039, size = 19321, normalized size = 32.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)*(c*x^2+b*x+a)^(1/2)/(h*x+g)^4,x)
```

```
[Out] result too large to display
```

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(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^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(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^4,x, algorithm="fricas
```

```
[Out] Timed out
```

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

$$\int \frac{\sqrt{a + bx + cx^2}\left(d + ex + fx^2\right)}{\left(g + hx\right)^4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2)/(h*x+g)**4,x)
```

```
[Out] Integral(sqrt(a + b*x + c*x**2)*(d + e*x + f*x**2)/(g + h*x)**4,
x)
```

GIAC/XCAS [A] time = 13.9828, size = 4, normalized size = 0.01

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^4,x, algorithm="giac")
```

```
[Out] sage0*x
```

3.194 $\int \frac{\sqrt{a+bx+cx^2}(d+ex+fx^2)}{(g+hx)^5}\,dx$

Optimal. Leaf size=497

$$\frac{\sqrt{a+bx+cx^2}(-2ah+x(2cg-bh)+bg)\left(16a^2fh^2-4c\left(a\left(dh^2-5egh+fg^2\right)+2bg(2dh+eg)\right)-8abh(eh+2fg)+b^2\left(5d\right.\right.}{64(g+hx)^2\left(ah^2-bgh+cg^2\right)^3}$$
$$-\frac{\left(b^2-4ac\right)\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(16a^2fh^2-4c\left(a\left(dh^2-5egh+fg^2\right)+2bg(2dh+eg)\right)-8abh(eh+2fg)+\right.}{128\left(ah^2-bgh+cg^2\right)^{7/2}}$$
$$+\frac{\left(a+bx+cx^2\right)^{3/2}\left(h\left(8ah(2fg-eh)-b\left(-5dh^2-3egh+11fg^2\right)\right)+2cg\left(h(eg-5dh)+3fg^2\right)\right)}{24h(g+hx)^3\left(ah^2-bgh+cg^2\right)^2}$$
$$-\frac{\left(a+bx+cx^2\right)^{3/2}\left(fg^2-h(eg-dh)\right)}{4h(g+hx)^4\left(ah^2-bgh+cg^2\right)}$$

```
[Out] ((16*c^2*d*g^2 + 16*a^2*f*h^2 - 8*a*b*h*(2*f*g + e*h) + b^2*(5*f*
g^2 + 3*e*g*h + 5*d*h^2) - 4*c*(2*b*g*(e*g + 2*d*h) + a*(f*g^2 -
5*e*g*h + d*h^2)))*(b*g - 2*a*h + (2*c*g - b*h)*x)*Sqrt[a + b*x +
 c*x^2])/(64*(c*g^2 - b*g*h + a*h^2)^3*(g + h*x)^2) - ((f*g^2 - h
*(e*g - d*h))*(a + b*x + c*x^2)^(3/2))/(4*h*(c*g^2 - b*g*h + a*h^
2)*(g + h*x)^4) + ((2*c*g*(3*f*g^2 + h*(e*g - 5*d*h)) + h*(8*a*h*
(2*f*g - e*h) - b*(11*f*g^2 - 3*e*g*h - 5*d*h^2)))*(a + b*x + c*x
^2)^(3/2))/(24*h*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x)^3) - ((b^2 -
 4*a*c)*(16*c^2*d*g^2 + 16*a^2*f*h^2 - 8*a*b*h*(2*f*g + e*h) + b^
2*(5*f*g^2 + 3*e*g*h + 5*d*h^2) - 4*c*(2*b*g*(e*g + 2*d*h) + a*(f
*g^2 - 5*e*g*h + d*h^2)))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)
/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(128*(c*
g^2 - b*g*h + a*h^2)^(7/2))
```

Rubi [A] time = 2.11471, antiderivative size = 499, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.156$

$$\frac{\sqrt{a+bx+cx^2}(-2ah+x(2cg-bh)+bg)\left(16a^2fh^2-4c\left(-ah(5eg-dh)+afg^2+2bg(2dh+eg)\right)-8abh(eh+2fg)+b^2\left(h(\right.\right.}{64(g+hx)^2\left(ah^2-bgh+cg^2\right)^3}$$
$$-\frac{\left(b^2-4ac\right)\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(16a^2fh^2-4c\left(-ah(5eg-dh)+afg^2+2bg(2dh+eg)\right)-8abh(eh+2fg)+\right.}{128\left(ah^2-bgh+cg^2\right)^{7/2}}$$
$$-\frac{\left(a+bx+cx^2\right)^{3/2}\left(fg^2-h(eg-dh)\right)}{4h(g+hx)^4\left(ah^2-bgh+cg^2\right)}$$
$$+\frac{\left(a+bx+cx^2\right)^{3/2}\left(8ah^2(2fg-eh)-bh\left(11fg^2-h(5dh+3eg)\right)+2cgh(eg-5dh)+6cfg^3\right)}{24h(g+hx)^3\left(ah^2-bgh+cg^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^5,x]
```

```
[Out] ((16*c^2*d*g^2 + 16*a^2*f*h^2 - 8*a*b*h*(2*f*g + e*h) - 4*c*(a*f*
g^2 - a*h*(5*e*g - d*h) + 2*b*g*(e*g + 2*d*h)) + b^2*(5*f*g^2 + h
*(3*e*g + 5*d*h)))*(b*g - 2*a*h + (2*c*g - b*h)*x)*Sqrt[a + b*x +
 c*x^2])/(64*(c*g^2 - b*g*h + a*h^2)^3*(g + h*x)^2) - ((f*g^2 - h
*(e*g - d*h))*(a + b*x + c*x^2)^(3/2))/(4*h*(c*g^2 - b*g*h + a*h^
2)*(g + h*x)^4) + ((6*c*f*g^3 + 2*c*g*h*(e*g - 5*d*h) + 8*a*h^2*(
2*f*g - e*h) - b*h*(11*f*g^2 - h*(3*e*g + 5*d*h)))*(a + b*x + c*x
^2)^(3/2))/(24*h*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x)^3) - ((b^2 -
 4*a*c)*(16*c^2*d*g^2 + 16*a^2*f*h^2 - 8*a*b*h*(2*f*g + e*h) - 4*
c*(a*f*g^2 - a*h*(5*e*g - d*h) + 2*b*g*(e*g + 2*d*h)) + b^2*(5*f*
g^2 + h*(3*e*g + 5*d*h)))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)
/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(128*(c*
g^2 - b*g*h + a*h^2)^(7/2))
```

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((f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2)/(h*x+g)**5,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 6.78823, size = 983, normalized size = 1.98

$$\sqrt{a+x(b+cx)}\left(\frac{-fg^2+ehg-dh^2}{4h^3(g+hx)^4}\right.$$
$$+\frac{48c^3fg^5+16c^3ehg^4-136bc^2fhg^4+16c^3dh^2g^3-40bc^2eh^2g^3+152ac^2fh^2g^3+118b^2cfh^2g^3-24bc^2dh^3g^2+72ac^2eh^3g^2+\cdots}{\cdots}$$
$$+\frac{-72c^2fg^4+8c^2ehg^3+136bcfhg^3+8c^2dh^2g^2-16bceh^2g^2-59b^2fh^2g^2-140acfh^2g^2-8bcdh^3g+3b^2eh^3g+28aceh^3g+\cdots}{96h^3\left(cg^2-bhg+ah^2\right)^2(g+hx)^2}$$
$$\left.+\frac{18cfg^3-10cehg^2-17bfhg^2+2cdh^2g+9beh^2g+16afh^2g-bdh^3-8aeh^3}{24h^3\left(cg^2-bhg+ah^2\right)(g+hx)^3}\right)$$
$$-\frac{\left(b^2-4ac\right)\left(5fg^2b^2+5dh^2b^2+3eghb^2-8ceg^2b-8aeh^2b-16cdghb-16afghb+16c^2dg^2-4acfg^2-4acdh^2+16a^2fh\cdots\right.}{128\left(cg^2-bhg+ah^2\right)^{7/2}\sqrt{cx^2+bx+a}}$$
$$+\frac{\left(b^2-4ac\right)\left(5fg^2b^2+5dh^2b^2+3eghb^2-8ceg^2b-8aeh^2b-16cdghb-16afghb+16c^2dg^2-4acfg^2-4acdh^2+16a^2fh^2\cdots\right.}{128\left(cg^2-bhg+ah^2\right)^{7/2}\sqrt{cx^2+b\cdots}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^5,x]
```

```
[Out] Sqrt[a + x*(b + c*x)]*((-(f*g^2) + e*g*h - d*h^2)/(4*h^3*(g + h*x
)^4) + (18*c*f*g^3 - 10*c*e*g^2*h - 17*b*f*g^2*h + 2*c*d*g*h^2 +
9*b*e*g*h^2 + 16*a*f*g*h^2 - b*d*h^3 - 8*a*e*h^3)/(24*h^3*(c*g^2
- b*g*h + a*h^2)*(g + h*x)^3) + (-72*c^2*f*g^4 + 8*c^2*e*g^3*h +
136*b*c*f*g^3*h + 8*c^2*d*g^2*h^2 - 16*b*c*e*g^2*h^2 - 59*b^2*f*g
^2*h^2 - 140*a*c*f*g^2*h^2 - 8*b*c*d*g*h^3 + 3*b^2*e*g*h^3 + 28*a
*c*e*g*h^3 + 112*a*b*f*g*h^3 + 5*b^2*d*h^4 - 12*a*c*d*h^4 - 8*a*b
*e*h^4 - 48*a^2*f*h^4)/(96*h^3*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x
)^2) + (48*c^3*f*g^5 + 16*c^3*e*g^4*h - 136*b*c^2*f*g^4*h + 16*c^
3*d*g^3*h^2 - 40*b*c^2*e*g^3*h^2 + 118*b^2*c*f*g^3*h^2 + 152*a*c^
2*f*g^3*h^2 - 24*b*c^2*d*g^2*h^3 + 18*b^2*c*e*g^2*h^3 + 72*a*c^2*
e*g^2*h^3 - 15*b^3*f*g^2*h^3 - 300*a*b*c*f*g^2*h^3 + 38*b^2*c*d*g
*h^4 - 104*a*c^2*d*g*h^4 - 9*b^3*e*g*h^4 - 20*a*b*c*e*g*h^4 + 48*
a*b^2*f*g*h^4 + 224*a^2*c*f*g*h^4 - 15*b^3*d*h^5 + 52*a*b*c*d*h^5
 + 24*a*b^2*e*h^5 - 64*a^2*c*e*h^5 - 48*a^2*b*f*h^5)/(192*h^3*(c*
g^2 - b*g*h + a*h^2)^3*(g + h*x))) - ((b^2 - 4*a*c)*(16*c^2*d*g^2
 - 8*b*c*e*g^2 + 5*b^2*f*g^2 - 4*a*c*f*g^2 - 16*b*c*d*g*h + 3*b^2
*e*g*h + 20*a*c*e*g*h - 16*a*b*f*g*h + 5*b^2*d*h^2 - 4*a*c*d*h^2
- 8*a*b*e*h^2 + 16*a^2*f*h^2)*Sqrt[a + x*(b + c*x)]*Log[g + h*x])
/(128*(c*g^2 - b*g*h + a*h^2)^(7/2)*Sqrt[a + b*x + c*x^2]) + ((b^
2 - 4*a*c)*(16*c^2*d*g^2 - 8*b*c*e*g^2 + 5*b^2*f*g^2 - 4*a*c*f*g^
2 - 16*b*c*d*g*h + 3*b^2*e*g*h + 20*a*c*e*g*h - 16*a*b*f*g*h + 5*
b^2*d*h^2 - 4*a*c*d*h^2 - 8*a*b*e*h^2 + 16*a^2*f*h^2)*Sqrt[a + x*
(b + c*x)]*Log[-(b*g) + 2*a*h - 2*c*g*x + b*h*x + 2*Sqrt[c*g^2 -
b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2]])/(128*(c*g^2 - b*g*h + a*h^
2)^(7/2)*Sqrt[a + b*x + c*x^2])
```

Maple [B] time = 0.051, size = 29161, normalized size = 58.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)*(c*x^2+b*x+a)^(1/2)/(h*x+g)^5,x)
```

```
[Out] result too large to display
```

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(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^5,x, algorithm="maxima
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 75.4541, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^5,x, algorithm="fricas
```

```
[Out] [-1/768*(4*(48*a^3*d*h^5 - (48*b*c^2*d - 8*(3*b^2*c - 8*a*c^2)*e
+ (15*b^3 - 52*a*b*c)*f)*g^5 + (16*(3*b^2*c + 14*a*c^2)*d - (9*b^
3 + 20*a*b*c)*e + 2*(19*a*b^2 - 52*a^2*c)*f)*g^4*h - 3*(8*a^2*b*f
 + 5*(b^3 + 20*a*b*c)*d - 6*(a*b^2 + 4*a^2*c)*e)*g^3*h^2 - 2*(20*
a^2*b*e - 8*a^3*f - (59*a*b^2 + 76*a^2*c)*d)*g^2*h^3 - 8*(17*a^2*
b*d - 2*a^3*e)*g*h^4 - (48*c^3*f*g^5 + 8*(2*c^3*e - 17*b*c^2*f)*g
^4*h + 2*(8*c^3*d - 20*b*c^2*e + (59*b^2*c + 76*a*c^2)*f)*g^3*h^2
 - 3*(8*b*c^2*d - 6*(b^2*c + 4*a*c^2)*e + 5*(b^3 + 20*a*b*c)*f)*g
^2*h^3 + (2*(19*b^2*c - 52*a*c^2)*d - (9*b^3 + 20*a*b*c)*e + 16*(
3*a*b^2 + 14*a^2*c)*f)*g*h^4 - (48*a^2*b*f + (15*b^3 - 52*a*b*c)*
d - 8*(3*a*b^2 - 8*a^2*c)*e)*h^5)*x^3 - (8*(8*c^3*e + b*c^2*f)*g^
5 + 4*(16*c^3*d - 42*b*c^2*e - (9*b^2*c - 8*a*c^2)*f)*g^4*h - (10
4*b*c^2*d - 4*(23*b^2*c + 72*a*c^2)*e - (73*b^3 - 124*a*b*c)*f)*g
^3*h^2 + (20*(7*b^2*c - 16*a*c^2)*d - (33*b^3 + 164*a*b*c)*e - 2*
(99*a*b^2 - 148*a^2*c)*f)*g^2*h^3 + (176*a^2*b*f - (55*b^3 - 164*
a*b*c)*d + 2*(47*a*b^2 - 68*a^2*c)*e)*g*h^4 - 2*(8*a^2*b*e + 48*a
^3*f - (5*a*b^2 - 12*a^2*c)*d)*h^5)*x^2 - (2*(48*c^3*d + 8*b*c^2*
e - (5*b^2*c - 12*a*c^2)*f)*g^5 - (176*b*c^2*d + 2*(47*b^2*c - 68
*a*c^2)*e - (55*b^3 - 164*a*b*c)*f)*g^4*h + (2*(99*b^2*c - 148*a*
c^2)*d + (33*b^3 + 164*a*b*c)*e - 20*(7*a*b^2 - 16*a^2*c)*f)*g^3*
h^2 + (104*a^2*b*f - (73*b^3 - 124*a*b*c)*d - 4*(23*a*b^2 + 72*a^
2*c)*e)*g^2*h^3 + 4*(42*a^2*b*e - 16*a^3*f + (9*a*b^2 - 8*a^2*c)*
d)*g*h^4 - 8*(a^2*b*d + 8*a^3*e)*h^5)*x)*sqrt(c*g^2 - b*g*h + a*h
^2)*sqrt(c*x^2 + b*x + a) + 3*((16*(b^2*c^2 - 4*a*c^3)*d - 8*(b^3
*c - 4*a*b*c^2)*e + (5*b^4 - 24*a*b^2*c + 16*a^2*c^2)*f)*g^6 - (1
6*(b^3*c - 4*a*b*c^2)*d - (3*b^4 + 8*a*b^2*c - 80*a^2*c^2)*e + 16
*(a*b^3 - 4*a^2*b*c)*f)*g^5*h + ((5*b^4 - 24*a*b^2*c + 16*a^2*c^2
)*d - 8*(a*b^3 - 4*a^2*b*c)*e + 16*(a^2*b^2 - 4*a^3*c)*f)*g^4*h^2
 + ((16*(b^2*c^2 - 4*a*c^3)*d - 8*(b^3*c - 4*a*b*c^2)*e + (5*b^4
- 24*a*b^2*c + 16*a^2*c^2)*f)*g^2*h^4 - (16*(b^3*c - 4*a*b*c^2)*d
 - (3*b^4 + 8*a*b^2*c - 80*a^2*c^2)*e + 16*(a*b^3 - 4*a^2*b*c)*f)
*g*h^5 + ((5*b^4 - 24*a*b^2*c + 16*a^2*c^2)*d - 8*(a*b^3 - 4*a^2*
b*c)*e + 16*(a^2*b^2 - 4*a^3*c)*f)*h^6)*x^4 + 4*((16*(b^2*c^2 - 4
*a*c^3)*d - 8*(b^3*c - 4*a*b*c^2)*e + (5*b^4 - 24*a*b^2*c + 16*a^
2*c^2)*f)*g^3*h^3 - (16*(b^3*c - 4*a*b*c^2)*d - (3*b^4 + 8*a*b^2*
c - 80*a^2*c^2)*e + 16*(a*b^3 - 4*a^2*b*c)*f)*g^2*h^4 + ((5*b^4 -
 24*a*b^2*c + 16*a^2*c^2)*d - 8*(a*b^3 - 4*a^2*b*c)*e + 16*(a^2*b
```

```
^2 - 4*a^3*c)*f)*g*h^5)*x^3 + 6*((16*(b^2*c^2 - 4*a*c^3)*d - 8*(b
^3*c - 4*a*b*c^2)*e + (5*b^4 - 24*a*b^2*c + 16*a^2*c^2)*f)*g^4*h^
2 - (16*(b^3*c - 4*a*b*c^2)*d - (3*b^4 + 8*a*b^2*c - 80*a^2*c^2)*
e + 16*(a*b^3 - 4*a^2*b*c)*f)*g^3*h^3 + ((5*b^4 - 24*a*b^2*c + 16
*a^2*c^2)*d - 8*(a*b^3 - 4*a^2*b*c)*e + 16*(a^2*b^2 - 4*a^3*c)*f)
*g^2*h^4)*x^2 + 4*((16*(b^2*c^2 - 4*a*c^3)*d - 8*(b^3*c - 4*a*b*c
^2)*e + (5*b^4 - 24*a*b^2*c + 16*a^2*c^2)*f)*g^5*h - (16*(b^3*c -
 4*a*b*c^2)*d - (3*b^4 + 8*a*b^2*c - 80*a^2*c^2)*e + 16*(a*b^3 -
4*a^2*b*c)*f)*g^4*h^2 + ((5*b^4 - 24*a*b^2*c + 16*a^2*c^2)*d - 8*
(a*b^3 - 4*a^2*b*c)*e + 16*(a^2*b^2 - 4*a^3*c)*f)*g^3*h^3)*x)*log
(((8*a*b*g*h - 8*a^2*h^2 - (b^2 + 4*a*c)*g^2 - (8*c^2*g^2 - 8*b*c
*g*h + (b^2 + 4*a*c)*h^2)*x^2 - 2*(4*b*c*g^2 + 4*a*b*h^2 - (3*b^2
 + 4*a*c)*g*h)*x)*sqrt(c*g^2 - b*g*h + a*h^2) - 4*(b*c*g^3 + 3*a*
b*g*h^2 - 2*a^2*h^3 - (b^2 + 2*a*c)*g^2*h + (2*c^2*g^3 - 3*b*c*g^
2*h - a*b*h^3 + (b^2 + 2*a*c)*g*h^2)*x)*sqrt(c*x^2 + b*x + a))/(h
^2*x^2 + 2*g*h*x + g^2)))/((c^3*g^10 - 3*b*c^2*g^9*h - 3*a^2*b*g^
5*h^5 + a^3*g^4*h^6 + 3*(b^2*c + a*c^2)*g^8*h^2 - (b^3 + 6*a*b*c)
*g^7*h^3 + 3*(a*b^2 + a^2*c)*g^6*h^4 + (c^3*g^6*h^4 - 3*b*c^2*g^5
*h^5 - 3*a^2*b*g*h^9 + a^3*h^10 + 3*(b^2*c + a*c^2)*g^4*h^6 - (b^
3 + 6*a*b*c)*g^3*h^7 + 3*(a*b^2 + a^2*c)*g^2*h^8)*x^4 + 4*(c^3*g^
7*h^3 - 3*b*c^2*g^6*h^4 - 3*a^2*b*g^2*h^8 + a^3*g*h^9 + 3*(b^2*c
+ a*c^2)*g^5*h^5 - (b^3 + 6*a*b*c)*g^4*h^6 + 3*(a*b^2 + a^2*c)*g^
3*h^7)*x^3 + 6*(c^3*g^8*h^2 - 3*b*c^2*g^7*h^3 - 3*a^2*b*g^3*h^7 +
 a^3*g^2*h^8 + 3*(b^2*c + a*c^2)*g^6*h^4 - (b^3 + 6*a*b*c)*g^5*h^
5 + 3*(a*b^2 + a^2*c)*g^4*h^6)*x^2 + 4*(c^3*g^9*h - 3*b*c^2*g^8*h
^2 - 3*a^2*b*g^4*h^6 + a^3*g^3*h^7 + 3*(b^2*c + a*c^2)*g^7*h^3 -
(b^3 + 6*a*b*c)*g^6*h^4 + 3*(a*b^2 + a^2*c)*g^5*h^5)*x)*sqrt(c*g^
2 - b*g*h + a*h^2)), -1/384*(2*(48*a^3*d*h^5 - (48*b*c^2*d - 8*(3
*b^2*c - 8*a*c^2)*e + (15*b^3 - 52*a*b*c)*f)*g^5 + (16*(3*b^2*c +
 14*a*c^2)*d - (9*b^3 + 20*a*b*c)*e + 2*(19*a*b^2 - 52*a^2*c)*f)*
g^4*h - 3*(8*a^2*b*f + 5*(b^3 + 20*a*b*c)*d - 6*(a*b^2 + 4*a^2*c)
*e)*g^3*h^2 - 2*(20*a^2*b*e - 8*a^3*f - (59*a*b^2 + 76*a^2*c)*d)*
g^2*h^3 - 8*(17*a^2*b*d - 2*a^3*e)*g*h^4 - (48*c^3*f*g^5 + 8*(2*c
^3*e - 17*b*c^2*f)*g^4*h + 2*(8*c^3*d - 20*b*c^2*e + (59*b^2*c +
76*a*c^2)*f)*g^3*h^2 - 3*(8*b*c^2*d - 6*(b^2*c + 4*a*c^2)*e + 5*(
b^3 + 20*a*b*c)*f)*g^2*h^3 + (2*(19*b^2*c - 52*a*c^2)*d - (9*b^3
+ 20*a*b*c)*e + 16*(3*a*b^2 + 14*a^2*c)*f)*g*h^4 - (48*a^2*b*f +
(15*b^3 - 52*a*b*c)*d - 8*(3*a*b^2 - 8*a^2*c)*e)*h^5)*x^3 - (8*(8
*c^3*e + b*c^2*f)*g^5 + 4*(16*c^3*d - 42*b*c^2*e - (9*b^2*c - 8*a
*c^2)*f)*g^4*h - (104*b*c^2*d - 4*(23*b^2*c + 72*a*c^2)*e - (73*b
^3 - 124*a*b*c)*f)*g^3*h^2 + (20*(7*b^2*c - 16*a*c^2)*d - (33*b^3
 + 164*a*b*c)*e - 2*(99*a*b^2 - 148*a^2*c)*f)*g^2*h^3 + (176*a^2*
b*f - (55*b^3 - 164*a*b*c)*d + 2*(47*a*b^2 - 68*a^2*c)*e)*g*h^4 -
 2*(8*a^2*b*e + 48*a^3*f - (5*a*b^2 - 12*a^2*c)*d)*h^5)*x^2 - (2*
(48*c^3*d + 8*b*c^2*e - (5*b^2*c - 12*a*c^2)*f)*g^5 - (176*b*c^2*
d + 2*(47*b^2*c - 68*a*c^2)*e - (55*b^3 - 164*a*b*c)*f)*g^4*h + (
2*(99*b^2*c - 148*a*c^2)*d + (33*b^3 + 164*a*b*c)*e - 20*(7*a*b^2
 - 16*a^2*c)*f)*g^3*h^2 + (104*a^2*b*f - (73*b^3 - 124*a*b*c)*d -
 4*(23*a*b^2 + 72*a^2*c)*e)*g^2*h^3 + 4*(42*a^2*b*e - 16*a^3*f +
(9*a*b^2 - 8*a^2*c)*d)*g*h^4 - 8*(a^2*b*d + 8*a^3*e)*h^5)*x)*sqrt
(-c*g^2 + b*g*h - a*h^2)*sqrt(c*x^2 + b*x + a) - 3*((16*(b^2*c^2
- 4*a*c^3)*d - 8*(b^3*c - 4*a*b*c^2)*e + (5*b^4 - 24*a*b^2*c + 16
*a^2*c^2)*f)*g^6 - (16*(b^3*c - 4*a*b*c^2)*d - (3*b^4 + 8*a*b^2*c
 - 80*a^2*c^2)*e + 16*(a*b^3 - 4*a^2*b*c)*f)*g^5*h + ((5*b^4 - 24
```

```
*a*b^2*c + 16*a^2*c^2)*d - 8*(a*b^3 - 4*a^2*b*c)*e + 16*(a^2*b^2
- 4*a^3*c)*f)*g^4*h^2 + ((16*(b^2*c^2 - 4*a*c^3)*d - 8*(b^3*c - 4
*a*b*c^2)*e + (5*b^4 - 24*a*b^2*c + 16*a^2*c^2)*f)*g^2*h^4 - (16*
(b^3*c - 4*a*b*c^2)*d - (3*b^4 + 8*a*b^2*c - 80*a^2*c^2)*e + 16*(
a*b^3 - 4*a^2*b*c)*f)*g*h^5 + ((5*b^4 - 24*a*b^2*c + 16*a^2*c^2)*
d - 8*(a*b^3 - 4*a^2*b*c)*e + 16*(a^2*b^2 - 4*a^3*c)*f)*h^6)*x^4
+ 4*((16*(b^2*c^2 - 4*a*c^3)*d - 8*(b^3*c - 4*a*b*c^2)*e + (5*b^4
 - 24*a*b^2*c + 16*a^2*c^2)*f)*g^3*h^3 - (16*(b^3*c - 4*a*b*c^2)*
d - (3*b^4 + 8*a*b^2*c - 80*a^2*c^2)*e + 16*(a*b^3 - 4*a^2*b*c)*f
)*g^2*h^4 + ((5*b^4 - 24*a*b^2*c + 16*a^2*c^2)*d - 8*(a*b^3 - 4*a
^2*b*c)*e + 16*(a^2*b^2 - 4*a^3*c)*f)*g*h^5)*x^3 + 6*((16*(b^2*c^
2 - 4*a*c^3)*d - 8*(b^3*c - 4*a*b*c^2)*e + (5*b^4 - 24*a*b^2*c +
16*a^2*c^2)*f)*g^4*h^2 - (16*(b^3*c - 4*a*b*c^2)*d - (3*b^4 + 8*a
*b^2*c - 80*a^2*c^2)*e + 16*(a*b^3 - 4*a^2*b*c)*f)*g^3*h^3 + ((5*
b^4 - 24*a*b^2*c + 16*a^2*c^2)*d - 8*(a*b^3 - 4*a^2*b*c)*e + 16*(
a^2*b^2 - 4*a^3*c)*f)*g^2*h^4)*x^2 + 4*((16*(b^2*c^2 - 4*a*c^3)*d
 - 8*(b^3*c - 4*a*b*c^2)*e + (5*b^4 - 24*a*b^2*c + 16*a^2*c^2)*f)
*g^5*h - (16*(b^3*c - 4*a*b*c^2)*d - (3*b^4 + 8*a*b^2*c - 80*a^2*
c^2)*e + 16*(a*b^3 - 4*a^2*b*c)*f)*g^4*h^2 + ((5*b^4 - 24*a*b^2*c
 + 16*a^2*c^2)*d - 8*(a*b^3 - 4*a^2*b*c)*e + 16*(a^2*b^2 - 4*a^3*
c)*f)*g^3*h^3)*x)*arctan(-1/2*sqrt(-c*g^2 + b*g*h - a*h^2)*(b*g -
 2*a*h + (2*c*g - b*h)*x)/((c*g^2 - b*g*h + a*h^2)*sqrt(c*x^2 + b
*x + a))))/((c^3*g^10 - 3*b*c^2*g^9*h - 3*a^2*b*g^5*h^5 + a^3*g^4
*h^6 + 3*(b^2*c + a*c^2)*g^8*h^2 - (b^3 + 6*a*b*c)*g^7*h^3 + 3*(a
*b^2 + a^2*c)*g^6*h^4 + (c^3*g^6*h^4 - 3*b*c^2*g^5*h^5 - 3*a^2*b*
g*h^9 + a^3*h^10 + 3*(b^2*c + a*c^2)*g^4*h^6 - (b^3 + 6*a*b*c)*g^
3*h^7 + 3*(a*b^2 + a^2*c)*g^2*h^8)*x^4 + 4*(c^3*g^7*h^3 - 3*b*c^2
*g^6*h^4 - 3*a^2*b*g^2*h^8 + a^3*g*h^9 + 3*(b^2*c + a*c^2)*g^5*h^
5 - (b^3 + 6*a*b*c)*g^4*h^6 + 3*(a*b^2 + a^2*c)*g^3*h^7)*x^3 + 6*
(c^3*g^8*h^2 - 3*b*c^2*g^7*h^3 - 3*a^2*b*g^3*h^7 + a^3*g^2*h^8 +
3*(b^2*c + a*c^2)*g^6*h^4 - (b^3 + 6*a*b*c)*g^5*h^5 + 3*(a*b^2 +
a^2*c)*g^4*h^6)*x^2 + 4*(c^3*g^9*h - 3*b*c^2*g^8*h^2 - 3*a^2*b*g^
4*h^6 + a^3*g^3*h^7 + 3*(b^2*c + a*c^2)*g^7*h^3 - (b^3 + 6*a*b*c)
*g^6*h^4 + 3*(a*b^2 + a^2*c)*g^5*h^5)*x)*sqrt(-c*g^2 + b*g*h - a*
h^2))]
```

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

$$\int \frac{\sqrt{a + bx + cx^2}\,\left(d + ex + fx^2\right)}{(g + hx)^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2)/(h*x+g)**5,x)
```

```
[Out] Integral(sqrt(a + b*x + c*x**2)*(d + e*x + f*x**2)/(g + h*x)**5,
x)
```

GIAC/XCAS [A] time = 10.249, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^5,x, algorithm="giac")
```

```
[Out] Done
```

3.195 $\int \frac{\sqrt{a+bx+cx^2}\left(d+ex+fx^2\right)}{(g+hx)^6}\,dx$

Optimal. Leaf size=824

$$\frac{\left(4c^2\left(3fg^2+h(2eg-27dh)\right)g^2-5h^2\left(\left(3fg^2+3ehg+7dh^2\right)b^2-2ah(6fg+5eh)b+16a^2fh^2\right)-2ch\left(bg\left(16fg^2-21ehg\right.\right.\right.}{240h\left(cg^2-bhg+ah^2\right)^3(g+hx)^3}$$
$$+\frac{\left(2cg\left(3fg^2+h(2eg-7dh)\right)+h\left(10ah(2fg-eh)-b\left(13fg^2-3ehg-7dh^2\right)\right)\right)\left(cx^2+bx+a\right)^{3/2}}{40h\left(cg^2-bhg+ah^2\right)^2(g+hx)^4}$$
$$-\frac{\left(fg^2-h(eg-dh)\right)\left(cx^2+bx+a\right)^{3/2}}{5h\left(cg^2-bhg+ah^2\right)(g+hx)^5}$$
$$+\frac{\left(32c^3dg^3-8c^2\left(2bg(eg+3dh)+a\left(fg^2-6ehg+3dh^2\right)\right)g-bh\left(\left(3fg^2+3ehg+7dh^2\right)b^2-2ah(6fg+5eh)b+16a^2fh^2\right)\right.}{128\left(cg^2-bhg\right.}$$
$$-\frac{\left(b^2-4ac\right)\left(32c^3dg^3-8c^2\left(2bg(eg+3dh)+a\left(fg^2-6ehg+3dh^2\right)\right)g-bh\left(\left(3fg^2+3ehg+7dh^2\right)b^2-2ah(6fg+5eh)b\right.\right.}{256\left(cg^2\right.}$$

```
[Out] ((32*c^3*d*g^3 - 8*c^2*g*(2*b*g*(e*g + 3*d*h) + a*(f*g^2 - 6*e*g*
h + 3*d*h^2)) - b*h*(16*a^2*f*h^2 - 2*a*b*h*(6*f*g + 5*e*h) + b^2
*(3*f*g^2 + 3*e*g*h + 7*d*h^2)) + 2*c*(4*a^2*h^2*(6*f*g - e*h) -
6*a*b*h*(3*f*g^2 + 3*e*g*h - d*h^2) + b^2*g*(5*f*g^2 + 6*e*g*h +
15*d*h^2)))*(b*g - 2*a*h + (2*c*g - b*h)*x)*Sqrt[a + b*x + c*x^2]
)/(128*(c*g^2 - b*g*h + a*h^2)^4*(g + h*x)^2) - ((f*g^2 - h*(e*g
- d*h))*(a + b*x + c*x^2)^(3/2))/(5*h*(c*g^2 - b*g*h + a*h^2)*(g
+ h*x)^5) + ((2*c*g*(3*f*g^2 + h*(2*e*g - 7*d*h)) + h*(10*a*h*(2*
f*g - e*h) - b*(13*f*g^2 - 3*e*g*h - 7*d*h^2)))*(a + b*x + c*x^2)
^(3/2))/(40*h*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x)^4) + ((4*c^2*g^
2*(3*f*g^2 + h*(2*e*g - 27*d*h)) - 5*h^2*(16*a^2*f*h^2 - 2*a*b*h*
(6*f*g + 5*e*h) + b^2*(3*f*g^2 + 3*e*g*h + 7*d*h^2)) - 2*c*h*(b*g
*(16*f*g^2 - 21*e*g*h - 54*d*h^2) - 2*a*h*(18*f*g^2 - 33*e*g*h +
8*d*h^2)))*(a + b*x + c*x^2)^(3/2))/(240*h*(c*g^2 - b*g*h + a*h^2
)^3*(g + h*x)^3) - ((b^2 - 4*a*c)*(32*c^3*d*g^3 - 8*c^2*g*(2*b*g*
(e*g + 3*d*h) + a*(f*g^2 - 6*e*g*h + 3*d*h^2)) - b*h*(16*a^2*f*h^
2 - 2*a*b*h*(6*f*g + 5*e*h) + b^2*(3*f*g^2 + 3*e*g*h + 7*d*h^2))
+ 2*c*(4*a^2*h^2*(6*f*g - e*h) - 6*a*b*h*(3*f*g^2 + 3*e*g*h - d*h
^2) + b^2*g*(5*f*g^2 + 6*e*g*h + 15*d*h^2)))*ArcTanh[(b*g - 2*a*h
 + (2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x +
 c*x^2])])/(256*(c*g^2 - b*g*h + a*h^2)^(9/2))
```

Rubi [A] time = 6.63627, antiderivative size = 826, normalized size of antiderivative = 1., number of

steps used = 6, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$\frac{\left(4\left(3fg^4+h(2eg-27dh)g^2\right)c^2-2h\left(bg\left(16fg^2-21ehg-54dh^2\right)-2ah\left(18fg^2-33ehg+8dh^2\right)\right)c-5h^2\left(\left(3fg^2+3ehg\right.\right.\right.}{240h\left(cg^2-bhg+ah^2\right)^3(g+hx)^3}$$
$$+\frac{\left(6cfg^3+2ch(2eg-7dh)g+10ah^2(2fg-eh)-bh\left(13fg^2-h(3eg+7dh)\right)\right)\left(cx^2+bx+a\right)^{3/2}}{40h\left(cg^2-bhg+ah^2\right)^2(g+hx)^4}$$
$$-\frac{\left(fg^2-h(eg-dh)\right)\left(cx^2+bx+a\right)^{3/2}}{5h\left(cg^2-bhg+ah^2\right)(g+hx)^5}$$
$$+\frac{\left(32c^3dg^3-8c^2\left(afg^2+2b(eg+3dh)g-3ah(2eg-dh)\right)g+2c\left(\left(5fg^3+3h(2eg+5dh)g\right)b^2-6ah\left(3fg^2+h(3eg-dh)\right)b\right.\right.}{128\left(cg^2-bhg\right.}$$
$$-\frac{\left(b^2-4ac\right)\left(32c^3dg^3-8c^2\left(afg^2+2b(eg+3dh)g-3ah(2eg-dh)\right)g+2c\left(\left(5fg^3+3h(2eg+5dh)g\right)b^2-6ah\left(3fg^2+h(3\right.\right.\right.}{256\left(cg^2\right.}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^6,x]
```

```
[Out] ((32*c^3*d*g^3 - 8*c^2*g*(a*f*g^2 - 3*a*h*(2*e*g - d*h) + 2*b*g*(
e*g + 3*d*h)) + 2*c*(4*a^2*h^2*(6*f*g - e*h) - 6*a*b*h*(3*f*g^2 +
 h*(3*e*g - d*h)) + b^2*(5*f*g^3 + 3*g*h*(2*e*g + 5*d*h))) - b*h*
(16*a^2*f*h^2 - 2*a*b*h*(6*f*g + 5*e*h) + b^2*(3*f*g^2 + h*(3*e*g
 + 7*d*h))))*(b*g - 2*a*h + (2*c*g - b*h)*x)*Sqrt[a + b*x + c*x^2
])/(128*(c*g^2 - b*g*h + a*h^2)^4*(g + h*x)^2) - ((f*g^2 - h*(e*g
 - d*h))*(a + b*x + c*x^2)^(3/2))/(5*h*(c*g^2 - b*g*h + a*h^2)*(g
 + h*x)^5) + ((6*c*f*g^3 + 2*c*g*h*(2*e*g - 7*d*h) + 10*a*h^2*(2*
f*g - e*h) - b*h*(13*f*g^2 - h*(3*e*g + 7*d*h)))*(a + b*x + c*x^2
)^(3/2))/(40*h*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x)^4) + ((4*c^2*(
3*f*g^4 + g^2*h*(2*e*g - 27*d*h)) - 5*h^2*(16*a^2*f*h^2 - 2*a*b*h
*(6*f*g + 5*e*h) + b^2*(3*f*g^2 + 3*e*g*h + 7*d*h^2)) - 2*c*h*(b*
g*(16*f*g^2 - 21*e*g*h - 54*d*h^2) - 2*a*h*(18*f*g^2 - 33*e*g*h +
 8*d*h^2)))*(a + b*x + c*x^2)^(3/2))/(240*h*(c*g^2 - b*g*h + a*h^
2)^3*(g + h*x)^3) - ((b^2 - 4*a*c)*(32*c^3*d*g^3 - 8*c^2*g*(a*f*g
^2 - 3*a*h*(2*e*g - d*h) + 2*b*g*(e*g + 3*d*h)) + 2*c*(4*a^2*h^2*
(6*f*g - e*h) - 6*a*b*h*(3*f*g^2 + h*(3*e*g - d*h)) + b^2*(5*f*g^
3 + 3*g*h*(2*e*g + 5*d*h))) - b*h*(16*a^2*f*h^2 - 2*a*b*h*(6*f*g
+ 5*e*h) + b^2*(3*f*g^2 + h*(3*e*g + 7*d*h))))*ArcTanh[(b*g - 2*a
*h + (2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x
 + c*x^2])])/(256*(c*g^2 - b*g*h + a*h^2)^(9/2))
```

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((f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2)/(h*x+g)**6,x)
```

```
[Out] Timed out
```

Mathematica [A]   time = 7.35021, size = 1633, normalized size = 1.98

$$\sqrt{a+x(b+cx)}\left(\frac{-fg^2+ehg-dh^2}{5h^3(g+hx)^5}\right.$$
$$+\frac{96c^4fg^6+64c^4ehg^5-352bc^3fhg^5+96c^4dh^2g^4-208bc^3eh^2g^4+432ac^3fh^2g^4+436b^2c^2fh^2g^4-192bc^3dh^3g^3+448ac^3eh}{}$$
$$+\frac{48c^3fg^5+32c^3ehg^4-152bc^2fhg^4+48c^3dh^2g^3-88bc^2eh^2g^3+168ac^2fh^2g^3+154b^2cfh^2g^3-72bc^2dh^3g^2+192ac^2eh^3g^2}{}$$
$$+\frac{-108c^2fg^4+8c^2ehg^3+208bcfhg^3+12c^2dh^2g^2-18bceh^2g^2-93b^2fh^2g^2-216acfh^2g^2-12bcdh^3g+3b^2eh^3g+36aceh^3}{240h^3(cg^2-bhg+ah^2)^2(g+hx)^3}$$
$$\left.+\frac{22cfg^3-12cehg^2-21bfhg^2+2cdh^2g+11beh^2g+20afh^2g-bdh^3-10aeh^3}{40h^3(cg^2-bhg+ah^2)(g+hx)^4}\right)$$
$$+\frac{(b^2-4ac)\left(7dh^3b^3+3egh^2b^3+3fg^2hb^3-10cfg^3b^2-10aeh^3b^2-30cdgh^2b^2-12afgh^2b^2-12ceg^2hb^2+16c^2eg^3b-12\right.}{2}$$
$$-\frac{(b^2-4ac)\left(7dh^3b^3+3egh^2b^3+3fg^2hb^3-10cfg^3b^2-10aeh^3b^2-30cdgh^2b^2-12afgh^2b^2-12ceg^2hb^2+16c^2eg^3b-12\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2))/(g + h*x)^6,x]
```

```
[Out] Sqrt[a + x*(b + c*x)]*((-(f*g^2) + e*g*h - d*h^2)/(5*h^3*(g + h*x
)^5) + (22*c*f*g^3 - 12*c*e*g^2*h - 21*b*f*g^2*h + 2*c*d*g*h^2 +
11*b*e*g*h^2 + 20*a*f*g*h^2 - b*d*h^3 - 10*a*e*h^3)/(40*h^3*(c*g^
2 - b*g*h + a*h^2)*(g + h*x)^4) + (-108*c^2*f*g^4 + 8*c^2*e*g^3*h
 + 208*b*c*f*g^3*h + 12*c^2*d*g^2*h^2 - 18*b*c*e*g^2*h^2 - 93*b^2
*f*g^2*h^2 - 216*a*c*f*g^2*h^2 - 12*b*c*d*g*h^3 + 3*b^2*e*g*h^3 +
 36*a*c*e*g*h^3 + 180*a*b*f*g*h^3 + 7*b^2*d*h^4 - 16*a*c*d*h^4 -
10*a*b*e*h^4 - 80*a^2*f*h^4)/(240*h^3*(c*g^2 - b*g*h + a*h^2)^2*(
g + h*x)^3) + (48*c^3*f*g^5 + 32*c^3*e*g^4*h - 152*b*c^2*f*g^4*h
+ 48*c^3*d*g^3*h^2 - 88*b*c^2*e*g^3*h^2 + 154*b^2*c*f*g^3*h^2 + 1
68*a*c^2*f*g^3*h^2 - 72*b*c^2*d*g^2*h^3 + 36*b^2*c*e*g^2*h^3 + 19
2*a*c^2*e*g^2*h^3 - 15*b^3*f*g^2*h^3 - 444*a*b*c*f*g^2*h^3 + 94*b
^2*c*d*g*h^4 - 232*a*c^2*d*g*h^4 - 15*b^3*e*g*h^4 - 76*a*b*c*e*g*
h^4 + 60*a*b^2*f*g*h^4 + 400*a^2*c*f*g*h^4 - 35*b^3*d*h^5 + 116*a
*b*c*d*h^5 + 50*a*b^2*e*h^5 - 120*a^2*c*e*h^5 - 80*a^2*b*f*h^5)/(
960*h^3*(c*g^2 - b*g*h + a*h^2)^3*(g + h*x)^2) + (96*c^4*f*g^6 +
64*c^4*e*g^5*h - 352*b*c^3*f*g^5*h + 96*c^4*d*g^4*h^2 - 208*b*c^3
*e*g^4*h^2 + 436*b^2*c^2*f*g^4*h^2 + 432*a*c^3*f*g^4*h^2 - 192*b*
c^3*d*g^3*h^3 + 144*b^2*c^2*e*g^3*h^3 + 448*a*c^3*e*g^3*h^3 - 120
```

```
*b^3*c*f*g^3*h^3 - 1312*a*b*c^2*f*g^3*h^3 + 476*b^2*c^2*d*g^2*h^4
 - 1328*a*c^3*d*g^2*h^4 - 150*b^3*c*e*g^2*h^4 - 8*a*b*c^2*e*g^2*h
^4 + 45*b^4*f*g^2*h^4 + 300*a*b^2*c*f*g^2*h^4 + 1376*a^2*c^2*f*g^
2*h^4 - 380*b^3*c*d*g*h^5 + 1328*a*b*c^2*d*g*h^5 + 45*b^4*e*g*h^5
 + 320*a*b^2*c*e*g*h^5 - 1296*a^2*c^2*e*g*h^5 - 180*a*b^3*f*g*h^5
 - 80*a^2*b*c*f*g*h^5 + 105*b^4*d*h^6 - 460*a*b^2*c*d*h^6 + 256*a
^2*c^2*d*h^6 - 150*a*b^3*e*h^6 + 520*a^2*b*c*e*h^6 + 240*a^2*b^2*
f*h^6 - 640*a^3*c*f*h^6)/(1920*h^3*(c*g^2 - b*g*h + a*h^2)^4*(g +
 h*x))) + ((b^2 - 4*a*c)*(-32*c^3*d*g^3 + 16*b*c^2*e*g^3 - 10*b^2
*c*f*g^3 + 8*a*c^2*f*g^3 + 48*b*c^2*d*g^2*h - 12*b^2*c*e*g^2*h -
48*a*c^2*e*g^2*h + 3*b^3*f*g^2*h + 36*a*b*c*f*g^2*h - 30*b^2*c*d*
g*h^2 + 24*a*c^2*d*g*h^2 + 3*b^3*e*g*h^2 + 36*a*b*c*e*g*h^2 - 12*
a*b^2*f*g*h^2 - 48*a^2*c*f*g*h^2 + 7*b^3*d*h^3 - 12*a*b*c*d*h^3 -
 10*a*b^2*e*h^3 + 8*a^2*c*e*h^3 + 16*a^2*b*f*h^3)*Sqrt[a + x*(b +
 c*x)]*Log[g + h*x])/(256*(c*g^2 - b*g*h + a*h^2)^(9/2)*Sqrt[a +
b*x + c*x^2]) - ((b^2 - 4*a*c)*(-32*c^3*d*g^3 + 16*b*c^2*e*g^3 -
10*b^2*c*f*g^3 + 8*a*c^2*f*g^3 + 48*b*c^2*d*g^2*h - 12*b^2*c*e*g^
2*h - 48*a*c^2*e*g^2*h + 3*b^3*f*g^2*h + 36*a*b*c*f*g^2*h - 30*b^
2*c*d*g*h^2 + 24*a*c^2*d*g*h^2 + 3*b^3*e*g*h^2 + 36*a*b*c*e*g*h^2
 - 12*a*b^2*f*g*h^2 - 48*a^2*c*f*g*h^2 + 7*b^3*d*h^3 - 12*a*b*c*d
*h^3 - 10*a*b^2*e*h^3 + 8*a^2*c*e*h^3 + 16*a^2*b*f*h^3)*Sqrt[a +
x*(b + c*x)]*Log[-(b*g) + 2*a*h - 2*c*g*x + b*h*x + 2*Sqrt[c*g^2
- b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2]])/(256*(c*g^2 - b*g*h + a*
h^2)^(9/2)*Sqrt[a + b*x + c*x^2])
```

Maple [B] time = 0.068, size = 40336, normalized size = 49.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)*(c*x^2+b*x+a)^(1/2)/(h*x+g)^6,x)
```

```
[Out] result too large to display
```

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(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^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(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^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((f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2)/(h*x+g)**6,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.793073, size = 4, normalized size = 0.

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)/(h*x + g)^6,x, algorithm="giac")
```

```
[Out] sage0*x
```

3.196 $\int (g+hx)^3 \left(a+bx+cx^2\right)^{3/2} \left(d+ex+fx^2\right) \, dx$

Optimal. Leaf size=1169

result too large to display

```
[Out] -((b^2 - 4*a*c)*(1536*c^5*d*g^3 - 143*b^5*f*h^3 + 22*b^3*c*h^2*(2
0*a*f*h + 9*b*(3*f*g + e*h)) - 48*b*c^2*h*(5*a^2*f*h^2 + 9*a*b*h*
(3*f*g + e*h) + 6*b^2*(3*f*g^2 + 3*e*g*h + d*h^2)) - 256*c^4*g*(3
*b*g*(e*g + 3*d*h) + a*(f*g^2 + 3*h*(e*g + d*h))) + 32*c^3*(3*a^2
*h^2*(3*f*g + e*h) + 14*b^2*g*(f*g^2 + 3*h*(e*g + d*h)) + 12*a*b*
h*(3*f*g^2 + h*(3*e*g + d*h))))*(b + 2*c*x)*Sqrt[a + b*x + c*x^2]
)/(32768*c^7) + ((1536*c^5*d*g^3 - 143*b^5*f*h^3 + 22*b^3*c*h^2*(
20*a*f*h + 9*b*(3*f*g + e*h)) - 48*b*c^2*h*(5*a^2*f*h^2 + 9*a*b*h
*(3*f*g + e*h) + 6*b^2*(3*f*g^2 + 3*e*g*h + d*h^2)) - 256*c^4*g*(
3*b*g*(e*g + 3*d*h) + a*(f*g^2 + 3*h*(e*g + d*h))) + 32*c^3*(3*a^
2*h^2*(3*f*g + e*h) + 14*b^2*g*(f*g^2 + 3*h*(e*g + d*h)) + 12*a*b
*h*(3*f*g^2 + h*(3*e*g + d*h))))*(b + 2*c*x)*(a + b*x + c*x^2)^(3
/2))/(12288*c^6) + ((143*b^2*f*h^2 - 2*c*h*(24*b*f*g + 99*b*e*h +
 64*a*f*h) - 12*c^2*(5*f*g^2 - 3*h*(3*e*g + 8*d*h)))*(g + h*x)^2*
(a + b*x + c*x^2)^(5/2))/(2016*c^3*h) - ((10*c*f*g - 18*c*e*h + 1
3*b*f*h)*(g + h*x)^3*(a + b*x + c*x^2)^(5/2))/(144*c^2*h) + (f*(g
 + h*x)^4*(a + b*x + c*x^2)^(5/2))/(9*c*h) + ((3003*b^4*f*h^4 - 1
92*c^4*g^2*(5*f*g^2 - 3*h*(3*e*g + 64*d*h)) - 198*b^2*c*h^3*(38*a
*f*h + 21*b*(3*f*g + e*h)) + 8*c^2*h^2*(256*a^2*f*h^2 + 837*a*b*h
*(3*f*g + e*h) + b^2*(1553*f*g^2 + 756*h*(3*e*g + d*h))) - 16*c^3
*h*(32*a*h*(17*f*g^2 + 9*h*(3*e*g + d*h)) + b*g*(13*f*g^2 + 9*h*(
141*e*g + 196*d*h))) - 10*c*h*(429*b^3*f*h^3 - 22*b*c*h^2*(29*b*f
*g + 27*b*e*h + 34*a*f*h) + 16*c^3*g*(5*f*g^2 - 9*h*(e*g + 12*d*h
)) + 8*c^2*h*(a*h*(61*f*g + 63*e*h) + 3*b*(f*g^2 + 6*h*(7*e*g + 6
*d*h))))*x)*(a + b*x + c*x^2)^(5/2))/(80640*c^5*h) + ((b^2 - 4*a*
c)^2*(1536*c^5*d*g^3 - 143*b^5*f*h^3 + 22*b^3*c*h^2*(20*a*f*h + 9
*b*(3*f*g + e*h)) - 48*b*c^2*h*(5*a^2*f*h^2 + 9*a*b*h*(3*f*g + e*
h) + 6*b^2*(3*f*g^2 + 3*e*g*h + d*h^2)) - 256*c^4*g*(3*b*g*(e*g +
 3*d*h) + a*(f*g^2 + 3*h*(e*g + d*h))) + 32*c^3*(3*a^2*h^2*(3*f*g
 + e*h) + 14*b^2*g*(f*g^2 + 3*h*(e*g + d*h)) + 12*a*b*h*(3*f*g^2
+ h*(3*e*g + d*h))))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x
+ c*x^2])])/(65536*c^(15/2))
```

Rubi [A] time = 9.91879, antiderivative size = 1166, normalized size of antiderivative = 1., number

of steps used = 8, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$\frac{f\left(cx^2+bx+a\right)^{5/2}(g+hx)^4}{9ch}-\frac{(10cfg-18ceh+13bfh)\left(cx^2+bx+a\right)^{5/2}(g+hx)^3}{144c^2h}$$
$$+\frac{\left(-12\left(5fg^2-3h(3eg+8dh)\right)c^2-2h(24bfg+99beh+64afh)c+143b^2fh^2\right)\left(cx^2+bx+a\right)^{5/2}(g+hx)^2}{2016c^3h}$$
$$+\frac{\left(-192\left(5fg^4-3g^2h(3eg+64dh)\right)c^4-16h\left(32ah\left(17fg^2+9h(3eg+dh)\right)+bg\left(13fg^2+9h(141eg+196dh)\right)\right)c^3+8h^2\left((1\right.}{}$$
$$+\frac{\left(-143fh^3b^5+22ch^2(20afh+9b(3fg+eh))b^3-48c^2h\left(6\left(3fg^2+3ehg+dh^2\right)b^2+9ah(3fg+eh)b+5a^2fh^2\right)b+1536c^5c\right.}{}$$
$$+\frac{\left(b^2-4ac\right)^2\left(-143fh^3b^5+22ch^2(20afh+9b(3fg+eh))b^3-48c^2h\left(6\left(3fg^2+3ehg+dh^2\right)b^2+9ah(3fg+eh)b+5a^2fh^2\right)\right.}{}$$
$$-\frac{\left(b^2-4ac\right)\left(-143fh^3b^5+22ch^2(20afh+9b(3fg+eh))b^3-48c^2h\left(6\left(3fg^2+3ehg+dh^2\right)b^2+9ah(3fg+eh)b+5a^2fh^2\right)\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Int[(g + h*x)^3*(a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2),x]
```

```
[Out] -((b^2 - 4*a*c)*(1536*c^5*d*g^3 - 143*b^5*f*h^3 - 256*c^4*g*(a*f*
g^2 + 3*a*h*(e*g + d*h) + 3*b*g*(e*g + 3*d*h)) + 22*b^3*c*h^2*(20
*a*f*h + 9*b*(3*f*g + e*h)) - 48*b*c^2*h*(5*a^2*f*h^2 + 9*a*b*h*(
3*f*g + e*h) + 6*b^2*(3*f*g^2 + 3*e*g*h + d*h^2)) + 32*c^3*(3*a^2
*h^2*(3*f*g + e*h) + 14*b^2*g*(f*g^2 + 3*h*(e*g + d*h)) + 12*a*b*
h*(3*f*g^2 + h*(3*e*g + d*h))))*(b + 2*c*x)*Sqrt[a + b*x + c*x^2]
)/(32768*c^7) + ((1536*c^5*d*g^3 - 143*b^5*f*h^3 - 256*c^4*g*(a*f
*g^2 + 3*a*h*(e*g + d*h) + 3*b*g*(e*g + 3*d*h)) + 22*b^3*c*h^2*(2
0*a*f*h + 9*b*(3*f*g + e*h)) - 48*b*c^2*h*(5*a^2*f*h^2 + 9*a*b*h*
(3*f*g + e*h) + 6*b^2*(3*f*g^2 + 3*e*g*h + d*h^2)) + 32*c^3*(3*a^
2*h^2*(3*f*g + e*h) + 14*b^2*g*(f*g^2 + 3*h*(e*g + d*h)) + 12*a*b
*h*(3*f*g^2 + h*(3*e*g + d*h))))*(b + 2*c*x)*(a + b*x + c*x^2)^(3
/2))/(12288*c^6) + ((143*b^2*f*h^2 - 2*c*h*(24*b*f*g + 99*b*e*h +
 64*a*f*h) - 12*c^2*(5*f*g^2 - 3*h*(3*e*g + 8*d*h)))*(g + h*x)^2*
(a + b*x + c*x^2)^(5/2))/(2016*c^3*h) - ((10*c*f*g - 18*c*e*h + 1
3*b*f*h)*(g + h*x)^3*(a + b*x + c*x^2)^(5/2))/(144*c^2*h) + (f*(g
 + h*x)^4*(a + b*x + c*x^2)^(5/2))/(9*c*h) + ((3003*b^4*f*h^4 - 1
92*c^4*(5*f*g^4 - 3*g^2*h*(3*e*g + 64*d*h)) - 198*b^2*c*h^3*(38*a
*f*h + 21*b*(3*f*g + e*h)) + 8*c^2*h^2*(256*a^2*f*h^2 + 837*a*b*h
*(3*f*g + e*h) + b^2*(1553*f*g^2 + 756*h*(3*e*g + d*h))) - 16*c^3
*h*(32*a*h*(17*f*g^2 + 9*h*(3*e*g + d*h)) + b*g*(13*f*g^2 + 9*h*(
141*e*g + 196*d*h))) - 10*c*h*(429*b^3*f*h^3 - 22*b*c*h^2*(29*b*f
*g + 27*b*e*h + 34*a*f*h) + 16*c^3*(5*f*g^3 - 9*g*h*(e*g + 12*d*h
)) + 8*c^2*h*(a*h*(61*f*g + 63*e*h) + 3*b*(f*g^2 + 6*h*(7*e*g + 6
*d*h))))*x)*(a + b*x + c*x^2)^(5/2))/(80640*c^5*h) + ((b^2 - 4*a*
c)^2*(1536*c^5*d*g^3 - 143*b^5*f*h^3 - 256*c^4*g*(a*f*g^2 + 3*a*h
*(e*g + d*h) + 3*b*g*(e*g + 3*d*h)) + 22*b^3*c*h^2*(20*a*f*h + 9*
b*(3*f*g + e*h)) - 48*b*c^2*h*(5*a^2*f*h^2 + 9*a*b*h*(3*f*g + e*h
) + 6*b^2*(3*f*g^2 + 3*e*g*h + d*h^2)) + 32*c^3*(3*a^2*h^2*(3*f*g
 + e*h) + 14*b^2*g*(f*g^2 + 3*h*(e*g + d*h)) + 12*a*b*h*(3*f*g^2
```

```
+ h*(3*e*g + d*h))))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x
+ c*x^2])])/(65536*c^(15/2))
```

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((h*x+g)**3*(c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d),x)
```

```
[Out] Timed out
```

Mathematica [B] time = 6.50467, size = 2527, normalized size = 2.16

Result too large to show

Antiderivative was successfully verified.

```
[In]  Integrate[(g + h*x)^3*(a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2),x]
```

```
[Out] (((-483840*b^3*c^5*d*g^3 + 3225600*a*b*c^6*d*g^3 + 241920*b^4*c^4
*e*g^3 - 1612800*a*b^2*c^5*e*g^3 + 2064384*a^2*c^6*e*g^3 - 141120
*b^5*c^3*f*g^3 + 1021440*a*b^3*c^4*f*g^3 - 1741824*a^2*b*c^5*f*g^
3 + 725760*b^4*c^4*d*g^2*h - 4838400*a*b^2*c^5*d*g^2*h + 6193152*
a^2*c^6*d*g^2*h - 423360*b^5*c^3*e*g^2*h + 3064320*a*b^3*c^4*e*g^
2*h - 5225472*a^2*b*c^5*e*g^2*h + 272160*b^6*c^2*f*g^2*h - 217728
0*a*b^4*c^3*f*g^2*h + 4741632*a^2*b^2*c^4*f*g^2*h - 1769472*a^3*c
^5*f*g^2*h - 423360*b^5*c^3*d*g*h^2 + 3064320*a*b^3*c^4*d*g*h^2 -
 5225472*a^2*b*c^5*d*g*h^2 + 272160*b^6*c^2*e*g*h^2 - 2177280*a*b
^4*c^3*e*g*h^2 + 4741632*a^2*b^2*c^4*e*g*h^2 - 1769472*a^3*c^5*e*
g*h^2 - 187110*b^7*c*f*g*h^2 + 1655640*a*b^5*c^2*f*g*h^2 - 440899
2*a^2*b^3*c^3*f*g*h^2 + 3176064*a^3*b*c^4*f*g*h^2 + 90720*b^6*c^2
*d*h^3 - 725760*a*b^4*c^3*d*h^3 + 1580544*a^2*b^2*c^4*d*h^3 - 589
824*a^3*c^5*d*h^3 - 62370*b^7*c*e*h^3 + 551880*a*b^5*c^2*e*h^3 -
1469664*a^2*b^3*c^3*e*h^3 + 1058688*a^3*b*c^4*e*h^3 + 45045*b^8*f
*h^3 - 438900*a*b^6*c*f*h^3 + 1383984*a^2*b^4*c^2*f*h^3 - 1467072
*a^3*b^2*c^3*f*h^3 + 262144*a^4*c^4*f*h^3)/(10321920*c^7) + ((161
280*b^2*c^5*d*g^3 + 3225600*a*c^6*d*g^3 - 80640*b^3*c^4*e*g^3 + 4
51584*a*b*c^5*e*g^3 + 47040*b^4*c^3*f*g^3 - 290304*a*b^2*c^4*f*g^
3 + 322560*a^2*c^5*f*g^3 - 241920*b^3*c^4*d*g^2*h + 1354752*a*b*c
^5*d*g^2*h + 141120*b^4*c^3*e*g^2*h - 870912*a*b^2*c^4*e*g^2*h +
967680*a^2*c^5*e*g^2*h - 90720*b^5*c^2*f*g^2*h + 628992*a*b^3*c^3
*f*g^2*h - 1009152*a^2*b*c^4*f*g^2*h + 141120*b^4*c^3*d*g*h^2 - 8
70912*a*b^2*c^4*d*g*h^2 + 967680*a^2*c^5*d*g*h^2 - 90720*b^5*c^2*
```

e*g*h^2 + 628992*a*b^3*c^3*e*g*h^2 - 1009152*a^2*b*c^4*e*g*h^2 + 62370*b^6*c*f*g*h^2 - 485352*a*b^4*c^2*f*g*h^2 + 1020384*a^2*b^2*c^3*f*g*h^2 - 362880*a^3*c^4*f*g*h^2 - 30240*b^5*c^2*d*h^3 + 209664*a*b^3*c^3*d*h^3 - 336384*a^2*b*c^4*d*h^3 + 20790*b^6*c*e*h^3 - 161784*a*b^4*c^2*e*h^3 + 340128*a^2*b^2*c^3*e*h^3 - 120960*a^3*c^4*e*h^3 - 15015*b^7*f*h^3 + 130284*a*b^5*c*f*h^3 - 338832*a^2*b^3*c^2*f*h^3 + 236864*a^3*b*c^3*f*h^3)*x)/(5160960*c^6) + ((483840*b*c^5*d*g^3 + 16128*b^2*c^4*e*g^3 + 516096*a*c^5*e*g^3 - 9408*b^3*c^3*f*g^3 + 48384*a*b*c^4*f*g^3 + 48384*b^2*c^4*d*g^2*h + 1548288*a*c^5*d*g^2*h - 28224*b^3*c^3*e*g^2*h + 145152*a*b*c^4*e*g^2*h + 18144*b^4*c^2*f*g^2*h - 107136*a*b^2*c^3*f*g^2*h + 110592*a^2*c^4*f*g^2*h - 28224*b^3*c^3*d*g*h^2 + 145152*a*b*c^4*d*g*h^2 + 18144*b^4*c^2*e*g*h^2 - 107136*a*b^2*c^3*e*g*h^2 + 110592*a^2*c^4*e*g*h^2 - 12474*b^5*c*f*g*h^2 + 84240*a*b^3*c^2*f*g*h^2 - 130464*a^2*b*c^3*f*g*h^2 + 6048*b^4*c^2*d*h^3 - 35712*a*b^2*c^3*d*h^3 + 36864*a^2*c^4*d*h^3 - 4158*b^5*c*e*h^3 + 28080*a*b^3*c^2*e*h^3 - 43488*a^2*b*c^3*e*h^3 + 3003*b^6*f*h^3 - 22968*a*b^4*c*f*h^3 + 47280*a^2*b^2*c^2*f*h^3 - 16384*a^3*c^3*f*h^3)*x^2)/(1290240*c^5) + ((161280*c^5*d*g^3 + 177408*b*c^4*e*g^3 + 4032*b^2*c^3*f*g^3 + 188160*a*c^4*f*g^3 + 532224*b*c^4*d*g^2*h + 12096*b^2*c^3*e*g^2*h + 564480*a*c^4*e*g^2*h - 7776*b^3*c^2*f*g^2*h + 38016*a*b*c^3*f*g^2*h + 12096*b^2*c^3*d*g*h^2 + 564480*a*c^4*d*g*h^2 - 7776*b^3*c^2*e*g*h^2 + 38016*a*b*c^3*e*g*h^2 + 5346*b^4*c*f*g*h^2 - 30672*a*b^2*c^2*f*g*h^2 + 30240*a^2*c^3*f*g*h^2 - 2592*b^3*c^2*d*h^3 + 12672*a*b*c^3*d*h^3 + 1782*b^4*c*e*h^3 - 10224*a*b^2*c^2*e*h^3 + 10080*a^2*c^3*e*h^3 - 1287*b^5*f*h^3 + 8536*a*b^3*c*f*h^3 - 12912*a^2*b*c^2*f*h^3)*x^3)/(645120*c^4) + ((16128*c^4*e*g^3 + 17472*b*c^3*f*g^3 + 48384*c^4*d*g^2*h + 52416*b*c^3*e*g^2*h + 864*b^2*c^2*f*g^2*h + 55296*a*c^3*f*g^2*h + 52416*b*c^3*d*g*h^2 + 864*b^2*c^2*e*g*h^2 + 55296*a*c^3*e*g*h^2 - 594*b^3*c*f*g*h^2 + 2808*a*b*c^2*f*g*h^2 + 288*b^2*c^2*d*h^3 + 18432*a*c^3*d*h^3 - 198*b^3*c*e*h^3 + 936*a*b*c^2*e*h^3 + 143*b^4*f*h^3 - 804*a*b^2*c*f*h^3 + 768*a^2*c^2*f*h^3)*x^4)/(80640*c^3) + ((1344*c^3*f*g^3 + 4032*c^3*e*g^2*h + 4320*b*c^2*f*g^2*h + 4032*c^3*d*g*h^2 + 4320*b*c^2*e*g*h^2 + 54*b^2*c*f*g*h^2 + 4536*a*c^2*f*g*h^2 + 1440*b*c^2*d*h^3 + 18*b^2*c*e*h^3 + 1512*a*c^2*e*h^3 - 13*b^3*f*h^3 + 60*a*b*c*f*h^3)*x^5)/(8064*c^2) + (h*(864*c^2*f*g^2 + 864*c^2*e*g*h + 918*b*c*f*g*h + 288*c^2*d*h^2 + 306*b*c*e*h^2 + 3*b^2*f*h^2 + 320*a*c*f*h^2)*x^6)/(2016*c) + (h^2*(54*c*f*g + 18*c*e*h + 19*b*f*h)*x^7)/144 + (c*f*h^3*x^8)/9)*(a + x*(b + c*x))^(3/2))/(a + b*x + c*x^2) + ((b^2 - 4*a*c)^2*(1536*c^5*d*g^3 - 768*b*c^4*e*g^3 + 448*b^2*c^3*f*g^3 - 256*a*c^4*f*g^3 - 2304*b*c^4*d*g^2*h + 1344*b^2*c^3*e*g^2*h - 768*a*c^4*e*g^2*h - 864*b^3*c^2*f*g^2*h + 1152*a*b*c^3*f*g^2*h + 1344*b^2*c^3*d*g*h^2 - 768*a*c^4*d*g*h^2 - 864*b^3*c^2*e*g*h^2 + 1152*a*b*c^3*e*g*h^2 + 594*b^4*c*f*g*h^2 - 1296*a*b^2*c^2*f*g*h^2 + 288*a^2*c^3*f*g*h^2 - 288*b^3*c^2*d*h^3 + 384*a*b*c^3*d*h^3 + 198*b^4*c*e*h^3 - 432*a*b^2*c^2*e*h^3 + 96*a^2*c^3*e*h^3 - 143*b^5*f*h^3 + 440*a*b^3*c*f*h^3 - 240*a^2*b*c^2*f*h^3)*(a + x*(b + c*x))^(3/2)*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + b*x + c*x^2]])/(65536*c^(15/2)*(a + b*x + c*x^2)^(3/2))

Maple [B] time = 0.04, size = 5881, normalized size = 5.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^3*(c*x^2+b*x+a)^(3/2)*(f*x^2+e*x+d),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g)^3,x, algorithm="maxi
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 4.78727, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g)^3,x, algorithm="fric
```

```
[Out] [1/41287680*(4*(1146880*c^8*f*h^3*x^8 + 71680*(54*c^8*f*g*h^2 + (
18*c^8*e + 19*b*c^7*f)*h^3)*x^7 + 5120*(864*c^8*f*g^2*h + 54*(16*
c^8*e + 17*b*c^7*f)*g*h^2 + (288*c^8*d + 306*b*c^7*e + (3*b^2*c^6
 + 320*a*c^7)*f)*h^3)*x^6 + 1280*(1344*c^8*f*g^3 + 288*(14*c^8*e
+ 15*b*c^7*f)*g^2*h + 18*(224*c^8*d + 240*b*c^7*e + 3*(b^2*c^6 +
84*a*c^7)*f)*g*h^2 + (1440*b*c^7*d + 18*(b^2*c^6 + 84*a*c^7)*e -
(13*b^3*c^5 - 60*a*b*c^6)*f)*h^3)*x^5 + 128*(1344*(12*c^8*e + 13*
b*c^7*f)*g^3 + 288*(168*c^8*d + 182*b*c^7*e + 3*(b^2*c^6 + 64*a*c
^7)*f)*g^2*h + 18*(2912*b*c^7*d + 48*(b^2*c^6 + 64*a*c^7)*e - 3*(
11*b^3*c^5 - 52*a*b*c^6)*f)*g*h^2 + (288*(b^2*c^6 + 64*a*c^7)*d -
 18*(11*b^3*c^5 - 52*a*b*c^6)*e + (143*b^4*c^4 - 804*a*b^2*c^5 +
768*a^2*c^6)*f)*h^3)*x^4 - 1344*(120*(3*b^3*c^5 - 20*a*b*c^6)*d -
 12*(15*b^4*c^4 - 100*a*b^2*c^5 + 128*a^2*c^6)*e + (105*b^5*c^3 -
 760*a*b^3*c^4 + 1296*a^2*b*c^5)*f)*g^3 + 288*(168*(15*b^4*c^4 -
```

100*a*b^2*c^5 + 128*a^2*c^6)*d - 14*(105*b^5*c^3 - 760*a*b^3*c^4
+ 1296*a^2*b*c^5)*e + 3*(315*b^6*c^2 - 2520*a*b^4*c^3 + 5488*a^2*
b^2*c^4 - 2048*a^3*c^5)*f)*g^2*h - 18*(224*(105*b^5*c^3 - 760*a*b
^3*c^4 + 1296*a^2*b*c^5)*d - 48*(315*b^6*c^2 - 2520*a*b^4*c^3 + 5
488*a^2*b^2*c^4 - 2048*a^3*c^5)*e + 3*(3465*b^7*c - 30660*a*b^5*c
^2 + 81648*a^2*b^3*c^3 - 58816*a^3*b*c^4)*f)*g*h^2 + (288*(315*b^
6*c^2 - 2520*a*b^4*c^3 + 5488*a^2*b^2*c^4 - 2048*a^3*c^5)*d - 18*
(3465*b^7*c - 30660*a*b^5*c^2 + 81648*a^2*b^3*c^3 - 58816*a^3*b*c
^4)*e + (45045*b^8 - 438900*a*b^6*c + 1383984*a^2*b^4*c^2 - 14670
72*a^3*b^2*c^3 + 262144*a^4*c^4)*f)*h^3 + 16*(1344*(120*c^8*d + 1
32*b*c^7*e + (3*b^2*c^6 + 140*a*c^7)*f)*g^3 + 288*(1848*b*c^7*d +
14*(3*b^2*c^6 + 140*a*c^7)*e - 3*(9*b^3*c^5 - 44*a*b*c^6)*f)*g^2
h + 18(224*(3*b^2*c^6 + 140*a*c^7)*d - 48*(9*b^3*c^5 - 44*a*b*c
^6)*e + 3*(99*b^4*c^4 - 568*a*b^2*c^5 + 560*a^2*c^6)*f)*g*h^2 - (
288*(9*b^3*c^5 - 44*a*b*c^6)*d - 18*(99*b^4*c^4 - 568*a*b^2*c^5 +
560*a^2*c^6)*e + (1287*b^5*c^3 - 8536*a*b^3*c^4 + 12912*a^2*b*c^
5)*f)*h^3)*x^3 + 8*(1344*(360*b*c^7*d + 12*(b^2*c^6 + 32*a*c^7)*e
- (7*b^3*c^5 - 36*a*b*c^6)*f)*g^3 + 288*(168*(b^2*c^6 + 32*a*c^7
)*d - 14*(7*b^3*c^5 - 36*a*b*c^6)*e + 3*(21*b^4*c^4 - 124*a*b^2*c
^5 + 128*a^2*c^6)*f)*g^2*h - 18*(224*(7*b^3*c^5 - 36*a*b*c^6)*d -
48*(21*b^4*c^4 - 124*a*b^2*c^5 + 128*a^2*c^6)*e + 3*(231*b^5*c^3
- 1560*a*b^3*c^4 + 2416*a^2*b*c^5)*f)*g*h^2 + (288*(21*b^4*c^4 -
124*a*b^2*c^5 + 128*a^2*c^6)*d - 18*(231*b^5*c^3 - 1560*a*b^3*c^
4 + 2416*a^2*b*c^5)*e + (3003*b^6*c^2 - 22968*a*b^4*c^3 + 47280*a
^2*b^2*c^4 - 16384*a^3*c^5)*f)*h^3)*x^2 + 2*(1344*(120*(b^2*c^6 +
20*a*c^7)*d - 12*(5*b^3*c^5 - 28*a*b*c^6)*e + (35*b^4*c^4 - 216*
a*b^2*c^5 + 240*a^2*c^6)*f)*g^3 - 288*(168*(5*b^3*c^5 - 28*a*b*c^
6)*d - 14*(35*b^4*c^4 - 216*a*b^2*c^5 + 240*a^2*c^6)*e + 3*(105*b
^5*c^3 - 728*a*b^3*c^4 + 1168*a^2*b*c^5)*f)*g^2*h + 18*(224*(35*b
^4*c^4 - 216*a*b^2*c^5 + 240*a^2*c^6)*d - 48*(105*b^5*c^3 - 728*a
*b^3*c^4 + 1168*a^2*b*c^5)*e + 3*(1155*b^6*c^2 - 8988*a*b^4*c^3 +
18896*a^2*b^2*c^4 - 6720*a^3*c^5)*f)*g*h^2 - (288*(105*b^5*c^3 -
728*a*b^3*c^4 + 1168*a^2*b*c^5)*d - 18*(1155*b^6*c^2 - 8988*a*b^
4*c^3 + 18896*a^2*b^2*c^4 - 6720*a^3*c^5)*e + (15015*b^7*c - 1302
84*a*b^5*c^2 + 338832*a^2*b^3*c^3 - 236864*a^3*b*c^4)*f)*h^3)*x)*
sqrt(c*x^2 + b*x + a)*sqrt(c) - 315*(64*(24*(b^4*c^5 - 8*a*b^2*c^
6 + 16*a^2*c^7)*d - 12*(b^5*c^4 - 8*a*b^3*c^5 + 16*a^2*b*c^6)*e +
(7*b^6*c^3 - 60*a*b^4*c^4 + 144*a^2*b^2*c^5 - 64*a^3*c^6)*f)*g^3
- 96*(24*(b^5*c^4 - 8*a*b^3*c^5 + 16*a^2*b*c^6)*d - 2*(7*b^6*c^3
- 60*a*b^4*c^4 + 144*a^2*b^2*c^5 - 64*a^3*c^6)*e + 3*(3*b^7*c^2
- 28*a*b^5*c^3 + 80*a^2*b^3*c^4 - 64*a^3*b*c^5)*f)*g^2*h + 6*(32*
(7*b^6*c^3 - 60*a*b^4*c^4 + 144*a^2*b^2*c^5 - 64*a^3*c^6)*d - 48*
(3*b^7*c^2 - 28*a*b^5*c^3 + 80*a^2*b^3*c^4 - 64*a^3*b*c^5)*e + 3*
(33*b^8*c - 336*a*b^6*c^2 + 1120*a^2*b^4*c^3 - 1280*a^3*b^2*c^4 +
256*a^4*c^5)*f)*g*h^2 - (96*(3*b^7*c^2 - 28*a*b^5*c^3 + 80*a^2*b
^3*c^4 - 64*a^3*b*c^5)*d - 6*(33*b^8*c - 336*a*b^6*c^2 + 1120*a^2
*b^4*c^3 - 1280*a^3*b^2*c^4 + 256*a^4*c^5)*e + (143*b^9 - 1584*a*
b^7*c + 6048*a^2*b^5*c^2 - 8960*a^3*b^3*c^3 + 3840*a^4*b*c^4)*f)*
h^3)*log(4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x + a) - (8*c^2*x^2 + 8
*b*c*x + b^2 + 4*a*c)*sqrt(c)))/c^(15/2), 1/20643840*(2*(1146880*
c^8*f*h^3*x^8 + 71680*(54*c^8*f*g*h^2 + (18*c^8*e + 19*b*c^7*f)*h
^3)*x^7 + 5120*(864*c^8*f*g^2*h + 54*(16*c^8*e + 17*b*c^7*f)*g*h^
2 + (288*c^8*d + 306*b*c^7*e + (3*b^2*c^6 + 320*a*c^7)*f)*h^3)*x^
6 + 1280*(1344*c^8*f*g^3 + 288*(14*c^8*e + 15*b*c^7*f)*g^2*h + 18

*(224*c^8*d + 240*b*c^7*e + 3*(b^2*c^6 + 84*a*c^7)*f)*g*h^2 + (14
40*b*c^7*d + 18*(b^2*c^6 + 84*a*c^7)*e - (13*b^3*c^5 - 60*a*b*c^6
)*f)*h^3)*x^5 + 128*(1344*(12*c^8*e + 13*b*c^7*f)*g^3 + 288*(168*
c^8*d + 182*b*c^7*e + 3*(b^2*c^6 + 64*a*c^7)*f)*g^2*h + 18*(2912*
b*c^7*d + 48*(b^2*c^6 + 64*a*c^7)*e - 3*(11*b^3*c^5 - 52*a*b*c^6)
*f)*g*h^2 + (288*(b^2*c^6 + 64*a*c^7)*d - 18*(11*b^3*c^5 - 52*a*b
*c^6)*e + (143*b^4*c^4 - 804*a*b^2*c^5 + 768*a^2*c^6)*f)*h^3)*x^4
 - 1344*(120*(3*b^3*c^5 - 20*a*b*c^6)*d - 12*(15*b^4*c^4 - 100*a*
b^2*c^5 + 128*a^2*c^6)*e + (105*b^5*c^3 - 760*a*b^3*c^4 + 1296*a^
2*b*c^5)*f)*g^3 + 288*(168*(15*b^4*c^4 - 100*a*b^2*c^5 + 128*a^2*
c^6)*d - 14*(105*b^5*c^3 - 760*a*b^3*c^4 + 1296*a^2*b*c^5)*e + 3*
(315*b^6*c^2 - 2520*a*b^4*c^3 + 5488*a^2*b^2*c^4 - 2048*a^3*c^5)*
f)*g^2*h - 18*(224*(105*b^5*c^3 - 760*a*b^3*c^4 + 1296*a^2*b*c^5)
d - 48(315*b^6*c^2 - 2520*a*b^4*c^3 + 5488*a^2*b^2*c^4 - 2048*a
^3*c^5)*e + 3*(3465*b^7*c - 30660*a*b^5*c^2 + 81648*a^2*b^3*c^3 -
 58816*a^3*b*c^4)*f)*g*h^2 + (288*(315*b^6*c^2 - 2520*a*b^4*c^3 +
 5488*a^2*b^2*c^4 - 2048*a^3*c^5)*d - 18*(3465*b^7*c - 30660*a*b^
5*c^2 + 81648*a^2*b^3*c^3 - 58816*a^3*b*c^4)*e + (45045*b^8 - 438
900*a*b^6*c + 1383984*a^2*b^4*c^2 - 1467072*a^3*b^2*c^3 + 262144*
a^4*c^4)*f)*h^3 + 16*(1344*(120*c^8*d + 132*b*c^7*e + (3*b^2*c^6
+ 140*a*c^7)*f)*g^3 + 288*(1848*b*c^7*d + 14*(3*b^2*c^6 + 140*a*c
^7)*e - 3*(9*b^3*c^5 - 44*a*b*c^6)*f)*g^2*h + 18*(224*(3*b^2*c^6
+ 140*a*c^7)*d - 48*(9*b^3*c^5 - 44*a*b*c^6)*e + 3*(99*b^4*c^4 -
568*a*b^2*c^5 + 560*a^2*c^6)*f)*g*h^2 - (288*(9*b^3*c^5 - 44*a*b*
c^6)*d - 18*(99*b^4*c^4 - 568*a*b^2*c^5 + 560*a^2*c^6)*e + (1287*
b^5*c^3 - 8536*a*b^3*c^4 + 12912*a^2*b*c^5)*f)*h^3)*x^3 + 8*(1344
*(360*b*c^7*d + 12*(b^2*c^6 + 32*a*c^7)*e - (7*b^3*c^5 - 36*a*b*c
^6)*f)*g^3 + 288*(168*(b^2*c^6 + 32*a*c^7)*d - 14*(7*b^3*c^5 - 36
*a*b*c^6)*e + 3*(21*b^4*c^4 - 124*a*b^2*c^5 + 128*a^2*c^6)*f)*g^2
h - 18(224*(7*b^3*c^5 - 36*a*b*c^6)*d - 48*(21*b^4*c^4 - 124*a*
b^2*c^5 + 128*a^2*c^6)*e + 3*(231*b^5*c^3 - 1560*a*b^3*c^4 + 2416
*a^2*b*c^5)*f)*g*h^2 + (288*(21*b^4*c^4 - 124*a*b^2*c^5 + 128*a^2
*c^6)*d - 18*(231*b^5*c^3 - 1560*a*b^3*c^4 + 2416*a^2*b*c^5)*e +
(3003*b^6*c^2 - 22968*a*b^4*c^3 + 47280*a^2*b^2*c^4 - 16384*a^3*c
^5)*f)*h^3)*x^2 + 2*(1344*(120*(b^2*c^6 + 20*a*c^7)*d - 12*(5*b^3
*c^5 - 28*a*b*c^6)*e + (35*b^4*c^4 - 216*a*b^2*c^5 + 240*a^2*c^6)
*f)*g^3 - 288*(168*(5*b^3*c^5 - 28*a*b*c^6)*d - 14*(35*b^4*c^4 -
216*a*b^2*c^5 + 240*a^2*c^6)*e + 3*(105*b^5*c^3 - 728*a*b^3*c^4 +
 1168*a^2*b*c^5)*f)*g^2*h + 18*(224*(35*b^4*c^4 - 216*a*b^2*c^5 +
 240*a^2*c^6)*d - 48*(105*b^5*c^3 - 728*a*b^3*c^4 + 1168*a^2*b*c^
5)*e + 3*(1155*b^6*c^2 - 8988*a*b^4*c^3 + 18896*a^2*b^2*c^4 - 672
0*a^3*c^5)*f)*g*h^2 - (288*(105*b^5*c^3 - 728*a*b^3*c^4 + 1168*a^
2*b*c^5)*d - 18*(1155*b^6*c^2 - 8988*a*b^4*c^3 + 18896*a^2*b^2*c^
4 - 6720*a^3*c^5)*e + (15015*b^7*c - 130284*a*b^5*c^2 + 338832*a^
2*b^3*c^3 - 236864*a^3*b*c^4)*f)*h^3)*x)*sqrt(c*x^2 + b*x + a)*sq
rt(-c) + 315*(64*(24*(b^4*c^5 - 8*a*b^2*c^6 + 16*a^2*c^7)*d - 12*
(b^5*c^4 - 8*a*b^3*c^5 + 16*a^2*b*c^6)*e + (7*b^6*c^3 - 60*a*b^4*
c^4 + 144*a^2*b^2*c^5 - 64*a^3*c^6)*f)*g^3 - 96*(24*(b^5*c^4 - 8*
a*b^3*c^5 + 16*a^2*b*c^6)*d - 2*(7*b^6*c^3 - 60*a*b^4*c^4 + 144*a
^2*b^2*c^5 - 64*a^3*c^6)*e + 3*(3*b^7*c^2 - 28*a*b^5*c^3 + 80*a^2
*b^3*c^4 - 64*a^3*b*c^5)*f)*g^2*h + 6*(32*(7*b^6*c^3 - 60*a*b^4*c
^4 + 144*a^2*b^2*c^5 - 64*a^3*c^6)*d - 48*(3*b^7*c^2 - 28*a*b^5*c
^3 + 80*a^2*b^3*c^4 - 64*a^3*b*c^5)*e + 3*(33*b^8*c - 336*a*b^6*c
^2 + 1120*a^2*b^4*c^3 - 1280*a^3*b^2*c^4 + 256*a^4*c^5)*f)*g*h^2

```
- (96*(3*b^7*c^2 - 28*a*b^5*c^3 + 80*a^2*b^3*c^4 - 64*a^3*b*c^5)*
d - 6*(33*b^8*c - 336*a*b^6*c^2 + 1120*a^2*b^4*c^3 - 1280*a^3*b^2
*c^4 + 256*a^4*c^5)*e + (143*b^9 - 1584*a*b^7*c + 6048*a^2*b^5*c^
2 - 8960*a^3*b^3*c^3 + 3840*a^4*b*c^4)*f)*h^3)*arctan(1/2*(2*c*x
+ b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))/(sqrt(-c)*c^7)]
```

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

$$\int (g + hx)^3 \left(a + bx + cx^2\right)^{\frac{3}{2}} \left(d + ex + fx^2\right) \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**3*(c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d),x)

[Out] Integral((g + h*x)**3*(a + b*x + c*x**2)**(3/2)*(d + e*x + f*x**2
), x)
```

GIAC/XCAS [A] time = 0.291722, size = 1, normalized size = 0.

$$\textit{Done}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g)^3,x, algorithm="giac

[Out] Done
```

3.197 $\int (g+hx)^2 \left(a+bx+cx^2\right)^{3/2} \left(d+ex+fx^2\right) \, dx$

Optimal. Leaf size=753

$$\frac{\left(b^2-4ac\right)^2 \tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right) \left(16c^2\left(3a^2fh^2+12abh(eh+2fg)+14b^2\left(dh^2+2egh+fg^2\right)\right)-72b^2ch(3afh+2beh+\right.}{32768c^{13/2}}$$
$$-\frac{\left(b^2-4ac\right)(b+2cx)\sqrt{a+bx+cx^2}\left(16c^2\left(3a^2fh^2+12abh(eh+2fg)+14b^2\left(dh^2+2egh+fg^2\right)\right)-72b^2ch(3afh+2beh+\right.}{16384c^6}$$
$$+\frac{(b+2cx)\left(a+bx+cx^2\right)^{3/2}\left(16c^2\left(3a^2fh^2+12abh(eh+2fg)+14b^2\left(dh^2+2egh+fg^2\right)\right)-72b^2ch(3afh+2beh+4bfg)\right.}{6144c^5}$$
$$-\frac{\left(a+bx+cx^2\right)^{5/2}\left(-10chx\left(-12ch(7afh+2b(6eh+fg))+99b^2fh^2-8c^2\left(5fg^2-4h(7dh+2eg)\right)\right)+8c^2h\left(96ah(eh+2f\right.\right.}{13440c^4h}$$
$$-\frac{(g+hx)^2\left(a+bx+cx^2\right)^{5/2}(11bfh-16ceh+10cfg)}{112c^2h}+\frac{f(g+hx)^3\left(a+bx+cx^2\right)^{5/2}}{8ch}$$

```
[Out] -((b^2 - 4*a*c)*(768*c^4*d*g^2 + 99*b^4*f*h^2 - 72*b^2*c*h*(4*b*f
*g + 2*b*e*h + 3*a*f*h) - 128*c^3*(3*b*g*(e*g + 2*d*h) + a*(f*g^2
 + 2*e*g*h + d*h^2)) + 16*c^2*(3*a^2*f*h^2 + 12*a*b*h*(2*f*g + e*
h) + 14*b^2*(f*g^2 + 2*e*g*h + d*h^2)))*(b + 2*c*x)*Sqrt[a + b*x
+ c*x^2])/(16384*c^6) + ((768*c^4*d*g^2 + 99*b^4*f*h^2 - 72*b^2*c
*h*(4*b*f*g + 2*b*e*h + 3*a*f*h) - 128*c^3*(3*b*g*(e*g + 2*d*h) +
 a*(f*g^2 + 2*e*g*h + d*h^2)) + 16*c^2*(3*a^2*f*h^2 + 12*a*b*h*(2
*f*g + e*h) + 14*b^2*(f*g^2 + 2*e*g*h + d*h^2)))*(b + 2*c*x)*(a +
 b*x + c*x^2)^(3/2))/(6144*c^5) - ((10*c*f*g - 16*c*e*h + 11*b*f*
h)*(g + h*x)^2*(a + b*x + c*x^2)^(5/2))/(112*c^2*h) + (f*(g + h*x
)^3*(a + b*x + c*x^2)^(5/2))/(8*c*h) - ((693*b^3*f*h^3 + 96*c^3*g
*(5*f*g^2 - 8*h*(e*g + 7*d*h)) - 36*b*c*h^2*(31*a*f*h + 28*b*(2*f
*g + e*h)) + 8*c^2*h*(96*a*h*(2*f*g + e*h) + b*(31*f*g^2 + 196*h*
(2*e*g + d*h))) - 10*c*h*(99*b^2*f*h^2 - 8*c^2*(5*f*g^2 - 4*h*(2*
e*g + 7*d*h)) - 12*c*h*(7*a*f*h + 2*b*(f*g + 6*e*h)))*x)*(a + b*x
 + c*x^2)^(5/2))/(13440*c^4*h) + ((b^2 - 4*a*c)^2*(768*c^4*d*g^2
+ 99*b^4*f*h^2 - 72*b^2*c*h*(4*b*f*g + 2*b*e*h + 3*a*f*h) - 128*c
^3*(3*b*g*(e*g + 2*d*h) + a*(f*g^2 + 2*e*g*h + d*h^2)) + 16*c^2*(
3*a^2*f*h^2 + 12*a*b*h*(2*f*g + e*h) + 14*b^2*(f*g^2 + 2*e*g*h +
d*h^2)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/
(32768*c^(13/2))
```

Rubi [A] time = 4.64852, antiderivative size = 749, normalized size of antiderivative = 0.99, number

of steps used = 7, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$\frac{(b^2-4ac)^2\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(16c^2\left(3a^2fh^2+12abh(eh+2fg)+14b^2\left(h(dh+2eg)+fg^2\right)\right)-72b^2ch(3afh+2beh+}{32768c^{13/2}}$$
$$-\frac{(b^2-4ac)(b+2cx)\sqrt{a+bx+cx^2}\left(16c^2\left(3a^2fh^2+12abh(eh+2fg)+14b^2\left(h(dh+2eg)+fg^2\right)\right)-72b^2ch(3afh+2beh}{16384c^6}$$
$$+\frac{(b+2cx)\left(a+bx+cx^2\right)^{3/2}\left(16c^2\left(3a^2fh^2+12abh(eh+2fg)+14b^2\left(h(dh+2eg)+fg^2\right)\right)-72b^2ch(3afh+2beh+4bfg)}{6144c^5}$$
$$-\frac{\left(a+bx+cx^2\right)^{5/2}\left(-10chx\left(-12ch(7afh+2b(6eh+fg))+99b^2fh^2-8c^2\left(5fg^2-4h(7dh+2eg)\right)\right)+8c^2h\left(96ah(eh+2f\right.\right.}{13440c^4h}$$
$$-\frac{(g+hx)^2\left(a+bx+cx^2\right)^{5/2}(11bfh-16ceh+10cfg)}{112c^2h}+\frac{f(g+hx)^3\left(a+bx+cx^2\right)^{5/2}}{8ch}$$

Antiderivative was successfully verified.

```
[In]  Int[(g + h*x)^2*(a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2),x]
```

```
[Out] -((b^2 - 4*a*c)*(768*c^4*d*g^2 + 99*b^4*f*h^2 - 72*b^2*c*h*(4*b*f
*g + 2*b*e*h + 3*a*f*h) - 128*c^3*(a*f*g^2 + a*h*(2*e*g + d*h) +
3*b*g*(e*g + 2*d*h)) + 16*c^2*(3*a^2*f*h^2 + 12*a*b*h*(2*f*g + e*
h) + 14*b^2*(f*g^2 + h*(2*e*g + d*h))))*(b + 2*c*x)*Sqrt[a + b*x
+ c*x^2])/(16384*c^6) + ((768*c^4*d*g^2 + 99*b^4*f*h^2 - 72*b^2*c
*h*(4*b*f*g + 2*b*e*h + 3*a*f*h) - 128*c^3*(a*f*g^2 + a*h*(2*e*g
+ d*h) + 3*b*g*(e*g + 2*d*h)) + 16*c^2*(3*a^2*f*h^2 + 12*a*b*h*(2
*f*g + e*h) + 14*b^2*(f*g^2 + h*(2*e*g + d*h))))*(b + 2*c*x)*(a +
 b*x + c*x^2)^(3/2))/(6144*c^5) - ((10*c*f*g - 16*c*e*h + 11*b*f*
h)*(g + h*x)^2*(a + b*x + c*x^2)^(5/2))/(112*c^2*h) + (f*(g + h*x
)^3*(a + b*x + c*x^2)^(5/2))/(8*c*h) - ((693*b^3*f*h^3 + 96*c^3*(
5*f*g^3 - 8*g*h*(e*g + 7*d*h)) - 36*b*c*h^2*(31*a*f*h + 28*b*(2*f
*g + e*h)) + 8*c^2*h*(31*b*f*g^2 + 196*b*h*(2*e*g + d*h) + 96*a*h
*(2*f*g + e*h)) - 10*c*h*(99*b^2*f*h^2 - 8*c^2*(5*f*g^2 - 4*h*(2*
e*g + 7*d*h)) - 12*c*h*(7*a*f*h + 2*b*(f*g + 6*e*h)))*x)*(a + b*x
 + c*x^2)^(5/2))/(13440*c^4*h) + ((b^2 - 4*a*c)^2*(768*c^4*d*g^2
+ 99*b^4*f*h^2 - 72*b^2*c*h*(4*b*f*g + 2*b*e*h + 3*a*f*h) - 128*c
^3*(a*f*g^2 + a*h*(2*e*g + d*h) + 3*b*g*(e*g + 2*d*h)) + 16*c^2*(
3*a^2*f*h^2 + 12*a*b*h*(2*f*g + e*h) + 14*b^2*(f*g^2 + h*(2*e*g +
 d*h))))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/
(32768*c^(13/2))
```

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((h*x+g)**2*(c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d),x)
```

```
[Out] Timed out
```

Mathematica [B] time = 6.3563, size = 1546, normalized size = 2.05

$$\frac{\left(99fh^2b^4 - 144ceh^2b^3 - 288cfghb^3 + 224c^2fg^2b^2 + 224c^2dh^2b^2 - 216acfh^2b^2 + 448c^2eghb^2 - 384c^3eg^2b + 192ac^2eh^2b - \right.}{}$$

$$+\frac{\left(\frac{1}{8}cfh^2x^7 + \frac{1}{112}h(32cfg + 16ceh + 17bfh)x^6 + \frac{(224fg^2c^2+224dh^2c^2+448eghc^2+240beh^2c+252afh^2c+480bfghc+3b^2fh^2)x^5}{1344c} + \frac{(-33fh^2b^3+4}{}\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(g + h*x)^2*(a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2),x]
```

```
[Out] (((-80640*b^3*c^4*d*g^2 + 537600*a*b*c^5*d*g^2 + 40320*b^4*c^3*e*
g^2 - 268800*a*b^2*c^4*e*g^2 + 344064*a^2*c^5*e*g^2 - 23520*b^5*c
^2*f*g^2 + 170240*a*b^3*c^3*f*g^2 - 290304*a^2*b*c^4*f*g^2 + 8064
0*b^4*c^3*d*g*h - 537600*a*b^2*c^4*d*g*h + 688128*a^2*c^5*d*g*h -
 47040*b^5*c^2*e*g*h + 340480*a*b^3*c^3*e*g*h - 580608*a^2*b*c^4*
e*g*h + 30240*b^6*c*f*g*h - 241920*a*b^4*c^2*f*g*h + 526848*a^2*b
^2*c^3*f*g*h - 196608*a^3*c^4*f*g*h - 23520*b^5*c^2*d*h^2 + 17024
0*a*b^3*c^3*d*h^2 - 290304*a^2*b*c^4*d*h^2 + 15120*b^6*c*e*h^2 -
120960*a*b^4*c^2*e*h^2 + 263424*a^2*b^2*c^3*e*h^2 - 98304*a^3*c^4
*e*h^2 - 10395*b^7*f*h^2 + 91980*a*b^5*c*f*h^2 - 244944*a^2*b^3*c
^2*f*h^2 + 176448*a^3*b*c^3*f*h^2)/(1720320*c^6) + ((26880*b^2*c^
4*d*g^2 + 537600*a*c^5*d*g^2 - 13440*b^3*c^3*e*g^2 + 75264*a*b*c^
4*e*g^2 + 7840*b^4*c^2*f*g^2 - 48384*a*b^2*c^3*f*g^2 + 53760*a^2*
c^4*f*g^2 - 26880*b^3*c^3*d*g*h + 150528*a*b*c^4*d*g*h + 15680*b^
4*c^2*e*g*h - 96768*a*b^2*c^3*e*g*h + 107520*a^2*c^4*e*g*h - 1008
0*b^5*c*f*g*h + 69888*a*b^3*c^2*f*g*h - 112128*a^2*b*c^3*f*g*h +
7840*b^4*c^2*d*h^2 - 48384*a*b^2*c^3*d*h^2 + 53760*a^2*c^4*d*h^2
- 5040*b^5*c*e*h^2 + 34944*a*b^3*c^2*e*h^2 - 56064*a^2*b*c^3*e*h^
2 + 3465*b^6*f*h^2 - 26964*a*b^4*c*f*h^2 + 56688*a^2*b^2*c^2*f*h^
2 - 20160*a^3*c^3*f*h^2)*x)/(860160*c^5) + ((80640*b*c^4*d*g^2 +
2688*b^2*c^3*e*g^2 + 86016*a*c^4*e*g^2 - 1568*b^3*c^2*f*g^2 + 806
4*a*b*c^3*f*g^2 + 5376*b^2*c^3*d*g*h + 172032*a*c^4*d*g*h - 3136*
b^3*c^2*e*g*h + 16128*a*b*c^3*e*g*h + 2016*b^4*c*f*g*h - 11904*a*
b^2*c^2*f*g*h + 12288*a^2*c^3*f*g*h - 1568*b^3*c^2*d*h^2 + 8064*a
*b*c^3*d*h^2 + 1008*b^4*c*e*h^2 - 5952*a*b^2*c^2*e*h^2 + 6144*a^2
*c^3*e*h^2 - 693*b^5*f*h^2 + 4680*a*b^3*c*f*h^2 - 7248*a^2*b*c^2*
f*h^2)*x^2)/(215040*c^4) + ((26880*c^4*d*g^2 + 29568*b*c^3*e*g^2
+ 672*b^2*c^2*f*g^2 + 31360*a*c^3*f*g^2 + 59136*b*c^3*d*g*h + 134
4*b^2*c^2*e*g*h + 62720*a*c^3*e*g*h - 864*b^3*c*f*g*h + 4224*a*b*
c^2*f*g*h + 672*b^2*c^2*d*h^2 + 31360*a*c^3*d*h^2 - 432*b^3*c*e*h
^2 + 2112*a*b*c^2*e*h^2 + 297*b^4*f*h^2 - 1704*a*b^2*c*f*h^2 + 16
80*a^2*c^2*f*h^2)*x^3)/(107520*c^3) + ((2688*c^3*e*g^2 + 2912*b*c
```

```
^2*f*g^2 + 5376*c^3*d*g*h + 5824*b*c^2*e*g*h + 96*b^2*c*f*g*h + 6
144*a*c^2*f*g*h + 2912*b*c^2*d*h^2 + 48*b^2*c*e*h^2 + 3072*a*c^2*
e*h^2 - 33*b^3*f*h^2 + 156*a*b*c*f*h^2)*x^4)/(13440*c^2) + ((224*
c^2*f*g^2 + 448*c^2*e*g*h + 480*b*c*f*g*h + 224*c^2*d*h^2 + 240*b
*c*e*h^2 + 3*b^2*f*h^2 + 252*a*c*f*h^2)*x^5)/(1344*c) + (h*(32*c*
f*g + 16*c*e*h + 17*b*f*h)*x^6)/112 + (c*f*h^2*x^7)/8)*(a + x*(b
+ c*x))^(3/2))/(a + b*x + c*x^2) + ((b^2 - 4*a*c)^2*(768*c^4*d*g^
2 - 384*b*c^3*e*g^2 + 224*b^2*c^2*f*g^2 - 128*a*c^3*f*g^2 - 768*b
*c^3*d*g*h + 448*b^2*c^2*e*g*h - 256*a*c^3*e*g*h - 288*b^3*c*f*g*
h + 384*a*b*c^2*f*g*h + 224*b^2*c^2*d*h^2 - 128*a*c^3*d*h^2 - 144
*b^3*c*e*h^2 + 192*a*b*c^2*e*h^2 + 99*b^4*f*h^2 - 216*a*b^2*c*f*h
^2 + 48*a^2*c^2*f*h^2)*(a + x*(b + c*x))^(3/2)*Log[b + 2*c*x + 2*
Sqrt[c]*Sqrt[a + b*x + c*x^2]])/(32768*c^(13/2)*(a + b*x + c*x^2)
^(3/2))
```

Maple [B] time = 0.026, size = 3769, normalized size = 5.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^2*(c*x^2+b*x+a)^(3/2)*(f*x^2+e*x+d),x)
```

```
[Out] 1/5*(c*x^2+b*x+a)^(5/2)/c*e*g^2+1/4*d*g^2*(c*x^2+b*x+a)^(3/2)*x+3
/16*b^3/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*d*g
*h+3/32*b^3/c^2*(c*x^2+b*x+a)^(1/2)*x*d*g*h-3/16*b^2/c^2*(c*x^2+b
*x+a)^(1/2)*a*d*g*h-3/8*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b
*x+a)^(1/2))*a^2*d*g*h-1/4*b/c*(c*x^2+b*x+a)^(3/2)*x*d*g*h-3/16*b
/c*(c*x^2+b*x+a)^(1/2)*x*a*e*g^2-1/12/c*a*(c*x^2+b*x+a)^(3/2)*x*e
*g*h+1/8*b^2/c^2*(c*x^2+b*x+a)^(1/2)*x*a*f*g^2+1/8*b^2/c^2*(c*x^2
+b*x+a)^(1/2)*x*a*d*h^2-7/128*b^4/c^3*(c*x^2+b*x+a)^(1/2)*x*e*g*h
+1/8*b^3/c^3*(c*x^2+b*x+a)^(1/2)*a*e*g*h+9/32*b^2/c^(5/2)*ln((1/2
*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a^2*e*g*h+1/4*b^2/c^2*(c*x^2
+b*x+a)^(1/2)*x*a*e*g*h+1/7*x^2*(c*x^2+b*x+a)^(5/2)/c*e*h^2-9/204
8*b^7/c^(11/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*h^2-
2/35/c^2*a*(c*x^2+b*x+a)^(5/2)*e*h^2+3/40*b^2/c^3*(c*x^2+b*x+a)^(
5/2)*e*h^2-3/128*b^4/c^4*(c*x^2+b*x+a)^(3/2)*e*h^2+9/1024*b^6/c^5
*(c*x^2+b*x+a)^(1/2)*e*h^2+1/8*d*g^2/c*(c*x^2+b*x+a)^(3/2)*b+3/8*
d*g^2*(c*x^2+b*x+a)^(1/2)*x*a-3/64*d*g^2/c^2*(c*x^2+b*x+a)^(1/2)*
b^3+7/192*b^3/c^3*(c*x^2+b*x+a)^(3/2)*f*g^2-7/512*b^5/c^4*(c*x^2+
b*x+a)^(1/2)*d*h^2+3/8*d*g^2/c^(1/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^
2+b*x+a)^(1/2))*a^2-3/16*b^3/c^3*(c*x^2+b*x+a)^(1/2)*x*a*f*g*h+1/
8*b/c^2*a*(c*x^2+b*x+a)^(3/2)*x*f*g*h+3/16*b/c^2*a^2*(c*x^2+b*x+a
)^(1/2)*x*f*g*h-3/8*b/c*(c*x^2+b*x+a)^(1/2)*x*a*d*g*h-3/16*d*g^2/
c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*b^2*a-3/32*d*
g^2/c*(c*x^2+b*x+a)^(1/2)*x*b^2+3/16*d*g^2/c*(c*x^2+b*x+a)^(1/2)*
b*a-1/8*b^2/c^2*(c*x^2+b*x+a)^(3/2)*d*g*h+3/64*b^3/c^2*(c*x^2+b*x
+a)^(1/2)*x*e*g^2-3/32*b^2/c^2*(c*x^2+b*x+a)^(1/2)*a*e*g^2+3/64*b
^4/c^3*(c*x^2+b*x+a)^(1/2)*d*g*h-3/16*b/c^(3/2)*ln((1/2*b+c*x)/c^
```

(1/2)+(c*x^2+b*x+a)^(1/2))*a^2*e*g^2+3/32*b^3/c^(5/2)*ln((1/2*b+c
*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*e*g^2-3/128*b^5/c^(7/2)*ln((1/
2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*d*g*h-1/24/c*a*(c*x^2+b*x+a
)^(3/2)*x*d*h^2+9/256*b^5/c^4*(c*x^2+b*x+a)^(1/2)*x*f*g*h-3/32*b^
3/c^3*(c*x^2+b*x+a)^(3/2)*x*f*g*h+153/4096*f*h^2*b^5/c^5*(c*x^2+b
*x+a)^(1/2)*a-1/16*f*h^2/c^2*a*x*(c*x^2+b*x+a)^(5/2)+1/64*f*h^2/c
^2*a^2*(c*x^2+b*x+a)^(3/2)*x-7/512*b^5/c^4*(c*x^2+b*x+a)^(1/2)*f*
g^2+7/1024*b^6/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2)
)*d*h^2+7/1024*b^6/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(
1/2))*f*g^2-1/16/c^(3/2)*a^3*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)
^(1/2))*d*h^2-1/16/c^(3/2)*a^3*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+
a)^(1/2))*f*g^2+1/6*x*(c*x^2+b*x+a)^(5/2)/c*d*h^2+1/6*x*(c*x^2+b*
x+a)^(5/2)/c*f*g^2-7/60*b/c^2*(c*x^2+b*x+a)^(5/2)*d*h^2-7/60*b/c^
2*(c*x^2+b*x+a)^(5/2)*f*g^2+7/192*b^3/c^3*(c*x^2+b*x+a)^(3/2)*d*h
^2+2/5*(c*x^2+b*x+a)^(5/2)/c*d*g*h-1/16*b^2/c^2*(c*x^2+b*x+a)^(3/
2)*e*g^2+3/128*b^4/c^3*(c*x^2+b*x+a)^(1/2)*e*g^2-3/256*b^5/c^(7/2
)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*g^2+3/128*f*h^2/c
^(5/2)*a^4*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+99/32768*f
*h^2*b^8/c^(13/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))-33/
640*f*h^2*b^3/c^4*(c*x^2+b*x+a)^(5/2)+33/2048*f*h^2*b^5/c^5*(c*x^
2+b*x+a)^(3/2)-99/16384*f*h^2*b^7/c^6*(c*x^2+b*x+a)^(1/2)+1/8*f*h
^2*x^3*(c*x^2+b*x+a)^(5/2)/c+1/128*f*h^2/c^3*a^2*(c*x^2+b*x+a)^(3
/2)*b+3/128*f*h^2/c^2*a^3*(c*x^2+b*x+a)^(1/2)*x+3/256*f*h^2/c^3*a
^3*(c*x^2+b*x+a)^(1/2)*b+105/1024*f*h^2*b^4/c^(9/2)*ln((1/2*b+c*x
)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a^2-63/2048*f*h^2*b^6/c^(11/2)*ln(
(1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a-15/128*f*h^2*b^2/c^(7/
2)*a^3*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))-11/112*f*h^2*b
/c^2*x^2*(c*x^2+b*x+a)^(5/2)+33/448*f*h^2*b^2/c^3*x*(c*x^2+b*x+a)
^(5/2)-9/256*f*h^2*b^3/c^4*a*(c*x^2+b*x+a)^(3/2)-57/1024*f*h^2*b^
3/c^4*a^2*(c*x^2+b*x+a)^(1/2)+93/1120*f*h^2*b/c^3*a*(c*x^2+b*x+a)
^(5/2)-15/128*b^3/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1
/2))*a^2*e*h^2+21/512*b^5/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b
*x+a)^(1/2))*a*e*h^2-7/30*b/c^2*(c*x^2+b*x+a)^(5/2)*e*g*h+7/96*b^
2/c^2*(c*x^2+b*x+a)^(3/2)*x*d*h^2+9/64*b^2/c^(5/2)*ln((1/2*b+c*x)
/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a^2*f*g^2-15/256*b^4/c^(7/2)*ln((1/
2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*d*h^2-15/256*b^4/c^(7/2)*
ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*f*g^2+7/512*b^6/c^(
9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*g*h-1/8*b/c*(c
*x^2+b*x+a)^(3/2)*x*e*g^2-1/48/c^2*a*(c*x^2+b*x+a)^(3/2)*b*d*h^2-
1/48/c^2*a*(c*x^2+b*x+a)^(3/2)*b*f*g^2-7/256*b^4/c^3*(c*x^2+b*x+a
)^(1/2)*x*f*g^2+1/16*b^3/c^3*(c*x^2+b*x+a)^(1/2)*a*d*h^2+1/16*b^3
/c^3*(c*x^2+b*x+a)^(1/2)*a*f*g^2+33/1024*f*h^2*b^4/c^4*(c*x^2+b*x
+a)^(3/2)*x-99/8192*f*h^2*b^6/c^5*(c*x^2+b*x+a)^(1/2)*x-1/24/c*a*
(c*x^2+b*x+a)^(3/2)*x*f*g^2-1/32/c^2*a^2*(c*x^2+b*x+a)^(1/2)*b*f*
g^2-1/8/c^(3/2)*a^3*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e
*g*h-1/8/c*a^2*(c*x^2+b*x+a)^(1/2)*x*e*g*h-1/16/c^2*a^2*(c*x^2+b*
x+a)^(1/2)*b*e*g*h-1/24/c^2*a*(c*x^2+b*x+a)^(3/2)*b*e*g*h+7/48*b^
2/c^2*(c*x^2+b*x+a)^(3/2)*x*e*g*h+3/32*b^2/c^3*a^2*(c*x^2+b*x+a)^
(1/2)*f*g*h-3/32*b^3/c^3*(c*x^2+b*x+a)^(1/2)*x*a*e*h^2-15/128*b^4
/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*e*g*h-57/5
12*f*h^2*b^2/c^3*a^2*(c*x^2+b*x+a)^(1/2)*x+153/2048*f*h^2*b^4/c^4
*(c*x^2+b*x+a)^(1/2)*x*a-9/128*f*h^2*b^2/c^3*a*(c*x^2+b*x+a)^(3/2
)*x-15/64*b^3/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))
*a^2*f*g*h+21/256*b^5/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a

```
)^(1/2))*a*f*g*h+1/16*b/c^2*a*(c*x^2+b*x+a)^(3/2)*x*e*h^2+3/32*b/
c^2*a^2*(c*x^2+b*x+a)^(1/2)*x*e*h^2+3/16*b/c^(5/2)*a^3*ln((1/2*b+
c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g*h-3/32*b^4/c^4*(c*x^2+b*x+a
)^(1/2)*a*f*g*h+1/16*b^2/c^3*a*(c*x^2+b*x+a)^(3/2)*f*g*h-3/14*b/c
^2*x*(c*x^2+b*x+a)^(5/2)*f*g*h+7/96*b^3/c^3*(c*x^2+b*x+a)^(3/2)*e
*g*h-7/256*b^4/c^3*(c*x^2+b*x+a)^(1/2)*x*d*h^2+7/96*b^2/c^2*(c*x^
2+b*x+a)^(3/2)*x*f*g^2+2/7*x^2*(c*x^2+b*x+a)^(5/2)/c*f*g*h-3/28*b
/c^2*x*(c*x^2+b*x+a)^(5/2)*e*h^2+3/32*b/c^(5/2)*a^3*ln((1/2*b+c*x
)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*h^2-7/256*b^5/c^4*(c*x^2+b*x+a)^
(1/2)*e*g*h+9/64*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)
^(1/2))*a^2*d*h^2-3/64*b^3/c^3*(c*x^2+b*x+a)^(3/2)*x*e*h^2+9/512*
b^5/c^4*(c*x^2+b*x+a)^(1/2)*x*e*h^2-3/64*b^4/c^4*(c*x^2+b*x+a)^(1
/2)*a*e*h^2-9/1024*b^7/c^(11/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x
+a)^(1/2))*f*g*h+1/32*b^2/c^3*a*(c*x^2+b*x+a)^(3/2)*e*h^2+3/64*b^
2/c^3*a^2*(c*x^2+b*x+a)^(1/2)*e*h^2-4/35/c^2*a*(c*x^2+b*x+a)^(5/2
)*f*g*h+3/20*b^2/c^3*(c*x^2+b*x+a)^(5/2)*f*g*h-3/64*b^4/c^4*(c*x^
2+b*x+a)^(3/2)*f*g*h+9/512*b^6/c^5*(c*x^2+b*x+a)^(1/2)*f*g*h-1/16
/c*a^2*(c*x^2+b*x+a)^(1/2)*x*d*h^2-1/16/c*a^2*(c*x^2+b*x+a)^(1/2)
*x*f*g^2-1/32/c^2*a^2*(c*x^2+b*x+a)^(1/2)*b*d*h^2+1/3*x*(c*x^2+b*
x+a)^(5/2)/c*e*g*h+3/128*d*g^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*
x^2+b*x+a)^(1/2))*b^4
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g)^2,x, algorithm="maxi
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 2.55112, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g)^2,x, algorithm="fric
```

```
[Out] [1/6881280*(4*(215040*c^7*f*h^2*x^7 + 15360*(32*c^7*f*g*h + (16*c
^7*e + 17*b*c^6*f)*h^2)*x^6 + 1280*(224*c^7*f*g^2 + 32*(14*c^7*e
+ 15*b*c^6*f)*g*h + (224*c^7*d + 240*b*c^6*e + 3*(b^2*c^5 + 84*a*
c^6)*f)*h^2)*x^5 + 128*(224*(12*c^7*e + 13*b*c^6*f)*g^2 + 32*(168
*c^7*d + 182*b*c^6*e + 3*(b^2*c^5 + 64*a*c^6)*f)*g*h + (2912*b*c^
```

```
6*d + 48*(b^2*c^5 + 64*a*c^6)*e - 3*(11*b^3*c^4 - 52*a*b*c^5)*f)*
h^2)*x^4 + 16*(224*(120*c^7*d + 132*b*c^6*e + (3*b^2*c^5 + 140*a*
c^6)*f)*g^2 + 32*(1848*b*c^6*d + 14*(3*b^2*c^5 + 140*a*c^6)*e - 3
*(9*b^3*c^4 - 44*a*b*c^5)*f)*g*h + (224*(3*b^2*c^5 + 140*a*c^6)*d
 - 48*(9*b^3*c^4 - 44*a*b*c^5)*e + 3*(99*b^4*c^3 - 568*a*b^2*c^4
+ 560*a^2*c^5)*f)*h^2)*x^3 - 224*(120*(3*b^3*c^4 - 20*a*b*c^5)*d
- 12*(15*b^4*c^3 - 100*a*b^2*c^4 + 128*a^2*c^5)*e + (105*b^5*c^2
- 760*a*b^3*c^3 + 1296*a^2*b*c^4)*f)*g^2 + 32*(168*(15*b^4*c^3 -
100*a*b^2*c^4 + 128*a^2*c^5)*d - 14*(105*b^5*c^2 - 760*a*b^3*c^3
+ 1296*a^2*b*c^4)*e + 3*(315*b^6*c - 2520*a*b^4*c^2 + 5488*a^2*b^
2*c^3 - 2048*a^3*c^4)*f)*g*h - (224*(105*b^5*c^2 - 760*a*b^3*c^3
+ 1296*a^2*b*c^4)*d - 48*(315*b^6*c - 2520*a*b^4*c^2 + 5488*a^2*b
^2*c^3 - 2048*a^3*c^4)*e + 3*(3465*b^7 - 30660*a*b^5*c + 81648*a^
2*b^3*c^2 - 58816*a^3*b*c^3)*f)*h^2 + 8*(224*(360*b*c^6*d + 12*(b
^2*c^5 + 32*a*c^6)*e - (7*b^3*c^4 - 36*a*b*c^5)*f)*g^2 + 32*(168*
(b^2*c^5 + 32*a*c^6)*d - 14*(7*b^3*c^4 - 36*a*b*c^5)*e + 3*(21*b^
4*c^3 - 124*a*b^2*c^4 + 128*a^2*c^5)*f)*g*h - (224*(7*b^3*c^4 - 3
6*a*b*c^5)*d - 48*(21*b^4*c^3 - 124*a*b^2*c^4 + 128*a^2*c^5)*e +
3*(231*b^5*c^2 - 1560*a*b^3*c^3 + 2416*a^2*b*c^4)*f)*h^2)*x^2 + 2
*(224*(120*(b^2*c^5 + 20*a*c^6)*d - 12*(5*b^3*c^4 - 28*a*b*c^5)*e
 + (35*b^4*c^3 - 216*a*b^2*c^4 + 240*a^2*c^5)*f)*g^2 - 32*(168*(5
*b^3*c^4 - 28*a*b*c^5)*d - 14*(35*b^4*c^3 - 216*a*b^2*c^4 + 240*a
^2*c^5)*e + 3*(105*b^5*c^2 - 728*a*b^3*c^3 + 1168*a^2*b*c^4)*f)*g
*h + (224*(35*b^4*c^3 - 216*a*b^2*c^4 + 240*a^2*c^5)*d - 48*(105*
b^5*c^2 - 728*a*b^3*c^3 + 1168*a^2*b*c^4)*e + 3*(1155*b^6*c - 898
8*a*b^4*c^2 + 18896*a^2*b^2*c^3 - 6720*a^3*c^4)*f)*h^2)*x)*sqrt(c
*x^2 + b*x + a)*sqrt(c) + 105*(32*(24*(b^4*c^4 - 8*a*b^2*c^5 + 16
*a^2*c^6)*d - 12*(b^5*c^3 - 8*a*b^3*c^4 + 16*a^2*b*c^5)*e + (7*b^
6*c^2 - 60*a*b^4*c^3 + 144*a^2*b^2*c^4 - 64*a^3*c^5)*f)*g^2 - 32*
(24*(b^5*c^3 - 8*a*b^3*c^4 + 16*a^2*b*c^5)*d - 2*(7*b^6*c^2 - 60*
a*b^4*c^3 + 144*a^2*b^2*c^4 - 64*a^3*c^5)*e + 3*(3*b^7*c - 28*a*b
^5*c^2 + 80*a^2*b^3*c^3 - 64*a^3*b*c^4)*f)*g*h + (32*(7*b^6*c^2 -
 60*a*b^4*c^3 + 144*a^2*b^2*c^4 - 64*a^3*c^5)*d - 48*(3*b^7*c - 2
8*a*b^5*c^2 + 80*a^2*b^3*c^3 - 64*a^3*b*c^4)*e + 3*(33*b^8 - 336*
a*b^6*c + 1120*a^2*b^4*c^2 - 1280*a^3*b^2*c^3 + 256*a^4*c^4)*f)*h
^2)*log(-4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x + a) - (8*c^2*x^2 + 8
*b*c*x + b^2 + 4*a*c)*sqrt(c)))/c^(13/2), 1/3440640*(2*(215040*c^
7*f*h^2*x^7 + 15360*(32*c^7*f*g*h + (16*c^7*e + 17*b*c^6*f)*h^2)*
x^6 + 1280*(224*c^7*f*g^2 + 32*(14*c^7*e + 15*b*c^6*f)*g*h + (224
*c^7*d + 240*b*c^6*e + 3*(b^2*c^5 + 84*a*c^6)*f)*h^2)*x^5 + 128*(
224*(12*c^7*e + 13*b*c^6*f)*g^2 + 32*(168*c^7*d + 182*b*c^6*e + 3
*(b^2*c^5 + 64*a*c^6)*f)*g*h + (2912*b*c^6*d + 48*(b^2*c^5 + 64*a
*c^6)*e - 3*(11*b^3*c^4 - 52*a*b*c^5)*f)*h^2)*x^4 + 16*(224*(120*
c^7*d + 132*b*c^6*e + (3*b^2*c^5 + 140*a*c^6)*f)*g^2 + 32*(1848*b
*c^6*d + 14*(3*b^2*c^5 + 140*a*c^6)*e - 3*(9*b^3*c^4 - 44*a*b*c^5
)*f)*g*h + (224*(3*b^2*c^5 + 140*a*c^6)*d - 48*(9*b^3*c^4 - 44*a*
b*c^5)*e + 3*(99*b^4*c^3 - 568*a*b^2*c^4 + 560*a^2*c^5)*f)*h^2)*x
^3 - 224*(120*(3*b^3*c^4 - 20*a*b*c^5)*d - 12*(15*b^4*c^3 - 100*a
*b^2*c^4 + 128*a^2*c^5)*e + (105*b^5*c^2 - 760*a*b^3*c^3 + 1296*a
^2*b*c^4)*f)*g^2 + 32*(168*(15*b^4*c^3 - 100*a*b^2*c^4 + 128*a^2*
c^5)*d - 14*(105*b^5*c^2 - 760*a*b^3*c^3 + 1296*a^2*b*c^4)*e + 3*
(315*b^6*c - 2520*a*b^4*c^2 + 5488*a^2*b^2*c^3 - 2048*a^3*c^4)*f)
*g*h - (224*(105*b^5*c^2 - 760*a*b^3*c^3 + 1296*a^2*b*c^4)*d - 48
*(315*b^6*c - 2520*a*b^4*c^2 + 5488*a^2*b^2*c^3 - 2048*a^3*c^4)*e
```

```
 + 3*(3465*b^7 - 30660*a*b^5*c + 81648*a^2*b^3*c^2 - 58816*a^3*b*
c^3)*f)*h^2 + 8*(224*(360*b*c^6*d + 12*(b^2*c^5 + 32*a*c^6)*e - (
7*b^3*c^4 - 36*a*b*c^5)*f)*g^2 + 32*(168*(b^2*c^5 + 32*a*c^6)*d -
 14*(7*b^3*c^4 - 36*a*b*c^5)*e + 3*(21*b^4*c^3 - 124*a*b^2*c^4 +
128*a^2*c^5)*f)*g*h - (224*(7*b^3*c^4 - 36*a*b*c^5)*d - 48*(21*b^
4*c^3 - 124*a*b^2*c^4 + 128*a^2*c^5)*e + 3*(231*b^5*c^2 - 1560*a*
b^3*c^3 + 2416*a^2*b*c^4)*f)*h^2)*x^2 + 2*(224*(120*(b^2*c^5 + 20
*a*c^6)*d - 12*(5*b^3*c^4 - 28*a*b*c^5)*e + (35*b^4*c^3 - 216*a*b
^2*c^4 + 240*a^2*c^5)*f)*g^2 - 32*(168*(5*b^3*c^4 - 28*a*b*c^5)*d
 - 14*(35*b^4*c^3 - 216*a*b^2*c^4 + 240*a^2*c^5)*e + 3*(105*b^5*c
^2 - 728*a*b^3*c^3 + 1168*a^2*b*c^4)*f)*g*h + (224*(35*b^4*c^3 -
216*a*b^2*c^4 + 240*a^2*c^5)*d - 48*(105*b^5*c^2 - 728*a*b^3*c^3
+ 1168*a^2*b*c^4)*e + 3*(1155*b^6*c - 8988*a*b^4*c^2 + 18896*a^2*
b^2*c^3 - 6720*a^3*c^4)*f)*h^2)*x)*sqrt(c*x^2 + b*x + a)*sqrt(-c)
 + 105*(32*(24*(b^4*c^4 - 8*a*b^2*c^5 + 16*a^2*c^6)*d - 12*(b^5*c
^3 - 8*a*b^3*c^4 + 16*a^2*b*c^5)*e + (7*b^6*c^2 - 60*a*b^4*c^3 +
144*a^2*b^2*c^4 - 64*a^3*c^5)*f)*g^2 - 32*(24*(b^5*c^3 - 8*a*b^3*
c^4 + 16*a^2*b*c^5)*d - 2*(7*b^6*c^2 - 60*a*b^4*c^3 + 144*a^2*b^2
*c^4 - 64*a^3*c^5)*e + 3*(3*b^7*c - 28*a*b^5*c^2 + 80*a^2*b^3*c^3
 - 64*a^3*b*c^4)*f)*g*h + (32*(7*b^6*c^2 - 60*a*b^4*c^3 + 144*a^2
*b^2*c^4 - 64*a^3*c^5)*d - 48*(3*b^7*c - 28*a*b^5*c^2 + 80*a^2*b^
3*c^3 - 64*a^3*b*c^4)*e + 3*(33*b^8 - 336*a*b^6*c + 1120*a^2*b^4*
c^2 - 1280*a^3*b^2*c^3 + 256*a^4*c^4)*f)*h^2)*arctan(1/2*(2*c*x +
 b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))/(sqrt(-c)*c^6)]
```

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

$$\int (g+hx)^2 \left(a+bx+cx^2\right)^{\frac{3}{2}} \left(d+ex+fx^2\right) \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**2*(c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d),x)
```

```
[Out] Integral((g + h*x)**2*(a + b*x + c*x**2)**(3/2)*(d + e*x + f*x**2
), x)
```

GIAC/XCAS [A] time = 0.282979, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g)^2,x, algorithm="giac
```

```
[Out] Done
```

3.198 $\int (g+hx)\left(a+bx+cx^2\right)^{3/2}\left(d+ex+fx^2\right)\,dx$

Optimal. Leaf size=418

$$\frac{(b+2cx)\left(a+bx+cx^2\right)^{3/2}\left(-8c^2(aeh+afg+3bdh+3beg)+2bc(6afh+7b(eh+fg))-9b^3fh+48c^3dg\right)}{384c^4}+\frac{\left(a+bx+cx^2\right)^{5/2}\left(-2ch(24afh+49b(eh+fg))+63b^2fh^2-10chx(9bfh-14ceh+10cfg)-24c^2\left(5fg^2-7h(dh+eg)\right)\right)}{840c^3h}+\frac{\left(b^2-4ac\right)^2\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-8c^2(aeh+afg+3bdh+3beg)+2bc(6afh+7b(eh+fg))-9b^3fh+48c^3dg\right)}{2048c^{11/2}}-\frac{\left(b^2-4ac\right)(b+2cx)\sqrt{a+bx+cx^2}\left(-8c^2(aeh+afg+3bdh+3beg)+2bc(6afh+7b(eh+fg))-9b^3fh+48c^3dg\right)}{1024c^5}+\frac{f(g+hx)^2\left(a+bx+cx^2\right)^{5/2}}{7ch}$$

```
[Out] -((b^2 - 4*a*c)*(48*c^3*d*g - 9*b^3*f*h - 8*c^2*(3*b*e*g + a*f*g
+ 3*b*d*h + a*e*h) + 2*b*c*(6*a*f*h + 7*b*(f*g + e*h)))*(b + 2*c*
x)*Sqrt[a + b*x + c*x^2])/(1024*c^5) + ((48*c^3*d*g - 9*b^3*f*h -
 8*c^2*(3*b*e*g + a*f*g + 3*b*d*h + a*e*h) + 2*b*c*(6*a*f*h + 7*b
*(f*g + e*h)))*(b + 2*c*x)*(a + b*x + c*x^2)^(3/2))/(384*c^4) + (
f*(g + h*x)^2*(a + b*x + c*x^2)^(5/2))/(7*c*h) + ((63*b^2*f*h^2 -
 24*c^2*(5*f*g^2 - 7*h*(e*g + d*h)) - 2*c*h*(24*a*f*h + 49*b*(f*g
 + e*h)) - 10*c*h*(10*c*f*g - 14*c*e*h + 9*b*f*h)*x)*(a + b*x + c
*x^2)^(5/2))/(840*c^3*h) + ((b^2 - 4*a*c)^2*(48*c^3*d*g - 9*b^3*f
*h - 8*c^2*(3*b*e*g + a*f*g + 3*b*d*h + a*e*h) + 2*b*c*(6*a*f*h +
 7*b*(f*g + e*h)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x +
c*x^2])])/(2048*c^(11/2))
```

Rubi [A] time = 1.46424, antiderivative size = 418, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$\frac{(b+2cx)\left(a+bx+cx^2\right)^{3/2}\left(-8c^2(aeh+afg+3bdh+3beg)+2bc(6afh+7b(eh+fg))-9b^3fh+48c^3dg\right)}{384c^4}+\frac{\left(a+bx+cx^2\right)^{5/2}\left(-2ch(24afh+49b(eh+fg))+63b^2fh^2-10chx(9bfh-14ceh+10cfg)-24c^2\left(5fg^2-7h(dh+eg)\right)\right)}{840c^3h}+\frac{\left(b^2-4ac\right)^2\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-8c^2(aeh+afg+3bdh+3beg)+2bc(6afh+7b(eh+fg))-9b^3fh+48c^3dg\right)}{2048c^{11/2}}-\frac{\left(b^2-4ac\right)(b+2cx)\sqrt{a+bx+cx^2}\left(-8c^2(aeh+afg+3bdh+3beg)+2bc(6afh+7b(eh+fg))-9b^3fh+48c^3dg\right)}{1024c^5}+\frac{f(g+hx)^2\left(a+bx+cx^2\right)^{5/2}}{7ch}$$

Antiderivative was successfully verified.

```
[In]  Int[(g + h*x)*(a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2),x]
```

```
[Out] -((b^2 - 4*a*c)*(48*c^3*d*g - 9*b^3*f*h - 8*c^2*(3*b*e*g + a*f*g
+ 3*b*d*h + a*e*h) + 2*b*c*(6*a*f*h + 7*b*(f*g + e*h)))*(b + 2*c*
x)*Sqrt[a + b*x + c*x^2])/(1024*c^5) + ((48*c^3*d*g - 9*b^3*f*h -
 8*c^2*(3*b*e*g + a*f*g + 3*b*d*h + a*e*h) + 2*b*c*(6*a*f*h + 7*b
*(f*g + e*h)))*(b + 2*c*x)*(a + b*x + c*x^2)^(3/2))/(384*c^4) + (
f*(g + h*x)^2*(a + b*x + c*x^2)^(5/2))/(7*c*h) + ((63*b^2*f*h^2 -
 24*c^2*(5*f*g^2 - 7*h*(e*g + d*h)) - 2*c*h*(24*a*f*h + 49*b*(f*g
 + e*h)) - 10*c*h*(10*c*f*g - 14*c*e*h + 9*b*f*h)*x)*(a + b*x + c
*x^2)^(5/2))/(840*c^3*h) + ((b^2 - 4*a*c)^2*(48*c^3*d*g - 9*b^3*f
*h - 8*c^2*(3*b*e*g + a*f*g + 3*b*d*h + a*e*h) + 2*b*c*(6*a*f*h +
 7*b*(f*g + e*h)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x +
c*x^2])])/(2048*c^(11/2))
```

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((h*x+g)*(c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 2.58401, size = 598, normalized size = 1.43

$$-2\sqrt{c}\sqrt{a+x(b+cx)}\left(-48b^2c^2\left(343a^2fh-2ac(175dh+7e(25g+9hx)+fx(63g+31hx))+2c^2x(7d(5g+2hx)+x(7e(2g+h$$

Antiderivative was successfully verified.

```
[In]  Integrate[(g + h*x)*(a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2),x]
```

```
[Out] (-2*Sqrt[c]*Sqrt[a + x*(b + c*x)]*(-945*b^6*f*h + 210*b^5*c*(7*f*
g + 7*e*h + 3*f*h*x) - 28*b^4*c*(-270*a*f*h + c*(90*e*g + 90*d*h
+ 35*f*g*x + 35*e*h*x + 18*f*h*x^2)) + 16*b^3*c^2*(105*c*d*(3*g +
 h*x) - 7*a*(95*f*g + 95*e*h + 39*f*h*x) + c*x*(7*e*(15*g + 7*h*x
) + f*x*(49*g + 27*h*x))) - 48*b^2*c^2*(343*a^2*f*h - 2*a*c*(175*
d*h + 7*e*(25*g + 9*h*x) + f*x*(63*g + 31*h*x)) + 2*c^2*x*(7*d*(5
*g + 2*h*x) + x*(7*e*(2*g + h*x) + f*x*(7*g + 4*h*x)))) - 32*b*c^
3*(-3*a^2*(189*f*g + 189*e*h + 73*f*h*x) + 6*a*c*(7*d*(25*g + 7*h
*x) + x*(7*e*(7*g + 3*h*x) + f*x*(21*g + 11*h*x))) + 4*c^2*x^2*(2
```

```
1*d*(15*g + 11*h*x) + x*(7*e*(33*g + 26*h*x) + 2*f*x*(91*g + 75*h
*x)))) - 64*c^3*(-96*a^3*f*h + 3*a^2*c*(112*d*h + 7*e*(16*g + 5*h
*x) + f*x*(35*g + 16*h*x)) + 4*c^3*x^3*(21*d*(5*g + 4*h*x) + 2*x*
(7*e*(6*g + 5*h*x) + 5*f*x*(7*g + 6*h*x))) + 2*a*c^2*x*(21*d*(25*
g + 16*h*x) + x*(7*e*(48*g + 35*h*x) + f*x*(245*g + 192*h*x)))))
- 105*(b^2 - 4*a*c)^2*(-48*c^3*d*g + 9*b^3*f*h + 8*c^2*(3*b*e*g +
 a*f*g + 3*b*d*h + a*e*h) - 2*b*c*(6*a*f*h + 7*b*(f*g + e*h)))*Lo
g[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]])/(215040*c^(11/2))
```

Maple [B] time = 0.017, size = 2026, normalized size = 4.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)*(c*x^2+b*x+a)^(3/2)*(f*x^2+e*x+d),x)
```

```
[Out] 1/5*(c*x^2+b*x+a)^(5/2)/c*d*h+1/4*d*g*(c*x^2+b*x+a)^(3/2)*x+1/5*e
*g*(c*x^2+b*x+a)^(5/2)/c+3/40*h*f*b^2/c^3*(c*x^2+b*x+a)^(5/2)-3/1
28*h*f*b^4/c^4*(c*x^2+b*x+a)^(3/2)-3/32*h*f*b^3/c^3*(c*x^2+b*x+a)
^(1/2)*x*a+1/16*h*f*b/c^2*a*(c*x^2+b*x+a)^(3/2)*x+3/32*h*f*b/c^2*
a^2*(c*x^2+b*x+a)^(1/2)*x+1/8*b^2/c^2*(c*x^2+b*x+a)^(1/2)*x*a*e*h
+1/8*b^2/c^2*(c*x^2+b*x+a)^(1/2)*x*a*f*g-3/16*b/c*(c*x^2+b*x+a)^(
1/2)*x*a*d*h-3/16*e*g*b/c*(c*x^2+b*x+a)^(1/2)*x*a+3/32*b^3/c^(5/2
)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a*d*h-1/8*b/c*(c*x^
2+b*x+a)^(3/2)*x*d*h-3/16*e*g*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c
*x^2+b*x+a)^(1/2))*a^2+9/1024*h*f*b^6/c^5*(c*x^2+b*x+a)^(1/2)-2/3
5*h*f/c^2*a*(c*x^2+b*x+a)^(5/2)+1/7*h*f*x^2*(c*x^2+b*x+a)^(5/2)/c
-9/2048*h*f*b^7/c^(11/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/
2))+7/192*b^3/c^3*(c*x^2+b*x+a)^(3/2)*e*h+7/192*b^3/c^3*(c*x^2+b*
x+a)^(3/2)*f*g+7/1024*b^6/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b
*x+a)^(1/2))*f*g-1/16/c^(3/2)*a^3*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b
*x+a)^(1/2))*e*h-1/16/c^(3/2)*a^3*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b
*x+a)^(1/2))*f*g+1/6*x*(c*x^2+b*x+a)^(5/2)/c*e*h+1/6*x*(c*x^2+b*x
+a)^(5/2)/c*f*g-7/512*b^5/c^4*(c*x^2+b*x+a)^(1/2)*e*h-7/512*b^5/c
^4*(c*x^2+b*x+a)^(1/2)*f*g+7/1024*b^6/c^(9/2)*ln((1/2*b+c*x)/c^(1
/2)+(c*x^2+b*x+a)^(1/2))*e*h-7/60*b/c^2*(c*x^2+b*x+a)^(5/2)*e*h-7
/60*b/c^2*(c*x^2+b*x+a)^(5/2)*f*g-3/64*d*g/c^2*(c*x^2+b*x+a)^(1/2
)*b^3+3/8*d*g/c^(1/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))
*a^2+3/128*d*g/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2)
)*b^4+1/8*d*g/c*(c*x^2+b*x+a)^(3/2)*b+3/8*d*g*(c*x^2+b*x+a)^(1/2)
*x*a+3/128*b^4/c^3*(c*x^2+b*x+a)^(1/2)*d*h-3/256*b^5/c^(7/2)*ln((
1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*d*h-1/16*e*g*b^2/c^2*(c*x
^2+b*x+a)^(3/2)+3/128*e*g*b^4/c^3*(c*x^2+b*x+a)^(1/2)-3/256*e*g*b
^5/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))-1/16*b^2/c
^2*(c*x^2+b*x+a)^(3/2)*d*h+3/32*e*g*b^3/c^(5/2)*ln((1/2*b+c*x)/c^
(1/2)+(c*x^2+b*x+a)^(1/2))*a+3/64*e*g*b^3/c^2*(c*x^2+b*x+a)^(1/2)
*x-3/32*e*g*b^2/c^2*(c*x^2+b*x+a)^(1/2)*a-1/8*e*g*b/c*(c*x^2+b*x+
a)^(3/2)*x-15/256*b^4/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a
```

```
)^(1/2))*a*f*g-1/24/c*a*(c*x^2+b*x+a)^(3/2)*x*e*h-1/24/c*a*(c*x^2
+b*x+a)^(3/2)*x*f*g-1/48/c^2*a*(c*x^2+b*x+a)^(3/2)*b*e*h-1/48/c^2
*a*(c*x^2+b*x+a)^(3/2)*b*f*g-3/16*d*g/c^(3/2)*ln((1/2*b+c*x)/c^(1
/2)+(c*x^2+b*x+a)^(1/2))*b^2*a-3/32*d*g/c*(c*x^2+b*x+a)^(1/2)*x*b
^2+3/16*d*g/c*(c*x^2+b*x+a)^(1/2)*b*a+3/64*b^3/c^2*(c*x^2+b*x+a)^
(1/2)*x*d*h-3/28*h*f*b/c^2*x*(c*x^2+b*x+a)^(5/2)-3/64*h*f*b^3/c^3
*(c*x^2+b*x+a)^(3/2)*x+9/512*h*f*b^5/c^4*(c*x^2+b*x+a)^(1/2)*x-3/
64*h*f*b^4/c^4*(c*x^2+b*x+a)^(1/2)*a+1/32*h*f*b^2/c^3*a*(c*x^2+b*
x+a)^(3/2)+3/64*h*f*b^2/c^3*a^2*(c*x^2+b*x+a)^(1/2)-15/128*h*f*b^
3/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a^2+21/512*
h*f*b^5/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a+3/3
2*h*f*b/c^(5/2)*a^3*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+7
/96*b^2/c^2*(c*x^2+b*x+a)^(3/2)*x*e*h+7/96*b^2/c^2*(c*x^2+b*x+a)^
(3/2)*x*f*g-7/256*b^4/c^3*(c*x^2+b*x+a)^(1/2)*x*e*h-7/256*b^4/c^3
*(c*x^2+b*x+a)^(1/2)*x*f*g+1/16*b^3/c^3*(c*x^2+b*x+a)^(1/2)*a*e*h
+1/16*b^3/c^3*(c*x^2+b*x+a)^(1/2)*a*f*g-1/16/c*a^2*(c*x^2+b*x+a)^
(1/2)*x*e*h-1/16/c*a^2*(c*x^2+b*x+a)^(1/2)*x*f*g-1/32/c^2*a^2*(c*
x^2+b*x+a)^(1/2)*b*e*h-1/32/c^2*a^2*(c*x^2+b*x+a)^(1/2)*b*f*g+9/6
4*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a^2*f*g
-15/256*b^4/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a
*e*h+9/64*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))
*a^2*e*h-3/32*b^2/c^2*(c*x^2+b*x+a)^(1/2)*a*d*h-3/16*b/c^(3/2)*ln
((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a^2*d*h
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g),x, algorithm="maxima
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.843156, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g),x, algorithm="fricas
```

```
[Out] [1/430080*(4*(15360*c^6*f*h*x^6 + 1280*(14*c^6*f*g + (14*c^6*e +
15*b*c^5*f)*h)*x^5 + 128*(14*(12*c^6*e + 13*b*c^5*f)*g + (168*c^6
*d + 182*b*c^5*e + 3*(b^2*c^4 + 64*a*c^5)*f)*h)*x^4 + 16*(14*(120
```

```
*c^6*d + 132*b*c^5*e + (3*b^2*c^4 + 140*a*c^5)*f)*g + (1848*b*c^5
*d + 14*(3*b^2*c^4 + 140*a*c^5)*e - 3*(9*b^3*c^3 - 44*a*b*c^4)*f)
*h)*x^3 + 8*(14*(360*b*c^5*d + 12*(b^2*c^4 + 32*a*c^5)*e - (7*b^3
*c^3 - 36*a*b*c^4)*f)*g + (168*(b^2*c^4 + 32*a*c^5)*d - 14*(7*b^3
*c^3 - 36*a*b*c^4)*e + 3*(21*b^4*c^2 - 124*a*b^2*c^3 + 128*a^2*c^
4)*f)*h)*x^2 - 14*(120*(3*b^3*c^3 - 20*a*b*c^4)*d - 12*(15*b^4*c^
2 - 100*a*b^2*c^3 + 128*a^2*c^4)*e + (105*b^5*c - 760*a*b^3*c^2 +
 1296*a^2*b*c^3)*f)*g + (168*(15*b^4*c^2 - 100*a*b^2*c^3 + 128*a^
2*c^4)*d - 14*(105*b^5*c - 760*a*b^3*c^2 + 1296*a^2*b*c^3)*e + 3*
(315*b^6 - 2520*a*b^4*c + 5488*a^2*b^2*c^2 - 2048*a^3*c^3)*f)*h +
 2*(14*(120*(b^2*c^4 + 20*a*c^5)*d - 12*(5*b^3*c^3 - 28*a*b*c^4)*
e + (35*b^4*c^2 - 216*a*b^2*c^3 + 240*a^2*c^4)*f)*g - (168*(5*b^3
*c^3 - 28*a*b*c^4)*d - 14*(35*b^4*c^2 - 216*a*b^2*c^3 + 240*a^2*c
^4)*e + 3*(105*b^5*c - 728*a*b^3*c^2 + 1168*a^2*b*c^3)*f)*h)*x)*s
qrt(c*x^2 + b*x + a)*sqrt(c) + 105*(2*(24*(b^4*c^3 - 8*a*b^2*c^4
+ 16*a^2*c^5)*d - 12*(b^5*c^2 - 8*a*b^3*c^3 + 16*a^2*b*c^4)*e + (
7*b^6*c - 60*a*b^4*c^2 + 144*a^2*b^2*c^3 - 64*a^3*c^4)*f)*g - (24
*(b^5*c^2 - 8*a*b^3*c^3 + 16*a^2*b*c^4)*d - 2*(7*b^6*c - 60*a*b^4
*c^2 + 144*a^2*b^2*c^3 - 64*a^3*c^4)*e + 3*(3*b^7 - 28*a*b^5*c +
80*a^2*b^3*c^2 - 64*a^3*b*c^3)*f)*h)*log(-4*(2*c^2*x + b*c)*sqrt(
c*x^2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))/
c^(11/2), 1/215040*(2*(15360*c^6*f*h*x^6 + 1280*(14*c^6*f*g + (14
*c^6*e + 15*b*c^5*f)*h)*x^5 + 128*(14*(12*c^6*e + 13*b*c^5*f)*g +
 (168*c^6*d + 182*b*c^5*e + 3*(b^2*c^4 + 64*a*c^5)*f)*h)*x^4 + 16
*(14*(120*c^6*d + 132*b*c^5*e + (3*b^2*c^4 + 140*a*c^5)*f)*g + (1
848*b*c^5*d + 14*(3*b^2*c^4 + 140*a*c^5)*e - 3*(9*b^3*c^3 - 44*a*
b*c^4)*f)*h)*x^3 + 8*(14*(360*b*c^5*d + 12*(b^2*c^4 + 32*a*c^5)*e
 - (7*b^3*c^3 - 36*a*b*c^4)*f)*g + (168*(b^2*c^4 + 32*a*c^5)*d -
14*(7*b^3*c^3 - 36*a*b*c^4)*e + 3*(21*b^4*c^2 - 124*a*b^2*c^3 + 1
28*a^2*c^4)*f)*h)*x^2 - 14*(120*(3*b^3*c^3 - 20*a*b*c^4)*d - 12*(
15*b^4*c^2 - 100*a*b^2*c^3 + 128*a^2*c^4)*e + (105*b^5*c - 760*a*
b^3*c^2 + 1296*a^2*b*c^3)*f)*g + (168*(15*b^4*c^2 - 100*a*b^2*c^3
 + 128*a^2*c^4)*d - 14*(105*b^5*c - 760*a*b^3*c^2 + 1296*a^2*b*c^
3)*e + 3*(315*b^6 - 2520*a*b^4*c + 5488*a^2*b^2*c^2 - 2048*a^3*c^
3)*f)*h + 2*(14*(120*(b^2*c^4 + 20*a*c^5)*d - 12*(5*b^3*c^3 - 28*
a*b*c^4)*e + (35*b^4*c^2 - 216*a*b^2*c^3 + 240*a^2*c^4)*f)*g - (1
68*(5*b^3*c^3 - 28*a*b*c^4)*d - 14*(35*b^4*c^2 - 216*a*b^2*c^3 +
240*a^2*c^4)*e + 3*(105*b^5*c - 728*a*b^3*c^2 + 1168*a^2*b*c^3)*f
)*h)*x)*sqrt(c*x^2 + b*x + a)*sqrt(-c) + 105*(2*(24*(b^4*c^3 - 8*
a*b^2*c^4 + 16*a^2*c^5)*d - 12*(b^5*c^2 - 8*a*b^3*c^3 + 16*a^2*b*
c^4)*e + (7*b^6*c - 60*a*b^4*c^2 + 144*a^2*b^2*c^3 - 64*a^3*c^4)*
f)*g - (24*(b^5*c^2 - 8*a*b^3*c^3 + 16*a^2*b*c^4)*d - 2*(7*b^6*c
- 60*a*b^4*c^2 + 144*a^2*b^2*c^3 - 64*a^3*c^4)*e + 3*(3*b^7 - 28*
a*b^5*c + 80*a^2*b^3*c^2 - 64*a^3*b*c^3)*f)*h)*arctan(1/2*(2*c*x
+ b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))/(sqrt(-c)*c^5)]
```

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

$$\int (g+hx)\left(a+bx+cx^2\right)^{\frac{3}{2}}\left(d+ex+fx^2\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)*(c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d),x)
```

```
[Out] Integral((g + h*x)*(a + b*x + c*x**2)**(3/2)*(d + e*x + f*x**2),
x)
```

GIAC/XCAS [A] time = 0.279094, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)*(h*x + g),x, algorithm="giac")
```

```
[Out] Done
```

3.199 $\int \left(a+bx+cx^2\right)^{3/2} \left(d+ex+fx^2\right) \, dx$

Optimal. Leaf size=236

$$\frac{\left(b^2-4ac\right)^2 \tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right) \left(-4c(af+3be)+7b^2f+24c^2d\right)}{1024c^{9/2}} - \frac{\left(b^2-4ac\right) (b+2cx)\sqrt{a+bx+cx^2} \left(-4c(af+3be)+7b^2f+24c^2d\right)}{512c^4} + \frac{(b+2cx) \left(a+bx+cx^2\right)^{3/2} \left(-4acf+7b^2f-12bce+24c^2d\right)}{192c^3} + \frac{\left(a+bx+cx^2\right)^{5/2} (12ce-7bf)}{60c^2} + \frac{fx \left(a+bx+cx^2\right)^{5/2}}{6c}$$

```
[Out] -((b^2 - 4*a*c)*(24*c^2*d + 7*b^2*f - 4*c*(3*b*e + a*f))*(b + 2*c
*x)*Sqrt[a + b*x + c*x^2])/(512*c^4) + ((24*c^2*d - 12*b*c*e + 7*
b^2*f - 4*a*c*f)*(b + 2*c*x)*(a + b*x + c*x^2)^(3/2))/(192*c^3) +
 ((12*c*e - 7*b*f)*(a + b*x + c*x^2)^(5/2))/(60*c^2) + (f*x*(a +
b*x + c*x^2)^(5/2))/(6*c) + ((b^2 - 4*a*c)^2*(24*c^2*d + 7*b^2*f
- 4*c*(3*b*e + a*f))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x
+ c*x^2])])/(1024*c^(9/2))
```

Rubi [A] time = 0.475441, antiderivative size = 236, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$\frac{\left(b^2-4ac\right)^2 \tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right) \left(-4c(af+3be)+7b^2f+24c^2d\right)}{1024c^{9/2}} - \frac{\left(b^2-4ac\right) (b+2cx)\sqrt{a+bx+cx^2} \left(-4c(af+3be)+7b^2f+24c^2d\right)}{512c^4} + \frac{(b+2cx) \left(a+bx+cx^2\right)^{3/2} \left(-4acf+7b^2f-12bce+24c^2d\right)}{192c^3} + \frac{\left(a+bx+cx^2\right)^{5/2} (12ce-7bf)}{60c^2} + \frac{fx \left(a+bx+cx^2\right)^{5/2}}{6c}$$

Antiderivative was successfully verified.

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

```
[Out] -((b^2 - 4*a*c)*(24*c^2*d + 7*b^2*f - 4*c*(3*b*e + a*f))*(b + 2*c
*x)*Sqrt[a + b*x + c*x^2])/(512*c^4) + ((24*c^2*d - 12*b*c*e + 7*
b^2*f - 4*a*c*f)*(b + 2*c*x)*(a + b*x + c*x^2)^(3/2))/(192*c^3) +
 ((12*c*e - 7*b*f)*(a + b*x + c*x^2)^(5/2))/(60*c^2) + (f*x*(a +
b*x + c*x^2)^(5/2))/(6*c) + ((b^2 - 4*a*c)^2*(24*c^2*d + 7*b^2*f
```

```
- 4*c*(3*b*e + a*f))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x
+ c*x^2])])/(1024*c^(9/2))
```

Rubi in Sympy [A] time = 30.2034, size = 223, normalized size = 0.94

$$-\frac{\left(a+bx+cx^2\right)^{\frac{5}{2}}\left(\frac{7bf}{2}-6ce-5cfx\right)}{30c^2}+\frac{(b+2cx)\left(a+bx+cx^2\right)^{\frac{3}{2}}\left(-4acf+7b^2f-12bce+24c^2d\right)}{192c^3}-\frac{(b+2cx)\left(-4ac+b^2\right)\sqrt{a+bx+cx^2}\left(-4acf+7b^2f-12bce+24c^2d\right)}{512c^4}+\frac{\left(-4ac+b^2\right)^2\left(-4acf+7b^2f-12bce+24c^2d\right)\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{1024c^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -(a + b*x + c*x**2)**(5/2)*(7*b*f/2 - 6*c*e - 5*c*f*x)/(30*c**2)
+ (b + 2*c*x)*(a + b*x + c*x**2)**(3/2)*(-4*a*c*f + 7*b**2*f - 12
*b*c*e + 24*c**2*d)/(192*c**3) - (b + 2*c*x)*(-4*a*c + b**2)*sqrt
(a + b*x + c*x**2)*(-4*a*c*f + 7*b**2*f - 12*b*c*e + 24*c**2*d)/(
512*c**4) + (-4*a*c + b**2)**2*(-4*a*c*f + 7*b**2*f - 12*b*c*e +
24*c**2*d)*atanh((b + 2*c*x)/(2*sqrt(c)*sqrt(a + b*x + c*x**2)))/
(1024*c**(9/2))
```

Mathematica [A] time = 0.630904, size = 290, normalized size = 1.23

$$\frac{15\left(b^2-4ac\right)^2\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)\left(-4c(af+3be)+7b^2f+24c^2d\right)-2\sqrt{c}\sqrt{a+x(b+cx)}\left(-16bc^2\left(-81a^2f\right.\right.}{}$$

Antiderivative was successfully verified.

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

```
[Out] (-2*Sqrt[c]*Sqrt[a + x*(b + c*x)]*(105*b^5*f - 10*b^4*c*(18*e + 7
*f*x) + 8*b^3*c*(45*c*d - 95*a*f + c*x*(15*e + 7*f*x)) + 48*b^2*c
^2*(a*(25*e + 9*f*x) - c*x*(5*d + x*(2*e + f*x))) - 16*b*c^2*(-81
*a^2*f + 6*a*c*(25*d + x*(7*e + 3*f*x)) + 4*c^2*x^2*(45*d + x*(33
*e + 26*f*x))) - 32*c^3*(3*a^2*(16*e + 5*f*x) + 4*c^2*x^3*(15*d +
 2*x*(6*e + 5*f*x)) + 2*a*c*x*(75*d + x*(48*e + 35*f*x)))) + 15*(
```

```
b^2 - 4*a*c)^2*(24*c^2*d + 7*b^2*f - 4*c*(3*b*e + a*f))*Log[b + 2
*c*x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]])/(15360*c^(9/2))
```

Maple [B] time = 0., size = 862, normalized size = 3.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -3/16*e*b/c*(c*x^2+b*x+a)^(1/2)*x*a+1/8*f*b^2/c^2*(c*x^2+b*x+a)^(
1/2)*x*a-15/256*f*b^4/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a
)^(1/2))*a-1/24*f/c*a*(c*x^2+b*x+a)^(3/2)*x-1/8*e*b/c*(c*x^2+b*x+
a)^(3/2)*x+3/64*e*b^3/c^2*(c*x^2+b*x+a)^(1/2)*x-3/32*e*b^2/c^2*(c
*x^2+b*x+a)^(1/2)*a-3/16*e*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^
2+b*x+a)^(1/2))*a^2+3/32*e*b^3/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*
x^2+b*x+a)^(1/2))*a-3/32*d/c*(c*x^2+b*x+a)^(1/2)*x*b^2+3/16*d/c*(
c*x^2+b*x+a)^(1/2)*b*a-3/16*d/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x
^2+b*x+a)^(1/2))*b^2*a-1/32*f/c^2*a^2*(c*x^2+b*x+a)^(1/2)*b+7/96*
f*b^2/c^2*(c*x^2+b*x+a)^(3/2)*x-7/256*f*b^4/c^3*(c*x^2+b*x+a)^(1/
2)*x+1/16*f*b^3/c^3*(c*x^2+b*x+a)^(1/2)*a+9/64*f*b^2/c^(5/2)*ln((
1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*a^2-1/16*f/c*a^2*(c*x^2+b
*x+a)^(1/2)*x+1/5*e*(c*x^2+b*x+a)^(5/2)/c+1/4*d*(c*x^2+b*x+a)^(3/
2)*x+1/6*f*x*(c*x^2+b*x+a)^(5/2)/c+3/8*d*(c*x^2+b*x+a)^(1/2)*x*a-
3/64*d/c^2*(c*x^2+b*x+a)^(1/2)*b^3+3/8*d/c^(1/2)*ln((1/2*b+c*x)/c
^(1/2)+(c*x^2+b*x+a)^(1/2))*a^2+3/128*d/c^(5/2)*ln((1/2*b+c*x)/c^
(1/2)+(c*x^2+b*x+a)^(1/2))*b^4+7/192*f*b^3/c^3*(c*x^2+b*x+a)^(3/2
)-7/512*f*b^5/c^4*(c*x^2+b*x+a)^(1/2)+7/1024*f*b^6/c^(9/2)*ln((1/
2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))-1/16*e*b^2/c^2*(c*x^2+b*x+a
)^(3/2)+3/128*e*b^4/c^3*(c*x^2+b*x+a)^(1/2)-3/256*e*b^5/c^(7/2)*l
n((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+1/8*d/c*(c*x^2+b*x+a)^
(3/2)*b-1/16*f/c^(3/2)*a^3*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(
1/2))-7/60*f*b/c^2*(c*x^2+b*x+a)^(5/2)-1/48*f/c^2*a*(c*x^2+b*x+a)
^(3/2)*b
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.348789, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] [1/30720*(4*(1280*c^5*f*x^5 + 128*(12*c^5*e + 13*b*c^4*f)*x^4 + 1
6*(120*c^5*d + 132*b*c^4*e + (3*b^2*c^3 + 140*a*c^4)*f)*x^3 + 8*(
360*b*c^4*d + 12*(b^2*c^3 + 32*a*c^4)*e - (7*b^3*c^2 - 36*a*b*c^3
)*f)*x^2 - 120*(3*b^3*c^2 - 20*a*b*c^3)*d + 12*(15*b^4*c - 100*a*
b^2*c^2 + 128*a^2*c^3)*e - (105*b^5 - 760*a*b^3*c + 1296*a^2*b*c^
2)*f + 2*(120*(b^2*c^3 + 20*a*c^4)*d - 12*(5*b^3*c^2 - 28*a*b*c^3
)*e + (35*b^4*c - 216*a*b^2*c^2 + 240*a^2*c^3)*f)*x)*sqrt(c*x^2 +
 b*x + a)*sqrt(c) - 15*(24*(b^4*c^2 - 8*a*b^2*c^3 + 16*a^2*c^4)*d
 - 12*(b^5*c - 8*a*b^3*c^2 + 16*a^2*b*c^3)*e + (7*b^6 - 60*a*b^4*
c + 144*a^2*b^2*c^2 - 64*a^3*c^3)*f)*log(4*(2*c^2*x + b*c)*sqrt(c
*x^2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))/c
^(9/2), 1/15360*(2*(1280*c^5*f*x^5 + 128*(12*c^5*e + 13*b*c^4*f)*
x^4 + 16*(120*c^5*d + 132*b*c^4*e + (3*b^2*c^3 + 140*a*c^4)*f)*x^
3 + 8*(360*b*c^4*d + 12*(b^2*c^3 + 32*a*c^4)*e - (7*b^3*c^2 - 36*
a*b*c^3)*f)*x^2 - 120*(3*b^3*c^2 - 20*a*b*c^3)*d + 12*(15*b^4*c -
 100*a*b^2*c^2 + 128*a^2*c^3)*e - (105*b^5 - 760*a*b^3*c + 1296*a
^2*b*c^2)*f + 2*(120*(b^2*c^3 + 20*a*c^4)*d - 12*(5*b^3*c^2 - 28*
a*b*c^3)*e + (35*b^4*c - 216*a*b^2*c^2 + 240*a^2*c^3)*f)*x)*sqrt(
c*x^2 + b*x + a)*sqrt(-c) + 15*(24*(b^4*c^2 - 8*a*b^2*c^3 + 16*a^
2*c^4)*d - 12*(b^5*c - 8*a*b^3*c^2 + 16*a^2*b*c^3)*e + (7*b^6 - 6
0*a*b^4*c + 144*a^2*b^2*c^2 - 64*a^3*c^3)*f)*arctan(1/2*(2*c*x +
b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))/(sqrt(-c)*c^4)]
```

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

$$\int \left(a + bx + cx^2\right)^{\frac{3}{2}} \left(d + ex + fx^2\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((a + b*x + c*x**2)**(3/2)*(d + e*x + f*x**2), x)
```

GIAC/XCAS [A] time = 0.279515, size = 563, normalized size = 2.39

$$\frac{1}{7680}\sqrt{cx^2+bx+a}\left(2\left(4\left(2\left(8\left(10\,cfx+\frac{13\,bc^5f+12\,c^6e}{c^5}\right)x+\frac{120\,c^6d+3\,b^2c^4f+140\,ac^5f+132\,bc^5e}{c^5}\right)x+\frac{360\,bc^5d-7\,\cdots}{\cdots}\right.\right.\right.\right.$$

$$-\frac{\left(24\,b^4c^2d-192\,ab^2c^3d+384\,a^2c^4d+7\,b^6f-60\,ab^4cf+144\,a^2b^2c^2f-64\,a^3c^3f-12\,b^5ce+96\,ab^3c^2e-192\,a^2bc^3e\right)\ln\left(\cdots\right.}{1024\,c^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/7680*sqrt(c*x^2 + b*x + a)*(2*(4*(2*(8*(10*c*f*x + (13*b*c^5*f
+ 12*c^6*e)/c^5)*x + (120*c^6*d + 3*b^2*c^4*f + 140*a*c^5*f + 132
*b*c^5*e)/c^5)*x + (360*b*c^5*d - 7*b^3*c^3*f + 36*a*b*c^4*f + 12
*b^2*c^4*e + 384*a*c^5*e)/c^5)*x + (120*b^2*c^4*d + 2400*a*c^5*d
+ 35*b^4*c^2*f - 216*a*b^2*c^3*f + 240*a^2*c^4*f - 60*b^3*c^3*e +
 336*a*b*c^4*e)/c^5)*x - (360*b^3*c^3*d - 2400*a*b*c^4*d + 105*b^
5*c*f - 760*a*b^3*c^2*f + 1296*a^2*b*c^3*f - 180*b^4*c^2*e + 1200
*a*b^2*c^3*e - 1536*a^2*c^4*e)/c^5) - 1/1024*(24*b^4*c^2*d - 192*
a*b^2*c^3*d + 384*a^2*c^4*d + 7*b^6*f - 60*a*b^4*c*f + 144*a^2*b^
2*c^2*f - 64*a^3*c^3*f - 12*b^5*c*e + 96*a*b^3*c^2*e - 192*a^2*b*
c^3*e)*ln(abs(-2*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))*sqrt(c) - b)
)/c^(9/2)
```

3.200 $\int \frac{(a+bx+cx^2)^{3/2}(d+ex+fx^2)}{g+hx}\,dx$

Optimal. Leaf size=660

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(4ch(2cg-bh)\left(8ch(bg-2ah)(bfg-2cdh)-g\left(-4ach-3b^2h+8bcg\right)(bfh-2ceh+2cfg)\right)-2\right.}{256}$$

$$+\frac{\sqrt{a+bx+cx^2}\left(2chx\left(8ch(2cg-bh)(bfg-2cdh)-\left(-4ch(2bg-3ah)-3b^2h^2+16c^2g^2\right)(bfh-2ceh+2cfg)\right)+6b^2ch^3(-\right.}{}$$

$$-\frac{\left(a+bx+cx^2\right)^{3/2}(8ch(bfg-2cdh)+6chx(bfh-2ceh+2cfg)-(8cg-3bh)(bfh-2ceh+2cfg))}{48c^2h^3}$$

$$+\frac{\left(ah^2-bgh+cg^2\right)^{3/2}\left(fg^2-h(eg-dh)\right)\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)}{h^6}+\frac{f\left(a+bx+cx^2\right)^{5/2}}{5ch}$$

```
[Out] ((3*b^4*f*h^4 + 6*b^2*c*h^3*(b*f*g - b*e*h - 2*a*f*h) + 128*c^4*g
^2*(f*g^2 - h*(e*g - d*h)) - 32*c^3*h*(5*b*g - 4*a*h)*(f*g^2 - h*
(e*g - d*h)) - 8*b*c^2*h^2*(3*a*h*(f*g - e*h) - 2*b*(f*g^2 - e*g*
h + d*h^2)) + 2*c*h*(8*c*h*(2*c*g - b*h)*(b*f*g - 2*c*d*h) - (2*c
*f*g - 2*c*e*h + b*f*h)*(16*c^2*g^2 - 3*b^2*h^2 - 4*c*h*(2*b*g -
3*a*h)))*x)*Sqrt[a + b*x + c*x^2])/(128*c^3*h^5) - ((8*c*h*(b*f*g
 - 2*c*d*h) - (8*c*g - 3*b*h)*(2*c*f*g - 2*c*e*h + b*f*h) + 6*c*h
*(2*c*f*g - 2*c*e*h + b*f*h)*x)*(a + b*x + c*x^2)^(3/2))/(48*c^2*
h^3) + (f*(a + b*x + c*x^2)^(5/2))/(5*c*h) - ((4*c*h*(2*c*g - b*h
)*(8*c*h*(b*g - 2*a*h)*(b*f*g - 2*c*d*h) - g*(8*b*c*g - 3*b^2*h -
 4*a*c*h)*(2*c*f*g - 2*c*e*h + b*f*h)) - 2*(4*c^2*g^2 - (b^2*h^2)
/2 - 2*c*h*(b*g - a*h))*(8*c*h*(2*c*g - b*h)*(b*f*g - 2*c*d*h) -
(2*c*f*g - 2*c*e*h + b*f*h)*(16*c^2*g^2 - 3*b^2*h^2 - 4*c*h*(2*b*
g - 3*a*h))))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2
])])/(256*c^(7/2)*h^6) + ((c*g^2 - b*g*h + a*h^2)^(3/2)*(f*g^2 -
h*(e*g - d*h))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*
g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/h^6
```

Rubi [A] time = 5.84298, antiderivative size = 660, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.188

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(4ch(2cg-bh)\left(8ch(bg-2ah)(bfg-2cdh)-g\left(-4ach-3b^2h+8bcg\right)(bfh-2ceh+2cfg)\right)-2\right.}{256}$$

$$+\frac{\sqrt{a+bx+cx^2}\left(2chx\left(8ch(2cg-bh)(bfg-2cdh)-\left(-4ch(2bg-3ah)-3b^2h^2+16c^2g^2\right)(bfh-2ceh+2cfg)\right)+6b^2ch^3(-\right.}{}$$

$$-\frac{\left(a+bx+cx^2\right)^{3/2}(8ch(bfg-2cdh)+6chx(bfh-2ceh+2cfg)-(8cg-3bh)(bfh-2ceh+2cfg))}{48c^2h^3}$$

$$+\frac{\left(ah^2-bgh+cg^2\right)^{3/2}\left(fg^2-h(eg-dh)\right)\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)}{h^6}+\frac{f\left(a+bx+cx^2\right)^{5/2}}{5ch}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x),x]
```

```
[Out] ((3*b^4*f*h^4 + 6*b^2*c*h^3*(b*f*g - b*e*h - 2*a*f*h) - 32*c^3*h*
(5*b*g - 4*a*h)*(f*g^2 - h*(e*g - d*h)) + 128*c^4*(f*g^4 - g^2*h*
(e*g - d*h)) - 8*b*c^2*h^2*(3*a*h*(f*g - e*h) - 2*b*(f*g^2 - e*g*
h + d*h^2)) + 2*c*h*(8*c*h*(2*c*g - b*h)*(b*f*g - 2*c*d*h) - (2*c
*f*g - 2*c*e*h + b*f*h)*(16*c^2*g^2 - 3*b^2*h^2 - 4*c*h*(2*b*g -
3*a*h)))*x)*Sqrt[a + b*x + c*x^2])/(128*c^3*h^5) - ((8*c*h*(b*f*g
 - 2*c*d*h) - (8*c*g - 3*b*h)*(2*c*f*g - 2*c*e*h + b*f*h) + 6*c*h
*(2*c*f*g - 2*c*e*h + b*f*h)*x)*(a + b*x + c*x^2)^(3/2))/(48*c^2*
h^3) + (f*(a + b*x + c*x^2)^(5/2))/(5*c*h) - ((4*c*h*(2*c*g - b*h
)*(8*c*h*(b*g - 2*a*h)*(b*f*g - 2*c*d*h) - g*(8*b*c*g - 3*b^2*h -
 4*a*c*h)*(2*c*f*g - 2*c*e*h + b*f*h)) - 2*(4*c^2*g^2 - (b^2*h^2)
/2 - 2*c*h*(b*g - a*h))*(8*c*h*(2*c*g - b*h)*(b*f*g - 2*c*d*h) -
(2*c*f*g - 2*c*e*h + b*f*h)*(16*c^2*g^2 - 3*b^2*h^2 - 4*c*h*(2*b*
g - 3*a*h))))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2
])])/(256*c^(7/2)*h^6) + ((c*g^2 - b*g*h + a*h^2)^(3/2)*(f*g^2 -
h*(e*g - d*h))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*
g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/h^6
```

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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 3.84253, size = 752, normalized size = 1.14

$$\frac{2h\sqrt{a+x(b+cx)}\left(12c^2h^2\left(32a^2fh^2+2abh(25eh-25fg+7fhx)+b^2\left(5h(4dh-4eg+ehx)+f\left(20g^2-5ghx+2h^2x^2\right)\right)\right)-30b^2ch^3(10afh+b(3eh-3fg+fhx))+16c^3h(ah(\cdots}{\cdots}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x),x]
```

```
[Out] ((2*h*Sqrt[a + x*(b + c*x)]*(45*b^4*f*h^4 - 30*b^2*c*h^3*(10*a*f*
h + b*(-3*f*g + 3*e*h + f*h*x)) + 12*c^2*h^2*(32*a^2*f*h^2 + 2*a*
```

```
b*h*(-25*f*g + 25*e*h + 7*f*h*x) + b^2*(5*h*(-4*e*g + 4*d*h + e*h
*x) + f*(20*g^2 - 5*g*h*x + 2*h^2*x^2))) + 32*c^4*(f*(60*g^4 - 30
*g^3*h*x + 20*g^2*h^2*x^2 - 15*g*h^3*x^3 + 12*h^4*x^4) + 5*h*(2*d
*h*(6*g^2 - 3*g*h*x + 2*h^2*x^2) + e*(-12*g^3 + 6*g^2*h*x - 4*g*h
^2*x^2 + 3*h^3*x^3))) + 16*c^3*h*(a*h*(5*h*(-32*e*g + 32*d*h + 15
*e*h*x) + f*(160*g^2 - 75*g*h*x + 48*h^2*x^2)) + b*(f*(-150*g^3 +
 70*g^2*h*x - 45*g*h^2*x^2 + 33*h^3*x^3) + 5*h*(2*d*h*(-15*g + 7*
h*x) + e*(30*g^2 - 14*g*h*x + 9*h^2*x^2))))))/c^3 + 3840*(c*g^2 +
 h*(-(b*g) + a*h))^(3/2)*(f*g^2 + h*(-(e*g) + d*h))*Log[g + h*x]
 - (15*(3*b^5*f*h^5 - 6*b^3*c*h^4*(-(b*f*g) + b*e*h + 4*a*f*h) - 3
84*c^4*g*h*(b*g - a*h)*(f*g^2 + h*(-(e*g) + d*h)) + 256*c^5*(f*g^
5 + g^3*h*(-(e*g) + d*h)) + 16*b*c^2*h^3*(3*a^2*f*h^2 + 3*a*b*h*(
-(f*g) + e*h) + b^2*(f*g^2 - e*g*h + d*h^2)) + 96*c^3*h^2*(a^2*h^
2*(f*g - e*h) + b^2*g*(f*g^2 - e*g*h + d*h^2) - 2*a*b*h*(f*g^2 -
e*g*h + d*h^2)))*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]]
)/c^(7/2) - 3840*(c*g^2 + h*(-(b*g) + a*h))^(3/2)*(f*g^2 + h*(-(e
*g) + d*h))*Log[-(b*g) + 2*a*h - 2*c*g*x + b*h*x + 2*Sqrt[c*g^2 +
 h*(-(b*g) + a*h)]*Sqrt[a + x*(b + c*x)]])/(3840*h^6)
```

Maple [B] time = 0.027, size = 6715, normalized size = 10.2

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+b*x+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g),x)

[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g),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((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g),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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g),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((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.201 $\int \frac{(a+bx+cx^2)^{3/2}(d+ex+fx^2)}{(g+hx)^2}\,dx$

Optimal. Leaf size=754

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(48c^2h^2\left(a^2fh^2-2abh(2fg-eh)+b^2\left(dh^2-2egh+3fg^2\right)\right)+8b^2ch^3(-3afh-beh+2bfg)+192\right.}{128c^{5/2}h^6}$$

$$-\frac{\sqrt{a+bx+cx^2}\left(2chx\left(4ch(-3afh-2beh+4bfg)+3b^2fh^2-16c^2\left(5fg^2-h(4eg-3dh)\right)\right)+16c^2h\left(4ah(2fg-eh)-b\right.\right.}{64c^2h^5}$$

$$-\frac{\left(a+bx+cx^2\right)^{3/2}\left(6ch^2x\left(-afh+bfg-4cdh+4ceg-\frac{5cfg^2}{h}\right)+ch\left(8ah(2fg-eh)-b\left(43fg^2-8h(4eg-3dh)\right)\right)+3bf\right.}{24ch^3\left(ah^2-bgh+cg^2\right)}$$

$$-\frac{\left(a+bx+cx^2\right)^{5/2}\left(fg^2-h(eg-dh)\right)}{h(g+hx)\left(ah^2-bgh+cg^2\right)}$$

$$-\frac{\sqrt{ah^2-bgh+cg^2}\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(h\left(2ah(2fg-eh)-b\left(3dh^2-5egh+7fg^2\right)\right)+2cg\left(5fg^2-h(4eg-\right.\right.}{2h^6}$$

```
[Out] -((3*b^3*f*h^3 + 4*b*c*h^2*(4*b*f*g - 2*b*e*h - 3*a*f*h) + 64*c^3
*g*(5*f*g^2 - h*(4*e*g - 3*d*h)) + 16*c^2*h*(4*a*h*(2*f*g - e*h)
- b*(19*f*g^2 - 14*e*g*h + 9*d*h^2)) + 2*c*h*(3*b^2*f*h^2 + 4*c*h
*(4*b*f*g - 2*b*e*h - 3*a*f*h) - 16*c^2*(5*f*g^2 - h*(4*e*g - 3*d
*h)))*x)*Sqrt[a + b*x + c*x^2])/(64*c^2*h^5) - ((3*b*f*h^2*(b*g -
 a*h) + 8*c^2*g*(5*f*g^2 - h*(4*e*g - 3*d*h)) + c*h*(8*a*h*(2*f*g
 - e*h) - b*(43*f*g^2 - 8*h*(4*e*g - 3*d*h))) + 6*c*h^2*(4*c*e*g
+ b*f*g - (5*c*f*g^2)/h - 4*c*d*h - a*f*h)*x)*(a + b*x + c*x^2)^(
3/2))/(24*c*h^3*(c*g^2 - b*g*h + a*h^2)) - ((f*g^2 - h*(e*g - d*h
))*(a + b*x + c*x^2)^(5/2))/(h*(c*g^2 - b*g*h + a*h^2)*(g + h*x))
 + ((3*b^4*f*h^4 + 8*b^2*c*h^3*(2*b*f*g - b*e*h - 3*a*f*h) + 128*
c^4*g^2*(5*f*g^2 - h*(4*e*g - 3*d*h)) + 48*c^2*h^2*(a^2*f*h^2 - 2
*a*b*h*(2*f*g - e*h) + b^2*(3*f*g^2 - 2*e*g*h + d*h^2)) + 192*c^3
*h*(a*h*(3*f*g^2 - 2*e*g*h + d*h^2) - b*g*(4*f*g^2 - 3*e*g*h + 2*
d*h^2)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/
(128*c^(5/2)*h^6) - (Sqrt[c*g^2 - b*g*h + a*h^2]*(2*c*g*(5*f*g^2
- h*(4*e*g - 3*d*h)) + h*(2*a*h*(2*f*g - e*h) - b*(7*f*g^2 - 5*e*
g*h + 3*d*h^2)))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[
c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(2*h^6)
```

Rubi [A] time = 7.32545, antiderivative size = 750, normalized size of antiderivative = 0.99, number

of steps used = 8, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(48c^2h^2\left(a^2fh^2-2abh(2fg-eh)+b^2\left(dh^2-2egh+3fg^2\right)\right)+8b^2ch^3(-3afh-beh+2bfg)+192\right.}{128c^{5/2}h^6}$$

$$-\frac{\sqrt{a+bx+cx^2}\left(2chx\left(4ch(-3afh-2beh+4bfg)+3b^2fh^2-16c^2\left(5fg^2-h(4eg-3dh)\right)\right)-16c^2h\left(-4ah(2fg-eh)-b\right.\right.}{64c^2h^5}$$

$$-\frac{\left(a+bx+cx^2\right)^{3/2}\left(6chx\left(-afh+bfg-4cdh+4ceg-\frac{5cfg^2}{h}\right)-c\left(-8ah(2fg-eh)-8bh(4eg-3dh)+43bfg^2\right)+3bfh(\right.}{24ch^2\left(ah^2-bgh+cg^2\right)}$$

$$-\frac{\left(a+bx+cx^2\right)^{5/2}\left(fg^2-h(eg-dh)\right)}{h(g+hx)\left(ah^2-bgh+cg^2\right)}$$

$$-\frac{\sqrt{ah^2-bgh+cg^2}\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(2c\left(5fg^3-gh(4eg-3dh)\right)-h\left(-2ah(2fg-eh)-bh(5eg-3dh)+\right.\right.}{2h^6}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^2,x]
```

```
[Out] -((3*b^3*f*h^3 + 4*b*c*h^2*(4*b*f*g - 2*b*e*h - 3*a*f*h) + 64*c^3
*(5*f*g^3 - g*h*(4*e*g - 3*d*h)) - 16*c^2*h*(19*b*f*g^2 - b*h*(14
*e*g - 9*d*h) - 4*a*h*(2*f*g - e*h)) + 2*c*h*(3*b^2*f*h^2 + 4*c*h
*(4*b*f*g - 2*b*e*h - 3*a*f*h) - 16*c^2*(5*f*g^2 - h*(4*e*g - 3*d
*h)))*x)*Sqrt[a + b*x + c*x^2])/(64*c^2*h^5) - ((3*b*f*h*(b*g - a
*h) + (8*c^2*(5*f*g^3 - g*h*(4*e*g - 3*d*h)))/h - c*(43*b*f*g^2 -
 8*b*h*(4*e*g - 3*d*h) - 8*a*h*(2*f*g - e*h)) + 6*c*h*(4*c*e*g +
b*f*g - (5*c*f*g^2)/h - 4*c*d*h - a*f*h)*x)*(a + b*x + c*x^2)^(3/
2))/(24*c*h^2*(c*g^2 - b*g*h + a*h^2)) - ((f*g^2 - h*(e*g - d*h))
*(a + b*x + c*x^2)^(5/2))/(h*(c*g^2 - b*g*h + a*h^2)*(g + h*x)) +
 ((3*b^4*f*h^4 + 8*b^2*c*h^3*(2*b*f*g - b*e*h - 3*a*f*h) + 128*c^
4*(5*f*g^4 - g^2*h*(4*e*g - 3*d*h)) + 48*c^2*h^2*(a^2*f*h^2 - 2*a
*b*h*(2*f*g - e*h) + b^2*(3*f*g^2 - 2*e*g*h + d*h^2)) + 192*c^3*h
*(a*h*(3*f*g^2 - 2*e*g*h + d*h^2) - b*g*(4*f*g^2 - 3*e*g*h + 2*d*
h^2)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(1
28*c^(5/2)*h^6) - (Sqrt[c*g^2 - b*g*h + a*h^2]*(2*c*(5*f*g^3 - g*
h*(4*e*g - 3*d*h)) - h*(7*b*f*g^2 - b*h*(5*e*g - 3*d*h) - 2*a*h*(
2*f*g - e*h)))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*
g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(2*h^6)
```

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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 4.65391, size = 722, normalized size = 0.96

$$\frac{\frac{3\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)\left(48c^2h^2\left(a^2fh^2+2abh(eh-2fg)+b^2\left(dh^2-2egh+3fg^2\right)\right)-8b^2ch^3(3afh+beh-2bfg)-192c^3h\left(bg\left(2dh^2-3egh+4fg^2\right)-ah\left(dh^2-\right.\right.\right.}{c^{5/2}}}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^2,x]
```

```
[Out] ((2*h*Sqrt[a + x*(b + c*x)]*(-9*b^3*f*h^3*(g + h*x) + 6*b*c*h^2*(
g + h*x)*(10*a*f*h + b*(-8*f*g + 4*e*h + f*h*x)) - 16*c^3*(f*(60*
g^4 + 30*g^3*h*x - 10*g^2*h^2*x^2 + 5*g*h^3*x^3 - 3*h^4*x^4) - 2*
h*(3*d*h*(-6*g^2 - 3*g*h*x + h^2*x^2) + 2*e*(12*g^3 + 6*g^2*h*x -
 2*g*h^2*x^2 + h^3*x^3))) + 8*c^2*h*(a*h*(8*h*(7*e*g - 3*d*h + 4*
e*h*x) + f*(-88*g^2 - 49*g*h*x + 15*h^2*x^2)) + b*(f*(114*g^3 + 6
2*g^2*h*x - 19*g*h^2*x^2 + 9*h^3*x^3) + 2*h*(3*d*h*(9*g + 5*h*x)
+ e*(-42*g^2 - 23*g*h*x + 7*h^2*x^2))))))/(c^2*(g + h*x)) - 192*S
qrt[c*g^2 + h*(-(b*g) + a*h)]*(2*c*(5*f*g^3 + g*h*(-4*e*g + 3*d*h
)) + h*(-7*b*f*g^2 + b*h*(5*e*g - 3*d*h) - 2*a*h*(-2*f*g + e*h)))
*Log[g + h*x] + (3*(3*b^4*f*h^4 - 8*b^2*c*h^3*(-2*b*f*g + b*e*h +
 3*a*f*h) + 128*c^4*(5*f*g^4 + g^2*h*(-4*e*g + 3*d*h)) + 48*c^2*h
^2*(a^2*f*h^2 + 2*a*b*h*(-2*f*g + e*h) + b^2*(3*f*g^2 - 2*e*g*h +
 d*h^2)) - 192*c^3*h*(-(a*h*(3*f*g^2 - 2*e*g*h + d*h^2)) + b*g*(4
*f*g^2 - 3*e*g*h + 2*d*h^2))))*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a +
x*(b + c*x)]])/c^(5/2) + 192*Sqrt[c*g^2 + h*(-(b*g) + a*h)]*(2*c*
(5*f*g^3 + g*h*(-4*e*g + 3*d*h)) + h*(-7*b*f*g^2 + b*h*(5*e*g - 3
*d*h) - 2*a*h*(-2*f*g + e*h)))*Log[-(b*g) + 2*a*h - 2*c*g*x + b*h
*x + 2*Sqrt[c*g^2 + h*(-(b*g) + a*h)]*Sqrt[a + x*(b + c*x)]])/(38
4*h^6)
```

Maple [B] time = 0.034, size = 14734, normalized size = 19.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+b*x+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^2,x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^2,x, algorithm="maxi
```

```
[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((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^2,x, algorithm="fric
```

```
[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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [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^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^2,x, algorithm="giac
```

[Out] Timed out

3.202 $\int \frac{(a+bx+cx^2)^{3/2}(d+ex+fx^2)}{(g+hx)^3}\,dx$

Optimal. Leaf size=824

$$-\frac{(fg^2-h(eg-dh))\,(cx^2+bx+a)^{5/2}}{2h\,(cg^2-bhg+ah^2)\,(g+hx)^2}$$
$$-\frac{\left(4cg\left(-\frac{10fg^2}{h}+6eg-3dh\right)-4ah(7fg-3eh)+b\,(31fg^2-3h(5eg-dh))+2h\left(-\frac{5cfg^2}{h}+3ceg+2bfg-3cdh-2afh\right)x}{12h^2\,(cg^2-bhg+ah^2)\,(g+hx)}$$
$$-\frac{\left(-8g^2\left(10fg^2-3h(2eg-dh)\right)c^3-2h\left(2ah\left(19fg^2-9ehg+3dh^2\right)-3bg\left(22fg^2-12ehg+5dh^2\right)\right)c^2-h^2\left((53fg^2-6h\right.\right.}{}$$
$$-\frac{\left(16g\left(10fg^2-3h(2eg-dh)\right)c^3+24h\left(ah(3fg-eh)-b\left(6fg^2-3ehg+dh^2\right)\right)c^2+6bh^2(3bfg-beh-2afh)c+b^3fh^3\right)}{16c^{3/2}h^6}$$
$$+\frac{\left(8c^2\left(10fg^2-3h(2eg-dh)\right)g^2+4ch\left(ah\left(19fg^2-9ehg+3dh^2\right)-bg\left(28fg^2-15ehg+6dh^2\right)\right)+h^2\left((35fg^2-3h(5eg-\right.\right.}{8h^6\sqrt{cg^2-bhg+ah^2}}$$

```
[Out] -((b^2*f*h^3*(b*g - a*h) - 8*c^3*g^2*(10*f*g^2 - 3*h*(2*e*g - d*h
)) - 2*c^2*h*(2*a*h*(19*f*g^2 - 9*e*g*h + 3*d*h^2) - 3*b*g*(22*f*
g^2 - 12*e*g*h + 5*d*h^2)) - c*h^2*(8*a^2*f*h^2 - 18*a*b*h*(3*f*g
 - e*h) + b^2*(53*f*g^2 - 6*h*(4*e*g - d*h))) + 2*c*h*(b*f*h^2*(b
*g - a*h) + 2*c^2*g*(10*f*g^2 - 3*h*(2*e*g - d*h)) + c*h*(2*a*h*(
7*f*g - 3*e*h) - 3*b*(6*f*g^2 - 3*e*g*h + d*h^2)))*x)*Sqrt[a + b*
x + c*x^2])/(8*c*h^5*(c*g^2 - b*g*h + a*h^2)) - ((4*c*g*(6*e*g -
(10*f*g^2)/h - 3*d*h) - 4*a*h*(7*f*g - 3*e*h) + b*(31*f*g^2 - 3*h
*(5*e*g - d*h)) + 2*h*(3*c*e*g + 2*b*f*g - (5*c*f*g^2)/h - 3*c*d*
h - 2*a*f*h)*x)*(a + b*x + c*x^2)^(3/2))/(12*h^2*(c*g^2 - b*g*h +
 a*h^2)*(g + h*x)) - ((f*g^2 - h*(e*g - d*h))*(a + b*x + c*x^2)^(
5/2))/(2*h*(c*g^2 - b*g*h + a*h^2)*(g + h*x)^2) - ((b^3*f*h^3 + 6
*b*c*h^2*(3*b*f*g - b*e*h - 2*a*f*h) + 16*c^3*g*(10*f*g^2 - 3*h*(
2*e*g - d*h)) + 24*c^2*h*(a*h*(3*f*g - e*h) - b*(6*f*g^2 - 3*e*g*
h + d*h^2)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2]
)])/(16*c^(3/2)*h^6) + ((8*c^2*g^2*(10*f*g^2 - 3*h*(2*e*g - d*h))
 + 4*c*h*(a*h*(19*f*g^2 - 9*e*g*h + 3*d*h^2) - b*g*(28*f*g^2 - 15
*e*g*h + 6*d*h^2)) + h^2*(8*a^2*f*h^2 - 4*a*b*h*(10*f*g - 3*e*h)
+ b^2*(35*f*g^2 - 3*h*(5*e*g - d*h))))*ArcTanh[(b*g - 2*a*h + (2*
c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2
])])/(8*h^6*Sqrt[c*g^2 - b*g*h + a*h^2])
```

Rubi [A] time = 5.8643, antiderivative size = 819, normalized size of antiderivative = 0.99, number

of steps used = 8, number of rules used = 7, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.219$

$$-\frac{(fg^2-h(eg-dh))\left(cx^2+bx+a\right)^{5/2}}{2h\left(cg^2-bhg+ah^2\right)(g+hx)^2}$$
$$-\frac{\left(31bfg^2+4c\left(-\frac{10fg^2}{h}+6eg-3dh\right)g-3bh(5eg-dh)-4ah(7fg-3eh)+2h\left(-\frac{5cfg^2}{h}+3ceg+2bfg-3cdh-2afh\right)x\right)}{12h^2\left(cg^2-bhg+ah^2\right)(g+hx)}$$
$$-\frac{\left(8g^2\left(-\frac{10fg^2}{h}+6eg-3dh\right)c^3-2\left(2ah\left(19fg^2-9ehg+3dh^2\right)-3bg\left(22fg^2-12ehg+5dh^2\right)\right)c^2-h\left((53fg^2-6h(4eg-\right.\right.}{}$$
$$-\frac{\left(16\left(10fg^3-3gh(2eg-dh)\right)c^3-24h\left(6bfg^2-bh(3eg-dh)-ah(3fg-eh)\right)c^2+6bh^2(3bfg-beh-2afh)c+b^3fh^3\right)}{16c^{3/2}h^6}$$
$$+\frac{\left(8\left(10fg^4-3g^2h(2eg-dh)\right)c^2-4h\left(28bfg^3-3bh(5eg-2dh)g-ah\left(19fg^2-9ehg+3dh^2\right)\right)c+h^2\left((35fg^2-3h(5eg-\right.\right.}{8h^6\sqrt{cg^2-bhg+ah^2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^3,x]
```

```
[Out] -((b^2*f*h^2*(b*g - a*h) + 8*c^3*g^2*(6*e*g - (10*f*g^2)/h - 3*d*
h) - 2*c^2*(2*a*h*(19*f*g^2 - 9*e*g*h + 3*d*h^2) - 3*b*g*(22*f*g^
2 - 12*e*g*h + 5*d*h^2)) - c*h*(8*a^2*f*h^2 - 18*a*b*h*(3*f*g - e
*h) + b^2*(53*f*g^2 - 6*h*(4*e*g - d*h))) + 2*c*(b*f*h^2*(b*g - a
*h) + 2*c^2*(10*f*g^3 - 3*g*h*(2*e*g - d*h)) + c*h*(2*a*h*(7*f*g
- 3*e*h) - 3*b*(6*f*g^2 - 3*e*g*h + d*h^2)))*x)*Sqrt[a + b*x + c*
x^2])/(8*c*h^4*(c*g^2 - b*g*h + a*h^2)) - ((31*b*f*g^2 + 4*c*g*(6
*e*g - (10*f*g^2)/h - 3*d*h) - 3*b*h*(5*e*g - d*h) - 4*a*h*(7*f*g
 - 3*e*h) + 2*h*(3*c*e*g + 2*b*f*g - (5*c*f*g^2)/h - 3*c*d*h - 2*
a*f*h)*x)*(a + b*x + c*x^2)^(3/2))/(12*h^2*(c*g^2 - b*g*h + a*h^2
)*(g + h*x)) - ((f*g^2 - h*(e*g - d*h))*(a + b*x + c*x^2)^(5/2))/
(2*h*(c*g^2 - b*g*h + a*h^2)*(g + h*x)^2) - ((b^3*f*h^3 + 6*b*c*h
^2*(3*b*f*g - b*e*h - 2*a*f*h) + 16*c^3*(10*f*g^3 - 3*g*h*(2*e*g
- d*h)) - 24*c^2*h*(6*b*f*g^2 - b*h*(3*e*g - d*h) - a*h*(3*f*g -
e*h)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(1
6*c^(3/2)*h^6) + ((8*c^2*(10*f*g^4 - 3*g^2*h*(2*e*g - d*h)) - 4*c
*h*(28*b*f*g^3 - 3*b*g*h*(5*e*g - 2*d*h) - a*h*(19*f*g^2 - 9*e*g*
h + 3*d*h^2)) + h^2*(8*a^2*f*h^2 - 4*a*b*h*(10*f*g - 3*e*h) + b^2
*(35*f*g^2 - 3*h*(5*e*g - d*h))))*ArcTanh[(b*g - 2*a*h + (2*c*g -
 b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/
(8*h^6*Sqrt[c*g^2 - b*g*h + a*h^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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 6.6214, size = 904, normalized size = 1.1

$$\frac{\left(\frac{cfx^2}{3h^3}+\frac{(-18cfg+6ceh+7bfh)x}{12h^4}+\frac{144fg^2c^2+24dh^2c^2-72eghc^2+30beh^2c+32afh^2c-90bfghc+3b^2fh^2}{24ch^5}+\frac{18cfg^3-14cehg^2-13bfhg^2+10cdh^2g+9beh^2g}{4h^5(g+hx)}\right.}{cx^2+bx+a}$$

$$+\frac{\left(80c^2fg^4-48c^2ehg^3-112bcfhg^3+24c^2dh^2g^2+60bceh^2g^2+35b^2fh^2g^2+76acfh^2g^2-24bcdh^3g-15b^2eh^3g-36aceh^3\right.}{8h^6\sqrt{cg^2-bhg+ah^2}\,(cx^2+bx+a)^{3/}}$$

$$-\frac{\left(160fg^3c^3+48dgh^2c^3-96eg^2hc^3-24bdh^3c^2-24aeh^3c^2+72begh^2c^2+72afgh^2c^2-144bfg^2hc^2-6b^2eh^3c-12abfh^3\right.}{16c^{3/2}h^6\,(cx^2+bx+a)^{3/2}}$$

$$-\frac{\left(80c^2fg^4-48c^2ehg^3-112bcfhg^3+24c^2dh^2g^2+60bceh^2g^2+35b^2fh^2g^2+76acfh^2g^2-24bcdh^3g-15b^2eh^3g-36aceh\right.}{8h^6\sqrt{cg^2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^3,x]
```

```
[Out] ((a + x*(b + c*x))^(3/2)*((144*c^2*f*g^2 - 72*c^2*e*g*h - 90*b*c*
f*g*h + 24*c^2*d*h^2 + 30*b*c*e*h^2 + 3*b^2*f*h^2 + 32*a*c*f*h^2)
/(24*c*h^5) + ((-18*c*f*g + 6*c*e*h + 7*b*f*h)*x)/(12*h^4) + (c*f
*x^2)/(3*h^3) - ((c*g^2 - b*g*h + a*h^2)*(f*g^2 - e*g*h + d*h^2))
/(2*h^5*(g + h*x)^2) + (18*c*f*g^3 - 14*c*e*g^2*h - 13*b*f*g^2*h
+ 10*c*d*g*h^2 + 9*b*e*g*h^2 + 8*a*f*g*h^2 - 5*b*d*h^3 - 4*a*e*h^
3)/(4*h^5*(g + h*x))))/(a + b*x + c*x^2) + ((80*c^2*f*g^4 - 48*c^
2*e*g^3*h - 112*b*c*f*g^3*h + 24*c^2*d*g^2*h^2 + 60*b*c*e*g^2*h^2
 + 35*b^2*f*g^2*h^2 + 76*a*c*f*g^2*h^2 - 24*b*c*d*g*h^3 - 15*b^2*
e*g*h^3 - 36*a*c*e*g*h^3 - 40*a*b*f*g*h^3 + 3*b^2*d*h^4 + 12*a*c*
d*h^4 + 12*a*b*e*h^4 + 8*a^2*f*h^4)*(a + x*(b + c*x))^(3/2)*Log[g
 + h*x])/(8*h^6*Sqrt[c*g^2 - b*g*h + a*h^2]*(a + b*x + c*x^2)^(3/
2)) - ((160*c^3*f*g^3 - 96*c^3*e*g^2*h - 144*b*c^2*f*g^2*h + 48*c
^3*d*g*h^2 + 72*b*c^2*e*g*h^2 + 18*b^2*c*f*g*h^2 + 72*a*c^2*f*g*h
^2 - 24*b*c^2*d*h^3 - 6*b^2*c*e*h^3 - 24*a*c^2*e*h^3 + b^3*f*h^3
- 12*a*b*c*f*h^3)*(a + x*(b + c*x))^(3/2)*Log[b + 2*c*x + 2*Sqrt[
c]*Sqrt[a + b*x + c*x^2]])/(16*c^(3/2)*h^6*(a + b*x + c*x^2)^(3/2
)) - ((80*c^2*f*g^4 - 48*c^2*e*g^3*h - 112*b*c*f*g^3*h + 24*c^2*d
*g^2*h^2 + 60*b*c*e*g^2*h^2 + 35*b^2*f*g^2*h^2 + 76*a*c*f*g^2*h^2
 - 24*b*c*d*g*h^3 - 15*b^2*e*g*h^3 - 36*a*c*e*g*h^3 - 40*a*b*f*g*
h^3 + 3*b^2*d*h^4 + 12*a*c*d*h^4 + 12*a*b*e*h^4 + 8*a^2*f*h^4)*(a
 + x*(b + c*x))^(3/2)*Log[-(b*g) + 2*a*h - 2*c*g*x + b*h*x + 2*Sq
rt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2]])/(8*h^6*Sqrt[c*g
^2 - b*g*h + a*h^2]*(a + b*x + c*x^2)^(3/2))
```

Maple [B] time = 0.043, size = 26596, normalized size = 32.3

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+b*x+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^3,x)

[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^3,x, algorithm="maxi

[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((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^3,x, algorithm="fric

[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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**3,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((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^3,x, algorithm="giac
```

```
[Out] Exception raised: TypeError
```

3.203 $\int \frac{(a+bx+cx^2)^{3/2}(d+ex+fx^2)}{(g+hx)^4}\,dx$

Optimal. Leaf size=833

$$-\frac{\left(fg^2-h(eg-dh)\right)\left(cx^2+bx+a\right)^{5/2}}{3h\left(cg^2-bhg+ah^2\right)(g+hx)^3}$$

$$-\frac{\left(2cg\left(-\frac{10fg^2}{h}+4eg-dh\right)-6ah(3fg-eh)+b\left(17fg^2-h(5eg+dh)\right)+2h\left(-\frac{5cfg^2}{h}+2ceg+3bfg-2cdh-3afh\right)x\right)(c}{12h^2\left(cg^2-bhg+ah^2\right)(g+hx)^2}$$

$$-\frac{\left(8c^2\left(10fg^2-h(4eg-dh)\right)g^2-2ch\left(3bg\left(18fg^2-6ehg+dh^2\right)-2ah\left(23fg^2-8ehg+2dh^2\right)\right)+h^2\left(\left(29fg^2-h(5eg+d\right.\right.\right.}{}$$

$$+\frac{\left(8\left(10fg^2-h(4eg-dh)\right)c^2-12h(4bfg-beh-afh)c+3b^2fh^2\right)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{cx^2+bx+a}}\right)}{8\sqrt{c}h^6}$$

$$-\frac{\left(16c^3\left(10fg^2-h(4eg-dh)\right)g^3-24c^2h\left(bg\left(14fg^2-5ehg+dh^2\right)-ah\left(11fg^2-4ehg+dh^2\right)\right)g-bh^3\left(\left(35fg^2-5ehg\right.\right.\right.}{}$$

```
[Out] -((8*c^2*g^2*(10*f*g^2 - h*(4*e*g - d*h)) - 2*c*h*(3*b*g*(18*f*g^
2 - 6*e*g*h + d*h^2) - 2*a*h*(23*f*g^2 - 8*e*g*h + 2*d*h^2)) + h^
2*(12*a^2*f*h^2 - 6*a*b*h*(7*f*g - e*h) + b^2*(29*f*g^2 - h*(5*e*
g + d*h))) + 2*h*(3*b*f*h^2*(b*g - a*h) + 2*c^2*g*(10*f*g^2 - h*(
4*e*g - d*h)) + c*h*(6*a*h*(3*f*g - e*h) - b*(22*f*g^2 - 7*e*g*h
+ d*h^2)))*x)*Sqrt[a + b*x + c*x^2])/(8*h^5*(c*g^2 - b*g*h + a*h^
2)*(g + h*x)) - ((2*c*g*(4*e*g - (10*f*g^2)/h - d*h) - 6*a*h*(3*f
*g - e*h) + b*(17*f*g^2 - h*(5*e*g + d*h)) + 2*h*(2*c*e*g + 3*b*f
*g - (5*c*f*g^2)/h - 2*c*d*h - 3*a*f*h)*x)*(a + b*x + c*x^2)^(3/2
))/(12*h^2*(c*g^2 - b*g*h + a*h^2)*(g + h*x)^2) - ((f*g^2 - h*(e*
g - d*h))*(a + b*x + c*x^2)^(5/2))/(3*h*(c*g^2 - b*g*h + a*h^2)*(
g + h*x)^3) + ((3*b^2*f*h^2 - 12*c*h*(4*b*f*g - b*e*h - a*f*h) +
8*c^2*(10*f*g^2 - h*(4*e*g - d*h)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c
]*Sqrt[a + b*x + c*x^2])])/(8*Sqrt[c]*h^6) - ((16*c^3*g^3*(10*f*g
^2 - h*(4*e*g - d*h)) - b*h^3*(24*a^2*f*h^2 - 6*a*b*h*(10*f*g - e
*h) + b^2*(35*f*g^2 - 5*e*g*h - d*h^2)) + 6*c*h^2*(4*a^2*h^2*(4*f
*g - e*h) + b^2*g*(35*f*g^2 - 10*e*g*h + d*h^2) - 2*a*b*h*(25*f*g
^2 - 7*e*g*h + d*h^2)) - 24*c^2*g*h*(b*g*(14*f*g^2 - 5*e*g*h + d*
h^2) - a*h*(11*f*g^2 - 4*e*g*h + d*h^2)))*ArcTanh[(b*g - 2*a*h +
(2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*
x^2])])/(16*h^6*(c*g^2 - b*g*h + a*h^2)^(3/2))
```

Rubi [A] time = 6.80611, antiderivative size = 829, normalized size of antiderivative = 1., number of

steps used = 8, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$-\frac{\left(fg^2-h(eg-dh)\right)\left(cx^2+bx+a\right)^{5/2}}{3h\left(cg^2-bhg+ah^2\right)(g+hx)^3}$$
$$-\frac{\left(17bfg^2+2c\left(-\frac{10fg^2}{h}+4eg-dh\right)g-bh(5eg+dh)-6ah(3fg-eh)+2h\left(-\frac{5cfg^2}{h}+2ceg+3bfg-2cdh-3afh\right)x\right)(cx}{12h^2\left(cg^2-bhg+ah^2\right)(g+hx)^2}$$
$$-\frac{\left(12a^2fh^3-6ab(7fg-eh)h^2+4ac\left(23fg^2-2h(4eg-dh)\right)h+b^2\left(29fg^2-h(5eg+dh)\right)h-8c^2g^2\left(-\frac{10fg^2}{h}+4eg-dh\right)\right.}{8}$$
$$+\frac{\left(8\left(10fg^2-h(4eg-dh)\right)c^2-12h(4bfg-beh-afh)c+3b^2fh^2\right)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{cx^2+bx+a}}\right)}{8\sqrt{c}h^6}$$
$$-\frac{\left(16\left(10fg^5-g^3h(4eg-dh)\right)c^3-24gh\left(bg\left(14fg^2-5ehg+dh^2\right)-ah\left(11fg^2-4ehg+dh^2\right)\right)c^2+6h^2\left(g\left(35fg^2-10eh\right.\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^4,x]
```

```
[Out] -((12*a^2*f*h^3 - 8*c^2*g^2*(4*e*g - (10*f*g^2)/h - d*h) - 6*a*b*
h^2*(7*f*g - e*h) + 4*a*c*h*(23*f*g^2 - 2*h*(4*e*g - d*h)) - 6*b*
c*g*(18*f*g^2 - h*(6*e*g - d*h)) + b^2*h*(29*f*g^2 - h*(5*e*g + d
*h)) + 2*(3*b*f*h^2*(b*g - a*h) + 2*c^2*(10*f*g^3 - g*h*(4*e*g -
d*h)) - c*h*(22*b*f*g^2 - b*h*(7*e*g - d*h) - 6*a*h*(3*f*g - e*h)
))*x)*Sqrt[a + b*x + c*x^2])/(8*h^4*(c*g^2 - b*g*h + a*h^2)*(g +
h*x)) - ((17*b*f*g^2 + 2*c*g*(4*e*g - (10*f*g^2)/h - d*h) - b*h*(
5*e*g + d*h) - 6*a*h*(3*f*g - e*h) + 2*h*(2*c*e*g + 3*b*f*g - (5*
c*f*g^2)/h - 2*c*d*h - 3*a*f*h)*x)*(a + b*x + c*x^2)^(3/2))/(12*h
^2*(c*g^2 - b*g*h + a*h^2)*(g + h*x)^2) - ((f*g^2 - h*(e*g - d*h)
)*(a + b*x + c*x^2)^(5/2))/(3*h*(c*g^2 - b*g*h + a*h^2)*(g + h*x)
^3) + ((3*b^2*f*h^2 - 12*c*h*(4*b*f*g - b*e*h - a*f*h) + 8*c^2*(1
0*f*g^2 - h*(4*e*g - d*h)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a
 + b*x + c*x^2])])/(8*Sqrt[c]*h^6) - ((16*c^3*(10*f*g^5 - g^3*h*(
4*e*g - d*h)) - b*h^3*(24*a^2*f*h^2 - 6*a*b*h*(10*f*g - e*h) + b^
2*(35*f*g^2 - 5*e*g*h - d*h^2)) + 6*c*h^2*(4*a^2*h^2*(4*f*g - e*h
) + b^2*g*(35*f*g^2 - 10*e*g*h + d*h^2) - 2*a*b*h*(25*f*g^2 - 7*e
*g*h + d*h^2)) - 24*c^2*g*h*(b*g*(14*f*g^2 - 5*e*g*h + d*h^2) - a
*h*(11*f*g^2 - 4*e*g*h + d*h^2)))*ArcTanh[(b*g - 2*a*h + (2*c*g -
 b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/
(16*h^6*(c*g^2 - b*g*h + a*h^2)^(3/2))
```

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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**4,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 6.98078, size = 1485, normalized size = 1.78

$$\frac{\left(\frac{-16cfg+4ceh+5bfh}{4h^5}+\frac{cfx}{2h^4}+\frac{-188c^2fg^4+104c^2ehg^3+272bcfhg^3-44c^2dh^2g^2-134bceh^2g^2-87b^2fh^2g^2-200acfh^2g^2+44bcdh^3g+33b^2eh^3g+92aceh^3g+1}{24h^5(cg^2-bhg+ah^2)(g+hx)}\right.}{}$$

$$+\frac{\left(-160c^3fg^5+64c^3ehg^4+336bc^2fhg^4-16c^3dh^2g^3-120bc^2eh^2g^3-264ac^2fh^2g^3-210b^2cfh^2g^3+24bc^2dh^3g^2+96ac^2eh\right.}{}$$

$$+\frac{\left(\frac{10c^3fg^4}{h^6(cg^2-bhg+ah^2)}+\frac{c^3dg^2}{h^4(cg^2-bhg+ah^2)}+\frac{51b^2cfg^2}{8h^4(cg^2-bhg+ah^2)}-\frac{c^2(bd+4ae)g}{h^3(cg^2-bhg+ah^2)}-\frac{3b^3fg}{8h^3(cg^2-bhg+ah^2)}+\frac{ac^2d}{h^2(cg^2-bhg+ah^2)}+\frac{3ab^2f}{8h^2(cg^2-bhg+ah\right.}{\sqrt{c}\,(cx}$$

$$-\frac{\left(-160c^3fg^5+64c^3ehg^4+336bc^2fhg^4-16c^3dh^2g^3-120bc^2eh^2g^3-264ac^2fh^2g^3-210b^2cfh^2g^3+24bc^2dh^3g^2+96ac^2e\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^4,x]
```

```
[Out] ((a + x*(b + c*x))^(3/2)*((-16*c*f*g + 4*c*e*h + 5*b*f*h)/(4*h^5)
 + (c*f*x)/(2*h^4) - ((c*g^2 - b*g*h + a*h^2)*(f*g^2 - e*g*h + d*
h^2))/(3*h^5*(g + h*x)^3) + (26*c*f*g^3 - 20*c*e*g^2*h - 19*b*f*g
^2*h + 14*c*d*g*h^2 + 13*b*e*g*h^2 + 12*a*f*g*h^2 - 7*b*d*h^3 - 6
*a*e*h^3)/(12*h^5*(g + h*x)^2) + (-188*c^2*f*g^4 + 104*c^2*e*g^3*
h + 272*b*c*f*g^3*h - 44*c^2*d*g^2*h^2 - 134*b*c*e*g^2*h^2 - 87*b
^2*f*g^2*h^2 - 200*a*c*f*g^2*h^2 + 44*b*c*d*g*h^3 + 33*b^2*e*g*h^
3 + 92*a*c*e*g*h^3 + 108*a*b*f*g*h^3 - 3*b^2*d*h^4 - 32*a*c*d*h^4
 - 30*a*b*e*h^4 - 24*a^2*f*h^4)/(24*h^5*(c*g^2 - b*g*h + a*h^2)*(
g + h*x))))/(a + b*x + c*x^2) + ((-160*c^3*f*g^5 + 64*c^3*e*g^4*h
 + 336*b*c^2*f*g^4*h - 16*c^3*d*g^3*h^2 - 120*b*c^2*e*g^3*h^2 - 2
10*b^2*c*f*g^3*h^2 - 264*a*c^2*f*g^3*h^2 + 24*b*c^2*d*g^2*h^3 + 6
0*b^2*c*e*g^2*h^3 + 96*a*c^2*e*g^2*h^3 + 35*b^3*f*g^2*h^3 + 300*a
*b*c*f*g^2*h^3 - 6*b^2*c*d*g*h^4 - 24*a*c^2*d*g*h^4 - 5*b^3*e*g*h
^4 - 84*a*b*c*e*g*h^4 - 60*a*b^2*f*g*h^4 - 96*a^2*c*f*g*h^4 - b^3
*d*h^5 + 12*a*b*c*d*h^5 + 6*a*b^2*e*h^5 + 24*a^2*c*e*h^5 + 24*a^2
*b*f*h^5)*(a + x*(b + c*x))^(3/2)*Log[g + h*x])/(16*h^6*(c*g^2 -
b*g*h + a*h^2)^(3/2)*(a + b*x + c*x^2)^(3/2)) + (((10*c^3*f*g^4)/
(h^6*(c*g^2 - b*g*h + a*h^2)) - (4*(c^3*e*g^3 + 4*b*c^2*f*g^3))/(
h^5*(c*g^2 - b*g*h + a*h^2)) + (c^3*d*g^2)/(h^4*(c*g^2 - b*g*h +
a*h^2)) + (51*b^2*c*f*g^2)/(8*h^4*(c*g^2 - b*g*h + a*h^2)) + (11*
b*c^2*e*g^2 + 23*a*c^2*f*g^2)/(2*h^4*(c*g^2 - b*g*h + a*h^2)) - (
c^2*(b*d + 4*a*e)*g)/(h^3*(c*g^2 - b*g*h + a*h^2)) - (3*b^3*f*g)/
```

```
(8*h^3*(c*g^2 - b*g*h + a*h^2)) - (3*(b^2*c*e*g + 5*a*b*c*f*g))/(
2*h^3*(c*g^2 - b*g*h + a*h^2)) + (a*c^2*d)/(h^2*(c*g^2 - b*g*h +
a*h^2)) + (3*a*b^2*f)/(8*h^2*(c*g^2 - b*g*h + a*h^2)) + (3*(a*b*c
*e + a^2*c*f))/(2*h^2*(c*g^2 - b*g*h + a*h^2)))*(a + x*(b + c*x))
^(3/2)*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + b*x + c*x^2]])/(Sqrt[c]
*(a + b*x + c*x^2)^(3/2)) - ((-160*c^3*f*g^5 + 64*c^3*e*g^4*h + 3
36*b*c^2*f*g^4*h - 16*c^3*d*g^3*h^2 - 120*b*c^2*e*g^3*h^2 - 210*b
^2*c*f*g^3*h^2 - 264*a*c^2*f*g^3*h^2 + 24*b*c^2*d*g^2*h^3 + 60*b^
2*c*e*g^2*h^3 + 96*a*c^2*e*g^2*h^3 + 35*b^3*f*g^2*h^3 + 300*a*b*c
*f*g^2*h^3 - 6*b^2*c*d*g*h^4 - 24*a*c^2*d*g*h^4 - 5*b^3*e*g*h^4 -
 84*a*b*c*e*g*h^4 - 60*a*b^2*f*g*h^4 - 96*a^2*c*f*g*h^4 - b^3*d*h
^5 + 12*a*b*c*d*h^5 + 6*a*b^2*e*h^5 + 24*a^2*c*e*h^5 + 24*a^2*b*f
*h^5)*(a + x*(b + c*x))^(3/2)*Log[-(b*g) + 2*a*h - 2*c*g*x + b*h*
x + 2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2]])/(16*h^6
*(c*g^2 - b*g*h + a*h^2)^(3/2)*(a + b*x + c*x^2)^(3/2))
```

Maple [B] time = 0.057, size = 40092, normalized size = 48.1

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+b*x+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^4,x)

[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^4,x, algorithm="maxi

[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((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^4,x, algorithm="fric
```

```
[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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**4,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((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^4,x, algorithm="giac
```

```
[Out] Exception raised: TypeError
```

3.204 $\int \frac{(a+bx+cx^2)^{3/2}(d+ex+fx^2)}{(g+hx)^5}\,dx$

Optimal. Leaf size=1097

result too large to display

```
[Out] ((64*c^3*g^4*(5*f*g - e*h) - 16*c^2*g^2*h*(b*g*(41*f*g - 7*e*h) -
 8*a*h*(5*f*g - e*h)) + 4*c*h^2*(2*b^2*g^2*(46*f*g - 5*e*h) + 16*
a^2*h^2*(5*f*g - e*h) - a*b*h*(173*f*g^2 - 25*e*g*h - 3*d*h^2)) -
 b*h^3*(48*a^2*f*h^2 - 8*a*b*h*(10*f*g + e*h) + b^2*(35*f*g^2 + 5
*e*g*h + 3*d*h^2)) + 2*c*h*(16*c^2*g^3*(5*f*g - e*h) - 4*c*h*(6*b
*g^2*(6*f*g - e*h) - a*h*(35*f*g^2 - h*(7*e*g - 3*d*h))) + h^2*(4
8*a^2*f*h^2 - 8*a*b*h*(14*f*g - e*h) + b^2*(61*f*g^2 - h*(5*e*g +
 3*d*h))))*x)*Sqrt[a + b*x + c*x^2])/(64*h^5*(c*g^2 - b*g*h + a*h
^2)^2*(g + h*x)) - ((16*c^2*g^4*(5*f*g - e*h) - h^2*(16*a^2*h^2*(
f*g - 2*e*h) - b^2*g*(35*f*g^2 + 5*e*g*h + 3*d*h^2) + 4*a*b*h*(7*
f*g^2 + 7*e*g*h + 3*d*h^2)) - 4*c*g*h*(b*g*(31*f*g^2 - 5*e*g*h +
3*d*h^2) - a*h*(25*f*g^2 - 5*e*g*h + 9*d*h^2)) + 3*h*(8*c^2*g^2*(
5*f*g^2 - h*(e*g + d*h)) + h^2*(16*a^2*f*h^2 - 8*a*b*h*(6*f*g - e
*h) + b^2*(29*f*g^2 - 5*e*g*h - 3*d*h^2)) - 4*c*h*(2*b*g*(9*f*g^2
 - 2*e*g*h - d*h^2) - a*h*(17*f*g^2 - 5*e*g*h + d*h^2))))*x)*(a +
b*x + c*x^2)^(3/2))/(96*h^3*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x)^3
) - ((f*g^2 - h*(e*g - d*h))*(a + b*x + c*x^2)^(5/2))/(4*h*(c*g^2
 - b*g*h + a*h^2)*(g + h*x)^4) - (Sqrt[c]*(10*c*f*g - 2*c*e*h - 3
*b*f*h)*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(
2*h^6) + ((128*c^4*g^5*(5*f*g - e*h) - 64*c^3*g^3*h*(b*g*(28*f*g
- 5*e*h) - 5*a*h*(5*f*g - e*h)) + 8*c*h^3*(24*a^3*f*h^3 - 12*a^2*
b*h^2*(10*f*g - e*h) - 5*b^3*g^2*(14*f*g - e*h) + 3*a*b^2*h*(55*f
*g^2 - 5*e*g*h - d*h^2)) - 48*c^2*h^2*(10*a*b*g^2*h*(6*f*g - e*h)
 - 5*b^2*g^3*(7*f*g - e*h) - a^2*h^2*(25*f*g^2 - 5*e*g*h + d*h^2)
) + b^2*h^4*(48*a^2*f*h^2 - 8*a*b*h*(10*f*g + e*h) + b^2*(35*f*g^
2 + 5*e*g*h + 3*d*h^2)))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/
(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(128*h^6*
(c*g^2 - b*g*h + a*h^2)^(5/2))
```

Rubi [A] time = 8.61963, antiderivative size = 1096, normalized size of antiderivative = 1., number

of steps used = 8, number of rules used = 7, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.219$

$$-\frac{\left(fg^2-h(eg-dh)\right)\left(cx^2+bx+a\right)^{5/2}}{4h\left(cg^2-bhg+ah^2\right)(g+hx)^4}$$

$$-\frac{\left(\frac{16c^2(5fg-eh)g^4}{h}-4c\left(bg\left(31fg^2-5ehg+3dh^2\right)-ah\left(25fg^2-5ehg+9dh^2\right)\right)g-h\left(-g\left(35fg^2+5ehg+3dh^2\right)b^2+4ah\left(\right.\right.\right.}{}$$

$$+\frac{\left(\frac{64c^3(5fg-eh)g^4}{h}-16c^2(bg(41fg-7eh)-8ah(5fg-eh))g^2+4ch\left(2b^2(46fg-5eh)g^2+16a^2h^2(5fg-eh)-abh\left(173fg^2-\right.\right.\right.}{}$$

$$-\frac{\sqrt{c}(10cfg-2ceh-3bfh)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{cx^2+bx+a}}\right)}{2h^6}$$

$$+\frac{\left(128c^4(5fg-eh)g^5-64c^3h(bg(28fg-5eh)-5ah(5fg-eh))g^3+8ch^3\left(-5g^2(14fg-eh)b^3+3ah\left(55fg^2-5ehg-dh^2\right)\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^5,x]
```

```
[Out] (((64*c^3*g^4*(5*f*g - e*h))/h - 16*c^2*g^2*(b*g*(41*f*g - 7*e*h)
 - 8*a*h*(5*f*g - e*h)) + 4*c*h*(2*b^2*g^2*(46*f*g - 5*e*h) + 16*
a^2*h^2*(5*f*g - e*h) - a*b*h*(173*f*g^2 - 25*e*g*h - 3*d*h^2)) -
 b*h^2*(48*a^2*f*h^2 - 8*a*b*h*(10*f*g + e*h) + b^2*(35*f*g^2 + 5
*e*g*h + 3*d*h^2)) + 2*c*(16*c^2*g^3*(5*f*g - e*h) - 4*c*h*(6*b*g
^2*(6*f*g - e*h) - a*h*(35*f*g^2 - h*(7*e*g - 3*d*h))) + h^2*(48*
a^2*f*h^2 - 8*a*b*h*(14*f*g - e*h) + b^2*(61*f*g^2 - h*(5*e*g + 3
*d*h))))*x)*Sqrt[a + b*x + c*x^2])/(64*h^4*(c*g^2 - b*g*h + a*h^2
)^2*(g + h*x)) - (((16*c^2*g^4*(5*f*g - e*h))/h - h*(16*a^2*h^2*(
f*g - 2*e*h) - b^2*g*(35*f*g^2 + 5*e*g*h + 3*d*h^2) + 4*a*b*h*(7*
f*g^2 + 7*e*g*h + 3*d*h^2)) - 4*c*g*(b*g*(31*f*g^2 - 5*e*g*h + 3*
d*h^2) - a*h*(25*f*g^2 - 5*e*g*h + 9*d*h^2)) + 3*h*((40*c^2*f*g^4
)/h + 16*a^2*f*h^3 - 8*c^2*g^2*(e*g + d*h) - 8*a*b*h^2*(6*f*g - e
*h) + 4*a*c*h*(17*f*g^2 - h*(5*e*g - d*h)) - 8*b*c*g*(9*f*g^2 - h
*(2*e*g + d*h)) + b^2*h*(29*f*g^2 - h*(5*e*g + 3*d*h)))*x)*(a + b
*x + c*x^2)^(3/2))/(96*h^2*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x)^3)
 - ((f*g^2 - h*(e*g - d*h))*(a + b*x + c*x^2)^(5/2))/(4*h*(c*g^2
- b*g*h + a*h^2)*(g + h*x)^4) - (Sqrt[c]*(10*c*f*g - 2*c*e*h - 3*
b*f*h)*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(2
*h^6) + ((128*c^4*g^5*(5*f*g - e*h) - 64*c^3*g^3*h*(b*g*(28*f*g -
 5*e*h) - 5*a*h*(5*f*g - e*h)) + 8*c*h^3*(24*a^3*f*h^3 - 12*a^2*b
*h^2*(10*f*g - e*h) - 5*b^3*g^2*(14*f*g - e*h) + 3*a*b^2*h*(55*f*
g^2 - 5*e*g*h - d*h^2)) - 48*c^2*h^2*(10*a*b*g^2*h*(6*f*g - e*h)
- 5*b^2*g^3*(7*f*g - e*h) - a^2*h^2*(25*f*g^2 - 5*e*g*h + d*h^2))
 + b^2*h^4*(48*a^2*f*h^2 - 8*a*b*h*(10*f*g + e*h) + b^2*(35*f*g^2
 + 5*e*g*h + 3*d*h^2)))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(
2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(128*h^6*(
c*g^2 - b*g*h + a*h^2)^(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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**5,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 7.46162, size = 1835, normalized size = 1.67

result too large to display

Antiderivative was successfully verified.

```
[In] Integrate[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^5,x]
```

```
[Out] ((a + x*(b + c*x))^(3/2)*((c*f)/h^5 - ((c*g^2 - b*g*h + a*h^2)*(f
*g^2 - e*g*h + d*h^2))/(4*h^5*(g + h*x)^4) + (34*c*f*g^3 - 26*c*e
*g^2*h - 25*b*f*g^2*h + 18*c*d*g*h^2 + 17*b*e*g*h^2 + 16*a*f*g*h^
2 - 9*b*d*h^3 - 8*a*e*h^3)/(24*h^5*(g + h*x)^3) + (-344*c^2*f*g^4
 + 184*c^2*e*g^3*h + 504*b*c*f*g^3*h - 72*c^2*d*g^2*h^2 - 240*b*c
*e*g^2*h^2 - 163*b^2*f*g^2*h^2 - 380*a*c*f*g^2*h^2 + 72*b*c*d*g*h
^3 + 59*b^2*e*g*h^3 + 172*a*c*e*g*h^3 + 208*a*b*f*g*h^3 - 3*b^2*d
*h^4 - 60*a*c*d*h^4 - 56*a*b*e*h^4 - 48*a^2*f*h^4)/(96*h^5*(c*g^2
 - b*g*h + a*h^2)*(g + h*x)^2) + (1232*c^3*f*g^5 - 400*c^3*e*g^4*
h - 2680*b*c^2*f*g^4*h + 48*c^3*d*g^3*h^2 + 776*b*c^2*e*g^3*h^2 +
 1718*b^2*c*f*g^3*h^2 + 2296*a*c^2*f*g^3*h^2 - 72*b*c^2*d*g^2*h^3
 - 382*b^2*c*e*g^2*h^3 - 728*a*c^2*e*g^2*h^3 - 279*b^3*f*g^2*h^3
- 2716*a*b*c*f*g^2*h^3 + 6*b^2*c*d*g*h^4 + 120*a*c^2*d*g*h^4 + 15
*b^3*e*g*h^4 + 668*a*b*c*e*g*h^4 + 528*a*b^2*f*g*h^4 + 992*a^2*c*
f*g*h^4 + 9*b^3*d*h^5 - 60*a*b*c*d*h^5 - 24*a*b^2*e*h^5 - 256*a^2
*c*e*h^5 - 240*a^2*b*f*h^5)/(192*h^5*(c*g^2 - b*g*h + a*h^2)^2*(g
 + h*x))))/(a + b*x + c*x^2) + ((640*c^4*f*g^6 - 128*c^4*e*g^5*h
- 1792*b*c^3*f*g^5*h + 320*b*c^3*e*g^4*h^2 + 1680*b^2*c^2*f*g^4*h
^2 + 1600*a*c^3*f*g^4*h^2 - 240*b^2*c^2*e*g^3*h^3 - 320*a*c^3*e*g
^3*h^3 - 560*b^3*c*f*g^3*h^3 - 2880*a*b*c^2*f*g^3*h^3 + 40*b^3*c*
e*g^2*h^4 + 480*a*b*c^2*e*g^2*h^4 + 35*b^4*f*g^2*h^4 + 1320*a*b^2
*c*f*g^2*h^4 + 1200*a^2*c^2*f*g^2*h^4 + 5*b^4*e*g*h^5 - 120*a*b^2
*c*e*g*h^5 - 240*a^2*c^2*e*g*h^5 - 80*a*b^3*f*g*h^5 - 960*a^2*b*c
*f*g*h^5 + 3*b^4*d*h^6 - 24*a*b^2*c*d*h^6 + 48*a^2*c^2*d*h^6 - 8*
a*b^3*e*h^6 + 96*a^2*b*c*e*h^6 + 48*a^2*b^2*f*h^6 + 192*a^3*c*f*h
^6)*(a + x*(b + c*x))^(3/2)*Log[g + h*x])/(128*h^6*(c*g^2 - b*g*h
 + a*h^2)^(5/2)*(a + b*x + c*x^2)^(3/2)) + (((-5*c^4*f*g^5)/(h^6*
```

```
(c*g^2 - b*g*h + a*h^2)^2) + (c^4*e*g^4)/(h^5*(c*g^2 - b*g*h + a*
h^2)^2) + (23*b*c^3*f*g^4)/(2*h^5*(c*g^2 - b*g*h + a*h^2)^2) - (2
*c^2*(b*c*e + 4*b^2*f + 5*a*c*f)*g^3)/(h^4*(c*g^2 - b*g*h + a*h^2
)^2) + (3*b^3*c*f*g^2)/(2*h^3*(c*g^2 - b*g*h + a*h^2)^2) + (c^2*(
b^2*e + 2*a*c*e + 13*a*b*f)*g^2)/(h^3*(c*g^2 - b*g*h + a*h^2)^2)
+ (-2*a*b*c^2*e*g - 3*a*b^2*c*f*g - 5*a^2*c^2*f*g)/(h^2*(c*g^2 -
b*g*h + a*h^2)^2) + (a^2*c^2*e)/(h*(c*g^2 - b*g*h + a*h^2)^2) + (
3*a^2*b*c*f)/(2*h*(c*g^2 - b*g*h + a*h^2)^2))*(a + x*(b + c*x))^(
3/2)*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + b*x + c*x^2]])/(Sqrt[c]*(
a + b*x + c*x^2)^(3/2)) - ((640*c^4*f*g^6 - 128*c^4*e*g^5*h - 179
2*b*c^3*f*g^5*h + 320*b*c^3*e*g^4*h^2 + 1680*b^2*c^2*f*g^4*h^2 +
1600*a*c^3*f*g^4*h^2 - 240*b^2*c^2*e*g^3*h^3 - 320*a*c^3*e*g^3*h^
3 - 560*b^3*c*f*g^3*h^3 - 2880*a*b*c^2*f*g^3*h^3 + 40*b^3*c*e*g^2
*h^4 + 480*a*b*c^2*e*g^2*h^4 + 35*b^4*f*g^2*h^4 + 1320*a*b^2*c*f*
g^2*h^4 + 1200*a^2*c^2*f*g^2*h^4 + 5*b^4*e*g*h^5 - 120*a*b^2*c*e*
g*h^5 - 240*a^2*c^2*e*g*h^5 - 80*a*b^3*f*g*h^5 - 960*a^2*b*c*f*g*
h^5 + 3*b^4*d*h^6 - 24*a*b^2*c*d*h^6 + 48*a^2*c^2*d*h^6 - 8*a*b^3
*e*h^6 + 96*a^2*b*c*e*h^6 + 48*a^2*b^2*f*h^6 + 192*a^3*c*f*h^6)*(
a + x*(b + c*x))^(3/2)*Log[-(b*g) + 2*a*h - 2*c*g*x + b*h*x + 2*S
qrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2]])/(128*h^6*(c*g^
2 - b*g*h + a*h^2)^(5/2)*(a + b*x + c*x^2)^(3/2))
```

Maple [B] time = 0.081, size = 57957, normalized size = 52.8

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+b*x+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^5,x)

[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^5,x, algorithm="maxi

[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((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^5,x, algorithm="fric
```

```
[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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**5,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((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^5,x, algorithm="giac
```

```
[Out] Exception raised: TypeError
```

3.205 $\int \frac{(a+bx+cx^2)^{3/2}(d+ex+fx^2)}{(g+hx)^6}\,dx$

Optimal. Leaf size=1226

result too large to display

```
[Out] -((128*c^4*f*g^7 - 32*c^3*f*g^5*h*(11*b*g - 10*a*h) + 8*c^2*g*h^2
*(38*b^2*f*g^4 + 2*a^2*h^2*(13*f*g^2 + 3*d*h^2) - a*b*g*h*(65*f*g
^2 + 3*d*h^2)) - 2*c*h^3*(8*a^3*h^3*(2*f*g - 3*e*h) - 2*a*b^2*g^2
*h*(34*f*g + 3*e*h) + 4*a^2*b*h^2*(5*f*g^2 + 6*e*g*h + 3*d*h^2) +
 b^3*(35*f*g^4 - 3*d*g^2*h^2)) - b*h^4*(b*g - 2*a*h)*(16*a^2*f*h^
2 - 2*a*b*h*(10*f*g + 3*e*h) + b^2*(7*f*g^2 + 3*h*(e*g + d*h))) +
 h*(128*c*f*(c*g^2 - h*(b*g - a*h))^3 + (2*c*g - b*h)*(32*c^3*f*g
^5 - 8*c^2*g*h*(10*b*f*g^3 - 11*a*f*g^2*h + 3*a*d*h^3) + 2*c*h^2*
(4*a^2*h^2*(10*f*g - 3*e*h) - 6*a*b*h*(11*f*g^2 - e*g*h - d*h^2)
+ b^2*(29*f*g^3 + 3*d*g*h^2)) - b*h^3*(16*a^2*f*h^2 - 2*a*b*h*(10
*f*g + 3*e*h) + b^2*(7*f*g^2 + 3*h*(e*g + d*h)))))*x)*Sqrt[a + b*
x + c*x^2])/(128*h^5*(c*g^2 - b*g*h + a*h^2)^3*(g + h*x)^2) - ((1
6*c^2*f*g^5 - 2*c*g*h*(13*b*f*g^3 - 10*a*f*g^2*h + 3*b*d*g*h^2 -
6*a*d*h^3) - h^2*(4*a^2*h^2*(2*f*g - 3*e*h) - b^2*g*(7*f*g^2 + 3*
h*(e*g + d*h)) + 2*a*b*h*(f*g^2 + 3*h*(2*e*g + d*h))) + h*(4*c^2*
(7*f*g^4 - 3*d*g^2*h^2) + 2*c*g*h*(2*a*h*(14*f*g - 3*e*h) - b*(28
*f*g^2 - 3*e*g*h - 6*d*h^2)) + h^2*(16*a^2*f*h^2 - 2*a*b*h*(22*f*
g - 3*e*h) + b^2*(25*f*g^2 - 3*h*(e*g + d*h))))*x)*(a + b*x + c*x
^2)^(3/2))/(48*h^3*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x)^4) - ((f*g
^2 - h*(e*g - d*h))*(a + b*x + c*x^2)^(5/2))/(5*h*(c*g^2 - b*g*h
+ a*h^2)*(g + h*x)^5) + (c^(3/2)*f*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]
*Sqrt[a + b*x + c*x^2])])/h^6 - ((256*c^5*f*g^7 - 896*c^4*f*g^5*h
*(b*g - a*h) + 32*c^3*g*h^2*(35*b^2*f*g^4 - 70*a*b*f*g^3*h + a^2*
h^2*(35*f*g^2 - 3*d*h^2)) - 16*c^2*h^3*(35*b^3*f*g^4 - 6*a^3*h^3*
(6*f*g - e*h) + 3*a^2*b*h^2*(35*f*g^2 - e*g*h - d*h^2) - 3*a*b^2*
g*h*(35*f*g^2 + d*h^2)) + b^3*h^5*(16*a^2*f*h^2 - 2*a*b*h*(10*f*g
 + 3*e*h) + b^2*(7*f*g^2 + 3*h*(e*g + d*h))) - 2*b*c*h^4*(96*a^3*
f*h^3 - 24*a^2*b*h^2*(8*f*g + e*h) - b^3*(35*f*g^3 - 3*d*g*h^2) +
 4*a*b^2*h*(35*f*g^2 + 3*h*(e*g + d*h))))*ArcTanh[(b*g - 2*a*h +
(2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*
x^2])])/(256*h^6*(c*g^2 - b*g*h + a*h^2)^(7/2))
```

Rubi [A] time = 11.4272, antiderivative size = 1223, normalized size of antiderivative = 1., number

of steps used = 8, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$-\frac{\left(fg^2-h(eg-dh)\right)\left(cx^2+bx+a\right)^{5/2}}{5h\left(cg^2-bhg+ah^2\right)(g+hx)^5}$$

$$-\frac{\left(16c^2fg^5-2ch\left(13bfg^3-10afhg^2+3bdh^2g-6adh^3\right)g-h^2\left(-g\left(7fg^2+3h(eg+dh)\right)b^2+2ah\left(fg^2+3h(2eg+dh)\right)b\right.\right.}{}$$

$$-\frac{\left(\frac{128c^4fg^7}{h}-32c^3f(11bg-10ah)g^5+8c^2h\left(38b^2fg^4-abh\left(65fg^2+3dh^2\right)g+2a^2h^2\left(13fg^2+3dh^2\right)\right)g-bh^3(bg-2ah)\left(\right.\right.}{}$$

$$+\frac{c^{3/2}f\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{cx^2+bx+a}}\right)}{h^6}$$

$$-\frac{\left(256c^5fg^7-896c^4fh(bg-ah)g^5+32c^3h^2\left(35b^2fg^4-70abfhg^3+a^2h^2\left(35fg^2-3dh^2\right)\right)g-16c^2h^3\left(35b^3fg^4-3ab^2h\left(\right.\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^6,x]
```

```
[Out] -((((128*c^4*f*g^7)/h - 32*c^3*f*g^5*(11*b*g - 10*a*h) + 8*c^2*g*h
*(38*b^2*f*g^4 + 2*a^2*h^2*(13*f*g^2 + 3*d*h^2) - a*b*g*h*(65*f*g
^2 + 3*d*h^2)) - b*h^3*(b*g - 2*a*h)*(16*a^2*f*h^2 - 2*a*b*h*(10*
f*g + 3*e*h) + b^2*(7*f*g^2 + 3*h*(e*g + d*h))) - 2*c*h^2*(8*a^3*
h^3*(2*f*g - 3*e*h) - 2*a*b^2*g^2*h*(34*f*g + 3*e*h) + b^3*(35*f*
g^4 - 3*d*g^2*h^2) + 4*a^2*b*h^2*(5*f*g^2 + 3*h*(2*e*g + d*h))) +
 (128*c*f*(c*g^2 - h*(b*g - a*h))^3 + (2*c*g - b*h)*(32*c^3*f*g^5
 - 8*c^2*g*h*(10*b*f*g^3 - 11*a*f*g^2*h + 3*a*d*h^3) + 2*c*h^2*(4
*a^2*h^2*(10*f*g - 3*e*h) - 6*a*b*h*(11*f*g^2 - e*g*h - d*h^2) +
b^2*(29*f*g^3 + 3*d*g*h^2)) - b*h^3*(16*a^2*f*h^2 - 2*a*b*h*(10*f
*g + 3*e*h) + b^2*(7*f*g^2 + 3*h*(e*g + d*h)))))*x)*Sqrt[a + b*x
+ c*x^2])/(128*h^4*(c*g^2 - b*g*h + a*h^2)^3*(g + h*x)^2) - ((16*
c^2*f*g^5 - 2*c*g*h*(13*b*f*g^3 - 10*a*f*g^2*h + 3*b*d*g*h^2 - 6*
a*d*h^3) - h^2*(4*a^2*h^2*(2*f*g - 3*e*h) - b^2*g*(7*f*g^2 + 3*h*
(e*g + d*h)) + 2*a*b*h*(f*g^2 + 3*h*(2*e*g + d*h))) + h^2*(16*a^2
*f*h^3 + 4*a*c*g*h*(14*f*g - 3*e*h) + c^2*((28*f*g^4)/h - 12*d*g^
2*h) + b^2*h*(25*f*g^2 - 3*h*(e*g + d*h)) - b*(56*c*f*g^3 - 6*c*g
*h*(e*g + 2*d*h) + 2*a*h^2*(22*f*g - 3*e*h)))*x)*(a + b*x + c*x^2
)^(3/2))/(48*h^3*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x)^4) - ((f*g^2
 - h*(e*g - d*h))*(a + b*x + c*x^2)^(5/2))/(5*h*(c*g^2 - b*g*h +
a*h^2)*(g + h*x)^5) + (c^(3/2)*f*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*S
qrt[a + b*x + c*x^2])])/h^6 - ((256*c^5*f*g^7 - 896*c^4*f*g^5*h*(
b*g - a*h) + 32*c^3*g*h^2*(35*b^2*f*g^4 - 70*a*b*f*g^3*h + a^2*h^
2*(35*f*g^2 - 3*d*h^2)) - 16*c^2*h^3*(35*b^3*f*g^4 - 6*a^3*h^3*(6
*f*g - e*h) + 3*a^2*b*h^2*(35*f*g^2 - e*g*h - d*h^2) - 3*a*b^2*g*
h*(35*f*g^2 + d*h^2)) + b^3*h^5*(16*a^2*f*h^2 - 2*a*b*h*(10*f*g +
 3*e*h) + b^2*(7*f*g^2 + 3*h*(e*g + d*h))) - 2*b*c*h^4*(96*a^3*f*
h^3 - 24*a^2*b*h^2*(8*f*g + e*h) - b^3*(35*f*g^3 - 3*d*g*h^2) + 4
*a*b^2*h*(35*f*g^2 + 3*h*(e*g + d*h))))*ArcTanh[(b*g - 2*a*h + (2
```

```
*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^
2])])/(256*h^6*(c*g^2 - b*g*h + a*h^2)^(7/2))
```

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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**6,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 8.03116, size = 2229, normalized size = 1.82

Result too large to show

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^6,x]
```

```
[Out] ((a + x*(b + c*x))^(3/2)*(-((c*g^2 - b*g*h + a*h^2)*(f*g^2 - e*g*
h + d*h^2))/(5*h^5*(g + h*x)^5) + (42*c*f*g^3 - 32*c*e*g^2*h - 31
*b*f*g^2*h + 22*c*d*g*h^2 + 21*b*e*g*h^2 + 20*a*f*g*h^2 - 11*b*d*
h^3 - 10*a*e*h^3)/(40*h^5*(g + h*x)^4) + (-548*c^2*f*g^4 + 288*c^
2*e*g^3*h + 808*b*c*f*g^3*h - 108*c^2*d*g^2*h^2 - 378*b*c*e*g^2*h
^2 - 263*b^2*f*g^2*h^2 - 616*a*c*f*g^2*h^2 + 108*b*c*d*g*h^3 + 93
*b^2*e*g*h^3 + 276*a*c*e*g*h^3 + 340*a*b*f*g*h^3 - 3*b^2*d*h^4 -
96*a*c*d*h^4 - 90*a*b*e*h^4 - 80*a^2*f*h^4)/(240*h^5*(c*g^2 - b*g
*h + a*h^2)*(g + h*x)^3) + (2608*c^3*f*g^5 - 768*c^3*e*g^4*h - 57
52*b*c^2*f*g^4*h + 48*c^3*d*g^3*h^2 + 1512*b*c^2*e*g^3*h^2 + 3734
*b^2*c*f*g^3*h^2 + 5048*a*c^2*f*g^3*h^2 - 72*b*c^2*d*g^2*h^3 - 74
4*b^2*c*e*g^2*h^3 - 1488*a*c^2*e*g^2*h^3 - 605*b^3*f*g^2*h^3 - 60
84*a*b*c*f*g^2*h^3 - 6*b^2*c*d*g*h^4 + 168*a*c^2*d*g*h^4 + 15*b^3
*e*g*h^4 + 1404*a*b*c*e*g*h^4 + 1180*a*b^2*f*g*h^4 + 2320*a^2*c*f
*g*h^4 + 15*b^3*d*h^5 - 84*a*b*c*d*h^5 - 30*a*b^2*e*h^5 - 600*a^2
*c*e*h^5 - 560*a^2*b*f*h^5)/(960*h^5*(c*g^2 - b*g*h + a*h^2)^2*(g
 + h*x)^2) + (-4384*c^4*f*g^6 + 384*c^4*e*g^5*h + 12768*b*c^3*f*g
^5*h + 96*c^4*d*g^4*h^2 - 1008*b*c^3*e*g^4*h^2 - 12324*b^2*c^2*f*
g^4*h^2 - 12528*a*c^3*f*g^4*h^2 - 192*b*c^3*d*g^3*h^3 + 744*b^2*c
^2*e*g^3*h^3 + 1248*a*c^3*e*g^3*h^3 + 4000*b^3*c*f*g^3*h^3 + 2380
8*a*b*c^2*f*g^3*h^3 + 36*b^2*c^2*d*g^2*h^4 + 432*a*c^3*d*g^2*h^4
- 30*b^3*c*e*g^2*h^4 - 2088*a*b*c^2*e*g^2*h^4 - 105*b^4*f*g^2*h^4
 - 11100*a*b^2*c*f*g^2*h^4 - 11424*a^2*c^2*f*g^2*h^4 + 60*b^3*c*d
*g*h^5 - 432*a*b*c^2*d*g*h^5 - 45*b^4*e*g*h^5 + 360*a*b^2*c*e*g*h
```

```
^5 + 1584*a^2*c^2*e*g*h^5 + 300*a*b^3*f*g*h^5 + 9840*a^2*b*c*f*g*
h^5 - 45*b^4*d*h^6 + 300*a*b^2*c*d*h^6 - 384*a^2*c^2*d*h^6 + 90*a
*b^3*e*h^6 - 600*a^2*b*c*e*h^6 - 240*a^2*b^2*f*h^6 - 2560*a^3*c*f
*h^6)/(1920*h^5*(c*g^2 - b*g*h + a*h^2)^3*(g + h*x))))/(a + b*x +
 c*x^2) - ((256*c^5*f*g^7 - 896*b*c^4*f*g^6*h + 1120*b^2*c^3*f*g^
5*h^2 + 896*a*c^4*f*g^5*h^2 - 560*b^3*c^2*f*g^4*h^3 - 2240*a*b*c^
3*f*g^4*h^3 + 70*b^4*c*f*g^3*h^4 + 1680*a*b^2*c^2*f*g^3*h^4 + 112
0*a^2*c^3*f*g^3*h^4 + 7*b^5*f*g^2*h^5 - 280*a*b^3*c*f*g^2*h^5 - 1
680*a^2*b*c^2*f*g^2*h^5 - 6*b^4*c*d*g*h^6 + 48*a*b^2*c^2*d*g*h^6
- 96*a^2*c^3*d*g*h^6 + 3*b^5*e*g*h^6 - 24*a*b^3*c*e*g*h^6 + 48*a^
2*b*c^2*e*g*h^6 - 20*a*b^4*f*g*h^6 + 384*a^2*b^2*c*f*g*h^6 + 576*
a^3*c^2*f*g*h^6 + 3*b^5*d*h^7 - 24*a*b^3*c*d*h^7 + 48*a^2*b*c^2*d
*h^7 - 6*a*b^4*e*h^7 + 48*a^2*b^2*c*e*h^7 - 96*a^3*c^2*e*h^7 + 16
*a^2*b^3*f*h^7 - 192*a^3*b*c*f*h^7)*(a + x*(b + c*x))^(3/2)*Log[g
 + h*x])/(256*h^6*(c*g^2 - b*g*h + a*h^2)^(7/2)*(a + b*x + c*x^2)
^(3/2)) + (((c^5*f*g^6)/(h^6*(c*g^2 - b*g*h + a*h^2)^3) - (3*b*c^
4*f*g^5)/(h^5*(c*g^2 - b*g*h + a*h^2)^3) + (3*c^3*(b^2 + a*c)*f*g
^4)/(h^4*(c*g^2 - b*g*h + a*h^2)^3) - (b*c^2*(b^2 + 6*a*c)*f*g^3)
/(h^3*(c*g^2 - b*g*h + a*h^2)^3) + (3*a*c^2*(b^2 + a*c)*f*g^2)/(h
^2*(c*g^2 - b*g*h + a*h^2)^3) + (a^2*c^2*f*(-3*b*g + a*h))/(h*(c*
g^2 - b*g*h + a*h^2)^3))*(a + x*(b + c*x))^(3/2)*Log[b + 2*c*x +
2*Sqrt[c]*Sqrt[a + b*x + c*x^2]])/(Sqrt[c]*(a + b*x + c*x^2)^(3/2
)) + ((256*c^5*f*g^7 - 896*b*c^4*f*g^6*h + 1120*b^2*c^3*f*g^5*h^2
 + 896*a*c^4*f*g^5*h^2 - 560*b^3*c^2*f*g^4*h^3 - 2240*a*b*c^3*f*g
^4*h^3 + 70*b^4*c*f*g^3*h^4 + 1680*a*b^2*c^2*f*g^3*h^4 + 1120*a^2
*c^3*f*g^3*h^4 + 7*b^5*f*g^2*h^5 - 280*a*b^3*c*f*g^2*h^5 - 1680*a
^2*b*c^2*f*g^2*h^5 - 6*b^4*c*d*g*h^6 + 48*a*b^2*c^2*d*g*h^6 - 96*
a^2*c^3*d*g*h^6 + 3*b^5*e*g*h^6 - 24*a*b^3*c*e*g*h^6 + 48*a^2*b*c
^2*e*g*h^6 - 20*a*b^4*f*g*h^6 + 384*a^2*b^2*c*f*g*h^6 + 576*a^3*c
^2*f*g*h^6 + 3*b^5*d*h^7 - 24*a*b^3*c*d*h^7 + 48*a^2*b*c^2*d*h^7
- 6*a*b^4*e*h^7 + 48*a^2*b^2*c*e*h^7 - 96*a^3*c^2*e*h^7 + 16*a^2*
b^3*f*h^7 - 192*a^3*b*c*f*h^7)*(a + x*(b + c*x))^(3/2)*Log[-(b*g)
 + 2*a*h - 2*c*g*x + b*h*x + 2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a
 + b*x + c*x^2]])/(256*h^6*(c*g^2 - b*g*h + a*h^2)^(7/2)*(a + b*x
 + c*x^2)^(3/2))
```

Maple [B] time = 0.104, size = 76693, normalized size = 62.6

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+b*x+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^6,x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^6,x, algorithm="maxi
```

```
[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((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^6,x, algorithm="fric
```

```
[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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**6,x)
```

```
[Out] Timed out
```

GIAC/XCAS [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^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^6,x, algorithm="giac
```

```
[Out] Timed out
```

3.206 $\int \frac{(a+bx+cx^2)^{3/2}(d+ex+fx^2)}{(g+hx)^7}\,dx$

Optimal. Leaf size=657

$$\frac{(a+bx+cx^2)^{3/2}(-2ah+x(2cg-bh)+bg)\left(24a^2fh^2-4c\left(a\left(dh^2-7egh+fg^2\right)+3bg(2dh+eg)\right)-12abh(eh+2fg)+b^2\right.}{192(g+hx)^4(ah^2-bgh+cg^2)^3}$$
$$-\frac{(b^2-4ac)\sqrt{a+bx+cx^2}(-2ah+x(2cg-bh)+bg)\left(24a^2fh^2-4c\left(a\left(dh^2-7egh+fg^2\right)+3bg(2dh+eg)\right)-12abh(eh+\right.}{512(g+hx)^2(ah^2-bgh+cg^2)^4}$$
$$+\frac{(b^2-4ac)^2\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(24a^2fh^2-4c\left(a\left(dh^2-7egh+fg^2\right)+3bg(2dh+eg)\right)-12abh(eh+2fg)+\right.}{1024(ah^2-bgh+cg^2)^{9/2}}$$
$$+\frac{(a+bx+cx^2)^{5/2}\left(h\left(12ah(2fg-eh)-b\left(-7dh^2-5egh+17fg^2\right)\right)+2cg\left(h(eg-7dh)+5fg^2\right)\right)}{60h(g+hx)^5(ah^2-bgh+cg^2)^2}$$
$$-\frac{(a+bx+cx^2)^{5/2}\left(fg^2-h(eg-dh)\right)}{6h(g+hx)^6(ah^2-bgh+cg^2)}$$

```
[Out] -((b^2 - 4*a*c)*(24*c^2*d*g^2 + 24*a^2*f*h^2 - 12*a*b*h*(2*f*g +
e*h) + b^2*(7*f*g^2 + 5*e*g*h + 7*d*h^2) - 4*c*(3*b*g*(e*g + 2*d*
h) + a*(f*g^2 - 7*e*g*h + d*h^2)))*(b*g - 2*a*h + (2*c*g - b*h)*x
)*Sqrt[a + b*x + c*x^2])/(512*(c*g^2 - b*g*h + a*h^2)^4*(g + h*x)
^2) + ((24*c^2*d*g^2 + 24*a^2*f*h^2 - 12*a*b*h*(2*f*g + e*h) + b^
2*(7*f*g^2 + 5*e*g*h + 7*d*h^2) - 4*c*(3*b*g*(e*g + 2*d*h) + a*(f
*g^2 - 7*e*g*h + d*h^2)))*(b*g - 2*a*h + (2*c*g - b*h)*x)*(a + b*
x + c*x^2)^(3/2))/(192*(c*g^2 - b*g*h + a*h^2)^3*(g + h*x)^4) - (
(f*g^2 - h*(e*g - d*h))*(a + b*x + c*x^2)^(5/2))/(6*h*(c*g^2 - b*
g*h + a*h^2)*(g + h*x)^6) + ((2*c*g*(5*f*g^2 + h*(e*g - 7*d*h)) +
 h*(12*a*h*(2*f*g - e*h) - b*(17*f*g^2 - 5*e*g*h - 7*d*h^2)))*(a
+ b*x + c*x^2)^(5/2))/(60*h*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x)^5
) + ((b^2 - 4*a*c)^2*(24*c^2*d*g^2 + 24*a^2*f*h^2 - 12*a*b*h*(2*f
*g + e*h) + b^2*(7*f*g^2 + 5*e*g*h + 7*d*h^2) - 4*c*(3*b*g*(e*g +
 2*d*h) + a*(f*g^2 - 7*e*g*h + d*h^2)))*ArcTanh[(b*g - 2*a*h + (2
*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^
2])])/(1024*(c*g^2 - b*g*h + a*h^2)^(9/2))
```

Rubi [A] time = 2.8847, antiderivative size = 660, normalized size of antiderivative = 1., number of

steps used = 6, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.156$

$$\frac{\left(a+bx+cx^2\right)^{3/2}\left(-2ah+x(2cg-bh)+bg\right)\left(24a^2fh^2-4c\left(-ah(7eg-dh)+afg^2+3bg(2dh+eg)\right)-12abh(eh+2fg)+b\right.}{192(g+hx)^4\left(ah^2-bgh+cg^2\right)^3}$$
$$-\frac{\left(b^2-4ac\right)\sqrt{a+bx+cx^2}(-2ah+x(2cg-bh)+bg)\left(24a^2fh^2-4c\left(-ah(7eg-dh)+afg^2+3bg(2dh+eg)\right)-12abh(eh+\right.}{512(g+hx)^2\left(ah^2-bgh+cg^2\right)^4}$$
$$+\frac{\left(b^2-4ac\right)^2\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(24a^2fh^2-4c\left(-ah(7eg-dh)+afg^2+3bg(2dh+eg)\right)-12abh(eh+2fg)\right.}{1024\left(ah^2-bgh+cg^2\right)^{9/2}}$$
$$-\frac{\left(a+bx+cx^2\right)^{5/2}\left(fg^2-h(eg-dh)\right)}{6h(g+hx)^6\left(ah^2-bgh+cg^2\right)}$$
$$+\frac{\left(a+bx+cx^2\right)^{5/2}\left(2c\left(gh(eg-7dh)+5fg^3\right)-h\left(-12ah(2fg-eh)-bh(7dh+5eg)+17bfg^2\right)\right)}{60h(g+hx)^5\left(ah^2-bgh+cg^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^7,x]
```

```
[Out] -((b^2 - 4*a*c)*(24*c^2*d*g^2 + 24*a^2*f*h^2 - 12*a*b*h*(2*f*g +
e*h) - 4*c*(a*f*g^2 - a*h*(7*e*g - d*h) + 3*b*g*(e*g + 2*d*h)) +
b^2*(7*f*g^2 + h*(5*e*g + 7*d*h)))*(b*g - 2*a*h + (2*c*g - b*h)*x
)*Sqrt[a + b*x + c*x^2])/(512*(c*g^2 - b*g*h + a*h^2)^4*(g + h*x)
^2) + ((24*c^2*d*g^2 + 24*a^2*f*h^2 - 12*a*b*h*(2*f*g + e*h) - 4*
c*(a*f*g^2 - a*h*(7*e*g - d*h) + 3*b*g*(e*g + 2*d*h)) + b^2*(7*f*
g^2 + h*(5*e*g + 7*d*h)))*(b*g - 2*a*h + (2*c*g - b*h)*x)*(a + b*
x + c*x^2)^(3/2))/(192*(c*g^2 - b*g*h + a*h^2)^3*(g + h*x)^4) - (
(f*g^2 - h*(e*g - d*h))*(a + b*x + c*x^2)^(5/2))/(6*h*(c*g^2 - b*
g*h + a*h^2)*(g + h*x)^6) + ((2*c*(5*f*g^3 + g*h*(e*g - 7*d*h)) -
 h*(17*b*f*g^2 - b*h*(5*e*g + 7*d*h) - 12*a*h*(2*f*g - e*h)))*(a
+ b*x + c*x^2)^(5/2))/(60*h*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x)^5
) + ((b^2 - 4*a*c)^2*(24*c^2*d*g^2 + 24*a^2*f*h^2 - 12*a*b*h*(2*f
*g + e*h) - 4*c*(a*f*g^2 - a*h*(7*e*g - d*h) + 3*b*g*(e*g + 2*d*h
)) + b^2*(7*f*g^2 + h*(5*e*g + 7*d*h)))*ArcTanh[(b*g - 2*a*h + (2
*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^
2])])/(1024*(c*g^2 - b*g*h + a*h^2)^(9/2))
```

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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**7,x)
```

```
[Out] Timed out
```

Mathematica [B] time = 8.40262, size = 2022, normalized size = 3.08

Result too large to show

Antiderivative was successfully verified.

```
[In]  Integrate[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^7,x]
```

```
[Out] ((a + x*(b + c*x))^(3/2)*(-((c*g^2 - b*g*h + a*h^2)*(f*g^2 - e*g*
h + d*h^2))/(6*h^5*(g + h*x)^6) + (50*c*f*g^3 - 38*c*e*g^2*h - 37
*b*f*g^2*h + 26*c*d*g*h^2 + 25*b*e*g*h^2 + 24*a*f*g*h^2 - 13*b*d*
h^3 - 12*a*e*h^3)/(60*h^5*(g + h*x)^5) + (-800*c^2*f*g^4 + 416*c^
2*e*g^3*h + 1184*b*c*f*g^3*h - 152*c^2*d*g^2*h^2 - 548*b*c*e*g^2*
h^2 - 387*b^2*f*g^2*h^2 - 908*a*c*f*g^2*h^2 + 152*b*c*d*g*h^3 + 1
35*b^2*e*g*h^3 + 404*a*c*e*g*h^3 + 504*a*b*f*g*h^3 - 3*b^2*d*h^4
- 140*a*c*d*h^4 - 132*a*b*e*h^4 - 120*a^2*f*h^4)/(480*h^5*(c*g^2
- b*g*h + a*h^2)*(g + h*x)^4) + (1600*c^3*f*g^5 - 448*c^3*e*g^4*h
 - 3552*b*c^2*f*g^4*h + 16*c^3*d*g^3*h^2 + 888*b*c^2*e*g^3*h^2 +
2322*b^2*c*f*g^3*h^2 + 3144*a*c^2*f*g^3*h^2 - 24*b*c^2*d*g^2*h^3
- 438*b^2*c*e*g^2*h^3 - 888*a*c^2*e*g^2*h^3 - 377*b^3*f*g^2*h^3 -
 3828*a*b*c*f*g^2*h^3 - 6*b^2*c*d*g*h^4 + 72*a*c^2*d*g*h^4 + 5*b^
3*e*g*h^4 + 852*a*b*c*e*g*h^4 + 744*a*b^2*f*g*h^4 + 1488*a^2*c*f*
g*h^4 + 7*b^3*d*h^5 - 36*a*b*c*d*h^5 - 12*a*b^2*e*h^5 - 384*a^2*c
*e*h^5 - 360*a^2*b*f*h^5)/(960*h^5*(c*g^2 - b*g*h + a*h^2)^2*(g +
 h*x)^3) + (-3200*c^4*f*g^6 + 128*c^4*e*g^5*h + 9472*b*c^3*f*g^5*
h + 64*c^4*d*g^4*h^2 - 352*b*c^3*e*g^4*h^2 - 9288*b^2*c^2*f*g^4*h
^2 - 9504*a*c^3*f*g^4*h^2 - 128*b*c^3*d*g^3*h^3 + 264*b^2*c^2*e*g
^3*h^3 + 480*a*c^3*e*g^3*h^3 + 3016*b^3*c*f*g^3*h^3 + 18528*a*b*c
^2*f*g^3*h^3 + 384*a*c^3*d*g^2*h^4 + 20*b^3*c*e*g^2*h^4 - 912*a*b
*c^2*e*g^2*h^4 - 35*b^4*f*g^2*h^4 - 8808*a*b^2*c*f*g^2*h^4 - 9264
*a^2*c^2*f*g^2*h^4 + 64*b^3*c*d*g*h^5 - 384*a*b*c^2*d*g*h^5 - 25*
b^4*e*g*h^5 + 96*a*b^2*c*e*g*h^5 + 912*a^2*c^2*e*g*h^5 + 120*a*b^
3*f*g*h^5 + 8352*a^2*b*c*f*g*h^5 - 35*b^4*d*h^6 + 216*a*b^2*c*d*h
^6 - 240*a^2*c^2*d*h^6 + 60*a*b^3*e*h^6 - 336*a^2*b*c*e*h^6 - 120
*a^2*b^2*f*h^6 - 2400*a^3*c*f*h^6)/(3840*h^5*(c*g^2 - b*g*h + a*h
^2)^3*(g + h*x)^2) + (1280*c^5*f*g^7 + 256*c^5*e*g^6*h - 4736*b*c
^4*f*g^6*h + 128*c^5*d*g^5*h^2 - 832*b*c^4*e*g^5*h^2 + 6192*b^2*c
^3*f*g^5*h^2 + 5312*a*c^4*f*g^5*h^2 - 320*b*c^4*d*g^4*h^3 + 816*b
^2*c^3*e*g^4*h^3 + 1216*a*c^4*e*g^4*h^3 - 3016*b^3*c^2*f*g^4*h^3
- 14496*a*b*c^3*f*g^4*h^3 + 96*b^2*c^3*d*g^3*h^4 + 896*a*c^4*d*g^
3*h^4 - 80*b^3*c^2*e*g^3*h^4 - 2880*a*b*c^3*e*g^3*h^4 + 70*b^4*c*
f*g^3*h^4 + 11664*a*b^2*c^2*f*g^3*h^4 + 8544*a^2*c^3*f*g^3*h^4 +
176*b^3*c^2*d*g^2*h^5 - 1344*a*b*c^3*d*g^2*h^5 - 130*b^4*c*e*g^2*
h^5 + 1104*a*b^2*c^2*e*g^2*h^5 + 2784*a^2*c^3*e*g^2*h^5 + 105*b^5
*f*g^2*h^5 - 1000*a*b^3*c*f*g^2*h^5 - 15600*a^2*b*c^2*f*g^2*h^5 -
 290*b^4*c*d*g*h^6 + 1968*a*b^2*c^2*d*g*h^6 - 2592*a^2*c^3*d*g*h^
6 + 75*b^5*e*g*h^6 - 200*a*b^3*c*e*g*h^6 - 1488*a^2*b*c^2*e*g*h^6
 - 360*a*b^4*f*g*h^6 + 2640*a^2*b^2*c*f*g*h^6 + 7872*a^3*c^2*f*g*
```

```
h^6 + 105*b^5*d*h^7 - 760*a*b^3*c*d*h^7 + 1296*a^2*b*c^2*d*h^7 -
180*a*b^4*e*h^7 + 1200*a^2*b^2*c*e*h^7 - 1536*a^3*c^2*e*h^7 + 360
*a^2*b^3*f*h^7 - 2400*a^3*b*c*f*h^7)/(7680*h^5*(c*g^2 - b*g*h + a
*h^2)^4*(g + h*x))))/(a + b*x + c*x^2) + ((b^2 - 4*a*c)^2*(24*c^2
*d*g^2 - 12*b*c*e*g^2 + 7*b^2*f*g^2 - 4*a*c*f*g^2 - 24*b*c*d*g*h
+ 5*b^2*e*g*h + 28*a*c*e*g*h - 24*a*b*f*g*h + 7*b^2*d*h^2 - 4*a*c
*d*h^2 - 12*a*b*e*h^2 + 24*a^2*f*h^2)*(a + x*(b + c*x))^(3/2)*Log
[g + h*x])/(1024*(c*g^2 - b*g*h + a*h^2)^(9/2)*(a + b*x + c*x^2)^
(3/2)) - ((b^2 - 4*a*c)^2*(24*c^2*d*g^2 - 12*b*c*e*g^2 + 7*b^2*f*
g^2 - 4*a*c*f*g^2 - 24*b*c*d*g*h + 5*b^2*e*g*h + 28*a*c*e*g*h - 2
4*a*b*f*g*h + 7*b^2*d*h^2 - 4*a*c*d*h^2 - 12*a*b*e*h^2 + 24*a^2*f
*h^2)*(a + x*(b + c*x))^(3/2)*Log[-(b*g) + 2*a*h - 2*c*g*x + b*h*
x + 2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2]])/(1024*(
c*g^2 - b*g*h + a*h^2)^(9/2)*(a + b*x + c*x^2)^(3/2))
```

Maple [B] time = 0.151, size = 100754, normalized size = 153.4

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+b*x+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^7,x)

[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^7,x, algorithm="maxi

[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((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^7,x, algorithm="fric
```

```
[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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**7,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.867631, size = 4, normalized size = 0.01

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^7,x, algorithm="giac
```

```
[Out] sage0*x
```

3.207 $\int \frac{(a+bx+cx^2)^{3/2}(d+ex+fx^2)}{(g+hx)^8} dx$

Optimal. Leaf size=1062

result too large to display

```
[Out] -((b^2 - 4*a*c)*(48*c^3*d*g^3 - 8*c^2*g*(3*b*g*(e*g + 3*d*h) + a*
(f*g^2 - 8*e*g*h + 3*d*h^2)) - b*h*(24*a^2*f*h^2 - 2*a*b*h*(10*f*
g + 7*e*h) + b^2*(5*f*g^2 + 5*e*g*h + 9*d*h^2)) + 2*c*(4*a^2*h^2*
(8*f*g - e*h) - 2*a*b*h*(13*f*g^2 + 13*e*g*h - 3*d*h^2) + b^2*g*(
7*f*g^2 + 10*e*g*h + 21*d*h^2)))*(b*g - 2*a*h + (2*c*g - b*h)*x)*
Sqrt[a + b*x + c*x^2])/(1024*(c*g^2 - b*g*h + a*h^2)^5*(g + h*x)^
2) + ((48*c^3*d*g^3 - 8*c^2*g*(3*b*g*(e*g + 3*d*h) + a*(f*g^2 - 8
*e*g*h + 3*d*h^2)) - b*h*(24*a^2*f*h^2 - 2*a*b*h*(10*f*g + 7*e*h)
 + b^2*(5*f*g^2 + 5*e*g*h + 9*d*h^2)) + 2*c*(4*a^2*h^2*(8*f*g - e
*h) - 2*a*b*h*(13*f*g^2 + 13*e*g*h - 3*d*h^2) + b^2*g*(7*f*g^2 +
10*e*g*h + 21*d*h^2)))*(b*g - 2*a*h + (2*c*g - b*h)*x)*(a + b*x +
 c*x^2)^(3/2))/(384*(c*g^2 - b*g*h + a*h^2)^4*(g + h*x)^4) - ((f*
g^2 - h*(e*g - d*h))*(a + b*x + c*x^2)^(5/2))/(7*h*(c*g^2 - b*g*h
 + a*h^2)*(g + h*x)^7) + ((2*c*g*(5*f*g^2 + h*(2*e*g - 9*d*h)) +
h*(14*a*h*(2*f*g - e*h) - b*(19*f*g^2 - 5*e*g*h - 9*d*h^2)))*(a +
 b*x + c*x^2)^(5/2))/(84*h*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x)^6)
 + ((4*c^2*g^2*(5*f*g^2 + h*(2*e*g - 51*d*h)) - 7*h^2*(24*a^2*f*h
^2 - 2*a*b*h*(10*f*g + 7*e*h) + b^2*(5*f*g^2 + 5*e*g*h + 9*d*h^2)
) - 2*c*h*(3*b*g*(8*f*g^2 - 15*e*g*h - 34*d*h^2) - 2*a*h*(26*f*g^
2 - 61*e*g*h + 12*d*h^2)))*(a + b*x + c*x^2)^(5/2))/(840*h*(c*g^2
 - b*g*h + a*h^2)^3*(g + h*x)^5) + ((b^2 - 4*a*c)^2*(48*c^3*d*g^3
 - 8*c^2*g*(3*b*g*(e*g + 3*d*h) + a*(f*g^2 - 8*e*g*h + 3*d*h^2))
- b*h*(24*a^2*f*h^2 - 2*a*b*h*(10*f*g + 7*e*h) + b^2*(5*f*g^2 + 5
*e*g*h + 9*d*h^2)) + 2*c*(4*a^2*h^2*(8*f*g - e*h) - 2*a*b*h*(13*f
*g^2 + 13*e*g*h - 3*d*h^2) + b^2*g*(7*f*g^2 + 10*e*g*h + 21*d*h^2
)))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h
 + a*h^2]*Sqrt[a + b*x + c*x^2])])/(2048*(c*g^2 - b*g*h + a*h^2)^
(11/2))
```

Rubi [A] time = 8.32039, antiderivative size = 1062, normalized size of antiderivative = 1., number

of steps used = 7, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$\frac{\left(4\left(5fg^4 + h(2eg - 51dh)g^2\right)c^2 - 2h\left(3bg\left(8fg^2 - 15ehg - 34dh^2\right) - 2ah\left(26fg^2 - 61ehg + 12dh^2\right)\right)c - 7h^2\left(\left(5fg^2 + 5ehg\right.\right.\right.}{840h\left(cg^2 - bhg + ah^2\right)^3(g + hx)^5}$$
$$+ \frac{\left(2c\left(5fg^3 + h(2eg - 9dh)g\right) - h\left(19bfg^2 - bh(5eg + 9dh) - 14ah(2fg - eh)\right)\right)\left(cx^2 + bx + a\right)^{5/2}}{84h\left(cg^2 - bhg + ah^2\right)^2(g + hx)^6}$$
$$- \frac{\left(fg^2 - h(eg - dh)\right)\left(cx^2 + bx + a\right)^{5/2}}{7h\left(cg^2 - bhg + ah^2\right)(g + hx)^7}$$
$$+ \frac{\left(48c^3dg^3 - 8c^2\left(afg^2 + 3b(eg + 3dh)g - ah(8eg - 3dh)\right)g - bh\left(\left(5fg^2 + h(5eg + 9dh)\right)b^2 - 2ah(10fg + 7eh)b + 24a^2fh^2\right)\right.}{384\left(cg^2 - \right.}$$
$$- \frac{\left(b^2 - 4ac\right)\left(48c^3dg^3 - 8c^2\left(afg^2 + 3b(eg + 3dh)g - ah(8eg - 3dh)\right)g - bh\left(\left(5fg^2 + h(5eg + 9dh)\right)b^2 - 2ah(10fg + 7eh)b\right.\right.}{1024\left(\right.}$$
$$+ \frac{\left(b^2 - 4ac\right)^2\left(48c^3dg^3 - 8c^2\left(afg^2 + 3b(eg + 3dh)g - ah(8eg - 3dh)\right)g - bh\left(\left(5fg^2 + h(5eg + 9dh)\right)b^2 - 2ah(10fg + 7eh)b\right.\right.}{2048\left(\right.}$$

Antiderivative was successfully verified.

```
[In]  Int[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^8,x]
```

```
[Out] -((b^2 - 4*a*c)*(48*c^3*d*g^3 - 8*c^2*g*(a*f*g^2 - a*h*(8*e*g - 3
*d*h) + 3*b*g*(e*g + 3*d*h)) - b*h*(24*a^2*f*h^2 - 2*a*b*h*(10*f*
g + 7*e*h) + b^2*(5*f*g^2 + h*(5*e*g + 9*d*h))) + 2*c*(4*a^2*h^2*
(8*f*g - e*h) - 2*a*b*h*(13*f*g^2 + h*(13*e*g - 3*d*h)) + b^2*(7*
f*g^3 + g*h*(10*e*g + 21*d*h))))*(b*g - 2*a*h + (2*c*g - b*h)*x)*
Sqrt[a + b*x + c*x^2])/(1024*(c*g^2 - b*g*h + a*h^2)^5*(g + h*x)^
2) + ((48*c^3*d*g^3 - 8*c^2*g*(a*f*g^2 - a*h*(8*e*g - 3*d*h) + 3*
b*g*(e*g + 3*d*h)) - b*h*(24*a^2*f*h^2 - 2*a*b*h*(10*f*g + 7*e*h)
 + b^2*(5*f*g^2 + h*(5*e*g + 9*d*h))) + 2*c*(4*a^2*h^2*(8*f*g - e
*h) - 2*a*b*h*(13*f*g^2 + h*(13*e*g - 3*d*h)) + b^2*(7*f*g^3 + g*
h*(10*e*g + 21*d*h))))*(b*g - 2*a*h + (2*c*g - b*h)*x)*(a + b*x +
 c*x^2)^(3/2))/(384*(c*g^2 - b*g*h + a*h^2)^4*(g + h*x)^4) - ((f*
g^2 - h*(e*g - d*h))*(a + b*x + c*x^2)^(5/2))/(7*h*(c*g^2 - b*g*h
 + a*h^2)*(g + h*x)^7) + ((2*c*(5*f*g^3 + g*h*(2*e*g - 9*d*h)) -
h*(19*b*f*g^2 - b*h*(5*e*g + 9*d*h) - 14*a*h*(2*f*g - e*h)))*(a +
 b*x + c*x^2)^(5/2))/(84*h*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x)^6)
 + ((4*c^2*(5*f*g^4 + g^2*h*(2*e*g - 51*d*h)) - 7*h^2*(24*a^2*f*h
^2 - 2*a*b*h*(10*f*g + 7*e*h) + b^2*(5*f*g^2 + 5*e*g*h + 9*d*h^2)
) - 2*c*h*(3*b*g*(8*f*g^2 - 15*e*g*h - 34*d*h^2) - 2*a*h*(26*f*g^
2 - 61*e*g*h + 12*d*h^2)))*(a + b*x + c*x^2)^(5/2))/(840*h*(c*g^2
 - b*g*h + a*h^2)^3*(g + h*x)^5) + ((b^2 - 4*a*c)^2*(48*c^3*d*g^3
 - 8*c^2*g*(a*f*g^2 - a*h*(8*e*g - 3*d*h) + 3*b*g*(e*g + 3*d*h))
- b*h*(24*a^2*f*h^2 - 2*a*b*h*(10*f*g + 7*e*h) + b^2*(5*f*g^2 + h
*(5*e*g + 9*d*h))) + 2*c*(4*a^2*h^2*(8*f*g - e*h) - 2*a*b*h*(13*f
*g^2 + h*(13*e*g - 3*d*h)) + b^2*(7*f*g^3 + g*h*(10*e*g + 21*d*h)
)))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h
 + a*h^2]*Sqrt[a + b*x + c*x^2])])/(2048*(c*g^2 - b*g*h + a*h^2)^
```

```
(11/2))
```

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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**8,x)
```

```
[Out] Timed out
```

Mathematica [B] time = 9.54127, size = 3059, normalized size = 2.88

Result too large to show

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((a + b*x + c*x^2)^(3/2)*(d + e*x + f*x^2))/(g + h*x)^8,x]
```

```
[Out] ((a + x*(b + c*x))^(3/2)*(-((c*g^2 - b*g*h + a*h^2)*(f*g^2 - e*g*
h + d*h^2))/(7*h^5*(g + h*x)^7) + (58*c*f*g^3 - 44*c*e*g^2*h - 43
*b*f*g^2*h + 30*c*d*g*h^2 + 29*b*e*g*h^2 + 28*a*f*g*h^2 - 15*b*d*
h^3 - 14*a*e*h^3)/(84*h^5*(g + h*x)^6) + (-1100*c^2*f*g^4 + 568*c
^2*e*g^3*h + 1632*b*c*f*g^3*h - 204*c^2*d*g^2*h^2 - 750*b*c*e*g^2
*h^2 - 535*b^2*f*g^2*h^2 - 1256*a*c*f*g^2*h^2 + 204*b*c*d*g*h^3 +
 185*b^2*e*g*h^3 + 556*a*c*e*g*h^3 + 700*a*b*f*g*h^3 - 3*b^2*d*h^
4 - 192*a*c*d*h^4 - 182*a*b*e*h^4 - 168*a^2*f*h^4)/(840*h^5*(c*g^
2 - b*g*h + a*h^2)*(g + h*x)^5) + (8000*c^3*f*g^5 - 2176*c^3*e*g^
4*h - 17824*b*c^2*f*g^4*h + 48*c^3*d*g^3*h^2 + 4328*b*c^2*e*g^3*h
^2 + 11702*b^2*c*f*g^3*h^2 + 15832*a*c^2*f*g^3*h^2 - 72*b*c^2*d*g
^2*h^3 - 2140*b^2*c*e*g^2*h^3 - 4352*a*c^2*e*g^2*h^3 - 1905*b^3*f
*g^2*h^3 - 19396*a*b*c*f*g^2*h^3 - 30*b^2*c*d*g*h^4 + 264*a*c^2*d
*g*h^4 + 15*b^3*e*g*h^4 + 4220*a*b*c*e*g*h^4 + 3780*a*b^2*f*g*h^4
 + 7616*a^2*c*f*g*h^4 + 27*b^3*d*h^5 - 132*a*b*c*d*h^5 - 42*a*b^2
*e*h^5 - 1960*a^2*c*e*h^5 - 1848*a^2*b*f*h^5)/(6720*h^5*(c*g^2 -
b*g*h + a*h^2)^2*(g + h*x)^4) + (-6400*c^4*f*g^6 + 128*c^4*e*g^5*
h + 19072*b*c^3*f*g^5*h + 96*c^4*d*g^4*h^2 - 368*b*c^3*e*g^4*h^2
- 18852*b^2*c^2*f*g^4*h^2 - 19216*a*c^3*f*g^4*h^2 - 192*b*c^3*d*g
^3*h^3 + 288*b^2*c^2*e*g^3*h^3 + 512*a*c^3*e*g^3*h^3 + 6152*b^3*c
*f*g^3*h^3 + 37920*a*b*c^2*f*g^3*h^3 - 36*b^2*c^2*d*g^2*h^4 + 720
*a*c^3*d*g^2*h^4 + 50*b^3*c*e*g^2*h^4 - 1128*a*b*c^2*e*g^2*h^4 -
35*b^4*f*g^2*h^4 - 18276*a*b^2*c*f*g^2*h^4 - 19200*a^2*c^2*f*g^2*
h^4 + 132*b^3*c*d*g*h^5 - 720*a*b*c^2*d*g*h^5 - 35*b^4*e*g*h^5 +
48*a*b^2*c*e*g*h^5 + 1392*a^2*c^2*e*g*h^5 + 140*a*b^3*f*g*h^5 + 1
```

7808*a^2*b*c*f*g*h^5 - 63*b^4*d*h^6 + 372*a*b^2*c*d*h^6 - 384*a^2*c^2*d*h^6 + 98*a*b^3*e*h^6 - 504*a^2*b*c*e*h^6 - 168*a^2*b^2*f*h^6 - 5376*a^3*c*f*h^6)/(13440*h^5*(c*g^2 - b*g*h + a*h^2)^3*(g + h*x)^3) + (1280*c^5*f*g^7 + 512*c^5*e*g^6*h - 4992*b*c^4*f*g^6*h + 384*c^5*d*g^5*h^2 - 1728*b*c^4*e*g^5*h^2 + 6928*b^2*c^3*f*g^5*h^2 + 5696*a*c^4*f*g^5*h^2 - 960*b*c^4*d*g^4*h^3 + 1696*b^2*c^3*e*g^4*h^3 + 2816*a*c^4*e*g^4*h^3 - 3496*b^3*c^2*f*g^4*h^3 - 17056*a*b*c^3*f*g^4*h^3 + 96*b^2*c^3*d*g^3*h^4 + 3456*a*c^4*d*g^3*h^4 + 80*b^3*c^2*e*g^3*h^4 - 7360*a*b*c^3*e*g^3*h^4 - 210*b^4*c*f*g^3*h^4 + 15504*a*b^2*c^2*f*g^3*h^4 + 10464*a^2*c^3*f*g^3*h^4 + 816*b^3*c^2*d*g^2*h^5 - 5184*a*b*c^3*d*g^2*h^5 - 420*b^4*c*e*g^2*h^5 + 2304*a*b^2*c^2*e*g^2*h^5 + 9024*a^2*c^3*e*g^2*h^5 + 175*b^5*f*g^2*h^5 - 280*a*b^3*c*f*g^2*h^5 - 24720*a^2*b*c^2*f*g^2*h^5 - 966*b^4*c*d*g*h^6 + 6096*a*b^2*c^2*d*g*h^6 - 7008*a^2*c^3*d*g*h^6 + 175*b^5*e*g*h^6 + 56*a*b^3*c*e*g*h^6 - 5520*a^2*b*c^2*e*g*h^6 - 700*a*b^4*f*g*h^6 + 3024*a^2*b^2*c*f*g*h^6 + 16128*a^3*c^2*f*g*h^6 + 315*b^5*d*h^7 - 2184*a*b^3*c*d*h^7 + 3504*a^2*b*c^2*d*h^7 - 490*a*b^4*e*h^7 + 3024*a^2*b^2*c*e*h^7 - 3360*a^3*c^2*e*h^7 + 840*a^2*b^3*f*h^7 - 4704*a^3*b*c*f*h^7)/(53760*h^5*(c*g^2 - b*g*h + a*h^2)^4*(g + h*x)^2) + (2560*c^6*f*g^8 + 1024*c^6*e*g^7*h - 11264*b*c^5*f*g^7*h + 768*c^6*d*g^6*h^2 - 3968*b*c^5*e*g^6*h^2 + 18208*b^2*c^4*f*g^6*h^2 + 13952*a*c^5*f*g^6*h^2 - 2304*b*c^5*d*g^5*h^3 + 4864*b^2*c^4*e*g^5*h^3 + 6656*a*c^5*e*g^5*h^3 - 11744*b^3*c^3*f*g^5*h^3 - 48512*a*b*c^4*f*g^5*h^3 + 960*b^2*c^4*d*g^4*h^4 + 7680*a*c^5*d*g^4*h^4 - 800*b^3*c^3*e*g^4*h^4 - 20480*a*b*c^4*e*g^4*h^4 + 700*b^4*c^2*f*g^4*h^4 + 54720*a*b^2*c^3*f*g^4*h^4 + 32320*a^2*c^4*f*g^4*h^4 + 1920*b^3*c^3*d*g^3*h^5 - 15360*a*b*c^4*d*g^3*h^5 - 1400*b^4*c^2*e*g^3*h^5 + 12480*a*b^2*c^3*e*g^3*h^5 + 23680*a^2*c^4*e*g^3*h^5 + 1120*b^5*c*f*g^3*h^5 - 11200*a*b^3*c^2*f*g^3*h^5 - 88320*a^2*b*c^3*f*g^3*h^5 - 5124*b^4*c^2*d*g^2*h^6 + 35232*a*b^2*c^3*d*g^2*h^6 - 47424*a^2*c^4*d*g^2*h^6 + 1750*b^5*c*e*g^2*h^6 - 8176*a*b^3*c^2*e*g^2*h^6 - 11808*a^2*b*c^3*e*g^2*h^6 - 525*b^6*f*g^2*h^6 - 560*a*b^4*c*f*g^2*h^6 + 27216*a^2*b^2*c^2*f*g^2*h^6 + 59904*a^3*c^3*f*g^2*h^6 + 3780*b^5*c*d*g*h^7 - 27552*a*b^3*c^2*d*g*h^7 + 47424*a^2*b*c^3*d*g*h^7 - 525*b^6*e*g*h^7 - 980*a*b^4*c*e*g*h^7 + 25872*a^2*b^2*c^2*e*g*h^7 - 42432*a^3*c^3*e*g*h^7 + 2100*a*b^5*f*g*h^7 - 8960*a^2*b^3*c*f*g*h^7 - 17472*a^3*b*c^2*f*g*h^7 - 945*b^6*d*h^8 + 7560*a*b^4*c*d*h^8 - 16464*a^2*b^2*c^2*d*h^8 + 6144*a^3*c^3*d*h^8 + 1470*a*b^5*e*h^8 - 10640*a^2*b^3*c*e*h^8 + 18144*a^3*b*c^2*e*h^8 - 2520*a^2*b^4*f*h^8 + 16800*a^3*b^2*c*f*h^8 - 21504*a^4*c^2*f*h^8)/(107520*h^5*(c*g^2 - b*g*h + a*h^2)^5*(g + h*x))))/(a + b*x + c*x^2) - ((b^2 - 4*a*c)^2*(-48*c^3*d*g^3 + 24*b*c^2*e*g^3 - 14*b^2*c*f*g^3 + 8*a*c^2*f*g^3 + 72*b*c^2*d*g^2*h - 20*b^2*c*e*g^2*h - 64*a*c^2*e*g^2*h + 5*b^3*f*g^2*h + 52*a*b*c*f*g^2*h - 42*b^2*c*d*g*h^2 + 24*a*c^2*d*g*h^2 + 5*b^3*e*g*h^2 + 52*a*b*c*e*g*h^2 - 20*a*b^2*f*g*h^2 - 64*a^2*c*f*g*h^2 + 9*b^3*d*h^3 - 12*a*b*c*d*h^3 - 14*a*b^2*e*h^3 + 8*a^2*c*e*h^3 + 24*a^2*b*f*h^3)*(a + x*(b + c*x))^(3/2)*Log[g + h*x])/(2048*(c*g^2 - b*g*h + a*h^2)^(11/2)*(a + b*x + c*x^2)^(3/2)) + ((b^2 - 4*a*c)^2*(-48*c^3*d*g^3 + 24*b*c^2*e*g^3 - 14*b^2*c*f*g^3 + 8*a*c^2*f*g^3 + 72*b*c^2*d*g^2*h - 20*b^2*c*e*g^2*h - 64*a*c^2*e*g^2*h + 5*b^3*f*g^2*h + 52*a*b*c*f*g^2*h - 42*b^2*c*d*g*h^2 + 24*a*c^2*d*g*h^2 + 5*b^3*e*g*h^2 + 52*a*b*c*e*g*h^2 - 20*a*b^2*f*g*h^2 - 64*a^2*c*f*g*h^2 + 9*b^3*d*h^3 - 12*a*b*c*d*h^3 - 14*a*b^2*e*h^3 + 8*a^2*c*e*h

```
^3 + 24*a^2*b*f*h^3)*(a + x*(b + c*x))^(3/2)*Log[-(b*g) + 2*a*h -
 2*c*g*x + b*h*x + 2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c
*x^2]])/(2048*(c*g^2 - b*g*h + a*h^2)^(11/2)*(a + b*x + c*x^2)^(3
/2))
```

Maple [B] time = 0.21, size = 126612, normalized size = 119.2

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+b*x+a)^(3/2)*(f*x^2+e*x+d)/(h*x+g)^8,x)

[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^8,x, algorithm="maxi

[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((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^8,x, algorithm="fric

[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((c*x**2+b*x+a)**(3/2)*(f*x**2+e*x+d)/(h*x+g)**8,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.924093, size = 4, normalized size = 0.

