

Computer algebra independent integration tests

1-Algebraic-functions/1.2-Trinomial-products/1.2.2-Quartic/1.2.2.5-P-x-
 $a+b-x^2+c-x^4-x^p$

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- 3.63 $\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{a+bx^2+cx^4} dx \dots\dots\dots 748$
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3.85	$\int \frac{2-x-2x^2+x^3}{(4-5x^2+x^4)^2} dx$	847
3.86	$\int \frac{(d+ex)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx$	850
3.87	$\int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx$	854
3.88	$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$	858
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3.90	$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$	866
3.91	$\int \frac{2-3x+x^2}{(4-5x^2+x^4)^2} dx$	870
3.92	$\int \frac{(d+ex)(2-3x+x^2)}{(4-5x^2+x^4)^2} dx$	875

3.93	$\int \frac{(2-3x+x^2)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx$	881
3.94	$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$	886
3.95	$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$	890
3.96	$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$	894
3.97	$\int \frac{2+x}{(4-5x^2+x^4)^2} dx$	898
3.98	$\int \frac{(2+x)(d+ex)}{(4-5x^2+x^4)^2} dx$	901
3.99	$\int \frac{(2+x)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx$	905
3.100	$\int \frac{(2+x)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$	909
3.101	$\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$	913
3.102	$\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$	917
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3.105	$\int \frac{d+ex+fx^2+gx^3}{\sqrt{a+bx^2+cx^4}} dx$	934
3.106	$\int \frac{d+ex+fx^2+gx^3}{(a+bx^2+cx^4)^{3/2}} dx$	939
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3.108	$\int \frac{ag-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$	950
3.109	$\int \frac{ag+ex-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$	953
3.110	$\int \frac{ag+fx^3-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$	957
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Chapter 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 <https://rulebasedintegration.org>

The number of integrals in this report is [111]. This is test number [42].

1.1 Listing of CAS systems tested

The following systems were tested at this time.

1. Mathematica 12.3 (64 bit) on windows 10.
2. Rubi 4.16.1 in Mathematica 12.1 on windows 10.
3. Maple 2021.1 (64 bit) on windows 10.
4. Maxima 5.44 on Linux. (via sagemath 9.3)
5. Fricas 1.3.7 on Linux (via sagemath 9.3)
6. Giac/Xcas 1.7 on Linux. (via sagemath 9.3)
7. Sympy 1.8 under Python 3.8.8 using Anaconda distribution on Ubuntu.
8. Mupad using Matlab 2021a with Symbolic Math Toolbox Version 8.7 under windows 10 (64 bit)

Maxima, Fricas and Giac/Xcas were called from inside SageMath. 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.

1.2 Results

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	% 100.00 (111)	% 0.00 (0)
Mathematica	% 92.79 (103)	% 7.21 (8)
Maple	% 100.00 (111)	% 0.00 (0)
Maxima	% 74.77 (83)	% 25.23 (28)
Fricas	% 74.77 (83)	% 25.23 (28)
Sympy	% 42.34 (47)	% 57.66 (64)
Giac	% 90.09 (100)	% 9.91 (11)
Mupad	% 95.50 (106)	% 4.50 (5)

Table 1.1: Percentage solved for each CAS

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 <ol style="list-style-type: none"> 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.

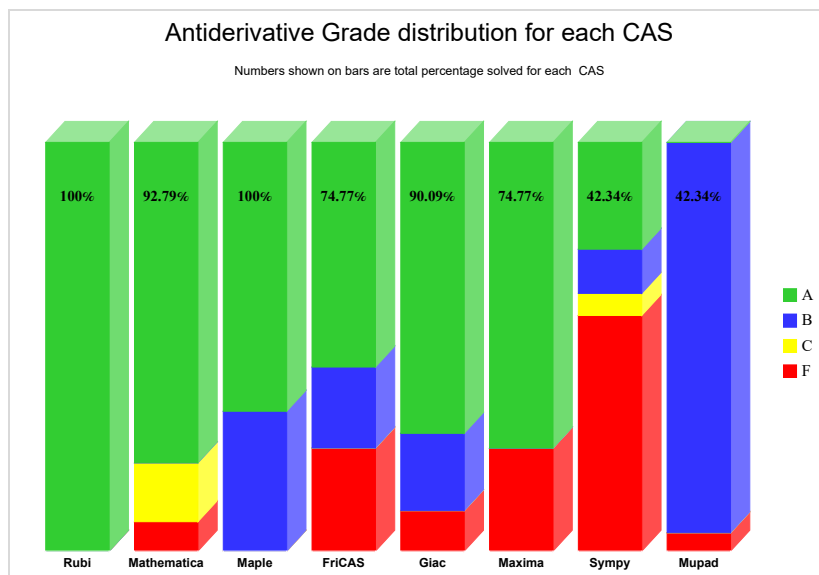
Table 1.2: Description of grading applied to integration result

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

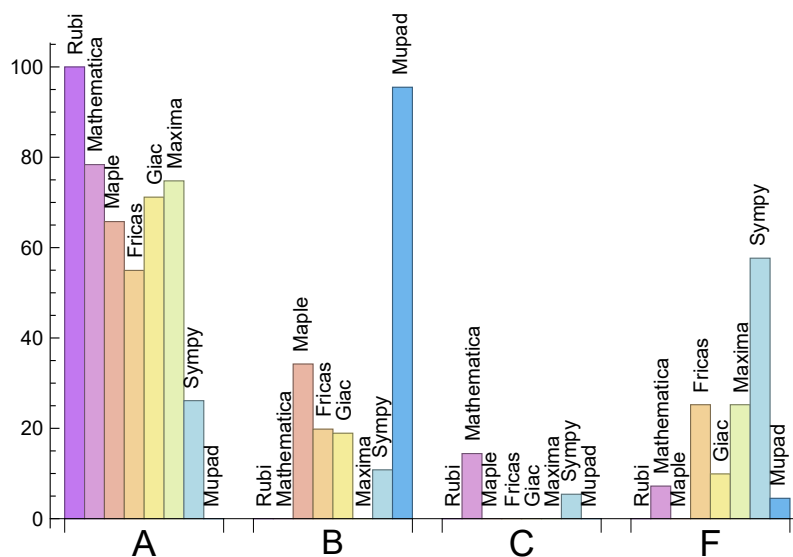
System	% A grade	% B grade	% C grade	% F grade
Rubi	100.00	0.00	0.00	0.00
Mathematica	78.38	0.00	14.41	7.21
Maple	65.77	34.23	0.00	0.00
Maxima	74.77	0.00	0.00	25.23
Fricas	54.95	19.82	0.00	25.23
Sympy	26.13	10.81	5.41	57.66
Giac	71.17	18.92	0.00	9.91
Mupad	0.00	95.50	0.00	4.50

Table 1.3: Antiderivative Grade distribution of each CAS

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.



The following table shows the distribution of the different types of failure for each CAS. There are 3 types of reasons why it can fail. The first is when CAS returns back the input within the time limit, which means it could not solve it. This is the typical normal failure **F**.

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

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

System	Number failed	Percentage normal failure	Percentage time-out failure	Percentage exception failure
Rubi	0	0.00 %	0.00 %	0.00 %
Mathematica	8	0.00 %	100.00 %	0.00 %
Maple	0	0.00 %	0.00 %	0.00 %
Maxima	28	100.00 %	0.00 %	0.00 %
Fricas	28	17.86 %	82.14 %	0.00 %
Sympy	64	12.50 %	87.50 %	0.00 %
Giac	11	45.45 %	54.55 %	0.00 %
Mupad	5	100.00 %	0.00 %	0.00 %

Table 1.4: Time and leaf size performance for each CAS

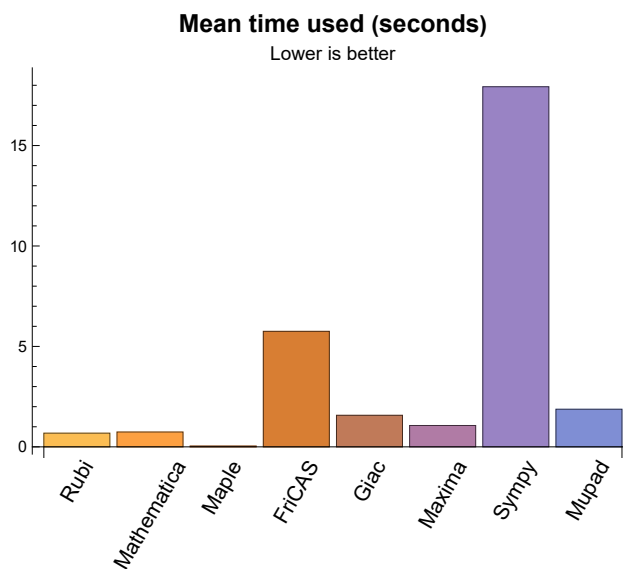
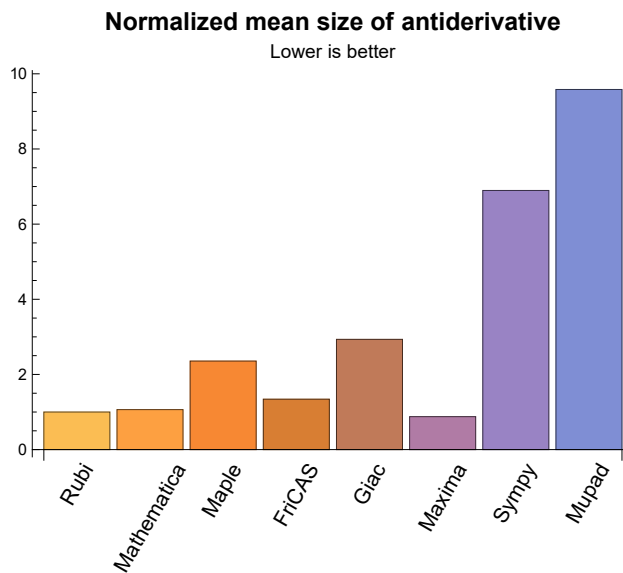
1.3 Performance