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((c*x^2 + b*x + a)^(3/2)*(f*x^2 + e*x + d)/(h*x + g)^8,x, algorithm="giac
```

```
[Out] sage0*x
```

3.208 $\int (1+2x)^3\sqrt{2-x+3x^2}\left(1+3x+4x^2\right)\,dx$

Optimal. Leaf size=143

$$\frac{2}{21}\left(3x^2-x+2\right)^{3/2}(2x+1)^4+\frac{67}{378}\left(3x^2-x+2\right)^{3/2}(2x+1)^3+\frac{17}{105}\left(3x^2-x+2\right)^{3/2}(2x+1)^2-\frac{(26982x+75295)\left(3x^2-x+2\right)^{3/2}}{68040}+\frac{5393(1-6x)\sqrt{3x^2-x+2}}{15552}+\frac{124039\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{31104\sqrt{3}}$$

```
[Out] (5393*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/15552 + (17*(1 + 2*x)^2*(2 -
 x + 3*x^2)^(3/2))/105 + (67*(1 + 2*x)^3*(2 - x + 3*x^2)^(3/2))/3
78 + (2*(1 + 2*x)^4*(2 - x + 3*x^2)^(3/2))/21 - ((75295 + 26982*x
)*(2 - x + 3*x^2)^(3/2))/68040 + (124039*ArcSinh[(1 - 6*x)/Sqrt[2
3]])/(31104*Sqrt[3])
```

Rubi [A] time = 0.320718, antiderivative size = 143, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.188

$$\frac{2}{21}\left(3x^2-x+2\right)^{3/2}(2x+1)^4+\frac{67}{378}\left(3x^2-x+2\right)^{3/2}(2x+1)^3+\frac{17}{105}\left(3x^2-x+2\right)^{3/2}(2x+1)^2-\frac{(26982x+75295)\left(3x^2-x+2\right)^{3/2}}{68040}+\frac{5393(1-6x)\sqrt{3x^2-x+2}}{15552}+\frac{124039\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{31104\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 2*x)^3*Sqrt[2 - x + 3*x^2]*(1 + 3*x + 4*x^2),x]
```


```
[Out] (5393*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/15552 + (17*(1 + 2*x)^2*(2 -
 x + 3*x^2)^(3/2))/105 + (67*(1 + 2*x)^3*(2 - x + 3*x^2)^(3/2))/3
78 + (2*(1 + 2*x)^4*(2 - x + 3*x^2)^(3/2))/21 - ((75295 + 26982*x
)*(2 - x + 3*x^2)^(3/2))/68040 + (124039*ArcSinh[(1 - 6*x)/Sqrt[2
3]])/(31104*Sqrt[3])
```

Rubi in Sympy [A] time = 35.7684, size = 138, normalized size = 0.97

$$\frac{5393\left(-6x+1\right)\sqrt{3x^2-x+2}}{15552}+\frac{2\left(2x+1\right)^4\left(3x^2-x+2\right)^{\frac{3}{2}}}{21}+\frac{67\left(2x+1\right)^3\left(3x^2-x+2\right)^{\frac{3}{2}}}{378}+\frac{17\left(2x+1\right)^2\left(3x^2-x+2\right)^{\frac{3}{2}}}{105}-\frac{\left(485676x+1355310\right)\left(3x^2-x+2\right)^{\frac{3}{2}}}{1224720}-\frac{124039\sqrt{3}\,\mathrm{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{93312}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**3*(4*x**2+3*x+1)*(3*x**2-x+2)**(1/2),x)
```

```
[Out] 5393*(-6*x + 1)*sqrt(3*x**2 - x + 2)/15552 + 2*(2*x + 1)**4*(3*x*
*2 - x + 2)**(3/2)/21 + 67*(2*x + 1)**3*(3*x**2 - x + 2)**(3/2)/3
78 + 17*(2*x + 1)**2*(3*x**2 - x + 2)**(3/2)/105 - (485676*x + 13
55310)*(3*x**2 - x + 2)**(3/2)/1224720 - 124039*sqrt(3)*atanh(sqr
t(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/93312
```

Mathematica [A] time = 0.106485, size = 70, normalized size = 0.49

$$\frac{6\sqrt{3x^2-x+2}\left(2488320x^6+6462720x^5+7491456x^4+5497776x^3+3280872x^2+1493894x-543069\right)-4341365\sqrt{3}\sinh^{-}}{3265920}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 2*x)^3*Sqrt[2 - x + 3*x^2]*(1 + 3*x + 4*x^2),x]
```

```
[Out] (6*Sqrt[2 - x + 3*x^2]*(-543069 + 1493894*x + 3280872*x^2 + 54977
76*x^3 + 7491456*x^4 + 6462720*x^5 + 2488320*x^6) - 4341365*Sqrt[
3]*ArcSinh[(-1 + 6*x)/Sqrt[23]])/3265920
```

Maple [A] time = 0.02, size = 115, normalized size = 0.8

$$-\frac{32358\,x-5393}{15552}\sqrt{3\,x^2-x+2}-\frac{124039\,\sqrt{3}}{93312}Arcsinh\left(\frac{6\,\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)-\frac{45739}{68040}\left(3\,x^2-x+2\right)^{\frac{3}{2}}$$
$$+\frac{7849\,x}{3780}\left(3\,x^2-x+2\right)^{\frac{3}{2}}+\frac{1594\,x^2}{315}\left(3\,x^2-x+2\right)^{\frac{3}{2}}+\frac{844\,x^3}{189}\left(3\,x^2-x+2\right)^{\frac{3}{2}}+\frac{32\,x^4}{21}\left(3\,x^2-x+2\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^3*(4*x^2+3*x+1)*(3*x^2-x+2)^(1/2),x)
```

```
[Out] -5393/15552*(6*x-1)*(3*x^2-x+2)^(1/2)-124039/93312*3^(1/2)*arcsin
h(6/23*23^(1/2)*(x-1/6))-45739/68040*(3*x^2-x+2)^(3/2)+7849/3780*
x*(3*x^2-x+2)^(3/2)+1594/315*x^2*(3*x^2-x+2)^(3/2)+844/189*x^3*(3
*x^2-x+2)^(3/2)+32/21*x^4*(3*x^2-x+2)^(3/2)
```

Maxima [A] time = 0.764812, size = 170, normalized size = 1.19

$$\frac{32}{21}\left(3x^2-x+2\right)^{\frac{3}{2}}x^4+\frac{844}{189}\left(3x^2-x+2\right)^{\frac{3}{2}}x^3+\frac{1594}{315}\left(3x^2-x+2\right)^{\frac{3}{2}}x^2+\frac{7849}{3780}\left(3x^2-x+2\right)^{\frac{3}{2}}x-\frac{45739}{68040}\left(3x^2-x+2\right)^{\frac{3}{2}}-\frac{5393}{2592}\sqrt{3x^2-x+2x}-\frac{124039}{93312}\sqrt{3}\operatorname{arsinh}\left(\frac{1}{23}\sqrt{23}(6x-1)\right)+\frac{5393}{15552}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)*(2*x + 1)^3,x, algorithm="maxima")
```

```
[Out] 32/21*(3*x^2 - x + 2)^(3/2)*x^4 + 844/189*(3*x^2 - x + 2)^(3/2)*x
^3 + 1594/315*(3*x^2 - x + 2)^(3/2)*x^2 + 7849/3780*(3*x^2 - x +
2)^(3/2)*x - 45739/68040*(3*x^2 - x + 2)^(3/2) - 5393/2592*sqrt(3
*x^2 - x + 2)*x - 124039/93312*sqrt(3)*arcsinh(1/23*sqrt(23)*(6*x
 - 1)) + 5393/15552*sqrt(3*x^2 - x + 2)
```

Fricas [A] time = 0.290079, size = 123, normalized size = 0.86

$$\frac{1}{6531840}\sqrt{3}\left(4\sqrt{3}\left(2488320x^6+6462720x^5+7491456x^4+5497776x^3+3280872x^2+1493894x-543069\right)\sqrt{3x^2-x+2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)*(2*x + 1)^3,x, algorithm="fricas")
```

```
[Out] 1/6531840*sqrt(3)*(4*sqrt(3)*(2488320*x^6 + 6462720*x^5 + 7491456
*x^4 + 5497776*x^3 + 3280872*x^2 + 1493894*x - 543069)*sqrt(3*x^2
 - x + 2) + 4341365*log(-sqrt(3)*(72*x^2 - 24*x + 25) + 12*sqrt(3
*x^2 - x + 2)*(6*x - 1)))
```

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

$$\int(2x+1)^3\sqrt{3x^2-x+2}\left(4x^2+3x+1\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((1+2*x)**3*(4*x**2+3*x+1)*(3*x**2-x+2)**(1/2),x)
```

```
[Out] Integral((2*x + 1)**3*sqrt(3*x**2 - x + 2)*(4*x**2 + 3*x + 1), x)
```

GIAC/XCAS [A] time = 0.272941, size = 105, normalized size = 0.73

$$\frac{1}{544320}\left(2\left(12\left(6\left(8\left(30\left(72x+187\right)x+6503\right)x+38179\right)x+136703\right)x+746947\right)x-543069\right)\sqrt{3x^2-x+2} + \frac{124039}{93312}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)*(2*x + 1)^3,x, algorithm="giac")
```

```
[Out] 1/544320*(2*(12*(6*(8*(30*(72*x + 187)*x + 6503)*x + 38179)*x + 1
36703)*x + 746947)*x - 543069)*sqrt(3*x^2 - x + 2) + 124039/93312
*sqrt(3)*ln(-2*sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 - x + 2)) + 1)
```

3.209 $\int (1+2x)^2 \sqrt{2-x+3x^2} \left(1+3x+4x^2\right) \, dx$

Optimal. Leaf size=118

$$\frac{1}{9}\left(3x^2-x+2\right)^{3/2}(2x+1)^3+\frac{1}{5}\left(3x^2-x+2\right)^{3/2}(2x+1)^2+\frac{1}{810}(306x+25)\left(3x^2-x+2\right)^{3/2}+\frac{235(1-6x)\sqrt{3x^2-x+2}}{1296}+\frac{5405\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{2592\sqrt{3}}$$

```
[Out] (235*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/1296 + ((1 + 2*x)^2*(2 - x +
3*x^2)^(3/2))/5 + ((1 + 2*x)^3*(2 - x + 3*x^2)^(3/2))/9 + ((25 +
306*x)*(2 - x + 3*x^2)^(3/2))/810 + (5405*ArcSinh[(1 - 6*x)/Sqrt[
23]])/(2592*Sqrt[3])
```

Rubi [A] time = 0.239764, antiderivative size = 118, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$\frac{1}{9}\left(3x^2-x+2\right)^{3/2}(2x+1)^3+\frac{1}{5}\left(3x^2-x+2\right)^{3/2}(2x+1)^2+\frac{1}{810}(306x+25)\left(3x^2-x+2\right)^{3/2}+\frac{235(1-6x)\sqrt{3x^2-x+2}}{1296}+\frac{5405\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{2592\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 2*x)^2*Sqrt[2 - x + 3*x^2]*(1 + 3*x + 4*x^2),x]
```

```
[Out] (235*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/1296 + ((1 + 2*x)^2*(2 - x +
3*x^2)^(3/2))/5 + ((1 + 2*x)^3*(2 - x + 3*x^2)^(3/2))/9 + ((25 +
306*x)*(2 - x + 3*x^2)^(3/2))/810 + (5405*ArcSinh[(1 - 6*x)/Sqrt[
23]])/(2592*Sqrt[3])
```

Rubi in Sympy [A] time = 28.3507, size = 112, normalized size = 0.95

$$\frac{235\left(-6x+1\right)\sqrt{3x^2-x+2}}{1296}+\frac{(2x+1)^3\left(3x^2-x+2\right)^{\frac{3}{2}}}{9}+\frac{(2x+1)^2\left(3x^2-x+2\right)^{\frac{3}{2}}}{5}+\frac{(22032x+1800)\left(3x^2-x+2\right)^{\frac{3}{2}}}{58320}-\frac{5405\sqrt{3}\,\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{7776}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**2*(4*x**2+3*x+1)*(3*x**2-x+2)**(1/2),x)
```

```
[Out] 235*(-6*x + 1)*sqrt(3*x**2 - x + 2)/1296 + (2*x + 1)**3*(3*x**2 -
 x + 2)**(3/2)/9 + (2*x + 1)**2*(3*x**2 - x + 2)**(3/2)/5 + (2203
2*x + 1800)*(3*x**2 - x + 2)**(3/2)/58320 - 5405*sqrt(3)*atanh(sq
rt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/7776
```

Mathematica [A] time = 0.0897732, size = 65, normalized size = 0.55

$$\frac{6\sqrt{3x^2-x+2}\left(17280x^5+35712x^4+33552x^3+22344x^2+14638x+5607\right)-27025\sqrt{3}\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)}{38880}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 2*x)^2*Sqrt[2 - x + 3*x^2]*(1 + 3*x + 4*x^2),x]
```

```
[Out] (6*Sqrt[2 - x + 3*x^2]*(5607 + 14638*x + 22344*x^2 + 33552*x^3 +
35712*x^4 + 17280*x^5) - 27025*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23
]])/38880
```

Maple [A] time = 0.011, size = 98, normalized size = 0.8

$$-\frac{1410\,x-235}{1296}\sqrt{3\,x^2-x+2}-\frac{5405\,\sqrt{3}}{7776}Arcsinh\left(\frac{6\,\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{277}{810}\left(3\,x^2-x+2\right)^{\frac{3}{2}}+\frac{83\,x}{45}\left(3\,x^2-x+2\right)^{\frac{3}{2}}+\frac{32\,x^2}{15}\left(3\,x^2-x+2\right)^{\frac{3}{2}}+\frac{8\,x^3}{9}\left(3\,x^2-x+2\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^2*(4*x^2+3*x+1)*(3*x^2-x+2)^(1/2),x)
```

```
[Out] -235/1296*(6*x-1)*(3*x^2-x+2)^(1/2)-5405/7776*3^(1/2)*arcsinh(6/2
3*23^(1/2)*(x-1/6))+277/810*(3*x^2-x+2)^(3/2)+83/45*x*(3*x^2-x+2)
^(3/2)+32/15*x^2*(3*x^2-x+2)^(3/2)+8/9*x^3*(3*x^2-x+2)^(3/2)
```

Maxima [A] time = 0.757082, size = 147, normalized size = 1.25

$$\frac{8}{9}\left(3\,x^2-x+2\right)^{\frac{3}{2}}x^3+\frac{32}{15}\left(3\,x^2-x+2\right)^{\frac{3}{2}}x^2+\frac{83}{45}\left(3\,x^2-x+2\right)^{\frac{3}{2}}x+\frac{277}{810}\left(3\,x^2-x+2\right)^{\frac{3}{2}}-\frac{235}{216}\sqrt{3\,x^2-x+2}x-\frac{5405}{7776}\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{23}\sqrt{23}(6\,x-1)\right)+\frac{235}{1296}\sqrt{3\,x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)*(2*x + 1)^2,x, algorithm="maxima")
```

```
[Out] 8/9*(3*x^2 - x + 2)^(3/2)*x^3 + 32/15*(3*x^2 - x + 2)^(3/2)*x^2 +
 83/45*(3*x^2 - x + 2)^(3/2)*x + 277/810*(3*x^2 - x + 2)^(3/2) -
235/216*sqrt(3*x^2 - x + 2)*x - 5405/7776*sqrt(3)*arcsinh(1/23*sq
rt(23)*(6*x - 1)) + 235/1296*sqrt(3*x^2 - x + 2)
```

Fricas [A] time = 0.282049, size = 116, normalized size = 0.98

$$\frac{1}{77760}\sqrt{3}\left(4\sqrt{3}\left(17280\,x^5+35712\,x^4+33552\,x^3+22344\,x^2+14638\,x+5607\right)\sqrt{3\,x^2-x+2}+27025\,\log\left(-\sqrt{3}\left(72\,x^2-24\,x\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)*(2*x + 1)^2,x, algorithm="fricas")
```

```
[Out] 1/77760*sqrt(3)*(4*sqrt(3)*(17280*x^5 + 35712*x^4 + 33552*x^3 + 2
2344*x^2 + 14638*x + 5607)*sqrt(3*x^2 - x + 2) + 27025*log(-sqrt(
3)*(72*x^2 - 24*x + 25) + 12*sqrt(3*x^2 - x + 2)*(6*x - 1)))
```

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

$$\int (2x+1)^2\sqrt{3x^2-x+2}\left(4x^2+3x+1\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((1+2*x)**2*(4*x**2+3*x+1)*(3*x**2-x+2)**(1/2),x)
```

```
[Out] Integral((2*x + 1)**2*sqrt(3*x**2 - x + 2)*(4*x**2 + 3*x + 1), x)
```

GIAC/XCAS [A] time = 0.268709, size = 99, normalized size = 0.84

$$\frac{1}{6480}\left(2\left(12\left(6\left(8\left(15\,x+31\right)x+233\right)x+931\right)x+7319\right)x+5607\right)\sqrt{3\,x^2-x+2}+\frac{5405}{7776}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x-\sqrt{3\,x^2-x+2}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)*(2*x + 1)^2,x, algorithm="giac")
```

```
[Out] 1/6480*(2*(12*(6*(8*(15*x + 31)*x + 233)*x + 931)*x + 7319)*x + 5
607)*sqrt(3*x^2 - x + 2) + 5405/7776*sqrt(3)*ln(-2*sqrt(3)*(sqrt(
3)*x - sqrt(3*x^2 - x + 2)) + 1)
```

3.210 $\int (1+2x)\sqrt{2-x+3x^2}\left(1+3x+4x^2\right)\,dx$

Optimal. Leaf size=93

$$\frac{2}{15}\left(3x^2-x+2\right)^{3/2}(2x+1)^2+\frac{(738x+745)\left(3x^2-x+2\right)^{3/2}}{1620}+\frac{19(1-6x)\sqrt{3x^2-x+2}}{2592}+\frac{437\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{5184\sqrt{3}}$$

```
[Out] (19*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/2592 + (2*(1 + 2*x)^2*(2 - x +
 3*x^2)^(3/2))/15 + ((745 + 738*x)*(2 - x + 3*x^2)^(3/2))/1620 +
(437*ArcSinh[(1 - 6*x)/Sqrt[23]])/(5184*Sqrt[3])
```

Rubi [A] time = 0.140751, antiderivative size = 93, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{2}{15}\left(3x^2-x+2\right)^{3/2}(2x+1)^2+\frac{(738x+745)\left(3x^2-x+2\right)^{3/2}}{1620}+\frac{19(1-6x)\sqrt{3x^2-x+2}}{2592}+\frac{437\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{5184\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 2*x)*Sqrt[2 - x + 3*x^2]*(1 + 3*x + 4*x^2),x]
```

```
[Out] (19*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/2592 + (2*(1 + 2*x)^2*(2 - x +
 3*x^2)^(3/2))/15 + ((745 + 738*x)*(2 - x + 3*x^2)^(3/2))/1620 +
(437*ArcSinh[(1 - 6*x)/Sqrt[23]])/(5184*Sqrt[3])
```

Rubi in Sympy [A] time = 19.5727, size = 94, normalized size = 1.01

$$\frac{19\left(-6x+1\right)\sqrt{3x^2-x+2}}{2592}+\frac{2\left(2x+1\right)^2\left(3x^2-x+2\right)^{\frac{3}{2}}}{15}+\frac{\left(1476x+1490\right)\left(3x^2-x+2\right)^{\frac{3}{2}}}{3240}-\frac{437\sqrt{3}\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{15552}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)*(4*x**2+3*x+1)*(3*x**2-x+2)**(1/2),x)
```

```
[Out] 19*(-6*x + 1)*sqrt(3*x**2 - x + 2)/2592 + 2*(2*x + 1)**2*(3*x**2
- x + 2)**(3/2)/15 + (1476*x + 1490)*(3*x**2 - x + 2)**(3/2)/3240
 - 437*sqrt(3)*atanh(sqrt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/
```

```
15552
```

Mathematica [A] time = 0.0697569, size = 60, normalized size = 0.65

$$\frac{6\sqrt{3x^2-x+2}\left(20736x^4+31536x^3+24072x^2+17374x+15471\right)-2185\sqrt{3}\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)}{77760}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 2*x)*Sqrt[2 - x + 3*x^2]*(1 + 3*x + 4*x^2),x]
```

```
[Out] (6*Sqrt[2 - x + 3*x^2]*(15471 + 17374*x + 24072*x^2 + 31536*x^3 +
 20736*x^4) - 2185*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]])/77760
```

Maple [A] time = 0.008, size = 81, normalized size = 0.9

$$-\frac{114\,x-19}{2592}\sqrt{3\,x^2-x+2}-\frac{437\,\sqrt{3}}{15552}Arcsinh\left(\frac{6\,\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{961}{1620}\left(3\,x^2-x+2\right)^{\frac{3}{2}}+\frac{89\,x}{90}\left(3\,x^2-x+2\right)^{\frac{3}{2}}+\frac{8\,x^2}{15}\left(3\,x^2-x+2\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)*(4*x^2+3*x+1)*(3*x^2-x+2)^(1/2),x)
```

```
[Out] -19/2592*(6*x-1)*(3*x^2-x+2)^(1/2)-437/15552*3^(1/2)*arcsinh(6/23
*23^(1/2)*(x-1/6))+961/1620*(3*x^2-x+2)^(3/2)+89/90*x*(3*x^2-x+2)
^(3/2)+8/15*x^2*(3*x^2-x+2)^(3/2)
```

Maxima [A] time = 0.764967, size = 124, normalized size = 1.33

$$\frac{8}{15}\left(3\,x^2-x+2\right)^{\frac{3}{2}}x^2+\frac{89}{90}\left(3\,x^2-x+2\right)^{\frac{3}{2}}x+\frac{961}{1620}\left(3\,x^2-x+2\right)^{\frac{3}{2}}-\frac{19}{432}\sqrt{3\,x^2-x+2}x-\frac{437}{15552}\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{23}\sqrt{23}(6\,x-1)\right)+\frac{19}{2592}\sqrt{3\,x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)*(2*x + 1),x, algorithm="maxima")
```

```
[Out] 8/15*(3*x^2 - x + 2)^(3/2)*x^2 + 89/90*(3*x^2 - x + 2)^(3/2)*x +
961/1620*(3*x^2 - x + 2)^(3/2) - 19/432*sqrt(3*x^2 - x + 2)*x - 4
37/15552*sqrt(3)*arcsinh(1/23*sqrt(23)*(6*x - 1)) + 19/2592*sqrt(
3*x^2 - x + 2)
```

Fricas [A] time = 0.281123, size = 109, normalized size = 1.17

$$\frac{1}{155520}\sqrt{3}\left(4\sqrt{3}\left(20736\,x^4+31536\,x^3+24072\,x^2+17374\,x+15471\right)\sqrt{3\,x^2-x+2}+2185\,\log\left(-\sqrt{3}\left(72\,x^2-24\,x+25\right)+1\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)*(2*x + 1),x, algorithm="fricas")
```

```
[Out] 1/155520*sqrt(3)*(4*sqrt(3)*(20736*x^4 + 31536*x^3 + 24072*x^2 +
17374*x + 15471)*sqrt(3*x^2 - x + 2) + 2185*log(-sqrt(3)*(72*x^2
- 24*x + 25) + 12*sqrt(3*x^2 - x + 2)*(6*x - 1)))
```

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

$$\int (2x+1)\sqrt{3x^2-x+2}\left(4x^2+3x+1\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)*(4*x**2+3*x+1)*(3*x**2-x+2)**(1/2),x)
```

```
[Out] Integral((2*x + 1)*sqrt(3*x**2 - x + 2)*(4*x**2 + 3*x + 1), x)
```

GIAC/XCAS [A] time = 0.26699, size = 92, normalized size = 0.99

$$\frac{1}{12960}\left(2\left(12\left(18\left(48\,x+73\right)x+1003\right)x+8687\right)x+15471\right)\sqrt{3\,x^2-x+2} + \frac{437}{15552}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x-\sqrt{3\,x^2-x+2}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)*(2*x + 1),x, algorithm="giac")
```

```
[Out] 1/12960*(2*(12*(18*(48*x + 73)*x + 1003)*x + 8687)*x + 15471)*sqr
t(3*x^2 - x + 2) + 437/15552*sqrt(3)*ln(-2*sqrt(3)*(sqrt(3)*x - s
qrt(3*x^2 - x + 2)) + 1)
```

3.211 $\int \frac{\sqrt{2-x+3x^2}(1+3x+4x^2)}{1+2x} \, dx$

Optimal. Leaf size=101

$$\frac{2}{9}\left(3x^2-x+2\right)^{3/2}+\frac{1}{72}(30x+13)\sqrt{3x^2-x+2}-\frac{1}{8}\sqrt{13}\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)-\frac{43\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{144\sqrt{3}}$$

```
[Out] ((13 + 30*x)*Sqrt[2 - x + 3*x^2])/72 + (2*(2 - x + 3*x^2)^(3/2))/
9 - (43*ArcSinh[(1 - 6*x)/Sqrt[23]])/(144*Sqrt[3]) - (Sqrt[13]*Ar
cTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/8
```

Rubi [A] time = 0.253179, antiderivative size = 101, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.219$

$$\frac{2}{9}\left(3x^2-x+2\right)^{3/2}+\frac{1}{72}(30x+13)\sqrt{3x^2-x+2}-\frac{1}{8}\sqrt{13}\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)-\frac{43\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{144\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[2 - x + 3*x^2]*(1 + 3*x + 4*x^2))/(1 + 2*x),x]
```

```
[Out] ((13 + 30*x)*Sqrt[2 - x + 3*x^2])/72 + (2*(2 - x + 3*x^2)^(3/2))/
9 - (43*ArcSinh[(1 - 6*x)/Sqrt[23]])/(144*Sqrt[3]) - (Sqrt[13]*Ar
cTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/8
```

Rubi in Sympy [A] time = 33.3528, size = 99, normalized size = 0.98

$$\frac{(180x+78)\sqrt{3x^2-x+2}}{432}+\frac{2\left(3x^2-x+2\right)^{\frac{3}{2}}}{9}-\frac{\sqrt{13}\,\mathrm{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{8}+\frac{43\sqrt{3}\,\mathrm{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{432}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)*(3*x**2-x+2)**(1/2)/(1+2*x),x)
```

```
[Out] (180*x + 78)*sqrt(3*x**2 - x + 2)/432 + 2*(3*x**2 - x + 2)**(3/2)
/9 - sqrt(13)*atanh(sqrt(13)*(-8*x + 9)/(26*sqrt(3*x**2 - x + 2))
)/8 + 43*sqrt(3)*atanh(sqrt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2))
)/432
```

Mathematica [A] time = 0.13691, size = 99, normalized size = 0.98

$$\frac{1}{432}\left(6\left(\sqrt{3x^2-x+2}\left(48x^2+14x+45\right)-9\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)+9\sqrt{13}\log(2x+1)\right)+43\sqrt{3}\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[2 - x + 3*x^2]*(1 + 3*x + 4*x^2))/(1 + 2*x),x]
```

```
[Out] (43*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]] + 6*(Sqrt[2 - x + 3*x^2]
*(45 + 14*x + 48*x^2) + 9*Sqrt[13]*Log[1 + 2*x] - 9*Sqrt[13]*Log[
9 - 8*x + 2*Sqrt[13]*Sqrt[2 - x + 3*x^2]]))/432
```

Maple [A] time = 0.012, size = 95, normalized size = 0.9

$$\frac{30\,x-5}{72}\sqrt{3\,x^2-x+2}+\frac{43\,\sqrt{3}}{432}Arcsinh\left(\frac{6\,\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{2}{9}\left(3\,x^2-x+2\right)^{\frac{3}{2}}+\frac{1}{8}\sqrt{12\,\left(1/2+x\right)^2-16\,x+5}-\frac{\sqrt{13}}{8}Artanh\left(\frac{2\,\sqrt{13}}{13}\left(\frac{9}{2}-4\,x\right)\frac{1}{\sqrt{12\,\left(1/2+x\right)^2-16\,x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)*(3*x^2-x+2)^(1/2)/(1+2*x),x)
```

```
[Out] 5/72*(6*x-1)*(3*x^2-x+2)^(1/2)+43/432*3^(1/2)*arcsinh(6/23*23^(1/
2)*(x-1/6))+2/9*(3*x^2-x+2)^(3/2)+1/8*(12*(1/2+x)^2-16*x+5)^(1/2)
-1/8*13^(1/2)*arctanh(2/13*(9/2-4*x)*13^(1/2)/(12*(1/2+x)^2-16*x+
5)^(1/2))
```

Maxima [A] time = 0.77387, size = 130, normalized size = 1.29

$$\frac{2}{9}\left(3\,x^2-x+2\right)^{\frac{3}{2}}+\frac{5}{12}\sqrt{3\,x^2-x+2}x+\frac{43}{432}\sqrt{3}\,\mathrm{arsinh}\left(\frac{6}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{1}{8}\sqrt{13}\,\mathrm{arsinh}\left(\frac{8\sqrt{23}x}{23\,|2\,x+1|}-\frac{9\sqrt{23}}{23\,|2\,x+1|}\right)+\frac{13}{72}\sqrt{3\,x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)/(2*x + 1),x, algorithm="maxima")
```

```
[Out] 2/9*(3*x^2 - x + 2)^(3/2) + 5/12*sqrt(3*x^2 - x + 2)*x + 43/432*s
qrt(3)*arcsinh(6/23*sqrt(23)*x - 1/23*sqrt(23)) + 1/8*sqrt(13)*ar
csinh(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*sqrt(23)/abs(2*x + 1))
+ 13/72*sqrt(3*x^2 - x + 2)
```

Fricas [A] time = 0.297543, size = 170, normalized size = 1.68

$$\frac{1}{864}\sqrt{3}\left(4\sqrt{3}\left(48x^2+14x+45\right)\sqrt{3x^2-x+2}+18\sqrt{13}\sqrt{3}\log\left(-\frac{4\sqrt{13}\sqrt{3x^2-x+2}(8x-9)+220x^2-196x+185}{4x^2+4x+1}\right)+43$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)/(2*x + 1),x, algorithm="fricas")
```

```
[Out] 1/864*sqrt(3)*(4*sqrt(3)*(48*x^2 + 14*x + 45)*sqrt(3*x^2 - x + 2)
 + 18*sqrt(13)*sqrt(3)*log(-(4*sqrt(13)*sqrt(3*x^2 - x + 2)*(8*x
- 9) + 220*x^2 - 196*x + 185)/(4*x^2 + 4*x + 1)) + 43*log(-sqrt(3
)*(72*x^2 - 24*x + 25) - 12*sqrt(3*x^2 - x + 2)*(6*x - 1)))
```

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

$$\int \frac{\sqrt{3x^2-x+2}\left(4x^2+3x+1\right)}{2x+1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x**2+3*x+1)*(3*x**2-x+2)**(1/2)/(1+2*x),x)
```

```
[Out] Integral(sqrt(3*x**2 - x + 2)*(4*x**2 + 3*x + 1)/(2*x + 1), x)
```

GIAC/XCAS [A] time = 0.288636, size = 170, normalized size = 1.68

$$\frac{1}{72}\left(2\left(24x+7\right)x+45\right)\sqrt{3x^2-x+2}-\frac{43}{432}\sqrt{3}\ln\left(-6\sqrt{3}x+\sqrt{3}+6\sqrt{3x^2-x+2}\right)$$
$$+\frac{1}{8}\sqrt{13}\ln\left(-\frac{\left|-4\sqrt{3}x-2\sqrt{13}-2\sqrt{3}+4\sqrt{3x^2-x+2}\right|}{2\left(2\sqrt{3}x-\sqrt{13}+\sqrt{3}-2\sqrt{3x^2-x+2}\right)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)/(2*x + 1),x, algorithm="giac")
```

```
[Out] 1/72*(2*(24*x + 7)*x + 45)*sqrt(3*x^2 - x + 2) - 43/432*sqrt(3)*l
n(-6*sqrt(3)*x + sqrt(3) + 6*sqrt(3*x^2 - x + 2)) + 1/8*sqrt(13)*
ln(-1/2*abs(-4*sqrt(3)*x - 2*sqrt(13) - 2*sqrt(3) + 4*sqrt(3*x^2
- x + 2))/(2*sqrt(3)*x - sqrt(13) + sqrt(3) - 2*sqrt(3*x^2 - x +
2)))
```

3.212 $\int \frac{\sqrt{2-x+3x^2}\left(1+3x+4x^2\right)}{(1+2x)^2}\,dx$

Optimal. Leaf size=108

$$-\frac{\left(3x^2-x+2\right)^{3/2}}{13(2x+1)}-\frac{1}{156}(67-96x)\sqrt{3x^2-x+2}+\frac{17\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{8\sqrt{13}}-\frac{11\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{6\sqrt{3}}$$

```
[Out] -((67 - 96*x)*Sqrt[2 - x + 3*x^2])/156 - (2 - x + 3*x^2)^(3/2)/(1
3*(1 + 2*x)) - (11*ArcSinh[(1 - 6*x)/Sqrt[23]])/(6*Sqrt[3]) + (17
*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/(8*Sqrt[13]
)
```

Rubi [A] time = 0.265829, antiderivative size = 108, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.219

$$-\frac{\left(3x^2-x+2\right)^{3/2}}{13(2x+1)}-\frac{1}{156}(67-96x)\sqrt{3x^2-x+2}+\frac{17\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{8\sqrt{13}}-\frac{11\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{6\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[2 - x + 3*x^2]*(1 + 3*x + 4*x^2))/(1 + 2*x)^2,x]
```

```
[Out] -((67 - 96*x)*Sqrt[2 - x + 3*x^2])/156 - (2 - x + 3*x^2)^(3/2)/(1
3*(1 + 2*x)) - (11*ArcSinh[(1 - 6*x)/Sqrt[23]])/(6*Sqrt[3]) + (17
*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/(8*Sqrt[13]
)
```

Rubi in Sympy [A] time = 33.0718, size = 102, normalized size = 0.94

$$-\frac{(-384x+268)\sqrt{3x^2-x+2}}{624}+\frac{17\sqrt{13}\operatorname{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{104}+\frac{11\sqrt{3}\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{18}-\frac{\left(3x^2-x+2\right)^{\frac{3}{2}}}{13\,(2x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)*(3*x**2-x+2)**(1/2)/(1+2*x)**2,x)
```

```
[Out] -(-384*x + 268)*sqrt(3*x**2 - x + 2)/624 + 17*sqrt(13)*atanh(sqrt
(13)*(-8*x + 9)/(26*sqrt(3*x**2 - x + 2)))/104 + 11*sqrt(3)*atanh
(sqrt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/18 - (3*x**2 - x + 2
```

```
)**(3/2)/(13*(2*x + 1))
```

Mathematica [A] time = 0.251002, size = 104, normalized size = 0.96

$$\frac{1}{936}\left(\frac{78\sqrt{3x^2-x+2}\left(12x^2-2x-7\right)}{2x+1}+153\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)-153\sqrt{13}\log(2x+1)+572\sqrt{3}\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[2 - x + 3*x^2]*(1 + 3*x + 4*x^2))/(1 + 2*x)^2,x]
```

```
[Out] ((78*Sqrt[2 - x + 3*x^2]*(-7 - 2*x + 12*x^2))/(1 + 2*x) + 572*Sqr
t[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]] - 153*Sqrt[13]*Log[1 + 2*x] + 1
53*Sqrt[13]*Log[9 - 8*x + 2*Sqrt[13]*Sqrt[2 - x + 3*x^2]])/936
```

Maple [A] time = 0.017, size = 123, normalized size = 1.1

$$\frac{6x-1}{12}\sqrt{3x^2-x+2}+\frac{11\sqrt{3}}{18}\mathit{Arcsinh}\left(\frac{6\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)-\frac{1}{26}\left(3\,(1/2+x)^2-4x+\frac{5}{4}\right)^{\frac{3}{2}}\left(\frac{1}{2}+x\right)^{-1}-\frac{17}{104}\sqrt{12\,(1/2+x)^2-16x+5}+\frac{17\sqrt{13}}{104}\mathit{Artanh}\left(\frac{2\sqrt{13}}{13}\left(\frac{9}{2}-4x\right)\frac{1}{\sqrt{12\,(1/2+x)^2-16x+5}}\right)+\frac{6x-1}{52}\sqrt{3\,(1/2+x)^2-4x+\frac{5}{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)*(3*x^2-x+2)^(1/2)/(1+2*x)^2,x)
```

```
[Out] 1/12*(6*x-1)*(3*x^2-x+2)^(1/2)+11/18*3^(1/2)*arcsinh(6/23*23^(1/2
)*(x-1/6))-1/26/(1/2+x)*(3*(1/2+x)^2-4*x+5/4)^(3/2)-17/104*(12*(1
/2+x)^2-16*x+5)^(1/2)+17/104*13^(1/2)*arctanh(2/13*(9/2-4*x)*13^(
1/2)/(12*(1/2+x)^2-16*x+5)^(1/2))+1/52*(6*x-1)*(3*(1/2+x)^2-4*x+5
/4)^(1/2)
```

Maxima [A] time = 0.768398, size = 139, normalized size = 1.29

$$\frac{1}{2}\sqrt{3x^2-x+2}x+\frac{11}{18}\sqrt{3}\operatorname{arsinh}\left(\frac{6}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)-\frac{17}{104}\sqrt{13}\operatorname{arsinh}\left(\frac{8\sqrt{23}x}{23|2x+1|}-\frac{9\sqrt{23}}{23|2x+1|}\right)-\frac{1}{3}\sqrt{3x^2-x+2}-\frac{\sqrt{3x^2-x+2}}{4(2x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)/(2*x + 1)^2,x, algorithm="maxima")
```

```
[Out] 1/2*sqrt(3*x^2 - x + 2)*x + 11/18*sqrt(3)*arcsinh(6/23*sqrt(23)*x
 - 1/23*sqrt(23)) - 17/104*sqrt(13)*arcsinh(8/23*sqrt(23)*x/abs(2
*x + 1) - 9/23*sqrt(23)/abs(2*x + 1)) - 1/3*sqrt(3*x^2 - x + 2) -
 1/4*sqrt(3*x^2 - x + 2)/(2*x + 1)
```

Fricas [A] time = 0.290038, size = 204, normalized size = 1.89

$$\frac{\sqrt{13}\sqrt{3}\left(4\sqrt{13}\sqrt{3}\left(12x^2-2x-7\right)\sqrt{3x^2-x+2}+44\sqrt{13}(2x+1)\log\left(-\sqrt{3}\left(72x^2-24x+25\right)-12\sqrt{3x^2-x+2}(6x-1)\right)\right.}{1872(2x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)/(2*x + 1)^2,x, algorithm="fricas")
```

```
[Out] 1/1872*sqrt(13)*sqrt(3)*(4*sqrt(13)*sqrt(3)*(12*x^2 - 2*x - 7)*sq
rt(3*x^2 - x + 2) + 44*sqrt(13)*(2*x + 1)*log(-sqrt(3)*(72*x^2 -
24*x + 25) - 12*sqrt(3*x^2 - x + 2)*(6*x - 1)) + 51*sqrt(3)*(2*x
+ 1)*log(-(sqrt(13)*(220*x^2 - 196*x + 185) - 52*sqrt(3*x^2 - x +
 2)*(8*x - 9))/(4*x^2 + 4*x + 1)))/(2*x + 1)
```

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

$$\int\frac{\sqrt{3x^2-x+2}\left(4x^2+3x+1\right)}{(2x+1)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x**2+3*x+1)*(3*x**2-x+2)**(1/2)/(1+2*x)**2,x)
```

```
[Out] Integral(sqrt(3*x**2 - x + 2)*(4*x**2 + 3*x + 1)/(2*x + 1)**2, x)
```

GIAC/XCAS [A] time = 0.445812, size = 513, normalized size = 4.75

$$\frac{17}{104}\sqrt{13}\ln\left(\sqrt{13}\left(\sqrt{-\frac{8}{2x+1}+\frac{13}{(2x+1)^2}+3}+\frac{\sqrt{13}}{2x+1}\right)-4\right)\operatorname{sign}\left(\frac{1}{2x+1}\right)$$
$$-\frac{11}{18}\sqrt{3}\ln\left(\frac{\left|-2\sqrt{3}+2\sqrt{-\frac{8}{2x+1}+\frac{13}{(2x+1)^2}+3}+\frac{2\sqrt{13}}{2x+1}\right|}{2\left(\sqrt{3}+\sqrt{-\frac{8}{2x+1}+\frac{13}{(2x+1)^2}+3}+\frac{\sqrt{13}}{2x+1}\right)}\right)\operatorname{sign}\left(\frac{1}{2x+1}\right)$$
$$-\frac{1}{8}\sqrt{-\frac{8}{2x+1}+\frac{13}{(2x+1)^2}+3}\operatorname{sign}\left(\frac{1}{2x+1}\right)$$
$$+\frac{67\left(\sqrt{-\frac{8}{2x+1}+\frac{13}{(2x+1)^2}+3}+\frac{\sqrt{13}}{2x+1}\right)^3\operatorname{sign}\left(\frac{1}{2x+1}\right)-57\sqrt{13}\left(\sqrt{-\frac{8}{2x+1}+\frac{13}{(2x+1)^2}+3}+\frac{\sqrt{13}}{2x+1}\right)^2\operatorname{sign}\left(\frac{1}{2x+1}\right)+129\left(\sqrt{-\frac{8}{2x+1}+\frac{13}{(2}\right.}{12\left(\left(\sqrt{-\frac{8}{2x+1}+\frac{13}{(2x+1)^2}+3}+\frac{\sqrt{13}}{2x+1}\right)^2-3\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)/(2*x + 1)^2,x, algorithm="giac")
```

```
[Out] 17/104*sqrt(13)*ln(sqrt(13)*(sqrt(-8/(2*x + 1) + 13/(2*x + 1)^2 +
 3) + sqrt(13)/(2*x + 1)) - 4)*sign(1/(2*x + 1)) - 11/18*sqrt(3)*
ln(1/2*abs(-2*sqrt(3) + 2*sqrt(-8/(2*x + 1) + 13/(2*x + 1)^2 + 3)
 + 2*sqrt(13)/(2*x + 1))/(sqrt(3) + sqrt(-8/(2*x + 1) + 13/(2*x +
 1)^2 + 3) + sqrt(13)/(2*x + 1)))*sign(1/(2*x + 1)) - 1/8*sqrt(-8
/(2*x + 1) + 13/(2*x + 1)^2 + 3)*sign(1/(2*x + 1)) + 1/12*(67*(sq
rt(-8/(2*x + 1) + 13/(2*x + 1)^2 + 3) + sqrt(13)/(2*x + 1))^3*sig
n(1/(2*x + 1)) - 57*sqrt(13)*(sqrt(-8/(2*x + 1) + 13/(2*x + 1)^2
+ 3) + sqrt(13)/(2*x + 1))^2*sign(1/(2*x + 1)) + 129*(sqrt(-8/(2*
x + 1) + 13/(2*x + 1)^2 + 3) + sqrt(13)/(2*x + 1))*sign(1/(2*x +
1)) + 27*sqrt(13)*sign(1/(2*x + 1)))/((sqrt(-8/(2*x + 1) + 13/(2*
x + 1)^2 + 3) + sqrt(13)/(2*x + 1))^2 - 3)^2
```

3.213 $\int \frac{\sqrt{2-x+3x^2}(1+3x+4x^2)}{(1+2x)^3}\,dx$

Optimal. Leaf size=115

$$-\frac{(3x^2-x+2)^{3/2}}{26(2x+1)^2}+\frac{11(10x+7)\sqrt{3x^2-x+2}}{104(2x+1)}-\frac{803\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{208\sqrt{13}}+\frac{11\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{8\sqrt{3}}$$

```
[Out] (11*(7 + 10*x)*Sqrt[2 - x + 3*x^2])/(104*(1 + 2*x)) - (2 - x + 3*
x^2)^(3/2)/(26*(1 + 2*x)^2) + (11*ArcSinh[(1 - 6*x)/Sqrt[23]])/(8
*Sqrt[3]) - (803*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2
])])/(208*Sqrt[13])
```

Rubi [A] time = 0.266091, antiderivative size = 115, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.219

$$-\frac{(3x^2-x+2)^{3/2}}{26(2x+1)^2}+\frac{11(10x+7)\sqrt{3x^2-x+2}}{104(2x+1)}-\frac{803\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{208\sqrt{13}}+\frac{11\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{8\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[2 - x + 3*x^2]*(1 + 3*x + 4*x^2))/(1 + 2*x)^3,x]
```

```
[Out] (11*(7 + 10*x)*Sqrt[2 - x + 3*x^2])/(104*(1 + 2*x)) - (2 - x + 3*
x^2)^(3/2)/(26*(1 + 2*x)^2) + (11*ArcSinh[(1 - 6*x)/Sqrt[23]])/(8
*Sqrt[3]) - (803*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2
])])/(208*Sqrt[13])
```

Rubi in Sympy [A] time = 32.8853, size = 109, normalized size = 0.95

$$-\frac{803\sqrt{13}\,\mathrm{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{2704}-\frac{11\sqrt{3}\,\mathrm{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{24}+\frac{(220x+154)\sqrt{3x^2-x+2}}{208\,(2x+1)}-\frac{(3x^2-x+2)^{\frac{3}{2}}}{26\,(2x+1)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)*(3*x**2-x+2)**(1/2)/(1+2*x)**3,x)
```

```
[Out] -803*sqrt(13)*atanh(sqrt(13)*(-8*x + 9)/(26*sqrt(3*x**2 - x + 2))
)/2704 - 11*sqrt(3)*atanh(sqrt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x +
2)))/24 + (220*x + 154)*sqrt(3*x**2 - x + 2)/(208*(2*x + 1)) - (3
```

```
*x**2 - x + 2)**(3/2)/(26*(2*x + 1)**2)
```

Mathematica [A] time = 0.158166, size = 104, normalized size = 0.9

$$\frac{\frac{78\sqrt{3x^2-x+2}(208x^2+268x+69)}{(2x+1)^2} - 2409\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right) + 2409\sqrt{13}\log(2x+1) - 3718\sqrt{3}\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)}{8112}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(Sqrt[2 - x + 3*x^2]*(1 + 3*x + 4*x^2))/(1 + 2*x)^3,x]
```

```
[Out] ((78*Sqrt[2 - x + 3*x^2]*(69 + 268*x + 208*x^2))/(1 + 2*x)^2 - 37
18*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]] + 2409*Sqrt[13]*Log[1 + 2
*x] - 2409*Sqrt[13]*Log[9 - 8*x + 2*Sqrt[13]*Sqrt[2 - x + 3*x^2]]
)/8112
```

Maple [A] time = 0.017, size = 125, normalized size = 1.1

$$\frac{803}{2704}\sqrt{12\,(1/2+x)^2-16\,x+5}-\frac{11\,\sqrt{3}}{24}Arcsinh\left(\frac{6\,\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right) -\frac{803\,\sqrt{13}}{2704}Artanh\left(\frac{2\,\sqrt{13}}{13}\left(\frac{9}{2}-4\,x\right)\frac{1}{\sqrt{12\,(1/2+x)^2-16\,x+5}}\right) -\frac{1}{104}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{\frac{3}{2}}\left(\frac{1}{2}+x\right)^{-2} +\frac{11}{338}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{\frac{3}{2}}\left(\frac{1}{2}+x\right)^{-1}-\frac{66\,x-11}{676}\sqrt{3\,(1/2+x)^2-4\,x+\frac{5}{4}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)*(3*x^2-x+2)^(1/2)/(1+2*x)^3,x)
```

```
[Out] 803/2704*(12*(1/2+x)^2-16*x+5)^(1/2)-11/24*3^(1/2)*arcsinh(6/23*2
3^(1/2)*(x-1/6))-803/2704*13^(1/2)*arctanh(2/13*(9/2-4*x)*13^(1/2
)/(12*(1/2+x)^2-16*x+5)^(1/2))-1/104/(1/2+x)^2*(3*(1/2+x)^2-4*x+5
/4)^(3/2)+11/338/(1/2+x)*(3*(1/2+x)^2-4*x+5/4)^(3/2)-11/676*(6*x-
1)*(3*(1/2+x)^2-4*x+5/4)^(1/2)
```

Maxima [A] time = 0.770675, size = 154, normalized size = 1.34

$$-\frac{11}{24}\sqrt{3}\,\mathrm{arsinh}\left(\frac{6}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{803}{2704}\sqrt{13}\,\mathrm{arsinh}\left(\frac{8\sqrt{23}x}{23\,|2\,x+1|}-\frac{9\sqrt{23}}{23\,|2\,x+1|}\right)+\frac{55}{104}\sqrt{3\,x^2-x+2}-\frac{\left(3\,x^2-x+2\right)^{\frac{3}{2}}}{26\,(4\,x^2+4\,x+1)}+\frac{11\sqrt{3\,x^2-x+2}}{52\,(2\,x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)/(2*x + 1)^3,x, algorithm="maxima")
```

```
[Out] -11/24*sqrt(3)*arcsinh(6/23*sqrt(23)*x - 1/23*sqrt(23)) + 803/270
4*sqrt(13)*arcsinh(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*sqrt(23)/a
bs(2*x + 1)) + 55/104*sqrt(3*x^2 - x + 2) - 1/26*(3*x^2 - x + 2)^
(3/2)/(4*x^2 + 4*x + 1) + 11/52*sqrt(3*x^2 - x + 2)/(2*x + 1)
```

Fricas [A] time = 0.281339, size = 224, normalized size = 1.95

$$\frac{\sqrt{13}\sqrt{3}\Big(4\sqrt{13}\sqrt{3}\left(208\,x^2+268\,x+69\right)\sqrt{3\,x^2-x+2}+286\sqrt{13}\left(4\,x^2+4\,x+1\right)\log\left(-\sqrt{3}\left(72\,x^2-24\,x+25\right)+12\sqrt{3\,x^2-x}\right.}{16224\,(4\,x^2+4\,x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)/(2*x + 1)^3,x, algorithm="fricas")
```

```
[Out] 1/16224*sqrt(13)*sqrt(3)*(4*sqrt(13)*sqrt(3)*(208*x^2 + 268*x + 6
9)*sqrt(3*x^2 - x + 2) + 286*sqrt(13)*(4*x^2 + 4*x + 1)*log(-sqrt
(3)*(72*x^2 - 24*x + 25) + 12*sqrt(3*x^2 - x + 2)*(6*x - 1)) + 80
3*sqrt(3)*(4*x^2 + 4*x + 1)*log(-(sqrt(13)*(220*x^2 - 196*x + 185
) + 52*sqrt(3*x^2 - x + 2)*(8*x - 9))/(4*x^2 + 4*x + 1)))/(4*x^2
+ 4*x + 1)
```

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

$$\int \frac{\sqrt{3x^2-x+2}\left(4x^2+3x+1\right)}{(2x+1)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x**2+3*x+1)*(3*x**2-x+2)**(1/2)/(1+2*x)**3,x)
```

```
[Out] Integral(sqrt(3*x**2 - x + 2)*(4*x**2 + 3*x + 1)/(2*x + 1)**3, 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((4*x^2 + 3*x + 1)*sqrt(3*x^2 - x + 2)/(2*x + 1)^3,x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.214 $\int (1+2x)^3 \left(2-x+3x^2\right)^{3/2} \left(1+3x+4x^2\right)\, dx$

Optimal. Leaf size=158

$$\frac{2}{27}\left(3x^2-x+2\right)^{5/2}(2x+1)^4+\frac{913}{486}x^2\left(3x^2-x+2\right)^{5/2}-\frac{11(283-5850x)\left(3x^2-x+2\right)^{5/2}}{58320}+\frac{54593(1-6x)\left(3x^2-x+2\right)^{3/2}}{559872}+\frac{1255639(1-6x)\sqrt{3x^2-x+2}}{4478976}+\frac{77}{81}x^3\left(3x^2-x+2\right)^{5/2}+\frac{28879697\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{8957952\sqrt{3}}$$

```
[Out] (1255639*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/4478976 + (54593*(1 - 6*x
)*(2 - x + 3*x^2)^(3/2))/559872 - (11*(283 - 5850*x)*(2 - x + 3*x
^2)^(5/2))/58320 + (913*x^2*(2 - x + 3*x^2)^(5/2))/486 + (77*x^3*
(2 - x + 3*x^2)^(5/2))/81 + (2*(1 + 2*x)^4*(2 - x + 3*x^2)^(5/2))
/27 + (28879697*ArcSinh[(1 - 6*x)/Sqrt[23]])/(8957952*Sqrt[3])
```

Rubi [A] time = 0.335867, antiderivative size = 158, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$\frac{2}{27}\left(3x^2-x+2\right)^{5/2}(2x+1)^4+\frac{913}{486}x^2\left(3x^2-x+2\right)^{5/2}-\frac{11(283-5850x)\left(3x^2-x+2\right)^{5/2}}{58320}+\frac{54593(1-6x)\left(3x^2-x+2\right)^{3/2}}{559872}+\frac{1255639(1-6x)\sqrt{3x^2-x+2}}{4478976}+\frac{77}{81}x^3\left(3x^2-x+2\right)^{5/2}+\frac{28879697\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{8957952\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 2*x)^3*(2 - x + 3*x^2)^(3/2)*(1 + 3*x + 4*x^2),x]
```

```
[Out] (1255639*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/4478976 + (54593*(1 - 6*x
)*(2 - x + 3*x^2)^(3/2))/559872 - (11*(283 - 5850*x)*(2 - x + 3*x
^2)^(5/2))/58320 + (913*x^2*(2 - x + 3*x^2)^(5/2))/486 + (77*x^3*
(2 - x + 3*x^2)^(5/2))/81 + (2*(1 + 2*x)^4*(2 - x + 3*x^2)^(5/2))
/27 + (28879697*ArcSinh[(1 - 6*x)/Sqrt[23]])/(8957952*Sqrt[3])
```

Rubi in Sympy [A] time = 36.8805, size = 160, normalized size = 1.01

$$\frac{54593\left(-6x+1\right)\left(3x^2-x+2\right)^{\frac{3}{2}}}{559872}+\frac{1255639\left(-6x+1\right)\sqrt{3x^2-x+2}}{4478976}+\frac{2\left(2x+1\right)^4\left(3x^2-x+2\right)^{\frac{5}{2}}}{27}+\frac{77\left(2x+1\right)^3\left(3x^2-x+2\right)^{\frac{5}{2}}}{648}+\frac{55\left(2x+1\right)^2\left(3x^2-x+2\right)^{\frac{5}{2}}}{486}-\frac{11\left(2970x+13617\right)\left(3x^2-x+2\right)^{\frac{5}{2}}}{524880}-\frac{28879697\sqrt{3}\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{26873856}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**3*(3*x**2-x+2)**(3/2)*(4*x**2+3*x+1),x)
```

```
[Out] 54593*(-6*x + 1)*(3*x**2 - x + 2)**(3/2)/559872 + 1255639*(-6*x +
 1)*sqrt(3*x**2 - x + 2)/4478976 + 2*(2*x + 1)**4*(3*x**2 - x + 2
)**(5/2)/27 + 77*(2*x + 1)**3*(3*x**2 - x + 2)**(5/2)/648 + 55*(2
*x + 1)**2*(3*x**2 - x + 2)**(5/2)/486 - 11*(2970*x + 13617)*(3*x
**2 - x + 2)**(5/2)/524880 - 28879697*sqrt(3)*atanh(sqrt(3)*(6*x
- 1)/(6*sqrt(3*x**2 - x + 2)))/26873856
```

Mathematica [A] time = 0.131657, size = 80, normalized size = 0.51

$$\frac{6\sqrt{3x^2-x+2}\left(238878720x^8+510105600x^7+635765760x^6+711210240x^5+649452672x^4+421626672x^3+201289704x^2\right.}{134369280}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 2*x)^3*(2 - x + 3*x^2)^(3/2)*(1 + 3*x + 4*x^2),x]
```

```
[Out] (6*Sqrt[2 - x + 3*x^2]*(12499587 + 84014278*x + 201289704*x^2 + 4
21626672*x^3 + 649452672*x^4 + 711210240*x^5 + 635765760*x^6 + 51
0105600*x^7 + 238878720*x^8) - 144398485*Sqrt[3]*ArcSinh[(-1 + 6*
x)/Sqrt[23]])/134369280
```

Maple [A] time = 0.021, size = 134, normalized size = 0.9

$$-\frac{327558\,x-54593}{559872}\left(3\,x^2-x+2\right)^{\frac{3}{2}}-\frac{7533834\,x-1255639}{4478976}\sqrt{3\,x^2-x+2}-\frac{28879697\,\sqrt{3}}{26873856}\mathit{Arcsinh}\left(\frac{6\,\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{1207}{58320}\left(3\,x^2-x+2\right)^{\frac{5}{2}}+\frac{1099\,x}{648}\left(3\,x^2-x+2\right)^{\frac{5}{2}}+\frac{1777\,x^2}{486}\left(3\,x^2-x+2\right)^{\frac{5}{2}}+\frac{269\,x^3}{81}\left(3\,x^2-x+2\right)^{\frac{5}{2}}+\frac{32\,x^4}{27}\left(3\,x^2-x+2\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^3*(3*x^2-x+2)^(3/2)*(4*x^2+3*x+1),x)
```

```
[Out] -54593/559872*(6*x-1)*(3*x^2-x+2)^(3/2)-1255639/4478976*(6*x-1)*(
3*x^2-x+2)^(1/2)-28879697/26873856*3^(1/2)*arcsinh(6/23*23^(1/2)*
(x-1/6))+1207/58320*(3*x^2-x+2)^(5/2)+1099/648*x*(3*x^2-x+2)^(5/2
)+1777/486*x^2*(3*x^2-x+2)^(5/2)+269/81*x^3*(3*x^2-x+2)^(5/2)+32/
27*x^4*(3*x^2-x+2)^(5/2)
```

Maxima [A] time = 0.770453, size = 209, normalized size = 1.32

$$\frac{32}{27}\left(3x^2-x+2\right)^{\frac{5}{2}}x^4+\frac{269}{81}\left(3x^2-x+2\right)^{\frac{5}{2}}x^3+\frac{1777}{486}\left(3x^2-x+2\right)^{\frac{5}{2}}x^2+\frac{1099}{648}\left(3x^2-x+2\right)^{\frac{5}{2}}x+\frac{1207}{58320}\left(3x^2-x+2\right)^{\frac{5}{2}}-\frac{54593}{93312}\left(3x^2-x+2\right)^{\frac{3}{2}}x+\frac{54593}{559872}\left(3x^2-x+2\right)^{\frac{3}{2}}-\frac{1255639}{746496}\sqrt{3x^2-x+2}x-\frac{28879697}{26873856}\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{23}\sqrt{23}(6x-1)\right)+\frac{1255639}{4478976}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)*(2*x + 1)^3,x, algorithm="maxima
```

```
[Out] 32/27*(3*x^2 - x + 2)^(5/2)*x^4 + 269/81*(3*x^2 - x + 2)^(5/2)*x^
3 + 1777/486*(3*x^2 - x + 2)^(5/2)*x^2 + 1099/648*(3*x^2 - x + 2)
^(5/2)*x + 1207/58320*(3*x^2 - x + 2)^(5/2) - 54593/93312*(3*x^2
- x + 2)^(3/2)*x + 54593/559872*(3*x^2 - x + 2)^(3/2) - 1255639/7
46496*sqrt(3*x^2 - x + 2)*x - 28879697/26873856*sqrt(3)*arcsinh(1
/23*sqrt(23)*(6*x - 1)) + 1255639/4478976*sqrt(3*x^2 - x + 2)
```

Fricas [A] time = 0.273636, size = 136, normalized size = 0.86

$$\frac{1}{268738560}\sqrt{3}\Big(4\sqrt{3}\big(238878720\,x^8+510105600\,x^7+635765760\,x^6+711210240\,x^5+649452672\,x^4+421626672\,x^3+20128$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)*(2*x + 1)^3,x, algorithm="fricas
```

```
[Out] 1/268738560*sqrt(3)*(4*sqrt(3)*(238878720*x^8 + 510105600*x^7 + 6
35765760*x^6 + 711210240*x^5 + 649452672*x^4 + 421626672*x^3 + 20
1289704*x^2 + 84014278*x + 12499587)*sqrt(3*x^2 - x + 2) + 144398
485*log(-sqrt(3)*(72*x^2 - 24*x + 25) + 12*sqrt(3*x^2 - x + 2)*(6
```

```
*x - 1)))
```

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

$$\int (2x+1)^3 \left(3x^2-x+2\right)^{\frac{3}{2}} \left(4x^2+3x+1\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)**3*(3*x**2-x+2)**(3/2)*(4*x**2+3*x+1),x)
```

```
[Out] Integral((2*x + 1)**3*(3*x**2 - x + 2)**(3/2)*(4*x**2 + 3*x + 1),
 x)
```

GIAC/XCAS [A] time = 0.26863, size = 119, normalized size = 0.75

$$\frac{1}{22394880}\left(2\left(12\left(6\left(8\left(30\left(36\left(2\left(96x+205\right)x+511\right)x+20579\right)x+563761\right)x+2927963\right)x+8387071\right)x+42007139\right)x+12499\right.$$
$$+\frac{28879697}{26873856}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)*(2*x + 1)^3,x, algorithm="giac")
```

```
[Out] 1/22394880*(2*(12*(6*(8*(30*(36*(2*(96*x + 205)*x + 511)*x + 2057
9)*x + 563761)*x + 2927963)*x + 8387071)*x + 42007139)*x + 124995
87)*sqrt(3*x^2 - x + 2) + 28879697/26873856*sqrt(3)*ln(-2*sqrt(3)
*(sqrt(3)*x - sqrt(3*x^2 - x + 2)) + 1)
```

3.215 $\int (1+2x)^2 \left(2-x+3x^2\right)^{3/2} \left(1+3x+4x^2\right)\, dx$

Optimal. Leaf size=141

$$\frac{1}{12}\left(3x^2-x+2\right)^{5/2}(2x+1)^3+\frac{8}{63}\left(3x^2-x+2\right)^{5/2}(2x+1)^2+\frac{13(50x+29)\left(3x^2-x+2\right)^{5/2}}{2520}+\frac{91(1-6x)\left(3x^2-x+2\right)^{3/2}}{3456}+\frac{2093(1-6x)\sqrt{3x^2-x+2}}{27648}+\frac{48139\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{55296\sqrt{3}}$$

```
[Out] (2093*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/27648 + (91*(1 - 6*x)*(2 - x
 + 3*x^2)^(3/2))/3456 + (8*(1 + 2*x)^2*(2 - x + 3*x^2)^(5/2))/63
+ ((1 + 2*x)^3*(2 - x + 3*x^2)^(5/2))/12 + (13*(29 + 50*x)*(2 - x
 + 3*x^2)^(5/2))/2520 + (48139*ArcSinh[(1 - 6*x)/Sqrt[23]])/(5529
6*Sqrt[3])
```

Rubi [A] time = 0.261448, antiderivative size = 141, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.188

$$\frac{1}{12}\left(3x^2-x+2\right)^{5/2}(2x+1)^3+\frac{8}{63}\left(3x^2-x+2\right)^{5/2}(2x+1)^2+\frac{13(50x+29)\left(3x^2-x+2\right)^{5/2}}{2520}+\frac{91(1-6x)\left(3x^2-x+2\right)^{3/2}}{3456}+\frac{2093(1-6x)\sqrt{3x^2-x+2}}{27648}+\frac{48139\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{55296\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 2*x)^2*(2 - x + 3*x^2)^(3/2)*(1 + 3*x + 4*x^2),x]
```

```
[Out] (2093*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/27648 + (91*(1 - 6*x)*(2 - x
 + 3*x^2)^(3/2))/3456 + (8*(1 + 2*x)^2*(2 - x + 3*x^2)^(5/2))/63
+ ((1 + 2*x)^3*(2 - x + 3*x^2)^(5/2))/12 + (13*(29 + 50*x)*(2 - x
 + 3*x^2)^(5/2))/2520 + (48139*ArcSinh[(1 - 6*x)/Sqrt[23]])/(5529
6*Sqrt[3])
```

Rubi in Sympy [A] time = 29.3096, size = 134, normalized size = 0.95

$$\frac{91\left(-6x+1\right)\left(3x^2-x+2\right)^{\frac{3}{2}}}{3456}+\frac{2093\left(-6x+1\right)\sqrt{3x^2-x+2}}{27648}+\frac{\left(2x+1\right)^3\left(3x^2-x+2\right)^{\frac{5}{2}}}{12}+\frac{8\left(2x+1\right)^2\left(3x^2-x+2\right)^{\frac{5}{2}}}{63}+\frac{\left(70200x+40716\right)\left(3x^2-x+2\right)^{\frac{5}{2}}}{272160}-\frac{48139\sqrt{3}\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{165888}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**2*(3*x**2-x+2)**(3/2)*(4*x**2+3*x+1),x)
```

```
[Out] 91*(-6*x + 1)*(3*x**2 - x + 2)**(3/2)/3456 + 2093*(-6*x + 1)*sqrt
(3*x**2 - x + 2)/27648 + (2*x + 1)**3*(3*x**2 - x + 2)**(5/2)/12
+ 8*(2*x + 1)**2*(3*x**2 - x + 2)**(5/2)/63 + (70200*x + 40716)*(
3*x**2 - x + 2)**(5/2)/272160 - 48139*sqrt(3)*atanh(sqrt(3)*(6*x
- 1)/(6*sqrt(3*x**2 - x + 2)))/165888
```

Mathematica [A] time = 0.111308, size = 75, normalized size = 0.53

$$\frac{6\sqrt{3x^2-x+2}\left(5806080x^7+9262080x^6+10656000x^5+12173952x^4+10119792x^3+5694024x^2+2735918x+1517367\right)-}{5806080}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 2*x)^2*(2 - x + 3*x^2)^(3/2)*(1 + 3*x + 4*x^2),x]
```

```
[Out] (6*Sqrt[2 - x + 3*x^2]*(1517367 + 2735918*x + 5694024*x^2 + 10119
792*x^3 + 12173952*x^4 + 10656000*x^5 + 9262080*x^6 + 5806080*x^7
) - 1684865*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]])/5806080
```

Maple [A] time = 0.009, size = 117, normalized size = 0.8

$$-\frac{546\,x-91}{3456}\left(3\,x^2-x+2\right)^{\frac{3}{2}}-\frac{12558\,x-2093}{27648}\sqrt{3\,x^2-x+2}-\frac{48139\,\sqrt{3}}{165888}\mathit{Arcsinh}\left(\frac{6\,\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{907}{2520}\left(3\,x^2-x+2\right)^{\frac{5}{2}}+\frac{319\,x}{252}\left(3\,x^2-x+2\right)^{\frac{5}{2}}+\frac{95\,x^2}{63}\left(3\,x^2-x+2\right)^{\frac{5}{2}}+\frac{2\,x^3}{3}\left(3\,x^2-x+2\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^2*(3*x^2-x+2)^(3/2)*(4*x^2+3*x+1),x)
```

```
[Out] -91/3456*(6*x-1)*(3*x^2-x+2)^(3/2)-2093/27648*(6*x-1)*(3*x^2-x+2)
^(1/2)-48139/165888*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))+907/25
20*(3*x^2-x+2)^(5/2)+319/252*x*(3*x^2-x+2)^(5/2)+95/63*x^2*(3*x^2
-x+2)^(5/2)+2/3*x^3*(3*x^2-x+2)^(5/2)
```

Maxima [A] time = 0.760255, size = 186, normalized size = 1.32

$$\frac{2}{3}\left(3x^2-x+2\right)^{\frac{5}{2}}x^3+\frac{95}{63}\left(3x^2-x+2\right)^{\frac{5}{2}}x^2+\frac{319}{252}\left(3x^2-x+2\right)^{\frac{5}{2}}x+\frac{907}{2520}\left(3x^2-x+2\right)^{\frac{5}{2}}-\frac{91}{576}\left(3x^2-x+2\right)^{\frac{3}{2}}x+\frac{91}{3456}\left(3x^2-x+2\right)^{\frac{3}{2}}-\frac{2093}{4608}\sqrt{3x^2-x+2}x-\frac{48139}{165888}\sqrt{3}\operatorname{arsinh}\left(\frac{1}{23}\sqrt{23}(6x-1)\right)+\frac{2093}{27648}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)*(2*x + 1)^2,x, algorithm="maxima
```

```
[Out] 2/3*(3*x^2 - x + 2)^(5/2)*x^3 + 95/63*(3*x^2 - x + 2)^(5/2)*x^2 +
 319/252*(3*x^2 - x + 2)^(5/2)*x + 907/2520*(3*x^2 - x + 2)^(5/2)
 - 91/576*(3*x^2 - x + 2)^(3/2)*x + 91/3456*(3*x^2 - x + 2)^(3/2)
 - 2093/4608*sqrt(3*x^2 - x + 2)*x - 48139/165888*sqrt(3)*arcsinh
(1/23*sqrt(23)*(6*x - 1)) + 2093/27648*sqrt(3*x^2 - x + 2)
```

Fricas [A] time = 0.27343, size = 130, normalized size = 0.92

$$\frac{1}{11612160}\sqrt{3}\Big(4\sqrt{3}\big(5806080x^7+9262080x^6+10656000x^5+12173952x^4+10119792x^3+5694024x^2+2735918x+1517$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)*(2*x + 1)^2,x, algorithm="fricas
```

```
[Out] 1/11612160*sqrt(3)*(4*sqrt(3)*(5806080*x^7 + 9262080*x^6 + 106560
00*x^5 + 12173952*x^4 + 10119792*x^3 + 5694024*x^2 + 2735918*x +
1517367)*sqrt(3*x^2 - x + 2) + 1684865*log(-sqrt(3)*(72*x^2 - 24*
x + 25) + 12*sqrt(3*x^2 - x + 2)*(6*x - 1)))
```

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

$$\int (2x+1)^2\left(3x^2-x+2\right)^{\frac{3}{2}}\left(4x^2+3x+1\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((1+2*x)**2*(3*x**2-x+2)**(3/2)*(4*x**2+3*x+1),x)
```

```
[Out] Integral((2*x + 1)**2*(3*x**2 - x + 2)**(3/2)*(4*x**2 + 3*x + 1),
 x)
```

GIAC/XCAS [A] time = 0.266921, size = 112, normalized size = 0.79

$$\frac{1}{967680}\left(2\left(12\left(2\left(8\left(30\left(12\left(42x+67\right)x+925\right)x+31703\right)x+210829\right)x+237251\right)x+1367959\right)x+1517367\right)\sqrt{3x^2-x+2}+\frac{48139}{165888}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)*(2*x + 1)^2,x, algorithm="giac")
```

```
[Out] 1/967680*(2*(12*(2*(8*(30*(12*(42*x + 67)*x + 925)*x + 31703)*x +
 210829)*x + 237251)*x + 1367959)*x + 1517367)*sqrt(3*x^2 - x + 2
) + 48139/165888*sqrt(3)*ln(-2*sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 -
x + 2)) + 1)
```

3.216 $\int (1+2x)\left(2-x+3x^2\right)^{3/2}\left(1+3x+4x^2\right)\,dx$

Optimal. Leaf size=116

$$\frac{2}{21}(2x+1)^2\left(3x^2-x+2\right)^{5/2}+\frac{1}{378}(102x+109)\left(3x^2-x+2\right)^{5/2} - \frac{71(1-6x)\left(3x^2-x+2\right)^{3/2}}{2592}-\frac{1633(1-6x)\sqrt{3x^2-x+2}}{20736}-\frac{37559\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{41472\sqrt{3}}$$

```
[Out] (-1633*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/20736 - (71*(1 - 6*x)*(2 -
x + 3*x^2)^(3/2))/2592 + (2*(1 + 2*x)^2*(2 - x + 3*x^2)^(5/2))/21
 + ((109 + 102*x)*(2 - x + 3*x^2)^(5/2))/378 - (37559*ArcSinh[(1
- 6*x)/Sqrt[23]])/(41472*Sqrt[3])
```

Rubi [A] time = 0.159586, antiderivative size = 116, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{2}{21}(2x+1)^2\left(3x^2-x+2\right)^{5/2}+\frac{1}{378}(102x+109)\left(3x^2-x+2\right)^{5/2} - \frac{71(1-6x)\left(3x^2-x+2\right)^{3/2}}{2592}-\frac{1633(1-6x)\sqrt{3x^2-x+2}}{20736}-\frac{37559\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{41472\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 2*x)*(2 - x + 3*x^2)^(3/2)*(1 + 3*x + 4*x^2),x]
```


```
[Out] (-1633*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/20736 - (71*(1 - 6*x)*(2 -
x + 3*x^2)^(3/2))/2592 + (2*(1 + 2*x)^2*(2 - x + 3*x^2)^(5/2))/21
 + ((109 + 102*x)*(2 - x + 3*x^2)^(5/2))/378 - (37559*ArcSinh[(1
- 6*x)/Sqrt[23]])/(41472*Sqrt[3])
```

Rubi in Sympy [A] time = 20.2617, size = 114, normalized size = 0.98

$$-\frac{71\left(-6x+1\right)\left(3x^2-x+2\right)^{\frac{3}{2}}}{2592}-\frac{1633\left(-6x+1\right)\sqrt{3x^2-x+2}}{20736}+\frac{2\left(2x+1\right)^2\left(3x^2-x+2\right)^{\frac{5}{2}}}{21} + \frac{\left(3060x+3270\right)\left(3x^2-x+2\right)^{\frac{5}{2}}}{11340}+\frac{37559\sqrt{3}\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{124416}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)*(3*x**2-x+2)**(3/2)*(4*x**2+3*x+1),x)
```

```
[Out] -71*(-6*x + 1)*(3*x**2 - x + 2)**(3/2)/2592 - 1633*(-6*x + 1)*sqr
t(3*x**2 - x + 2)/20736 + 2*(2*x + 1)**2*(3*x**2 - x + 2)**(5/2)/
21 + (3060*x + 3270)*(3*x**2 - x + 2)**(5/2)/11340 + 37559*sqrt(3
)*atanh(sqrt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/124416
```

Mathematica [A] time = 0.0519224, size = 81, normalized size = 0.7

$$\sqrt{3x^2-x+2}\left(\frac{24x^6}{7}+\frac{25x^5}{7}+\frac{9x^4}{2}+\frac{1723x^3}{336}+\frac{3163x^2}{864}+\frac{137705x}{72576}+\frac{7531}{5376}\right)+\frac{37559\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)}{41472\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 2*x)*(2 - x + 3*x^2)^(3/2)*(1 + 3*x + 4*x^2),x]
```

```
[Out] Sqrt[2 - x + 3*x^2]*(7531/5376 + (137705*x)/72576 + (3163*x^2)/86
4 + (1723*x^3)/336 + (9*x^4)/2 + (25*x^5)/7 + (24*x^6)/7) + (3755
9*ArcSinh[(-1 + 6*x)/Sqrt[23]])/(41472*Sqrt[3])
```

Maple [A] time = 0.008, size = 100, normalized size = 0.9

$$\frac{426\,x-71}{2592}\left(3\,x^2-x+2\right)^{\frac{3}{2}}+\frac{9798\,x-1633}{20736}\sqrt{3\,x^2-x+2}+\frac{37559\,\sqrt{3}}{124416}Arcsinh\left(\frac{6\,\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{145}{378}\left(3\,x^2-x+2\right)^{\frac{5}{2}}+\frac{41\,x}{63}\left(3\,x^2-x+2\right)^{\frac{5}{2}}+\frac{8\,x^2}{21}\left(3\,x^2-x+2\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)*(3*x^2-x+2)^(3/2)*(4*x^2+3*x+1),x)
```

```
[Out] 71/2592*(6*x-1)*(3*x^2-x+2)^(3/2)+1633/20736*(6*x-1)*(3*x^2-x+2)^
(1/2)+37559/124416*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))+145/378
*(3*x^2-x+2)^(5/2)+41/63*x*(3*x^2-x+2)^(5/2)+8/21*x^2*(3*x^2-x+2)
^(5/2)
```

Maxima [A] time = 0.773246, size = 163, normalized size = 1.41

$$\frac{8}{21}\left(3x^2-x+2\right)^{\frac{5}{2}}x^2+\frac{41}{63}\left(3x^2-x+2\right)^{\frac{5}{2}}x+\frac{145}{378}\left(3x^2-x+2\right)^{\frac{5}{2}}+\frac{71}{432}\left(3x^2-x+2\right)^{\frac{3}{2}}x-\frac{71}{2592}\left(3x^2-x+2\right)^{\frac{3}{2}}+\frac{1633}{3456}\sqrt{3x^2-x+2}x+\frac{37559}{124416}\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{23}\sqrt{23}(6x-1)\right)-\frac{1633}{20736}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)*(2*x + 1),x, algorithm="maxima")
```

```
[Out] 8/21*(3*x^2 - x + 2)^(5/2)*x^2 + 41/63*(3*x^2 - x + 2)^(5/2)*x +
145/378*(3*x^2 - x + 2)^(5/2) + 71/432*(3*x^2 - x + 2)^(3/2)*x -
71/2592*(3*x^2 - x + 2)^(3/2) + 1633/3456*sqrt(3*x^2 - x + 2)*x +
 37559/124416*sqrt(3)*arcsinh(1/23*sqrt(23)*(6*x - 1)) - 1633/207
36*sqrt(3*x^2 - x + 2)
```

Fricas [A] time = 0.270599, size = 123, normalized size = 1.06

$$\frac{1}{1741824}\sqrt{3}\left(4\sqrt{3}\left(497664x^6+518400x^5+653184x^4+744336x^3+531384x^2+275410x+203337\right)\sqrt{3x^2-x+2}+26291\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)*(2*x + 1),x, algorithm="fricas")
```

```
[Out] 1/1741824*sqrt(3)*(4*sqrt(3)*(497664*x^6 + 518400*x^5 + 653184*x^
4 + 744336*x^3 + 531384*x^2 + 275410*x + 203337)*sqrt(3*x^2 - x +
 2) + 262913*log(-sqrt(3)*(72*x^2 - 24*x + 25) - 12*sqrt(3*x^2 -
x + 2)*(6*x - 1)))
```

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

$$\int(2x+1)\left(3x^2-x+2\right)^{\frac{3}{2}}\left(4x^2+3x+1\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((1+2*x)*(3*x**2-x+2)**(3/2)*(4*x**2+3*x+1),x)
```

```
[Out] Integral((2*x + 1)*(3*x**2 - x + 2)**(3/2)*(4*x**2 + 3*x + 1), x)
```

GIAC/XCAS [A] time = 0.268198, size = 105, normalized size = 0.91

$$\frac{1}{145152}\left(2\left(12\left(18\left(24\left(2\left(24x+25\right)x+63\right)x+1723\right)x+22141\right)x+137705\right)x+203337\right)\sqrt{3x^2-x+2} - \frac{37559}{124416}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)*(2*x + 1),x, algorithm="giac")
```

```
[Out] 1/145152*(2*(12*(18*(24*(2*(24*x + 25)*x + 63)*x + 1723)*x + 2214
1)*x + 137705)*x + 203337)*sqrt(3*x^2 - x + 2) - 37559/124416*sqr
t(3)*ln(-2*sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 - x + 2)) + 1)
```

3.217 $\int \frac{(2-x+3x^2)^{3/2}(1+3x+4x^2)}{1+2x}\,dx$

Optimal. Leaf size=124

$$\frac{2}{15}\left(3x^2-x+2\right)^{5/2}+\frac{1}{144}(30x+7)\left(3x^2-x+2\right)^{3/2}+\frac{(402x+869)\sqrt{3x^2-x+2}}{1152}-\frac{13}{32}\sqrt{13}\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)+\frac{2203\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{2304\sqrt{3}}$$

```
[Out] ((869 + 402*x)*Sqrt[2 - x + 3*x^2])/1152 + ((7 + 30*x)*(2 - x + 3
*x^2)^(3/2))/144 + (2*(2 - x + 3*x^2)^(5/2))/15 + (2203*ArcSinh[(
1 - 6*x)/Sqrt[23]])/(2304*Sqrt[3]) - (13*Sqrt[13]*ArcTanh[(9 - 8*
x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/32
```

Rubi [A] time = 0.320889, antiderivative size = 124, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.219

$$\frac{2}{15}\left(3x^2-x+2\right)^{5/2}+\frac{1}{144}(30x+7)\left(3x^2-x+2\right)^{3/2}+\frac{(402x+869)\sqrt{3x^2-x+2}}{1152}-\frac{13}{32}\sqrt{13}\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)+\frac{2203\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{2304\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((2 - x + 3*x^2)^(3/2)*(1 + 3*x + 4*x^2))/(1 + 2*x),x]
```

```
[Out] ((869 + 402*x)*Sqrt[2 - x + 3*x^2])/1152 + ((7 + 30*x)*(2 - x + 3
*x^2)^(3/2))/144 + (2*(2 - x + 3*x^2)^(5/2))/15 + (2203*ArcSinh[(
1 - 6*x)/Sqrt[23]])/(2304*Sqrt[3]) - (13*Sqrt[13]*ArcTanh[(9 - 8*
x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/32
```

Rubi in Sympy [A] time = 40.3268, size = 119, normalized size = 0.96

$$\frac{(900x+210)\left(3x^2-x+2\right)^{\frac{3}{2}}}{4320}+\frac{(24120x+52140)\sqrt{3x^2-x+2}}{69120}+\frac{2\left(3x^2-x+2\right)^{\frac{5}{2}}}{15}-\frac{13\sqrt{13}\,\mathrm{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{32}-\frac{2203\sqrt{3}\,\mathrm{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{6912}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((3*x**2-x+2)**(3/2)*(4*x**2+3*x+1)/(1+2*x),x)
```

```
[Out] (900*x + 210)*(3*x**2 - x + 2)**(3/2)/4320 + (24120*x + 52140)*sq
rt(3*x**2 - x + 2)/69120 + 2*(3*x**2 - x + 2)**(5/2)/15 - 13*sqrt
(13)*atanh(sqrt(13)*(-8*x + 9)/(26*sqrt(3*x**2 - x + 2)))/32 - 22
03*sqrt(3)*atanh(sqrt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/6912
```

Mathematica [A] time = 0.180624, size = 109, normalized size = 0.88

$$\frac{6\left(-2340\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)+\sqrt{3x^2-x+2}\left(6912x^4-1008x^3+9624x^2+1058x+7977\right)+2340\sqrt{13}\log\right.}{34560}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((2 - x + 3*x^2)^(3/2)*(1 + 3*x + 4*x^2))/(1 + 2*x),x]
```

```
[Out] (-11015*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]] + 6*(Sqrt[2 - x + 3*
x^2]*(7977 + 1058*x + 9624*x^2 - 1008*x^3 + 6912*x^4) + 2340*Sqrt
[13]*Log[1 + 2*x] - 2340*Sqrt[13]*Log[9 - 8*x + 2*Sqrt[13]*Sqrt[2
 - x + 3*x^2]]))/34560
```

Maple [A] time = 0.011, size = 151, normalized size = 1.2

$$\frac{30x-5}{144}\left(3x^2-x+2\right)^{\frac{3}{2}}+\frac{690x-115}{1152}\sqrt{3x^2-x+2}-\frac{2203\sqrt{3}}{6912}\mathit{Arcsinh}\left(\frac{6\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{2}{15}\left(3x^2-x+2\right)^{\frac{5}{2}}+\frac{1}{12}\left(3\,(1/2+x)^2-4x+\frac{5}{4}\right)^{\frac{3}{2}}-\frac{6x-1}{24}\sqrt{3\,(1/2+x)^2-4x+\frac{5}{4}}+\frac{13}{32}\sqrt{12\,(1/2+x)^2-16x+5}-\frac{13\sqrt{13}}{32}\mathit{Artanh}\left(\frac{2\sqrt{13}}{13}\left(\frac{9}{2}-4x\right)\frac{1}{\sqrt{12\,(1/2+x)^2-16x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((3*x^2-x+2)^(3/2)*(4*x^2+3*x+1)/(1+2*x),x)
```

```
[Out] 5/144*(6*x-1)*(3*x^2-x+2)^(3/2)+115/1152*(6*x-1)*(3*x^2-x+2)^(1/2
)-2203/6912*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))+2/15*(3*x^2-x+
2)^(5/2)+1/12*(3*(1/2+x)^2-4*x+5/4)^(3/2)-1/24*(6*x-1)*(3*(1/2+x)
^2-4*x+5/4)^(1/2)+13/32*(12*(1/2+x)^2-16*x+5)^(1/2)-13/32*13^(1/2
)*arctanh(2/13*(9/2-4*x)*13^(1/2)/(12*(1/2+x)^2-16*x+5)^(1/2))
```

Maxima [A] time = 0.775929, size = 169, normalized size = 1.36

$$\frac{2}{15}\left(3x^2-x+2\right)^{\frac{5}{2}}+\frac{5}{24}\left(3x^2-x+2\right)^{\frac{3}{2}}x+\frac{7}{144}\left(3x^2-x+2\right)^{\frac{3}{2}}+\frac{67}{192}\sqrt{3x^2-x+2}x-\frac{2203}{6912}\sqrt{3}\,\mathrm{arsinh}\left(\frac{6}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{13}{32}\sqrt{13}\,\mathrm{arsinh}\left(\frac{8\sqrt{23}x}{23\,|2x+1|}-\frac{9\sqrt{23}}{23\,|2x+1|}\right)+\frac{869}{1152}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)/(2*x + 1),x, algorithm="maxima")
```

```
[Out] 2/15*(3*x^2 - x + 2)^(5/2) + 5/24*(3*x^2 - x + 2)^(3/2)*x + 7/144
*(3*x^2 - x + 2)^(3/2) + 67/192*sqrt(3*x^2 - x + 2)*x - 2203/6912
*sqrt(3)*arcsinh(6/23*sqrt(23)*x - 1/23*sqrt(23)) + 13/32*sqrt(13
)*arcsinh(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*sqrt(23)/abs(2*x +
1)) + 869/1152*sqrt(3*x^2 - x + 2)
```

Fricas [A] time = 0.282191, size = 184, normalized size = 1.48

$$\frac{1}{69120}\sqrt{3}\left(4\sqrt{3}\left(6912x^4-1008x^3+9624x^2+1058x+7977\right)\sqrt{3x^2-x+2}+4680\sqrt{13}\sqrt{3}\log\left(-\frac{4\sqrt{13}\sqrt{3x^2-x+2}(8x-\right.\right.$$
$$4x^2+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)/(2*x + 1),x, algorithm="fricas")
```

```
[Out] 1/69120*sqrt(3)*(4*sqrt(3)*(6912*x^4 - 1008*x^3 + 9624*x^2 + 1058
*x + 7977)*sqrt(3*x^2 - x + 2) + 4680*sqrt(13)*sqrt(3)*log(-(4*sq
rt(13)*sqrt(3*x^2 - x + 2)*(8*x - 9) + 220*x^2 - 196*x + 185)/(4*
x^2 + 4*x + 1)) + 11015*log(-sqrt(3)*(72*x^2 - 24*x + 25) + 12*sq
rt(3*x^2 - x + 2)*(6*x - 1)))
```

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

$$\int\frac{\left(3x^2-x+2\right)^{\frac{3}{2}}\left(4x^2+3x+1\right)}{2x+1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((3*x**2-x+2)**(3/2)*(4*x**2+3*x+1)/(1+2*x),x)
```

```
[Out] Integral((3*x**2 - x + 2)**(3/2)*(4*x**2 + 3*x + 1)/(2*x + 1), x)
```

GIAC/XCAS [A] time = 0.293002, size = 184, normalized size = 1.48

$$\frac{1}{5760}\left(2\left(12\left(6\left(48x-7\right)x+401\right)x+529\right)x+7977\right)\sqrt{3x^2-x+2} + \frac{2203}{6912}\sqrt{3}\ln\left(-6\sqrt{3}x+\sqrt{3}+6\sqrt{3x^2-x+2}\right) + \frac{13}{32}\sqrt{13}\ln\left(-\frac{\left|-4\sqrt{3}x-2\sqrt{13}-2\sqrt{3}+4\sqrt{3x^2-x+2}\right|}{2\left(2\sqrt{3}x-\sqrt{13}+\sqrt{3}-2\sqrt{3x^2-x+2}\right)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)/(2*x + 1),x, algorithm="giac")
```

```
[Out] 1/5760*(2*(12*(6*(48*x - 7)*x + 401)*x + 529)*x + 7977)*sqrt(3*x^
2 - x + 2) + 2203/6912*sqrt(3)*ln(-6*sqrt(3)*x + sqrt(3) + 6*sqrt
(3*x^2 - x + 2)) + 13/32*sqrt(13)*ln(-1/2*abs(-4*sqrt(3)*x - 2*sq
rt(13) - 2*sqrt(3) + 4*sqrt(3*x^2 - x + 2))/(2*sqrt(3)*x - sqrt(1
3) + sqrt(3) - 2*sqrt(3*x^2 - x + 2)))
```

3.218 $\int \frac{(2-x+3x^2)^{3/2}(1+3x+4x^2)}{(1+2x)^2}\,dx$

Optimal. Leaf size=131

$$-\frac{(3x^2-x+2)^{5/2}}{13(2x+1)}-\frac{1}{104}(23-38x)\left(3x^2-x+2\right)^{3/2}-\frac{1}{192}(349-294x)\sqrt{3x^2-x+2}+\frac{25}{32}\sqrt{13}\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)-\frac{2327\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{384\sqrt{3}}$$

```
[Out] -((349 - 294*x)*Sqrt[2 - x + 3*x^2])/192 - ((23 - 38*x)*(2 - x +
3*x^2)^(3/2))/104 - (2 - x + 3*x^2)^(5/2)/(13*(1 + 2*x)) - (2327*
ArcSinh[(1 - 6*x)/Sqrt[23]])/(384*Sqrt[3]) + (25*Sqrt[13]*ArcTanh
[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/32
```

Rubi [A] time = 0.321829, antiderivative size = 131, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.219

$$-\frac{(3x^2-x+2)^{5/2}}{13(2x+1)}-\frac{1}{104}(23-38x)\left(3x^2-x+2\right)^{3/2}-\frac{1}{192}(349-294x)\sqrt{3x^2-x+2}+\frac{25}{32}\sqrt{13}\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)-\frac{2327\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{384\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((2 - x + 3*x^2)^(3/2)*(1 + 3*x + 4*x^2))/(1 + 2*x)^2,x]
```


```
[Out] -((349 - 294*x)*Sqrt[2 - x + 3*x^2])/192 - ((23 - 38*x)*(2 - x +
3*x^2)^(3/2))/104 - (2 - x + 3*x^2)^(5/2)/(13*(1 + 2*x)) - (2327*
ArcSinh[(1 - 6*x)/Sqrt[23]])/(384*Sqrt[3]) + (25*Sqrt[13]*ArcTanh
[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/32
```

Rubi in Sympy [A] time = 40.8274, size = 121, normalized size = 0.92

$$-\frac{(-91728x+108888)\sqrt{3x^2-x+2}}{59904}-\frac{(-1368x+828)\left(3x^2-x+2\right)^{\frac{3}{2}}}{3744}+\frac{25\sqrt{13}\operatorname{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{32}+\frac{2327\sqrt{3}\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{1152}-\frac{\left(3x^2-x+2\right)^{\frac{5}{2}}}{13\left(2x+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((3*x**2-x+2)**(3/2)*(4*x**2+3*x+1)/(1+2*x)**2,x)
```

```
[Out] -(-91728*x + 108888)*sqrt(3*x**2 - x + 2)/59904 - (-1368*x + 828)
*(3*x**2 - x + 2)**(3/2)/3744 + 25*sqrt(13)*atanh(sqrt(13)*(-8*x
+ 9)/(26*sqrt(3*x**2 - x + 2)))/32 + 2327*sqrt(3)*atanh(sqrt(3)*(
6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/1152 - (3*x**2 - x + 2)**(5/2)
/(13*(2*x + 1))
```

Mathematica [A] time = 0.309671, size = 114, normalized size = 0.87

$$\frac{900\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)+\frac{6\sqrt{3x^2-x+2}\left(288x^4-96x^3+564x^2-332x-493\right)}{2x+1}-900\sqrt{13}\log(2x+1)+2327\sqrt{3}\sinh^{-1}\left(\frac{6x}{\sqrt{}}\right.}{1152}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((2 - x + 3*x^2)^(3/2)*(1 + 3*x + 4*x^2))/(1 + 2*x)^2,x]
```

```
[Out] ((6*Sqrt[2 - x + 3*x^2]*(-493 - 332*x + 564*x^2 - 96*x^3 + 288*x^
4))/(1 + 2*x) + 2327*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]] - 900*S
qrt[13]*Log[1 + 2*x] + 900*Sqrt[13]*Log[9 - 8*x + 2*Sqrt[13]*Sqrt
[2 - x + 3*x^2]])/1152
```

Maple [A] time = 0.016, size = 179, normalized size = 1.4

$$\begin{aligned}&\frac{6\,x-1}{24}\left(3\,x^2-x+2\right)^{\frac{3}{2}}+\frac{138\,x-23}{192}\sqrt{3\,x^2-x+2}+\frac{2327\,\sqrt{3}}{1152}Arcsinh\left(\frac{6\,\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)\\&-\frac{1}{26}\left(3\,\left(1/2+x\right)^2-4\,x+\frac{5}{4}\right)^{\frac{5}{2}}\left(\frac{1}{2}+x\right)^{-1}-\frac{25}{156}\left(3\,\left(1/2+x\right)^2-4\,x+\frac{5}{4}\right)^{\frac{3}{2}}\\&+\frac{78\,x-13}{96}\sqrt{3\,\left(1/2+x\right)^2-4\,x+\frac{5}{4}}-\frac{25}{32}\sqrt{12\,\left(1/2+x\right)^2-16\,x+5}\\&+\frac{25\,\sqrt{13}}{32}Artanh\left(\frac{2\,\sqrt{13}}{13}\left(\frac{9}{2}-4\,x\right)\frac{1}{\sqrt{12\,\left(1/2+x\right)^2-16\,x+5}}\right)\\&+\frac{6\,x-1}{52}\left(3\,\left(1/2+x\right)^2-4\,x+\frac{5}{4}\right)^{\frac{3}{2}}\end{aligned}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((3*x^2-x+2)^(3/2)*(4*x^2+3*x+1)/(1+2*x)^2,x)
```

```
[Out] 1/24*(6*x-1)*(3*x^2-x+2)^(3/2)+23/192*(6*x-1)*(3*x^2-x+2)^(1/2)+2
327/1152*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))-1/26/(1/2+x)*(3*(
```

```
1/2+x)^2-4*x+5/4)^(5/2)-25/156*(3*(1/2+x)^2-4*x+5/4)^(3/2)+13/96*
(6*x-1)*(3*(1/2+x)^2-4*x+5/4)^(1/2)-25/32*(12*(1/2+x)^2-16*x+5)^(
1/2)+25/32*13^(1/2)*arctanh(2/13*(9/2-4*x)*13^(1/2)/(12*(1/2+x)^2
-16*x+5)^(1/2))+1/52*(6*x-1)*(3*(1/2+x)^2-4*x+5/4)^(3/2)
```

Maxima [A] time = 0.776872, size = 178, normalized size = 1.36

$$\frac{1}{4}\left(3x^2-x+2\right)^{\frac{3}{2}}x-\frac{1}{8}\left(3x^2-x+2\right)^{\frac{3}{2}}+\frac{49}{32}\sqrt{3x^2-x+2}x+\frac{2327}{1152}\sqrt{3}\,\mathrm{arsinh}\left(\frac{6}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)-\frac{25}{32}\sqrt{13}\,\mathrm{arsinh}\left(\frac{8\sqrt{23}x}{23\,|2x+1|}-\frac{9\sqrt{23}}{23\,|2x+1|}\right)-\frac{349}{192}\sqrt{3x^2-x+2}-\frac{\left(3x^2-x+2\right)^{\frac{3}{2}}}{4\,(2x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)/(2*x + 1)^2,x, algorithm="maxima
```

```
[Out] 1/4*(3*x^2 - x + 2)^(3/2)*x - 1/8*(3*x^2 - x + 2)^(3/2) + 49/32*s
qrt(3*x^2 - x + 2)*x + 2327/1152*sqrt(3)*arcsinh(6/23*sqrt(23)*x
- 1/23*sqrt(23)) - 25/32*sqrt(13)*arcsinh(8/23*sqrt(23)*x/abs(2*x
 + 1) - 9/23*sqrt(23)/abs(2*x + 1)) - 349/192*sqrt(3*x^2 - x + 2)
 - 1/4*(3*x^2 - x + 2)^(3/2)/(2*x + 1)
```

Fricas [A] time = 0.286462, size = 205, normalized size = 1.56

$$\frac{\sqrt{3}\left(300\sqrt{13}\sqrt{3}(2x+1)\log\left(\frac{4\sqrt{13}\sqrt{3x^2-x+2}(8x-9)-220x^2+196x-185}{4x^2+4x+1}\right)+4\sqrt{3}\left(288x^4-96x^3+564x^2-332x-493\right)\sqrt{3x^2-x+}\right.}{2304\,(2x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)/(2*x + 1)^2,x, algorithm="fricas
```

```
[Out] 1/2304*sqrt(3)*(300*sqrt(13)*sqrt(3)*(2*x + 1)*log((4*sqrt(13)*sq
rt(3*x^2 - x + 2)*(8*x - 9) - 220*x^2 + 196*x - 185)/(4*x^2 + 4*x
 + 1)) + 4*sqrt(3)*(288*x^4 - 96*x^3 + 564*x^2 - 332*x - 493)*sqr
t(3*x^2 - x + 2) + 2327*(2*x + 1)*log(-sqrt(3)*(72*x^2 - 24*x + 2
5) - 12*sqrt(3*x^2 - x + 2)*(6*x - 1)))/(2*x + 1)
```

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

$$\int \frac{\left(3x^2-x+2\right)^{\frac{3}{2}}\left(4x^2+3x+1\right)}{(2x+1)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x**2-x+2)**(3/2)*(4*x**2+3*x+1)/(1+2*x)**2,x)
```

```
[Out] Integral((3*x**2 - x + 2)**(3/2)*(4*x**2 + 3*x + 1)/(2*x + 1)**2,
 x)
```

GIAC/XCAS [A] time = 0.514864, size = 770, normalized size = 5.88

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)/(2*x + 1)^2,x, algorithm="giac")
```

```
[Out] 25/32*sqrt(13)*ln(sqrt(13)*(sqrt(-8/(2*x + 1) + 13/(2*x + 1)^2 +
3) + sqrt(13)/(2*x + 1)) - 4)*sign(1/(2*x + 1)) - 2327/1152*sqrt(
3)*ln(1/2*abs(-2*sqrt(3) + 2*sqrt(-8/(2*x + 1) + 13/(2*x + 1)^2 +
 3) + 2*sqrt(13)/(2*x + 1))/(sqrt(3) + sqrt(-8/(2*x + 1) + 13/(2*
x + 1)^2 + 3) + sqrt(13)/(2*x + 1)))*sign(1/(2*x + 1)) - 13/32*sq
rt(-8/(2*x + 1) + 13/(2*x + 1)^2 + 3)*sign(1/(2*x + 1)) + 1/192*(
5929*(sqrt(-8/(2*x + 1) + 13/(2*x + 1)^2 + 3) + sqrt(13)/(2*x + 1
))^7*sign(1/(2*x + 1)) - 7272*sqrt(13)*(sqrt(-8/(2*x + 1) + 13/(2
*x + 1)^2 + 3) + sqrt(13)/(2*x + 1))^6*sign(1/(2*x + 1)) + 25101*
(sqrt(-8/(2*x + 1) + 13/(2*x + 1)^2 + 3) + sqrt(13)/(2*x + 1))^5*
sign(1/(2*x + 1)) - 48*sqrt(13)*(sqrt(-8/(2*x + 1) + 13/(2*x + 1)
^2 + 3) + sqrt(13)/(2*x + 1))^4*sign(1/(2*x + 1)) + 112359*(sqrt(
-8/(2*x + 1) + 13/(2*x + 1)^2 + 3) + sqrt(13)/(2*x + 1))^3*sign(1
/(2*x + 1)) - 69336*sqrt(13)*(sqrt(-8/(2*x + 1) + 13/(2*x + 1)^2
+ 3) + sqrt(13)/(2*x + 1))^2*sign(1/(2*x + 1)) + 71955*(sqrt(-8/(
2*x + 1) + 13/(2*x + 1)^2 + 3) + sqrt(13)/(2*x + 1))*sign(1/(2*x
+ 1)) + 24624*sqrt(13)*sign(1/(2*x + 1)))/((sqrt(-8/(2*x + 1) + 1
3/(2*x + 1)^2 + 3) + sqrt(13)/(2*x + 1))^2 - 3)^4
```

3.219 $\int \frac{(2-x+3x^2)^{3/2}(1+3x+4x^2)}{(1+2x)^3}\,dx$

Optimal. Leaf size=138

$$-\frac{(3x^2-x+2)^{5/2}}{26(2x+1)^2}+\frac{(122x+151)(3x^2-x+2)^{3/2}}{312(2x+1)}+\frac{1}{624}(1858-771x)\sqrt{3x^2-x+2}-\frac{1153\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{64\sqrt{13}}+\frac{1519\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{192\sqrt{3}}$$

```
[Out] ((1858 - 771*x)*Sqrt[2 - x + 3*x^2])/624 + ((151 + 122*x)*(2 - x
+ 3*x^2)^(3/2))/(312*(1 + 2*x)) - (2 - x + 3*x^2)^(5/2)/(26*(1 +
2*x)^2) + (1519*ArcSinh[(1 - 6*x)/Sqrt[23]])/(192*Sqrt[3]) - (115
3*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/(64*Sqrt[1
3])
```

Rubi [A] time = 0.328289, antiderivative size = 138, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 8, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$-\frac{(3x^2-x+2)^{5/2}}{26(2x+1)^2}+\frac{(122x+151)(3x^2-x+2)^{3/2}}{312(2x+1)}+\frac{1}{624}(1858-771x)\sqrt{3x^2-x+2}-\frac{1153\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{64\sqrt{13}}+\frac{1519\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{192\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((2 - x + 3*x^2)^(3/2)*(1 + 3*x + 4*x^2))/(1 + 2*x)^3,x]
```

```
[Out] ((1858 - 771*x)*Sqrt[2 - x + 3*x^2])/624 + ((151 + 122*x)*(2 - x
+ 3*x^2)^(3/2))/(312*(1 + 2*x)) - (2 - x + 3*x^2)^(5/2)/(26*(1 +
2*x)^2) + (1519*ArcSinh[(1 - 6*x)/Sqrt[23]])/(192*Sqrt[3]) - (115
3*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/(64*Sqrt[1
3])
```

Rubi in Sympy [A] time = 40.6244, size = 128, normalized size = 0.93

$$\frac{(-12336x+29728)\sqrt{3x^2-x+2}}{9984}-\frac{1153\sqrt{13}\,\operatorname{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{832}-\frac{1519\sqrt{3}\,\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{576}+\frac{(244x+302)(3x^2-x+2)^{\frac{3}{2}}}{624(2x+1)}-\frac{(3x^2-x+2)^{\frac{5}{2}}}{26(2x+1)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((3*x**2-x+2)**(3/2)*(4*x**2+3*x+1)/(1+2*x)**3,x)
```

```
[Out] (-12336*x + 29728)*sqrt(3*x**2 - x + 2)/9984 - 1153*sqrt(13)*atan
h(sqrt(13)*(-8*x + 9)/(26*sqrt(3*x**2 - x + 2)))/832 - 1519*sqrt(
3)*atanh(sqrt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/576 + (244*x
 + 302)*(3*x**2 - x + 2)**(3/2)/(624*(2*x + 1)) - (3*x**2 - x + 2
)**(5/2)/(26*(2*x + 1)**2)
```

Mathematica [A] time = 0.19841, size = 114, normalized size = 0.83

$$\frac{-10377\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)+\frac{156\sqrt{3x^2-x+2}(96x^4-68x^3+390x^2+627x+182)}{(2x+1)^2}+10377\sqrt{13}\log(2x+1)-19747\sqrt{3}\,\mathrm{sin}}{7488}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((2 - x + 3*x^2)^(3/2)*(1 + 3*x + 4*x^2))/(1 + 2*x)^3,x]
```

```
[Out] ((156*Sqrt[2 - x + 3*x^2]*(182 + 627*x + 390*x^2 - 68*x^3 + 96*x^
4))/(1 + 2*x)^2 - 19747*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]] + 10
377*Sqrt[13]*Log[1 + 2*x] - 10377*Sqrt[13]*Log[9 - 8*x + 2*Sqrt[1
3]*Sqrt[2 - x + 3*x^2]])/7488
```

Maple [A] time = 0.017, size = 162, normalized size = 1.2

$$\frac{1153}{4056}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{\frac{3}{2}}-\frac{1542\,x-257}{1248}\sqrt{3\,(1/2+x)^2-4\,x+\frac{5}{4}}$$
$$-\frac{1519\sqrt{3}}{576}\mathit{Arcsinh}\left(\frac{6\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{1153}{832}\sqrt{12\,(1/2+x)^2-16\,x+5}$$
$$-\frac{1153\sqrt{13}}{832}\mathit{Artanh}\left(\frac{2\sqrt{13}}{13}\left(\frac{9}{2}-4\,x\right)\frac{1}{\sqrt{12\,(1/2+x)^2-16\,x+5}}\right)$$
$$-\frac{1}{104}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{\frac{5}{2}}\left(\frac{1}{2}+x\right)^{-2}$$
$$+\frac{15}{338}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{\frac{5}{2}}\left(\frac{1}{2}+x\right)^{-1}-\frac{90\,x-15}{676}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((3*x^2-x+2)^(3/2)*(4*x^2+3*x+1)/(1+2*x)^3,x)
```

```
[Out] 1153/4056*(3*(1/2+x)^2-4*x+5/4)^(3/2)-257/1248*(6*x-1)*(3*(1/2+x)
^2-4*x+5/4)^(1/2)-1519/576*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))
+1153/832*(12*(1/2+x)^2-16*x+5)^(1/2)-1153/832*13^(1/2)*arctanh(2
/13*(9/2-4*x)*13^(1/2)/(12*(1/2+x)^2-16*x+5)^(1/2))-1/104/(1/2+x)
^2*(3*(1/2+x)^2-4*x+5/4)^(5/2)+15/338/(1/2+x)*(3*(1/2+x)^2-4*x+5/
4)^(5/2)-15/676*(6*x-1)*(3*(1/2+x)^2-4*x+5/4)^(3/2)
```

Maxima [A] time = 0.777818, size = 193, normalized size = 1.4

$$\frac{61}{312}\left(3x^2-x+2\right)^{\frac{3}{2}}-\frac{\left(3x^2-x+2\right)^{\frac{5}{2}}}{26\left(4x^2+4x+1\right)}-\frac{257}{208}\sqrt{3x^2-x+2}x-\frac{1519}{576}\sqrt{3}\,\mathrm{arsinh}\left(\frac{6}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{1153}{832}\sqrt{13}\,\mathrm{arsinh}\left(\frac{8\sqrt{23}x}{23\left|2x+1\right|}-\frac{9\sqrt{23}}{23\left|2x+1\right|}\right)+\frac{929}{312}\sqrt{3x^2-x+2}+\frac{15\left(3x^2-x+2\right)^{\frac{3}{2}}}{52\left(2x+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)/(2*x + 1)^3,x, algorithm="maxima
```

```
[Out] 61/312*(3*x^2 - x + 2)^(3/2) - 1/26*(3*x^2 - x + 2)^(5/2)/(4*x^2
+ 4*x + 1) - 257/208*sqrt(3*x^2 - x + 2)*x - 1519/576*sqrt(3)*arc
sinh(6/23*sqrt(23)*x - 1/23*sqrt(23)) + 1153/832*sqrt(13)*arcsinh
(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*sqrt(23)/abs(2*x + 1)) + 929
/312*sqrt(3*x^2 - x + 2) + 15/52*(3*x^2 - x + 2)^(3/2)/(2*x + 1)
```

Fricas [A] time = 0.284081, size = 238, normalized size = 1.72

$$\frac{\sqrt{13}\sqrt{3}\left(8\sqrt{13}\sqrt{3}\left(96x^4-68x^3+390x^2+627x+182\right)\sqrt{3x^2-x+2}+1519\sqrt{13}\left(4x^2+4x+1\right)\log\left(-\sqrt{3}\left(72x^2-24x+2\right.\right.\right.}{14976\left(4x^2+4x+1\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)/(2*x + 1)^3,x, algorithm="fricas
```

```
[Out] 1/14976*sqrt(13)*sqrt(3)*(8*sqrt(13)*sqrt(3)*(96*x^4 - 68*x^3 + 3
90*x^2 + 627*x + 182)*sqrt(3*x^2 - x + 2) + 1519*sqrt(13)*(4*x^2
+ 4*x + 1)*log(-sqrt(3)*(72*x^2 - 24*x + 25) + 12*sqrt(3*x^2 - x
+ 2)*(6*x - 1)) + 3459*sqrt(3)*(4*x^2 + 4*x + 1)*log(-(sqrt(13)*(
220*x^2 - 196*x + 185) + 52*sqrt(3*x^2 - x + 2)*(8*x - 9))/(4*x^2
 + 4*x + 1)))/(4*x^2 + 4*x + 1)
```

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

$$\int \frac{(3x^2 - x + 2)^{\frac{3}{2}} (4x^2 + 3x + 1)}{(2x + 1)^3} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x**2-x+2)**(3/2)*(4*x**2+3*x+1)/(1+2*x)**3,x)
```

```
[Out] Integral((3*x**2 - x + 2)**(3/2)*(4*x**2 + 3*x + 1)/(2*x + 1)**3,
 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((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(3/2)/(2*x + 1)^3,x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.220 $\int (1+2x)^3 \left(2-x+3x^2\right)^{5/2} \left(1+3x+4x^2\right)\, dx$

Optimal. Leaf size=189

$$\frac{2}{33}\left(3x^2-x+2\right)^{7/2}(2x+1)^4+\frac{29}{330}\left(3x^2-x+2\right)^{7/2}(2x+1)^3+\frac{133\left(3x^2-x+2\right)^{7/2}(2x+1)^2}{1485}-\frac{(26353-21350x)\left(3x^2-x+2\right)^{7/2}}{498960}+\frac{5089(1-6x)\left(3x^2-x+2\right)^{5/2}}{155520}+\frac{117047(1-6x)\left(3x^2-x+2\right)^{3/2}}{1492992}+\frac{2692081(1-6x)\sqrt{3x^2-x+2}}{11943936}+\frac{61917863\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{23887872\sqrt{3}}$$

```
[Out] (2692081*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/11943936 + (117047*(1 - 6
*x)*(2 - x + 3*x^2)^(3/2))/1492992 + (5089*(1 - 6*x)*(2 - x + 3*x
^2)^(5/2))/155520 - ((26353 - 21350*x)*(2 - x + 3*x^2)^(7/2))/498
960 + (133*(1 + 2*x)^2*(2 - x + 3*x^2)^(7/2))/1485 + (29*(1 + 2*x
)^3*(2 - x + 3*x^2)^(7/2))/330 + (2*(1 + 2*x)^4*(2 - x + 3*x^2)^(
7/2))/33 + (61917863*ArcSinh[(1 - 6*x)/Sqrt[23]])/(23887872*Sqrt[
3])
```

Rubi [A] time = 0.365309, antiderivative size = 189, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$\frac{2}{33}\left(3x^2-x+2\right)^{7/2}(2x+1)^4+\frac{29}{330}\left(3x^2-x+2\right)^{7/2}(2x+1)^3+\frac{133\left(3x^2-x+2\right)^{7/2}(2x+1)^2}{1485}-\frac{(26353-21350x)\left(3x^2-x+2\right)^{7/2}}{498960}+\frac{5089(1-6x)\left(3x^2-x+2\right)^{5/2}}{155520}+\frac{117047(1-6x)\left(3x^2-x+2\right)^{3/2}}{1492992}+\frac{2692081(1-6x)\sqrt{3x^2-x+2}}{11943936}+\frac{61917863\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{23887872\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 2*x)^3*(2 - x + 3*x^2)^(5/2)*(1 + 3*x + 4*x^2),x]
```


```
[Out] (2692081*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/11943936 + (117047*(1 - 6
*x)*(2 - x + 3*x^2)^(3/2))/1492992 + (5089*(1 - 6*x)*(2 - x + 3*x
^2)^(5/2))/155520 - ((26353 - 21350*x)*(2 - x + 3*x^2)^(7/2))/498
960 + (133*(1 + 2*x)^2*(2 - x + 3*x^2)^(7/2))/1485 + (29*(1 + 2*x
)^3*(2 - x + 3*x^2)^(7/2))/330 + (2*(1 + 2*x)^4*(2 - x + 3*x^2)^(
7/2))/33 + (61917863*ArcSinh[(1 - 6*x)/Sqrt[23]])/(23887872*Sqrt[
3])
```

Rubi in Sympy [A] time = 38.3741, size = 178, normalized size = 0.94

$$-\frac{(-1152900x+1423062)\left(3x^2-x+2\right)^{\frac{7}{2}}}{26943840}+\frac{5089\,(-6x+1)\left(3x^2-x+2\right)^{\frac{5}{2}}}{155520}+\frac{117047\,(-6x+1)\left(3x^2-x+2\right)^{\frac{3}{2}}}{1492992}+\frac{2692081\,(-6x+1)\sqrt{3x^2-x+2}}{11943936}+\frac{2\,(2x+1)^4\left(3x^2-x+2\right)^{\frac{7}{2}}}{33}+\frac{29\,(2x+1)^3\left(3x^2-x+2\right)^{\frac{7}{2}}}{330}+\frac{133\,(2x+1)^2\left(3x^2-x+2\right)^{\frac{7}{2}}}{1485}-\frac{61917863\sqrt{3}\,\mathrm{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{71663616}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**3*(3*x**2-x+2)**(5/2)*(4*x**2+3*x+1),x)
```

```
[Out] -(-1152900*x + 1423062)*(3*x**2 - x + 2)**(7/2)/26943840 + 5089*(
-6*x + 1)*(3*x**2 - x + 2)**(5/2)/155520 + 117047*(-6*x + 1)*(3*x
**2 - x + 2)**(3/2)/1492992 + 2692081*(-6*x + 1)*sqrt(3*x**2 - x
+ 2)/11943936 + 2*(2*x + 1)**4*(3*x**2 - x + 2)**(7/2)/33 + 29*(2
*x + 1)**3*(3*x**2 - x + 2)**(7/2)/330 + 133*(2*x + 1)**2*(3*x**2
 - x + 2)**(7/2)/1485 - 61917863*sqrt(3)*atanh(sqrt(3)*(6*x - 1)/
(6*sqrt(3*x**2 - x + 2)))/71663616
```

Mathematica [A] time = 0.14664, size = 90, normalized size = 0.48

$$\frac{6\sqrt{3x^2-x+2}\,\left(120394874880x^{10}+207681159168x^9+308846297088x^8+419978151936x^7+415908006912x^6+347247744\right.}{275}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 2*x)^3*(2 - x + 3*x^2)^(5/2)*(1 + 3*x + 4*x^2),x]
```

```
[Out] (6*Sqrt[2 - x + 3*x^2]*(9173509857 + 26646633218*x + 72088585464*
x^2 + 161269204752*x^3 + 263636134272*x^4 + 347247744768*x^5 + 41
5908006912*x^6 + 419978151936*x^7 + 308846297088*x^8 + 2076811591
68*x^9 + 120394874880*x^10) - 23838377255*Sqrt[3]*ArcSinh[(-1 + 6
*x)/Sqrt[23]])/27590492160
```

Maple [A] time = 0.022, size = 153, normalized size = 0.8

$$-\frac{30534x-5089}{155520}\left(3x^{2}-x+2\right)^{\frac{5}{2}}-\frac{702282x-117047}{1492992}\left(3x^{2}-x+2\right)^{\frac{3}{2}}-\frac{16152486x-2692081}{11943936}\sqrt{3x^{2}-x+2}-\frac{61917863\sqrt{3}}{71663616}Arcsinh\left(\frac{6\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{92423}{498960}\left(3x^{2}-x+2\right)^{\frac{7}{2}}+\frac{10073x}{7128}\left(3x^{2}-x+2\right)^{\frac{7}{2}}+\frac{4258x^{2}}{1485}\left(3x^{2}-x+2\right)^{\frac{7}{2}}+\frac{436x^{3}}{165}\left(3x^{2}-x+2\right)^{\frac{7}{2}}+\frac{32x^{4}}{33}\left(3x^{2}-x+2\right)^{\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^3*(3*x^2-x+2)^(5/2)*(4*x^2+3*x+1),x)
```

```
[Out] -5089/155520*(6*x-1)*(3*x^2-x+2)^(5/2)-117047/1492992*(6*x-1)*(3*
x^2-x+2)^(3/2)-2692081/11943936*(6*x-1)*(3*x^2-x+2)^(1/2)-6191786
3/71663616*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))+92423/498960*(3
*x^2-x+2)^(7/2)+10073/7128*x*(3*x^2-x+2)^(7/2)+4258/1485*x^2*(3*x
^2-x+2)^(7/2)+436/165*x^3*(3*x^2-x+2)^(7/2)+32/33*x^4*(3*x^2-x+2)
^(7/2)
```

Maxima [A] time = 0.768622, size = 248, normalized size = 1.31

$$\frac{32}{33}\left(3x^{2}-x+2\right)^{\frac{7}{2}}x^{4}+\frac{436}{165}\left(3x^{2}-x+2\right)^{\frac{7}{2}}x^{3}+\frac{4258}{1485}\left(3x^{2}-x+2\right)^{\frac{7}{2}}x^{2}+\frac{10073}{7128}\left(3x^{2}-x+2\right)^{\frac{7}{2}}x+\frac{92423}{498960}\left(3x^{2}-x+2\right)^{\frac{7}{2}}-\frac{5089}{25920}\left(3x^{2}-x+2\right)^{\frac{5}{2}}x+\frac{5089}{155520}\left(3x^{2}-x+2\right)^{\frac{5}{2}}-\frac{117047}{248832}\left(3x^{2}-x+2\right)^{\frac{3}{2}}x+\frac{117047}{1492992}\left(3x^{2}-x+2\right)^{\frac{3}{2}}-\frac{2692081}{1990656}\sqrt{3x^{2}-x+2}x-\frac{61917863}{71663616}\sqrt{3}\operatorname{arsinh}\left(\frac{1}{23}\sqrt{23}(6x-1)\right)+\frac{2692081}{11943936}\sqrt{3x^{2}-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)*(2*x + 1)^3,x, algorithm="maxima
```

```
[Out] 32/33*(3*x^2 - x + 2)^(7/2)*x^4 + 436/165*(3*x^2 - x + 2)^(7/2)*x
^3 + 4258/1485*(3*x^2 - x + 2)^(7/2)*x^2 + 10073/7128*(3*x^2 - x
+ 2)^(7/2)*x + 92423/498960*(3*x^2 - x + 2)^(7/2) - 5089/25920*(3
*x^2 - x + 2)^(5/2)*x + 5089/155520*(3*x^2 - x + 2)^(5/2) - 11704
7/248832*(3*x^2 - x + 2)^(3/2)*x + 117047/1492992*(3*x^2 - x + 2)
^(3/2) - 2692081/1990656*sqrt(3*x^2 - x + 2)*x - 61917863/7166361
6*sqrt(3)*arcsinh(1/23*sqrt(23)*(6*x - 1)) + 2692081/11943936*sqr
t(3*x^2 - x + 2)
```

Fricas [A] time = 0.279493, size = 150, normalized size = 0.79

$$\frac{1}{55180984320}\sqrt{3}\Big(4\sqrt{3}\big(120394874880\,x^{10} + 207681159168\,x^{9} + 308846297088\,x^{8} + 419978151936\,x^{7} + 415908006912\,x^{6} + 3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)*(2*x + 1)^3,x, algorithm="fricas
```

```
[Out] 1/55180984320*sqrt(3)*(4*sqrt(3)*(120394874880*x^10 + 20768115916
8*x^9 + 308846297088*x^8 + 419978151936*x^7 + 415908006912*x^6 +
347247744768*x^5 + 263636134272*x^4 + 161269204752*x^3 + 72088585
464*x^2 + 26646633218*x + 9173509857)*sqrt(3*x^2 - x + 2) + 23838
377255*log(-sqrt(3)*(72*x^2 - 24*x + 25) + 12*sqrt(3*x^2 - x + 2)
*(6*x - 1)))
```

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

$$\int (2x+1)^3\left(3x^2-x+2\right)^{\frac{5}{2}}\left(4x^2+3x+1\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)**3*(3*x**2-x+2)**(5/2)*(4*x**2+3*x+1),x)
```

```
[Out] Integral((2*x + 1)**3*(3*x**2 - x + 2)**(5/2)*(4*x**2 + 3*x + 1),
 x)
```

GIAC/XCAS [A] time = 0.268435, size = 132, normalized size = 0.7

$$\frac{1}{4598415360}\,(2\,(12\,(6\,(8\,(6\,(36\,(14\,(48\,(18\,(40\,x + 69)x + 1847)x + 120557)x + 1671441)x + 50238389)x + 228850811)x + 1119$$
$$+\frac{61917863}{71663616}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x - \sqrt{3\,x^2 - x + 2}\right) + 1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)*(2*x + 1)^3,x, algorithm="giac")
```

```
[Out] 1/4598415360*(2*(12*(6*(8*(6*(36*(14*(48*(18*(40*x + 69)*x + 1847
)*x + 120557)*x + 1671441)*x + 50238389)*x + 228850811)*x + 11199
```

```
25033)*x + 3003691061)*x + 13323316609)*x + 9173509857)*sqrt(3*x^
2 - x + 2) + 61917863/71663616*sqrt(3)*ln(-2*sqrt(3)*(sqrt(3)*x -
 sqrt(3*x^2 - x + 2)) + 1)
```

3.221 $\int (1+2x)^2 \left(2-x+3x^2\right)^{5/2} \left(1+3x+4x^2\right)\,dx$

Optimal. Leaf size=164

$$\frac{1}{15}(2x+1)^3\left(3x^2-x+2\right)^{7/2}+\frac{37}{405}(2x+1)^2\left(3x^2-x+2\right)^{7/2}+\frac{(3430x+2731)\left(3x^2-x+2\right)^{7/2}}{17010}-\frac{293(1-6x)\left(3x^2-x+2\right)^{5/2}}{58320}-\frac{6739(1-6x)\left(3x^2-x+2\right)^{3/2}}{559872}-\frac{154997(1-6x)\sqrt{3x^2-x+2}}{4478976}-\frac{3564931\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{8957952\sqrt{3}}$$

```
[Out] (-154997*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/4478976 - (6739*(1 - 6*x)
*(2 - x + 3*x^2)^(3/2))/559872 - (293*(1 - 6*x)*(2 - x + 3*x^2)^(
5/2))/58320 + (37*(1 + 2*x)^2*(2 - x + 3*x^2)^(7/2))/405 + ((1 +
2*x)^3*(2 - x + 3*x^2)^(7/2))/15 + ((2731 + 3430*x)*(2 - x + 3*x^
2)^(7/2))/17010 - (3564931*ArcSinh[(1 - 6*x)/Sqrt[23]])/(8957952*
Sqrt[3])
```

Rubi [A] time = 0.287074, antiderivative size = 164, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.188$

$$\frac{1}{15}(2x+1)^3\left(3x^2-x+2\right)^{7/2}+\frac{37}{405}(2x+1)^2\left(3x^2-x+2\right)^{7/2}+\frac{(3430x+2731)\left(3x^2-x+2\right)^{7/2}}{17010}-\frac{293(1-6x)\left(3x^2-x+2\right)^{5/2}}{58320}-\frac{6739(1-6x)\left(3x^2-x+2\right)^{3/2}}{559872}-\frac{154997(1-6x)\sqrt{3x^2-x+2}}{4478976}-\frac{3564931\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{8957952\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 2*x)^2*(2 - x + 3*x^2)^(5/2)*(1 + 3*x + 4*x^2),x]
```


```
[Out] (-154997*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/4478976 - (6739*(1 - 6*x)
*(2 - x + 3*x^2)^(3/2))/559872 - (293*(1 - 6*x)*(2 - x + 3*x^2)^(
5/2))/58320 + (37*(1 + 2*x)^2*(2 - x + 3*x^2)^(7/2))/405 + ((1 +
2*x)^3*(2 - x + 3*x^2)^(7/2))/15 + ((2731 + 3430*x)*(2 - x + 3*x^
2)^(7/2))/17010 - (3564931*ArcSinh[(1 - 6*x)/Sqrt[23]])/(8957952*
Sqrt[3])
```

Rubi in Sympy [A] time = 30.6234, size = 155, normalized size = 0.95

$$-\frac{293(-6x+1)(3x^2-x+2)^{\frac{5}{2}}}{58320}-\frac{6739(-6x+1)(3x^2-x+2)^{\frac{3}{2}}}{559872}-\frac{154997(-6x+1)\sqrt{3x^2-x+2}}{4478976}+\frac{(2x+1)^3(3x^2-x+2)^{\frac{7}{2}}}{15}+\frac{37(2x+1)^2(3x^2-x+2)^{\frac{7}{2}}}{405}+\frac{(164640x+131088)(3x^2-x+2)^{\frac{7}{2}}}{816480}+\frac{3564931\sqrt{3}\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{26873856}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**2*(3*x**2-x+2)**(5/2)*(4*x**2+3*x+1),x)
```

```
[Out] -293*(-6*x + 1)*(3*x**2 - x + 2)**(5/2)/58320 - 6739*(-6*x + 1)*(
3*x**2 - x + 2)**(3/2)/559872 - 154997*(-6*x + 1)*sqrt(3*x**2 - x
 + 2)/4478976 + (2*x + 1)**3*(3*x**2 - x + 2)**(7/2)/15 + 37*(2*x
 + 1)**2*(3*x**2 - x + 2)**(7/2)/405 + (164640*x + 131088)*(3*x**
2 - x + 2)**(7/2)/816480 + 3564931*sqrt(3)*atanh(sqrt(3)*(6*x - 1
)/(6*sqrt(3*x**2 - x + 2)))/26873856
```

Mathematica [A] time = 0.136541, size = 85, normalized size = 0.52

$$\frac{6\sqrt{3x^2-x+2}\,(2257403904x^9+2675441664x^8+4427716608x^7+5671627776x^6+4996802304x^5+4171579776x^4+30961}{940584960}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 2*x)^2*(2 - x + 3*x^2)^(5/2)*(1 + 3*x + 4*x^2),x]
```

```
[Out] (6*Sqrt[2 - x + 3*x^2]*(387182961 + 692659234*x + 1693765752*x^2
+ 3096104976*x^3 + 4171579776*x^4 + 4996802304*x^5 + 5671627776*x
^6 + 4427716608*x^7 + 2675441664*x^8 + 2257403904*x^9) + 12477258
5*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]])/940584960
```

Maple [A] time = 0.01, size = 136, normalized size = 0.8

$$\frac{1758x-293}{58320}(3x^2-x+2)^{\frac{5}{2}}+\frac{40434x-6739}{559872}(3x^2-x+2)^{\frac{3}{2}}+\frac{929982x-154997}{4478976}\sqrt{3x^2-x+2}+\frac{3564931\sqrt{3}}{26873856}Arcsinh\left(\frac{6\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{5419}{17010}(3x^2-x+2)^{\frac{7}{2}}+\frac{235x}{243}(3x^2-x+2)^{\frac{7}{2}}+\frac{472x^2}{405}(3x^2-x+2)^{\frac{7}{2}}+\frac{8x^3}{15}(3x^2-x+2)^{\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^2*(3*x^2-x+2)^(5/2)*(4*x^2+3*x+1),x)
```

```
[Out] 293/58320*(6*x-1)*(3*x^2-x+2)^(5/2)+6739/559872*(6*x-1)*(3*x^2-x+
2)^(3/2)+154997/4478976*(6*x-1)*(3*x^2-x+2)^(1/2)+3564931/2687385
6*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))+5419/17010*(3*x^2-x+2)^(
7/2)+235/243*x*(3*x^2-x+2)^(7/2)+472/405*x^2*(3*x^2-x+2)^(7/2)+8/
15*x^3*(3*x^2-x+2)^(7/2)
```

Maxima [A] time = 0.768039, size = 225, normalized size = 1.37

$$\frac{8}{15}\left(3x^2-x+2\right)^{\frac{7}{2}}x^3+\frac{472}{405}\left(3x^2-x+2\right)^{\frac{7}{2}}x^2+\frac{235}{243}\left(3x^2-x+2\right)^{\frac{7}{2}}x+\frac{5419}{17010}\left(3x^2-x+2\right)^{\frac{7}{2}}+\frac{293}{9720}\left(3x^2-x+2\right)^{\frac{5}{2}}x-\frac{293}{58320}\left(3x^2-x+2\right)^{\frac{5}{2}}+\frac{6739}{93312}\left(3x^2-x+2\right)^{\frac{3}{2}}x-\frac{6739}{559872}\left(3x^2-x+2\right)^{\frac{3}{2}}+\frac{154997}{746496}\sqrt{3x^2-x+2}x+\frac{3564931}{26873856}\sqrt{3}\operatorname{arsinh}\left(\frac{1}{23}\sqrt{23}(6x-1)\right)-\frac{154997}{4478976}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)*(2*x + 1)^2,x, algorithm="maxima
```

```
[Out] 8/15*(3*x^2 - x + 2)^(7/2)*x^3 + 472/405*(3*x^2 - x + 2)^(7/2)*x^
2 + 235/243*(3*x^2 - x + 2)^(7/2)*x + 5419/17010*(3*x^2 - x + 2)^
(7/2) + 293/9720*(3*x^2 - x + 2)^(5/2)*x - 293/58320*(3*x^2 - x +
 2)^(5/2) + 6739/93312*(3*x^2 - x + 2)^(3/2)*x - 6739/559872*(3*x
^2 - x + 2)^(3/2) + 154997/746496*sqrt(3*x^2 - x + 2)*x + 3564931
/26873856*sqrt(3)*arcsinh(1/23*sqrt(23)*(6*x - 1)) - 154997/44789
76*sqrt(3*x^2 - x + 2)
```

Fricas [A] time = 0.274627, size = 143, normalized size = 0.87

$$\frac{1}{1881169920}\sqrt{3}\Big(4\sqrt{3}\big(2257403904\,x^9+2675441664\,x^8+4427716608\,x^7+5671627776\,x^6+4996802304\,x^5+4171579776\,x^4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)*(2*x + 1)^2,x, algorithm="fricas
```

```
[Out] 1/1881169920*sqrt(3)*(4*sqrt(3)*(2257403904*x^9 + 2675441664*x^8
+ 4427716608*x^7 + 5671627776*x^6 + 4996802304*x^5 + 4171579776*x
^4 + 3096104976*x^3 + 1693765752*x^2 + 692659234*x + 387182961)*s
qrt(3*x^2 - x + 2) + 124772585*log(-sqrt(3)*(72*x^2 - 24*x + 25)
```

```
- 12*sqrt(3*x^2 - x + 2)*(6*x - 1)))
```

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

$$\int (2x+1)^2 \left(3x^2 - x + 2\right)^{\frac{5}{2}} \left(4x^2 + 3x + 1\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)**2*(3*x**2-x+2)**(5/2)*(4*x**2+3*x+1),x)
```

```
[Out] Integral((2*x + 1)**2*(3*x**2 - x + 2)**(5/2)*(4*x**2 + 3*x + 1),
 x)
```

GIAC/XCAS [A] time = 0.269581, size = 126, normalized size = 0.77

$$\frac{1}{156764160}\,(2\,(12\,(6\,(8\,(6\,(36\,(14\,(24\,(27\,x + 32)x + 1271)x + 22793)x + 722917)x + 3621163)x + 21500729)x + 70573573)x +$$
$$-\frac{3564931}{26873856}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x - \sqrt{3\,x^2 - x + 2}\right) + 1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)*(2*x + 1)^2,x, algorithm="giac")
```

```
[Out] 1/156764160*(2*(12*(6*(8*(6*(36*(14*(24*(27*x + 32)*x + 1271)*x +
 22793)*x + 722917)*x + 3621163)*x + 21500729)*x + 70573573)*x +
346329617)*x + 387182961)*sqrt(3*x^2 - x + 2) - 3564931/26873856*
sqrt(3)*ln(-2*sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 - x + 2)) + 1)
```

3.222 $\int (1+2x)\left(2-x+3x^2\right)^{5/2}\left(1+3x+4x^2\right)\,dx$

Optimal. Leaf size=139

$$\frac{2}{27}(2x+1)^2\left(3x^2-x+2\right)^{7/2}+\frac{1}{648}(122x+137)\left(3x^2-x+2\right)^{7/2}-\frac{445(1-6x)\left(3x^2-x+2\right)^{5/2}}{15552}-\frac{51175(1-6x)\left(3x^2-x+2\right)^{3/2}}{746496}-\frac{1177025(1-6x)\sqrt{3x^2-x+2}}{5971968}-\frac{27071575\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{11943936\sqrt{3}}$$

```
[Out] (-1177025*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/5971968 - (51175*(1 - 6*
x)*(2 - x + 3*x^2)^(3/2))/746496 - (445*(1 - 6*x)*(2 - x + 3*x^2)
^(5/2))/15552 + (2*(1 + 2*x)^2*(2 - x + 3*x^2)^(7/2))/27 + ((137
+ 122*x)*(2 - x + 3*x^2)^(7/2))/648 - (27071575*ArcSinh[(1 - 6*x)
/Sqrt[23]])/(11943936*Sqrt[3])
```

Rubi [A] time = 0.182502, antiderivative size = 139, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.167

$$\frac{2}{27}(2x+1)^2\left(3x^2-x+2\right)^{7/2}+\frac{1}{648}(122x+137)\left(3x^2-x+2\right)^{7/2}-\frac{445(1-6x)\left(3x^2-x+2\right)^{5/2}}{15552}-\frac{51175(1-6x)\left(3x^2-x+2\right)^{3/2}}{746496}-\frac{1177025(1-6x)\sqrt{3x^2-x+2}}{5971968}-\frac{27071575\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{11943936\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 2*x)*(2 - x + 3*x^2)^(5/2)*(1 + 3*x + 4*x^2),x]
```


```
[Out] (-1177025*(1 - 6*x)*Sqrt[2 - x + 3*x^2])/5971968 - (51175*(1 - 6*
x)*(2 - x + 3*x^2)^(3/2))/746496 - (445*(1 - 6*x)*(2 - x + 3*x^2)
^(5/2))/15552 + (2*(1 + 2*x)^2*(2 - x + 3*x^2)^(7/2))/27 + ((137
+ 122*x)*(2 - x + 3*x^2)^(7/2))/648 - (27071575*ArcSinh[(1 - 6*x)
/Sqrt[23]])/(11943936*Sqrt[3])
```

Rubi in Sympy [A] time = 21.3923, size = 134, normalized size = 0.96

$$-\frac{445\left(-6x+1\right)\left(3x^2-x+2\right)^{\frac{5}{2}}}{15552}-\frac{51175\left(-6x+1\right)\left(3x^2-x+2\right)^{\frac{3}{2}}}{746496}-\frac{1177025\left(-6x+1\right)\sqrt{3x^2-x+2}}{5971968}+\frac{2\left(2x+1\right)^2\left(3x^2-x+2\right)^{\frac{7}{2}}}{27}+\frac{\left(5124x+5754\right)\left(3x^2-x+2\right)^{\frac{7}{2}}}{27216}+\frac{27071575\sqrt{3}\,\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{35831808}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)*(3*x**2-x+2)**(5/2)*(4*x**2+3*x+1),x)
```

```
[Out] -445*(-6*x + 1)*(3*x**2 - x + 2)**(5/2)/15552 - 51175*(-6*x + 1)*
(3*x**2 - x + 2)**(3/2)/746496 - 1177025*(-6*x + 1)*sqrt(3*x**2 -
 x + 2)/5971968 + 2*(2*x + 1)**2*(3*x**2 - x + 2)**(7/2)/27 + (51
24*x + 5754)*(3*x**2 - x + 2)**(7/2)/27216 + 27071575*sqrt(3)*ata
nh(sqrt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/35831808
```

Mathematica [A] time = 0.0957674, size = 80, normalized size = 0.58

$$\frac{6\sqrt{3x^2-x+2}\,(47775744x^8+30357504x^7+79377408x^6+80034048x^5+66969216x^4+58946544x^3+41031048x^2+19860}{35831808}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 2*x)*(2 - x + 3*x^2)^(5/2)*(1 + 3*x + 4*x^2),x]
```

```
[Out] (6*Sqrt[2 - x + 3*x^2]*(10960335 + 19860062*x + 41031048*x^2 + 58
946544*x^3 + 66969216*x^4 + 80034048*x^5 + 79377408*x^6 + 3035750
4*x^7 + 47775744*x^8) + 27071575*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[
23]])/35831808
```

Maple [A] time = 0.008, size = 119, normalized size = 0.9

$$\frac{2670\,x-445}{15552}\left(3\,x^2-x+2\right)^{\frac{5}{2}}+\frac{307050\,x-51175}{746496}\left(3\,x^2-x+2\right)^{\frac{3}{2}}+\frac{7062150\,x-1177025}{5971968}\sqrt{3\,x^2-x+2}+\frac{27071575\,\sqrt{3}}{35831808}Arcsinh\left(\frac{6\,\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{185}{648}\left(3\,x^2-x+2\right)^{\frac{7}{2}}+\frac{157\,x}{324}\left(3\,x^2-x+2\right)^{\frac{7}{2}}+\frac{8\,x^2}{27}\left(3\,x^2-x+2\right)^{\frac{7}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)*(3*x^2-x+2)^(5/2)*(4*x^2+3*x+1),x)
```

```
[Out] 445/15552*(6*x-1)*(3*x^2-x+2)^(5/2)+51175/746496*(6*x-1)*(3*x^2-x
+2)^(3/2)+1177025/5971968*(6*x-1)*(3*x^2-x+2)^(1/2)+27071575/3583
1808*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))+185/648*(3*x^2-x+2)^(
7/2)+157/324*x*(3*x^2-x+2)^(7/2)+8/27*x^2*(3*x^2-x+2)^(7/2)
```

Maxima [A] time = 0.758041, size = 203, normalized size = 1.46

$$\frac{8}{27}\left(3x^2-x+2\right)^{\frac{7}{2}}x^2+\frac{157}{324}\left(3x^2-x+2\right)^{\frac{7}{2}}x+\frac{185}{648}\left(3x^2-x+2\right)^{\frac{7}{2}}+\frac{445}{2592}\left(3x^2-x+2\right)^{\frac{5}{2}}x-\frac{445}{15552}\left(3x^2-x+2\right)^{\frac{5}{2}}+\frac{51175}{124416}\left(3x^2-x+2\right)^{\frac{3}{2}}x-\frac{51175}{746496}\left(3x^2-x+2\right)^{\frac{3}{2}}+\frac{1177025}{995328}\sqrt{3x^2-x+2}x+\frac{27071575}{35831808}\sqrt{3}\operatorname{arsinh}\left(\frac{1}{23}\sqrt{23}(6x-1)\right)-\frac{1177025}{5971968}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)*(2*x + 1),x, algorithm="maxima")
```

```
[Out] 8/27*(3*x^2 - x + 2)^(7/2)*x^2 + 157/324*(3*x^2 - x + 2)^(7/2)*x
+ 185/648*(3*x^2 - x + 2)^(7/2) + 445/2592*(3*x^2 - x + 2)^(5/2)*
x - 445/15552*(3*x^2 - x + 2)^(5/2) + 51175/124416*(3*x^2 - x + 2
)^(3/2)*x - 51175/746496*(3*x^2 - x + 2)^(3/2) + 1177025/995328*s
qrt(3*x^2 - x + 2)*x + 27071575/35831808*sqrt(3)*arcsinh(1/23*sqr
t(23)*(6*x - 1)) - 1177025/5971968*sqrt(3*x^2 - x + 2)
```

Fricas [A] time = 0.270353, size = 136, normalized size = 0.98

$$\frac{1}{71663616}\sqrt{3}\Big(4\sqrt{3}\big(47775744x^8+30357504x^7+79377408x^6+80034048x^5+66969216x^4+58946544x^3+41031048x^2+$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)*(2*x + 1),x, algorithm="fricas")
```

```
[Out] 1/71663616*sqrt(3)*(4*sqrt(3)*(47775744*x^8 + 30357504*x^7 + 7937
7408*x^6 + 80034048*x^5 + 66969216*x^4 + 58946544*x^3 + 41031048*
x^2 + 19860062*x + 10960335)*sqrt(3*x^2 - x + 2) + 27071575*log(-
sqrt(3)*(72*x^2 - 24*x + 25) - 12*sqrt(3*x^2 - x + 2)*(6*x - 1)))
```

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

$$\int(2x+1)\left(3x^2-x+2\right)^{\frac{5}{2}}\left(4x^2+3x+1\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((1+2*x)*(3*x**2-x+2)**(5/2)*(4*x**2+3*x+1),x)
```

```
[Out] Integral((2*x + 1)*(3*x**2 - x + 2)**(5/2)*(4*x**2 + 3*x + 1), x)
```

GIAC/XCAS [A] time = 0.269155, size = 119, normalized size = 0.86

$$\frac{1}{5971968}\left(2\left(12\left(6\left(8\left(6\left(36\left(2\left(96x+61\right)x+319\right)x+11579\right)x+58133\right)x+409351\right)x+1709627\right)x+9930031\right)x+10960335\right)\sqrt{3}$$
$$-\frac{27071575}{35831808}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)*(2*x + 1),x, algorithm="giac")
```

```
[Out] 1/5971968*(2*(12*(6*(8*(6*(36*(2*(96*x + 61)*x + 319)*x + 11579)*
x + 58133)*x + 409351)*x + 1709627)*x + 9930031)*x + 10960335)*sq
rt(3*x^2 - x + 2) - 27071575/35831808*sqrt(3)*ln(-2*sqrt(3)*(sqrt
(3)*x - sqrt(3*x^2 - x + 2)) + 1)
```

3.223 $\int \frac{(2-x+3x^2)^{5/2}(1+3x+4x^2)}{1+2x}\,dx$

Optimal. Leaf size=147

$$\frac{2}{21}\left(3x^2-x+2\right)^{7/2}+\frac{(150x+29)\left(3x^2-x+2\right)^{5/2}}{1080}+\frac{(2154x+2449)\left(3x^2-x+2\right)^{3/2}}{10368}+\frac{(221999-17850x)\sqrt{3x^2-x+2}}{82944}-\frac{169}{128}\sqrt{13}\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)+\frac{944521\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{165888\sqrt{3}}$$

```
[Out] ((221999 - 17850*x)*Sqrt[2 - x + 3*x^2])/82944 + ((2449 + 2154*x)
*(2 - x + 3*x^2)^(3/2))/10368 + ((29 + 150*x)*(2 - x + 3*x^2)^(5/
2))/1080 + (2*(2 - x + 3*x^2)^(7/2))/21 + (944521*ArcSinh[(1 - 6*
x)/Sqrt[23]])/(165888*Sqrt[3]) - (169*Sqrt[13]*ArcTanh[(9 - 8*x)/
(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/128
```

Rubi [A] time = 0.383662, antiderivative size = 147, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.219

$$\frac{2}{21}\left(3x^2-x+2\right)^{7/2}+\frac{(150x+29)\left(3x^2-x+2\right)^{5/2}}{1080}+\frac{(2154x+2449)\left(3x^2-x+2\right)^{3/2}}{10368}+\frac{(221999-17850x)\sqrt{3x^2-x+2}}{82944}-\frac{169}{128}\sqrt{13}\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)+\frac{944521\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{165888\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((2 - x + 3*x^2)^(5/2)*(1 + 3*x + 4*x^2))/(1 + 2*x),x]
```

```
[Out] ((221999 - 17850*x)*Sqrt[2 - x + 3*x^2])/82944 + ((2449 + 2154*x)
*(2 - x + 3*x^2)^(3/2))/10368 + ((29 + 150*x)*(2 - x + 3*x^2)^(5/
2))/1080 + (2*(2 - x + 3*x^2)^(7/2))/21 + (944521*ArcSinh[(1 - 6*
x)/Sqrt[23]])/(165888*Sqrt[3]) - (169*Sqrt[13]*ArcTanh[(9 - 8*x)/
(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/128
```

Rubi in Sympy [A] time = 48.4748, size = 138, normalized size = 0.94

$$\frac{(-2998800x+37295832)\sqrt{3x^2-x+2}}{13934592}+\frac{(2100x+406)\left(3x^2-x+2\right)^{\frac{5}{2}}}{15120}+\frac{(180936x+205716)\left(3x^2-x+2\right)^{\frac{3}{2}}}{870912}+\frac{2\left(3x^2-x+2\right)^{\frac{7}{2}}}{21}-\frac{169\sqrt{13}\operatorname{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{128}-\frac{944521\sqrt{3}\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{497664}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((3*x**2-x+2)**(5/2)*(4*x**2+3*x+1)/(1+2*x),x)
```

```
[Out] (-2998800*x + 37295832)*sqrt(3*x**2 - x + 2)/13934592 + (2100*x +
 406)*(3*x**2 - x + 2)**(5/2)/15120 + (180936*x + 205716)*(3*x**2
 - x + 2)**(3/2)/870912 + 2*(3*x**2 - x + 2)**(7/2)/21 - 169*sqrt
(13)*atanh(sqrt(13)*(-8*x + 9)/(26*sqrt(3*x**2 - x + 2)))/128 - 9
44521*sqrt(3)*atanh(sqrt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/4
97664
```

Mathematica [A] time = 0.250106, size = 119, normalized size = 0.81

$$\frac{6\left(-3832920\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)+\sqrt{3x^2-x+2}\left(7464960x^6-3836160x^5+15700608x^4-3646512x^3+\right.\right.}{17418240}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((2 - x + 3*x^2)^(5/2)*(1 + 3*x + 4*x^2))/(1 + 2*x),x]
```

```
[Out] (-33058235*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]] + 6*(Sqrt[2 - x +
 3*x^2]*(11665053 - 2120998*x + 12466776*x^2 - 3646512*x^3 + 1570
0608*x^4 - 3836160*x^5 + 7464960*x^6) + 3832920*Sqrt[13]*Log[1 +
2*x] - 3832920*Sqrt[13]*Log[9 - 8*x + 2*Sqrt[13]*Sqrt[2 - x + 3*x
^2]]))/17418240
```

Maple [A] time = 0.012, size = 207, normalized size = 1.4

$$\frac{30x-5}{216}\left(3x^2-x+2\right)^{\frac{5}{2}}+\frac{3450x-575}{10368}\left(3x^2-x+2\right)^{\frac{3}{2}}+\frac{79350x-13225}{82944}\sqrt{3x^2-x+2}-\frac{944521\sqrt{3}}{497664}Arcsinh\left(\frac{6\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{2}{21}\left(3x^2-x+2\right)^{\frac{7}{2}}+\frac{1}{20}\left(3\ (1/2+x)^2-4x+\frac{5}{4}\right)^{\frac{5}{2}}-\frac{6x-1}{48}\left(3\ (1/2+x)^2-4x+\frac{5}{4}\right)^{\frac{3}{2}}-\frac{150x-25}{128}\sqrt{3\ (1/2+x)^2-4x+\frac{5}{4}}+\frac{13}{48}\left(3\ (1/2+x)^2-4x+\frac{5}{4}\right)^{\frac{3}{2}}+\frac{169}{128}\sqrt{12\ (1/2+x)^2-16x+5}-\frac{169\sqrt{13}}{128}Artanh\left(\frac{2\sqrt{13}}{13}\left(\frac{9}{2}-4x\right)\frac{1}{\sqrt{12\ (1/2+x)^2-16x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((3*x^2-x+2)^(5/2)*(4*x^2+3*x+1)/(1+2*x),x)
```

```
[Out] 5/216*(6*x-1)*(3*x^2-x+2)^(5/2)+575/10368*(6*x-1)*(3*x^2-x+2)^(3/
2)+13225/82944*(6*x-1)*(3*x^2-x+2)^(1/2)-944521/497664*3^(1/2)*ar
csinh(6/23*23^(1/2)*(x-1/6))+2/21*(3*x^2-x+2)^(7/2)+1/20*(3*(1/2+
x)^2-4*x+5/4)^(5/2)-1/48*(6*x-1)*(3*(1/2+x)^2-4*x+5/4)^(3/2)-25/1
28*(6*x-1)*(3*(1/2+x)^2-4*x+5/4)^(1/2)+13/48*(3*(1/2+x)^2-4*x+5/4
)^(3/2)+169/128*(12*(1/2+x)^2-16*x+5)^(1/2)-169/128*13^(1/2)*arct
anh(2/13*(9/2-4*x)*13^(1/2)/(12*(1/2+x)^2-16*x+5)^(1/2))
```

Maxima [A] time = 0.78469, size = 208, normalized size = 1.41

$$\frac{2}{21}\left(3x^2-x+2\right)^{\frac{7}{2}}+\frac{5}{36}\left(3x^2-x+2\right)^{\frac{5}{2}}x+\frac{29}{1080}\left(3x^2-x+2\right)^{\frac{5}{2}}+\frac{359}{1728}\left(3x^2-x+2\right)^{\frac{3}{2}}x+\frac{2449}{10368}\left(3x^2-x+2\right)^{\frac{3}{2}}-\frac{2975}{13824}\sqrt{3x^2-x+2}x-\frac{944521}{497664}\sqrt{3}\operatorname{arsinh}\left(\frac{6}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{169}{128}\sqrt{13}\operatorname{arsinh}\left(\frac{8\sqrt{23}x}{23\,|2x+1|}-\frac{9\sqrt{23}}{23\,|2x+1|}\right)+\frac{221999}{82944}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)/(2*x + 1),x, algorithm="maxima")
```

```
[Out] 2/21*(3*x^2 - x + 2)^(7/2) + 5/36*(3*x^2 - x + 2)^(5/2)*x + 29/10
80*(3*x^2 - x + 2)^(5/2) + 359/1728*(3*x^2 - x + 2)^(3/2)*x + 244
9/10368*(3*x^2 - x + 2)^(3/2) - 2975/13824*sqrt(3*x^2 - x + 2)*x
- 944521/497664*sqrt(3)*arcsinh(6/23*sqrt(23)*x - 1/23*sqrt(23))
+ 169/128*sqrt(13)*arcsinh(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*sq
```

```
rt(23)/abs(2*x + 1)) + 221999/82944*sqrt(3*x^2 - x + 2)
```

Fricas [A] time = 0.286199, size = 197, normalized size = 1.34

$$\frac{1}{34836480}\sqrt{3}\Big(4\sqrt{3}\big(7464960\,x^6 - 3836160\,x^5 + 15700608\,x^4 - 3646512\,x^3 + 12466776\,x^2 - 2120998\,x + 11665053\big)\sqrt{3\,x^2 -$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)/(2*x + 1),x, algorithm="fricas")
```

```
[Out] 1/34836480*sqrt(3)*(4*sqrt(3)*(7464960*x^6 - 3836160*x^5 + 157006
08*x^4 - 3646512*x^3 + 12466776*x^2 - 2120998*x + 11665053)*sqrt(
3*x^2 - x + 2) + 7665840*sqrt(13)*sqrt(3)*log(-(4*sqrt(13)*sqrt(3
*x^2 - x + 2)*(8*x - 9) + 220*x^2 - 196*x + 185)/(4*x^2 + 4*x + 1
)) + 33058235*log(-sqrt(3)*(72*x^2 - 24*x + 25) + 12*sqrt(3*x^2 -
 x + 2)*(6*x - 1)))
```

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

$$\int \frac{\left(3x^2 - x + 2\right)^{\frac{5}{2}}\left(4x^2 + 3x + 1\right)}{2x + 1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((3*x**2-x+2)**(5/2)*(4*x**2+3*x+1)/(1+2*x),x)
```

```
[Out] Integral((3*x**2 - x + 2)**(5/2)*(4*x**2 + 3*x + 1)/(2*x + 1), x)
```

GIAC/XCAS [A] time = 0.295686, size = 197, normalized size = 1.34

$$\frac{1}{2903040}\left(2\left(12\left(18\left(8\left(30\left(72\,x - 37\right)x + 4543\right)x - 8441\right)x + 519449\right)x - 1060499\right)x + 11665053\right)\sqrt{3\,x^2 - x + 2} + \frac{944521}{497664}\sqrt{3}\ln\left(-6\sqrt{3}x + \sqrt{3} + 6\sqrt{3\,x^2 - x + 2}\right) + \frac{169}{128}\sqrt{13}\ln\left(-\frac{\left|-4\sqrt{3}x - 2\sqrt{13} - 2\sqrt{3} + 4\sqrt{3\,x^2 - x + 2}\right|}{2\left(2\sqrt{3}x - \sqrt{13} + \sqrt{3} - 2\sqrt{3\,x^2 - x + 2}\right)}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)/(2*x + 1),x, algorithm="giac")
```

```
[Out] 1/2903040*(2*(12*(18*(8*(30*(72*x - 37)*x + 4543)*x - 8441)*x + 5
19449)*x - 1060499)*x + 11665053)*sqrt(3*x^2 - x + 2) + 944521/49
7664*sqrt(3)*ln(-6*sqrt(3)*x + sqrt(3) + 6*sqrt(3*x^2 - x + 2)) +
 169/128*sqrt(13)*ln(-1/2*abs(-4*sqrt(3)*x - 2*sqrt(13) - 2*sqrt(
3) + 4*sqrt(3*x^2 - x + 2))/(2*sqrt(3)*x - sqrt(13) + sqrt(3) - 2
*sqrt(3*x^2 - x + 2)))
```

3.224 $\int \frac{(2-x+3x^2)^{5/2}(1+3x+4x^2)}{(1+2x)^2}\,dx$

Optimal. Leaf size=154

$$-\frac{(3x^2-x+2)^{7/2}}{13(2x+1)}-\frac{11(37-60x)(3x^2-x+2)^{5/2}}{2340}-\frac{11}{864}(67-78x)(3x^2-x+2)^{3/2}-\frac{11(4727-3090x)\sqrt{3x^2-x+2}}{6912}+\frac{429}{128}\sqrt{13}\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)-\frac{315623\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{13824\sqrt{3}}$$

```
[Out] (-11*(4727 - 3090*x)*Sqrt[2 - x + 3*x^2])/6912 - (11*(67 - 78*x)*
(2 - x + 3*x^2)^(3/2))/864 - (11*(37 - 60*x)*(2 - x + 3*x^2)^(5/2
))/2340 - (2 - x + 3*x^2)^(7/2)/(13*(1 + 2*x)) - (315623*ArcSinh[
(1 - 6*x)/Sqrt[23]])/(13824*Sqrt[3]) + (429*Sqrt[13]*ArcTanh[(9 -
 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/128
```

Rubi [A] time = 0.390026, antiderivative size = 154, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.219

$$-\frac{(3x^2-x+2)^{7/2}}{13(2x+1)}-\frac{11(37-60x)(3x^2-x+2)^{5/2}}{2340}-\frac{11}{864}(67-78x)(3x^2-x+2)^{3/2}-\frac{11(4727-3090x)\sqrt{3x^2-x+2}}{6912}+\frac{429}{128}\sqrt{13}\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)-\frac{315623\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{13824\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((2 - x + 3*x^2)^(5/2)*(1 + 3*x + 4*x^2))/(1 + 2*x)^2,x]
```


```
[Out] (-11*(4727 - 3090*x)*Sqrt[2 - x + 3*x^2])/6912 - (11*(67 - 78*x)*
(2 - x + 3*x^2)^(3/2))/864 - (11*(37 - 60*x)*(2 - x + 3*x^2)^(5/2
))/2340 - (2 - x + 3*x^2)^(7/2)/(13*(1 + 2*x)) - (315623*ArcSinh[
(1 - 6*x)/Sqrt[23]])/(13824*Sqrt[3]) + (429*Sqrt[13]*ArcTanh[(9 -
 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/128
```

Rubi in Sympy [A] time = 48.4268, size = 139, normalized size = 0.9

$$-\frac{(-42419520x+64892256)\sqrt{3x^2-x+2}}{8626176}-\frac{(-535392x+459888)\left(3x^2-x+2\right)^{\frac{3}{2}}}{539136}-\frac{(-2640x+1628)\left(3x^2-x+2\right)^{\frac{5}{2}}}{9360}+\frac{429\sqrt{13}\,\mathrm{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{128}+\frac{315623\sqrt{3}\,\mathrm{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{41472}-\frac{\left(3x^2-x+2\right)^{\frac{7}{2}}}{13\,(2x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((3*x**2-x+2)**(5/2)*(4*x**2+3*x+1)/(1+2*x)**2,x)
```

```
[Out] -(-42419520*x + 64892256)*sqrt(3*x**2 - x + 2)/8626176 - (-535392
*x + 459888)*(3*x**2 - x + 2)**(3/2)/539136 - (-2640*x + 1628)*(3
*x**2 - x + 2)**(5/2)/9360 + 429*sqrt(13)*atanh(sqrt(13)*(-8*x +
9)/(26*sqrt(3*x**2 - x + 2)))/128 + 315623*sqrt(3)*atanh(sqrt(3)*
(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/41472 - (3*x**2 - x + 2)**(7/
2)/(13*(2*x + 1))
```

Mathematica [A] time = 0.435659, size = 124, normalized size = 0.81

$$\frac{694980\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)+\frac{6\sqrt{3x^2-x+2}\left(103680x^6-65664x^5+251424x^4-115680x^3+310660x^2-322972x-364257\right)}{2x+1}-694980}{207360}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((2 - x + 3*x^2)^(5/2)*(1 + 3*x + 4*x^2))/(1 + 2*x)^2,x]
```

```
[Out] ((6*Sqrt[2 - x + 3*x^2]*(-364257 - 322972*x + 310660*x^2 - 115680
*x^3 + 251424*x^4 - 65664*x^5 + 103680*x^6))/(1 + 2*x) + 1578115*
Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]] - 694980*Sqrt[13]*Log[1 + 2*
x] + 694980*Sqrt[13]*Log[9 - 8*x + 2*Sqrt[13]*Sqrt[2 - x + 3*x^2]
])/207360
```

Maple [A] time = 0.017, size = 235, normalized size = 1.5

$$\frac{6x-1}{36}\left(3x^2-x+2\right)^{\frac{5}{2}}+\frac{690x-115}{1728}\left(3x^2-x+2\right)^{\frac{3}{2}}+\frac{15870x-2645}{13824}\sqrt{3x^2-x+2}+\frac{315623\sqrt{3}}{41472}Arcsinh\left(\frac{6\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)-\frac{1}{26}\left(3\left(1/2+x\right)^2-4x+\frac{5}{4}\right)^{\frac{7}{2}}\left(\frac{1}{2}+x\right)^{-1}-\frac{33}{260}\left(3\left(1/2+x\right)^2-4x+\frac{5}{4}\right)^{\frac{5}{2}}+\frac{114x-19}{192}\left(3\left(1/2+x\right)^2-4x+\frac{5}{4}\right)^{\frac{3}{2}}+\frac{5790x-965}{1536}\sqrt{3\left(1/2+x\right)^2-4x+\frac{5}{4}}-\frac{11}{16}\left(3\left(1/2+x\right)^2-4x+\frac{5}{4}\right)^{\frac{3}{2}}-\frac{429}{128}\sqrt{12\left(1/2+x\right)^2-16x+5}+\frac{429\sqrt{13}}{128}Artanh\left(\frac{2\sqrt{13}}{13}\left(\frac{9}{2}-4x\right)\frac{1}{\sqrt{12\left(1/2+x\right)^2-16x+5}}\right)+\frac{6x-1}{52}\left(3\left(1/2+x\right)^2-4x+\frac{5}{4}\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((3*x^2-x+2)^(5/2)*(4*x^2+3*x+1)/(1+2*x)^2,x)
```

```
[Out] 1/36*(6*x-1)*(3*x^2-x+2)^(5/2)+115/1728*(6*x-1)*(3*x^2-x+2)^(3/2)
+2645/13824*(6*x-1)*(3*x^2-x+2)^(1/2)+315623/41472*3^(1/2)*arcsin
h(6/23*23^(1/2)*(x-1/6))-1/26/(1/2+x)*(3*(1/2+x)^2-4*x+5/4)^(7/2)
-33/260*(3*(1/2+x)^2-4*x+5/4)^(5/2)+19/192*(6*x-1)*(3*(1/2+x)^2-4
*x+5/4)^(3/2)+965/1536*(6*x-1)*(3*(1/2+x)^2-4*x+5/4)^(1/2)-11/16*
(3*(1/2+x)^2-4*x+5/4)^(3/2)-429/128*(12*(1/2+x)^2-16*x+5)^(1/2)+4
29/128*13^(1/2)*arctanh(2/13*(9/2-4*x)*13^(1/2)/(12*(1/2+x)^2-16*
x+5)^(1/2))+1/52*(6*x-1)*(3*(1/2+x)^2-4*x+5/4)^(5/2)
```

Maxima [A] time = 0.779959, size = 217, normalized size = 1.41

$$\frac{1}{6}\left(3x^2-x+2\right)^{\frac{5}{2}}x-\frac{7}{90}\left(3x^2-x+2\right)^{\frac{5}{2}}+\frac{143}{144}\left(3x^2-x+2\right)^{\frac{3}{2}}x-\frac{737}{864}\left(3x^2-x+2\right)^{\frac{3}{2}}-\frac{\left(3x^2-x+2\right)^{\frac{5}{2}}}{4\left(2x+1\right)}+\frac{5665}{1152}\sqrt{3x^2-x+2}x+\frac{315623}{41472}\sqrt{3}\operatorname{arsinh}\left(\frac{6}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)-\frac{429}{128}\sqrt{13}\operatorname{arsinh}\left(\frac{8\sqrt{23}x}{23\left|2x+1\right|}-\frac{9\sqrt{23}}{23\left|2x+1\right|}\right)-\frac{51997}{6912}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)/(2*x + 1)^2,x, algorithm="maxima
```

```
[Out] 1/6*(3*x^2 - x + 2)^(5/2)*x - 7/90*(3*x^2 - x + 2)^(5/2) + 143/14
4*(3*x^2 - x + 2)^(3/2)*x - 737/864*(3*x^2 - x + 2)^(3/2) - 1/4*(
3*x^2 - x + 2)^(5/2)/(2*x + 1) + 5665/1152*sqrt(3*x^2 - x + 2)*x
+ 315623/41472*sqrt(3)*arcsinh(6/23*sqrt(23)*x - 1/23*sqrt(23)) -
 429/128*sqrt(13)*arcsinh(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*sqr
t(23)/abs(2*x + 1)) - 51997/6912*sqrt(3*x^2 - x + 2)
```

Fricas [A] time = 0.287457, size = 219, normalized size = 1.42

$$\frac{\sqrt{3}\left(231660\,\sqrt{13}\sqrt{3}(2\,x+1)\log\left(\frac{4\,\sqrt{13}\sqrt{3\,x^2-x+2}(8\,x-9)-220\,x^2+196\,x-185}{4\,x^2+4\,x+1}\right)+4\,\sqrt{3}\left(103680\,x^6-65664\,x^5+251424\,x^4-115680\,x^3\right.\right.}{41472}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)/(2*x + 1)^2,x, algorithm="fricas
```

```
[Out] 1/414720*sqrt(3)*(231660*sqrt(13)*sqrt(3)*(2*x + 1)*log((4*sqrt(1
3)*sqrt(3*x^2 - x + 2)*(8*x - 9) - 220*x^2 + 196*x - 185)/(4*x^2
+ 4*x + 1)) + 4*sqrt(3)*(103680*x^6 - 65664*x^5 + 251424*x^4 - 11
5680*x^3 + 310660*x^2 - 322972*x - 364257)*sqrt(3*x^2 - x + 2) +
1578115*(2*x + 1)*log(-sqrt(3)*(72*x^2 - 24*x + 25) - 12*sqrt(3*x
^2 - x + 2)*(6*x - 1)))/(2*x + 1)
```

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

$$\int \frac{\left(3x^2 - x + 2\right)^{\frac{5}{2}}\left(4x^2 + 3x + 1\right)}{\left(2x + 1\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x**2-x+2)**(5/2)*(4*x**2+3*x+1)/(1+2*x)**2,x)
```

```
[Out] Integral((3*x**2 - x + 2)**(5/2)*(4*x**2 + 3*x + 1)/(2*x + 1)**2,
 x)
```

GIAC/XCAS [A] time = 0.593089, size = 1, normalized size = 0.01

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)/(2*x + 1)^2,x, algorithm="giac")

[Out] Done
```

3.225 $\int \frac{(2-x+3x^2)^{5/2}(1+3x+4x^2)}{(1+2x)^3}\,dx$

Optimal. Leaf size=161

$$-\frac{(3x^2-x+2)^{7/2}}{26(2x+1)^2}+\frac{(134x+257)(3x^2-x+2)^{5/2}}{520(2x+1)}+\frac{1}{832}(1227-838x)(3x^2-x+2)^{3/2}+\frac{(21317-10470x)\sqrt{3x^2-x+2}}{1536}-\frac{1631}{256}\sqrt{13}\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)+\frac{118423\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{3072\sqrt{3}}$$

```
[Out] ((21317 - 10470*x)*Sqrt[2 - x + 3*x^2])/1536 + ((1227 - 838*x)*(2
 - x + 3*x^2)^(3/2))/832 + ((257 + 134*x)*(2 - x + 3*x^2)^(5/2))/
(520*(1 + 2*x)) - (2 - x + 3*x^2)^(7/2)/(26*(1 + 2*x)^2) + (11842
3*ArcSinh[(1 - 6*x)/Sqrt[23]])/(3072*Sqrt[3]) - (1631*Sqrt[13]*Ar
cTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/256
```

Rubi [A] time = 0.393682, antiderivative size = 161, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$-\frac{(3x^2-x+2)^{7/2}}{26(2x+1)^2}+\frac{(134x+257)(3x^2-x+2)^{5/2}}{520(2x+1)}+\frac{1}{832}(1227-838x)(3x^2-x+2)^{3/2}+\frac{(21317-10470x)\sqrt{3x^2-x+2}}{1536}-\frac{1631}{256}\sqrt{13}\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)+\frac{118423\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{3072\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((2 - x + 3*x^2)^(5/2)*(1 + 3*x + 4*x^2))/(1 + 2*x)^3,x]
```

```
[Out] ((21317 - 10470*x)*Sqrt[2 - x + 3*x^2])/1536 + ((1227 - 838*x)*(2
 - x + 3*x^2)^(3/2))/832 + ((257 + 134*x)*(2 - x + 3*x^2)^(5/2))/
(520*(1 + 2*x)) - (2 - x + 3*x^2)^(7/2)/(26*(1 + 2*x)^2) + (11842
3*ArcSinh[(1 - 6*x)/Sqrt[23]])/(3072*Sqrt[3]) - (1631*Sqrt[13]*Ar
cTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/256
```

Rubi in Sympy [A] time = 49.0253, size = 146, normalized size = 0.91

$$\frac{(-6533280x+13301808)\sqrt{3x^2-x+2}}{958464}+\frac{(-60336x+88344)\left(3x^2-x+2\right)^{\frac{3}{2}}}{59904}-\frac{1631\sqrt{13}\,\mathrm{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{256}-\frac{118423\sqrt{3}\,\mathrm{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{9216}+\frac{(268x+514)\left(3x^2-x+2\right)^{\frac{5}{2}}}{1040\,(2x+1)}-\frac{\left(3x^2-x+2\right)^{\frac{7}{2}}}{26\,(2x+1)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((3*x**2-x+2)**(5/2)*(4*x**2+3*x+1)/(1+2*x)**3,x)
```

```
[Out] (-6533280*x + 13301808)*sqrt(3*x**2 - x + 2)/958464 + (-60336*x +
 88344)*(3*x**2 - x + 2)**(3/2)/59904 - 1631*sqrt(13)*atanh(sqrt(
13)*(-8*x + 9)/(26*sqrt(3*x**2 - x + 2)))/256 - 118423*sqrt(3)*at
anh(sqrt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/9216 + (268*x + 5
14)*(3*x**2 - x + 2)**(5/2)/(1040*(2*x + 1)) - (3*x**2 - x + 2)**
(7/2)/(26*(2*x + 1)**2)
```

Mathematica [A] time = 0.227246, size = 126, normalized size = 0.78

$$\frac{-58716\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)+\frac{6\sqrt{3x^2-x+2}\left(27648x^6-22464x^5+83616x^4-76200x^3+256564x^2+464446x+142057\right)}{5(2x+1)^2}+58716\sqrt{13}}{9216}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((2 - x + 3*x^2)^(5/2)*(1 + 3*x + 4*x^2))/(1 + 2*x)^3,x]
```

```
[Out] ((6*Sqrt[2 - x + 3*x^2]*(142057 + 464446*x + 256564*x^2 - 76200*x
^3 + 83616*x^4 - 22464*x^5 + 27648*x^6))/(5*(1 + 2*x)^2) - 118423
*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]] + 58716*Sqrt[13]*Log[1 + 2*
x] - 58716*Sqrt[13]*Log[9 - 8*x + 2*Sqrt[13]*Sqrt[2 - x + 3*x^2]]
)/9216
```

Maple [A] time = 0.018, size = 199, normalized size = 1.2

$$\frac{1631}{6760}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{\frac{5}{2}}-\frac{2514\,x-419}{2496}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{\frac{3}{2}}-\frac{10470\,x-1745}{1536}\sqrt{3\,(1/2+x)^2-4\,x+\frac{5}{4}}-\frac{118423\sqrt{3}}{9216}Arcsinh\left(\frac{6\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{1631}{1248}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{\frac{3}{2}}+\frac{1631}{256}\sqrt{12\,(1/2+x)^2-16\,x+5}-\frac{1631\sqrt{13}}{256}Artanh\left(\frac{2\sqrt{13}}{13}\left(\frac{9}{2}-4\,x\right)\frac{1}{\sqrt{12\,(1/2+x)^2-16\,x+5}}\right)-\frac{1}{104}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{\frac{7}{2}}\left(\frac{1}{2}+x\right)^{-2}+\frac{19}{338}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{\frac{7}{2}}\left(\frac{1}{2}+x\right)^{-1}-\frac{114\,x-19}{676}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((3*x^2-x+2)^(5/2)*(4*x^2+3*x+1)/(1+2*x)^3,x)
```

```
[Out] 1631/6760*(3*(1/2+x)^2-4*x+5/4)^(5/2)-419/2496*(6*x-1)*(3*(1/2+x)
^2-4*x+5/4)^(3/2)-1745/1536*(6*x-1)*(3*(1/2+x)^2-4*x+5/4)^(1/2)-1
18423/9216*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))+1631/1248*(3*(1
/2+x)^2-4*x+5/4)^(3/2)+1631/256*(12*(1/2+x)^2-16*x+5)^(1/2)-1631/
256*13^(1/2)*arctanh(2/13*(9/2-4*x)*13^(1/2)/(12*(1/2+x)^2-16*x+5
)^(1/2))-1/104/(1/2+x)^2*(3*(1/2+x)^2-4*x+5/4)^(7/2)+19/338/(1/2+
x)*(3*(1/2+x)^2-4*x+5/4)^(7/2)-19/676*(6*x-1)*(3*(1/2+x)^2-4*x+5/
4)^(5/2)
```

Maxima [A] time = 0.77833, size = 232, normalized size = 1.44

$$\frac{67}{520}\left(3\,x^2-x+2\right)^{\frac{5}{2}}-\frac{\left(3\,x^2-x+2\right)^{\frac{7}{2}}}{26\left(4\,x^2+4\,x+1\right)}-\frac{419}{416}\left(3\,x^2-x+2\right)^{\frac{3}{2}}x+\frac{1227}{832}\left(3\,x^2-x+2\right)^{\frac{3}{2}}+\frac{19\left(3\,x^2-x+2\right)^{\frac{5}{2}}}{52\left(2\,x+1\right)}-\frac{1745}{256}\sqrt{3\,x^2-x+2}x-\frac{118423}{9216}\sqrt{3}\,\mathrm{arsinh}\left(\frac{6}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{1631}{256}\sqrt{13}\,\mathrm{arsinh}\left(\frac{8\sqrt{23}x}{23\,|2\,x+1|}-\frac{9\sqrt{23}}{23\,|2\,x+1|}\right)+\frac{21317}{1536}\sqrt{3\,x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)/(2*x + 1)^3,x, algorithm="maxima
```

```
[Out] 67/520*(3*x^2 - x + 2)^(5/2) - 1/26*(3*x^2 - x + 2)^(7/2)/(4*x^2
+ 4*x + 1) - 419/416*(3*x^2 - x + 2)^(3/2)*x + 1227/832*(3*x^2 -
x + 2)^(3/2) + 19/52*(3*x^2 - x + 2)^(5/2)/(2*x + 1) - 1745/256*s
qrt(3*x^2 - x + 2)*x - 118423/9216*sqrt(3)*arcsinh(6/23*sqrt(23)*
x - 1/23*sqrt(23)) + 1631/256*sqrt(13)*arcsinh(8/23*sqrt(23)*x/ab
s(2*x + 1) - 9/23*sqrt(23)/abs(2*x + 1)) + 21317/1536*sqrt(3*x^2
- x + 2)
```

Fricas [A] time = 0.285207, size = 240, normalized size = 1.49

$$\frac{\sqrt{3}\left(97860\sqrt{13}\sqrt{3}\left(4x^2+4x+1\right)\log\left(-\frac{4\sqrt{13}\sqrt{3x^2-x+2}(8x-9)+220x^2-196x+185}{4x^2+4x+1}\right)+4\sqrt{3}\left(27648x^6-22464x^5+83616x^4-7620\right.}{921}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)/(2*x + 1)^3,x, algorithm="fricas
```

```
[Out] 1/92160*sqrt(3)*(97860*sqrt(13)*sqrt(3)*(4*x^2 + 4*x + 1)*log(-(4
*sqrt(13)*sqrt(3*x^2 - x + 2)*(8*x - 9) + 220*x^2 - 196*x + 185)/
(4*x^2 + 4*x + 1)) + 4*sqrt(3)*(27648*x^6 - 22464*x^5 + 83616*x^4
 - 76200*x^3 + 256564*x^2 + 464446*x + 142057)*sqrt(3*x^2 - x + 2
) + 592115*(4*x^2 + 4*x + 1)*log(-sqrt(3)*(72*x^2 - 24*x + 25) +
12*sqrt(3*x^2 - x + 2)*(6*x - 1)))/(4*x^2 + 4*x + 1)
```

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

$$\int \frac{\left(3x^2-x+2\right)^{\frac{5}{2}}\left(4x^2+3x+1\right)}{(2x+1)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((3*x**2-x+2)**(5/2)*(4*x**2+3*x+1)/(1+2*x)**3,x)
```

```
[Out] Integral((3*x**2 - x + 2)**(5/2)*(4*x**2 + 3*x + 1)/(2*x + 1)**3,
 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((4*x^2 + 3*x + 1)*(3*x^2 - x + 2)^(5/2)/(2*x + 1)^3,x, algorithm="giac")

[Out] Exception raised: TypeError
```

3.226 $\int \frac{(g+hx)^3\left(d+ex+fx^2\right)}{\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=693

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(96c^3\left(a^2h^2(eh+3fg)+2abh\left(h(dh+3eg)+3fg^2\right)+b^2g\left(3h(dh+eg)+fg^2\right)\right)-80bc^2h\left(3a^2fh^2+\right.\right.}{}$$

$$+\frac{\sqrt{a+bx+cx^2}\left(8c^2h^2\left(128a^2fh^2+275abh(eh+3fg)+3b^2\left(50h(dh+3eg)+129fg^2\right)\right)-2chx\left(8c^2h\left(ah(45eh+71fg)+b\right.\right.\right.}{}$$

$$+\frac{(g+hx)^2\sqrt{a+bx+cx^2}\left(-2ch(32afh+35beh+24bfg)+63b^2fh^2+c^2\left(-\left(12fg^2-20h(4dh+3eg)\right)\right)\right)}{240c^3h}$$

$$-\frac{(g+hx)^3\sqrt{a+bx+cx^2}(9bfh+2c(fg-5eh))}{40c^2h}+\frac{f(g+hx)^4\sqrt{a+bx+cx^2}}{5ch}$$

```
[Out] ((63*b^2*f*h^2 - 2*c*h*(24*b*f*g + 35*b*e*h + 32*a*f*h) - c^2*(12
*f*g^2 - 20*h*(3*e*g + 4*d*h)))*(g + h*x)^2*Sqrt[a + b*x + c*x^2]
)/(240*c^3*h) - ((9*b*f*h + 2*c*(f*g - 5*e*h))*(g + h*x)^3*Sqrt[a
 + b*x + c*x^2])/(40*c^2*h) + (f*(g + h*x)^4*Sqrt[a + b*x + c*x^2
])/(5*c*h) + ((945*b^4*f*h^4 - 64*c^4*g^2*(3*f*g^2 - 5*h*(3*e*g +
 16*d*h)) - 210*b^2*c*h^3*(14*a*f*h + 5*b*(3*f*g + e*h)) + 8*c^2*
h^2*(128*a^2*f*h^2 + 275*a*b*h*(3*f*g + e*h) + 3*b^2*(129*f*g^2 +
 50*h*(3*e*g + d*h))) - 16*c^3*h*(16*a*h*(13*f*g^2 + 5*h*(3*e*g +
 d*h)) + b*g*(39*f*g^2 + 5*h*(47*e*g + 54*d*h))) - 2*c*h*(315*b^3
*f*h^3 - 14*b*c*h^2*(39*b*f*g + 25*b*e*h + 46*a*f*h) + 16*c^3*g*(
3*f*g^2 - 5*h*(3*e*g + 10*d*h)) + 8*c^2*h*(a*h*(71*f*g + 45*e*h)
+ b*(21*f*g^2 + 80*e*g*h + 50*d*h^2))))*x)*Sqrt[a + b*x + c*x^2])/
(1920*c^5*h) + ((256*c^5*d*g^3 - 63*b^5*f*h^3 + 70*b^3*c*h^2*(3*b
*f*g + b*e*h + 4*a*f*h) - 80*b*c^2*h*(3*a^2*f*h^2 + 3*a*b*h*(3*f*
g + e*h) + b^2*(3*f*g^2 + 3*e*g*h + d*h^2)) - 128*c^4*g*(b*g*(e*g
 + 3*d*h) + a*(f*g^2 + 3*h*(e*g + d*h))) + 96*c^3*(a^2*h^2*(3*f*g
 + e*h) + b^2*g*(f*g^2 + 3*h*(e*g + d*h)) + 2*a*b*h*(3*f*g^2 + h*
(3*e*g + d*h))))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*
x^2])])/(256*c^(11/2))
```

Rubi [A] time = 5.55608, antiderivative size = 692, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.156$

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(96c^3\left(a^2h^2(eh+3fg)+2abh\left(h(dh+3eg)+3fg^2\right)+b^2g\left(3h(dh+eg)+fg^2\right)\right)-80bc^2h\left(3a^2fh^2+\right.\right.}{}$$

$$+\frac{\sqrt{a+bx+cx^2}\left(8c^2h^2\left(128a^2fh^2+275abh(eh+3fg)+3b^2\left(50h(dh+3eg)+129fg^2\right)\right)-2chx\left(8c^2h\left(ah(45eh+71fg)+1\right.\right.\right.}{}$$

$$+\frac{(g+hx)^2\sqrt{a+bx+cx^2}\left(-2ch(32afh+35beh+24bfg)+63b^2fh^2+c^2\left(-\left(12fg^2-20h(4dh+3eg)\right)\right)\right)}{240c^3h}$$

$$-\frac{(g+hx)^3\sqrt{a+bx+cx^2}(9bfh+2c(fg-5eh))}{40c^2h}+\frac{f(g+hx)^4\sqrt{a+bx+cx^2}}{5ch}$$

Antiderivative was successfully verified.

```
[In]  Int[((g + h*x)^3*(d + e*x + f*x^2))/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] ((63*b^2*f*h^2 - 2*c*h*(24*b*f*g + 35*b*e*h + 32*a*f*h) - c^2*(12
*f*g^2 - 20*h*(3*e*g + 4*d*h)))*(g + h*x)^2*Sqrt[a + b*x + c*x^2]
)/(240*c^3*h) - ((9*b*f*h + 2*c*(f*g - 5*e*h))*(g + h*x)^3*Sqrt[a
 + b*x + c*x^2])/(40*c^2*h) + (f*(g + h*x)^4*Sqrt[a + b*x + c*x^2
])/(5*c*h) + ((945*b^4*f*h^4 - 64*c^4*(3*f*g^4 - 5*g^2*h*(3*e*g +
 16*d*h)) - 210*b^2*c*h^3*(14*a*f*h + 5*b*(3*f*g + e*h)) + 8*c^2*
h^2*(128*a^2*f*h^2 + 275*a*b*h*(3*f*g + e*h) + 3*b^2*(129*f*g^2 +
 50*h*(3*e*g + d*h))) - 16*c^3*h*(16*a*h*(13*f*g^2 + 5*h*(3*e*g +
 d*h)) + b*g*(39*f*g^2 + 5*h*(47*e*g + 54*d*h))) - 2*c*h*(315*b^3
*f*h^3 - 14*b*c*h^2*(39*b*f*g + 25*b*e*h + 46*a*f*h) + 16*c^3*(3*
f*g^3 - 5*g*h*(3*e*g + 10*d*h)) + 8*c^2*h*(21*b*f*g^2 + 10*b*h*(8
*e*g + 5*d*h) + a*h*(71*f*g + 45*e*h)))*x)*Sqrt[a + b*x + c*x^2])
/(1920*c^5*h) + ((256*c^5*d*g^3 - 63*b^5*f*h^3 + 70*b^3*c*h^2*(3*
b*f*g + b*e*h + 4*a*f*h) - 128*c^4*g*(a*f*g^2 + 3*a*h*(e*g + d*h)
 + b*g*(e*g + 3*d*h)) - 80*b*c^2*h*(3*a^2*f*h^2 + 3*a*b*h*(3*f*g
+ e*h) + b^2*(3*f*g^2 + 3*e*g*h + d*h^2)) + 96*c^3*(a^2*h^2*(3*f*
g + e*h) + b^2*g*(f*g^2 + 3*h*(e*g + d*h)) + 2*a*b*h*(3*f*g^2 + h
*(3*e*g + d*h))))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c
*x^2])])/(256*c^(11/2))
```

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((h*x+g)**3*(f*x**2+e*x+d)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.78191, size = 588, normalized size = 0.85

$$\frac{2\sqrt{c}\sqrt{a+x(b+cx)}\left(4c^2h\left(256a^2fh^2+2abh(275eh+825fg+161fhx)+b^2\left(25h(12dh+36eg+7ehx)+3f\left(300g^2+175gh\right.\right.\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((g + h*x)^3*(d + e*x + f*x^2))/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] (2*Sqrt[c]*Sqrt[a + x*(b + c*x)]*(945*b^4*f*h^3 - 210*b^2*c*h^2*(
5*b*e*h + 14*a*f*h + 3*b*f*(5*g + h*x)) + 32*c^4*(10*d*h*(18*g^2
+ 9*g*h*x + 2*h^2*x^2) + 15*e*(4*g^3 + 6*g^2*h*x + 4*g*h^2*x^2 +
h^3*x^3) + 3*f*x*(10*g^3 + 20*g^2*h*x + 15*g*h^2*x^2 + 4*h^3*x^3)
) + 4*c^2*h*(256*a^2*f*h^2 + 2*a*b*h*(825*f*g + 275*e*h + 161*f*h
*x) + b^2*(25*h*(36*e*g + 12*d*h + 7*e*h*x) + 3*f*(300*g^2 + 175*
g*h*x + 42*h^2*x^2))) - 16*c^3*(a*h*(5*h*(48*e*g + 16*d*h + 9*e*h
*x) + f*(240*g^2 + 135*g*h*x + 32*h^2*x^2)) + b*(3*f*(30*g^3 + 50
*g^2*h*x + 35*g*h^2*x^2 + 9*h^3*x^3) + 5*h*(2*d*h*(27*g + 5*h*x)
+ e*(54*g^2 + 30*g*h*x + 7*h^2*x^2))))) + 15*(256*c^5*d*g^3 - 63*
b^5*f*h^3 + 70*b^3*c*h^2*(3*b*f*g + b*e*h + 4*a*f*h) - 128*c^4*g*
(a*f*g^2 + 3*a*h*(e*g + d*h) + b*g*(e*g + 3*d*h)) - 80*b*c^2*h*(3
*a^2*f*h^2 + 3*a*b*h*(3*f*g + e*h) + b^2*(3*f*g^2 + 3*e*g*h + d*h
^2)) + 96*c^3*(a^2*h^2*(3*f*g + e*h) + b^2*g*(f*g^2 + 3*h*(e*g +
d*h)) + 2*a*b*h*(3*f*g^2 + h*(3*e*g + d*h))))*Log[b + 2*c*x + 2*S
qrt[c]*Sqrt[a + x*(b + c*x)]])/(3840*c^(11/2))
```

Maple [B] time = 0.024, size = 1869, normalized size = 2.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^3*(f*x^2+e*x+d)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] 9/4*b/c^(5/2)*a*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g*h^2
*e+9/4*b/c^(5/2)*a*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g^
2*h*f+35/32*b^2/c^3*x*(c*x^2+b*x+a)^(1/2)*g*h^2*f-45/16*b^2/c^(7/
2)*a*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g*h^2*f+55/16*b/
c^3*a*(c*x^2+b*x+a)^(1/2)*g*h^2*f-9/8/c^2*a*x*(c*x^2+b*x+a)^(1/2)
*g*h^2*f-7/8*b/c^2*x^2*(c*x^2+b*x+a)^(1/2)*g*h^2*f+1/c*(c*x^2+b*x
+a)^(1/2)*g^3*e+g^3*d*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))
/c^(1/2)+35/128*b^4/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^
(1/2))*h^3*e+x^2/c*(c*x^2+b*x+a)^(1/2)*g*h^2*e-3/2*b/c^(3/2)*ln((
1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g^2*h*d+3/4*x^3/c*(c*x^2+
b*x+a)^(1/2)*g*h^2*f-5/12*b/c^2*x*(c*x^2+b*x+a)^(1/2)*h^3*d+x^2/c
*(c*x^2+b*x+a)^(1/2)*g^2*h*f+15/8*b^2/c^3*(c*x^2+b*x+a)^(1/2)*g*h
^2*e+15/8*b^2/c^3*(c*x^2+b*x+a)^(1/2)*g^2*h*f-7/24*b/c^2*x^2*(c*x
^2+b*x+a)^(1/2)*h^3*e-9/40*h^3*f*b/c^2*x^3*(c*x^2+b*x+a)^(1/2)+21
/80*h^3*f*b^2/c^3*x^2*(c*x^2+b*x+a)^(1/2)-21/64*h^3*f*b^3/c^4*x*(
c*x^2+b*x+a)^(1/2)+35/32*h^3*f*b^3/c^(9/2)*a*ln((1/2*b+c*x)/c^(1/
2)+(c*x^2+b*x+a)^(1/2))-49/32*h^3*f*b^2/c^4*a*(c*x^2+b*x+a)^(1/2)
+161/240*h^3*f*b/c^3*a*x*(c*x^2+b*x+a)^(1/2)-5/4*b/c^2*x*(c*x^2+b
*x+a)^(1/2)*g*h^2*e-5/4*b/c^2*x*(c*x^2+b*x+a)^(1/2)*g^2*h*f-35/64
*b^3/c^4*(c*x^2+b*x+a)^(1/2)*h^3*e-3/8/c^2*a*x*(c*x^2+b*x+a)^(1/2
)*h^3*e+9/8/c^(5/2)*a^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2
))*g*h^2*f-2/c^2*a*(c*x^2+b*x+a)^(1/2)*g*h^2*e-2/c^2*a*(c*x^2+b*x
+a)^(1/2)*g^2*h*f-15/16*b^3/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2
+b*x+a)^(1/2))*g*h^2*e-15/16*b^3/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(
```

```
c*x^2+b*x+a)^(1/2))*g^2*h*f+3/4*b/c^(5/2)*a*ln((1/2*b+c*x)/c^(1/2
)+(c*x^2+b*x+a)^(1/2))*h^3*d-3/2*a/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)
+(c*x^2+b*x+a)^(1/2))*g^2*h*e+3/2*x/c*(c*x^2+b*x+a)^(1/2)*g*h^2*d
+3/2*x/c*(c*x^2+b*x+a)^(1/2)*g^2*h*e-9/4*b/c^2*(c*x^2+b*x+a)^(1/2
)*g*h^2*d-9/4*b/c^2*(c*x^2+b*x+a)^(1/2)*g^2*h*e+9/8*b^2/c^(5/2)*l
n((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g*h^2*d+9/8*b^2/c^(5/2
)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g^2*h*e-3/2*a/c^(3/
2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g*h^2*d-15/16*h^3*
f*b/c^(7/2)*a^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))-4/15*
h^3*f/c^2*a*x^2*(c*x^2+b*x+a)^(1/2)+35/96*b^2/c^3*x*(c*x^2+b*x+a)
^(1/2)*h^3*e-105/64*b^3/c^4*(c*x^2+b*x+a)^(1/2)*g*h^2*f+105/128*b
^4/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g*h^2*f-15
/16*b^2/c^(7/2)*a*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*h^3
*e+55/48*b/c^3*a*(c*x^2+b*x+a)^(1/2)*h^3*e+3/8/c^(5/2)*a^2*ln((1/
2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*h^3*e+1/5*h^3*f*x^4/c*(c*x^
2+b*x+a)^(1/2)+63/128*h^3*f*b^4/c^5*(c*x^2+b*x+a)^(1/2)-63/256*h^
3*f*b^5/c^(11/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+8/15
*h^3*f/c^3*a^2*(c*x^2+b*x+a)^(1/2)+1/3*x^2/c*(c*x^2+b*x+a)^(1/2)*
h^3*d+5/8*b^2/c^3*(c*x^2+b*x+a)^(1/2)*h^3*d-5/16*b^3/c^(7/2)*ln((
1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*h^3*d-2/3/c^2*a*(c*x^2+b*
x+a)^(1/2)*h^3*d+3/c*(c*x^2+b*x+a)^(1/2)*g^2*h*d-1/2*b/c^(3/2)*ln
((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g^3*e+1/2*x/c*(c*x^2+b*
x+a)^(1/2)*g^3*f-3/4*b/c^2*(c*x^2+b*x+a)^(1/2)*g^3*f+3/8*b^2/c^(5
/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g^3*f+1/4*x^3/c*(
c*x^2+b*x+a)^(1/2)*h^3*e-1/2*a/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*
x^2+b*x+a)^(1/2))*g^3*f
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)^3/sqrt(c*x^2 + b*x + a),x, algorithm="maxima

[Out] Exception raised: ValueError
```

Fricas [A] time = 8.83215, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)^3/sqrt(c*x^2 + b*x + a),x, algorithm="fricas
```

```
[Out] [1/7680*(4*(384*c^4*f*h^3*x^4 + 480*(4*c^4*e - 3*b*c^3*f)*g^3 + 2
40*(24*c^4*d - 18*b*c^3*e + (15*b^2*c^2 - 16*a*c^3)*f)*g^2*h - 30
*(144*b*c^3*d - 8*(15*b^2*c^2 - 16*a*c^3)*e + 5*(21*b^3*c - 44*a*
b*c^2)*f)*g*h^2 + (80*(15*b^2*c^2 - 16*a*c^3)*d - 50*(21*b^3*c -
44*a*b*c^2)*e + (945*b^4 - 2940*a*b^2*c + 1024*a^2*c^2)*f)*h^3 +
48*(30*c^4*f*g*h^2 + (10*c^4*e - 9*b*c^3*f)*h^3)*x^3 + 8*(240*c^4
*f*g^2*h + 30*(8*c^4*e - 7*b*c^3*f)*g*h^2 + (80*c^4*d - 70*b*c^3*
e + (63*b^2*c^2 - 64*a*c^3)*f)*h^3)*x^2 + 2*(480*c^4*f*g^3 + 240*
(6*c^4*e - 5*b*c^3*f)*g^2*h + 30*(48*c^4*d - 40*b*c^3*e + (35*b^2
*c^2 - 36*a*c^3)*f)*g*h^2 - (400*b*c^3*d - 10*(35*b^2*c^2 - 36*a*
c^3)*e + 7*(45*b^3*c - 92*a*b*c^2)*f)*h^3)*x)*sqrt(c*x^2 + b*x +
a)*sqrt(c) - 15*(32*(8*c^5*d - 4*b*c^4*e + (3*b^2*c^3 - 4*a*c^4)*
f)*g^3 - 48*(8*b*c^4*d - 2*(3*b^2*c^3 - 4*a*c^4)*e + (5*b^3*c^2 -
 12*a*b*c^3)*f)*g^2*h + 6*(16*(3*b^2*c^3 - 4*a*c^4)*d - 8*(5*b^3*
c^2 - 12*a*b*c^3)*e + (35*b^4*c - 120*a*b^2*c^2 + 48*a^2*c^3)*f)*
g*h^2 - (16*(5*b^3*c^2 - 12*a*b*c^3)*d - 2*(35*b^4*c - 120*a*b^2*
c^2 + 48*a^2*c^3)*e + (63*b^5 - 280*a*b^3*c + 240*a^2*b*c^2)*f)*h
^3)*log(4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x + a) - (8*c^2*x^2 + 8*
b*c*x + b^2 + 4*a*c)*sqrt(c)))/c^(11/2), 1/3840*(2*(384*c^4*f*h^3
*x^4 + 480*(4*c^4*e - 3*b*c^3*f)*g^3 + 240*(24*c^4*d - 18*b*c^3*e
 + (15*b^2*c^2 - 16*a*c^3)*f)*g^2*h - 30*(144*b*c^3*d - 8*(15*b^2
*c^2 - 16*a*c^3)*e + 5*(21*b^3*c - 44*a*b*c^2)*f)*g*h^2 + (80*(15
*b^2*c^2 - 16*a*c^3)*d - 50*(21*b^3*c - 44*a*b*c^2)*e + (945*b^4
- 2940*a*b^2*c + 1024*a^2*c^2)*f)*h^3 + 48*(30*c^4*f*g*h^2 + (10*
c^4*e - 9*b*c^3*f)*h^3)*x^3 + 8*(240*c^4*f*g^2*h + 30*(8*c^4*e -
7*b*c^3*f)*g*h^2 + (80*c^4*d - 70*b*c^3*e + (63*b^2*c^2 - 64*a*c^
3)*f)*h^3)*x^2 + 2*(480*c^4*f*g^3 + 240*(6*c^4*e - 5*b*c^3*f)*g^2
*h + 30*(48*c^4*d - 40*b*c^3*e + (35*b^2*c^2 - 36*a*c^3)*f)*g*h^2
 - (400*b*c^3*d - 10*(35*b^2*c^2 - 36*a*c^3)*e + 7*(45*b^3*c - 92
*a*b*c^2)*f)*h^3)*x)*sqrt(c*x^2 + b*x + a)*sqrt(-c) + 15*(32*(8*c
^5*d - 4*b*c^4*e + (3*b^2*c^3 - 4*a*c^4)*f)*g^3 - 48*(8*b*c^4*d -
 2*(3*b^2*c^3 - 4*a*c^4)*e + (5*b^3*c^2 - 12*a*b*c^3)*f)*g^2*h +
6*(16*(3*b^2*c^3 - 4*a*c^4)*d - 8*(5*b^3*c^2 - 12*a*b*c^3)*e + (3
5*b^4*c - 120*a*b^2*c^2 + 48*a^2*c^3)*f)*g*h^2 - (16*(5*b^3*c^2 -
 12*a*b*c^3)*d - 2*(35*b^4*c - 120*a*b^2*c^2 + 48*a^2*c^3)*e + (6
3*b^5 - 280*a*b^3*c + 240*a^2*b*c^2)*f)*h^3)*arctan(1/2*(2*c*x +
b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))/(sqrt(-c)*c^5)]
```

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

$$\int \frac{(g+hx)^3\left(d+ex+fx^2\right)}{\sqrt{a+bx+cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**3*(f*x**2+e*x+d)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((g + h*x)**3*(d + e*x + f*x**2)/sqrt(a + b*x + c*x**2),
x)
```

GIAC/XCAS [A] time = 0.287262, size = 1110, normalized size = 1.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)^3/sqrt(c*x^2 + b*x + a),x, algorithm="giac")
```

```
[Out] 1/1920*sqrt(c*x^2 + b*x + a)*(2*(4*(6*(8*f*h^3*x/c + (30*c^4*f*g*
h^2 - 9*b*c^3*f*h^3 + 10*c^4*h^3*e)/c^5)*x + (240*c^4*f*g^2*h - 2
10*b*c^3*f*g*h^2 + 80*c^4*d*h^3 + 63*b^2*c^2*f*h^3 - 64*a*c^3*f*h
^3 + 240*c^4*g*h^2*e - 70*b*c^3*h^3*e)/c^5)*x + (480*c^4*f*g^3 -
1200*b*c^3*f*g^2*h + 1440*c^4*d*g*h^2 + 1050*b^2*c^2*f*g*h^2 - 10
80*a*c^3*f*g*h^2 - 400*b*c^3*d*h^3 - 315*b^3*c*f*h^3 + 644*a*b*c^
2*f*h^3 + 1440*c^4*g^2*h*e - 1200*b*c^3*g*h^2*e + 350*b^2*c^2*h^3
*e - 360*a*c^3*h^3*e)/c^5)*x - (1440*b*c^3*f*g^3 - 5760*c^4*d*g^2
*h - 3600*b^2*c^2*f*g^2*h + 3840*a*c^3*f*g^2*h + 4320*b*c^3*d*g*h
^2 + 3150*b^3*c*f*g*h^2 - 6600*a*b*c^2*f*g*h^2 - 1200*b^2*c^2*d*h
^3 + 1280*a*c^3*d*h^3 - 945*b^4*f*h^3 + 2940*a*b^2*c*f*h^3 - 1024
*a^2*c^2*f*h^3 - 1920*c^4*g^3*e + 4320*b*c^3*g^2*h*e - 3600*b^2*c
^2*g*h^2*e + 3840*a*c^3*g*h^2*e + 1050*b^3*c*h^3*e - 2200*a*b*c^2
*h^3*e)/c^5) - 1/256*(256*c^5*d*g^3 + 96*b^2*c^3*f*g^3 - 128*a*c^
4*f*g^3 - 384*b*c^4*d*g^2*h - 240*b^3*c^2*f*g^2*h + 576*a*b*c^3*f
*g^2*h + 288*b^2*c^3*d*g*h^2 - 384*a*c^4*d*g*h^2 + 210*b^4*c*f*g*
h^2 - 720*a*b^2*c^2*f*g*h^2 + 288*a^2*c^3*f*g*h^2 - 80*b^3*c^2*d*
h^3 + 192*a*b*c^3*d*h^3 - 63*b^5*f*h^3 + 280*a*b^3*c*f*h^3 - 240*
a^2*b*c^2*f*h^3 - 128*b*c^4*g^3*e + 288*b^2*c^3*g^2*h*e - 384*a*c
^4*g^2*h*e - 240*b^3*c^2*g*h^2*e + 576*a*b*c^3*g*h^2*e + 70*b^4*c
*h^3*e - 240*a*b^2*c^2*h^3*e + 96*a^2*c^3*h^3*e)*ln(abs(-2*(sqrt(
c)*x - sqrt(c*x^2 + b*x + a))*sqrt(c) - b))/c^(11/2)
```

3.227 $\int \frac{(g+hx)^2(d+ex+fx^2)}{\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=420

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(48c^2\left(a^2fh^2+2abh(eh+2fg)+b^2\left(dh^2+2egh+fg^2\right)\right)-40b^2ch(3afh+beh+2bfg)-64c^3\left(a\left(\right.\right.\right.}{128c^{9/2}}$$
$$-\frac{\sqrt{a+bx+cx^2}\left(-2chx\left(-4ch(9afh+10beh+6bfg)+35b^2fh^2-8c^2\left(fg^2-2h(3dh+2eg)\right)\right)+8c^2h\left(16ah(eh+2fg)+b\right.\right.}{192c^4h}$$
$$-\frac{(g+hx)^2\sqrt{a+bx+cx^2}(7bfh-8ceh+2cfg)}{24c^2h}+\frac{f(g+hx)^3\sqrt{a+bx+cx^2}}{4ch}$$

```
[Out] -((2*c*f*g - 8*c*e*h + 7*b*f*h)*(g + h*x)^2*Sqrt[a + b*x + c*x^2]
)/(24*c^2*h) + (f*(g + h*x)^3*Sqrt[a + b*x + c*x^2])/(4*c*h) - ((
105*b^3*f*h^3 + 32*c^3*g*(f*g^2 - 4*h*(e*g + 3*d*h)) - 20*b*c*h^2
*(11*a*f*h + 6*b*(2*f*g + e*h)) + 8*c^2*h*(16*a*h*(2*f*g + e*h) +
 b*(11*f*g^2 + 18*h*(2*e*g + d*h))) - 2*c*h*(35*b^2*f*h^2 - 4*c*h
*(6*b*f*g + 10*b*e*h + 9*a*f*h) - 8*c^2*(f*g^2 - 2*h*(2*e*g + 3*d
*h)))*x)*Sqrt[a + b*x + c*x^2])/(192*c^4*h) + ((128*c^4*d*g^2 + 3
5*b^4*f*h^2 - 40*b^2*c*h*(2*b*f*g + b*e*h + 3*a*f*h) - 64*c^3*(b*
g*(e*g + 2*d*h) + a*(f*g^2 + 2*e*g*h + d*h^2)) + 48*c^2*(a^2*f*h^
2 + 2*a*b*h*(2*f*g + e*h) + b^2*(f*g^2 + 2*e*g*h + d*h^2)))*ArcTa
nh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(128*c^(9/2))
```

Rubi [A] time = 2.38699, antiderivative size = 418, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.156$

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(48c^2\left(a^2fh^2+2abh(eh+2fg)+b^2\left(h(dh+2eg)+fg^2\right)\right)-40b^2ch(3afh+beh+2bfg)-64c^3\left(ah\right.\right.}{128c^{9/2}}$$
$$-\frac{\sqrt{a+bx+cx^2}\left(-2chx\left(-4ch(9afh+10beh+6bfg)+35b^2fh^2-8c^2\left(fg^2-2h(3dh+2eg)\right)\right)+8c^2h\left(16ah(eh+2fg)+1\right.\right.}{192c^4h}$$
$$-\frac{(g+hx)^2\sqrt{a+bx+cx^2}(7bfh-8ceh+2cfg)}{24c^2h}+\frac{f(g+hx)^3\sqrt{a+bx+cx^2}}{4ch}$$

Antiderivative was successfully verified.

```
[In]  Int[((g + h*x)^2*(d + e*x + f*x^2))/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] -((2*c*f*g - 8*c*e*h + 7*b*f*h)*(g + h*x)^2*Sqrt[a + b*x + c*x^2]
)/(24*c^2*h) + (f*(g + h*x)^3*Sqrt[a + b*x + c*x^2])/(4*c*h) - ((
105*b^3*f*h^3 + 32*c^3*(f*g^3 - 4*g*h*(e*g + 3*d*h)) - 20*b*c*h^2
*(11*a*f*h + 6*b*(2*f*g + e*h)) + 8*c^2*h*(11*b*f*g^2 + 18*b*h*(2
*e*g + d*h) + 16*a*h*(2*f*g + e*h)) - 2*c*h*(35*b^2*f*h^2 - 4*c*h
*(6*b*f*g + 10*b*e*h + 9*a*f*h) - 8*c^2*(f*g^2 - 2*h*(2*e*g + 3*d
```

```
*h)))*x)*Sqrt[a + b*x + c*x^2])/(192*c^4*h) + ((128*c^4*d*g^2 + 3
5*b^4*f*h^2 - 40*b^2*c*h*(2*b*f*g + b*e*h + 3*a*f*h) - 64*c^3*(a*
f*g^2 + a*h*(2*e*g + d*h) + b*g*(e*g + 2*d*h)) + 48*c^2*(a^2*f*h^
2 + 2*a*b*h*(2*f*g + e*h) + b^2*(f*g^2 + h*(2*e*g + d*h))))*ArcTa
nh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(128*c^(9/2))
```

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((h*x+g)**2*(f*x**2+e*x+d)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.765011, size = 341, normalized size = 0.81

$$3\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)\left(48c^2\left(a^2fh^2+2abh(eh+2fg)+b^2\left(h(dh+2eg)+fg^2\right)\right)-40b^2ch(3afh+beh+2bf$$

Antiderivative was successfully verified.

```
[In]  Integrate[((g + h*x)^2*(d + e*x + f*x^2))/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] (2*Sqrt[c]*Sqrt[a + x*(b + c*x)]*(-105*b^3*f*h^2 + 10*b*c*h*(22*a
*f*h + b*(24*f*g + 12*e*h + 7*f*h*x)) + 16*c^3*(6*d*h*(4*g + h*x)
 + 4*e*(3*g^2 + 3*g*h*x + h^2*x^2) + f*x*(6*g^2 + 8*g*h*x + 3*h^2
*x^2)) - 8*c^2*(2*b*h*(18*e*g + 9*d*h + 5*e*h*x) + a*h*(32*f*g +
16*e*h + 9*f*h*x) + b*f*(18*g^2 + 20*g*h*x + 7*h^2*x^2))) + 3*(12
8*c^4*d*g^2 + 35*b^4*f*h^2 - 40*b^2*c*h*(2*b*f*g + b*e*h + 3*a*f*
h) - 64*c^3*(a*f*g^2 + a*h*(2*e*g + d*h) + b*g*(e*g + 2*d*h)) + 4
8*c^2*(a^2*f*h^2 + 2*a*b*h*(2*f*g + e*h) + b^2*(f*g^2 + h*(2*e*g
+ d*h))))*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]])/(384*
c^(9/2))
```

Maple [B] time = 0.018, size = 1069, normalized size = 2.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^2*(f*x^2+e*x+d)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] 1/c*(c*x^2+b*x+a)^(1/2)*e*g^2+g^2*d*ln((1/2*b+c*x)/c^(1/2)+(c*x^2
+b*x+a)^(1/2))/c^(1/2)-2/3/c^2*a*(c*x^2+b*x+a)^(1/2)*h^2*e+2/c*(c
*x^2+b*x+a)^(1/2)*g*h*d-1/2*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x
^2+b*x+a)^(1/2))*e*g^2+35/128*h^2*f*b^4/c^(9/2)*ln((1/2*b+c*x)/c^
(1/2)+(c*x^2+b*x+a)^(1/2))+1/2*x/c*(c*x^2+b*x+a)^(1/2)*f*g^2-5/16
*b^3/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*h^2*e-3/
8*h^2*f/c^2*a*x*(c*x^2+b*x+a)^(1/2)-7/24*h^2*f*b/c^2*x^2*(c*x^2+b
*x+a)^(1/2)+35/96*h^2*f*b^2/c^3*x*(c*x^2+b*x+a)^(1/2)-3/4*b/c^2*(
c*x^2+b*x+a)^(1/2)*d*h^2+3/8*h^2*f/c^(5/2)*a^2*ln((1/2*b+c*x)/c^(
1/2)+(c*x^2+b*x+a)^(1/2))+1/2*x/c*(c*x^2+b*x+a)^(1/2)*d*h^2+1/3*x
^2/c*(c*x^2+b*x+a)^(1/2)*h^2*e-3/4*b/c^2*(c*x^2+b*x+a)^(1/2)*f*g^
2+3/8*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*d*h
^2+3/8*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*
g^2-1/2*a/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*d*h
^2-1/2*a/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g^
2+1/4*h^2*f*x^3/c*(c*x^2+b*x+a)^(1/2)-35/64*h^2*f*b^3/c^4*(c*x^2+
b*x+a)^(1/2)+5/8*b^2/c^3*(c*x^2+b*x+a)^(1/2)*h^2*e+x/c*(c*x^2+b*x
+a)^(1/2)*e*g*h-3/2*b/c^2*(c*x^2+b*x+a)^(1/2)*e*g*h+3/4*b^2/c^(5/
2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*g*h-a/c^(3/2)*ln
((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*g*h-15/16*h^2*f*b^2/c
^(7/2)*a*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+55/48*h^2*f*
b/c^3*a*(c*x^2+b*x+a)^(1/2)+2/3*x^2/c*(c*x^2+b*x+a)^(1/2)*g*h*f-5
/12*b/c^2*x*(c*x^2+b*x+a)^(1/2)*h^2*e-b/c^(3/2)*ln((1/2*b+c*x)/c^
(1/2)+(c*x^2+b*x+a)^(1/2))*g*h*d-5/8*b^3/c^(7/2)*ln((1/2*b+c*x)/c
^(1/2)+(c*x^2+b*x+a)^(1/2))*g*h*f+3/4*b/c^(5/2)*a*ln((1/2*b+c*x)/
c^(1/2)+(c*x^2+b*x+a)^(1/2))*h^2*e-4/3/c^2*a*(c*x^2+b*x+a)^(1/2)*
g*h*f+5/4*b^2/c^3*(c*x^2+b*x+a)^(1/2)*g*h*f-5/6*b/c^2*x*(c*x^2+b*
x+a)^(1/2)*g*h*f+3/2*b/c^(5/2)*a*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*
x+a)^(1/2))*g*h*f
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)^2/sqrt(c*x^2 + b*x + a),x, algorithm="maxima
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 6.78201, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(h*x + g)^2/sqrt(c*x^2 + b*x + a),x, algorithm="fricas
```

```
[Out] [1/768*(4*(48*c^3*f*h^2*x^3 + 48*(4*c^3*e - 3*b*c^2*f)*g^2 + 16*(
24*c^3*d - 18*b*c^2*e + (15*b^2*c - 16*a*c^2)*f)*g*h - (144*b*c^2
*d - 8*(15*b^2*c - 16*a*c^2)*e + 5*(21*b^3 - 44*a*b*c)*f)*h^2 + 8
*(16*c^3*f*g*h + (8*c^3*e - 7*b*c^2*f)*h^2)*x^2 + 2*(48*c^3*f*g^2
 + 16*(6*c^3*e - 5*b*c^2*f)*g*h + (48*c^3*d - 40*b*c^2*e + (35*b^
2*c - 36*a*c^2)*f)*h^2)*x)*sqrt(c*x^2 + b*x + a)*sqrt(c) + 3*(16*
(8*c^4*d - 4*b*c^3*e + (3*b^2*c^2 - 4*a*c^3)*f)*g^2 - 16*(8*b*c^3
*d - 2*(3*b^2*c^2 - 4*a*c^3)*e + (5*b^3*c - 12*a*b*c^2)*f)*g*h +
(16*(3*b^2*c^2 - 4*a*c^3)*d - 8*(5*b^3*c - 12*a*b*c^2)*e + (35*b^
4 - 120*a*b^2*c + 48*a^2*c^2)*f)*h^2)*log(-4*(2*c^2*x + b*c)*sqrt
(c*x^2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))
/c^(9/2), 1/384*(2*(48*c^3*f*h^2*x^3 + 48*(4*c^3*e - 3*b*c^2*f)*g
^2 + 16*(24*c^3*d - 18*b*c^2*e + (15*b^2*c - 16*a*c^2)*f)*g*h - (
144*b*c^2*d - 8*(15*b^2*c - 16*a*c^2)*e + 5*(21*b^3 - 44*a*b*c)*f
)*h^2 + 8*(16*c^3*f*g*h + (8*c^3*e - 7*b*c^2*f)*h^2)*x^2 + 2*(48*
c^3*f*g^2 + 16*(6*c^3*e - 5*b*c^2*f)*g*h + (48*c^3*d - 40*b*c^2*e
 + (35*b^2*c - 36*a*c^2)*f)*h^2)*x)*sqrt(c*x^2 + b*x + a)*sqrt(-c
) + 3*(16*(8*c^4*d - 4*b*c^3*e + (3*b^2*c^2 - 4*a*c^3)*f)*g^2 - 1
6*(8*b*c^3*d - 2*(3*b^2*c^2 - 4*a*c^3)*e + (5*b^3*c - 12*a*b*c^2)
*f)*g*h + (16*(3*b^2*c^2 - 4*a*c^3)*d - 8*(5*b^3*c - 12*a*b*c^2)*
e + (35*b^4 - 120*a*b^2*c + 48*a^2*c^2)*f)*h^2)*arctan(1/2*(2*c*x
 + b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))/(sqrt(-c)*c^4)]
```

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

$$\int \frac{(g+hx)^2\left(d+ex+fx^2\right)}{\sqrt{a+bx+cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**2*(f*x**2+e*x+d)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((g + h*x)**2*(d + e*x + f*x**2)/sqrt(a + b*x + c*x**2),
x)
```

GIAC/XCAS [A] time = 0.286879, size = 617, normalized size = 1.47

$$\frac{1}{192}\sqrt{cx^2+bx+a}\left(2\left(4\left(\frac{6fh^2x}{c}+\frac{16c^3fgh-7bc^2fh^2+8c^3h^2e}{c^4}\right)x+\frac{48c^3fg^2-80bc^2fgh+48c^3dh^2+35b^2cfh^2-36a}{c^4}\right.\right.$$

$$-\frac{\left(128c^4dg^2+48b^2c^2fg^2-64ac^3fg^2-128bc^3dgh-80b^3cfgh+192abc^2fgh+48b^2c^2dh^2-64ac^3dh^2+35b^4fh^2-12\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)^2/sqrt(c*x^2 + b*x + a),x, algorithm="giac")
```

```
[Out] 1/192*sqrt(c*x^2 + b*x + a)*(2*(4*(6*f*h^2*x/c + (16*c^3*f*g*h -
7*b*c^2*f*h^2 + 8*c^3*h^2*e)/c^4)*x + (48*c^3*f*g^2 - 80*b*c^2*f*
g*h + 48*c^3*d*h^2 + 35*b^2*c*f*h^2 - 36*a*c^2*f*h^2 + 96*c^3*g*h
*e - 40*b*c^2*h^2*e)/c^4)*x - (144*b*c^2*f*g^2 - 384*c^3*d*g*h -
240*b^2*c*f*g*h + 256*a*c^2*f*g*h + 144*b*c^2*d*h^2 + 105*b^3*f*h
^2 - 220*a*b*c*f*h^2 - 192*c^3*g^2*e + 288*b*c^2*g*h*e - 120*b^2*
c*h^2*e + 128*a*c^2*h^2*e)/c^4) - 1/128*(128*c^4*d*g^2 + 48*b^2*c
^2*f*g^2 - 64*a*c^3*f*g^2 - 128*b*c^3*d*g*h - 80*b^3*c*f*g*h + 19
2*a*b*c^2*f*g*h + 48*b^2*c^2*d*h^2 - 64*a*c^3*d*h^2 + 35*b^4*f*h^
2 - 120*a*b^2*c*f*h^2 + 48*a^2*c^2*f*h^2 - 64*b*c^3*g^2*e + 96*b^
2*c^2*g*h*e - 128*a*c^3*g*h*e - 40*b^3*c*h^2*e + 96*a*b*c^2*h^2*e
)*ln(abs(-2*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))*sqrt(c) - b))/c^(
9/2)
```

3.228 $\int \frac{(g+hx)(d+ex+fx^2)}{\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=223

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-8c^2(aeh+afg+bdh+beg)+6bc(2afh+beh+bfg)-5b^3fh+16c^3dg\right)}{16c^{7/2}}+\frac{\sqrt{a+bx+cx^2}\left(-2ch(8afh+9b(eh+fg))+15b^2fh^2-2chx(5bfh-6ceh+2cfg)-8c^2\left(fg^2-3h(dh+eg)\right)\right)}{24c^3h}+\frac{f(g+hx)^2\sqrt{a+bx+cx^2}}{3ch}$$

```
[Out] (f*(g + h*x)^2*Sqrt[a + b*x + c*x^2])/(3*c*h) + ((15*b^2*f*h^2 -
8*c^2*(f*g^2 - 3*h*(e*g + d*h)) - 2*c*h*(8*a*f*h + 9*b*(f*g + e*h
)) - 2*c*h*(2*c*f*g - 6*c*e*h + 5*b*f*h)*x)*Sqrt[a + b*x + c*x^2]
)/(24*c^3*h) + ((16*c^3*d*g - 5*b^3*f*h - 8*c^2*(b*e*g + a*f*g +
b*d*h + a*e*h) + 6*b*c*(b*f*g + b*e*h + 2*a*f*h))*ArcTanh[(b + 2*
c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(16*c^(7/2))
```

Rubi [A] time = 0.67103, antiderivative size = 223, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-8c^2(aeh+afg+bdh+beg)+6bc(2afh+beh+bfg)-5b^3fh+16c^3dg\right)}{16c^{7/2}}+\frac{\sqrt{a+bx+cx^2}\left(-2ch(8afh+9b(eh+fg))+15b^2fh^2-2chx(5bfh-6ceh+2cfg)-8c^2\left(fg^2-3h(dh+eg)\right)\right)}{24c^3h}+\frac{f(g+hx)^2\sqrt{a+bx+cx^2}}{3ch}$$

Antiderivative was successfully verified.

```
[In]  Int[((g + h*x)*(d + e*x + f*x^2))/Sqrt[a + b*x + c*x^2],x]
```


```
[Out] (f*(g + h*x)^2*Sqrt[a + b*x + c*x^2])/(3*c*h) + ((15*b^2*f*h^2 -
8*c^2*(f*g^2 - 3*h*(e*g + d*h)) - 2*c*h*(8*a*f*h + 9*b*(f*g + e*h
)) - 2*c*h*(2*c*f*g - 6*c*e*h + 5*b*f*h)*x)*Sqrt[a + b*x + c*x^2]
)/(24*c^3*h) + ((16*c^3*d*g - 5*b^3*f*h - 8*c^2*(b*e*g + a*f*g +
b*d*h + a*e*h) + 6*b*c*(b*f*g + b*e*h + 2*a*f*h))*ArcTanh[(b + 2*
c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(16*c^(7/2))
```

Rubi in Sympy [A] time = 88.9334, size = 274, normalized size = 1.23

$$\frac{f(g+hx)^2\sqrt{a+bx+cx^2}}{3ch}+\frac{\sqrt{a+bx+cx^2}\left(-4acfh^2+\frac{15b^2fh^2}{4}-\frac{9bceh^2}{2}-\frac{9bcfgh}{2}+6c^2dh^2+6c^2egh-2c^2fg^2-\frac{chx(5bfh-6ceh+2cfg)}{2}\right)}{6c^3h}-\frac{\left(-12abcfh+8ac^2eh+8ac^2fg+5b^3fh-6b^2ceh-6b^2cfg+8bc^2dh+8bc^2eg-16c^3dg\right)\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{16c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)*(f*x**2+e*x+d)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] f*(g + h*x)**2*sqrt(a + b*x + c*x**2)/(3*c*h) + sqrt(a + b*x + c*
x**2)*(-4*a*c*f*h**2 + 15*b**2*f*h**2/4 - 9*b*c*e*h**2/2 - 9*b*c*
f*g*h/2 + 6*c**2*d*h**2 + 6*c**2*e*g*h - 2*c**2*f*g**2 - c*h*x*(5
*b*f*h - 6*c*e*h + 2*c*f*g)/2)/(6*c**3*h) - (-12*a*b*c*f*h + 8*a*
c**2*e*h + 8*a*c**2*f*g + 5*b**3*f*h - 6*b**2*c*e*h - 6*b**2*c*f*
g + 8*b*c**2*d*h + 8*b*c**2*e*g - 16*c**3*d*g)*atanh((b + 2*c*x)/
(2*sqrt(c)*sqrt(a + b*x + c*x**2)))/(16*c**(7/2))
```

Mathematica [A] time = 0.344653, size = 178, normalized size = 0.8

$$\frac{3\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)\left(-8c^2(aeh+afg+bdh+beg)+6bc(2afh+beh+bfg)-5b^3fh+16c^3dg\right)+2\sqrt{c}\sqrt{a}}{48c^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((g + h*x)*(d + e*x + f*x^2))/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] (2*Sqrt[c]*Sqrt[a + x*(b + c*x)]*(15*b^2*f*h + 4*c^2*(6*e*g + 6*d
*h + 3*f*g*x + 3*e*h*x + 2*f*h*x^2) - 2*c*(8*a*f*h + b*(9*f*g + 9
*e*h + 5*f*h*x))) + 3*(16*c^3*d*g - 5*b^3*f*h - 8*c^2*(b*e*g + a*
f*g + b*d*h + a*e*h) + 6*b*c*(b*f*g + b*e*h + 2*a*f*h))*Log[b + 2
*c*x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]])/(48*c^(7/2))
```

Maple [B] time = 0.013, size = 505, normalized size = 2.3

$$dg\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)\frac{1}{\sqrt{c}}+\frac{dh}{c}\sqrt{cx^2+bx+a}+\frac{eg}{c}\sqrt{cx^2+bx+a}-\frac{bdh}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}-\frac{beg}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}+\frac{ehx}{2c}\sqrt{cx^2+bx+a}+\frac{fgx}{2c}\sqrt{cx^2+bx+a}-\frac{3beh}{4c^2}\sqrt{cx^2+bx+a}-\frac{3bfg}{4c^2}\sqrt{cx^2+bx+a}+\frac{3b^2eh}{8}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{5}{2}}+\frac{3b^2fg}{8}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{5}{2}}-\frac{aeh}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}-\frac{afg}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}+\frac{fhx^2}{3c}\sqrt{cx^2+bx+a}-\frac{5bfhx}{12c^2}\sqrt{cx^2+bx+a}+\frac{5hfb^2}{8c^3}\sqrt{cx^2+bx+a}-\frac{5b^3fh}{16}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{7}{2}}+\frac{3abfh}{4}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{5}{2}}-\frac{2afh}{3c^2}\sqrt{cx^2+bx+a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)*(f*x^2+e*x+d)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] d*g*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))/c^(1/2)+1/c*(c*x^
2+b*x+a)^(1/2)*d*h+e*g/c*(c*x^2+b*x+a)^(1/2)-1/2*b/c^(3/2)*ln((1/
2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*d*h-1/2*e*g*b/c^(3/2)*ln((1
/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+1/2*x/c*(c*x^2+b*x+a)^(1/2
)*e*h+1/2*x/c*(c*x^2+b*x+a)^(1/2)*f*g-3/4*b/c^2*(c*x^2+b*x+a)^(1/
2)*e*h-3/4*b/c^2*(c*x^2+b*x+a)^(1/2)*f*g+3/8*b^2/c^(5/2)*ln((1/2*
b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*h+3/8*b^2/c^(5/2)*ln((1/2*b
+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g-1/2*a/c^(3/2)*ln((1/2*b+c*
x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*h-1/2*a/c^(3/2)*ln((1/2*b+c*x)/
c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g+1/3*h*f*x^2/c*(c*x^2+b*x+a)^(1/2
)-5/12*h*f*b/c^2*x*(c*x^2+b*x+a)^(1/2)+5/8*h*f*b^2/c^3*(c*x^2+b*x
+a)^(1/2)-5/16*h*f*b^3/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+
a)^(1/2))+3/4*h*f*b/c^(5/2)*a*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a
)^(1/2))-2/3*h*f/c^2*a*(c*x^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((f*x^2 + e*x + d)*(h*x + g)/sqrt(c*x^2 + b*x + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 5.22841, size = 1, normalized size = 0.

$$\left[\frac{4\left(8\,c^2fhx^2+6\left(4\,c^2e-3\,bcf\right)g+\left(24\,c^2d-18\,bce+\left(15\,b^2-16\,ac\right)f\right)h+2\left(6\,c^2fg+\left(6\,c^2e-5\,bcf\right)h\right)x\right)\sqrt{cx^2+bx+a}}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)/sqrt(c*x^2 + b*x + a),x, algorithm="fricas")
```

```
[Out] [1/96*(4*(8*c^2*f*h*x^2 + 6*(4*c^2*e - 3*b*c*f)*g + (24*c^2*d - 1
8*b*c*e + (15*b^2 - 16*a*c)*f)*h + 2*(6*c^2*f*g + (6*c^2*e - 5*b*
c*f)*h)*x)*sqrt(c*x^2 + b*x + a)*sqrt(c) + 3*(2*(8*c^3*d - 4*b*c^
2*e + (3*b^2*c - 4*a*c^2)*f)*g - (8*b*c^2*d - 2*(3*b^2*c - 4*a*c^
2)*e + (5*b^3 - 12*a*b*c)*f)*h)*log(-4*(2*c^2*x + b*c)*sqrt(c*x^2
 + b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))/c^(7/
2), 1/48*(2*(8*c^2*f*h*x^2 + 6*(4*c^2*e - 3*b*c*f)*g + (24*c^2*d
- 18*b*c*e + (15*b^2 - 16*a*c)*f)*h + 2*(6*c^2*f*g + (6*c^2*e - 5
*b*c*f)*h)*x)*sqrt(c*x^2 + b*x + a)*sqrt(-c) + 3*(2*(8*c^3*d - 4*
b*c^2*e + (3*b^2*c - 4*a*c^2)*f)*g - (8*b*c^2*d - 2*(3*b^2*c - 4*
a*c^2)*e + (5*b^3 - 12*a*b*c)*f)*h)*arctan(1/2*(2*c*x + b)*sqrt(-
c)/(sqrt(c*x^2 + b*x + a)*c)))/(sqrt(-c)*c^3)]
```

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

$$\int \frac{(g+hx)\left(d+ex+fx^2\right)}{\sqrt{a+bx+cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x+g)*(f*x**2+e*x+d)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((g + h*x)*(d + e*x + f*x**2)/sqrt(a + b*x + c*x**2), x)
```

GIAC/XCAS [A] time = 0.281421, size = 284, normalized size = 1.27

$$\frac{1}{24}\sqrt{cx^2+bx+a}\left(2\left(\frac{4\,fhx}{c}+\frac{6\,c^2fg-5\,bcfh+6\,c^2he}{c^3}\right)x-\frac{18\,bcfg-24\,c^2dh-15\,b^2fh+16\,acfh-24\,c^2ge+18\,bche}{c^3}\right)$$
$$-\frac{\left(16\,c^3dg+6\,b^2cfg-8\,ac^2fg-8\,bc^2dh-5\,b^3fh+12\,abcfh-8\,bc^2ge+6\,b^2che-8\,ac^2he\right)\ln\left(\left|-2\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right.\right.\right.}{16\,c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(h*x + g)/sqrt(c*x^2 + b*x + a),x, algorithm="giac")
```

```
[Out] 1/24*sqrt(c*x^2 + b*x + a)*(2*(4*f*h*x/c + (6*c^2*f*g - 5*b*c*f*h
 + 6*c^2*h*e)/c^3)*x - (18*b*c*f*g - 24*c^2*d*h - 15*b^2*f*h + 16
*a*c*f*h - 24*c^2*g*e + 18*b*c*h*e)/c^3) - 1/16*(16*c^3*d*g + 6*b
^2*c*f*g - 8*a*c^2*f*g - 8*b*c^2*d*h - 5*b^3*f*h + 12*a*b*c*f*h -
 8*b*c^2*g*e + 6*b^2*c*h*e - 8*a*c^2*h*e)*ln(abs(-2*(sqrt(c)*x -
sqrt(c*x^2 + b*x + a))*sqrt(c) - b))/c^(7/2)
```

3.229 $\int \frac{d+ex+fx^2}{\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=116

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-4c(af+be)+3b^2f+8c^2d\right)}{8c^{5/2}}+\frac{\sqrt{a+bx+cx^2}(4ce-3bf)}{4c^2}+\frac{fx\sqrt{a+bx+cx^2}}{2c}$$

```
[Out] ((4*c*e - 3*b*f)*Sqrt[a + b*x + c*x^2])/(4*c^2) + (f*x*Sqrt[a + b
*x + c*x^2])/(2*c) + ((8*c^2*d + 3*b^2*f - 4*c*(b*e + a*f))*ArcTa
nh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(8*c^(5/2))
```

Rubi [A] time = 0.212699, antiderivative size = 116, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.16

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-4c(af+be)+3b^2f+8c^2d\right)}{8c^{5/2}}+\frac{\sqrt{a+bx+cx^2}(4ce-3bf)}{4c^2}+\frac{fx\sqrt{a+bx+cx^2}}{2c}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] ((4*c*e - 3*b*f)*Sqrt[a + b*x + c*x^2])/(4*c^2) + (f*x*Sqrt[a + b
*x + c*x^2])/(2*c) + ((8*c^2*d + 3*b^2*f - 4*c*(b*e + a*f))*ArcTa
nh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(8*c^(5/2))
```

Rubi in Sympy [A] time = 15.33, size = 97, normalized size = 0.84

$$-\frac{\sqrt{a+bx+cx^2}\left(\frac{3bf}{2}-2ce-cfx\right)}{2c^2}+\frac{\left(-4acf+3b^2f-4bce+8c^2d\right)\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{8c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] -sqrt(a + b*x + c*x**2)*(3*b*f/2 - 2*c*e - c*f*x)/(2*c**2) + (-4*
a*c*f + 3*b**2*f - 4*b*c*e + 8*c**2*d)*atanh((b + 2*c*x)/(2*sqrt(
c)*sqrt(a + b*x + c*x**2)))/(8*c**(5/2))
```

Mathematica [A] time = 0.145283, size = 95, normalized size = 0.82

$$\frac{\log \left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)\left(-4c(af+be)+3b^2f+8c^2d\right)+2\sqrt{c}\sqrt{a+x(b+cx)}(-3bf+4ce+2cfx)}{8c^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] (2*Sqrt[c]*(4*c*e - 3*b*f + 2*c*f*x)*Sqrt[a + x*(b + c*x)] + (8*c
^2*d + 3*b^2*f - 4*c*(b*e + a*f))*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[
a + x*(b + c*x)]])/(8*c^(5/2))
```

Maple [A] time = 0., size = 185, normalized size = 1.6

$$d\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)\frac{1}{\sqrt{c}}+\frac{e}{c}\sqrt{cx^2+bx+a}$$
$$-\frac{be}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}+\frac{fx}{2c}\sqrt{cx^2+bx+a}-\frac{3bf}{4c^2}\sqrt{cx^2+bx+a}$$
$$+\frac{3b^2f}{8}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{5}{2}}-\frac{fa}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] d*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))/c^(1/2)+e/c*(c*x^2+
b*x+a)^(1/2)-1/2*e*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)
^(1/2))+1/2*f*x*(c*x^2+b*x+a)^(1/2)/c-3/4*f*b/c^2*(c*x^2+b*x+a)^(
1/2)+3/8*f*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2)
)-1/2*f*a/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^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((f*x^2 + e*x + d)/sqrt(c*x^2 + b*x + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.517795, size = 1, normalized size = 0.01

$$\left[\frac{4\,(2\,cfx + 4\,ce - 3\,bf)\sqrt{cx^2 + bx + a}\sqrt{c} - \left(8\,c^2d - 4\,bce + \left(3\,b^2 - 4\,ac\right)f\right)\log\left(4\,\left(2\,c^2x + bc\right)\sqrt{cx^2 + bx + a} - \left(8\,c^2x^2 + 8\,b\right.\right.}{16\,c^{\frac{5}{2}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/sqrt(c*x^2 + b*x + a),x, algorithm="fricas")
```

```
[Out] [1/16*(4*(2*c*f*x + 4*c*e - 3*b*f)*sqrt(c*x^2 + b*x + a)*sqrt(c)
- (8*c^2*d - 4*b*c*e + (3*b^2 - 4*a*c)*f)*log(4*(2*c^2*x + b*c)*s
qrt(c*x^2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c
)))/c^(5/2), 1/8*(2*(2*c*f*x + 4*c*e - 3*b*f)*sqrt(c*x^2 + b*x +
a)*sqrt(-c) + (8*c^2*d - 4*b*c*e + (3*b^2 - 4*a*c)*f)*arctan(1/2*
(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))/(sqrt(-c)*c^2)]
```

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

$$\int \frac{d + ex + fx^2}{\sqrt{a + bx + cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2)/sqrt(a + b*x + c*x**2), x)
```

GIAC/XCAS [A] time = 0.279947, size = 132, normalized size = 1.14

$$\frac{1}{4}\sqrt{cx^2 + bx + a}\left(\frac{2\,fx}{c} - \frac{3\,bf - 4\,ce}{c^2}\right) - \frac{\left(8\,c^2d + 3\,b^2f - 4\,acf - 4\,bce\right)\ln\left(\left|-2\left(\sqrt{c}x - \sqrt{cx^2 + bx + a}\right)\sqrt{c} - b\right|\right)}{8\,c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)/sqrt(c*x^2 + b*x + a),x, algorithm="giac")
```

```
[Out] 1/4*sqrt(c*x^2 + b*x + a)*(2*f*x/c - (3*b*f - 4*c*e)/c^2) - 1/8*(
8*c^2*d + 3*b^2*f - 4*a*c*f - 4*b*c*e)*ln(abs(-2*(sqrt(c)*x - sqr
t(c*x^2 + b*x + a))*sqrt(c) - b))/c^(5/2)
```

3.230 $\int \frac{d+ex+fx^2}{(g+hx)\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=179

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)(bfh-2ceh+2cfg)}{2c^{3/2}h^2}+\frac{\left(fg^2-h(eg-dh)\right)\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)}{h^2\sqrt{ah^2-bgh+cg^2}}+\frac{f\sqrt{a+bx+cx^2}}{ch}$$

```
[Out] (f*Sqrt[a + b*x + c*x^2])/(c*h) - ((2*c*f*g - 2*c*e*h + b*f*h)*Ar
cTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(2*c^(3/2)*
h^2) + ((f*g^2 - h*(e*g - d*h))*ArcTanh[(b*g - 2*a*h + (2*c*g - b
*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(h
^2*Sqrt[c*g^2 - b*g*h + a*h^2])
```

Rubi [A] time = 0.588803, antiderivative size = 179, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.156

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)(bfh-2ceh+2cfg)}{2c^{3/2}h^2}+\frac{\left(fg^2-h(eg-dh)\right)\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)}{h^2\sqrt{ah^2-bgh+cg^2}}+\frac{f\sqrt{a+bx+cx^2}}{ch}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/((g + h*x)*Sqrt[a + b*x + c*x^2]),x]
```


```
[Out] (f*Sqrt[a + b*x + c*x^2])/(c*h) - ((2*c*f*g - 2*c*e*h + b*f*h)*Ar
cTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(2*c^(3/2)*
h^2) + ((f*g^2 - h*(e*g - d*h))*ArcTanh[(b*g - 2*a*h + (2*c*g - b
*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(h
^2*Sqrt[c*g^2 - b*g*h + a*h^2])
```

Rubi in Sympy [A] time = 84.39, size = 163, normalized size = 0.91

$$-\frac{\left(dh^2-egh+fg^2\right)\operatorname{atanh}\left(\frac{2ah-bg+x(bh-2cg)}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)}{h^2\sqrt{ah^2-bgh+cg^2}}+\frac{f\sqrt{a+bx+cx^2}}{ch}-\frac{\left(\frac{bfh}{2}-ceh+cfg\right)\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{c^{\frac{3}{2}}h^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)/(h*x+g)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] -(d*h**2 - e*g*h + f*g**2)*atanh((2*a*h - b*g + x*(b*h - 2*c*g))/
(2*sqrt(a + b*x + c*x**2)*sqrt(a*h**2 - b*g*h + c*g**2)))/(h**2*s
qrt(a*h**2 - b*g*h + c*g**2)) + f*sqrt(a + b*x + c*x**2)/(c*h) -
(b*f*h/2 - c*e*h + c*f*g)*atanh((b + 2*c*x)/(2*sqrt(c)*sqrt(a + b
*x + c*x**2)))/(c**(3/2)*h**2)
```

Mathematica [A] time = 0.381021, size = 213, normalized size = 1.19

$$\frac{-\frac{\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)(bfh-2ceh+2cfg)}{c^{3/2}}-\frac{2\left(h(dh-eg)+fg^2\right)\log\left(2\sqrt{a+x(b+cx)}\sqrt{ah^2-bgh+cg^2}+2ah-bg+bhx-2cgx\right)}{\sqrt{h(ah-bg)+cg^2}}+\frac{2\log(g+hx)(h(dh-eg}{\sqrt{h(ah-bg)+cg}}}{2h^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/((g + h*x)*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] ((2*f*h*Sqrt[a + x*(b + c*x)])/c + (2*(f*g^2 + h*(-(e*g) + d*h))*
Log[g + h*x])/Sqrt[c*g^2 + h*(-(b*g) + a*h)] - ((2*c*f*g - 2*c*e*
h + b*f*h)*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]])/c^(3
/2) - (2*(f*g^2 + h*(-(e*g) + d*h))*Log[-(b*g) + 2*a*h - 2*c*g*x
+ b*h*x + 2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + x*(b + c*x)]])/S
qrt[c*g^2 + h*(-(b*g) + a*h)])/(2*h^2)
```

Maple [B] time = 0.021, size = 599, normalized size = 3.4

$$\frac{e}{h}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)\frac{1}{\sqrt{c}}+\frac{f}{ch}\sqrt{cx^{2}+bx+a}$$
$$-\frac{bf}{2h}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)c^{-\frac{3}{2}}-\frac{fg}{h^{2}}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)\frac{1}{\sqrt{c}}$$
$$-\frac{d}{h}\ln\left(1\left(2\frac{ah^{2}-bgh+cg^{2}}{h^{2}}+\frac{bh-2cg}{h}\left(x+\frac{g}{h}\right)+2\sqrt{\frac{ah^{2}-bgh+cg^{2}}{h^{2}}}\sqrt{\left(x+\frac{g}{h}\right)^{2}c+\frac{bh-2cg}{h}\left(x+\frac{g}{h}\right)+\frac{ah^{2}-bgh+c}{h^{2}}}\right.\right.$$
$$+\frac{eg}{h^{2}}\ln\left(1\left(2\frac{ah^{2}-bgh+cg^{2}}{h^{2}}+\frac{bh-2cg}{h}\left(x+\frac{g}{h}\right)+2\sqrt{\frac{ah^{2}-bgh+cg^{2}}{h^{2}}}\sqrt{\left(x+\frac{g}{h}\right)^{2}c+\frac{bh-2cg}{h}\left(x+\frac{g}{h}\right)+\frac{ah^{2}-bgh+}{h^{2}}}\right.\right.$$
$$-\frac{fg^{2}}{h^{3}}\ln\left(1\left(2\frac{ah^{2}-bgh+cg^{2}}{h^{2}}+\frac{bh-2cg}{h}\left(x+\frac{g}{h}\right)+2\sqrt{\frac{ah^{2}-bgh+cg^{2}}{h^{2}}}\sqrt{\left(x+\frac{g}{h}\right)^{2}c+\frac{bh-2cg}{h}\left(x+\frac{g}{h}\right)+\frac{ah^{2}-bgh}{h^{2}}}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(h*x+g)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] 1/h*e*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))/c^(1/2)+f*(c*x^
2+b*x+a)^(1/2)/c/h-1/2/h*f*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^
2+b*x+a)^(1/2))-1/h^2*f*g*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1
/2))/c^(1/2)-1/h/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g
*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)
^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)
/h^2)^(1/2))/(x+1/h*g))*d+1/h^2/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*l
n((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*
g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h
^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*e*g-1/h^3/((a*h^2-b*g*h+c*
g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/
h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)
/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*f*g^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((f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*(h*x + g)),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((f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*(h*x + g)),x, algorithm="fricas
```

```
[Out] Timed out
```

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

$$\int \frac{d + ex + fx^2}{(g + hx)\sqrt{a + bx + cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)/(h*x+g)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2)/((g + h*x)*sqrt(a + b*x + c*x**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((f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*(h*x + g)),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.231 $\int \frac{d+ex+fx^2}{(g+hx)^2\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=241

$$-\frac{\sqrt{a+bx+cx^2}\left(fg^2-h(eg-dh)\right)}{h(g+hx)\left(ah^2-bgh+cg^2\right)}-\frac{\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(h\left(2ah(2fg-eh)-b\left(-dh^2-egh+3fg^2\right)\right)+2c\left(fg^3-dgh^2\right)\right)}{2h^2\left(ah^2-bgh+cg^2\right)^{3/2}}+\frac{f\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{\sqrt{c}h^2}$$

```
[Out] -(((f*g^2 - h*(e*g - d*h))*Sqrt[a + b*x + c*x^2])/(h*(c*g^2 - b*g
*h + a*h^2)*(g + h*x))) + (f*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[
a + b*x + c*x^2])])/(Sqrt[c]*h^2) - ((2*c*(f*g^3 - d*g*h^2) + h*(
2*a*h*(2*f*g - e*h) - b*(3*f*g^2 - e*g*h - d*h^2)))*ArcTanh[(b*g
- 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a
+ b*x + c*x^2])])/(2*h^2*(c*g^2 - b*g*h + a*h^2)^(3/2))
```

Rubi [A] time = 0.878499, antiderivative size = 239, normalized size of antiderivative = 0.99, number of steps used = 6, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.156

$$-\frac{\sqrt{a+bx+cx^2}\left(fg^2-h(eg-dh)\right)}{h(g+hx)\left(ah^2-bgh+cg^2\right)}-\frac{\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(2c\left(fg^3-dgh^2\right)-h\left(-2ah(2fg-eh)-bh(dh+eg)+3bfg^2\right)\right)}{2h^2\left(ah^2-bgh+cg^2\right)^{3/2}}+\frac{f\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{\sqrt{c}h^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/((g + h*x)^2*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] -(((f*g^2 - h*(e*g - d*h))*Sqrt[a + b*x + c*x^2])/(h*(c*g^2 - b*g
*h + a*h^2)*(g + h*x))) + (f*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[
a + b*x + c*x^2])])/(Sqrt[c]*h^2) - ((2*c*(f*g^3 - d*g*h^2) - h*(
3*b*f*g^2 - b*h*(e*g + d*h) - 2*a*h*(2*f*g - e*h)))*ArcTanh[(b*g
- 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a
+ b*x + c*x^2])])/(2*h^2*(c*g^2 - b*g*h + a*h^2)^(3/2))
```

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((f*x**2+e*x+d)/(h*x+g)**2/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.1208, size = 301, normalized size = 1.25

$$\frac{-\frac{2h\sqrt{a+x(b+cx)}\left(h(dh-eg)+fg^2\right)}{(g+hx)(h(ah-bg)+cg^2)}-\frac{\log(g+hx)\left(h\left(-2ah(eh-2fg)+bh(dh+eg)-3bfg^2\right)+2c\left(fg^3-dgh^2\right)\right)}{(h(ah-bg)+cg^2)^{3/2}}+\frac{\log\left(2\sqrt{a+x(b+cx)}\sqrt{ah^2-bgh+cg^2}+2ah-bg+b\right.}{}}{2h^2}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/((g + h*x)^2*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] ((-2*h*(f*g^2 + h*(-(e*g) + d*h))*Sqrt[a + x*(b + c*x)])/((c*g^2
+ h*(-(b*g) + a*h))*(g + h*x)) - ((2*c*(f*g^3 - d*g*h^2) + h*(-3*
b*f*g^2 + b*h*(e*g + d*h) - 2*a*h*(-2*f*g + e*h)))*Log[g + h*x])/
(c*g^2 + h*(-(b*g) + a*h))^(3/2) + (2*f*Log[b + 2*c*x + 2*Sqrt[c]
*Sqrt[a + x*(b + c*x)]])/Sqrt[c] + ((2*c*(f*g^3 - d*g*h^2) + h*(-
3*b*f*g^2 + b*h*(e*g + d*h) - 2*a*h*(-2*f*g + e*h)))*Log[-(b*g) +
 2*a*h - 2*c*g*x + b*h*x + 2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a +
 x*(b + c*x)]])/(c*g^2 + h*(-(b*g) + a*h))^(3/2))/(2*h^2)
```

Maple [B] time = 0.023, size = 1671, normalized size = 6.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(h*x+g)^2/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] f/h^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))/c^(1/2)-1/h^2/(
(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h
-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^
```

```
2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/
h*g))*e+2/h^3/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+
c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1
/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^
2)^(1/2))/(x+1/h*g))*f*g-1/(a*h^2-b*g*h+c*g^2)/(x+1/h*g)*((x+1/h*
g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*d+1
/h/(a*h^2-b*g*h+c*g^2)/(x+1/h*g)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+
1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*e*g-1/h^2/(a*h^2-b*g*h+c*g^
2)/(x+1/h*g)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+
c*g^2)/h^2)^(1/2)*f*g^2+1/2/(a*h^2-b*g*h+c*g^2)/((a*h^2-b*g*h+c*g
^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h
*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/
h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*b*d-1/2/h/
(a*h^2-b*g*h+c*g^2)/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-
b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h
^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g
^2)/h^2)^(1/2))/(x+1/h*g))*b*e*g+1/2/h^2/(a*h^2-b*g*h+c*g^2)/((a*
h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*
c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c
+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g
))*b*f*g^2-1/h/(a*h^2-b*g*h+c*g^2)/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2
)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2
-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(
a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*c*g*d+1/h^2/(a*h^2-b*g*
h+c*g^2)/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2
)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*(
(x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1
/2))/(x+1/h*g))*c*g^2*e-1/h^3/(a*h^2-b*g*h+c*g^2)/((a*h^2-b*g*h+c
*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1
/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g
)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*c*g^3*f
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*(h*x + g)^2),x, algorithm="maxi

[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((f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*(h*x + g)^2),x, algorithm="fric
```

```
[Out] Timed out
```

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

$$\int \frac{d + ex + fx^2}{(g + hx)^2 \sqrt{a + bx + cx^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)/(h*x+g)**2/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2)/((g + h*x)**2*sqrt(a + b*x + c*x**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((f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*(h*x + g)^2),x, algorithm="giac
```

```
[Out] Exception raised: TypeError
```

3.232 $\int \frac{d+ex+fx^2}{(g+hx)^3\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=336

$$\frac{\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(8a^2fh^2-4c\left(a\left(dh^2-3egh+fg^2\right)+bg(2dh+eg)\right)-4abh(eh+2fg)+b^2\left(3dh^2+egh\right.\right.}{8\left(ah^2-bgh+cg^2\right)^{5/2}}$$

$$-\frac{\sqrt{a+bx+cx^2}\left(fg^2-h(eg-dh)\right)}{2h(g+hx)^2\left(ah^2-bgh+cg^2\right)}$$

$$+\frac{\sqrt{a+bx+cx^2}\left(h\left(4ah(2fg-eh)-b\left(-3dh^2-egh+5fg^2\right)\right)+2cg\left(h(eg-3dh)+fg^2\right)\right)}{4h(g+hx)\left(ah^2-bgh+cg^2\right)^2}$$

```
[Out] -((f*g^2 - h*(e*g - d*h))*Sqrt[a + b*x + c*x^2])/(2*h*(c*g^2 - b*
g*h + a*h^2)*(g + h*x)^2) + ((2*c*g*(f*g^2 + h*(e*g - 3*d*h)) + h
*(4*a*h*(2*f*g - e*h) - b*(5*f*g^2 - e*g*h - 3*d*h^2)))*Sqrt[a +
b*x + c*x^2])/(4*h*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x)) + ((8*c^2
*d*g^2 + 8*a^2*f*h^2 - 4*a*b*h*(2*f*g + e*h) + b^2*(3*f*g^2 + e*g
*h + 3*d*h^2) - 4*c*(b*g*(e*g + 2*d*h) + a*(f*g^2 - 3*e*g*h + d*h
^2)))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g
*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(8*(c*g^2 - b*g*h + a*h^2)^(
5/2))
```

Rubi [A] time = 1.44767, antiderivative size = 336, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(8a^2fh^2-4c\left(-ah(3eg-dh)+afg^2+bg(2dh+eg)\right)-4abh(eh+2fg)+b^2\left(h(3dh+eg\right.\right.}{8\left(ah^2-bgh+cg^2\right)^{5/2}}$$

$$-\frac{\sqrt{a+bx+cx^2}\left(fg^2-h(eg-dh)\right)}{2h(g+hx)^2\left(ah^2-bgh+cg^2\right)}$$

$$+\frac{\sqrt{a+bx+cx^2}\left(2c\left(gh(eg-3dh)+fg^3\right)-h\left(-4ah(2fg-eh)-bh(3dh+eg)+5bfg^2\right)\right)}{4h(g+hx)\left(ah^2-bgh+cg^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/((g + h*x)^3*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] -((f*g^2 - h*(e*g - d*h))*Sqrt[a + b*x + c*x^2])/(2*h*(c*g^2 - b*
g*h + a*h^2)*(g + h*x)^2) + ((2*c*(f*g^3 + g*h*(e*g - 3*d*h)) - h
*(5*b*f*g^2 - b*h*(e*g + 3*d*h) - 4*a*h*(2*f*g - e*h)))*Sqrt[a +
b*x + c*x^2])/(4*h*(c*g^2 - b*g*h + a*h^2)^2*(g + h*x)) + ((8*c^2
*d*g^2 + 8*a^2*f*h^2 - 4*a*b*h*(2*f*g + e*h) - 4*c*(a*f*g^2 - a*h
```

```
*(3*e*g - d*h) + b*g*(e*g + 2*d*h)) + b^2*(3*f*g^2 + h*(e*g + 3*d
*h)))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g
*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(8*(c*g^2 - b*g*h + a*h^2)^(
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((f*x**2+e*x+d)/(h*x+g)**3/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 2.97866, size = 415, normalized size = 1.24

$$\frac{h(g+hx)^2\log(g+hx)\left(8a^2fh^2-4c\left(ah(dh-3eg)+afg^2+bg(2dh+eg)\right)-4abh(eh+2fg)+b^2\left(h(3dh+eg)+3fg^2\right)+8c\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/((g + h*x)^3*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] (-2*Sqrt[c*g^2 + h*(-(b*g) + a*h)]*Sqrt[a + x*(b + c*x)]*(2*(c*g^
2 + h*(-(b*g) + a*h))*(f*g^2 + h*(-(e*g) + d*h)) - (2*c*(f*g^3 +
g*h*(e*g - 3*d*h)) + h*(-5*b*f*g^2 + b*h*(e*g + 3*d*h) - 4*a*h*(-
2*f*g + e*h)))*(g + h*x)) + h*(8*c^2*d*g^2 + 8*a^2*f*h^2 - 4*a*b*
h*(2*f*g + e*h) - 4*c*(a*f*g^2 + a*h*(-3*e*g + d*h) + b*g*(e*g +
2*d*h)) + b^2*(3*f*g^2 + h*(e*g + 3*d*h)))*(g + h*x)^2*Log[g + h*
x] + h*(-8*c^2*d*g^2 - 8*a^2*f*h^2 + 4*a*b*h*(2*f*g + e*h) + 4*c*
(a*f*g^2 + a*h*(-3*e*g + d*h) + b*g*(e*g + 2*d*h)) - b^2*(3*f*g^2
 + h*(e*g + 3*d*h)))*(g + h*x)^2*Log[-(b*g) + 2*a*h - 2*c*g*x + b
*h*x + 2*Sqrt[c*g^2 + h*(-(b*g) + a*h)]*Sqrt[a + x*(b + c*x)]])/(
8*h*(c*g^2 + h*(-(b*g) + a*h))^(5/2)*(g + h*x)^2)
```

Maple [B] time = 0.027, size = 3615, normalized size = 10.8

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(h*x+g)^3/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] -f/h^3/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/
h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x
+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2
))/(x+1/h*g))-1/2/h/(a*h^2-b*g*h+c*g^2)/(x+1/h*g)^2*((x+1/h*g)^2*
c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*d+3/2/h^
2/(a*h^2-b*g*h+c*g^2)^2/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*
h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^
2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h
+c*g^2)/h^2)^(1/2))/(x+1/h*g))*b*c*g^3*f+3/4/h/(a*h^2-b*g*h+c*g^2
)^2/(x+1/h*g)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h
+c*g^2)/h^2)^(1/2)*b*f*g^2+3/2/h/(a*h^2-b*g*h+c*g^2)^2/(x+1/h*g)*
((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(
1/2)*c*g^2*e-3/2/h^2/(a*h^2-b*g*h+c*g^2)^2/(x+1/h*g)*((x+1/h*g)^2
*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*c*g^3*f
-3/8/h/(a*h^2-b*g*h+c*g^2)^2/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((
2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h
+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-
b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*b^2*f*g^2+3/2/(a*h^2-b*g*h+c*
g^2)^2/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/
h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x
+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2
))/(x+1/h*g))*b*c*g*d-3/2/h/(a*h^2-b*g*h+c*g^2)^2/((a*h^2-b*g*h+c
*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1
/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g
)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*c^2*g^2*
d+3/2/h^2/(a*h^2-b*g*h+c*g^2)^2/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*l
n((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*
g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h
^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*c^2*g^3*e-3/2/h^3/(a*h^2-b
*g*h+c*g^2)^2/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+
c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1
/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^
2)^(1/2))/(x+1/h*g))*c^2*g^4*f-1/h^2/(a*h^2-b*g*h+c*g^2)/((a*h^2-
b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)
/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*
h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*b
*f*g-3/2/h^2/(a*h^2-b*g*h+c*g^2)/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*
ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b
*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*
h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*c*g*e+5/2/h^3/(a*h^2-b*g*
h+c*g^2)/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2
)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*(
(x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1
/2))/(x+1/h*g))*c*g^2*f-3/2/h/(a*h^2-b*g*h+c*g^2)^2/((a*h^2-b*g*h
+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x
+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c
*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*b*c*g^
2*e-1/2/h^3/(a*h^2-b*g*h+c*g^2)/(x+1/h*g)^2*((x+1/h*g)^2*c+(b*h-2
*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*f*g^2+3/4*h/(a*h
^2-b*g*h+c*g^2)^2/(x+1/h*g)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g
)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b*d-3/4/(a*h^2-b*g*h+c*g^2)^2/(x
```

```
+1/h*g)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2
)/h^2)^(1/2)*b*e*g-3/2/(a*h^2-b*g*h+c*g^2)^2/(x+1/h*g)*((x+1/h*g)
^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*c*g*d
-3/8*h/(a*h^2-b*g*h+c*g^2)^2/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((
2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h
+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-
b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*b^2*d+3/8/(a*h^2-b*g*h+c*g^2)
^2/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+
(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h
*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(
x+1/h*g))*b^2*e*g+1/2/h*c/(a*h^2-b*g*h+c*g^2)/((a*h^2-b*g*h+c*g^2
)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g
)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*
(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*d+2/h^2/(a*h
^2-b*g*h+c*g^2)/(x+1/h*g)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+
(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*f*g+1/2/h/(a*h^2-b*g*h+c*g^2)/((a*
h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*
c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c
+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g
))*b*e+1/2/h^2/(a*h^2-b*g*h+c*g^2)/(x+1/h*g)^2*((x+1/h*g)^2*c+(b*
h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*e*g-1/h/(a*h^
2-b*g*h+c*g^2)/(x+1/h*g)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(
a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*e
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*(h*x + g)^3),x, algorithm="maxi
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 29.4697, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*(h*x + g)^3),x, algorithm="fric
```

```
[Out] [-1/16*(4*(2*a*d*h^3 - (4*c*e - 3*b*f)*g^3 + (8*c*d + b*e - 6*a*f
)*g^2*h - (5*b*d - 2*a*e)*g*h^2 - (2*c*f*g^3 + (2*c*e - 5*b*f)*g^
2*h - (6*c*d - b*e - 8*a*f)*g*h^2 + (3*b*d - 4*a*e)*h^3)*x)*sqrt(
```

```
c*g^2 - b*g*h + a*h^2)*sqrt(c*x^2 + b*x + a) - ((8*c^2*d - 4*b*c*
e + (3*b^2 - 4*a*c)*f)*g^4 - (8*b*c*d + 8*a*b*f - (b^2 + 12*a*c)*
e)*g^3*h - (4*a*b*e - 8*a^2*f - (3*b^2 - 4*a*c)*d)*g^2*h^2 + ((8*
c^2*d - 4*b*c*e + (3*b^2 - 4*a*c)*f)*g^2*h^2 - (8*b*c*d + 8*a*b*f
 - (b^2 + 12*a*c)*e)*g*h^3 - (4*a*b*e - 8*a^2*f - (3*b^2 - 4*a*c)
*d)*h^4)*x^2 + 2*((8*c^2*d - 4*b*c*e + (3*b^2 - 4*a*c)*f)*g^3*h -
 (8*b*c*d + 8*a*b*f - (b^2 + 12*a*c)*e)*g^2*h^2 - (4*a*b*e - 8*a^
2*f - (3*b^2 - 4*a*c)*d)*g*h^3)*x)*log(((8*a*b*g*h - 8*a^2*h^2 -
(b^2 + 4*a*c)*g^2 - (8*c^2*g^2 - 8*b*c*g*h + (b^2 + 4*a*c)*h^2)*x
^2 - 2*(4*b*c*g^2 + 4*a*b*h^2 - (3*b^2 + 4*a*c)*g*h)*x)*sqrt(c*g^
2 - b*g*h + a*h^2) - 4*(b*c*g^3 + 3*a*b*g*h^2 - 2*a^2*h^3 - (b^2
+ 2*a*c)*g^2*h + (2*c^2*g^3 - 3*b*c*g^2*h - a*b*h^3 + (b^2 + 2*a*
c)*g*h^2)*x)*sqrt(c*x^2 + b*x + a))/(h^2*x^2 + 2*g*h*x + g^2)))/(
(c^2*g^6 - 2*b*c*g^5*h - 2*a*b*g^3*h^3 + a^2*g^2*h^4 + (b^2 + 2*a
*c)*g^4*h^2 + (c^2*g^4*h^2 - 2*b*c*g^3*h^3 - 2*a*b*g*h^5 + a^2*h^
6 + (b^2 + 2*a*c)*g^2*h^4)*x^2 + 2*(c^2*g^5*h - 2*b*c*g^4*h^2 - 2
*a*b*g^2*h^4 + a^2*g*h^5 + (b^2 + 2*a*c)*g^3*h^3)*x)*sqrt(c*g^2 -
 b*g*h + a*h^2)), -1/8*(2*(2*a*d*h^3 - (4*c*e - 3*b*f)*g^3 + (8*c
*d + b*e - 6*a*f)*g^2*h - (5*b*d - 2*a*e)*g*h^2 - (2*c*f*g^3 + (2
*c*e - 5*b*f)*g^2*h - (6*c*d - b*e - 8*a*f)*g*h^2 + (3*b*d - 4*a*
e)*h^3)*x)*sqrt(-c*g^2 + b*g*h - a*h^2)*sqrt(c*x^2 + b*x + a) + (
(8*c^2*d - 4*b*c*e + (3*b^2 - 4*a*c)*f)*g^4 - (8*b*c*d + 8*a*b*f
- (b^2 + 12*a*c)*e)*g^3*h - (4*a*b*e - 8*a^2*f - (3*b^2 - 4*a*c)*
d)*g^2*h^2 + ((8*c^2*d - 4*b*c*e + (3*b^2 - 4*a*c)*f)*g^2*h^2 - (
8*b*c*d + 8*a*b*f - (b^2 + 12*a*c)*e)*g*h^3 - (4*a*b*e - 8*a^2*f
- (3*b^2 - 4*a*c)*d)*h^4)*x^2 + 2*((8*c^2*d - 4*b*c*e + (3*b^2 -
4*a*c)*f)*g^3*h - (8*b*c*d + 8*a*b*f - (b^2 + 12*a*c)*e)*g^2*h^2
- (4*a*b*e - 8*a^2*f - (3*b^2 - 4*a*c)*d)*g*h^3)*x)*arctan(-1/2*s
qrt(-c*g^2 + b*g*h - a*h^2)*(b*g - 2*a*h + (2*c*g - b*h)*x)/((c*g
^2 - b*g*h + a*h^2)*sqrt(c*x^2 + b*x + a))))/((c^2*g^6 - 2*b*c*g^
5*h - 2*a*b*g^3*h^3 + a^2*g^2*h^4 + (b^2 + 2*a*c)*g^4*h^2 + (c^2*
g^4*h^2 - 2*b*c*g^3*h^3 - 2*a*b*g*h^5 + a^2*h^6 + (b^2 + 2*a*c)*g
^2*h^4)*x^2 + 2*(c^2*g^5*h - 2*b*c*g^4*h^2 - 2*a*b*g^2*h^4 + a^2*
g*h^5 + (b^2 + 2*a*c)*g^3*h^3)*x)*sqrt(-c*g^2 + b*g*h - a*h^2))]
```

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

$$\int \frac{d + ex + fx^2}{(g + hx)^3 \sqrt{a + bx + cx^2}} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x**2+e*x+d)/(h*x+g)**3/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2)/((g + h*x)**3*sqrt(a + b*x + c*x**2))
, x)
```

GIAC/XCAS [A] time = 0.632222, size = 4, normalized size = 0.01

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*(h*x + g)^3),x, algorithm="giac
```

```
[Out] sage0*x
```

3.233 $\int \frac{(g+hx)^3\left(d+ex+fx^2\right)}{\left(a+bx+cx^2\right)^{3/2}}\,dx$

Optimal. Leaf size=504

$$\frac{h\sqrt{a+bx+cx^2}\left(8c^2\left(32a^2fh^2+39abh(eh+3fg)+b^2\left(9h(dh+3eg)+20fg^2\right)\right)+2chx\left(-8c^2(9aeh+11afg+3bdh+3beg\right)\right.}{}$$

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(24c^2h\left(ah(eh+3fg)+b\left(dh^2+3egh+3fg^2\right)\right)-30bch^2(2afh+beh+3bfg)+35b^3fh^3-16c^3g\right.}{16c^{9/2}}$$

$$+\frac{2(g+hx)^3\left(c\left(2ae-b\left(\frac{af}{c}+d\right)\right)-x\left(-2acf+b^2f-bce+2c^2d\right)\right)}{c\left(b^2-4ac\right)\sqrt{a+bx+cx^2}}$$

$$+\frac{h(g+hx)^2\sqrt{a+bx+cx^2}\left(-16acf+7b^2f-6bce+12c^2d\right)}{3c^2\left(b^2-4ac\right)}$$

```
[Out] (2*(c*(2*a*e - b*(d + (a*f)/c)) - (2*c^2*d - b*c*e + b^2*f - 2*a*
c*f)*x)*(g + h*x)^3)/(c*(b^2 - 4*a*c)*Sqrt[a + b*x + c*x^2]) + ((
12*c^2*d - 6*b*c*e + 7*b^2*f - 16*a*c*f)*h*(g + h*x)^2*Sqrt[a + b
*x + c*x^2])/(3*c^2*(b^2 - 4*a*c)) + (h*(192*c^4*d*g^2 + 105*b^4*
f*h^2 - 10*b^2*c*h*(46*a*f*h + 9*b*(3*f*g + e*h)) - 16*c^3*(3*b*g
*(2*e*g + 3*d*h) + 4*a*(7*f*g^2 + 9*e*g*h + 3*d*h^2)) + 8*c^2*(32
*a^2*f*h^2 + 39*a*b*h*(3*f*g + e*h) + b^2*(20*f*g^2 + 9*h*(3*e*g
+ d*h))) + 2*c*h*(48*c^3*d*g - 35*b^3*f*h - 8*c^2*(3*b*e*g + 11*a
*f*g + 3*b*d*h + 9*a*e*h) + 2*b*c*(17*b*f*g + 15*b*e*h + 58*a*f*h
))*x)*Sqrt[a + b*x + c*x^2])/(24*c^4*(b^2 - 4*a*c)) - ((35*b^3*f*
h^3 - 30*b*c*h^2*(3*b*f*g + b*e*h + 2*a*f*h) - 16*c^3*g*(f*g^2 +
3*h*(e*g + d*h)) + 24*c^2*h*(a*h*(3*f*g + e*h) + b*(3*f*g^2 + 3*e
*g*h + d*h^2)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x
^2])])/(16*c^(9/2))
```

Rubi [A] time = 2.95135, antiderivative size = 502, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.156$

$$\frac{h\sqrt{a+bx+cx^2}\left(8c\left(32a^2fh^2+39abh(eh+3fg)+b^2\left(9h(dh+3eg)+20fg^2\right)\right)+2hx\left(-8c^2(9aeh+11afg+3bdh+3beg)+\right.\right.}{}$$

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(24c^2h\left(ah(eh+3fg)+bh(dh+3eg)+3bfg^2\right)-30bch^2(2afh+beh+3bfg)+35b^3fh^3-16c^3\left(3\right.\right.}{16c^{9/2}}$$

$$+\frac{2(g+hx)^3\left(-x\left(-2acf+b^2f-bce+2c^2d\right)-b(af+cd)+2ace\right)}{c\left(b^2-4ac\right)\sqrt{a+bx+cx^2}}$$

$$+\frac{h(g+hx)^2\sqrt{a+bx+cx^2}\left(-2c(8af+3be)+7b^2f+12c^2d\right)}{3c^2\left(b^2-4ac\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[((g + h*x)^3*(d + e*x + f*x^2))/(a + b*x + c*x^2)^(3/2),x]
```

```
[Out] (2*(2*a*c*e - b*(c*d + a*f) - (2*c^2*d - b*c*e + b^2*f - 2*a*c*f)
*x)*(g + h*x)^3)/(c*(b^2 - 4*a*c)*Sqrt[a + b*x + c*x^2]) + ((12*c
^2*d + 7*b^2*f - 2*c*(3*b*e + 8*a*f))*h*(g + h*x)^2*Sqrt[a + b*x
+ c*x^2])/(3*c^2*(b^2 - 4*a*c)) + (h*(192*c^3*d*g^2 + (105*b^4*f*
h^2)/c - 10*b^2*h*(46*a*f*h + 9*b*(3*f*g + e*h)) - 16*c^2*(3*b*g*
(2*e*g + 3*d*h) + 4*a*(7*f*g^2 + 9*e*g*h + 3*d*h^2)) + 8*c*(32*a^
2*f*h^2 + 39*a*b*h*(3*f*g + e*h) + b^2*(20*f*g^2 + 9*h*(3*e*g + d
*h))) + 2*h*(48*c^3*d*g - 35*b^3*f*h - 8*c^2*(3*b*e*g + 11*a*f*g
+ 3*b*d*h + 9*a*e*h) + 2*b*c*(17*b*f*g + 15*b*e*h + 58*a*f*h))*x)
*Sqrt[a + b*x + c*x^2])/(24*c^3*(b^2 - 4*a*c)) - ((35*b^3*f*h^3 -
 30*b*c*h^2*(3*b*f*g + b*e*h + 2*a*f*h) - 16*c^3*(f*g^3 + 3*g*h*(
e*g + d*h)) + 24*c^2*h*(3*b*f*g^2 + b*h*(3*e*g + d*h) + a*h*(3*f*
g + e*h)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])]
)/(16*c^(9/2))
```

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((h*x+g)**3*(f*x**2+e*x+d)/(c*x**2+b*x+a)**(3/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 5.14135, size = 692, normalized size = 1.37

$$\frac{4b^2c (115a^2 fh^3 - ach (3h(6dh + 18eg + 31ehx) + f (54g^2 + 279ghx - 43h^2x^2)) - c^2x (3h (2dh(hx - 6g) + e (-12g^2 + 6ghx}{}$$

$$+\frac{\log (2\sqrt{c}\sqrt{a + x(b + cx)} + b + 2cx) (-24c^2h (ah(eh + 3fg) + bh(dh + 3eg) + 3bfg^2) + 30bch^2(2afh + beh + 3bfg) - 35b^3}{16c^{9/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((g + h*x)^3*(d + e*x + f*x^2))/(a + b*x + c*x^2)^(3/2),x]
```

```
[Out] (-105*b^5*f*h^3*x - 5*b^4*h^2*(21*a*f*h + c*x*(-54*f*g - 18*e*h +
 7*f*h*x)) + 2*b^3*c*h*(5*a*h*(27*f*g + 9*e*h + 53*f*h*x) + c*x*(
3*h*(-36*e*g - 12*d*h + 5*e*h*x) + f*(-108*g^2 + 45*g*h*x + 7*h^2
*x^2))) + 16*c^2*(-16*a^3*f*h^3 + 6*c^3*d*g^3*x + a*c^2*(6*d*h*(-
```

```
3*g^2 - 3*g*h*x + h^2*x^2) - 3*e*(2*g^3 + 6*g^2*h*x - 6*g*h^2*x^2
 - h^3*x^3) + f*x*(-6*g^3 + 18*g^2*h*x + 9*g*h^2*x^2 + 2*h^3*x^3)
) + a^2*c*h*(f*(36*g^2 + 27*g*h*x - 8*h^2*x^2) + 3*h*(4*d*h + 3*e
*(4*g + h*x)))) + 8*b*c^2*(-6*c^2*g^2*(-(d*g) + e*g*x + 3*d*h*x)
- a^2*h^2*(117*f*g + 39*e*h + 61*f*h*x) + a*c*(f*(6*g^3 + 90*g^2*
h*x - 45*g*h^2*x^2 - 7*h^3*x^3) + 3*h*(2*d*h*(3*g + 5*h*x) + e*(6
*g^2 + 30*g*h*x - 5*h^2*x^2)))) + 4*b^2*c*(115*a^2*f*h^3 - a*c*h*
(3*h*(18*e*g + 6*d*h + 31*e*h*x) + f*(54*g^2 + 279*g*h*x - 43*h^2
*x^2)) - c^2*x*(f*(-12*g^3 + 18*g^2*h*x + 9*g*h^2*x^2 + 2*h^3*x^3
) + 3*h*(2*d*h*(-6*g + h*x) + e*(-12*g^2 + 6*g*h*x + h^2*x^2)))))
/(24*c^4*(-b^2 + 4*a*c)*Sqrt[a + x*(b + c*x)]) + ((-35*b^3*f*h^3
+ 30*b*c*h^2*(3*b*f*g + b*e*h + 2*a*f*h) + 16*c^3*(f*g^3 + 3*g*h*
(e*g + d*h)) - 24*c^2*h*(3*b*f*g^2 + b*h*(3*e*g + d*h) + a*h*(3*f
*g + e*h)))*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]])/(16
*c^(9/2))
```

Maple [B] time = 0.024, size = 2780, normalized size = 5.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^3*(f*x^2+e*x+d)/(c*x^2+b*x+a)^(3/2),x)
```

```
[Out] -1/c/(c*x^2+b*x+a)^(1/2)*g^3*e+1/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(
c*x^2+b*x+a)^(1/2))*g^3*f-13/2*b^2/c^2*a/(4*a*c-b^2)/(c*x^2+b*x+a
)^(1/2)*x*h^3*e-39/4*b^3/c^3*a/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*g*
h^2*f-9/2*b^3/c^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*g*h^2*e-9/2*b
^3/c^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*g^2*h*f+4/c*a*b/(4*a*c-b
^2)/(c*x^2+b*x+a)^(1/2)*x*h^3*d+12/c*a*b/(4*a*c-b^2)/(c*x^2+b*x+a
)^(1/2)*x*g*h^2*e+12/c*a*b/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*g^2*
h*f-39/2*b^2/c^2*a/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*g*h^2*f+45/8
*b^4/c^3/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*g*h^2*f+6/c^2*a*b^2/(4
*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*g*h^2*e+6/c^2*a*b^2/(4*a*c-b^2)/(c*
x^2+b*x+a)^(1/2)*g^2*h*f+3*b^2/c/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*
x*g*h^2*d+3*b^2/c/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*g^2*h*e+115/1
2*h^3*f*b^3/c^3*a/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x+6/c^2*a/(c*x^
2+b*x+a)^(1/2)*g*h^2*e+6/c^2*a/(c*x^2+b*x+a)^(1/2)*g^2*h*f-7/12*h
^3*f*b/c^2*x^3/(c*x^2+b*x+a)^(1/2)+35/24*h^3*f*b^2/c^3*x^2/(c*x^2
+b*x+a)^(1/2)+35/16*h^3*f*b^3/c^4*x/(c*x^2+b*x+a)^(1/2)-35/32*h^3
*f*b^6/c^5/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)+115/24*h^3*f*b^2/c^4*a
/(c*x^2+b*x+a)^(1/2)+15/4*h^3*f*b/c^(7/2)*a*ln((1/2*b+c*x)/c^(1/2
)+(c*x^2+b*x+a)^(1/2))-4/3*h^3*f/c^2*a*x^2/(c*x^2+b*x+a)^(1/2)-2*
b/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*g^3*e-b^2/c/(4*a*c-b^2)/(c*x^
2+b*x+a)^(1/2)*g^3*e-3*x/c/(c*x^2+b*x+a)^(1/2)*g*h^2*d-3*x/c/(c*x
^2+b*x+a)^(1/2)*g^2*h*e+3/2*b/c^2/(c*x^2+b*x+a)^(1/2)*g*h^2*d+3/2
*b/c^2/(c*x^2+b*x+a)^(1/2)*g^2*h*e+1/2*b^3/c^2/(4*a*c-b^2)/(c*x^2
+b*x+a)^(1/2)*g^3*f-3/4*b^4/c^3/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*h
^3*d-9/2*b/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g*
```

```
h^2*e+3*x^2/c/(c*x^2+b*x+a)^(1/2)*g*h^2*e+115/24*h^3*f*b^4/c^4*a/
(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)+3/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+
(c*x^2+b*x+a)^(1/2))*g^2*h*e-15/4*h^3*f*b/c^3*a*x/(c*x^2+b*x+a)^(
1/2)-8/3*h^3*f/c^3*a^2*b^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)-15/4*b
/c^2*x^2/(c*x^2+b*x+a)^(1/2)*g*h^2*f-45/8*b^2/c^3*x/(c*x^2+b*x+a)
^(1/2)*g*h^2*f+15/8*b^4/c^3/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*h^3
*e+45/16*b^5/c^4/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*g*h^2*f-39/4*b/c
^3*a/(c*x^2+b*x+a)^(1/2)*g*h^2*f-13/4*b^3/c^3*a/(4*a*c-b^2)/(c*x^
2+b*x+a)^(1/2)*h^3*e+9/2/c^2*a*x/(c*x^2+b*x+a)^(1/2)*g*h^2*f-9/4*
b^4/c^3/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*g*h^2*e+b^2/c/(4*a*c-b^2)
/(c*x^2+b*x+a)^(1/2)*x*g^3*f+3/2*b^3/c^2/(4*a*c-b^2)/(c*x^2+b*x+a
)^(1/2)*g*h^2*d+3/2*b^3/c^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*g^2*h
*e-35/16*h^3*f*b^5/c^4/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x-6*b/(4*a
*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*g^2*h*d-3*b^2/c/(4*a*c-b^2)/(c*x^2+
b*x+a)^(1/2)*g^2*h*d-3/2*b^3/c^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*
x*h^3*d-9/4*b^4/c^3/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*g^2*h*f+2/c^2
*a*b^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*h^3*d+9/2*b/c^2*x/(c*x^2+b
*x+a)^(1/2)*g*h^2*e+9/2*b/c^2*x/(c*x^2+b*x+a)^(1/2)*g^2*h*f+1/2*x
^3/c/(c*x^2+b*x+a)^(1/2)*h^3*e+15/16*b^3/c^4/(c*x^2+b*x+a)^(1/2)*
h^3*e+3*x^2/c/(c*x^2+b*x+a)^(1/2)*g^2*h*f+3/2*x^3/c/(c*x^2+b*x+a)
^(1/2)*g*h^2*f+1/3*h^3*f*x^4/c/(c*x^2+b*x+a)^(1/2)-35/32*h^3*f*b^
4/c^5/(c*x^2+b*x+a)^(1/2)-35/16*h^3*f*b^3/c^(9/2)*ln((1/2*b+c*x)/
c^(1/2)+(c*x^2+b*x+a)^(1/2))-8/3*h^3*f/c^3*a^2/(c*x^2+b*x+a)^(1/2
)-3/c/(c*x^2+b*x+a)^(1/2)*g^2*h*d+x^2/c/(c*x^2+b*x+a)^(1/2)*h^3*d
-3/4*b^2/c^3/(c*x^2+b*x+a)^(1/2)*h^3*d-3/2*b/c^(5/2)*ln((1/2*b+c*
x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*h^3*d+2/c^2*a/(c*x^2+b*x+a)^(1/2)
*h^3*d+15/8*b^2/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2
))*h^3*e-3/2/c^(5/2)*a*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2)
)*h^3*e+2*g^3*d*(2*c*x+b)/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)-x/c/(c*
x^2+b*x+a)^(1/2)*g^3*f+1/2*b/c^2/(c*x^2+b*x+a)^(1/2)*g^3*f+3/c^(3
/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g*h^2*d-5/4*b/c^2
*x^2/(c*x^2+b*x+a)^(1/2)*h^3*e-15/8*b^2/c^3*x/(c*x^2+b*x+a)^(1/2)
*h^3*e+45/16*b^3/c^4/(c*x^2+b*x+a)^(1/2)*g*h^2*f+15/16*b^5/c^4/(4
*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*h^3*e+45/8*b^2/c^(7/2)*ln((1/2*b+c*
x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g*h^2*f-13/4*b/c^3*a/(c*x^2+b*x+a
)^(1/2)*h^3*e+3/2/c^2*a*x/(c*x^2+b*x+a)^(1/2)*h^3*e-9/2/c^(5/2)*a
*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g*h^2*f+3/2*b/c^2*x/
(c*x^2+b*x+a)^(1/2)*h^3*d-9/4*b^2/c^3/(c*x^2+b*x+a)^(1/2)*g*h^2*e
-9/4*b^2/c^3/(c*x^2+b*x+a)^(1/2)*g^2*h*f-9/2*b/c^(5/2)*ln((1/2*b+
c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g^2*h*f-16/3*h^3*f/c^2*a^2*b/(4
*a*c-b^2)/(c*x^2+b*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((f*x^2 + e*x + d)*(h*x + g)^3/(c*x^2 + b*x + a)^(3/2),x, algorithm="maxi
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 10.9618, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)^3/(c*x^2 + b*x + a)^(3/2),x, algorithm="fric
```

```
[Out] [1/96*(4*(8*(b^2*c^3 - 4*a*c^4)*f*h^3*x^4 - 48*(b*c^4*d - 2*a*c^4
*e + a*b*c^3*f)*g^3 + 72*(4*a*c^4*d - 2*a*b*c^3*e + (3*a*b^2*c^2
- 8*a^2*c^3)*f)*g^2*h - 18*(8*a*b*c^3*d - 4*(3*a*b^2*c^2 - 8*a^2*
c^3)*e + (15*a*b^3*c - 52*a^2*b*c^2)*f)*g*h^2 + (24*(3*a*b^2*c^2
- 8*a^2*c^3)*d - 6*(15*a*b^3*c - 52*a^2*b*c^2)*e + (105*a*b^4 - 4
60*a^2*b^2*c + 256*a^3*c^2)*f)*h^3 + 2*(18*(b^2*c^3 - 4*a*c^4)*f*
g*h^2 + (6*(b^2*c^3 - 4*a*c^4)*e - 7*(b^3*c^2 - 4*a*b*c^3)*f)*h^3
)*x^3 + (72*(b^2*c^3 - 4*a*c^4)*f*g^2*h + 18*(4*(b^2*c^3 - 4*a*c^
4)*e - 5*(b^3*c^2 - 4*a*b*c^3)*f)*g*h^2 + (24*(b^2*c^3 - 4*a*c^4)
*d - 30*(b^3*c^2 - 4*a*b*c^3)*e + (35*b^4*c - 172*a*b^2*c^2 + 128
*a^2*c^3)*f)*h^3)*x^2 - (48*(2*c^5*d - b*c^4*e + (b^2*c^3 - 2*a*c
^4)*f)*g^3 - 72*(2*b*c^4*d - 2*(b^2*c^3 - 2*a*c^4)*e + (3*b^3*c^2
 - 10*a*b*c^3)*f)*g^2*h + 18*(8*(b^2*c^3 - 2*a*c^4)*d - 4*(3*b^3*
c^2 - 10*a*b*c^3)*e + (15*b^4*c - 62*a*b^2*c^2 + 24*a^2*c^3)*f)*g
*h^2 - (24*(3*b^3*c^2 - 10*a*b*c^3)*d - 6*(15*b^4*c - 62*a*b^2*c^
2 + 24*a^2*c^3)*e + (105*b^5 - 530*a*b^3*c + 488*a^2*b*c^2)*f)*h^
3)*x)*sqrt(c*x^2 + b*x + a)*sqrt(c) + 3*(16*(a*b^2*c^3 - 4*a^2*c^
4)*f*g^3 + 24*(2*(a*b^2*c^3 - 4*a^2*c^4)*e - 3*(a*b^3*c^2 - 4*a^2
*b*c^3)*f)*g^2*h + 6*(8*(a*b^2*c^3 - 4*a^2*c^4)*d - 12*(a*b^3*c^2
 - 4*a^2*b*c^3)*e + 3*(5*a*b^4*c - 24*a^2*b^2*c^2 + 16*a^3*c^3)*f
)*g*h^2 - (24*(a*b^3*c^2 - 4*a^2*b*c^3)*d - 6*(5*a*b^4*c - 24*a^2
*b^2*c^2 + 16*a^3*c^3)*e + 5*(7*a*b^5 - 40*a^2*b^3*c + 48*a^3*b*c
^2)*f)*h^3 + (16*(b^2*c^4 - 4*a*c^5)*f*g^3 + 24*(2*(b^2*c^4 - 4*a
*c^5)*e - 3*(b^3*c^3 - 4*a*b*c^4)*f)*g^2*h + 6*(8*(b^2*c^4 - 4*a*
c^5)*d - 12*(b^3*c^3 - 4*a*b*c^4)*e + 3*(5*b^4*c^2 - 24*a*b^2*c^3
 + 16*a^2*c^4)*f)*g*h^2 - (24*(b^3*c^3 - 4*a*b*c^4)*d - 6*(5*b^4*
c^2 - 24*a*b^2*c^3 + 16*a^2*c^4)*e + 5*(7*b^5*c - 40*a*b^3*c^2 +
48*a^2*b*c^3)*f)*h^3)*x^2 + (16*(b^3*c^3 - 4*a*b*c^4)*f*g^3 + 24*
(2*(b^3*c^3 - 4*a*b*c^4)*e - 3*(b^4*c^2 - 4*a*b^2*c^3)*f)*g^2*h +
 6*(8*(b^3*c^3 - 4*a*b*c^4)*d - 12*(b^4*c^2 - 4*a*b^2*c^3)*e + 3*
(5*b^5*c - 24*a*b^3*c^2 + 16*a^2*b*c^3)*f)*g*h^2 - (24*(b^4*c^2 -
 4*a*b^2*c^3)*d - 6*(5*b^5*c - 24*a*b^3*c^2 + 16*a^2*b*c^3)*e + 5
*(7*b^6 - 40*a*b^4*c + 48*a^2*b^2*c^2)*f)*h^3)*x)*log(-4*(2*c^2*x
 + b*c)*sqrt(c*x^2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*
c)*sqrt(c)))/((a*b^2*c^4 - 4*a^2*c^5 + (b^2*c^5 - 4*a*c^6)*x^2 +
(b^3*c^4 - 4*a*b*c^5)*x)*sqrt(c)), 1/48*(2*(8*(b^2*c^3 - 4*a*c^4)
*f*h^3*x^4 - 48*(b*c^4*d - 2*a*c^4*e + a*b*c^3*f)*g^3 + 72*(4*a*c
^4*d - 2*a*b*c^3*e + (3*a*b^2*c^2 - 8*a^2*c^3)*f)*g^2*h - 18*(8*a
*b*c^3*d - 4*(3*a*b^2*c^2 - 8*a^2*c^3)*e + (15*a*b^3*c - 52*a^2*b
*c^2)*f)*g*h^2 + (24*(3*a*b^2*c^2 - 8*a^2*c^3)*d - 6*(15*a*b^3*c
```

```
- 52*a^2*b*c^2)*e + (105*a*b^4 - 460*a^2*b^2*c + 256*a^3*c^2)*f)*
h^3 + 2*(18*(b^2*c^3 - 4*a*c^4)*f*g*h^2 + (6*(b^2*c^3 - 4*a*c^4)*
e - 7*(b^3*c^2 - 4*a*b*c^3)*f)*h^3)*x^3 + (72*(b^2*c^3 - 4*a*c^4)
*f*g^2*h + 18*(4*(b^2*c^3 - 4*a*c^4)*e - 5*(b^3*c^2 - 4*a*b*c^3)*
f)*g*h^2 + (24*(b^2*c^3 - 4*a*c^4)*d - 30*(b^3*c^2 - 4*a*b*c^3)*e
 + (35*b^4*c - 172*a*b^2*c^2 + 128*a^2*c^3)*f)*h^3)*x^2 - (48*(2*
c^5*d - b*c^4*e + (b^2*c^3 - 2*a*c^4)*f)*g^3 - 72*(2*b*c^4*d - 2*
(b^2*c^3 - 2*a*c^4)*e + (3*b^3*c^2 - 10*a*b*c^3)*f)*g^2*h + 18*(8
*(b^2*c^3 - 2*a*c^4)*d - 4*(3*b^3*c^2 - 10*a*b*c^3)*e + (15*b^4*c
 - 62*a*b^2*c^2 + 24*a^2*c^3)*f)*g*h^2 - (24*(3*b^3*c^2 - 10*a*b*
c^3)*d - 6*(15*b^4*c - 62*a*b^2*c^2 + 24*a^2*c^3)*e + (105*b^5 -
530*a*b^3*c + 488*a^2*b*c^2)*f)*h^3)*x)*sqrt(c*x^2 + b*x + a)*sqr
t(-c) + 3*(16*(a*b^2*c^3 - 4*a^2*c^4)*f*g^3 + 24*(2*(a*b^2*c^3 -
4*a^2*c^4)*e - 3*(a*b^3*c^2 - 4*a^2*b*c^3)*f)*g^2*h + 6*(8*(a*b^2
*c^3 - 4*a^2*c^4)*d - 12*(a*b^3*c^2 - 4*a^2*b*c^3)*e + 3*(5*a*b^4
*c - 24*a^2*b^2*c^2 + 16*a^3*c^3)*f)*g*h^2 - (24*(a*b^3*c^2 - 4*a
^2*b*c^3)*d - 6*(5*a*b^4*c - 24*a^2*b^2*c^2 + 16*a^3*c^3)*e + 5*(
7*a*b^5 - 40*a^2*b^3*c + 48*a^3*b*c^2)*f)*h^3 + (16*(b^2*c^4 - 4*
a*c^5)*f*g^3 + 24*(2*(b^2*c^4 - 4*a*c^5)*e - 3*(b^3*c^3 - 4*a*b*c
^4)*f)*g^2*h + 6*(8*(b^2*c^4 - 4*a*c^5)*d - 12*(b^3*c^3 - 4*a*b*c
^4)*e + 3*(5*b^4*c^2 - 24*a*b^2*c^3 + 16*a^2*c^4)*f)*g*h^2 - (24*
(b^3*c^3 - 4*a*b*c^4)*d - 6*(5*b^4*c^2 - 24*a*b^2*c^3 + 16*a^2*c^
4)*e + 5*(7*b^5*c - 40*a*b^3*c^2 + 48*a^2*b*c^3)*f)*h^3)*x^2 + (1
6*(b^3*c^3 - 4*a*b*c^4)*f*g^3 + 24*(2*(b^3*c^3 - 4*a*b*c^4)*e - 3
*(b^4*c^2 - 4*a*b^2*c^3)*f)*g^2*h + 6*(8*(b^3*c^3 - 4*a*b*c^4)*d
- 12*(b^4*c^2 - 4*a*b^2*c^3)*e + 3*(5*b^5*c - 24*a*b^3*c^2 + 16*a
^2*b*c^3)*f)*g*h^2 - (24*(b^4*c^2 - 4*a*b^2*c^3)*d - 6*(5*b^5*c -
 24*a*b^3*c^2 + 16*a^2*b*c^3)*e + 5*(7*b^6 - 40*a*b^4*c + 48*a^2*
b^2*c^2)*f)*h^3)*x)*arctan(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 +
 b*x + a)*c)))/((a*b^2*c^4 - 4*a^2*c^5 + (b^2*c^5 - 4*a*c^6)*x^2
+ (b^3*c^4 - 4*a*b*c^5)*x)*sqrt(-c))]
```

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

$$\int \frac{(g+hx)^3\,(d+ex+fx^2)}{(a+bx+cx^2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**3*(f*x**2+e*x+d)/(c*x**2+b*x+a)**(3/2),x)
```

```
[Out] Integral((g + h*x)**3*(d + e*x + f*x**2)/(a + b*x + c*x**2)**(3/2
), x)
```

GIAC/XCAS [A] time = 0.285743, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(h*x + g)^3/(c*x^2 + b*x + a)^(3/2),x, algorithm="giac
```

```
[Out] Done
```

3.234 $\int \frac{(g+hx)^2(d+ex+fx^2)}{(a+bx+cx^2)^{3/2}}\,dx$

Optimal. Leaf size=289

$$\frac{2(g+hx)^2\left(c\left(2ae-b\left(\frac{af}{c}+d\right)\right)-x\left(-2acf+b^2f-bce+2c^2d\right)\right)}{c\left(b^2-4ac\right)\sqrt{a+bx+cx^2}}$$
$$+\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-12ch(afh+beh+2bfg)+15b^2fh^2+8c^2\left(h(dh+2eg)+fg^2\right)\right)}{8c^{7/2}}$$
$$+\frac{h\sqrt{a+bx+cx^2}\left(2chx\left(-12acf+5b^2f-4bce+8c^2d\right)-8c^2(4aeh+8afg+bdh+2beg)+4bc(13afh+3beh+6bfg)-1\right.}{4c^3\left(b^2-4ac\right)}$$

```
[Out] (2*(c*(2*a*e - b*(d + (a*f)/c)) - (2*c^2*d - b*c*e + b^2*f - 2*a*
c*f)*x)*(g + h*x)^2)/(c*(b^2 - 4*a*c)*Sqrt[a + b*x + c*x^2]) + (h
*(32*c^3*d*g - 15*b^3*f*h - 8*c^2*(2*b*e*g + 8*a*f*g + b*d*h + 4*
a*e*h) + 4*b*c*(6*b*f*g + 3*b*e*h + 13*a*f*h) + 2*c*(8*c^2*d - 4*
b*c*e + 5*b^2*f - 12*a*c*f)*h*x)*Sqrt[a + b*x + c*x^2])/(4*c^3*(b
^2 - 4*a*c)) + ((15*b^2*f*h^2 - 12*c*h*(2*b*f*g + b*e*h + a*f*h)
+ 8*c^2*(f*g^2 + h*(2*e*g + d*h)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]
*Sqrt[a + b*x + c*x^2])])/(8*c^(7/2))
```

Rubi [A] time = 0.88162, antiderivative size = 288, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{2(g+hx)^2\left(-x\left(-2acf+b^2f-bce+2c^2d\right)-b(af+cd)+2ace\right)}{c\left(b^2-4ac\right)\sqrt{a+bx+cx^2}}$$
$$+\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-12ch(afh+beh+2bfg)+15b^2fh^2+8c^2\left(h(dh+2eg)+fg^2\right)\right)}{8c^{7/2}}$$
$$+\frac{h\sqrt{a+bx+cx^2}\left(2hx\left(-12acf+5b^2f-4bce+8c^2d\right)-8c(4aeh+8afg+bdh+2beg)+4b(13afh+3beh+6bfg)-\frac{15b^3f}{c}\right.}{4c^2\left(b^2-4ac\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[((g + h*x)^2*(d + e*x + f*x^2))/(a + b*x + c*x^2)^(3/2),x]
```

```
[Out] (2*(2*a*c*e - b*(c*d + a*f) - (2*c^2*d - b*c*e + b^2*f - 2*a*c*f)
*x)*(g + h*x)^2)/(c*(b^2 - 4*a*c)*Sqrt[a + b*x + c*x^2]) + (h*(32
*c^2*d*g - (15*b^3*f*h)/c - 8*c*(2*b*e*g + 8*a*f*g + b*d*h + 4*a*
e*h) + 4*b*(6*b*f*g + 3*b*e*h + 13*a*f*h) + 2*(8*c^2*d - 4*b*c*e
+ 5*b^2*f - 12*a*c*f)*h*x)*Sqrt[a + b*x + c*x^2])/(4*c^2*(b^2 - 4
*a*c)) + ((15*b^2*f*h^2 - 12*c*h*(2*b*f*g + b*e*h + a*f*h) + 8*c^
2*(f*g^2 + h*(2*e*g + d*h)))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[
```

```
a + b*x + c*x^2])])/(8*c^(7/2))
```

Rubi in Sympy [A] time = 119.038, size = 332, normalized size = 1.15

$$-\frac{2(g+hx)^2\left(abf-2ace+bcd+x\left(-2acf+b^2f-bce+2c^2d\right)\right)}{c\left(-4ac+b^2\right)\sqrt{a+bx+cx^2}}-\frac{h\sqrt{a+bx+cx^2}\left(-13abcfh+8ac^2eh+16ac^2fg+\frac{15b^3fh}{4}-3b^2ceh-6b^2cfg+2bc^2dh+4bc^2eg-8c^3dg-\frac{chx(-12acf+5b^2...}{2}\right)}{c^3\left(-4ac+b^2\right)}+\frac{\left(-12acfh^2+15b^2fh^2-12bceh^2-24bcfgh+8c^2dh^2+16c^2egh+8c^2fg^2\right)\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{8c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)**2*(f*x**2+e*x+d)/(c*x**2+b*x+a)**(3/2),x)
```

```
[Out] -2*(g + h*x)**2*(a*b*f - 2*a*c*e + b*c*d + x*(-2*a*c*f + b**2*f -
 b*c*e + 2*c**2*d))/(c*(-4*a*c + b**2)*sqrt(a + b*x + c*x**2)) -
h*sqrt(a + b*x + c*x**2)*(-13*a*b*c*f*h + 8*a*c**2*e*h + 16*a*c**
2*f*g + 15*b**3*f*h/4 - 3*b**2*c*e*h - 6*b**2*c*f*g + 2*b*c**2*d*
h + 4*b*c**2*e*g - 8*c**3*d*g - c*h*x*(-12*a*c*f + 5*b**2*f - 4*b
*c*e + 8*c**2*d)/2)/(c**3*(-4*a*c + b**2)) + (-12*a*c*f*h**2 + 15
*b**2*f*h**2 - 12*b*c*e*h**2 - 24*b*c*f*g*h + 8*c**2*d*h**2 + 16*
c**2*e*g*h + 8*c**2*f*g**2)*atanh((b + 2*c*x)/(2*sqrt(c)*sqrt(a +
 b*x + c*x**2)))/(8*c**(7/2))
```

Mathematica [A] time = 1.80427, size = 387, normalized size = 1.34

$$\frac{4bc\left(-13a^2fh^2+ac\left(2h(dh+2eg+5ehx)+f\left(2g^2+20ghx-5h^2x^2\right)\right)-2c^2g(-dg+2dhx+egx)\right)+8c^2\left(a^2h(4eh+8fg+...\right.}{...}$$

$$+\frac{\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)\left(-12ch(afh+beh+2bfg)+15b^2fh^2+8c^2\left(h(dh+2eg)+fg^2\right)\right)}{8c^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((g + h*x)^2*(d + e*x + f*x^2))/(a + b*x + c*x^2)^(3/2),x]
```

```
[Out] (15*b^4*f*h^2*x + b^3*h*(15*a*f*h + c*x*(-24*f*g - 12*e*h + 5*f*h
*x)) + 4*b*c*(-13*a^2*f*h^2 - 2*c^2*g*(-(d*g) + e*g*x + 2*d*h*x)
+ a*c*(2*h*(2*e*g + d*h + 5*e*h*x) + f*(2*g^2 + 20*g*h*x - 5*h^2*
x^2))) - 2*b^2*c*(a*h*(12*f*g + 6*e*h + 31*f*h*x) + c*x*(2*h*(-4*
```

```
e*g - 2*d*h + e*h*x) + f*(-4*g^2 + 4*g*h*x + h^2*x^2))) + 8*c^2*(
2*c^2*d*g^2*x + a^2*h*(8*f*g + 4*e*h + 3*f*h*x) + a*c*(-2*d*h*(2*
g + h*x) - 2*e*(g^2 + 2*g*h*x - h^2*x^2) + f*x*(-2*g^2 + 4*g*h*x
+ h^2*x^2))))/(4*c^3*(-b^2 + 4*a*c)*Sqrt[a + x*(b + c*x)]) + ((15
*b^2*f*h^2 - 12*c*h*(2*b*f*g + b*e*h + a*f*h) + 8*c^2*(f*g^2 + h*
(2*e*g + d*h)))*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]])
/(8*c^(7/2))
```

Maple [B] time = 0.017, size = 1557, normalized size = 5.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^2*(f*x^2+e*x+d)/(c*x^2+b*x+a)^(3/2),x)
```

```
[Out] -3/2*b^4/c^3/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*g*h*f+2/c^2*a*b^2/(4
*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*h^2*e-3/2*b^3/c^2/(4*a*c-b^2)/(c*x^
2+b*x+a)^(1/2)*x*h^2*e+3*b/c^2*x/(c*x^2+b*x+a)^(1/2)*g*h*f+b^2/c/
(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*d*h^2+b^2/c/(4*a*c-b^2)/(c*x^2+
b*x+a)^(1/2)*x*f*g^2+b^3/c^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*e*g*
h+15/8*h^2*f*b^4/c^3/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x+1/c^(3/2)*
ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g^2-1/c/(c*x^2+b*x+
a)^(1/2)*e*g^2+1/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/
2))*d*h^2+8/c*a*b/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*g*h*f+4/c^2*a
*b^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*g*h*f+2*b^2/c/(4*a*c-b^2)/(c
*x^2+b*x+a)^(1/2)*x*e*g*h-3*b^3/c^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/
2)*x*g*h*f+4/c*a*b/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*h^2*e-13/2*h
^2*f*b^2/c^2*a/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x-13/4*h^2*f*b^3/c
^3*a/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)-4*b/(4*a*c-b^2)/(c*x^2+b*x+a
)^(1/2)*x*g*h*d-2*b^2/c/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*g*h*d+x^2
/c/(c*x^2+b*x+a)^(1/2)*h^2*e-3/4*b^2/c^3/(c*x^2+b*x+a)^(1/2)*h^2*
e-3*b/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*g*h*f+4
/c^2*a/(c*x^2+b*x+a)^(1/2)*g*h*f-3/2*b^2/c^3/(c*x^2+b*x+a)^(1/2)*
g*h*f-3/4*b^4/c^3/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*h^2*e+3/2*b/c^2
*x/(c*x^2+b*x+a)^(1/2)*h^2*e+2*x^2/c/(c*x^2+b*x+a)^(1/2)*g*h*f-5/
4*h^2*f*b/c^2*x^2/(c*x^2+b*x+a)^(1/2)-15/8*h^2*f*b^2/c^3*x/(c*x^2
+b*x+a)^(1/2)-2*b/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*e*g^2-b^2/c/(
4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*e*g^2-2*x/c/(c*x^2+b*x+a)^(1/2)*e*
g*h+b/c^2/(c*x^2+b*x+a)^(1/2)*e*g*h+1/2*b^3/c^2/(4*a*c-b^2)/(c*x^
2+b*x+a)^(1/2)*d*h^2+15/16*h^2*f*b^5/c^4/(4*a*c-b^2)/(c*x^2+b*x+a
)^(1/2)-13/4*h^2*f*b/c^3*a/(c*x^2+b*x+a)^(1/2)+3/2*h^2*f/c^2*a*x/
(c*x^2+b*x+a)^(1/2)+1/2*b^3/c^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*f
*g^2+1/2*h^2*f*x^3/c/(c*x^2+b*x+a)^(1/2)+15/16*h^2*f*b^3/c^4/(c*x
^2+b*x+a)^(1/2)+15/8*h^2*f*b^2/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*
x^2+b*x+a)^(1/2))-3/2*h^2*f/c^(5/2)*a*ln((1/2*b+c*x)/c^(1/2)+(c*x
^2+b*x+a)^(1/2))-2/c/(c*x^2+b*x+a)^(1/2)*g*h*d-x/c/(c*x^2+b*x+a)^
(1/2)*d*h^2-3/2*b/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1
/2))*h^2*e+2/c^2*a/(c*x^2+b*x+a)^(1/2)*h^2*e-x/c/(c*x^2+b*x+a)^(1
```

```
/2)*f*g^2+1/2*b/c^2/(c*x^2+b*x+a)^(1/2)*d*h^2+1/2*b/c^2/(c*x^2+b*
x+a)^(1/2)*f*g^2+2/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(
1/2))*e*g*h+2*g^2*d*(2*c*x+b)/(4*a*c-b^2)/(c*x^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((f*x^2 + e*x + d)*(h*x + g)^2/(c*x^2 + b*x + a)^(3/2),x, algorithm="maxi
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 8.98259, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)^2/(c*x^2 + b*x + a)^(3/2),x, algorithm="fric
```

```
[Out] [1/16*(4*(2*(b^2*c^2 - 4*a*c^3)*f*h^2*x^3 - 8*(b*c^3*d - 2*a*c^3*
e + a*b*c^2*f)*g^2 + 8*(4*a*c^3*d - 2*a*b*c^2*e + (3*a*b^2*c - 8*
a^2*c^2)*f)*g*h - (8*a*b*c^2*d - 4*(3*a*b^2*c - 8*a^2*c^2)*e + (1
5*a*b^3 - 52*a^2*b*c)*f)*h^2 + (8*(b^2*c^2 - 4*a*c^3)*f*g*h + (4*
(b^2*c^2 - 4*a*c^3)*e - 5*(b^3*c - 4*a*b*c^2)*f)*h^2)*x^2 - (8*(2
*c^4*d - b*c^3*e + (b^2*c^2 - 2*a*c^3)*f)*g^2 - 8*(2*b*c^3*d - 2*
(b^2*c^2 - 2*a*c^3)*e + (3*b^3*c - 10*a*b*c^2)*f)*g*h + (8*(b^2*c
^2 - 2*a*c^3)*d - 4*(3*b^3*c - 10*a*b*c^2)*e + (15*b^4 - 62*a*b^2
*c + 24*a^2*c^2)*f)*h^2)*x)*sqrt(c*x^2 + b*x + a)*sqrt(c) - (8*(a
*b^2*c^2 - 4*a^2*c^3)*f*g^2 + 8*(2*(a*b^2*c^2 - 4*a^2*c^3)*e - 3*
(a*b^3*c - 4*a^2*b*c^2)*f)*g*h + (8*(a*b^2*c^2 - 4*a^2*c^3)*d - 1
2*(a*b^3*c - 4*a^2*b*c^2)*e + 3*(5*a*b^4 - 24*a^2*b^2*c + 16*a^3*
c^2)*f)*h^2 + (8*(b^2*c^3 - 4*a*c^4)*f*g^2 + 8*(2*(b^2*c^3 - 4*a*
c^4)*e - 3*(b^3*c^2 - 4*a*b*c^3)*f)*g*h + (8*(b^2*c^3 - 4*a*c^4)*
d - 12*(b^3*c^2 - 4*a*b*c^3)*e + 3*(5*b^4*c - 24*a*b^2*c^2 + 16*a
^2*c^3)*f)*h^2)*x^2 + (8*(b^3*c^2 - 4*a*b*c^3)*f*g^2 + 8*(2*(b^3*
c^2 - 4*a*b*c^3)*e - 3*(b^4*c - 4*a*b^2*c^2)*f)*g*h + (8*(b^3*c^2
 - 4*a*b*c^3)*d - 12*(b^4*c - 4*a*b^2*c^2)*e + 3*(5*b^5 - 24*a*b^
3*c + 16*a^2*b*c^2)*f)*h^2)*x)*log(4*(2*c^2*x + b*c)*sqrt(c*x^2 +
 b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))/((a*b^2
*c^3 - 4*a^2*c^4 + (b^2*c^4 - 4*a*c^5)*x^2 + (b^3*c^3 - 4*a*b*c^4
)*x)*sqrt(c)), 1/8*(2*(2*(b^2*c^2 - 4*a*c^3)*f*h^2*x^3 - 8*(b*c^3
*d - 2*a*c^3*e + a*b*c^2*f)*g^2 + 8*(4*a*c^3*d - 2*a*b*c^2*e + (3
```

```
*a*b^2*c - 8*a^2*c^2)*f)*g*h - (8*a*b*c^2*d - 4*(3*a*b^2*c - 8*a^
2*c^2)*e + (15*a*b^3 - 52*a^2*b*c)*f)*h^2 + (8*(b^2*c^2 - 4*a*c^3
)*f*g*h + (4*(b^2*c^2 - 4*a*c^3)*e - 5*(b^3*c - 4*a*b*c^2)*f)*h^2
)*x^2 - (8*(2*c^4*d - b*c^3*e + (b^2*c^2 - 2*a*c^3)*f)*g^2 - 8*(2
*b*c^3*d - 2*(b^2*c^2 - 2*a*c^3)*e + (3*b^3*c - 10*a*b*c^2)*f)*g*
h + (8*(b^2*c^2 - 2*a*c^3)*d - 4*(3*b^3*c - 10*a*b*c^2)*e + (15*b
^4 - 62*a*b^2*c + 24*a^2*c^2)*f)*h^2)*x)*sqrt(c*x^2 + b*x + a)*sq
rt(-c) + (8*(a*b^2*c^2 - 4*a^2*c^3)*f*g^2 + 8*(2*(a*b^2*c^2 - 4*a
^2*c^3)*e - 3*(a*b^3*c - 4*a^2*b*c^2)*f)*g*h + (8*(a*b^2*c^2 - 4*
a^2*c^3)*d - 12*(a*b^3*c - 4*a^2*b*c^2)*e + 3*(5*a*b^4 - 24*a^2*b
^2*c + 16*a^3*c^2)*f)*h^2 + (8*(b^2*c^3 - 4*a*c^4)*f*g^2 + 8*(2*(
b^2*c^3 - 4*a*c^4)*e - 3*(b^3*c^2 - 4*a*b*c^3)*f)*g*h + (8*(b^2*c
^3 - 4*a*c^4)*d - 12*(b^3*c^2 - 4*a*b*c^3)*e + 3*(5*b^4*c - 24*a*
b^2*c^2 + 16*a^2*c^3)*f)*h^2)*x^2 + (8*(b^3*c^2 - 4*a*b*c^3)*f*g^
2 + 8*(2*(b^3*c^2 - 4*a*b*c^3)*e - 3*(b^4*c - 4*a*b^2*c^2)*f)*g*h
 + (8*(b^3*c^2 - 4*a*b*c^3)*d - 12*(b^4*c - 4*a*b^2*c^2)*e + 3*(5
*b^5 - 24*a*b^3*c + 16*a^2*b*c^2)*f)*h^2)*x)*arctan(1/2*(2*c*x +
b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))/((a*b^2*c^3 - 4*a^2*c^4 +
 (b^2*c^4 - 4*a*c^5)*x^2 + (b^3*c^3 - 4*a*b*c^4)*x)*sqrt(-c))]
```

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

$$\int \frac{(g+hx)^2\,(d+ex+fx^2)}{(a+bx+cx^2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)**2*(f*x**2+e*x+d)/(c*x**2+b*x+a)**(3/2),x)
```

```
[Out] Integral((g + h*x)**2*(d + e*x + f*x**2)/(a + b*x + c*x**2)**(3/2
), x)
```

GIAC/XCAS [A] time = 0.283096, size = 783, normalized size = 2.71

$$\frac{\left(\left(\frac{2\left(b^2c^2fh^2-4\,ac^3fh^2\right)x}{b^2c^3-4\,ac^4}+\frac{8\,b^2c^2fgh-32\,ac^3fgh-5\,b^3cfh^2+20\,abc^2fh^2+4\,b^2c^2h^2e-16\,ac^3h^2e}{b^2c^3-4\,ac^4}\right)x-\frac{16\,c^4dg^2+8\,b^2c^2fg^2-16\,ac^3fg^2-16\,bc^3dgh-24\,b^3}{}\right.}{}$$

$$-\frac{\left(8\,c^2fg^2-24\,bcfgh+8\,c^2dh^2+15\,b^2fh^2-12\,acfh^2+16\,c^2ghe-12\,bch^2e\right)\ln\left(\left|-2\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right)\sqrt{c}-b\right|\right)}{8\,c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)^2/(c*x^2 + b*x + a)^(3/2),x, algorithm="giac
```

```
[Out] 1/4*(((2*(b^2*c^2*f*h^2 - 4*a*c^3*f*h^2)*x/(b^2*c^3 - 4*a*c^4) +
(8*b^2*c^2*f*g*h - 32*a*c^3*f*g*h - 5*b^3*c*f*h^2 + 20*a*b*c^2*f*
h^2 + 4*b^2*c^2*h^2*e - 16*a*c^3*h^2*e)/(b^2*c^3 - 4*a*c^4))*x -
(16*c^4*d*g^2 + 8*b^2*c^2*f*g^2 - 16*a*c^3*f*g^2 - 16*b*c^3*d*g*h
 - 24*b^3*c*f*g*h + 80*a*b*c^2*f*g*h + 8*b^2*c^2*d*h^2 - 16*a*c^3
*d*h^2 + 15*b^4*f*h^2 - 62*a*b^2*c*f*h^2 + 24*a^2*c^2*f*h^2 - 8*b
*c^3*g^2*e + 16*b^2*c^2*g*h*e - 32*a*c^3*g*h*e - 12*b^3*c*h^2*e +
 40*a*b*c^2*h^2*e)/(b^2*c^3 - 4*a*c^4))*x - (8*b*c^3*d*g^2 + 8*a*
b*c^2*f*g^2 - 32*a*c^3*d*g*h - 24*a*b^2*c*f*g*h + 64*a^2*c^2*f*g*
h + 8*a*b*c^2*d*h^2 + 15*a*b^3*f*h^2 - 52*a^2*b*c*f*h^2 - 16*a*c^
3*g^2*e + 16*a*b*c^2*g*h*e - 12*a*b^2*c*h^2*e + 32*a^2*c^2*h^2*e)
/(b^2*c^3 - 4*a*c^4))/sqrt(c*x^2 + b*x + a) - 1/8*(8*c^2*f*g^2 -
24*b*c*f*g*h + 8*c^2*d*h^2 + 15*b^2*f*h^2 - 12*a*c*f*h^2 + 16*c^2
*g*h*e - 12*b*c*h^2*e)*ln(abs(-2*(sqrt(c)*x - sqrt(c*x^2 + b*x +
a))*sqrt(c) - b))/c^(7/2)
```

3.235 $\int \frac{(g+hx)(d+ex+fx^2)}{(a+bx+cx^2)^{3/2}}\,dx$

Optimal. Leaf size=186

$$\frac{2(g+hx)\left(c\left(2ae-b\left(\frac{af}{c}+d\right)\right)-x\left(-2acf+b^2f-bce+2c^2d\right)\right)}{c\left(b^2-4ac\right)\sqrt{a+bx+cx^2}}+\frac{h\sqrt{a+bx+cx^2}\left(-8acf+3b^2f-2bce+4c^2d\right)}{c^2\left(b^2-4ac\right)}-\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)(3bfh-2c(eh+fg))}{2c^{5/2}}$$

```
[Out] (2*(c*(2*a*e - b*(d + (a*f)/c)) - (2*c^2*d - b*c*e + b^2*f - 2*a*
c*f)*x)*(g + h*x))/(c*(b^2 - 4*a*c)*Sqrt[a + b*x + c*x^2]) + ((4*
c^2*d - 2*b*c*e + 3*b^2*f - 8*a*c*f)*h*Sqrt[a + b*x + c*x^2])/(c^
2*(b^2 - 4*a*c)) - ((3*b*f*h - 2*c*(f*g + e*h))*ArcTanh[(b + 2*c*
x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(2*c^(5/2))
```

Rubi [A] time = 0.462228, antiderivative size = 186, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{2(g+hx)\left(-x\left(-2acf+b^2f-bce+2c^2d\right)-b(af+cd)+2ace\right)}{c\left(b^2-4ac\right)\sqrt{a+bx+cx^2}}+\frac{h\sqrt{a+bx+cx^2}\left(-2c(4af+be)+3b^2f+4c^2d\right)}{c^2\left(b^2-4ac\right)}-\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)(3bfh-2c(eh+fg))}{2c^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((g + h*x)*(d + e*x + f*x^2))/(a + b*x + c*x^2)^(3/2),x]
```

```
[Out] (2*(2*a*c*e - b*(c*d + a*f) - (2*c^2*d - b*c*e + b^2*f - 2*a*c*f)
*x)*(g + h*x))/(c*(b^2 - 4*a*c)*Sqrt[a + b*x + c*x^2]) + ((4*c^2*
d + 3*b^2*f - 2*c*(b*e + 4*a*f))*h*Sqrt[a + b*x + c*x^2])/(c^2*(b
^2 - 4*a*c)) - ((3*b*f*h - 2*c*(f*g + e*h))*ArcTanh[(b + 2*c*x)/(
2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(2*c^(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((h*x+g)*(f*x**2+e*x+d)/(c*x**2+b*x+a)**(3/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.731269, size = 205, normalized size = 1.1

$$\frac{\frac{2\sqrt{c}\left(4c\left(2a^2fh-ac(dh+e(g+hx)+fx(g-hx))+c^2dgx\right)+b^2(cx(2eh+2fg-fhx)-3afh)+2bc(aeh+af(g+5hx)+cd(g-hx)-cegx)-3b^3fhx\right)}{\sqrt{a+x(b+cx)}}+\left(b^2-4ac\right)\log}{2c^{5/2}\left(4ac-b^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((g + h*x)*(d + e*x + f*x^2))/(a + b*x + c*x^2)^(3/2),x]
```

```
[Out] ((2*Sqrt[c]*(-3*b^3*f*h*x + 2*b*c*(a*e*h - c*e*g*x + c*d*(g - h*x
) + a*f*(g + 5*h*x)) + b^2*(-3*a*f*h + c*x*(2*f*g + 2*e*h - f*h*x
)) + 4*c*(2*a^2*f*h + c^2*d*g*x - a*c*(d*h + f*x*(g - h*x) + e*(g
 + h*x)))))/Sqrt[a + x*(b + c*x)] + (b^2 - 4*a*c)*(3*b*f*h - 2*c*
(f*g + e*h))*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]])/(2
*c^(5/2)*(-b^2 + 4*a*c))
```

Maple [B] time = 0.012, size = 735, normalized size = 4.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)*(f*x^2+e*x+d)/(c*x^2+b*x+a)^(3/2),x)
```

```
[Out] -1/c/(c*x^2+b*x+a)^(1/2)*d*h-1/c/(c*x^2+b*x+a)^(1/2)*e*g+1/c^(3/2
)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*e*h+1/c^(3/2)*ln((1
/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))*f*g+b^2/c/(4*a*c-b^2)/(c*x
^2+b*x+a)^(1/2)*x*f*g-3/2*h*f*b^3/c^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(
1/2)*x+2*h*f/c^2*a*b^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)+b^2/c/(4*a
*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*e*h+1/2*b/c^2/(c*x^2+b*x+a)^(1/2)*f
*g-3/2*h*f*b/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+
4*h*f/c*a*b/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x+1/2*b/c^2/(c*x^2+b*
x+a)^(1/2)*e*h+2*h*f/c^2*a/(c*x^2+b*x+a)^(1/2)+h*f*x^2/c/(c*x^2+b
*x+a)^(1/2)-3/4*h*f*b^2/c^3/(c*x^2+b*x+a)^(1/2)+2*d*g*(2*c*x+b)/(
4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)-x/c/(c*x^2+b*x+a)^(1/2)*f*g-x/c/(c
*x^2+b*x+a)^(1/2)*e*h-2*b/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*d*h+3
/2*h*f*b/c^2*x/(c*x^2+b*x+a)^(1/2)-3/4*h*f*b^4/c^3/(4*a*c-b^2)/(c
*x^2+b*x+a)^(1/2)+1/2*b^3/c^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*f*g
+1/2*b^3/c^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*e*h-b^2/c/(4*a*c-b^2
```

```
)/(c*x^2+b*x+a)^(1/2)*e*g-2*b/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x*e
*g-b^2/c/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*d*h
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)/(c*x^2 + b*x + a)^(3/2),x, algorithm="maxima
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 5.77114, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)*(h*x + g)/(c*x^2 + b*x + a)^(3/2),x, algorithm="fricas
```

```
[Out] [1/4*(4*((b^2*c - 4*a*c^2)*f*h*x^2 - 2*(b*c^2*d - 2*a*c^2*e + a*b
*c*f)*g + (4*a*c^2*d - 2*a*b*c*e + (3*a*b^2 - 8*a^2*c)*f)*h - (2*
(2*c^3*d - b*c^2*e + (b^2*c - 2*a*c^2)*f)*g - (2*b*c^2*d - 2*(b^2
*c - 2*a*c^2)*e + (3*b^3 - 10*a*b*c)*f)*h)*x)*sqrt(c*x^2 + b*x +
a)*sqrt(c) - (2*(a*b^2*c - 4*a^2*c^2)*f*g + (2*(b^2*c^2 - 4*a*c^3
)*f*g + (2*(b^2*c^2 - 4*a*c^3)*e - 3*(b^3*c - 4*a*b*c^2)*f)*h)*x^
2 + (2*(a*b^2*c - 4*a^2*c^2)*e - 3*(a*b^3 - 4*a^2*b*c)*f)*h + (2*
(b^3*c - 4*a*b*c^2)*f*g + (2*(b^3*c - 4*a*b*c^2)*e - 3*(b^4 - 4*a
*b^2*c)*f)*h)*x)*log(4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x + a) - (8
*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))/((a*b^2*c^2 - 4*a^2*c
^3 + (b^2*c^3 - 4*a*c^4)*x^2 + (b^3*c^2 - 4*a*b*c^3)*x)*sqrt(c)),
 1/2*(2*((b^2*c - 4*a*c^2)*f*h*x^2 - 2*(b*c^2*d - 2*a*c^2*e + a*b
*c*f)*g + (4*a*c^2*d - 2*a*b*c*e + (3*a*b^2 - 8*a^2*c)*f)*h - (2*
(2*c^3*d - b*c^2*e + (b^2*c - 2*a*c^2)*f)*g - (2*b*c^2*d - 2*(b^2
*c - 2*a*c^2)*e + (3*b^3 - 10*a*b*c)*f)*h)*x)*sqrt(c*x^2 + b*x +
a)*sqrt(-c) + (2*(a*b^2*c - 4*a^2*c^2)*f*g + (2*(b^2*c^2 - 4*a*c^
3)*f*g + (2*(b^2*c^2 - 4*a*c^3)*e - 3*(b^3*c - 4*a*b*c^2)*f)*h)*x
^2 + (2*(a*b^2*c - 4*a^2*c^2)*e - 3*(a*b^3 - 4*a^2*b*c)*f)*h + (2
*(b^3*c - 4*a*b*c^2)*f*g + (2*(b^3*c - 4*a*b*c^2)*e - 3*(b^4 - 4*
a*b^2*c)*f)*h)*x)*arctan(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 + b
*x + a)*c)))/((a*b^2*c^2 - 4*a^2*c^3 + (b^2*c^3 - 4*a*c^4)*x^2 +
(b^3*c^2 - 4*a*b*c^3)*x)*sqrt(-c))]
```

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

$$\int \frac{(g+hx)\left(d+ex+fx^2\right)}{(a+bx+cx^2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((h*x+g)*(f*x**2+e*x+d)/(c*x**2+b*x+a)**(3/2),x)
```

```
[Out] Integral((g + h*x)*(d + e*x + f*x**2)/(a + b*x + c*x**2)**(3/2),
x)
```

GIAC/XCAS [A] time = 0.284441, size = 366, normalized size = 1.97

$$\frac{\left(\frac{(b^2cfh-4\,ac^2fh)\,x}{b^2c^2-4\,ac^3}-\frac{4\,c^3dg+2\,b^2cfg-4\,ac^2fg-2\,bc^2dh-3\,b^3fh+10\,abcfh-2\,bc^2ge+2\,b^2che-4\,ac^2he}{b^2c^2-4\,ac^3}\right)x-\frac{2\,bc^2dg+2\,abcfg-4\,ac^2dh-3\,ab^2fh+8\,a^2}{b^2c^2-4\,ac^3}}{\sqrt{cx^2+bx+a}}$$

$$-\frac{(2\,cfg-3\,bfh+2\,che)\ln\left(\left|-2\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right)\sqrt{c}-b\right|\right)}{2\,c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(h*x + g)/(c*x^2 + b*x + a)^(3/2),x, algorithm="giac")
```

```
[Out] (((b^2*c*f*h - 4*a*c^2*f*h)*x/(b^2*c^2 - 4*a*c^3) - (4*c^3*d*g +
2*b^2*c*f*g - 4*a*c^2*f*g - 2*b*c^2*d*h - 3*b^3*f*h + 10*a*b*c*f*
h - 2*b*c^2*g*e + 2*b^2*c*h*e - 4*a*c^2*h*e)/(b^2*c^2 - 4*a*c^3))
*x - (2*b*c^2*d*g + 2*a*b*c*f*g - 4*a*c^2*d*h - 3*a*b^2*f*h + 8*a
^2*c*f*h - 4*a*c^2*g*e + 2*a*b*c*h*e)/(b^2*c^2 - 4*a*c^3))/sqrt(c
*x^2 + b*x + a) - 1/2*(2*c*f*g - 3*b*f*h + 2*c*h*e)*ln(abs(-2*(sq
rt(c)*x - sqrt(c*x^2 + b*x + a))*sqrt(c) - b))/c^(5/2)
```

3.236 $\int \frac{d+ex+fx^2}{(a+bx+cx^2)^{3/2}}\,dx$

Optimal. Leaf size=111

$$\frac{2\left(c\left(2ae-b\left(\frac{af}{c}+d\right)\right)-x\left(-2acf+b^2f-bce+2c^2d\right)\right)}{c\left(b^2-4ac\right)\sqrt{a+bx+cx^2}}+\frac{f\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{c^{3/2}}$$

```
[Out] (2*(c*(2*a*e - b*(d + (a*f)/c)) - (2*c^2*d - b*c*e + b^2*f - 2*a*
c*f)*x))/(c*(b^2 - 4*a*c)*Sqrt[a + b*x + c*x^2]) + (f*ArcTanh[(b
+ 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/c^(3/2)
```

Rubi [A] time = 0.15022, antiderivative size = 111, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.16

$$\frac{2\left(-x\left(-2acf+b^2f-bce+2c^2d\right)-b(af+cd)+2ace\right)}{c\left(b^2-4ac\right)\sqrt{a+bx+cx^2}}+\frac{f\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{c^{3/2}}$$

Antiderivative was successfully verified.

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

```
[Out] (2*(2*a*c*e - b*(c*d + a*f) - (2*c^2*d - b*c*e + b^2*f - 2*a*c*f)
*x))/(c*(b^2 - 4*a*c)*Sqrt[a + b*x + c*x^2]) + (f*ArcTanh[(b + 2*
c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/c^(3/2)
```

Rubi in Sympy [A] time = 15.2059, size = 105, normalized size = 0.95

$$-\frac{2\left(abf-2ace+bcd+x\left(-2acf+b^2f-bce+2c^2d\right)\right)}{c\left(-4ac+b^2\right)\sqrt{a+bx+cx^2}}+\frac{f\,\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -2*(a*b*f - 2*a*c*e + b*c*d + x*(-2*a*c*f + b**2*f - b*c*e + 2*c*
*2*d))/(c*(-4*a*c + b**2)*sqrt(a + b*x + c*x**2)) + f*atanh((b +
2*c*x)/(2*sqrt(c)*sqrt(a + b*x + c*x**2)))/c**(3/2)
```

Mathematica [A] time = 0.334624, size = 113, normalized size = 1.02

$$\frac{\frac{2\sqrt{c}\left(abf-2ac(e+fx)+b^2fx+bc(d-ex)+2c^2dx\right)}{\sqrt{a+x(b+cx)}}-f\left(b^2-4ac\right)\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)}{c^{3/2}\left(4ac-b^2\right)}$$

Antiderivative was successfully verified.

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

```
[Out] ((2*Sqrt[c]*(a*b*f + 2*c^2*d*x + b^2*f*x + b*c*(d - e*x) - 2*a*c*
(e + f*x)))/Sqrt[a + x*(b + c*x)] - (b^2 - 4*a*c)*f*Log[b + 2*c*x
 + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]])/(c^(3/2)*(-b^2 + 4*a*c))
```

Maple [B] time = 0.006, size = 249, normalized size = 2.2

$$2\,\frac{d\,(2\,cx+b)}{(4\,ac-b^2)\,\sqrt{cx^2+bx+a}}-\frac{e}{c}\frac{1}{\sqrt{cx^2+bx+a}}-2\,\frac{bex}{(4\,ac-b^2)\,\sqrt{cx^2+bx+a}}-\frac{b^2e}{c\,(4\,ac-b^2)}\frac{1}{\sqrt{cx^2+bx+a}}-\frac{fx}{c}\frac{1}{\sqrt{cx^2+bx+a}}+\frac{bf}{2\,c^2}\frac{1}{\sqrt{cx^2+bx+a}}+\frac{b^2fx}{c\,(4\,ac-b^2)}\frac{1}{\sqrt{cx^2+bx+a}}+\frac{fb^3}{2\,c^2\,(4\,ac-b^2)}\frac{1}{\sqrt{cx^2+bx+a}}+f\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 2*d*(2*c*x+b)/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)-e/c/(c*x^2+b*x+a)^(
1/2)-2*e*b/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x-e*b^2/c/(4*a*c-b^2)/
(c*x^2+b*x+a)^(1/2)-f*x/c/(c*x^2+b*x+a)^(1/2)+1/2*f*b/c^2/(c*x^2+
b*x+a)^(1/2)+f*b^2/c/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*x+1/2*f*b^3/
c^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)+f/c^(3/2)*ln((1/2*b+c*x)/c^(1
/2)+(c*x^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((f*x^2 + e*x + d)/(c*x^2 + b*x + a)^(3/2),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.564561, size = 1, normalized size = 0.01

$$\left[-\frac{4\left(bcd-2\,ace+abf+\left(2\,c^2d-bce+\left(b^2-2\,ac\right)f\right)x\right)\sqrt{cx^2+bx+a}\sqrt{c}-\left(\left(b^2c-4\,ac^2\right)fx^2+\left(b^3-4\,abc\right)fx+\left(ab^2-\right.\right.}{2\,(ab^2c-4\,a^2c^2+(b^2c^2-4\,ac^3)x^2+(b^3c-4\,abc}\right.$$

$$-\frac{2\left(bcd-2\,ace+abf+\left(2\,c^2d-bce+\left(b^2-2\,ac\right)f\right)x\right)\sqrt{cx^2+bx+a}\sqrt{-c}-\left(\left(b^2c-4\,ac^2\right)fx^2+\left(b^3-4\,abc\right)fx+\left(ab^2-\right.\right.}{(ab^2c-4\,a^2c^2+(b^2c^2-4\,ac^3)x^2+(b^3c-4\,abc^2)x)\sqrt{-c}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] [-1/2*(4*(b*c*d - 2*a*c*e + a*b*f + (2*c^2*d - b*c*e + (b^2 - 2*a
*c)*f)*x)*sqrt(c*x^2 + b*x + a)*sqrt(c) - ((b^2*c - 4*a*c^2)*f*x^
2 + (b^3 - 4*a*b*c)*f*x + (a*b^2 - 4*a^2*c)*f)*log(-4*(2*c^2*x +
b*c)*sqrt(c*x^2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*
sqrt(c)))/((a*b^2*c - 4*a^2*c^2 + (b^2*c^2 - 4*a*c^3)*x^2 + (b^3*
c - 4*a*b*c^2)*x)*sqrt(c)), -(2*(b*c*d - 2*a*c*e + a*b*f + (2*c^2
*d - b*c*e + (b^2 - 2*a*c)*f)*x)*sqrt(c*x^2 + b*x + a)*sqrt(-c) -
 ((b^2*c - 4*a*c^2)*f*x^2 + (b^3 - 4*a*b*c)*f*x + (a*b^2 - 4*a^2*
c)*f)*arctan(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))
/((a*b^2*c - 4*a^2*c^2 + (b^2*c^2 - 4*a*c^3)*x^2 + (b^3*c - 4*a*b
*c^2)*x)*sqrt(-c))]
```

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

$$\int \frac{d+ex+fx^2}{(a+bx+cx^2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] Integral((d + e*x + f*x**2)/(a + b*x + c*x**2)**(3/2), x)
```

GIAC/XCAS [A] time = 0.282098, size = 165, normalized size = 1.49

$$-\frac{2\left(\frac{(2c^2d+b^2f-2acf-bce)x}{b^2c-4ac^2}+\frac{bcd+abf-2ace}{b^2c-4ac^2}\right)}{\sqrt{cx^2+bx+a}}-\frac{f\ln\left(\left|-2\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right)\sqrt{c}-b\right|\right)}{c^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] -2*((2*c^2*d + b^2*f - 2*a*c*f - b*c*e)*x/(b^2*c - 4*a*c^2) + (b*
c*d + a*b*f - 2*a*c*e)/(b^2*c - 4*a*c^2))/sqrt(c*x^2 + b*x + a) -
 f*ln(abs(-2*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))*sqrt(c) - b))/c^
(3/2)
```

3.237 $\int \frac{d+ex+fx^2}{(g+hx)(a+bx+cx^2)^{3/2}}\,dx$

Optimal. Leaf size=225

$$\frac{2\left(-x\left(-c(-2aeh+2afg+bdh+beg)+bf(bg-ah)+2c^2dg\right)-b(aeh+afg+cdg)+2a(afh-cdh+ceg)+b^2dh\right)}{(b^2-4ac)\sqrt{a+bx+cx^2}\,(ah^2-bgh+cg^2)}+\frac{\left(fg^2-h(eg-dh)\right)\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)}{(ah^2-bgh+cg^2)^{3/2}}$$

```
[Out] (2*(b^2*d*h - b*(c*d*g + a*f*g + a*e*h) + 2*a*(c*e*g - c*d*h + a*
f*h) - (2*c^2*d*g + b*f*(b*g - a*h) - c*(b*e*g + 2*a*f*g + b*d*h
- 2*a*e*h))*x))/((b^2 - 4*a*c)*(c*g^2 - b*g*h + a*h^2)*Sqrt[a + b
*x + c*x^2]) + ((f*g^2 - h*(e*g - d*h))*ArcTanh[(b*g - 2*a*h + (2
*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^
2])])/(c*g^2 - b*g*h + a*h^2)^(3/2)
```

Rubi [A] time = 0.650337, antiderivative size = 225, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$

$$\frac{2\left(-x\left(-c(-2aeh+2afg+bdh+beg)+bf(bg-ah)+2c^2dg\right)-b(aeh+afg+cdg)+2a(afh-cdh+ceg)+b^2dh\right)}{(b^2-4ac)\sqrt{a+bx+cx^2}\,(ah^2-bgh+cg^2)}+\frac{\left(fg^2-h(eg-dh)\right)\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)}{(ah^2-bgh+cg^2)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/((g + h*x)*(a + b*x + c*x^2)^(3/2)),x]
```



```
[Out] (2*(b^2*d*h - b*(c*d*g + a*f*g + a*e*h) + 2*a*(c*e*g - c*d*h + a*
f*h) - (2*c^2*d*g + b*f*(b*g - a*h) - c*(b*e*g + 2*a*f*g + b*d*h
- 2*a*e*h))*x))/((b^2 - 4*a*c)*(c*g^2 - b*g*h + a*h^2)*Sqrt[a + b
*x + c*x^2]) + ((f*g^2 - h*(e*g - d*h))*ArcTanh[(b*g - 2*a*h + (2
*c*g - b*h)*x)/(2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^
2])])/(c*g^2 - b*g*h + a*h^2)^(3/2)
```

Rubi in Sympy [A] time = 75.7903, size = 233, normalized size = 1.04

$$-\frac{(dh^2-egh+fg^2)\operatorname{atanh}\left(\frac{2ah-bg+x(bh-2cg)}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)}{(ah^2-bgh+cg^2)^{\frac{3}{2}}}+\frac{4a(afh-bfg-cdh+ceg)-2b(aeh-afg-bdh+cdg)-x\left(-2abfh+4aceh-4acfg+2b^2fg-2bcdh-2bceg+4c^2\right.}{(-4ac+b^2)\sqrt{a+bx+cx^2}\,(ah^2-bgh+cg^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)/(h*x+g)/(c*x**2+b*x+a)**(3/2),x)
```

```
[Out] -(d*h**2 - e*g*h + f*g**2)*atanh((2*a*h - b*g + x*(b*h - 2*c*g))/
(2*sqrt(a + b*x + c*x**2)*sqrt(a*h**2 - b*g*h + c*g**2)))/(a*h**2
 - b*g*h + c*g**2)**(3/2) + (4*a*(a*f*h - b*f*g - c*d*h + c*e*g)
- 2*b*(a*e*h - a*f*g - b*d*h + c*d*g) - x*(-2*a*b*f*h + 4*a*c*e*h
 - 4*a*c*f*g + 2*b**2*f*g - 2*b*c*d*h - 2*b*c*e*g + 4*c**2*d*g))/
((-4*a*c + b**2)*sqrt(a + b*x + c*x**2)*(a*h**2 - b*g*h + c*g**2)
)
```

Mathematica [A] time = 0.93496, size = 262, normalized size = 1.16

$$\frac{2\left(-2a^2fh+ab(eh+f(g-hx))+2ac(dh-eg+ehx-fgx)+b^2(fgx-dh)+bc(d(g-hx)-egx)+2c^2dgx\right)}{(b^2-4ac)\sqrt{a+x(b+cx)}\,(h(bg-ah)-cg^2)}+\frac{\log(g+hx)\left(h(dh-eg)+fg^2\right)}{(h(ah-bg)+cg^2)^{3/2}}-\frac{\left(h(dh-eg)+fg^2\right)\log\left(2\sqrt{a+x(b+cx)}\sqrt{h(ah-bg)+cg^2}+2ah-bg+bhx-2cgx\right)}{(h(ah-bg)+cg^2)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/((g + h*x)*(a + b*x + c*x^2)^(3/2)),x]
```

```
[Out] (2*(-2*a^2*f*h + 2*c^2*d*g*x + b^2*(-(d*h) + f*g*x) + 2*a*c*(-(e*
g) + d*h - f*g*x + e*h*x) + b*c*(-(e*g*x) + d*(g - h*x)) + a*b*(e
*h + f*(g - h*x))))/((b^2 - 4*a*c)*(-(c*g^2) + h*(b*g - a*h))*Sqr
t[a + x*(b + c*x)]) + ((f*g^2 + h*(-(e*g) + d*h))*Log[g + h*x])/(
c*g^2 + h*(-(b*g) + a*h))^(3/2) - ((f*g^2 + h*(-(e*g) + d*h))*Log
[-(b*g) + 2*a*h - 2*c*g*x + b*h*x + 2*Sqrt[c*g^2 + h*(-(b*g) + a*
h)]*Sqrt[a + x*(b + c*x)]])/(c*g^2 + h*(-(b*g) + a*h))^(3/2)
```

Maple [B] time = 0.022, size = 2079, normalized size = 9.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(h*x+g)/(c*x^2+b*x+a)^(3/2),x)
```

```
[Out] -2*h/(a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h
*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*b*c*d+h/(a*h^2-b*g*h+
c*g^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)
/h^2)^(1/2)*d-1/(a*h^2-b*g*h+c*g^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*
(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*e*g-1/h*f/c/(c*x^2+b*x+a
)^(1/2)-2/h/(a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2
*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*b*c*f*g^2-h/(a
*h^2-b*g*h+c*g^2)/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*
g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2
)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2
)/h^2)^(1/2))/(x+1/h*g))*d+1/h/(a*h^2-b*g*h+c*g^2)/((x+1/h*g)^2*c
+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*f*g^2+2/(
a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/
h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*b*c*e*g-2/h*f*b/(4*a*c-b^2)
/(c*x^2+b*x+a)^(1/2)*x-1/h*f*b^2/c/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2
)-2/h^2*f*g/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*b+4/h*e/(4*a*c-b^2)/(
c*x^2+b*x+a)^(1/2)*c*x-1/h/(a*h^2-b*g*h+c*g^2)/((a*h^2-b*g*h+c*g^
2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*
g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h
*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*f*g^2-h/(a*
h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*
g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b^2*d+1/(a*h^2-b*g*h+c*g^2)/(4*
a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^
2)/h^2)^(1/2)*b^2*e*g-2/h/(a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/h
*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b*
c*g^2*e+2/h^2/(a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h
-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b*c*g^3*f-4/h/
(a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1
/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*c^2*g^2*e+4/h^2/(a*h^2-b*g
*h+c*g^2)/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h
^2-b*g*h+c*g^2)/h^2)^(1/2)*x*c^2*g^3*f+1/(a*h^2-b*g*h+c*g^2)/((a*
h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*
c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c
+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g
))*e*g+2/h*e/(4*a*c-b^2)/(c*x^2+b*x+a)^(1/2)*b-4/h^2*f*g/(4*a*c-b
^2)/(c*x^2+b*x+a)^(1/2)*c*x+4/(a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x
+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2
)*x*c^2*g*d-1/h/(a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/h*g)^2*c+(b
*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b^2*f*g^2+2/
(a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1
/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b*c*g*d
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/((c*x^2 + b*x + a)^(3/2)*(h*x + g)),x, algorithm="maxi
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 6.42407, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/((c*x^2 + b*x + a)^(3/2)*(h*x + g)),x, algorithm="fric
```

```
[Out] [-1/2*(4*sqrt(c*g^2 - b*g*h + a*h^2)*sqrt(c*x^2 + b*x + a)*((b*c*
d - 2*a*c*e + a*b*f)*g + (a*b*e - 2*a^2*f - (b^2 - 2*a*c)*d)*h +
((2*c^2*d - b*c*e + (b^2 - 2*a*c)*f)*g - (b*c*d - 2*a*c*e + a*b*f
)*h)*x) - ((a*b^2 - 4*a^2*c)*f*g^2 - (a*b^2 - 4*a^2*c)*e*g*h + (a
*b^2 - 4*a^2*c)*d*h^2 + ((b^2*c - 4*a*c^2)*f*g^2 - (b^2*c - 4*a*c
^2)*e*g*h + (b^2*c - 4*a*c^2)*d*h^2)*x^2 + ((b^3 - 4*a*b*c)*f*g^2
 - (b^3 - 4*a*b*c)*e*g*h + (b^3 - 4*a*b*c)*d*h^2)*x)*log(((8*a*b*
g*h - 8*a^2*h^2 - (b^2 + 4*a*c)*g^2 - (8*c^2*g^2 - 8*b*c*g*h + (b
^2 + 4*a*c)*h^2)*x^2 - 2*(4*b*c*g^2 + 4*a*b*h^2 - (3*b^2 + 4*a*c)
*g*h)*x)*sqrt(c*g^2 - b*g*h + a*h^2) - 4*(b*c*g^3 + 3*a*b*g*h^2 -
 2*a^2*h^3 - (b^2 + 2*a*c)*g^2*h + (2*c^2*g^3 - 3*b*c*g^2*h - a*b
*h^3 + (b^2 + 2*a*c)*g*h^2)*x)*sqrt(c*x^2 + b*x + a))/(h^2*x^2 +
2*g*h*x + g^2)))/(((a*b^2*c - 4*a^2*c^2)*g^2 - (a*b^3 - 4*a^2*b*c
)*g*h + (a^2*b^2 - 4*a^3*c)*h^2 + ((b^2*c^2 - 4*a*c^3)*g^2 - (b^3
*c - 4*a*b*c^2)*g*h + (a*b^2*c - 4*a^2*c^2)*h^2)*x^2 + ((b^3*c -
4*a*b*c^2)*g^2 - (b^4 - 4*a*b^2*c)*g*h + (a*b^3 - 4*a^2*b*c)*h^2)
*x)*sqrt(c*g^2 - b*g*h + a*h^2)), -(2*sqrt(-c*g^2 + b*g*h - a*h^2
)*sqrt(c*x^2 + b*x + a)*((b*c*d - 2*a*c*e + a*b*f)*g + (a*b*e - 2
*a^2*f - (b^2 - 2*a*c)*d)*h + ((2*c^2*d - b*c*e + (b^2 - 2*a*c)*f
)*g - (b*c*d - 2*a*c*e + a*b*f)*h)*x) + ((a*b^2 - 4*a^2*c)*f*g^2
- (a*b^2 - 4*a^2*c)*e*g*h + (a*b^2 - 4*a^2*c)*d*h^2 + ((b^2*c - 4
*a*c^2)*f*g^2 - (b^2*c - 4*a*c^2)*e*g*h + (b^2*c - 4*a*c^2)*d*h^2
)*x^2 + ((b^3 - 4*a*b*c)*f*g^2 - (b^3 - 4*a*b*c)*e*g*h + (b^3 - 4
*a*b*c)*d*h^2)*x)*arctan(-1/2*sqrt(-c*g^2 + b*g*h - a*h^2)*(b*g -
 2*a*h + (2*c*g - b*h)*x)/((c*g^2 - b*g*h + a*h^2)*sqrt(c*x^2 + b
*x + a))))/(((a*b^2*c - 4*a^2*c^2)*g^2 - (a*b^3 - 4*a^2*b*c)*g*h
+ (a^2*b^2 - 4*a^3*c)*h^2 + ((b^2*c^2 - 4*a*c^3)*g^2 - (b^3*c - 4
*a*b*c^2)*g*h + (a*b^2*c - 4*a^2*c^2)*h^2)*x^2 + ((b^3*c - 4*a*b*
c^2)*g^2 - (b^4 - 4*a*b^2*c)*g*h + (a*b^3 - 4*a^2*b*c)*h^2)*x)*sq
```

```
rt(-c*g^2 + b*g*h - a*h^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((f*x**2+e*x+d)/(h*x+g)/(c*x**2+b*x+a)**(3/2),x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.280063, size = 971, normalized size = 4.32

$$-\frac{2\left(\frac{(2c^3dg^3+b^2cfg^3-2ac^2fg^3-3bc^2dg^2h-b^3fg^2h+abcfg^2h+b^2cdgh^2+2ac^2dgh^2+2ab^2fgh^2-2a^2cfgh^2-abcdh^3-a^2bfh^3-bc^2g^3e+b^2cg^2he+2ac^2g^2h}{b^2c^2g^4-4ac^3g^4-2b^3cg^3h+8abc^2g^3h+b^4g^2h^2-2ab^2cg^2h^2-8a^2c^2g^2h^2-2ab^3gh^3+8a^2bcgh^3+a^2b^2h^4-4a^3ch^4}\right.}{}$$

$$+\frac{2\left(fg^2+dh^2-ghe\right)\arctan\left(-\frac{\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right)h+\sqrt{c}g}{\sqrt{-cg^2+bgh-ah^2}}\right)}{(cg^2-bgh+ah^2)\sqrt{-cg^2+bgh-ah^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)/((c*x^2 + b*x + a)^(3/2)*(h*x + g)),x, algorithm="giac

[Out] -2*((2*c^3*d*g^3 + b^2*c*f*g^3 - 2*a*c^2*f*g^3 - 3*b*c^2*d*g^2*h
- b^3*f*g^2*h + a*b*c*f*g^2*h + b^2*c*d*g*h^2 + 2*a*c^2*d*g*h^2 +
 2*a*b^2*f*g*h^2 - 2*a^2*c*f*g*h^2 - a*b*c*d*h^3 - a^2*b*f*h^3 -
b*c^2*g^3*e + b^2*c*g^2*h*e + 2*a*c^2*g^2*h*e - 3*a*b*c*g*h^2*e +
 2*a^2*c*h^3*e)*x/(b^2*c^2*g^4 - 4*a*c^3*g^4 - 2*b^3*c*g^3*h + 8*
a*b*c^2*g^3*h + b^4*g^2*h^2 - 2*a*b^2*c*g^2*h^2 - 8*a^2*c^2*g^2*h
^2 - 2*a*b^3*g*h^3 + 8*a^2*b*c*g*h^3 + a^2*b^2*h^4 - 4*a^3*c*h^4)
 + (b*c^2*d*g^3 + a*b*c*f*g^3 - 2*b^2*c*d*g^2*h + 2*a*c^2*d*g^2*h
 - a*b^2*f*g^2*h - 2*a^2*c*f*g^2*h + b^3*d*g*h^2 - a*b*c*d*g*h^2
+ 3*a^2*b*f*g*h^2 - a*b^2*d*h^3 + 2*a^2*c*d*h^3 - 2*a^3*f*h^3 - 2
*a*c^2*g^3*e + 3*a*b*c*g^2*h*e - a*b^2*g*h^2*e - 2*a^2*c*g*h^2*e
+ a^2*b*h^3*e)/(b^2*c^2*g^4 - 4*a*c^3*g^4 - 2*b^3*c*g^3*h + 8*a*b
*c^2*g^3*h + b^4*g^2*h^2 - 2*a*b^2*c*g^2*h^2 - 8*a^2*c^2*g^2*h^2
- 2*a*b^3*g*h^3 + 8*a^2*b*c*g*h^3 + a^2*b^2*h^4 - 4*a^3*c*h^4))/s
qrt(c*x^2 + b*x + a) + 2*(f*g^2 + d*h^2 - g*h*e)*arctan(-((sqrt(c
)*x - sqrt(c*x^2 + b*x + a))*h + sqrt(c)*g)/sqrt(-c*g^2 + b*g*h -
 a*h^2))/((c*g^2 - b*g*h + a*h^2)*sqrt(-c*g^2 + b*g*h - a*h^2))
```

3.238 $\int \frac{d+ex+fx^2}{(g+hx)^2(a+bx+cx^2)^{3/2}}\,dx$

Optimal. Leaf size=421

$$-\frac{2\left(cx\left(2a^2fh^2-c\left(2a\left(dh^2-2egh+fg^2\right)+bg(2dh+eg)\right)-abh(eh+2fg)+b^2\left(dh^2+fg^2\right)+2c^2dg^2\right)+b\left(a^2fh^2+ac\left(\cdots\right.\right.\right.}{(b^2-4ac)\sqrt{a+bx+cx^2}\left(ah^2-bg\cdots\right.}-\frac{h\sqrt{a+bx+cx^2}\left(fg^2-h(eg-dh)\right)}{(g+hx)\left(ah^2-bgh+cg^2\right)^2}+\frac{\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(2cg\left(fg^2-h(2eg-3dh)\right)-h\left(2ah(2fg-eh)-b\left(-3dh^2+egh+fg^2\right)\right)\right)}{2\left(ah^2-bgh+cg^2\right)^{5/2}}$$

```
[Out] (-2*(b^3*d*h^2 - b^2*h*(2*c*d*g + a*e*h) - 2*a*c*(c*g*(e*g - 2*d*
h) + a*h*(2*f*g - e*h)) + b*(c^2*d*g^2 + a^2*f*h^2 + a*c*(f*g^2 +
 2*e*g*h - 3*d*h^2)) + c*(2*c^2*d*g^2 + 2*a^2*f*h^2 - a*b*h*(2*f*
g + e*h) + b^2*(f*g^2 + d*h^2) - c*(b*g*(e*g + 2*d*h) + 2*a*(f*g^
2 - 2*e*g*h + d*h^2)))*x))/((b^2 - 4*a*c)*(c*g^2 - b*g*h + a*h^2)
^2*Sqrt[a + b*x + c*x^2]) - (h*(f*g^2 - h*(e*g - d*h))*Sqrt[a + b
*x + c*x^2])/((c*g^2 - b*g*h + a*h^2)^2*(g + h*x)) + ((2*c*g*(f*g
^2 - h*(2*e*g - 3*d*h)) - h*(2*a*h*(2*f*g - e*h) - b*(f*g^2 + e*g
*h - 3*d*h^2)))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c
*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(2*(c*g^2 - b*g*h
+ a*h^2)^(5/2))
```

Rubi [A] time = 1.97212, antiderivative size = 418, normalized size of antiderivative = 0.99, number of steps used = 4, number of rules used = 4, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$

$$-\frac{2\left(cx\left(2a^2fh^2-c\left(2a\left(dh^2-2egh+fg^2\right)+bg(2dh+eg)\right)-abh(eh+2fg)+b^2\left(dh^2+fg^2\right)+2c^2dg^2\right)+b\left(a^2fh^2+ac\left(\cdots\right.\right.\right.}{(b^2-4ac)\sqrt{a+bx+cx^2}\left(ah^2-bg\cdots\right.}-\frac{h\sqrt{a+bx+cx^2}\left(fg^2-h(eg-dh)\right)}{(g+hx)\left(ah^2-bgh+cg^2\right)^2}+\frac{\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(h\left(-2ah(2fg-eh)+bh(eg-3dh)+bfg^2\right)+2c\left(fg^3-gh(2eg-3dh)\right)\right)}{2\left(ah^2-bgh+cg^2\right)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/((g + h*x)^2*(a + b*x + c*x^2)^(3/2)),x]
```

```
[Out] (-2*(b^3*d*h^2 - b^2*h*(2*c*d*g + a*e*h) - 2*a*c*(c*g*(e*g - 2*d*
h) + a*h*(2*f*g - e*h)) + b*(c^2*d*g^2 + a^2*f*h^2 + a*c*(f*g^2 +
 2*e*g*h - 3*d*h^2)) + c*(2*c^2*d*g^2 + 2*a^2*f*h^2 - a*b*h*(2*f*
```

```
g + e*h) + b^2*(f*g^2 + d*h^2) - c*(b*g*(e*g + 2*d*h) + 2*a*(f*g^
2 - 2*e*g*h + d*h^2)))*x))/((b^2 - 4*a*c)*(c*g^2 - b*g*h + a*h^2)
^2*Sqrt[a + b*x + c*x^2]) - (h*(f*g^2 - h*(e*g - d*h))*Sqrt[a + b
*x + c*x^2])/((c*g^2 - b*g*h + a*h^2)^2*(g + h*x)) + ((2*c*(f*g^3
 - g*h*(2*e*g - 3*d*h)) + h*(b*f*g^2 + b*h*(e*g - 3*d*h) - 2*a*h*
(2*f*g - e*h)))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c
*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(2*(c*g^2 - b*g*h
+ a*h^2)^(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((f*x**2+e*x+d)/(h*x+g)**2/(c*x**2+b*x+a)**(3/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 5.78182, size = 474, normalized size = 1.13

$$\frac{1}{2}\left(-\frac{4\left(b\left(a^2fh^2+ac(fg(g-2hx)-h(3dh-2eg+ehx))+c^2g(d(g-2hx)-egx)\right)+2c\left(a^2h(eh-2fg+fhx)-ac\left(dh(hx\right.\right.\right.}{(b^2-4ac)\sqrt{a+x(b+cx)}\,(h(ah-bg)}\right.$$
$$-\frac{2h\sqrt{a+x(b+cx)}\left(h(dh-eg)+fg^2\right)}{(g+hx)\left(h(ah-bg)+cg^2\right)^2}$$
$$+\frac{\log(g+hx)\left(h\left(2ah(eh-2fg)+bh(eg-3dh)+bfg^2\right)+2c\left(gh(3dh-2eg)+fg^3\right)\right)}{\left(h(ah-bg)+cg^2\right)^{5/2}}$$
$$-\frac{\log\left(2\sqrt{a+x(b+cx)}\sqrt{h(ah-bg)+cg^2}+2ah-bg+bhx-2cgx\right)\left(h\left(2ah(eh-2fg)+bh(eg-3dh)+bfg^2\right)+2c\left(gh(3d\right.\right.}{\left(h(ah-bg)+cg^2\right)^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/((g + h*x)^2*(a + b*x + c*x^2)^(3/2)),x]
```

```
[Out] ((-2*h*(f*g^2 + h*(-(e*g) + d*h))*Sqrt[a + x*(b + c*x)])/((c*g^2
+ h*(-(b*g) + a*h))^2*(g + h*x)) - (4*(b^3*d*h^2 + b^2*(-(a*e*h^2
) + c*f*g^2*x + c*d*h*(-2*g + h*x)) + 2*c*(c^2*d*g^2*x + a^2*h*(-
2*f*g + e*h + f*h*x) - a*c*(f*g^2*x + e*g*(g - 2*h*x) + d*h*(-2*g
 + h*x))) + b*(a^2*f*h^2 + c^2*g*(-(e*g*x) + d*(g - 2*h*x)) + a*c
```

```
*(f*g*(g - 2*h*x) - h*(-2*e*g + 3*d*h + e*h*x)))))/((b^2 - 4*a*c)
*(c*g^2 + h*(-(b*g) + a*h))^2*Sqrt[a + x*(b + c*x)]) + ((2*c*(f*g
^3 + g*h*(-2*e*g + 3*d*h)) + h*(b*f*g^2 + b*h*(e*g - 3*d*h) + 2*a
*h*(-2*f*g + e*h)))*Log[g + h*x])/(c*g^2 + h*(-(b*g) + a*h))^(5/2
) - ((2*c*(f*g^3 + g*h*(-2*e*g + 3*d*h)) + h*(b*f*g^2 + b*h*(e*g
- 3*d*h) + 2*a*h*(-2*f*g + e*h)))*Log[-(b*g) + 2*a*h - 2*c*g*x +
b*h*x + 2*Sqrt[c*g^2 + h*(-(b*g) + a*h)]*Sqrt[a + x*(b + c*x)]])/
(c*g^2 + h*(-(b*g) + a*h))^(5/2))/2
```

Maple [B] time = 0.029, size = 4930, normalized size = 11.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(h*x+g)^2/(c*x^2+b*x+a)^(3/2),x)
```

```
[Out] -1/(a*h^2-b*g*h+c*g^2)/(x+1/h*g)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+
1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*d-1/(a*h^2-b*g*h+c*g^2)/((a
*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2
*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*
c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*
g))*e-2/h/(a*h^2-b*g*h+c*g^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h
*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*f*g-1/(a*h^2-b*g*h+c*g^2)/(4*a
*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2
)/h^2)^(1/2)*b^2*e+12/(a*h^2-b*g*h+c*g^2)^2/(4*a*c-b^2)/((x+1/h*g
)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*c^
3*g^2*d-3*h/(a*h^2-b*g*h+c*g^2)^2/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h
-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*b^2*c*e*g+4/
h/(a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x
+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*b*c*f*g-12*h/(a*h^2-b*g*
h+c*g^2)^2/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*
h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*b*c^2*g*d-12/h/(a*h^2-b*g*h+c*g^2)^
2/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h
+c*g^2)/h^2)^(1/2)*x*b*c^2*g^3*f-3/2*h/(a*h^2-b*g*h+c*g^2)^2/((a*
h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*
c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c
+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g
))*b*e*g-3*h/(a*h^2-b*g*h+c*g^2)^2/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2
)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2
-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(
a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*c*g*d-3/h/(a*h^2-b*g*h+
c*g^2)^2/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2
)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*(
(x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1
/2))/(x+1/h*g))*c*g^3*f+1/(a*h^2-b*g*h+c*g^2)/((x+1/h*g)^2*c+(b*h
-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*e-3/2*h/(a*h^2
-b*g*h+c*g^2)^2/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g
)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b^3*e*g-2/(a*h^2-b*g*h+c*g^2)/(4
```

```
*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g
^2)/h^2)^(1/2)*x*b*c*e+2/h/(a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/
h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b
^2*f*g+6/(a*h^2-b*g*h+c*g^2)^2/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*
c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b^2*c*g^2*e+6/(a*
h^2-b*g*h+c*g^2)^2/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/
h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b*c^2*g^2*d+6/h/(a*h^2-b*g*h+
c*g^2)/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-
b*g*h+c*g^2)/h^2)^(1/2)*b*c*g*e-8/h^2/(a*h^2-b*g*h+c*g^2)/(4*a*c-
b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h
^2)^(1/2)*b*c*g^2*f+12/h/(a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/h*
g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*c
^2*g*e+3/(a*h^2-b*g*h+c*g^2)^2/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*
c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*b^2*c*f*g^2+12/
(a*h^2-b*g*h+c*g^2)^2/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x
+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*b*c^2*g^2*e+6/h^2/(a*h^2
-b*g*h+c*g^2)^2/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g
)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b*c^2*g^4*f+12/h^2/(a*h^2-b*g*h+
c*g^2)^2/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^
2-b*g*h+c*g^2)/h^2)^(1/2)*x*c^3*g^4*f-6*h/(a*h^2-b*g*h+c*g^2)^2/(
4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*
g^2)/h^2)^(1/2)*b^2*c*g*d+2*f/h^2*(2*c*x+b)/(4*a*c-b^2)/(c*x^2+b*
x+a)^(1/2)-3/(a*h^2-b*g*h+c*g^2)^2/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(
x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*c*g^2*e+2/h/(a*h^2-b*g*h+
c*g^2)/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/
h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x
+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2
))/(x+1/h*g))*f*g-8*c^2/(a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/h*g
)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*d-
4*c/(a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*
(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b*d+3/2/(a*h^2-b*g*h+c*g
^2)^2/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b
*g*h+c*g^2)/h^2)^(1/2)*b^3*f*g^2+3/2/(a*h^2-b*g*h+c*g^2)^2/((a*h^
2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*
g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(
b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))
*b*f*g^2+1/h/(a*h^2-b*g*h+c*g^2)/(x+1/h*g)/((x+1/h*g)^2*c+(b*h-2*
c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*e*g-1/h^2/(a*h^2-
b*g*h+c*g^2)/(x+1/h*g)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*
h^2-b*g*h+c*g^2)/h^2)^(1/2)*f*g^2+3/h/(a*h^2-b*g*h+c*g^2)^2/((x+1
/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*
c*g^3*f+3/2*h^2/(a*h^2-b*g*h+c*g^2)^2/(4*a*c-b^2)/((x+1/h*g)^2*c+
(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b^3*d+3/2*
h/(a*h^2-b*g*h+c*g^2)^2/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a
*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b*e*g+3*h/(a*h^2-b*g*h+c*g^2)^2/((x+
1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)
*c*g*d+3/2*h^2/(a*h^2-b*g*h+c*g^2)^2/((a*h^2-b*g*h+c*g^2)/h^2)^(1
/2)*ln((2*(a*h^2-b*g*h+c*g^2)/h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h
^2-b*g*h+c*g^2)/h^2)^(1/2)*((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)
+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2))/(x+1/h*g))*b*d+3/(a*h^2-b*g*h+c*
g^2)^2/((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*ln((2*(a*h^2-b*g*h+c*g^2)/
h^2+(b*h-2*c*g)/h*(x+1/h*g)+2*((a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*((x
+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2
))/(x+1/h*g))*c*g^2*e-3/2*h^2/(a*h^2-b*g*h+c*g^2)^2/((x+1/h*g)^2*
```

```
c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*b*d-3/2/
(a*h^2-b*g*h+c*g^2)^2/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h
^2-b*g*h+c*g^2)/h^2)^(1/2)*b*f*g^2-6/h/(a*h^2-b*g*h+c*g^2)^2/(4*a
*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2
)/h^2)^(1/2)*b^2*c*g^3*f-6/h/(a*h^2-b*g*h+c*g^2)^2/(4*a*c-b^2)/((
x+1/h*g)^2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/
2)*b*c^2*g^3*e-16/h^2/(a*h^2-b*g*h+c*g^2)/(4*a*c-b^2)/((x+1/h*g)^
2*c+(b*h-2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*c^2*
g^2*f-12/h/(a*h^2-b*g*h+c*g^2)^2/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-
2*c*g)/h*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*c^3*g^3*e+3*h
^2/(a*h^2-b*g*h+c*g^2)^2/(4*a*c-b^2)/((x+1/h*g)^2*c+(b*h-2*c*g)/h
*(x+1/h*g)+(a*h^2-b*g*h+c*g^2)/h^2)^(1/2)*x*b^2*c*d
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/((c*x^2 + b*x + a)^(3/2)*(h*x + g)^2),x, algorithm="ma
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 11.0851, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/((c*x^2 + b*x + a)^(3/2)*(h*x + g)^2),x, algorithm="fr
```

```
[Out] [-1/4*(4*((a*b^2 - 4*a^2*c)*d*h^3 + 2*(b*c^2*d - 2*a*c^2*e + a*b*
c*f)*g^3 + (4*a*b*c*e - 4*(b^2*c - 2*a*c^2)*d + (a*b^2 - 12*a^2*c
)*f)*g^2*h + (2*a^2*b*f + 2*(b^3 - 3*a*b*c)*d - (3*a*b^2 - 8*a^2*
c)*e)*g*h^2 + ((4*c^3*d - 2*b*c^2*e + (3*b^2*c - 8*a*c^2)*f)*g^2*
h - (4*b*c^2*d + 4*a*b*c*f + (b^2*c - 12*a*c^2)*e)*g*h^2 - (2*a*b
*c*e - 4*a^2*c*f - (3*b^2*c - 8*a*c^2)*d)*h^3)*x^2 + (2*(2*c^3*d
- b*c^2*e + (b^2*c - 2*a*c^2)*f)*g^3 - (2*b*c^2*d - 4*a*c^2*e - (
b^3 - 6*a*b*c)*f)*g^2*h - (4*a^2*c*f + 2*(b^2*c - 2*a*c^2)*d + (b
^3 - 6*a*b*c)*e)*g*h^2 + (2*a^2*b*f + (3*b^3 - 10*a*b*c)*d - 2*(a
*b^2 - 2*a^2*c)*e)*h^3)*x)*sqrt(c*g^2 - b*g*h + a*h^2)*sqrt(c*x^2
 + b*x + a) - (2*(a*b^2*c - 4*a^2*c^2)*f*g^4 - (4*(a*b^2*c - 4*a^
2*c^2)*e - (a*b^3 - 4*a^2*b*c)*f)*g^3*h + (6*(a*b^2*c - 4*a^2*c^2
)*d + (a*b^3 - 4*a^2*b*c)*e - 4*(a^2*b^2 - 4*a^3*c)*f)*g^2*h^2 -
(3*(a*b^3 - 4*a^2*b*c)*d - 2*(a^2*b^2 - 4*a^3*c)*e)*g*h^3 + (2*(b
```

```
^2*c^2 - 4*a*c^3)*f*g^3*h - (4*(b^2*c^2 - 4*a*c^3)*e - (b^3*c - 4
*a*b*c^2)*f)*g^2*h^2 + (6*(b^2*c^2 - 4*a*c^3)*d + (b^3*c - 4*a*b*
c^2)*e - 4*(a*b^2*c - 4*a^2*c^2)*f)*g*h^3 - (3*(b^3*c - 4*a*b*c^2
)*d - 2*(a*b^2*c - 4*a^2*c^2)*e)*h^4)*x^3 + (2*(b^2*c^2 - 4*a*c^3
)*f*g^4 - (4*(b^2*c^2 - 4*a*c^3)*e - 3*(b^3*c - 4*a*b*c^2)*f)*g^3
*h + (6*(b^2*c^2 - 4*a*c^3)*d - 3*(b^3*c - 4*a*b*c^2)*e + (b^4 -
8*a*b^2*c + 16*a^2*c^2)*f)*g^2*h^2 + (3*(b^3*c - 4*a*b*c^2)*d + (
b^4 - 2*a*b^2*c - 8*a^2*c^2)*e - 4*(a*b^3 - 4*a^2*b*c)*f)*g*h^3 -
 (3*(b^4 - 4*a*b^2*c)*d - 2*(a*b^3 - 4*a^2*b*c)*e)*h^4)*x^2 + (2*
(b^3*c - 4*a*b*c^2)*f*g^4 - (4*(b^3*c - 4*a*b*c^2)*e - (b^4 - 2*a
*b^2*c - 8*a^2*c^2)*f)*g^3*h + (6*(b^3*c - 4*a*b*c^2)*d + (b^4 -
8*a*b^2*c + 16*a^2*c^2)*e - 3*(a*b^3 - 4*a^2*b*c)*f)*g^2*h^2 - (3
*(b^4 - 6*a*b^2*c + 8*a^2*c^2)*d - 3*(a*b^3 - 4*a^2*b*c)*e + 4*(a
^2*b^2 - 4*a^3*c)*f)*g*h^3 - (3*(a*b^3 - 4*a^2*b*c)*d - 2*(a^2*b^
2 - 4*a^3*c)*e)*h^4)*x)*log(((8*a*b*g*h - 8*a^2*h^2 - (b^2 + 4*a*
c)*g^2 - (8*c^2*g^2 - 8*b*c*g*h + (b^2 + 4*a*c)*h^2)*x^2 - 2*(4*b
*c*g^2 + 4*a*b*h^2 - (3*b^2 + 4*a*c)*g*h)*x)*sqrt(c*g^2 - b*g*h +
 a*h^2) - 4*(b*c*g^3 + 3*a*b*g*h^2 - 2*a^2*h^3 - (b^2 + 2*a*c)*g^
2*h + (2*c^2*g^3 - 3*b*c*g^2*h - a*b*h^3 + (b^2 + 2*a*c)*g*h^2)*x
)*sqrt(c*x^2 + b*x + a))/(h^2*x^2 + 2*g*h*x + g^2)))/(((a*b^2*c^2
 - 4*a^2*c^3)*g^5 - 2*(a*b^3*c - 4*a^2*b*c^2)*g^4*h + (a*b^4 - 2*
a^2*b^2*c - 8*a^3*c^2)*g^3*h^2 - 2*(a^2*b^3 - 4*a^3*b*c)*g^2*h^3
+ (a^3*b^2 - 4*a^4*c)*g*h^4 + ((b^2*c^3 - 4*a*c^4)*g^4*h - 2*(b^3
*c^2 - 4*a*b*c^3)*g^3*h^2 + (b^4*c - 2*a*b^2*c^2 - 8*a^2*c^3)*g^2
*h^3 - 2*(a*b^3*c - 4*a^2*b*c^2)*g*h^4 + (a^2*b^2*c - 4*a^3*c^2)*
h^5)*x^3 + ((b^2*c^3 - 4*a*c^4)*g^5 - (b^3*c^2 - 4*a*b*c^3)*g^4*h
 - (b^4*c - 6*a*b^2*c^2 + 8*a^2*c^3)*g^3*h^2 + (b^5 - 4*a*b^3*c)*
g^2*h^3 - (2*a*b^4 - 9*a^2*b^2*c + 4*a^3*c^2)*g*h^4 + (a^2*b^3 -
4*a^3*b*c)*h^5)*x^2 + ((b^3*c^2 - 4*a*b*c^3)*g^5 - (2*b^4*c - 9*a
*b^2*c^2 + 4*a^2*c^3)*g^4*h + (b^5 - 4*a*b^3*c)*g^3*h^2 - (a*b^4
- 6*a^2*b^2*c + 8*a^3*c^2)*g^2*h^3 - (a^2*b^3 - 4*a^3*b*c)*g*h^4
+ (a^3*b^2 - 4*a^4*c)*h^5)*x)*sqrt(c*g^2 - b*g*h + a*h^2)), -1/2*
(2*((a*b^2 - 4*a^2*c)*d*h^3 + 2*(b*c^2*d - 2*a*c^2*e + a*b*c*f)*g
^3 + (4*a*b*c*e - 4*(b^2*c - 2*a*c^2)*d + (a*b^2 - 12*a^2*c)*f)*g
^2*h + (2*a^2*b*f + 2*(b^3 - 3*a*b*c)*d - (3*a*b^2 - 8*a^2*c)*e)*
g*h^2 + ((4*c^3*d - 2*b*c^2*e + (3*b^2*c - 8*a*c^2)*f)*g^2*h - (4
*b*c^2*d + 4*a*b*c*f + (b^2*c - 12*a*c^2)*e)*g*h^2 - (2*a*b*c*e -
 4*a^2*c*f - (3*b^2*c - 8*a*c^2)*d)*h^3)*x^2 + (2*(2*c^3*d - b*c^
2*e + (b^2*c - 2*a*c^2)*f)*g^3 - (2*b*c^2*d - 4*a*c^2*e - (b^3 -
6*a*b*c)*f)*g^2*h - (4*a^2*c*f + 2*(b^2*c - 2*a*c^2)*d + (b^3 - 6
*a*b*c)*e)*g*h^2 + (2*a^2*b*f + (3*b^3 - 10*a*b*c)*d - 2*(a*b^2 -
 2*a^2*c)*e)*h^3)*x)*sqrt(-c*g^2 + b*g*h - a*h^2)*sqrt(c*x^2 + b*
x + a) + (2*(a*b^2*c - 4*a^2*c^2)*f*g^4 - (4*(a*b^2*c - 4*a^2*c^2
)*e - (a*b^3 - 4*a^2*b*c)*f)*g^3*h + (6*(a*b^2*c - 4*a^2*c^2)*d +
 (a*b^3 - 4*a^2*b*c)*e - 4*(a^2*b^2 - 4*a^3*c)*f)*g^2*h^2 - (3*(a
*b^3 - 4*a^2*b*c)*d - 2*(a^2*b^2 - 4*a^3*c)*e)*g*h^3 + (2*(b^2*c^
2 - 4*a*c^3)*f*g^3*h - (4*(b^2*c^2 - 4*a*c^3)*e - (b^3*c - 4*a*b*
c^2)*f)*g^2*h^2 + (6*(b^2*c^2 - 4*a*c^3)*d + (b^3*c - 4*a*b*c^2)*
e - 4*(a*b^2*c - 4*a^2*c^2)*f)*g*h^3 - (3*(b^3*c - 4*a*b*c^2)*d -
 2*(a*b^2*c - 4*a^2*c^2)*e)*h^4)*x^3 + (2*(b^2*c^2 - 4*a*c^3)*f*g
^4 - (4*(b^2*c^2 - 4*a*c^3)*e - 3*(b^3*c - 4*a*b*c^2)*f)*g^3*h +
(6*(b^2*c^2 - 4*a*c^3)*d - 3*(b^3*c - 4*a*b*c^2)*e + (b^4 - 8*a*b
^2*c + 16*a^2*c^2)*f)*g^2*h^2 + (3*(b^3*c - 4*a*b*c^2)*d + (b^4 -
 2*a*b^2*c - 8*a^2*c^2)*e - 4*(a*b^3 - 4*a^2*b*c)*f)*g*h^3 - (3*(
```

```
b^4 - 4*a*b^2*c)*d - 2*(a*b^3 - 4*a^2*b*c)*e)*h^4)*x^2 + (2*(b^3*
c - 4*a*b*c^2)*f*g^4 - (4*(b^3*c - 4*a*b*c^2)*e - (b^4 - 2*a*b^2*
c - 8*a^2*c^2)*f)*g^3*h + (6*(b^3*c - 4*a*b*c^2)*d + (b^4 - 8*a*b
^2*c + 16*a^2*c^2)*e - 3*(a*b^3 - 4*a^2*b*c)*f)*g^2*h^2 - (3*(b^4
 - 6*a*b^2*c + 8*a^2*c^2)*d - 3*(a*b^3 - 4*a^2*b*c)*e + 4*(a^2*b^
2 - 4*a^3*c)*f)*g*h^3 - (3*(a*b^3 - 4*a^2*b*c)*d - 2*(a^2*b^2 - 4
*a^3*c)*e)*h^4)*x)*arctan(-1/2*sqrt(-c*g^2 + b*g*h - a*h^2)*(b*g
- 2*a*h + (2*c*g - b*h)*x)/((c*g^2 - b*g*h + a*h^2)*sqrt(c*x^2 +
b*x + a))))/(((a*b^2*c^2 - 4*a^2*c^3)*g^5 - 2*(a*b^3*c - 4*a^2*b*
c^2)*g^4*h + (a*b^4 - 2*a^2*b^2*c - 8*a^3*c^2)*g^3*h^2 - 2*(a^2*b
^3 - 4*a^3*b*c)*g^2*h^3 + (a^3*b^2 - 4*a^4*c)*g*h^4 + ((b^2*c^3 -
 4*a*c^4)*g^4*h - 2*(b^3*c^2 - 4*a*b*c^3)*g^3*h^2 + (b^4*c - 2*a*
b^2*c^2 - 8*a^2*c^3)*g^2*h^3 - 2*(a*b^3*c - 4*a^2*b*c^2)*g*h^4 +
(a^2*b^2*c - 4*a^3*c^2)*h^5)*x^3 + ((b^2*c^3 - 4*a*c^4)*g^5 - (b^
3*c^2 - 4*a*b*c^3)*g^4*h - (b^4*c - 6*a*b^2*c^2 + 8*a^2*c^3)*g^3*
h^2 + (b^5 - 4*a*b^3*c)*g^2*h^3 - (2*a*b^4 - 9*a^2*b^2*c + 4*a^3*
c^2)*g*h^4 + (a^2*b^3 - 4*a^3*b*c)*h^5)*x^2 + ((b^3*c^2 - 4*a*b*c
^3)*g^5 - (2*b^4*c - 9*a*b^2*c^2 + 4*a^2*c^3)*g^4*h + (b^5 - 4*a*
b^3*c)*g^3*h^2 - (a*b^4 - 6*a^2*b^2*c + 8*a^3*c^2)*g^2*h^3 - (a^2
*b^3 - 4*a^3*b*c)*g*h^4 + (a^3*b^2 - 4*a^4*c)*h^5)*x)*sqrt(-c*g^2
 + b*g*h - a*h^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((f*x**2+e*x+d)/(h*x+g)**2/(c*x**2+b*x+a)**(3/2),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((f*x^2 + e*x + d)/((c*x^2 + b*x + a)^(3/2)*(h*x + g)^2),x, algorithm="gi

[Out] Exception raised: TypeError
```