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

System	Mean time (sec)	Mean size	Normalized mean	Median size	Normalized median
Rubi	0.68	217.75	1.00	140.00	1.00
Mathematica	0.74	239.05	1.06	146.00	1.02
Maple	0.04	883.14	2.36	186.00	1.54
Maxima	1.06	100.89	0.88	88.00	0.87
Fricas	5.75	172.94	1.34	106.00	1.11
Sympy	17.93	711.77	6.90	165.00	1.21
Giac	1.57	934.38	2.93	117.50	1.00
Mupad	1.87	5695.50	9.58	132.00	1.00

Table 1.5: Time and leaf size performance for each CAS

The following are bar charts for the normalized leafsize and time used columns from the above table.



1.4 list of integrals that has no closed form antiderivative

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

Rubi {}

Mathematica {}

Maple {}

Maxima {}

Fricas {}

Sympy {}

Giac {}

Mupad {}

1.6 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 {}

Mathematica {15, 16, 17, 31, 32, 33, 34, 35, 47, 48, 49, 50, 51}

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.

Mupad Verification phase not implemented yet.

1.7 Timing

The command `AbsoluteTiming[]` 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.

1.8 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.

1.9 Important notes about some of the results

1.9.1 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 14 such integrals out of total 705, or about 2 percent. This percentage 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. The exception message will indicate of the error is due to the interactive question being asked or not.

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.

1.9.2 Important note about FriCAS and Giac/X-CAS 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.

1.9.3 Important note about finding leaf size of antiderivative

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

The other CAS systems (SageMath and Sympy) do not have special builtin function for this purpose at this time. Therefore the leaf size for Fricas and Sympy and Giac antiderivatives is determined using the following function, thanks to user `slelievre` at <https://>

ask.sagemath.org/question/57123/could-we-have-a-leaf_count-function-in-base-sagemath/

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

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

```
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
```

1.9.4 Important note about Mupad results

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

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

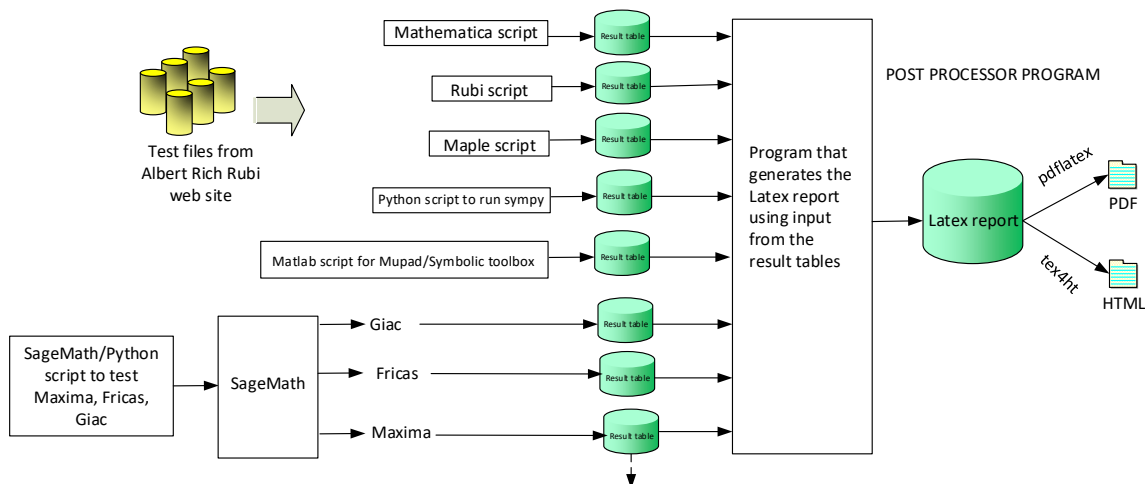
The following is an example of using Matlab's symbolic toolbox (Mupad) to solve an integral

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

Which gives $\sin(x)^2/2$

1.10 Design of the test system

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



One record (line) per one integral result. The line is CSV comma separated. This is description of each record

1. integer, the problem number.
 2. integer. 0 for failed, 1 for passed, -1 for timeout, -2 for CAS specific exception. (this is not the grade field)
 3. integer. Leaf size of result.
 4. integer. Leaf size of the optimal antiderivative.
 5. number. CPU time used to solve this integral. 0 if failed.
 6. string. The integral in Latex format
 7. string. The input used in CAS own syntax.
 8. string. The result (antiderivative) produced by CAS in Latex format
 9. string. The optimal antiderivative in Latex format.
 10. integer. 0 or 1. Indicates if problem has known antiderivative or not
 11. String. The result (antiderivative) in CAS own syntax.
 12. String. The grade of the antiderivative. Can be "A", "B", "C", or "F"
- The following field present only in Rubi and Mathematica Tables*
13. integer. 1 if result was verified or 0 if not verified.
- The following fields present only in Rubi Tables*
14. integer. Number of rules used.
 15. integer. Integrand leaf size.
 16. real number. Ratio of field 14 over field 15
 17. integer. 1 if result was verified or 0 if not verified.
 18. String of form "{n,n,...}" which is list of the rules used by Rubi

High level overview of the CAS independent integration test build system

Chapter 2

detailed summary tables of results

2.1 List of integrals sorted by grade for each CAS

2.1.1 Rubi

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111 }

B grade: { }

C grade: { }

F grade: { }

2.1.2 Mathematica

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102 }

B grade: { }

C grade: { 15, 16, 17, 18, 19, 31, 32, 33, 34, 35, 47, 48, 49, 50, 51, 105 }

F grade: { 103, 104, 106, 107, 108, 109, 110, 111 }

2.1.3 Maple

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 16, 17, 20, 26, 27, 28, 31, 32, 33, 34, 42, 43, 44, 47, 48, 49, 50, 51, 61, 62, 63, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 105, 108, 109, 110, 111 }

B grade: { 11, 12, 13, 14, 18, 19, 21, 22, 23, 24, 25, 29, 30, 35, 36, 37, 38, 39, 40, 41, 45, 46, 52, 53, 54, 55, 56, 57, 58, 59, 60, 64, 65, 66, 103, 104, 106, 107 }

C grade: { }

F grade: { }

2.1.4 Maxima

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 60, 61, 62, 63, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 108, 109, 110, 111 }

B grade: { }

C grade: { }

F grade: { 20, 21, 22, 23, 24, 25, 36, 37, 38, 39, 40, 41, 52, 53, 54, 55, 56, 57, 58, 59, 64, 65, 66, 103, 104, 105, 106, 107 }

2.1.5 FriCAS

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 31, 32, 33, 34, 35, 47, 48, 49, 60, 61, 62, 63, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 108, 109, 110, 111 }

B grade: { 26, 27, 28, 29, 30, 42, 43, 44, 45, 46, 50, 51, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102 }

C grade: { }

F grade: { 20, 21, 22, 23, 24, 25, 36, 37, 38, 39, 40, 41, 52, 53, 54, 55, 56, 57, 58, 59, 64, 65, 66, 103, 104, 105, 106, 107 }

2.1.6 Sympy

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 60, 61, 62, 63, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 85, 91, 97 }

B grade: { 10, 11, 26, 27, 42, 43, 80, 81, 82, 86, 92, 98 }

C grade: { 15, 16, 31, 32, 47, 48 }

F grade: { 12, 13, 14, 17, 18, 19, 20, 21, 22, 23, 24, 25, 28, 29, 30, 33, 34, 35, 36, 37, 38, 39, 40, 41, 44, 45, 46, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 64, 65, 66, 83, 84, 87, 88, 89, 90, 93, 94, 95, 96, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111 }

2.1.7 Giac

A grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 60, 61, 62, 63, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102 }

B grade: { 20, 21, 22, 23, 24, 25, 36, 37, 38, 39, 52, 53, 54, 55, 64, 65, 66, 108, 109, 110, 111 }