3.239 $\int \frac{d+ex+fx^2}{(g+hx)^3(a+bx+cx^2)^{3/2}}\,dx$

Optimal. Leaf size=713

$$\frac{\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(h^2\left(8a^2fh^2+4abh(2fg-3eh)+b^2\left(-\left(3h(eg-5dh)+fg^2\right)\right)\right)-4ch\left(ah\left(3dh^2-9egh\right.\right.\right.}{8\left(ah^2-bgh+cg^2\right)^{7/2}}$$

$$+\frac{2\left(b^2h\left(a^2fh^2+ach(3eg-4dh)+3c^2dg^2\right)-cx\left(c\left(2a^2h^2(3fg-eh)-3abh\left(-dh^2+egh+fg^2\right)+b^2\left(3dgh^2+fg^3\right)\right)-bh\right.\right.}{}$$

$$-\frac{h\sqrt{a+bx+cx^2}\left(fg^2-h(eg-dh)\right)}{2(g+hx)^2\left(ah^2-bgh+cg^2\right)^2}$$

$$-\frac{h\sqrt{a+bx+cx^2}\left(2cg\left(3fg^2-h(5eg-7dh)\right)-h\left(4ah(2fg-eh)-b\left(-7dh^2+3egh+fg^2\right)\right)\right)}{4(g+hx)\left(ah^2-bgh+cg^2\right)^3}$$

```
[Out] (2*(b^4*d*h^3 - b^3*h^2*(3*c*d*g + a*e*h) + b^2*h*(3*c^2*d*g^2 +
a^2*f*h^2 + a*c*h*(3*e*g - 4*d*h)) - b*c*(c^2*d*g^3 + 3*a^2*h^2*(
f*g - e*h) + a*c*g*(f*g^2 + 3*e*g*h - 9*d*h^2)) - 2*a*c*(a^2*f*h^
3 - c^2*g^2*(e*g - 3*d*h) - a*c*h*(3*f*g^2 - 3*e*g*h + d*h^2)) -
c*(2*c^3*d*g^3 - b*(b^2*d - a*b*e + a^2*f)*h^3 - c^2*g*(b*g*(e*g
+ 3*d*h) + 2*a*(f*g^2 - 3*e*g*h + 3*d*h^2)) + c*(2*a^2*h^2*(3*f*g
 - e*h) - 3*a*b*h*(f*g^2 + e*g*h - d*h^2) + b^2*(f*g^3 + 3*d*g*h^
2)))*x))/((b^2 - 4*a*c)*(c*g^2 - b*g*h + a*h^2)^3*Sqrt[a + b*x +
c*x^2]) - (h*(f*g^2 - h*(e*g - d*h))*Sqrt[a + b*x + c*x^2])/(2*(c
*g^2 - b*g*h + a*h^2)^2*(g + h*x)^2) - (h*(2*c*g*(3*f*g^2 - h*(5*
e*g - 7*d*h)) - h*(4*a*h*(2*f*g - e*h) - b*(f*g^2 + 3*e*g*h - 7*d
*h^2)))*Sqrt[a + b*x + c*x^2])/(4*(c*g^2 - b*g*h + a*h^2)^3*(g +
h*x)) + ((8*c^2*g^2*(f*g^2 - 3*e*g*h + 6*d*h^2) + h^2*(8*a^2*f*h^
2 + 4*a*b*h*(2*f*g - 3*e*h) - b^2*(f*g^2 + 3*h*(e*g - 5*d*h))) -
4*c*h*(a*h*(11*f*g^2 - 9*e*g*h + 3*d*h^2) - b*g*(2*f*g^2 + 3*h*(e
*g - 4*d*h))))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*
g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(8*(c*g^2 - b*g*h +
 a*h^2)^(7/2))
```

Rubi [A] time = 10.5461, antiderivative size = 707, normalized size of antiderivative = 0.99, number

of steps used = 5, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.156$

$$\frac{\tanh^{-1}\left(\frac{-2ah+x(2cg-bh)+bg}{2\sqrt{a+bx+cx^2}\sqrt{ah^2-bgh+cg^2}}\right)\left(h^2\left(8a^2fh^2+4abh(2fg-3eh)+b^2\left(-\left(3h(eg-5dh)+fg^2\right)\right)\right)+4ch\left(-ah\left(3dh^2-9egh\right.\right.\right.}{8\left(ah^2-bgh+cg^2\right)^{7/2}}$$
$$+\frac{2\left(b^2h\left(a^2fh^2+ach(3eg-4dh)+3c^2dg^2\right)-cx\left(c\left(2a^2h^2(3fg-eh)-3abh\left(h(eg-dh)+fg^2\right)+b^2\left(3dgh^2+fg^3\right)\right)-bh^3\right.\right.}{}$$
$$-\frac{h\sqrt{a+bx+cx^2}\left(fg^2-h(eg-dh)\right)}{2(g+hx)^2\left(ah^2-bgh+cg^2\right)^2}$$
$$-\frac{h\sqrt{a+bx+cx^2}\left(-4ah^2(2fg-eh)+bh\left(h(3eg-7dh)+fg^2\right)-2cgh(5eg-7dh)+6cfg^3\right)}{4(g+hx)\left(ah^2-bgh+cg^2\right)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2)/((g + h*x)^3*(a + b*x + c*x^2)^(3/2)),x]
```

```
[Out] (2*(b^4*d*h^3 - b^3*h^2*(3*c*d*g + a*e*h) + b^2*h*(3*c^2*d*g^2 +
a^2*f*h^2 + a*c*h*(3*e*g - 4*d*h)) - b*c*(c^2*d*g^3 + 3*a^2*h^2*(
f*g - e*h) + a*c*g*(f*g^2 + 3*e*g*h - 9*d*h^2)) - 2*a*c*(a^2*f*h^
3 - c^2*g^2*(e*g - 3*d*h) - a*c*h*(3*f*g^2 - 3*e*g*h + d*h^2)) -
c*(2*c^3*d*g^3 - b*(b^2*d - a*b*e + a^2*f)*h^3 - c^2*g*(2*a*f*g^2
 - 6*a*h*(e*g - d*h) + b*g*(e*g + 3*d*h)) + c*(2*a^2*h^2*(3*f*g -
 e*h) + b^2*(f*g^3 + 3*d*g*h^2) - 3*a*b*h*(f*g^2 + h*(e*g - d*h))
))*x))/((b^2 - 4*a*c)*(c*g^2 - b*g*h + a*h^2)^3*Sqrt[a + b*x + c*
x^2]) - (h*(f*g^2 - h*(e*g - d*h))*Sqrt[a + b*x + c*x^2])/(2*(c*g
^2 - b*g*h + a*h^2)^2*(g + h*x)^2) - (h*(6*c*f*g^3 - 2*c*g*h*(5*e
*g - 7*d*h) - 4*a*h^2*(2*f*g - e*h) + b*h*(f*g^2 + h*(3*e*g - 7*d
*h)))*Sqrt[a + b*x + c*x^2])/(4*(c*g^2 - b*g*h + a*h^2)^3*(g + h*
x)) + ((8*c^2*g^2*(f*g^2 - 3*e*g*h + 6*d*h^2) + 4*c*h*(2*b*f*g^3
+ 3*b*g*h*(e*g - 4*d*h) - a*h*(11*f*g^2 - 9*e*g*h + 3*d*h^2)) + h
^2*(8*a^2*f*h^2 + 4*a*b*h*(2*f*g - 3*e*h) - b^2*(f*g^2 + 3*h*(e*g
 - 5*d*h))))*ArcTanh[(b*g - 2*a*h + (2*c*g - b*h)*x)/(2*Sqrt[c*g^
2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2])])/(8*(c*g^2 - b*g*h + a
*h^2)^(7/2))
```

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((f*x**2+e*x+d)/(h*x+g)**3/(c*x**2+b*x+a)**(3/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 7.6471, size = 1070, normalized size = 1.5

$$\left(-\frac{h(fg^2-ehg+dh^2)}{2(cg^2-bhg+ah^2)^2(g+hx)^2}-\frac{h(6cfg^3-10cehg^2+bfhg^2+14cdh^2g+3beh^2g-8afh^2g-7bdh^3+4aeh^3)}{4(cg^2-bhg+ah^2)^3(g+hx)}+\frac{2(-dh^3b^4+aeh^3b^3+3cdgh^2b^3-cdh^3xb^3+4acdh \ldots$$

$$+\frac{(8c^2fg^4-24c^2ehg^3+8bcfhg^3+48c^2dh^2g^2+12bceh^2g^2-b^2fh^2g^2-44acfh^2g^2-48bcdh^3g-3b^2eh^3g+36aceh^3g+8ab \ldots}{8(cg^2-bhg+ah^2)^{7/2}(a+x(b+cx))^{3/2}}$$

$$-\frac{(8c^2fg^4-24c^2ehg^3+8bcfhg^3+48c^2dh^2g^2+12bceh^2g^2-b^2fh^2g^2-44acfh^2g^2-48bcdh^3g-3b^2eh^3g+36aceh^3g+8a \ldots}{8(cg^2-bhg \ldots}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/((g + h*x)^3*(a + b*x + c*x^2)^(3/2)),x]
```

```
[Out] ((a + b*x + c*x^2)^2*(-(h*(f*g^2 - e*g*h + d*h^2))/(2*(c*g^2 - b*
g*h + a*h^2)^2*(g + h*x)^2) - (h*(6*c*f*g^3 - 10*c*e*g^2*h + b*f*
g^2*h + 14*c*d*g*h^2 + 3*b*e*g*h^2 - 8*a*f*g*h^2 - 7*b*d*h^3 + 4*
a*e*h^3))/(4*(c*g^2 - b*g*h + a*h^2)^3*(g + h*x)) + (2*(b*c^3*d*g
^3 - 2*a*c^3*e*g^3 + a*b*c^2*f*g^3 - 3*b^2*c^2*d*g^2*h + 6*a*c^3*
d*g^2*h + 3*a*b*c^2*e*g^2*h - 6*a^2*c^2*f*g^2*h + 3*b^3*c*d*g*h^2
 - 9*a*b*c^2*d*g*h^2 - 3*a*b^2*c*e*g*h^2 + 6*a^2*c^2*e*g*h^2 + 3*
a^2*b*c*f*g*h^2 - b^4*d*h^3 + 4*a*b^2*c*d*h^3 - 2*a^2*c^2*d*h^3 +
 a*b^3*e*h^3 - 3*a^2*b*c*e*h^3 - a^2*b^2*f*h^3 + 2*a^3*c*f*h^3 +
2*c^4*d*g^3*x - b*c^3*e*g^3*x + b^2*c^2*f*g^3*x - 2*a*c^3*f*g^3*x
 - 3*b*c^3*d*g^2*h*x + 6*a*c^3*e*g^2*h*x - 3*a*b*c^2*f*g^2*h*x +
3*b^2*c^2*d*g*h^2*x - 6*a*c^3*d*g*h^2*x - 3*a*b*c^2*e*g*h^2*x + 6
*a^2*c^2*f*g*h^2*x - b^3*c*d*h^3*x + 3*a*b*c^2*d*h^3*x + a*b^2*c*
e*h^3*x - 2*a^2*c^2*e*h^3*x - a^2*b*c*f*h^3*x))/((-b^2 + 4*a*c)*(
c*g^2 - b*g*h + a*h^2)^3*(a + b*x + c*x^2))))/(a + x*(b + c*x))^(
3/2) + ((8*c^2*f*g^4 - 24*c^2*e*g^3*h + 8*b*c*f*g^3*h + 48*c^2*d*
g^2*h^2 + 12*b*c*e*g^2*h^2 - b^2*f*g^2*h^2 - 44*a*c*f*g^2*h^2 - 4
8*b*c*d*g*h^3 - 3*b^2*e*g*h^3 + 36*a*c*e*g*h^3 + 8*a*b*f*g*h^3 +
15*b^2*d*h^4 - 12*a*c*d*h^4 - 12*a*b*e*h^4 + 8*a^2*f*h^4)*(a + b*
x + c*x^2)^(3/2)*Log[g + h*x])/(8*(c*g^2 - b*g*h + a*h^2)^(7/2)*(
a + x*(b + c*x))^(3/2)) - ((8*c^2*f*g^4 - 24*c^2*e*g^3*h + 8*b*c*
f*g^3*h + 48*c^2*d*g^2*h^2 + 12*b*c*e*g^2*h^2 - b^2*f*g^2*h^2 - 4
4*a*c*f*g^2*h^2 - 48*b*c*d*g*h^3 - 3*b^2*e*g*h^3 + 36*a*c*e*g*h^3
 + 8*a*b*f*g*h^3 + 15*b^2*d*h^4 - 12*a*c*d*h^4 - 12*a*b*e*h^4 + 8
*a^2*f*h^4)*(a + b*x + c*x^2)^(3/2)*Log[-(b*g) + 2*a*h - 2*c*g*x
+ b*h*x + 2*Sqrt[c*g^2 - b*g*h + a*h^2]*Sqrt[a + b*x + c*x^2]])/(
8*(c*g^2 - b*g*h + a*h^2)^(7/2)*(a + x*(b + c*x))^(3/2))
```

Maple [B] time = 0.037, size = 9126, normalized size = 12.8

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(h*x+g)^3/(c*x^2+b*x+a)^(3/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/((c*x^2 + b*x + a)^(3/2)*(h*x + g)^3),x, algorithm="ma
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 51.8394, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/((c*x^2 + b*x + a)^(3/2)*(h*x + g)^3),x, algorithm="fr
```

```
[Out] [-1/16*(4*(2*(a^2*b^2 - 4*a^3*c)*d*h^5 + 8*(b*c^3*d - 2*a*c^3*e +
 a*b*c^2*f)*g^5 + 8*(3*a*b*c^2*e - 3*(b^2*c^2 - 2*a*c^3)*d + (a*b
^2*c - 10*a^2*c^2)*f)*g^4*h + (24*(b^3*c - 3*a*b*c^2)*d - 12*(3*a
*b^2*c - 8*a^2*c^2)*e - (a*b^3 - 28*a^2*b*c)*f)*g^3*h^2 - (8*(b^4
 - 6*a*b^2*c + 10*a^2*c^2)*d - (13*a*b^3 - 44*a^2*b*c)*e + 2*(7*a
^2*b^2 - 20*a^3*c)*f)*g^2*h^3 - (9*(a*b^3 - 4*a^2*b*c)*d - 2*(a^2
*b^2 - 4*a^3*c)*e)*g*h^4 + (2*(8*c^4*d - 4*b*c^3*e + (7*b^2*c^2 -
 20*a*c^3)*f)*g^3*h^2 - (24*b*c^3*d + 2*(5*b^2*c^2 - 44*a*c^3)*e
- (b^3*c - 28*a*b*c^2)*f)*g^2*h^3 + (2*(19*b^2*c^2 - 52*a*c^3)*d
+ 3*(b^3*c - 12*a*b*c^2)*e - 8*(a*b^2*c - 10*a^2*c^2)*f)*g*h^4 -
(8*a^2*b*c*f + (15*b^3*c - 52*a*b*c^2)*d - 4*(3*a*b^2*c - 8*a^2*c
^2)*e)*h^5)*x^3 + (8*(4*c^4*d - 2*b*c^3*e + (3*b^2*c^2 - 8*a*c^3)
*f)*g^4*h - (40*b*c^3*d + 4*(3*b^2*c^2 - 32*a*c^3)*e - 5*(b^3*c -
 12*a*b*c^2)*f)*g^3*h^2 + (8*(5*b^2*c^2 - 14*a*c^3)*d - (5*b^3*c
+ 4*a*b*c^2)*e + (b^4 - 10*a*b^2*c + 72*a^2*c^2)*f)*g^2*h^3 + ((1
3*b^3*c - 44*a*b*c^2)*d + (3*b^4 - 18*a*b^2*c + 8*a^2*c^2)*e - 8*
(a*b^3 - 5*a^2*b*c)*f)*g*h^4 - ((15*b^4 - 62*a*b^2*c + 24*a^2*c^2
)*d - 4*(3*a*b^3 - 10*a^2*b*c)*e + 8*(a^2*b^2 - 2*a^3*c)*f)*h^5)*
x^2 + (8*(2*c^4*d - b*c^3*e + (b^2*c^2 - 2*a*c^3)*f)*g^5 - 8*(b*c
^3*d - 2*a*c^3*e - (b^3*c - 5*a*b*c^2)*f)*g^4*h - (24*(b^2*c^2 -
```

2*a*c^3)*d + 12*(b^3*c - 6*a*b*c^2)*e + (b^4 - 10*a*b^2*c + 72*a^2*c^2)*f)*g^3*h^2 + (8*(7*b^3*c - 23*a*b*c^2)*d + 5*(b^4 - 14*a*b^2*c + 24*a^2*c^2)*e - 5*(a*b^3 - 12*a^2*b*c)*f)*g^2*h^3 - ((25*b^4 - 114*a*b^2*c + 88*a^2*c^2)*d - (21*a*b^3 - 68*a^2*b*c)*e + 8*(3*a^2*b^2 - 8*a^3*c)*f)*g*h^4 - (5*(a*b^3 - 4*a^2*b*c)*d - 4*(a^2*b^2 - 4*a^3*c)*e)*h^5)*x)*sqrt(c*g^2 - b*g*h + a*h^2)*sqrt(c*x^2 + b*x + a) - (8*(a*b^2*c^2 - 4*a^2*c^3)*f*g^6 - 8*(3*(a*b^2*c^2 - 4*a^2*c^3)*e - (a*b^3*c - 4*a^2*b*c^2)*f)*g^5*h + (48*(a*b^2*c^2 - 4*a^2*c^3)*d + 12*(a*b^3*c - 4*a^2*b*c^2)*e - (a*b^4 + 40*a^2*b^2*c - 176*a^3*c^2)*f)*g^4*h^2 - (48*(a*b^3*c - 4*a^2*b*c^2)*d + 3*(a*b^4 - 16*a^2*b^2*c + 48*a^3*c^2)*e - 8*(a^2*b^3 - 4*a^3*b*c)*f)*g^3*h^3 + (3*(5*a*b^4 - 24*a^2*b^2*c + 16*a^3*c^2)*d - 12*(a^2*b^3 - 4*a^3*b*c)*e + 8*(a^3*b^2 - 4*a^4*c)*f)*g^2*h^4 + (8*(b^2*c^3 - 4*a*c^4)*f*g^4*h^2 - 8*(3*(b^2*c^3 - 4*a*c^4)*e - (b^3*c^2 - 4*a*b*c^3)*f)*g^3*h^3 + (48*(b^2*c^3 - 4*a*c^4)*d + 12*(b^3*c^2 - 4*a*b*c^3)*e - (b^4*c + 40*a*b^2*c^2 - 176*a^2*c^3)*f)*g^2*h^4 - (48*(b^3*c^2 - 4*a*b*c^3)*d + 3*(b^4*c - 16*a*b^2*c^2 + 48*a^2*c^3)*e - 8*(a*b^3*c - 4*a^2*b*c^2)*f)*g*h^5 + (3*(5*b^4*c - 24*a*b^2*c^2 + 16*a^2*c^3)*d - 12*(a*b^3*c - 4*a^2*b*c^2)*e + 8*(a^2*b^2*c - 4*a^3*c^2)*f)*h^6)*x^4 + (16*(b^2*c^3 - 4*a*c^4)*f*g^5*h - 24*(2*(b^2*c^3 - 4*a*c^4)*e - (b^3*c^2 - 4*a*b*c^3)*f)*g^4*h^2 + 2*(48*(b^2*c^3 - 4*a*c^4)*d + (3*b^4*c - 56*a*b^2*c^2 + 176*a^2*c^3)*f)*g^3*h^3 - (48*(b^3*c^2 - 4*a*b*c^3)*d - 6*(b^4*c + 8*a*b^2*c^2 - 48*a^2*c^3)*e + (b^5 + 24*a*b^3*c - 112*a^2*b*c^2)*f)*g^2*h^4 - (6*(3*b^4*c - 8*a*b^2*c^2 - 16*a^2*c^3)*d + 3*(b^5 - 8*a*b^3*c + 16*a^2*b*c^2)*e - 8*(a*b^4 - 2*a^2*b^2*c - 8*a^3*c^2)*f)*g*h^5 + (3*(5*b^5 - 24*a*b^3*c + 16*a^2*b*c^2)*d - 12*(a*b^4 - 4*a^2*b^2*c)*e + 8*(a^2*b^3 - 4*a^3*b*c)*f)*h^6)*x^3 + (8*(b^2*c^3 - 4*a*c^4)*f*g^6 - 24*((b^2*c^3 - 4*a*c^4)*e - (b^3*c^2 - 4*a*b*c^3)*f)*g^5*h + 3*(16*(b^2*c^3 - 4*a*c^4)*d - 12*(b^3*c^2 - 4*a*b*c^3)*e + (5*b^4*c - 32*a*b^2*c^2 + 48*a^2*c^3)*f)*g^4*h^2 + (48*(b^3*c^2 - 4*a*b*c^3)*d + 3*(7*b^4*c - 24*a*b^2*c^2 - 16*a^2*c^3)*e - 2*(b^5 + 32*a*b^3*c - 144*a^2*b*c^2)*f)*g^3*h^3 - 3*(3*(9*b^4*c - 40*a*b^2*c^2 + 16*a^2*c^3)*d + 2*(b^5 - 16*a*b^3*c + 48*a^2*b*c^2)*e - (5*a*b^4 - 32*a^2*b^2*c + 48*a^3*c^2)*f)*g^2*h^4 + 3*(2*(5*b^5 - 32*a*b^3*c + 48*a^2*b*c^2)*d - 3*(3*a*b^4 - 16*a^2*b^2*c + 16*a^3*c^2)*e + 8*(a^2*b^3 - 4*a^3*b*c)*f)*g*h^5 + (3*(5*a*b^4 - 24*a^2*b^2*c + 16*a^3*c^2)*d - 12*(a^2*b^3 - 4*a^3*b*c)*e + 8*(a^3*b^2 - 4*a^4*c)*f)*h^6)*x^2 + (8*(b^3*c^2 - 4*a*b*c^3)*f*g^6 - 8*(3*(b^3*c^2 - 4*a*b*c^3)*e - (b^4*c - 2*a*b^2*c^2 - 8*a^2*c^3)*f)*g^5*h + (48*(b^3*c^2 - 4*a*b*c^3)*d + 12*(b^4*c - 8*a*b^2*c^2 + 16*a^2*c^3)*e - (b^5 + 24*a*b^3*c - 112*a^2*b*c^2)*f)*g^4*h^2 - (48*(b^4*c - 6*a*b^2*c^2 + 8*a^2*c^3)*d + 3*(b^5 - 24*a*b^3*c + 80*a^2*b*c^2)*e - 2*(3*a*b^4 - 56*a^2*b^2*c + 176*a^3*c^2)*f)*g^3*h^3 + 3*((5*b^5 - 56*a*b^3*c + 144*a^2*b*c^2)*d - 6*(a*b^4 - 8*a^2*b^2*c + 16*a^3*c^2)*e + 8*(a^2*b^3 - 4*a^3*b*c)*f)*g^2*h^4 + 2*(3*(5*a*b^4 - 24*a^2*b^2*c + 16*a^3*c^2)*d - 12*(a^2*b^3 - 4*a^3*b*c)*e + 8*(a^3*b^2 - 4*a^4*c)*f)*g*h^5)*x)*log(((8*a*b*g*h - 8*a^2*h^2 - (b^2 + 4*a*c)*g^2 - (8*c^2*g^2 - 8*b*c*g*h + (b^2 + 4*a*c)*h^2)*x^2 - 2*(4*b*c*g^2 + 4*a*b*h^2 - (3*b^2 + 4*a*c)*g*h)*x)*sqrt(c*g^2 - b*g*h + a*h^2) - 4*(b*c*g^3 + 3*a*b*g*h^2 - 2*a^2*h^3 - (b^2 + 2*a*c)*g^2*h + (2*c^2*g^3 - 3*b*c*g^2*h - a*b*h^3 + (b^2 + 2*a*c)*g*h^2)*x)*sqrt(c*x^2 + b*x + a))/(h^2*x^2 + 2*g*h*x + g^2)))/(((a*b^2*c^3 - 4*a^2*c^4)*g^8 - 3*(a*b^3*c^2 - 4

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*a^2*b*c^3)*g^7*h + 3*(a*b^4*c - 3*a^2*b^2*c^2 - 4*a^3*c^3)*g^6*h
^2 - (a*b^5 + 2*a^2*b^3*c - 24*a^3*b*c^2)*g^5*h^3 + 3*(a^2*b^4 -
3*a^3*b^2*c - 4*a^4*c^2)*g^4*h^4 - 3*(a^3*b^3 - 4*a^4*b*c)*g^3*h^
5 + (a^4*b^2 - 4*a^5*c)*g^2*h^6 + ((b^2*c^4 - 4*a*c^5)*g^6*h^2 -
3*(b^3*c^3 - 4*a*b*c^4)*g^5*h^3 + 3*(b^4*c^2 - 3*a*b^2*c^3 - 4*a^
2*c^4)*g^4*h^4 - (b^5*c + 2*a*b^3*c^2 - 24*a^2*b*c^3)*g^3*h^5 + 3
*(a*b^4*c - 3*a^2*b^2*c^2 - 4*a^3*c^3)*g^2*h^6 - 3*(a^2*b^3*c - 4
*a^3*b*c^2)*g*h^7 + (a^3*b^2*c - 4*a^4*c^2)*h^8)*x^4 + (2*(b^2*c^
4 - 4*a*c^5)*g^7*h - 5*(b^3*c^3 - 4*a*b*c^4)*g^6*h^2 + 3*(b^4*c^2
 - 2*a*b^2*c^3 - 8*a^2*c^4)*g^5*h^3 + (b^5*c - 13*a*b^3*c^2 + 36*
a^2*b*c^3)*g^4*h^4 - (b^6 - 4*a*b^4*c - 6*a^2*b^2*c^2 + 24*a^3*c^
3)*g^3*h^5 + 3*(a*b^5 - 5*a^2*b^3*c + 4*a^3*b*c^2)*g^2*h^6 - (3*a
^2*b^4 - 14*a^3*b^2*c + 8*a^4*c^2)*g*h^7 + (a^3*b^3 - 4*a^4*b*c)*
h^8)*x^3 + ((b^2*c^4 - 4*a*c^5)*g^8 - (b^3*c^3 - 4*a*b*c^4)*g^7*h
 - (3*b^4*c^2 - 16*a*b^2*c^3 + 16*a^2*c^4)*g^6*h^2 + (5*b^5*c - 2
3*a*b^3*c^2 + 12*a^2*b*c^3)*g^5*h^3 - 2*(b^6 - a*b^4*c - 15*a^2*b
^2*c^2 + 12*a^3*c^3)*g^4*h^4 + (5*a*b^5 - 23*a^2*b^3*c + 12*a^3*b
*c^2)*g^3*h^5 - (3*a^2*b^4 - 16*a^3*b^2*c + 16*a^4*c^2)*g^2*h^6 -
 (a^3*b^3 - 4*a^4*b*c)*g*h^7 + (a^4*b^2 - 4*a^5*c)*h^8)*x^2 + ((b
^3*c^3 - 4*a*b*c^4)*g^8 - (3*b^4*c^2 - 14*a*b^2*c^3 + 8*a^2*c^4)*
g^7*h + 3*(b^5*c - 5*a*b^3*c^2 + 4*a^2*b*c^3)*g^6*h^2 - (b^6 - 4*
a*b^4*c - 6*a^2*b^2*c^2 + 24*a^3*c^3)*g^5*h^3 + (a*b^5 - 13*a^2*b
^3*c + 36*a^3*b*c^2)*g^4*h^4 + 3*(a^2*b^4 - 2*a^3*b^2*c - 8*a^4*c
^2)*g^3*h^5 - 5*(a^3*b^3 - 4*a^4*b*c)*g^2*h^6 + 2*(a^4*b^2 - 4*a^
5*c)*g*h^7)*x)*sqrt(c*g^2 - b*g*h + a*h^2)), -1/8*(2*(2*(a^2*b^2
 - 4*a^3*c)*d*h^5 + 8*(b*c^3*d - 2*a*c^3*e + a*b*c^2*f)*g^5 + 8*(3
*a*b*c^2*e - 3*(b^2*c^2 - 2*a*c^3)*d + (a*b^2*c - 10*a^2*c^2)*f)*
g^4*h + (24*(b^3*c - 3*a*b*c^2)*d - 12*(3*a*b^2*c - 8*a^2*c^2)*e
 - (a*b^3 - 28*a^2*b*c)*f)*g^3*h^2 - (8*(b^4 - 6*a*b^2*c + 10*a^2*
c^2)*d - (13*a*b^3 - 44*a^2*b*c)*e + 2*(7*a^2*b^2 - 20*a^3*c)*f)*
g^2*h^3 - (9*(a*b^3 - 4*a^2*b*c)*d - 2*(a^2*b^2 - 4*a^3*c)*e)*g*h
^4 + (2*(8*c^4*d - 4*b*c^3*e + (7*b^2*c^2 - 20*a*c^3)*f)*g^3*h^2
 - (24*b*c^3*d + 2*(5*b^2*c^2 - 44*a*c^3)*e - (b^3*c - 28*a*b*c^2)
*f)*g^2*h^3 + (2*(19*b^2*c^2 - 52*a*c^3)*d + 3*(b^3*c - 12*a*b*c^
2)*e - 8*(a*b^2*c - 10*a^2*c^2)*f)*g*h^4 - (8*a^2*b*c*f + (15*b^3
*c - 52*a*b*c^2)*d - 4*(3*a*b^2*c - 8*a^2*c^2)*e)*h^5)*x^3 + (8*(
4*c^4*d - 2*b*c^3*e + (3*b^2*c^2 - 8*a*c^3)*f)*g^4*h - (40*b*c^3*
d + 4*(3*b^2*c^2 - 32*a*c^3)*e - 5*(b^3*c - 12*a*b*c^2)*f)*g^3*h^
2 + (8*(5*b^2*c^2 - 14*a*c^3)*d - (5*b^3*c + 4*a*b*c^2)*e + (b^4
 - 10*a*b^2*c + 72*a^2*c^2)*f)*g^2*h^3 + ((13*b^3*c - 44*a*b*c^2)*
d + (3*b^4 - 18*a*b^2*c + 8*a^2*c^2)*e - 8*(a*b^3 - 5*a^2*b*c)*f)
*g*h^4 - ((15*b^4 - 62*a*b^2*c + 24*a^2*c^2)*d - 4*(3*a*b^3 - 10*
a^2*b*c)*e + 8*(a^2*b^2 - 2*a^3*c)*f)*h^5)*x^2 + (8*(2*c^4*d - b*
c^3*e + (b^2*c^2 - 2*a*c^3)*f)*g^5 - 8*(b*c^3*d - 2*a*c^3*e - (b^
3*c - 5*a*b*c^2)*f)*g^4*h - (24*(b^2*c^2 - 2*a*c^3)*d + 12*(b^3*c
 - 6*a*b*c^2)*e + (b^4 - 10*a*b^2*c + 72*a^2*c^2)*f)*g^3*h^2 + (8
*(7*b^3*c - 23*a*b*c^2)*d + 5*(b^4 - 14*a*b^2*c + 24*a^2*c^2)*e -
 5*(a*b^3 - 12*a^2*b*c)*f)*g^2*h^3 - ((25*b^4 - 114*a*b^2*c + 88*
a^2*c^2)*d - (21*a*b^3 - 68*a^2*b*c)*e + 8*(3*a^2*b^2 - 8*a^3*c)*
f)*g*h^4 - (5*(a*b^3 - 4*a^2*b*c)*d - 4*(a^2*b^2 - 4*a^3*c)*e)*h^
5)*x)*sqrt(-c*g^2 + b*g*h - a*h^2)*sqrt(c*x^2 + b*x + a) + (8*(a*
b^2*c^2 - 4*a^2*c^3)*f*g^6 - 8*(3*(a*b^2*c^2 - 4*a^2*c^3)*e - (a*
b^3*c - 4*a^2*b*c^2)*f)*g^5*h + (48*(a*b^2*c^2 - 4*a^2*c^3)*d + 1
2*(a*b^3*c - 4*a^2*b*c^2)*e - (a*b^4 + 40*a^2*b^2*c - 176*a^3*c^2
```

)*f)*g^4*h^2 - (48*(a*b^3*c - 4*a^2*b*c^2)*d + 3*(a*b^4 - 16*a^2*b^2*c + 48*a^3*c^2)*e - 8*(a^2*b^3 - 4*a^3*b*c)*f)*g^3*h^3 + (3*(5*a*b^4 - 24*a^2*b^2*c + 16*a^3*c^2)*d - 12*(a^2*b^3 - 4*a^3*b*c)*e + 8*(a^3*b^2 - 4*a^4*c)*f)*g^2*h^4 + (8*(b^2*c^3 - 4*a*c^4)*f*g^4*h^2 - 8*(3*(b^2*c^3 - 4*a*c^4)*e - (b^3*c^2 - 4*a*b*c^3)*f)*g^3*h^3 + (48*(b^2*c^3 - 4*a*c^4)*d + 12*(b^3*c^2 - 4*a*b*c^3)*e - (b^4*c + 40*a*b^2*c^2 - 176*a^2*c^3)*f)*g^2*h^4 - (48*(b^3*c^2 - 4*a*b*c^3)*d + 3*(b^4*c - 16*a*b^2*c^2 + 48*a^2*c^3)*e - 8*(a*b^3*c - 4*a^2*b*c^2)*f)*g*h^5 + (3*(5*b^4*c - 24*a*b^2*c^2 + 16*a^2*c^3)*d - 12*(a*b^3*c - 4*a^2*b*c^2)*e + 8*(a^2*b^2*c - 4*a^3*c^2)*f)*h^6)*x^4 + (16*(b^2*c^3 - 4*a*c^4)*f*g^5*h - 24*(2*(b^2*c^3 - 4*a*c^4)*e - (b^3*c^2 - 4*a*b*c^3)*f)*g^4*h^2 + 2*(48*(b^2*c^3 - 4*a*c^4)*d + (3*b^4*c - 56*a*b^2*c^2 + 176*a^2*c^3)*f)*g^3*h^3 - (48*(b^3*c^2 - 4*a*b*c^3)*d - 6*(b^4*c + 8*a*b^2*c^2 - 48*a^2*c^3)*e + (b^5 + 24*a*b^3*c - 112*a^2*b*c^2)*f)*g^2*h^4 - (6*(3*b^4*c - 8*a*b^2*c^2 - 16*a^2*c^3)*d + 3*(b^5 - 8*a*b^3*c + 16*a^2*b*c^2)*e - 8*(a*b^4 - 2*a^2*b^2*c - 8*a^3*c^2)*f)*g*h^5 + (3*(5*b^5 - 24*a*b^3*c + 16*a^2*b*c^2)*d - 12*(a*b^4 - 4*a^2*b^2*c)*e + 8*(a^2*b^3 - 4*a^3*b*c)*f)*h^6)*x^3 + (8*(b^2*c^3 - 4*a*c^4)*f*g^6 - 24*((b^2*c^3 - 4*a*c^4)*e - (b^3*c^2 - 4*a*b*c^3)*f)*g^5*h + 3*(16*(b^2*c^3 - 4*a*c^4)*d - 12*(b^3*c^2 - 4*a*b*c^3)*e + (5*b^4*c - 32*a*b^2*c^2 + 48*a^2*c^3)*f)*g^4*h^2 + (48*(b^3*c^2 - 4*a*b*c^3)*d + 3*(7*b^4*c - 24*a*b^2*c^2 - 16*a^2*c^3)*e - 2*(b^5 + 32*a*b^3*c - 144*a^2*b*c^2)*f)*g^3*h^3 - 3*(3*(9*b^4*c - 40*a*b^2*c^2 + 16*a^2*c^3)*d + 2*(b^5 - 16*a*b^3*c + 48*a^2*b*c^2)*e - (5*a*b^4 - 32*a^2*b^2*c + 48*a^3*c^2)*f)*g^2*h^4 + 3*(2*(5*b^5 - 32*a*b^3*c + 48*a^2*b*c^2)*d - 3*(3*a*b^4 - 16*a^2*b^2*c + 16*a^3*c^2)*e + 8*(a^2*b^3 - 4*a^3*b*c)*f)*g*h^5 + (3*(5*a*b^4 - 24*a^2*b^2*c + 16*a^3*c^2)*d - 12*(a^2*b^3 - 4*a^3*b*c)*e + 8*(a^3*b^2 - 4*a^4*c)*f)*h^6)*x^2 + (8*(b^3*c^2 - 4*a*b*c^3)*f*g^6 - 8*(3*(b^3*c^2 - 4*a*b*c^3)*e - (b^4*c - 2*a*b^2*c^2 - 8*a^2*c^3)*f)*g^5*h + (48*(b^3*c^2 - 4*a*b*c^3)*d + 12*(b^4*c - 8*a*b^2*c^2 + 16*a^2*c^3)*e - (b^5 + 24*a*b^3*c - 112*a^2*b*c^2)*f)*g^4*h^2 - (48*(b^4*c - 6*a*b^2*c^2 + 8*a^2*c^3)*d + 3*(b^5 - 24*a*b^3*c + 80*a^2*b*c^2)*e - 2*(3*a*b^4 - 56*a^2*b^2*c + 176*a^3*c^2)*f)*g^3*h^3 + 3*((5*b^5 - 56*a*b^3*c + 144*a^2*b*c^2)*d - 6*(a*b^4 - 8*a^2*b^2*c + 16*a^3*c^2)*e + 8*(a^2*b^3 - 4*a^3*b*c)*f)*g^2*h^4 + 2*(3*(5*a*b^4 - 24*a^2*b^2*c + 16*a^3*c^2)*d - 12*(a^2*b^3 - 4*a^3*b*c)*e + 8*(a^3*b^2 - 4*a^4*c)*f)*g*h^5)*x)*arctan(-1/2*sqrt(-c*g^2 + b*g*h - a*h^2)*(b*g - 2*a*h + (2*c*g - b*h)*x)/((c*g^2 - b*g*h + a*h^2)*sqrt(c*x^2 + b*x + a))))/(((a*b^2*c^3 - 4*a^2*c^4)*g^8 - 3*(a*b^3*c^2 - 4*a^2*b*c^3)*g^7*h + 3*(a*b^4*c - 3*a^2*b^2*c^2 - 4*a^3*c^3)*g^6*h^2 - (a*b^5 + 2*a^2*b^3*c - 24*a^3*b*c^2)*g^5*h^3 + 3*(a^2*b^4 - 3*a^3*b^2*c - 4*a^4*c^2)*g^4*h^4 - 3*(a^3*b^3 - 4*a^4*b*c)*g^3*h^5 + (a^4*b^2 - 4*a^5*c)*g^2*h^6 + ((b^2*c^4 - 4*a*c^5)*g^6*h^2 - 3*(b^3*c^3 - 4*a*b*c^4)*g^5*h^3 + 3*(b^4*c^2 - 3*a*b^2*c^3 - 4*a^2*c^4)*g^4*h^4 - (b^5*c + 2*a*b^3*c^2 - 24*a^2*b*c^3)*g^3*h^5 + 3*(a*b^4*c - 3*a^2*b^2*c^2 - 4*a^3*c^3)*g^2*h^6 - 3*(a^2*b^3*c - 4*a^3*b*c^2)*g*h^7 + (a^3*b^2*c - 4*a^4*c^2)*h^8)*x^4 + (2*(b^2*c^4 - 4*a*c^5)*g^7*h - 5*(b^3*c^3 - 4*a*b*c^4)*g^6*h^2 + 3*(b^4*c^2 - 2*a*b^2*c^3 - 8*a^2*c^4)*g^5*h^3 + (b^5*c - 13*a*b^3*c^2 + 36*a^2*b*c^3)*g^4*h^4 - (b^6 - 4*a*b^4*c - 6*a^2*b^2*c^2 + 24*a^3*c^3)*g^3*h^5 + 3*(a*b^5 - 5*a^2*b^3*c + 4*a^3*b*c^2)*g^2*h^6 - (3*a^2*b^4 - 14*a^3*b^2*c + 8*a^4*c^2)*g*h^7 + (a^3*b^3 - 4*a

```
^4*b*c)*h^8)*x^3 + ((b^2*c^4 - 4*a*c^5)*g^8 - (b^3*c^3 - 4*a*b*c^
4)*g^7*h - (3*b^4*c^2 - 16*a*b^2*c^3 + 16*a^2*c^4)*g^6*h^2 + (5*b
^5*c - 23*a*b^3*c^2 + 12*a^2*b*c^3)*g^5*h^3 - 2*(b^6 - a*b^4*c -
15*a^2*b^2*c^2 + 12*a^3*c^3)*g^4*h^4 + (5*a*b^5 - 23*a^2*b^3*c +
12*a^3*b*c^2)*g^3*h^5 - (3*a^2*b^4 - 16*a^3*b^2*c + 16*a^4*c^2)*g
^2*h^6 - (a^3*b^3 - 4*a^4*b*c)*g*h^7 + (a^4*b^2 - 4*a^5*c)*h^8)*x
^2 + ((b^3*c^3 - 4*a*b*c^4)*g^8 - (3*b^4*c^2 - 14*a*b^2*c^3 + 8*a
^2*c^4)*g^7*h + 3*(b^5*c - 5*a*b^3*c^2 + 4*a^2*b*c^3)*g^6*h^2 - (
b^6 - 4*a*b^4*c - 6*a^2*b^2*c^2 + 24*a^3*c^3)*g^5*h^3 + (a*b^5 -
13*a^2*b^3*c + 36*a^3*b*c^2)*g^4*h^4 + 3*(a^2*b^4 - 2*a^3*b^2*c -
 8*a^4*c^2)*g^3*h^5 - 5*(a^3*b^3 - 4*a^4*b*c)*g^2*h^6 + 2*(a^4*b^
2 - 4*a^5*c)*g*h^7)*x)*sqrt(-c*g^2 + b*g*h - a*h^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((f*x**2+e*x+d)/(h*x+g)**3/(c*x**2+b*x+a)**(3/2),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((f*x^2 + e*x + d)/((c*x^2 + b*x + a)^(3/2)*(h*x + g)^3),x, algorithm="gi
```

```
[Out] Exception raised: TypeError
```

3.240 $\int \frac{(1+2x)^3(1+3x+4x^2)}{\sqrt{2-x+3x^2}}\,dx$

Optimal. Leaf size=120

$$\frac{2}{15}\sqrt{3x^2-x+2}(2x+1)^4+\frac{19}{60}\sqrt{3x^2-x+2}(2x+1)^3+\frac{44}{135}\sqrt{3x^2-x+2}(2x+1)^2 -\frac{(6298x+24897)\sqrt{3x^2-x+2}}{3240}+\frac{9211\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{1296\sqrt{3}}$$

```
[Out] (44*(1 + 2*x)^2*Sqrt[2 - x + 3*x^2])/135 + (19*(1 + 2*x)^3*Sqrt[2
 - x + 3*x^2])/60 + (2*(1 + 2*x)^4*Sqrt[2 - x + 3*x^2])/15 - ((24
897 + 6298*x)*Sqrt[2 - x + 3*x^2])/3240 + (9211*ArcSinh[(1 - 6*x)
/Sqrt[23]])/(1296*Sqrt[3])
```

Rubi [A] time = 0.316722, antiderivative size = 120, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.156

$$\frac{2}{15}\sqrt{3x^2-x+2}(2x+1)^4+\frac{19}{60}\sqrt{3x^2-x+2}(2x+1)^3+\frac{44}{135}\sqrt{3x^2-x+2}(2x+1)^2 -\frac{(6298x+24897)\sqrt{3x^2-x+2}}{3240}+\frac{9211\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{1296\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)^3*(1 + 3*x + 4*x^2))/Sqrt[2 - x + 3*x^2],x]
```

```
[Out] (44*(1 + 2*x)^2*Sqrt[2 - x + 3*x^2])/135 + (19*(1 + 2*x)^3*Sqrt[2
 - x + 3*x^2])/60 + (2*(1 + 2*x)^4*Sqrt[2 - x + 3*x^2])/15 - ((24
897 + 6298*x)*Sqrt[2 - x + 3*x^2])/3240 + (9211*ArcSinh[(1 - 6*x)
/Sqrt[23]])/(1296*Sqrt[3])
```

Rubi in Sympy [A] time = 35.5468, size = 117, normalized size = 0.98

$$\frac{2\left(2x+1\right)^4\sqrt{3x^2-x+2}}{15}+\frac{19\left(2x+1\right)^3\sqrt{3x^2-x+2}}{60}+\frac{44\left(2x+1\right)^2\sqrt{3x^2-x+2}}{135} -\frac{\left(113364x+448146\right)\sqrt{3x^2-x+2}}{58320}-\frac{9211\sqrt{3}\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{3888}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**3*(4*x**2+3*x+1)/(3*x**2-x+2)**(1/2),x)
```

```
[Out] 2*(2*x + 1)**4*sqrt(3*x**2 - x + 2)/15 + 19*(2*x + 1)**3*sqrt(3*x
**2 - x + 2)/60 + 44*(2*x + 1)**2*sqrt(3*x**2 - x + 2)/135 - (113
364*x + 448146)*sqrt(3*x**2 - x + 2)/58320 - 9211*sqrt(3)*atanh(s
qrt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/3888
```

Mathematica [A] time = 0.116609, size = 60, normalized size = 0.5

$$\frac{6\sqrt{3x^2-x+2}\left(6912x^4+22032x^3+26904x^2+7538x-22383\right)-46055\sqrt{3}\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)}{19440}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)^3*(1 + 3*x + 4*x^2))/Sqrt[2 - x + 3*x^2],x]
```

```
[Out] (6*Sqrt[2 - x + 3*x^2]*(-22383 + 7538*x + 26904*x^2 + 22032*x^3 +
 6912*x^4) - 46055*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]])/19440
```

Maple [A] time = 0.019, size = 96, normalized size = 0.8

$$-\frac{9211\sqrt{3}}{3888} Arcsinh\left(\frac{6\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)-\frac{829}{120}\sqrt{3x^2-x+2}+\frac{3769x}{1620}\sqrt{3x^2-x+2}+\frac{1121x^2}{135}\sqrt{3x^2-x+2}+\frac{34x^3}{5}\sqrt{3x^2-x+2}+\frac{32x^4}{15}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^3*(4*x^2+3*x+1)/(3*x^2-x+2)^(1/2),x)
```

```
[Out] -9211/3888*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))-829/120*(3*x^2-
x+2)^(1/2)+3769/1620*x*(3*x^2-x+2)^(1/2)+1121/135*x^2*(3*x^2-x+2)
^(1/2)+34/5*x^3*(3*x^2-x+2)^(1/2)+32/15*x^4*(3*x^2-x+2)^(1/2)
```

Maxima [A] time = 0.770591, size = 131, normalized size = 1.09

$$\frac{32}{15}\sqrt{3x^2-x+2}x^4+\frac{34}{5}\sqrt{3x^2-x+2}x^3+\frac{1121}{135}\sqrt{3x^2-x+2}x^2+\frac{3769}{1620}\sqrt{3x^2-x+2}x-\frac{9211}{3888}\sqrt{3}\,\text{arsinh}\left(\frac{1}{23}\sqrt{23}(6x-1)\right)-\frac{829}{120}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/sqrt(3*x^2 - x + 2),x, algorithm="maxima")
```

```
[Out] 32/15*sqrt(3*x^2 - x + 2)*x^4 + 34/5*sqrt(3*x^2 - x + 2)*x^3 + 11
21/135*sqrt(3*x^2 - x + 2)*x^2 + 3769/1620*sqrt(3*x^2 - x + 2)*x
- 9211/3888*sqrt(3)*arcsinh(1/23*sqrt(23)*(6*x - 1)) - 829/120*sq
rt(3*x^2 - x + 2)
```

Fricas [A] time = 0.274566, size = 109, normalized size = 0.91

$$\frac{1}{38880}\sqrt{3}\left(4\sqrt{3}\left(6912\,x^4+22032\,x^3+26904\,x^2+7538\,x-22383\right)\sqrt{3\,x^2-x+2}+46055\,\log\left(-\sqrt{3}\left(72\,x^2-24\,x+25\right)+12\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/sqrt(3*x^2 - x + 2),x, algorithm="fricas")
```

```
[Out] 1/38880*sqrt(3)*(4*sqrt(3)*(6912*x^4 + 22032*x^3 + 26904*x^2 + 75
38*x - 22383)*sqrt(3*x^2 - x + 2) + 46055*log(-sqrt(3)*(72*x^2 -
24*x + 25) + 12*sqrt(3*x^2 - x + 2)*(6*x - 1)))
```

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

$$\int\frac{(2x+1)^3\left(4x^2+3x+1\right)}{\sqrt{3x^2-x+2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)**3*(4*x**2+3*x+1)/(3*x**2-x+2)**(1/2),x)
```

```
[Out] Integral((2*x + 1)**3*(4*x**2 + 3*x + 1)/sqrt(3*x**2 - x + 2), x)
```

GIAC/XCAS [A] time = 0.271707, size = 92, normalized size = 0.77

$$\frac{1}{3240}\left(2\left(12\left(18\left(16\,x+51\right)x+1121\right)x+3769\right)x-22383\right)\sqrt{3\,x^2-x+2}+\frac{9211}{3888}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x-\sqrt{3\,x^2-x+2}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/sqrt(3*x^2 - x + 2),x, algorithm="giac")

[Out] 1/3240*(2*(12*(18*(16*x + 51)*x + 1121)*x + 3769)*x - 22383)*sqrt
(3*x^2 - x + 2) + 9211/3888*sqrt(3)*ln(-2*sqrt(3)*(sqrt(3)*x - sq
rt(3*x^2 - x + 2)) + 1)
```

3.241 $\int \frac{(1+2x)^2(1+3x+4x^2)}{\sqrt{2-x+3x^2}}\,dx$

Optimal. Leaf size=95

$$\frac{1}{6}\sqrt{3x^2-x+2}(2x+1)^3+\frac{11}{27}\sqrt{3x^2-x+2}(2x+1)^2-\frac{143}{324}(3-2x)\sqrt{3x^2-x+2}+\frac{4147\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{648\sqrt{3}}$$

```
[Out] (-143*(3 - 2*x)*Sqrt[2 - x + 3*x^2])/324 + (11*(1 + 2*x)^2*Sqrt[2
 - x + 3*x^2])/27 + ((1 + 2*x)^3*Sqrt[2 - x + 3*x^2])/6 + (4147*A
rcSinh[(1 - 6*x)/Sqrt[23]])/(648*Sqrt[3])
```

Rubi [A] time = 0.236514, antiderivative size = 95, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.156

$$\frac{1}{6}\sqrt{3x^2-x+2}(2x+1)^3+\frac{11}{27}\sqrt{3x^2-x+2}(2x+1)^2-\frac{143}{324}(3-2x)\sqrt{3x^2-x+2}+\frac{4147\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{648\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)^2*(1 + 3*x + 4*x^2))/Sqrt[2 - x + 3*x^2],x]
```

```
[Out] (-143*(3 - 2*x)*Sqrt[2 - x + 3*x^2])/324 + (11*(1 + 2*x)^2*Sqrt[2
 - x + 3*x^2])/27 + ((1 + 2*x)^3*Sqrt[2 - x + 3*x^2])/6 + (4147*A
rcSinh[(1 - 6*x)/Sqrt[23]])/(648*Sqrt[3])
```

Rubi in Sympy [A] time = 27.7294, size = 94, normalized size = 0.99

$$-\frac{(-3432x+5148)\sqrt{3x^2-x+2}}{3888}+\frac{(2x+1)^3\sqrt{3x^2-x+2}}{6}+\frac{11(2x+1)^2\sqrt{3x^2-x+2}}{27}-\frac{4147\sqrt{3}\,\mathrm{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{1944}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**2*(4*x**2+3*x+1)/(3*x**2-x+2)**(1/2),x)
```

```
[Out] -(-3432*x + 5148)*sqrt(3*x**2 - x + 2)/3888 + (2*x + 1)**3*sqrt(3
*x**2 - x + 2)/6 + 11*(2*x + 1)**2*sqrt(3*x**2 - x + 2)/27 - 4147
```

```
*sqrt(3)*atanh(sqrt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/1944
```

Mathematica [A] time = 0.0753845, size = 55, normalized size = 0.58

$$\frac{6\sqrt{3x^2-x+2}\left(432x^3+1176x^2+1138x-243\right)-4147\sqrt{3}\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)}{1944}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)^2*(1 + 3*x + 4*x^2))/Sqrt[2 - x + 3*x^2],x]
```

```
[Out] (6*Sqrt[2 - x + 3*x^2]*(-243 + 1138*x + 1176*x^2 + 432*x^3) - 414
7*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]])/1944
```

Maple [A] time = 0.011, size = 79, normalized size = 0.8

$$-\frac{4147\sqrt{3}}{1944}Arcsinh\left(\frac{6\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)-\frac{3}{4}\sqrt{3x^2-x+2}+\frac{569x}{162}\sqrt{3x^2-x+2}+\frac{98x^2}{27}\sqrt{3x^2-x+2}+\frac{4x^3}{3}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^2*(4*x^2+3*x+1)/(3*x^2-x+2)^(1/2),x)
```

```
[Out] -4147/1944*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))-3/4*(3*x^2-x+2)
^(1/2)+569/162*x*(3*x^2-x+2)^(1/2)+98/27*x^2*(3*x^2-x+2)^(1/2)+4/
3*x^3*(3*x^2-x+2)^(1/2)
```

Maxima [A] time = 0.777503, size = 108, normalized size = 1.14

$$\frac{4}{3}\sqrt{3x^2-x+2}x^3+\frac{98}{27}\sqrt{3x^2-x+2}x^2+\frac{569}{162}\sqrt{3x^2-x+2}x-\frac{4147}{1944}\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{23}\sqrt{23}(6x-1)\right)-\frac{3}{4}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/sqrt(3*x^2 - x + 2),x, algorithm="maxima")
```

```
[Out] 4/3*sqrt(3*x^2 - x + 2)*x^3 + 98/27*sqrt(3*x^2 - x + 2)*x^2 + 569
/162*sqrt(3*x^2 - x + 2)*x - 4147/1944*sqrt(3)*arcsinh(1/23*sqrt(
23)*(6*x - 1)) - 3/4*sqrt(3*x^2 - x + 2)
```

Fricas [A] time = 0.276567, size = 103, normalized size = 1.08

$$\frac{1}{3888}\sqrt{3}\left(4\sqrt{3}\left(432x^3+1176x^2+1138x-243\right)\sqrt{3x^2-x+2}+4147\log\left(-\sqrt{3}\left(72x^2-24x+25\right)+12\sqrt{3x^2-x+2}(6x-\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/sqrt(3*x^2 - x + 2),x, algorithm="fricas")
```

```
[Out] 1/3888*sqrt(3)*(4*sqrt(3)*(432*x^3 + 1176*x^2 + 1138*x - 243)*sqr
t(3*x^2 - x + 2) + 4147*log(-sqrt(3)*(72*x^2 - 24*x + 25) + 12*sq
rt(3*x^2 - x + 2)*(6*x - 1)))
```

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

$$\int \frac{(2x+1)^2\left(4x^2+3x+1\right)}{\sqrt{3x^2-x+2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)**2*(4*x**2+3*x+1)/(3*x**2-x+2)**(1/2),x)
```

```
[Out] Integral((2*x + 1)**2*(4*x**2 + 3*x + 1)/sqrt(3*x**2 - x + 2), x)
```

GIAC/XCAS [A] time = 0.271194, size = 85, normalized size = 0.89

$$\frac{1}{324}\left(2\left(12\left(18x+49\right)x+569\right)x-243\right)\sqrt{3x^2-x+2}+\frac{4147}{1944}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/sqrt(3*x^2 - x + 2),x, algorithm="giac")
```

```
[Out] 1/324*(2*(12*(18*x + 49)*x + 569)*x - 243)*sqrt(3*x^2 - x + 2) +
4147/1944*sqrt(3)*ln(-2*sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 - x + 2))
 + 1)
```

3.242 $\int \frac{(1+2x)(1+3x+4x^2)}{\sqrt{2-x+3x^2}}\,dx$

Optimal. Leaf size=70

$$\frac{2}{9}\sqrt{3x^2-x+2}(2x+1)^2+\frac{1}{54}(62x+69)\sqrt{3x^2-x+2}+\frac{251\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{108\sqrt{3}}$$

```
[Out] (2*(1 + 2*x)^2*Sqrt[2 - x + 3*x^2])/9 + ((69 + 62*x)*Sqrt[2 - x +
 3*x^2])/54 + (251*ArcSinh[(1 - 6*x)/Sqrt[23]])/(108*Sqrt[3])
```

Rubi [A] time = 0.133267, antiderivative size = 70, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{2}{9}\sqrt{3x^2-x+2}(2x+1)^2+\frac{1}{54}(62x+69)\sqrt{3x^2-x+2}+\frac{251\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{108\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)*(1 + 3*x + 4*x^2))/Sqrt[2 - x + 3*x^2],x]
```

```
[Out] (2*(1 + 2*x)^2*Sqrt[2 - x + 3*x^2])/9 + ((69 + 62*x)*Sqrt[2 - x +
 3*x^2])/54 + (251*ArcSinh[(1 - 6*x)/Sqrt[23]])/(108*Sqrt[3])
```

Rubi in Sympy [A] time = 19.0369, size = 73, normalized size = 1.04

$$\frac{2\,(2x+1)^2\,\sqrt{3x^2-x+2}}{9}+\frac{(372x+414)\,\sqrt{3x^2-x+2}}{324}-\frac{251\sqrt{3}\,\mathrm{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{324}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)*(4*x**2+3*x+1)/(3*x**2-x+2)**(1/2),x)
```

```
[Out] 2*(2*x + 1)**2*sqrt(3*x**2 - x + 2)/9 + (372*x + 414)*sqrt(3*x**2
 - x + 2)/324 - 251*sqrt(3)*atanh(sqrt(3)*(6*x - 1)/(6*sqrt(3*x**
2 - x + 2)))/324
```

Mathematica [A] time = 0.0636894, size = 50, normalized size = 0.71

$$\frac{1}{324}\left(6\sqrt{3x^2-x+2}\left(48x^2+110x+81\right)-251\sqrt{3}\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)*(1 + 3*x + 4*x^2))/Sqrt[2 - x + 3*x^2],x]

[Out] (6*Sqrt[2 - x + 3*x^2]*(81 + 110*x + 48*x^2) - 251*Sqrt[3]*ArcSin
h[(-1 + 6*x)/Sqrt[23]])/324
```

Maple [A] time = 0.008, size = 62, normalized size = 0.9

$$-\frac{251\sqrt{3}}{324}Arcsinh\left(\frac{6\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{3}{2}\sqrt{3x^2-x+2}+\frac{55x}{27}\sqrt{3x^2-x+2}+\frac{8x^2}{9}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)*(4*x^2+3*x+1)/(3*x^2-x+2)^(1/2),x)

[Out] -251/324*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))+3/2*(3*x^2-x+2)^(
1/2)+55/27*x*(3*x^2-x+2)^(1/2)+8/9*x^2*(3*x^2-x+2)^(1/2)
```

Maxima [A] time = 0.766281, size = 85, normalized size = 1.21

$$\frac{8}{9}\sqrt{3x^2-x+2}x^2+\frac{55}{27}\sqrt{3x^2-x+2}x-\frac{251}{324}\sqrt{3}\operatorname{arsinh}\left(\frac{1}{23}\sqrt{23}(6x-1)\right)+\frac{3}{2}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)/sqrt(3*x^2 - x + 2),x, algorithm="maxima")

[Out] 8/9*sqrt(3*x^2 - x + 2)*x^2 + 55/27*sqrt(3*x^2 - x + 2)*x - 251/3
24*sqrt(3)*arcsinh(1/23*sqrt(23)*(6*x - 1)) + 3/2*sqrt(3*x^2 - x
+ 2)
```

Fricas [A] time = 0.273243, size = 96, normalized size = 1.37

$$\frac{1}{648}\sqrt{3}\left(4\sqrt{3}\left(48x^2+110x+81\right)\sqrt{3x^2-x+2}+251\log\left(-\sqrt{3}\left(72x^2-24x+25\right)+12\sqrt{3x^2-x+2}(6x-1)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)/sqrt(3*x^2 - x + 2),x, algorithm="fricas")
```

```
[Out] 1/648*sqrt(3)*(4*sqrt(3)*(48*x^2 + 110*x + 81)*sqrt(3*x^2 - x + 2
) + 251*log(-sqrt(3)*(72*x^2 - 24*x + 25) + 12*sqrt(3*x^2 - x + 2
)*(6*x - 1)))
```

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

$$\int \frac{(2x+1)\left(4x^2+3x+1\right)}{\sqrt{3x^2-x+2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((1+2*x)*(4*x**2+3*x+1)/(3*x**2-x+2)**(1/2),x)
```

```
[Out] Integral((2*x + 1)*(4*x**2 + 3*x + 1)/sqrt(3*x**2 - x + 2), x)
```

GIAC/XCAS [A] time = 0.269991, size = 78, normalized size = 1.11

$$\frac{1}{54}\left(2\left(24\,x+55\right)x+81\right)\sqrt{3\,x^2-x+2}+\frac{251}{324}\,\sqrt{3}\ln\left(-2\,\sqrt{3}\left(\sqrt{3}x-\sqrt{3\,x^2-x+2}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)/sqrt(3*x^2 - x + 2),x, algorithm="giac")
```

```
[Out] 1/54*(2*(24*x + 55)*x + 81)*sqrt(3*x^2 - x + 2) + 251/324*sqrt(3)
*ln(-2*sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 - x + 2)) + 1)
```

3.243 $\int \frac{1+3x+4x^2}{(1+2x)\sqrt{2-x+3x^2}}\,dx$

Optimal. Leaf size=78

$$\frac{2}{3}\sqrt{3x^2-x+2}-\frac{\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{2\sqrt{13}}-\frac{5\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{6\sqrt{3}}$$

```
[Out] (2*Sqrt[2 - x + 3*x^2])/3 - (5*ArcSinh[(1 - 6*x)/Sqrt[23]])/(6*Sq
rt[3]) - ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])]/(2*S
qrt[13])
```

Rubi [A] time = 0.207952, antiderivative size = 78, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.188

$$\frac{2}{3}\sqrt{3x^2-x+2}-\frac{\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{2\sqrt{13}}-\frac{5\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{6\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)*Sqrt[2 - x + 3*x^2]),x]
```

```
[Out] (2*Sqrt[2 - x + 3*x^2])/3 - (5*ArcSinh[(1 - 6*x)/Sqrt[23]])/(6*Sq
rt[3]) - ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])]/(2*S
qrt[13])
```

Rubi in Sympy [A] time = 26.119, size = 80, normalized size = 1.03

$$\frac{2\sqrt{3x^2-x+2}}{3}-\frac{\sqrt{13}\,\operatorname{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{26}+\frac{5\sqrt{3}\,\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{18}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)/(3*x**2-x+2)**(1/2),x)
```

```
[Out] 2*sqrt(3*x**2 - x + 2)/3 - sqrt(13)*atanh(sqrt(13)*(-8*x + 9)/(26
*sqrt(3*x**2 - x + 2)))/26 + 5*sqrt(3)*atanh(sqrt(3)*(6*x - 1)/(6
*sqrt(3*x**2 - x + 2)))/18
```

Mathematica [A] time = 0.0720816, size = 87, normalized size = 1.12

$$\frac{1}{234}\left(156\sqrt{3x^2-x+2}-9\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)+9\sqrt{13}\log(2x+1)+65\sqrt{3}\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)\right)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)*Sqrt[2 - x + 3*x^2]),x]
```

```
[Out] (156*Sqrt[2 - x + 3*x^2] + 65*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]
] + 9*Sqrt[13]*Log[1 + 2*x] - 9*Sqrt[13]*Log[9 - 8*x + 2*Sqrt[13]
*Sqrt[2 - x + 3*x^2]])/234
```

Maple [A] time = 0.011, size = 60, normalized size = 0.8

$$\frac{5\sqrt{3}}{18}Arcsinh\left(\frac{6\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{2}{3}\sqrt{3x^2-x+2}-\frac{\sqrt{13}}{26}Artanh\left(\frac{2\sqrt{13}}{13}\left(\frac{9}{2}-4x\right)\frac{1}{\sqrt{12\,(1/2+x)^2-16x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)/(3*x^2-x+2)^(1/2),x)
```

```
[Out] 5/18*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))+2/3*(3*x^2-x+2)^(1/2)
-1/26*13^(1/2)*arctanh(2/13*(9/2-4*x)*13^(1/2)/(12*(1/2+x)^2-16*x
+5)^(1/2))
```

Maxima [A] time = 0.77004, size = 90, normalized size = 1.15

$$\frac{5}{18}\sqrt{3}\,\mathrm{arsinh}\left(\frac{6}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{1}{26}\sqrt{13}\,\mathrm{arsinh}\left(\frac{8\sqrt{23}x}{23\,|2x+1|}-\frac{9\sqrt{23}}{23\,|2x+1|}\right)+\frac{2}{3}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 - x + 2)*(2*x + 1)),x, algorithm="maxima")
```

```
[Out] 5/18*sqrt(3)*arcsinh(6/23*sqrt(23)*x - 1/23*sqrt(23)) + 1/26*sqrt
(13)*arcsinh(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*sqrt(23)/abs(2*x
 + 1)) + 2/3*sqrt(3*x^2 - x + 2)
```

Fricas [A] time = 0.280379, size = 167, normalized size = 2.14

$$\frac{1}{468}\sqrt{13}\sqrt{3}\left(8\sqrt{13}\sqrt{3}\sqrt{3x^2-x+2}+5\sqrt{13}\log\left(-\sqrt{3}\left(72x^2-24x+25\right)-12\sqrt{3x^2-x+2}(6x-1)\right)+3\sqrt{3}\log\left(-\frac{\sqrt{13}(22\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 - x + 2)*(2*x + 1)),x, algorithm="fricas")
```

```
[Out] 1/468*sqrt(13)*sqrt(3)*(8*sqrt(13)*sqrt(3)*sqrt(3*x^2 - x + 2) +
5*sqrt(13)*log(-sqrt(3)*(72*x^2 - 24*x + 25) - 12*sqrt(3*x^2 - x
+ 2)*(6*x - 1)) + 3*sqrt(3)*log(-(sqrt(13)*(220*x^2 - 196*x + 185
) + 52*sqrt(3*x^2 - x + 2)*(8*x - 9))/(4*x^2 + 4*x + 1)))
```

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

$$\int \frac{4x^2+3x+1}{(2x+1)\sqrt{3x^2-x+2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**2+3*x+1)/(1+2*x)/(3*x**2-x+2)**(1/2),x)
```

```
[Out] Integral((4*x**2 + 3*x + 1)/((2*x + 1)*sqrt(3*x**2 - x + 2)), x)
```

GIAC/XCAS [A] time = 0.29558, size = 157, normalized size = 2.01

$$-\frac{5}{18}\sqrt{3}\ln\left(-6\sqrt{3}x+\sqrt{3}+6\sqrt{3x^2-x+2}\right)+\frac{1}{26}\sqrt{13}\ln\left(-\frac{\left|-4\sqrt{3}x-2\sqrt{13}-2\sqrt{3}+4\sqrt{3x^2-x+2}\right|}{2\left(2\sqrt{3}x-\sqrt{13}+\sqrt{3}-2\sqrt{3x^2-x+2}\right)}\right)+\frac{2}{3}\sqrt{3x^2-x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 - x + 2)*(2*x + 1)),x, algorithm="giac")
```

```
[Out] -5/18*sqrt(3)*ln(-6*sqrt(3)*x + sqrt(3) + 6*sqrt(3*x^2 - x + 2))
+ 1/26*sqrt(13)*ln(-1/2*abs(-4*sqrt(3)*x - 2*sqrt(13) - 2*sqrt(3)
 + 4*sqrt(3*x^2 - x + 2))/(2*sqrt(3)*x - sqrt(13) + sqrt(3) - 2*s
qrt(3*x^2 - x + 2))) + 2/3*sqrt(3*x^2 - x + 2)
```

3.244 $\int \frac{1+3x+4x^2}{(1+2x)^2\sqrt{2-x+3x^2}}\,dx$

Optimal. Leaf size=83

$$-\frac{\sqrt{3x^2-x+2}}{13(2x+1)}+\frac{9\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{26\sqrt{13}}-\frac{\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{\sqrt{3}}$$

```
[Out] -Sqrt[2 - x + 3*x^2]/(13*(1 + 2*x)) - ArcSinh[(1 - 6*x)/Sqrt[23]]
/Sqrt[3] + (9*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])]
)/(26*Sqrt[13])
```

Rubi [A] time = 0.202146, antiderivative size = 83, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.188

$$-\frac{\sqrt{3x^2-x+2}}{13(2x+1)}+\frac{9\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{26\sqrt{13}}-\frac{\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)^2*Sqrt[2 - x + 3*x^2]),x]
```

```
[Out] -Sqrt[2 - x + 3*x^2]/(13*(1 + 2*x)) - ArcSinh[(1 - 6*x)/Sqrt[23]]
/Sqrt[3] + (9*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])]
)/(26*Sqrt[13])
```

Rubi in Sympy [A] time = 25.9542, size = 82, normalized size = 0.99

$$\frac{9\sqrt{13}\,\operatorname{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{338}+\frac{\sqrt{3}\,\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{3}-\frac{\sqrt{3x^2-x+2}}{13\,(2x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)**2/(3*x**2-x+2)**(1/2),x)
```

```
[Out] 9*sqrt(13)*atanh(sqrt(13)*(-8*x + 9)/(26*sqrt(3*x**2 - x + 2)))/3
38 + sqrt(3)*atanh(sqrt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/3
- sqrt(3*x**2 - x + 2)/(13*(2*x + 1))
```

Mathematica [A] time = 0.175466, size = 93, normalized size = 1.12

$$-\frac{\sqrt{3x^2-x+2}}{26x+13}+\frac{9\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)}{26\sqrt{13}}-\frac{9\log(2x+1)}{26\sqrt{13}}+\frac{\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)}{\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)^2*Sqrt[2 - x + 3*x^2]),x]
```

```
[Out] -(Sqrt[2 - x + 3*x^2]/(13 + 26*x)) + ArcSinh[(-1 + 6*x)/Sqrt[23]]
/Sqrt[3] - (9*Log[1 + 2*x])/(26*Sqrt[13]) + (9*Log[9 - 8*x + 2*Sq
rt[13]*Sqrt[2 - x + 3*x^2]])/(26*Sqrt[13])
```

Maple [A] time = 0.016, size = 67, normalized size = 0.8

$$\frac{\sqrt{3}}{3}Arcsinh\left(\frac{6\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)-\frac{1}{26}\sqrt{3\left(1/2+x\right)^2-4x+\frac{5}{4}}\left(\frac{1}{2}+x\right)^{-1}+\frac{9\sqrt{13}}{338}Artanh\left(\frac{2\sqrt{13}}{13}\left(\frac{9}{2}-4x\right)\frac{1}{\sqrt{12\left(1/2+x\right)^2-16x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)^2/(3*x^2-x+2)^(1/2),x)
```

```
[Out] 1/3*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))-1/26/(1/2+x)*(3*(1/2+x
)^2-4*x+5/4)^(1/2)+9/338*13^(1/2)*arctanh(2/13*(9/2-4*x)*13^(1/2)
/(12*(1/2+x)^2-16*x+5)^(1/2))
```

Maxima [A] time = 0.777041, size = 100, normalized size = 1.2

$$\frac{1}{3}\sqrt{3}\,\text{arsinh}\left(\frac{6}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)-\frac{9}{338}\sqrt{13}\,\text{arsinh}\left(\frac{8\sqrt{23}x}{23\left|2x+1\right|}-\frac{9\sqrt{23}}{23\left|2x+1\right|}\right)-\frac{\sqrt{3x^2-x+2}}{13\left(2x+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 - x + 2)*(2*x + 1)^2),x, algorithm="maxima
```

```
[Out] 1/3*sqrt(3)*arcsinh(6/23*sqrt(23)*x - 1/23*sqrt(23)) - 9/338*sqrt
(13)*arcsinh(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*sqrt(23)/abs(2*x
```

```
+ 1)) - 1/13*sqrt(3*x^2 - x + 2)/(2*x + 1)
```

Fricas [A] time = 0.284809, size = 190, normalized size = 2.29

$$\frac{\sqrt{13}\sqrt{3}\left(26\sqrt{13}(2x+1)\log\left(-\sqrt{3}\left(72x^2-24x+25\right)-12\sqrt{3x^2-x+2}(6x-1)\right)+9\sqrt{3}(2x+1)\log\left(-\frac{\sqrt{13}\left(220x^2-196x+185\right)}{4x^2+4}\right.\right.}{2028\,(2x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 - x + 2)*(2*x + 1)^2),x, algorithm="fricas
```

```
[Out] 1/2028*sqrt(13)*sqrt(3)*(26*sqrt(13)*(2*x + 1)*log(-sqrt(3)*(72*x
^2 - 24*x + 25) - 12*sqrt(3*x^2 - x + 2)*(6*x - 1)) + 9*sqrt(3)*(
2*x + 1)*log(-(sqrt(13)*(220*x^2 - 196*x + 185) - 52*sqrt(3*x^2 -
 x + 2)*(8*x - 9))/(4*x^2 + 4*x + 1)) - 4*sqrt(13)*sqrt(3)*sqrt(3
*x^2 - x + 2))/(2*x + 1)
```

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

$$\int \frac{4x^2+3x+1}{(2x+1)^2\sqrt{3x^2-x+2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x**2+3*x+1)/(1+2*x)**2/(3*x**2-x+2)**(1/2),x)
```

```
[Out] Integral((4*x**2 + 3*x + 1)/((2*x + 1)**2*sqrt(3*x**2 - x + 2)),
x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{4x^2+3x+1}{\sqrt{3x^2-x+2}(2x+1)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 - x + 2)*(2*x + 1)^2),x, algorithm="giac")
```

```
[Out] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 - x + 2)*(2*x + 1)^2), x)
```

3.245 $\int \frac{1+3x+4x^2}{(1+2x)^3\sqrt{2-x+3x^2}}\,dx$

Optimal. Leaf size=89

$$\frac{7\sqrt{3x^2-x+2}}{169(2x+1)}-\frac{\sqrt{3x^2-x+2}}{26(2x+1)^2}-\frac{581\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{676\sqrt{13}}$$

```
[Out] -Sqrt[2 - x + 3*x^2]/(26*(1 + 2*x)^2) + (7*Sqrt[2 - x + 3*x^2])/(
169*(1 + 2*x)) - (581*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x +
3*x^2])])/(676*Sqrt[13])
```

Rubi [A] time = 0.182218, antiderivative size = 89, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{7\sqrt{3x^2-x+2}}{169(2x+1)}-\frac{\sqrt{3x^2-x+2}}{26(2x+1)^2}-\frac{581\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{676\sqrt{13}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)^3*Sqrt[2 - x + 3*x^2]),x]
```

```
[Out] -Sqrt[2 - x + 3*x^2]/(26*(1 + 2*x)^2) + (7*Sqrt[2 - x + 3*x^2])/(
169*(1 + 2*x)) - (581*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x +
3*x^2])])/(676*Sqrt[13])
```

Rubi in Sympy [A] time = 24.9855, size = 71, normalized size = 0.8

$$-\frac{581\sqrt{13}\,\operatorname{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{8788}+\frac{7\sqrt{3x^2-x+2}}{169\,(2x+1)}-\frac{\sqrt{3x^2-x+2}}{26\,(2x+1)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)**3/(3*x**2-x+2)**(1/2),x)
```

```
[Out] -581*sqrt(13)*atanh(sqrt(13)*(-8*x + 9)/(26*sqrt(3*x**2 - x + 2))
)/8788 + 7*sqrt(3*x**2 - x + 2)/(169*(2*x + 1)) - sqrt(3*x**2 - x
 + 2)/(26*(2*x + 1)**2)
```

Mathematica [A] time = 0.122478, size = 80, normalized size = 0.9

$$\frac{\frac{26\sqrt{3x^2-x+2}(28x+1)}{(2x+1)^2}-581\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)+581\sqrt{13}\log(2x+1)}{8788}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)^3*Sqrt[2 - x + 3*x^2]),x]
```

```
[Out] ((26*(1 + 28*x)*Sqrt[2 - x + 3*x^2])/(1 + 2*x)^2 + 581*Sqrt[13]*L
og[1 + 2*x] - 581*Sqrt[13]*Log[9 - 8*x + 2*Sqrt[13]*Sqrt[2 - x +
3*x^2]])/8788
```

Maple [A] time = 0.015, size = 74, normalized size = 0.8

$$-\frac{581\sqrt{13}}{8788}\mathit{Artanh}\left(\frac{2\sqrt{13}}{13}\left(\frac{9}{2}-4x\right)\frac{1}{\sqrt{12(1/2+x)^2-16x+5}}\right)-\frac{1}{104}\sqrt{3(1/2+x)^2-4x+\frac{5}{4}}\left(\frac{1}{2}+x\right)^{-2}+\frac{7}{338}\sqrt{3(1/2+x)^2-4x+\frac{5}{4}}\left(\frac{1}{2}+x\right)^{-1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)^3/(3*x^2-x+2)^(1/2),x)
```

```
[Out] -581/8788*13^(1/2)*arctanh(2/13*(9/2-4*x)*13^(1/2)/(12*(1/2+x)^2-
16*x+5)^(1/2))-1/104/(1/2+x)^2*(3*(1/2+x)^2-4*x+5/4)^(1/2)+7/338/
(1/2+x)*(3*(1/2+x)^2-4*x+5/4)^(1/2)
```

Maxima [A] time = 0.765057, size = 111, normalized size = 1.25

$$\frac{581}{8788}\sqrt{13}\,\mathrm{arsinh}\left(\frac{8\sqrt{23}x}{23\,|2x+1|}-\frac{9\sqrt{23}}{23\,|2x+1|}\right)-\frac{\sqrt{3x^2-x+2}}{26\,(4x^2+4x+1)}+\frac{7\sqrt{3x^2-x+2}}{169\,(2x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 - x + 2)*(2*x + 1)^3),x, algorithm="maxima
```

```
[Out] 581/8788*sqrt(13)*arcsinh(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*sqr
t(23)/abs(2*x + 1)) - 1/26*sqrt(3*x^2 - x + 2)/(4*x^2 + 4*x + 1)
+ 7/169*sqrt(3*x^2 - x + 2)/(2*x + 1)
```

Fricas [A] time = 0.274897, size = 136, normalized size = 1.53

$$\frac{\sqrt{13}\left(4\sqrt{13}\sqrt{3x^2-x+2}(28x+1)+581\left(4x^2+4x+1\right)\log\left(-\frac{\sqrt{13}\left(220x^2-196x+185\right)+52\sqrt{3x^2-x+2}(8x-9)}{4x^2+4x+1}\right)\right)}{17576\left(4x^2+4x+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 - x + 2)*(2*x + 1)^3),x, algorithm="fricas
```

```
[Out] 1/17576*sqrt(13)*(4*sqrt(13)*sqrt(3*x^2 - x + 2)*(28*x + 1) + 581
*(4*x^2 + 4*x + 1)*log(-(sqrt(13)*(220*x^2 - 196*x + 185) + 52*sq
rt(3*x^2 - x + 2)*(8*x - 9))/(4*x^2 + 4*x + 1)))/(4*x^2 + 4*x + 1
)
```

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

$$\int \frac{4x^2+3x+1}{(2x+1)^3\sqrt{3x^2-x+2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**2+3*x+1)/(1+2*x)**3/(3*x**2-x+2)**(1/2),x)
```

```
[Out] Integral((4*x**2 + 3*x + 1)/((2*x + 1)**3*sqrt(3*x**2 - x + 2)),
x)
```

GIAC/XCAS [A] time = 0.295261, size = 275, normalized size = 3.09

$$\frac{581}{8788}\sqrt{13}\ln\left(-\frac{\left|-4\sqrt{3}x-2\sqrt{13}-2\sqrt{3}+4\sqrt{3x^2-x+2}\right|}{2\left(2\sqrt{3}x-\sqrt{13}+\sqrt{3}-2\sqrt{3x^2-x+2}\right)}\right)$$
$$+\frac{190\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)^3-53\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)^2-489\sqrt{3}x+289\sqrt{3}+489\sqrt{3x^2-x+2}}{338\left(2\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)^2+2\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)-5\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/(sqrt(3*x^2 - x + 2)*(2*x + 1)^3),x, algorithm="giac")
```

```
[Out] 581/8788*sqrt(13)*ln(-1/2*abs(-4*sqrt(3)*x - 2*sqrt(13) - 2*sqrt(
3) + 4*sqrt(3*x^2 - x + 2))/(2*sqrt(3)*x - sqrt(13) + sqrt(3) - 2
*sqrt(3*x^2 - x + 2))) + 1/338*(190*(sqrt(3)*x - sqrt(3*x^2 - x +
 2))^3 - 53*sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 - x + 2))^2 - 489*sqr
t(3)*x + 289*sqrt(3) + 489*sqrt(3*x^2 - x + 2))/(2*(sqrt(3)*x - s
qrt(3*x^2 - x + 2))^2 + 2*sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 - x + 2
)) - 5)^2
```

3.246 $\int \frac{(1+2x)^3(1+3x+4x^2)}{(2-x+3x^2)^{3/2}}\,dx$

Optimal. Leaf size=103

$$\frac{32}{27}\sqrt{3x^2-x+2}x^2+\frac{412}{81}\sqrt{3x^2-x+2}x+\frac{746}{81}\sqrt{3x^2-x+2}+\frac{2(12839-3871x)}{1863\sqrt{3x^2-x+2}}+\frac{353\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{81\sqrt{3}}$$

```
[Out] (2*(12839 - 3871*x))/(1863*Sqrt[2 - x + 3*x^2]) + (746*Sqrt[2 - x
 + 3*x^2])/81 + (412*x*Sqrt[2 - x + 3*x^2])/81 + (32*x^2*Sqrt[2 -
 x + 3*x^2])/27 + (353*ArcSinh[(1 - 6*x)/Sqrt[23]])/(81*Sqrt[3])
```

Rubi [A] time = 0.203675, antiderivative size = 103, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.156

$$\frac{32}{27}\sqrt{3x^2-x+2}x^2+\frac{412}{81}\sqrt{3x^2-x+2}x+\frac{746}{81}\sqrt{3x^2-x+2}+\frac{2(12839-3871x)}{1863\sqrt{3x^2-x+2}}+\frac{353\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{81\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)^3*(1 + 3*x + 4*x^2))/(2 - x + 3*x^2)^(3/2),x]
```

```
[Out] (2*(12839 - 3871*x))/(1863*Sqrt[2 - x + 3*x^2]) + (746*Sqrt[2 - x
 + 3*x^2])/81 + (412*x*Sqrt[2 - x + 3*x^2])/81 + (32*x^2*Sqrt[2 -
 x + 3*x^2])/27 + (353*ArcSinh[(1 - 6*x)/Sqrt[23]])/(81*Sqrt[3])
```

Rubi in Sympy [A] time = 28.5777, size = 100, normalized size = 0.97

$$-\frac{2(2x+1)^3(17x+47)}{69\sqrt{3x^2-x+2}}+\frac{388(2x+1)^2\sqrt{3x^2-x+2}}{621}+\frac{(48228x+90306)\sqrt{3x^2-x+2}}{5589}-\frac{353\sqrt{3}\,\text{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{243}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**3*(4*x**2+3*x+1)/(3*x**2-x+2)**(3/2),x)
```

```
[Out] -2*(2*x + 1)**3*(17*x + 47)/(69*sqrt(3*x**2 - x + 2)) + 388*(2*x
+ 1)**2*sqrt(3*x**2 - x + 2)/621 + (48228*x + 90306)*sqrt(3*x**2
```

```
- x + 2)/5589 - 353*sqrt(3)*atanh(sqrt(3)*(6*x - 1)/(6*sqrt(3*x**
2 - x + 2)))/243
```

Mathematica [A] time = 0.140946, size = 60, normalized size = 0.58

$$\frac{\frac{6(3312x^4+13110x^3+23207x^2-2974x+29997)}{\sqrt{3x^2-x+2}} - 8119\sqrt{3}\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)}{5589}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)^3*(1 + 3*x + 4*x^2))/(2 - x + 3*x^2)^(3/2),x]
```

```
[Out] ((6*(29997 - 2974*x + 23207*x^2 + 13110*x^3 + 3312*x^4))/Sqrt[2 -
 x + 3*x^2] - 8119*Sqrt[3]*ArcSinh[(-1 + 6*x)/Sqrt[23]])/5589
```

Maple [A] time = 0.018, size = 115, normalized size = 1.1

$$-\frac{3126\,x-521}{414}\frac{1}{\sqrt{3\,x^2-x+2}}+\frac{557}{18}\frac{1}{\sqrt{3\,x^2-x+2}}+\frac{353\,x}{81}\frac{1}{\sqrt{3\,x^2-x+2}}-\frac{353\,\sqrt{3}}{243}Arcsinh\left(\frac{6\,\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{2018\,x^2}{81}\frac{1}{\sqrt{3\,x^2-x+2}}+\frac{380\,x^3}{27}\frac{1}{\sqrt{3\,x^2-x+2}}+\frac{32\,x^4}{9}\frac{1}{\sqrt{3\,x^2-x+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^3*(4*x^2+3*x+1)/(3*x^2-x+2)^(3/2),x)
```

```
[Out] -521/414*(6*x-1)/(3*x^2-x+2)^(1/2)+557/18/(3*x^2-x+2)^(1/2)+353/8
1*x/(3*x^2-x+2)^(1/2)-353/243*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/
6))+2018/81*x^2/(3*x^2-x+2)^(1/2)+380/27*x^3/(3*x^2-x+2)^(1/2)+32
/9*x^4/(3*x^2-x+2)^(1/2)
```

Maxima [A] time = 0.769714, size = 131, normalized size = 1.27

$$\frac{32\,x^4}{9\,\sqrt{3\,x^2-x+2}}+\frac{380\,x^3}{27\,\sqrt{3\,x^2-x+2}}+\frac{2018\,x^2}{81\,\sqrt{3\,x^2-x+2}}-\frac{353}{243}\,\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{23}\,\sqrt{23}(6\,x-1)\right)-\frac{5948\,x}{1863\,\sqrt{3\,x^2-x+2}}+\frac{2222}{69\,\sqrt{3\,x^2-x+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/(3*x^2 - x + 2)^(3/2),x, algorithm="maxima
```

```
[Out] 32/9*x^4/sqrt(3*x^2 - x + 2) + 380/27*x^3/sqrt(3*x^2 - x + 2) + 2
018/81*x^2/sqrt(3*x^2 - x + 2) - 353/243*sqrt(3)*arcsinh(1/23*sqr
t(23)*(6*x - 1)) - 5948/1863*x/sqrt(3*x^2 - x + 2) + 2222/69/sqrt
(3*x^2 - x + 2)
```

Fricas [A]   time = 0.27763, size = 139, normalized size = 1.35

$$\frac{\sqrt{3}\Big(4\sqrt{3}\big(3312\,x^4 + 13110\,x^3 + 23207\,x^2 - 2974\,x + 29997\big)\sqrt{3\,x^2 - x + 2} + 8119\,\big(3\,x^2 - x + 2\big)\log\Big(-\sqrt{3}\big(72\,x^2 - 24\,x + 25\big)}{11178\,(3\,x^2 - x + 2)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/(3*x^2 - x + 2)^(3/2),x, algorithm="fricas
```

```
[Out] 1/11178*sqrt(3)*(4*sqrt(3)*(3312*x^4 + 13110*x^3 + 23207*x^2 - 29
74*x + 29997)*sqrt(3*x^2 - x + 2) + 8119*(3*x^2 - x + 2)*log(-sqr
t(3)*(72*x^2 - 24*x + 25) + 12*sqrt(3*x^2 - x + 2)*(6*x - 1)))/(3
*x^2 - x + 2)
```

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

$$\int \frac{(2x+1)^3\,(4x^2+3x+1)}{(3x^2-x+2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)**3*(4*x**2+3*x+1)/(3*x**2-x+2)**(3/2),x)
```

```
[Out] Integral((2*x + 1)**3*(4*x**2 + 3*x + 1)/(3*x**2 - x + 2)**(3/2),
 x)
```

GIAC/XCAS [A]   time = 0.272385, size = 90, normalized size = 0.87

$$\frac{353}{243}\,\sqrt{3}\ln\left(-2\,\sqrt{3}\left(\sqrt{3}x - \sqrt{3\,x^2 - x + 2}\right) + 1\right) + \frac{2\,((23\,(6\,(24\,x + 95)x + 1009)x - 2974)x + 29997)}{1863\,\sqrt{3\,x^2 - x + 2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/(3*x^2 - x + 2)^(3/2),x, algorithm="giac")
```

```
[Out] 353/243*sqrt(3)*ln(-2*sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 - x + 2)) +
 1) + 2/1863*((23*(6*(24*x + 95)*x + 1009)*x - 2974)*x + 29997)/s
qrt(3*x^2 - x + 2)
```

3.247 $\int \frac{(1+2x)^2(1+3x+4x^2)}{(2-x+3x^2)^{3/2}}\,dx$

Optimal. Leaf size=82

$$\frac{2(1249-2273x)}{621\sqrt{3x^2-x+2}}+\frac{8}{9}x\sqrt{3x^2-x+2}+\frac{112}{27}\sqrt{3x^2-x+2}-\frac{64\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{9\sqrt{3}}$$

```
[Out] (2*(1249 - 2273*x))/(621*Sqrt[2 - x + 3*x^2]) + (112*Sqrt[2 - x +
 3*x^2])/27 + (8*x*Sqrt[2 - x + 3*x^2])/9 - (64*ArcSinh[(1 - 6*x)
/Sqrt[23]])/(9*Sqrt[3])
```

Rubi [A] time = 0.165183, antiderivative size = 82, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.156

$$\frac{2(1249-2273x)}{621\sqrt{3x^2-x+2}}+\frac{8}{9}x\sqrt{3x^2-x+2}+\frac{112}{27}\sqrt{3x^2-x+2}-\frac{64\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{9\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)^2*(1 + 3*x + 4*x^2))/(2 - x + 3*x^2)^(3/2),x]
```

```
[Out] (2*(1249 - 2273*x))/(621*Sqrt[2 - x + 3*x^2]) + (112*Sqrt[2 - x +
 3*x^2])/27 + (8*x*Sqrt[2 - x + 3*x^2])/9 - (64*ArcSinh[(1 - 6*x)
/Sqrt[23]])/(9*Sqrt[3])
```

Rubi in Sympy [A] time = 21.2798, size = 78, normalized size = 0.95

$$-\frac{2\,(2x+1)^2\,(17x+47)}{69\sqrt{3x^2-x+2}}+\frac{(960x+4248)\sqrt{3x^2-x+2}}{621}+\frac{64\sqrt{3}\,\text{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{27}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**2*(4*x**2+3*x+1)/(3*x**2-x+2)**(3/2),x)
```

```
[Out] -2*(2*x + 1)**2*(17*x + 47)/(69*sqrt(3*x**2 - x + 2)) + (960*x +
4248)*sqrt(3*x**2 - x + 2)/621 + 64*sqrt(3)*atanh(sqrt(3)*(6*x -
1)/(6*sqrt(3*x**2 - x + 2)))/27
```

Mathematica [A] time = 0.157123, size = 55, normalized size = 0.67

$$\frac{2\left(276x^3+1196x^2-1003x+1275\right)}{207\sqrt{3x^2-x+2}}+\frac{64\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)}{9\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)^2*(1 + 3*x + 4*x^2))/(2 - x + 3*x^2)^(3/2),x]
```

```
[Out] (2*(1275 - 1003*x + 1196*x^2 + 276*x^3))/(207*Sqrt[2 - x + 3*x^2]
) + (64*ArcSinh[(-1 + 6*x)/Sqrt[23]])/(9*Sqrt[3])
```

Maple [A] time = 0.011, size = 98, normalized size = 1.2

$$-\frac{534\,x-89}{207}\frac{1}{\sqrt{3\,x^2-x+2}}+\frac{107}{9}\frac{1}{\sqrt{3\,x^2-x+2}}-\frac{64\,x}{9}\frac{1}{\sqrt{3\,x^2-x+2}}+\frac{64\,\sqrt{3}}{27}Arcsinh\left(\frac{6\,\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{104\,x^2}{9}\frac{1}{\sqrt{3\,x^2-x+2}}+\frac{8\,x^3}{3}\frac{1}{\sqrt{3\,x^2-x+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^2*(4*x^2+3*x+1)/(3*x^2-x+2)^(3/2),x)
```

```
[Out] -89/207*(6*x-1)/(3*x^2-x+2)^(1/2)+107/9/(3*x^2-x+2)^(1/2)-64/9*x/
(3*x^2-x+2)^(1/2)+64/27*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))+10
4/9*x^2/(3*x^2-x+2)^(1/2)+8/3*x^3/(3*x^2-x+2)^(1/2)
```

Maxima [A] time = 0.762149, size = 108, normalized size = 1.32

$$\frac{8\,x^3}{3\,\sqrt{3\,x^2-x+2}}+\frac{104\,x^2}{9\,\sqrt{3\,x^2-x+2}}+\frac{64}{27}\,\sqrt{3}\,\text{arsinh}\left(\frac{1}{23}\,\sqrt{23}(6\,x-1)\right)-\frac{2006\,x}{207\,\sqrt{3\,x^2-x+2}}+\frac{850}{69\,\sqrt{3\,x^2-x+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/(3*x^2 - x + 2)^(3/2),x, algorithm="maxima
```

```
[Out] 8/3*x^3/sqrt(3*x^2 - x + 2) + 104/9*x^2/sqrt(3*x^2 - x + 2) + 64/
27*sqrt(3)*arcsinh(1/23*sqrt(23)*(6*x - 1)) - 2006/207*x/sqrt(3*x
```

```
^2 - x + 2) + 850/69/sqrt(3*x^2 - x + 2)
```

Fricas [A] time = 0.278456, size = 131, normalized size = 1.6

$$\frac{2\sqrt{3}\left(\sqrt{3}\left(276\,x^3+1196\,x^2-1003\,x+1275\right)\sqrt{3\,x^2-x+2}+368\left(3\,x^2-x+2\right)\log\left(-\sqrt{3}\left(72\,x^2-24\,x+25\right)-12\sqrt{3\,x^2-x}\right.\right.}{621\left(3\,x^2-x+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/(3*x^2 - x + 2)^(3/2),x, algorithm="fricas
```

```
[Out] 2/621*sqrt(3)*(sqrt(3)*(276*x^3 + 1196*x^2 - 1003*x + 1275)*sqrt(
3*x^2 - x + 2) + 368*(3*x^2 - x + 2)*log(-sqrt(3)*(72*x^2 - 24*x
+ 25) - 12*sqrt(3*x^2 - x + 2)*(6*x - 1)))/(3*x^2 - x + 2)
```

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

$$\int \frac{(2x+1)^2\left(4x^2+3x+1\right)}{(3x^2-x+2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)**2*(4*x**2+3*x+1)/(3*x**2-x+2)**(3/2),x)
```

```
[Out] Integral((2*x + 1)**2*(4*x**2 + 3*x + 1)/(3*x**2 - x + 2)**(3/2),
 x)
```

GIAC/XCAS [A] time = 0.270582, size = 84, normalized size = 1.02

$$-\frac{64}{27}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x-\sqrt{3\,x^2-x+2}\right)+1\right)+\frac{2\left((92\,(3\,x+13)x-1003)x+1275\right)}{207\sqrt{3\,x^2-x+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/(3*x^2 - x + 2)^(3/2),x, algorithm="giac")
```

```
[Out] -64/27*sqrt(3)*ln(-2*sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 - x + 2)) +
1) + 2/207*((92*(3*x + 13)*x - 1003)*x + 1275)/sqrt(3*x^2 - x + 2
)
```

3.248 $\int \frac{(1+2x)(1+3x+4x^2)}{(2-x+3x^2)^{3/2}} \, dx$

Optimal. Leaf size=63

$$-\frac{2(367x+73)}{207\sqrt{3x^2-x+2}}+\frac{8}{9}\sqrt{3x^2-x+2}-\frac{14\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{3\sqrt{3}}$$

```
[Out] (-2*(73 + 367*x))/(207*Sqrt[2 - x + 3*x^2]) + (8*Sqrt[2 - x + 3*x
^2])/9 - (14*ArcSinh[(1 - 6*x)/Sqrt[23]])/(3*Sqrt[3])
```

Rubi [A] time = 0.105991, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$-\frac{2(367x+73)}{207\sqrt{3x^2-x+2}}+\frac{8}{9}\sqrt{3x^2-x+2}-\frac{14\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)*(1 + 3*x + 4*x^2))/(2 - x + 3*x^2)^(3/2),x]
```

```
[Out] (-2*(73 + 367*x))/(207*Sqrt[2 - x + 3*x^2]) + (8*Sqrt[2 - x + 3*x
^2])/9 - (14*ArcSinh[(1 - 6*x)/Sqrt[23]])/(3*Sqrt[3])
```

Rubi in Sympy [A] time = 19.851, size = 78, normalized size = 1.24

$$\frac{(-1848x+2352)\sqrt{3x^2-x+2}}{2691}-\frac{2(-77x+101)(2x+1)^2}{299\sqrt{3x^2-x+2}}+\frac{14\sqrt{3}\,\mathrm{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)*(4*x**2+3*x+1)/(3*x**2-x+2)**(3/2),x)
```

```
[Out] (-1848*x + 2352)*sqrt(3*x**2 - x + 2)/2691 - 2*(-77*x + 101)*(2*x
 + 1)**2/(299*sqrt(3*x**2 - x + 2)) + 14*sqrt(3)*atanh(sqrt(3)*(6
*x - 1)/(6*sqrt(3*x**2 - x + 2)))/9
```

Mathematica [A] time = 0.0696264, size = 50, normalized size = 0.79

$$\frac{2\left(92x^2-153x+37\right)}{69\sqrt{3x^2-x+2}}+\frac{14\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)}{3\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)*(1 + 3*x + 4*x^2))/(2 - x + 3*x^2)^(3/2),x]
```

```
[Out] (2*(37 - 153*x + 92*x^2))/(69*Sqrt[2 - x + 3*x^2]) + (14*ArcSinh[
(-1 + 6*x)/Sqrt[23]])/(3*Sqrt[3])
```

Maple [A] time = 0.008, size = 81, normalized size = 1.3

$$\frac{48\,x-8}{207}\frac{1}{\sqrt{3\,x^2-x+2}}+\frac{10}{9}\frac{1}{\sqrt{3\,x^2-x+2}}-\frac{14\,x}{3}\frac{1}{\sqrt{3\,x^2-x+2}}+\frac{14\,\sqrt{3}}{9}Arcsinh\left(\frac{6\,\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{8\,x^2}{3}\frac{1}{\sqrt{3\,x^2-x+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)*(4*x^2+3*x+1)/(3*x^2-x+2)^(3/2),x)
```

```
[Out] 8/207*(6*x-1)/(3*x^2-x+2)^(1/2)+10/9/(3*x^2-x+2)^(1/2)-14/3*x/(3*
x^2-x+2)^(1/2)+14/9*3^(1/2)*arcsinh(6/23*23^(1/2)*(x-1/6))+8/3*x^
2/(3*x^2-x+2)^(1/2)
```

Maxima [A] time = 0.766708, size = 85, normalized size = 1.35

$$\frac{8\,x^2}{3\,\sqrt{3\,x^2-x+2}}+\frac{14}{9}\,\sqrt{3}\,\text{arsinh}\left(\frac{1}{23}\,\sqrt{23}(6\,x-1)\right)-\frac{102\,x}{23\,\sqrt{3\,x^2-x+2}}+\frac{74}{69\,\sqrt{3\,x^2-x+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)/(3*x^2 - x + 2)^(3/2),x, algorithm="maxima")
```

```
[Out] 8/3*x^2/sqrt(3*x^2 - x + 2) + 14/9*sqrt(3)*arcsinh(1/23*sqrt(23)*
(6*x - 1)) - 102/23*x/sqrt(3*x^2 - x + 2) + 74/69/sqrt(3*x^2 - x
+ 2)
```

Fricas [A] time = 0.27432, size = 126, normalized size = 2.

$$\frac{\sqrt{3}\left(2\sqrt{3}\left(92\,x^2-153\,x+37\right)\sqrt{3\,x^2-x+2}+161\left(3\,x^2-x+2\right)\log\left(-\sqrt{3}\left(72\,x^2-24\,x+25\right)-12\sqrt{3\,x^2-x+2}(6\,x-1)\right)\right)}{207\left(3\,x^2-x+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)/(3*x^2 - x + 2)^(3/2),x, algorithm="fricas")
```

```
[Out] 1/207*sqrt(3)*(2*sqrt(3)*(92*x^2 - 153*x + 37)*sqrt(3*x^2 - x + 2
) + 161*(3*x^2 - x + 2)*log(-sqrt(3)*(72*x^2 - 24*x + 25) - 12*sq
rt(3*x^2 - x + 2)*(6*x - 1)))/(3*x^2 - x + 2)
```

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

$$\int\frac{(2x+1)\left(4x^2+3x+1\right)}{\left(3x^2-x+2\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)*(4*x**2+3*x+1)/(3*x**2-x+2)**(3/2),x)
```

```
[Out] Integral((2*x + 1)*(4*x**2 + 3*x + 1)/(3*x**2 - x + 2)**(3/2), x)
```

GIAC/XCAS [A] time = 0.27123, size = 77, normalized size = 1.22

$$-\frac{14}{9}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x-\sqrt{3\,x^2-x+2}\right)+1\right)+\frac{2\left((92\,x-153)x+37\right)}{69\sqrt{3\,x^2-x+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)/(3*x^2 - x + 2)^(3/2),x, algorithm="giac")
```

```
[Out] -14/9*sqrt(3)*ln(-2*sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 - x + 2)) + 1
) + 2/69*((92*x - 153)*x + 37)/sqrt(3*x^2 - x + 2)
```

3.249 $\int \frac{1+3x+4x^2}{(1+2x)(2-x+3x^2)^{3/2}}\,dx$

Optimal. Leaf size=62

$$-\frac{2(101-77x)}{299\sqrt{3x^2-x+2}}-\frac{2\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{13\sqrt{13}}$$

```
[Out] (-2*(101 - 77*x))/(299*Sqrt[2 - x + 3*x^2]) - (2*ArcTanh[(9 - 8*x
)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/(13*Sqrt[13])
```

Rubi [A] time = 0.125669, antiderivative size = 62, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$-\frac{2(101-77x)}{299\sqrt{3x^2-x+2}}-\frac{2\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{13\sqrt{13}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)*(2 - x + 3*x^2)^(3/2)),x]
```

```
[Out] (-2*(101 - 77*x))/(299*Sqrt[2 - x + 3*x^2]) - (2*ArcTanh[(9 - 8*x
)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/(13*Sqrt[13])
```

Rubi in Sympy [A] time = 20.7025, size = 53, normalized size = 0.85

$$-\frac{-154x+202}{299\sqrt{3x^2-x+2}}-\frac{2\sqrt{13}\,\mathrm{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{169}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)/(3*x**2-x+2)**(3/2),x)
```

```
[Out] -(-154*x + 202)/(299*sqrt(3*x**2 - x + 2)) - 2*sqrt(13)*atanh(sqr
t(13)*(-8*x + 9)/(26*sqrt(3*x**2 - x + 2)))/169
```

Mathematica [A] time = 0.102742, size = 73, normalized size = 1.18

$$\frac{\frac{26(77x-101)}{\sqrt{3x^2-x+2}}-46\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)+46\sqrt{13}\log(2x+1)}{3887}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)*(2 - x + 3*x^2)^(3/2)),x]
```

```
[Out] ((26*(-101 + 77*x))/Sqrt[2 - x + 3*x^2] + 46*Sqrt[13]*Log[1 + 2*x
] - 46*Sqrt[13]*Log[9 - 8*x + 2*Sqrt[13]*Sqrt[2 - x + 3*x^2]])/38
87
```

Maple [B] time = 0.011, size = 102, normalized size = 1.7

$$\frac{30\,x-5}{69}\frac{1}{\sqrt{3\,x^{2}-x+2}}-\frac{2}{3}\frac{1}{\sqrt{3\,x^{2}-x+2}}+\frac{1}{13}\frac{1}{\sqrt{3\,\left(1/2+x\right)^{2}-4\,x+\frac{5}{4}}}+\frac{24\,x-4}{299}\frac{1}{\sqrt{3\,\left(1/2+x\right)^{2}-4\,x+\frac{5}{4}}}-\frac{2\,\sqrt{13}}{169}Artanh\left(\frac{2\,\sqrt{13}}{13}\left(\frac{9}{2}-4\,x\right)\frac{1}{\sqrt{12\,\left(1/2+x\right)^{2}-16\,x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)/(3*x^2-x+2)^(3/2),x)
```

```
[Out] 5/69*(6*x-1)/(3*x^2-x+2)^(1/2)-2/3/(3*x^2-x+2)^(1/2)+1/13/(3*(1/2
+x)^2-4*x+5/4)^(1/2)+4/299*(6*x-1)/(3*(1/2+x)^2-4*x+5/4)^(1/2)-2/
169*13^(1/2)*arctanh(2/13*(9/2-4*x)*13^(1/2)/(12*(1/2+x)^2-16*x+5
)^(1/2))
```

Maxima [A] time = 0.764134, size = 86, normalized size = 1.39

$$\frac{2}{169}\,\sqrt{13}\,\operatorname{arsinh}\left(\frac{8\,\sqrt{23}x}{23\,\left|2\,x+1\right|}-\frac{9\,\sqrt{23}}{23\,\left|2\,x+1\right|}\right)+\frac{154\,x}{299\,\sqrt{3\,x^{2}-x+2}}-\frac{202}{299\,\sqrt{3\,x^{2}-x+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(3/2)*(2*x + 1)),x, algorithm="maxima
```

```
[Out] 2/169*sqrt(13)*arcsinh(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*sqrt(2
3)/abs(2*x + 1)) + 154/299*x/sqrt(3*x^2 - x + 2) - 202/299/sqrt(3
*x^2 - x + 2)
```

Fricas [A] time = 0.273339, size = 136, normalized size = 2.19

$$\frac{\sqrt{13}\left(2\sqrt{13}\sqrt{3x^2-x+2}(77x-101)+23\left(3x^2-x+2\right)\log\left(-\frac{\sqrt{13}(220x^2-196x+185)+52\sqrt{3x^2-x+2}(8x-9)}{4x^2+4x+1}\right)\right)}{3887\left(3x^2-x+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(3/2)*(2*x + 1)),x, algorithm="fricas
```

```
[Out] 1/3887*sqrt(13)*(2*sqrt(13)*sqrt(3*x^2 - x + 2)*(77*x - 101) + 23
*(3*x^2 - x + 2)*log(-(sqrt(13)*(220*x^2 - 196*x + 185) + 52*sqrt
(3*x^2 - x + 2)*(8*x - 9))/(4*x^2 + 4*x + 1)))/(3*x^2 - x + 2)
```

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

$$\int \frac{4x^2+3x+1}{(2x+1)(3x^2-x+2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**2+3*x+1)/(1+2*x)/(3*x**2-x+2)**(3/2),x)
```

```
[Out] Integral((4*x**2 + 3*x + 1)/((2*x + 1)*(3*x**2 - x + 2)**(3/2)),
x)
```

GIAC/XCAS [A] time = 0.29443, size = 123, normalized size = 1.98

$$\frac{2}{169}\sqrt{13}\ln\left(-\frac{\left|-4\sqrt{3}x-2\sqrt{13}-2\sqrt{3}+4\sqrt{3x^2-x+2}\right|}{2\left(2\sqrt{3}x-\sqrt{13}+\sqrt{3}-2\sqrt{3x^2-x+2}\right)}\right)+\frac{2(77x-101)}{299\sqrt{3x^2-x+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(3/2)*(2*x + 1)),x, algorithm="giac")
```

```
[Out] 2/169*sqrt(13)*ln(-1/2*abs(-4*sqrt(3)*x - 2*sqrt(13) - 2*sqrt(3)
+ 4*sqrt(3*x^2 - x + 2))/(2*sqrt(3)*x - sqrt(13) + sqrt(3) - 2*sq
rt(3*x^2 - x + 2))) + 2/299*(77*x - 101)/sqrt(3*x^2 - x + 2)
```

3.250 $\int \frac{1+3x+4x^2}{(1+2x)^2(2-x+3x^2)^{3/2}}\,dx$

Optimal. Leaf size=87

$$-\frac{2(197-837x)}{3887\sqrt{3x^2-x+2}}-\frac{4\sqrt{3x^2-x+2}}{169(2x+1)}+\frac{2\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{169\sqrt{13}}$$

```
[Out] (-2*(197 - 837*x))/(3887*Sqrt[2 - x + 3*x^2]) - (4*Sqrt[2 - x + 3
*x^2])/(169*(1 + 2*x)) + (2*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2
- x + 3*x^2])])/(169*Sqrt[13])
```

Rubi [A] time = 0.190675, antiderivative size = 87, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 4, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$-\frac{2(197-837x)}{3887\sqrt{3x^2-x+2}}-\frac{4\sqrt{3x^2-x+2}}{169(2x+1)}+\frac{2\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{169\sqrt{13}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)^2*(2 - x + 3*x^2)^(3/2)),x]
```

```
[Out] (-2*(197 - 837*x))/(3887*Sqrt[2 - x + 3*x^2]) - (4*Sqrt[2 - x + 3
*x^2])/(169*(1 + 2*x)) + (2*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2
- x + 3*x^2])])/(169*Sqrt[13])
```

Rubi in Sympy [A] time = 25.5883, size = 71, normalized size = 0.82

$$-\frac{-1536x+279}{3887\sqrt{3x^2-x+2}}+\frac{2\sqrt{13}\,\operatorname{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{2197}-\frac{1}{13\,(2x+1)\,\sqrt{3x^2-x+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)**2/(3*x**2-x+2)**(3/2),x)
```

```
[Out] -(-1536*x + 279)/(3887*sqrt(3*x**2 - x + 2)) + 2*sqrt(13)*atanh(s
qrt(13)*(-8*x + 9)/(26*sqrt(3*x**2 - x + 2)))/2197 - 1/(13*(2*x +
 1)*sqrt(3*x**2 - x + 2))
```

Mathematica [A] time = 0.130531, size = 85, normalized size = 0.98

$$\frac{2\left(\frac{13(1536x^2+489x-289)}{(2x+1)\sqrt{3x^2-x+2}}+23\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)-23\sqrt{13}\log(2x+1)\right)}{50531}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)^2*(2 - x + 3*x^2)^(3/2)),x]
```

```
[Out] (2*((13*(-289 + 489*x + 1536*x^2))/((1 + 2*x)*Sqrt[2 - x + 3*x^2]
) - 23*Sqrt[13]*Log[1 + 2*x] + 23*Sqrt[13]*Log[9 - 8*x + 2*Sqrt[1
3]*Sqrt[2 - x + 3*x^2]]))/50531
```

Maple [A] time = 0.016, size = 109, normalized size = 1.3

$$\frac{12x-2}{23}\frac{1}{\sqrt{3x^2-x+2}}-\frac{1}{26}\left(\frac{1}{2}+x\right)^{-1}\frac{1}{\sqrt{3\,(1/2+x)^2-4x+\frac{5}{4}}}-\frac{1}{169}\frac{1}{\sqrt{3\,(1/2+x)^2-4x+\frac{5}{4}}}$$
$$-\frac{492x-82}{3887}\frac{1}{\sqrt{3\,(1/2+x)^2-4x+\frac{5}{4}}}+\frac{2\sqrt{13}}{2197}\mathit{Artanh}\left(\frac{2\sqrt{13}}{13}\left(\frac{9}{2}-4x\right)\frac{1}{\sqrt{12\,(1/2+x)^2-16x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)^2/(3*x^2-x+2)^(3/2),x)
```

```
[Out] 2/23*(6*x-1)/(3*x^2-x+2)^(1/2)-1/26/(1/2+x)/(3*(1/2+x)^2-4*x+5/4)
^(1/2)-1/169/(3*(1/2+x)^2-4*x+5/4)^(1/2)-82/3887*(6*x-1)/(3*(1/2+
x)^2-4*x+5/4)^(1/2)+2/2197*13^(1/2)*arctanh(2/13*(9/2-4*x)*13^(1/
2)/(12*(1/2+x)^2-16*x+5)^(1/2))
```

Maxima [A] time = 0.779622, size = 130, normalized size = 1.49

$$-\frac{2}{2197}\sqrt{13}\,\mathrm{arsinh}\left(\frac{8\sqrt{23}x}{23\,|2x+1|}-\frac{9\sqrt{23}}{23\,|2x+1|}\right)+\frac{1536x}{3887\sqrt{3x^2-x+2}}$$
$$-\frac{279}{3887\sqrt{3x^2-x+2}}-\frac{1}{13\left(2\sqrt{3x^2-x+2}x+\sqrt{3x^2-x+2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(3/2)*(2*x + 1)^2),x, algorithm="maxi
```

```
[Out] -2/2197*sqrt(13)*arcsinh(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*sqrt
(23)/abs(2*x + 1)) + 1536/3887*x/sqrt(3*x^2 - x + 2) - 279/3887/s
qrt(3*x^2 - x + 2) - 1/13/(2*sqrt(3*x^2 - x + 2)*x + sqrt(3*x^2 -
 x + 2))
```

Fricas [A] time = 0.278813, size = 151, normalized size = 1.74

$$\frac{\sqrt{13}\left(2\sqrt{13}\left(1536\,x^2+489\,x-289\right)\sqrt{3\,x^2-x+2}+23\left(6\,x^3+x^2+3\,x+2\right)\log\left(-\frac{\sqrt{13}\left(220\,x^2-196\,x+185\right)-52\,\sqrt{3\,x^2-x+2}\left(8\,x-9\right)}{4\,x^2+4\,x+1}\right)\right)}{50531\left(6\,x^3+x^2+3\,x+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(3/2)*(2*x + 1)^2),x, algorithm="fric
```

```
[Out] 1/50531*sqrt(13)*(2*sqrt(13)*(1536*x^2 + 489*x - 289)*sqrt(3*x^2
- x + 2) + 23*(6*x^3 + x^2 + 3*x + 2)*log(-(sqrt(13)*(220*x^2 - 1
96*x + 185) - 52*sqrt(3*x^2 - x + 2)*(8*x - 9))/(4*x^2 + 4*x + 1)
))/(6*x^3 + x^2 + 3*x + 2)
```

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

$$\int \frac{4x^2+3x+1}{(2x+1)^2\,(3x^2-x+2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**2+3*x+1)/(1+2*x)**2/(3*x**2-x+2)**(3/2),x)
```

```
[Out] Integral((4*x**2 + 3*x + 1)/((2*x + 1)**2*(3*x**2 - x + 2)**(3/2)
), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{4\,x^2+3\,x+1}{(3\,x^2-x+2)^{\frac{3}{2}}(2\,x+1)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(3/2)*(2*x + 1)^2),x, algorithm="giac
```

```
[Out] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(3/2)*(2*x + 1)^2),
x)
```

3.251 $\int \frac{1+3x+4x^2}{(1+2x)^3(2-x+3x^2)^{3/2}}\,dx$

Optimal. Leaf size=112

$$\frac{2(3693x+2363)}{50531\sqrt{3x^2-x+2}}-\frac{4\sqrt{3x^2-x+2}}{2197(2x+1)}-\frac{2\sqrt{3x^2-x+2}}{169(2x+1)^2}-\frac{487\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{2197\sqrt{13}}$$

```
[Out] (2*(2363 + 3693*x))/(50531*Sqrt[2 - x + 3*x^2]) - (2*Sqrt[2 - x +
 3*x^2])/(169*(1 + 2*x)^2) - (4*Sqrt[2 - x + 3*x^2])/(2197*(1 + 2
*x)) - (487*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/
(2197*Sqrt[13])
```

Rubi [A] time = 0.28446, antiderivative size = 112, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.156$

$$\frac{2(3693x+2363)}{50531\sqrt{3x^2-x+2}}-\frac{4\sqrt{3x^2-x+2}}{2197(2x+1)}-\frac{2\sqrt{3x^2-x+2}}{169(2x+1)^2}-\frac{487\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{2197\sqrt{13}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)^3*(2 - x + 3*x^2)^(3/2)),x]
```

```
[Out] (2*(2363 + 3693*x))/(50531*Sqrt[2 - x + 3*x^2]) - (2*Sqrt[2 - x +
 3*x^2])/(169*(1 + 2*x)^2) - (4*Sqrt[2 - x + 3*x^2])/(2197*(1 + 2
*x)) - (487*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/
(2197*Sqrt[13])
```

Rubi in Sympy [A] time = 31.6243, size = 97, normalized size = 0.87

$$-\frac{-3210x+673}{7774\,(2x+1)\,\sqrt{3x^2-x+2}}-\frac{487\sqrt{13}\,\mathrm{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{28561}+\frac{4832\sqrt{3x^2-x+2}}{50531\,(2x+1)}-\frac{1}{26\,(2x+1)^2\,\sqrt{3x^2-x+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)**3/(3*x**2-x+2)**(3/2),x)
```

```
[Out] -(-3210*x + 673)/(7774*(2*x + 1)*sqrt(3*x**2 - x + 2)) - 487*sqrt
(13)*atanh(sqrt(13)*(-8*x + 9)/(26*sqrt(3*x**2 - x + 2)))/28561 +
 4832*sqrt(3*x**2 - x + 2)/(50531*(2*x + 1)) - 1/(26*(2*x + 1)**2
```

```
*sqrt(3*x**2 - x + 2))
```

Mathematica [A] time = 0.1561, size = 90, normalized size = 0.8

$$\frac{-11201\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)+\frac{26(14496x^3+23281x^2+13306x+1673)}{(2x+1)^2\sqrt{3x^2-x+2}}+11201\sqrt{13}\log(2x+1)}{656903}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)^3*(2 - x + 3*x^2)^(3/2)),x]
```

```
[Out] ((26*(1673 + 13306*x + 23281*x^2 + 14496*x^3))/((1 + 2*x)^2*Sqrt[
2 - x + 3*x^2]) + 11201*Sqrt[13]*Log[1 + 2*x] - 11201*Sqrt[13]*Lo
g[9 - 8*x + 2*Sqrt[13]*Sqrt[2 - x + 3*x^2]])/656903
```

Maple [A] time = 0.017, size = 111, normalized size = 1.

$$\frac{487}{4394}\frac{1}{\sqrt{3\,(1/2+x)^2-4\,x+\frac{5}{4}}}+\frac{7248\,x-1208}{50531}\frac{1}{\sqrt{3\,(1/2+x)^2-4\,x+\frac{5}{4}}}-\frac{487\,\sqrt{13}}{28561}\mathit{Artanh}\left(\frac{2\,\sqrt{13}}{13}\left(\frac{9}{2}-4\,x\right)\frac{1}{\sqrt{12\,(1/2+x)^2-16\,x+5}}\right)-\frac{1}{104}\left(\frac{1}{2}+x\right)^{-2}\frac{1}{\sqrt{3\,(1/2+x)^2-4\,x+\frac{5}{4}}}+\frac{3}{338}\left(\frac{1}{2}+x\right)^{-1}\frac{1}{\sqrt{3\,(1/2+x)^2-4\,x+\frac{5}{4}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)^3/(3*x^2-x+2)^(3/2),x)
```

```
[Out] 487/4394/(3*(1/2+x)^2-4*x+5/4)^(1/2)+1208/50531*(6*x-1)/(3*(1/2+x
)^2-4*x+5/4)^(1/2)-487/28561*13^(1/2)*arctanh(2/13*(9/2-4*x)*13^(
1/2)/(12*(1/2+x)^2-16*x+5)^(1/2))-1/104/(1/2+x)^2/(3*(1/2+x)^2-4*
x+5/4)^(1/2)+3/338/(1/2+x)/(3*(1/2+x)^2-4*x+5/4)^(1/2)
```

Maxima [A] time = 0.773148, size = 196, normalized size = 1.75

$$\frac{487}{28561}\sqrt{13}\,\text{arsinh}\left(\frac{8\sqrt{23}x}{23\,|2\,x+1|}-\frac{9\sqrt{23}}{23\,|2\,x+1|}\right)+\frac{7248\,x}{50531\sqrt{3\,x^2-x+2}}+\frac{8785}{101062\sqrt{3\,x^2-x+2}}-\frac{1}{26\left(4\sqrt{3\,x^2-x+2}x^2+4\sqrt{3\,x^2-x+2}x+\sqrt{3\,x^2-x+2}\right)}+\frac{3}{169\left(2\sqrt{3\,x^2-x+2}x+\sqrt{3\,x^2-x+2}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(3/2)*(2*x + 1)^3),x, algorithm="maxi
```

```
[Out] 487/28561*sqrt(13)*arcsinh(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*sq
rt(23)/abs(2*x + 1)) + 7248/50531*x/sqrt(3*x^2 - x + 2) + 8785/10
1062/sqrt(3*x^2 - x + 2) - 1/26/(4*sqrt(3*x^2 - x + 2)*x^2 + 4*sq
rt(3*x^2 - x + 2)*x + sqrt(3*x^2 - x + 2)) + 3/169/(2*sqrt(3*x^2
- x + 2)*x + sqrt(3*x^2 - x + 2))
```

Fricas [A] time = 0.280088, size = 177, normalized size = 1.58

$$\frac{\sqrt{13}\left(4\sqrt{13}\left(14496\,x^3+23281\,x^2+13306\,x+1673\right)\sqrt{3\,x^2-x+2}+11201\left(12\,x^4+8\,x^3+7\,x^2+7\,x+2\right)\log\left(-\frac{\sqrt{13}\left(220\,x^2-196\right.}{}\right.\right.}{1313806\left(12\,x^4+8\,x^3+7\,x^2+7\,x+2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(3/2)*(2*x + 1)^3),x, algorithm="fric
```

```
[Out] 1/1313806*sqrt(13)*(4*sqrt(13)*(14496*x^3 + 23281*x^2 + 13306*x +
 1673)*sqrt(3*x^2 - x + 2) + 11201*(12*x^4 + 8*x^3 + 7*x^2 + 7*x
+ 2)*log(-(sqrt(13)*(220*x^2 - 196*x + 185) + 52*sqrt(3*x^2 - x +
 2)*(8*x - 9))/(4*x^2 + 4*x + 1)))/(12*x^4 + 8*x^3 + 7*x^2 + 7*x
+ 2)
```

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

$$\int\frac{4x^2+3x+1}{(2x+1)^3\,(3x^2-x+2)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**2+3*x+1)/(1+2*x)**3/(3*x**2-x+2)**(3/2),x)
```

```
[Out] Integral((4*x**2 + 3*x + 1)/((2*x + 1)**3*(3*x**2 - x + 2)**(3/2)
), x)
```

GIAC/XCAS [A] time = 0.295653, size = 301, normalized size = 2.69

$$\frac{487}{28561}\sqrt{13}\ln\left(-\frac{\left|-4\sqrt{3}x-2\sqrt{13}-2\sqrt{3}+4\sqrt{3x^2-x+2}\right|}{2\left(2\sqrt{3}x-\sqrt{13}+\sqrt{3}-2\sqrt{3x^2-x+2}\right)}\right)+\frac{2(3693x+2363)}{50531\sqrt{3x^2-x+2}}+\frac{2\left(62\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)^3-37\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)^2+263\sqrt{3}x-71\sqrt{3}-263\sqrt{3x^2-x+2}\right)}{2197\left(2\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)^2+2\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)-5\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(3/2)*(2*x + 1)^3),x, algorithm="giac
```

```
[Out] 487/28561*sqrt(13)*ln(-1/2*abs(-4*sqrt(3)*x - 2*sqrt(13) - 2*sqrt
(3) + 4*sqrt(3*x^2 - x + 2))/(2*sqrt(3)*x - sqrt(13) + sqrt(3) -
2*sqrt(3*x^2 - x + 2))) + 2/50531*(3693*x + 2363)/sqrt(3*x^2 - x
+ 2) + 2/2197*(62*(sqrt(3)*x - sqrt(3*x^2 - x + 2))^3 - 37*sqrt(3
)*(sqrt(3)*x - sqrt(3*x^2 - x + 2))^2 + 263*sqrt(3)*x - 71*sqrt(3
) - 263*sqrt(3*x^2 - x + 2))/(2*(sqrt(3)*x - sqrt(3*x^2 - x + 2))
^2 + 2*sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 - x + 2)) - 5)^2
```

3.252 $\int \frac{(1+2x)^3(1+3x+4x^2)}{(2-x+3x^2)^{5/2}}\,dx$

Optimal. Leaf size=86

$$\frac{2(12839-3871x)}{5589\,(3x^2-x+2)^{3/2}}+\frac{32}{27}\sqrt{3x^2-x+2}-\frac{28(42240x+35809)}{128547\sqrt{3x^2-x+2}}-\frac{296\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{27\sqrt{3}}$$

```
[Out] (2*(12839 - 3871*x))/(5589*(2 - x + 3*x^2)^(3/2)) - (28*(35809 +
42240*x))/(128547*Sqrt[2 - x + 3*x^2]) + (32*Sqrt[2 - x + 3*x^2])
/27 - (296*ArcSinh[(1 - 6*x)/Sqrt[23]])/(27*Sqrt[3])
```

Rubi [A] time = 0.17344, antiderivative size = 86, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{2(12839-3871x)}{5589\,(3x^2-x+2)^{3/2}}+\frac{32}{27}\sqrt{3x^2-x+2}-\frac{28(42240x+35809)}{128547\sqrt{3x^2-x+2}}-\frac{296\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{27\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)^3*(1 + 3*x + 4*x^2))/(2 - x + 3*x^2)^(5/2),x]
```

```
[Out] (2*(12839 - 3871*x))/(5589*(2 - x + 3*x^2)^(3/2)) - (28*(35809 +
42240*x))/(128547*Sqrt[2 - x + 3*x^2]) + (32*Sqrt[2 - x + 3*x^2])
/27 - (296*ArcSinh[(1 - 6*x)/Sqrt[23]])/(27*Sqrt[3])
```

Rubi in Sympy [A] time = 25.8296, size = 100, normalized size = 1.16

$$-\frac{4\,(-3374x+15382)\,(2x+1)}{14283\sqrt{3x^2-x+2}}-\frac{2\,(2x+1)^3\,(17x+47)}{207\,(3x^2-x+2)^{\frac{3}{2}}}+\frac{10016\sqrt{3x^2-x+2}}{14283}+\frac{296\sqrt{3}\,\mathrm{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{81}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**3*(4*x**2+3*x+1)/(3*x**2-x+2)**(5/2),x)
```

```
[Out] -4*(-3374*x + 15382)*(2*x + 1)/(14283*sqrt(3*x**2 - x + 2)) - 2*(
2*x + 1)**3*(17*x + 47)/(207*(3*x**2 - x + 2)**(3/2)) + 10016*sqr
t(3*x**2 - x + 2)/14283 + 296*sqrt(3)*atanh(sqrt(3)*(6*x - 1)/(6*
sqrt(3*x**2 - x + 2)))/81
```

Mathematica [A] time = 0.155511, size = 60, normalized size = 0.7

$$\frac{2\left(76176x^4-247904x^3+8630x^2-119459x-44739\right)}{14283\left(3x^2-x+2\right)^{3/2}}+\frac{296\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)}{27\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)^3*(1 + 3*x + 4*x^2))/(2 - x + 3*x^2)^(5/2),x]
```

```
[Out] (2*(-44739 - 119459*x + 8630*x^2 - 247904*x^3 + 76176*x^4))/(1428
3*(2 - x + 3*x^2)^(3/2)) + (296*ArcSinh[(-1 + 6*x)/Sqrt[23]])/(27
*Sqrt[3])
```

Maple [B] time = 0.02, size = 163, normalized size = 1.9

$$\frac{82578\,x-13763}{33534}\left(3\,x^2-x+2\right)^{-\frac{3}{2}}+\frac{391584\,x-65264}{128547}\frac{1}{\sqrt{3\,x^2-x+2}}-\frac{1727}{1458}\left(3\,x^2-x+2\right)^{-\frac{3}{2}}-\frac{461\,x}{81}\left(3\,x^2-x+2\right)^{-\frac{3}{2}}+\frac{8\,x^2}{27}\left(3\,x^2-x+2\right)^{-\frac{3}{2}}-\frac{296\,x^3}{27}\left(3\,x^2-x+2\right)^{-\frac{3}{2}}-\frac{296\,x}{27}\frac{1}{\sqrt{3\,x^2-x+2}}-\frac{148}{81}\frac{1}{\sqrt{3\,x^2-x+2}}+\frac{296\,\sqrt{3}}{81}Arcsinh\left(\frac{6\,\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)+\frac{32\,x^4}{3}\left(3\,x^2-x+2\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^3*(4*x^2+3*x+1)/(3*x^2-x+2)^(5/2),x)
```

```
[Out] 13763/33534*(6*x-1)/(3*x^2-x+2)^(3/2)+65264/128547*(6*x-1)/(3*x^2
-x+2)^(1/2)-1727/1458/(3*x^2-x+2)^(3/2)-461/81*x/(3*x^2-x+2)^(3/2
)+8/27*x^2/(3*x^2-x+2)^(3/2)-296/27*x^3/(3*x^2-x+2)^(3/2)-296/27*
x/(3*x^2-x+2)^(1/2)-148/81/(3*x^2-x+2)^(1/2)+296/81*3^(1/2)*arcsi
nh(6/23*23^(1/2)*(x-1/6))+32/3*x^4/(3*x^2-x+2)^(3/2)
```

Maxima [A] time = 0.779701, size = 273, normalized size = 3.17

$$\frac{32\,x^4}{3\,(3\,x^2-x+2)^{\frac{3}{2}}}+\frac{296}{42849}\,x\left(\frac{426\,x}{\sqrt{3\,x^2-x+2}}-\frac{4761\,x^2}{(3\,x^2-x+2)^{\frac{3}{2}}}-\frac{71}{\sqrt{3\,x^2-x+2}}+\frac{805\,x}{(3\,x^2-x+2)^{\frac{3}{2}}}-\frac{2162}{(3\,x^2-x+2)^{\frac{3}{2}}}\right)+\frac{296}{81}\,\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{23}\,\sqrt{23}(6\,x-1)\right)-\frac{42032}{42849}\,\sqrt{3\,x^2-x+2}-\frac{47072\,x}{42849\,\sqrt{3\,x^2-x+2}}+\frac{52\,x^2}{9\,(3\,x^2-x+2)^{\frac{3}{2}}}-\frac{23104}{14283\,\sqrt{3\,x^2-x+2}}-\frac{7742\,x}{1863\,(3\,x^2-x+2)^{\frac{3}{2}}}+\frac{1666}{1863\,(3\,x^2-x+2)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/(3*x^2 - x + 2)^(5/2),x, algorithm="maxima
```

```
[Out] 32/3*x^4/(3*x^2 - x + 2)^(3/2) + 296/42849*x*(426*x/sqrt(3*x^2 -
x + 2) - 4761*x^2/(3*x^2 - x + 2)^(3/2) - 71/sqrt(3*x^2 - x + 2)
+ 805*x/(3*x^2 - x + 2)^(3/2) - 2162/(3*x^2 - x + 2)^(3/2)) + 296
/81*sqrt(3)*arcsinh(1/23*sqrt(23)*(6*x - 1)) - 42032/42849*sqrt(3
*x^2 - x + 2) - 47072/42849*x/sqrt(3*x^2 - x + 2) + 52/9*x^2/(3*x
^2 - x + 2)^(3/2) - 23104/14283/sqrt(3*x^2 - x + 2) - 7742/1863*x
/(3*x^2 - x + 2)^(3/2) + 1666/1863/(3*x^2 - x + 2)^(3/2)
```

Fricas [A] time = 0.278627, size = 165, normalized size = 1.92

$$\frac{2\,\sqrt{3}\left(\sqrt{3}\left(76176\,x^4-247904\,x^3+8630\,x^2-119459\,x-44739\right)\sqrt{3\,x^2-x+2}+39146\,\left(9\,x^4-6\,x^3+13\,x^2-4\,x+4\right)\,\log\left(-\right.\right.}{42849\,(9\,x^4-6\,x^3+13\,x^2-4\,x+4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/(3*x^2 - x + 2)^(5/2),x, algorithm="fricas
```

```
[Out] 2/42849*sqrt(3)*(sqrt(3)*(76176*x^4 - 247904*x^3 + 8630*x^2 - 119
459*x - 44739)*sqrt(3*x^2 - x + 2) + 39146*(9*x^4 - 6*x^3 + 13*x^
2 - 4*x + 4)*log(-sqrt(3)*(72*x^2 - 24*x + 25) - 12*sqrt(3*x^2 -
x + 2)*(6*x - 1)))/(9*x^4 - 6*x^3 + 13*x^2 - 4*x + 4)
```

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

$$\int \frac{(2x+1)^3\,\left(4x^2+3x+1\right)}{(3x^2-x+2)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)**3*(4*x**2+3*x+1)/(3*x**2-x+2)**(5/2),x)
```

```
[Out] Integral((2*x + 1)**3*(4*x**2 + 3*x + 1)/(3*x**2 - x + 2)**(5/2),
 x)
```

GIAC/XCAS [A] time = 0.2729, size = 90, normalized size = 1.05

$$-\frac{296}{81}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)+1\right)+\frac{2\left(\left(2\left(8\left(4761x-15494\right)x+4315\right)x-119459\right)x-44739\right)}{14283\left(3x^2-x+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(2*x + 1)^3/(3*x^2 - x + 2)^(5/2),x, algorithm="giac")
```

```
[Out] -296/81*sqrt(3)*ln(-2*sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 - x + 2)) +
 1) + 2/14283*((2*(8*(4761*x - 15494)*x + 4315)*x - 119459)*x - 4
4739)/(3*x^2 - x + 2)^(3/2)
```

3.253 $\int \frac{(1+2x)^2(1+3x+4x^2)}{(2-x+3x^2)^{5/2}}\,dx$

Optimal. Leaf size=68

$$\frac{2(1249-2273x)}{1863\,(3x^2-x+2)^{3/2}}-\frac{8(23257-1473x)}{42849\sqrt{3x^2-x+2}}-\frac{16\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{9\sqrt{3}}$$

```
[Out] (2*(1249 - 2273*x))/(1863*(2 - x + 3*x^2)^(3/2)) - (8*(23257 - 14
73*x))/(42849*Sqrt[2 - x + 3*x^2]) - (16*ArcSinh[(1 - 6*x)/Sqrt[2
3]])/(9*Sqrt[3])
```

Rubi [A] time = 0.139359, antiderivative size = 68, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{2(1249-2273x)}{1863\,(3x^2-x+2)^{3/2}}-\frac{8(23257-1473x)}{42849\sqrt{3x^2-x+2}}-\frac{16\sinh^{-1}\left(\frac{1-6x}{\sqrt{23}}\right)}{9\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)^2*(1 + 3*x + 4*x^2))/(2 - x + 3*x^2)^(5/2),x]
```

```
[Out] (2*(1249 - 2273*x))/(1863*(2 - x + 3*x^2)^(3/2)) - (8*(23257 - 14
73*x))/(42849*Sqrt[2 - x + 3*x^2]) - (16*ArcSinh[(1 - 6*x)/Sqrt[2
3]])/(9*Sqrt[3])
```

Rubi in Sympy [A] time = 20.9894, size = 78, normalized size = 1.15

$$-\frac{4\,(-1764x+12300)}{14283\sqrt{3x^2-x+2}}-\frac{2\,(2x+1)^2\,(17x+47)}{207\,(3x^2-x+2)^{\frac{3}{2}}}+\frac{16\sqrt{3}\,\operatorname{atanh}\left(\frac{\sqrt{3}(6x-1)}{6\sqrt{3x^2-x+2}}\right)}{27}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)**2*(4*x**2+3*x+1)/(3*x**2-x+2)**(5/2),x)
```

```
[Out] -4*(-1764*x + 12300)/(14283*sqrt(3*x**2 - x + 2)) - 2*(2*x + 1)**
2*(17*x + 47)/(207*(3*x**2 - x + 2)**(3/2)) + 16*sqrt(3)*atanh(sq
rt(3)*(6*x - 1)/(6*sqrt(3*x**2 - x + 2)))/27
```

Mathematica [A] time = 0.140833, size = 55, normalized size = 0.81

$$\frac{2\left(1964x^3-31664x^2+5837x-17481\right)}{4761\left(3x^2-x+2\right)^{3/2}}+\frac{16\sinh^{-1}\left(\frac{6x-1}{\sqrt{23}}\right)}{9\sqrt{3}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)^2*(1 + 3*x + 4*x^2))/(2 - x + 3*x^2)^(5/2),x]
```

```
[Out] (2*(-17481 + 5837*x - 31664*x^2 + 1964*x^3))/(4761*(2 - x + 3*x^2
)^(3/2)) + (16*ArcSinh[(-1 + 6*x)/Sqrt[23]])/(9*Sqrt[3])
```

Maple [B] time = 0.011, size = 146, normalized size = 2.2

$$\frac{27510\,x-4585}{11178}\left(3\,x^2-x+2\right)^{-\frac{3}{2}}+\frac{113352\,x-18892}{42849}\frac{1}{\sqrt{3\,x^2-x+2}}-\frac{2653}{486}\left(3\,x^2-x+2\right)^{-\frac{3}{2}}-\frac{67\,x}{27}\left(3\,x^2-x+2\right)^{-\frac{3}{2}}-\frac{92\,x^2}{9}\left(3\,x^2-x+2\right)^{-\frac{3}{2}}-\frac{16\,x^3}{9}\left(3\,x^2-x+2\right)^{-\frac{3}{2}}-\frac{16\,x}{9}\frac{1}{\sqrt{3\,x^2-x+2}}-\frac{8}{27}\frac{1}{\sqrt{3\,x^2-x+2}}+\frac{16\sqrt{3}}{27}Arcsinh\left(\frac{6\sqrt{23}}{23}\left(x-\frac{1}{6}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)^2*(4*x^2+3*x+1)/(3*x^2-x+2)^(5/2),x)
```

```
[Out] 4585/11178*(6*x-1)/(3*x^2-x+2)^(3/2)+18892/42849*(6*x-1)/(3*x^2-x
+2)^(1/2)-2653/486/(3*x^2-x+2)^(3/2)-67/27*x/(3*x^2-x+2)^(3/2)-92
/9*x^2/(3*x^2-x+2)^(3/2)-16/9*x^3/(3*x^2-x+2)^(3/2)-16/9*x/(3*x^2
-x+2)^(1/2)-8/27/(3*x^2-x+2)^(1/2)+16/27*3^(1/2)*arcsinh(6/23*23^
(1/2)*(x-1/6))
```

Maxima [A] time = 0.77077, size = 250, normalized size = 3.68

$$\frac{16}{14283}x\left(\frac{426\,x}{\sqrt{3\,x^2-x+2}}-\frac{4761\,x^2}{\left(3\,x^2-x+2\right)^{\frac{3}{2}}}-\frac{71}{\sqrt{3\,x^2-x+2}}+\frac{805\,x}{\left(3\,x^2-x+2\right)^{\frac{3}{2}}}-\frac{2162}{\left(3\,x^2-x+2\right)^{\frac{3}{2}}}\right)+\frac{16}{27}\sqrt{3}\,\mathrm{arsinh}\left(\frac{1}{23}\sqrt{23}(6\,x-1)\right)-\frac{2272}{14283}\sqrt{3\,x^2-x+2}+\frac{28184\,x}{14283\sqrt{3\,x^2-x+2}}-\frac{28\,x^2}{3\left(3\,x^2-x+2\right)^{\frac{3}{2}}}-\frac{2956}{4761\sqrt{3\,x^2-x+2}}-\frac{106\,x}{621\left(3\,x^2-x+2\right)^{\frac{3}{2}}}-\frac{3394}{621\left(3\,x^2-x+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/(3*x^2 - x + 2)^(5/2),x, algorithm="maxima
```

```
[Out] 16/14283*x*(426*x/sqrt(3*x^2 - x + 2) - 4761*x^2/(3*x^2 - x + 2)^
(3/2) - 71/sqrt(3*x^2 - x + 2) + 805*x/(3*x^2 - x + 2)^(3/2) - 21
62/(3*x^2 - x + 2)^(3/2)) + 16/27*sqrt(3)*arcsinh(1/23*sqrt(23)*(
6*x - 1)) - 2272/14283*sqrt(3*x^2 - x + 2) + 28184/14283*x/sqrt(3
*x^2 - x + 2) - 28/3*x^2/(3*x^2 - x + 2)^(3/2) - 2956/4761/sqrt(3
*x^2 - x + 2) - 106/621*x/(3*x^2 - x + 2)^(3/2) - 3394/621/(3*x^2
 - x + 2)^(3/2)
```

Fricas [A] time = 0.277454, size = 158, normalized size = 2.32

$$\frac{2\sqrt{3}\Big(\sqrt{3}\big(1964\,x^3-31664\,x^2+5837\,x-17481\big)\sqrt{3\,x^2-x+2}+2116\left(9\,x^4-6\,x^3+13\,x^2-4\,x+4\right)\log\Big(-\sqrt{3}\big(72\,x^2-24\,x}{14283\left(9\,x^4-6\,x^3+13\,x^2-4\,x+4\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/(3*x^2 - x + 2)^(5/2),x, algorithm="fricas
```

```
[Out] 2/14283*sqrt(3)*(sqrt(3)*(1964*x^3 - 31664*x^2 + 5837*x - 17481)*
sqrt(3*x^2 - x + 2) + 2116*(9*x^4 - 6*x^3 + 13*x^2 - 4*x + 4)*log
(-sqrt(3)*(72*x^2 - 24*x + 25) - 12*sqrt(3*x^2 - x + 2)*(6*x - 1)
))/(9*x^4 - 6*x^3 + 13*x^2 - 4*x + 4)
```

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

$$\int \frac{(2x+1)^2\left(4x^2+3x+1\right)}{(3x^2-x+2)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((1+2*x)**2*(4*x**2+3*x+1)/(3*x**2-x+2)**(5/2),x)
```

```
[Out] Integral((2*x + 1)**2*(4*x**2 + 3*x + 1)/(3*x**2 - x + 2)**(5/2),
 x)
```

GIAC/XCAS [A] time = 0.271529, size = 84, normalized size = 1.24

$$-\frac{16}{27}\sqrt{3}\ln\left(-2\sqrt{3}\left(\sqrt{3}x-\sqrt{3x^2-x+2}\right)+1\right)+\frac{2\left(\left(4\left(491x-7916\right)x+5837\right)x-17481\right)}{4761\left(3x^2-x+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)^2/(3*x^2 - x + 2)^(5/2),x, algorithm="giac")
```

```
[Out] -16/27*sqrt(3)*ln(-2*sqrt(3)*(sqrt(3)*x - sqrt(3*x^2 - x + 2)) +
1) + 2/4761*((4*(491*x - 7916)*x + 5837)*x - 17481)/(3*x^2 - x +
2)^(3/2)
```

3.254 $\int \frac{(1+2x)(1+3x+4x^2)}{(2-x+3x^2)^{5/2}}\,dx$

Optimal. Leaf size=47

$$-\frac{4(3889-4290x)}{14283\sqrt{3x^2-x+2}}-\frac{2(367x+73)}{621\,(3x^2-x+2)^{3/2}}$$

```
[Out] (-2*(73 + 367*x))/(621*(2 - x + 3*x^2)^(3/2)) - (4*(3889 - 4290*x
))/(14283*Sqrt[2 - x + 3*x^2])
```

Rubi [A] time = 0.0849356, antiderivative size = 47, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.067

$$-\frac{4(3889-4290x)}{14283\sqrt{3x^2-x+2}}-\frac{2(367x+73)}{621\,(3x^2-x+2)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 2*x)*(1 + 3*x + 4*x^2))/(2 - x + 3*x^2)^(5/2),x]
```

```
[Out] (-2*(73 + 367*x))/(621*(2 - x + 3*x^2)^(3/2)) - (4*(3889 - 4290*x
))/(14283*Sqrt[2 - x + 3*x^2])
```

Rubi in Sympy [A] time = 16.2354, size = 46, normalized size = 0.98

$$-\frac{2\,(-77x+101)\,(2x+1)^2}{897\,(3x^2-x+2)^{\frac{3}{2}}}-\frac{418\,(-16x+18)}{6877\sqrt{3x^2-x+2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((1+2*x)*(4*x**2+3*x+1)/(3*x**2-x+2)**(5/2),x)
```

```
[Out] -2*(-77*x + 101)*(2*x + 1)**2/(897*(3*x**2 - x + 2)**(3/2)) - 418
*(-16*x + 18)/(6877*sqrt(3*x**2 - x + 2))
```

Mathematica [A] time = 0.0370224, size = 33, normalized size = 0.7

$$\frac{2\left(2860x^3-3546x^2+1833x-1915\right)}{1587\,(3x^2-x+2)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((1 + 2*x)*(1 + 3*x + 4*x^2))/(2 - x + 3*x^2)^(5/2),x]
```

```
[Out] (2*(-1915 + 1833*x - 3546*x^2 + 2860*x^3))/(1587*(2 - x + 3*x^2)^
(3/2))
```

Maple [A] time = 0.006, size = 30, normalized size = 0.6

$$\frac{5720\,x^{3}-7092\,x^{2}+3666\,x-3830}{1587}\left(3\,x^{2}-x+2\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((1+2*x)*(4*x^2+3*x+1)/(3*x^2-x+2)^(5/2),x)
```

```
[Out] 2/1587/(3*x^2-x+2)^(3/2)*(2860*x^3-3546*x^2+1833*x-1915)
```

Maxima [A] time = 0.688234, size = 103, normalized size = 2.19

$$\frac{5720\,x}{4761\,\sqrt{3\,x^{2}-x+2}}-\frac{8\,x^{2}}{3\,(3\,x^{2}-x+2)^{\frac{3}{2}}}-\frac{2860}{14283\,\sqrt{3\,x^{2}-x+2}}-\frac{182\,x}{621\,(3\,x^{2}-x+2)^{\frac{3}{2}}}-\frac{1250}{621\,(3\,x^{2}-x+2)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)/(3*x^2 - x + 2)^(5/2),x, algorithm="maxima")
```

```
[Out] 5720/4761*x/sqrt(3*x^2 - x + 2) - 8/3*x^2/(3*x^2 - x + 2)^(3/2) -
 2860/14283/sqrt(3*x^2 - x + 2) - 182/621*x/(3*x^2 - x + 2)^(3/2)
 - 1250/621/(3*x^2 - x + 2)^(3/2)
```

Fricas [A] time = 0.270968, size = 69, normalized size = 1.47

$$\frac{2\left(2860\,x^{3}-3546\,x^{2}+1833\,x-1915\right)\sqrt{3\,x^{2}-x+2}}{1587\,(9\,x^{4}-6\,x^{3}+13\,x^{2}-4\,x+4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)*(2*x + 1)/(3*x^2 - x + 2)^(5/2),x, algorithm="fricas")
```

```
[Out] 2/1587*(2860*x^3 - 3546*x^2 + 1833*x - 1915)*sqrt(3*x^2 - x + 2)/
(9*x^4 - 6*x^3 + 13*x^2 - 4*x + 4)
```

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

$$\int \frac{(2x+1)\left(4x^2+3x+1\right)}{(3x^2-x+2)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((1+2*x)*(4*x**2+3*x+1)/(3*x**2-x+2)**(5/2),x)
```

```
[Out] Integral((2*x + 1)*(4*x**2 + 3*x + 1)/(3*x**2 - x + 2)**(5/2), x)
```

GIAC/XCAS [A] time = 0.27008, size = 38, normalized size = 0.81

$$\frac{2\,((2\,(1430\,x-1773)x+1833)x-1915)}{1587\,(3\,x^2-x+2)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^2 + 3*x + 1)*(2*x + 1)/(3*x^2 - x + 2)^(5/2),x, algorithm="giac")
```

```
[Out] 2/1587*((2*(1430*x - 1773)*x + 1833)*x - 1915)/(3*x^2 - x + 2)^(3
/2)
```

3.255 $\int \frac{1+3x+4x^2}{(1+2x)(2-x+3x^2)^{5/2}}\,dx$

Optimal. Leaf size=85

$$-\frac{4(691-13668x)}{268203\sqrt{3x^2-x+2}}-\frac{2(101-77x)}{897\,(3x^2-x+2)^{3/2}}-\frac{8\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{169\sqrt{13}}$$

```
[Out] (-2*(101 - 77*x))/(897*(2 - x + 3*x^2)^(3/2)) - (4*(691 - 13668*x
))/(268203*Sqrt[2 - x + 3*x^2]) - (8*ArcTanh[(9 - 8*x)/(2*Sqrt[13
]*Sqrt[2 - x + 3*x^2])])/(169*Sqrt[13])
```

Rubi [A] time = 0.198539, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.156

$$-\frac{4(691-13668x)}{268203\sqrt{3x^2-x+2}}-\frac{2(101-77x)}{897\,(3x^2-x+2)^{3/2}}-\frac{8\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{169\sqrt{13}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)*(2 - x + 3*x^2)^(5/2)),x]
```

```
[Out] (-2*(101 - 77*x))/(897*(2 - x + 3*x^2)^(3/2)) - (4*(691 - 13668*x
))/(268203*Sqrt[2 - x + 3*x^2]) - (8*ArcTanh[(9 - 8*x)/(2*Sqrt[13
]*Sqrt[2 - x + 3*x^2])])/(169*Sqrt[13])
```

Rubi in Sympy [A] time = 26.8263, size = 71, normalized size = 0.84

$$-\frac{4\,(-13668x+691)}{268203\sqrt{3x^2-x+2}}-\frac{2\,(-77x+101)}{897\,(3x^2-x+2)^{\frac{3}{2}}}-\frac{8\sqrt{13}\,\text{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{2197}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)/(3*x**2-x+2)**(5/2),x)
```

```
[Out] -4*(-13668*x + 691)/(268203*sqrt(3*x**2 - x + 2)) - 2*(-77*x + 10
1)/(897*(3*x**2 - x + 2)**(3/2)) - 8*sqrt(13)*atanh(sqrt(13)*(-8*
x + 9)/(26*sqrt(3*x**2 - x + 2)))/2197
```

Mathematica [A] time = 0.15498, size = 85, normalized size = 1.

$$-\frac{8\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)}{169\sqrt{13}}+\frac{2\left(82008x^3-31482x^2+79077x-32963\right)}{268203\left(3x^2-x+2\right)^{3/2}}+\frac{8\log(2x+1)}{169\sqrt{13}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)*(2 - x + 3*x^2)^(5/2)),x]
```

```
[Out] (2*(-32963 + 79077*x - 31482*x^2 + 82008*x^3))/(268203*(2 - x + 3
*x^2)^(3/2)) + (8*Log[1 + 2*x])/(169*Sqrt[13]) - (8*Log[9 - 8*x +
 2*Sqrt[13]*Sqrt[2 - x + 3*x^2]])/(169*Sqrt[13])
```

Maple [B] time = 0.012, size = 158, normalized size = 1.9

$$\frac{30\,x-5}{207}\left(3\,x^2-x+2\right)^{-\frac{3}{2}}+\frac{240\,x-40}{1587}\frac{1}{\sqrt{3\,x^2-x+2}}-\frac{2}{9}\left(3\,x^2-x+2\right)^{-\frac{3}{2}}$$
$$+\frac{1}{39}\left(3\,\left(1/2+x\right)^2-4\,x+\frac{5}{4}\right)^{-\frac{3}{2}}+\frac{24\,x-4}{897}\left(3\,\left(1/2+x\right)^2-4\,x+\frac{5}{4}\right)^{-\frac{3}{2}}$$
$$+\frac{4704\,x-784}{89401}\frac{1}{\sqrt{3\,\left(1/2+x\right)^2-4\,x+\frac{5}{4}}}+\frac{4}{169}\frac{1}{\sqrt{3\,\left(1/2+x\right)^2-4\,x+\frac{5}{4}}}$$
$$-\frac{8\,\sqrt{13}}{2197}Artanh\left(\frac{2\,\sqrt{13}}{13}\left(\frac{9}{2}-4\,x\right)\frac{1}{\sqrt{12\,\left(1/2+x\right)^2-16\,x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)/(3*x^2-x+2)^(5/2),x)
```

```
[Out] 5/207*(6*x-1)/(3*x^2-x+2)^(3/2)+40/1587*(6*x-1)/(3*x^2-x+2)^(1/2)
-2/9/(3*x^2-x+2)^(3/2)+1/39/(3*(1/2+x)^2-4*x+5/4)^(3/2)+4/897*(6*
x-1)/(3*(1/2+x)^2-4*x+5/4)^(3/2)+784/89401*(6*x-1)/(3*(1/2+x)^2-4
*x+5/4)^(1/2)+4/169/(3*(1/2+x)^2-4*x+5/4)^(1/2)-8/2197*13^(1/2)*a
rctanh(2/13*(9/2-4*x)*13^(1/2)/(12*(1/2+x)^2-16*x+5)^(1/2))
```

Maxima [A] time = 0.764443, size = 126, normalized size = 1.48

$$\frac{8}{2197}\sqrt{13}\,\mathrm{arsinh}\left(\frac{8\,\sqrt{23}x}{23\,|2\,x+1|}-\frac{9\,\sqrt{23}}{23\,|2\,x+1|}\right)+\frac{18224\,x}{89401\,\sqrt{3\,x^2-x+2}}$$
$$-\frac{2764}{268203\,\sqrt{3\,x^2-x+2}}+\frac{154\,x}{897\,(3\,x^2-x+2)^{\frac{3}{2}}}-\frac{202}{897\,(3\,x^2-x+2)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(5/2)*(2*x + 1)),x, algorithm="maxima
```

```
[Out] 8/2197*sqrt(13)*arcsinh(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*sqrt(
23)/abs(2*x + 1)) + 18224/89401*x/sqrt(3*x^2 - x + 2) - 2764/2682
03/sqrt(3*x^2 - x + 2) + 154/897*x/(3*x^2 - x + 2)^(3/2) - 202/89
7/(3*x^2 - x + 2)^(3/2)
```

Fricas [A] time = 0.278428, size = 176, normalized size = 2.07

$$\frac{2\sqrt{13}\left(\sqrt{13}\left(82008\,x^3-31482\,x^2+79077\,x-32963\right)\sqrt{3\,x^2-x+2}+3174\left(9\,x^4-6\,x^3+13\,x^2-4\,x+4\right)\log\left(-\frac{\sqrt{13}\left(220\,x^2-19\right.}{}\right.\right.}{3486639\left(9\,x^4-6\,x^3+13\,x^2-4\,x+4\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(5/2)*(2*x + 1)),x, algorithm="fricas
```

```
[Out] 2/3486639*sqrt(13)*(sqrt(13)*(82008*x^3 - 31482*x^2 + 79077*x - 3
2963)*sqrt(3*x^2 - x + 2) + 3174*(9*x^4 - 6*x^3 + 13*x^2 - 4*x +
4)*log(-(sqrt(13)*(220*x^2 - 196*x + 185) + 52*sqrt(3*x^2 - x + 2
)*(8*x - 9))/(4*x^2 + 4*x + 1)))/(9*x^4 - 6*x^3 + 13*x^2 - 4*x +
4)
```

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

$$\int \frac{4x^2+3x+1}{(2x+1)\,(3x^2-x+2)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x**2+3*x+1)/(1+2*x)/(3*x**2-x+2)**(5/2),x)
```

```
[Out] Integral((4*x**2 + 3*x + 1)/((2*x + 1)*(3*x**2 - x + 2)**(5/2)),
x)
```

GIAC/XCAS [A] time = 0.293828, size = 136, normalized size = 1.6

$$\frac{8}{2197}\sqrt{13}\ln\left(-\frac{\left|-4\sqrt{3}x-2\sqrt{13}-2\sqrt{3}+4\sqrt{3x^2-x+2}\right|}{2\left(2\sqrt{3}x-\sqrt{13}+\sqrt{3}-2\sqrt{3x^2-x+2}\right)}\right)+\frac{2\left(3\left(6\left(4556x-1749\right)x+26359\right)x-32963\right)}{268203\left(3x^2-x+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(5/2)*(2*x + 1)),x, algorithm="giac")
```

```
[Out] 8/2197*sqrt(13)*ln(-1/2*abs(-4*sqrt(3)*x - 2*sqrt(13) - 2*sqrt(3)
 + 4*sqrt(3*x^2 - x + 2))/(2*sqrt(3)*x - sqrt(13) + sqrt(3) - 2*s
qrt(3*x^2 - x + 2))) + 2/268203*(3*(6*(4556*x - 1749)*x + 26359)*
x - 32963)/(3*x^2 - x + 2)^(3/2)
```

3.256 $\int \frac{1+3x+4x^2}{(1+2x)^2(2-x+3x^2)^{5/2}}\,dx$

Optimal. Leaf size=110

$$-\frac{24(841-6633x)}{1162213\sqrt{3x^2-x+2}}-\frac{16\sqrt{3x^2-x+2}}{2197(2x+1)}-\frac{2(197-837x)}{11661\left(3x^2-x+2\right)^{3/2}}-\frac{56\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{2197\sqrt{13}}$$

```
[Out] (-2*(197 - 837*x))/(11661*(2 - x + 3*x^2)^(3/2)) - (24*(841 - 663
3*x))/(1162213*Sqrt[2 - x + 3*x^2]) - (16*Sqrt[2 - x + 3*x^2])/(2
197*(1 + 2*x)) - (56*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3
*x^2])])/(2197*Sqrt[13])
```

Rubi [A] time = 0.290182, antiderivative size = 110, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$-\frac{24(841-6633x)}{1162213\sqrt{3x^2-x+2}}-\frac{16\sqrt{3x^2-x+2}}{2197(2x+1)}-\frac{2(197-837x)}{11661\left(3x^2-x+2\right)^{3/2}}-\frac{56\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{2197\sqrt{13}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)^2*(2 - x + 3*x^2)^(5/2)),x]
```

```
[Out] (-2*(197 - 837*x))/(11661*(2 - x + 3*x^2)^(3/2)) - (24*(841 - 663
3*x))/(1162213*Sqrt[2 - x + 3*x^2]) - (16*Sqrt[2 - x + 3*x^2])/(2
197*(1 + 2*x)) - (56*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3
*x^2])])/(2197*Sqrt[13])
```

Rubi in Sympy [A] time = 33.6844, size = 92, normalized size = 0.84

$$-\frac{2\left(-219744x+14406\right)}{3486639\sqrt{3x^2-x+2}}-\frac{-1260x+49}{11661\left(3x^2-x+2\right)^{\frac{3}{2}}}-\frac{56\sqrt{13}\operatorname{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{28561}-\frac{1}{13\left(2x+1\right)\left(3x^2-x+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)**2/(3*x**2-x+2)**(5/2),x)
```

```
[Out] -2*(-219744*x + 14406)/(3486639*sqrt(3*x**2 - x + 2)) - (-1260*x
+ 49)/(11661*(3*x**2 - x + 2)**(3/2)) - 56*sqrt(13)*atanh(sqrt(13
)*(-8*x + 9)/(26*sqrt(3*x**2 - x + 2)))/28561 - 1/(13*(2*x + 1)*(
```

```
3*x**2 - x + 2)**(3/2))
```

Mathematica [A] time = 0.189858, size = 95, normalized size = 0.86

$$\frac{2\left(-44436\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)+\frac{13(1318464x^4+133308x^3+1021566x^2+569989x-170239)}{(2x+1)(3x^2-x+2)^{3/2}}+44436\sqrt{13}\log(2x+1)\right)}{45326307}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)^2*(2 - x + 3*x^2)^(5/2)),x]
```

```
[Out] (2*((13*(-170239 + 569989*x + 1021566*x^2 + 133308*x^3 + 1318464*
x^4))/((1 + 2*x)*(2 - x + 3*x^2)^(3/2)) + 44436*Sqrt[13]*Log[1 +
2*x] - 44436*Sqrt[13]*Log[9 - 8*x + 2*Sqrt[13]*Sqrt[2 - x + 3*x^2
]]))/45326307
```

Maple [A] time = 0.016, size = 165, normalized size = 1.5

$$\frac{12x-2}{69}\left(3x^2-x+2\right)^{-\frac{3}{2}}+\frac{96x-16}{529}\frac{1}{\sqrt{3x^2-x+2}}-\frac{1}{26}\left(\frac{1}{2}+x\right)^{-1}\left(3\,(1/2+x)^2-4x+\frac{5}{4}\right)^{-\frac{3}{2}}$$
$$+\frac{7}{507}\left(3\,(1/2+x)^2-4x+\frac{5}{4}\right)^{-\frac{3}{2}}-\frac{768x-128}{11661}\left(3\,(1/2+x)^2-4x+\frac{5}{4}\right)^{-\frac{3}{2}}$$
$$-\frac{64416x-10736}{1162213}\frac{1}{\sqrt{3\,(1/2+x)^2-4x+\frac{5}{4}}}+\frac{28}{2197}\frac{1}{\sqrt{3\,(1/2+x)^2-4x+\frac{5}{4}}}$$
$$-\frac{56\sqrt{13}}{28561}\mathit{Artanh}\left(\frac{2\sqrt{13}}{13}\left(\frac{9}{2}-4x\right)\frac{1}{\sqrt{12\,(1/2+x)^2-16x+5}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)^2/(3*x^2-x+2)^(5/2),x)
```

```
[Out] 2/69*(6*x-1)/(3*x^2-x+2)^(3/2)+16/529*(6*x-1)/(3*x^2-x+2)^(1/2)-1
/26/(1/2+x)/(3*(1/2+x)^2-4*x+5/4)^(3/2)+7/507/(3*(1/2+x)^2-4*x+5/
4)^(3/2)-128/11661*(6*x-1)/(3*(1/2+x)^2-4*x+5/4)^(3/2)-10736/1162
213*(6*x-1)/(3*(1/2+x)^2-4*x+5/4)^(1/2)+28/2197/(3*(1/2+x)^2-4*x+
5/4)^(1/2)-56/28561*13^(1/2)*arctanh(2/13*(9/2-4*x)*13^(1/2)/(12*
(1/2+x)^2-16*x+5)^(1/2))
```

Maxima [A] time = 0.774015, size = 169, normalized size = 1.54

$$\frac{56}{28561}\sqrt{13}\,\text{arsinh}\left(\frac{8\sqrt{23}x}{23\,|2\,x+1|}-\frac{9\sqrt{23}}{23\,|2\,x+1|}\right)+\frac{146496\,x}{1162213\sqrt{3\,x^2-x+2}}-\frac{9604}{1162213\sqrt{3\,x^2-x+2}}+\frac{420\,x}{3887\,(3\,x^2-x+2)^{\frac{3}{2}}}-\frac{1}{13\left(2\,(3\,x^2-x+2)^{\frac{3}{2}}x+(3\,x^2-x+2)^{\frac{3}{2}}\right)}-\frac{49}{11661\,(3\,x^2-x+2)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(5/2)*(2*x + 1)^2),x, algorithm="maxi
```

```
[Out] 56/28561*sqrt(13)*arcsinh(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*sqr
t(23)/abs(2*x + 1)) + 146496/1162213*x/sqrt(3*x^2 - x + 2) - 9604
/1162213/sqrt(3*x^2 - x + 2) + 420/3887*x/(3*x^2 - x + 2)^(3/2) -
 1/13/(2*(3*x^2 - x + 2)^(3/2)*x + (3*x^2 - x + 2)^(3/2)) - 49/11
661/(3*x^2 - x + 2)^(3/2)
```

Fricas [A] time = 0.279336, size = 196, normalized size = 1.78

$$\frac{2\sqrt{13}\left(\sqrt{13}\left(1318464\,x^4+133308\,x^3+1021566\,x^2+569989\,x-170239\right)\sqrt{3\,x^2-x+2}+22218\left(18\,x^5-3\,x^4+20\,x^3+5\,x^2\right.\right.}{45326307\,(18\,x^5-3\,x^4+20\,x^3+5\,x^2+4\,x+4)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(5/2)*(2*x + 1)^2),x, algorithm="fric
```

```
[Out] 2/45326307*sqrt(13)*(sqrt(13)*(1318464*x^4 + 133308*x^3 + 1021566
*x^2 + 569989*x - 170239)*sqrt(3*x^2 - x + 2) + 22218*(18*x^5 - 3
*x^4 + 20*x^3 + 5*x^2 + 4*x + 4)*log(-(sqrt(13)*(220*x^2 - 196*x
+ 185) + 52*sqrt(3*x^2 - x + 2)*(8*x - 9))/(4*x^2 + 4*x + 1)))/(1
8*x^5 - 3*x^4 + 20*x^3 + 5*x^2 + 4*x + 4)
```

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

$$\int \frac{4x^2+3x+1}{(2x+1)^2\,(3x^2-x+2)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**2+3*x+1)/(1+2*x)**2/(3*x**2-x+2)**(5/2),x)
```

```
[Out] Integral((4*x**2 + 3*x + 1)/((2*x + 1)**2*(3*x**2 - x + 2)**(5/2)
), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{4x^2 + 3x + 1}{(3x^2 - x + 2)^{\frac{5}{2}}(2x + 1)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(5/2)*(2*x + 1)^2),x, algorithm="giac
```

```
[Out] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(5/2)*(2*x + 1)^2),
x)
```

3.257 $\int \frac{1+3x+4x^2}{(1+2x)^3(2-x+3x^2)^{5/2}}\,dx$

Optimal. Leaf size=135

$$\frac{2(3693x+2363)}{151593\left(3x^2-x+2\right)^{3/2}}-\frac{144\sqrt{3x^2-x+2}}{28561(2x+1)}-\frac{8\sqrt{3x^2-x+2}}{2197(2x+1)^2}+\frac{12(103526x+25771)}{15108769\sqrt{3x^2-x+2}}-\frac{2084\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{28561\sqrt{13}}$$

```
[Out] (2*(2363 + 3693*x))/(151593*(2 - x + 3*x^2)^(3/2)) + (12*(25771 +
 103526*x))/(15108769*Sqrt[2 - x + 3*x^2]) - (8*Sqrt[2 - x + 3*x^
2])/(2197*(1 + 2*x)^2) - (144*Sqrt[2 - x + 3*x^2])/(28561*(1 + 2*
x)) - (2084*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/
(28561*Sqrt[13])
```

Rubi [A] time = 0.387889, antiderivative size = 135, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.156

$$\frac{2(3693x+2363)}{151593\left(3x^2-x+2\right)^{3/2}}-\frac{144\sqrt{3x^2-x+2}}{28561(2x+1)}-\frac{8\sqrt{3x^2-x+2}}{2197(2x+1)^2}+\frac{12(103526x+25771)}{15108769\sqrt{3x^2-x+2}}-\frac{2084\tanh^{-1}\left(\frac{9-8x}{2\sqrt{13}\sqrt{3x^2-x+2}}\right)}{28561\sqrt{13}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 3*x + 4*x^2)/((1 + 2*x)^3*(2 - x + 3*x^2)^(5/2)),x]
```

```
[Out] (2*(2363 + 3693*x))/(151593*(2 - x + 3*x^2)^(3/2)) + (12*(25771 +
 103526*x))/(15108769*Sqrt[2 - x + 3*x^2]) - (8*Sqrt[2 - x + 3*x^
2])/(2197*(1 + 2*x)^2) - (144*Sqrt[2 - x + 3*x^2])/(28561*(1 + 2*
x)) - (2084*ArcTanh[(9 - 8*x)/(2*Sqrt[13]*Sqrt[2 - x + 3*x^2])])/
(28561*Sqrt[13])
```

Rubi in Sympy [A] time = 39.3949, size = 121, normalized size = 0.9

$$-\frac{-601500x+181762}{3486639\,(2x+1)\sqrt{3x^2-x+2}}-\frac{-2934x+443}{23322\,(2x+1)\left(3x^2-x+2\right)^{\frac{3}{2}}}-\frac{2084\sqrt{13}\,\operatorname{atanh}\left(\frac{\sqrt{13}(-8x+9)}{26\sqrt{3x^2-x+2}}\right)}{371293}+\frac{752032\sqrt{3x^2-x+2}}{15108769\,(2x+1)}-\frac{1}{26\,(2x+1)^2\left(3x^2-x+2\right)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**2+3*x+1)/(1+2*x)**3/(3*x**2-x+2)**(5/2),x)
```

```
[Out] -(-601500*x + 181762)/(3486639*(2*x + 1)*sqrt(3*x**2 - x + 2)) -
(-2934*x + 443)/(23322*(2*x + 1)*(3*x**2 - x + 2)**(3/2)) - 2084*
sqrt(13)*atanh(sqrt(13)*(-8*x + 9)/(26*sqrt(3*x**2 - x + 2)))/371
293 + 752032*sqrt(3*x**2 - x + 2)/(15108769*(2*x + 1)) - 1/(26*(2
*x + 1)**2*(3*x**2 - x + 2)**(3/2))
```

Mathematica [A]   time = 0.242192, size = 100, normalized size = 0.74

$$\frac{2\left(-1653654\sqrt{13}\log\left(2\sqrt{13}\sqrt{3x^2-x+2}-8x+9\right)+\frac{13\left(20304864x^5+20074356x^4+19381992x^3+21890266x^2+10777477x+847141\right)}{(2x+1)^2\left(3x^2-x+2\right)^{3/2}}+1653654}{589241991}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 3*x + 4*x^2)/((1 + 2*x)^3*(2 - x + 3*x^2)^(5/2)),x]
```

```
[Out] (2*((13*(847141 + 10777477*x + 21890266*x^2 + 19381992*x^3 + 2007
4356*x^4 + 20304864*x^5))/((1 + 2*x)^2*(2 - x + 3*x^2)^(3/2)) + 1
653654*Sqrt[13]*Log[1 + 2*x] - 1653654*Sqrt[13]*Log[9 - 8*x + 2*S
qrt[13]*Sqrt[2 - x + 3*x^2]]))/589241991
```

Maple [A]   time = 0.019, size = 148, normalized size = 1.1

$$\frac{521}{13182}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{-\frac{3}{2}}+\frac{5316\,x-886}{151593}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{-\frac{3}{2}}$$
$$+\frac{1128048\,x-188008}{15108769}\frac{1}{\sqrt{3\,(1/2+x)^2-4\,x+\frac{5}{4}}}+\frac{1042}{28561}\frac{1}{\sqrt{3\,(1/2+x)^2-4\,x+\frac{5}{4}}}$$
$$-\frac{2084\sqrt{13}}{371293}\mathit{Artanh}\left(\frac{2\sqrt{13}}{13}\left(\frac{9}{2}-4\,x\right)\frac{1}{\sqrt{12\,(1/2+x)^2-16\,x+5}}\right)$$
$$-\frac{1}{104}\left(\frac{1}{2}+x\right)^{-2}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{-\frac{3}{2}}-\frac{1}{338}\left(\frac{1}{2}+x\right)^{-1}\left(3\,(1/2+x)^2-4\,x+\frac{5}{4}\right)^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^2+3*x+1)/(1+2*x)^3/(3*x^2-x+2)^(5/2),x)
```

```
[Out] 521/13182/(3*(1/2+x)^2-4*x+5/4)^(3/2)+886/151593*(6*x-1)/(3*(1/2+
x)^2-4*x+5/4)^(3/2)+188008/15108769*(6*x-1)/(3*(1/2+x)^2-4*x+5/4)
^(1/2)+1042/28561/(3*(1/2+x)^2-4*x+5/4)^(1/2)-2084/371293*13^(1/2
)*arctanh(2/13*(9/2-4*x)*13^(1/2)/(12*(1/2+x)^2-16*x+5)^(1/2))-1/
104/(1/2+x)^2/(3*(1/2+x)^2-4*x+5/4)^(3/2)-1/338/(1/2+x)/(3*(1/2+x
)^2-4*x+5/4)^(3/2)
```

Maxima [A] time = 0.777185, size = 235, normalized size = 1.74

$$\frac{2084}{371293}\sqrt{13}\,\operatorname{arsinh}\left(\frac{8\sqrt{23}x}{23\,|2\,x+1|}-\frac{9\sqrt{23}}{23\,|2\,x+1|}\right)+\frac{1128048\,x}{15108769\sqrt{3\,x^2-x+2}}+\frac{363210}{15108769\sqrt{3\,x^2-x+2}}+\frac{1772\,x}{50531\,(3\,x^2-x+2)^{\frac{3}{2}}}-\frac{1}{26\left(4\,(3\,x^2-x+2)^{\frac{3}{2}}x^2+4\,(3\,x^2-x+2)^{\frac{3}{2}}x+(3\,x^2-x+2)^{\frac{3}{2}}\right)}-\frac{1}{169\left(2\,(3\,x^2-x+2)^{\frac{3}{2}}x+(3\,x^2-x+2)^{\frac{3}{2}}\right)}+\frac{10211}{303186\,(3\,x^2-x+2)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(5/2)*(2*x + 1)^3),x, algorithm="maxi
```

```
[Out] 2084/371293*sqrt(13)*arcsinh(8/23*sqrt(23)*x/abs(2*x + 1) - 9/23*
sqrt(23)/abs(2*x + 1)) + 1128048/15108769*x/sqrt(3*x^2 - x + 2) +
 363210/15108769/sqrt(3*x^2 - x + 2) + 1772/50531*x/(3*x^2 - x +
2)^(3/2) - 1/26/(4*(3*x^2 - x + 2)^(3/2)*x^2 + 4*(3*x^2 - x + 2)^
(3/2)*x + (3*x^2 - x + 2)^(3/2)) - 1/169/(2*(3*x^2 - x + 2)^(3/2)
*x + (3*x^2 - x + 2)^(3/2)) + 10211/303186/(3*x^2 - x + 2)^(3/2)
```

Fricas [A] time = 0.282868, size = 216, normalized size = 1.6

$$\frac{2\sqrt{13}\left(\sqrt{13}\left(20304864\,x^5+20074356\,x^4+19381992\,x^3+21890266\,x^2+10777477\,x+847141\right)\sqrt{3\,x^2-x+2}+826827\,(36\,x^{\cdots}\right.}{589241991\,(36\,x^6+12\,x^5+37\,x^4+30\,x^3+13\,x^{\cdots}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(5/2)*(2*x + 1)^3),x, algorithm="fric
```

```
[Out] 2/589241991*sqrt(13)*(sqrt(13)*(20304864*x^5 + 20074356*x^4 + 193
81992*x^3 + 21890266*x^2 + 10777477*x + 847141)*sqrt(3*x^2 - x +
```

```
2) + 826827*(36*x^6 + 12*x^5 + 37*x^4 + 30*x^3 + 13*x^2 + 12*x +
4)*log(-(sqrt(13)*(220*x^2 - 196*x + 185) + 52*sqrt(3*x^2 - x + 2
)*(8*x - 9))/(4*x^2 + 4*x + 1)))/(36*x^6 + 12*x^5 + 37*x^4 + 30*x
^3 + 13*x^2 + 12*x + 4)
```

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

$$\int \frac{4x^2 + 3x + 1}{(2x + 1)^3 (3x^2 - x + 2)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**2+3*x+1)/(1+2*x)**3/(3*x**2-x+2)**(5/2),x)
```

```
[Out] Integral((4*x**2 + 3*x + 1)/((2*x + 1)**3*(3*x**2 - x + 2)**(5/2)
), x)
```

GIAC/XCAS [A] time = 0.296963, size = 315, normalized size = 2.33

$$\frac{2084}{371293}\sqrt{13}\ln\left(-\frac{\left|-4\sqrt{3}x - 2\sqrt{13} - 2\sqrt{3} + 4\sqrt{3x^2 - x + 2}\right|}{2\left(2\sqrt{3}x - \sqrt{13} + \sqrt{3} - 2\sqrt{3x^2 - x + 2}\right)}\right) + \frac{2(3(6(310578x - 26213)x + 1455755)x + 1634293)}{45326307(3x^2 - x + 2)^{\frac{3}{2}}} - \frac{8\left(66\left(\sqrt{3}x - \sqrt{3x^2 - x + 2}\right)^3 + 21\sqrt{3}\left(\sqrt{3}x - \sqrt{3x^2 - x + 2}\right)^2 - 1015\sqrt{3}x + 431\sqrt{3} + 1015\sqrt{3x^2 - x + 2}\right)}{28561\left(2\left(\sqrt{3}x - \sqrt{3x^2 - x + 2}\right)^2 + 2\sqrt{3}\left(\sqrt{3}x - \sqrt{3x^2 - x + 2}\right) - 5\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^2 + 3*x + 1)/((3*x^2 - x + 2)^(5/2)*(2*x + 1)^3),x, algorithm="giac
```

```
[Out] 2084/371293*sqrt(13)*ln(-1/2*abs(-4*sqrt(3)*x - 2*sqrt(13) - 2*sq
rt(3) + 4*sqrt(3*x^2 - x + 2))/(2*sqrt(3)*x - sqrt(13) + sqrt(3)
- 2*sqrt(3*x^2 - x + 2))) + 2/45326307*(3*(6*(310578*x - 26213)*x
 + 1455755)*x + 1634293)/(3*x^2 - x + 2)^(3/2) - 8/28561*(66*(sqr
t(3)*x - sqrt(3*x^2 - x + 2))^3 + 21*sqrt(3)*(sqrt(3)*x - sqrt(3*
x^2 - x + 2))^2 - 1015*sqrt(3)*x + 431*sqrt(3) + 1015*sqrt(3*x^2
- x + 2))/(2*(sqrt(3)*x - sqrt(3*x^2 - x + 2))^2 + 2*sqrt(3)*(sqr
t(3)*x - sqrt(3*x^2 - x + 2)) - 5)^2
```

3.258 $\int \frac{d+ex+fx^2}{(g+hx)(-cg^2+bgh+bh^2x+ch^2x^2)^{3/2}} dx$

Optimal. Leaf size=208

$$\frac{(b+2cx)\left(-3b^2fh^2+6bceh^2+4c^2\left(fg^2-h(2dh+eg)\right)\right)}{3ch^2(2cg-bh)^3\sqrt{-g(cg-bh)+bh^2x+ch^2x^2}}+\frac{2\left(dh^2-egh+fg^2\right)}{3h^3(g+hx)(2cg-bh)\sqrt{-g(cg-bh)+bh^2x+ch^2x^2}}-\frac{f}{ch^3\sqrt{-g(cg-bh)+bh^2x+ch^2x^2}}$$

```
[Out] -(f/(c*h^3*Sqrt[-(g*(c*g - b*h)) + b*h^2*x + c*h^2*x^2])) + ((6*b
*c*e*h^2 - 3*b^2*f*h^2 + 4*c^2*(f*g^2 - h*(e*g + 2*d*h)))*(b + 2*
c*x))/(3*c*h^2*(2*c*g - b*h)^3*Sqrt[-(g*(c*g - b*h)) + b*h^2*x +
c*h^2*x^2]) + (2*(f*g^2 - e*g*h + d*h^2))/(3*h^3*(2*c*g - b*h)*(g
 + h*x)*Sqrt[-(g*(c*g - b*h)) + b*h^2*x + c*h^2*x^2])
```

Rubi [A] time = 0.90548, antiderivative size = 208, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 47, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.064

$$\frac{(b+2cx)\left(-3b^2fh^2+6bceh^2+4c^2\left(fg^2-h(2dh+eg)\right)\right)}{3ch^2(2cg-bh)^3\sqrt{-g(cg-bh)+bh^2x+ch^2x^2}}+\frac{2\left(dh^2-egh+fg^2\right)}{3h^3(g+hx)(2cg-bh)\sqrt{-g(cg-bh)+bh^2x+ch^2x^2}}-\frac{f}{ch^3\sqrt{-g(cg-bh)+bh^2x+ch^2x^2}}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2)/((g + h*x)*(-(c*g^2) + b*g*h + b*h^2*x + c*h^2*x^2)^(3/2)),x
```

```
[Out] -(f/(c*h^3*Sqrt[-(g*(c*g - b*h)) + b*h^2*x + c*h^2*x^2])) + ((6*b
*c*e*h^2 - 3*b^2*f*h^2 + 4*c^2*(f*g^2 - h*(e*g + 2*d*h)))*(b + 2*
c*x))/(3*c*h^2*(2*c*g - b*h)^3*Sqrt[-(g*(c*g - b*h)) + b*h^2*x +
c*h^2*x^2]) + (2*(f*g^2 - e*g*h + d*h^2))/(3*h^3*(2*c*g - b*h)*(g
 + h*x)*Sqrt[-(g*(c*g - b*h)) + b*h^2*x + c*h^2*x^2])
```

Rubi in Sympy [A] time = 133.482, size = 202, normalized size = 0.97

$$-\frac{2\left(dh^2-egh+fg^2\right)}{3h^3\left(g+hx\right)\left(bh-2cg\right)\sqrt{bh^2x+ch^2x^2+g\left(bh-cg\right)}}-\frac{f}{ch^3\sqrt{bh^2x+ch^2x^2+g\left(bh-cg\right)}}+\frac{\left(2b+4cx\right)\left(3b^2fh^2-6bceh^2+8c^2dh^2+4c^2egh-4c^2fg^2\right)}{6ch^2\left(bh-2cg\right)^3\sqrt{bh^2x+ch^2x^2+g\left(bh-cg\right)}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((f*x**2+e*x+d)/(h*x+g)/(c*h**2*x**2+b*h**2*x+b*g*h-
c*g**2)**(3/2),x)
```

```
[Out] -2*(d*h**2 - e*g*h + f*g**2)/(3*h**3*(g + h*x)*(b*h - 2*c*g)*sqrt
(b*h**2*x + c*h**2*x**2 + g*(b*h - c*g))) - f/(c*h**3*sqrt(b*h**2
*x + c*h**2*x**2 + g*(b*h - c*g))) + (2*b + 4*c*x)*(3*b**2*f*h**2
 - 6*b*c*e*h**2 + 8*c**2*d*h**2 + 4*c**2*e*g*h - 4*c**2*f*g**2)/(
6*c*h**2*(b*h - 2*c*g)**3*sqrt(b*h**2*x + c*h**2*x**2 + g*(b*h -
c*g)))
```

Mathematica [A] time = 0.829274, size = 221, normalized size = 1.06

$$\frac{(g+hx)^2(-bh+cg-chx)^2\left(\frac{2\left(b^2fh^2-bceh^2-2bcfgh+c^2dh^2+c^2egh+c^2fg^2\right)}{h^3(bh-2cg)^3(bh-cg+chx)}-\frac{2\left(dh^2-egh+fg^2\right)}{3h^3(g+hx)^2(bh-2cg)^2}+\frac{2\left(-3beh^2+6bfgh+5cdh^2+cegh-7cfg^2\right)}{3h^3(g+hx)(bh-2cg)^3}\right.}{(-(g+hx)(c(g-hx)-bh))^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2)/((g + h*x)*(-(c*g^2) + b*g*h + b*h^2*x + c*h^2*x^2)^(3
```

```
[Out] ((g + h*x)^2*(c*g - b*h - c*h*x)^2*((-2*(f*g^2 - e*g*h + d*h^2))/
(3*h^3*(-2*c*g + b*h)^2*(g + h*x)^2) + (2*(-7*c*f*g^2 + c*e*g*h +
 6*b*f*g*h + 5*c*d*h^2 - 3*b*e*h^2))/(3*h^3*(-2*c*g + b*h)^3*(g +
 h*x)) + (2*(c^2*f*g^2 + c^2*e*g*h - 2*b*c*f*g*h + c^2*d*h^2 - b*
c*e*h^2 + b^2*f*h^2))/(h^3*(-2*c*g + b*h)^3*(-(c*g) + b*h + c*h*x
))))/(-((g + h*x)*(-(b*h) + c*(g - h*x))))^(3/2)
```

Maple [A] time = 0.016, size = 324, normalized size = 1.6

$$-\frac{(2\,chx+2\,bh-2\,cg)\left(-3\,b^2fh^4x^2+6\,bceh^4x^2-8\,c^2dh^4x^2-4\,c^2egh^3x^2+4\,c^2fg^2h^2x^2+3\,b^2eh^4x-12\,b^2fgh^3x-4\,bcdh^4\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((f*x^2+e*x+d)/(h*x+g)/(c*h^2*x^2+b*h^2*x+b*g*h-c*g^2)^(3/2),x)
```

```
[Out] -2/3*(c*h*x+b*h-c*g)*(-3*b^2*f*h^4*x^2+6*b*c*e*h^4*x^2-8*c^2*d*h^
4*x^2-4*c^2*e*g*h^3*x^2+4*c^2*f*g^2*h^2*x^2+3*b^2*e*h^4*x-12*b^2*
f*g*h^3*x-4*b*c*d*h^4*x+4*b*c*e*g*h^3*x+20*b*c*f*g^2*h^2*x-8*c^2*
d*g*h^3*x-4*c^2*e*g^2*h^2*x-8*c^2*f*g^3*h*x+b^2*d*h^4+2*b^2*e*g*h
^3-8*b^2*f*g^2*h^2-8*b*c*d*g*h^3+2*b*c*e*g^2*h^2+16*b*c*f*g^3*h+4
```

```
*c^2*d*g^2*h^2-4*c^2*e*g^3*h-8*c^2*f*g^4)/(b^3*h^3-6*b^2*c*g*h^2+
12*b*c^2*g^2*h-8*c^3*g^3)/h^3/(c*h^2*x^2+b*h^2*x+b*g*h-c*g^2)^(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((f*x^2 + e*x + d)/((c*h^2*x^2 + b*h^2*x - c*g^2 + b*g*h)^(3/2)*(h*x + g)
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 4.29595, size = 628, normalized size = 3.02

$$\frac{2\left(8\,c^2fg^4 - b^2dh^4 + 4\left(c^2e - 4\,bcf\right)g^3h - 2\left(2\,c^2d + bce - 4\,b^2f\right)g^2h^2 + 2\left(4\,bcd - b^2e\right)gh^3 - \left(4\,c^2fg^2h^2 - 4\,c^2egh^3 - (8\,c\right.}{3\,(8\,c^4g^6h^3 - 20\,bc^3g^5h^4 + 18\,b^2c^2g^4h^5 - 7\,b^3cg^3h^6 + b^4g^2h^7 - (8\,c^4g^3h^6 - 12\,bc^3g^2h^7 + 6\,b^2c^2gh^8 - b^3ch^9)x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/((c*h^2*x^2 + b*h^2*x - c*g^2 + b*g*h)^(3/2)*(h*x + g)
```

```
[Out] 2/3*(8*c^2*f*g^4 - b^2*d*h^4 + 4*(c^2*e - 4*b*c*f)*g^3*h - 2*(2*c
^2*d + b*c*e - 4*b^2*f)*g^2*h^2 + 2*(4*b*c*d - b^2*e)*g*h^3 - (4*
c^2*f*g^2*h^2 - 4*c^2*e*g*h^3 - (8*c^2*d - 6*b*c*e + 3*b^2*f)*h^4
)*x^2 + (8*c^2*f*g^3*h + 4*(c^2*e - 5*b*c*f)*g^2*h^2 + 4*(2*c^2*d
 - b*c*e + 3*b^2*f)*g*h^3 + (4*b*c*d - 3*b^2*e)*h^4)*x)*sqrt(c*h^
2*x^2 + b*h^2*x - c*g^2 + b*g*h)/(8*c^4*g^6*h^3 - 20*b*c^3*g^5*h^
4 + 18*b^2*c^2*g^4*h^5 - 7*b^3*c*g^3*h^6 + b^4*g^2*h^7 - (8*c^4*g
^3*h^6 - 12*b*c^3*g^2*h^7 + 6*b^2*c^2*g*h^8 - b^3*c*h^9)*x^3 - (8
*c^4*g^4*h^5 - 4*b*c^3*g^3*h^6 - 6*b^2*c^2*g^2*h^7 + 5*b^3*c*g*h^
8 - b^4*h^9)*x^2 + (8*c^4*g^5*h^4 - 28*b*c^3*g^4*h^5 + 30*b^2*c^2
*g^3*h^6 - 13*b^3*c*g^2*h^7 + 2*b^4*g*h^8)*x)
```

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

$$\int \frac{d + ex + fx^2}{\left((g + hx)\,(bh - cg + chx)\right)^{\frac{3}{2}}\,(g + hx)}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)/(h*x+g)/(c*h**2*x**2+b*h**2*x+b*g*h-c*g**2)**(3/2),x)
```

```
[Out] Integral((d + e*x + f*x**2)/(((g + h*x)*(b*h - c*g + c*h*x))**(3/
2)*(g + h*x)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{fx^2 + ex + d}{(ch^2x^2 + bh^2x - cg^2 + bgh)^{\frac{3}{2}}(hx + g)}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2 + e*x + d)/((c*h^2*x^2 + b*h^2*x - c*g^2 + b*g*h)^(3/2)*(h*x + g)
```

```
[Out] integrate((f*x^2 + e*x + d)/((c*h^2*x^2 + b*h^2*x - c*g^2 + b*g*h
)^(3/2)*(h*x + g)), x)
```

3.259 $\int \sqrt{d+ex}\sqrt{a+bx+cx^2}\left(A+Bx+Cx^2\right)\,dx$

Optimal. Leaf size=906

$$\frac{2C(d+ex)^{3/2}\left(cx^2+bx+a\right)^{3/2}}{9ce}-\frac{2(2cCd-3Bce+2bCe)\sqrt{d+ex}\left(cx^2+bx+a\right)^{3/2}}{21c^2e}$$
$$+\frac{2\sqrt{d+ex}\left(d\left(8Cd^2-3e(4Bd-7Ae)\right)c^3+3e\left(ae(Cd-5Be)-b\left(Cd^2-2Bed-7Ae^2\right)\right)c^2-3be^2(bCd+4bBe-aCe)c+3e\right.}{315c^3e^3}$$
$$+\frac{\sqrt{2}\sqrt{b^2-4ac}\left(2\left(4c^2d^2-b^2e^2-\frac{3}{2}ce(bd-2ae)\right)\left(-\left(2Cd^2-3e(Bd+7Ae)\right)c^2-e(bCd+12bBe+7aCe)c+8b^2Ce^2\right)-5ce(\right.}{315c^4e^4}$$
$$-\frac{2\sqrt{2}\sqrt{b^2-4ac}\left(cd^2-bed+ae^2\right)\left(-2d\left(8Cd^2-3e(4Bd-7Ae)\right)c^3-3e^2(bBd+2aCd-7Abe-10aBe)c^2+3be^2(bCd-4b\right.}{315c^4e^4\sqrt{d+ex}\sqrt{cx^2+}}$$

```
[Out] (2*Sqrt[d + e*x]*(8*b^3*C*e^3 - 3*b*c*e^2*(b*C*d + 4*b*B*e - a*C*
e) + c^3*d*(8*C*d^2 - 3*e*(4*B*d - 7*A*e)) + 3*c^2*e*(a*e*(C*d -
5*B*e) - b*(C*d^2 - 2*B*d*e - 7*A*e^2)) + 3*c*e*(8*b^2*C*e^2 - c*
e*(b*C*d + 12*b*B*e + 7*a*C*e) - c^2*(2*C*d^2 - 3*e*(B*d + 7*A*e)
))*x)*Sqrt[a + b*x + c*x^2])/(315*c^3*e^3) - (2*(2*c*C*d - 3*B*c*
e + 2*b*C*e)*Sqrt[d + e*x]*(a + b*x + c*x^2)^(3/2))/(21*c^2*e) +
(2*C*(d + e*x)^(3/2)*(a + b*x + c*x^2)^(3/2))/(9*c*e) + (Sqrt[2]*
Sqrt[b^2 - 4*a*c]*(2*(4*c^2*d^2 - b^2*e^2 - (3*c*e*(b*d - 2*a*e))
/2)*(8*b^2*C*e^2 - c*e*(b*C*d + 12*b*B*e + 7*a*C*e) - c^2*(2*C*d^
2 - 3*e*(B*d + 7*A*e))) - 5*c*e*(2*c*d - b*e)*(6*b^2*C*d*e + c*e*
(21*A*c*d - 5*a*C*d - 3*a*B*e) + b*(2*a*C*e^2 - c*d*(C*d + 9*B*e)
)))*Sqrt[d + e*x]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*El
lipticE[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*
a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 -
 4*a*c])*e)])/(315*c^4*e^4*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[
b^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) - (2*Sqrt[2]*Sqrt[b^2 -
4*a*c]*(c*d^2 - b*d*e + a*e^2)*(8*b^3*C*e^3 - 3*c^2*e^2*(b*B*d +
2*a*C*d - 7*A*b*e - 10*a*B*e) + 3*b*c*e^2*(b*C*d - 4*b*B*e - 9*a*
C*e) - 2*c^3*d*(8*C*d^2 - 3*e*(4*B*d - 7*A*e)))*Sqrt[(c*(d + e*x)
)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[-((c*(a + b*x + c*x^2
))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] +
 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*
c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(315*c^4*e^4*Sqrt[d + e*x]*Sqr
t[a + b*x + c*x^2])
```

Rubi [A] time = 8.11444, antiderivative size = 905, normalized size of antiderivative = 1., number of

steps used = 8, number of rules used = 7, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.206$

$$\frac{2C(d+ex)^{3/2}\left(cx^2+bx+a\right)^{3/2}}{9ce}-\frac{2(2cCd-3Bce+2bCe)\sqrt{d+ex}\left(cx^2+bx+a\right)^{3/2}}{21c^2e}+\frac{2\sqrt{d+ex}\left(\left(8Cd^3-3de(4Bd-7Ae)\right)c^3-3e\left(bCd^2-be(2Bd+7Ae)-ae(Cd-5Be)\right)c^2-3be^2(bCd+4bBe-aCe)c+3e\right.}{315c^3e^3}$$

$$-\frac{\sqrt{2}\sqrt{b^2-4ac}\left(5ce(2cd-be)\left(6Cdeb^2+2aCe^2b-cd(Cd+9Be)b+ce(21Acd-5aCd-3aBe)\right)-2\left(4c^2d^2-b^2e^2-\frac{3}{2}ce(bc\right.\right.}{315c^4e^4}$$

$$-\frac{2\sqrt{2}\sqrt{b^2-4ac}\left(cd^2-bed+ae^2\right)\left(-2\left(8Cd^3-3de(4Bd-7Ae)\right)c^3-3e^2(bBd+2aCd-7Abe-10aBe)c^2+3be^2(bCd-4b\right.}{315c^4e^4\sqrt{d+ex}\sqrt{cx^2+}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2]*(A + B*x + C*x^2),x]
```

```
[Out] (2*Sqrt[d + e*x]*(8*b^3*C*e^3 - 3*b*c*e^2*(b*C*d + 4*b*B*e - a*C*
e) + c^3*(8*C*d^3 - 3*d*e*(4*B*d - 7*A*e)) - 3*c^2*e*(b*C*d^2 - b
*e*(2*B*d + 7*A*e) - a*e*(C*d - 5*B*e)) + 3*c*e*(8*b^2*C*e^2 - c*
e*(b*C*d + 12*b*B*e + 7*a*C*e) - c^2*(2*C*d^2 - 3*e*(B*d + 7*A*e)
))*x)*Sqrt[a + b*x + c*x^2])/(315*c^3*e^3) - (2*(2*c*C*d - 3*B*c*
e + 2*b*C*e)*Sqrt[d + e*x]*(a + b*x + c*x^2)^(3/2))/(21*c^2*e) +
(2*C*(d + e*x)^(3/2)*(a + b*x + c*x^2)^(3/2))/(9*c*e) - (Sqrt[2]*
Sqrt[b^2 - 4*a*c]*(5*c*e*(2*c*d - b*e)*(6*b^2*C*d*e + 2*a*b*C*e^2
 - b*c*d*(C*d + 9*B*e) + c*e*(21*A*c*d - 5*a*C*d - 3*a*B*e)) - 2*
(4*c^2*d^2 - b^2*e^2 - (3*c*e*(b*d - 2*a*e))/2)*(8*b^2*C*e^2 - c*
e*(b*C*d + 12*b*B*e + 7*a*C*e) - c^2*(2*C*d^2 - 3*e*(B*d + 7*A*e)
)))*Sqrt[d + e*x]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*El
lipticE[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*
a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 -
 4*a*c])*e)])/(315*c^4*e^4*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[
b^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) - (2*Sqrt[2]*Sqrt[b^2 -
4*a*c]*(c*d^2 - b*d*e + a*e^2)*(8*b^3*C*e^3 - 3*c^2*e^2*(b*B*d +
2*a*C*d - 7*A*b*e - 10*a*B*e) + 3*b*c*e^2*(b*C*d - 4*b*B*e - 9*a*
C*e) - 2*c^3*(8*C*d^3 - 3*d*e*(4*B*d - 7*A*e)))*Sqrt[(c*(d + e*x)
)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[-((c*(a + b*x + c*x^2
))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] +
 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*
c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(315*c^4*e^4*Sqrt[d + e*x]*Sqr
t[a + b*x + c*x^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((e*x+d)**(1/2)*(C*x**2+B*x+A)*(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 18.0862, size = 15669, normalized size = 17.29

Result too large to show

Warning: Unable to verify antiderivative.

```
[In] Integrate[Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2]*(A + B*x + C*x^2),x]
```

```
[Out] Result too large to show
```

Maple [B] time = 0.151, size = 19955, normalized size = 22.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^(1/2)*(C*x^2+B*x+A)*(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Cx^2 + Bx + A\right)\sqrt{cx^2 + bx + a}\sqrt{ex + d}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)*sqrt(e*x + d),x, algorithm="maxi
```

```
[Out] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)*sqrt(e*x + d),
x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(Cx^2 + Bx + A\right)\sqrt{cx^2 + bx + a}\sqrt{ex + d}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)*sqrt(e*x + d),x, algorithm="fric
```

```
[Out] integral((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)*sqrt(e*x + d), x
)
```

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

$$\int \sqrt{d + ex}\left(A + Bx + Cx^2\right)\sqrt{a + bx + cx^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**(1/2)*(C*x**2+B*x+A)*(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral(sqrt(d + e*x)*(A + B*x + C*x**2)*sqrt(a + b*x + c*x**2),
 x)
```

GIAC/XCAS [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^2 + B*x + A)*sqrt(c*x^2 + b*x + a)*sqrt(e*x + d),x, algorithm="giac
```

```
[Out] Timed out
```

3.260 $\int \frac{\sqrt{a+bx+cx^2}\left(A+Bx+Cx^2\right)}{\sqrt{d+ex}}\,dx$

Optimal. Leaf size=668

$$\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(ae^2-bde+cd^2\right)\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}\left(ce(-10aCe-7bBe+8bCd)+c^2\left(48Cd^2-14e(4Bd-5\right.\right.}{105c^3e^4\sqrt{d+ex}\sqrt{a+bx+cx^2}}$$
$$+\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(5ce(2cd-be)(aCe-7Ace+3bCd)-\left(-3ce(bd-2ae)-2b^2e^2+8c^2d^2\right)(4bCe-7Bc\right.}{105c^3e^4\sqrt{a+bx+cx^2}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}}$$
$$-\frac{2\sqrt{d+ex}\sqrt{a+bx+cx^2}(5ce(aCe-7Ace+3bCd)+3cex(4bCe-7Bce+6cCd)-(4cd-be)(4bCe-7Bce+6cCd))}{105c^2e^3}$$
$$+\frac{2C\sqrt{d+ex}\left(a+bx+cx^2\right)^{3/2}}{7ce}$$

```
[Out] (-2*Sqrt[d + e*x]*(5*c*e*(3*b*C*d - 7*A*c*e + a*C*e) - (4*c*d - b
*e)*(6*c*C*d - 7*B*c*e + 4*b*C*e) + 3*c*e*(6*c*C*d - 7*B*c*e + 4*
b*C*e)*x)*Sqrt[a + b*x + c*x^2])/(105*c^2*e^3) + (2*C*Sqrt[d + e*
x]*(a + b*x + c*x^2)^(3/2))/(7*c*e) + (Sqrt[2]*Sqrt[b^2 - 4*a*c]*
(5*c*e*(2*c*d - b*e)*(3*b*C*d - 7*A*c*e + a*C*e) - (6*c*C*d - 7*B
*c*e + 4*b*C*e)*(8*c^2*d^2 - 2*b^2*e^2 - 3*c*e*(b*d - 2*a*e)))*Sq
rt[d + e*x]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*Elliptic
E[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/
Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c
])*e)])/(105*c^3*e^4*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 -
4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) + (2*Sqrt[2]*Sqrt[b^2 - 4*a*c]
*(c*d^2 - b*d*e + a*e^2)*(4*b^2*C*e^2 + c*e*(8*b*C*d - 7*b*B*e -
10*a*C*e) + c^2*(48*C*d^2 - 14*e*(4*B*d - 5*A*e)))*Sqrt[(c*(d + e
*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[-((c*(a + b*x + c*
x^2))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c
] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/
(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(105*c^3*e^4*Sqrt[d + e*x]*
Sqrt[a + b*x + c*x^2])
```

Rubi [A] time = 3.09637, antiderivative size = 668, normalized size of antiderivative = 1., number of

steps used = 7, number of rules used = 6, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.176$

$$\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(ae^2-bde+cd^2\right)\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}\left(ce(-10aCe-7bBe+8bCd)+c^2\left(48Cd^2-14e(4Bd-5\right.\right.}{105c^3e^4\sqrt{d+ex}\sqrt{a+bx+cx^2}}$$

$$+\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(5ce(2cd-be)(aCe-7Ace+3bCd)-\left(-3ce(bd-2ae)-2b^2e^2+8c^2d^2\right)(4bCe-7Bc\right.}{105c^3e^4\sqrt{a+bx+cx^2}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}}$$

$$-\frac{2\sqrt{d+ex}\sqrt{a+bx+cx^2}(5ce(aCe-7Ace+3bCd)+3cex(4bCe-7Bce+6cCd)-(4cd-be)(4bCe-7Bce+6cCd))}{105c^2e^3}$$

$$+\frac{2C\sqrt{d+ex}\left(a+bx+cx^2\right)^{3/2}}{7ce}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(Sqrt[a + b*x + c*x^2]*(A + B*x + C*x^2))/Sqrt[d + e*x],x]
```

```
[Out] (-2*Sqrt[d + e*x]*(5*c*e*(3*b*C*d - 7*A*c*e + a*C*e) - (4*c*d - b
*e)*(6*c*C*d - 7*B*c*e + 4*b*C*e) + 3*c*e*(6*c*C*d - 7*B*c*e + 4*
b*C*e)*x)*Sqrt[a + b*x + c*x^2])/(105*c^2*e^3) + (2*C*Sqrt[d + e*
x]*(a + b*x + c*x^2)^(3/2))/(7*c*e) + (Sqrt[2]*Sqrt[b^2 - 4*a*c]*
(5*c*e*(2*c*d - b*e)*(3*b*C*d - 7*A*c*e + a*C*e) - (6*c*C*d - 7*B
*c*e + 4*b*C*e)*(8*c^2*d^2 - 2*b^2*e^2 - 3*c*e*(b*d - 2*a*e)))*Sq
rt[d + e*x]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*Elliptic
E[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/
Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c
])*e)])/(105*c^3*e^4*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 -
4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) + (2*Sqrt[2]*Sqrt[b^2 - 4*a*c]
*(c*d^2 - b*d*e + a*e^2)*(4*b^2*C*e^2 + c*e*(8*b*C*d - 7*b*B*e -
10*a*C*e) + c^2*(48*C*d^2 - 14*e*(4*B*d - 5*A*e)))*Sqrt[(c*(d + e
*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[-((c*(a + b*x + c*
x^2))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c
] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/
(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(105*c^3*e^4*Sqrt[d + e*x]*
Sqrt[a + b*x + c*x^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((C*x**2+B*x+A)*(c*x**2+b*x+a)**(1/2)/(e*x+d)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 16.077, size = 9965, normalized size = 14.92

Result too large to show

Warning: Unable to verify antiderivative.

```
[In] Integrate[(Sqrt[a + b*x + c*x^2]*(A + B*x + C*x^2))/Sqrt[d + e*x],x]
```

```
[Out] Result too large to show
```

Maple [B] time = 0.07, size = 12761, normalized size = 19.1

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((C*x^2+B*x+A)*(c*x^2+b*x+a)^(1/2)/(e*x+d)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Cx^2 + Bx + A\right)\sqrt{cx^2 + bx + a}}{\sqrt{ex + d}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/sqrt(e*x + d),x, algorithm="maxi
```

```
[Out] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/sqrt(e*x + d),
x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Cx^2 + Bx + A)\sqrt{cx^2 + bx + a}}{\sqrt{ex + d}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/sqrt(e*x + d),x, algorithm="fric
```

```
[Out] integral((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/sqrt(e*x + d), x
)
```

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

$$\int \frac{(A + Bx + Cx^2)\sqrt{a + bx + cx^2}}{\sqrt{d + ex}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)*(c*x**2+b*x+a)**(1/2)/(e*x+d)**(1/2),x)
```

```
[Out] Integral((A + B*x + C*x**2)*sqrt(a + b*x + c*x**2)/sqrt(d + e*x),
 x)
```

GIAC/XCAS [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^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/sqrt(e*x + d),x, algorithm="giac
```

```
[Out] Timed out
```

3.261 $\int \frac{\sqrt{a+bx+cx^2}\left(A+Bx+Cx^2\right)}{(d+ex)^{3/2}}\,dx$

Optimal. Leaf size=749

$$\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}\left(-ce\left(2ae(9Cd-5Be)-b\left(32Cd^2-5e(5Bd-3Ae)\right)\right)+bCe^2(bd-ae)-2\right.}{15c^2e^4\sqrt{d+ex}\sqrt{a+bx+cx^2}}$$

$$-\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(ce(-6aCe-5bBe+8bCd)+c^2\left(-\left(48Cd^2-10e(4Bd-3Ae)\right)\right)+2b^2Ce^2\right)E\left(\sin^{-1}\left(\right.\right.}{15c^2e^4\sqrt{a+bx+cx^2}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}}$$

$$-\frac{2\sqrt{d+ex}\sqrt{a+bx+cx^2}\left(3ce^2x\left(-aCe-5Ace+bCd+5Bcd-\frac{6cCd^2}{e}\right)+ce\left(ae(9Cd-5Be)-5b\left(3Ae^2-4Bde+5Cd^2\right)\right)\right.}{15ce^3\left(ae^2-bde+cd^2\right)}$$

$$-\frac{2\left(a+bx+cx^2\right)^{3/2}\left(Cd^2-e(Bd-Ae)\right)}{e\sqrt{d+ex}\left(ae^2-bde+cd^2\right)}$$

```
[Out] (-2*Sqrt[d + e*x]*(b*C*e^2*(b*d - a*e) + c^2*d*(24*C*d^2 - 5*e*(4
*B*d - 3*A*e)) + c*e*(a*e*(9*C*d - 5*B*e) - 5*b*(5*C*d^2 - 4*B*d*
e + 3*A*e^2)) + 3*c*e^2*(5*B*c*d + b*C*d - (6*c*C*d^2)/e - 5*A*c*
e - a*C*e)*x)*Sqrt[a + b*x + c*x^2])/(15*c*e^3*(c*d^2 - b*d*e + a
*e^2)) - (2*(C*d^2 - e*(B*d - A*e))*(a + b*x + c*x^2)^(3/2))/(e*(
c*d^2 - b*d*e + a*e^2)*Sqrt[d + e*x]) - (Sqrt[2]*Sqrt[b^2 - 4*a*c
]*(2*b^2*C*e^2 + c*e*(8*b*C*d - 5*b*B*e - 6*a*C*e) - c^2*(48*C*d^
2 - 10*e*(4*B*d - 3*A*e)))*Sqrt[d + e*x]*Sqrt[-((c*(a + b*x + c*x
^2))/(b^2 - 4*a*c))]*EllipticE[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c]
 + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(
2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(15*c^2*e^4*Sqrt[(c*(d + e*x
))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) +
(2*Sqrt[2]*Sqrt[b^2 - 4*a*c]*(b*C*e^2*(b*d - a*e) - 2*c^2*d*(24*C
*d^2 - 5*e*(4*B*d - 3*A*e)) - c*e*(2*a*e*(9*C*d - 5*B*e) - b*(32*
C*d^2 - 5*e*(5*B*d - 3*A*e))))*Sqrt[(c*(d + e*x))/(2*c*d - (b + S
qrt[b^2 - 4*a*c])*e)]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))
]*EllipticF[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2
- 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b
^2 - 4*a*c])*e)])/(15*c^2*e^4*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2]
)
```

Rubi [A] time = 3.68969, antiderivative size = 746, normalized size of antiderivative = 1., number of

steps used = 7, number of rules used = 6, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.176$

$$\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}\left(ce\left(-2ae(9Cd-5Be)-5be(5Bd-3Ae)+32bCd^2\right)+bCe^2(bd-ae)-2c^2\right.}{15c^2e^4\sqrt{d+ex}\sqrt{a+bx+cx^2}}$$

$$-\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(ce(-6aCe-5bBe+8bCd)+c^2\left(-\left(48Cd^2-10e(4Bd-3Ae)\right)\right)+2b^2Ce^2\right)E\left(\sin^{-1}\left(\right.\right.}{15c^2e^4\sqrt{a+bx+cx^2}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}}$$

$$-\frac{2\sqrt{d+ex}\sqrt{a+bx+cx^2}\left(3ce^2x\left(-aCe-5Ace+bCd+5Bcd-\frac{6cCd^2}{e}\right)+ce\left(ae(9Cd-5Be)-5b\left(3Ae^2-4Bde+5Cd^2\right)\right)\right.}{15ce^3\left(ae^2-bde+cd^2\right)}$$

$$-\frac{2\left(a+bx+cx^2\right)^{3/2}\left(Cd^2-e(Bd-Ae)\right)}{e\sqrt{d+ex}\left(ae^2-bde+cd^2\right)}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[a + b*x + c*x^2]*(A + B*x + C*x^2))/(d + e*x)^(3/2),x]
```

```
[Out] (-2*Sqrt[d + e*x]*(b*C*e^2*(b*d - a*e) + c^2*(24*C*d^3 - 5*d*e*(4
*B*d - 3*A*e)) + c*e*(a*e*(9*C*d - 5*B*e) - 5*b*(5*C*d^2 - 4*B*d*
e + 3*A*e^2)) + 3*c*e^2*(5*B*c*d + b*C*d - (6*c*C*d^2)/e - 5*A*c*
e - a*C*e)*x)*Sqrt[a + b*x + c*x^2])/(15*c*e^3*(c*d^2 - b*d*e + a
*e^2)) - (2*(C*d^2 - e*(B*d - A*e))*(a + b*x + c*x^2)^(3/2))/(e*(
c*d^2 - b*d*e + a*e^2)*Sqrt[d + e*x]) - (Sqrt[2]*Sqrt[b^2 - 4*a*c
]*(2*b^2*C*e^2 + c*e*(8*b*C*d - 5*b*B*e - 6*a*C*e) - c^2*(48*C*d^
2 - 10*e*(4*B*d - 3*A*e)))*Sqrt[d + e*x]*Sqrt[-((c*(a + b*x + c*x
^2))/(b^2 - 4*a*c))]*EllipticE[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c]
 + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(
2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(15*c^2*e^4*Sqrt[(c*(d + e*x
))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) +
(2*Sqrt[2]*Sqrt[b^2 - 4*a*c]*(b*C*e^2*(b*d - a*e) - 2*c^2*d*(24*C
*d^2 - 5*e*(4*B*d - 3*A*e)) + c*e*(32*b*C*d^2 - 5*b*e*(5*B*d - 3*
A*e) - 2*a*e*(9*C*d - 5*B*e)))*Sqrt[(c*(d + e*x))/(2*c*d - (b + S
qrt[b^2 - 4*a*c])*e)]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))
]*EllipticF[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2
- 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b
^2 - 4*a*c])*e)])/(15*c^2*e^4*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^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((C*x**2+B*x+A)*(c*x**2+b*x+a)**(1/2)/(e*x+d)**(3/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 15.017, size = 13240, normalized size = 17.68

Result too large to show

Warning: Unable to verify antiderivative.

```
[In] Integrate[(Sqrt[a + b*x + c*x^2]*(A + B*x + C*x^2))/(d + e*x)^(3/2),x]
```

```
[Out] Result too large to show
```

Maple [B] time = 0.09, size = 8221, normalized size = 11.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((C*x^2+B*x+A)*(c*x^2+b*x+a)^(1/2)/(e*x+d)^(3/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Cx^2 + Bx + A\right)\sqrt{cx^2 + bx + a}}{(ex + d)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(3/2),x, algorithm="ma
```

```
[Out] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(3/2)
, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Cx^2 + Bx + A)\sqrt{cx^2 + bx + a}}{(ex + d)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(3/2),x, algorithm="fr
```

```
[Out] integral((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(3/2),
 x)
```

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

$$\int \frac{(A + Bx + Cx^2)\sqrt{a + bx + cx^2}}{(d + ex)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)*(c*x**2+b*x+a)**(1/2)/(e*x+d)**(3/2),x)
```

```
[Out] Integral((A + B*x + C*x**2)*sqrt(a + b*x + c*x**2)/(d + e*x)**(3/
2), x)
```

GIAC/XCAS [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^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(3/2),x, algorithm="gi
```

```
[Out] Timed out
```

3.262 $\int \frac{\sqrt{a+bx+cx^2}(A+Bx+Cx^2)}{(d+ex)^{5/2}}\,dx$

Optimal. Leaf size=712

$$-\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}\left(e(-2aCe-3bBe+8bCd)-2c\left(8Cd^2-e(4Bd-Ae)\right)\right)F\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2cx+\sqrt{b^2-4ac}}{\sqrt{b^2-4ac}}}}{\sqrt{2}}\right)\right.}{3ce^4\sqrt{d+ex}\sqrt{a+bx+cx^2}}$$

$$+\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(2\left(4cd-\frac{be}{2}\right)\left(-aCe-Ace+bCd+Bcd-\frac{2cCd^2}{e}\right)+6c(e(aBe-aCd+Acd)+bd(Cd\ldots\right.}{3ce^3\sqrt{a+bx+cx^2}\,(ae^2-bde+cd^2)\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}}$$

$$-\frac{2\left(a+bx+cx^2\right)^{3/2}\left(Cd^2-e(Bd-Ae)\right)}{3e(d+ex)^{3/2}\,(ae^2-bde+cd^2)}$$

$$-\frac{2\sqrt{a+bx+cx^2}\left(e^2x\left(-aCe-Ace+bCd+Bcd-\frac{2cCd^2}{e}\right)+e(bd-ae)(7Cd-3Be)-cd\left(8Cd^2-e(4Bd-Ae)\right)\right)}{3e^3\sqrt{d+ex}\,(ae^2-bde+cd^2)}$$

```
[Out] (-2*(e*(b*d - a*e)*(7*C*d - 3*B*e) - c*d*(8*C*d^2 - e*(4*B*d - A*
e)) + e^2*(B*c*d + b*C*d - (2*c*C*d^2)/e - A*c*e - a*C*e)*x)*Sqrt
[a + b*x + c*x^2])/(3*e^3*(c*d^2 - b*d*e + a*e^2)*Sqrt[d + e*x])
- (2*(C*d^2 - e*(B*d - A*e))*(a + b*x + c*x^2)^(3/2))/(3*e*(c*d^2
 - b*d*e + a*e^2)*(d + e*x)^(3/2)) + (Sqrt[2]*Sqrt[b^2 - 4*a*c]*(
2*(4*c*d - (b*e)/2)*(B*c*d + b*C*d - (2*c*C*d^2)/e - A*c*e - a*C*
e) + 6*c*(b*d*(C*d - B*e) + e*(A*c*d - a*C*d + a*B*e)))*Sqrt[d +
e*x]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[ArcSi
n[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]
], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])
/(3*c*e^3*(c*d^2 - b*d*e + a*e^2)*Sqrt[(c*(d + e*x))/(2*c*d - (b
+ Sqrt[b^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) - (2*Sqrt[2]*Sqrt
[b^2 - 4*a*c]*(e*(8*b*C*d - 3*b*B*e - 2*a*C*e) - 2*c*(8*C*d^2 - e
*(4*B*d - A*e)))*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*
c])*e)]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticF[Ar
cSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt
[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e
)])/(3*c*e^4*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2])
```

Rubi [A] time = 3.71461, antiderivative size = 711, normalized size of antiderivative = 1., number of

steps used = 7, number of rules used = 6, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.176$

$$-\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}\left(e(-2aCe-3bBe+8bCd)-2c\left(8Cd^2-e(4Bd-Ae)\right)\right)F\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2cx+\dots}{\sqrt{b\dots}}}}{\sqrt{\dots}}\cdots\right.\right.}{3ce^4\sqrt{d+ex}\sqrt{a+bx+cx^2}}$$

$$+\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(2\left(4cd-\frac{be}{2}\right)\left(-aCe-Ace+bCd+Bcd-\frac{2cCd^2}{e}\right)+6c(e(aBe-aCd+Acd)+bd(Cd\cdots\right.}{3ce^3\sqrt{a+bx+cx^2}\left(ae^2-bde+cd^2\right)\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}}$$

$$-\frac{2\left(a+bx+cx^2\right)^{3/2}\left(Cd^2-e(Bd-Ae)\right)}{3e(d+ex)^{3/2}\left(ae^2-bde+cd^2\right)}$$

$$+\frac{2\sqrt{a+bx+cx^2}\left(-ex\left(-aCe-Ace+bCd+Bcd-\frac{2cCd^2}{e}\right)-(bd-ae)(7Cd-3Be)-cd(4Bd-Ae)+\frac{8cCd^3}{e}\right)}{3e^2\sqrt{d+ex}\left(ae^2-bde+cd^2\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(Sqrt[a + b*x + c*x^2]*(A + B*x + C*x^2))/(d + e*x)^(5/2),x]
```

```
[Out] (2*((8*c*C*d^3)/e - c*d*(4*B*d - A*e) - (b*d - a*e)*(7*C*d - 3*B*
e) - e*(B*c*d + b*C*d - (2*c*C*d^2)/e - A*c*e - a*C*e)*x)*Sqrt[a
+ b*x + c*x^2])/(3*e^2*(c*d^2 - b*d*e + a*e^2)*Sqrt[d + e*x]) - (
2*(C*d^2 - e*(B*d - A*e))*(a + b*x + c*x^2)^(3/2))/(3*e*(c*d^2 -
b*d*e + a*e^2)*(d + e*x)^(3/2)) + (Sqrt[2]*Sqrt[b^2 - 4*a*c]*(2*(
4*c*d - (b*e)/2)*(B*c*d + b*C*d - (2*c*C*d^2)/e - A*c*e - a*C*e)
+ 6*c*(b*d*(C*d - B*e) + e*(A*c*d - a*C*d + a*B*e)))*Sqrt[d + e*x
]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[ArcSin[S
qrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]],
(-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(3
*c*e^3*(c*d^2 - b*d*e + a*e^2)*Sqrt[(c*(d + e*x))/(2*c*d - (b + S
qrt[b^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) - (2*Sqrt[2]*Sqrt[b^
2 - 4*a*c]*(e*(8*b*C*d - 3*b*B*e - 2*a*C*e) - 2*c*(8*C*d^2 - e*(4
*B*d - A*e)))*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])
*e)]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticF[ArcSi
n[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]
], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])
/(3*c*e^4*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^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((C*x**2+B*x+A)*(c*x**2+b*x+a)**(1/2)/(e*x+d)**(5/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 15.4917, size = 8456, normalized size = 11.88

Result too large to show

Warning: Unable to verify antiderivative.

```
[In] Integrate[(Sqrt[a + b*x + c*x^2]*(A + B*x + C*x^2))/(d + e*x)^(5/2),x]
```

```
[Out] Result too large to show
```

Maple [B] time = 0.117, size = 21038, normalized size = 29.6

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((C*x^2+B*x+A)*(c*x^2+b*x+a)^(1/2)/(e*x+d)^(5/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Cx^2 + Bx + A\right)\sqrt{cx^2 + bx + a}}{(ex + d)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(5/2),x, algorithm="ma
```

```
[Out] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(5/2)
, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Cx^2+Bx+A\right)\sqrt{cx^2+bx+a}}{\left(e^2x^2+2\,dex+d^2\right)\sqrt{ex+d}},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(5/2),x, algorithm="fr
```

```
[Out] integral((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/((e^2*x^2 + 2*d*
e*x + d^2)*sqrt(e*x + d)), x)
```

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

$$\int\frac{\left(A+Bx+Cx^2\right)\sqrt{a+bx+cx^2}}{\left(d+ex\right)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)*(c*x**2+b*x+a)**(1/2)/(e*x+d)**(5/2),x)
```

```
[Out] Integral((A + B*x + C*x**2)*sqrt(a + b*x + c*x**2)/(d + e*x)**(5/
2), x)
```

GIAC/XCAS [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^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(5/2),x, algorithm="gi
```

```
[Out] Timed out
```

3.263 $\int \frac{\sqrt{a+bx+cx^2}\left(A+Bx+Cx^2\right)}{(d+ex)^{7/2}}\,dx$

Optimal. Leaf size=992

$$-\frac{2\left(Cd^2-e(Bd-Ae)\right)\left(cx^2+bx+a\right)^{3/2}}{5e\left(cd^2-bed+ae^2\right)(d+ex)^{5/2}}$$

$$-\frac{2\left(c^2\left(24Cd^2-e(4Bd+Ae)\right)d^3-ce\left(bd\left(41Cd^2-6Bed+Ae^2\right)-ae\left(37Cd^2-7Bed+7Ae^2\right)\right)d+e^2\left(15b^2Cd^3+5a^2e^2(Ca\right.}{}$$

$$+\frac{\sqrt{2}\sqrt{b^2-4ac}\left(2c^2\left(24Cd^2-e(4Bd+Ae)\right)d^2+e^2\left(\left(38Cd^2-3Bed-2Ae^2\right)b^2-5ae(14Cd-Be)b+30a^2Ce^2\right)-ce\left(bd\left(88\right.\right.}{15e^4\left(cd^2-bed+ae^2\right)^2\sqrt{\frac{}{2c}}}$$

$$-\frac{2\sqrt{2}\sqrt{b^2-4ac}\left(2d\left(24Cd^2-e(4Bd+Ae)\right)c^2+e\left(10ae(5Cd-Be)-b\left(64Cd^2-9Bed-Ae^2\right)\right)c+15bCe^2(bd-ae)\right)\sqrt{\frac{}{2cc}}}{15ce^4\left(cd^2-bed+ae^2\right)\sqrt{d+ex}\sqrt{cx^2+bx+a}}$$

```
[Out] (-2*(c^2*d^3*(24*C*d^2 - e*(4*B*d + A*e)) + e^2*(15*b^2*C*d^3 + 5
*a^2*e^2*(C*d + B*e) - a*b*e*(22*C*d^2 + 3*B*d*e + 2*A*e^2)) - c*
d*e*(b*d*(41*C*d^2 - 6*B*d*e + A*e^2) - a*e*(37*C*d^2 - 7*B*d*e +
 7*A*e^2)) + e*(5*c^2*d^2*(6*C*d^2 - e*(B*d + A*e)) + e^2*(15*a^2
*C*e^2 - 5*a*b*e*(8*C*d - B*e) + b^2*(23*C*d^2 - 3*B*d*e - 2*A*e^
2)) - c*e*(5*b*d*(11*C*d^2 - 2*B*d*e - A*e^2) - a*e*(53*C*d^2 - 1
3*B*d*e + 3*A*e^2)))*x)*Sqrt[a + b*x + c*x^2])/(15*e^3*(c*d^2 - b
*d*e + a*e^2)^2*(d + e*x)^(3/2)) - (2*(C*d^2 - e*(B*d - A*e))*(a
+ b*x + c*x^2)^(3/2))/(5*e*(c*d^2 - b*d*e + a*e^2)*(d + e*x)^(5/2
)) + (Sqrt[2]*Sqrt[b^2 - 4*a*c]*(2*c^2*d^2*(24*C*d^2 - e*(4*B*d +
 A*e)) + e^2*(30*a^2*C*e^2 - 5*a*b*e*(14*C*d - B*e) + b^2*(38*C*d
^2 - 3*B*d*e - 2*A*e^2)) - c*e*(b*d*(88*C*d^2 - 13*B*d*e - 2*A*e^
2) - 2*a*e*(43*C*d^2 - 8*B*d*e + 3*A*e^2)))*Sqrt[d + e*x]*Sqrt[-(
(c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[ArcSin[Sqrt[(b +
Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[
b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(15*e^4*(c*
d^2 - b*d*e + a*e^2)^2*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2
- 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) - (2*Sqrt[2]*Sqrt[b^2 - 4*a*
c]*(15*b*C*e^2*(b*d - a*e) + 2*c^2*d*(24*C*d^2 - e*(4*B*d + A*e))
 + c*e*(10*a*e*(5*C*d - B*e) - b*(64*C*d^2 - 9*B*d*e - A*e^2)))*S
qrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[-((c*
(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sqrt[(b + Sqr
t[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2
 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(15*c*e^4*(c*d
^2 - b*d*e + a*e^2)*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2])
```

Rubi [A] time = 5.3851, antiderivative size = 989, normalized size of antiderivative = 1., number of

steps used = 7, number of rules used = 6, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.176$

$$-\frac{2\left(Cd^2-e(Bd-Ae)\right)\left(cx^2+bx+a\right)^{3/2}}{5e\left(cd^2-bed+ae^2\right)(d+ex)^{5/2}}$$

$$-\frac{2\left(\left(24Cd^5-d^3e(4Bd+Ae)\right)c^2-de\left(bd\left(41Cd^2-6Bed+Ae^2\right)-ae\left(37Cd^2-7Bed+7Ae^2\right)\right)c+e^2\left(15b^2Cd^3+5a^2e^2(Ca\right.\right.}{}$$

$$+\frac{\sqrt{2}\sqrt{b^2-4ac}\left(\left(48Cd^4-2d^2e(4Bd+Ae)\right)c^2-e\left(bd\left(88Cd^2-13Bed-2Ae^2\right)-2ae\left(43Cd^2-8Bed+3Ae^2\right)\right)c+e^2\left(\left(38C\right.\right.\right.}{15e^4\left(cd^2-bed+ae^2\right)^2\sqrt{\frac{}{2a}}}$$

$$-\frac{2\sqrt{2}\sqrt{b^2-4ac}\left(\left(48Cd^3-2de(4Bd+Ae)\right)c^2-e\left(64bCd^2-be(9Bd+Ae)-10ae(5Cd-Be)\right)c+15bCe^2(bd-ae)\right)\sqrt{\frac{}{2cd-}}}{15ce^4\left(cd^2-bed+ae^2\right)\sqrt{d+ex}\sqrt{cx^2+bx+a}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(Sqrt[a + b*x + c*x^2]*(A + B*x + C*x^2))/(d + e*x)^(7/2),x]
```

```
[Out] (-2*(c^2*(24*C*d^5 - d^3*e*(4*B*d + A*e)) + e^2*(15*b^2*C*d^3 + 5
*a^2*e^2*(C*d + B*e) - a*b*e*(22*C*d^2 + 3*B*d*e + 2*A*e^2)) - c*
d*e*(b*d*(41*C*d^2 - 6*B*d*e + A*e^2) - a*e*(37*C*d^2 - 7*B*d*e +
 7*A*e^2)) + e^2*((30*c^2*C*d^4)/e + 15*a^2*C*e^3 - 5*c^2*d^2*(B*
d + A*e) - 5*a*b*e^2*(8*C*d - B*e) + a*c*e*(53*C*d^2 - e*(13*B*d
- 3*A*e)) - 5*b*c*d*(11*C*d^2 - e*(2*B*d + A*e)) + b^2*e*(23*C*d^
2 - e*(3*B*d + 2*A*e)))*x)*Sqrt[a + b*x + c*x^2])/(15*e^3*(c*d^2
- b*d*e + a*e^2)^2*(d + e*x)^(3/2)) - (2*(C*d^2 - e*(B*d - A*e))*
(a + b*x + c*x^2)^(3/2))/(5*e*(c*d^2 - b*d*e + a*e^2)*(d + e*x)^(
5/2)) + (Sqrt[2]*Sqrt[b^2 - 4*a*c]*(c^2*(48*C*d^4 - 2*d^2*e*(4*B*
d + A*e)) + e^2*(30*a^2*C*e^2 - 5*a*b*e*(14*C*d - B*e) + b^2*(38*
C*d^2 - 3*B*d*e - 2*A*e^2)) - c*e*(b*d*(88*C*d^2 - 13*B*d*e - 2*A
*e^2) - 2*a*e*(43*C*d^2 - 8*B*d*e + 3*A*e^2)))*Sqrt[d + e*x]*Sqrt
[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[ArcSin[Sqrt[(b
 + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sq
rt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(15*e^4*
(c*d^2 - b*d*e + a*e^2)^2*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b
^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) - (2*Sqrt[2]*Sqrt[b^2 - 4
*a*c]*(15*b*C*e^2*(b*d - a*e) + c^2*(48*C*d^3 - 2*d*e*(4*B*d + A*
e)) - c*e*(64*b*C*d^2 - b*e*(9*B*d + A*e) - 10*a*e*(5*C*d - B*e))
)*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[-(
(c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sqrt[(b +
Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[
b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(15*c*e^4*(
c*d^2 - b*d*e + a*e^2)*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^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((C*x**2+B*x+A)*(c*x**2+b*x+a)**(1/2)/(e*x+d)**(7/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 16.5563, size = 12997, normalized size = 13.1

Result too large to show

Warning: Unable to verify antiderivative.

```
[In] Integrate[(Sqrt[a + b*x + c*x^2]*(A + B*x + C*x^2))/(d + e*x)^(7/2),x]
```

```
[Out] Result too large to show
```

Maple [B] time = 0.205, size = 48427, normalized size = 48.8

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((C*x^2+B*x+A)*(c*x^2+b*x+a)^(1/2)/(e*x+d)^(7/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Cx^2 + Bx + A\right)\sqrt{cx^2 + bx + a}}{(ex + d)^{\frac{7}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(7/2),x, algorithm="ma
```

```
[Out] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(7/2)
, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Cx^2 + Bx + A)\sqrt{cx^2 + bx + a}}{(e^3x^3 + 3\,de^2x^2 + 3\,d^2ex + d^3)\sqrt{ex + d}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(7/2),x, algorithm="fr
```

```
[Out] integral((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/((e^3*x^3 + 3*d*
e^2*x^2 + 3*d^2*e*x + d^3)*sqrt(e*x + d)), x)
```

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

$$\int \frac{(A + Bx + Cx^2)\,\sqrt{a + bx + cx^2}}{(d + ex)^{\frac{7}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)*(c*x**2+b*x+a)**(1/2)/(e*x+d)**(7/2),x)
```

```
[Out] Integral((A + B*x + C*x**2)*sqrt(a + b*x + c*x**2)/(d + e*x)**(7/
2), x)
```

GIAC/XCAS [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^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(7/2),x, algorithm="gi
```

```
[Out] Timed out
```

3.264 $\int \frac{\sqrt{a+bx+cx^2}(A+Bx+Cx^2)}{(d+ex)^{9/2}} dx$

Optimal. Leaf size=1363

result too large to display

```
[Out] (2*(2*c^3*d^3*(24*C*d^2 + e*(4*B*d + 3*A*e)) - b*e^3*(35*a^2*C*e^
2 - 14*a*b*e*(3*C*d + B*e) + b^2*(15*C*d^2 + 6*B*d*e + 8*A*e^2))
+ c^2*d*e*(2*a*e*(69*C*d^2 + e*(15*B*d - 29*A*e)) - b*d*(128*C*d^
2 + e*(19*B*d + 9*A*e))) + c*e^2*(14*a^2*e^2*(11*C*d - 3*B*e) - a
*b*e*(237*C*d^2 + e*(B*d - 29*A*e)) + b^2*d*(103*C*d^2 + e*(9*B*d
 + 19*A*e))))*Sqrt[a + b*x + c*x^2])/(105*e^3*(c*d^2 - b*d*e + a*
e^2)^3*Sqrt[d + e*x]) - (2*(c^2*d^3*(24*C*d^2 + e*(4*B*d + 3*A*e)
) - e^2*(7*a^2*e^2*(C*d - 3*B*e) - b^2*d*(15*C*d^2 + 6*B*d*e + 8*
A*e^2) + a*b*e*(12*C*d^2 + 23*B*d*e + 12*A*e^2)) - c*d*e*(b*d*(43
*C*d^2 + 6*B*d*e + 15*A*e^2) - a*e*(33*C*d^2 + 9*B*d*e + 19*A*e^2
)) + e*(7*c^2*d^2*(6*C*d^2 + e*(B*d - 3*A*e)) + e^2*(35*a^2*C*e^2
 - 7*a*b*e*(12*C*d - B*e) + b^2*(45*C*d^2 - 3*B*d*e - 4*A*e^2)) +
 c*e*(a*e*(93*C*d^2 - 9*B*d*e - 5*A*e^2) - b*(91*C*d^3 - 21*A*d*e
^2)))*x)*Sqrt[a + b*x + c*x^2])/(105*e^3*(c*d^2 - b*d*e + a*e^2)^
2*(d + e*x)^(5/2)) - (2*(C*d^2 - e*(B*d - A*e))*(a + b*x + c*x^2)
^(3/2))/(7*e*(c*d^2 - b*d*e + a*e^2)*(d + e*x)^(7/2)) - (Sqrt[2]*
Sqrt[b^2 - 4*a*c]*(2*c^3*d^3*(24*C*d^2 + e*(4*B*d + 3*A*e)) - b*e
^3*(35*a^2*C*e^2 - 14*a*b*e*(3*C*d + B*e) + b^2*(15*C*d^2 + 6*B*d
*e + 8*A*e^2)) + c^2*d*e*(2*a*e*(69*C*d^2 + e*(15*B*d - 29*A*e))
- b*d*(128*C*d^2 + e*(19*B*d + 9*A*e))) + c*e^2*(14*a^2*e^2*(11*C
*d - 3*B*e) - a*b*e*(237*C*d^2 + e*(B*d - 29*A*e)) + b^2*d*(103*C
*d^2 + e*(9*B*d + 19*A*e))))*Sqrt[d + e*x]*Sqrt[-((c*(a + b*x + c
*x^2))/(b^2 - 4*a*c))]*EllipticE[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*
c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)
/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(105*e^4*(c*d^2 - b*d*e +
a*e^2)^3*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*
Sqrt[a + b*x + c*x^2]) + (2*Sqrt[2]*Sqrt[b^2 - 4*a*c]*(2*c^2*d^2*
(24*C*d^2 + e*(4*B*d + 3*A*e)) + c*e*(2*a*e*(51*C*d^2 + e*(12*B*d
 - 5*A*e)) - b*d*(104*C*d^2 + 3*e*(5*B*d + 2*A*e))) + e^2*(70*a^2
*C*e^2 - 7*a*b*e*(18*C*d + B*e) + b^2*(60*C*d^2 + e*(3*B*d + 4*A*
e))))*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqr
t[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sqrt[(
b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*S
qrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(105*e^
4*(c*d^2 - b*d*e + a*e^2)^2*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2])
```

Rubi [A] time = 13.6607, antiderivative size = 1363, normalized size of antiderivative = 1., number

of steps used = 8, number of rules used = 7, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.206$

$$-\frac{2\left(Cd^2-e(Bd-Ae)\right)\left(cx^2+bx+a\right)^{3/2}}{7e\left(cd^2-bed+ae^2\right)(d+ex)^{7/2}}$$
$$-\frac{2\left(\left(24Cd^5+e(4Bd+3Ae)d^3\right)c^2-de\left(bd\left(43Cd^2+6Bed+15Ae^2\right)-ae\left(33Cd^2+9Bed+19Ae^2\right)\right)c-e^2\left(-d\left(15Cd^2+6B\right.\right.\right.}{}$$
$$+\frac{2\left(\left(48Cd^5+2e(4Bd+3Ae)d^3\right)c^3+de\left(2ae\left(69Cd^2+e(15Bd-29Ae)\right)-b\left(128Cd^3+e(19Bd+9Ae)d\right)\right)c^2+e^2\left(\left(103Cd^3\right.\right.\right.}{}$$
$$-\frac{\sqrt{2}\sqrt{b^2-4ac}\left(2\left(24Cd^5+e(4Bd+3Ae)d^3\right)c^3+de\left(2ae\left(69Cd^2+e(15Bd-29Ae)\right)-b\left(128Cd^3+e(19Bd+9Ae)d\right)\right)c^2+\right.}{}$$
$$+\frac{2\sqrt{2}\sqrt{b^2-4ac}\left(\left(48Cd^4+2e(4Bd+3Ae)d^2\right)c^2+e\left(2ae\left(51Cd^2+e(12Bd-5Ae)\right)-b\left(104Cd^3+3e(5Bd+2Ae)d\right)\right)c+e^2\left(\right.\right.}{105e^4\left(cd^2-b\right.}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(Sqrt[a + b*x + c*x^2]*(A + B*x + C*x^2))/(d + e*x)^(9/2),x]
```

```
[Out] (2*(c^3*(48*C*d^5 + 2*d^3*e*(4*B*d + 3*A*e)) - b*e^3*(35*a^2*C*e^
2 - 14*a*b*e*(3*C*d + B*e) + b^2*(15*C*d^2 + 6*B*d*e + 8*A*e^2))
+ c^2*d*e*(2*a*e*(69*C*d^2 + e*(15*B*d - 29*A*e)) - b*(128*C*d^3
+ d*e*(19*B*d + 9*A*e))) + c*e^2*(14*a^2*e^2*(11*C*d - 3*B*e) - a
*b*e*(237*C*d^2 + e*(B*d - 29*A*e)) + b^2*(103*C*d^3 + d*e*(9*B*d
 + 19*A*e))))*Sqrt[a + b*x + c*x^2])/(105*e^3*(c*d^2 - b*d*e + a*
e^2)^3*Sqrt[d + e*x]) - (2*(c^2*(24*C*d^5 + d^3*e*(4*B*d + 3*A*e)
) - e^2*(7*a^2*e^2*(C*d - 3*B*e) - b^2*d*(15*C*d^2 + 6*B*d*e + 8*
A*e^2) + a*b*e*(12*C*d^2 + 23*B*d*e + 12*A*e^2)) - c*d*e*(b*d*(43
*C*d^2 + 6*B*d*e + 15*A*e^2) - a*e*(33*C*d^2 + 9*B*d*e + 19*A*e^2
)) + e*(7*c^2*(6*C*d^4 + d^2*e*(B*d - 3*A*e)) + e^2*(35*a^2*C*e^2
 - 7*a*b*e*(12*C*d - B*e) + b^2*(45*C*d^2 - 3*B*d*e - 4*A*e^2)) +
 c*e*(a*e*(93*C*d^2 - 9*B*d*e - 5*A*e^2) - b*(91*C*d^3 - 21*A*d*e
^2)))*x)*Sqrt[a + b*x + c*x^2])/(105*e^3*(c*d^2 - b*d*e + a*e^2)^
2*(d + e*x)^(5/2)) - (2*(C*d^2 - e*(B*d - A*e))*(a + b*x + c*x^2)
^(3/2))/(7*e*(c*d^2 - b*d*e + a*e^2)*(d + e*x)^(7/2)) - (Sqrt[2]*
Sqrt[b^2 - 4*a*c]*(2*c^3*(24*C*d^5 + d^3*e*(4*B*d + 3*A*e)) - b*e
^3*(35*a^2*C*e^2 - 14*a*b*e*(3*C*d + B*e) + b^2*(15*C*d^2 + 6*B*d
*e + 8*A*e^2)) + c^2*d*e*(2*a*e*(69*C*d^2 + e*(15*B*d - 29*A*e))
- b*(128*C*d^3 + d*e*(19*B*d + 9*A*e))) + c*e^2*(14*a^2*e^2*(11*C
*d - 3*B*e) - a*b*e*(237*C*d^2 + e*(B*d - 29*A*e)) + b^2*(103*C*d
^3 + d*e*(9*B*d + 19*A*e))))*Sqrt[d + e*x]*Sqrt[-((c*(a + b*x + c
*x^2))/(b^2 - 4*a*c))]*EllipticE[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*
c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)
/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(105*e^4*(c*d^2 - b*d*e +
a*e^2)^3*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*
```

```
Sqrt[a + b*x + c*x^2]) + (2*Sqrt[2]*Sqrt[b^2 - 4*a*c]*(c^2*(48*C*
d^4 + 2*d^2*e*(4*B*d + 3*A*e)) + c*e*(2*a*e*(51*C*d^2 + e*(12*B*d
 - 5*A*e)) - b*(104*C*d^3 + 3*d*e*(5*B*d + 2*A*e))) + e^2*(70*a^2
*C*e^2 - 7*a*b*e*(18*C*d + B*e) + b^2*(60*C*d^2 + e*(3*B*d + 4*A*
e))))*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqr
t[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sqrt[(
b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*S
qrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(105*e^
4*(c*d^2 - b*d*e + a*e^2)^2*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^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((C*x**2+B*x+A)*(c*x**2+b*x+a)**(1/2)/(e*x+d)**(9/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 20.3315, size = 23364, normalized size = 17.14

Result too large to show

Warning: Unable to verify antiderivative.

```
[In] Integrate[(Sqrt[a + b*x + c*x^2]*(A + B*x + C*x^2))/(d + e*x)^(9/2),x]
```

```
[Out] Result too large to show
```

Maple [B] time = 0.317, size = 88790, normalized size = 65.1

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)*(c*x^2+b*x+a)^(1/2)/(e*x+d)^(9/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Cx^2 + Bx + A)\sqrt{cx^2 + bx + a}}{(ex + d)^{\frac{9}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(9/2),x, algorithm="ma
```

```
[Out] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(9/2)
, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Cx^2 + Bx + A)\sqrt{cx^2 + bx + a}}{(e^4x^4 + 4\,de^3x^3 + 6\,d^2e^2x^2 + 4\,d^3ex + d^4)\sqrt{ex + d}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(9/2),x, algorithm="fr
```

```
[Out] integral((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/((e^4*x^4 + 4*d*
e^3*x^3 + 6*d^2*e^2*x^2 + 4*d^3*e*x + d^4)*sqrt(e*x + d)), 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((C*x**2+B*x+A)*(c*x**2+b*x+a)**(1/2)/(e*x+d)**(9/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [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^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(9/2),x, algorithm="gi
```

```
[Out] Timed out
```

3.265 $\int \frac{\sqrt{a+bx+cx^2}\left(A+Bx+Cx^2\right)}{(d+ex)^{11/2}}\,dx$

Optimal. Leaf size=1904

result too large to display

```
[Out] (2*(2*c^3*d^3*(8*C*d^2 + e*(4*B*d + 5*A*e)) + 3*c^2*d*e*(2*a*e*(9
*C*d^2 + 7*B*d*e - 9*A*e^2) - b*d*(16*C*d^2 + 7*B*d*e + 5*A*e^2))
 + 3*c*e^2*(2*a^2*e^2*(17*C*d - 5*B*e) - a*b*e*(41*C*d^2 + 5*B*d*
e - 9*A*e^2) + b^2*d*(15*C*d^2 + 3*B*d*e + 7*A*e^2)) - b*e^3*(21*
a^2*C*e^2 - 6*a*b*e*(3*C*d + 2*B*e) + b^2*(5*C*d^2 + 4*B*d*e + 8*
A*e^2)))*Sqrt[a + b*x + c*x^2])/(315*e^3*(c*d^2 - b*d*e + a*e^2)^
3*(d + e*x)^(3/2)) + (2*(2*c^4*d^4*(8*C*d^2 + e*(4*B*d + 5*A*e))
+ 2*b^2*e^4*(21*a^2*C*e^2 - 6*a*b*e*(3*C*d + 2*B*e) + b^2*(5*C*d^
2 + 4*B*d*e + 8*A*e^2)) - 6*c^2*e^2*(a*b*d*e*(30*C*d^2 - 5*B*d*e
- 34*A*e^2) - a^2*e^2*(30*C*d^2 - 36*B*d*e + 7*A*e^2) - b^2*d^2*(
11*C*d^2 + 3*B*d*e + 11*A*e^2)) - c*e^3*(126*a^3*C*e^3 - 3*a^2*b*
e^2*(12*C*d + 29*B*e) - 6*a*b^2*e*(5*C*d^2 + 7*B*d*e - 12*A*e^2)
+ b^3*d*(20*C*d^2 + 25*B*d*e + 56*A*e^2)) + c^3*d^2*e*(6*a*e*(11*
C*d^2 + 8*B*d*e - 34*A*e^2) - b*d*(56*C*d^2 + 5*e*(5*B*d + 4*A*e)
)))*Sqrt[a + b*x + c*x^2])/(315*e^3*(c*d^2 - b*d*e + a*e^2)^4*Sqr
t[d + e*x]) - (2*(c^2*d^3*(8*C*d^2 + e*(4*B*d + 5*A*e)) - e^2*(3*
a^2*e^2*(3*C*d - 5*B*e) - a*b*e*(2*C*d^2 - 17*B*d*e - 10*A*e^2) -
 b^2*d*(5*C*d^2 + 4*B*d*e + 8*A*e^2)) - c*d*e*(3*b*d*(5*C*d^2 + 2
*B*d*e + 5*A*e^2) - a*e*(7*C*d^2 + 11*B*d*e + 13*A*e^2)) + e*(3*c
^2*d^2*(6*C*d^2 + e*(3*B*d - 5*A*e)) + c*e*(a*e*(47*C*d^2 + B*d*e
 - 7*A*e^2) - 3*b*d*(15*C*d^2 + 2*B*d*e - 5*A*e^2)) + e^2*(21*a^2
*C*e^2 - 3*a*b*e*(16*C*d - B*e) + b^2*(25*C*d^2 - e*(B*d + 2*A*e)
)))*x)*Sqrt[a + b*x + c*x^2])/(105*e^3*(c*d^2 - b*d*e + a*e^2)^2*
(d + e*x)^(7/2)) - (2*(C*d^2 - e*(B*d - A*e))*(a + b*x + c*x^2)^(
3/2))/(9*e*(c*d^2 - b*d*e + a*e^2)*(d + e*x)^(9/2)) - (Sqrt[2]*Sq
rt[b^2 - 4*a*c]*(2*c^4*d^4*(8*C*d^2 + e*(4*B*d + 5*A*e)) + 2*b^2*
e^4*(21*a^2*C*e^2 - 6*a*b*e*(3*C*d + 2*B*e) + b^2*(5*C*d^2 + 4*B*
d*e + 8*A*e^2)) - 6*c^2*e^2*(a*b*d*e*(30*C*d^2 - 5*B*d*e - 34*A*e
^2) - a^2*e^2*(30*C*d^2 - 36*B*d*e + 7*A*e^2) - b^2*d^2*(11*C*d^2
 + 3*B*d*e + 11*A*e^2)) - c*e^3*(126*a^3*C*e^3 - 3*a^2*b*e^2*(12*
C*d + 29*B*e) - 6*a*b^2*e*(5*C*d^2 + 7*B*d*e - 12*A*e^2) + b^3*d*
(20*C*d^2 + 25*B*d*e + 56*A*e^2)) + c^3*d^2*e*(6*a*e*(11*C*d^2 +
8*B*d*e - 34*A*e^2) - b*d*(56*C*d^2 + 5*e*(5*B*d + 4*A*e))))*Sqrt
[d + e*x]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[
ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sq
rt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])
*e)])/(315*e^4*(c*d^2 - b*d*e + a*e^2)^4*Sqrt[(c*(d + e*x))/(2*c*
d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) + (2*Sqrt[
2]*Sqrt[b^2 - 4*a*c]*(2*c^3*d^3*(8*C*d^2 + e*(4*B*d + 5*A*e)) + 3
*c^2*d*e*(2*a*e*(9*C*d^2 + 7*B*d*e - 9*A*e^2) - b*d*(16*C*d^2 + 7
*B*d*e + 5*A*e^2)) + 3*c*e^2*(2*a^2*e^2*(17*C*d - 5*B*e) - a*b*e*
(41*C*d^2 + 5*B*d*e - 9*A*e^2) + b^2*d*(15*C*d^2 + 3*B*d*e + 7*A*
e^2)) - b*e^3*(21*a^2*C*e^2 - 6*a*b*e*(3*C*d + 2*B*e) + b^2*(5*C*
d^2 + 4*B*d*e + 8*A*e^2)))*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[
b^2 - 4*a*c])*e)]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*El
lipticF[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*
```

```
a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 -
 4*a*c])*e)])/(315*e^4*(c*d^2 - b*d*e + a*e^2)^3*Sqrt[d + e*x]*Sq
rt[a + b*x + c*x^2])
```

Rubi [A] time = 20.5456, antiderivative size = 1904, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.206$

result too large to display

Warning: Unable to verify antiderivative.

```
[In]  Int[(Sqrt[a + b*x + c*x^2]*(A + B*x + C*x^2))/(d + e*x)^(11/2),x]
```

```
[Out] (2*(2*c^3*(8*C*d^5 + d^3*e*(4*B*d + 5*A*e)) + 3*c^2*d*e*(2*a*e*(9
*C*d^2 + 7*B*d*e - 9*A*e^2) - b*d*(16*C*d^2 + 7*B*d*e + 5*A*e^2))
 + 3*c*e^2*(2*a^2*e^2*(17*C*d - 5*B*e) - a*b*e*(41*C*d^2 + 5*B*d*
e - 9*A*e^2) + b^2*d*(15*C*d^2 + 3*B*d*e + 7*A*e^2)) - b*e^3*(21*
a^2*C*e^2 - 6*a*b*e*(3*C*d + 2*B*e) + b^2*(5*C*d^2 + 4*B*d*e + 8*
A*e^2)))*Sqrt[a + b*x + c*x^2])/(315*e^3*(c*d^2 - b*d*e + a*e^2)^
3*(d + e*x)^(3/2)) + (2*(2*c^4*(8*C*d^6 + d^4*e*(4*B*d + 5*A*e))
- c^3*d^2*e*(56*b*C*d^3 + 5*b*d*e*(5*B*d + 4*A*e) - 6*a*e*(11*C*d
^2 + 8*B*d*e - 34*A*e^2)) + 2*b^2*e^4*(21*a^2*C*e^2 - 6*a*b*e*(3*
C*d + 2*B*e) + b^2*(5*C*d^2 + 4*B*d*e + 8*A*e^2)) - 6*c^2*e^2*(a*
b*d*e*(30*C*d^2 - 5*B*d*e - 34*A*e^2) - a^2*e^2*(30*C*d^2 - 36*B*
d*e + 7*A*e^2) - b^2*d^2*(11*C*d^2 + 3*B*d*e + 11*A*e^2)) - c*e^3
*(126*a^3*C*e^3 - 3*a^2*b*e^2*(12*C*d + 29*B*e) - 6*a*b^2*e*(5*C*
d^2 + 7*B*d*e - 12*A*e^2) + b^3*d*(20*C*d^2 + 25*B*d*e + 56*A*e^2
)))*Sqrt[a + b*x + c*x^2])/(315*e^3*(c*d^2 - b*d*e + a*e^2)^4*Sqr
t[d + e*x]) - (2*(c^2*(8*C*d^5 + d^3*e*(4*B*d + 5*A*e)) - e^2*(3*
a^2*e^2*(3*C*d - 5*B*e) - a*b*e*(2*C*d^2 - 17*B*d*e - 10*A*e^2) -
 b^2*d*(5*C*d^2 + 4*B*d*e + 8*A*e^2)) - c*d*e*(3*b*d*(5*C*d^2 + 2
*B*d*e + 5*A*e^2) - a*e*(7*C*d^2 + 11*B*d*e + 13*A*e^2)) + e^2*((
3*c^2*(6*C*d^4 + d^2*e*(3*B*d - 5*A*e)))/e + c*(a*e*(47*C*d^2 + e
*(B*d - 7*A*e)) - 3*b*(15*C*d^3 + d*e*(2*B*d - 5*A*e))) + e*(21*a
^2*C*e^2 - 3*a*b*e*(16*C*d - B*e) + b^2*(25*C*d^2 - e*(B*d + 2*A*
e))))*x)*Sqrt[a + b*x + c*x^2])/(105*e^3*(c*d^2 - b*d*e + a*e^2)^
2*(d + e*x)^(7/2)) - (2*(C*d^2 - e*(B*d - A*e))*(a + b*x + c*x^2)
^(3/2))/(9*e*(c*d^2 - b*d*e + a*e^2)*(d + e*x)^(9/2)) - (Sqrt[2]*
Sqrt[b^2 - 4*a*c]*(2*c^4*(8*C*d^6 + d^4*e*(4*B*d + 5*A*e)) - c^3*
d^2*e*(56*b*C*d^3 + 5*b*d*e*(5*B*d + 4*A*e) - 6*a*e*(11*C*d^2 + 8
*B*d*e - 34*A*e^2)) + 2*b^2*e^4*(21*a^2*C*e^2 - 6*a*b*e*(3*C*d +
2*B*e) + b^2*(5*C*d^2 + 4*B*d*e + 8*A*e^2)) - 6*c^2*e^2*(a*b*d*e*
(30*C*d^2 - 5*B*d*e - 34*A*e^2) - a^2*e^2*(30*C*d^2 - 36*B*d*e +
7*A*e^2) - b^2*d^2*(11*C*d^2 + 3*B*d*e + 11*A*e^2)) - c*e^3*(126*
a^3*C*e^3 - 3*a^2*b*e^2*(12*C*d + 29*B*e) - 6*a*b^2*e*(5*C*d^2 +
7*B*d*e - 12*A*e^2) + b^3*d*(20*C*d^2 + 25*B*d*e + 56*A*e^2)))*Sq
rt[d + e*x]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*Elliptic
E[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/
Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c
```

```
])*e)])/(315*e^4*(c*d^2 - b*d*e + a*e^2)^4*Sqrt[(c*(d + e*x))/(2*
c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) + (2*Sqr
t[2]*Sqrt[b^2 - 4*a*c]*(2*c^3*(8*C*d^5 + d^3*e*(4*B*d + 5*A*e)) +
 3*c^2*d*e*(2*a*e*(9*C*d^2 + 7*B*d*e - 9*A*e^2) - b*d*(16*C*d^2 +
 7*B*d*e + 5*A*e^2)) + 3*c*e^2*(2*a^2*e^2*(17*C*d - 5*B*e) - a*b*
e*(41*C*d^2 + 5*B*d*e - 9*A*e^2) + b^2*d*(15*C*d^2 + 3*B*d*e + 7*
A*e^2)) - b*e^3*(21*a^2*C*e^2 - 6*a*b*e*(3*C*d + 2*B*e) + b^2*(5*
C*d^2 + 4*B*d*e + 8*A*e^2)))*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqr
t[b^2 - 4*a*c])*e)]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*
EllipticF[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 -
4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2
 - 4*a*c])*e)])/(315*e^4*(c*d^2 - b*d*e + a*e^2)^3*Sqrt[d + e*x]*
Sqrt[a + b*x + c*x^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((C*x**2+B*x+A)*(c*x**2+b*x+a)**(1/2)/(e*x+d)**(11/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 23.3254, size = 34410, normalized size = 18.07

Result too large to show

Warning: Unable to verify antiderivative.

```
[In] Integrate[(Sqrt[a + b*x + c*x^2]*(A + B*x + C*x^2))/(d + e*x)^(11/2),x]
```

```
[Out] Result too large to show
```

Maple [B] time = 0.495, size = 153623, normalized size = 80.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)*(c*x^2+b*x+a)^(1/2)/(e*x+d)^(11/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{(Cx^2 + Bx + A)\sqrt{cx^2 + bx + a}}{(ex + d)^{\frac{11}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(11/2),x, algorithm="m
```

```
[Out] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(11/2
), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{(Cx^2 + Bx + A)\sqrt{cx^2 + bx + a}}{(e^5x^5 + 5\,de^4x^4 + 10\,d^2e^3x^3 + 10\,d^3e^2x^2 + 5\,d^4ex + d^5)\sqrt{ex + d}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(11/2),x, algorithm="f
```

```
[Out] integral((C*x^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/((e^5*x^5 + 5*d*
e^4*x^4 + 10*d^2*e^3*x^3 + 10*d^3*e^2*x^2 + 5*d^4*e*x + d^5)*sqrt
(e*x + d)), 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((C*x**2+B*x+A)*(c*x**2+b*x+a)**(1/2)/(e*x+d)**(11/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [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^2 + B*x + A)*sqrt(c*x^2 + b*x + a)/(e*x + d)^(11/2),x, algorithm="g
```

```
[Out] Timed out
```

3.266 $\int \frac{(d+ex)^{3/2}\left(A+Bx+Cx^2\right)}{\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=724

$$-\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(ae^2-bde+cd^2\right)\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}\left(-ce(25aCe+28bBe+15bCd)+c^2\left(-\left(6Cd^2-7e(5A\right.\right.\right.}{105c^4e^2\sqrt{d+ex}\sqrt{a+bx+cx^2}}$$

$$+\frac{2\sqrt{d+ex}\sqrt{a+bx+cx^2}\left(-ce(25aCe+28bBe+15bCd)+c^2\left(-\left(6Cd^2-7e(5Ae+3Bd)\right)\right)+24b^2Ce^2\right)}{105c^3e}$$

$$-\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(c^2e\left(ae(63Be+82Cd)+b\left(70Ae^2+91Bde+12Cd^2\right)\right)-8bce^2(13aCe+7bBe+9bCd\right.}{105c^4e^2\sqrt{a+bx+cx^2}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4\right.}}}}$$

$$-\frac{2(d+ex)^{3/2}\sqrt{a+bx+cx^2}(6bCe-7Bce+2cCd)}{35c^2e}+\frac{2C(d+ex)^{5/2}\sqrt{a+bx+cx^2}}{7ce}$$

```
[Out] (2*(24*b^2*C*e^2 - c*e*(15*b*C*d + 28*b*B*e + 25*a*C*e) - c^2*(6*
C*d^2 - 7*e*(3*B*d + 5*A*e)))*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2]
)/(105*c^3*e) - (2*(2*c*C*d - 7*B*c*e + 6*b*C*e)*(d + e*x)^(3/2)*
Sqrt[a + b*x + c*x^2])/(35*c^2*e) + (2*C*(d + e*x)^(5/2)*Sqrt[a +
 b*x + c*x^2])/(7*c*e) - (Sqrt[2]*Sqrt[b^2 - 4*a*c]*(48*b^3*C*e^3
 - 8*b*c*e^2*(9*b*C*d + 7*b*B*e + 13*a*C*e) + c^3*d*(6*C*d^2 - 7*
e*(3*B*d + 20*A*e)) + c^2*e*(a*e*(82*C*d + 63*B*e) + b*(12*C*d^2
+ 91*B*d*e + 70*A*e^2)))*Sqrt[d + e*x]*Sqrt[-((c*(a + b*x + c*x^2
))/(b^2 - 4*a*c))]*EllipticE[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] +
 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*
c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(105*c^4*e^2*Sqrt[(c*(d + e*x)
)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) - (
2*Sqrt[2]*Sqrt[b^2 - 4*a*c]*(c*d^2 - b*d*e + a*e^2)*(24*b^2*C*e^2
 - c*e*(15*b*C*d + 28*b*B*e + 25*a*C*e) - c^2*(6*C*d^2 - 7*e*(3*B
*d + 5*A*e)))*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])
*e)]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticF[ArcSi
n[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]
], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])
/(105*c^4*e^2*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2])
```

Rubi [A] time = 4.02533, antiderivative size = 724, normalized size of antiderivative = 1., number of

steps used = 8, number of rules used = 6, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.176$

$$-\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(ae^2-bde+cd^2\right)\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}\left(-ce(25aCe+28bBe+15bCd)+c^2\left(-\left(6Cd^2-7e(5A\right.\right.\right.}{105c^4e^2\sqrt{d+ex}\sqrt{a+bx+cx^2}}$$

$$+\frac{2\sqrt{d+ex}\sqrt{a+bx+cx^2}\left(-ce(25aCe+28bBe+15bCd)+c^2\left(-\left(6Cd^2-7e(5Ae+3Bd)\right)\right)+24b^2Ce^2\right)}{105c^3e}$$

$$-\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(c^2e\left(ae(63Be+82Cd)+b\left(70Ae^2+91Bde+12Cd^2\right)\right)-8bce^2(13aCe+7bBe+9bCd\right.}{105c^4e^2\sqrt{a+bx+cx^2}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4\right.}}}}$$

$$-\frac{2(d+ex)^{3/2}\sqrt{a+bx+cx^2}(6bCe-7Bce+2cCd)}{35c^2e}+\frac{2C(d+ex)^{5/2}\sqrt{a+bx+cx^2}}{7ce}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[((d + e*x)^(3/2)*(A + B*x + C*x^2))/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] (2*(24*b^2*C*e^2 - c*e*(15*b*C*d + 28*b*B*e + 25*a*C*e) - c^2*(6*
C*d^2 - 7*e*(3*B*d + 5*A*e)))*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2]
)/(105*c^3*e) - (2*(2*c*C*d - 7*B*c*e + 6*b*C*e)*(d + e*x)^(3/2)*
Sqrt[a + b*x + c*x^2])/(35*c^2*e) + (2*C*(d + e*x)^(5/2)*Sqrt[a +
 b*x + c*x^2])/(7*c*e) - (Sqrt[2]*Sqrt[b^2 - 4*a*c]*(48*b^3*C*e^3
 - 8*b*c*e^2*(9*b*C*d + 7*b*B*e + 13*a*C*e) + c^3*(6*C*d^3 - 7*d*
e*(3*B*d + 20*A*e)) + c^2*e*(a*e*(82*C*d + 63*B*e) + b*(12*C*d^2
+ 91*B*d*e + 70*A*e^2)))*Sqrt[d + e*x]*Sqrt[-((c*(a + b*x + c*x^2
))/(b^2 - 4*a*c))]*EllipticE[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] +
 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*
c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(105*c^4*e^2*Sqrt[(c*(d + e*x)
)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) - (
2*Sqrt[2]*Sqrt[b^2 - 4*a*c]*(c*d^2 - b*d*e + a*e^2)*(24*b^2*C*e^2
 - c*e*(15*b*C*d + 28*b*B*e + 25*a*C*e) - c^2*(6*C*d^2 - 7*e*(3*B
*d + 5*A*e)))*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])
*e)]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticF[ArcSi
n[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]
], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])
/(105*c^4*e^2*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^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((e*x+d)**(3/2)*(C*x**2+B*x+A)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 16.0655, size = 9972, normalized size = 13.77

Result too large to show

Warning: Unable to verify antiderivative.

```
[In] Integrate[((d + e*x)^(3/2)*(A + B*x + C*x^2))/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] Result too large to show
```

Maple [B] time = 0.074, size = 14084, normalized size = 19.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^(3/2)*(C*x^2+B*x+A)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Cx^2 + Bx + A\right)(ex + d)^{\frac{3}{2}}}{\sqrt{cx^2 + bx + a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^(3/2)/sqrt(c*x^2 + b*x + a),x, algorithm="ma
```

```
[Out] integrate((C*x^2 + B*x + A)*(e*x + d)^(3/2)/sqrt(c*x^2 + b*x + a)
, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(Cex^3 + (Cd + Be)x^2 + Ad + (Bd + Ae)x\right)\sqrt{ex + d}}{\sqrt{cx^2 + bx + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(e*x + d)^(3/2)/sqrt(c*x^2 + b*x + a),x, algorithm="fr
```

```
[Out] integral((C*e*x^3 + (C*d + B*e)*x^2 + A*d + (B*d + A*e)*x)*sqrt(e
*x + d)/sqrt(c*x^2 + b*x + a), x)
```

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

$$\int \frac{(d + ex)^{\frac{3}{2}}\left(A + Bx + Cx^2\right)}{\sqrt{a + bx + cx^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**(3/2)*(C*x**2+B*x+A)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((d + e*x)**(3/2)*(A + B*x + C*x**2)/sqrt(a + b*x + c*x**
2), x)
```

GIAC/XCAS [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^2 + B*x + A)*(e*x + d)^(3/2)/sqrt(c*x^2 + b*x + a),x, algorithm="gi
```

```
[Out] Timed out
```

3.267 $\int \frac{\sqrt{d+ex}\left(A+Bx+Cx^2\right)}{\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=557

$$\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(-ce(9aCe+10bBe+3bCd)+c^2\left(-\left(2Cd^2-5e(3Ae+Bd)\right)\right)+8b^2Ce^2\right)E\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2}{}}}{}\right.\right.}{15c^3e^2\sqrt{a+bx+cx^2}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}}$$

$$+\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(ae^2-bde+cd^2\right)\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}(4bCe-5Bce+2cCd)F\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2cx+\sqrt{b^2-4ac}}{\sqrt{b^2-4ac}}}}{\sqrt{2}}\right)\middle|-\frac{2}{2cd-}\right.}{15c^3e^2\sqrt{d+ex}\sqrt{a+bx+cx^2}}$$

$$-\frac{2\sqrt{d+ex}\sqrt{a+bx+cx^2}(4bCe-5Bce+2cCd)}{15c^2e}+\frac{2C(d+ex)^{3/2}\sqrt{a+bx+cx^2}}{5ce}$$

```
[Out] (-2*(2*c*C*d - 5*B*c*e + 4*b*C*e)*Sqrt[d + e*x]*Sqrt[a + b*x + c*
x^2])/(15*c^2*e) + (2*C*(d + e*x)^(3/2)*Sqrt[a + b*x + c*x^2])/(5
*c*e) + (Sqrt[2]*Sqrt[b^2 - 4*a*c]*(8*b^2*C*e^2 - c*e*(3*b*C*d +
10*b*B*e + 9*a*C*e) - c^2*(2*C*d^2 - 5*e*(B*d + 3*A*e)))*Sqrt[d +
 e*x]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[ArcS
in[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2
]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]
)/(15*c^3*e^2*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])
*e)]*Sqrt[a + b*x + c*x^2]) + (2*Sqrt[2]*Sqrt[b^2 - 4*a*c]*(2*c*C
*d - 5*B*c*e + 4*b*C*e)*(c*d^2 - b*d*e + a*e^2)*Sqrt[(c*(d + e*x)
)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[-((c*(a + b*x + c*x^2
))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] +
 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*
c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(15*c^3*e^2*Sqrt[d + e*x]*Sqrt
[a + b*x + c*x^2])
```

Rubi [A] time = 2.07321, antiderivative size = 557, normalized size of antiderivative = 1., number of

steps used = 7, number of rules used = 6, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.176$

$$\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(-ce(9aCe+10bBe+3bCd)+c^2\left(-\left(2Cd^2-5e(3Ae+Bd)\right)\right)+8b^2Ce^2\right)E\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2\cdots}{}}}{}\right.\right.}{15c^3e^2\sqrt{a+bx+cx^2}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}}$$

$$+\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(ae^2-bde+cd^2\right)\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}(4bCe-5Bce+2cCd)F\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2cx+\sqrt{b^2-4ac}}{\sqrt{b^2-4ac}}}}{\sqrt{2}}\right)|-\frac{2\cdots}{2cd-\cdots}\right.}{15c^3e^2\sqrt{d+ex}\sqrt{a+bx+cx^2}}$$

$$-\frac{2\sqrt{d+ex}\sqrt{a+bx+cx^2}(4bCe-5Bce+2cCd)}{15c^2e}+\frac{2C(d+ex)^{3/2}\sqrt{a+bx+cx^2}}{5ce}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[d + e*x]*(A + B*x + C*x^2))/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] (-2*(2*c*C*d - 5*B*c*e + 4*b*C*e)*Sqrt[d + e*x]*Sqrt[a + b*x + c*
x^2])/(15*c^2*e) + (2*C*(d + e*x)^(3/2)*Sqrt[a + b*x + c*x^2])/(5
*c*e) + (Sqrt[2]*Sqrt[b^2 - 4*a*c]*(8*b^2*C*e^2 - c*e*(3*b*C*d +
10*b*B*e + 9*a*C*e) - c^2*(2*C*d^2 - 5*e*(B*d + 3*A*e)))*Sqrt[d +
 e*x]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[ArcS
in[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2
]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]
)/(15*c^3*e^2*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])
*e)]*Sqrt[a + b*x + c*x^2]) + (2*Sqrt[2]*Sqrt[b^2 - 4*a*c]*(2*c*C
*d - 5*B*c*e + 4*b*C*e)*(c*d^2 - b*d*e + a*e^2)*Sqrt[(c*(d + e*x)
)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[-((c*(a + b*x + c*x^2
))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] +
 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*
c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(15*c^3*e^2*Sqrt[d + e*x]*Sqrt
[a + b*x + c*x^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((e*x+d)**(1/2)*(C*x**2+B*x+A)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 14.346, size = 5505, normalized size = 9.88

Result too large to show

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(Sqrt[d + e*x]*(A + B*x + C*x^2))/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] Result too large to show
```

Maple [B] time = 0.06, size = 8161, normalized size = 14.7

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^(1/2)*(C*x^2+B*x+A)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(Cx^2 + Bx + A\right)\sqrt{ex + d}}{\sqrt{cx^2 + bx + a}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*sqrt(e*x + d)/sqrt(c*x^2 + b*x + a),x, algorithm="maxi
```

```
[Out] integrate((C*x^2 + B*x + A)*sqrt(e*x + d)/sqrt(c*x^2 + b*x + a),
x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\frac{\left(Cx^2 + Bx + A\right)\sqrt{ex + d}}{\sqrt{cx^2 + bx + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*sqrt(e*x + d)/sqrt(c*x^2 + b*x + a),x, algorithm="fric
```

```
[Out] integral((C*x^2 + B*x + A)*sqrt(e*x + d)/sqrt(c*x^2 + b*x + a), x
)
```

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

$$\int \frac{\sqrt{d+ex}\left(A+Bx+Cx^2\right)}{\sqrt{a+bx+cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**(1/2)*(C*x**2+B*x+A)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral(sqrt(d + e*x)*(A + B*x + C*x**2)/sqrt(a + b*x + c*x**2),
 x)
```

GIAC/XCAS [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^2 + B*x + A)*sqrt(e*x + d)/sqrt(c*x^2 + b*x + a),x, algorithm="giac
```

```
[Out] Timed out
```

3.268 $\int \frac{A+Bx+Cx^2}{\sqrt{d+ex}\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=471

$$\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}\left(Ce(bd-ae)+c\left(2Cd^2-3e(Bd-Ae)\right)\right)F\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2cx+\sqrt{b^2-4ac}}{\sqrt{b^2-4ac}}}}{\sqrt{2}}\right)\middle|-\frac{2\cdots}{2cd-(\cdots}\right.}{3c^2e^2\sqrt{d+ex}\sqrt{a+bx+cx^2}}$$

$$-\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}(2bCe-3Bce+2cCd)E\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2cx+\sqrt{b^2-4ac}}{\sqrt{b^2-4ac}}}}{\sqrt{2}}\right)\middle|-\frac{2\sqrt{b^2-4ac}e}{2cd-\left(b+\sqrt{b^2-4ac}\right)e}\right)}{3c^2e^2\sqrt{a+bx+cx^2}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}}$$

$$+\frac{2C\sqrt{d+ex}\sqrt{a+bx+cx^2}}{3ce}$$

```
[Out] (2*C*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2])/(3*c*e) - (Sqrt[2]*Sqrt
[b^2 - 4*a*c]*(2*c*C*d - 3*B*c*e + 2*b*C*e)*Sqrt[d + e*x]*Sqrt[-(
(c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[ArcSin[Sqrt[(b +
Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[
b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(3*c^2*e^2*
Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[a +
b*x + c*x^2]) + (2*Sqrt[2]*Sqrt[b^2 - 4*a*c]*(C*e*(b*d - a*e) + c
*(2*C*d^2 - 3*e*(B*d - A*e)))*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sq
rt[b^2 - 4*a*c])*e)]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]
*EllipticF[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 -
 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^
2 - 4*a*c])*e)])/(3*c^2*e^2*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2])
```

Rubi [A] time = 1.28542, antiderivative size = 470, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.147

$$\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}\left(Ce(bd-ae)-3ce(Bd-Ae)+2cCd^2\right)F\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2cx+\sqrt{b^2-4ac}}{\sqrt{b^2-4ac}}}}{\sqrt{2}}\right)\middle|-\frac{2\sqrt{b\cdots}}{2cd-(b\cdots}\right.}{3c^2e^2\sqrt{d+ex}\sqrt{a+bx+cx^2}}$$

$$-\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}(2bCe-3Bce+2cCd)E\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2cx+\sqrt{b^2-4ac}}{\sqrt{b^2-4ac}}}}{\sqrt{2}}\right)\middle|-\frac{2\sqrt{b^2-4ac}e}{2cd-\left(b+\sqrt{b^2-4ac}\right)e}\right)}{3c^2e^2\sqrt{a+bx+cx^2}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}}$$

$$+\frac{2C\sqrt{d+ex}\sqrt{a+bx+cx^2}}{3ce}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/(Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] (2*C*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2])/(3*c*e) - (Sqrt[2]*Sqrt
[b^2 - 4*a*c]*(2*c*C*d - 3*B*c*e + 2*b*C*e)*Sqrt[d + e*x]*Sqrt[-(
(c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[ArcSin[Sqrt[(b +
Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[
b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(3*c^2*e^2*
Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[a +
b*x + c*x^2]) + (2*Sqrt[2]*Sqrt[b^2 - 4*a*c]*(2*c*C*d^2 + C*e*(b*
d - a*e) - 3*c*e*(B*d - A*e))*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sq
rt[b^2 - 4*a*c])*e)]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]
*EllipticF[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 -
 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^
2 - 4*a*c])*e)])/(3*c^2*e^2*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^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((C*x**2+B*x+A)/(e*x+d)**(1/2)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 13.6797, size = 6180, normalized size = 13.12

Result too large to show

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/(Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] Result too large to show
```

Maple [B] time = 0.06, size = 4251, normalized size = 9.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)^(1/2)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] -1/3/c^2*(6*B*2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d
))^(1/2)*(e*(-2*c*x+(-4*a*c+b^2)^(1/2)-b)/(e*(-4*a*c+b^2)^(1/2)-b
*e+2*c*d))^(1/2)*(e*(b+2*c*x+(-4*a*c+b^2)^(1/2))/(e*(-4*a*c+b^2)^
(1/2)+b*e-2*c*d))^(1/2)*EllipticE(2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+
b^2)^(1/2)+b*e-2*c*d))^(1/2),(-(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d)/(
e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2))*c^2*d^2*e-C*2^(1/2)*(-(e*
x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*(e*(-2*c*x+(-4*a*c
+b^2)^(1/2)-b)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2)*(e*(b+2*c*
x+(-4*a*c+b^2)^(1/2))/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*Ell
ipticF(2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2
),(-(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*
c*d))^(1/2))*(-4*a*c+b^2)^(1/2)*a*e^3+3*C*2^(1/2)*(-(e*x+d)*c/(e*
(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*(e*(-2*c*x+(-4*a*c+b^2)^(1/2
)-b)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2)*(e*(b+2*c*x+(-4*a*c+
b^2)^(1/2))/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*EllipticF(2^(
1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2),(-(e*(-4
*a*c+b^2)^(1/2)+b*e-2*c*d)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2
))*a*b*e^3-3*C*2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*
d))^(1/2)*(e*(-2*c*x+(-4*a*c+b^2)^(1/2)-b)/(e*(-4*a*c+b^2)^(1/2)-
b*e+2*c*d))^(1/2)*(e*(b+2*c*x+(-4*a*c+b^2)^(1/2))/(e*(-4*a*c+b^2)
^(1/2)+b*e-2*c*d))^(1/2)*EllipticF(2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c
+b^2)^(1/2)+b*e-2*c*d))^(1/2),(-(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d)/
(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2))*b^2*d*e^2-4*C*2^(1/2)*(-
(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*(e*(-2*c*x+(-4*
a*c+b^2)^(1/2)-b)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2)*(e*(b+2
*c*x+(-4*a*c+b^2)^(1/2))/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*
EllipticE(2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(
1/2),(-(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d)/(e*(-4*a*c+b^2)^(1/2)-b*e
+2*c*d))^(1/2))*a*b*e^3+4*C*2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(
1/2)+b*e-2*c*d))^(1/2)*(e*(-2*c*x+(-4*a*c+b^2)^(1/2)-b)/(e*(-4*a*
c+b^2)^(1/2)-b*e+2*c*d))^(1/2)*(e*(b+2*c*x+(-4*a*c+b^2)^(1/2))/(e
*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*EllipticE(2^(1/2)*(-(e*x+d)
*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2),(-(e*(-4*a*c+b^2)^(1/2
)+b*e-2*c*d)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2))*b^2*d*e^2-6
*A*2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*(e
*(-2*c*x+(-4*a*c+b^2)^(1/2)-b)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^
(1/2)*(e*(b+2*c*x+(-4*a*c+b^2)^(1/2))/(e*(-4*a*c+b^2)^(1/2)+b*e-2
*c*d))^(1/2)*EllipticF(2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+
b*e-2*c*d))^(1/2),(-(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d)/(e*(-4*a*c+b
^2)^(1/2)-b*e+2*c*d))^(1/2))*c^2*d*e^2-6*B*2^(1/2)*(-(e*x+d)*c/(e
*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*(e*(-2*c*x+(-4*a*c+b^2)^(1/
2)-b)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2)*(e*(b+2*c*x+(-4*a*c
+b^2)^(1/2))/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*EllipticF(2^
(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2),(-(e*(-
4*a*c+b^2)^(1/2)+b*e-2*c*d)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/
2))*a*c*e^3+3*A*2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c
*d))^(1/2)*(e*(-2*c*x+(-4*a*c+b^2)^(1/2)-b)/(e*(-4*a*c+b^2)^(1/2)
-b*e+2*c*d))^(1/2)*(e*(b+2*c*x+(-4*a*c+b^2)^(1/2))/(e*(-4*a*c+b^2
)^(1/2)+b*e-2*c*d))^(1/2)*EllipticF(2^(1/2)*(-(e*x+d)*c/(e*(-4*a*
```

```
c+b^2)^(1/2)+b*e-2*c*d))^(1/2),(-(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d)
/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2))*(-4*a*c+b^2)^(1/2)*c*e^
3+3*A*2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)
*(e*(-2*c*x+(-4*a*c+b^2)^(1/2)-b)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d
))^(1/2)*(e*(b+2*c*x+(-4*a*c+b^2)^(1/2))/(e*(-4*a*c+b^2)^(1/2)+b*
e-2*c*d))^(1/2)*EllipticF(2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/
2)+b*e-2*c*d))^(1/2),(-(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d)/(e*(-4*a*
c+b^2)^(1/2)-b*e+2*c*d))^(1/2))*b*c*e^3+6*B*2^(1/2)*(-(e*x+d)*c/(
e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*(e*(-2*c*x+(-4*a*c+b^2)^(1
/2)-b)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2)*(e*(b+2*c*x+(-4*a*
c+b^2)^(1/2))/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*EllipticE(2
^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2),(-(e*(
-4*a*c+b^2)^(1/2)+b*e-2*c*d)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1
/2))*a*c*e^3-2*C*x^3*c^2*e^3-2*C*x*b*c*d*e^2-4*C*2^(1/2)*(-(e*x+d
)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*(e*(-2*c*x+(-4*a*c+b^
2)^(1/2)-b)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2)*(e*(b+2*c*x+(
-4*a*c+b^2)^(1/2))/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*Ellipt
icE(2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2),(
-(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d
))^(1/2))*c^2*d^3-2*C*x^2*c^2*d*e^2-2*C*a*c*d*e^2-2*C*x*a*c*e^3-2
*C*x^2*b*c*e^3+3*B*2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-
2*c*d))^(1/2)*(e*(-2*c*x+(-4*a*c+b^2)^(1/2)-b)/(e*(-4*a*c+b^2)^(1
/2)-b*e+2*c*d))^(1/2)*(e*(b+2*c*x+(-4*a*c+b^2)^(1/2))/(e*(-4*a*c+
b^2)^(1/2)+b*e-2*c*d))^(1/2)*EllipticF(2^(1/2)*(-(e*x+d)*c/(e*(-4
*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2),(-(e*(-4*a*c+b^2)^(1/2)+b*e-2*c
*d)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2))*b*c*d*e^2+C*2^(1/2)*
(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*(e*(-2*c*x+(-
4*a*c+b^2)^(1/2)-b)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2)*(e*(b
+2*c*x+(-4*a*c+b^2)^(1/2))/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2
)*EllipticF(2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))
^(1/2),(-(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d)/(e*(-4*a*c+b^2)^(1/2)-b
*e+2*c*d))^(1/2))*(-4*a*c+b^2)^(1/2)*b*d*e^2+2*C*2^(1/2)*(-(e*x+d
)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*(e*(-2*c*x+(-4*a*c+b^
2)^(1/2)-b)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2)*(e*(b+2*c*x+(
-4*a*c+b^2)^(1/2))/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*Ellipt
icF(2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2),(
-(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d
))^(1/2))*(-4*a*c+b^2)^(1/2)*c*d^2*e-6*B*2^(1/2)*(-(e*x+d)*c/(e*(
-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*(e*(-2*c*x+(-4*a*c+b^2)^(1/2)
-b)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2)*(e*(b+2*c*x+(-4*a*c+b
^2)^(1/2))/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*EllipticE(2^(1
/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2),(-(e*(-4*
a*c+b^2)^(1/2)+b*e-2*c*d)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2)
)*b*c*d*e^2-3*B*2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c
*d))^(1/2)*(e*(-2*c*x+(-4*a*c+b^2)^(1/2)-b)/(e*(-4*a*c+b^2)^(1/2)
-b*e+2*c*d))^(1/2)*(e*(b+2*c*x+(-4*a*c+b^2)^(1/2))/(e*(-4*a*c+b^2
)^(1/2)+b*e-2*c*d))^(1/2)*EllipticF(2^(1/2)*(-(e*x+d)*c/(e*(-4*a*
c+b^2)^(1/2)+b*e-2*c*d))^(1/2),(-(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d)
/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2))*(-4*a*c+b^2)^(1/2)*c*d*
e^2+6*C*2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/
2)*(e*(-2*c*x+(-4*a*c+b^2)^(1/2)-b)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c
*d))^(1/2)*(e*(b+2*c*x+(-4*a*c+b^2)^(1/2))/(e*(-4*a*c+b^2)^(1/2)+
b*e-2*c*d))^(1/2)*EllipticF(2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(
1/2)+b*e-2*c*d))^(1/2),(-(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d)/(e*(-4*
```

```
a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2))*a*c*d*e^2-4*C*2^(1/2)*(-(e*x+d)
*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*(e*(-2*c*x+(-4*a*c+b^2
)^(1/2)-b)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d))^(1/2)*(e*(b+2*c*x+(-
4*a*c+b^2)^(1/2))/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2)*Ellipti
cE(2^(1/2)*(-(e*x+d)*c/(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d))^(1/2),(-
(e*(-4*a*c+b^2)^(1/2)+b*e-2*c*d)/(e*(-4*a*c+b^2)^(1/2)-b*e+2*c*d)
)^(1/2))*a*c*d*e^2)*(e*x+d)^(1/2)*(c*x^2+b*x+a)^(1/2)/(c*e*x^3+b*
e*x^2+c*d*x^2+a*e*x+b*d*x+a*d)/e^3
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Cx^2 + Bx + A}{\sqrt{cx^2 + bx + a}\sqrt{ex + d}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*sqrt(e*x + d)),x, algorithm="ma
```

```
[Out] integrate((C*x^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*sqrt(e*x + d))
, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Cx^2 + Bx + A}{\sqrt{cx^2 + bx + a}\sqrt{ex + d}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*sqrt(e*x + d)),x, algorithm="fr
```

```
[Out] integral((C*x^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*sqrt(e*x + d)),
 x)
```

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

$$\int \frac{A + Bx + Cx^2}{\sqrt{d + ex}\sqrt{a + bx + cx^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)/(e*x+d)**(1/2)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((A + B*x + C*x**2)/(sqrt(d + e*x)*sqrt(a + b*x + c*x**2)
), x)
```

GIAC/XCAS [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^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*sqrt(e*x + d)),x, algorithm="gi
```

```
[Out] Timed out
```

3.269 $\int \frac{A+Bx+Cx^2}{(d+ex)^{3/2}\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=508

$$-\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(Ce(bd-ae)-c\left(2Cd^2-e(Bd-Ae)\right)\right)E\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2cx+\sqrt{b^2-4ac}}{\sqrt{b^2-4ac}}}}{\sqrt{2}}\right)|-\frac{2\sqrt{b^2-4ac}e}{2cd-\left(b+\sqrt{b^2-4ac}\right)e}\right)}{ce^2\sqrt{a+bx+cx^2}\,(ae^2-bde+cd^2)\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}}$$

$$-\frac{2\sqrt{a+bx+cx^2}\left(Cd^2-e(Bd-Ae)\right)}{e\sqrt{d+ex}\,(ae^2-bde+cd^2)}$$

$$-\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}(2Cd-Be)\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}F\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2cx+\sqrt{b^2-4ac}}{\sqrt{b^2-4ac}}}}{\sqrt{2}}\right)|-\frac{2\sqrt{b^2-4ac}e}{2cd-\left(b+\sqrt{b^2-4ac}\right)e}\right)}{ce^2\sqrt{d+ex}\sqrt{a+bx+cx^2}}$$

```
[Out] (-2*(C*d^2 - e*(B*d - A*e))*Sqrt[a + b*x + c*x^2])/(e*(c*d^2 - b*
d*e + a*e^2)*Sqrt[d + e*x]) - (Sqrt[2]*Sqrt[b^2 - 4*a*c]*(C*e*(b*
d - a*e) - c*(2*C*d^2 - e*(B*d - A*e)))*Sqrt[d + e*x]*Sqrt[-((c*(
a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[ArcSin[Sqrt[(b + Sqrt
[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2
- 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(c*e^2*(c*d^2 -
 b*d*e + a*e^2)*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c
])*e)]*Sqrt[a + b*x + c*x^2]) - (2*Sqrt[2]*Sqrt[b^2 - 4*a*c]*(2*C
*d - B*e)*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]
*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sq
rt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (
-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(c*
e^2*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2])
```

Rubi [A] time = 1.68391, antiderivative size = 506, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.147$

$$\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(-Ce(bd-ae)-ce(Bd-Ae)+2cCd^2\right)E\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2cx+\sqrt{b^2-4ac}}{\sqrt{b^2-4ac}}}}{\sqrt{2}}\right)|-\frac{2\sqrt{b^2-4ac}e}{2cd-\left(b+\sqrt{b^2-4ac}\right)e}\right)}{ce^2\sqrt{a+bx+cx^2}\,(ae^2-bde+cd^2)\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}}$$

$$-\frac{2\sqrt{a+bx+cx^2}\left(Cd^2-e(Bd-Ae)\right)}{e\sqrt{d+ex}\,(ae^2-bde+cd^2)}$$

$$-\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}(2Cd-Be)\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}F\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2cx+\sqrt{b^2-4ac}}{\sqrt{b^2-4ac}}}}{\sqrt{2}}\right)|-\frac{2\sqrt{b^2-4ac}e}{2cd-\left(b+\sqrt{b^2-4ac}\right)e}\right)}{ce^2\sqrt{d+ex}\sqrt{a+bx+cx^2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)^(3/2)*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] (-2*(C*d^2 - e*(B*d - A*e))*Sqrt[a + b*x + c*x^2])/(e*(c*d^2 - b*
d*e + a*e^2)*Sqrt[d + e*x]) + (Sqrt[2]*Sqrt[b^2 - 4*a*c]*(2*c*C*d
^2 - C*e*(b*d - a*e) - c*e*(B*d - A*e))*Sqrt[d + e*x]*Sqrt[-((c*(
a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[ArcSin[Sqrt[(b + Sqrt
[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2
- 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(c*e^2*(c*d^2 -
 b*d*e + a*e^2)*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c
])*e)]*Sqrt[a + b*x + c*x^2]) - (2*Sqrt[2]*Sqrt[b^2 - 4*a*c]*(2*C
*d - B*e)*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]
*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sq
rt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (
-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(c*
e^2*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^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((C*x**2+B*x+A)/(e*x+d)**(3/2)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 13.769, size = 925, normalized size = 1.82

$$-\frac{2\sqrt{cx^2+bx+a}\left(\frac{i\sqrt{1-\frac{2\left(cd^2+e(ae-bd)\right)}{\left(2cd-be+\sqrt{\left(b^2-4ac\right)e^2}\right)(d+ex)}}\sqrt{\frac{2\left(cd^2+e(ae-bd)\right)}{\left(-2cd+be+\sqrt{\left(b^2-4ac\right)e^2}\right)(d+ex)}+1}\left(\left(2cd-be+\sqrt{(b^2-4ac)e^2}\right)\left(2cCd^2+Ce(ae-bd)+ce(Ae-Bd)\right)E\left(i\,\mathrm{s}\cdots\right.\right.}{\cdots}\right.}{\cdots}$$

$$-\frac{2\left(Cd^2-Bed+Ae^2\right)\left(cx^2+bx+a\right)}{e\left(cd^2-bed+ae^2\right)\sqrt{a+x(b+cx)}\sqrt{d+ex}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(A + B*x + C*x^2)/((d + e*x)^(3/2)*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] (-2*(C*d^2 - B*d*e + A*e^2)*(a + b*x + c*x^2))/(e*(c*d^2 - b*d*e
+ a*e^2)*Sqrt[d + e*x]*Sqrt[a + x*(b + c*x)]) - (2*(d + e*x)^(3/2
)*Sqrt[a + b*x + c*x^2]*(-((2*c*C*d^2 + C*e*(-(b*d) + a*e) + c*e*
(-(B*d) + A*e))*(c*(-1 + d/(d + e*x))^2 + (e*(b - (b*d)/(d + e*x)
 + (a*e)/(d + e*x)))/(d + e*x))) + ((I/2)*Sqrt[1 - (2*(c*d^2 + e*
(-(b*d) + a*e)))/((2*c*d - b*e + Sqrt[(b^2 - 4*a*c)*e^2])*(d + e*
x))]*Sqrt[1 + (2*(c*d^2 + e*(-(b*d) + a*e)))/((-2*c*d + b*e + Sqr
t[(b^2 - 4*a*c)*e^2])*(d + e*x))]*((2*c*d - b*e + Sqrt[(b^2 - 4*a
*c)*e^2])*(2*c*C*d^2 + C*e*(-(b*d) + a*e) + c*e*(-(B*d) + A*e))*E
llipticE[I*ArcSinh[(Sqrt[2]*Sqrt[(c*d^2 - b*d*e + a*e^2)/(-2*c*d
+ b*e + Sqrt[(b^2 - 4*a*c)*e^2])])/Sqrt[d + e*x]], -((-2*c*d + b*
e + Sqrt[(b^2 - 4*a*c)*e^2])/(2*c*d - b*e + Sqrt[(b^2 - 4*a*c)*e^
2]))] + (-(b^2*C*d*e^2) + 2*a*c*C*d*e^2 - 2*a*B*c*e^3 - 2*c*C*d^2
*Sqrt[(b^2 - 4*a*c)*e^2] + B*c*d*e*Sqrt[(b^2 - 4*a*c)*e^2] - a*C*
e^2*Sqrt[(b^2 - 4*a*c)*e^2] - A*c*e^2*(2*c*d + Sqrt[(b^2 - 4*a*c)
*e^2]) + b*(B*c*d*e^2 + A*c*e^3 + a*C*e^3 + C*d*e*Sqrt[(b^2 - 4*a
*c)*e^2]))*EllipticF[I*ArcSinh[(Sqrt[2]*Sqrt[(c*d^2 - b*d*e + a*e
^2)/(-2*c*d + b*e + Sqrt[(b^2 - 4*a*c)*e^2])])/Sqrt[d + e*x]], -(
(-2*c*d + b*e + Sqrt[(b^2 - 4*a*c)*e^2])/(2*c*d - b*e + Sqrt[(b^2
 - 4*a*c)*e^2]))]))/(Sqrt[2]*Sqrt[(c*d^2 + e*(-(b*d) + a*e))/(-2*
c*d + b*e + Sqrt[(b^2 - 4*a*c)*e^2])]*Sqrt[d + e*x])))/(c*e^3*(c*
d^2 - b*d*e + a*e^2)*Sqrt[a + x*(b + c*x)]*Sqrt[((d + e*x)^2*(c*(
-1 + d/(d + e*x))^2 + (e*(b - (b*d)/(d + e*x) + (a*e)/(d + e*x)))
/(d + e*x)))/e^2])
```

Maple [B] time = 0.072, size = 6053, normalized size = 11.9

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((C*x^2+B*x+A)/(e*x+d)^(3/2)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Cx^2 + Bx + A}{\sqrt{cx^2 + bx + a}(ex + d)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*(e*x + d)^(3/2)),x, algorithm='
```

```
[Out] integrate((C*x^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*(e*x + d)^(3/2
)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Cx^2 + Bx + A}{\sqrt{cx^2 + bx + a}(ex + d)^{\frac{3}{2}}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*(e*x + d)^(3/2)),x, algorithm='
```

```
[Out] integral((C*x^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*(e*x + d)^(3/2)
), x)
```

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

$$\int \frac{A + Bx + Cx^2}{(d + ex)^{\frac{3}{2}}\sqrt{a + bx + cx^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)/(e*x+d)**(3/2)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((A + B*x + C*x**2)/((d + e*x)**(3/2)*sqrt(a + b*x + c*x*
*2)), x)
```

GIAC/XCAS [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^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*(e*x + d)^(3/2)),x, algorithm='
```

```
[Out] Timed out
```

3.270 $\int \frac{A+Bx+Cx^2}{(d+ex)^{5/2}\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=684

$$-\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}\left(3Ce(bd-ae)-c\left(e(Bd-Ae)+2Cd^2\right)\right)F\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2cx+\sqrt{b^2-4ac}}{\sqrt{b^2-4ac}}}}{\sqrt{2}}\right)\middle|-\frac{\cdots}{2cd\cdots}\right.}{3ce^2\sqrt{d+ex}\sqrt{a+bx+cx^2}\,(ae^2-bde+cd^2)}$$

$$-\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(e\left(3ae(2Cd-Be)-b\left(-2Ae^2-Bde+4Cd^2\right)\right)+cd\left(e(Bd-4Ae)+2Cd^2\right)\right)E\left(\sin^{-1}\cdots\right.}{3e^2\sqrt{a+bx+cx^2}\,(ae^2-bde+cd^2)^2\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}}$$

$$-\frac{2\sqrt{a+bx+cx^2}\left(Cd^2-e(Bd-Ae)\right)}{3e(d+ex)^{3/2}\,(ae^2-bde+cd^2)}$$

$$+\frac{2\sqrt{a+bx+cx^2}\left(e\left(3ae(2Cd-Be)-b\left(-2Ae^2-Bde+4Cd^2\right)\right)+cd\left(e(Bd-4Ae)+2Cd^2\right)\right)}{3e\sqrt{d+ex}\,(ae^2-bde+cd^2)^2}$$

```
[Out] (-2*(C*d^2 - e*(B*d - A*e))*Sqrt[a + b*x + c*x^2])/(3*e*(c*d^2 -
b*d*e + a*e^2)*(d + e*x)^(3/2)) + (2*(c*d*(2*C*d^2 + e*(B*d - 4*A
*e)) + e*(3*a*e*(2*C*d - B*e) - b*(4*C*d^2 - B*d*e - 2*A*e^2)))*S
qrt[a + b*x + c*x^2])/(3*e*(c*d^2 - b*d*e + a*e^2)^2*Sqrt[d + e*x
]) - (Sqrt[2]*Sqrt[b^2 - 4*a*c]*(c*d*(2*C*d^2 + e*(B*d - 4*A*e))
+ e*(3*a*e*(2*C*d - B*e) - b*(4*C*d^2 - B*d*e - 2*A*e^2)))*Sqrt[d
 + e*x]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[Ar
cSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt
[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e
)])/(3*e^2*(c*d^2 - b*d*e + a*e^2)^2*Sqrt[(c*(d + e*x))/(2*c*d -
(b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) - (2*Sqrt[2]*S
qrt[b^2 - 4*a*c]*(3*C*e*(b*d - a*e) - c*(2*C*d^2 + e*(B*d - A*e))
)*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[-(
(c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sqrt[(b +
Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[
b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(3*c*e^2*(c
*d^2 - b*d*e + a*e^2)*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2])
```

Rubi [A] time = 2.87183, antiderivative size = 680, normalized size of antiderivative = 0.99, number

of steps used = 7, number of rules used = 6, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.176$

$$\frac{2\sqrt{2}\sqrt{b^2-4ac}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}\left(-3Ce(bd-ae)+ce(Bd-Ae)+2cCd^2\right)F\left(\sin^{-1}\left(\frac{\sqrt{\frac{b+2cx+\sqrt{b^2-4ac}}{\sqrt{b^2-4ac}}}}{\sqrt{2}}\right)\middle|-\frac{2\cdots}{2cd-(\cdots}\right.\cdots}{3ce^2\sqrt{d+ex}\sqrt{a+bx+cx^2}\left(ae^2-bde+cd^2\right)}$$

$$-\frac{\sqrt{2}\sqrt{b^2-4ac}\sqrt{d+ex}\sqrt{-\frac{c(a+bx+cx^2)}{b^2-4ac}}\left(3ae^2(2Cd-Be)-be\left(4Cd^2-e(2Ae+Bd)\right)+cde(Bd-4Ae)+2cCd^3\right)E\left(\sin^{-1}\left(\frac{\sqrt{b\cdots}}{\cdots}\right.\right.\cdots}{3e^2\sqrt{a+bx+cx^2}\left(ae^2-bde+cd^2\right)^2\sqrt{\frac{c(d+ex)}{2cd-e\left(\sqrt{b^2-4ac}+b\right)}}}$$

$$-\frac{2\sqrt{a+bx+cx^2}\left(Cd^2-e(Bd-Ae)\right)}{3e(d+ex)^{3/2}\left(ae^2-bde+cd^2\right)}$$

$$+\frac{2\sqrt{a+bx+cx^2}\left(3ae^2(2Cd-Be)-be\left(4Cd^2-e(2Ae+Bd)\right)+cde(Bd-4Ae)+2cCd^3\right)}{3e\sqrt{d+ex}\left(ae^2-bde+cd^2\right)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)^(5/2)*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] (-2*(C*d^2 - e*(B*d - A*e))*Sqrt[a + b*x + c*x^2])/(3*e*(c*d^2 -
b*d*e + a*e^2)*(d + e*x)^(3/2)) + (2*(2*c*C*d^3 + c*d*e*(B*d - 4*
A*e) + 3*a*e^2*(2*C*d - B*e) - b*e*(4*C*d^2 - e*(B*d + 2*A*e)))*S
qrt[a + b*x + c*x^2])/(3*e*(c*d^2 - b*d*e + a*e^2)^2*Sqrt[d + e*x
]) - (Sqrt[2]*Sqrt[b^2 - 4*a*c]*(2*c*C*d^3 + c*d*e*(B*d - 4*A*e)
+ 3*a*e^2*(2*C*d - B*e) - b*e*(4*C*d^2 - e*(B*d + 2*A*e)))*Sqrt[d
 + e*x]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[Ar
cSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt
[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e
)])/(3*e^2*(c*d^2 - b*d*e + a*e^2)^2*Sqrt[(c*(d + e*x))/(2*c*d -
(b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) + (2*Sqrt[2]*S
qrt[b^2 - 4*a*c]*(2*c*C*d^2 - 3*C*e*(b*d - a*e) + c*e*(B*d - A*e)
)*Sqrt[(c*(d + e*x))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[-(
(c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sqrt[(b +
Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[
b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(3*c*e^2*(c
*d^2 - b*d*e + a*e^2)*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^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((C*x**2+B*x+A)/(e*x+d)**(5/2)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 14.5592, size = 6924, normalized size = 10.12

Result too large to show

Warning: Unable to verify antiderivative.

```
[In] Integrate[(A + B*x + C*x^2)/((d + e*x)^(5/2)*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] Result too large to show
```

Maple [B] time = 0.118, size = 20481, normalized size = 29.9

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((C*x^2+B*x+A)/(e*x+d)^(5/2)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Cx^2 + Bx + A}{\sqrt{cx^2 + bx + a}(ex + d)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*(e*x + d)^(5/2)),x, algorithm='
```

```
[Out] integrate((C*x^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*(e*x + d)^(5/2
)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Cx^2 + Bx + A}{(e^2x^2 + 2\,dex + d^2)\sqrt{cx^2 + bx + a}\sqrt{ex + d}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*(e*x + d)^(5/2)),x, algorithm='
```

```
[Out] integral((C*x^2 + B*x + A)/((e^2*x^2 + 2*d*e*x + d^2)*sqrt(c*x^2
+ b*x + a)*sqrt(e*x + d)), x)
```

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

$$\int \frac{A + Bx + Cx^2}{(d + ex)^{\frac{5}{2}} \sqrt{a + bx + cx^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x**2+B*x+A)/(e*x+d)**(5/2)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((A + B*x + C*x**2)/((d + e*x)**(5/2)*sqrt(a + b*x + c*x*
*2)), x)
```

GIAC/XCAS [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^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*(e*x + d)^(5/2)),x, algorithm='
```

```
[Out] Timed out
```

3.271 $\int \frac{A+Bx+Cx^2}{(d+ex)^{7/2}\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=944

$$-\frac{2\sqrt{cx^2+bx+a}\left(Cd^2-e(Bd-Ae)\right)}{5e\left(cd^2-bed+ae^2\right)(d+ex)^{5/2}}$$

$$-\frac{\sqrt{2}\sqrt{b^2-4ac}\left(c^2\left(2Cd^2+e(3Bd-23Ae)\right)d^2-e^2\left(\left(3Cd^2+2Bed+8Ae^2\right)b^2-10ae(Cd+Be)b+15a^2Ce^2\right)-ce\left(bd\left(7Cd^2\right.\right.\right.}{15e^2\left(cd^2-bed+ae^2\right)^3\sqrt{\frac{}{2cd}}}$$

$$+\frac{2\sqrt{2}\sqrt{b^2-4ac}\left(cd\left(2Cd^2+e(3Bd-8Ae)\right)+e\left(5ae(2Cd-Be)-b\left(6Cd^2-Bed-4Ae^2\right)\right)\right)\sqrt{\frac{c(d+ex)}{2cd-\left(b+\sqrt{b^2-4ac}\right)e}}\sqrt{-\frac{c(cx^2+bx}{b^2-4ac}}}{15e^2\left(cd^2-bed+ae^2\right)^2\sqrt{d+ex}\sqrt{cx^2+bx+a}}$$

$$+\frac{2\left(c^2\left(2Cd^2+e(3Bd-23Ae)\right)d^2-e^2\left(\left(3Cd^2+2Bed+8Ae^2\right)b^2-10ae(Cd+Be)b+15a^2Ce^2\right)-ce\left(bd\left(7Cd^2-7Bed-2\right.\right.\right.}{15e\left(cd^2-bed+ae^2\right)^3\sqrt{d+ex}}$$

$$+\frac{2\left(cd\left(2Cd^2+e(3Bd-8Ae)\right)+e\left(5ae(2Cd-Be)-b\left(6Cd^2-Bed-4Ae^2\right)\right)\right)\sqrt{cx^2+bx+a}}{15e\left(cd^2-bed+ae^2\right)^2(d+ex)^{3/2}}$$

```
[Out] (-2*(C*d^2 - e*(B*d - A*e))*Sqrt[a + b*x + c*x^2])/(5*e*(c*d^2 -
b*d*e + a*e^2)*(d + e*x)^(5/2)) + (2*(c*d*(2*C*d^2 + e*(3*B*d - 8
*A*e)) + e*(5*a*e*(2*C*d - B*e) - b*(6*C*d^2 - B*d*e - 4*A*e^2)))
*Sqrt[a + b*x + c*x^2])/(15*e*(c*d^2 - b*d*e + a*e^2)^2*(d + e*x)
^(3/2)) + (2*(c^2*d^2*(2*C*d^2 + e*(3*B*d - 23*A*e)) - e^2*(15*a^
2*C*e^2 - 10*a*b*e*(C*d + B*e) + b^2*(3*C*d^2 + 2*B*d*e + 8*A*e^2
)) - c*e*(b*d*(7*C*d^2 - 7*B*d*e - 23*A*e^2) - a*e*(19*C*d^2 - 29
*B*d*e + 9*A*e^2)))*Sqrt[a + b*x + c*x^2])/(15*e*(c*d^2 - b*d*e +
 a*e^2)^3*Sqrt[d + e*x]) - (Sqrt[2]*Sqrt[b^2 - 4*a*c]*(c^2*d^2*(2
*C*d^2 + e*(3*B*d - 23*A*e)) - e^2*(15*a^2*C*e^2 - 10*a*b*e*(C*d
+ B*e) + b^2*(3*C*d^2 + 2*B*d*e + 8*A*e^2)) - c*e*(b*d*(7*C*d^2 -
 7*B*d*e - 23*A*e^2) - a*e*(19*C*d^2 - 29*B*d*e + 9*A*e^2)))*Sqrt
[d + e*x]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[
ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sq
rt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])
*e)])/(15*e^2*(c*d^2 - b*d*e + a*e^2)^3*Sqrt[(c*(d + e*x))/(2*c*d
 - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) + (2*Sqrt[2
]*Sqrt[b^2 - 4*a*c]*(c*d*(2*C*d^2 + e*(3*B*d - 8*A*e)) + e*(5*a*e
*(2*C*d - B*e) - b*(6*C*d^2 - B*d*e - 4*A*e^2)))*Sqrt[(c*(d + e*x
))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[-((c*(a + b*x + c*x^
2))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c]
+ 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2
*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(15*e^2*(c*d^2 - b*d*e + a*e^
2)^2*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^2])
```

Rubi [A] time = 5.93438, antiderivative size = 942, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.176

$$-\frac{2\sqrt{cx^2+bx+a}\,(Cd^2-e(Bd-Ae))}{5e\,(cd^2-bed+ae^2)\,(d+ex)^{5/2}}$$

$$-\frac{\sqrt{2}\sqrt{b^2-4ac}\,\left(\left(2Cd^4+e(3Bd-23Ae)d^2\right)c^2-e\left(bd\left(7Cd^2-7Bed-23Ae^2\right)-ae\left(19Cd^2-29Bed+9Ae^2\right)\right)c-e^2\left(\left(3Cd\right.\right.\right.}{15e^2\,(cd^2-bed+ae^2)^3\sqrt{\frac{}{2cd}}}$$

$$+\frac{2\sqrt{2}\sqrt{b^2-4ac}\,\left(2cCd^3+ce(3Bd-8Ae)d+5ae^2(2Cd-Be)-be\left(6Cd^2-e(Bd+4Ae)\right)\right)\sqrt{\frac{c(d+ex)}{2cd-\left(b+\sqrt{b^2-4ac}\right)e}}\sqrt{-\frac{c(cx^2+bx+a)}{b^2-4ac}}}{15e^2\,(cd^2-bed+ae^2)^2\sqrt{d+ex}\sqrt{cx^2+bx+a}}$$

$$+\frac{2\left(\left(2Cd^4+e(3Bd-23Ae)d^2\right)c^2-e\left(bd\left(7Cd^2-7Bed-23Ae^2\right)-ae\left(19Cd^2-29Bed+9Ae^2\right)\right)c-e^2\left(\left(3Cd^2+2Bed+8\right.\right.\right.}{15e\,(cd^2-bed+ae^2)^3\sqrt{d+ex}}$$

$$+\frac{2\left(2cCd^3+ce(3Bd-8Ae)d+5ae^2(2Cd-Be)-be\left(6Cd^2-e(Bd+4Ae)\right)\right)\sqrt{cx^2+bx+a}}{15e\,(cd^2-bed+ae^2)^2\,(d+ex)^{3/2}}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(A + B*x + C*x^2)/((d + e*x)^(7/2)*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] (-2*(C*d^2 - e*(B*d - A*e))*Sqrt[a + b*x + c*x^2])/(5*e*(c*d^2 -
b*d*e + a*e^2)*(d + e*x)^(5/2)) + (2*(2*c*C*d^3 + c*d*e*(3*B*d -
8*A*e) + 5*a*e^2*(2*C*d - B*e) - b*e*(6*C*d^2 - e*(B*d + 4*A*e)))
*Sqrt[a + b*x + c*x^2])/(15*e*(c*d^2 - b*d*e + a*e^2)^2*(d + e*x)
^(3/2)) + (2*(c^2*(2*C*d^4 + d^2*e*(3*B*d - 23*A*e)) - e^2*(15*a^
2*C*e^2 - 10*a*b*e*(C*d + B*e) + b^2*(3*C*d^2 + 2*B*d*e + 8*A*e^2
)) - c*e*(b*d*(7*C*d^2 - 7*B*d*e - 23*A*e^2) - a*e*(19*C*d^2 - 29
*B*d*e + 9*A*e^2)))*Sqrt[a + b*x + c*x^2])/(15*e*(c*d^2 - b*d*e +
 a*e^2)^3*Sqrt[d + e*x]) - (Sqrt[2]*Sqrt[b^2 - 4*a*c]*(c^2*(2*C*d
^4 + d^2*e*(3*B*d - 23*A*e)) - e^2*(15*a^2*C*e^2 - 10*a*b*e*(C*d
+ B*e) + b^2*(3*C*d^2 + 2*B*d*e + 8*A*e^2)) - c*e*(b*d*(7*C*d^2 -
 7*B*d*e - 23*A*e^2) - a*e*(19*C*d^2 - 29*B*d*e + 9*A*e^2)))*Sqrt
[d + e*x]*Sqrt[-((c*(a + b*x + c*x^2))/(b^2 - 4*a*c))]*EllipticE[
ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sq
rt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2*c*d - (b + Sqrt[b^2 - 4*a*c])
*e)])/(15*e^2*(c*d^2 - b*d*e + a*e^2)^3*Sqrt[(c*(d + e*x))/(2*c*d
 - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[a + b*x + c*x^2]) + (2*Sqrt[2
]*Sqrt[b^2 - 4*a*c]*(2*c*C*d^3 + c*d*e*(3*B*d - 8*A*e) + 5*a*e^2*
(2*C*d - B*e) - b*e*(6*C*d^2 - e*(B*d + 4*A*e)))*Sqrt[(c*(d + e*x
))/(2*c*d - (b + Sqrt[b^2 - 4*a*c])*e)]*Sqrt[-((c*(a + b*x + c*x^
2))/(b^2 - 4*a*c))]*EllipticF[ArcSin[Sqrt[(b + Sqrt[b^2 - 4*a*c]
+ 2*c*x)/Sqrt[b^2 - 4*a*c]]/Sqrt[2]], (-2*Sqrt[b^2 - 4*a*c]*e)/(2
*c*d - (b + Sqrt[b^2 - 4*a*c])*e)])/(15*e^2*(c*d^2 - b*d*e + a*e^
2)^2*Sqrt[d + e*x]*Sqrt[a + b*x + c*x^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((C*x**2+B*x+A)/(e*x+d)**(7/2)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 18.1447, size = 12295, normalized size = 13.02

Result too large to show

Warning: Unable to verify antiderivative.

```
[In] Integrate[(A + B*x + C*x^2)/((d + e*x)^(7/2)*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] Result too large to show
```

Maple [B] time = 0.211, size = 46695, normalized size = 49.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((C*x^2+B*x+A)/(e*x+d)^(7/2)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{Cx^2 + Bx + A}{\sqrt{cx^2 + bx + a}(ex + d)^{\frac{7}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*(e*x + d)^(7/2)),x, algorithm='
```

```
[Out] integrate((C*x^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*(e*x + d)^(7/2
)), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{Cx^2 + Bx + A}{(e^3x^3 + 3\,de^2x^2 + 3\,d^2ex + d^3)\sqrt{cx^2 + bx + a}\sqrt{ex + d}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*(e*x + d)^(7/2)),x, algorithm='
```

```
[Out] integral((C*x^2 + B*x + A)/((e^3*x^3 + 3*d*e^2*x^2 + 3*d^2*e*x +
d^3)*sqrt(c*x^2 + b*x + a)*sqrt(e*x + d)), 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((C*x**2+B*x+A)/(e*x+d)**(7/2)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [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^2 + B*x + A)/(sqrt(c*x^2 + b*x + a)*(e*x + d)^(7/2)),x, algorithm='
```

```
[Out] Timed out
```

3.272 $\int (g+hx)^m \left(a+bx+cx^2\right)^p \left(d+ex+fx^2\right) \, dx$

Optimal. Leaf size=510

$$\frac{(g+hx)^{m+1}\left(a+bx+cx^2\right)^p\left(1-\frac{2c(g+hx)}{2cg-h\left(b-\sqrt{b^2-4ac}\right)}\right)^{-p}\left(1-\frac{2c(g+hx)}{2cg-h\left(\sqrt{b^2-4ac}+b\right)}\right)^{-p}F_1\left(m+1;-p,-p;m+2;\frac{2c(g+hx)}{2cg-\left(b-\sqrt{b^2-4ac}\right)h}\right.}{ch^3(m+1)(m+2p+3)}$$

$$-\frac{(g+hx)^{m+2}\left(a+bx+cx^2\right)^p\left(1-\frac{2c(g+hx)}{2cg-h\left(b-\sqrt{b^2-4ac}\right)}\right)^{-p}\left(1-\frac{2c(g+hx)}{2cg-h\left(\sqrt{b^2-4ac}+b\right)}\right)^{-p}(bfh(m+p+2)+c(2fg(p+1)-eh(m}{ch^3(m+2)(m+2p+3)}$$

$$+\frac{f(g+hx)^{m+1}\left(a+bx+cx^2\right)^{p+1}}{ch(m+2p+3)}$$

```
[Out] (f*(g + h*x)^(1 + m)*(a + b*x + c*x^2)^(1 + p))/(c*h*(3 + m + 2*p
)) + ((f*h*(b*g - a*h)*(1 + m) + c*(2*f*g^2*(1 + p) - h*(e*g - d*
h)*(3 + m + 2*p)))*(g + h*x)^(1 + m)*(a + b*x + c*x^2)^p*AppellF1
[1 + m, -p, -p, 2 + m, (2*c*(g + h*x))/(2*c*g - (b - Sqrt[b^2 - 4
*a*c])*h), (2*c*(g + h*x))/(2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)])/
(c*h^3*(1 + m)*(3 + m + 2*p)*(1 - (2*c*(g + h*x))/(2*c*g - (b - S
qrt[b^2 - 4*a*c])*h))^p*(1 - (2*c*(g + h*x))/(2*c*g - (b + Sqrt[b
^2 - 4*a*c])*h))^p) - ((b*f*h*(2 + m + p) + c*(2*f*g*(1 + p) - e*
h*(3 + m + 2*p)))*(g + h*x)^(2 + m)*(a + b*x + c*x^2)^p*AppellF1[
2 + m, -p, -p, 3 + m, (2*c*(g + h*x))/(2*c*g - (b - Sqrt[b^2 - 4*
a*c])*h), (2*c*(g + h*x))/(2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)])/(
c*h^3*(2 + m)*(3 + m + 2*p)*(1 - (2*c*(g + h*x))/(2*c*g - (b - Sq
rt[b^2 - 4*a*c])*h))^p*(1 - (2*c*(g + h*x))/(2*c*g - (b + Sqrt[b^
2 - 4*a*c])*h))^p)
```

Rubi [A] time = 1.90381, antiderivative size = 508, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.133$

$$\frac{(g+hx)^{m+1}\left(a+bx+cx^2\right)^p\left(1-\frac{2c(g+hx)}{2cg-h\left(b-\sqrt{b^2-4ac}\right)}\right)^{-p}\left(1-\frac{2c(g+hx)}{2cg-h\left(\sqrt{b^2-4ac}+b\right)}\right)^{-p}F_1\left(m+1;-p,-p;m+2;\frac{2c(g+hx)}{2cg-\left(b-\sqrt{b^2-4ac}\right)h}\right.}{ch^3(m+1)(m+2p+3)}$$

$$-\frac{(g+hx)^{m+2}\left(a+bx+cx^2\right)^p\left(1-\frac{2c(g+hx)}{2cg-h\left(b-\sqrt{b^2-4ac}\right)}\right)^{-p}\left(1-\frac{2c(g+hx)}{2cg-h\left(\sqrt{b^2-4ac}+b\right)}\right)^{-p}(bfh(m+p+2)-ceh(m+2p+3)+2c}{ch^3(m+2)(m+2p+3)}$$

$$+\frac{f(g+hx)^{m+1}\left(a+bx+cx^2\right)^{p+1}}{ch(m+2p+3)}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(g + h*x)^m*(a + b*x + c*x^2)^p*(d + e*x + f*x^2),x]
```

```
[Out] (f*(g + h*x)^(1 + m)*(a + b*x + c*x^2)^(1 + p))/(c*h*(3 + m + 2*p
)) + ((f*h*(b*g - a*h)*(1 + m) + 2*c*f*g^2*(1 + p) - c*h*(e*g - d
*h)*(3 + m + 2*p))*(g + h*x)^(1 + m)*(a + b*x + c*x^2)^p*AppellF1
[1 + m, -p, -p, 2 + m, (2*c*(g + h*x))/(2*c*g - (b - Sqrt[b^2 - 4
*a*c])*h), (2*c*(g + h*x))/(2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)])/
(c*h^3*(1 + m)*(3 + m + 2*p)*(1 - (2*c*(g + h*x))/(2*c*g - (b - S
qrt[b^2 - 4*a*c])*h))^p*(1 - (2*c*(g + h*x))/(2*c*g - (b + Sqrt[b
^2 - 4*a*c])*h))^p) - ((2*c*f*g*(1 + p) + b*f*h*(2 + m + p) - c*e
*h*(3 + m + 2*p))*(g + h*x)^(2 + m)*(a + b*x + c*x^2)^p*AppellF1[
2 + m, -p, -p, 3 + m, (2*c*(g + h*x))/(2*c*g - (b - Sqrt[b^2 - 4*
a*c])*h), (2*c*(g + h*x))/(2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)])/(
c*h^3*(2 + m)*(3 + m + 2*p)*(1 - (2*c*(g + h*x))/(2*c*g - (b - Sq
rt[b^2 - 4*a*c])*h))^p*(1 - (2*c*(g + h*x))/(2*c*g - (b + Sqrt[b^
2 - 4*a*c])*h))^p)
```

Rubi in Sympy [A] time = 174.741, size = 481, normalized size = 0.94

$$\frac{f\left(g+hx\right)^{m+1}\left(a+bx+cx^{2}\right)^{p+1}}{ch\left(m+2p+3\right)}-\frac{\left(g+hx\right)^{m+1}\left(g\left(-bfh\left(m+p+2\right)+c\left(eh\left(m+2p+3\right)-2fg\left(p+1\right)\right)\right)+h\left(bfg\left(p+1\right)+h\left(af\left(m+1\right)-cd\left(m+2p+3\right)\right)\right)\right)\left(\cdots\right.}{ch^{3}\cdots}+\frac{\left(g+hx\right)^{m+2}\left(\frac{c\left(-2g-2hx\right)}{2cg-h\left(b+\sqrt{-4ac+b^{2}}\right)}+1\right)^{-p}\left(\frac{c\left(2g+2hx\right)}{bh-2cg-h\sqrt{-4ac+b^{2}}}+1\right)^{-p}\left(-bfh\left(m+p+2\right)+c\left(eh\left(m+2p+3\right)-2fg\left(p+1\right)\right)\right)\left(a\cdots\right.}{ch^{3}\left(m+2\right)\left(m+2p+3\right)\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)**m*(c*x**2+b*x+a)**p*(f*x**2+e*x+d),x)
```

```
[Out] f*(g + h*x)**(m + 1)*(a + b*x + c*x**2)**(p + 1)/(c*h*(m + 2*p +
3)) - (g + h*x)**(m + 1)*(g*(-b*f*h*(m + p + 2) + c*(e*h*(m + 2*p
 + 3) - 2*f*g*(p + 1))) + h*(b*f*g*(p + 1) + h*(a*f*(m + 1) - c*d
*(m + 2*p + 3))))*(c*(-2*g - 2*h*x)/(2*c*g - h*(b + sqrt(-4*a*c +
 b**2))) + 1)**(-p)*(c*(2*g + 2*h*x)/(b*h - 2*c*g - h*sqrt(-4*a*c
 + b**2)) + 1)**(-p)*(a + b*x + c*x**2)**p*appellf1(m + 1, -p, -p
, m + 2, c*(-2*g - 2*h*x)/(b*h - 2*c*g - h*sqrt(-4*a*c + b**2)),
c*(2*g + 2*h*x)/(2*c*g - h*(b + sqrt(-4*a*c + b**2))))/(c*h**3*(m
 + 1)*(m + 2*p + 3)) + (g + h*x)**(m + 2)*(c*(-2*g - 2*h*x)/(2*c*
g - h*(b + sqrt(-4*a*c + b**2))) + 1)**(-p)*(c*(2*g + 2*h*x)/(b*h
 - 2*c*g - h*sqrt(-4*a*c + b**2)) + 1)**(-p)*(-b*f*h*(m + p + 2)
+ c*(e*h*(m + 2*p + 3) - 2*f*g*(p + 1)))*(a + b*x + c*x**2)**p*ap
pellf1(m + 2, -p, -p, m + 3, c*(-2*g - 2*h*x)/(b*h - 2*c*g - h*sq
rt(-4*a*c + b**2)), c*(2*g + 2*h*x)/(2*c*g - h*(b + sqrt(-4*a*c +
```

```
b**2))))/(c*h**3*(m + 2)*(m + 2*p + 3))
```

Mathematica [A] time = 2.99378, size = 0, normalized size = 0.

$$\int (g+hx)^m \left(a+bx+cx^2\right)^p \left(d+ex+fx^2\right)\, dx$$

Verification is Not applicable to the result.

```
[In]  Integrate[(g + h*x)^m*(a + b*x + c*x^2)^p*(d + e*x + f*x^2),x]
```

```
[Out] Integrate[(g + h*x)^m*(a + b*x + c*x^2)^p*(d + e*x + f*x^2), x]
```

Maple [F] time = 0.185, size = 0, normalized size = 0.

$$\int (hx+g)^m \left(cx^2+bx+a\right)^p \left(fx^2+ex+d\right)\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^m*(c*x^2+b*x+a)^p*(f*x^2+e*x+d),x)
```

```
[Out] int((h*x+g)^m*(c*x^2+b*x+a)^p*(f*x^2+e*x+d),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(fx^2+ex+d\right)\left(cx^2+bx+a\right)^p (hx+g)^m\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(c*x^2 + b*x + a)^p*(h*x + g)^m,x, algorithm="maxima")
```

```
[Out] integrate((f*x^2 + e*x + d)*(c*x^2 + b*x + a)^p*(h*x + g)^m, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\left(fx^2+ex+d\right)\left(cx^2+bx+a\right)^p (hx+g)^m, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(c*x^2 + b*x + a)^p*(h*x + g)^m,x, algorithm="fricas")
```

```
[Out] integral((f*x^2 + e*x + d)*(c*x^2 + b*x + a)^p*(h*x + g)^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((h*x+g)**m*(c*x**2+b*x+a)**p*(f*x**2+e*x+d),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (fx^2 + ex + d)(cx^2 + bx + a)^p (hx + g)^m \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(c*x^2 + b*x + a)^p*(h*x + g)^m,x, algorithm="giac")
```

```
[Out] integrate((f*x^2 + e*x + d)*(c*x^2 + b*x + a)^p*(h*x + g)^m, x)
```

3.273 $\int (g+hx)^m \sqrt{a+bx+cx^2}\left(d+ex+fx^2\right)\,dx$

Optimal. Leaf size=496

$$\frac{\sqrt{a+bx+cx^2}(g+hx)^{m+1}F_1\left(m+1;-\frac{1}{2},-\frac{1}{2};m+2;\frac{2c(g+hx)}{2cg-\left(b-\sqrt{b^2-4ac}\right)h},\frac{2c(g+hx)}{2cg-\left(b+\sqrt{b^2-4ac}\right)h}\right)\left(fh(m+1)(bg-ah)+c\left(3fg^2-h\right.\right.}{ch^3(m+1)(m+4)\sqrt{1-\frac{2c(g+hx)}{2cg-h\left(b-\sqrt{b^2-4ac}\right)}}\sqrt{1-\frac{2c(g+hx)}{2cg-h\left(\sqrt{b^2-4ac}+b\right)}}}$$
$$-\frac{\sqrt{a+bx+cx^2}(g+hx)^{m+2}(bfh(2m+5)+c(6fg-2eh(m+4)))F_1\left(m+2;-\frac{1}{2},-\frac{1}{2};m+3;\frac{2c(g+hx)}{2cg-\left(b-\sqrt{b^2-4ac}\right)h},\frac{2c(g+hx)}{2cg-\left(b+\sqrt{b^2-4ac}\right)}\right.}{2ch^3(m+2)(m+4)\sqrt{1-\frac{2c(g+hx)}{2cg-h\left(b-\sqrt{b^2-4ac}\right)}}\sqrt{1-\frac{2c(g+hx)}{2cg-h\left(\sqrt{b^2-4ac}+b\right)}}}$$
$$+\frac{f\left(a+bx+cx^2\right)^{3/2}(g+hx)^{m+1}}{ch(m+4)}$$

```
[Out] (f*(g + h*x)^(1 + m)*(a + b*x + c*x^2)^(3/2))/(c*h*(4 + m)) + ((f
*h*(b*g - a*h)*(1 + m) + c*(3*f*g^2 - h*(e*g - d*h)*(4 + m)))*(g
+ h*x)^(1 + m)*Sqrt[a + b*x + c*x^2]*AppellF1[1 + m, -1/2, -1/2,
2 + m, (2*c*(g + h*x))/(2*c*g - (b - Sqrt[b^2 - 4*a*c])*h), (2*c*
(g + h*x))/(2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)])/(c*h^3*(1 + m)*(
4 + m)*Sqrt[1 - (2*c*(g + h*x))/(2*c*g - (b - Sqrt[b^2 - 4*a*c])*
h)]*Sqrt[1 - (2*c*(g + h*x))/(2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)]
) - ((b*f*h*(5 + 2*m) + c*(6*f*g - 2*e*h*(4 + m)))*(g + h*x)^(2 +
 m)*Sqrt[a + b*x + c*x^2]*AppellF1[2 + m, -1/2, -1/2, 3 + m, (2*c
*(g + h*x))/(2*c*g - (b - Sqrt[b^2 - 4*a*c])*h), (2*c*(g + h*x))/
(2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)])/(2*c*h^3*(2 + m)*(4 + m)*Sq
rt[1 - (2*c*(g + h*x))/(2*c*g - (b - Sqrt[b^2 - 4*a*c])*h)]*Sqrt[
1 - (2*c*(g + h*x))/(2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)])
```

Rubi [A] time = 2.09833, antiderivative size = 494, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$

$$\frac{\sqrt{a+bx+cx^2}(g+hx)^{m+1}F_1\left(m+1;-\frac{1}{2},-\frac{1}{2};m+2;\frac{2c(g+hx)}{2cg-\left(b-\sqrt{b^2-4ac}\right)h},\frac{2c(g+hx)}{2cg-\left(b+\sqrt{b^2-4ac}\right)h}\right)\left(fh(m+1)(bg-ah)-ch(m+4)(e\right.}{ch^3(m+1)(m+4)\sqrt{1-\frac{2c(g+hx)}{2cg-h\left(b-\sqrt{b^2-4ac}\right)}}\sqrt{1-\frac{2c(g+hx)}{2cg-h\left(\sqrt{b^2-4ac}+b\right)}}}$$
$$-\frac{\sqrt{a+bx+cx^2}(g+hx)^{m+2}(bfh(2m+5)-2ceh(m+4)+6cfg)F_1\left(m+2;-\frac{1}{2},-\frac{1}{2};m+3;\frac{2c(g+hx)}{2cg-\left(b-\sqrt{b^2-4ac}\right)h},\frac{2c(g+hx)}{2cg-\left(b+\sqrt{b^2-4ac}\right)}\right.}{2ch^3(m+2)(m+4)\sqrt{1-\frac{2c(g+hx)}{2cg-h\left(b-\sqrt{b^2-4ac}\right)}}\sqrt{1-\frac{2c(g+hx)}{2cg-h\left(\sqrt{b^2-4ac}+b\right)}}}$$
$$+\frac{f\left(a+bx+cx^2\right)^{3/2}(g+hx)^{m+1}}{ch(m+4)}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(g + h*x)^m*Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] (f*(g + h*x)^(1 + m)*(a + b*x + c*x^2)^(3/2))/(c*h*(4 + m)) + ((3
*c*f*g^2 + f*h*(b*g - a*h)*(1 + m) - c*h*(e*g - d*h)*(4 + m))*(g
+ h*x)^(1 + m)*Sqrt[a + b*x + c*x^2]*AppellF1[1 + m, -1/2, -1/2,
2 + m, (2*c*(g + h*x))/(2*c*g - (b - Sqrt[b^2 - 4*a*c])*h), (2*c*
(g + h*x))/(2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)])/(c*h^3*(1 + m)*(
4 + m)*Sqrt[1 - (2*c*(g + h*x))/(2*c*g - (b - Sqrt[b^2 - 4*a*c])*
h)]*Sqrt[1 - (2*c*(g + h*x))/(2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)]
) - ((6*c*f*g - 2*c*e*h*(4 + m) + b*f*h*(5 + 2*m))*(g + h*x)^(2 +
 m)*Sqrt[a + b*x + c*x^2]*AppellF1[2 + m, -1/2, -1/2, 3 + m, (2*c
*(g + h*x))/(2*c*g - (b - Sqrt[b^2 - 4*a*c])*h), (2*c*(g + h*x))/
(2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)])/(2*c*h^3*(2 + m)*(4 + m)*Sq
rt[1 - (2*c*(g + h*x))/(2*c*g - (b - Sqrt[b^2 - 4*a*c])*h)]*Sqrt[
1 - (2*c*(g + h*x))/(2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)])
```

Rubi in Sympy [A] time = 170.755, size = 476, normalized size = 0.96

$$\frac{f(g+hx)^{m+1}\left(a+bx+cx^2\right)^{\frac{3}{2}}}{ch(m+4)}$$

$$+\frac{(g+hx)^{m+1}\left(g\left(bfh(2m+5)+2c(-eh(m+4)+3fg)\right)-h\left(3bfg+2h\left(af(m+1)-cd(m+4)\right)\right)\right)\sqrt{a+bx+cx^2}\,\mathrm{appellf}_1\left(m\ \cdots\right.}{2ch^3(m+1)(m+4)\sqrt{\frac{c(-2g-2hx)}{2cg-h\left(b+\sqrt{-4ac+b^2}\right)}+1}\sqrt{\frac{c(2g+2hx)}{bh-2cg-h\sqrt{-4ac+b^2}}+\cdots}}$$

$$-\frac{(g+hx)^{m+2}\left(\frac{bfh(2m+5)}{2}+c(-eh(m+4)+3fg)\right)\sqrt{a+bx+cx^2}\,\mathrm{appellf}_1\left(m+2,-\frac{1}{2},-\frac{1}{2},m+3,\frac{c(-2g-2hx)}{bh-2cg-h\sqrt{-4ac+b^2}},\frac{c(2g\cdots}{2cg-h\left(b+\cdots\right.}\right.}{ch^3(m+2)(m+4)\sqrt{\frac{c(-2g-2hx)}{2cg-h\left(b+\sqrt{-4ac+b^2}\right)}+1}\sqrt{\frac{c(2g+2hx)}{bh-2cg-h\sqrt{-4ac+b^2}}+1}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((h*x+g)**m*(f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] f*(g + h*x)**(m + 1)*(a + b*x + c*x**2)**(3/2)/(c*h*(m + 4)) + (g
 + h*x)**(m + 1)*(g*(b*f*h*(2*m + 5) + 2*c*(-e*h*(m + 4) + 3*f*g)
) - h*(3*b*f*g + 2*h*(a*f*(m + 1) - c*d*(m + 4))))*sqrt(a + b*x +
 c*x**2)*appellf1(m + 1, -1/2, -1/2, m + 2, c*(-2*g - 2*h*x)/(b*h
 - 2*c*g - h*sqrt(-4*a*c + b**2)), c*(2*g + 2*h*x)/(2*c*g - h*(b
+ sqrt(-4*a*c + b**2))))/(2*c*h**3*(m + 1)*(m + 4)*sqrt(c*(-2*g -
 2*h*x)/(2*c*g - h*(b + sqrt(-4*a*c + b**2))) + 1)*sqrt(c*(2*g +
2*h*x)/(b*h - 2*c*g - h*sqrt(-4*a*c + b**2)) + 1)) - (g + h*x)**(
m + 2)*(b*f*h*(2*m + 5)/2 + c*(-e*h*(m + 4) + 3*f*g))*sqrt(a + b*
x + c*x**2)*appellf1(m + 2, -1/2, -1/2, m + 3, c*(-2*g - 2*h*x)/(
```

```
b*h - 2*c*g - h*sqrt(-4*a*c + b**2)), c*(2*g + 2*h*x)/(2*c*g - h*
(b + sqrt(-4*a*c + b**2))))/(c*h**3*(m + 2)*(m + 4)*sqrt(c*(-2*g
- 2*h*x)/(2*c*g - h*(b + sqrt(-4*a*c + b**2))) + 1)*sqrt(c*(2*g +
 2*h*x)/(b*h - 2*c*g - h*sqrt(-4*a*c + b**2)) + 1))
```

Mathematica [A] time = 2.15511, size = 0, normalized size = 0.

$$\int (g+hx)^m\sqrt{a+bx+cx^2}\left(d+ex+fx^2\right)\,dx$$

Verification is Not applicable to the result.

```
[In]  Integrate[(g + h*x)^m*Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2),x]
```

```
[Out] Integrate[(g + h*x)^m*Sqrt[a + b*x + c*x^2]*(d + e*x + f*x^2), x]
```

Maple [F] time = 0.114, size = 0, normalized size = 0.

$$\int (hx+g)^m\left(fx^2+ex+d\right)\sqrt{cx^2+bx+a}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^m*(f*x^2+e*x+d)*(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] int((h*x+g)^m*(f*x^2+e*x+d)*(c*x^2+b*x+a)^(1/2),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{cx^2+bx+a}\left(fx^2+ex+d\right)(hx+g)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g)^m,x, algorithm="maxima
```

```
[Out] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g)^m, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\sqrt{cx^2+bx+a}\left(fx^2+ex+d\right)(hx+g)^m,x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g)^m,x, algorithm="fricas
```

```
[Out] integral(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g)^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((h*x+g)**m*(f*x**2+e*x+d)*(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \sqrt{cx^2+bx+a}\left(fx^2+ex+d\right)(hx+g)^m\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g)^m,x, algorithm="giac")
```

```
[Out] integrate(sqrt(c*x^2 + b*x + a)*(f*x^2 + e*x + d)*(h*x + g)^m, x)
```

3.274 $\int (g+hx)^{-3-2p}\left(a+bx+cx^2\right)^p\left(d+ex+fx^2\right)\,dx$

Optimal. Leaf size=590

$$-\frac{f(g+hx)^{-2p}\left(a+bx+cx^2\right)^p\left(1-\frac{2c(g+hx)}{2cg-h\left(b-\sqrt{b^2-4ac}\right)}\right)^{-p}\left(1-\frac{2c(g+hx)}{2cg-h\left(\sqrt{b^2-4ac}+b\right)}\right)^{-p}F_1\left(-2p;-p,-p;1-2p;\frac{2c(g+hx)}{2cg-\left(b-\sqrt{b^2-4ac}\right.}\right.}{2h^3p}$$

$$-\frac{\left(-\sqrt{b^2-4ac}+b+2cx\right)(g+hx)^{-2p-1}\left(a+bx+cx^2\right)^p\left(\frac{\left(\sqrt{b^2-4ac}+b+2cx\right)\left(2cg-h\left(b-\sqrt{b^2-4ac}\right)\right)}{\left(-\sqrt{b^2-4ac}+b+2cx\right)\left(2cg-h\left(\sqrt{b^2-4ac}+b\right)\right)}\right)^{-p}\left(h\left(2ah(2fg-eh)-b\left(-\right.\right.\right.}{2h^2(2p+1)\left(2cg-h\left(b-\sqrt{b^2-4ac}\right)\right)}$$

$$-\frac{(g+hx)^{-2(p+1)}\left(a+bx+cx^2\right)^{p+1}\left(fg^2-h(eg-dh)\right)}{2h(p+1)\left(ah^2-bgh+cg^2\right)}$$

```
[Out] -((f*g^2 - h*(e*g - d*h))*(a + b*x + c*x^2)^(1 + p))/(2*h*(c*g^2
- b*g*h + a*h^2)*(1 + p)*(g + h*x)^(2*(1 + p))) - (f*(a + b*x + c
*x^2)^p*AppellF1[-2*p, -p, -p, 1 - 2*p, (2*c*(g + h*x))/(2*c*g -
(b - Sqrt[b^2 - 4*a*c])*h), (2*c*(g + h*x))/(2*c*g - (b + Sqrt[b^
2 - 4*a*c])*h)])/(2*h^3*p*(g + h*x)^(2*p)*(1 - (2*c*(g + h*x))/(2
*c*g - (b - Sqrt[b^2 - 4*a*c])*h))^p*(1 - (2*c*(g + h*x))/(2*c*g
- (b + Sqrt[b^2 - 4*a*c])*h))^p) - ((2*c*(f*g^3 - d*g*h^2) + h*(2
*a*h*(2*f*g - e*h) - b*(3*f*g^2 - e*g*h - d*h^2)))*(b - Sqrt[b^2
- 4*a*c] + 2*c*x)*(g + h*x)^(-1 - 2*p)*(a + b*x + c*x^2)^p*Hyperg
eometric2F1[-1 - 2*p, -p, -2*p, (-4*c*Sqrt[b^2 - 4*a*c]*(g + h*x)
)/((2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)*(b - Sqrt[b^2 - 4*a*c] + 2
*c*x))])/(2*h^2*(2*c*g - (b - Sqrt[b^2 - 4*a*c])*h)*(c*g^2 - b*g*
h + a*h^2)*(1 + 2*p)*(((2*c*g - (b - Sqrt[b^2 - 4*a*c])*h)*(b + S
qrt[b^2 - 4*a*c] + 2*c*x))/((2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)*(
b - Sqrt[b^2 - 4*a*c] + 2*c*x)))^p)
```

Rubi [A] time = 1.73917, antiderivative size = 588, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.147$

$$-\frac{f(g+hx)^{-2p}\left(a+bx+cx^2\right)^p\left(1-\frac{2c(g+hx)}{2cg-h\left(b-\sqrt{b^2-4ac}\right)}\right)^{-p}\left(1-\frac{2c(g+hx)}{2cg-h\left(\sqrt{b^2-4ac}+b\right)}\right)^{-p}F_1\left(-2p;-p,-p;1-2p;\frac{2c(g+hx)}{2cg-\left(b-\sqrt{b^2-4ac}\right.}\right.}{2h^3p}$$

$$-\frac{\left(-\sqrt{b^2-4ac}+b+2cx\right)(g+hx)^{-2p-1}\left(a+bx+cx^2\right)^p\left(\frac{\left(\sqrt{b^2-4ac}+b+2cx\right)\left(2cg-h\left(b-\sqrt{b^2-4ac}\right)\right)}{\left(-\sqrt{b^2-4ac}+b+2cx\right)\left(2cg-h\left(\sqrt{b^2-4ac}+b\right)\right)}\right)^{-p}\left(2c\left(fg^3-dgh^2\right)-h\left(-2\right.\right.}{2h^2(2p+1)\left(2cg-h\left(b-\sqrt{b^2-4ac}\right)\right)}$$

$$-\frac{(g+hx)^{-2(p+1)}\left(a+bx+cx^2\right)^{p+1}\left(fg^2-h(eg-dh)\right)}{2h(p+1)\left(ah^2-bgh+cg^2\right)}$$

Warning: Unable to verify antiderivative.

```
[In]  Int[(g + h*x)^(-3 - 2*p)*(a + b*x + c*x^2)^p*(d + e*x + f*x^2),x]
```

```
[Out] -((f*g^2 - h*(e*g - d*h))*(a + b*x + c*x^2)^(1 + p))/(2*h*(c*g^2
- b*g*h + a*h^2)*(1 + p)*(g + h*x)^(2*(1 + p))) - (f*(a + b*x + c
*x^2)^p*AppellF1[-2*p, -p, -p, 1 - 2*p, (2*c*(g + h*x))/(2*c*g -
(b - Sqrt[b^2 - 4*a*c])*h), (2*c*(g + h*x))/(2*c*g - (b + Sqrt[b^
2 - 4*a*c])*h)])/(2*h^3*p*(g + h*x)^(2*p)*(1 - (2*c*(g + h*x))/(2
*c*g - (b - Sqrt[b^2 - 4*a*c])*h))^p*(1 - (2*c*(g + h*x))/(2*c*g
- (b + Sqrt[b^2 - 4*a*c])*h))^p) - ((2*c*(f*g^3 - d*g*h^2) - h*(3
*b*f*g^2 - b*h*(e*g + d*h) - 2*a*h*(2*f*g - e*h)))*(b - Sqrt[b^2
- 4*a*c] + 2*c*x)*(g + h*x)^(-1 - 2*p)*(a + b*x + c*x^2)^p*Hyperg
eometric2F1[-1 - 2*p, -p, -2*p, (-4*c*Sqrt[b^2 - 4*a*c]*(g + h*x)
)/((2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)*(b - Sqrt[b^2 - 4*a*c] + 2
*c*x))])/(2*h^2*(2*c*g - (b - Sqrt[b^2 - 4*a*c])*h)*(c*g^2 - b*g*
h + a*h^2)*(1 + 2*p)*(((2*c*g - (b - Sqrt[b^2 - 4*a*c])*h)*(b + S
qrt[b^2 - 4*a*c] + 2*c*x))/((2*c*g - (b + Sqrt[b^2 - 4*a*c])*h)*(
b - Sqrt[b^2 - 4*a*c] + 2*c*x)))^p)
```

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((h*x+g)**(-3-2*p)*(c*x**2+b*x+a)**p*(f*x**2+e*x+d),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 4.7974, size = 0, normalized size = 0.

$$\int (g+hx)^{-3-2p}\left(a+bx+cx^2\right)^p\left(d+ex+fx^2\right)\,dx$$

Verification is Not applicable to the result.

```
[In] Integrate[(g + h*x)^(-3 - 2*p)*(a + b*x + c*x^2)^p*(d + e*x + f*x^2),x]
```

```
[Out] Integrate[(g + h*x)^(-3 - 2*p)*(a + b*x + c*x^2)^p*(d + e*x + f*x
^2), x]
```

Maple [F] time = 0.128, size = 0, normalized size = 0.

$$\int (hx+g)^{-3-2p}\left(cx^2+bx+a\right)^p\left(fx^2+ex+d\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((h*x+g)^(-3-2*p)*(c*x^2+b*x+a)^p*(f*x^2+e*x+d),x)
```

```
[Out] int((h*x+g)^(-3-2*p)*(c*x^2+b*x+a)^p*(f*x^2+e*x+d),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \left(fx^2+ex+d\right)\left(cx^2+bx+a\right)^p(hx+g)^{-2p-3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(c*x^2 + b*x + a)^p*(h*x + g)^(-
2*p - 3),x, algorithm="maxima")
```

```
[Out] integrate((f*x^2 + e*x + d)*(c*x^2 + b*x + a)^p*(h*x + g)^(-2*p -
 3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left(\left(fx^2+ex+d\right)\left(cx^2+bx+a\right)^p(hx+g)^{-2p-3},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(c*x^2 + b*x + a)^p*(h*x + g)^(-
2*p - 3),x, algorithm="fricas")
```

```
[Out] integral((f*x^2 + e*x + d)*(c*x^2 + b*x + a)^p*(h*x + g)^(-2*p -
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((h*x+g)**(-3-2*p)*(c*x**2+b*x+a)**p*(f*x**2+e*x+d),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (fx^2 + ex + d) (cx^2 + bx + a)^p (hx + g)^{-2p-3} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((f*x^2 + e*x + d)*(c*x^2 + b*x + a)^p*(h*x + g)^(-
2*p - 3),x, algorithm="giac")
```

```
[Out] integrate((f*x^2 + e*x + d)*(c*x^2 + b*x + a)^p*(h*x + g)^(-2*p -
 3), x)
```

3.275 $\int \left(d+fx^2\right)^p \left(2cdf+2bf^2(3+2p)x+2cf^2(3+2p)x^2\right) \, dx$

Optimal. Leaf size=41

$$\frac{bf(2p+3)\left(d+fx^2\right)^{p+1}}{p+1}+2cfx\left(d+fx^2\right)^{p+1}$$

```
[Out] (b*f*(3 + 2*p)*(d + f*x^2)^(1 + p))/(1 + p) + 2*c*f*x*(d + f*x^2)
^(1 + p)
```

Rubi [A] time = 0.0901495, antiderivative size = 41, normalized size of antiderivative = 1., number of steps used = 3, number of rules used = 3, integrand size = 42, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.071

$$\frac{bf(2p+3)\left(d+fx^2\right)^{p+1}}{p+1}+2cfx\left(d+fx^2\right)^{p+1}$$

Antiderivative was successfully verified.

```
[In] Int[(d + f*x^2)^p*(2*c*d*f + 2*b*f^2*(3 + 2*p)*x + 2*c*f^2*(3 + 2*p)*x^2),x]
```

```
[Out] (b*f*(3 + 2*p)*(d + f*x^2)^(1 + p))/(1 + p) + 2*c*f*x*(d + f*x^2)
^(1 + p)
```

Rubi in Sympy [A] time = 20.7281, size = 32, normalized size = 0.78

$$\frac{f\left(d+fx^2\right)^{p+1}\left(2b\left(2p+3\right)+4cx\left(p+1\right)\right)}{2\left(p+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((f*x**2+d)**p*(2*c*d*f+2*b*f**2*(3+2*p)*x+2*c*f**2*(3+2*p)*x**2
```

```
[Out] f*(d + f*x**2)**(p + 1)*(2*b*(2*p + 3) + 4*c*x*(p + 1))/(2*(p + 1
))
```

Mathematica [A] time = 0.062725, size = 33, normalized size = 0.8

$$\frac{f(b(2p+3)+2c(p+1)x)\left(d+fx^2\right)^{p+1}}{p+1}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + f*x^2)^p*(2*c*d*f + 2*b*f^2*(3 + 2*p)*x + 2*c*f^2*(3 + 2*p)*x^2),x
```

```
[Out] (f*(b*(3 + 2*p) + 2*c*(1 + p)*x)*(d + f*x^2)^(1 + p))/(1 + p)
```

Maple [A] time = 0.005, size = 36, normalized size = 0.9

$$\frac{f\left(fx^2+d\right)^{1+p}\left(2\,cxp+2\,pb+2\,cx+3\,b\right)}{1+p}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+d)^p*(2*c*d*f+2*b*f^2*(3+2*p)*x+2*c*f^2*(3+2*p)*x^2),x)
```

```
[Out] f*(f*x^2+d)^(1+p)*(2*c*p*x+2*b*p+2*c*x+3*b)/(1+p)
```

Maxima [A] time = 0.745019, size = 80, normalized size = 1.95

$$\frac{\left(2\,cf^2(p+1)x^3+bf^2(2\,p+3)x^2+2\,cdf(p+1)x+bdf(2\,p+3)\right)\left(fx^2+d\right)^p}{p+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(2*(c*f^2*(2*p + 3)*x^2 + b*f^2*(2*p + 3)*x + c*d*f)*(f*x^2 + d)^p,x, alg
```

```
[Out] (2*c*f^2*(p + 1)*x^3 + b*f^2*(2*p + 3)*x^2 + 2*c*d*f*(p + 1)*x +
b*d*f*(2*p + 3))*(f*x^2 + d)^p/(p + 1)
```

Fricas [A] time = 0.27911, size = 101, normalized size = 2.46

$$\frac{\left(2\,bdfp+2\left(cf^2p+cf^2\right)x^3+3\,bdf+\left(2\,bf^2p+3\,bf^2\right)x^2+2\,(cdfp+cdf)x\right)\left(fx^2+d\right)^p}{p+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(2*(c*f^2*(2*p + 3)*x^2 + b*f^2*(2*p + 3)*x + c*d*f)*(f*x^2 + d)^p,x, alg
```

```
[Out] (2*b*d*f*p + 2*(c*f^2*p + c*f^2)*x^3 + 3*b*d*f + (2*b*f^2*p + 3*b
*f^2)*x^2 + 2*(c*d*f*p + c*d*f)*x)*(f*x^2 + d)^p/(p + 1)
```

Sympy [A] time = 15.4659, size = 221, normalized size = 5.39

$$\begin{cases} \frac{2bdfp(d+fx^2)^p}{p+1} + \frac{3bdf(d+fx^2)^p}{p+1} + \frac{2bf^2px^2(d+fx^2)^p}{p+1} + \frac{3bf^2x^2(d+fx^2)^p}{p+1} + \frac{2cdfpx(d+fx^2)^p}{p+1} + \frac{2cdfx(d+fx^2)^p}{p+1} + \frac{2cf^2px^3(d+fx^2)^p}{p+1} + \frac{2cf^2 \\ bf\log\left(-i\sqrt{d}\sqrt{\frac{1}{f}} + x\right) + bf\log\left(i\sqrt{d}\sqrt{\frac{1}{f}} + x\right) + 2cfx \end{cases}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+d)**p*(2*c*d*f+2*b*f**2*(3+2*p)*x+2*c*f**2*(3+2*p)*x**2),x)
```

```
[Out] Piecewise((2*b*d*f*p*(d + f*x**2)**p/(p + 1) + 3*b*d*f*(d + f*x**
2)**p/(p + 1) + 2*b*f**2*p*x**2*(d + f*x**2)**p/(p + 1) + 3*b*f**
2*x**2*(d + f*x**2)**p/(p + 1) + 2*c*d*f*p*x*(d + f*x**2)**p/(p +
 1) + 2*c*d*f*x*(d + f*x**2)**p/(p + 1) + 2*c*f**2*p*x**3*(d + f*
x**2)**p/(p + 1) + 2*c*f**2*x**3*(d + f*x**2)**p/(p + 1), Ne(p, -
1)), (b*f*log(-I*sqrt(d)*sqrt(1/f) + x) + b*f*log(I*sqrt(d)*sqrt(
1/f) + x) + 2*c*f*x, True))
```

GIAC/XCAS [A] time = 0.291107, size = 212, normalized size = 5.17

$$\frac{2\,cf^2px^3e^{\left(p\ln\left(fx^2+d\right)\right)} + 2\,bf^2px^2e^{\left(p\ln\left(fx^2+d\right)\right)} + 2\,cf^2x^3e^{\left(p\ln\left(fx^2+d\right)\right)} + 2\,cdfpxe^{\left(p\ln\left(fx^2+d\right)\right)} + 3\,bf^2x^2e^{\left(p\ln\left(fx^2+d\right)\right)} + 2\,bdfp}{p+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(2*(c*f^2*(2*p + 3)*x^2 + b*f^2*(2*p + 3)*x + c*d*f)*(f*x^2 + d)^p,x, alg
```

```
[Out] (2*c*f^2*p*x^3*e^(p*ln(f*x^2 + d)) + 2*b*f^2*p*x^2*e^(p*ln(f*x^2
+ d)) + 2*c*f^2*x^3*e^(p*ln(f*x^2 + d)) + 2*c*d*f*p*x*e^(p*ln(f*x
^2 + d)) + 3*b*f^2*x^2*e^(p*ln(f*x^2 + d)) + 2*b*d*f*p*e^(p*ln(f*
x^2 + d)) + 2*c*d*f*x*e^(p*ln(f*x^2 + d)) + 3*b*d*f*e^(p*ln(f*x^2
 + d)))/(p + 1)
```

3.276 $\int \left(d+ex+fx^2\right)^p \left(-2ce^2+2cdf-ce^2p+2cf^2(3+2p)x^2\right)\,dx$

Optimal. Leaf size=46

$$2cfx\left(d+ex+fx^2\right)^{p+1}-\frac{ce(p+2)\left(d+ex+fx^2\right)^{p+1}}{p+1}$$

```
[Out] -((c*e*(2 + p)*(d + e*x + f*x^2)^(1 + p))/(1 + p)) + 2*c*f*x*(d +
 e*x + f*x^2)^(1 + p)
```

Rubi [A] time = 0.0961239, antiderivative size = 46, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 46, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.043

$$2cfx\left(d+ex+fx^2\right)^{p+1}-\frac{ce(p+2)\left(d+ex+fx^2\right)^{p+1}}{p+1}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2)^p*(-2*c*e^2 + 2*c*d*f - c*e^2*p + 2*c*f^2*(3 + 2*p)*x^2),x]
```

```
[Out] -((c*e*(2 + p)*(d + e*x + f*x^2)^(1 + p))/(1 + p)) + 2*c*f*x*(d +
 e*x + f*x^2)^(1 + p)
```

Rubi in Sympy [A] time = 25.6366, size = 36, normalized size = 0.78

$$-\frac{c\left(2e\left(p+2\right)-4fx\left(p+1\right)\right)\left(d+ex+fx^2\right)^{p+1}}{2\left(p+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((f*x**2+e*x+d)**p*(-2*c*e**2+2*c*d*f-c*e**2*p+2*c*f**2*(3+2*p)*
```

```
[Out] -c*(2*e*(p + 2) - 4*f*x*(p + 1))*(d + e*x + f*x**2)**(p + 1)/(2*(
p + 1))
```

Mathematica [A] time = 0.0771271, size = 34, normalized size = 0.74

$$\frac{c(2f(p+1)x-e(p+2))(d+x(e+fx))^{p+1}}{p+1}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2)^p*(-2*c*e^2 + 2*c*d*f - c*e^2*p + 2*c*f^2*(3 + 2*p)*x^
```

```
[Out] (c*(-(e*(2 + p)) + 2*f*(1 + p)*x)*(d + x*(e + f*x))^(1 + p))/(1 +
 p)
```

Maple [A] time = 0.006, size = 39, normalized size = 0.9

$$-\frac{c\left(fx^2+ex+d\right)^{1+p}\left(-2fpx+ep-2fx+2e\right)}{1+p}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)^p*(-2*e^2*c+2*c*d*f-c*e^2*p+2*c*f^2*(3+2*p)*x^2),x)
```

```
[Out] -c*(f*x^2+e*x+d)^(1+p)*(-2*f*p*x+e*p-2*f*x+2*e)/(1+p)
```

Maxima [A] time = 0.746146, size = 89, normalized size = 1.93

$$\frac{\left(2\,cf^2(p+1)x^3+cefpx^2-cde(p+2)-\left(e^2(p+2)-2\,df(p+1)\right)cx\right)\left(fx^2+ex+d\right)^p}{p+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*f^2*(2*p + 3)*x^2 - c*e^2*p - 2*c*e^2 + 2*c*d*f)*(f*x^2 + e*x + d)^
```

```
[Out] (2*c*f^2*(p + 1)*x^3 + c*e*f*p*x^2 - c*d*e*(p + 2) - (e^2*(p + 2)
 - 2*d*f*(p + 1))*c*x)*(f*x^2 + e*x + d)^p/(p + 1)
```

Fricas [A] time = 0.282227, size = 112, normalized size = 2.43

$$\frac{\left(cefpx^2-cdep+2\left(cf^2p+cf^2\right)x^3-2\,cde-\left(2\,ce^2-2\,cdf+\left(ce^2-2\,cdf\right)p\right)x\right)\left(fx^2+ex+d\right)^p}{p+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*f^2*(2*p + 3)*x^2 - c*e^2*p - 2*c*e^2 + 2*c*d*f)*(f*x^2 + e*x + d)^
```

```
[Out] (c*e*f*p*x^2 - c*d*e*p + 2*(c*f^2*p + c*f^2)*x^3 - 2*c*d*e - (2*c
*e^2 - 2*c*d*f + (c*e^2 - 2*c*d*f)*p)*x)*(f*x^2 + e*x + d)^p/(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((f*x**2+e*x+d)**p*(-2*c*e**2+2*c*d*f-c*e**2*p+2*c*f**2*(3+2*p)*x**2)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.28379, size = 282, normalized size = 6.13

$$\frac{2\,cf^2px^3e^{\left(p\ln\left(fx^2+xe+d\right)\right)} + 2\,cf^2x^3e^{\left(p\ln\left(fx^2+xe+d\right)\right)} + cfpx^2e^{\left(p\ln\left(fx^2+xe+d\right)+1\right)} + 2\,cdfpxe^{\left(p\ln\left(fx^2+xe+d\right)\right)} + 2\,cdfxe^{\left(p\ln\left(fx^2+x\right.\right.}}{p+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*f^2*(2*p + 3)*x^2 - c*e^2*p - 2*c*e^2 + 2*c*d*f)*(f*x^2 + e*x + d)^
```

```
[Out] (2*c*f^2*p*x^3*e^(p*ln(f*x^2 + x*e + d)) + 2*c*f^2*x^3*e^(p*ln(f*
x^2 + x*e + d)) + c*f*p*x^2*e^(p*ln(f*x^2 + x*e + d) + 1) + 2*c*d
*f*p*x*e^(p*ln(f*x^2 + x*e + d)) + 2*c*d*f*x*e^(p*ln(f*x^2 + x*e
+ d)) - c*p*x*e^(p*ln(f*x^2 + x*e + d) + 2) - c*d*p*e^(p*ln(f*x^2
 + x*e + d) + 1) - 2*c*x*e^(p*ln(f*x^2 + x*e + d) + 2) - 2*c*d*e^
(p*ln(f*x^2 + x*e + d) + 1))/(p + 1)
```

3.277 $\int \left(d+ex+fx^2\right)^p \left(-2ce^2+2cdf+3bef-ce^2p+2befp+2bf^2(3$

Optimal. Leaf size=57

$$2cfx\left(d+ex+fx^2\right)^{p+1}-\frac{(ce(p+2)-bf(2p+3))\left(d+ex+fx^2\right)^{p+1}}{p+1}$$

```
[Out] -((((c*e*(2 + p) - b*f*(3 + 2*p))*(d + e*x + f*x^2)^(1 + p))/(1 +
p)) + 2*c*f*x*(d + e*x + f*x^2)^(1 + p)
```

Rubi [A] time = 0.190696, antiderivative size = 57, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 69, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.029

$$2cfx\left(d+ex+fx^2\right)^{p+1}-\frac{(ce(p+2)-bf(2p+3))\left(d+ex+fx^2\right)^{p+1}}{p+1}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2)^p*(-2*c*e^2 + 2*c*d*f + 3*b*e*f - c*e^2*p + 2*b*e*f*p + 2*b*f
```

```
[Out] -((((c*e*(2 + p) - b*f*(3 + 2*p))*(d + e*x + f*x^2)^(1 + p))/(1 +
p)) + 2*c*f*x*(d + e*x + f*x^2)^(1 + p)
```

Rubi in Sympy [A] time = 68.5292, size = 46, normalized size = 0.81

$$\frac{\left(d+ex+fx^2\right)^{p+1}\left(2bf\left(2p+3\right)-2ce\left(p+2\right)+4cfx\left(p+1\right)\right)}{2\left(p+1\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((f*x**2+e*x+d)**p*(-2*c*e**2+2*c*d*f+3*b*e*f-c*e**2*p+2*b*e*f*p
```

```
[Out] (d + e*x + f*x**2)**(p + 1)*(2*b*f*(2*p + 3) - 2*c*e*(p + 2) + 4*
c*f*x*(p + 1))/(2*(p + 1))
```

Mathematica [A] time = 0.143571, size = 43, normalized size = 0.75

$$\frac{(d+x(e+fx))^{p+1}(bf(2p+3)-ce(p+2)+2cf(p+1)x)}{p+1}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2)^p*(-2*c*e^2 + 2*c*d*f + 3*b*e*f - c*e^2*p + 2*b*e*f*p
```

```
[Out] ((-(c*e*(2 + p)) + b*f*(3 + 2*p) + 2*c*f*(1 + p)*x)*(d + x*(e + f
*x))^(1 + p))/(1 + p)
```

Maple [A] time = 0.006, size = 51, normalized size = 0.9

$$\frac{\left(fx^2+ex+d\right)^{1+p}\left(2\,cxfp+2\,bfp-cep+2\,cxf+3\,bf-2\,ce\right)}{1+p}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((f*x^2+e*x+d)^p*(-2*e^2*c+2*c*d*f+3*b*e*f-c*e^2*p+2*b*e*f*p+2*b*f^2*(3+2*p
```

```
[Out] (f*x^2+e*x+d)^(1+p)*(2*c*f*p*x+2*b*f*p-c*e*p+2*c*f*x+3*b*f-2*c*e)
/(1+p)
```

Maxima [A] time = 0.764412, size = 132, normalized size = 2.32

$$\frac{\left(2\,cf^2(p+1)x^3+bdf(2\,p+3)-cde(p+2)+\left(bf^2(2\,p+3)+cefp\right)x^2+\left(bef(2\,p+3)-\left(e^2(p+2)-2\,df(p+1)\right)c\right)x\right)\left(fx^2\right.}{p+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*f^2*(2*p + 3)*x^2 + 2*b*f^2*(2*p + 3)*x - c*e^2*p + 2*b*e*f*p - 2*c
```

```
[Out] (2*c*f^2*(p + 1)*x^3 + b*d*f*(2*p + 3) - c*d*e*(p + 2) + (b*f^2*(
2*p + 3) + c*e*f*p)*x^2 + (b*e*f*(2*p + 3) - (e^2*(p + 2) - 2*d*f
*(p + 1))*c)*x)*(f*x^2 + e*x + d)^p/(p + 1)
```

Fricas [A] time = 0.284705, size = 166, normalized size = 2.91

$$\frac{\left(2\left(cf^2p+cf^2\right)x^3-2\,cde+3\,bdf+\left(3\,bf^2+\left(cef+2\,bf^2\right)p\right)x^2-(cde-2\,bdf)p-\left(2\,ce^2-(2\,cd+3\,be)f+\left(ce^2-2\,(cd\right.\right.}{p+1}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*f^2*(2*p + 3)*x^2 + 2*b*f^2*(2*p + 3)*x - c*e^2*p + 2*b*e*f*p - 2*c
```

```
[Out] (2*(c*f^2*p + c*f^2)*x^3 - 2*c*d*e + 3*b*d*f + (3*b*f^2 + (c*e*f
+ 2*b*f^2)*p)*x^2 - (c*d*e - 2*b*d*f)*p - (2*c*e^2 - (2*c*d + 3*b
*e)*f + (c*e^2 - 2*(c*d + b*e)*f)*p)*x)*(f*x^2 + e*x + d)^p/(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((f*x**2+e*x+d)**p*(-2*c*e**2+2*c*d*f+3*b*e*f-c*e**2*p+2*b*e*f*p+2*b*
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.289994, size = 464, normalized size = 8.14

$$\frac{2\,cf^2px^3e^{\left(p\ln\left(fx^2+xe+d\right)\right)} + 2\,bf^2px^2e^{\left(p\ln\left(fx^2+xe+d\right)\right)} + 2\,cf^2x^3e^{\left(p\ln\left(fx^2+xe+d\right)\right)} + cfpx^2e^{\left(p\ln\left(fx^2+xe+d\right)+1\right)} + 2\,cdfpxe^{\left(p\ln\left(fx^2\right.\right.}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*c*f^2*(2*p + 3)*x^2 + 2*b*f^2*(2*p + 3)*x - c*e^2*p + 2*b*e*f*p - 2*c
```

```
[Out] (2*c*f^2*p*x^3*e^(p*ln(f*x^2 + x*e + d)) + 2*b*f^2*p*x^2*e^(p*ln(
f*x^2 + x*e + d)) + 2*c*f^2*x^3*e^(p*ln(f*x^2 + x*e + d)) + c*f*p
*x^2*e^(p*ln(f*x^2 + x*e + d) + 1) + 2*c*d*f*p*x*e^(p*ln(f*x^2 +
x*e + d)) + 3*b*f^2*x^2*e^(p*ln(f*x^2 + x*e + d)) + 2*b*f*p*x*e^(
p*ln(f*x^2 + x*e + d) + 1) + 2*b*d*f*p*e^(p*ln(f*x^2 + x*e + d))
+ 2*c*d*f*x*e^(p*ln(f*x^2 + x*e + d)) - c*p*x*e^(p*ln(f*x^2 + x*e
 + d) + 2) - c*d*p*e^(p*ln(f*x^2 + x*e + d) + 1) + 3*b*f*x*e^(p*l
n(f*x^2 + x*e + d) + 1) + 3*b*d*f*e^(p*ln(f*x^2 + x*e + d)) - 2*c
*x*e^(p*ln(f*x^2 + x*e + d) + 2) - 2*c*d*e^(p*ln(f*x^2 + x*e + d)
 + 1))/(p + 1)
```

3.278 $\int (d+ex)^3 \left(a+bx+cx^2\right)^5 \left(d(6bd+5ae)+\left(12cd^2+17bde+5ae^2\right) x$

Optimal. Leaf size=20

$$(d+ex)^5 \left(a+bx+cx^2\right)^6$$

```
[Out] (d + e*x)^5*(a + b*x + c*x^2)^6
```

Rubi [A] time = 0.431839, antiderivative size = 20, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 2, integrand size = 75, $\frac{\text{number of rules}}{\text{integrand size}} = 0.027$

$$(d+ex)^5 \left(a+bx+cx^2\right)^6$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)^3*(a + b*x + c*x^2)^5*(d*(6*b*d + 5*a*e) + (12*c*d^2 + 17*b*d*e + 5*a
```

```
[Out] (d + e*x)^5*(a + b*x + c*x^2)^6
```

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((e*x+d)**3*(c*x**2+b*x+a)**5*(d*(5*a*e+6*b*d)+(5*a*e**2+17*b*d*
```

```
[Out] Timed out
```

Mathematica [B] time = 1.11845, size = 167, normalized size = 8.35

$$x \left(a^6 e \left(5d^4+10d^3ex+10d^2e^2x^2+5de^3x^3+e^4x^4\right)+6a^5(b+cx)(d+ex)^5+15a^4x(b+cx)^2(d+ex)^5 +20a^3x^2(b+cx)^3(d+ex)^5+15a^2x^3(b+cx)^4(d+ex)^5+6ax^4(b+cx)^5(d+ex)^5+x^5(b+cx)^6(d+ex)^5\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)^3*(a + b*x + c*x^2)^5*(d*(6*b*d + 5*a*e) + (12*c*d^2 + 17*b*d*
```

```
[Out] x*(6*a^5*(b + c*x)*(d + e*x)^5 + 15*a^4*x*(b + c*x)^2*(d + e*x)^5
 + 20*a^3*x^2*(b + c*x)^3*(d + e*x)^5 + 15*a^2*x^3*(b + c*x)^4*(d
 + e*x)^5 + 6*a*x^4*(b + c*x)^5*(d + e*x)^5 + x^5*(b + c*x)^6*(d
+ e*x)^5 + a^6*e*(5*d^4 + 10*d^3*e*x + 10*d^2*e^2*x^2 + 5*d*e^3*x
^3 + e^4*x^4))
```

Maple [B] time = 0.005, size = 8419, normalized size = 421.

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^3*(c*x^2+b*x+a)^5*(d*(5*a*e+6*b*d)+(5*a*e^2+17*b*d*e+12*c*d^2)*x+e
```

```
[Out] result too large to display
```

Maxima [A] time = 0.711754, size = 2402, normalized size = 120.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((17*c*e^2*x^3 + (29*c*d + 11*b*e)*e*x^2 + (6*b*d + 5*a*e)*d + (12*c*d^2
```

```
[Out] c^6*e^5*x^17 + (5*c^6*d*e^4 + 6*b*c^5*e^5)*x^16 + (10*c^6*d^2*e^3
 + 30*b*c^5*d*e^4 + 3*(5*b^2*c^4 + 2*a*c^5)*e^5)*x^15 + 5*(2*c^6*
d^3*e^2 + 12*b*c^5*d^2*e^3 + 3*(5*b^2*c^4 + 2*a*c^5)*d*e^4 + 2*(2
*b^3*c^3 + 3*a*b*c^4)*e^5)*x^14 + 5*(c^6*d^4*e + 12*b*c^5*d^3*e^2
 + 6*(5*b^2*c^4 + 2*a*c^5)*d^2*e^3 + 10*(2*b^3*c^3 + 3*a*b*c^4)*d
*e^4 + 3*(b^4*c^2 + 4*a*b^2*c^3 + a^2*c^4)*e^5)*x^13 + (c^6*d^5 +
 30*b*c^5*d^4*e + 30*(5*b^2*c^4 + 2*a*c^5)*d^3*e^2 + 100*(2*b^3*c
^3 + 3*a*b*c^4)*d^2*e^3 + 75*(b^4*c^2 + 4*a*b^2*c^3 + a^2*c^4)*d*
e^4 + 6*(b^5*c + 10*a*b^3*c^2 + 10*a^2*b*c^3)*e^5)*x^12 + (6*b*c^
5*d^5 + 15*(5*b^2*c^4 + 2*a*c^5)*d^4*e + 100*(2*b^3*c^3 + 3*a*b*c
^4)*d^3*e^2 + 150*(b^4*c^2 + 4*a*b^2*c^3 + a^2*c^4)*d^2*e^3 + 30*
(b^5*c + 10*a*b^3*c^2 + 10*a^2*b*c^3)*d*e^4 + (b^6 + 30*a*b^4*c +
 90*a^2*b^2*c^2 + 20*a^3*c^3)*e^5)*x^11 + (3*(5*b^2*c^4 + 2*a*c^5
)*d^5 + 50*(2*b^3*c^3 + 3*a*b*c^4)*d^4*e + 150*(b^4*c^2 + 4*a*b^2
*c^3 + a^2*c^4)*d^3*e^2 + 60*(b^5*c + 10*a*b^3*c^2 + 10*a^2*b*c^3
)*d^2*e^3 + 5*(b^6 + 30*a*b^4*c + 90*a^2*b^2*c^2 + 20*a^3*c^3)*d*
e^4 + 6*(a*b^5 + 10*a^2*b^3*c + 10*a^3*b*c^2)*e^5)*x^10 + 5*(2*(2
*b^3*c^3 + 3*a*b*c^4)*d^5 + 15*(b^4*c^2 + 4*a*b^2*c^3 + a^2*c^4)*
d^4*e + 12*(b^5*c + 10*a*b^3*c^2 + 10*a^2*b*c^3)*d^3*e^2 + 2*(b^6
 + 30*a*b^4*c + 90*a^2*b^2*c^2 + 20*a^3*c^3)*d^2*e^3 + 6*(a*b^5 +
 10*a^2*b^3*c + 10*a^3*b*c^2)*d*e^4 + 3*(a^2*b^4 + 4*a^3*b^2*c +
```

```
a^4*c^2)*e^5)*x^9 + 5*(3*(b^4*c^2 + 4*a*b^2*c^3 + a^2*c^4)*d^5 +
6*(b^5*c + 10*a*b^3*c^2 + 10*a^2*b*c^3)*d^4*e + 2*(b^6 + 30*a*b^4
*c + 90*a^2*b^2*c^2 + 20*a^3*c^3)*d^3*e^2 + 12*(a*b^5 + 10*a^2*b^
3*c + 10*a^3*b*c^2)*d^2*e^3 + 15*(a^2*b^4 + 4*a^3*b^2*c + a^4*c^2
)*d*e^4 + 2*(2*a^3*b^3 + 3*a^4*b*c)*e^5)*x^8 + (6*(b^5*c + 10*a*b
^3*c^2 + 10*a^2*b*c^3)*d^5 + 5*(b^6 + 30*a*b^4*c + 90*a^2*b^2*c^2
 + 20*a^3*c^3)*d^4*e + 60*(a*b^5 + 10*a^2*b^3*c + 10*a^3*b*c^2)*d
^3*e^2 + 150*(a^2*b^4 + 4*a^3*b^2*c + a^4*c^2)*d^2*e^3 + 50*(2*a^
3*b^3 + 3*a^4*b*c)*d*e^4 + 3*(5*a^4*b^2 + 2*a^5*c)*e^5)*x^7 + (6*
a^5*b*e^5 + (b^6 + 30*a*b^4*c + 90*a^2*b^2*c^2 + 20*a^3*c^3)*d^5
+ 30*(a*b^5 + 10*a^2*b^3*c + 10*a^3*b*c^2)*d^4*e + 150*(a^2*b^4 +
 4*a^3*b^2*c + a^4*c^2)*d^3*e^2 + 100*(2*a^3*b^3 + 3*a^4*b*c)*d^2
*e^3 + 15*(5*a^4*b^2 + 2*a^5*c)*d*e^4)*x^6 + (30*a^5*b*d*e^4 + a^
6*e^5 + 6*(a*b^5 + 10*a^2*b^3*c + 10*a^3*b*c^2)*d^5 + 75*(a^2*b^4
 + 4*a^3*b^2*c + a^4*c^2)*d^4*e + 100*(2*a^3*b^3 + 3*a^4*b*c)*d^3
*e^2 + 30*(5*a^4*b^2 + 2*a^5*c)*d^2*e^3)*x^5 + 5*(12*a^5*b*d^2*e^
3 + a^6*d*e^4 + 3*(a^2*b^4 + 4*a^3*b^2*c + a^4*c^2)*d^5 + 10*(2*a
^3*b^3 + 3*a^4*b*c)*d^4*e + 6*(5*a^4*b^2 + 2*a^5*c)*d^3*e^2)*x^4
+ 5*(12*a^5*b*d^3*e^2 + 2*a^6*d^2*e^3 + 2*(2*a^3*b^3 + 3*a^4*b*c)
*d^5 + 3*(5*a^4*b^2 + 2*a^5*c)*d^4*e)*x^3 + (30*a^5*b*d^4*e + 10*
a^6*d^3*e^2 + 3*(5*a^4*b^2 + 2*a^5*c)*d^5)*x^2 + (6*a^5*b*d^5 + 5
*a^6*d^4*e)*x
```

Fricas [A] time = 0.24248, size = 1, normalized size = 0.05

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((17*c*e^2*x^3 + (29*c*d + 11*b*e)*e*x^2 + (6*b*d + 5*a*e)*d + (12*c*d^2
```

```
[Out] x^17*e^5*c^6 + 5*x^16*e^4*d*c^6 + 6*x^16*e^5*c^5*b + 10*x^15*e^3*
d^2*c^6 + 30*x^15*e^4*d*c^5*b + 15*x^15*e^5*c^4*b^2 + 6*x^15*e^5*
c^5*a + 10*x^14*e^2*d^3*c^6 + 60*x^14*e^3*d^2*c^5*b + 75*x^14*e^4
*d*c^4*b^2 + 20*x^14*e^5*c^3*b^3 + 30*x^14*e^4*d*c^5*a + 30*x^14*
e^5*c^4*b*a + 5*x^13*e*d^4*c^6 + 60*x^13*e^2*d^3*c^5*b + 150*x^13
*e^3*d^2*c^4*b^2 + 100*x^13*e^4*d*c^3*b^3 + 15*x^13*e^5*c^2*b^4 +
 60*x^13*e^3*d^2*c^5*a + 150*x^13*e^4*d*c^4*b*a + 60*x^13*e^5*c^3
*b^2*a + 15*x^13*e^5*c^4*a^2 + x^12*d^5*c^6 + 30*x^12*e*d^4*c^5*b
 + 150*x^12*e^2*d^3*c^4*b^2 + 200*x^12*e^3*d^2*c^3*b^3 + 75*x^12*
e^4*d*c^2*b^4 + 6*x^12*e^5*c*b^5 + 60*x^12*e^2*d^3*c^5*a + 300*x^
12*e^3*d^2*c^4*b*a + 300*x^12*e^4*d*c^3*b^2*a + 60*x^12*e^5*c^2*b
^3*a + 75*x^12*e^4*d*c^4*a^2 + 60*x^12*e^5*c^3*b*a^2 + 6*x^11*d^5
*c^5*b + 75*x^11*e*d^4*c^4*b^2 + 200*x^11*e^2*d^3*c^3*b^3 + 150*x
^11*e^3*d^2*c^2*b^4 + 30*x^11*e^4*d*c*b^5 + x^11*e^5*b^6 + 30*x^1
1*e*d^4*c^5*a + 300*x^11*e^2*d^3*c^4*b*a + 600*x^11*e^3*d^2*c^3*b
^2*a + 300*x^11*e^4*d*c^2*b^3*a + 30*x^11*e^5*c*b^4*a + 150*x^11*
e^3*d^2*c^4*a^2 + 300*x^11*e^4*d*c^3*b*a^2 + 90*x^11*e^5*c^2*b^2*
a^2 + 20*x^11*e^5*c^3*a^3 + 15*x^10*d^5*c^4*b^2 + 100*x^10*e*d^4*
c^3*b^3 + 150*x^10*e^2*d^3*c^2*b^4 + 60*x^10*e^3*d^2*c*b^5 + 5*x^
```

```
10*e^4*d*b^6 + 6*x^10*d^5*c^5*a + 150*x^10*e*d^4*c^4*b*a + 600*x^
10*e^2*d^3*c^3*b^2*a + 600*x^10*e^3*d^2*c^2*b^3*a + 150*x^10*e^4*
d*c*b^4*a + 6*x^10*e^5*b^5*a + 150*x^10*e^2*d^3*c^4*a^2 + 600*x^1
0*e^3*d^2*c^3*b*a^2 + 450*x^10*e^4*d*c^2*b^2*a^2 + 60*x^10*e^5*c*
b^3*a^2 + 100*x^10*e^4*d*c^3*a^3 + 60*x^10*e^5*c^2*b*a^3 + 20*x^9
*d^5*c^3*b^3 + 75*x^9*e*d^4*c^2*b^4 + 60*x^9*e^2*d^3*c*b^5 + 10*x
^9*e^3*d^2*b^6 + 30*x^9*d^5*c^4*b*a + 300*x^9*e*d^4*c^3*b^2*a + 6
00*x^9*e^2*d^3*c^2*b^3*a + 300*x^9*e^3*d^2*c*b^4*a + 30*x^9*e^4*d
*b^5*a + 75*x^9*e*d^4*c^4*a^2 + 600*x^9*e^2*d^3*c^3*b*a^2 + 900*x
^9*e^3*d^2*c^2*b^2*a^2 + 300*x^9*e^4*d*c*b^3*a^2 + 15*x^9*e^5*b^4
*a^2 + 200*x^9*e^3*d^2*c^3*a^3 + 300*x^9*e^4*d*c^2*b*a^3 + 60*x^9
*e^5*c*b^2*a^3 + 15*x^9*e^5*c^2*a^4 + 15*x^8*d^5*c^2*b^4 + 30*x^8
*e*d^4*c*b^5 + 10*x^8*e^2*d^3*b^6 + 60*x^8*d^5*c^3*b^2*a + 300*x^
8*e*d^4*c^2*b^3*a + 300*x^8*e^2*d^3*c*b^4*a + 60*x^8*e^3*d^2*b^5*
a + 15*x^8*d^5*c^4*a^2 + 300*x^8*e*d^4*c^3*b*a^2 + 900*x^8*e^2*d^
3*c^2*b^2*a^2 + 600*x^8*e^3*d^2*c*b^3*a^2 + 75*x^8*e^4*d*b^4*a^2
+ 200*x^8*e^2*d^3*c^3*a^3 + 600*x^8*e^3*d^2*c^2*b*a^3 + 300*x^8*e
^4*d*c*b^2*a^3 + 20*x^8*e^5*b^3*a^3 + 75*x^8*e^4*d*c^2*a^4 + 30*x
^8*e^5*c*b*a^4 + 6*x^7*d^5*c*b^5 + 5*x^7*e*d^4*b^6 + 60*x^7*d^5*c
^2*b^3*a + 150*x^7*e*d^4*c*b^4*a + 60*x^7*e^2*d^3*b^5*a + 60*x^7*
d^5*c^3*b*a^2 + 450*x^7*e*d^4*c^2*b^2*a^2 + 600*x^7*e^2*d^3*c*b^3
*a^2 + 150*x^7*e^3*d^2*b^4*a^2 + 100*x^7*e*d^4*c^3*a^3 + 600*x^7*
e^2*d^3*c^2*b*a^3 + 600*x^7*e^3*d^2*c*b^2*a^3 + 100*x^7*e^4*d*b^3
*a^3 + 150*x^7*e^3*d^2*c^2*a^4 + 150*x^7*e^4*d*c*b*a^4 + 15*x^7*e
^5*b^2*a^4 + 6*x^7*e^5*c*a^5 + x^6*d^5*b^6 + 30*x^6*d^5*c*b^4*a +
 30*x^6*e*d^4*b^5*a + 90*x^6*d^5*c^2*b^2*a^2 + 300*x^6*e*d^4*c*b^
3*a^2 + 150*x^6*e^2*d^3*b^4*a^2 + 20*x^6*d^5*c^3*a^3 + 300*x^6*e*
d^4*c^2*b*a^3 + 600*x^6*e^2*d^3*c*b^2*a^3 + 200*x^6*e^3*d^2*b^3*a
^3 + 150*x^6*e^2*d^3*c^2*a^4 + 300*x^6*e^3*d^2*c*b*a^4 + 75*x^6*e
^4*d*b^2*a^4 + 30*x^6*e^4*d*c*a^5 + 6*x^6*e^5*b*a^5 + 6*x^5*d^5*b
^5*a + 60*x^5*d^5*c*b^3*a^2 + 75*x^5*e*d^4*b^4*a^2 + 60*x^5*d^5*c
^2*b*a^3 + 300*x^5*e*d^4*c*b^2*a^3 + 200*x^5*e^2*d^3*b^3*a^3 + 75
*x^5*e*d^4*c^2*a^4 + 300*x^5*e^2*d^3*c*b*a^4 + 150*x^5*e^3*d^2*b^
2*a^4 + 60*x^5*e^3*d^2*c*a^5 + 30*x^5*e^4*d*b*a^5 + x^5*e^5*a^6 +
 15*x^4*d^5*b^4*a^2 + 60*x^4*d^5*c*b^2*a^3 + 100*x^4*e*d^4*b^3*a^
3 + 15*x^4*d^5*c^2*a^4 + 150*x^4*e*d^4*c*b*a^4 + 150*x^4*e^2*d^3*
b^2*a^4 + 60*x^4*e^2*d^3*c*a^5 + 60*x^4*e^3*d^2*b*a^5 + 5*x^4*e^4
*d*a^6 + 20*x^3*d^5*b^3*a^3 + 30*x^3*d^5*c*b*a^4 + 75*x^3*e*d^4*b
^2*a^4 + 30*x^3*e*d^4*c*a^5 + 60*x^3*e^2*d^3*b*a^5 + 10*x^3*e^3*d
^2*a^6 + 15*x^2*d^5*b^2*a^4 + 6*x^2*d^5*c*a^5 + 30*x^2*e*d^4*b*a^
5 + 10*x^2*e^2*d^3*a^6 + 6*x*d^5*b*a^5 + 5*x*e*d^4*a^6
```

Sympy [A] time = 0.617671, size = 2281, normalized size = 114.05

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**3*(c*x**2+b*x+a)**5*(d*(5*a*e+6*b*d)+(5*a*e**2+17*b*d*e+12*
```

```
[Out] c**6*e**5*x**17 + x**16*(6*b*c**5*e**5 + 5*c**6*d*e**4) + x**15*(
6*a*c**5*e**5 + 15*b**2*c**4*e**5 + 30*b*c**5*d*e**4 + 10*c**6*d*
*2*e**3) + x**14*(30*a*b*c**4*e**5 + 30*a*c**5*d*e**4 + 20*b**3*c
**3*e**5 + 75*b**2*c**4*d*e**4 + 60*b*c**5*d**2*e**3 + 10*c**6*d*
*3*e**2) + x**13*(15*a**2*c**4*e**5 + 60*a*b**2*c**3*e**5 + 150*a
*b*c**4*d*e**4 + 60*a*c**5*d**2*e**3 + 15*b**4*c**2*e**5 + 100*b*
*3*c**3*d*e**4 + 150*b**2*c**4*d**2*e**3 + 60*b*c**5*d**3*e**2 +
5*c**6*d**4*e) + x**12*(60*a**2*b*c**3*e**5 + 75*a**2*c**4*d*e**4
 + 60*a*b**3*c**2*e**5 + 300*a*b**2*c**3*d*e**4 + 300*a*b*c**4*d*
*2*e**3 + 60*a*c**5*d**3*e**2 + 6*b**5*c*e**5 + 75*b**4*c**2*d*e*
*4 + 200*b**3*c**3*d**2*e**3 + 150*b**2*c**4*d**3*e**2 + 30*b*c**
5*d**4*e + c**6*d**5) + x**11*(20*a**3*c**3*e**5 + 90*a**2*b**2*c
**2*e**5 + 300*a**2*b*c**3*d*e**4 + 150*a**2*c**4*d**2*e**3 + 30*
a*b**4*c*e**5 + 300*a*b**3*c**2*d*e**4 + 600*a*b**2*c**3*d**2*e**
3 + 300*a*b*c**4*d**3*e**2 + 30*a*c**5*d**4*e + b**6*e**5 + 30*b*
*5*c*d*e**4 + 150*b**4*c**2*d**2*e**3 + 200*b**3*c**3*d**3*e**2 +
 75*b**2*c**4*d**4*e + 6*b*c**5*d**5) + x**10*(60*a**3*b*c**2*e**
5 + 100*a**3*c**3*d*e**4 + 60*a**2*b**3*c*e**5 + 450*a**2*b**2*c*
*2*d*e**4 + 600*a**2*b*c**3*d**2*e**3 + 150*a**2*c**4*d**3*e**2 +
 6*a*b**5*e**5 + 150*a*b**4*c*d*e**4 + 600*a*b**3*c**2*d**2*e**3
+ 600*a*b**2*c**3*d**3*e**2 + 150*a*b*c**4*d**4*e + 6*a*c**5*d**5
 + 5*b**6*d*e**4 + 60*b**5*c*d**2*e**3 + 150*b**4*c**2*d**3*e**2
+ 100*b**3*c**3*d**4*e + 15*b**2*c**4*d**5) + x**9*(15*a**4*c**2*
e**5 + 60*a**3*b**2*c*e**5 + 300*a**3*b*c**2*d*e**4 + 200*a**3*c*
*3*d**2*e**3 + 15*a**2*b**4*e**5 + 300*a**2*b**3*c*d*e**4 + 900*a
**2*b**2*c**2*d**2*e**3 + 600*a**2*b*c**3*d**3*e**2 + 75*a**2*c**
4*d**4*e + 30*a*b**5*d*e**4 + 300*a*b**4*c*d**2*e**3 + 600*a*b**3
*c**2*d**3*e**2 + 300*a*b**2*c**3*d**4*e + 30*a*b*c**4*d**5 + 10*
b**6*d**2*e**3 + 60*b**5*c*d**3*e**2 + 75*b**4*c**2*d**4*e + 20*b
**3*c**3*d**5) + x**8*(30*a**4*b*c*e**5 + 75*a**4*c**2*d*e**4 + 2
0*a**3*b**3*e**5 + 300*a**3*b**2*c*d*e**4 + 600*a**3*b*c**2*d**2*
e**3 + 200*a**3*c**3*d**3*e**2 + 75*a**2*b**4*d*e**4 + 600*a**2*b
**3*c*d**2*e**3 + 900*a**2*b**2*c**2*d**3*e**2 + 300*a**2*b*c**3*
d**4*e + 15*a**2*c**4*d**5 + 60*a*b**5*d**2*e**3 + 300*a*b**4*c*d
**3*e**2 + 300*a*b**3*c**2*d**4*e + 60*a*b**2*c**3*d**5 + 10*b**6
*d**3*e**2 + 30*b**5*c*d**4*e + 15*b**4*c**2*d**5) + x**7*(6*a**5
*c*e**5 + 15*a**4*b**2*e**5 + 150*a**4*b*c*d*e**4 + 150*a**4*c**2
*d**2*e**3 + 100*a**3*b**3*d*e**4 + 600*a**3*b**2*c*d**2*e**3 + 6
00*a**3*b*c**2*d**3*e**2 + 100*a**3*c**3*d**4*e + 150*a**2*b**4*d
**2*e**3 + 600*a**2*b**3*c*d**3*e**2 + 450*a**2*b**2*c**2*d**4*e
+ 60*a**2*b*c**3*d**5 + 60*a*b**5*d**3*e**2 + 150*a*b**4*c*d**4*e
 + 60*a*b**3*c**2*d**5 + 5*b**6*d**4*e + 6*b**5*c*d**5) + x**6*(6
*a**5*b*e**5 + 30*a**5*c*d*e**4 + 75*a**4*b**2*d*e**4 + 300*a**4*
b*c*d**2*e**3 + 150*a**4*c**2*d**3*e**2 + 200*a**3*b**3*d**2*e**3
 + 600*a**3*b**2*c*d**3*e**2 + 300*a**3*b*c**2*d**4*e + 20*a**3*c
**3*d**5 + 150*a**2*b**4*d**3*e**2 + 300*a**2*b**3*c*d**4*e + 90*
a**2*b**2*c**2*d**5 + 30*a*b**5*d**4*e + 30*a*b**4*c*d**5 + b**6*
d**5) + x**5*(a**6*e**5 + 30*a**5*b*d*e**4 + 60*a**5*c*d**2*e**3
+ 150*a**4*b**2*d**2*e**3 + 300*a**4*b*c*d**3*e**2 + 75*a**4*c**2
*d**4*e + 200*a**3*b**3*d**3*e**2 + 300*a**3*b**2*c*d**4*e + 60*a
**3*b*c**2*d**5 + 75*a**2*b**4*d**4*e + 60*a**2*b**3*c*d**5 + 6*a
*b**5*d**5) + x**4*(5*a**6*d*e**4 + 60*a**5*b*d**2*e**3 + 60*a**5
*c*d**3*e**2 + 150*a**4*b**2*d**3*e**2 + 150*a**4*b*c*d**4*e + 15
*a**4*c**2*d**5 + 100*a**3*b**3*d**4*e + 60*a**3*b**2*c*d**5 + 15
```

```
*a**2*b**4*d**5) + x**3*(10*a**6*d**2*e**3 + 60*a**5*b*d**3*e**2
+ 30*a**5*c*d**4*e + 75*a**4*b**2*d**4*e + 30*a**4*b*c*d**5 + 20*
a**3*b**3*d**5) + x**2*(10*a**6*d**3*e**2 + 30*a**5*b*d**4*e + 6*
a**5*c*d**5 + 15*a**4*b**2*d**5) + x*(5*a**6*d**4*e + 6*a**5*b*d*
*5)
```

GIAC/XCAS [A] time = 0.277459, size = 1, normalized size = 0.05

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((17*c*e^2*x^3 + (29*c*d + 11*b*e)*e*x^2 + (6*b*d + 5*a*e)*d + (12*c*d^2
```

```
[Out] Done
```

3.279 $\int \frac{x^2+x^3}{-2+x+x^2} \, dx$

Optimal. Leaf size=26

$$\frac{x^2}{2} + \frac{2}{3}\log(1-x) + \frac{4}{3}\log(x+2)$$

```
[Out] x^2/2 + (2*Log[1 - x])/3 + (4*Log[2 + x])/3
```

Rubi [A] time = 0.0499074, antiderivative size = 26, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.25$

$$\frac{x^2}{2} + \frac{2}{3}\log(1-x) + \frac{4}{3}\log(x+2)$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2 + x^3)/(-2 + x + x^2),x]

[Out] x^2/2 + (2*Log[1 - x])/3 + (4*Log[2 + x])/3
```

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

$$\frac{2\log(-x+1)}{3} + \frac{4\log(x+2)}{3} + \int x \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] 2*log(-x + 1)/3 + 4*log(x + 2)/3 + Integral(x, x)
```

Mathematica [A] time = 0.00844723, size = 26, normalized size = 1.

$$\frac{x^2}{2} + \frac{2}{3}\log(1-x) + \frac{4}{3}\log(x+2)$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2 + x^3)/(-2 + x + x^2),x]
```

```
[Out] x^2/2 + (2*Log[1 - x])/3 + (4*Log[2 + x])/3
```

Maple [A] time = 0.008, size = 19, normalized size = 0.7

$$\frac{x^2}{2} + \frac{4\,\ln(2+x)}{3} + \frac{2\,\ln(-1+x)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^3+x^2)/(x^2+x-2),x)
```

```
[Out] 1/2*x^2+4/3*ln(2+x)+2/3*ln(-1+x)
```

Maxima [A] time = 0.696163, size = 24, normalized size = 0.92

$$\frac{1}{2}\,x^2 + \frac{4}{3}\,\log(x+2) + \frac{2}{3}\,\log(x-1)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*x^2 + 4/3*log(x + 2) + 2/3*log(x - 1)
```

Fricas [A] time = 0.257948, size = 24, normalized size = 0.92

$$\frac{1}{2}\,x^2 + \frac{4}{3}\,\log(x+2) + \frac{2}{3}\,\log(x-1)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*x^2 + 4/3*log(x + 2) + 2/3*log(x - 1)
```

Sympy [A] time = 0.100227, size = 20, normalized size = 0.77

$$\frac{x^2}{2} + \frac{2\log(x-1)}{3} + \frac{4\log(x+2)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] x**2/2 + 2*log(x - 1)/3 + 4*log(x + 2)/3
```

GIAC/XCAS [A] time = 0.269666, size = 27, normalized size = 1.04

$$\frac{1}{2}x^2 + \frac{4}{3}\ln\left(|x+2|\right) + \frac{2}{3}\ln\left(|x-1|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

```
[Out] 1/2*x^2 + 4/3*ln(abs(x + 2)) + 2/3*ln(abs(x - 1))
```

3.280 $\int \frac{x^2\left(d+ex+fx^2+gx^3\right)}{\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=346

$$\frac{x^2\sqrt{a+bx+cx^2}\left(-64acg+63b^2g-70bcf+80c^2e\right)}{240c^3}$$
$$-\frac{\sqrt{a+bx+cx^2}\left(-2cx\left(-40c^2(9af+10be)+14bc(46ag+25bf)-315b^3g+480c^3d\right)-60b^2c(20ce-49ag)+40bc^2(36cd-\right.}{1920c^5}$$
$$+\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-40b^3c(2ce-7ag)+48b^2c^2(2cd-5af)+48abc^2(4ce-5ag)-32ac^3(4cd-3af)-63b^5g+70b^4c\right.}{256c^{11/2}}$$
$$+\frac{x^3\sqrt{a+bx+cx^2}(10cf-9bg)}{40c^2}+\frac{gx^4\sqrt{a+bx+cx^2}}{5c}$$

```
[Out] ((80*c^2*e - 70*b*c*f + 63*b^2*g - 64*a*c*g)*x^2*Sqrt[a + b*x + c
*x^2])/(240*c^3) + ((10*c*f - 9*b*g)*x^3*Sqrt[a + b*x + c*x^2])/(
40*c^2) + (g*x^4*Sqrt[a + b*x + c*x^2])/(5*c) - ((1050*b^3*c*f +
40*b*c^2*(36*c*d - 55*a*f) - 945*b^4*g - 60*b^2*c*(20*c*e - 49*a*
g) + 256*a*c^2*(5*c*e - 4*a*g) - 2*c*(480*c^3*d - 40*c^2*(10*b*e
+ 9*a*f) - 315*b^3*g + 14*b*c*(25*b*f + 46*a*g))*x)*Sqrt[a + b*x
+ c*x^2])/(1920*c^5) + ((70*b^4*c*f + 48*b^2*c^2*(2*c*d - 5*a*f)
- 32*a*c^3*(4*c*d - 3*a*f) - 63*b^5*g - 40*b^3*c*(2*c*e - 7*a*g)
+ 48*a*b*c^2*(4*c*e - 5*a*g))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt
[a + b*x + c*x^2])])/(256*c^(11/2))
```

Rubi **[A]** time = 1.58916, antiderivative size = 346, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.152

$$\frac{x^2\sqrt{a+bx+cx^2}\left(-64acg+63b^2g-70bcf+80c^2e\right)}{240c^3}$$
$$-\frac{\sqrt{a+bx+cx^2}\left(-2cx\left(-40c^2(9af+10be)+14bc(46ag+25bf)-315b^3g+480c^3d\right)-60b^2c(20ce-49ag)+40bc^2(36cd-\right.}{1920c^5}$$
$$+\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-40b^3c(2ce-7ag)+48b^2c^2(2cd-5af)+48abc^2(4ce-5ag)-32ac^3(4cd-3af)-63b^5g+70b^4c\right.}{256c^{11/2}}$$
$$+\frac{x^3\sqrt{a+bx+cx^2}(10cf-9bg)}{40c^2}+\frac{gx^4\sqrt{a+bx+cx^2}}{5c}$$

Antiderivative was successfully verified.

```
[In]  Int[(x^2*(d + e*x + f*x^2 + g*x^3))/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] ((80*c^2*e - 70*b*c*f + 63*b^2*g - 64*a*c*g)*x^2*Sqrt[a + b*x + c
*x^2])/(240*c^3) + ((10*c*f - 9*b*g)*x^3*Sqrt[a + b*x + c*x^2])/(
```

```
40*c^2) + (g*x^4*Sqrt[a + b*x + c*x^2])/(5*c) - ((1050*b^3*c*f +
40*b*c^2*(36*c*d - 55*a*f) - 945*b^4*g - 60*b^2*c*(20*c*e - 49*a*
g) + 256*a*c^2*(5*c*e - 4*a*g) - 2*c*(480*c^3*d - 40*c^2*(10*b*e
+ 9*a*f) - 315*b^3*g + 14*b*c*(25*b*f + 46*a*g))*x)*Sqrt[a + b*x
+ c*x^2])/(1920*c^5) + ((70*b^4*c*f + 48*b^2*c^2*(2*c*d - 5*a*f)
- 32*a*c^3*(4*c*d - 3*a*f) - 63*b^5*g - 40*b^3*c*(2*c*e - 7*a*g)
+ 48*a*b*c^2*(4*c*e - 5*a*g))*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt
[a + b*x + c*x^2])])/(256*c^(11/2))
```

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(x**2*(g*x**3+f*x**2+e*x+d)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.568588, size = 282, normalized size = 0.82

$$\frac{15\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)\left(-40b^3c(2ce-7ag)+48b^2c^2(2cd-5af)-48abc^2(5ag-4ce)+32ac^3(3af-4cd)-\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x^2*(d + e*x + f*x^2 + g*x^3))/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] (-2*Sqrt[c]*Sqrt[a + x*(b + c*x)]*(-945*b^4*g + 210*b^3*c*(5*f +
3*g*x) - 4*b^2*c*(300*c*e - 735*a*g + 7*c*x*(25*f + 18*g*x)) + 8*
b*c^2*(-(a*(275*f + 161*g*x)) + 2*c*(90*d + x*(50*e + 35*f*x + 27
*g*x^2))) - 16*c^2*(64*a^2*g - a*c*(80*e + x*(45*f + 32*g*x)) + 2
*c^2*x*(30*d + x*(20*e + 3*x*(5*f + 4*g*x))))) + 15*(70*b^4*c*f +
 48*b^2*c^2*(2*c*d - 5*a*f) + 32*a*c^3*(-4*c*d + 3*a*f) - 63*b^5*
g - 40*b^3*c*(2*c*e - 7*a*g) - 48*a*b*c^2*(-4*c*e + 5*a*g))*Log[b
 + 2*c*x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]])/(3840*c^(11/2))
```

Maple [B] time = 0.019, size = 783, normalized size = 2.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x^2*(g*x^3+f*x^2+e*x+d)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] 63/128*g*b^4/c^5*(c*x^2+b*x+a)^(1/2)-63/256*g*b^5/c^(11/2)*ln((1/
2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+8/15*g/c^3*a^2*(c*x^2+b*x+a
)^(1/2)+1/4*f*x^3/c*(c*x^2+b*x+a)^(1/2)-35/64*f*b^3/c^4*(c*x^2+b*
x+a)^(1/2)+35/128*f*b^4/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x
+a)^(1/2))+3/8*f/c^(5/2)*a^2*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)
^(1/2))+1/3*e*x^2/c*(c*x^2+b*x+a)^(1/2)+5/8*e*b^2/c^3*(c*x^2+b*x+
a)^(1/2)-5/16*e*b^3/c^(7/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^
(1/2))-2/3*e/c^2*a*(c*x^2+b*x+a)^(1/2)-1/2*d*a/c^(3/2)*ln((1/2*b+
c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+3/8*d*b^2/c^(5/2)*ln((1/2*b+c*x
)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+1/2*d*x/c*(c*x^2+b*x+a)^(1/2)-3/4*
d*b/c^2*(c*x^2+b*x+a)^(1/2)+21/80*g*b^2/c^3*x^2*(c*x^2+b*x+a)^(1/
2)-21/64*g*b^3/c^4*x*(c*x^2+b*x+a)^(1/2)+35/32*g*b^3/c^(9/2)*a*ln
((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))-7/24*f*b/c^2*x^2*(c*x^2
+b*x+a)^(1/2)+35/96*f*b^2/c^3*x*(c*x^2+b*x+a)^(1/2)-15/16*f*b^2/c
^(7/2)*a*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+55/48*f*b/c^
3*a*(c*x^2+b*x+a)^(1/2)-3/8*f/c^2*a*x*(c*x^2+b*x+a)^(1/2)-5/12*e*
b/c^2*x*(c*x^2+b*x+a)^(1/2)+3/4*e*b/c^(5/2)*a*ln((1/2*b+c*x)/c^(1
/2)+(c*x^2+b*x+a)^(1/2))-9/40*g*b/c^2*x^3*(c*x^2+b*x+a)^(1/2)-4/1
5*g/c^2*a*x^2*(c*x^2+b*x+a)^(1/2)-15/16*g*b/c^(7/2)*a^2*ln((1/2*b
+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+161/240*g*b/c^3*a*x*(c*x^2+b*x
+a)^(1/2)+1/5*g*x^4*(c*x^2+b*x+a)^(1/2)/c-49/32*g*b^2/c^4*a*(c*x^
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((g*x^3 + f*x^2 + e*x + d)*x^2/sqrt(c*x^2 + b*x + a),x, algorithm="maxima
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 2.2178, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)*x^2/sqrt(c*x^2 + b*x + a),x, algorithm="fricas
```

```
[Out] [1/7680*(4*(384*c^4*g*x^4 - 1440*b*c^3*d + 48*(10*c^4*f - 9*b*c^3
*g)*x^3 + 8*(80*c^4*e - 70*b*c^3*f + (63*b^2*c^2 - 64*a*c^3)*g)*x
^2 + 80*(15*b^2*c^2 - 16*a*c^3)*e - 50*(21*b^3*c - 44*a*b*c^2)*f
+ (945*b^4 - 2940*a*b^2*c + 1024*a^2*c^2)*g + 2*(480*c^4*d - 400*
b*c^3*e + 10*(35*b^2*c^2 - 36*a*c^3)*f - 7*(45*b^3*c - 92*a*b*c^2
)*g)*x)*sqrt(c*x^2 + b*x + a)*sqrt(c) - 15*(32*(3*b^2*c^3 - 4*a*c
^4)*d - 16*(5*b^3*c^2 - 12*a*b*c^3)*e + 2*(35*b^4*c - 120*a*b^2*c
^2 + 48*a^2*c^3)*f - (63*b^5 - 280*a*b^3*c + 240*a^2*b*c^2)*g)*lo
g(4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x
+ b^2 + 4*a*c)*sqrt(c)))/c^(11/2), 1/3840*(2*(384*c^4*g*x^4 - 144
0*b*c^3*d + 48*(10*c^4*f - 9*b*c^3*g)*x^3 + 8*(80*c^4*e - 70*b*c^
3*f + (63*b^2*c^2 - 64*a*c^3)*g)*x^2 + 80*(15*b^2*c^2 - 16*a*c^3)
*e - 50*(21*b^3*c - 44*a*b*c^2)*f + (945*b^4 - 2940*a*b^2*c + 102
4*a^2*c^2)*g + 2*(480*c^4*d - 400*b*c^3*e + 10*(35*b^2*c^2 - 36*a
*c^3)*f - 7*(45*b^3*c - 92*a*b*c^2)*g)*x)*sqrt(c*x^2 + b*x + a)*s
qrt(-c) + 15*(32*(3*b^2*c^3 - 4*a*c^4)*d - 16*(5*b^3*c^2 - 12*a*b
*c^3)*e + 2*(35*b^4*c - 120*a*b^2*c^2 + 48*a^2*c^3)*f - (63*b^5 -
 280*a*b^3*c + 240*a^2*b*c^2)*g)*arctan(1/2*(2*c*x + b)*sqrt(-c)/
(sqrt(c*x^2 + b*x + a)*c)))/(sqrt(-c)*c^5)]
```

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

$$\int \frac{x^2\left(d+ex+fx^2+gx^3\right)}{\sqrt{a+bx+cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(x**2*(g*x**3+f*x**2+e*x+d)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral(x**2*(d + e*x + f*x**2 + g*x**3)/sqrt(a + b*x + c*x**2),
 x)
```

GIAC/XCAS [A] time = 0.29035, size = 446, normalized size = 1.29

$$\frac{1}{1920}\sqrt{cx^2+bx+a}\left(2\left(4\left(6\left(\frac{8\,gx}{c}+\frac{10\,c^4f-9\,bc^3g}{c^5}\right)x-\frac{70\,bc^3f-63\,b^2c^2g+64\,ac^3g-80\,c^4e}{c^5}\right)x+\frac{480\,c^4d+350\,b^2c^2f-\cdots}{\cdots}\right.\right.$$

$$-\frac{\left(96\,b^2c^3d-128\,ac^4d+70\,b^4cf-240\,ab^2c^2f+96\,a^2c^3f-63\,b^5g+280\,ab^3cg-240\,a^2bc^2g-80\,b^3c^2e+192\,abc^3e\right)\ln\left(\left|-\cdots\right.\right.}{256\,c^{\frac{11}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((g*x^3 + f*x^2 + e*x + d)*x^2/sqrt(c*x^2 + b*x + a),x, algorithm="giac")
```

```
[Out] 1/1920*sqrt(c*x^2 + b*x + a)*(2*(4*(6*(8*g*x/c + (10*c^4*f - 9*b*
c^3*g)/c^5)*x - (70*b*c^3*f - 63*b^2*c^2*g + 64*a*c^3*g - 80*c^4*
e)/c^5)*x + (480*c^4*d + 350*b^2*c^2*f - 360*a*c^3*f - 315*b^3*c*
g + 644*a*b*c^2*g - 400*b*c^3*e)/c^5)*x - (1440*b*c^3*d + 1050*b^
3*c*f - 2200*a*b*c^2*f - 945*b^4*g + 2940*a*b^2*c*g - 1024*a^2*c^
2*g - 1200*b^2*c^2*e + 1280*a*c^3*e)/c^5) - 1/256*(96*b^2*c^3*d -
 128*a*c^4*d + 70*b^4*c*f - 240*a*b^2*c^2*f + 96*a^2*c^3*f - 63*b
^5*g + 280*a*b^3*c*g - 240*a^2*b*c^2*g - 80*b^3*c^2*e + 192*a*b*c
^3*e)*ln(abs(-2*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))*sqrt(c) - b))
/c^(11/2)
```

3.281 $\int \frac{x(d+ex+fx^2+gx^3)}{\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=245

$$\frac{\sqrt{a+bx+cx^2}\left(2cx\left(-36acg+35b^2g-40bcf+48c^2e\right)-16c^2(8af+9be)+20bc(11ag+6bf)-105b^3g+192c^3d\right)}{192c^4}-\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-24b^2c(2ce-5ag)+32bc^2(2cd-3af)+16ac^2(4ce-3ag)-35b^4g+40b^3cf\right)}{128c^{9/2}}+\frac{x^2\sqrt{a+bx+cx^2}(8cf-7bg)}{24c^2}+\frac{gx^3\sqrt{a+bx+cx^2}}{4c}$$

```
[Out] ((8*c*f - 7*b*g)*x^2*Sqrt[a + b*x + c*x^2])/(24*c^2) + (g*x^3*Sqr
t[a + b*x + c*x^2])/(4*c) + ((192*c^3*d - 16*c^2*(9*b*e + 8*a*f)
- 105*b^3*g + 20*b*c*(6*b*f + 11*a*g) + 2*c*(48*c^2*e - 40*b*c*f
+ 35*b^2*g - 36*a*c*g)*x)*Sqrt[a + b*x + c*x^2])/(192*c^4) - ((40
*b^3*c*f + 32*b*c^2*(2*c*d - 3*a*f) - 35*b^4*g - 24*b^2*c*(2*c*e
- 5*a*g) + 16*a*c^2*(4*c*e - 3*a*g))*ArcTanh[(b + 2*c*x)/(2*Sqrt[
c]*Sqrt[a + b*x + c*x^2])])/(128*c^(9/2))
```

Rubi [A] time = 0.820266, antiderivative size = 245, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.129

$$\frac{\sqrt{a+bx+cx^2}\left(2cx\left(-36acg+35b^2g-40bcf+48c^2e\right)-16c^2(8af+9be)+20bc(11ag+6bf)-105b^3g+192c^3d\right)}{192c^4}-\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-24b^2c(2ce-5ag)+32bc^2(2cd-3af)+16ac^2(4ce-3ag)-35b^4g+40b^3cf\right)}{128c^{9/2}}+\frac{x^2\sqrt{a+bx+cx^2}(8cf-7bg)}{24c^2}+\frac{gx^3\sqrt{a+bx+cx^2}}{4c}$$

Antiderivative was successfully verified.

```
[In]  Int[(x*(d + e*x + f*x^2 + g*x^3))/Sqrt[a + b*x + c*x^2],x]
```



```
[Out] ((8*c*f - 7*b*g)*x^2*Sqrt[a + b*x + c*x^2])/(24*c^2) + (g*x^3*Sqr
t[a + b*x + c*x^2])/(4*c) + ((192*c^3*d - 16*c^2*(9*b*e + 8*a*f)
- 105*b^3*g + 20*b*c*(6*b*f + 11*a*g) + 2*c*(48*c^2*e - 40*b*c*f
+ 35*b^2*g - 36*a*c*g)*x)*Sqrt[a + b*x + c*x^2])/(192*c^4) - ((40
*b^3*c*f + 32*b*c^2*(2*c*d - 3*a*f) - 35*b^4*g - 24*b^2*c*(2*c*e
- 5*a*g) + 16*a*c^2*(4*c*e - 3*a*g))*ArcTanh[(b + 2*c*x)/(2*Sqrt[
c]*Sqrt[a + b*x + c*x^2])])/(128*c^(9/2))
```

Rubi in Sympy [A] time = 139.074, size = 262, normalized size = 1.07

$$\frac{gx^3\sqrt{a+bx+cx^2}}{4c}-\frac{x^2\left(\frac{7bg}{8}-cf\right)\sqrt{a+bx+cx^2}}{3c^2}-\frac{\sqrt{a+bx+cx^2}\left(\frac{105b^3g}{32}-cx\left(-\frac{9acg}{4}+\frac{35b^2g}{16}-\frac{5bcf}{2}+3c^2e\right)-\frac{c(55abg-32acf+30b^2f-36bce+48c^2d)}{8}\right)}{6c^4}+\frac{(48a^2c^2g-120ab^2cg+96abc^2f-64ac^3e+35b^4g-40b^3cf+48b^2c^2e-64bc^3d)\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{128c^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate(x*(g*x**3+f*x**2+e*x+d)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] g*x**3*sqrt(a + b*x + c*x**2)/(4*c) - x**2*(7*b*g/8 - c*f)*sqrt(a
 + b*x + c*x**2)/(3*c**2) - sqrt(a + b*x + c*x**2)*(105*b**3*g/32
 - c*x*(-9*a*c*g/4 + 35*b**2*g/16 - 5*b*c*f/2 + 3*c**2*e) - c*(55
*a*b*g - 32*a*c*f + 30*b**2*f - 36*b*c*e + 48*c**2*d)/8)/(6*c**4)
 + (48*a**2*c**2*g - 120*a*b**2*c*g + 96*a*b*c**2*f - 64*a*c**3*e
 + 35*b**4*g - 40*b**3*c*f + 48*b**2*c**2*e - 64*b*c**3*d)*atanh(
(b + 2*c*x)/(2*sqrt(c)*sqrt(a + b*x + c*x**2)))/(128*c**(9/2))
```

Mathematica [A] time = 0.335804, size = 199, normalized size = 0.81

$$2\sqrt{c}\sqrt{a+x(b+cx)}\left(-8c^2\left(16af+9agx+18be+10bfx+7bgx^2\right)+10bc(22ag+12bf+7bgx)-105b^3g+16c^3\left(12d+x\left(6\right.\right.\right.$$

Antiderivative was successfully verified.

```
[In]  Integrate[(x*(d + e*x + f*x^2 + g*x^3))/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] (2*Sqrt[c]*Sqrt[a + x*(b + c*x)]*(-105*b^3*g + 10*b*c*(12*b*f + 2
2*a*g + 7*b*g*x) - 8*c^2*(18*b*e + 16*a*f + 10*b*f*x + 9*a*g*x +
7*b*g*x^2) + 16*c^3*(12*d + x*(6*e + 4*f*x + 3*g*x^2))) + 3*(-40*
b^3*c*f + 32*b*c^2*(-2*c*d + 3*a*f) + 35*b^4*g + 24*b^2*c*(2*c*e
- 5*a*g) + 16*a*c^2*(-4*c*e + 3*a*g))*Log[b + 2*c*x + 2*Sqrt[c]*S
qrt[a + x*(b + c*x)]])/(384*c^(9/2))
```

Maple [B] time = 0.013, size = 532, normalized size = 2.2

$$\frac{d}{c}\sqrt{cx^2+bx+a}-\frac{bd}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}+\frac{ex}{2\,c}\sqrt{cx^2+bx+a}$$
$$-\frac{3\,be}{4\,c^2}\sqrt{cx^2+bx+a}+\frac{3\,b^2e}{8}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{5}{2}}$$
$$-\frac{ae}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}+\frac{fx^2}{3\,c}\sqrt{cx^2+bx+a}-\frac{5\,bfx}{12\,c^2}\sqrt{cx^2+bx+a}$$
$$+\frac{5\,b^2f}{8\,c^3}\sqrt{cx^2+bx+a}-\frac{5\,fb^3}{16}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{7}{2}}$$
$$+\frac{3\,abf}{4}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{5}{2}}-\frac{2\,fa}{3\,c^2}\sqrt{cx^2+bx+a}$$
$$+\frac{gx^3}{4\,c}\sqrt{cx^2+bx+a}-\frac{7\,bgx^2}{24\,c^2}\sqrt{cx^2+bx+a}+\frac{35\,b^2gx}{96\,c^3}\sqrt{cx^2+bx+a}$$
$$-\frac{35\,b^3g}{64\,c^4}\sqrt{cx^2+bx+a}+\frac{35\,b^4g}{128}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{9}{2}}$$
$$-\frac{15\,b^2ga}{16}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{7}{2}}+\frac{55\,bga}{48\,c^3}\sqrt{cx^2+bx+a}$$
$$-\frac{3\,agx}{8\,c^2}\sqrt{cx^2+bx+a}+\frac{3\,ga^2}{8}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int(x*(g*x^3+f*x^2+e*x+d)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] d/c*(c*x^2+b*x+a)^(1/2)-1/2*d*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c
*x^2+b*x+a)^(1/2))+1/2*e*x/c*(c*x^2+b*x+a)^(1/2)-3/4*e*b/c^2*(c*x
^2+b*x+a)^(1/2)+3/8*e*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b
*x+a)^(1/2))-1/2*e*a/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)
^(1/2))+1/3*f*x^2/c*(c*x^2+b*x+a)^(1/2)-5/12*f*b/c^2*x*(c*x^2+b*x
+a)^(1/2)+5/8*f*b^2/c^3*(c*x^2+b*x+a)^(1/2)-5/16*f*b^3/c^(7/2)*ln
((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+3/4*f*b/c^(5/2)*a*ln((1
/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))-2/3*f/c^2*a*(c*x^2+b*x+a)^
(1/2)+1/4*g*x^3*(c*x^2+b*x+a)^(1/2)/c-7/24*g*b/c^2*x^2*(c*x^2+b*x
+a)^(1/2)+35/96*g*b^2/c^3*x*(c*x^2+b*x+a)^(1/2)-35/64*g*b^3/c^4*(
c*x^2+b*x+a)^(1/2)+35/128*g*b^4/c^(9/2)*ln((1/2*b+c*x)/c^(1/2)+(c
*x^2+b*x+a)^(1/2))-15/16*g*b^2/c^(7/2)*a*ln((1/2*b+c*x)/c^(1/2)+(
c*x^2+b*x+a)^(1/2))+55/48*g*b/c^3*a*(c*x^2+b*x+a)^(1/2)-3/8*g/c^2
*a*x*(c*x^2+b*x+a)^(1/2)+3/8*g/c^(5/2)*a^2*ln((1/2*b+c*x)/c^(1/2)
+(c*x^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((g*x^3 + f*x^2 + e*x + d)*x/sqrt(c*x^2 + b*x + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 1.85479, size = 1, normalized size = 0.

$$\left[\frac{4\left(48\,c^3gx^3 + 192\,c^3d - 144\,bc^2e + 8\left(8\,c^3f - 7\,bc^2g\right)x^2 + 8\left(15\,b^2c - 16\,ac^2\right)f - 5\left(21\,b^3 - 44\,abc\right)g + 2\left(48\,c^3e - 40\,bc^2f\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)*x/sqrt(c*x^2 + b*x + a),x, algorithm="fricas")
```

```
[Out] [1/768*(4*(48*c^3*g*x^3 + 192*c^3*d - 144*b*c^2*e + 8*(8*c^3*f -
7*b*c^2*g)*x^2 + 8*(15*b^2*c - 16*a*c^2)*f - 5*(21*b^3 - 44*a*b*c
)*g + 2*(48*c^3*e - 40*b*c^2*f + (35*b^2*c - 36*a*c^2)*g)*x)*sqrt
(c*x^2 + b*x + a)*sqrt(c) - 3*(64*b*c^3*d - 16*(3*b^2*c^2 - 4*a*c
^3)*e + 8*(5*b^3*c - 12*a*b*c^2)*f - (35*b^4 - 120*a*b^2*c + 48*a
^2*c^2)*g)*log(-4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x + a) - (8*c^2*
x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))/c^(9/2), 1/384*(2*(48*c^3*
g*x^3 + 192*c^3*d - 144*b*c^2*e + 8*(8*c^3*f - 7*b*c^2*g)*x^2 + 8
*(15*b^2*c - 16*a*c^2)*f - 5*(21*b^3 - 44*a*b*c)*g + 2*(48*c^3*e
- 40*b*c^2*f + (35*b^2*c - 36*a*c^2)*g)*x)*sqrt(c*x^2 + b*x + a)*
sqrt(-c) - 3*(64*b*c^3*d - 16*(3*b^2*c^2 - 4*a*c^3)*e + 8*(5*b^3*
c - 12*a*b*c^2)*f - (35*b^4 - 120*a*b^2*c + 48*a^2*c^2)*g)*arctan
(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))/(sqrt(-c)*c
^4)]
```

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

$$\int \frac{x\left(d + ex + fx^2 + gx^3\right)}{\sqrt{a + bx + cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(x*(g*x**3+f*x**2+e*x+d)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral(x*(d + e*x + f*x**2 + g*x**3)/sqrt(a + b*x + c*x**2), x)
```

GIAC/XCAS [A] time = 0.293467, size = 308, normalized size = 1.26

$$\frac{1}{192}\sqrt{cx^2+bx+a}\left(2\left(4\left(\frac{6\,gx}{c}+\frac{8\,c^3f-7\,bc^2g}{c^4}\right)x-\frac{40\,bc^2f-35\,b^2cg+36\,ac^2g-48\,c^3e}{c^4}\right)x+\frac{192\,c^3d+120\,b^2cf-128\,ac\cdots}{}\right.$$
$$+\frac{\left(64\,bc^3d+40\,b^3cf-96\,abc^2f-35\,b^4g+120\,ab^2cg-48\,a^2c^2g-48\,b^2c^2e+64\,ac^3e\right)\ln\left(\left|-2\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right)\sqrt{c}-\cdots\right.\right.}{128\,c^{\frac{9}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)*x/sqrt(c*x^2 + b*x + a),x, algorithm="giac")
```

```
[Out] 1/192*sqrt(c*x^2 + b*x + a)*(2*(4*(6*g*x/c + (8*c^3*f - 7*b*c^2*g
)/c^4)*x - (40*b*c^2*f - 35*b^2*c*g + 36*a*c^2*g - 48*c^3*e)/c^4)
*x + (192*c^3*d + 120*b^2*c*f - 128*a*c^2*f - 105*b^3*g + 220*a*b
*c*g - 144*b*c^2*e)/c^4) + 1/128*(64*b*c^3*d + 40*b^3*c*f - 96*a*
b*c^2*f - 35*b^4*g + 120*a*b^2*c*g - 48*a^2*c^2*g - 48*b^2*c^2*e
+ 64*a*c^3*e)*ln(abs(-2*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))*sqrt(
c) - b))/c^(9/2)
```

3.282 $\int \frac{d+ex+fx^2+gx^3}{\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=177

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-8c^2(af+be)+6bc(2ag+bf)-5b^3g+16c^3d\right)}{16c^{7/2}}+\frac{\sqrt{a+bx+cx^2}\left(-16acg+15b^2g-18bcf+24c^2e\right)}{24c^3}+\frac{x\sqrt{a+bx+cx^2}(6cf-5bg)}{12c^2}+\frac{gx^2\sqrt{a+bx+cx^2}}{3c}$$

```
[Out] ((24*c^2*e - 18*b*c*f + 15*b^2*g - 16*a*c*g)*Sqrt[a + b*x + c*x^2
])/(24*c^3) + ((6*c*f - 5*b*g)*x*Sqrt[a + b*x + c*x^2])/(12*c^2)
+ (g*x^2*Sqrt[a + b*x + c*x^2])/(3*c) + ((16*c^3*d - 8*c^2*(b*e +
 a*f) - 5*b^3*g + 6*b*c*(b*f + 2*a*g))*ArcTanh[(b + 2*c*x)/(2*Sqr
t[c]*Sqrt[a + b*x + c*x^2])])/(16*c^(7/2))
```

Rubi [A] time = 0.427128, antiderivative size = 177, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.133

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-8c^2(af+be)+6bc(2ag+bf)-5b^3g+16c^3d\right)}{16c^{7/2}}+\frac{\sqrt{a+bx+cx^2}\left(-16acg+15b^2g-18bcf+24c^2e\right)}{24c^3}+\frac{x\sqrt{a+bx+cx^2}(6cf-5bg)}{12c^2}+\frac{gx^2\sqrt{a+bx+cx^2}}{3c}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2 + g*x^3)/Sqrt[a + b*x + c*x^2],x]
```


```
[Out] ((24*c^2*e - 18*b*c*f + 15*b^2*g - 16*a*c*g)*Sqrt[a + b*x + c*x^2
])/(24*c^3) + ((6*c*f - 5*b*g)*x*Sqrt[a + b*x + c*x^2])/(12*c^2)
+ (g*x^2*Sqrt[a + b*x + c*x^2])/(3*c) + ((16*c^3*d - 8*c^2*(b*e +
 a*f) - 5*b^3*g + 6*b*c*(b*f + 2*a*g))*ArcTanh[(b + 2*c*x)/(2*Sqr
t[c]*Sqrt[a + b*x + c*x^2])])/(16*c^(7/2))
```

Rubi in Sympy [A] time = 61.3486, size = 163, normalized size = 0.92

$$\frac{gx^2\sqrt{a+bx+cx^2}}{3c} - \frac{\sqrt{a+bx+cx^2}\left(\frac{4ag}{3}-\frac{5b^2g}{4c}+\frac{3bf}{2}-2ce+x\left(\frac{5bg}{6}-cf\right)\right)}{2c^2} - \frac{\left(-12abcg+8ac^2f+5b^3g-6b^2cf+8bc^2e-16c^3d\right)\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{16c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((g*x**3+f*x**2+e*x+d)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] g*x**2*sqrt(a + b*x + c*x**2)/(3*c) - sqrt(a + b*x + c*x**2)*(4*a
*g/3 - 5*b**2*g/(4*c) + 3*b*f/2 - 2*c*e + x*(5*b*g/6 - c*f))/(2*c
**2) - (-12*a*b*c*g + 8*a*c**2*f + 5*b**3*g - 6*b**2*c*f + 8*b*c*
*2*e - 16*c**3*d)*atanh((b + 2*c*x)/(2*sqrt(c)*sqrt(a + b*x + c*x
**2)))/(16*c**(7/2))
```

Mathematica [A] time = 0.232549, size = 139, normalized size = 0.79

$$\frac{3\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)\left(-8c^2(af+be)+6bc(2ag+bf)-5b^3g+16c^3d\right)+2\sqrt{c}\sqrt{a+x(b+cx)}\left(-2c(8ag+9bf\right.}{48c^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2 + g*x^3)/Sqrt[a + b*x + c*x^2],x]
```

```
[Out] (2*Sqrt[c]*Sqrt[a + x*(b + c*x)]*(15*b^2*g - 2*c*(9*b*f + 8*a*g +
 5*b*g*x) + 4*c^2*(6*e + x*(3*f + 2*g*x))) + 3*(16*c^3*d - 8*c^2*
(b*e + a*f) - 5*b^3*g + 6*b*c*(b*f + 2*a*g))*Log[b + 2*c*x + 2*Sq
rt[c]*Sqrt[a + x*(b + c*x)]])/(48*c^(7/2))
```

Maple [B] time = 0.01, size = 333, normalized size = 1.9

$$d\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)\frac{1}{\sqrt{c}}+\frac{e}{c}\sqrt{cx^{2}+bx+a}$$
$$-\frac{be}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)c^{-\frac{3}{2}}+\frac{fx}{2c}\sqrt{cx^{2}+bx+a}$$
$$-\frac{3bf}{4c^{2}}\sqrt{cx^{2}+bx+a}+\frac{3b^{2}f}{8}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)c^{-\frac{5}{2}}$$
$$-\frac{fa}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)c^{-\frac{3}{2}}+\frac{gx^{2}}{3c}\sqrt{cx^{2}+bx+a}-\frac{5bgx}{12c^{2}}\sqrt{cx^{2}+bx+a}$$
$$+\frac{5b^{2}g}{8c^{3}}\sqrt{cx^{2}+bx+a}-\frac{5b^{3}g}{16}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)c^{-\frac{7}{2}}$$
$$+\frac{3bga}{4}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^{2}+bx+a}\right)c^{-\frac{5}{2}}-\frac{2ag}{3c^{2}}\sqrt{cx^{2}+bx+a}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((g*x^3+f*x^2+e*x+d)/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] d*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))/c^(1/2)+e/c*(c*x^2+
b*x+a)^(1/2)-1/2*e*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)
^(1/2))+1/2*f*x*(c*x^2+b*x+a)^(1/2)/c-3/4*f*b/c^2*(c*x^2+b*x+a)^(
1/2)+3/8*f*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2)
)-1/2*f*a/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+1/3
*g*x^2*(c*x^2+b*x+a)^(1/2)/c-5/12*g*b/c^2*x*(c*x^2+b*x+a)^(1/2)+5
/8*g*b^2/c^3*(c*x^2+b*x+a)^(1/2)-5/16*g*b^3/c^(7/2)*ln((1/2*b+c*x
)/c^(1/2)+(c*x^2+b*x+a)^(1/2))+3/4*g*b/c^(5/2)*a*ln((1/2*b+c*x)/c
^(1/2)+(c*x^2+b*x+a)^(1/2))-2/3*g/c^2*a*(c*x^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((g*x^3 + f*x^2 + e*x + d)/sqrt(c*x^2 + b*x + a),x, algorithm="maxima")
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 1.51105, size = 1, normalized size = 0.01

$$\left[\frac{4\left(8c^2gx^2+24c^2e-18bcf+\left(15b^2-16ac\right)g+2\left(6c^2f-5bcg\right)x\right)\sqrt{cx^2+bx+a}\sqrt{c}+3\left(16c^3d-8bc^2e+2\left(3b^2c-4a\right.\right.}{96c^{\frac{7}{2}}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)/sqrt(c*x^2 + b*x + a),x, algorithm="fricas")
```

```
[Out] [1/96*(4*(8*c^2*g*x^2 + 24*c^2*e - 18*b*c*f + (15*b^2 - 16*a*c)*g
 + 2*(6*c^2*f - 5*b*c*g)*x)*sqrt(c*x^2 + b*x + a)*sqrt(c) + 3*(16
*c^3*d - 8*b*c^2*e + 2*(3*b^2*c - 4*a*c^2)*f - (5*b^3 - 12*a*b*c)
*g)*log(-4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x + a) - (8*c^2*x^2 + 8
*b*c*x + b^2 + 4*a*c)*sqrt(c)))/c^(7/2), 1/48*(2*(8*c^2*g*x^2 + 2
4*c^2*e - 18*b*c*f + (15*b^2 - 16*a*c)*g + 2*(6*c^2*f - 5*b*c*g)*
x)*sqrt(c*x^2 + b*x + a)*sqrt(-c) + 3*(16*c^3*d - 8*b*c^2*e + 2*(
3*b^2*c - 4*a*c^2)*f - (5*b^3 - 12*a*b*c)*g)*arctan(1/2*(2*c*x +
b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))/(sqrt(-c)*c^3)]
```

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

$$\int \frac{d+ex+fx^2+gx^3}{\sqrt{a+bx+cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2 + g*x**3)/sqrt(a + b*x + c*x**2), x)
```

GIAC/XCAS [A] time = 0.29079, size = 201, normalized size = 1.14

$$\frac{1}{24}\sqrt{cx^2+bx+a}\left(2\left(\frac{4gx}{c}+\frac{6c^2f-5bcg}{c^3}\right)x-\frac{18bcf-15b^2g+16acg-24c^2e}{c^3}\right)-\frac{\left(16c^3d+6b^2cf-8ac^2f-5b^3g+12abcg-8bc^2e\right)\ln\left(\left|-2\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right)\sqrt{c}-b\right|\right)}{16c^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)/sqrt(c*x^2 + b*x + a),x, algorithm="giac")
```

```
[Out] 1/24*sqrt(c*x^2 + b*x + a)*(2*(4*g*x/c + (6*c^2*f - 5*b*c*g)/c^3)
*x - (18*b*c*f - 15*b^2*g + 16*a*c*g - 24*c^2*e)/c^3) - 1/16*(16*
c^3*d + 6*b^2*c*f - 8*a*c^2*f - 5*b^3*g + 12*a*b*c*g - 8*b*c^2*e)
*ln(abs(-2*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))*sqrt(c) - b))/c^(7
/2)
```

3.283 $\int \frac{d+ex+fx^2+gx^3}{x\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=155

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-4c(ag+bf)+3b^2g+8c^2e\right)}{8c^{5/2}}+\frac{\sqrt{a+bx+cx^2}(4cf-3bg)}{4c^2}-\frac{d\tanh^{-1}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)}{\sqrt{a}}+\frac{gx\sqrt{a+bx+cx^2}}{2c}$$

```
[Out] ((4*c*f - 3*b*g)*Sqrt[a + b*x + c*x^2])/(4*c^2) + (g*x*Sqrt[a + b
*x + c*x^2])/(2*c) - (d*ArcTanh[(2*a + b*x)/(2*Sqrt[a]*Sqrt[a + b
*x + c*x^2])])/Sqrt[a] + ((8*c^2*e + 3*b^2*g - 4*c*(b*f + a*g))*A
rcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(8*c^(5/2)
)
```

Rubi [A] time = 0.468534, antiderivative size = 155, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.152

$$\frac{\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)\left(-4c(ag+bf)+3b^2g+8c^2e\right)}{8c^{5/2}}+\frac{\sqrt{a+bx+cx^2}(4cf-3bg)}{4c^2}-\frac{d\tanh^{-1}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)}{\sqrt{a}}+\frac{gx\sqrt{a+bx+cx^2}}{2c}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2 + g*x^3)/(x*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] ((4*c*f - 3*b*g)*Sqrt[a + b*x + c*x^2])/(4*c^2) + (g*x*Sqrt[a + b
*x + c*x^2])/(2*c) - (d*ArcTanh[(2*a + b*x)/(2*Sqrt[a]*Sqrt[a + b
*x + c*x^2])])/Sqrt[a] + ((8*c^2*e + 3*b^2*g - 4*c*(b*f + a*g))*A
rcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/(8*c^(5/2)
)
```

Rubi in Sympy [A] time = 84.0843, size = 144, normalized size = 0.93

$$\frac{gx\sqrt{a+bx+cx^2}}{2c}-\frac{\left(\frac{3bg}{4}-cf\right)\sqrt{a+bx+cx^2}}{c^2}+\frac{\left(-4acg+3b^2g-4bcf+8c^2e\right)\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{8c^{\frac{5}{2}}}-\frac{d\operatorname{atanh}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)}{\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((g*x**3+f*x**2+e*x+d)/x/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] g*x*sqrt(a + b*x + c*x**2)/(2*c) - (3*b*g/4 - c*f)*sqrt(a + b*x +
 c*x**2)/c**2 + (-4*a*c*g + 3*b**2*g - 4*b*c*f + 8*c**2*e)*atanh(
(b + 2*c*x)/(2*sqrt(c)*sqrt(a + b*x + c*x**2)))/(8*c**(5/2)) - d*
atanh((2*a + b*x)/(2*sqrt(a)*sqrt(a + b*x + c*x**2)))/sqrt(a)
```

Mathematica [A] time = 0.804931, size = 139, normalized size = 0.9

$$\frac{\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)\left(-4c(ag+bf)+3b^2g+8c^2e\right)}{8c^{5/2}}+\frac{\sqrt{a+x(b+cx)}(-3bg+4cf+2cgx)}{4c^2}-\frac{d\log\left(2\sqrt{a}\sqrt{a+x(b+cx)}+2a+bx\right)}{\sqrt{a}}+\frac{d\log(x)}{\sqrt{a}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2 + g*x^3)/(x*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] ((4*c*f - 3*b*g + 2*c*g*x)*Sqrt[a + x*(b + c*x)])/(4*c^2) + (d*Lo
g[x])/Sqrt[a] - (d*Log[2*a + b*x + 2*Sqrt[a]*Sqrt[a + x*(b + c*x)
]])/Sqrt[a] + ((8*c^2*e + 3*b^2*g - 4*c*(b*f + a*g))*Log[b + 2*c*
x + 2*Sqrt[c]*Sqrt[a + x*(b + c*x)]])/(8*c^(5/2))
```

Maple [A] time = 0.011, size = 220, normalized size = 1.4

$$e\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)\frac{1}{\sqrt{c}}+\frac{f}{c}\sqrt{cx^2+bx+a}-\frac{bf}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}-d\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^2+bx+a}\right)\right)\frac{1}{\sqrt{a}}+\frac{gx}{2\,c}\sqrt{cx^2+bx+a}-\frac{3\,bg}{4\,c^2}\sqrt{cx^2+bx+a}+\frac{3\,b^2g}{8}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{5}{2}}-\frac{ag}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((g*x^3+f*x^2+e*x+d)/x/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] e*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))/c^(1/2)+f/c*(c*x^2+
b*x+a)^(1/2)-1/2*f*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)
^(1/2))-d/a^(1/2)*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/x)+1
/2*g*x*(c*x^2+b*x+a)^(1/2)/c-3/4*g*b/c^2*(c*x^2+b*x+a)^(1/2)+3/8*
g*b^2/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))-1/2*g*a
/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^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((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x),x, algorithm="maxima
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 2.69923, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x),x, algorithm="fricas
```

```
[Out] [1/16*(8*c^(5/2)*d*log((4*(a*b*x + 2*a^2)*sqrt(c*x^2 + b*x + a) -
 (8*a*b*x + (b^2 + 4*a*c)*x^2 + 8*a^2)*sqrt(a))/x^2) + 4*(2*c*g*x
 + 4*c*f - 3*b*g)*sqrt(c*x^2 + b*x + a)*sqrt(a)*sqrt(c) - (8*c^2*
e - 4*b*c*f + (3*b^2 - 4*a*c)*g)*sqrt(a)*log(4*(2*c^2*x + b*c)*sq
rt(c*x^2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)
))/(sqrt(a)*c^(5/2)), 1/8*(4*sqrt(-c)*c^2*d*log((4*(a*b*x + 2*a^2
)*sqrt(c*x^2 + b*x + a) - (8*a*b*x + (b^2 + 4*a*c)*x^2 + 8*a^2)*s
qrt(a))/x^2) + 2*(2*c*g*x + 4*c*f - 3*b*g)*sqrt(c*x^2 + b*x + a)*
sqrt(a)*sqrt(-c) + (8*c^2*e - 4*b*c*f + (3*b^2 - 4*a*c)*g)*sqrt(a
)*arctan(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))/(sq
rt(a)*sqrt(-c)*c^2), -1/16*(16*c^(5/2)*d*arctan(1/2*(b*x + 2*a)*s
qrt(-a)/(sqrt(c*x^2 + b*x + a)*a)) - 4*(2*c*g*x + 4*c*f - 3*b*g)*
sqrt(c*x^2 + b*x + a)*sqrt(-a)*sqrt(c) + (8*c^2*e - 4*b*c*f + (3*
b^2 - 4*a*c)*g)*sqrt(-a)*log(4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x +
 a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))/(sqrt(-a)*c^(
5/2)), -1/8*(8*sqrt(-c)*c^2*d*arctan(1/2*(b*x + 2*a)*sqrt(-a)/(sq
rt(c*x^2 + b*x + a)*a)) - 2*(2*c*g*x + 4*c*f - 3*b*g)*sqrt(c*x^2
+ b*x + a)*sqrt(-a)*sqrt(-c) - (8*c^2*e - 4*b*c*f + (3*b^2 - 4*a*
c)*g)*sqrt(-a)*arctan(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 + b*x
```

```
+ a)*c)))/(sqrt(-a)*sqrt(-c)*c^2)]
```

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

$$\int \frac{d + ex + fx^2 + gx^3}{x\sqrt{a + bx + cx^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((g*x**3+f*x**2+e*x+d)/x/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2 + g*x**3)/(x*sqrt(a + b*x + c*x**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((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x),x, algorithm="giac")
```

```
[Out] Exception raised: TypeError
```

3.284 $\int \frac{d+ex+fx^2+gx^3}{x^2\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=139

$$\frac{(bd-2ae)\tanh^{-1}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)}{2a^{3/2}}+\frac{(2cf-bg)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{2c^{3/2}}-\frac{d\sqrt{a+bx+cx^2}}{ax}+\frac{g\sqrt{a+bx+cx^2}}{c}$$

```
[Out] (g*Sqrt[a + b*x + c*x^2])/c - (d*Sqrt[a + b*x + c*x^2])/(a*x) + (
(b*d - 2*a*e)*ArcTanh[(2*a + b*x)/(2*Sqrt[a]*Sqrt[a + b*x + c*x^2
]])]/(2*a^(3/2)) + ((2*c*f - b*g)*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*
Sqrt[a + b*x + c*x^2])])/(2*c^(3/2))
```

Rubi [A] time = 0.418626, antiderivative size = 139, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$

$$\frac{(bd-2ae)\tanh^{-1}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)}{2a^{3/2}}+\frac{(2cf-bg)\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{2c^{3/2}}-\frac{d\sqrt{a+bx+cx^2}}{ax}+\frac{g\sqrt{a+bx+cx^2}}{c}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2 + g*x^3)/(x^2*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] (g*Sqrt[a + b*x + c*x^2])/c - (d*Sqrt[a + b*x + c*x^2])/(a*x) + (
(b*d - 2*a*e)*ArcTanh[(2*a + b*x)/(2*Sqrt[a]*Sqrt[a + b*x + c*x^2
]])]/(2*a^(3/2)) + ((2*c*f - b*g)*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*
Sqrt[a + b*x + c*x^2])])/(2*c^(3/2))
```

Rubi in Sympy [A] time = 81.5838, size = 121, normalized size = 0.87

$$\frac{g\sqrt{a+bx+cx^2}}{c}-\frac{(bg-2cf)\operatorname{atanh}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{2c^{\frac{3}{2}}}-\frac{d\sqrt{a+bx+cx^2}}{ax}-\frac{\left(ae-\frac{bd}{2}\right)\operatorname{atanh}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)}{a^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((g*x**3+f*x**2+e*x+d)/x**2/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] g*sqrt(a + b*x + c*x**2)/c - (b*g - 2*c*f)*atanh((b + 2*c*x)/(2*s
qrt(c)*sqrt(a + b*x + c*x**2)))/(2*c**(3/2)) - d*sqrt(a + b*x + c
*x**2)/(a*x) - (a*e - b*d/2)*atanh((2*a + b*x)/(2*sqrt(a)*sqrt(a
```

```
+ b*x + c*x**2)))/a**(3/2)
```

Mathematica [A] time = 1.1377, size = 142, normalized size = 1.02

$$\frac{\frac{\sqrt{a}\left(2\sqrt{c}\sqrt{a+x(b+cx)}(agx-cd)+ax(2cf-bg)\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)\right)}{c^{3/2}x}+(bd-2ae)\log\left(2\sqrt{a}\sqrt{a+x(b+cx)}+2a+bx\right)+\log(x)(2ae\cdots}{2a^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2 + g*x^3)/(x^2*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] ((-(b*d) + 2*a*e)*Log[x] + (b*d - 2*a*e)*Log[2*a + b*x + 2*Sqrt[a
]*Sqrt[a + x*(b + c*x)]] + (Sqrt[a]*(2*Sqrt[c]*(-(c*d) + a*g*x)*S
qrt[a + x*(b + c*x)] + a*(2*c*f - b*g)*x*Log[b + 2*c*x + 2*Sqrt[c
]*Sqrt[a + x*(b + c*x)]]))/(c^(3/2)*x))/(2*a^(3/2))
```

Maple [A] time = 0.014, size = 173, normalized size = 1.2

$$f\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)\frac{1}{\sqrt{c}}-\frac{d}{ax}\sqrt{cx^2+bx+a}+\frac{bd}{2}\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^2+bx+a}\right)\right)a^{-\frac{3}{2}}-e\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^2+bx+a}\right)\right)\frac{1}{\sqrt{a}}+\frac{g}{c}\sqrt{cx^2+bx+a}-\frac{bg}{2}\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)c^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((g*x^3+f*x^2+e*x+d)/x^2/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] f*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))/c^(1/2)-d*(c*x^2+b*
x+a)^(1/2)/a/x+1/2*d*b/a^(3/2)*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a
)^(1/2))/x)-e/a^(1/2)*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/
x)+g*(c*x^2+b*x+a)^(1/2)/c-1/2*g*b/c^(3/2)*ln((1/2*b+c*x)/c^(1/2)
+(c*x^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((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^2),x, algorithm="maxi
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 1.91107, size = 1, normalized size = 0.01

$$\left[-\frac{(2\,acf-abg)\sqrt{a}x\log\left(4\left(2\,c^2x+bc\right)\sqrt{cx^2+bx+a}-\left(8\,c^2x^2+8\,bcx+b^2+4\,ac\right)\sqrt{c}\right)+(bcd-2\,ace)\sqrt{c}x\log\left(\frac{4\,(abx+2\,a^2}{}\right.}{4\,a^{\frac{3}{2}}c^{\frac{3}{2}}x}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^2),x, algorithm="fric
```

```
[Out] [-1/4*((2*a*c*f - a*b*g)*sqrt(a)*x*log(4*(2*c^2*x + b*c)*sqrt(c*x
^2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)) + (b
*c*d - 2*a*c*e)*sqrt(c)*x*log((4*(a*b*x + 2*a^2)*sqrt(c*x^2 + b*x
 + a) - (8*a*b*x + (b^2 + 4*a*c)*x^2 + 8*a^2)*sqrt(a))/x^2) - 4*(
a*g*x - c*d)*sqrt(c*x^2 + b*x + a)*sqrt(a)*sqrt(c))/(a^(3/2)*c^(3
/2)*x), 1/4*(2*(2*a*c*f - a*b*g)*sqrt(a)*x*arctan(1/2*(2*c*x + b)
*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)) - (b*c*d - 2*a*c*e)*sqrt(-c)
*x*log((4*(a*b*x + 2*a^2)*sqrt(c*x^2 + b*x + a) - (8*a*b*x + (b^2
 + 4*a*c)*x^2 + 8*a^2)*sqrt(a))/x^2) + 4*(a*g*x - c*d)*sqrt(c*x^2
 + b*x + a)*sqrt(a)*sqrt(-c))/(a^(3/2)*sqrt(-c)*c*x), 1/4*(2*(b*c
*d - 2*a*c*e)*sqrt(c)*x*arctan(1/2*(b*x + 2*a)*sqrt(-a)/(sqrt(c*x
^2 + b*x + a)*a)) - (2*a*c*f - a*b*g)*sqrt(-a)*x*log(4*(2*c^2*x +
 b*c)*sqrt(c*x^2 + b*x + a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)
*sqrt(c)) + 4*(a*g*x - c*d)*sqrt(c*x^2 + b*x + a)*sqrt(-a)*sqrt(c
))/(sqrt(-a)*a*c^(3/2)*x), 1/2*((b*c*d - 2*a*c*e)*sqrt(-c)*x*arct
an(1/2*(b*x + 2*a)*sqrt(-a)/(sqrt(c*x^2 + b*x + a)*a)) + (2*a*c*f
 - a*b*g)*sqrt(-a)*x*arctan(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2
+ b*x + a)*c)) + 2*(a*g*x - c*d)*sqrt(c*x^2 + b*x + a)*sqrt(-a)*s
qrt(-c))/(sqrt(-a)*a*sqrt(-c)*c*x)]
```

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

$$\int \frac{d+ex+fx^2+gx^3}{x^2\sqrt{a+bx+cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/x**2/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2 + g*x**3)/(x**2*sqrt(a + b*x + c*x**2)
), x)
```

GIAC/XCAS [A] time = 0.654313, size = 4, normalized size = 0.03

$$sage_0x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^2),x, algorithm="giac
```

```
[Out] sage0*x
```

3.285 $\int \frac{d+ex+fx^2+gx^3}{x^3\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=159

$$\frac{\sqrt{a+bx+cx^2}(3bd-4ae)}{4a^2x}-\frac{\tanh^{-1}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)\left(8a^2f-4abe-4acd+3b^2d\right)}{8a^{5/2}}-\frac{d\sqrt{a+bx+cx^2}}{2ax^2}+\frac{g\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{\sqrt{c}}$$

```
[Out] -(d*Sqrt[a + b*x + c*x^2])/(2*a*x^2) + ((3*b*d - 4*a*e)*Sqrt[a +
b*x + c*x^2])/(4*a^2*x) - ((3*b^2*d - 4*a*c*d - 4*a*b*e + 8*a^2*f
)*ArcTanh[(2*a + b*x)/(2*Sqrt[a]*Sqrt[a + b*x + c*x^2])])/(8*a^(5
/2)) + (g*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])
/Sqrt[c]
```

Rubi [A] time = 0.44457, antiderivative size = 159, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.152

$$\frac{\sqrt{a+bx+cx^2}(3bd-4ae)}{4a^2x}-\frac{\tanh^{-1}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)\left(8a^2f-4abe-4acd+3b^2d\right)}{8a^{5/2}}-\frac{d\sqrt{a+bx+cx^2}}{2ax^2}+\frac{g\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{\sqrt{c}}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2 + g*x^3)/(x^3*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] -(d*Sqrt[a + b*x + c*x^2])/(2*a*x^2) + ((3*b*d - 4*a*e)*Sqrt[a +
b*x + c*x^2])/(4*a^2*x) - ((3*b^2*d - 4*a*c*d - 4*a*b*e + 8*a^2*f
)*ArcTanh[(2*a + b*x)/(2*Sqrt[a]*Sqrt[a + b*x + c*x^2])])/(8*a^(5
/2)) + (g*ArcTanh[(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])
/Sqrt[c]
```

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((g*x**3+f*x**2+e*x+d)/x**3/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.28258, size = 166, normalized size = 1.04

$$\frac{\frac{8a^{5/2}g\log\left(2\sqrt{c}\sqrt{a+x(b+cx)}+b+2cx\right)}{\sqrt{c}}+\log(x)\left(8a^2f-4abe-4acd+3b^2d\right)+\log\left(2\sqrt{a}\sqrt{a+x(b+cx)}+2a+bx\right)\left(4abe+4a(cd-\right.}{8a^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2 + g*x^3)/(x^3*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] ((2*Sqrt[a]*Sqrt[a + x*(b + c*x)]*(3*b*d*x - 2*a*(d + 2*e*x)))/x^
2 + (3*b^2*d - 4*a*c*d - 4*a*b*e + 8*a^2*f)*Log[x] + (-3*b^2*d +
4*a*b*e + 4*a*(c*d - 2*a*f))*Log[2*a + b*x + 2*Sqrt[a]*Sqrt[a + x
*(b + c*x)]] + (8*a^(5/2)*g*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + x*
(b + c*x)]])/Sqrt[c])/(8*a^(5/2))
```

Maple [A] time = 0.013, size = 241, normalized size = 1.5

$$g\ln\left(1\left(\frac{b}{2}+cx\right)\frac{1}{\sqrt{c}}+\sqrt{cx^2+bx+a}\right)\frac{1}{\sqrt{c}}-\frac{d}{2\,x^2a}\sqrt{cx^2+bx+a}$$
$$+\frac{3\,bd}{4\,a^2x}\sqrt{cx^2+bx+a}-\frac{3\,b^2d}{8}\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^2+bx+a}\right)\right)a^{-\frac{5}{2}}$$
$$+\frac{cd}{2}\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^2+bx+a}\right)\right)a^{-\frac{3}{2}}-\frac{e}{ax}\sqrt{cx^2+bx+a}$$
$$+\frac{be}{2}\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^2+bx+a}\right)\right)a^{-\frac{3}{2}}-f\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^2+bx+a}\right)\right)\frac{1}{\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((g*x^3+f*x^2+e*x+d)/x^3/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] g*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a)^(1/2))/c^(1/2)-1/2*d*(c*x^
2+b*x+a)^(1/2)/a/x^2+3/4*d*b/a^2/x*(c*x^2+b*x+a)^(1/2)-3/8*d*b^2/
a^(5/2)*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/x)+1/2*d*c/a^(
3/2)*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/x)-e/a/x*(c*x^2+b
*x+a)^(1/2)+1/2*e*b/a^(3/2)*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(
1/2))/x)-f/a^(1/2)*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*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((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^3),x, algorithm="maxi
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 1.45616, size = 1, normalized size = 0.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^3),x, algorithm="fric
```

```
[Out] [1/16*(8*a^(5/2)*g*x^2*log(-4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x +
a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)) - (4*a*b*e - 8*
a^2*f - (3*b^2 - 4*a*c)*d)*sqrt(c)*x^2*log((4*(a*b*x + 2*a^2)*sqr
t(c*x^2 + b*x + a) - (8*a*b*x + (b^2 + 4*a*c)*x^2 + 8*a^2)*sqrt(a
))/x^2) - 4*sqrt(c*x^2 + b*x + a)*(2*a*d - (3*b*d - 4*a*e)*x)*sqr
t(a)*sqrt(c))/(a^(5/2)*sqrt(c)*x^2), 1/16*(16*a^(5/2)*g*x^2*arcta
n(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)) - (4*a*b*e
- 8*a^2*f - (3*b^2 - 4*a*c)*d)*sqrt(-c)*x^2*log((4*(a*b*x + 2*a^2
)*sqrt(c*x^2 + b*x + a) - (8*a*b*x + (b^2 + 4*a*c)*x^2 + 8*a^2)*s
qrt(a))/x^2) - 4*sqrt(c*x^2 + b*x + a)*(2*a*d - (3*b*d - 4*a*e)*x
)*sqrt(a)*sqrt(-c))/(a^(5/2)*sqrt(-c)*x^2), 1/8*(4*sqrt(-a)*a^2*g
*x^2*log(-4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x + a) - (8*c^2*x^2 +
8*b*c*x + b^2 + 4*a*c)*sqrt(c)) + (4*a*b*e - 8*a^2*f - (3*b^2 - 4
*a*c)*d)*sqrt(c)*x^2*arctan(1/2*(b*x + 2*a)*sqrt(-a)/(sqrt(c*x^2
+ b*x + a)*a)) - 2*sqrt(c*x^2 + b*x + a)*(2*a*d - (3*b*d - 4*a*e)
*x)*sqrt(-a)*sqrt(c))/(sqrt(-a)*a^2*sqrt(c)*x^2), 1/8*(8*sqrt(-a)
*a^2*g*x^2*arctan(1/2*(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)
*c)) + (4*a*b*e - 8*a^2*f - (3*b^2 - 4*a*c)*d)*sqrt(-c)*x^2*arcta
n(1/2*(b*x + 2*a)*sqrt(-a)/(sqrt(c*x^2 + b*x + a)*a)) - 2*sqrt(c*
x^2 + b*x + a)*(2*a*d - (3*b*d - 4*a*e)*x)*sqrt(-a)*sqrt(-c))/(sq
rt(-a)*a^2*sqrt(-c)*x^2)]
```

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

$$\int \frac{d + ex + fx^2 + gx^3}{x^3\sqrt{a + bx + cx^2}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((g*x**3+f*x**2+e*x+d)/x**3/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2 + g*x**3)/(x**3*sqrt(a + b*x + c*x**2)
), x)
```

GIAC/XCAS [A] time = 0.649326, size = 4, normalized size = 0.03

$$sage_0 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^3),x, algorithm="giac
```

```
[Out] sage0*x
```

3.286 $\int \frac{d+ex+fx^2+gx^3}{x^4\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=186

$$\frac{\sqrt{a+bx+cx^2}(5bd-6ae)}{12a^2x^2} + \frac{\tanh^{-1}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)\left(8a^2(ce-2ag)-6ab^2e-4ab(3cd-2af)+5b^3d\right)}{16a^{7/2}} - \frac{\sqrt{a+bx+cx^2}\left(24a^2f-18abe-16acd+15b^2d\right)}{24a^3x} - \frac{d\sqrt{a+bx+cx^2}}{3ax^3}$$

```
[Out] -(d*Sqrt[a + b*x + c*x^2])/(3*a*x^3) + ((5*b*d - 6*a*e)*Sqrt[a +
b*x + c*x^2])/(12*a^2*x^2) - ((15*b^2*d - 16*a*c*d - 18*a*b*e + 2
4*a^2*f)*Sqrt[a + b*x + c*x^2])/(24*a^3*x) + ((5*b^3*d - 6*a*b^2*
e - 4*a*b*(3*c*d - 2*a*f) + 8*a^2*(c*e - 2*a*g))*ArcTanh[(2*a + b
*x)/(2*Sqrt[a]*Sqrt[a + b*x + c*x^2])])/(16*a^(7/2))
```

Rubi [A] time = 0.593421, antiderivative size = 186, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.121

$$\frac{\sqrt{a+bx+cx^2}(5bd-6ae)}{12a^2x^2} + \frac{\tanh^{-1}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)\left(8a^2(ce-2ag)-6ab^2e-4ab(3cd-2af)+5b^3d\right)}{16a^{7/2}} - \frac{\sqrt{a+bx+cx^2}\left(24a^2f-18abe-16acd+15b^2d\right)}{24a^3x} - \frac{d\sqrt{a+bx+cx^2}}{3ax^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2 + g*x^3)/(x^4*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] -(d*Sqrt[a + b*x + c*x^2])/(3*a*x^3) + ((5*b*d - 6*a*e)*Sqrt[a +
b*x + c*x^2])/(12*a^2*x^2) - ((15*b^2*d - 16*a*c*d - 18*a*b*e + 2
4*a^2*f)*Sqrt[a + b*x + c*x^2])/(24*a^3*x) + ((5*b^3*d - 6*a*b^2*
e - 4*a*b*(3*c*d - 2*a*f) + 8*a^2*(c*e - 2*a*g))*ArcTanh[(2*a + b
*x)/(2*Sqrt[a]*Sqrt[a + b*x + c*x^2])])/(16*a^(7/2))
```

Rubi in Sympy [A] time = 140.519, size = 216, normalized size = 1.16

$$-\frac{g\sqrt{a+bx+cx^2}}{cx^2}-\frac{d\sqrt{a+bx+cx^2}}{3ax^3}+\frac{\sqrt{a+bx+cx^2}\,(12a^2g-6ace+5bcd)}{12a^2cx^2}-\frac{\sqrt{a+bx+cx^2}\,(24a^2f-18abe-16acd+15b^2d)}{24a^3x}-\frac{(16a^3g-8a^2bf-8a^2ce+6ab^2e+12abcd-5b^3d)\,\operatorname{atanh}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)}{16a^{\frac{7}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((g*x**3+f*x**2+e*x+d)/x**4/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] -g*sqrt(a + b*x + c*x**2)/(c*x**2) - d*sqrt(a + b*x + c*x**2)/(3*
a*x**3) + sqrt(a + b*x + c*x**2)*(12*a**2*g - 6*a*c*e + 5*b*c*d)/
(12*a**2*c*x**2) - sqrt(a + b*x + c*x**2)*(24*a**2*f - 18*a*b*e -
 16*a*c*d + 15*b**2*d)/(24*a**3*x) - (16*a**3*g - 8*a**2*b*f - 8*
a**2*c*e + 6*a*b**2*e + 12*a*b*c*d - 5*b**3*d)*atanh((2*a + b*x)/
(2*sqrt(a)*sqrt(a + b*x + c*x**2)))/(16*a**(7/2))
```

Mathematica [A] time = 0.33901, size = 194, normalized size = 1.04

$$\frac{-\frac{2\sqrt{a}\sqrt{a+x(b+cx)}\left(4a^2(2d+3x(e+2fx))-2ax(5bd+9bex+8cdx)+15b^2dx^2\right)}{x^3}-3\log(x)\left(8a^2(ce-2ag)-6ab^2e+4ab(2af-3cd)+5b^3d\right)+3}{48a^{7/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2 + g*x^3)/(x^4*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] ((-2*Sqrt[a]*Sqrt[a + x*(b + c*x)]*(15*b^2*d*x^2 - 2*a*x*(5*b*d +
 8*c*d*x + 9*b*e*x) + 4*a^2*(2*d + 3*x*(e + 2*f*x))))/x^3 - 3*(5*
b^3*d - 6*a*b^2*e + 4*a*b*(-3*c*d + 2*a*f) + 8*a^2*(c*e - 2*a*g))
*Log[x] + 3*(5*b^3*d - 6*a*b^2*e + 4*a*b*(-3*c*d + 2*a*f) + 8*a^2
*(c*e - 2*a*g))*Log[2*a + b*x + 2*Sqrt[a]*Sqrt[a + x*(b + c*x)]])
/(48*a^(7/2))
```

Maple [B] time = 0.017, size = 375, normalized size = 2.

$$-\frac{d}{3\,a x^{3}}\sqrt{c x^{2}+b x+a}+\frac{5\,b d}{12\,a^{2} x^{2}}\sqrt{c x^{2}+b x+a}-\frac{5\,b^{2} d}{8\,a^{3} x}\sqrt{c x^{2}+b x+a} +\frac{5\,b^{3} d}{16}\ln\left(\frac{1}{x}\left(2\,a+b x+2\,\sqrt{a}\sqrt{c x^{2}+b x+a}\right)\right)a^{-\frac{7}{2}} -\frac{3\,b c d}{4}\ln\left(\frac{1}{x}\left(2\,a+b x+2\,\sqrt{a}\sqrt{c x^{2}+b x+a}\right)\right)a^{-\frac{5}{2}}+\frac{2\,c d}{3\,a^{2} x}\sqrt{c x^{2}+b x+a} -\frac{e}{2\,x^{2} a}\sqrt{c x^{2}+b x+a}+\frac{3\,b e}{4\,a^{2} x}\sqrt{c x^{2}+b x+a}-\frac{3\,b^{2} e}{8}\ln\left(\frac{1}{x}\left(2\,a+b x+2\,\sqrt{a}\sqrt{c x^{2}+b x+a}\right)\right)a^{-\frac{5}{2}} +\frac{c e}{2}\ln\left(\frac{1}{x}\left(2\,a+b x+2\,\sqrt{a}\sqrt{c x^{2}+b x+a}\right)\right)a^{-\frac{3}{2}}-\frac{f}{a x}\sqrt{c x^{2}+b x+a} +\frac{b f}{2}\ln\left(\frac{1}{x}\left(2\,a+b x+2\,\sqrt{a}\sqrt{c x^{2}+b x+a}\right)\right)a^{-\frac{3}{2}} -g\ln\left(\frac{1}{x}\left(2\,a+b x+2\,\sqrt{a}\sqrt{c x^{2}+b x+a}\right)\right)\frac{1}{\sqrt{a}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((g*x^3+f*x^2+e*x+d)/x^4/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] -1/3*d*(c*x^2+b*x+a)^(1/2)/a/x^3+5/12*d*b/a^2/x^2*(c*x^2+b*x+a)^(
1/2)-5/8*d*b^2/a^3/x*(c*x^2+b*x+a)^(1/2)+5/16*d*b^3/a^(7/2)*ln((2
*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/x)-3/4*d*b/a^(5/2)*c*ln((2*
a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/x)+2/3*d*c/a^2/x*(c*x^2+b*x+
a)^(1/2)-1/2*e/a/x^2*(c*x^2+b*x+a)^(1/2)+3/4*e*b/a^2/x*(c*x^2+b*x
+a)^(1/2)-3/8*e*b^2/a^(5/2)*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(
1/2))/x)+1/2*e*c/a^(3/2)*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2
))/x)-f/a/x*(c*x^2+b*x+a)^(1/2)+1/2*f*b/a^(3/2)*ln((2*a+b*x+2*a^(
1/2)*(c*x^2+b*x+a)^(1/2))/x)-g/a^(1/2)*ln((2*a+b*x+2*a^(1/2)*(c*x
^2+b*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((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^4),x, algorithm="maxi
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 1.18775, size = 1, normalized size = 0.01

$$\left[-\frac{3\left(8\,a^2bf-16\,a^3g+\left(5\,b^3-12\,abc\right)d-2\left(3\,ab^2-4\,a^2c\right)e\right)x^3\log\left(\frac{4\left(abx+2\,a^2\right)\sqrt{cx^2+bx+a}-\left(8\,abx+\left(b^2+4\,ac\right)x^2+8\,a^2\right)\sqrt{a}}{x^2}\right)+4\left(8\right.}{96\,a^{\frac{7}{2}}x^3}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^4),x, algorithm="fric
```

```
[Out] [-1/96*(3*(8*a^2*b*f - 16*a^3*g + (5*b^3 - 12*a*b*c)*d - 2*(3*a*b
^2 - 4*a^2*c)*e)*x^3*log((4*(a*b*x + 2*a^2)*sqrt(c*x^2 + b*x + a)
 - (8*a*b*x + (b^2 + 4*a*c)*x^2 + 8*a^2)*sqrt(a))/x^2) + 4*(8*a^2
*d - (18*a*b*e - 24*a^2*f - (15*b^2 - 16*a*c)*d)*x^2 - 2*(5*a*b*d
 - 6*a^2*e)*x)*sqrt(c*x^2 + b*x + a)*sqrt(a))/(a^(7/2)*x^3), 1/48
*(3*(8*a^2*b*f - 16*a^3*g + (5*b^3 - 12*a*b*c)*d - 2*(3*a*b^2 - 4
*a^2*c)*e)*x^3*arctan(1/2*(b*x + 2*a)*sqrt(-a)/(sqrt(c*x^2 + b*x
+ a)*a)) - 2*(8*a^2*d - (18*a*b*e - 24*a^2*f - (15*b^2 - 16*a*c)*
d)*x^2 - 2*(5*a*b*d - 6*a^2*e)*x)*sqrt(c*x^2 + b*x + a)*sqrt(-a))
/(sqrt(-a)*a^3*x^3)]
```

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

$$\int \frac{d+ex+fx^2+gx^3}{x^4\sqrt{a+bx+cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/x**4/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2 + g*x**3)/(x**4*sqrt(a + b*x + c*x**2)
), x)
```

GIAC/XCAS [A] time = 0.288157, size = 930, normalized size = 5.

$$-\frac{\left(5\,b^3d-12\,abcd+8\,a^2bf-16\,a^3g-6\,ab^2e+8\,a^2ce\right)\arctan\left(-\frac{\sqrt{c}x-\sqrt{cx^2+bx+a}}{\sqrt{-a}}\right)}{8\sqrt{-a}a^3}$$
$$+\frac{15\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right)^5b^3d-36\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right)^5abcd+24\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right)^5a^2bf-18\left(\sqrt{c}x-\sqrt{cx^2+\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^4),x, algorithm="giac
```

```
[Out] -1/8*(5*b^3*d - 12*a*b*c*d + 8*a^2*b*f - 16*a^3*g - 6*a*b^2*e + 8
*a^2*c*e)*arctan(-(sqrt(c)*x - sqrt(c*x^2 + b*x + a))/sqrt(-a))/(
sqrt(-a)*a^3) + 1/24*(15*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))^5*b^
3*d - 36*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))^5*a*b*c*d + 24*(sqrt
(c)*x - sqrt(c*x^2 + b*x + a))^5*a^2*b*f - 18*(sqrt(c)*x - sqrt(c
*x^2 + b*x + a))^5*a*b^2*e + 24*(sqrt(c)*x - sqrt(c*x^2 + b*x + a
))^5*a^2*c*e + 48*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))^4*a^3*sqrt(
c)*f - 40*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))^3*a*b^3*d + 96*(sqr
t(c)*x - sqrt(c*x^2 + b*x + a))^3*a^2*b*c*d - 48*(sqrt(c)*x - sqr
t(c*x^2 + b*x + a))^3*a^3*b*f + 48*(sqrt(c)*x - sqrt(c*x^2 + b*x
+ a))^3*a^2*b^2*e + 96*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))^2*a^3*
c^(3/2)*d - 96*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))^2*a^4*sqrt(c)*
f + 48*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))^2*a^3*b*sqrt(c)*e + 33
*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))*a^2*b^3*d + 36*(sqrt(c)*x -
sqrt(c*x^2 + b*x + a))*a^3*b*c*d + 24*(sqrt(c)*x - sqrt(c*x^2 + b
*x + a))*a^4*b*f - 30*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))*a^3*b^2
*e - 24*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))*a^4*c*e + 48*a^3*b^2*
sqrt(c)*d - 32*a^4*c^(3/2)*d + 48*a^5*sqrt(c)*f - 48*a^4*b*sqrt(c
)*e)/(((sqrt(c)*x - sqrt(c*x^2 + b*x + a))^2 - a)^3*a^3)
```

3.287 $\int \frac{d+ex+fx^2+gx^3}{x^5\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=270

$$\frac{\sqrt{a+bx+cx^2}(7bd-8ae)}{24a^2x^3}-\frac{\tanh^{-1}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)\left(32a^2b(3ce-2ag)+16a^2c(3cd-4af)-40ab^3e-24ab^2(5cd-2af)+35b^4d\right)}{128a^{9/2}}+\frac{\sqrt{a+bx+cx^2}\left(64a^2(2ce-3ag)-120ab^2e-4ab(55cd-36af)+105b^3d\right)}{192a^4x}-\frac{\sqrt{a+bx+cx^2}\left(48a^2f-40abe-36acd+35b^2d\right)}{96a^3x^2}-\frac{d\sqrt{a+bx+cx^2}}{4ax^4}$$

```
[Out] -(d*Sqrt[a + b*x + c*x^2])/(4*a*x^4) + ((7*b*d - 8*a*e)*Sqrt[a +
b*x + c*x^2])/(24*a^2*x^3) - ((35*b^2*d - 36*a*c*d - 40*a*b*e + 4
8*a^2*f)*Sqrt[a + b*x + c*x^2])/(96*a^3*x^2) + ((105*b^3*d - 120*
a*b^2*e - 4*a*b*(55*c*d - 36*a*f) + 64*a^2*(2*c*e - 3*a*g))*Sqrt[
a + b*x + c*x^2])/(192*a^4*x) - ((35*b^4*d - 40*a*b^3*e + 16*a^2*
c*(3*c*d - 4*a*f) - 24*a*b^2*(5*c*d - 2*a*f) + 32*a^2*b*(3*c*e -
2*a*g))*ArcTanh[(2*a + b*x)/(2*Sqrt[a]*Sqrt[a + b*x + c*x^2])])/(
128*a^(9/2))
```

Rubi [A] time = 0.984652, antiderivative size = 270, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.152$

$$\frac{\sqrt{a+bx+cx^2}(7bd-8ae)}{24a^2x^3}-\frac{\tanh^{-1}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)\left(32a^2b(3ce-2ag)+16a^2c(3cd-4af)-40ab^3e-24ab^2(5cd-2af)+35b^4d\right)}{128a^{9/2}}+\frac{\sqrt{a+bx+cx^2}\left(64a^2(2ce-3ag)-120ab^2e-4ab(55cd-36af)+105b^3d\right)}{192a^4x}-\frac{\sqrt{a+bx+cx^2}\left(48a^2f-40abe-36acd+35b^2d\right)}{96a^3x^2}-\frac{d\sqrt{a+bx+cx^2}}{4ax^4}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2 + g*x^3)/(x^5*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] -(d*Sqrt[a + b*x + c*x^2])/(4*a*x^4) + ((7*b*d - 8*a*e)*Sqrt[a +
b*x + c*x^2])/(24*a^2*x^3) - ((35*b^2*d - 36*a*c*d - 40*a*b*e + 4
8*a^2*f)*Sqrt[a + b*x + c*x^2])/(96*a^3*x^2) + ((105*b^3*d - 120*
a*b^2*e - 4*a*b*(55*c*d - 36*a*f) + 64*a^2*(2*c*e - 3*a*g))*Sqrt[
```

```
a + b*x + c*x^2])/(192*a^4*x) - ((35*b^4*d - 40*a*b^3*e + 16*a^2*
c*(3*c*d - 4*a*f) - 24*a*b^2*(5*c*d - 2*a*f) + 32*a^2*b*(3*c*e -
2*a*g))*ArcTanh[(2*a + b*x)/(2*Sqrt[a]*Sqrt[a + b*x + c*x^2])])/(
128*a^(9/2))
```

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((g*x**3+f*x**2+e*x+d)/x**5/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.49643, size = 275, normalized size = 1.02

$$3\log(x)\left(32a^2b(3ce-2ag)+16a^2c(3cd-4af)-40ab^3e+24ab^2(2af-5cd)+35b^4d\right)-3\log\left(2\sqrt{a}\sqrt{a+x(b+cx)}+2a+b\right.$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2 + g*x^3)/(x^5*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] ((-2*Sqrt[a]*Sqrt[a + x*(b + c*x)]*(-105*b^3*d*x^3 + 10*a*b*x^2*(
7*b*d + 22*c*d*x + 12*b*e*x) - 8*a^2*x*(7*b*d + c*x*(9*d + 16*e*x
) + 2*b*x*(5*e + 9*f*x)) + 16*a^3*(3*d + 4*e*x + 6*x^2*(f + 2*g*x
))))/x^4 + 3*(35*b^4*d - 40*a*b^3*e + 16*a^2*c*(3*c*d - 4*a*f) +
24*a*b^2*(-5*c*d + 2*a*f) + 32*a^2*b*(3*c*e - 2*a*g))*Log[x] - 3*
(35*b^4*d - 40*a*b^3*e + 16*a^2*c*(3*c*d - 4*a*f) + 24*a*b^2*(-5*
c*d + 2*a*f) + 32*a^2*b*(3*c*e - 2*a*g))*Log[2*a + b*x + 2*Sqrt[a
]*Sqrt[a + x*(b + c*x)]])/(384*a^(9/2))
```

Maple [B] time = 0.019, size = 591, normalized size = 2.2

$$-\frac{d}{4\,ax^{4}}\sqrt{cx^{2}+bx+a}+\frac{7\,bd}{24\,a^{2}x^{3}}\sqrt{cx^{2}+bx+a}-\frac{35\,b^{2}d}{96\,a^{3}x^{2}}\sqrt{cx^{2}+bx+a}$$
$$+\frac{35\,b^{3}d}{64\,a^{4}x}\sqrt{cx^{2}+bx+a}-\frac{35\,b^{4}d}{128}\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^{2}+bx+a}\right)\right)a^{-\frac{9}{2}}$$
$$+\frac{15\,b^{2}cd}{16}\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^{2}+bx+a}\right)\right)a^{-\frac{7}{2}}-\frac{55\,bcd}{48\,a^{3}x}\sqrt{cx^{2}+bx+a}$$
$$+\frac{3\,cd}{8\,a^{2}x^{2}}\sqrt{cx^{2}+bx+a}-\frac{3\,c^{2}d}{8}\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^{2}+bx+a}\right)\right)a^{-\frac{5}{2}}$$
$$-\frac{e}{3\,ax^{3}}\sqrt{cx^{2}+bx+a}+\frac{5\,be}{12\,a^{2}x^{2}}\sqrt{cx^{2}+bx+a}-\frac{5\,b^{2}e}{8\,a^{3}x}\sqrt{cx^{2}+bx+a}$$
$$+\frac{5\,eb^{3}}{16}\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^{2}+bx+a}\right)\right)a^{-\frac{7}{2}}$$
$$-\frac{3\,bce}{4}\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^{2}+bx+a}\right)\right)a^{-\frac{5}{2}}$$
$$+\frac{2\,ce}{3\,a^{2}x}\sqrt{cx^{2}+bx+a}-\frac{f}{2\,x^{2}a}\sqrt{cx^{2}+bx+a}+\frac{3\,bf}{4\,a^{2}x}\sqrt{cx^{2}+bx+a}$$
$$-\frac{3\,b^{2}f}{8}\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^{2}+bx+a}\right)\right)a^{-\frac{5}{2}}$$
$$+\frac{cf}{2}\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^{2}+bx+a}\right)\right)a^{-\frac{3}{2}}$$
$$-\frac{g}{ax}\sqrt{cx^{2}+bx+a}+\frac{bg}{2}\ln\left(\frac{1}{x}\left(2\,a+bx+2\,\sqrt{a}\sqrt{cx^{2}+bx+a}\right)\right)a^{-\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((g*x^3+f*x^2+e*x+d)/x^5/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] -1/4*d*(c*x^2+b*x+a)^(1/2)/a/x^4+7/24*d*b/a^2/x^3*(c*x^2+b*x+a)^(
1/2)-35/96*d*b^2/a^3/x^2*(c*x^2+b*x+a)^(1/2)+35/64*d*b^3/a^4/x*(c
*x^2+b*x+a)^(1/2)-35/128*d*b^4/a^(9/2)*ln((2*a+b*x+2*a^(1/2)*(c*x
^2+b*x+a)^(1/2))/x)+15/16*d*b^2/a^(7/2)*c*ln((2*a+b*x+2*a^(1/2)*(
c*x^2+b*x+a)^(1/2))/x)-55/48*d*b/a^3*c/x*(c*x^2+b*x+a)^(1/2)+3/8*
d*c/a^2/x^2*(c*x^2+b*x+a)^(1/2)-3/8*d*c^2/a^(5/2)*ln((2*a+b*x+2*a
^(1/2)*(c*x^2+b*x+a)^(1/2))/x)-1/3*e/a/x^3*(c*x^2+b*x+a)^(1/2)+5/
12*e*b/a^2/x^2*(c*x^2+b*x+a)^(1/2)-5/8*e*b^2/a^3/x*(c*x^2+b*x+a)^
(1/2)+5/16*e*b^3/a^(7/2)*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2
))/x)-3/4*e*b/a^(5/2)*c*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2)
)/x)+2/3*e*c/a^2/x*(c*x^2+b*x+a)^(1/2)-1/2*f/a/x^2*(c*x^2+b*x+a)^
(1/2)+3/4*f*b/a^2/x*(c*x^2+b*x+a)^(1/2)-3/8*f*b^2/a^(5/2)*ln((2*a
+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/x)+1/2*f*c/a^(3/2)*ln((2*a+b*
x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/x)-g/a/x*(c*x^2+b*x+a)^(1/2)+1/2
*g*b/a^(3/2)*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*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((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^5),x, algorithm="maxi
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 1.48012, size = 1, normalized size = 0.

$$\left[\frac{3\left(64\,a^3bg-\left(35\,b^4-120\,ab^2c+48\,a^2c^2\right)d+8\left(5\,ab^3-12\,a^2bc\right)e-16\left(3\,a^2b^2-4\,a^3c\right)f\right)x^4\log\left(-\frac{4\left(abx+2\,a^2\right)\sqrt{cx^2+bx+a}+(8}{x^2}\right.}{}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^5),x, algorithm="fric
```

```
[Out] [1/768*(3*(64*a^3*b*g - (35*b^4 - 120*a*b^2*c + 48*a^2*c^2)*d + 8
*(5*a*b^3 - 12*a^2*b*c)*e - 16*(3*a^2*b^2 - 4*a^3*c)*f)*x^4*log(-
(4*(a*b*x + 2*a^2)*sqrt(c*x^2 + b*x + a) + (8*a*b*x + (b^2 + 4*a*
c)*x^2 + 8*a^2)*sqrt(a))/x^2) - 4*(48*a^3*d - (144*a^2*b*f - 192*
a^3*g + 5*(21*b^3 - 44*a*b*c)*d - 8*(15*a*b^2 - 16*a^2*c)*e)*x^3
- 2*(40*a^2*b*e - 48*a^3*f - (35*a*b^2 - 36*a^2*c)*d)*x^2 - 8*(7*
a^2*b*d - 8*a^3*e)*x)*sqrt(c*x^2 + b*x + a)*sqrt(a))/(a^(9/2)*x^4
), 1/384*(3*(64*a^3*b*g - (35*b^4 - 120*a*b^2*c + 48*a^2*c^2)*d +
 8*(5*a*b^3 - 12*a^2*b*c)*e - 16*(3*a^2*b^2 - 4*a^3*c)*f)*x^4*arc
tan(1/2*(b*x + 2*a)*sqrt(-a)/(sqrt(c*x^2 + b*x + a)*a)) - 2*(48*a
^3*d - (144*a^2*b*f - 192*a^3*g + 5*(21*b^3 - 44*a*b*c)*d - 8*(15
*a*b^2 - 16*a^2*c)*e)*x^3 - 2*(40*a^2*b*e - 48*a^3*f - (35*a*b^2
- 36*a^2*c)*d)*x^2 - 8*(7*a^2*b*d - 8*a^3*e)*x)*sqrt(c*x^2 + b*x
+ a)*sqrt(-a))/(sqrt(-a)*a^4*x^4)]
```

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

$$\int \frac{d+ex+fx^2+gx^3}{x^5\sqrt{a+bx+cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((g*x**3+f*x**2+e*x+d)/x**5/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2 + g*x**3)/(x**5*sqrt(a + b*x + c*x**2)
), x)
```

GIAC/XCAS [A] time = 0.290784, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^5),x, algorithm="giac
```

```
[Out] Done
```

3.288 $\int \frac{d+ex+fx^2+gx^3}{x^6\sqrt{a+bx+cx^2}}\,dx$

Optimal. Leaf size=371

$$\frac{\sqrt{a+bx+cx^2}(9bd-10ae)}{40a^2x^4}$$
$$-\frac{\sqrt{a+bx+cx^2}\left(40a^2b(55ce-36ag)+256a^2c(4cd-5af)-1050ab^3e-60ab^2(49cd-20af)+945b^4d\right)}{1920a^5x}$$
$$+\frac{\sqrt{a+bx+cx^2}\left(120a^2(3ce-4ag)-350ab^2e-4ab(161cd-100af)+315b^3d\right)}{960a^4x^2}$$
$$-\frac{\sqrt{a+bx+cx^2}\left(80a^2f-70abe-64acd+63b^2d\right)}{240a^3x^3}$$
$$+\frac{\tanh^{-1}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)\left(-32a^3c(3ce-4ag)+48a^2b^2(5ce-2ag)+48a^2bc(5cd-4af)-70ab^4e-40ab^3(7cd-2af)+63b\right.}{256a^{11/2}}$$
$$-\frac{d\sqrt{a+bx+cx^2}}{5ax^5}$$

```
[Out] -(d*Sqrt[a + b*x + c*x^2])/(5*a*x^5) + ((9*b*d - 10*a*e)*Sqrt[a +
 b*x + c*x^2])/(40*a^2*x^4) - ((63*b^2*d - 64*a*c*d - 70*a*b*e +
80*a^2*f)*Sqrt[a + b*x + c*x^2])/(240*a^3*x^3) + ((315*b^3*d - 35
0*a*b^2*e - 4*a*b*(161*c*d - 100*a*f) + 120*a^2*(3*c*e - 4*a*g))*
Sqrt[a + b*x + c*x^2])/(960*a^4*x^2) - ((945*b^4*d - 1050*a*b^3*e
 - 60*a*b^2*(49*c*d - 20*a*f) + 256*a^2*c*(4*c*d - 5*a*f) + 40*a^
2*b*(55*c*e - 36*a*g))*Sqrt[a + b*x + c*x^2])/(1920*a^5*x) + ((63
*b^5*d - 70*a*b^4*e + 48*a^2*b*c*(5*c*d - 4*a*f) - 40*a*b^3*(7*c*
d - 2*a*f) - 32*a^3*c*(3*c*e - 4*a*g) + 48*a^2*b^2*(5*c*e - 2*a*g
))*ArcTanh[(2*a + b*x)/(2*Sqrt[a]*Sqrt[a + b*x + c*x^2])])/(256*a
^(11/2))
```

Rubi [A] time = 1.81751, antiderivative size = 371, normalized size of antiderivative = 1., number of

steps used = 7, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.152$

$$\frac{\sqrt{a+bx+cx^2}(9bd-10ae)}{40a^2x^4} - \frac{\sqrt{a+bx+cx^2}\left(40a^2b(55ce-36ag)+256a^2c(4cd-5af)-1050ab^3e-60ab^2(49cd-20af)+945b^4d\right)}{1920a^5x} + \frac{\sqrt{a+bx+cx^2}\left(120a^2(3ce-4ag)-350ab^2e-4ab(161cd-100af)+315b^3d\right)}{960a^4x^2} - \frac{\sqrt{a+bx+cx^2}\left(80a^2f-70abe-64acd+63b^2d\right)}{240a^3x^3} + \frac{\tanh^{-1}\left(\frac{2a+bx}{2\sqrt{a}\sqrt{a+bx+cx^2}}\right)\left(-32a^3c(3ce-4ag)+48a^2b^2(5ce-2ag)+48a^2bc(5cd-4af)-70ab^4e-40ab^3(7cd-2af)+63b\right.}{256a^{11/2}} - \frac{d\sqrt{a+bx+cx^2}}{5ax^5}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2 + g*x^3)/(x^6*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] -(d*Sqrt[a + b*x + c*x^2])/(5*a*x^5) + ((9*b*d - 10*a*e)*Sqrt[a +
 b*x + c*x^2])/(40*a^2*x^4) - ((63*b^2*d - 64*a*c*d - 70*a*b*e +
80*a^2*f)*Sqrt[a + b*x + c*x^2])/(240*a^3*x^3) + ((315*b^3*d - 35
0*a*b^2*e - 4*a*b*(161*c*d - 100*a*f) + 120*a^2*(3*c*e - 4*a*g))*
Sqrt[a + b*x + c*x^2])/(960*a^4*x^2) - ((945*b^4*d - 1050*a*b^3*e
 - 60*a*b^2*(49*c*d - 20*a*f) + 256*a^2*c*(4*c*d - 5*a*f) + 40*a^
2*b*(55*c*e - 36*a*g))*Sqrt[a + b*x + c*x^2])/(1920*a^5*x) + ((63
*b^5*d - 70*a*b^4*e + 48*a^2*b*c*(5*c*d - 4*a*f) - 40*a*b^3*(7*c*
d - 2*a*f) - 32*a^3*c*(3*c*e - 4*a*g) + 48*a^2*b^2*(5*c*e - 2*a*g
))*ArcTanh[(2*a + b*x)/(2*Sqrt[a]*Sqrt[a + b*x + c*x^2])])/(256*a
^(11/2))
```

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((g*x**3+f*x**2+e*x+d)/x**6/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.772558, size = 380, normalized size = 1.02

$$\frac{-15\log(x)\left(32a^3c(4ag-3ce)-48a^2b^2(2ag-5ce)-48a^2bc(4af-5cd)-70ab^4e+40ab^3(2af-7cd)+63b^5d\right)+15\log\left(2\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2 + g*x^3)/(x^6*Sqrt[a + b*x + c*x^2]),x]
```

```
[Out] ((-2*Sqrt[a]*Sqrt[a + x*(b + c*x)]*(945*b^4*d*x^4 - 210*a*b^2*x^3
*(3*b*d + 14*c*d*x + 5*b*e*x) + 32*a^4*(12*d + 5*x*(3*e + 4*f*x +
 6*g*x^2)) + 4*a^2*x^2*(256*c^2*d*x^2 + 2*b*c*x*(161*d + 275*e*x)
 + b^2*(126*d + 25*x*(7*e + 12*f*x))) - 16*a^3*x*(c*x*(32*d + 5*x
*(9*e + 16*f*x)) + b*(27*d + 5*x*(7*e + 2*x*(5*f + 9*g*x))))))/x^
5 - 15*(63*b^5*d - 70*a*b^4*e + 40*a*b^3*(-7*c*d + 2*a*f) - 48*a^
2*b*c*(-5*c*d + 4*a*f) - 48*a^2*b^2*(-5*c*e + 2*a*g) + 32*a^3*c*(
-3*c*e + 4*a*g))*Log[x] + 15*(63*b^5*d - 70*a*b^4*e + 40*a*b^3*(-
7*c*d + 2*a*f) - 48*a^2*b*c*(-5*c*d + 4*a*f) - 48*a^2*b^2*(-5*c*e
 + 2*a*g) + 32*a^3*c*(-3*c*e + 4*a*g))*Log[2*a + b*x + 2*Sqrt[a]*
Sqrt[a + x*(b + c*x)]])/(3840*a^(11/2))
```

Maple [B] time = 0.023, size = 859, normalized size = 2.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((g*x^3+f*x^2+e*x+d)/x^6/(c*x^2+b*x+a)^(1/2),x)
```

```
[Out] 63/256*d*b^5/a^(11/2)*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/
x)-1/3*f/a/x^3*(c*x^2+b*x+a)^(1/2)+5/16*f*b^3/a^(7/2)*ln((2*a+b*x
+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/x)-1/2*g/a/x^2*(c*x^2+b*x+a)^(1/2
)-3/8*g*b^2/a^(5/2)*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/x)
+1/2*g*c/a^(3/2)*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/x)-1/
4*e/a/x^4*(c*x^2+b*x+a)^(1/2)-35/128*e*b^4/a^(9/2)*ln((2*a+b*x+2*
a^(1/2)*(c*x^2+b*x+a)^(1/2))/x)-3/8*e*c^2/a^(5/2)*ln((2*a+b*x+2*a
^(1/2)*(c*x^2+b*x+a)^(1/2))/x)+5/12*f*b/a^2/x^2*(c*x^2+b*x+a)^(1/
2)-1/5*d*(c*x^2+b*x+a)^(1/2)/a/x^5+49/32*d*b^2/a^4*c/x*(c*x^2+b*x
+a)^(1/2)-161/240*d*b/a^3*c/x^2*(c*x^2+b*x+a)^(1/2)-55/48*e*b/a^3
*c/x*(c*x^2+b*x+a)^(1/2)+9/40*d*b/a^2/x^4*(c*x^2+b*x+a)^(1/2)-21/
80*d*b^2/a^3/x^3*(c*x^2+b*x+a)^(1/2)+21/64*d*b^3/a^4/x^2*(c*x^2+b
*x+a)^(1/2)-63/128*d*b^4/a^5/x*(c*x^2+b*x+a)^(1/2)-35/32*d*b^3/a^
(9/2)*c*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/x)+15/16*d*b/a
^(7/2)*c^2*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/x)+4/15*d*c
/a^2/x^3*(c*x^2+b*x+a)^(1/2)-8/15*d*c^2/a^3/x*(c*x^2+b*x+a)^(1/2)
+3/4*g*b/a^2/x*(c*x^2+b*x+a)^(1/2)-5/8*f*b^2/a^3/x*(c*x^2+b*x+a)^
```

```
(1/2)-3/4*f*b/a^(5/2)*c*ln((2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2)
)/x)+2/3*f*c/a^2/x*(c*x^2+b*x+a)^(1/2)+15/16*e*b^2/a^(7/2)*c*ln((
2*a+b*x+2*a^(1/2)*(c*x^2+b*x+a)^(1/2))/x)+3/8*e*c/a^2/x^2*(c*x^2+
b*x+a)^(1/2)+7/24*e*b/a^2/x^3*(c*x^2+b*x+a)^(1/2)-35/96*e*b^2/a^3
/x^2*(c*x^2+b*x+a)^(1/2)+35/64*e*b^3/a^4/x*(c*x^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((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^6),x, algorithm="maxi
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 1.78, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^6),x, algorithm="fric
```

```
[Out] [1/7680*(15*((63*b^5 - 280*a*b^3*c + 240*a^2*b*c^2)*d - 2*(35*a*b
^4 - 120*a^2*b^2*c + 48*a^3*c^2)*e + 16*(5*a^2*b^3 - 12*a^3*b*c)*
f - 32*(3*a^3*b^2 - 4*a^4*c)*g)*x^5*log(-(4*(a*b*x + 2*a^2)*sqrt(
c*x^2 + b*x + a) + (8*a*b*x + (b^2 + 4*a*c)*x^2 + 8*a^2)*sqrt(a))
/x^2) - 4*(384*a^4*d - (1440*a^3*b*g - (945*b^4 - 2940*a*b^2*c +
1024*a^2*c^2)*d + 50*(21*a*b^3 - 44*a^2*b*c)*e - 80*(15*a^2*b^2 -
 16*a^3*c)*f)*x^4 - 2*(400*a^3*b*f - 480*a^4*g + 7*(45*a*b^3 - 92
*a^2*b*c)*d - 10*(35*a^2*b^2 - 36*a^3*c)*e)*x^3 - 8*(70*a^3*b*e -
 80*a^4*f - (63*a^2*b^2 - 64*a^3*c)*d)*x^2 - 48*(9*a^3*b*d - 10*a
^4*e)*x)*sqrt(c*x^2 + b*x + a)*sqrt(a))/(a^(11/2)*x^5), 1/3840*(1
5*((63*b^5 - 280*a*b^3*c + 240*a^2*b*c^2)*d - 2*(35*a*b^4 - 120*a
^2*b^2*c + 48*a^3*c^2)*e + 16*(5*a^2*b^3 - 12*a^3*b*c)*f - 32*(3*
a^3*b^2 - 4*a^4*c)*g)*x^5*arctan(1/2*(b*x + 2*a)*sqrt(-a)/(sqrt(c
*x^2 + b*x + a)*a)) - 2*(384*a^4*d - (1440*a^3*b*g - (945*b^4 - 2
940*a*b^2*c + 1024*a^2*c^2)*d + 50*(21*a*b^3 - 44*a^2*b*c)*e - 80
*(15*a^2*b^2 - 16*a^3*c)*f)*x^4 - 2*(400*a^3*b*f - 480*a^4*g + 7*
(45*a*b^3 - 92*a^2*b*c)*d - 10*(35*a^2*b^2 - 36*a^3*c)*e)*x^3 - 8
*(70*a^3*b*e - 80*a^4*f - (63*a^2*b^2 - 64*a^3*c)*d)*x^2 - 48*(9*
a^3*b*d - 10*a^4*e)*x)*sqrt(c*x^2 + b*x + a)*sqrt(-a))/(sqrt(-a)*
a^5*x^5)]
```

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

$$\int \frac{d + ex + fx^2 + gx^3}{x^6\sqrt{a + bx + cx^2}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((g*x**3+f*x**2+e*x+d)/x**6/(c*x**2+b*x+a)**(1/2),x)
```

```
[Out] Integral((d + e*x + f*x**2 + g*x**3)/(x**6*sqrt(a + b*x + c*x**2)
), x)
```

GIAC/XCAS [A] time = 0.298179, size = 1, normalized size = 0.

$$Done$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((g*x^3 + f*x^2 + e*x + d)/(sqrt(c*x^2 + b*x + a)*x^6),x, algorithm="giac
```

```
[Out] Done
```

3.289 $\int (d+ex)^3 \left(3+2x+5x^2\right) \left(2+x+3x^2-5x^3+4x^4\right) dx$

Optimal. Leaf size=258

$$\frac{\left(300d^2+85de+17e^2\right)(d+ex)^8}{8e^7}-\frac{2\left(200d^3+85d^2e+34de^2+2e^3\right)(d+ex)^7}{7e^7}+\frac{\left(300d^4+170d^3e+102d^2e^2+12de^3+21e^4\right)(d+ex)^6}{6e^7}+\frac{\left(5d^2-2de+3e^2\right)\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)(d+ex)^4}{4e^7}-\frac{\left(120d^5+85d^4e+68d^3e^2+12d^2e^3+42de^4-7e^5\right)(d+ex)^5}{5e^7}+\frac{2(d+ex)^{10}}{e^7}-\frac{(120d+17e)(d+ex)^9}{9e^7}$$

```
[Out] ((5*d^2 - 2*d*e + 3*e^2)*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2
*e^4)*(d + e*x)^4)/(4*e^7) - ((120*d^5 + 85*d^4*e + 68*d^3*e^2 +
12*d^2*e^3 + 42*d*e^4 - 7*e^5)*(d + e*x)^5)/(5*e^7) + ((300*d^4 +
 170*d^3*e + 102*d^2*e^2 + 12*d*e^3 + 21*e^4)*(d + e*x)^6)/(6*e^7
) - (2*(200*d^3 + 85*d^2*e + 34*d*e^2 + 2*e^3)*(d + e*x)^7)/(7*e^
7) + ((300*d^2 + 85*d*e + 17*e^2)*(d + e*x)^8)/(8*e^7) - ((120*d
+ 17*e)*(d + e*x)^9)/(9*e^7) + (2*(d + e*x)^10)/e^7
```

Rubi [A] time = 0.506845, antiderivative size = 258, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.028$

$$\frac{\left(300d^2+85de+17e^2\right)(d+ex)^8}{8e^7}-\frac{2\left(200d^3+85d^2e+34de^2+2e^3\right)(d+ex)^7}{7e^7}+\frac{\left(300d^4+170d^3e+102d^2e^2+12de^3+21e^4\right)(d+ex)^6}{6e^7}+\frac{\left(5d^2-2de+3e^2\right)\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)(d+ex)^4}{4e^7}-\frac{\left(120d^5+85d^4e+68d^3e^2+12d^2e^3+42de^4-7e^5\right)(d+ex)^5}{5e^7}+\frac{2(d+ex)^{10}}{e^7}-\frac{(120d+17e)(d+ex)^9}{9e^7}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)^3*(3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] ((5*d^2 - 2*d*e + 3*e^2)*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2
*e^4)*(d + e*x)^4)/(4*e^7) - ((120*d^5 + 85*d^4*e + 68*d^3*e^2 +
12*d^2*e^3 + 42*d*e^4 - 7*e^5)*(d + e*x)^5)/(5*e^7) + ((300*d^4 +
 170*d^3*e + 102*d^2*e^2 + 12*d*e^3 + 21*e^4)*(d + e*x)^6)/(6*e^7
) - (2*(200*d^3 + 85*d^2*e + 34*d*e^2 + 2*e^3)*(d + e*x)^7)/(7*e^
7) + ((300*d^2 + 85*d*e + 17*e^2)*(d + e*x)^8)/(8*e^7) - ((120*d
+ 17*e)*(d + e*x)^9)/(9*e^7) + (2*(d + e*x)^10)/e^7
```

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

$$7d^3 \int x\,dx + 7d^2x^3(d+e) - \frac{dx^4(4d^2 - 63de - 21e^2)}{4} + 2e^3x^{10} + \frac{e^2x^9(60d - 17e)}{9} + \frac{ex^8(60d^2 - 51de + 17e^2)}{8} + x^7\left(\frac{20d^3}{7} - \frac{51d^2e}{7} + \frac{51de^2}{7} - \frac{4e^3}{7}\right) - x^6\left(\frac{17d^3}{6} - \frac{17d^2e}{2} + 2de^2 - \frac{7e^3}{2}\right) + x^5\left(\frac{17d^3}{5} - \frac{12d^2e}{5} + \frac{63de^2}{5} + \frac{7e^3}{5}\right) + \frac{3(d+ex)^4}{2e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x+d)**3*(5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 7*d**3*Integral(x, x) + 7*d**2*x**3*(d + e) - d*x**4*(4*d**2 - 63
*d*e - 21*e**2)/4 + 2*e**3*x**10 + e**2*x**9*(60*d - 17*e)/9 + e*
x**8*(60*d**2 - 51*d*e + 17*e**2)/8 + x**7*(20*d**3/7 - 51*d**2*e
/7 + 51*d*e**2/7 - 4*e**3/7) - x**6*(17*d**3/6 - 17*d**2*e/2 + 2*
d*e**2 - 7*e**3/2) + x**5*(17*d**3/5 - 12*d**2*e/5 + 63*d*e**2/5
+ 7*e**3/5) + 3*(d + e*x)**4/(2*e)
```

Mathematica [A] time = 0.0688843, size = 212, normalized size = 0.82

$$6d^3x + \frac{1}{8}ex^8(60d^2 - 51de + 17e^2) + dx^3(7d^2 + 7de + 6e^2) + \frac{1}{2}d^2x^2(7d + 18e) + \frac{1}{7}x^7(20d^3 - 51d^2e + 51de^2 - 4e^3) + \frac{1}{6}x^6(-17d^3 + 51d^2e - 12de^2 + 21e^3) + \frac{1}{5}x^5(17d^3 - 12d^2e + 63de^2 + 7e^3) + \frac{1}{4}x^4(-4d^3 + 63d^2e + 21de^2 + 6e^3) + \frac{1}{9}e^2x^9(60d - 17e) + 2e^3x^{10}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)^3*(3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] 6*d^3*x + (d^2*(7*d + 18*e)*x^2)/2 + d*(7*d^2 + 7*d*e + 6*e^2)*x^
3 + ((-4*d^3 + 63*d^2*e + 21*d*e^2 + 6*e^3)*x^4)/4 + ((17*d^3 - 1
2*d^2*e + 63*d*e^2 + 7*e^3)*x^5)/5 + ((-17*d^3 + 51*d^2*e - 12*d*
e^2 + 21*e^3)*x^6)/6 + ((20*d^3 - 51*d^2*e + 51*d*e^2 - 4*e^3)*x^
7)/7 + (e*(60*d^2 - 51*d*e + 17*e^2)*x^8)/8 + ((60*d - 17*e)*e^2*
x^9)/9 + 2*e^3*x^10
```

Maple [A] time = 0.002, size = 208, normalized size = 0.8

$$2e^3x^{10}+\frac{(60e^2d-17e^3)x^9}{9}+\frac{(60d^2e-51e^2d+17e^3)x^8}{8}+\frac{(20d^3-51d^2e+51e^2d-4e^3)x^7}{7}+\frac{(-17d^3+51d^2e-12e^2d+21e^3)x^6}{6}+\frac{(17d^3-12d^2e+63e^2d+7e^3)x^5}{5}+\frac{(-4d^3+63d^2e+21e^2d+6e^3)x^4}{4}+\frac{(21d^3+21d^2e+18e^2d)x^3}{3}+\frac{(7d^3+18d^2e)x^2}{2}+6d^3x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^3*(5*x^2+2*x+3)*(4*x^4-5*x^3+3*x^2+x+2),x)
```

```
[Out] 2*e^3*x^10+1/9*(60*d*e^2-17*e^3)*x^9+1/8*(60*d^2*e-51*d*e^2+17*e^
3)*x^8+1/7*(20*d^3-51*d^2*e+51*d*e^2-4*e^3)*x^7+1/6*(-17*d^3+51*d
^2*e-12*d*e^2+21*e^3)*x^6+1/5*(17*d^3-12*d^2*e+63*d*e^2+7*e^3)*x^
5+1/4*(-4*d^3+63*d^2*e+21*d*e^2+6*e^3)*x^4+1/3*(21*d^3+21*d^2*e+1
8*d*e^2)*x^3+1/2*(7*d^3+18*d^2*e)*x^2+6*d^3*x
```

Maxima [A] time = 0.691695, size = 278, normalized size = 1.08

$$2e^3x^{10}+\frac{1}{9}\left(60de^2-17e^3\right)x^9+\frac{1}{8}\left(60d^2e-51de^2+17e^3\right)x^8+\frac{1}{7}\left(20d^3-51d^2e+51de^2-4e^3\right)x^7-\frac{1}{6}\left(17d^3-51d^2e+12de^2-21e^3\right)x^6+\frac{1}{5}\left(17d^3-12d^2e+63de^2+7e^3\right)x^5-\frac{1}{4}\left(4d^3-63d^2e-21de^2-6e^3\right)x^4+6d^3x+\left(7d^3+7d^2e+6de^2\right)x^3+\frac{1}{2}\left(7d^3+18d^2e\right)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3*(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] 2*e^3*x^10 + 1/9*(60*d*e^2 - 17*e^3)*x^9 + 1/8*(60*d^2*e - 51*d*e
^2 + 17*e^3)*x^8 + 1/7*(20*d^3 - 51*d^2*e + 51*d*e^2 - 4*e^3)*x^7
 - 1/6*(17*d^3 - 51*d^2*e + 12*d*e^2 - 21*e^3)*x^6 + 1/5*(17*d^3
- 12*d^2*e + 63*d*e^2 + 7*e^3)*x^5 - 1/4*(4*d^3 - 63*d^2*e - 21*d
*e^2 - 6*e^3)*x^4 + 6*d^3*x + (7*d^3 + 7*d^2*e + 6*d*e^2)*x^3 + 1
/2*(7*d^3 + 18*d^2*e)*x^2
```

Fricas [A] time = 0.234357, size = 1, normalized size = 0.

$$2x^{10}e^3 - \frac{17}{9}x^9e^3 + \frac{20}{3}x^9e^2d + \frac{17}{8}x^8e^3 - \frac{51}{8}x^8e^2d + \frac{15}{2}x^8ed^2 - \frac{4}{7}x^7e^3 + \frac{51}{7}x^7e^2d - \frac{51}{7}x^7ed^2 + \frac{20}{7}x^7d^3 + \frac{7}{2}x^6e^3 - 2x^6e^2d + \frac{17}{2}x^6ed^2 - \frac{17}{6}x^6d^3 + \frac{7}{5}x^5e^3 + \frac{63}{5}x^5e^2d - \frac{12}{5}x^5ed^2 + \frac{17}{5}x^5d^3 + \frac{3}{2}x^4e^3 + \frac{21}{4}x^4e^2d + \frac{63}{4}x^4ed^2 - x^4d^3 + 6x^3e^2d + 7x^3ed^2 + 7x^3d^3 + 9x^2ed^2 + \frac{7}{2}x^2d^3 + 6xd^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3*(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] 2*x^10*e^3 - 17/9*x^9*e^3 + 20/3*x^9*e^2*d + 17/8*x^8*e^3 - 51/8*
x^8*e^2*d + 15/2*x^8*e*d^2 - 4/7*x^7*e^3 + 51/7*x^7*e^2*d - 51/7*
x^7*e*d^2 + 20/7*x^7*d^3 + 7/2*x^6*e^3 - 2*x^6*e^2*d + 17/2*x^6*e
*d^2 - 17/6*x^6*d^3 + 7/5*x^5*e^3 + 63/5*x^5*e^2*d - 12/5*x^5*e*d
^2 + 17/5*x^5*d^3 + 3/2*x^4*e^3 + 21/4*x^4*e^2*d + 63/4*x^4*e*d^2
 - x^4*d^3 + 6*x^3*e^2*d + 7*x^3*e*d^2 + 7*x^3*d^3 + 9*x^2*e*d^2
+ 7/2*x^2*d^3 + 6*x*d^3
```

Sympy [A] time = 0.115868, size = 230, normalized size = 0.89

$$6d^3x + 2e^3x^{10} + x^9\left(\frac{20de^2}{3} - \frac{17e^3}{9}\right) + x^8\left(\frac{15d^2e}{2} - \frac{51de^2}{8} + \frac{17e^3}{8}\right) + x^7\left(\frac{20d^3}{7} - \frac{51d^2e}{7} + \frac{51de^2}{7} - \frac{4e^3}{7}\right) + x^6\left(-\frac{17d^3}{6} + \frac{17d^2e}{2} - 2de^2 + \frac{7e^3}{2}\right) + x^5\left(\frac{17d^3}{5} - \frac{12d^2e}{5} + \frac{63de^2}{5} + \frac{7e^3}{5}\right) + x^4\left(-d^3 + \frac{63d^2e}{4} + \frac{21de^2}{4} + \frac{3e^3}{2}\right) + x^3\left(7d^3 + 7d^2e + 6de^2\right) + x^2\left(\frac{7d^3}{2} + 9d^2e\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**3*(5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 6*d**3*x + 2*e**3*x**10 + x**9*(20*d*e**2/3 - 17*e**3/9) + x**8*(
15*d**2*e/2 - 51*d*e**2/8 + 17*e**3/8) + x**7*(20*d**3/7 - 51*d**
2*e/7 + 51*d*e**2/7 - 4*e**3/7) + x**6*(-17*d**3/6 + 17*d**2*e/2
- 2*d*e**2 + 7*e**3/2) + x**5*(17*d**3/5 - 12*d**2*e/5 + 63*d*e**
2/5 + 7*e**3/5) + x**4*(-d**3 + 63*d**2*e/4 + 21*d*e**2/4 + 3*e**
3/2) + x**3*(7*d**3 + 7*d**2*e + 6*d*e**2) + x**2*(7*d**3/2 + 9*d
**2*e)
```

GIAC/XCAS [A] time = 0.269838, size = 311, normalized size = 1.21

$$2x^{10}e^3 + \frac{20}{3}dx^9e^2 + \frac{15}{2}d^2x^8e + \frac{20}{7}d^3x^7 - \frac{17}{9}x^9e^3 - \frac{51}{8}dx^8e^2 - \frac{51}{7}d^2x^7e - \frac{17}{6}d^3x^6 + \frac{17}{8}x^8e^3 + \frac{51}{7}dx^7e^2 + \frac{17}{2}d^2x^6e + \frac{17}{5}d^3x^5 - \frac{4}{7}x^7e^3 - 2dx^6e^2 - \frac{12}{5}d^2x^5e - d^3x^4 + \frac{7}{2}x^6e^3 + \frac{63}{5}dx^5e^2 + \frac{63}{4}d^2x^4e + 7d^3x^3 + \frac{7}{5}x^5e^3 + \frac{21}{4}dx^4e^2 + 7d^2x^3e + \frac{7}{2}d^3x^2 + \frac{3}{2}x^4e^3 + 6dx^3e^2 + 9d^2x^2e + 6d^3x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3*(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] 2*x^10*e^3 + 20/3*d*x^9*e^2 + 15/2*d^2*x^8*e + 20/7*d^3*x^7 - 17/
9*x^9*e^3 - 51/8*d*x^8*e^2 - 51/7*d^2*x^7*e - 17/6*d^3*x^6 + 17/8
*x^8*e^3 + 51/7*d*x^7*e^2 + 17/2*d^2*x^6*e + 17/5*d^3*x^5 - 4/7*x
^7*e^3 - 2*d*x^6*e^2 - 12/5*d^2*x^5*e - d^3*x^4 + 7/2*x^6*e^3 + 6
3/5*d*x^5*e^2 + 63/4*d^2*x^4*e + 7*d^3*x^3 + 7/5*x^5*e^3 + 21/4*d
*x^4*e^2 + 7*d^2*x^3*e + 7/2*d^3*x^2 + 3/2*x^4*e^3 + 6*d*x^3*e^2
+ 9*d^2*x^2*e + 6*d^3*x
```

3.290 $\int (d+ex)^2 \left(3+2x+5x^2\right) \left(2+x+3x^2-5x^3+4x^4\right) \, dx$

Optimal. Leaf size=260

$$\frac{\left(300d^2+85de+17e^2\right)(d+ex)^7}{7e^7}-\frac{\left(200d^3+85d^2e+34de^2+2e^3\right)(d+ex)^6}{3e^7}+\frac{\left(300d^4+170d^3e+102d^2e^2+12de^3+21e^4\right)(d+ex)^5}{5e^7}+\frac{\left(5d^2-2de+3e^2\right)\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)(d+ex)^3}{3e^7}-\frac{\left(120d^5+85d^4e+68d^3e^2+12d^2e^3+42de^4-7e^5\right)(d+ex)^4}{4e^7}+\frac{20(d+ex)^9}{9e^7}-\frac{(120d+17e)(d+ex)^8}{8e^7}$$

```
[Out] ((5*d^2 - 2*d*e + 3*e^2)*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2
*e^4)*(d + e*x)^3)/(3*e^7) - ((120*d^5 + 85*d^4*e + 68*d^3*e^2 +
12*d^2*e^3 + 42*d*e^4 - 7*e^5)*(d + e*x)^4)/(4*e^7) + ((300*d^4 +
 170*d^3*e + 102*d^2*e^2 + 12*d*e^3 + 21*e^4)*(d + e*x)^5)/(5*e^7
) - ((200*d^3 + 85*d^2*e + 34*d*e^2 + 2*e^3)*(d + e*x)^6)/(3*e^7)
 + ((300*d^2 + 85*d*e + 17*e^2)*(d + e*x)^7)/(7*e^7) - ((120*d +
17*e)*(d + e*x)^8)/(8*e^7) + (20*(d + e*x)^9)/(9*e^7)
```

Rubi [A] time = 0.415363, antiderivative size = 260, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.028$

$$\frac{\left(300d^2+85de+17e^2\right)(d+ex)^7}{7e^7}-\frac{\left(200d^3+85d^2e+34de^2+2e^3\right)(d+ex)^6}{3e^7}+\frac{\left(300d^4+170d^3e+102d^2e^2+12de^3+21e^4\right)(d+ex)^5}{5e^7}+\frac{\left(5d^2-2de+3e^2\right)\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)(d+ex)^3}{3e^7}-\frac{\left(120d^5+85d^4e+68d^3e^2+12d^2e^3+42de^4-7e^5\right)(d+ex)^4}{4e^7}+\frac{20(d+ex)^9}{9e^7}-\frac{(120d+17e)(d+ex)^8}{8e^7}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)^2*(3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] ((5*d^2 - 2*d*e + 3*e^2)*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2
*e^4)*(d + e*x)^3)/(3*e^7) - ((120*d^5 + 85*d^4*e + 68*d^3*e^2 +
12*d^2*e^3 + 42*d*e^4 - 7*e^5)*(d + e*x)^4)/(4*e^7) + ((300*d^4 +
 170*d^3*e + 102*d^2*e^2 + 12*d*e^3 + 21*e^4)*(d + e*x)^5)/(5*e^7
) - ((200*d^3 + 85*d^2*e + 34*d*e^2 + 2*e^3)*(d + e*x)^6)/(3*e^7)
 + ((300*d^2 + 85*d*e + 17*e^2)*(d + e*x)^7)/(7*e^7) - ((120*d +
17*e)*(d + e*x)^8)/(8*e^7) + (20*(d + e*x)^9)/(9*e^7)
```

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

$$7d^2\int x\,dx+\frac{7dx^3(3d+2e)}{3}+\frac{20e^2x^9}{9}+\frac{ex^8(40d-17e)}{8}+x^7\left(\frac{20d^2}{7}-\frac{34de}{7}+\frac{17e^2}{7}\right)-x^6\left(\frac{17d^2}{6}-\frac{17de}{3}+\frac{2e^2}{3}\right)+x^5\left(\frac{17d^2}{5}-\frac{8de}{5}+\frac{21e^2}{5}\right)-x^4\left(d^2-\frac{21de}{2}-\frac{7e^2}{4}\right)+\frac{2(d+ex)^3}{e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x+d)**2*(5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 7*d**2*Integral(x, x) + 7*d*x**3*(3*d + 2*e)/3 + 20*e**2*x**9/9 +
 e*x**8*(40*d - 17*e)/8 + x**7*(20*d**2/7 - 34*d*e/7 + 17*e**2/7)
 - x**6*(17*d**2/6 - 17*d*e/3 + 2*e**2/3) + x**5*(17*d**2/5 - 8*d
*e/5 + 21*e**2/5) - x**4*(d**2 - 21*d*e/2 - 7*e**2/4) + 2*(d + e*
x)**3/e
```

Mathematica [A] time = 0.0667417, size = 136, normalized size = 0.52

$$d^2\left(\frac{20x^7}{7}-\frac{17x^6}{6}+\frac{17x^5}{5}-x^4+7x^3+\frac{7x^2}{2}+6x\right)+de\left(5x^8-\frac{34x^7}{7}+\frac{17x^6}{3}-\frac{8x^5}{5}+\frac{21x^4}{2}+\frac{14x^3}{3}+6x^2\right)+\frac{e^2\left(5600x^6-5355x^5+6120x^4-1680x^3+10584x^2+4410x+5040\right)x^3}{2520}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)^2*(3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] (e^2*x^3*(5040 + 4410*x + 10584*x^2 - 1680*x^3 + 6120*x^4 - 5355*
x^5 + 5600*x^6))/2520 + d^2*(6*x + (7*x^2)/2 + 7*x^3 - x^4 + (17*
x^5)/5 - (17*x^6)/6 + (20*x^7)/7) + d*e*(6*x^2 + (14*x^3)/3 + (21
*x^4)/2 - (8*x^5)/5 + (17*x^6)/3 - (34*x^7)/7 + 5*x^8)
```

Maple [A] time = 0.001, size = 146, normalized size = 0.6

$$\frac{20\,e^2x^9}{9}+\frac{\left(40\,de-17\,e^2\right)x^8}{8}+\frac{\left(20\,d^2-34\,de+17\,e^2\right)x^7}{7}+\frac{\left(-17\,d^2+34\,de-4\,e^2\right)x^6}{6}+\frac{\left(17\,d^2-8\,de+21\,e^2\right)x^5}{5}+\frac{\left(-4\,d^2+42\,de+7\,e^2\right)x^4}{4}+\frac{\left(21\,d^2+14\,de+6\,e^2\right)x^3}{3}+\frac{\left(7\,d^2+12\,de\right)x^2}{2}+6\,d^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^2*(5*x^2+2*x+3)*(4*x^4-5*x^3+3*x^2+x+2),x)
```

```
[Out] 20/9*e^2*x^9+1/8*(40*d*e-17*e^2)*x^8+1/7*(20*d^2-34*d*e+17*e^2)*x
^7+1/6*(-17*d^2+34*d*e-4*e^2)*x^6+1/5*(17*d^2-8*d*e+21*e^2)*x^5+1
/4*(-4*d^2+42*d*e+7*e^2)*x^4+1/3*(21*d^2+14*d*e+6*e^2)*x^3+1/2*(7
*d^2+12*d*e)*x^2+6*d^2*x
```

Maxima [A] time = 0.700342, size = 196, normalized size = 0.75

$$\frac{20}{9}e^2x^9 + \frac{1}{8}\left(40\,de - 17\,e^2\right)x^8 + \frac{1}{7}\left(20\,d^2 - 34\,de + 17\,e^2\right)x^7 - \frac{1}{6}\left(17\,d^2 - 34\,de + 4\,e^2\right)x^6 + \frac{1}{5}\left(17\,d^2 - 8\,de + 21\,e^2\right)x^5 - \frac{1}{4}\left(4\,d^2 - 42\,de - 7\,e^2\right)x^4 + \frac{1}{3}\left(21\,d^2 + 14\,de + 6\,e^2\right)x^3 + 6\,d^2x + \frac{1}{2}\left(7\,d^2 + 12\,de\right)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2*(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] 20/9*e^2*x^9 + 1/8*(40*d*e - 17*e^2)*x^8 + 1/7*(20*d^2 - 34*d*e +
 17*e^2)*x^7 - 1/6*(17*d^2 - 34*d*e + 4*e^2)*x^6 + 1/5*(17*d^2 -
8*d*e + 21*e^2)*x^5 - 1/4*(4*d^2 - 42*d*e - 7*e^2)*x^4 + 1/3*(21*
d^2 + 14*d*e + 6*e^2)*x^3 + 6*d^2*x + 1/2*(7*d^2 + 12*d*e)*x^2
```

Fricas [A] time = 0.236542, size = 1, normalized size = 0.

$$\frac{20}{9}x^9e^2 - \frac{17}{8}x^8e^2 + 5x^8ed + \frac{17}{7}x^7e^2 - \frac{34}{7}x^7ed + \frac{20}{7}x^7d^2 - \frac{2}{3}x^6e^2 + \frac{17}{3}x^6ed - \frac{17}{6}x^6d^2 + \frac{21}{5}x^5e^2 - \frac{8}{5}x^5ed + \frac{17}{5}x^5d^2 + \frac{7}{4}x^4e^2 + \frac{21}{2}x^4ed - x^4d^2 + 2x^3e^2 + \frac{14}{3}x^3ed + 7x^3d^2 + 6x^2ed + \frac{7}{2}x^2d^2 + 6xd^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2*(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] 20/9*x^9*e^2 - 17/8*x^8*e^2 + 5*x^8*e*d + 17/7*x^7*e^2 - 34/7*x^7
*e*d + 20/7*x^7*d^2 - 2/3*x^6*e^2 + 17/3*x^6*e*d - 17/6*x^6*d^2 +
 21/5*x^5*e^2 - 8/5*x^5*e*d + 17/5*x^5*d^2 + 7/4*x^4*e^2 + 21/2*x
^4*e*d - x^4*d^2 + 2*x^3*e^2 + 14/3*x^3*e*d + 7*x^3*d^2 + 6*x^2*e
*d + 7/2*x^2*d^2 + 6*x*d^2
```

Sympy [A] time = 0.098831, size = 158, normalized size = 0.61

$$6d^2x+\frac{20e^2x^9}{9}+x^8\left(5de-\frac{17e^2}{8}\right)+x^7\left(\frac{20d^2}{7}-\frac{34de}{7}+\frac{17e^2}{7}\right)+x^6\left(-\frac{17d^2}{6}+\frac{17de}{3}-\frac{2e^2}{3}\right)+x^5\left(\frac{17d^2}{5}-\frac{8de}{5}+\frac{21e^2}{5}\right)+x^4\left(-d^2+\frac{21de}{2}+\frac{7e^2}{4}\right)+x^3\left(7d^2+\frac{14de}{3}+2e^2\right)+x^2\left(\frac{7d^2}{2}+6de\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**2*(5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 6*d**2*x + 20*e**2*x**9/9 + x**8*(5*d*e - 17*e**2/8) + x**7*(20*d
**2/7 - 34*d*e/7 + 17*e**2/7) + x**6*(-17*d**2/6 + 17*d*e/3 - 2*e
**2/3) + x**5*(17*d**2/5 - 8*d*e/5 + 21*e**2/5) + x**4*(-d**2 + 2
1*d*e/2 + 7*e**2/4) + x**3*(7*d**2 + 14*d*e/3 + 2*e**2) + x**2*(7
*d**2/2 + 6*d*e)
```

GIAC/XCAS [A] time = 0.267937, size = 216, normalized size = 0.83

$$\frac{20}{9}x^9e^2+5\,dx^8e+\frac{20}{7}d^2x^7-\frac{17}{8}x^8e^2-\frac{34}{7}dx^7e-\frac{17}{6}d^2x^6+\frac{17}{7}x^7e^2+\frac{17}{3}dx^6e+\frac{17}{5}d^2x^5-\frac{2}{3}x^6e^2-\frac{8}{5}dx^5e-d^2x^4+\frac{21}{5}x^5e^2+\frac{21}{2}dx^4e+7\,d^2x^3+\frac{7}{4}x^4e^2+\frac{14}{3}dx^3e+\frac{7}{2}d^2x^2+2\,x^3e^2+6\,dx^2e+6\,d^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2*(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] 20/9*x^9*e^2 + 5*d*x^8*e + 20/7*d^2*x^7 - 17/8*x^8*e^2 - 34/7*d*x
^7*e - 17/6*d^2*x^6 + 17/7*x^7*e^2 + 17/3*d*x^6*e + 17/5*d^2*x^5
- 2/3*x^6*e^2 - 8/5*d*x^5*e - d^2*x^4 + 21/5*x^5*e^2 + 21/2*d*x^4
*e + 7*d^2*x^3 + 7/4*x^4*e^2 + 14/3*d*x^3*e + 7/2*d^2*x^2 + 2*x^3
*e^2 + 6*d*x^2*e + 6*d^2*x
```

3.291 $\int (d+ex)\left(3+2x+5x^2\right)\left(2+x+3x^2-5x^3+4x^4\right)\,dx$

Optimal. Leaf size=93

$$\frac{1}{7}x^7(20d-17e)-\frac{17}{6}x^6(d-e)+\frac{1}{5}x^5(17d-4e)-\frac{1}{4}x^4(4d-21e)+\frac{7}{3}x^3(3d+e)+\frac{1}{2}x^2(7d+6e)+6dx+\frac{5ex^8}{2}$$

```
[Out] 6*d*x + ((7*d + 6*e)*x^2)/2 + (7*(3*d + e)*x^3)/3 - ((4*d - 21*e)
*x^4)/4 + ((17*d - 4*e)*x^5)/5 - (17*(d - e)*x^6)/6 + ((20*d - 17
*e)*x^7)/7 + (5*e*x^8)/2
```

Rubi [A] time = 0.206419, antiderivative size = 93, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 34, $\frac{\text{number of rules}}{\text{integrand size}} = 0.029$

$$\frac{1}{7}x^7(20d-17e)-\frac{17}{6}x^6(d-e)+\frac{1}{5}x^5(17d-4e)-\frac{1}{4}x^4(4d-21e)+\frac{7}{3}x^3(3d+e)+\frac{1}{2}x^2(7d+6e)+6dx+\frac{5ex^8}{2}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)*(3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] 6*d*x + ((7*d + 6*e)*x^2)/2 + (7*(3*d + e)*x^3)/3 - ((4*d - 21*e)
*x^4)/4 + ((17*d - 4*e)*x^5)/5 - (17*(d - e)*x^6)/6 + ((20*d - 17
*e)*x^7)/7 + (5*e*x^8)/2
```

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

$$6dx+\frac{5ex^8}{2}+x^7\left(\frac{20d}{7}-\frac{17e}{7}\right)-x^6\left(\frac{17d}{6}-\frac{17e}{6}\right)+x^5\left(\frac{17d}{5}-\frac{4e}{5}\right)-x^4\left(d-\frac{21e}{4}\right)+x^3\left(7d+\frac{7e}{3}\right)+(7d+6e)\int x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x+d)*(5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 6*d*x + 5*e*x**8/2 + x**7*(20*d/7 - 17*e/7) - x**6*(17*d/6 - 17*e
/6) + x**5*(17*d/5 - 4*e/5) - x**4*(d - 21*e/4) + x**3*(7*d + 7*e
/3) + (7*d + 6*e)*Integral(x, x)
```

Mathematica [A] time = 0.0251475, size = 93, normalized size = 1.

$$\frac{1}{7}x^7(20d-17e)-\frac{17}{6}x^6(d-e)+\frac{1}{5}x^5(17d-4e)+\frac{1}{4}x^4(21e-4d)+\frac{7}{3}x^3(3d+e)+\frac{1}{2}x^2(7d+6e)+6dx+\frac{5ex^8}{2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)*(3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] 6*d*x + ((7*d + 6*e)*x^2)/2 + (7*(3*d + e)*x^3)/3 + ((-4*d + 21*e
)*x^4)/4 + ((17*d - 4*e)*x^5)/5 - (17*(d - e)*x^6)/6 + ((20*d - 1
7*e)*x^7)/7 + (5*e*x^8)/2
```

Maple [A] time = 0.001, size = 84, normalized size = 0.9

$$\frac{5\,ex^8}{2}+\frac{(20\,d-17\,e)\,x^7}{7}+\frac{(-17\,d+17\,e)\,x^6}{6}+\frac{(17\,d-4\,e)\,x^5}{5}+\frac{(-4\,d+21\,e)\,x^4}{4}+\frac{(21\,d+7\,e)\,x^3}{3}+\frac{(7\,d+6\,e)\,x^2}{2}+6\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(5*x^2+2*x+3)*(4*x^4-5*x^3+3*x^2+x+2),x)
```

```
[Out] 5/2*e*x^8+1/7*(20*d-17*e)*x^7+1/6*(-17*d+17*e)*x^6+1/5*(17*d-4*e)
*x^5+1/4*(-4*d+21*e)*x^4+1/3*(21*d+7*e)*x^3+1/2*(7*d+6*e)*x^2+6*d
*x
```

Maxima [A] time = 0.694648, size = 107, normalized size = 1.15

$$\frac{5}{2}\,ex^8+\frac{1}{7}\,(20\,d-17\,e)x^7-\frac{17}{6}\,(d-e)x^6+\frac{1}{5}\,(17\,d-4\,e)x^5-\frac{1}{4}\,(4\,d-21\,e)x^4+\frac{7}{3}\,(3\,d+e)x^3+\frac{1}{2}\,(7\,d+6\,e)x^2+6\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)*(5*x^2 + 2*x + 3),x, algorithm=
```

```
[Out] 5/2*e*x^8 + 1/7*(20*d - 17*e)*x^7 - 17/6*(d - e)*x^6 + 1/5*(17*d
- 4*e)*x^5 - 1/4*(4*d - 21*e)*x^4 + 7/3*(3*d + e)*x^3 + 1/2*(7*d
+ 6*e)*x^2 + 6*d*x
```

Fricas [A] time = 0.238688, size = 1, normalized size = 0.01

$$\frac{5}{2}x^8e-\frac{17}{7}x^7e+\frac{20}{7}x^7d+\frac{17}{6}x^6e-\frac{17}{6}x^6d-\frac{4}{5}x^5e+\frac{17}{5}x^5d+\frac{21}{4}x^4e-x^4d+\frac{7}{3}x^3e+7x^3d+3x^2e+\frac{7}{2}x^2d+6xd$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)*(5*x^2 + 2*x + 3),x, algorithm=
```

```
[Out] 5/2*x^8*e - 17/7*x^7*e + 20/7*x^7*d + 17/6*x^6*e - 17/6*x^6*d - 4
/5*x^5*e + 17/5*x^5*d + 21/4*x^4*e - x^4*d + 7/3*x^3*e + 7*x^3*d
+ 3*x^2*e + 7/2*x^2*d + 6*x*d
```

Sympy [A] time = 0.073836, size = 87, normalized size = 0.94

$$6dx+\frac{5ex^8}{2}+x^7\left(\frac{20d}{7}-\frac{17e}{7}\right)+x^6\left(-\frac{17d}{6}+\frac{17e}{6}\right)+x^5\left(\frac{17d}{5}-\frac{4e}{5}\right)$$
$$+x^4\left(-d+\frac{21e}{4}\right)+x^3\left(7d+\frac{7e}{3}\right)+x^2\left(\frac{7d}{2}+3e\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)*(5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 6*d*x + 5*e*x**8/2 + x**7*(20*d/7 - 17*e/7) + x**6*(-17*d/6 + 17*
e/6) + x**5*(17*d/5 - 4*e/5) + x**4*(-d + 21*e/4) + x**3*(7*d + 7
*e/3) + x**2*(7*d/2 + 3*e)
```

GIAC/XCAS [A] time = 0.267359, size = 122, normalized size = 1.31

$$\frac{5}{2}x^8e+\frac{20}{7}dx^7-\frac{17}{7}x^7e-\frac{17}{6}dx^6+\frac{17}{6}x^6e+\frac{17}{5}dx^5-\frac{4}{5}x^5e$$
$$-dx^4+\frac{21}{4}x^4e+7dx^3+\frac{7}{3}x^3e+\frac{7}{2}dx^2+3x^2e+6dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)*(5*x^2 + 2*x + 3),x, algorithm=
```

```
[Out] 5/2*x^8*e + 20/7*d*x^7 - 17/7*x^7*e - 17/6*d*x^6 + 17/6*x^6*e + 1
7/5*d*x^5 - 4/5*x^5*e - d*x^4 + 21/4*x^4*e + 7*d*x^3 + 7/3*x^3*e
+ 7/2*d*x^2 + 3*x^2*e + 6*d*x
```

3.292 $\int \left(3+2x+5x^2\right)\left(2+x+3x^2-5x^3+4x^4\right)\,dx$

Optimal. Leaf size=42

$$\frac{20x^7}{7}-\frac{17x^6}{6}+\frac{17x^5}{5}-x^4+7x^3+\frac{7x^2}{2}+6x$$

```
[Out] 6*x + (7*x^2)/2 + 7*x^3 - x^4 + (17*x^5)/5 - (17*x^6)/6 + (20*x^7
)/7
```

Rubi [A] time = 0.0438201, antiderivative size = 42, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.034

$$\frac{20x^7}{7}-\frac{17x^6}{6}+\frac{17x^5}{5}-x^4+7x^3+\frac{7x^2}{2}+6x$$

Antiderivative was successfully verified.

```
[In]  Int[(3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] 6*x + (7*x^2)/2 + 7*x^3 - x^4 + (17*x^5)/5 - (17*x^6)/6 + (20*x^7
)/7
```

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

$$\frac{20x^7}{7}-\frac{17x^6}{6}+\frac{17x^5}{5}-x^4+7x^3+6x+7\int x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 20*x**7/7 - 17*x**6/6 + 17*x**5/5 - x**4 + 7*x**3 + 6*x + 7*Integ
ral(x, x)
```

Mathematica [A] time = 0.00312687, size = 42, normalized size = 1.

$$\frac{20x^7}{7}-\frac{17x^6}{6}+\frac{17x^5}{5}-x^4+7x^3+\frac{7x^2}{2}+6x$$

Antiderivative was successfully verified.

```
[In]  Integrate[(3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] 6*x + (7*x^2)/2 + 7*x^3 - x^4 + (17*x^5)/5 - (17*x^6)/6 + (20*x^7
)/7
```

Maple [A] time = 0.001, size = 35, normalized size = 0.8

$$6x + \frac{7x^2}{2} + 7x^3 - x^4 + \frac{17x^5}{5} - \frac{17x^6}{6} + \frac{20x^7}{7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^2+2*x+3)*(4*x^4-5*x^3+3*x^2+x+2),x)
```

```
[Out] 6*x+7/2*x^2+7*x^3-x^4+17/5*x^5-17/6*x^6+20/7*x^7
```

Maxima [A] time = 0.687414, size = 46, normalized size = 1.1

$$\frac{20}{7}x^7 - \frac{17}{6}x^6 + \frac{17}{5}x^5 - x^4 + 7x^3 + \frac{7}{2}x^2 + 6x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3),x, algorithm="maxima")
```

```
[Out] 20/7*x^7 - 17/6*x^6 + 17/5*x^5 - x^4 + 7*x^3 + 7/2*x^2 + 6*x
```

Fricas [A] time = 0.232162, size = 1, normalized size = 0.02

$$\frac{20}{7}x^7 - \frac{17}{6}x^6 + \frac{17}{5}x^5 - x^4 + 7x^3 + \frac{7}{2}x^2 + 6x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3),x, algorithm="fricas")
```

```
[Out] 20/7*x^7 - 17/6*x^6 + 17/5*x^5 - x^4 + 7*x^3 + 7/2*x^2 + 6*x
```

Sympy [A] time = 0.045703, size = 37, normalized size = 0.88

$$\frac{20x^7}{7} - \frac{17x^6}{6} + \frac{17x^5}{5} - x^4 + 7x^3 + \frac{7x^2}{2} + 6x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 20*x**7/7 - 17*x**6/6 + 17*x**5/5 - x**4 + 7*x**3 + 7*x**2/2 + 6*
x
```

GIAC/XCAS [A] time = 0.268592, size = 46, normalized size = 1.1

$$\frac{20}{7}\,x^7 - \frac{17}{6}\,x^6 + \frac{17}{5}\,x^5 - x^4 + 7\,x^3 + \frac{7}{2}\,x^2 + 6\,x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3),x, algorithm="giac")
```

```
[Out] 20/7*x^7 - 17/6*x^6 + 17/5*x^5 - x^4 + 7*x^3 + 7/2*x^2 + 6*x
```

3.293 $\int \frac{(3+2x+5x^2)(2+x+3x^2-5x^3+4x^4)}{d+ex}\,dx$

Optimal. Leaf size=228

$$\frac{x^4(20d^2+17de+17e^2)}{4e^3}-\frac{x^3(20d^3+17d^2e+17de^2+4e^3)}{3e^4}+\frac{(5d^2-2de+3e^2)(4d^4+5d^3e+3d^2e^2-de^3+2e^4)\log(d+ex)}{e^7}+\frac{x^2(20d^4+17d^3e+17d^2e^2+4de^3+21e^4)}{2e^5}-\frac{x(20d^5+17d^4e+17d^3e^2+4d^2e^3+21de^4-7e^5)}{e^6}-\frac{x^5(20d+17e)}{5e^2}+\frac{10x^6}{3e}$$

```
[Out] -(((20*d^5 + 17*d^4*e + 17*d^3*e^2 + 4*d^2*e^3 + 21*d*e^4 - 7*e^5
)*x)/e^6) + ((20*d^4 + 17*d^3*e + 17*d^2*e^2 + 4*d*e^3 + 21*e^4)*
x^2)/(2*e^5) - ((20*d^3 + 17*d^2*e + 17*d*e^2 + 4*e^3)*x^3)/(3*e^
4) + ((20*d^2 + 17*d*e + 17*e^2)*x^4)/(4*e^3) - ((20*d + 17*e)*x^
5)/(5*e^2) + (10*x^6)/(3*e) + ((5*d^2 - 2*d*e + 3*e^2)*(4*d^4 + 5
*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*Log[d + e*x])/e^7
```

Rubi [A] time = 0.398489, antiderivative size = 228, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.028

$$\frac{x^4(20d^2+17de+17e^2)}{4e^3}-\frac{x^3(20d^3+17d^2e+17de^2+4e^3)}{3e^4}+\frac{(5d^2-2de+3e^2)(4d^4+5d^3e+3d^2e^2-de^3+2e^4)\log(d+ex)}{e^7}+\frac{x^2(20d^4+17d^3e+17d^2e^2+4de^3+21e^4)}{2e^5}-\frac{x(20d^5+17d^4e+17d^3e^2+4d^2e^3+21de^4-7e^5)}{e^6}-\frac{x^5(20d+17e)}{5e^2}+\frac{10x^6}{3e}$$

Antiderivative was successfully verified.

```
[In]  Int[((3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(d + e*x),x]
```

```
[Out] -(((20*d^5 + 17*d^4*e + 17*d^3*e^2 + 4*d^2*e^3 + 21*d*e^4 - 7*e^5
)*x)/e^6) + ((20*d^4 + 17*d^3*e + 17*d^2*e^2 + 4*d*e^3 + 21*e^4)*
x^2)/(2*e^5) - ((20*d^3 + 17*d^2*e + 17*d*e^2 + 4*e^3)*x^3)/(3*e^
4) + ((20*d^2 + 17*d*e + 17*e^2)*x^4)/(4*e^3) - ((20*d + 17*e)*x^
5)/(5*e^2) + (10*x^6)/(3*e) + ((5*d^2 - 2*d*e + 3*e^2)*(4*d^4 + 5
*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*Log[d + e*x])/e^7
```

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

$$-\left(20d^5+17d^4e+17d^3e^2+4d^2e^3+21de^4-7e^5\right)\int\frac{1}{e^6}\,dx+\frac{10x^6}{3e}-\frac{x^5\,(20d+17e)}{5e^2}+\frac{x^4\left(20d^2+17de+17e^2\right)}{4e^3}-\frac{x^3\left(20d^3+17d^2e+17de^2+4e^3\right)}{3e^4}+\frac{\left(20d^4+17d^3e+17d^2e^2+4de^3+21e^4\right)\int x\,dx}{e^5}+\frac{\left(5d^2-2de+3e^2\right)\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)\log{(d+ex)}}{e^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2)/(e*x+d),x)
```

```
[Out] -(20*d**5 + 17*d**4*e + 17*d**3*e**2 + 4*d**2*e**3 + 21*d*e**4 -
7*e**5)*Integral(e**(-6), x) + 10*x**6/(3*e) - x**5*(20*d + 17*e)
/(5*e**2) + x**4*(20*d**2 + 17*d*e + 17*e**2)/(4*e**3) - x**3*(20
*d**3 + 17*d**2*e + 17*d*e**2 + 4*e**3)/(3*e**4) + (20*d**4 + 17*
d**3*e + 17*d**2*e**2 + 4*d*e**3 + 21*e**4)*Integral(x, x)/e**5 +
 (5*d**2 - 2*d*e + 3*e**2)*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e
**3 + 2*e**4)*log(d + e*x)/e**7
```

Mathematica [A] time = 0.105024, size = 179, normalized size = 0.79

$$ex\left(-1200d^5+60d^4e(10x-17)-10d^3e^2\left(40x^2-51x+102\right)+10d^2e^3\left(30x^3-34x^2+51x-24\right)-5de^4\left(48x^4-51x^3+68\right.\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(d + e*x),x]
```

```
[Out] (e*x*(-1200*d^5 + 60*d^4*e*(-17 + 10*x) - 10*d^3*e^2*(102 - 51*x
+ 40*x^2) + 10*d^2*e^3*(-24 + 51*x - 34*x^2 + 30*x^3) - 5*d*e^4*(
252 - 24*x + 68*x^2 - 51*x^3 + 48*x^4) + e^5*(420 + 630*x - 80*x^
2 + 255*x^3 - 204*x^4 + 200*x^5)) + 60*(20*d^6 + 17*d^5*e + 17*d^
4*e^2 + 4*d^3*e^3 + 21*d^2*e^4 - 7*d*e^5 + 6*e^6)*Log[d + e*x])/(
60*e^7)
```

Maple [A] time = 0.007, size = 286, normalized size = 1.3

$$-\frac{4x^3}{3e}+7\frac{x}{e}+\frac{17x^4}{4e}-\frac{17x^5}{5e}+6\frac{\ln(ex+d)}{e}+17\frac{\ln(ex+d)d^5}{e^6}+21\frac{\ln(ex+d)d^2}{e^3}-7\frac{\ln(ex+d)d}{e^2}+17\frac{\ln(ex+d)d^4}{e^5}+4\frac{\ln(ex+d)d^3}{e^4}+20\frac{\ln(ex+d)d^6}{e^7}+\frac{17x^2d^3}{2e^4}+\frac{17x^2d^2}{2e^3}+10\frac{x^2d^4}{e^5}-\frac{17x^3d}{3e^2}+\frac{17x^4d}{4e^2}-\frac{20x^3d^3}{3e^4}-\frac{17x^3d^2}{3e^3}+5\frac{x^4d^2}{e^3}-4\frac{x^5d}{e^2}-21\frac{dx}{e^2}-17\frac{xd^4}{e^5}-17\frac{d^3x}{e^4}-4\frac{d^2x}{e^3}-20\frac{d^5x}{e^6}+2\frac{dx^2}{e^2}+\frac{10x^6}{3e}+\frac{21x^2}{2e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^2+2*x+3)*(4*x^4-5*x^3+3*x^2+x+2)/(e*x+d),x)
```

```
[Out] -4/3/e*x^3+7/e*x+17/4/e*x^4-17/5/e*x^5+6/e*ln(e*x+d)+17/e^6*ln(e*
x+d)*d^5+21/e^3*ln(e*x+d)*d^2-7/e^2*ln(e*x+d)*d+17/e^5*ln(e*x+d)*
d^4+4/e^4*ln(e*x+d)*d^3+20/e^7*ln(e*x+d)*d^6+17/2/e^4*x^2*d^3+17/
2/e^3*x^2*d^2+10/e^5*x^2*d^4-17/3/e^2*x^3*d+17/4/e^2*x^4*d-20/3/e
^4*x^3*d^3-17/3/e^3*x^3*d^2+5/e^3*x^4*d^2-4/e^2*x^5*d-21/e^2*x*d-
17/e^5*x*d^4-17/e^4*x*d^3-4/e^3*x*d^2-20/e^6*d^5*x+2/e^2*x^2*d+10
/3*x^6/e+21/2*x^2/e
```

Maxima [A] time = 0.693037, size = 308, normalized size = 1.35

$$\frac{200\,e^5x^6-12\left(20\,de^4+17\,e^5\right)x^5+15\left(20\,d^2e^3+17\,de^4+17\,e^5\right)x^4-20\left(20\,d^3e^2+17\,d^2e^3+17\,de^4+4\,e^5\right)x^3+30\left(20\,d^4e+\cdots\right.}{60\,e^6}+\frac{\left(20\,d^6+17\,d^5e+17\,d^4e^2+4\,d^3e^3+21\,d^2e^4-7\,de^5+6\,e^6\right)\log\left(ex+d\right)}{e^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)/(e*x + d),x, algorithm=
```

```
[Out] 1/60*(200*e^5*x^6 - 12*(20*d*e^4 + 17*e^5)*x^5 + 15*(20*d^2*e^3 +
 17*d*e^4 + 17*e^5)*x^4 - 20*(20*d^3*e^2 + 17*d^2*e^3 + 17*d*e^4
+ 4*e^5)*x^3 + 30*(20*d^4*e + 17*d^3*e^2 + 17*d^2*e^3 + 4*d*e^4 +
 21*e^5)*x^2 - 60*(20*d^5 + 17*d^4*e + 17*d^3*e^2 + 4*d^2*e^3 + 2
1*d*e^4 - 7*e^5)*x)/e^6 + (20*d^6 + 17*d^5*e + 17*d^4*e^2 + 4*d^3
*e^3 + 21*d^2*e^4 - 7*d*e^5 + 6*e^6)*log(e*x + d)/e^7
```

Fricas [A] time = 0.259344, size = 311, normalized size = 1.36

$$\frac{200\,e^6x^6-12\left(20\,de^5+17\,e^6\right)x^5+15\left(20\,d^2e^4+17\,de^5+17\,e^6\right)x^4-20\left(20\,d^3e^3+17\,d^2e^4+17\,de^5+4\,e^6\right)x^3+30\left(20\,d^4e^2+\cdots\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)/(e*x + d),x, algorithm=
```

```
[Out] 1/60*(200*e^6*x^6 - 12*(20*d*e^5 + 17*e^6)*x^5 + 15*(20*d^2*e^4 +
 17*d*e^5 + 17*e^6)*x^4 - 20*(20*d^3*e^3 + 17*d^2*e^4 + 17*d*e^5
+ 4*e^6)*x^3 + 30*(20*d^4*e^2 + 17*d^3*e^3 + 17*d^2*e^4 + 4*d*e^5
 + 21*e^6)*x^2 - 60*(20*d^5*e + 17*d^4*e^2 + 17*d^3*e^3 + 4*d^2*e
^4 + 21*d*e^5 - 7*e^6)*x + 60*(20*d^6 + 17*d^5*e + 17*d^4*e^2 + 4
*d^3*e^3 + 21*d^2*e^4 - 7*d*e^5 + 6*e^6)*log(e*x + d))/e^7
```

Sympy [A] time = 1.05172, size = 221, normalized size = 0.97

$$\frac{10x^6}{3e} - \frac{x^5(20d + 17e)}{5e^2} + \frac{x^4\left(20d^2 + 17de + 17e^2\right)}{4e^3} - \frac{x^3\left(20d^3 + 17d^2e + 17de^2 + 4e^3\right)}{3e^4} + \frac{x^2\left(20d^4 + 17d^3e + 17d^2e^2 + 4de^3 + 21e^4\right)}{2e^5} - \frac{x\left(20d^5 + 17d^4e + 17d^3e^2 + 4d^2e^3 + 21de^4 - 7e^5\right)}{e^6} + \frac{\left(5d^2 - 2de + 3e^2\right)\left(4d^4 + 5d^3e + 3d^2e^2 - de^3 + 2e^4\right)\log(d + ex)}{e^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2)/(e*x+d),x)
```

```
[Out] 10*x**6/(3*e) - x**5*(20*d + 17*e)/(5*e**2) + x**4*(20*d**2 + 17*
d*e + 17*e**2)/(4*e**3) - x**3*(20*d**3 + 17*d**2*e + 17*d*e**2 +
 4*e**3)/(3*e**4) + x**2*(20*d**4 + 17*d**3*e + 17*d**2*e**2 + 4*
d*e**3 + 21*e**4)/(2*e**5) - x*(20*d**5 + 17*d**4*e + 17*d**3*e**
2 + 4*d**2*e**3 + 21*d*e**4 - 7*e**5)/e**6 + (5*d**2 - 2*d*e + 3*
e**2)*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)*log(d +
 e*x)/e**7
```

GIAC/XCAS [A] time = 0.270353, size = 308, normalized size = 1.35

$$\left(20\,d^6 + 17\,d^5e + 17\,d^4e^2 + 4\,d^3e^3 + 21\,d^2e^4 - 7\,de^5 + 6\,e^6\right)e^{(-7)}\ln\left(|xe + d|\right) + \frac{1}{60}\left(200\,x^6e^5 - 240\,dx^5e^4 + 300\,d^2x^4e^3 - 400\,d^3x^3e^2 + 600\,d^4x^2e - 1200\,d^5x - 204\,x^5e^5 + 255\,dx^4e^4 - 340\,d^2x^3e^3 + 510\,d^3\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)/(e*x + d),x, algorithm=
```

```
[Out] (20*d^6 + 17*d^5*e + 17*d^4*e^2 + 4*d^3*e^3 + 21*d^2*e^4 - 7*d*e^
5 + 6*e^6)*e^(-7)*ln(abs(x*e + d)) + 1/60*(200*x^6*e^5 - 240*d*x^
```

```
5*e^4 + 300*d^2*x^4*e^3 - 400*d^3*x^3*e^2 + 600*d^4*x^2*e - 1200*
d^5*x - 204*x^5*e^5 + 255*d*x^4*e^4 - 340*d^2*x^3*e^3 + 510*d^3*x
^2*e^2 - 1020*d^4*x*e + 255*x^4*e^5 - 340*d*x^3*e^4 + 510*d^2*x^2
*e^3 - 1020*d^3*x*e^2 - 80*x^3*e^5 + 120*d*x^2*e^4 - 240*d^2*x*e^
3 + 630*x^2*e^5 - 1260*d*x*e^4 + 420*x*e^5)*e^(-6)
```

3.294 $\int \frac{(3+2x+5x^2)(2+x+3x^2-5x^3+4x^4)}{(d+ex)^2}\,dx$

Optimal. Leaf size=228

$$\frac{x^3(60d^2+34de+17e^2)}{3e^4}-\frac{x^2(80d^3+51d^2e+34de^2+4e^3)}{2e^5}-\frac{(5d^2-2de+3e^2)(4d^4+5d^3e+3d^2e^2-de^3+2e^4)}{e^7(d+ex)}+\frac{x(100d^4+68d^3e+51d^2e^2+8de^3+21e^4)}{e^6}-\frac{(120d^5+85d^4e+68d^3e^2+12d^2e^3+42de^4-7e^5)\log(d+ex)}{e^7}-\frac{x^4(40d+17e)}{4e^3}+\frac{4x^5}{e^2}$$

```
[Out] ((100*d^4 + 68*d^3*e + 51*d^2*e^2 + 8*d*e^3 + 21*e^4)*x)/e^6 - ((
80*d^3 + 51*d^2*e + 34*d*e^2 + 4*e^3)*x^2)/(2*e^5) + ((60*d^2 + 3
4*d*e + 17*e^2)*x^3)/(3*e^4) - ((40*d + 17*e)*x^4)/(4*e^3) + (4*x
^5)/e^2 - ((5*d^2 - 2*d*e + 3*e^2)*(4*d^4 + 5*d^3*e + 3*d^2*e^2 -
 d*e^3 + 2*e^4))/(e^7*(d + e*x)) - ((120*d^5 + 85*d^4*e + 68*d^3*
e^2 + 12*d^2*e^3 + 42*d*e^4 - 7*e^5)*Log[d + e*x])/e^7
```

Rubi [A] time = 0.427875, antiderivative size = 228, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.028

$$\frac{x^3(60d^2+34de+17e^2)}{3e^4}-\frac{x^2(80d^3+51d^2e+34de^2+4e^3)}{2e^5}-\frac{(5d^2-2de+3e^2)(4d^4+5d^3e+3d^2e^2-de^3+2e^4)}{e^7(d+ex)}+\frac{x(100d^4+68d^3e+51d^2e^2+8de^3+21e^4)}{e^6}-\frac{(120d^5+85d^4e+68d^3e^2+12d^2e^3+42de^4-7e^5)\log(d+ex)}{e^7}-\frac{x^4(40d+17e)}{4e^3}+\frac{4x^5}{e^2}$$

Antiderivative was successfully verified.

```
[In] Int[((3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(d + e*x)^2,x]
```


```
[Out] ((100*d^4 + 68*d^3*e + 51*d^2*e^2 + 8*d*e^3 + 21*e^4)*x)/e^6 - ((
80*d^3 + 51*d^2*e + 34*d*e^2 + 4*e^3)*x^2)/(2*e^5) + ((60*d^2 + 3
4*d*e + 17*e^2)*x^3)/(3*e^4) - ((40*d + 17*e)*x^4)/(4*e^3) + (4*x
^5)/e^2 - ((5*d^2 - 2*d*e + 3*e^2)*(4*d^4 + 5*d^3*e + 3*d^2*e^2 -
 d*e^3 + 2*e^4))/(e^7*(d + e*x)) - ((120*d^5 + 85*d^4*e + 68*d^3*
e^2 + 12*d^2*e^3 + 42*d*e^4 - 7*e^5)*Log[d + e*x])/e^7
```

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

$$\left(100d^4+68d^3e+51d^2e^2+8de^3+21e^4\right)\int \frac{1}{e^6}\,dx+\frac{4x^5}{e^2}-\frac{x^4\,(40d+17e)}{4e^3}+\frac{x^3\left(60d^2+34de+17e^2\right)}{3e^4}-\frac{\left(80d^3+51d^2e+34de^2+4e^3\right)\int x\,dx}{e^5}-\frac{\left(120d^5+85d^4e+68d^3e^2+12d^2e^3+42de^4-7e^5\right)\log(d+ex)}{e^7}-\frac{\left(5d^2-2de+3e^2\right)\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)}{e^7\,(d+ex)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**2,x)
```

```
[Out] (100*d**4 + 68*d**3*e + 51*d**2*e**2 + 8*d*e**3 + 21*e**4)*Integr
al(e**(-6), x) + 4*x**5/e**2 - x**4*(40*d + 17*e)/(4*e**3) + x**3
*(60*d**2 + 34*d*e + 17*e**2)/(3*e**4) - (80*d**3 + 51*d**2*e + 3
4*d*e**2 + 4*e**3)*Integral(x, x)/e**5 - (120*d**5 + 85*d**4*e +
68*d**3*e**2 + 12*d**2*e**3 + 42*d*e**4 - 7*e**5)*log(d + e*x)/e*
*7 - (5*d**2 - 2*d*e + 3*e**2)*(4*d**4 + 5*d**3*e + 3*d**2*e**2 -
 d*e**3 + 2*e**4)/(e**7*(d + e*x))
```

Mathematica [A] time = 0.275544, size = 223, normalized size = 0.98

$$\frac{4e^3x^3\left(60d^2+34de+17e^2\right)-6e^2x^2\left(80d^3+51d^2e+34de^2+4e^3\right)+12ex\left(100d^4+68d^3e+51d^2e^2+8de^3+21e^4\right)-12\,(12\cdots}{\cdots}$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(d + e*x)^2,x]
```

```
[Out] (12*e*(100*d^4 + 68*d^3*e + 51*d^2*e^2 + 8*d*e^3 + 21*e^4)*x - 6*
e^2*(80*d^3 + 51*d^2*e + 34*d*e^2 + 4*e^3)*x^2 + 4*e^3*(60*d^2 +
34*d*e + 17*e^2)*x^3 - 3*e^4*(40*d + 17*e)*x^4 + 48*e^5*x^5 - (12
*(20*d^6 + 17*d^5*e + 17*d^4*e^2 + 4*d^3*e^3 + 21*d^2*e^4 - 7*d*e
^5 + 6*e^6))/(d + e*x) - 12*(120*d^5 + 85*d^4*e + 68*d^3*e^2 + 12
*d^2*e^3 + 42*d*e^4 - 7*e^5)*Log[d + e*x])/(12*e^7)
```

Maple [A] time = 0.014, size = 313, normalized size = 1.4

$$-6\,\frac{1}{e\left(ex+d\right)}+7\,\frac{\ln\left(ex+d\right)}{e^{2}}-\frac{17\,x^{4}}{4\,e^{2}}+\frac{17\,x^{3}}{3\,e^{2}}-2\,\frac{x^{2}}{e^{2}}-120\,\frac{\ln\left(ex+d\right)d^{5}}{e^{7}}-85\,\frac{\ln\left(ex+d\right)d^{4}}{e^{6}}$$
$$-68\,\frac{\ln\left(ex+d\right)d^{3}}{e^{5}}-10\,\frac{x^{4}d}{e^{3}}+20\,\frac{x^{3}d^{2}}{e^{4}}+\frac{34\,x^{3}d}{3\,e^{3}}-40\,\frac{x^{2}d^{3}}{e^{5}}-\frac{51\,x^{2}d^{2}}{2\,e^{4}}-17\,\frac{dx^{2}}{e^{3}}+100\,\frac{d^{4}x}{e^{6}}$$
$$-4\,\frac{d^{3}}{e^{4}\left(ex+d\right)}-21\,\frac{d^{2}}{e^{3}\left(ex+d\right)}+7\,\frac{d}{e^{2}\left(ex+d\right)}-12\,\frac{\ln\left(ex+d\right)d^{2}}{e^{4}}-42\,\frac{\ln\left(ex+d\right)d}{e^{3}}$$
$$+68\,\frac{d^{3}x}{e^{5}}+51\,\frac{d^{2}x}{e^{4}}+8\,\frac{dx}{e^{3}}-20\,\frac{d^{6}}{e^{7}\left(ex+d\right)}-17\,\frac{d^{5}}{e^{6}\left(ex+d\right)}-17\,\frac{d^{4}}{e^{5}\left(ex+d\right)}+4\,\frac{x^{5}}{e^{2}}+21\,\frac{x}{e^{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^2+2*x+3)*(4*x^4-5*x^3+3*x^2+x+2)/(e*x+d)^2,x)
```

```
[Out] -6/e/(e*x+d)+7/e^2*ln(e*x+d)-17/4/e^2*x^4+17/3/e^2*x^3-2/e^2*x^2-
120/e^7*ln(e*x+d)*d^5-85/e^6*ln(e*x+d)*d^4-68/e^5*ln(e*x+d)*d^3-1
0/e^3*x^4*d+20/e^4*x^3*d^2+34/3/e^3*x^3*d-40/e^5*x^2*d^3-51/2/e^4
*x^2*d^2-17/e^3*x^2*d+100/e^6*d^4*x-4/e^4/(e*x+d)*d^3-21/e^3/(e*x
+d)*d^2+7/e^2/(e*x+d)*d-12/e^4*ln(e*x+d)*d^2-42/e^3*ln(e*x+d)*d+6
8/e^5*x*d^3+51/e^4*x*d^2+8/e^3*x*d-20/e^7/(e*x+d)*d^6-17/e^6/(e*x
+d)*d^5-17/e^5/(e*x+d)*d^4+4*x^5/e^2+21*x/e^2
```

Maxima [A] time = 0.689762, size = 316, normalized size = 1.39

$$-\frac{20\,d^{6}+17\,d^{5}e+17\,d^{4}e^{2}+4\,d^{3}e^{3}+21\,d^{2}e^{4}-7\,de^{5}+6\,e^{6}}{e^{8}x+de^{7}}$$
$$+\frac{48\,e^{4}x^{5}-3\left(40\,de^{3}+17\,e^{4}\right)x^{4}+4\left(60\,d^{2}e^{2}+34\,de^{3}+17\,e^{4}\right)x^{3}-6\left(80\,d^{3}e+51\,d^{2}e^{2}+34\,de^{3}+4\,e^{4}\right)x^{2}+12\left(100\,d^{4}+68\,d\right.}{12\,e^{6}}$$
$$-\frac{\left(120\,d^{5}+85\,d^{4}e+68\,d^{3}e^{2}+12\,d^{2}e^{3}+42\,de^{4}-7\,e^{5}\right)\log\left(ex+d\right)}{e^{7}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)/(e*x + d)^2,x, algorith
```

```
[Out] -(20*d^6 + 17*d^5*e + 17*d^4*e^2 + 4*d^3*e^3 + 21*d^2*e^4 - 7*d*e
^5 + 6*e^6)/(e^8*x + d*e^7) + 1/12*(48*e^4*x^5 - 3*(40*d*e^3 + 17
*e^4)*x^4 + 4*(60*d^2*e^2 + 34*d*e^3 + 17*e^4)*x^3 - 6*(80*d^3*e
+ 51*d^2*e^2 + 34*d*e^3 + 4*e^4)*x^2 + 12*(100*d^4 + 68*d^3*e + 5
1*d^2*e^2 + 8*d*e^3 + 21*e^4)*x)/e^6 - (120*d^5 + 85*d^4*e + 68*d
^3*e^2 + 12*d^2*e^3 + 42*d*e^4 - 7*e^5)*log(e*x + d)/e^7
```

Fricas [A] time = 0.258951, size = 431, normalized size = 1.89

$$\frac{48\,e^6x^6 - 240\,d^6 - 204\,d^5e - 204\,d^4e^2 - 48\,d^3e^3 - 252\,d^2e^4 + 84\,de^5 - 72\,e^6 - 3\left(24\,de^5 + 17\,e^6\right)x^5 + \left(120\,d^2e^4 + 85\,de^5 + 68\cdots\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)/(e*x + d)^2,x, algorith
```

```
[Out] 1/12*(48*e^6*x^6 - 240*d^6 - 204*d^5*e - 204*d^4*e^2 - 48*d^3*e^3
 - 252*d^2*e^4 + 84*d*e^5 - 72*e^6 - 3*(24*d*e^5 + 17*e^6)*x^5 +
(120*d^2*e^4 + 85*d*e^5 + 68*e^6)*x^4 - 2*(120*d^3*e^3 + 85*d^2*e
^4 + 68*d*e^5 + 12*e^6)*x^3 + 6*(120*d^4*e^2 + 85*d^3*e^3 + 68*d^
2*e^4 + 12*d*e^5 + 42*e^6)*x^2 + 12*(100*d^5*e + 68*d^4*e^2 + 51*
d^3*e^3 + 8*d^2*e^4 + 21*d*e^5)*x - 12*(120*d^6 + 85*d^5*e + 68*d
^4*e^2 + 12*d^3*e^3 + 42*d^2*e^4 - 7*d*e^5 + (120*d^5*e + 85*d^4*
e^2 + 68*d^3*e^3 + 12*d^2*e^4 + 42*d*e^5 - 7*e^6)*x)*log(e*x + d)
)/(e^8*x + d*e^7)
```

Sympy [A] time = 1.83602, size = 226, normalized size = 0.99

$$-\frac{20d^6 + 17d^5e + 17d^4e^2 + 4d^3e^3 + 21d^2e^4 - 7de^5 + 6e^6}{de^7 + e^8x} + \frac{4x^5}{e^2} - \frac{x^4\left(40d + 17e\right)}{4e^3} + \frac{x^3\left(60d^2 + 34de + 17e^2\right)}{3e^4} - \frac{x^2\left(80d^3 + 51d^2e + 34de^2 + 4e^3\right)}{2e^5} + \frac{x\left(100d^4 + 68d^3e + 51d^2e^2 + 8de^3 + 21e^4\right)}{e^6} - \frac{\left(120d^5 + 85d^4e + 68d^3e^2 + 12d^2e^3 + 42de^4 - 7e^5\right)\log\left(d + ex\right)}{e^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**2,x)
```

```
[Out] -(20*d**6 + 17*d**5*e + 17*d**4*e**2 + 4*d**3*e**3 + 21*d**2*e**4
 - 7*d*e**5 + 6*e**6)/(d*e**7 + e**8*x) + 4*x**5/e**2 - x**4*(40*
d + 17*e)/(4*e**3) + x**3*(60*d**2 + 34*d*e + 17*e**2)/(3*e**4) -
 x**2*(80*d**3 + 51*d**2*e + 34*d*e**2 + 4*e**3)/(2*e**5) + x*(10
0*d**4 + 68*d**3*e + 51*d**2*e**2 + 8*d*e**3 + 21*e**4)/e**6 - (1
20*d**5 + 85*d**4*e + 68*d**3*e**2 + 12*d**2*e**3 + 42*d*e**4 - 7
*e**5)*log(d + e*x)/e**7
```

GIAC/XCAS [A] time = 0.274671, size = 416, normalized size = 1.82

$$-\frac{1}{12}\,(xe+d)^5\left(\frac{3\left(120\,de+17\,e^2\right)e^{(-1)}}{xe+d}-\frac{4\left(300\,d^2e^2+85\,de^3+17\,e^4\right)e^{(-2)}}{(xe+d)^2}+\frac{12\left(200\,d^3e^3+85\,d^2e^4+34\,de^5+2\,e^6\right)e^{(-3)}}{(xe+d)^3}-\right.$$
$$+\left(120\,d^5+85\,d^4e+68\,d^3e^2+12\,d^2e^3+42\,de^4-7\,e^5\right)e^{(-7)}\ln\left(\frac{|xe+d|e^{(-1)}}{(xe+d)^2}\right)$$
$$-\left(\frac{20\,d^6e^5}{xe+d}+\frac{17\,d^5e^6}{xe+d}+\frac{17\,d^4e^7}{xe+d}+\frac{4\,d^3e^8}{xe+d}+\frac{21\,d^2e^9}{xe+d}-\frac{7\,de^{10}}{xe+d}+\frac{6\,e^{11}}{xe+d}\right)e^{(-12)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)/(e*x + d)^2,x, algorith
```

```
[Out] -1/12*(x*e + d)^5*(3*(120*d*e + 17*e^2)*e^(-1)/(x*e + d) - 4*(300
*d^2*e^2 + 85*d*e^3 + 17*e^4)*e^(-2)/(x*e + d)^2 + 12*(200*d^3*e^
3 + 85*d^2*e^4 + 34*d*e^5 + 2*e^6)*e^(-3)/(x*e + d)^3 - 12*(300*d
^4*e^4 + 170*d^3*e^5 + 102*d^2*e^6 + 12*d*e^7 + 21*e^8)*e^(-4)/(x
*e + d)^4 - 48)*e^(-7) + (120*d^5 + 85*d^4*e + 68*d^3*e^2 + 12*d^
2*e^3 + 42*d*e^4 - 7*e^5)*e^(-7)*ln(abs(x*e + d)*e^(-1)/(x*e + d)
^2) - (20*d^6*e^5/(x*e + d) + 17*d^5*e^6/(x*e + d) + 17*d^4*e^7/(
x*e + d) + 4*d^3*e^8/(x*e + d) + 21*d^2*e^9/(x*e + d) - 7*d*e^10/
(x*e + d) + 6*e^11/(x*e + d))*e^(-12)
```

3.295 $\int \frac{(3+2x+5x^2)(2+x+3x^2-5x^3+4x^4)}{(d+ex)^3}\,dx$

Optimal. Leaf size=231

$$\frac{x^2(120d^2+51de+17e^2)}{2e^5}-\frac{x(200d^3+102d^2e+51de^2+4e^3)}{e^6}-\frac{(5d^2-2de+3e^2)(4d^4+5d^3e+3d^2e^2-de^3+2e^4)}{2e^7(d+ex)^2}+\frac{(300d^4+170d^3e+102d^2e^2+12de^3+21e^4)\log(d+ex)}{e^7}+\frac{120d^5+85d^4e+68d^3e^2+12d^2e^3+42de^4-7e^5}{e^7(d+ex)}-\frac{x^3(60d+17e)}{3e^4}+\frac{5x^4}{e^3}$$

```
[Out] -(((200*d^3 + 102*d^2*e + 51*d*e^2 + 4*e^3)*x)/e^6) + ((120*d^2 +
 51*d*e + 17*e^2)*x^2)/(2*e^5) - ((60*d + 17*e)*x^3)/(3*e^4) + (5
*x^4)/e^3 - ((5*d^2 - 2*d*e + 3*e^2)*(4*d^4 + 5*d^3*e + 3*d^2*e^2
 - d*e^3 + 2*e^4))/(2*e^7*(d + e*x)^2) + (120*d^5 + 85*d^4*e + 68
*d^3*e^2 + 12*d^2*e^3 + 42*d*e^4 - 7*e^5)/(e^7*(d + e*x)) + ((300
*d^4 + 170*d^3*e + 102*d^2*e^2 + 12*d*e^3 + 21*e^4)*Log[d + e*x])
/e^7
```

Rubi [A] time = 0.42641, antiderivative size = 231, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.028$

$$\frac{x^2(120d^2+51de+17e^2)}{2e^5}-\frac{x(200d^3+102d^2e+51de^2+4e^3)}{e^6}-\frac{(5d^2-2de+3e^2)(4d^4+5d^3e+3d^2e^2-de^3+2e^4)}{2e^7(d+ex)^2}+\frac{(300d^4+170d^3e+102d^2e^2+12de^3+21e^4)\log(d+ex)}{e^7}+\frac{120d^5+85d^4e+68d^3e^2+12d^2e^3+42de^4-7e^5}{e^7(d+ex)}-\frac{x^3(60d+17e)}{3e^4}+\frac{5x^4}{e^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(d + e*x)^3,x]
```


```
[Out] -(((200*d^3 + 102*d^2*e + 51*d*e^2 + 4*e^3)*x)/e^6) + ((120*d^2 +
 51*d*e + 17*e^2)*x^2)/(2*e^5) - ((60*d + 17*e)*x^3)/(3*e^4) + (5
*x^4)/e^3 - ((5*d^2 - 2*d*e + 3*e^2)*(4*d^4 + 5*d^3*e + 3*d^2*e^2
 - d*e^3 + 2*e^4))/(2*e^7*(d + e*x)^2) + (120*d^5 + 85*d^4*e + 68
*d^3*e^2 + 12*d^2*e^3 + 42*d*e^4 - 7*e^5)/(e^7*(d + e*x)) + ((300
*d^4 + 170*d^3*e + 102*d^2*e^2 + 12*d*e^3 + 21*e^4)*Log[d + e*x])
```

```
/e^7
```

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

$$- \left(200d^3 + 102d^2e + 51de^2 + 4e^3\right) \int \frac{1}{e^6}\,dx + \frac{5x^4}{e^3} - \frac{x^3\left(60d + 17e\right)}{3e^4} + \frac{\left(120d^2 + 51de + 17e^2\right) \int x\,dx}{e^5} + \frac{\left(300d^4 + 170d^3e + 102d^2e^2 + 12de^3 + 21e^4\right) \log\left(d + ex\right)}{e^7} + \frac{120d^5 + 85d^4e + 68d^3e^2 + 12d^2e^3 + 42de^4 - 7e^5}{e^7\left(d + ex\right)} - \frac{\left(5d^2 - 2de + 3e^2\right)\left(4d^4 + 5d^3e + 3d^2e^2 - de^3 + 2e^4\right)}{2e^7\left(d + ex\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**3,x)
```

```
[Out] -(200*d**3 + 102*d**2*e + 51*d*e**2 + 4*e**3)*Integral(e**(-6), x
) + 5*x**4/e**3 - x**3*(60*d + 17*e)/(3*e**4) + (120*d**2 + 51*d*
e + 17*e**2)*Integral(x, x)/e**5 + (300*d**4 + 170*d**3*e + 102*d
**2*e**2 + 12*d*e**3 + 21*e**4)*log(d + e*x)/e**7 + (120*d**5 + 8
5*d**4*e + 68*d**3*e**2 + 12*d**2*e**3 + 42*d*e**4 - 7*e**5)/(e**
7*(d + e*x)) - (5*d**2 - 2*d*e + 3*e**2)*(4*d**4 + 5*d**3*e + 3*d
**2*e**2 - d*e**3 + 2*e**4)/(2*e**7*(d + e*x)**2)
```

Mathematica [A] time = 0.124898, size = 204, normalized size = 0.88

$$\frac{660d^6 + d^5e(459 - 480x) - 51d^4e^2\left(40x^2 + 2x - 7\right) - 3d^3e^3\left(200x^3 + 357x^2 - 34x - 20\right) + d^2e^4\left(150x^4 - 340x^3 - 561x^2 + 4\right.}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(d + e*x)^3,x]
```

```
[Out] (660*d^6 + d^5*e*(459 - 480*x) - 51*d^4*e^2*(-7 + 2*x + 40*x^2) -
 3*d^3*e^3*(-20 - 34*x + 357*x^2 + 200*x^3) + d^2*e^4*(189 + 48*x
 - 561*x^2 - 340*x^3 + 150*x^4) - d*e^5*(21 - 252*x + 48*x^2 + 20
4*x^3 - 85*x^4 + 60*x^5) + e^6*(-18 - 42*x - 24*x^3 + 51*x^4 - 34
*x^5 + 30*x^6) + 6*(300*d^4 + 170*d^3*e + 102*d^2*e^2 + 12*d*e^3
+ 21*e^4)*(d + e*x)^2*Log[d + e*x])/(6*e^7*(d + e*x)^2)
```

Maple [A] time = 0.014, size = 336, normalized size = 1.5

$$21\frac{\ln(ex+d)}{e^3}-7\frac{1}{e^2(ex+d)}-3\frac{1}{e(ex+d)^2}+\frac{17x^2}{2e^3}-4\frac{x}{e^3}-\frac{17x^3}{3e^3}+5\frac{x^4}{e^3}+300\frac{\ln(ex+d)d^4}{e^7}+170\frac{\ln(ex+d)d^3}{e^6}+102\frac{\ln(ex+d)d^2}{e^5}+12\frac{\ln(ex+d)d}{e^4}-20\frac{x^3d}{e^4}+60\frac{x^2d^2}{e^5}+\frac{51dx^2}{2e^4}-200\frac{d^3x}{e^6}-102\frac{d^2x}{e^5}-51\frac{dx}{e^4}+120\frac{d^5}{e^7(ex+d)}+85\frac{d^4}{e^6(ex+d)}+68\frac{d^3}{e^5(ex+d)}+12\frac{d^2}{e^4(ex+d)}+42\frac{d}{e^3(ex+d)}-10\frac{d^6}{e^7(ex+d)^2}-\frac{17d^5}{2e^6(ex+d)^2}-\frac{17d^4}{2e^5(ex+d)^2}-2\frac{d^3}{e^4(ex+d)^2}-\frac{21d^2}{2e^3(ex+d)^2}+\frac{7d}{2e^2(ex+d)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^2+2*x+3)*(4*x^4-5*x^3+3*x^2+x+2)/(e*x+d)^3,x)
```

```
[Out] 21/e^3*ln(e*x+d)-7/e^2/(e*x+d)-3/e/(e*x+d)^2+17/2/e^3*x^2-4/e^3*x
-17/3/e^3*x^3+5*x^4/e^3+300/e^7*ln(e*x+d)*d^4+170/e^6*ln(e*x+d)*d
^3+102/e^5*ln(e*x+d)*d^2+12/e^4*ln(e*x+d)*d-20/e^4*x^3*d+60/e^5*x
^2*d^2+51/2/e^4*x^2*d-200/e^6*d^3*x-102/e^5*x*d^2-51/e^4*x*d+120/
e^7/(e*x+d)*d^5+85/e^6/(e*x+d)*d^4+68/e^5/(e*x+d)*d^3+12/e^4/(e*x
+d)*d^2+42/e^3/(e*x+d)*d-10/e^7/(e*x+d)^2*d^6-17/2/e^6/(e*x+d)^2*
d^5-17/2/e^5/(e*x+d)^2*d^4-2/e^4/(e*x+d)^2*d^3-21/2/e^3/(e*x+d)^2
*d^2+7/2/e^2/(e*x+d)^2*d
```

Maxima [A] time = 0.690772, size = 324, normalized size = 1.4

$$\frac{220d^6+153d^5e+119d^4e^2+20d^3e^3+63d^2e^4-7de^5-6e^6+2\left(120d^5e+85d^4e^2+68d^3e^3+12d^2e^4+42de^5-7e^6\right)x}{2\left(e^9x^2+2de^8x+d^2e^7\right)}+\frac{30e^3x^4-2\left(60de^2+17e^3\right)x^3+3\left(120d^2e+51de^2+17e^3\right)x^2-6\left(200d^3+102d^2e+51de^2+4e^3\right)x}{6e^6}+\frac{\left(300d^4+170d^3e+102d^2e^2+12de^3+21e^4\right)\log(ex+d)}{e^7}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)/(e*x + d)^3,x, algorith
```

```
[Out] 1/2*(220*d^6 + 153*d^5*e + 119*d^4*e^2 + 20*d^3*e^3 + 63*d^2*e^4
- 7*d*e^5 - 6*e^6 + 2*(120*d^5*e + 85*d^4*e^2 + 68*d^3*e^3 + 12*d
^2*e^4 + 42*d*e^5 - 7*e^6)*x)/(e^9*x^2 + 2*d*e^8*x + d^2*e^7) + 1
/6*(30*e^3*x^4 - 2*(60*d*e^2 + 17*e^3)*x^3 + 3*(120*d^2*e + 51*d*
e^2 + 17*e^3)*x^2 - 6*(200*d^3 + 102*d^2*e + 51*d*e^2 + 4*e^3)*x)
/e^6 + (300*d^4 + 170*d^3*e + 102*d^2*e^2 + 12*d*e^3 + 21*e^4)*lo
g(e*x + d)/e^7
```

Fricas [A] time = 0.256824, size = 486, normalized size = 2.1

$$\frac{30\, e^{6} x^{6} + 660\, d^{6} + 459\, d^{5} e + 357\, d^{4} e^{2} + 60\, d^{3} e^{3} + 189\, d^{2} e^{4} - 21\, d e^{5} - 18\, e^{6} - 2\left(30\, d e^{5} + 17\, e^{6}\right) x^{5} + \left(150\, d^{2} e^{4} + 85\, d e^{5} + 51 \right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)/(e*x + d)^3,x, algorith
```

```
[Out] 1/6*(30*e^6*x^6 + 660*d^6 + 459*d^5*e + 357*d^4*e^2 + 60*d^3*e^3
+ 189*d^2*e^4 - 21*d*e^5 - 18*e^6 - 2*(30*d*e^5 + 17*e^6)*x^5 + (
150*d^2*e^4 + 85*d*e^5 + 51*e^6)*x^4 - 4*(150*d^3*e^3 + 85*d^2*e^
4 + 51*d*e^5 + 6*e^6)*x^3 - 3*(680*d^4*e^2 + 357*d^3*e^3 + 187*d^
2*e^4 + 16*d*e^5)*x^2 - 6*(80*d^5*e + 17*d^4*e^2 - 17*d^3*e^3 - 8
*d^2*e^4 - 42*d*e^5 + 7*e^6)*x + 6*(300*d^6 + 170*d^5*e + 102*d^4
*e^2 + 12*d^3*e^3 + 21*d^2*e^4 + (300*d^4*e^2 + 170*d^3*e^3 + 102
*d^2*e^4 + 12*d*e^5 + 21*e^6)*x^2 + 2*(300*d^5*e + 170*d^4*e^2 +
102*d^3*e^3 + 12*d^2*e^4 + 21*d*e^5)*x)*log(e*x + d))/(e^9*x^2 +
2*d*e^8*x + d^2*e^7)
```

Sympy [A] time = 2.97981, size = 238, normalized size = 1.03

$$\frac{220d^{6} + 153d^{5}e + 119d^{4}e^{2} + 20d^{3}e^{3} + 63d^{2}e^{4} - 7de^{5} - 6e^{6} + x\left(240d^{5}e + 170d^{4}e^{2} + 136d^{3}e^{3} + 24d^{2}e^{4} + 84de^{5} - 14e^{6}\right)}{2d^{2}e^{7} + 4de^{8}x + 2e^{9}x^{2}} + \frac{5x^{4}}{e^{3}} - \frac{x^{3}\left(60d + 17e\right)}{3e^{4}} + \frac{x^{2}\left(120d^{2} + 51de + 17e^{2}\right)}{2e^{5}} - \frac{x\left(200d^{3} + 102d^{2}e + 51de^{2} + 4e^{3}\right)}{e^{6}} + \frac{\left(300d^{4} + 170d^{3}e + 102d^{2}e^{2} + 12de^{3} + 21e^{4}\right)\log\left(d + ex\right)}{e^{7}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**3,x)
```

```
[Out] (220*d**6 + 153*d**5*e + 119*d**4*e**2 + 20*d**3*e**3 + 63*d**2*e
**4 - 7*d*e**5 - 6*e**6 + x*(240*d**5*e + 170*d**4*e**2 + 136*d**
3*e**3 + 24*d**2*e**4 + 84*d*e**5 - 14*e**6))/(2*d**2*e**7 + 4*d*
e**8*x + 2*e**9*x**2) + 5*x**4/e**3 - x**3*(60*d + 17*e)/(3*e**4)
 + x**2*(120*d**2 + 51*d*e + 17*e**2)/(2*e**5) - x*(200*d**3 + 10
2*d**2*e + 51*d*e**2 + 4*e**3)/e**6 + (300*d**4 + 170*d**3*e + 10
2*d**2*e**2 + 12*d*e**3 + 21*e**4)*log(d + e*x)/e**7
```

GIAC/XCAS [A] time = 0.272649, size = 292, normalized size = 1.26

$$\left(300\,d^4+170\,d^3e+102\,d^2e^2+12\,de^3+21\,e^4\right)e^{(-7)}\ln\left(|xe+d|\right)+\frac{1}{6}\left(30\,x^4e^9-120\,dx^3e^8+360\,d^2x^2e^7-1200\,d^3xe^6-34\,x^3e^9+153\,dx^2e^8-612\,d^2xe^7+51\,x^2e^9-306\,dxe^8-24\,xe^9\right)e^{(-12)}+\frac{\left(220\,d^6+153\,d^5e+119\,d^4e^2+20\,d^3e^3+63\,d^2e^4+2\left(120\,d^5e+85\,d^4e^2+68\,d^3e^3+12\,d^2e^4+42\,de^5-7\,e^6\right)x-7\,de^5-6\,e^6}{2\,(xe+d)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)/(e*x + d)^3,x, algorith
```

```
[Out] (300*d^4 + 170*d^3*e + 102*d^2*e^2 + 12*d*e^3 + 21*e^4)*e^(-7)*ln
(abs(x*e + d)) + 1/6*(30*x^4*e^9 - 120*d*x^3*e^8 + 360*d^2*x^2*e^
7 - 1200*d^3*x*e^6 - 34*x^3*e^9 + 153*d*x^2*e^8 - 612*d^2*x*e^7 +
 51*x^2*e^9 - 306*d*x*e^8 - 24*x*e^9)*e^(-12) + 1/2*(220*d^6 + 15
3*d^5*e + 119*d^4*e^2 + 20*d^3*e^3 + 63*d^2*e^4 + 2*(120*d^5*e +
85*d^4*e^2 + 68*d^3*e^3 + 12*d^2*e^4 + 42*d*e^5 - 7*e^6)*x - 7*d*
e^5 - 6*e^6)*e^(-7)/(x*e + d)^2
```

3.296 $\int (d+ex)^3 \left(3+2x+5x^2\right)^2 \left(2+x+3x^2-5x^3+4x^4\right) \, dx$

Optimal. Leaf size=391

$$\frac{\left(2800d^2+315de+111e^2\right)(d+ex)^{10}}{10e^9}-\frac{\left(5600d^3+945d^2e+666de^2+37e^3\right)(d+ex)^9}{9e^9}+\frac{\left(7000d^4+1575d^3e+1665d^2e^2+185de^3+148e^4\right)(d+ex)^8}{8e^9}+\frac{\left(5d^2-2de+3e^2\right)^2\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)(d+ex)^4}{4e^9}-\frac{\left(5600d^5+1575d^4e+2220d^3e^2+370d^2e^3+592de^4-65e^5\right)(d+ex)^7}{7e^9}-\frac{\left(5d^2-2de+3e^2\right)\left(160d^5+127d^4e+88d^3e^2-4d^2e^3+64de^4-11e^5\right)(d+ex)^5}{5e^9}+\frac{\left(2800d^6+945d^5e+1665d^4e^2+370d^3e^3+888d^2e^4-195de^5+107e^6\right)(d+ex)^6}{6e^9}+\frac{25(d+ex)^{12}}{3e^9}-\frac{5(160d+9e)(d+ex)^{11}}{11e^9}$$

```
[Out] ((5*d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 +
 2*e^4)*(d + e*x)^4)/(4*e^9) - ((5*d^2 - 2*d*e + 3*e^2)*(160*d^5
+ 127*d^4*e + 88*d^3*e^2 - 4*d^2*e^3 + 64*d*e^4 - 11*e^5)*(d + e*
x)^5)/(5*e^9) + ((2800*d^6 + 945*d^5*e + 1665*d^4*e^2 + 370*d^3*e
^3 + 888*d^2*e^4 - 195*d*e^5 + 107*e^6)*(d + e*x)^6)/(6*e^9) - ((
5600*d^5 + 1575*d^4*e + 2220*d^3*e^2 + 370*d^2*e^3 + 592*d*e^4 -
65*e^5)*(d + e*x)^7)/(7*e^9) + ((7000*d^4 + 1575*d^3*e + 1665*d^2
*e^2 + 185*d*e^3 + 148*e^4)*(d + e*x)^8)/(8*e^9) - ((5600*d^3 + 9
45*d^2*e + 666*d*e^2 + 37*e^3)*(d + e*x)^9)/(9*e^9) + ((2800*d^2
+ 315*d*e + 111*e^2)*(d + e*x)^10)/(10*e^9) - (5*(160*d + 9*e)*(d
 + e*x)^11)/(11*e^9) + (25*(d + e*x)^12)/(3*e^9)
```

Rubi [A] time = 0.759975, antiderivative size = 391, normalized size of antiderivative = 1., number

of steps used = 2, number of rules used = 1, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.026$

$$\frac{(2800d^2+315de+111e^2)(d+ex)^{10}}{10e^9}-\frac{(5600d^3+945d^2e+666de^2+37e^3)(d+ex)^9}{9e^9}+\frac{(7000d^4+1575d^3e+1665d^2e^2+185de^3+148e^4)(d+ex)^8}{8e^9}+\frac{(5d^2-2de+3e^2)^2(4d^4+5d^3e+3d^2e^2-de^3+2e^4)(d+ex)^4}{4e^9}-\frac{(5600d^5+1575d^4e+2220d^3e^2+370d^2e^3+592de^4-65e^5)(d+ex)^7}{7e^9}-\frac{(5d^2-2de+3e^2)(160d^5+127d^4e+88d^3e^2-4d^2e^3+64de^4-11e^5)(d+ex)^5}{5e^9}+\frac{(2800d^6+945d^5e+1665d^4e^2+370d^3e^3+888d^2e^4-195de^5+107e^6)(d+ex)^6}{6e^9}+\frac{25(d+ex)^{12}}{3e^9}-\frac{5(160d+9e)(d+ex)^{11}}{11e^9}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)^3*(3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] ((5*d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 +
 2*e^4)*(d + e*x)^4)/(4*e^9) - ((5*d^2 - 2*d*e + 3*e^2)*(160*d^5
+ 127*d^4*e + 88*d^3*e^2 - 4*d^2*e^3 + 64*d*e^4 - 11*e^5)*(d + e*
x)^5)/(5*e^9) + ((2800*d^6 + 945*d^5*e + 1665*d^4*e^2 + 370*d^3*e
^3 + 888*d^2*e^4 - 195*d*e^5 + 107*e^6)*(d + e*x)^6)/(6*e^9) - ((
5600*d^5 + 1575*d^4*e + 2220*d^3*e^2 + 370*d^2*e^3 + 592*d*e^4 -
65*e^5)*(d + e*x)^7)/(7*e^9) + ((7000*d^4 + 1575*d^3*e + 1665*d^2
*e^2 + 185*d*e^3 + 148*e^4)*(d + e*x)^8)/(8*e^9) - ((5600*d^3 + 9
45*d^2*e + 666*d*e^2 + 37*e^3)*(d + e*x)^9)/(9*e^9) + ((2800*d^2
+ 315*d*e + 111*e^2)*(d + e*x)^10)/(10*e^9) - (5*(160*d + 9*e)*(d
 + e*x)^11)/(11*e^9) + (25*(d + e*x)^12)/(3*e^9)
```

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

$$33d^3\int x\,dx+\frac{d^2x^3(107d+99e)}{3}+\frac{dx^4(65d^2+321de+99e^2)}{4}+\frac{25e^3x^{12}}{3}+\frac{15e^2x^{11}(20d-3e)}{11}+\frac{3ex^{10}(100d^2-45de+37e^2)}{10}+x^9\left(\frac{100d^3}{9}-15d^2e+37de^2-\frac{37e^3}{9}\right)-x^8\left(\frac{45d^3}{8}-\frac{333d^2e}{8}+\frac{111de^2}{8}-\frac{37e^3}{2}\right)+x^7\left(\frac{111d^3}{7}-\frac{111d^2e}{7}+\frac{444de^2}{7}+\frac{65e^3}{7}\right)-x^6\left(\frac{37d^3}{6}-74d^2e-\frac{65de^2}{2}-\frac{107e^3}{6}\right)+x^5\left(\frac{148d^3}{5}+39d^2e+\frac{321de^2}{5}+\frac{33e^3}{5}\right)+\frac{9(d+ex)^4}{2e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x+d)**3*(5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 33*d**3*Integral(x, x) + d**2*x**3*(107*d + 99*e)/3 + d*x**4*(65*
d**2 + 321*d*e + 99*e**2)/4 + 25*e**3*x**12/3 + 15*e**2*x**11*(20
*d - 3*e)/11 + 3*e*x**10*(100*d**2 - 45*d*e + 37*e**2)/10 + x**9*
(100*d**3/9 - 15*d**2*e + 37*d*e**2 - 37*e**3/9) - x**8*(45*d**3/
8 - 333*d**2*e/8 + 111*d*e**2/8 - 37*e**3/2) + x**7*(111*d**3/7 -
 111*d**2*e/7 + 444*d*e**2/7 + 65*e**3/7) - x**6*(37*d**3/6 - 74*
d**2*e - 65*d*e**2/2 - 107*e**3/6) + x**5*(148*d**3/5 + 39*d**2*e
 + 321*d*e**2/5 + 33*e**3/5) + 9*(d + e*x)**4/(2*e)
```

Mathematica [A] time = 0.0744312, size = 277, normalized size = 0.71

$$18d^3x+\frac{3}{10}ex^{10}\left(100d^2-45de+37e^2\right)+\frac{1}{3}dx^3\left(107d^2+99de+54e^2\right)+\frac{3}{2}d^2x^2(11d+18e)+\frac{1}{9}x^9\left(100d^3-135d^2e+333de^2-37e^3\right)+\frac{1}{8}x^8\left(-45d^3+333d^2e-111de^2+148e^3\right)+\frac{1}{7}x^7\left(111d^3-111d^2e+444de^2+65e^3\right)+\frac{1}{6}x^6\left(-37d^3+444d^2e+195de^2+107e^3\right)+\frac{1}{5}x^5\left(148d^3+195d^2e+321de^2+33e^3\right)+\frac{1}{4}x^4\left(65d^3+321d^2e+99de^2+18e^3\right)+\frac{15}{11}e^2x^{11}(20d-3e)+\frac{25e^3x^{12}}{3}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)^3*(3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] 18*d^3*x + (3*d^2*(11*d + 18*e)*x^2)/2 + (d*(107*d^2 + 99*d*e + 5
4*e^2)*x^3)/3 + ((65*d^3 + 321*d^2*e + 99*d*e^2 + 18*e^3)*x^4)/4
+ ((148*d^3 + 195*d^2*e + 321*d*e^2 + 33*e^3)*x^5)/5 + ((-37*d^3
+ 444*d^2*e + 195*d*e^2 + 107*e^3)*x^6)/6 + ((111*d^3 - 111*d^2*e
 + 444*d*e^2 + 65*e^3)*x^7)/7 + ((-45*d^3 + 333*d^2*e - 111*d*e^2
 + 148*e^3)*x^8)/8 + ((100*d^3 - 135*d^2*e + 333*d*e^2 - 37*e^3)*
x^9)/9 + (3*e*(100*d^2 - 45*d*e + 37*e^2)*x^10)/10 + (15*(20*d -
3*e)*e^2*x^11)/11 + (25*e^3*x^12)/3
```

Maple [A] time = 0.002, size = 264, normalized size = 0.7

$$\frac{25 e^3 x^{12}}{3} + \frac{(300 e^2 d - 45 e^3) x^{11}}{11} + \frac{(300 d^2 e - 135 e^2 d + 111 e^3) x^{10}}{10} + \frac{(100 d^3 - 135 d^2 e + 333 e^2 d - 37 e^3) x^9}{9} + \frac{(-45 d^3 + 333 d^2 e - 111 e^2 d + 148 e^3) x^8}{8} + \frac{(111 d^3 - 111 d^2 e + 444 e^2 d + 65 e^3) x^7}{7} + \frac{(-37 d^3 + 444 d^2 e + 195 e^2 d + 107 e^3) x^6}{6} + \frac{(148 d^3 + 195 d^2 e + 321 e^2 d + 33 e^3) x^5}{5} + \frac{(65 d^3 + 321 d^2 e + 99 e^2 d + 18 e^3) x^4}{4} + \frac{(107 d^3 + 99 d^2 e + 54 e^2 d) x^3}{3} + \frac{(33 d^3 + 54 d^2 e) x^2}{2} + 18 d^3 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^3*(5*x^2+2*x+3)^2*(4*x^4-5*x^3+3*x^2+x+2),x)
```

```
[Out] 25/3*e^3*x^12+1/11*(300*d*e^2-45*e^3)*x^11+1/10*(300*d^2*e-135*d*
e^2+111*e^3)*x^10+1/9*(100*d^3-135*d^2*e+333*d*e^2-37*e^3)*x^9+1/
8*(-45*d^3+333*d^2*e-111*d*e^2+148*e^3)*x^8+1/7*(111*d^3-111*d^2*
e+444*d*e^2+65*e^3)*x^7+1/6*(-37*d^3+444*d^2*e+195*d*e^2+107*e^3)
*x^6+1/5*(148*d^3+195*d^2*e+321*d*e^2+33*e^3)*x^5+1/4*(65*d^3+321
*d^2*e+99*d*e^2+18*e^3)*x^4+1/3*(107*d^3+99*d^2*e+54*d*e^2)*x^3+1
/2*(33*d^3+54*d^2*e)*x^2+18*d^3*x
```

Maxima [A] time = 0.69128, size = 355, normalized size = 0.91

$$\frac{25}{3} e^3 x^{12} + \frac{15}{11} (20 de^2 - 3 e^3) x^{11} + \frac{3}{10} (100 d^2 e - 45 de^2 + 37 e^3) x^{10} + \frac{1}{9} (100 d^3 - 135 d^2 e + 333 de^2 - 37 e^3) x^9 - \frac{1}{8} (45 d^3 - 333 d^2 e + 111 de^2 - 148 e^3) x^8 + \frac{1}{7} (111 d^3 - 111 d^2 e + 444 de^2 + 65 e^3) x^7 - \frac{1}{6} (37 d^3 - 444 d^2 e - 195 de^2 - 107 e^3) x^6 + \frac{1}{5} (148 d^3 + 195 d^2 e + 321 de^2 + 33 e^3) x^5 + \frac{1}{4} (65 d^3 + 321 d^2 e + 99 de^2 + 18 e^3) x^4 + 18 d^3 x + \frac{1}{3} (107 d^3 + 99 d^2 e + 54 de^2) x^3 + \frac{3}{2} (11 d^3 + 18 d^2 e) x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3*(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] 25/3*e^3*x^12 + 15/11*(20*d*e^2 - 3*e^3)*x^11 + 3/10*(100*d^2*e -
 45*d*e^2 + 37*e^3)*x^10 + 1/9*(100*d^3 - 135*d^2*e + 333*d*e^2 -
 37*e^3)*x^9 - 1/8*(45*d^3 - 333*d^2*e + 111*d*e^2 - 148*e^3)*x^8
 + 1/7*(111*d^3 - 111*d^2*e + 444*d*e^2 + 65*e^3)*x^7 - 1/6*(37*d
```

```
^3 - 444*d^2*e - 195*d*e^2 - 107*e^3)*x^6 + 1/5*(148*d^3 + 195*d^
2*e + 321*d*e^2 + 33*e^3)*x^5 + 1/4*(65*d^3 + 321*d^2*e + 99*d*e^
2 + 18*e^3)*x^4 + 18*d^3*x + 1/3*(107*d^3 + 99*d^2*e + 54*d*e^2)*
x^3 + 3/2*(11*d^3 + 18*d^2*e)*x^2
```

Fricas [A] time = 0.235106, size = 1, normalized size = 0.

$$\frac{25}{3}x^{12}e^3 - \frac{45}{11}x^{11}e^3 + \frac{300}{11}x^{11}e^2d + \frac{111}{10}x^{10}e^3 - \frac{27}{2}x^{10}e^2d + 30x^{10}ed^2 - \frac{37}{9}x^9e^3 + 37x^9e^2d - 15x^9ed^2 + \frac{100}{9}x^9d^3 + \frac{37}{2}x^8e^3 - \frac{111}{8}x^8e^2d + \frac{333}{8}x^8ed^2 - \frac{45}{8}x^8d^3 + \frac{65}{7}x^7e^3 + \frac{444}{7}x^7e^2d - \frac{111}{7}x^7ed^2 + \frac{111}{7}x^7d^3 + \frac{107}{6}x^6e^3 + \frac{65}{2}x^6e^2d + 74x^6ed^2 - \frac{37}{6}x^6d^3 + \frac{33}{5}x^5e^3 + \frac{321}{5}x^5e^2d + 39x^5ed^2 + \frac{148}{5}x^5d^3 + \frac{9}{2}x^4e^3 + \frac{99}{4}x^4e^2d + \frac{321}{4}x^4ed^2 + \frac{65}{4}x^4d^3 + 18x^3e^2d + 33x^3ed^2 + \frac{107}{3}x^3d^3 + 27x^2ed^2 + \frac{33}{2}x^2d^3 + 18xd^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3*(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] 25/3*x^12*e^3 - 45/11*x^11*e^3 + 300/11*x^11*e^2*d + 111/10*x^10*
e^3 - 27/2*x^10*e^2*d + 30*x^10*e*d^2 - 37/9*x^9*e^3 + 37*x^9*e^2
*d - 15*x^9*e*d^2 + 100/9*x^9*d^3 + 37/2*x^8*e^3 - 111/8*x^8*e^2*
d + 333/8*x^8*e*d^2 - 45/8*x^8*d^3 + 65/7*x^7*e^3 + 444/7*x^7*e^2
*d - 111/7*x^7*e*d^2 + 111/7*x^7*d^3 + 107/6*x^6*e^3 + 65/2*x^6*e
^2*d + 74*x^6*e*d^2 - 37/6*x^6*d^3 + 33/5*x^5*e^3 + 321/5*x^5*e^2
*d + 39*x^5*e*d^2 + 148/5*x^5*d^3 + 9/2*x^4*e^3 + 99/4*x^4*e^2*d
+ 321/4*x^4*e*d^2 + 65/4*x^4*d^3 + 18*x^3*e^2*d + 33*x^3*e*d^2 +
107/3*x^3*d^3 + 27*x^2*e*d^2 + 33/2*x^2*d^3 + 18*x*d^3
```

Sympy [A] time = 0.133166, size = 298, normalized size = 0.76

$$18d^3x + \frac{25e^3x^{12}}{3} + x^{11}\left(\frac{300de^2}{11} - \frac{45e^3}{11}\right) + x^{10}\left(30d^2e - \frac{27de^2}{2} + \frac{111e^3}{10}\right) + x^9\left(\frac{100d^3}{9} - 15d^2e + 37de^2 - \frac{37e^3}{9}\right) + x^8\left(-\frac{45d^3}{8} + \frac{333d^2e}{8} - \frac{111de^2}{8} + \frac{37e^3}{2}\right) + x^7\left(\frac{111d^3}{7} - \frac{111d^2e}{7} + \frac{444de^2}{7} + \frac{65e^3}{7}\right) + x^6\left(-\frac{37d^3}{6} + 74d^2e + \frac{65de^2}{2} + \frac{107e^3}{6}\right) + x^5\left(\frac{148d^3}{5} + 39d^2e + \frac{321de^2}{5} + \frac{33e^3}{5}\right) + x^4\left(\frac{65d^3}{4} + \frac{321d^2e}{4} + \frac{99de^2}{4} + \frac{9e^3}{2}\right) + x^3\left(\frac{107d^3}{3} + 33d^2e + 18de^2\right) + x^2\left(\frac{33d^3}{2} + 27d^2e\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**3*(5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 18*d**3*x + 25*e**3*x**12/3 + x**11*(300*d*e**2/11 - 45*e**3/11)
+ x**10*(30*d**2*e - 27*d*e**2/2 + 111*e**3/10) + x**9*(100*d**3/
9 - 15*d**2*e + 37*d*e**2 - 37*e**3/9) + x**8*(-45*d**3/8 + 333*d
**2*e/8 - 111*d*e**2/8 + 37*e**3/2) + x**7*(111*d**3/7 - 111*d**2
*e/7 + 444*d*e**2/7 + 65*e**3/7) + x**6*(-37*d**3/6 + 74*d**2*e +
 65*d*e**2/2 + 107*e**3/6) + x**5*(148*d**3/5 + 39*d**2*e + 321*d
*e**2/5 + 33*e**3/5) + x**4*(65*d**3/4 + 321*d**2*e/4 + 99*d*e**2
/4 + 9*e**3/2) + x**3*(107*d**3/3 + 33*d**2*e + 18*d*e**2) + x**2
*(33*d**3/2 + 27*d**2*e)
```

GIAC/XCAS [A] time = 0.269559, size = 400, normalized size = 1.02

$$\frac{25}{3}\,x^{12}e^3 + \frac{300}{11}\,dx^{11}e^2 + 30\,d^2x^{10}e + \frac{100}{9}\,d^3x^9 - \frac{45}{11}\,x^{11}e^3 - \frac{27}{2}\,dx^{10}e^2 - 15\,d^2x^9e - \frac{45}{8}\,d^3x^8 + \frac{111}{10}\,x^{10}e^3 + 37\,dx^9e^2 + \frac{333}{8}\,d^2x^8e + \frac{111}{7}\,d^3x^7 - \frac{37}{9}\,x^9e^3 - \frac{111}{8}\,dx^8e^2 - \frac{111}{7}\,d^2x^7e - \frac{37}{6}\,d^3x^6 + \frac{37}{2}\,x^8e^3 + \frac{444}{7}\,dx^7e^2 + 74\,d^2x^6e + \frac{148}{5}\,d^3x^5 + \frac{65}{7}\,x^7e^3 + \frac{65}{2}\,dx^6e^2 + 39\,d^2x^5e + \frac{65}{4}\,d^3x^4 + \frac{107}{6}\,x^6e^3 + \frac{321}{5}\,dx^5e^2 + \frac{321}{4}\,d^2x^4e + \frac{107}{3}\,d^3x^3 + \frac{33}{5}\,x^5e^3 + \frac{99}{4}\,dx^4e^2 + 33\,d^2x^3e + \frac{33}{2}\,d^3x^2 + \frac{9}{2}\,x^4e^3 + 18\,dx^3e^2 + 27\,d^2x^2e + 18\,d^3x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3*(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] 25/3*x^12*e^3 + 300/11*d*x^11*e^2 + 30*d^2*x^10*e + 100/9*d^3*x^9
 - 45/11*x^11*e^3 - 27/2*d*x^10*e^2 - 15*d^2*x^9*e - 45/8*d^3*x^8
 + 111/10*x^10*e^3 + 37*d*x^9*e^2 + 333/8*d^2*x^8*e + 111/7*d^3*x
^7 - 37/9*x^9*e^3 - 111/8*d*x^8*e^2 - 111/7*d^2*x^7*e - 37/6*d^3*
x^6 + 37/2*x^8*e^3 + 444/7*d*x^7*e^2 + 74*d^2*x^6*e + 148/5*d^3*x
^5 + 65/7*x^7*e^3 + 65/2*d*x^6*e^2 + 39*d^2*x^5*e + 65/4*d^3*x^4
+ 107/6*x^6*e^3 + 321/5*d*x^5*e^2 + 321/4*d^2*x^4*e + 107/3*d^3*x
^3 + 33/5*x^5*e^3 + 99/4*d*x^4*e^2 + 33*d^2*x^3*e + 33/2*d^3*x^2
+ 9/2*x^4*e^3 + 18*d*x^3*e^2 + 27*d^2*x^2*e + 18*d^3*x
```

3.297 $\int (d+ex)^2 \left(3+2x+5x^2\right)^2 \left(2+x+3x^2-5x^3+4x^4\right) \, dx$

Optimal. Leaf size=391

$$\frac{\left(2800d^2+315de+111e^2\right)(d+ex)^9}{9e^9}-\frac{\left(5600d^3+945d^2e+666de^2+37e^3\right)(d+ex)^8}{8e^9}+\frac{\left(7000d^4+1575d^3e+1665d^2e^2+185de^3+148e^4\right)(d+ex)^7}{7e^9}+\frac{\left(5d^2-2de+3e^2\right)^2\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)(d+ex)^3}{3e^9}-\frac{\left(5600d^5+1575d^4e+2220d^3e^2+370d^2e^3+592de^4-65e^5\right)(d+ex)^6}{6e^9}-\frac{\left(5d^2-2de+3e^2\right)\left(160d^5+127d^4e+88d^3e^2-4d^2e^3+64de^4-11e^5\right)(d+ex)^4}{4e^9}+\frac{\left(2800d^6+945d^5e+1665d^4e^2+370d^3e^3+888d^2e^4-195de^5+107e^6\right)(d+ex)^5}{5e^9}+\frac{100(d+ex)^{11}}{11e^9}-\frac{(160d+9e)(d+ex)^{10}}{2e^9}$$

```
[Out] ((5*d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 +
 2*e^4)*(d + e*x)^3)/(3*e^9) - ((5*d^2 - 2*d*e + 3*e^2)*(160*d^5
+ 127*d^4*e + 88*d^3*e^2 - 4*d^2*e^3 + 64*d*e^4 - 11*e^5)*(d + e*
x)^4)/(4*e^9) + ((2800*d^6 + 945*d^5*e + 1665*d^4*e^2 + 370*d^3*e
^3 + 888*d^2*e^4 - 195*d*e^5 + 107*e^6)*(d + e*x)^5)/(5*e^9) - ((
5600*d^5 + 1575*d^4*e + 2220*d^3*e^2 + 370*d^2*e^3 + 592*d*e^4 -
65*e^5)*(d + e*x)^6)/(6*e^9) + ((7000*d^4 + 1575*d^3*e + 1665*d^2
*e^2 + 185*d*e^3 + 148*e^4)*(d + e*x)^7)/(7*e^9) - ((5600*d^3 + 9
45*d^2*e + 666*d*e^2 + 37*e^3)*(d + e*x)^8)/(8*e^9) + ((2800*d^2
+ 315*d*e + 111*e^2)*(d + e*x)^9)/(9*e^9) - ((160*d + 9*e)*(d + e
*x)^10)/(2*e^9) + (100*(d + e*x)^11)/(11*e^9)
```

Rubi [A] time = 0.647377, antiderivative size = 391, normalized size of antiderivative = 1., number

of steps used = 2, number of rules used = 1, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.026

$$\frac{(2800d^2+315de+111e^2)(d+ex)^9}{9e^9}-\frac{(5600d^3+945d^2e+666de^2+37e^3)(d+ex)^8}{8e^9}+\frac{(7000d^4+1575d^3e+1665d^2e^2+185de^3+148e^4)(d+ex)^7}{7e^9}+\frac{(5d^2-2de+3e^2)^2(4d^4+5d^3e+3d^2e^2-de^3+2e^4)(d+ex)^3}{3e^9}-\frac{(5600d^5+1575d^4e+2220d^3e^2+370d^2e^3+592de^4-65e^5)(d+ex)^6}{6e^9}-\frac{(5d^2-2de+3e^2)(160d^5+127d^4e+88d^3e^2-4d^2e^3+64de^4-11e^5)(d+ex)^4}{4e^9}+\frac{(2800d^6+945d^5e+1665d^4e^2+370d^3e^3+888d^2e^4-195de^5+107e^6)(d+ex)^5}{5e^9}+\frac{100(d+ex)^{11}}{11e^9}-\frac{(160d+9e)(d+ex)^{10}}{2e^9}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x)^2*(3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] ((5*d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 +
 2*e^4)*(d + e*x)^3)/(3*e^9) - ((5*d^2 - 2*d*e + 3*e^2)*(160*d^5
+ 127*d^4*e + 88*d^3*e^2 - 4*d^2*e^3 + 64*d*e^4 - 11*e^5)*(d + e*
x)^4)/(4*e^9) + ((2800*d^6 + 945*d^5*e + 1665*d^4*e^2 + 370*d^3*e
^3 + 888*d^2*e^4 - 195*d*e^5 + 107*e^6)*(d + e*x)^5)/(5*e^9) - ((
5600*d^5 + 1575*d^4*e + 2220*d^3*e^2 + 370*d^2*e^3 + 592*d*e^4 -
65*e^5)*(d + e*x)^6)/(6*e^9) + ((7000*d^4 + 1575*d^3*e + 1665*d^2
*e^2 + 185*d*e^3 + 148*e^4)*(d + e*x)^7)/(7*e^9) - ((5600*d^3 + 9
45*d^2*e + 666*d*e^2 + 37*e^3)*(d + e*x)^8)/(8*e^9) + ((2800*d^2
+ 315*d*e + 111*e^2)*(d + e*x)^9)/(9*e^9) - ((160*d + 9*e)*(d + e
*x)^10)/(2*e^9) + (100*(d + e*x)^11)/(11*e^9)
```

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

$$33d^2\int x\,dx+\frac{dx^3(107d+66e)}{3}+\frac{100e^2x^{11}}{11}+\frac{ex^{10}(40d-9e)}{2}+x^9\left(\frac{100d^2}{9}-10de+\frac{37e^2}{3}\right)-x^8\left(\frac{45d^2}{8}-\frac{111de}{4}+\frac{37e^2}{8}\right)+x^7\left(\frac{111d^2}{7}-\frac{74de}{7}+\frac{148e^2}{7}\right)-x^6\left(\frac{37d^2}{6}-\frac{148de}{3}-\frac{65e^2}{6}\right)+x^5\left(\frac{148d^2}{5}+26de+\frac{107e^2}{5}\right)+x^4\left(\frac{65d^2}{4}+\frac{107de}{2}+\frac{33e^2}{4}\right)+\frac{6(d+ex)^3}{e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x+d)**2*(5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 33*d**2*Integral(x, x) + d*x**3*(107*d + 66*e)/3 + 100*e**2*x**11
/11 + e*x**10*(40*d - 9*e)/2 + x**9*(100*d**2/9 - 10*d*e + 37*e**
2/3) - x**8*(45*d**2/8 - 111*d*e/4 + 37*e**2/8) + x**7*(111*d**2/
7 - 74*d*e/7 + 148*e**2/7) - x**6*(37*d**2/6 - 148*d*e/3 - 65*e**
2/6) + x**5*(148*d**2/5 + 26*d*e + 107*e**2/5) + x**4*(65*d**2/4
+ 107*d*e/2 + 33*e**2/4) + 6*(d + e*x)**3/e
```

Mathematica [A] time = 0.0606384, size = 201, normalized size = 0.51

$$\frac{1}{9}x^9\left(100d^2-90de+111e^2\right)+\frac{1}{8}x^8\left(-45d^2+222de-37e^2\right)+\frac{37}{7}x^7\left(3d^2-2de+4e^2\right)+\frac{1}{6}x^6\left(-37d^2+296de+65e^2\right)+\frac{1}{5}x^5\left(148d^2+130de+107e^2\right)+\frac{1}{4}x^4\left(65d^2+214de+33e^2\right)+\frac{1}{3}x^3\left(107d^2+66de+18e^2\right)+18d^2x+\frac{1}{2}ex^{10}(40d-9e)+\frac{3}{2}dx^2(11d+12e)+\frac{100e^2x^{11}}{11}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)^2*(3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] 18*d^2*x + (3*d*(11*d + 12*e)*x^2)/2 + ((107*d^2 + 66*d*e + 18*e^
2)*x^3)/3 + ((65*d^2 + 214*d*e + 33*e^2)*x^4)/4 + ((148*d^2 + 130
*d*e + 107*e^2)*x^5)/5 + ((-37*d^2 + 296*d*e + 65*e^2)*x^6)/6 + (
37*(3*d^2 - 2*d*e + 4*e^2)*x^7)/7 + ((-45*d^2 + 222*d*e - 37*e^2)
*x^8)/8 + ((100*d^2 - 90*d*e + 111*e^2)*x^9)/9 + ((40*d - 9*e)*e*
x^10)/2 + (100*e^2*x^11)/11
```

Maple [A] time = 0.002, size = 186, normalized size = 0.5

$$\frac{100\,e^2x^{11}}{11}+\frac{\left(200\,de-45\,e^2\right)x^{10}}{10}+\frac{\left(100\,d^2-90\,de+111\,e^2\right)x^9}{9}+\frac{\left(-45\,d^2+222\,de-37\,e^2\right)x^8}{8}+\frac{\left(111\,d^2-74\,de+148\,e^2\right)x^7}{7}+\frac{\left(-37\,d^2+296\,de+65\,e^2\right)x^6}{6}+\frac{\left(148\,d^2+130\,de+107\,e^2\right)x^5}{5}+\frac{\left(65\,d^2+214\,de+33\,e^2\right)x^4}{4}+\frac{\left(107\,d^2+66\,de+18\,e^2\right)x^3}{3}+\frac{\left(33\,d^2+36\,de\right)x^2}{2}+18\,d^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(5*x^2+2*x+3)^2*(4*x^4-5*x^3+3*x^2+x+2),x)
```

```
[Out] 100/11*e^2*x^11+1/10*(200*d*e-45*e^2)*x^10+1/9*(100*d^2-90*d*e+11
1*e^2)*x^9+1/8*(-45*d^2+222*d*e-37*e^2)*x^8+1/7*(111*d^2-74*d*e+1
48*e^2)*x^7+1/6*(-37*d^2+296*d*e+65*e^2)*x^6+1/5*(148*d^2+130*d*e
+107*e^2)*x^5+1/4*(65*d^2+214*d*e+33*e^2)*x^4+1/3*(107*d^2+66*d*e
```

```
+18*e^2)*x^3+1/2*(33*d^2+36*d*e)*x^2+18*d^2*x
```

Maxima [A] time = 0.688965, size = 250, normalized size = 0.64

$$\frac{100}{11}\,e^2x^{11}+\frac{1}{2}\left(40\,de-9\,e^2\right)x^{10}+\frac{1}{9}\left(100\,d^2-90\,de+111\,e^2\right)x^9-\frac{1}{8}\left(45\,d^2-222\,de+37\,e^2\right)x^8+\frac{37}{7}\left(3\,d^2-2\,de+4\,e^2\right)x^7-\frac{1}{6}\left(37\,d^2-296\,de-65\,e^2\right)x^6+\frac{1}{5}\left(148\,d^2+130\,de+107\,e^2\right)x^5+\frac{1}{4}\left(65\,d^2+214\,de+33\,e^2\right)x^4+\frac{1}{3}\left(107\,d^2+66\,de+18\,e^2\right)x^3+18\,d^2x+\frac{3}{2}\left(11\,d^2+12\,de\right)x^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2*(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] 100/11*e^2*x^11 + 1/2*(40*d*e - 9*e^2)*x^10 + 1/9*(100*d^2 - 90*d
*e + 111*e^2)*x^9 - 1/8*(45*d^2 - 222*d*e + 37*e^2)*x^8 + 37/7*(3
*d^2 - 2*d*e + 4*e^2)*x^7 - 1/6*(37*d^2 - 296*d*e - 65*e^2)*x^6 +
 1/5*(148*d^2 + 130*d*e + 107*e^2)*x^5 + 1/4*(65*d^2 + 214*d*e +
33*e^2)*x^4 + 1/3*(107*d^2 + 66*d*e + 18*e^2)*x^3 + 18*d^2*x + 3/
2*(11*d^2 + 12*d*e)*x^2
```

Fricas [A] time = 0.23532, size = 1, normalized size = 0.

$$\frac{100}{11}x^{11}e^2-\frac{9}{2}x^{10}e^2+20x^{10}ed+\frac{37}{3}x^9e^2-10x^9ed+\frac{100}{9}x^9d^2-\frac{37}{8}x^8e^2+\frac{111}{4}x^8ed-\frac{45}{8}x^8d^2+\frac{148}{7}x^7e^2-\frac{74}{7}x^7ed+\frac{111}{7}x^7d^2+\frac{65}{6}x^6e^2+\frac{148}{3}x^6ed-\frac{37}{6}x^6d^2+\frac{107}{5}x^5e^2+26x^5ed+\frac{148}{5}x^5d^2+\frac{33}{4}x^4e^2+\frac{107}{2}x^4ed+\frac{65}{4}x^4d^2+6x^3e^2+22x^3ed+\frac{107}{3}x^3d^2+18x^2ed+\frac{33}{2}x^2d^2+18xd^2$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2*(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] 100/11*x^11*e^2 - 9/2*x^10*e^2 + 20*x^10*e*d + 37/3*x^9*e^2 - 10*
x^9*e*d + 100/9*x^9*d^2 - 37/8*x^8*e^2 + 111/4*x^8*e*d - 45/8*x^8
*d^2 + 148/7*x^7*e^2 - 74/7*x^7*e*d + 111/7*x^7*d^2 + 65/6*x^6*e^
2 + 148/3*x^6*e*d - 37/6*x^6*d^2 + 107/5*x^5*e^2 + 26*x^5*e*d + 1
48/5*x^5*d^2 + 33/4*x^4*e^2 + 107/2*x^4*e*d + 65/4*x^4*d^2 + 6*x^
3*e^2 + 22*x^3*e*d + 107/3*x^3*d^2 + 18*x^2*e*d + 33/2*x^2*d^2 +
18*x*d^2
```

Sympy [A] time = 0.1157, size = 206, normalized size = 0.53

$$18d^2x + \frac{100e^2x^{11}}{11} + x^{10}\left(20de - \frac{9e^2}{2}\right) + x^9\left(\frac{100d^2}{9} - 10de + \frac{37e^2}{3}\right) + x^8\left(-\frac{45d^2}{8} + \frac{111de}{4} - \frac{37e^2}{8}\right) + x^7\left(\frac{111d^2}{7} - \frac{74de}{7} + \frac{148e^2}{7}\right) + x^6\left(-\frac{37d^2}{6} + \frac{148de}{3} + \frac{65e^2}{6}\right) + x^5\left(\frac{148d^2}{5} + 26de + \frac{107e^2}{5}\right) + x^4\left(\frac{65d^2}{4} + \frac{107de}{2} + \frac{33e^2}{4}\right) + x^3\left(\frac{107d^2}{3} + 22de + 6e^2\right) + x^2\left(\frac{33d^2}{2} + 18de\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 18*d**2*x + 100*e**2*x**11/11 + x**10*(20*d*e - 9*e**2/2) + x**9*
(100*d**2/9 - 10*d*e + 37*e**2/3) + x**8*(-45*d**2/8 + 111*d*e/4
- 37*e**2/8) + x**7*(111*d**2/7 - 74*d*e/7 + 148*e**2/7) + x**6*(
-37*d**2/6 + 148*d*e/3 + 65*e**2/6) + x**5*(148*d**2/5 + 26*d*e +
 107*e**2/5) + x**4*(65*d**2/4 + 107*d*e/2 + 33*e**2/4) + x**3*(1
07*d**2/3 + 22*d*e + 6*e**2) + x**2*(33*d**2/2 + 18*d*e)
```

GIAC/XCAS [A] time = 0.269075, size = 278, normalized size = 0.71

$$\frac{100}{11}x^{11}e^2 + 20\,dx^{10}e + \frac{100}{9}d^2x^9 - \frac{9}{2}x^{10}e^2 - 10\,dx^9e - \frac{45}{8}d^2x^8 + \frac{37}{3}x^9e^2 + \frac{111}{4}dx^8e + \frac{111}{7}d^2x^7 - \frac{37}{8}x^8e^2 - \frac{74}{7}dx^7e - \frac{37}{6}d^2x^6 + \frac{148}{7}x^7e^2 + \frac{148}{3}dx^6e + \frac{148}{5}d^2x^5 + \frac{65}{6}x^6e^2 + 26\,dx^5e + \frac{65}{4}d^2x^4 + \frac{107}{5}x^5e^2 + \frac{107}{2}dx^4e + \frac{107}{3}d^2x^3 + \frac{33}{4}x^4e^2 + 22\,dx^3e + \frac{33}{2}d^2x^2 + 6\,x^3e^2 + 18\,dx^2e + 18\,d^2x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2*(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] 100/11*x^11*e^2 + 20*d*x^10*e + 100/9*d^2*x^9 - 9/2*x^10*e^2 - 10
*d*x^9*e - 45/8*d^2*x^8 + 37/3*x^9*e^2 + 111/4*d*x^8*e + 111/7*d^
2*x^7 - 37/8*x^8*e^2 - 74/7*d*x^7*e - 37/6*d^2*x^6 + 148/7*x^7*e^
2 + 148/3*d*x^6*e + 148/5*d^2*x^5 + 65/6*x^6*e^2 + 26*d*x^5*e + 6
5/4*d^2*x^4 + 107/5*x^5*e^2 + 107/2*d*x^4*e + 107/3*d^2*x^3 + 33/
4*x^4*e^2 + 22*d*x^3*e + 33/2*d^2*x^2 + 6*x^3*e^2 + 18*d*x^2*e +
18*d^2*x
```

3.298 $\int (d+ex)\left(3+2x+5x^2\right)^2\left(2+x+3x^2-5x^3+4x^4\right)\,dx$

Optimal. Leaf size=121

$$\frac{5}{9}x^9(20d-9e)-\frac{3}{8}x^8(15d-37e)+\frac{37}{7}x^7(3d-e)-\frac{37}{6}x^6(d-4e)+\frac{1}{5}x^5(148d+65e)+\frac{1}{4}x^4(65d+107e)+\frac{1}{3}x^3(107d+33e)+\frac{3}{2}x^2(11d+6e)+18dx+10ex^{10}$$

```
[Out] 18*d*x + (3*(11*d + 6*e)*x^2)/2 + ((107*d + 33*e)*x^3)/3 + ((65*d
 + 107*e)*x^4)/4 + ((148*d + 65*e)*x^5)/5 - (37*(d - 4*e)*x^6)/6
+ (37*(3*d - e)*x^7)/7 - (3*(15*d - 37*e)*x^8)/8 + (5*(20*d - 9*e
)*x^9)/9 + 10*e*x^10
```

Rubi [A] time = 0.307849, antiderivative size = 121, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.028$

$$\frac{5}{9}x^9(20d-9e)-\frac{3}{8}x^8(15d-37e)+\frac{37}{7}x^7(3d-e)-\frac{37}{6}x^6(d-4e)+\frac{1}{5}x^5(148d+65e)+\frac{1}{4}x^4(65d+107e)+\frac{1}{3}x^3(107d+33e)+\frac{3}{2}x^2(11d+6e)+18dx+10ex^{10}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)*(3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] 18*d*x + (3*(11*d + 6*e)*x^2)/2 + ((107*d + 33*e)*x^3)/3 + ((65*d
 + 107*e)*x^4)/4 + ((148*d + 65*e)*x^5)/5 - (37*(d - 4*e)*x^6)/6
+ (37*(3*d - e)*x^7)/7 - (3*(15*d - 37*e)*x^8)/8 + (5*(20*d - 9*e
)*x^9)/9 + 10*e*x^10
```

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

$$18dx+10ex^{10}+x^9\left(\frac{100d}{9}-5e\right)-x^8\left(\frac{45d}{8}-\frac{111e}{8}\right)+x^7\left(\frac{111d}{7}-\frac{37e}{7}\right)-x^6\left(\frac{37d}{6}-\frac{74e}{3}\right)+x^5\left(\frac{148d}{5}+13e\right)+x^4\left(\frac{65d}{4}+\frac{107e}{4}\right)+x^3\left(\frac{107d}{3}+11e\right)+(33d+18e)\int x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x+d)*(5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 18*d*x + 10*e*x**10 + x**9*(100*d/9 - 5*e) - x**8*(45*d/8 - 111*e
/8) + x**7*(111*d/7 - 37*e/7) - x**6*(37*d/6 - 74*e/3) + x**5*(14
8*d/5 + 13*e) + x**4*(65*d/4 + 107*e/4) + x**3*(107*d/3 + 11*e) +
 (33*d + 18*e)*Integral(x, x)
```

Mathematica [A] time = 0.0312876, size = 121, normalized size = 1.

$$\frac{5}{9}x^9(20d-9e)-\frac{3}{8}x^8(15d-37e)+\frac{37}{7}x^7(3d-e)-\frac{37}{6}x^6(d-4e)+\frac{1}{5}x^5(148d+65e)+\frac{1}{4}x^4(65d+107e)+\frac{1}{3}x^3(107d+33e)+\frac{3}{2}x^2(11d+6e)+18dx+10ex^{10}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x)*(3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] 18*d*x + (3*(11*d + 6*e)*x^2)/2 + ((107*d + 33*e)*x^3)/3 + ((65*d
 + 107*e)*x^4)/4 + ((148*d + 65*e)*x^5)/5 - (37*(d - 4*e)*x^6)/6
+ (37*(3*d - e)*x^7)/7 - (3*(15*d - 37*e)*x^8)/8 + (5*(20*d - 9*e
)*x^9)/9 + 10*e*x^10
```

Maple [A] time = 0.002, size = 108, normalized size = 0.9

$$10\,ex^{10}+\frac{(100\,d-45\,e)\,x^9}{9}+\frac{(-45\,d+111\,e)\,x^8}{8}+\frac{(111\,d-37\,e)\,x^7}{7}+\frac{(-37\,d+148\,e)\,x^6}{6}+\frac{(148\,d+65\,e)\,x^5}{5}+\frac{(65\,d+107\,e)\,x^4}{4}+\frac{(107\,d+33\,e)\,x^3}{3}+\frac{(33\,d+18\,e)\,x^2}{2}+18\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)*(5*x^2+2*x+3)^2*(4*x^4-5*x^3+3*x^2+x+2),x)
```

```
[Out] 10*e*x^10+1/9*(100*d-45*e)*x^9+1/8*(-45*d+111*e)*x^8+1/7*(111*d-3
7*e)*x^7+1/6*(-37*d+148*e)*x^6+1/5*(148*d+65*e)*x^5+1/4*(65*d+107
*e)*x^4+1/3*(107*d+33*e)*x^3+1/2*(33*d+18*e)*x^2+18*d*x
```

Maxima [A] time = 0.698921, size = 142, normalized size = 1.17

$$10\,ex^{10}+\frac{5}{9}\,(20\,d-9\,e)x^9-\frac{3}{8}\,(15\,d-37\,e)x^8+\frac{37}{7}\,(3\,d-e)x^7-\frac{37}{6}\,(d-4\,e)x^6+\frac{1}{5}\,(148\,d+65\,e)x^5+\frac{1}{4}\,(65\,d+107\,e)x^4+\frac{1}{3}\,(107\,d+33\,e)x^3+\frac{3}{2}\,(11\,d+6\,e)x^2+18\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)*(5*x^2 + 2*x + 3)^2,x, algorith
```

```
[Out] 10*e*x^10 + 5/9*(20*d - 9*e)*x^9 - 3/8*(15*d - 37*e)*x^8 + 37/7*(
3*d - e)*x^7 - 37/6*(d - 4*e)*x^6 + 1/5*(148*d + 65*e)*x^5 + 1/4*
(65*d + 107*e)*x^4 + 1/3*(107*d + 33*e)*x^3 + 3/2*(11*d + 6*e)*x^
2 + 18*d*x
```

Fricas [A] time = 0.236675, size = 1, normalized size = 0.01

$$10x^{10}e - 5x^9e + \frac{100}{9}x^9d + \frac{111}{8}x^8e - \frac{45}{8}x^8d - \frac{37}{7}x^7e + \frac{111}{7}x^7d + \frac{74}{3}x^6e - \frac{37}{6}x^6d + 13x^5e + \frac{148}{5}x^5d + \frac{107}{4}x^4e + \frac{65}{4}x^4d + 11x^3e + \frac{107}{3}x^3d + 9x^2e + \frac{33}{2}x^2d + 18xd$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)*(5*x^2 + 2*x + 3)^2,x, algorith
```

```
[Out] 10*x^10*e - 5*x^9*e + 100/9*x^9*d + 111/8*x^8*e - 45/8*x^8*d - 37
/7*x^7*e + 111/7*x^7*d + 74/3*x^6*e - 37/6*x^6*d + 13*x^5*e + 148
/5*x^5*d + 107/4*x^4*e + 65/4*x^4*d + 11*x^3*e + 107/3*x^3*d + 9*
x^2*e + 33/2*x^2*d + 18*x*d
```

Sympy [A] time = 0.095766, size = 112, normalized size = 0.93

$$18dx + 10ex^{10} + x^9\left(\frac{100d}{9} - 5e\right) + x^8\left(-\frac{45d}{8} + \frac{111e}{8}\right) + x^7\left(\frac{111d}{7} - \frac{37e}{7}\right) + x^6\left(-\frac{37d}{6} + \frac{74e}{3}\right) + x^5\left(\frac{148d}{5} + 13e\right) + x^4\left(\frac{65d}{4} + \frac{107e}{4}\right) + x^3\left(\frac{107d}{3} + 11e\right) + x^2\left(\frac{33d}{2} + 9e\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)*(5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 18*d*x + 10*e*x**10 + x**9*(100*d/9 - 5*e) + x**8*(-45*d/8 + 111*
e/8) + x**7*(111*d/7 - 37*e/7) + x**6*(-37*d/6 + 74*e/3) + x**5*(
148*d/5 + 13*e) + x**4*(65*d/4 + 107*e/4) + x**3*(107*d/3 + 11*e)
 + x**2*(33*d/2 + 9*e)
```

GIAC/XCAS [A] time = 0.270112, size = 157, normalized size = 1.3

$$10x^{10}e + \frac{100}{9}dx^9 - 5x^9e - \frac{45}{8}dx^8 + \frac{111}{8}x^8e + \frac{111}{7}dx^7 - \frac{37}{7}x^7e - \frac{37}{6}dx^6 + \frac{74}{3}x^6e + \frac{148}{5}dx^5 + 13x^5e + \frac{65}{4}dx^4 + \frac{107}{4}x^4e + \frac{107}{3}dx^3 + 11x^3e + \frac{33}{2}dx^2 + 9x^2e + 18dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)*(5*x^2 + 2*x + 3)^2,x, algorith
```

```
[Out] 10*x^10*e + 100/9*d*x^9 - 5*x^9*e - 45/8*d*x^8 + 111/8*x^8*e + 11
1/7*d*x^7 - 37/7*x^7*e - 37/6*d*x^6 + 74/3*x^6*e + 148/5*d*x^5 +
13*x^5*e + 65/4*d*x^4 + 107/4*x^4*e + 107/3*d*x^3 + 11*x^3*e + 33
/2*d*x^2 + 9*x^2*e + 18*d*x
```

3.299 $\int \left(3+2x+5x^2\right)^2 \left(2+x+3x^2-5x^3+4x^4\right) \, dx$

Optimal. Leaf size=60

$$\frac{100x^9}{9}-\frac{45x^8}{8}+\frac{111x^7}{7}-\frac{37x^6}{6}+\frac{148x^5}{5}+\frac{65x^4}{4}+\frac{107x^3}{3}+\frac{33x^2}{2}+18x$$

```
[Out] 18*x + (33*x^2)/2 + (107*x^3)/3 + (65*x^4)/4 + (148*x^5)/5 - (37*
x^6)/6 + (111*x^7)/7 - (45*x^8)/8 + (100*x^9)/9
```

Rubi [A] time = 0.0634098, antiderivative size = 60, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.032$

$$\frac{100x^9}{9}-\frac{45x^8}{8}+\frac{111x^7}{7}-\frac{37x^6}{6}+\frac{148x^5}{5}+\frac{65x^4}{4}+\frac{107x^3}{3}+\frac{33x^2}{2}+18x$$

Antiderivative was successfully verified.

```
[In]  Int[(3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] 18*x + (33*x^2)/2 + (107*x^3)/3 + (65*x^4)/4 + (148*x^5)/5 - (37*
x^6)/6 + (111*x^7)/7 - (45*x^8)/8 + (100*x^9)/9
```

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

$$\frac{100x^9}{9}-\frac{45x^8}{8}+\frac{111x^7}{7}-\frac{37x^6}{6}+\frac{148x^5}{5}+\frac{65x^4}{4}+\frac{107x^3}{3}+18x+33\int x\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 100*x**9/9 - 45*x**8/8 + 111*x**7/7 - 37*x**6/6 + 148*x**5/5 + 65
*x**4/4 + 107*x**3/3 + 18*x + 33*Integral(x, x)
```

Mathematica [A] time = 0.00257426, size = 60, normalized size = 1.

$$\frac{100x^9}{9}-\frac{45x^8}{8}+\frac{111x^7}{7}-\frac{37x^6}{6}+\frac{148x^5}{5}+\frac{65x^4}{4}+\frac{107x^3}{3}+\frac{33x^2}{2}+18x$$

Antiderivative was successfully verified.

```
[In]  Integrate[(3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] 18*x + (33*x^2)/2 + (107*x^3)/3 + (65*x^4)/4 + (148*x^5)/5 - (37*
x^6)/6 + (111*x^7)/7 - (45*x^8)/8 + (100*x^9)/9
```

Maple [A] time = 0.002, size = 45, normalized size = 0.8

$$18\,x+\frac{33\,x^{2}}{2}+\frac{107\,x^{3}}{3}+\frac{65\,x^{4}}{4}+\frac{148\,x^{5}}{5}-\frac{37\,x^{6}}{6}+\frac{111\,x^{7}}{7}-\frac{45\,x^{8}}{8}+\frac{100\,x^{9}}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^2+2*x+3)^2*(4*x^4-5*x^3+3*x^2+x+2),x)
```

```
[Out] 18*x+33/2*x^2+107/3*x^3+65/4*x^4+148/5*x^5-37/6*x^6+111/7*x^7-45/
8*x^8+100/9*x^9
```

Maxima [A] time = 0.677371, size = 59, normalized size = 0.98

$$\frac{100}{9}\,x^{9}-\frac{45}{8}\,x^{8}+\frac{111}{7}\,x^{7}-\frac{37}{6}\,x^{6}+\frac{148}{5}\,x^{5}+\frac{65}{4}\,x^{4}+\frac{107}{3}\,x^{3}+\frac{33}{2}\,x^{2}+18\,x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2,x, algorithm="maxima
```

```
[Out] 100/9*x^9 - 45/8*x^8 + 111/7*x^7 - 37/6*x^6 + 148/5*x^5 + 65/4*x^
4 + 107/3*x^3 + 33/2*x^2 + 18*x
```

Fricas [A] time = 0.231857, size = 1, normalized size = 0.02

$$\frac{100}{9}x^{9}-\frac{45}{8}x^{8}+\frac{111}{7}x^{7}-\frac{37}{6}x^{6}+\frac{148}{5}x^{5}+\frac{65}{4}x^{4}+\frac{107}{3}x^{3}+\frac{33}{2}x^{2}+18x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2,x, algorithm="fricas
```

```
[Out] 100/9*x^9 - 45/8*x^8 + 111/7*x^7 - 37/6*x^6 + 148/5*x^5 + 65/4*x^
4 + 107/3*x^3 + 33/2*x^2 + 18*x
```

Sympy [A] time = 0.068571, size = 56, normalized size = 0.93

$$\frac{100x^9}{9} - \frac{45x^8}{8} + \frac{111x^7}{7} - \frac{37x^6}{6} + \frac{148x^5}{5} + \frac{65x^4}{4} + \frac{107x^3}{3} + \frac{33x^2}{2} + 18x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] 100*x**9/9 - 45*x**8/8 + 111*x**7/7 - 37*x**6/6 + 148*x**5/5 + 65
*x**4/4 + 107*x**3/3 + 33*x**2/2 + 18*x
```

GIAC/XCAS [A] time = 0.268008, size = 59, normalized size = 0.98

$$\frac{100}{9}\,x^9 - \frac{45}{8}\,x^8 + \frac{111}{7}\,x^7 - \frac{37}{6}\,x^6 + \frac{148}{5}\,x^5 + \frac{65}{4}\,x^4 + \frac{107}{3}\,x^3 + \frac{33}{2}\,x^2 + 18\,x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2,x, algorithm="giac")
```

```
[Out] 100/9*x^9 - 45/8*x^8 + 111/7*x^7 - 37/6*x^6 + 148/5*x^5 + 65/4*x^
4 + 107/3*x^3 + 33/2*x^2 + 18*x
```

3.300 $\int \frac{(3+2x+5x^2)^2(2+x+3x^2-5x^3+4x^4)}{d+ex}\,dx$

Optimal. Leaf size=352

$$\frac{x^6(100d^2+45de+111e^2)}{6e^3}-\frac{x^5(100d^3+45d^2e+111de^2+37e^3)}{5e^4}+\frac{(5d^2-2de+3e^2)^2(4d^4+5d^3e+3d^2e^2-de^3+2e^4)\log(d+ex)}{e^9}+\frac{x^4(100d^4+45d^3e+111d^2e^2+37de^3+148e^4)}{4e^5}-\frac{x^3(100d^5+45d^4e+111d^3e^2+37d^2e^3+148de^4-65e^5)}{3e^6}+\frac{x^2(100d^6+45d^5e+111d^4e^2+37d^3e^3+148d^2e^4-65de^5+107e^6)}{2e^7}-\frac{x(100d^7+45d^6e+111d^5e^2+37d^4e^3+148d^3e^4-65d^2e^5+107de^6-33e^7)}{e^8}-\frac{5x^7(20d+9e)}{7e^2}+\frac{25x^8}{2e}$$

```
[Out] -(((100*d^7 + 45*d^6*e + 111*d^5*e^2 + 37*d^4*e^3 + 148*d^3*e^4 -
 65*d^2*e^5 + 107*d*e^6 - 33*e^7)*x)/e^8) + ((100*d^6 + 45*d^5*e
+ 111*d^4*e^2 + 37*d^3*e^3 + 148*d^2*e^4 - 65*d*e^5 + 107*e^6)*x^
2)/(2*e^7) - ((100*d^5 + 45*d^4*e + 111*d^3*e^2 + 37*d^2*e^3 + 14
8*d*e^4 - 65*e^5)*x^3)/(3*e^6) + ((100*d^4 + 45*d^3*e + 111*d^2*e
^2 + 37*d*e^3 + 148*e^4)*x^4)/(4*e^5) - ((100*d^3 + 45*d^2*e + 11
1*d*e^2 + 37*e^3)*x^5)/(5*e^4) + ((100*d^2 + 45*d*e + 111*e^2)*x^
6)/(6*e^3) - (5*(20*d + 9*e)*x^7)/(7*e^2) + (25*x^8)/(2*e) + ((5*
d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e
^4)*Log[d + e*x])/e^9
```

Rubi [A] time = 0.706756, antiderivative size = 352, normalized size of antiderivative = 1., number

of steps used = 2, number of rules used = 1, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.026$

$$\frac{x^6(100d^2+45de+111e^2)}{6e^3}-\frac{x^5(100d^3+45d^2e+111de^2+37e^3)}{5e^4}+\frac{(5d^2-2de+3e^2)^2(4d^4+5d^3e+3d^2e^2-de^3+2e^4)\log(d+ex)}{e^9}+\frac{x^4(100d^4+45d^3e+111d^2e^2+37de^3+148e^4)}{4e^5}-\frac{x^3(100d^5+45d^4e+111d^3e^2+37d^2e^3+148de^4-65e^5)}{3e^6}+\frac{x^2(100d^6+45d^5e+111d^4e^2+37d^3e^3+148d^2e^4-65de^5+107e^6)}{2e^7}-\frac{x(100d^7+45d^6e+111d^5e^2+37d^4e^3+148d^3e^4-65d^2e^5+107de^6-33e^7)}{e^8}-\frac{5x^7(20d+9e)}{7e^2}+\frac{25x^8}{2e}$$

Antiderivative was successfully verified.

```
[In] Int[((3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(d + e*x),x]
```

```
[Out] -(((100*d^7 + 45*d^6*e + 111*d^5*e^2 + 37*d^4*e^3 + 148*d^3*e^4 -
 65*d^2*e^5 + 107*d*e^6 - 33*e^7)*x)/e^8) + ((100*d^6 + 45*d^5*e
+ 111*d^4*e^2 + 37*d^3*e^3 + 148*d^2*e^4 - 65*d*e^5 + 107*e^6)*x^
2)/(2*e^7) - ((100*d^5 + 45*d^4*e + 111*d^3*e^2 + 37*d^2*e^3 + 14
8*d*e^4 - 65*e^5)*x^3)/(3*e^6) + ((100*d^4 + 45*d^3*e + 111*d^2*e
^2 + 37*d*e^3 + 148*e^4)*x^4)/(4*e^5) - ((100*d^3 + 45*d^2*e + 11
1*d*e^2 + 37*e^3)*x^5)/(5*e^4) + ((100*d^2 + 45*d*e + 111*e^2)*x^
6)/(6*e^3) - (5*(20*d + 9*e)*x^7)/(7*e^2) + (25*x^8)/(2*e) + ((5*
d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e
^4)*Log[d + e*x])/e^9
```

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

$$-(100d^7+45d^6e+111d^5e^2+37d^4e^3+148d^3e^4-65d^2e^5+107de^6-33e^7)\int\frac{1}{e^8}\,dx+\frac{25x^8}{2e}-\frac{5x^7(20d+9e)}{7e^2}+\frac{x^6(100d^2+45de+111e^2)}{6e^3}-\frac{x^5(100d^3+45d^2e+111de^2+37e^3)}{5e^4}+\frac{x^4(100d^4+45d^3e+111d^2e^2+37de^3+148e^4)}{4e^5}-\frac{x^3(100d^5+45d^4e+111d^3e^2+37d^2e^3+148de^4-65e^5)}{3e^6}+\frac{(100d^6+45d^5e+111d^4e^2+37d^3e^3+148d^2e^4-65de^5+107e^6)\int x\,dx}{e^7}+\frac{(5d^2-2de+3e^2)^2(4d^4+5d^3e+3d^2e^2-de^3+2e^4)\log(d+ex)}{e^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2)/(e*x+d),x)
```

```
[Out] -(100*d**7 + 45*d**6*e + 111*d**5*e**2 + 37*d**4*e**3 + 148*d**3*
e**4 - 65*d**2*e**5 + 107*d*e**6 - 33*e**7)*Integral(e**(-8), x)
+ 25*x**8/(2*e) - 5*x**7*(20*d + 9*e)/(7*e**2) + x**6*(100*d**2 +
 45*d*e + 111*e**2)/(6*e**3) - x**5*(100*d**3 + 45*d**2*e + 111*d
*e**2 + 37*e**3)/(5*e**4) + x**4*(100*d**4 + 45*d**3*e + 111*d**2
*e**2 + 37*d*e**3 + 148*e**4)/(4*e**5) - x**3*(100*d**5 + 45*d**4
*e + 111*d**3*e**2 + 37*d**2*e**3 + 148*d*e**4 - 65*e**5)/(3*e**6
) + (100*d**6 + 45*d**5*e + 111*d**4*e**2 + 37*d**3*e**3 + 148*d*
*2*e**4 - 65*d*e**5 + 107*e**6)*Integral(x, x)/e**7 + (5*d**2 - 2
*d*e + 3*e**2)**2*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e
**4)*log(d + e*x)/e**9
```

Mathematica [A] time = 0.294174, size = 262, normalized size = 0.74

$$\frac{\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)\left(5d^2-2de+3e^2\right)^2\log(d+ex)}{e^9}+\frac{x\left(-42000d^7+2100d^6e(10x-9)-70d^5e^2\left(200x^2-135x+666\right)+210d^4e^3\left(50x^3-30x^2+111x-74\right)-105d^3e^4\left(80x^4-\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(d + e*x),x]
```

```
[Out] (x*(-42000*d^7 + 2100*d^6*e*(-9 + 10*x) - 70*d^5*e^2*(666 - 135*x
 + 200*x^2) + 210*d^4*e^3*(-74 + 111*x - 30*x^2 + 50*x^3) - 105*d
^3*e^4*(592 - 74*x + 148*x^2 - 45*x^3 + 80*x^4) + 35*d^2*e^5*(780
 + 888*x - 148*x^2 + 333*x^3 - 108*x^4 + 200*x^5) - d*e^6*(44940
+ 13650*x + 20720*x^2 - 3885*x^3 + 9324*x^4 - 3150*x^5 + 6000*x^6
) + 2*e^7*(6930 + 11235*x + 4550*x^2 + 7770*x^3 - 1554*x^4 + 3885
*x^5 - 1350*x^6 + 2625*x^7)))/(420*e^8) + ((5*d^2 - 2*d*e + 3*e^2
)^2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*Log[d + e*x])/e
^9
```

Maple [A] time = 0.008, size = 465, normalized size = 1.3

$$-\frac{45x^7}{7e}+\frac{65x^3}{3e}+33\frac{x}{e}+37\frac{x^4}{e}-\frac{37x^5}{5e}+18\frac{\ln(ex+d)}{e}+37\frac{\ln(ex+d)d^5}{e^6}+107\frac{\ln(ex+d)d^2}{e^3}-33\frac{\ln(ex+d)d}{e^2}+148\frac{\ln(ex+d)d^4}{e^5}-65\frac{\ln(ex+d)d^3}{e^4}+111\frac{\ln(ex+d)d^6}{e^7}+\frac{25x^8}{2e}+45\frac{\ln(ex+d)d^7}{e^8}+\frac{45x^2d^5}{2e^6}-\frac{100x^3d^5}{3e^6}-45\frac{xd^6}{e^7}+50\frac{x^2d^6}{e^7}-\frac{100x^7d}{7e^2}-9\frac{x^5d^2}{e^3}+\frac{50x^6d^2}{3e^3}+\frac{45x^4d^3}{4e^4}-20\frac{x^5d^3}{e^4}+\frac{15x^6d}{2e^2}-100\frac{d^7x}{e^8}-15\frac{x^3d^4}{e^5}+25\frac{x^4d^4}{e^5}+100\frac{\ln(ex+d)d^8}{e^9}+\frac{37x^2d^3}{2e^4}+74\frac{x^2d^2}{e^3}+\frac{111x^2d^4}{2e^5}-\frac{148x^3d}{3e^2}+\frac{37x^4d}{4e^2}-37\frac{x^3d^3}{e^4}-\frac{37x^3d^2}{3e^3}+\frac{111x^4d^2}{4e^3}-\frac{111x^5d}{5e^2}-107\frac{dx}{e^2}-37\frac{xd^4}{e^5}-148\frac{d^3x}{e^4}+65\frac{d^2x}{e^3}-111\frac{d^5x}{e^6}-\frac{65dx^2}{2e^2}+\frac{37x^6}{2e}+\frac{107x^2}{2e}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^2+2*x+3)^2*(4*x^4-5*x^3+3*x^2+x+2)/(e*x+d),x)
```

```
[Out] -45/7/e*x^7+65/3/e*x^3+33/e*x+37/e*x^4-37/5/e*x^5+18/e*ln(e*x+d)+
37/e^6*ln(e*x+d)*d^5+107/e^3*ln(e*x+d)*d^2-33/e^2*ln(e*x+d)*d+148
/e^5*ln(e*x+d)*d^4-65/e^4*ln(e*x+d)*d^3+111/e^7*ln(e*x+d)*d^6+25/
2*x^8/e+45/e^8*ln(e*x+d)*d^7+45/2/e^6*x^2*d^5-100/3/e^6*x^3*d^5-4
5/e^7*x*d^6+50/e^7*x^2*d^6-100/7/e^2*x^7*d-9/e^3*x^5*d^2+50/3/e^3
*x^6*d^2+45/4/e^4*x^4*d^3-20/e^4*x^5*d^3+15/2/e^2*x^6*d-100/e^8*d
^7*x-15/e^5*x^3*d^4+25/e^5*x^4*d^4+100/e^9*ln(e*x+d)*d^8+37/2/e^4
*x^2*d^3+74/e^3*x^2*d^2+111/2/e^5*x^2*d^4-148/3/e^2*x^3*d+37/4/e^
2*x^4*d-37/e^4*x^3*d^3-37/3/e^3*x^3*d^2+111/4/e^3*x^4*d^2-111/5/e
^2*x^5*d-107/e^2*x*d-37/e^5*x*d^4-148/e^4*x*d^3+65/e^3*x*d^2-111/
e^6*d^5*x-65/2/e^2*x^2*d+37/2*x^6/e+107/2*x^2/e
```

Maxima [A] time = 0.693332, size = 494, normalized size = 1.4

$$\frac{5250\,e^7x^8-300\left(20\,de^6+9\,e^7\right)x^7+70\left(100\,d^2e^5+45\,de^6+111\,e^7\right)x^6-84\left(100\,d^3e^4+45\,d^2e^5+111\,de^6+37\,e^7\right)x^5+105\,(\ldots}{}$$

$$+\frac{\left(100\,d^8+45\,d^7e+111\,d^6e^2+37\,d^5e^3+148\,d^4e^4-65\,d^3e^5+107\,d^2e^6-33\,de^7+18\,e^8\right)\log(ex+d)}{e^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2/(e*x + d),x, algorith
```

```
[Out] 1/420*(5250*e^7*x^8 - 300*(20*d*e^6 + 9*e^7)*x^7 + 70*(100*d^2*e^
5 + 45*d*e^6 + 111*e^7)*x^6 - 84*(100*d^3*e^4 + 45*d^2*e^5 + 111*
d*e^6 + 37*e^7)*x^5 + 105*(100*d^4*e^3 + 45*d^3*e^4 + 111*d^2*e^5
```

```
 + 37*d*e^6 + 148*e^7)*x^4 - 140*(100*d^5*e^2 + 45*d^4*e^3 + 111*
d^3*e^4 + 37*d^2*e^5 + 148*d*e^6 - 65*e^7)*x^3 + 210*(100*d^6*e +
 45*d^5*e^2 + 111*d^4*e^3 + 37*d^3*e^4 + 148*d^2*e^5 - 65*d*e^6 +
 107*e^7)*x^2 - 420*(100*d^7 + 45*d^6*e + 111*d^5*e^2 + 37*d^4*e^
3 + 148*d^3*e^4 - 65*d^2*e^5 + 107*d*e^6 - 33*e^7)*x)/e^8 + (100*
d^8 + 45*d^7*e + 111*d^6*e^2 + 37*d^5*e^3 + 148*d^4*e^4 - 65*d^3*
e^5 + 107*d^2*e^6 - 33*d*e^7 + 18*e^8)*log(e*x + d)/e^9
```

Fricas [A] time = 0.255527, size = 497, normalized size = 1.41

$$\frac{5250\,e^{8}x^{8} - 300\,\left(20\,de^{7} + 9\,e^{8}\right)x^{7} + 70\,\left(100\,d^{2}e^{6} + 45\,de^{7} + 111\,e^{8}\right)x^{6} - 84\,\left(100\,d^{3}e^{5} + 45\,d^{2}e^{6} + 111\,de^{7} + 37\,e^{8}\right)x^{5} + 105\,(\cdots}{\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2/(e*x + d),x, algorith
```

```
[Out] 1/420*(5250*e^8*x^8 - 300*(20*d*e^7 + 9*e^8)*x^7 + 70*(100*d^2*e^
6 + 45*d*e^7 + 111*e^8)*x^6 - 84*(100*d^3*e^5 + 45*d^2*e^6 + 111*
d*e^7 + 37*e^8)*x^5 + 105*(100*d^4*e^4 + 45*d^3*e^5 + 111*d^2*e^6
 + 37*d*e^7 + 148*e^8)*x^4 - 140*(100*d^5*e^3 + 45*d^4*e^4 + 111*
d^3*e^5 + 37*d^2*e^6 + 148*d*e^7 - 65*e^8)*x^3 + 210*(100*d^6*e^2
 + 45*d^5*e^3 + 111*d^4*e^4 + 37*d^3*e^5 + 148*d^2*e^6 - 65*d*e^7
 + 107*e^8)*x^2 - 420*(100*d^7*e + 45*d^6*e^2 + 111*d^5*e^3 + 37*
d^4*e^4 + 148*d^3*e^5 - 65*d^2*e^6 + 107*d*e^7 - 33*e^8)*x + 420*
(100*d^8 + 45*d^7*e + 111*d^6*e^2 + 37*d^5*e^3 + 148*d^4*e^4 - 65
*d^3*e^5 + 107*d^2*e^6 - 33*d*e^7 + 18*e^8)*log(e*x + d))/e^9
```

Sympy [A] time = 1.34363, size = 347, normalized size = 0.99

$$\frac{25x^{8}}{2e} - \frac{x^{7}\left(100d + 45e\right)}{7e^{2}} + \frac{x^{6}\left(100d^{2} + 45de + 111e^{2}\right)}{6e^{3}} - \frac{x^{5}\left(100d^{3} + 45d^{2}e + 111de^{2} + 37e^{3}\right)}{5e^{4}} + \frac{x^{4}\left(100d^{4} + 45d^{3}e + 111d^{2}e^{2} + 37de^{3} + 148e^{4}\right)}{4e^{5}} - \frac{x^{3}\left(100d^{5} + 45d^{4}e + 111d^{3}e^{2} + 37d^{2}e^{3} + 148de^{4} - 65e^{5}\right)}{3e^{6}} + \frac{x^{2}\left(100d^{6} + 45d^{5}e + 111d^{4}e^{2} + 37d^{3}e^{3} + 148d^{2}e^{4} - 65de^{5} + 107e^{6}\right)}{2e^{7}} - \frac{x\left(100d^{7} + 45d^{6}e + 111d^{5}e^{2} + 37d^{4}e^{3} + 148d^{3}e^{4} - 65d^{2}e^{5} + 107de^{6} - 33e^{7}\right)}{e^{8}} + \frac{\left(5d^{2} - 2de + 3e^{2}\right)^{2}\left(4d^{4} + 5d^{3}e + 3d^{2}e^{2} - de^{3} + 2e^{4}\right)\log\left(d + ex\right)}{e^{9}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2)/(e*x+d),x)
```

```
[Out] 25*x**8/(2*e) - x**7*(100*d + 45*e)/(7*e**2) + x**6*(100*d**2 + 4
5*d*e + 111*e**2)/(6*e**3) - x**5*(100*d**3 + 45*d**2*e + 111*d*e
**2 + 37*e**3)/(5*e**4) + x**4*(100*d**4 + 45*d**3*e + 111*d**2*e
**2 + 37*d*e**3 + 148*e**4)/(4*e**5) - x**3*(100*d**5 + 45*d**4*e
 + 111*d**3*e**2 + 37*d**2*e**3 + 148*d*e**4 - 65*e**5)/(3*e**6)
+ x**2*(100*d**6 + 45*d**5*e + 111*d**4*e**2 + 37*d**3*e**3 + 148
*d**2*e**4 - 65*d*e**5 + 107*e**6)/(2*e**7) - x*(100*d**7 + 45*d*
*6*e + 111*d**5*e**2 + 37*d**4*e**3 + 148*d**3*e**4 - 65*d**2*e**
5 + 107*d*e**6 - 33*e**7)/e**8 + (5*d**2 - 2*d*e + 3*e**2)**2*(4*
d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)*log(d + e*x)/e**
9
```

GIAC/XCAS [A] time = 0.272123, size = 510, normalized size = 1.45

$$\left(100\,d^8 + 45\,d^7e + 111\,d^6e^2 + 37\,d^5e^3 + 148\,d^4e^4 - 65\,d^3e^5 + 107\,d^2e^6 - 33\,de^7 + 18\,e^8\right)e^{(-9)}\ln\left(|xe + d|\right) + \frac{1}{420}\left(5250\,x^8e^7 - 6000\,dx^7e^6 + 7000\,d^2x^6e^5 - 8400\,d^3x^5e^4 + 10500\,d^4x^4e^3 - 14000\,d^5x^3e^2 + 21000\,d^6x^2e - 42000\,d^7x - 27\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2/(e*x + d),x, algorith
```

```
[Out] (100*d^8 + 45*d^7*e + 111*d^6*e^2 + 37*d^5*e^3 + 148*d^4*e^4 - 65
*d^3*e^5 + 107*d^2*e^6 - 33*d*e^7 + 18*e^8)*e^(-9)*ln(abs(x*e + d
)) + 1/420*(5250*x^8*e^7 - 6000*d*x^7*e^6 + 7000*d^2*x^6*e^5 - 84
00*d^3*x^5*e^4 + 10500*d^4*x^4*e^3 - 14000*d^5*x^3*e^2 + 21000*d^
6*x^2*e - 42000*d^7*x - 2700*x^7*e^7 + 3150*d*x^6*e^6 - 3780*d^2*
x^5*e^5 + 4725*d^3*x^4*e^4 - 6300*d^4*x^3*e^3 + 9450*d^5*x^2*e^2
- 18900*d^6*x*e + 7770*x^6*e^7 - 9324*d*x^5*e^6 + 11655*d^2*x^4*e
^5 - 15540*d^3*x^3*e^4 + 23310*d^4*x^2*e^3 - 46620*d^5*x*e^2 - 31
08*x^5*e^7 + 3885*d*x^4*e^6 - 5180*d^2*x^3*e^5 + 7770*d^3*x^2*e^4
 - 15540*d^4*x*e^3 + 15540*x^4*e^7 - 20720*d*x^3*e^6 + 31080*d^2*
x^2*e^5 - 62160*d^3*x*e^4 + 9100*x^3*e^7 - 13650*d*x^2*e^6 + 2730
0*d^2*x*e^5 + 22470*x^2*e^7 - 44940*d*x*e^6 + 13860*x*e^7)*e^(-8)
```

3.301 $\int \frac{(3+2x+5x^2)^2(2+x+3x^2-5x^3+4x^4)}{(d+ex)^2}\,dx$

Optimal. Leaf size=353

$$\frac{3x^5(100d^2+30de+37e^2)}{5e^4}-\frac{x^4(400d^3+135d^2e+222de^2+37e^3)}{4e^5}-\frac{(5d^2-2de+3e^2)^2(4d^4+5d^3e+3d^2e^2-de^3+2e^4)}{e^9(d+ex)}+\frac{x^3(500d^4+180d^3e+333d^2e^2+74de^3+148e^4)}{3e^6}-\frac{(5d^2-2de+3e^2)(160d^5+127d^4e+88d^3e^2-4d^2e^3+64de^4-11e^5)\log(d+ex)}{e^9}-\frac{x^2(600d^5+225d^4e+444d^3e^2+111d^2e^3+296de^4-65e^5)}{2e^7}+\frac{x(700d^6+270d^5e+555d^4e^2+148d^3e^3+444d^2e^4-130de^5+107e^6)}{e^8}-\frac{5x^6(40d+9e)}{6e^3}+\frac{100x^7}{7e^2}$$

```
[Out] ((700*d^6 + 270*d^5*e + 555*d^4*e^2 + 148*d^3*e^3 + 444*d^2*e^4 -
 130*d*e^5 + 107*e^6)*x)/e^8 - ((600*d^5 + 225*d^4*e + 444*d^3*e^
2 + 111*d^2*e^3 + 296*d*e^4 - 65*e^5)*x^2)/(2*e^7) + ((500*d^4 +
180*d^3*e + 333*d^2*e^2 + 74*d*e^3 + 148*e^4)*x^3)/(3*e^6) - ((40
0*d^3 + 135*d^2*e + 222*d*e^2 + 37*e^3)*x^4)/(4*e^5) + (3*(100*d^
2 + 30*d*e + 37*e^2)*x^5)/(5*e^4) - (5*(40*d + 9*e)*x^6)/(6*e^3)
+ (100*x^7)/(7*e^2) - ((5*d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e
 + 3*d^2*e^2 - d*e^3 + 2*e^4))/(e^9*(d + e*x)) - ((5*d^2 - 2*d*e
+ 3*e^2)*(160*d^5 + 127*d^4*e + 88*d^3*e^2 - 4*d^2*e^3 + 64*d*e^4
 - 11*e^5)*Log[d + e*x])/e^9
```

Rubi [A] time = 0.724621, antiderivative size = 353, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.026$

$$\frac{3x^5(100d^2+30de+37e^2)}{5e^4}-\frac{x^4(400d^3+135d^2e+222de^2+37e^3)}{4e^5}-\frac{(5d^2-2de+3e^2)^2(4d^4+5d^3e+3d^2e^2-de^3+2e^4)}{e^9(d+ex)}+\frac{x^3(500d^4+180d^3e+333d^2e^2+74de^3+148e^4)}{3e^6}-\frac{(5d^2-2de+3e^2)(160d^5+127d^4e+88d^3e^2-4d^2e^3+64de^4-11e^5)\log(d+ex)}{e^9}-\frac{x^2(600d^5+225d^4e+444d^3e^2+111d^2e^3+296de^4-65e^5)}{2e^7}+\frac{x(700d^6+270d^5e+555d^4e^2+148d^3e^3+444d^2e^4-130de^5+107e^6)}{e^8}-\frac{5x^6(40d+9e)}{6e^3}+\frac{100x^7}{7e^2}$$

Antiderivative was successfully verified.