C grade: { }

F grade: { 40, 41, 56, 57, 58, 59, 103, 104, 105, 106, 107 }

2.1.8 Mupad

A grade: { }

B grade: { 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 108, 109, 110, 111 }

C grade: { }

F grade: { 103, 104, 105, 106, 107 }

2.2 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	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	50	50	50	41	40	40	46	43	40
normalized size	1	1.00	1.00	0.82	0.80	0.80	0.92	0.86	0.80
time (sec)	N/A	0.041	0.002	0.000	1.249	0.509	0.064	0.320	0.027
Problem 2	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	69	58	57	61	65	64	59
normalized size	1	1.00	1.00	0.84	0.83	0.88	0.94	0.93	0.86
time (sec)	N/A	0.045	0.021	0.002	1.207	0.789	0.069	0.244	0.033
Problem 3	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	88	88	88	75	74	82	83	85	78
normalized size	1	1.00	1.00	0.85	0.84	0.93	0.94	0.97	0.89
time (sec)	N/A	0.073	0.019	0.002	1.559	0.502	0.074	0.218	0.662

Problem 4	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	105	105	90	89	103	102	106	95
normalized size	1	1.00	1.00	0.86	0.85	0.98	0.97	1.01	0.90
time (sec)	N/A	0.095	0.034	0.002	1.643	0.695	0.079	0.360	0.659

Problem 5	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	122	105	104	124	121	127	112
normalized size	1	1.00	1.00	0.86	0.85	1.02	0.99	1.04	0.92
time (sec)	N/A	0.111	0.038	0.001	1.174	0.901	0.083	0.319	0.058

Problem 6	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	112	112	97	95	94	100	116	106	94
normalized size	1	1.00	0.87	0.85	0.84	0.89	1.04	0.95	0.84
time (sec)	N/A	0.126	0.049	0.001	1.060	1.094	0.084	0.389	0.056

Problem 7	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	154	154	154	139	138	151	165	157	138
normalized size	1	1.00	1.00	0.90	0.90	0.98	1.07	1.02	0.90
time (sec)	N/A	0.130	0.045	0.000	1.027	0.447	0.093	0.256	0.697

Problem 8	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	196	196	196	183	182	202	209	208	182
normalized size	1	1.00	1.00	0.93	0.93	1.03	1.07	1.06	0.93
time (sec)	N/A	0.168	0.057	0.000	1.400	0.783	0.102	0.299	0.716

Problem 9	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	234	234	234	219	218	253	258	259	220
normalized size	1	1.00	1.00	0.94	0.93	1.08	1.10	1.11	0.94
time (sec)	N/A	0.238	0.083	0.000	1.138	0.831	0.110	0.258	0.114

Problem 10	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	45	45	50	58	43	43	515	51	51
normalized size	1	1.00	1.11	1.29	0.96	0.96	11.44	1.13	1.13
time (sec)	N/A	0.032	0.018	0.012	1.125	1.600	3.147	0.251	0.709

Problem 11	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	58	86	51	51	2195	59	63
normalized size	1	1.00	1.14	1.69	1.00	1.00	43.04	1.16	1.24
time (sec)	N/A	0.057	0.026	0.009	1.122	1.018	110.122	0.306	0.715

Problem 12	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	68	114	61	61	0	69	75
normalized size	1	1.00	1.19	2.00	1.07	1.07	0.00	1.21	1.32
time (sec)	N/A	0.072	0.032	0.008	1.355	1.481	0.000	0.310	0.742

Problem 13	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	64	64	81	145	72	72	0	80	90
normalized size	1	1.00	1.27	2.27	1.12	1.12	0.00	1.25	1.41
time (sec)	N/A	0.147	0.045	0.010	1.238	4.816	0.000	0.434	0.815

Problem 14	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	76	76	98	179	88	88	0	96	108
normalized size	1	1.00	1.29	2.36	1.16	1.16	0.00	1.26	1.42
time (sec)	N/A	0.192	0.064	0.009	1.245	18.713	0.000	0.261	1.190

Problem 15	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	C	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	92	92	98	92	65	65	923	67	118
normalized size	1	1.00	1.07	1.00	0.71	0.71	10.03	0.73	1.28
time (sec)	N/A	0.077	0.178	0.007	2.209	0.933	2.887	0.378	0.242

Problem 16	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	C	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	104	104	121	148	75	75	3589	77	159
normalized size	1	1.00	1.16	1.42	0.72	0.72	34.51	0.74	1.53
time (sec)	N/A	0.085	0.138	0.003	2.579	0.997	98.602	0.228	0.951

Problem 17	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	F(-1)	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	127	127	150	204	83	83	0	85	199
normalized size	1	1.00	1.18	1.61	0.65	0.65	0.00	0.67	1.57
time (sec)	N/A	0.101	0.481	0.003	2.385	1.299	0.000	0.291	1.127

Problem 18	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	B	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	136	136	165	241	92	92	0	94	1209
normalized size	1	1.00	1.21	1.77	0.68	0.68	0.00	0.69	8.89
time (sec)	N/A	0.140	0.603	0.006	2.618	4.555	0.000	0.301	6.108

Problem 19	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	B	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	151	151	187	303	106	106	0	108	1509
normalized size	1	1.00	1.24	2.01	0.70	0.70	0.00	0.72	9.99
time (sec)	N/A	0.176	0.582	0.006	2.367	17.273	0.000	0.307	7.805

Problem 20	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	189	189	194	231	0	0	0	1248	1308
normalized size	1	1.00	1.03	1.22	0.00	0.00	0.00	6.60	6.92
time (sec)	N/A	0.211	0.251	0.034	0.000	0.000	0.000	4.590	1.316

Problem 21	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	211	211	234	616	0	0	0	1618	3942
normalized size	1	1.00	1.11	2.92	0.00	0.00	0.00	7.67	18.68
time (sec)	N/A	0.240	0.219	0.031	0.000	0.000	0.000	3.540	2.139

Problem 22	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	245	245	280	866	0	0	0	3272	15179
normalized size	1	1.00	1.14	3.53	0.00	0.00	0.00	13.36	61.96
time (sec)	N/A	0.159	0.289	0.033	0.000	0.000	0.000	2.827	2.539

Problem 23	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	290	290	383	1132	0	0	0	5201	5981
normalized size	1	1.00	1.32	3.90	0.00	0.00	0.00	17.93	20.62
time (sec)	N/A	0.725	0.500	0.042	0.000	0.000	0.000	4.908	1.749

Problem 24	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	321	321	441	1435	0	0	0	6096	11383
normalized size	1	1.00	1.37	4.47	0.00	0.00	0.00	18.99	35.46
time (sec)	N/A	0.534	0.647	0.043	0.000	0.000	0.000	3.720	2.030

Problem 25	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	545	545	816	3835	0	0	0	11831	49150
normalized size	1	1.00	1.50	7.04	0.00	0.00	0.00	21.71	90.18
time (sec)	N/A	4.213	1.293	0.080	0.000	0.000	0.000	7.208	4.306

Problem 26	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	94	94	90	122	83	169	604	93	84
normalized size	1	1.00	0.96	1.30	0.88	1.80	6.43	0.99	0.89
time (sec)	N/A	0.052	0.054	0.019	1.677	1.317	3.565	0.230	0.088

Problem 27	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	115	115	112	182	106	217	2689	115	107
normalized size	1	1.00	0.97	1.58	0.92	1.89	23.38	1.00	0.93
time (sec)	N/A	0.140	0.080	0.018	1.068	1.464	118.426	0.252	0.104

Problem 28	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	138	138	134	242	127	262	0	136	128
normalized size	1	1.00	0.97	1.75	0.92	1.90	0.00	0.99	0.93
time (sec)	N/A	0.154	0.054	0.023	0.971	1.855	0.000	0.253	0.136

Problem 29	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	150	150	159	302	145	304	0	158	146
normalized size	1	1.00	1.06	2.01	0.97	2.03	0.00	1.05	0.97
time (sec)	N/A	0.214	0.072	0.017	1.183	5.398	0.000	0.298	0.870

Problem 30	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	162	162	185	362	163	346	0	179	164
normalized size	1	1.00	1.14	2.23	1.01	2.14	0.00	1.10	1.01
time (sec)	N/A	0.232	0.086	0.020	1.349	25.374	0.000	0.316	0.583

Problem 31	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	C	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	140	140	146	146	96	154	952	100	149
normalized size	1	1.00	1.04	1.04	0.69	1.10	6.80	0.71	1.06
time (sec)	N/A	0.098	0.489	0.014	2.417	1.089	3.495	0.239	0.252

Problem 32	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	C	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	165	165	186	214	120	212	4106	128	201
normalized size	1	1.00	1.13	1.30	0.73	1.28	24.88	0.78	1.22
time (sec)	N/A	0.129	0.419	0.013	2.391	0.928	108.823	0.234	0.315

Problem 33	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	F(-1)	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	179	179	200	260	135	239	0	142	237
normalized size	1	1.00	1.12	1.45	0.75	1.34	0.00	0.79	1.32
time (sec)	N/A	0.141	0.434	0.016	2.581	1.475	0.000	0.308	1.154

Problem 34	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	F(-1)	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	187	187	234	328	143	255	0	155	1547
normalized size	1	1.00	1.25	1.75	0.76	1.36	0.00	0.83	8.27
time (sec)	N/A	0.167	0.606	0.015	2.951	4.343	0.000	0.318	5.349

Problem 35	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	B	A	A	F(-1)	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	194	194	243	374	155	279	0	169	1894
normalized size	1	1.00	1.25	1.93	0.80	1.44	0.00	0.87	9.76
time (sec)	N/A	0.197	0.659	0.015	2.628	19.792	0.000	0.305	8.177

Problem 36	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	330	330	341	1237	0	0	0	3434	2382
normalized size	1	1.00	1.03	3.75	0.00	0.00	0.00	10.41	7.22
time (sec)	N/A	0.745	0.756	0.145	0.000	0.000	0.000	5.020	1.504

Problem 37	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	368	368	398	1813	0	0	0	5164	4707
normalized size	1	1.00	1.08	4.93	0.00	0.00	0.00	14.03	12.79
time (sec)	N/A	0.870	1.170	0.179	0.000	0.000	0.000	6.669	1.709

Problem 38	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	386	386	421	2310	0	0	0	5579	7373
normalized size	1	1.00	1.09	5.98	0.00	0.00	0.00	14.45	19.10
time (sec)	N/A	0.490	1.296	0.175	0.000	0.000	0.000	6.114	1.771

Problem 39	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	439	439	489	1801	0	0	0	7502	13024
normalized size	1	1.00	1.11	4.10	0.00	0.00	0.00	17.09	29.67
time (sec)	N/A	1.894	1.882	0.070	0.000	0.000	0.000	8.028	2.306

Problem 40	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	468	468	524	1917	0	0	0	0	18449
normalized size	1	1.00	1.12	4.10	0.00	0.00	0.00	0.00	39.42
time (sec)	N/A	1.118	2.112	0.049	0.000	0.000	0.000	0.000	3.116

Problem 41	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	770	770	935	4570	0	0	0	0	82785
normalized size	1	1.00	1.21	5.94	0.00	0.00	0.00	0.00	107.51
time (sec)	N/A	7.835	5.697	0.104	0.000	0.000	0.000	0.000	13.909

Problem 42	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	143	143	128	186	121	307	668	123	118
normalized size	1	1.00	0.90	1.30	0.85	2.15	4.67	0.86	0.83
time (sec)	N/A	0.076	0.098	0.020	1.062	1.495	3.687	0.334	0.092

Problem 43	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	175	175	161	278	155	389	2822	157	151
normalized size	1	1.00	0.92	1.59	0.89	2.22	16.13	0.90	0.86
time (sec)	N/A	0.224	0.126	0.023	1.098	1.917	124.287	0.353	0.113

Problem 44	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	204	204	193	370	188	470	0	190	182
normalized size	1	1.00	0.95	1.81	0.92	2.30	0.00	0.93	0.89
time (sec)	N/A	0.252	0.084	0.022	1.082	2.865	0.000	0.394	0.847

Problem 45	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	224	224	231	462	214	544	0	224	209
normalized size	1	1.00	1.03	2.06	0.96	2.43	0.00	1.00	0.93
time (sec)	N/A	0.307	0.118	0.022	1.065	6.125	0.000	0.333	0.248

Problem 46	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	239	239	261	554	238	616	0	257	233
normalized size	1	1.00	1.09	2.32	1.00	2.58	0.00	1.08	0.97
time (sec)	N/A	0.345	0.129	0.021	1.117	27.719	0.000	0.370	0.616

Problem 47	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	C	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	185	185	186	180	137	278	1103	131	185
normalized size	1	1.00	1.01	0.97	0.74	1.50	5.96	0.71	1.00
time (sec)	N/A	0.117	0.746	0.017	2.554	0.734	3.615	0.362	0.260

Problem 48	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	C	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	223	223	235	264	173	384	4496	171	249
normalized size	1	1.00	1.05	1.18	0.78	1.72	20.16	0.77	1.12
time (sec)	N/A	0.215	0.592	0.017	2.568	0.893	117.113	0.365	1.008

Problem 49	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	A	F(-1)	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	243	243	259	322	200	435	0	198	295
normalized size	1	1.00	1.07	1.33	0.82	1.79	0.00	0.81	1.21
time (sec)	N/A	0.227	0.658	0.019	2.606	2.172	0.000	0.379	1.170

Problem 50	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	B	F(-1)	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	263	263	303	396	217	485	0	228	1611
normalized size	1	1.00	1.15	1.51	0.83	1.84	0.00	0.87	6.13
time (sec)	N/A	0.263	0.904	0.023	3.147	5.214	0.000	0.388	5.453

Problem 51	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	A	B	F(-1)	A	B
verified	N/A	Yes	NO	TBD	TBD	TBD	TBD	TBD	TBD
size	269	269	325	454	229	521	0	255	1963
normalized size	1	1.00	1.21	1.69	0.85	1.94	0.00	0.95	7.30
time (sec)	N/A	0.286	0.977	0.019	2.120	23.869	0.000	0.375	8.217

Problem 52	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	474	474	488	3725	0	0	0	3397	4225
normalized size	1	1.00	1.03	7.86	0.00	0.00	0.00	7.17	8.91
time (sec)	N/A	2.193	1.911	0.359	0.000	0.000	0.000	13.320	2.344

Problem 53	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	621	621	625	7858	0	0	0	5288	8689
normalized size	1	1.00	1.01	12.65	0.00	0.00	0.00	8.52	13.99
time (sec)	N/A	4.512	3.609	0.616	0.000	0.000	0.000	10.792	3.265

Problem 54	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	646	646	661	10222	0	0	0	5439	13431
normalized size	1	1.00	1.02	15.82	0.00	0.00	0.00	8.42	20.79
time (sec)	N/A	3.299	4.293	0.448	0.000	0.000	0.000	10.391	4.558

Problem 55	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	679	679	845	3492	0	0	0	6861	23811
normalized size	1	1.00	1.24	5.14	0.00	0.00	0.00	10.10	35.07
time (sec)	N/A	4.182	6.548	0.096	0.000	0.000	0.000	13.218	5.347

Problem 56	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	728	728	980	3824	0	0	0	0	36653
normalized size	1	1.00	1.35	5.25	0.00	0.00	0.00	0.00	50.35
time (sec)	N/A	2.733	6.674	0.063	0.000	0.000	0.000	0.000	7.160

Problem 57	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	1150	1144	1590	6026	0	0	0	0	114377
normalized size	1	0.99	1.38	5.24	0.00	0.00	0.00	0.00	99.46
time (sec)	N/A	8.164	7.480	0.125	0.000	0.000	0.000	0.000	20.572

Problem 58	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	645	645	775	3107	0	0	0	0	53538
normalized size	1	1.00	1.20	4.82	0.00	0.00	0.00	0.00	83.00
time (sec)	N/A	3.367	4.405	0.089	0.000	0.000	0.000	0.000	8.852

Problem 59	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	F(-1)	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	1177	1179	1649	6130	0	0	0	0	97905
normalized size	1	1.00	1.40	5.21	0.00	0.00	0.00	0.00	83.18
time (sec)	N/A	7.926	7.346	0.129	0.000	0.000	0.000	0.000	17.175

Problem 60	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	416	416	416	829	418	463	503	478	398
normalized size	1	1.00	1.00	1.99	1.00	1.11	1.21	1.15	0.96
time (sec)	N/A	0.629	0.122	0.003	0.517	0.809	0.161	0.428	0.383

Problem 61	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	259	259	259	354	251	285	309	295	246
normalized size	1	1.00	1.00	1.37	0.97	1.10	1.19	1.14	0.95
time (sec)	N/A	0.332	0.046	0.002	0.698	0.696	0.125	0.306	0.948

Problem 62	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	154	154	154	161	138	151	165	157	138
normalized size	1	1.00	1.00	1.05	0.90	0.98	1.07	1.02	0.90
time (sec)	N/A	0.152	0.032	0.001	0.588	0.725	0.096	0.284	0.089

Problem 63	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	20	20	20	17	16	16	15	17	16
normalized size	1	1.00	1.00	0.85	0.80	0.80	0.75	0.85	0.80
time (sec)	N/A	0.033	0.002	0.001	0.617	0.896	0.090	1.774	0.027

Problem 64	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	211	211	234	616	0	0	0	1620	3942
normalized size	1	1.00	1.11	2.92	0.00	0.00	0.00	7.68	18.68
time (sec)	N/A	0.318	0.059	0.024	0.000	0.000	0.000	4.239	1.174

Problem 65	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	368	368	398	1813	0	0	0	5164	4707
normalized size	1	1.00	1.08	4.93	0.00	0.00	0.00	14.03	12.79
time (sec)	N/A	0.923	1.197	0.140	0.000	0.000	0.000	11.929	1.523