```
[In] Int[((3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(d + e*x)^2,x]
```

```
[Out] ((700*d^6 + 270*d^5*e + 555*d^4*e^2 + 148*d^3*e^3 + 444*d^2*e^4 -
 130*d*e^5 + 107*e^6)*x)/e^8 - ((600*d^5 + 225*d^4*e + 444*d^3*e^
2 + 111*d^2*e^3 + 296*d*e^4 - 65*e^5)*x^2)/(2*e^7) + ((500*d^4 +
180*d^3*e + 333*d^2*e^2 + 74*d*e^3 + 148*e^4)*x^3)/(3*e^6) - ((40
0*d^3 + 135*d^2*e + 222*d*e^2 + 37*e^3)*x^4)/(4*e^5) + (3*(100*d^
2 + 30*d*e + 37*e^2)*x^5)/(5*e^4) - (5*(40*d + 9*e)*x^6)/(6*e^3)
+ (100*x^7)/(7*e^2) - ((5*d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e
 + 3*d^2*e^2 - d*e^3 + 2*e^4))/(e^9*(d + e*x)) - ((5*d^2 - 2*d*e
+ 3*e^2)*(160*d^5 + 127*d^4*e + 88*d^3*e^2 - 4*d^2*e^3 + 64*d*e^4
 - 11*e^5)*Log[d + e*x])/e^9
```

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

$$\left(700d^6 + 270d^5e + 555d^4e^2 + 148d^3e^3 + 444d^2e^4 - 130de^5 + 107e^6\right)\int \frac{1}{e^8}\,dx + \frac{100x^7}{7e^2} - \frac{5x^6\,(40d+9e)}{6e^3} + \frac{3x^5\left(100d^2+30de+37e^2\right)}{5e^4} - \frac{x^4\left(400d^3+135d^2e+222de^2+37e^3\right)}{4e^5} + \frac{x^3\left(500d^4+180d^3e+333d^2e^2+74de^3+148e^4\right)}{3e^6} - \frac{\left(600d^5+225d^4e+444d^3e^2+111d^2e^3+296de^4-65e^5\right)\int x\,dx}{e^7} - \frac{\left(5d^2-2de+3e^2\right)\left(160d^5+127d^4e+88d^3e^2-4d^2e^3+64de^4-11e^5\right)\log(d+ex)}{e^9} - \frac{\left(5d^2-2de+3e^2\right)^2\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)}{e^9\,(d+ex)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**2,x)
```

```
[Out] (700*d**6 + 270*d**5*e + 555*d**4*e**2 + 148*d**3*e**3 + 444*d**2
*e**4 - 130*d*e**5 + 107*e**6)*Integral(e**(-8), x) + 100*x**7/(7
*e**2) - 5*x**6*(40*d + 9*e)/(6*e**3) + 3*x**5*(100*d**2 + 30*d*e
 + 37*e**2)/(5*e**4) - x**4*(400*d**3 + 135*d**2*e + 222*d*e**2 +
 37*e**3)/(4*e**5) + x**3*(500*d**4 + 180*d**3*e + 333*d**2*e**2
+ 74*d*e**3 + 148*e**4)/(3*e**6) - (600*d**5 + 225*d**4*e + 444*d
**3*e**2 + 111*d**2*e**3 + 296*d*e**4 - 65*e**5)*Integral(x, x)/e
**7 - (5*d**2 - 2*d*e + 3*e**2)*(160*d**5 + 127*d**4*e + 88*d**3*
e**2 - 4*d**2*e**3 + 64*d*e**4 - 11*e**5)*log(d + e*x)/e**9 - (5*
d**2 - 2*d*e + 3*e**2)**2*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e*
*3 + 2*e**4)/(e**9*(d + e*x))
```

Mathematica [A] time = 0.320599, size = 342, normalized size = 0.97

$$\frac{252e^5x^5\left(100d^2+30de+37e^2\right)-105e^4x^4\left(400d^3+135d^2e+222de^2+37e^3\right)+140e^3x^3\left(500d^4+180d^3e+333d^2e^2+74de^3\cdots\right.}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(d + e*x)^2,x]
```

```
[Out] (420*e*(700*d^6 + 270*d^5*e + 555*d^4*e^2 + 148*d^3*e^3 + 444*d^2
*e^4 - 130*d*e^5 + 107*e^6)*x - 210*e^2*(600*d^5 + 225*d^4*e + 44
4*d^3*e^2 + 111*d^2*e^3 + 296*d*e^4 - 65*e^5)*x^2 + 140*e^3*(500*
d^4 + 180*d^3*e + 333*d^2*e^2 + 74*d*e^3 + 148*e^4)*x^3 - 105*e^4
*(400*d^3 + 135*d^2*e + 222*d*e^2 + 37*e^3)*x^4 + 252*e^5*(100*d^
2 + 30*d*e + 37*e^2)*x^5 - 350*e^6*(40*d + 9*e)*x^6 + 6000*e^7*x^
7 - (420*(5*d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 -
 d*e^3 + 2*e^4))/(d + e*x) - 420*(800*d^7 + 315*d^6*e + 666*d^5*e
^2 + 185*d^4*e^3 + 592*d^3*e^4 - 195*d^2*e^5 + 214*d*e^6 - 33*e^7
)*Log[d + e*x])/(420*e^9)
```

Maple [A] time = 0.016, size = 500, normalized size = 1.4

$$-\frac{15x^6}{2e^2}-18\frac{1}{e(ex+d)}+33\frac{\ln(ex+d)}{e^2}-\frac{37x^4}{4e^2}+\frac{148x^3}{3e^2}+\frac{65x^2}{2e^2}-800\frac{\ln(ex+d)d^7}{e^9}$$
$$-315\frac{\ln(ex+d)d^6}{e^8}-\frac{135x^4d^2}{4e^4}+60\frac{x^5d^2}{e^4}+60\frac{x^3d^3}{e^5}-100\frac{x^4d^3}{e^5}-\frac{225x^2d^4}{2e^6}-\frac{100x^6d}{3e^3}$$
$$+18\frac{x^5d}{e^3}-100\frac{d^8}{e^9(ex+d)}-45\frac{d^7}{e^8(ex+d)}+700\frac{d^6x}{e^8}+\frac{500x^3d^4}{3e^6}+270\frac{xd^5}{e^7}-300\frac{x^2d^5}{e^7}$$
$$-666\frac{\ln(ex+d)d^5}{e^7}-185\frac{\ln(ex+d)d^4}{e^6}-592\frac{\ln(ex+d)d^3}{e^5}-\frac{111x^4d}{2e^3}+111\frac{x^3d^2}{e^4}$$
$$+\frac{74x^3d}{3e^3}-222\frac{x^2d^3}{e^5}-\frac{111x^2d^2}{2e^4}-148\frac{dx^2}{e^3}+555\frac{d^4x}{e^6}+65\frac{d^3}{e^4(ex+d)}-107\frac{d^2}{e^3(ex+d)}$$
$$+33\frac{d}{e^2(ex+d)}+195\frac{\ln(ex+d)d^2}{e^4}-214\frac{\ln(ex+d)d}{e^3}+148\frac{d^3x}{e^5}+444\frac{d^2x}{e^4}-130\frac{dx}{e^3}$$
$$-111\frac{d^6}{e^7(ex+d)}-37\frac{d^5}{e^6(ex+d)}-148\frac{d^4}{e^5(ex+d)}+\frac{111x^5}{5e^2}+107\frac{x}{e^2}+\frac{100x^7}{7e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5*x^2+2*x+3)^2*(4*x^4-5*x^3+3*x^2+x+2)/(e*x+d)^2,x)
```

```
[Out] -15/2/e^2*x^6-18/e/(e*x+d)+33/e^2*ln(e*x+d)-37/4/e^2*x^4+148/3/e^
2*x^3+65/2/e^2*x^2-800/e^9*ln(e*x+d)*d^7-315/e^8*ln(e*x+d)*d^6-13
```

```
5/4/e^4*x^4*d^2+60/e^4*x^5*d^2+60/e^5*x^3*d^3-100/e^5*x^4*d^3-225
/2/e^6*x^2*d^4-100/3/e^3*x^6*d+18/e^3*x^5*d-100/e^9/(e*x+d)*d^8-4
5/e^8/(e*x+d)*d^7+700/e^8*d^6*x+500/3/e^6*x^3*d^4+270/e^7*x*d^5-3
00/e^7*x^2*d^5-666/e^7*ln(e*x+d)*d^5-185/e^6*ln(e*x+d)*d^4-592/e^
5*ln(e*x+d)*d^3-111/2/e^3*x^4*d+111/e^4*x^3*d^2+74/3/e^3*x^3*d-22
2/e^5*x^2*d^3-111/2/e^4*x^2*d^2-148/e^3*x^2*d+555/e^6*d^4*x+65/e^
4/(e*x+d)*d^3-107/e^3/(e*x+d)*d^2+33/e^2/(e*x+d)*d+195/e^4*ln(e*x
+d)*d^2-214/e^3*ln(e*x+d)*d+148/e^5*x*d^3+444/e^4*x*d^2-130/e^3*x
*d-111/e^7/(e*x+d)*d^6-37/e^6/(e*x+d)*d^5-148/e^5/(e*x+d)*d^4+111
/5*x^5/e^2+107*x/e^2+100/7*x^7/e^2
```

Maxima [A] time = 0.716631, size = 502, normalized size = 1.42

$$-\frac{100\,d^8+45\,d^7e+111\,d^6e^2+37\,d^5e^3+148\,d^4e^4-65\,d^3e^5+107\,d^2e^6-33\,de^7+18\,e^8}{e^{10}x+de^9}$$
$$+\frac{6000\,e^6x^7-350\left(40\,de^5+9\,e^6\right)x^6+252\left(100\,d^2e^4+30\,de^5+37\,e^6\right)x^5-105\left(400\,d^3e^3+135\,d^2e^4+222\,de^5+37\,e^6\right)x^4+14}{}$$
$$-\frac{\left(800\,d^7+315\,d^6e+666\,d^5e^2+185\,d^4e^3+592\,d^3e^4-195\,d^2e^5+214\,de^6-33\,e^7\right)\log\left(ex+d\right)}{e^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2/(e*x + d)^2,x, algori
```

```
[Out] -(100*d^8 + 45*d^7*e + 111*d^6*e^2 + 37*d^5*e^3 + 148*d^4*e^4 - 6
5*d^3*e^5 + 107*d^2*e^6 - 33*d*e^7 + 18*e^8)/(e^10*x + d*e^9) + 1
/420*(6000*e^6*x^7 - 350*(40*d*e^5 + 9*e^6)*x^6 + 252*(100*d^2*e^
4 + 30*d*e^5 + 37*e^6)*x^5 - 105*(400*d^3*e^3 + 135*d^2*e^4 + 222
*d*e^5 + 37*e^6)*x^4 + 140*(500*d^4*e^2 + 180*d^3*e^3 + 333*d^2*e
^4 + 74*d*e^5 + 148*e^6)*x^3 - 210*(600*d^5*e + 225*d^4*e^2 + 444
*d^3*e^3 + 111*d^2*e^4 + 296*d*e^5 - 65*e^6)*x^2 + 420*(700*d^6 +
 270*d^5*e + 555*d^4*e^2 + 148*d^3*e^3 + 444*d^2*e^4 - 130*d*e^5
+ 107*e^6)*x)/e^8 - (800*d^7 + 315*d^6*e + 666*d^5*e^2 + 185*d^4*
e^3 + 592*d^3*e^4 - 195*d^2*e^5 + 214*d*e^6 - 33*e^7)*log(e*x + d
)/e^9
```

Fricas [A] time = 0.266035, size = 662, normalized size = 1.88

$$\frac{6000\,e^8x^8-42000\,d^8-18900\,d^7e-46620\,d^6e^2-15540\,d^5e^3-62160\,d^4e^4+27300\,d^3e^5-44940\,d^2e^6+13860\,de^7-7560\,e^8}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2/(e*x + d)^2,x, algori
```

```
[Out] 1/420*(6000*e^8*x^8 - 42000*d^8 - 18900*d^7*e - 46620*d^6*e^2 - 1
5540*d^5*e^3 - 62160*d^4*e^4 + 27300*d^3*e^5 - 44940*d^2*e^6 + 13
860*d*e^7 - 7560*e^8 - 50*(160*d*e^7 + 63*e^8)*x^7 + 14*(800*d^2*
e^6 + 315*d*e^7 + 666*e^8)*x^6 - 21*(800*d^3*e^5 + 315*d^2*e^6 +
666*d*e^7 + 185*e^8)*x^5 + 35*(800*d^4*e^4 + 315*d^3*e^5 + 666*d^
2*e^6 + 185*d*e^7 + 592*e^8)*x^4 - 70*(800*d^5*e^3 + 315*d^4*e^4
+ 666*d^3*e^5 + 185*d^2*e^6 + 592*d*e^7 - 195*e^8)*x^3 + 210*(800
*d^6*e^2 + 315*d^5*e^3 + 666*d^4*e^4 + 185*d^3*e^5 + 592*d^2*e^6
- 195*d*e^7 + 214*e^8)*x^2 + 420*(700*d^7*e + 270*d^6*e^2 + 555*d
^5*e^3 + 148*d^4*e^4 + 444*d^3*e^5 - 130*d^2*e^6 + 107*d*e^7)*x -
 420*(800*d^8 + 315*d^7*e + 666*d^6*e^2 + 185*d^5*e^3 + 592*d^4*e
^4 - 195*d^3*e^5 + 214*d^2*e^6 - 33*d*e^7 + (800*d^7*e + 315*d^6*
e^2 + 666*d^5*e^3 + 185*d^4*e^4 + 592*d^3*e^5 - 195*d^2*e^6 + 214
*d*e^7 - 33*e^8)*x)*log(e*x + d))/(e^10*x + d*e^9)
```

Sympy [A] time = 2.55944, size = 367, normalized size = 1.04

$$- \frac{100d^8 + 45d^7e + 111d^6e^2 + 37d^5e^3 + 148d^4e^4 - 65d^3e^5 + 107d^2e^6 - 33de^7 + 18e^8}{de^9 + e^{10}x} + \frac{100x^7}{7e^2} - \frac{x^6(200d + 45e)}{6e^3} + \frac{x^5\left(300d^2 + 90de + 111e^2\right)}{5e^4} - \frac{x^4\left(400d^3 + 135d^2e + 222de^2 + 37e^3\right)}{4e^5} + \frac{x^3\left(500d^4 + 180d^3e + 333d^2e^2 + 74de^3 + 148e^4\right)}{3e^6} - \frac{x^2\left(600d^5 + 225d^4e + 444d^3e^2 + 111d^2e^3 + 296de^4 - 65e^5\right)}{2e^7} + \frac{x\left(700d^6 + 270d^5e + 555d^4e^2 + 148d^3e^3 + 444d^2e^4 - 130de^5 + 107e^6\right)}{e^8} - \frac{\left(5d^2 - 2de + 3e^2\right)\left(160d^5 + 127d^4e + 88d^3e^2 - 4d^2e^3 + 64de^4 - 11e^5\right)\log(d + ex)}{e^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**2,x)
```

```
[Out] -(100*d**8 + 45*d**7*e + 111*d**6*e**2 + 37*d**5*e**3 + 148*d**4*
e**4 - 65*d**3*e**5 + 107*d**2*e**6 - 33*d*e**7 + 18*e**8)/(d*e**
9 + e**10*x) + 100*x**7/(7*e**2) - x**6*(200*d + 45*e)/(6*e**3) +
 x**5*(300*d**2 + 90*d*e + 111*e**2)/(5*e**4) - x**4*(400*d**3 +
135*d**2*e + 222*d*e**2 + 37*e**3)/(4*e**5) + x**3*(500*d**4 + 18
0*d**3*e + 333*d**2*e**2 + 74*d*e**3 + 148*e**4)/(3*e**6) - x**2*
(600*d**5 + 225*d**4*e + 444*d**3*e**2 + 111*d**2*e**3 + 296*d*e*
*4 - 65*e**5)/(2*e**7) + x*(700*d**6 + 270*d**5*e + 555*d**4*e**2
 + 148*d**3*e**3 + 444*d**2*e**4 - 130*d*e**5 + 107*e**6)/e**8 -
(5*d**2 - 2*d*e + 3*e**2)*(160*d**5 + 127*d**4*e + 88*d**3*e**2 -
 4*d**2*e**3 + 64*d*e**4 - 11*e**5)*log(d + e*x)/e**9
```

GIAC/XCAS [A] time = 0.280417, size = 620, normalized size = 1.76

$$-\frac{1}{420}\,(xe+d)^7\left(\frac{350\,\left(160\,de+9\,e^2\right)e^{(-1)}}{xe+d}-\frac{84\,\left(2800\,d^2e^2+315\,de^3+111\,e^4\right)e^{(-2)}}{(xe+d)^2}+\frac{105\,\left(5600\,d^3e^3+945\,d^2e^4+666\,de^5+3\right.}{(xe+d)^3}\right.$$

$$+\left(800\,d^7+315\,d^6e+666\,d^5e^2+185\,d^4e^3+592\,d^3e^4-195\,d^2e^5+214\,de^6-33\,e^7\right)e^{(-9)}\ln\left(\frac{|xe+d|e^{(-1)}}{(xe+d)^2}\right)$$

$$-\left(\frac{100\,d^8e^7}{xe+d}+\frac{45\,d^7e^8}{xe+d}+\frac{111\,d^6e^9}{xe+d}+\frac{37\,d^5e^{10}}{xe+d}+\frac{148\,d^4e^{11}}{xe+d}-\frac{65\,d^3e^{12}}{xe+d}+\frac{107\,d^2e^{13}}{xe+d}-\frac{33\,de^{14}}{xe+d}+\frac{18\,e^{15}}{xe+d}\right)e^{(-16)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2/(e*x + d)^2,x, algori
```

```
[Out] -1/420*(x*e + d)^7*(350*(160*d*e + 9*e^2)*e^(-1)/(x*e + d) - 84*(
2800*d^2*e^2 + 315*d*e^3 + 111*e^4)*e^(-2)/(x*e + d)^2 + 105*(560
0*d^3*e^3 + 945*d^2*e^4 + 666*d*e^5 + 37*e^6)*e^(-3)/(x*e + d)^3
- 140*(7000*d^4*e^4 + 1575*d^3*e^5 + 1665*d^2*e^6 + 185*d*e^7 + 1
48*e^8)*e^(-4)/(x*e + d)^4 + 210*(5600*d^5*e^5 + 1575*d^4*e^6 + 2
220*d^3*e^7 + 370*d^2*e^8 + 592*d*e^9 - 65*e^10)*e^(-5)/(x*e + d)
^5 - 420*(2800*d^6*e^6 + 945*d^5*e^7 + 1665*d^4*e^8 + 370*d^3*e^9
 + 888*d^2*e^10 - 195*d*e^11 + 107*e^12)*e^(-6)/(x*e + d)^6 - 600
0)*e^(-9) + (800*d^7 + 315*d^6*e + 666*d^5*e^2 + 185*d^4*e^3 + 59
2*d^3*e^4 - 195*d^2*e^5 + 214*d*e^6 - 33*e^7)*e^(-9)*ln(abs(x*e +
 d)*e^(-1)/(x*e + d)^2) - (100*d^8*e^7/(x*e + d) + 45*d^7*e^8/(x*
e + d) + 111*d^6*e^9/(x*e + d) + 37*d^5*e^10/(x*e + d) + 148*d^4*
e^11/(x*e + d) - 65*d^3*e^12/(x*e + d) + 107*d^2*e^13/(x*e + d) -
 33*d*e^14/(x*e + d) + 18*e^15/(x*e + d))*e^(-16)
```

3.302 $\int \frac{(3+2x+5x^2)^2(2+x+3x^2-5x^3+4x^4)}{(d+ex)^3}\,dx$

Optimal. Leaf size=354

$$\frac{3x^4(200d^2+45de+37e^2)}{4e^5}-\frac{x^3(1000d^3+270d^2e+333de^2+37e^3)}{3e^6}-\frac{(5d^2-2de+3e^2)^2(4d^4+5d^3e+3d^2e^2-de^3+2e^4)}{2e^9(d+ex)^2}+\frac{x^2(1500d^4+450d^3e+666d^2e^2+111de^3+148e^4)}{2e^7}+\frac{(5d^2-2de+3e^2)(160d^5+127d^4e+88d^3e^2-4d^2e^3+64de^4-11e^5)}{e^9(d+ex)}-\frac{x(2100d^5+675d^4e+1110d^3e^2+222d^2e^3+444de^4-65e^5)}{e^8}+\frac{(2800d^6+945d^5e+1665d^4e^2+370d^3e^3+888d^2e^4-195de^5+107e^6)\log(d+ex)}{e^9}-\frac{3x^5(20d+3e)}{e^4}+\frac{50x^6}{3e^3}$$

```
[Out] -(((2100*d^5 + 675*d^4*e + 1110*d^3*e^2 + 222*d^2*e^3 + 444*d*e^4
 - 65*e^5)*x)/e^8) + ((1500*d^4 + 450*d^3*e + 666*d^2*e^2 + 111*d
*e^3 + 148*e^4)*x^2)/(2*e^7) - ((1000*d^3 + 270*d^2*e + 333*d*e^2
 + 37*e^3)*x^3)/(3*e^6) + (3*(200*d^2 + 45*d*e + 37*e^2)*x^4)/(4*
e^5) - (3*(20*d + 3*e)*x^5)/e^4 + (50*x^6)/(3*e^3) - ((5*d^2 - 2*
d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4))/(2*
e^9*(d + e*x)^2) + ((5*d^2 - 2*d*e + 3*e^2)*(160*d^5 + 127*d^4*e
+ 88*d^3*e^2 - 4*d^2*e^3 + 64*d*e^4 - 11*e^5))/(e^9*(d + e*x)) +
((2800*d^6 + 945*d^5*e + 1665*d^4*e^2 + 370*d^3*e^3 + 888*d^2*e^4
 - 195*d*e^5 + 107*e^6)*Log[d + e*x])/e^9
```

Rubi [A] time = 0.777513, antiderivative size = 354, normalized size of antiderivative = 1., number

of steps used = 2, number of rules used = 1, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.026$

$$\frac{3x^4(200d^2 + 45de + 37e^2)}{4e^5} - \frac{x^3(1000d^3 + 270d^2e + 333de^2 + 37e^3)}{3e^6} - \frac{(5d^2 - 2de + 3e^2)^2(4d^4 + 5d^3e + 3d^2e^2 - de^3 + 2e^4)}{2e^9(d + ex)^2} + \frac{x^2(1500d^4 + 450d^3e + 666d^2e^2 + 111de^3 + 148e^4)}{2e^7} + \frac{(5d^2 - 2de + 3e^2)(160d^5 + 127d^4e + 88d^3e^2 - 4d^2e^3 + 64de^4 - 11e^5)}{e^9(d + ex)} - \frac{x(2100d^5 + 675d^4e + 1110d^3e^2 + 222d^2e^3 + 444de^4 - 65e^5)}{e^8} + \frac{(2800d^6 + 945d^5e + 1665d^4e^2 + 370d^3e^3 + 888d^2e^4 - 195de^5 + 107e^6)\log(d + ex)}{e^9} - \frac{3x^5(20d + 3e)}{e^4} + \frac{50x^6}{3e^3}$$

Antiderivative was successfully verified.

```
[In]  Int[((3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(d + e*x)^3,x]
```

```
[Out] -(((2100*d^5 + 675*d^4*e + 1110*d^3*e^2 + 222*d^2*e^3 + 444*d*e^4
 - 65*e^5)*x)/e^8) + ((1500*d^4 + 450*d^3*e + 666*d^2*e^2 + 111*d
*e^3 + 148*e^4)*x^2)/(2*e^7) - ((1000*d^3 + 270*d^2*e + 333*d*e^2
 + 37*e^3)*x^3)/(3*e^6) + (3*(200*d^2 + 45*d*e + 37*e^2)*x^4)/(4*
e^5) - (3*(20*d + 3*e)*x^5)/e^4 + (50*x^6)/(3*e^3) - ((5*d^2 - 2*
d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4))/(2*
e^9*(d + e*x)^2) + ((5*d^2 - 2*d*e + 3*e^2)*(160*d^5 + 127*d^4*e
+ 88*d^3*e^2 - 4*d^2*e^3 + 64*d*e^4 - 11*e^5))/(e^9*(d + e*x)) +
((2800*d^6 + 945*d^5*e + 1665*d^4*e^2 + 370*d^3*e^3 + 888*d^2*e^4
 - 195*d*e^5 + 107*e^6)*Log[d + e*x])/e^9
```

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

$$-\left(2100d^5+675d^4e+1110d^3e^2+222d^2e^3+444de^4-65e^5\right)\int\frac{1}{e^8}\,dx+\frac{50x^6}{3e^3}-\frac{3x^5\,(20d+3e)}{e^4}+\frac{3x^4\left(200d^2+45de+37e^2\right)}{4e^5}-\frac{x^3\left(1000d^3+270d^2e+333de^2+37e^3\right)}{3e^6}+\frac{\left(1500d^4+450d^3e+666d^2e^2+111de^3+148e^4\right)\int x\,dx}{e^7}+\frac{\left(2800d^6+945d^5e+1665d^4e^2+370d^3e^3+888d^2e^4-195de^5+107e^6\right)\log\left(d+ex\right)}{e^9}+\frac{\left(5d^2-2de+3e^2\right)\left(160d^5+127d^4e+88d^3e^2-4d^2e^3+64de^4-11e^5\right)}{e^9\,(d+ex)}-\frac{\left(5d^2-2de+3e^2\right)^2\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)}{2e^9\,(d+ex)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**3,x)
```

```
[Out] -(2100*d**5 + 675*d**4*e + 1110*d**3*e**2 + 222*d**2*e**3 + 444*d
*e**4 - 65*e**5)*Integral(e**(-8), x) + 50*x**6/(3*e**3) - 3*x**5
*(20*d + 3*e)/e**4 + 3*x**4*(200*d**2 + 45*d*e + 37*e**2)/(4*e**5
) - x**3*(1000*d**3 + 270*d**2*e + 333*d*e**2 + 37*e**3)/(3*e**6)
 + (1500*d**4 + 450*d**3*e + 666*d**2*e**2 + 111*d*e**3 + 148*e**
4)*Integral(x, x)/e**7 + (2800*d**6 + 945*d**5*e + 1665*d**4*e**2
 + 370*d**3*e**3 + 888*d**2*e**4 - 195*d*e**5 + 107*e**6)*log(d +
 e*x)/e**9 + (5*d**2 - 2*d*e + 3*e**2)*(160*d**5 + 127*d**4*e + 8
8*d**3*e**2 - 4*d**2*e**3 + 64*d*e**4 - 11*e**5)/(e**9*(d + e*x))
 - (5*d**2 - 2*d*e + 3*e**2)**2*(4*d**4 + 5*d**3*e + 3*d**2*e**2
- d*e**3 + 2*e**4)/(2*e**9*(d + e*x)**2)
```

Mathematica [A] time = 0.201153, size = 311, normalized size = 0.88

$$\frac{9000d^8-390d^7e(40x-9)-18d^6e^2\left(2300x^2+240x-407\right)-2d^5e^3\left(5600x^3+6750x^2+2664x-999\right)+4d^4e^4\left(700x^4-94\right.}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(d + e*x)^3,x]
```

```
[Out] (9000*d^8 - 390*d^7*e*(-9 + 40*x) - 18*d^6*e^2*(-407 + 240*x + 23
00*x^2) - 2*d^5*e^3*(-999 + 2664*x + 6750*x^2 + 5600*x^3) + 4*d^4
*e^4*(1554 - 111*x - 5661*x^2 - 945*x^3 + 700*x^4) - d^3*e^5*(195
0 - 1776*x + 4662*x^2 + 6660*x^3 - 945*x^4 + 1120*x^5) + d^2*e^6*
```

```
(1926 - 1560*x - 9768*x^2 - 1480*x^3 + 1665*x^4 - 378*x^5 + 560*x
^6) + d*e^7*(-198 + 2568*x + 1560*x^2 - 3552*x^3 + 370*x^4 - 666*
x^5 + 189*x^6 - 320*x^7) + e^8*(-108 - 396*x + 780*x^3 + 888*x^4
- 148*x^5 + 333*x^6 - 108*x^7 + 200*x^8) + 12*(2800*d^6 + 945*d^5
*e + 1665*d^4*e^2 + 370*d^3*e^3 + 888*d^2*e^4 - 195*d*e^5 + 107*e
^6)*(d + e*x)^2*Log[d + e*x])/(12*e^9*(d + e*x)^2)
```

Maple [A] time = 0.016, size = 531, normalized size = 1.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^2+2*x+3)^2*(4*x^4-5*x^3+3*x^2+x+2)/(e*x+d)^3,x)
```

```
[Out] -9/e^3*x^5+107/e^3*ln(e*x+d)-33/e^2/(e*x+d)-9/e/(e*x+d)^2+74/e^3*
x^2+65/e^3*x-37/3/e^3*x^3+111/4*x^4/e^3-1000/3/e^6*x^3*d^3-90/e^5
*x^3*d^2+750/e^7*x^2*d^4+225/e^6*x^2*d^3-2100/e^8*d^5*x-675/e^7*x
*d^4+800/e^9/(e*x+d)*d^7+315/e^8/(e*x+d)*d^6-50/e^9/(e*x+d)^2*d^8
-45/2/e^8/(e*x+d)^2*d^7+2800/e^9*ln(e*x+d)*d^6+945/e^8*ln(e*x+d)*
d^5-60/e^4*x^5*d+150/e^5*x^4*d^2+135/4/e^4*x^4*d+1665/e^7*ln(e*x+
d)*d^4+370/e^6*ln(e*x+d)*d^3+888/e^5*ln(e*x+d)*d^2-195/e^4*ln(e*x
+d)*d-111/e^4*x^3*d+333/e^5*x^2*d^2+111/2/e^4*x^2*d-1110/e^6*d^3*
x-222/e^5*x*d^2-444/e^4*x*d+666/e^7/(e*x+d)*d^5+185/e^6/(e*x+d)*d
^4+592/e^5/(e*x+d)*d^3-195/e^4/(e*x+d)*d^2+214/e^3/(e*x+d)*d-111/
2/e^7/(e*x+d)^2*d^6-37/2/e^6/(e*x+d)^2*d^5-74/e^5/(e*x+d)^2*d^4+6
5/2/e^4/(e*x+d)^2*d^3-107/2/e^3/(e*x+d)^2*d^2+33/2/e^2/(e*x+d)^2*
d+50/3*x^6/e^3
```

Maxima [A] time = 0.730394, size = 510, normalized size = 1.44

$$\frac{1500\,d^8 + 585\,d^7 e + 1221\,d^6 e^2 + 333\,d^5 e^3 + 1036\,d^4 e^4 - 325\,d^3 e^5 + 321\,d^2 e^6 - 33\,d e^7 - 18\,e^8 + 2\left(800\,d^7 e + 315\,d^6 e^2 + 666\,d\right.}{2\left(e^{11} x^2 + 2\,d e^{10} x + d^2 e^9\right)}$$
$$+\frac{200\,e^5 x^6 - 36\left(20\,d e^4 + 3\,e^5\right) x^5 + 9\left(200\,d^2 e^3 + 45\,d e^4 + 37\,e^5\right) x^4 - 4\left(1000\,d^3 e^2 + 270\,d^2 e^3 + 333\,d e^4 + 37\,e^5\right) x^3 + 6\left(1500\right.}{12\,e^8}$$
$$+\frac{\left(2800\,d^6 + 945\,d^5 e + 1665\,d^4 e^2 + 370\,d^3 e^3 + 888\,d^2 e^4 - 195\,d e^5 + 107\,e^6\right)\log\left(ex + d\right)}{e^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2/(e*x + d)^3,x, algori
```

```
[Out] 1/2*(1500*d^8 + 585*d^7*e + 1221*d^6*e^2 + 333*d^5*e^3 + 1036*d^4
*e^4 - 325*d^3*e^5 + 321*d^2*e^6 - 33*d*e^7 - 18*e^8 + 2*(800*d^7
```

```
*e + 315*d^6*e^2 + 666*d^5*e^3 + 185*d^4*e^4 + 592*d^3*e^5 - 195*
d^2*e^6 + 214*d*e^7 - 33*e^8)*x)/(e^11*x^2 + 2*d*e^10*x + d^2*e^9
) + 1/12*(200*e^5*x^6 - 36*(20*d*e^4 + 3*e^5)*x^5 + 9*(200*d^2*e^
3 + 45*d*e^4 + 37*e^5)*x^4 - 4*(1000*d^3*e^2 + 270*d^2*e^3 + 333*
d*e^4 + 37*e^5)*x^3 + 6*(1500*d^4*e + 450*d^3*e^2 + 666*d^2*e^3 +
 111*d*e^4 + 148*e^5)*x^2 - 12*(2100*d^5 + 675*d^4*e + 1110*d^3*e
^2 + 222*d^2*e^3 + 444*d*e^4 - 65*e^5)*x)/e^8 + (2800*d^6 + 945*d
^5*e + 1665*d^4*e^2 + 370*d^3*e^3 + 888*d^2*e^4 - 195*d*e^5 + 107
*e^6)*log(e*x + d)/e^9
```

Fricas [A] time = 0.260564, size = 736, normalized size = 2.08

$$\frac{200\,e^8x^8 + 9000\,d^8 + 3510\,d^7e + 7326\,d^6e^2 + 1998\,d^5e^3 + 6216\,d^4e^4 - 1950\,d^3e^5 + 1926\,d^2e^6 - 198\,de^7 - 108\,e^8 - 4\left(80\,de^7 + \right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2/(e*x + d)^3,x, algori
```

```
[Out] 1/12*(200*e^8*x^8 + 9000*d^8 + 3510*d^7*e + 7326*d^6*e^2 + 1998*d
^5*e^3 + 6216*d^4*e^4 - 1950*d^3*e^5 + 1926*d^2*e^6 - 198*d*e^7 -
 108*e^8 - 4*(80*d*e^7 + 27*e^8)*x^7 + (560*d^2*e^6 + 189*d*e^7 +
 333*e^8)*x^6 - 2*(560*d^3*e^5 + 189*d^2*e^6 + 333*d*e^7 + 74*e^8
)*x^5 + (2800*d^4*e^4 + 945*d^3*e^5 + 1665*d^2*e^6 + 370*d*e^7 +
888*e^8)*x^4 - 4*(2800*d^5*e^3 + 945*d^4*e^4 + 1665*d^3*e^5 + 370
*d^2*e^6 + 888*d*e^7 - 195*e^8)*x^3 - 6*(6900*d^6*e^2 + 2250*d^5*
e^3 + 3774*d^4*e^4 + 777*d^3*e^5 + 1628*d^2*e^6 - 260*d*e^7)*x^2
- 12*(1300*d^7*e + 360*d^6*e^2 + 444*d^5*e^3 + 37*d^4*e^4 - 148*d
^3*e^5 + 130*d^2*e^6 - 214*d*e^7 + 33*e^8)*x + 12*(2800*d^8 + 945
*d^7*e + 1665*d^6*e^2 + 370*d^5*e^3 + 888*d^4*e^4 - 195*d^3*e^5 +
 107*d^2*e^6 + (2800*d^6*e^2 + 945*d^5*e^3 + 1665*d^4*e^4 + 370*d
^3*e^5 + 888*d^2*e^6 - 195*d*e^7 + 107*e^8)*x^2 + 2*(2800*d^7*e +
 945*d^6*e^2 + 1665*d^5*e^3 + 370*d^4*e^4 + 888*d^3*e^5 - 195*d^2
*e^6 + 107*d*e^7)*x)*log(e*x + d))/(e^11*x^2 + 2*d*e^10*x + d^2*e
^9)
```

Sympy [A] time = 4.42843, size = 379, normalized size = 1.07

$$\frac{1500d^8 + 585d^7e + 1221d^6e^2 + 333d^5e^3 + 1036d^4e^4 - 325d^3e^5 + 321d^2e^6 - 33de^7 - 18e^8 + x\left(1600d^7e + 630d^6e^2 + 1332d^5e^3\right.}{2d^2e^9 + 4de^{10}x + 2e^{11}x^2}$$
$$+ \frac{50x^6}{3e^3} - \frac{x^5(60d + 9e)}{e^4} + \frac{x^4(600d^2 + 135de + 111e^2)}{4e^5} - \frac{x^3(1000d^3 + 270d^2e + 333de^2 + 37e^3)}{3e^6}$$
$$+ \frac{x^2(1500d^4 + 450d^3e + 666d^2e^2 + 111de^3 + 148e^4)}{2e^7}$$
$$- \frac{x(2100d^5 + 675d^4e + 1110d^3e^2 + 222d^2e^3 + 444de^4 - 65e^5)}{e^8}$$
$$+ \frac{(2800d^6 + 945d^5e + 1665d^4e^2 + 370d^3e^3 + 888d^2e^4 - 195de^5 + 107e^6)\log(d + ex)}{e^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**3,x)
```

```
[Out] (1500*d**8 + 585*d**7*e + 1221*d**6*e**2 + 333*d**5*e**3 + 1036*d
**4*e**4 - 325*d**3*e**5 + 321*d**2*e**6 - 33*d*e**7 - 18*e**8 +
x*(1600*d**7*e + 630*d**6*e**2 + 1332*d**5*e**3 + 370*d**4*e**4 +
 1184*d**3*e**5 - 390*d**2*e**6 + 428*d*e**7 - 66*e**8))/(2*d**2*
e**9 + 4*d*e**10*x + 2*e**11*x**2) + 50*x**6/(3*e**3) - x**5*(60*
d + 9*e)/e**4 + x**4*(600*d**2 + 135*d*e + 111*e**2)/(4*e**5) - x
**3*(1000*d**3 + 270*d**2*e + 333*d*e**2 + 37*e**3)/(3*e**6) + x*
*2*(1500*d**4 + 450*d**3*e + 666*d**2*e**2 + 111*d*e**3 + 148*e**
4)/(2*e**7) - x*(2100*d**5 + 675*d**4*e + 1110*d**3*e**2 + 222*d*
*2*e**3 + 444*d*e**4 - 65*e**5)/e**8 + (2800*d**6 + 945*d**5*e +
1665*d**4*e**2 + 370*d**3*e**3 + 888*d**2*e**4 - 195*d*e**5 + 107
*e**6)*log(d + e*x)/e**9
```

GIAC/XCAS [A] time = 0.273136, size = 478, normalized size = 1.35

$$\left(2800\,d^6 + 945\,d^5e + 1665\,d^4e^2 + 370\,d^3e^3 + 888\,d^2e^4 - 195\,de^5 + 107\,e^6\right)e^{(-9)}\ln\left(|xe + d|\right)$$
$$+ \frac{1}{12}\left(200\,x^6e^{15} - 720\,dx^5e^{14} + 1800\,d^2x^4e^{13} - 4000\,d^3x^3e^{12} + 9000\,d^4x^2e^{11} - 25200\,d^5xe^{10} - 108\,x^5e^{15} + 405\,dx^4e^{14} - 1080\right.$$
$$+ \frac{\left(1500\,d^8 + 585\,d^7e + 1221\,d^6e^2 + 333\,d^5e^3 + 1036\,d^4e^4 - 325\,d^3e^5 + 321\,d^2e^6 + 2\left(800\,d^7e + 315\,d^6e^2 + 666\,d^5e^3 + 185\,d^4e^4\right.\right.}{2\,(xe + d)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2/(e*x + d)^3,x, algori
```

```
[Out] (2800*d^6 + 945*d^5*e + 1665*d^4*e^2 + 370*d^3*e^3 + 888*d^2*e^4
- 195*d*e^5 + 107*e^6)*e^(-9)*ln(abs(x*e + d)) + 1/12*(200*x^6*e^
15 - 720*d*x^5*e^14 + 1800*d^2*x^4*e^13 - 4000*d^3*x^3*e^12 + 900
```

```
0*d^4*x^2*e^11 - 25200*d^5*x*e^10 - 108*x^5*e^15 + 405*d*x^4*e^14
 - 1080*d^2*x^3*e^13 + 2700*d^3*x^2*e^12 - 8100*d^4*x*e^11 + 333*
x^4*e^15 - 1332*d*x^3*e^14 + 3996*d^2*x^2*e^13 - 13320*d^3*x*e^12
 - 148*x^3*e^15 + 666*d*x^2*e^14 - 2664*d^2*x*e^13 + 888*x^2*e^15
 - 5328*d*x*e^14 + 780*x*e^15)*e^(-18) + 1/2*(1500*d^8 + 585*d^7*
e + 1221*d^6*e^2 + 333*d^5*e^3 + 1036*d^4*e^4 - 325*d^3*e^5 + 321
*d^2*e^6 + 2*(800*d^7*e + 315*d^6*e^2 + 666*d^5*e^3 + 185*d^4*e^4
 + 592*d^3*e^5 - 195*d^2*e^6 + 214*d*e^7 - 33*e^8)*x - 33*d*e^7 -
 18*e^8)*e^(-9)/(x*e + d)^2
```

3.303 $\int \frac{(3+2x+5x^2)^2(2+x+3x^2-5x^3+4x^4)}{(d+ex)^4}\,dx$

Optimal. Leaf size=360

$$\frac{x^3(1000d^2+180de+111e^2)}{3e^6}-\frac{x^2(2000d^3+450d^2e+444de^2+37e^3)}{2e^7}-\frac{(5d^2-2de+3e^2)^2(4d^4+5d^3e+3d^2e^2-de^3+2e^4)}{3e^9(d+ex)^3}+\frac{2x(1750d^4+450d^3e+555d^2e^2+74de^3+74e^4)}{e^8}+\frac{(5d^2-2de+3e^2)(160d^5+127d^4e+88d^3e^2-4d^2e^3+64de^4-11e^5)}{2e^9(d+ex)^2}-\frac{(5600d^5+1575d^4e+2220d^3e^2+370d^2e^3+592de^4-65e^5)\log(d+ex)}{e^9}-\frac{2800d^6+945d^5e+1665d^4e^2+370d^3e^3+888d^2e^4-195de^5+107e^6}{e^9(d+ex)}-\frac{5x^4(80d+9e)}{4e^5}+\frac{20x^5}{e^4}$$

```
[Out] (2*(1750*d^4 + 450*d^3*e + 555*d^2*e^2 + 74*d*e^3 + 74*e^4)*x)/e^
8 - ((2000*d^3 + 450*d^2*e + 444*d*e^2 + 37*e^3)*x^2)/(2*e^7) + (
(1000*d^2 + 180*d*e + 111*e^2)*x^3)/(3*e^6) - (5*(80*d + 9*e)*x^4
)/(4*e^5) + (20*x^5)/e^4 - ((5*d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*
d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4))/(3*e^9*(d + e*x)^3) + ((5*d^2
 - 2*d*e + 3*e^2)*(160*d^5 + 127*d^4*e + 88*d^3*e^2 - 4*d^2*e^3 +
 64*d*e^4 - 11*e^5))/(2*e^9*(d + e*x)^2) - (2800*d^6 + 945*d^5*e
+ 1665*d^4*e^2 + 370*d^3*e^3 + 888*d^2*e^4 - 195*d*e^5 + 107*e^6)
/(e^9*(d + e*x)) - ((5600*d^5 + 1575*d^4*e + 2220*d^3*e^2 + 370*d
^2*e^3 + 592*d*e^4 - 65*e^5)*Log[d + e*x])/e^9
```

Rubi [A] time = 0.796214, antiderivative size = 360, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.026

$$\frac{x^3(1000d^2+180de+111e^2)}{3e^6}-\frac{x^2(2000d^3+450d^2e+444de^2+37e^3)}{2e^7}-\frac{(5d^2-2de+3e^2)^2(4d^4+5d^3e+3d^2e^2-de^3+2e^4)}{3e^9(d+ex)^3}+\frac{2x(1750d^4+450d^3e+555d^2e^2+74de^3+74e^4)}{e^8}+\frac{(5d^2-2de+3e^2)(160d^5+127d^4e+88d^3e^2-4d^2e^3+64de^4-11e^5)}{2e^9(d+ex)^2}-\frac{(5600d^5+1575d^4e+2220d^3e^2+370d^2e^3+592de^4-65e^5)\log(d+ex)}{e^9}-\frac{2800d^6+945d^5e+1665d^4e^2+370d^3e^3+888d^2e^4-195de^5+107e^6}{e^9(d+ex)}-\frac{5x^4(80d+9e)}{4e^5}+\frac{20x^5}{e^4}$$

Antiderivative was successfully verified.

```
[In] Int[((3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(d + e*x)^4,x]
```

```
[Out] (2*(1750*d^4 + 450*d^3*e + 555*d^2*e^2 + 74*d*e^3 + 74*e^4)*x)/e^
8 - ((2000*d^3 + 450*d^2*e + 444*d*e^2 + 37*e^3)*x^2)/(2*e^7) + (
(1000*d^2 + 180*d*e + 111*e^2)*x^3)/(3*e^6) - (5*(80*d + 9*e)*x^4
)/(4*e^5) + (20*x^5)/e^4 - ((5*d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*
d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4))/(3*e^9*(d + e*x)^3) + ((5*d^2
 - 2*d*e + 3*e^2)*(160*d^5 + 127*d^4*e + 88*d^3*e^2 - 4*d^2*e^3 +
 64*d*e^4 - 11*e^5))/(2*e^9*(d + e*x)^2) - (2800*d^6 + 945*d^5*e
+ 1665*d^4*e^2 + 370*d^3*e^3 + 888*d^2*e^4 - 195*d*e^5 + 107*e^6)
/(e^9*(d + e*x)) - ((5600*d^5 + 1575*d^4*e + 2220*d^3*e^2 + 370*d
^2*e^3 + 592*d*e^4 - 65*e^5)*Log[d + e*x])/e^9
```

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

$$\frac{20x^5}{e^4} - \frac{5x^4(80d+9e)}{4e^5} + \frac{x^3(1000d^2+180de+111e^2)}{3e^6} - \frac{(2000d^3+450d^2e+444de^2+37e^3)\int x\,dx}{e^7} + \frac{2x(1750d^4+450d^3e+555d^2e^2+74de^3+74e^4)}{e^8} - \frac{(5600d^5+1575d^4e+2220d^3e^2+370d^2e^3+592de^4-65e^5)\log(d+ex)}{e^9} - \frac{2800d^6+945d^5e+1665d^4e^2+370d^3e^3+888d^2e^4-195de^5+107e^6}{e^9(d+ex)} + \frac{(5d^2-2de+3e^2)(160d^5+127d^4e+88d^3e^2-4d^2e^3+64de^4-11e^5)}{2e^9(d+ex)^2} - \frac{(5d^2-2de+3e^2)^2(4d^4+5d^3e+3d^2e^2-de^3+2e^4)}{3e^9(d+ex)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**4,x)
```

```
[Out] 20*x**5/e**4 - 5*x**4*(80*d + 9*e)/(4*e**5) + x**3*(1000*d**2 + 1
80*d*e + 111*e**2)/(3*e**6) - (2000*d**3 + 450*d**2*e + 444*d*e**
2 + 37*e**3)*Integral(x, x)/e**7 + 2*x*(1750*d**4 + 450*d**3*e +
555*d**2*e**2 + 74*d*e**3 + 74*e**4)/e**8 - (5600*d**5 + 1575*d**
4*e + 2220*d**3*e**2 + 370*d**2*e**3 + 592*d*e**4 - 65*e**5)*log(
d + e*x)/e**9 - (2800*d**6 + 945*d**5*e + 1665*d**4*e**2 + 370*d*
*3*e**3 + 888*d**2*e**4 - 195*d*e**5 + 107*e**6)/(e**9*(d + e*x))
 + (5*d**2 - 2*d*e + 3*e**2)*(160*d**5 + 127*d**4*e + 88*d**3*e**
2 - 4*d**2*e**3 + 64*d*e**4 - 11*e**5)/(2*e**9*(d + e*x)**2) - (5
*d**2 - 2*d*e + 3*e**2)**2*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e
**3 + 2*e**4)/(3*e**9*(d + e*x)**3)
```

Mathematica [A] time = 0.360383, size = 344, normalized size = 0.96

$$\frac{4e^3x^3\left(1000d^2+180de+111e^2\right)-6e^2x^2\left(2000d^3+450d^2e+444de^2+37e^3\right)+24ex\left(1750d^4+450d^3e+555d^2e^2+74de^3+\right.}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(d + e*x)^4,x]
```

```
[Out] (24*e*(1750*d^4 + 450*d^3*e + 555*d^2*e^2 + 74*d*e^3 + 74*e^4)*x
- 6*e^2*(2000*d^3 + 450*d^2*e + 444*d*e^2 + 37*e^3)*x^2 + 4*e^3*(
1000*d^2 + 180*d*e + 111*e^2)*x^3 - 15*e^4*(80*d + 9*e)*x^4 + 240
*e^5*x^5 - (4*(5*d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e + 3*d^2*
e^2 - d*e^3 + 2*e^4))/(d + e*x)^3 + (6*(800*d^7 + 315*d^6*e + 666
*d^5*e^2 + 185*d^4*e^3 + 592*d^3*e^4 - 195*d^2*e^5 + 214*d*e^6 -
33*e^7))/(d + e*x)^2 - (12*(2800*d^6 + 945*d^5*e + 1665*d^4*e^2 +
 370*d^3*e^3 + 888*d^2*e^4 - 195*d*e^5 + 107*e^6))/(d + e*x) - 12
*(5600*d^5 + 1575*d^4*e + 2220*d^3*e^2 + 370*d^2*e^3 + 592*d*e^4
- 65*e^5)*Log[d + e*x])/(12*e^9)
```

Maple [A] time = 0.018, size = 558, normalized size = 1.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5*x^2+2*x+3)^2*(4*x^4-5*x^3+3*x^2+x+2)/(e*x+d)^4,x)
```

```
[Out] 65/e^4*ln(e*x+d)+37/e^4*x^3-37/2/e^4*x^2+148/e^4*x-6/e/(e*x+d)^3-
107/e^3/(e*x+d)-33/2/e^2/(e*x+d)^2-45/4/e^4*x^4-37/e^7/(e*x+d)^3*
d^6-37/3/e^6/(e*x+d)^3*d^5-148/3/e^5/(e*x+d)^3*d^4+65/3/e^4/(e*x+
d)^3*d^3-107/3/e^3/(e*x+d)^3*d^2+11/e^2/(e*x+d)^3*d-2800/e^9/(e*x
+d)*d^6-945/e^8/(e*x+d)*d^5-1665/e^7/(e*x+d)*d^4-370/e^6/(e*x+d)*
d^3-888/e^5/(e*x+d)*d^2+195/e^4/(e*x+d)*d+400/e^9/(e*x+d)^2*d^7+3
15/2/e^8/(e*x+d)^2*d^6+333/e^7/(e*x+d)^2*d^5+185/2/e^6/(e*x+d)^2*
d^4+296/e^5/(e*x+d)^2*d^3-195/2/e^4/(e*x+d)^2*d^2+107/e^3/(e*x+d)
^2*d-5600/e^9*ln(e*x+d)*d^5-1575/e^8*ln(e*x+d)*d^4-2220/e^7*ln(e*
x+d)*d^3-370/e^6*ln(e*x+d)*d^2-592/e^5*ln(e*x+d)*d-100/e^5*x^4*d+
1000/3/e^6*x^3*d^2+60/e^5*x^3*d-1000/e^7*x^2*d^3-225/e^6*x^2*d^2-
222/e^5*x^2*d+3500/e^8*d^4*x+900/e^7*x*d^3+1110/e^6*x*d^2+148/e^5
*x*d-100/3/e^9/(e*x+d)^3*d^8-15/e^8/(e*x+d)^3*d^7+20*x^5/e^4
```

Maxima [A] time = 0.70982, size = 527, normalized size = 1.46

$$-\frac{14600\,d^8+4815\,d^7e+8214\,d^6e^2+1739\,d^5e^3+3848\,d^4e^4-715\,d^3e^5+214\,d^2e^6+33\,de^7+36\,e^8+6\left(2800\,d^6e^2+945\,d^5e^3\right.}{6\,(e^1}$$
$$+\frac{240\,e^4x^5-15\left(80\,de^3+9\,e^4\right)x^4+4\left(1000\,d^2e^2+180\,de^3+111\,e^4\right)x^3-6\left(2000\,d^3e+450\,d^2e^2+444\,de^3+37\,e^4\right)x^2+24\,(1}{12\,e^8}$$
$$-\frac{\left(5600\,d^5+1575\,d^4e+2220\,d^3e^2+370\,d^2e^3+592\,de^4-65\,e^5\right)\log\left(ex+d\right)}{e^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2/(e*x + d)^4,x, algori
```

```
[Out] -1/6*(14600*d^8 + 4815*d^7*e + 8214*d^6*e^2 + 1739*d^5*e^3 + 3848
*d^4*e^4 - 715*d^3*e^5 + 214*d^2*e^6 + 33*d*e^7 + 36*e^8 + 6*(280
0*d^6*e^2 + 945*d^5*e^3 + 1665*d^4*e^4 + 370*d^3*e^5 + 888*d^2*e^
6 - 195*d*e^7 + 107*e^8)*x^2 + 3*(10400*d^7*e + 3465*d^6*e^2 + 59
94*d^5*e^3 + 1295*d^4*e^4 + 2960*d^3*e^5 - 585*d^2*e^6 + 214*d*e^
7 + 33*e^8)*x)/(e^12*x^3 + 3*d*e^11*x^2 + 3*d^2*e^10*x + d^3*e^9)
 + 1/12*(240*e^4*x^5 - 15*(80*d*e^3 + 9*e^4)*x^4 + 4*(1000*d^2*e^
2 + 180*d*e^3 + 111*e^4)*x^3 - 6*(2000*d^3*e + 450*d^2*e^2 + 444*
d*e^3 + 37*e^4)*x^2 + 24*(1750*d^4 + 450*d^3*e + 555*d^2*e^2 + 74
*d*e^3 + 74*e^4)*x)/e^8 - (5600*d^5 + 1575*d^4*e + 2220*d^3*e^2 +
 370*d^2*e^3 + 592*d*e^4 - 65*e^5)*log(e*x + d)/e^9
```

Fricas [A] time = 0.258776, size = 792, normalized size = 2.2

$$\frac{240\,e^8x^8-29200\,d^8-9630\,d^7e-16428\,d^6e^2-3478\,d^5e^3-7696\,d^4e^4+1430\,d^3e^5-428\,d^2e^6-66\,de^7-72\,e^8-15\left(32\,de^7\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2/(e*x + d)^4,x, algori
```

```
[Out] 1/12*(240*e^8*x^8 - 29200*d^8 - 9630*d^7*e - 16428*d^6*e^2 - 3478
*d^5*e^3 - 7696*d^4*e^4 + 1430*d^3*e^5 - 428*d^2*e^6 - 66*d*e^7 -
 72*e^8 - 15*(32*d*e^7 + 9*e^8)*x^7 + (1120*d^2*e^6 + 315*d*e^7 +
 444*e^8)*x^6 - 3*(1120*d^3*e^5 + 315*d^2*e^6 + 444*d*e^7 + 74*e^
8)*x^5 + 3*(5600*d^4*e^4 + 1575*d^3*e^5 + 2220*d^2*e^6 + 370*d*e^
7 + 592*e^8)*x^4 + 2*(47000*d^5*e^3 + 12510*d^4*e^4 + 16206*d^3*e
^5 + 2331*d^2*e^6 + 2664*d*e^7)*x^3 + 6*(13400*d^6*e^2 + 3060*d^5
*e^3 + 2886*d^4*e^4 + 111*d^3*e^5 - 888*d^2*e^6 + 390*d*e^7 - 214
*e^8)*x^2 - 6*(3400*d^7*e + 1665*d^6*e^2 + 3774*d^5*e^3 + 999*d^4
*e^4 + 2664*d^3*e^5 - 585*d^2*e^6 + 214*d*e^7 + 33*e^8)*x - 12*(5
600*d^8 + 1575*d^7*e + 2220*d^6*e^2 + 370*d^5*e^3 + 592*d^4*e^4 -
 65*d^3*e^5 + (5600*d^5*e^3 + 1575*d^4*e^4 + 2220*d^3*e^5 + 370*d
```

```
^2*e^6 + 592*d*e^7 - 65*e^8)*x^3 + 3*(5600*d^6*e^2 + 1575*d^5*e^3
 + 2220*d^4*e^4 + 370*d^3*e^5 + 592*d^2*e^6 - 65*d*e^7)*x^2 + 3*(
5600*d^7*e + 1575*d^6*e^2 + 2220*d^5*e^3 + 370*d^4*e^4 + 592*d^3*
e^5 - 65*d^2*e^6)*x)*log(e*x + d))/(e^12*x^3 + 3*d*e^11*x^2 + 3*d
^2*e^10*x + d^3*e^9)
```

Sympy [A] time = 7.6688, size = 391, normalized size = 1.09

$$-\frac{14600d^8 + 4815d^7e + 8214d^6e^2 + 1739d^5e^3 + 3848d^4e^4 - 715d^3e^5 + 214d^2e^6 + 33de^7 + 36e^8 + x^2\left(16800d^6e^2 + 5670d^5e^3 + \cdots\right.}{6d^3e^9 \cdots}$$
$$+\frac{20x^5}{e^4} - \frac{x^4(400d + 45e)}{4e^5} + \frac{x^3\left(1000d^2 + 180de + 111e^2\right)}{3e^6}$$
$$-\frac{x^2\left(2000d^3 + 450d^2e + 444de^2 + 37e^3\right)}{2e^7} + \frac{x\left(3500d^4 + 900d^3e + 1110d^2e^2 + 148de^3 + 148e^4\right)}{e^8}$$
$$-\frac{\left(5600d^5 + 1575d^4e + 2220d^3e^2 + 370d^2e^3 + 592de^4 - 65e^5\right)\log(d + ex)}{e^9}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**4,x)
```

```
[Out] -(14600*d**8 + 4815*d**7*e + 8214*d**6*e**2 + 1739*d**5*e**3 + 38
48*d**4*e**4 - 715*d**3*e**5 + 214*d**2*e**6 + 33*d*e**7 + 36*e**
8 + x**2*(16800*d**6*e**2 + 5670*d**5*e**3 + 9990*d**4*e**4 + 222
0*d**3*e**5 + 5328*d**2*e**6 - 1170*d*e**7 + 642*e**8) + x*(31200
*d**7*e + 10395*d**6*e**2 + 17982*d**5*e**3 + 3885*d**4*e**4 + 88
80*d**3*e**5 - 1755*d**2*e**6 + 642*d*e**7 + 99*e**8))/(6*d**3*e*
*9 + 18*d**2*e**10*x + 18*d*e**11*x**2 + 6*e**12*x**3) + 20*x**5/
e**4 - x**4*(400*d + 45*e)/(4*e**5) + x**3*(1000*d**2 + 180*d*e +
 111*e**2)/(3*e**6) - x**2*(2000*d**3 + 450*d**2*e + 444*d*e**2 +
 37*e**3)/(2*e**7) + x*(3500*d**4 + 900*d**3*e + 1110*d**2*e**2 +
 148*d*e**3 + 148*e**4)/e**8 - (5600*d**5 + 1575*d**4*e + 2220*d*
*3*e**2 + 370*d**2*e**3 + 592*d*e**4 - 65*e**5)*log(d + e*x)/e**9
```

GIAC/XCAS [A] time = 0.2722, size = 466, normalized size = 1.29

$$-\left(5600\,d^5 + 1575\,d^4e + 2220\,d^3e^2 + 370\,d^2e^3 + 592\,de^4 - 65\,e^5\right)e^{(-9)}\ln\left(|xe + d|\right)$$
$$+\frac{1}{12}\left(240\,x^5e^{16} - 1200\,dx^4e^{15} + 4000\,d^2x^3e^{14} - 12000\,d^3x^2e^{13} + 42000\,d^4xe^{12} - 135\,x^4e^{16} + 720\,dx^3e^{15} - 2700\,d^2x^2e^{14} + 10\cdots\right.$$
$$-\frac{\left(14600\,d^8 + 4815\,d^7e + 8214\,d^6e^2 + 1739\,d^5e^3 + 3848\,d^4e^4 - 715\,d^3e^5 + 6\left(2800\,d^6e^2 + 945\,d^5e^3 + 1665\,d^4e^4 + 370\,d^3e^5 + 8\cdots\right.\right.}{\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2/(e*x + d)^4,x, algori

[Out] -(5600*d^5 + 1575*d^4*e + 2220*d^3*e^2 + 370*d^2*e^3 + 592*d*e^4
- 65*e^5)*e^(-9)*ln(abs(x*e + d)) + 1/12*(240*x^5*e^16 - 1200*d*x
^4*e^15 + 4000*d^2*x^3*e^14 - 12000*d^3*x^2*e^13 + 42000*d^4*x*e^
12 - 135*x^4*e^16 + 720*d*x^3*e^15 - 2700*d^2*x^2*e^14 + 10800*d^
3*x*e^13 + 444*x^3*e^16 - 2664*d*x^2*e^15 + 13320*d^2*x*e^14 - 22
2*x^2*e^16 + 1776*d*x*e^15 + 1776*x*e^16)*e^(-20) - 1/6*(14600*d^
8 + 4815*d^7*e + 8214*d^6*e^2 + 1739*d^5*e^3 + 3848*d^4*e^4 - 715
*d^3*e^5 + 6*(2800*d^6*e^2 + 945*d^5*e^3 + 1665*d^4*e^4 + 370*d^3
*e^5 + 888*d^2*e^6 - 195*d*e^7 + 107*e^8)*x^2 + 214*d^2*e^6 + 3*(
10400*d^7*e + 3465*d^6*e^2 + 5994*d^5*e^3 + 1295*d^4*e^4 + 2960*d
^3*e^5 - 585*d^2*e^6 + 214*d*e^7 + 33*e^8)*x + 33*d*e^7 + 36*e^8)
*e^(-9)/(x*e + d)^3
```

3.304 $\int \frac{(d+ex)^3(2+x+3x^2-5x^3+4x^4)}{3+2x+5x^2}\,dx$

Optimal. Leaf size=221

$$\frac{3}{500}ex^4\left(100d^2-165de+27e^2\right)+\frac{x^3\left(500d^3-2475d^2e+1215de^2+458e^3\right)}{1875}-\frac{x^2\left(4125d^3-6075d^2e-6870de^2+881e^3\right)}{6250}+\frac{\left(57250d^3-66075d^2e-76620de^2+23431e^3\right)\log\left(5x^2+2x+3\right)}{156250}+\frac{x\left(10125d^3+34350d^2e-13215de^2-5108e^3\right)}{15625}-\frac{\left(52875d^3+449175d^2e-274845de^2-53189e^3\right)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{78125\sqrt{14}}+\frac{3}{125}e^2x^5(20d-11e)+\frac{2e^3x^6}{15}$$

```
[Out] ((10125*d^3 + 34350*d^2*e - 13215*d*e^2 - 5108*e^3)*x)/15625 - ((
4125*d^3 - 6075*d^2*e - 6870*d*e^2 + 881*e^3)*x^2)/6250 + ((500*d
^3 - 2475*d^2*e + 1215*d*e^2 + 458*e^3)*x^3)/1875 + (3*e*(100*d^2
 - 165*d*e + 27*e^2)*x^4)/500 + (3*(20*d - 11*e)*e^2*x^5)/125 + (
2*e^3*x^6)/15 - ((52875*d^3 + 449175*d^2*e - 274845*d*e^2 - 53189
*e^3)*ArcTan[(1 + 5*x)/Sqrt[14]])/(78125*Sqrt[14]) + ((57250*d^3
- 66075*d^2*e - 76620*d*e^2 + 23431*e^3)*Log[3 + 2*x + 5*x^2])/15
6250
```

Rubi [A] time = 0.364591, antiderivative size = 221, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.132

$$\frac{3}{500}ex^4\left(100d^2-165de+27e^2\right)+\frac{x^3\left(500d^3-2475d^2e+1215de^2+458e^3\right)}{1875}-\frac{x^2\left(4125d^3-6075d^2e-6870de^2+881e^3\right)}{6250}+\frac{\left(57250d^3-66075d^2e-76620de^2+23431e^3\right)\log\left(5x^2+2x+3\right)}{156250}+\frac{x\left(10125d^3+34350d^2e-13215de^2-5108e^3\right)}{15625}-\frac{\left(52875d^3+449175d^2e-274845de^2-53189e^3\right)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{78125\sqrt{14}}+\frac{3}{125}e^2x^5(20d-11e)+\frac{2e^3x^6}{15}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^3*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2),x]
```

```
[Out] ((10125*d^3 + 34350*d^2*e - 13215*d*e^2 - 5108*e^3)*x)/15625 - ((
4125*d^3 - 6075*d^2*e - 6870*d*e^2 + 881*e^3)*x^2)/6250 + ((500*d
^3 - 2475*d^2*e + 1215*d*e^2 + 458*e^3)*x^3)/1875 + (3*e*(100*d^2
 - 165*d*e + 27*e^2)*x^4)/500 + (3*(20*d - 11*e)*e^2*x^5)/125 + (
2*e^3*x^6)/15 - ((52875*d^3 + 449175*d^2*e - 274845*d*e^2 - 53189
*e^3)*ArcTan[(1 + 5*x)/Sqrt[14]])/(78125*Sqrt[14]) + ((57250*d^3
- 66075*d^2*e - 76620*d*e^2 + 23431*e^3)*Log[3 + 2*x + 5*x^2])/15
6250
```

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((e*x+d)**3*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.334243, size = 178, normalized size = 0.81

$$42\left(57250d^3-66075d^2e-76620de^2+23431e^3\right)\log\left(5x^2+2x+3\right)+35x\left(250d^3\left(200x^2-495x+486\right)+450d^2e\left(250x^3-\right.\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^3*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2),x]
```

```
[Out] (35*x*(250*d^3*(486 - 495*x + 200*x^2) + 450*d^2*e*(916 + 405*x -
 550*x^2 + 250*x^3) + 45*d*e^2*(-3524 + 4580*x + 2700*x^2 - 4125*
x^3 + 2000*x^4) + e^3*(-61296 - 26430*x + 45800*x^2 + 30375*x^3 -
 49500*x^4 + 25000*x^5)) - 6*Sqrt[14]*(52875*d^3 + 449175*d^2*e -
 274845*d*e^2 - 53189*e^3)*ArcTan[(1 + 5*x)/Sqrt[14]] + 42*(57250
*d^3 - 66075*d^2*e - 76620*d*e^2 + 23431*e^3)*Log[3 + 2*x + 5*x^2
])/6562500
```

Maple [A] time = 0.011, size = 291, normalized size = 1.3

$$\frac{54969\sqrt{14}e^2d}{218750}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)-\frac{17967\sqrt{14}d^2e}{43750}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)-\frac{33x^5e^3}{125}-\frac{33x^2d^3}{50}+\frac{458x^3e^3}{1875}-\frac{5108xe^3}{15625}+\frac{229\ln\left(5x^2+2x+3\right)d^3}{625}+\frac{23431\ln\left(5x^2+2x+3\right)e^3}{156250}+\frac{4x^3d^3}{15}+\frac{81d^3x}{125}+\frac{53189\sqrt{14}e^3}{1093750}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)-\frac{2643xde^2}{3125}+\frac{687x^2e^2d}{625}-\frac{423\sqrt{14}d^3}{8750}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)-\frac{7662\ln\left(5x^2+2x+3\right)e^2d}{15625}+\frac{3x^4d^2e}{5}+\frac{12x^5de^2}{25}+\frac{81x^3e^2d}{125}+\frac{1374xd^2e}{625}+\frac{243x^2d^2e}{250}-\frac{2643\ln\left(5x^2+2x+3\right)d^2e}{6250}-\frac{33x^3d^2e}{25}-\frac{99x^4de^2}{100}-\frac{881e^3x^2}{6250}+\frac{81e^3x^4}{500}+\frac{2e^3x^6}{15}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((e*x+d)^3*(4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3),x)
```

```
[Out] 54969/218750*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*e^2*d-17967/
43750*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d^2*e-33/125*x^5*e^
3-33/50*x^2*d^3+458/1875*x^3*e^3-5108/15625*x*e^3+229/625*ln(5*x^
2+2*x+3)*d^3+23431/156250*ln(5*x^2+2*x+3)*e^3+4/15*x^3*d^3+81/125
*d^3*x+53189/1093750*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*e^3-
2643/3125*x*d*e^2+687/625*x^2*e^2*d-423/8750*14^(1/2)*arctan(1/28
*(10*x+2)*14^(1/2))*d^3-7662/15625*ln(5*x^2+2*x+3)*e^2*d+3/5*x^4*
d^2*e+12/25*x^5*d*e^2+81/125*x^3*e^2*d+1374/625*x*d^2*e+243/250*x
^2*d^2*e-2643/6250*ln(5*x^2+2*x+3)*d^2*e-33/25*x^3*d^2*e-99/100*x
^4*d*e^2-881/6250*e^3*x^2+81/500*e^3*x^4+2/15*e^3*x^6
```

Maxima [A] time = 0.77301, size = 278, normalized size = 1.26

$$\frac{2}{15}e^3x^6+\frac{3}{125}\left(20de^2-11e^3\right)x^5+\frac{3}{500}\left(100d^2e-165de^2+27e^3\right)x^4+\frac{1}{1875}\left(500d^3-2475d^2e+1215de^2+458e^3\right)x^3-\frac{1}{6250}\left(4125d^3-6075d^2e-6870de^2+881e^3\right)x^2-\frac{1}{1093750}\sqrt{14}\left(52875d^3+449175d^2e-274845de^2-53189e^3\right)\arctan\left(\frac{1}{14}\sqrt{14}(5x+1)\right)+\frac{1}{15625}\left(10125d^3+34350d^2e-13215de^2-5108e^3\right)x+\frac{1}{156250}\left(57250d^3-66075d^2e-76620de^2+23431e^3\right)\log\left(5x^2+2x+3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3/(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] 2/15*e^3*x^6 + 3/125*(20*d*e^2 - 11*e^3)*x^5 + 3/500*(100*d^2*e -
 165*d*e^2 + 27*e^3)*x^4 + 1/1875*(500*d^3 - 2475*d^2*e + 1215*d*
e^2 + 458*e^3)*x^3 - 1/6250*(4125*d^3 - 6075*d^2*e - 6870*d*e^2 +
 881*e^3)*x^2 - 1/1093750*sqrt(14)*(52875*d^3 + 449175*d^2*e - 27
4845*d*e^2 - 53189*e^3)*arctan(1/14*sqrt(14)*(5*x + 1)) + 1/15625
*(10125*d^3 + 34350*d^2*e - 13215*d*e^2 - 5108*e^3)*x + 1/156250*
(57250*d^3 - 66075*d^2*e - 76620*d*e^2 + 23431*e^3)*log(5*x^2 + 2
*x + 3)
```

Fricas [A] time = 0.268416, size = 293, normalized size = 1.33

$$\frac{1}{13125000}\sqrt{14}\left(6\sqrt{14}\left(57250\,d^3 - 66075\,d^2e - 76620\,de^2 + 23431\,e^3\right)\log\left(5\,x^2 + 2\,x + 3\right) - 12\left(52875\,d^3 + 449175\,d^2e - 274\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3/(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] 1/13125000*sqrt(14)*(6*sqrt(14)*(57250*d^3 - 66075*d^2*e - 76620*
d*e^2 + 23431*e^3)*log(5*x^2 + 2*x + 3) - 12*(52875*d^3 + 449175*
d^2*e - 274845*d*e^2 - 53189*e^3)*arctan(1/14*sqrt(14)*(5*x + 1))
 + 5*sqrt(14)*(25000*e^3*x^6 + 4500*(20*d*e^2 - 11*e^3)*x^5 + 112
5*(100*d^2*e - 165*d*e^2 + 27*e^3)*x^4 + 100*(500*d^3 - 2475*d^2*
e + 1215*d*e^2 + 458*e^3)*x^3 - 30*(4125*d^3 - 6075*d^2*e - 6870*
d*e^2 + 881*e^3)*x^2 + 12*(10125*d^3 + 34350*d^2*e - 13215*d*e^2
- 5108*e^3)*x))
```

Sympy [A] time = 2.18619, size = 450, normalized size = 2.04

$$\frac{2e^3x^6}{15} + x^5\left(\frac{12de^2}{25} - \frac{33e^3}{125}\right) + x^4\left(\frac{3d^2e}{5} - \frac{99de^2}{100} + \frac{81e^3}{500}\right) + x^3\left(\frac{4d^3}{15} - \frac{33d^2e}{25} + \frac{81de^2}{125} + \frac{458e^3}{1875}\right) + x^2\left(-\frac{33d^3}{50} + \frac{243d^2e}{250} + \frac{687de^2}{625} - \frac{881e^3}{6250}\right) + x\left(\frac{81d^3}{125} + \frac{1374d^2e}{625} - \frac{2643de^2}{3125} - \frac{5108e^3}{15625}\right) + \left(\frac{229d^3}{625} - \frac{2643d^2e}{6250} - \frac{7662de^2}{15625} + \frac{23431e^3}{156250} - \frac{\sqrt{14}i\left(52875d^3 + 449175d^2e - 274845de^2 - 53189e^3\right)}{2187500}\right)\log\left(x + \frac{10575d^3 + 89835d^2e - 54969de^2 - \frac{53189e^3}{5} + \frac{\sqrt{14}i(52875d^3 + 4}{52875d^3 + 449175d^2e - 274845de^2 - 5}\right. + \left(\frac{229d^3}{625} - \frac{2643d^2e}{6250} - \frac{7662de^2}{15625} + \frac{23431e^3}{156250} + \frac{\sqrt{14}i\left(52875d^3 + 449175d^2e - 274845de^2 - 53189e^3\right)}{2187500}\right)\log\left(x + \frac{10575d^3 + 89835d^2e - 54969de^2 - \frac{53189e^3}{5} - \frac{\sqrt{14}i(52875d^3 + 4}{52875d^3 + 449175d^2e - 274845de^2 - 5}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**3*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3),x)
```

```
[Out] 2*e**3*x**6/15 + x**5*(12*d*e**2/25 - 33*e**3/125) + x**4*(3*d**2
*e/5 - 99*d*e**2/100 + 81*e**3/500) + x**3*(4*d**3/15 - 33*d**2*e
/25 + 81*d*e**2/125 + 458*e**3/1875) + x**2*(-33*d**3/50 + 243*d*
*2*e/250 + 687*d*e**2/625 - 881*e**3/6250) + x*(81*d**3/125 + 137
4*d**2*e/625 - 2643*d*e**2/3125 - 5108*e**3/15625) + (229*d**3/62
5 - 2643*d**2*e/6250 - 7662*d*e**2/15625 + 23431*e**3/156250 - sq
rt(14)*I*(52875*d**3 + 449175*d**2*e - 274845*d*e**2 - 53189*e**3
)/2187500)*log(x + (10575*d**3 + 89835*d**2*e - 54969*d*e**2 - 53
189*e**3/5 + sqrt(14)*I*(52875*d**3 + 449175*d**2*e - 274845*d*e*
*2 - 53189*e**3)/5)/(52875*d**3 + 449175*d**2*e - 274845*d*e**2 -
 53189*e**3)) + (229*d**3/625 - 2643*d**2*e/6250 - 7662*d*e**2/15
625 + 23431*e**3/156250 + sqrt(14)*I*(52875*d**3 + 449175*d**2*e
- 274845*d*e**2 - 53189*e**3)/2187500)*log(x + (10575*d**3 + 8983
5*d**2*e - 54969*d*e**2 - 53189*e**3/5 - sqrt(14)*I*(52875*d**3 +
 449175*d**2*e - 274845*d*e**2 - 53189*e**3)/5)/(52875*d**3 + 449
175*d**2*e - 274845*d*e**2 - 53189*e**3))
```

GIAC/XCAS [A] time = 0.273855, size = 286, normalized size = 1.29

$$\frac{2}{15}\,x^6e^3 + \frac{12}{25}\,dx^5e^2 + \frac{3}{5}\,d^2x^4e + \frac{4}{15}\,d^3x^3 - \frac{33}{125}\,x^5e^3 - \frac{99}{100}\,dx^4e^2 - \frac{33}{25}\,d^2x^3e - \frac{33}{50}\,d^3x^2 + \frac{81}{500}\,x^4e^3 + \frac{81}{125}\,dx^3e^2 + \frac{243}{250}\,d^2x^2e + \frac{81}{125}\,d^3x + \frac{458}{1875}\,x^3e^3 + \frac{687}{625}\,dx^2e^2 + \frac{1374}{625}\,d^2xe - \frac{881}{6250}\,x^2e^3 - \frac{2643}{3125}\,dxe^2 - \frac{1}{1093750}\,\sqrt{14}\left(52875\,d^3 + 449175\,d^2e - 274845\,de^2 - 53189\,e^3\right)\arctan\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right) - \frac{5108}{15625}\,xe^3 + \frac{1}{156250}\,\left(57250\,d^3 - 66075\,d^2e - 76620\,de^2 + 23431\,e^3\right)\ln\left(5\,x^2 + 2\,x + 3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3/(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] 2/15*x^6*e^3 + 12/25*d*x^5*e^2 + 3/5*d^2*x^4*e + 4/15*d^3*x^3 - 3
3/125*x^5*e^3 - 99/100*d*x^4*e^2 - 33/25*d^2*x^3*e - 33/50*d^3*x^
2 + 81/500*x^4*e^3 + 81/125*d*x^3*e^2 + 243/250*d^2*x^2*e + 81/12
5*d^3*x + 458/1875*x^3*e^3 + 687/625*d*x^2*e^2 + 1374/625*d^2*x*e
 - 881/6250*x^2*e^3 - 2643/3125*d*x*e^2 - 1/1093750*sqrt(14)*(528
75*d^3 + 449175*d^2*e - 274845*d*e^2 - 53189*e^3)*arctan(1/14*sqr
t(14)*(5*x + 1)) - 5108/15625*x*e^3 + 1/156250*(57250*d^3 - 66075
*d^2*e - 76620*d*e^2 + 23431*e^3)*ln(5*x^2 + 2*x + 3)
```

3.305 $\int \frac{(d+ex)^2(2+x+3x^2-5x^3+4x^4)}{3+2x+5x^2}\,dx$

Optimal. Leaf size=156

$$\frac{1}{375}x^3\left(100d^2-330de+81e^2\right)-\frac{x^2\left(825d^2-810de-458e^2\right)}{1250}+\frac{\left(5725d^2-4405de-2554e^2\right)\log\left(5x^2+2x+3\right)}{15625}+\frac{x\left(2025d^2+4580de-881e^2\right)}{3125}-\frac{\left(10575d^2+59890de-18323e^2\right)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{15625\sqrt{14}}+\frac{1}{100}ex^4(40d-33e)+\frac{4e^2x^5}{25}$$

```
[Out] ((2025*d^2 + 4580*d*e - 881*e^2)*x)/3125 - ((825*d^2 - 810*d*e -
458*e^2)*x^2)/1250 + ((100*d^2 - 330*d*e + 81*e^2)*x^3)/375 + ((4
0*d - 33*e)*e*x^4)/100 + (4*e^2*x^5)/25 - ((10575*d^2 + 59890*d*e
 - 18323*e^2)*ArcTan[(1 + 5*x)/Sqrt[14]])/(15625*Sqrt[14]) + ((57
25*d^2 - 4405*d*e - 2554*e^2)*Log[3 + 2*x + 5*x^2])/15625
```

Rubi [A] time = 0.301554, antiderivative size = 156, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.132

$$\frac{1}{375}x^3\left(100d^2-330de+81e^2\right)-\frac{x^2\left(825d^2-810de-458e^2\right)}{1250}+\frac{\left(5725d^2-4405de-2554e^2\right)\log\left(5x^2+2x+3\right)}{15625}+\frac{x\left(2025d^2+4580de-881e^2\right)}{3125}-\frac{\left(10575d^2+59890de-18323e^2\right)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{15625\sqrt{14}}+\frac{1}{100}ex^4(40d-33e)+\frac{4e^2x^5}{25}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2),x]
```

```
[Out] ((2025*d^2 + 4580*d*e - 881*e^2)*x)/3125 - ((825*d^2 - 810*d*e -
458*e^2)*x^2)/1250 + ((100*d^2 - 330*d*e + 81*e^2)*x^3)/375 + ((4
0*d - 33*e)*e*x^4)/100 + (4*e^2*x^5)/25 - ((10575*d^2 + 59890*d*e
 - 18323*e^2)*ArcTan[(1 + 5*x)/Sqrt[14]])/(15625*Sqrt[14]) + ((57
25*d^2 - 4405*d*e - 2554*e^2)*Log[3 + 2*x + 5*x^2])/15625
```

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((e*x+d)**2*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.161281, size = 130, normalized size = 0.83

$$\frac{84\left(5725d^2-4405de-2554e^2\right)\log\left(5x^2+2x+3\right)+35x\left(50d^2\left(200x^2-495x+486\right)+60de\left(250x^3-550x^2+405x+916\right)\right.}{1312500}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2),x]
```

```
[Out] (35*x*(50*d^2*(486 - 495*x + 200*x^2) + 60*d*e*(916 + 405*x - 550
*x^2 + 250*x^3) + 3*e^2*(-3524 + 4580*x + 2700*x^2 - 4125*x^3 + 2
000*x^4)) - 6*Sqrt[14]*(10575*d^2 + 59890*d*e - 18323*e^2)*ArcTan
[(1 + 5*x)/Sqrt[14]] + 84*(5725*d^2 - 4405*d*e - 2554*e^2)*Log[3
+ 2*x + 5*x^2])/1312500
```

Maple [A] time = 0.007, size = 191, normalized size = 1.2

$$\frac{4\,e^2x^5}{25}+\frac{2\,x^4de}{5}-\frac{33\,x^4e^2}{100}+\frac{4\,x^3d^2}{15}-\frac{22\,x^3de}{25}+\frac{27\,e^2x^3}{125}-\frac{33\,x^2d^2}{50}+\frac{81\,x^2de}{125}+\frac{229\,e^2x^2}{625}+\frac{81\,d^2x}{125}+\frac{916\,xde}{625}-\frac{881\,e^2x}{3125}+\frac{229\,\ln\left(5\,x^2+2\,x+3\right)\,d^2}{625}-\frac{881\,\ln\left(5\,x^2+2\,x+3\right)\,de}{3125}-\frac{2554\,\ln\left(5\,x^2+2\,x+3\right)\,e^2}{15625}-\frac{423\,\sqrt{14}d^2}{8750}\arctan\left(\frac{(10\,x+2)\,\sqrt{14}}{28}\right)-\frac{5989\,\sqrt{14}de}{21875}\arctan\left(\frac{(10\,x+2)\,\sqrt{14}}{28}\right)+\frac{18323\,\sqrt{14}e^2}{218750}\arctan\left(\frac{(10\,x+2)\,\sqrt{14}}{28}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3),x)
```

```
[Out] 4/25*e^2*x^5+2/5*x^4*d*e-33/100*x^4*e^2+4/15*x^3*d^2-22/25*x^3*d*
e+27/125*e^2*x^3-33/50*x^2*d^2+81/125*x^2*d*e+229/625*e^2*x^2+81/
125*d^2*x+916/625*x*d*e-881/3125*e^2*x+229/625*ln(5*x^2+2*x+3)*d^
2-881/3125*ln(5*x^2+2*x+3)*d*e-2554/15625*ln(5*x^2+2*x+3)*e^2-423
```

```
/8750*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d^2-5989/21875*14^(
1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d*e+18323/218750*14^(1/2)*arc
tan(1/28*(10*x+2)*14^(1/2))*e^2
```

Maxima [A] time = 0.763578, size = 190, normalized size = 1.22

$$\frac{4}{25}e^2x^5+\frac{1}{100}\left(40\,de-33\,e^2\right)x^4+\frac{1}{375}\left(100\,d^2-330\,de+81\,e^2\right)x^3 - \frac{1}{1250}\left(825\,d^2-810\,de-458\,e^2\right)x^2 - \frac{1}{218750}\sqrt{14}\left(10575\,d^2+59890\,de-18323\,e^2\right)\arctan\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right) + \frac{1}{3125}\left(2025\,d^2+4580\,de-881\,e^2\right)x+\frac{1}{15625}\left(5725\,d^2-4405\,de-2554\,e^2\right)\log\left(5\,x^2+2\,x+3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2/(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] 4/25*e^2*x^5 + 1/100*(40*d*e - 33*e^2)*x^4 + 1/375*(100*d^2 - 330
*d*e + 81*e^2)*x^3 - 1/1250*(825*d^2 - 810*d*e - 458*e^2)*x^2 - 1
/218750*sqrt(14)*(10575*d^2 + 59890*d*e - 18323*e^2)*arctan(1/14*
sqrt(14)*(5*x + 1)) + 1/3125*(2025*d^2 + 4580*d*e - 881*e^2)*x +
1/15625*(5725*d^2 - 4405*d*e - 2554*e^2)*log(5*x^2 + 2*x + 3)
```

Fricas [A] time = 0.267392, size = 205, normalized size = 1.31

$$\frac{1}{2625000}\sqrt{14}\left(12\sqrt{14}\left(5725\,d^2-4405\,de-2554\,e^2\right)\log\left(5\,x^2+2\,x+3\right)-12\left(10575\,d^2+59890\,de-18323\,e^2\right)\arctan\left(\frac{1}{14}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2/(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] 1/2625000*sqrt(14)*(12*sqrt(14)*(5725*d^2 - 4405*d*e - 2554*e^2)*
log(5*x^2 + 2*x + 3) - 12*(10575*d^2 + 59890*d*e - 18323*e^2)*arc
tan(1/14*sqrt(14)*(5*x + 1)) + 5*sqrt(14)*(6000*e^2*x^5 + 375*(40
*d*e - 33*e^2)*x^4 + 100*(100*d^2 - 330*d*e + 81*e^2)*x^3 - 30*(8
25*d^2 - 810*d*e - 458*e^2)*x^2 + 12*(2025*d^2 + 4580*d*e - 881*e
^2)*x))
```

Sympy [A] time = 1.72076, size = 303, normalized size = 1.94

$$\frac{4e^2x^5}{25} + x^4\left(\frac{2de}{5} - \frac{33e^2}{100}\right) + x^3\left(\frac{4d^2}{15} - \frac{22de}{25} + \frac{27e^2}{125}\right) + x^2\left(-\frac{33d^2}{50} + \frac{81de}{125} + \frac{229e^2}{625}\right) + x\left(\frac{81d^2}{125} + \frac{916de}{625} - \frac{881e^2}{3125}\right) + \left(\frac{229d^2}{625} - \frac{881de}{3125} - \frac{2554e^2}{15625} - \frac{\sqrt{14}i\left(10575d^2 + 59890de - 18323e^2\right)}{437500}\right)\log\left(x + \frac{2115d^2 + 11978de - \frac{18323e^2}{5} + \frac{\sqrt{14}i\left(10575d^2+59890de-18323e^2\right)}{5}}{10575d^2 + 59890de - 18323e^2}\right) + \left(\frac{229d^2}{625} - \frac{881de}{3125} - \frac{2554e^2}{15625} + \frac{\sqrt{14}i\left(10575d^2 + 59890de - 18323e^2\right)}{437500}\right)\log\left(x + \frac{2115d^2 + 11978de - \frac{18323e^2}{5} - \frac{\sqrt{14}i\left(10575d^2+59890de-18323e^2\right)}{5}}{10575d^2 + 59890de - 18323e^2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)**2*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3),x)
```

```
[Out] 4*e**2*x**5/25 + x**4*(2*d*e/5 - 33*e**2/100) + x**3*(4*d**2/15 -
 22*d*e/25 + 27*e**2/125) + x**2*(-33*d**2/50 + 81*d*e/125 + 229*
e**2/625) + x*(81*d**2/125 + 916*d*e/625 - 881*e**2/3125) + (229*
d**2/625 - 881*d*e/3125 - 2554*e**2/15625 - sqrt(14)*I*(10575*d**
2 + 59890*d*e - 18323*e**2)/437500)*log(x + (2115*d**2 + 11978*d*
e - 18323*e**2/5 + sqrt(14)*I*(10575*d**2 + 59890*d*e - 18323*e**
2)/5)/(10575*d**2 + 59890*d*e - 18323*e**2)) + (229*d**2/625 - 88
1*d*e/3125 - 2554*e**2/15625 + sqrt(14)*I*(10575*d**2 + 59890*d*e
 - 18323*e**2)/437500)*log(x + (2115*d**2 + 11978*d*e - 18323*e**
2/5 - sqrt(14)*I*(10575*d**2 + 59890*d*e - 18323*e**2)/5)/(10575*
d**2 + 59890*d*e - 18323*e**2))
```

GIAC/XCAS [A] time = 0.270952, size = 196, normalized size = 1.26

$$\frac{4}{25}\,x^5e^2 + \frac{2}{5}\,dx^4e + \frac{4}{15}\,d^2x^3 - \frac{33}{100}\,x^4e^2 - \frac{22}{25}\,dx^3e - \frac{33}{50}\,d^2x^2 + \frac{27}{125}\,x^3e^2 + \frac{81}{125}\,dx^2e + \frac{81}{125}\,d^2x + \frac{229}{625}\,x^2e^2 + \frac{916}{625}\,dxe - \frac{1}{218750}\,\sqrt{14}\left(10575\,d^2 + 59890\,de - 18323\,e^2\right)\arctan\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right) - \frac{881}{3125}\,xe^2 + \frac{1}{15625}\,\left(5725\,d^2 - 4405\,de - 2554\,e^2\right)\ln\left(5\,x^2 + 2\,x + 3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2/(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] 4/25*x^5*e^2 + 2/5*d*x^4*e + 4/15*d^2*x^3 - 33/100*x^4*e^2 - 22/2
5*d*x^3*e - 33/50*d^2*x^2 + 27/125*x^3*e^2 + 81/125*d*x^2*e + 81/
125*d^2*x + 229/625*x^2*e^2 + 916/625*d*x*e - 1/218750*sqrt(14)*(
10575*d^2 + 59890*d*e - 18323*e^2)*arctan(1/14*sqrt(14)*(5*x + 1)
) - 881/3125*x*e^2 + 1/15625*(5725*d^2 - 4405*d*e - 2554*e^2)*ln(
5*x^2 + 2*x + 3)
```

3.306 $\int \frac{(d+ex)(2+x+3x^2-5x^3+4x^4)}{3+2x+5x^2}\,dx$

Optimal. Leaf size=99

$$\frac{1}{75}x^3(20d-33e)-\frac{3}{250}x^2(55d-27e)+\frac{(2290d-881e)\log\left(5x^2+2x+3\right)}{6250}+\frac{1}{625}x(405d+458e)-\frac{(2115d+5989e)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{3125\sqrt{14}}+\frac{ex^4}{5}$$

```
[Out] ((405*d + 458*e)*x)/625 - (3*(55*d - 27*e)*x^2)/250 + ((20*d - 33
*e)*x^3)/75 + (e*x^4)/5 - ((2115*d + 5989*e)*ArcTan[(1 + 5*x)/Sqr
t[14]])/(3125*Sqrt[14]) + ((2290*d - 881*e)*Log[3 + 2*x + 5*x^2])
/6250
```

Rubi [A] time = 0.196099, antiderivative size = 99, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.139

$$\frac{1}{75}x^3(20d-33e)-\frac{3}{250}x^2(55d-27e)+\frac{(2290d-881e)\log\left(5x^2+2x+3\right)}{6250}+\frac{1}{625}x(405d+458e)-\frac{(2115d+5989e)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{3125\sqrt{14}}+\frac{ex^4}{5}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2),x]
```

```
[Out] ((405*d + 458*e)*x)/625 - (3*(55*d - 27*e)*x^2)/250 + ((20*d - 33
*e)*x^3)/75 + (e*x^4)/5 - ((2115*d + 5989*e)*ArcTan[(1 + 5*x)/Sqr
t[14]])/(3125*Sqrt[14]) + ((2290*d - 881*e)*Log[3 + 2*x + 5*x^2])
/6250
```

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

$$d\int\frac{81}{125}\,dx+\frac{ex^4}{5}+e\int\frac{458}{625}\,dx+x^3\left(\frac{4d}{15}-\frac{11e}{25}\right)-x^2\left(\frac{33d}{50}-\frac{81e}{250}\right)+\left(\frac{229d}{625}-\frac{881e}{6250}\right)\log\left(5x^2+2x+3\right)-\frac{\sqrt{14}\,(2115d+5989e)\,\mathrm{atan}\left(\sqrt{14}\left(\frac{5x}{14}+\frac{1}{14}\right)\right)}{43750}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x+d)*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3),x)
```

```
[Out] d*Integral(81/125, x) + e*x**4/5 + e*Integral(458/625, x) + x**3*
(4*d/15 - 11*e/25) - x**2*(33*d/50 - 81*e/250) + (229*d/625 - 881
*e/6250)*log(5*x**2 + 2*x + 3) - sqrt(14)*(2115*d + 5989*e)*atan(
sqrt(14)*(5*x/14 + 1/14))/43750
```

Mathematica [A] time = 0.0868843, size = 86, normalized size = 0.87

$$\frac{21(2290d-881e)\log\left(5x^2+2x+3\right)+35x\left(5d\left(200x^2-495x+486\right)+3e\left(250x^3-550x^2+405x+916\right)\right)-3\sqrt{14}(2115d+}{131250}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2),x]
```

```
[Out] (35*x*(5*d*(486 - 495*x + 200*x^2) + 3*e*(916 + 405*x - 550*x^2 +
 250*x^3)) - 3*Sqrt[14]*(2115*d + 5989*e)*ArcTan[(1 + 5*x)/Sqrt[1
4]] + 21*(2290*d - 881*e)*Log[3 + 2*x + 5*x^2])/131250
```

Maple [A] time = 0.006, size = 102, normalized size = 1.

$$\frac{ex^4}{5}+\frac{4x^3d}{15}-\frac{11x^3e}{25}-\frac{33dx^2}{50}+\frac{81ex^2}{250}+\frac{81dx}{125}+\frac{458ex}{625}+\frac{229\ln\left(5x^2+2x+3\right)d}{625}-\frac{881e\ln\left(5x^2+2x+3\right)}{6250}-\frac{423\sqrt{14}d}{8750}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)-\frac{5989\sqrt{14}e}{43750}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3),x)
```

```
[Out] 1/5*e*x^4+4/15*x^3*d-11/25*x^3*e-33/50*d*x^2+81/250*e*x^2+81/125*
d*x+458/625*e*x+229/625*ln(5*x^2+2*x+3)*d-881/6250*e*ln(5*x^2+2*x
+3)-423/8750*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d-5989/43750
*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*e
```

Maxima [A] time = 0.763406, size = 113, normalized size = 1.14

$$\frac{1}{5}ex^4 + \frac{1}{75}(20d - 33e)x^3 - \frac{3}{250}(55d - 27e)x^2 - \frac{1}{43750}\sqrt{14}(2115d + 5989e)\arctan\left(\frac{1}{14}\sqrt{14}(5x+1)\right) + \frac{1}{625}(405d + 458e)x + \frac{1}{6250}(2290d - 881e)\log\left(5x^2 + 2x + 3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)/(5*x^2 + 2*x + 3),x, algorithm=
```

```
[Out] 1/5*e*x^4 + 1/75*(20*d - 33*e)*x^3 - 3/250*(55*d - 27*e)*x^2 - 1/
43750*sqrt(14)*(2115*d + 5989*e)*arctan(1/14*sqrt(14)*(5*x + 1))
+ 1/625*(405*d + 458*e)*x + 1/6250*(2290*d - 881*e)*log(5*x^2 + 2
*x + 3)
```

Fricas [A] time = 0.263962, size = 128, normalized size = 1.29

$$\frac{1}{262500}\sqrt{14}\left(3\sqrt{14}(2290d - 881e)\log\left(5x^2 + 2x + 3\right) - 6(2115d + 5989e)\arctan\left(\frac{1}{14}\sqrt{14}(5x+1)\right) + 5\sqrt{14}(750ex^4 + 50$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)/(5*x^2 + 2*x + 3),x, algorithm=
```

```
[Out] 1/262500*sqrt(14)*(3*sqrt(14)*(2290*d - 881*e)*log(5*x^2 + 2*x +
3) - 6*(2115*d + 5989*e)*arctan(1/14*sqrt(14)*(5*x + 1)) + 5*sqrt
(14)*(750*e*x^4 + 50*(20*d - 33*e)*x^3 - 45*(55*d - 27*e)*x^2 + 6
*(405*d + 458*e)*x))
```

Sympy [A] time = 1.24463, size = 163, normalized size = 1.65

$$\frac{ex^4}{5} + x^3\left(\frac{4d}{15} - \frac{11e}{25}\right) + x^2\left(-\frac{33d}{50} + \frac{81e}{250}\right) + x\left(\frac{81d}{125} + \frac{458e}{625}\right) + \left(\frac{229d}{625} - \frac{881e}{6250} - \frac{\sqrt{14}i\,(2115d + 5989e)}{87500}\right)\log\left(x + \frac{423d + \frac{5989e}{5} + \frac{\sqrt{14}i(2115d+5989e)}{5}}{2115d + 5989e}\right) + \left(\frac{229d}{625} - \frac{881e}{6250} + \frac{\sqrt{14}i\,(2115d + 5989e)}{87500}\right)\log\left(x + \frac{423d + \frac{5989e}{5} - \frac{\sqrt{14}i(2115d+5989e)}{5}}{2115d + 5989e}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3),x)
```

```
[Out] e*x**4/5 + x**3*(4*d/15 - 11*e/25) + x**2*(-33*d/50 + 81*e/250) +
 x*(81*d/125 + 458*e/625) + (229*d/625 - 881*e/6250 - sqrt(14)*I*
(2115*d + 5989*e)/87500)*log(x + (423*d + 5989*e/5 + sqrt(14)*I*(
2115*d + 5989*e)/5)/(2115*d + 5989*e)) + (229*d/625 - 881*e/6250
+ sqrt(14)*I*(2115*d + 5989*e)/87500)*log(x + (423*d + 5989*e/5 -
 sqrt(14)*I*(2115*d + 5989*e)/5)/(2115*d + 5989*e))
```

GIAC/XCAS [A] time = 0.27052, size = 119, normalized size = 1.2

$$\frac{1}{5}\,x^4e+\frac{4}{15}\,dx^3-\frac{11}{25}\,x^3e-\frac{33}{50}\,dx^2+\frac{81}{250}\,x^2e-\frac{1}{43750}\,\sqrt{14}(2115\,d+5989\,e)\arctan\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right)+\frac{81}{125}\,dx+\frac{458}{625}\,xe+\frac{1}{6250}\,(2290\,d-881\,e)\ln\left(5\,x^2+2\,x+3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)/(5*x^2 + 2*x + 3),x, algorithm=
```

```
[Out] 1/5*x^4*e + 4/15*d*x^3 - 11/25*x^3*e - 33/50*d*x^2 + 81/250*x^2*e
 - 1/43750*sqrt(14)*(2115*d + 5989*e)*arctan(1/14*sqrt(14)*(5*x +
 1)) + 81/125*d*x + 458/625*x*e + 1/6250*(2290*d - 881*e)*ln(5*x^
2 + 2*x + 3)
```

3.307 $\int \frac{2+x+3x^2-5x^3+4x^4}{3+2x+5x^2}\,dx$

Optimal. Leaf size=56

$$\frac{4x^3}{15}-\frac{33x^2}{50}+\frac{229}{625}\log\left(5x^2+2x+3\right)+\frac{81x}{125}-\frac{423\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{625\sqrt{14}}$$

```
[Out] (81*x)/125 - (33*x^2)/50 + (4*x^3)/15 - (423*ArcTan[(1 + 5*x)/Sqr
t[14]])/(625*Sqrt[14]) + (229*Log[3 + 2*x + 5*x^2])/625
```

Rubi [A] time = 0.0838083, antiderivative size = 56, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.161$

$$\frac{4x^3}{15}-\frac{33x^2}{50}+\frac{229}{625}\log\left(5x^2+2x+3\right)+\frac{81x}{125}-\frac{423\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{625\sqrt{14}}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/(3 + 2*x + 5*x^2),x]
```

```
[Out] (81*x)/125 - (33*x^2)/50 + (4*x^3)/15 - (423*ArcTan[(1 + 5*x)/Sqr
t[14]])/(625*Sqrt[14]) + (229*Log[3 + 2*x + 5*x^2])/625
```

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

$$\frac{4x^3}{15}-\frac{33x^2}{50}+\frac{229\log\left(5x^2+2x+3\right)}{625}-\frac{423\sqrt{14}\,\mathrm{atan}\left(\sqrt{14}\left(\frac{5x}{14}+\frac{1}{14}\right)\right)}{8750}+\int\frac{81}{125}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3),x)
```

```
[Out] 4*x**3/15 - 33*x**2/50 + 229*log(5*x**2 + 2*x + 3)/625 - 423*sqrt
(14)*atan(sqrt(14)*(5*x/14 + 1/14))/8750 + Integral(81/125, x)
```

Mathematica [A] time = 0.0386943, size = 50, normalized size = 0.89

$$\frac{35x\left(200x^2-495x+486\right)+9618\log\left(5x^2+2x+3\right)-1269\sqrt{14}\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{26250}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/(3 + 2*x + 5*x^2),x]
```

```
[Out] (35*x*(486 - 495*x + 200*x^2) - 1269*Sqrt[14]*ArcTan[(1 + 5*x)/Sq
rt[14]] + 9618*Log[3 + 2*x + 5*x^2])/26250
```

Maple [A] time = 0.005, size = 44, normalized size = 0.8

$$\frac{4x^3}{15} - \frac{33x^2}{50} + \frac{81x}{125} + \frac{229 \ln\left(5x^2 + 2x + 3\right)}{625} - \frac{423\sqrt{14}}{8750} \arctan\left(\frac{(10x + 2)\sqrt{14}}{28}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3),x)
```

```
[Out] 4/15*x^3-33/50*x^2+81/125*x+229/625*ln(5*x^2+2*x+3)-423/8750*14^(
1/2)*arctan(1/28*(10*x+2)*14^(1/2))
```

Maxima [A] time = 0.759198, size = 58, normalized size = 1.04

$$\frac{4}{15}x^3 - \frac{33}{50}x^2 - \frac{423}{8750}\sqrt{14}\arctan\left(\frac{1}{14}\sqrt{14}(5x + 1)\right) + \frac{81}{125}x + \frac{229}{625}\log\left(5x^2 + 2x + 3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/(5*x^2 + 2*x + 3),x, algorithm="maxima")
```

```
[Out] 4/15*x^3 - 33/50*x^2 - 423/8750*sqrt(14)*arctan(1/14*sqrt(14)*(5*
x + 1)) + 81/125*x + 229/625*log(5*x^2 + 2*x + 3)
```

Fricas [A] time = 0.261465, size = 73, normalized size = 1.3

$$\frac{1}{52500}\sqrt{14}\left(5\sqrt{14}\left(200x^3 - 495x^2 + 486x\right) + 1374\sqrt{14}\log\left(5x^2 + 2x + 3\right) - 2538\arctan\left(\frac{1}{14}\sqrt{14}(5x + 1)\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/(5*x^2 + 2*x + 3),x, algorithm="fricas")
```

```
[Out] 1/52500*sqrt(14)*(5*sqrt(14)*(200*x^3 - 495*x^2 + 486*x) + 1374*s
qrt(14)*log(5*x^2 + 2*x + 3) - 2538*arctan(1/14*sqrt(14)*(5*x + 1
)))
```

Sympy [A] time = 0.139929, size = 61, normalized size = 1.09

$$\frac{4x^3}{15} - \frac{33x^2}{50} + \frac{81x}{125} + \frac{229\log\left(x^2 + \frac{2x}{5} + \frac{3}{5}\right)}{625} - \frac{423\sqrt{14}\,\mathrm{atan}\left(\frac{5\sqrt{14}x}{14} + \frac{\sqrt{14}}{14}\right)}{8750}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3),x)
```

```
[Out] 4*x**3/15 - 33*x**2/50 + 81*x/125 + 229*log(x**2 + 2*x/5 + 3/5)/6
25 - 423*sqrt(14)*atan(5*sqrt(14)*x/14 + sqrt(14)/14)/8750
```

GIAC/XCAS [A] time = 0.270033, size = 58, normalized size = 1.04

$$\frac{4}{15}\,x^3 - \frac{33}{50}\,x^2 - \frac{423}{8750}\,\sqrt{14}\,\arctan\left(\frac{1}{14}\,\sqrt{14}(5\,x + 1)\right) + \frac{81}{125}\,x + \frac{229}{625}\,\ln\left(5\,x^2 + 2\,x + 3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/(5*x^2 + 2*x + 3),x, algorithm="giac")
```

```
[Out] 4/15*x^3 - 33/50*x^2 - 423/8750*sqrt(14)*arctan(1/14*sqrt(14)*(5*
x + 1)) + 81/125*x + 229/625*ln(5*x^2 + 2*x + 3)
```

3.308 $\int \frac{2+x+3x^2-5x^3+4x^4}{(d+ex)(3+2x+5x^2)}\,dx$

Optimal. Leaf size=168

$$\frac{(458d-7e)\log\left(5x^2+2x+3\right)}{250\left(5d^2-2de+3e^2\right)}-\frac{(423d-1367e)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{125\sqrt{14}\left(5d^2-2de+3e^2\right)}+\frac{\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)\log(d+ex)}{e^3\left(5d^2-2de+3e^2\right)}-\frac{x(20d+33e)}{25e^2}+\frac{2x^2}{5e}$$

```
[Out] -((20*d + 33*e)*x)/(25*e^2) + (2*x^2)/(5*e) - ((423*d - 1367*e)*A
rcTan[(1 + 5*x)/Sqrt[14]])/(125*Sqrt[14]*(5*d^2 - 2*d*e + 3*e^2))
 + ((4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*Log[d + e*x])/(
e^3*(5*d^2 - 2*d*e + 3*e^2)) + ((458*d - 7*e)*Log[3 + 2*x + 5*x^2
])/(250*(5*d^2 - 2*d*e + 3*e^2))
```

Rubi [A] time = 0.367802, antiderivative size = 168, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.132$

$$\frac{(458d-7e)\log\left(5x^2+2x+3\right)}{250\left(5d^2-2de+3e^2\right)}-\frac{(423d-1367e)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{125\sqrt{14}\left(5d^2-2de+3e^2\right)}+\frac{\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)\log(d+ex)}{e^3\left(5d^2-2de+3e^2\right)}-\frac{x(20d+33e)}{25e^2}+\frac{2x^2}{5e}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)*(3 + 2*x + 5*x^2)),x]
```

```
[Out] -((20*d + 33*e)*x)/(25*e^2) + (2*x^2)/(5*e) - ((423*d - 1367*e)*A
rcTan[(1 + 5*x)/Sqrt[14]])/(125*Sqrt[14]*(5*d^2 - 2*d*e + 3*e^2))
 + ((4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*Log[d + e*x])/(
e^3*(5*d^2 - 2*d*e + 3*e^2)) + ((458*d - 7*e)*Log[3 + 2*x + 5*x^2
])/(250*(5*d^2 - 2*d*e + 3*e^2))
```

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

$$-\frac{\sqrt{14}(423d-1367e)\,\mathrm{atan}\left(\sqrt{14}\left(\frac{5x}{14}+\frac{1}{14}\right)\right)}{1750\left(5d^2-2de+3e^2\right)}+\frac{(458d-7e)\log\left(5x^2+2x+3\right)}{250\left(5d^2-2de+3e^2\right)}+\frac{4\int x\,dx}{5e}+\frac{(20d+33e)\int\left(-\frac{1}{25}\right)dx}{e^2}+\frac{\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)\log(d+ex)}{e^3\left(5d^2-2de+3e^2\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)/(5*x**2+2*x+3),x)
```

```
[Out] -sqrt(14)*(423*d - 1367*e)*atan(sqrt(14)*(5*x/14 + 1/14))/(1750*(
5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)*log(5*x**2 + 2*x + 3)/(
250*(5*d**2 - 2*d*e + 3*e**2)) + 4*Integral(x, x)/(5*e) + (20*d +
 33*e)*Integral(-1/25, x)/e**2 + (4*d**4 + 5*d**3*e + 3*d**2*e**2
 - d*e**3 + 2*e**4)*log(d + e*x)/(e**3*(5*d**2 - 2*d*e + 3*e**2))
```

Mathematica [A] time = 0.219543, size = 146, normalized size = 0.87

$$\frac{70ex\left(5d^2-2de+3e^2\right)\left(e(10x-33)-20d\right)+1750\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)\log(d+ex)+7e^3(458d-7e)\log\left(5x^2+\right.}{1750e^3\left(5d^2-2de+3e^2\right)}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)*(3 + 2*x + 5*x^2)),x]
```

```
[Out] (70*e*(5*d^2 - 2*d*e + 3*e^2)*x*(-20*d + e*(-33 + 10*x)) - Sqrt[1
4]*(423*d - 1367*e)*e^3*ArcTan[(1 + 5*x)/Sqrt[14]] + 1750*(4*d^4
+ 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*Log[d + e*x] + 7*(458*d -
7*e)*e^3*Log[3 + 2*x + 5*x^2])/(1750*e^3*(5*d^2 - 2*d*e + 3*e^2))
```

Maple [A] time = 0.014, size = 298, normalized size = 1.8

$$\frac{2\,x^2}{5\,e}-\frac{4\,dx}{5\,e^2}-\frac{33\,x}{25\,e}+4\,\frac{\ln(ex+d)\,d^4}{e^3\,(5\,d^2-2\,de+3\,e^2)}+5\,\frac{\ln(ex+d)\,d^3}{e^2\,(5\,d^2-2\,de+3\,e^2)}+3\,\frac{\ln(ex+d)\,d^2}{e\,(5\,d^2-2\,de+3\,e^2)}-\frac{\ln(ex+d)\,d}{5\,d^2-2\,de+3\,e^2}+2\,\frac{e\ln(ex+d)}{5\,d^2-2\,de+3\,e^2}+\frac{229\,\ln\left(5\,x^2+2\,x+3\right)\,d}{625\,d^2-250\,de+375\,e^2}-\frac{7\,e\ln\left(5\,x^2+2\,x+3\right)}{1250\,d^2-500\,de+750\,e^2}-\frac{423\,\sqrt{14}d}{8750\,d^2-3500\,de+5250\,e^2}\arctan\left(\frac{(10\,x+2)\,\sqrt{14}}{28}\right)+\frac{1367\,\sqrt{14}e}{8750\,d^2-3500\,de+5250\,e^2}\arctan\left(\frac{(10\,x+2)\,\sqrt{14}}{28}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^4-5*x^3+3*x^2+x+2)/(e*x+d)/(5*x^2+2*x+3),x)
```

```
[Out] 2/5*x^2/e-4/5/e^2*x*d-33/25/e*x+4/e^3/(5*d^2-2*d*e+3*e^2)*ln(e*x+
d)*d^4+5/e^2/(5*d^2-2*d*e+3*e^2)*ln(e*x+d)*d^3+3/e/(5*d^2-2*d*e+3
```

```
*e^2)*ln(e*x+d)*d^2-1/(5*d^2-2*d*e+3*e^2)*ln(e*x+d)*d+2*e/(5*d^2-
2*d*e+3*e^2)*ln(e*x+d)+229/5/(125*d^2-50*d*e+75*e^2)*ln(5*x^2+2*x
+3)*d-7/10/(125*d^2-50*d*e+75*e^2)*ln(5*x^2+2*x+3)*e-423/70/(125*
d^2-50*d*e+75*e^2)*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d+1367
/70/(125*d^2-50*d*e+75*e^2)*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2
))*e
```

Maxima [A] time = 0.763673, size = 216, normalized size = 1.29

$$-\frac{\sqrt{14}(423\,d-1367\,e)\arctan\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right)}{1750\,(5\,d^2-2\,de+3\,e^2)}+\frac{\left(4\,d^4+5\,d^3e+3\,d^2e^2-de^3+2\,e^4\right)\log\left(ex+d\right)}{5\,d^2e^3-2\,de^4+3\,e^5}+\frac{(458\,d-7\,e)\log\left(5\,x^2+2\,x+3\right)}{250\,(5\,d^2-2\,de+3\,e^2)}+\frac{10\,ex^2-(20\,d+33\,e)x}{25\,e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)*(5*x^2 + 2*x + 3)),x, algorith
```

```
[Out] -1/1750*sqrt(14)*(423*d - 1367*e)*arctan(1/14*sqrt(14)*(5*x + 1))
/(5*d^2 - 2*d*e + 3*e^2) + (4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 +
 2*e^4)*log(e*x + d)/(5*d^2*e^3 - 2*d*e^4 + 3*e^5) + 1/250*(458*d
 - 7*e)*log(5*x^2 + 2*x + 3)/(5*d^2 - 2*d*e + 3*e^2) + 1/25*(10*e
*x^2 - (20*d + 33*e)*x)/e^2
```

Fricas [A] time = 0.307484, size = 246, normalized size = 1.46

$$\frac{\sqrt{14}\Big(250\,\sqrt{14}\left(4\,d^4+5\,d^3e+3\,d^2e^2-de^3+2\,e^4\right)\log\left(ex+d\right)+\sqrt{14}\left(458\,de^3-7\,e^4\right)\log\left(5\,x^2+2\,x+3\right)-2\,\big(423\,de^3-1367}{3500\,(5\,d^2e^3-2\,de^4}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)*(5*x^2 + 2*x + 3)),x, algorith
```

```
[Out] 1/3500*sqrt(14)*(250*sqrt(14)*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^
3 + 2*e^4)*log(e*x + d) + sqrt(14)*(458*d*e^3 - 7*e^4)*log(5*x^2
+ 2*x + 3) - 2*(423*d*e^3 - 1367*e^4)*arctan(1/14*sqrt(14)*(5*x +
 1)) + 10*sqrt(14)*(10*(5*d^2*e^2 - 2*d*e^3 + 3*e^4)*x^2 - (100*d
^3*e + 125*d^2*e^2 - 6*d*e^3 + 99*e^4)*x))/(5*d^2*e^3 - 2*d*e^4 +
 3*e^5)
```

Sympy [A] time = 16.1486, size = 4106, normalized size = 24.44

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)/(5*x**2+2*x+3),x)
```

```
[Out] (-sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) +
(458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2)))*log(x + (-39200000
0*d**10*(-sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e
**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2))) - 82320000
0*d**9*e*(-sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*
e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2))) + 1531040
00*d**9 + 490000000*d**8*e**3*(-sqrt(14)*I*(423*d - 1367*e)/(3500
*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e
+ 3*e**2)))**2 - 1043700000*d**8*e**2*(-sqrt(14)*I*(423*d - 1367*
e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2
- 2*d*e + 3*e**2))) + 349944000*d**8*e + 220500000*d**7*e**4*(-sq
rt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458
*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2)))**2 - 646800000*d**7*e*
*3*(-sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2))
 + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2))) + 386841000*d**
7*e**2 + 617925000*d**6*e**5*(-sqrt(14)*I*(423*d - 1367*e)/(3500*
(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e +
 3*e**2)))**2 - 872200000*d**6*e**4*(-sqrt(14)*I*(423*d - 1367*e)
/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 -
2*d*e + 3*e**2))) + 39565736*d**6*e**3 - 356370000*d**5*e**6*(-sq
rt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458
*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2)))**2 - 573645520*d**5*e*
*5*(-sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2))
 + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2))) + 14633332*d**5
*e**4 + 1259909000*d**4*e**7*(-sqrt(14)*I*(423*d - 1367*e)/(3500*
(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e +
 3*e**2)))**2 - 115902052*d**4*e**6*(-sqrt(14)*I*(423*d - 1367*e)
/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 -
2*d*e + 3*e**2))) + 107677543*d**4*e**5 - 1045744000*d**3*e**8*(-
sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (4
58*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2)))**2 - 126665168*d**3*
e**7*(-sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2
)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2))) + 129989935*d
**3*e**6 + 850339000*d**2*e**9*(-sqrt(14)*I*(423*d - 1367*e)/(350
0*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e
 + 3*e**2)))**2 - 218333192*d**2*e**8*(-sqrt(14)*I*(423*d - 1367*
e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2
- 2*d*e + 3*e**2))) - 50221473*d**2*e**7 - 358554000*d*e**10*(-sq
rt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458
*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2)))**2 + 113884512*d*e**9*
(-sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) +
(458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2))) + 17826327*d*e**8
+ 106659000*e**11*(-sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2
*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2)))*
```

```
*2 - 89860932*e**10*(-sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 -
 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2))
) + 12503288*e**9)/(47376000*d**9 - 34664000*d**8*e - 237671000*d
**7*e**2 - 447135416*d**6*e**3 - 79441992*d**5*e**4 + 39361392*d*
*4*e**5 + 28919955*d**3*e**6 - 233063217*d**2*e**7 + 141064083*d*
e**8 - 59791213*e**9)) + (sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d*
*2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e*
*2)))*log(x + (-392000000*d**10*(sqrt(14)*I*(423*d - 1367*e)/(350
0*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e
 + 3*e**2))) - 823200000*d**9*e*(sqrt(14)*I*(423*d - 1367*e)/(350
0*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e
 + 3*e**2))) + 153104000*d**9 + 490000000*d**8*e**3*(sqrt(14)*I*(
423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/
(250*(5*d**2 - 2*d*e + 3*e**2)))**2 - 1043700000*d**8*e**2*(sqrt(
14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458*d
- 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2))) + 349944000*d**8*e + 2205
00000*d**7*e**4*(sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*
e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2)))**2
- 646800000*d**7*e**3*(sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2
- 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2)
)) + 386841000*d**7*e**2 + 617925000*d**6*e**5*(sqrt(14)*I*(423*d
 - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*
(5*d**2 - 2*d*e + 3*e**2)))**2 - 872200000*d**6*e**4*(sqrt(14)*I*
(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)
/(250*(5*d**2 - 2*d*e + 3*e**2))) + 39565736*d**6*e**3 - 35637000
0*d**5*e**6*(sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e +
3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2)))**2 - 57
3645520*d**5*e**5*(sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*
d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2))) +
 14633332*d**5*e**4 + 1259909000*d**4*e**7*(sqrt(14)*I*(423*d - 1
367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d
**2 - 2*d*e + 3*e**2)))**2 - 115902052*d**4*e**6*(sqrt(14)*I*(423
*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(25
0*(5*d**2 - 2*d*e + 3*e**2))) + 107677543*d**4*e**5 - 1045744000*
d**3*e**8*(sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*
e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2)))**2 - 1266
65168*d**3*e**7*(sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*
e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2))) + 1
29989935*d**3*e**6 + 850339000*d**2*e**9*(sqrt(14)*I*(423*d - 136
7*e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**
2 - 2*d*e + 3*e**2)))**2 - 218333192*d**2*e**8*(sqrt(14)*I*(423*d
 - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*
(5*d**2 - 2*d*e + 3*e**2))) - 50221473*d**2*e**7 - 358554000*d*e*
*10*(sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**2))
 + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2)))**2 + 113884512*
d*e**9*(sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**2 - 2*d*e + 3*e**
2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**2))) + 17826327*d
*e**8 + 106659000*e**11*(sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d**
2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e**
2)))**2 - 89860932*e**10*(sqrt(14)*I*(423*d - 1367*e)/(3500*(5*d*
*2 - 2*d*e + 3*e**2)) + (458*d - 7*e)/(250*(5*d**2 - 2*d*e + 3*e*
*2))) + 12503288*e**9)/(47376000*d**9 - 34664000*d**8*e - 2376710
00*d**7*e**2 - 447135416*d**6*e**3 - 79441992*d**5*e**4 + 3936139
2*d**4*e**5 + 28919955*d**3*e**6 - 233063217*d**2*e**7 + 14106408
```

```
3*d*e**8 - 59791213*e**9)) + 2*x**2/(5*e) - x*(20*d + 33*e)/(25*e
**2) + (4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)*log(x
+ (-392000000*d**10*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2
*e**4)/(e**3*(5*d**2 - 2*d*e + 3*e**2)) + 153104000*d**9 - 823200
000*d**9*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)/(e**
2*(5*d**2 - 2*d*e + 3*e**2)) + 349944000*d**8*e - 1043700000*d**8
*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)/(e*(5*d**2 -
 2*d*e + 3*e**2)) + 490000000*d**8*(4*d**4 + 5*d**3*e + 3*d**2*e*
*2 - d*e**3 + 2*e**4)**2/(e**3*(5*d**2 - 2*d*e + 3*e**2)**2) + 38
6841000*d**7*e**2 - 646800000*d**7*(4*d**4 + 5*d**3*e + 3*d**2*e*
*2 - d*e**3 + 2*e**4)/(5*d**2 - 2*d*e + 3*e**2) + 220500000*d**7*
(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)**2/(e**2*(5*d
**2 - 2*d*e + 3*e**2)**2) + 39565736*d**6*e**3 - 872200000*d**6*e
*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)/(5*d**2 - 2*
d*e + 3*e**2) + 617925000*d**6*(4*d**4 + 5*d**3*e + 3*d**2*e**2 -
 d*e**3 + 2*e**4)**2/(e*(5*d**2 - 2*d*e + 3*e**2)**2) + 14633332*
d**5*e**4 - 573645520*d**5*e**2*(4*d**4 + 5*d**3*e + 3*d**2*e**2
- d*e**3 + 2*e**4)/(5*d**2 - 2*d*e + 3*e**2) - 356370000*d**5*(4*
d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)**2/(5*d**2 - 2*d
*e + 3*e**2)**2 + 107677543*d**4*e**5 - 115902052*d**4*e**3*(4*d*
*4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)/(5*d**2 - 2*d*e +
3*e**2) + 1259909000*d**4*e*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*
e**3 + 2*e**4)**2/(5*d**2 - 2*d*e + 3*e**2)**2 + 129989935*d**3*e
**6 - 126665168*d**3*e**4*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e*
*3 + 2*e**4)/(5*d**2 - 2*d*e + 3*e**2) - 1045744000*d**3*e**2*(4*
d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)**2/(5*d**2 - 2*d
*e + 3*e**2)**2 - 50221473*d**2*e**7 - 218333192*d**2*e**5*(4*d**
4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)/(5*d**2 - 2*d*e + 3
*e**2) + 850339000*d**2*e**3*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d
*e**3 + 2*e**4)**2/(5*d**2 - 2*d*e + 3*e**2)**2 + 17826327*d*e**8
 + 113884512*d*e**6*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2
*e**4)/(5*d**2 - 2*d*e + 3*e**2) - 358554000*d*e**4*(4*d**4 + 5*d
**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)**2/(5*d**2 - 2*d*e + 3*e**
2)**2 + 12503288*e**9 - 89860932*e**7*(4*d**4 + 5*d**3*e + 3*d**2
*e**2 - d*e**3 + 2*e**4)/(5*d**2 - 2*d*e + 3*e**2) + 106659000*e*
*5*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)**2/(5*d**2
 - 2*d*e + 3*e**2)**2)/(47376000*d**9 - 34664000*d**8*e - 2376710
00*d**7*e**2 - 447135416*d**6*e**3 - 79441992*d**5*e**4 + 3936139
2*d**4*e**5 + 28919955*d**3*e**6 - 233063217*d**2*e**7 + 14106408
3*d*e**8 - 59791213*e**9))/(e**3*(5*d**2 - 2*d*e + 3*e**2))
```

GIAC/XCAS [A] time = 0.272393, size = 213, normalized size = 1.27

$$\frac{1}{25}\left(10\,x^2e - 20\,dx - 33\,xe\right)e^{(-2)} - \frac{\sqrt{14}(423\,d - 1367\,e)\arctan\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right)}{1750\left(5\,d^2 - 2\,de + 3\,e^2\right)} + \frac{(458\,d - 7\,e)\ln\left(5\,x^2 + 2\,x + 3\right)}{250\left(5\,d^2 - 2\,de + 3\,e^2\right)} + \frac{\left(4\,d^4 + 5\,d^3e + 3\,d^2e^2 - de^3 + 2\,e^4\right)\ln\left(|xe + d|\right)}{5\,d^2e^3 - 2\,de^4 + 3\,e^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)*(5*x^2 + 2*x + 3)),x, algorith

[Out] 1/25*(10*x^2*e - 20*d*x - 33*x*e)*e^(-2) - 1/1750*sqrt(14)*(423*d
 - 1367*e)*arctan(1/14*sqrt(14)*(5*x + 1))/(5*d^2 - 2*d*e + 3*e^2
) + 1/250*(458*d - 7*e)*ln(5*x^2 + 2*x + 3)/(5*d^2 - 2*d*e + 3*e^
2) + (4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*ln(abs(x*e + d
))/(5*d^2*e^3 - 2*d*e^4 + 3*e^5)
```

3.309 $\int \frac{2+x+3x^2-5x^3+4x^4}{(d+ex)^2(3+2x+5x^2)}\,dx$

Optimal. Leaf size=233

$$\frac{(229d^2-7de-136e^2)\log(5x^2+2x+3)}{25(5d^2-2de+3e^2)^2}-\frac{(423d^2-2734de+293e^2)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{25\sqrt{14}(5d^2-2de+3e^2)^2}-\frac{4d^4+5d^3e+3d^2e^2-de^3+2e^4}{e^3(5d^2-2de+3e^2)(d+ex)}-\frac{(40d^5+d^4e+28d^3e^2+44d^2e^3-2de^4+e^5)\log(d+ex)}{e^3(5d^2-2de+3e^2)^2}+\frac{4x}{5e^2}$$

```
[Out] (4*x)/(5*e^2) - (4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)/(e^
3*(5*d^2 - 2*d*e + 3*e^2)*(d + e*x)) - ((423*d^2 - 2734*d*e + 293
*e^2)*ArcTan[(1 + 5*x)/Sqrt[14]])/(25*Sqrt[14]*(5*d^2 - 2*d*e + 3
*e^2)^2) - ((40*d^5 + d^4*e + 28*d^3*e^2 + 44*d^2*e^3 - 2*d*e^4 +
 e^5)*Log[d + e*x])/(e^3*(5*d^2 - 2*d*e + 3*e^2)^2) + ((229*d^2 -
 7*d*e - 136*e^2)*Log[3 + 2*x + 5*x^2])/(25*(5*d^2 - 2*d*e + 3*e^
2)^2)
```

Rubi [A] time = 0.477142, antiderivative size = 233, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.132

$$\frac{(229d^2-7de-136e^2)\log(5x^2+2x+3)}{25(5d^2-2de+3e^2)^2}-\frac{(423d^2-2734de+293e^2)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{25\sqrt{14}(5d^2-2de+3e^2)^2}-\frac{4d^4+5d^3e+3d^2e^2-de^3+2e^4}{e^3(5d^2-2de+3e^2)(d+ex)}-\frac{(40d^5+d^4e+28d^3e^2+44d^2e^3-2de^4+e^5)\log(d+ex)}{e^3(5d^2-2de+3e^2)^2}+\frac{4x}{5e^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)^2*(3 + 2*x + 5*x^2)),x]
```

```
[Out] (4*x)/(5*e^2) - (4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)/(e^
3*(5*d^2 - 2*d*e + 3*e^2)*(d + e*x)) - ((423*d^2 - 2734*d*e + 293
*e^2)*ArcTan[(1 + 5*x)/Sqrt[14]])/(25*Sqrt[14]*(5*d^2 - 2*d*e + 3
*e^2)^2) - ((40*d^5 + d^4*e + 28*d^3*e^2 + 44*d^2*e^3 - 2*d*e^4 +
 e^5)*Log[d + e*x])/(e^3*(5*d^2 - 2*d*e + 3*e^2)^2) + ((229*d^2 -
 7*d*e - 136*e^2)*Log[3 + 2*x + 5*x^2])/(25*(5*d^2 - 2*d*e + 3*e^
2)^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((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**2/(5*x**2+2*x+3),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.278047, size = 233, normalized size = 1.

$$\frac{(229d^2-7de-136e^2)\log(5x^2+2x+3)}{25(5d^2-2de+3e^2)^2}+\frac{(-423d^2+2734de-293e^2)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{25\sqrt{14}(5d^2-2de+3e^2)^2}+\frac{-4d^4-5d^3e-3d^2e^2+de^3-2e^4}{e^3(5d^2-2de+3e^2)(d+ex)}+\frac{(-40d^5-d^4e-28d^3e^2-44d^2e^3+2de^4-e^5)\log(d+ex)}{e^3(5d^2-2de+3e^2)^2}+\frac{4x}{5e^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)^2*(3 + 2*x + 5*x^2)),x]
```

```
[Out] (4*x)/(5*e^2) + (-4*d^4 - 5*d^3*e - 3*d^2*e^2 + d*e^3 - 2*e^4)/(e
^3*(5*d^2 - 2*d*e + 3*e^2)*(d + e*x)) + ((-423*d^2 + 2734*d*e - 2
93*e^2)*ArcTan[(1 + 5*x)/Sqrt[14]])/(25*Sqrt[14]*(5*d^2 - 2*d*e +
 3*e^2)^2) + ((-40*d^5 - d^4*e - 28*d^3*e^2 - 44*d^2*e^3 + 2*d*e^
4 - e^5)*Log[d + e*x])/(e^3*(5*d^2 - 2*d*e + 3*e^2)^2) + ((229*d^
2 - 7*d*e - 136*e^2)*Log[3 + 2*x + 5*x^2])/(25*(5*d^2 - 2*d*e + 3
*e^2)^2)
```

Maple [B] time = 0.019, size = 538, normalized size = 2.3

$$\frac{4x}{5e^2} - 4\frac{d^4}{e^3(5d^2-2de+3e^2)(ex+d)} - 5\frac{d^3}{e^2(5d^2-2de+3e^2)(ex+d)} - 3\frac{d^2}{(5d^2-2de+3e^2)e(ex+d)} + \frac{d}{(5d^2-2de+3e^2)(ex+d)} - 2\frac{e}{(5d^2-2de+3e^2)(ex+d)} - 40\frac{\ln(ex+d)d^5}{e^3(5d^2-2de+3e^2)^2} - \frac{\ln(ex+d)d^4}{e^2(5d^2-2de+3e^2)^2} - 28\frac{\ln(ex+d)d^3}{(5d^2-2de+3e^2)^2e} - 44\frac{\ln(ex+d)d^2}{(5d^2-2de+3e^2)^2} + 2\frac{e\ln(ex+d)d}{(5d^2-2de+3e^2)^2} - \frac{e^2\ln(ex+d)}{(5d^2-2de+3e^2)^2} + \frac{229\ln(5x^2+2x+3)d^2}{25(5d^2-2de+3e^2)^2} - \frac{7\ln(5x^2+2x+3)de}{25(5d^2-2de+3e^2)^2} - \frac{136\ln(5x^2+2x+3)e^2}{25(5d^2-2de+3e^2)^2} - \frac{423\sqrt{14}d^2}{350(5d^2-2de+3e^2)^2}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right) + \frac{1367\sqrt{14}de}{175(5d^2-2de+3e^2)^2}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right) - \frac{293\sqrt{14}e^2}{350(5d^2-2de+3e^2)^2}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^4-5*x^3+3*x^2+x+2)/(e*x+d)^2/(5*x^2+2*x+3),x)
```

```
[Out] 4/5*x/e^2-4/e^3/(5*d^2-2*d*e+3*e^2)/(e*x+d)*d^4-5/e^2/(5*d^2-2*d*
e+3*e^2)/(e*x+d)*d^3-3/e/(5*d^2-2*d*e+3*e^2)/(e*x+d)*d^2+1/(5*d^2
-2*d*e+3*e^2)/(e*x+d)*d-2*e/(5*d^2-2*d*e+3*e^2)/(e*x+d)-40/e^3/(5
*d^2-2*d*e+3*e^2)^2*ln(e*x+d)*d^5-1/e^2/(5*d^2-2*d*e+3*e^2)^2*ln(
e*x+d)*d^4-28/e/(5*d^2-2*d*e+3*e^2)^2*ln(e*x+d)*d^3-44/(5*d^2-2*d
*e+3*e^2)^2*ln(e*x+d)*d^2+2*e/(5*d^2-2*d*e+3*e^2)^2*ln(e*x+d)*d-e
^2/(5*d^2-2*d*e+3*e^2)^2*ln(e*x+d)+229/25/(5*d^2-2*d*e+3*e^2)^2*l
n(5*x^2+2*x+3)*d^2-7/25/(5*d^2-2*d*e+3*e^2)^2*ln(5*x^2+2*x+3)*d*e
-136/25/(5*d^2-2*d*e+3*e^2)^2*ln(5*x^2+2*x+3)*e^2-423/350/(5*d^2-
2*d*e+3*e^2)^2*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d^2+1367/1
75/(5*d^2-2*d*e+3*e^2)^2*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*
d*e-293/350/(5*d^2-2*d*e+3*e^2)^2*14^(1/2)*arctan(1/28*(10*x+2)*1
4^(1/2))*e^2
```

Maxima [A] time = 0.771189, size = 397, normalized size = 1.7

$$-\frac{\sqrt{14}\left(423\,d^2-2734\,de+293\,e^2\right)\arctan\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right)}{350\left(25\,d^4-20\,d^3e+34\,d^2e^2-12\,de^3+9\,e^4\right)}-\frac{\left(40\,d^5+d^4e+28\,d^3e^2+44\,d^2e^3-2\,de^4+e^5\right)\log\left(ex+d\right)}{25\,d^4e^3-20\,d^3e^4+34\,d^2e^5-12\,de^6+9\,e^7}+\frac{\left(229\,d^2-7\,de-136\,e^2\right)\log\left(5\,x^2+2\,x+3\right)}{25\left(25\,d^4-20\,d^3e+34\,d^2e^2-12\,de^3+9\,e^4\right)}-\frac{4\,d^4+5\,d^3e+3\,d^2e^2-de^3+2\,e^4}{5\,d^3e^3-2\,d^2e^4+3\,de^5+(5\,d^2e^4-2\,de^5+3\,e^6)x}+\frac{4\,x}{5\,e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^2*(5*x^2 + 2*x + 3)),x, algori
```

```
[Out] -1/350*sqrt(14)*(423*d^2 - 2734*d*e + 293*e^2)*arctan(1/14*sqrt(1
4)*(5*x + 1))/(25*d^4 - 20*d^3*e + 34*d^2*e^2 - 12*d*e^3 + 9*e^4)
 - (40*d^5 + d^4*e + 28*d^3*e^2 + 44*d^2*e^3 - 2*d*e^4 + e^5)*log
(e*x + d)/(25*d^4*e^3 - 20*d^3*e^4 + 34*d^2*e^5 - 12*d*e^6 + 9*e^
7) + 1/25*(229*d^2 - 7*d*e - 136*e^2)*log(5*x^2 + 2*x + 3)/(25*d^
4 - 20*d^3*e + 34*d^2*e^2 - 12*d*e^3 + 9*e^4) - (4*d^4 + 5*d^3*e
+ 3*d^2*e^2 - d*e^3 + 2*e^4)/(5*d^3*e^3 - 2*d^2*e^4 + 3*d*e^5 + (
5*d^2*e^4 - 2*d*e^5 + 3*e^6)*x) + 4/5*x/e^2
```

Fricas [A] time = 0.382691, size = 578, normalized size = 2.48

$$-\frac{\sqrt{14}\left(25\sqrt{14}\left(40\,d^6+d^5e+28\,d^4e^2+44\,d^3e^3-2\,d^2e^4+de^5+\left(40\,d^5e+d^4e^2+28\,d^3e^3+44\,d^2e^4-2\,de^5+e^6\right)x\right)\log\left(ex+\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^2*(5*x^2 + 2*x + 3)),x, algori
```

```
[Out] -1/350*sqrt(14)*(25*sqrt(14)*(40*d^6 + d^5*e + 28*d^4*e^2 + 44*d^
3*e^3 - 2*d^2*e^4 + d*e^5 + (40*d^5*e + d^4*e^2 + 28*d^3*e^3 + 44
*d^2*e^4 - 2*d*e^5 + e^6)*x)*log(e*x + d) - sqrt(14)*(229*d^3*e^3
 - 7*d^2*e^4 - 136*d*e^5 + (229*d^2*e^4 - 7*d*e^5 - 136*e^6)*x)*l
og(5*x^2 + 2*x + 3) + (423*d^3*e^3 - 2734*d^2*e^4 + 293*d*e^5 + (
423*d^2*e^4 - 2734*d*e^5 + 293*e^6)*x)*arctan(1/14*sqrt(14)*(5*x
+ 1)) + 5*sqrt(14)*(100*d^6 + 85*d^5*e + 85*d^4*e^2 + 20*d^3*e^3
+ 105*d^2*e^4 - 35*d*e^5 + 30*e^6 - 4*(25*d^4*e^2 - 20*d^3*e^3 +
34*d^2*e^4 - 12*d*e^5 + 9*e^6)*x^2 - 4*(25*d^5*e - 20*d^4*e^2 + 3
4*d^3*e^3 - 12*d^2*e^4 + 9*d*e^5)*x))/(25*d^5*e^3 - 20*d^4*e^4 +
34*d^3*e^5 - 12*d^2*e^6 + 9*d*e^7 + (25*d^4*e^4 - 20*d^3*e^5 + 34
```

```
*d^2*e^6 - 12*d*e^7 + 9*e^8)*x)
```

Sympy [A] time = 28.6809, size = 8391, normalized size = 36.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**2/(5*x**2+2*x+3),x)
```

```
[Out] (-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*
d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e
- 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))*log(x + (-78400000
00*d**14*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d
**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2
 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) - 4900000
000*d**13*e**3*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700
*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (22
9*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2
+ 5880000000*d**13*e*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2
)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4))
 + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2
)) + 7717500000*d**12*e**4*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 29
3*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*
e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e*
*2)**2))**2 - 21329700000*d**12*e**2*(-sqrt(14)*I*(423*d**2 - 273
4*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d
*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*
d*e + 3*e**2)**2)) + 3062080000*d**12 - 19327875000*d**11*e**5*(-
sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d*
*3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e -
136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 - 5507600000*d**1
1*e**3*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**
4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 -
 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) - 115953600
0*d**11*e + 10872225000*d**10*e**6*(-sqrt(14)*I*(423*d**2 - 2734*
d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e
**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*
e + 3*e**2)**2))**2 - 7039144000*d**10*e**4*(-sqrt(14)*I*(423*d**
2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2
 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d*
*2 - 2*d*e + 3*e**2)**2)) + 2648473800*d**10*e**2 - 10871735000*d
**9*e**7*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d
**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2
 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 - 2862
6939600*d**9*e**5*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(
700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) +
(229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))
+ 5631029040*d**9*e**3 - 12890563000*d**8*e**8*(-sqrt(14)*I*(423*
```

d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 + 3140906580*d**8*e**6*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) - 3844841924*d**8*e**4 + 14866261200*d**7*e**9*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 - 16078247136*d**7*e**7*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) - 1183700793*d**7*e**5 - 24188575600*d**6*e**10*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 - 7728337232*d**6*e**8*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) + 1694057982*d**6*e**6 + 14439653200*d**5*e**11*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 + 2286078144*d**5*e**9*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) - 5520804349*d**5*e**7 - 10082618000*d**4*e**12*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 - 7135930760*d**4*e**10*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) - 4247714700*d**4*e**8 + 3006129000*d**3*e**13*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 + 2323015520*d**3*e**11*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) + 1298698281*d**3*e**9 - 918199800*d**2*e**14*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 - 1227448656*d**2*e**12*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) - 128577018*d**2*e**10 - 38820600*d*e**15*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 + 157117968*d*e**13*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) + 25259757*d*e**11 + 63844200*e**16*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7

```
*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 + 38078964
*e**14*(-sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**
4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 -
 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) + 3442796*e
**12)/(947520000*d**12 - 6076784000*d**11*e + 1677232200*d**10*e*
*2 - 5993164240*d**9*e**3 - 15153874456*d**8*e**4 + 607741008*d**
7*e**5 - 8131500617*d**6*e**6 - 9569972586*d**5*e**7 + 3091977675
*d**4*e**8 + 698760764*d**3*e**9 + 9842433*d**2*e**10 - 95316042*
d*e**11 + 9092669*e**12)) + (sqrt(14)*I*(423*d**2 - 2734*d*e + 29
3*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*
e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e*
*2)**2))*log(x + (-7840000000*d**14*(sqrt(14)*I*(423*d**2 - 2734*
d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e
**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*
e + 3*e**2)**2)) - 4900000000*d**13*e**3*(sqrt(14)*I*(423*d**2 -
2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 1
2*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 -
 2*d*e + 3*e**2)**2))**2 + 5880000000*d**13*e*(sqrt(14)*I*(423*d*
*2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**
2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d
**2 - 2*d*e + 3*e**2)**2)) + 7717500000*d**12*e**4*(sqrt(14)*I*(4
23*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**
2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25
*(5*d**2 - 2*d*e + 3*e**2)**2))**2 - 21329700000*d**12*e**2*(sqrt
(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e
 + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*
e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) + 3062080000*d**12 - 193
27875000*d**11*e**5*(sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/
(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) +
 (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))
**2 - 5507600000*d**11*e**3*(sqrt(14)*I*(423*d**2 - 2734*d*e + 29
3*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*
e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e*
*2)**2)) - 1159536000*d**11*e + 10872225000*d**10*e**6*(sqrt(14)*
I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34
*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)
/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 - 7039144000*d**10*e**4*(s
qrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**
3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 1
36*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) + 2648473800*d**10*e*
*2 - 10871735000*d**9*e**7*(sqrt(14)*I*(423*d**2 - 2734*d*e + 293
*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e
**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**
2)**2))**2 - 28626939600*d**9*e**5*(sqrt(14)*I*(423*d**2 - 2734*d
*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e*
*3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e
 + 3*e**2)**2)) + 5631029040*d**9*e**3 - 12890563000*d**8*e**8*(s
qrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**
3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 1
36*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 + 3140906580*d**8*
e**6*(sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 -
 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*
d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) - 3844841924*d
**8*e**4 + 14866261200*d**7*e**9*(sqrt(14)*I*(423*d**2 - 2734*d*e
```

```
 + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3
 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e +
 3*e**2)**2))**2 - 16078247136*d**7*e**7*(sqrt(14)*I*(423*d**2 -
2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 1
2*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 -
 2*d*e + 3*e**2)**2)) - 1183700793*d**7*e**5 - 24188575600*d**6*e
**10*(sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 -
 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*
d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 - 772833723
2*d**6*e**8*(sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25
*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d*
*2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) + 16940
57982*d**6*e**6 + 14439653200*d**5*e**11*(sqrt(14)*I*(423*d**2 -
2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 1
2*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 -
 2*d*e + 3*e**2)**2))**2 + 2286078144*d**5*e**9*(sqrt(14)*I*(423*
d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e
**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5
*d**2 - 2*d*e + 3*e**2)**2)) - 5520804349*d**5*e**7 - 10082618000
*d**4*e**12*(sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25
*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d*
*2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 - 71
35930760*d**4*e**10*(sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/
(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) +
 (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))
 - 4247714700*d**4*e**8 + 3006129000*d**3*e**13*(sqrt(14)*I*(423*
d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e
**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5
*d**2 - 2*d*e + 3*e**2)**2))**2 + 2323015520*d**3*e**11*(sqrt(14)
*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 3
4*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2
)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) + 1298698281*d**3*e**9 - 918
199800*d**2*e**14*(sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(7
00*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (
229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**
2 - 1227448656*d**2*e**12*(sqrt(14)*I*(423*d**2 - 2734*d*e + 293*
e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e*
*4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2
)**2)) - 128577018*d**2*e**10 - 38820600*d*e**15*(sqrt(14)*I*(423
*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d**2*
e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(25*(
5*d**2 - 2*d*e + 3*e**2)**2))**2 + 157117968*d*e**13*(sqrt(14)*I*
(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 - 20*d**3*e + 34*d
**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*d*e - 136*e**2)/(
25*(5*d**2 - 2*d*e + 3*e**2)**2)) + 25259757*d*e**11 + 63844200*e
**16*(sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4 -
 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7*
d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2))**2 + 38078964*
e**14*(sqrt(14)*I*(423*d**2 - 2734*d*e + 293*e**2)/(700*(25*d**4
 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) + (229*d**2 - 7
*d*e - 136*e**2)/(25*(5*d**2 - 2*d*e + 3*e**2)**2)) + 3442796*e**
12)/(947520000*d**12 - 6076784000*d**11*e + 1677232200*d**10*e**2
 - 5993164240*d**9*e**3 - 15153874456*d**8*e**4 + 607741008*d**7*
e**5 - 8131500617*d**6*e**6 - 9569972586*d**5*e**7 + 3091977675*d
```

```
**4*e**8 + 698760764*d**3*e**9 + 9842433*d**2*e**10 - 95316042*d*
e**11 + 9092669*e**12)) - (4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e*
*3 + 2*e**4)/(5*d**3*e**3 - 2*d**2*e**4 + 3*d*e**5 + x*(5*d**2*e*
*4 - 2*d*e**5 + 3*e**6)) + 4*x/(5*e**2) - (40*d**5 + d**4*e + 28*
d**3*e**2 + 44*d**2*e**3 - 2*d*e**4 + e**5)*log(x + (7840000000*d
**14*(40*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3 - 2*d*e**4 +
 e**5)/(e**3*(5*d**2 - 2*d*e + 3*e**2)**2) - 5880000000*d**13*(40
*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3 - 2*d*e**4 + e**5)/(
e**2*(5*d**2 - 2*d*e + 3*e**2)**2) - 4900000000*d**13*(40*d**5 +
d**4*e + 28*d**3*e**2 + 44*d**2*e**3 - 2*d*e**4 + e**5)**2/(e**3*
(5*d**2 - 2*d*e + 3*e**2)**4) + 3062080000*d**12 + 21329700000*d*
*12*(40*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3 - 2*d*e**4 +
e**5)/(e*(5*d**2 - 2*d*e + 3*e**2)**2) + 7717500000*d**12*(40*d**
5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3 - 2*d*e**4 + e**5)**2/(e
**2*(5*d**2 - 2*d*e + 3*e**2)**4) - 1159536000*d**11*e + 55076000
00*d**11*(40*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3 - 2*d*e*
*4 + e**5)/(5*d**2 - 2*d*e + 3*e**2)**2 - 19327875000*d**11*(40*d
**5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3 - 2*d*e**4 + e**5)**2/
(e*(5*d**2 - 2*d*e + 3*e**2)**4) + 2648473800*d**10*e**2 + 703914
4000*d**10*e*(40*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3 - 2*
d*e**4 + e**5)/(5*d**2 - 2*d*e + 3*e**2)**2 + 10872225000*d**10*(
40*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3 - 2*d*e**4 + e**5)
**2/(5*d**2 - 2*d*e + 3*e**2)**4 + 5631029040*d**9*e**3 + 2862693
9600*d**9*e**2*(40*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3 -
2*d*e**4 + e**5)/(5*d**2 - 2*d*e + 3*e**2)**2 - 10871735000*d**9*
e*(40*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3 - 2*d*e**4 + e*
*5)**2/(5*d**2 - 2*d*e + 3*e**2)**4 - 3844841924*d**8*e**4 - 3140
906580*d**8*e**3*(40*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3
- 2*d*e**4 + e**5)/(5*d**2 - 2*d*e + 3*e**2)**2 - 12890563000*d**
8*e**2*(40*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3 - 2*d*e**4
 + e**5)**2/(5*d**2 - 2*d*e + 3*e**2)**4 - 1183700793*d**7*e**5 +
 16078247136*d**7*e**4*(40*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2
*e**3 - 2*d*e**4 + e**5)/(5*d**2 - 2*d*e + 3*e**2)**2 + 148662612
00*d**7*e**3*(40*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3 - 2*
d*e**4 + e**5)**2/(5*d**2 - 2*d*e + 3*e**2)**4 + 1694057982*d**6*
e**6 + 7728337232*d**6*e**5*(40*d**5 + d**4*e + 28*d**3*e**2 + 44
*d**2*e**3 - 2*d*e**4 + e**5)/(5*d**2 - 2*d*e + 3*e**2)**2 - 2418
8575600*d**6*e**4*(40*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3
 - 2*d*e**4 + e**5)**2/(5*d**2 - 2*d*e + 3*e**2)**4 - 5520804349*
d**5*e**7 - 2286078144*d**5*e**6*(40*d**5 + d**4*e + 28*d**3*e**2
 + 44*d**2*e**3 - 2*d*e**4 + e**5)/(5*d**2 - 2*d*e + 3*e**2)**2 +
 14439653200*d**5*e**5*(40*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2
*e**3 - 2*d*e**4 + e**5)**2/(5*d**2 - 2*d*e + 3*e**2)**4 - 424771
4700*d**4*e**8 + 7135930760*d**4*e**7*(40*d**5 + d**4*e + 28*d**3
*e**2 + 44*d**2*e**3 - 2*d*e**4 + e**5)/(5*d**2 - 2*d*e + 3*e**2)
**2 - 10082618000*d**4*e**6*(40*d**5 + d**4*e + 28*d**3*e**2 + 44
*d**2*e**3 - 2*d*e**4 + e**5)**2/(5*d**2 - 2*d*e + 3*e**2)**4 + 1
298698281*d**3*e**9 - 2323015520*d**3*e**8*(40*d**5 + d**4*e + 28
*d**3*e**2 + 44*d**2*e**3 - 2*d*e**4 + e**5)/(5*d**2 - 2*d*e + 3*
e**2)**2 + 3006129000*d**3*e**7*(40*d**5 + d**4*e + 28*d**3*e**2
+ 44*d**2*e**3 - 2*d*e**4 + e**5)**2/(5*d**2 - 2*d*e + 3*e**2)**4
 - 128577018*d**2*e**10 + 1227448656*d**2*e**9*(40*d**5 + d**4*e
+ 28*d**3*e**2 + 44*d**2*e**3 - 2*d*e**4 + e**5)/(5*d**2 - 2*d*e
+ 3*e**2)**2 - 918199800*d**2*e**8*(40*d**5 + d**4*e + 28*d**3*e*
```

```
*2 + 44*d**2*e**3 - 2*d*e**4 + e**5)**2/(5*d**2 - 2*d*e + 3*e**2)
**4 + 25259757*d*e**11 - 157117968*d*e**10*(40*d**5 + d**4*e + 28
*d**3*e**2 + 44*d**2*e**3 - 2*d*e**4 + e**5)/(5*d**2 - 2*d*e + 3*
e**2)**2 - 38820600*d*e**9*(40*d**5 + d**4*e + 28*d**3*e**2 + 44*
d**2*e**3 - 2*d*e**4 + e**5)**2/(5*d**2 - 2*d*e + 3*e**2)**4 + 34
42796*e**12 - 38078964*e**11*(40*d**5 + d**4*e + 28*d**3*e**2 + 4
4*d**2*e**3 - 2*d*e**4 + e**5)/(5*d**2 - 2*d*e + 3*e**2)**2 + 638
44200*e**10*(40*d**5 + d**4*e + 28*d**3*e**2 + 44*d**2*e**3 - 2*d
*e**4 + e**5)**2/(5*d**2 - 2*d*e + 3*e**2)**4)/(947520000*d**12 -
 6076784000*d**11*e + 1677232200*d**10*e**2 - 5993164240*d**9*e**
3 - 15153874456*d**8*e**4 + 607741008*d**7*e**5 - 8131500617*d**6
*e**6 - 9569972586*d**5*e**7 + 3091977675*d**4*e**8 + 698760764*d
**3*e**9 + 9842433*d**2*e**10 - 95316042*d*e**11 + 9092669*e**12)
)/(e**3*(5*d**2 - 2*d*e + 3*e**2)**2)
```

GIAC/XCAS [A] time = 0.282025, size = 479, normalized size = 2.06

$$\frac{1}{25}\,(40\,d+33\,e)e^{(-3)}\ln\left(\frac{|xe+d|e^{(-1)}}{(xe+d)^2}\right) - \frac{\sqrt{14}\left(423\,d^2e^2-2734\,de^3+293\,e^4\right)\arctan\left(\frac{1}{14}\sqrt{14}\left(5\,d-\frac{5\,d^2}{xe+d}+\frac{2\,de}{xe+d}-\frac{3\,e^2}{xe+d}-e\right)e^{(-1)}\right)e^{(-2)}}{350\,(25\,d^4-20\,d^3e+34\,d^2e^2-12\,de^3+9\,e^4)} + \frac{4}{5}\,(xe+d)e^{(-3)} + \frac{\left(229\,d^2-7\,de-136\,e^2\right)\ln\left(-\frac{10\,d}{xe+d}+\frac{5\,d^2}{(xe+d)^2}+\frac{2\,e}{xe+d}-\frac{2\,de}{(xe+d)^2}+\frac{3\,e^2}{(xe+d)^2}+5\right)}{25\,(25\,d^4-20\,d^3e+34\,d^2e^2-12\,de^3+9\,e^4)} - \frac{\frac{4\,d^4e^3}{xe+d}+\frac{5\,d^3e^4}{xe+d}+\frac{3\,d^2e^5}{xe+d}-\frac{de^6}{xe+d}+\frac{2\,e^7}{xe+d}}{5\,d^2e^6-2\,de^7+3\,e^8}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^2*(5*x^2 + 2*x + 3)),x, algori
```

```
[Out] 1/25*(40*d + 33*e)*e^(-3)*ln(abs(x*e + d)*e^(-1)/(x*e + d)^2) - 1
/350*sqrt(14)*(423*d^2*e^2 - 2734*d*e^3 + 293*e^4)*arctan(1/14*sq
rt(14)*(5*d - 5*d^2/(x*e + d) + 2*d*e/(x*e + d) - 3*e^2/(x*e + d)
 - e)*e^(-1))*e^(-2)/(25*d^4 - 20*d^3*e + 34*d^2*e^2 - 12*d*e^3 +
 9*e^4) + 4/5*(x*e + d)*e^(-3) + 1/25*(229*d^2 - 7*d*e - 136*e^2)
*ln(-10*d/(x*e + d) + 5*d^2/(x*e + d)^2 + 2*e/(x*e + d) - 2*d*e/(
x*e + d)^2 + 3*e^2/(x*e + d)^2 + 5)/(25*d^4 - 20*d^3*e + 34*d^2*e
^2 - 12*d*e^3 + 9*e^4) - (4*d^4*e^3/(x*e + d) + 5*d^3*e^4/(x*e +
d) + 3*d^2*e^5/(x*e + d) - d*e^6/(x*e + d) + 2*e^7/(x*e + d))/(5*
d^2*e^6 - 2*d*e^7 + 3*e^8)
```

3.310 $\int \frac{2+x+3x^2-5x^3+4x^4}{(d+ex)^3(3+2x+5x^2)}\,dx$

Optimal. Leaf size=317

$$\frac{(458d^3-21d^2e-816de^2+113e^3)\log(5x^2+2x+3)}{10(5d^2-2de+3e^2)^3} - \frac{(423d^3-4101d^2e+879de^2+703e^3)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{5\sqrt{14}(5d^2-2de+3e^2)^3} - \frac{4d^4+5d^3e+3d^2e^2-de^3+2e^4}{2e^3(5d^2-2de+3e^2)(d+ex)^2} + \frac{40d^5+d^4e+28d^3e^2+44d^2e^3-2de^4+e^5}{e^3(5d^2-2de+3e^2)^2(d+ex)} + \frac{(100d^6-120d^5e+228d^4e^2-242d^3e^3+141d^2e^4+120de^5-e^6)\log(d+ex)}{e^3(5d^2-2de+3e^2)^3}$$

```
[Out] -(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)/(2*e^3*(5*d^2 - 2*
d*e + 3*e^2)*(d + e*x)^2) + (40*d^5 + d^4*e + 28*d^3*e^2 + 44*d^2
*e^3 - 2*d*e^4 + e^5)/(e^3*(5*d^2 - 2*d*e + 3*e^2)^2*(d + e*x)) -
 ((423*d^3 - 4101*d^2*e + 879*d*e^2 + 703*e^3)*ArcTan[(1 + 5*x)/S
qrt[14]])/(5*Sqrt[14]*(5*d^2 - 2*d*e + 3*e^2)^3) + ((100*d^6 - 12
0*d^5*e + 228*d^4*e^2 - 242*d^3*e^3 + 141*d^2*e^4 + 120*d*e^5 - e
^6)*Log[d + e*x])/(e^3*(5*d^2 - 2*d*e + 3*e^2)^3) + ((458*d^3 - 2
1*d^2*e - 816*d*e^2 + 113*e^3)*Log[3 + 2*x + 5*x^2])/(10*(5*d^2 -
 2*d*e + 3*e^2)^3)
```

Rubi [A] time = 0.609487, antiderivative size = 317, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.132$

$$\frac{(458d^3-21d^2e-816de^2+113e^3)\log(5x^2+2x+3)}{10(5d^2-2de+3e^2)^3} - \frac{(423d^3-4101d^2e+879de^2+703e^3)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{5\sqrt{14}(5d^2-2de+3e^2)^3} - \frac{4d^4+5d^3e+3d^2e^2-de^3+2e^4}{2e^3(5d^2-2de+3e^2)(d+ex)^2} + \frac{40d^5+d^4e+28d^3e^2+44d^2e^3-2de^4+e^5}{e^3(5d^2-2de+3e^2)^2(d+ex)} + \frac{(100d^6-120d^5e+228d^4e^2-242d^3e^3+141d^2e^4+120de^5-e^6)\log(d+ex)}{e^3(5d^2-2de+3e^2)^3}$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)^3*(3 + 2*x + 5*x^2)),x]
```

```
[Out] -(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)/(2*e^3*(5*d^2 - 2*
d*e + 3*e^2)*(d + e*x)^2) + (40*d^5 + d^4*e + 28*d^3*e^2 + 44*d^2
```

```
*e^3 - 2*d*e^4 + e^5)/(e^3*(5*d^2 - 2*d*e + 3*e^2)^2*(d + e*x)) -
 ((423*d^3 - 4101*d^2*e + 879*d*e^2 + 703*e^3)*ArcTan[(1 + 5*x)/S
qrt[14]])/(5*Sqrt[14]*(5*d^2 - 2*d*e + 3*e^2)^3) + ((100*d^6 - 12
0*d^5*e + 228*d^4*e^2 - 242*d^3*e^3 + 141*d^2*e^4 + 120*d*e^5 - e
^6)*Log[d + e*x])/(e^3*(5*d^2 - 2*d*e + 3*e^2)^3) + ((458*d^3 - 2
1*d^2*e - 816*d*e^2 + 113*e^3)*Log[3 + 2*x + 5*x^2])/(10*(5*d^2 -
 2*d*e + 3*e^2)^3)
```

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((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**3/(5*x**2+2*x+3),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.28404, size = 278, normalized size = 0.88

$$-\frac{-7\left(458d^3-21d^2e-816de^2+113e^3\right)\log\left(5x^2+2x+3\right)+\sqrt{14}\left(423d^3-4101d^2e+879de^2+703e^3\right)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)+\frac{35(4d\cdots}{\cdots}}{70\cdots}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)^3*(3 + 2*x + 5*x^2)),x]
```

```
[Out] -((35*(5*d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*
e^3 + 2*e^4))/(e^3*(d + e*x)^2) - (70*(5*d^2 - 2*d*e + 3*e^2)*(40
*d^5 + d^4*e + 28*d^3*e^2 + 44*d^2*e^3 - 2*d*e^4 + e^5))/(e^3*(d
+ e*x)) + Sqrt[14]*(423*d^3 - 4101*d^2*e + 879*d*e^2 + 703*e^3)*A
rcTan[(1 + 5*x)/Sqrt[14]] + (70*(-100*d^6 + 120*d^5*e - 228*d^4*e
^2 + 242*d^3*e^3 - 141*d^2*e^4 - 120*d*e^5 + e^6)*Log[d + e*x])/e
^3 - 7*(458*d^3 - 21*d^2*e - 816*d*e^2 + 113*e^3)*Log[3 + 2*x + 5
*x^2])/(70*(5*d^2 - 2*d*e + 3*e^2)^3)
```

Maple [B] time = 0.02, size = 819, normalized size = 2.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^4-5*x^3+3*x^2+x+2)/(e*x+d)^3/(5*x^2+2*x+3),x)
```

```
[Out] 1/e^2/(5*d^2-2*d*e+3*e^2)^2/(e*x+d)*d^4+28/e/(5*d^2-2*d*e+3*e^2)^
2/(e*x+d)*d^3-2/e^3/(5*d^2-2*d*e+3*e^2)/(e*x+d)^2*d^4-5/2/e^2/(5*
d^2-2*d*e+3*e^2)/(e*x+d)^2*d^3-3/2/e/(5*d^2-2*d*e+3*e^2)/(e*x+d)^
2*d^2-423/70/(5*d^2-2*d*e+3*e^2)^3*14^(1/2)*arctan(1/28*(10*x+2)*
14^(1/2))*d^3-703/70/(5*d^2-2*d*e+3*e^2)^3*14^(1/2)*arctan(1/28*(
10*x+2)*14^(1/2))*e^3-21/10/(5*d^2-2*d*e+3*e^2)^3*ln(5*x^2+2*x+3)
*d^2*e-408/5/(5*d^2-2*d*e+3*e^2)^3*ln(5*x^2+2*x+3)*e^2*d+100/(5*d
^2-2*d*e+3*e^2)^3/e^3*ln(e*x+d)*d^6-120/(5*d^2-2*d*e+3*e^2)^3/e^2
*ln(e*x+d)*d^5+228/(5*d^2-2*d*e+3*e^2)^3/e*ln(e*x+d)*d^4+141/(5*d
^2-2*d*e+3*e^2)^3*e*ln(e*x+d)*d^2+120/(5*d^2-2*d*e+3*e^2)^3*e^2*l
n(e*x+d)*d-2*e/(5*d^2-2*d*e+3*e^2)^2/(e*x+d)*d+40/e^3/(5*d^2-2*d*
e+3*e^2)^2/(e*x+d)*d^5-879/70/(5*d^2-2*d*e+3*e^2)^3*14^(1/2)*arct
an(1/28*(10*x+2)*14^(1/2))*e^2*d+4101/70/(5*d^2-2*d*e+3*e^2)^3*14
^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d^2*e+44/(5*d^2-2*d*e+3*e^2
)^2/(e*x+d)*d^2+1/2/(5*d^2-2*d*e+3*e^2)/(e*x+d)^2*d+229/5/(5*d^2-
2*d*e+3*e^2)^3*ln(5*x^2+2*x+3)*d^3+113/10/(5*d^2-2*d*e+3*e^2)^3*l
n(5*x^2+2*x+3)*e^3-e/(5*d^2-2*d*e+3*e^2)/(e*x+d)^2+e^2/(5*d^2-2*d
*e+3*e^2)^2/(e*x+d)-242/(5*d^2-2*d*e+3*e^2)^3*ln(e*x+d)*d^3-1/(5*
d^2-2*d*e+3*e^2)^3*e^3*ln(e*x+d)
```

Maxima [A] time = 0.773141, size = 672, normalized size = 2.12

$$-\frac{\sqrt{14}\left(423\,d^{3}-4101\,d^{2}e+879\,de^{2}+703\,e^{3}\right)\arctan\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right)}{70\,(125\,d^{6}-150\,d^{5}e+285\,d^{4}e^{2}-188\,d^{3}e^{3}+171\,d^{2}e^{4}-54\,de^{5}+27\,e^{6})}+\frac{\left(100\,d^{6}-120\,d^{5}e+228\,d^{4}e^{2}-242\,d^{3}e^{3}+141\,d^{2}e^{4}+120\,de^{5}-e^{6}\right)\log\left(ex+d\right)}{125\,d^{6}e^{3}-150\,d^{5}e^{4}+285\,d^{4}e^{5}-188\,d^{3}e^{6}+171\,d^{2}e^{7}-54\,de^{8}+27\,e^{9}}+\frac{\left(458\,d^{3}-21\,d^{2}e-816\,de^{2}+113\,e^{3}\right)\log\left(5\,x^{2}+2\,x+3\right)}{10\,(125\,d^{6}-150\,d^{5}e+285\,d^{4}e^{2}-188\,d^{3}e^{3}+171\,d^{2}e^{4}-54\,de^{5}+27\,e^{6})}+\frac{60\,d^{6}-15\,d^{5}e+39\,d^{4}e^{2}+84\,d^{3}e^{3}-25\,d^{2}e^{4}+9\,de^{5}-6\,e^{6}+2\left(40\,d^{5}e+d^{4}e^{2}+28\,d^{3}e^{3}+44\,d^{2}e^{4}-2\,de^{5}\right.}{2\,(25\,d^{6}e^{3}-20\,d^{5}e^{4}+34\,d^{4}e^{5}-12\,d^{3}e^{6}+9\,d^{2}e^{7}+(25\,d^{4}e^{5}-20\,d^{3}e^{6}+34\,d^{2}e^{7}-12\,de^{8}+9\,e^{9})x^{2}+2\,(25\,d^{5}e^{4}-20\,d^{4}e^{5}+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^3*(5*x^2 + 2*x + 3)),x, algori
```

```
[Out] -1/70*sqrt(14)*(423*d^3 - 4101*d^2*e + 879*d*e^2 + 703*e^3)*arcta
n(1/14*sqrt(14)*(5*x + 1))/(125*d^6 - 150*d^5*e + 285*d^4*e^2 - 1
88*d^3*e^3 + 171*d^2*e^4 - 54*d*e^5 + 27*e^6) + (100*d^6 - 120*d^
5*e + 228*d^4*e^2 - 242*d^3*e^3 + 141*d^2*e^4 + 120*d*e^5 - e^6)*
log(e*x + d)/(125*d^6*e^3 - 150*d^5*e^4 + 285*d^4*e^5 - 188*d^3*e
^6 + 171*d^2*e^7 - 54*d*e^8 + 27*e^9) + 1/10*(458*d^3 - 21*d^2*e
- 816*d*e^2 + 113*e^3)*log(5*x^2 + 2*x + 3)/(125*d^6 - 150*d^5*e
+ 285*d^4*e^2 - 188*d^3*e^3 + 171*d^2*e^4 - 54*d*e^5 + 27*e^6) +
1/2*(60*d^6 - 15*d^5*e + 39*d^4*e^2 + 84*d^3*e^3 - 25*d^2*e^4 + 9
*d*e^5 - 6*e^6 + 2*(40*d^5*e + d^4*e^2 + 28*d^3*e^3 + 44*d^2*e^4
```

```
- 2*d*e^5 + e^6)*x)/(25*d^6*e^3 - 20*d^5*e^4 + 34*d^4*e^5 - 12*d^
3*e^6 + 9*d^2*e^7 + (25*d^4*e^5 - 20*d^3*e^6 + 34*d^2*e^7 - 12*d*
e^8 + 9*e^9)*x^2 + 2*(25*d^5*e^4 - 20*d^4*e^5 + 34*d^3*e^6 - 12*d
^2*e^7 + 9*d*e^8)*x)
```

Fricas [A] time = 0.496925, size = 957, normalized size = 3.02

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^3*(5*x^2 + 2*x + 3)),x, algori
```

```
[Out] 1/140*sqrt(14)*(10*sqrt(14)*(100*d^8 - 120*d^7*e + 228*d^6*e^2 -
242*d^5*e^3 + 141*d^4*e^4 + 120*d^3*e^5 - d^2*e^6 + (100*d^6*e^2
- 120*d^5*e^3 + 228*d^4*e^4 - 242*d^3*e^5 + 141*d^2*e^6 + 120*d*e
^7 - e^8)*x^2 + 2*(100*d^7*e - 120*d^6*e^2 + 228*d^5*e^3 - 242*d^
4*e^4 + 141*d^3*e^5 + 120*d^2*e^6 - d*e^7)*x)*log(e*x + d) + sqrt
(14)*(458*d^5*e^3 - 21*d^4*e^4 - 816*d^3*e^5 + 113*d^2*e^6 + (458
*d^3*e^5 - 21*d^2*e^6 - 816*d*e^7 + 113*e^8)*x^2 + 2*(458*d^4*e^4
 - 21*d^3*e^5 - 816*d^2*e^6 + 113*d*e^7)*x)*log(5*x^2 + 2*x + 3)
- 2*(423*d^5*e^3 - 4101*d^4*e^4 + 879*d^3*e^5 + 703*d^2*e^6 + (42
3*d^3*e^5 - 4101*d^2*e^6 + 879*d*e^7 + 703*e^8)*x^2 + 2*(423*d^4*
e^4 - 4101*d^3*e^5 + 879*d^2*e^6 + 703*d*e^7)*x)*arctan(1/14*sqrt
(14)*(5*x + 1)) + 5*sqrt(14)*(300*d^8 - 195*d^7*e + 405*d^6*e^2 +
 297*d^5*e^3 - 176*d^4*e^4 + 347*d^3*e^5 - 123*d^2*e^6 + 39*d*e^7
 - 18*e^8 + 2*(200*d^7*e - 75*d^6*e^2 + 258*d^5*e^3 + 167*d^4*e^4
 - 14*d^3*e^5 + 141*d^2*e^6 - 8*d*e^7 + 3*e^8)*x))/(125*d^8*e^3 -
 150*d^7*e^4 + 285*d^6*e^5 - 188*d^5*e^6 + 171*d^4*e^7 - 54*d^3*e
^8 + 27*d^2*e^9 + (125*d^6*e^5 - 150*d^5*e^6 + 285*d^4*e^7 - 188*
d^3*e^8 + 171*d^2*e^9 - 54*d*e^10 + 27*e^11)*x^2 + 2*(125*d^7*e^4
 - 150*d^6*e^5 + 285*d^5*e^6 - 188*d^4*e^7 + 171*d^3*e^8 - 54*d^2
*e^9 + 27*d*e^10)*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((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**3/(5*x**2+2*x+3),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.282694, size = 548, normalized size = 1.73

$$-\frac{\sqrt{14}\left(423\,d^3-4101\,d^2e+879\,de^2+703\,e^3\right)\arctan\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right)}{70\left(125\,d^6-150\,d^5e+285\,d^4e^2-188\,d^3e^3+171\,d^2e^4-54\,de^5+27\,e^6\right)}+\frac{\left(458\,d^3-21\,d^2e-816\,de^2+113\,e^3\right)\ln\left(5\,x^2+2\,x+3\right)}{10\left(125\,d^6-150\,d^5e+285\,d^4e^2-188\,d^3e^3+171\,d^2e^4-54\,de^5+27\,e^6\right)}+\frac{\left(100\,d^6-120\,d^5e+228\,d^4e^2-242\,d^3e^3+141\,d^2e^4+120\,de^5-e^6\right)\ln\left(|xe+d|\right)}{125\,d^6e^3-150\,d^5e^4+285\,d^4e^5-188\,d^3e^6+171\,d^2e^7-54\,de^8+27\,e^9}+\frac{\left(2\left(200\,d^7-75\,d^6e+258\,d^5e^2+167\,d^4e^3-14\,d^3e^4+141\,d^2e^5-8\,de^6+3\,e^7\right)x+\left(300\,d^8-195\,d^7e+405\,d^6e^2+297\,d^5e^3-\right.\right.}{2\left(5\,d^2-2\,de+3\,e^2\right)^3(xe+d)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^3*(5*x^2 + 2*x + 3)),x, algori
```

```
[Out] -1/70*sqrt(14)*(423*d^3 - 4101*d^2*e + 879*d*e^2 + 703*e^3)*arcta
n(1/14*sqrt(14)*(5*x + 1))/(125*d^6 - 150*d^5*e + 285*d^4*e^2 - 1
88*d^3*e^3 + 171*d^2*e^4 - 54*d*e^5 + 27*e^6) + 1/10*(458*d^3 - 2
1*d^2*e - 816*d*e^2 + 113*e^3)*ln(5*x^2 + 2*x + 3)/(125*d^6 - 150
*d^5*e + 285*d^4*e^2 - 188*d^3*e^3 + 171*d^2*e^4 - 54*d*e^5 + 27*
e^6) + (100*d^6 - 120*d^5*e + 228*d^4*e^2 - 242*d^3*e^3 + 141*d^2
*e^4 + 120*d*e^5 - e^6)*ln(abs(x*e + d))/(125*d^6*e^3 - 150*d^5*e
^4 + 285*d^4*e^5 - 188*d^3*e^6 + 171*d^2*e^7 - 54*d*e^8 + 27*e^9)
 + 1/2*(2*(200*d^7 - 75*d^6*e + 258*d^5*e^2 + 167*d^4*e^3 - 14*d^
3*e^4 + 141*d^2*e^5 - 8*d*e^6 + 3*e^7)*x + (300*d^8 - 195*d^7*e +
 405*d^6*e^2 + 297*d^5*e^3 - 176*d^4*e^4 + 347*d^3*e^5 - 123*d^2*
e^6 + 39*d*e^7 - 18*e^8)*e^(-1))*e^(-2)/((5*d^2 - 2*d*e + 3*e^2)^
3*(x*e + d)^2)
```

3.311 $\int \frac{(d+ex)^3(2+x+3x^2-5x^3+4x^4)}{(3+2x+5x^2)^2}\,dx$

Optimal. Leaf size=189

$$\frac{ex^2(840d^2-1722de+373e^2)}{3500}-\frac{(1025d^3-1545d^2e-2601de^2+832e^3)\log(5x^2+2x+3)}{6250}+\frac{x(2800d^3-17220d^2e+9921de^2+6053e^3)}{17500}+\frac{(32825d^3+317565d^2e-221643de^2-67499e^3)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{87500\sqrt{14}}+\frac{1}{375}e^2x^3(60d-41e)-\frac{(423x+1367)(d+ex)^3}{3500(5x^2+2x+3)}+\frac{e^3x^4}{25}$$

```
[Out] ((2800*d^3 - 17220*d^2*e + 9921*d*e^2 + 6053*e^3)*x)/17500 + (e*(
840*d^2 - 1722*d*e + 373*e^2)*x^2)/3500 + ((60*d - 41*e)*e^2*x^3)
/375 + (e^3*x^4)/25 - ((1367 + 423*x)*(d + e*x)^3)/(3500*(3 + 2*x
 + 5*x^2)) + ((32825*d^3 + 317565*d^2*e - 221643*d*e^2 - 67499*e^
3)*ArcTan[(1 + 5*x)/Sqrt[14]])/(87500*Sqrt[14]) - ((1025*d^3 - 15
45*d^2*e - 2601*d*e^2 + 832*e^3)*Log[3 + 2*x + 5*x^2])/6250
```

Rubi [A] time = 0.457867, antiderivative size = 189, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{ex^2(840d^2-1722de+373e^2)}{3500}-\frac{(1025d^3-1545d^2e-2601de^2+832e^3)\log(5x^2+2x+3)}{6250}+\frac{x(2800d^3-17220d^2e+9921de^2+6053e^3)}{17500}+\frac{(32825d^3+317565d^2e-221643de^2-67499e^3)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{87500\sqrt{14}}+\frac{1}{375}e^2x^3(60d-41e)-\frac{(423x+1367)(d+ex)^3}{3500(5x^2+2x+3)}+\frac{e^3x^4}{25}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^3*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2)^2,x]
```


```
[Out] ((2800*d^3 - 17220*d^2*e + 9921*d*e^2 + 6053*e^3)*x)/17500 + (e*(
840*d^2 - 1722*d*e + 373*e^2)*x^2)/3500 + ((60*d - 41*e)*e^2*x^3)
/375 + (e^3*x^4)/25 - ((1367 + 423*x)*(d + e*x)^3)/(3500*(3 + 2*x
 + 5*x^2)) + ((32825*d^3 + 317565*d^2*e - 221643*d*e^2 - 67499*e^
3)*ArcTan[(1 + 5*x)/Sqrt[14]])/(87500*Sqrt[14]) - ((1025*d^3 - 15
45*d^2*e - 2601*d*e^2 + 832*e^3)*Log[3 + 2*x + 5*x^2])/6250
```

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((e*x+d)**3*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.299958, size = 209, normalized size = 1.11

$$\frac{14700ex^2\left(300d^2-615de+103e^2\right)-\frac{42\left(125d^3(423x+1367)+75d^2e(5989x-1269)-15de^2(18323x+17967)+e^3(54969-53189x)\right)}{5x^2+2x+3}+2940\left(-1025d^3\cdots\right.}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^3*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2)^2,x]
```

```
[Out] (5880*(500*d^3 - 3075*d^2*e + 1545*d*e^2 + 867*e^3)*x + 14700*e*(
300*d^2 - 615*d*e + 103*e^2)*x^2 + 49000*(60*d - 41*e)*e^2*x^3 +
735000*e^3*x^4 - (42*(e^3*(54969 - 53189*x) + 125*d^3*(1367 + 423
*x) + 75*d^2*e*(-1269 + 5989*x) - 15*d*e^2*(17967 + 18323*x)))/(3
 + 2*x + 5*x^2) + 15*Sqrt[14]*(32825*d^3 + 317565*d^2*e - 221643*
d*e^2 - 67499*e^3)*ArcTan[(1 + 5*x)/Sqrt[14]] + 2940*(-1025*d^3 +
 1545*d^2*e + 2601*d*e^2 - 832*e^3)*Log[3 + 2*x + 5*x^2])/1837500
0
```

Maple [A] time = 0.015, size = 283, normalized size = 1.5

$$\frac{e^3x^4}{25}+\frac{4\,x^3e^2d}{25}-\frac{41\,x^3e^3}{375}+\frac{6\,x^2d^2e}{25}-\frac{123\,x^2e^2d}{250}+\frac{103\,e^3x^2}{1250}+\frac{4\,d^3x}{25}-\frac{123\,xd^2e}{125}+\frac{309\,xde^2}{625}+\frac{867\,xe^3}{3125}-\frac{1}{3125}\left(\left(\frac{2115\,d^3}{28}+\frac{17967\,d^2e}{28}-\frac{54969\,e^2d}{140}-\frac{53189\,e^3}{700}\right)x+\frac{6835\,d^3}{28}-\frac{3807\,d^2e}{28}-\frac{53901\,e^2d}{140}+\frac{54969\,e^3}{700}\right)\left(x^2+\frac{2\,x}{5}+\frac{3}{5}\right)-\frac{41\,\ln\left(5\,x^2+2\,x+3\right)d^3}{250}+\frac{309\,\ln\left(5\,x^2+2\,x+3\right)d^2e}{1250}+\frac{2601\,\ln\left(5\,x^2+2\,x+3\right)e^2d}{6250}-\frac{416\,\ln\left(5\,x^2+2\,x+3\right)e^3}{3125}+\frac{1313\,\sqrt{14}d^3}{49000}\arctan\left(\frac{(10\,x+2)\sqrt{14}}{28}\right)+\frac{63513\,\sqrt{14}d^2e}{245000}\arctan\left(\frac{(10\,x+2)\sqrt{14}}{28}\right)-\frac{221643\,\sqrt{14}e^2d}{1225000}\arctan\left(\frac{(10\,x+2)\sqrt{14}}{28}\right)-\frac{67499\,\sqrt{14}e^3}{1225000}\arctan\left(\frac{(10\,x+2)\sqrt{14}}{28}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((e*x+d)^3*(4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3)^2,x)
```

```
[Out] 1/25*e^3*x^4+4/25*x^3*e^2*d-41/375*x^3*e^3+6/25*x^2*d^2*e-123/250
*x^2*e^2*d+103/1250*e^3*x^2+4/25*d^3*x-123/125*x*d^2*e+309/625*x*
d*e^2+867/3125*x*e^3-1/3125*((2115/28*d^3+17967/28*d^2*e-54969/14
0*e^2*d-53189/700*e^3)*x+6835/28*d^3-3807/28*d^2*e-53901/140*e^2*
d+54969/700*e^3)/(x^2+2/5*x+3/5)-41/250*ln(5*x^2+2*x+3)*d^3+309/1
250*ln(5*x^2+2*x+3)*d^2*e+2601/6250*ln(5*x^2+2*x+3)*e^2*d-416/312
5*ln(5*x^2+2*x+3)*e^3+1313/49000*14^(1/2)*arctan(1/28*(10*x+2)*14
^(1/2))*d^3+63513/245000*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*
d^2*e-221643/1225000*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*e^2*
d-67499/1225000*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*e^3
```

Maxima [A] time = 0.776676, size = 286, normalized size = 1.51

$$\frac{1}{25}\,e^3x^4+\frac{1}{375}\left(60\,de^2-41\,e^3\right)x^3+\frac{1}{1250}\left(300\,d^2e-615\,de^2+103\,e^3\right)x^2+\frac{1}{1225000}\sqrt{14}\left(32825\,d^3+317565\,d^2e-221643\,de^2-67499\,e^3\right)\arctan\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right)+\frac{1}{3125}\left(500\,d^3-3075\,d^2e+1545\,de^2+867\,e^3\right)x-\frac{1}{6250}\left(1025\,d^3-1545\,d^2e-2601\,de^2+832\,e^3\right)\log\left(5\,x^2+2\,x+3\right)-\frac{170875\,d^3-95175\,d^2e-269505\,de^2+54969\,e^3+\left(52875\,d^3+449175\,d^2e-274845\,de^2-53189\,e^3\right)x}{437500\,(5\,x^2+2\,x+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3/(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] 1/25*e^3*x^4 + 1/375*(60*d*e^2 - 41*e^3)*x^3 + 1/1250*(300*d^2*e
- 615*d*e^2 + 103*e^3)*x^2 + 1/1225000*sqrt(14)*(32825*d^3 + 3175
65*d^2*e - 221643*d*e^2 - 67499*e^3)*arctan(1/14*sqrt(14)*(5*x +
1)) + 1/3125*(500*d^3 - 3075*d^2*e + 1545*d*e^2 + 867*e^3)*x - 1/
6250*(1025*d^3 - 1545*d^2*e - 2601*d*e^2 + 832*e^3)*log(5*x^2 + 2
*x + 3) - 1/437500*(170875*d^3 - 95175*d^2*e - 269505*d*e^2 + 549
69*e^3 + (52875*d^3 + 449175*d^2*e - 274845*d*e^2 - 53189*e^3)*x)
/(5*x^2 + 2*x + 3)
```

Fricas [A] time = 0.265372, size = 485, normalized size = 2.57

$$-\frac{\sqrt{14}\left(210\sqrt{14}\left(3075\,d^3 - 4635\,d^2e - 7803\,de^2 + 2496\,e^3 + 5\left(1025\,d^3 - 1545\,d^2e - 2601\,de^2 + 832\,e^3\right)x^2 + 2\left(1025\,d^3 - 154\right.\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3/(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] -1/18375000*sqrt(14)*(210*sqrt(14)*(3075*d^3 - 4635*d^2*e - 7803*
d*e^2 + 2496*e^3 + 5*(1025*d^3 - 1545*d^2*e - 2601*d*e^2 + 832*e^
3)*x^2 + 2*(1025*d^3 - 1545*d^2*e - 2601*d*e^2 + 832*e^3)*x)*log(
5*x^2 + 2*x + 3) - 15*(98475*d^3 + 952695*d^2*e - 664929*d*e^2 -
202497*e^3 + 5*(32825*d^3 + 317565*d^2*e - 221643*d*e^2 - 67499*e
^3)*x^2 + 2*(32825*d^3 + 317565*d^2*e - 221643*d*e^2 - 67499*e^3)
*x)*arctan(1/14*sqrt(14)*(5*x + 1)) - sqrt(14)*(262500*e^3*x^6 +
87500*(12*d*e^2 - 7*e^3)*x^5 + 8750*(180*d^2*e - 321*d*e^2 + 47*e
^3)*x^4 + 10500*(100*d^3 - 555*d^2*e + 246*d*e^2 + 153*e^3)*x^3 -
 512625*d^3 + 285525*d^2*e + 808515*d*e^2 - 164907*e^3 + 210*(200
0*d^3 - 7800*d^2*e - 3045*d*e^2 + 5013*e^3)*x^2 + 3*(157125*d^3 -
 1740675*d^2*e + 923745*d*e^2 + 417329*e^3)*x))/(5*x^2 + 2*x + 3)
```

Sympy [A] time = 3.85157, size = 444, normalized size = 2.35

$$\frac{e^3x^4}{25}+x^3\left(\frac{4de^2}{25}-\frac{41e^3}{375}\right)+x^2\left(\frac{6d^2e}{25}-\frac{123de^2}{250}+\frac{103e^3}{1250}\right)+x\left(\frac{4d^3}{25}-\frac{123d^2e}{125}+\frac{309de^2}{625}+\frac{867e^3}{3125}\right)+\left(-\frac{41d^3}{250}+\frac{309d^2e}{1250}+\frac{2601de^2}{6250}-\frac{416e^3}{3125}-\frac{\sqrt{14}i\left(32825d^3+317565d^2e-221643de^2-67499e^3\right)}{2450000}\right)\log\left(x+\frac{6565d^3+63513d^2e-\frac{221643de^2}{5}-\frac{67499e^3}{5}-\frac{\sqrt{14}i(32825d^3+317\ldots}{\ldots}}{32825d^3+317565d^2e-221643de^2-67\ldots}\right)+\left(-\frac{41d^3}{250}+\frac{309d^2e}{1250}+\frac{2601de^2}{6250}-\frac{416e^3}{3125}+\frac{\sqrt{14}i\left(32825d^3+317565d^2e-221643de^2-67499e^3\right)}{2450000}\right)\log\left(x+\frac{6565d^3+63513d^2e-\frac{221643de^2}{5}-\frac{67499e^3}{5}+\frac{\sqrt{14}i(32825d^3+3175\ldots}{\ldots}}{32825d^3+317565d^2e-221643de^2-67\ldots}\right)-\frac{170875d^3-95175d^2e-269505de^2+54969e^3+x\left(52875d^3+449175d^2e-274845de^2-53189e^3\right)}{2187500x^2+875000x+1312500}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**3*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**2,x)
```

```
[Out] e**3*x**4/25 + x**3*(4*d*e**2/25 - 41*e**3/375) + x**2*(6*d**2*e/
25 - 123*d*e**2/250 + 103*e**3/1250) + x*(4*d**3/25 - 123*d**2*e/
125 + 309*d*e**2/625 + 867*e**3/3125) + (-41*d**3/250 + 309*d**2*
e/1250 + 2601*d*e**2/6250 - 416*e**3/3125 - sqrt(14)*I*(32825*d**
3 + 317565*d**2*e - 221643*d*e**2 - 67499*e**3)/2450000)*log(x +
(6565*d**3 + 63513*d**2*e - 221643*d*e**2/5 - 67499*e**3/5 - sqrt
(14)*I*(32825*d**3 + 317565*d**2*e - 221643*d*e**2 - 67499*e**3)/
5)/(32825*d**3 + 317565*d**2*e - 221643*d*e**2 - 67499*e**3)) + (
-41*d**3/250 + 309*d**2*e/1250 + 2601*d*e**2/6250 - 416*e**3/3125
 + sqrt(14)*I*(32825*d**3 + 317565*d**2*e - 221643*d*e**2 - 67499
*e**3)/2450000)*log(x + (6565*d**3 + 63513*d**2*e - 221643*d*e**2
/5 - 67499*e**3/5 + sqrt(14)*I*(32825*d**3 + 317565*d**2*e - 2216
43*d*e**2 - 67499*e**3)/5)/(32825*d**3 + 317565*d**2*e - 221643*d
*e**2 - 67499*e**3)) - (170875*d**3 - 95175*d**2*e - 269505*d*e**
2 + 54969*e**3 + x*(52875*d**3 + 449175*d**2*e - 274845*d*e**2 -
53189*e**3))/(2187500*x**2 + 875000*x + 1312500)
```

GIAC/XCAS [A] time = 0.272275, size = 278, normalized size = 1.47

$$\frac{1}{25}x^4e^3 + \frac{4}{25}dx^3e^2 + \frac{6}{25}d^2x^2e + \frac{4}{25}d^3x - \frac{41}{375}x^3e^3 - \frac{123}{250}dx^2e^2 - \frac{123}{125}d^2xe + \frac{103}{1250}x^2e^3 + \frac{309}{625}dxe^2 + \frac{1}{1225000}\sqrt{14}\left(32825\,d^3 + 317565\,d^2e - 221643\,de^2 - 67499\,e^3\right)\arctan\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right) + \frac{867}{3125}xe^3 - \frac{1}{6250}\left(1025\,d^3 - 1545\,d^2e - 2601\,de^2 + 832\,e^3\right)\ln\left(5\,x^2 + 2\,x + 3\right) - \frac{170875\,d^3 - 95175\,d^2e + \left(52875\,d^3 + 449175\,d^2e - 274845\,de^2 - 53189\,e^3\right)x - 269505\,de^2 + 54969\,e^3}{437500\,(5\,x^2 + 2\,x + 3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3/(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] 1/25*x^4*e^3 + 4/25*d*x^3*e^2 + 6/25*d^2*x^2*e + 4/25*d^3*x - 41/
375*x^3*e^3 - 123/250*d*x^2*e^2 - 123/125*d^2*x*e + 103/1250*x^2*
e^3 + 309/625*d*x*e^2 + 1/1225000*sqrt(14)*(32825*d^3 + 317565*d^
2*e - 221643*d*e^2 - 67499*e^3)*arctan(1/14*sqrt(14)*(5*x + 1)) +
 867/3125*x*e^3 - 1/6250*(1025*d^3 - 1545*d^2*e - 2601*d*e^2 + 83
2*e^3)*ln(5*x^2 + 2*x + 3) - 1/437500*(170875*d^3 - 95175*d^2*e +
 (52875*d^3 + 449175*d^2*e - 274845*d*e^2 - 53189*e^3)*x - 269505
*d*e^2 + 54969*e^3)/(5*x^2 + 2*x + 3)
```

3.312 $\int \frac{(d+ex)^2(2+x+3x^2-5x^3+4x^4)}{(3+2x+5x^2)^2}\,dx$

Optimal. Leaf size=140

$$-\frac{(1025d^2-1030de-867e^2)\log(5x^2+2x+3)}{6250}+\frac{x(2800d^2-11480de+3307e^2)}{17500}+\frac{(32825d^2+211710de-73881e^2)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{87500\sqrt{14}}+\frac{1}{250}ex^2(40d-41e)-\frac{(423x+1367)(d+ex)^2}{3500(5x^2+2x+3)}+\frac{4e^2x^3}{75}$$

```
[Out] ((2800*d^2 - 11480*d*e + 3307*e^2)*x)/17500 + ((40*d - 41*e)*e*x^
2)/250 + (4*e^2*x^3)/75 - ((1367 + 423*x)*(d + e*x)^2)/(3500*(3 +
 2*x + 5*x^2)) + ((32825*d^2 + 211710*d*e - 73881*e^2)*ArcTan[(1
+ 5*x)/Sqrt[14]])/(87500*Sqrt[14]) - ((1025*d^2 - 1030*d*e - 867*
e^2)*Log[3 + 2*x + 5*x^2])/6250
```

Rubi [A] time = 0.363096, antiderivative size = 140, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{(1025d^2-1030de-867e^2)\log(5x^2+2x+3)}{6250}+\frac{x(2800d^2-11480de+3307e^2)}{17500}+\frac{(32825d^2+211710de-73881e^2)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{87500\sqrt{14}}+\frac{1}{250}ex^2(40d-41e)-\frac{(423x+1367)(d+ex)^2}{3500(5x^2+2x+3)}+\frac{4e^2x^3}{75}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2)^2,x]
```

```
[Out] ((2800*d^2 - 11480*d*e + 3307*e^2)*x)/17500 + ((40*d - 41*e)*e*x^
2)/250 + (4*e^2*x^3)/75 - ((1367 + 423*x)*(d + e*x)^2)/(3500*(3 +
 2*x + 5*x^2)) + ((32825*d^2 + 211710*d*e - 73881*e^2)*ArcTan[(1
+ 5*x)/Sqrt[14]])/(87500*Sqrt[14]) - ((1025*d^2 - 1030*d*e - 867*
e^2)*Log[3 + 2*x + 5*x^2])/6250
```

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((e*x+d)**2*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.21467, size = 150, normalized size = 1.07

$$\frac{-\frac{42\left(25d^2(423x+1367)+10de(5989x-1269)-e^2(18323x+17967)\right)}{5x^2+2x+3}+588\left(-1025d^2+1030de+867e^2\right)\log\left(5x^2+2x+3\right)+5880x\left(100d^2-4\right.}{3675000}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2)^2,x]
```

```
[Out] (5880*(100*d^2 - 410*d*e + 103*e^2)*x + 14700*(40*d - 41*e)*e*x^2
 + 196000*e^2*x^3 - (42*(25*d^2*(1367 + 423*x) + 10*d*e*(-1269 +
5989*x) - e^2*(17967 + 18323*x)))/(3 + 2*x + 5*x^2) + 3*Sqrt[14]*
(32825*d^2 + 211710*d*e - 73881*e^2)*ArcTan[(1 + 5*x)/Sqrt[14]] +
 588*(-1025*d^2 + 1030*d*e + 867*e^2)*Log[3 + 2*x + 5*x^2])/36750
00
```

Maple [A] time = 0.012, size = 189, normalized size = 1.4

$$\frac{4e^2x^3}{75}+\frac{4x^2de}{25}-\frac{41e^2x^2}{250}+\frac{4d^2x}{25}-\frac{82xde}{125}+\frac{103e^2x}{625}-\frac{1}{625}\left(\left(\frac{423d^2}{28}+\frac{5989de}{70}-\frac{18323e^2}{700}\right)x+\frac{1367d^2}{28}-\frac{1269de}{70}-\frac{17967e^2}{700}\right)\left(x^2+\frac{2x}{5}+\frac{3}{5}\right)^{-1}-\frac{41\ln\left(5x^2+2x+3\right)d^2}{250}+\frac{103\ln\left(5x^2+2x+3\right)de}{625}+\frac{867\ln\left(5x^2+2x+3\right)e^2}{6250}+\frac{1313\sqrt{14}d^2}{49000}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)+\frac{21171\sqrt{14}de}{122500}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)-\frac{73881\sqrt{14}e^2}{1225000}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^2*(4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3)^2,x)
```

```
[Out] 4/75*e^2*x^3+4/25*x^2*d*e-41/250*e^2*x^2+4/25*d^2*x-82/125*x*d*e+
103/625*e^2*x-1/625*((423/28*d^2+5989/70*d*e-18323/700*e^2)*x+136
```

```
7/28*d^2-1269/70*d*e-17967/700*e^2)/(x^2+2/5*x+3/5)-41/250*ln(5*x
^2+2*x+3)*d^2+103/625*ln(5*x^2+2*x+3)*d*e+867/6250*ln(5*x^2+2*x+3
)*e^2+1313/49000*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d^2+2117
1/122500*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d*e-73881/122500
0*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*e^2
```

Maxima [A] time = 0.812814, size = 198, normalized size = 1.41

$$\frac{4}{75}\,e^2x^3+\frac{1}{250}\left(40\,de-41\,e^2\right)x^2+\frac{1}{1225000}\,\sqrt{14}\left(32825\,d^2+211710\,de-73881\,e^2\right)\arctan\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right)+\frac{1}{625}\left(100\,d^2-410\,de+103\,e^2\right)x-\frac{1}{6250}\left(1025\,d^2-1030\,de-867\,e^2\right)\log\left(5\,x^2+2\,x+3\right)-\frac{34175\,d^2-12690\,de-17967\,e^2+\left(10575\,d^2+59890\,de-18323\,e^2\right)x}{87500\,(5\,x^2+2\,x+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2/(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] 4/75*e^2*x^3 + 1/250*(40*d*e - 41*e^2)*x^2 + 1/1225000*sqrt(14)*(
32825*d^2 + 211710*d*e - 73881*e^2)*arctan(1/14*sqrt(14)*(5*x + 1
)) + 1/625*(100*d^2 - 410*d*e + 103*e^2)*x - 1/6250*(1025*d^2 - 1
030*d*e - 867*e^2)*log(5*x^2 + 2*x + 3) - 1/87500*(34175*d^2 - 12
690*d*e - 17967*e^2 + (10575*d^2 + 59890*d*e - 18323*e^2)*x)/(5*x
^2 + 2*x + 3)
```

Fricas [A] time = 0.266928, size = 343, normalized size = 2.45

$$-\frac{\sqrt{14}\Big(42\,\sqrt{14}\big(5\,\left(1025\,d^2-1030\,de-867\,e^2\right)x^2+3075\,d^2-3090\,de-2601\,e^2+2\,\left(1025\,d^2-1030\,de-867\,e^2\right)x\big)\log\left(5\,x^2\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2/(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] -1/3675000*sqrt(14)*(42*sqrt(14)*(5*(1025*d^2 - 1030*d*e - 867*e^
2)*x^2 + 3075*d^2 - 3090*d*e - 2601*e^2 + 2*(1025*d^2 - 1030*d*e
- 867*e^2)*x)*log(5*x^2 + 2*x + 3) - 3*(5*(32825*d^2 + 211710*d*e
 - 73881*e^2)*x^2 + 98475*d^2 + 635130*d*e - 221643*e^2 + 2*(3282
5*d^2 + 211710*d*e - 73881*e^2)*x)*arctan(1/14*sqrt(14)*(5*x + 1)
) - sqrt(14)*(70000*e^2*x^5 + 1750*(120*d*e - 107*e^2)*x^4 + 4200
```

```
*(50*d^2 - 185*d*e + 41*e^2)*x^3 + 210*(400*d^2 - 1040*d*e - 203*
e^2)*x^2 - 102525*d^2 + 38070*d*e + 53901*e^2 + 3*(31425*d^2 - 23
2090*d*e + 61583*e^2)*x))/(5*x^2 + 2*x + 3)
```

Sympy [A] time = 2.82471, size = 298, normalized size = 2.13

$$\frac{4e^2x^3}{75} + x^2\left(\frac{4de}{25} - \frac{41e^2}{250}\right) + x\left(\frac{4d^2}{25} - \frac{82de}{125} + \frac{103e^2}{625}\right) + \left(-\frac{41d^2}{250} + \frac{103de}{625} + \frac{867e^2}{6250} - \frac{\sqrt{14}i\left(32825d^2 + 211710de - 73881e^2\right)}{2450000}\right)\log\left(x + \frac{6565d^2 + 42342de - \frac{73881e^2}{5} - \frac{\sqrt{14}i(32825d^2+211710de-73881e^2)}{5}}{32825d^2 + 211710de - 73881e^2}\right) + \left(-\frac{41d^2}{250} + \frac{103de}{625} + \frac{867e^2}{6250} + \frac{\sqrt{14}i\left(32825d^2 + 211710de - 73881e^2\right)}{2450000}\right)\log\left(x + \frac{6565d^2 + 42342de - \frac{73881e^2}{5} + \frac{\sqrt{14}i(32825d^2+211710de-73881e^2)}{5}}{32825d^2 + 211710de - 73881e^2}\right) - \frac{34175d^2 - 12690de - 17967e^2 + x\left(10575d^2 + 59890de - 18323e^2\right)}{437500x^2 + 175000x + 262500}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**2,x)
```

```
[Out] 4*e**2*x**3/75 + x**2*(4*d*e/25 - 41*e**2/250) + x*(4*d**2/25 - 8
2*d*e/125 + 103*e**2/625) + (-41*d**2/250 + 103*d*e/625 + 867*e**
2/6250 - sqrt(14)*I*(32825*d**2 + 211710*d*e - 73881*e**2)/245000
0)*log(x + (6565*d**2 + 42342*d*e - 73881*e**2/5 - sqrt(14)*I*(32
825*d**2 + 211710*d*e - 73881*e**2)/5)/(32825*d**2 + 211710*d*e -
 73881*e**2)) + (-41*d**2/250 + 103*d*e/625 + 867*e**2/6250 + sqr
t(14)*I*(32825*d**2 + 211710*d*e - 73881*e**2)/2450000)*log(x + (
6565*d**2 + 42342*d*e - 73881*e**2/5 + sqrt(14)*I*(32825*d**2 + 2
11710*d*e - 73881*e**2)/5)/(32825*d**2 + 211710*d*e - 73881*e**2)
) - (34175*d**2 - 12690*d*e - 17967*e**2 + x*(10575*d**2 + 59890*
d*e - 18323*e**2))/(437500*x**2 + 175000*x + 262500)
```

GIAC/XCAS [A] time = 0.271093, size = 196, normalized size = 1.4

$$\frac{4}{75}x^3e^2 + \frac{4}{25}dx^2e + \frac{4}{25}d^2x - \frac{41}{250}x^2e^2 - \frac{82}{125}dxe + \frac{1}{1225000}\sqrt{14}\left(32825\,d^2 + 211710\,de - 73881\,e^2\right)\arctan\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right) + \frac{103}{625}xe^2 - \frac{1}{6250}\left(1025\,d^2 - 1030\,de - 867\,e^2\right)\ln\left(5\,x^2+2\,x+3\right) - \frac{34175\,d^2 + \left(10575\,d^2 + 59890\,de - 18323\,e^2\right)x - 12690\,de - 17967\,e^2}{87500\,(5\,x^2+2\,x+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2/(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] 4/75*x^3*e^2 + 4/25*d*x^2*e + 4/25*d^2*x - 41/250*x^2*e^2 - 82/12
5*d*x*e + 1/1225000*sqrt(14)*(32825*d^2 + 211710*d*e - 73881*e^2)
*arctan(1/14*sqrt(14)*(5*x + 1)) + 103/625*x*e^2 - 1/6250*(1025*d
^2 - 1030*d*e - 867*e^2)*ln(5*x^2 + 2*x + 3) - 1/87500*(34175*d^2
 + (10575*d^2 + 59890*d*e - 18323*e^2)*x - 12690*d*e - 17967*e^2)
/(5*x^2 + 2*x + 3)
```

3.313 $\int \frac{(d+ex)(2+x+3x^2-5x^3+4x^4)}{(3+2x+5x^2)^2}\,dx$

Optimal. Leaf size=97

$$-\frac{(423x+1367)(d+ex)}{3500\,(5x^2+2x+3)}-\frac{(205d-103e)\log\left(5x^2+2x+3\right)}{1250}+\frac{1}{125}x(20d-41e)+\frac{(6565d+21171e)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{17500\sqrt{14}}+\frac{2ex^2}{25}$$

```
[Out] ((20*d - 41*e)*x)/125 + (2*e*x^2)/25 - ((1367 + 423*x)*(d + e*x))
/(3500*(3 + 2*x + 5*x^2)) + ((6565*d + 21171*e)*ArcTan[(1 + 5*x)/
Sqrt[14]])/(17500*Sqrt[14]) - ((205*d - 103*e)*Log[3 + 2*x + 5*x^
2])/1250
```

Rubi [A] time = 0.268992, antiderivative size = 97, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$-\frac{(423x+1367)(d+ex)}{3500\,(5x^2+2x+3)}-\frac{(205d-103e)\log\left(5x^2+2x+3\right)}{1250}+\frac{1}{125}x(20d-41e)+\frac{(6565d+21171e)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{17500\sqrt{14}}+\frac{2ex^2}{25}$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2)^2,x]
```

```
[Out] ((20*d - 41*e)*x)/125 + (2*e*x^2)/25 - ((1367 + 423*x)*(d + e*x))
/(3500*(3 + 2*x + 5*x^2)) + ((6565*d + 21171*e)*ArcTan[(1 + 5*x)/
Sqrt[14]])/(17500*Sqrt[14]) - ((205*d - 103*e)*Log[3 + 2*x + 5*x^
2])/1250
```

Rubi in Sympy [A] time = 124.093, size = 121, normalized size = 1.25

$$\frac{2ex^4}{5\,(5x^2+2x+3)}+\frac{x^3\left(\frac{4d}{5}-\frac{37e}{25}\right)}{5x^2+2x+3}-\left(\frac{41d}{250}-\frac{103e}{1250}\right)\log\left(5x^2+2x+3\right)+4.08163265306122\cdot 10^{-6}\sqrt{14}\,(6565d+21171e)\operatorname{atan}\left(\sqrt{14}\left(\frac{5x}{14}+\frac{1}{14}\right)\right)-\frac{0.00178571428571429\left(\frac{8156d}{25}-\frac{22548e}{125}-x\left(\frac{3236d}{25}-\frac{81188e}{125}\right)\right)}{5x^2+2x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x+d)*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**2,x)
```

```
[Out] 2*e*x**4/(5*(5*x**2 + 2*x + 3)) + x**3*(4*d/5 - 37*e/25)/(5*x**2
+ 2*x + 3) - (41*d/250 - 103*e/1250)*log(5*x**2 + 2*x + 3) + 4.08
163265306122e-6*sqrt(14)*(6565*d + 21171*e)*atan(sqrt(14)*(5*x/14
 + 1/14)) - 0.00178571428571429*(8156*d/25 - 22548*e/125 - x*(323
6*d/25 - 81188*e/125))/(5*x**2 + 2*x + 3)
```

Mathematica [A] time = 0.128082, size = 96, normalized size = 0.99

$$\frac{-\frac{14(5d(423x+1367)+e(5989x-1269))}{5x^2+2x+3}+196(103e-205d)\log\left(5x^2+2x+3\right)+1960x(20d-41e)+\sqrt{14}(6565d+21171e)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{245000}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2)^2,x]
```

```
[Out] (1960*(20*d - 41*e)*x + 19600*e*x^2 - (14*(5*d*(1367 + 423*x) + e
*(-1269 + 5989*x)))/(3 + 2*x + 5*x^2) + Sqrt[14]*(6565*d + 21171*
e)*ArcTan[(1 + 5*x)/Sqrt[14]] + 196*(-205*d + 103*e)*Log[3 + 2*x
+ 5*x^2])/245000
```

Maple [A] time = 0.013, size = 106, normalized size = 1.1

$$\frac{2\,ex^2}{25}+\frac{4\,dx}{25}-\frac{41\,ex}{125}-\frac{1}{125}\left(\left(\frac{423\,d}{140}+\frac{5989\,e}{700}\right)x+\frac{1367\,d}{140}-\frac{1269\,e}{700}\right)\left(x^2+\frac{2\,x}{5}+\frac{3}{5}\right)^{-1}$$
$$-\frac{41\,\ln\left(5\,x^2+2\,x+3\right)d}{250}+\frac{103\,e\ln\left(5\,x^2+2\,x+3\right)}{1250}$$
$$+\frac{1313\,\sqrt{14}d}{49000}\arctan\left(\frac{(10\,x+2)\sqrt{14}}{28}\right)+\frac{21171\,\sqrt{14}e}{245000}\arctan\left(\frac{(10\,x+2)\sqrt{14}}{28}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)*(4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3)^2,x)
```

```
[Out] 2/25*e*x^2+4/25*d*x-41/125*e*x-1/125*((423/140*d+5989/700*e)*x+13
67/140*d-1269/700*e)/(x^2+2/5*x+3/5)-41/250*ln(5*x^2+2*x+3)*d+103
/1250*e*ln(5*x^2+2*x+3)+1313/49000*14^(1/2)*arctan(1/28*(10*x+2)*
14^(1/2))*d+21171/245000*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*
```

e

Maxima [A] time = 0.808127, size = 122, normalized size = 1.26

$$\frac{2}{25}\,ex^2+\frac{1}{245000}\,\sqrt{14}(6565\,d+21171\,e)\arctan\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right)+\frac{1}{125}\,(20\,d-41\,e)x-\frac{1}{1250}\,(205\,d-103\,e)\log\left(5\,x^2+2\,x+3\right)-\frac{(2115\,d+5989\,e)x+6835\,d-1269\,e}{17500\,(5\,x^2+2\,x+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)/(5*x^2 + 2*x + 3)^2,x, algorith
```

```
[Out] 2/25*e*x^2 + 1/245000*sqrt(14)*(6565*d + 21171*e)*arctan(1/14*sqr
t(14)*(5*x + 1)) + 1/125*(20*d - 41*e)*x - 1/1250*(205*d - 103*e)
*log(5*x^2 + 2*x + 3) - 1/17500*((2115*d + 5989*e)*x + 6835*d - 1
269*e)/(5*x^2 + 2*x + 3)
```

Fricas [A] time = 0.270398, size = 211, normalized size = 2.18

$$-\frac{\sqrt{14}\Big(14\,\sqrt{14}\big(5\,(205\,d-103\,e)x^2+2\,(205\,d-103\,e)x+615\,d-309\,e\big)\log\left(5\,x^2+2\,x+3\right)-\big(5\,(6565\,d+21171\,e)x^2+2\,(65}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)/(5*x^2 + 2*x + 3)^2,x, algorith
```

```
[Out] -1/245000*sqrt(14)*(14*sqrt(14)*(5*(205*d - 103*e)*x^2 + 2*(205*d
 - 103*e)*x + 615*d - 309*e)*log(5*x^2 + 2*x + 3) - (5*(6565*d +
21171*e)*x^2 + 2*(6565*d + 21171*e)*x + 19695*d + 63513*e)*arctan
(1/14*sqrt(14)*(5*x + 1)) - sqrt(14)*(7000*e*x^4 + 700*(20*d - 37
*e)*x^3 + 560*(10*d - 13*e)*x^2 + (6285*d - 23209*e)*x - 6835*d +
 1269*e))/(5*x^2 + 2*x + 3)
```

Sympy [A] time = 1.84486, size = 163, normalized size = 1.68

$$\frac{2ex^2}{25} + x\left(\frac{4d}{25} - \frac{41e}{125}\right) + \left(-\frac{41d}{250} + \frac{103e}{1250} - \frac{\sqrt{14}i\,(6565d + 21171e)}{490000}\right)\log\left(x + \frac{1313d + \frac{21171e}{5} - \frac{\sqrt{14}i(6565d+21171e)}{5}}{6565d + 21171e}\right) + \left(-\frac{41d}{250} + \frac{103e}{1250} + \frac{\sqrt{14}i\,(6565d + 21171e)}{490000}\right)\log\left(x + \frac{1313d + \frac{21171e}{5} + \frac{\sqrt{14}i(6565d+21171e)}{5}}{6565d + 21171e}\right) - \frac{6835d - 1269e + x\,(2115d + 5989e)}{87500x^2 + 35000x + 52500}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**2,x)
```

```
[Out] 2*e*x**2/25 + x*(4*d/25 - 41*e/125) + (-41*d/250 + 103*e/1250 - s
qrt(14)*I*(6565*d + 21171*e)/490000)*log(x + (1313*d + 21171*e/5
- sqrt(14)*I*(6565*d + 21171*e)/5)/(6565*d + 21171*e)) + (-41*d/2
50 + 103*e/1250 + sqrt(14)*I*(6565*d + 21171*e)/490000)*log(x + (
1313*d + 21171*e/5 + sqrt(14)*I*(6565*d + 21171*e)/5)/(6565*d + 2
1171*e)) - (6835*d - 1269*e + x*(2115*d + 5989*e))/(87500*x**2 +
35000*x + 52500)
```

GIAC/XCAS [A] time = 0.271035, size = 127, normalized size = 1.31

$$\frac{2}{25}\,x^2 e + \frac{1}{245000}\,\sqrt{14}(6565\,d + 21171\,e)\arctan\left(\frac{1}{14}\,\sqrt{14}(5\,x + 1)\right) + \frac{4}{25}\,dx - \frac{41}{125}\,xe - \frac{1}{1250}\,(205\,d - 103\,e)\ln\left(5\,x^2 + 2\,x + 3\right) - \frac{(2115\,d + 5989\,e)x + 6835\,d - 1269\,e}{17500\,(5\,x^2 + 2\,x + 3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)/(5*x^2 + 2*x + 3)^2,x, algorith
```

```
[Out] 2/25*x^2*e + 1/245000*sqrt(14)*(6565*d + 21171*e)*arctan(1/14*sqr
t(14)*(5*x + 1)) + 4/25*d*x - 41/125*x*e - 1/1250*(205*d - 103*e)
*ln(5*x^2 + 2*x + 3) - 1/17500*((2115*d + 5989*e)*x + 6835*d - 12
69*e)/(5*x^2 + 2*x + 3)
```

3.314 $\int \frac{2+x+3x^2-5x^3+4x^4}{(3+2x+5x^2)^2}\,dx$

Optimal. Leaf size=63

$$-\frac{423x+1367}{3500(5x^2+2x+3)}-\frac{41}{250}\log\left(5x^2+2x+3\right)+\frac{4x}{25}+\frac{1313\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{3500\sqrt{14}}$$

```
[Out] (4*x)/25 - (1367 + 423*x)/(3500*(3 + 2*x + 5*x^2)) + (1313*ArcTan
[(1 + 5*x)/Sqrt[14]])/(3500*Sqrt[14]) - (41*Log[3 + 2*x + 5*x^2])
/250
```

Rubi [A] time = 0.104998, antiderivative size = 63, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.194

$$-\frac{423x+1367}{3500(5x^2+2x+3)}-\frac{41}{250}\log\left(5x^2+2x+3\right)+\frac{4x}{25}+\frac{1313\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{3500\sqrt{14}}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/(3 + 2*x + 5*x^2)^2,x]
```

```
[Out] (4*x)/25 - (1367 + 423*x)/(3500*(3 + 2*x + 5*x^2)) + (1313*ArcTan
[(1 + 5*x)/Sqrt[14]])/(3500*Sqrt[14]) - (41*Log[3 + 2*x + 5*x^2])
/250
```

Rubi in Sympy [A] time = 48.0574, size = 66, normalized size = 1.05

$$\frac{4x^3}{5(5x^2+2x+3)}-\frac{0.00178571428571429\left(-\frac{3236x}{25}+\frac{8156}{25}\right)}{5x^2+2x+3}-\frac{41\log\left(5x^2+2x+3\right)}{250}+0.0267959183673469\sqrt{14}\,\mathrm{atan}\left(\sqrt{14}\left(\frac{5x}{14}+\frac{1}{14}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**2,x)
```

```
[Out] 4*x**3/(5*(5*x**2 + 2*x + 3)) - 0.00178571428571429*(-3236*x/25 +
 8156/25)/(5*x**2 + 2*x + 3) - 41*log(5*x**2 + 2*x + 3)/250 + 0.0
267959183673469*sqrt(14)*atan(sqrt(14)*(5*x/14 + 1/14))
```

Mathematica [A] time = 0.0636101, size = 59, normalized size = 0.94

$$\frac{-\frac{14(423x+1367)}{5x^2+2x+3} - 8036\log\left(5x^2+2x+3\right) + 7840x + 1313\sqrt{14}\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{49000}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/(3 + 2*x + 5*x^2)^2,x]
```

```
[Out] (7840*x - (14*(1367 + 423*x))/(3 + 2*x + 5*x^2) + 1313*Sqrt[14]*A
rcTan[(1 + 5*x)/Sqrt[14]] - 8036*Log[3 + 2*x + 5*x^2])/49000
```

Maple [A] time = 0.01, size = 51, normalized size = 0.8

$$\frac{4\,x}{25} - \frac{1}{25}\left(\frac{423\,x}{700} + \frac{1367}{700}\right)\left(x^2 + \frac{2\,x}{5} + \frac{3}{5}\right)^{-1} - \frac{41\,\ln\left(25\,x^2+10\,x+15\right)}{250} + \frac{1313\,\sqrt{14}}{49000}\arctan\left(\frac{(50\,x+10)\,\sqrt{14}}{140}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3)^2,x)
```

```
[Out] 4/25*x-1/25*(423/700*x+1367/700)/(x^2+2/5*x+3/5)-41/250*ln(25*x^2
+10*x+15)+1313/49000*14^(1/2)*arctan(1/140*(50*x+10)*14^(1/2))
```

Maxima [A] time = 0.800905, size = 70, normalized size = 1.11

$$\frac{1313}{49000}\,\sqrt{14}\arctan\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right) + \frac{4}{25}\,x - \frac{423\,x+1367}{3500\,(5\,x^2+2\,x+3)} - \frac{41}{250}\,\log\left(5\,x^2+2\,x+3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/(5*x^2 + 2*x + 3)^2,x, algorithm="maxima
```

```
[Out] 1313/49000*sqrt(14)*arctan(1/14*sqrt(14)*(5*x + 1)) + 4/25*x - 1/
3500*(423*x + 1367)/(5*x^2 + 2*x + 3) - 41/250*log(5*x^2 + 2*x +
3)
```

Fricas [A] time = 0.262199, size = 117, normalized size = 1.86

$$-\frac{\sqrt{14}\left(574\sqrt{14}\left(5x^2+2x+3\right)\log\left(5x^2+2x+3\right)-1313\left(5x^2+2x+3\right)\arctan\left(\frac{1}{14}\sqrt{14}(5x+1)\right)-\sqrt{14}\left(2800x^3+1120x\right.\right.}{49000\left(5x^2+2x+3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/(5*x^2 + 2*x + 3)^2,x, algorithm="fricas
```

```
[Out] -1/49000*sqrt(14)*(574*sqrt(14)*(5*x^2 + 2*x + 3)*log(5*x^2 + 2*x
 + 3) - 1313*(5*x^2 + 2*x + 3)*arctan(1/14*sqrt(14)*(5*x + 1)) -
sqrt(14)*(2800*x^3 + 1120*x^2 + 1257*x - 1367))/(5*x^2 + 2*x + 3)
```

Sympy [A] time = 0.203836, size = 63, normalized size = 1.

$$\frac{4x}{25}-\frac{423x+1367}{17500x^2+7000x+10500}-\frac{41\log\left(x^2+\frac{2x}{5}+\frac{3}{5}\right)}{250}+\frac{1313\sqrt{14}\,\mathrm{atan}\left(\frac{5\sqrt{14}x}{14}+\frac{\sqrt{14}}{14}\right)}{49000}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**2,x)
```

```
[Out] 4*x/25 - (423*x + 1367)/(17500*x**2 + 7000*x + 10500) - 41*log(x*
*2 + 2*x/5 + 3/5)/250 + 1313*sqrt(14)*atan(5*sqrt(14)*x/14 + sqrt
(14)/14)/49000
```

GIAC/XCAS [A] time = 0.271461, size = 70, normalized size = 1.11

$$\frac{1313}{49000}\sqrt{14}\arctan\left(\frac{1}{14}\sqrt{14}(5x+1)\right)+\frac{4}{25}x-\frac{423x+1367}{3500\left(5x^2+2x+3\right)}-\frac{41}{250}\ln\left(5x^2+2x+3\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/(5*x^2 + 2*x + 3)^2,x, algorithm="giac")
```

```
[Out] 1313/49000*sqrt(14)*arctan(1/14*sqrt(14)*(5*x + 1)) + 4/25*x - 1/
3500*(423*x + 1367)/(5*x^2 + 2*x + 3) - 41/250*ln(5*x^2 + 2*x + 3
)
```

3.315 $\int \frac{2+x+3x^2-5x^3+4x^4}{(d+ex)(3+2x+5x^2)^2}\,dx$

Optimal. Leaf size=224

$$-\frac{x(423d-1367e)+1367d-293e}{700(5x^2+2x+3)(5d^2-2de+3e^2)}-\frac{(205d^3-61d^2e+23de^2+14e^3)\log(5x^2+2x+3)}{50(5d^2-2de+3e^2)^2}+\frac{(6565d^3-26423d^2e+11089de^2-6623e^3)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{700\sqrt{14}(5d^2-2de+3e^2)^2}+\frac{(4d^4+5d^3e+3d^2e^2-de^3+2e^4)\log(d+ex)}{e(5d^2-2de+3e^2)^2}$$

```
[Out] -(1367*d - 293*e + (423*d - 1367*e)*x)/(700*(5*d^2 - 2*d*e + 3*e^
2)*(3 + 2*x + 5*x^2)) + ((6565*d^3 - 26423*d^2*e + 11089*d*e^2 -
6623*e^3)*ArcTan[(1 + 5*x)/Sqrt[14]])/(700*Sqrt[14]*(5*d^2 - 2*d*
e + 3*e^2)^2) + ((4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*Lo
g[d + e*x])/(e*(5*d^2 - 2*d*e + 3*e^2)^2) - ((205*d^3 - 61*d^2*e
+ 23*d*e^2 + 14*e^3)*Log[3 + 2*x + 5*x^2])/(50*(5*d^2 - 2*d*e + 3
*e^2)^2)
```

Rubi [A] time = 0.608716, antiderivative size = 224, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{x(423d-1367e)+1367d-293e}{700(5x^2+2x+3)(5d^2-2de+3e^2)}-\frac{(205d^3-61d^2e+23de^2+14e^3)\log(5x^2+2x+3)}{50(5d^2-2de+3e^2)^2}+\frac{(6565d^3-26423d^2e+11089de^2-6623e^3)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{700\sqrt{14}(5d^2-2de+3e^2)^2}+\frac{(4d^4+5d^3e+3d^2e^2-de^3+2e^4)\log(d+ex)}{e(5d^2-2de+3e^2)^2}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)*(3 + 2*x + 5*x^2)^2),x]
```

```
[Out] -(1367*d - 293*e + (423*d - 1367*e)*x)/(700*(5*d^2 - 2*d*e + 3*e^
2)*(3 + 2*x + 5*x^2)) + ((6565*d^3 - 26423*d^2*e + 11089*d*e^2 -
6623*e^3)*ArcTan[(1 + 5*x)/Sqrt[14]])/(700*Sqrt[14]*(5*d^2 - 2*d*
e + 3*e^2)^2) + ((4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*Lo
g[d + e*x])/(e*(5*d^2 - 2*d*e + 3*e^2)^2) - ((205*d^3 - 61*d^2*e
+ 23*d*e^2 + 14*e^3)*Log[3 + 2*x + 5*x^2])/(50*(5*d^2 - 2*d*e + 3
*e^2)^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((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)/(5*x**2+2*x+3)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.283761, size = 186, normalized size = 0.83

$$\frac{\frac{14\left(5d^2-2de+3e^2\right)\left(e(1367x+293)-d(423x+1367)\right)}{5x^2+2x+3}-196\left(205d^3-61d^2e+23de^2+14e^3\right)\log\left(5x^2+2x+3\right)+\sqrt{14}\left(6565d^3-26423d^2e\right.}{9800\left(5d^2-2de+3e^2\right)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)*(3 + 2*x + 5*x^2)^2),x]
```

```
[Out] ((14*(5*d^2 - 2*d*e + 3*e^2)*(-(d*(1367 + 423*x)) + e*(293 + 1367
*x)))/(3 + 2*x + 5*x^2) + Sqrt[14]*(6565*d^3 - 26423*d^2*e + 1108
9*d*e^2 - 6623*e^3)*ArcTan[(1 + 5*x)/Sqrt[14]] + (9800*(4*d^4 + 5
*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*Log[d + e*x])/e - 196*(205*d^
3 - 61*d^2*e + 23*d*e^2 + 14*e^3)*Log[3 + 2*x + 5*x^2])/(9800*(5*
d^2 - 2*d*e + 3*e^2)^2)
```

Maple [B] time = 0.128, size = 691, normalized size = 3.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((4*x^4-5*x^3+3*x^2+x+2)/(e*x+d)/(5*x^2+2*x+3)^2,x)
```

```
[Out] 4/(5*d^2-2*d*e+3*e^2)^2/e*ln(e*x+d)*d^4+5/(5*d^2-2*d*e+3*e^2)^2*l
n(e*x+d)*d^3+3/(5*d^2-2*d*e+3*e^2)^2*e*ln(e*x+d)*d^2-1/(5*d^2-2*d
*e+3*e^2)^2*e^2*ln(e*x+d)*d+2/(5*d^2-2*d*e+3*e^2)^2*e^3*ln(e*x+d)
-423/700/(5*d^2-2*d*e+3*e^2)^2/(x^2+2/5*x+3/5)*d^3*x+7681/3500/(5
*d^2-2*d*e+3*e^2)^2/(x^2+2/5*x+3/5)*x*d^2*e-4003/3500/(5*d^2-2*d*
e+3*e^2)^2/(x^2+2/5*x+3/5)*x*d*e^2+4101/3500/(5*d^2-2*d*e+3*e^2)^
2/(x^2+2/5*x+3/5)*x*e^3-1367/700/(5*d^2-2*d*e+3*e^2)^2/(x^2+2/5*x
```

```
+3/5)*d^3+4199/3500/(5*d^2-2*d*e+3*e^2)^2/(x^2+2/5*x+3/5)*d^2*e-4
687/3500/(5*d^2-2*d*e+3*e^2)^2/(x^2+2/5*x+3/5)*e^2*d+879/3500/(5*
d^2-2*d*e+3*e^2)^2/(x^2+2/5*x+3/5)*e^3-41/10/(5*d^2-2*d*e+3*e^2)^
2*ln(25*x^2+10*x+15)*d^3+61/50/(5*d^2-2*d*e+3*e^2)^2*ln(25*x^2+10
*x+15)*d^2*e-23/50/(5*d^2-2*d*e+3*e^2)^2*ln(25*x^2+10*x+15)*e^2*d
-7/25/(5*d^2-2*d*e+3*e^2)^2*ln(25*x^2+10*x+15)*e^3+1313/1960/(5*d
^2-2*d*e+3*e^2)^2*14^(1/2)*arctan(1/140*(50*x+10)*14^(1/2))*d^3-2
6423/9800/(5*d^2-2*d*e+3*e^2)^2*14^(1/2)*arctan(1/140*(50*x+10)*1
4^(1/2))*d^2*e+11089/9800/(5*d^2-2*d*e+3*e^2)^2*14^(1/2)*arctan(1
/140*(50*x+10)*14^(1/2))*e^2*d-6623/9800/(5*d^2-2*d*e+3*e^2)^2*14
^(1/2)*arctan(1/140*(50*x+10)*14^(1/2))*e^3
```

Maxima [A] time = 0.77341, size = 390, normalized size = 1.74

$$\frac{\sqrt{14}\left(6565\,d^3-26423\,d^2e+11089\,de^2-6623\,e^3\right)\arctan\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right)}{9800\,(25\,d^4-20\,d^3e+34\,d^2e^2-12\,de^3+9\,e^4)}+\frac{\left(4\,d^4+5\,d^3e+3\,d^2e^2-de^3+2\,e^4\right)\log\left(ex+d\right)}{25\,d^4e-20\,d^3e^2+34\,d^2e^3-12\,de^4+9\,e^5}-\frac{\left(205\,d^3-61\,d^2e+23\,de^2+14\,e^3\right)\log\left(5\,x^2+2\,x+3\right)}{50\,(25\,d^4-20\,d^3e+34\,d^2e^2-12\,de^3+9\,e^4)}-\frac{(423\,d-1367\,e)x+1367\,d-293\,e}{700\,(5\,(5\,d^2-2\,de+3\,e^2)x^2+15\,d^2-6\,de+9\,e^2+2\,(5\,d^2-2\,de+3\,e^2)x)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)*(5*x^2 + 2*x + 3)^2),x, algori
```

```
[Out] 1/9800*sqrt(14)*(6565*d^3 - 26423*d^2*e + 11089*d*e^2 - 6623*e^3)
*arctan(1/14*sqrt(14)*(5*x + 1))/(25*d^4 - 20*d^3*e + 34*d^2*e^2
- 12*d*e^3 + 9*e^4) + (4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^
4)*log(e*x + d)/(25*d^4*e - 20*d^3*e^2 + 34*d^2*e^3 - 12*d*e^4 +
9*e^5) - 1/50*(205*d^3 - 61*d^2*e + 23*d*e^2 + 14*e^3)*log(5*x^2
+ 2*x + 3)/(25*d^4 - 20*d^3*e + 34*d^2*e^2 - 12*d*e^3 + 9*e^4) -
1/700*((423*d - 1367*e)*x + 1367*d - 293*e)/(5*(5*d^2 - 2*d*e + 3
*e^2)*x^2 + 15*d^2 - 6*d*e + 9*e^2 + 2*(5*d^2 - 2*d*e + 3*e^2)*x)
```

Fricas [A] time = 0.358749, size = 660, normalized size = 2.95

$$\frac{\sqrt{14}\Big(700\,\sqrt{14}\big(12\,d^4+15\,d^3e+9\,d^2e^2-3\,de^3+6\,e^4+5\,\left(4\,d^4+5\,d^3e+3\,d^2e^2-de^3+2\,e^4\right)x^2+2\,\left(4\,d^4+5\,d^3e+3\,d^2e^2-de\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)*(5*x^2 + 2*x + 3)^2),x, algori
```

```
[Out] 1/9800*sqrt(14)*(700*sqrt(14)*(12*d^4 + 15*d^3*e + 9*d^2*e^2 - 3*
d*e^3 + 6*e^4 + 5*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*x
^2 + 2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*x)*log(e*x +
 d) - 14*sqrt(14)*(615*d^3*e - 183*d^2*e^2 + 69*d*e^3 + 42*e^4 +
5*(205*d^3*e - 61*d^2*e^2 + 23*d*e^3 + 14*e^4)*x^2 + 2*(205*d^3*e
 - 61*d^2*e^2 + 23*d*e^3 + 14*e^4)*x)*log(5*x^2 + 2*x + 3) + (196
95*d^3*e - 79269*d^2*e^2 + 33267*d*e^3 - 19869*e^4 + 5*(6565*d^3*
e - 26423*d^2*e^2 + 11089*d*e^3 - 6623*e^4)*x^2 + 2*(6565*d^3*e -
 26423*d^2*e^2 + 11089*d*e^3 - 6623*e^4)*x)*arctan(1/14*sqrt(14)*
(5*x + 1)) - sqrt(14)*(6835*d^3*e - 4199*d^2*e^2 + 4687*d*e^3 - 8
79*e^4 + (2115*d^3*e - 7681*d^2*e^2 + 4003*d*e^3 - 4101*e^4)*x))/
(75*d^4*e - 60*d^3*e^2 + 102*d^2*e^3 - 36*d*e^4 + 27*e^5 + 5*(25*
d^4*e - 20*d^3*e^2 + 34*d^2*e^3 - 12*d*e^4 + 9*e^5)*x^2 + 2*(25*d
^4*e - 20*d^3*e^2 + 34*d^2*e^3 - 12*d*e^4 + 9*e^5)*x)
```

Sympy [A] time = 24.8956, size = 8322, normalized size = 37.15

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)/(5*x**2+2*x+3)**2,x)
```

```
[Out] (-sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3
)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4
)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2
*d*e + 3*e**2)**2))*log(x + (-6252890000000*d**12*e*(-sqrt(14)*I*
(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*
d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**
3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2
)**2))**2 + 1721036800000*d**12*(-sqrt(14)*I*(6565*d**3 - 26423*d
**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 3
4*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d
*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2)) - 33493264000
000*d**11*e**2*(-sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e
**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*
d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/
(50*(5*d**2 - 2*d*e + 3*e**2)**2))**2 + 4402940080000*d**11*e*(-s
qrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(
19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4))
- (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*
e + 3*e**2)**2)) + 305308416000*d**11 + 55032566400000*d**10*e**3
*(-sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**
3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**
4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 -
2*d*e + 3*e**2)**2))**2 - 5332117966000*d**10*e**2*(-sqrt(14)*I*(
6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d
```

```
**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3
 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)
**2)) + 1028468958725*d**10*e - 141469554240000*d**9*e**4*(-sqrt(
14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(1960
0*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (2
05*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e +
3*e**2)**2))**2 + 17262989570400*d**9*e**3*(-sqrt(14)*I*(6565*d**
3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20
*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d*
*2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2)) +
95412070955*d**9*e**2 + 139354879664000*d**8*e**5*(-sqrt(14)*I*(6
565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d*
*4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3
- 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)*
*2))**2 - 11862414903920*d**8*e**4*(-sqrt(14)*I*(6565*d**3 - 2642
3*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e
+ 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 2
3*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2)) + 92755456
5402*d**8*e**3 - 160769212620800*d**7*e**6*(-sqrt(14)*I*(6565*d**
3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20
*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d*
*2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2))**2
 + 13220300596608*d**7*e**5*(-sqrt(14)*I*(6565*d**3 - 26423*d**2*
e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d*
*2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**
2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2)) - 1587450017342*d
**7*e**4 + 92712805606400*d**6*e**7*(-sqrt(14)*I*(6565*d**3 - 264
23*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e
 + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e +
23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2))**2 - 3769
82672864*d**6*e**6*(-sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089
*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 -
 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e*
*3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2)) + 1705352927600*d**6*e**5
- 61599603788800*d**5*e**8*(-sqrt(14)*I*(6565*d**3 - 26423*d**2*e
 + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**
2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2
 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2))**2 - 1766518292672
*d**5*e**7*(-sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2
- 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e*
*3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*
(5*d**2 - 2*d*e + 3*e**2)**2)) - 927094311444*d**5*e**6 + 1326767
3552000*d**4*e**9*(-sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*
d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 -
12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**
3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2))**2 + 6357651035680*d**4*e**
8*(-sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e*
*3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e*
*4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 -
 2*d*e + 3*e**2)**2)) + 5551412790*d**4*e**7 - 3617733504000*d**3
*e**10*(-sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 66
23*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 +
 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d
**2 - 2*d*e + 3*e**2)**2))**2 - 3730299722240*d**3*e**9*(-sqrt(14
```

```
)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*
(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205
*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*
e**2)**2)) + 227625566062*d**3*e**8 - 3887664076800*d**2*e**11*(-
sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/
(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4))
 - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d
*e + 3*e**2)**2))**2 + 2547991828368*d**2*e**10*(-sqrt(14)*I*(656
5*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4
 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 -
61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2
)) - 201172444677*d**2*e**9 + 1207100966400*d*e**12*(-sqrt(14)*I*
(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*
d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**
3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2
)**2))**2 - 703802088864*d*e**11*(-sqrt(14)*I*(6565*d**3 - 26423*
d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e +
34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*
d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2)) + 6214578370
5*d*e**10 - 676838332800*e**13*(-sqrt(14)*I*(6565*d**3 - 26423*d*
*2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34
*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*
e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2))**2 + 221086021
968*e**12*(-sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 -
 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**
3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(
5*d**2 - 2*d*e + 3*e**2)**2)) - 15706111904*e**11)/(115291904000*
d**11 + 60548006400*d**10*e - 1205961319355*d**9*e**2 - 197922257
6837*d**8*e**3 + 528572641642*d**7*e**4 - 1648297602686*d**6*e**5
 + 151381570368*d**5*e**6 - 924616717780*d**4*e**7 + 478372778758
*d**3*e**8 - 478669057938*d**2*e**9 + 139540516779*d*e**10 - 4940
9758967*e**11)) + (sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d
*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 1
2*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3
)/(50*(5*d**2 - 2*d*e + 3*e**2)**2))*log(x + (-6252890000000*d**1
2*e*(sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e
**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e
**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2
- 2*d*e + 3*e**2)**2))**2 + 1721036800000*d**12*(sqrt(14)*I*(6565
*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4
- 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 6
1*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2)
) - 33493264000000*d**11*e**2*(sqrt(14)*I*(6565*d**3 - 26423*d**2
*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d
**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e*
*2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2))**2 + 44029400800
00*d**11*e*(sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 -
 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**
3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(
5*d**2 - 2*d*e + 3*e**2)**2)) + 305308416000*d**11 + 550325664000
00*d**10*e**3*(sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**
2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*
e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(5
0*(5*d**2 - 2*d*e + 3*e**2)**2))**2 - 5332117966000*d**10*e**2*(s
```

```
qrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(
19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4))
- (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*
e + 3*e**2)**2)) + 1028468958725*d**10*e - 141469554240000*d**9*e
**4*(sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e
**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e
**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2
- 2*d*e + 3*e**2)**2))**2 + 17262989570400*d**9*e**3*(sqrt(14)*I*
(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*
d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**
3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2
)**2)) + 95412070955*d**9*e**2 + 139354879664000*d**8*e**5*(sqrt(
14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(1960
0*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (2
05*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e +
3*e**2)**2))**2 - 11862414903920*d**8*e**4*(sqrt(14)*I*(6565*d**3
 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*
d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**
2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2)) + 9
27554565402*d**8*e**3 - 160769212620800*d**7*e**6*(sqrt(14)*I*(65
65*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**
4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 -
 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**
2))**2 + 13220300596608*d**7*e**5*(sqrt(14)*I*(6565*d**3 - 26423*
d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e +
34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*
d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2)) - 1587450017
342*d**7*e**4 + 92712805606400*d**6*e**7*(sqrt(14)*I*(6565*d**3 -
 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d*
*3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*
e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2))**2 -
376982672864*d**6*e**6*(sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11
089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**
2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14
*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2)) + 1705352927600*d**6*e*
*5 - 61599603788800*d**5*e**8*(sqrt(14)*I*(6565*d**3 - 26423*d**2
*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d
**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e*
*2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2))**2 - 17665182926
72*d**5*e**7*(sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2
 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e
**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50
*(5*d**2 - 2*d*e + 3*e**2)**2)) - 927094311444*d**5*e**6 + 132676
73552000*d**4*e**9*(sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*
d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 -
12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**
3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2))**2 + 6357651035680*d**4*e**
8*(sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**
3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**
4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 -
2*d*e + 3*e**2)**2)) + 5551412790*d**4*e**7 - 3617733504000*d**3*
e**10*(sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623
*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9
*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**
```

2 - 2*d*e + 3*e**2)**2))**2 - 3730299722240*d**3*e**9*(sqrt(14)*I
*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25
*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d*
*3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**
2)**2)) + 227625566062*d**3*e**8 - 3887664076800*d**2*e**11*(sqrt
(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(196
00*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (
205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e +
 3*e**2)**2))**2 + 2547991828368*d**2*e**10*(sqrt(14)*I*(6565*d**
3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20
*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d*
*2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2)) -
201172444677*d**2*e**9 + 1207100966400*d*e**12*(sqrt(14)*I*(6565*
d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 -
 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61
*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2))
2 - 703802088864*d*e11*(sqrt(14)*I*(6565*d**3 - 26423*d**2*e
+ 11089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2
*e**2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2
+ 14*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2)) + 62145783705*d*e**
10 - 676838332800*e**13*(sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 1
1089*d*e**2 - 6623*e**3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e*
*2 - 12*d*e**3 + 9*e**4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 1
4*e**3)/(50*(5*d**2 - 2*d*e + 3*e**2)**2))**2 + 221086021968*e**1
2*(sqrt(14)*I*(6565*d**3 - 26423*d**2*e + 11089*d*e**2 - 6623*e**
3)/(19600*(25*d**4 - 20*d**3*e + 34*d**2*e**2 - 12*d*e**3 + 9*e**
4)) - (205*d**3 - 61*d**2*e + 23*d*e**2 + 14*e**3)/(50*(5*d**2 -
2*d*e + 3*e**2)**2)) - 15706111904*e**11)/(115291904000*d**11 + 6
0548006400*d**10*e - 1205961319355*d**9*e**2 - 1979222576837*d**8
*e**3 + 528572641642*d**7*e**4 - 1648297602686*d**6*e**5 + 151381
570368*d**5*e**6 - 924616717780*d**4*e**7 + 478372778758*d**3*e**
8 - 478669057938*d**2*e**9 + 139540516779*d*e**10 - 49409758967*e
11)) - (1367*d - 293*e + x*(423*d - 1367*e))/(10500*d2 - 4200
*d*e + 6300*e**2 + x**2*(17500*d**2 - 7000*d*e + 10500*e**2) + x*
(7000*d**2 - 2800*d*e + 4200*e**2)) + (4*d**4 + 5*d**3*e + 3*d**2
*e**2 - d*e**3 + 2*e**4)*log(x + (1721036800000*d**12*(4*d**4 + 5
*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)/(e*(5*d**2 - 2*d*e + 3*e
2)2) - 6252890000000*d**12*(4*d**4 + 5*d**3*e + 3*d**2*e**2 -
 d*e**3 + 2*e**4)**2/(e*(5*d**2 - 2*d*e + 3*e**2)**4) + 305308416
000*d**11 + 4402940080000*d**11*(4*d**4 + 5*d**3*e + 3*d**2*e**2
- d*e**3 + 2*e**4)/(5*d**2 - 2*d*e + 3*e**2)**2 - 33493264000000*
d**11*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)**2/(5*d
2 - 2*d*e + 3*e2)**4 + 1028468958725*d**10*e - 5332117966000*
d**10*e*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)/(5*d*
*2 - 2*d*e + 3*e**2)**2 + 55032566400000*d**10*e*(4*d**4 + 5*d**3
*e + 3*d**2*e**2 - d*e**3 + 2*e**4)**2/(5*d**2 - 2*d*e + 3*e**2)*
*4 + 95412070955*d**9*e**2 + 17262989570400*d**9*e**2*(4*d**4 + 5
*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)/(5*d**2 - 2*d*e + 3*e**2
)**2 - 141469554240000*d**9*e**2*(4*d**4 + 5*d**3*e + 3*d**2*e**2
 - d*e**3 + 2*e**4)**2/(5*d**2 - 2*d*e + 3*e**2)**4 + 92755456540
2*d**8*e**3 - 11862414903920*d**8*e**3*(4*d**4 + 5*d**3*e + 3*d**
2*e**2 - d*e**3 + 2*e**4)/(5*d**2 - 2*d*e + 3*e**2)**2 + 13935487
9664000*d**8*e**3*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e
4)2/(5*d**2 - 2*d*e + 3*e**2)**4 - 1587450017342*d**7*e**4 +

```
13220300596608*d**7*e**4*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**
3 + 2*e**4)/(5*d**2 - 2*d*e + 3*e**2)**2 - 160769212620800*d**7*e
**4*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)**2/(5*d**
2 - 2*d*e + 3*e**2)**4 + 1705352927600*d**6*e**5 - 376982672864*d
**6*e**5*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)/(5*d
**2 - 2*d*e + 3*e**2)**2 + 92712805606400*d**6*e**5*(4*d**4 + 5*d
**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)**2/(5*d**2 - 2*d*e + 3*e**
2)**4 - 927094311444*d**5*e**6 - 1766518292672*d**5*e**6*(4*d**4
+ 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)/(5*d**2 - 2*d*e + 3*e
**2)**2 - 61599603788800*d**5*e**6*(4*d**4 + 5*d**3*e + 3*d**2*e*
*2 - d*e**3 + 2*e**4)**2/(5*d**2 - 2*d*e + 3*e**2)**4 + 555141279
0*d**4*e**7 + 6357651035680*d**4*e**7*(4*d**4 + 5*d**3*e + 3*d**2
*e**2 - d*e**3 + 2*e**4)/(5*d**2 - 2*d*e + 3*e**2)**2 + 132676735
52000*d**4*e**7*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**
4)**2/(5*d**2 - 2*d*e + 3*e**2)**4 + 227625566062*d**3*e**8 - 373
0299722240*d**3*e**8*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 +
2*e**4)/(5*d**2 - 2*d*e + 3*e**2)**2 - 3617733504000*d**3*e**8*(4
*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)**2/(5*d**2 - 2*
d*e + 3*e**2)**4 - 201172444677*d**2*e**9 + 2547991828368*d**2*e*
*9*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)/(5*d**2 -
2*d*e + 3*e**2)**2 - 3887664076800*d**2*e**9*(4*d**4 + 5*d**3*e +
 3*d**2*e**2 - d*e**3 + 2*e**4)**2/(5*d**2 - 2*d*e + 3*e**2)**4 +
 62145783705*d*e**10 - 703802088864*d*e**10*(4*d**4 + 5*d**3*e +
3*d**2*e**2 - d*e**3 + 2*e**4)/(5*d**2 - 2*d*e + 3*e**2)**2 + 120
7100966400*d*e**10*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*
e**4)**2/(5*d**2 - 2*d*e + 3*e**2)**4 - 15706111904*e**11 + 22108
6021968*e**11*(4*d**4 + 5*d**3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)
/(5*d**2 - 2*d*e + 3*e**2)**2 - 676838332800*e**11*(4*d**4 + 5*d*
*3*e + 3*d**2*e**2 - d*e**3 + 2*e**4)**2/(5*d**2 - 2*d*e + 3*e**2
)**4)/(115291904000*d**11 + 60548006400*d**10*e - 1205961319355*d
**9*e**2 - 1979222576837*d**8*e**3 + 528572641642*d**7*e**4 - 164
8297602686*d**6*e**5 + 151381570368*d**5*e**6 - 924616717780*d**4
*e**7 + 478372778758*d**3*e**8 - 478669057938*d**2*e**9 + 1395405
16779*d*e**10 - 49409758967*e**11))/(e*(5*d**2 - 2*d*e + 3*e**2)*
*2)
```

GIAC/XCAS [A] time = 0.277563, size = 383, normalized size = 1.71

$$\frac{\sqrt{14}\left(6565\,d^{3}-26423\,d^{2}e+11089\,de^{2}-6623\,e^{3}\right)\arctan\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right)}{9800\,(25\,d^{4}-20\,d^{3}e+34\,d^{2}e^{2}-12\,de^{3}+9\,e^{4})}-\frac{\left(205\,d^{3}-61\,d^{2}e+23\,de^{2}+14\,e^{3}\right)\ln\left(5\,x^{2}+2\,x+3\right)}{50\,(25\,d^{4}-20\,d^{3}e+34\,d^{2}e^{2}-12\,de^{3}+9\,e^{4})}+\frac{\left(4\,d^{4}+5\,d^{3}e+3\,d^{2}e^{2}-de^{3}+2\,e^{4}\right)\ln\left(|xe+d|\right)}{25\,d^{4}e-20\,d^{3}e^{2}+34\,d^{2}e^{3}-12\,de^{4}+9\,e^{5}}-\frac{6835\,d^{3}-4199\,d^{2}e+\left(2115\,d^{3}-7681\,d^{2}e+4003\,de^{2}-4101\,e^{3}\right)x+4687\,de^{2}-879\,e^{3}}{700\,(5\,d^{2}-2\,de+3\,e^{2})^{2}(5\,x^{2}+2\,x+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)*(5*x^2 + 2*x + 3)^2),x, algori

[Out] 1/9800*sqrt(14)*(6565*d^3 - 26423*d^2*e + 11089*d*e^2 - 6623*e^3)
*arctan(1/14*sqrt(14)*(5*x + 1))/(25*d^4 - 20*d^3*e + 34*d^2*e^2
- 12*d*e^3 + 9*e^4) - 1/50*(205*d^3 - 61*d^2*e + 23*d*e^2 + 14*e^
3)*ln(5*x^2 + 2*x + 3)/(25*d^4 - 20*d^3*e + 34*d^2*e^2 - 12*d*e^3
 + 9*e^4) + (4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*ln(abs(
x*e + d))/(25*d^4*e - 20*d^3*e^2 + 34*d^2*e^3 - 12*d*e^4 + 9*e^5)
 - 1/700*(6835*d^3 - 4199*d^2*e + (2115*d^3 - 7681*d^2*e + 4003*d
*e^2 - 4101*e^3)*x + 4687*d*e^2 - 879*e^3)/((5*d^2 - 2*d*e + 3*e^
2)^2*(5*x^2 + 2*x + 3))
```

3.316 $\int \frac{2+x+3x^2-5x^3+4x^4}{(d+ex)^2(3+2x+5x^2)^2} dx$

Optimal. Leaf size=313

$$-\frac{x\left(423d^2-2734de+293e^2\right)+1367d^2-586de-703e^2}{140\left(5x^2+2x+3\right)\left(5d^2-2de+3e^2\right)^2}-\frac{\left(41d^4-8d^3e-60d^2e^2+24de^3-5e^4\right)\log\left(5x^2+2x+3\right)}{2\left(5d^2-2de+3e^2\right)^3}-\frac{4d^4+5d^3e+3d^2e^2-de^3+2e^4}{e\left(5d^2-2de+3e^2\right)^2(d+ex)}+\frac{\left(41d^4-8d^3e-60d^2e^2+24de^3-5e^4\right)\log(d+ex)}{\left(5d^2-2de+3e^2\right)^3}+\frac{\left(1313d^4-10044d^3e+4290d^2e^2+156de^3-271e^4\right)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{28\sqrt{14}\left(5d^2-2de+3e^2\right)^3}$$

```
[Out] -((4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)/(e*(5*d^2 - 2*d*e
 + 3*e^2)^2*(d + e*x))) - (1367*d^2 - 586*d*e - 703*e^2 + (423*d^
2 - 2734*d*e + 293*e^2)*x)/(140*(5*d^2 - 2*d*e + 3*e^2)^2*(3 + 2*
x + 5*x^2)) + ((1313*d^4 - 10044*d^3*e + 4290*d^2*e^2 + 156*d*e^3
 - 271*e^4)*ArcTan[(1 + 5*x)/Sqrt[14]])/(28*Sqrt[14]*(5*d^2 - 2*d
*e + 3*e^2)^3) + ((41*d^4 - 8*d^3*e - 60*d^2*e^2 + 24*d*e^3 - 5*e
^4)*Log[d + e*x])/(5*d^2 - 2*d*e + 3*e^2)^3 - ((41*d^4 - 8*d^3*e
- 60*d^2*e^2 + 24*d*e^3 - 5*e^4)*Log[3 + 2*x + 5*x^2])/(2*(5*d^2
- 2*d*e + 3*e^2)^3)
```

Rubi [A] time = 0.949495, antiderivative size = 313, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$-\frac{x\left(423d^2-2734de+293e^2\right)+1367d^2-586de-703e^2}{140\left(5x^2+2x+3\right)\left(5d^2-2de+3e^2\right)^2}-\frac{\left(41d^4-8d^3e-60d^2e^2+24de^3-5e^4\right)\log\left(5x^2+2x+3\right)}{2\left(5d^2-2de+3e^2\right)^3}-\frac{4d^4+5d^3e+3d^2e^2-de^3+2e^4}{e\left(5d^2-2de+3e^2\right)^2(d+ex)}+\frac{\left(41d^4-8d^3e-60d^2e^2+24de^3-5e^4\right)\log(d+ex)}{\left(5d^2-2de+3e^2\right)^3}+\frac{\left(1313d^4-10044d^3e+4290d^2e^2+156de^3-271e^4\right)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{28\sqrt{14}\left(5d^2-2de+3e^2\right)^3}$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)^2*(3 + 2*x + 5*x^2)^2),x]
```

```
[Out] -((4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)/(e*(5*d^2 - 2*d*e
 + 3*e^2)^2*(d + e*x))) - (1367*d^2 - 586*d*e - 703*e^2 + (423*d^
```

```
2 - 2734*d*e + 293*e^2)*x)/(140*(5*d^2 - 2*d*e + 3*e^2)^2*(3 + 2*
x + 5*x^2)) + ((1313*d^4 - 10044*d^3*e + 4290*d^2*e^2 + 156*d*e^3
 - 271*e^4)*ArcTan[(1 + 5*x)/Sqrt[14]])/(28*Sqrt[14]*(5*d^2 - 2*d
*e + 3*e^2)^3) + ((41*d^4 - 8*d^3*e - 60*d^2*e^2 + 24*d*e^3 - 5*e
^4)*Log[d + e*x])/(5*d^2 - 2*d*e + 3*e^2)^3 - ((41*d^4 - 8*d^3*e
- 60*d^2*e^2 + 24*d*e^3 - 5*e^4)*Log[3 + 2*x + 5*x^2])/(2*(5*d^2
- 2*d*e + 3*e^2)^3)
```

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((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**2/(5*x**2+2*x+3)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.465873, size = 270, normalized size = 0.86

$$-\frac{14\left(5d^2-2de+3e^2\right)\left(d^2(423x+1367)-2de(1367x+293)+e^2(293x-703)\right)}{5x^2+2x+3}+980\left(-41d^4+8d^3e+60d^2e^2-24de^3+5e^4\right)\log\left(5x^2+2x+3\right)-\frac{1}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)^2*(3 + 2*x + 5*x^2)^2),x]
```

```
[Out] ((-1960*(5*d^2 - 2*d*e + 3*e^2)*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*
e^3 + 2*e^4))/(e*(d + e*x)) - (14*(5*d^2 - 2*d*e + 3*e^2)*(e^2*(-
703 + 293*x) + d^2*(1367 + 423*x) - 2*d*e*(293 + 1367*x)))/(3 + 2
*x + 5*x^2) + 5*Sqrt[14]*(1313*d^4 - 10044*d^3*e + 4290*d^2*e^2 +
 156*d*e^3 - 271*e^4)*ArcTan[(1 + 5*x)/Sqrt[14]] + 1960*(41*d^4 -
 8*d^3*e - 60*d^2*e^2 + 24*d*e^3 - 5*e^4)*Log[d + e*x] + 980*(-41
*d^4 + 8*d^3*e + 60*d^2*e^2 - 24*d*e^3 + 5*e^4)*Log[3 + 2*x + 5*x
^2])/(1960*(5*d^2 - 2*d*e + 3*e^2)^3)
```

Maple [B] time = 0.029, size = 986, normalized size = 3.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^4-5*x^3+3*x^2+x+2)/(e*x+d)^2/(5*x^2+2*x+3)^2,x)
```

```
[Out] 24/(5*d^2-2*d*e+3*e^2)^3*ln(e*x+d)*d*e^3+1/(5*d^2-2*d*e+3*e^2)^2*
e^2/(e*x+d)*d-8/(5*d^2-2*d*e+3*e^2)^3*ln(e*x+d)*d^3*e-4/(5*d^2-2*
d*e+3*e^2)^2/e/(e*x+d)*d^4-3/(5*d^2-2*d*e+3*e^2)^2*e/(e*x+d)*d^2-
423/140/(5*d^2-2*d*e+3*e^2)^3/(x^2+2/5*x+3/5)*d^4*x-879/700/(5*d^
2-2*d*e+3*e^2)^3/(x^2+2/5*x+3/5)*x*e^4-60/(5*d^2-2*d*e+3*e^2)^3*l
n(e*x+d)*d^2*e^2+1416/175/(5*d^2-2*d*e+3*e^2)^3/(x^2+2/5*x+3/5)*d
^3*e-879/350/(5*d^2-2*d*e+3*e^2)^3/(x^2+2/5*x+3/5)*d^2*e^2+88/175
/(5*d^2-2*d*e+3*e^2)^3/(x^2+2/5*x+3/5)*d*e^3-271/392/(5*d^2-2*d*e
+3*e^2)^3*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*e^4+30/(5*d^2-2
*d*e+3*e^2)^3*ln(5*x^2+2*x+3)*d^2*e^2-12/(5*d^2-2*d*e+3*e^2)^3*ln
(5*x^2+2*x+3)*d*e^3+1313/392/(5*d^2-2*d*e+3*e^2)^3*14^(1/2)*arcta
n(1/28*(10*x+2)*14^(1/2))*d^4+4/(5*d^2-2*d*e+3*e^2)^3*ln(5*x^2+2*
x+3)*d^3*e-4101/350/(5*d^2-2*d*e+3*e^2)^3/(x^2+2/5*x+3/5)*x*d^2*e
^2+2197/175/(5*d^2-2*d*e+3*e^2)^3/(x^2+2/5*x+3/5)*x*d*e^3-5/(5*d^
2-2*d*e+3*e^2)^2/(e*x+d)*d^3-1367/140/(5*d^2-2*d*e+3*e^2)^3/(x^2+
2/5*x+3/5)*d^4+2109/700/(5*d^2-2*d*e+3*e^2)^3/(x^2+2/5*x+3/5)*e^4
-41/2/(5*d^2-2*d*e+3*e^2)^3*ln(5*x^2+2*x+3)*d^4+5/2/(5*d^2-2*d*e+
3*e^2)^3*ln(5*x^2+2*x+3)*e^4+41/(5*d^2-2*d*e+3*e^2)^3*ln(e*x+d)*d
^4-5/(5*d^2-2*d*e+3*e^2)^3*ln(e*x+d)*e^4-2/(5*d^2-2*d*e+3*e^2)^2*
e^3/(e*x+d)+3629/175/(5*d^2-2*d*e+3*e^2)^3/(x^2+2/5*x+3/5)*x*d^3*
e-2511/98/(5*d^2-2*d*e+3*e^2)^3*14^(1/2)*arctan(1/28*(10*x+2)*14^
(1/2))*d^3*e+2145/196/(5*d^2-2*d*e+3*e^2)^3*14^(1/2)*arctan(1/28*
(10*x+2)*14^(1/2))*d^2*e^2+39/98/(5*d^2-2*d*e+3*e^2)^3*14^(1/2)*a
rctan(1/28*(10*x+2)*14^(1/2))*d*e^3
```

Maxima [A] time = 0.780458, size = 740, normalized size = 2.36

$$\frac{\sqrt{14}\left(1313\,d^4-10044\,d^3e+4290\,d^2e^2+156\,de^3-271\,e^4\right)\arctan\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right)}{392\,(125\,d^6-150\,d^5e+285\,d^4e^2-188\,d^3e^3+171\,d^2e^4-54\,de^5+27\,e^6)}+\frac{\left(41\,d^4-8\,d^3e-60\,d^2e^2+24\,de^3-5\,e^4\right)\log\left(ex+d\right)}{125\,d^6-150\,d^5e+285\,d^4e^2-188\,d^3e^3+171\,d^2e^4-54\,de^5+27\,e^6}-\frac{\left(41\,d^4-8\,d^3e-60\,d^2e^2+24\,de^3-5\,e^4\right)\log\left(5\,x^2+2\,x+3\right)}{2\,(125\,d^6-150\,d^5e+285\,d^4e^2-188\,d^3e^3+171\,d^2e^4-54\,de^5+27\,e^6)}-\frac{1680\,d^4+3467\,d^3e+674\,d^2e^2-1123\,de^3+840\,e^4+\left(2800\,d^4+3500\,d^3e+2523\,d^2e^2-3434\,de\right.}{140\,(75\,d^5e-60\,d^4e^2+102\,d^3e^3-36\,d^2e^4+27\,de^5+5\,(25\,d^4e^2-20\,d^3e^3+34\,d^2e^4-12\,de^5+9\,e^6)x^3+(125\,d^5e-50\,d^4e^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^2*(5*x^2 + 2*x + 3)^2),x, algo
```

```
[Out] 1/392*sqrt(14)*(1313*d^4 - 10044*d^3*e + 4290*d^2*e^2 + 156*d*e^3
 - 271*e^4)*arctan(1/14*sqrt(14)*(5*x + 1))/(125*d^6 - 150*d^5*e
+ 285*d^4*e^2 - 188*d^3*e^3 + 171*d^2*e^4 - 54*d*e^5 + 27*e^6) +
(41*d^4 - 8*d^3*e - 60*d^2*e^2 + 24*d*e^3 - 5*e^4)*log(e*x + d)/(
125*d^6 - 150*d^5*e + 285*d^4*e^2 - 188*d^3*e^3 + 171*d^2*e^4 - 5
```

```
4*d*e^5 + 27*e^6) - 1/2*(41*d^4 - 8*d^3*e - 60*d^2*e^2 + 24*d*e^3
 - 5*e^4)*log(5*x^2 + 2*x + 3)/(125*d^6 - 150*d^5*e + 285*d^4*e^2
 - 188*d^3*e^3 + 171*d^2*e^4 - 54*d*e^5 + 27*e^6) - 1/140*(1680*d
^4 + 3467*d^3*e + 674*d^2*e^2 - 1123*d*e^3 + 840*e^4 + (2800*d^4
+ 3500*d^3*e + 2523*d^2*e^2 - 3434*d*e^3 + 1693*e^4)*x^2 + (1120*
d^4 + 1823*d^3*e - 527*d^2*e^2 - 573*d*e^3 - 143*e^4)*x)/(75*d^5*
e - 60*d^4*e^2 + 102*d^3*e^3 - 36*d^2*e^4 + 27*d*e^5 + 5*(25*d^4*
e^2 - 20*d^3*e^3 + 34*d^2*e^4 - 12*d*e^5 + 9*e^6)*x^3 + (125*d^5*
e - 50*d^4*e^2 + 130*d^3*e^3 + 8*d^2*e^4 + 21*d*e^5 + 18*e^6)*x^2
 + (50*d^5*e + 35*d^4*e^2 + 8*d^3*e^3 + 78*d^2*e^4 - 18*d*e^5 + 2
7*e^6)*x)
```

Fricas [A] time = 0.417767, size = 1242, normalized size = 3.97

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^2*(5*x^2 + 2*x + 3)^2),x, algo
```

```
[Out] 1/1960*sqrt(14)*(140*sqrt(14)*(123*d^5*e - 24*d^4*e^2 - 180*d^3*e
^3 + 72*d^2*e^4 - 15*d*e^5 + 5*(41*d^4*e^2 - 8*d^3*e^3 - 60*d^2*e
^4 + 24*d*e^5 - 5*e^6)*x^3 + (205*d^5*e + 42*d^4*e^2 - 316*d^3*e^
3 + 23*d*e^5 - 10*e^6)*x^2 + (82*d^5*e + 107*d^4*e^2 - 144*d^3*e^
3 - 132*d^2*e^4 + 62*d*e^5 - 15*e^6)*x)*log(e*x + d) - 70*sqrt(14
)*(123*d^5*e - 24*d^4*e^2 - 180*d^3*e^3 + 72*d^2*e^4 - 15*d*e^5 +
 5*(41*d^4*e^2 - 8*d^3*e^3 - 60*d^2*e^4 + 24*d*e^5 - 5*e^6)*x^3 +
 (205*d^5*e + 42*d^4*e^2 - 316*d^3*e^3 + 23*d*e^5 - 10*e^6)*x^2 +
 (82*d^5*e + 107*d^4*e^2 - 144*d^3*e^3 - 132*d^2*e^4 + 62*d*e^5 -
 15*e^6)*x)*log(5*x^2 + 2*x + 3) + 5*(3939*d^5*e - 30132*d^4*e^2
+ 12870*d^3*e^3 + 468*d^2*e^4 - 813*d*e^5 + 5*(1313*d^4*e^2 - 100
44*d^3*e^3 + 4290*d^2*e^4 + 156*d*e^5 - 271*e^6)*x^3 + (6565*d^5*
e - 47594*d^4*e^2 + 1362*d^3*e^3 + 9360*d^2*e^4 - 1043*d*e^5 - 54
2*e^6)*x^2 + (2626*d^5*e - 16149*d^4*e^2 - 21552*d^3*e^3 + 13182*
d^2*e^4 - 74*d*e^5 - 813*e^6)*x)*arctan(1/14*sqrt(14)*(5*x + 1))
- sqrt(14)*(8400*d^6 + 13975*d^5*e + 1476*d^4*e^2 + 3438*d^3*e^3
+ 8468*d^2*e^4 - 5049*d*e^5 + 2520*e^6 + (14000*d^6 + 11900*d^5*e
 + 14015*d^4*e^2 - 11716*d^3*e^3 + 22902*d^2*e^4 - 13688*d*e^5 +
5079*e^6)*x^2 + (5600*d^6 + 6875*d^5*e - 2921*d^4*e^2 + 3658*d^3*
e^3 - 1150*d^2*e^4 - 1433*d*e^5 - 429*e^6)*x))/(375*d^7*e - 450*d
^6*e^2 + 855*d^5*e^3 - 564*d^4*e^4 + 513*d^3*e^5 - 162*d^2*e^6 +
81*d*e^7 + 5*(125*d^6*e^2 - 150*d^5*e^3 + 285*d^4*e^4 - 188*d^3*e
^5 + 171*d^2*e^6 - 54*d*e^7 + 27*e^8)*x^3 + (625*d^7*e - 500*d^6*
e^2 + 1125*d^5*e^3 - 370*d^4*e^4 + 479*d^3*e^5 + 72*d^2*e^6 + 27*
d*e^7 + 54*e^8)*x^2 + (250*d^7*e + 75*d^6*e^2 + 120*d^5*e^3 + 479
*d^4*e^4 - 222*d^3*e^5 + 405*d^2*e^6 - 108*d*e^7 + 81*e^8)*x)
```

Sympy [A] time = 38.8995, size = 13362, normalized size = 42.69

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**2/(5*x**2+2*x+3)**2,x)
```

```
[Out] (-sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e
**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188
*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8
*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e +
 3*e**2)**3))*log(x + (4503590000000*d**17*(-sqrt(14)*I*(1313*d**
4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(
125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*
e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2
 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**2 - 792
36430000000*d**16*e*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290
*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e +
 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e
**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/
(2*(5*d**2 - 2*d*e + 3*e**2)**3))**2 + 219307065600000*d**15*e**2
*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*
e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 18
8*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 -
8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e
+ 3*e**2)**3))**2 + 1477177520000*d**15*(-sqrt(14)*I*(1313*d**4 -
 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125
*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**
4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 +
24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)) - 470102080
000000*d**14*e**3*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d
**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 2
85*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**
6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2
*(5*d**2 - 2*d*e + 3*e**2)**3))**2 - 8062738222000*d**14*e*(-sqrt
(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 -
271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*
e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*
e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**
2)**3)) + 669820607680000*d**13*e**4*(-sqrt(14)*I*(1313*d**4 - 10
044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d*
*6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 -
 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*
d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**2 + 134016199
91200*d**13*e**2*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d*
*2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 28
5*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6
)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*
(5*d**2 - 2*d*e + 3*e**2)**3)) + 132446413125*d**13 - 74827997090
5600*d**12*e**5*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**
2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285
```

```
*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)
) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(
5*d**2 - 2*d*e + 3*e**2)**3))**2 - 8564369003120*d**12*e**3*(-sqr
t(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 -
 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3
*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3
*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e*
*2)**3)) + 684029295980*d**12*e + 599319595212800*d**11*e**6*(-sq
rt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3
- 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**
3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**
3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e
**2)**3))**2 - 12510243478208*d**11*e**4*(-sqrt(14)*I*(1313*d**4
- 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(12
5*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e*
*4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 +
 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)) + 76420662
3630*d**11*e**2 - 291411662710784*d**10*e**7*(-sqrt(14)*I*(1313*d
**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784
*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**
2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e*
*2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**2 + 4
9159980986704*d**10*e**5*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e +
 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**
5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 +
 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e
**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)) - 14657220189100*d**10*e**
3 - 27190445185792*d**9*e**8*(-sqrt(14)*I*(1313*d**4 - 10044*d**3
*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150
*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e*
*5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 -
 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**2 - 77659175364512*d*
*9*e**6*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 +
 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e*
*2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*
d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 -
 2*d*e + 3*e**2)**3)) + 16942805253691*d**9*e**4 + 25383084683443
2*d**8*e**9*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e*
*2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**
4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) -
(41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d*
*2 - 2*d*e + 3*e**2)**3))**2 + 91313688339216*d**8*e**7*(-sqrt(14
)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271
*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**
3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e -
 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)*
*3)) + 6404919470120*d**8*e**5 - 308064129587200*d**7*e**10*(-sqr
t(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 -
 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3
*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3
*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e*
*2)**3))**2 - 78573287795968*d**7*e**8*(-sqrt(14)*I*(1313*d**4 -
10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*
d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4
```

```
 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 2
4*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)) - 1699887911
9292*d**7*e**6 + 262468005502976*d**6*e**11*(-sqrt(14)*I*(1313*d*
*4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*
(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2
*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**
2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**2 + 55
676827575152*d**6*e**9*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4
290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*
e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 2
7*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**
4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)) + 5633839731848*d**6*e**7 -
162086347196928*d**5*e**12*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e
 + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d
**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5
 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5
*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**2 - 30431528150688*d**5
*e**10*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 +
156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**
2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d
**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 -
2*d*e + 3*e**2)**3)) + 3033254622763*d**5*e**8 + 82236632099328*d
**4*e**13*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2
 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*
e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (4
1*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2
 - 2*d*e + 3*e**2)**3))**2 + 13587008752688*d**4*e**11*(-sqrt(14)
*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*
e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3
 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e -
60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**
3)) - 3506827379684*d**4*e**9 - 30865482805248*d**3*e**14*(-sqrt(
14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 2
71*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e
**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e
 - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2
)**3))**2 - 4535008734144*d**3*e**12*(-sqrt(14)*I*(1313*d**4 - 10
044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d*
*6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 -
 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*
d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)) + 148422945646
2*d**3*e**10 + 9233948989440*d**2*e**15*(-sqrt(14)*I*(1313*d**4 -
 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125
*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**
4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 +
24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**2 + 114438
5029872*d**2*e**13*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*
d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e +
285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e*
*6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(
2*(5*d**2 - 2*d*e + 3*e**2)**3)) - 361088969436*d**2*e**11 - 1739
174903424*d*e**16*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d
**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 2
85*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**
```

```
6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2
*(5*d**2 - 2*d*e + 3*e**2)**3))**2 - 187156660320*d*e**14*(-sqrt(
14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 2
71*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e
**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e
 - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2
)**3)) + 50336842869*d*e**12 + 196869004416*e**17*(-sqrt(14)*I*(1
313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)
/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 17
1*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d*
*2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**
2 + 17373868848*e**15*(-sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 42
90*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e
 + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27
*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4
)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)) - 3533954480*e**13)/(11014748
66245*d**12*e - 9024487794180*d**11*e**2 + 5764879624590*d**10*e*
*3 + 17969136971220*d**9*e**4 - 16485388615365*d**8*e**5 - 122215
10721480*d**7*e**6 + 21212253502020*d**6*e**7 - 11710335235320*d*
*5*e**8 + 3048287389995*d**4*e**9 - 183650820660*d**3*e**10 - 118
302770610*d**2*e**11 + 34222696740*d*e**12 - 3445820555*e**13)) +
 (sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e
**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188
*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8
*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e +
 3*e**2)**3))*log(x + (4503590000000*d**17*(sqrt(14)*I*(1313*d**4
 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(1
25*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e
**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2
+ 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**2 - 7923
6430000000*d**16*e*(sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d
**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 2
85*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**
6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2
*(5*d**2 - 2*d*e + 3*e**2)**3))**2 + 219307065600000*d**15*e**2*(
sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**
3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d
**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d
**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3
*e**2)**3))**2 + 1477177520000*d**15*(sqrt(14)*I*(1313*d**4 - 100
44*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**
6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 -
54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d
*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)) - 4701020800000
00*d**14*e**3*(sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e
**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d*
*4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) -
 (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d
**2 - 2*d*e + 3*e**2)**3))**2 - 8062738222000*d**14*e*(sqrt(14)*I
*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e*
*4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 +
 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60
*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)
) + 669820607680000*d**13*e**4*(sqrt(14)*I*(1313*d**4 - 10044*d**
```

3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 15
0*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e
5 + 27*e6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3
- 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**2 + 13401619991200*d
13*e2*(sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2
+ 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e
2 - 188*d3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41
*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2
- 2*d*e + 3*e**2)**3)) + 132446413125*d**13 - 748279970905600*d**
12*e**5*(sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 +
156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**
2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d
4 - 8*d3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 -
2*d*e + 3*e**2)**3))**2 - 8564369003120*d**12*e**3*(sqrt(14)*I*(1
313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)
/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 17
1*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d*
*2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)) +
 684029295980*d**12*e + 599319595212800*d**11*e**6*(sqrt(14)*I*(1
313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)
/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 17
1*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d*
*2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**
2 - 12510243478208*d**11*e**4*(sqrt(14)*I*(1313*d**4 - 10044*d**3
*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150
*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e*
*5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 -
 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)) + 764206623630*d**11*e
2 - 291411662710784*d10*e**7*(sqrt(14)*I*(1313*d**4 - 10044*d
3*e + 4290*d2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 -
150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d
*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**
3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**2 + 49159980986704
*d**10*e**5*(sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**
2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4
*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (
41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**
2 - 2*d*e + 3*e**2)**3)) - 14657220189100*d**10*e**3 - 2719044518
5792*d**9*e**8*(sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*
e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d
4*e2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6))
- (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*
d**2 - 2*d*e + 3*e**2)**3))**2 - 77659175364512*d**9*e**6*(sqrt(1
4)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 27
1*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e*
*3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e
- 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)
3)) + 16942805253691*d9*e**4 + 253830846834432*d**8*e**9*(sqr
t(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 -
 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3
*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3
*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e*
*2)**3))**2 + 91313688339216*d**8*e**7*(sqrt(14)*I*(1313*d**4 - 1
0044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d

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**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4
- 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24
*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)) + 64049194701
20*d**8*e**5 - 308064129587200*d**7*e**10*(sqrt(14)*I*(1313*d**4
- 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(12
5*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e*
*4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 +
 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**2 - 78573
287795968*d**7*e**8*(sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*
d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e +
285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e*
*6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(
2*(5*d**2 - 2*d*e + 3*e**2)**3)) - 16998879119292*d**7*e**6 + 262
468005502976*d**6*e**11*(sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4
290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*
e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 2
7*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**
4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**2 + 55676827575152*d**6*e**
9*(sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*
e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 18
8*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 -
8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e
+ 3*e**2)**3)) + 5633839731848*d**6*e**7 - 162086347196928*d**5*e
**12*(sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156
*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 -
 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4
 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d
*e + 3*e**2)**3))**2 - 30431528150688*d**5*e**10*(sqrt(14)*I*(131
3*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(
784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*
d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2
*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)) + 3
033254622763*d**5*e**8 + 82236632099328*d**4*e**13*(sqrt(14)*I*(1
313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)
/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 17
1*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d*
*2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**
2 + 13587008752688*d**4*e**11*(sqrt(14)*I*(1313*d**4 - 10044*d**3
*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150
*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e*
*5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 -
 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)) - 3506827379684*d**4*e
**9 - 30865482805248*d**3*e**14*(sqrt(14)*I*(1313*d**4 - 10044*d*
*3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 1
50*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*
e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3
 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))**2 - 4535008734144*d
**3*e**12*(sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2
+ 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e
**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41
*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2
- 2*d*e + 3*e**2)**3)) + 1484229456462*d**3*e**10 + 9233948989440
*d**2*e**15*(sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**
2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4
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*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (
41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**
2 - 2*d*e + 3*e**2)**3))**2 + 1144385029872*d**2*e**13*(sqrt(14)*
I*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e
**4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3
+ 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 6
0*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3
)) - 361088969436*d**2*e**11 - 1739174903424*d*e**16*(sqrt(14)*I*
(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e**
4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 +
171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60*
d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3))
**2 - 187156660320*d*e**14*(sqrt(14)*I*(1313*d**4 - 10044*d**3*e
+ 4290*d**2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d*
*5*e + 285*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5
+ 27*e**6)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*
e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)) + 50336842869*d*e**12 + 1
96869004416*e**17*(sqrt(14)*I*(1313*d**4 - 10044*d**3*e + 4290*d*
*2*e**2 + 156*d*e**3 - 271*e**4)/(784*(125*d**6 - 150*d**5*e + 28
5*d**4*e**2 - 188*d**3*e**3 + 171*d**2*e**4 - 54*d*e**5 + 27*e**6
)) - (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*
(5*d**2 - 2*d*e + 3*e**2)**3))**2 + 17373868848*e**15*(sqrt(14)*I
*(1313*d**4 - 10044*d**3*e + 4290*d**2*e**2 + 156*d*e**3 - 271*e*
*4)/(784*(125*d**6 - 150*d**5*e + 285*d**4*e**2 - 188*d**3*e**3 +
 171*d**2*e**4 - 54*d*e**5 + 27*e**6)) - (41*d**4 - 8*d**3*e - 60
*d**2*e**2 + 24*d*e**3 - 5*e**4)/(2*(5*d**2 - 2*d*e + 3*e**2)**3)
) - 3533954480*e**13)/(1101474866245*d**12*e - 9024487794180*d**1
1*e**2 + 5764879624590*d**10*e**3 + 17969136971220*d**9*e**4 - 16
485388615365*d**8*e**5 - 12221510721480*d**7*e**6 + 2121225350202
0*d**6*e**7 - 11710335235320*d**5*e**8 + 3048287389995*d**4*e**9
- 183650820660*d**3*e**10 - 118302770610*d**2*e**11 + 34222696740
*d*e**12 - 3445820555*e**13)) - (1680*d**4 + 3467*d**3*e + 674*d*
*2*e**2 - 1123*d*e**3 + 840*e**4 + x**2*(2800*d**4 + 3500*d**3*e
+ 2523*d**2*e**2 - 3434*d*e**3 + 1693*e**4) + x*(1120*d**4 + 1823
*d**3*e - 527*d**2*e**2 - 573*d*e**3 - 143*e**4))/(10500*d**5*e -
 8400*d**4*e**2 + 14280*d**3*e**3 - 5040*d**2*e**4 + 3780*d*e**5
+ x**3*(17500*d**4*e**2 - 14000*d**3*e**3 + 23800*d**2*e**4 - 840
0*d*e**5 + 6300*e**6) + x**2*(17500*d**5*e - 7000*d**4*e**2 + 182
00*d**3*e**3 + 1120*d**2*e**4 + 2940*d*e**5 + 2520*e**6) + x*(700
0*d**5*e + 4900*d**4*e**2 + 1120*d**3*e**3 + 10920*d**2*e**4 - 25
20*d*e**5 + 3780*e**6)) + (41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24
*d*e**3 - 5*e**4)*log(x + (4503590000000*d**17*(41*d**4 - 8*d**3*
e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)**2/(5*d**2 - 2*d*e + 3*e**
2)**6 - 79236430000000*d**16*e*(41*d**4 - 8*d**3*e - 60*d**2*e**2
 + 24*d*e**3 - 5*e**4)**2/(5*d**2 - 2*d*e + 3*e**2)**6 + 21930706
5600000*d**15*e**2*(41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3
 - 5*e**4)**2/(5*d**2 - 2*d*e + 3*e**2)**6 + 1477177520000*d**15*
(41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(5*d**2
- 2*d*e + 3*e**2)**3 - 470102080000000*d**14*e**3*(41*d**4 - 8*d*
*3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)**2/(5*d**2 - 2*d*e + 3*
e**2)**6 - 8062738222000*d**14*e*(41*d**4 - 8*d**3*e - 60*d**2*e*
*2 + 24*d*e**3 - 5*e**4)/(5*d**2 - 2*d*e + 3*e**2)**3 + 669820607
680000*d**13*e**4*(41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3
- 5*e**4)**2/(5*d**2 - 2*d*e + 3*e**2)**6 + 13401619991200*d**13*
```

e**2*(41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(5*
d**2 - 2*d*e + 3*e**2)**3 + 132446413125*d**13 - 748279970905600*
d**12*e**5*(41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**
4)**2/(5*d**2 - 2*d*e + 3*e**2)**6 - 8564369003120*d**12*e**3*(41
*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(5*d**2 - 2
*d*e + 3*e**2)**3 + 684029295980*d**12*e + 599319595212800*d**11*
e**6*(41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)**2/
(5*d**2 - 2*d*e + 3*e**2)**6 - 12510243478208*d**11*e**4*(41*d**4
 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(5*d**2 - 2*d*e
+ 3*e**2)**3 + 764206623630*d**11*e**2 - 291411662710784*d**10*e*
7(41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)**2/(5
*d**2 - 2*d*e + 3*e**2)**6 + 49159980986704*d**10*e**5*(41*d**4 -
 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(5*d**2 - 2*d*e +
3*e**2)**3 - 14657220189100*d**10*e**3 - 27190445185792*d**9*e**8
*(41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)**2/(5*d
2 - 2*d*e + 3*e2)**6 - 77659175364512*d**9*e**6*(41*d**4 - 8*
d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(5*d**2 - 2*d*e + 3*e
2)3 + 16942805253691*d**9*e**4 + 253830846834432*d**8*e**9*(4
1*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)**2/(5*d**2
 - 2*d*e + 3*e**2)**6 + 91313688339216*d**8*e**7*(41*d**4 - 8*d**
3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(5*d**2 - 2*d*e + 3*e**2
)**3 + 6404919470120*d**8*e**5 - 308064129587200*d**7*e**10*(41*d
4 - 8*d3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)**2/(5*d**2 -
2*d*e + 3*e**2)**6 - 78573287795968*d**7*e**8*(41*d**4 - 8*d**3*e
 - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(5*d**2 - 2*d*e + 3*e**2)**
3 - 16998879119292*d**7*e**6 + 262468005502976*d**6*e**11*(41*d**
4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)**2/(5*d**2 - 2*
d*e + 3*e**2)**6 + 55676827575152*d**6*e**9*(41*d**4 - 8*d**3*e -
 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(5*d**2 - 2*d*e + 3*e**2)**3
+ 5633839731848*d**6*e**7 - 162086347196928*d**5*e**12*(41*d**4 -
 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)**2/(5*d**2 - 2*d*e
 + 3*e**2)**6 - 30431528150688*d**5*e**10*(41*d**4 - 8*d**3*e - 6
0*d**2*e**2 + 24*d*e**3 - 5*e**4)/(5*d**2 - 2*d*e + 3*e**2)**3 +
3033254622763*d**5*e**8 + 82236632099328*d**4*e**13*(41*d**4 - 8*
d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)**2/(5*d**2 - 2*d*e +
3*e**2)**6 + 13587008752688*d**4*e**11*(41*d**4 - 8*d**3*e - 60*d
2*e2 + 24*d*e**3 - 5*e**4)/(5*d**2 - 2*d*e + 3*e**2)**3 - 350
6827379684*d**4*e**9 - 30865482805248*d**3*e**14*(41*d**4 - 8*d**
3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)**2/(5*d**2 - 2*d*e + 3*e
2)6 - 4535008734144*d**3*e**12*(41*d**4 - 8*d**3*e - 60*d**2*
e**2 + 24*d*e**3 - 5*e**4)/(5*d**2 - 2*d*e + 3*e**2)**3 + 1484229
456462*d**3*e**10 + 9233948989440*d**2*e**15*(41*d**4 - 8*d**3*e
 - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)**2/(5*d**2 - 2*d*e + 3*e**2)
6 + 1144385029872*d2*e**13*(41*d**4 - 8*d**3*e - 60*d**2*e**2
 + 24*d*e**3 - 5*e**4)/(5*d**2 - 2*d*e + 3*e**2)**3 - 36108896943
6*d**2*e**11 - 1739174903424*d*e**16*(41*d**4 - 8*d**3*e - 60*d**
2*e**2 + 24*d*e**3 - 5*e**4)**2/(5*d**2 - 2*d*e + 3*e**2)**6 - 18
7156660320*d*e**14*(41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3
 - 5*e**4)/(5*d**2 - 2*d*e + 3*e**2)**3 + 50336842869*d*e**12 + 1
96869004416*e**17*(41*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3
 - 5*e**4)**2/(5*d**2 - 2*d*e + 3*e**2)**6 + 17373868848*e**15*(41
*d**4 - 8*d**3*e - 60*d**2*e**2 + 24*d*e**3 - 5*e**4)/(5*d**2 - 2
*d*e + 3*e**2)**3 - 3533954480*e**13)/(1101474866245*d**12*e - 90
24487794180*d**11*e**2 + 5764879624590*d**10*e**3 + 1796913697122

```
0*d**9*e**4 - 16485388615365*d**8*e**5 - 12221510721480*d**7*e**6
 + 21212253502020*d**6*e**7 - 11710335235320*d**5*e**8 + 30482873
89995*d**4*e**9 - 183650820660*d**3*e**10 - 118302770610*d**2*e**
11 + 34222696740*d*e**12 - 3445820555*e**13))/(5*d**2 - 2*d*e + 3
*e**2)**3
```

GIAC/XCAS [A] time = 0.283631, size = 771, normalized size = 2.46

$$\frac{\sqrt{14}\left(1313\,d^4e^2-10044\,d^3e^3+4290\,d^2e^4+156\,de^5-271\,e^6\right)\arctan\left(\frac{1}{14}\sqrt{14}\left(5\,d-\frac{5\,d^2}{xe+d}+\frac{2\,de}{xe+d}-\frac{3\,e^2}{xe+d}-e\right)e^{(-1)}\right)e^{(-2)}}{392\left(125\,d^6-150\,d^5e+285\,d^4e^2-188\,d^3e^3+171\,d^2e^4-54\,de^5+27\,e^6\right)} - \frac{\left(41\,d^4-8\,d^3e-60\,d^2e^2+24\,de^3-5\,e^4\right)\ln\left(-\frac{10\,d}{xe+d}+\frac{5\,d^2}{(xe+d)^2}+\frac{2\,e}{xe+d}-\frac{2\,de}{(xe+d)^2}+\frac{3\,e^2}{(xe+d)^2}+5\right)}{2\left(125\,d^6-150\,d^5e+285\,d^4e^2-188\,d^3e^3+171\,d^2e^4-54\,de^5+27\,e^6\right)} - \frac{\frac{4\,d^4e^3}{xe+d}+\frac{5\,d^3e^4}{xe+d}+\frac{3\,d^2e^5}{xe+d}-\frac{de^6}{xe+d}+\frac{2\,e^7}{xe+d}}{25\,d^4e^4-20\,d^3e^5+34\,d^2e^6-12\,de^7+9\,e^8} + \frac{\frac{423\,d^3e-4101\,d^2e^2+879\,de^3+703\,e^4}{5\,d^2-2\,de+3\,e^2}-\frac{\left(423\,d^4e^2-5468\,d^3e^3+1758\,d^2e^4+2812\,de^5-457\,e^6\right)e^{(-1)}}{(5\,d^2-2\,de+3\,e^2)(xe+d)}}{28\left(5\,d^2-2\,de+3\,e^2\right)^2\left(\frac{10\,d}{xe+d}-\frac{5\,d^2}{(xe+d)^2}-\frac{2\,e}{xe+d}+\frac{2\,de}{(xe+d)^2}-\frac{3\,e^2}{(xe+d)^2}-5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^2*(5*x^2 + 2*x + 3)^2),x, algo
```

```
[Out] 1/392*sqrt(14)*(1313*d^4*e^2 - 10044*d^3*e^3 + 4290*d^2*e^4 + 156
*d*e^5 - 271*e^6)*arctan(1/14*sqrt(14)*(5*d - 5*d^2/(x*e + d) + 2
*d*e/(x*e + d) - 3*e^2/(x*e + d) - e)*e^(-1))*e^(-2)/(125*d^6 - 1
50*d^5*e + 285*d^4*e^2 - 188*d^3*e^3 + 171*d^2*e^4 - 54*d*e^5 + 2
7*e^6) - 1/2*(41*d^4 - 8*d^3*e - 60*d^2*e^2 + 24*d*e^3 - 5*e^4)*l
n(-10*d/(x*e + d) + 5*d^2/(x*e + d)^2 + 2*e/(x*e + d) - 2*d*e/(x*
e + d)^2 + 3*e^2/(x*e + d)^2 + 5)/(125*d^6 - 150*d^5*e + 285*d^4*
e^2 - 188*d^3*e^3 + 171*d^2*e^4 - 54*d*e^5 + 27*e^6) - (4*d^4*e^3
/(x*e + d) + 5*d^3*e^4/(x*e + d) + 3*d^2*e^5/(x*e + d) - d*e^6/(x
*e + d) + 2*e^7/(x*e + d))/(25*d^4*e^4 - 20*d^3*e^5 + 34*d^2*e^6
- 12*d*e^7 + 9*e^8) + 1/28*((423*d^3*e - 4101*d^2*e^2 + 879*d*e^3
 + 703*e^4)/(5*d^2 - 2*d*e + 3*e^2) - (423*d^4*e^2 - 5468*d^3*e^3
 + 1758*d^2*e^4 + 2812*d*e^5 - 457*e^6)*e^(-1)/((5*d^2 - 2*d*e +
3*e^2)*(x*e + d)))/((5*d^2 - 2*d*e + 3*e^2)^2*(10*d/(x*e + d) - 5
*d^2/(x*e + d)^2 - 2*e/(x*e + d) + 2*d*e/(x*e + d)^2 - 3*e^2/(x*e
 + d)^2 - 5))
```

3.317 $\int \frac{2+x+3x^2-5x^3+4x^4}{(d+ex)^3(3+2x+5x^2)^2}\,dx$

Optimal. Leaf size=412

$$-\frac{1367d^3-879d^2e+x\left(423d^3-4101d^2e+879de^2+703e^3\right)-2109de^2+457e^3}{28\left(5x^2+2x+3\right)\left(5d^2-2de+3e^2\right)^3}-\frac{41d^4-8d^3e-60d^2e^2+24de^3-5e^4}{\left(5d^2-2de+3e^2\right)^3(d+ex)}-\frac{4d^4+5d^3e+3d^2e^2-de^3+2e^4}{2e\left(5d^2-2de+3e^2\right)^2(d+ex)^2}-\frac{\left(205d^5-19d^4e-846d^3e^2+396d^2e^3+57de^4-21e^5\right)\log\left(5x^2+2x+3\right)}{2\left(5d^2-2de+3e^2\right)^4}+\frac{\left(205d^5-19d^4e-846d^3e^2+396d^2e^3+57de^4-21e^5\right)\log(d+ex)}{\left(5d^2-2de+3e^2\right)^4}+\frac{\left(6565d^5-74017d^4e+35022d^3e^2+42858d^2e^3-17247de^4+579e^5\right)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{28\sqrt{14}\left(5d^2-2de+3e^2\right)^4}$$

```
[Out] -(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)/(2*e*(5*d^2 - 2*d*
e + 3*e^2)^2*(d + e*x)^2) - (41*d^4 - 8*d^3*e - 60*d^2*e^2 + 24*d
*e^3 - 5*e^4)/((5*d^2 - 2*d*e + 3*e^2)^3*(d + e*x)) - (1367*d^3 -
 879*d^2*e - 2109*d*e^2 + 457*e^3 + (423*d^3 - 4101*d^2*e + 879*d
*e^2 + 703*e^3)*x)/(28*(5*d^2 - 2*d*e + 3*e^2)^3*(3 + 2*x + 5*x^2
)) + ((6565*d^5 - 74017*d^4*e + 35022*d^3*e^2 + 42858*d^2*e^3 - 1
7247*d*e^4 + 579*e^5)*ArcTan[(1 + 5*x)/Sqrt[14]])/(28*Sqrt[14]*(5
*d^2 - 2*d*e + 3*e^2)^4) + ((205*d^5 - 19*d^4*e - 846*d^3*e^2 + 3
96*d^2*e^3 + 57*d*e^4 - 21*e^5)*Log[d + e*x])/(5*d^2 - 2*d*e + 3*
e^2)^4 - ((205*d^5 - 19*d^4*e - 846*d^3*e^2 + 396*d^2*e^3 + 57*d*
e^4 - 21*e^5)*Log[3 + 2*x + 5*x^2])/(2*(5*d^2 - 2*d*e + 3*e^2)^4)
```

Rubi [A] time = 1.76153, antiderivative size = 412, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$-\frac{1367d^3-879d^2e+x\left(423d^3-4101d^2e+879de^2+703e^3\right)-2109de^2+457e^3}{28\left(5x^2+2x+3\right)\left(5d^2-2de+3e^2\right)^3}-\frac{41d^4-8d^3e-60d^2e^2+24de^3-5e^4}{\left(5d^2-2de+3e^2\right)^3(d+ex)}-\frac{4d^4+5d^3e+3d^2e^2-de^3+2e^4}{2e\left(5d^2-2de+3e^2\right)^2(d+ex)^2}-\frac{\left(205d^5-19d^4e-846d^3e^2+396d^2e^3+57de^4-21e^5\right)\log\left(5x^2+2x+3\right)}{2\left(5d^2-2de+3e^2\right)^4}+\frac{\left(205d^5-19d^4e-846d^3e^2+396d^2e^3+57de^4-21e^5\right)\log(d+ex)}{\left(5d^2-2de+3e^2\right)^4}+\frac{\left(6565d^5-74017d^4e+35022d^3e^2+42858d^2e^3-17247de^4+579e^5\right)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{28\sqrt{14}\left(5d^2-2de+3e^2\right)^4}$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)^3*(3 + 2*x + 5*x^2)^2),x]
```

```
[Out] -(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)/(2*e*(5*d^2 - 2*d*
e + 3*e^2)^2*(d + e*x)^2) - (41*d^4 - 8*d^3*e - 60*d^2*e^2 + 24*d
*e^3 - 5*e^4)/((5*d^2 - 2*d*e + 3*e^2)^3*(d + e*x)) - (1367*d^3 -
 879*d^2*e - 2109*d*e^2 + 457*e^3 + (423*d^3 - 4101*d^2*e + 879*d
*e^2 + 703*e^3)*x)/(28*(5*d^2 - 2*d*e + 3*e^2)^3*(3 + 2*x + 5*x^2
)) + ((6565*d^5 - 74017*d^4*e + 35022*d^3*e^2 + 42858*d^2*e^3 - 1
7247*d*e^4 + 579*e^5)*ArcTan[(1 + 5*x)/Sqrt[14]])/(28*Sqrt[14]*(5
*d^2 - 2*d*e + 3*e^2)^4) + ((205*d^5 - 19*d^4*e - 846*d^3*e^2 + 3
96*d^2*e^3 + 57*d*e^4 - 21*e^5)*Log[d + e*x])/(5*d^2 - 2*d*e + 3*
e^2)^4 - ((205*d^5 - 19*d^4*e - 846*d^3*e^2 + 396*d^2*e^3 + 57*d*
e^4 - 21*e^5)*Log[3 + 2*x + 5*x^2])/(2*(5*d^2 - 2*d*e + 3*e^2)^4)
```

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((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**3/(5*x**2+2*x+3)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.683701, size = 363, normalized size = 0.88

$$\frac{-\frac{14\left(5d^2-2de+3e^2\right)\left(d^3(423x+1367)-3d^2e(1367x+293)+3de^2(293x-703)+e^3(703x+457)\right)}{5x^2+2x+3}-\frac{196\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)\left(5d^2-2de+3e^2\right)^2}{e(d+ex)^2}+\frac{392\left(-41d^4+8\right.}{}}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)^3*(3 + 2*x + 5*x^2)^2),x]
```

```
[Out] ((-196*(5*d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d
*e^3 + 2*e^4))/(e*(d + e*x)^2) + (392*(5*d^2 - 2*d*e + 3*e^2)*(-4
1*d^4 + 8*d^3*e + 60*d^2*e^2 - 24*d*e^3 + 5*e^4))/(d + e*x) - (14
*(5*d^2 - 2*d*e + 3*e^2)*(3*d*e^2*(-703 + 293*x) + d^3*(1367 + 42
3*x) + e^3*(457 + 703*x) - 3*d^2*e*(293 + 1367*x)))/(3 + 2*x + 5*
x^2) + Sqrt[14]*(6565*d^5 - 74017*d^4*e + 35022*d^3*e^2 + 42858*d
^2*e^3 - 17247*d*e^4 + 579*e^5)*ArcTan[(1 + 5*x)/Sqrt[14]] + 392*
(205*d^5 - 19*d^4*e - 846*d^3*e^2 + 396*d^2*e^3 + 57*d*e^4 - 21*e
```

```
^5)*Log[d + e*x] + 196*(-205*d^5 + 19*d^4*e + 846*d^3*e^2 - 396*d
^2*e^3 - 57*d*e^4 + 21*e^5)*Log[3 + 2*x + 5*x^2])/(392*(5*d^2 - 2
*d*e + 3*e^2)^4)
```

Maple [B] time = 0.033, size = 1314, normalized size = 3.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^4-5*x^3+3*x^2+x+2)/(e*x+d)^3/(5*x^2+2*x+3)^2,x)
```

```
[Out] 21429/196/(5*d^2-2*d*e+3*e^2)^4*14^(1/2)*arctan(1/28*(10*x+2)*14^
(1/2))*d^2*e^3-17247/392/(5*d^2-2*d*e+3*e^2)^4*14^(1/2)*arctan(1/
28*(10*x+2)*14^(1/2))*d*e^4-1/(5*d^2-2*d*e+3*e^2)^2*e^3/(e*x+d)^2
-41/(5*d^2-2*d*e+3*e^2)^3/(e*x+d)*d^4+5/(5*d^2-2*d*e+3*e^2)^3/(e*
x+d)*e^4+205/(5*d^2-2*d*e+3*e^2)^4*ln(e*x+d)*d^5-21/(5*d^2-2*d*e+
3*e^2)^4*ln(e*x+d)*e^5-3/2/(5*d^2-2*d*e+3*e^2)^2*e/(e*x+d)^2*d^2+
1/2/(5*d^2-2*d*e+3*e^2)^2*e^2/(e*x+d)^2*d+7129/140/(5*d^2-2*d*e+3
*e^2)^4/(x^2+2/5*x+3/5)*d^4*e+2343/70/(5*d^2-2*d*e+3*e^2)^4/(x^2+
2/5*x+3/5)*d^3*e^2-1933/70/(5*d^2-2*d*e+3*e^2)^4/(x^2+2/5*x+3/5)*
d^2*e^3+7241/140/(5*d^2-2*d*e+3*e^2)^4/(x^2+2/5*x+3/5)*d*e^4+19/2
/(5*d^2-2*d*e+3*e^2)^4*ln(5*x^2+2*x+3)*d^4*e+423/(5*d^2-2*d*e+3*e
^2)^4*ln(5*x^2+2*x+3)*d^3*e^2-198/(5*d^2-2*d*e+3*e^2)^4*ln(5*x^2+
2*x+3)*d^2*e^3-57/2/(5*d^2-2*d*e+3*e^2)^4*ln(5*x^2+2*x+3)*d*e^4+6
565/392/(5*d^2-2*d*e+3*e^2)^4*14^(1/2)*arctan(1/28*(10*x+2)*14^(1
/2))*d^5+579/392/(5*d^2-2*d*e+3*e^2)^4*14^(1/2)*arctan(1/28*(10*x
+2)*14^(1/2))*e^5-423/28/(5*d^2-2*d*e+3*e^2)^4/(x^2+2/5*x+3/5)*d^
5*x-2109/140/(5*d^2-2*d*e+3*e^2)^4/(x^2+2/5*x+3/5)*x*e^5-2/(5*d^2
-2*d*e+3*e^2)^2/e/(e*x+d)^2*d^4-19/(5*d^2-2*d*e+3*e^2)^4*ln(e*x+d
)*d^4*e-846/(5*d^2-2*d*e+3*e^2)^4*ln(e*x+d)*d^3*e^2+396/(5*d^2-2*
d*e+3*e^2)^4*ln(e*x+d)*d^2*e^3+57/(5*d^2-2*d*e+3*e^2)^4*ln(e*x+d)
*d*e^4-24/(5*d^2-2*d*e+3*e^2)^3/(e*x+d)*d*e^3+8/(5*d^2-2*d*e+3*e^
2)^3/(e*x+d)*d^3*e+60/(5*d^2-2*d*e+3*e^2)^3/(e*x+d)*d^2*e^2-6933/
70/(5*d^2-2*d*e+3*e^2)^4/(x^2+2/5*x+3/5)*x*d^3*e^2+5273/70/(5*d^2
-2*d*e+3*e^2)^4/(x^2+2/5*x+3/5)*x*d^2*e^3-5/2/(5*d^2-2*d*e+3*e^2)
^2/(e*x+d)^2*d^3-1367/28/(5*d^2-2*d*e+3*e^2)^4/(x^2+2/5*x+3/5)*d^
5-1371/140/(5*d^2-2*d*e+3*e^2)^4/(x^2+2/5*x+3/5)*e^5-205/2/(5*d^2
-2*d*e+3*e^2)^4*ln(5*x^2+2*x+3)*d^5+21/2/(5*d^2-2*d*e+3*e^2)^4*ln
(5*x^2+2*x+3)*e^5-1231/140/(5*d^2-2*d*e+3*e^2)^4/(x^2+2/5*x+3/5)*
x*d*e^4-74017/392/(5*d^2-2*d*e+3*e^2)^4*14^(1/2)*arctan(1/28*(10*
x+2)*14^(1/2))*d^4*e+21351/140/(5*d^2-2*d*e+3*e^2)^4/(x^2+2/5*x+3
/5)*x*d^4*e+17511/196/(5*d^2-2*d*e+3*e^2)^4*14^(1/2)*arctan(1/28*
(10*x+2)*14^(1/2))*d^3*e^2
```

Maxima [A] time = 0.798703, size = 1149, normalized size = 2.79

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^3*(5*x^2 + 2*x + 3)^2),x, algo
```

```
[Out] 1/392*sqrt(14)*(6565*d^5 - 74017*d^4*e + 35022*d^3*e^2 + 42858*d^
2*e^3 - 17247*d*e^4 + 579*e^5)*arctan(1/14*sqrt(14)*(5*x + 1))/(6
25*d^8 - 1000*d^7*e + 2100*d^6*e^2 - 1960*d^5*e^3 + 2086*d^4*e^4
- 1176*d^3*e^5 + 756*d^2*e^6 - 216*d*e^7 + 81*e^8) + (205*d^5 - 1
9*d^4*e - 846*d^3*e^2 + 396*d^2*e^3 + 57*d*e^4 - 21*e^5)*log(e*x
+ d)/(625*d^8 - 1000*d^7*e + 2100*d^6*e^2 - 1960*d^5*e^3 + 2086*d
^4*e^4 - 1176*d^3*e^5 + 756*d^2*e^6 - 216*d*e^7 + 81*e^8) - 1/2*(
205*d^5 - 19*d^4*e - 846*d^3*e^2 + 396*d^2*e^3 + 57*d*e^4 - 21*e^
5)*log(5*x^2 + 2*x + 3)/(625*d^8 - 1000*d^7*e + 2100*d^6*e^2 - 19
60*d^5*e^3 + 2086*d^4*e^4 - 1176*d^3*e^5 + 756*d^2*e^6 - 216*d*e^
7 + 81*e^8) - 1/28*(840*d^6 + 5525*d^5*e - 837*d^4*e^2 - 6981*d^3
*e^3 + 3355*d^2*e^4 - 714*d*e^5 + 252*e^6 + (5740*d^4*e^2 - 697*d
^3*e^3 - 12501*d^2*e^4 + 4239*d*e^5 + 3*e^6)*x^3 + (1400*d^6 + 69
30*d^5*e + 3212*d^4*e^2 - 15403*d^3*e^3 + 2349*d^2*e^4 - 549*d*e^
5 + 597*e^6)*x^2 + (560*d^6 + 3195*d^5*e + 2105*d^4*e^2 - 4799*d^
3*e^3 - 6623*d^2*e^4 + 2454*d*e^5 - 252*e^6)*x)/(375*d^8*e - 450*
d^7*e^2 + 855*d^6*e^3 - 564*d^5*e^4 + 513*d^4*e^5 - 162*d^3*e^6 +
 81*d^2*e^7 + 5*(125*d^6*e^3 - 150*d^5*e^4 + 285*d^4*e^5 - 188*d^
3*e^6 + 171*d^2*e^7 - 54*d*e^8 + 27*e^9)*x^4 + 2*(625*d^7*e^2 - 6
25*d^6*e^3 + 1275*d^5*e^4 - 655*d^4*e^5 + 667*d^3*e^6 - 99*d^2*e^
7 + 81*d*e^8 + 27*e^9)*x^3 + (625*d^8*e - 250*d^7*e^2 + 1200*d^6*
e^3 - 250*d^5*e^4 + 958*d^4*e^5 - 150*d^3*e^6 + 432*d^2*e^7 - 54*
d*e^8 + 81*e^9)*x^2 + 2*(125*d^8*e + 225*d^7*e^2 - 165*d^6*e^3 +
667*d^5*e^4 - 393*d^4*e^5 + 459*d^3*e^6 - 135*d^2*e^7 + 81*d*e^8)
*x)
```

Fricas [A] time = 0.587969, size = 2034, normalized size = 4.94

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^3*(5*x^2 + 2*x + 3)^2),x, algo
```

```
[Out] 1/392*sqrt(14)*(28*sqrt(14)*(615*d^7*e - 57*d^6*e^2 - 2538*d^5*e^
3 + 1188*d^4*e^4 + 171*d^3*e^5 - 63*d^2*e^6 + 5*(205*d^5*e^3 - 19
*d^4*e^4 - 846*d^3*e^5 + 396*d^2*e^6 + 57*d*e^7 - 21*e^8)*x^4 + 2
*(1025*d^6*e^2 + 110*d^5*e^3 - 4249*d^4*e^4 + 1134*d^3*e^5 + 681*
d^2*e^6 - 48*d*e^7 - 21*e^8)*x^3 + (1025*d^7*e + 725*d^6*e^2 - 36
```

```
91*d^5*e^3 - 1461*d^4*e^4 - 669*d^3*e^5 + 1311*d^2*e^6 + 87*d*e^7
 - 63*e^8)*x^2 + 2*(205*d^7*e + 596*d^6*e^2 - 903*d^5*e^3 - 2142*
d^4*e^4 + 1245*d^3*e^5 + 150*d^2*e^6 - 63*d*e^7)*x)*log(e*x + d)
- 14*sqrt(14)*(615*d^7*e - 57*d^6*e^2 - 2538*d^5*e^3 + 1188*d^4*e
^4 + 171*d^3*e^5 - 63*d^2*e^6 + 5*(205*d^5*e^3 - 19*d^4*e^4 - 846
*d^3*e^5 + 396*d^2*e^6 + 57*d*e^7 - 21*e^8)*x^4 + 2*(1025*d^6*e^2
 + 110*d^5*e^3 - 4249*d^4*e^4 + 1134*d^3*e^5 + 681*d^2*e^6 - 48*d
*e^7 - 21*e^8)*x^3 + (1025*d^7*e + 725*d^6*e^2 - 3691*d^5*e^3 - 1
461*d^4*e^4 - 669*d^3*e^5 + 1311*d^2*e^6 + 87*d*e^7 - 63*e^8)*x^2
 + 2*(205*d^7*e + 596*d^6*e^2 - 903*d^5*e^3 - 2142*d^4*e^4 + 1245
*d^3*e^5 + 150*d^2*e^6 - 63*d*e^7)*x)*log(5*x^2 + 2*x + 3) + (196
95*d^7*e - 222051*d^6*e^2 + 105066*d^5*e^3 + 128574*d^4*e^4 - 517
41*d^3*e^5 + 1737*d^2*e^6 + 5*(6565*d^5*e^3 - 74017*d^4*e^4 + 350
22*d^3*e^5 + 42858*d^2*e^6 - 17247*d*e^7 + 579*e^8)*x^4 + 2*(3282
5*d^6*e^2 - 363520*d^5*e^3 + 101093*d^4*e^4 + 249312*d^3*e^5 - 43
377*d^2*e^6 - 14352*d*e^7 + 579*e^8)*x^3 + (32825*d^7*e - 343825*
d^6*e^2 - 101263*d^5*e^3 + 132327*d^4*e^4 + 190263*d^3*e^5 + 6248
1*d^2*e^6 - 49425*d*e^7 + 1737*e^8)*x^2 + 2*(6565*d^7*e - 54322*d
^6*e^2 - 187029*d^5*e^3 + 147924*d^4*e^4 + 111327*d^3*e^5 - 51162
*d^2*e^6 + 1737*d*e^7)*x)*arctan(1/14*sqrt(14)*(5*x + 1)) - sqrt(
14)*(4200*d^8 + 25945*d^7*e - 12715*d^6*e^2 - 16656*d^5*e^3 + 282
26*d^4*e^4 - 31223*d^3*e^5 + 12753*d^2*e^6 - 2646*d*e^7 + 756*e^8
 + (28700*d^6*e^2 - 14965*d^5*e^3 - 43891*d^4*e^4 + 44106*d^3*e^5
 - 45966*d^2*e^6 + 12711*d*e^7 + 9*e^8)*x^3 + (7000*d^8 + 31850*d
^7*e + 6400*d^6*e^2 - 62649*d^5*e^3 + 52187*d^4*e^4 - 53652*d^3*e
^5 + 11130*d^2*e^6 - 2841*d*e^7 + 1791*e^8)*x^2 + (2800*d^8 + 148
55*d^7*e + 5815*d^6*e^2 - 18620*d^5*e^3 - 17202*d^4*e^4 + 11119*d
^3*e^5 - 26037*d^2*e^6 + 7866*d*e^7 - 756*e^8)*x))/(1875*d^10*e -
 3000*d^9*e^2 + 6300*d^8*e^3 - 5880*d^7*e^4 + 6258*d^6*e^5 - 3528
*d^5*e^6 + 2268*d^4*e^7 - 648*d^3*e^8 + 243*d^2*e^9 + 5*(625*d^8*
e^3 - 1000*d^7*e^4 + 2100*d^6*e^5 - 1960*d^5*e^6 + 2086*d^4*e^7 -
 1176*d^3*e^8 + 756*d^2*e^9 - 216*d*e^10 + 81*e^11)*x^4 + 2*(3125
*d^9*e^2 - 4375*d^8*e^3 + 9500*d^7*e^4 - 7700*d^6*e^5 + 8470*d^5*
e^6 - 3794*d^4*e^7 + 2604*d^3*e^8 - 324*d^2*e^9 + 189*d*e^10 + 81
*e^11)*x^3 + (3125*d^10*e - 2500*d^9*e^2 + 8375*d^8*e^3 - 4400*d^
7*e^4 + 8890*d^6*e^5 - 3416*d^5*e^6 + 5334*d^4*e^7 - 1584*d^3*e^8
 + 1809*d^2*e^9 - 324*d*e^10 + 243*e^11)*x^2 + 2*(625*d^10*e + 87
5*d^9*e^2 - 900*d^8*e^3 + 4340*d^7*e^4 - 3794*d^6*e^5 + 5082*d^5*
e^6 - 2772*d^4*e^7 + 2052*d^3*e^8 - 567*d^2*e^9 + 243*d*e^10)*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((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**3/(5*x**2+2*x+3)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.291869, size = 803, normalized size = 1.95

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^3*(5*x^2 + 2*x + 3)^2),x, algo
```

```
[Out] 1/392*sqrt(14)*(6565*d^5 - 74017*d^4*e + 35022*d^3*e^2 + 42858*d^
2*e^3 - 17247*d*e^4 + 579*e^5)*arctan(1/14*sqrt(14)*(5*x + 1))/(6
25*d^8 - 1000*d^7*e + 2100*d^6*e^2 - 1960*d^5*e^3 + 2086*d^4*e^4
- 1176*d^3*e^5 + 756*d^2*e^6 - 216*d*e^7 + 81*e^8) - 1/2*(205*d^5
 - 19*d^4*e - 846*d^3*e^2 + 396*d^2*e^3 + 57*d*e^4 - 21*e^5)*ln(5
*x^2 + 2*x + 3)/(625*d^8 - 1000*d^7*e + 2100*d^6*e^2 - 1960*d^5*e
^3 + 2086*d^4*e^4 - 1176*d^3*e^5 + 756*d^2*e^6 - 216*d*e^7 + 81*e
^8) + (205*d^5*e - 19*d^4*e^2 - 846*d^3*e^3 + 396*d^2*e^4 + 57*d*
e^5 - 21*e^6)*ln(abs(x*e + d))/(625*d^8*e - 1000*d^7*e^2 + 2100*d
^6*e^3 - 1960*d^5*e^4 + 2086*d^4*e^5 - 1176*d^3*e^6 + 756*d^2*e^7
 - 216*d*e^8 + 81*e^9) - 1/28*(4200*d^8 + 25945*d^7*e - 12715*d^6
*e^2 - 16656*d^5*e^3 + 28226*d^4*e^4 + (28700*d^6*e^2 - 14965*d^5
*e^3 - 43891*d^4*e^4 + 44106*d^3*e^5 - 45966*d^2*e^6 + 12711*d*e^
7 + 9*e^8)*x^3 - 31223*d^3*e^5 + (7000*d^8 + 31850*d^7*e + 6400*d
^6*e^2 - 62649*d^5*e^3 + 52187*d^4*e^4 - 53652*d^3*e^5 + 11130*d^
2*e^6 - 2841*d*e^7 + 1791*e^8)*x^2 + 12753*d^2*e^6 + (2800*d^8 +
14855*d^7*e + 5815*d^6*e^2 - 18620*d^5*e^3 - 17202*d^4*e^4 + 1111
9*d^3*e^5 - 26037*d^2*e^6 + 7866*d*e^7 - 756*e^8)*x - 2646*d*e^7
+ 756*e^8)*e^(-1)/((5*d^2 - 2*d*e + 3*e^2)^4*(5*x^2 + 2*x + 3)*(x
*e + d)^2)
```

3.318 $\int \frac{(d+ex)^3(2+x+3x^2-5x^3+4x^4)}{(3+2x+5x^2)^3}\,dx$

Optimal. Leaf size=171

$$\frac{3e(100d^2-245de+47e^2)\log(5x^2+2x+3)}{6250}+\frac{3(353125d^3-855175d^2e+74085de^2+556349e^3)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{4900000\sqrt{14}}+\frac{e^2x(83065d-126009e)}{980000}+\frac{(d+ex)^2(x(11015d+49177e)+3(11449d-2105e))}{196000(5x^2+2x+3)}-\frac{(423x+1367)(d+ex)^3}{7000(5x^2+2x+3)^2}+\frac{2e^3x^2}{125}$$

```
[Out] ((83065*d - 126009*e)*e^2*x)/980000 + (2*e^3*x^2)/125 - ((1367 +
423*x)*(d + e*x)^3)/(7000*(3 + 2*x + 5*x^2)^2) + ((d + e*x)^2*(3*
(11449*d - 2105*e) + (11015*d + 49177*e)*x))/(196000*(3 + 2*x + 5
*x^2)) + (3*(353125*d^3 - 855175*d^2*e + 74085*d*e^2 + 556349*e^3
)*ArcTan[(1 + 5*x)/Sqrt[14]])/(4900000*Sqrt[14]) + (3*e*(100*d^2
- 245*d*e + 47*e^2)*Log[3 + 2*x + 5*x^2])/6250
```

Rubi [A] time = 0.57517, antiderivative size = 171, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$\frac{3e(100d^2-245de+47e^2)\log(5x^2+2x+3)}{6250}+\frac{3(353125d^3-855175d^2e+74085de^2+556349e^3)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{4900000\sqrt{14}}+\frac{e^2x(83065d-126009e)}{980000}+\frac{(d+ex)^2(x(11015d+49177e)+3(11449d-2105e))}{196000(5x^2+2x+3)}-\frac{(423x+1367)(d+ex)^3}{7000(5x^2+2x+3)^2}+\frac{2e^3x^2}{125}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^3*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2)^3,x]
```

```
[Out] ((83065*d - 126009*e)*e^2*x)/980000 + (2*e^3*x^2)/125 - ((1367 +
423*x)*(d + e*x)^3)/(7000*(3 + 2*x + 5*x^2)^2) + ((d + e*x)^2*(3*
(11449*d - 2105*e) + (11015*d + 49177*e)*x))/(196000*(3 + 2*x + 5
*x^2)) + (3*(353125*d^3 - 855175*d^2*e + 74085*d*e^2 + 556349*e^3
)*ArcTan[(1 + 5*x)/Sqrt[14]])/(4900000*Sqrt[14]) + (3*e*(100*d^2
- 245*d*e + 47*e^2)*Log[3 + 2*x + 5*x^2])/6250
```

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((e*x+d)**3*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.398994, size = 209, normalized size = 1.22

$$164640e\left(100d^2-245de+47e^2\right)\log\left(5x^2+2x+3\right)-\frac{392\left(125d^3(423x+1367)+75d^2e(5989x-1269)-15de^2(18323x+17967)+e^3(54969-53189x)\right)}{\left(5x^2+2x+3\right)^2}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^3*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2)^3,x]
```

```
[Out] (548800*(60*d - 49*e)*e^2*x + 5488000*e^3*x^2 - (392*(e^3*(54969
- 53189*x) + 125*d^3*(1367 + 423*x) + 75*d^2*e*(-1269 + 5989*x) -
 15*d*e^2*(17967 + 18323*x)))/(3 + 2*x + 5*x^2)^2 + (14*(e^3*(263
9639 - 3109005*x) + 125*d^3*(34347 + 11015*x) + 75*d^2*e*(-44399
+ 181765*x) - 15*d*e^2*(809167 + 647195*x)))/(3 + 2*x + 5*x^2) +
15*Sqrt[14]*(353125*d^3 - 855175*d^2*e + 74085*d*e^2 + 556349*e^3
)*ArcTan[(1 + 5*x)/Sqrt[14]] + 164640*e*(100*d^2 - 245*d*e + 47*e
^2)*Log[3 + 2*x + 5*x^2])/343000000
```

Maple [A] time = 0.018, size = 267, normalized size = 1.6

$$\frac{2e^3x^2}{125}+\frac{12xde^2}{125}-\frac{49xe^3}{625}$$
$$+\frac{1}{25\left(5x^2+2x+3\right)^2}\left(\left(\left(\frac{11015d^3}{1568}+\frac{109059d^2e}{1568}-\frac{388317e^2d}{7840}-\frac{621801e^3}{39200}\right)x^3+\left(\frac{38753d^3}{1568}+\frac{84921d^2e}{7840}-\frac{640827e^2d}{7840}+\right.\right.\right.$$
$$+\frac{6\ln\left(5x^2+2x+3\right)d^2e}{125}-\frac{147\ln\left(5x^2+2x+3\right)e^2d}{1250}+\frac{141\ln\left(5x^2+2x+3\right)e^3}{6250}$$
$$+\frac{339\sqrt{14}d^3}{21952}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)-\frac{102621\sqrt{14}d^2e}{2744000}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)$$
$$+\frac{44451\sqrt{14}e^2d}{13720000}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)+\frac{1669047\sqrt{14}e^3}{68600000}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^3*(4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3)^3,x)
```

```
[Out] 2/125*e^3*x^2+12/125*x*d*e^2-49/625*x*e^3+1/25*((11015/1568*d^3+1
09059/1568*d^2*e-388317/7840*e^2*d-621801/39200*e^3)*x^3+(38753/1
568*d^3+84921/7840*d^2*e-640827/7840*e^2*d+1396037/196000*e^3)*x^
2+(17979/1568*d^3+173283/7840*d^2*e-73125/1568*e^2*d-511689/19600
0*e^3)*x+12953/1568*d^3-58599/7840*d^2*e-230931/7840*e^2*d+127595
7/196000*e^3)/(5*x^2+2*x+3)^2+6/125*ln(5*x^2+2*x+3)*d^2*e-147/125
0*ln(5*x^2+2*x+3)*e^2*d+141/6250*ln(5*x^2+2*x+3)*e^3+339/21952*14
^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d^3-102621/2744000*14^(1/2)
*arctan(1/28*(10*x+2)*14^(1/2))*d^2*e+44451/13720000*14^(1/2)*arc
tan(1/28*(10*x+2)*14^(1/2))*e^2*d+1669047/68600000*14^(1/2)*arcta
n(1/28*(10*x+2)*14^(1/2))*e^3
```

Maxima [A] time = 0.766806, size = 300, normalized size = 1.75

$$\frac{2}{125}\,e^3x^2+\frac{3}{68600000}\,\sqrt{14}\left(353125\,d^3-855175\,d^2e+74085\,de^2+556349\,e^3\right)\arctan\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right)$$
$$+\frac{1}{625}\left(60\,de^2-49\,e^3\right)x+\frac{3}{6250}\left(100\,d^2e-245\,de^2+47\,e^3\right)\log\left(5\,x^2+2\,x+3\right)$$
$$+\frac{5\left(275375\,d^3+2726475\,d^2e-1941585\,de^2-621801\,e^3\right)x^3+1619125\,d^3-1464975\,d^2e-5773275\,de^2+1275957\,e^3+\left(484\right.}{4900000\left(25\,x^4+20\,x^3+\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3/(5*x^2 + 2*x + 3)^3,x, algori
```

```
[Out] 2/125*e^3*x^2 + 3/68600000*sqrt(14)*(353125*d^3 - 855175*d^2*e +
74085*d*e^2 + 556349*e^3)*arctan(1/14*sqrt(14)*(5*x + 1)) + 1/625
*(60*d*e^2 - 49*e^3)*x + 3/6250*(100*d^2*e - 245*d*e^2 + 47*e^3)*
log(5*x^2 + 2*x + 3) + 1/4900000*(5*(275375*d^3 + 2726475*d^2*e -
 1941585*d*e^2 - 621801*e^3)*x^3 + 1619125*d^3 - 1464975*d^2*e -
5773275*d*e^2 + 1275957*e^3 + (4844125*d^3 + 2123025*d^2*e - 1602
0675*d*e^2 + 1396037*e^3)*x^2 + 3*(749125*d^3 + 1444025*d^2*e - 3
046875*d*e^2 - 170563*e^3)*x)/(25*x^4 + 20*x^3 + 34*x^2 + 12*x +
9)
```

Fricas [A] time = 0.26993, size = 605, normalized size = 3.54

$$\frac{\sqrt{14}\left(2352\,\sqrt{14}\left(25\left(100\,d^2e-245\,de^2+47\,e^3\right)x^4+20\left(100\,d^2e-245\,de^2+47\,e^3\right)x^3+900\,d^2e-2205\,de^2+423\,e^3+34\left(100\right.\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3/(5*x^2 + 2*x + 3)^3,x, algori
```

```
[Out] 1/68600000*sqrt(14)*(2352*sqrt(14)*(25*(100*d^2*e - 245*d*e^2 + 4
7*e^3)*x^4 + 20*(100*d^2*e - 245*d*e^2 + 47*e^3)*x^3 + 900*d^2*e
- 2205*d*e^2 + 423*e^3 + 34*(100*d^2*e - 245*d*e^2 + 47*e^3)*x^2
+ 12*(100*d^2*e - 245*d*e^2 + 47*e^3)*x)*log(5*x^2 + 2*x + 3) + 3
*(25*(353125*d^3 - 855175*d^2*e + 74085*d*e^2 + 556349*e^3)*x^4 +
 20*(353125*d^3 - 855175*d^2*e + 74085*d*e^2 + 556349*e^3)*x^3 +
3178125*d^3 - 7696575*d^2*e + 666765*d*e^2 + 5007141*e^3 + 34*(35
3125*d^3 - 855175*d^2*e + 74085*d*e^2 + 556349*e^3)*x^2 + 12*(353
125*d^3 - 855175*d^2*e + 74085*d*e^2 + 556349*e^3)*x)*arctan(1/14
*sqrt(14)*(5*x + 1)) + sqrt(14)*(1960000*e^3*x^6 + 196000*(60*d*e
^2 - 41*e^3)*x^5 + 627200*(15*d*e^2 - 8*e^3)*x^4 + 5*(275375*d^3
+ 2726475*d^2*e + 1257135*d*e^2 - 3045929*e^3)*x^3 + 1619125*d^3
- 1464975*d^2*e - 5773275*d*e^2 + 1275957*e^3 + (4844125*d^3 + 21
23025*d^2*e - 10375875*d*e^2 - 2508283*e^3)*x^2 + 3*(749125*d^3 +
 1444025*d^2*e - 1635675*d*e^2 - 1323043*e^3)*x))/(25*x^4 + 20*x^
3 + 34*x^2 + 12*x + 9)
```

Sympy [A] time = 7.59783, size = 469, normalized size = 2.74

$$\frac{2e^3x^2}{125} + x\left(\frac{12de^2}{125} - \frac{49e^3}{625}\right) + \left(\frac{3e\left(100d^2 - 245de + 47e^2\right)}{6250} - \frac{3\sqrt{14}i\left(353125d^3 - 855175d^2e + 74085de^2 + 556349e^3\right)}{137200000}\right)\log\left(x + \frac{211875d^3 - 1830225d^2e + 3271395de^2 - 285237e^3 + \frac{65\cdots}{}}{1059375d^3 - 2565525\cdots}\right.$$
$$+\left(\frac{3e\left(100d^2 - 245de + 47e^2\right)}{6250} + \frac{3\sqrt{14}i\left(353125d^3 - 855175d^2e + 74085de^2 + 556349e^3\right)}{137200000}\right)\log\left(x + \frac{211875d^3 - 1830225d^2e + 3271395de^2 - 285237e^3 + \frac{658\cdots}{}}{1059375d^3 - 2565525\cdots}\right.$$
$$+\frac{1619125d^3 - 1464975d^2e - 5773275de^2 + 1275957e^3 + x^3\left(1376875d^3 + 13632375d^2e - 9707925de^2 - 3109005e^3\right) + x^2\left(4\cdots\right.}{122500000x^4 + 98000000x^3 + 16660000\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**3*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**3,x)
```

```
[Out] 2*e**3*x**2/125 + x*(12*d*e**2/125 - 49*e**3/625) + (3*e*(100*d**
2 - 245*d*e + 47*e**2)/6250 - 3*sqrt(14)*I*(353125*d**3 - 855175*
d**2*e + 74085*d*e**2 + 556349*e**3)/137200000)*log(x + (211875*d
**3 - 1830225*d**2*e + 3271395*d*e**2 - 285237*e**3 + 65856*e*(10
0*d**2 - 245*d*e + 47*e**2)/5 - 3*sqrt(14)*I*(353125*d**3 - 85517
5*d**2*e + 74085*d*e**2 + 556349*e**3)/5)/(1059375*d**3 - 2565525
*d**2*e + 222255*d*e**2 + 1669047*e**3)) + (3*e*(100*d**2 - 245*d
*e + 47*e**2)/6250 + 3*sqrt(14)*I*(353125*d**3 - 855175*d**2*e +
74085*d*e**2 + 556349*e**3)/137200000)*log(x + (211875*d**3 - 183
0225*d**2*e + 3271395*d*e**2 - 285237*e**3 + 65856*e*(100*d**2 -
```

```
245*d*e + 47*e**2)/5 + 3*sqrt(14)*I*(353125*d**3 - 855175*d**2*e
+ 74085*d*e**2 + 556349*e**3)/5)/(1059375*d**3 - 2565525*d**2*e +
 222255*d*e**2 + 1669047*e**3)) + (1619125*d**3 - 1464975*d**2*e
- 5773275*d*e**2 + 1275957*e**3 + x**3*(1376875*d**3 + 13632375*d
**2*e - 9707925*d*e**2 - 3109005*e**3) + x**2*(4844125*d**3 + 212
3025*d**2*e - 16020675*d*e**2 + 1396037*e**3) + x*(2247375*d**3 +
 4332075*d**2*e - 9140625*d*e**2 - 511689*e**3))/(122500000*x**4
+ 98000000*x**3 + 166600000*x**2 + 58800000*x + 44100000)
```

GIAC/XCAS [A] time = 0.274179, size = 271, normalized size = 1.58

$$\frac{2}{125}x^2e^3 + \frac{12}{125}dxe^2 + \frac{3}{68600000}\sqrt{14}\left(353125\,d^3 - 855175\,d^2e + 74085\,de^2 + 556349\,e^3\right)\arctan\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right) - \frac{49}{625}xe^3 + \frac{3}{6250}\left(100\,d^2e - 245\,de^2 + 47\,e^3\right)\ln\left(5\,x^2 + 2\,x + 3\right) + \frac{5\left(275375\,d^3 + 2726475\,d^2e - 1941585\,de^2 - 621801\,e^3\right)x^3 + 1619125\,d^3 + \left(4844125\,d^3 + 2123025\,d^2e - 16020675\,de^2 + 13\right.}{4900000\,(5\,x^2 +}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^3/(5*x^2 + 2*x + 3)^3,x, algori
```

```
[Out] 2/125*x^2*e^3 + 12/125*d*x*e^2 + 3/68600000*sqrt(14)*(353125*d^3
- 855175*d^2*e + 74085*d*e^2 + 556349*e^3)*arctan(1/14*sqrt(14)*(
5*x + 1)) - 49/625*x*e^3 + 3/6250*(100*d^2*e - 245*d*e^2 + 47*e^3
)*ln(5*x^2 + 2*x + 3) + 1/4900000*(5*(275375*d^3 + 2726475*d^2*e
- 1941585*d*e^2 - 621801*e^3)*x^3 + 1619125*d^3 + (4844125*d^3 +
2123025*d^2*e - 16020675*d*e^2 + 1396037*e^3)*x^2 - 1464975*d^2*e
 + 3*(749125*d^3 + 1444025*d^2*e - 3046875*d*e^2 - 170563*e^3)*x
- 5773275*d*e^2 + 1275957*e^3)/(5*x^2 + 2*x + 3)^2
```

3.319 $\int \frac{(d+ex)^2(2+x+3x^2-5x^3+4x^4)}{(3+2x+5x^2)^3}\,dx$

Optimal. Leaf size=134

$$\frac{(211875d^2-342070de+14817e^2)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{980000\sqrt{14}}+\frac{(d+ex)(5x(2203d+8553e)+34347d-6413e)}{196000(5x^2+2x+3)}-\frac{(423x+1367)(d+ex)^2}{7000(5x^2+2x+3)^2}+\frac{e(40d-49e)\log(5x^2+2x+3)}{1250}+\frac{4e^2x}{125}$$

```
[Out] (4*e^2*x)/125 - ((1367 + 423*x)*(d + e*x)^2)/(7000*(3 + 2*x + 5*x
^2)^2) + ((d + e*x)*(34347*d - 6413*e + 5*(2203*d + 8553*e)*x))/(
196000*(3 + 2*x + 5*x^2)) + ((211875*d^2 - 342070*d*e + 14817*e^2
)*ArcTan[(1 + 5*x)/Sqrt[14]])/(980000*Sqrt[14]) + ((40*d - 49*e)*
e*Log[3 + 2*x + 5*x^2])/1250
```

Rubi [A] time = 0.417482, antiderivative size = 134, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$\frac{(211875d^2-342070de+14817e^2)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{980000\sqrt{14}}+\frac{(d+ex)(5x(2203d+8553e)+34347d-6413e)}{196000(5x^2+2x+3)}-\frac{(423x+1367)(d+ex)^2}{7000(5x^2+2x+3)^2}+\frac{e(40d-49e)\log(5x^2+2x+3)}{1250}+\frac{4e^2x}{125}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2)^3,x]
```

```
[Out] (4*e^2*x)/125 - ((1367 + 423*x)*(d + e*x)^2)/(7000*(3 + 2*x + 5*x
^2)^2) + ((d + e*x)*(34347*d - 6413*e + 5*(2203*d + 8553*e)*x))/(
196000*(3 + 2*x + 5*x^2)) + ((211875*d^2 - 342070*d*e + 14817*e^2
)*ArcTan[(1 + 5*x)/Sqrt[14]])/(980000*Sqrt[14]) + ((40*d - 49*e)*
e*Log[3 + 2*x + 5*x^2])/1250
```

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((e*x+d)**2*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.353016, size = 146, normalized size = 1.09

$$\frac{70\left(\frac{5\left(5d^2\left(11015x^3+38753x^2+17979x+12953\right)+2de\left(181765x^3+28307x^2+57761x-19533\right)+e^2\left(156800x^5+125440x^4+83809x^3-138345x^2-65427x-76977\right)\right)}{(5x^2+2x+3)^2}+784\dots}{68600000}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2)^3,x]
```

```
[Out] (5*Sqrt[14]*(211875*d^2 - 342070*d*e + 14817*e^2)*ArcTan[(1 + 5*x
)/Sqrt[14]] + 70*((5*(5*d^2*(12953 + 17979*x + 38753*x^2 + 11015*
x^3) + 2*d*e*(-19533 + 57761*x + 28307*x^2 + 181765*x^3) + e^2*(-
76977 - 65427*x - 138345*x^2 + 83809*x^3 + 125440*x^4 + 156800*x^
5)))/(3 + 2*x + 5*x^2)^2 + 784*(40*d - 49*e)*e*Log[3 + 2*x + 5*x^
2]))/68600000
```

Maple [A] time = 0.016, size = 179, normalized size = 1.3

$$\frac{4e^2x}{125}+\frac{1}{5\left(5x^2+2x+3\right)^2}\left(\left(\frac{2203d^2}{1568}+\frac{36353de}{3920}-\frac{129439e^2}{39200}\right)x^3+\left(\frac{38753d^2}{7840}+\frac{28307de}{19600}-\frac{213609e^2}{39200}\right)x^2+\left(\frac{17979d^2}{7840}+\frac{57761}{1960\dots}\dots\right.\right.$$
$$+\frac{4\ln\left(5x^2+2x+3\right)de}{125}-\frac{49\ln\left(5x^2+2x+3\right)e^2}{1250}+\frac{339\sqrt{14}d^2}{21952}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)$$
$$-\frac{34207\sqrt{14}de}{1372000}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)+\frac{14817\sqrt{14}e^2}{13720000}\arctan\left(\frac{(10x+2)\sqrt{14}}{28}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((e*x+d)^2*(4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3)^3,x)
```

```
[Out] 4/125*e^2*x+1/5*((2203/1568*d^2+36353/3920*d*e-129439/39200*e^2)*
x^3+(38753/7840*d^2+28307/19600*d*e-213609/39200*e^2)*x^2+(17979/
7840*d^2+57761/19600*d*e-4875/1568*e^2)*x+12953/7840*d^2-19533/19
600*d*e-76977/39200*e^2)/(5*x^2+2*x+3)^2+4/125*ln(5*x^2+2*x+3)*d*
e-49/1250*ln(5*x^2+2*x+3)*e^2+339/21952*14^(1/2)*arctan(1/28*(10*
x+2)*14^(1/2))*d^2-34207/1372000*14^(1/2)*arctan(1/28*(10*x+2)*14
```

```
^(1/2))*d*e+14817/13720000*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2)
)*e^2
```

Maxima [A] time = 0.767642, size = 209, normalized size = 1.56

$$\frac{4}{125}\,e^2x+\frac{1}{13720000}\,\sqrt{14}\big(211875\,d^2-342070\,de+14817\,e^2\big)\arctan\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right)+\frac{1}{1250}\,\big(40\,de-49\,e^2\big)\log\big(5\,x^2+2\,x+3\big)+\frac{\big(55075\,d^2+363530\,de-129439\,e^2\big)x^3+\big(193765\,d^2+56614\,de-213609\,e^2\big)x^2+64765\,d^2-39066\,de-76977\,e^2+\big(8989}{196000\,(25\,x^4+20\,x^3+34\,x^2+12\,x+9)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2/(5*x^2 + 2*x + 3)^3,x, algori
```

```
[Out] 4/125*e^2*x + 1/13720000*sqrt(14)*(211875*d^2 - 342070*d*e + 1481
7*e^2)*arctan(1/14*sqrt(14)*(5*x + 1)) + 1/1250*(40*d*e - 49*e^2)
*log(5*x^2 + 2*x + 3) + 1/196000*((55075*d^2 + 363530*d*e - 12943
9*e^2)*x^3 + (193765*d^2 + 56614*d*e - 213609*e^2)*x^2 + 64765*d^
2 - 39066*d*e - 76977*e^2 + (89895*d^2 + 115522*d*e - 121875*e^2)
*x)/(25*x^4 + 20*x^3 + 34*x^2 + 12*x + 9)
```

Fricas [A] time = 0.266138, size = 416, normalized size = 3.1

$$\frac{\sqrt{14}\Big(784\,\sqrt{14}\big(25\,\big(40\,de-49\,e^2\big)x^4+20\,\big(40\,de-49\,e^2\big)x^3+34\,\big(40\,de-49\,e^2\big)x^2+360\,de-441\,e^2+12\,\big(40\,de-49\,e^2\big)x\big)\,\mathrm{l}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2/(5*x^2 + 2*x + 3)^3,x, algori
```

```
[Out] 1/13720000*sqrt(14)*(784*sqrt(14)*(25*(40*d*e - 49*e^2)*x^4 + 20*
(40*d*e - 49*e^2)*x^3 + 34*(40*d*e - 49*e^2)*x^2 + 360*d*e - 441*
e^2 + 12*(40*d*e - 49*e^2)*x)*log(5*x^2 + 2*x + 3) + (25*(211875*
d^2 - 342070*d*e + 14817*e^2)*x^4 + 20*(211875*d^2 - 342070*d*e +
 14817*e^2)*x^3 + 34*(211875*d^2 - 342070*d*e + 14817*e^2)*x^2 +
1906875*d^2 - 3078630*d*e + 133353*e^2 + 12*(211875*d^2 - 342070*
d*e + 14817*e^2)*x)*arctan(1/14*sqrt(14)*(5*x + 1)) + 5*sqrt(14)*
(156800*e^2*x^5 + 125440*e^2*x^4 + (55075*d^2 + 363530*d*e + 8380
9*e^2)*x^3 + (193765*d^2 + 56614*d*e - 138345*e^2)*x^2 + 64765*d^
2 - 39066*d*e - 76977*e^2 + (89895*d^2 + 115522*d*e - 65427*e^2)*
x))/(25*x^4 + 20*x^3 + 34*x^2 + 12*x + 9)
```

Sympy [A] time = 5.04933, size = 304, normalized size = 2.27

$$\frac{4e^2x}{125} + \left(\frac{e(40d-49e)}{1250} - \frac{\sqrt{14}i\,(211875d^2-342070de+14817e^2)}{27440000}\right)\log\left(x + \frac{42375d^2-244030de+218093e^2+\frac{21952e(40d-49e)}{5}-\frac{\sqrt{14}i(211875d^2-342070\ldots}{5}}{211875d^2-342070de+14817e^2}\right.$$
$$+\left(\frac{e(40d-49e)}{1250} + \frac{\sqrt{14}i\,(211875d^2-342070de+14817e^2)}{27440000}\right)\log\left(x + \frac{42375d^2-244030de+218093e^2+\frac{21952e(40d-49e)}{5}+\frac{\sqrt{14}i(211875d^2-342070d\ldots}{5}}{211875d^2-342070de+14817e^2}\right.$$
$$+\frac{64765d^2-39066de-76977e^2+x^3(55075d^2+363530de-129439e^2)+x^2(193765d^2+56614de-213609e^2)+x(89895\ldots}{4900000x^4+3920000x^3+6664000x^2+2352000x+1764000}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**2*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**3,x)
```

```
[Out] 4*e**2*x/125 + (e*(40*d - 49*e)/1250 - sqrt(14)*I*(211875*d**2 -
342070*d*e + 14817*e**2)/27440000)*log(x + (42375*d**2 - 244030*d
*e + 218093*e**2 + 21952*e*(40*d - 49*e)/5 - sqrt(14)*I*(211875*d
**2 - 342070*d*e + 14817*e**2)/5)/(211875*d**2 - 342070*d*e + 148
17*e**2)) + (e*(40*d - 49*e)/1250 + sqrt(14)*I*(211875*d**2 - 342
070*d*e + 14817*e**2)/27440000)*log(x + (42375*d**2 - 244030*d*e
+ 218093*e**2 + 21952*e*(40*d - 49*e)/5 + sqrt(14)*I*(211875*d**2
 - 342070*d*e + 14817*e**2)/5)/(211875*d**2 - 342070*d*e + 14817*
e**2)) + (64765*d**2 - 39066*d*e - 76977*e**2 + x**3*(55075*d**2
+ 363530*d*e - 129439*e**2) + x**2*(193765*d**2 + 56614*d*e - 213
609*e**2) + x*(89895*d**2 + 115522*d*e - 121875*e**2))/(4900000*x
**4 + 3920000*x**3 + 6664000*x**2 + 2352000*x + 1764000)
```

GIAC/XCAS [A] time = 0.273632, size = 194, normalized size = 1.45

$$\frac{1}{13720000}\sqrt{14}\left(211875\,d^2-342070\,de+14817\,e^2\right)\arctan\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right) + \frac{4}{125}\,xe^2 + \frac{1}{1250}\left(40\,de-49\,e^2\right)\ln\left(5\,x^2+2\,x+3\right) + \frac{\left(55075\,d^2+363530\,de-129439\,e^2\right)x^3+\left(193765\,d^2+56614\,de-213609\,e^2\right)x^2+64765\,d^2+\left(89895\,d^2+115522\,de-121\ldots\right.}{196000\left(5\,x^2+2\,x+3\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^2/(5*x^2 + 2*x + 3)^3,x, algori

[Out] 1/13720000*sqrt(14)*(211875*d^2 - 342070*d*e + 14817*e^2)*arctan(
1/14*sqrt(14)*(5*x + 1)) + 4/125*x*e^2 + 1/1250*(40*d*e - 49*e^2)
*ln(5*x^2 + 2*x + 3) + 1/196000*((55075*d^2 + 363530*d*e - 129439
*e^2)*x^3 + (193765*d^2 + 56614*d*e - 213609*e^2)*x^2 + 64765*d^2
 + (89895*d^2 + 115522*d*e - 121875*e^2)*x - 39066*d*e - 76977*e^
2)/(5*x^2 + 2*x + 3)^2
```

3.320 $\int \frac{(d+ex)(2+x+3x^2-5x^3+4x^4)}{(3+2x+5x^2)^3} dx$

Optimal. Leaf size=103

$$-\frac{(423x+1367)(d+ex)}{7000(5x^2+2x+3)^2}+\frac{x(11015d+36353e)+34347d-6511e}{196000(5x^2+2x+3)}+\frac{(42375d-34207e)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{196000\sqrt{14}}+\frac{2}{125}e\log\left(5x^2+2x+3\right)$$

```
[Out] -((1367 + 423*x)*(d + e*x))/(7000*(3 + 2*x + 5*x^2)^2) + (34347*d
 - 6511*e + (11015*d + 36353*e)*x)/(196000*(3 + 2*x + 5*x^2)) + (
(42375*d - 34207*e)*ArcTan[(1 + 5*x)/Sqrt[14]])/(196000*Sqrt[14])
 + (2*e*Log[3 + 2*x + 5*x^2])/125
```

Rubi [A] time = 0.252892, antiderivative size = 103, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 6, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.167$

$$-\frac{(423x+1367)(d+ex)}{7000(5x^2+2x+3)^2}+\frac{x(11015d+36353e)+34347d-6511e}{196000(5x^2+2x+3)}+\frac{(42375d-34207e)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{196000\sqrt{14}}+\frac{2}{125}e\log\left(5x^2+2x+3\right)$$

Antiderivative was successfully verified.

```
[In]  Int[((d + e*x)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2)^3,x]
```

```
[Out] -((1367 + 423*x)*(d + e*x))/(7000*(3 + 2*x + 5*x^2)^2) + (34347*d
 - 6511*e + (11015*d + 36353*e)*x)/(196000*(3 + 2*x + 5*x^2)) + (
(42375*d - 34207*e)*ArcTan[(1 + 5*x)/Sqrt[14]])/(196000*Sqrt[14])
 + (2*e*Log[3 + 2*x + 5*x^2])/125
```

Rubi in Sympy [A] time = 140.074, size = 143, normalized size = 1.39

$$\frac{2e\log\left(5x^2+2x+3\right)}{125}-\frac{x^3\left(0.8d-1.8e\right)}{\left(5x^2+2x+3\right)^2}+\frac{x^2\left(0.34d+0.668e\right)}{\left(5x^2+2x+3\right)^2}+\frac{\left(0.0216198979591837d-0.0174525510204082e\right)\left(10x+2\right)}{5x^2+2x+3}+3.64431486880466\cdot 10^{-7}\sqrt{14}\left(42375d-34207e\right)\operatorname{atan}\left(\sqrt{14}\left(\frac{5x}{14}+\frac{1}{14}\right)\right)+\frac{0.000892857142857143\left(\frac{1124d}{5}+\frac{708e}{125}-x\left(\frac{1548d}{5}-\frac{124332e}{125}\right)\right)}{\left(5x^2+2x+3\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x+d)*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**3,x)
```

```
[Out] 2*e*log(5*x**2 + 2*x + 3)/125 - x**3*(0.8*d - 1.8*e)/(5*x**2 + 2*
x + 3)**2 + x**2*(0.34*d + 0.668*e)/(5*x**2 + 2*x + 3)**2 + (0.02
16198979591837*d - 0.0174525510204082*e)*(10*x + 2)/(5*x**2 + 2*x
 + 3) + 3.64431486880466e-7*sqrt(14)*(42375*d - 34207*e)*atan(sqr
t(14)*(5*x/14 + 1/14)) + 0.000892857142857143*(1124*d/5 + 708*e/1
25 - x*(1548*d/5 - 124332*e/125))/(5*x**2 + 2*x + 3)**2
```

Mathematica [A] time = 0.169342, size = 107, normalized size = 1.04

$$\frac{-2115dx-6835d-5989ex+1269e}{35000\left(5x^2+2x+3\right)^2}+\frac{55075dx+171735d+181765ex-44399e}{980000\left(5x^2+2x+3\right)}+\frac{\left(42375d-34207e\right)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{196000\sqrt{14}}+\frac{2}{125}e\log\left(5x^2+2x+3\right)$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2)^3,x]
```

```
[Out] (-6835*d + 1269*e - 2115*d*x - 5989*e*x)/(35000*(3 + 2*x + 5*x^2)
^2) + (171735*d - 44399*e + 55075*d*x + 181765*e*x)/(980000*(3 +
2*x + 5*x^2)) + ((42375*d - 34207*e)*ArcTan[(1 + 5*x)/Sqrt[14]])/
(196000*Sqrt[14]) + (2*e*Log[3 + 2*x + 5*x^2])/125
```

Maple [A] time = 0.016, size = 102, normalized size = 1.

$$25\frac{1}{\left(5x^2+2x+3\right)^2}\left(\left(\frac{36353e}{980000}+\frac{2203d}{196000}\right)x^3+\left(\frac{28307e}{4900000}+\frac{38753d}{980000}\right)x^2+\left(\frac{57761e}{4900000}+\frac{17979d}{980000}\right)x+\frac{12953d}{980000}-\frac{19533e}{4900000}\right)+\frac{2e\ln\left(125x^2+50x+75\right)}{125}+\frac{339\sqrt{14}d}{21952}\arctan\left(\frac{(250x+50)\sqrt{14}}{700}\right)-\frac{34207\sqrt{14}e}{2744000}\arctan\left(\frac{(250x+50)\sqrt{14}}{700}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)*(4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3)^3,x)
```

```
[Out] 25*((36353/980000*e+2203/196000*d)*x^3+(28307/4900000*e+38753/980
000*d)*x^2+(57761/4900000*e+17979/980000*d)*x+12953/980000*d-1953
3/4900000*e)/(5*x^2+2*x+3)^2+2/125*e*ln(125*x^2+50*x+75)+339/2195
2*14^(1/2)*arctan(1/700*(250*x+50)*14^(1/2))*d-34207/2744000*14^(
1/2)*arctan(1/700*(250*x+50)*14^(1/2))*e
```

Maxima [A] time = 0.77222, size = 136, normalized size = 1.32

$$\frac{1}{2744000}\sqrt{14}(42375d-34207e)\arctan\left(\frac{1}{14}\sqrt{14}(5x+1)\right)+\frac{2}{125}e\log\left(5x^2+2x+3\right)+\frac{5(11015d+36353e)x^3+(193765d+28307e)x^2+(89895d+57761e)x+64765d-19533e}{196000\left(25x^4+20x^3+34x^2+12x+9\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)/(5*x^2 + 2*x + 3)^3,x, algorith
```

```
[Out] 1/2744000*sqrt(14)*(42375*d - 34207*e)*arctan(1/14*sqrt(14)*(5*x
+ 1)) + 2/125*e*log(5*x^2 + 2*x + 3) + 1/196000*(5*(11015*d + 363
53*e)*x^3 + (193765*d + 28307*e)*x^2 + (89895*d + 57761*e)*x + 64
765*d - 19533*e)/(25*x^4 + 20*x^3 + 34*x^2 + 12*x + 9)
```

Fricas [A] time = 0.273212, size = 240, normalized size = 2.33

$$\frac{\sqrt{14}\left(3136\sqrt{14}\left(25ex^4+20ex^3+34ex^2+12ex+9e\right)\log\left(5x^2+2x+3\right)+\left(25(42375d-34207e)x^4+20(42375d-3420\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)/(5*x^2 + 2*x + 3)^3,x, algorith
```

```
[Out] 1/2744000*sqrt(14)*(3136*sqrt(14)*(25*e*x^4 + 20*e*x^3 + 34*e*x^2
 + 12*e*x + 9*e)*log(5*x^2 + 2*x + 3) + (25*(42375*d - 34207*e)*x
^4 + 20*(42375*d - 34207*e)*x^3 + 34*(42375*d - 34207*e)*x^2 + 12
*(42375*d - 34207*e)*x + 381375*d - 307863*e)*arctan(1/14*sqrt(14
)*(5*x + 1)) + sqrt(14)*(5*(11015*d + 36353*e)*x^3 + (193765*d +
28307*e)*x^2 + (89895*d + 57761*e)*x + 64765*d - 19533*e))/(25*x^
4 + 20*x^3 + 34*x^2 + 12*x + 9)
```

Sympy [A] time = 2.68242, size = 163, normalized size = 1.58

$$\left(\frac{2e}{125}-\frac{\sqrt{14}i\left(42375d-34207e\right)}{5488000}\right)\log\left(x+\frac{8475d-\frac{34207e}{5}-\frac{\sqrt{14}i(42375d-34207e)}{5}}{42375d-34207e}\right)+\left(\frac{2e}{125}+\frac{\sqrt{14}i\left(42375d-34207e\right)}{5488000}\right)\log\left(x+\frac{8475d-\frac{34207e}{5}+\frac{\sqrt{14}i(42375d-34207e)}{5}}{42375d-34207e}\right)+\frac{64765d-19533e+x^3\left(55075d+181765e\right)+x^2\left(193765d+28307e\right)+x\left(89895d+57761e\right)}{4900000x^4+3920000x^3+6664000x^2+2352000x+1764000}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((e*x+d)*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**3,x)
```

```
[Out] (2*e/125 - sqrt(14)*I*(42375*d - 34207*e)/5488000)*log(x + (8475*
d - 34207*e/5 - sqrt(14)*I*(42375*d - 34207*e)/5)/(42375*d - 3420
7*e)) + (2*e/125 + sqrt(14)*I*(42375*d - 34207*e)/5488000)*log(x
+ (8475*d - 34207*e/5 + sqrt(14)*I*(42375*d - 34207*e)/5)/(42375*
d - 34207*e)) + (64765*d - 19533*e + x**3*(55075*d + 181765*e) +
x**2*(193765*d + 28307*e) + x*(89895*d + 57761*e))/(4900000*x**4
+ 3920000*x**3 + 6664000*x**2 + 2352000*x + 1764000)
```

GIAC/XCAS [A] time = 0.271894, size = 131, normalized size = 1.27

$$\frac{1}{2744000}\sqrt{14}(42375\,d-34207\,e)\arctan\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right)+\frac{2}{125}\,e\ln\left(5\,x^2+2\,x+3\right)+\frac{5\,(11015\,d+36353\,e)x^3+(193765\,d+28307\,e)x^2+(89895\,d+57761\,e)x+64765\,d-19533\,e}{196000\,(5\,x^2+2\,x+3)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)/(5*x^2 + 2*x + 3)^3,x, algorith
```

```
[Out] 1/2744000*sqrt(14)*(42375*d - 34207*e)*arctan(1/14*sqrt(14)*(5*x
+ 1)) + 2/125*e*ln(5*x^2 + 2*x + 3) + 1/196000*(5*(11015*d + 3635
3*e)*x^3 + (193765*d + 28307*e)*x^2 + (89895*d + 57761*e)*x + 647
65*d - 19533*e)/(5*x^2 + 2*x + 3)^2
```

3.321 $\int \frac{2+x+3x^2-5x^3+4x^4}{(3+2x+5x^2)^3} dx$

Optimal. Leaf size=64

$$-\frac{423x+1367}{7000\,(5x^2+2x+3)^2}+\frac{11015x+34347}{196000\,(5x^2+2x+3)}+\frac{339\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{1568\sqrt{14}}$$

```
[Out] -(1367 + 423*x)/(7000*(3 + 2*x + 5*x^2)^2) + (34347 + 11015*x)/(1
96000*(3 + 2*x + 5*x^2)) + (339*ArcTan[(1 + 5*x)/Sqrt[14]])/(1568
*Sqrt[14])
```

Rubi [A] time = 0.0872773, antiderivative size = 64, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.129

$$-\frac{423x+1367}{7000\,(5x^2+2x+3)^2}+\frac{11015x+34347}{196000\,(5x^2+2x+3)}+\frac{339\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{1568\sqrt{14}}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/(3 + 2*x + 5*x^2)^3,x]
```

```
[Out] -(1367 + 423*x)/(7000*(3 + 2*x + 5*x^2)^2) + (34347 + 11015*x)/(1
96000*(3 + 2*x + 5*x^2)) + (339*ArcTan[(1 + 5*x)/Sqrt[14]])/(1568
*Sqrt[14])
```

Rubi in Sympy [A] time = 48.1109, size = 97, normalized size = 1.52

$$-\frac{4x^3}{5\,(5x^2+2x+3)^2}+\frac{17x^2}{50\,(5x^2+2x+3)^2}+\frac{-\frac{774x}{5}+\frac{562}{5}}{560\,(5x^2+2x+3)^2}+\frac{339\,(10x+2)}{15680\,(5x^2+2x+3)}+\frac{339\sqrt{14}\,\mathrm{atan}\left(\sqrt{14}\left(\frac{5x}{14}+\frac{1}{14}\right)\right)}{21952}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**3,x)
```

```
[Out] -4*x**3/(5*(5*x**2 + 2*x + 3)**2) + 17*x**2/(50*(5*x**2 + 2*x + 3
)**2) + (-774*x/5 + 562/5)/(560*(5*x**2 + 2*x + 3)**2) + 339*(10*
```

```
x + 2)/(15680*(5*x**2 + 2*x + 3)) + 339*sqrt(14)*atan(sqrt(14)*(5
*x/14 + 1/14))/21952
```

Mathematica [A] time = 0.0751909, size = 53, normalized size = 0.83

$$\frac{\frac{14(11015x^3+38753x^2+17979x+12953)}{(5x^2+2x+3)^2}+8475\sqrt{14}\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{548800}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/(3 + 2*x + 5*x^2)^3,x]
```

```
[Out] ((14*(12953 + 17979*x + 38753*x^2 + 11015*x^3))/(3 + 2*x + 5*x^2)
^2 + 8475*Sqrt[14]*ArcTan[(1 + 5*x)/Sqrt[14]])/548800
```

Maple [A] time = 0.008, size = 47, normalized size = 0.7

$$25\,\frac{1}{(5\,x^2+2\,x+3)^2}\left(\frac{2203\,x^3}{196000}+\frac{38753\,x^2}{980000}+\frac{17979\,x}{980000}+\frac{12953}{980000}\right)+\frac{339\,\sqrt{14}}{21952}\arctan\left(\frac{(250\,x+50)\,\sqrt{14}}{700}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3)^3,x)
```

```
[Out] 25*(2203/196000*x^3+38753/980000*x^2+17979/980000*x+12953/980000)
/(5*x^2+2*x+3)^2+339/21952*14^(1/2)*arctan(1/700*(250*x+50)*14^(1
/2))
```

Maxima [A] time = 0.764318, size = 76, normalized size = 1.19

$$\frac{339}{21952}\sqrt{14}\arctan\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right)+\frac{11015\,x^3+38753\,x^2+17979\,x+12953}{39200\,(25\,x^4+20\,x^3+34\,x^2+12\,x+9)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/(5*x^2 + 2*x + 3)^3,x, algorithm="maxima
```

```
[Out] 339/21952*sqrt(14)*arctan(1/14*sqrt(14)*(5*x + 1)) + 1/39200*(110
15*x^3 + 38753*x^2 + 17979*x + 12953)/(25*x^4 + 20*x^3 + 34*x^2 +
```

```
12*x + 9)
```

Fricas [A] time = 0.261049, size = 108, normalized size = 1.69

$$\frac{\sqrt{14}\left(8475\left(25x^4+20x^3+34x^2+12x+9\right)\arctan\left(\frac{1}{14}\sqrt{14}(5x+1)\right)+\sqrt{14}\left(11015x^3+38753x^2+17979x+12953\right)\right)}{548800\left(25x^4+20x^3+34x^2+12x+9\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/(5*x^2 + 2*x + 3)^3,x, algorithm="fricas
```

```
[Out] 1/548800*sqrt(14)*(8475*(25*x^4 + 20*x^3 + 34*x^2 + 12*x + 9)*arc
tan(1/14*sqrt(14)*(5*x + 1)) + sqrt(14)*(11015*x^3 + 38753*x^2 +
17979*x + 12953))/(25*x^4 + 20*x^3 + 34*x^2 + 12*x + 9)
```

Sympy [A] time = 0.239072, size = 61, normalized size = 0.95

$$\frac{11015x^3+38753x^2+17979x+12953}{980000x^4+784000x^3+1332800x^2+470400x+352800}+\frac{339\sqrt{14}\operatorname{atan}\left(\frac{5\sqrt{14}x}{14}+\frac{\sqrt{14}}{14}\right)}{21952}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**3,x)
```

```
[Out] (11015*x**3 + 38753*x**2 + 17979*x + 12953)/(980000*x**4 + 784000
*x**3 + 1332800*x**2 + 470400*x + 352800) + 339*sqrt(14)*atan(5*s
qrt(14)*x/14 + sqrt(14)/14)/21952
```

GIAC/XCAS [A] time = 0.269741, size = 62, normalized size = 0.97

$$\frac{339}{21952}\sqrt{14}\arctan\left(\frac{1}{14}\sqrt{14}(5x+1)\right)+\frac{11015x^3+38753x^2+17979x+12953}{39200\left(5x^2+2x+3\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/(5*x^2 + 2*x + 3)^3,x, algorithm="giac")
```

```
[Out] 339/21952*sqrt(14)*arctan(1/14*sqrt(14)*(5*x + 1)) + 1/39200*(110
15*x^3 + 38753*x^2 + 17979*x + 12953)/(5*x^2 + 2*x + 3)^2
```

3.322 $\int \frac{2+x+3x^2-5x^3+4x^4}{(d+ex)(3+2x+5x^2)^3}\,dx$

Optimal. Leaf size=329

$$-\frac{x(423d-1367e)+1367d-293e}{1400\left(5x^2+2x+3\right)^2\left(5d^2-2de+3e^2\right)}+\frac{171735d^3-92989d^2e+25x\left(2203d^3-9033d^2e+3635de^2-1829e^3\right)+36207de^2+1831e^3}{39200\left(5x^2+2x+3\right)\left(5d^2-2de+3e^2\right)^2}-\frac{e\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)\log\left(5x^2+2x+3\right)}{2\left(5d^2-2de+3e^2\right)^3}+\frac{e\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)\log(d+ex)}{\left(5d^2-2de+3e^2\right)^3}+\frac{\left(42375d^5-16643d^4e+58530d^3e^2-56058d^2e^3+31811de^4-8623e^5\right)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{1568\sqrt{14}\left(5d^2-2de+3e^2\right)^3}$$

```
[Out] -(1367*d - 293*e + (423*d - 1367*e)*x)/(1400*(5*d^2 - 2*d*e + 3*e
^2)*(3 + 2*x + 5*x^2)^2) + (171735*d^3 - 92989*d^2*e + 36207*d*e^
2 + 1831*e^3 + 25*(2203*d^3 - 9033*d^2*e + 3635*d*e^2 - 1829*e^3)
*x)/(39200*(5*d^2 - 2*d*e + 3*e^2)^2*(3 + 2*x + 5*x^2)) + ((42375
*d^5 - 16643*d^4*e + 58530*d^3*e^2 - 56058*d^2*e^3 + 31811*d*e^4
- 8623*e^5)*ArcTan[(1 + 5*x)/Sqrt[14]])/(1568*Sqrt[14]*(5*d^2 - 2
*d*e + 3*e^2)^3) + (e*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^
4)*Log[d + e*x])/(5*d^2 - 2*d*e + 3*e^2)^3 - (e*(4*d^4 + 5*d^3*e
+ 3*d^2*e^2 - d*e^3 + 2*e^4)*Log[3 + 2*x + 5*x^2])/(2*(5*d^2 - 2*
d*e + 3*e^2)^3)
```

Rubi [A] time = 1.15774, antiderivative size = 329, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.158$

$$-\frac{x(423d-1367e)+1367d-293e}{1400\left(5x^2+2x+3\right)^2\left(5d^2-2de+3e^2\right)}+\frac{171735d^3-92989d^2e+25x\left(2203d^3-9033d^2e+3635de^2-1829e^3\right)+36207de^2+1831e^3}{39200\left(5x^2+2x+3\right)\left(5d^2-2de+3e^2\right)^2}-\frac{e\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)\log\left(5x^2+2x+3\right)}{2\left(5d^2-2de+3e^2\right)^3}+\frac{e\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)\log(d+ex)}{\left(5d^2-2de+3e^2\right)^3}+\frac{\left(42375d^5-16643d^4e+58530d^3e^2-56058d^2e^3+31811de^4-8623e^5\right)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{1568\sqrt{14}\left(5d^2-2de+3e^2\right)^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)*(3 + 2*x + 5*x^2)^3),x]
```

```
[Out] -(1367*d - 293*e + (423*d - 1367*e)*x)/(1400*(5*d^2 - 2*d*e + 3*e
^2)*(3 + 2*x + 5*x^2)^2) + (171735*d^3 - 92989*d^2*e + 36207*d*e^
2 + 1831*e^3 + 25*(2203*d^3 - 9033*d^2*e + 3635*d*e^2 - 1829*e^3)
*x)/(39200*(5*d^2 - 2*d*e + 3*e^2)^2*(3 + 2*x + 5*x^2)) + ((42375
*d^5 - 16643*d^4*e + 58530*d^3*e^2 - 56058*d^2*e^3 + 31811*d*e^4
- 8623*e^5)*ArcTan[(1 + 5*x)/Sqrt[14]])/(1568*Sqrt[14]*(5*d^2 - 2
*d*e + 3*e^2)^3) + (e*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^
4)*Log[d + e*x])/(5*d^2 - 2*d*e + 3*e^2)^3 - (e*(4*d^4 + 5*d^3*e
+ 3*d^2*e^2 - d*e^3 + 2*e^4)*Log[3 + 2*x + 5*x^2])/(2*(5*d^2 - 2*
d*e + 3*e^2)^3)
```

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((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)/(5*x**2+2*x+3)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.544084, size = 282, normalized size = 0.86

$$\frac{\frac{392\left(5d^2-2de+3e^2\right)^2(e(1367x+293)-d(423x+1367))}{\left(5x^2+2x+3\right)^2}+\frac{14\left(5d^2-2de+3e^2\right)\left(5d^3(11015x+34347)-d^2e(225825x+92989)+de^2(90875x+36207)+e^3(1831-45725x)\right)}{5x^2+2x+3}-}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)*(3 + 2*x + 5*x^2)^3),x]
```

```
[Out] ((392*(5*d^2 - 2*d*e + 3*e^2)^2*(-(d*(1367 + 423*x)) + e*(293 + 1
367*x)))/(3 + 2*x + 5*x^2)^2 + (14*(5*d^2 - 2*d*e + 3*e^2)*(e^3*(
1831 - 45725*x) + 5*d^3*(34347 + 11015*x) + d*e^2*(36207 + 90875*
x) - d^2*e*(92989 + 225825*x)))/(3 + 2*x + 5*x^2) + 25*Sqrt[14]*(
42375*d^5 - 16643*d^4*e + 58530*d^3*e^2 - 56058*d^2*e^3 + 31811*d
*e^4 - 8623*e^5)*ArcTan[(1 + 5*x)/Sqrt[14]] + 548800*e*(4*d^4 + 5
*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*Log[d + e*x] - 274400*e*(4*d^
4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4)*Log[3 + 2*x + 5*x^2])/(5
48800*(5*d^2 - 2*d*e + 3*e^2)^3)
```

Maple [B] time = 0.029, size = 1437, normalized size = 4.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((4*x^4-5*x^3+3*x^2+x+2)/(e*x+d)/(5*x^2+2*x+3)^3,x)
```

```
[Out] 193765/1568/(5*d^2-2*d*e+3*e^2)^3/(5*x^2+2*x+3)^2*x^2*d^5-8623/21
952/(5*d^2-2*d*e+3*e^2)^3*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))
*e^5-2/(5*d^2-2*d*e+3*e^2)^3*ln(5*x^2+2*x+3)*d^4*e+3*e^3/(5*d^2-2
*d*e+3*e^2)^3*ln(e*x+d)*d^2-5/2/(5*d^2-2*d*e+3*e^2)^3*ln(5*x^2+2*
x+3)*d^3*e^2-3/2/(5*d^2-2*d*e+3*e^2)^3*ln(5*x^2+2*x+3)*d^2*e^3+1/
2/(5*d^2-2*d*e+3*e^2)^3*ln(5*x^2+2*x+3)*d*e^4+42375/21952/(5*d^2-
2*d*e+3*e^2)^3*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d^5-27435/
1568/(5*d^2-2*d*e+3*e^2)^3/(5*x^2+2*x+3)^2*x^3*e^5-28843/3920/(5*
d^2-2*d*e+3*e^2)^3/(5*x^2+2*x+3)^2*d^2*e^3-11211/7840/(5*d^2-2*d*
e+3*e^2)^3/(5*x^2+2*x+3)^2*x*e^5-58185/1568/(5*d^2-2*d*e+3*e^2)^3
/(5*x^2+2*x+3)^2*d^4*e+118119/3920/(5*d^2-2*d*e+3*e^2)^3/(5*x^2+2
*x+3)^2*d^3*e^2+89895/1568/(5*d^2-2*d*e+3*e^2)^3/(5*x^2+2*x+3)^2*
d^5*x-e^4/(5*d^2-2*d*e+3*e^2)^3*ln(e*x+d)*d+4*e/(5*d^2-2*d*e+3*e^
2)^3*ln(e*x+d)*d^4+5*e^2/(5*d^2-2*d*e+3*e^2)^3*ln(e*x+d)*d^3-4937
7/7840/(5*d^2-2*d*e+3*e^2)^3/(5*x^2+2*x+3)^2*x^2*e^5-25611/7840/(
5*d^2-2*d*e+3*e^2)^3/(5*x^2+2*x+3)^2*d*e^4+55075/1568/(5*d^2-2*d*
e+3*e^2)^3/(5*x^2+2*x+3)^2*x^3*d^5+64765/1568/(5*d^2-2*d*e+3*e^2)
^3/(5*x^2+2*x+3)^2*d^5+18063/7840/(5*d^2-2*d*e+3*e^2)^3/(5*x^2+2*
x+3)^2*e^5-1/(5*d^2-2*d*e+3*e^2)^3*ln(5*x^2+2*x+3)*e^5+2*e^5/(5*d
^2-2*d*e+3*e^2)^3*ln(e*x+d)+31811/21952/(5*d^2-2*d*e+3*e^2)^3*14^
(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d*e^4-28029/10976/(5*d^2-2*d
*e+3*e^2)^3*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d^2*e^3-25044
9/3920/(5*d^2-2*d*e+3*e^2)^3/(5*x^2+2*x+3)^2*x*d^2*e^3-108785/784
/(5*d^2-2*d*e+3*e^2)^3/(5*x^2+2*x+3)^2*x^3*d^2*e^3-247855/1568/(5
*d^2-2*d*e+3*e^2)^3/(5*x^2+2*x+3)^2*x^3*d^4*e-16643/21952/(5*d^2-
2*d*e+3*e^2)^3*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d^4*e+1071
25/784/(5*d^2-2*d*e+3*e^2)^3/(5*x^2+2*x+3)^2*x^3*d^3*e^2-165635/1
568/(5*d^2-2*d*e+3*e^2)^3/(5*x^2+2*x+3)^2*x*d^4*e-388683/3920/(5*
d^2-2*d*e+3*e^2)^3/(5*x^2+2*x+3)^2*x^2*d^2*e^3+250589/7840/(5*d^2
-2*d*e+3*e^2)^3/(5*x^2+2*x+3)^2*x^2*d*e^4+655359/3920/(5*d^2-2*d*
e+3*e^2)^3/(5*x^2+2*x+3)^2*x^2*d^3*e^2+72815/1568/(5*d^2-2*d*e+3*
e^2)^3/(5*x^2+2*x+3)^2*x^3*d*e^4-260825/1568/(5*d^2-2*d*e+3*e^2)^
3/(5*x^2+2*x+3)^2*x^2*d^4*e+29265/10976/(5*d^2-2*d*e+3*e^2)^3*14^
(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d^3*e^2+380997/3920/(5*d^2-2
*d*e+3*e^2)^3/(5*x^2+2*x+3)^2*x*d^3*e^2+147247/7840/(5*d^2-2*d*e+
3*e^2)^3/(5*x^2+2*x+3)^2*x*d*e^4
```

Maxima [A] time = 0.775767, size = 771, normalized size = 2.34

$$\frac{\sqrt{14}\left(42375\,d^5-16643\,d^4e+58530\,d^3e^2-56058\,d^2e^3+31811\,de^4-8623\,e^5\right)\arctan\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right)}{21952\,(125\,d^6-150\,d^5e+285\,d^4e^2-188\,d^3e^3+171\,d^2e^4-54\,de^5+27\,e^6)}+\frac{\left(4\,d^4e+5\,d^3e^2+3\,d^2e^3-de^4+2\,e^5\right)\log\left(ex+d\right)}{125\,d^6-150\,d^5e+285\,d^4e^2-188\,d^3e^3+171\,d^2e^4-54\,de^5+27\,e^6}-\frac{\left(4\,d^4e+5\,d^3e^2+3\,d^2e^3-de^4+2\,e^5\right)\log\left(5\,x^2+2\,x+3\right)}{2\,(125\,d^6-150\,d^5e+285\,d^4e^2-188\,d^3e^3+171\,d^2e^4-54\,de^5+27\,e^6)}+\frac{25\left(2203\,d^3-9033\,d^2e+3635\,de^2-1829\,e^3\right)x^3+64765\,d^3-32279\,d^2e-4523\,de^2+6021\,e^3+(19}{7840\,(25\,(25\,d^4-20\,d^3e+34\,d^2e^2-12\,de^3+9\,e^4)x^4+225\,d^4-180\,d^3e+306\,d^2e^2-108\,de^3+81\,e^4+20\,(25\,d^4-20\,d^3e+}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)*(5*x^2 + 2*x + 3)^3),x, algori
```

```
[Out] 1/21952*sqrt(14)*(42375*d^5 - 16643*d^4*e + 58530*d^3*e^2 - 56058
*d^2*e^3 + 31811*d*e^4 - 8623*e^5)*arctan(1/14*sqrt(14)*(5*x + 1)
)/(125*d^6 - 150*d^5*e + 285*d^4*e^2 - 188*d^3*e^3 + 171*d^2*e^4
- 54*d*e^5 + 27*e^6) + (4*d^4*e + 5*d^3*e^2 + 3*d^2*e^3 - d*e^4 +
 2*e^5)*log(e*x + d)/(125*d^6 - 150*d^5*e + 285*d^4*e^2 - 188*d^3
*e^3 + 171*d^2*e^4 - 54*d*e^5 + 27*e^6) - 1/2*(4*d^4*e + 5*d^3*e^
2 + 3*d^2*e^3 - d*e^4 + 2*e^5)*log(5*x^2 + 2*x + 3)/(125*d^6 - 15
0*d^5*e + 285*d^4*e^2 - 188*d^3*e^3 + 171*d^2*e^4 - 54*d*e^5 + 27
*e^6) + 1/7840*(25*(2203*d^3 - 9033*d^2*e + 3635*d*e^2 - 1829*e^3
)*x^3 + 64765*d^3 - 32279*d^2*e - 4523*d*e^2 + 6021*e^3 + (193765
*d^3 - 183319*d^2*e + 72557*d*e^2 - 16459*e^3)*x^2 + (89895*d^3 -
 129677*d^2*e + 46591*d*e^2 - 3737*e^3)*x)/(25*(25*d^4 - 20*d^3*e
 + 34*d^2*e^2 - 12*d*e^3 + 9*e^4)*x^4 + 225*d^4 - 180*d^3*e + 306
*d^2*e^2 - 108*d*e^3 + 81*e^4 + 20*(25*d^4 - 20*d^3*e + 34*d^2*e^
2 - 12*d*e^3 + 9*e^4)*x^3 + 34*(25*d^4 - 20*d^3*e + 34*d^2*e^2 -
12*d*e^3 + 9*e^4)*x^2 + 12*(25*d^4 - 20*d^3*e + 34*d^2*e^2 - 12*d
*e^3 + 9*e^4)*x)
```

Fricas [A] time = 0.501772, size = 1432, normalized size = 4.35

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)*(5*x^2 + 2*x + 3)^3),x, algori
```

```
[Out] 1/109760*sqrt(14)*(7840*sqrt(14)*(36*d^4*e + 45*d^3*e^2 + 27*d^2*
e^3 - 9*d*e^4 + 18*e^5 + 25*(4*d^4*e + 5*d^3*e^2 + 3*d^2*e^3 - d*
e^4 + 2*e^5)*x^4 + 20*(4*d^4*e + 5*d^3*e^2 + 3*d^2*e^3 - d*e^4 +
2*e^5)*x^3 + 34*(4*d^4*e + 5*d^3*e^2 + 3*d^2*e^3 - d*e^4 + 2*e^5)
```

```
*x^2 + 12*(4*d^4*e + 5*d^3*e^2 + 3*d^2*e^3 - d*e^4 + 2*e^5)*x)*lo
g(e*x + d) - 3920*sqrt(14)*(36*d^4*e + 45*d^3*e^2 + 27*d^2*e^3 -
9*d*e^4 + 18*e^5 + 25*(4*d^4*e + 5*d^3*e^2 + 3*d^2*e^3 - d*e^4 +
2*e^5)*x^4 + 20*(4*d^4*e + 5*d^3*e^2 + 3*d^2*e^3 - d*e^4 + 2*e^5)
*x^3 + 34*(4*d^4*e + 5*d^3*e^2 + 3*d^2*e^3 - d*e^4 + 2*e^5)*x^2 +
 12*(4*d^4*e + 5*d^3*e^2 + 3*d^2*e^3 - d*e^4 + 2*e^5)*x)*log(5*x^
2 + 2*x + 3) + 5*(381375*d^5 - 149787*d^4*e + 526770*d^3*e^2 - 50
4522*d^2*e^3 + 286299*d*e^4 - 77607*e^5 + 25*(42375*d^5 - 16643*d
^4*e + 58530*d^3*e^2 - 56058*d^2*e^3 + 31811*d*e^4 - 8623*e^5)*x^
4 + 20*(42375*d^5 - 16643*d^4*e + 58530*d^3*e^2 - 56058*d^2*e^3 +
 31811*d*e^4 - 8623*e^5)*x^3 + 34*(42375*d^5 - 16643*d^4*e + 5853
0*d^3*e^2 - 56058*d^2*e^3 + 31811*d*e^4 - 8623*e^5)*x^2 + 12*(423
75*d^5 - 16643*d^4*e + 58530*d^3*e^2 - 56058*d^2*e^3 + 31811*d*e^
4 - 8623*e^5)*x)*arctan(1/14*sqrt(14)*(5*x + 1)) + sqrt(14)*(3238
25*d^5 - 290925*d^4*e + 236238*d^3*e^2 - 57686*d^2*e^3 - 25611*d*
e^4 + 18063*e^5 + 25*(11015*d^5 - 49571*d^4*e + 42850*d^3*e^2 - 4
3514*d^2*e^3 + 14563*d*e^4 - 5487*e^5)*x^3 + (968825*d^5 - 130412
5*d^4*e + 1310718*d^3*e^2 - 777366*d^2*e^3 + 250589*d*e^4 - 49377
*e^5)*x^2 + (449475*d^5 - 828175*d^4*e + 761994*d^3*e^2 - 500898*
d^2*e^3 + 147247*d*e^4 - 11211*e^5)*x))/(1125*d^6 - 1350*d^5*e +
2565*d^4*e^2 - 1692*d^3*e^3 + 1539*d^2*e^4 - 486*d*e^5 + 243*e^6
+ 25*(125*d^6 - 150*d^5*e + 285*d^4*e^2 - 188*d^3*e^3 + 171*d^2*e
^4 - 54*d*e^5 + 27*e^6)*x^4 + 20*(125*d^6 - 150*d^5*e + 285*d^4*e
^2 - 188*d^3*e^3 + 171*d^2*e^4 - 54*d*e^5 + 27*e^6)*x^3 + 34*(125
*d^6 - 150*d^5*e + 285*d^4*e^2 - 188*d^3*e^3 + 171*d^2*e^4 - 54*d
*e^5 + 27*e^6)*x^2 + 12*(125*d^6 - 150*d^5*e + 285*d^4*e^2 - 188*
d^3*e^3 + 171*d^2*e^4 - 54*d*e^5 + 27*e^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((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)/(5*x**2+2*x+3)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.283033, size = 621, normalized size = 1.89

$$\frac{\sqrt{14}\left(42375\,d^5-16643\,d^4e+58530\,d^3e^2-56058\,d^2e^3+31811\,de^4-8623\,e^5\right)\arctan\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right)}{21952\,(125\,d^6-150\,d^5e+285\,d^4e^2-188\,d^3e^3+171\,d^2e^4-54\,de^5+27\,e^6)} - \frac{\left(4\,d^4e+5\,d^3e^2+3\,d^2e^3-de^4+2\,e^5\right)\ln\left(5\,x^2+2\,x+3\right)}{2\,(125\,d^6-150\,d^5e+285\,d^4e^2-188\,d^3e^3+171\,d^2e^4-54\,de^5+27\,e^6)} + \frac{\left(4\,d^4e^2+5\,d^3e^3+3\,d^2e^4-de^5+2\,e^6\right)\ln\left(|xe+d|\right)}{125\,d^6e-150\,d^5e^2+285\,d^4e^3-188\,d^3e^4+171\,d^2e^5-54\,de^6+27\,e^7} + \frac{323825\,d^5-290925\,d^4e+25\left(11015\,d^5-49571\,d^4e+42850\,d^3e^2-43514\,d^2e^3+14563\,de^4-5487\,e^5\right)x^3+236238\,d^3e^2+(\cdots}{\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)*(5*x^2 + 2*x + 3)^3),x, algori
```

```
[Out] 1/21952*sqrt(14)*(42375*d^5 - 16643*d^4*e + 58530*d^3*e^2 - 56058
*d^2*e^3 + 31811*d*e^4 - 8623*e^5)*arctan(1/14*sqrt(14)*(5*x + 1)
)/(125*d^6 - 150*d^5*e + 285*d^4*e^2 - 188*d^3*e^3 + 171*d^2*e^4
- 54*d*e^5 + 27*e^6) - 1/2*(4*d^4*e + 5*d^3*e^2 + 3*d^2*e^3 - d*e
^4 + 2*e^5)*ln(5*x^2 + 2*x + 3)/(125*d^6 - 150*d^5*e + 285*d^4*e^
2 - 188*d^3*e^3 + 171*d^2*e^4 - 54*d*e^5 + 27*e^6) + (4*d^4*e^2 +
 5*d^3*e^3 + 3*d^2*e^4 - d*e^5 + 2*e^6)*ln(abs(x*e + d))/(125*d^6
*e - 150*d^5*e^2 + 285*d^4*e^3 - 188*d^3*e^4 + 171*d^2*e^5 - 54*d
*e^6 + 27*e^7) + 1/7840*(323825*d^5 - 290925*d^4*e + 25*(11015*d^
5 - 49571*d^4*e + 42850*d^3*e^2 - 43514*d^2*e^3 + 14563*d*e^4 - 5
487*e^5)*x^3 + 236238*d^3*e^2 + (968825*d^5 - 1304125*d^4*e + 131
0718*d^3*e^2 - 777366*d^2*e^3 + 250589*d*e^4 - 49377*e^5)*x^2 - 5
7686*d^2*e^3 + (449475*d^5 - 828175*d^4*e + 761994*d^3*e^2 - 5008
98*d^2*e^3 + 147247*d*e^4 - 11211*e^5)*x - 25611*d*e^4 + 18063*e^
5)/((5*d^2 - 2*d*e + 3*e^2)^3*(5*x^2 + 2*x + 3)^2)
```

3.323 $\int \frac{2+x+3x^2-5x^3+4x^4}{(d+ex)^2(3+2x+5x^2)^3}\,dx$

Optimal. Leaf size=443

$$-\frac{x\left(423d^2-2734de+293e^2\right)+1367d^2-586de-703e^2}{280\left(5x^2+2x+3\right)^2\left(5d^2-2de+3e^2\right)^2}$$
$$+\frac{171735d^4-117284d^3e-200502d^2e^2+5x\left(11015d^4-85924d^3e+34698d^2e^2+10348de^3-3589e^4\right)+104428de^3-23189}{7840\left(5x^2+2x+3\right)\left(5d^2-2de+3e^2\right)^3}$$
$$-\frac{e\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)}{\left(5d^2-2de+3e^2\right)^3(d+ex)}$$
$$-\frac{e\left(40d^5+83d^4e+12d^3e^2-76d^2e^3+46de^4-9e^5\right)\log\left(5x^2+2x+3\right)}{2\left(5d^2-2de+3e^2\right)^4}$$
$$+\frac{e\left(40d^5+83d^4e+12d^3e^2-76d^2e^3+46de^4-9e^5\right)\log(d+ex)}{\left(5d^2-2de+3e^2\right)^4}$$
$$+\frac{\left(211875d^6+3070d^5e+209039d^4e^2-921444d^3e^3+380621d^2e^4-49586de^5-43695e^6\right)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{1568\sqrt{14}\left(5d^2-2de+3e^2\right)^4}$$

```
[Out] -((e*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4))/((5*d^2 - 2*d
*e + 3*e^2)^3*(d + e*x))) - (1367*d^2 - 586*d*e - 703*e^2 + (423*
d^2 - 2734*d*e + 293*e^2)*x)/(280*(5*d^2 - 2*d*e + 3*e^2)^2*(3 +
2*x + 5*x^2)^2) + (171735*d^4 - 117284*d^3*e - 200502*d^2*e^2 + 1
04428*d*e^3 - 23189*e^4 + 5*(11015*d^4 - 85924*d^3*e + 34698*d^2*
e^2 + 10348*d*e^3 - 3589*e^4)*x)/(7840*(5*d^2 - 2*d*e + 3*e^2)^3*
(3 + 2*x + 5*x^2)) + ((211875*d^6 + 3070*d^5*e + 209039*d^4*e^2 -
 921444*d^3*e^3 + 380621*d^2*e^4 - 49586*d*e^5 - 43695*e^6)*ArcTa
n[(1 + 5*x)/Sqrt[14]])/(1568*Sqrt[14]*(5*d^2 - 2*d*e + 3*e^2)^4)
+ (e*(40*d^5 + 83*d^4*e + 12*d^3*e^2 - 76*d^2*e^3 + 46*d*e^4 - 9*
e^5)*Log[d + e*x])/(5*d^2 - 2*d*e + 3*e^2)^4 - (e*(40*d^5 + 83*d^
4*e + 12*d^3*e^2 - 76*d^2*e^3 + 46*d*e^4 - 9*e^5)*Log[3 + 2*x + 5
*x^2])/(2*(5*d^2 - 2*d*e + 3*e^2)^4)
```

Rubi [A] time = 2.29288, antiderivative size = 443, normalized size of antiderivative = 1., number of

steps used = 8, number of rules used = 6, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.158

$$-\frac{x\left(423d^2-2734de+293e^2\right)+1367d^2-586de-703e^2}{280\left(5x^2+2x+3\right)^2\left(5d^2-2de+3e^2\right)^2}+\frac{171735d^4-117284d^3e-200502d^2e^2+5x\left(11015d^4-85924d^3e+34698d^2e^2+10348de^3-3589e^4\right)+104428de^3-23189}{7840\left(5x^2+2x+3\right)\left(5d^2-2de+3e^2\right)^3}-\frac{e\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)}{\left(5d^2-2de+3e^2\right)^3(d+ex)}-\frac{e\left(40d^5+83d^4e+12d^3e^2-76d^2e^3+46de^4-9e^5\right)\log\left(5x^2+2x+3\right)}{2\left(5d^2-2de+3e^2\right)^4}+\frac{e\left(40d^5+83d^4e+12d^3e^2-76d^2e^3+46de^4-9e^5\right)\log(d+ex)}{\left(5d^2-2de+3e^2\right)^4}+\frac{\left(211875d^6+3070d^5e+209039d^4e^2-921444d^3e^3+380621d^2e^4-49586de^5-43695e^6\right)\tan^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{1568\sqrt{14}\left(5d^2-2de+3e^2\right)^4}$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)^2*(3 + 2*x + 5*x^2)^3),x]
```

```
[Out] -((e*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2*e^4))/((5*d^2 - 2*d
*e + 3*e^2)^3*(d + e*x))) - (1367*d^2 - 586*d*e - 703*e^2 + (423*
d^2 - 2734*d*e + 293*e^2)*x)/(280*(5*d^2 - 2*d*e + 3*e^2)^2*(3 +
2*x + 5*x^2)^2) + (171735*d^4 - 117284*d^3*e - 200502*d^2*e^2 + 1
04428*d*e^3 - 23189*e^4 + 5*(11015*d^4 - 85924*d^3*e + 34698*d^2*
e^2 + 10348*d*e^3 - 3589*e^4)*x)/(7840*(5*d^2 - 2*d*e + 3*e^2)^3*
(3 + 2*x + 5*x^2)) + ((211875*d^6 + 3070*d^5*e + 209039*d^4*e^2 -
 921444*d^3*e^3 + 380621*d^2*e^4 - 49586*d*e^5 - 43695*e^6)*ArcTa
n[(1 + 5*x)/Sqrt[14]])/(1568*Sqrt[14]*(5*d^2 - 2*d*e + 3*e^2)^4)
+ (e*(40*d^5 + 83*d^4*e + 12*d^3*e^2 - 76*d^2*e^3 + 46*d*e^4 - 9*
e^5)*Log[d + e*x])/(5*d^2 - 2*d*e + 3*e^2)^4 - (e*(40*d^5 + 83*d^
4*e + 12*d^3*e^2 - 76*d^2*e^3 + 46*d*e^4 - 9*e^5)*Log[3 + 2*x + 5
*x^2])/(2*(5*d^2 - 2*d*e + 3*e^2)^4)
```

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((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**2/(5*x**2+2*x+3)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.942373, size = 389, normalized size = 0.88

$$\frac{-\frac{392(5d^2-2de+3e^2)^2(d^2(423x+1367)-2de(1367x+293)+e^2(293x-703))}{(5x^2+2x+3)^2}+\frac{14(5d^2-2de+3e^2)(5d^4(11015x+34347)-4d^3e(107405x+29321)+6d^2e^2(28915x-33417}{5x^2+2x+3}}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - 5*x^3 + 4*x^4)/((d + e*x)^2*(3 + 2*x + 5*x^2)^3),x]
```

```
[Out] ((-109760*e*(5*d^2 - 2*d*e + 3*e^2)*(4*d^4 + 5*d^3*e + 3*d^2*e^2
- d*e^3 + 2*e^4))/(d + e*x) - (392*(5*d^2 - 2*d*e + 3*e^2)^2*(e^2
*(-703 + 293*x) + d^2*(1367 + 423*x) - 2*d*e*(293 + 1367*x)))/(3
+ 2*x + 5*x^2)^2 + (14*(5*d^2 - 2*d*e + 3*e^2)*(5*d^4*(34347 + 11
015*x) + 4*d*e^3*(26107 + 12935*x) - e^4*(23189 + 17945*x) + 6*d^
2*e^2*(-33417 + 28915*x) - 4*d^3*e*(29321 + 107405*x)))/(3 + 2*x
+ 5*x^2) + 5*Sqrt[14]*(211875*d^6 + 3070*d^5*e + 209039*d^4*e^2 -
 921444*d^3*e^3 + 380621*d^2*e^4 - 49586*d*e^5 - 43695*e^6)*ArcTa
n[(1 + 5*x)/Sqrt[14]] + 109760*e*(40*d^5 + 83*d^4*e + 12*d^3*e^2
- 76*d^2*e^3 + 46*d*e^4 - 9*e^5)*Log[d + e*x] - 54880*e*(40*d^5 +
 83*d^4*e + 12*d^3*e^2 - 76*d^2*e^3 + 46*d*e^4 - 9*e^5)*Log[3 + 2
*x + 5*x^2])/(109760*(5*d^2 - 2*d*e + 3*e^2)^4)
```

Maple [B] time = 0.036, size = 1850, normalized size = 4.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((4*x^4-5*x^3+3*x^2+x+2)/(e*x+d)^2/(5*x^2+2*x+3)^3,x)
```

```
[Out] -6309/1568/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*e^6+323825/1568/
(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*d^6+9/2/(5*d^2-2*d*e+3*e^2)
^4*ln(5*x^2+2*x+3)*e^6-9*e^6/(5*d^2-2*d*e+3*e^2)^4*ln(e*x+d)-2*e^
5/(5*d^2-2*d*e+3*e^2)^3/(e*x+d)+83*e^2/(5*d^2-2*d*e+3*e^2)^4*ln(e
*x+d)*d^4-53835/1568/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x^3*e^
6+12*e^3/(5*d^2-2*d*e+3*e^2)^4*ln(e*x+d)*d^3-76*e^4/(5*d^2-2*d*e+
3*e^2)^4*ln(e*x+d)*d^2+46*e^5/(5*d^2-2*d*e+3*e^2)^4*ln(e*x+d)*d-4
*e/(5*d^2-2*d*e+3*e^2)^3/(e*x+d)*d^4-5*e^2/(5*d^2-2*d*e+3*e^2)^3/
(e*x+d)*d^3-3*e^3/(5*d^2-2*d*e+3*e^2)^3/(e*x+d)*d^2+e^4/(5*d^2-2*
d*e+3*e^2)^3/(e*x+d)*d+40*e/(5*d^2-2*d*e+3*e^2)^4*ln(e*x+d)*d^5-9
1101/1568/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x^2*e^6-74895/156
8/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x*e^6-161395/784/(5*d^2-2
*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*d^5*e-379131/1568/(5*d^2-2*d*e+3*e^
2)^4/(5*x^2+2*x+3)^2*d^4*e^2+116869/392/(5*d^2-2*d*e+3*e^2)^4/(5*
```

```
x^2+2*x+3)^2*d^3*e^3-530209/1568/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x
+3)^2*d^2*e^4+99045/784/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*d*e
^5-20/(5*d^2-2*d*e+3*e^2)^4*ln(5*x^2+2*x+3)*d^5*e-83/2/(5*d^2-2*d
*e+3*e^2)^4*ln(5*x^2+2*x+3)*d^4*e^2-6/(5*d^2-2*d*e+3*e^2)^4*ln(5*
x^2+2*x+3)*d^3*e^3+38/(5*d^2-2*d*e+3*e^2)^4*ln(5*x^2+2*x+3)*d^2*e
^4-23/(5*d^2-2*d*e+3*e^2)^4*ln(5*x^2+2*x+3)*d*e^5+211875/21952/(5
*d^2-2*d*e+3*e^2)^4*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d^6-4
3695/21952/(5*d^2-2*d*e+3*e^2)^4*14^(1/2)*arctan(1/28*(10*x+2)*14
^(1/2))*e^6+968825/1568/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x^2
*d^6+275375/1568/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x^3*d^6+44
9475/1568/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*d^6*x+208007/784/
(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x*d*e^5-434995/1568/(5*d^2-
2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x*d^2*e^4-344285/392/(5*d^2-2*d*e+
3*e^2)^4/(5*x^2+2*x+3)^2*x^3*d^3*e^3+1535/10976/(5*d^2-2*d*e+3*e^
2)^4*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d^5*e+209039/21952/(
5*d^2-2*d*e+3*e^2)^4*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d^4*
e^2-230361/5488/(5*d^2-2*d*e+3*e^2)^4*14^(1/2)*arctan(1/28*(10*x+
2)*14^(1/2))*d^3*e^3-795401/1568/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x
+3)^2*x^2*d^2*e^4+218053/784/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^
2*x^2*d*e^5+504029/1568/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x^2
*d^4*e^2+95555/784/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x^3*d*e^
5+327265/1568/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x^3*d^2*e^4-6
48385/784/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x*d^5*e-916595/78
4/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x^2*d^5*e+606287/1568/(5*
d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x*d^4*e^2+380621/21952/(5*d^2-
2*d*e+3*e^2)^4*14^(1/2)*arctan(1/28*(10*x+2)*14^(1/2))*d^2*e^4-24
793/10976/(5*d^2-2*d*e+3*e^2)^4*14^(1/2)*arctan(1/28*(10*x+2)*14^
(1/2))*d*e^5-1129125/784/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x^
3*d^5*e-3993/392/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x*d^3*e^3+
1891915/1568/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x^3*d^4*e^2+51
09/392/(5*d^2-2*d*e+3*e^2)^4/(5*x^2+2*x+3)^2*x^2*d^3*e^3
```

Maxima [A] time = 0.793423, size = 1237, normalized size = 2.79

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^2*(5*x^2 + 2*x + 3)^3),x, algo
```

```
[Out] 1/21952*sqrt(14)*(211875*d^6 + 3070*d^5*e + 209039*d^4*e^2 - 9214
44*d^3*e^3 + 380621*d^2*e^4 - 49586*d*e^5 - 43695*e^6)*arctan(1/1
4*sqrt(14)*(5*x + 1))/(625*d^8 - 1000*d^7*e + 2100*d^6*e^2 - 1960
*d^5*e^3 + 2086*d^4*e^4 - 1176*d^3*e^5 + 756*d^2*e^6 - 216*d*e^7
+ 81*e^8) + (40*d^5*e + 83*d^4*e^2 + 12*d^3*e^3 - 76*d^2*e^4 + 46
*d*e^5 - 9*e^6)*log(e*x + d)/(625*d^8 - 1000*d^7*e + 2100*d^6*e^2
 - 1960*d^5*e^3 + 2086*d^4*e^4 - 1176*d^3*e^5 + 756*d^2*e^6 - 216
*d*e^7 + 81*e^8) - 1/2*(40*d^5*e + 83*d^4*e^2 + 12*d^3*e^3 - 76*d
^2*e^4 + 46*d*e^5 - 9*e^6)*log(5*x^2 + 2*x + 3)/(625*d^8 - 1000*d
^7*e + 2100*d^6*e^2 - 1960*d^5*e^3 + 2086*d^4*e^4 - 1176*d^3*e^5
```

```
+ 756*d^2*e^6 - 216*d*e^7 + 81*e^8) + 1/1568*(64765*d^5 - 95100*d
^4*e - 200706*d^3*e^2 + 22292*d^2*e^3 + 12009*d*e^4 - 28224*e^5 -
 5*(20345*d^4*e + 125124*d^3*e^2 - 11178*d^2*e^3 - 18188*d*e^4 +
19269*e^5)*x^4 + (55075*d^5 - 361295*d^4*e - 272442*d^3*e^2 - 173
446*d^2*e^3 + 138539*d*e^4 - 93087*e^5)*x^3 + (193765*d^5 - 41248
5*d^4*e - 621062*d^3*e^2 - 56850*d^2*e^3 + 144973*d*e^4 - 131589*
e^5)*x^2 + 3*(29965*d^5 - 77965*d^4*e - 51590*d^3*e^2 - 21522*d^2
*e^3 + 19493*d*e^4 - 13245*e^5)*x)/(1125*d^7 - 1350*d^6*e + 2565*
d^5*e^2 - 1692*d^4*e^3 + 1539*d^3*e^4 - 486*d^2*e^5 + 243*d*e^6 +
 25*(125*d^6*e - 150*d^5*e^2 + 285*d^4*e^3 - 188*d^3*e^4 + 171*d^
2*e^5 - 54*d*e^6 + 27*e^7)*x^5 + 5*(625*d^7 - 250*d^6*e + 825*d^5
*e^2 + 200*d^4*e^3 + 103*d^3*e^4 + 414*d^2*e^5 - 81*d*e^6 + 108*e
^7)*x^4 + 2*(1250*d^7 + 625*d^6*e + 300*d^5*e^2 + 2965*d^4*e^3 -
1486*d^3*e^4 + 2367*d^2*e^5 - 648*d*e^6 + 459*e^7)*x^3 + 2*(2125*
d^7 - 1800*d^6*e + 3945*d^5*e^2 - 1486*d^4*e^3 + 1779*d^3*e^4 + 1
08*d^2*e^5 + 135*d*e^6 + 162*e^7)*x^2 + 3*(500*d^7 - 225*d^6*e +
690*d^5*e^2 + 103*d^4*e^3 + 120*d^3*e^4 + 297*d^2*e^5 - 54*d*e^6
+ 81*e^7)*x)
```

Fricas [A] time = 0.735717, size = 2353, normalized size = 5.31

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^2*(5*x^2 + 2*x + 3)^3),x, algo
```

```
[Out] 1/21952*sqrt(14)*(1568*sqrt(14)*(360*d^6*e + 747*d^5*e^2 + 108*d^
4*e^3 - 684*d^3*e^4 + 414*d^2*e^5 - 81*d*e^6 + 25*(40*d^5*e^2 + 8
3*d^4*e^3 + 12*d^3*e^4 - 76*d^2*e^5 + 46*d*e^6 - 9*e^7)*x^5 + 5*(
200*d^6*e + 575*d^5*e^2 + 392*d^4*e^3 - 332*d^3*e^4 - 74*d^2*e^5
+ 139*d*e^6 - 36*e^7)*x^4 + 2*(400*d^6*e + 1510*d^5*e^2 + 1531*d^
4*e^3 - 556*d^3*e^4 - 832*d^2*e^5 + 692*d*e^6 - 153*e^7)*x^3 + 2*
(680*d^6*e + 1651*d^5*e^2 + 702*d^4*e^3 - 1220*d^3*e^4 + 326*d^2*
e^5 + 123*d*e^6 - 54*e^7)*x^2 + 3*(160*d^6*e + 452*d^5*e^2 + 297*
d^4*e^3 - 268*d^3*e^4 - 44*d^2*e^5 + 102*d*e^6 - 27*e^7)*x)*log(e
*x + d) - 784*sqrt(14)*(360*d^6*e + 747*d^5*e^2 + 108*d^4*e^3 - 6
84*d^3*e^4 + 414*d^2*e^5 - 81*d*e^6 + 25*(40*d^5*e^2 + 83*d^4*e^3
 + 12*d^3*e^4 - 76*d^2*e^5 + 46*d*e^6 - 9*e^7)*x^5 + 5*(200*d^6*e
 + 575*d^5*e^2 + 392*d^4*e^3 - 332*d^3*e^4 - 74*d^2*e^5 + 139*d*e
^6 - 36*e^7)*x^4 + 2*(400*d^6*e + 1510*d^5*e^2 + 1531*d^4*e^3 - 5
56*d^3*e^4 - 832*d^2*e^5 + 692*d*e^6 - 153*e^7)*x^3 + 2*(680*d^6*
e + 1651*d^5*e^2 + 702*d^4*e^3 - 1220*d^3*e^4 + 326*d^2*e^5 + 123
*d*e^6 - 54*e^7)*x^2 + 3*(160*d^6*e + 452*d^5*e^2 + 297*d^4*e^3 -
 268*d^3*e^4 - 44*d^2*e^5 + 102*d*e^6 - 27*e^7)*x)*log(5*x^2 + 2*
x + 3) + (1906875*d^7 + 27630*d^6*e + 1881351*d^5*e^2 - 8292996*d
^4*e^3 + 3425589*d^3*e^4 - 446274*d^2*e^5 - 393255*d*e^6 + 25*(21
1875*d^6*e + 3070*d^5*e^2 + 209039*d^4*e^3 - 921444*d^3*e^4 + 380
621*d^2*e^5 - 49586*d*e^6 - 43695*e^7)*x^5 + 5*(1059375*d^7 + 862
850*d^6*e + 1057475*d^5*e^2 - 3771064*d^4*e^3 - 1782671*d^3*e^4 +
```

```
 1274554*d^2*e^5 - 416819*d*e^6 - 174780*e^7)*x^4 + 2*(2118750*d^
7 + 3632575*d^6*e + 2142580*d^5*e^2 - 5660777*d^4*e^3 - 11858338*
d^3*e^4 + 5974697*d^2*e^5 - 1279912*d*e^6 - 742815*e^7)*x^3 + 2*(
3601875*d^7 + 1323440*d^6*e + 3572083*d^5*e^2 - 14410314*d^4*e^3
+ 941893*d^3*e^4 + 1440764*d^2*e^5 - 1040331*d*e^6 - 262170*e^7)*
x^2 + 3*(847500*d^7 + 647905*d^6*e + 845366*d^5*e^2 - 3058659*d^4
*e^3 - 1241848*d^3*e^4 + 943519*d^2*e^5 - 323538*d*e^6 - 131085*e
^7)*x)*arctan(1/14*sqrt(14)*(5*x + 1)) + sqrt(14)*(323825*d^7 - 6
05030*d^6*e - 619035*d^5*e^2 + 227572*d^4*e^3 - 586657*d^3*e^4 -
98262*d^2*e^5 + 92475*d*e^6 - 84672*e^7 - 5*(101725*d^6*e + 58493
0*d^5*e^2 - 245103*d^4*e^3 + 306788*d^3*e^4 + 99187*d^2*e^5 - 931
02*d*e^6 + 57807*e^7)*x^4 + (275375*d^7 - 1916625*d^6*e - 474395*
d^5*e^2 - 1406231*d^4*e^3 + 222261*d^3*e^4 - 1262851*d^2*e^5 + 60
1791*d*e^6 - 279261*e^7)*x^3 + (968825*d^7 - 2449955*d^6*e - 1699
045*d^5*e^2 - 279581*d^4*e^3 - 1024621*d^3*e^4 - 1118441*d^2*e^5
+ 698097*d*e^6 - 394767*e^7)*x^2 + 3*(149825*d^7 - 449755*d^6*e -
 12125*d^5*e^2 - 238325*d^4*e^3 - 14261*d^3*e^4 - 169777*d^2*e^5
+ 84969*d*e^6 - 39735*e^7)*x))/(5625*d^9 - 9000*d^8*e + 18900*d^7
*e^2 - 17640*d^6*e^3 + 18774*d^5*e^4 - 10584*d^4*e^5 + 6804*d^3*e
^6 - 1944*d^2*e^7 + 729*d*e^8 + 25*(625*d^8*e - 1000*d^7*e^2 + 21
00*d^6*e^3 - 1960*d^5*e^4 + 2086*d^4*e^5 - 1176*d^3*e^6 + 756*d^2
*e^7 - 216*d*e^8 + 81*e^9)*x^5 + 5*(3125*d^9 - 2500*d^8*e + 6500*
d^7*e^2 - 1400*d^6*e^3 + 2590*d^5*e^4 + 2464*d^4*e^5 - 924*d^3*e^
6 + 1944*d^2*e^7 - 459*d*e^8 + 324*e^9)*x^4 + 2*(6250*d^9 + 625*d
^8*e + 4000*d^7*e^2 + 16100*d^6*e^3 - 12460*d^5*e^4 + 23702*d^4*e
^5 - 12432*d^3*e^6 + 10692*d^2*e^7 - 2862*d*e^8 + 1377*e^9)*x^3 +
 2*(10625*d^9 - 13250*d^8*e + 29700*d^7*e^2 - 20720*d^6*e^3 + 237
02*d^5*e^4 - 7476*d^4*e^5 + 5796*d^3*e^6 + 864*d^2*e^7 + 81*d*e^8
 + 486*e^9)*x^2 + 3*(2500*d^9 - 2125*d^8*e + 5400*d^7*e^2 - 1540*
d^6*e^3 + 2464*d^5*e^4 + 1554*d^4*e^5 - 504*d^3*e^6 + 1404*d^2*e^
7 - 324*d*e^8 + 243*e^9)*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((4*x**4-5*x**3+3*x**2+x+2)/(e*x+d)**2/(5*x**2+2*x+3)**3,x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.30213, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)/((e*x + d)^2*(5*x^2 + 2*x + 3)^3),x, algo

[Out] Done
```

3.324 $\int (5+2x)\sqrt{3-x+2x^2}\left(2+x+3x^2-x^3+5x^4\right)\,dx$

Optimal. Leaf size=143

$$\frac{5}{112}\left(2x^2-x+3\right)^{3/2}(2x+5)^4-\frac{823\left(2x^2-x+3\right)^{3/2}(2x+5)^3}{1344}+\frac{11433\left(2x^2-x+3\right)^{3/2}(2x+5)^2}{4480}-\frac{(295276x+1005757)\left(2x^2-x+3\right)^{3/2}}{71680}-\frac{51435(1-4x)\sqrt{2x^2-x+3}}{32768}-\frac{1183005\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{65536\sqrt{2}}$$

```
[Out] (-51435*(1 - 4*x)*Sqrt[3 - x + 2*x^2])/32768 + (11433*(5 + 2*x)^2
*(3 - x + 2*x^2)^(3/2))/4480 - (823*(5 + 2*x)^3*(3 - x + 2*x^2)^(
3/2))/1344 + (5*(5 + 2*x)^4*(3 - x + 2*x^2)^(3/2))/112 - ((100575
7 + 295276*x)*(3 - x + 2*x^2)^(3/2))/71680 - (1183005*ArcSinh[(1
- 4*x)/Sqrt[23]])/(65536*Sqrt[2])
```

Rubi [A] time = 0.288799, antiderivative size = 143, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.132

$$\frac{5}{112}\left(2x^2-x+3\right)^{3/2}(2x+5)^4-\frac{823\left(2x^2-x+3\right)^{3/2}(2x+5)^3}{1344}+\frac{11433\left(2x^2-x+3\right)^{3/2}(2x+5)^2}{4480}-\frac{(295276x+1005757)\left(2x^2-x+3\right)^{3/2}}{71680}-\frac{51435(1-4x)\sqrt{2x^2-x+3}}{32768}-\frac{1183005\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{65536\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(5 + 2*x)*Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4),x]
```



```
[Out] (-51435*(1 - 4*x)*Sqrt[3 - x + 2*x^2])/32768 + (11433*(5 + 2*x)^2
*(3 - x + 2*x^2)^(3/2))/4480 - (823*(5 + 2*x)^3*(3 - x + 2*x^2)^(
3/2))/1344 + (5*(5 + 2*x)^4*(3 - x + 2*x^2)^(3/2))/112 - ((100575
7 + 295276*x)*(3 - x + 2*x^2)^(3/2))/71680 - (1183005*ArcSinh[(1
- 4*x)/Sqrt[23]])/(65536*Sqrt[2])
```

Rubi in Sympy [A] time = 74.674, size = 131, normalized size = 0.92

$$\frac{5x^4\left(2x^2-x+3\right)^{\frac{3}{2}}}{7}+\frac{377x^3\left(2x^2-x+3\right)^{\frac{3}{2}}}{168}+\frac{283x^2\left(2x^2-x+3\right)^{\frac{3}{2}}}{1120}+\frac{\left(-\frac{15537x}{1120}+\frac{242329}{4480}\right)\left(2x^2-x+3\right)^{\frac{3}{2}}}{48}-\frac{51435\left(-4x+1\right)\sqrt{2x^2-x+3}}{32768}+\frac{1183005\sqrt{2}\operatorname{atanh}\left(\frac{\sqrt{2}(4x-1)}{4\sqrt{2x^2-x+3}}\right)}{131072}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((5+2*x)*(5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2),x)
```

```
[Out] 5*x**4*(2*x**2 - x + 3)**(3/2)/7 + 377*x**3*(2*x**2 - x + 3)**(3/
2)/168 + 283*x**2*(2*x**2 - x + 3)**(3/2)/1120 + (-15537*x/1120 +
 242329/4480)*(2*x**2 - x + 3)**(3/2)/48 - 51435*(-4*x + 1)*sqrt(
2*x**2 - x + 3)/32768 + 1183005*sqrt(2)*atanh(sqrt(2)*(4*x - 1)/(
4*sqrt(2*x**2 - x + 3)))/131072
```

Mathematica [A] time = 0.0823524, size = 70, normalized size = 0.49

$$\frac{4\sqrt{2x^2-x+3}\left(4915200x^6+12984320x^5+1390592x^4+20304768x^3+11357024x^2+14742332x+6231117\right)+124215525\sqrt{}}{13762560}$$

Antiderivative was successfully verified.

```
[In] Integrate[(5 + 2*x)*Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4),x]
```

```
[Out] (4*Sqrt[3 - x + 2*x^2]*(6231117 + 14742332*x + 11357024*x^2 + 203
04768*x^3 + 1390592*x^4 + 12984320*x^5 + 4915200*x^6) + 124215525
*Sqrt[2]*ArcSinh[(-1 + 4*x)/Sqrt[23]])/13762560
```

Maple [A] time = 0.009, size = 115, normalized size = 0.8

$$\frac{283\,x^2}{1120}\left(2\,x^2-x+3\right)^{\frac{3}{2}}-\frac{5179\,x}{17920}\left(2\,x^2-x+3\right)^{\frac{3}{2}}+\frac{242329}{215040}\left(2\,x^2-x+3\right)^{\frac{3}{2}}+\frac{205740\,x-51435}{32768}\sqrt{2\,x^2-x+3}+\frac{1183005\,\sqrt{2}}{131072}Arcsinh\left(\frac{4\,\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)+\frac{377\,x^3}{168}\left(2\,x^2-x+3\right)^{\frac{3}{2}}+\frac{5\,x^4}{7}\left(2\,x^2-x+3\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5+2*x)*(5*x^4-x^3+3*x^2+x+2)*(2*x^2-x+3)^(1/2),x)
```

```
[Out] 283/1120*x^2*(2*x^2-x+3)^(3/2)-5179/17920*x*(2*x^2-x+3)^(3/2)+242
329/215040*(2*x^2-x+3)^(3/2)+51435/32768*(4*x-1)*(2*x^2-x+3)^(1/2
)+1183005/131072*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4))+377/168*x
^3*(2*x^2-x+3)^(3/2)+5/7*x^4*(2*x^2-x+3)^(3/2)
```

Maxima [A] time = 0.786861, size = 170, normalized size = 1.19

$$\frac{5}{7}\left(2x^2-x+3\right)^{\frac{3}{2}}x^4+\frac{377}{168}\left(2x^2-x+3\right)^{\frac{3}{2}}x^3+\frac{283}{1120}\left(2x^2-x+3\right)^{\frac{3}{2}}x^2-\frac{5179}{17920}\left(2x^2-x+3\right)^{\frac{3}{2}}x+\frac{242329}{215040}\left(2x^2-x+3\right)^{\frac{3}{2}}+\frac{51435}{8192}\sqrt{2x^2-x+3}x+\frac{1183005}{131072}\sqrt{2}\operatorname{arsinh}\left(\frac{1}{23}\sqrt{23}(4x-1)\right)-\frac{51435}{32768}\sqrt{2x^2-x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)*(2*x + 5),x, algorithm=
```

```
[Out] 5/7*(2*x^2 - x + 3)^(3/2)*x^4 + 377/168*(2*x^2 - x + 3)^(3/2)*x^3
 + 283/1120*(2*x^2 - x + 3)^(3/2)*x^2 - 5179/17920*(2*x^2 - x + 3
)^(3/2)*x + 242329/215040*(2*x^2 - x + 3)^(3/2) + 51435/8192*sqrt
(2*x^2 - x + 3)*x + 1183005/131072*sqrt(2)*arcsinh(1/23*sqrt(23)*
(4*x - 1)) - 51435/32768*sqrt(2*x^2 - x + 3)
```

Fricas [A] time = 0.274603, size = 123, normalized size = 0.86

$$\frac{1}{27525120}\sqrt{2}\Big(4\sqrt{2}\left(4915200x^6+12984320x^5+1390592x^4+20304768x^3+11357024x^2+14742332x+6231117\right)\sqrt{2x^2-$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)*(2*x + 5),x, algorithm=
```

```
[Out] 1/27525120*sqrt(2)*(4*sqrt(2)*(4915200*x^6 + 12984320*x^5 + 13905
92*x^4 + 20304768*x^3 + 11357024*x^2 + 14742332*x + 6231117)*sqrt
(2*x^2 - x + 3) + 124215525*log(-sqrt(2)*(32*x^2 - 16*x + 25) - 8
*sqrt(2*x^2 - x + 3)*(4*x - 1)))
```

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

$$\int(2x+5)\sqrt{2x^2-x+3}\left(5x^4-x^3+3x^2+x+2\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5+2*x)*(5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2),x)
```

```
[Out] Integral((2*x + 5)*sqrt(2*x**2 - x + 3)*(5*x**4 - x**3 + 3*x**2 +
 x + 2), x)
```

GIAC/XCAS [A] time = 0.27568, size = 105, normalized size = 0.73

$$\frac{1}{3440640}\left(4\left(8\left(4\left(16\left(20\left(120\,x+317\right)x+679\right)x+158631\right)x+354907\right)x+3685583\right)x+6231117\right)\sqrt{2\,x^2-x+3} - \frac{1183005}{131072}\,\sqrt{2}\ln\left(-2\,\sqrt{2}\left(\sqrt{2}x-\sqrt{2\,x^2-x+3}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)*(2*x + 5),x, algorithm=
```

```
[Out] 1/3440640*(4*(8*(4*(16*(20*(120*x + 317)*x + 679)*x + 158631)*x +
 354907)*x + 3685583)*x + 6231117)*sqrt(2*x^2 - x + 3) - 1183005/
131072*sqrt(2)*ln(-2*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3)) +
1)
```

3.325 $\int \sqrt{3-x+2x^2}\left(2+x+3x^2-x^3+5x^4\right)\,dx$

Optimal. Leaf size=124

$$\frac{7}{80}\left(2x^2-x+3\right)^{3/2}x^2-\frac{71\left(2x^2-x+3\right)^{3/2}x}{1280}+\frac{287\left(2x^2-x+3\right)^{3/2}}{5120}-\frac{4609(1-4x)\sqrt{2x^2-x+3}}{16384}+\frac{5}{12}\left(2x^2-x+3\right)^{3/2}x^3-\frac{106007\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{32768\sqrt{2}}$$

```
[Out] (-4609*(1 - 4*x)*Sqrt[3 - x + 2*x^2])/16384 + (287*(3 - x + 2*x^2
)^(3/2))/5120 - (71*x*(3 - x + 2*x^2)^(3/2))/1280 + (7*x^2*(3 - x
 + 2*x^2)^(3/2))/80 + (5*x^3*(3 - x + 2*x^2)^(3/2))/12 - (106007*
ArcSinh[(1 - 4*x)/Sqrt[23]])/(32768*Sqrt[2])
```

Rubi [A] time = 0.164796, antiderivative size = 124, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.152

$$\frac{7}{80}\left(2x^2-x+3\right)^{3/2}x^2-\frac{71\left(2x^2-x+3\right)^{3/2}x}{1280}+\frac{287\left(2x^2-x+3\right)^{3/2}}{5120}-\frac{4609(1-4x)\sqrt{2x^2-x+3}}{16384}+\frac{5}{12}\left(2x^2-x+3\right)^{3/2}x^3-\frac{106007\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{32768\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4),x]
```

```
[Out] (-4609*(1 - 4*x)*Sqrt[3 - x + 2*x^2])/16384 + (287*(3 - x + 2*x^2
)^(3/2))/5120 - (71*x*(3 - x + 2*x^2)^(3/2))/1280 + (7*x^2*(3 - x
 + 2*x^2)^(3/2))/80 + (5*x^3*(3 - x + 2*x^2)^(3/2))/12 - (106007*
ArcSinh[(1 - 4*x)/Sqrt[23]])/(32768*Sqrt[2])
```

Rubi in Sympy [A] time = 48.7326, size = 112, normalized size = 0.9

$$\frac{5x^3\left(2x^2-x+3\right)^{\frac{3}{2}}}{12}+\frac{7x^2\left(2x^2-x+3\right)^{\frac{3}{2}}}{80}-\frac{4609\left(-4x+1\right)\sqrt{2x^2-x+3}}{16384}+\frac{\left(-\frac{213x}{80}+\frac{861}{320}\right)\left(2x^2-x+3\right)^{\frac{3}{2}}}{48}+\frac{106007\sqrt{2}\,\mathrm{atanh}\left(\frac{\sqrt{2}(4x-1)}{4\sqrt{2x^2-x+3}}\right)}{65536}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2),x)
```

```
[Out] 5*x**3*(2*x**2 - x + 3)**(3/2)/12 + 7*x**2*(2*x**2 - x + 3)**(3/2
)/80 - 4609*(-4*x + 1)*sqrt(2*x**2 - x + 3)/16384 + (-213*x/80 +
861/320)*(2*x**2 - x + 3)**(3/2)/48 + 106007*sqrt(2)*atanh(sqrt(2
)*(4*x - 1)/(4*sqrt(2*x**2 - x + 3)))/65536
```

Mathematica [A] time = 0.0736492, size = 65, normalized size = 0.52

$$\frac{4\sqrt{2x^2-x+3}\left(204800x^5-59392x^4+258432x^3+105696x^2+221868x-27807\right)+1590105\sqrt{2}\sinh^{-1}\left(\frac{4x-1}{\sqrt{23}}\right)}{983040}$$

Antiderivative was successfully verified.

```
[In]  Integrate[Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4),x]
```

```
[Out] (4*Sqrt[3 - x + 2*x^2]*(-27807 + 221868*x + 105696*x^2 + 258432*x
^3 - 59392*x^4 + 204800*x^5) + 1590105*Sqrt[2]*ArcSinh[(-1 + 4*x)
/Sqrt[23]])/983040
```

Maple [A] time = 0.008, size = 98, normalized size = 0.8

$$\frac{287}{5120}\left(2x^2-x+3\right)^{\frac{3}{2}}+\frac{18436x-4609}{16384}\sqrt{2x^2-x+3}+\frac{106007\sqrt{2}}{65536}Arcsinh\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)-\frac{71x}{1280}\left(2x^2-x+3\right)^{\frac{3}{2}}+\frac{7x^2}{80}\left(2x^2-x+3\right)^{\frac{3}{2}}+\frac{5x^3}{12}\left(2x^2-x+3\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^4-x^3+3*x^2+x+2)*(2*x^2-x+3)^(1/2),x)
```

```
[Out] 287/5120*(2*x^2-x+3)^(3/2)+4609/16384*(4*x-1)*(2*x^2-x+3)^(1/2)+1
06007/65536*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4))-71/1280*x*(2*x
^2-x+3)^(3/2)+7/80*x^2*(2*x^2-x+3)^(3/2)+5/12*x^3*(2*x^2-x+3)^(3/
2)
```

Maxima [A] time = 0.798914, size = 147, normalized size = 1.19

$$\frac{5}{12}\left(2x^2-x+3\right)^{\frac{3}{2}}x^3+\frac{7}{80}\left(2x^2-x+3\right)^{\frac{3}{2}}x^2-\frac{71}{1280}\left(2x^2-x+3\right)^{\frac{3}{2}}x+\frac{287}{5120}\left(2x^2-x+3\right)^{\frac{3}{2}}+\frac{4609}{4096}\sqrt{2x^2-x+3}x+\frac{106007}{65536}\sqrt{2}\,\mathrm{arsinh}\left(\frac{1}{23}\sqrt{23}(4x-1)\right)-\frac{4609}{16384}\sqrt{2x^2-x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3),x, algorithm="maxima")
```

```
[Out] 5/12*(2*x^2 - x + 3)^(3/2)*x^3 + 7/80*(2*x^2 - x + 3)^(3/2)*x^2 -
 71/1280*(2*x^2 - x + 3)^(3/2)*x + 287/5120*(2*x^2 - x + 3)^(3/2)
 + 4609/4096*sqrt(2*x^2 - x + 3)*x + 106007/65536*sqrt(2)*arcsinh
(1/23*sqrt(23)*(4*x - 1)) - 4609/16384*sqrt(2*x^2 - x + 3)
```

Fricas [A] time = 0.277768, size = 116, normalized size = 0.94

$$\frac{1}{1966080}\sqrt{2}\Big(4\sqrt{2}\left(204800x^5-59392x^4+258432x^3+105696x^2+221868x-27807\right)\sqrt{2x^2-x+3}+1590105\log\Big(-\sqrt{2}(3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3),x, algorithm="fricas")
```

```
[Out] 1/1966080*sqrt(2)*(4*sqrt(2)*(204800*x^5 - 59392*x^4 + 258432*x^3
 + 105696*x^2 + 221868*x - 27807)*sqrt(2*x^2 - x + 3) + 1590105*l
og(-sqrt(2)*(32*x^2 - 16*x + 25) - 8*sqrt(2*x^2 - x + 3)*(4*x - 1
)))
```

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

$$\int\sqrt{2x^2-x+3}\left(5x^4-x^3+3x^2+x+2\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2),x)
```

```
[Out] Integral(sqrt(2*x**2 - x + 3)*(5*x**4 - x**3 + 3*x**2 + x + 2), x
)
```

GIAC/XCAS [A] time = 0.27492, size = 99, normalized size = 0.8

$$\frac{1}{245760}\left(4\left(8\left(4\left(16\left(100\,x-29\right)x+2019\right)x+3303\right)x+55467\right)x-27807\right)\sqrt{2\,x^2-x+3}-\frac{106007}{65536}\,\sqrt{2}\ln\left(-2\,\sqrt{2}\left(\sqrt{2}x-\sqrt{2\,x^2-x+3}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3),x, algorithm="giac")
```

```
[Out] 1/245760*(4*(8*(4*(16*(100*x - 29)*x + 2019)*x + 3303)*x + 55467)
*x - 27807)*sqrt(2*x^2 - x + 3) - 106007/65536*sqrt(2)*ln(-2*sqrt
(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3)) + 1)
```

3.326 $\int \frac{\sqrt{3-x+2x^2}\left(2+x+3x^2-x^3+5x^4\right)}{5+2x}\,dx$

Optimal. Leaf size=149

$$\frac{1}{16}\left(2x^2-x+3\right)^{3/2}(2x+5)^2-\frac{127}{128}\left(2x^2-x+3\right)^{3/2}(2x+5)+\frac{4535}{768}\left(2x^2-x+3\right)^{3/2}+\frac{(489587-80844x)\sqrt{2x^2-x+3}}{4096}-\frac{11001\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{16\sqrt{2}}+\frac{5627989\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{8192\sqrt{2}}$$

```
[Out] ((489587 - 80844*x)*Sqrt[3 - x + 2*x^2])/4096 + (4535*(3 - x + 2*
x^2)^(3/2))/768 - (127*(5 + 2*x)*(3 - x + 2*x^2)^(3/2))/128 + ((5
 + 2*x)^2*(3 - x + 2*x^2)^(3/2))/16 + (5627989*ArcSinh[(1 - 4*x)/
Sqrt[23]])/(8192*Sqrt[2]) - (11001*ArcTanh[(17 - 22*x)/(12*Sqrt[2
]*Sqrt[3 - x + 2*x^2])])/(16*Sqrt[2])
```

Rubi [A] time = 0.444533, antiderivative size = 149, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.175

$$\frac{1}{16}\left(2x^2-x+3\right)^{3/2}(2x+5)^2-\frac{127}{128}\left(2x^2-x+3\right)^{3/2}(2x+5)+\frac{4535}{768}\left(2x^2-x+3\right)^{3/2}+\frac{(489587-80844x)\sqrt{2x^2-x+3}}{4096}-\frac{11001\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{16\sqrt{2}}+\frac{5627989\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{8192\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x),x]
```

```
[Out] ((489587 - 80844*x)*Sqrt[3 - x + 2*x^2])/4096 + (4535*(3 - x + 2*
x^2)^(3/2))/768 - (127*(5 + 2*x)*(3 - x + 2*x^2)^(3/2))/128 + ((5
 + 2*x)^2*(3 - x + 2*x^2)^(3/2))/16 + (5627989*ArcSinh[(1 - 4*x)/
Sqrt[23]])/(8192*Sqrt[2]) - (11001*ArcTanh[(17 - 22*x)/(12*Sqrt[2
]*Sqrt[3 - x + 2*x^2])])/(16*Sqrt[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((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.217525, size = 104, normalized size = 0.7

$$\frac{4\left(-4224384\sqrt{2}\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\sqrt{2x^2-x+3}\left(6144x^4-21120x^3+79840x^2-300404x+1561161\right)+\cdots\right.}{49152}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x),x]
```

```
[Out] (-16883967*Sqrt[2]*ArcSinh[(-1 + 4*x)/Sqrt[23]] + 4*(Sqrt[3 - x +
 2*x^2]*(1561161 - 300404*x + 79840*x^2 - 21120*x^3 + 6144*x^4) +
 4224384*Sqrt[2]*Log[5 + 2*x] - 4224384*Sqrt[2]*Log[17 - 22*x + 1
2*Sqrt[6 - 2*x + 4*x^2]]))/49152
```

Maple [A] time = 0.013, size = 127, normalized size = 0.9

$$-\frac{80844\,x-20211}{4096}\sqrt{2\,x^2-x+3}-\frac{5627989\,\sqrt{2}}{16384}\mathit{Arcsinh}\left(\frac{4\,\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)+\frac{1925}{768}\left(2\,x^2-x+3\right)^{\frac{3}{2}}-\frac{47\,x}{64}\left(2\,x^2-x+3\right)^{\frac{3}{2}}+\frac{x^2}{4}\left(2\,x^2-x+3\right)^{\frac{3}{2}}+\frac{3667}{32}\sqrt{2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}}-\frac{11001\,\sqrt{2}}{32}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5*x^4-x^3+3*x^2+x+2)*(2*x^2-x+3)^(1/2)/(5+2*x),x)
```

```
[Out] -20211/4096*(4*x-1)*(2*x^2-x+3)^(1/2)-5627989/16384*2^(1/2)*arcsi
nh(4/23*23^(1/2)*(x-1/4))+1925/768*(2*x^2-x+3)^(3/2)-47/64*x*(2*x
^2-x+3)^(3/2)+1/4*x^2*(2*x^2-x+3)^(3/2)+3667/32*(2*(x+5/2)^2-11*x
-19/2)^(1/2)-11001/32*2^(1/2)*arctanh(1/12*(17/2-11*x)*2^(1/2)/(2
*(x+5/2)^2-11*x-19/2)^(1/2))
```

Maxima [A] time = 0.773915, size = 173, normalized size = 1.16

$$\frac{1}{4}\left(2x^2-x+3\right)^{\frac{3}{2}}x^2-\frac{47}{64}\left(2x^2-x+3\right)^{\frac{3}{2}}x+\frac{1925}{768}\left(2x^2-x+3\right)^{\frac{3}{2}}-\frac{20211}{1024}\sqrt{2x^2-x+3}x-\frac{5627989}{16384}\sqrt{2}\,\mathrm{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{11001}{32}\sqrt{2}\,\mathrm{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2x+5|}-\frac{17\sqrt{23}}{23\,|2x+5|}\right)+\frac{489587}{4096}\sqrt{2x^2-x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5),x, algorithm=
```

```
[Out] 1/4*(2*x^2 - x + 3)^(3/2)*x^2 - 47/64*(2*x^2 - x + 3)^(3/2)*x + 1
925/768*(2*x^2 - x + 3)^(3/2) - 20211/1024*sqrt(2*x^2 - x + 3)*x
- 5627989/16384*sqrt(2)*arcsinh(4/23*sqrt(23)*x - 1/23*sqrt(23))
+ 11001/32*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5) - 17/23*
sqrt(23)/abs(2*x + 5)) + 489587/4096*sqrt(2*x^2 - x + 3)
```

Fricas [A] time = 0.28573, size = 178, normalized size = 1.19

$$\frac{1}{98304}\sqrt{2}\left(4\sqrt{2}\left(6144x^4-21120x^3+79840x^2-300404x+1561161\right)\sqrt{2x^2-x+3}+16883967\log\left(-\sqrt{2}\left(32x^2-16x+2\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5),x, algorithm=
```

```
[Out] 1/98304*sqrt(2)*(4*sqrt(2)*(6144*x^4 - 21120*x^3 + 79840*x^2 - 30
0404*x + 1561161)*sqrt(2*x^2 - x + 3) + 16883967*log(-sqrt(2)*(32
*x^2 - 16*x + 25) + 8*sqrt(2*x^2 - x + 3)*(4*x - 1)) + 16897536*l
og(-(sqrt(2)*(1060*x^2 - 1036*x + 1153) + 48*sqrt(2*x^2 - x + 3)*
(22*x - 17))/(4*x^2 + 20*x + 25)))
```

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

$$\int\frac{\sqrt{2x^2-x+3}\left(5x^4-x^3+3x^2+x+2\right)}{2x+5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x),x)
```

```
[Out] Integral(sqrt(2*x**2 - x + 3)*(5*x**4 - x**3 + 3*x**2 + x + 2)/(2
*x + 5), x)
```

GIAC/XCAS [A] time = 0.289398, size = 174, normalized size = 1.17

$$\frac{1}{12288}\left(4\left(8\left(12\left(16x-55\right)x+2495\right)x-75101\right)x+1561161\right)\sqrt{2x^2-x+3} + \frac{5627989}{16384}\sqrt{2}\ln\left(-4\sqrt{2}x+\sqrt{2}+4\sqrt{2x^2-x+3}\right) - \frac{11001}{32}\sqrt{2}\ln\left(\left|-2\sqrt{2}x+\sqrt{2}+2\sqrt{2x^2-x+3}\right|\right) + \frac{11001}{32}\sqrt{2}\ln\left(\left|-2\sqrt{2}x-11\sqrt{2}+2\sqrt{2x^2-x+3}\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5),x, algorithm=
```

```
[Out] 1/12288*(4*(8*(12*(16*x - 55)*x + 2495)*x - 75101)*x + 1561161)*s
qrt(2*x^2 - x + 3) + 5627989/16384*sqrt(2)*ln(-4*sqrt(2)*x + sqrt
(2) + 4*sqrt(2*x^2 - x + 3)) - 11001/32*sqrt(2)*ln(abs(-2*sqrt(2)
*x + sqrt(2) + 2*sqrt(2*x^2 - x + 3))) + 11001/32*sqrt(2)*ln(abs(
-2*sqrt(2)*x - 11*sqrt(2) + 2*sqrt(2*x^2 - x + 3)))
```

3.327 $\int \frac{\sqrt{3-x+2x^2}\left(2+x+3x^2-x^3+5x^4\right)}{(5+2x)^2}\,dx$

Optimal. Leaf size=149

$$\frac{5}{64}(2x+5)\left(2x^2-x+3\right)^{3/2}-\frac{3667\left(2x^2-x+3\right)^{3/2}}{576(2x+5)}-\frac{541}{384}\left(2x^2-x+3\right)^{3/2}-\frac{(1996953-333380x)\sqrt{2x^2-x+3}}{18432}+\frac{239201\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{384\sqrt{2}}-\frac{2551847\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{4096\sqrt{2}}$$

```
[Out] -((1996953 - 333380*x)*Sqrt[3 - x + 2*x^2])/18432 - (541*(3 - x +
 2*x^2)^(3/2))/384 - (3667*(3 - x + 2*x^2)^(3/2))/(576*(5 + 2*x))
 + (5*(5 + 2*x)*(3 - x + 2*x^2)^(3/2))/64 - (2551847*ArcSinh[(1 -
 4*x)/Sqrt[23]])/(4096*Sqrt[2]) + (239201*ArcTanh[(17 - 22*x)/(12
*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(384*Sqrt[2])
```

Rubi [A] time = 0.445528, antiderivative size = 149, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{5}{64}(2x+5)\left(2x^2-x+3\right)^{3/2}-\frac{3667\left(2x^2-x+3\right)^{3/2}}{576(2x+5)}-\frac{541}{384}\left(2x^2-x+3\right)^{3/2}-\frac{(1996953-333380x)\sqrt{2x^2-x+3}}{18432}+\frac{239201\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{384\sqrt{2}}-\frac{2551847\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{4096\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^2,x]
```


```
[Out] -((1996953 - 333380*x)*Sqrt[3 - x + 2*x^2])/18432 - (541*(3 - x +
 2*x^2)^(3/2))/384 - (3667*(3 - x + 2*x^2)^(3/2))/(576*(5 + 2*x))
 + (5*(5 + 2*x)*(3 - x + 2*x^2)^(3/2))/64 - (2551847*ArcSinh[(1 -
 4*x)/Sqrt[23]])/(4096*Sqrt[2]) + (239201*ArcTanh[(17 - 22*x)/(12
*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(384*Sqrt[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((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.340253, size = 109, normalized size = 0.73

$$\frac{7654432\sqrt{2}\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{4\sqrt{2x^2-x+3}(3840x^4-17344x^3+94936x^2-728410x-3539439)}{2x+5}-7654432\sqrt{2}\log(2x+5)+}{24576}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^2,x]
```

```
[Out] ((4*Sqrt[3 - x + 2*x^2]*(-3539439 - 728410*x + 94936*x^2 - 17344*
x^3 + 3840*x^4))/(5 + 2*x) + 7655541*Sqrt[2]*ArcSinh[(-1 + 4*x)/S
qrt[23]] - 7654432*Sqrt[2]*Log[5 + 2*x] + 7654432*Sqrt[2]*Log[17
- 22*x + 12*Sqrt[6 - 2*x + 4*x^2]])/24576
```

Maple [A] time = 0.017, size = 152, normalized size = 1.

$$\frac{24004\,x-6001}{2048}\sqrt{2\,x^2-x+3}+\frac{2551847\,\sqrt{2}}{8192}Arcsinh\left(\frac{4\,\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)-\frac{391}{384}\left(2\,x^2-x+3\right)^{\frac{3}{2}}+\frac{5\,x}{32}\left(2\,x^2-x+3\right)^{\frac{3}{2}}-\frac{3667}{1152}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-1}-\frac{239201}{2304}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}+\frac{239201\,\sqrt{2}}{768}Artanh\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}\right)+\frac{14668\,x-3667}{2304}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^4-x^3+3*x^2+x+2)*(2*x^2-x+3)^(1/2)/(5+2*x)^2,x)
```

```
[Out] 6001/2048*(4*x-1)*(2*x^2-x+3)^(1/2)+2551847/8192*2^(1/2)*arcsinh(
4/23*23^(1/2)*(x-1/4))-391/384*(2*x^2-x+3)^(3/2)+5/32*x*(2*x^2-x+
3)^(3/2)-3667/1152/(x+5/2)*(2*(x+5/2)^2-11*x-19/2)^(3/2)-239201/2
304*(2*(x+5/2)^2-11*x-19/2)^(1/2)+239201/768*2^(1/2)*arctanh(1/12
```

```
*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))+3667/2304*(4*
x-1)*(2*(x+5/2)^2-11*x-19/2)^(1/2)
```

Maxima [A] time = 0.772933, size = 178, normalized size = 1.19

$$\frac{5}{32}\left(2x^2-x+3\right)^{\frac{3}{2}}x-\frac{391}{384}\left(2x^2-x+3\right)^{\frac{3}{2}}+\frac{6001}{512}\sqrt{2x^2-x+3}x+\frac{2551847}{8192}\sqrt{2}\,\mathrm{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)-\frac{239201}{768}\sqrt{2}\,\mathrm{arsinh}\left(\frac{22\sqrt{23}x}{23|2x+5|}-\frac{17\sqrt{23}}{23|2x+5|}\right)-\frac{182769}{2048}\sqrt{2x^2-x+3}-\frac{3667\sqrt{2x^2-x+3}}{32(2x+5)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^2,x, algorith
```

```
[Out] 5/32*(2*x^2 - x + 3)^(3/2)*x - 391/384*(2*x^2 - x + 3)^(3/2) + 60
01/512*sqrt(2*x^2 - x + 3)*x + 2551847/8192*sqrt(2)*arcsinh(4/23*
sqrt(23)*x - 1/23*sqrt(23)) - 239201/768*sqrt(2)*arcsinh(22/23*sq
rt(23)*x/abs(2*x + 5) - 17/23*sqrt(23)/abs(2*x + 5)) - 182769/204
8*sqrt(2*x^2 - x + 3) - 3667/32*sqrt(2*x^2 - x + 3)/(2*x + 5)
```

Fricas [A] time = 0.289762, size = 201, normalized size = 1.35

$$\frac{\sqrt{2}\left(4\sqrt{2}\left(3840x^4-17344x^3+94936x^2-728410x-3539439\right)\sqrt{2x^2-x+3}+7655541(2x+5)\log\left(-\sqrt{2}\left(32x^2-16x+\right.\right.\right.}{49152(2x+5)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^2,x, algorith
```

```
[Out] 1/49152*sqrt(2)*(4*sqrt(2)*(3840*x^4 - 17344*x^3 + 94936*x^2 - 72
8410*x - 3539439)*sqrt(2*x^2 - x + 3) + 7655541*(2*x + 5)*log(-sq
rt(2)*(32*x^2 - 16*x + 25) - 8*sqrt(2*x^2 - x + 3)*(4*x - 1)) + 7
654432*(2*x + 5)*log(-(sqrt(2)*(1060*x^2 - 1036*x + 1153) - 48*sq
rt(2*x^2 - x + 3)*(22*x - 17))/(4*x^2 + 20*x + 25)))/(2*x + 5)
```

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

$$\int \frac{\sqrt{2x^2-x+3}\left(5x^4-x^3+3x^2+x+2\right)}{(2x+5)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x)**2,x)
```

```
[Out] Integral(sqrt(2*x**2 - x + 3)*(5*x**4 - x**3 + 3*x**2 + x + 2)/(2
*x + 5)**2, x)
```

GIAC/XCAS [A] time = 0.331088, size = 717, normalized size = 4.81

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^2,x, algorith
```

```
[Out] 1/24576*sqrt(2)*(7654432*ln(12*sqrt(-11/(2*x + 5) + 36/(2*x + 5)^
2 + 1) + 72/(2*x + 5) - 11)*sign(1/(2*x + 5)) + 7655541*ln(abs(sq
rt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5) + 1))*sign(1
/(2*x + 5)) - 7655541*ln(abs(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2
+ 1) + 6/(2*x + 5) - 1))*sign(1/(2*x + 5)) - 1408128*sqrt(-11/(2*
x + 5) + 36/(2*x + 5)^2 + 1)*sign(1/(2*x + 5)) + 2*(16367883*(sqr
t(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5))^7*sign(1/(2*
x + 5)) - 34896384*(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/
(2*x + 5))^6*sign(1/(2*x + 5)) - 93395*(sqrt(-11/(2*x + 5) + 36/(
2*x + 5)^2 + 1) + 6/(2*x + 5))^5*sign(1/(2*x + 5)) + 25574400*(sq
rt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5))^4*sign(1/(2
*x + 5)) + 19752365*(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6
/(2*x + 5))^3*sign(1/(2*x + 5)) - 31921920*(sqrt(-11/(2*x + 5) +
36/(2*x + 5)^2 + 1) + 6/(2*x + 5))^2*sign(1/(2*x + 5)) - 2445813*
(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5))*sign(1/(
2*x + 5)) + 7663104*sign(1/(2*x + 5)))/((sqrt(-11/(2*x + 5) + 36/
(2*x + 5)^2 + 1) + 6/(2*x + 5))^2 - 1)^4)
```

3.328 $\int \frac{\sqrt{3-x+2x^2}\left(2+x+3x^2-x^3+5x^4\right)}{(5+2x)^3}\,dx$

Optimal. Leaf size=151

$$\frac{357391\left(2x^2-x+3\right)^{3/2}}{82944(2x+5)}-\frac{3667\left(2x^2-x+3\right)^{3/2}}{1152(2x+5)^2}+\frac{5}{48}\left(2x^2-x+3\right)^{3/2}+\frac{5(661065-110099x)\sqrt{2x^2-x+3}}{82944}-\frac{12670805\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{55296\sqrt{2}}+\frac{117315\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{512\sqrt{2}}$$

```
[Out] (5*(661065 - 110099*x)*Sqrt[3 - x + 2*x^2])/82944 + (5*(3 - x + 2
*x^2)^(3/2))/48 - (3667*(3 - x + 2*x^2)^(3/2))/(1152*(5 + 2*x)^2)
 + (357391*(3 - x + 2*x^2)^(3/2))/(82944*(5 + 2*x)) + (117315*Arc
Sinh[(1 - 4*x)/Sqrt[23]])/(512*Sqrt[2]) - (12670805*ArcTanh[(17 -
 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(55296*Sqrt[2])
```

Rubi [A] time = 0.444374, antiderivative size = 151, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 8, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{357391\left(2x^2-x+3\right)^{3/2}}{82944(2x+5)}-\frac{3667\left(2x^2-x+3\right)^{3/2}}{1152(2x+5)^2}+\frac{5}{48}\left(2x^2-x+3\right)^{3/2}+\frac{5(661065-110099x)\sqrt{2x^2-x+3}}{82944}-\frac{12670805\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{55296\sqrt{2}}+\frac{117315\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{512\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^3,x]
```

```
[Out] (5*(661065 - 110099*x)*Sqrt[3 - x + 2*x^2])/82944 + (5*(3 - x + 2
*x^2)^(3/2))/48 - (3667*(3 - x + 2*x^2)^(3/2))/(1152*(5 + 2*x)^2)
 + (357391*(3 - x + 2*x^2)^(3/2))/(82944*(5 + 2*x)) + (117315*Arc
Sinh[(1 - 4*x)/Sqrt[23]])/(512*Sqrt[2]) - (12670805*ArcTanh[(17 -
 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(55296*Sqrt[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((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.336816, size = 99, normalized size = 0.66

$$\frac{-12670805\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{12\sqrt{4x^2-2x+6}\left(3840x^4-25632x^3+272520x^2+2959330x+4880551\right)}{(2x+5)^2}+12670805\log(2x+5)-}{55296\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^3,x]
```

```
[Out] ((12*Sqrt[6 - 2*x + 4*x^2]*(4880551 + 2959330*x + 272520*x^2 - 25
632*x^3 + 3840*x^4))/(5 + 2*x)^2 - 12670020*ArcSinh[(-1 + 4*x)/Sq
rt[23]] + 12670805*Log[5 + 2*x] - 12670805*Log[17 - 22*x + 12*Sqr
t[6 - 2*x + 4*x^2]])/(55296*Sqrt[2])
```

Maple [A] time = 0.018, size = 158, normalized size = 1.1

$$-\frac{596\,x-149}{256}\sqrt{2\,x^2-x+3}-\frac{117315\,\sqrt{2}}{1024}\mathit{Arcsinh}\left(\frac{4\,\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)+\frac{5}{48}\left(2\,x^2-x+3\right)^{\frac{3}{2}}-\frac{3667}{4608}\left(2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-2}+\frac{357391}{165888}\left(2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-1}+\frac{12670805}{331776}\sqrt{2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}}-\frac{12670805\,\sqrt{2}}{110592}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}}}\right)-\frac{1429564\,x-357391}{331776}\sqrt{2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5*x^4-x^3+3*x^2+x+2)*(2*x^2-x+3)^(1/2)/(5+2*x)^3,x)
```

```
[Out] -149/256*(4*x-1)*(2*x^2-x+3)^(1/2)-117315/1024*2^(1/2)*arcsinh(4/
23*23^(1/2)*(x-1/4))+5/48*(2*x^2-x+3)^(3/2)-3667/4608/(x+5/2)^2*(
2*(x+5/2)^2-11*x-19/2)^(3/2)+357391/165888/(x+5/2)*(2*(x+5/2)^2-1
```

```
1*x-19/2)^(3/2)+12670805/331776*(2*(x+5/2)^2-11*x-19/2)^(1/2)-126
70805/110592*2^(1/2)*arctanh(1/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^
2-11*x-19/2)^(1/2))-357391/331776*(4*x-1)*(2*(x+5/2)^2-11*x-19/2)
^(1/2)
```

Maxima [A] time = 0.777359, size = 193, normalized size = 1.28

$$\frac{5}{48}\left(2x^2-x+3\right)^{\frac{3}{2}}-\frac{149}{64}\sqrt{2x^2-x+3}x-\frac{117315}{1024}\sqrt{2}\,\text{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{12670805}{110592}\sqrt{2}\,\text{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2x+5|}-\frac{17\sqrt{23}}{23\,|2x+5|}\right)+\frac{3877}{144}\sqrt{2x^2-x+3}-\frac{3667\left(2x^2-x+3\right)^{\frac{3}{2}}}{1152\left(4x^2+20x+25\right)}+\frac{357391\sqrt{2x^2-x+3}}{4608\left(2x+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^3,x, algorith
```

```
[Out] 5/48*(2*x^2 - x + 3)^(3/2) - 149/64*sqrt(2*x^2 - x + 3)*x - 11731
5/1024*sqrt(2)*arcsinh(4/23*sqrt(23)*x - 1/23*sqrt(23)) + 1267080
5/110592*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5) - 17/23*sq
rt(23)/abs(2*x + 5)) + 3877/144*sqrt(2*x^2 - x + 3) - 3667/1152*(
2*x^2 - x + 3)^(3/2)/(4*x^2 + 20*x + 25) + 357391/4608*sqrt(2*x^2
 - x + 3)/(2*x + 5)
```

Fricas [A] time = 0.289861, size = 221, normalized size = 1.46

$$\frac{\sqrt{2}\left(24\sqrt{2}\left(3840x^4-25632x^3+272520x^2+2959330x+4880551\right)\sqrt{2x^2-x+3}+12670020\left(4x^2+20x+25\right)\log\left(-\sqrt{2}(3\right.\right.}{221184\,(4x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^3,x, algorith
```

```
[Out] 1/221184*sqrt(2)*(24*sqrt(2)*(3840*x^4 - 25632*x^3 + 272520*x^2 +
 2959330*x + 4880551)*sqrt(2*x^2 - x + 3) + 12670020*(4*x^2 + 20*
x + 25)*log(-sqrt(2)*(32*x^2 - 16*x + 25) + 8*sqrt(2*x^2 - x + 3)
*(4*x - 1)) + 12670805*(4*x^2 + 20*x + 25)*log(-(sqrt(2)*(1060*x^
2 - 1036*x + 1153) + 48*sqrt(2*x^2 - x + 3)*(22*x - 17))/(4*x^2 +
 20*x + 25)))/(4*x^2 + 20*x + 25)
```

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

$$\int \frac{\sqrt{2x^2 - x + 3}\,(5x^4 - x^3 + 3x^2 + x + 2)}{(2x + 5)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x)**3,x)
```

```
[Out] Integral(sqrt(2*x**2 - x + 3)*(5*x**4 - x**3 + 3*x**2 + x + 2)/(2
*x + 5)**3, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$undef$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^3,x, algorith
```

```
[Out] undef
```

3.329 $\int \frac{\sqrt{3-x+2x^2}\,(2+x+3x^2-x^3+5x^4)}{(5+2x)^4}\,dx$

Optimal. Leaf size=158

$$-\frac{6467659\,(2x^2-x+3)^{3/2}}{5971968(2x+5)}+\frac{158527\,(2x^2-x+3)^{3/2}}{82944(2x+5)^2}-\frac{3667\,(2x^2-x+3)^{3/2}}{1728(2x+5)^3}-\frac{(44378877-7400779x)\sqrt{2x^2-x+3}}{5971968}+\frac{170114729\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{3981312\sqrt{2}}-\frac{10939\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{256\sqrt{2}}$$

```
[Out] -((44378877 - 7400779*x)*Sqrt[3 - x + 2*x^2])/5971968 - (3667*(3
- x + 2*x^2)^(3/2))/(1728*(5 + 2*x)^3) + (158527*(3 - x + 2*x^2)^
(3/2))/(82944*(5 + 2*x)^2) - (6467659*(3 - x + 2*x^2)^(3/2))/(597
1968*(5 + 2*x)) - (10939*ArcSinh[(1 - 4*x)/Sqrt[23]])/(256*Sqrt[2
]) + (170114729*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^
2])])/(3981312*Sqrt[2])
```

Rubi [A] time = 0.437675, antiderivative size = 158, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.175

$$-\frac{6467659\,(2x^2-x+3)^{3/2}}{5971968(2x+5)}+\frac{158527\,(2x^2-x+3)^{3/2}}{82944(2x+5)^2}-\frac{3667\,(2x^2-x+3)^{3/2}}{1728(2x+5)^3}-\frac{(44378877-7400779x)\sqrt{2x^2-x+3}}{5971968}+\frac{170114729\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{3981312\sqrt{2}}-\frac{10939\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{256\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^4,x]
```


```
[Out] -((44378877 - 7400779*x)*Sqrt[3 - x + 2*x^2])/5971968 - (3667*(3
- x + 2*x^2)^(3/2))/(1728*(5 + 2*x)^3) + (158527*(3 - x + 2*x^2)^
(3/2))/(82944*(5 + 2*x)^2) - (6467659*(3 - x + 2*x^2)^(3/2))/(597
1968*(5 + 2*x)) - (10939*ArcSinh[(1 - 4*x)/Sqrt[23]])/(256*Sqrt[2
]) + (170114729*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^
2])])/(3981312*Sqrt[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((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x)**4,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.273656, size = 99, normalized size = 0.63

$$\frac{170114729 \log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{12\sqrt{4x^2-2x+6}\left(414720x^4-5453568x^3-97682900x^2-329667508x-327735797\right)}{(2x+5)^3}-170114729 \text{lo}}{3981312\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^4,x]
```

```
[Out] ((12*Sqrt[6 - 2*x + 4*x^2]*(-327735797 - 329667508*x - 97682900*x
^2 - 5453568*x^3 + 414720*x^4))/(5 + 2*x)^3 + 170123328*ArcSinh[(
-1 + 4*x)/Sqrt[23]] - 170114729*Log[5 + 2*x] + 170114729*Log[17 -
 22*x + 12*Sqrt[6 - 2*x + 4*x^2]])/(3981312*Sqrt[2])
```

Maple [A] time = 0.019, size = 165, normalized size = 1.

$$\begin{aligned}
&\frac{20\,x-5}{128}\sqrt{2\,x^2-x+3}+\frac{10939\,\sqrt{2}}{512}\mathit{Arcsinh}\left(\frac{4\,\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)\\
&-\frac{3667}{13824}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-3}\\
&+\frac{158527}{331776}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-2}\\
&-\frac{6467659}{11943936}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-1}-\frac{170114729}{23887872}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}\\
&+\frac{170114729\,\sqrt{2}}{7962624}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}\right)\\
&+\frac{25870636\,x-6467659}{23887872}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}
\end{aligned}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5*x^4-x^3+3*x^2+x+2)*(2*x^2-x+3)^(1/2)/(5+2*x)^4,x)
```

```
[Out] 5/128*(4*x-1)*(2*x^2-x+3)^(1/2)+10939/512*2^(1/2)*arcsinh(4/23*23
^(1/2)*(x-1/4))-3667/13824/(x+5/2)^3*(2*(x+5/2)^2-11*x-19/2)^(3/2
)+158527/331776/(x+5/2)^2*(2*(x+5/2)^2-11*x-19/2)^(3/2)-6467659/1
1943936/(x+5/2)*(2*(x+5/2)^2-11*x-19/2)^(3/2)-170114729/23887872*
(2*(x+5/2)^2-11*x-19/2)^(1/2)+170114729/7962624*2^(1/2)*arctanh(1
/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))+6467659/23
887872*(4*x-1)*(2*(x+5/2)^2-11*x-19/2)^(1/2)
```

Maxima [A] time = 0.780409, size = 216, normalized size = 1.37

$$\frac{5}{32}\sqrt{2x^2-x+3}x+\frac{10939}{512}\sqrt{2}\,\text{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)-\frac{170114729}{7962624}\sqrt{2}\,\text{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2x+5|}-\frac{17\sqrt{23}}{23\,|2x+5|}\right)-\frac{693775}{165888}\sqrt{2x^2-x+3}-\frac{3667\left(2x^2-x+3\right)^{\frac{3}{2}}}{1728\left(8x^3+60x^2+150x+125\right)}+\frac{158527\left(2x^2-x+3\right)^{\frac{3}{2}}}{82944\left(4x^2+20x+25\right)}-\frac{6467659\sqrt{2x^2-x+3}}{331776\left(2x+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^4,x, algorith
```

```
[Out] 5/32*sqrt(2*x^2 - x + 3)*x + 10939/512*sqrt(2)*arcsinh(4/23*sqrt(
23)*x - 1/23*sqrt(23)) - 170114729/7962624*sqrt(2)*arcsinh(22/23*
sqrt(23)*x/abs(2*x + 5) - 17/23*sqrt(23)/abs(2*x + 5)) - 693775/1
65888*sqrt(2*x^2 - x + 3) - 3667/1728*(2*x^2 - x + 3)^(3/2)/(8*x^
3 + 60*x^2 + 150*x + 125) + 158527/82944*(2*x^2 - x + 3)^(3/2)/(4
*x^2 + 20*x + 25) - 6467659/331776*sqrt(2*x^2 - x + 3)/(2*x + 5)
```

Fricas [A] time = 0.289897, size = 242, normalized size = 1.53

$$\sqrt{2}\Big(24\sqrt{2}\left(414720x^4-5453568x^3-97682900x^2-329667508x-327735797\right)\sqrt{2x^2-x+3}+170123328\left(8x^3+60x^2+\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^4,x, algorith
```

```
[Out] 1/15925248*sqrt(2)*(24*sqrt(2)*(414720*x^4 - 5453568*x^3 - 976829
00*x^2 - 329667508*x - 327735797)*sqrt(2*x^2 - x + 3) + 170123328
*(8*x^3 + 60*x^2 + 150*x + 125)*log(-sqrt(2)*(32*x^2 - 16*x + 25)
 - 8*sqrt(2*x^2 - x + 3)*(4*x - 1)) + 170114729*(8*x^3 + 60*x^2 +
 150*x + 125)*log(-(sqrt(2)*(1060*x^2 - 1036*x + 1153) - 48*sqrt(
```

```
2*x^2 - x + 3)*(22*x - 17))/(4*x^2 + 20*x + 25)))/(8*x^3 + 60*x^2
 + 150*x + 125)
```

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

$$\int \frac{\sqrt{2x^2 - x + 3}\,(5x^4 - x^3 + 3x^2 + x + 2)}{(2x + 5)^4}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x)**4,x)
```

```
[Out] Integral(sqrt(2*x**2 - x + 3)*(5*x**4 - x**3 + 3*x**2 + x + 2)/(2
*x + 5)**4, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$undef$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^4,x, algorith
```

```
[Out] undef
```

3.330 $\int \frac{\sqrt{3-x+2x^2}(2+x+3x^2-x^3+5x^4)}{(5+2x)^5}\,dx$

Optimal. Leaf size=165

$$-\frac{9363383\left(2x^2-x+3\right)^{3/2}}{23887872(2x+5)^2}+\frac{593771\left(2x^2-x+3\right)^{3/2}}{497664(2x+5)^3}-\frac{3667\left(2x^2-x+3\right)^{3/2}}{2304(2x+5)^4}+\frac{7(9616196x+52836655)\sqrt{2x^2-x+3}}{95551488(2x+5)}-\frac{4640586097\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{1146617856\sqrt{2}}+\frac{259\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{64\sqrt{2}}$$

```
[Out] (7*(52836655 + 9616196*x)*Sqrt[3 - x + 2*x^2])/(95551488*(5 + 2*x
)) - (3667*(3 - x + 2*x^2)^(3/2))/(2304*(5 + 2*x)^4) + (593771*(3
 - x + 2*x^2)^(3/2))/(497664*(5 + 2*x)^3) - (9363383*(3 - x + 2*x
^2)^(3/2))/(23887872*(5 + 2*x)^2) + (259*ArcSinh[(1 - 4*x)/Sqrt[2
3]])/(64*Sqrt[2]) - (4640586097*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*S
qrt[3 - x + 2*x^2])])/(1146617856*Sqrt[2])
```

Rubi [A] time = 0.451277, antiderivative size = 165, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}} = 0.175$

$$-\frac{9363383\left(2x^2-x+3\right)^{3/2}}{23887872(2x+5)^2}+\frac{593771\left(2x^2-x+3\right)^{3/2}}{497664(2x+5)^3}-\frac{3667\left(2x^2-x+3\right)^{3/2}}{2304(2x+5)^4}+\frac{7(9616196x+52836655)\sqrt{2x^2-x+3}}{95551488(2x+5)}-\frac{4640586097\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{1146617856\sqrt{2}}+\frac{259\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{64\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^5,x]
```

```
[Out] (7*(52836655 + 9616196*x)*Sqrt[3 - x + 2*x^2])/(95551488*(5 + 2*x
)) - (3667*(3 - x + 2*x^2)^(3/2))/(2304*(5 + 2*x)^4) + (593771*(3
 - x + 2*x^2)^(3/2))/(497664*(5 + 2*x)^3) - (9363383*(3 - x + 2*x
^2)^(3/2))/(23887872*(5 + 2*x)^2) + (259*ArcSinh[(1 - 4*x)/Sqrt[2
3]])/(64*Sqrt[2]) - (4640586097*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*S
qrt[3 - x + 2*x^2])])/(1146617856*Sqrt[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((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x)**5,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.273957, size = 99, normalized size = 0.6

$$\frac{-4640586097\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{12\sqrt{4x^2-2x+6}\left(238878720x^4+6105343976x^3+31323229164x^2+62847867486x+44676885233\right)}{(2x+5)^4}+}{1146617856\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^5,x]
```

```
[Out] ((12*Sqrt[6 - 2*x + 4*x^2]*(44676885233 + 62847867486*x + 3132322
9164*x^2 + 6105343976*x^3 + 238878720*x^4))/(5 + 2*x)^4 - 4640219
136*ArcSinh[(-1 + 4*x)/Sqrt[23]] + 4640586097*Log[5 + 2*x] - 4640
586097*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]])/(1146617856*Sqr
t[2])
```

Maple [A] time = 0.018, size = 167, normalized size = 1.

$$
\begin{aligned}
&-\frac{3667}{36864}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-4}\\
&+\frac{593771}{3981312}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-3}\\
&-\frac{9363383}{95551488}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-2}\\
&+\frac{201573155}{3439853568}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-1}+\frac{4640586097}{6879707136}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}\\
&-\frac{4640586097\,\sqrt{2}}{2293235712}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}\right)\\
&-\frac{806292620\,x-201573155}{6879707136}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}-\frac{259\,\sqrt{2}}{128}\mathit{Arcsinh}\left(\frac{4\,\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)
\end{aligned}
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5*x^4-x^3+3*x^2+x+2)*(2*x^2-x+3)^(1/2)/(5+2*x)^5,x)
```

```
[Out] -3667/36864/(x+5/2)^4*(2*(x+5/2)^2-11*x-19/2)^(3/2)+593771/398131
2/(x+5/2)^3*(2*(x+5/2)^2-11*x-19/2)^(3/2)-9363383/95551488/(x+5/2
)^2*(2*(x+5/2)^2-11*x-19/2)^(3/2)+201573155/3439853568/(x+5/2)*(2
*(x+5/2)^2-11*x-19/2)^(3/2)+4640586097/6879707136*(2*(x+5/2)^2-11
*x-19/2)^(1/2)-4640586097/2293235712*2^(1/2)*arctanh(1/12*(17/2-1
1*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))-201573155/6879707136*
(4*x-1)*(2*(x+5/2)^2-11*x-19/2)^(1/2)-259/128*2^(1/2)*arcsinh(4/2
3*23^(1/2)*(x-1/4))
```

Maxima [A] time = 0.78098, size = 244, normalized size = 1.48

$$-\frac{259}{128}\sqrt{2}\,\mathrm{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{4640586097}{2293235712}\sqrt{2}\,\mathrm{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\sqrt{23}}{23\,|2\,x+5|}\right)+\frac{16828343}{47775744}\sqrt{2\,x^2-x+3}-\frac{3667\,\left(2\,x^2-x+3\right)^{\frac{3}{2}}}{2304\,(16\,x^4+160\,x^3+600\,x^2+1000\,x+625)}+\frac{593771\,\left(2\,x^2-x+3\right)^{\frac{3}{2}}}{497664\,(8\,x^3+60\,x^2+150\,x+125)}-\frac{9363383\,\left(2\,x^2-x+3\right)^{\frac{3}{2}}}{23887872\,(4\,x^2+20\,x+25)}+\frac{201573155\sqrt{2\,x^2-x+3}}{95551488\,(2\,x+5)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^5,x, algorith
```

```
[Out] -259/128*sqrt(2)*arcsinh(4/23*sqrt(23)*x - 1/23*sqrt(23)) + 46405
86097/2293235712*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5) -
17/23*sqrt(23)/abs(2*x + 5)) + 16828343/47775744*sqrt(2*x^2 - x +
 3) - 3667/2304*(2*x^2 - x + 3)^(3/2)/(16*x^4 + 160*x^3 + 600*x^2
 + 1000*x + 625) + 593771/497664*(2*x^2 - x + 3)^(3/2)/(8*x^3 + 6
0*x^2 + 150*x + 125) - 9363383/23887872*(2*x^2 - x + 3)^(3/2)/(4*
x^2 + 20*x + 25) + 201573155/95551488*sqrt(2*x^2 - x + 3)/(2*x +
5)
```

Fricas [A] time = 0.288744, size = 262, normalized size = 1.59

$$\frac{\sqrt{2}\Big(24\,\sqrt{2}\big(238878720\,x^4+6105343976\,x^3+31323229164\,x^2+62847867486\,x+44676885233\big)\sqrt{2\,x^2-x+3}+4640219136}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^5,x, algorith
```

```
[Out] 1/4586471424*sqrt(2)*(24*sqrt(2)*(238878720*x^4 + 6105343976*x^3
+ 31323229164*x^2 + 62847867486*x + 44676885233)*sqrt(2*x^2 - x +
```

```
3) + 4640219136*(16*x^4 + 160*x^3 + 600*x^2 + 1000*x + 625)*log(
-sqrt(2)*(32*x^2 - 16*x + 25) + 8*sqrt(2*x^2 - x + 3)*(4*x - 1))
+ 4640586097*(16*x^4 + 160*x^3 + 600*x^2 + 1000*x + 625)*log(-(sq
rt(2)*(1060*x^2 - 1036*x + 1153) + 48*sqrt(2*x^2 - x + 3)*(22*x -
 17))/(4*x^2 + 20*x + 25)))/(16*x^4 + 160*x^3 + 600*x^2 + 1000*x
+ 625)
```

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

$$\int \frac{\sqrt{2x^2 - x + 3}\,(5x^4 - x^3 + 3x^2 + x + 2)}{(2x + 5)^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x)**5,x)
```

```
[Out] Integral(sqrt(2*x**2 - x + 3)*(5*x**4 - x**3 + 3*x**2 + x + 2)/(2
*x + 5)**5, x)
```

GIAC/XCAS [A] time = 0.324242, size = 441, normalized size = 2.67

$$-\frac{1}{2293235712}\sqrt{2}\left(4640586097\ln\left(12\sqrt{-\frac{11}{2x+5}+\frac{36}{(2x+5)^2}+1}+\frac{72}{2x+5}-11\right)\mathrm{sign}\left(\frac{1}{2x+5}\right)+4640219136\ln\left(\left|\sqrt{-\frac{1}{2x}}\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^5,x, algorith
```

```
[Out] -1/2293235712*sqrt(2)*(4640586097*ln(12*sqrt(-11/(2*x + 5) + 36/(
2*x + 5)^2 + 1) + 72/(2*x + 5) - 11)*sign(1/(2*x + 5)) + 46402191
36*ln(abs(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5)
+ 1))*sign(1/(2*x + 5)) - 4640219136*ln(abs(sqrt(-11/(2*x + 5) +
36/(2*x + 5)^2 + 1) + 6/(2*x + 5) - 1))*sign(1/(2*x + 5)) + 12*(2
4*(144*(792072*sign(1/(2*x + 5))/(2*x + 5) - 835793*sign(1/(2*x +
 5)))/(2*x + 5) + 57384361*sign(1/(2*x + 5)))/(2*x + 5) - 4645695
97*sign(1/(2*x + 5)))*sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) +
179159040*(11*(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x
```

```
+ 5))*sign(1/(2*x + 5)) - 12*sign(1/(2*x + 5)))/((sqrt(-11/(2*x +
 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5))^2 - 1))
```

3.331 $\int \frac{\sqrt{3-x+2x^2}\left(2+x+3x^2-x^3+5x^4\right)}{(5+2x)^6}\,dx$

Optimal. Leaf size=165

$$-\frac{38732321\left(2x^2-x+3\right)^{3/2}}{179159040(2x+5)^3}+\frac{711961\left(2x^2-x+3\right)^{3/2}}{829440(2x+5)^4}-\frac{3667\left(2x^2-x+3\right)^{3/2}}{2880(2x+5)^5}-\frac{(3174439702x+4583087983)\sqrt{2x^2-x+3}}{6879707136(2x+5)^2}+\frac{12895597463\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{82556485632\sqrt{2}}-\frac{5\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{32\sqrt{2}}$$

```
[Out] -((4583087983 + 3174439702*x)*Sqrt[3 - x + 2*x^2])/(6879707136*(5
 + 2*x)^2) - (3667*(3 - x + 2*x^2)^(3/2))/(2880*(5 + 2*x)^5) + (7
11961*(3 - x + 2*x^2)^(3/2))/(829440*(5 + 2*x)^4) - (38732321*(3
- x + 2*x^2)^(3/2))/(179159040*(5 + 2*x)^3) - (5*ArcSinh[(1 - 4*x
)/Sqrt[23]])/(32*Sqrt[2]) + (12895597463*ArcTanh[(17 - 22*x)/(12*
Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(82556485632*Sqrt[2])
```

Rubi [A] time = 0.442962, antiderivative size = 165, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}} = 0.175$

$$-\frac{38732321\left(2x^2-x+3\right)^{3/2}}{179159040(2x+5)^3}+\frac{711961\left(2x^2-x+3\right)^{3/2}}{829440(2x+5)^4}-\frac{3667\left(2x^2-x+3\right)^{3/2}}{2880(2x+5)^5}-\frac{(3174439702x+4583087983)\sqrt{2x^2-x+3}}{6879707136(2x+5)^2}+\frac{12895597463\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{82556485632\sqrt{2}}-\frac{5\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{32\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^6,x]
```

```
[Out] -((4583087983 + 3174439702*x)*Sqrt[3 - x + 2*x^2])/(6879707136*(5
 + 2*x)^2) - (3667*(3 - x + 2*x^2)^(3/2))/(2880*(5 + 2*x)^5) + (7
11961*(3 - x + 2*x^2)^(3/2))/(829440*(5 + 2*x)^4) - (38732321*(3
- x + 2*x^2)^(3/2))/(179159040*(5 + 2*x)^3) - (5*ArcSinh[(1 - 4*x
)/Sqrt[23]])/(32*Sqrt[2]) + (12895597463*ArcTanh[(17 - 22*x)/(12*
Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(82556485632*Sqrt[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((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x)**6,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.275114, size = 101, normalized size = 0.61

$$\frac{12895597463\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)-\frac{12\sqrt{4x^2-2x+6}\left(186470433136x^4+1285267446304x^3+3919478861832x^2+5608297138216x+311067\right.}{5(2x+5)^5}}{82556485632\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^6,x]
```

```
[Out] ((-12*Sqrt[6 - 2*x + 4*x^2]*(3110673952831 + 5608297138216*x + 39
19478861832*x^2 + 1285267446304*x^3 + 186470433136*x^4))/(5*(5 +
2*x)^5) + 12899450880*ArcSinh[(-1 + 4*x)/Sqrt[23]] - 12895597463*
Log[5 + 2*x] + 12895597463*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^
2]])/(82556485632*Sqrt[2])
```

Maple [A] time = 0.02, size = 188, normalized size = 1.1

$$-\frac{3667}{92160}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-5}+\frac{711961}{13271040}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-4}-\frac{38732321}{1433272320}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-3}+\frac{46569601}{6879707136}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-2}-\frac{562688629}{247669456896}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-1}-\frac{12895597463}{495338913792}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}+\frac{12895597463\sqrt{2}}{165112971264}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}\right)+\frac{2250754516\,x-562688629}{495338913792}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}+\frac{5\sqrt{2}}{64}\mathit{Arcsinh}\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((5*x^4-x^3+3*x^2+x+2)*(2*x^2-x+3)^(1/2)/(5+2*x)^6,x)
```

```
[Out] -3667/92160/(x+5/2)^5*(2*(x+5/2)^2-11*x-19/2)^(3/2)+711961/132710
40/(x+5/2)^4*(2*(x+5/2)^2-11*x-19/2)^(3/2)-38732321/1433272320/(x
+5/2)^3*(2*(x+5/2)^2-11*x-19/2)^(3/2)+46569601/6879707136/(x+5/2)
^2*(2*(x+5/2)^2-11*x-19/2)^(3/2)-562688629/247669456896/(x+5/2)*(
2*(x+5/2)^2-11*x-19/2)^(3/2)-12895597463/495338913792*(2*(x+5/2)^
2-11*x-19/2)^(1/2)+12895597463/165112971264*2^(1/2)*arctanh(1/12*
(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))+562688629/4953
38913792*(4*x-1)*(2*(x+5/2)^2-11*x-19/2)^(1/2)+5/64*2^(1/2)*arcsi
nh(4/23*23^(1/2)*(x-1/4))
```

Maxima [A] time = 0.794975, size = 300, normalized size = 1.82

$$\frac{5}{64}\sqrt{2}\operatorname{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)-\frac{12895597463}{165112971264}\sqrt{2}\operatorname{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\sqrt{23}}{23\,|2\,x+5|}\right)-\frac{46569601}{3439853568}\sqrt{2\,x^2-x+3}-\frac{3667\,(2\,x^2-x+3)^{\frac{3}{2}}}{2880\,(32\,x^5+400\,x^4+2000\,x^3+5000\,x^2+6250\,x+3125)}+\frac{711961\,(2\,x^2-x+3)^{\frac{3}{2}}}{829440\,(16\,x^4+160\,x^3+600\,x^2+1000\,x+625)}-\frac{38732321\,(2\,x^2-x+3)^{\frac{3}{2}}}{179159040\,(8\,x^3+60\,x^2+150\,x+125)}+\frac{46569601\,(2\,x^2-x+3)^{\frac{3}{2}}}{1719926784\,(4\,x^2+20\,x+25)}-\frac{562688629\sqrt{2\,x^2-x+3}}{6879707136\,(2\,x+5)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^6,x, algorith
```

```
[Out] 5/64*sqrt(2)*arcsinh(4/23*sqrt(23)*x - 1/23*sqrt(23)) - 128955974
63/165112971264*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5) - 1
7/23*sqrt(23)/abs(2*x + 5)) - 46569601/3439853568*sqrt(2*x^2 - x
+ 3) - 3667/2880*(2*x^2 - x + 3)^(3/2)/(32*x^5 + 400*x^4 + 2000*x
^3 + 5000*x^2 + 6250*x + 3125) + 711961/829440*(2*x^2 - x + 3)^(3
/2)/(16*x^4 + 160*x^3 + 600*x^2 + 1000*x + 625) - 38732321/179159
040*(2*x^2 - x + 3)^(3/2)/(8*x^3 + 60*x^2 + 150*x + 125) + 465696
01/1719926784*(2*x^2 - x + 3)^(3/2)/(4*x^2 + 20*x + 25) - 5626886
29/6879707136*sqrt(2*x^2 - x + 3)/(2*x + 5)
```

Fricas [A] time = 0.294503, size = 282, normalized size = 1.71

$$-\frac{\sqrt{2}\Big(24\sqrt{2}\big(186470433136\,x^4+1285267446304\,x^3+3919478861832\,x^2+5608297138216\,x+3110673952831\big)\sqrt{2\,x^2-x+}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^6,x, algorith
```

```
[Out] -1/1651129712640*sqrt(2)*(24*sqrt(2)*(186470433136*x^4 + 12852674
46304*x^3 + 3919478861832*x^2 + 5608297138216*x + 3110673952831)*
sqrt(2*x^2 - x + 3) - 64497254400*(32*x^5 + 400*x^4 + 2000*x^3 +
5000*x^2 + 6250*x + 3125)*log(-sqrt(2)*(32*x^2 - 16*x + 25) - 8*s
qrt(2*x^2 - x + 3)*(4*x - 1)) - 64477987315*(32*x^5 + 400*x^4 + 2
000*x^3 + 5000*x^2 + 6250*x + 3125)*log(-(sqrt(2)*(1060*x^2 - 103
6*x + 1153) - 48*sqrt(2*x^2 - x + 3)*(22*x - 17))/(4*x^2 + 20*x +
 25)))/(32*x^5 + 400*x^4 + 2000*x^3 + 5000*x^2 + 6250*x + 3125)
```

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

$$\int \frac{\sqrt{2x^2-x+3}\,(5x^4-x^3+3x^2+x+2)}{(2x+5)^6}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x)**6,x)
```

```
[Out] Integral(sqrt(2*x**2 - x + 3)*(5*x**4 - x**3 + 3*x**2 + x + 2)/(2
*x + 5)**6, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$undef$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^6,x, algorith
```

```
[Out] undef
```

3.332 $\int \frac{\sqrt{3-x+2x^2}\left(2+x+3x^2-x^3+5x^4\right)}{(5+2x)^7}\,dx$

Optimal. Leaf size=169

$$\frac{87677717\left(2x^2-x+3\right)^{3/2}}{8599633920(2x+5)^3}-\frac{5703277\left(2x^2-x+3\right)^{3/2}}{39813120(2x+5)^4}+\frac{92239\left(2x^2-x+3\right)^{3/2}}{138240(2x+5)^5}-\frac{3667\left(2x^2-x+3\right)^{3/2}}{3456(2x+5)^6}-\frac{1172725(17-22x)\sqrt{2x^2-x+3}}{330225942528(2x+5)^2}-\frac{26972675\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{3962711310336\sqrt{2}}$$

```
[Out] (-1172725*(17 - 22*x)*Sqrt[3 - x + 2*x^2])/(330225942528*(5 + 2*x
)^2) - (3667*(3 - x + 2*x^2)^(3/2))/(3456*(5 + 2*x)^6) + (92239*(
3 - x + 2*x^2)^(3/2))/(138240*(5 + 2*x)^5) - (5703277*(3 - x + 2*
x^2)^(3/2))/(39813120*(5 + 2*x)^4) + (87677717*(3 - x + 2*x^2)^(3
/2))/(8599633920*(5 + 2*x)^3) - (26972675*ArcTanh[(17 - 22*x)/(12
*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(3962711310336*Sqrt[2])
```

Rubi [A] time = 0.394854, antiderivative size = 169, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{87677717\left(2x^2-x+3\right)^{3/2}}{8599633920(2x+5)^3}-\frac{5703277\left(2x^2-x+3\right)^{3/2}}{39813120(2x+5)^4}+\frac{92239\left(2x^2-x+3\right)^{3/2}}{138240(2x+5)^5}-\frac{3667\left(2x^2-x+3\right)^{3/2}}{3456(2x+5)^6}-\frac{1172725(17-22x)\sqrt{2x^2-x+3}}{330225942528(2x+5)^2}-\frac{26972675\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{3962711310336\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^7,x]
```

```
[Out] (-1172725*(17 - 22*x)*Sqrt[3 - x + 2*x^2])/(330225942528*(5 + 2*x
)^2) - (3667*(3 - x + 2*x^2)^(3/2))/(3456*(5 + 2*x)^6) + (92239*(
3 - x + 2*x^2)^(3/2))/(138240*(5 + 2*x)^5) - (5703277*(3 - x + 2*
x^2)^(3/2))/(39813120*(5 + 2*x)^4) + (87677717*(3 - x + 2*x^2)^(3
/2))/(8599633920*(5 + 2*x)^3) - (26972675*ArcTanh[(17 - 22*x)/(12
*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(3962711310336*Sqrt[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((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x)**7,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.243564, size = 92, normalized size = 0.54

$$\frac{-26972675\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{12\sqrt{4x^2-2x+6}\left(271409942624x^5+12256250416x^4+397498825328x^3+158340720344x^2+27245373694\right.}{5(2x+5)^6}}{3962711310336\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^7,x]
```

```
[Out] ((12*Sqrt[6 - 2*x + 4*x^2]*(-219337079305 + 27245373694*x + 15834
0720344*x^2 + 397498825328*x^3 + 12256250416*x^4 + 271409942624*x
^5))/(5*(5 + 2*x)^6) + 26972675*Log[5 + 2*x] - 26972675*Log[17 -
22*x + 12*Sqrt[6 - 2*x + 4*x^2]])/(3962711310336*Sqrt[2])
```

Maple [A] time = 0.021, size = 195, normalized size = 1.2

$$\begin{aligned}
&-\frac{3667}{221184}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-6}\\
&+\frac{92239}{4423680}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-5}\\
&-\frac{5703277}{637009920}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-4}\\
&+\frac{87677717}{68797071360}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-3}\\
&-\frac{1172725}{330225942528}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-2}\\
&-\frac{12899975}{11888133931008}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-1}\\
&+\frac{26972675}{23776267862016}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}\\
&-\frac{26972675\sqrt{2}}{7925422620672}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}\right)\\
&+\frac{51599900\,x-12899975}{23776267862016}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}
\end{aligned}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^4-x^3+3*x^2+x+2)*(2*x^2-x+3)^(1/2)/(5+2*x)^7,x)
```

```
[Out] -3667/221184/(x+5/2)^6*(2*(x+5/2)^2-11*x-19/2)^(3/2)+92239/442368
0/(x+5/2)^5*(2*(x+5/2)^2-11*x-19/2)^(3/2)-5703277/637009920/(x+5/
2)^4*(2*(x+5/2)^2-11*x-19/2)^(3/2)+87677717/68797071360/(x+5/2)^3
*(2*(x+5/2)^2-11*x-19/2)^(3/2)-1172725/330225942528/(x+5/2)^2*(2*
(x+5/2)^2-11*x-19/2)^(3/2)-12899975/11888133931008/(x+5/2)*(2*(x+
5/2)^2-11*x-19/2)^(3/2)+26972675/23776267862016*(2*(x+5/2)^2-11*x
-19/2)^(1/2)-26972675/7925422620672*2^(1/2)*arctanh(1/12*(17/2-11
*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))+12899975/2377626786201
6*(4*x-1)*(2*(x+5/2)^2-11*x-19/2)^(1/2)
```

Maxima [A] time = 0.798242, size = 338, normalized size = 2.

$$\frac{26972675}{7925422620672}\sqrt{2}\operatorname{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\sqrt{23}}{23\,|2\,x+5|}\right)+\frac{1172725}{165112971264}\sqrt{2\,x^2-x+3}-\frac{3667\left(2\,x^2-x+3\right)^{\frac{3}{2}}}{3456\left(64\,x^6+960\,x^5+6000\,x^4+20000\,x^3+37500\,x^2+37500\,x+15625\right)}+\frac{92239\left(2\,x^2-x+3\right)^{\frac{3}{2}}}{138240\left(32\,x^5+400\,x^4+2000\,x^3+5000\,x^2+6250\,x+3125\right)}-\frac{5703277\left(2\,x^2-x+3\right)^{\frac{3}{2}}}{39813120\left(16\,x^4+160\,x^3+600\,x^2+1000\,x+625\right)}+\frac{87677717\left(2\,x^2-x+3\right)^{\frac{3}{2}}}{8599633920\left(8\,x^3+60\,x^2+150\,x+125\right)}-\frac{1172725\left(2\,x^2-x+3\right)^{\frac{3}{2}}}{82556485632\left(4\,x^2+20\,x+25\right)}-\frac{12899975\sqrt{2\,x^2-x+3}}{330225942528\left(2\,x+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^7,x, algorith
```

```
[Out] 26972675/7925422620672*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x +
 5) - 17/23*sqrt(23)/abs(2*x + 5)) + 1172725/165112971264*sqrt(2*
x^2 - x + 3) - 3667/3456*(2*x^2 - x + 3)^(3/2)/(64*x^6 + 960*x^5
+ 6000*x^4 + 20000*x^3 + 37500*x^2 + 37500*x + 15625) + 92239/138
240*(2*x^2 - x + 3)^(3/2)/(32*x^5 + 400*x^4 + 2000*x^3 + 5000*x^2
 + 6250*x + 3125) - 5703277/39813120*(2*x^2 - x + 3)^(3/2)/(16*x^
4 + 160*x^3 + 600*x^2 + 1000*x + 625) + 87677717/8599633920*(2*x^
2 - x + 3)^(3/2)/(8*x^3 + 60*x^2 + 150*x + 125) - 1172725/8255648
5632*(2*x^2 - x + 3)^(3/2)/(4*x^2 + 20*x + 25) - 12899975/3302259
42528*sqrt(2*x^2 - x + 3)/(2*x + 5)
```

Fricas [A] time = 0.284227, size = 217, normalized size = 1.28

$$\frac{\sqrt{2}\left(24\,\sqrt{2}\left(271409942624\,x^5+12256250416\,x^4+397498825328\,x^3+158340720344\,x^2+27245373694\,x-219337079305\right)\sqrt{}\right.}{79254226206720\,(64\,x^6+960\,x^5}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^7,x, algorith
```

```
[Out] 1/79254226206720*sqrt(2)*(24*sqrt(2)*(271409942624*x^5 + 12256250
416*x^4 + 397498825328*x^3 + 158340720344*x^2 + 27245373694*x - 2
19337079305)*sqrt(2*x^2 - x + 3) + 134863375*(64*x^6 + 960*x^5 +
6000*x^4 + 20000*x^3 + 37500*x^2 + 37500*x + 15625)*log(-(sqrt(2)
*(1060*x^2 - 1036*x + 1153) + 48*sqrt(2*x^2 - x + 3)*(22*x - 17))
/(4*x^2 + 20*x + 25)))/(64*x^6 + 960*x^5 + 6000*x^4 + 20000*x^3 +
 37500*x^2 + 37500*x + 15625)
```

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

$$\int \frac{\sqrt{2x^2-x+3}\,\left(5x^4-x^3+3x^2+x+2\right)}{(2x+5)^7}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x)**7,x)
```

```
[Out] Integral(sqrt(2*x**2 - x + 3)*(5*x**4 - x**3 + 3*x**2 + x + 2)/(2
*x + 5)**7, x)
```

GIAC/XCAS [A] time = 0.300036, size = 547, normalized size = 3.24

$$-\frac{26972675}{7925422620672}\,\sqrt{2}\ln\left(\left|-2\,\sqrt{2}x+\sqrt{2}+2\,\sqrt{2\,x^2-x+3}\right|\right)$$
$$+\frac{26972675}{7925422620672}\,\sqrt{2}\ln\left(\left|-2\,\sqrt{2}x-11\,\sqrt{2}+2\,\sqrt{2\,x^2-x+3}\right|\right)$$
$$+\frac{\sqrt{2}\left(16506981498400\,\sqrt{2}\left(\sqrt{2}x-\sqrt{2\,x^2-x+3}\right)^{11}+389429252643040\left(\sqrt{2}x-\sqrt{2\,x^2-x+3}\right)^{10}+2263923918689840\,\sqrt{2}\left(\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^7,x, algorith

[Out] -26972675/7925422620672*sqrt(2)*ln(abs(-2*sqrt(2)*x + sqrt(2) + 2
*sqrt(2*x^2 - x + 3))) + 26972675/7925422620672*sqrt(2)*ln(abs(-2
*sqrt(2)*x - 11*sqrt(2) + 2*sqrt(2*x^2 - x + 3))) + 1/33022594252
80*sqrt(2)*(16506981498400*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x +
3))^11 + 389429252643040*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^10 + 2
263923918689840*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^9 + 116
63651054548560*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^8 + 902212326134
736*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^7 - 841927295198618
40*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^6 - 4317200555009448*sqrt(2)
*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^5 + 351543414066518760*(sqrt(2
)*x - sqrt(2*x^2 - x + 3))^4 - 376787166452923830*sqrt(2)*(sqrt(2
)*x - sqrt(2*x^2 - x + 3))^3 + 356306707647610982*(sqrt(2)*x - sq
rt(2*x^2 - x + 3))^2 - 82348353128195465*sqrt(2)*(sqrt(2)*x - sqr
t(2*x^2 - x + 3)) + 15499394004553969)/(2*(sqrt(2)*x - sqrt(2*x^2
 - x + 3))^2 + 10*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3)) - 11)
^6
```

3.333 $\int \frac{\sqrt{3-x+2x^2}\,(2+x+3x^2-x^3+5x^4)}{(5+2x)^8}\,dx$

Optimal. Leaf size=194

$$\frac{246159769\left(2x^2-x+3\right)^{3/2}}{866843099136(2x+5)^3}+\frac{19414831\left(2x^2-x+3\right)^{3/2}}{4013162496(2x+5)^4}-\frac{1464037\left(2x^2-x+3\right)^{3/2}}{13934592(2x+5)^5}+\frac{948341\left(2x^2-x+3\right)^{3/2}}{1741824(2x+5)^6}-\frac{3667\left(2x^2-x+3\right)^{3/2}}{4032(2x+5)^7}-\frac{12568315(17-22x)\sqrt{2x^2-x+3}}{23776267862016(2x+5)^2}-\frac{289071245\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{285315214344192\sqrt{2}}$$

```
[Out] (-12568315*(17 - 22*x)*Sqrt[3 - x + 2*x^2])/(23776267862016*(5 +
2*x)^2) - (3667*(3 - x + 2*x^2)^(3/2))/(4032*(5 + 2*x)^7) + (9483
41*(3 - x + 2*x^2)^(3/2))/(1741824*(5 + 2*x)^6) - (1464037*(3 - x
 + 2*x^2)^(3/2))/(13934592*(5 + 2*x)^5) + (19414831*(3 - x + 2*x^
2)^(3/2))/(4013162496*(5 + 2*x)^4) + (246159769*(3 - x + 2*x^2)^(
3/2))/(866843099136*(5 + 2*x)^3) - (289071245*ArcTanh[(17 - 22*x)
/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(285315214344192*Sqrt[2])
```

Rubi [A] time = 0.472896, antiderivative size = 194, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.15

$$\frac{246159769\left(2x^2-x+3\right)^{3/2}}{866843099136(2x+5)^3}+\frac{19414831\left(2x^2-x+3\right)^{3/2}}{4013162496(2x+5)^4}-\frac{1464037\left(2x^2-x+3\right)^{3/2}}{13934592(2x+5)^5}+\frac{948341\left(2x^2-x+3\right)^{3/2}}{1741824(2x+5)^6}-\frac{3667\left(2x^2-x+3\right)^{3/2}}{4032(2x+5)^7}-\frac{12568315(17-22x)\sqrt{2x^2-x+3}}{23776267862016(2x+5)^2}-\frac{289071245\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{285315214344192\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^8,x]
```

```
[Out] (-12568315*(17 - 22*x)*Sqrt[3 - x + 2*x^2])/(23776267862016*(5 +
2*x)^2) - (3667*(3 - x + 2*x^2)^(3/2))/(4032*(5 + 2*x)^7) + (9483
41*(3 - x + 2*x^2)^(3/2))/(1741824*(5 + 2*x)^6) - (1464037*(3 - x
 + 2*x^2)^(3/2))/(13934592*(5 + 2*x)^5) + (19414831*(3 - x + 2*x^
2)^(3/2))/(4013162496*(5 + 2*x)^4) + (246159769*(3 - x + 2*x^2)^(
3/2))/(866843099136*(5 + 2*x)^3) - (289071245*ArcTanh[(17 - 22*x)
/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(285315214344192*Sqrt[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((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x)**8,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.252735, size = 97, normalized size = 0.5

$$\frac{-289071245\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{12\sqrt{4x^2-2x+6}\left(1574342277056x^6+27976951397184x^5+4982916071952x^4+41058010262368x^3+147\right.}{7(2x+5)^7}}{285315214344192\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(Sqrt[3 - x + 2*x^2]*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^8,x]
```

```
[Out] ((12*Sqrt[6 - 2*x + 4*x^2]*(-20465234808721 + 590492177460*x + 14
716683780036*x^2 + 41058010262368*x^3 + 4982916071952*x^4 + 27976
951397184*x^5 + 1574342277056*x^6))/(7*(5 + 2*x)^7) + 289071245*L
og[5 + 2*x] - 289071245*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]]
)/(285315214344192*Sqrt[2])
```

Maple [A] time = 0.026, size = 216, normalized size = 1.1

$$
\begin{aligned}
&-\frac{3667}{516096}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-7} \\
&+\frac{948341}{111476736}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-6} \\
&-\frac{1464037}{445906944}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-5} \\
&+\frac{19414831}{64210599936}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-4} \\
&+\frac{246159769}{6934744793088}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-3} \\
&-\frac{12568315}{23776267862016}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-2} \\
&-\frac{138251465}{855945643032576}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}\left(x+\frac{5}{2}\right)^{-1} \\
&+\frac{289071245}{1711891286065152}\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}} \\
&-\frac{289071245\sqrt{2}}{570630428688384}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11x\right)\frac{1}{\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}}\right) \\
&+\frac{553005860x-138251465}{1711891286065152}\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}
\end{aligned}
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((5*x^4-x^3+3*x^2+x+2)*(2*x^2-x+3)^(1/2)/(5+2*x)^8,x)
```

```
[Out] -3667/516096/(x+5/2)^7*(2*(x+5/2)^2-11*x-19/2)^(3/2)+948341/11147
6736/(x+5/2)^6*(2*(x+5/2)^2-11*x-19/2)^(3/2)-1464037/445906944/(x
+5/2)^5*(2*(x+5/2)^2-11*x-19/2)^(3/2)+19414831/64210599936/(x+5/2
)^4*(2*(x+5/2)^2-11*x-19/2)^(3/2)+246159769/6934744793088/(x+5/2)
^3*(2*(x+5/2)^2-11*x-19/2)^(3/2)-12568315/23776267862016/(x+5/2)^
2*(2*(x+5/2)^2-11*x-19/2)^(3/2)-138251465/855945643032576/(x+5/2)
*(2*(x+5/2)^2-11*x-19/2)^(3/2)+289071245/1711891286065152*(2*(x+5
/2)^2-11*x-19/2)^(1/2)-289071245/570630428688384*2^(1/2)*arctanh(
1/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))+138251465
/1711891286065152*(4*x-1)*(2*(x+5/2)^2-11*x-19/2)^(1/2)
```

Maxima [A] time = 0.788234, size = 406, normalized size = 2.09

$$\frac{289071245}{570630428688384}\sqrt{2}\,\text{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\sqrt{23}}{23\,|2\,x+5|}\right)+\frac{12568315}{11888133931008}\sqrt{2\,x^2-x+3}-\frac{3667\left(2\,x^2-x+3\right)^{\frac{3}{2}}}{4032\left(128\,x^7+2240\,x^6+16800\,x^5+70000\,x^4+175000\,x^3+262500\,x^2+218750\,x+78125\right)}+\frac{948341\left(2\,x^2-x+3\right)^{\frac{3}{2}}}{1741824\left(64\,x^6+960\,x^5+6000\,x^4+20000\,x^3+37500\,x^2+37500\,x+15625\right)}-\frac{1464037\left(2\,x^2-x+3\right)^{\frac{3}{2}}}{13934592\left(32\,x^5+400\,x^4+2000\,x^3+5000\,x^2+6250\,x+3125\right)}+\frac{19414831\left(2\,x^2-x+3\right)^{\frac{3}{2}}}{4013162496\left(16\,x^4+160\,x^3+600\,x^2+1000\,x+625\right)}+\frac{246159769\left(2\,x^2-x+3\right)^{\frac{3}{2}}}{866843099136\left(8\,x^3+60\,x^2+150\,x+125\right)}-\frac{12568315\left(2\,x^2-x+3\right)^{\frac{3}{2}}}{5944066965504\left(4\,x^2+20\,x+25\right)}-\frac{138251465\sqrt{2\,x^2-x+3}}{23776267862016\left(2\,x+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^8,x, algorith
```

```
[Out] 289071245/570630428688384*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*
x + 5) - 17/23*sqrt(23)/abs(2*x + 5)) + 12568315/11888133931008*s
qrt(2*x^2 - x + 3) - 3667/4032*(2*x^2 - x + 3)^(3/2)/(128*x^7 + 2
240*x^6 + 16800*x^5 + 70000*x^4 + 175000*x^3 + 262500*x^2 + 21875
0*x + 78125) + 948341/1741824*(2*x^2 - x + 3)^(3/2)/(64*x^6 + 960
*x^5 + 6000*x^4 + 20000*x^3 + 37500*x^2 + 37500*x + 15625) - 1464
037/13934592*(2*x^2 - x + 3)^(3/2)/(32*x^5 + 400*x^4 + 2000*x^3 +
 5000*x^2 + 6250*x + 3125) + 19414831/4013162496*(2*x^2 - x + 3)^
(3/2)/(16*x^4 + 160*x^3 + 600*x^2 + 1000*x + 625) + 246159769/866
843099136*(2*x^2 - x + 3)^(3/2)/(8*x^3 + 60*x^2 + 150*x + 125) -
12568315/5944066965504*(2*x^2 - x + 3)^(3/2)/(4*x^2 + 20*x + 25)
- 138251465/23776267862016*sqrt(2*x^2 - x + 3)/(2*x + 5)
```

Fricas [A] time = 0.285432, size = 238, normalized size = 1.23

$$\frac{\sqrt{2}\Big(24\sqrt{2}\big(1574342277056\,x^6+27976951397184\,x^5+4982916071952\,x^4+41058010262368\,x^3+14716683780036\,x^2+5904}{7988826001637}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^8,x, algorith
```

```
[Out] 1/7988826001637376*sqrt(2)*(24*sqrt(2)*(1574342277056*x^6 + 27976
951397184*x^5 + 4982916071952*x^4 + 41058010262368*x^3 + 14716683
780036*x^2 + 590492177460*x - 20465234808721)*sqrt(2*x^2 - x + 3)
 + 2023498715*(128*x^7 + 2240*x^6 + 16800*x^5 + 70000*x^4 + 17500
0*x^3 + 262500*x^2 + 218750*x + 78125)*log(-(sqrt(2)*(1060*x^2 -
1036*x + 1153) + 48*sqrt(2*x^2 - x + 3)*(22*x - 17))/(4*x^2 + 20*
x + 25)))/(128*x^7 + 2240*x^6 + 16800*x^5 + 70000*x^4 + 175000*x^
3 + 262500*x^2 + 218750*x + 78125)
```

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

$$\int \frac{\sqrt{2x^2-x+3}\left(5x^4-x^3+3x^2+x+2\right)}{(2x+5)^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)*(2*x**2-x+3)**(1/2)/(5+2*x)**8,x)
```

```
[Out] Integral(sqrt(2*x**2 - x + 3)*(5*x**4 - x**3 + 3*x**2 + x + 2)/(2
*x + 5)**8, x)
```

GIAC/XCAS [A] time = 0.300506, size = 616, normalized size = 3.18

$$-\frac{289071245}{570630428688384}\sqrt{2}\ln\left(\left|-2\sqrt{2}x+\sqrt{2}+2\sqrt{2x^2-x+3}\right|\right)+\frac{289071245}{570630428688384}\sqrt{2}\ln\left(\left|-2\sqrt{2}x-11\sqrt{2}+2\sqrt{2x^2-x+3}\right|\right)-\frac{\sqrt{2}\left(129503917760\sqrt{2}\left(\sqrt{2}x-\sqrt{2x^2-x+3}\right)^{13}-3320259746027840\left(\sqrt{2}x-\sqrt{2x^2-x+3}\right)^{12}-23966708071916736\sqrt{2}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*sqrt(2*x^2 - x + 3)/(2*x + 5)^8,x, algorith
```

```
[Out] -289071245/570630428688384*sqrt(2)*ln(abs(-2*sqrt(2)*x + sqrt(2)
+ 2*sqrt(2*x^2 - x + 3))) + 289071245/570630428688384*sqrt(2)*ln(
abs(-2*sqrt(2)*x - 11*sqrt(2) + 2*sqrt(2*x^2 - x + 3))) - 1/33286
7750068224*sqrt(2)*(129503917760*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2
- x + 3))^13 - 3320259746027840*(sqrt(2)*x - sqrt(2*x^2 - x + 3))
^12 - 23966708071916736*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3))
^11 - 186055342532355520*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^10 - 2
```

```
74256644494948976*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^9 + 7
96135370176031760*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^8 + 253152313
9171005408*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^7 - 46103938
11900786336*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^6 - 799712685430005
2364*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^5 + 30842713619423
538868*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^4 - 21873571601855032556
*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^3 + 162047069606046681
00*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^2 - 3196254593191113265*sqrt
(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3)) + 536799032216117911)/(2*(s
qrt(2)*x - sqrt(2*x^2 - x + 3))^2 + 10*sqrt(2)*(sqrt(2)*x - sqrt(
2*x^2 - x + 3)) - 11)^7
```

3.334 $\int (5+2x)\left(3-x+2x^2\right)^{3/2}\left(2+x+3x^2-x^3+5x^4\right)\,dx$

Optimal. Leaf size=166

$$\frac{5}{144}\left(2x^2-x+3\right)^{5/2}(2x+5)^4-\frac{1121\left(2x^2-x+3\right)^{5/2}(2x+5)^3}{2304}+\frac{69415\left(2x^2-x+3\right)^{5/2}(2x+5)^2}{32256}-\frac{3(215900x+661397)\left(2x^2-x+3\right)^{5/2}}{143360}-\frac{92727(1-4x)\left(2x^2-x+3\right)^{3/2}}{131072}-\frac{6398163(1-4x)\sqrt{2x^2-x+3}}{2097152}-\frac{147157749\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{4194304\sqrt{2}}$$

```
[Out] (-6398163*(1 - 4*x)*Sqrt[3 - x + 2*x^2])/2097152 - (92727*(1 - 4*
x)*(3 - x + 2*x^2)^(3/2))/131072 + (69415*(5 + 2*x)^2*(3 - x + 2*
x^2)^(5/2))/32256 - (1121*(5 + 2*x)^3*(3 - x + 2*x^2)^(5/2))/2304
 + (5*(5 + 2*x)^4*(3 - x + 2*x^2)^(5/2))/144 - (3*(661397 + 21590
0*x)*(3 - x + 2*x^2)^(5/2))/143360 - (147157749*ArcSinh[(1 - 4*x)
/Sqrt[23]])/(4194304*Sqrt[2])
```

Rubi [A] time = 0.316341, antiderivative size = 166, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 5, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.132

$$\frac{5}{144}\left(2x^2-x+3\right)^{5/2}(2x+5)^4-\frac{1121\left(2x^2-x+3\right)^{5/2}(2x+5)^3}{2304}+\frac{69415\left(2x^2-x+3\right)^{5/2}(2x+5)^2}{32256}-\frac{3(215900x+661397)\left(2x^2-x+3\right)^{5/2}}{143360}-\frac{92727(1-4x)\left(2x^2-x+3\right)^{3/2}}{131072}-\frac{6398163(1-4x)\sqrt{2x^2-x+3}}{2097152}-\frac{147157749\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{4194304\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(5 + 2*x)*(3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4),x]
```


```
[Out] (-6398163*(1 - 4*x)*Sqrt[3 - x + 2*x^2])/2097152 - (92727*(1 - 4*
x)*(3 - x + 2*x^2)^(3/2))/131072 + (69415*(5 + 2*x)^2*(3 - x + 2*
x^2)^(5/2))/32256 - (1121*(5 + 2*x)^3*(3 - x + 2*x^2)^(5/2))/2304
 + (5*(5 + 2*x)^4*(3 - x + 2*x^2)^(5/2))/144 - (3*(661397 + 21590
0*x)*(3 - x + 2*x^2)^(5/2))/143360 - (147157749*ArcSinh[(1 - 4*x)
/Sqrt[23]])/(4194304*Sqrt[2])
```

Rubi in Sympy [A] time = 76.4268, size = 151, normalized size = 0.91

$$\frac{5x^4\left(2x^2-x+3\right)^{\frac{5}{2}}}{9}+\frac{479x^3\left(2x^2-x+3\right)^{\frac{5}{2}}}{288}+\frac{2005x^2\left(2x^2-x+3\right)^{\frac{5}{2}}}{8064}-\frac{92727(-4x+1)\left(2x^2-x+3\right)^{\frac{3}{2}}}{131072}-\frac{6398163(-4x+1)\sqrt{2x^2-x+3}}{2097152}+\frac{\left(\frac{28225x}{896}+\frac{362427}{3584}\right)\left(2x^2-x+3\right)^{\frac{5}{2}}}{120}+\frac{147157749\sqrt{2}\operatorname{atanh}\left(\frac{\sqrt{2}(4x-1)}{4\sqrt{2x^2-x+3}}\right)}{8388608}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((5+2*x)*(2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2),x)
```

```
[Out] 5*x**4*(2*x**2 - x + 3)**(5/2)/9 + 479*x**3*(2*x**2 - x + 3)**(5/
2)/288 + 2005*x**2*(2*x**2 - x + 3)**(5/2)/8064 - 92727*(-4*x + 1
)*(2*x**2 - x + 3)**(3/2)/131072 - 6398163*(-4*x + 1)*sqrt(2*x**2
 - x + 3)/2097152 + (28225*x/896 + 362427/3584)*(2*x**2 - x + 3)*
*(5/2)/120 + 147157749*sqrt(2)*atanh(sqrt(2)*(4*x - 1)/(4*sqrt(2*
x**2 - x + 3)))/8388608
```

Mathematica [A] time = 0.103736, size = 80, normalized size = 0.48

$$\frac{4\sqrt{2x^2-x+3}\left(1468006400x^8+2926837760x^7+1033175040x^6+12117893120x^5+379086848x^4+12669290112x^3+4870\ldots\right.}{2642411520}$$

Antiderivative was successfully verified.

```
[In] Integrate[(5 + 2*x)*(3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4),x]
```

```
[Out] (4*Sqrt[3 - x + 2*x^2]*(1592737263 + 12357760788*x + 4870637856*x
^2 + 12669290112*x^3 + 379086848*x^4 + 12117893120*x^5 + 10331750
40*x^6 + 2926837760*x^7 + 1468006400*x^8) + 46354690935*Sqrt[2]*A
rcSinh[(-1 + 4*x)/Sqrt[23]])/2642411520
```

Maple [A] time = 0.011, size = 134, normalized size = 0.8

$$\frac{2005\,x^2}{8064}\left(2\,x^2-x+3\right)^{\frac{5}{2}}+\frac{5645\,x}{21504}\left(2\,x^2-x+3\right)^{\frac{5}{2}}+\frac{120809}{143360}\left(2\,x^2-x+3\right)^{\frac{5}{2}}+\frac{370908\,x-92727}{131072}\left(2\,x^2-x+3\right)^{\frac{3}{2}}+\frac{25592652\,x-6398163}{2097152}\sqrt{2\,x^2-x+3}+\frac{147157749\,\sqrt{2}}{8388608}Arcsinh\left(\frac{4\,\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)+\frac{479\,x^3}{288}\left(2\,x^2-x+3\right)^{\frac{5}{2}}+\frac{5\,x^4}{9}\left(2\,x^2-x+3\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5+2*x)*(2*x^2-x+3)^(3/2)*(5*x^4-x^3+3*x^2+x+2),x)
```

```
[Out] 2005/8064*x^2*(2*x^2-x+3)^(5/2)+5645/21504*x*(2*x^2-x+3)^(5/2)+12
0809/143360*(2*x^2-x+3)^(5/2)+92727/131072*(4*x-1)*(2*x^2-x+3)^(3
/2)+6398163/2097152*(4*x-1)*(2*x^2-x+3)^(1/2)+147157749/8388608*2
^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4))+479/288*x^3*(2*x^2-x+3)^(5/
2)+5/9*x^4*(2*x^2-x+3)^(5/2)
```

Maxima [A] time = 0.772597, size = 209, normalized size = 1.26

$$\frac{5}{9}\left(2x^2-x+3\right)^{\frac{5}{2}}x^4+\frac{479}{288}\left(2x^2-x+3\right)^{\frac{5}{2}}x^3+\frac{2005}{8064}\left(2x^2-x+3\right)^{\frac{5}{2}}x^2+\frac{5645}{21504}\left(2x^2-x+3\right)^{\frac{5}{2}}x+\frac{120809}{143360}\left(2x^2-x+3\right)^{\frac{5}{2}}+\frac{92727}{32768}\left(2x^2-x+3\right)^{\frac{3}{2}}x-\frac{92727}{131072}\left(2x^2-x+3\right)^{\frac{3}{2}}+\frac{6398163}{524288}\sqrt{2x^2-x+3}x+\frac{147157749}{8388608}\sqrt{2}\,\mathrm{arsinh}\left(\frac{1}{23}\sqrt{23}(4x-1)\right)-\frac{6398163}{2097152}\sqrt{2x^2-x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)*(2*x + 5),x, algorith
```

```
[Out] 5/9*(2*x^2 - x + 3)^(5/2)*x^4 + 479/288*(2*x^2 - x + 3)^(5/2)*x^3
 + 2005/8064*(2*x^2 - x + 3)^(5/2)*x^2 + 5645/21504*(2*x^2 - x +
3)^(5/2)*x + 120809/143360*(2*x^2 - x + 3)^(5/2) + 92727/32768*(2
*x^2 - x + 3)^(3/2)*x - 92727/131072*(2*x^2 - x + 3)^(3/2) + 6398
163/524288*sqrt(2*x^2 - x + 3)*x + 147157749/8388608*sqrt(2)*arcs
inh(1/23*sqrt(23)*(4*x - 1)) - 6398163/2097152*sqrt(2*x^2 - x + 3
)
```

Fricas [A] time = 0.276813, size = 136, normalized size = 0.82

$$\frac{1}{5284823040}\sqrt{2}\Big(4\sqrt{2}\big(1468006400x^8+2926837760x^7+1033175040x^6+12117893120x^5+379086848x^4+12669290112x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)*(2*x + 5),x, algorith
```

```
[Out] 1/5284823040*sqrt(2)*(4*sqrt(2)*(1468006400*x^8 + 2926837760*x^7
+ 1033175040*x^6 + 12117893120*x^5 + 379086848*x^4 + 12669290112*
x^3 + 4870637856*x^2 + 12357760788*x + 1592737263)*sqrt(2*x^2 - x
 + 3) + 46354690935*log(-sqrt(2)*(32*x^2 - 16*x + 25) - 8*sqrt(2*
```

```
x^2 - x + 3)*(4*x - 1)))
```

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

$$\int (2x+5)\left(2x^2-x+3\right)^{\frac{3}{2}}\left(5x^4-x^3+3x^2+x+2\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5+2*x)*(2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2),x)
```

```
[Out] Integral((2*x + 5)*(2*x**2 - x + 3)**(3/2)*(5*x**4 - x**3 + 3*x**
2 + x + 2), x)
```

GIAC/XCAS [A] time = 0.277681, size = 119, normalized size = 0.72

$$\frac{1}{660602880}\left(4\left(8\left(4\left(16\left(20\left(8\left(28\left(160\,x+319\right)x+3153\right)x+295847\right)x+185101\right)x+98978829\right)x+152207433\right)x+3089440197\right.$$
$$-\frac{147157749}{8388608}\sqrt{2}\ln\left(-2\sqrt{2}\left(\sqrt{2}x-\sqrt{2\,x^2-x+3}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)*(2*x + 5),x, algorith
```

```
[Out] 1/660602880*(4*(8*(4*(16*(20*(8*(28*(160*x + 319)*x + 3153)*x + 2
95847)*x + 185101)*x + 98978829)*x + 152207433)*x + 3089440197)*x
 + 1592737263)*sqrt(2*x^2 - x + 3) - 147157749/8388608*sqrt(2)*ln
(-2*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3)) + 1)
```

3.335 $\int \left(3-x+2x^2\right)^{3/2} \left(2+x+3x^2-x^3+5x^4\right)\, dx$

Optimal. Leaf size=147

$$\frac{23}{448}\left(2x^2-x+3\right)^{5/2}x^2+\frac{125\left(2x^2-x+3\right)^{5/2}x}{3584}+\frac{1167\left(2x^2-x+3\right)^{5/2}}{14336}-\frac{8597(1-4x)\left(2x^2-x+3\right)^{3/2}}{65536}-\frac{593193(1-4x)\sqrt{2x^2-x+3}}{1048576}+\frac{5}{16}\left(2x^2-x+3\right)^{5/2}x^3-\frac{13643439\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{2097152\sqrt{2}}$$

```
[Out] (-593193*(1 - 4*x)*Sqrt[3 - x + 2*x^2])/1048576 - (8597*(1 - 4*x)
*(3 - x + 2*x^2)^(3/2))/65536 + (1167*(3 - x + 2*x^2)^(5/2))/1433
6 + (125*x*(3 - x + 2*x^2)^(5/2))/3584 + (23*x^2*(3 - x + 2*x^2)^
(5/2))/448 + (5*x^3*(3 - x + 2*x^2)^(5/2))/16 - (13643439*ArcSinh
[(1 - 4*x)/Sqrt[23]])/(2097152*Sqrt[2])
```

Rubi [A] time = 0.185517, antiderivative size = 147, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.152

$$\frac{23}{448}\left(2x^2-x+3\right)^{5/2}x^2+\frac{125\left(2x^2-x+3\right)^{5/2}x}{3584}+\frac{1167\left(2x^2-x+3\right)^{5/2}}{14336}-\frac{8597(1-4x)\left(2x^2-x+3\right)^{3/2}}{65536}-\frac{593193(1-4x)\sqrt{2x^2-x+3}}{1048576}+\frac{5}{16}\left(2x^2-x+3\right)^{5/2}x^3-\frac{13643439\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{2097152\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4),x]
```


```
[Out] (-593193*(1 - 4*x)*Sqrt[3 - x + 2*x^2])/1048576 - (8597*(1 - 4*x)
*(3 - x + 2*x^2)^(3/2))/65536 + (1167*(3 - x + 2*x^2)^(5/2))/1433
6 + (125*x*(3 - x + 2*x^2)^(5/2))/3584 + (23*x^2*(3 - x + 2*x^2)^
(5/2))/448 + (5*x^3*(3 - x + 2*x^2)^(5/2))/16 - (13643439*ArcSinh
[(1 - 4*x)/Sqrt[23]])/(2097152*Sqrt[2])
```

Rubi in Sympy [A] time = 49.8782, size = 133, normalized size = 0.9

$$\frac{5x^3\left(2x^2-x+3\right)^{\frac{5}{2}}}{16}+\frac{23x^2\left(2x^2-x+3\right)^{\frac{5}{2}}}{448}-\frac{8597\left(-4x+1\right)\left(2x^2-x+3\right)^{\frac{3}{2}}}{65536}-\frac{593193\left(-4x+1\right)\sqrt{2x^2-x+3}}{1048576}+\frac{\left(\frac{1875x}{448}+\frac{17505}{1792}\right)\left(2x^2-x+3\right)^{\frac{5}{2}}}{120}+\frac{13643439\sqrt{2}\,\mathrm{atanh}\left(\frac{\sqrt{2}(4x-1)}{4\sqrt{2x^2-x+3}}\right)}{4194304}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2),x)
```

```
[Out] 5*x**3*(2*x**2 - x + 3)**(5/2)/16 + 23*x**2*(2*x**2 - x + 3)**(5/
2)/448 - 8597*(-4*x + 1)*(2*x**2 - x + 3)**(3/2)/65536 - 593193*(
-4*x + 1)*sqrt(2*x**2 - x + 3)/1048576 + (1875*x/448 + 17505/1792
)*(2*x**2 - x + 3)**(5/2)/120 + 13643439*sqrt(2)*atanh(sqrt(2)*(4
*x - 1)/(4*sqrt(2*x**2 - x + 3)))/4194304
```

Mathematica [A] time = 0.096328, size = 75, normalized size = 0.51

$$\frac{4\sqrt{2x^2-x+3}\left(9175040x^7-7667712x^6+29335552x^5-7497728x^4+27023744x^3+3845856x^2+27845612x-1663407\right)+}{29360128}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4),x]
```

```
[Out] (4*Sqrt[3 - x + 2*x^2]*(-1663407 + 27845612*x + 3845856*x^2 + 270
23744*x^3 - 7497728*x^4 + 29335552*x^5 - 7667712*x^6 + 9175040*x^
7) + 95504073*Sqrt[2]*ArcSinh[(-1 + 4*x)/Sqrt[23]])/29360128
```

Maple [A] time = 0.008, size = 117, normalized size = 0.8

$$\frac{1167}{14336}\left(2x^2-x+3\right)^{\frac{5}{2}}+\frac{34388x-8597}{65536}\left(2x^2-x+3\right)^{\frac{3}{2}}+\frac{2372772x-593193}{1048576}\sqrt{2x^2-x+3}+\frac{13643439\sqrt{2}}{4194304}\mathit{Arcsinh}\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)+\frac{125x}{3584}\left(2x^2-x+3\right)^{\frac{5}{2}}+\frac{23x^2}{448}\left(2x^2-x+3\right)^{\frac{5}{2}}+\frac{5x^3}{16}\left(2x^2-x+3\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((2*x^2-x+3)^(3/2)*(5*x^4-x^3+3*x^2+x+2),x)
```

```
[Out] 1167/14336*(2*x^2-x+3)^(5/2)+8597/65536*(4*x-1)*(2*x^2-x+3)^(3/2)
+593193/1048576*(4*x-1)*(2*x^2-x+3)^(1/2)+13643439/4194304*2^(1/2
)*arcsinh(4/23*23^(1/2)*(x-1/4))+125/3584*x*(2*x^2-x+3)^(5/2)+23/
448*x^2*(2*x^2-x+3)^(5/2)+5/16*x^3*(2*x^2-x+3)^(5/2)
```

Maxima [A] time = 0.789903, size = 186, normalized size = 1.27

$$\frac{5}{16}\left(2x^2-x+3\right)^{\frac{5}{2}}x^3+\frac{23}{448}\left(2x^2-x+3\right)^{\frac{5}{2}}x^2+\frac{125}{3584}\left(2x^2-x+3\right)^{\frac{5}{2}}x+\frac{1167}{14336}\left(2x^2-x+3\right)^{\frac{5}{2}}+\frac{8597}{16384}\left(2x^2-x+3\right)^{\frac{3}{2}}x-\frac{8597}{65536}\left(2x^2-x+3\right)^{\frac{3}{2}}+\frac{593193}{262144}\sqrt{2x^2-x+3}x+\frac{13643439}{4194304}\sqrt{2}\,\mathrm{arsinh}\left(\frac{1}{23}\sqrt{23}(4x-1)\right)-\frac{593193}{1048576}\sqrt{2x^2-x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2),x, algorithm="maxima
```

```
[Out] 5/16*(2*x^2 - x + 3)^(5/2)*x^3 + 23/448*(2*x^2 - x + 3)^(5/2)*x^2
 + 125/3584*(2*x^2 - x + 3)^(5/2)*x + 1167/14336*(2*x^2 - x + 3)^
(5/2) + 8597/16384*(2*x^2 - x + 3)^(3/2)*x - 8597/65536*(2*x^2 -
x + 3)^(3/2) + 593193/262144*sqrt(2*x^2 - x + 3)*x + 13643439/419
4304*sqrt(2)*arcsinh(1/23*sqrt(23)*(4*x - 1)) - 593193/1048576*sq
rt(2*x^2 - x + 3)
```

Fricas [A] time = 0.279785, size = 130, normalized size = 0.88

$$\frac{1}{58720256}\sqrt{2}\Big(4\sqrt{2}\big(9175040x^7-7667712x^6+29335552x^5-7497728x^4+27023744x^3+3845856x^2+27845612x-166$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2),x, algorithm="fricas
```

```
[Out] 1/58720256*sqrt(2)*(4*sqrt(2)*(9175040*x^7 - 7667712*x^6 + 293355
52*x^5 - 7497728*x^4 + 27023744*x^3 + 3845856*x^2 + 27845612*x -
1663407)*sqrt(2*x^2 - x + 3) + 95504073*log(-sqrt(2)*(32*x^2 - 16
*x + 25) - 8*sqrt(2*x^2 - x + 3)*(4*x - 1)))
```

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

$$\int \left(2x^2 - x + 3\right)^{\frac{3}{2}} \left(5x^4 - x^3 + 3x^2 + x + 2\right) \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2),x)
```

```
[Out] Integral((2*x**2 - x + 3)**(3/2)*(5*x**4 - x**3 + 3*x**2 + x + 2)
, x)
```

GIAC/XCAS [A] time = 0.274863, size = 112, normalized size = 0.76

$$\frac{1}{7340032} \left(4 \left(8 \left(4 \left(16 \left(4 \left(8 \left(140 \, x - 117\right)x + 3581\right)x - 3661\right)x + 211123\right)x + 120183\right)x + 6961403\right)x - 1663407\right)\sqrt{2 \, x^2 - x + 3} - \frac{13643439}{4194304} \sqrt{2}\ln \left(-2 \sqrt{2}\left(\sqrt{2}x - \sqrt{2 \, x^2 - x + 3}\right) + 1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2),x, algorithm="giac")
```

```
[Out] 1/7340032*(4*(8*(4*(16*(4*(8*(140*x - 117)*x + 3581)*x - 3661)*x
+ 211123)*x + 120183)*x + 6961403)*x - 1663407)*sqrt(2*x^2 - x +
3) - 13643439/4194304*sqrt(2)*ln(-2*sqrt(2)*(sqrt(2)*x - sqrt(2*x
^2 - x + 3)) + 1)
```

3.336 $\int \frac{(3-x+2x^2)^{3/2}(2+x+3x^2-x^3+5x^4)}{5+2x}\,dx$

Optimal. Leaf size=172

$$\frac{5}{112}(2x+5)^2\left(2x^2-x+3\right)^{5/2}-\frac{311}{448}(2x+5)\left(2x^2-x+3\right)^{5/2}+\frac{3505}{896}\left(2x^2-x+3\right)^{5/2}+\frac{(500141-123060x)\left(2x^2-x+3\right)^{3/2}}{12288}+\frac{(141051019-23482924x)\sqrt{2x^2-x+3}}{65536}-\frac{99009\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{8\sqrt{2}}+\frac{1622009981\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{131072\sqrt{2}}$$

```
[Out] ((141051019 - 23482924*x)*Sqrt[3 - x + 2*x^2])/65536 + ((500141 -
 123060*x)*(3 - x + 2*x^2)^(3/2))/12288 + (3505*(3 - x + 2*x^2)^(
5/2))/896 - (311*(5 + 2*x)*(3 - x + 2*x^2)^(5/2))/448 + (5*(5 + 2
*x)^2*(3 - x + 2*x^2)^(5/2))/112 + (1622009981*ArcSinh[(1 - 4*x)/
Sqrt[23]])/(131072*Sqrt[2]) - (99009*ArcTanh[(17 - 22*x)/(12*Sqrt
[2]*Sqrt[3 - x + 2*x^2])])/(8*Sqrt[2])
```

Rubi [A] time = 0.507909, antiderivative size = 172, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 7, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.175

$$\frac{5}{112}(2x+5)^2\left(2x^2-x+3\right)^{5/2}-\frac{311}{448}(2x+5)\left(2x^2-x+3\right)^{5/2}+\frac{3505}{896}\left(2x^2-x+3\right)^{5/2}+\frac{(500141-123060x)\left(2x^2-x+3\right)^{3/2}}{12288}+\frac{(141051019-23482924x)\sqrt{2x^2-x+3}}{65536}-\frac{99009\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{8\sqrt{2}}+\frac{1622009981\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{131072\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x),x]
```

```
[Out] ((141051019 - 23482924*x)*Sqrt[3 - x + 2*x^2])/65536 + ((500141 -
 123060*x)*(3 - x + 2*x^2)^(3/2))/12288 + (3505*(3 - x + 2*x^2)^(
5/2))/896 - (311*(5 + 2*x)*(3 - x + 2*x^2)^(5/2))/448 + (5*(5 + 2
*x)^2*(3 - x + 2*x^2)^(5/2))/112 + (1622009981*ArcSinh[(1 - 4*x)/
Sqrt[23]])/(131072*Sqrt[2]) - (99009*ArcTanh[(17 - 22*x)/(12*Sqrt
[2]*Sqrt[3 - x + 2*x^2])])/(8*Sqrt[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((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.226822, size = 116, normalized size = 0.67

$$-\frac{99009\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)}{8\sqrt{2}}+\frac{\sqrt{2x^2-x+3}\left(983040x^6-3710976x^5+14493696x^4-46476672x^3+159973408x^2-609499532x+3149403255\right)}{1376256}+\frac{99009\log(2x+5)}{8\sqrt{2}}-\frac{1622009981\sinh^{-1}\left(\frac{4x-1}{\sqrt{23}}\right)}{131072\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x),x]
```

```
[Out] (Sqrt[3 - x + 2*x^2]*(3149403255 - 609499532*x + 159973408*x^2 - 
46476672*x^3 + 14493696*x^4 - 3710976*x^5 + 983040*x^6))/1376256 
- (1622009981*ArcSinh[(-1 + 4*x)/Sqrt[23]])/(131072*Sqrt[2]) + (9
9009*Log[5 + 2*x])/(8*Sqrt[2]) - (99009*Log[17 - 22*x + 12*Sqrt[6
 - 2*x + 4*x^2]])/(8*Sqrt[2])
```

Maple [A] time = 0.012, size = 183, normalized size = 1.1

$$-\frac{41020\,x-10255}{4096}\left(2\,x^2-x+3\right)^{\frac{3}{2}}-\frac{2830380\,x-707595}{65536}\sqrt{2\,x^2-x+3}-\frac{1622009981\,\sqrt{2}}{262144}Arcsinh\left(\frac{4\,\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)+\frac{1395}{896}\left(2\,x^2-x+3\right)^{\frac{5}{2}}-\frac{111\,x}{224}\left(2\,x^2-x+3\right)^{\frac{5}{2}}+\frac{5\,x^2}{28}\left(2\,x^2-x+3\right)^{\frac{5}{2}}+\frac{3667}{96}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}-\frac{161348\,x-40337}{512}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}+\frac{33003}{16}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}-\frac{99009\,\sqrt{2}}{16}Artanh\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((2*x^2-x+3)^(3/2)*(5*x^4-x^3+3*x^2+x+2)/(5+2*x),x)
```

```
[Out] -10255/4096*(4*x-1)*(2*x^2-x+3)^(3/2)-707595/65536*(4*x-1)*(2*x^2
-x+3)^(1/2)-1622009981/262144*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/
4))+1395/896*(2*x^2-x+3)^(5/2)-111/224*x*(2*x^2-x+3)^(5/2)+5/28*x
^2*(2*x^2-x+3)^(5/2)+3667/96*(2*(x+5/2)^2-11*x-19/2)^(3/2)-40337/
512*(4*x-1)*(2*(x+5/2)^2-11*x-19/2)^(1/2)+33003/16*(2*(x+5/2)^2-1
1*x-19/2)^(1/2)-99009/16*2^(1/2)*arctanh(1/12*(17/2-11*x)*2^(1/2)
/(2*(x+5/2)^2-11*x-19/2)^(1/2))
```

Maxima [A] time = 0.808089, size = 212, normalized size = 1.23

$$\frac{5}{28}\left(2x^2-x+3\right)^{\frac{5}{2}}x^2-\frac{111}{224}\left(2x^2-x+3\right)^{\frac{5}{2}}x+\frac{1395}{896}\left(2x^2-x+3\right)^{\frac{5}{2}}-\frac{10255}{1024}\left(2x^2-x+3\right)^{\frac{3}{2}}x+\frac{500141}{12288}\left(2x^2-x+3\right)^{\frac{3}{2}}-\frac{5870731}{16384}\sqrt{2x^2-x+3}x-\frac{1622009981}{262144}\sqrt{2}\operatorname{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{99009}{16}\sqrt{2}\operatorname{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2x+5|}-\frac{17\sqrt{23}}{23\,|2x+5|}\right)+\frac{141051019}{65536}\sqrt{2x^2-x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5),x, algorith
```

```
[Out] 5/28*(2*x^2 - x + 3)^(5/2)*x^2 - 111/224*(2*x^2 - x + 3)^(5/2)*x
+ 1395/896*(2*x^2 - x + 3)^(5/2) - 10255/1024*(2*x^2 - x + 3)^(3/
2)*x + 500141/12288*(2*x^2 - x + 3)^(3/2) - 5870731/16384*sqrt(2*
x^2 - x + 3)*x - 1622009981/262144*sqrt(2)*arcsinh(4/23*sqrt(23)*
x - 1/23*sqrt(23)) + 99009/16*sqrt(2)*arcsinh(22/23*sqrt(23)*x/ab
s(2*x + 5) - 17/23*sqrt(23)/abs(2*x + 5)) + 141051019/65536*sqrt(
2*x^2 - x + 3)
```

Fricas [A] time = 0.287224, size = 192, normalized size = 1.12

$$\frac{1}{11010048}\sqrt{2}\left(4\sqrt{2}\left(983040x^6-3710976x^5+14493696x^4-46476672x^3+159973408x^2-609499532x+3149403255\right)\sqrt{2}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5),x, algorith
```

```
[Out] 1/11010048*sqrt(2)*(4*sqrt(2)*(983040*x^6 - 3710976*x^5 + 1449369
6*x^4 - 46476672*x^3 + 159973408*x^2 - 609499532*x + 3149403255)*
```

```
sqrt(2*x^2 - x + 3) + 34062209601*log(-sqrt(2)*(32*x^2 - 16*x + 2
5) + 8*sqrt(2*x^2 - x + 3)*(4*x - 1)) + 34065432576*log(-(sqrt(2)
*(1060*x^2 - 1036*x + 1153) + 48*sqrt(2*x^2 - x + 3)*(22*x - 17))
/(4*x^2 + 20*x + 25)))
```

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

$$\int \frac{(2x^2 - x + 3)^{\frac{3}{2}} (5x^4 - x^3 + 3x^2 + x + 2)}{2x + 5} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x),x)
```

```
[Out] Integral((2*x**2 - x + 3)**(3/2)*(5*x**4 - x**3 + 3*x**2 + x + 2)
/(2*x + 5), x)
```

GIAC/XCAS [A] time = 0.288562, size = 188, normalized size = 1.09

$$\frac{1}{1376256} (4 (8 (12 (16 (4 (40 x - 151)x + 2359)x - 121033)x + 4999169)x - 152374883)x + 3149403255)\sqrt{2 x^2 - x + 3} + \frac{1622009981}{262144} \sqrt{2}\ln \left(-4 \sqrt{2}x + \sqrt{2} + 4 \sqrt{2 x^2 - x + 3}\right) - \frac{99009}{16} \sqrt{2}\ln \left(\left|-2 \sqrt{2}x + \sqrt{2} + 2 \sqrt{2 x^2 - x + 3}\right|\right) + \frac{99009}{16} \sqrt{2}\ln \left(\left|-2 \sqrt{2}x - 11 \sqrt{2} + 2 \sqrt{2 x^2 - x + 3}\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5),x, algorith
```

```
[Out] 1/1376256*(4*(8*(12*(16*(4*(40*x - 151)*x + 2359)*x - 121033)*x +
 4999169)*x - 152374883)*x + 3149403255)*sqrt(2*x^2 - x + 3) + 16
22009981/262144*sqrt(2)*ln(-4*sqrt(2)*x + sqrt(2) + 4*sqrt(2*x^2
- x + 3)) - 99009/16*sqrt(2)*ln(abs(-2*sqrt(2)*x + sqrt(2) + 2*sq
rt(2*x^2 - x + 3))) + 99009/16*sqrt(2)*ln(abs(-2*sqrt(2)*x - 11*s
qrt(2) + 2*sqrt(2*x^2 - x + 3)))
```

3.337 $\int \frac{(3-x+2x^2)^{3/2}(2+x+3x^2-x^3+5x^4)}{(5+2x)^2}\,dx$

Optimal. Leaf size=172

$$\frac{5}{96}(2x+5)\left(2x^2-x+3\right)^{5/2}-\frac{3667\left(2x^2-x+3\right)^{5/2}}{576(2x+5)}-\frac{839}{960}\left(2x^2-x+3\right)^{5/2}-\frac{(909513-226052x)\left(2x^2-x+3\right)^{3/2}}{18432}-\frac{(85448933-14243732x)\sqrt{2x^2-x+3}}{32768}+\frac{959625\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{64\sqrt{2}}-\frac{982669459\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{65536\sqrt{2}}$$

```
[Out] -((85448933 - 14243732*x)*Sqrt[3 - x + 2*x^2])/32768 - ((909513 -
 226052*x)*(3 - x + 2*x^2)^(3/2))/18432 - (839*(3 - x + 2*x^2)^(5
/2))/960 - (3667*(3 - x + 2*x^2)^(5/2))/(576*(5 + 2*x)) + (5*(5 +
 2*x)*(3 - x + 2*x^2)^(5/2))/96 - (982669459*ArcSinh[(1 - 4*x)/Sq
rt[23]])/(65536*Sqrt[2]) + (959625*ArcTanh[(17 - 22*x)/(12*Sqrt[2
]*Sqrt[3 - x + 2*x^2])])/(64*Sqrt[2])
```

Rubi [A] time = 0.514709, antiderivative size = 172, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 8, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{5}{96}(2x+5)\left(2x^2-x+3\right)^{5/2}-\frac{3667\left(2x^2-x+3\right)^{5/2}}{576(2x+5)}-\frac{839}{960}\left(2x^2-x+3\right)^{5/2}-\frac{(909513-226052x)\left(2x^2-x+3\right)^{3/2}}{18432}-\frac{(85448933-14243732x)\sqrt{2x^2-x+3}}{32768}+\frac{959625\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{64\sqrt{2}}-\frac{982669459\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{65536\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^2,x]
```


```
[Out] -((85448933 - 14243732*x)*Sqrt[3 - x + 2*x^2])/32768 - ((909513 -
 226052*x)*(3 - x + 2*x^2)^(3/2))/18432 - (839*(3 - x + 2*x^2)^(5
/2))/960 - (3667*(3 - x + 2*x^2)^(5/2))/(576*(5 + 2*x)) + (5*(5 +
 2*x)*(3 - x + 2*x^2)^(5/2))/96 - (982669459*ArcSinh[(1 - 4*x)/Sq
rt[23]])/(65536*Sqrt[2]) + (959625*ArcTanh[(17 - 22*x)/(12*Sqrt[2
]*Sqrt[3 - x + 2*x^2])])/(64*Sqrt[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((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.433414, size = 119, normalized size = 0.69

$$\frac{14739840000\sqrt{2}\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{4\sqrt{2x^2-x+3}(409600x^6-1798144x^5+8283904x^4-35369408x^3+182033816x^2-1404323114x-6}{2x+5}}{1966080}$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^2,x]
```

```
[Out] ((4*Sqrt[3 - x + 2*x^2]*(-6814208295 - 1404323114*x + 182033816*x
^2 - 35369408*x^3 + 8283904*x^4 - 1798144*x^5 + 409600*x^6))/(5 +
 2*x) + 14740041885*Sqrt[2]*ArcSinh[(-1 + 4*x)/Sqrt[23]] - 147398
40000*Sqrt[2]*Log[5 + 2*x] + 14739840000*Sqrt[2]*Log[17 - 22*x +
12*Sqrt[6 - 2*x + 4*x^2]])/1966080
```

Maple [A] time = 0.019, size = 208, normalized size = 1.2

$$\frac{36236\,x-9059}{6144}\left(2\,x^2-x+3\right)^{\frac{3}{2}}+\frac{833428\,x-208357}{32768}\sqrt{2\,x^2-x+3}+\frac{982669459\,\sqrt{2}}{131072}Arcsinh\left(\frac{4\,\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)-\frac{589}{960}\left(2\,x^2-x+3\right)^{\frac{5}{2}}+\frac{5\,x}{48}\left(2\,x^2-x+3\right)^{\frac{5}{2}}-\frac{3667}{1152}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-1}-\frac{106625}{2304}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}+\frac{6548\,x-1637}{16}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}-\frac{319875}{128}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}+\frac{959625\,\sqrt{2}}{128}Artanh\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}\right)+\frac{14668\,x-3667}{2304}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((2*x^2-x+3)^(3/2)*(5*x^4-x^3+3*x^2+x+2)/(5+2*x)^2,x)
```

```
[Out] 9059/6144*(4*x-1)*(2*x^2-x+3)^(3/2)+208357/32768*(4*x-1)*(2*x^2-x
+3)^(1/2)+982669459/131072*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4))
-589/960*(2*x^2-x+3)^(5/2)+5/48*x*(2*x^2-x+3)^(5/2)-3667/1152/(x+
5/2)*(2*(x+5/2)^2-11*x-19/2)^(5/2)-106625/2304*(2*(x+5/2)^2-11*x-
19/2)^(3/2)+1637/16*(4*x-1)*(2*(x+5/2)^2-11*x-19/2)^(1/2)-319875/
128*(2*(x+5/2)^2-11*x-19/2)^(1/2)+959625/128*2^(1/2)*arctanh(1/12
*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))+3667/2304*(4*
x-1)*(2*(x+5/2)^2-11*x-19/2)^(3/2)
```

Maxima [A] time = 0.776547, size = 217, normalized size = 1.26

$$\frac{5}{48}\left(2x^2-x+3\right)^{\frac{5}{2}}x-\frac{589}{960}\left(2x^2-x+3\right)^{\frac{5}{2}}+\frac{9059}{1536}\left(2x^2-x+3\right)^{\frac{3}{2}}x-\frac{185827}{6144}\left(2x^2-x+3\right)^{\frac{3}{2}}+\frac{3560933}{8192}\sqrt{2x^2-x+3}\,x+\frac{982669459}{131072}\sqrt{2}\operatorname{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)-\frac{959625}{128}\sqrt{2}\operatorname{arsinh}\left(\frac{22\sqrt{23}x}{23\left|2x+5\right|}-\frac{17\sqrt{23}}{23\left|2x+5\right|}\right)-\frac{85448933}{32768}\sqrt{2x^2-x+3}-\frac{3667\left(2x^2-x+3\right)^{\frac{3}{2}}}{32\left(2x+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^2,x, algori
```

```
[Out] 5/48*(2*x^2 - x + 3)^(5/2)*x - 589/960*(2*x^2 - x + 3)^(5/2) + 90
59/1536*(2*x^2 - x + 3)^(3/2)*x - 185827/6144*(2*x^2 - x + 3)^(3/
2) + 3560933/8192*sqrt(2*x^2 - x + 3)*x + 982669459/131072*sqrt(2
)*arcsinh(4/23*sqrt(23)*x - 1/23*sqrt(23)) - 959625/128*sqrt(2)*a
rcsinh(22/23*sqrt(23)*x/abs(2*x + 5) - 17/23*sqrt(23)/abs(2*x + 5
)) - 85448933/32768*sqrt(2*x^2 - x + 3) - 3667/32*(2*x^2 - x + 3)
^(3/2)/(2*x + 5)
```

Fricas [A] time = 0.29136, size = 215, normalized size = 1.25

$$\frac{\sqrt{2}\Big(4\sqrt{2}\left(409600x^6-1798144x^5+8283904x^4-35369408x^3+182033816x^2-1404323114x-6814208295\right)\sqrt{2x^2-x+}}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^2,x, algori
```

```
[Out] 1/3932160*sqrt(2)*(4*sqrt(2)*(409600*x^6 - 1798144*x^5 + 8283904*
x^4 - 35369408*x^3 + 182033816*x^2 - 1404323114*x - 6814208295)*s
qrt(2*x^2 - x + 3) + 14740041885*(2*x + 5)*log(-sqrt(2)*(32*x^2 -
 16*x + 25) - 8*sqrt(2*x^2 - x + 3)*(4*x - 1)) + 14739840000*(2*x
 + 5)*log(-(sqrt(2)*(1060*x^2 - 1036*x + 1153) - 48*sqrt(2*x^2 -
x + 3)*(22*x - 17))/(4*x^2 + 20*x + 25)))/(2*x + 5)
```

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

$$\int \frac{\left(2x^2 - x + 3\right)^{\frac{3}{2}} \left(5x^4 - x^3 + 3x^2 + x + 2\right)}{\left(2x + 5\right)^2}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x)**2,x)
```

```
[Out] Integral((2*x**2 - x + 3)**(3/2)*(5*x**4 - x**3 + 3*x**2 + x + 2)
/(2*x + 5)**2, x)
```

GIAC/XCAS [A] time = 0.337733, size = 954, normalized size = 5.55

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^2,x, algori
```

```
[Out] 1/1966080*sqrt(2)*(14739840000*ln(12*sqrt(-11/(2*x + 5) + 36/(2*x
 + 5)^2 + 1) + 72/(2*x + 5) - 11)*sign(1/(2*x + 5)) + 14740041885
*ln(abs(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5) +
1))*sign(1/(2*x + 5)) - 14740041885*ln(abs(sqrt(-11/(2*x + 5) + 3
6/(2*x + 5)^2 + 1) + 6/(2*x + 5) - 1))*sign(1/(2*x + 5)) - 202770
4320*sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1)*sign(1/(2*x + 5)) +
 2*(45496763235*(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*
x + 5))^11*sign(1/(2*x + 5)) - 126553743360*(sqrt(-11/(2*x + 5) +
 36/(2*x + 5)^2 + 1) + 6/(2*x + 5))^10*sign(1/(2*x + 5)) + 440627
68335*(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5))^9*
sign(1/(2*x + 5)) + 33178982400*(sqrt(-11/(2*x + 5) + 36/(2*x + 5
)^2 + 1) + 6/(2*x + 5))^8*sign(1/(2*x + 5)) + 294206421582*(sqrt(
-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5))^7*sign(1/(2*x
+ 5)) - 463672074240*(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) +
6/(2*x + 5))^6*sign(1/(2*x + 5)) + 35099942478*(sqrt(-11/(2*x + 5
) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5))^5*sign(1/(2*x + 5)) + 1713
24610560*(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5))
```

```
^4*sign(1/(2*x + 5)) + 60059281615*(sqrt(-11/(2*x + 5) + 36/(2*x
+ 5)^2 + 1) + 6/(2*x + 5))^3*sign(1/(2*x + 5)) - 105051009024*(sq
rt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5))^2*sign(1/(2
*x + 5)) - 5210329245*(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) +
 6/(2*x + 5))*sign(1/(2*x + 5)) + 17058392064*sign(1/(2*x + 5)))/
((sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5))^2 - 1)^
6)
```

3.338 $\int \frac{(3-x+2x^2)^{3/2}(2+x+3x^2-x^3+5x^4)}{(5+2x)^3} dx$

Optimal. Leaf size=174

$$\frac{438065\,(2x^2-x+3)^{5/2}}{82944(2x+5)}-\frac{3667\,(2x^2-x+3)^{5/2}}{1152(2x+5)^2}+\frac{1}{16}\,(2x^2-x+3)^{5/2}+\frac{(2154633-534617x)\,(2x^2-x+3)^{3/2}}{82944}+\frac{(33741483-5623292x)\sqrt{2x^2-x+3}}{24576}-\frac{8083915\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{1024\sqrt{2}}+\frac{129342063\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{16384\sqrt{2}}$$

```
[Out] ((33741483 - 5623292*x)*Sqrt[3 - x + 2*x^2])/24576 + ((2154633 -
534617*x)*(3 - x + 2*x^2)^(3/2))/82944 + (3 - x + 2*x^2)^(5/2)/16
 - (3667*(3 - x + 2*x^2)^(5/2))/(1152*(5 + 2*x)^2) + (438065*(3 -
 x + 2*x^2)^(5/2))/(82944*(5 + 2*x)) + (129342063*ArcSinh[(1 - 4*
x)/Sqrt[23]])/(16384*Sqrt[2]) - (8083915*ArcTanh[(17 - 22*x)/(12*
Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(1024*Sqrt[2])
```

Rubi [A] time = 0.513504, antiderivative size = 174, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 8, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$\frac{438065\,(2x^2-x+3)^{5/2}}{82944(2x+5)}-\frac{3667\,(2x^2-x+3)^{5/2}}{1152(2x+5)^2}+\frac{1}{16}\,(2x^2-x+3)^{5/2}+\frac{(2154633-534617x)\,(2x^2-x+3)^{3/2}}{82944}+\frac{(33741483-5623292x)\sqrt{2x^2-x+3}}{24576}-\frac{8083915\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{1024\sqrt{2}}+\frac{129342063\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{16384\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^3,x]
```

```
[Out] ((33741483 - 5623292*x)*Sqrt[3 - x + 2*x^2])/24576 + ((2154633 -
534617*x)*(3 - x + 2*x^2)^(3/2))/82944 + (3 - x + 2*x^2)^(5/2)/16
 - (3667*(3 - x + 2*x^2)^(5/2))/(1152*(5 + 2*x)^2) + (438065*(3 -
 x + 2*x^2)^(5/2))/(82944*(5 + 2*x)) + (129342063*ArcSinh[(1 - 4*
x)/Sqrt[23]])/(16384*Sqrt[2]) - (8083915*ArcTanh[(17 - 22*x)/(12*
Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(1024*Sqrt[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((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.440337, size = 119, normalized size = 0.68

$$\frac{-129342640\sqrt{2}\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{4\sqrt{2x^2-x+3}(8192x^6-43520x^5+253312x^4-1620944x^3+16667188x^2+181223072x+298966737)}{(2x+5)^2}}{32768}$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^3,x]
```

```
[Out] ((4*Sqrt[3 - x + 2*x^2]*(298966737 + 181223072*x + 16667188*x^2 -
 1620944*x^3 + 253312*x^4 - 43520*x^5 + 8192*x^6))/(5 + 2*x)^2 -
129342063*Sqrt[2]*ArcSinh[(-1 + 4*x)/Sqrt[23]] + 129342640*Sqrt[2
]*Log[5 + 2*x] - 129342640*Sqrt[2]*Log[17 - 22*x + 12*Sqrt[6 - 2*
x + 4*x^2]])/32768
```

Maple [A] time = 0.017, size = 214, normalized size = 1.2

$$-\frac{596x-149}{512}\left(2x^2-x+3\right)^{\frac{3}{2}}-\frac{41124x-10281}{8192}\sqrt{2x^2-x+3}-\frac{129342063\sqrt{2}}{32768}\mathit{Arcsinh}\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)+\frac{1}{16}\left(2x^2-x+3\right)^{\frac{5}{2}}-\frac{3667}{4608}\left(2\left(x+5/2\right)^2-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-2}+\frac{438065}{165888}\left(2\left(x+5/2\right)^2-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-1}+\frac{8083915}{331776}\left(2\left(x+5/2\right)^2-11x-\frac{19}{2}\right)^{\frac{3}{2}}-\frac{1374980x-343745}{6144}\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}+\frac{8083915}{6144}\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}-\frac{8083915\sqrt{2}}{2048}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11x\right)\frac{1}{\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}}\right)-\frac{1752260x-438065}{331776}\left(2\left(x+5/2\right)^2-11x-\frac{19}{2}\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((2*x^2-x+3)^(3/2)*(5*x^4-x^3+3*x^2+x+2)/(5+2*x)^3,x)
```

```
[Out] -149/512*(4*x-1)*(2*x^2-x+3)^(3/2)-10281/8192*(4*x-1)*(2*x^2-x+3)
^(1/2)-129342063/32768*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4))+1/1
6*(2*x^2-x+3)^(5/2)-3667/4608/(x+5/2)^2*(2*(x+5/2)^2-11*x-19/2)^(
5/2)+438065/165888/(x+5/2)*(2*(x+5/2)^2-11*x-19/2)^(5/2)+8083915/
331776*(2*(x+5/2)^2-11*x-19/2)^(3/2)-343745/6144*(4*x-1)*(2*(x+5/
2)^2-11*x-19/2)^(1/2)+8083915/6144*(2*(x+5/2)^2-11*x-19/2)^(1/2)-
8083915/2048*2^(1/2)*arctanh(1/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^
2-11*x-19/2)^(1/2))-438065/331776*(4*x-1)*(2*(x+5/2)^2-11*x-19/2)
^(3/2)
```

Maxima [A] time = 0.782847, size = 232, normalized size = 1.33

$$\frac{1}{16}\left(2x^2-x+3\right)^{\frac{5}{2}}-\frac{149}{128}\left(2x^2-x+3\right)^{\frac{3}{2}}x+\frac{46691}{4608}\left(2x^2-x+3\right)^{\frac{3}{2}}-\frac{3667\left(2x^2-x+3\right)^{\frac{5}{2}}}{1152\left(4x^2+20x+25\right)}-\frac{1405823}{6144}\sqrt{2x^2-x+3}x-\frac{129342063}{32768}\sqrt{2}\,\mathrm{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{8083915}{2048}\sqrt{2}\,\mathrm{arsinh}\left(\frac{22\sqrt{23}x}{23\left|2x+5\right|}-\frac{17\sqrt{23}}{23\left|2x+5\right|}\right)+\frac{11247161}{8192}\sqrt{2x^2-x+3}+\frac{438065\left(2x^2-x+3\right)^{\frac{3}{2}}}{4608\left(2x+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^3,x, algori
```

```
[Out] 1/16*(2*x^2 - x + 3)^(5/2) - 149/128*(2*x^2 - x + 3)^(3/2)*x + 46
691/4608*(2*x^2 - x + 3)^(3/2) - 3667/1152*(2*x^2 - x + 3)^(5/2)/
(4*x^2 + 20*x + 25) - 1405823/6144*sqrt(2*x^2 - x + 3)*x - 129342
063/32768*sqrt(2)*arcsinh(4/23*sqrt(23)*x - 1/23*sqrt(23)) + 8083
915/2048*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5) - 17/23*sq
rt(23)/abs(2*x + 5)) + 11247161/8192*sqrt(2*x^2 - x + 3) + 438065
/4608*(2*x^2 - x + 3)^(3/2)/(2*x + 5)
```

Fricas [A] time = 0.299671, size = 235, normalized size = 1.35

$$\frac{\sqrt{2}\Big(4\sqrt{2}\left(8192\,x^6 - 43520\,x^5 + 253312\,x^4 - 1620944\,x^3 + 16667188\,x^2 + 181223072\,x + 298966737\right)\sqrt{2\,x^2 - x + 3} + 129342}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^3,x, algori
```

```
[Out] 1/65536*sqrt(2)*(4*sqrt(2)*(8192*x^6 - 43520*x^5 + 253312*x^4 - 1
620944*x^3 + 16667188*x^2 + 181223072*x + 298966737)*sqrt(2*x^2 -
 x + 3) + 129342063*(4*x^2 + 20*x + 25)*log(-sqrt(2)*(32*x^2 - 16
*x + 25) + 8*sqrt(2*x^2 - x + 3)*(4*x - 1)) + 129342640*(4*x^2 +
20*x + 25)*log(-(sqrt(2)*(1060*x^2 - 1036*x + 1153) + 48*sqrt(2*x
^2 - x + 3)*(22*x - 17))/(4*x^2 + 20*x + 25)))/(4*x^2 + 20*x + 25
)
```

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

$$\int \frac{\left(2x^2 - x + 3\right)^{\frac{3}{2}}\left(5x^4 - x^3 + 3x^2 + x + 2\right)}{\left(2x + 5\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x)**3,x)
```

```
[Out] Integral((2*x**2 - x + 3)**(3/2)*(5*x**4 - x**3 + 3*x**2 + x + 2)
/(2*x + 5)**3, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

undef

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^3,x, algori
```

```
[Out] undef
```

3.339 $\int \frac{(3-x+2x^2)^{3/2}(2+x+3x^2-x^3+5x^4)}{(5+2x)^4}\,dx$

Optimal. Leaf size=181

$$-\frac{32865365\left(2x^2-x+3\right)^{5/2}}{17915904(2x+5)}+\frac{556255\left(2x^2-x+3\right)^{5/2}}{248832(2x+5)^2}-\frac{3667\left(2x^2-x+3\right)^{5/2}}{1728(2x+5)^3}-\frac{(138006843-34265045x)\left(2x^2-x+3\right)^{3/2}}{17915904}-\frac{(135068604-22512089x)\sqrt{2x^2-x+3}}{331776}+\frac{517762327\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{221184\sqrt{2}}-\frac{19176431\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{8192\sqrt{2}}$$

```
[Out] -((135068604 - 22512089*x)*Sqrt[3 - x + 2*x^2])/331776 - ((138006
843 - 34265045*x)*(3 - x + 2*x^2)^(3/2))/17915904 - (3667*(3 - x
+ 2*x^2)^(5/2))/(1728*(5 + 2*x)^3) + (556255*(3 - x + 2*x^2)^(5/2
))/(248832*(5 + 2*x)^2) - (32865365*(3 - x + 2*x^2)^(5/2))/(17915
904*(5 + 2*x)) - (19176431*ArcSinh[(1 - 4*x)/Sqrt[23]])/(8192*Sqr
t[2]) + (517762327*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2
*x^2])])/(221184*Sqrt[2])
```

Rubi [A] time = 0.513365, antiderivative size = 181, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 7, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}} = 0.175$

$$-\frac{32865365\left(2x^2-x+3\right)^{5/2}}{17915904(2x+5)}+\frac{556255\left(2x^2-x+3\right)^{5/2}}{248832(2x+5)^2}-\frac{3667\left(2x^2-x+3\right)^{5/2}}{1728(2x+5)^3}-\frac{(138006843-34265045x)\left(2x^2-x+3\right)^{3/2}}{17915904}-\frac{(135068604-22512089x)\sqrt{2x^2-x+3}}{331776}+\frac{517762327\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{221184\sqrt{2}}-\frac{19176431\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{8192\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^4,x]
```


```
[Out] -((135068604 - 22512089*x)*Sqrt[3 - x + 2*x^2])/331776 - ((138006
843 - 34265045*x)*(3 - x + 2*x^2)^(3/2))/17915904 - (3667*(3 - x
+ 2*x^2)^(5/2))/(1728*(5 + 2*x)^3) + (556255*(3 - x + 2*x^2)^(5/2
))/(248832*(5 + 2*x)^2) - (32865365*(3 - x + 2*x^2)^(5/2))/(17915
904*(5 + 2*x)) - (19176431*ArcSinh[(1 - 4*x)/Sqrt[23]])/(8192*Sqr
t[2]) + (517762327*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2
*x^2])])/(221184*Sqrt[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((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x)**4,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.517604, size = 109, normalized size = 0.6

$$\frac{517762327\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{6\sqrt{4x^2-2x+6}\left(46080x^6-315648x^5+2626848x^4-33595416x^3-594798908x^2-2006873194x-19946507\right.}{(2x+5)^3}}{221184\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^4,x]
```

```
[Out] ((6*Sqrt[6 - 2*x + 4*x^2]*(-1994650739 - 2006873194*x - 594798908
*x^2 - 33595416*x^3 + 2626848*x^4 - 315648*x^5 + 46080*x^6))/(5 +
 2*x)^3 + 517763637*ArcSinh[(-1 + 4*x)/Sqrt[23]] - 517762327*Log[
5 + 2*x] + 517762327*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]])/(
221184*Sqrt[2])
```

Maple [A] time = 0.018, size = 221, normalized size = 1.2

$$\frac{20x-5}{256}\left(2x^{2}-x+3\right)^{\frac{3}{2}}+\frac{1380x-345}{4096}\sqrt{2x^{2}-x+3}$$
$$+\frac{19176431\sqrt{2}}{16384}Arcsinh\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)-\frac{3667}{13824}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-3}$$
$$+\frac{556255}{995328}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-2}$$
$$-\frac{32865365}{35831808}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-1}$$
$$-\frac{517762327}{71663616}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}$$
$$+\frac{89601236x-22400309}{1327104}\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}-\frac{517762327}{1327104}\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}$$
$$+\frac{517762327\sqrt{2}}{442368}Artanh\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11x\right)\frac{1}{\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}}\right)$$
$$+\frac{131461460x-32865365}{71663616}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((2*x^2-x+3)^(3/2)*(5*x^4-x^3+3*x^2+x+2)/(5+2*x)^4,x)
```

```
[Out] 5/256*(4*x-1)*(2*x^2-x+3)^(3/2)+345/4096*(4*x-1)*(2*x^2-x+3)^(1/2
)+19176431/16384*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4))-3667/1382
4/(x+5/2)^3*(2*(x+5/2)^2-11*x-19/2)^(5/2)+556255/995328/(x+5/2)^2
*(2*(x+5/2)^2-11*x-19/2)^(5/2)-32865365/35831808/(x+5/2)*(2*(x+5/
2)^2-11*x-19/2)^(5/2)-517762327/71663616*(2*(x+5/2)^2-11*x-19/2)^
(3/2)+22400309/1327104*(4*x-1)*(2*(x+5/2)^2-11*x-19/2)^(1/2)-5177
62327/1327104*(2*(x+5/2)^2-11*x-19/2)^(1/2)+517762327/442368*2^(1
/2)*arctanh(1/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2
))+32865365/71663616*(4*x-1)*(2*(x+5/2)^2-11*x-19/2)^(3/2)
```

Maxima [A] time = 0.783547, size = 255, normalized size = 1.41

$$\frac{5}{64}\left(2x^2-x+3\right)^{\frac{3}{2}}x-\frac{1094743}{497664}\left(2x^2-x+3\right)^{\frac{3}{2}}-\frac{3667\left(2x^2-x+3\right)^{\frac{5}{2}}}{1728\left(8x^3+60x^2+150x+125\right)}+\frac{556255\left(2x^2-x+3\right)^{\frac{5}{2}}}{248832\left(4x^2+20x+25\right)}+\frac{22512089}{331776}\sqrt{2x^2-x+3}x+\frac{19176431}{16384}\sqrt{2}\,\mathrm{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)-\frac{517762327}{442368}\sqrt{2}\,\mathrm{arsinh}\left(\frac{22\sqrt{23}x}{23\left|2x+5\right|}-\frac{17\sqrt{23}}{23\left|2x+5\right|}\right)-\frac{11255717}{27648}\sqrt{2x^2-x+3}-\frac{32865365\left(2x^2-x+3\right)^{\frac{3}{2}}}{995328\left(2x+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^4,x, algori
```

```
[Out] 5/64*(2*x^2 - x + 3)^(3/2)*x - 1094743/497664*(2*x^2 - x + 3)^(3/
2) - 3667/1728*(2*x^2 - x + 3)^(5/2)/(8*x^3 + 60*x^2 + 150*x + 12
5) + 556255/248832*(2*x^2 - x + 3)^(5/2)/(4*x^2 + 20*x + 25) + 22
512089/331776*sqrt(2*x^2 - x + 3)*x + 19176431/16384*sqrt(2)*arcs
inh(4/23*sqrt(23)*x - 1/23*sqrt(23)) - 517762327/442368*sqrt(2)*a
rcsinh(22/23*sqrt(23)*x/abs(2*x + 5) - 17/23*sqrt(23)/abs(2*x + 5
)) - 11255717/27648*sqrt(2*x^2 - x + 3) - 32865365/995328*(2*x^2
- x + 3)^(3/2)/(2*x + 5)
```

Fricas [A] time = 0.292885, size = 255, normalized size = 1.41

$$\frac{\sqrt{2}\left(12\sqrt{2}\left(46080x^6-315648x^5+2626848x^4-33595416x^3-594798908x^2-2006873194x-1994650739\right)\sqrt{2x^2-x+3}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^4,x, algori
```

```
[Out] 1/884736*sqrt(2)*(12*sqrt(2)*(46080*x^6 - 315648*x^5 + 2626848*x^
4 - 33595416*x^3 - 594798908*x^2 - 2006873194*x - 1994650739)*sqr
t(2*x^2 - x + 3) + 517763637*(8*x^3 + 60*x^2 + 150*x + 125)*log(-
sqrt(2)*(32*x^2 - 16*x + 25) - 8*sqrt(2*x^2 - x + 3)*(4*x - 1)) +
 517762327*(8*x^3 + 60*x^2 + 150*x + 125)*log(-(sqrt(2)*(1060*x^2
 - 1036*x + 1153) - 48*sqrt(2*x^2 - x + 3)*(22*x - 17))/(4*x^2 +
20*x + 25)))/(8*x^3 + 60*x^2 + 150*x + 125)
```

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

$$\int \frac{\left(2x^2 - x + 3\right)^{\frac{3}{2}} \left(5x^4 - x^3 + 3x^2 + x + 2\right)}{\left(2x + 5\right)^4}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x)**4,x)
```

```
[Out] Integral((2*x**2 - x + 3)**(3/2)*(5*x**4 - x**3 + 3*x**2 + x + 2)
/(2*x + 5)**4, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$undef$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^4,x, algori
```

```
[Out] undef
```

3.340 $\int \frac{(3-x+2x^2)^{3/2}(2+x+3x^2-x^3+5x^4)}{(5+2x)^5}\,dx$

Optimal. Leaf size=188

$$-\frac{14477995\left(2x^2-x+3\right)^{5/2}}{23887872(2x+5)^2}+\frac{224815\left(2x^2-x+3\right)^{5/2}}{165888(2x+5)^3}-\frac{3667\left(2x^2-x+3\right)^{5/2}}{2304(2x+5)^4}+\frac{(67865260x+762984903)\left(2x^2-x+3\right)^{3/2}}{95551488(2x+5)}+\frac{(2339916063-389975609x)\sqrt{2x^2-x+3}}{31850496}-\frac{8969688643\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{21233664\sqrt{2}}+\frac{432565\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{1024\sqrt{2}}$$

```
[Out] ((2339916063 - 389975609*x)*Sqrt[3 - x + 2*x^2])/31850496 + ((762
984903 + 67865260*x)*(3 - x + 2*x^2)^(3/2))/(95551488*(5 + 2*x))
- (3667*(3 - x + 2*x^2)^(5/2))/(2304*(5 + 2*x)^4) + (224815*(3 -
x + 2*x^2)^(5/2))/(165888*(5 + 2*x)^3) - (14477995*(3 - x + 2*x^2
)^(5/2))/(23887872*(5 + 2*x)^2) + (432565*ArcSinh[(1 - 4*x)/Sqrt[
23]])/(1024*Sqrt[2]) - (8969688643*ArcTanh[(17 - 22*x)/(12*Sqrt[2
]*Sqrt[3 - x + 2*x^2])])/(21233664*Sqrt[2])
```

Rubi [A] time = 0.52267, antiderivative size = 188, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 8, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$-\frac{14477995\left(2x^2-x+3\right)^{5/2}}{23887872(2x+5)^2}+\frac{224815\left(2x^2-x+3\right)^{5/2}}{165888(2x+5)^3}-\frac{3667\left(2x^2-x+3\right)^{5/2}}{2304(2x+5)^4}+\frac{(67865260x+762984903)\left(2x^2-x+3\right)^{3/2}}{95551488(2x+5)}+\frac{(2339916063-389975609x)\sqrt{2x^2-x+3}}{31850496}-\frac{8969688643\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{21233664\sqrt{2}}+\frac{432565\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{1024\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^5,x]
```


```
[Out] ((2339916063 - 389975609*x)*Sqrt[3 - x + 2*x^2])/31850496 + ((762
984903 + 67865260*x)*(3 - x + 2*x^2)^(3/2))/(95551488*(5 + 2*x))
- (3667*(3 - x + 2*x^2)^(5/2))/(2304*(5 + 2*x)^4) + (224815*(3 -
x + 2*x^2)^(5/2))/(165888*(5 + 2*x)^3) - (14477995*(3 - x + 2*x^2
)^(5/2))/(23887872*(5 + 2*x)^2) + (432565*ArcSinh[(1 - 4*x)/Sqrt[
23]])/(1024*Sqrt[2]) - (8969688643*ArcTanh[(17 - 22*x)/(12*Sqrt[2
]*Sqrt[3 - x + 2*x^2])])/(21233664*Sqrt[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((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x)**5,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.321395, size = 109, normalized size = 0.58

$$\frac{-8969688643\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{12\sqrt{4x^2-2x+6}\left(2949120x^6-29270016x^5+468043776x^4+11761910072x^3+60528581892x^2+121473\right.}{(2x+5)^4}}{21233664\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^5,x]
```

```
[Out] ((12*Sqrt[6 - 2*x + 4*x^2]*(86386856771 + 121473790266*x + 605285
81892*x^2 + 11761910072*x^3 + 468043776*x^4 - 29270016*x^5 + 2949
120*x^6))/(5 + 2*x)^4 - 8969667840*ArcSinh[(-1 + 4*x)/Sqrt[23]] +
 8969688643*Log[5 + 2*x] - 8969688643*Log[17 - 22*x + 12*Sqrt[6 -
 2*x + 4*x^2]])/(21233664*Sqrt[2])
```

Maple [A] time = 0.019, size = 204, normalized size = 1.1

$$-\frac{3667}{36864}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-4}+\frac{224815}{1327104}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-3}-\frac{14477995}{95551488}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-2}+\frac{593321753}{3439853568}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-1}+\frac{8969688643}{6879707136}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}-\frac{1559902436x-389975609}{127401984}\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}+\frac{8969688643}{127401984}\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}-\frac{8969688643\sqrt{2}}{42467328}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11x\right)\frac{1}{\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}}\right)-\frac{2373287012x-593321753}{6879707136}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}-\frac{432565\sqrt{2}}{2048}\mathit{Arcsinh}\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((2*x^2-x+3)^(3/2)*(5*x^4-x^3+3*x^2+x+2)/(5+2*x)^5,x)
```

```
[Out] -3667/36864/(x+5/2)^4*(2*(x+5/2)^2-11*x-19/2)^(5/2)+224815/132710
4/(x+5/2)^3*(2*(x+5/2)^2-11*x-19/2)^(5/2)-14477995/95551488/(x+5/
2)^2*(2*(x+5/2)^2-11*x-19/2)^(5/2)+593321753/3439853568/(x+5/2)*(
2*(x+5/2)^2-11*x-19/2)^(5/2)+8969688643/6879707136*(2*(x+5/2)^2-1
1*x-19/2)^(3/2)-389975609/127401984*(4*x-1)*(2*(x+5/2)^2-11*x-19/
2)^(1/2)+8969688643/127401984*(2*(x+5/2)^2-11*x-19/2)^(1/2)-89696
88643/42467328*2^(1/2)*arctanh(1/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2
)^2-11*x-19/2)^(1/2))-593321753/6879707136*(4*x-1)*(2*(x+5/2)^2-1
1*x-19/2)^(3/2)-432565/2048*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4)
)
```

Maxima [A] time = 0.795628, size = 284, normalized size = 1.51

$$\frac{16966315}{47775744}\left(2x^2-x+3\right)^{\frac{3}{2}}-\frac{3667\left(2x^2-x+3\right)^{\frac{5}{2}}}{2304\left(16x^4+160x^3+600x^2+1000x+625\right)}+\frac{224815\left(2x^2-x+3\right)^{\frac{5}{2}}}{165888\left(8x^3+60x^2+150x+125\right)}-\frac{14477995\left(2x^2-x+3\right)^{\frac{5}{2}}}{23887872\left(4x^2+20x+25\right)}-\frac{389975609}{31850496}\sqrt{2x^2-x+3}x-\frac{432565}{2048}\sqrt{2}\,\mathrm{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{8969688643}{42467328}\sqrt{2}\,\mathrm{arsinh}\left(\frac{22\sqrt{23}x}{23\left|2x+5\right|}-\frac{17\sqrt{23}}{23\left|2x+5\right|}\right)+\frac{779972021}{10616832}\sqrt{2x^2-x+3}+\frac{593321753\left(2x^2-x+3\right)^{\frac{3}{2}}}{95551488\left(2x+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^5,x, algori
```

```
[Out] 16966315/47775744*(2*x^2 - x + 3)^(3/2) - 3667/2304*(2*x^2 - x +
3)^(5/2)/(16*x^4 + 160*x^3 + 600*x^2 + 1000*x + 625) + 224815/165
888*(2*x^2 - x + 3)^(5/2)/(8*x^3 + 60*x^2 + 150*x + 125) - 144779
95/23887872*(2*x^2 - x + 3)^(5/2)/(4*x^2 + 20*x + 25) - 389975609
/31850496*sqrt(2*x^2 - x + 3)*x - 432565/2048*sqrt(2)*arcsinh(4/2
3*sqrt(23)*x - 1/23*sqrt(23)) + 8969688643/42467328*sqrt(2)*arcsi
nh(22/23*sqrt(23)*x/abs(2*x + 5) - 17/23*sqrt(23)/abs(2*x + 5)) +
 779972021/10616832*sqrt(2*x^2 - x + 3) + 593321753/95551488*(2*x
^2 - x + 3)^(3/2)/(2*x + 5)
```

Fricas [A] time = 0.304275, size = 275, normalized size = 1.46

$$\sqrt{2}\Big(24\sqrt{2}\big(2949120x^6-29270016x^5+468043776x^4+11761910072x^3+60528581892x^2+121473790266x+8638685677$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^5,x, algori
```

```
[Out] 1/84934656*sqrt(2)*(24*sqrt(2)*(2949120*x^6 - 29270016*x^5 + 4680
43776*x^4 + 11761910072*x^3 + 60528581892*x^2 + 121473790266*x +
86386856771)*sqrt(2*x^2 - x + 3) + 8969667840*(16*x^4 + 160*x^3 +
 600*x^2 + 1000*x + 625)*log(-sqrt(2)*(32*x^2 - 16*x + 25) + 8*sq
rt(2*x^2 - x + 3)*(4*x - 1)) + 8969688643*(16*x^4 + 160*x^3 + 600
*x^2 + 1000*x + 625)*log(-(sqrt(2)*(1060*x^2 - 1036*x + 1153) + 4
8*sqrt(2*x^2 - x + 3)*(22*x - 17))/(4*x^2 + 20*x + 25)))/(16*x^4
+ 160*x^3 + 600*x^2 + 1000*x + 625)
```

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

$$\int \frac{(2x^2 - x + 3)^{\frac{3}{2}} (5x^4 - x^3 + 3x^2 + x + 2)}{(2x + 5)^5} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x)**5,x)
```

```
[Out] Integral((2*x**2 - x + 3)**(3/2)*(5*x**4 - x**3 + 3*x**2 + x + 2)
/(2*x + 5)**5, x)
```

GIAC/XCAS [A] time = 0.332185, size = 679, normalized size = 3.61

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^5,x, algori
```

```
[Out] -1/42467328*sqrt(2)*(8969688643*ln(12*sqrt(-11/(2*x + 5) + 36/(2*
x + 5)^2 + 1) + 72/(2*x + 5) - 11)*sign(1/(2*x + 5)) + 8969667840
*ln(abs(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5) +
1))*sign(1/(2*x + 5)) - 8969667840*ln(abs(sqrt(-11/(2*x + 5) + 36
/(2*x + 5)^2 + 1) + 6/(2*x + 5) - 1))*sign(1/(2*x + 5)) + 12*(24*
(1296*(29336*sign(1/(2*x + 5))/(2*x + 5) - 42907*sign(1/(2*x + 5)
))/(2*x + 5) + 39923563*sign(1/(2*x + 5)))/(2*x + 5) - 541312039*
sign(1/(2*x + 5)))*sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 138
24*(806241*(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5
))^5*sign(1/(2*x + 5)) - 1152288*(sqrt(-11/(2*x + 5) + 36/(2*x +
5)^2 + 1) + 6/(2*x + 5))^4*sign(1/(2*x + 5)) - 957352*(sqrt(-11/(
2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5))^3*sign(1/(2*x + 5))
 + 1529280*(sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5
))^2*sign(1/(2*x + 5)) + 394431*(sqrt(-11/(2*x + 5) + 36/(2*x + 5
)^2 + 1) + 6/(2*x + 5))*sign(1/(2*x + 5)) - 620352*sign(1/(2*x +
5)))/((sqrt(-11/(2*x + 5) + 36/(2*x + 5)^2 + 1) + 6/(2*x + 5))^2
- 1)^3)
```

3.341 $\int \frac{(3-x+2x^2)^{3/2}(2+x+3x^2-x^3+5x^4)}{(5+2x)^6}\,dx$

Optimal. Leaf size=195

$$-\frac{3730507\left(2x^2-x+3\right)^{5/2}}{11943936(2x+5)^3}+\frac{158527\left(2x^2-x+3\right)^{5/2}}{165888(2x+5)^4}-\frac{3667\left(2x^2-x+3\right)^{5/2}}{2880(2x+5)^5}+\frac{(44773976x+246012435)\left(2x^2-x+3\right)^{3/2}}{95551488(2x+5)^2}-\frac{(1028823716x+5658774871)\sqrt{2x^2-x+3}}{127401984(2x+5)}+\frac{70991525167\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{1528823808\sqrt{2}}-\frac{23775\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{512\sqrt{2}}$$

```
[Out] -((5658774871 + 1028823716*x)*Sqrt[3 - x + 2*x^2])/(127401984*(5
+ 2*x)) + ((246012435 + 44773976*x)*(3 - x + 2*x^2)^(3/2))/(95551
488*(5 + 2*x)^2) - (3667*(3 - x + 2*x^2)^(5/2))/(2880*(5 + 2*x)^5
) + (158527*(3 - x + 2*x^2)^(5/2))/(165888*(5 + 2*x)^4) - (373050
7*(3 - x + 2*x^2)^(5/2))/(11943936*(5 + 2*x)^3) - (23775*ArcSinh[
(1 - 4*x)/Sqrt[23]])/(512*Sqrt[2]) + (70991525167*ArcTanh[(17 - 2
2*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(1528823808*Sqrt[2])
```

Rubi [A] time = 0.535975, antiderivative size = 195, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 7, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.175

$$-\frac{3730507\left(2x^2-x+3\right)^{5/2}}{11943936(2x+5)^3}+\frac{158527\left(2x^2-x+3\right)^{5/2}}{165888(2x+5)^4}-\frac{3667\left(2x^2-x+3\right)^{5/2}}{2880(2x+5)^5}+\frac{(44773976x+246012435)\left(2x^2-x+3\right)^{3/2}}{95551488(2x+5)^2}-\frac{(1028823716x+5658774871)\sqrt{2x^2-x+3}}{127401984(2x+5)}+\frac{70991525167\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{1528823808\sqrt{2}}-\frac{23775\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{512\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^6,x]
```


```
[Out] -((5658774871 + 1028823716*x)*Sqrt[3 - x + 2*x^2])/(127401984*(5
+ 2*x)) + ((246012435 + 44773976*x)*(3 - x + 2*x^2)^(3/2))/(95551
488*(5 + 2*x)^2) - (3667*(3 - x + 2*x^2)^(5/2))/(2880*(5 + 2*x)^5
) + (158527*(3 - x + 2*x^2)^(5/2))/(165888*(5 + 2*x)^4) - (373050
7*(3 - x + 2*x^2)^(5/2))/(11943936*(5 + 2*x)^3) - (23775*ArcSinh[
(1 - 4*x)/Sqrt[23]])/(512*Sqrt[2]) + (70991525167*ArcTanh[(17 - 2
2*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(1528823808*Sqrt[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((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x)**6,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.407051, size = 111, normalized size = 0.57

$$\frac{70991525167\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{12\sqrt{4x^2-2x+6}\left(1592524800x^6-30496849920x^5-1023534029552x^4-7117092892448x^3-21590439\right.}{5(2x+5)^5}}{1528823808\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^6,x]
```

```
[Out] ((12*Sqrt[6 - 2*x + 4*x^2]*(-17093312738327 - 30872393829992*x -
21590439797064*x^2 - 7117092892448*x^3 - 1023534029552*x^4 - 3049
6849920*x^5 + 1592524800*x^6))/(5*(5 + 2*x)^5) + 70991769600*ArcS
inh[(-1 + 4*x)/Sqrt[23]] - 70991525167*Log[5 + 2*x] + 70991525167
*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]])/(1528823808*Sqrt[2])
```

Maple [A] time = 0.022, size = 225, normalized size = 1.2

$$
\begin{aligned}
&-\frac{3667}{92160}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-5} \\
&+\frac{158527}{2654208}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-4} \\
&-\frac{3730507}{95551488}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-3} \\
&+\frac{134077495}{6879707136}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-2} \\
&-\frac{4698578717}{247669456896}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-1} \\
&-\frac{70991525167}{495338913792}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}} \\
&+\frac{12346862324x-3086715581}{9172942848}\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}} \\
&-\frac{70991525167}{9172942848}\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}} \\
&+\frac{70991525167\sqrt{2}}{3057647616}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11x\right)\frac{1}{\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}}\right) \\
&+\frac{18794314868x-4698578717}{495338913792}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}} \\
&+\frac{23775\sqrt{2}}{1024}\mathit{Arcsinh}\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)
\end{aligned}
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((2*x^2-x+3)^(3/2)*(5*x^4-x^3+3*x^2+x+2)/(5+2*x)^6,x)
```

```
[Out] -3667/92160/(x+5/2)^5*(2*(x+5/2)^2-11*x-19/2)^(5/2)+158527/265420
8/(x+5/2)^4*(2*(x+5/2)^2-11*x-19/2)^(5/2)-3730507/95551488/(x+5/2
)^3*(2*(x+5/2)^2-11*x-19/2)^(5/2)+134077495/6879707136/(x+5/2)^2*
(2*(x+5/2)^2-11*x-19/2)^(5/2)-4698578717/247669456896/(x+5/2)*(2*
(x+5/2)^2-11*x-19/2)^(5/2)-70991525167/495338913792*(2*(x+5/2)^2-
11*x-19/2)^(3/2)+3086715581/9172942848*(4*x-1)*(2*(x+5/2)^2-11*x-
19/2)^(1/2)-70991525167/9172942848*(2*(x+5/2)^2-11*x-19/2)^(1/2)+
70991525167/3057647616*2^(1/2)*arctanh(1/12*(17/2-11*x)*2^(1/2)/(
2*(x+5/2)^2-11*x-19/2)^(1/2))+4698578717/495338913792*(4*x-1)*(2*
(x+5/2)^2-11*x-19/2)^(3/2)+23775/1024*2^(1/2)*arcsinh(4/23*23^(1/
2)*(x-1/4))
```

Maxima [A] time = 0.796258, size = 339, normalized size = 1.74

$$-\frac{134077495}{3439853568}\left(2x^2-x+3\right)^{\frac{3}{2}}-\frac{3667\left(2x^2-x+3\right)^{\frac{5}{2}}}{2880\left(32x^5+400x^4+2000x^3+5000x^2+6250x+3125\right)}+\frac{158527\left(2x^2-x+3\right)^{\frac{5}{2}}}{165888\left(16x^4+160x^3+600x^2+1000x+625\right)}-\frac{3730507\left(2x^2-x+3\right)^{\frac{5}{2}}}{11943936\left(8x^3+60x^2+150x+125\right)}+\frac{134077495\left(2x^2-x+3\right)^{\frac{5}{2}}}{1719926784\left(4x^2+20x+25\right)}+\frac{3086715581}{2293235712}\sqrt{2x^2-x+3}x+\frac{23775}{1024}\sqrt{2}\operatorname{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)-\frac{70991525167}{3057647616}\sqrt{2}\operatorname{arsinh}\left(\frac{22\sqrt{23}x}{23\left|2x+5\right|}-\frac{17\sqrt{23}}{23\left|2x+5\right|}\right)-\frac{6173186729}{764411904}\sqrt{2x^2-x+3}-\frac{4698578717\left(2x^2-x+3\right)^{\frac{3}{2}}}{6879707136\left(2x+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^6,x, algori
```

```
[Out] -134077495/3439853568*(2*x^2 - x + 3)^(3/2) - 3667/2880*(2*x^2 -
x + 3)^(5/2)/(32*x^5 + 400*x^4 + 2000*x^3 + 5000*x^2 + 6250*x + 3
125) + 158527/165888*(2*x^2 - x + 3)^(5/2)/(16*x^4 + 160*x^3 + 60
0*x^2 + 1000*x + 625) - 3730507/11943936*(2*x^2 - x + 3)^(5/2)/(8
*x^3 + 60*x^2 + 150*x + 125) + 134077495/1719926784*(2*x^2 - x +
3)^(5/2)/(4*x^2 + 20*x + 25) + 3086715581/2293235712*sqrt(2*x^2 -
 x + 3)*x + 23775/1024*sqrt(2)*arcsinh(4/23*sqrt(23)*x - 1/23*sqr
t(23)) - 70991525167/3057647616*sqrt(2)*arcsinh(22/23*sqrt(23)*x/
abs(2*x + 5) - 17/23*sqrt(23)/abs(2*x + 5)) - 6173186729/76441190
4*sqrt(2*x^2 - x + 3) - 4698578717/6879707136*(2*x^2 - x + 3)^(3/
2)/(2*x + 5)
```

Fricas [A] time = 0.31024, size = 296, normalized size = 1.52

$$\frac{\sqrt{2}\left(24\sqrt{2}\left(1592524800x^6-30496849920x^5-1023534029552x^4-7117092892448x^3-21590439797064x^2-3087239382\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^6,x, algori
```

```
[Out] 1/30576476160*sqrt(2)*(24*sqrt(2)*(1592524800*x^6 - 30496849920*x
^5 - 1023534029552*x^4 - 7117092892448*x^3 - 21590439797064*x^2 -
 30872393829992*x - 17093312738327)*sqrt(2*x^2 - x + 3) + 3549588
48000*(32*x^5 + 400*x^4 + 2000*x^3 + 5000*x^2 + 6250*x + 3125)*lo
```

```
g(-sqrt(2)*(32*x^2 - 16*x + 25) - 8*sqrt(2*x^2 - x + 3)*(4*x - 1)
) + 354957625835*(32*x^5 + 400*x^4 + 2000*x^3 + 5000*x^2 + 6250*x
 + 3125)*log(-(sqrt(2)*(1060*x^2 - 1036*x + 1153) - 48*sqrt(2*x^2
 - x + 3)*(22*x - 17))/(4*x^2 + 20*x + 25)))/(32*x^5 + 400*x^4 +
2000*x^3 + 5000*x^2 + 6250*x + 3125)
```

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

$$\int \frac{\left(2x^2 - x + 3\right)^{\frac{3}{2}} \left(5x^4 - x^3 + 3x^2 + x + 2\right)}{\left(2x + 5\right)^6}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x)**6,x)
```

```
[Out] Integral((2*x**2 - x + 3)**(3/2)*(5*x**4 - x**3 + 3*x**2 + x + 2)
/(2*x + 5)**6, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$undef$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^6,x, algori
```

```
[Out] undef
```

3.342 $\int \frac{(3-x+2x^2)^{3/2}(2+x+3x^2-x^3+5x^4)}{(5+2x)^7}\,dx$

Optimal. Leaf size=195

$$-\frac{14087245\,(2x^2-x+3)^{5/2}}{71663616(2x+5)^4}+\frac{182165\,(2x^2-x+3)^{5/2}}{248832(2x+5)^5}-\frac{3667\,(2x^2-x+3)^{5/2}}{3456(2x+5)^6}-\frac{(6793718806x+9802984711)\,(2x^2-x+3)^{3/2}}{13759414272(2x+5)^3}+\frac{(27596573612x+151764102421)\sqrt{2x^2-x+3}}{55037657088(2x+5)}-\frac{1903976002333\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{660451885056\sqrt{2}}+\frac{369\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{128\sqrt{2}}$$

```
[Out] ((151764102421 + 27596573612*x)*Sqrt[3 - x + 2*x^2])/(55037657088
*(5 + 2*x)) - ((9802984711 + 6793718806*x)*(3 - x + 2*x^2)^(3/2))
/(13759414272*(5 + 2*x)^3) - (3667*(3 - x + 2*x^2)^(5/2))/(3456*(
5 + 2*x)^6) + (182165*(3 - x + 2*x^2)^(5/2))/(248832*(5 + 2*x)^5)
 - (14087245*(3 - x + 2*x^2)^(5/2))/(71663616*(5 + 2*x)^4) + (369
*ArcSinh[(1 - 4*x)/Sqrt[23]])/(128*Sqrt[2]) - (1903976002333*ArcT
anh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(660451885056*
Sqrt[2])
```

Rubi [A] time = 0.530357, antiderivative size = 195, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 8, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.2

$$-\frac{14087245\,(2x^2-x+3)^{5/2}}{71663616(2x+5)^4}+\frac{182165\,(2x^2-x+3)^{5/2}}{248832(2x+5)^5}-\frac{3667\,(2x^2-x+3)^{5/2}}{3456(2x+5)^6}-\frac{(6793718806x+9802984711)\,(2x^2-x+3)^{3/2}}{13759414272(2x+5)^3}+\frac{(27596573612x+151764102421)\sqrt{2x^2-x+3}}{55037657088(2x+5)}-\frac{1903976002333\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{660451885056\sqrt{2}}+\frac{369\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{128\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^7,x]
```


```
[Out] ((151764102421 + 27596573612*x)*Sqrt[3 - x + 2*x^2])/(55037657088
*(5 + 2*x)) - ((9802984711 + 6793718806*x)*(3 - x + 2*x^2)^(3/2))
/(13759414272*(5 + 2*x)^3) - (3667*(3 - x + 2*x^2)^(5/2))/(3456*(
5 + 2*x)^6) + (182165*(3 - x + 2*x^2)^(5/2))/(248832*(5 + 2*x)^5)
 - (14087245*(3 - x + 2*x^2)^(5/2))/(71663616*(5 + 2*x)^4) + (369
*ArcSinh[(1 - 4*x)/Sqrt[23]])/(128*Sqrt[2]) - (1903976002333*ArcT
anh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(660451885056*
```

```
Sqrt[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((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x)**7,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.290748, size = 109, normalized size = 0.56

$$\frac{-1903976002333 \log \left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{12\sqrt{4x^2-2x+6}\left(275188285440x^6+11854023276320x^5+103803827945872x^4+42255411485652\right.}{(2x+5)^6}}{660451885056}$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^7,x]
```

```
[Out] ((12*Sqrt[6 - 2*x + 4*x^2]*(458411625354581 + 1011372787716826*x
+ 910256842473992*x^2 + 422554114856528*x^3 + 103803827945872*x^4
 + 11854023276320*x^5 + 275188285440*x^6))/(5 + 2*x)^6 - 19039589
49888*ArcSinh[(-1 + 4*x)/Sqrt[23]] + 1903976002333*Log[5 + 2*x] -
 1903976002333*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]])/(660451
885056*Sqrt[2])
```

Maple [A] time = 0.022, size = 246, normalized size = 1.3

$$-\frac{3667}{221184}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-6}+\frac{182165}{7962624}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-5}-\frac{14087245}{1146617856}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-4}+\frac{149610673}{41278242816}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-3}-\frac{3607708597}{2972033482752}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-2}+\frac{125860542215}{106993205379072}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-1}+\frac{1903976002333}{213986410758144}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}-\frac{331090673564x-82772668391}{3962711310336}\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}+\frac{1903976002333}{3962711310336}\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}-\frac{1903976002333\sqrt{2}}{1320903770112}Artanh\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11x\right)\frac{1}{\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}}\right)-\frac{503442168860x-125860542215}{213986410758144}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}-\frac{369\sqrt{2}}{256}Arcsinh\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((2*x^2-x+3)^(3/2)*(5*x^4-x^3+3*x^2+x+2)/(5+2*x)^7,x)
```

```
[Out] -3667/221184/(x+5/2)^6*(2*(x+5/2)^2-11*x-19/2)^(5/2)+182165/79626
24/(x+5/2)^5*(2*(x+5/2)^2-11*x-19/2)^(5/2)-14087245/1146617856/(x
+5/2)^4*(2*(x+5/2)^2-11*x-19/2)^(5/2)+149610673/41278242816/(x+5/
2)^3*(2*(x+5/2)^2-11*x-19/2)^(5/2)-3607708597/2972033482752/(x+5/
2)^2*(2*(x+5/2)^2-11*x-19/2)^(5/2)+125860542215/106993205379072/(
x+5/2)*(2*(x+5/2)^2-11*x-19/2)^(5/2)+1903976002333/21398641075814
4*(2*(x+5/2)^2-11*x-19/2)^(3/2)-82772668391/3962711310336*(4*x-1)
*(2*(x+5/2)^2-11*x-19/2)^(1/2)+1903976002333/3962711310336*(2*(x+
5/2)^2-11*x-19/2)^(1/2)-1903976002333/1320903770112*2^(1/2)*arcta
nh(1/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))-125860
542215/213986410758144*(4*x-1)*(2*(x+5/2)^2-11*x-19/2)^(3/2)-369/
```

```
256*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4))
```

Maxima [A] time = 0.800169, size = 401, normalized size = 2.06

$$\frac{3607708597}{1486016741376}\left(2x^2-x+3\right)^{\frac{3}{2}} - \frac{3667\left(2x^2-x+3\right)^{\frac{5}{2}}}{3456\left(64x^6+960x^5+6000x^4+20000x^3+37500x^2+37500x+15625\right)} + \frac{182165\left(2x^2-x+3\right)^{\frac{5}{2}}}{248832\left(32x^5+400x^4+2000x^3+5000x^2+6250x+3125\right)} - \frac{14087245\left(2x^2-x+3\right)^{\frac{5}{2}}}{71663616\left(16x^4+160x^3+600x^2+1000x+625\right)} + \frac{149610673\left(2x^2-x+3\right)^{\frac{5}{2}}}{5159780352\left(8x^3+60x^2+150x+125\right)} - \frac{3607708597\left(2x^2-x+3\right)^{\frac{5}{2}}}{743008370688\left(4x^2+20x+25\right)} - \frac{82772668391}{990677827584}\sqrt{2x^2-x+3}x - \frac{369}{256}\sqrt{2}\operatorname{arsinh}\left(\frac{4}{23}\sqrt{23}x - \frac{1}{23}\sqrt{23}\right) + \frac{1903976002333}{1320903770112}\sqrt{2}\operatorname{arsinh}\left(\frac{22\sqrt{23}x}{23\left|2x+5\right|} - \frac{17\sqrt{23}}{23\left|2x+5\right|}\right) + \frac{165562389227}{330225942528}\sqrt{2x^2-x+3} + \frac{125860542215\left(2x^2-x+3\right)^{\frac{3}{2}}}{2972033482752\left(2x+5\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^7,x, algori
```

```
[Out] 3607708597/1486016741376*(2*x^2 - x + 3)^(3/2) - 3667/3456*(2*x^2
 - x + 3)^(5/2)/(64*x^6 + 960*x^5 + 6000*x^4 + 20000*x^3 + 37500*
x^2 + 37500*x + 15625) + 182165/248832*(2*x^2 - x + 3)^(5/2)/(32*
x^5 + 400*x^4 + 2000*x^3 + 5000*x^2 + 6250*x + 3125) - 14087245/7
1663616*(2*x^2 - x + 3)^(5/2)/(16*x^4 + 160*x^3 + 600*x^2 + 1000*
x + 625) + 149610673/5159780352*(2*x^2 - x + 3)^(5/2)/(8*x^3 + 60
*x^2 + 150*x + 125) - 3607708597/743008370688*(2*x^2 - x + 3)^(5/
2)/(4*x^2 + 20*x + 25) - 82772668391/990677827584*sqrt(2*x^2 - x
+ 3)*x - 369/256*sqrt(2)*arcsinh(4/23*sqrt(23)*x - 1/23*sqrt(23))
 + 1903976002333/1320903770112*sqrt(2)*arcsinh(22/23*sqrt(23)*x/a
bs(2*x + 5) - 17/23*sqrt(23)/abs(2*x + 5)) + 165562389227/3302259
42528*sqrt(2*x^2 - x + 3) + 125860542215/2972033482752*(2*x^2 - x
 + 3)^(3/2)/(2*x + 5)
```

Fricas [A] time = 0.295486, size = 316, normalized size = 1.62

$$\sqrt{2}\Big(24\sqrt{2}\big(275188285440x^6 + 11854023276320x^5 + 103803827945872x^4 + 422554114856528x^3 + 910256842473992x^2 + 1$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^7,x, algori
```

```
[Out] 1/2641807540224*sqrt(2)*(24*sqrt(2)*(275188285440*x^6 + 118540232
76320*x^5 + 103803827945872*x^4 + 422554114856528*x^3 + 910256842
473992*x^2 + 1011372787716826*x + 458411625354581)*sqrt(2*x^2 - x
 + 3) + 1903958949888*(64*x^6 + 960*x^5 + 6000*x^4 + 20000*x^3 +
37500*x^2 + 37500*x + 15625)*log(-sqrt(2)*(32*x^2 - 16*x + 25) +
8*sqrt(2*x^2 - x + 3)*(4*x - 1)) + 1903976002333*(64*x^6 + 960*x^
5 + 6000*x^4 + 20000*x^3 + 37500*x^2 + 37500*x + 15625)*log(-(sqr
t(2)*(1060*x^2 - 1036*x + 1153) + 48*sqrt(2*x^2 - x + 3)*(22*x -
17))/(4*x^2 + 20*x + 25)))/(64*x^6 + 960*x^5 + 6000*x^4 + 20000*x
^3 + 37500*x^2 + 37500*x + 15625)
```

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

$$\int \frac{\left(2x^2 - x + 3\right)^{\frac{3}{2}} \left(5x^4 - x^3 + 3x^2 + x + 2\right)}{\left(2x + 5\right)^7}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x)**7,x)
```

```
[Out] Integral((2*x**2 - x + 3)**(3/2)*(5*x**4 - x**3 + 3*x**2 + x + 2)
/(2*x + 5)**7, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$undef$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^7,x, algori
```

```
[Out] undef
```

3.343 $\int \frac{(3-x+2x^2)^{3/2}(2+x+3x^2-x^3+5x^4)}{(5+2x)^8}\,dx$

Optimal. Leaf size=195

$$-\frac{1930441\left(2x^2-x+3\right)^{5/2}}{13934592(2x+5)^5}+\frac{114335\left(2x^2-x+3\right)^{5/2}}{193536(2x+5)^6}-\frac{3667\left(2x^2-x+3\right)^{5/2}}{4032(2x+5)^7}-\frac{(411822458x+463558457)\left(2x^2-x+3\right)^{3/2}}{2293235712(2x+5)^4}-\frac{(101679102454x+146583836191)\sqrt{2x^2-x+3}}{440301256704(2x+5)^2}+\frac{412760561351\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{5283615080448\sqrt{2}}-\frac{5\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{64\sqrt{2}}$$

```
[Out] -((146583836191 + 101679102454*x)*Sqrt[3 - x + 2*x^2])/(440301256
704*(5 + 2*x)^2) - ((463558457 + 411822458*x)*(3 - x + 2*x^2)^(3/
2))/(2293235712*(5 + 2*x)^4) - (3667*(3 - x + 2*x^2)^(5/2))/(4032
*(5 + 2*x)^7) + (114335*(3 - x + 2*x^2)^(5/2))/(193536*(5 + 2*x)^
6) - (1930441*(3 - x + 2*x^2)^(5/2))/(13934592*(5 + 2*x)^5) - (5*
ArcSinh[(1 - 4*x)/Sqrt[23]])/(64*Sqrt[2]) + (412760561351*ArcTanh
[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(5283615080448*Sq
rt[2])
```

Rubi [A] time = 0.52835, antiderivative size = 195, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 7, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}} = 0.175$

$$-\frac{1930441\left(2x^2-x+3\right)^{5/2}}{13934592(2x+5)^5}+\frac{114335\left(2x^2-x+3\right)^{5/2}}{193536(2x+5)^6}-\frac{3667\left(2x^2-x+3\right)^{5/2}}{4032(2x+5)^7}-\frac{(411822458x+463558457)\left(2x^2-x+3\right)^{3/2}}{2293235712(2x+5)^4}-\frac{(101679102454x+146583836191)\sqrt{2x^2-x+3}}{440301256704(2x+5)^2}+\frac{412760561351\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{5283615080448\sqrt{2}}-\frac{5\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{64\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^8,x]
```



```
[Out] -((146583836191 + 101679102454*x)*Sqrt[3 - x + 2*x^2])/(440301256
704*(5 + 2*x)^2) - ((463558457 + 411822458*x)*(3 - x + 2*x^2)^(3/
2))/(2293235712*(5 + 2*x)^4) - (3667*(3 - x + 2*x^2)^(5/2))/(4032
*(5 + 2*x)^7) + (114335*(3 - x + 2*x^2)^(5/2))/(193536*(5 + 2*x)^
6) - (1930441*(3 - x + 2*x^2)^(5/2))/(13934592*(5 + 2*x)^5) - (5*
ArcSinh[(1 - 4*x)/Sqrt[23]])/(64*Sqrt[2]) + (412760561351*ArcTanh
[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(5283615080448*Sq
```

```
rt[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((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x)**8,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.348816, size = 111, normalized size = 0.57

$$\frac{412760561351 \log\left(12\sqrt{4x^2-2x+6}-22x+17\right)-\frac{12\sqrt{4x^2-2x+6}\left(38463671680832x^6+402255822731712x^5+2069947287085104x^4+5966329646300\right.}{7(2x+5)^7}}{52836150804}$$

Antiderivative was successfully verified.

```
[In] Integrate[((3 - x + 2*x^2)^(3/2)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(5 + 2*x)^8,x]
```

```
[Out] ((-12*Sqrt[6 - 2*x + 4*x^2]*(3479517268702637 + 9065154700300572*
x + 9976065367498188*x^2 + 5966329646300704*x^3 + 206994728708510
4*x^4 + 402255822731712*x^5 + 38463671680832*x^6))/(7*(5 + 2*x)^7
) + 412782428160*ArcSinh[(-1 + 4*x)/Sqrt[23]] - 412760561351*Log[
5 + 2*x] + 412760561351*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]]
)/(5283615080448*Sqrt[2])
```

Maple [A] time = 0.025, size = 267, normalized size = 1.4

$$
\begin{aligned}
&-\frac{3667}{516096}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-7}\\
&+\frac{114335}{12386304}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-6}\\
&-\frac{1930441}{445906944}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-5}\\
&+\frac{7861079}{9172942848}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-4}\\
&-\frac{32967491}{330225942528}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-3}\\
&+\frac{769352975}{23776267862016}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-2}\\
&-\frac{27452157541}{855945643032576}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{5}{2}}\left(x+\frac{5}{2}\right)^{-1}\\
&-\frac{412760561351}{1711891286065152}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}\\
&+\frac{71830080532x-17957520133}{31701690482688}\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}\\
&-\frac{412760561351}{31701690482688}\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}\\
&+\frac{412760561351\sqrt{2}}{10567230160896}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11x\right)\frac{1}{\sqrt{2\left(x+5/2\right)^{2}-11x-\frac{19}{2}}}\right)\\
&+\frac{109808630164x-27452157541}{1711891286065152}\left(2\left(x+5/2\right)^{2}-11x-\frac{19}{2}\right)^{\frac{3}{2}}\\
&+\frac{5\sqrt{2}}{128}\mathit{Arcsinh}\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)
\end{aligned}
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((2*x^2-x+3)^(3/2)*(5*x^4-x^3+3*x^2+x+2)/(5+2*x)^8,x)
```

```
[Out] -3667/516096/(x+5/2)^7*(2*(x+5/2)^2-11*x-19/2)^(5/2)+114335/12386
304/(x+5/2)^6*(2*(x+5/2)^2-11*x-19/2)^(5/2)-1930441/445906944/(x+
5/2)^5*(2*(x+5/2)^2-11*x-19/2)^(5/2)+7861079/9172942848/(x+5/2)^4
*(2*(x+5/2)^2-11*x-19/2)^(5/2)-32967491/330225942528/(x+5/2)^3*(2
*(x+5/2)^2-11*x-19/2)^(5/2)+769352975/23776267862016/(x+5/2)^2*(2
*(x+5/2)^2-11*x-19/2)^(5/2)-27452157541/855945643032576/(x+5/2)*(
2*(x+5/2)^2-11*x-19/2)^(5/2)-412760561351/1711891286065152*(2*(x+
5/2)^2-11*x-19/2)^(3/2)+17957520133/31701690482688*(4*x-1)*(2*(x+
```

```
5/2)^2-11*x-19/2)^(1/2)-412760561351/31701690482688*(2*(x+5/2)^2-
11*x-19/2)^(1/2)+412760561351/10567230160896*2^(1/2)*arctanh(1/12
*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))+27452157541/1
711891286065152*(4*x-1)*(2*(x+5/2)^2-11*x-19/2)^(3/2)+5/128*2^(1/
2)*arcsinh(4/23*23^(1/2)*(x-1/4))
```

Maxima [A] time = 0.794697, size = 470, normalized size = 2.41

$$
\begin{aligned}
&-\frac{769352975}{11888133931008}\left(2x^2-x+3\right)^{\frac{3}{2}} \\
&-\frac{3667\left(2x^2-x+3\right)^{\frac{5}{2}}}{4032\left(128x^7+2240x^6+16800x^5+70000x^4+175000x^3+262500x^2+218750x+78125\right)} \\
&+\frac{114335\left(2x^2-x+3\right)^{\frac{5}{2}}}{193536\left(64x^6+960x^5+6000x^4+20000x^3+37500x^2+37500x+15625\right)} \\
&-\frac{1930441\left(2x^2-x+3\right)^{\frac{5}{2}}}{13934592\left(32x^5+400x^4+2000x^3+5000x^2+6250x+3125\right)} \\
&+\frac{7861079\left(2x^2-x+3\right)^{\frac{5}{2}}}{573308928\left(16x^4+160x^3+600x^2+1000x+625\right)} \\
&-\frac{32967491\left(2x^2-x+3\right)^{\frac{5}{2}}}{41278242816\left(8x^3+60x^2+150x+125\right)}+\frac{769352975\left(2x^2-x+3\right)^{\frac{5}{2}}}{5944066965504\left(4x^2+20x+25\right)} \\
&+\frac{17957520133}{7925422620672}\sqrt{2x^2-x+3}x+\frac{5}{128}\sqrt{2}\operatorname{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right) \\
&-\frac{412760561351}{10567230160896}\sqrt{2}\operatorname{arsinh}\left(\frac{22\sqrt{23}x}{23\left|2x+5\right|}-\frac{17\sqrt{23}}{23\left|2x+5\right|}\right) \\
&-\frac{35893173457}{2641807540224}\sqrt{2x^2-x+3}-\frac{27452157541\left(2x^2-x+3\right)^{\frac{3}{2}}}{23776267862016\left(2x+5\right)}
\end{aligned}
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^8,x, algori
```

```
[Out] -769352975/11888133931008*(2*x^2 - x + 3)^(3/2) - 3667/4032*(2*x^
2 - x + 3)^(5/2)/(128*x^7 + 2240*x^6 + 16800*x^5 + 70000*x^4 + 17
5000*x^3 + 262500*x^2 + 218750*x + 78125) + 114335/193536*(2*x^2
- x + 3)^(5/2)/(64*x^6 + 960*x^5 + 6000*x^4 + 20000*x^3 + 37500*x
^2 + 37500*x + 15625) - 1930441/13934592*(2*x^2 - x + 3)^(5/2)/(3
2*x^5 + 400*x^4 + 2000*x^3 + 5000*x^2 + 6250*x + 3125) + 7861079/
573308928*(2*x^2 - x + 3)^(5/2)/(16*x^4 + 160*x^3 + 600*x^2 + 100
0*x + 625) - 32967491/41278242816*(2*x^2 - x + 3)^(5/2)/(8*x^3 +
60*x^2 + 150*x + 125) + 769352975/5944066965504*(2*x^2 - x + 3)^(
5/2)/(4*x^2 + 20*x + 25) + 17957520133/7925422620672*sqrt(2*x^2 -
 x + 3)*x + 5/128*sqrt(2)*arcsinh(4/23*sqrt(23)*x - 1/23*sqrt(23)
) - 412760561351/10567230160896*sqrt(2)*arcsinh(22/23*sqrt(23)*x/
abs(2*x + 5) - 17/23*sqrt(23)/abs(2*x + 5)) - 35893173457/2641807
```

```
540224*sqrt(2*x^2 - x + 3) - 27452157541/23776267862016*(2*x^2 -
x + 3)^(3/2)/(2*x + 5)
```

Fricas [A] time = 0.310466, size = 336, normalized size = 1.72

$$-\frac{\sqrt{2}\left(24\sqrt{2}\left(38463671680832\,x^6+402255822731712\,x^5+2069947287085104\,x^4+5966329646300704\,x^3+99760653674981\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^8,x, algori
```

```
[Out] -1/147941222252544*sqrt(2)*(24*sqrt(2)*(38463671680832*x^6 + 4022
55822731712*x^5 + 2069947287085104*x^4 + 5966329646300704*x^3 + 9
976065367498188*x^2 + 9065154700300572*x + 3479517268702637)*sqrt
(2*x^2 - x + 3) - 2889476997120*(128*x^7 + 2240*x^6 + 16800*x^5 +
 70000*x^4 + 175000*x^3 + 262500*x^2 + 218750*x + 78125)*log(-sqr
t(2)*(32*x^2 - 16*x + 25) - 8*sqrt(2*x^2 - x + 3)*(4*x - 1)) - 28
89323929457*(128*x^7 + 2240*x^6 + 16800*x^5 + 70000*x^4 + 175000*
x^3 + 262500*x^2 + 218750*x + 78125)*log(-(sqrt(2)*(1060*x^2 - 10
36*x + 1153) - 48*sqrt(2*x^2 - x + 3)*(22*x - 17))/(4*x^2 + 20*x
+ 25)))/(128*x^7 + 2240*x^6 + 16800*x^5 + 70000*x^4 + 175000*x^3
+ 262500*x^2 + 218750*x + 78125)
```

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

$$\int \frac{\left(2x^2-x+3\right)^{\frac{3}{2}}\left(5x^4-x^3+3x^2+x+2\right)}{(2x+5)^8}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2*x**2-x+3)**(3/2)*(5*x**4-x**3+3*x**2+x+2)/(5+2*x)**8,x)
```

```
[Out] Integral((2*x**2 - x + 3)**(3/2)*(5*x**4 - x**3 + 3*x**2 + x + 2)
/(2*x + 5)**8, x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

undef

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x^2 - x + 3)^(3/2)/(2*x + 5)^8,x, algori
```

```
[Out] undef
```

3.344 $\int \frac{(5+2x)(2+x+3x^2-x^3+5x^4)}{\sqrt{3-x+2x^2}}\,dx$

Optimal. Leaf size=120

$$\frac{1}{16}\sqrt{2x^2-x+3}(2x+5)^4-\frac{105}{128}\sqrt{2x^2-x+3}(2x+5)^3+\frac{761}{256}\sqrt{2x^2-x+3}(2x+5)^2-\frac{(4676x+19227)\sqrt{2x^2-x+3}}{2048}-\frac{85429\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{4096\sqrt{2}}$$

```
[Out] (761*(5 + 2*x)^2*Sqrt[3 - x + 2*x^2])/256 - (105*(5 + 2*x)^3*Sqrt
[3 - x + 2*x^2])/128 + ((5 + 2*x)^4*Sqrt[3 - x + 2*x^2])/16 - ((1
9227 + 4676*x)*Sqrt[3 - x + 2*x^2])/2048 - (85429*ArcSinh[(1 - 4*
x)/Sqrt[23]])/(4096*Sqrt[2])
```

Rubi [A] time = 0.268947, antiderivative size = 120, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.105$

$$\frac{1}{16}\sqrt{2x^2-x+3}(2x+5)^4-\frac{105}{128}\sqrt{2x^2-x+3}(2x+5)^3+\frac{761}{256}\sqrt{2x^2-x+3}(2x+5)^2-\frac{(4676x+19227)\sqrt{2x^2-x+3}}{2048}-\frac{85429\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{4096\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((5 + 2*x)*(2 + x + 3*x^2 - x^3 + 5*x^4))/Sqrt[3 - x + 2*x^2],x]
```

```
[Out] (761*(5 + 2*x)^2*Sqrt[3 - x + 2*x^2])/256 - (105*(5 + 2*x)^3*Sqrt
[3 - x + 2*x^2])/128 + ((5 + 2*x)^4*Sqrt[3 - x + 2*x^2])/16 - ((1
9227 + 4676*x)*Sqrt[3 - x + 2*x^2])/2048 - (85429*ArcSinh[(1 - 4*
x)/Sqrt[23]])/(4096*Sqrt[2])
```

Rubi in Sympy [A] time = 74.2092, size = 107, normalized size = 0.89

$$x^4\sqrt{2x^2-x+3}+\frac{55x^3\sqrt{2x^2-x+3}}{16}+\frac{11x^2\sqrt{2x^2-x+3}}{64}+\frac{\left(-\frac{1729x}{64}+\frac{2973}{256}\right)\sqrt{2x^2-x+3}}{8}+\frac{85429\sqrt{2}\,\mathrm{atanh}\left(\frac{\sqrt{2}(4x-1)}{4\sqrt{2x^2-x+3}}\right)}{8192}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((5+2*x)*(5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(1/2),x)
```

```
[Out] x**4*sqrt(2*x**2 - x + 3) + 55*x**3*sqrt(2*x**2 - x + 3)/16 + 11*
x**2*sqrt(2*x**2 - x + 3)/64 + (-1729*x/64 + 2973/256)*sqrt(2*x**
2 - x + 3)/8 + 85429*sqrt(2)*atanh(sqrt(2)*(4*x - 1)/(4*sqrt(2*x*
*2 - x + 3)))/8192
```

Mathematica [A] time = 0.0783597, size = 60, normalized size = 0.5

$$\frac{4\sqrt{2x^2-x+3}\left(2048x^4+7040x^3+352x^2-6916x+2973\right)+85429\sqrt{2}\sinh^{-1}\left(\frac{4x-1}{\sqrt{23}}\right)}{8192}$$

Antiderivative was successfully verified.

```
[In] Integrate[((5 + 2*x)*(2 + x + 3*x^2 - x^3 + 5*x^4))/Sqrt[3 - x + 2*x^2],x]
```

```
[Out] (4*Sqrt[3 - x + 2*x^2]*(2973 - 6916*x + 352*x^2 + 7040*x^3 + 2048
*x^4) + 85429*Sqrt[2]*ArcSinh[(-1 + 4*x)/Sqrt[23]])/8192
```

Maple [A] time = 0.009, size = 95, normalized size = 0.8

$$\frac{11\,x^2}{64}\sqrt{2\,x^2-x+3}-\frac{1729\,x}{512}\sqrt{2\,x^2-x+3}+\frac{2973}{2048}\sqrt{2\,x^2-x+3}+\frac{85429\,\sqrt{2}}{8192}Arcsinh\left(\frac{4\,\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)+\frac{55\,x^3}{16}\sqrt{2\,x^2-x+3}+x^4\sqrt{2\,x^2-x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5+2*x)*(5*x^4-x^3+3*x^2+x+2)/(2*x^2-x+3)^(1/2),x)
```

```
[Out] 11/64*x^2*(2*x^2-x+3)^(1/2)-1729/512*x*(2*x^2-x+3)^(1/2)+2973/204
8*(2*x^2-x+3)^(1/2)+85429/8192*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1
/4))+55/16*x^3*(2*x^2-x+3)^(1/2)+x^4*(2*x^2-x+3)^(1/2)
```

Maxima [A] time = 0.760945, size = 130, normalized size = 1.08

$$\sqrt{2\,x^2-x+3}x^4+\frac{55}{16}\sqrt{2\,x^2-x+3}x^3+\frac{11}{64}\sqrt{2\,x^2-x+3}x^2-\frac{1729}{512}\sqrt{2\,x^2-x+3}x+\frac{85429}{8192}\sqrt{2}\,\mathrm{arsinh}\left(\frac{1}{23}\sqrt{23}(4\,x-1)\right)+\frac{2973}{2048}\sqrt{2\,x^2-x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)/sqrt(2*x^2 - x + 3),x, algorithm=
```

```
[Out] sqrt(2*x^2 - x + 3)*x^4 + 55/16*sqrt(2*x^2 - x + 3)*x^3 + 11/64*s
qrt(2*x^2 - x + 3)*x^2 - 1729/512*sqrt(2*x^2 - x + 3)*x + 85429/8
192*sqrt(2)*arcsinh(1/23*sqrt(23)*(4*x - 1)) + 2973/2048*sqrt(2*x
^2 - x + 3)
```

Fricas [A] time = 0.269551, size = 109, normalized size = 0.91

$$\frac{1}{16384}\sqrt{2}\left(4\sqrt{2}\left(2048\,x^4+7040\,x^3+352\,x^2-6916\,x+2973\right)\sqrt{2\,x^2-x+3}+85429\,\log\left(-\sqrt{2}\left(32\,x^2-16\,x+25\right)-8\,\sqrt{2\,x^2}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)/sqrt(2*x^2 - x + 3),x, algorithm=
```

```
[Out] 1/16384*sqrt(2)*(4*sqrt(2)*(2048*x^4 + 7040*x^3 + 352*x^2 - 6916*
x + 2973)*sqrt(2*x^2 - x + 3) + 85429*log(-sqrt(2)*(32*x^2 - 16*x
 + 25) - 8*sqrt(2*x^2 - x + 3)*(4*x - 1)))
```

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

$$\int\frac{(2x+5)\left(5x^4-x^3+3x^2+x+2\right)}{\sqrt{2x^2-x+3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5+2*x)*(5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(1/2),x)
```

```
[Out] Integral((2*x + 5)*(5*x**4 - x**3 + 3*x**2 + x + 2)/sqrt(2*x**2 -
 x + 3), x)
```

GIAC/XCAS [A] time = 0.279967, size = 92, normalized size = 0.77

$$\frac{1}{2048}\left(4\left(8\left(4\left(16\,x+55\right)x+11\right)x-1729\right)x+2973\right)\sqrt{2\,x^2-x+3}$$
$$-\frac{85429}{8192}\sqrt{2}\ln\left(-2\,\sqrt{2}\left(\sqrt{2}x-\sqrt{2\,x^2-x+3}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)/sqrt(2*x^2 - x + 3),x, algorithm=
```

```
[Out] 1/2048*(4*(8*(4*(16*x + 55)*x + 11)*x - 1729)*x + 2973)*sqrt(2*x^
2 - x + 3) - 85429/8192*sqrt(2)*ln(-2*sqrt(2)*(sqrt(2)*x - sqrt(2
*x^2 - x + 3)) + 1)
```

3.345 $\int \frac{2+x+3x^2-x^3+5x^4}{\sqrt{3-x+2x^2}}\,dx$

Optimal. Leaf size=101

$$\frac{19}{96}\sqrt{2x^2-x+3}\,x^2-\frac{409}{768}\sqrt{2x^2-x+3}\,x-\frac{505\sqrt{2x^2-x+3}}{1024}+\frac{5}{8}\sqrt{2x^2-x+3}\,x^3-\frac{6863\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{2048\sqrt{2}}$$

```
[Out] (-505*Sqrt[3 - x + 2*x^2])/1024 - (409*x*Sqrt[3 - x + 2*x^2])/768
 + (19*x^2*Sqrt[3 - x + 2*x^2])/96 + (5*x^3*Sqrt[3 - x + 2*x^2])/
8 - (6863*ArcSinh[(1 - 4*x)/Sqrt[23]])/(2048*Sqrt[2])
```

Rubi [A] time = 0.140692, antiderivative size = 101, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.121

$$\frac{19}{96}\sqrt{2x^2-x+3}\,x^2-\frac{409}{768}\sqrt{2x^2-x+3}\,x-\frac{505\sqrt{2x^2-x+3}}{1024}+\frac{5}{8}\sqrt{2x^2-x+3}\,x^3-\frac{6863\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{2048\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/Sqrt[3 - x + 2*x^2],x]
```

```
[Out] (-505*Sqrt[3 - x + 2*x^2])/1024 - (409*x*Sqrt[3 - x + 2*x^2])/768
 + (19*x^2*Sqrt[3 - x + 2*x^2])/96 + (5*x^3*Sqrt[3 - x + 2*x^2])/
8 - (6863*ArcSinh[(1 - 4*x)/Sqrt[23]])/(2048*Sqrt[2])
```

Rubi in Sympy [A] time = 49.1944, size = 92, normalized size = 0.91

$$\frac{5x^3\sqrt{2x^2-x+3}}{8}+\frac{19x^2\sqrt{2x^2-x+3}}{96}-\frac{\left(\frac{409x}{96}+\frac{505}{128}\right)\sqrt{2x^2-x+3}}{8}+\frac{6863\sqrt{2}\,\mathrm{atanh}\left(\frac{\sqrt{2}(4x-1)}{4\sqrt{2x^2-x+3}}\right)}{4096}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(1/2),x)
```

```
[Out] 5*x**3*sqrt(2*x**2 - x + 3)/8 + 19*x**2*sqrt(2*x**2 - x + 3)/96 -
 (409*x/96 + 505/128)*sqrt(2*x**2 - x + 3)/8 + 6863*sqrt(2)*atanh
(sqrt(2)*(4*x - 1)/(4*sqrt(2*x**2 - x + 3)))/4096
```

Mathematica [A] time = 0.0580248, size = 55, normalized size = 0.54

$$\frac{4\sqrt{2x^2-x+3}\left(1920x^3+608x^2-1636x-1515\right)+20589\sqrt{2}\sinh^{-1}\left(\frac{4x-1}{\sqrt{23}}\right)}{12288}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/Sqrt[3 - x + 2*x^2],x]
```

```
[Out] (4*Sqrt[3 - x + 2*x^2]*(-1515 - 1636*x + 608*x^2 + 1920*x^3) + 20
589*Sqrt[2]*ArcSinh[(-1 + 4*x)/Sqrt[23]])/12288
```

Maple [A] time = 0.009, size = 79, normalized size = 0.8

$$-\frac{505}{1024}\sqrt{2\,x^2-x+3}+\frac{6863\,\sqrt{2}}{4096}Arcsinh\left(\frac{4\,\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)-\frac{409\,x}{768}\sqrt{2\,x^2-x+3}+\frac{19\,x^2}{96}\sqrt{2\,x^2-x+3}+\frac{5\,x^3}{8}\sqrt{2\,x^2-x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^4-x^3+3*x^2+x+2)/(2*x^2-x+3)^(1/2),x)
```

```
[Out] -505/1024*(2*x^2-x+3)^(1/2)+6863/4096*2^(1/2)*arcsinh(4/23*23^(1/
2)*(x-1/4))-409/768*x*(2*x^2-x+3)^(1/2)+19/96*x^2*(2*x^2-x+3)^(1/
2)+5/8*x^3*(2*x^2-x+3)^(1/2)
```

Maxima [A] time = 0.762597, size = 108, normalized size = 1.07

$$\frac{5}{8}\,\sqrt{2\,x^2-x+3}x^3+\frac{19}{96}\,\sqrt{2\,x^2-x+3}x^2-\frac{409}{768}\,\sqrt{2\,x^2-x+3}x+\frac{6863}{4096}\,\sqrt{2}\,\mathrm{arsinh}\left(\frac{1}{23}\,\sqrt{23}(4\,x-1)\right)-\frac{505}{1024}\,\sqrt{2\,x^2-x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/sqrt(2*x^2 - x + 3),x, algorithm="maxima")
```

```
[Out] 5/8*sqrt(2*x^2 - x + 3)*x^3 + 19/96*sqrt(2*x^2 - x + 3)*x^2 - 409
/768*sqrt(2*x^2 - x + 3)*x + 6863/4096*sqrt(2)*arcsinh(1/23*sqrt(
23)*(4*x - 1)) - 505/1024*sqrt(2*x^2 - x + 3)
```

Fricas [A] time = 0.27832, size = 103, normalized size = 1.02

$$\frac{1}{24576}\sqrt{2}\Big(4\sqrt{2}\big(1920x^3+608x^2-1636x-1515\big)\sqrt{2x^2-x+3}+20589\log\Big(-\sqrt{2}\big(32x^2-16x+25\big)-8\sqrt{2x^2-x+3}(4$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/sqrt(2*x^2 - x + 3),x, algorithm="fricas")
```

```
[Out] 1/24576*sqrt(2)*(4*sqrt(2)*(1920*x^3 + 608*x^2 - 1636*x - 1515)*s
qrt(2*x^2 - x + 3) + 20589*log(-sqrt(2)*(32*x^2 - 16*x + 25) - 8*
sqrt(2*x^2 - x + 3)*(4*x - 1)))
```

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

$$\int \frac{5x^4 - x^3 + 3x^2 + x + 2}{\sqrt{2x^2 - x + 3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(1/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/sqrt(2*x**2 - x + 3), x
)
```

GIAC/XCAS [A] time = 0.280023, size = 85, normalized size = 0.84

$$\frac{1}{3072}\left(4\left(8\left(60x+19\right)x-409\right)x-1515\right)\sqrt{2x^2-x+3}-\frac{6863}{4096}\sqrt{2}\ln\left(-2\sqrt{2}\left(\sqrt{2}x-\sqrt{2x^2-x+3}\right)+1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/sqrt(2*x^2 - x + 3),x, algorithm="giac")
```

```
[Out] 1/3072*(4*(8*(60*x + 19)*x - 409)*x - 1515)*sqrt(2*x^2 - x + 3) -
 6863/4096*sqrt(2)*ln(-2*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3)
) + 1)
```

3.346 $\int \frac{2+x+3x^2-x^3+5x^4}{(5+2x)\sqrt{3-x+2x^2}}\,dx$

Optimal. Leaf size=126

$$\frac{5}{48}\sqrt{2x^2-x+3}(2x+5)^2-\frac{337}{192}\sqrt{2x^2-x+3}(2x+5)+\frac{1669}{128}\sqrt{2x^2-x+3}-\frac{3667\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{96\sqrt{2}}+\frac{9657\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{256\sqrt{2}}$$

```
[Out] (1669*Sqrt[3 - x + 2*x^2])/128 - (337*(5 + 2*x)*Sqrt[3 - x + 2*x^
2])/192 + (5*(5 + 2*x)^2*Sqrt[3 - x + 2*x^2])/48 + (9657*ArcSinh[
(1 - 4*x)/Sqrt[23]])/(256*Sqrt[2]) - (3667*ArcTanh[(17 - 22*x)/(1
2*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(96*Sqrt[2])
```

Rubi [A] time = 0.383919, antiderivative size = 126, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.15

$$\frac{5}{48}\sqrt{2x^2-x+3}(2x+5)^2-\frac{337}{192}\sqrt{2x^2-x+3}(2x+5)+\frac{1669}{128}\sqrt{2x^2-x+3}-\frac{3667\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{96\sqrt{2}}+\frac{9657\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{256\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)*Sqrt[3 - x + 2*x^2]),x]
```

```
[Out] (1669*Sqrt[3 - x + 2*x^2])/128 - (337*(5 + 2*x)*Sqrt[3 - x + 2*x^
2])/192 + (5*(5 + 2*x)^2*Sqrt[3 - x + 2*x^2])/48 + (9657*ArcSinh[
(1 - 4*x)/Sqrt[23]])/(256*Sqrt[2]) - (3667*ArcTanh[(17 - 22*x)/(1
2*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(96*Sqrt[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((5*x**4-x**3+3*x**2+x+2)/(5+2*x)/(2*x**2-x+3)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.171382, size = 94, normalized size = 0.75

$$\frac{4\left(\sqrt{2x^2-x+3}\left(160x^2-548x+2637\right)-7334\sqrt{2}\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+7334\sqrt{2}\log(2x+5)\right)-28971\sqrt{2}\,\mathrm{sin}}{1536}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)*Sqrt[3 - x + 2*x^2]),x]
```

```
[Out] (-28971*Sqrt[2]*ArcSinh[(-1 + 4*x)/Sqrt[23]] + 4*(Sqrt[3 - x + 2*
x^2]*(2637 - 548*x + 160*x^2) + 7334*Sqrt[2]*Log[5 + 2*x] - 7334*
Sqrt[2]*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]]))/1536
```

Maple [A] time = 0.013, size = 92, normalized size = 0.7

$$-\frac{9657\sqrt{2}}{512}\mathit{Arcsinh}\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)+\frac{879}{128}\sqrt{2x^2-x+3}-\frac{137x}{96}\sqrt{2x^2-x+3}+\frac{5x^2}{12}\sqrt{2x^2-x+3}-\frac{3667\sqrt{2}}{192}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11x\right)\frac{1}{\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^4-x^3+3*x^2+x+2)/(5+2*x)/(2*x^2-x+3)^(1/2),x)
```

```
[Out] -9657/512*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4))+879/128*(2*x^2-x
+3)^(1/2)-137/96*x*(2*x^2-x+3)^(1/2)+5/12*x^2*(2*x^2-x+3)^(1/2)-3
667/192*2^(1/2)*arctanh(1/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*
x-19/2)^(1/2))
```

Maxima [A] time = 0.789396, size = 134, normalized size = 1.06

$$\frac{5}{12}\sqrt{2x^2-x+3}x^2-\frac{137}{96}\sqrt{2x^2-x+3}x-\frac{9657}{512}\sqrt{2}\,\mathrm{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{3667}{192}\sqrt{2}\,\mathrm{arsinh}\left(\frac{22\sqrt{23}x}{23\left|2x+5\right|}-\frac{17\sqrt{23}}{23\left|2x+5\right|}\right)+\frac{879}{128}\sqrt{2x^2-x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)),x, algorith
```

```
[Out] 5/12*sqrt(2*x^2 - x + 3)*x^2 - 137/96*sqrt(2*x^2 - x + 3)*x - 965
7/512*sqrt(2)*arcsinh(4/23*sqrt(23)*x - 1/23*sqrt(23)) + 3667/192
*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5) - 17/23*sqrt(23)/a
bs(2*x + 5)) + 879/128*sqrt(2*x^2 - x + 3)
```

Fricas [A] time = 0.292188, size = 165, normalized size = 1.31

$$\frac{1}{3072}\sqrt{2}\left(4\sqrt{2}\left(160x^2-548x+2637\right)\sqrt{2x^2-x+3}+28971\log\left(-\sqrt{2}\left(32x^2-16x+25\right)+8\sqrt{2x^2-x+3}(4x-1)\right)+29$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)),x, algorith
```

```
[Out] 1/3072*sqrt(2)*(4*sqrt(2)*(160*x^2 - 548*x + 2637)*sqrt(2*x^2 - x
 + 3) + 28971*log(-sqrt(2)*(32*x^2 - 16*x + 25) + 8*sqrt(2*x^2 -
x + 3)*(4*x - 1)) + 29336*log(-(sqrt(2)*(1060*x^2 - 1036*x + 1153
) + 48*sqrt(2*x^2 - x + 3)*(22*x - 17))/(4*x^2 + 20*x + 25)))
```

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

$$\int \frac{5x^4-x^3+3x^2+x+2}{(2x+5)\sqrt{2x^2-x+3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)/(5+2*x)/(2*x**2-x+3)**(1/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/((2*x + 5)*sqrt(2*x**2
- x + 3)), x)
```

GIAC/XCAS [A] time = 0.290551, size = 161, normalized size = 1.28

$$\frac{1}{384}(4(40x-137)x+2637)\sqrt{2x^2-x+3}+\frac{9657}{512}\sqrt{2}\ln\left(-4\sqrt{2}x+\sqrt{2}+4\sqrt{2x^2-x+3}\right)-\frac{3667}{192}\sqrt{2}\ln\left(\left|-2\sqrt{2}x+\sqrt{2}+2\sqrt{2x^2-x+3}\right|\right)+\frac{3667}{192}\sqrt{2}\ln\left(\left|-2\sqrt{2}x-11\sqrt{2}+2\sqrt{2x^2-x+3}\right|\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)),x, algorith
```

```
[Out] 1/384*(4*(40*x - 137)*x + 2637)*sqrt(2*x^2 - x + 3) + 9657/512*sq
rt(2)*ln(-4*sqrt(2)*x + sqrt(2) + 4*sqrt(2*x^2 - x + 3)) - 3667/1
92*sqrt(2)*ln(abs(-2*sqrt(2)*x + sqrt(2) + 2*sqrt(2*x^2 - x + 3))
) + 3667/192*sqrt(2)*ln(abs(-2*sqrt(2)*x - 11*sqrt(2) + 2*sqrt(2*
x^2 - x + 3)))
```

3.347 $\int \frac{2+x+3x^2-x^3+5x^4}{(5+2x)^2\sqrt{3-x+2x^2}}\,dx$

Optimal. Leaf size=126

$$\frac{5}{32}\sqrt{2x^2-x+3}(2x+5)-\frac{243}{64}\sqrt{2x^2-x+3}-\frac{3667\sqrt{2x^2-x+3}}{576(2x+5)}+\frac{158527\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{6912\sqrt{2}}-\frac{2943\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{128\sqrt{2}}$$

```
[Out] (-243*Sqrt[3 - x + 2*x^2])/64 - (3667*Sqrt[3 - x + 2*x^2])/(576*(
5 + 2*x)) + (5*(5 + 2*x)*Sqrt[3 - x + 2*x^2])/32 - (2943*ArcSinh[
(1 - 4*x)/Sqrt[23]])/(128*Sqrt[2]) + (158527*ArcTanh[(17 - 22*x)/
(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(6912*Sqrt[2])
```

Rubi [A] time = 0.378803, antiderivative size = 126, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.175

$$\frac{5}{32}\sqrt{2x^2-x+3}(2x+5)-\frac{243}{64}\sqrt{2x^2-x+3}-\frac{3667\sqrt{2x^2-x+3}}{576(2x+5)}+\frac{158527\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{6912\sqrt{2}}-\frac{2943\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{128\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^2*Sqrt[3 - x + 2*x^2]),x]
```

```
[Out] (-243*Sqrt[3 - x + 2*x^2])/64 - (3667*Sqrt[3 - x + 2*x^2])/(576*(
5 + 2*x)) + (5*(5 + 2*x)*Sqrt[3 - x + 2*x^2])/32 - (2943*ArcSinh[
(1 - 4*x)/Sqrt[23]])/(128*Sqrt[2]) + (158527*ArcTanh[(17 - 22*x)/
(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(6912*Sqrt[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((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**2/(2*x**2-x+3)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.218021, size = 122, normalized size = 0.97

$$\frac{4320\sqrt{2x^2-x+3}x-\frac{88008\sqrt{2x^2-x+3}}{2x+5}-41688\sqrt{2x^2-x+3}+158527\sqrt{2}\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)-158527\sqrt{2}\log(2}{13824}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^2*Sqrt[3 - x + 2*x^2]),x]
```

```
[Out] (-41688*Sqrt[3 - x + 2*x^2] + 4320*x*Sqrt[3 - x + 2*x^2] - (88008
*Sqrt[3 - x + 2*x^2])/(5 + 2*x) + 158922*Sqrt[2]*ArcSinh[(-1 + 4*
x)/Sqrt[23]] - 158527*Sqrt[2]*Log[5 + 2*x] + 158527*Sqrt[2]*Log[1
7 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]])/13824
```

Maple [A] time = 0.017, size = 96, normalized size = 0.8

$$\frac{2943\sqrt{2}}{256}\mathit{Arcsinh}\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)-\frac{193}{64}\sqrt{2x^2-x+3}+\frac{5x}{16}\sqrt{2x^2-x+3}-\frac{3667}{1152}\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}\left(x+\frac{5}{2}\right)^{-1}+\frac{158527\sqrt{2}}{13824}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11x\right)\frac{1}{\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5*x^4-x^3+3*x^2+x+2)/(5+2*x)^2/(2*x^2-x+3)^(1/2),x)
```

```
[Out] 2943/256*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4))-193/64*(2*x^2-x+3
)^(1/2)+5/16*x*(2*x^2-x+3)^(1/2)-3667/1152/(x+5/2)*(2*(x+5/2)^2-1
1*x-19/2)^(1/2)+158527/13824*2^(1/2)*arctanh(1/12*(17/2-11*x)*2^(
1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))
```

Maxima [A] time = 0.822262, size = 139, normalized size = 1.1

$$\frac{5}{16}\sqrt{2x^2-x+3}x+\frac{2943}{256}\sqrt{2}\,\mathrm{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)-\frac{158527}{13824}\sqrt{2}\,\mathrm{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2x+5|}-\frac{17\sqrt{23}}{23\,|2x+5|}\right)-\frac{193}{64}\sqrt{2x^2-x+3}-\frac{3667\sqrt{2x^2-x+3}}{576\,(2x+5)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)^2),x, algori
```

```
[Out] 5/16*sqrt(2*x^2 - x + 3)*x + 2943/256*sqrt(2)*arcsinh(4/23*sqrt(2
3)*x - 1/23*sqrt(23)) - 158527/13824*sqrt(2)*arcsinh(22/23*sqrt(2
3)*x/abs(2*x + 5) - 17/23*sqrt(23)/abs(2*x + 5)) - 193/64*sqrt(2*
x^2 - x + 3) - 3667/576*sqrt(2*x^2 - x + 3)/(2*x + 5)
```

Fricas [A] time = 0.282331, size = 188, normalized size = 1.49

$$\frac{\sqrt{2}\Big(48\sqrt{2}\left(180x^2-1287x-6176\right)\sqrt{2x^2-x+3}+158922\,(2x+5)\log\left(-\sqrt{2}\left(32x^2-16x+25\right)-8\sqrt{2x^2-x+3}(4x-1)\right.}{27648\,(2x+5)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)^2),x, algori
```

```
[Out] 1/27648*sqrt(2)*(48*sqrt(2)*(180*x^2 - 1287*x - 6176)*sqrt(2*x^2
- x + 3) + 158922*(2*x + 5)*log(-sqrt(2)*(32*x^2 - 16*x + 25) - 8
*sqrt(2*x^2 - x + 3)*(4*x - 1)) + 158527*(2*x + 5)*log(-(sqrt(2)*
(1060*x^2 - 1036*x + 1153) - 48*sqrt(2*x^2 - x + 3)*(22*x - 17))/
(4*x^2 + 20*x + 25)))/(2*x + 5)
```

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

$$\int \frac{5x^4-x^3+3x^2+x+2}{(2x+5)^2\sqrt{2x^2-x+3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**2/(2*x**2-x+3)**(1/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/((2*x + 5)**2*sqrt(2*x*
*2 - x + 3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{5\,x^4 - x^3 + 3\,x^2 + x + 2}{\sqrt{2\,x^2 - x + 3}(2\,x + 5)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)^2),x, algori
```

```
[Out] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x
 + 5)^2), x)
```

3.348 $\int \frac{2+x+3x^2-x^3+5x^4}{(5+2x)^3\sqrt{3-x+2x^2}}\,dx$

Optimal. Leaf size=128

$$\frac{92239\sqrt{2x^2-x+3}}{27648(2x+5)}-\frac{3667\sqrt{2x^2-x+3}}{1152(2x+5)^2}+\frac{5}{16}\sqrt{2x^2-x+3}-\frac{1546507\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{331776\sqrt{2}}+\frac{149\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{32\sqrt{2}}$$

```
[Out] (5*Sqrt[3 - x + 2*x^2])/16 - (3667*Sqrt[3 - x + 2*x^2])/(1152*(5
+ 2*x)^2) + (92239*Sqrt[3 - x + 2*x^2])/(27648*(5 + 2*x)) + (149*
ArcSinh[(1 - 4*x)/Sqrt[23]])/(32*Sqrt[2]) - (1546507*ArcTanh[(17
- 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(331776*Sqrt[2])
```

Rubi [A] time = 0.382335, antiderivative size = 128, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 7, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.175

$$\frac{92239\sqrt{2x^2-x+3}}{27648(2x+5)}-\frac{3667\sqrt{2x^2-x+3}}{1152(2x+5)^2}+\frac{5}{16}\sqrt{2x^2-x+3}-\frac{1546507\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{331776\sqrt{2}}+\frac{149\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{32\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^3*Sqrt[3 - x + 2*x^2]),x]
```

```
[Out] (5*Sqrt[3 - x + 2*x^2])/16 - (3667*Sqrt[3 - x + 2*x^2])/(1152*(5
+ 2*x)^2) + (92239*Sqrt[3 - x + 2*x^2])/(27648*(5 + 2*x)) + (149*
ArcSinh[(1 - 4*x)/Sqrt[23]])/(32*Sqrt[2]) - (1546507*ArcTanh[(17
- 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(331776*Sqrt[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((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**3/(2*x**2-x+3)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.20557, size = 89, normalized size = 0.7

$$\frac{\frac{12\sqrt{4x^2-2x+6}(34560x^2+357278x+589187)}{(2x+5)^2} - 1546507\log\left(12\sqrt{4x^2-2x+6}-22x+17\right) + 1546507\log(2x+5) - 1544832\sinh^{-1}\left(\frac{4x}{\sqrt{}}\right.}{331776\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^3*Sqrt[3 - x + 2*x^2]),x]
```

```
[Out] ((12*Sqrt[6 - 2*x + 4*x^2]*(589187 + 357278*x + 34560*x^2))/(5 +
2*x)^2 - 1544832*ArcSinh[(-1 + 4*x)/Sqrt[23]] + 1546507*Log[5 + 2
*x] - 1546507*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]])/(331776*
Sqrt[2])
```

Maple [A] time = 0.017, size = 102, normalized size = 0.8

$$-\frac{149\sqrt{2}}{64}Arcsinh\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)+\frac{5}{16}\sqrt{2x^2-x+3}$$
$$-\frac{3667}{4608}\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}\left(x+\frac{5}{2}\right)^{-2}+\frac{92239}{55296}\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}\left(x+\frac{5}{2}\right)^{-1}$$
$$-\frac{1546507\sqrt{2}}{663552}Artanh\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11x\right)\frac{1}{\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5*x^4-x^3+3*x^2+x+2)/(5+2*x)^3/(2*x^2-x+3)^(1/2),x)
```

```
[Out] -149/64*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4))+5/16*(2*x^2-x+3)^(
1/2)-3667/4608/(x+5/2)^2*(2*(x+5/2)^2-11*x-19/2)^(1/2)+92239/5529
6/(x+5/2)*(2*(x+5/2)^2-11*x-19/2)^(1/2)-1546507/663552*2^(1/2)*ar
ctanh(1/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))
```

Maxima [A] time = 0.784682, size = 154, normalized size = 1.2

$$-\frac{149}{64}\sqrt{2}\operatorname{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)+\frac{1546507}{663552}\sqrt{2}\operatorname{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\sqrt{23}}{23\,|2\,x+5|}\right)+\frac{5}{16}\sqrt{2\,x^2-x+3}-\frac{3667\sqrt{2\,x^2-x+3}}{1152\,(4\,x^2+20\,x+25)}+\frac{92239\sqrt{2\,x^2-x+3}}{27648\,(2\,x+5)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)^3),x, algori
```

```
[Out] -149/64*sqrt(2)*arcsinh(4/23*sqrt(23)*x - 1/23*sqrt(23)) + 154650
7/663552*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5) - 17/23*sq
rt(23)/abs(2*x + 5)) + 5/16*sqrt(2*x^2 - x + 3) - 3667/1152*sqrt(
2*x^2 - x + 3)/(4*x^2 + 20*x + 25) + 92239/27648*sqrt(2*x^2 - x +
 3)/(2*x + 5)
```

Fricas [A] time = 0.28727, size = 208, normalized size = 1.62

$$\frac{\sqrt{2}\Big(24\sqrt{2}\left(34560\,x^2+357278\,x+589187\right)\sqrt{2\,x^2-x+3}+1544832\left(4\,x^2+20\,x+25\right)\log\Big(-\sqrt{2}\left(32\,x^2-16\,x+25\right)+8\sqrt{2\,x}}{1327104\,(4\,x^2+20\,x+25)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)^3),x, algori
```

```
[Out] 1/1327104*sqrt(2)*(24*sqrt(2)*(34560*x^2 + 357278*x + 589187)*sqr
t(2*x^2 - x + 3) + 1544832*(4*x^2 + 20*x + 25)*log(-sqrt(2)*(32*x
^2 - 16*x + 25) + 8*sqrt(2*x^2 - x + 3)*(4*x - 1)) + 1546507*(4*x
^2 + 20*x + 25)*log(-(sqrt(2)*(1060*x^2 - 1036*x + 1153) + 48*sqr
t(2*x^2 - x + 3)*(22*x - 17))/(4*x^2 + 20*x + 25)))/(4*x^2 + 20*x
 + 25)
```

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

$$\int \frac{5x^4-x^3+3x^2+x+2}{(2x+5)^3\sqrt{2x^2-x+3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**3/(2*x**2-x+3)**(1/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/((2*x + 5)**3*sqrt(2*x*
*2 - x + 3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$undef$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)^3),x, algori
```

```
[Out] undef
```

3.349 $\int \frac{2+x+3x^2-x^3+5x^4}{(5+2x)^4\sqrt{3-x+2x^2}}\,dx$

Optimal. Leaf size=135

$$-\frac{3163415\sqrt{2x^2-x+3}}{5971968(2x+5)}+\frac{394907\sqrt{2x^2-x+3}}{248832(2x+5)^2}-\frac{3667\sqrt{2x^2-x+3}}{1728(2x+5)^3}+\frac{22389491\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{71663616\sqrt{2}}-\frac{5\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{16\sqrt{2}}$$

```
[Out] (-3667*Sqrt[3 - x + 2*x^2])/(1728*(5 + 2*x)^3) + (394907*Sqrt[3 -
 x + 2*x^2])/(248832*(5 + 2*x)^2) - (3163415*Sqrt[3 - x + 2*x^2])
/(5971968*(5 + 2*x)) - (5*ArcSinh[(1 - 4*x)/Sqrt[23]])/(16*Sqrt[2
]) + (22389491*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2
])])/(71663616*Sqrt[2])
```

Rubi [A] time = 0.378246, antiderivative size = 135, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.15

$$-\frac{3163415\sqrt{2x^2-x+3}}{5971968(2x+5)}+\frac{394907\sqrt{2x^2-x+3}}{248832(2x+5)^2}-\frac{3667\sqrt{2x^2-x+3}}{1728(2x+5)^3}+\frac{22389491\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{71663616\sqrt{2}}-\frac{5\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{16\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^4*Sqrt[3 - x + 2*x^2]),x]
```


```
[Out] (-3667*Sqrt[3 - x + 2*x^2])/(1728*(5 + 2*x)^3) + (394907*Sqrt[3 -
 x + 2*x^2])/(248832*(5 + 2*x)^2) - (3163415*Sqrt[3 - x + 2*x^2])
/(5971968*(5 + 2*x)) - (5*ArcSinh[(1 - 4*x)/Sqrt[23]])/(16*Sqrt[2
]) + (22389491*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2
])])/(71663616*Sqrt[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((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**4/(2*x**2-x+3)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.242047, size = 89, normalized size = 0.66

$$\frac{-\frac{12\sqrt{4x^2-2x+6}(12653660x^2+44312764x+44369687)}{(2x+5)^3}+22389491\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)-22389491\log(2x+5)+2239488}{71663616\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^4*Sqrt[3 - x + 2*x^2]),x]
```

```
[Out] ((-12*Sqrt[6 - 2*x + 4*x^2]*(44369687 + 44312764*x + 12653660*x^2
))/(5 + 2*x)^3 + 22394880*ArcSinh[(-1 + 4*x)/Sqrt[23]] - 22389491
*Log[5 + 2*x] + 22389491*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]
])/(71663616*Sqrt[2])
```

Maple [A] time = 0.019, size = 109, normalized size = 0.8

$$\frac{5\sqrt{2}}{32}\mathit{Arcsinh}\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)-\frac{3667}{13824}\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}\left(x+\frac{5}{2}\right)^{-3}+\frac{394907}{995328}\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}\left(x+\frac{5}{2}\right)^{-2}-\frac{3163415}{11943936}\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}\left(x+\frac{5}{2}\right)^{-1}+\frac{22389491\sqrt{2}}{143327232}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11x\right)\frac{1}{\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^4-x^3+3*x^2+x+2)/(5+2*x)^4/(2*x^2-x+3)^(1/2),x)
```

```
[Out] 5/32*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4))-3667/13824/(x+5/2)^3*
(2*(x+5/2)^2-11*x-19/2)^(1/2)+394907/995328/(x+5/2)^2*(2*(x+5/2)^
2-11*x-19/2)^(1/2)-3163415/11943936/(x+5/2)*(2*(x+5/2)^2-11*x-19/
2)^(1/2)+22389491/143327232*2^(1/2)*arctanh(1/12*(17/2-11*x)*2^(1
/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))
```

Maxima [A] time = 0.795664, size = 177, normalized size = 1.31

$$\frac{5}{32}\sqrt{2}\,\operatorname{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)-\frac{22389491}{143327232}\sqrt{2}\,\operatorname{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\sqrt{23}}{23\,|2\,x+5|}\right)-\frac{3667\sqrt{2\,x^2-x+3}}{1728\,(8\,x^3+60\,x^2+150\,x+125)}+\frac{394907\sqrt{2\,x^2-x+3}}{248832\,(4\,x^2+20\,x+25)}-\frac{3163415\sqrt{2\,x^2-x+3}}{5971968\,(2\,x+5)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)^4),x, algori
```

```
[Out] 5/32*sqrt(2)*arcsinh(4/23*sqrt(23)*x - 1/23*sqrt(23)) - 22389491/
143327232*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5) - 17/23*s
qrt(23)/abs(2*x + 5)) - 3667/1728*sqrt(2*x^2 - x + 3)/(8*x^3 + 60
*x^2 + 150*x + 125) + 394907/248832*sqrt(2*x^2 - x + 3)/(4*x^2 +
20*x + 25) - 3163415/5971968*sqrt(2*x^2 - x + 3)/(2*x + 5)
```

Fricas [A] time = 0.306398, size = 228, normalized size = 1.69

$$-\frac{\sqrt{2}\Big(24\sqrt{2}\left(12653660\,x^2+44312764\,x+44369687\right)\sqrt{2\,x^2-x+3}-22394880\left(8\,x^3+60\,x^2+150\,x+125\right)\log\Big(-\sqrt{2}(32\,x^2}{286654464\,(8\,x}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)^4),x, algori
```

```
[Out] -1/286654464*sqrt(2)*(24*sqrt(2)*(12653660*x^2 + 44312764*x + 443
69687)*sqrt(2*x^2 - x + 3) - 22394880*(8*x^3 + 60*x^2 + 150*x + 1
25)*log(-sqrt(2)*(32*x^2 - 16*x + 25) - 8*sqrt(2*x^2 - x + 3)*(4*
x - 1)) - 22389491*(8*x^3 + 60*x^2 + 150*x + 125)*log(-(sqrt(2)*(
1060*x^2 - 1036*x + 1153) - 48*sqrt(2*x^2 - x + 3)*(22*x - 17))/(
4*x^2 + 20*x + 25)))/(8*x^3 + 60*x^2 + 150*x + 125)
```

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

$$\int \frac{5x^4-x^3+3x^2+x+2}{(2x+5)^4\sqrt{2x^2-x+3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**4/(2*x**2-x+3)**(1/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/((2*x + 5)**4*sqrt(2*x*
*2 - x + 3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$undef$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)^4),x, algori
```

```
[Out] undef
```

3.350 $\int \frac{2+x+3x^2-x^3+5x^4}{(5+2x)^5\sqrt{3-x+2x^2}}\,dx$

Optimal. Leaf size=139

$$\frac{26800085\sqrt{2x^2-x+3}}{1719926784(2x+5)}-\frac{16295969\sqrt{2x^2-x+3}}{71663616(2x+5)^2}+\frac{513097\sqrt{2x^2-x+3}}{497664(2x+5)^3}-\frac{3667\sqrt{2x^2-x+3}}{2304(2x+5)^4}+\frac{2053207\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{20639121408\sqrt{2}}$$

```
[Out] (-3667*Sqrt[3 - x + 2*x^2])/(2304*(5 + 2*x)^4) + (513097*Sqrt[3 -
 x + 2*x^2])/(497664*(5 + 2*x)^3) - (16295969*Sqrt[3 - x + 2*x^2]
)/(71663616*(5 + 2*x)^2) + (26800085*Sqrt[3 - x + 2*x^2])/(171992
6784*(5 + 2*x)) + (2053207*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3
 - x + 2*x^2])])/(20639121408*Sqrt[2])
```

Rubi [A] time = 0.366231, antiderivative size = 139, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}} = 0.1$

$$\frac{26800085\sqrt{2x^2-x+3}}{1719926784(2x+5)}-\frac{16295969\sqrt{2x^2-x+3}}{71663616(2x+5)^2}+\frac{513097\sqrt{2x^2-x+3}}{497664(2x+5)^3}-\frac{3667\sqrt{2x^2-x+3}}{2304(2x+5)^4}+\frac{2053207\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{20639121408\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^5*Sqrt[3 - x + 2*x^2]),x]
```

```
[Out] (-3667*Sqrt[3 - x + 2*x^2])/(2304*(5 + 2*x)^4) + (513097*Sqrt[3 -
 x + 2*x^2])/(497664*(5 + 2*x)^3) - (16295969*Sqrt[3 - x + 2*x^2]
)/(71663616*(5 + 2*x)^2) + (26800085*Sqrt[3 - x + 2*x^2])/(171992
6784*(5 + 2*x)) + (2053207*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3
 - x + 2*x^2])])/(20639121408*Sqrt[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((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**5/(2*x**2-x+3)**(1/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.213809, size = 80, normalized size = 0.58

$$\frac{2053207\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{12\sqrt{4x^2-2x+6}(214400680x^3+43592076x^2-255525906x-298655447)}{(2x+5)^4}-2053207\log(2x+5)}{20639121408\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^5*Sqrt[3 - x + 2*x^2]),x]
```

```
[Out] ((12*Sqrt[6 - 2*x + 4*x^2]*(-298655447 - 255525906*x + 43592076*x
^2 + 214400680*x^3))/(5 + 2*x)^4 - 2053207*Log[5 + 2*x] + 2053207
*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]])/(20639121408*Sqrt[2])
```

Maple [A] time = 0.018, size = 116, normalized size = 0.8

$$-\frac{3667}{36864}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}\left(x+\frac{5}{2}\right)^{-4}+\frac{513097}{3981312}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}\left(x+\frac{5}{2}\right)^{-3}$$
$$-\frac{16295969}{286654464}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}\left(x+\frac{5}{2}\right)^{-2}$$
$$+\frac{26800085}{3439853568}\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}\left(x+\frac{5}{2}\right)^{-1}$$
$$+\frac{2053207\sqrt{2}}{41278242816}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^4-x^3+3*x^2+x+2)/(5+2*x)^5/(2*x^2-x+3)^(1/2),x)
```

```
[Out] -3667/36864/(x+5/2)^4*(2*(x+5/2)^2-11*x-19/2)^(1/2)+513097/398131
2/(x+5/2)^3*(2*(x+5/2)^2-11*x-19/2)^(1/2)-16295969/286654464/(x+5
/2)^2*(2*(x+5/2)^2-11*x-19/2)^(1/2)+26800085/3439853568/(x+5/2)*(
2*(x+5/2)^2-11*x-19/2)^(1/2)+2053207/41278242816*2^(1/2)*arctanh(
1/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))
```

Maxima [A] time = 0.801793, size = 201, normalized size = 1.45

$$-\frac{2053207}{41278242816}\sqrt{2}\operatorname{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\sqrt{23}}{23\,|2\,x+5|}\right)-\frac{3667\sqrt{2\,x^2-x+3}}{2304\,(16\,x^4+160\,x^3+600\,x^2+1000\,x+625)}+\frac{513097\sqrt{2\,x^2-x+3}}{497664\,(8\,x^3+60\,x^2+150\,x+125)}-\frac{16295969\sqrt{2\,x^2-x+3}}{71663616\,(4\,x^2+20\,x+25)}+\frac{26800085\sqrt{2\,x^2-x+3}}{1719926784\,(2\,x+5)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)^5),x, algori
```

```
[Out] -2053207/41278242816*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5
) - 17/23*sqrt(23)/abs(2*x + 5)) - 3667/2304*sqrt(2*x^2 - x + 3)/
(16*x^4 + 160*x^3 + 600*x^2 + 1000*x + 625) + 513097/497664*sqrt(
2*x^2 - x + 3)/(8*x^3 + 60*x^2 + 150*x + 125) - 16295969/71663616
*sqrt(2*x^2 - x + 3)/(4*x^2 + 20*x + 25) + 26800085/1719926784*sq
rt(2*x^2 - x + 3)/(2*x + 5)
```

Fricas [A] time = 0.301779, size = 177, normalized size = 1.27

$$\frac{\sqrt{2}\left(24\sqrt{2}\left(214400680\,x^3+43592076\,x^2-255525906\,x-298655447\right)\sqrt{2\,x^2-x+3}+2053207\,\left(16\,x^4+160\,x^3+600\,x^2+10\ldots\right.\right.}{82556485632\,(16\,x^4+160\,x^3+600\,x^2+1000\,x+625)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)^5),x, algori
```

```
[Out] 1/82556485632*sqrt(2)*(24*sqrt(2)*(214400680*x^3 + 43592076*x^2 -
 255525906*x - 298655447)*sqrt(2*x^2 - x + 3) + 2053207*(16*x^4 +
 160*x^3 + 600*x^2 + 1000*x + 625)*log(-(sqrt(2)*(1060*x^2 - 1036
*x + 1153) - 48*sqrt(2*x^2 - x + 3)*(22*x - 17))/(4*x^2 + 20*x +
25)))/(16*x^4 + 160*x^3 + 600*x^2 + 1000*x + 625)
```

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

$$\int \frac{5x^4-x^3+3x^2+x+2}{(2x+5)^5\sqrt{2x^2-x+3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**5/(2*x**2-x+3)**(1/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/((2*x + 5)**5*sqrt(2*x*
*2 - x + 3)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{5\,x^4 - x^3 + 3\,x^2 + x + 2}{\sqrt{2\,x^2 - x + 3}(2\,x + 5)^5}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x + 5)^5),x, algori
```

```
[Out] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(sqrt(2*x^2 - x + 3)*(2*x
 + 5)^5), x)
```

3.351 $\int \frac{(5+2x)^2(2+x+3x^2-x^3+5x^4)}{(3-x+2x^2)^{3/2}}\,dx$

Optimal. Leaf size=124

$$\frac{153}{16}\sqrt{2x^2-x+3}x^2+\frac{2645}{128}\sqrt{2x^2-x+3}x-\frac{13153}{512}\sqrt{2x^2-x+3}-\frac{4(346-533x)}{23\sqrt{2x^2-x+3}}+\frac{5}{4}\sqrt{2x^2-x+3}x^3+\frac{144217\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{1024\sqrt{2}}$$

```
[Out] (-4*(346 - 533*x))/(23*Sqrt[3 - x + 2*x^2]) - (13153*Sqrt[3 - x +
 2*x^2])/512 + (2645*x*Sqrt[3 - x + 2*x^2])/128 + (153*x^2*Sqrt[3
 - x + 2*x^2])/16 + (5*x^3*Sqrt[3 - x + 2*x^2])/4 + (144217*ArcSi
nh[(1 - 4*x)/Sqrt[23]])/(1024*Sqrt[2])
```

Rubi [A] time = 0.255208, antiderivative size = 124, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$

$$\frac{153}{16}\sqrt{2x^2-x+3}x^2+\frac{2645}{128}\sqrt{2x^2-x+3}x-\frac{13153}{512}\sqrt{2x^2-x+3}-\frac{4(346-533x)}{23\sqrt{2x^2-x+3}}+\frac{5}{4}\sqrt{2x^2-x+3}x^3+\frac{144217\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{1024\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[((5 + 2*x)^2*(2 + x + 3*x^2 - x^3 + 5*x^4))/(3 - x + 2*x^2)^(3/2),x]
```

```
[Out] (-4*(346 - 533*x))/(23*Sqrt[3 - x + 2*x^2]) - (13153*Sqrt[3 - x +
 2*x^2])/512 + (2645*x*Sqrt[3 - x + 2*x^2])/128 + (153*x^2*Sqrt[3
 - x + 2*x^2])/16 + (5*x^3*Sqrt[3 - x + 2*x^2])/4 + (144217*ArcSi
nh[(1 - 4*x)/Sqrt[23]])/(1024*Sqrt[2])
```

Rubi in Sympy [A] time = 107.079, size = 129, normalized size = 1.04

$$\frac{5x^5}{2\sqrt{2x^2-x+3}}+\frac{143x^4}{8\sqrt{2x^2-x+3}}+\frac{2273x^3}{64\sqrt{2x^2-x+3}}-\frac{11099x^2}{256\sqrt{2x^2-x+3}}-\frac{-\frac{2124123x}{512}+\frac{1616165}{512}}{23\sqrt{2x^2-x+3}}-\frac{144217\sqrt{2}\,\text{atanh}\left(\frac{\sqrt{2}(4x-1)}{4\sqrt{2x^2-x+3}}\right)}{2048}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((5+2*x)**2*(5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(3/2),x)
```

```
[Out] 5*x**5/(2*sqrt(2*x**2 - x + 3)) + 143*x**4/(8*sqrt(2*x**2 - x + 3
)) + 2273*x**3/(64*sqrt(2*x**2 - x + 3)) - 11099*x**2/(256*sqrt(2
*x**2 - x + 3)) - (-2124123*x/512 + 1616165/512)/(23*sqrt(2*x**2
- x + 3)) - 144217*sqrt(2)*atanh(sqrt(2)*(4*x - 1)/(4*sqrt(2*x**2
 - x + 3)))/2048
```

Mathematica [A] time = 0.184517, size = 65, normalized size = 0.52

$$\frac{\frac{4(29440x^5+210496x^4+418232x^3-510554x^2+2124123x-1616165)}{\sqrt{2x^2-x+3}} - 3316991\sqrt{2}\sinh^{-1}\left(\frac{4x-1}{\sqrt{23}}\right)}{47104}$$

Antiderivative was successfully verified.

```
[In] Integrate[((5 + 2*x)^2*(2 + x + 3*x^2 - x^3 + 5*x^4))/(3 - x + 2*x^2)^(3/2),x]
```

```
[Out] ((4*(-1616165 + 2124123*x - 510554*x^2 + 418232*x^3 + 210496*x^4
+ 29440*x^5))/Sqrt[3 - x + 2*x^2] - 3316991*Sqrt[2]*ArcSinh[(-1 +
 4*x)/Sqrt[23]])/47104
```

Maple [A] time = 0.01, size = 132, normalized size = 1.1

$$\frac{3725020\,x-931255}{94208}\frac{1}{\sqrt{2\,x^2-x+3}}-\frac{521655}{4096}\frac{1}{\sqrt{2\,x^2-x+3}}+\frac{144217\,x}{1024}\frac{1}{\sqrt{2\,x^2-x+3}}-\frac{144217\,\sqrt{2}}{2048}Arcsinh\left(\frac{4\,\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)-\frac{11099\,x^2}{256}\frac{1}{\sqrt{2\,x^2-x+3}}+\frac{2273\,x^3}{64}\frac{1}{\sqrt{2\,x^2-x+3}}+\frac{143\,x^4}{8}\frac{1}{\sqrt{2\,x^2-x+3}}+\frac{5\,x^5}{2}\frac{1}{\sqrt{2\,x^2-x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5+2*x)^2*(5*x^4-x^3+3*x^2+x+2)/(2*x^2-x+3)^(3/2),x)
```

```
[Out] 931255/94208*(4*x-1)/(2*x^2-x+3)^(1/2)-521655/4096/(2*x^2-x+3)^(1
/2)+144217/1024*x/(2*x^2-x+3)^(1/2)-144217/2048*2^(1/2)*arcsinh(4
/23*23^(1/2)*(x-1/4))-11099/256*x^2/(2*x^2-x+3)^(1/2)+2273/64*x^3
/(2*x^2-x+3)^(1/2)+143/8*x^4/(2*x^2-x+3)^(1/2)+5/2*x^5/(2*x^2-x+3
)^(1/2)
```

Maxima [A] time = 0.792196, size = 154, normalized size = 1.24

$$\frac{5\,x^5}{2\,\sqrt{2\,x^2-x+3}}+\frac{143\,x^4}{8\,\sqrt{2\,x^2-x+3}}+\frac{2273\,x^3}{64\,\sqrt{2\,x^2-x+3}}-\frac{11099\,x^2}{256\,\sqrt{2\,x^2-x+3}}-\frac{144217}{2048}\,\sqrt{2}\,\mathrm{arsinh}\left(\frac{1}{23}\,\sqrt{23}(4\,x-1)\right)+\frac{2124123\,x}{11776\,\sqrt{2\,x^2-x+3}}-\frac{1616165}{11776\,\sqrt{2\,x^2-x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)^2/(2*x^2 - x + 3)^(3/2),x, algori
```

```
[Out] 5/2*x^5/sqrt(2*x^2 - x + 3) + 143/8*x^4/sqrt(2*x^2 - x + 3) + 227
3/64*x^3/sqrt(2*x^2 - x + 3) - 11099/256*x^2/sqrt(2*x^2 - x + 3)
- 144217/2048*sqrt(2)*arcsinh(1/23*sqrt(23)*(4*x - 1)) + 2124123/
11776*x/sqrt(2*x^2 - x + 3) - 1616165/11776/sqrt(2*x^2 - x + 3)
```

Fricas [A] time = 0.293997, size = 146, normalized size = 1.18

$$\frac{\sqrt{2}\Big(4\,\sqrt{2}\big(29440\,x^5+210496\,x^4+418232\,x^3-510554\,x^2+2124123\,x-1616165\big)\,\sqrt{2\,x^2-x+3}+3316991\,\big(2\,x^2-x+3\big)\,\mathrm{lo}}{94208\,(2\,x^2-x+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)^2/(2*x^2 - x + 3)^(3/2),x, algori
```

```
[Out] 1/94208*sqrt(2)*(4*sqrt(2)*(29440*x^5 + 210496*x^4 + 418232*x^3 -
 510554*x^2 + 2124123*x - 1616165)*sqrt(2*x^2 - x + 3) + 3316991*
(2*x^2 - x + 3)*log(-sqrt(2)*(32*x^2 - 16*x + 25) + 8*sqrt(2*x^2
- x + 3)*(4*x - 1)))/(2*x^2 - x + 3)
```

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

$$\int\frac{(2x+5)^2\left(5x^4-x^3+3x^2+x+2\right)}{(2x^2-x+3)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5+2*x)**2*(5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(3/2),x)
```

```
[Out] Integral((2*x + 5)**2*(5*x**4 - x**3 + 3*x**2 + x + 2)/(2*x**2 -
x + 3)**(3/2), x)
```

GIAC/XCAS [A] time = 0.281373, size = 97, normalized size = 0.78

$$\frac{144217}{2048}\sqrt{2}\ln\left(-2\sqrt{2}\left(\sqrt{2}x-\sqrt{2x^2-x+3}\right)+1\right)+\frac{(46(4(8(20x+143)x+2273)x-11099)x+2124123)x-1616165}{11776\sqrt{2x^2-x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)^2/(2*x^2 - x + 3)^(3/2),x, algori
```

```
[Out] 144217/2048*sqrt(2)*ln(-2*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3
)) + 1) + 1/11776*((46*(4*(8*(20*x + 143)*x + 2273)*x - 11099)*x
+ 2124123)*x - 1616165)/sqrt(2*x^2 - x + 3)
```

3.352 $\int \frac{(5+2x)(2+x+3x^2-x^3+5x^4)}{(3-x+2x^2)^{3/2}}\,dx$

Optimal. Leaf size=103

$$\frac{5}{6}\sqrt{2x^2-x+3}x^2+\frac{193}{48}\sqrt{2x^2-x+3}x+\frac{33}{64}\sqrt{2x^2-x+3}-\frac{53-373x}{23\sqrt{2x^2-x+3}}+\frac{3111\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{128\sqrt{2}}$$

```
[Out] -(53 - 373*x)/(23*Sqrt[3 - x + 2*x^2]) + (33*Sqrt[3 - x + 2*x^2])
/64 + (193*x*Sqrt[3 - x + 2*x^2])/48 + (5*x^2*Sqrt[3 - x + 2*x^2]
)/6 + (3111*ArcSinh[(1 - 4*x)/Sqrt[23]])/(128*Sqrt[2])
```

Rubi [A] time = 0.178309, antiderivative size = 103, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.132

$$\frac{5}{6}\sqrt{2x^2-x+3}x^2+\frac{193}{48}\sqrt{2x^2-x+3}x+\frac{33}{64}\sqrt{2x^2-x+3}-\frac{53-373x}{23\sqrt{2x^2-x+3}}+\frac{3111\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{128\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[((5 + 2*x)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(3 - x + 2*x^2)^(3/2),x]
```

```
[Out] -(53 - 373*x)/(23*Sqrt[3 - x + 2*x^2]) + (33*Sqrt[3 - x + 2*x^2])
/64 + (193*x*Sqrt[3 - x + 2*x^2])/48 + (5*x^2*Sqrt[3 - x + 2*x^2]
)/6 + (3111*ArcSinh[(1 - 4*x)/Sqrt[23]])/(128*Sqrt[2])
```

Rubi in Sympy [A] time = 73.9189, size = 110, normalized size = 1.07

$$\frac{5x^4}{3\sqrt{2x^2-x+3}}+\frac{173x^3}{24\sqrt{2x^2-x+3}}-\frac{47x^2}{96\sqrt{2x^2-x+3}}-\frac{-\frac{40869x}{64}+\frac{1115}{64}}{23\sqrt{2x^2-x+3}}-\frac{3111\sqrt{2}\operatorname{atanh}\left(\frac{\sqrt{2}(4x-1)}{4\sqrt{2x^2-x+3}}\right)}{256}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((5+2*x)*(5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(3/2),x)
```

```
[Out] 5*x**4/(3*sqrt(2*x**2 - x + 3)) + 173*x**3/(24*sqrt(2*x**2 - x +
3)) - 47*x**2/(96*sqrt(2*x**2 - x + 3)) - (-40869*x/64 + 1115/64)
/(23*sqrt(2*x**2 - x + 3)) - 3111*sqrt(2)*atanh(sqrt(2)*(4*x - 1)
/(4*sqrt(2*x**2 - x + 3)))/256
```

Mathematica [A] time = 0.0862261, size = 60, normalized size = 0.58

$$\frac{7360x^4+31832x^3-2162x^2+122607x-3345}{4416\sqrt{2x^2-x+3}}-\frac{3111\sinh^{-1}\left(\frac{4x-1}{\sqrt{23}}\right)}{128\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[((5 + 2*x)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(3 - x + 2*x^2)^(3/2),x]
```

```
[Out] (-3345 + 122607*x - 2162*x^2 + 31832*x^3 + 7360*x^4)/(4416*Sqrt[3
 - x + 2*x^2]) - (3111*ArcSinh[(-1 + 4*x)/Sqrt[23]])/(128*Sqrt[2]
)
```

Maple [A] time = 0.009, size = 115, normalized size = 1.1

$$-\frac{47x^2}{96}\frac{1}{\sqrt{2x^2-x+3}}+\frac{3111x}{128}\frac{1}{\sqrt{2x^2-x+3}}+\frac{55}{512}\frac{1}{\sqrt{2x^2-x+3}}+\frac{40740x-10185}{11776}\frac{1}{\sqrt{2x^2-x+3}}-\frac{3111\sqrt{2}}{256}\mathit{Arcsinh}\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)+\frac{173x^3}{24}\frac{1}{\sqrt{2x^2-x+3}}+\frac{5x^4}{3}\frac{1}{\sqrt{2x^2-x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5+2*x)*(5*x^4-x^3+3*x^2+x+2)/(2*x^2-x+3)^(3/2),x)
```

```
[Out] -47/96*x^2/(2*x^2-x+3)^(1/2)+3111/128*x/(2*x^2-x+3)^(1/2)+55/512/
(2*x^2-x+3)^(1/2)+10185/11776*(4*x-1)/(2*x^2-x+3)^(1/2)-3111/256*
2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4))+173/24*x^3/(2*x^2-x+3)^(1/
2)+5/3*x^4/(2*x^2-x+3)^(1/2)
```

Maxima [A] time = 0.776172, size = 131, normalized size = 1.27

$$\frac{5x^4}{3\sqrt{2x^2-x+3}}+\frac{173x^3}{24\sqrt{2x^2-x+3}}-\frac{47x^2}{96\sqrt{2x^2-x+3}}-\frac{3111}{256}\sqrt{2}\,\mathrm{arsinh}\left(\frac{1}{23}\sqrt{23}(4x-1)\right)+\frac{40869x}{1472\sqrt{2x^2-x+3}}-\frac{1115}{1472\sqrt{2x^2-x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)/(2*x^2 - x + 3)^(3/2),x, algorith
```

```
[Out] 5/3*x^4/sqrt(2*x^2 - x + 3) + 173/24*x^3/sqrt(2*x^2 - x + 3) - 47
/96*x^2/sqrt(2*x^2 - x + 3) - 3111/256*sqrt(2)*arcsinh(1/23*sqrt(
23)*(4*x - 1)) + 40869/1472*x/sqrt(2*x^2 - x + 3) - 1115/1472/sqr
t(2*x^2 - x + 3)
```

Fricas [A] time = 0.291289, size = 139, normalized size = 1.35

$$\frac{\sqrt{2}\left(4\sqrt{2}\left(7360\,x^4+31832\,x^3-2162\,x^2+122607\,x-3345\right)\sqrt{2\,x^2-x+3}+214659\left(2\,x^2-x+3\right)\log\left(-\sqrt{2}\left(32\,x^2-16\,x+\right.\right.\right.}{35328\left(2\,x^2-x+3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)/(2*x^2 - x + 3)^(3/2),x, algorith
```

```
[Out] 1/35328*sqrt(2)*(4*sqrt(2)*(7360*x^4 + 31832*x^3 - 2162*x^2 + 122
607*x - 3345)*sqrt(2*x^2 - x + 3) + 214659*(2*x^2 - x + 3)*log(-s
qrt(2)*(32*x^2 - 16*x + 25) + 8*sqrt(2*x^2 - x + 3)*(4*x - 1)))/(
2*x^2 - x + 3)
```

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

$$\int \frac{(2x+5)\left(5x^4-x^3+3x^2+x+2\right)}{(2x^2-x+3)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5+2*x)*(5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(3/2),x)
```

```
[Out] Integral((2*x + 5)*(5*x**4 - x**3 + 3*x**2 + x + 2)/(2*x**2 - x +
 3)**(3/2), x)
```