Problem 66	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	B	F	F(-1)	F(-1)	B	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	621	621	625	7858	0	0	0	5288	8689
normalized size	1	1.00	1.01	12.65	0.00	0.00	0.00	8.52	13.99
time (sec)	N/A	4.594	3.584	0.381	0.000	0.000	0.000	6.426	3.161

Problem 67	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	4	4	4	5	4	4	3	5	4
normalized size	1	1.00	1.00	1.25	1.00	1.00	0.75	1.25	1.00
time (sec)	N/A	0.011	0.001	0.002	0.430	0.774	0.069	0.307	0.018

Problem 68	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	14	14	16	18	14	14	12	17	14
normalized size	1	1.00	1.14	1.29	1.00	1.00	0.86	1.21	1.00
time (sec)	N/A	0.024	0.004	0.003	0.436	1.301	0.121	0.331	0.728

Problem 69	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	31	31	30	35	27	27	26	30	27
normalized size	1	1.00	0.97	1.13	0.87	0.87	0.84	0.97	0.87
time (sec)	N/A	0.052	0.012	0.003	0.455	1.187	0.146	0.278	0.037

Problem 70	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	51	51	45	58	43	43	41	49	44
normalized size	1	1.00	0.88	1.14	0.84	0.84	0.80	0.96	0.86
time (sec)	N/A	0.085	0.025	0.003	0.448	1.239	0.176	0.248	0.038

Problem 71	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	68	87	62	62	63	74	64
normalized size	1	1.00	1.00	1.28	0.91	0.91	0.93	1.09	0.94
time (sec)	N/A	0.117	0.018	0.002	0.436	1.209	0.209	0.230	0.034

Problem 72	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	92	92	92	122	84	84	88	105	87
normalized size	1	1.00	1.00	1.33	0.91	0.91	0.96	1.14	0.95
time (sec)	N/A	0.149	0.032	0.003	0.463	0.896	0.247	0.267	0.038

Problem 73	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	11	11	11	12	11	11	8	13	8
normalized size	1	1.00	1.00	1.09	1.00	1.00	0.73	1.18	0.73
time (sec)	N/A	0.010	0.003	0.004	0.429	0.926	0.107	0.279	0.083

Problem 74	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	22	22	23	29	22	22	29	26	22
normalized size	1	1.00	1.05	1.32	1.00	1.00	1.32	1.18	1.00
time (sec)	N/A	0.021	0.007	0.004	0.437	0.829	0.283	0.285	0.799

Problem 75	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	30	45	29	29	44	33	29
normalized size	1	1.00	1.03	1.55	1.00	1.00	1.52	1.14	1.00
time (sec)	N/A	0.050	0.013	0.006	0.434	0.951	0.510	0.250	0.071

Problem 76	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	47	47	44	69	45	45	66	49	45
normalized size	1	1.00	0.94	1.47	0.96	0.96	1.40	1.04	0.96
time (sec)	N/A	0.068	0.019	0.006	0.448	0.837	0.858	0.228	0.764

Problem 77	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	66	66	67	98	62	62	94	69	63
normalized size	1	1.00	1.02	1.48	0.94	0.94	1.42	1.05	0.95
time (sec)	N/A	0.085	0.023	0.008	0.444	0.825	1.531	0.293	0.074

Problem 78	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	90	90	91	134	84	84	122	97	86
normalized size	1	1.00	1.01	1.49	0.93	0.93	1.36	1.08	0.96
time (sec)	N/A	0.107	0.036	0.007	0.441	0.816	2.591	0.388	0.084

Problem 79	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	29	29	29	20	19	19	19	22	19
normalized size	1	1.00	1.00	0.69	0.66	0.66	0.66	0.76	0.66
time (sec)	N/A	0.021	0.007	0.008	0.439	0.899	0.141	0.237	0.078

Problem 80	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	42	42	39	44	32	32	304	38	38
normalized size	1	1.00	0.93	1.05	0.76	0.76	7.24	0.90	0.90
time (sec)	N/A	0.052	0.019	0.006	0.444	0.751	1.760	0.287	0.843

Problem 81	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	47	47	44	65	37	37	716	43	47
normalized size	1	1.00	0.94	1.38	0.79	0.79	15.23	0.91	1.00
time (sec)	N/A	0.064	0.021	0.006	0.436	0.928	12.723	0.367	0.111

Problem 82	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	55	89	47	47	1389	53	59
normalized size	1	1.00	0.96	1.56	0.82	0.82	24.37	0.93	1.04
time (sec)	N/A	0.079	0.025	0.007	0.438	0.926	91.466	0.374	0.820

Problem 83	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	74	74	71	120	62	62	0	68	78
normalized size	1	1.00	0.96	1.62	0.84	0.84	0.00	0.92	1.05
time (sec)	N/A	0.107	0.033	0.007	0.450	1.032	0.000	0.328	0.880

Problem 84	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	96	96	91	156	82	82	0	90	99
normalized size	1	1.00	0.95	1.62	0.85	0.85	0.00	0.94	1.03
time (sec)	N/A	0.137	0.046	0.009	0.449	1.300	0.000	0.243	0.883

Problem 85	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	46	46	42	33	32	45	34	36	32
normalized size	1	1.00	0.91	0.72	0.70	0.98	0.74	0.78	0.70
time (sec)	N/A	0.051	0.022	0.010	0.436	0.946	0.260	0.252	0.049

Problem 86	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	71	71	66	74	57	93	1188	66	64
normalized size	1	1.00	0.93	1.04	0.80	1.31	16.73	0.93	0.90
time (sec)	N/A	0.174	0.047	0.010	0.439	0.971	10.543	0.256	0.807

Problem 87	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	82	82	77	110	68	116	0	77	79
normalized size	1	1.00	0.94	1.34	0.83	1.41	0.00	0.94	0.96
time (sec)	N/A	0.199	0.061	0.010	0.461	1.100	0.000	0.251	0.842

Problem 88	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	95	95	90	146	81	141	0	90	94
normalized size	1	1.00	0.95	1.54	0.85	1.48	0.00	0.95	0.99
time (sec)	N/A	0.221	0.049	0.013	0.444	2.419	0.000	0.329	0.876

Problem 89	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	106	106	102	182	92	164	0	101	108
normalized size	1	1.00	0.96	1.72	0.87	1.55	0.00	0.95	1.02
time (sec)	N/A	0.266	0.057	0.010	0.442	11.237	0.000	0.289	1.364

Problem 90	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	118	221	108	200	0	117	127
normalized size	1	1.00	0.97	1.81	0.89	1.64	0.00	0.96	1.04
time (sec)	N/A	0.315	0.063	0.013	0.450	66.478	0.000	0.367	1.673

Problem 91	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	56	56	48	40	42	72	46	46	42
normalized size	1	1.00	0.86	0.71	0.75	1.29	0.82	0.82	0.75
time (sec)	N/A	0.057	0.024	0.010	0.433	0.740	0.291	0.351	0.046

Problem 92	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	A	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	89	89	80	90	75	153	1255	85	79
normalized size	1	1.00	0.90	1.01	0.84	1.72	14.10	0.96	0.89
time (sec)	N/A	0.260	0.051	0.013	0.454	0.723	10.508	0.381	0.101

Problem 93	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	105	97	134	91	191	0	101	97
normalized size	1	1.00	0.92	1.28	0.87	1.82	0.00	0.96	0.92
time (sec)	N/A	0.320	0.074	0.013	0.442	0.880	0.000	0.322	0.828

Problem 94	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	117	117	114	178	107	229	0	117	115
normalized size	1	1.00	0.97	1.52	0.91	1.96	0.00	1.00	0.98
time (sec)	N/A	0.246	0.055	0.015	0.440	2.548	0.000	0.380	0.905

Problem 95	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	131	131	136	222	123	267	0	133	133
normalized size	1	1.00	1.04	1.69	0.94	2.04	0.00	1.02	1.02
time (sec)	N/A	0.280	0.062	0.013	0.454	11.825	0.000	0.328	1.332

Problem 96	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	147	147	153	266	139	305	0	149	151
normalized size	1	1.00	1.04	1.81	0.95	2.07	0.00	1.01	1.03
time (sec)	N/A	0.330	0.083	0.014	0.452	70.058	0.000	0.394	1.680

Problem 97	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	A	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	68	68	60	47	52	103	53	56	52
normalized size	1	1.00	0.88	0.69	0.76	1.51	0.78	0.82	0.76
time (sec)	N/A	0.058	0.031	0.013	0.442	0.655	0.305	0.400	0.046

Problem 98	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	B	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	105	105	97	106	88	211	1034	98	90
normalized size	1	1.00	0.92	1.01	0.84	2.01	9.85	0.93	0.86
time (sec)	N/A	0.196	0.089	0.014	0.441	0.938	8.787	0.311	0.093