GIAC/XCAS [A] time = 0.281744, size = 90, normalized size = 0.87

$$\frac{3111}{256}\sqrt{2}\ln\left(-2\sqrt{2}\left(\sqrt{2}x-\sqrt{2\,x^2-x+3}\right)+1\right)+\frac{(46\,(4\,(40\,x+173)x-47)x+122607)x-3345}{4416\sqrt{2\,x^2-x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)/(2*x^2 - x + 3)^(3/2),x, algorith
```

```
[Out] 3111/256*sqrt(2)*ln(-2*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3))
+ 1) + 1/4416*((46*(4*(40*x + 173)*x - 47)*x + 122607)*x - 3345)/
sqrt(2*x^2 - x + 3)
```

3.353 $\int \frac{2+x+3x^2-x^3+5x^4}{(3-x+2x^2)^{3/2}}\,dx$

Optimal. Leaf size=82

$$\frac{5}{8}\sqrt{2x^2-x+3}x+\frac{27}{32}\sqrt{2x^2-x+3}+\frac{219x+89}{92\sqrt{2x^2-x+3}}+\frac{213\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{64\sqrt{2}}$$

```
[Out] (89 + 219*x)/(92*Sqrt[3 - x + 2*x^2]) + (27*Sqrt[3 - x + 2*x^2])/
32 + (5*x*Sqrt[3 - x + 2*x^2])/8 + (213*ArcSinh[(1 - 4*x)/Sqrt[23
]])/(64*Sqrt[2])
```

Rubi [A] time = 0.10625, antiderivative size = 82, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.152

$$\frac{5}{8}\sqrt{2x^2-x+3}x+\frac{27}{32}\sqrt{2x^2-x+3}+\frac{219x+89}{92\sqrt{2x^2-x+3}}+\frac{213\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{64\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/(3 - x + 2*x^2)^(3/2),x]
```


```
[Out] (89 + 219*x)/(92*Sqrt[3 - x + 2*x^2]) + (27*Sqrt[3 - x + 2*x^2])/
32 + (5*x*Sqrt[3 - x + 2*x^2])/8 + (213*ArcSinh[(1 - 4*x)/Sqrt[23
]])/(64*Sqrt[2])
```

Rubi in Sympy [A] time = 47.7808, size = 92, normalized size = 1.12

$$\frac{5x^3}{4\sqrt{2x^2-x+3}}+\frac{17x^2}{16\sqrt{2x^2-x+3}}+\frac{\frac{2511x}{32}+\frac{2575}{32}}{23\sqrt{2x^2-x+3}}-\frac{213\sqrt{2}\,\mathrm{atanh}\left(\frac{\sqrt{2}(4x-1)}{4\sqrt{2x^2-x+3}}\right)}{128}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(3/2),x)
```

```
[Out] 5*x**3/(4*sqrt(2*x**2 - x + 3)) + 17*x**2/(16*sqrt(2*x**2 - x + 3
)) + (2511*x/32 + 2575/32)/(23*sqrt(2*x**2 - x + 3)) - 213*sqrt(2
)*atanh(sqrt(2)*(4*x - 1)/(4*sqrt(2*x**2 - x + 3)))/128
```

Mathematica [A] time = 0.0709869, size = 55, normalized size = 0.67

$$\frac{920x^3+782x^2+2511x+2575}{736\sqrt{2x^2-x+3}}-\frac{213\sinh^{-1}\left(\frac{4x-1}{\sqrt{23}}\right)}{64\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/(3 - x + 2*x^2)^(3/2),x]
```

```
[Out] (2575 + 2511*x + 782*x^2 + 920*x^3)/(736*Sqrt[3 - x + 2*x^2]) - (
213*ArcSinh[(-1 + 4*x)/Sqrt[23]])/(64*Sqrt[2])
```

Maple [A] time = 0.008, size = 98, normalized size = 1.2

$$\frac{901}{256}\frac{1}{\sqrt{2x^2-x+3}}+\frac{492x-123}{5888}\frac{1}{\sqrt{2x^2-x+3}}+\frac{213x}{64}\frac{1}{\sqrt{2x^2-x+3}}-\frac{213\sqrt{2}}{128}Arcsinh\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)+\frac{17x^2}{16}\frac{1}{\sqrt{2x^2-x+3}}+\frac{5x^3}{4}\frac{1}{\sqrt{2x^2-x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^4-x^3+3*x^2+x+2)/(2*x^2-x+3)^(3/2),x)
```

```
[Out] 901/256/(2*x^2-x+3)^(1/2)+123/5888*(4*x-1)/(2*x^2-x+3)^(1/2)+213/
64*x/(2*x^2-x+3)^(1/2)-213/128*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1
/4))+17/16*x^2/(2*x^2-x+3)^(1/2)+5/4*x^3/(2*x^2-x+3)^(1/2)
```

Maxima [A] time = 0.775438, size = 108, normalized size = 1.32

$$\frac{5x^3}{4\sqrt{2x^2-x+3}}+\frac{17x^2}{16\sqrt{2x^2-x+3}}-\frac{213}{128}\sqrt{2}\,\mathrm{arsinh}\left(\frac{1}{23}\sqrt{23}(4x-1)\right)+\frac{2511x}{736\sqrt{2x^2-x+3}}+\frac{2575}{736\sqrt{2x^2-x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(2*x^2 - x + 3)^(3/2),x, algorithm="maxima
```

```
[Out] 5/4*x^3/sqrt(2*x^2 - x + 3) + 17/16*x^2/sqrt(2*x^2 - x + 3) - 213
/128*sqrt(2)*arcsinh(1/23*sqrt(23)*(4*x - 1)) + 2511/736*x/sqrt(2
```

```
*x^2 - x + 3) + 2575/736/sqrt(2*x^2 - x + 3)
```

Fricas [A] time = 0.288588, size = 132, normalized size = 1.61

$$\frac{\sqrt{2}\left(4\sqrt{2}\left(920\,x^3+782\,x^2+2511\,x+2575\right)\sqrt{2\,x^2-x+3}+4899\left(2\,x^2-x+3\right)\log\left(-\sqrt{2}\left(32\,x^2-16\,x+25\right)+8\sqrt{2\,x^2-x+\right.\right.}{5888\left(2\,x^2-x+3\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(2*x^2 - x + 3)^(3/2),x, algorithm="fricas
```

```
[Out] 1/5888*sqrt(2)*(4*sqrt(2)*(920*x^3 + 782*x^2 + 2511*x + 2575)*sqr
t(2*x^2 - x + 3) + 4899*(2*x^2 - x + 3)*log(-sqrt(2)*(32*x^2 - 16
*x + 25) + 8*sqrt(2*x^2 - x + 3)*(4*x - 1)))/(2*x^2 - x + 3)
```

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

$$\int \frac{5x^4 - x^3 + 3x^2 + x + 2}{(2x^2 - x + 3)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(3/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/(2*x**2 - x + 3)**(3/2)
, x)
```

GIAC/XCAS [A] time = 0.278971, size = 84, normalized size = 1.02

$$\frac{213}{128}\sqrt{2}\ln\left(-2\sqrt{2}\left(\sqrt{2}x-\sqrt{2\,x^2-x+3}\right)+1\right)+\frac{(46\,(20\,x+17)x+2511)x+2575}{736\sqrt{2\,x^2-x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(2*x^2 - x + 3)^(3/2),x, algorithm="giac")
```

```
[Out] 213/128*sqrt(2)*ln(-2*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3)) +
 1) + 1/736*((46*(20*x + 17)*x + 2511)*x + 2575)/sqrt(2*x^2 - x +
 3)
```

3.354 $\int \frac{2+x+3x^2-x^3+5x^4}{(5+2x)(3-x+2x^2)^{3/2}}\,dx$

Optimal. Leaf size=101

$$\frac{917x+1191}{3312\sqrt{2x^2-x+3}}+\frac{5}{8}\sqrt{2x^2-x+3}-\frac{3667\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{1728\sqrt{2}}+\frac{39\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{16\sqrt{2}}$$

```
[Out] (1191 + 917*x)/(3312*Sqrt[3 - x + 2*x^2]) + (5*Sqrt[3 - x + 2*x^2
])/8 + (39*ArcSinh[(1 - 4*x)/Sqrt[23]])/(16*Sqrt[2]) - (3667*ArcT
anh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(1728*Sqrt[2])
```

Rubi [A] time = 0.293749, antiderivative size = 101, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.175

$$\frac{917x+1191}{3312\sqrt{2x^2-x+3}}+\frac{5}{8}\sqrt{2x^2-x+3}-\frac{3667\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{1728\sqrt{2}}+\frac{39\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{16\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)*(3 - x + 2*x^2)^(3/2)),x]
```

```
[Out] (1191 + 917*x)/(3312*Sqrt[3 - x + 2*x^2]) + (5*Sqrt[3 - x + 2*x^2
])/8 + (39*ArcSinh[(1 - 4*x)/Sqrt[23]])/(16*Sqrt[2]) - (3667*ArcT
anh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x^2])])/(1728*Sqrt[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((5*x**4-x**3+3*x**2+x+2)/(5+2*x)/(2*x**2-x+3)**(3/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.243943, size = 86, normalized size = 0.85

$$\frac{\frac{12(4140x^2-1153x+7401)}{23\sqrt{x^2-\frac{x}{2}+\frac{3}{2}}}-3667\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+3667\log(2x+5)-4212\sinh^{-1}\left(\frac{4x-1}{\sqrt{23}}\right)}{1728\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)*(3 - x + 2*x^2)^(3/2)),x]
```

```
[Out] ((12*(7401 - 1153*x + 4140*x^2))/(23*Sqrt[3/2 - x/2 + x^2]) - 421
2*ArcSinh[(-1 + 4*x)/Sqrt[23]] + 3667*Log[5 + 2*x] - 3667*Log[17
- 22*x + 12*Sqrt[6 - 2*x + 4*x^2]])/(1728*Sqrt[2])
```

Maple [A] time = 0.012, size = 148, normalized size = 1.5

$$-\frac{22028\,x-5507}{1472}\frac{1}{\sqrt{2\,x^2-x+3}}-\frac{309}{64}\frac{1}{\sqrt{2\,x^2-x+3}}+\frac{39\,x}{16}\frac{1}{\sqrt{2\,x^2-x+3}}-\frac{39\,\sqrt{2}}{32}\mathit{Arcsinh}\left(\frac{4\,\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)+\frac{5\,x^2}{4}\frac{1}{\sqrt{2\,x^2-x+3}}+\frac{3667}{576}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}+\frac{161348\,x-40337}{13248}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}-\frac{3667\,\sqrt{2}}{3456}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5*x^4-x^3+3*x^2+x+2)/(5+2*x)/(2*x^2-x+3)^(3/2),x)
```

```
[Out] -5507/1472*(4*x-1)/(2*x^2-x+3)^(1/2)-309/64/(2*x^2-x+3)^(1/2)+39/
16*x/(2*x^2-x+3)^(1/2)-39/32*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4
))+5/4*x^2/(2*x^2-x+3)^(1/2)+3667/576/(2*(x+5/2)^2-11*x-19/2)^(1/
2)+40337/13248*(4*x-1)/(2*(x+5/2)^2-11*x-19/2)^(1/2)-3667/3456*2^
(1/2)*arctanh(1/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1
/2))
```

Maxima [A] time = 0.799293, size = 134, normalized size = 1.33

$$\frac{5\,x^2}{4\,\sqrt{2\,x^2-x+3}}-\frac{39}{32}\,\sqrt{2}\,\mathrm{arsinh}\left(\frac{4}{23}\,\sqrt{23}x-\frac{1}{23}\,\sqrt{23}\right)+\frac{3667}{3456}\,\sqrt{2}\,\mathrm{arsinh}\left(\frac{22\,\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\,\sqrt{23}}{23\,|2\,x+5|}\right)-\frac{1153\,x}{3312\,\sqrt{2\,x^2-x+3}}+\frac{2467}{1104\,\sqrt{2\,x^2-x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(3/2)*(2*x + 5)),x, algori
```

```
[Out] 5/4*x^2/sqrt(2*x^2 - x + 3) - 39/32*sqrt(2)*arcsinh(4/23*sqrt(23)
*x - 1/23*sqrt(23)) + 3667/3456*sqrt(2)*arcsinh(22/23*sqrt(23)*x/
abs(2*x + 5) - 17/23*sqrt(23)/abs(2*x + 5)) - 1153/3312*x/sqrt(2*
x^2 - x + 3) + 2467/1104/sqrt(2*x^2 - x + 3)
```

Fricas [A] time = 0.292593, size = 208, normalized size = 2.06

$$\frac{\sqrt{2}\left(24\,\sqrt{2}\left(4140\,x^2-1153\,x+7401\right)\sqrt{2\,x^2-x+3}+96876\,\left(2\,x^2-x+3\right)\,\log\left(-\sqrt{2}\left(32\,x^2-16\,x+25\right)+8\,\sqrt{2\,x^2-x+3}(4\,x\right.\right.}{158976\,(2\,x^2-x+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(3/2)*(2*x + 5)),x, algori
```

```
[Out] 1/158976*sqrt(2)*(24*sqrt(2)*(4140*x^2 - 1153*x + 7401)*sqrt(2*x^
2 - x + 3) + 96876*(2*x^2 - x + 3)*log(-sqrt(2)*(32*x^2 - 16*x +
25) + 8*sqrt(2*x^2 - x + 3)*(4*x - 1)) + 84341*(2*x^2 - x + 3)*lo
g(-(sqrt(2)*(1060*x^2 - 1036*x + 1153) + 48*sqrt(2*x^2 - x + 3)*(
22*x - 17))/(4*x^2 + 20*x + 25)))/(2*x^2 - x + 3)
```

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

$$\int \frac{5x^4-x^3+3x^2+x+2}{(2x+5)\,(2x^2-x+3)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x**4-x**3+3*x**2+x+2)/(5+2*x)/(2*x**2-x+3)**(3/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/((2*x + 5)*(2*x**2 - x
+ 3)**(3/2)), x)
```

GIAC/XCAS [A] time = 0.291796, size = 159, normalized size = 1.57

$$\frac{39}{32}\sqrt{2}\ln\left(-4\sqrt{2}x+\sqrt{2}+4\sqrt{2x^2-x+3}\right)-\frac{3667}{3456}\sqrt{2}\ln\left(\left|-2\sqrt{2}x+\sqrt{2}+2\sqrt{2x^2-x+3}\right|\right)+\frac{3667}{3456}\sqrt{2}\ln\left(\left|-2\sqrt{2}x-11\sqrt{2}+2\sqrt{2x^2-x+3}\right|\right)+\frac{(4140x-1153)x+7401}{3312\sqrt{2x^2-x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(3/2)*(2*x + 5)),x, algori
```

```
[Out] 39/32*sqrt(2)*ln(-4*sqrt(2)*x + sqrt(2) + 4*sqrt(2*x^2 - x + 3))
- 3667/3456*sqrt(2)*ln(abs(-2*sqrt(2)*x + sqrt(2) + 2*sqrt(2*x^2
- x + 3))) + 3667/3456*sqrt(2)*ln(abs(-2*sqrt(2)*x - 11*sqrt(2) +
 2*sqrt(2*x^2 - x + 3))) + 1/3312*((4140*x - 1153)*x + 7401)/sqrt
(2*x^2 - x + 3)
```

3.355 $\int \frac{2+x+3x^2-x^3+5x^4}{(5+2x)^2(3-x+2x^2)^{3/2}}\,dx$

Optimal. Leaf size=108

$$\frac{2203x+9897}{119232\sqrt{2x^2-x+3}}-\frac{3667\sqrt{2x^2-x+3}}{10368(2x+5)}+\frac{25951\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{41472\sqrt{2}}-\frac{5\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{8\sqrt{2}}$$

```
[Out] (9897 + 2203*x)/(119232*Sqrt[3 - x + 2*x^2]) - (3667*Sqrt[3 - x +
 2*x^2])/(10368*(5 + 2*x)) - (5*ArcSinh[(1 - 4*x)/Sqrt[23]])/(8*S
qrt[2]) + (25951*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x
^2])])/(41472*Sqrt[2])
```

Rubi [A] time = 0.307806, antiderivative size = 108, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 7, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}} = 0.175$

$$\frac{2203x+9897}{119232\sqrt{2x^2-x+3}}-\frac{3667\sqrt{2x^2-x+3}}{10368(2x+5)}+\frac{25951\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{41472\sqrt{2}}-\frac{5\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{8\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^2*(3 - x + 2*x^2)^(3/2)),x]
```

```
[Out] (9897 + 2203*x)/(119232*Sqrt[3 - x + 2*x^2]) - (3667*Sqrt[3 - x +
 2*x^2])/(10368*(5 + 2*x)) - (5*ArcSinh[(1 - 4*x)/Sqrt[23]])/(8*S
qrt[2]) + (25951*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x + 2*x
^2])])/(41472*Sqrt[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((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**2/(2*x**2-x+3)**(3/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.263574, size = 104, normalized size = 0.96

$$\frac{\frac{8(2203x+9897)}{23\sqrt{x^2-\frac{x}{2}+\frac{3}{2}}}-\frac{14668\sqrt{4x^2-2x+6}}{2x+5}+25951\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)-25951\log(2x+5)+25920\sinh^{-1}\left(\frac{4x-1}{\sqrt{23}}\right)}{41472\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^2*(3 - x + 2*x^2)^(3/2)),x]
```

```
[Out] ((8*(9897 + 2203*x))/(23*Sqrt[3/2 - x/2 + x^2]) - (14668*Sqrt[6 -
 2*x + 4*x^2])/(5 + 2*x) + 25920*ArcSinh[(-1 + 4*x)/Sqrt[23]] - 2
5951*Log[5 + 2*x] + 25951*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2
]])/(41472*Sqrt[2])
```

Maple [A] time = 0.017, size = 152, normalized size = 1.4

$$\frac{6116\,x-1529}{736}\frac{1}{\sqrt{2\,x^2-x+3}}+\frac{99}{32}\frac{1}{\sqrt{2\,x^2-x+3}}-\frac{5\,x}{8}\frac{1}{\sqrt{2\,x^2-x+3}}+\frac{5\,\sqrt{2}}{16}Arcsinh\left(\frac{4\,\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)-\frac{3667}{1152}\left(x+\frac{5}{2}\right)^{-1}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}-\frac{25951}{13824}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}-\frac{2549972\,x-637493}{317952}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}+\frac{25951\,\sqrt{2}}{82944}Artanh\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5*x^4-x^3+3*x^2+x+2)/(5+2*x)^2/(2*x^2-x+3)^(3/2),x)
```

```
[Out] 1529/736*(4*x-1)/(2*x^2-x+3)^(1/2)+99/32/(2*x^2-x+3)^(1/2)-5/8*x/
(2*x^2-x+3)^(1/2)+5/16*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4))-366
7/1152/(x+5/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2)-25951/13824/(2*(x+5/
2)^2-11*x-19/2)^(1/2)-637493/317952*(4*x-1)/(2*(x+5/2)^2-11*x-19/
2)^(1/2)+25951/82944*2^(1/2)*arctanh(1/12*(17/2-11*x)*2^(1/2)/(2*
(x+5/2)^2-11*x-19/2)^(1/2))
```

Maxima [A] time = 0.785433, size = 157, normalized size = 1.45

$$\frac{5}{16}\sqrt{2}\operatorname{arsinh}\left(\frac{4}{23}\sqrt{23}x-\frac{1}{23}\sqrt{23}\right)-\frac{25951}{82944}\sqrt{2}\operatorname{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\sqrt{23}}{23\,|2\,x+5|}\right)-\frac{26645\,x}{79488\sqrt{2\,x^2-x+3}}+\frac{30313}{26496\sqrt{2\,x^2-x+3}}-\frac{3667}{576\left(2\sqrt{2\,x^2-x+3}x+5\sqrt{2\,x^2-x+3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(3/2)*(2*x + 5)^2),x, algo
```

```
[Out] 5/16*sqrt(2)*arcsinh(4/23*sqrt(23)*x - 1/23*sqrt(23)) - 25951/829
44*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5) - 17/23*sqrt(23)
/abs(2*x + 5)) - 26645/79488*x/sqrt(2*x^2 - x + 3) + 30313/26496/
sqrt(2*x^2 - x + 3) - 3667/576/(2*sqrt(2*x^2 - x + 3)*x + 5*sqrt(
2*x^2 - x + 3))
```

Fricas [A] time = 0.295737, size = 220, normalized size = 2.04

$$-\frac{\sqrt{2}\Big(24\sqrt{2}\left(53290\,x^2-48653\,x+51351\right)\sqrt{2\,x^2-x+3}-596160\left(4\,x^3+8\,x^2+x+15\right)\log\left(-\sqrt{2}\left(32\,x^2-16\,x+25\right)-8\,\sqrt{2}\right.}{3815424\left(4\,x^3+8\,x^2+x\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(3/2)*(2*x + 5)^2),x, algo
```

```
[Out] -1/3815424*sqrt(2)*(24*sqrt(2)*(53290*x^2 - 48653*x + 51351)*sqrt
(2*x^2 - x + 3) - 596160*(4*x^3 + 8*x^2 + x + 15)*log(-sqrt(2)*(3
2*x^2 - 16*x + 25) - 8*sqrt(2*x^2 - x + 3)*(4*x - 1)) - 596873*(4
*x^3 + 8*x^2 + x + 15)*log(-(sqrt(2)*(1060*x^2 - 1036*x + 1153) -
 48*sqrt(2*x^2 - x + 3)*(22*x - 17))/(4*x^2 + 20*x + 25)))/(4*x^3
 + 8*x^2 + x + 15)
```

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

$$\int \frac{5x^4-x^3+3x^2+x+2}{(2x+5)^2\,(2x^2-x+3)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**2/(2*x**2-x+3)**(3/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/((2*x + 5)**2*(2*x**2 -
 x + 3)**(3/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{5\,x^4 - x^3 + 3\,x^2 + x + 2}{\left(2\,x^2 - x + 3\right)^{\frac{3}{2}} \left(2\,x + 5\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(3/2)*(2*x + 5)^2),x, algo
```

```
[Out] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(3/2)*(2
*x + 5)^2), x)
```

3.356 $\int \frac{2+x+3x^2-x^3+5x^4}{(5+2x)^3(3-x+2x^2)^{3/2}}\,dx$

Optimal. Leaf size=112

$$\frac{65991-8779x}{4292352\sqrt{2x^2-x+3}}+\frac{115369\sqrt{2x^2-x+3}}{1492992(2x+5)}-\frac{3667\sqrt{2x^2-x+3}}{20736(2x+5)^2}-\frac{52631\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{5971968\sqrt{2}}$$

```
[Out] (65991 - 8779*x)/(4292352*Sqrt[3 - x + 2*x^2]) - (3667*Sqrt[3 - x
 + 2*x^2])/(20736*(5 + 2*x)^2) + (115369*Sqrt[3 - x + 2*x^2])/(14
92992*(5 + 2*x)) - (52631*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3
- x + 2*x^2])])/(5971968*Sqrt[2])
```

Rubi [A] time = 0.297824, antiderivative size = 112, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$

$$\frac{65991-8779x}{4292352\sqrt{2x^2-x+3}}+\frac{115369\sqrt{2x^2-x+3}}{1492992(2x+5)}-\frac{3667\sqrt{2x^2-x+3}}{20736(2x+5)^2}-\frac{52631\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{5971968\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^3*(3 - x + 2*x^2)^(3/2)),x]
```

```
[Out] (65991 - 8779*x)/(4292352*Sqrt[3 - x + 2*x^2]) - (3667*Sqrt[3 - x
 + 2*x^2])/(20736*(5 + 2*x)^2) + (115369*Sqrt[3 - x + 2*x^2])/(14
92992*(5 + 2*x)) - (52631*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3
- x + 2*x^2])])/(5971968*Sqrt[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((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**3/(2*x**2-x+3)**(3/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.217322, size = 84, normalized size = 0.75

$$\frac{-52631\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{12(3444340x^3+3263288x^2+5842933x+11594283)}{23(2x+5)^2\sqrt{x^2-\frac{x}{2}+\frac{3}{2}}}+52631\log(2x+5)}{5971968\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^3*(3 - x + 2*x^2)^(3/2)),x]
```

```
[Out] ((12*(11594283 + 5842933*x + 3263288*x^2 + 3444340*x^3))/(23*(5 +
 2*x)^2*Sqrt[3/2 - x/2 + x^2]) + 52631*Log[5 + 2*x] - 52631*Log[1
7 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]])/(5971968*Sqrt[2])
```

Maple [A] time = 0.017, size = 144, normalized size = 1.3

$$-\frac{596\,x-149}{368}\frac{1}{\sqrt{2\,x^2-x+3}}-\frac{5}{16}\frac{1}{\sqrt{2\,x^2-x+3}}-\frac{3667}{4608}\left(x+\frac{5}{2}\right)^{-2}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}$$
$$+\frac{196043}{165888}\left(x+\frac{5}{2}\right)^{-1}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}+\frac{52631}{1990656}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}$$
$$+\frac{77596276\,x-19399069}{45785088}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}$$
$$-\frac{52631\,\sqrt{2}}{11943936}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5*x^4-x^3+3*x^2+x+2)/(5+2*x)^3/(2*x^2-x+3)^(3/2),x)
```

```
[Out] -149/368*(4*x-1)/(2*x^2-x+3)^(1/2)-5/16/(2*x^2-x+3)^(1/2)-3667/46
08/(x+5/2)^2/(2*(x+5/2)^2-11*x-19/2)^(1/2)+196043/165888/(x+5/2)/
(2*(x+5/2)^2-11*x-19/2)^(1/2)+52631/1990656/(2*(x+5/2)^2-11*x-19/
2)^(1/2)+19399069/45785088*(4*x-1)/(2*(x+5/2)^2-11*x-19/2)^(1/2)-
52631/11943936*2^(1/2)*arctanh(1/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2
)^2-11*x-19/2)^(1/2))
```

Maxima [A] time = 0.794174, size = 201, normalized size = 1.79

$$\frac{52631}{11943936}\sqrt{2}\,\mathrm{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\sqrt{23}}{23\,|2\,x+5|}\right)+\frac{861085\,x}{11446272\sqrt{2\,x^2-x+3}}-\frac{1163201}{3815424\sqrt{2\,x^2-x+3}}-\frac{3667}{1152\left(4\sqrt{2\,x^2-x+3}x^2+20\sqrt{2\,x^2-x+3}x+25\sqrt{2\,x^2-x+3}\right)}+\frac{196043}{82944\left(2\sqrt{2\,x^2-x+3}x+5\sqrt{2\,x^2-x+3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(3/2)*(2*x + 5)^3),x, algo
```

```
[Out] 52631/11943936*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5) - 17
/23*sqrt(23)/abs(2*x + 5)) + 861085/11446272*x/sqrt(2*x^2 - x + 3
) - 1163201/3815424/sqrt(2*x^2 - x + 3) - 3667/1152/(4*sqrt(2*x^2
 - x + 3)*x^2 + 20*sqrt(2*x^2 - x + 3)*x + 25*sqrt(2*x^2 - x + 3)
) + 196043/82944/(2*sqrt(2*x^2 - x + 3)*x + 5*sqrt(2*x^2 - x + 3)
)
```

Fricas [A] time = 0.275276, size = 177, normalized size = 1.58

$$\frac{\sqrt{2}\left(24\sqrt{2}\left(3444340\,x^3+3263288\,x^2+5842933\,x+11594283\right)\sqrt{2\,x^2-x+3}+1210513\left(8\,x^4+36\,x^3+42\,x^2+35\,x+75\right)\log\right.}{549421056\left(8\,x^4+36\,x^3+42\,x^2+35\,x+75\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(3/2)*(2*x + 5)^3),x, algo
```

```
[Out] 1/549421056*sqrt(2)*(24*sqrt(2)*(3444340*x^3 + 3263288*x^2 + 5842
933*x + 11594283)*sqrt(2*x^2 - x + 3) + 1210513*(8*x^4 + 36*x^3 +
 42*x^2 + 35*x + 75)*log(-(sqrt(2)*(1060*x^2 - 1036*x + 1153) + 4
8*sqrt(2*x^2 - x + 3)*(22*x - 17))/(4*x^2 + 20*x + 25)))/(8*x^4 +
 36*x^3 + 42*x^2 + 35*x + 75)
```

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

$$\int \frac{5x^4-x^3+3x^2+x+2}{(2x+5)^3\,(2x^2-x+3)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**3/(2*x**2-x+3)**(3/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/((2*x + 5)**3*(2*x**2 -
 x + 3)**(3/2)), x)
```

GIAC/XCAS [A] time = 0.29334, size = 297, normalized size = 2.65

$$-\frac{52631}{11943936}\sqrt{2}\ln\left(\left|-2\sqrt{2}x+\sqrt{2}+2\sqrt{2x^2-x+3}\right|\right)+\frac{52631}{11943936}\sqrt{2}\ln\left(\left|-2\sqrt{2}x-11\sqrt{2}+2\sqrt{2x^2-x+3}\right|\right)-\frac{8779x-65991}{4292352\sqrt{2x^2-x+3}}+\frac{\sqrt{2}\left(3594214\sqrt{2}\left(\sqrt{2}x-\sqrt{2x^2-x+3}\right)^3+19874490\left(\sqrt{2}x-\sqrt{2x^2-x+3}\right)^2-30140067\sqrt{2}\left(\sqrt{2}x-\sqrt{2x^2-x+3}\right)+199\right.}{2985984\left(2\left(\sqrt{2}x-\sqrt{2x^2-x+3}\right)^2+10\sqrt{2}\left(\sqrt{2}x-\sqrt{2x^2-x+3}\right)-11\right)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(3/2)*(2*x + 5)^3),x, algo
```

```
[Out] -52631/11943936*sqrt(2)*ln(abs(-2*sqrt(2)*x + sqrt(2) + 2*sqrt(2*
x^2 - x + 3))) + 52631/11943936*sqrt(2)*ln(abs(-2*sqrt(2)*x - 11*
sqrt(2) + 2*sqrt(2*x^2 - x + 3))) - 1/4292352*(8779*x - 65991)/sq
rt(2*x^2 - x + 3) + 1/2985984*sqrt(2)*(3594214*sqrt(2)*(sqrt(2)*x
 - sqrt(2*x^2 - x + 3))^3 + 19874490*(sqrt(2)*x - sqrt(2*x^2 - x
+ 3))^2 - 30140067*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3)) + 19
989859)/(2*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^2 + 10*sqrt(2)*(sqrt
(2)*x - sqrt(2*x^2 - x + 3)) - 11)^2
```

3.357 $\int \frac{2+x+3x^2-x^3+5x^4}{(5+2x)^4(3-x+2x^2)^{3/2}}\,dx$

Optimal. Leaf size=137

$$\frac{369609-175877x}{154524672\sqrt{2x^2-x+3}}+\frac{430799\sqrt{2x^2-x+3}}{107495424(2x+5)}+\frac{152885\sqrt{2x^2-x+3}}{4478976(2x+5)^2}-\frac{3667\sqrt{2x^2-x+3}}{31104(2x+5)^3}-\frac{3505819\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{1289945088\sqrt{2}}$$

```
[Out] (369609 - 175877*x)/(154524672*Sqrt[3 - x + 2*x^2]) - (3667*Sqrt[
3 - x + 2*x^2])/(31104*(5 + 2*x)^3) + (152885*Sqrt[3 - x + 2*x^2]
)/(4478976*(5 + 2*x)^2) + (430799*Sqrt[3 - x + 2*x^2])/(107495424
*(5 + 2*x)) - (3505819*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x
 + 2*x^2])])/(1289945088*Sqrt[2])
```

Rubi [A] time = 0.402529, antiderivative size = 137, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{369609-175877x}{154524672\sqrt{2x^2-x+3}}+\frac{430799\sqrt{2x^2-x+3}}{107495424(2x+5)}+\frac{152885\sqrt{2x^2-x+3}}{4478976(2x+5)^2}-\frac{3667\sqrt{2x^2-x+3}}{31104(2x+5)^3}-\frac{3505819\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{1289945088\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^4*(3 - x + 2*x^2)^(3/2)),x]
```


```
[Out] (369609 - 175877*x)/(154524672*Sqrt[3 - x + 2*x^2]) - (3667*Sqrt[
3 - x + 2*x^2])/(31104*(5 + 2*x)^3) + (152885*Sqrt[3 - x + 2*x^2]
)/(4478976*(5 + 2*x)^2) + (430799*Sqrt[3 - x + 2*x^2])/(107495424
*(5 + 2*x)) - (3505819*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x
 + 2*x^2])])/(1289945088*Sqrt[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((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**4/(2*x**2-x+3)**(3/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.225539, size = 89, normalized size = 0.65

$$\frac{-3505819 \log \left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{12\left(56754760x^4+572739684x^3+441046842x^2+1257975811x+1873786587\right)}{23(2x+5)^3\sqrt{x^2-\frac{x}{2}+\frac{3}{2}}}+3505819\log(2x+}{1289945088\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^4*(3 - x + 2*x^2)^(3/2)),x]
```

```
[Out] ((12*(1873786587 + 1257975811*x + 441046842*x^2 + 572739684*x^3 +
 56754760*x^4))/(23*(5 + 2*x)^3*Sqrt[3/2 - x/2 + x^2]) + 3505819*
Log[5 + 2*x] - 3505819*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]])
/(1289945088*Sqrt[2])
```

Maple [A] time = 0.018, size = 151, normalized size = 1.1

$$\frac{20\,x-5}{184}\frac{1}{\sqrt{2\,x^2-x+3}}-\frac{3667}{13824}\left(x+\frac{5}{2}\right)^{-3}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}$$
$$+\frac{314233}{995328}\left(x+\frac{5}{2}\right)^{-2}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}-\frac{3127169}{35831808}\left(x+\frac{5}{2}\right)^{-1}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}$$
$$+\frac{3505819}{429981696}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}-\frac{1046576860\,x-261644215}{9889579008}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}$$
$$-\frac{3505819\sqrt{2}}{2579890176}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^4-x^3+3*x^2+x+2)/(5+2*x)^4/(2*x^2-x+3)^(3/2),x)
```

```
[Out] 5/184*(4*x-1)/(2*x^2-x+3)^(1/2)-3667/13824/(x+5/2)^3/(2*(x+5/2)^2
-11*x-19/2)^(1/2)+314233/995328/(x+5/2)^2/(2*(x+5/2)^2-11*x-19/2)
^(1/2)-3127169/35831808/(x+5/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2)+350
5819/429981696/(2*(x+5/2)^2-11*x-19/2)^(1/2)-261644215/9889579008
*(4*x-1)/(2*(x+5/2)^2-11*x-19/2)^(1/2)-3505819/2579890176*2^(1/2)
*arctanh(1/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))
```

Maxima [A] time = 0.813162, size = 293, normalized size = 2.14

$$\frac{3505819}{2579890176}\sqrt{2}\,\mathrm{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\sqrt{23}}{23\,|2\,x+5|}\right)+\frac{7094345\,x}{2472394752\sqrt{2\,x^2-x+3}}+\frac{6128291}{824131584\sqrt{2\,x^2-x+3}}-\frac{3667}{1728\left(8\sqrt{2\,x^2-x+3}x^3+60\sqrt{2\,x^2-x+3}x^2+150\sqrt{2\,x^2-x+3}x+125\sqrt{2\,x^2-x+3}\right)}+\frac{314233}{248832\left(4\sqrt{2\,x^2-x+3}x^2+20\sqrt{2\,x^2-x+3}x+25\sqrt{2\,x^2-x+3}\right)}-\frac{3127169}{17915904\left(2\sqrt{2\,x^2-x+3}x+5\sqrt{2\,x^2-x+3}\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(3/2)*(2*x + 5)^4),x, algo
```

```
[Out] 3505819/2579890176*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5)
- 17/23*sqrt(23)/abs(2*x + 5)) + 7094345/2472394752*x/sqrt(2*x^2
- x + 3) + 6128291/824131584/sqrt(2*x^2 - x + 3) - 3667/1728/(8*s
qrt(2*x^2 - x + 3)*x^3 + 60*sqrt(2*x^2 - x + 3)*x^2 + 150*sqrt(2*
x^2 - x + 3)*x + 125*sqrt(2*x^2 - x + 3)) + 314233/248832/(4*sqrt
(2*x^2 - x + 3)*x^2 + 20*sqrt(2*x^2 - x + 3)*x + 25*sqrt(2*x^2 -
x + 3)) - 3127169/17915904/(2*sqrt(2*x^2 - x + 3)*x + 5*sqrt(2*x^
2 - x + 3))
```

Fricas [A] time = 0.286882, size = 197, normalized size = 1.44

$$\frac{\sqrt{2}\left(24\sqrt{2}\left(56754760\,x^4+572739684\,x^3+441046842\,x^2+1257975811\,x+1873786587\right)\sqrt{2\,x^2-x+3}+80633837\left(16\,x^5+1\right.\right.}{118674948096\left(16\,x^5+112\,x^4+264\,x^3+280\,x^2\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(3/2)*(2*x + 5)^4),x, algo
```

```
[Out] 1/118674948096*sqrt(2)*(24*sqrt(2)*(56754760*x^4 + 572739684*x^3
+ 441046842*x^2 + 1257975811*x + 1873786587)*sqrt(2*x^2 - x + 3)
+ 80633837*(16*x^5 + 112*x^4 + 264*x^3 + 280*x^2 + 325*x + 375)*l
og(-(sqrt(2)*(1060*x^2 - 1036*x + 1153) + 48*sqrt(2*x^2 - x + 3)*
(22*x - 17))/(4*x^2 + 20*x + 25)))/(16*x^5 + 112*x^4 + 264*x^3 +
```

```
280*x^2 + 325*x + 375)
```

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

$$\int \frac{5x^4 - x^3 + 3x^2 + x + 2}{(2x + 5)^4 (2x^2 - x + 3)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**4/(2*x**2-x+3)**(3/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/((2*x + 5)**4*(2*x**2 -
 x + 3)**(3/2)), x)
```

GIAC/XCAS [A] time = 0.295377, size = 366, normalized size = 2.67

$$-\frac{3505819}{2579890176}\sqrt{2}\ln\left(\left|-2\sqrt{2}x + \sqrt{2} + 2\sqrt{2x^2 - x + 3}\right|\right) + \frac{3505819}{2579890176}\sqrt{2}\ln\left(\left|-2\sqrt{2}x - 11\sqrt{2} + 2\sqrt{2x^2 - x + 3}\right|\right) - \frac{175877x - 369609}{154524672\sqrt{2x^2 - x + 3}} - \frac{\sqrt{2}\left(10398764\sqrt{2}\left(\sqrt{2}x - \sqrt{2x^2 - x + 3}\right)^5 - 303070900\left(\sqrt{2}x - \sqrt{2x^2 - x + 3}\right)^4 - 529738052\sqrt{2}\left(\sqrt{2}x - \sqrt{2x^2 - x + 3}\right)^3 \right.}{214990848\left(2\left(\sqrt{2}x - \sqrt{2x^2 - x + 3}\right)^2 + 10\sqrt{2}\left(\sqrt{2x}\right.\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(3/2)*(2*x + 5)^4),x, algo
```

```
[Out] -3505819/2579890176*sqrt(2)*ln(abs(-2*sqrt(2)*x + sqrt(2) + 2*sqr
t(2*x^2 - x + 3))) + 3505819/2579890176*sqrt(2)*ln(abs(-2*sqrt(2)
*x - 11*sqrt(2) + 2*sqrt(2*x^2 - x + 3))) - 1/154524672*(175877*x
 - 369609)/sqrt(2*x^2 - x + 3) - 1/214990848*sqrt(2)*(10398764*sq
rt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^5 - 303070900*(sqrt(2)*x
- sqrt(2*x^2 - x + 3))^4 - 529738052*sqrt(2)*(sqrt(2)*x - sqrt(2*
x^2 - x + 3))^3 + 3644644652*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^2
- 2612608649*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3)) + 10522844
71)/(2*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^2 + 10*sqrt(2)*(sqrt(2)*
x - sqrt(2*x^2 - x + 3)) - 11)^3
```

3.358 $\int \frac{(5+2x)^2(2+x+3x^2-x^3+5x^4)}{(3-x+2x^2)^{5/2}}\,dx$

Optimal. Leaf size=105

$$\frac{4(18982-20383x)}{1587\sqrt{2x^2-x+3}}+\frac{5}{4}x\sqrt{2x^2-x+3}+\frac{247}{16}\sqrt{2x^2-x+3}-\frac{4(346-533x)}{69\,(2x^2-x+3)^{3/2}}-\frac{1471\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{32\sqrt{2}}$$

```
[Out] (-4*(346 - 533*x))/(69*(3 - x + 2*x^2)^(3/2)) + (4*(18982 - 20383
*x))/(1587*Sqrt[3 - x + 2*x^2]) + (247*Sqrt[3 - x + 2*x^2])/16 +
(5*x*Sqrt[3 - x + 2*x^2])/4 - (1471*ArcSinh[(1 - 4*x)/Sqrt[23]])/
(32*Sqrt[2])
```

Rubi [A] time = 0.218666, antiderivative size = 105, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$\frac{4(18982-20383x)}{1587\sqrt{2x^2-x+3}}+\frac{5}{4}x\sqrt{2x^2-x+3}+\frac{247}{16}\sqrt{2x^2-x+3}-\frac{4(346-533x)}{69\,(2x^2-x+3)^{3/2}}-\frac{1471\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{32\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[((5 + 2*x)^2*(2 + x + 3*x^2 - x^3 + 5*x^4))/(3 - x + 2*x^2)^(5/2),x]
```

```
[Out] (-4*(346 - 533*x))/(69*(3 - x + 2*x^2)^(3/2)) + (4*(18982 - 20383
*x))/(1587*Sqrt[3 - x + 2*x^2]) + (247*Sqrt[3 - x + 2*x^2])/16 +
(5*x*Sqrt[3 - x + 2*x^2])/4 - (1471*ArcSinh[(1 - 4*x)/Sqrt[23]])/
(32*Sqrt[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((5+2*x)**2*(5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(5/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.235619, size = 65, normalized size = 0.62

$$\frac{126960x^5+1440996x^4-3764360x^3+8639625x^2-6410082x+6663133}{25392\left(2x^2-x+3\right)^{3/2}}+\frac{1471\sinh^{-1}\left(\frac{4x-1}{\sqrt{23}}\right)}{32\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[((5 + 2*x)^2*(2 + x + 3*x^2 - x^3 + 5*x^4))/(3 - x + 2*x^2)^(5/2),x]
```

```
[Out] (6663133 - 6410082*x + 8639625*x^2 - 3764360*x^3 + 1440996*x^4 +
126960*x^5)/(25392*(3 - x + 2*x^2)^(3/2)) + (1471*ArcSinh[(-1 + 4
*x)/Sqrt[23]])/(32*Sqrt[2])
```

Maple [B] time = 0.01, size = 180, normalized size = 1.7

$$-\frac{3012892\,x-753223}{141312}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}-\frac{651724\,x-162931}{50784}\frac{1}{\sqrt{2\,x^2-x+3}}+\frac{577397}{2048}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}-\frac{32257\,x}{512}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}+\frac{19073\,x^2}{64}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}-\frac{1471\,x^3}{48}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}-\frac{1471\,x}{32}\frac{1}{\sqrt{2\,x^2-x+3}}-\frac{1471}{128}\frac{1}{\sqrt{2\,x^2-x+3}}+\frac{1471\sqrt{2}}{64}\mathit{Arcsinh}\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)+\frac{227\,x^4}{4}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}+5\,\frac{x^5}{\left(2\,x^2-x+3\right)^{3/2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5+2*x)^2*(5*x^4-x^3+3*x^2+x+2)/(2*x^2-x+3)^(5/2),x)
```

```
[Out] -753223/141312*(4*x-1)/(2*x^2-x+3)^(3/2)-162931/50784*(4*x-1)/(2*
x^2-x+3)^(1/2)+577397/2048/(2*x^2-x+3)^(3/2)-32257/512*x/(2*x^2-x
+3)^(3/2)+19073/64*x^2/(2*x^2-x+3)^(3/2)-1471/48*x^3/(2*x^2-x+3)^
(3/2)-1471/32*x/(2*x^2-x+3)^(1/2)-1471/128/(2*x^2-x+3)^(1/2)+1471
/64*2^(1/2)*arcsinh(4/23*23^(1/2)*(x-1/4))+227/4*x^4/(2*x^2-x+3)^
(3/2)+5*x^5/(2*x^2-x+3)^(3/2)
```

Maxima [A] time = 0.838063, size = 296, normalized size = 2.82

$$\frac{5\,x^5}{(2\,x^2-x+3)^{\frac{3}{2}}}+\frac{227\,x^4}{4\,(2\,x^2-x+3)^{\frac{3}{2}}}+\frac{1471}{50784}\,x\left(\frac{284\,x}{\sqrt{2\,x^2-x+3}}-\frac{3174\,x^2}{(2\,x^2-x+3)^{\frac{3}{2}}}-\frac{71}{\sqrt{2\,x^2-x+3}}+\frac{805\,x}{(2\,x^2-x+3)^{\frac{3}{2}}}-\frac{3243}{(2\,x^2-x+3)^{\frac{3}{2}}}\right)+\frac{1471}{64}\,\sqrt{2}\,\mathrm{arsinh}\left(\frac{1}{23}\,\sqrt{23}(4\,x-1)\right)-\frac{104441}{25392}\,\sqrt{2\,x^2-x+3}-\frac{383581\,x}{12696\,\sqrt{2\,x^2-x+3}}+\frac{321\,x^2}{(2\,x^2-x+3)^{\frac{3}{2}}}-\frac{15965}{4232\,\sqrt{2\,x^2-x+3}}-\frac{4147\,x}{46\,(2\,x^2-x+3)^{\frac{3}{2}}}+\frac{42883}{138\,(2\,x^2-x+3)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)^2/(2*x^2 - x + 3)^(5/2),x, algori
```

```
[Out] 5*x^5/(2*x^2 - x + 3)^(3/2) + 227/4*x^4/(2*x^2 - x + 3)^(3/2) + 1
471/50784*x*(284*x/sqrt(2*x^2 - x + 3) - 3174*x^2/(2*x^2 - x + 3)
^(3/2) - 71/sqrt(2*x^2 - x + 3) + 805*x/(2*x^2 - x + 3)^(3/2) - 3
243/(2*x^2 - x + 3)^(3/2)) + 1471/64*sqrt(2)*arcsinh(1/23*sqrt(23
)*(4*x - 1)) - 104441/25392*sqrt(2*x^2 - x + 3) - 383581/12696*x/
sqrt(2*x^2 - x + 3) + 321*x^2/(2*x^2 - x + 3)^(3/2) - 15965/4232/
sqrt(2*x^2 - x + 3) - 4147/46*x/(2*x^2 - x + 3)^(3/2) + 42883/138
/(2*x^2 - x + 3)^(3/2)
```

Fricas [A] time = 0.281952, size = 173, normalized size = 1.65

$$\frac{\sqrt{2}\Big(4\,\sqrt{2}\big(126960\,x^5+1440996\,x^4-3764360\,x^3+8639625\,x^2-6410082\,x+6663133\big)\,\sqrt{2\,x^2-x+3}+2334477\,\big(4\,x^4-4\,x^3}{203136\,(4\,x^4-4\,x^3+13\,x^2-6\,x+9)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)^2/(2*x^2 - x + 3)^(5/2),x, algori
```

```
[Out] 1/203136*sqrt(2)*(4*sqrt(2)*(126960*x^5 + 1440996*x^4 - 3764360*x
^3 + 8639625*x^2 - 6410082*x + 6663133)*sqrt(2*x^2 - x + 3) + 233
4477*(4*x^4 - 4*x^3 + 13*x^2 - 6*x + 9)*log(-sqrt(2)*(32*x^2 - 16
*x + 25) - 8*sqrt(2*x^2 - x + 3)*(4*x - 1)))/(4*x^4 - 4*x^3 + 13*
x^2 - 6*x + 9)
```

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

$$\int \frac{(2x+5)^2\left(5x^4-x^3+3x^2+x+2\right)}{(2x^2-x+3)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5+2*x)**2*(5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(5/2),x)
```

```
[Out] Integral((2*x + 5)**2*(5*x**4 - x**3 + 3*x**2 + x + 2)/(2*x**2 -
x + 3)**(5/2), x)
```

GIAC/XCAS [A] time = 0.283108, size = 96, normalized size = 0.91

$$-\frac{1471}{64}\,\sqrt{2}\ln\left(-2\,\sqrt{2}\left(\sqrt{2}x-\sqrt{2\,x^2-x+3}\right)+1\right)+\frac{((4\,(1587\,(20\,x+227)x-941090)x+8639625)x-6410082)x+6663133}{25392\,(2\,x^2-x+3)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)^2/(2*x^2 - x + 3)^(5/2),x, algori
```

```
[Out] -1471/64*sqrt(2)*ln(-2*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3))
+ 1) + 1/25392*(((4*(1587*(20*x + 227)*x - 941090)*x + 8639625)*x
 - 6410082)*x + 6663133)/(2*x^2 - x + 3)^(3/2)
```

3.359 $\int \frac{(5+2x)(2+x+3x^2-x^3+5x^4)}{(3-x+2x^2)^{5/2}}\,dx$

Optimal. Leaf size=86

$$\frac{6055-28981x}{3174\sqrt{2x^2-x+3}}+\frac{5}{4}\sqrt{2x^2-x+3}-\frac{53-373x}{69\,(2x^2-x+3)^{3/2}}-\frac{71\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{8\sqrt{2}}$$

```
[Out] -(53 - 373*x)/(69*(3 - x + 2*x^2)^(3/2)) + (6055 - 28981*x)/(3174
*Sqrt[3 - x + 2*x^2]) + (5*Sqrt[3 - x + 2*x^2])/4 - (71*ArcSinh[(
1 - 4*x)/Sqrt[23]])/(8*Sqrt[2])
```

Rubi [A] time = 0.142647, antiderivative size = 86, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.105

$$\frac{6055-28981x}{3174\sqrt{2x^2-x+3}}+\frac{5}{4}\sqrt{2x^2-x+3}-\frac{53-373x}{69\,(2x^2-x+3)^{3/2}}-\frac{71\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{8\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[((5 + 2*x)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(3 - x + 2*x^2)^(5/2),x]
```


```
[Out] -(53 - 373*x)/(69*(3 - x + 2*x^2)^(3/2)) + (6055 - 28981*x)/(3174
*Sqrt[3 - x + 2*x^2]) + (5*Sqrt[3 - x + 2*x^2])/4 - (71*ArcSinh[(
1 - 4*x)/Sqrt[23]])/(8*Sqrt[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((5+2*x)*(5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(5/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.0744991, size = 60, normalized size = 0.7

$$\frac{31740x^4 - 147664x^3 + 185337x^2 - 199290x + 102869}{6348\,(2x^2 - x + 3)^{3/2}} + \frac{71\sinh^{-1}\left(\frac{4x-1}{\sqrt{23}}\right)}{8\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[((5 + 2*x)*(2 + x + 3*x^2 - x^3 + 5*x^4))/(3 - x + 2*x^2)^(5/2),x]
```

```
[Out] (102869 - 199290*x + 185337*x^2 - 147664*x^3 + 31740*x^4)/(6348*(
3 - x + 2*x^2)^(3/2)) + (71*ArcSinh[(-1 + 4*x)/Sqrt[23]])/(8*Sqrt
[2])
```

Maple [B] time = 0.01, size = 163, normalized size = 1.9

$$\frac{401\,x^2}{16}\left(2\,x^2 - x + 3\right)^{-\frac{3}{2}} - \frac{945\,x}{128}\left(2\,x^2 - x + 3\right)^{-\frac{3}{2}} + \frac{11749}{512}\left(2\,x^2 - x + 3\right)^{-\frac{3}{2}} - \frac{9308\,x - 2327}{35328}\left(2\,x^2 - x + 3\right)^{-\frac{3}{2}} + \frac{2572\,x - 643}{12696}\frac{1}{\sqrt{2\,x^2 - x + 3}} - \frac{71\,x^3}{12}\left(2\,x^2 - x + 3\right)^{-\frac{3}{2}} - \frac{71\,x}{8}\frac{1}{\sqrt{2\,x^2 - x + 3}} - \frac{71}{32}\frac{1}{\sqrt{2\,x^2 - x + 3}} + \frac{71\sqrt{2}}{16}Arcsinh\left(\frac{4\sqrt{23}}{23}\left(x - \frac{1}{4}\right)\right) + 5\,\frac{x^4}{(2\,x^2 - x + 3)^{3/2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5+2*x)*(5*x^4-x^3+3*x^2+x+2)/(2*x^2-x+3)^(5/2),x)
```

```
[Out] 401/16*x^2/(2*x^2-x+3)^(3/2)-945/128*x/(2*x^2-x+3)^(3/2)+11749/51
2/(2*x^2-x+3)^(3/2)-2327/35328*(4*x-1)/(2*x^2-x+3)^(3/2)+643/1269
6*(4*x-1)/(2*x^2-x+3)^(1/2)-71/12*x^3/(2*x^2-x+3)^(3/2)-71/8*x/(2
*x^2-x+3)^(1/2)-71/32/(2*x^2-x+3)^(1/2)+71/16*2^(1/2)*arcsinh(4/2
3*23^(1/2)*(x-1/4))+5*x^4/(2*x^2-x+3)^(3/2)
```

Maxima [A] time = 0.836527, size = 273, normalized size = 3.17

$$\frac{5\,x^4}{(2\,x^2-x+3)^{\frac{3}{2}}} + \frac{71}{12696}\,x\left(\frac{284\,x}{\sqrt{2\,x^2-x+3}} - \frac{3174\,x^2}{(2\,x^2-x+3)^{\frac{3}{2}}} - \frac{71}{\sqrt{2\,x^2-x+3}} + \frac{805\,x}{(2\,x^2-x+3)^{\frac{3}{2}}} - \frac{3243}{(2\,x^2-x+3)^{\frac{3}{2}}}\right) + \frac{71}{16}\,\sqrt{2}\,\mathrm{arsinh}\left(\frac{1}{23}\,\sqrt{23}(4\,x-1)\right) - \frac{5041}{6348}\,\sqrt{2\,x^2-x+3} - \frac{10007\,x}{3174\,\sqrt{2\,x^2-x+3}} + \frac{59\,x^2}{2\,(2\,x^2-x+3)^{\frac{3}{2}}} - \frac{2959}{2116\,\sqrt{2\,x^2-x+3}} - \frac{807\,x}{92\,(2\,x^2-x+3)^{\frac{3}{2}}} + \frac{7603}{276\,(2\,x^2-x+3)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)/(2*x^2 - x + 3)^(5/2),x, algorith
```

```
[Out] 5*x^4/(2*x^2 - x + 3)^(3/2) + 71/12696*x*(284*x/sqrt(2*x^2 - x +
3) - 3174*x^2/(2*x^2 - x + 3)^(3/2) - 71/sqrt(2*x^2 - x + 3) + 80
5*x/(2*x^2 - x + 3)^(3/2) - 3243/(2*x^2 - x + 3)^(3/2)) + 71/16*s
qrt(2)*arcsinh(1/23*sqrt(23)*(4*x - 1)) - 5041/6348*sqrt(2*x^2 -
x + 3) - 10007/3174*x/sqrt(2*x^2 - x + 3) + 59/2*x^2/(2*x^2 - x +
 3)^(3/2) - 2959/2116/sqrt(2*x^2 - x + 3) - 807/92*x/(2*x^2 - x +
 3)^(3/2) + 7603/276/(2*x^2 - x + 3)^(3/2)
```

Fricas [A] time = 0.284268, size = 166, normalized size = 1.93

$$\frac{\sqrt{2}\left(4\,\sqrt{2}\left(31740\,x^4-147664\,x^3+185337\,x^2-199290\,x+102869\right)\sqrt{2\,x^2-x+3}+112677\,\left(4\,x^4-4\,x^3+13\,x^2-6\,x+9\right)\log\right.}{50784\,(4\,x^4-4\,x^3+13\,x^2-6\,x+9)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)/(2*x^2 - x + 3)^(5/2),x, algorith
```

```
[Out] 1/50784*sqrt(2)*(4*sqrt(2)*(31740*x^4 - 147664*x^3 + 185337*x^2 -
 199290*x + 102869)*sqrt(2*x^2 - x + 3) + 112677*(4*x^4 - 4*x^3 +
 13*x^2 - 6*x + 9)*log(-sqrt(2)*(32*x^2 - 16*x + 25) - 8*sqrt(2*x
^2 - x + 3)*(4*x - 1)))/(4*x^4 - 4*x^3 + 13*x^2 - 6*x + 9)
```

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

$$\int \frac{(2x+5)\left(5x^4-x^3+3x^2+x+2\right)}{(2x^2-x+3)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5+2*x)*(5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(5/2),x)
```

```
[Out] Integral((2*x + 5)*(5*x**4 - x**3 + 3*x**2 + x + 2)/(2*x**2 - x +
 3)**(5/2), x)
```

GIAC/XCAS [A] time = 0.281884, size = 89, normalized size = 1.03

$$-\frac{71}{16}\sqrt{2}\ln\left(-2\sqrt{2}\left(\sqrt{2}x-\sqrt{2x^2-x+3}\right)+1\right)+\frac{((4(7935x-36916)x+185337)x-199290)x+102869}{6348(2x^2-x+3)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)*(2*x + 5)/(2*x^2 - x + 3)^(5/2),x, algorith
```

```
[Out] -71/16*sqrt(2)*ln(-2*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3)) +
1) + 1/6348*(((4*(7935*x - 36916)*x + 185337)*x - 199290)*x + 102
869)/(2*x^2 - x + 3)^(3/2)
```

3.360 $\int \frac{2+x+3x^2-x^3+5x^4}{(3-x+2x^2)^{5/2}}\,dx$

Optimal. Leaf size=68

$$\frac{219x+89}{276\left(2x^2-x+3\right)^{3/2}}-\frac{2604x+1465}{2116\sqrt{2x^2-x+3}}-\frac{5\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{4\sqrt{2}}$$

```
[Out] (89 + 219*x)/(276*(3 - x + 2*x^2)^(3/2)) - (1465 + 2604*x)/(2116*
Sqrt[3 - x + 2*x^2]) - (5*ArcSinh[(1 - 4*x)/Sqrt[23]])/(4*Sqrt[2]
)
```

Rubi [A] time = 0.087556, antiderivative size = 68, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.121

$$\frac{219x+89}{276\left(2x^2-x+3\right)^{3/2}}-\frac{2604x+1465}{2116\sqrt{2x^2-x+3}}-\frac{5\sinh^{-1}\left(\frac{1-4x}{\sqrt{23}}\right)}{4\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/(3 - x + 2*x^2)^(5/2),x]
```

```
[Out] (89 + 219*x)/(276*(3 - x + 2*x^2)^(3/2)) - (1465 + 2604*x)/(2116*
Sqrt[3 - x + 2*x^2]) - (5*ArcSinh[(1 - 4*x)/Sqrt[23]])/(4*Sqrt[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((5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(5/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.103245, size = 55, normalized size = 0.81

$$\frac{5\sinh^{-1}\left(\frac{4x-1}{\sqrt{23}}\right)}{4\sqrt{2}}-\frac{7812x^3+489x^2+7002x+5569}{3174\left(2x^2-x+3\right)^{3/2}}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/(3 - x + 2*x^2)^(5/2),x]
```

```
[Out] -(5569 + 7002*x + 489*x^2 + 7812*x^3)/(3174*(3 - x + 2*x^2)^(3/2)
) + (5*ArcSinh[(-1 + 4*x)/Sqrt[23]])/(4*Sqrt[2])
```

Maple [B] time = 0.01, size = 146, normalized size = 2.2

$$-\frac{271}{768}\left(2x^2-x+3\right)^{-\frac{3}{2}}+\frac{9692x-2423}{17664}\left(2x^2-x+3\right)^{-\frac{3}{2}}+\frac{692x-173}{1587}\frac{1}{\sqrt{2x^2-x+3}}-\frac{47x}{64}\left(2x^2-x+3\right)^{-\frac{3}{2}}-\frac{x^2}{8}\left(2x^2-x+3\right)^{-\frac{3}{2}}-\frac{5x^3}{6}\left(2x^2-x+3\right)^{-\frac{3}{2}}-\frac{5x}{4}\frac{1}{\sqrt{2x^2-x+3}}-\frac{5}{16}\frac{1}{\sqrt{2x^2-x+3}}+\frac{5\sqrt{2}}{8}Arcsinh\left(\frac{4\sqrt{23}}{23}\left(x-\frac{1}{4}\right)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^4-x^3+3*x^2+x+2)/(2*x^2-x+3)^(5/2),x)
```

```
[Out] -271/768/(2*x^2-x+3)^(3/2)+2423/17664*(4*x-1)/(2*x^2-x+3)^(3/2)+1
73/1587*(4*x-1)/(2*x^2-x+3)^(1/2)-47/64*x/(2*x^2-x+3)^(3/2)-1/8*x
^2/(2*x^2-x+3)^(3/2)-5/6*x^3/(2*x^2-x+3)^(3/2)-5/4*x/(2*x^2-x+3)^
(1/2)-5/16/(2*x^2-x+3)^(1/2)+5/8*2^(1/2)*arcsinh(4/23*23^(1/2)*(x
-1/4))
```

Maxima [A] time = 0.793159, size = 250, normalized size = 3.68

$$\frac{5}{6348}x\left(\frac{284x}{\sqrt{2x^2-x+3}}-\frac{3174x^2}{(2x^2-x+3)^{\frac{3}{2}}}-\frac{71}{\sqrt{2x^2-x+3}}+\frac{805x}{(2x^2-x+3)^{\frac{3}{2}}}-\frac{3243}{(2x^2-x+3)^{\frac{3}{2}}}\right)+\frac{5}{8}\sqrt{2}\operatorname{arsinh}\left(\frac{1}{23}\sqrt{23}(4x-1)\right)-\frac{355}{3174}\sqrt{2x^2-x+3}-\frac{58x}{1587\sqrt{2x^2-x+3}}+\frac{x^2}{2(2x^2-x+3)^{\frac{3}{2}}}-\frac{1897}{6348\sqrt{2x^2-x+3}}-\frac{95x}{276(2x^2-x+3)^{\frac{3}{2}}}+\frac{41}{276(2x^2-x+3)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(2*x^2 - x + 3)^(5/2),x, algorithm="maxima
```

```
[Out] 5/6348*x*(284*x/sqrt(2*x^2 - x + 3) - 3174*x^2/(2*x^2 - x + 3)^(3
/2) - 71/sqrt(2*x^2 - x + 3) + 805*x/(2*x^2 - x + 3)^(3/2) - 3243
```

```
/(2*x^2 - x + 3)^(3/2)) + 5/8*sqrt(2)*arcsinh(1/23*sqrt(23)*(4*x
- 1)) - 355/3174*sqrt(2*x^2 - x + 3) - 58/1587*x/sqrt(2*x^2 - x +
 3) + 1/2*x^2/(2*x^2 - x + 3)^(3/2) - 1897/6348/sqrt(2*x^2 - x +
3) - 95/276*x/(2*x^2 - x + 3)^(3/2) + 41/276/(2*x^2 - x + 3)^(3/2
)
```

Fricas [A] time = 0.277752, size = 159, normalized size = 2.34

$$-\frac{\sqrt{2}\left(4\sqrt{2}\left(7812\,x^3+489\,x^2+7002\,x+5569\right)\sqrt{2\,x^2-x+3}-7935\,\left(4\,x^4-4\,x^3+13\,x^2-6\,x+9\right)\log\left(-\sqrt{2}\left(32\,x^2-16\,x+\right.\right.\right.}{25392\,\left(4\,x^4-4\,x^3+13\,x^2-6\,x+9\right)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(2*x^2 - x + 3)^(5/2),x, algorithm="fricas
```

```
[Out] -1/25392*sqrt(2)*(4*sqrt(2)*(7812*x^3 + 489*x^2 + 7002*x + 5569)*
sqrt(2*x^2 - x + 3) - 7935*(4*x^4 - 4*x^3 + 13*x^2 - 6*x + 9)*log
(-sqrt(2)*(32*x^2 - 16*x + 25) - 8*sqrt(2*x^2 - x + 3)*(4*x - 1))
)/(4*x^4 - 4*x^3 + 13*x^2 - 6*x + 9)
```

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

$$\int \frac{5x^4 - x^3 + 3x^2 + x + 2}{(2x^2 - x + 3)^{\frac{5}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x**4-x**3+3*x**2+x+2)/(2*x**2-x+3)**(5/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/(2*x**2 - x + 3)**(5/2)
, x)
```

GIAC/XCAS [A] time = 0.277767, size = 84, normalized size = 1.24

$$-\frac{5}{8}\sqrt{2}\ln\left(-2\sqrt{2}\left(\sqrt{2}x-\sqrt{2\,x^2-x+3}\right)+1\right)-\frac{3\,((2604\,x+163)x+2334)x+5569}{3174\,(2\,x^2-x+3)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/(2*x^2 - x + 3)^(5/2),x, algorithm="giac")
```

```
[Out] -5/8*sqrt(2)*ln(-2*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3)) + 1)
 - 1/3174*(3*((2604*x + 163)*x + 2334)*x + 5569)/(2*x^2 - x + 3)^
(3/2)
```

3.361 $\int \frac{2+x+3x^2-x^3+5x^4}{(5+2x)(3-x+2x^2)^{5/2}}\,dx$

Optimal. Leaf size=85

$$\frac{917x+1191}{9936\,(2x^2-x+3)^{3/2}}-\frac{146729x+335337}{1371168\sqrt{2x^2-x+3}}-\frac{3667\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{31104\sqrt{2}}$$

```
[Out] (1191 + 917*x)/(9936*(3 - x + 2*x^2)^(3/2)) - (335337 + 146729*x)
/(1371168*Sqrt[3 - x + 2*x^2]) - (3667*ArcTanh[(17 - 22*x)/(12*Sq
rt[2]*Sqrt[3 - x + 2*x^2])])/(31104*Sqrt[2])
```

Rubi [A] time = 0.223263, antiderivative size = 85, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$\frac{917x+1191}{9936\,(2x^2-x+3)^{3/2}}-\frac{146729x+335337}{1371168\sqrt{2x^2-x+3}}-\frac{3667\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{31104\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)*(3 - x + 2*x^2)^(5/2)),x]
```

```
[Out] (1191 + 917*x)/(9936*(3 - x + 2*x^2)^(3/2)) - (335337 + 146729*x)
/(1371168*Sqrt[3 - x + 2*x^2]) - (3667*ArcTanh[(17 - 22*x)/(12*Sq
rt[2]*Sqrt[3 - x + 2*x^2])])/(31104*Sqrt[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((5*x**4-x**3+3*x**2+x+2)/(5+2*x)/(2*x**2-x+3)**(5/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.221072, size = 80, normalized size = 0.94

$$\frac{-3667\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)-\frac{12\sqrt{2}(293458x^3+523945x^2-21696x+841653)}{529(2x^2-x+3)^{3/2}}+3667\log(2x+5)}{31104\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)*(3 - x + 2*x^2)^(5/2)),x]
```

```
[Out] ((-12*Sqrt[2]*(841653 - 21696*x + 523945*x^2 + 293458*x^3))/(529*
(3 - x + 2*x^2)^(3/2)) + 3667*Log[5 + 2*x] - 3667*Log[17 - 22*x +
 12*Sqrt[6 - 2*x + 4*x^2]])/(31104*Sqrt[2])
```

Maple [B] time = 0.013, size = 190, normalized size = 2.2

$$-\frac{15268\,x-3817}{2944}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}-\frac{15268\,x-3817}{4232}\frac{1}{\sqrt{2\,x^2-x+3}}-\frac{1597}{384}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}+\frac{59\,x}{32}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}-\frac{5\,x^2}{4}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}+\frac{3667}{1728}\left(2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}\right)^{-\frac{3}{2}}+\frac{161348\,x-40337}{39744}\left(2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}\right)^{-\frac{3}{2}}+\frac{19200412\,x-4800103}{5484672}\frac{1}{\sqrt{2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}}}+\frac{3667}{10368}\frac{1}{\sqrt{2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}}}-\frac{3667\,\sqrt{2}}{62208}Artanh\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5*x^4-x^3+3*x^2+x+2)/(5+2*x)/(2*x^2-x+3)^(5/2),x)
```

```
[Out] -3817/2944*(4*x-1)/(2*x^2-x+3)^(3/2)-3817/4232*(4*x-1)/(2*x^2-x+3
)^(1/2)-1597/384/(2*x^2-x+3)^(3/2)+59/32*x/(2*x^2-x+3)^(3/2)-5/4*
x^2/(2*x^2-x+3)^(3/2)+3667/1728/(2*(x+5/2)^2-11*x-19/2)^(3/2)+403
37/39744*(4*x-1)/(2*(x+5/2)^2-11*x-19/2)^(3/2)+4800103/5484672*(4
*x-1)/(2*(x+5/2)^2-11*x-19/2)^(1/2)+3667/10368/(2*(x+5/2)^2-11*x-
19/2)^(1/2)-3667/62208*2^(1/2)*arctanh(1/12*(17/2-11*x)*2^(1/2)/(
2*(x+5/2)^2-11*x-19/2)^(1/2))
```

Maxima [A] time = 0.814584, size = 149, normalized size = 1.75

$$\frac{3667}{62208}\sqrt{2}\,\mathrm{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\sqrt{23}}{23\,|2\,x+5|}\right)-\frac{146729\,x}{1371168\sqrt{2\,x^2-x+3}}-\frac{5\,x^2}{4\,(2\,x^2-x+3)^{\frac{3}{2}}}+\frac{173881}{457056\sqrt{2\,x^2-x+3}}+\frac{7127\,x}{9936\,(2\,x^2-x+3)^{\frac{3}{2}}}-\frac{5813}{3312\,(2\,x^2-x+3)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(5/2)*(2*x + 5)),x, algori
```

```
[Out] 3667/62208*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5) - 17/23*
sqrt(23)/abs(2*x + 5)) - 146729/1371168*x/sqrt(2*x^2 - x + 3) - 5
/4*x^2/(2*x^2 - x + 3)^(3/2) + 173881/457056/sqrt(2*x^2 - x + 3)
+ 7127/9936*x/(2*x^2 - x + 3)^(3/2) - 5813/3312/(2*x^2 - x + 3)^(
3/2)
```

Fricas [A] time = 0.275293, size = 177, normalized size = 2.08

$$-\frac{\sqrt{2}\Big(24\sqrt{2}\big(293458\,x^3+523945\,x^2-21696\,x+841653\big)\sqrt{2\,x^2-x+3}-1939843\,\big(4\,x^4-4\,x^3+13\,x^2-6\,x+9\big)\log\Big(-\frac{\sqrt{2}(1\cdots}{}$$
$$\overline{65816064\,(4\,x^4-4\,x^3+13\,x^2-6\,x+9)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(5/2)*(2*x + 5)),x, algori
```

```
[Out] -1/65816064*sqrt(2)*(24*sqrt(2)*(293458*x^3 + 523945*x^2 - 21696*
x + 841653)*sqrt(2*x^2 - x + 3) - 1939843*(4*x^4 - 4*x^3 + 13*x^2
 - 6*x + 9)*log(-(sqrt(2)*(1060*x^2 - 1036*x + 1153) + 48*sqrt(2*
x^2 - x + 3)*(22*x - 17))/(4*x^2 + 20*x + 25)))/(4*x^4 - 4*x^3 +
13*x^2 - 6*x + 9)
```

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

$$\int \frac{5x^4-x^3+3x^2+x+2}{(2x+5)\,(2x^2-x+3)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x**4-x**3+3*x**2+x+2)/(5+2*x)/(2*x**2-x+3)**(5/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/((2*x + 5)*(2*x**2 - x
+ 3)**(5/2)), x)
```

GIAC/XCAS [A] time = 0.288861, size = 124, normalized size = 1.46

$$-\frac{3667}{62208}\sqrt{2}\ln\left(\left|-2\sqrt{2}x+\sqrt{2}+2\sqrt{2x^2-x+3}\right|\right)+\frac{3667}{62208}\sqrt{2}\ln\left(\left|-2\sqrt{2}x-11\sqrt{2}+2\sqrt{2x^2-x+3}\right|\right)-\frac{((293458x+523945)x-21696)x+841653}{1371168\,(2x^2-x+3)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(5/2)*(2*x + 5)),x, algori
```

```
[Out] -3667/62208*sqrt(2)*ln(abs(-2*sqrt(2)*x + sqrt(2) + 2*sqrt(2*x^2
- x + 3))) + 3667/62208*sqrt(2)*ln(abs(-2*sqrt(2)*x - 11*sqrt(2)
+ 2*sqrt(2*x^2 - x + 3))) - 1/1371168*(((293458*x + 523945)*x - 2
1696)*x + 841653)/(2*x^2 - x + 3)^(3/2)
```

3.362 $\int \frac{2+x+3x^2-x^3+5x^4}{(5+2x)^2(3-x+2x^2)^{5/2}}\,dx$

Optimal. Leaf size=110

$$-\frac{1255878-62021x}{24681024\sqrt{2x^2-x+3}}-\frac{3667\sqrt{2x^2-x+3}}{186624(2x+5)}+\frac{2203x+9897}{357696\left(2x^2-x+3\right)^{3/2}}-\frac{2821\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{2239488\sqrt{2}}$$

```
[Out] (9897 + 2203*x)/(357696*(3 - x + 2*x^2)^(3/2)) - (1255878 - 62021
*x)/(24681024*Sqrt[3 - x + 2*x^2]) - (3667*Sqrt[3 - x + 2*x^2])/(
186624*(5 + 2*x)) - (2821*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3
- x + 2*x^2])])/(2239488*Sqrt[2])
```

Rubi [A] time = 0.299339, antiderivative size = 110, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.1

$$-\frac{1255878-62021x}{24681024\sqrt{2x^2-x+3}}-\frac{3667\sqrt{2x^2-x+3}}{186624(2x+5)}+\frac{2203x+9897}{357696\left(2x^2-x+3\right)^{3/2}}-\frac{2821\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{2239488\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^2*(3 - x + 2*x^2)^(5/2)),x]
```

```
[Out] (9897 + 2203*x)/(357696*(3 - x + 2*x^2)^(3/2)) - (1255878 - 62021
*x)/(24681024*Sqrt[3 - x + 2*x^2]) - (3667*Sqrt[3 - x + 2*x^2])/(
186624*(5 + 2*x)) - (2821*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3
- x + 2*x^2])])/(2239488*Sqrt[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((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**2/(2*x**2-x+3)**(5/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.254427, size = 92, normalized size = 0.84

$$\frac{-2821\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)-\frac{12\sqrt{2}(6767036x^4+10350004x^3+63941915x^2-18840090x+79153407)}{529(2x+5)(2x^2-x+3)^{3/2}}+2821\log(2x+5)}{2239488\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^2*(3 - x + 2*x^2)^(5/2)),x]
```

```
[Out] ((-12*Sqrt[2]*(79153407 - 18840090*x + 63941915*x^2 + 10350004*x^
3 + 6767036*x^4))/(529*(5 + 2*x)*(3 - x + 2*x^2)^(3/2)) + 2821*Lo
g[5 + 2*x] - 2821*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]])/(223
9488*Sqrt[2])
```

Maple [B] time = 0.018, size = 194, normalized size = 1.8

$$\frac{12692\,x-3173}{4416}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}+\frac{12692\,x-3173}{6348}\frac{1}{\sqrt{2\,x^2-x+3}}+\frac{203}{192}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}$$
$$-\frac{5\,x}{16}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}-\frac{3667}{1152}\left(x+\frac{5}{2}\right)^{-1}\left(2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}\right)^{-\frac{3}{2}}$$
$$+\frac{2821}{124416}\left(2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}\right)^{-\frac{3}{2}}-\frac{8324644\,x-2081161}{2861568}\left(2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}\right)^{-\frac{3}{2}}$$
$$-\frac{796310972\,x-199077743}{394896384}\frac{1}{\sqrt{2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}}}+\frac{2821}{746496}\frac{1}{\sqrt{2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}}}$$
$$-\frac{2821\,\sqrt{2}}{4478976}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,\left(x+5/2\right)^2-11\,x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((5*x^4-x^3+3*x^2+x+2)/(5+2*x)^2/(2*x^2-x+3)^(5/2),x)
```

```
[Out] 3173/4416*(4*x-1)/(2*x^2-x+3)^(3/2)+3173/6348*(4*x-1)/(2*x^2-x+3)
^(1/2)+203/192/(2*x^2-x+3)^(3/2)-5/16*x/(2*x^2-x+3)^(3/2)-3667/11
52/(x+5/2)/(2*(x+5/2)^2-11*x-19/2)^(3/2)+2821/124416/(2*(x+5/2)^2
-11*x-19/2)^(3/2)-2081161/2861568*(4*x-1)/(2*(x+5/2)^2-11*x-19/2)
^(3/2)-199077743/394896384*(4*x-1)/(2*(x+5/2)^2-11*x-19/2)^(1/2)+
2821/746496/(2*(x+5/2)^2-11*x-19/2)^(1/2)-2821/4478976*2^(1/2)*ar
ctanh(1/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))
```

Maxima [A] time = 0.786429, size = 171, normalized size = 1.55

$$\frac{2821}{4478976}\sqrt{2}\,\mathrm{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\sqrt{23}}{23\,|2\,x+5|}\right)-\frac{1691759\,x}{98724096\sqrt{2\,x^2-x+3}}+\frac{265339}{32908032\sqrt{2\,x^2-x+3}}-\frac{248617\,x}{715392\,(2\,x^2-x+3)^{\frac{3}{2}}}-\frac{3667}{576\left(2\,(2\,x^2-x+3)^{\frac{3}{2}}x+5\,(2\,x^2-x+3)^{\frac{3}{2}}\right)}+\frac{259621}{238464\,(2\,x^2-x+3)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(5/2)*(2*x + 5)^2),x, algo
```

```
[Out] 2821/4478976*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5) - 17/2
3*sqrt(23)/abs(2*x + 5)) - 1691759/98724096*x/sqrt(2*x^2 - x + 3)
 + 265339/32908032/sqrt(2*x^2 - x + 3) - 248617/715392*x/(2*x^2 -
 x + 3)^(3/2) - 3667/576/(2*(2*x^2 - x + 3)^(3/2)*x + 5*(2*x^2 -
x + 3)^(3/2)) + 259621/238464/(2*x^2 - x + 3)^(3/2)
```

Fricas [A] time = 0.277538, size = 197, normalized size = 1.79

$$-\frac{\sqrt{2}\Big(24\sqrt{2}\big(6767036\,x^4+10350004\,x^3+63941915\,x^2-18840090\,x+79153407\big)\sqrt{2\,x^2-x+3}-1492309\,\big(8\,x^5+12\,x^4+6\,\cdots}{4738756608\,(8\,x^5+12\,x^4+6\,x^3+53\,x^2-12\,x+4\cdots}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(5/2)*(2*x + 5)^2),x, algo
```

```
[Out] -1/4738756608*sqrt(2)*(24*sqrt(2)*(6767036*x^4 + 10350004*x^3 + 6
3941915*x^2 - 18840090*x + 79153407)*sqrt(2*x^2 - x + 3) - 149230
9*(8*x^5 + 12*x^4 + 6*x^3 + 53*x^2 - 12*x + 45)*log(-(sqrt(2)*(10
60*x^2 - 1036*x + 1153) + 48*sqrt(2*x^2 - x + 3)*(22*x - 17))/(4*
x^2 + 20*x + 25)))/(8*x^5 + 12*x^4 + 6*x^3 + 53*x^2 - 12*x + 45)
```

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

$$\int\frac{5x^4-x^3+3x^2+x+2}{(2x+5)^2\,(2x^2-x+3)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**2/(2*x**2-x+3)**(5/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/((2*x + 5)**2*(2*x**2 -
 x + 3)**(5/2)), x)
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{5\,x^4 - x^3 + 3\,x^2 + x + 2}{(2\,x^2 - x + 3)^{\frac{5}{2}}(2\,x + 5)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(5/2)*(2*x + 5)^2),x, algo
```

```
[Out] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(5/2)*(2
*x + 5)^2), x)
```

3.363 $\int \frac{2+x+3x^2-x^3+5x^4}{(5+2x)^3(3-x+2x^2)^{5/2}}\,dx$

Optimal. Leaf size=135

$$-\frac{4679797-2148263x}{592344576\sqrt{2x^2-x+3}}-\frac{45979\sqrt{2x^2-x+3}}{26873856(2x+5)}-\frac{3667\sqrt{2x^2-x+3}}{373248(2x+5)^2}+\frac{65991-8779x}{12877056\left(2x^2-x+3\right)^{3/2}}+\frac{774079\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{322486272\sqrt{2}}$$

```
[Out] (65991 - 8779*x)/(12877056*(3 - x + 2*x^2)^(3/2)) - (4679797 - 21
48263*x)/(592344576*Sqrt[3 - x + 2*x^2]) - (3667*Sqrt[3 - x + 2*x
^2])/(373248*(5 + 2*x)^2) - (45979*Sqrt[3 - x + 2*x^2])/(26873856
*(5 + 2*x)) + (774079*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x
+ 2*x^2])])/(322486272*Sqrt[2])
```

Rubi [A] time = 0.399205, antiderivative size = 135, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$-\frac{4679797-2148263x}{592344576\sqrt{2x^2-x+3}}-\frac{45979\sqrt{2x^2-x+3}}{26873856(2x+5)}-\frac{3667\sqrt{2x^2-x+3}}{373248(2x+5)^2}+\frac{65991-8779x}{12877056\left(2x^2-x+3\right)^{3/2}}+\frac{774079\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{322486272\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^3*(3 - x + 2*x^2)^(5/2)),x]
```


```
[Out] (65991 - 8779*x)/(12877056*(3 - x + 2*x^2)^(3/2)) - (4679797 - 21
48263*x)/(592344576*Sqrt[3 - x + 2*x^2]) - (3667*Sqrt[3 - x + 2*x
^2])/(373248*(5 + 2*x)^2) - (45979*Sqrt[3 - x + 2*x^2])/(26873856
*(5 + 2*x)) + (774079*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x
+ 2*x^2])])/(322486272*Sqrt[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((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**3/(2*x**2-x+3)**(5/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.187643, size = 97, normalized size = 0.72

$$\frac{774079\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{12\sqrt{2}(217883368x^5+107028732x^4-1503926130x^3-5919924791x^2+2280511668x-8953831359)}{529(2x+5)^2(2x^2-x+3)^{3/2}}-7740}{322486272\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^3*(3 - x + 2*x^2)^(5/2)),x]
```

```
[Out] ((12*Sqrt[2]*(-8953831359 + 2280511668*x - 5919924791*x^2 - 15039
26130*x^3 + 107028732*x^4 + 217883368*x^5))/(529*(5 + 2*x)^2*(3 -
 x + 2*x^2)^(3/2)) - 774079*Log[5 + 2*x] + 774079*Log[17 - 22*x +
 12*Sqrt[6 - 2*x + 4*x^2]])/(322486272*Sqrt[2])
```

Maple [A] time = 0.018, size = 200, normalized size = 1.5

$$-\frac{596\,x-149}{1104}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}-\frac{596\,x-149}{1587}\frac{1}{\sqrt{2\,x^2-x+3}}$$
$$-\frac{5}{48}\left(2\,x^2-x+3\right)^{-\frac{3}{2}}-\frac{3667}{4608}\left(x+\frac{5}{2}\right)^{-2}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{-\frac{3}{2}}$$
$$+\frac{115369}{165888}\left(x+\frac{5}{2}\right)^{-1}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{-\frac{3}{2}}-\frac{774079}{17915904}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{-\frac{3}{2}}$$
$$+\frac{231750700\,x-57937675}{412065792}\left(2\,(x+5/2)^2-11\,x-\frac{19}{2}\right)^{-\frac{3}{2}}$$
$$+\frac{21464699252\,x-5366174813}{56865079296}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}$$
$$-\frac{774079}{107495424}\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}$$
$$+\frac{774079\,\sqrt{2}}{644972544}Artanh\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11\,x\right)\frac{1}{\sqrt{2\,(x+5/2)^2-11\,x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^4-x^3+3*x^2+x+2)/(5+2*x)^3/(2*x^2-x+3)^(5/2),x)
```

```
[Out] -149/1104*(4*x-1)/(2*x^2-x+3)^(3/2)-149/1587*(4*x-1)/(2*x^2-x+3)^
(1/2)-5/48/(2*x^2-x+3)^(3/2)-3667/4608/(x+5/2)^2/(2*(x+5/2)^2-11*
x-19/2)^(3/2)+115369/165888/(x+5/2)/(2*(x+5/2)^2-11*x-19/2)^(3/2)
-774079/17915904/(2*(x+5/2)^2-11*x-19/2)^(3/2)+57937675/412065792
*(4*x-1)/(2*(x+5/2)^2-11*x-19/2)^(3/2)+5366174813/56865079296*(4*
x-1)/(2*(x+5/2)^2-11*x-19/2)^(1/2)-774079/107495424/(2*(x+5/2)^2-
11*x-19/2)^(1/2)+774079/644972544*2^(1/2)*arctanh(1/12*(17/2-11*x
)*2^(1/2)/(2*(x+5/2)^2-11*x-19/2)^(1/2))
```

Maxima [A] time = 0.789834, size = 240, normalized size = 1.78

$$-\frac{774079}{644972544}\sqrt{2}\operatorname{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\sqrt{23}}{23\,|2\,x+5|}\right)+\frac{27235421\,x}{14216269824\sqrt{2\,x^2-x+3}}-\frac{36393601}{4738756608\sqrt{2\,x^2-x+3}}+\frac{2323723\,x}{103016448\,(2\,x^2-x+3)^{\frac{3}{2}}}-\frac{3667}{1152\left(4\,(2\,x^2-x+3)^{\frac{3}{2}}x^2+20\,(2\,x^2-x+3)^{\frac{3}{2}}x+25\,(2\,x^2-x+3)^{\frac{3}{2}}\right)}+\frac{115369}{82944\left(2\,(2\,x^2-x+3)^{\frac{3}{2}}x+5\,(2\,x^2-x+3)^{\frac{3}{2}}\right)}-\frac{5254255}{34338816\,(2\,x^2-x+3)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(5/2)*(2*x + 5)^3),x, algo
```

```
[Out] -774079/644972544*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5) -
 17/23*sqrt(23)/abs(2*x + 5)) + 27235421/14216269824*x/sqrt(2*x^2
 - x + 3) - 36393601/4738756608/sqrt(2*x^2 - x + 3) + 2323723/103
016448*x/(2*x^2 - x + 3)^(3/2) - 3667/1152/(4*(2*x^2 - x + 3)^(3/
2)*x^2 + 20*(2*x^2 - x + 3)^(3/2)*x + 25*(2*x^2 - x + 3)^(3/2)) +
 115369/82944/(2*(2*x^2 - x + 3)^(3/2)*x + 5*(2*x^2 - x + 3)^(3/2
)) - 5254255/34338816/(2*x^2 - x + 3)^(3/2)
```

Fricas [A] time = 0.286189, size = 217, normalized size = 1.61

$$\frac{\sqrt{2}\left(24\sqrt{2}\left(217883368\,x^5+107028732\,x^4-1503926130\,x^3-5919924791\,x^2+2280511668\,x-8953831359\right)\sqrt{2\,x^2-x+3}+\right.}{682380951552\,(16\,x^6+64\,x^5+72\,x^4+}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(5/2)*(2*x + 5)^3),x, algo
```

```
[Out] 1/682380951552*sqrt(2)*(24*sqrt(2)*(217883368*x^5 + 107028732*x^4
 - 1503926130*x^3 - 5919924791*x^2 + 2280511668*x - 8953831359)*s
qrt(2*x^2 - x + 3) + 409487791*(16*x^6 + 64*x^5 + 72*x^4 + 136*x^
3 + 241*x^2 + 30*x + 225)*log(-(sqrt(2)*(1060*x^2 - 1036*x + 1153
) - 48*sqrt(2*x^2 - x + 3)*(22*x - 17))/(4*x^2 + 20*x + 25)))/(16
*x^6 + 64*x^5 + 72*x^4 + 136*x^3 + 241*x^2 + 30*x + 225)
```

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

$$\int \frac{5x^4 - x^3 + 3x^2 + x + 2}{(2x+5)^3\,(2x^2 - x + 3)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**3/(2*x**2-x+3)**(5/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/((2*x + 5)**3*(2*x**2 -
 x + 3)**(5/2)), x)
```

GIAC/XCAS [A] time = 0.29543, size = 308, normalized size = 2.28

$$\frac{774079}{644972544}\sqrt{2}\ln\left(\left|-2\sqrt{2}x + \sqrt{2} + 2\sqrt{2x^2 - x + 3}\right|\right) - \frac{774079}{644972544}\sqrt{2}\ln\left(\left|-2\sqrt{2}x - 11\sqrt{2} + 2\sqrt{2x^2 - x + 3}\right|\right) + \frac{\sqrt{2}\left(44558\sqrt{2}\left(\sqrt{2}x - \sqrt{2x^2 - x + 3}\right)^3 - 10136238\left(\sqrt{2}x - \sqrt{2x^2 - x + 3}\right)^2 + 16812201\sqrt{2}\left(\sqrt{2}x - \sqrt{2x^2 - x + 3}\right) - 10182\right.}{53747712\left(2\left(\sqrt{2}x - \sqrt{2x^2 - x + 3}\right)^2 + 10\sqrt{2}\left(\sqrt{2}x - \sqrt{2x^2 - x + 3}\right) - 11\right)^2} + \frac{((4296526x - 11507857)x + 10720752)x - 11003805}{592344576\,(2x^2 - x + 3)^{\frac{3}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(5/2)*(2*x + 5)^3),x, algo
```

```
[Out] 774079/644972544*sqrt(2)*ln(abs(-2*sqrt(2)*x + sqrt(2) + 2*sqrt(2
*x^2 - x + 3))) - 774079/644972544*sqrt(2)*ln(abs(-2*sqrt(2)*x -
11*sqrt(2) + 2*sqrt(2*x^2 - x + 3))) + 1/53747712*sqrt(2)*(44558*
sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^3 - 10136238*(sqrt(2)*x
```

```
 - sqrt(2*x^2 - x + 3))^2 + 16812201*sqrt(2)*(sqrt(2)*x - sqrt(2*
x^2 - x + 3)) - 10182217)/(2*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^2
+ 10*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3)) - 11)^2 + 1/592344
576*(((4296526*x - 11507857)*x + 10720752)*x - 11003805)/(2*x^2 -
 x + 3)^(3/2)
```

3.364 $\int \frac{2+x+3x^2-x^3+5x^4}{(5+2x)^4(3-x+2x^2)^{5/2}} dx$

Optimal. Leaf size=160

$$-\frac{27754539-31190998x}{31986607104\sqrt{2x^2-x+3}}+\frac{475357\sqrt{2x^2-x+3}}{1934917632(2x+5)}-\frac{89137\sqrt{2x^2-x+3}}{80621568(2x+5)^2}-\frac{3667\sqrt{2x^2-x+3}}{559872(2x+5)^3}+\frac{369609-175877x}{463574016\left(2x^2-x+3\right)^{3/2}}+\frac{4778789\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{7739670528\sqrt{2}}$$

```
[Out] (369609 - 175877*x)/(463574016*(3 - x + 2*x^2)^(3/2)) - (27754539
 - 31190998*x)/(31986607104*Sqrt[3 - x + 2*x^2]) - (3667*Sqrt[3 -
 x + 2*x^2])/(559872*(5 + 2*x)^3) - (89137*Sqrt[3 - x + 2*x^2])/(
80621568*(5 + 2*x)^2) + (475357*Sqrt[3 - x + 2*x^2])/(1934917632*
(5 + 2*x)) + (4778789*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x
+ 2*x^2])])/(7739670528*Sqrt[2])
```

Rubi [A] time = 0.520738, antiderivative size = 160, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.125

$$-\frac{27754539-31190998x}{31986607104\sqrt{2x^2-x+3}}+\frac{475357\sqrt{2x^2-x+3}}{1934917632(2x+5)}-\frac{89137\sqrt{2x^2-x+3}}{80621568(2x+5)^2}-\frac{3667\sqrt{2x^2-x+3}}{559872(2x+5)^3}+\frac{369609-175877x}{463574016\left(2x^2-x+3\right)^{3/2}}+\frac{4778789\tanh^{-1}\left(\frac{17-22x}{12\sqrt{2}\sqrt{2x^2-x+3}}\right)}{7739670528\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Int[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^4*(3 - x + 2*x^2)^(5/2)),x]
```

```
[Out] (369609 - 175877*x)/(463574016*(3 - x + 2*x^2)^(3/2)) - (27754539
 - 31190998*x)/(31986607104*Sqrt[3 - x + 2*x^2]) - (3667*Sqrt[3 -
 x + 2*x^2])/(559872*(5 + 2*x)^3) - (89137*Sqrt[3 - x + 2*x^2])/(
80621568*(5 + 2*x)^2) + (475357*Sqrt[3 - x + 2*x^2])/(1934917632*
(5 + 2*x)) + (4778789*ArcTanh[(17 - 22*x)/(12*Sqrt[2]*Sqrt[3 - x
+ 2*x^2])])/(7739670528*Sqrt[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((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**4/(2*x**2-x+3)**(5/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.208869, size = 102, normalized size = 0.64

$$\frac{4778789\log\left(12\sqrt{4x^2-2x+6}-22x+17\right)+\frac{12\sqrt{2}(6664404208x^6+34872810880x^5+46210466520x^4+27484986184x^3-6702882569x^2+73621973154x-}{529(2x+5)^3(2x^2-x+3)^{3/2}}}{7739670528\sqrt{2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + x + 3*x^2 - x^3 + 5*x^4)/((5 + 2*x)^4*(3 - x + 2*x^2)^(5/2)),x]
```

```
[Out] ((12*Sqrt[2]*(-95241881529 + 73621973154*x - 6702882569*x^2 + 274
84986184*x^3 + 46210466520*x^4 + 34872810880*x^5 + 6664404208*x^6
))/(529*(5 + 2*x)^3*(3 - x + 2*x^2)^(3/2)) - 4778789*Log[5 + 2*x]
 + 4778789*Log[17 - 22*x + 12*Sqrt[6 - 2*x + 4*x^2]])/(7739670528
*Sqrt[2])
```

Maple [A] time = 0.02, size = 207, normalized size = 1.3

$$\frac{20x-5}{552}\left(2x^2-x+3\right)^{-\frac{3}{2}}+\frac{40x-10}{1587}\frac{1}{\sqrt{2x^2-x+3}}$$
$$-\frac{3667}{13824}\left(x+\frac{5}{2}\right)^{-3}\left(2\left(x+5/2\right)^2-11x-\frac{19}{2}\right)^{-\frac{3}{2}}$$
$$+\frac{25951}{110592}\left(x+\frac{5}{2}\right)^{-2}\left(2\left(x+5/2\right)^2-11x-\frac{19}{2}\right)^{-\frac{3}{2}}$$
$$-\frac{34861}{3981312}\left(x+\frac{5}{2}\right)^{-1}\left(2\left(x+5/2\right)^2-11x-\frac{19}{2}\right)^{-\frac{3}{2}}-\frac{4778789}{429981696}\left(2\left(x+5/2\right)^2-11x-\frac{19}{2}\right)^{-\frac{3}{2}}$$
$$-\frac{290586460x-72646615}{9889579008}\left(2\left(x+5/2\right)^2-11x-\frac{19}{2}\right)^{-\frac{3}{2}}$$
$$-\frac{32732434628x-8183108657}{1364761903104}\frac{1}{\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}}$$
$$-\frac{4778789}{2579890176}\frac{1}{\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}}$$
$$+\frac{4778789\sqrt{2}}{15479341056}\mathit{Artanh}\left(\frac{\sqrt{2}}{12}\left(\frac{17}{2}-11x\right)\frac{1}{\sqrt{2\left(x+5/2\right)^2-11x-\frac{19}{2}}}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((5*x^4-x^3+3*x^2+x+2)/(5+2*x)^4/(2*x^2-x+3)^(5/2),x)
```

```
[Out] 5/552*(4*x-1)/(2*x^2-x+3)^(3/2)+10/1587*(4*x-1)/(2*x^2-x+3)^(1/2)
-3667/13824/(x+5/2)^3/(2*(x+5/2)^2-11*x-19/2)^(3/2)+25951/110592/
(x+5/2)^2/(2*(x+5/2)^2-11*x-19/2)^(3/2)-34861/3981312/(x+5/2)/(2*
(x+5/2)^2-11*x-19/2)^(3/2)-4778789/429981696/(2*(x+5/2)^2-11*x-19
/2)^(3/2)-72646615/9889579008*(4*x-1)/(2*(x+5/2)^2-11*x-19/2)^(3/
2)-8183108657/1364761903104*(4*x-1)/(2*(x+5/2)^2-11*x-19/2)^(1/2)
-4778789/2579890176/(2*(x+5/2)^2-11*x-19/2)^(1/2)+4778789/1547934
1056*2^(1/2)*arctanh(1/12*(17/2-11*x)*2^(1/2)/(2*(x+5/2)^2-11*x-1
9/2)^(1/2))
```

Maxima [A] time = 0.803255, size = 332, normalized size = 2.08

$$
\begin{aligned}
&-\frac{4778789}{15479341056}\sqrt{2}\,\operatorname{arsinh}\left(\frac{22\sqrt{23}x}{23\,|2\,x+5|}-\frac{17\sqrt{23}}{23\,|2\,x+5|}\right)+\frac{416525263\,x}{341190475776\sqrt{2\,x^2-x+3}}\\
&-\frac{245375387}{113730158592\sqrt{2\,x^2-x+3}}+\frac{16932905\,x}{2472394752\,(2\,x^2-x+3)^{\frac{3}{2}}}\\
&-\frac{3667}{1728\left(8\,(2\,x^2-x+3)^{\frac{3}{2}}x^3+60\,(2\,x^2-x+3)^{\frac{3}{2}}x^2+150\,(2\,x^2-x+3)^{\frac{3}{2}}x+125\,(2\,x^2-x+3)^{\frac{3}{2}}\right)}\\
&+\frac{25951}{27648\left(4\,(2\,x^2-x+3)^{\frac{3}{2}}x^2+20\,(2\,x^2-x+3)^{\frac{3}{2}}x+25\,(2\,x^2-x+3)^{\frac{3}{2}}\right)}\\
&-\frac{34861}{1990656\left(2\,(2\,x^2-x+3)^{\frac{3}{2}}x+5\,(2\,x^2-x+3)^{\frac{3}{2}}\right)}-\frac{10570421}{824131584\,(2\,x^2-x+3)^{\frac{3}{2}}}
\end{aligned}
$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(5/2)*(2*x + 5)^4),x, algo
```

```
[Out] -4778789/15479341056*sqrt(2)*arcsinh(22/23*sqrt(23)*x/abs(2*x + 5
) - 17/23*sqrt(23)/abs(2*x + 5)) + 416525263/341190475776*x/sqrt(
2*x^2 - x + 3) - 245375387/113730158592/sqrt(2*x^2 - x + 3) + 169
32905/2472394752*x/(2*x^2 - x + 3)^(3/2) - 3667/1728/(8*(2*x^2 -
x + 3)^(3/2)*x^3 + 60*(2*x^2 - x + 3)^(3/2)*x^2 + 150*(2*x^2 - x
+ 3)^(3/2)*x + 125*(2*x^2 - x + 3)^(3/2)) + 25951/27648/(4*(2*x^2
 - x + 3)^(3/2)*x^2 + 20*(2*x^2 - x + 3)^(3/2)*x + 25*(2*x^2 - x
+ 3)^(3/2)) - 34861/1990656/(2*(2*x^2 - x + 3)^(3/2)*x + 5*(2*x^2
 - x + 3)^(3/2)) - 10570421/824131584/(2*x^2 - x + 3)^(3/2)
```

Fricas [A] time = 0.289541, size = 238, normalized size = 1.49

$$\frac{\sqrt{2}\left(24\sqrt{2}\left(6664404208\,x^{6}+34872810880\,x^{5}+46210466520\,x^{4}+27484986184\,x^{3}-6702882569\,x^{2}+73621973154\,x-9524\right.\right.}{16377142837248\,(32\,x^{7}+}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(5/2)*(2*x + 5)^4),x, algo
```

```
[Out] 1/16377142837248*sqrt(2)*(24*sqrt(2)*(6664404208*x^6 + 3487281088
0*x^5 + 46210466520*x^4 + 27484986184*x^3 - 6702882569*x^2 + 7362
1973154*x - 95241881529)*sqrt(2*x^2 - x + 3) + 2527979381*(32*x^7
 + 208*x^6 + 464*x^5 + 632*x^4 + 1162*x^3 + 1265*x^2 + 600*x + 11
25)*log(-(sqrt(2)*(1060*x^2 - 1036*x + 1153) - 48*sqrt(2*x^2 - x
+ 3)*(22*x - 17))/(4*x^2 + 20*x + 25)))/(32*x^7 + 208*x^6 + 464*x
^5 + 632*x^4 + 1162*x^3 + 1265*x^2 + 600*x + 1125)
```

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

$$\int \frac{5x^{4}-x^{3}+3x^{2}+x+2}{(2x+5)^{4}\,(2x^{2}-x+3)^{\frac{5}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x**4-x**3+3*x**2+x+2)/(5+2*x)**4/(2*x**2-x+3)**(5/2),x)
```

```
[Out] Integral((5*x**4 - x**3 + 3*x**2 + x + 2)/((2*x + 5)**4*(2*x**2 -
 x + 3)**(5/2)), x)
```

GIAC/XCAS [A] time = 0.297628, size = 377, normalized size = 2.36

$$\frac{4778789}{15479341056}\,\sqrt{2}\ln\left(\left|-2\sqrt{2}x+\sqrt{2}+2\sqrt{2\,x^{2}-x+3}\right|\right)$$
$$-\frac{4778789}{15479341056}\,\sqrt{2}\ln\left(\left|-2\sqrt{2}x-11\sqrt{2}+2\sqrt{2\,x^{2}-x+3}\right|\right)$$
$$+\frac{((15595499\,x-21675019)x+27298005)x-14440149}{7996651776\,(2\,x^{2}-x+3)^{\frac{3}{2}}}$$
$$+\frac{\sqrt{2}\left(38030012\sqrt{2}\left(\sqrt{2}x-\sqrt{2\,x^{2}-x+3}\right)^{5}+734231900\left(\sqrt{2}x-\sqrt{2\,x^{2}-x+3}\right)^{4}+122834956\sqrt{2}\left(\sqrt{2}x-\sqrt{2\,x^{2}-x+3}\right)^{3}-\right.}{3869835264\left(2\left(\sqrt{2}x-\sqrt{2\,x^{2}-x+3}\right)^{2}+10\sqrt{2}\left(\sqrt{2}x\right.\right.}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^4 - x^3 + 3*x^2 + x + 2)/((2*x^2 - x + 3)^(5/2)*(2*x + 5)^4),x, algo
```

```
[Out] 4778789/15479341056*sqrt(2)*ln(abs(-2*sqrt(2)*x + sqrt(2) + 2*sqr
t(2*x^2 - x + 3))) - 4778789/15479341056*sqrt(2)*ln(abs(-2*sqrt(2
)*x - 11*sqrt(2) + 2*sqrt(2*x^2 - x + 3))) + 1/7996651776*(((1559
5499*x - 21675019)*x + 27298005)*x - 14440149)/(2*x^2 - x + 3)^(3
/2) + 1/3869835264*sqrt(2)*(38030012*sqrt(2)*(sqrt(2)*x - sqrt(2*
x^2 - x + 3))^5 + 734231900*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^4 +
 122834956*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^3 - 21545953
96*(sqrt(2)*x - sqrt(2*x^2 - x + 3))^2 + 1659431083*sqrt(2)*(sqrt
(2)*x - sqrt(2*x^2 - x + 3)) - 760577429)/(2*(sqrt(2)*x - sqrt(2*
x^2 - x + 3))^2 + 10*sqrt(2)*(sqrt(2)*x - sqrt(2*x^2 - x + 3)) -
11)^3
```

3.365 $\int \frac{f+gx+hx^2+ix^3+jx^4}{(a+bx+cx^2)^{5/2}}\,dx$

Optimal. Leaf size=354

$$\frac{2\left(-x\left(c^2\left(2a^2j+3abi+b^2h\right)-b^2c(4aj+bi)-c^3(2ah+bg)+b^4j+2c^4f\right)-bc\left(-3a^2j+ach+c^2f\right)-ab^3j+ab^2ci+2ac^2(\cdots\right.}{3c^3\left(b^2-4ac\right)\left(a+bx+cx^2\right)^{3/2}}$$
$$-\frac{2\left(-cx\left(2c^2\left(-16a^2j-6abi+b^2h\right)+b^2c(28aj+bi)-c^3(8bg-8ah)-4b^4j+16c^4f\right)-4bc^2\left(8a^2j+ach+2c^2f\right)+24a^2c^3\cdots\right.}{3c^3\left(b^2-4ac\right)^2\sqrt{a+bx+cx^2}}$$
$$+\frac{j\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{c^{5/2}}$$

```
[Out] (2*(a*b^2*c*i + 2*a*c^2*(c*g - a*i) - a*b^3*j - b*c*(c^2*f + a*c*
h - 3*a^2*j) - (2*c^4*f - c^3*(b*g + 2*a*h) + b^4*j - b^2*c*(b*i
+ 4*a*j) + c^2*(b^2*h + 3*a*b*i + 2*a^2*j))*x))/(3*c^3*(b^2 - 4*a
*c)*(a + b*x + c*x^2)^(3/2)) - (2*(b^4*c*i + 24*a^2*c^3*i + 2*b^2
*c^2*(2*c*g - 3*a*i) - b^5*j - b^3*c*(c*h - 10*a*j) - 4*b*c^2*(2*
c^2*f + a*c*h + 8*a^2*j) - c*(16*c^4*f - c^3*(8*b*g - 8*a*h) - 4*
b^4*j + b^2*c*(b*i + 28*a*j) + 2*c^2*(b^2*h - 6*a*b*i - 16*a^2*j)
)*x))/(3*c^3*(b^2 - 4*a*c)^2*Sqrt[a + b*x + c*x^2]) + (j*ArcTanh[
(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/c^(5/2)
```

Rubi [A] time = 0.762752, antiderivative size = 354, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.114

$$\frac{2\left(-x\left(c^2\left(2a^2j+3abi+b^2h\right)-b^2c(4aj+bi)-c^3(2ah+bg)+b^4j+2c^4f\right)-bc\left(-3a^2j+ach+c^2f\right)-ab^3j+ab^2ci+2ac^2(\cdots\right.}{3c^3\left(b^2-4ac\right)\left(a+bx+cx^2\right)^{3/2}}$$
$$-\frac{2\left(-cx\left(2c^2\left(-16a^2j-6abi+b^2h\right)+b^2c(28aj+bi)-c^3(8bg-8ah)-4b^4j+16c^4f\right)-4bc^2\left(8a^2j+ach+2c^2f\right)+24a^2c^3\cdots\right.}{3c^3\left(b^2-4ac\right)^2\sqrt{a+bx+cx^2}}$$
$$+\frac{j\tanh^{-1}\left(\frac{b+2cx}{2\sqrt{c}\sqrt{a+bx+cx^2}}\right)}{c^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(f + g*x + h*x^2 + i*x^3 + j*x^4)/(a + b*x + c*x^2)^(5/2),x]
```

```
[Out] (2*(a*b^2*c*i + 2*a*c^2*(c*g - a*i) - a*b^3*j - b*c*(c^2*f + a*c*
h - 3*a^2*j) - (2*c^4*f - c^3*(b*g + 2*a*h) + b^4*j - b^2*c*(b*i
+ 4*a*j) + c^2*(b^2*h + 3*a*b*i + 2*a^2*j))*x))/(3*c^3*(b^2 - 4*a
*c)*(a + b*x + c*x^2)^(3/2)) - (2*(b^4*c*i + 24*a^2*c^3*i + 2*b^2
*c^2*(2*c*g - 3*a*i) - b^5*j - b^3*c*(c*h - 10*a*j) - 4*b*c^2*(2*
c^2*f + a*c*h + 8*a^2*j) - c*(16*c^4*f - c^3*(8*b*g - 8*a*h) - 4*
b^4*j + b^2*c*(b*i + 28*a*j) + 2*c^2*(b^2*h - 6*a*b*i - 16*a^2*j)
```

```
)*x))/(3*c^3*(b^2 - 4*a*c)^2*Sqrt[a + b*x + c*x^2]) + (j*ArcTanh[
(b + 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x + c*x^2])])/c^(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((j*x**4+i*x**3+h*x**2+g*x+f)/(c*x**2+b*x+a)**(5/2),x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.09753, size = 316, normalized size = 0.89

$$\frac{-\frac{2\left(bc\left(-3a^2j+ac(h+3ix)+c^2(f-gx)\right)+2c^2\left(a^2(i+jx)-ac(g+hx)+c^2fx\right)+b^3(aj-cix)+b^2c(chx-a(i+4jx))+b^4jx\right)}{(b^2-4ac)(a+x(b+cx))^{3/2}}+\frac{2\left(4bc^2\left(8a^2j+ac(h-3ix)+2c^2(f-gx)\right)+8c^3 \cdots}{\cdots}}{3c^3 \cdots}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f + g*x + h*x^2 + i*x^3 + j*x^4)/(a + b*x + c*x^2)^(5/2),x]
```

```
[Out] ((-2*(b^4*j*x + b^3*(a*j - c*i*x) + b*c*(-3*a^2*j + c^2*(f - g*x)
 + a*c*(h + 3*i*x)) + 2*c^2*(c^2*f*x - a*c*(g + h*x) + a^2*(i + j
*x)) + b^2*c*(c*h*x - a*(i + 4*j*x))))/((b^2 - 4*a*c)*(a + x*(b +
 c*x))^(3/2)) + (2*(b^5*j - b^4*c*(i + 4*j*x) + 2*b^2*c^2*(-2*c*g
 + 3*a*i + c*h*x + 14*a*j*x) + 4*b*c^2*(8*a^2*j + 2*c^2*(f - g*x)
 + a*c*(h - 3*i*x)) + b^3*c*(-10*a*j + c*(h + i*x)) + 8*c^3*(2*c^
2*f*x + a*c*h*x - a^2*(3*i + 4*j*x))))/((b^2 - 4*a*c)^2*Sqrt[a +
x*(b + c*x)]) + 3*Sqrt[c]*j*Log[b + 2*c*x + 2*Sqrt[c]*Sqrt[a + x*
(b + c*x)]])/(3*c^3)
```

Maple [B] time = 0.014, size = 1406, normalized size = 4.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((j*x^4+i*x^3+h*x^2+g*x+f)/(c*x^2+b*x+a)^(5/2),x)
```

```
[Out] 1/12*h*b^3/c^2/(4*a*c-b^2)/(c*x^2+b*x+a)^(3/2)+1/12*h*b/c^2/(c*x^
2+b*x+a)^(3/2)-8/3*g*b^2/(4*a*c-b^2)^2/(c*x^2+b*x+a)^(1/2)+1/24*i
*b^2/c^3/(c*x^2+b*x+a)^(3/2)-2/3*i/c^2*a/(c*x^2+b*x+a)^(3/2)-i*x^
2/c/(c*x^2+b*x+a)^(3/2)-1/2*h*x/c/(c*x^2+b*x+a)^(3/2)-1/48*j*b^3/
c^4/(c*x^2+b*x+a)^(3/2)+2/3*f/(4*a*c-b^2)/(c*x^2+b*x+a)^(3/2)*b-j
/c^2*x/(c*x^2+b*x+a)^(1/2)+1/2*j/c^3*b/(c*x^2+b*x+a)^(1/2)-1/3*j*
x^3/c/(c*x^2+b*x+a)^(3/2)+1/12*i*b^3/c^2/(4*a*c-b^2)/(c*x^2+b*x+a
)^(3/2)*x+2/3*i*b^3/c/(4*a*c-b^2)^2/(c*x^2+b*x+a)^(1/2)*x+1/6*h*b
^2/c/(4*a*c-b^2)/(c*x^2+b*x+a)^(3/2)*x+1/3*h/c*a/(4*a*c-b^2)/(c*x
^2+b*x+a)^(3/2)*b+16/3*h*c*a/(4*a*c-b^2)^2/(c*x^2+b*x+a)^(1/2)*x-
16/3*g*b*c/(4*a*c-b^2)^2/(c*x^2+b*x+a)^(1/2)*x-i*b/c*a/(4*a*c-b^2
)/(c*x^2+b*x+a)^(3/2)*x+1/2*j*b^2/c^2*a/(4*a*c-b^2)/(c*x^2+b*x+a)
^(3/2)*x+4*j*b^2/c*a/(4*a*c-b^2)^2/(c*x^2+b*x+a)^(1/2)*x-1/3*g/c/
(c*x^2+b*x+a)^(3/2)+j/c^(5/2)*ln((1/2*b+c*x)/c^(1/2)+(c*x^2+b*x+a
)^(1/2))+4/3*h*b^2/(4*a*c-b^2)^2/(c*x^2+b*x+a)^(1/2)*x+2/3*h*b^3/
c/(4*a*c-b^2)^2/(c*x^2+b*x+a)^(1/2)+1/3*i*b^4/c^2/(4*a*c-b^2)^2/(
c*x^2+b*x+a)^(1/2)-1/4*i*b/c^2*x/(c*x^2+b*x+a)^(3/2)-1/2*i*b^2/c^
2*a/(4*a*c-b^2)/(c*x^2+b*x+a)^(3/2)-8*i*b*a/(4*a*c-b^2)^2/(c*x^2+
b*x+a)^(1/2)*x-4*i*b^2/c*a/(4*a*c-b^2)^2/(c*x^2+b*x+a)^(1/2)-1/24
*j*b^4/c^3/(4*a*c-b^2)/(c*x^2+b*x+a)^(3/2)*x-1/3*j*b^4/c^2/(4*a*c
-b^2)^2/(c*x^2+b*x+a)^(1/2)*x+1/4*j*b^3/c^3*a/(4*a*c-b^2)/(c*x^2+
b*x+a)^(3/2)+2/3*h*a/(4*a*c-b^2)/(c*x^2+b*x+a)^(3/2)*x+8/3*h*a/(4
*a*c-b^2)^2/(c*x^2+b*x+a)^(1/2)*b+4/3*f/(4*a*c-b^2)/(c*x^2+b*x+a)
^(3/2)*c*x+32/3*f*c^2/(4*a*c-b^2)^2/(c*x^2+b*x+a)^(1/2)*x+16/3*f*
c/(4*a*c-b^2)^2/(c*x^2+b*x+a)^(1/2)*b+1/3*j*b/c^3*a/(c*x^2+b*x+a)
^(3/2)+1/24*i*b^4/c^3/(4*a*c-b^2)/(c*x^2+b*x+a)^(3/2)-2/3*g*b/(4*
a*c-b^2)/(c*x^2+b*x+a)^(3/2)*x-1/3*g*b^2/c/(4*a*c-b^2)/(c*x^2+b*x
+a)^(3/2)+1/2*j*b/c^2*x^2/(c*x^2+b*x+a)^(3/2)-1/6*j*b^5/c^3/(4*a*
c-b^2)^2/(c*x^2+b*x+a)^(1/2)+1/8*j*b^2/c^3*x/(c*x^2+b*x+a)^(3/2)-
1/48*j*b^5/c^4/(4*a*c-b^2)/(c*x^2+b*x+a)^(3/2)+1/2*j/c^3*b^3/(4*a
*c-b^2)/(c*x^2+b*x+a)^(1/2)+2*j*b^3/c^2*a/(4*a*c-b^2)^2/(c*x^2+b*
x+a)^(1/2)+j/c^2*b^2/(4*a*c-b^2)/(c*x^2+b*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((j*x^4 + i*x^3 + h*x^2 + g*x + f)/(c*x^2 + b*x + a)^(5/2),x, algorithm="m
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 6.75236, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((j*x^4 + i*x^3 + h*x^2 + g*x + f)/(c*x^2 + b*x + a)^(5/2),x, algorithm="
```

```
[Out] [1/6*(4*(8*a^2*b*c^2*h - 16*a^3*c^2*i + (16*c^5*f - 8*b*c^4*g + 2
*(b^2*c^3 + 4*a*c^4)*h + (b^3*c^2 - 12*a*b*c^3)*i - 4*(b^4*c - 7*
a*b^2*c^2 + 8*a^2*c^3)*j)*x^3 + 3*(8*b*c^4*f - 4*b^2*c^3*g + (b^3
*c^2 + 4*a*b*c^3)*h - 2*(a*b^2*c^2 + 4*a^2*c^3)*i - (b^5 - 6*a*b^
3*c)*j)*x^2 - (b^3*c^2 - 12*a*b*c^3)*f - 2*(a*b^2*c^2 + 4*a^2*c^3
)*g - (3*a^2*b^3 - 20*a^3*b*c)*j + 3*(4*a*b^2*c^2*h - 8*a^2*b*c^2
*i + 2*(b^2*c^3 + 4*a*c^4)*f - (b^3*c^2 + 4*a*b*c^3)*g - 2*(a*b^4
 - 7*a^2*b^2*c + 4*a^3*c^2)*j)*x)*sqrt(c*x^2 + b*x + a)*sqrt(c) +
 3*((b^4*c^2 - 8*a*b^2*c^3 + 16*a^2*c^4)*j*x^4 + 2*(b^5*c - 8*a*b
^3*c^2 + 16*a^2*b*c^3)*j*x^3 + (b^6 - 6*a*b^4*c + 32*a^3*c^3)*j*x
^2 + 2*(a*b^5 - 8*a^2*b^3*c + 16*a^3*b*c^2)*j*x + (a^2*b^4 - 8*a^
3*b^2*c + 16*a^4*c^2)*j)*log(-4*(2*c^2*x + b*c)*sqrt(c*x^2 + b*x
+ a) - (8*c^2*x^2 + 8*b*c*x + b^2 + 4*a*c)*sqrt(c)))/((a^2*b^4*c^
2 - 8*a^3*b^2*c^3 + 16*a^4*c^4 + (b^4*c^4 - 8*a*b^2*c^5 + 16*a^2*
c^6)*x^4 + 2*(b^5*c^3 - 8*a*b^3*c^4 + 16*a^2*b*c^5)*x^3 + (b^6*c^
2 - 6*a*b^4*c^3 + 32*a^3*c^5)*x^2 + 2*(a*b^5*c^2 - 8*a^2*b^3*c^3
+ 16*a^3*b*c^4)*x)*sqrt(c)), 1/3*(2*(8*a^2*b*c^2*h - 16*a^3*c^2*i
 + (16*c^5*f - 8*b*c^4*g + 2*(b^2*c^3 + 4*a*c^4)*h + (b^3*c^2 - 1
2*a*b*c^3)*i - 4*(b^4*c - 7*a*b^2*c^2 + 8*a^2*c^3)*j)*x^3 + 3*(8*
b*c^4*f - 4*b^2*c^3*g + (b^3*c^2 + 4*a*b*c^3)*h - 2*(a*b^2*c^2 +
4*a^2*c^3)*i - (b^5 - 6*a*b^3*c)*j)*x^2 - (b^3*c^2 - 12*a*b*c^3)*
f - 2*(a*b^2*c^2 + 4*a^2*c^3)*g - (3*a^2*b^3 - 20*a^3*b*c)*j + 3*
(4*a*b^2*c^2*h - 8*a^2*b*c^2*i + 2*(b^2*c^3 + 4*a*c^4)*f - (b^3*c
^2 + 4*a*b*c^3)*g - 2*(a*b^4 - 7*a^2*b^2*c + 4*a^3*c^2)*j)*x)*sqr
t(c*x^2 + b*x + a)*sqrt(-c) + 3*((b^4*c^2 - 8*a*b^2*c^3 + 16*a^2*
c^4)*j*x^4 + 2*(b^5*c - 8*a*b^3*c^2 + 16*a^2*b*c^3)*j*x^3 + (b^6
- 6*a*b^4*c + 32*a^3*c^3)*j*x^2 + 2*(a*b^5 - 8*a^2*b^3*c + 16*a^3
*b*c^2)*j*x + (a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2)*j)*arctan(1/2*
(2*c*x + b)*sqrt(-c)/(sqrt(c*x^2 + b*x + a)*c)))/((a^2*b^4*c^2 -
8*a^3*b^2*c^3 + 16*a^4*c^4 + (b^4*c^4 - 8*a*b^2*c^5 + 16*a^2*c^6)
*x^4 + 2*(b^5*c^3 - 8*a*b^3*c^4 + 16*a^2*b*c^5)*x^3 + (b^6*c^2 -
6*a*b^4*c^3 + 32*a^3*c^5)*x^2 + 2*(a*b^5*c^2 - 8*a^2*b^3*c^3 + 16
*a^3*b*c^4)*x)*sqrt(-c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((j*x**4+i*x**3+h*x**2+g*x+f)/(c*x**2+b*x+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.294794, size = 628, normalized size = 1.77

$$\frac{2\left(\left(\left(\frac{\left(16\,c^5f-8\,bc^4g+2\,b^2c^3h+8\,ac^4h+b^3c^2i-12\,abc^3i-4\,b^4cj+28\,ab^2c^2j-32\,a^2c^3j\right)x}{b^4c^2-8\,ab^2c^3+16\,a^2c^4}+\frac{3\left(8\,bc^4f-4\,b^2c^3g+b^3c^2h+4\,abc^3h-2\,ab^2c^2i-8\,a^2c^3i-b^5j+6\,ab^3cj\right.}{b^4c^2-8\,ab^2c^3+16\,a^2c^4}\right.\right.\right.}{3}$$

$$-\frac{j\ln\left(\left|-2\left(\sqrt{c}x-\sqrt{cx^2+bx+a}\right)\sqrt{c}-b\right|\right)}{c^{\frac{5}{2}}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((j*x^4 + i*x^3 + h*x^2 + g*x + f)/(c*x^2 + b*x + a)^(5/2),x, algorithm="
```

```
[Out] 2/3*((((16*c^5*f - 8*b*c^4*g + 2*b^2*c^3*h + 8*a*c^4*h + b^3*c^2*
i - 12*a*b*c^3*i - 4*b^4*c*j + 28*a*b^2*c^2*j - 32*a^2*c^3*j)*x/(
b^4*c^2 - 8*a*b^2*c^3 + 16*a^2*c^4) + 3*(8*b*c^4*f - 4*b^2*c^3*g
+ b^3*c^2*h + 4*a*b*c^3*h - 2*a*b^2*c^2*i - 8*a^2*c^3*i - b^5*j +
 6*a*b^3*c*j)/(b^4*c^2 - 8*a*b^2*c^3 + 16*a^2*c^4))*x + 3*(2*b^2*
c^3*f + 8*a*c^4*f - b^3*c^2*g - 4*a*b*c^3*g + 4*a*b^2*c^2*h - 8*a
^2*b*c^2*i - 2*a*b^4*j + 14*a^2*b^2*c*j - 8*a^3*c^2*j)/(b^4*c^2 -
 8*a*b^2*c^3 + 16*a^2*c^4))*x - (b^3*c^2*f - 12*a*b*c^3*f + 2*a*b
^2*c^2*g + 8*a^2*c^3*g - 8*a^2*b*c^2*h + 16*a^3*c^2*i + 3*a^2*b^3
*j - 20*a^3*b*c*j)/(b^4*c^2 - 8*a*b^2*c^3 + 16*a^2*c^4))/(c*x^2 +
 b*x + a)^(3/2) - j*ln(abs(-2*(sqrt(c)*x - sqrt(c*x^2 + b*x + a))
*sqrt(c) - b))/c^(5/2)
```

3.366 $\int \frac{f+gx+hx^2+ix^3+jx^4}{(a+bx-cx^2)^{5/2}}\,dx$

Optimal. Leaf size=353

$$\frac{2\left(x\left(c^2\left(2a^2j+3abi+b^2h\right)+b^2c(4aj+bi)+c^3(2ah+bg)+b^4j+2c^4f\right)-bc\left(-3a^2j-ach+c^2f\right)+ab^3j+ab^2ci+2ac^2(ai\right.}{3c^3\left(4ac+b^2\right)\left(a+bx-cx^2\right)^{3/2}}$$
$$-\frac{2\left(-cx\left(2c^2\left(-16a^2j-6abi+b^2h\right)-b^2c(28aj+bi)+8c^3(bg-ah)-4b^4j+16c^4f\right)+4bc^2\left(8a^2j-ach+2c^2f\right)+24a^2c^3i\right.}{3c^3\left(4ac+b^2\right)^2\sqrt{a+bx-cx^2}}$$
$$-\frac{j\tan^{-1}\left(\frac{b-2cx}{2\sqrt{c}\sqrt{a+bx-cx^2}}\right)}{c^{5/2}}$$

```
[Out] (2*(a*b^2*c*i + 2*a*c^2*(c*g + a*i) + a*b^3*j - b*c*(c^2*f - a*c*
h - 3*a^2*j) + (2*c^4*f + c^3*(b*g + 2*a*h) + b^4*j + b^2*c*(b*i
+ 4*a*j) + c^2*(b^2*h + 3*a*b*i + 2*a^2*j))*x))/(3*c^3*(b^2 + 4*a
*c)*(a + b*x - c*x^2)^(3/2)) - (2*(b^4*c*i + 24*a^2*c^3*i + 2*b^2
*c^2*(2*c*g + 3*a*i) + b^5*j + b^3*c*(c*h + 10*a*j) + 4*b*c^2*(2*
c^2*f - a*c*h + 8*a^2*j) - c*(16*c^4*f + 8*c^3*(b*g - a*h) - 4*b^
4*j - b^2*c*(b*i + 28*a*j) + 2*c^2*(b^2*h - 6*a*b*i - 16*a^2*j))*
x))/(3*c^3*(b^2 + 4*a*c)^2*Sqrt[a + b*x - c*x^2]) - (j*ArcTan[(b
- 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x - c*x^2])])/c^(5/2)
```

Rubi [A] time = 0.747583, antiderivative size = 353, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 4, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$

$$\frac{2\left(x\left(c^2\left(2a^2j+3abi+b^2h\right)+b^2c(4aj+bi)+c^3(2ah+bg)+b^4j+2c^4f\right)-bc\left(-3a^2j-ach+c^2f\right)+ab^3j+ab^2ci+2ac^2(ai\right.}{3c^3\left(4ac+b^2\right)\left(a+bx-cx^2\right)^{3/2}}$$
$$-\frac{2\left(-cx\left(2c^2\left(-16a^2j-6abi+b^2h\right)-b^2c(28aj+bi)+8c^3(bg-ah)-4b^4j+16c^4f\right)+4bc^2\left(8a^2j-ach+2c^2f\right)+24a^2c^3i\right.}{3c^3\left(4ac+b^2\right)^2\sqrt{a+bx-cx^2}}$$
$$-\frac{j\tan^{-1}\left(\frac{b-2cx}{2\sqrt{c}\sqrt{a+bx-cx^2}}\right)}{c^{5/2}}$$

Antiderivative was successfully verified.

```
[In]  Int[(f + g*x + h*x^2 + i*x^3 + j*x^4)/(a + b*x - c*x^2)^(5/2),x]
```

```
[Out] (2*(a*b^2*c*i + 2*a*c^2*(c*g + a*i) + a*b^3*j - b*c*(c^2*f - a*c*
h - 3*a^2*j) + (2*c^4*f + c^3*(b*g + 2*a*h) + b^4*j + b^2*c*(b*i
+ 4*a*j) + c^2*(b^2*h + 3*a*b*i + 2*a^2*j))*x))/(3*c^3*(b^2 + 4*a
*c)*(a + b*x - c*x^2)^(3/2)) - (2*(b^4*c*i + 24*a^2*c^3*i + 2*b^2
*c^2*(2*c*g + 3*a*i) + b^5*j + b^3*c*(c*h + 10*a*j) + 4*b*c^2*(2*
c^2*f - a*c*h + 8*a^2*j) - c*(16*c^4*f + 8*c^3*(b*g - a*h) - 4*b^
4*j - b^2*c*(b*i + 28*a*j) + 2*c^2*(b^2*h - 6*a*b*i - 16*a^2*j))*
```

```
x))/(3*c^3*(b^2 + 4*a*c)^2*Sqrt[a + b*x - c*x^2]) - (j*ArcTan[(b
- 2*c*x)/(2*Sqrt[c]*Sqrt[a + b*x - c*x^2])])/c^(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((j*x**4+i*x**3+h*x**2+g*x+f)/(-c*x**2+b*x+a)**(5/2),x)
```

```
[Out] Timed out
```

Mathematica [C] time = 1.53427, size = 319, normalized size = 0.9

$$-\frac{2\left(b^3\left(3a^2j+18acjx^2+c^2\left(f+3gx+x^2(-(3h+ix))\right)\right)+2b^2c\left(21a^2jx+ac\left(g+x\left(-6h+3ix-14jx^2\right)\right)+c^2x(3f+x(hx-\right.\right.}{}$$

$$+\frac{ij\log\left(2\sqrt{a+x(b-cx)}+\frac{i(b-2cx)}{\sqrt{c}}\right)}{c^{5/2}}$$

Antiderivative was successfully verified.

```
[In] Integrate[(f + g*x + h*x^2 + i*x^3 + j*x^4)/(a + b*x - c*x^2)^(5/2),x]
```

```
[Out] (-2*(3*b^5*j*x^2 + b^4*(6*a*j*x - 4*c*j*x^3) + b^3*(3*a^2*j + 18*
a*c*j*x^2 + c^2*(f + 3*g*x - x^2*(3*h + i*x))) + 8*c^2*(2*c^3*f*x
^3 + a^3*(2*i + 3*j*x) - a*c^2*x*(3*f + h*x^2) - a^2*c*(g + x^2*(
3*i + 4*j*x))) + 4*b*c*(5*a^3*j + 2*c^3*x^2*(-3*f + g*x) - 2*a^2*
c*(h - 3*i*x) + 3*a*c^2*(f - x*(g - h*x + i*x^2))) + 2*b^2*c*(21*
a^2*j*x + c^2*x*(3*f + x*(-6*g + h*x)) + a*c*(g + x*(-6*h + 3*i*x
 - 14*j*x^2)))))/(3*c^2*(b^2 + 4*a*c)^2*(a + x*(b - c*x))^(3/2))
+ (I*j*Log[(I*(b - 2*c*x))/Sqrt[c] + 2*Sqrt[a + x*(b - c*x)]])/c^
(5/2)
```

Maple [B] time = 0.025, size = 1453, normalized size = 4.1

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((j*x^4+i*x^3+h*x^2+g*x+f)/(-c*x^2+b*x+a)^(5/2),x)
```

```
[Out] -2/3*i/c^2*a/(-c*x^2+b*x+a)^(3/2)+1/2*h*x/c/(-c*x^2+b*x+a)^(3/2)+
1/12*h*b/c^2/(-c*x^2+b*x+a)^(3/2)-8/3*g*b^2/(-4*a*c-b^2)^2/(-c*x^
2+b*x+a)^(1/2)+1/3*j*x^3/c/(-c*x^2+b*x+a)^(3/2)-1/48*j*b^3/c^4/(-
c*x^2+b*x+a)^(3/2)-j/c^2*x/(-c*x^2+b*x+a)^(1/2)-1/2*j/c^3*b/(-c*x
^2+b*x+a)^(1/2)+2/3*f/(-4*a*c-b^2)/(-c*x^2+b*x+a)^(3/2)*b+i*x^2/c
/(-c*x^2+b*x+a)^(3/2)-1/24*i*b^2/c^3/(-c*x^2+b*x+a)^(3/2)-1/3*h/c
*a/(-4*a*c-b^2)/(-c*x^2+b*x+a)^(3/2)*b-2/3*i*b^3/c/(-4*a*c-b^2)^2
/(-c*x^2+b*x+a)^(1/2)*x-1/2*i*b^2/c^2*a/(-4*a*c-b^2)/(-c*x^2+b*x+
a)^(3/2)+i*b/c*a/(-4*a*c-b^2)/(-c*x^2+b*x+a)^(3/2)*x-4*j*b^2/c*a/
(-4*a*c-b^2)^2/(-c*x^2+b*x+a)^(1/2)*x+1/2*j*b^2/c^2*a/(-4*a*c-b^2
)/(-c*x^2+b*x+a)^(3/2)*x+j/c^(5/2)*arctan(c^(1/2)*(x-1/2*b/c)/(-c
*x^2+b*x+a)^(1/2))+1/3*g/c/(-c*x^2+b*x+a)^(3/2)+4/3*h*b^2/(-4*a*c
-b^2)^2/(-c*x^2+b*x+a)^(1/2)*x-16/3*h*c*a/(-4*a*c-b^2)^2/(-c*x^2+
b*x+a)^(1/2)*x-8*i*b*a/(-4*a*c-b^2)^2/(-c*x^2+b*x+a)^(1/2)*x+1/12
*i*b^3/c^2/(-4*a*c-b^2)/(-c*x^2+b*x+a)^(3/2)*x-1/6*h*b^2/c/(-4*a*
c-b^2)/(-c*x^2+b*x+a)^(3/2)*x+1/12*h*b^3/c^2/(-4*a*c-b^2)/(-c*x^2
+b*x+a)^(3/2)+32/3*f*c^2/(-4*a*c-b^2)^2/(-c*x^2+b*x+a)^(1/2)*x-16
/3*f*c/(-4*a*c-b^2)^2/(-c*x^2+b*x+a)^(1/2)*b-1/3*j*b/c^3*a/(-c*x^
2+b*x+a)^(3/2)-1/2*j/c^3*b^3/(-4*a*c-b^2)/(-c*x^2+b*x+a)^(1/2)+1/
2*j*b/c^2*x^2/(-c*x^2+b*x+a)^(3/2)-1/8*j*b^2/c^3*x/(-c*x^2+b*x+a)
^(3/2)-1/48*j*b^5/c^4/(-4*a*c-b^2)/(-c*x^2+b*x+a)^(3/2)+1/6*j*b^5
/c^3/(-4*a*c-b^2)^2/(-c*x^2+b*x+a)^(1/2)-2/3*g*b/(-4*a*c-b^2)/(-c
*x^2+b*x+a)^(3/2)*x+1/3*g*b^2/c/(-4*a*c-b^2)/(-c*x^2+b*x+a)^(3/2)
-1/4*i*b/c^2*x/(-c*x^2+b*x+a)^(3/2)-1/24*i*b^4/c^3/(-4*a*c-b^2)/(
-c*x^2+b*x+a)^(3/2)+1/3*i*b^4/c^2/(-4*a*c-b^2)^2/(-c*x^2+b*x+a)^(
1/2)+1/24*j*b^4/c^3/(-4*a*c-b^2)/(-c*x^2+b*x+a)^(3/2)*x-1/3*j*b^4
/c^2/(-4*a*c-b^2)^2/(-c*x^2+b*x+a)^(1/2)*x-1/4*j*b^3/c^3*a/(-4*a*
c-b^2)/(-c*x^2+b*x+a)^(3/2)+2*j*b^3/c^2*a/(-4*a*c-b^2)^2/(-c*x^2+
b*x+a)^(1/2)+j/c^2*b^2/(-4*a*c-b^2)/(-c*x^2+b*x+a)^(1/2)*x+16/3*g
*b*c/(-4*a*c-b^2)^2/(-c*x^2+b*x+a)^(1/2)*x-2/3*h*b^3/c/(-4*a*c-b^
2)^2/(-c*x^2+b*x+a)^(1/2)+2/3*h*a/(-4*a*c-b^2)/(-c*x^2+b*x+a)^(3/
2)*x+8/3*h*a/(-4*a*c-b^2)^2/(-c*x^2+b*x+a)^(1/2)*b-4/3*f/(-4*a*c-
b^2)/(-c*x^2+b*x+a)^(3/2)*c*x+4*i*b^2/c*a/(-4*a*c-b^2)^2/(-c*x^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((j*x^4 + i*x^3 + h*x^2 + g*x + f)/(-c*x^2 + b*x + a)^(5/2),x, algorithm=
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 6.73871, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((j*x^4 + i*x^3 + h*x^2 + g*x + f)/(-c*x^2 + b*x + a)^(5/2),x, algorithm=
```

```
[Out] [1/6*(4*(8*a^2*b*c^2*h - 16*a^3*c^2*i - (16*c^5*f + 8*b*c^4*g + 2
*(b^2*c^3 - 4*a*c^4)*h - (b^3*c^2 + 12*a*b*c^3)*i - 4*(b^4*c + 7*
a*b^2*c^2 + 8*a^2*c^3)*j)*x^3 + 3*(8*b*c^4*f + 4*b^2*c^3*g + (b^3
*c^2 - 4*a*b*c^3)*h - 2*(a*b^2*c^2 - 4*a^2*c^3)*i - (b^5 + 6*a*b^
3*c)*j)*x^2 - (b^3*c^2 + 12*a*b*c^3)*f - 2*(a*b^2*c^2 - 4*a^2*c^3
)*g - (3*a^2*b^3 + 20*a^3*b*c)*j + 3*(4*a*b^2*c^2*h - 8*a^2*b*c^2
*i - 2*(b^2*c^3 - 4*a*c^4)*f - (b^3*c^2 - 4*a*b*c^3)*g - 2*(a*b^4
 + 7*a^2*b^2*c + 4*a^3*c^2)*j)*x)*sqrt(-c*x^2 + b*x + a)*sqrt(-c)
 + 3*((b^4*c^2 + 8*a*b^2*c^3 + 16*a^2*c^4)*j*x^4 - 2*(b^5*c + 8*a
*b^3*c^2 + 16*a^2*b*c^3)*j*x^3 + (b^6 + 6*a*b^4*c - 32*a^3*c^3)*j
*x^2 + 2*(a*b^5 + 8*a^2*b^3*c + 16*a^3*b*c^2)*j*x + (a^2*b^4 + 8*
a^3*b^2*c + 16*a^4*c^2)*j)*log(4*(2*c^2*x - b*c)*sqrt(-c*x^2 + b*
x + a) + (8*c^2*x^2 - 8*b*c*x + b^2 - 4*a*c)*sqrt(-c)))/((a^2*b^4
*c^2 + 8*a^3*b^2*c^3 + 16*a^4*c^4 + (b^4*c^4 + 8*a*b^2*c^5 + 16*a
^2*c^6)*x^4 - 2*(b^5*c^3 + 8*a*b^3*c^4 + 16*a^2*b*c^5)*x^3 + (b^6
*c^2 + 6*a*b^4*c^3 - 32*a^3*c^5)*x^2 + 2*(a*b^5*c^2 + 8*a^2*b^3*c
^3 + 16*a^3*b*c^4)*x)*sqrt(-c)), 1/3*(2*(8*a^2*b*c^2*h - 16*a^3*c
^2*i - (16*c^5*f + 8*b*c^4*g + 2*(b^2*c^3 - 4*a*c^4)*h - (b^3*c^2
 + 12*a*b*c^3)*i - 4*(b^4*c + 7*a*b^2*c^2 + 8*a^2*c^3)*j)*x^3 + 3
*(8*b*c^4*f + 4*b^2*c^3*g + (b^3*c^2 - 4*a*b*c^3)*h - 2*(a*b^2*c^
2 - 4*a^2*c^3)*i - (b^5 + 6*a*b^3*c)*j)*x^2 - (b^3*c^2 + 12*a*b*c
^3)*f - 2*(a*b^2*c^2 - 4*a^2*c^3)*g - (3*a^2*b^3 + 20*a^3*b*c)*j
+ 3*(4*a*b^2*c^2*h - 8*a^2*b*c^2*i - 2*(b^2*c^3 - 4*a*c^4)*f - (b
^3*c^2 - 4*a*b*c^3)*g - 2*(a*b^4 + 7*a^2*b^2*c + 4*a^3*c^2)*j)*x)
*sqrt(-c*x^2 + b*x + a)*sqrt(c) + 3*((b^4*c^2 + 8*a*b^2*c^3 + 16*
a^2*c^4)*j*x^4 - 2*(b^5*c + 8*a*b^3*c^2 + 16*a^2*b*c^3)*j*x^3 + (
b^6 + 6*a*b^4*c - 32*a^3*c^3)*j*x^2 + 2*(a*b^5 + 8*a^2*b^3*c + 16
*a^3*b*c^2)*j*x + (a^2*b^4 + 8*a^3*b^2*c + 16*a^4*c^2)*j)*arctan(
1/2*(2*c*x - b)/(sqrt(-c*x^2 + b*x + a)*sqrt(c))))/((a^2*b^4*c^2
+ 8*a^3*b^2*c^3 + 16*a^4*c^4 + (b^4*c^4 + 8*a*b^2*c^5 + 16*a^2*c^
6)*x^4 - 2*(b^5*c^3 + 8*a*b^3*c^4 + 16*a^2*b*c^5)*x^3 + (b^6*c^2
+ 6*a*b^4*c^3 - 32*a^3*c^5)*x^2 + 2*(a*b^5*c^2 + 8*a^2*b^3*c^3 +
16*a^3*b*c^4)*x)*sqrt(c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((j*x**4+i*x**3+h*x**2+g*x+f)/(-c*x**2+b*x+a)**(5/2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.292573, size = 659, normalized size = 1.87

$$-\frac{2\sqrt{-cx^2+bx+a}\left(\left(\left(\frac{(16\,c^5f+8\,bc^4g+2\,b^2c^3h-8\,ac^4h-b^3c^2i-12\,abc^3i-4\,b^4cj-28\,ab^2c^2j-32\,a^2c^3j)\,x}{b^4c^2+8\,ab^2c^3+16\,a^2c^4}-\frac{3\,(8\,bc^4f+4\,b^2c^3g+b^3c^2h-4\,abc^3h-2\,ab^2c^2}{b^4c^2+8\,ab^2c^3+16\,a^2c}\right.\right.\right.}{}$$

$$-\frac{j\ln\left(\left|2\left(\sqrt{-c}x-\sqrt{-cx^2+bx+a}\right)\sqrt{-c}+b\right|\right)}{\sqrt{-c}c^2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((j*x^4 + i*x^3 + h*x^2 + g*x + f)/(-c*x^2 + b*x + a)^(5/2),x, algorithm=
```

```
[Out] -2/3*sqrt(-c*x^2 + b*x + a)*((((16*c^5*f + 8*b*c^4*g + 2*b^2*c^3*
h - 8*a*c^4*h - b^3*c^2*i - 12*a*b*c^3*i - 4*b^4*c*j - 28*a*b^2*c
^2*j - 32*a^2*c^3*j)*x/(b^4*c^2 + 8*a*b^2*c^3 + 16*a^2*c^4) - 3*(
8*b*c^4*f + 4*b^2*c^3*g + b^3*c^2*h - 4*a*b*c^3*h - 2*a*b^2*c^2*i
 + 8*a^2*c^3*i - b^5*j - 6*a*b^3*c*j)/(b^4*c^2 + 8*a*b^2*c^3 + 16
*a^2*c^4))*x + 3*(2*b^2*c^3*f - 8*a*c^4*f + b^3*c^2*g - 4*a*b*c^3
*g - 4*a*b^2*c^2*h + 8*a^2*b*c^2*i + 2*a*b^4*j + 14*a^2*b^2*c*j +
 8*a^3*c^2*j)/(b^4*c^2 + 8*a*b^2*c^3 + 16*a^2*c^4))*x + (b^3*c^2*
f + 12*a*b*c^3*f + 2*a*b^2*c^2*g - 8*a^2*c^3*g - 8*a^2*b*c^2*h +
16*a^3*c^2*i + 3*a^2*b^3*j + 20*a^3*b*c*j)/(b^4*c^2 + 8*a*b^2*c^3
 + 16*a^2*c^4))/(c*x^2 - b*x - a)^2 - j*ln(abs(2*(sqrt(-c)*x - sq
rt(-c*x^2 + b*x + a))*sqrt(-c) + b))/(sqrt(-c)*c^2)
```

3.367 $\int (d+ex)^m \left(3+2x+5x^2\right)^3 \left(2+x+3x^2-5x^3+4x^4\right) \, dx$

Optimal. Leaf size=588

$$\frac{45\left(500d^2+5de+17e^2\right)(d+ex)^{m+9}}{e^{11}(m+9)}-\frac{2\left(30000d^3+450d^2e+3060de^2+49e^3\right)(d+ex)^{m+8}}{e^{11}(m+8)}+\frac{\left(5d^2-2de+3e^2\right)^3\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)(d+ex)^{m+1}}{e^{11}(m+1)}+\frac{\left(105000d^4+2100d^3e+21420d^2e^2+686de^3+999e^4\right)(d+ex)^{m+7}}{e^{11}(m+7)}-\frac{\left(5d^2-2de+3e^2\right)^2\left(200d^5+169d^4e+108d^3e^2-20d^2e^3+86de^4-15e^5\right)(d+ex)^{m+2}}{e^{11}(m+2)}-\frac{6\left(21000d^5+525d^4e+7140d^3e^2+343d^2e^3+999de^4-85e^5\right)(d+ex)^{m+6}}{e^{11}(m+6)}+\frac{3\left(5d^2-2de+3e^2\right)\left(1500d^6+660d^5e+792d^4e^2+58d^3e^3+547d^2e^4-156de^5+53e^6\right)(d+ex)^{m+3}}{e^{11}(m+3)}+\frac{\left(105000d^6+3150d^5e+53550d^4e^2+3430d^3e^3+14985d^2e^4-2550de^5+1109e^6\right)(d+ex)^{m+5}}{e^{11}(m+5)}-\frac{2\left(30000d^7+1050d^6e+21420d^5e^2+1715d^4e^3+9990d^3e^4-2550d^2e^5+2218de^6-287e^7\right)(d+ex)^{m+4}}{e^{11}(m+4)}-\frac{25(200d+e)(d+ex)^{m+10}}{e^{11}(m+10)}+\frac{500(d+ex)^{m+11}}{e^{11}(m+11)}$$

```
[Out] ((5*d^2 - 2*d*e + 3*e^2)^3*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 +
 2*e^4)*(d + e*x)^(1 + m))/(e^11*(1 + m)) - ((5*d^2 - 2*d*e + 3*e
^2)^2*(200*d^5 + 169*d^4*e + 108*d^3*e^2 - 20*d^2*e^3 + 86*d*e^4
- 15*e^5)*(d + e*x)^(2 + m))/(e^11*(2 + m)) + (3*(5*d^2 - 2*d*e +
 3*e^2)*(1500*d^6 + 660*d^5*e + 792*d^4*e^2 + 58*d^3*e^3 + 547*d^
2*e^4 - 156*d*e^5 + 53*e^6)*(d + e*x)^(3 + m))/(e^11*(3 + m)) - (
2*(30000*d^7 + 1050*d^6*e + 21420*d^5*e^2 + 1715*d^4*e^3 + 9990*d
^3*e^4 - 2550*d^2*e^5 + 2218*d*e^6 - 287*e^7)*(d + e*x)^(4 + m))/
(e^11*(4 + m)) + ((105000*d^6 + 3150*d^5*e + 53550*d^4*e^2 + 3430
*d^3*e^3 + 14985*d^2*e^4 - 2550*d*e^5 + 1109*e^6)*(d + e*x)^(5 +
m))/(e^11*(5 + m)) - (6*(21000*d^5 + 525*d^4*e + 7140*d^3*e^2 + 3
43*d^2*e^3 + 999*d*e^4 - 85*e^5)*(d + e*x)^(6 + m))/(e^11*(6 + m)
) + ((105000*d^4 + 2100*d^3*e + 21420*d^2*e^2 + 686*d*e^3 + 999*e
^4)*(d + e*x)^(7 + m))/(e^11*(7 + m)) - (2*(30000*d^3 + 450*d^2*e
 + 3060*d*e^2 + 49*e^3)*(d + e*x)^(8 + m))/(e^11*(8 + m)) + (45*(
500*d^2 + 5*d*e + 17*e^2)*(d + e*x)^(9 + m))/(e^11*(9 + m)) - (25
*(200*d + e)*(d + e*x)^(10 + m))/(e^11*(10 + m)) + (500*(d + e*x)
^(11 + m))/(e^11*(11 + m))
```

Rubi [A] time = 0.80439, antiderivative size = 588, normalized size of antiderivative = 1., number of

steps used = 2, number of rules used = 1, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.026$

$$\frac{45\left(500d^2+5de+17e^2\right)(d+ex)^{m+9}}{e^{11}(m+9)}-\frac{2\left(30000d^3+450d^2e+3060de^2+49e^3\right)(d+ex)^{m+8}}{e^{11}(m+8)}$$
$$+\frac{\left(5d^2-2de+3e^2\right)^3\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)(d+ex)^{m+1}}{e^{11}(m+1)}$$
$$+\frac{\left(105000d^4+2100d^3e+21420d^2e^2+686de^3+999e^4\right)(d+ex)^{m+7}}{e^{11}(m+7)}$$
$$-\frac{\left(5d^2-2de+3e^2\right)^2\left(200d^5+169d^4e+108d^3e^2-20d^2e^3+86de^4-15e^5\right)(d+ex)^{m+2}}{e^{11}(m+2)}$$
$$-\frac{6\left(21000d^5+525d^4e+7140d^3e^2+343d^2e^3+999de^4-85e^5\right)(d+ex)^{m+6}}{e^{11}(m+6)}$$
$$+\frac{3\left(5d^2-2de+3e^2\right)\left(1500d^6+660d^5e+792d^4e^2+58d^3e^3+547d^2e^4-156de^5+53e^6\right)(d+ex)^{m+3}}{e^{11}(m+3)}$$
$$+\frac{\left(105000d^6+3150d^5e+53550d^4e^2+3430d^3e^3+14985d^2e^4-2550de^5+1109e^6\right)(d+ex)^{m+5}}{e^{11}(m+5)}$$
$$-\frac{2\left(30000d^7+1050d^6e+21420d^5e^2+1715d^4e^3+9990d^3e^4-2550d^2e^5+2218de^6-287e^7\right)(d+ex)^{m+4}}{e^{11}(m+4)}$$
$$-\frac{25(200d+e)(d+ex)^{m+10}}{e^{11}(m+10)}+\frac{500(d+ex)^{m+11}}{e^{11}(m+11)}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)^m*(3 + 2*x + 5*x^2)^3*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] ((5*d^2 - 2*d*e + 3*e^2)^3*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 +
 2*e^4)*(d + e*x)^(1 + m))/(e^11*(1 + m)) - ((5*d^2 - 2*d*e + 3*e
^2)^2*(200*d^5 + 169*d^4*e + 108*d^3*e^2 - 20*d^2*e^3 + 86*d*e^4
- 15*e^5)*(d + e*x)^(2 + m))/(e^11*(2 + m)) + (3*(5*d^2 - 2*d*e +
 3*e^2)*(1500*d^6 + 660*d^5*e + 792*d^4*e^2 + 58*d^3*e^3 + 547*d^
2*e^4 - 156*d*e^5 + 53*e^6)*(d + e*x)^(3 + m))/(e^11*(3 + m)) - (
2*(30000*d^7 + 1050*d^6*e + 21420*d^5*e^2 + 1715*d^4*e^3 + 9990*d
^3*e^4 - 2550*d^2*e^5 + 2218*d*e^6 - 287*e^7)*(d + e*x)^(4 + m))/
(e^11*(4 + m)) + ((105000*d^6 + 3150*d^5*e + 53550*d^4*e^2 + 3430
*d^3*e^3 + 14985*d^2*e^4 - 2550*d*e^5 + 1109*e^6)*(d + e*x)^(5 +
m))/(e^11*(5 + m)) - (6*(21000*d^5 + 525*d^4*e + 7140*d^3*e^2 + 3
43*d^2*e^3 + 999*d*e^4 - 85*e^5)*(d + e*x)^(6 + m))/(e^11*(6 + m)
) + ((105000*d^4 + 2100*d^3*e + 21420*d^2*e^2 + 686*d*e^3 + 999*e
^4)*(d + e*x)^(7 + m))/(e^11*(7 + m)) - (2*(30000*d^3 + 450*d^2*e
 + 3060*d*e^2 + 49*e^3)*(d + e*x)^(8 + m))/(e^11*(8 + m)) + (45*(
500*d^2 + 5*d*e + 17*e^2)*(d + e*x)^(9 + m))/(e^11*(9 + m)) - (25
*(200*d + e)*(d + e*x)^(10 + m))/(e^11*(10 + m)) + (500*(d + e*x)
^(11 + m))/(e^11*(11 + m))
```

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((e*x+d)**m*(5*x**2+2*x+3)**3*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] Timed out
```

Mathematica [B] time = 6.10417, size = 3741, normalized size = 6.36

Result too large to show

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)^m*(3 + 2*x + 5*x^2)^3*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] (d + e*x)^m*((3*d*(604800000*d^10 + 33264000*d^9*e + 1130976000*d
^8*e^2 + 162993600*d^7*e^3 + 1898899200*d^6*e^4 - 1130976000*d^5*
e^5 + 2951182080*d^4*e^6 - 1909353600*d^3*e^7 + 2115590400*d^2*e^
8 - 898128000*d*e^9 + 718502400*e^10 + 3024000*d^9*e*m + 21591360
0*d^8*e^2*m + 49227360*d^7*e^3*m + 810868320*d^6*e^4*m - 64451760
0*d^5*e^5*m + 2173675488*d^4*e^6*m - 1788193680*d^3*e^7*m + 25102
41120*d^2*e^8*m - 1365044400*d*e^9*m + 1451286720*e^10*m + 102816
00*d^8*e^2*m^2 + 4939200*d^7*e^3*m^2 + 129230640*d^6*e^4*m^2 - 14
5962000*d^5*e^5*m^2 + 661176928*d^4*e^6*m^2 - 709032352*d^3*e^7*m
^2 + 1280953608*d^2*e^8*m^2 - 899023860*d*e^9*m^2 + 1265236848*e^
10*m^2 + 164640*d^7*e^3*m^3 + 9110880*d^6*e^4*m^3 - 16422000*d^5*
e^5*m^3 + 106330920*d^4*e^6*m^3 - 154347452*d^3*e^7*m^3 + 3674235
60*d^2*e^8*m^3 - 337248720*d*e^9*m^3 + 629408520*e^10*m^3 + 23976
0*d^6*e^4*m^4 - 918000*d^5*e^5*m^4 + 9537400*d^4*e^6*m^4 - 199292
80*d^3*e^7*m^4 + 64836702*d^2*e^8*m^4 - 79518915*d*e^9*m^4 + 1985
14620*e^10*m^4 - 20400*d^5*e^5*m^5 + 452472*d^4*e^6*m^5 - 1526840
*d^3*e^7*m^5 + 7212240*d^2*e^8*m^5 - 12236805*d*e^9*m^5 + 4159701
0*e^10*m^5 + 8872*d^4*e^6*m^6 - 64288*d^3*e^7*m^6 + 494172*d^2*e^
8*m^6 - 1230390*d*e^9*m^6 + 5879034*e^10*m^6 - 1148*d^3*e^7*m^7 +
 19080*d^2*e^8*m^7 - 78030*d*e^9*m^7 + 554580*e^10*m^7 + 318*d^2*
e^8*m^8 - 2835*d*e^9*m^8 + 33480*e^10*m^8 - 45*d*e^9*m^9 + 1170*e
^10*m^9 + 18*e^10*m^10))/(e^11*(1 + m)*(2 + m)*(3 + m)*(4 + m)*(5
 + m)*(6 + m)*(7 + m)*(8 + m)*(9 + m)*(10 + m)*(11 + m)) - (3*(-7
18502400*e^10 + 604800000*d^10*m + 33264000*d^9*e*m + 1130976000*
d^8*e^2*m + 162993600*d^7*e^3*m + 1898899200*d^6*e^4*m - 11309760
00*d^5*e^5*m + 2951182080*d^4*e^6*m - 1909353600*d^3*e^7*m + 2115
590400*d^2*e^8*m - 898128000*d*e^9*m - 1451286720*e^10*m + 302400
0*d^9*e*m^2 + 215913600*d^8*e^2*m^2 + 49227360*d^7*e^3*m^2 + 8108
68320*d^6*e^4*m^2 - 644517600*d^5*e^5*m^2 + 2173675488*d^4*e^6*m^
```

2 - 1788193680*d^3*e^7*m^2 + 2510241120*d^2*e^8*m^2 - 1365044400*
d*e^9*m^2 - 1265236848*e^10*m^2 + 10281600*d^8*e^2*m^3 + 4939200*
d^7*e^3*m^3 + 129230640*d^6*e^4*m^3 - 145962000*d^5*e^5*m^3 + 661
176928*d^4*e^6*m^3 - 709032352*d^3*e^7*m^3 + 1280953608*d^2*e^8*m
^3 - 899023860*d*e^9*m^3 - 629408520*e^10*m^3 + 164640*d^7*e^3*m^
4 + 9110880*d^6*e^4*m^4 - 16422000*d^5*e^5*m^4 + 106330920*d^4*e^
6*m^4 - 154347452*d^3*e^7*m^4 + 367423560*d^2*e^8*m^4 - 337248720
*d*e^9*m^4 - 198514620*e^10*m^4 + 239760*d^6*e^4*m^5 - 918000*d^5
*e^5*m^5 + 9537400*d^4*e^6*m^5 - 19929280*d^3*e^7*m^5 + 64836702*
d^2*e^8*m^5 - 79518915*d*e^9*m^5 - 41597010*e^10*m^5 - 20400*d^5*
e^5*m^6 + 452472*d^4*e^6*m^6 - 1526840*d^3*e^7*m^6 + 7212240*d^2*
e^8*m^6 - 12236805*d*e^9*m^6 - 5879034*e^10*m^6 + 8872*d^4*e^6*m^
7 - 64288*d^3*e^7*m^7 + 494172*d^2*e^8*m^7 - 1230390*d*e^9*m^7 -
554580*e^10*m^7 - 1148*d^3*e^7*m^8 + 19080*d^2*e^8*m^8 - 78030*d*
e^9*m^8 - 33480*e^10*m^8 + 318*d^2*e^8*m^9 - 2835*d*e^9*m^9 - 117
0*e^10*m^9 - 45*d*e^9*m^10 - 18*e^10*m^10)*x)/(e^9*(2 + m)*(3 + m
)*(4 + m)*(5 + m)*(6 + m)*(7 + m)*(8 + m)*(9 + m)*(10 + m)*(11 +
m)*(e + e*m)) + (3*(898128000*e^9 + 302400000*d^9*m + 16632000*d^
8*e*m + 565488000*d^7*e^2*m + 81496800*d^6*e^3*m + 949449600*d^5*
e^4*m - 565488000*d^4*e^5*m + 1475591040*d^3*e^6*m - 954676800*d^
2*e^7*m + 1057795200*d*e^8*m + 1365044400*e^9*m + 1512000*d^8*e*m
^2 + 107956800*d^7*e^2*m^2 + 24613680*d^6*e^3*m^2 + 405434160*d^5
*e^4*m^2 - 322258800*d^4*e^5*m^2 + 1086837744*d^3*e^6*m^2 - 89409
6840*d^2*e^7*m^2 + 1255120560*d*e^8*m^2 + 899023860*e^9*m^2 + 514
0800*d^7*e^2*m^3 + 2469600*d^6*e^3*m^3 + 64615320*d^5*e^4*m^3 - 7
2981000*d^4*e^5*m^3 + 330588464*d^3*e^6*m^3 - 354516176*d^2*e^7*m
^3 + 640476804*d*e^8*m^3 + 337248720*e^9*m^3 + 82320*d^6*e^3*m^4
+ 4555440*d^5*e^4*m^4 - 8211000*d^4*e^5*m^4 + 53165460*d^3*e^6*m^
4 - 77173726*d^2*e^7*m^4 + 183711780*d*e^8*m^4 + 79518915*e^9*m^4
 + 119880*d^5*e^4*m^5 - 459000*d^4*e^5*m^5 + 4768700*d^3*e^6*m^5
- 9964640*d^2*e^7*m^5 + 32418351*d*e^8*m^5 + 12236805*e^9*m^5 - 1
0200*d^4*e^5*m^6 + 226236*d^3*e^6*m^6 - 763420*d^2*e^7*m^6 + 3606
120*d*e^8*m^6 + 1230390*e^9*m^6 + 4436*d^3*e^6*m^7 - 32144*d^2*e^
7*m^7 + 247086*d*e^8*m^7 + 78030*e^9*m^7 - 574*d^2*e^7*m^8 + 9540
*d*e^8*m^8 + 2835*e^9*m^8 + 159*d*e^8*m^9 + 45*e^9*m^9)*x^2)/(e^8
(3 + m)(4 + m)*(5 + m)*(6 + m)*(7 + m)*(8 + m)*(9 + m)*(10 + m)
(11 + m)(2*e + e*m)) + ((3173385600*e^8 - 302400000*d^8*m - 166
32000*d^7*e*m - 565488000*d^6*e^2*m - 81496800*d^5*e^3*m - 949449
600*d^4*e^4*m + 565488000*d^3*e^5*m - 1475591040*d^2*e^6*m + 9546
76800*d*e^7*m + 3765361680*e^8*m - 1512000*d^7*e*m^2 - 107956800*
d^6*e^2*m^2 - 24613680*d^5*e^3*m^2 - 405434160*d^4*e^4*m^2 + 3222
58800*d^3*e^5*m^2 - 1086837744*d^2*e^6*m^2 + 894096840*d*e^7*m^2
+ 1921430412*e^8*m^2 - 5140800*d^6*e^2*m^3 - 2469600*d^5*e^3*m^3
- 64615320*d^4*e^4*m^3 + 72981000*d^3*e^5*m^3 - 330588464*d^2*e^6
*m^3 + 354516176*d*e^7*m^3 + 551135340*e^8*m^3 - 82320*d^5*e^3*m^
4 - 4555440*d^4*e^4*m^4 + 8211000*d^3*e^5*m^4 - 53165460*d^2*e^6*
m^4 + 77173726*d*e^7*m^4 + 97255053*e^8*m^4 - 119880*d^4*e^4*m^5
+ 459000*d^3*e^5*m^5 - 4768700*d^2*e^6*m^5 + 9964640*d*e^7*m^5 +
10818360*e^8*m^5 + 10200*d^3*e^5*m^6 - 226236*d^2*e^6*m^6 + 76342
0*d*e^7*m^6 + 741258*e^8*m^6 - 4436*d^2*e^6*m^7 + 32144*d*e^7*m^7
 + 28620*e^8*m^7 + 574*d*e^7*m^8 + 477*e^8*m^8)*x^3)/(e^7*(4 + m)
(5 + m)(6 + m)*(7 + m)*(8 + m)*(9 + m)*(10 + m)*(11 + m)*(3*e +
 e*m)) + ((954676800*e^7 + 75600000*d^7*m + 4158000*d^6*e*m + 141
372000*d^5*e^2*m + 20374200*d^4*e^3*m + 237362400*d^3*e^4*m - 141

```
372000*d^2*e^5*m + 368897760*d*e^6*m + 894096840*e^7*m + 378000*d
^6*e*m^2 + 26989200*d^5*e^2*m^2 + 6153420*d^4*e^3*m^2 + 101358540
*d^3*e^4*m^2 - 80564700*d^2*e^5*m^2 + 271709436*d*e^6*m^2 + 35451
6176*e^7*m^2 + 1285200*d^5*e^2*m^3 + 617400*d^4*e^3*m^3 + 1615383
0*d^3*e^4*m^3 - 18245250*d^2*e^5*m^3 + 82647116*d*e^6*m^3 + 77173
726*e^7*m^3 + 20580*d^4*e^3*m^4 + 1138860*d^3*e^4*m^4 - 2052750*d
^2*e^5*m^4 + 13291365*d*e^6*m^4 + 9964640*e^7*m^4 + 29970*d^3*e^4
*m^5 - 114750*d^2*e^5*m^5 + 1192175*d*e^6*m^5 + 763420*e^7*m^5 -
2550*d^2*e^5*m^6 + 56559*d*e^6*m^6 + 32144*e^7*m^6 + 1109*d*e^6*m
^7 + 574*e^7*m^7)*x^4)/(e^6*(5 + m)*(6 + m)*(7 + m)*(8 + m)*(9 +
m)*(10 + m)*(11 + m)*(4*e + e*m)) + ((368897760*e^6 - 15120000*d^
6*m - 831600*d^5*e*m - 28274400*d^4*e^2*m - 4074840*d^3*e^3*m - 4
7472480*d^2*e^4*m + 28274400*d*e^5*m + 271709436*e^6*m - 75600*d^
5*e*m^2 - 5397840*d^4*e^2*m^2 - 1230684*d^3*e^3*m^2 - 20271708*d^
2*e^4*m^2 + 16112940*d*e^5*m^2 + 82647116*e^6*m^2 - 257040*d^4*e^
2*m^3 - 123480*d^3*e^3*m^3 - 3230766*d^2*e^4*m^3 + 3649050*d*e^5*
m^3 + 13291365*e^6*m^3 - 4116*d^3*e^3*m^4 - 227772*d^2*e^4*m^4 +
410550*d*e^5*m^4 + 1192175*e^6*m^4 - 5994*d^2*e^4*m^5 + 22950*d*e
^5*m^5 + 56559*e^6*m^5 + 510*d*e^5*m^6 + 1109*e^6*m^6)*x^5)/(e^5*
(6 + m)*(7 + m)*(8 + m)*(9 + m)*(10 + m)*(11 + m)*(5*e + e*m)) +
((28274400*e^5 + 2520000*d^5*m + 138600*d^4*e*m + 4712400*d^3*e^2
*m + 679140*d^2*e^3*m + 7912080*d*e^4*m + 16112940*e^5*m + 12600*
d^4*e*m^2 + 899640*d^3*e^2*m^2 + 205114*d^2*e^3*m^2 + 3378618*d*e
^4*m^2 + 3649050*e^5*m^2 + 42840*d^3*e^2*m^3 + 20580*d^2*e^3*m^3
+ 538461*d*e^4*m^3 + 410550*e^5*m^3 + 686*d^2*e^3*m^4 + 37962*d*e
^4*m^4 + 22950*e^5*m^4 + 999*d*e^4*m^5 + 510*e^5*m^5)*x^6)/(e^4*(
7 + m)*(8 + m)*(9 + m)*(10 + m)*(11 + m)*(6*e + e*m)) + ((7912080
*e^4 - 360000*d^4*m - 19800*d^3*e*m - 673200*d^2*e^2*m - 97020*d*
e^3*m + 3378618*e^4*m - 1800*d^3*e*m^2 - 128520*d^2*e^2*m^2 - 293
02*d*e^3*m^2 + 538461*e^4*m^2 - 6120*d^2*e^2*m^3 - 2940*d*e^3*m^3
 + 37962*e^4*m^3 - 98*d*e^3*m^4 + 999*e^4*m^4)*x^7)/(e^3*(8 + m)*
(9 + m)*(10 + m)*(11 + m)*(7*e + e*m)) + ((-97020*e^3 + 45000*d^3
*m + 2475*d^2*e*m + 84150*d*e^2*m - 29302*e^3*m + 225*d^2*e*m^2 +
 16065*d*e^2*m^2 - 2940*e^3*m^2 + 765*d*e^2*m^3 - 98*e^3*m^3)*x^8
)/(e^2*(9 + m)*(10 + m)*(11 + m)*(8*e + e*m)) - (5*(-16830*e^2 +
1000*d^2*m + 55*d*e*m - 3213*e^2*m + 5*d*e*m^2 - 153*e^2*m^2)*x^9
)/(e*(10 + m)*(11 + m)*(9*e + e*m)) + (25*(-11*e + 20*d*m - e*m)*
x^10)/((11 + m)*(10*e + e*m)) + (500*e*x^11)/(11*e + e*m))
```

Maple [B] time = 0.054, size = 5924, normalized size = 10.1

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^m*(5*x^2+2*x+3)^3*(4*x^4-5*x^3+3*x^2+x+2),x)
```

```
[Out] result too large to display
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^3*(e*x + d)^m,x, algori
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.311243, size = 6473, normalized size = 11.01

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^3*(e*x + d)^m,x, algori
```

```
[Out] (54*d*e^10*m^10 + 500*(e^11*m^10 + 55*e^11*m^9 + 1320*e^11*m^8 +
18150*e^11*m^7 + 157773*e^11*m^6 + 902055*e^11*m^5 + 3416930*e^11
*m^4 + 8409500*e^11*m^3 + 12753576*e^11*m^2 + 10628640*e^11*m + 3
628800*e^11)*x^11 + 1814400000*d^11 + 99792000*d^10*e + 339292800
0*d^9*e^2 + 488980800*d^8*e^3 + 5696697600*d^7*e^4 - 3392928000*d
^6*e^5 + 8853546240*d^5*e^6 - 5728060800*d^4*e^7 + 6346771200*d^3
*e^8 - 2694384000*d^2*e^9 + 2155507200*d*e^10 - 25*(3991680*e^11
- (20*d*e^10 - e^11)*m^10 - 4*(225*d*e^10 - 14*e^11)*m^9 - 15*(11
60*d*e^10 - 91*e^11)*m^8 - 60*(3150*d*e^10 - 317*e^11)*m^7 - 21*(
60260*d*e^10 - 7963*e^11)*m^6 - 84*(64125*d*e^10 - 11492*e^11)*m^
5 - 5*(2894720*d*e^10 - 737251*e^11)*m^4 - 20*(1172700*d*e^10 - 4
56659*e^11)*m^3 - 36*(570320*d*e^10 - 386841*e^11)*m^2 - 144*(504
00*d*e^10 - 80939*e^11)*m)*x^10 - 135*(d^2*e^9 - 26*d*e^10)*m^9 +
 5*(678585600*e^11 - (5*d*e^10 - 153*e^11)*m^10 - (1000*d^2*e^9 +
 235*d*e^10 - 8721*e^11)*m^9 - 6*(6000*d^2*e^9 + 785*d*e^10 - 360
06*e^11)*m^8 - 6*(91000*d^2*e^9 + 8785*d*e^10 - 509031*e^11)*m^7
- 105*(43200*d^2*e^9 + 3445*d*e^10 - 259029*e^11)*m^6 - 21*(10690
00*d^2*e^9 + 74815*d*e^10 - 7560189*e^11)*m^5 - 2*(33642000*d^2*e
^9 + 2145620*d*e^10 - 306036567*e^11)*m^4 - 4*(29531000*d^2*e^9 +
 1761185*d*e^10 - 382172121*e^11)*m^3 - 72*(1522000*d^2*e^9 + 865
10*d*e^10 - 32587351*e^11)*m^2 - 1440*(28000*d^2*e^9 + 1540*d*e^1
0 - 1370727*e^11)*m)*x^9 + 9*(106*d^3*e^8 - 945*d^2*e^9 + 11160*d
*e^10)*m^8 - (488980800*e^11 - (765*d*e^10 - 98*e^11)*m^10 - (225
*d^2*e^9 + 37485*d*e^10 - 5684*e^11)*m^9 - 3*(15000*d^3*e^8 + 292
5*d^2*e^9 + 260100*d*e^10 - 47726*e^11)*m^8 - 42*(30000*d^3*e^8 +
 3375*d^2*e^9 + 214965*d*e^10 - 48958*e^11)*m^7 - 63*(230000*d^3*
e^8 + 19650*d^2*e^9 + 1012095*d*e^10 - 294882*e^11)*m^6 - 63*(140
0000*d^3*e^8 + 101175*d^2*e^9 + 4503555*d*e^10 - 1743812*e^11)*m^
```

5 - (304605000*d^3*e^8 + 19707975*d^2*e^9 + 790573950*d*e^10 - 42
8393182*e^11)*m^4 - 4*(147735000*d^3*e^8 + 8860500*d^2*e^9 + 3297
12705*d*e^10 - 270109021*e^11)*m^3 - 36*(16335000*d^3*e^8 + 92992
5*d^2*e^9 + 32795550*d*e^10 - 46438966*e^11)*m^2 - 5040*(45000*d^
3*e^8 + 2475*d^2*e^9 + 84150*d*e^10 - 280861*e^11)*m)*x^8 - 6*(57
4*d^4*e^7 - 9540*d^3*e^8 + 39015*d^2*e^9 - 277290*d*e^10)*m^7 + (
5696697600*e^11 - (98*d*e^10 - 999*e^11)*m^10 - 3*(2040*d^2*e^9 +
 1666*d*e^10 - 19647*e^11)*m^9 - 24*(75*d^3*e^8 + 10710*d^2*e^9 +
 4508*d*e^10 - 62937*e^11)*m^8 - 6*(60000*d^4*e^7 + 9600*d^3*e^8
+ 740520*d^2*e^9 + 216482*d*e^10 - 3677319*e^11)*m^7 - 3*(2520000
*d^4*e^7 + 243600*d^3*e^8 + 13708800*d^2*e^9 + 3161774*d*e^10 - 6
7539393*e^11)*m^6 - 21*(3000000*d^4*e^7 + 228000*d^3*e^8 + 105814
80*d^2*e^9 + 2069662*d*e^10 - 57933009*e^11)*m^5 - 2*(132300000*d
^4*e^7 + 8738100*d^3*e^8 + 357157080*d^2*e^9 + 62076434*d*e^10 -
2405021571*e^11)*m^4 - 36*(16240000*d^4*e^7 + 981400*d^3*e^8 + 36
788680*d^2*e^9 + 5871278*d*e^10 - 341095341*e^11)*m^3 - 72*(88200
00*d^4*e^7 + 503100*d^3*e^8 + 17778600*d^2*e^9 + 2670010*d*e^10 -
 266622111*e^11)*m^2 - 12960*(20000*d^4*e^7 + 1100*d^3*e^8 + 3740
0*d^2*e^9 + 5390*d*e^10 - 1264623*e^11)*m)*x^7 + 6*(4436*d^5*e^6
- 32144*d^4*e^7 + 247086*d^3*e^8 - 615195*d^2*e^9 + 2939517*d*e^1
0)*m^6 + (3392928000*e^11 + 3*(333*d*e^10 + 170*e^11)*m^10 + (686
*d^2*e^9 + 52947*d*e^10 + 30600*e^11)*m^9 + 6*(7140*d^3*e^8 + 514
5*d^2*e^9 + 198801*d*e^10 + 133025*e^11)*m^8 + 6*(2100*d^4*e^7 +
257040*d^3*e^8 + 95354*d^2*e^9 + 2484513*d*e^10 + 1978800*e^11)*m
^7 + 3*(840000*d^5*e^6 + 109200*d^4*e^7 + 7282800*d^3*e^8 + 18865
00*d^2*e^9 + 37725237*d*e^10 + 37016310*e^11)*m^6 + 3*(12600000*d
^5*e^6 + 1050000*d^4*e^7 + 52264800*d^3*e^8 + 10813418*d^2*e^9 +
179179641*d*e^10 + 226287000*e^11)*m^5 + 42*(5100000*d^5*e^6 + 34
8000*d^4*e^7 + 14635980*d^3*e^8 + 2609495*d^2*e^9 + 37733562*d*e^
10 + 64999925*e^11)*m^4 + 4*(141750000*d^5*e^6 + 8659350*d^4*e^7
+ 327983040*d^3*e^8 + 52869334*d^2*e^9 + 692643663*d*e^10 + 17694
60300*e^11)*m^3 + 120*(5754000*d^5*e^6 + 329070*d^4*e^7 + 1165962
0*d^3*e^8 + 1755817*d^2*e^9 + 21444534*d*e^10 + 93454763*e^11)*m^
2 + 7200*(42000*d^5*e^6 + 2310*d^4*e^7 + 78540*d^3*e^8 + 11319*d^
2*e^9 + 131868*d*e^10 + 1344547*e^11)*m)*x^6 - 3*(20400*d^6*e^5 -
 452472*d^5*e^6 + 1526840*d^4*e^7 - 7212240*d^3*e^8 + 12236805*d^
2*e^9 - 41597010*d*e^10)*m^5 + (8853546240*e^11 + (510*d*e^10 + 1
109*e^11)*m^10 - (5994*d^2*e^9 - 28050*d*e^10 - 67649*e^11)*m^9 -
 12*(343*d^3*e^8 + 23976*d^2*e^9 - 54825*d*e^10 - 149715*e^11)*m^
8 - 6*(42840*d^4*e^7 + 27440*d^3*e^8 + 953046*d^2*e^9 - 1430550*d
*e^10 - 4541355*e^11)*m^7 - 3*(25200*d^5*e^6 + 2656080*d^4*e^7 +
869848*d^3*e^8 + 20283696*d^2*e^9 - 22710810*d*e^10 - 86713819*e^
11)*m^6 - 3*(5040000*d^6*e^5 + 529200*d^5*e^6 + 30416400*d^4*e^7
+ 6969760*d^3*e^8 + 124932942*d^2*e^9 - 112732950*d*e^10 - 541448
179*e^11)*m^5 - 2*(75600000*d^6*e^5 + 5481000*d^5*e^6 + 242260200
*d^4*e^7 + 45047562*d^3*e^8 + 675619704*d^2*e^9 - 519501300*d*e^1
0 - 3335910815*e^11)*m^4 - 4*(132300000*d^6*e^5 + 8221500*d^5*e^6
 + 316416240*d^4*e^7 + 51779280*d^3*e^8 + 688165146*d^2*e^9 - 470
707050*d*e^10 - 4412539105*e^11)*m^3 - 72*(10500000*d^6*e^5 + 602
700*d^5*e^6 + 21434280*d^4*e^7 + 3239978*d^3*e^8 + 39724236*d^2*e
^9 - 25005980*d*e^10 - 395561447*e^11)*m^2 - 288*(1260000*d^6*e^5
 + 69300*d^5*e^6 + 2356200*d^4*e^7 + 339570*d^3*e^8 + 3956040*d^2
*e^9 - 2356200*d*e^10 - 86687203*e^11)*m)*x^5 + 3*(239760*d^7*e^4
 - 918000*d^6*e^5 + 9537400*d^5*e^6 - 19929280*d^4*e^7 + 64836702

*d^3*e^8 - 79518915*d^2*e^9 + 198514620*d*e^10)*m^4 + (5728060800
*e^11 + (1109*d*e^10 + 574*e^11)*m^10 - (2550*d^2*e^9 - 63213*d*e
^10 - 35588*e^11)*m^9 + 6*(4995*d^3*e^8 - 21675*d^2*e^9 + 257288*
d*e^10 + 160433*e^11)*m^8 + 6*(3430*d^4*e^7 + 219780*d^3*e^8 - 46
1550*d^2*e^9 + 3512203*d*e^10 + 2483698*e^11)*m^7 + 15*(85680*d^5
*e^6 + 49392*d^4*e^7 + 1554444*d^3*e^8 - 2122620*d^2*e^9 + 117232
39*d*e^10 + 9703470*e^11)*m^6 + 3*(126000*d^6*e^5 + 11566800*d^5*
e^6 + 3361400*d^4*e^7 + 70329600*d^3*e^8 - 71101650*d^2*e^9 + 306
983399*d*e^10 + 310583364*e^11)*m^5 + 2*(37800000*d^7*e^4 + 32130
00*d^6*e^5 + 158722200*d^5*e^6 + 32104800*d^4*e^7 + 515019465*d^3
*e^8 - 418887225*d^2*e^9 + 1494010421*d*e^10 + 1964946361*e^11)*m
^4 + 4*(113400000*d^7*e^4 + 7276500*d^6*e^5 + 288206100*d^5*e^6 +
 48409305*d^4*e^7 + 659010330*d^3*e^8 - 460978800*d^2*e^9 + 14245
18263*d*e^10 + 2670494533*e^11)*m^3 + 72*(11550000*d^7*e^4 + 6667
50*d^6*e^5 + 23847600*d^5*e^6 + 3625510*d^4*e^7 + 44710245*d^3*e^
8 - 28312225*d^2*e^9 + 79001833*d*e^10 + 245697543*e^11)*m^2 + 72
0*(630000*d^7*e^4 + 34650*d^6*e^5 + 1178100*d^5*e^6 + 169785*d^4*
e^7 + 1978020*d^3*e^8 - 1178100*d^2*e^9 + 3074148*d*e^10 + 220361
47*e^11)*m)*x^4 + 12*(41160*d^8*e^3 + 2277720*d^7*e^4 - 4105500*d
^6*e^5 + 26582730*d^5*e^6 - 38586863*d^4*e^7 + 91855890*d^3*e^8 -
 84312180*d^2*e^9 + 157352130*d*e^10)*m^3 + (6346771200*e^11 + (5
74*d*e^10 + 477*e^11)*m^10 - (4436*d^2*e^9 - 33866*d*e^10 - 30051
*e^11)*m^9 + 24*(425*d^3*e^8 - 9981*d^2*e^9 + 35875*d*e^10 + 3450
3*e^11)*m^8 - 6*(19980*d^4*e^7 - 81600*d^3*e^8 + 909380*d^2*e^9 -
 2053198*d*e^10 - 2183229*e^11)*m^7 - 3*(27440*d^5*e^6 + 1638360*
d^4*e^7 - 3202800*d^3*e^8 + 22641344*d^2*e^9 - 36198162*d*e^10 -
43730883*e^11)*m^6 - 3*(1713600*d^6*e^5 + 905520*d^5*e^6 + 261738
00*d^4*e^7 - 32844000*d^3*e^8 + 166540748*d^2*e^9 - 201988878*d*e
^10 - 288179073*e^11)*m^5 - 2*(756000*d^7*e^4 + 61689600*d^6*e^5
+ 16093560*d^5*e^6 + 304195500*d^4*e^7 - 278811900*d^3*e^8 + 1092
467028*d^2*e^9 - 1055996410*d*e^10 - 1884673269*e^11)*m^4 - 4*(75
600000*d^8*e^3 + 5292000*d^7*e^4 + 224910000*d^6*e^5 + 40069260*d
^5*e^6 + 573745680*d^4*e^7 - 419556600*d^3*e^8 + 1349320300*d^2*e
^9 - 1086499918*d*e^10 - 2657980899*e^11)*m^3 - 24*(37800000*d^8*
e^3 + 2205000*d^7*e^4 + 79682400*d^6*e^5 + 12238240*d^5*e^6 + 152
467380*d^4*e^7 - 97540900*d^3*e^8 + 275018692*d^2*e^9 - 193842670
*d*e^10 - 763013811*e^11)*m^2 - 4320*(140000*d^8*e^3 + 7700*d^7*e
^4 + 261800*d^6*e^5 + 37730*d^5*e^6 + 439560*d^4*e^7 - 261800*d^3
*e^8 + 683144*d^2*e^9 - 441980*d*e^10 - 3946963*e^11)*m)*x^3 + 12
*(2570400*d^9*e^2 + 1234800*d^8*e^3 + 32307660*d^7*e^4 - 36490500
*d^6*e^5 + 165294232*d^5*e^6 - 177258088*d^4*e^7 + 320238402*d^3*
e^8 - 224755965*d^2*e^9 + 316309212*d*e^10)*m^2 + 3*(898128000*e^
11 + 3*(53*d*e^10 + 15*e^11)*m^10 - (574*d^2*e^9 - 9699*d*e^10 -
2880*e^11)*m^9 + (4436*d^3*e^8 - 32718*d^2*e^9 + 256626*d*e^10 +
80865*e^11)*m^8 - 2*(5100*d^4*e^7 - 115336*d^3*e^8 + 397782*d^2*e
^9 - 1926603*d*e^10 - 654210*e^11)*m^7 + (119880*d^5*e^6 - 469200
*d^4*e^7 + 4994936*d^3*e^8 - 10728060*d^2*e^9 + 36024471*d*e^10 +
 13467195*e^11)*m^6 + (82320*d^6*e^5 + 4675320*d^5*e^6 - 8670000*
d^4*e^7 + 57934160*d^3*e^8 - 87138366*d^2*e^9 + 216130131*d*e^10
+ 91755720*e^11)*m^5 + (5140800*d^7*e^4 + 2551920*d^6*e^5 + 69170
760*d^5*e^6 - 81192000*d^4*e^7 + 383753924*d^3*e^8 - 431689902*d^
2*e^9 + 824188584*d*e^10 + 416767635*e^11)*m^4 + 4*(378000*d^8*e^
3 + 28274400*d^7*e^4 + 6770820*d^6*e^5 + 117512370*d^5*e^6 - 9880
9950*d^4*e^7 + 354356552*d^3*e^8 - 312153254*d^2*e^9 + 473899341*

```
d*e^10 + 309068145*e^11)*m^3 + 12*(25200000*d^9*e^2 + 1512000*d^8
*e^3 + 56120400*d^7*e^4 + 8842540*d^6*e^5 + 112906980*d^5*e^6 - 7
3978900*d^4*e^7 + 213535732*d^3*e^8 - 154064470*d^2*e^9 + 1927429
80*d*e^10 + 188672355*e^11)*m^2 + 2160*(140000*d^9*e^2 + 7700*d^8
*e^3 + 261800*d^7*e^4 + 37730*d^6*e^5 + 439560*d^5*e^6 - 261800*d
^4*e^7 + 683144*d^3*e^8 - 441980*d^2*e^9 + 489720*d*e^10 + 104776
5*e^11)*m)*x^2 + 144*(63000*d^10*e + 4498200*d^9*e^2 + 1025570*d^
8*e^3 + 16893090*d^7*e^4 - 13427450*d^6*e^5 + 45284906*d^5*e^6 -
37254035*d^4*e^7 + 52296690*d^3*e^8 - 28438425*d^2*e^9 + 30235140
*d*e^10)*m + 3*(718502400*e^11 + 9*(5*d*e^10 + 2*e^11)*m^10 - 3*(
106*d^2*e^9 - 945*d*e^10 - 390*e^11)*m^9 + 2*(574*d^3*e^8 - 9540*
d^2*e^9 + 39015*d*e^10 + 16740*e^11)*m^8 - 2*(4436*d^4*e^7 - 3214
4*d^3*e^8 + 247086*d^2*e^9 - 615195*d*e^10 - 277290*e^11)*m^7 + (
20400*d^5*e^6 - 452472*d^4*e^7 + 1526840*d^3*e^8 - 7212240*d^2*e^
9 + 12236805*d*e^10 + 5879034*e^11)*m^6 - (239760*d^6*e^5 - 91800
0*d^5*e^6 + 9537400*d^4*e^7 - 19929280*d^3*e^8 + 64836702*d^2*e^9
 - 79518915*d*e^10 - 41597010*e^11)*m^5 - 4*(41160*d^7*e^4 + 2277
720*d^6*e^5 - 4105500*d^5*e^6 + 26582730*d^4*e^7 - 38586863*d^3*e
^8 + 91855890*d^2*e^9 - 84312180*d*e^10 - 49628655*e^11)*m^4 - 4*
(2570400*d^8*e^3 + 1234800*d^7*e^4 + 32307660*d^6*e^5 - 36490500*
d^5*e^6 + 165294232*d^4*e^7 - 177258088*d^3*e^8 + 320238402*d^2*e
^9 - 224755965*d*e^10 - 157352130*e^11)*m^3 - 48*(63000*d^9*e^2 +
 4498200*d^8*e^3 + 1025570*d^7*e^4 + 16893090*d^6*e^5 - 13427450*
d^5*e^6 + 45284906*d^4*e^7 - 37254035*d^3*e^8 + 52296690*d^2*e^9
- 28438425*d*e^10 - 26359101*e^11)*m^2 - 8640*(70000*d^10*e + 385
0*d^9*e^2 + 130900*d^8*e^3 + 18865*d^7*e^4 + 219780*d^6*e^5 - 130
900*d^5*e^6 + 341572*d^4*e^7 - 220990*d^3*e^8 + 244860*d^2*e^9 -
103950*d*e^10 - 167973*e^11)*m)*x)*(e*x + d)^m/(e^11*m^11 + 66*e^
11*m^10 + 1925*e^11*m^9 + 32670*e^11*m^8 + 357423*e^11*m^7 + 2637
558*e^11*m^6 + 13339535*e^11*m^5 + 45995730*e^11*m^4 + 105258076*
e^11*m^3 + 150917976*e^11*m^2 + 120543840*e^11*m + 39916800*e^11)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**m*(5*x**2+2*x+3)**3*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.321426, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^3*(e*x + d)^m,x, algori

[Out] Done
```

3.368 $\int (d+ex)^m \left(3+2x+5x^2\right)^2 \left(2+x+3x^2-5x^3+4x^4\right) \, dx$

Optimal. Leaf size=432

$$\frac{\left(2800d^2+315de+111e^2\right)(d+ex)^{m+7}}{e^9(m+7)}-\frac{\left(5600d^3+945d^2e+666de^2+37e^3\right)(d+ex)^{m+6}}{e^9(m+6)}+\frac{\left(5d^2-2de+3e^2\right)^2\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)(d+ex)^{m+1}}{e^9(m+1)}+\frac{\left(7000d^4+1575d^3e+1665d^2e^2+185de^3+148e^4\right)(d+ex)^{m+5}}{e^9(m+5)}-\frac{\left(5d^2-2de+3e^2\right)\left(160d^5+127d^4e+88d^3e^2-4d^2e^3+64de^4-11e^5\right)(d+ex)^{m+2}}{e^9(m+2)}-\frac{\left(5600d^5+1575d^4e+2220d^3e^2+370d^2e^3+592de^4-65e^5\right)(d+ex)^{m+4}}{e^9(m+4)}+\frac{\left(2800d^6+945d^5e+1665d^4e^2+370d^3e^3+888d^2e^4-195de^5+107e^6\right)(d+ex)^{m+3}}{e^9(m+3)}-\frac{5(160d+9e)(d+ex)^{m+8}}{e^9(m+8)}+\frac{100(d+ex)^{m+9}}{e^9(m+9)}$$

```
[Out] ((5*d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 +
 2*e^4)*(d + e*x)^(1 + m))/(e^9*(1 + m)) - ((5*d^2 - 2*d*e + 3*e^
2)*(160*d^5 + 127*d^4*e + 88*d^3*e^2 - 4*d^2*e^3 + 64*d*e^4 - 11*
e^5)*(d + e*x)^(2 + m))/(e^9*(2 + m)) + ((2800*d^6 + 945*d^5*e +
1665*d^4*e^2 + 370*d^3*e^3 + 888*d^2*e^4 - 195*d*e^5 + 107*e^6)*(
d + e*x)^(3 + m))/(e^9*(3 + m)) - ((5600*d^5 + 1575*d^4*e + 2220*
d^3*e^2 + 370*d^2*e^3 + 592*d*e^4 - 65*e^5)*(d + e*x)^(4 + m))/(e
^9*(4 + m)) + ((7000*d^4 + 1575*d^3*e + 1665*d^2*e^2 + 185*d*e^3
+ 148*e^4)*(d + e*x)^(5 + m))/(e^9*(5 + m)) - ((5600*d^3 + 945*d^
2*e + 666*d*e^2 + 37*e^3)*(d + e*x)^(6 + m))/(e^9*(6 + m)) + ((28
00*d^2 + 315*d*e + 111*e^2)*(d + e*x)^(7 + m))/(e^9*(7 + m)) - (5
*(160*d + 9*e)*(d + e*x)^(8 + m))/(e^9*(8 + m)) + (100*(d + e*x)^
(9 + m))/(e^9*(9 + m))
```

Rubi [A] time = 0.53114, antiderivative size = 432, normalized size of antiderivative = 1., number of

steps used = 2, number of rules used = 1, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.026$

$$\frac{(2800d^2 + 315de + 111e^2)(d + ex)^{m+7}}{e^9(m + 7)} - \frac{(5600d^3 + 945d^2e + 666de^2 + 37e^3)(d + ex)^{m+6}}{e^9(m + 6)} + \frac{(5d^2 - 2de + 3e^2)^2(4d^4 + 5d^3e + 3d^2e^2 - de^3 + 2e^4)(d + ex)^{m+1}}{e^9(m + 1)} + \frac{(7000d^4 + 1575d^3e + 1665d^2e^2 + 185de^3 + 148e^4)(d + ex)^{m+5}}{e^9(m + 5)} - \frac{(5d^2 - 2de + 3e^2)(160d^5 + 127d^4e + 88d^3e^2 - 4d^2e^3 + 64de^4 - 11e^5)(d + ex)^{m+2}}{e^9(m + 2)} - \frac{(5600d^5 + 1575d^4e + 2220d^3e^2 + 370d^2e^3 + 592de^4 - 65e^5)(d + ex)^{m+4}}{e^9(m + 4)} + \frac{(2800d^6 + 945d^5e + 1665d^4e^2 + 370d^3e^3 + 888d^2e^4 - 195de^5 + 107e^6)(d + ex)^{m+3}}{e^9(m + 3)} - \frac{5(160d + 9e)(d + ex)^{m+8}}{e^9(m + 8)} + \frac{100(d + ex)^{m+9}}{e^9(m + 9)}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)^m*(3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] ((5*d^2 - 2*d*e + 3*e^2)^2*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 +
 2*e^4)*(d + e*x)^(1 + m))/(e^9*(1 + m)) - ((5*d^2 - 2*d*e + 3*e^
2)*(160*d^5 + 127*d^4*e + 88*d^3*e^2 - 4*d^2*e^3 + 64*d*e^4 - 11*
e^5)*(d + e*x)^(2 + m))/(e^9*(2 + m)) + ((2800*d^6 + 945*d^5*e +
1665*d^4*e^2 + 370*d^3*e^3 + 888*d^2*e^4 - 195*d*e^5 + 107*e^6)*(
d + e*x)^(3 + m))/(e^9*(3 + m)) - ((5600*d^5 + 1575*d^4*e + 2220*
d^3*e^2 + 370*d^2*e^3 + 592*d*e^4 - 65*e^5)*(d + e*x)^(4 + m))/(e
^9*(4 + m)) + ((7000*d^4 + 1575*d^3*e + 1665*d^2*e^2 + 185*d*e^3
+ 148*e^4)*(d + e*x)^(5 + m))/(e^9*(5 + m)) - ((5600*d^3 + 945*d^
2*e + 666*d*e^2 + 37*e^3)*(d + e*x)^(6 + m))/(e^9*(6 + m)) + ((28
00*d^2 + 315*d*e + 111*e^2)*(d + e*x)^(7 + m))/(e^9*(7 + m)) - (5
*(160*d + 9*e)*(d + e*x)^(8 + m))/(e^9*(8 + m)) + (100*(d + e*x)^
(9 + m))/(e^9*(9 + m))
```

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((e*x+d)**m*(5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] Timed out
```

Mathematica [B] time = 5.07817, size = 1476, normalized size = 3.42

result too large to display

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)^m*(3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] ((d + e*x)^(1 + m)*(4032000*d^8 - 25200*d^7*e*(-81 + 160*x + m*(-
9 + 160*x)) + 720*d^6*e^2*(7992 - 2835*x + 5600*x^2 + 3*m*(629 -
1050*x + 2800*x^2) + m^2*(111 - 315*x + 2800*x^2)) - 120*d^5*e^3*
(12*m^2*(-74 + 999*x - 945*x^2 + 2800*x^3) + 6*(-3108 + 7992*x -
2835*x^2 + 5600*x^3) + m^3*(-37 + 666*x - 945*x^2 + 5600*x^3) + m
*(-7067 + 59274*x - 27405*x^2 + 61600*x^3)) + 24*d^4*e^4*(m^4*(14
8 - 185*x + 1665*x^2 - 1575*x^3 + 7000*x^4) + 25*m*(9768 - 5143*x
 + 16650*x^2 - 6615*x^3 + 14000*x^4) + 5*m^3*(888 - 925*x + 6660*
x^2 - 4725*x^3 + 14000*x^4) + 6*(74592 - 15540*x + 39960*x^2 - 14
175*x^3 + 28000*x^4) + 5*m^2*(9916 - 7955*x + 41625*x^2 - 20475*x
^3 + 49000*x^4)) - 6*d^3*e^5*(m^5*(65 + 592*x - 370*x^2 + 2220*x^
3 - 1575*x^4 + 5600*x^5) + 24*(40950 + 74592*x - 15540*x^2 + 3996
0*x^3 - 14175*x^4 + 28000*x^5) + m^4*(2275 + 18352*x - 9990*x^2 +
 51060*x^3 - 29925*x^4 + 84000*x^5) + 5*m^3*(6305 + 43216*x - 196
10*x^2 + 82140*x^3 - 39375*x^4 + 95200*x^5) + 5*m^2*(43225 + 2350
24*x - 83250*x^2 + 277500*x^3 - 114975*x^4 + 252000*x^5) + 2*m*(3
66405 + 1383504*x - 350390*x^2 + 992340*x^3 - 373275*x^4 + 767200
*x^5)) + 2*d^2*e^6*(m^6*(107 + 195*x + 888*x^2 - 370*x^3 + 1665*x
^4 - 945*x^5 + 2800*x^6) + 3*m^5*(1391 + 2340*x + 9768*x^2 - 3700
*x^3 + 14985*x^4 - 7560*x^5 + 19600*x^6) + 72*(89880 + 40950*x +
74592*x^2 - 15540*x^3 + 39960*x^4 - 14175*x^5 + 28000*x^6) + 15*m
^3*(37557 + 49530*x + 160728*x^2 - 47360*x^3 + 151515*x^4 - 62370
*x^5 + 137200*x^6) + m^4*(66875 + 101400*x + 379176*x^2 - 128020*
x^3 + 461205*x^4 - 207900*x^5 + 490000*x^6) + 6*m*(1073852 + 8578
05*x + 1831056*x^2 - 412550*x^3 + 1112220*x^4 - 407295*x^5 + 8232
00*x^6) + m^2*(2629418 + 2846805*x + 7675872*x^2 - 1949530*x^3 +
5651010*x^4 - 2172555*x^5 + 4547200*x^6)) - d*e^7*(m^7*(33 + 214*
x + 195*x^2 + 592*x^3 - 185*x^4 + 666*x^5 - 315*x^6 + 800*x^7) +
2*m^6*(693 + 4280*x + 3705*x^2 + 10656*x^3 - 3145*x^4 + 10656*x^5
 - 4725*x^6 + 11200*x^7) + 144*(41580 + 89880*x + 40950*x^2 + 745
92*x^3 - 15540*x^4 + 39960*x^5 - 14175*x^6 + 28000*x^7) + 2*m^5*(
12243 + 71048*x + 57720*x^2 + 155696*x^3 - 43105*x^4 + 137196*x^5
 - 57330*x^6 + 128800*x^7) + 2*m^4*(117810 + 630230*x + 472875*x^
2 + 1182816*x^3 - 305620*x^4 + 915750*x^5 - 363825*x^6 + 784000*x
^7) + 12*m*(663102 + 2152412*x + 1103505*x^2 + 2129424*x^3 - 4591
70*x^4 + 1208124*x^5 - 435645*x^6 + 871200*x^7) + 2*m^2*(2209977
+ 9072530*x + 5420220*x^2 + 11337984*x^3 - 2568355*x^4 + 6985674*
x^5 - 2579850*x^6 + 5252800*x^7) + m^3*(1332177 + 6385546*x + 433
2705*x^2 + 9939088*x^3 - 2395565*x^4 + 6805854*x^5 - 2595285*x^6
+ 5415200*x^7)) + e^8*(m^8*(3 + 2*x + 5*x^2)^2*(2 + x + 3*x^2 - 5
*x^3 + 4*x^4) + m^7*(792 + 1419*x + 4494*x^2 + 2665*x^3 + 5920*x^
4 - 1443*x^5 + 4218*x^6 - 1665*x^7 + 3600*x^8) + 2*m^6*(7434 + 12
```

```
936*x + 39804*x^2 + 22945*x^3 + 49580*x^4 - 11766*x^5 + 33522*x^6
 - 12915*x^7 + 27300*x^8) + 144*(45360 + 41580*x + 89880*x^2 + 40
950*x^3 + 74592*x^4 - 15540*x^5 + 39960*x^6 - 14175*x^7 + 28000*x
^8) + 2*m^5*(77616 + 130053*x + 386163*x^2 + 215345*x^3 + 451400*
x^4 - 104229*x^5 + 289821*x^6 - 109305*x^7 + 226800*x^8) + 12*m*(
995544 + 1162062*x + 2691692*x^2 + 1267305*x^3 + 2353200*x^4 - 49
6466*x^5 + 1288044*x^6 - 459945*x^7 + 913200*x^8) + m^4*(983682 +
 1567797*x + 4453233*x^2 + 2389985*x^3 + 4850404*x^4 - 1090353*x^
5 + 2965809*x^6 - 1098405*x^7 + 2244900*x^8) + 2*m^2*(4581036 + 6
188589*x + 15529766*x^2 + 7627230*x^3 + 14532120*x^4 - 3119359*x^
5 + 8193798*x^6 - 2953260*x^7 + 5906200*x^8) + m^3*(3864168 + 575
2131*x + 15458076*x^2 + 7946185*x^3 + 15608080*x^4 - 3422907*x^5
+ 9134412*x^6 - 3332385*x^7 + 6728400*x^8))))/(e^9*(1 + m)*(2 + m
)*(3 + m)*(4 + m)*(5 + m)*(6 + m)*(7 + m)*(8 + m)*(9 + m))
```

Maple [B] time = 0.03, size = 3222, normalized size = 7.5

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^m*(5*x^2+2*x+3)^2*(4*x^4-5*x^3+3*x^2+x+2),x)
```

```
[Out] (e*x+d)^(1+m)*(100*e^8*m^8*x^8-45*e^8*m^8*x^7+3600*e^8*m^7*x^8-80
0*d*e^7*m^7*x^7+111*e^8*m^8*x^6-1665*e^8*m^7*x^7+54600*e^8*m^6*x^
8+315*d*e^7*m^7*x^6-22400*d*e^7*m^6*x^7-37*e^8*m^8*x^5+4218*e^8*m
^7*x^6-25830*e^8*m^6*x^7+453600*e^8*m^5*x^8+5600*d^2*e^6*m^6*x^6-
666*d*e^7*m^7*x^5+9450*d*e^7*m^6*x^6-257600*d*e^7*m^5*x^7+148*e^8
*m^8*x^4-1443*e^8*m^7*x^5+67044*e^8*m^6*x^6-218610*e^8*m^5*x^7+22
44900*e^8*m^4*x^8-1890*d^2*e^6*m^6*x^5+117600*d^2*e^6*m^5*x^6+185
*d*e^7*m^7*x^4-21312*d*e^7*m^6*x^5+114660*d*e^7*m^5*x^6-1568000*d
*e^7*m^4*x^7+65*e^8*m^8*x^3+5920*e^8*m^7*x^4-23532*e^8*m^6*x^5+57
9642*e^8*m^5*x^6-1098405*e^8*m^4*x^7+6728400*e^8*m^3*x^8-33600*d^
3*e^5*m^5*x^5+3330*d^2*e^6*m^6*x^4-45360*d^2*e^6*m^5*x^5+980000*d
^2*e^6*m^4*x^6-592*d*e^7*m^7*x^3+6290*d*e^7*m^6*x^4-274392*d*e^7*
m^5*x^5+727650*d*e^7*m^4*x^6-5415200*d*e^7*m^3*x^7+107*e^8*m^8*x^
2+2665*e^8*m^7*x^3+99160*e^8*m^6*x^4-208458*e^8*m^5*x^5+2965809*e
^8*m^4*x^6-3332385*e^8*m^3*x^7+11812400*e^8*m^2*x^8+9450*d^3*e^5*
m^5*x^4-504000*d^3*e^5*m^4*x^5-740*d^2*e^6*m^6*x^3+89910*d^2*e^6*
m^5*x^4-415800*d^2*e^6*m^4*x^5+4116000*d^2*e^6*m^3*x^6-195*d*e^7*
m^7*x^2-21312*d*e^7*m^6*x^3+86210*d*e^7*m^5*x^4-1831500*d*e^7*m^4
*x^5+2595285*d*e^7*m^3*x^6-10505600*d*e^7*m^2*x^7+33*e^8*m^8*x+44
94*e^8*m^7*x^2+45890*e^8*m^6*x^3+902800*e^8*m^5*x^4-1090353*e^8*m
^4*x^5+9134412*e^8*m^3*x^6-5906520*e^8*m^2*x^7+10958400*e^8*m*x^8
+168000*d^4*e^4*m^4*x^4-13320*d^3*e^5*m^5*x^3+179550*d^3*e^5*m^4*
x^4-2856000*d^3*e^5*m^3*x^5+1776*d^2*e^6*m^6*x^2-22200*d^2*e^6*m^
5*x^3+922410*d^2*e^6*m^4*x^4-1871100*d^2*e^6*m^3*x^5+9094400*d^2*
e^6*m^2*x^6-214*d*e^7*m^7*x-7410*d*e^7*m^6*x^2-311392*d*e^7*m^5*x
^3+611240*d*e^7*m^4*x^4-6805854*d*e^7*m^3*x^5+5159700*d*e^7*m^2*x
```

^6-10454400*d*e^7*m*x^7+18*e^8*m^8+1419*e^8*m^7*x+79608*e^8*m^6*x^2+430690*e^8*m^5*x^3+4850404*e^8*m^4*x^4-3422907*e^8*m^3*x^5+16387596*e^8*m^2*x^6-5519340*e^8*m*x^7+4032000*e^8*x^8-37800*d^4*e^4*m^4*x^3+1680000*d^4*e^4*m^3*x^4+2220*d^3*e^5*m^5*x^2-306360*d^3*e^5*m^4*x^3+1181250*d^3*e^5*m^3*x^4-7560000*d^3*e^5*m^2*x^5+390*d^2*e^6*m^6*x+58608*d^2*e^6*m^5*x^2-256040*d^2*e^6*m^4*x^3+4545450*d^2*e^6*m^3*x^4-4345110*d^2*e^6*m^2*x^5+9878400*d^2*e^6*m*x^6-33*d*e^7*m^7-8560*d*e^7*m^6*x-115440*d*e^7*m^5*x^2-2365632*d*e^7*m^4*x^3+2395565*d*e^7*m^3*x^4-13971348*d*e^7*m^2*x^5+5227740*d*e^7*m*x^6-4032000*d*e^7*x^7+792*e^8*m^7+25872*e^8*m^6*x+772326*e^8*m^5*x^2+2389985*e^8*m^4*x^3+15608080*e^8*m^3*x^4-6238718*e^8*m^2*x^5+15456528*e^8*m*x^6-2041200*e^8*x^7-672000*d^5*e^3*m^3*x^3+39960*d^4*e^4*m^4*x^2-567000*d^4*e^4*m^3*x^3+5880000*d^4*e^4*m^2*x^4-3552*d^3*e^5*m^5*x+59940*d^3*e^5*m^4*x^2-2464200*d^3*e^5*m^3*x^3+3449250*d^3*e^5*m^2*x^4-9206400*d^3*e^5*m*x^5+214*d^2*e^6*m^6+14040*d^2*e^6*m^5*x+758352*d^2*e^6*m^4*x^2-1420800*d^2*e^6*m^3*x^3+11302020*d^2*e^6*m^2*x^4-4887540*d^2*e^6*m*x^5+4032000*d^2*e^6*x^6-1386*d*e^7*m^6-142096*d*e^7*m^5*x-945750*d*e^7*m^4*x^2-9939088*d*e^7*m^3*x^3+5136710*d*e^7*m^2*x^4-14497488*d*e^7*m*x^5+2041200*d*e^7*x^6+14868*e^8*m^6+260106*e^8*m^5*x+4453233*e^8*m^4*x^2+7946185*e^8*m^3*x^3+29064240*e^8*m^2*x^4-5957592*e^8*m*x^5+5754240*e^8*x^6+113400*d^5*e^3*m^3*x^2-4032000*d^5*e^3*m^2*x^3-4440*d^4*e^4*m^4*x+799200*d^4*e^4*m^3*x^2-2457000*d^4*e^4*m^2*x^3+8400000*d^4*e^4*m*x^4-390*d^3*e^5*m^5-110112*d^3*e^5*m^4*x+588300*d^3*e^5*m^3*x^2-8325000*d^3*e^5*m^2*x^3+4479300*d^3*e^5*m*x^4-4032000*d^3*e^5*x^5+8346*d^2*e^6*m^5+202800*d^2*e^6*m^4*x+4821840*d^2*e^6*m^3*x^2-3899060*d^2*e^6*m^2*x^3+13346640*d^2*e^6*m*x^4-2041200*d^2*e^6*x^5-24486*d*e^7*m^5-1260460*d*e^7*m^4*x-4332705*d*e^7*m^3*x^2-22675968*d*e^7*m^2*x^3+5510040*d*e^7*m*x^4-5754240*d*e^7*x^5+155232*e^8*m^5+1567797*e^8*m^4*x+15458076*e^8*m^3*x^2+15254460*e^8*m^2*x^3+28238400*e^8*m*x^4-2237760*e^8*x^5+2016000*d^6*e^2*m^2*x^2-79920*d^5*e^3*m^3*x+1360800*d^5*e^3*m^2*x^2-7392000*d^5*e^3*m*x^3+3552*d^4*e^4*m^4-111000*d^4*e^4*m^3*x+4995000*d^4*e^4*m^2*x^2-3969000*d^4*e^4*m*x^3+4032000*d^4*e^4*x^4-13650*d^3*e^5*m^4-1296480*d^3*e^5*m^3*x+2497500*d^3*e^5*m^2*x^2-11908080*d^3*e^5*m*x^3+2041200*d^3*e^5*x^4+133750*d^2*e^6*m^4+1485900*d^2*e^6*m^3*x+15351744*d^2*e^6*m^2*x^2-4950600*d^2*e^6*m*x^3+5754240*d^2*e^6*x^4-235620*d*e^7*m^4-6385546*d*e^7*m^3*x-10840440*d*e^7*m^2*x^2-25553088*d*e^7*m*x^3+2237760*d*e^7*x^4+983682*e^8*m^4+5752131*e^8*m^3*x+31059532*e^8*m^2*x^2+15207660*e^8*m*x^3+10741248*e^8*x^4-226800*d^6*e^2*m^2*x+6048000*d^6*e^2*m*x^2+4440*d^5*e^3*m^3-1438560*d^5*e^3*m^2*x+3288600*d^5*e^3*m*x^2-4032000*d^5*e^3*x^3+106560*d^4*e^4*m^3-954600*d^4*e^4*m^2*x+9990000*d^4*e^4*m*x^2-2041200*d^4*e^4*x^3-189150*d^3*e^5*m^3-7050720*d^3*e^5*m^2*x+4204680*d^3*e^5*m*x^2-5754240*d^3*e^5*x^3+1126710*d^2*e^6*m^3+5693610*d^2*e^6*m^2*x+21972672*d^2*e^6*m*x^2-2237760*d^2*e^6*x^3-1332177*d*e^7*m^3-18145060*d*e^7*m^2*x-13242060*d*e^7*m*x^2-10741248*d*e^7*x^3+3864168*e^8*m^3+12377178*e^8*m^2*x+32300304*e^8*m*x^2+5896800*e^8*x^3-4032000*d^7*e*m*x+79920*d^6*e^2*m^2-2268000*d^6*e^2*m*x+4032000*d^6*e^2*x^2+106560*d^5*e^3*m^2-7112880*d^5*e^3*m*x+2041200*d^5*e^3*x^2+1189920*d^4*e^4*m^2-3085800*d^4*e^4*m*x+5754240*d^4*e^4*x^2-1296750*d^3*e^5*m^2-16602048*d^3*e^5*m*x+2237760*d^3*e^5*x^2+5258836*d^2*e^6*m^2+10293660*d^2*e^6*m*x+10741248*d^2*e^6*x^2-4419954*d*e^7*m^2-25828944*d*e^7*m*x-5896800*d*e^7*x^2+9162072*e^8*m^2+13944744*e^8

```
*m*x+12942720*e^8*x^2+226800*d^7*e*m-4032000*d^7*e*x+1358640*d^6*
e^2*m-2041200*d^6*e^2*x+848040*d^5*e^3*m-5754240*d^5*e^3*x+586080
0*d^4*e^4*m-2237760*d^4*e^4*x-4396860*d^3*e^5*m-10741248*d^3*e^5*
x+12886224*d^2*e^6*m+5896800*d^2*e^6*x-7957224*d*e^7*m-12942720*d
*e^7*x+11946528*e^8*m+5987520*e^8*x+4032000*d^8+2041200*d^7*e+575
4240*d^6*e^2+2237760*d^5*e^3+10741248*d^4*e^4-5896800*d^3*e^5+129
42720*d^2*e^6-5987520*d*e^7+6531840*e^8)/e^9/(m^9+45*m^8+870*m^7+
9450*m^6+63273*m^5+269325*m^4+723680*m^3+1172700*m^2+1026576*m+36
2880)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2*(e*x + d)^m,x, algori
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.295684, size = 3775, normalized size = 8.74

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2*(e*x + d)^m,x, algori
```

```
[Out] (18*d*e^8*m^8 + 100*(e^9*m^8 + 36*e^9*m^7 + 546*e^9*m^6 + 4536*e^
9*m^5 + 22449*e^9*m^4 + 67284*e^9*m^3 + 118124*e^9*m^2 + 109584*e
^9*m + 40320*e^9)*x^9 + 4032000*d^9 + 2041200*d^8*e + 5754240*d^7
*e^2 + 2237760*d^6*e^3 + 10741248*d^5*e^4 - 5896800*d^4*e^5 + 129
42720*d^3*e^6 - 5987520*d^2*e^7 + 6531840*d*e^8 - 5*(408240*e^9 -
 (20*d*e^8 - 9*e^9)*m^8 - (560*d*e^8 - 333*e^9)*m^7 - 14*(460*d*e
^8 - 369*e^9)*m^6 - 14*(2800*d*e^8 - 3123*e^9)*m^5 - 7*(19340*d*e
^8 - 31383*e^9)*m^4 - 7*(37520*d*e^8 - 95211*e^9)*m^3 - 216*(1210
*d*e^8 - 5469*e^9)*m^2 - 36*(2800*d*e^8 - 30663*e^9)*m)*x^8 - 33*
(d^2*e^7 - 24*d*e^8)*m^7 + (5754240*e^9 - 3*(15*d*e^8 - 37*e^9)*m
^8 - 2*(400*d^2*e^7 + 675*d*e^8 - 2109*e^9)*m^7 - 12*(1400*d^2*e^
7 + 1365*d*e^8 - 5587*e^9)*m^6 - 14*(10000*d^2*e^7 + 7425*d*e^8 -
 41403*e^9)*m^5 - 21*(28000*d^2*e^7 + 17655*d*e^8 - 141229*e^9)*m
^4 - 28*(46400*d^2*e^7 + 26325*d*e^8 - 326229*e^9)*m^3 - 36*(3920
0*d^2*e^7 + 20745*d*e^8 - 455211*e^9)*m^2 - 144*(4000*d^2*e^7 + 2
025*d*e^8 - 107337*e^9)*m)*x^7 + 2*(107*d^3*e^6 - 693*d^2*e^7 + 7
434*d*e^8)*m^6 - (2237760*e^9 - 37*(3*d*e^8 - e^9)*m^8 - 3*(105*d
```

^2*e^7 + 1184*d*e^8 - 481*e^9)*m^7 - 4*(1400*d^3*e^6 + 1890*d^2*e
^7 + 11433*d*e^8 - 5883*e^9)*m^6 - 6*(14000*d^3*e^6 + 11550*d^2*e
^7 + 50875*d*e^8 - 34743*e^9)*m^5 - (476000*d^3*e^6 + 311850*d^2*
e^7 + 1134309*d*e^8 - 1090353*e^9)*m^4 - 3*(420000*d^3*e^6 + 2413
95*d^2*e^7 + 776186*d*e^8 - 1140969*e^9)*m^3 - 2*(767200*d^3*e^6
+ 407295*d^2*e^7 + 1208124*d*e^8 - 3119359*e^9)*m^2 - 24*(28000*d
^3*e^6 + 14175*d^2*e^7 + 39960*d*e^8 - 248233*e^9)*m)*x^6 - 6*(65
*d^4*e^5 - 1391*d^3*e^6 + 4081*d^2*e^7 - 25872*d*e^8)*m^5 + (1074
1248*e^9 - 37*(d*e^8 - 4*e^9)*m^8 - 74*(9*d^2*e^7 + 17*d*e^8 - 80
*e^9)*m^7 - 2*(945*d^3*e^6 + 8991*d^2*e^7 + 8621*d*e^8 - 49580*e^
9)*m^6 - 2*(16800*d^4*e^5 + 17955*d^3*e^6 + 92241*d^2*e^7 + 61124
*d*e^8 - 451400*e^9)*m^5 - (336000*d^4*e^5 + 236250*d^3*e^6 + 909
090*d^2*e^7 + 479113*d*e^8 - 4850404*e^9)*m^4 - 2*(588000*d^4*e^5
+ 344925*d^3*e^6 + 1130202*d^2*e^7 + 513671*d*e^8 - 7804040*e^9)
m^3 - 12(140000*d^4*e^5 + 74655*d^3*e^6 + 222444*d^2*e^7 + 9183
4*d*e^8 - 2422020*e^9)*m^2 - 144*(5600*d^4*e^5 + 2835*d^3*e^6 + 7
992*d^2*e^7 + 3108*d*e^8 - 196100*e^9)*m)*x^5 + 2*(1776*d^5*e^4 -
6825*d^4*e^5 + 66875*d^3*e^6 - 117810*d^2*e^7 + 491841*d*e^8)*m^
4 + (5896800*e^9 + (148*d*e^8 + 65*e^9)*m^8 + (185*d^2*e^7 + 5328
*d*e^8 + 2665*e^9)*m^7 + 2*(1665*d^3*e^6 + 2775*d^2*e^7 + 38924*d
*e^8 + 22945*e^9)*m^6 + 2*(4725*d^4*e^5 + 38295*d^3*e^6 + 32005*d
^2*e^7 + 295704*d*e^8 + 215345*e^9)*m^5 + (168000*d^5*e^4 + 14175
0*d^4*e^5 + 616050*d^3*e^6 + 355200*d^2*e^7 + 2484772*d*e^8 + 238
9985*e^9)*m^4 + (1008000*d^5*e^4 + 614250*d^4*e^5 + 2081250*d^3*e
^6 + 974765*d^2*e^7 + 5668992*d*e^8 + 7946185*e^9)*m^3 + 6*(30800
0*d^5*e^4 + 165375*d^4*e^5 + 496170*d^3*e^6 + 206275*d^2*e^7 + 10
64712*d*e^8 + 2542410*e^9)*m^2 + 36*(28000*d^5*e^4 + 14175*d^4*e^
5 + 39960*d^3*e^6 + 15540*d^2*e^7 + 74592*d*e^8 + 422435*e^9)*m)*
x^4 + 3*(1480*d^6*e^3 + 35520*d^5*e^4 - 63050*d^4*e^5 + 375570*d^
3*e^6 - 444059*d^2*e^7 + 1288056*d*e^8)*m^3 + (12942720*e^9 + (65
*d*e^8 + 107*e^9)*m^8 - 2*(296*d^2*e^7 - 1235*d*e^8 - 2247*e^9)*m
^7 - 4*(185*d^3*e^6 + 4884*d^2*e^7 - 9620*d*e^8 - 19902*e^9)*m^6
- 2*(6660*d^4*e^5 + 9990*d^3*e^6 + 126392*d^2*e^7 - 157625*d*e^8
- 386163*e^9)*m^5 - (37800*d^5*e^4 + 266400*d^4*e^5 + 196100*d^3*
e^6 + 1607280*d^2*e^7 - 1444235*d*e^8 - 4453233*e^9)*m^4 - 4*(168
000*d^6*e^3 + 113400*d^5*e^4 + 416250*d^4*e^5 + 208125*d^3*e^6 +
1279312*d^2*e^7 - 903370*d*e^8 - 3864519*e^9)*m^3 - 4*(504000*d^6
*e^3 + 274050*d^5*e^4 + 832500*d^4*e^5 + 350390*d^3*e^6 + 1831056
*d^2*e^7 - 1103505*d*e^8 - 7764883*e^9)*m^2 - 48*(28000*d^6*e^3 +
14175*d^5*e^4 + 39960*d^4*e^5 + 15540*d^3*e^6 + 74592*d^2*e^7 -
40950*d*e^8 - 672923*e^9)*m)*x^3 + 2*(39960*d^7*e^2 + 53280*d^6*e
^3 + 594960*d^5*e^4 - 648375*d^4*e^5 + 2629418*d^3*e^6 - 2209977*
d^2*e^7 + 4581036*d*e^8)*m^2 + (5987520*e^9 + (107*d*e^8 + 33*e^9
)*m^8 - (195*d^2*e^7 - 4280*d*e^8 - 1419*e^9)*m^7 + 4*(444*d^3*e^
6 - 1755*d^2*e^7 + 17762*d*e^8 + 6468*e^9)*m^6 + 2*(1110*d^4*e^5
+ 27528*d^3*e^6 - 50700*d^2*e^7 + 315115*d*e^8 + 130053*e^9)*m^5
+ (39960*d^5*e^4 + 55500*d^4*e^5 + 648240*d^3*e^6 - 742950*d^2*e^
7 + 3192773*d*e^8 + 1567797*e^9)*m^4 + (113400*d^6*e^3 + 719280*d
^5*e^4 + 477300*d^4*e^5 + 3525360*d^3*e^6 - 2846805*d^2*e^7 + 907
2530*d*e^8 + 5752131*e^9)*m^3 + 6*(336000*d^7*e^2 + 189000*d^6*e^
3 + 592740*d^5*e^4 + 257150*d^4*e^5 + 1383504*d^3*e^6 - 857805*d^
2*e^7 + 2152412*d*e^8 + 2062863*e^9)*m^2 + 72*(28000*d^7*e^2 + 14
175*d^6*e^3 + 39960*d^5*e^4 + 15540*d^4*e^5 + 74592*d^3*e^6 - 409
50*d^2*e^7 + 89880*d*e^8 + 193677*e^9)*m)*x^2 + 12*(18900*d^8*e +

```
 113220*d^7*e^2 + 70670*d^6*e^3 + 488400*d^5*e^4 - 366405*d^4*e^5
 + 1073852*d^3*e^6 - 663102*d^2*e^7 + 995544*d*e^8)*m + (6531840*
e^9 + 3*(11*d*e^8 + 6*e^9)*m^8 - 2*(107*d^2*e^7 - 693*d*e^8 - 396
*e^9)*m^7 + 6*(65*d^3*e^6 - 1391*d^2*e^7 + 4081*d*e^8 + 2478*e^9)
*m^6 - 2*(1776*d^4*e^5 - 6825*d^3*e^6 + 66875*d^2*e^7 - 117810*d*
e^8 - 77616*e^9)*m^5 - 3*(1480*d^5*e^4 + 35520*d^4*e^5 - 63050*d^
3*e^6 + 375570*d^2*e^7 - 444059*d*e^8 - 327894*e^9)*m^4 - 2*(3996
0*d^6*e^3 + 53280*d^5*e^4 + 594960*d^4*e^5 - 648375*d^3*e^6 + 262
9418*d^2*e^7 - 2209977*d*e^8 - 1932084*e^9)*m^3 - 12*(18900*d^7*e
^2 + 113220*d^6*e^3 + 70670*d^5*e^4 + 488400*d^4*e^5 - 366405*d^3
*e^6 + 1073852*d^2*e^7 - 663102*d*e^8 - 763506*e^9)*m^2 - 144*(28
000*d^8*e + 14175*d^7*e^2 + 39960*d^6*e^3 + 15540*d^5*e^4 + 74592
*d^4*e^5 - 40950*d^3*e^6 + 89880*d^2*e^7 - 41580*d*e^8 - 82962*e^
9)*m)*x)*(e*x + d)^m/(e^9*m^9 + 45*e^9*m^8 + 870*e^9*m^7 + 9450*e
^9*m^6 + 63273*e^9*m^5 + 269325*e^9*m^4 + 723680*e^9*m^3 + 117270
0*e^9*m^2 + 1026576*e^9*m + 362880*e^9)
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)**m*(5*x**2+2*x+3)**2*(4*x**4-5*x**3+3*x**2+x+2),x)

[Out] Timed out
```

GIAC/XCAS [A] time = 0.292041, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)^2*(e*x + d)^m,x, algori

[Out] Done
```

3.369 $\int (d+ex)^m \left(3+2x+5x^2\right) \left(2+x+3x^2-5x^3+4x^4\right) \, dx$

Optimal. Leaf size=292

$$\frac{\left(300d^2+85de+17e^2\right)(d+ex)^{m+5}}{e^7(m+5)}-\frac{2\left(200d^3+85d^2e+34de^2+2e^3\right)(d+ex)^{m+4}}{e^7(m+4)}+\frac{\left(5d^2-2de+3e^2\right)\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)(d+ex)^{m+1}}{e^7(m+1)}+\frac{\left(300d^4+170d^3e+102d^2e^2+12de^3+21e^4\right)(d+ex)^{m+3}}{e^7(m+3)}-\frac{\left(120d^5+85d^4e+68d^3e^2+12d^2e^3+42de^4-7e^5\right)(d+ex)^{m+2}}{e^7(m+2)}-\frac{(120d+17e)(d+ex)^{m+6}}{e^7(m+6)}+\frac{20(d+ex)^{m+7}}{e^7(m+7)}$$

```
[Out] ((5*d^2 - 2*d*e + 3*e^2)*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2
*e^4)*(d + e*x)^(1 + m))/(e^7*(1 + m)) - ((120*d^5 + 85*d^4*e + 6
8*d^3*e^2 + 12*d^2*e^3 + 42*d*e^4 - 7*e^5)*(d + e*x)^(2 + m))/(e^
7*(2 + m)) + ((300*d^4 + 170*d^3*e + 102*d^2*e^2 + 12*d*e^3 + 21*
e^4)*(d + e*x)^(3 + m))/(e^7*(3 + m)) - (2*(200*d^3 + 85*d^2*e +
34*d*e^2 + 2*e^3)*(d + e*x)^(4 + m))/(e^7*(4 + m)) + ((300*d^2 +
85*d*e + 17*e^2)*(d + e*x)^(5 + m))/(e^7*(5 + m)) - ((120*d + 17*
e)*(d + e*x)^(6 + m))/(e^7*(6 + m)) + (20*(d + e*x)^(7 + m))/(e^7
*(7 + m))
```

Rubi [A] time = 0.349797, antiderivative size = 292, normalized size of antiderivative = 1., number of steps used = 2, number of rules used = 1, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.028$

$$\frac{\left(300d^2+85de+17e^2\right)(d+ex)^{m+5}}{e^7(m+5)}-\frac{2\left(200d^3+85d^2e+34de^2+2e^3\right)(d+ex)^{m+4}}{e^7(m+4)}+\frac{\left(5d^2-2de+3e^2\right)\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)(d+ex)^{m+1}}{e^7(m+1)}+\frac{\left(300d^4+170d^3e+102d^2e^2+12de^3+21e^4\right)(d+ex)^{m+3}}{e^7(m+3)}-\frac{\left(120d^5+85d^4e+68d^3e^2+12d^2e^3+42de^4-7e^5\right)(d+ex)^{m+2}}{e^7(m+2)}-\frac{(120d+17e)(d+ex)^{m+6}}{e^7(m+6)}+\frac{20(d+ex)^{m+7}}{e^7(m+7)}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x)^m*(3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] ((5*d^2 - 2*d*e + 3*e^2)*(4*d^4 + 5*d^3*e + 3*d^2*e^2 - d*e^3 + 2
*e^4)*(d + e*x)^(1 + m))/(e^7*(1 + m)) - ((120*d^5 + 85*d^4*e + 6
8*d^3*e^2 + 12*d^2*e^3 + 42*d*e^4 - 7*e^5)*(d + e*x)^(2 + m))/(e^
7*(2 + m)) + ((300*d^4 + 170*d^3*e + 102*d^2*e^2 + 12*d*e^3 + 21*
e^4)*(d + e*x)^(3 + m))/(e^7*(3 + m)) - (2*(200*d^3 + 85*d^2*e +
34*d*e^2 + 2*e^3)*(d + e*x)^(4 + m))/(e^7*(4 + m)) + ((300*d^2 +
85*d*e + 17*e^2)*(d + e*x)^(5 + m))/(e^7*(5 + m)) - ((120*d + 17*
e)*(d + e*x)^(6 + m))/(e^7*(6 + m)) + (20*(d + e*x)^(7 + m))/(e^7
*(7 + m))
```

Rubi in Sympy [A] time = 129.158, size = 274, normalized size = 0.94

$$\frac{(d+ex)^{m+1}\left(5d^2-2de+3e^2\right)\left(4d^4+5d^3e+3d^2e^2-de^3+2e^4\right)}{e^7(m+1)} - \frac{(d+ex)^{m+2}\left(120d^5+85d^4e+68d^3e^2+12d^2e^3+42de^4-7e^5\right)}{e^7(m+2)} + \frac{(d+ex)^{m+3}\left(300d^4+170d^3e+102d^2e^2+12de^3+21e^4\right)}{e^7(m+3)} - \frac{2(d+ex)^{m+4}\left(200d^3+85d^2e+34de^2+2e^3\right)}{e^7(m+4)} + \frac{(d+ex)^{m+5}\left(300d^2+85de+17e^2\right)}{e^7(m+5)} - \frac{(d+ex)^{m+6}(120d+17e)}{e^7(m+6)} + \frac{20(d+ex)^{m+7}}{e^7(m+7)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x+d)**m*(5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] (d + e*x)**(m + 1)*(5*d**2 - 2*d*e + 3*e**2)*(4*d**4 + 5*d**3*e +
 3*d**2*e**2 - d*e**3 + 2*e**4)/(e**7*(m + 1)) - (d + e*x)**(m +
2)*(120*d**5 + 85*d**4*e + 68*d**3*e**2 + 12*d**2*e**3 + 42*d*e**
4 - 7*e**5)/(e**7*(m + 2)) + (d + e*x)**(m + 3)*(300*d**4 + 170*d
**3*e + 102*d**2*e**2 + 12*d*e**3 + 21*e**4)/(e**7*(m + 3)) - 2*(
d + e*x)**(m + 4)*(200*d**3 + 85*d**2*e + 34*d*e**2 + 2*e**3)/(e*
*7*(m + 4)) + (d + e*x)**(m + 5)*(300*d**2 + 85*d*e + 17*e**2)/(e
**7*(m + 5)) - (d + e*x)**(m + 6)*(120*d + 17*e)/(e**7*(m + 6)) +
 20*(d + e*x)**(m + 7)/(e**7*(m + 7))
```

Mathematica [B] time = 1.98358, size = 743, normalized size = 2.54

$$\frac{(d+ex)^{m+1}\left(14400d^6-120d^5e(m(120x-17)+120x-119)+24d^4e^2\left(m^2\left(300x^2-85x+17\right)+m\left(900x^2-680x+221\right)+\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x)^m*(3 + 2*x + 5*x^2)*(2 + x + 3*x^2 - 5*x^3 + 4*x^4),x]
```

```
[Out] ((d + e*x)^(1 + m)*(14400*d^6 - 120*d^5*e*(-119 + 120*x + m*(-17
+ 120*x)) + 24*d^4*e^2*(714 - 595*x + 600*x^2 + m^2*(17 - 85*x +
300*x^2) + m*(221 - 680*x + 900*x^2)) - 12*d^3*e^3*(m^3*(-2 + 34*
x - 85*x^2 + 200*x^3) + 2*(-210 + 714*x - 595*x^2 + 600*x^3) + 2*
m^2*(-18 + 238*x - 425*x^2 + 600*x^3) + m*(-214 + 1870*x - 1955*x
^2 + 2200*x^3)) + 2*d^2*e^4*(m^4*(21 - 12*x + 102*x^2 - 170*x^3 +
 300*x^4) + 12*(1470 - 210*x + 714*x^2 - 595*x^3 + 600*x^4) + 2*m
^3*(231 - 114*x + 816*x^2 - 1105*x^3 + 1500*x^4) + 2*m*(6699 - 19
02*x + 7752*x^2 - 7055*x^3 + 7500*x^4) + m^2*(3759 - 1500*x + 846
6*x^2 - 9010*x^3 + 10500*x^4)) - d*e^5*(m^5*(7 + 42*x - 12*x^2 +
68*x^3 - 85*x^4 + 120*x^5) + 24*(735 + 1470*x - 210*x^2 + 714*x^3
 - 595*x^4 + 600*x^5) + m^4*(175 + 966*x - 252*x^2 + 1292*x^3 - 1
445*x^4 + 1800*x^5) + m^3*(1715 + 8442*x - 1956*x^2 + 8908*x^3 -
8925*x^4 + 10200*x^5) + 2*m*(9639 + 31038*x - 5064*x^2 + 18360*x^
3 - 15895*x^4 + 16440*x^5) + m^2*(8225 + 34314*x - 6804*x^2 + 272
68*x^3 - 25075*x^4 + 27000*x^5)) + e^6*(m^6*(6 + 7*x + 21*x^2 - 4
*x^3 + 17*x^4 - 17*x^5 + 20*x^6) + m^5*(162 + 182*x + 525*x^2 - 9
6*x^3 + 391*x^4 - 374*x^5 + 420*x^6) + 24*(1260 + 735*x + 1470*x^
2 - 210*x^3 + 714*x^4 - 595*x^5 + 600*x^6) + m^4*(1770 + 1890*x +
 5187*x^2 - 904*x^3 + 3519*x^4 - 3230*x^5 + 3500*x^6) + m^3*(9990
 + 9940*x + 25599*x^2 - 4224*x^3 + 15725*x^4 - 13940*x^5 + 14700*
x^6) + 2*m*(24084 + 18459*x + 39858*x^2 - 5904*x^3 + 20502*x^4 -
17323*x^5 + 17640*x^6) + m^2*(30624 + 27503*x + 65352*x^2 - 10180
*x^3 + 36448*x^4 - 31433*x^5 + 32480*x^6))))/(e^7*(1 + m)*(2 + m)
*(3 + m)*(4 + m)*(5 + m)*(6 + m)*(7 + m))
```

Maple [B] time = 0.016, size = 1504, normalized size = 5.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^m*(5*x^2+2*x+3)*(4*x^4-5*x^3+3*x^2+x+2),x)
```

```
[Out] (e*x+d)^(1+m)*(20*e^6*m^6*x^6-17*e^6*m^6*x^5+420*e^6*m^5*x^6-120*
d*e^5*m^5*x^5+17*e^6*m^6*x^4-374*e^6*m^5*x^5+3500*e^6*m^4*x^6+85*
d*e^5*m^5*x^4-1800*d*e^5*m^4*x^5-4*e^6*m^6*x^3+391*e^6*m^5*x^4-32
30*e^6*m^4*x^5+14700*e^6*m^3*x^6+600*d^2*e^4*m^4*x^4-68*d*e^5*m^5
*x^3+1445*d*e^5*m^4*x^4-10200*d*e^5*m^3*x^5+21*e^6*m^6*x^2-96*e^6
*m^5*x^3+3519*e^6*m^4*x^4-13940*e^6*m^3*x^5+32480*e^6*m^2*x^6-340
*d^2*e^4*m^4*x^3+6000*d^2*e^4*m^3*x^4+12*d*e^5*m^5*x^2-1292*d*e^5
*m^4*x^3+8925*d*e^5*m^3*x^4-27000*d*e^5*m^2*x^5+7*e^6*m^6*x+525*e
^6*m^5*x^2-904*e^6*m^4*x^3+15725*e^6*m^3*x^4-31433*e^6*m^2*x^5+35
280*e^6*m*x^6-2400*d^3*e^3*m^3*x^3+204*d^2*e^4*m^4*x^2-4420*d^2*e
^4*m^3*x^3+21000*d^2*e^4*m^2*x^4-42*d*e^5*m^5*x+252*d*e^5*m^4*x^2
-8908*d*e^5*m^3*x^3+25075*d*e^5*m^2*x^4-32880*d*e^5*m*x^5+6*e^6*m
^6+182*e^6*m^5*x+5187*e^6*m^4*x^2-4224*e^6*m^3*x^3+36448*e^6*m^2*
```

```
x^4-34646*e^6*m*x^5+14400*e^6*x^6+1020*d^3*e^3*m^3*x^2-14400*d^3*
e^3*m^2*x^3-24*d^2*e^4*m^4*x+3264*d^2*e^4*m^3*x^2-18020*d^2*e^4*m
^2*x^3+30000*d^2*e^4*m*x^4-7*d*e^5*m^5-966*d*e^5*m^4*x+1956*d*e^5
*m^3*x^2-27268*d*e^5*m^2*x^3+31790*d*e^5*m*x^4-14400*d*e^5*x^5+16
2*e^6*m^5+1890*e^6*m^4*x+25599*e^6*m^3*x^2-10180*e^6*m^2*x^3+4100
4*e^6*m*x^4-14280*e^6*x^5+7200*d^4*e^2*m^2*x^2-408*d^3*e^3*m^3*x+
10200*d^3*e^3*m^2*x^2-26400*d^3*e^3*m*x^3+42*d^2*e^4*m^4-456*d^2*
e^4*m^3*x+16932*d^2*e^4*m^2*x^2-28220*d^2*e^4*m*x^3+14400*d^2*e^4
*x^4-175*d*e^5*m^4-8442*d*e^5*m^3*x+6804*d*e^5*m^2*x^2-36720*d*e^
5*m*x^3+14280*d*e^5*x^4+1770*e^6*m^4+9940*e^6*m^3*x+65352*e^6*m^2
*x^2-11808*e^6*m*x^3+17136*e^6*x^4-2040*d^4*e^2*m^2*x+21600*d^4*e
^2*m*x^2+24*d^3*e^3*m^3-5712*d^3*e^3*m^2*x+23460*d^3*e^3*m*x^2-14
400*d^3*e^3*x^3+924*d^2*e^4*m^3-3000*d^2*e^4*m^2*x+31008*d^2*e^4*
m*x^2-14280*d^2*e^4*x^3-1715*d*e^5*m^3-34314*d*e^5*m^2*x+10128*d*
e^5*m*x^2-17136*d*e^5*x^3+9990*e^6*m^3+27503*e^6*m^2*x+79716*e^6*
m*x^2-5040*e^6*x^3-14400*d^5*e*m*x+408*d^4*e^2*m^2-16320*d^4*e^2*
m*x+14400*d^4*e^2*x^2+432*d^3*e^3*m^2-22440*d^3*e^3*m*x+14280*d^3
*e^3*x^2+7518*d^2*e^4*m^2-7608*d^2*e^4*m*x+17136*d^2*e^4*x^2-8225
*d*e^5*m^2-62076*d*e^5*m*x+5040*d*e^5*x^2+30624*e^6*m^2+36918*e^6
*m*x+35280*e^6*x^2+2040*d^5*e*m-14400*d^5*e*x+5304*d^4*e^2*m-1428
0*d^4*e^2*x+2568*d^3*e^3*m-17136*d^3*e^3*x+26796*d^2*e^4*m-5040*d
^2*e^4*x-19278*d*e^5*m-35280*d*e^5*x+48168*e^6*m+17640*e^6*x+1440
0*d^6+14280*d^5*e+17136*d^4*e^2+5040*d^3*e^3+35280*d^2*e^4-17640*
d*e^5+30240*e^6)/e^7/(m^7+28*m^6+322*m^5+1960*m^4+6769*m^3+13132*
m^2+13068*m+5040)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)*(e*x + d)^m,x, algorith
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.279778, size = 1955, normalized size = 6.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)*(e*x + d)^m,x, algorith
```

```
[Out] (6*d*e^6*m^6 + 20*(e^7*m^6 + 21*e^7*m^5 + 175*e^7*m^4 + 735*e^7*m
^3 + 1624*e^7*m^2 + 1764*e^7*m + 720*e^7)*x^7 + 14400*d^7 + 14280
```

```
*d^6*e + 17136*d^5*e^2 + 5040*d^4*e^3 + 35280*d^3*e^4 - 17640*d^2
*e^5 + 30240*d*e^6 - (14280*e^7 - (20*d*e^6 - 17*e^7)*m^6 - 2*(15
0*d*e^6 - 187*e^7)*m^5 - 170*(10*d*e^6 - 19*e^7)*m^4 - 20*(225*d*
e^6 - 697*e^7)*m^3 - (5480*d*e^6 - 31433*e^7)*m^2 - 2*(1200*d*e^6
 - 17323*e^7)*m)*x^6 - (7*d^2*e^5 - 162*d*e^6)*m^5 + (17136*e^7 -
 17*(d*e^6 - e^7)*m^6 - (120*d^2*e^5 + 289*d*e^6 - 391*e^7)*m^5 -
 3*(400*d^2*e^5 + 595*d*e^6 - 1173*e^7)*m^4 - 5*(840*d^2*e^5 + 10
03*d*e^6 - 3145*e^7)*m^3 - 2*(3000*d^2*e^5 + 3179*d*e^6 - 18224*e
^7)*m^2 - 12*(240*d^2*e^5 + 238*d*e^6 - 3417*e^7)*m)*x^5 + (42*d^
3*e^4 - 175*d^2*e^5 + 1770*d*e^6)*m^4 - (5040*e^7 - (17*d*e^6 - 4
*e^7)*m^6 - (85*d^2*e^5 + 323*d*e^6 - 96*e^7)*m^5 - (600*d^3*e^4
+ 1105*d^2*e^5 + 2227*d*e^6 - 904*e^7)*m^4 - (3600*d^3*e^4 + 4505
*d^2*e^5 + 6817*d*e^6 - 4224*e^7)*m^3 - 5*(1320*d^3*e^4 + 1411*d^
2*e^5 + 1836*d*e^6 - 2036*e^7)*m^2 - 6*(600*d^3*e^4 + 595*d^2*e^5
 + 714*d*e^6 - 1968*e^7)*m)*x^4 + (24*d^4*e^3 + 924*d^3*e^4 - 171
5*d^2*e^5 + 9990*d*e^6)*m^3 + (35280*e^7 - (4*d*e^6 - 21*e^7)*m^6
 - (68*d^2*e^5 + 84*d*e^6 - 525*e^7)*m^5 - (340*d^3*e^4 + 1088*d^
2*e^5 + 652*d*e^6 - 5187*e^7)*m^4 - (2400*d^4*e^3 + 3400*d^3*e^4
+ 5644*d^2*e^5 + 2268*d*e^6 - 25599*e^7)*m^3 - 4*(1800*d^4*e^3 +
1955*d^3*e^4 + 2584*d^2*e^5 + 844*d*e^6 - 16338*e^7)*m^2 - 4*(120
0*d^4*e^3 + 1190*d^3*e^4 + 1428*d^2*e^5 + 420*d*e^6 - 19929*e^7)*
m)*x^3 + (408*d^5*e^2 + 432*d^4*e^3 + 7518*d^3*e^4 - 8225*d^2*e^5
 + 30624*d*e^6)*m^2 + (17640*e^7 + 7*(3*d*e^6 + e^7)*m^6 + (12*d^
2*e^5 + 483*d*e^6 + 182*e^7)*m^5 + 3*(68*d^3*e^4 + 76*d^2*e^5 + 1
407*d*e^6 + 630*e^7)*m^4 + (1020*d^4*e^3 + 2856*d^3*e^4 + 1500*d^
2*e^5 + 17157*d*e^6 + 9940*e^7)*m^3 + (7200*d^5*e^2 + 8160*d^4*e^
3 + 11220*d^3*e^4 + 3804*d^2*e^5 + 31038*d*e^6 + 27503*e^7)*m^2 +
 6*(1200*d^5*e^2 + 1190*d^4*e^3 + 1428*d^3*e^4 + 420*d^2*e^5 + 29
40*d*e^6 + 6153*e^7)*m)*x^2 + 6*(340*d^6*e + 884*d^5*e^2 + 428*d^
4*e^3 + 4466*d^3*e^4 - 3213*d^2*e^5 + 8028*d*e^6)*m + (30240*e^7
+ (7*d*e^6 + 6*e^7)*m^6 - (42*d^2*e^5 - 175*d*e^6 - 162*e^7)*m^5
- (24*d^3*e^4 + 924*d^2*e^5 - 1715*d*e^6 - 1770*e^7)*m^4 - (408*d
^4*e^3 + 432*d^3*e^4 + 7518*d^2*e^5 - 8225*d*e^6 - 9990*e^7)*m^3
- 6*(340*d^5*e^2 + 884*d^4*e^3 + 428*d^3*e^4 + 4466*d^2*e^5 - 321
3*d*e^6 - 5104*e^7)*m^2 - 24*(600*d^6*e + 595*d^5*e^2 + 714*d^4*e
^3 + 210*d^3*e^4 + 1470*d^2*e^5 - 735*d*e^6 - 2007*e^7)*m)*x)*(e*
x + d)^m/(e^7*m^7 + 28*e^7*m^6 + 322*e^7*m^5 + 1960*e^7*m^4 + 676
9*e^7*m^3 + 13132*e^7*m^2 + 13068*e^7*m + 5040*e^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((e*x+d)**m*(5*x**2+2*x+3)*(4*x**4-5*x**3+3*x**2+x+2),x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.277309, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(5*x^2 + 2*x + 3)*(e*x + d)^m,x, algorith
```

```
[Out] Done
```

3.370 $\int \frac{(d+ex)^m (2+x+3x^2-5x^3+4x^4)}{3+2x+5x^2} \, dx$

Optimal. Leaf size=254

$$\frac{(100d^2+165de+81e^2)(d+ex)^{m+1}}{125e^3(m+1)}-\frac{(40d+33e)(d+ex)^{m+2}}{25e^3(m+2)}+\frac{4(d+ex)^{m+3}}{5e^3(m+3)}-\frac{\left(423\sqrt{14}+6412i\right)(d+ex)^{m+1}{}_2F_1\left(1,m+1;m+2;\frac{5(d+ex)}{5d-i\sqrt{14}e-e}\right)}{3500(m+1)\left(5id-\left(-\sqrt{14}+i\right)e\right)}-\frac{\left(-423\sqrt{14}+6412i\right)(d+ex)^{m+1}{}_2F_1\left(1,m+1;m+2;\frac{5(d+ex)}{5d+i\sqrt{14}e-e}\right)}{3500(m+1)\left(5id-\left(\sqrt{14}+i\right)e\right)}$$

```
[Out] ((100*d^2 + 165*d*e + 81*e^2)*(d + e*x)^(1 + m))/(125*e^3*(1 + m)
) - ((40*d + 33*e)*(d + e*x)^(2 + m))/(25*e^3*(2 + m)) + (4*(d +
e*x)^(3 + m))/(5*e^3*(3 + m)) - ((6412*I + 423*Sqrt[14])*(d + e*x
)^(1 + m)*Hypergeometric2F1[1, 1 + m, 2 + m, (5*(d + e*x))/(5*d -
 e - I*Sqrt[14]*e)])/(3500*((5*I)*d - (I - Sqrt[14])*e)*(1 + m))
- ((6412*I - 423*Sqrt[14])*(d + e*x)^(1 + m)*Hypergeometric2F1[1,
 1 + m, 2 + m, (5*(d + e*x))/(5*d - e + I*Sqrt[14]*e)])/(3500*((5
*I)*d - (I + Sqrt[14])*e)*(1 + m))
```

Rubi [A] time = 0.702292, antiderivative size = 254, normalized size of antiderivative = 1., number of steps used = 4, number of rules used = 2, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.053$

$$\frac{(100d^2+165de+81e^2)(d+ex)^{m+1}}{125e^3(m+1)}-\frac{(40d+33e)(d+ex)^{m+2}}{25e^3(m+2)}+\frac{4(d+ex)^{m+3}}{5e^3(m+3)}-\frac{\left(423\sqrt{14}+6412i\right)(d+ex)^{m+1}{}_2F_1\left(1,m+1;m+2;\frac{5(d+ex)}{5d-i\sqrt{14}e-e}\right)}{3500(m+1)\left(5id-\left(-\sqrt{14}+i\right)e\right)}-\frac{\left(-423\sqrt{14}+6412i\right)(d+ex)^{m+1}{}_2F_1\left(1,m+1;m+2;\frac{5(d+ex)}{5d+i\sqrt{14}e-e}\right)}{3500(m+1)\left(5id-\left(\sqrt{14}+i\right)e\right)}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^m*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2),x]
```


```
[Out] ((100*d^2 + 165*d*e + 81*e^2)*(d + e*x)^(1 + m))/(125*e^3*(1 + m)
) - ((40*d + 33*e)*(d + e*x)^(2 + m))/(25*e^3*(2 + m)) + (4*(d +
e*x)^(3 + m))/(5*e^3*(3 + m)) - ((6412*I + 423*Sqrt[14])*(d + e*x
)^(1 + m)*Hypergeometric2F1[1, 1 + m, 2 + m, (5*(d + e*x))/(5*d -
 e - I*Sqrt[14]*e)])/(3500*((5*I)*d - (I - Sqrt[14])*e)*(1 + m))
```

```
- ((6412*I - 423*Sqrt[14])*(d + e*x)^(1 + m)*Hypergeometric2F1[1,
 1 + m, 2 + m, (5*(d + e*x))/(5*d - e + I*Sqrt[14]*e)])/(3500*((5
*I)*d - (I + Sqrt[14])*e)*(1 + m))
```

Rubi in Sympy [A] time = 120.015, size = 202, normalized size = 0.8

$$-\frac{\left(6412+423\sqrt{14}i\right)(d+ex)^{m+1}\,{}_2F_1\left(\begin{matrix}1,m+1\\ m+2\end{matrix}\middle|\frac{5d+5ex}{5d-e+\sqrt{14}ie}\right)}{3500(m+1)\left(5d-e+\sqrt{14}ie\right)}-\frac{\left(6412-423\sqrt{14}i\right)(d+ex)^{m+1}\,{}_2F_1\left(\begin{matrix}1,m+1\\ m+2\end{matrix}\middle|\frac{5d+5ex}{5d-e-\sqrt{14}ie}\right)}{3500\left(5d-e\left(1+\sqrt{14}i\right)\right)(m+1)}+\frac{(d+ex)^{m+1}\left(100d^2+165de+81e^2\right)}{125e^3(m+1)}-\frac{(d+ex)^{m+2}(40d+33e)}{25e^3(m+2)}+\frac{4(d+ex)^{m+3}}{5e^3(m+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((e*x+d)**m*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3),x)
```

```
[Out] -(6412 + 423*sqrt(14)*I)*(d + e*x)**(m + 1)*hyper((1, m + 1), (m
+ 2,), (5*d + 5*e*x)/(5*d - e + sqrt(14)*I*e))/(3500*(m + 1)*(5*d
 - e + sqrt(14)*I*e)) - (6412 - 423*sqrt(14)*I)*(d + e*x)**(m + 1
)*hyper((1, m + 1), (m + 2,), (5*d + 5*e*x)/(5*d - e - sqrt(14)*I
*e))/(3500*(5*d - e*(1 + sqrt(14)*I))*(m + 1)) + (d + e*x)**(m +
1)*(100*d**2 + 165*d*e + 81*e**2)/(125*e**3*(m + 1)) - (d + e*x)*
*(m + 2)*(40*d + 33*e)/(25*e**3*(m + 2)) + 4*(d + e*x)**(m + 3)/(
5*e**3*(m + 3))
```

Mathematica [B] time = 1.23251, size = 621, normalized size = 2.44

$$\frac{(d+ex)^m\left(-28000d^3m\left(\frac{ex}{d}+1\right)^{-m}+28000d^3m-28000d^2em^2x-23100d^2em(m+3)\left(\frac{ex}{d}+1\right)^{-m}+23100d^2em(m+3)+64\cdots\right.}{\cdots}$$

Antiderivative was successfully verified.

```
[In] Integrate[((d + e*x)^m*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2),x]
```

```
[Out] ((d + e*x)^m*(28000*d^3*m + 23100*d^2*e*m*(3 + m) + 11340*d*e^2*m
*(2 + m)*(3 + m) - 28000*d^2*e*m^2*x - 23100*d*e^2*m^2*(3 + m)*x
```

```
+ 11340*e^3*m*(2 + m)*(3 + m)*x + 14000*d*e^2*m^2*x^2 + 14000*d*e
^2*m^3*x^2 - 23100*e^3*m*(3 + m)*x^2 - 23100*e^3*m^2*(3 + m)*x^2
+ 28000*e^3*m*x^3 + 42000*e^3*m^2*x^3 + 14000*e^3*m^3*x^3 - (2800
0*d^3*m)/(1 + (e*x)/d)^m - (23100*d^2*e*m*(3 + m))/(1 + (e*x)/d)^
m + (6412*e^3*(1 + m)*(2 + m)*(3 + m)*Hypergeometric2F1[-m, -m, 1
 - m, ((5*I)*d + (-I + Sqrt[14])*e)/(e*(-I + Sqrt[14] - (5*I)*x))
])/(5^m*((d + e*x)/(e*(1 + I*Sqrt[14] + 5*x)))^m) - ((423*I)*Sqrt
[14]*e^3*(1 + m)*(2 + m)*(3 + m)*Hypergeometric2F1[-m, -m, 1 - m,
 ((5*I)*d + (-I + Sqrt[14])*e)/(e*(-I + Sqrt[14] - (5*I)*x))])/(5
^m*((d + e*x)/(e*(1 + I*Sqrt[14] + 5*x)))^m) + (6412*e^3*(1 + m)*
(2 + m)*(3 + m)*Hypergeometric2F1[-m, -m, 1 - m, ((-5*I)*d + (I +
 Sqrt[14])*e)/(e*(I + Sqrt[14] + (5*I)*x))])/(5^m*((d + e*x)/(e*(
1 - I*Sqrt[14] + 5*x)))^m) + ((423*I)*Sqrt[14]*e^3*(1 + m)*(2 + m
)*(3 + m)*Hypergeometric2F1[-m, -m, 1 - m, ((-5*I)*d + (I + Sqrt[
14])*e)/(e*(I + Sqrt[14] + (5*I)*x))])/(5^m*((d + e*x)/(e*(1 - I*
Sqrt[14] + 5*x)))^m)))/(17500*e^3*m*(1 + m)*(2 + m)*(3 + m))
```

Maple [F] time = 0.273, size = 0, normalized size = 0.

$$\int \frac{(ex+d)^m \left(4\,x^4-5\,x^3+3\,x^2+x+2\right)}{5\,x^2+2\,x+3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^m*(4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3),x)
```

```
[Out] int((e*x+d)^m*(4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3),x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(4\,x^4-5\,x^3+3\,x^2+x+2\right)(ex+d)^m}{5\,x^2+2\,x+3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^m/(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^m/(5*x^2 + 2*
x + 3), x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(4\,x^4-5\,x^3+3\,x^2+x+2\right)(ex+d)^m}{5\,x^2+2\,x+3},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^m/(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] integral((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^m/(5*x^2 + 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((e*x+d)**m*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3),x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(4\,x^4-5\,x^3+3\,x^2+x+2\right)(ex+d)^m}{5\,x^2+2\,x+3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^m/(5*x^2 + 2*x + 3),x, algorith
```

```
[Out] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^m/(5*x^2 + 2*
x + 3), x)
```

3.371 $\int \frac{(d+ex)^m(2+x+3x^2-5x^3+4x^4)}{(3+2x+5x^2)^2}\,dx$

Optimal. Leaf size=376

$$\frac{\left(-i\sqrt{14}\left(6565d^2-2de(1313-3206m)+e^2(3939-98m)\right)+80360d^2-5922dem-32144de+19138e^2m+48216e^2\right)(d+ex}{19600(m+1)\left(5d-\left(1+i\sqrt{14}\right)e\right)(5d^2-2de+3e^2)}$$
$$+\frac{\left(i\sqrt{14}\left(6565d^2-2de(1313-3206m)+e^2(3939-98m)\right)+80360d^2-5922dem-32144de+19138e^2m+48216e^2\right)(d+ex}{19600(m+1)\left(5d+i\left(\sqrt{14}+i\right)e\right)(5d^2-2de+3e^2)}$$
$$-\frac{(x(423d-1367e)+1367d-293e)(d+ex)^{m+1}}{700(5x^2+2x+3)(5d^2-2de+3e^2)}+\frac{4(d+ex)^{m+1}}{25e(m+1)}$$

```
[Out] (4*(d + e*x)^(1 + m))/(25*e*(1 + m)) - ((1367*d - 293*e + (423*d
- 1367*e)*x)*(d + e*x)^(1 + m))/(700*(5*d^2 - 2*d*e + 3*e^2)*(3 +
 2*x + 5*x^2)) + ((80360*d^2 - 32144*d*e + 48216*e^2 - I*Sqrt[14]
*(6565*d^2 - 2*d*e*(1313 - 3206*m) + e^2*(3939 - 98*m)) - 5922*d*
e*m + 19138*e^2*m)*(d + e*x)^(1 + m)*Hypergeometric2F1[1, 1 + m,
2 + m, (5*(d + e*x))/(5*d - e - I*Sqrt[14]*e)])/(19600*(5*d - (1
+ I*Sqrt[14])*e)*(5*d^2 - 2*d*e + 3*e^2)*(1 + m)) + ((80360*d^2 -
 32144*d*e + 48216*e^2 + I*Sqrt[14]*(6565*d^2 - 2*d*e*(1313 - 320
6*m) + e^2*(3939 - 98*m)) - 5922*d*e*m + 19138*e^2*m)*(d + e*x)^(
1 + m)*Hypergeometric2F1[1, 1 + m, 2 + m, (5*(d + e*x))/(5*d - e
+ I*Sqrt[14]*e)])/(19600*(5*d + I*(I + Sqrt[14])*e)*(5*d^2 - 2*d*
e + 3*e^2)*(1 + m))
```

Rubi [A] time = 1.90398, antiderivative size = 376, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 3, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.079$

$$\frac{\left(-i\sqrt{14}\left(6565d^2-2de(1313-3206m)+e^2(3939-98m)\right)+80360d^2-5922dem-32144de+19138e^2m+48216e^2\right)(d+ex}{19600(m+1)\left(5d-\left(1+i\sqrt{14}\right)e\right)(5d^2-2de+3e^2)}$$
$$+\frac{\left(i\sqrt{14}\left(6565d^2-2de(1313-3206m)+e^2(3939-98m)\right)+80360d^2-5922dem-32144de+19138e^2m+48216e^2\right)(d+ex}{19600(m+1)\left(5d+i\left(\sqrt{14}+i\right)e\right)(5d^2-2de+3e^2)}$$
$$-\frac{(x(423d-1367e)+1367d-293e)(d+ex)^{m+1}}{700(5x^2+2x+3)(5d^2-2de+3e^2)}+\frac{4(d+ex)^{m+1}}{25e(m+1)}$$

Antiderivative was successfully verified.

```
[In] Int[((d + e*x)^m*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2)^2,x]
```

```
[Out] (4*(d + e*x)^(1 + m))/(25*e*(1 + m)) - ((1367*d - 293*e + (423*d
- 1367*e)*x)*(d + e*x)^(1 + m))/(700*(5*d^2 - 2*d*e + 3*e^2)*(3 +
 2*x + 5*x^2)) + ((80360*d^2 - 32144*d*e + 48216*e^2 - I*Sqrt[14]
*(6565*d^2 - 2*d*e*(1313 - 3206*m) + e^2*(3939 - 98*m)) - 5922*d*
e*m + 19138*e^2*m)*(d + e*x)^(1 + m)*Hypergeometric2F1[1, 1 + m,
2 + m, (5*(d + e*x))/(5*d - e - I*Sqrt[14]*e)])/(19600*(5*d - (1
+ I*Sqrt[14])*e)*(5*d^2 - 2*d*e + 3*e^2)*(1 + m)) + ((80360*d^2 -
 32144*d*e + 48216*e^2 + I*Sqrt[14]*(6565*d^2 - 2*d*e*(1313 - 320
6*m) + e^2*(3939 - 98*m)) - 5922*d*e*m + 19138*e^2*m)*(d + e*x)^(
1 + m)*Hypergeometric2F1[1, 1 + m, 2 + m, (5*(d + e*x))/(5*d - e
+ I*Sqrt[14]*e)])/(19600*(5*d + I*(I + Sqrt[14])*e)*(5*d^2 - 2*d*
e + 3*e^2)*(1 + m))
```

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((e*x+d)**m*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**2,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 0.191001, size = 0, normalized size = 0.

$$\int \frac{(d+ex)^m \left(2+x+3x^2-5x^3+4x^4\right)}{\left(3+2x+5x^2\right)^2} \, dx$$

Verification is Not applicable to the result.

```
[In] Integrate[((d + e*x)^m*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x + 5*x^2)^2,x]
```

```
[Out] Integrate[((d + e*x)^m*(2 + x + 3*x^2 - 5*x^3 + 4*x^4))/(3 + 2*x
+ 5*x^2)^2, x]
```

Maple [F] time = 0.146, size = 0, normalized size = 0.

$$\int \frac{(ex+d)^m \left(4\,x^4-5\,x^3+3\,x^2+x+2\right)}{\left(5\,x^2+2\,x+3\right)^2} \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((e*x+d)^m*(4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3)^2,x)
```

```
[Out] int((e*x+d)^m*(4*x^4-5*x^3+3*x^2+x+2)/(5*x^2+2*x+3)^2,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(4\,x^4-5\,x^3+3\,x^2+x+2\right)(ex+d)^m}{(5\,x^2+2\,x+3)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^m/(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^m/(5*x^2 + 2*
x + 3)^2, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left(\frac{\left(4\,x^4-5\,x^3+3\,x^2+x+2\right)(ex+d)^m}{25\,x^4+20\,x^3+34\,x^2+12\,x+9},x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^m/(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] integral((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^m/(25*x^4 + 20
*x^3 + 34*x^2 + 12*x + 9), 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((e*x+d)**m*(4*x**4-5*x**3+3*x**2+x+2)/(5*x**2+2*x+3)**2,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(4x^4 - 5x^3 + 3x^2 + x + 2\right)(ex + d)^m}{\left(5x^2 + 2x + 3\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^m/(5*x^2 + 2*x + 3)^2,x, algori
```

```
[Out] integrate((4*x^4 - 5*x^3 + 3*x^2 + x + 2)*(e*x + d)^m/(5*x^2 + 2*
x + 3)^2, x)
```

3.372 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{\left(a+bx+cx^2\right)^3}\,dx$

Optimal. Leaf size=528

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(2c^3\left(6a^2h-3abg+b^2f\right)-30a^2bc^2i+10ab^3ci-c^4(6be-4af)+b^5(-i)+12c^5d\right)}{c^3\left(b^2-4ac\right)^{5/2}}$$
$$-\frac{x\left(c^3\left(2a^2h+3abg+b^2f\right)-bc^2\left(5a^2i+4abh+b^2g\right)+b^3c(5ai+bh)-c^4(2af+be)+b^5(-i)+2c^5d\right)+bc^2\left(-3a^2h+acf\right.}{2c^4\left(b^2-4ac\right)\left(a+bx+cx^2\right)^2}$$
$$+\frac{-b^2c^2\left(39a^2i-5acg+3c^2e\right)+2cx\left(c^3\left(-10a^2h-3abg+b^2f\right)-b^3c(15ai+bh)-c^4(3be-2af)+abc^2(25ai+8bh)+2b^5i\right.}{2c^4\left(b^2-4ac\right)^2\left(a+bx\right.}$$
$$+\frac{i\log\left(a+bx+cx^2\right)}{2c^3}$$

```
[Out] -(a*b^3*c*h + b*c^2*(c^2*d + a*c*f - 3*a^2*h) - a*b^4*i - a*b^2*c
*(c*g - 4*a*i) - 2*a*c^2*(c^2*e - a*c*g + a^2*i) + (2*c^5*d - c^4
*(b*e + 2*a*f) + c^3*(b^2*f + 3*a*b*g + 2*a^2*h) - b^5*i + b^3*c*
(b*h + 5*a*i) - b*c^2*(b^2*g + 4*a*b*h + 5*a^2*i))*x)/(2*c^4*(b^2
 - 4*a*c)*(a + b*x + c*x^2)^2) + (b^5*c*h + b^3*c^2*(c*f - 8*a*h)
 + 2*b*c^3*(3*c^2*d + a*c*f + 11*a^2*h) - b^6*i - b^4*c*(c*g - 11
*a*i) - 16*a^2*c^3*(c*g - 2*a*i) - b^2*c^2*(3*c^2*e - 5*a*c*g + 3
9*a^2*i) + 2*c*(6*c^5*d - c^4*(3*b*e - 2*a*f) + c^3*(b^2*f - 3*a*
b*g - 10*a^2*h) + 2*b^5*i - b^3*c*(b*h + 15*a*i) + a*b*c^2*(8*b*h
 + 25*a*i))*x)/(2*c^4*(b^2 - 4*a*c)^2*(a + b*x + c*x^2)) - ((12*c
^5*d - c^4*(6*b*e - 4*a*f) + 2*c^3*(b^2*f - 3*a*b*g + 6*a^2*h) -
b^5*i + 10*a*b^3*c*i - 30*a^2*b*c^2*i)*ArcTanh[(b + 2*c*x)/Sqrt[b
^2 - 4*a*c]])/(c^3*(b^2 - 4*a*c)^(5/2)) + (i*Log[a + b*x + c*x^2]
)/(2*c^3)
```

Rubi [A] time = 2.65552, antiderivative size = 528, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 5, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.132$

$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(2c^3\left(6a^2h-3abg+b^2f\right)-30a^2bc^2i+10ab^3ci-c^4(6be-4af)+b^5(-i)+12c^5d\right)}{c^3\left(b^2-4ac\right)^{5/2}}$$
$$-\frac{x\left(c^3\left(2a^2h+3abg+b^2f\right)-bc^2\left(5a^2i+4abh+b^2g\right)+b^3c(5ai+bh)-c^4(2af+be)+b^5(-i)+2c^5d\right)+bc^2\left(-3a^2h+acf\right.}{2c^4\left(b^2-4ac\right)\left(a+bx+cx^2\right)^2}$$
$$+\frac{-b^2c^2\left(39a^2i-5acg+3c^2e\right)+2cx\left(c^3\left(-10a^2h-3abg+b^2f\right)-b^3c(15ai+bh)-c^4(3be-2af)+abc^2(25ai+8bh)+2b^5i\right.}{2c^4\left(b^2-4ac\right)^2\left(a+bx\right.}$$
$$+\frac{i\log\left(a+bx+cx^2\right)}{2c^3}$$

Antiderivative was successfully verified.

```
[In]  Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x + c*x^2)^3,x]
```

```
[Out] -(a*b^3*c*h + b*c^2*(c^2*d + a*c*f - 3*a^2*h) - a*b^4*i - a*b^2*c
*(c*g - 4*a*i) - 2*a*c^2*(c^2*e - a*c*g + a^2*i) + (2*c^5*d - c^4
*(b*e + 2*a*f) + c^3*(b^2*f + 3*a*b*g + 2*a^2*h) - b^5*i + b^3*c*
(b*h + 5*a*i) - b*c^2*(b^2*g + 4*a*b*h + 5*a^2*i))*x)/(2*c^4*(b^2
 - 4*a*c)*(a + b*x + c*x^2)^2) + (b^5*c*h + b^3*c^2*(c*f - 8*a*h)
 + 2*b*c^3*(3*c^2*d + a*c*f + 11*a^2*h) - b^6*i - b^4*c*(c*g - 11
*a*i) - 16*a^2*c^3*(c*g - 2*a*i) - b^2*c^2*(3*c^2*e - 5*a*c*g + 3
9*a^2*i) + 2*c*(6*c^5*d - c^4*(3*b*e - 2*a*f) + c^3*(b^2*f - 3*a*
b*g - 10*a^2*h) + 2*b^5*i - b^3*c*(b*h + 15*a*i) + a*b*c^2*(8*b*h
 + 25*a*i))*x)/(2*c^4*(b^2 - 4*a*c)^2*(a + b*x + c*x^2)) - ((12*c
^5*d - c^4*(6*b*e - 4*a*f) + 2*c^3*(b^2*f - 3*a*b*g + 6*a^2*h) -
b^5*i + 10*a*b^3*c*i - 30*a^2*b*c^2*i)*ArcTanh[(b + 2*c*x)/Sqrt[b
^2 - 4*a*c]])/(c^3*(b^2 - 4*a*c)^(5/2)) + (i*Log[a + b*x + c*x^2]
)/(2*c^3)
```

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((i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**2+b*x+a)**3,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 2.78191, size = 488, normalized size = 0.92

$$\frac{\frac{2c\tan^{-1}\left(\frac{b+2cx}{\sqrt{4ac-b^2}}\right)\left(2c^3\left(6a^2h-3abg+b^2f\right)-30a^2bc^2i+10ab^3ci+c^4(4af-6be)+b^5(-i)+12c^5d\right)}{\left(4ac-b^2\right)^{5/2}}+\frac{b^2c\left(-4a^2i+ac(g+4hx)-c^2fx\right)+bc^2\left(a^2(3h+5ix)-ac(f+3gx)\right.}{\ldots}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x + c*x^2)^3,x]
```

```
[Out] ((b^5*i*x + b^4*(a*i - c*h*x) + 2*c^2*(a^3*i - c^3*d*x + a*c^2*(e
 + f*x) - a^2*c*(g + h*x)) + b^2*c*(-4*a^2*i - c^2*f*x + a*c*(g +
 4*h*x)) + b^3*c*(c*g*x - a*(h + 5*i*x)) + b*c^2*(c^2*(-d + e*x)
- a*c*(f + 3*g*x) + a^2*(3*h + 5*i*x)))/((b^2 - 4*a*c)*(a + x*(b
+ c*x))^2) + (-(b^6*i) + b^5*c*(h + 4*i*x) + b^3*c^2*(c*f - 8*a*h
 - 30*a*i*x) - b^4*c*(-11*a*i + c*(g + 2*h*x)) + 4*c^3*(8*a^3*i +
```

```
 3*c^3*d*x + a*c^2*f*x - a^2*c*(4*g + 5*h*x)) + b^2*c^2*(-39*a^2*
i + c^2*(-3*e + 2*f*x) + a*c*(5*g + 16*h*x)) + 2*b*c^3*(3*c^2*(d
- e*x) + a*c*(f - 3*g*x) + a^2*(11*h + 25*i*x)))/((b^2 - 4*a*c)^2
*(a + x*(b + c*x))) + (2*c*(12*c^5*d + c^4*(-6*b*e + 4*a*f) + 2*c
^3*(b^2*f - 3*a*b*g + 6*a^2*h) - b^5*i + 10*a*b^3*c*i - 30*a^2*b*
c^2*i)*ArcTan[(b + 2*c*x)/Sqrt[-b^2 + 4*a*c]])/(-b^2 + 4*a*c)^(5/
2) + c*i*Log[a + x*(b + c*x)])/(2*c^4)
```

Maple [B] time = 0.041, size = 2410, normalized size = 4.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^2+b*x+a)^3,x)
```

```
[Out] ((25*a^2*b*c^2*i-10*a^2*c^3*h-15*a*b^3*c*i+8*a*b^2*c^2*h-3*a*b*c^
3*g+2*a*c^4*f+2*b^5*i-b^4*c*h+b^2*c^3*f-3*b*c^4*e+6*c^5*d)/c^2/(1
6*a^2*c^2-8*a*b^2*c+b^4)*x^3+1/2*(32*a^3*c^3*i+11*a^2*b^2*c^2*i+2
*a^2*b*c^3*h-16*a^2*c^4*g-19*a*b^4*c*i+8*a*b^3*c^2*h-a*b^2*c^3*g+
6*a*b*c^4*f+3*b^6*i-b^5*c*h-b^4*c^2*g+3*b^3*c^3*f-9*b^2*c^4*e+18*
b*c^5*d)/(16*a^2*c^2-8*a*b^2*c+b^4)/c^3*x^2+(31*a^3*b*c^2*i-6*a^3
*c^3*h-22*a^2*b^3*c*i+10*a^2*b^2*c^2*h-5*a^2*b*c^3*g-2*a^2*c^4*f+
3*a*b^5*i-a*b^4*c*h-a*b^3*c^2*g+5*a*b^2*c^3*f-5*a*b*c^4*e+10*a*c^
5*d-b^3*c^3*e+2*b^2*c^4*d)/(16*a^2*c^2-8*a*b^2*c+b^4)/c^3*x+1/2/c
^3*(24*a^4*c^2*i-21*a^3*b^2*c*i+10*a^3*b*c^2*h-8*a^3*c^3*g+3*a^2*
b^4*i-a^2*b^3*c*h-a^2*b^2*c^2*g+6*a^2*b*c^3*f-8*a^2*c^4*e-a*b^2*c
^3*e+10*a*b*c^4*d-b^3*c^3*d)/(16*a^2*c^2-8*a*b^2*c+b^4))/(c*x^2+b
*x+a)^2+8/(16*a^2*c^2-8*a*b^2*c+b^4)/c*ln(c^2*(16*a^2*c^2-8*a*b^2
*c+b^4)*(c*x^2+b*x+a))*a^2*i-4/(16*a^2*c^2-8*a*b^2*c+b^4)/c^2*ln(
c^2*(16*a^2*c^2-8*a*b^2*c+b^4)*(c*x^2+b*x+a))*a*b^2*i+1/2/(16*a^2
*c^2-8*a*b^2*c+b^4)/c^3*ln(c^2*(16*a^2*c^2-8*a*b^2*c+b^4)*(c*x^2+
b*x+a))*b^4*i-30/(1024*a^5*c^9-1280*a^4*b^2*c^8+640*a^3*b^4*c^7-1
60*a^2*b^6*c^6+20*a*b^8*c^5-b^10*c^4)^(1/2)*arctan((2*(16*a^2*c^2
-8*a*b^2*c+b^4)*c^3*x+c^2*(16*a^2*c^2-8*a*b^2*c+b^4)*b)/(1024*a^5
*c^9-1280*a^4*b^2*c^8+640*a^3*b^4*c^7-160*a^2*b^6*c^6+20*a*b^8*c^
5-b^10*c^4)^(1/2))*a^2*b*i*c+12/(1024*a^5*c^9-1280*a^4*b^2*c^8+64
0*a^3*b^4*c^7-160*a^2*b^6*c^6+20*a*b^8*c^5-b^10*c^4)^(1/2)*arctan
((2*(16*a^2*c^2-8*a*b^2*c+b^4)*c^3*x+c^2*(16*a^2*c^2-8*a*b^2*c+b^
4)*b)/(1024*a^5*c^9-1280*a^4*b^2*c^8+640*a^3*b^4*c^7-160*a^2*b^6*
c^6+20*a*b^8*c^5-b^10*c^4)^(1/2))*a^2*c^2*h+10/(1024*a^5*c^9-1280
*a^4*b^2*c^8+640*a^3*b^4*c^7-160*a^2*b^6*c^6+20*a*b^8*c^5-b^10*c^
4)^(1/2)*arctan((2*(16*a^2*c^2-8*a*b^2*c+b^4)*c^3*x+c^2*(16*a^2*c
^2-8*a*b^2*c+b^4)*b)/(1024*a^5*c^9-1280*a^4*b^2*c^8+640*a^3*b^4*c
^7-160*a^2*b^6*c^6+20*a*b^8*c^5-b^10*c^4)^(1/2))*a*b^3*i-6/(1024*
a^5*c^9-1280*a^4*b^2*c^8+640*a^3*b^4*c^7-160*a^2*b^6*c^6+20*a*b^8
*c^5-b^10*c^4)^(1/2)*arctan((2*(16*a^2*c^2-8*a*b^2*c+b^4)*c^3*x+c
^2*(16*a^2*c^2-8*a*b^2*c+b^4)*b)/(1024*a^5*c^9-1280*a^4*b^2*c^8+6
40*a^3*b^4*c^7-160*a^2*b^6*c^6+20*a*b^8*c^5-b^10*c^4)^(1/2))*a*b*
```

```
c^2*g+4/(1024*a^5*c^9-1280*a^4*b^2*c^8+640*a^3*b^4*c^7-160*a^2*b^
6*c^6+20*a*b^8*c^5-b^10*c^4)^(1/2)*arctan((2*(16*a^2*c^2-8*a*b^2*
c+b^4)*c^3*x+c^2*(16*a^2*c^2-8*a*b^2*c+b^4)*b)/(1024*a^5*c^9-1280
*a^4*b^2*c^8+640*a^3*b^4*c^7-160*a^2*b^6*c^6+20*a*b^8*c^5-b^10*c^
4)^(1/2))*a*c^3*f+2/(1024*a^5*c^9-1280*a^4*b^2*c^8+640*a^3*b^4*c^
7-160*a^2*b^6*c^6+20*a*b^8*c^5-b^10*c^4)^(1/2)*arctan((2*(16*a^2*
c^2-8*a*b^2*c+b^4)*c^3*x+c^2*(16*a^2*c^2-8*a*b^2*c+b^4)*b)/(1024*
a^5*c^9-1280*a^4*b^2*c^8+640*a^3*b^4*c^7-160*a^2*b^6*c^6+20*a*b^8
*c^5-b^10*c^4)^(1/2))*b^2*c^2*f-6/(1024*a^5*c^9-1280*a^4*b^2*c^8+
640*a^3*b^4*c^7-160*a^2*b^6*c^6+20*a*b^8*c^5-b^10*c^4)^(1/2)*arct
an((2*(16*a^2*c^2-8*a*b^2*c+b^4)*c^3*x+c^2*(16*a^2*c^2-8*a*b^2*c+
b^4)*b)/(1024*a^5*c^9-1280*a^4*b^2*c^8+640*a^3*b^4*c^7-160*a^2*b^
6*c^6+20*a*b^8*c^5-b^10*c^4)^(1/2))*b*c^3*e+12/(1024*a^5*c^9-1280
*a^4*b^2*c^8+640*a^3*b^4*c^7-160*a^2*b^6*c^6+20*a*b^8*c^5-b^10*c^
4)^(1/2)*arctan((2*(16*a^2*c^2-8*a*b^2*c+b^4)*c^3*x+c^2*(16*a^2*c
^2-8*a*b^2*c+b^4)*b)/(1024*a^5*c^9-1280*a^4*b^2*c^8+640*a^3*b^4*c
^7-160*a^2*b^6*c^6+20*a*b^8*c^5-b^10*c^4)^(1/2))*c^4*d-1/(1024*a^
5*c^9-1280*a^4*b^2*c^8+640*a^3*b^4*c^7-160*a^2*b^6*c^6+20*a*b^8*c
^5-b^10*c^4)^(1/2)*arctan((2*(16*a^2*c^2-8*a*b^2*c+b^4)*c^3*x+c^2
*(16*a^2*c^2-8*a*b^2*c+b^4)*b)/(1024*a^5*c^9-1280*a^4*b^2*c^8+640
*a^3*b^4*c^7-160*a^2*b^6*c^6+20*a*b^8*c^5-b^10*c^4)^(1/2))*b^5/c*
i
```

<u>Maxima</u> [F] time = 0., size = 0, normalized size = 0.

Exception raised: ValueError

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5 + h*x^4 + g*x^3 + f*x^2 + e*x + d)/(c*x^2 + b*x + a)^3,x, algorith
```

```
[Out] Exception raised: ValueError
```

<u>Fricas</u> [A] time = 0.325936, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((i*x^5 + h*x^4 + g*x^3 + f*x^2 + e*x + d)/(c*x^2 + b*x + a)^3,x, algorith
```

```
[Out] [-1/2*((12*a^2*c^5*d - 6*a^2*b*c^4*e - 6*a^3*b*c^3*g + 12*a^4*c^3
*h + (12*c^7*d - 6*b*c^6*e - 6*a*b*c^5*g + 12*a^2*c^5*h + 2*(b^2*
c^5 + 2*a*c^6)*f - (b^5*c^2 - 10*a*b^3*c^3 + 30*a^2*b*c^4)*i)*x^4
 + 2*(12*b*c^6*d - 6*b^2*c^5*e - 6*a*b^2*c^4*g + 12*a^2*b*c^4*h +
```

```
 2*(b^3*c^4 + 2*a*b*c^5)*f - (b^6*c - 10*a*b^4*c^2 + 30*a^2*b^2*c
^3)*i)*x^3 + (12*(b^2*c^5 + 2*a*c^6)*d - 6*(b^3*c^4 + 2*a*b*c^5)*
e + 2*(b^4*c^3 + 4*a*b^2*c^4 + 4*a^2*c^5)*f - 6*(a*b^3*c^3 + 2*a^
2*b*c^4)*g + 12*(a^2*b^2*c^3 + 2*a^3*c^4)*h - (b^7 - 8*a*b^5*c +
10*a^2*b^3*c^2 + 60*a^3*b*c^3)*i)*x^2 + 2*(a^2*b^2*c^3 + 2*a^3*c^
4)*f - (a^2*b^5 - 10*a^3*b^3*c + 30*a^4*b*c^2)*i + 2*(12*a*b*c^5*
d - 6*a*b^2*c^4*e - 6*a^2*b^2*c^3*g + 12*a^3*b*c^3*h + 2*(a*b^3*c
^3 + 2*a^2*b*c^4)*f - (a*b^6 - 10*a^2*b^4*c + 30*a^3*b^2*c^2)*i)*
x)*log((b^3 - 4*a*b*c + 2*(b^2*c - 4*a*c^2)*x + (2*c^2*x^2 + 2*b*
c*x + b^2 - 2*a*c)*sqrt(b^2 - 4*a*c))/(c*x^2 + b*x + a)) - (6*a^2
*b*c^3*f + 2*(6*c^6*d - 3*b*c^5*e - 3*a*b*c^4*g + (b^2*c^4 + 2*a*
c^5)*f - (b^4*c^2 - 8*a*b^2*c^3 + 10*a^2*c^4)*h + (2*b^5*c - 15*a
*b^3*c^2 + 25*a^2*b*c^3)*i)*x^3 + (18*b*c^5*d - 9*b^2*c^4*e + 3*(
b^3*c^3 + 2*a*b*c^4)*f - (b^4*c^2 + a*b^2*c^3 + 16*a^2*c^4)*g - (
b^5*c - 8*a*b^3*c^2 - 2*a^2*b*c^3)*h + (3*b^6 - 19*a*b^4*c + 11*a
^2*b^2*c^2 + 32*a^3*c^3)*i)*x^2 - (b^3*c^3 - 10*a*b*c^4)*d - (a*b
^2*c^3 + 8*a^2*c^4)*e - (a^2*b^2*c^2 + 8*a^3*c^3)*g - (a^2*b^3*c
- 10*a^3*b*c^2)*h + 3*(a^2*b^4 - 7*a^3*b^2*c + 8*a^4*c^2)*i + 2*(
2*(b^2*c^4 + 5*a*c^5)*d - (b^3*c^3 + 5*a*b*c^4)*e + (5*a*b^2*c^3
- 2*a^2*c^4)*f - (a*b^3*c^2 + 5*a^2*b*c^3)*g - (a*b^4*c - 10*a^2*
b^2*c^2 + 6*a^3*c^3)*h + (3*a*b^5 - 22*a^2*b^3*c + 31*a^3*b*c^2)*
i)*x + ((b^4*c^2 - 8*a*b^2*c^3 + 16*a^2*c^4)*i*x^4 + 2*(b^5*c - 8
*a*b^3*c^2 + 16*a^2*b*c^3)*i*x^3 + (b^6 - 6*a*b^4*c + 32*a^3*c^3)
*i*x^2 + 2*(a*b^5 - 8*a^2*b^3*c + 16*a^3*b*c^2)*i*x + (a^2*b^4 -
8*a^3*b^2*c + 16*a^4*c^2)*i)*log(c*x^2 + b*x + a))*sqrt(b^2 - 4*a
*c))/((a^2*b^4*c^3 - 8*a^3*b^2*c^4 + 16*a^4*c^5 + (b^4*c^5 - 8*a*
b^2*c^6 + 16*a^2*c^7)*x^4 + 2*(b^5*c^4 - 8*a*b^3*c^5 + 16*a^2*b*c
^6)*x^3 + (b^6*c^3 - 6*a*b^4*c^4 + 32*a^3*c^6)*x^2 + 2*(a*b^5*c^3
 - 8*a^2*b^3*c^4 + 16*a^3*b*c^5)*x)*sqrt(b^2 - 4*a*c)), 1/2*(2*(1
2*a^2*c^5*d - 6*a^2*b*c^4*e - 6*a^3*b*c^3*g + 12*a^4*c^3*h + (12*
c^7*d - 6*b*c^6*e - 6*a*b*c^5*g + 12*a^2*c^5*h + 2*(b^2*c^5 + 2*a
*c^6)*f - (b^5*c^2 - 10*a*b^3*c^3 + 30*a^2*b*c^4)*i)*x^4 + 2*(12*
b*c^6*d - 6*b^2*c^5*e - 6*a*b^2*c^4*g + 12*a^2*b*c^4*h + 2*(b^3*c
^4 + 2*a*b*c^5)*f - (b^6*c - 10*a*b^4*c^2 + 30*a^2*b^2*c^3)*i)*x^
3 + (12*(b^2*c^5 + 2*a*c^6)*d - 6*(b^3*c^4 + 2*a*b*c^5)*e + 2*(b^
4*c^3 + 4*a*b^2*c^4 + 4*a^2*c^5)*f - 6*(a*b^3*c^3 + 2*a^2*b*c^4)*
g + 12*(a^2*b^2*c^3 + 2*a^3*c^4)*h - (b^7 - 8*a*b^5*c + 10*a^2*b^
3*c^2 + 60*a^3*b*c^3)*i)*x^2 + 2*(a^2*b^2*c^3 + 2*a^3*c^4)*f - (a
^2*b^5 - 10*a^3*b^3*c + 30*a^4*b*c^2)*i + 2*(12*a*b*c^5*d - 6*a*b
^2*c^4*e - 6*a^2*b^2*c^3*g + 12*a^3*b*c^3*h + 2*(a*b^3*c^3 + 2*a^
2*b*c^4)*f - (a*b^6 - 10*a^2*b^4*c + 30*a^3*b^2*c^2)*i)*x)*arctan
(-sqrt(-b^2 + 4*a*c)*(2*c*x + b)/(b^2 - 4*a*c)) + (6*a^2*b*c^3*f
+ 2*(6*c^6*d - 3*b*c^5*e - 3*a*b*c^4*g + (b^2*c^4 + 2*a*c^5)*f -
(b^4*c^2 - 8*a*b^2*c^3 + 10*a^2*c^4)*h + (2*b^5*c - 15*a*b^3*c^2
+ 25*a^2*b*c^3)*i)*x^3 + (18*b*c^5*d - 9*b^2*c^4*e + 3*(b^3*c^3 +
 2*a*b*c^4)*f - (b^4*c^2 + a*b^2*c^3 + 16*a^2*c^4)*g - (b^5*c - 8
*a*b^3*c^2 - 2*a^2*b*c^3)*h + (3*b^6 - 19*a*b^4*c + 11*a^2*b^2*c^
2 + 32*a^3*c^3)*i)*x^2 - (b^3*c^3 - 10*a*b*c^4)*d - (a*b^2*c^3 +
8*a^2*c^4)*e - (a^2*b^2*c^2 + 8*a^3*c^3)*g - (a^2*b^3*c - 10*a^3*
b*c^2)*h + 3*(a^2*b^4 - 7*a^3*b^2*c + 8*a^4*c^2)*i + 2*(2*(b^2*c^
4 + 5*a*c^5)*d - (b^3*c^3 + 5*a*b*c^4)*e + (5*a*b^2*c^3 - 2*a^2*c
^4)*f - (a*b^3*c^2 + 5*a^2*b*c^3)*g - (a*b^4*c - 10*a^2*b^2*c^2 +
 6*a^3*c^3)*h + (3*a*b^5 - 22*a^2*b^3*c + 31*a^3*b*c^2)*i)*x + ((
b^4*c^2 - 8*a*b^2*c^3 + 16*a^2*c^4)*i*x^4 + 2*(b^5*c - 8*a*b^3*c^
```

```
2 + 16*a^2*b*c^3)*i*x^3 + (b^6 - 6*a*b^4*c + 32*a^3*c^3)*i*x^2 +
2*(a*b^5 - 8*a^2*b^3*c + 16*a^3*b*c^2)*i*x + (a^2*b^4 - 8*a^3*b^2
*c + 16*a^4*c^2)*i)*log(c*x^2 + b*x + a))*sqrt(-b^2 + 4*a*c))/((a
^2*b^4*c^3 - 8*a^3*b^2*c^4 + 16*a^4*c^5 + (b^4*c^5 - 8*a*b^2*c^6
+ 16*a^2*c^7)*x^4 + 2*(b^5*c^4 - 8*a*b^3*c^5 + 16*a^2*b*c^6)*x^3
+ (b^6*c^3 - 6*a*b^4*c^4 + 32*a^3*c^6)*x^2 + 2*(a*b^5*c^3 - 8*a^2
*b^3*c^4 + 16*a^3*b*c^5)*x)*sqrt(-b^2 + 4*a*c))]
```

Sympy [F(-1)] time = 0., size = 0, normalized size = 0.

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**2+b*x+a)**3,x)
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.281622, size = 887, normalized size = 1.68

$$\frac{\left(12\,c^5di + 2\,b^2c^3fi + 4\,ac^4fi - 6\,abc^3gi + 12\,a^2c^3hi - 6\,bc^4ie + b^5 - 10\,ab^3c + 30\,a^2bc^2\right)\arctan\left(\frac{2\,cx+b}{\sqrt{-b^2+4\,ac}}\right)}{\left(b^4c^3i - 8\,ab^2c^4i + 16\,a^2c^5i\right)\sqrt{-b^2+4\,ac}} + \frac{i\ln\left(cx^2+bx+a\right)}{2\,c^3} - \frac{b^3c^3d - 10\,abc^4d - 6\,a^2bc^3f + a^2b^2c^2g + 8\,a^3c^3g + a^2b^3ch - 10\,a^3bc^2h - 3\,a^2b^4i + 21\,a^3b^2ci - 24\,a^4c^2i + ab^2c^3e + 8\,a^2c^4e}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((i*x^5 + h*x^4 + g*x^3 + f*x^2 + e*x + d)/(c*x^2 + b*x + a)^3,x, algorith
```

```
[Out] (12*c^5*d*i + 2*b^2*c^3*f*i + 4*a*c^4*f*i - 6*a*b*c^3*g*i + 12*a^
2*c^3*h*i - 6*b*c^4*i*e + b^5 - 10*a*b^3*c + 30*a^2*b*c^2)*arctan
((2*c*x + b)/sqrt(-b^2 + 4*a*c))/((b^4*c^3*i - 8*a*b^2*c^4*i + 16
*a^2*c^5*i)*sqrt(-b^2 + 4*a*c)) + 1/2*i*ln(c*x^2 + b*x + a)/c^3 -
 1/2*(b^3*c^3*d - 10*a*b*c^4*d - 6*a^2*b*c^3*f + a^2*b^2*c^2*g +
8*a^3*c^3*g + a^2*b^3*c*h - 10*a^3*b*c^2*h - 3*a^2*b^4*i + 21*a^3
*b^2*c*i - 24*a^4*c^2*i + a*b^2*c^3*e + 8*a^2*c^4*e - 2*(6*c^6*d
+ b^2*c^4*f + 2*a*c^5*f - 3*a*b*c^4*g - b^4*c^2*h + 8*a*b^2*c^3*h
 - 10*a^2*c^4*h + 2*b^5*c*i - 15*a*b^3*c^2*i + 25*a^2*b*c^3*i - 3
*b*c^5*e)*x^3 - (18*b*c^5*d + 3*b^3*c^3*f + 6*a*b*c^4*f - b^4*c^2
*g - a*b^2*c^3*g - 16*a^2*c^4*g - b^5*c*h + 8*a*b^3*c^2*h + 2*a^2
*b*c^3*h + 3*b^6*i - 19*a*b^4*c*i + 11*a^2*b^2*c^2*i + 32*a^3*c^3
```

```
*i - 9*b^2*c^4*e)*x^2 - 2*(2*b^2*c^4*d + 10*a*c^5*d + 5*a*b^2*c^3
*f - 2*a^2*c^4*f - a*b^3*c^2*g - 5*a^2*b*c^3*g - a*b^4*c*h + 10*a
^2*b^2*c^2*h - 6*a^3*c^3*h + 3*a*b^5*i - 22*a^2*b^3*c*i + 31*a^3*
b*c^2*i - b^3*c^3*e - 5*a*b*c^4*e)*x)/((c*x^2 + b*x + a)^2*(b^2 -
 4*a*c)^2*c^3)
```

3.373 $\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{a+bx+cx^2}\,dx$

Optimal. Leaf size=765

$$\frac{x^3\left(c^2\left(a^2m+2abl+b^2k\right)-b^2c(3am+bl)-c^3(ak+bj)+b^4m+c^4h\right)}{3c^5}$$
$$+\frac{x^2\left(c^3\left(a^2l+2abk+b^2j\right)-bc^2\left(3a^2m+3abl+b^2k\right)+b^3c(4am+bl)-c^4(aj+bh)+b^5(-m)+c^5g\right)}{2c^6}$$
$$+\frac{\log\left(a+bx+cx^2\right)\left(c^5\left(a^2j+2abh+b^2g\right)-b^3c^2\left(10a^2m+5abl+b^2k\right)-c^4\left(a^3l+3a^2bk+3ab^2j+b^3h\right)+bc^3\left(4a^3m+6a^2\right.\right.}{2c^8}$$
$$+\frac{x\left(c^4\left(a^2k+2abj+b^2h\right)+b^2c^2\left(6a^2m+4abl+b^2k\right)-c^3\left(a^3m+3a^2bl+3ab^2k+b^3j\right)-b^4c(5am+bl)-c^5(ah+bg)+b^6\right.}{c^7}$$
$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(c^6\left(2a^2h+3abg+b^2f\right)+b^4c^2\left(20a^2m+7abl+b^2k\right)-c^5\left(2a^3k+5a^2bj+4ab^2h+b^3g\right)-b^2c^3\left(16a^3m\right.\right.}{c^8\sqrt{b^2-}}$$
$$+\frac{x^4\left(-c^2(al+bk)+bc(2am+bl)+b^3(-m)+c^3j\right)}{4c^4}+\frac{x^5\left(-c(am+bl)+b^2m+c^2k\right)}{5c^3}+\frac{x^6(cl-bm)}{6c^2}+\frac{mx^7}{7c}$$

```
[Out] ((c^6*f - c^5*(b*g + a*h) + c^4*(b^2*h + 2*a*b*j + a^2*k) + b^6*m
 - b^4*c*(b*l + 5*a*m) + b^2*c^2*(b^2*k + 4*a*b*l + 6*a^2*m) - c^
3*(b^3*j + 3*a*b^2*k + 3*a^2*b*l + a^3*m))*x)/c^7 + ((c^5*g - c^4
*(b*h + a*j) + c^3*(b^2*j + 2*a*b*k + a^2*l) - b^5*m + b^3*c*(b*l
 + 4*a*m) - b*c^2*(b^2*k + 3*a*b*l + 3*a^2*m))*x^2)/(2*c^6) + ((c
^4*h - c^3*(b*j + a*k) + b^4*m - b^2*c*(b*l + 3*a*m) + c^2*(b^2*k
 + 2*a*b*l + a^2*m))*x^3)/(3*c^5) + ((c^3*j - c^2*(b*k + a*l) - b
^3*m + b*c*(b*l + 2*a*m))*x^4)/(4*c^4) + ((c^2*k + b^2*m - c*(b*l
 + a*m))*x^5)/(5*c^3) + ((c*l - b*m)*x^6)/(6*c^2) + (m*x^7)/(7*c)
 - ((2*c^8*d - c^7*(b*e + 2*a*f) + c^6*(b^2*f + 3*a*b*g + 2*a^2*h
) - c^5*(b^3*g + 4*a*b^2*h + 5*a^2*b*j + 2*a^3*k) + b^8*m - b^6*c
*(b*l + 8*a*m) + b^4*c^2*(b^2*k + 7*a*b*l + 20*a^2*m) - b^2*c^3*(
b^3*j + 6*a*b^2*k + 14*a^2*b*l + 16*a^3*m) + c^4*(b^4*h + 5*a*b^3
*j + 9*a^2*b^2*k + 7*a^3*b*l + 2*a^4*m))*ArcTanh[(b + 2*c*x)/Sqrt
[b^2 - 4*a*c]])/(c^8*Sqrt[b^2 - 4*a*c]) + ((c^7*e - c^6*(b*f + a*
g) + c^5*(b^2*g + 2*a*b*h + a^2*j) - c^4*(b^3*h + 3*a*b^2*j + 3*a
^2*b*k + a^3*l) - b^7*m + b^5*c*(b*l + 6*a*m) - b^3*c^2*(b^2*k +
5*a*b*l + 10*a^2*m) + b*c^3*(b^3*j + 4*a*b^2*k + 6*a^2*b*l + 4*a^
3*m))*Log[a + b*x + c*x^2])/(2*c^8)
```

Rubi [A] time = 8.91297, antiderivative size = 765, normalized size of antiderivative = 1., number of

steps used = 6, number of rules used = 5, integrand size = 53, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.094

$$\frac{x^3\left(c^2\left(a^2m+2abl+b^2k\right)-b^2c(3am+bl)-c^3(ak+bj)+b^4m+c^4h\right)}{3c^5}$$
$$+\frac{x^2\left(c^3\left(a^2l+2abk+b^2j\right)-bc^2\left(3a^2m+3abl+b^2k\right)+b^3c(4am+bl)-c^4(aj+bh)+b^5(-m)+c^5g\right)}{2c^6}$$
$$+\frac{\log\left(a+bx+cx^2\right)\left(c^5\left(a^2j+2abh+b^2g\right)-b^3c^2\left(10a^2m+5abl+b^2k\right)-c^4\left(a^3l+3a^2bk+3ab^2j+b^3h\right)+bc^3\left(4a^3m+6a^2\right.\right.}{2c^8}$$
$$+\frac{x\left(c^4\left(a^2k+2abj+b^2h\right)+b^2c^2\left(6a^2m+4abl+b^2k\right)-c^3\left(a^3m+3a^2bl+3ab^2k+b^3j\right)-b^4c(5am+bl)-c^5(ah+bg)+b^6\right.}{c^7}$$
$$-\frac{\tanh^{-1}\left(\frac{b+2cx}{\sqrt{b^2-4ac}}\right)\left(c^6\left(2a^2h+3abg+b^2f\right)+b^4c^2\left(20a^2m+7abl+b^2k\right)-c^5\left(2a^3k+5a^2bj+4ab^2h+b^3g\right)-b^2c^3\left(16a^3m\right.\right.}{c^8\sqrt{b^2-}}$$
$$+\frac{x^4\left(-c^2(al+bk)+bc(2am+bl)+b^3(-m)+c^3j\right)}{4c^4}+\frac{x^5\left(-c(am+bl)+b^2m+c^2k\right)}{5c^3}+\frac{x^6(cl-bm)}{6c^2}+\frac{mx^7}{7c}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)/(a + b*x + c*x^
```

```
[Out] ((c^6*f - c^5*(b*g + a*h) + c^4*(b^2*h + 2*a*b*j + a^2*k) + b^6*m
 - b^4*c*(b*l + 5*a*m) + b^2*c^2*(b^2*k + 4*a*b*l + 6*a^2*m) - c^
3*(b^3*j + 3*a*b^2*k + 3*a^2*b*l + a^3*m))*x)/c^7 + ((c^5*g - c^4
*(b*h + a*j) + c^3*(b^2*j + 2*a*b*k + a^2*l) - b^5*m + b^3*c*(b*l
 + 4*a*m) - b*c^2*(b^2*k + 3*a*b*l + 3*a^2*m))*x^2)/(2*c^6) + ((c
^4*h - c^3*(b*j + a*k) + b^4*m - b^2*c*(b*l + 3*a*m) + c^2*(b^2*k
 + 2*a*b*l + a^2*m))*x^3)/(3*c^5) + ((c^3*j - c^2*(b*k + a*l) - b
^3*m + b*c*(b*l + 2*a*m))*x^4)/(4*c^4) + ((c^2*k + b^2*m - c*(b*l
 + a*m))*x^5)/(5*c^3) + ((c*l - b*m)*x^6)/(6*c^2) + (m*x^7)/(7*c)
 - ((2*c^8*d - c^7*(b*e + 2*a*f) + c^6*(b^2*f + 3*a*b*g + 2*a^2*h
) - c^5*(b^3*g + 4*a*b^2*h + 5*a^2*b*j + 2*a^3*k) + b^8*m - b^6*c
*(b*l + 8*a*m) + b^4*c^2*(b^2*k + 7*a*b*l + 20*a^2*m) - b^2*c^3*(
b^3*j + 6*a*b^2*k + 14*a^2*b*l + 16*a^3*m) + c^4*(b^4*h + 5*a*b^3
*j + 9*a^2*b^2*k + 7*a^3*b*l + 2*a^4*m))*ArcTanh[(b + 2*c*x)/Sqrt
[b^2 - 4*a*c]])/(c^8*Sqrt[b^2 - 4*a*c]) + ((c^7*e - c^6*(b*f + a*
g) + c^5*(b^2*g + 2*a*b*h + a^2*j) - c^4*(b^3*h + 3*a*b^2*j + 3*a
^2*b*k + a^3*l) - b^7*m + b^5*c*(b*l + 6*a*m) - b^3*c^2*(b^2*k +
5*a*b*l + 10*a^2*m) + b*c^3*(b^3*j + 4*a*b^2*k + 6*a^2*b*l + 4*a^
3*m))*Log[a + b*x + c*x^2])/(2*c^8)
```

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((m*x**8+l*x**7+k*x**6+j*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**
```

```
[Out] Timed out
```

Mathematica [A] time = 1.63279, size = 754, normalized size = 0.99

$$\frac{140c^3x^3\left(c^2\left(a^2m+2abl+b^2k\right)-b^2c(3am+bl)-c^3(ak+bj)+b^4m+c^4h\right)+210c^2x^2\left(c^3\left(a^2l+2abk+b^2j\right)-bc^2\left(3a^2m+\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)/(a + b*x
```

```
[Out] (420*c*(c^6*f - c^5*(b*g + a*h) + c^4*(b^2*h + 2*a*b*j + a^2*k) +
 b^6*m - b^4*c*(b*l + 5*a*m) + b^2*c^2*(b^2*k + 4*a*b*l + 6*a^2*m
) - c^3*(b^3*j + 3*a*b^2*k + 3*a^2*b*l + a^3*m))*x + 210*c^2*(c^5
*g - c^4*(b*h + a*j) + c^3*(b^2*j + 2*a*b*k + a^2*l) - b^5*m + b^
3*c*(b*l + 4*a*m) - b*c^2*(b^2*k + 3*a*b*l + 3*a^2*m))*x^2 + 140*
c^3*(c^4*h - c^3*(b*j + a*k) + b^4*m - b^2*c*(b*l + 3*a*m) + c^2*
(b^2*k + 2*a*b*l + a^2*m))*x^3 + 105*c^4*(c^3*j - c^2*(b*k + a*l)
 - b^3*m + b*c*(b*l + 2*a*m))*x^4 + 84*c^5*(c^2*k + b^2*m - c*(b*
l + a*m))*x^5 + 70*c^6*(c*l - b*m)*x^6 + 60*c^7*m*x^7 + (420*(2*c
^8*d - c^7*(b*e + 2*a*f) + c^6*(b^2*f + 3*a*b*g + 2*a^2*h) - c^5*
(b^3*g + 4*a*b^2*h + 5*a^2*b*j + 2*a^3*k) + b^8*m - b^6*c*(b*l +
8*a*m) + b^4*c^2*(b^2*k + 7*a*b*l + 20*a^2*m) - b^2*c^3*(b^3*j +
6*a*b^2*k + 14*a^2*b*l + 16*a^3*m) + c^4*(b^4*h + 5*a*b^3*j + 9*a
^2*b^2*k + 7*a^3*b*l + 2*a^4*m))*ArcTan[(b + 2*c*x)/Sqrt[-b^2 + 4
*a*c]])/Sqrt[-b^2 + 4*a*c] + 210*(c^7*e - c^6*(b*f + a*g) + c^5*(
b^2*g + 2*a*b*h + a^2*j) - c^4*(b^3*h + 3*a*b^2*j + 3*a^2*b*k + a
^3*l) - b^7*m + b^5*c*(b*l + 6*a*m) - b^3*c^2*(b^2*k + 5*a*b*l +
10*a^2*m) + b*c^3*(b^3*j + 4*a*b^2*k + 6*a^2*b*l + 4*a^3*m))*Log[
a + x*(b + c*x)])/(420*c^8)
```

Maple [B] time = 0.017, size = 1960, normalized size = 2.6

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^2+b*x+a),x)
```

```
[Out] -1/4/c^2*x^4*b*k-1/4/c^2*x^4*a*l-1/4/c^4*x^4*b^3*m+1/5/c^3*x^5*b^
2*m-1/5/c^2*x^5*b*l-1/5/c^2*x^5*a*m-1/6/c^2*x^6*b*m+1/c^7*b^6*m*x
```

```
-1/c^6*b^5*l*x+1/c^5*b^4*k*x-1/c^4*b^3*j*x+1/c^3*b^2*h*x-1/2/c^2*
x^2*b*h-1/c^4*a^3*m*x+1/c^3*a^2*k*x-1/2/c^4*x^2*b^3*k+1/2/c^3*x^2
*b^2*j+1/2/c^5*x^2*b^4*l-1/2/c^2*x^2*a*j-1/2/c^6*x^2*b^5*m+1/2/c^
3*x^2*a^2*l-1/3/c^2*x^3*b*j-1/c^2*b*g*x-1/c^2*a*h*x-1/2/c^6*ln(c*
x^2+b*x+a)*b^5*k+1/2/c^5*ln(c*x^2+b*x+a)*b^4*j-1/2/c^4*ln(c*x^2+b
*x+a)*b^3*h+1/2/c^3*ln(c*x^2+b*x+a)*b^2*g-1/2/c^2*ln(c*x^2+b*x+a)
*b*f-1/2/c^4*ln(c*x^2+b*x+a)*a^3*l+1/2/c^3*ln(c*x^2+b*x+a)*a^2*j-
1/2/c^2*ln(c*x^2+b*x+a)*a*g-1/2/c^8*ln(c*x^2+b*x+a)*b^7*m+1/2/c^7
*ln(c*x^2+b*x+a)*b^6*l-1/3/c^4*x^3*b^3*l+1/3/c^3*x^3*b^2*k+1/3/c^
5*x^3*b^4*m-1/3/c^2*x^3*a*k+1/3/c^3*x^3*a^2*m+1/4/c^3*x^4*b^2*l+1
/7*m*x^7/c-6/c^5/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(
1/2))*a*b^4*k+9/c^4/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2
)^(1/2))*a^2*b^2*k-8/c^7/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*
c-b^2)^(1/2))*a*b^6*m+5/c^4/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4
*a*c-b^2)^(1/2))*a*b^3*j+20/c^6/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b
)/(4*a*c-b^2)^(1/2))*a^2*b^4*m-16/c^5/(4*a*c-b^2)^(1/2)*arctan((2
*c*x+b)/(4*a*c-b^2)^(1/2))*a^3*b^2*m+1/6/c*x^6*l+2/(4*a*c-b^2)^(1
/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*d+1/2/c*ln(c*x^2+b*x+a)*e
+1/c*f*x+1/2/c*x^2*g+1/5/c*x^5*k+1/4/c*x^4*j+1/3/c*x^3*h+2/c^3*a*
b*j*x+1/2/c^3*x^4*a*b*m-3/c^4*a*b^2*k*x-5/c^6*a*b^4*m*x+4/c^5*a*b
^3*l*x-3/c^4*a^2*b*l*x+6/c^5*a^2*b^2*m*x+2/c^5*x^2*a*b^3*m-3/2/c^
4*x^2*a*b^2*l-5/c^6*ln(c*x^2+b*x+a)*a^2*b^3*m+3/c^5*ln(c*x^2+b*x+
a)*a^2*b^2*l-3/2/c^4*ln(c*x^2+b*x+a)*a^2*b*k+3/c^7*ln(c*x^2+b*x+a
)*a*b^5*m-5/2/c^6*ln(c*x^2+b*x+a)*a*b^4*l+2/c^4/(4*a*c-b^2)^(1/2)
*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a^4*m-2/c^3/(4*a*c-b^2)^(1/2
)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a^3*k-3/2/c^4*x^2*a^2*b*m-1
/c^4*x^3*a*b^2*m+2/3/c^3*x^3*a*b*l+1/c^3*x^2*a*b*k-5/c^3/(4*a*c-b
^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a^2*b*j+3/c^2/(4*a*
c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*b*g-4/c^3/(4*a
*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*b^2*h+7/c^6/(
4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a*b^5*l-14/c
^5/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a^2*b^3*
l+7/c^4/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*a^3
*b*l+1/c^8/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))*
b^8*m+1/c^6/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2))
*b^6*k-1/c^3/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2)
)*b^3*g-1/c^5/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/2
))*b^5*j-1/c^7/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1/
2))*b^7*l+1/c^4/(4*a*c-b^2)^(1/2)*arctan((2*c*x+b)/(4*a*c-b^2)^(1
/2))*b^4*h+2/c^5*ln(c*x^2+b*x+a)*a*b^3*k-3/2/c^4*ln(c*x^2+b*x+a)*
a*b^2*j+1/c^3*ln(c*x^2+b*x+a)*a*b*h-2/c/(4*a*c-b^2)^(1/2)*arctan(
(2*c*x+b)/(4*a*c-b^2)^(1/2))*a*f+1/c^2/(4*a*c-b^2)^(1/2)*arctan((
2*c*x+b)/(4*a*c-b^2)^(1/2))*b^2*f-1/c/(4*a*c-b^2)^(1/2)*arctan((2
*c*x+b)/(4*a*c-b^2)^(1/2))*b*e+2/c^2/(4*a*c-b^2)^(1/2)*arctan((2*
c*x+b)/(4*a*c-b^2)^(1/2))*a^2*h+2/c^5*ln(c*x^2+b*x+a)*a^3*b*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((m*x^8 + l*x^7 + k*x^6 + j*x^5 + h*x^4 + g*x^3 + f*x^2 + e*x + d)/(c*x^2 +
```

```
[Out] Exception raised: ValueError
```

Fricas [A] time = 0.750869, size = 1, normalized size = 0.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x^8 + l*x^7 + k*x^6 + j*x^5 + h*x^4 + g*x^3 + f*x^2 + e*x + d)/(c*x^2 +
```

```
[Out] [1/420*(210*(2*c^8*d - b*c^7*e + (b^2*c^6 - 2*a*c^7)*f - (b^3*c^5
 - 3*a*b*c^6)*g + (b^4*c^4 - 4*a*b^2*c^5 + 2*a^2*c^6)*h - (b^5*c^
3 - 5*a*b^3*c^4 + 5*a^2*b*c^5)*j + (b^6*c^2 - 6*a*b^4*c^3 + 9*a^2
*b^2*c^4 - 2*a^3*c^5)*k - (b^7*c - 7*a*b^5*c^2 + 14*a^2*b^3*c^3 -
 7*a^3*b*c^4)*l + (b^8 - 8*a*b^6*c + 20*a^2*b^4*c^2 - 16*a^3*b^2*
c^3 + 2*a^4*c^4)*m)*log(-(b^3 - 4*a*b*c + 2*(b^2*c - 4*a*c^2)*x -
 (2*c^2*x^2 + 2*b*c*x + b^2 - 2*a*c)*sqrt(b^2 - 4*a*c))/(c*x^2 +
b*x + a)) + (60*c^7*m*x^7 + 70*(c^7*l - b*c^6*m)*x^6 + 84*(c^7*k
- b*c^6*l + (b^2*c^5 - a*c^6)*m)*x^5 + 105*(c^7*j - b*c^6*k + (b^
2*c^5 - a*c^6)*l - (b^3*c^4 - 2*a*b*c^5)*m)*x^4 + 140*(c^7*h - b*
c^6*j + (b^2*c^5 - a*c^6)*k - (b^3*c^4 - 2*a*b*c^5)*l + (b^4*c^3
- 3*a*b^2*c^4 + a^2*c^5)*m)*x^3 + 210*(c^7*g - b*c^6*h + (b^2*c^5
 - a*c^6)*j - (b^3*c^4 - 2*a*b*c^5)*k + (b^4*c^3 - 3*a*b^2*c^4 +
a^2*c^5)*l - (b^5*c^2 - 4*a*b^3*c^3 + 3*a^2*b*c^4)*m)*x^2 + 420*(
c^7*f - b*c^6*g + (b^2*c^5 - a*c^6)*h - (b^3*c^4 - 2*a*b*c^5)*j +
 (b^4*c^3 - 3*a*b^2*c^4 + a^2*c^5)*k - (b^5*c^2 - 4*a*b^3*c^3 + 3
*a^2*b*c^4)*l + (b^6*c - 5*a*b^4*c^2 + 6*a^2*b^2*c^3 - a^3*c^4)*m
)*x + 210*(c^7*e - b*c^6*f + (b^2*c^5 - a*c^6)*g - (b^3*c^4 - 2*a
*b*c^5)*h + (b^4*c^3 - 3*a*b^2*c^4 + a^2*c^5)*j - (b^5*c^2 - 4*a*
b^3*c^3 + 3*a^2*b*c^4)*k + (b^6*c - 5*a*b^4*c^2 + 6*a^2*b^2*c^3 -
 a^3*c^4)*l - (b^7 - 6*a*b^5*c + 10*a^2*b^3*c^2 - 4*a^3*b*c^3)*m)
*log(c*x^2 + b*x + a))*sqrt(b^2 - 4*a*c))/(sqrt(b^2 - 4*a*c)*c^8)
, 1/420*(420*(2*c^8*d - b*c^7*e + (b^2*c^6 - 2*a*c^7)*f - (b^3*c^
5 - 3*a*b*c^6)*g + (b^4*c^4 - 4*a*b^2*c^5 + 2*a^2*c^6)*h - (b^5*c
^3 - 5*a*b^3*c^4 + 5*a^2*b*c^5)*j + (b^6*c^2 - 6*a*b^4*c^3 + 9*a^
2*b^2*c^4 - 2*a^3*c^5)*k - (b^7*c - 7*a*b^5*c^2 + 14*a^2*b^3*c^3
- 7*a^3*b*c^4)*l + (b^8 - 8*a*b^6*c + 20*a^2*b^4*c^2 - 16*a^3*b^2
*c^3 + 2*a^4*c^4)*m)*arctan(-sqrt(-b^2 + 4*a*c)*(2*c*x + b)/(b^2
- 4*a*c)) + (60*c^7*m*x^7 + 70*(c^7*l - b*c^6*m)*x^6 + 84*(c^7*k
- b*c^6*l + (b^2*c^5 - a*c^6)*m)*x^5 + 105*(c^7*j - b*c^6*k + (b^
2*c^5 - a*c^6)*l - (b^3*c^4 - 2*a*b*c^5)*m)*x^4 + 140*(c^7*h - b*
c^6*j + (b^2*c^5 - a*c^6)*k - (b^3*c^4 - 2*a*b*c^5)*l + (b^4*c^3
- 3*a*b^2*c^4 + a^2*c^5)*m)*x^3 + 210*(c^7*g - b*c^6*h + (b^2*c^5
 - a*c^6)*j - (b^3*c^4 - 2*a*b*c^5)*k + (b^4*c^3 - 3*a*b^2*c^4 +
a^2*c^5)*l - (b^5*c^2 - 4*a*b^3*c^3 + 3*a^2*b*c^4)*m)*x^2 + 420*(
c^7*f - b*c^6*g + (b^2*c^5 - a*c^6)*h - (b^3*c^4 - 2*a*b*c^5)*j +
 (b^4*c^3 - 3*a*b^2*c^4 + a^2*c^5)*k - (b^5*c^2 - 4*a*b^3*c^3 + 3
```

```
*a^2*b*c^4)*l + (b^6*c - 5*a*b^4*c^2 + 6*a^2*b^2*c^3 - a^3*c^4)*m
)*x + 210*(c^7*e - b*c^6*f + (b^2*c^5 - a*c^6)*g - (b^3*c^4 - 2*a
*b*c^5)*h + (b^4*c^3 - 3*a*b^2*c^4 + a^2*c^5)*j - (b^5*c^2 - 4*a*
b^3*c^3 + 3*a^2*b*c^4)*k + (b^6*c - 5*a*b^4*c^2 + 6*a^2*b^2*c^3 -
 a^3*c^4)*l - (b^7 - 6*a*b^5*c + 10*a^2*b^3*c^2 - 4*a^3*b*c^3)*m)
*log(c*x^2 + b*x + a))*sqrt(-b^2 + 4*a*c))/(sqrt(-b^2 + 4*a*c)*c^
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((m*x**8+l*x**7+k*x**6+j*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**2+b*x
```

```
[Out] Timed out
```

GIAC/XCAS [A] time = 0.273935, size = 1, normalized size = 0.

Done

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((m*x^8 + l*x^7 + k*x^6 + j*x^5 + h*x^4 + g*x^3 + f*x^2 + e*x + d)/(c*x^2 +
```

```
[Out] Done
```

3.374 $\int \left(1+4x-7x^2\right)^3 \left(2+5x+x^2\right) \sqrt{3+2x+5x^2}\, dx$

Optimal. Leaf size=208

$$\frac{98060877 \left(5x^2+2x+3\right)^{3/2} x^2}{4375000}+\frac{1045360143 \left(5x^2+2x+3\right)^{3/2} x}{43750000} - \frac{1968340667 \left(5x^2+2x+3\right)^{3/2}}{131250000}-\frac{77159983(5x+1)\sqrt{5x^2+2x+3}}{31250000} - \frac{343}{50}\left(5x^2+2x+3\right)^{3/2} x^7-\frac{50519 \left(5x^2+2x+3\right)^{3/2} x^6}{2250}+\frac{190939 \left(5x^2+2x+3\right)^{3/2} x^5}{3000}-\frac{888751 \left(5x^2+2x+3\right)^{3/2} x^4}{105000}-\frac{909608}{}$$

```
[Out] (-77159983*(1 + 5*x)*Sqrt[3 + 2*x + 5*x^2])/31250000 - (196834066
7*(3 + 2*x + 5*x^2)^(3/2))/131250000 + (1045360143*x*(3 + 2*x + 5
*x^2)^(3/2))/43750000 + (98060877*x^2*(3 + 2*x + 5*x^2)^(3/2))/43
75000 - (90960857*x^3*(3 + 2*x + 5*x^2)^(3/2))/1575000 - (888751*
x^4*(3 + 2*x + 5*x^2)^(3/2))/105000 + (190939*x^5*(3 + 2*x + 5*x^
2)^(3/2))/3000 - (50519*x^6*(3 + 2*x + 5*x^2)^(3/2))/2250 - (343*
x^7*(3 + 2*x + 5*x^2)^(3/2))/50 - (540119881*ArcSinh[(1 + 5*x)/Sq
rt[14]])/(15625000*Sqrt[5])
```

Rubi [A] time = 0.546338, antiderivative size = 208, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 5, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{98060877 \left(5x^2+2x+3\right)^{3/2} x^2}{4375000}+\frac{1045360143 \left(5x^2+2x+3\right)^{3/2} x}{43750000} - \frac{1968340667 \left(5x^2+2x+3\right)^{3/2}}{131250000}-\frac{77159983(5x+1)\sqrt{5x^2+2x+3}}{31250000} - \frac{343}{50}\left(5x^2+2x+3\right)^{3/2} x^7-\frac{50519 \left(5x^2+2x+3\right)^{3/2} x^6}{2250}+\frac{190939 \left(5x^2+2x+3\right)^{3/2} x^5}{3000}-\frac{888751 \left(5x^2+2x+3\right)^{3/2} x^4}{105000}-\frac{909608}{}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 4*x - 7*x^2)^3*(2 + 5*x + x^2)*Sqrt[3 + 2*x + 5*x^2],x]
```

```
[Out] (-77159983*(1 + 5*x)*Sqrt[3 + 2*x + 5*x^2])/31250000 - (196834066
7*(3 + 2*x + 5*x^2)^(3/2))/131250000 + (1045360143*x*(3 + 2*x + 5
*x^2)^(3/2))/43750000 + (98060877*x^2*(3 + 2*x + 5*x^2)^(3/2))/43
75000 - (90960857*x^3*(3 + 2*x + 5*x^2)^(3/2))/1575000 - (888751*
x^4*(3 + 2*x + 5*x^2)^(3/2))/105000 + (190939*x^5*(3 + 2*x + 5*x^
2)^(3/2))/3000 - (50519*x^6*(3 + 2*x + 5*x^2)^(3/2))/2250 - (343*
x^7*(3 + 2*x + 5*x^2)^(3/2))/50 - (540119881*ArcSinh[(1 + 5*x)/Sq
rt[14]])/(15625000*Sqrt[5])
```

Rubi in Sympy [A] time = 106.898, size = 182, normalized size = 0.88

$$-\frac{(-45606517752773876139866769840000x + 99295136027173118442850735824000)\sqrt{5x^2+2x+3}}{1973606781168104701500000000000}$$
$$+\frac{(-12177683873497800x + 14053509569321640)\sqrt{5x^2+2x+3}\left(115977941652360x^2 + 25932711538080x + 8369841861000\right.}{3947213562336209403000000000000}$$
$$-\frac{(-105095690x + 14662250)\left(-7x^2+4x+1\right)^3\sqrt{5x^2+2x+3}}{216090000}$$
$$-\frac{(315x+1877)\left(-7x^2+4x+1\right)^4\sqrt{5x^2+2x+3}}{22050}$$
$$+\frac{(1236122989500x + 28085608620)\left(-7x^2+4x+1\right)^2\sqrt{5x^2+2x+3}}{1134472500000} - \frac{540119881\sqrt{5}\,\operatorname{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{78125000}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((-7*x**2+4*x+1)**3*(x**2+5*x+2)*(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] -(-45606517752773876139866769840000*x + 99295136027173118442850735824000)*sqrt(5*x**2 + 2*x + 3)/1973606781168104701500000000000 +
 (-12177683873497800*x + 14053509569321640)*sqrt(5*x**2 + 2*x + 3
)*(115977941652360*x**2 + 25932711538080*x + 8369841861000)/39472
13562336209403000000000000 - (-105095690*x + 14662250)*(-7*x**2 + 4
*x + 1)**3*sqrt(5*x**2 + 2*x + 3)/216090000 - (315*x + 1877)*(-7*
x**2 + 4*x + 1)**4*sqrt(5*x**2 + 2*x + 3)/22050 + (1236122989500*
x + 28085608620)*(-7*x**2 + 4*x + 1)**2*sqrt(5*x**2 + 2*x + 3)/11
34472500000 - 540119881*sqrt(5)*atanh(sqrt(5)*(10*x + 2)/(10*sqrt
(5*x**2 + 2*x + 3)))/78125000
```

Mathematica [A] time = 0.129792, size = 85, normalized size = 0.41

$$\frac{-5\sqrt{5x^2+2x+3}\left(67528125000x^9 + 248031875000x^8 - 497593468750x^7 - 34674656250x^6 + 225922362500x^5 + 567574130\right.}{9843750000}$$

Antiderivative was successfully verified.

```
[In] Integrate[(1 + 4*x - 7*x^2)^3*(2 + 5*x + x^2)*Sqrt[3 + 2*x + 5*x^2],x]
```

```
[Out] (-5*Sqrt[3 + 2*x + 5*x^2]*(93436408944 - 57768004650*x - 78839046
795*x^2 + 17642392275*x^3 + 56757413000*x^4 + 225922362500*x^5 -
34674656250*x^6 - 497593468750*x^7 + 248031875000*x^8 + 675281250
00*x^9) - 68055105006*Sqrt[5]*ArcSinh[(1 + 5*x)/Sqrt[14]])/984375
0000
```

Maple [A] time = 0.043, size = 166, normalized size = 0.8

$$-\frac{771599830\,x+154319966}{62500000}\sqrt{5\,x^{2}+2\,x+3}-\frac{540119881\,\sqrt{5}}{78125000}\mathit{Arcsinh}\left(\frac{5\,\sqrt{14}}{14}\left(x+\frac{1}{5}\right)\right)-\frac{1968340667}{131250000}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}+\frac{1045360143\,x}{43750000}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}+\frac{98060877\,x^{2}}{4375000}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}-\frac{90960857\,x^{3}}{1575000}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}-\frac{888751\,x^{4}}{105000}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}+\frac{190939\,x^{5}}{3000}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}-\frac{50519\,x^{6}}{2250}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}-\frac{343\,x^{7}}{50}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((-7*x^2+4*x+1)^3*(x^2+5*x+2)*(5*x^2+2*x+3)^(1/2),x)
```

```
[Out] -77159983/62500000*(10*x+2)*(5*x^2+2*x+3)^(1/2)-540119881/7812500
0*5^(1/2)*arcsinh(5/14*14^(1/2)*(x+1/5))-1968340667/131250000*(5*
x^2+2*x+3)^(3/2)+1045360143/43750000*x*(5*x^2+2*x+3)^(3/2)+980608
77/4375000*x^2*(5*x^2+2*x+3)^(3/2)-90960857/1575000*x^3*(5*x^2+2*
x+3)^(3/2)-888751/105000*x^4*(5*x^2+2*x+3)^(3/2)+190939/3000*x^5*
(5*x^2+2*x+3)^(3/2)-50519/2250*x^6*(5*x^2+2*x+3)^(3/2)-343/50*x^7
*(5*x^2+2*x+3)^(3/2)
```

Maxima [A] time = 0.771375, size = 239, normalized size = 1.15

$$-\frac{343}{50}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}x^{7}-\frac{50519}{2250}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}x^{6}+\frac{190939}{3000}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}x^{5}-\frac{888751}{105000}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}x^{4}-\frac{90960857}{1575000}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}x^{3}+\frac{98060877}{4375000}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}x^{2}+\frac{1045360143}{43750000}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}x-\frac{1968340667}{131250000}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}-\frac{77159983}{6250000}\sqrt{5\,x^{2}+2\,x+3}x-\frac{540119881}{78125000}\sqrt{5}\operatorname{arsinh}\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right)-\frac{77159983}{31250000}\sqrt{5\,x^{2}+2\,x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)^3*sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2),x, algorithm=
```

```
[Out] -343/50*(5*x^2 + 2*x + 3)^(3/2)*x^7 - 50519/2250*(5*x^2 + 2*x + 3
)^(3/2)*x^6 + 190939/3000*(5*x^2 + 2*x + 3)^(3/2)*x^5 - 888751/10
5000*(5*x^2 + 2*x + 3)^(3/2)*x^4 - 90960857/1575000*(5*x^2 + 2*x
+ 3)^(3/2)*x^3 + 98060877/4375000*(5*x^2 + 2*x + 3)^(3/2)*x^2 + 1
045360143/43750000*(5*x^2 + 2*x + 3)^(3/2)*x - 1968340667/1312500
00*(5*x^2 + 2*x + 3)^(3/2) - 77159983/6250000*sqrt(5*x^2 + 2*x +
```

```
3)*x - 540119881/78125000*sqrt(5)*arcsinh(1/14*sqrt(14)*(5*x + 1)
) - 77159983/31250000*sqrt(5*x^2 + 2*x + 3)
```

Fricas [A] time = 0.285201, size = 142, normalized size = 0.68

$$-\frac{1}{9843750000}\sqrt{5}\Big(\sqrt{5}\big(67528125000\,x^9 + 248031875000\,x^8 - 497593468750\,x^7 - 34674656250\,x^6 + 225922362500\,x^5 + 5675$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)^3*sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2),x, algorithm=
```

```
[Out] -1/9843750000*sqrt(5)*(sqrt(5)*(67528125000*x^9 + 248031875000*x^
8 - 497593468750*x^7 - 34674656250*x^6 + 225922362500*x^5 + 56757
413000*x^4 + 17642392275*x^3 - 78839046795*x^2 - 57768004650*x +
93436408944)*sqrt(5*x^2 + 2*x + 3) - 34027552503*log(-sqrt(5)*(25
*x^2 + 10*x + 8) + 5*sqrt(5*x^2 + 2*x + 3)*(5*x + 1)))
```

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

$$-\int\left(-29x\sqrt{5x^2+2x+3}\right)dx-\int\left(-115x^2\sqrt{5x^2+2x+3}\right)dx-\int 61x^3\sqrt{5x^2+2x+3}\,dx$$
$$-\int 871x^4\sqrt{5x^2+2x+3}\,dx-\int\left(-127x^5\sqrt{5x^2+2x+3}\right)dx-\int\left(-2065x^6\sqrt{5x^2+2x+3}\right)dx$$
$$-\int 1127x^7\sqrt{5x^2+2x+3}\,dx-\int 343x^8\sqrt{5x^2+2x+3}\,dx-\int\left(-2\sqrt{5x^2+2x+3}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-7*x**2+4*x+1)**3*(x**2+5*x+2)*(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] -Integral(-29*x*sqrt(5*x**2 + 2*x + 3), x) - Integral(-115*x**2*s
qrt(5*x**2 + 2*x + 3), x) - Integral(61*x**3*sqrt(5*x**2 + 2*x +
3), x) - Integral(871*x**4*sqrt(5*x**2 + 2*x + 3), x) - Integral(
-127*x**5*sqrt(5*x**2 + 2*x + 3), x) - Integral(-2065*x**6*sqrt(5
*x**2 + 2*x + 3), x) - Integral(1127*x**7*sqrt(5*x**2 + 2*x + 3),
 x) - Integral(343*x**8*sqrt(5*x**2 + 2*x + 3), x) - Integral(-2*
sqrt(5*x**2 + 2*x + 3), x)
```

GIAC/XCAS [A] time = 0.275334, size = 124, normalized size = 0.6

$$-\frac{1}{1968750000}\,(5\,((5\,(10\,(25\,(5\,(49\,(140\,(315\,x + 1157)x - 324959)x - 1109589)x + 36147578)x + 227029652)x + 705695691)x$$
$$+\frac{540119881}{78125000}\sqrt{5}\ln\left(-\sqrt{5}\left(\sqrt{5}x - \sqrt{5\,x^2 + 2\,x + 3}\right) - 1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)^3*sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2),x, algorithm=
```

```
[Out] -1/1968750000*(5*((5*(10*(25*(5*(49*(140*(315*x + 1157)*x - 32495
9)*x - 1109589)*x + 36147578)*x + 227029652)*x + 705695691)*x - 1
5767809359)*x - 11553600930)*x + 93436408944)*sqrt(5*x^2 + 2*x +
3) + 540119881/78125000*sqrt(5)*ln(-sqrt(5)*(sqrt(5)*x - sqrt(5*x
^2 + 2*x + 3)) - 1)
```

3.375 $\int \left(1+4x-7x^2\right)^2 \left(2+5x+x^2\right) \sqrt{3+2x+5x^2}\,dx$

Optimal. Leaf size=166

$$-\frac{77509\left(5x^2+2x+3\right)^{3/2}x^2}{25000}+\frac{1781669\left(5x^2+2x+3\right)^{3/2}x}{250000}+\frac{198439\left(5x^2+2x+3\right)^{3/2}}{750000}-\frac{2521723(5x+1)\sqrt{5x^2+2x+3}}{1250000}+\frac{49}{40}\left(5x^2+2x+3\right)^{3/2}x^5+\frac{989}{200}\left(5x^2+2x+3\right)^{3/2}x^4-\frac{25277\left(5x^2+2x+3\right)^{3/2}x^3}{3000}-\frac{17652061\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{625000\sqrt{5}}$$

```
[Out] (-2521723*(1 + 5*x)*Sqrt[3 + 2*x + 5*x^2])/1250000 + (198439*(3 +
 2*x + 5*x^2)^(3/2))/750000 + (1781669*x*(3 + 2*x + 5*x^2)^(3/2))
/250000 - (77509*x^2*(3 + 2*x + 5*x^2)^(3/2))/25000 - (25277*x^3*
(3 + 2*x + 5*x^2)^(3/2))/3000 + (989*x^4*(3 + 2*x + 5*x^2)^(3/2))
/200 + (49*x^5*(3 + 2*x + 5*x^2)^(3/2))/40 - (17652061*ArcSinh[(1
 + 5*x)/Sqrt[14]])/(625000*Sqrt[5])
```

Rubi [A] time = 0.330579, antiderivative size = 166, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 5, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$

$$-\frac{77509\left(5x^2+2x+3\right)^{3/2}x^2}{25000}+\frac{1781669\left(5x^2+2x+3\right)^{3/2}x}{250000}+\frac{198439\left(5x^2+2x+3\right)^{3/2}}{750000}-\frac{2521723(5x+1)\sqrt{5x^2+2x+3}}{1250000}+\frac{49}{40}\left(5x^2+2x+3\right)^{3/2}x^5+\frac{989}{200}\left(5x^2+2x+3\right)^{3/2}x^4-\frac{25277\left(5x^2+2x+3\right)^{3/2}x^3}{3000}-\frac{17652061\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{625000\sqrt{5}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 4*x - 7*x^2)^2*(2 + 5*x + x^2)*Sqrt[3 + 2*x + 5*x^2],x]
```

```
[Out] (-2521723*(1 + 5*x)*Sqrt[3 + 2*x + 5*x^2])/1250000 + (198439*(3 +
 2*x + 5*x^2)^(3/2))/750000 + (1781669*x*(3 + 2*x + 5*x^2)^(3/2))
/250000 - (77509*x^2*(3 + 2*x + 5*x^2)^(3/2))/25000 - (25277*x^3*
(3 + 2*x + 5*x^2)^(3/2))/3000 + (989*x^4*(3 + 2*x + 5*x^2)^(3/2))
/200 + (49*x^5*(3 + 2*x + 5*x^2)^(3/2))/40 - (17652061*ArcSinh[(1
 + 5*x)/Sqrt[14]])/(625000*Sqrt[5])
```

Rubi in Sympy [A] time = 79.9049, size = 150, normalized size = 0.9

$$-\frac{(-76014918996600x+10411004441160)\sqrt{5x^2+2x+3}}{7563150000000}-\frac{(-47991650x+4150806)\left(-7x^2+4x+1\right)^2\sqrt{5x^2+2x+3}}{72030000}-\frac{(245x+1507)\left(-7x^2+4x+1\right)^3\sqrt{5x^2+2x+3}}{13720}+\frac{(245156848860x+48462661332)\left(-7x^2+4x+1\right)\sqrt{5x^2+2x+3}}{151263000000}-\frac{17652061\sqrt{5}\operatorname{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{3125000}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((-7*x**2+4*x+1)**2*(x**2+5*x+2)*(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] -(-76014918996600*x + 10411004441160)*sqrt(5*x**2 + 2*x + 3)/7563
150000000 - (-47991650*x + 4150806)*(-7*x**2 + 4*x + 1)**2*sqrt(5
*x**2 + 2*x + 3)/72030000 - (245*x + 1507)*(-7*x**2 + 4*x + 1)**3
*sqrt(5*x**2 + 2*x + 3)/13720 + (245156848860*x + 48462661332)*(-
7*x**2 + 4*x + 1)*sqrt(5*x**2 + 2*x + 3)/151263000000 - 17652061*
sqrt(5)*atanh(sqrt(5)*(10*x + 2)/(10*sqrt(5*x**2 + 2*x + 3)))/312
5000
```

Mathematica [A] time = 0.0967888, size = 75, normalized size = 0.45

$$\frac{5\sqrt{5x^2+2x+3}\left(22968750x^7+101906250x^6-107112500x^5-65693000x^4+15583725x^3+23531995x^2+44333650x-458\right.}{18750000}$$

Antiderivative was successfully verified.