Problem 99	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	122	122	121	158	108	267	0	118	113
normalized size	1	1.00	0.99	1.30	0.89	2.19	0.00	0.97	0.93
time (sec)	N/A	0.222	0.051	0.015	0.442	1.241	0.000	0.326	0.126

Problem 100	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	141	141	144	210	126	321	0	136	131
normalized size	1	1.00	1.02	1.49	0.89	2.28	0.00	0.96	0.93
time (sec)	N/A	0.253	0.074	0.017	0.447	2.534	0.000	0.320	0.881

Problem 101	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	158	158	169	262	145	376	0	155	152
normalized size	1	1.00	1.07	1.66	0.92	2.38	0.00	0.98	0.96
time (sec)	N/A	0.289	0.090	0.016	0.450	12.105	0.000	0.365	1.392

Problem 102	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	A	A	A	B	F(-1)	A	B
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	177	177	195	314	163	430	0	173	170
normalized size	1	1.00	1.10	1.77	0.92	2.43	0.00	0.98	0.96
time (sec)	N/A	0.343	0.108	0.017	0.462	70.992	0.000	0.430	1.755

Problem 103	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	B	F	F	F	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	717	717	0	3038	0	0	0	0	-1
normalized size	1	1.00	0.00	4.24	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.596	0.000	0.019	0.000	1.554	0.000	0.000	0.000

Problem 104	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	B	F	F	F	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	505	505	0	1585	0	0	0	0	-1
normalized size	1	1.00	0.00	3.14	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.279	0.000	0.014	0.000	1.514	0.000	0.000	0.000

Problem 105	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	C	A	F	F	F	F	F
verified	N/A	Yes	Yes	TBD	TBD	TBD	TBD	TBD	TBD
size	359	359	526	453	0	0	0	0	-1
normalized size	1	1.00	1.47	1.26	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.159	1.382	0.011	0.000	0.984	0.000	0.000	0.000

Problem 106	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	B	F	F	F	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	447	447	0	1005	0	0	0	0	-1
normalized size	1	1.00	0.00	2.25	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.273	0.000	0.026	0.000	0.607	0.000	0.000	0.000

Problem 107	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	B	F	F	F(-1)	F	F
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	680	680	0	1395	0	0	0	0	-1
normalized size	1	1.00	0.00	2.05	0.00	0.00	0.00	0.00	-0.00
time (sec)	N/A	0.515	0.000	0.057	0.000	0.962	0.000	0.000	0.000

Problem 108	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	A	A	A	F	B	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	19	19	0	18	17	17	0	60	17
normalized size	1	1.00	0.00	0.95	0.89	0.89	0.00	3.16	0.89
time (sec)	N/A	0.018	0.000	0.005	0.633	0.715	0.000	1.911	0.987

Problem 109	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	A	A	A	F	B	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	0	52	51	82	0	142	51
normalized size	1	1.00	0.00	0.91	0.89	1.44	0.00	2.49	0.89
time (sec)	N/A	0.067	0.000	0.005	0.638	0.825	0.000	2.012	0.928

Problem 110	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	A	A	A	F	B	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	57	57	0	53	49	80	0	136	51
normalized size	1	1.00	0.00	0.93	0.86	1.40	0.00	2.39	0.89
time (sec)	N/A	0.080	0.000	0.005	0.630	0.608	0.000	1.946	0.957

Problem 111	Optimal	Rubi	Mathematica	Maple	Maxima	Fricas	Sympy	Giac	Mupad
grade	A	A	F(-1)	A	A	A	F	B	B
verified	N/A	Yes	N/A	TBD	TBD	TBD	TBD	TBD	TBD
size	69	69	0	63	94	92	0	166	62
normalized size	1	1.00	0.00	0.91	1.36	1.33	0.00	2.41	0.90
time (sec)	N/A	0.091	0.000	0.005	0.678	0.754	0.000	2.099	0.977

2.3 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 [47] had the largest ratio of [.6875]

Table 2.1: Rubi specific breakdown of results for each integral

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
1	A	2	1	1.00	18	0.056
2	A	2	1	1.00	23	0.043
3	A	2	1	1.00	28	0.036
4	A	2	1	1.00	33	0.030
5	A	2	1	1.00	38	0.026
6	A	2	1	1.00	20	0.050
7	A	2	1	1.00	25	0.040
8	A	2	1	1.00	30	0.033
9	A	2	1	1.00	35	0.029
10	A	10	7	1.00	18	0.389
11	A	9	7	1.00	23	0.304
12	A	8	6	1.00	28	0.214
13	A	10	7	1.00	33	0.212
14	A	12	8	1.00	38	0.210
15	A	15	8	1.00	16	0.500
16	A	14	8	1.00	21	0.381
17	A	15	7	1.00	26	0.269
18	A	17	8	1.00	31	0.258
19	A	19	9	1.00	36	0.250
20	A	9	7	1.00	20	0.350
21	A	8	7	1.00	25	0.280
22	A	9	8	1.00	30	0.267
23	A	11	9	1.00	35	0.257
24	A	13	10	1.00	40	0.250
25	A	13	10	1.00	55	0.182

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
26	A	12	9	1.00	18	0.500
27	A	11	9	1.00	23	0.391
28	A	10	8	1.00	28	0.286
29	A	10	8	1.00	33	0.242
30	A	11	9	1.00	38	0.237
31	A	17	10	1.00	16	0.625
32	A	16	10	1.00	21	0.476
33	A	15	9	1.00	26	0.346
34	A	15	9	1.00	31	0.290
35	A	16	10	1.00	36	0.278
36	A	11	9	1.00	20	0.450
37	A	10	9	1.00	25	0.360
38	A	9	8	1.00	30	0.267
39	A	9	8	1.00	35	0.229
40	A	10	9	1.00	40	0.225
41	A	13	11	1.00	55	0.200
42	A	14	10	1.00	18	0.556
43	A	13	9	1.00	23	0.391
44	A	12	9	1.00	28	0.321
45	A	12	10	1.00	33	0.303
46	A	13	11	1.00	38	0.290
47	A	19	11	1.00	16	0.688
48	A	18	10	1.00	21	0.476
49	A	17	10	1.00	26	0.385
50	A	17	11	1.00	31	0.355
51	A	18	12	1.00	36	0.333

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
52	A	13	10	1.00	20	0.500
53	A	12	9	1.00	25	0.360
54	A	11	9	1.00	30	0.300
55	A	11	10	1.00	35	0.286
56	A	12	11	1.00	40	0.275
57	A	11	9	0.99	55	0.164
58	A	11	10	1.00	50	0.200
59	A	13	10	1.00	50	0.200
60	A	2	1	1.00	63	0.016
61	A	2	1	1.00	63	0.016
62	A	2	1	1.00	61	0.016
63	A	2	1	1.00	63	0.016
64	A	9	8	1.00	63	0.127
65	A	11	10	1.00	63	0.159
66	A	13	10	1.00	63	0.159
67	A	2	2	1.00	26	0.077
68	A	3	2	1.00	31	0.065
69	A	3	2	1.00	36	0.056
70	A	3	2	1.00	41	0.049
71	A	3	2	1.00	46	0.043
72	A	3	2	1.00	51	0.039
73	A	4	3	1.00	21	0.143
74	A	4	3	1.00	26	0.115
75	A	6	4	1.00	31	0.129
76	A	6	4	1.00	36	0.111
77	A	6	4	1.00	41	0.098

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
78	A	6	4	1.00	46	0.087
79	A	3	2	1.00	16	0.125
80	A	3	2	1.00	21	0.095
81	A	3	2	1.00	26	0.077
82	A	3	2	1.00	31	0.065
83	A	3	2	1.00	36	0.056
84	A	3	2	1.00	41	0.049
85	A	3	2	1.00	26	0.077
86	A	3	2	1.00	31	0.065
87	A	3	2	1.00	36	0.056
88	A	3	2	1.00	41	0.049
89	A	3	2	1.00	46	0.043
90	A	3	2	1.00	51	0.039
91	A	9	5	1.00	21	0.238
92	A	9	5	1.00	26	0.192
93	A	9	5	1.00	31	0.161
94	A	3	2	1.00	36	0.056
95	A	3	2	1.00	41	0.049
96	A	3	2	1.00	46	0.043
97	A	3	2	1.00	16	0.125
98	A	3	2	1.00	21	0.095
99	A	3	2	1.00	26	0.077
100	A	3	2	1.00	31	0.065
101	A	3	2	1.00	36	0.056
102	A	3	2	1.00	41	0.049
103	A	12	10	1.00	32	0.312

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Table 2.1 – continued from previous page

#	grade	number of steps used	number of unique rules	normalized antiderivative leaf size	integrand leaf size	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
104	A	10	10	1.00	32	0.312
105	A	8	8	1.00	32	0.250
106	A	7	7	1.00	32	0.219
107	A	9	8	1.00	32	0.250
108	A	1	1	1.00	28	0.036
109	A	5	5	1.00	31	0.161
110	A	5	5	1.00	33	0.152
111	A	4	4	1.00	36	0.111

Chapter 3

Listing of integrals

3.1 $\int (d + ex) (a + bx^2 + cx^4) dx$

Optimal. Leaf size=50

$$adx + \frac{1}{2}aex^2 + \frac{1}{3}bdx^3 + \frac{1}{4}bex^4 + \frac{1}{5}cdx^5 + \frac{1}{6}cex^6$$

[Out] $a*d*x+1/2*a*e*x^2+1/3*b*d*x^3+1/4*b*e*x^4+1/5*c*d*x^5+1/6*c*e*x^6$

Rubi [A] time = 0.04, antiderivative size = 50, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {1671}

$$adx + \frac{1}{2}aex^2 + \frac{1}{3}bdx^3 + \frac{1}{4}bex^4 + \frac{1}{5}cdx^5 + \frac{1}{6}cex^6$$

Antiderivative was successfully verified.

[In] $\text{Int}[(d + e*x)*(a + b*x^2 + c*x^4), x]$

[Out] $a*d*x + (a*e*x^2)/2 + (b*d*x^3)/3 + (b*e*x^4)/4 + (c*d*x^5)/5 + (c*e*x^6)/6$

Rule 1671

$\text{Int}[(Pq_)*((a_)+(b_)*(x_)^2+(c_)*(x_)^4)^(p_), x_Symbol] \rightarrow \text{Int}[\text{ExpandIntegrand}[Pq*(a + b*x^2 + c*x^4)^p, x], x] /;$ FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\int (d + ex)(a + bx^2 + cx^4) dx = \int (ad + aex + bdx^2 + bex^3 + cdx^4 + cex^5) dx$$

$$= adx + \frac{1}{2}aex^2 + \frac{1}{3}bdx^3 + \frac{1}{4}bex^4 + \frac{1}{5}cdx^5 + \frac{1}{6}cex^6$$

Mathematica [A] time = 0.00, size = 50, normalized size = 1.00

$$adx + \frac{1}{2}aex^2 + \frac{1}{3}bdx^3 + \frac{1}{4}bex^4 + \frac{1}{5}cdx^5 + \frac{1}{6}cex^6$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x)*(a + b*x^2 + c*x^4),x]

[Out] a*d*x + (a*e*x^2)/2 + (b*d*x^3)/3 + (b*e*x^4)/4 + (c*d*x^5)/5 + (c*e*x^6)/6

fricas [A] time = 0.51, size = 40, normalized size = 0.80

$$\frac{1}{6}x^6ec + \frac{1}{5}x^5dc + \frac{1}{4}x^4eb + \frac{1}{3}x^3db + \frac{1}{2}x^2ea + xda$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(c*x^4+b*x^2+a),x, algorithm="fricas")

[Out] 1/6*x^6*e*c + 1/5*x^5*d*c + 1/4*x^4*e*b + 1/3*x^3*d*b + 1/2*x^2*e*a + x*d*a

giac [A] time = 0.32, size = 43, normalized size = 0.86

$$\frac{1}{6}cx^6e + \frac{1}{5}cdx^5 + \frac{1}{4}bx^4e + \frac{1}{3}bdx^3 + \frac{1}{2}ax^2e + adx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(c*x^4+b*x^2+a),x, algorithm="giac")

[Out] 1/6*c*x^6*e + 1/5*c*d*x^5 + 1/4*b*x^4*e + 1/3*b*d*x^3 + 1/2*a*x^2*e + a*d*x

maple [A] time = 0.00, size = 41, normalized size = 0.82

$$\frac{1}{6}ce x^6 + \frac{1}{5}cd x^5 + \frac{1}{4}be x^4 + \frac{1}{3}bd x^3 + \frac{1}{2}ae x^2 + adx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x+d)*(c*x^4+b*x^2+a),x)

[Out] $a*d*x+1/2*a*e*x^2+1/3*b*d*x^3+1/4*b*e*x^4+1/5*c*d*x^5+1/6*c*e*x^6$

maxima [A] time = 1.25, size = 40, normalized size = 0.80

$$\frac{1}{6}cex^6 + \frac{1}{5}cdx^5 + \frac{1}{4}bex^4 + \frac{1}{3}bdx^3 + \frac{1}{2}aex^2 + adx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)*(c*x^4+b*x^2+a),x, algorithm="maxima")`

[Out] $1/6*c*e*x^6 + 1/5*c*d*x^5 + 1/4*b*e*x^4 + 1/3*b*d*x^3 + 1/2*a*e*x^2 + a*d*x$

mupad [B] time = 0.03, size = 40, normalized size = 0.80

$$\frac{cex^6}{6} + \frac{cdx^5}{5} + \frac{bex^4}{4} + \frac{bdx^3}{3} + \frac{aex^2}{2} + adx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((d + e*x)*(a + b*x^2 + c*x^4),x)`

[Out] $a*d*x + (a*e*x^2)/2 + (b*d*x^3)/3 + (b*e*x^4)/4 + (c*d*x^5)/5 + (c*e*x^6)/6$

sympy [A] time = 0.06, size = 46, normalized size = 0.92

$$adx + \frac{aex^2}{2} + \frac{bdx^3}{3} + \frac{bex^4}{4} + \frac{cdx^5}{5} + \frac{cex^6}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)*(c*x**4+b*x**2+a),x)`

[Out] $a*d*x + a*e*x**2/2 + b*d*x**3/3 + b*e*x**4/4 + c*d*x**5/5 + c*e*x**6/6$

3.2 $\int (d + ex + fx^2)(a + bx^2 + cx^4) dx$

Optimal. Leaf size=69

$$\frac{1}{3}x^3(af + bd) + adx + \frac{1}{2}aex^2 + \frac{1}{5}x^5(bf + cd) + \frac{1}{4}bex^4 + \frac{1}{6}cex^6 + \frac{1}{7}cfx^7$$

[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*b*e*x^4+1/5*(b*f+c*d)*x^5+1/6*c*e*x^6+1/7*c*f*x^7

Rubi [A] time = 0.04, antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.043$, Rules used = {1657}

$$\frac{1}{3}x^3(af + bd) + adx + \frac{1}{2}aex^2 + \frac{1}{5}x^5(bf + cd) + \frac{1}{4}bex^4 + \frac{1}{6}cex^6 + \frac{1}{7}cfx^7$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2)*(a + b*x^2 + c*x^4), x]

[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + (b*e*x^4)/4 + ((c*d + b*f)*x^5)/5 + (c*e*x^6)/6 + (c*f*x^7)/7

Rule 1657

Int[(Pq_)*((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol] := Int[Expand Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, -2]

Rubi steps

$$\begin{aligned} \int (d + ex + fx^2)(a + bx^2 + cx^4) dx &= \int (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx \\ &= adx + \frac{1}{2}aex^2 + \frac{1}{3}(bd + af)x^3 + \frac{1}{4}bex^4 + \frac{1}{5}(cd + bf)x^5 + \frac{1}{6}cex^6 + \frac{1}{7}cfx^7 \end{aligned}$$

Mathematica [A] time = 0.02, size = 69, normalized size = 1.00

$$\frac{1}{3}x^3(af + bd) + adx + \frac{1}{2}aex^2 + \frac{1}{5}x^5(bf + cd) + \frac{1}{4}bex^4 + \frac{1}{6}cex^6 + \frac{1}{7}cfx^7$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2)*(a + b*x^2 + c*x^4),x]

[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + (b*e*x^4)/4 + ((c*d + b*f)*x^5)/5 + (c*e*x^6)/6 + (c*f*x^7)/7

fricas [A] time = 0.79, size = 61, normalized size = 0.88

$$\frac{1}{7}x^7fc + \frac{1}{6}x^6ec + \frac{1}{5}x^5dc + \frac{1}{5}x^5fb + \frac{1}{4}x^4eb + \frac{1}{3}x^3db + \frac{1}{3}x^3fa + \frac{1}{2}x^2ea + xda$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)*(c*x^4+b*x^2+a),x, algorithm="fricas")

[Out] 1/7*x^7*f*c + 1/6*x^6*e*c + 1/5*x^5*d*c + 1/5*x^5*f*b + 1/4*x^4*e*b + 1/3*x^3*d*b + 1/3*x^3*f*a + 1/2*x^2*e*a + x*d*a

giac [A] time = 0.24, size = 64, normalized size = 0.93

$$\frac{1}{7}cfx^7 + \frac{1}{6}cx^6e + \frac{1}{5}cdx^5 + \frac{1}{5}bfx^5 + \frac{1}{4}bx^4e + \frac{1}{3}bdx^3 + \frac{1}{3}afx^3 + \frac{1}{2}ax^2e + adx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)*(c*x^4+b*x^2+a),x, algorithm="giac")