```
[In] Integrate[(1 + 4*x - 7*x^2)^2*(2 + 5*x + x^2)*Sqrt[3 + 2*x + 5*x^2],x]
```

```
[Out] (5*Sqrt[3 + 2*x + 5*x^2]*(-4588584 + 44333650*x + 23531995*x^2 +
15583725*x^3 - 65693000*x^4 - 107112500*x^5 + 101906250*x^6 + 229
68750*x^7) - 105912366*Sqrt[5]*ArcSinh[(1 + 5*x)/Sqrt[14]])/18750
000
```

Maple [A] time = 0.012, size = 132, normalized size = 0.8

$$-\frac{25217230\,x+5043446}{2500000}\sqrt{5\,x^2+2\,x+3}-\frac{17652061\,\sqrt{5}}{3125000}Arcsinh\left(\frac{5\,\sqrt{14}}{14}\left(x+\frac{1}{5}\right)\right)+\frac{198439}{750000}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}+\frac{1781669\,x}{250000}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}-\frac{77509\,x^2}{25000}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}-\frac{25277\,x^3}{3000}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}+\frac{989\,x^4}{200}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}+\frac{49\,x^5}{40}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]   int((-7*x^2+4*x+1)^2*(x^2+5*x+2)*(5*x^2+2*x+3)^(1/2),x)
```

```
[Out] -2521723/2500000*(10*x+2)*(5*x^2+2*x+3)^(1/2)-17652061/3125000*5^
(1/2)*arcsinh(5/14*14^(1/2)*(x+1/5))+198439/750000*(5*x^2+2*x+3)^
(3/2)+1781669/250000*x*(5*x^2+2*x+3)^(3/2)-77509/25000*x^2*(5*x^2
+2*x+3)^(3/2)-25277/3000*x^3*(5*x^2+2*x+3)^(3/2)+989/200*x^4*(5*x
^2+2*x+3)^(3/2)+49/40*x^5*(5*x^2+2*x+3)^(3/2)
```

Maxima [A] time = 0.764674, size = 193, normalized size = 1.16

$$\frac{49}{40}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}x^5+\frac{989}{200}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}x^4-\frac{25277}{3000}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}x^3-\frac{77509}{25000}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}x^2+\frac{1781669}{250000}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}x+\frac{198439}{750000}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}-\frac{2521723}{250000}\sqrt{5\,x^2+2\,x+3}x-\frac{17652061}{3125000}\sqrt{5}\,\text{arsinh}\left(\frac{1}{14}\sqrt{14}(5\,x+1)\right)-\frac{2521723}{1250000}\sqrt{5\,x^2+2\,x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((7*x^2 - 4*x - 1)^2*sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2),x, algorithm="
```

```
[Out] 49/40*(5*x^2 + 2*x + 3)^(3/2)*x^5 + 989/200*(5*x^2 + 2*x + 3)^(3/
2)*x^4 - 25277/3000*(5*x^2 + 2*x + 3)^(3/2)*x^3 - 77509/25000*(5*
x^2 + 2*x + 3)^(3/2)*x^2 + 1781669/250000*(5*x^2 + 2*x + 3)^(3/2)
*x + 198439/750000*(5*x^2 + 2*x + 3)^(3/2) - 2521723/250000*sqrt(
5*x^2 + 2*x + 3)*x - 17652061/3125000*sqrt(5)*arcsinh(1/14*sqrt(1
4)*(5*x + 1)) - 2521723/1250000*sqrt(5*x^2 + 2*x + 3)
```

Fricas [A] time = 0.279091, size = 128, normalized size = 0.77

$$\frac{1}{18750000}\sqrt{5}\Big(\sqrt{5}\big(22968750\,x^7+101906250\,x^6-107112500\,x^5-65693000\,x^4+15583725\,x^3+23531995\,x^2+44333650\,x -$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((7*x^2 - 4*x - 1)^2*sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2),x, algorithm="
```

```
[Out] 1/18750000*sqrt(5)*(sqrt(5)*(22968750*x^7 + 101906250*x^6 - 10711
2500*x^5 - 65693000*x^4 + 15583725*x^3 + 23531995*x^2 + 44333650*
x - 4588584)*sqrt(5*x^2 + 2*x + 3) + 52956183*log(-sqrt(5)*(25*x^
2 + 10*x + 8) + 5*sqrt(5*x^2 + 2*x + 3)*(5*x + 1)))
```

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

$$\int \left(x^2+5x+2\right)\sqrt{5x^2+2x+3}\left(7x^2-4x-1\right)^2\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-7*x**2+4*x+1)**2*(x**2+5*x+2)*(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] Integral((x**2 + 5*x + 2)*sqrt(5*x**2 + 2*x + 3)*(7*x**2 - 4*x -
1)**2, x)
```

GIAC/XCAS [A] time = 0.276908, size = 111, normalized size = 0.67

$$\frac{1}{3750000}\left(5\left(\left(5\left(10\left(25\left(15\left(245x+1087\right)x-17138\right)x-262772\right)x+623349\right)x+4706399\right)x+8866730\right)x-4588584\right)\sqrt{5x^2+2 \cdots}$$
$$+\frac{17652061}{3125000}\sqrt{5}\ln\left(-\sqrt{5}\left(\sqrt{5}x-\sqrt{5x^2+2x+3}\right)-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((7*x^2 - 4*x - 1)^2*sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2),x, algorithm="
```

```
[Out] 1/3750000*(5*((5*(10*(25*(15*(245*x + 1087)*x - 17138)*x - 262772
)*x + 623349)*x + 4706399)*x + 8866730)*x - 4588584)*sqrt(5*x^2 +
 2*x + 3) + 17652061/3125000*sqrt(5)*ln(-sqrt(5)*(sqrt(5)*x - sqr
t(5*x^2 + 2*x + 3)) - 1)
```

3.376 $\int \left(1+4x-7x^2\right)\left(2+5x+x^2\right)\sqrt{3+2x+5x^2}\,dx$

Optimal. Leaf size=124

$$-\frac{289}{250}\left(5x^2+2x+3\right)^{3/2}x^2+\frac{2149\left(5x^2+2x+3\right)^{3/2}x}{2500}+\frac{7819\left(5x^2+2x+3\right)^{3/2}}{7500}-\frac{4633(5x+1)\sqrt{5x^2+2x+3}}{12500}-\frac{7}{30}\left(5x^2+2x+3\right)^{3/2}x^3-\frac{32431\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{6250\sqrt{5}}$$

```
[Out] (-4633*(1 + 5*x)*Sqrt[3 + 2*x + 5*x^2])/12500 + (7819*(3 + 2*x +
5*x^2)^(3/2))/7500 + (2149*x*(3 + 2*x + 5*x^2)^(3/2))/2500 - (289
*x^2*(3 + 2*x + 5*x^2)^(3/2))/250 - (7*x^3*(3 + 2*x + 5*x^2)^(3/2
))/30 - (32431*ArcSinh[(1 + 5*x)/Sqrt[14]])/(6250*Sqrt[5])
```

Rubi [A] time = 0.196511, antiderivative size = 124, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.152

$$-\frac{289}{250}\left(5x^2+2x+3\right)^{3/2}x^2+\frac{2149\left(5x^2+2x+3\right)^{3/2}x}{2500}+\frac{7819\left(5x^2+2x+3\right)^{3/2}}{7500}-\frac{4633(5x+1)\sqrt{5x^2+2x+3}}{12500}-\frac{7}{30}\left(5x^2+2x+3\right)^{3/2}x^3-\frac{32431\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{6250\sqrt{5}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 4*x - 7*x^2)*(2 + 5*x + x^2)*Sqrt[3 + 2*x + 5*x^2],x]
```

```
[Out] (-4633*(1 + 5*x)*Sqrt[3 + 2*x + 5*x^2])/12500 + (7819*(3 + 2*x +
5*x^2)^(3/2))/7500 + (2149*x*(3 + 2*x + 5*x^2)^(3/2))/2500 - (289
*x^2*(3 + 2*x + 5*x^2)^(3/2))/250 - (7*x^3*(3 + 2*x + 5*x^2)^(3/2
))/30 - (32431*ArcSinh[(1 + 5*x)/Sqrt[14]])/(6250*Sqrt[5])
```

Rubi in Sympy [A] time = 51.766, size = 114, normalized size = 0.92

$$\frac{(-175x+813)\left(x^2+5x+2\right)^2\sqrt{5x^2+2x+3}}{150}-\frac{(858630x+1574076)\left(x^2+5x+2\right)\sqrt{5x^2+2x+3}}{45000}+\frac{(252306000x+114830760)\sqrt{5x^2+2x+3}}{2250000}-\frac{32431\sqrt{5}\,\mathrm{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{31250}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((-7*x**2+4*x+1)*(x**2+5*x+2)*(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] (-175*x + 813)*(x**2 + 5*x + 2)**2*sqrt(5*x**2 + 2*x + 3)/150 - (
858630*x + 1574076)*(x**2 + 5*x + 2)*sqrt(5*x**2 + 2*x + 3)/45000
 + (252306000*x + 114830760)*sqrt(5*x**2 + 2*x + 3)/2250000 - 324
31*sqrt(5)*atanh(sqrt(5)*(10*x + 2)/(10*sqrt(5*x**2 + 2*x + 3)))/
31250
```

Mathematica [A] time = 0.0754677, size = 65, normalized size = 0.52

$$\frac{5\sqrt{5x^2+2x+3}\left(-43750x^5-234250x^4+48225x^3+129895x^2+105400x+103386\right)-194586\sqrt{5}\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{187500}$$

Antiderivative was successfully verified.

```
[In] Integrate[(1 + 4*x - 7*x^2)*(2 + 5*x + x^2)*Sqrt[3 + 2*x + 5*x^2],x]
```

```
[Out] (5*Sqrt[3 + 2*x + 5*x^2]*(103386 + 105400*x + 129895*x^2 + 48225*
x^3 - 234250*x^4 - 43750*x^5) - 194586*Sqrt[5]*ArcSinh[(1 + 5*x)/
Sqrt[14]])/187500
```

Maple [A] time = 0.009, size = 98, normalized size = 0.8

$$-\frac{46330\,x+9266}{25000}\sqrt{5\,x^2+2\,x+3}-\frac{32431\,\sqrt{5}}{31250}Arcsinh\left(\frac{5\,\sqrt{14}}{14}\left(x+\frac{1}{5}\right)\right)+\frac{7819}{7500}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}+\frac{2149\,x}{2500}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}-\frac{289\,x^2}{250}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}-\frac{7\,x^3}{30}\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((-7*x^2+4*x+1)*(x^2+5*x+2)*(5*x^2+2*x+3)^(1/2),x)
```

```
[Out] -4633/25000*(10*x+2)*(5*x^2+2*x+3)^(1/2)-32431/31250*5^(1/2)*arcs
inh(5/14*14^(1/2)*(x+1/5))+7819/7500*(5*x^2+2*x+3)^(3/2)+2149/250
0*x*(5*x^2+2*x+3)^(3/2)-289/250*x^2*(5*x^2+2*x+3)^(3/2)-7/30*x^3*
(5*x^2+2*x+3)^(3/2)
```

Maxima [A] time = 0.770061, size = 147, normalized size = 1.19

$$-\frac{7}{30}\left(5x^2+2x+3\right)^{\frac{3}{2}}x^3-\frac{289}{250}\left(5x^2+2x+3\right)^{\frac{3}{2}}x^2+\frac{2149}{2500}\left(5x^2+2x+3\right)^{\frac{3}{2}}x+\frac{7819}{7500}\left(5x^2+2x+3\right)^{\frac{3}{2}}-\frac{4633}{2500}\sqrt{5x^2+2x+3}x-\frac{32431}{31250}\sqrt{5}\,\mathrm{arsinh}\left(\frac{1}{14}\sqrt{14}(5x+1)\right)-\frac{4633}{12500}\sqrt{5x^2+2x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)*sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2),x, algorithm="m
```

```
[Out] -7/30*(5*x^2 + 2*x + 3)^(3/2)*x^3 - 289/250*(5*x^2 + 2*x + 3)^(3/
2)*x^2 + 2149/2500*(5*x^2 + 2*x + 3)^(3/2)*x + 7819/7500*(5*x^2 +
 2*x + 3)^(3/2) - 4633/2500*sqrt(5*x^2 + 2*x + 3)*x - 32431/31250
*sqrt(5)*arcsinh(1/14*sqrt(14)*(5*x + 1)) - 4633/12500*sqrt(5*x^2
 + 2*x + 3)
```

Fricas [A] time = 0.281825, size = 115, normalized size = 0.93

$$-\frac{1}{187500}\sqrt{5}\left(\sqrt{5}\left(43750x^5+234250x^4-48225x^3-129895x^2-105400x-103386\right)\sqrt{5x^2+2x+3}-97293\log\left(-\sqrt{5}(25\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)*sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2),x, algorithm="f
```

```
[Out] -1/187500*sqrt(5)*(sqrt(5)*(43750*x^5 + 234250*x^4 - 48225*x^3 -
129895*x^2 - 105400*x - 103386)*sqrt(5*x^2 + 2*x + 3) - 97293*log
(-sqrt(5)*(25*x^2 + 10*x + 8) + 5*sqrt(5*x^2 + 2*x + 3)*(5*x + 1)
))
```

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

$$-\int\left(-13x\sqrt{5x^2+2x+3}\right)dx-\int\left(-7x^2\sqrt{5x^2+2x+3}\right)dx-\int 31x^3\sqrt{5x^2+2x+3}\,dx-\int 7x^4\sqrt{5x^2+2x+3}\,dx-\int\left(-2\sqrt{5x^2+2x+3}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-7*x**2+4*x+1)*(x**2+5*x+2)*(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] -Integral(-13*x*sqrt(5*x**2 + 2*x + 3), x) - Integral(-7*x**2*sqr
t(5*x**2 + 2*x + 3), x) - Integral(31*x**3*sqrt(5*x**2 + 2*x + 3)
, x) - Integral(7*x**4*sqrt(5*x**2 + 2*x + 3), x) - Integral(-2*s
qrt(5*x**2 + 2*x + 3), x)
```

GIAC/XCAS [A] time = 0.277011, size = 97, normalized size = 0.78

$$-\frac{1}{37500}\left(5\left(\left(5\left(10\left(175\,x+937\right)x-1929\right)x-25979\right)x-21080\right)x-103386\right)\sqrt{5\,x^{2}+2\,x+3}+\frac{32431}{31250}\sqrt{5}\ln\left(-\sqrt{5}\left(\sqrt{5}x-\sqrt{5\,x^{2}+2\,x+3}\right)-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)*sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2),x, algorithm="g
```

```
[Out] -1/37500*(5*((5*(10*(175*x + 937)*x - 1929)*x - 25979)*x - 21080)
*x - 103386)*sqrt(5*x^2 + 2*x + 3) + 32431/31250*sqrt(5)*ln(-sqrt
(5)*(sqrt(5)*x - sqrt(5*x^2 + 2*x + 3)) - 1)
```

3.377 $\int \frac{(2+5x+x^2)\sqrt{3+2x+5x^2}}{1+4x-7x^2}\,dx$

Optimal. Leaf size=187

$$-\frac{1}{490}\sqrt{5x^2+2x+3}(35x+397)-\frac{3}{343}\sqrt{\frac{1}{11}\left(497041-146555\sqrt{11}\right)}\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)+\frac{3}{343}\sqrt{\frac{1}{11}\left(497041+146555\sqrt{11}\right)}\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)-\frac{8233\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{1715\sqrt{5}}$$

```
[Out] -((397 + 35*x)*Sqrt[3 + 2*x + 5*x^2])/490 - (8233*ArcSinh[(1 + 5*
x)/Sqrt[14]])/(1715*Sqrt[5]) - (3*Sqrt[(497041 - 146555*Sqrt[11])
/11]*ArcTanh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)/(Sqrt[2*(125 -
 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/343 + (3*Sqrt[(497041 + 1
46555*Sqrt[11])/11]*ArcTanh[(23 + Sqrt[11] + (17 + 5*Sqrt[11])*x)
/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/343
```

Rubi [A] time = 0.749121, antiderivative size = 187, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$-\frac{1}{490}\sqrt{5x^2+2x+3}(35x+397)-\frac{3}{343}\sqrt{\frac{1}{11}\left(497041-146555\sqrt{11}\right)}\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)+\frac{3}{343}\sqrt{\frac{1}{11}\left(497041+146555\sqrt{11}\right)}\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)-\frac{8233\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{1715\sqrt{5}}$$

Antiderivative was successfully verified.

```
[In]  Int[((2 + 5*x + x^2)*Sqrt[3 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2),x]
```

```
[Out] -((397 + 35*x)*Sqrt[3 + 2*x + 5*x^2])/490 - (8233*ArcSinh[(1 + 5*
x)/Sqrt[14]])/(1715*Sqrt[5]) - (3*Sqrt[(497041 - 146555*Sqrt[11])
/11]*ArcTanh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)/(Sqrt[2*(125 -
 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/343 + (3*Sqrt[(497041 + 1
46555*Sqrt[11])/11]*ArcTanh[(23 + Sqrt[11] + (17 + 5*Sqrt[11])*x)
/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/343
```

Rubi in Sympy [A] time = 88.9296, size = 216, normalized size = 1.16

$$-\frac{(35x+397)\sqrt{5x^2+2x+3}}{490}-\frac{8233\sqrt{5}\operatorname{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{8575}+\frac{\sqrt{22}\left(-319440\sqrt{11}+1206720\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68+20\sqrt{11}\right)-92+4\sqrt{11}\right)}{8\sqrt{-17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{301840\sqrt{-17\sqrt{11}+125}}-\frac{\sqrt{22}\left(319440\sqrt{11}+1206720\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68-20\sqrt{11}\right)-92-4\sqrt{11}\right)}{8\sqrt{17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{301840\sqrt{17\sqrt{11}+125}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((x**2+5*x+2)*(5*x**2+2*x+3)**(1/2)/(-7*x**2+4*x+1),x)
```

```
[Out] -(35*x + 397)*sqrt(5*x**2 + 2*x + 3)/490 - 8233*sqrt(5)*atanh(sqr
t(5)*(10*x + 2)/(10*sqrt(5*x**2 + 2*x + 3)))/8575 + sqrt(22)*(-31
9440*sqrt(11) + 1206720)*atanh(sqrt(2)*(x*(-68 + 20*sqrt(11)) - 9
2 + 4*sqrt(11))/(8*sqrt(-17*sqrt(11) + 125)*sqrt(5*x**2 + 2*x + 3
)))/(301840*sqrt(-17*sqrt(11) + 125)) - sqrt(22)*(319440*sqrt(11)
 + 1206720)*atanh(sqrt(2)*(x*(-68 - 20*sqrt(11)) - 92 - 4*sqrt(11
))/(8*sqrt(17*sqrt(11) + 125)*sqrt(5*x**2 + 2*x + 3)))/(301840*sq
rt(17*sqrt(11) + 125))
```

Mathematica [A] time = 1.77305, size = 343, normalized size = 1.83

$$-\frac{5}{889}\left(2395855\sqrt{125-17\sqrt{11}}\sqrt{5x^2+2x+3}x+27175841\sqrt{125-17\sqrt{11}}\sqrt{5x^2+2x+3}-150840\sqrt{2794\left(9402-2125\sqrt{11}\right)}\right.$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[((2 + 5*x + x^2)*Sqrt[3 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2),x]
```

```
[Out] (-181126*Sqrt[625 - 85*Sqrt[11]]*ArcSinh[(1 + 5*x)/Sqrt[14]] - (5
*(27175841*Sqrt[125 - 17*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2] + 239585
5*Sqrt[125 - 17*Sqrt[11]]*x*Sqrt[3 + 2*x + 5*x^2] - 26670*Sqrt[2]
*(-14641 + 5028*Sqrt[11])*ArcTanh[(Sqrt[250 - 34*Sqrt[11]]*Sqrt[3
 + 2*x + 5*x^2])/(-23 + Sqrt[11] + (-17 + 5*Sqrt[11])*x)] + 30*Sq
rt[254*(9402 - 2125*Sqrt[11])]*(14641 + 5028*Sqrt[11])*Log[2 + Sq
rt[11] - 7*x] - 439230*Sqrt[254*(9402 - 2125*Sqrt[11])]*Log[11 +
23*Sqrt[11] + (55 + 17*Sqrt[11])*x + Sqrt[2750 + 374*Sqrt[11]]*Sq
rt[3 + 2*x + 5*x^2]] - 150840*Sqrt[2794*(9402 - 2125*Sqrt[11])]*L
og[11 + 23*Sqrt[11] + (55 + 17*Sqrt[11])*x + Sqrt[2750 + 374*Sqrt
[11]]*Sqrt[3 + 2*x + 5*x^2]]))/889)/(188650*Sqrt[125 - 17*Sqrt[11
]])
```

Maple [B] time = 0.081, size = 403, normalized size = 2.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+5*x+2)*(5*x^2+2*x+3)^(1/2)/(-7*x^2+4*x+1),x)
```

```
[Out] -1/140*(10*x+2)*(5*x^2+2*x+3)^(1/2)-1/25*5^(1/2)*arcsinh(5/14*14^
(1/2)*(x+1/5))-3/154*(-61+13*11^(1/2))*11^(1/2)*(1/49*(245*(x-2/7
+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250
-34*11^(1/2))^(1/2)+1/70*(34/7-10/7*11^(1/2))*5^(1/2)*arcsinh(5^(
1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*(x
+1/5))-(250/49-34/49*11^(1/2))/(250-34*11^(1/2))^(1/2)*arctanh(49
/2*(500/49-68/49*11^(1/2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2
)))/(250-34*11^(1/2))^(1/2)/(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-
10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2)))-3/15
4*(61+13*11^(1/2))*11^(1/2)*(1/49*(245*(x-2/7-1/7*11^(1/2))^2+49*
(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2)+
1/70*(34/7+10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/2)/(250/49+34/49*1
1^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1/5))-(250/49+34/49
*11^(1/2))/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+68/49*11^
(1/2)+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2)
)^(1/2)/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/
7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2)))
```

Maxima [A] time = 0.820814, size = 675, normalized size = 3.61

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1),x, algorithm="m
```

```
[Out] 1/188650*sqrt(11)*(975*sqrt(11)*sqrt(2)*sqrt(17*sqrt(11) + 125)*a
rcsinh(5/7*sqrt(11)*sqrt(7)*sqrt(2)*x/abs(14*x - 2*sqrt(11) - 4)
+ 17/7*sqrt(7)*sqrt(2)*x/abs(14*x - 2*sqrt(11) - 4) + 1/7*sqrt(11
)*sqrt(7)*sqrt(2)/abs(14*x - 2*sqrt(11) - 4) + 23/7*sqrt(7)*sqrt(
2)/abs(14*x - 2*sqrt(11) - 4)) - 1225*sqrt(11)*sqrt(5*x^2 + 2*x +
 3)*x - 16466*sqrt(11)*sqrt(5)*arcsinh(5/14*sqrt(7)*sqrt(2)*x + 1
/14*sqrt(7)*sqrt(2)) - 6825*sqrt(11)*sqrt(-34/49*sqrt(11) + 250/4
9)*arcsinh(5/7*sqrt(11)*sqrt(7)*sqrt(2)*x/abs(14*x + 2*sqrt(11) -
 4) - 17/7*sqrt(7)*sqrt(2)*x/abs(14*x + 2*sqrt(11) - 4) + 1/7*sqr
t(11)*sqrt(7)*sqrt(2)/abs(14*x + 2*sqrt(11) - 4) - 23/7*sqrt(7)*s
qrt(2)/abs(14*x + 2*sqrt(11) - 4)) + 4575*sqrt(2)*sqrt(17*sqrt(11
) + 125)*arcsinh(5/7*sqrt(11)*sqrt(7)*sqrt(2)*x/abs(14*x - 2*sqrt
(11) - 4) + 17/7*sqrt(7)*sqrt(2)*x/abs(14*x - 2*sqrt(11) - 4) + 1
/7*sqrt(11)*sqrt(7)*sqrt(2)/abs(14*x - 2*sqrt(11) - 4) + 23/7*sqr
t(7)*sqrt(2)/abs(14*x - 2*sqrt(11) - 4)) + 32025*sqrt(-34/49*sqrt
(11) + 250/49)*arcsinh(5/7*sqrt(11)*sqrt(7)*sqrt(2)*x/abs(14*x +
2*sqrt(11) - 4) - 17/7*sqrt(7)*sqrt(2)*x/abs(14*x + 2*sqrt(11) -
4) + 1/7*sqrt(11)*sqrt(7)*sqrt(2)/abs(14*x + 2*sqrt(11) - 4) - 23
/7*sqrt(7)*sqrt(2)/abs(14*x + 2*sqrt(11) - 4)) - 13895*sqrt(11)*s
qrt(5*x^2 + 2*x + 3))
```

Fricas [A] time = 0.298961, size = 467, normalized size = 2.5

$$-\frac{1}{188650}\sqrt{5}\left(77\sqrt{5}\sqrt{5x^2+2x+3}(35x+397)+15\sqrt{5}\sqrt{\sqrt{11}\left(497041\sqrt{11}-1612105\right)}\log\left(-\frac{6\left(\sqrt{5x^2+2x+3}\sqrt{\sqrt{11}\left(497\right.}\right.}{}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1),x, algorithm="f
```

```
[Out] -1/188650*sqrt(5)*(77*sqrt(5)*sqrt(5*x^2 + 2*x + 3)*(35*x + 397)
+ 15*sqrt(5)*sqrt(sqrt(11)*(497041*sqrt(11) - 1612105))*log(-6/37
73*(sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(497041*sqrt(11) - 161210
5))*(265*sqrt(11) + 957) + 71687*sqrt(11)*(x + 3) - 215061*x + 35
8435)/x) - 15*sqrt(5)*sqrt(sqrt(11)*(497041*sqrt(11) - 1612105))*
log(6/3773*(sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(497041*sqrt(11)
- 1612105))*(265*sqrt(11) + 957) - 71687*sqrt(11)*(x + 3) + 21506
1*x - 358435)/x) + 15*sqrt(5)*sqrt(sqrt(11)*(497041*sqrt(11) + 16
12105))*log(6/3773*(sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(497041*s
qrt(11) + 1612105))*(265*sqrt(11) - 957) + 71687*sqrt(11)*(x + 3)
 + 215061*x - 358435)/x) - 15*sqrt(5)*sqrt(sqrt(11)*(497041*sqrt(
11) + 1612105))*log(-6/3773*(sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*
(497041*sqrt(11) + 1612105))*(265*sqrt(11) - 957) - 71687*sqrt(11
)*(x + 3) - 215061*x + 358435)/x) - 90563*log(-sqrt(5)*(25*x^2 +
```

```
10*x + 8) + 5*sqrt(5*x^2 + 2*x + 3)*(5*x + 1)))
```

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

$$-\int \frac{2\sqrt{5x^2+2x+3}}{7x^2-4x-1}\,dx - \int \frac{5x\sqrt{5x^2+2x+3}}{7x^2-4x-1}\,dx - \int \frac{x^2\sqrt{5x^2+2x+3}}{7x^2-4x-1}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+5*x+2)*(5*x**2+2*x+3)**(1/2)/(-7*x**2+4*x+1),x)
```

```
[Out] -Integral(2*sqrt(5*x**2 + 2*x + 3)/(7*x**2 - 4*x - 1), x) - Integ
ral(5*x*sqrt(5*x**2 + 2*x + 3)/(7*x**2 - 4*x - 1), x) - Integral(
x**2*sqrt(5*x**2 + 2*x + 3)/(7*x**2 - 4*x - 1), 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(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1),x, algorithm="g
```

```
[Out] Exception raised: TypeError
```

3.378 $\int \frac{(2+5x+x^2)\sqrt{3+2x+5x^2}}{(1+4x-7x^2)^2}\,dx$

Optimal. Leaf size=199

$$\frac{3\sqrt{5x^2+2x+3}(61x+3)}{154(-7x^2+4x+1)}-\frac{\sqrt{\frac{325022311+39132731\sqrt{11}}{1397}}\tanh^{-1}\left(\frac{(17-5\sqrt{11})x-\sqrt{11}+23}{\sqrt{2(125-17\sqrt{11})}\sqrt{5x^2+2x+3}}\right)}{2156}+\frac{\sqrt{\frac{325022311-39132731\sqrt{11}}{1397}}\tanh^{-1}\left(\frac{(17+5\sqrt{11})x+\sqrt{11}+23}{\sqrt{2(125+17\sqrt{11})}\sqrt{5x^2+2x+3}}\right)}{2156}+\frac{1}{49}\sqrt{5}\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)$$

```
[Out] (3*(3 + 61*x)*Sqrt[3 + 2*x + 5*x^2])/(154*(1 + 4*x - 7*x^2)) + (S
qrt[5]*ArcSinh[(1 + 5*x)/Sqrt[14]])/49 - (Sqrt[(325022311 + 39132
731*Sqrt[11])/1397]*ArcTanh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)
/(Sqrt[2*(125 - 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/2156 + (Sq
rt[(325022311 - 39132731*Sqrt[11])/1397]*ArcTanh[(23 + Sqrt[11] +
 (17 + 5*Sqrt[11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x +
 5*x^2])])/2156
```

Rubi [A] time = 0.685526, antiderivative size = 199, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 7, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$\frac{3\sqrt{5x^2+2x+3}(61x+3)}{154(-7x^2+4x+1)}-\frac{\sqrt{\frac{325022311+39132731\sqrt{11}}{1397}}\tanh^{-1}\left(\frac{(17-5\sqrt{11})x-\sqrt{11}+23}{\sqrt{2(125-17\sqrt{11})}\sqrt{5x^2+2x+3}}\right)}{2156}+\frac{\sqrt{\frac{325022311-39132731\sqrt{11}}{1397}}\tanh^{-1}\left(\frac{(17+5\sqrt{11})x+\sqrt{11}+23}{\sqrt{2(125+17\sqrt{11})}\sqrt{5x^2+2x+3}}\right)}{2156}+\frac{1}{49}\sqrt{5}\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[((2 + 5*x + x^2)*Sqrt[3 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2)^2,x]
```

```
[Out] (3*(3 + 61*x)*Sqrt[3 + 2*x + 5*x^2])/(154*(1 + 4*x - 7*x^2)) + (S
qrt[5]*ArcSinh[(1 + 5*x)/Sqrt[14]])/49 - (Sqrt[(325022311 + 39132
731*Sqrt[11])/1397]*ArcTanh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)
/(Sqrt[2*(125 - 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/2156 + (Sq
rt[(325022311 - 39132731*Sqrt[11])/1397]*ArcTanh[(23 + Sqrt[11] +
 (17 + 5*Sqrt[11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x +
```

```
5*x^2])])/2156
```

Rubi in Sympy [A] time = 89.2876, size = 223, normalized size = 1.12

$$\frac{(366x+18)\sqrt{5x^2+2x+3}}{308(-7x^2+4x+1)}+\frac{\sqrt{5}\operatorname{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{49}+\frac{\sqrt{22}\left(-872\sqrt{11}+91568\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68+20\sqrt{11}\right)-92+4\sqrt{11}\right)}{8\sqrt{-17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{189728\sqrt{-17\sqrt{11}+125}}-\frac{\sqrt{22}\left(872\sqrt{11}+91568\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68-20\sqrt{11}\right)-92-4\sqrt{11}\right)}{8\sqrt{17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{189728\sqrt{17\sqrt{11}+125}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((x**2+5*x+2)*(5*x**2+2*x+3)**(1/2)/(-7*x**2+4*x+1)**2,x)
```

```
[Out] (366*x + 18)*sqrt(5*x**2 + 2*x + 3)/(308*(-7*x**2 + 4*x + 1)) + s
qrt(5)*atanh(sqrt(5)*(10*x + 2)/(10*sqrt(5*x**2 + 2*x + 3)))/49 +
 sqrt(22)*(-872*sqrt(11) + 91568)*atanh(sqrt(2)*(x*(-68 + 20*sqrt
(11)) - 92 + 4*sqrt(11))/(8*sqrt(-17*sqrt(11) + 125)*sqrt(5*x**2
+ 2*x + 3)))/(189728*sqrt(-17*sqrt(11) + 125)) - sqrt(22)*(872*sq
rt(11) + 91568)*atanh(sqrt(2)*(x*(-68 - 20*sqrt(11)) - 92 - 4*sqr
t(11))/(8*sqrt(17*sqrt(11) + 125)*sqrt(5*x**2 + 2*x + 3)))/(18972
8*sqrt(17*sqrt(11) + 125))
```

Mathematica [A] time = 1.90664, size = 354, normalized size = 1.78

$$\frac{\frac{56364\sqrt{5x^2+2x+3}x}{-7x^2+4x+1}+\frac{2772\sqrt{5x^2+2x+3}}{-7x^2+4x+1}+22892\sqrt{\frac{22}{125+17\sqrt{11}}}\log\left(\sqrt{2750+374\sqrt{11}}\sqrt{5x^2+2x+3}+\left(55+17\sqrt{11}\right)x+23\sqrt{11}+11\right)+}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 + 5*x + x^2)*Sqrt[3 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2)^2,x]
```

```
[Out] ((2772*Sqrt[3 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2) + (56364*x*Sqrt[3
 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2) + 968*Sqrt[5]*ArcSinh[(1 + 5*x
)/Sqrt[14]] + 2*Sqrt[2/(125 - 17*Sqrt[11])]*(-1199 + 11446*Sqrt[1
1])*ArcTanh[(Sqrt[250 - 34*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2])/(-23
+ Sqrt[11] - 17*x + 5*Sqrt[11]*x)] - 2398*Sqrt[2/(125 + 17*Sqrt[1
```

```
1])]*Log[2 + Sqrt[11] - 7*x] - 22892*Sqrt[22/(125 + 17*Sqrt[11])]
*Log[2 + Sqrt[11] - 7*x] + 2398*Sqrt[2/(125 + 17*Sqrt[11])]*Log[1
1 + 23*Sqrt[11] + (55 + 17*Sqrt[11])*x + Sqrt[2750 + 374*Sqrt[11]
]*Sqrt[3 + 2*x + 5*x^2]] + 22892*Sqrt[22/(125 + 17*Sqrt[11])]*Log
[11 + 23*Sqrt[11] + (55 + 17*Sqrt[11])*x + Sqrt[2750 + 374*Sqrt[1
1]]*Sqrt[3 + 2*x + 5*x^2]])/47432
```

Maple [B] time = 0.043, size = 1084, normalized size = 5.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+5*x+2)*(5*x^2+2*x+3)^(1/2)/(-7*x^2+4*x+1)^2,x)
```

```
[Out] -161/484*11^(1/2)*(1/49*(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7
*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2)+1/70*(34/7
+10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/2)/(250/49+34/49*11^(1/2)-1/
20*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1/5))-(250/49+34/49*11^(1/2))
/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+68/49*11^(1/2)+(34/
7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2))^(1/2)/(2
45*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(
1/2))+250+34*11^(1/2))^(1/2)))+161/484*11^(1/2)*(1/49*(245*(x-2/7
+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250
-34*11^(1/2))^(1/2)+1/70*(34/7-10/7*11^(1/2))*5^(1/2)*arcsinh(5^(
1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*(x
+1/5))-(250/49-34/49*11^(1/2))/(250-34*11^(1/2))^(1/2)*arctanh(49
/2*(500/49-68/49*11^(1/2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2
)))/(250-34*11^(1/2))^(1/2)/(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-
10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2)))+(183
/44-39/44*11^(1/2))*(-1/49/(250/49-34/49*11^(1/2))/(x-2/7+1/7*11^
(1/2))*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*
11^(1/2))+250/49-34/49*11^(1/2))^(3/2)+1/98*(34/7-10/7*11^(1/2))/
(250/49-34/49*11^(1/2))*(1/7*(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7
-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2)+1/10*
(34/7-10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/2)/(250/49-34/49*11^(1/
2)-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*(x+1/5))-7*(250/49-34/49*11
^(1/2))/(250-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11^(1/
2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2))^(
1/2)/(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1
/7*11^(1/2))+250-34*11^(1/2))^(1/2)))+10/49/(250/49-34/49*11^(1/2
))*(1/20*(10*x+2)*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*
(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)+1/200*(5000/49-
680/49*11^(1/2)-(34/7-10/7*11^(1/2))^2)*5^(1/2)*arcsinh(5^(1/2)/(
250/49-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*(x+1/5))
))+(183/44+39/44*11^(1/2))*(-1/49/(250/49+34/49*11^(1/2))/(x-2/7-
1/7*11^(1/2))*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2
/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(3/2)+1/98*(34/7+10/7*11^
(1/2))/(250/49+34/49*11^(1/2))*(1/7*(245*(x-2/7-1/7*11^(1/2))^2+4
```

```
9*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2
)+1/10*(34/7+10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/2)/(250/49+34/49
*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1/5))-7*(250/49+3
4/49*11^(1/2))/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+68/49
*11^(1/2)+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(
1/2))^(1/2)/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(
x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2))+10/49/(250/49+34/49*
11^(1/2))*(1/20*(10*x+2)*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^
(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2)+1/200*(5
000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2))^2)*5^(1/2)*arcsinh(5^
(1/2)/(250/49+34/49*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)*(
x+1/5))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\sqrt{5\,x^2+2\,x+3}\left(x^2+5\,x+2\right)}{\left(7\,x^2-4\,x-1\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1)^2,x, algorithm="
```

```
[Out] integrate(sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1)
^2, x)
```

Fricas [A] time = 0.293087, size = 506, normalized size = 2.54

$$\frac{\sqrt{1397}\left(44\,\sqrt{1397}\sqrt{5}\left(7\,x^2-4\,x-1\right)\log\left(-\sqrt{5}\sqrt{5\,x^2+2\,x+3}(5\,x+1)-25\,x^2-10\,x-8\right)-\left(7\,x^2-4\,x-1\right)\sqrt{39132731\,\sqrt{1}}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1)^2,x, algorithm="
```

```
[Out] 1/6023864*sqrt(1397)*(44*sqrt(1397)*sqrt(5)*(7*x^2 - 4*x - 1)*log
(-sqrt(5)*sqrt(5*x^2 + 2*x + 3)*(5*x + 1) - 25*x^2 - 10*x - 8) -
(7*x^2 - 4*x - 1)*sqrt(39132731*sqrt(11) + 325022311)*log(-(sqrt(
1397)*sqrt(5*x^2 + 2*x + 3)*sqrt(39132731*sqrt(11) + 325022311)*(
16943*sqrt(11) + 235367) + 26119953475*sqrt(11)*(x + 3) - 7835986
0425*x + 130599767375)/x) + (7*x^2 - 4*x - 1)*sqrt(39132731*sqrt(
11) + 325022311)*log((sqrt(1397)*sqrt(5*x^2 + 2*x + 3)*sqrt(39132
731*sqrt(11) + 325022311)*(16943*sqrt(11) + 235367) - 26119953475
```

```
*sqrt(11)*(x + 3) + 78359860425*x - 130599767375)/x) - (7*x^2 - 4
*x - 1)*sqrt(-39132731*sqrt(11) + 325022311)*log((sqrt(1397)*sqrt
(5*x^2 + 2*x + 3)*(16943*sqrt(11) - 235367)*sqrt(-39132731*sqrt(1
1) + 325022311) + 26119953475*sqrt(11)*(x + 3) + 78359860425*x -
130599767375)/x) + (7*x^2 - 4*x - 1)*sqrt(-39132731*sqrt(11) + 32
5022311)*log(-(sqrt(1397)*sqrt(5*x^2 + 2*x + 3)*(16943*sqrt(11) -
 235367)*sqrt(-39132731*sqrt(11) + 325022311) - 26119953475*sqrt(
11)*(x + 3) - 78359860425*x + 130599767375)/x) - 84*sqrt(1397)*sq
rt(5*x^2 + 2*x + 3)*(61*x + 3))/(7*x^2 - 4*x - 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**2+5*x+2)*(5*x**2+2*x+3)**(1/2)/(-7*x**2+4*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(sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1)^2,x, algorithm="
```

```
[Out] Exception raised: TypeError
```

3.379 $\int \frac{(2+5x+x^2)\sqrt{3+2x+5x^2}}{(1+4x-7x^2)^3}\,dx$

Optimal. Leaf size=213

$$-\frac{\sqrt{5x^2+2x+3}(272941-813113x)}{1721104(-7x^2+4x+1)}+\frac{3(61x+3)\sqrt{5x^2+2x+3}}{308(-7x^2+4x+1)^2} -\frac{\sqrt{\frac{6492253020949-11879169071\sqrt{11}}{1397}}\tanh^{-1}\left(\frac{(17-5\sqrt{11})x-\sqrt{11}+23}{\sqrt{2(125-17\sqrt{11})}\sqrt{5x^2+2x+3}}\right)}{491744} +\frac{\sqrt{\frac{6492253020949+11879169071\sqrt{11}}{1397}}\tanh^{-1}\left(\frac{(17+5\sqrt{11})x+\sqrt{11}+23}{\sqrt{2(125+17\sqrt{11})}\sqrt{5x^2+2x+3}}\right)}{491744}$$

```
[Out] (3*(3 + 61*x)*Sqrt[3 + 2*x + 5*x^2])/(308*(1 + 4*x - 7*x^2)^2) -
((272941 - 813113*x)*Sqrt[3 + 2*x + 5*x^2])/(1721104*(1 + 4*x - 7
*x^2)) - (Sqrt[(6492253020949 - 11879169071*Sqrt[11])/1397]*ArcTa
nh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)/(Sqrt[2*(125 - 17*Sqrt[1
1])]*Sqrt[3 + 2*x + 5*x^2])])/491744 + (Sqrt[(6492253020949 + 118
79169071*Sqrt[11])/1397]*ArcTanh[(23 + Sqrt[11] + (17 + 5*Sqrt[11
])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/49174
4
```

Rubi [A] time = 0.662953, antiderivative size = 213, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$

$$-\frac{\sqrt{5x^2+2x+3}(272941-813113x)}{1721104(-7x^2+4x+1)}+\frac{3(61x+3)\sqrt{5x^2+2x+3}}{308(-7x^2+4x+1)^2} -\frac{\sqrt{\frac{6492253020949-11879169071\sqrt{11}}{1397}}\tanh^{-1}\left(\frac{(17-5\sqrt{11})x-\sqrt{11}+23}{\sqrt{2(125-17\sqrt{11})}\sqrt{5x^2+2x+3}}\right)}{491744} +\frac{\sqrt{\frac{6492253020949+11879169071\sqrt{11}}{1397}}\tanh^{-1}\left(\frac{(17+5\sqrt{11})x+\sqrt{11}+23}{\sqrt{2(125+17\sqrt{11})}\sqrt{5x^2+2x+3}}\right)}{491744}$$

Antiderivative was successfully verified.

```
[In]  Int[((2 + 5*x + x^2)*Sqrt[3 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2)^3,x]
```

```
[Out] (3*(3 + 61*x)*Sqrt[3 + 2*x + 5*x^2])/(308*(1 + 4*x - 7*x^2)^2) -
((272941 - 813113*x)*Sqrt[3 + 2*x + 5*x^2])/(1721104*(1 + 4*x - 7
```

```
*x^2)) - (Sqrt[(6492253020949 - 11879169071*Sqrt[11])/1397]*ArcTa
nh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)/(Sqrt[2*(125 - 17*Sqrt[1
1])]*Sqrt[3 + 2*x + 5*x^2])])/491744 + (Sqrt[(6492253020949 + 118
79169071*Sqrt[11])/1397]*ArcTanh[(23 + Sqrt[11] + (17 + 5*Sqrt[11
])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/49174
4
```

Rubi in Sympy [A] time = 89.4913, size = 221, normalized size = 1.04

$$-\frac{(-13009808x+4367056)\sqrt{5x^2+2x+3}}{27537664(-7x^2+4x+1)}+\frac{(366x+18)\sqrt{5x^2+2x+3}}{616(-7x^2+4x+1)^2}+\frac{\sqrt{22}\left(-56690816\sqrt{11}+779521344\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68+20\sqrt{11}\right)-92+4\sqrt{11}\right)}{8\sqrt{-17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{2423314432\sqrt{-17\sqrt{11}+125}}-\frac{\sqrt{22}\left(56690816\sqrt{11}+779521344\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68-20\sqrt{11}\right)-92-4\sqrt{11}\right)}{8\sqrt{17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{2423314432\sqrt{17\sqrt{11}+125}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((x**2+5*x+2)*(5*x**2+2*x+3)**(1/2)/(-7*x**2+4*x+1)**3,x)
```

```
[Out] -(-13009808*x + 4367056)*sqrt(5*x**2 + 2*x + 3)/(27537664*(-7*x**
2 + 4*x + 1)) + (366*x + 18)*sqrt(5*x**2 + 2*x + 3)/(616*(-7*x**2
 + 4*x + 1)**2) + sqrt(22)*(-56690816*sqrt(11) + 779521344)*atanh
(sqrt(2)*(x*(-68 + 20*sqrt(11)) - 92 + 4*sqrt(11))/(8*sqrt(-17*sq
rt(11) + 125)*sqrt(5*x**2 + 2*x + 3)))/(2423314432*sqrt(-17*sqrt(
11) + 125)) - sqrt(22)*(56690816*sqrt(11) + 779521344)*atanh(sqrt
(2)*(x*(-68 - 20*sqrt(11)) - 92 - 4*sqrt(11))/(8*sqrt(17*sqrt(11)
 + 125)*sqrt(5*x**2 + 2*x + 3)))/(2423314432*sqrt(17*sqrt(11) + 1
25))
```

Mathematica [A] time = 1.61426, size = 334, normalized size = 1.57

$$-\sqrt{\frac{22}{125-17\sqrt{11}}}\left(126542\sqrt{11}-1740003\right)\log\left(49x^2+14\left(\sqrt{11}-2\right)x-4\sqrt{11}+15\right)+2\sqrt{\frac{22}{125+17\sqrt{11}}}\left(1740003+126542\sqrt{11}\right)\text{lo}$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 + 5*x + x^2)*Sqrt[3 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2)^3,x]
```

```
[Out] ((-44*Sqrt[3 + 2*x + 5*x^2]*(31807 - 106279*x - 737577*x^2 + 8131
13*x^3))/(1 + 4*x - 7*x^2)^2 - 2*Sqrt[22/(125 - 17*Sqrt[11])]*(-1
740003 + 126542*Sqrt[11])*ArcTanh[(Sqrt[250 - 34*Sqrt[11]]*Sqrt[3
 + 2*x + 5*x^2])/(-23 + Sqrt[11] + (-17 + 5*Sqrt[11])*x)] - 2*Sqr
t[22/(125 + 17*Sqrt[11])]*(1740003 + 126542*Sqrt[11])*Log[2 + Sqr
t[11] - 7*x] + Sqrt[22/(125 - 17*Sqrt[11])]*(-1740003 + 126542*Sq
rt[11])*Log[(-2 + Sqrt[11] + 7*x)^2] - Sqrt[22/(125 - 17*Sqrt[11]
)]*(-1740003 + 126542*Sqrt[11])*Log[15 - 4*Sqrt[11] + 14*(-2 + Sq
rt[11])*x + 49*x^2] + 2*Sqrt[22/(125 + 17*Sqrt[11])]*(1740003 + 1
26542*Sqrt[11])*Log[11 + 23*Sqrt[11] + (55 + 17*Sqrt[11])*x + Sqr
t[2750 + 374*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2]])/10818368
```

Maple [B] time = 0.04, size = 2342, normalized size = 11.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+5*x+2)*(5*x^2+2*x+3)^(1/2)/(-7*x^2+4*x+1)^3,x)
```

```
[Out] -3535/21296*11^(1/2)*(1/49*(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+1
0/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2)+1/70*(3
4/7+10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/2)/(250/49+34/49*11^(1/2)
-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1/5))-(250/49+34/49*11^(1/
2))/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+68/49*11^(1/2)+(
34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2))^(1/2)
/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*1
1^(1/2))+250+34*11^(1/2))^(1/2)))+3535/21296*11^(1/2)*(1/49*(245*
(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2
))+250-34*11^(1/2))^(1/2)+1/70*(34/7-10/7*11^(1/2))*5^(1/2)*arcsi
nh(5^(1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(1
/2)*(x+1/5))-(250/49-34/49*11^(1/2))/(250-34*11^(1/2))^(1/2)*arct
anh(49/2*(500/49-68/49*11^(1/2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7*1
1^(1/2)))/(250-34*11^(1/2))^(1/2)/(245*(x-2/7+1/7*11^(1/2))^2+49*
(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2))
)-(-3535/1936-273/1936*11^(1/2))*(-1/49/(250/49+34/49*11^(1/2))/(
x-2/7-1/7*11^(1/2))*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2)
)*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(3/2)+1/98*(34/7+10
/7*11^(1/2))/(250/49+34/49*11^(1/2))*(1/7*(245*(x-2/7-1/7*11^(1/2
))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2)
)^(1/2)+1/10*(34/7+10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/2)/(250/49
+34/49*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1/5))-7*(25
0/49+34/49*11^(1/2))/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49
+68/49*11^(1/2)+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+3
4*11^(1/2))^(1/2)/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1
/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2)))+10/49/(250/49+
34/49*11^(1/2))*(1/20*(10*x+2)*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10
/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2)+1/
200*(5000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2))^2)*5^(1/2)*arcs
```

```
inh(5^(1/2)/(250/49+34/49*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(
1/2)*(x+1/5)))))-(-3535/1936+273/1936*11^(1/2))*(-1/49/(250/49-34/
49*11^(1/2))/(x-2/7+1/7*11^(1/2))*(5*(x-2/7+1/7*11^(1/2))^2+(34/7
-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(3/2)
+1/98*(34/7-10/7*11^(1/2))/(250/49-34/49*11^(1/2))*(1/7*(245*(x-2
/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+2
50-34*11^(1/2))^(1/2)+1/10*(34/7-10/7*11^(1/2))*5^(1/2)*arcsinh(5
^(1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*
(x+1/5))-7*(250/49-34/49*11^(1/2))/(250-34*11^(1/2))^(1/2)*arctan
h(49/2*(500/49-68/49*11^(1/2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^
(1/2)))/(250-34*11^(1/2))^(1/2)/(245*(x-2/7+1/7*11^(1/2))^2+49*(3
4/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2)))+
10/49/(250/49-34/49*11^(1/2))*(1/20*(10*x+2)*(5*(x-2/7+1/7*11^(1/
2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(
1/2))^(1/2)+1/200*(5000/49-680/49*11^(1/2)-(34/7-10/7*11^(1/2))^2
)*5^(1/2)*arcsinh(5^(1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*
11^(1/2))^2)^(1/2)*(x+1/5))))-21/968*(-61+13*11^(1/2))*11^(1/2)*(
-1/686/(250/49-34/49*11^(1/2))/(x-2/7+1/7*11^(1/2))^2*(5*(x-2/7+1
/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-3
4/49*11^(1/2))^(3/2)-1/1372*(34/7-10/7*11^(1/2))/(250/49-34/49*11
^(1/2))*(-1/(250/49-34/49*11^(1/2))/(x-2/7+1/7*11^(1/2))*(5*(x-2/
7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/4
9-34/49*11^(1/2))^(3/2)+1/2*(34/7-10/7*11^(1/2))/(250/49-34/49*11
^(1/2))*(1/7*(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*
(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2)+1/10*(34/7-10/7*11^(1
/2))*5^(1/2)*arcsinh(5^(1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10
/7*11^(1/2))^2)^(1/2)*(x+1/5))-7*(250/49-34/49*11^(1/2))/(250-34*
11^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11^(1/2)+(34/7-10/7*11
^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2))^(1/2)/(245*(x-2/7
+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250
-34*11^(1/2))^(1/2)))+10/(250/49-34/49*11^(1/2))*(1/20*(10*x+2)*(
5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)
)+250/49-34/49*11^(1/2))^(1/2)+1/200*(5000/49-680/49*11^(1/2)-(34
/7-10/7*11^(1/2))^2)*5^(1/2)*arcsinh(5^(1/2)/(250/49-34/49*11^(1/
2)-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*(x+1/5))))+5/686/(250/49-34
/49*11^(1/2))*(1/7*(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(
1/2))*(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2)+1/10*(34/7-10/7
*11^(1/2))*5^(1/2)*arcsinh(5^(1/2)/(250/49-34/49*11^(1/2)-1/20*(3
4/7-10/7*11^(1/2))^2)^(1/2)*(x+1/5))-7*(250/49-34/49*11^(1/2))/(2
50-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11^(1/2)+(34/7-1
0/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2))^(1/2)/(245*
(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2
))+250-34*11^(1/2))^(1/2))))-21/968*(61+13*11^(1/2))*11^(1/2)*(-1
/686/(250/49+34/49*11^(1/2))/(x-2/7-1/7*11^(1/2))^2*(5*(x-2/7-1/7
*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/
49*11^(1/2))^(3/2)-1/1372*(34/7+10/7*11^(1/2))/(250/49+34/49*11^(
1/2))*(-1/(250/49+34/49*11^(1/2))/(x-2/7-1/7*11^(1/2))*(5*(x-2/7-
1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+
34/49*11^(1/2))^(3/2)+1/2*(34/7+10/7*11^(1/2))/(250/49+34/49*11^(
1/2))*(1/7*(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x
-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2)+1/10*(34/7+10/7*11^(1/2
))*5^(1/2)*arcsinh(5^(1/2)/(250/49+34/49*11^(1/2)-1/20*(34/7+10/7
*11^(1/2))^2)^(1/2)*(x+1/5))-7*(250/49+34/49*11^(1/2))/(250+34*11
^(1/2))^(1/2)*arctanh(49/2*(500/49+68/49*11^(1/2)+(34/7+10/7*11^(
```

```
1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2))^(1/2)/(245*(x-2/7-1
/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+3
4*11^(1/2))^(1/2)))+10/(250/49+34/49*11^(1/2))*(1/20*(10*x+2)*(5*
(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+
250/49+34/49*11^(1/2))^(1/2)+1/200*(5000/49+680/49*11^(1/2)-(34/7
+10/7*11^(1/2))^2)*5^(1/2)*arcsinh(5^(1/2)/(250/49+34/49*11^(1/2)
-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1/5))))+5/686/(250/49+34/4
9*11^(1/2))*(1/7*(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/
2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2)+1/10*(34/7+10/7*1
1^(1/2))*5^(1/2)*arcsinh(5^(1/2)/(250/49+34/49*11^(1/2)-1/20*(34/
7+10/7*11^(1/2))^2)^(1/2)*(x+1/5))-7*(250/49+34/49*11^(1/2))/(250
+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+68/49*11^(1/2)+(34/7+10/
7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2))^(1/2)/(245*(x
-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))
+250+34*11^(1/2))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\sqrt{5\,x^2+2\,x+3}\left(x^2+5\,x+2\right)}{\left(7\,x^2-4\,x-1\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1)^3,x, algorithm=
```

```
[Out] -integrate(sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1
)^3, x)
```

Fricas [A] time = 0.293412, size = 572, normalized size = 2.69

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1)^3,x, algorithm=
```

```
[Out] -1/10818368*(sqrt(1/127)*(49*x^4 - 56*x^3 + 2*x^2 + 8*x + 1)*sqrt
(sqrt(11)*(6492253020949*sqrt(11) - 130670859781))*log(-1/1397*(s
qrt(1/127)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(6492253020949*sqr
t(11) - 130670859781))*(4822219*sqrt(11) + 37335441) + 4480879518
665*sqrt(11)*(x + 3) - 13442638555995*x + 22404397593325)/x) - sq
rt(1/127)*(49*x^4 - 56*x^3 + 2*x^2 + 8*x + 1)*sqrt(sqrt(11)*(6492
253020949*sqrt(11) - 130670859781))*log(1/1397*(sqrt(1/127)*sqrt(
5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(6492253020949*sqrt(11) - 13067085
```

```
9781))*(4822219*sqrt(11) + 37335441) - 4480879518665*sqrt(11)*(x
+ 3) + 13442638555995*x - 22404397593325)/x) + sqrt(1/127)*(49*x^
4 - 56*x^3 + 2*x^2 + 8*x + 1)*sqrt(sqrt(11)*(6492253020949*sqrt(1
1) + 130670859781))*log(1/1397*(sqrt(1/127)*sqrt(5*x^2 + 2*x + 3)
*sqrt(sqrt(11)*(6492253020949*sqrt(11) + 130670859781))*(4822219*
sqrt(11) - 37335441) + 4480879518665*sqrt(11)*(x + 3) + 134426385
55995*x - 22404397593325)/x) - sqrt(1/127)*(49*x^4 - 56*x^3 + 2*x
^2 + 8*x + 1)*sqrt(sqrt(11)*(6492253020949*sqrt(11) + 13067085978
1))*log(-1/1397*(sqrt(1/127)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*
(6492253020949*sqrt(11) + 130670859781))*(4822219*sqrt(11) - 3733
5441) - 4480879518665*sqrt(11)*(x + 3) - 13442638555995*x + 22404
397593325)/x) + 44*(813113*x^3 - 737577*x^2 - 106279*x + 31807)*s
qrt(5*x^2 + 2*x + 3))/(49*x^4 - 56*x^3 + 2*x^2 + 8*x + 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**2+5*x+2)*(5*x**2+2*x+3)**(1/2)/(-7*x**2+4*x+1)**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(-sqrt(5*x^2 + 2*x + 3)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1)^3,x, algorithm=
```

```
[Out] Exception raised: RuntimeError
```

3.380 $\int \left(1+4x-7x^2\right)^3 \left(2+5x+x^2\right) \left(3+2x+5x^2\right)^{3/2} \, dx$

Optimal. Leaf size=231

$$\frac{2173004363\left(5x^2+2x+3\right)^{5/2}x^2}{173250000}+\frac{837379699\left(5x^2+2x+3\right)^{5/2}x}{72187500}-\frac{6133820867\left(5x^2+2x+3\right)^{5/2}}{1203125000}$$
$$-\frac{22840599(5x+1)\left(5x^2+2x+3\right)^{3/2}}{62500000}-\frac{479652579(5x+1)\sqrt{5x^2+2x+3}}{312500000}$$
$$-\frac{343}{60}\left(5x^2+2x+3\right)^{5/2}x^7-\frac{61103\left(5x^2+2x+3\right)^{5/2}x^6}{3300}+\frac{1031177\left(5x^2+2x+3\right)^{5/2}x^5}{20625}-\frac{796559\left(5x^2+2x+3\right)^{5/2}x^4}{123750}-\frac{19023}{}$$

```
[Out] (-479652579*(1 + 5*x)*Sqrt[3 + 2*x + 5*x^2])/312500000 - (2284059
9*(1 + 5*x)*(3 + 2*x + 5*x^2)^(3/2))/62500000 - (6133820867*(3 +
2*x + 5*x^2)^(5/2))/1203125000 + (837379699*x*(3 + 2*x + 5*x^2)^(
5/2))/72187500 + (2173004363*x^2*(3 + 2*x + 5*x^2)^(5/2))/1732500
00 - (190236913*x^3*(3 + 2*x + 5*x^2)^(5/2))/4950000 - (796559*x^
4*(3 + 2*x + 5*x^2)^(5/2))/123750 + (1031177*x^5*(3 + 2*x + 5*x^2
)^(5/2))/20625 - (61103*x^6*(3 + 2*x + 5*x^2)^(5/2))/3300 - (343*
x^7*(3 + 2*x + 5*x^2)^(5/2))/60 - (3357568053*ArcSinh[(1 + 5*x)/S
qrt[14]])/(156250000*Sqrt[5])
```

Rubi [A] time = 0.604019, antiderivative size = 231, normalized size of antiderivative = 1., number of steps used = 12, number of rules used = 5, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.143

$$\frac{2173004363\left(5x^2+2x+3\right)^{5/2}x^2}{173250000}+\frac{837379699\left(5x^2+2x+3\right)^{5/2}x}{72187500}-\frac{6133820867\left(5x^2+2x+3\right)^{5/2}}{1203125000}$$
$$-\frac{22840599(5x+1)\left(5x^2+2x+3\right)^{3/2}}{62500000}-\frac{479652579(5x+1)\sqrt{5x^2+2x+3}}{312500000}$$
$$-\frac{343}{60}\left(5x^2+2x+3\right)^{5/2}x^7-\frac{61103\left(5x^2+2x+3\right)^{5/2}x^6}{3300}+\frac{1031177\left(5x^2+2x+3\right)^{5/2}x^5}{20625}-\frac{796559\left(5x^2+2x+3\right)^{5/2}x^4}{123750}-\frac{19023}{}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 4*x - 7*x^2)^3*(2 + 5*x + x^2)*(3 + 2*x + 5*x^2)^(3/2),x]
```

```
[Out] (-479652579*(1 + 5*x)*Sqrt[3 + 2*x + 5*x^2])/312500000 - (2284059
9*(1 + 5*x)*(3 + 2*x + 5*x^2)^(3/2))/62500000 - (6133820867*(3 +
2*x + 5*x^2)^(5/2))/1203125000 + (837379699*x*(3 + 2*x + 5*x^2)^(
5/2))/72187500 + (2173004363*x^2*(3 + 2*x + 5*x^2)^(5/2))/1732500
00 - (190236913*x^3*(3 + 2*x + 5*x^2)^(5/2))/4950000 - (796559*x^
4*(3 + 2*x + 5*x^2)^(5/2))/123750 + (1031177*x^5*(3 + 2*x + 5*x^2
)^(5/2))/20625 - (61103*x^6*(3 + 2*x + 5*x^2)^(5/2))/3300 - (343*
x^7*(3 + 2*x + 5*x^2)^(5/2))/60 - (3357568053*ArcSinh[(1 + 5*x)/S
```

```
qrt[14]])/(156250000*Sqrt[5])
```

Rubi in Sympy [A] time = 134.716, size = 216, normalized size = 0.94

$$-\frac{(-17647383729980992755600 0x+166867164520858014645600)\sqrt{5x^2+2x+3}}{385232826825000000000}-\frac{(-9121606768520508276 00x+258576971071203524880)\left(-7x^2+4x+1\right)\sqrt{5x^2+2x+3}}{77046565365000000000}-\frac{(-162090637417359000x+29161572207069960)\left(-7x^2+4x+1\right)^2\sqrt{5x^2+2x+3}}{3668884065000000 0}-\frac{(-15715379470980x+3618588130500)\left(-7x^2+4x+1\right)^3\sqrt{5x^2+2x+3}}{6988350600000}-\frac{(385x+2281)\left(-7x^2+4x+1\right)^4\left(5x^2+2x+3\right)^{\frac{3}{2}}}{32340}-\frac{(225143730x+227571834)\left(-7x^2+4x+1\right)^4\sqrt{5x^2+2x+3}}{713097000}-\frac{3357568053\sqrt{5}\,\text{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{781250000}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((-7*x**2+4*x+1)**3*(x**2+5*x+2)*(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] -(-176473837299809927556000*x + 166867164520858014645600)*sqrt(5*
x**2 + 2*x + 3)/385232826825000000000 - (-912160676852050827600*
x + 258576971071203524880)*(-7*x**2 + 4*x + 1)*sqrt(5*x**2 + 2*x
+ 3)/77046565365000000000 - (-162090637417359000*x + 291615722070
69960)*(-7*x**2 + 4*x + 1)**2*sqrt(5*x**2 + 2*x + 3)/366888406500
00000 - (-15715379470980*x + 3618588130500)*(-7*x**2 + 4*x + 1)**
3*sqrt(5*x**2 + 2*x + 3)/6988350600000 - (385*x + 2281)*(-7*x**2
+ 4*x + 1)**4*(5*x**2 + 2*x + 3)**(3/2)/32340 - (225143730*x + 22
7571834)*(-7*x**2 + 4*x + 1)**4*sqrt(5*x**2 + 2*x + 3)/713097000
- 3357568053*sqrt(5)*atanh(sqrt(5)*(10*x + 2)/(10*sqrt(5*x**2 + 2
*x + 3)))/781250000
```

Mathematica [A] time = 0.159839, size = 95, normalized size = 0.41

$$5\sqrt{5x^2+2x+3}\left(-30950390625000x^{11}-125007421875000x^{10}+148393743750000x^9+30505457500000x^8+729182472812\right.$$

Antiderivative was successfully verified.

```
[In]  Integrate[(1 + 4*x - 7*x^2)^3*(2 + 5*x + x^2)*(3 + 2*x + 5*x^2)^(3/2),x]
```

```
[Out] (5*Sqrt[3 + 2*x + 5*x^2]*(-10506617068392 + 6352777129950*x + 158
65844408685*x^2 + 19041688239675*x^3 + 2573089891000*x^4 - 851303
34087500*x^5 - 52106830406250*x^6 + 72918247281250*x^7 + 30505457
500000*x^8 + 148393743750000*x^9 - 125007421875000*x^10 - 3095039
0625000*x^11) - 4653589321458*Sqrt[5]*ArcSinh[(1 + 5*x)/Sqrt[14]]
)/1082812500000
```

Maple [A] time = 0.047, size = 185, normalized size = 0.8

$$-\frac{228405990\,x+45681198}{125000000}\left(5\,x^{2}+2\,x+3\right)^{\frac{3}{2}}-\frac{4796525790\,x+959305158}{625000000}\sqrt{5\,x^{2}+2\,x+3}-\frac{3357568053\,\sqrt{5}}{781250000}Arcsinh\left(\frac{5\,\sqrt{14}}{14}\left(x+\frac{1}{5}\right)\right)-\frac{6133820867}{1203125000}\left(5\,x^{2}+2\,x+3\right)^{\frac{5}{2}}+\frac{837379699\,x}{72187500}\left(5\,x^{2}+2\,x+3\right)^{\frac{5}{2}}+\frac{2173004363\,x^{2}}{173250000}\left(5\,x^{2}+2\,x+3\right)^{\frac{5}{2}}-\frac{190236913\,x^{3}}{4950000}\left(5\,x^{2}+2\,x+3\right)^{\frac{5}{2}}-\frac{796559\,x^{4}}{123750}\left(5\,x^{2}+2\,x+3\right)^{\frac{5}{2}}+\frac{1031177\,x^{5}}{20625}\left(5\,x^{2}+2\,x+3\right)^{\frac{5}{2}}-\frac{61103\,x^{6}}{3300}\left(5\,x^{2}+2\,x+3\right)^{\frac{5}{2}}-\frac{343\,x^{7}}{60}\left(5\,x^{2}+2\,x+3\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((-7*x^2+4*x+1)^3*(x^2+5*x+2)*(5*x^2+2*x+3)^(3/2),x)
```

```
[Out] -22840599/125000000*(10*x+2)*(5*x^2+2*x+3)^(3/2)-479652579/625000
000*(10*x+2)*(5*x^2+2*x+3)^(1/2)-3357568053/781250000*5^(1/2)*arc
sinh(5/14*14^(1/2)*(x+1/5))-6133820867/1203125000*(5*x^2+2*x+3)^(
5/2)+837379699/72187500*x*(5*x^2+2*x+3)^(5/2)+2173004363/17325000
0*x^2*(5*x^2+2*x+3)^(5/2)-190236913/4950000*x^3*(5*x^2+2*x+3)^(5/
2)-796559/123750*x^4*(5*x^2+2*x+3)^(5/2)+1031177/20625*x^5*(5*x^2
+2*x+3)^(5/2)-61103/3300*x^6*(5*x^2+2*x+3)^(5/2)-343/60*x^7*(5*x^
2+2*x+3)^(5/2)
```

Maxima [A] time = 0.772932, size = 278, normalized size = 1.2

$$-\frac{343}{60}\left(5x^2+2x+3\right)^{\frac{5}{2}}x^7-\frac{61103}{3300}\left(5x^2+2x+3\right)^{\frac{5}{2}}x^6+\frac{1031177}{20625}\left(5x^2+2x+3\right)^{\frac{5}{2}}x^5-\frac{796559}{123750}\left(5x^2+2x+3\right)^{\frac{5}{2}}x^4-\frac{190236913}{4950000}\left(5x^2+2x+3\right)^{\frac{5}{2}}x^3+\frac{2173004363}{173250000}\left(5x^2+2x+3\right)^{\frac{5}{2}}x^2+\frac{837379699}{72187500}\left(5x^2+2x+3\right)^{\frac{5}{2}}x-\frac{6133820867}{1203125000}\left(5x^2+2x+3\right)^{\frac{5}{2}}-\frac{22840599}{12500000}\left(5x^2+2x+3\right)^{\frac{3}{2}}x-\frac{22840599}{62500000}\left(5x^2+2x+3\right)^{\frac{3}{2}}-\frac{479652579}{62500000}\sqrt{5x^2+2x+3}x-\frac{3357568053}{781250000}\sqrt{5}\,\operatorname{arsinh}\left(\frac{1}{14}\sqrt{14}(5x+1)\right)-\frac{479652579}{312500000}\sqrt{5x^2+2x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)^3*(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2),x, algorithm
```

```
[Out] -343/60*(5*x^2 + 2*x + 3)^(5/2)*x^7 - 61103/3300*(5*x^2 + 2*x + 3
)^(5/2)*x^6 + 1031177/20625*(5*x^2 + 2*x + 3)^(5/2)*x^5 - 796559/
123750*(5*x^2 + 2*x + 3)^(5/2)*x^4 - 190236913/4950000*(5*x^2 + 2
*x + 3)^(5/2)*x^3 + 2173004363/173250000*(5*x^2 + 2*x + 3)^(5/2)*
x^2 + 837379699/72187500*(5*x^2 + 2*x + 3)^(5/2)*x - 6133820867/1
203125000*(5*x^2 + 2*x + 3)^(5/2) - 22840599/12500000*(5*x^2 + 2*
x + 3)^(3/2)*x - 22840599/62500000*(5*x^2 + 2*x + 3)^(3/2) - 4796
52579/62500000*sqrt(5*x^2 + 2*x + 3)*x - 3357568053/781250000*sqr
t(5)*arcsinh(1/14*sqrt(14)*(5*x + 1)) - 479652579/312500000*sqrt(
5*x^2 + 2*x + 3)
```

Fricas [A] time = 0.278749, size = 155, normalized size = 0.67

$$-\frac{1}{1082812500000}\sqrt{5}\Big(\sqrt{5}\big(30950390625000\,x^{11}+125007421875000\,x^{10}-148393743750000\,x^{9}-30505457500000\,x^{8}-7291$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)^3*(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2),x, algorithm
```

```
[Out] -1/1082812500000*sqrt(5)*(sqrt(5)*(30950390625000*x^11 + 12500742
1875000*x^10 - 148393743750000*x^9 - 30505457500000*x^8 - 7291824
7281250*x^7 + 52106830406250*x^6 + 85130334087500*x^5 - 257308989
1000*x^4 - 19041688239675*x^3 - 15865844408685*x^2 - 635277712995
0*x + 10506617068392)*sqrt(5*x^2 + 2*x + 3) - 2326794660729*log(-
sqrt(5)*(25*x^2 + 10*x + 8) + 5*sqrt(5*x^2 + 2*x + 3)*(5*x + 1)))
```

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

$$-\int\left(-91x\sqrt{5x^2+2x+3}\right)\,dx-\int\left(-413x^2\sqrt{5x^2+2x+3}\right)\,dx-\int\left(-192x^3\sqrt{5x^2+2x+3}\right)\,dx$$
$$-\int 2160x^4\sqrt{5x^2+2x+3}\,dx-\int 1666x^5\sqrt{5x^2+2x+3}\,dx-\int\left(-2094x^6\sqrt{5x^2+2x+3}\right)\,dx$$
$$-\int\left(-1384x^7\sqrt{5x^2+2x+3}\right)\,dx-\int\left(-7042x^8\sqrt{5x^2+2x+3}\right)\,dx$$
$$-\int 6321x^9\sqrt{5x^2+2x+3}\,dx-\int 1715x^{10}\sqrt{5x^2+2x+3}\,dx-\int\left(-6\sqrt{5x^2+2x+3}\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-7*x**2+4*x+1)**3*(x**2+5*x+2)*(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] -Integral(-91*x*sqrt(5*x**2 + 2*x + 3), x) - Integral(-413*x**2*s
qrt(5*x**2 + 2*x + 3), x) - Integral(-192*x**3*sqrt(5*x**2 + 2*x
+ 3), x) - Integral(2160*x**4*sqrt(5*x**2 + 2*x + 3), x) - Integr
al(1666*x**5*sqrt(5*x**2 + 2*x + 3), x) - Integral(-2094*x**6*sqr
t(5*x**2 + 2*x + 3), x) - Integral(-1384*x**7*sqrt(5*x**2 + 2*x +
 3), x) - Integral(-7042*x**8*sqrt(5*x**2 + 2*x + 3), x) - Integr
al(6321*x**9*sqrt(5*x**2 + 2*x + 3), x) - Integral(1715*x**10*sqr
t(5*x**2 + 2*x + 3), x) - Integral(-6*sqrt(5*x**2 + 2*x + 3), x)
```

GIAC/XCAS [A] time = 0.276642, size = 138, normalized size = 0.6

$$-\frac{1}{216562500000}\left(5\left(\left(5\left(10\left(25\left(5\left(7\left(20\left(105\left(875\left(77\,x+311\right)x-323034\right)x-6972676\right)x-333340559\right)x+1667418573\right)x+136\right.\right.\right.\right.\right.\right.\right.\right.\right.$$
$$+\frac{3357568053}{781250000}\sqrt{5}\ln\left(-\sqrt{5}\left(\sqrt{5}x-\sqrt{5\,x^2+2\,x+3}\right)-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(7*x^2 - 4*x - 1)^3*(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2),x, algorith
```

```
[Out] -1/216562500000*(5*((5*(10*(25*(5*(7*(20*(105*(875*(77*x + 311)*x
 - 323034)*x - 6972676)*x - 333340559)*x + 1667418573)*x + 136208
53454)*x - 10292359564)*x - 761667529587)*x - 3173168881737)*x -
1270555425990)*x + 10506617068392)*sqrt(5*x^2 + 2*x + 3) + 335756
8053/781250000*sqrt(5)*ln(-sqrt(5)*(sqrt(5)*x - sqrt(5*x^2 + 2*x
+ 3)) - 1)
```

3.381 $\int \left(1+4x-7x^2\right)^2 \left(2+5x+x^2\right) \left(3+2x+5x^2\right)^{3/2} \, dx$

Optimal. Leaf size=189

$$-\frac{219271 \left(5x^2+2x+3\right)^{5/2} x^2}{105000}+\frac{86721 \left(5x^2+2x+3\right)^{5/2} x}{21875}+\frac{505667 \left(5x^2+2x+3\right)^{5/2}}{2187500}-\frac{690561(5x+1) \left(5x^2+2x+3\right)^{3/2}}{1250000}-\frac{14501781(5x+1)\sqrt{5x^2+2x+3}}{6250000}+\frac{49}{50} \left(5x^2+2x+3\right)^{5/2} x^5+\frac{581}{150} \left(5x^2+2x+3\right)^{5/2} x^4-\frac{18379 \left(5x^2+2x+3\right)^{5/2} x^3}{3000}-\frac{101512467 \sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{3125000\sqrt{5}}$$

```
[Out] (-14501781*(1 + 5*x)*Sqrt[3 + 2*x + 5*x^2])/6250000 - (690561*(1
+ 5*x)*(3 + 2*x + 5*x^2)^(3/2))/1250000 + (505667*(3 + 2*x + 5*x^
2)^(5/2))/2187500 + (86721*x*(3 + 2*x + 5*x^2)^(5/2))/21875 - (21
9271*x^2*(3 + 2*x + 5*x^2)^(5/2))/105000 - (18379*x^3*(3 + 2*x +
5*x^2)^(5/2))/3000 + (581*x^4*(3 + 2*x + 5*x^2)^(5/2))/150 + (49*
x^5*(3 + 2*x + 5*x^2)^(5/2))/50 - (101512467*ArcSinh[(1 + 5*x)/Sq
rt[14]])/(3125000*Sqrt[5])
```

Rubi [A] time = 0.376645, antiderivative size = 189, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 5, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$

$$-\frac{219271 \left(5x^2+2x+3\right)^{5/2} x^2}{105000}+\frac{86721 \left(5x^2+2x+3\right)^{5/2} x}{21875}+\frac{505667 \left(5x^2+2x+3\right)^{5/2}}{2187500}-\frac{690561(5x+1) \left(5x^2+2x+3\right)^{3/2}}{1250000}-\frac{14501781(5x+1)\sqrt{5x^2+2x+3}}{6250000}+\frac{49}{50} \left(5x^2+2x+3\right)^{5/2} x^5+\frac{581}{150} \left(5x^2+2x+3\right)^{5/2} x^4-\frac{18379 \left(5x^2+2x+3\right)^{5/2} x^3}{3000}-\frac{101512467 \sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{3125000\sqrt{5}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 4*x - 7*x^2)^2*(2 + 5*x + x^2)*(3 + 2*x + 5*x^2)^(3/2),x]
```


```
[Out] (-14501781*(1 + 5*x)*Sqrt[3 + 2*x + 5*x^2])/6250000 - (690561*(1
+ 5*x)*(3 + 2*x + 5*x^2)^(3/2))/1250000 + (505667*(3 + 2*x + 5*x^
2)^(5/2))/2187500 + (86721*x*(3 + 2*x + 5*x^2)^(5/2))/21875 - (21
9271*x^2*(3 + 2*x + 5*x^2)^(5/2))/105000 - (18379*x^3*(3 + 2*x +
5*x^2)^(5/2))/3000 + (581*x^4*(3 + 2*x + 5*x^2)^(5/2))/150 + (49*
x^5*(3 + 2*x + 5*x^2)^(5/2))/50 - (101512467*ArcSinh[(1 + 5*x)/Sq
rt[14]])/(3125000*Sqrt[5])
```

Rubi in Sympy [A] time = 112.23, size = 184, normalized size = 0.97

$$-\frac{(-3962302329762882000x+3444197836993200)\sqrt{5x^2+2x+3}}{166767457500000000} - \frac{(-22879408776172200x+1763434632564360)\left(-7x^2+4x+1\right)\sqrt{5x^2+2x+3}}{3335349150000000} - \frac{(-5099598535500x+1011708415620)\left(-7x^2+4x+1\right)^2\sqrt{5x^2+2x+3}}{1588261500000} - \frac{(315x+1911)\left(-7x^2+4x+1\right)^3\left(5x^2+2x+3\right)^{\frac{3}{2}}}{22050} - \frac{(124869150x+136384290)\left(-7x^2+4x+1\right)^3\sqrt{5x^2+2x+3}}{302526000} - \frac{101512467\sqrt{5}\operatorname{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{15625000}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((-7*x**2+4*x+1)**2*(x**2+5*x+2)*(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] -(-3962302329762882000*x + 3444197836993200)*sqrt(5*x**2 + 2*x +
3)/166767457500000000 - (-22879408776172200*x + 1763434632564360)
*(-7*x**2 + 4*x + 1)*sqrt(5*x**2 + 2*x + 3)/3335349150000000 - (-
5099598535500*x + 1011708415620)*(-7*x**2 + 4*x + 1)**2*sqrt(5*x*
*2 + 2*x + 3)/1588261500000 - (315*x + 1911)*(-7*x**2 + 4*x + 1)*
*3*(5*x**2 + 2*x + 3)**(3/2)/22050 - (124869150*x + 136384290)*(-
7*x**2 + 4*x + 1)**3*sqrt(5*x**2 + 2*x + 3)/302526000 - 101512467
*sqrt(5)*atanh(sqrt(5)*(10*x + 2)/(10*sqrt(5*x**2 + 2*x + 3)))/15
625000
```

Mathematica [A] time = 0.121738, size = 85, normalized size = 0.45

$$\frac{5\sqrt{5x^2+2x+3}\left(3215625000x^9+15281875000x^8-5561281250x^7-4105593750x^6-12554262500x^5-3227597000x^4+59\cdots\right.}{656250000}$$

Antiderivative was successfully verified.

```
[In] Integrate[(1 + 4*x - 7*x^2)^2*(2 + 5*x + x^2)*(3 + 2*x + 5*x^2)^(3/2),x]
```

```
[Out] (5*Sqrt[3 + 2*x + 5*x^2]*(-249003936 + 2291675850*x + 3721040355*
x^2 + 5959365525*x^3 - 3227597000*x^4 - 12554262500*x^5 - 4105593
750*x^6 - 5561281250*x^7 + 15281875000*x^8 + 3215625000*x^9) - 42
63523614*Sqrt[5]*ArcSinh[(1 + 5*x)/Sqrt[14]])/656250000
```

Maple [A] time = 0.012, size = 151, normalized size = 0.8

$$-\frac{6905610x+1381122}{2500000}\left(5x^{2}+2x+3\right)^{\frac{3}{2}}-\frac{145017810x+29003562}{12500000}\sqrt{5x^{2}+2x+3}-\frac{101512467\sqrt{5}}{15625000}Arcsinh\left(\frac{5\sqrt{14}}{14}\left(x+\frac{1}{5}\right)\right)+\frac{505667}{2187500}\left(5x^{2}+2x+3\right)^{\frac{5}{2}}+\frac{86721x}{21875}\left(5x^{2}+2x+3\right)^{\frac{5}{2}}-\frac{219271x^{2}}{105000}\left(5x^{2}+2x+3\right)^{\frac{5}{2}}-\frac{18379x^{3}}{3000}\left(5x^{2}+2x+3\right)^{\frac{5}{2}}+\frac{581x^{4}}{150}\left(5x^{2}+2x+3\right)^{\frac{5}{2}}+\frac{49x^{5}}{50}\left(5x^{2}+2x+3\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((-7*x^2+4*x+1)^2*(x^2+5*x+2)*(5*x^2+2*x+3)^(3/2),x)
```

```
[Out] -690561/2500000*(10*x+2)*(5*x^2+2*x+3)^(3/2)-14501781/12500000*(1
0*x+2)*(5*x^2+2*x+3)^(1/2)-101512467/15625000*5^(1/2)*arcsinh(5/1
4*14^(1/2)*(x+1/5))+505667/2187500*(5*x^2+2*x+3)^(5/2)+86721/2187
5*x*(5*x^2+2*x+3)^(5/2)-219271/105000*x^2*(5*x^2+2*x+3)^(5/2)-183
79/3000*x^3*(5*x^2+2*x+3)^(5/2)+581/150*x^4*(5*x^2+2*x+3)^(5/2)+4
9/50*x^5*(5*x^2+2*x+3)^(5/2)
```

Maxima [A] time = 0.768901, size = 232, normalized size = 1.23

$$\frac{49}{50}\left(5x^{2}+2x+3\right)^{\frac{5}{2}}x^{5}+\frac{581}{150}\left(5x^{2}+2x+3\right)^{\frac{5}{2}}x^{4}-\frac{18379}{3000}\left(5x^{2}+2x+3\right)^{\frac{5}{2}}x^{3}-\frac{219271}{105000}\left(5x^{2}+2x+3\right)^{\frac{5}{2}}x^{2}+\frac{86721}{21875}\left(5x^{2}+2x+3\right)^{\frac{5}{2}}x+\frac{505667}{2187500}\left(5x^{2}+2x+3\right)^{\frac{5}{2}}-\frac{690561}{250000}\left(5x^{2}+2x+3\right)^{\frac{3}{2}}x-\frac{690561}{1250000}\left(5x^{2}+2x+3\right)^{\frac{3}{2}}-\frac{14501781}{1250000}\sqrt{5x^{2}+2x+3}x-\frac{101512467}{15625000}\sqrt{5}\operatorname{arsinh}\left(\frac{1}{14}\sqrt{14}(5x+1)\right)-\frac{14501781}{6250000}\sqrt{5x^{2}+2x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((7*x^2 - 4*x - 1)^2*(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2),x, algorithm
```

```
[Out] 49/50*(5*x^2 + 2*x + 3)^(5/2)*x^5 + 581/150*(5*x^2 + 2*x + 3)^(5/
2)*x^4 - 18379/3000*(5*x^2 + 2*x + 3)^(5/2)*x^3 - 219271/105000*(
5*x^2 + 2*x + 3)^(5/2)*x^2 + 86721/21875*(5*x^2 + 2*x + 3)^(5/2)*
x + 505667/2187500*(5*x^2 + 2*x + 3)^(5/2) - 690561/250000*(5*x^2
 + 2*x + 3)^(3/2)*x - 690561/1250000*(5*x^2 + 2*x + 3)^(3/2) - 14
501781/1250000*sqrt(5*x^2 + 2*x + 3)*x - 101512467/15625000*sqrt(
5)*arcsinh(1/14*sqrt(14)*(5*x + 1)) - 14501781/6250000*sqrt(5*x^2
```

```
+ 2*x + 3)
```

Fricas [A] time = 0.271512, size = 142, normalized size = 0.75

$$\frac{1}{656250000}\sqrt{5}\left(\sqrt{5}\left(3215625000\,x^{9}+15281875000\,x^{8}-5561281250\,x^{7}-4105593750\,x^{6}-12554262500\,x^{5}-3227597000\,x\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((7*x^2 - 4*x - 1)^2*(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2),x, algorithm
```

```
[Out] 1/656250000*sqrt(5)*(sqrt(5)*(3215625000*x^9 + 15281875000*x^8 -
5561281250*x^7 - 4105593750*x^6 - 12554262500*x^5 - 3227597000*x^
4 + 5959365525*x^3 + 3721040355*x^2 + 2291675850*x - 249003936)*s
qrt(5*x^2 + 2*x + 3) + 2131761807*log(-sqrt(5)*(25*x^2 + 10*x + 8
) + 5*sqrt(5*x^2 + 2*x + 3)*(5*x + 1)))
```

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

$$\int\left(x^{2}+5x+2\right)\left(5x^{2}+2x+3\right)^{\frac{3}{2}}\left(7x^{2}-4x-1\right)^{2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-7*x**2+4*x+1)**2*(x**2+5*x+2)*(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] Integral((x**2 + 5*x + 2)*(5*x**2 + 2*x + 3)**(3/2)*(7*x**2 - 4*x
 - 1)**2, x)
```

GIAC/XCAS [A] time = 0.276752, size = 124, normalized size = 0.66

$$\frac{1}{131250000}\left(5\left(\left(5\left(10\left(25\left(5\left(7\left(140\left(105\,x+499\right)x-25423\right)x-131379\right)x-2008682\right)x-12910388\right)x+238374621\right)x+744208\right.\right.\right.$$
$$+\frac{101512467}{15625000}\sqrt{5}\ln\left(-\sqrt{5}\left(\sqrt{5}x-\sqrt{5\,x^{2}+2\,x+3}\right)-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((7*x^2 - 4*x - 1)^2*(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2),x, algorithm
```

```
[Out] 1/131250000*(5*((5*(10*(25*(5*(7*(140*(105*x + 499)*x - 25423)*x
- 131379)*x - 2008682)*x - 12910388)*x + 238374621)*x + 744208071
)*x + 458335170)*x - 249003936)*sqrt(5*x^2 + 2*x + 3) + 101512467
/15625000*sqrt(5)*ln(-sqrt(5)*(sqrt(5)*x - sqrt(5*x^2 + 2*x + 3))
 - 1)
```

3.382 $\int \left(1+4x-7x^2\right) \left(2+5x+x^2\right) \left(3+2x+5x^2\right)^{3/2} dx$

Optimal. Leaf size=147

$$-\frac{1163 \left(5x^2+2x+3\right)^{5/2} x^2}{1400}+\frac{2809 \left(5x^2+2x+3\right)^{5/2} x}{5250}+\frac{149509 \left(5x^2+2x+3\right)^{5/2}}{262500}-\frac{18397(5x+1) \left(5x^2+2x+3\right)^{3/2}}{150000}-\frac{128779(5x+1)\sqrt{5x^2+2x+3}}{250000}-\frac{7}{40} \left(5x^2+2x+3\right)^{5/2} x^3-\frac{901453 \sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{125000\sqrt{5}}$$

```
[Out] (-128779*(1 + 5*x)*Sqrt[3 + 2*x + 5*x^2])/250000 - (18397*(1 + 5*
x)*(3 + 2*x + 5*x^2)^(3/2))/150000 + (149509*(3 + 2*x + 5*x^2)^(5
/2))/262500 + (2809*x*(3 + 2*x + 5*x^2)^(5/2))/5250 - (1163*x^2*(
3 + 2*x + 5*x^2)^(5/2))/1400 - (7*x^3*(3 + 2*x + 5*x^2)^(5/2))/40
 - (901453*ArcSinh[(1 + 5*x)/Sqrt[14]])/(125000*Sqrt[5])
```

Rubi [A] time = 0.227023, antiderivative size = 147, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.152$

$$-\frac{1163 \left(5x^2+2x+3\right)^{5/2} x^2}{1400}+\frac{2809 \left(5x^2+2x+3\right)^{5/2} x}{5250}+\frac{149509 \left(5x^2+2x+3\right)^{5/2}}{262500}-\frac{18397(5x+1) \left(5x^2+2x+3\right)^{3/2}}{150000}-\frac{128779(5x+1)\sqrt{5x^2+2x+3}}{250000}-\frac{7}{40} \left(5x^2+2x+3\right)^{5/2} x^3-\frac{901453 \sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{125000\sqrt{5}}$$

Antiderivative was successfully verified.

```
[In]  Int[(1 + 4*x - 7*x^2)*(2 + 5*x + x^2)*(3 + 2*x + 5*x^2)^(3/2),x]
```

```
[Out] (-128779*(1 + 5*x)*Sqrt[3 + 2*x + 5*x^2])/250000 - (18397*(1 + 5*
x)*(3 + 2*x + 5*x^2)^(3/2))/150000 + (149509*(3 + 2*x + 5*x^2)^(5
/2))/262500 + (2809*x*(3 + 2*x + 5*x^2)^(5/2))/5250 - (1163*x^2*(
3 + 2*x + 5*x^2)^(5/2))/1400 - (7*x^3*(3 + 2*x + 5*x^2)^(5/2))/40
 - (901453*ArcSinh[(1 + 5*x)/Sqrt[14]])/(125000*Sqrt[5])
```

Rubi in Sympy [A] time = 77.7268, size = 148, normalized size = 1.01

$$\frac{(-2086331626585624437117002054707200x + 3332059603328146415722320702597120)\sqrt{5x^2+2x+3}}{125376728050804085966638080000000} + \frac{(-245x+1189)\left(x^2+5x+2\right)^2\left(5x^2+2x+3\right)^{\frac{3}{2}}}{280} - \frac{(3486100x+19572884)\sqrt{5x^2+2x+3}\left(139444x^2+74158x+40494\right)^2}{816674423712000} - \frac{(21407591518357272960x+11251724661395028672)\sqrt{5x^2+2x+3}\left(10234737729056x^2+8694788483408x+7575167867\right.}{2507534561016081719332761600000} - \frac{901453\sqrt{5}\operatorname{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{625000}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((-7*x**2+4*x+1)*(x**2+5*x+2)*(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] (-2086331626585624437117002054707200*x + 33320596033281464157223232
0702597120)*sqrt(5*x**2 + 2*x + 3)/125376728050804085966638080000
000 + (-245*x + 1189)*(x**2 + 5*x + 2)**2*(5*x**2 + 2*x + 3)**(3/
2)/280 - (3486100*x + 19572884)*sqrt(5*x**2 + 2*x + 3)*(139444*x*
*2 + 74158*x + 40494)**2/816674423712000 - (21407591518357272960*
x + 11251724661395028672)*sqrt(5*x**2 + 2*x + 3)*(10234737729056*
x**2 + 8694788483408*x + 7575167867472)/2507534561016081719332761
600000 - 901453*sqrt(5)*atanh(sqrt(5)*(10*x + 2)/(10*sqrt(5*x**2
+ 2*x + 3)))/625000
```

Mathematica [A] time = 0.106417, size = 75, normalized size = 0.51

$$\frac{5\sqrt{5x^2+2x+3}\left(-22968750x^7-127406250x^6-48237500x^5-28373000x^4+78608475x^3+86464445x^2+36695150x+222\right.}{26250000}$$

Antiderivative was successfully verified.

```
[In] Integrate[(1 + 4*x - 7*x^2)*(2 + 5*x + x^2)*(3 + 2*x + 5*x^2)^(3/2),x]
```

```
[Out] (5*Sqrt[3 + 2*x + 5*x^2]*(22275576 + 36695150*x + 86464445*x^2 +
78608475*x^3 - 28373000*x^4 - 48237500*x^5 - 127406250*x^6 - 2296
8750*x^7) - 37861026*Sqrt[5]*ArcSinh[(1 + 5*x)/Sqrt[14]])/2625000
0
```

Maple [A] time = 0.01, size = 117, normalized size = 0.8

$$-\frac{183970 x + 36794}{300000}\left(5 x^{2}+2 x+3\right)^{\frac{3}{2}}-\frac{1287790 x + 257558}{500000}\sqrt{5 x^{2}+2 x+3}-\frac{901453 \sqrt{5}}{625000}\mathit{Arcsinh}\left(\frac{5 \sqrt{14}}{14}\left(x+\frac{1}{5}\right)\right)+\frac{149509}{262500}\left(5 x^{2}+2 x+3\right)^{\frac{5}{2}}+\frac{2809 x}{5250}\left(5 x^{2}+2 x+3\right)^{\frac{5}{2}}-\frac{1163 x^{2}}{1400}\left(5 x^{2}+2 x+3\right)^{\frac{5}{2}}-\frac{7 x^{3}}{40}\left(5 x^{2}+2 x+3\right)^{\frac{5}{2}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((-7*x^2+4*x+1)*(x^2+5*x+2)*(5*x^2+2*x+3)^(3/2),x)
```

```
[Out] -18397/300000*(10*x+2)*(5*x^2+2*x+3)^(3/2)-128779/500000*(10*x+2)
*(5*x^2+2*x+3)^(1/2)-901453/625000*5^(1/2)*arcsinh(5/14*14^(1/2)*
(x+1/5))+149509/262500*(5*x^2+2*x+3)^(5/2)+2809/5250*x*(5*x^2+2*x
+3)^(5/2)-1163/1400*x^2*(5*x^2+2*x+3)^(5/2)-7/40*x^3*(5*x^2+2*x+3
)^(5/2)
```

Maxima [A] time = 0.77312, size = 186, normalized size = 1.27

$$-\frac{7}{40}\left(5 x^{2}+2 x+3\right)^{\frac{5}{2}} x^{3}-\frac{1163}{1400}\left(5 x^{2}+2 x+3\right)^{\frac{5}{2}} x^{2}+\frac{2809}{5250}\left(5 x^{2}+2 x+3\right)^{\frac{5}{2}} x+\frac{149509}{262500}\left(5 x^{2}+2 x+3\right)^{\frac{5}{2}}-\frac{18397}{30000}\left(5 x^{2}+2 x+3\right)^{\frac{3}{2}} x-\frac{18397}{150000}\left(5 x^{2}+2 x+3\right)^{\frac{3}{2}}-\frac{128779}{50000}\sqrt{5 x^{2}+2 x+3}\, x-\frac{901453}{625000}\sqrt{5}\,\operatorname{arsinh}\left(\frac{1}{14}\sqrt{14}(5 x+1)\right)-\frac{128779}{250000}\sqrt{5 x^{2}+2 x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)*(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2),x, algorithm=
```

```
[Out] -7/40*(5*x^2 + 2*x + 3)^(5/2)*x^3 - 1163/1400*(5*x^2 + 2*x + 3)^(
5/2)*x^2 + 2809/5250*(5*x^2 + 2*x + 3)^(5/2)*x + 149509/262500*(5
*x^2 + 2*x + 3)^(5/2) - 18397/30000*(5*x^2 + 2*x + 3)^(3/2)*x - 1
8397/150000*(5*x^2 + 2*x + 3)^(3/2) - 128779/50000*sqrt(5*x^2 + 2
*x + 3)*x - 901453/625000*sqrt(5)*arcsinh(1/14*sqrt(14)*(5*x + 1)
) - 128779/250000*sqrt(5*x^2 + 2*x + 3)
```

Fricas [A] time = 0.283951, size = 128, normalized size = 0.87

$$-\frac{1}{26250000}\sqrt{5}\Big(\sqrt{5}\big(22968750 x^{7}+127406250 x^{6}+48237500 x^{5}+28373000 x^{4}-78608475 x^{3}-86464445 x^{2}-36695150 x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)*(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2),x, algorithm=
```

```
[Out] -1/26250000*sqrt(5)*(sqrt(5)*(22968750*x^7 + 127406250*x^6 + 4823
7500*x^5 + 28373000*x^4 - 78608475*x^3 - 86464445*x^2 - 36695150*
x - 22275576)*sqrt(5*x^2 + 2*x + 3) - 18930513*log(-sqrt(5)*(25*x
^2 + 10*x + 8) + 5*sqrt(5*x^2 + 2*x + 3)*(5*x + 1)))
```

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

$$-\int\left(-43x\sqrt{5x^2+2x+3}\right)\,dx-\int\left(-57x^2\sqrt{5x^2+2x+3}\right)\,dx-\int 14x^3\sqrt{5x^2+2x+3}\,dx-\int 48x^4\sqrt{5x^2+2x+3}\,dx-\int 169x^5\sqrt{5x^2+2x+3}\,dx-\int 35x^6\sqrt{5x^2+2x+3}\,dx-\int\left(-6\sqrt{5x^2+2x+3}\right)\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-7*x**2+4*x+1)*(x**2+5*x+2)*(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] -Integral(-43*x*sqrt(5*x**2 + 2*x + 3), x) - Integral(-57*x**2*sq
rt(5*x**2 + 2*x + 3), x) - Integral(14*x**3*sqrt(5*x**2 + 2*x + 3
), x) - Integral(48*x**4*sqrt(5*x**2 + 2*x + 3), x) - Integral(16
9*x**5*sqrt(5*x**2 + 2*x + 3), x) - Integral(35*x**6*sqrt(5*x**2
+ 2*x + 3), x) - Integral(-6*sqrt(5*x**2 + 2*x + 3), x)
```

GIAC/XCAS [A] time = 0.274544, size = 111, normalized size = 0.76

$$-\frac{1}{5250000}\left(5\left(\left(5\left(10\left(25\left(15\left(245x+1359\right)x+7718\right)x+113492\right)x-3144339\right)x-17292889\right)x-7339030\right)x-22275576\right)\sqrt{5x^2\cdots}+\frac{901453}{625000}\sqrt{5}\ln\left(-\sqrt{5}\left(\sqrt{5}x-\sqrt{5x^2+2x+3}\right)-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)*(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2),x, algorithm=
```

```
[Out] -1/5250000*(5*((5*(10*(25*(15*(245*x + 1359)*x + 7718)*x + 113492
)*x - 3144339)*x - 17292889)*x - 7339030)*x - 22275576)*sqrt(5*x^
2 + 2*x + 3) + 901453/625000*sqrt(5)*ln(-sqrt(5)*(sqrt(5)*x - sqr
t(5*x^2 + 2*x + 3)) - 1)
```

3.383 $\int \frac{(2+5x+x^2)(3+2x+5x^2)^{3/2}}{1+4x-7x^2}\,dx$

Optimal. Leaf size=210

$$-\frac{1}{980}(35x+267)\left(5x^2+2x+3\right)^{3/2}-\frac{3(196105x+571621)\sqrt{5x^2+2x+3}}{240100}-\frac{6\sqrt{\frac{2}{11}\left(8098902607-2434122235\sqrt{11}\right)}\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{16807}+\frac{6\sqrt{\frac{2}{11}\left(8098902607+2434122235\sqrt{11}\right)}\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{16807}-\frac{34425687\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{840350\sqrt{5}}$$

```
[Out] (-3*(571621 + 196105*x)*Sqrt[3 + 2*x + 5*x^2])/240100 - ((267 + 3
5*x)*(3 + 2*x + 5*x^2)^(3/2))/980 - (34425687*ArcSinh[(1 + 5*x)/S
qrt[14]])/(840350*Sqrt[5]) - (6*Sqrt[(2*(8098902607 - 2434122235*
Sqrt[11]))/11]*ArcTanh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)/(Sqr
t[2*(125 - 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/16807 + (6*Sqrt
[(2*(8098902607 + 2434122235*Sqrt[11]))/11]*ArcTanh[(23 + Sqrt[11
] + (17 + 5*Sqrt[11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*
x + 5*x^2])])/16807
```

Rubi [A] time = 0.809592, antiderivative size = 210, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 7, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$-\frac{1}{980}(35x+267)\left(5x^2+2x+3\right)^{3/2}-\frac{3(196105x+571621)\sqrt{5x^2+2x+3}}{240100}-\frac{6\sqrt{\frac{2}{11}\left(8098902607-2434122235\sqrt{11}\right)}\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{16807}+\frac{6\sqrt{\frac{2}{11}\left(8098902607+2434122235\sqrt{11}\right)}\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{16807}-\frac{34425687\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{840350\sqrt{5}}$$

Antiderivative was successfully verified.

```
[In]  Int[((2 + 5*x + x^2)*(3 + 2*x + 5*x^2)^(3/2))/(1 + 4*x - 7*x^2),x]
```

```
[Out] (-3*(571621 + 196105*x)*Sqrt[3 + 2*x + 5*x^2])/240100 - ((267 + 3
5*x)*(3 + 2*x + 5*x^2)^(3/2))/980 - (34425687*ArcSinh[(1 + 5*x)/S
qrt[14]])/(840350*Sqrt[5]) - (6*Sqrt[(2*(8098902607 - 2434122235*
Sqrt[11]))/11]*ArcTanh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)/(Sqr
t[2*(125 - 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/16807 + (6*Sqrt
[(2*(8098902607 + 2434122235*Sqrt[11]))/11]*ArcTanh[(23 + Sqrt[11
] + (17 + 5*Sqrt[11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*
x + 5*x^2])])/16807
```

Rubi in Sympy [A] time = 116.393, size = 236, normalized size = 1.12

$$-\frac{(105x+801)\left(5x^2+2x+3\right)^{\frac{3}{2}}}{2940}-\frac{(3529890x+10289178)\sqrt{5x^2+2x+3}}{1440600}-\frac{34425687\sqrt{5}\operatorname{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{4201750}+\frac{\sqrt{22}\left(-7253308800\sqrt{11}+25269033600\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68+20\sqrt{11}\right)-92+4\sqrt{11}\right)}{8\sqrt{-17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{887409600\sqrt{-17\sqrt{11}+125}}-\frac{\sqrt{22}\left(7253308800\sqrt{11}+25269033600\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68-20\sqrt{11}\right)-92-4\sqrt{11}\right)}{8\sqrt{17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{887409600\sqrt{17\sqrt{11}+125}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2+5*x+2)*(5*x**2+2*x+3)**(3/2)/(-7*x**2+4*x+1),x)
```

```
[Out] -(105*x + 801)*(5*x**2 + 2*x + 3)**(3/2)/2940 - (3529890*x + 1028
9178)*sqrt(5*x**2 + 2*x + 3)/1440600 - 34425687*sqrt(5)*atanh(sqr
t(5)*(10*x + 2)/(10*sqrt(5*x**2 + 2*x + 3)))/4201750 + sqrt(22)*(
-7253308800*sqrt(11) + 25269033600)*atanh(sqrt(2)*(x*(-68 + 20*sq
rt(11)) - 92 + 4*sqrt(11))/(8*sqrt(-17*sqrt(11) + 125)*sqrt(5*x**
2 + 2*x + 3)))/(887409600*sqrt(-17*sqrt(11) + 125)) - sqrt(22)*(7
253308800*sqrt(11) + 25269033600)*atanh(sqrt(2)*(x*(-68 - 20*sqrt
(11)) - 92 - 4*sqrt(11))/(8*sqrt(17*sqrt(11) + 125)*sqrt(5*x**2 +
 2*x + 3)))/(887409600*sqrt(17*sqrt(11) + 125))
```

Mathematica [A] time = 1.72115, size = 350, normalized size = 1.67

$$-5\left(26505325\sqrt{5x^2+2x+3}x^2+57354990\sqrt{5x^2+2x+3}x+147155316\sqrt{5x^2+2x+3}-526438200\sqrt{\frac{22}{125+17\sqrt{11}}}\log\left(\sqrt{2750}\right.\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 + 5*x + x^2)*(3 + 2*x + 5*x^2)^(3/2))/(1 + 4*x - 7*x^2),x]
```

```
[Out] (-757365114*Sqrt[5]*ArcSinh[(1 + 5*x)/Sqrt[14]] - 5*(147155316*Sq
rt[3 + 2*x + 5*x^2] + 57354990*x*Sqrt[3 + 2*x + 5*x^2] + 26505325
*x^2*Sqrt[3 + 2*x + 5*x^2] + 3301375*x^3*Sqrt[3 + 2*x + 5*x^2] -
600*Sqrt[2/(125 - 17*Sqrt[11])]*(-2770361 + 877397*Sqrt[11])*ArcT
anh[(Sqrt[250 - 34*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2])/(-23 + Sqrt[1
1] + (-17 + 5*Sqrt[11])*x)] + 600*Sqrt[2/(125 + 17*Sqrt[11])]*(27
70361 + 877397*Sqrt[11])*Log[2 + Sqrt[11] - 7*x] - 1662216600*Sqr
t[2/(125 + 17*Sqrt[11])]*Log[11 + 23*Sqrt[11] + (55 + 17*Sqrt[11]
)*x + Sqrt[2750 + 374*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2]] - 52643820
0*Sqrt[22/(125 + 17*Sqrt[11])]*Log[11 + 23*Sqrt[11] + (55 + 17*Sq
rt[11])*x + Sqrt[2750 + 374*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2]]))/92
438500
```

Maple [B] time = 0.024, size = 730, normalized size = 3.5

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((x^2+5*x+2)*(5*x^2+2*x+3)^(3/2)/(-7*x^2+4*x+1),x)
```

```
[Out] -1/280*(10*x+2)*(5*x^2+2*x+3)^(3/2)-3/200*(10*x+2)*(5*x^2+2*x+3)^
(1/2)-21/250*5^(1/2)*arcsinh(5/14*14^(1/2)*(x+1/5))-3/154*(-61+13
*11^(1/2))*11^(1/2)*(1/21*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11
^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(3/2)+1/14*(3
4/7-10/7*11^(1/2))*(1/20*(10*x+2)*(5*(x-2/7+1/7*11^(1/2))^2+(34/7
-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)
+1/200*(5000/49-680/49*11^(1/2)-(34/7-10/7*11^(1/2))^2)*5^(1/2)*a
rcsinh(5^(1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2
)^(1/2)*(x+1/5)))+1/7*(250/49-34/49*11^(1/2))*(1/7*(245*(x-2/7+1/
7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34
*11^(1/2))^(1/2)+1/10*(34/7-10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/2
)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*(x+1/
5))-7*(250/49-34/49*11^(1/2))/(250-34*11^(1/2))^(1/2)*arctanh(49/
2*(500/49-68/49*11^(1/2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)
))/(250-34*11^(1/2))^(1/2)/(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-1
```

```
0/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2))))-3/15
4*(61+13*11^(1/2))*11^(1/2)*(1/21*(5*(x-2/7-1/7*11^(1/2))^2+(34/7
+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(3/2)
+1/14*(34/7+10/7*11^(1/2))*(1/20*(10*x+2)*(5*(x-2/7-1/7*11^(1/2))
^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2
))^(1/2)+1/200*(5000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2))^2)*5
^(1/2)*arcsinh(5^(1/2)/(250/49+34/49*11^(1/2)-1/20*(34/7+10/7*11^
(1/2))^2)^(1/2)*(x+1/5)))+1/7*(250/49+34/49*11^(1/2))*(1/7*(245*(
x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)
)+250+34*11^(1/2))^(1/2)+1/10*(34/7+10/7*11^(1/2))*5^(1/2)*arcsin
h(5^(1/2)/(250/49+34/49*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(1/
2)*(x+1/5))-7*(250/49+34/49*11^(1/2))/(250+34*11^(1/2))^(1/2)*arc
tanh(49/2*(500/49+68/49*11^(1/2)+(34/7+10/7*11^(1/2))*(x-2/7-1/7*
11^(1/2)))/(250+34*11^(1/2))^(1/2)/(245*(x-2/7-1/7*11^(1/2))^2+49
*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2)
)))
```

Maxima [A] time = 0.862954, size = 722, normalized size = 3.44

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1),x, algorithm=
```

```
[Out] 1/92438500*sqrt(11)*(19500*sqrt(11)*sqrt(2)*(17*sqrt(11) + 125)^(
3/2)*arcsinh(5/7*sqrt(11)*sqrt(7)*sqrt(2)*x/abs(14*x - 2*sqrt(11)
 - 4) + 17/7*sqrt(7)*sqrt(2)*x/abs(14*x - 2*sqrt(11) - 4) + 1/7*s
qrt(11)*sqrt(7)*sqrt(2)/abs(14*x - 2*sqrt(11) - 4) + 23/7*sqrt(7)
*sqrt(2)/abs(14*x - 2*sqrt(11) - 4)) - 300125*sqrt(11)*(5*x^2 + 2
*x + 3)^(3/2)*x - 3344250*sqrt(11)*(-34/49*sqrt(11) + 250/49)^(3/
2)*arcsinh(5/7*sqrt(11)*sqrt(7)*sqrt(2)*x/abs(14*x + 2*sqrt(11) -
 4) - 17/7*sqrt(7)*sqrt(2)*x/abs(14*x + 2*sqrt(11) - 4) + 1/7*sqr
t(11)*sqrt(7)*sqrt(2)/abs(14*x + 2*sqrt(11) - 4) - 23/7*sqrt(7)*s
qrt(2)/abs(14*x + 2*sqrt(11) - 4)) + 91500*sqrt(2)*(17*sqrt(11) +
 125)^(3/2)*arcsinh(5/7*sqrt(11)*sqrt(7)*sqrt(2)*x/abs(14*x - 2*s
qrt(11) - 4) + 17/7*sqrt(7)*sqrt(2)*x/abs(14*x - 2*sqrt(11) - 4)
+ 1/7*sqrt(11)*sqrt(7)*sqrt(2)/abs(14*x - 2*sqrt(11) - 4) + 23/7*
sqrt(7)*sqrt(2)/abs(14*x - 2*sqrt(11) - 4)) + 15692250*(-34/49*sq
rt(11) + 250/49)^(3/2)*arcsinh(5/7*sqrt(11)*sqrt(7)*sqrt(2)*x/abs
(14*x + 2*sqrt(11) - 4) - 17/7*sqrt(7)*sqrt(2)*x/abs(14*x + 2*sqr
t(11) - 4) + 1/7*sqrt(11)*sqrt(7)*sqrt(2)/abs(14*x + 2*sqrt(11) -
 4) - 23/7*sqrt(7)*sqrt(2)/abs(14*x + 2*sqrt(11) - 4)) - 2289525*
sqrt(11)*(5*x^2 + 2*x + 3)^(3/2) - 20591025*sqrt(11)*sqrt(5*x^2 +
 2*x + 3)*x - 68851374*sqrt(11)*sqrt(5)*arcsinh(5/14*sqrt(7)*sqrt
(2)*x + 1/14*sqrt(7)*sqrt(2)) - 60020205*sqrt(11)*sqrt(5*x^2 + 2*
x + 3))
```

Fricas [A] time = 0.317185, size = 513, normalized size = 2.44

$$-\frac{1}{92438500}\sqrt{5}\left(300\sqrt{5}\sqrt{2}\sqrt{\sqrt{11}\left(8098902607\sqrt{11}-26775344585\right)}\log\left(-\frac{12\left(\sqrt{2}\sqrt{5x^2+2x+3}\sqrt{\sqrt{11}\left(8098902607\sqrt{11}-\right.}\right.}{}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1),x, algorithm=
```

```
[Out] -1/92438500*sqrt(5)*(300*sqrt(5)*sqrt(2)*sqrt(sqrt(11)*(809890260
7*sqrt(11) - 26775344585))*log(-12/184877*(sqrt(2)*sqrt(5*x^2 + 2
*x + 3)*sqrt(sqrt(11)*(8098902607*sqrt(11) - 26775344585))*(24697
*sqrt(11) + 84590) + 446108201*sqrt(11)*(x + 3) - 1338324603*x +
2230541005)/x) - 300*sqrt(5)*sqrt(2)*sqrt(sqrt(11)*(8098902607*sq
rt(11) - 26775344585))*log(12/184877*(sqrt(2)*sqrt(5*x^2 + 2*x +
3)*sqrt(sqrt(11)*(8098902607*sqrt(11) - 26775344585))*(24697*sqrt
(11) + 84590) - 446108201*sqrt(11)*(x + 3) + 1338324603*x - 22305
41005)/x) + 300*sqrt(5)*sqrt(2)*sqrt(sqrt(11)*(8098902607*sqrt(11
) + 26775344585))*log(12/184877*(sqrt(2)*sqrt(5*x^2 + 2*x + 3)*sq
rt(sqrt(11)*(8098902607*sqrt(11) + 26775344585))*(24697*sqrt(11)
- 84590) + 446108201*sqrt(11)*(x + 3) + 1338324603*x - 2230541005
)/x) - 300*sqrt(5)*sqrt(2)*sqrt(sqrt(11)*(8098902607*sqrt(11) + 2
6775344585))*log(-12/184877*(sqrt(2)*sqrt(5*x^2 + 2*x + 3)*sqrt(s
qrt(11)*(8098902607*sqrt(11) + 26775344585))*(24697*sqrt(11) - 84
590) - 446108201*sqrt(11)*(x + 3) - 1338324603*x + 2230541005)/x)
 + 77*sqrt(5)*(42875*x^3 + 344225*x^2 + 744870*x + 1911108)*sqrt(
5*x^2 + 2*x + 3) - 378682557*log(-sqrt(5)*(25*x^2 + 10*x + 8) + 5
*sqrt(5*x^2 + 2*x + 3)*(5*x + 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**2+5*x+2)*(5*x**2+2*x+3)**(3/2)/(-7*x**2+4*x+1),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(-(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1),x, algorithm=
```

```
[Out] Exception raised: TypeError
```

3.384 $\int \frac{(2+5x+x^2)(3+2x+5x^2)^{3/2}}{(1+4x-7x^2)^2}\,dx$

Optimal. Leaf size=222

$$\frac{3(61x+3)(5x^2+2x+3)^{3/2}}{154(-7x^2+4x+1)}+\frac{(3395x+5826)\sqrt{5x^2+2x+3}}{3773}-\frac{\sqrt{\frac{1}{22}\left(52175400311-13155376531\sqrt{11}\right)}\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{26411}-\frac{\sqrt{\frac{1}{22}\left(52175400311+13155376531\sqrt{11}\right)}\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{26411}+\frac{16691\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{2401\sqrt{5}}$$

```
[Out] ((5826 + 3395*x)*Sqrt[3 + 2*x + 5*x^2])/3773 + (3*(3 + 61*x)*(3 +
 2*x + 5*x^2)^(3/2))/(154*(1 + 4*x - 7*x^2)) + (16691*ArcSinh[(1
+ 5*x)/Sqrt[14]])/(2401*Sqrt[5]) - (Sqrt[(52175400311 - 131553765
31*Sqrt[11])/22]*ArcTanh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)/(S
qrt[2*(125 - 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/26411 - (Sqrt
[(52175400311 + 13155376531*Sqrt[11])/22]*ArcTanh[(23 + Sqrt[11]
+ (17 + 5*Sqrt[11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x
+ 5*x^2])])/26411
```

Rubi [A] time = 0.882271, antiderivative size = 222, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 8, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.229

$$\frac{3(61x+3)(5x^2+2x+3)^{3/2}}{154(-7x^2+4x+1)}+\frac{(3395x+5826)\sqrt{5x^2+2x+3}}{3773}-\frac{\sqrt{\frac{1}{22}\left(52175400311-13155376531\sqrt{11}\right)}\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{26411}-\frac{\sqrt{\frac{1}{22}\left(52175400311+13155376531\sqrt{11}\right)}\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{26411}+\frac{16691\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{2401\sqrt{5}}$$

Antiderivative was successfully verified.

```
[In] Int[((2 + 5*x + x^2)*(3 + 2*x + 5*x^2)^(3/2))/(1 + 4*x - 7*x^2)^2,x]
```

```
[Out] ((5826 + 3395*x)*Sqrt[3 + 2*x + 5*x^2])/3773 + (3*(3 + 61*x)*(3 +
 2*x + 5*x^2)^(3/2))/(154*(1 + 4*x - 7*x^2)) + (16691*ArcSinh[(1
+ 5*x)/Sqrt[14]])/(2401*Sqrt[5]) - (Sqrt[(52175400311 - 131553765
31*Sqrt[11])/22]*ArcTanh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)/(S
qrt[2*(125 - 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/26411 - (Sqrt
[(52175400311 + 13155376531*Sqrt[11])/22]*ArcTanh[(23 + Sqrt[11]
+ (17 + 5*Sqrt[11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x
+ 5*x^2])])/26411
```

Rubi in Sympy [A] time = 113.822, size = 245, normalized size = 1.1

$$\frac{(366x+18)\left(5x^2+2x+3\right)^{\frac{3}{2}}}{308\left(-7x^2+4x+1\right)}+\frac{(135800x+233040)\sqrt{5x^2+2x+3}}{150920}+\frac{16691\sqrt{5}\,\operatorname{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{12005}-\frac{\sqrt{22}\left(-119020640\sqrt{11}+272238240\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68+20\sqrt{11}\right)-92+4\sqrt{11}\right)}{8\sqrt{-17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{92966720\sqrt{-17\sqrt{11}+125}}+\frac{\sqrt{22}\left(272238240+119020640\sqrt{11}\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68-20\sqrt{11}\right)-92-4\sqrt{11}\right)}{8\sqrt{17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{92966720\sqrt{17\sqrt{11}+125}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((x**2+5*x+2)*(5*x**2+2*x+3)**(3/2)/(-7*x**2+4*x+1)**2,x)
```

```
[Out] (366*x + 18)*(5*x**2 + 2*x + 3)**(3/2)/(308*(-7*x**2 + 4*x + 1))
+ (135800*x + 233040)*sqrt(5*x**2 + 2*x + 3)/150920 + 16691*sqrt(
5)*atanh(sqrt(5)*(10*x + 2)/(10*sqrt(5*x**2 + 2*x + 3)))/12005 -
sqrt(22)*(-119020640*sqrt(11) + 272238240)*atanh(sqrt(2)*(x*(-68
+ 20*sqrt(11)) - 92 + 4*sqrt(11))/(8*sqrt(-17*sqrt(11) + 125)*sqr
t(5*x**2 + 2*x + 3)))/(92966720*sqrt(-17*sqrt(11) + 125)) + sqrt(
22)*(272238240 + 119020640*sqrt(11))*atanh(sqrt(2)*(x*(-68 - 20*s
qrt(11)) - 92 - 4*sqrt(11))/(8*sqrt(17*sqrt(11) + 125)*sqrt(5*x**
2 + 2*x + 3)))/(92966720*sqrt(17*sqrt(11) + 125))
```

Mathematica [A] time = 1.6898, size = 354, normalized size = 1.59

$$5\sqrt{\frac{22}{125-17\sqrt{11}}}\left(743879\sqrt{11}-1701489\right)\log\left(49x^2+14\left(\sqrt{11}-2\right)x-4\sqrt{11}+15\right)-10\sqrt{\frac{22}{125+17\sqrt{11}}}\left(1701489+743879\sqrt{11}\right)\mathrm{l}$$

Antiderivative was successfully verified.

```
[In]  Integrate[((2 + 5*x + x^2)*(3 + 2*x + 5*x^2)^(3/2))/(1 + 4*x - 7*x^2)^2,x]
```

```
[Out] ((770*Sqrt[3 + 2*x + 5*x^2]*(-12975 - 81181*x + 34265*x^2 + 2695*
x^3))/(-1 - 4*x + 7*x^2) + 8078444*Sqrt[5]*ArcSinh[(1 + 5*x)/Sqrt
[14]] + 10*Sqrt[22/(125 - 17*Sqrt[11])]*(-1701489 + 743879*Sqrt[1
1])*ArcTanh[(Sqrt[250 - 34*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2])/(-23
+ Sqrt[11] + (-17 + 5*Sqrt[11])*x)] + 10*Sqrt[22/(125 + 17*Sqrt[1
1])]*(1701489 + 743879*Sqrt[11])*Log[2 + Sqrt[11] - 7*x] - 5*Sqrt
[22/(125 - 17*Sqrt[11])]*(-1701489 + 743879*Sqrt[11])*Log[(-2 + S
qrt[11] + 7*x)^2] + 5*Sqrt[22/(125 - 17*Sqrt[11])]*(-1701489 + 74
3879*Sqrt[11])*Log[15 - 4*Sqrt[11] + 14*(-2 + Sqrt[11])*x + 49*x^
2] - 10*Sqrt[22/(125 + 17*Sqrt[11])]*(1701489 + 743879*Sqrt[11])*
Log[11 + 23*Sqrt[11] + (55 + 17*Sqrt[11])*x + Sqrt[2750 + 374*Sqr
t[11]]*Sqrt[3 + 2*x + 5*x^2]])/5810420
```

Maple [B] time = 0.029, size = 1828, normalized size = 8.2

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+5*x+2)*(5*x^2+2*x+3)^(3/2)/(-7*x^2+4*x+1)^2,x)
```

```
[Out] -161/484*11^(1/2)*(1/21*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(
1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(3/2)+1/14*(34/
7+10/7*11^(1/2))*(1/20*(10*x+2)*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+1
0/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2)+1
/200*(5000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2))^2)*5^(1/2)*arc
sinh(5^(1/2)/(250/49+34/49*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^
(1/2)*(x+1/5)))+1/7*(250/49+34/49*11^(1/2))*(1/7*(245*(x-2/7-1/7*
11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*1
1^(1/2))^(1/2)+1/10*(34/7+10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/2)/
(250/49+34/49*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1/5)
)-7*(250/49+34/49*11^(1/2))/(250+34*11^(1/2))^(1/2)*arctanh(49/2*
(500/49+68/49*11^(1/2)+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))
/(250+34*11^(1/2))^(1/2)/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/
7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2))))+161/48
4*11^(1/2)*(1/21*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(
x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(3/2)+1/14*(34/7-10/7*
11^(1/2))*(1/20*(10*x+2)*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^
(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)+1/200*(5
000/49-680/49*11^(1/2)-(34/7-10/7*11^(1/2))^2)*5^(1/2)*arcsinh(5^
(1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*(
x+1/5)))+1/7*(250/49-34/49*11^(1/2))*(1/7*(245*(x-2/7+1/7*11^(1/2
))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34*11^(1/2)
)^(1/2)+1/10*(34/7-10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/2)/(250/49
-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*(x+1/5))-7*(25
0/49-34/49*11^(1/2))/(250-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49
-68/49*11^(1/2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-3
```

```
4*11^(1/2))^(1/2)/(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1
/2))*(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2))))+(183/44-39/44
*11^(1/2))*(-1/49/(250/49-34/49*11^(1/2))/(x-2/7+1/7*11^(1/2))*(5
*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))
+250/49-34/49*11^(1/2))^(5/2)+3/98*(34/7-10/7*11^(1/2))/(250/49-3
4/49*11^(1/2))*(1/3*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2)
)*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(3/2)+1/2*(34/7-10/
7*11^(1/2))*(1/20*(10*x+2)*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*1
1^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)+1/200*
(5000/49-680/49*11^(1/2)-(34/7-10/7*11^(1/2))^2)*5^(1/2)*arcsinh(
5^(1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)
*(x+1/5)))+(250/49-34/49*11^(1/2))*(1/7*(245*(x-2/7+1/7*11^(1/2))
^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^
(1/2)+1/10*(34/7-10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/2)/(250/49-3
4/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*(x+1/5))-7*(250/
49-34/49*11^(1/2))/(250-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49-6
8/49*11^(1/2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*
11^(1/2))^(1/2)/(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2
))*(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2))))+20/49/(250/49-3
4/49*11^(1/2))*(1/40*(10*x+2)*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/
7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(3/2)+3/8
0*(5000/49-680/49*11^(1/2)-(34/7-10/7*11^(1/2))^2)*(1/20*(10*x+2)
*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/
2))+250/49-34/49*11^(1/2))^(1/2)+1/200*(5000/49-680/49*11^(1/2)-(
34/7-10/7*11^(1/2))^2)*5^(1/2)*arcsinh(5^(1/2)/(250/49-34/49*11^(
1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*(x+1/5)))))+(183/44+39/44
*11^(1/2))*(-1/49/(250/49+34/49*11^(1/2))/(x-2/7-1/7*11^(1/2))*(5
*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))
+250/49+34/49*11^(1/2))^(5/2)+3/98*(34/7+10/7*11^(1/2))/(250/49+3
4/49*11^(1/2))*(1/3*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2)
)*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(3/2)+1/2*(34/7+10/
7*11^(1/2))*(1/20*(10*x+2)*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*1
1^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2)+1/200*
(5000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2))^2)*5^(1/2)*arcsinh(
5^(1/2)/(250/49+34/49*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)
*(x+1/5)))+(250/49+34/49*11^(1/2))*(1/7*(245*(x-2/7-1/7*11^(1/2))
^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^
(1/2)+1/10*(34/7+10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/2)/(250/49+3
4/49*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1/5))-7*(250/
49+34/49*11^(1/2))/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+6
8/49*11^(1/2)+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*
11^(1/2))^(1/2)/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2
))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2))))+20/49/(250/49+3
4/49*11^(1/2))*(1/40*(10*x+2)*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/
7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(3/2)+3/8
0*(5000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2))^2)*(1/20*(10*x+2)
*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/
2))+250/49+34/49*11^(1/2))^(1/2)+1/200*(5000/49+680/49*11^(1/2)-(
34/7+10/7*11^(1/2))^2)*5^(1/2)*arcsinh(5^(1/2)/(250/49+34/49*11^(
1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1/5)))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}\left(x^2+5\,x+2\right)}{\left(7\,x^2-4\,x-1\right)^2}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1)^2,x, algorithm
```

```
[Out] integrate((5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2)/(7*x^2 - 4*x -
1)^2, x)
```

Fricas [A] time = 0.316402, size = 594, normalized size = 2.68

$$-\frac{\sqrt{5}\left(\sqrt{5}\sqrt{2}\left(7\,x^2-4\,x-1\right)\sqrt{\sqrt{11}\left(52175400311\,\sqrt{11}-144709141841\right)}\log\left(-\frac{\sqrt{2}\sqrt{5\,x^2+2\,x+3}\sqrt{\sqrt{11}\left(52175400311\,\sqrt{11}-144709141841\right)}\left(\right.}{}\right.\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1)^2,x, algorithm
```

```
[Out] -1/5810420*sqrt(5)*(sqrt(5)*sqrt(2)*(7*x^2 - 4*x - 1)*sqrt(sqrt(1
1)*(52175400311*sqrt(11) - 144709141841))*log(-1/26411*(sqrt(2)*s
qrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(52175400311*sqrt(11) - 144709
141841))*(68441*sqrt(11) + 178266) + 19747108535*sqrt(11)*(x + 3)
 - 59241325605*x + 98735542675)/x) - sqrt(5)*sqrt(2)*(7*x^2 - 4*x
 - 1)*sqrt(sqrt(11)*(52175400311*sqrt(11) - 144709141841))*log(1/
26411*(sqrt(2)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(52175400311*s
qrt(11) - 144709141841))*(68441*sqrt(11) + 178266) - 19747108535*
sqrt(11)*(x + 3) + 59241325605*x - 98735542675)/x) + sqrt(5)*sqrt
(2)*(7*x^2 - 4*x - 1)*sqrt(sqrt(11)*(52175400311*sqrt(11) + 14470
9141841))*log(1/26411*(sqrt(2)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11
)*(52175400311*sqrt(11) + 144709141841))*(68441*sqrt(11) - 178266
) + 19747108535*sqrt(11)*(x + 3) + 59241325605*x - 98735542675)/x
) - sqrt(5)*sqrt(2)*(7*x^2 - 4*x - 1)*sqrt(sqrt(11)*(52175400311*
sqrt(11) + 144709141841))*log(-1/26411*(sqrt(2)*sqrt(5*x^2 + 2*x
+ 3)*sqrt(sqrt(11)*(52175400311*sqrt(11) + 144709141841))*(68441*
sqrt(11) - 178266) - 19747108535*sqrt(11)*(x + 3) - 59241325605*x
 + 98735542675)/x) - 154*sqrt(5)*(2695*x^3 + 34265*x^2 - 81181*x
- 12975)*sqrt(5*x^2 + 2*x + 3) - 4039222*(7*x^2 - 4*x - 1)*log(-s
qrt(5)*(25*x^2 + 10*x + 8) - 5*sqrt(5*x^2 + 2*x + 3)*(5*x + 1)))/
(7*x^2 - 4*x - 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**2+5*x+2)*(5*x**2+2*x+3)**(3/2)/(-7*x**2+4*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((5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1)^2,x, algorithm
```

```
[Out] Exception raised: TypeError
```

3.385 $\int \frac{(2+5x+x^2)(3+2x+5x^2)^{3/2}}{(1+4x-7x^2)^3}\,dx$

Optimal. Leaf size=234

$$\frac{3(61x+3)\left(5x^2+2x+3\right)^{3/2}}{308\left(-7x^2+4x+1\right)^2}-\frac{(9495-37088x)\sqrt{5x^2+2x+3}}{23716\left(-7x^2+4x+1\right)}-\frac{\sqrt{\frac{62294197250171-2085440742055\sqrt{11}}{2794}}\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{332024}+\frac{\sqrt{\frac{62294197250171+2085440742055\sqrt{11}}{2794}}\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{332024}-\frac{5}{343}\sqrt{5}\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)$$

```
[Out] -((9495 - 37088*x)*Sqrt[3 + 2*x + 5*x^2])/(23716*(1 + 4*x - 7*x^2
)) + (3*(3 + 61*x)*(3 + 2*x + 5*x^2)^(3/2))/(308*(1 + 4*x - 7*x^2
)^2) - (5*Sqrt[5]*ArcSinh[(1 + 5*x)/Sqrt[14]])/343 - (Sqrt[(62294
197250171 - 2085440742055*Sqrt[11])/2794]*ArcTanh[(23 - Sqrt[11]
+ (17 - 5*Sqrt[11])*x)/(Sqrt[2*(125 - 17*Sqrt[11])]*Sqrt[3 + 2*x
+ 5*x^2])])/332024 + (Sqrt[(62294197250171 + 2085440742055*Sqrt[1
1])/2794]*ArcTanh[(23 + Sqrt[11] + (17 + 5*Sqrt[11])*x)/(Sqrt[2*(
125 + 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/332024
```

Rubi [A] time = 0.851037, antiderivative size = 234, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 7, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.2$

$$\frac{3(61x+3)\left(5x^2+2x+3\right)^{3/2}}{308\left(-7x^2+4x+1\right)^2}-\frac{(9495-37088x)\sqrt{5x^2+2x+3}}{23716\left(-7x^2+4x+1\right)}-\frac{\sqrt{\frac{62294197250171-2085440742055\sqrt{11}}{2794}}\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{332024}+\frac{\sqrt{\frac{62294197250171+2085440742055\sqrt{11}}{2794}}\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{332024}-\frac{5}{343}\sqrt{5}\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)$$

Antiderivative was successfully verified.

```
[In] Int[((2 + 5*x + x^2)*(3 + 2*x + 5*x^2)^(3/2))/(1 + 4*x - 7*x^2)^3,x]
```

```
[Out] -((9495 - 37088*x)*Sqrt[3 + 2*x + 5*x^2])/(23716*(1 + 4*x - 7*x^2
)) + (3*(3 + 61*x)*(3 + 2*x + 5*x^2)^(3/2))/(308*(1 + 4*x - 7*x^2
)^2) - (5*Sqrt[5]*ArcSinh[(1 + 5*x)/Sqrt[14]])/343 - (Sqrt[(62294
197250171 - 2085440742055*Sqrt[11])/2794]*ArcTanh[(23 - Sqrt[11]
+ (17 - 5*Sqrt[11])*x)/(Sqrt[2*(125 - 17*Sqrt[11])]*Sqrt[3 + 2*x
+ 5*x^2])])/332024 + (Sqrt[(62294197250171 + 2085440742055*Sqrt[1
1])/2794]*ArcTanh[(23 + Sqrt[11] + (17 + 5*Sqrt[11])*x)/(Sqrt[2*(
125 + 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/332024
```

Rubi in Sympy [A] time = 109.393, size = 257, normalized size = 1.1

$$-\frac{(-296704x+75960)\sqrt{5x^2+2x+3}}{189728\left(-7x^2+4x+1\right)}+\frac{(366x+18)\left(5x^2+2x+3\right)^{\frac{3}{2}}}{616\left(-7x^2+4x+1\right)^2}-\frac{5\sqrt{5}\operatorname{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{343}+\frac{\sqrt{22}\left(-10787536\sqrt{11}+123297168\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68+20\sqrt{11}\right)-92+4\sqrt{11}\right)}{8\sqrt{-17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{116872448\sqrt{-17\sqrt{11}+125}}-\frac{\sqrt{22}\left(10787536\sqrt{11}+123297168\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68-20\sqrt{11}\right)-92-4\sqrt{11}\right)}{8\sqrt{17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{116872448\sqrt{17\sqrt{11}+125}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((x**2+5*x+2)*(5*x**2+2*x+3)**(3/2)/(-7*x**2+4*x+1)**3,x)
```

```
[Out] -(-296704*x + 75960)*sqrt(5*x**2 + 2*x + 3)/(189728*(-7*x**2 + 4*
x + 1)) + (366*x + 18)*(5*x**2 + 2*x + 3)**(3/2)/(616*(-7*x**2 +
4*x + 1)**2) - 5*sqrt(5)*atanh(sqrt(5)*(10*x + 2)/(10*sqrt(5*x**2
 + 2*x + 3)))/343 + sqrt(22)*(-10787536*sqrt(11) + 123297168)*ata
nh(sqrt(2)*(x*(-68 + 20*sqrt(11)) - 92 + 4*sqrt(11))/(8*sqrt(-17*
sqrt(11) + 125)*sqrt(5*x**2 + 2*x + 3)))/(116872448*sqrt(-17*sqrt
(11) + 125)) - sqrt(22)*(10787536*sqrt(11) + 123297168)*atanh(sqr
t(2)*(x*(-68 - 20*sqrt(11)) - 92 - 4*sqrt(11))/(8*sqrt(17*sqrt(11
) + 125)*sqrt(5*x**2 + 2*x + 3)))/(116872448*sqrt(17*sqrt(11) + 1
25))
```

Mathematica [A] time = 2.64169, size = 376, normalized size = 1.61

$$\frac{88\sqrt{5x^2+2x+3}(138372-189161x)}{7x^2-4x-1}+\frac{11616(5028x+655)\sqrt{5x^2+2x+3}}{\left(-7x^2+4x+1\right)^2}-\sqrt{\frac{22}{125-17\sqrt{11}}}\left(674221\sqrt{11}-7706073\right)\log\left(49x^2+14\left(\sqrt{11}-2\right)x-4\right.$$

Antiderivative was successfully verified.

```
[In]  Integrate[((2 + 5*x + x^2)*(3 + 2*x + 5*x^2)^(3/2))/(1 + 4*x - 7*x^2)^3,x]
```

```
[Out] ((11616*(655 + 5028*x)*Sqrt[3 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2)^2
 + (88*(138372 - 189161*x)*Sqrt[3 + 2*x + 5*x^2])/(-1 - 4*x + 7*x
^2) - 212960*Sqrt[5]*ArcSinh[(1 + 5*x)/Sqrt[14]] - 2*Sqrt[22/(125
 - 17*Sqrt[11])]*(-7706073 + 674221*Sqrt[11])*ArcTanh[(Sqrt[250 -
 34*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2])/(-23 + Sqrt[11] + (-17 + 5*S
qrt[11])*x)] - 2*Sqrt[22/(125 + 17*Sqrt[11])]*(7706073 + 674221*S
qrt[11])*Log[2 + Sqrt[11] - 7*x] + Sqrt[22/(125 - 17*Sqrt[11])]*(
-7706073 + 674221*Sqrt[11])*Log[(-2 + Sqrt[11] + 7*x)^2] - Sqrt[2
2/(125 - 17*Sqrt[11])]*(-7706073 + 674221*Sqrt[11])*Log[15 - 4*Sq
rt[11] + 14*(-2 + Sqrt[11])*x + 49*x^2] + 2*Sqrt[22/(125 + 17*Sqr
t[11])]*(7706073 + 674221*Sqrt[11])*Log[11 + 23*Sqrt[11] + (55 +
17*Sqrt[11])*x + Sqrt[2750 + 374*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2]]
)/14609056
```

Maple [B] time = 0.031, size = 3828, normalized size = 16.4

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+5*x+2)*(5*x^2+2*x+3)^(3/2)/(-7*x^2+4*x+1)^3,x)
```

```
[Out] -3535/21296*11^(1/2)*(1/21*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*1
1^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(3/2)+1/14*(
34/7+10/7*11^(1/2))*(1/20*(10*x+2)*(5*(x-2/7-1/7*11^(1/2))^2+(34/
7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2
)+1/200*(5000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2))^2)*5^(1/2)*
arcsinh(5^(1/2)/(250/49+34/49*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^
2)^(1/2)*(x+1/5)))+1/7*(250/49+34/49*11^(1/2))*(1/7*(245*(x-2/7-1
/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+3
4*11^(1/2))^(1/2)+1/10*(34/7+10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/
2)/(250/49+34/49*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1
/5))-7*(250/49+34/49*11^(1/2))/(250+34*11^(1/2))^(1/2)*arctanh(49
/2*(500/49+68/49*11^(1/2)+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2
)))/(250+34*11^(1/2))^(1/2)/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+
10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2))))+353
5/21296*11^(1/2)*(1/21*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1
/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(3/2)+1/14*(34/7
-10/7*11^(1/2))*(1/20*(10*x+2)*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10
/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)+1/
200*(5000/49-680/49*11^(1/2)-(34/7-10/7*11^(1/2))^2)*5^(1/2)*arcs
inh(5^(1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(
1/2)*(x+1/5)))+1/7*(250/49-34/49*11^(1/2))*(1/7*(245*(x-2/7+1/7*1
1^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34*11
^(1/2))^(1/2)+1/10*(34/7-10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/2)/(
250/49-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*(x+1/5))
-7*(250/49-34/49*11^(1/2))/(250-34*11^(1/2))^(1/2)*arctanh(49/2*(
```

500/49-68/49*11^(1/2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/
(250-34*11^(1/2))^(1/2)/(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7
11^(1/2))(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2))))-(-3535/
1936-273/1936*11^(1/2))*(-1/49/(250/49+34/49*11^(1/2))/(x-2/7-1/7
11^(1/2))(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-
1/7*11^(1/2))+250/49+34/49*11^(1/2))^(5/2)+3/98*(34/7+10/7*11^(1/
2))/(250/49+34/49*11^(1/2))*(1/3*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+
10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(3/2)+
1/2*(34/7+10/7*11^(1/2))*(1/20*(10*x+2)*(5*(x-2/7-1/7*11^(1/2))^2
+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))
^(1/2)+1/200*(5000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2))^2)*5^(
1/2)*arcsinh(5^(1/2)/(250/49+34/49*11^(1/2)-1/20*(34/7+10/7*11^(1
/2))^2)^(1/2)*(x+1/5)))+(250/49+34/49*11^(1/2))*(1/7*(245*(x-2/7-
1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+
34*11^(1/2))^(1/2)+1/10*(34/7+10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1
/2)/(250/49+34/49*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+
1/5))-7*(250/49+34/49*11^(1/2))/(250+34*11^(1/2))^(1/2)*arctanh(4
9/2*(500/49+68/49*11^(1/2)+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/
2)))/(250+34*11^(1/2))^(1/2)/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7
+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2))))+20
/49/(250/49+34/49*11^(1/2))*(1/40*(10*x+2)*(5*(x-2/7-1/7*11^(1/2)
)^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/
2))^(3/2)+3/80*(5000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2))^2)*(
1/20*(10*x+2)*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2
/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2)+1/200*(5000/49+680/
49*11^(1/2)-(34/7+10/7*11^(1/2))^2)*5^(1/2)*arcsinh(5^(1/2)/(250/
49+34/49*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1/5)))))-
(-3535/1936+273/1936*11^(1/2))*(-1/49/(250/49-34/49*11^(1/2))/(x-
2/7+1/7*11^(1/2))*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*
(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(5/2)+3/98*(34/7-10/7
*11^(1/2))/(250/49-34/49*11^(1/2))*(1/3*(5*(x-2/7+1/7*11^(1/2))^2
+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))
^(3/2)+1/2*(34/7-10/7*11^(1/2))*(1/20*(10*x+2)*(5*(x-2/7+1/7*11^(
1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11
^(1/2))^(1/2)+1/200*(5000/49-680/49*11^(1/2)-(34/7-10/7*11^(1/2))
^2)*5^(1/2)*arcsinh(5^(1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/
7*11^(1/2))^2)^(1/2)*(x+1/5)))+(250/49-34/49*11^(1/2))*(1/7*(245*
(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2
))+250-34*11^(1/2))^(1/2)+1/10*(34/7-10/7*11^(1/2))*5^(1/2)*arcsi
nh(5^(1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(1
/2)*(x+1/5))-7*(250/49-34/49*11^(1/2))/(250-34*11^(1/2))^(1/2)*ar
ctanh(49/2*(500/49-68/49*11^(1/2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7
*11^(1/2)))/(250-34*11^(1/2))^(1/2)/(245*(x-2/7+1/7*11^(1/2))^2+4
9*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2
))))+20/49/(250/49-34/49*11^(1/2))*(1/40*(10*x+2)*(5*(x-2/7+1/7*1
1^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49
11^(1/2))^(3/2)+3/80(5000/49-680/49*11^(1/2)-(34/7-10/7*11^(1/2
))^2)*(1/20*(10*x+2)*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2
))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)+1/200*(5000/
49-680/49*11^(1/2)-(34/7-10/7*11^(1/2))^2)*5^(1/2)*arcsinh(5^(1/2
)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*(x+1/
5)))))-21/968*(-61+13*11^(1/2))*11^(1/2)*(-1/686/(250/49-34/49*11
^(1/2))/(x-2/7+1/7*11^(1/2))^2*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10
/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(5/2)+1/

```
1372*(34/7-10/7*11^(1/2))/(250/49-34/49*11^(1/2))*(-1/(250/49-34/
49*11^(1/2))/(x-2/7+1/7*11^(1/2))*(5*(x-2/7+1/7*11^(1/2))^2+(34/7
-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(5/2)
+3/2*(34/7-10/7*11^(1/2))/(250/49-34/49*11^(1/2))*(1/3*(5*(x-2/7+
1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-
34/49*11^(1/2))^(3/2)+1/2*(34/7-10/7*11^(1/2))*(1/20*(10*x+2)*(5*
(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+
250/49-34/49*11^(1/2))^(1/2)+1/200*(5000/49-680/49*11^(1/2)-(34/7
-10/7*11^(1/2))^2)*5^(1/2)*arcsinh(5^(1/2)/(250/49-34/49*11^(1/2)
-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*(x+1/5)))+(250/49-34/49*11^(1
/2))*(1/7*(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-
2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2)+1/10*(34/7-10/7*11^(1/2)
)*5^(1/2)*arcsinh(5^(1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*
11^(1/2))^2)^(1/2)*(x+1/5))-7*(250/49-34/49*11^(1/2))/(250-34*11^
(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11^(1/2)+(34/7-10/7*11^(1
/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2))^(1/2)/(245*(x-2/7+1/
7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34
*11^(1/2))^(1/2))))+20/(250/49-34/49*11^(1/2))*(1/40*(10*x+2)*(5*
(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+
250/49-34/49*11^(1/2))^(3/2)+3/80*(5000/49-680/49*11^(1/2)-(34/7-
10/7*11^(1/2))^2)*(1/20*(10*x+2)*(5*(x-2/7+1/7*11^(1/2))^2+(34/7-
10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)+
1/200*(5000/49-680/49*11^(1/2)-(34/7-10/7*11^(1/2))^2)*5^(1/2)*ar
csinh(5^(1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*11^(1/2))^2)
^(1/2)*(x+1/5))))+15/686/(250/49-34/49*11^(1/2))*(1/3*(5*(x-2/7+
1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-
34/49*11^(1/2))^(3/2)+1/2*(34/7-10/7*11^(1/2))*(1/20*(10*x+2)*(5*
(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+
250/49-34/49*11^(1/2))^(1/2)+1/200*(5000/49-680/49*11^(1/2)-(34/7
-10/7*11^(1/2))^2)*5^(1/2)*arcsinh(5^(1/2)/(250/49-34/49*11^(1/2)
-1/20*(34/7-10/7*11^(1/2))^2)^(1/2)*(x+1/5)))+(250/49-34/49*11^(1
/2))*(1/7*(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-
2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2)+1/10*(34/7-10/7*11^(1/2)
)*5^(1/2)*arcsinh(5^(1/2)/(250/49-34/49*11^(1/2)-1/20*(34/7-10/7*
11^(1/2))^2)^(1/2)*(x+1/5))-7*(250/49-34/49*11^(1/2))/(250-34*11^
(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11^(1/2)+(34/7-10/7*11^(1
/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2))^(1/2)/(245*(x-2/7+1/
7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34
*11^(1/2))^(1/2))))-21/968*(61+13*11^(1/2))*11^(1/2)*(-1/686/(25
0/49+34/49*11^(1/2))/(x-2/7-1/7*11^(1/2))^2*(5*(x-2/7-1/7*11^(1/2
))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1
/2))^(5/2)+1/1372*(34/7+10/7*11^(1/2))/(250/49+34/49*11^(1/2))*(-
1/(250/49+34/49*11^(1/2))/(x-2/7-1/7*11^(1/2))*(5*(x-2/7-1/7*11^(
1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11
^(1/2))^(5/2)+3/2*(34/7+10/7*11^(1/2))/(250/49+34/49*11^(1/2))*(1
/3*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(
1/2))+250/49+34/49*11^(1/2))^(3/2)+1/2*(34/7+10/7*11^(1/2))*(1/20
*(10*x+2)*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1
/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2)+1/200*(5000/49+680/49*1
1^(1/2)-(34/7+10/7*11^(1/2))^2)*5^(1/2)*arcsinh(5^(1/2)/(250/49+3
4/49*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1/5)))+(250/4
9+34/49*11^(1/2))*(1/7*(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*
11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2)+1/10*(34/7+
10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/2)/(250/49+34/49*11^(1/2)-1/2
```

```
0*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1/5))-7*(250/49+34/49*11^(1/2)
)/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+68/49*11^(1/2)+(34
/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2))^(1/2)/(
245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^
(1/2))+250+34*11^(1/2))^(1/2))))+20/(250/49+34/49*11^(1/2))*(1/40
*(10*x+2)*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1
/7*11^(1/2))+250/49+34/49*11^(1/2))^(3/2)+3/80*(5000/49+680/49*11
^(1/2)-(34/7+10/7*11^(1/2))^2)*(1/20*(10*x+2)*(5*(x-2/7-1/7*11^(1
/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^
(1/2))^(1/2)+1/200*(5000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2))^
2)*5^(1/2)*arcsinh(5^(1/2)/(250/49+34/49*11^(1/2)-1/20*(34/7+10/7
*11^(1/2))^2)^(1/2)*(x+1/5)))))+15/686/(250/49+34/49*11^(1/2))*(1
/3*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(
1/2))+250/49+34/49*11^(1/2))^(3/2)+1/2*(34/7+10/7*11^(1/2))*(1/20
*(10*x+2)*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1
/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2)+1/200*(5000/49+680/49*1
1^(1/2)-(34/7+10/7*11^(1/2))^2)*5^(1/2)*arcsinh(5^(1/2)/(250/49+3
4/49*11^(1/2)-1/20*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1/5)))+(250/4
9+34/49*11^(1/2))*(1/7*(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*
11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2)+1/10*(34/7+
10/7*11^(1/2))*5^(1/2)*arcsinh(5^(1/2)/(250/49+34/49*11^(1/2)-1/2
0*(34/7+10/7*11^(1/2))^2)^(1/2)*(x+1/5))-7*(250/49+34/49*11^(1/2)
)/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+68/49*11^(1/2)+(34
/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2))^(1/2)/(
245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^
(1/2))+250+34*11^(1/2))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{\left(5\,x^2+2\,x+3\right)^{\frac{3}{2}}\left(x^2+5\,x+2\right)}{\left(7\,x^2-4\,x-1\right)^3}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1)^3,x, algorith
```

```
[Out] -integrate((5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2)/(7*x^2 - 4*x -
 1)^3, x)
```

Fricas [A] time = 0.350934, size = 655, normalized size = 2.8

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1)^3,x, algorithm
```

```
[Out] -1/7304528*(sqrt(1/254)*(49*x^4 - 56*x^3 + 2*x^2 + 8*x + 1)*sqrt(
sqrt(11)*(62294197250171*sqrt(11) - 22939848162605))*log(-1/3773*
(2*sqrt(1/254)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(6229419725017
1*sqrt(11) - 22939848162605))*(11840590*sqrt(11) + 83479737) + 42
729694508347*sqrt(11)*(x + 3) - 128189083525041*x + 2136484725417
35)/x) - sqrt(1/254)*(49*x^4 - 56*x^3 + 2*x^2 + 8*x + 1)*sqrt(sqr
t(11)*(62294197250171*sqrt(11) - 22939848162605))*log(1/3773*(2*s
qrt(1/254)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(62294197250171*sq
rt(11) - 22939848162605))*(11840590*sqrt(11) + 83479737) - 427296
94508347*sqrt(11)*(x + 3) + 128189083525041*x - 213648472541735)/
x) + sqrt(1/254)*(49*x^4 - 56*x^3 + 2*x^2 + 8*x + 1)*sqrt(sqrt(11
)*(62294197250171*sqrt(11) + 22939848162605))*log(1/3773*(2*sqrt(
1/254)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(62294197250171*sqrt(1
1) + 22939848162605))*(11840590*sqrt(11) - 83479737) + 4272969450
8347*sqrt(11)*(x + 3) + 128189083525041*x - 213648472541735)/x) -
 sqrt(1/254)*(49*x^4 - 56*x^3 + 2*x^2 + 8*x + 1)*sqrt(sqrt(11)*(6
2294197250171*sqrt(11) + 22939848162605))*log(-1/3773*(2*sqrt(1/2
54)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(62294197250171*sqrt(11)
+ 22939848162605))*(11840590*sqrt(11) - 83479737) - 4272969450834
7*sqrt(11)*(x + 3) - 128189083525041*x + 213648472541735)/x) - 53
240*sqrt(5)*(49*x^4 - 56*x^3 + 2*x^2 + 8*x + 1)*log(sqrt(5)*sqrt(
5*x^2 + 2*x + 3)*(5*x + 1) - 25*x^2 - 10*x - 8) + 308*(189161*x^3
 - 246464*x^2 - 42767*x + 7416)*sqrt(5*x^2 + 2*x + 3))/(49*x^4 -
56*x^3 + 2*x^2 + 8*x + 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**2+5*x+2)*(5*x**2+2*x+3)**(3/2)/(-7*x**2+4*x+1)**3,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(-(5*x^2 + 2*x + 3)^(3/2)*(x^2 + 5*x + 2)/(7*x^2 - 4*x - 1)^3,x, algorithm
```

```
[Out] Exception raised: TypeError
```

3.386 $\int \frac{(1+4x-7x^2)^3(2+5x+x^2)}{\sqrt{3+2x+5x^2}}\,dx$

Optimal. Leaf size=185

$$\frac{40722851\sqrt{5x^2+2x+3}x^2}{750000}+\frac{5793077\sqrt{5x^2+2x+3}x}{75000}-\frac{16515809\sqrt{5x^2+2x+3}}{156250}-\frac{343}{40}\sqrt{5x^2+2x+3}x^7-\frac{1141}{40}\sqrt{5x^2+2x+3}x^6+\frac{26159}{300}\sqrt{5x^2+2x+3}x^5-\frac{47807\sqrt{5x^2+2x+3}x^4}{3750}-\frac{5160533\sqrt{5x^2+2x+3}x^3}{50000}-\frac{77513689\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{625000\sqrt{5}}$$

```
[Out] (-16515809*Sqrt[3 + 2*x + 5*x^2])/156250 + (5793077*x*Sqrt[3 + 2*
x + 5*x^2])/75000 + (40722851*x^2*Sqrt[3 + 2*x + 5*x^2])/750000 -
 (5160533*x^3*Sqrt[3 + 2*x + 5*x^2])/50000 - (47807*x^4*Sqrt[3 +
2*x + 5*x^2])/3750 + (26159*x^5*Sqrt[3 + 2*x + 5*x^2])/300 - (114
1*x^6*Sqrt[3 + 2*x + 5*x^2])/40 - (343*x^7*Sqrt[3 + 2*x + 5*x^2])
/40 - (77513689*ArcSinh[(1 + 5*x)/Sqrt[14]])/(625000*Sqrt[5])
```

Rubi [A] time = 0.516764, antiderivative size = 185, normalized size of antiderivative = 1., number of steps used = 10, number of rules used = 4, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.114$

$$\frac{40722851\sqrt{5x^2+2x+3}x^2}{750000}+\frac{5793077\sqrt{5x^2+2x+3}x}{75000}-\frac{16515809\sqrt{5x^2+2x+3}}{156250}-\frac{343}{40}\sqrt{5x^2+2x+3}x^7-\frac{1141}{40}\sqrt{5x^2+2x+3}x^6+\frac{26159}{300}\sqrt{5x^2+2x+3}x^5-\frac{47807\sqrt{5x^2+2x+3}x^4}{3750}-\frac{5160533\sqrt{5x^2+2x+3}x^3}{50000}-\frac{77513689\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{625000\sqrt{5}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 4*x - 7*x^2)^3*(2 + 5*x + x^2))/Sqrt[3 + 2*x + 5*x^2],x]
```


```
[Out] (-16515809*Sqrt[3 + 2*x + 5*x^2])/156250 + (5793077*x*Sqrt[3 + 2*
x + 5*x^2])/75000 + (40722851*x^2*Sqrt[3 + 2*x + 5*x^2])/750000 -
 (5160533*x^3*Sqrt[3 + 2*x + 5*x^2])/50000 - (47807*x^4*Sqrt[3 +
2*x + 5*x^2])/3750 + (26159*x^5*Sqrt[3 + 2*x + 5*x^2])/300 - (114
1*x^6*Sqrt[3 + 2*x + 5*x^2])/40 - (343*x^7*Sqrt[3 + 2*x + 5*x^2])
/40 - (77513689*ArcSinh[(1 + 5*x)/Sqrt[14]])/(625000*Sqrt[5])
```

Rubi in Sympy [A] time = 78.1787, size = 150, normalized size = 0.81

$$-\frac{(-27852006362342680926000 0x+585207683498664248436000)\sqrt{5x^2+2x+3}}{596818632973500000000}-\frac{(-811998140100x+926841667380)\left(-7733315620x^2-2021601360x+1090465500\right)\sqrt{5x^2+2x+3}}{119363726594700000000}+\frac{(245x+1235)\left(-7x^2+4x+1\right)^3\sqrt{5x^2+2x+3}}{9800}+\frac{(18712750x+35738790)\left(-7x^2+4x+1\right)^2\sqrt{5x^2+2x+3}}{51450000}-\frac{77513689\sqrt{5}\operatorname{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{3125000}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((-7*x**2+4*x+1)**3*(x**2+5*x+2)/(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] -(-278520063623426809260000*x + 585207683498664248436000)*sqrt(5*
x**2 + 2*x + 3)/596818632973500000000 - (-811998140100*x + 92684
1667380)*(-7733315620*x**2 - 2021601360*x + 1090465500)*sqrt(5*x*
*2 + 2*x + 3)/119363726594700000000 + (245*x + 1235)*(-7*x**2 + 4
*x + 1)**3*sqrt(5*x**2 + 2*x + 3)/9800 + (18712750*x + 35738790)*
(-7*x**2 + 4*x + 1)**2*sqrt(5*x**2 + 2*x + 3)/51450000 - 77513689
*sqrt(5)*atanh(sqrt(5)*(10*x + 2)/(10*sqrt(5*x**2 + 2*x + 3)))/31
25000
```

Mathematica [A] time = 0.123024, size = 75, normalized size = 0.41

$$\frac{-5\sqrt{5x^2+2x+3}\left(32156250x^7+106968750x^6-326987500x^5+47807000x^4+387039975x^3-203614255x^2-289653850x\right.}{18750000}$$

Antiderivative was successfully verified.

```
[In] Integrate[((1 + 4*x - 7*x^2)^3*(2 + 5*x + x^2))/Sqrt[3 + 2*x + 5*x^2],x]
```

```
[Out] (-5*Sqrt[3 + 2*x + 5*x^2]*(396379416 - 289653850*x - 203614255*x^
2 + 387039975*x^3 + 47807000*x^4 - 326987500*x^5 + 106968750*x^6
+ 32156250*x^7) - 465082134*Sqrt[5]*ArcSinh[(1 + 5*x)/Sqrt[14]])/
18750000
```

Maple [A] time = 0.032, size = 147, normalized size = 0.8

$$-\frac{77513689\sqrt{5}}{3125000}Arcsinh\left(\frac{5\sqrt{14}}{14}\left(x+\frac{1}{5}\right)\right)-\frac{16515809}{156250}\sqrt{5x^2+2x+3}+\frac{5793077x}{75000}\sqrt{5x^2+2x+3}+\frac{40722851x^2}{750000}\sqrt{5x^2+2x+3}-\frac{5160533x^3}{50000}\sqrt{5x^2+2x+3}-\frac{47807x^4}{3750}\sqrt{5x^2+2x+3}+\frac{26159x^5}{300}\sqrt{5x^2+2x+3}-\frac{1141x^6}{40}\sqrt{5x^2+2x+3}-\frac{343x^7}{40}\sqrt{5x^2+2x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((-7*x^2+4*x+1)^3*(x^2+5*x+2)/(5*x^2+2*x+3)^(1/2),x)
```

```
[Out] -77513689/3125000*5^(1/2)*arcsinh(5/14*14^(1/2)*(x+1/5))-16515809
/156250*(5*x^2+2*x+3)^(1/2)+5793077/75000*x*(5*x^2+2*x+3)^(1/2)+4
0722851/750000*x^2*(5*x^2+2*x+3)^(1/2)-5160533/50000*x^3*(5*x^2+2
*x+3)^(1/2)-47807/3750*x^4*(5*x^2+2*x+3)^(1/2)+26159/300*x^5*(5*x
^2+2*x+3)^(1/2)-1141/40*x^6*(5*x^2+2*x+3)^(1/2)-343/40*x^7*(5*x^2
+2*x+3)^(1/2)
```

Maxima [A] time = 0.775662, size = 200, normalized size = 1.08

$$-\frac{343}{40}\sqrt{5x^2+2x+3}x^7-\frac{1141}{40}\sqrt{5x^2+2x+3}x^6+\frac{26159}{300}\sqrt{5x^2+2x+3}x^5-\frac{47807}{3750}\sqrt{5x^2+2x+3}x^4-\frac{5160533}{50000}\sqrt{5x^2+2x+3}x^3+\frac{40722851}{750000}\sqrt{5x^2+2x+3}x^2+\frac{5793077}{75000}\sqrt{5x^2+2x+3}x-\frac{77513689}{3125000}\sqrt{5}\,\mathrm{arsinh}\left(\frac{1}{14}\sqrt{14}(5x+1)\right)-\frac{16515809}{156250}\sqrt{5x^2+2x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(7*x^2 - 4*x - 1)^3*(x^2 + 5*x + 2)/sqrt(5*x^2 + 2*x + 3),x, algorithm=
```

```
[Out] -343/40*sqrt(5*x^2 + 2*x + 3)*x^7 - 1141/40*sqrt(5*x^2 + 2*x + 3)
*x^6 + 26159/300*sqrt(5*x^2 + 2*x + 3)*x^5 - 47807/3750*sqrt(5*x^
2 + 2*x + 3)*x^4 - 5160533/50000*sqrt(5*x^2 + 2*x + 3)*x^3 + 4072
2851/750000*sqrt(5*x^2 + 2*x + 3)*x^2 + 5793077/75000*sqrt(5*x^2
+ 2*x + 3)*x - 77513689/3125000*sqrt(5)*arcsinh(1/14*sqrt(14)*(5*
x + 1)) - 16515809/156250*sqrt(5*x^2 + 2*x + 3)
```

Fricas [A] time = 0.281288, size = 128, normalized size = 0.69

$$-\frac{1}{18750000}\sqrt{5}\left(\sqrt{5}\left(32156250x^7+106968750x^6-326987500x^5+47807000x^4+387039975x^3-203614255x^2-2896538\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)^3*(x^2 + 5*x + 2)/sqrt(5*x^2 + 2*x + 3),x, algorithm=
```

```
[Out] -1/18750000*sqrt(5)*(sqrt(5)*(32156250*x^7 + 106968750*x^6 - 3269
87500*x^5 + 47807000*x^4 + 387039975*x^3 - 203614255*x^2 - 289653
850*x + 396379416)*sqrt(5*x^2 + 2*x + 3) - 232541067*log(-sqrt(5)
*(25*x^2 + 10*x + 8) + 5*sqrt(5*x^2 + 2*x + 3)*(5*x + 1)))
```

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

$$-\int\left(-\frac{29x}{\sqrt{5x^2+2x+3}}\right)dx-\int\left(-\frac{115x^2}{\sqrt{5x^2+2x+3}}\right)dx-\int\frac{61x^3}{\sqrt{5x^2+2x+3}}\,dx-\int\frac{871x^4}{\sqrt{5x^2+2x+3}}\,dx-\int\left(-\frac{127x^5}{\sqrt{5x^2+2x+3}}\right)dx-\int\left(-\frac{2065x^6}{\sqrt{5x^2+2x+3}}\right)dx-\int\frac{1127x^7}{\sqrt{5x^2+2x+3}}\,dx-\int\frac{343x^8}{\sqrt{5x^2+2x+3}}\,dx-\int\left(-\frac{2}{\sqrt{5x^2+2x+3}}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-7*x**2+4*x+1)**3*(x**2+5*x+2)/(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] -Integral(-29*x/sqrt(5*x**2 + 2*x + 3), x) - Integral(-115*x**2/s
qrt(5*x**2 + 2*x + 3), x) - Integral(61*x**3/sqrt(5*x**2 + 2*x +
3), x) - Integral(871*x**4/sqrt(5*x**2 + 2*x + 3), x) - Integral(
-127*x**5/sqrt(5*x**2 + 2*x + 3), x) - Integral(-2065*x**6/sqrt(5
*x**2 + 2*x + 3), x) - Integral(1127*x**7/sqrt(5*x**2 + 2*x + 3),
 x) - Integral(343*x**8/sqrt(5*x**2 + 2*x + 3), x) - Integral(-2/
sqrt(5*x**2 + 2*x + 3), x)
```

GIAC/XCAS [A] time = 0.28023, size = 111, normalized size = 0.6

$$-\frac{1}{3750000}\left(5\left(\left(5\left(10\left(175\left(15\left(49x+163\right)x-7474\right)x+191228\right)x+15481599\right)x-40722851\right)x-57930770\right)x+396379416\right)\sqrt{5}$$
$$+\frac{77513689}{3125000}\sqrt{5}\ln\left(-\sqrt{5}\left(\sqrt{5}x-\sqrt{5x^2+2x+3}\right)-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)^3*(x^2 + 5*x + 2)/sqrt(5*x^2 + 2*x + 3),x, algorithm=
```

```
[Out] -1/3750000*(5*((5*(10*(175*(15*(49*x + 163)*x - 7474)*x + 191228)
*x + 15481599)*x - 40722851)*x - 57930770)*x + 396379416)*sqrt(5*
```

```
x^2 + 2*x + 3) + 77513689/3125000*sqrt(5)*ln(-sqrt(5)*(sqrt(5)*x
- sqrt(5*x^2 + 2*x + 3)) - 1)
```

3.387 $\int \frac{\left(1+4x-7x^2\right)^2\left(2+5x+x^2\right)}{\sqrt{3+2x+5x^2}}\,dx$

Optimal. Leaf size=143

$$-\frac{207427\sqrt{5x^2+2x+3}\,x^2}{37500}+\frac{36073\sqrt{5x^2+2x+3}\,x}{1875}-\frac{22053\sqrt{5x^2+2x+3}}{31250}+\frac{49}{30}\sqrt{5x^2+2x+3}\,x^5+\frac{5131}{750}\sqrt{5x^2+2x+3}\,x^4-\frac{33259\sqrt{5x^2+2x+3}\,x^3}{2500}-\frac{1719097\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{31250\sqrt{5}}$$

```
[Out] (-22053*Sqrt[3 + 2*x + 5*x^2])/31250 + (36073*x*Sqrt[3 + 2*x + 5*
x^2])/1875 - (207427*x^2*Sqrt[3 + 2*x + 5*x^2])/37500 - (33259*x^
3*Sqrt[3 + 2*x + 5*x^2])/2500 + (5131*x^4*Sqrt[3 + 2*x + 5*x^2])/
750 + (49*x^5*Sqrt[3 + 2*x + 5*x^2])/30 - (1719097*ArcSinh[(1 + 5
*x)/Sqrt[14]])/(31250*Sqrt[5])
```

Rubi [A] time = 0.329755, antiderivative size = 143, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 4, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.114$

$$-\frac{207427\sqrt{5x^2+2x+3}\,x^2}{37500}+\frac{36073\sqrt{5x^2+2x+3}\,x}{1875}-\frac{22053\sqrt{5x^2+2x+3}}{31250}+\frac{49}{30}\sqrt{5x^2+2x+3}\,x^5+\frac{5131}{750}\sqrt{5x^2+2x+3}\,x^4-\frac{33259\sqrt{5x^2+2x+3}\,x^3}{2500}-\frac{1719097\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{31250\sqrt{5}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 4*x - 7*x^2)^2*(2 + 5*x + x^2))/Sqrt[3 + 2*x + 5*x^2],x]
```

```
[Out] (-22053*Sqrt[3 + 2*x + 5*x^2])/31250 + (36073*x*Sqrt[3 + 2*x + 5*
x^2])/1875 - (207427*x^2*Sqrt[3 + 2*x + 5*x^2])/37500 - (33259*x^
3*Sqrt[3 + 2*x + 5*x^2])/2500 + (5131*x^4*Sqrt[3 + 2*x + 5*x^2])/
750 + (49*x^5*Sqrt[3 + 2*x + 5*x^2])/30 - (1719097*ArcSinh[(1 + 5
*x)/Sqrt[14]])/(31250*Sqrt[5])
```

Rubi in Sympy [A] time = 55.1048, size = 117, normalized size = 0.82

$$-\frac{(-53435312825400x+1873059490440)\sqrt{5x^2+2x+3}}{4037827500000}-\frac{(-5383770x+2537826)\left(-51274x^2-116472x+13350\right)\sqrt{5x^2+2x+3}}{80756550000}+\frac{(175x+933)\left(-7x^2+4x+1\right)^2\sqrt{5x^2+2x+3}}{5250}-\frac{1719097\sqrt{5}\,\mathrm{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{156250}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((-7*x**2+4*x+1)**2*(x**2+5*x+2)/(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] -(-53435312825400*x + 1873059490440)*sqrt(5*x**2 + 2*x + 3)/40378
27500000 - (-5383770*x + 2537826)*(-51274*x**2 - 116472*x + 13350
)*sqrt(5*x**2 + 2*x + 3)/80756550000 + (175*x + 933)*(-7*x**2 + 4
*x + 1)**2*sqrt(5*x**2 + 2*x + 3)/5250 - 1719097*sqrt(5)*atanh(sq
rt(5)*(10*x + 2)/(10*sqrt(5*x**2 + 2*x + 3)))/156250
```

Mathematica [A] time = 0.103078, size = 65, normalized size = 0.45

$$\frac{5\sqrt{5x^2+2x+3}\left(306250x^5+1282750x^4-2494425x^3-1037135x^2+3607300x-132318\right)-10314582\sqrt{5}\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{937500}$$

Antiderivative was successfully verified.

```
[In] Integrate[((1 + 4*x - 7*x^2)^2*(2 + 5*x + x^2))/Sqrt[3 + 2*x + 5*x^2],x]
```

```
[Out] (5*Sqrt[3 + 2*x + 5*x^2]*(-132318 + 3607300*x - 1037135*x^2 - 249
4425*x^3 + 1282750*x^4 + 306250*x^5) - 10314582*Sqrt[5]*ArcSinh[(
1 + 5*x)/Sqrt[14]])/937500
```

Maple [A] time = 0.014, size = 113, normalized size = 0.8

$$-\frac{1719097\sqrt{5}}{156250}\mathit{Arcsinh}\left(\frac{5\sqrt{14}}{14}\left(x+\frac{1}{5}\right)\right)-\frac{22053}{31250}\sqrt{5x^2+2x+3}+\frac{36073x}{1875}\sqrt{5x^2+2x+3}-\frac{207427x^2}{37500}\sqrt{5x^2+2x+3}-\frac{33259x^3}{2500}\sqrt{5x^2+2x+3}+\frac{5131x^4}{750}\sqrt{5x^2+2x+3}+\frac{49x^5}{30}\sqrt{5x^2+2x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((-7*x^2+4*x+1)^2*(x^2+5*x+2)/(5*x^2+2*x+3)^(1/2),x)
```

```
[Out] -1719097/156250*5^(1/2)*arcsinh(5/14*14^(1/2)*(x+1/5))-22053/3125
0*(5*x^2+2*x+3)^(1/2)+36073/1875*x*(5*x^2+2*x+3)^(1/2)-207427/375
00*x^2*(5*x^2+2*x+3)^(1/2)-33259/2500*x^3*(5*x^2+2*x+3)^(1/2)+513
1/750*x^4*(5*x^2+2*x+3)^(1/2)+49/30*x^5*(5*x^2+2*x+3)^(1/2)
```

Maxima [A] time = 0.770817, size = 154, normalized size = 1.08

$$\frac{49}{30}\sqrt{5x^2+2x+3}x^5+\frac{5131}{750}\sqrt{5x^2+2x+3}x^4-\frac{33259}{2500}\sqrt{5x^2+2x+3}x^3-\frac{207427}{37500}\sqrt{5x^2+2x+3}x^2+\frac{36073}{1875}\sqrt{5x^2+2x+3}x-\frac{1719097}{156250}\sqrt{5}\operatorname{arsinh}\left(\frac{1}{14}\sqrt{14}(5x+1)\right)-\frac{22053}{31250}\sqrt{5x^2+2x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((7*x^2 - 4*x - 1)^2*(x^2 + 5*x + 2)/sqrt(5*x^2 + 2*x + 3),x, algorithm="
```

```
[Out] 49/30*sqrt(5*x^2 + 2*x + 3)*x^5 + 5131/750*sqrt(5*x^2 + 2*x + 3)*
x^4 - 33259/2500*sqrt(5*x^2 + 2*x + 3)*x^3 - 207427/37500*sqrt(5*
x^2 + 2*x + 3)*x^2 + 36073/1875*sqrt(5*x^2 + 2*x + 3)*x - 1719097
/156250*sqrt(5)*arcsinh(1/14*sqrt(14)*(5*x + 1)) - 22053/31250*sq
rt(5*x^2 + 2*x + 3)
```

Fricas [A] time = 0.284869, size = 115, normalized size = 0.8

$$\frac{1}{937500}\sqrt{5}\left(\sqrt{5}\left(306250x^5+1282750x^4-2494425x^3-1037135x^2+3607300x-132318\right)\sqrt{5x^2+2x+3}+5157291\log\left(\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((7*x^2 - 4*x - 1)^2*(x^2 + 5*x + 2)/sqrt(5*x^2 + 2*x + 3),x, algorithm="
```

```
[Out] 1/937500*sqrt(5)*(sqrt(5)*(306250*x^5 + 1282750*x^4 - 2494425*x^3
 - 1037135*x^2 + 3607300*x - 132318)*sqrt(5*x^2 + 2*x + 3) + 5157
291*log(-sqrt(5)*(25*x^2 + 10*x + 8) + 5*sqrt(5*x^2 + 2*x + 3)*(5
*x + 1)))
```

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

$$\int \frac{\left(x^2+5x+2\right)\left(7x^2-4x-1\right)^2}{\sqrt{5x^2+2x+3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-7*x**2+4*x+1)**2*(x**2+5*x+2)/(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] Integral((x**2 + 5*x + 2)*(7*x**2 - 4*x - 1)**2/sqrt(5*x**2 + 2*x
 + 3), x)
```

GIAC/XCAS [A] time = 0.280595, size = 97, normalized size = 0.68

$$\frac{1}{187500}\left(5\left(\left(5\left(70\left(175x+733\right)x-99777\right)x-207427\right)x+721460\right)x-132318\right)\sqrt{5x^2+2x+3} + \frac{1719097}{156250}\sqrt{5}\ln\left(-\sqrt{5}\left(\sqrt{5}x-\sqrt{5x^2+2x+3}\right)-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((7*x^2 - 4*x - 1)^2*(x^2 + 5*x + 2)/sqrt(5*x^2 + 2*x + 3),x, algorithm="
```

```
[Out] 1/187500*(5*((5*(70*(175*x + 733)*x - 99777)*x - 207427)*x + 7214
60)*x - 132318)*sqrt(5*x^2 + 2*x + 3) + 1719097/156250*sqrt(5)*ln
(-sqrt(5)*(sqrt(5)*x - sqrt(5*x^2 + 2*x + 3)) - 1)
```

3.388 $\int \frac{(1+4x-7x^2)(2+5x+x^2)}{\sqrt{3+2x+5x^2}}\,dx$

Optimal. Leaf size=101

$$-\frac{571}{300}\sqrt{5x^2+2x+3}\,x^2+\frac{59}{30}\sqrt{5x^2+2x+3}\,x+\frac{463}{125}\sqrt{5x^2+2x+3}-\frac{7}{20}\sqrt{5x^2+2x+3}\,x^3-\frac{1901\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{250\sqrt{5}}$$

```
[Out] (463*Sqrt[3 + 2*x + 5*x^2])/125 + (59*x*Sqrt[3 + 2*x + 5*x^2])/30
 - (571*x^2*Sqrt[3 + 2*x + 5*x^2])/300 - (7*x^3*Sqrt[3 + 2*x + 5*
x^2])/20 - (1901*ArcSinh[(1 + 5*x)/Sqrt[14]])/(250*Sqrt[5])
```

Rubi [A] time = 0.18332, antiderivative size = 101, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.121$

$$-\frac{571}{300}\sqrt{5x^2+2x+3}\,x^2+\frac{59}{30}\sqrt{5x^2+2x+3}\,x+\frac{463}{125}\sqrt{5x^2+2x+3}-\frac{7}{20}\sqrt{5x^2+2x+3}\,x^3-\frac{1901\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{250\sqrt{5}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 4*x - 7*x^2)*(2 + 5*x + x^2))/Sqrt[3 + 2*x + 5*x^2],x]
```

```
[Out] (463*Sqrt[3 + 2*x + 5*x^2])/125 + (59*x*Sqrt[3 + 2*x + 5*x^2])/30
 - (571*x^2*Sqrt[3 + 2*x + 5*x^2])/300 - (7*x^3*Sqrt[3 + 2*x + 5*
x^2])/20 - (1901*ArcSinh[(1 + 5*x)/Sqrt[14]])/(250*Sqrt[5])
```

Rubi in Sympy [A] time = 29.2272, size = 85, normalized size = 0.84

$$\frac{(105x+631)\left(-7x^2+4x+1\right)\sqrt{5x^2+2x+3}}{2100}+\frac{(75050x+357370)\sqrt{5x^2+2x+3}}{105000}-\frac{1901\sqrt{5}\,\operatorname{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{1250}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((-7*x**2+4*x+1)*(x**2+5*x+2)/(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] (105*x + 631)*(-7*x**2 + 4*x + 1)*sqrt(5*x**2 + 2*x + 3)/2100 + (
75050*x + 357370)*sqrt(5*x**2 + 2*x + 3)/105000 - 1901*sqrt(5)*at
```

```
anh(sqrt(5)*(10*x + 2)/(10*sqrt(5*x**2 + 2*x + 3)))/1250
```

Mathematica [A] time = 0.0771633, size = 55, normalized size = 0.54

$$\frac{5\sqrt{5x^2+2x+3}\left(-525x^3-2855x^2+2950x+5556\right)-11406\sqrt{5}\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{7500}$$

Antiderivative was successfully verified.

```
[In] Integrate[((1 + 4*x - 7*x^2)*(2 + 5*x + x^2))/Sqrt[3 + 2*x + 5*x^2],x]
```

```
[Out] (5*Sqrt[3 + 2*x + 5*x^2]*(5556 + 2950*x - 2855*x^2 - 525*x^3) - 1
1406*Sqrt[5]*ArcSinh[(1 + 5*x)/Sqrt[14]])/7500
```

Maple [A] time = 0.01, size = 79, normalized size = 0.8

$$-\frac{1901\sqrt{5}}{1250}\mathit{Arcsinh}\left(\frac{5\sqrt{14}}{14}\left(x+\frac{1}{5}\right)\right)+\frac{463}{125}\sqrt{5x^2+2x+3}+\frac{59x}{30}\sqrt{5x^2+2x+3}-\frac{571x^2}{300}\sqrt{5x^2+2x+3}-\frac{7x^3}{20}\sqrt{5x^2+2x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((-7*x^2+4*x+1)*(x^2+5*x+2)/(5*x^2+2*x+3)^(1/2),x)
```

```
[Out] -1901/1250*5^(1/2)*arcsinh(5/14*14^(1/2)*(x+1/5))+463/125*(5*x^2+
2*x+3)^(1/2)+59/30*x*(5*x^2+2*x+3)^(1/2)-571/300*x^2*(5*x^2+2*x+3
)^(1/2)-7/20*x^3*(5*x^2+2*x+3)^(1/2)
```

Maxima [A] time = 0.767703, size = 108, normalized size = 1.07

$$-\frac{7}{20}\sqrt{5x^2+2x+3}x^3-\frac{571}{300}\sqrt{5x^2+2x+3}x^2+\frac{59}{30}\sqrt{5x^2+2x+3}x-\frac{1901}{1250}\sqrt{5}\operatorname{arsinh}\left(\frac{1}{14}\sqrt{14}(5x+1)\right)+\frac{463}{125}\sqrt{5x^2+2x+3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)*(x^2 + 5*x + 2)/sqrt(5*x^2 + 2*x + 3),x, algorithm="m
```

```
[Out] -7/20*sqrt(5*x^2 + 2*x + 3)*x^3 - 571/300*sqrt(5*x^2 + 2*x + 3)*x
^2 + 59/30*sqrt(5*x^2 + 2*x + 3)*x - 1901/1250*sqrt(5)*arcsinh(1/
14*sqrt(14)*(5*x + 1)) + 463/125*sqrt(5*x^2 + 2*x + 3)
```

Fricas [A] time = 0.284399, size = 101, normalized size = 1.

$$-\frac{1}{7500}\sqrt{5}\left(\sqrt{5}\left(525x^3+2855x^2-2950x-5556\right)\sqrt{5x^2+2x+3}-5703\log\left(-\sqrt{5}\left(25x^2+10x+8\right)+5\sqrt{5x^2+2x+3}(5x\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)*(x^2 + 5*x + 2)/sqrt(5*x^2 + 2*x + 3),x, algorithm="f
```

```
[Out] -1/7500*sqrt(5)*(sqrt(5)*(525*x^3 + 2855*x^2 - 2950*x - 5556)*sqr
t(5*x^2 + 2*x + 3) - 5703*log(-sqrt(5)*(25*x^2 + 10*x + 8) + 5*sq
rt(5*x^2 + 2*x + 3)*(5*x + 1)))
```

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

$$-\int\left(-\frac{13x}{\sqrt{5x^2+2x+3}}\right)dx-\int\left(-\frac{7x^2}{\sqrt{5x^2+2x+3}}\right)dx-\int\frac{31x^3}{\sqrt{5x^2+2x+3}}\,dx-\int\frac{7x^4}{\sqrt{5x^2+2x+3}}\,dx-\int\left(-\frac{2}{\sqrt{5x^2+2x+3}}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-7*x**2+4*x+1)*(x**2+5*x+2)/(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] -Integral(-13*x/sqrt(5*x**2 + 2*x + 3), x) - Integral(-7*x**2/sqr
t(5*x**2 + 2*x + 3), x) - Integral(31*x**3/sqrt(5*x**2 + 2*x + 3)
, x) - Integral(7*x**4/sqrt(5*x**2 + 2*x + 3), x) - Integral(-2/s
qrt(5*x**2 + 2*x + 3), x)
```

GIAC/XCAS [A] time = 0.279052, size = 84, normalized size = 0.83

$$-\frac{1}{1500}\left(5\left((105x+571)x-590\right)x-5556\right)\sqrt{5x^2+2x+3}+\frac{1901}{1250}\sqrt{5}\ln\left(-\sqrt{5}\left(\sqrt{5}x-\sqrt{5x^2+2x+3}\right)-1\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)*(x^2 + 5*x + 2)/sqrt(5*x^2 + 2*x + 3),x, algorithm="g
```

```
[Out] -1/1500*(5*((105*x + 571)*x - 590)*x - 5556)*sqrt(5*x^2 + 2*x + 3
) + 1901/1250*sqrt(5)*ln(-sqrt(5)*(sqrt(5)*x - sqrt(5*x^2 + 2*x +
 3)) - 1)
```

3.389 $\int \frac{2+5x+x^2}{(1+4x-7x^2)\sqrt{3+2x+5x^2}}\,dx$

Optimal. Leaf size=164

$$-\frac{3}{14}\sqrt{\frac{4091-1055\sqrt{11}}{2794}}\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)+\frac{3}{14}\sqrt{\frac{4091+1055\sqrt{11}}{2794}}\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)-\frac{\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{7\sqrt{5}}$$

```
[Out] -ArcSinh[(1 + 5*x)/Sqrt[14]]/(7*Sqrt[5]) - (3*Sqrt[(4091 - 1055*S
qrt[11])/2794]*ArcTanh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)/(Sqr
t[2*(125 - 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2]])])/14 + (3*Sqrt[(4
091 + 1055*Sqrt[11])/2794]*ArcTanh[(23 + Sqrt[11] + (17 + 5*Sqrt[
11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2]])])/14
```

Rubi [A] time = 0.577346, antiderivative size = 164, normalized size of antiderivative = 1., number of steps used = 8, number of rules used = 6, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.171

$$-\frac{3}{14}\sqrt{\frac{4091-1055\sqrt{11}}{2794}}\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)+\frac{3}{14}\sqrt{\frac{4091+1055\sqrt{11}}{2794}}\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)-\frac{\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{7\sqrt{5}}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + 5*x + x^2)/((1 + 4*x - 7*x^2)*Sqrt[3 + 2*x + 5*x^2]),x]
```

```
[Out] -ArcSinh[(1 + 5*x)/Sqrt[14]]/(7*Sqrt[5]) - (3*Sqrt[(4091 - 1055*S
qrt[11])/2794]*ArcTanh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)/(Sqr
t[2*(125 - 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2]])])/14 + (3*Sqrt[(4
091 + 1055*Sqrt[11])/2794]*ArcTanh[(23 + Sqrt[11] + (17 + 5*Sqrt[
11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2]])])/14
```

Rubi in Sympy [A] time = 61.2036, size = 194, normalized size = 1.18

$$-\frac{\sqrt{5}\,\mathrm{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{35}+\frac{\sqrt{22}\left(-78\sqrt{11}+366\right)\mathrm{atanh}\left(\frac{\sqrt{2}\left(x\left(-68+20\sqrt{11}\right)-92+4\sqrt{11}\right)}{8\sqrt{-17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{616\sqrt{-17\sqrt{11}+125}}-\frac{\sqrt{22}\left(78\sqrt{11}+366\right)\mathrm{atanh}\left(\frac{\sqrt{2}\left(x\left(-68-20\sqrt{11}\right)-92-4\sqrt{11}\right)}{8\sqrt{17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{616\sqrt{17\sqrt{11}+125}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((x**2+5*x+2)/(-7*x**2+4*x+1)/(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] -sqrt(5)*atanh(sqrt(5)*(10*x + 2)/(10*sqrt(5*x**2 + 2*x + 3)))/35
 + sqrt(22)*(-78*sqrt(11) + 366)*atanh(sqrt(2)*(x*(-68 + 20*sqrt(
11)) - 92 + 4*sqrt(11))/(8*sqrt(-17*sqrt(11) + 125)*sqrt(5*x**2 +
 2*x + 3)))/(616*sqrt(-17*sqrt(11) + 125)) - sqrt(22)*(78*sqrt(11
) + 366)*atanh(sqrt(2)*(x*(-68 - 20*sqrt(11)) - 92 - 4*sqrt(11))/
(8*sqrt(17*sqrt(11) + 125)*sqrt(5*x**2 + 2*x + 3)))/(616*sqrt(17*
sqrt(11) + 125))
```

Mathematica [A] time = 1.90786, size = 189, normalized size = 1.15

$$\frac{-30\sqrt{250-34\sqrt{11}}\left(143+61\sqrt{11}\right)\left(\log\left(-7x+\sqrt{11}+2\right)-\log\left(\sqrt{2750+374\sqrt{11}}\sqrt{5x^2+2x+3}+\left(55+17\sqrt{11}\right)x+23\sqrt{11}\right.\right.}{21560\sqrt{254}}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(2 + 5*x + x^2)/((1 + 4*x - 7*x^2)*Sqrt[3 + 2*x + 5*x^2]),x]
```

```
[Out] (-616*Sqrt[1270]*ArcSinh[(1 + 5*x)/Sqrt[14]] + 30*Sqrt[250 + 34*S
qrt[11]]*(-143 + 61*Sqrt[11])*ArcTanh[(Sqrt[250 - 34*Sqrt[11]]*Sq
rt[3 + 2*x + 5*x^2])/(-23 + Sqrt[11] + (-17 + 5*Sqrt[11])*x)] - 3
0*Sqrt[250 - 34*Sqrt[11]]*(143 + 61*Sqrt[11])*(Log[2 + Sqrt[11] -
 7*x] - Log[11 + 23*Sqrt[11] + (55 + 17*Sqrt[11])*x + Sqrt[2750 +
 374*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2]]))/(21560*Sqrt[254])
```

Maple [A] time = 0.023, size = 204, normalized size = 1.2

$$-\frac{\sqrt{5}}{35}Arcsinh\left(\frac{5\sqrt{14}}{14}\left(x+\frac{1}{5}\right)\right)$$
$$+\frac{\left(-183+39\sqrt{11}\right)\sqrt{11}}{154\sqrt{250-34\sqrt{11}}}Artanh\left(\frac{49}{2\sqrt{250-34\sqrt{11}}}\left(\frac{500}{49}-\frac{68\sqrt{11}}{49}+\left(\frac{34}{7}-\frac{10\sqrt{11}}{7}\right)\left(x-\frac{2}{7}+\frac{\sqrt{11}}{7}\right)\right)\frac{1}{\sqrt{245\left(x-2/7+1/\right.}}\right.$$
$$+\frac{\left(183+39\sqrt{11}\right)\sqrt{11}}{154\sqrt{250+34\sqrt{11}}}Artanh\left(\frac{49}{2\sqrt{250+34\sqrt{11}}}\left(\frac{500}{49}+\frac{68\sqrt{11}}{49}+\left(\frac{34}{7}+\frac{10\sqrt{11}}{7}\right)\left(x-\frac{2}{7}-\frac{\sqrt{11}}{7}\right)\right)\frac{1}{\sqrt{245\left(x-2/7-1/7\right.}}\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+5*x+2)/(-7*x^2+4*x+1)/(5*x^2+2*x+3)^(1/2),x)
```

```
[Out] -1/35*5^(1/2)*arcsinh(5/14*14^(1/2)*(x+1/5))+3/154*(-61+13*11^(1/
2))*11^(1/2)/(250-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*1
1^(1/2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/
2))^(1/2)/(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-
2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2))+3/154*(61+13*11^(1/2))*
11^(1/2)/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+68/49*11^(1
/2)+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2))^
(1/2)/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-
1/7*11^(1/2))+250+34*11^(1/2))^(1/2))
```

Maxima [A] time = 0.802718, size = 628, normalized size = 3.83

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)*sqrt(5*x^2 + 2*x + 3)),x, algorithm=
```

```
[Out] -1/10780*sqrt(11)*(28*sqrt(11)*sqrt(5)*arcsinh(5/14*sqrt(7)*sqrt(
2)*x + 1/14*sqrt(7)*sqrt(2)) - 1365*sqrt(11)*sqrt(2)*arcsinh(5/7*
sqrt(11)*sqrt(7)*sqrt(2)*x/abs(14*x - 2*sqrt(11) - 4) + 17/7*sqrt
(7)*sqrt(2)*x/abs(14*x - 2*sqrt(11) - 4) + 1/7*sqrt(11)*sqrt(7)*s
qrt(2)/abs(14*x - 2*sqrt(11) - 4) + 23/7*sqrt(7)*sqrt(2)/abs(14*x
 - 2*sqrt(11) - 4))/sqrt(17*sqrt(11) + 125) + 390*sqrt(11)*arcsin
h(5/7*sqrt(11)*sqrt(7)*sqrt(2)*x/abs(14*x + 2*sqrt(11) - 4) - 17/
7*sqrt(7)*sqrt(2)*x/abs(14*x + 2*sqrt(11) - 4) + 1/7*sqrt(11)*sqr
t(7)*sqrt(2)/abs(14*x + 2*sqrt(11) - 4) - 23/7*sqrt(7)*sqrt(2)/ab
```

```
s(14*x + 2*sqrt(11) - 4))/sqrt(-34/49*sqrt(11) + 250/49) - 6405*s
qrt(2)*arcsinh(5/7*sqrt(11)*sqrt(7)*sqrt(2)*x/abs(14*x - 2*sqrt(1
1) - 4) + 17/7*sqrt(7)*sqrt(2)*x/abs(14*x - 2*sqrt(11) - 4) + 1/7
*sqrt(11)*sqrt(7)*sqrt(2)/abs(14*x - 2*sqrt(11) - 4) + 23/7*sqrt(
7)*sqrt(2)/abs(14*x - 2*sqrt(11) - 4))/sqrt(17*sqrt(11) + 125) -
1830*arcsinh(5/7*sqrt(11)*sqrt(7)*sqrt(2)*x/abs(14*x + 2*sqrt(11)
 - 4) - 17/7*sqrt(7)*sqrt(2)*x/abs(14*x + 2*sqrt(11) - 4) + 1/7*s
qrt(11)*sqrt(7)*sqrt(2)/abs(14*x + 2*sqrt(11) - 4) - 23/7*sqrt(7)
*sqrt(2)/abs(14*x + 2*sqrt(11) - 4))/sqrt(-34/49*sqrt(11) + 250/4
9))
```

Fricas [A] time = 0.298775, size = 475, normalized size = 2.9

$$-\frac{1}{1540}\sqrt{5}\left(3\sqrt{5}\sqrt{\frac{1}{254}}\sqrt{\sqrt{11}\left(4091\sqrt{11}-11605\right)}\log\left(-\frac{3\left(2\sqrt{\frac{1}{254}}\sqrt{5x^2+2x+3}\sqrt{\sqrt{11}\left(4091\sqrt{11}-11605\right)}\left(172\sqrt{11}+71\right.\right.}{77x}\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)*sqrt(5*x^2 + 2*x + 3)),x, algorithm=
```

```
[Out] -1/1540*sqrt(5)*(3*sqrt(5)*sqrt(1/254)*sqrt(sqrt(11)*(4091*sqrt(1
1) - 11605))*log(-3/77*(2*sqrt(1/254)*sqrt(5*x^2 + 2*x + 3)*sqrt(
sqrt(11)*(4091*sqrt(11) - 11605))*(172*sqrt(11) + 715) + 1463*sqr
t(11)*(x + 3) - 4389*x + 7315)/x) - 3*sqrt(5)*sqrt(1/254)*sqrt(sq
rt(11)*(4091*sqrt(11) - 11605))*log(3/77*(2*sqrt(1/254)*sqrt(5*x^
2 + 2*x + 3)*sqrt(sqrt(11)*(4091*sqrt(11) - 11605))*(172*sqrt(11)
 + 715) - 1463*sqrt(11)*(x + 3) + 4389*x - 7315)/x) + 3*sqrt(5)*s
qrt(1/254)*sqrt(sqrt(11)*(4091*sqrt(11) + 11605))*log(3/77*(2*sqr
t(1/254)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(4091*sqrt(11) + 116
05))*(172*sqrt(11) - 715) + 1463*sqrt(11)*(x + 3) + 4389*x - 7315
)/x) - 3*sqrt(5)*sqrt(1/254)*sqrt(sqrt(11)*(4091*sqrt(11) + 11605
))*log(-3/77*(2*sqrt(1/254)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(
4091*sqrt(11) + 11605))*(172*sqrt(11) - 715) - 1463*sqrt(11)*(x +
 3) - 4389*x + 7315)/x) - 22*log(-sqrt(5)*(25*x^2 + 10*x + 8) + 5
*sqrt(5*x^2 + 2*x + 3)*(5*x + 1)))
```

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

$$-\int \frac{5x}{7x^2\sqrt{5x^2+2x+3}-4x\sqrt{5x^2+2x+3}-\sqrt{5x^2+2x+3}}\,dx -\int \frac{x^2}{7x^2\sqrt{5x^2+2x+3}-4x\sqrt{5x^2+2x+3}-\sqrt{5x^2+2x+3}}\,dx -\int \frac{2}{7x^2\sqrt{5x^2+2x+3}-4x\sqrt{5x^2+2x+3}-\sqrt{5x^2+2x+3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x**2+5*x+2)/(-7*x**2+4*x+1)/(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] -Integral(5*x/(7*x**2*sqrt(5*x**2 + 2*x + 3) - 4*x*sqrt(5*x**2 +
2*x + 3) - sqrt(5*x**2 + 2*x + 3)), x) - Integral(x**2/(7*x**2*sq
rt(5*x**2 + 2*x + 3) - 4*x*sqrt(5*x**2 + 2*x + 3) - sqrt(5*x**2 +
 2*x + 3)), x) - Integral(2/(7*x**2*sqrt(5*x**2 + 2*x + 3) - 4*x*
sqrt(5*x**2 + 2*x + 3) - sqrt(5*x**2 + 2*x + 3)), 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 + 5*x + 2)/((7*x^2 - 4*x - 1)*sqrt(5*x^2 + 2*x + 3)),x, algorithm=
```

```
[Out] Exception raised: TypeError
```

3.390 $\int \frac{2+5x+x^2}{(1+4x-7x^2)^2\sqrt{3+2x+5x^2}}\,dx$

Optimal. Leaf size=178

$$-\frac{3\sqrt{5x^2+2x+3}(40-371x)}{5588\left(-7x^2+4x+1\right)}-\frac{\sqrt{\frac{3027900955+14035681\sqrt{11}}{2794}}\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{11176}+\frac{\sqrt{\frac{3027900955-14035681\sqrt{11}}{2794}}\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{11176}$$

```
[Out] (-3*(40 - 371*x)*Sqrt[3 + 2*x + 5*x^2])/(5588*(1 + 4*x - 7*x^2))
- (Sqrt[(3027900955 + 14035681*Sqrt[11])/2794]*ArcTanh[(23 - Sqrt
[11] + (17 - 5*Sqrt[11])*x)/(Sqrt[2*(125 - 17*Sqrt[11])]*Sqrt[3 +
 2*x + 5*x^2])])/11176 + (Sqrt[(3027900955 - 14035681*Sqrt[11])/2
794]*ArcTanh[(23 + Sqrt[11] + (17 + 5*Sqrt[11])*x)/(Sqrt[2*(125 +
 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/11176
```

Rubi [A] time = 0.572585, antiderivative size = 178, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.114

$$-\frac{3\sqrt{5x^2+2x+3}(40-371x)}{5588\left(-7x^2+4x+1\right)}-\frac{\sqrt{\frac{3027900955+14035681\sqrt{11}}{2794}}\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{11176}+\frac{\sqrt{\frac{3027900955-14035681\sqrt{11}}{2794}}\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{11176}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + 5*x + x^2)/((1 + 4*x - 7*x^2)^2*Sqrt[3 + 2*x + 5*x^2]),x]
```



```
[Out] (-3*(40 - 371*x)*Sqrt[3 + 2*x + 5*x^2])/(5588*(1 + 4*x - 7*x^2))
- (Sqrt[(3027900955 + 14035681*Sqrt[11])/2794]*ArcTanh[(23 - Sqrt
[11] + (17 - 5*Sqrt[11])*x)/(Sqrt[2*(125 - 17*Sqrt[11])]*Sqrt[3 +
 2*x + 5*x^2])])/11176 + (Sqrt[(3027900955 - 14035681*Sqrt[11])/2
794]*ArcTanh[(23 + Sqrt[11] + (17 + 5*Sqrt[11])*x)/(Sqrt[2*(125 +
 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/11176
```

Rubi in Sympy [A] time = 59.0784, size = 189, normalized size = 1.06

$$-\frac{(-8904x+960)\sqrt{5x^2+2x+3}}{44704(-7x^2+4x+1)}+\frac{\sqrt{22}\left(-59088\sqrt{11}+848080\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68+20\sqrt{11}\right)-92+4\sqrt{11}\right)}{8\sqrt{-17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{3933952\sqrt{-17\sqrt{11}+125}}-\frac{\sqrt{22}\left(59088\sqrt{11}+848080\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68-20\sqrt{11}\right)-92-4\sqrt{11}\right)}{8\sqrt{17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{3933952\sqrt{17\sqrt{11}+125}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((x**2+5*x+2)/(-7*x**2+4*x+1)**2/(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] -(-8904*x + 960)*sqrt(5*x**2 + 2*x + 3)/(44704*(-7*x**2 + 4*x + 1
)) + sqrt(22)*(-59088*sqrt(11) + 848080)*atanh(sqrt(2)*(x*(-68 +
20*sqrt(11)) - 92 + 4*sqrt(11))/(8*sqrt(-17*sqrt(11) + 125)*sqrt(
5*x**2 + 2*x + 3)))/(3933952*sqrt(-17*sqrt(11) + 125)) - sqrt(22)
*(59088*sqrt(11) + 848080)*atanh(sqrt(2)*(x*(-68 - 20*sqrt(11)) -
 92 - 4*sqrt(11))/(8*sqrt(17*sqrt(11) + 125)*sqrt(5*x**2 + 2*x +
3)))/(3933952*sqrt(17*sqrt(11) + 125))
```

Mathematica [A] time = 1.35632, size = 313, normalized size = 1.76

$$\frac{\frac{48972\sqrt{5x^2+2x+3}x}{-7x^2+4x+1}+\frac{5280\sqrt{5x^2+2x+3}}{7x^2-4x-1}+53005\sqrt{\frac{22}{125+17\sqrt{11}}}\log\left(\sqrt{2750+374\sqrt{11}}\sqrt{5x^2+2x+3}+\left(55+17\sqrt{11}\right)x+23\sqrt{11}+11\right)+}{}$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + 5*x + x^2)/((1 + 4*x - 7*x^2)^2*Sqrt[3 + 2*x + 5*x^2]),x]
```

```
[Out] ((48972*x*Sqrt[3 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2) + (5280*Sqrt[3
 + 2*x + 5*x^2])/(-1 - 4*x + 7*x^2) + Sqrt[2/(125 - 17*Sqrt[11])]
*(-40623 + 53005*Sqrt[11])*ArcTanh[(Sqrt[250 - 34*Sqrt[11]]*Sqrt[
3 + 2*x + 5*x^2])/(-23 + Sqrt[11] + (-17 + 5*Sqrt[11])*x)] - Sqrt
[2/(125 + 17*Sqrt[11])]*(40623 + 53005*Sqrt[11])*Log[2 + Sqrt[11]
 - 7*x] + 40623*Sqrt[2/(125 + 17*Sqrt[11])]*Log[11 + 23*Sqrt[11]
+ (55 + 17*Sqrt[11])*x + Sqrt[2750 + 374*Sqrt[11]]*Sqrt[3 + 2*x +
 5*x^2]] + 53005*Sqrt[22/(125 + 17*Sqrt[11])]*Log[11 + 23*Sqrt[11
] + (55 + 17*Sqrt[11])*x + Sqrt[2750 + 374*Sqrt[11]]*Sqrt[3 + 2*x
 + 5*x^2]])/245872
```

Maple [B] time = 0.028, size = 510, normalized size = 2.9

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+5*x+2)/(-7*x^2+4*x+1)^2/(5*x^2+2*x+3)^(1/2),x)
```

```
[Out] 161/484*11^(1/2)/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+68/
49*11^(1/2)+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11
^(1/2))^(1/2)/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))
*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2))-161/484*11^(1/2)/(2
50-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11^(1/2)+(34/7-1
0/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2))^(1/2)/(245*
(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2
))+250-34*11^(1/2))^(1/2))+(183/44-39/44*11^(1/2))*(-1/49/(250/49
-34/49*11^(1/2))/(x-2/7+1/7*11^(1/2))*(5*(x-2/7+1/7*11^(1/2))^2+(
34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(
1/2)+1/14*(34/7-10/7*11^(1/2))/(250/49-34/49*11^(1/2))/(250-34*11
^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11^(1/2)+(34/7-10/7*11^(
1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2))^(1/2)/(245*(x-2/7+1
/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-3
4*11^(1/2))^(1/2)))+(183/44+39/44*11^(1/2))*(-1/49/(250/49+34/49*
11^(1/2))/(x-2/7-1/7*11^(1/2))*(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10
/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2)+1/
14*(34/7+10/7*11^(1/2))/(250/49+34/49*11^(1/2))/(250+34*11^(1/2))
^(1/2)*arctanh(49/2*(500/49+68/49*11^(1/2)+(34/7+10/7*11^(1/2))*(
x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2))^(1/2)/(245*(x-2/7-1/7*11^(
1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1
/2))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2 + 5\,x + 2}{(7\,x^2 - 4\,x - 1)^2\sqrt{5\,x^2 + 2\,x + 3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^2*sqrt(5*x^2 + 2*x + 3)),x, algorithm
```

```
[Out] integrate((x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^2*sqrt(5*x^2 + 2*x +
 3)), x)
```

Fricas [A] time = 0.28368, size = 497, normalized size = 2.79

$$-\frac{\sqrt{\frac{1}{254}}\left(7\,x^{2}-4\,x-1\right)\sqrt{\sqrt{11}\left(3027900955\,\sqrt{11}+154392491\right)}\log\left(-\frac{2\,\sqrt{\frac{1}{254}}\sqrt{5\,x^{2}+2\,x+3}\sqrt{\sqrt{11}\left(3027900955\,\sqrt{11}+154392491\right)}\left(71796\,\sqrt{11}+56\right.}{1397\,x}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^2*sqrt(5*x^2 + 2*x + 3)),x, algorithm
```

```
[Out] -1/245872*(sqrt(1/254)*(7*x^2 - 4*x - 1)*sqrt(sqrt(11)*(302790095
5*sqrt(11) + 154392491))*log(-1/1397*(2*sqrt(1/254)*sqrt(5*x^2 +
2*x + 3)*sqrt(sqrt(11)*(3027900955*sqrt(11) + 154392491))*(71796*
sqrt(11) + 567523) + 2089614439*sqrt(11)*(x + 3) - 6268843317*x +
 10448072195)/x) - sqrt(1/254)*(7*x^2 - 4*x - 1)*sqrt(sqrt(11)*(3
027900955*sqrt(11) + 154392491))*log(1/1397*(2*sqrt(1/254)*sqrt(5
*x^2 + 2*x + 3)*sqrt(sqrt(11)*(3027900955*sqrt(11) + 154392491))*
(71796*sqrt(11) + 567523) - 2089614439*sqrt(11)*(x + 3) + 6268843
317*x - 10448072195)/x) + sqrt(1/254)*(7*x^2 - 4*x - 1)*sqrt(sqrt
(11)*(3027900955*sqrt(11) - 154392491))*log(1/1397*(2*sqrt(1/254)
*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(3027900955*sqrt(11) - 15439
2491))*(71796*sqrt(11) - 567523) + 2089614439*sqrt(11)*(x + 3) +
6268843317*x - 10448072195)/x) - sqrt(1/254)*(7*x^2 - 4*x - 1)*sq
rt(sqrt(11)*(3027900955*sqrt(11) - 154392491))*log(-1/1397*(2*sqr
t(1/254)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(3027900955*sqrt(11)
 - 154392491))*(71796*sqrt(11) - 567523) - 2089614439*sqrt(11)*(x
 + 3) - 6268843317*x + 10448072195)/x) + 132*sqrt(5*x^2 + 2*x + 3
)*(371*x - 40))/(7*x^2 - 4*x - 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**2+5*x+2)/(-7*x**2+4*x+1)**2/(5*x**2+2*x+3)**(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((x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^2*sqrt(5*x^2 + 2*x + 3)),x, algorithm
```

```
[Out] Exception raised: RuntimeError
```

3.391 $\int \frac{2+5x+x^2}{(1+4x-7x^2)^3\sqrt{3+2x+5x^2}}\,dx$

Optimal. Leaf size=227

$$-\frac{7\sqrt{5x^2+2x+3}(409769-1189370x)}{62451488(-7x^2+4x+1)}-\frac{3(40-371x)\sqrt{5x^2+2x+3}}{11176(-7x^2+4x+1)^2}-\frac{7\left(39370231-2538725\sqrt{11}\right)\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{124902976\sqrt{22\left(125-17\sqrt{11}\right)}}+\frac{7\left(39370231+2538725\sqrt{11}\right)\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{124902976\sqrt{22\left(125+17\sqrt{11}\right)}}$$

```
[Out] (-3*(40 - 371*x)*Sqrt[3 + 2*x + 5*x^2])/(11176*(1 + 4*x - 7*x^2)^
2) - (7*(409769 - 1189370*x)*Sqrt[3 + 2*x + 5*x^2])/(62451488*(1
+ 4*x - 7*x^2)) - (7*(39370231 - 2538725*Sqrt[11])*ArcTanh[(23 -
Sqrt[11] + (17 - 5*Sqrt[11])*x)/(Sqrt[2*(125 - 17*Sqrt[11])]*Sqrt
[3 + 2*x + 5*x^2])])/(124902976*Sqrt[22*(125 - 17*Sqrt[11])]) + (
7*(39370231 + 2538725*Sqrt[11])*ArcTanh[(23 + Sqrt[11] + (17 + 5*
Sqrt[11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])]
)/(124902976*Sqrt[22*(125 + 17*Sqrt[11])])
```

Rubi [A] time = 0.75071, antiderivative size = 227, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 4, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.114$

$$-\frac{7\sqrt{5x^2+2x+3}(409769-1189370x)}{62451488(-7x^2+4x+1)}-\frac{3(40-371x)\sqrt{5x^2+2x+3}}{11176(-7x^2+4x+1)^2}-\frac{7\left(39370231-2538725\sqrt{11}\right)\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{124902976\sqrt{22\left(125-17\sqrt{11}\right)}}+\frac{7\left(39370231+2538725\sqrt{11}\right)\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{124902976\sqrt{22\left(125+17\sqrt{11}\right)}}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + 5*x + x^2)/((1 + 4*x - 7*x^2)^3*Sqrt[3 + 2*x + 5*x^2]),x]
```

```
[Out] (-3*(40 - 371*x)*Sqrt[3 + 2*x + 5*x^2])/(11176*(1 + 4*x - 7*x^2)^
2) - (7*(409769 - 1189370*x)*Sqrt[3 + 2*x + 5*x^2])/(62451488*(1
+ 4*x - 7*x^2)) - (7*(39370231 - 2538725*Sqrt[11])*ArcTanh[(23 -
Sqrt[11] + (17 - 5*Sqrt[11])*x)/(Sqrt[2*(125 - 17*Sqrt[11])]*Sqrt
[3 + 2*x + 5*x^2])])/(124902976*Sqrt[22*(125 - 17*Sqrt[11])]) + (
7*(39370231 + 2538725*Sqrt[11])*ArcTanh[(23 + Sqrt[11] + (17 + 5*
Sqrt[11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])]
)/(124902976*Sqrt[22*(125 + 17*Sqrt[11])])
```

Rubi in Sympy [A] time = 84.272, size = 221, normalized size = 0.97

$$-\frac{(-532837760x + 183576512)\sqrt{5x^2+2x+3}}{3996895232\,(-7x^2+4x+1)} - \frac{(-8904x+960)\sqrt{5x^2+2x+3}}{89408\,(-7x^2+4x+1)^2} + \frac{\sqrt{22}\left(-2274697600\sqrt{11}+35275726976\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68+20\sqrt{11}\right)-92+4\sqrt{11}\right)}{8\sqrt{-17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{351726780416\sqrt{-17\sqrt{11}+125}} - \frac{\sqrt{22}\left(2274697600\sqrt{11}+35275726976\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68-20\sqrt{11}\right)-92-4\sqrt{11}\right)}{8\sqrt{17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{351726780416\sqrt{17\sqrt{11}+125}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((x**2+5*x+2)/(-7*x**2+4*x+1)**3/(5*x**2+2*x+3)**(1/2),x)
```

```
[Out] -(-532837760*x + 183576512)*sqrt(5*x**2 + 2*x + 3)/(3996895232*(-
7*x**2 + 4*x + 1)) - (-8904*x + 960)*sqrt(5*x**2 + 2*x + 3)/(8940
8*(-7*x**2 + 4*x + 1)**2) + sqrt(22)*(-2274697600*sqrt(11) + 3527
5726976)*atanh(sqrt(2)*(x*(-68 + 20*sqrt(11)) - 92 + 4*sqrt(11))/
(8*sqrt(-17*sqrt(11) + 125)*sqrt(5*x**2 + 2*x + 3)))/(35172678041
6*sqrt(-17*sqrt(11) + 125)) - sqrt(22)*(2274697600*sqrt(11) + 352
75726976)*atanh(sqrt(2)*(x*(-68 - 20*sqrt(11)) - 92 - 4*sqrt(11))
/(8*sqrt(17*sqrt(11) + 125)*sqrt(5*x**2 + 2*x + 3)))/(35172678041
6*sqrt(17*sqrt(11) + 125))
```

Mathematica [A] time = 1.80658, size = 371, normalized size = 1.63

$$\frac{\frac{732651920\sqrt{5x^2+2x+3}x}{-7x^2+4x+1} + \frac{547311072\sqrt{5x^2+2x+3}x}{(-7x^2+4x+1)^2} - \frac{59009280\sqrt{5x^2+2x+3}}{(-7x^2+4x+1)^2} + \frac{252417704\sqrt{5x^2+2x+3}}{7x^2-4x-1} + 551183234\sqrt{\frac{22}{125+17\sqrt{11}}}\log\left(\sqrt{2750+374\sqrt{\ldots}}\right.}{\ldots}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(2 + 5*x + x^2)/((1 + 4*x - 7*x^2)^3*Sqrt[3 + 2*x + 5*x^2]),x]
```

```
[Out] ((-59009280*Sqrt[3 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2)^2 + (5473110
72*x*Sqrt[3 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2)^2 + (732651920*x*Sq
rt[3 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2) + (252417704*Sqrt[3 + 2*x
+ 5*x^2])/(-1 - 4*x + 7*x^2) + 14*Sqrt[2/(125 - 17*Sqrt[11])]*(-2
7925975 + 39370231*Sqrt[11])*ArcTanh[(Sqrt[250 - 34*Sqrt[11]]*Sqr
t[3 + 2*x + 5*x^2])/(-23 + Sqrt[11] + (-17 + 5*Sqrt[11])*x)] - 14
*Sqrt[2/(125 + 17*Sqrt[11])]*(27925975 + 39370231*Sqrt[11])*Log[2
 + Sqrt[11] - 7*x] + 390963650*Sqrt[2/(125 + 17*Sqrt[11])]*Log[11
 + 23*Sqrt[11] + (55 + 17*Sqrt[11])*x + Sqrt[2750 + 374*Sqrt[11]]
*Sqrt[3 + 2*x + 5*x^2]] + 551183234*Sqrt[22/(125 + 17*Sqrt[11])]*
Log[11 + 23*Sqrt[11] + (55 + 17*Sqrt[11])*x + Sqrt[2750 + 374*Sqr
t[11]]*Sqrt[3 + 2*x + 5*x^2]])/5495730944
```

Maple [B]   time = 0.029, size = 1194, normalized size = 5.3

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+5*x+2)/(-7*x^2+4*x+1)^3/(5*x^2+2*x+3)^(1/2),x)
```

```
[Out] 3535/21296*11^(1/2)/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+
68/49*11^(1/2)+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34
*11^(1/2))^(1/2)/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/
2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2))-3535/21296*11^(1
/2)/(250-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11^(1/2)+(
34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2))^(1/2)
/(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*1
1^(1/2))+250-34*11^(1/2))^(1/2))-(-3535/1936-273/1936*11^(1/2))*(
-1/49/(250/49+34/49*11^(1/2))/(x-2/7-1/7*11^(1/2))*(5*(x-2/7-1/7*
11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/4
9*11^(1/2))^(1/2)+1/14*(34/7+10/7*11^(1/2))/(250/49+34/49*11^(1/2
))/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+68/49*11^(1/2)+(3
4/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2))^(1/2)/
(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11
^(1/2))+250+34*11^(1/2))^(1/2)))-(-3535/1936+273/1936*11^(1/2))*(
-1/49/(250/49-34/49*11^(1/2))/(x-2/7+1/7*11^(1/2))*(5*(x-2/7+1/7*
11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/4
9*11^(1/2))^(1/2)+1/14*(34/7-10/7*11^(1/2))/(250/49-34/49*11^(1/2
))/(250-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11^(1/2)+(3
4/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2))^(1/2)/
(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11
^(1/2))+250-34*11^(1/2))^(1/2)))-21/968*(-61+13*11^(1/2))*11^(1/2
)*(-1/686/(250/49-34/49*11^(1/2))/(x-2/7+1/7*11^(1/2))^2*(5*(x-2/
```

```
7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/4
9-34/49*11^(1/2))^(1/2)-3/1372*(34/7-10/7*11^(1/2))/(250/49-34/49
*11^(1/2))*(-1/(250/49-34/49*11^(1/2))/(x-2/7+1/7*11^(1/2))*(5*(x
-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+25
0/49-34/49*11^(1/2))^(1/2)+7/2*(34/7-10/7*11^(1/2))/(250/49-34/49
*11^(1/2))/(250-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11^
(1/2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2)
)^(1/2)/(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/
7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2)))+5/98/(250/49-34/49*11^(1
/2))/(250-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11^(1/2)+
(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2))^(1/2
)/(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*
11^(1/2))+250-34*11^(1/2))^(1/2)))-21/968*(61+13*11^(1/2))*11^(1/
2)*(-1/686/(250/49+34/49*11^(1/2))/(x-2/7-1/7*11^(1/2))^2*(5*(x-2
/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/
49+34/49*11^(1/2))^(1/2)-3/1372*(34/7+10/7*11^(1/2))/(250/49+34/4
9*11^(1/2))*(-1/(250/49+34/49*11^(1/2))/(x-2/7-1/7*11^(1/2))*(5*(
x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+2
50/49+34/49*11^(1/2))^(1/2)+7/2*(34/7+10/7*11^(1/2))/(250/49+34/4
9*11^(1/2))/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+68/49*11
^(1/2)+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2
))^(1/2)/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2
/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2)))+5/98/(250/49+34/49*11^(
1/2))/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+68/49*11^(1/2)
+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2))^(1/
2)/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7
*11^(1/2))+250+34*11^(1/2))^(1/2)))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x^2+5\,x+2}{\left(7\,x^2-4\,x-1\right)^3\sqrt{5\,x^2+2\,x+3}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^3*sqrt(5*x^2 + 2*x + 3)),x, algorith
```

```
[Out] -integrate((x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^3*sqrt(5*x^2 + 2*x
+ 3)), x)
```

Fricas [A] time = 0.308363, size = 578, normalized size = 2.55

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^3*sqrt(5*x^2 + 2*x + 3)),x, algorithm
```

```
[Out] -1/2747865472*(sqrt(1/254)*(49*x^4 - 56*x^3 + 2*x^2 + 8*x + 1)*sq
rt(sqrt(11)*(82616280769148425*sqrt(11) + 14123710667056441))*log
(-1/177419*(2*sqrt(1/254)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(82
616280769148425*sqrt(11) + 14123710667056441))*(358684877*sqrt(11
) + 2940638404) + 56946070647292211*sqrt(11)*(x + 3) - 1708382119
41876633*x + 284730353236461055)/x) - sqrt(1/254)*(49*x^4 - 56*x^
3 + 2*x^2 + 8*x + 1)*sqrt(sqrt(11)*(82616280769148425*sqrt(11) +
14123710667056441))*log(1/177419*(2*sqrt(1/254)*sqrt(5*x^2 + 2*x
+ 3)*sqrt(sqrt(11)*(82616280769148425*sqrt(11) + 141237106670564
41))*(358684877*sqrt(11) + 2940638404) - 56946070647292211*sqrt(11
)*(x + 3) + 170838211941876633*x - 284730353236461055)/x) + sqrt(
1/254)*(49*x^4 - 56*x^3 + 2*x^2 + 8*x + 1)*sqrt(sqrt(11)*(8261628
0769148425*sqrt(11) - 14123710667056441))*log(1/177419*(2*sqrt(1/
254)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(82616280769148425*sqrt(
11) - 14123710667056441))*(358684877*sqrt(11) - 2940638404) + 569
46070647292211*sqrt(11)*(x + 3) + 170838211941876633*x - 28473035
3236461055)/x) - sqrt(1/254)*(49*x^4 - 56*x^3 + 2*x^2 + 8*x + 1)*
sqrt(sqrt(11)*(82616280769148425*sqrt(11) - 14123710667056441))*l
og(-1/177419*(2*sqrt(1/254)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(
82616280769148425*sqrt(11) - 14123710667056441))*(358684877*sqrt(
11) - 2940638404) - 56946070647292211*sqrt(11)*(x + 3) - 17083821
1941876633*x + 284730353236461055)/x) + 44*(58279130*x^3 - 533810
41*x^2 - 3071502*x + 3538943)*sqrt(5*x^2 + 2*x + 3))/(49*x^4 - 56
*x^3 + 2*x^2 + 8*x + 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**2+5*x+2)/(-7*x**2+4*x+1)**3/(5*x**2+2*x+3)**(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(-(x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^3*sqrt(5*x^2 + 2*x + 3)),x, algorithm
```

```
[Out] Exception raised: RuntimeError
```

3.392 $\int \frac{(1+4x-7x^2)^3(2+5x+x^2)}{(3+2x+5x^2)^{3/2}} dx$

Optimal. Leaf size=166

$$-\frac{2583293\sqrt{5x^2+2x+3}x^2}{187500}-\frac{3192602\sqrt{5x^2+2x+3}x}{46875}+\frac{15715799\sqrt{5x^2+2x+3}}{156250}+\frac{16(6122807-5338217x)}{546875\sqrt{5x^2+2x+3}}-\frac{343}{150}\sqrt{5x^2+2x+3}x^5-\frac{25921\sqrt{5x^2+2x+3}x^4}{3750}+\frac{393659\sqrt{5x^2+2x+3}x^3}{12500}+\frac{50047657\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{156250\sqrt{5}}$$

```
[Out] (16*(6122807 - 5338217*x))/(546875*Sqrt[3 + 2*x + 5*x^2]) + (1571
5799*Sqrt[3 + 2*x + 5*x^2])/156250 - (3192602*x*Sqrt[3 + 2*x + 5*
x^2])/46875 - (2583293*x^2*Sqrt[3 + 2*x + 5*x^2])/187500 + (39365
9*x^3*Sqrt[3 + 2*x + 5*x^2])/12500 - (25921*x^4*Sqrt[3 + 2*x + 5*
x^2])/3750 - (343*x^5*Sqrt[3 + 2*x + 5*x^2])/150 + (50047657*ArcS
inh[(1 + 5*x)/Sqrt[14]])/(156250*Sqrt[5])
```

Rubi [A] time = 0.390599, antiderivative size = 166, normalized size of antiderivative = 1., number of steps used = 9, number of rules used = 5, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$

$$-\frac{2583293\sqrt{5x^2+2x+3}x^2}{187500}-\frac{3192602\sqrt{5x^2+2x+3}x}{46875}+\frac{15715799\sqrt{5x^2+2x+3}}{156250}+\frac{16(6122807-5338217x)}{546875\sqrt{5x^2+2x+3}}-\frac{343}{150}\sqrt{5x^2+2x+3}x^5-\frac{25921\sqrt{5x^2+2x+3}x^4}{3750}+\frac{393659\sqrt{5x^2+2x+3}x^3}{12500}+\frac{50047657\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{156250\sqrt{5}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 4*x - 7*x^2)^3*(2 + 5*x + x^2))/(3 + 2*x + 5*x^2)^(3/2),x]
```

```
[Out] (16*(6122807 - 5338217*x))/(546875*Sqrt[3 + 2*x + 5*x^2]) + (1571
5799*Sqrt[3 + 2*x + 5*x^2])/156250 - (3192602*x*Sqrt[3 + 2*x + 5*
x^2])/46875 - (2583293*x^2*Sqrt[3 + 2*x + 5*x^2])/187500 + (39365
9*x^3*Sqrt[3 + 2*x + 5*x^2])/12500 - (25921*x^4*Sqrt[3 + 2*x + 5*
x^2])/3750 - (343*x^5*Sqrt[3 + 2*x + 5*x^2])/150 + (50047657*ArcS
inh[(1 + 5*x)/Sqrt[14]])/(156250*Sqrt[5])
```

Rubi in Sympy [A] time = 79.1459, size = 150, normalized size = 0.9

$$\frac{(-152934892741387209600x + 249735114986647570560)\sqrt{5x^2+2x+3}}{1749339307800000000} + \frac{(-16660374360x + 17868488568)(-158670232x^2 - 74284896x + 38173800)\sqrt{5x^2+2x+3}}{34986786156000000} - \frac{(-142100x + 1225644)(-7x^2+4x+1)^2\sqrt{5x^2+2x+3}}{735000} - \frac{(-24x+124)(-7x^2+4x+1)^3}{140\sqrt{5x^2+2x+3}} + \frac{50047657\sqrt{5}\operatorname{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{781250}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((-7*x**2+4*x+1)**3*(x**2+5*x+2)/(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] (-152934892741387209600*x + 249735114986647570560)*sqrt(5*x**2 +
2*x + 3)/1749339307800000000 + (-16660374360*x + 17868488568)*(-1
58670232*x**2 - 74284896*x + 38173800)*sqrt(5*x**2 + 2*x + 3)/349
86786156000000 - (-142100*x + 1225644)*(-7*x**2 + 4*x + 1)**2*sqr
t(5*x**2 + 2*x + 3)/735000 - (-24*x + 124)*(-7*x**2 + 4*x + 1)**3
/(140*sqrt(5*x**2 + 2*x + 3)) + 50047657*sqrt(5)*atanh(sqrt(5)*(1
0*x + 2)/(10*sqrt(5*x**2 + 2*x + 3)))/781250
```

Mathematica [A] time = 0.151487, size = 75, normalized size = 0.45

$$\frac{2102001594\sqrt{5}\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right) - \frac{5(75031250x^7+256821250x^6-897612625x^5+174819575x^4+1795638985x^3-2135143465x^2+1045703388x-3155769618)}{\sqrt{5x^2+2x+3}}}{32812500}$$

Antiderivative was successfully verified.

```
[In] Integrate[((1 + 4*x - 7*x^2)^3*(2 + 5*x + x^2))/(3 + 2*x + 5*x^2)^(3/2),x]
```

```
[Out] ((-5*(-3155769618 + 1045703388*x - 2135143465*x^2 + 1795638985*x^
3 + 174819575*x^4 - 897612625*x^5 + 256821250*x^6 + 75031250*x^7)
)/Sqrt[3 + 2*x + 5*x^2] + 2102001594*Sqrt[5]*ArcSinh[(1 + 5*x)/Sq
rt[14]])/32812500
```

Maple [A] time = 0.037, size = 166, normalized size = 1.

$$\frac{1760497010\,x+352099402}{10937500}\frac{1}{\sqrt{5\,x^{2}+2\,x+3}}+\frac{175268451}{390625}\frac{1}{\sqrt{5\,x^{2}+2\,x+3}}-\frac{50047657\,x}{156250}\frac{1}{\sqrt{5\,x^{2}+2\,x+3}}+\frac{50047657\,\sqrt{5}}{781250}\mathit{Arcsinh}\left(\frac{5\,\sqrt{14}}{14}\left(x+\frac{1}{5}\right)\right)+\frac{61004099\,x^{2}}{187500}\frac{1}{\sqrt{5\,x^{2}+2\,x+3}}-\frac{51303971\,x^{3}}{187500}\frac{1}{\sqrt{5\,x^{2}+2\,x+3}}-\frac{998969\,x^{4}}{37500}\frac{1}{\sqrt{5\,x^{2}+2\,x+3}}+\frac{1025843\,x^{5}}{7500}\frac{1}{\sqrt{5\,x^{2}+2\,x+3}}-\frac{29351\,x^{6}}{750}\frac{1}{\sqrt{5\,x^{2}+2\,x+3}}-\frac{343\,x^{7}}{30}\frac{1}{\sqrt{5\,x^{2}+2\,x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((-7*x^2+4*x+1)^3*(x^2+5*x+2)/(5*x^2+2*x+3)^(3/2),x)
```

```
[Out] 176049701/10937500*(10*x+2)/(5*x^2+2*x+3)^(1/2)+175268451/390625/
(5*x^2+2*x+3)^(1/2)-50047657/156250*x/(5*x^2+2*x+3)^(1/2)+5004765
7/781250*5^(1/2)*arcsinh(5/14*14^(1/2)*(x+1/5))+61004099/187500*x
^2/(5*x^2+2*x+3)^(1/2)-51303971/187500*x^3/(5*x^2+2*x+3)^(1/2)-99
8969/37500*x^4/(5*x^2+2*x+3)^(1/2)+1025843/7500*x^5/(5*x^2+2*x+3)
^(1/2)-29351/750*x^6/(5*x^2+2*x+3)^(1/2)-343/30*x^7/(5*x^2+2*x+3)
^(1/2)
```

Maxima [A] time = 0.769725, size = 200, normalized size = 1.2

$$-\frac{343\,x^{7}}{30\,\sqrt{5\,x^{2}+2\,x+3}}-\frac{29351\,x^{6}}{750\,\sqrt{5\,x^{2}+2\,x+3}}+\frac{1025843\,x^{5}}{7500\,\sqrt{5\,x^{2}+2\,x+3}}-\frac{998969\,x^{4}}{37500\,\sqrt{5\,x^{2}+2\,x+3}}-\frac{51303971\,x^{3}}{187500\,\sqrt{5\,x^{2}+2\,x+3}}+\frac{61004099\,x^{2}}{187500\,\sqrt{5\,x^{2}+2\,x+3}}+\frac{50047657}{781250}\,\sqrt{5}\,\mathrm{arsinh}\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right)-\frac{87141949\,x}{546875\,\sqrt{5\,x^{2}+2\,x+3}}+\frac{525961603}{1093750\,\sqrt{5\,x^{2}+2\,x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)^3*(x^2 + 5*x + 2)/(5*x^2 + 2*x + 3)^(3/2),x, algorith
```

```
[Out] -343/30*x^7/sqrt(5*x^2 + 2*x + 3) - 29351/750*x^6/sqrt(5*x^2 + 2*
x + 3) + 1025843/7500*x^5/sqrt(5*x^2 + 2*x + 3) - 998969/37500*x^
4/sqrt(5*x^2 + 2*x + 3) - 51303971/187500*x^3/sqrt(5*x^2 + 2*x +
3) + 61004099/187500*x^2/sqrt(5*x^2 + 2*x + 3) + 50047657/781250*
sqrt(5)*arcsinh(1/14*sqrt(14)*(5*x + 1)) - 87141949/546875*x/sqrt
(5*x^2 + 2*x + 3) + 525961603/1093750/sqrt(5*x^2 + 2*x + 3)
```

Fricas [A] time = 0.279757, size = 158, normalized size = 0.95

$$-\frac{\sqrt{5}\left(\sqrt{5}\left(75031250\,x^{7}+256821250\,x^{6}-897612625\,x^{5}+174819575\,x^{4}+1795638985\,x^{3}-2135143465\,x^{2}+1045703388\,x-\right.\right.}{32812500\,(5\,x^{}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)^3*(x^2 + 5*x + 2)/(5*x^2 + 2*x + 3)^(3/2),x, algorith
```

```
[Out] -1/32812500*sqrt(5)*(sqrt(5)*(75031250*x^7 + 256821250*x^6 - 8976
12625*x^5 + 174819575*x^4 + 1795638985*x^3 - 2135143465*x^2 + 104
5703388*x - 3155769618)*sqrt(5*x^2 + 2*x + 3) - 1051000797*(5*x^2
 + 2*x + 3)*log(-sqrt(5)*(25*x^2 + 10*x + 8) - 5*sqrt(5*x^2 + 2*x
 + 3)*(5*x + 1)))/(5*x^2 + 2*x + 3)
```

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

$$\begin{aligned}
&-\int\left(-\frac{29x}{5x^2\sqrt{5x^2+2x+3}+2x\sqrt{5x^2+2x+3}+3\sqrt{5x^2+2x+3}}\right)dx\\
&-\int\left(-\frac{115x^2}{5x^2\sqrt{5x^2+2x+3}+2x\sqrt{5x^2+2x+3}+3\sqrt{5x^2+2x+3}}\right)dx\\
&-\int\frac{61x^3}{5x^2\sqrt{5x^2+2x+3}+2x\sqrt{5x^2+2x+3}+3\sqrt{5x^2+2x+3}}\,dx\\
&-\int\frac{871x^4}{5x^2\sqrt{5x^2+2x+3}+2x\sqrt{5x^2+2x+3}+3\sqrt{5x^2+2x+3}}\,dx\\
&-\int\left(-\frac{127x^5}{5x^2\sqrt{5x^2+2x+3}+2x\sqrt{5x^2+2x+3}+3\sqrt{5x^2+2x+3}}\right)dx\\
&-\int\left(-\frac{2065x^6}{5x^2\sqrt{5x^2+2x+3}+2x\sqrt{5x^2+2x+3}+3\sqrt{5x^2+2x+3}}\right)dx\\
&-\int\frac{1127x^7}{5x^2\sqrt{5x^2+2x+3}+2x\sqrt{5x^2+2x+3}+3\sqrt{5x^2+2x+3}}\,dx\\
&-\int\frac{343x^8}{5x^2\sqrt{5x^2+2x+3}+2x\sqrt{5x^2+2x+3}+3\sqrt{5x^2+2x+3}}\,dx\\
&-\int\left(-\frac{2}{5x^2\sqrt{5x^2+2x+3}+2x\sqrt{5x^2+2x+3}+3\sqrt{5x^2+2x+3}}\right)dx
\end{aligned}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-7*x**2+4*x+1)**3*(x**2+5*x+2)/(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] -Integral(-29*x/(5*x**2*sqrt(5*x**2 + 2*x + 3) + 2*x*sqrt(5*x**2
+ 2*x + 3) + 3*sqrt(5*x**2 + 2*x + 3)), x) - Integral(-115*x**2/(
5*x**2*sqrt(5*x**2 + 2*x + 3) + 2*x*sqrt(5*x**2 + 2*x + 3) + 3*sq
rt(5*x**2 + 2*x + 3)), x) - Integral(61*x**3/(5*x**2*sqrt(5*x**2
+ 2*x + 3) + 2*x*sqrt(5*x**2 + 2*x + 3) + 3*sqrt(5*x**2 + 2*x + 3
)), x) - Integral(871*x**4/(5*x**2*sqrt(5*x**2 + 2*x + 3) + 2*x*s
qrt(5*x**2 + 2*x + 3) + 3*sqrt(5*x**2 + 2*x + 3)), x) - Integral(
-127*x**5/(5*x**2*sqrt(5*x**2 + 2*x + 3) + 2*x*sqrt(5*x**2 + 2*x
+ 3) + 3*sqrt(5*x**2 + 2*x + 3)), x) - Integral(-2065*x**6/(5*x**
2*sqrt(5*x**2 + 2*x + 3) + 2*x*sqrt(5*x**2 + 2*x + 3) + 3*sqrt(5*
x**2 + 2*x + 3)), x) - Integral(1127*x**7/(5*x**2*sqrt(5*x**2 + 2
*x + 3) + 2*x*sqrt(5*x**2 + 2*x + 3) + 3*sqrt(5*x**2 + 2*x + 3)),
 x) - Integral(343*x**8/(5*x**2*sqrt(5*x**2 + 2*x + 3) + 2*x*sqrt
(5*x**2 + 2*x + 3) + 3*sqrt(5*x**2 + 2*x + 3)), x) - Integral(-2/
(5*x**2*sqrt(5*x**2 + 2*x + 3) + 2*x*sqrt(5*x**2 + 2*x + 3) + 3*s
qrt(5*x**2 + 2*x + 3)), x)
```

GIAC/XCAS [A] time = 0.281998, size = 109, normalized size = 0.66

$$-\frac{50047657}{781250}\sqrt{5}\ln\left(-\sqrt{5}\left(\sqrt{5}x-\sqrt{5\,x^2+2\,x+3}\right)-1\right)-\frac{(35\,((5\,(35\,(70\,(175\,x+599)x-146549)x+998969)x+51303971)x-61004099)x+1045703388)x-3155769618}{6562500\,\sqrt{5\,x^2+2\,x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)^3*(x^2 + 5*x + 2)/(5*x^2 + 2*x + 3)^(3/2),x, algorithm
```

```
[Out] -50047657/781250*sqrt(5)*ln(-sqrt(5)*(sqrt(5)*x - sqrt(5*x^2 + 2*
x + 3)) - 1) - 1/6562500*((35*((5*(35*(70*(175*x + 599)*x - 14654
9)*x + 998969)*x + 51303971)*x - 61004099)*x + 1045703388)*x - 31
55769618)/sqrt(5*x^2 + 2*x + 3)
```

3.393 $\int \frac{(1+4x-7x^2)^2(2+5x+x^2)}{(3+2x+5x^2)^{3/2}}\,dx$

Optimal. Leaf size=124

$$\frac{203}{100}\sqrt{5x^2+2x+3}\,x^2-\frac{8749\sqrt{5x^2+2x+3}\,x}{1250}-\frac{5086\sqrt{5x^2+2x+3}}{3125}-\frac{8(136602x+12983)}{21875\sqrt{5x^2+2x+3}}+\frac{49}{100}\sqrt{5x^2+2x+3}\,x^3+\frac{89583\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{1250\sqrt{5}}$$

```
[Out] (-8*(12983 + 136602*x))/(21875*Sqrt[3 + 2*x + 5*x^2]) - (5086*Sqr
t[3 + 2*x + 5*x^2])/3125 - (8749*x*Sqrt[3 + 2*x + 5*x^2])/1250 +
(203*x^2*Sqrt[3 + 2*x + 5*x^2])/100 + (49*x^3*Sqrt[3 + 2*x + 5*x^
2])/100 + (89583*ArcSinh[(1 + 5*x)/Sqrt[14]])/(1250*Sqrt[5])
```

Rubi [A] time = 0.266561, antiderivative size = 124, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$

$$\frac{203}{100}\sqrt{5x^2+2x+3}\,x^2-\frac{8749\sqrt{5x^2+2x+3}\,x}{1250}-\frac{5086\sqrt{5x^2+2x+3}}{3125}-\frac{8(136602x+12983)}{21875\sqrt{5x^2+2x+3}}+\frac{49}{100}\sqrt{5x^2+2x+3}\,x^3+\frac{89583\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{1250\sqrt{5}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 4*x - 7*x^2)^2*(2 + 5*x + x^2))/(3 + 2*x + 5*x^2)^(3/2),x]
```


```
[Out] (-8*(12983 + 136602*x))/(21875*Sqrt[3 + 2*x + 5*x^2]) - (5086*Sqr
t[3 + 2*x + 5*x^2])/3125 - (8749*x*Sqrt[3 + 2*x + 5*x^2])/1250 +
(203*x^2*Sqrt[3 + 2*x + 5*x^2])/100 + (49*x^3*Sqrt[3 + 2*x + 5*x^
2])/100 + (89583*ArcSinh[(1 + 5*x)/Sqrt[14]])/(1250*Sqrt[5])
```

Rubi in Sympy [A] time = 53.843, size = 117, normalized size = 0.94

$$-\frac{(-15053186400x+12385729440)\sqrt{5x^2+2x+3}}{999600000}+\frac{(-49980x+185724)\sqrt{5x^2+2x+3}\left(476x^2-3552x+1020\right)}{19992000}-\frac{(-24x+124)\left(-7x^2+4x+1\right)^2}{140\sqrt{5x^2+2x+3}}+\frac{89583\sqrt{5}\operatorname{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{6250}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((-7*x**2+4*x+1)**2*(x**2+5*x+2)/(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] -(-15053186400*x + 12385729440)*sqrt(5*x**2 + 2*x + 3)/999600000
+ (-49980*x + 185724)*sqrt(5*x**2 + 2*x + 3)*(476*x**2 - 3552*x +
 1020)/19992000 - (-24*x + 124)*(-7*x**2 + 4*x + 1)**2/(140*sqrt(
5*x**2 + 2*x + 3)) + 89583*sqrt(5)*atanh(sqrt(5)*(10*x + 2)/(10*s
qrt(5*x**2 + 2*x + 3)))/6250
```

Mathematica [A] time = 0.131883, size = 65, normalized size = 0.52

$$\frac{\frac{5(42875x^5+194775x^4-515655x^3-280805x^2-1298674x-168536)}{\sqrt{5x^2+2x+3}}+1254162\sqrt{5}\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{87500}$$

Antiderivative was successfully verified.

```
[In] Integrate[((1 + 4*x - 7*x^2)^2*(2 + 5*x + x^2))/(3 + 2*x + 5*x^2)^(3/2),x]
```

```
[Out] ((5*(-168536 - 1298674*x - 280805*x^2 - 515655*x^3 + 194775*x^4 +
 42875*x^5))/Sqrt[3 + 2*x + 5*x^2] + 1254162*Sqrt[5]*ArcSinh[(1 +
 5*x)/Sqrt[14]])/87500
```

Maple [A] time = 0.01, size = 132, normalized size = 1.1

$$-\frac{55640\,x+11128}{21875}\frac{1}{\sqrt{5\,x^2+2\,x+3}}-\frac{28506}{3125}\frac{1}{\sqrt{5\,x^2+2\,x+3}}-\frac{89583\,x}{1250}\frac{1}{\sqrt{5\,x^2+2\,x+3}}+\frac{89583\,\sqrt{5}}{6250}Arcsinh\left(\frac{5\,\sqrt{14}}{14}\left(x+\frac{1}{5}\right)\right)-\frac{8023\,x^2}{500}\frac{1}{\sqrt{5\,x^2+2\,x+3}}-\frac{14733\,x^3}{500}\frac{1}{\sqrt{5\,x^2+2\,x+3}}+\frac{1113\,x^4}{100}\frac{1}{\sqrt{5\,x^2+2\,x+3}}+\frac{49\,x^5}{20}\frac{1}{\sqrt{5\,x^2+2\,x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((-7*x^2+4*x+1)^2*(x^2+5*x+2)/(5*x^2+2*x+3)^(3/2),x)
```

```
[Out] -5564/21875*(10*x+2)/(5*x^2+2*x+3)^(1/2)-28506/3125/(5*x^2+2*x+3)
^(1/2)-89583/1250*x/(5*x^2+2*x+3)^(1/2)+89583/6250*5^(1/2)*arcsin
h(5/14*14^(1/2)*(x+1/5))-8023/500*x^2/(5*x^2+2*x+3)^(1/2)-14733/5
00*x^3/(5*x^2+2*x+3)^(1/2)+1113/100*x^4/(5*x^2+2*x+3)^(1/2)+49/20
*x^5/(5*x^2+2*x+3)^(1/2)
```

Maxima [A] time = 0.770751, size = 154, normalized size = 1.24

$$\frac{49\,x^5}{20\,\sqrt{5\,x^2+2\,x+3}}+\frac{1113\,x^4}{100\,\sqrt{5\,x^2+2\,x+3}}-\frac{14733\,x^3}{500\,\sqrt{5\,x^2+2\,x+3}}-\frac{8023\,x^2}{500\,\sqrt{5\,x^2+2\,x+3}}+\frac{89583}{6250}\,\sqrt{5}\,\mathrm{arsinh}\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right)-\frac{649337\,x}{8750\,\sqrt{5\,x^2+2\,x+3}}-\frac{42134}{4375\,\sqrt{5\,x^2+2\,x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((7*x^2 - 4*x - 1)^2*(x^2 + 5*x + 2)/(5*x^2 + 2*x + 3)^(3/2),x, algorithm
```

```
[Out] 49/20*x^5/sqrt(5*x^2 + 2*x + 3) + 1113/100*x^4/sqrt(5*x^2 + 2*x +
 3) - 14733/500*x^3/sqrt(5*x^2 + 2*x + 3) - 8023/500*x^2/sqrt(5*x
^2 + 2*x + 3) + 89583/6250*sqrt(5)*arcsinh(1/14*sqrt(14)*(5*x + 1
)) - 649337/8750*x/sqrt(5*x^2 + 2*x + 3) - 42134/4375/sqrt(5*x^2
+ 2*x + 3)
```

Fricas [A] time = 0.273634, size = 144, normalized size = 1.16

$$\frac{\sqrt{5}\Big(\sqrt{5}\left(42875\,x^5+194775\,x^4-515655\,x^3-280805\,x^2-1298674\,x-168536\right)\sqrt{5\,x^2+2\,x+3}+627081\,\left(5\,x^2+2\,x+3\right)\,\log}{87500\,(5\,x^2+2\,x+3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((7*x^2 - 4*x - 1)^2*(x^2 + 5*x + 2)/(5*x^2 + 2*x + 3)^(3/2),x, algorithm
```

```
[Out] 1/87500*sqrt(5)*(sqrt(5)*(42875*x^5 + 194775*x^4 - 515655*x^3 - 2
80805*x^2 - 1298674*x - 168536)*sqrt(5*x^2 + 2*x + 3) + 627081*(5
*x^2 + 2*x + 3)*log(-sqrt(5)*(25*x^2 + 10*x + 8) - 5*sqrt(5*x^2 +
 2*x + 3)*(5*x + 1)))/(5*x^2 + 2*x + 3)
```

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

$$\int \frac{\left(x^2+5x+2\right)\left(7x^2-4x-1\right)^2}{\left(5x^2+2x+3\right)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((-7*x**2+4*x+1)**2*(x**2+5*x+2)/(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] Integral((x**2 + 5*x + 2)*(7*x**2 - 4*x - 1)**2/(5*x**2 + 2*x + 3
)**(3/2), x)
```

GIAC/XCAS [A] time = 0.280026, size = 96, normalized size = 0.77

$$-\frac{89583}{6250}\sqrt{5}\ln\left(-\sqrt{5}\left(\sqrt{5}x-\sqrt{5x^2+2x+3}\right)-1\right)+\frac{(35((35(35x+159)x-14733)x-8023)x-1298674)x-168536}{17500\sqrt{5x^2+2x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((7*x^2 - 4*x - 1)^2*(x^2 + 5*x + 2)/(5*x^2 + 2*x + 3)^(3/2),x, algorithm
```

```
[Out] -89583/6250*sqrt(5)*ln(-sqrt(5)*(sqrt(5)*x - sqrt(5*x^2 + 2*x + 3
)) - 1) + 1/17500*((35*((35*(35*x + 159)*x - 14733)*x - 8023)*x -
 1298674)*x - 168536)/sqrt(5*x^2 + 2*x + 3)
```

3.394 $\int \frac{(1+4x-7x^2)(2+5x+x^2)}{(3+2x+5x^2)^{3/2}}\,dx$

Optimal. Leaf size=82

$$-\frac{7}{50}\sqrt{5x^2+2x+3}x-\frac{261}{250}\sqrt{5x^2+2x+3}-\frac{2(2449x+2321)}{875\sqrt{5x^2+2x+3}}+\frac{149\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{25\sqrt{5}}$$

```
[Out] (-2*(2321 + 2449*x))/(875*Sqrt[3 + 2*x + 5*x^2]) - (261*Sqrt[3 +
2*x + 5*x^2])/250 - (7*x*Sqrt[3 + 2*x + 5*x^2])/50 + (149*ArcSinh
[(1 + 5*x)/Sqrt[14]])/(25*Sqrt[5])
```

Rubi [A] time = 0.153664, antiderivative size = 82, normalized size of antiderivative = 1., number of steps used = 5, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.152

$$-\frac{7}{50}\sqrt{5x^2+2x+3}x-\frac{261}{250}\sqrt{5x^2+2x+3}-\frac{2(2449x+2321)}{875\sqrt{5x^2+2x+3}}+\frac{149\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{25\sqrt{5}}$$

Antiderivative was successfully verified.

```
[In]  Int[((1 + 4*x - 7*x^2)*(2 + 5*x + x^2))/(3 + 2*x + 5*x^2)^(3/2),x]
```

```
[Out] (-2*(2321 + 2449*x))/(875*Sqrt[3 + 2*x + 5*x^2]) - (261*Sqrt[3 +
2*x + 5*x^2])/250 - (7*x*Sqrt[3 + 2*x + 5*x^2])/50 + (149*ArcSinh
[(1 + 5*x)/Sqrt[14]])/(25*Sqrt[5])
```

Rubi in Sympy [A] time = 28.5168, size = 83, normalized size = 1.01

$$-\frac{(-192x+152)(x^2+5x+2)}{140\sqrt{5x^2+2x+3}}-\frac{(2900x+14620)\sqrt{5x^2+2x+3}}{7000}+\frac{149\sqrt{5}\,\text{atanh}\left(\frac{\sqrt{5}(10x+2)}{10\sqrt{5x^2+2x+3}}\right)}{125}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((-7*x**2+4*x+1)*(x**2+5*x+2)/(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] -(-192*x + 152)*(x**2 + 5*x + 2)/(140*sqrt(5*x**2 + 2*x + 3)) - (
2900*x + 14620)*sqrt(5*x**2 + 2*x + 3)/7000 + 149*sqrt(5)*atanh(s
qrt(5)*(10*x + 2)/(10*sqrt(5*x**2 + 2*x + 3)))/125
```

Mathematica [A] time = 0.0740818, size = 55, normalized size = 0.67

$$\frac{149\sinh^{-1}\left(\frac{5x+1}{\sqrt{14}}\right)}{25\sqrt{5}}-\frac{245x^3+1925x^2+2837x+2953}{350\sqrt{5x^2+2x+3}}$$

Antiderivative was successfully verified.

```
[In] Integrate[((1 + 4*x - 7*x^2)*(2 + 5*x + x^2))/(3 + 2*x + 5*x^2)^(3/2),x]
```

```
[Out] -(2953 + 2837*x + 1925*x^2 + 245*x^3)/(350*Sqrt[3 + 2*x + 5*x^2])
 + (149*ArcSinh[(1 + 5*x)/Sqrt[14]])/(25*Sqrt[5])
```

Maple [A] time = 0.009, size = 98, normalized size = 1.2

$$-\frac{7510\,x+1502}{3500}\frac{1}{\sqrt{5\,x^2+2\,x+3}}-\frac{1001}{125}\frac{1}{\sqrt{5\,x^2+2\,x+3}}-\frac{149\,x}{25}\frac{1}{\sqrt{5\,x^2+2\,x+3}}+\frac{149\,\sqrt{5}}{125}Arcsinh\left(\frac{5\,\sqrt{14}}{14}\left(x+\frac{1}{5}\right)\right)-\frac{11\,x^2}{2}\frac{1}{\sqrt{5\,x^2+2\,x+3}}-\frac{7\,x^3}{10}\frac{1}{\sqrt{5\,x^2+2\,x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((-7*x^2+4*x+1)*(x^2+5*x+2)/(5*x^2+2*x+3)^(3/2),x)
```

```
[Out] -751/3500*(10*x+2)/(5*x^2+2*x+3)^(1/2)-1001/125/(5*x^2+2*x+3)^(1/
2)-149/25*x/(5*x^2+2*x+3)^(1/2)+149/125*5^(1/2)*arcsinh(5/14*14^(
1/2)*(x+1/5))-11/2*x^2/(5*x^2+2*x+3)^(1/2)-7/10*x^3/(5*x^2+2*x+3)
^(1/2)
```

Maxima [A] time = 0.765557, size = 108, normalized size = 1.32

$$-\frac{7\,x^3}{10\,\sqrt{5\,x^2+2\,x+3}}-\frac{11\,x^2}{2\,\sqrt{5\,x^2+2\,x+3}}+\frac{149}{125}\,\sqrt{5}\,\mathrm{arsinh}\left(\frac{1}{14}\,\sqrt{14}(5\,x+1)\right)-\frac{2837\,x}{350\,\sqrt{5\,x^2+2\,x+3}}-\frac{2953}{350\,\sqrt{5\,x^2+2\,x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)*(x^2 + 5*x + 2)/(5*x^2 + 2*x + 3)^(3/2),x, algorithm=
```

```
[Out] -7/10*x^3/sqrt(5*x^2 + 2*x + 3) - 11/2*x^2/sqrt(5*x^2 + 2*x + 3)
+ 149/125*sqrt(5)*arcsinh(1/14*sqrt(14)*(5*x + 1)) - 2837/350*x/s
qrt(5*x^2 + 2*x + 3) - 2953/350/sqrt(5*x^2 + 2*x + 3)
```

Fricas [A] time = 0.272531, size = 131, normalized size = 1.6

$$-\frac{\sqrt{5}\left(\sqrt{5}\left(245\,x^3 + 1925\,x^2 + 2837\,x + 2953\right)\sqrt{5\,x^2 + 2\,x + 3} - 1043\,\left(5\,x^2 + 2\,x + 3\right)\,\log\left(-\sqrt{5}\left(25\,x^2 + 10\,x + 8\right) - 5\,\sqrt{5\,x^2 +}\right.\right.}{1750\,(5\,x^2 + 2\,x + 3)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)*(x^2 + 5*x + 2)/(5*x^2 + 2*x + 3)^(3/2),x, algorithm=
```

```
[Out] -1/1750*sqrt(5)*(sqrt(5)*(245*x^3 + 1925*x^2 + 2837*x + 2953)*sqr
t(5*x^2 + 2*x + 3) - 1043*(5*x^2 + 2*x + 3)*log(-sqrt(5)*(25*x^2
+ 10*x + 8) - 5*sqrt(5*x^2 + 2*x + 3)*(5*x + 1)))/(5*x^2 + 2*x +
3)
```

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

$$-\int\left(-\frac{13x}{5x^2\sqrt{5x^2+2x+3}+2x\sqrt{5x^2+2x+3}+3\sqrt{5x^2+2x+3}}\right)dx$$
$$-\int\left(-\frac{7x^2}{5x^2\sqrt{5x^2+2x+3}+2x\sqrt{5x^2+2x+3}+3\sqrt{5x^2+2x+3}}\right)dx$$
$$-\int\frac{31x^3}{5x^2\sqrt{5x^2+2x+3}+2x\sqrt{5x^2+2x+3}+3\sqrt{5x^2+2x+3}}\,dx$$
$$-\int\frac{7x^4}{5x^2\sqrt{5x^2+2x+3}+2x\sqrt{5x^2+2x+3}+3\sqrt{5x^2+2x+3}}\,dx$$
$$-\int\left(-\frac{2}{5x^2\sqrt{5x^2+2x+3}+2x\sqrt{5x^2+2x+3}+3\sqrt{5x^2+2x+3}}\right)dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((-7*x**2+4*x+1)*(x**2+5*x+2)/(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] -Integral(-13*x/(5*x**2*sqrt(5*x**2 + 2*x + 3) + 2*x*sqrt(5*x**2
+ 2*x + 3) + 3*sqrt(5*x**2 + 2*x + 3)), x) - Integral(-7*x**2/(5*
x**2*sqrt(5*x**2 + 2*x + 3) + 2*x*sqrt(5*x**2 + 2*x + 3) + 3*sqrt
(5*x**2 + 2*x + 3)), x) - Integral(31*x**3/(5*x**2*sqrt(5*x**2 +
2*x + 3) + 2*x*sqrt(5*x**2 + 2*x + 3) + 3*sqrt(5*x**2 + 2*x + 3))
, x) - Integral(7*x**4/(5*x**2*sqrt(5*x**2 + 2*x + 3) + 2*x*sqrt(
```

```
5*x**2 + 2*x + 3) + 3*sqrt(5*x**2 + 2*x + 3)), x) - Integral(-2/(
5*x**2*sqrt(5*x**2 + 2*x + 3) + 2*x*sqrt(5*x**2 + 2*x + 3) + 3*sq
rt(5*x**2 + 2*x + 3)), x)
```

GIAC/XCAS [A] time = 0.277833, size = 84, normalized size = 1.02

$$-\frac{149}{125}\sqrt{5}\ln\left(-\sqrt{5}\left(\sqrt{5}x-\sqrt{5x^2+2x+3}\right)-1\right)-\frac{(35(7x+55)x+2837)x+2953}{350\sqrt{5x^2+2x+3}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(7*x^2 - 4*x - 1)*(x^2 + 5*x + 2)/(5*x^2 + 2*x + 3)^(3/2),x, algorithm=
```

```
[Out] -149/125*sqrt(5)*ln(-sqrt(5)*(sqrt(5)*x - sqrt(5*x^2 + 2*x + 3))
- 1) - 1/350*((35*(7*x + 55)*x + 2837)*x + 2953)/sqrt(5*x^2 + 2*x
 + 3)
```

3.395 $\int \frac{2+5x+x^2}{(1+4x-7x^2)(3+2x+5x^2)^{3/2}}\,dx$

Optimal. Leaf size=166

$$-\frac{131-605x}{3556\sqrt{5x^2+2x+3}}-\frac{3\sqrt{\frac{281693-25015\sqrt{11}}{1397}}\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{1016}+\frac{3\sqrt{\frac{281693+25015\sqrt{11}}{1397}}\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{1016}$$

```
[Out] -(131 - 605*x)/(3556*Sqrt[3 + 2*x + 5*x^2]) - (3*Sqrt[(281693 - 2
5015*Sqrt[11])/1397]*ArcTanh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x
)/(Sqrt[2*(125 - 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/1016 + (3
*Sqrt[(281693 + 25015*Sqrt[11])/1397]*ArcTanh[(23 + Sqrt[11] + (1
7 + 5*Sqrt[11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*
x^2])])/1016
```

Rubi [A] time = 0.489987, antiderivative size = 166, normalized size of antiderivative = 1., number of steps used = 6, number of rules used = 4, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.114

$$-\frac{131-605x}{3556\sqrt{5x^2+2x+3}}-\frac{3\sqrt{\frac{281693-25015\sqrt{11}}{1397}}\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{1016}+\frac{3\sqrt{\frac{281693+25015\sqrt{11}}{1397}}\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{1016}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + 5*x + x^2)/((1 + 4*x - 7*x^2)*(3 + 2*x + 5*x^2)^(3/2)),x]
```

```
[Out] -(131 - 605*x)/(3556*Sqrt[3 + 2*x + 5*x^2]) - (3*Sqrt[(281693 - 2
5015*Sqrt[11])/1397]*ArcTanh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x
)/(Sqrt[2*(125 - 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/1016 + (3
*Sqrt[(281693 + 25015*Sqrt[11])/1397]*ArcTanh[(23 + Sqrt[11] + (1
7 + 5*Sqrt[11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*
x^2])])/1016
```

Rubi in Sympy [A] time = 59.1703, size = 180, normalized size = 1.08

$$-\frac{-4840x+1048}{28448\sqrt{5x^2+2x+3}}+\frac{\sqrt{22}\left(-28224\sqrt{11}+249312\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68+20\sqrt{11}\right)-92+4\sqrt{11}\right)}{8\sqrt{-17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{2503424\sqrt{-17\sqrt{11}+125}}-\frac{\sqrt{22}\left(28224\sqrt{11}+249312\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68-20\sqrt{11}\right)-92-4\sqrt{11}\right)}{8\sqrt{17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{2503424\sqrt{17\sqrt{11}+125}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((x**2+5*x+2)/(-7*x**2+4*x+1)/(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] -(-4840*x + 1048)/(28448*sqrt(5*x**2 + 2*x + 3)) + sqrt(22)*(-282
24*sqrt(11) + 249312)*atanh(sqrt(2)*(x*(-68 + 20*sqrt(11)) - 92 +
 4*sqrt(11))/(8*sqrt(-17*sqrt(11) + 125)*sqrt(5*x**2 + 2*x + 3)))
/(2503424*sqrt(-17*sqrt(11) + 125)) - sqrt(22)*(28224*sqrt(11) +
249312)*atanh(sqrt(2)*(x*(-68 - 20*sqrt(11)) - 92 - 4*sqrt(11))/(
8*sqrt(17*sqrt(11) + 125)*sqrt(5*x**2 + 2*x + 3)))/(2503424*sqrt(
17*sqrt(11) + 125))
```

Mathematica [A] time = 1.88548, size = 278, normalized size = 1.67

$$\frac{\frac{1690370x}{\sqrt{5x^2+2x+3}}-\frac{366014}{\sqrt{5x^2+2x+3}}+1113\sqrt{1397\left(125-17\sqrt{11}\right)}\log\left(\sqrt{250+34\sqrt{11}}\sqrt{5x^2+2x+3}+\left(17+5\sqrt{11}\right)x+\sqrt{11}+23\right)+138}{}$$

Warning: Unable to verify antiderivative.

```
[In] Integrate[(2 + 5*x + x^2)/((1 + 4*x - 7*x^2)*(3 + 2*x + 5*x^2)^(3/2)),x]
```

```
[Out] (-366014/Sqrt[3 + 2*x + 5*x^2] + (1690370*x)/Sqrt[3 + 2*x + 5*x^2
] + 21*Sqrt[127*(125 + 17*Sqrt[11])]*(-66 + 53*Sqrt[11])*ArcTanh[
(Sqrt[250 - 34*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2])/(-23 + Sqrt[11] +
 (-17 + 5*Sqrt[11])*x)] - 21*Sqrt[127*(125 - 17*Sqrt[11])]*(66 +
53*Sqrt[11])*Log[2 + Sqrt[11] - 7*x] + 1386*Sqrt[127*(125 - 17*Sq
rt[11])]*Log[23 + Sqrt[11] + (17 + 5*Sqrt[11])*x + Sqrt[250 + 34*
Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2]] + 1113*Sqrt[1397*(125 - 17*Sqrt[
11])]*Log[23 + Sqrt[11] + (17 + 5*Sqrt[11])*x + Sqrt[250 + 34*Sqr
t[11]]*Sqrt[3 + 2*x + 5*x^2]])/9935464
```

Maple [B] time = 0.023, size = 489, normalized size = 3.

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+5*x+2)/(-7*x^2+4*x+1)/(5*x^2+2*x+3)^(3/2),x)
```

```
[Out] -1/196*(10*x+2)/(5*x^2+2*x+3)^(1/2)-3/154*(-61+13*11^(1/2))*11^(1
/2)*(1/7/(250/49-34/49*11^(1/2))/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-
10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)-
1/7*(34/7-10/7*11^(1/2))/(250/49-34/49*11^(1/2))*(10*x+2)/(5000/4
9-680/49*11^(1/2)-(34/7-10/7*11^(1/2))^2)/(5*(x-2/7+1/7*11^(1/2))
^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2
))^(1/2)-1/(250/49-34/49*11^(1/2))/(250-34*11^(1/2))^(1/2)*arctan
h(49/2*(500/49-68/49*11^(1/2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^
(1/2)))/(250-34*11^(1/2))^(1/2)/(245*(x-2/7+1/7*11^(1/2))^2+49*(3
4/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2)))-
3/154*(61+13*11^(1/2))*11^(1/2)*(1/7/(250/49+34/49*11^(1/2))/(5*(
x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+2
50/49+34/49*11^(1/2))^(1/2)-1/7*(34/7+10/7*11^(1/2))/(250/49+34/4
9*11^(1/2))*(10*x+2)/(5000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2)
)^2)/(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11
^(1/2))+250/49+34/49*11^(1/2))^(1/2)-1/(250/49+34/49*11^(1/2))/(2
50+34*11^(1/2))^(1/2)*arctanh(49/2*(500/49+68/49*11^(1/2)+(34/7+1
0/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2))^(1/2)/(245*
(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2
))+250+34*11^(1/2))^(1/2)))
```

Maxima [A] time = 0.812194, size = 1049, normalized size = 6.32

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate(-(x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)*(5*x^2 + 2*x + 3)^(3/2)),x, algorithm
```

```
[Out] -1/4312*sqrt(11)*(20*sqrt(11)*x/sqrt(5*x^2 + 2*x + 3) - 7890*sqrt
(11)*x/(17*sqrt(11)*sqrt(5*x^2 + 2*x + 3) + 125*sqrt(5*x^2 + 2*x
+ 3)) + 7890*sqrt(11)*x/(17*sqrt(11)*sqrt(5*x^2 + 2*x + 3) - 125*
sqrt(5*x^2 + 2*x + 3)) - 13377*sqrt(11)*sqrt(2)*arcsinh(5/7*sqrt(
11)*sqrt(7)*sqrt(2)*x/abs(14*x - 2*sqrt(11) - 4) + 17/7*sqrt(7)*s
qrt(2)*x/abs(14*x - 2*sqrt(11) - 4) + 1/7*sqrt(11)*sqrt(7)*sqrt(2
)/abs(14*x - 2*sqrt(11) - 4) + 23/7*sqrt(7)*sqrt(2)/abs(14*x - 2*
sqrt(11) - 4))/(17*sqrt(11) + 125)^(3/2) + 4*sqrt(11)/sqrt(5*x^2
+ 2*x + 3) - 26280*x/(17*sqrt(11)*sqrt(5*x^2 + 2*x + 3) + 125*sqr
t(5*x^2 + 2*x + 3)) - 26280*x/(17*sqrt(11)*sqrt(5*x^2 + 2*x + 3)
```

```
- 125*sqrt(5*x^2 + 2*x + 3)) + 156*sqrt(11)*arcsinh(5/7*sqrt(11)*
sqrt(7)*sqrt(2)*x/abs(14*x + 2*sqrt(11) - 4) - 17/7*sqrt(7)*sqrt(
2)*x/abs(14*x + 2*sqrt(11) - 4) + 1/7*sqrt(11)*sqrt(7)*sqrt(2)/ab
s(14*x + 2*sqrt(11) - 4) - 23/7*sqrt(7)*sqrt(2)/abs(14*x + 2*sqrt
(11) - 4))/(-34/49*sqrt(11) + 250/49)^(3/2) - 62769*sqrt(2)*arcsi
nh(5/7*sqrt(11)*sqrt(7)*sqrt(2)*x/abs(14*x - 2*sqrt(11) - 4) + 17
/7*sqrt(7)*sqrt(2)*x/abs(14*x - 2*sqrt(11) - 4) + 1/7*sqrt(11)*sq
rt(7)*sqrt(2)/abs(14*x - 2*sqrt(11) - 4) + 23/7*sqrt(7)*sqrt(2)/a
bs(14*x - 2*sqrt(11) - 4))/(17*sqrt(11) + 125)^(3/2) + 2244*sqrt(
11)/(17*sqrt(11)*sqrt(5*x^2 + 2*x + 3) + 125*sqrt(5*x^2 + 2*x + 3
)) - 2244*sqrt(11)/(17*sqrt(11)*sqrt(5*x^2 + 2*x + 3) - 125*sqrt(
5*x^2 + 2*x + 3)) - 732*arcsinh(5/7*sqrt(11)*sqrt(7)*sqrt(2)*x/ab
s(14*x + 2*sqrt(11) - 4) - 17/7*sqrt(7)*sqrt(2)*x/abs(14*x + 2*sq
rt(11) - 4) + 1/7*sqrt(11)*sqrt(7)*sqrt(2)/abs(14*x + 2*sqrt(11)
- 4) - 23/7*sqrt(7)*sqrt(2)/abs(14*x + 2*sqrt(11) - 4))/(-34/49*s
qrt(11) + 250/49)^(3/2) + 12678/(17*sqrt(11)*sqrt(5*x^2 + 2*x + 3
) + 125*sqrt(5*x^2 + 2*x + 3)) + 12678/(17*sqrt(11)*sqrt(5*x^2 +
2*x + 3) - 125*sqrt(5*x^2 + 2*x + 3)))
```

Fricas [A] time = 0.283681, size = 494, normalized size = 2.98

$$-\frac{21\sqrt{\frac{1}{127}}\left(5x^2+2x+3\right)\sqrt{\sqrt{11}\left(281693\sqrt{11}-275165\right)}\log\left(-\frac{3\left(\sqrt{\frac{1}{127}}\sqrt{5x^2+2x+3}\sqrt{\sqrt{11}\left(281693\sqrt{11}-275165\right)}\left(1335\sqrt{11}+8173\right)+185801\sqrt{1}\right.}{1397x}\right.}{}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)*(5*x^2 + 2*x + 3)^(3/2)),x, algorith
```

```
[Out] -1/156464*(21*sqrt(1/127)*(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(281693
*sqrt(11) - 275165))*log(-3/1397*(sqrt(1/127)*sqrt(5*x^2 + 2*x +
3)*sqrt(sqrt(11)*(281693*sqrt(11) - 275165))*(1335*sqrt(11) + 817
3) + 185801*sqrt(11)*(x + 3) - 557403*x + 929005)/x) - 21*sqrt(1/
127)*(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(281693*sqrt(11) - 275165))*
log(3/1397*(sqrt(1/127)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(2816
93*sqrt(11) - 275165))*(1335*sqrt(11) + 8173) - 185801*sqrt(11)*(
x + 3) + 557403*x - 929005)/x) + 21*sqrt(1/127)*(5*x^2 + 2*x + 3)
*sqrt(sqrt(11)*(281693*sqrt(11) + 275165))*log(3/1397*(sqrt(1/127
)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(281693*sqrt(11) + 275165))
*(1335*sqrt(11) - 8173) + 185801*sqrt(11)*(x + 3) + 557403*x - 92
9005)/x) - 21*sqrt(1/127)*(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(281693
*sqrt(11) + 275165))*log(-3/1397*(sqrt(1/127)*sqrt(5*x^2 + 2*x +
3)*sqrt(sqrt(11)*(281693*sqrt(11) + 275165))*(1335*sqrt(11) - 817
3) - 185801*sqrt(11)*(x + 3) - 557403*x + 929005)/x) - 44*sqrt(5*
x^2 + 2*x + 3)*(605*x - 131))/(5*x^2 + 2*x + 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**2+5*x+2)/(-7*x**2+4*x+1)/(5*x**2+2*x+3)**(3/2),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(-(x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)*(5*x^2 + 2*x + 3)^(3/2)),x, algorith
```

```
[Out] Exception raised: RuntimeError
```

3.396 $\int \frac{2+5x+x^2}{(1+4x-7x^2)^2(3+2x+5x^2)^{3/2}}\,dx$

Optimal. Leaf size=215

$$-\frac{3(40-371x)}{5588\left(-7x^2+4x+1\right)\sqrt{5x^2+2x+3}}-\frac{22755x+76567}{19870928\sqrt{5x^2+2x+3}}-\frac{7\left(541543-5144\sqrt{11}\right)\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{2838704\sqrt{22\left(125-17\sqrt{11}\right)}}+\frac{7\left(541543+5144\sqrt{11}\right)\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{2838704\sqrt{22\left(125+17\sqrt{11}\right)}}$$

```
[Out] -(76567 + 22755*x)/(19870928*Sqrt[3 + 2*x + 5*x^2]) - (3*(40 - 37
1*x))/(5588*(1 + 4*x - 7*x^2)*Sqrt[3 + 2*x + 5*x^2]) - (7*(541543
 - 5144*Sqrt[11])*ArcTanh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)/(
Sqrt[2*(125 - 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2])])/(2838704*Sqr
t[22*(125 - 17*Sqrt[11])]) + (7*(541543 + 5144*Sqrt[11])*ArcTanh[
(23 + Sqrt[11] + (17 + 5*Sqrt[11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])
]*Sqrt[3 + 2*x + 5*x^2])])/(2838704*Sqrt[22*(125 + 17*Sqrt[11])])
```

Rubi [A] time = 0.863155, antiderivative size = 215, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 4, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.114$

$$-\frac{3(40-371x)}{5588\left(-7x^2+4x+1\right)\sqrt{5x^2+2x+3}}-\frac{22755x+76567}{19870928\sqrt{5x^2+2x+3}}-\frac{7\left(541543-5144\sqrt{11}\right)\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{2838704\sqrt{22\left(125-17\sqrt{11}\right)}}+\frac{7\left(541543+5144\sqrt{11}\right)\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{2838704\sqrt{22\left(125+17\sqrt{11}\right)}}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + 5*x + x^2)/((1 + 4*x - 7*x^2)^2*(3 + 2*x + 5*x^2)^(3/2)),x]
```

```
[Out] -(76567 + 22755*x)/(19870928*Sqrt[3 + 2*x + 5*x^2]) - (3*(40 - 37
1*x))/(5588*(1 + 4*x - 7*x^2)*Sqrt[3 + 2*x + 5*x^2]) - (7*(541543
 - 5144*Sqrt[11])*ArcTanh[(23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)/(
Sqrt[2*(125 - 17*Sqrt[11])]*Sqrt[3 + 2*x + 5*x^2]])/(2838704*Sqr
t[22*(125 - 17*Sqrt[11])]) + (7*(541543 + 5144*Sqrt[11])*ArcTanh[
(23 + Sqrt[11] + (17 + 5*Sqrt[11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])
]*Sqrt[3 + 2*x + 5*x^2]])/(2838704*Sqrt[22*(125 + 17*Sqrt[11])])
```

Rubi in Sympy [A] time = 81.6369, size = 211, normalized size = 0.98

$$-\frac{-8904x+960}{44704\left(-7x^2+4x+1\right)\sqrt{5x^2+2x+3}}-\frac{1456320x+4900288}{1271739392\sqrt{5x^2+2x+3}}+\frac{\sqrt{22}\left(-64526336\sqrt{11}+6793115392\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68+20\sqrt{11}\right)-92+4\sqrt{11}\right)}{8\sqrt{-17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{111913066496\sqrt{-17\sqrt{11}+125}}-\frac{\sqrt{22}\left(64526336\sqrt{11}+6793115392\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68-20\sqrt{11}\right)-92-4\sqrt{11}\right)}{8\sqrt{17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{111913066496\sqrt{17\sqrt{11}+125}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((x**2+5*x+2)/(-7*x**2+4*x+1)**2/(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] -(-8904*x + 960)/(44704*(-7*x**2 + 4*x + 1)*sqrt(5*x**2 + 2*x + 3
)) - (1456320*x + 4900288)/(1271739392*sqrt(5*x**2 + 2*x + 3)) +
sqrt(22)*(-64526336*sqrt(11) + 6793115392)*atanh(sqrt(2)*(x*(-68
+ 20*sqrt(11)) - 92 + 4*sqrt(11))/(8*sqrt(-17*sqrt(11) + 125)*sqr
t(5*x**2 + 2*x + 3)))/(111913066496*sqrt(-17*sqrt(11) + 125)) - s
qrt(22)*(64526336*sqrt(11) + 6793115392)*atanh(sqrt(2)*(x*(-68 -
20*sqrt(11)) - 92 - 4*sqrt(11))/(8*sqrt(17*sqrt(11) + 125)*sqrt(5
*x**2 + 2*x + 3)))/(111913066496*sqrt(17*sqrt(11) + 125))
```

Mathematica [A] time = 1.72036, size = 351, normalized size = 1.63

$$\frac{\frac{5084772\sqrt{5x^2+2x+3}x}{-7x^2+4x+1}+\frac{24422640x}{7\sqrt{5x^2+2x+3}}+\frac{12968296}{7\sqrt{5x^2+2x+3}}+\frac{1672044\sqrt{5x^2+2x+3}}{7x^2-4x-1}+7581602\sqrt{\frac{22}{125+17\sqrt{11}}}\log\left(\sqrt{2750+374\sqrt{11}}\sqrt{5x^2+2x+3}+\left(\right.\right.}{}$$

Antiderivative was successfully verified.

```
[In]  Integrate[(2 + 5*x + x^2)/((1 + 4*x - 7*x^2)^2*(3 + 2*x + 5*x^2)^(3/2)),x]
```

```
[Out] (12968296/(7*Sqrt[3 + 2*x + 5*x^2]) + (24422640*x)/(7*Sqrt[3 + 2*
x + 5*x^2]) + (5084772*x*Sqrt[3 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2)
 + (1672044*Sqrt[3 + 2*x + 5*x^2])/(-1 - 4*x + 7*x^2) + 14*Sqrt[2
/(125 - 17*Sqrt[11])]*(-56584 + 541543*Sqrt[11])*ArcTanh[(Sqrt[25
0 - 34*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2])/(-23 + Sqrt[11] + (-17 +
5*Sqrt[11])*x)] - 14*Sqrt[2/(125 + 17*Sqrt[11])]*(56584 + 541543*
Sqrt[11])*Log[2 + Sqrt[11] - 7*x] + 792176*Sqrt[2/(125 + 17*Sqrt[
11])]*Log[11 + 23*Sqrt[11] + (55 + 17*Sqrt[11])*x + Sqrt[2750 + 3
74*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2]] + 7581602*Sqrt[22/(125 + 17*S
qrt[11])]*Log[11 + 23*Sqrt[11] + (55 + 17*Sqrt[11])*x + Sqrt[2750
 + 374*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2]])/124902976
```

Maple [B] time = 0.029, size = 1214, normalized size = 5.7

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+5*x+2)/(-7*x^2+4*x+1)^2/(5*x^2+2*x+3)^(3/2),x)
```

```
[Out] -161/484*11^(1/2)*(1/7/(250/49+34/49*11^(1/2))/(5*(x-2/7-1/7*11^(
1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11
^(1/2))^(1/2)-1/7*(34/7+10/7*11^(1/2))/(250/49+34/49*11^(1/2))*(1
0*x+2)/(5000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2))^2)/(5*(x-2/7
-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49
+34/49*11^(1/2))^(1/2)-1/(250/49+34/49*11^(1/2))/(250+34*11^(1/2)
)^(1/2)*arctanh(49/2*(500/49+68/49*11^(1/2)+(34/7+10/7*11^(1/2))*
(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2))^(1/2)/(245*(x-2/7-1/7*11^
(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(
1/2))^(1/2)))+161/484*11^(1/2)*(1/7/(250/49-34/49*11^(1/2))/(5*(x
-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+25
0/49-34/49*11^(1/2))^(1/2)-1/7*(34/7-10/7*11^(1/2))/(250/49-34/49
*11^(1/2))*(10*x+2)/(5000/49-680/49*11^(1/2)-(34/7-10/7*11^(1/2))
^2)/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^
(1/2))+250/49-34/49*11^(1/2))^(1/2)-1/(250/49-34/49*11^(1/2))/(25
0-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11^(1/2)+(34/7-10
/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2))^(1/2)/(245*(
x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)
)+250-34*11^(1/2))^(1/2)))+(183/44-39/44*11^(1/2))*(-1/49/(250/49
-34/49*11^(1/2))/(x-2/7+1/7*11^(1/2))/(5*(x-2/7+1/7*11^(1/2))^2+(
34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(
1/2)-3/98*(34/7-10/7*11^(1/2))/(250/49-34/49*11^(1/2))*(1/(250/49
-34/49*11^(1/2))/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(
x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)-(34/7-10/7*11^(1
/2))/(250/49-34/49*11^(1/2))*(10*x+2)/(5000/49-680/49*11^(1/2)-(3
4/7-10/7*11^(1/2))^2)/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/
2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)-7/(250/49-3
```

```
4/49*11^(1/2))/(250-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49
*11^(1/2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(
1/2))^(1/2)/(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(
x-2/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2)))-20/49/(250/49-34/49*
11^(1/2))*(10*x+2)/(5000/49-680/49*11^(1/2)-(34/7-10/7*11^(1/2))^
2)/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(
1/2))+250/49-34/49*11^(1/2))^(1/2))+(183/44+39/44*11^(1/2))*(-1/4
9/(250/49+34/49*11^(1/2))/(x-2/7-1/7*11^(1/2))/(5*(x-2/7-1/7*11^(
1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11
^(1/2))^(1/2)-3/98*(34/7+10/7*11^(1/2))/(250/49+34/49*11^(1/2))*(
1/(250/49+34/49*11^(1/2))/(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11
^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2)-(34/7+1
0/7*11^(1/2))/(250/49+34/49*11^(1/2))*(10*x+2)/(5000/49+680/49*11
^(1/2)-(34/7+10/7*11^(1/2))^2)/(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10
/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2)-7/
(250/49+34/49*11^(1/2))/(250+34*11^(1/2))^(1/2)*arctanh(49/2*(500
/49+68/49*11^(1/2)+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))/(25
0+34*11^(1/2))^(1/2)/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/7*11
^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2)))-20/49/(250/
49+34/49*11^(1/2))*(10*x+2)/(5000/49+680/49*11^(1/2)-(34/7+10/7*1
1^(1/2))^2)/(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7
-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2))
```

<u>Maxima</u> [F] time = 0., size = 0, normalized size = 0.

$$\int \frac{x^2 + 5x + 2}{(7x^2 - 4x - 1)^2 (5x^2 + 2x + 3)^{\frac{3}{2}}}\, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^2*(5*x^2 + 2*x + 3)^(3/2)),x, algorit
```

```
[Out] integrate((x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^2*(5*x^2 + 2*x + 3)^
(3/2)), x)
```

<u>Fricas</u> [A] time = 0.303646, size = 575, normalized size = 2.67

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^2*(5*x^2 + 2*x + 3)^(3/2)),x, algorit
```

```
[Out] -1/874320832*(7*sqrt(1/127)*(35*x^4 - 6*x^3 + 8*x^2 - 14*x - 3)*s
qrt(sqrt(11)*(35653135368317*sqrt(11) + 47235031954715))*log(-1/1
```

```
77419*(sqrt(1/127)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(356531353
68317*sqrt(11) + 47235031954715))*(5609479*sqrt(11) + 77949905) +
 22559286961981*sqrt(11)*(x + 3) - 67677860885943*x + 11279643480
9905)/x) - 7*sqrt(1/127)*(35*x^4 - 6*x^3 + 8*x^2 - 14*x - 3)*sqrt
(sqrt(11)*(35653135368317*sqrt(11) + 47235031954715))*log(1/17741
9*(sqrt(1/127)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(3565313536831
7*sqrt(11) + 47235031954715))*(5609479*sqrt(11) + 77949905) - 225
59286961981*sqrt(11)*(x + 3) + 67677860885943*x - 112796434809905
)/x) + 7*sqrt(1/127)*(35*x^4 - 6*x^3 + 8*x^2 - 14*x - 3)*sqrt(sqr
t(11)*(35653135368317*sqrt(11) - 47235031954715))*log(1/177419*(s
qrt(1/127)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(35653135368317*sq
rt(11) - 47235031954715))*(5609479*sqrt(11) - 77949905) + 2255928
6961981*sqrt(11)*(x + 3) + 67677860885943*x - 112796434809905)/x)
 - 7*sqrt(1/127)*(35*x^4 - 6*x^3 + 8*x^2 - 14*x - 3)*sqrt(sqrt(11
)*(35653135368317*sqrt(11) - 47235031954715))*log(-1/177419*(sqrt
(1/127)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(35653135368317*sqrt(
11) - 47235031954715))*(5609479*sqrt(11) - 77949905) - 2255928696
1981*sqrt(11)*(x + 3) - 67677860885943*x + 112796434809905)/x) +
44*(159285*x^3 + 444949*x^2 + 3628805*x - 503287)*sqrt(5*x^2 + 2*
x + 3))/(35*x^4 - 6*x^3 + 8*x^2 - 14*x - 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**2+5*x+2)/(-7*x**2+4*x+1)**2/(5*x**2+2*x+3)**(3/2),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((x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^2*(5*x^2 + 2*x + 3)^(3/2)),x, algorit
```

```
[Out] Exception raised: RuntimeError
```

3.397 $\int \frac{2+5x+x^2}{(1+4x-7x^2)^3(3+2x+5x^2)^{3/2}}\,dx$

Optimal. Leaf size=250

$$-\frac{2701733-9148874x}{62451488\left(-7x^2+4x+1\right)\sqrt{5x^2+2x+3}}-\frac{5(1118731375x+461370781)}{222077491328\sqrt{5x^2+2x+3}}-\frac{3(40-371x)}{11176\left(-7x^2+4x+1\right)^2\sqrt{5x^2+2x+3}}-\frac{7\left(2792860024-84865895\sqrt{11}\right)\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{31725355904\sqrt{22\left(125-17\sqrt{11}\right)}}+\frac{7\left(2792860024+84865895\sqrt{11}\right)\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{31725355904\sqrt{22\left(125+17\sqrt{11}\right)}}$$

```
[Out] (-5*(461370781 + 1118731375*x))/(222077491328*Sqrt[3 + 2*x + 5*x^
2]) - (3*(40 - 371*x))/(11176*(1 + 4*x - 7*x^2)^2*Sqrt[3 + 2*x +
5*x^2]) - (2701733 - 9148874*x)/(62451488*(1 + 4*x - 7*x^2)*Sqrt[
3 + 2*x + 5*x^2]) - (7*(2792860024 - 84865895*Sqrt[11])*ArcTanh[(
23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)/(Sqrt[2*(125 - 17*Sqrt[11])]
*Sqrt[3 + 2*x + 5*x^2])])/(31725355904*Sqrt[22*(125 - 17*Sqrt[11]
)]) + (7*(2792860024 + 84865895*Sqrt[11])*ArcTanh[(23 + Sqrt[11]
+ (17 + 5*Sqrt[11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x
+ 5*x^2])])/(31725355904*Sqrt[22*(125 + 17*Sqrt[11])])
```

Rubi [A] time = 0.789087, antiderivative size = 250, normalized size of antiderivative = 1., number

of steps used = 8, number of rules used = 4, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.114$

$$-\frac{2701733-9148874x}{62451488\left(-7x^2+4x+1\right)\sqrt{5x^2+2x+3}}-\frac{5(1118731375x+461370781)}{222077491328\sqrt{5x^2+2x+3}}-\frac{3(40-371x)}{11176\left(-7x^2+4x+1\right)^2\sqrt{5x^2+2x+3}}-\frac{7\left(2792860024-84865895\sqrt{11}\right)\tanh^{-1}\left(\frac{\left(17-5\sqrt{11}\right)x-\sqrt{11}+23}{\sqrt{2\left(125-17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{31725355904\sqrt{22\left(125-17\sqrt{11}\right)}}+\frac{7\left(2792860024+84865895\sqrt{11}\right)\tanh^{-1}\left(\frac{\left(17+5\sqrt{11}\right)x+\sqrt{11}+23}{\sqrt{2\left(125+17\sqrt{11}\right)}\sqrt{5x^2+2x+3}}\right)}{31725355904\sqrt{22\left(125+17\sqrt{11}\right)}}$$

Antiderivative was successfully verified.

```
[In]  Int[(2 + 5*x + x^2)/((1 + 4*x - 7*x^2)^3*(3 + 2*x + 5*x^2)^(3/2)),x]
```

```
[Out] (-5*(461370781 + 1118731375*x))/(222077491328*Sqrt[3 + 2*x + 5*x^
2]) - (3*(40 - 371*x))/(11176*(1 + 4*x - 7*x^2)^2*Sqrt[3 + 2*x +
5*x^2]) - (2701733 - 9148874*x)/(62451488*(1 + 4*x - 7*x^2)*Sqrt[
3 + 2*x + 5*x^2]) - (7*(2792860024 - 84865895*Sqrt[11])*ArcTanh[(
23 - Sqrt[11] + (17 - 5*Sqrt[11])*x)/(Sqrt[2*(125 - 17*Sqrt[11])]
*Sqrt[3 + 2*x + 5*x^2])])/(31725355904*Sqrt[22*(125 - 17*Sqrt[11]
)]) + (7*(2792860024 + 84865895*Sqrt[11])*ArcTanh[(23 + Sqrt[11]
+ (17 + 5*Sqrt[11])*x)/(Sqrt[2*(125 + 17*Sqrt[11])]*Sqrt[3 + 2*x
+ 5*x^2])])/(31725355904*Sqrt[22*(125 + 17*Sqrt[11])])
```

Rubi in Sympy [A] time = 105.5, size = 243, normalized size = 0.97

$$-\frac{-585527936x+172910912}{3996895232\left(-7x^2+4x+1\right)\sqrt{5x^2+2x+3}}-\frac{-8904x+960}{89408\left(-7x^2+4x+1\right)^2\sqrt{5x^2+2x+3}}-\frac{2863952320000x+1181109199360}{113703675559936\sqrt{5x^2+2x+3}}+\frac{\sqrt{22}\left(-8516462295040\sqrt{11}+280269089128448\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68+20\sqrt{11}\right)-92+4\sqrt{11}\right)}{8\sqrt{-17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{10005923449274368\sqrt{-17\sqrt{11}+125}}-\frac{\sqrt{22}\left(8516462295040\sqrt{11}+280269089128448\right)\operatorname{atanh}\left(\frac{\sqrt{2}\left(x\left(-68-20\sqrt{11}\right)-92-4\sqrt{11}\right)}{8\sqrt{17\sqrt{11}+125}\sqrt{5x^2+2x+3}}\right)}{10005923449274368\sqrt{17\sqrt{11}+125}}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] rubi_integrate((x**2+5*x+2)/(-7*x**2+4*x+1)**3/(5*x**2+2*x+3)**(3/2),x)
```

```
[Out] -(-585527936*x + 172910912)/(3996895232*(-7*x**2 + 4*x + 1)*sqrt(
5*x**2 + 2*x + 3)) - (-8904*x + 960)/(89408*(-7*x**2 + 4*x + 1)**
2*sqrt(5*x**2 + 2*x + 3)) - (2863952320000*x + 1181109199360)/(11
3703675559936*sqrt(5*x**2 + 2*x + 3)) + sqrt(22)*(-8516462295040*
sqrt(11) + 280269089128448)*atanh(sqrt(2)*(x*(-68 + 20*sqrt(11))
- 92 + 4*sqrt(11))/(8*sqrt(-17*sqrt(11) + 125)*sqrt(5*x**2 + 2*x
+ 3)))/(10005923449274368*sqrt(-17*sqrt(11) + 125)) - sqrt(22)*(8
516462295040*sqrt(11) + 280269089128448)*atanh(sqrt(2)*(x*(-68 -
20*sqrt(11)) - 92 - 4*sqrt(11))/(8*sqrt(17*sqrt(11) + 125)*sqrt(5
*x**2 + 2*x + 3)))/(10005923449274368*sqrt(17*sqrt(11) + 125))
```

Mathematica [A] time = 1.7995, size = 381, normalized size = 1.52

$$\frac{44\sqrt{5x^2+2x+3}(507770113-1167248019x)}{7x^2-4x-1}+\frac{737616(38521x-12667)\sqrt{5x^2+2x+3}}{(-7x^2+4x+1)^2}+\frac{21296(501205x+1702037)}{7\sqrt{5x^2+2x+3}}-7\sqrt{\frac{22}{125-17\sqrt{11}}}\left(84865895\sqrt{11}-279286\right.$$

Antiderivative was successfully verified.

```
[In] Integrate[(2 + 5*x + x^2)/((1 + 4*x - 7*x^2)^3*(3 + 2*x + 5*x^2)^(3/2)),x]
```

```
[Out] ((21296*(1702037 + 501205*x))/(7*Sqrt[3 + 2*x + 5*x^2]) + (737616
*(-12667 + 38521*x)*Sqrt[3 + 2*x + 5*x^2])/(1 + 4*x - 7*x^2)^2 +
(44*(507770113 - 1167248019*x)*Sqrt[3 + 2*x + 5*x^2])/(-1 - 4*x +
 7*x^2) - 14*Sqrt[22/(125 - 17*Sqrt[11])]*(-2792860024 + 84865895
*Sqrt[11])*ArcTanh[(Sqrt[250 - 34*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2]
)/(-23 + Sqrt[11] + (-17 + 5*Sqrt[11])*x)] - 14*Sqrt[22/(125 + 17
*Sqrt[11])]*(2792860024 + 84865895*Sqrt[11])*Log[2 + Sqrt[11] - 7
*x] + 7*Sqrt[22/(125 - 17*Sqrt[11])]*(-2792860024 + 84865895*Sqrt
[11])*Log[(-2 + Sqrt[11] + 7*x)^2] - 7*Sqrt[22/(125 - 17*Sqrt[11]
)]*(-2792860024 + 84865895*Sqrt[11])*Log[15 - 4*Sqrt[11] + 14*(-2
 + Sqrt[11])*x + 49*x^2] + 14*Sqrt[22/(125 + 17*Sqrt[11])]*(27928
60024 + 84865895*Sqrt[11])*Log[11 + 23*Sqrt[11] + (55 + 17*Sqrt[1
1])*x + Sqrt[2750 + 374*Sqrt[11]]*Sqrt[3 + 2*x + 5*x^2]])/1395915
659776
```

Maple [B] time = 0.033, size = 2600, normalized size = 10.4

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((x^2+5*x+2)/(-7*x^2+4*x+1)^3/(5*x^2+2*x+3)^(3/2),x)
```

```
[Out] -3535/21296*11^(1/2)*(1/7/(250/49+34/49*11^(1/2))/(5*(x-2/7-1/7*1
1^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49
*11^(1/2))^(1/2)-1/7*(34/7+10/7*11^(1/2))/(250/49+34/49*11^(1/2))
*(10*x+2)/(5000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2))^2)/(5*(x-
2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250
/49+34/49*11^(1/2))^(1/2)-1/(250/49+34/49*11^(1/2))/(250+34*11^(1
/2))^(1/2)*arctanh(49/2*(500/49+68/49*11^(1/2)+(34/7+10/7*11^(1/2
))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2))^(1/2)/(245*(x-2/7-1/7*
11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*1
1^(1/2))^(1/2)))+3535/21296*11^(1/2)*(1/7/(250/49-34/49*11^(1/2))
/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/
2))+250/49-34/49*11^(1/2))^(1/2)-1/7*(34/7-10/7*11^(1/2))/(250/49
-34/49*11^(1/2))*(10*x+2)/(5000/49-680/49*11^(1/2)-(34/7-10/7*11^
(1/2))^2)/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1
/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)-1/(250/49-34/49*11^(1/2
))/(250-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11^(1/2)+(3
4/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2))^(1/2)/
(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11
^(1/2))+250-34*11^(1/2))^(1/2)))-(-3535/1936-273/1936*11^(1/2))*(
-1/49/(250/49+34/49*11^(1/2))/(x-2/7-1/7*11^(1/2))/(5*(x-2/7-1/7*
11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/4
9*11^(1/2))^(1/2)-3/98*(34/7+10/7*11^(1/2))/(250/49+34/49*11^(1/2
))*(1/(250/49+34/49*11^(1/2))/(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/
7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2)-(34
/7+10/7*11^(1/2))/(250/49+34/49*11^(1/2))*(10*x+2)/(5000/49+680/4
9*11^(1/2)-(34/7+10/7*11^(1/2))^2)/(5*(x-2/7-1/7*11^(1/2))^2+(34/
7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2
)-7/(250/49+34/49*11^(1/2))/(250+34*11^(1/2))^(1/2)*arctanh(49/2*
(500/49+68/49*11^(1/2)+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2)))
/(250+34*11^(1/2))^(1/2)/(245*(x-2/7-1/7*11^(1/2))^2+49*(34/7+10/
7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2))^(1/2)))-20/49/(
250/49+34/49*11^(1/2))*(10*x+2)/(5000/49+680/49*11^(1/2)-(34/7+10
/7*11^(1/2))^2)/(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x
-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2))-(-3535/1936+273/
1936*11^(1/2))*(-1/49/(250/49-34/49*11^(1/2))/(x-2/7+1/7*11^(1/2)
)/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1
/2))+250/49-34/49*11^(1/2))^(1/2)-3/98*(34/7-10/7*11^(1/2))/(250/
49-34/49*11^(1/2))*(1/(250/49-34/49*11^(1/2))/(5*(x-2/7+1/7*11^(1
/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^
(1/2))^(1/2)-(34/7-10/7*11^(1/2))/(250/49-34/49*11^(1/2))*(10*x+2
)/(5000/49-680/49*11^(1/2)-(34/7-10/7*11^(1/2))^2)/(5*(x-2/7+1/7*
11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/4
9*11^(1/2))^(1/2)-7/(250/49-34/49*11^(1/2))/(250-34*11^(1/2))^(1/
2)*arctanh(49/2*(500/49-68/49*11^(1/2)+(34/7-10/7*11^(1/2))*(x-2/
7+1/7*11^(1/2)))/(250-34*11^(1/2))^(1/2)/(245*(x-2/7+1/7*11^(1/2)
)^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250-34*11^(1/2))
^(1/2)))-20/49/(250/49-34/49*11^(1/2))*(10*x+2)/(5000/49-680/49*1
1^(1/2)-(34/7-10/7*11^(1/2))^2)/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-1
0/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2))-
21/968*(-61+13*11^(1/2))*11^(1/2)*(-1/686/(250/49-34/49*11^(1/2))
/(x-2/7+1/7*11^(1/2))^2/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(
```

```
1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)-5/1372*(3
4/7-10/7*11^(1/2))/(250/49-34/49*11^(1/2))*(-1/(250/49-34/49*11^(
1/2))/(x-2/7+1/7*11^(1/2))/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*1
1^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)-3/2*(3
4/7-10/7*11^(1/2))/(250/49-34/49*11^(1/2))*(1/(250/49-34/49*11^(1
/2))/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11
^(1/2))+250/49-34/49*11^(1/2))^(1/2)-(34/7-10/7*11^(1/2))/(250/49
-34/49*11^(1/2))*(10*x+2)/(5000/49-680/49*11^(1/2)-(34/7-10/7*11^
(1/2))^2)/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1
/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)-7/(250/49-34/49*11^(1/2
))/(250-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11^(1/2)+(3
4/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2))^(1/2)/
(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2/7+1/7*11
^(1/2))+250-34*11^(1/2))^(1/2)))-20/(250/49-34/49*11^(1/2))*(10*x
+2)/(5000/49-680/49*11^(1/2)-(34/7-10/7*11^(1/2))^2)/(5*(x-2/7+1/
7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2))+250/49-34
/49*11^(1/2))^(1/2))-15/686/(250/49-34/49*11^(1/2))*(1/(250/49-34
/49*11^(1/2))/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))*(x-2
/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)-(34/7-10/7*11^(1/2)
)/(250/49-34/49*11^(1/2))*(10*x+2)/(5000/49-680/49*11^(1/2)-(34/7
-10/7*11^(1/2))^2)/(5*(x-2/7+1/7*11^(1/2))^2+(34/7-10/7*11^(1/2))
*(x-2/7+1/7*11^(1/2))+250/49-34/49*11^(1/2))^(1/2)-7/(250/49-34/4
9*11^(1/2))/(250-34*11^(1/2))^(1/2)*arctanh(49/2*(500/49-68/49*11
^(1/2)+(34/7-10/7*11^(1/2))*(x-2/7+1/7*11^(1/2)))/(250-34*11^(1/2
))^(1/2)/(245*(x-2/7+1/7*11^(1/2))^2+49*(34/7-10/7*11^(1/2))*(x-2
/7+1/7*11^(1/2))+250-34*11^(1/2))^(1/2))))-21/968*(61+13*11^(1/2)
)*11^(1/2)*(-1/686/(250/49+34/49*11^(1/2))/(x-2/7-1/7*11^(1/2))^2
/(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/
2))+250/49+34/49*11^(1/2))^(1/2)-5/1372*(34/7+10/7*11^(1/2))/(250
/49+34/49*11^(1/2))*(-1/(250/49+34/49*11^(1/2))/(x-2/7-1/7*11^(1/
2))/(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^
(1/2))+250/49+34/49*11^(1/2))^(1/2)-3/2*(34/7+10/7*11^(1/2))/(250
/49+34/49*11^(1/2))*(1/(250/49+34/49*11^(1/2))/(5*(x-2/7-1/7*11^(
1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11
^(1/2))^(1/2)-(34/7+10/7*11^(1/2))/(250/49+34/49*11^(1/2))*(10*x+
2)/(5000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2))^2)/(5*(x-2/7-1/7
*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/
49*11^(1/2))^(1/2)-7/(250/49+34/49*11^(1/2))/(250+34*11^(1/2))^(1
/2)*arctanh(49/2*(500/49+68/49*11^(1/2)+(34/7+10/7*11^(1/2))*(x-2
/7-1/7*11^(1/2)))/(250+34*11^(1/2))^(1/2)/(245*(x-2/7-1/7*11^(1/2
))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34*11^(1/2)
)^(1/2)))-20/(250/49+34/49*11^(1/2))*(10*x+2)/(5000/49+680/49*11^
(1/2)-(34/7+10/7*11^(1/2))^2)/(5*(x-2/7-1/7*11^(1/2))^2+(34/7+10/
7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49+34/49*11^(1/2))^(1/2))-15
/686/(250/49+34/49*11^(1/2))*(1/(250/49+34/49*11^(1/2))/(5*(x-2/7
-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250/49
+34/49*11^(1/2))^(1/2)-(34/7+10/7*11^(1/2))/(250/49+34/49*11^(1/2
))*(10*x+2)/(5000/49+680/49*11^(1/2)-(34/7+10/7*11^(1/2))^2)/(5*(
x-2/7-1/7*11^(1/2))^2+(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+2
50/49+34/49*11^(1/2))^(1/2)-7/(250/49+34/49*11^(1/2))/(250+34*11^
(1/2))^(1/2)*arctanh(49/2*(500/49+68/49*11^(1/2)+(34/7+10/7*11^(1
/2))*(x-2/7-1/7*11^(1/2)))/(250+34*11^(1/2))^(1/2)/(245*(x-2/7-1/
7*11^(1/2))^2+49*(34/7+10/7*11^(1/2))*(x-2/7-1/7*11^(1/2))+250+34
*11^(1/2))^(1/2))))
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$-\int \frac{x^2+5x+2}{(7x^2-4x-1)^3(5x^2+2x+3)^{\frac{3}{2}}}\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^3*(5*x^2 + 2*x + 3)^(3/2)),x, algori
```

```
[Out] -integrate((x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^3*(5*x^2 + 2*x + 3)
^(3/2)), x)
```

Fricas [A] time = 0.397067, size = 656, normalized size = 2.62

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate(-(x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^3*(5*x^2 + 2*x + 3)^(3/2)),x, algori
```

```
[Out] -1/9771409618432*(7*sqrt(1/127)*(245*x^6 - 182*x^5 + 45*x^4 - 124
*x^3 + 27*x^2 + 26*x + 3)*sqrt(sqrt(11)*(896266498377233657855*sq
rt(11) + 821626461817036056137))*log(-1/22532213*(sqrt(1/127)*sqr
t(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(896266498377233657855*sqrt(11)
+ 821626461817036056137))*(37271563201*sqrt(11) + 407780707037) +
 594504887297984686177*sqrt(11)*(x + 3) - 1783514661893954058531*
x + 2972524436489923430885)/x) - 7*sqrt(1/127)*(245*x^6 - 182*x^5
 + 45*x^4 - 124*x^3 + 27*x^2 + 26*x + 3)*sqrt(sqrt(11)*(896266498
377233657855*sqrt(11) + 821626461817036056137))*log(1/22532213*(s
qrt(1/127)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(89626649837723365
7855*sqrt(11) + 821626461817036056137))*(37271563201*sqrt(11) + 4
07780707037) - 594504887297984686177*sqrt(11)*(x + 3) + 178351466
1893954058531*x - 2972524436489923430885)/x) + 7*sqrt(1/127)*(245
*x^6 - 182*x^5 + 45*x^4 - 124*x^3 + 27*x^2 + 26*x + 3)*sqrt(sqrt(
11)*(896266498377233657855*sqrt(11) - 821626461817036056137))*log
(1/22532213*(sqrt(1/127)*sqrt(5*x^2 + 2*x + 3)*sqrt(sqrt(11)*(896
266498377233657855*sqrt(11) - 821626461817036056137))*(3727156320
1*sqrt(11) - 407780707037) + 594504887297984686177*sqrt(11)*(x +
3) + 1783514661893954058531*x - 2972524436489923430885)/x) - 7*sq
rt(1/127)*(245*x^6 - 182*x^5 + 45*x^4 - 124*x^3 + 27*x^2 + 26*x +
 3)*sqrt(sqrt(11)*(896266498377233657855*sqrt(11) - 8216264618170
36056137))*log(-1/22532213*(sqrt(1/127)*sqrt(5*x^2 + 2*x + 3)*sqr
t(sqrt(11)*(896266498377233657855*sqrt(11) - 8216264618170360561З
```

```
7))*(37271563201*sqrt(11) - 407780707037) - 5945048872979846861 77
*sqrt(11)*(x + 3) - 17835146618939540585 31*x + 297252443648992343
0885)/x) + 44*(274089186875*x^5 - 200208943655*x^4 + 109737266678
*x^3 - 148022158802*x^2 + 7828199499*x + 14298727813)*sqrt(5*x^2
+ 2*x + 3))/(245*x^6 - 182*x^5 + 45*x^4 - 124*x^3 + 27*x^2 + 26*x
 + 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**2+5*x+2)/(-7*x**2+4*x+1)**3/(5*x**2+2*x+3)**(3/2),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(-(x^2 + 5*x + 2)/((7*x^2 - 4*x - 1)^3*(5*x^2 + 2*x + 3)^(3/2)),x, algori
```

```
[Out] Exception raised: RuntimeError
```

3.398 $\int \left(a+cx^2\right)^p \left(A+Cx^2\right) \left(d+fx^2\right)^q \, dx$

Optimal. Leaf size=166

$$Ax\left(a+cx^2\right)^p\left(\frac{cx^2}{a}+1\right)^{-p}\left(d+fx^2\right)^q\left(\frac{fx^2}{d}+1\right)^{-q}F_1\left(\frac{1}{2};-p,-q;\frac{3}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+\frac{1}{3}Cx^3\left(a+cx^2\right)^p\left(\frac{cx^2}{a}+1\right)^{-p}\left(d+fx^2\right)^q\left(\frac{fx^2}{d}+1\right)^{-q}F_1\left(\frac{3}{2};-p,-q;\frac{5}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)$$

```
[Out] (A*x*(a + c*x^2)^p*(d + f*x^2)^q*AppellF1[1/2, -p, -q, 3/2, -((c*
x^2)/a), -((f*x^2)/d)])/((1 + (c*x^2)/a)^p*(1 + (f*x^2)/d)^q) + (
C*x^3*(a + c*x^2)^p*(d + f*x^2)^q*AppellF1[3/2, -p, -q, 5/2, -((c
*x^2)/a), -((f*x^2)/d)])/(3*(1 + (c*x^2)/a)^p*(1 + (f*x^2)/d)^q)
```

Rubi [A] time = 0.414501, antiderivative size = 166, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.192$

$$Ax\left(a+cx^2\right)^p\left(\frac{cx^2}{a}+1\right)^{-p}\left(d+fx^2\right)^q\left(\frac{fx^2}{d}+1\right)^{-q}F_1\left(\frac{1}{2};-p,-q;\frac{3}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+\frac{1}{3}Cx^3\left(a+cx^2\right)^p\left(\frac{cx^2}{a}+1\right)^{-p}\left(d+fx^2\right)^q\left(\frac{fx^2}{d}+1\right)^{-q}F_1\left(\frac{3}{2};-p,-q;\frac{5}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)$$

Antiderivative was successfully verified.

```
[In]  Int[(a + c*x^2)^p*(A + C*x^2)*(d + f*x^2)^q,x]
```

```
[Out] (A*x*(a + c*x^2)^p*(d + f*x^2)^q*AppellF1[1/2, -p, -q, 3/2, -((c*
x^2)/a), -((f*x^2)/d)])/((1 + (c*x^2)/a)^p*(1 + (f*x^2)/d)^q) + (
C*x^3*(a + c*x^2)^p*(d + f*x^2)^q*AppellF1[3/2, -p, -q, 5/2, -((c
*x^2)/a), -((f*x^2)/d)])/(3*(1 + (c*x^2)/a)^p*(1 + (f*x^2)/d)^q)
```

Rubi in Sympy [A] time = 70.9197, size = 131, normalized size = 0.79

$$Ax\left(1+\frac{cx^2}{a}\right)^{-p}\left(1+\frac{fx^2}{d}\right)^{-q}\left(a+cx^2\right)^p\left(d+fx^2\right)^q \operatorname{appellf}_1\left(\frac{1}{2},-p,-q,\frac{3}{2},-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+\frac{Cx^3\left(1+\frac{cx^2}{a}\right)^{-p}\left(1+\frac{fx^2}{d}\right)^{-q}\left(a+cx^2\right)^p\left(d+fx^2\right)^q \operatorname{appellf}_1\left(\frac{3}{2},-p,-q,\frac{5}{2},-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((c*x**2+a)**p*(C*x**2+A)*(f*x**2+d)**q,x)
```

```
[Out] A*x*(1 + c*x**2/a)**(-p)*(1 + f*x**2/d)**(-q)*(a + c*x**2)**p*(d
+ f*x**2)**q*appellf1(1/2, -p, -q, 3/2, -c*x**2/a, -f*x**2/d) + C
*x**3*(1 + c*x**2/a)**(-p)*(1 + f*x**2/d)**(-q)*(a + c*x**2)**p*(
d + f*x**2)**q*appellf1(3/2, -p, -q, 5/2, -c*x**2/a, -f*x**2/d)/3
```

Mathematica [A] time = 0.970025, size = 330, normalized size = 1.99

$$adx\left(a+cx^2\right)^p\left(d+fx^2\right)^q\left(\frac{3AF_1\left(\frac{1}{2};-p,-q;\frac{3}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}{2x^2\left(cdpF_1\left(\frac{3}{2};1-p,-q;\frac{5}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+afqF_1\left(\frac{3}{2};-p,1-q;\frac{5}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)\right)+3adF_1\left(\frac{1}{2};-p,-q;\frac{3}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}+\frac{5Cx^2F_1\left(\frac{3}{2};-p,-q;\frac{5}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}{6x^2\left(cdpF_1\left(\frac{5}{2};1-p,-q;\frac{7}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+afqF_1\left(\frac{5}{2};-p,1-q;\frac{7}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)\right)+15adF_1\left(\frac{3}{2};-p,-q;\frac{5}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}\right)$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(a + c*x^2)^p*(A + C*x^2)*(d + f*x^2)^q,x]
```

```
[Out] a*d*x*(a + c*x^2)^p*(d + f*x^2)^q*((3*A*AppellF1[1/2, -p, -q, 3/2
, -((c*x^2)/a), -((f*x^2)/d)])/(3*a*d*AppellF1[1/2, -p, -q, 3/2,
-((c*x^2)/a), -((f*x^2)/d)] + 2*x^2*(c*d*p*AppellF1[3/2, 1 - p, -
q, 5/2, -((c*x^2)/a), -((f*x^2)/d)] + a*f*q*AppellF1[3/2, -p, 1 -
 q, 5/2, -((c*x^2)/a), -((f*x^2)/d)])) + (5*C*x^2*AppellF1[3/2, -
p, -q, 5/2, -((c*x^2)/a), -((f*x^2)/d)])/(15*a*d*AppellF1[3/2, -p
, -q, 5/2, -((c*x^2)/a), -((f*x^2)/d)] + 6*x^2*(c*d*p*AppellF1[5/
2, 1 - p, -q, 7/2, -((c*x^2)/a), -((f*x^2)/d)] + a*f*q*AppellF1[5
/2, -p, 1 - q, 7/2, -((c*x^2)/a), -((f*x^2)/d)])))
```

Maple [F] time = 0.093, size = 0, normalized size = 0.

$$\int\left(cx^2+a\right)^p\left(Cx^2+A\right)\left(fx^2+d\right)^q\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^p*(C*x^2+A)*(f*x^2+d)^q,x)
```

```
[Out] int((c*x^2+a)^p*(C*x^2+A)*(f*x^2+d)^q,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (Cx^2 + A)(cx^2 + a)^p (fx^2 + d)^q \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + A)*(c*x^2 + a)^p*(f*x^2 + d)^q,x, algorithm="maxima")
```

```
[Out] integrate((C*x^2 + A)*(c*x^2 + a)^p*(f*x^2 + d)^q, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left((Cx^2 + A)(cx^2 + a)^p (fx^2 + d)^q, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + A)*(c*x^2 + a)^p*(f*x^2 + d)^q,x, algorithm="fricas")
```

```
[Out] integral((C*x^2 + A)*(c*x^2 + a)^p*(f*x^2 + d)^q, 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((c*x**2+a)**p*(C*x**2+A)*(f*x**2+d)**q,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (Cx^2 + A)(cx^2 + a)^p (fx^2 + d)^q \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + A)*(c*x^2 + a)^p*(f*x^2 + d)^q,x, algorithm="giac")

[Out] integrate((C*x^2 + A)*(c*x^2 + a)^p*(f*x^2 + d)^q, x)
```

3.399 $\int (A+Bx)\left(a+cx^2\right)^p\left(d+fx^2\right)^q\,dx$

Optimal. Leaf size=167

$$Ax\left(a+cx^2\right)^p\left(\frac{cx^2}{a}+1\right)^{-p}\left(d+fx^2\right)^q\left(\frac{fx^2}{d}+1\right)^{-q}F_1\left(\frac{1}{2};-p,-q;\frac{3}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+\frac{B\left(a+cx^2\right)^{p+1}\left(d+fx^2\right)^q\left(\frac{c(d+fx^2)}{cd-af}\right)^{-q}{}_2F_1\left(p+1,-q;p+2;-\frac{f(cx^2+a)}{cd-af}\right)}{2c(p+1)}$$

```
[Out] (A*x*(a + c*x^2)^p*(d + f*x^2)^q*AppellF1[1/2, -p, -q, 3/2, -((c*
x^2)/a), -((f*x^2)/d)])/((1 + (c*x^2)/a)^p*(1 + (f*x^2)/d)^q) + (
B*(a + c*x^2)^(1 + p)*(d + f*x^2)^q*Hypergeometric2F1[1 + p, -q,
2 + p, -((f*(a + c*x^2))/(c*d - a*f))])/(2*c*(1 + p)*((c*(d + f*x
^2))/(c*d - a*f))^q)
```

Rubi [A] time = 0.386335, antiderivative size = 167, normalized size of antiderivative = 1., number of steps used = 7, number of rules used = 6, integrand size = 24, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.25

$$Ax\left(a+cx^2\right)^p\left(\frac{cx^2}{a}+1\right)^{-p}\left(d+fx^2\right)^q\left(\frac{fx^2}{d}+1\right)^{-q}F_1\left(\frac{1}{2};-p,-q;\frac{3}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+\frac{B\left(a+cx^2\right)^{p+1}\left(d+fx^2\right)^q\left(\frac{c(d+fx^2)}{cd-af}\right)^{-q}{}_2F_1\left(p+1,-q;p+2;-\frac{f(cx^2+a)}{cd-af}\right)}{2c(p+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[(A + B*x)*(a + c*x^2)^p*(d + f*x^2)^q,x]
```

```
[Out] (A*x*(a + c*x^2)^p*(d + f*x^2)^q*AppellF1[1/2, -p, -q, 3/2, -((c*
x^2)/a), -((f*x^2)/d)])/((1 + (c*x^2)/a)^p*(1 + (f*x^2)/d)^q) + (
B*(a + c*x^2)^(1 + p)*(d + f*x^2)^q*Hypergeometric2F1[1 + p, -q,
2 + p, -((f*(a + c*x^2))/(c*d - a*f))])/(2*c*(1 + p)*((c*(d + f*x
^2))/(c*d - a*f))^q)
```

Rubi in Sympy [A] time = 60.4127, size = 131, normalized size = 0.78

$$Ax\left(1+\frac{cx^2}{a}\right)^{-p}\left(1+\frac{fx^2}{d}\right)^{-q}\left(a+cx^2\right)^p\left(d+fx^2\right)^q\operatorname{appellf}_1\left(\frac{1}{2},-p,-q,\frac{3}{2},-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+\frac{B\left(\frac{c(-d-fx^2)}{af-cd}\right)^{-q}\left(a+cx^2\right)^{p+1}\left(d+fx^2\right)^q{}_2F_1\left(\begin{matrix}-q,p+1\\p+2\end{matrix}\middle|\frac{f(a+cx^2)}{af-cd}\right)}{2c(p+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  rubi_integrate((B*x+A)*(c*x**2+a)**p*(f*x**2+d)**q,x)
```

```
[Out] A*x*(1 + c*x**2/a)**(-p)*(1 + f*x**2/d)**(-q)*(a + c*x**2)**p*(d
+ f*x**2)**q*appellf1(1/2, -p, -q, 3/2, -c*x**2/a, -f*x**2/d) + B
*(c*(-d - f*x**2)/(a*f - c*d))**(-q)*(a + c*x**2)**(p + 1)*(d + f
*x**2)**q*hyper((-q, p + 1), (p + 2,), f*(a + c*x**2)/(a*f - c*d)
)/(2*c*(p + 1))
```

Mathematica [A] time = 0.897234, size = 310, normalized size = 1.86

$$adx\left(a+cx^2\right)^p\left(d+fx^2\right)^q\left(\frac{3AF_1\left(\frac{1}{2};-p,-q;\frac{3}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}{2x^2\left(cdpF_1\left(\frac{3}{2};1-p,-q;\frac{5}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+afqF_1\left(\frac{3}{2};-p,1-q;\frac{5}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)\right)+3adF_1\left(\frac{1}{2};-p,-q;\frac{3}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}+\frac{BxF_1\left(1;-p,-q;2;-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}{x^2\left(cdpF_1\left(2;1-p,-q;3;-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+afqF_1\left(2;-p,1-q;3;-\frac{cx^2}{a},-\frac{fx^2}{d}\right)\right)+2adF_1\left(1;-p,-q;2;-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}\right)$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(A + B*x)*(a + c*x^2)^p*(d + f*x^2)^q,x]
```

```
[Out] a*d*x*(a + c*x^2)^p*(d + f*x^2)^q*((3*A*AppellF1[1/2, -p, -q, 3/2
, -((c*x^2)/a), -((f*x^2)/d)])/(3*a*d*AppellF1[1/2, -p, -q, 3/2,
-((c*x^2)/a), -((f*x^2)/d)] + 2*x^2*(c*d*p*AppellF1[3/2, 1 - p, -
q, 5/2, -((c*x^2)/a), -((f*x^2)/d)] + a*f*q*AppellF1[3/2, -p, 1 -
 q, 5/2, -((c*x^2)/a), -((f*x^2)/d)])) + (B*x*AppellF1[1, -p, -q,
 2, -((c*x^2)/a), -((f*x^2)/d)])/(2*a*d*AppellF1[1, -p, -q, 2, -(
(c*x^2)/a), -((f*x^2)/d)] + x^2*(c*d*p*AppellF1[2, 1 - p, -q, 3,
-((c*x^2)/a), -((f*x^2)/d)] + a*f*q*AppellF1[2, -p, 1 - q, 3, -((
c*x^2)/a), -((f*x^2)/d)])))
```

Maple [F] time = 0.083, size = 0, normalized size = 0.

$$\int (Bx+A)\left(cx^2+a\right)^p\left(fx^2+d\right)^q\,dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((B*x+A)*(c*x^2+a)^p*(f*x^2+d)^q,x)
```

```
[Out] int((B*x+A)*(c*x^2+a)^p*(f*x^2+d)^q,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (Bx + A)(cx^2 + a)^p (fx^2 + d)^q dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x + A)*(c*x^2 + a)^p*(f*x^2 + d)^q,x, algorithm="maxima")
```

```
[Out] integrate((B*x + A)*(c*x^2 + a)^p*(f*x^2 + d)^q, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\text{integral}\left((Bx + A)(cx^2 + a)^p (fx^2 + d)^q, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((B*x + A)*(c*x^2 + a)^p*(f*x^2 + d)^q,x, algorithm="fricas")
```

```
[Out] integral((B*x + A)*(c*x^2 + a)^p*(f*x^2 + d)^q, 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+A)*(c*x**2+a)**p*(f*x**2+d)**q,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int (Bx + A)(cx^2 + a)^p (fx^2 + d)^q dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((B*x + A)*(c*x^2 + a)^p*(f*x^2 + d)^q,x, algorithm="giac")
```

```
[Out] integrate((B*x + A)*(c*x^2 + a)^p*(f*x^2 + d)^q, x)
```

3.400 $\int \left(a+cx^2\right)^p \left(A+Bx+Cx^2\right) \left(d+fx^2\right)^q \, dx$

Optimal. Leaf size=252

$$Ax\left(a+cx^2\right)^p\left(\frac{cx^2}{a}+1\right)^{-p}\left(d+fx^2\right)^q\left(\frac{fx^2}{d}+1\right)^{-q}F_1\left(\frac{1}{2};-p,-q;\frac{3}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+\frac{1}{3}Cx^3\left(a+cx^2\right)^p\left(\frac{cx^2}{a}+1\right)^{-p}\left(d+fx^2\right)^q\left(\frac{fx^2}{d}+1\right)^{-q}F_1\left(\frac{3}{2};-p,-q;\frac{5}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+\frac{B\left(a+cx^2\right)^{p+1}\left(d+fx^2\right)^q\left(\frac{c\left(d+fx^2\right)}{cd-af}\right)^{-q}{}_2F_1\left(p+1,-q;p+2;-\frac{f\left(cx^2+a\right)}{cd-af}\right)}{2c(p+1)}$$

```
[Out] (A*x*(a + c*x^2)^p*(d + f*x^2)^q*AppellF1[1/2, -p, -q, 3/2, -((c*
x^2)/a), -((f*x^2)/d)])/((1 + (c*x^2)/a)^p*(1 + (f*x^2)/d)^q) + (
C*x^3*(a + c*x^2)^p*(d + f*x^2)^q*AppellF1[3/2, -p, -q, 5/2, -((c
*x^2)/a), -((f*x^2)/d)])/(3*(1 + (c*x^2)/a)^p*(1 + (f*x^2)/d)^q)
+ (B*(a + c*x^2)^(1 + p)*(d + f*x^2)^q*Hypergeometric2F1[1 + p, -
q, 2 + p, -((f*(a + c*x^2))/(c*d - a*f))])/(2*c*(1 + p)*((c*(d +
f*x^2))/(c*d - a*f))^q)
```

Rubi [A] time = 0.92947, antiderivative size = 252, normalized size of antiderivative = 1., number of steps used = 11, number of rules used = 8, integrand size = 29, $\frac{\text{number of rules}}{\text{integrand size}}$ = 0.276

$$Ax\left(a+cx^2\right)^p\left(\frac{cx^2}{a}+1\right)^{-p}\left(d+fx^2\right)^q\left(\frac{fx^2}{d}+1\right)^{-q}F_1\left(\frac{1}{2};-p,-q;\frac{3}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+\frac{1}{3}Cx^3\left(a+cx^2\right)^p\left(\frac{cx^2}{a}+1\right)^{-p}\left(d+fx^2\right)^q\left(\frac{fx^2}{d}+1\right)^{-q}F_1\left(\frac{3}{2};-p,-q;\frac{5}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+\frac{B\left(a+cx^2\right)^{p+1}\left(d+fx^2\right)^q\left(\frac{c\left(d+fx^2\right)}{cd-af}\right)^{-q}{}_2F_1\left(p+1,-q;p+2;-\frac{f\left(cx^2+a\right)}{cd-af}\right)}{2c(p+1)}$$

Antiderivative was successfully verified.

```
[In]  Int[(a + c*x^2)^p*(A + B*x + C*x^2)*(d + f*x^2)^q,x]
```

```
[Out] (A*x*(a + c*x^2)^p*(d + f*x^2)^q*AppellF1[1/2, -p, -q, 3/2, -((c*
x^2)/a), -((f*x^2)/d)])/((1 + (c*x^2)/a)^p*(1 + (f*x^2)/d)^q) + (
C*x^3*(a + c*x^2)^p*(d + f*x^2)^q*AppellF1[3/2, -p, -q, 5/2, -((c
*x^2)/a), -((f*x^2)/d)])/(3*(1 + (c*x^2)/a)^p*(1 + (f*x^2)/d)^q)
+ (B*(a + c*x^2)^(1 + p)*(d + f*x^2)^q*Hypergeometric2F1[1 + p, -
q, 2 + p, -((f*(a + c*x^2))/(c*d - a*f))])/(2*c*(1 + p)*((c*(d +
f*x^2))/(c*d - a*f))^q)
```

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((c*x**2+a)**p*(C*x**2+B*x+A)*(f*x**2+d)**q,x)
```

```
[Out] Timed out
```

Mathematica [A] time = 1.24674, size = 465, normalized size = 1.85

$$adx\left(a+cx^2\right)^p\left(d+fx^2\right)^q\left(\frac{3AF_1\left(\frac{1}{2};-p,-q;\frac{3}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}{2x^2\left(cdpF_1\left(\frac{3}{2};1-p,-q;\frac{5}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+afqF_1\left(\frac{3}{2};-p,1-q;\frac{5}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)\right)+3adF_1\left(\frac{1}{2};-p,-q;\frac{3}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}+x\left(\frac{BF_1\left(1;-p,-q;2;-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}{x^2\left(cdpF_1\left(2;1-p,-q;3;-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+afqF_1\left(2;-p,1-q;3;-\frac{cx^2}{a},-\frac{fx^2}{d}\right)\right)+2adF_1\left(1;-p,-q;2;-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}+\frac{5CxF_1\left(\frac{3}{2};-p,-q;\frac{5}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}{6x^2\left(cdpF_1\left(\frac{5}{2};1-p,-q;\frac{7}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)+afqF_1\left(\frac{5}{2};-p,1-q;\frac{7}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)\right)+15adF_1\left(\frac{3}{2};-p,-q;\frac{5}{2};-\frac{cx^2}{a},-\frac{fx^2}{d}\right)}\right)\right)$$

Warning: Unable to verify antiderivative.

```
[In]  Integrate[(a + c*x^2)^p*(A + B*x + C*x^2)*(d + f*x^2)^q,x]
```

```
[Out] a*d*x*(a + c*x^2)^p*(d + f*x^2)^q*((3*A*AppellF1[1/2, -p, -q, 3/2
, -((c*x^2)/a), -((f*x^2)/d)])/(3*a*d*AppellF1[1/2, -p, -q, 3/2,
-((c*x^2)/a), -((f*x^2)/d)] + 2*x^2*(c*d*p*AppellF1[3/2, 1 - p, -
q, 5/2, -((c*x^2)/a), -((f*x^2)/d)] + a*f*q*AppellF1[3/2, -p, 1 -
 q, 5/2, -((c*x^2)/a), -((f*x^2)/d)])) + x*((B*AppellF1[1, -p, -q
, 2, -((c*x^2)/a), -((f*x^2)/d)])/(2*a*d*AppellF1[1, -p, -q, 2, -
((c*x^2)/a), -((f*x^2)/d)] + x^2*(c*d*p*AppellF1[2, 1 - p, -q, 3,
 -((c*x^2)/a), -((f*x^2)/d)] + a*f*q*AppellF1[2, -p, 1 - q, 3, -(
(c*x^2)/a), -((f*x^2)/d)])) + (5*C*x*AppellF1[3/2, -p, -q, 5/2, -
((c*x^2)/a), -((f*x^2)/d)])/(15*a*d*AppellF1[3/2, -p, -q, 5/2, -(
(c*x^2)/a), -((f*x^2)/d)] + 6*x^2*(c*d*p*AppellF1[5/2, 1 - p, -q,
 7/2, -((c*x^2)/a), -((f*x^2)/d)] + a*f*q*AppellF1[5/2, -p, 1 - q
, 7/2, -((c*x^2)/a), -((f*x^2)/d)]))))
```

Maple [F] time = 0.117, size = 0, normalized size = 0.

$$\int \left(c x^{2}+a \right)^{p} \left(C \,x^{2}+B x +A \right) \left(f \,x^{2}+d \right)^{q}d x$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  int((c*x^2+a)^p*(C*x^2+B*x+A)*(f*x^2+d)^q,x)
```

```
[Out] int((c*x^2+a)^p*(C*x^2+B*x+A)*(f*x^2+d)^q,x)
```

Maxima [F] time = 0., size = 0, normalized size = 0.

$$\int (Cx^2 + Bx + A)(cx^2 + a)^p (fx^2 + d)^q \, dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^p*(f*x^2 + d)^q,x, algorithm="maxima")
```

```
[Out] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^p*(f*x^2 + d)^q, x)
```

Fricas [F] time = 0., size = 0, normalized size = 0.

$$\mathrm{integral}\left((Cx^2 + Bx + A)(cx^2 + a)^p (fx^2 + d)^q, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In]  integrate((C*x^2 + B*x + A)*(c*x^2 + a)^p*(f*x^2 + d)^q,x, algorithm="fricas")
```

```
[Out] integral((C*x^2 + B*x + A)*(c*x^2 + a)^p*(f*x^2 + d)^q, 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((c*x**2+a)**p*(C*x**2+B*x+A)*(f*x**2+d)**q,x)
```

```
[Out] Timed out
```

GIAC/XCAS [F] time = 0., size = 0, normalized size = 0.

$$\int \left(Cx^2 + Bx + A\right)\left(cx^2 + a\right)^p \left(fx^2 + d\right)^q dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^p*(f*x^2 + d)^q,x, algorithm="giac")
```

```
[Out] integrate((C*x^2 + B*x + A)*(c*x^2 + a)^p*(f*x^2 + d)^q, 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:
```