[Out] 1/7*c*f*x^7 + 1/6*c*x^6*e + 1/5*c*d*x^5 + 1/5*b*f*x^5 + 1/4*b*x^4*e + 1/3*b*d*x^3 + 1/3*a*f*x^3 + 1/2*a*x^2*e + a*d*x

maple [A] time = 0.00, size = 58, normalized size = 0.84

$$\frac{cfx^7}{7} + \frac{cex^6}{6} + \frac{bex^4}{4} + \frac{(bf+cd)x^5}{5} + \frac{aex^2}{2} + adx + \frac{(af+bd)x^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((f*x^2+e*x+d)*(c*x^4+b*x^2+a),x)

[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*b*e*x^4+1/5*(b*f+c*d)*x^5+1/6*c*e*x^6+1/7*c*f*x^7

maxima [A] time = 1.21, size = 57, normalized size = 0.83

$$\frac{1}{7}cfx^7 + \frac{1}{6}cex^6 + \frac{1}{4}bex^4 + \frac{1}{5}(cd+bf)x^5 + \frac{1}{2}aex^2 + \frac{1}{3}(bd+af)x^3 + adx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)*(c*x^4+b*x^2+a),x, algorithm="maxima")

[Out] $\frac{1}{7}cfx^7 + \frac{1}{6}cex^6 + \frac{1}{4}bex^4 + \frac{1}{5}(cd + bf)x^5 + \frac{1}{2}aex^2 + \frac{1}{3}(bd + af)x^3 + adx$

mupad [B] time = 0.03, size = 59, normalized size = 0.86

$$\frac{cfx^7}{7} + \frac{cex^6}{6} + \left(\frac{cd}{5} + \frac{bf}{5}\right)x^5 + \frac{bex^4}{4} + \left(\frac{bd}{3} + \frac{af}{3}\right)x^3 + \frac{aex^2}{2} + adx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((d + e*x + f*x^2)*(a + b*x^2 + c*x^4),x)`

[Out] $x^3*((b*d)/3 + (a*f)/3) + x^5*((c*d)/5 + (b*f)/5) + a*d*x + (a*e*x^2)/2 + (b*e*x^4)/4 + (c*e*x^6)/6 + (c*f*x^7)/7$

sympy [A] time = 0.07, size = 65, normalized size = 0.94

$$adx + \frac{aex^2}{2} + \frac{bex^4}{4} + \frac{cex^6}{6} + \frac{cfx^7}{7} + x^5\left(\frac{bf}{5} + \frac{cd}{5}\right) + x^3\left(\frac{af}{3} + \frac{bd}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((f*x**2+e*x+d)*(c*x**4+b*x**2+a),x)`

[Out] $a*d*x + a*e*x**2/2 + b*e*x**4/4 + c*e*x**6/6 + c*f*x**7/7 + x**5*(b*f/5 + c*d/5) + x**3*(a*f/3 + b*d/3)$

3.3 $\int (d + ex + fx^2 + gx^3)(a + bx^2 + cx^4) dx$

Optimal. Leaf size=88

$$\frac{1}{3}x^3(af + bd) + \frac{1}{4}x^4(ag + be) + adx + \frac{1}{2}aex^2 + \frac{1}{5}x^5(bf + cd) + \frac{1}{6}x^6(bg + ce) + \frac{1}{7}cfx^7 + \frac{1}{8}cgx^8$$

[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*(a*g+b*e)*x^4+1/5*(b*f+c*d)*x^5+1/6*(b*g+c*e)*x^6+1/7*c*f*x^7+1/8*c*g*x^8

Rubi [A] time = 0.07, antiderivative size = 88, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}} = 0.036$, Rules used = {1671}

$$\frac{1}{3}x^3(af + bd) + \frac{1}{4}x^4(ag + be) + adx + \frac{1}{2}aex^2 + \frac{1}{5}x^5(bf + cd) + \frac{1}{6}x^6(bg + ce) + \frac{1}{7}cfx^7 + \frac{1}{8}cgx^8$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3)*(a + b*x^2 + c*x^4), x]

[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + ((b*e + a*g)*x^4)/4 + ((c*d + b*f)*x^5)/5 + ((c*e + b*g)*x^6)/6 + (c*f*x^7)/7 + (c*g*x^8)/8

Rule 1671

Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :> Int[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\begin{aligned} \int (d + ex + fx^2 + gx^3)(a + bx^2 + cx^4) dx &= \int (ad + aex + (bd + af)x^2 + (be + ag)x^3 + (cd + bf)x^4 + (ce + bg)x^5 + (cf + cg)x^6) dx \\ &= adx + \frac{1}{2}aex^2 + \frac{1}{3}(bd + af)x^3 + \frac{1}{4}(be + ag)x^4 + \frac{1}{5}(cd + bf)x^5 + \frac{1}{6}(cf + cg)x^6 \end{aligned}$$

Mathematica [A] time = 0.02, size = 88, normalized size = 1.00

$$\frac{1}{3}x^3(af + bd) + \frac{1}{4}x^4(ag + be) + adx + \frac{1}{2}aex^2 + \frac{1}{5}x^5(bf + cd) + \frac{1}{6}x^6(bg + ce) + \frac{1}{7}cfx^7 + \frac{1}{8}cgx^8$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)*(a + b*x^2 + c*x^4),x]

[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + ((b*e + a*g)*x^4)/4 + ((c*d + b*f)*x^5)/5 + ((c*e + b*g)*x^6)/6 + (c*f*x^7)/7 + (c*g*x^8)/8

fricas [A] time = 0.50, size = 82, normalized size = 0.93

$$\frac{1}{8}x^8gc + \frac{1}{7}x^7fc + \frac{1}{6}x^6ec + \frac{1}{6}x^6gb + \frac{1}{5}x^5dc + \frac{1}{5}x^5fb + \frac{1}{4}x^4eb + \frac{1}{4}x^4ga + \frac{1}{3}x^3db + \frac{1}{3}x^3fa + \frac{1}{2}x^2ea + xda$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a),x, algorithm="fricas")

[Out] 1/8*x^8*g*c + 1/7*x^7*f*c + 1/6*x^6*e*c + 1/6*x^6*g*b + 1/5*x^5*d*c + 1/5*x^5*f*b + 1/4*x^4*e*b + 1/4*x^4*g*a + 1/3*x^3*d*b + 1/3*x^3*f*a + 1/2*x^2*e*a + x*d*a

giac [A] time = 0.22, size = 85, normalized size = 0.97

$$\frac{1}{8}cgx^8 + \frac{1}{7}cfx^7 + \frac{1}{6}bgx^6 + \frac{1}{6}cx^6e + \frac{1}{5}cdx^5 + \frac{1}{5}bfx^5 + \frac{1}{4}agx^4 + \frac{1}{4}bx^4e + \frac{1}{3}bdx^3 + \frac{1}{3}afx^3 + \frac{1}{2}ax^2e + adx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a),x, algorithm="giac")

[Out] 1/8*c*g*x^8 + 1/7*c*f*x^7 + 1/6*b*g*x^6 + 1/6*c*x^6*e + 1/5*c*d*x^5 + 1/5*b*f*x^5 + 1/4*a*g*x^4 + 1/4*b*x^4*e + 1/3*b*d*x^3 + 1/3*a*f*x^3 + 1/2*a*x^2*e + a*d*x

maple [A] time = 0.00, size = 75, normalized size = 0.85

$$\frac{cgx^8}{8} + \frac{cfx^7}{7} + \frac{(bg+ce)x^6}{6} + \frac{(bf+cd)x^5}{5} + \frac{aex^2}{2} + \frac{(ag+be)x^4}{4} + adx + \frac{(af+bd)x^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a),x)

[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*(a*g+b*e)*x^4+1/5*(b*f+c*d)*x^5+1/6*(b*g+c*e)*x^6+1/7*c*f*x^7+1/8*c*g*x^8

maxima [A] time = 1.56, size = 74, normalized size = 0.84

$$\frac{1}{8}cgx^8 + \frac{1}{7}cfx^7 + \frac{1}{6}(ce+bg)x^6 + \frac{1}{5}(cd+bf)x^5 + \frac{1}{4}(be+ag)x^4 + \frac{1}{2}aex^2 + \frac{1}{3}(bd+af)x^3 + adx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a),x, algorithm="maxima")

[Out] 1/8*c*g*x^8 + 1/7*c*f*x^7 + 1/6*(c*e + b*g)*x^6 + 1/5*(c*d + b*f)*x^5 + 1/4*(b*e + a*g)*x^4 + 1/2*a*e*x^2 + 1/3*(b*d + a*f)*x^3 + a*d*x

mupad [B] time = 0.66, size = 78, normalized size = 0.89

$$\frac{c g x^8}{8} + \frac{c f x^7}{7} + \left(\frac{c e}{6} + \frac{b g}{6}\right) x^6 + \left(\frac{c d}{5} + \frac{b f}{5}\right) x^5 + \left(\frac{b e}{4} + \frac{a g}{4}\right) x^4 + \left(\frac{b d}{3} + \frac{a f}{3}\right) x^3 + \frac{a e x^2}{2} + a d x$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a + b*x^2 + c*x^4)*(d + e*x + f*x^2 + g*x^3),x)

[Out] x^3*((b*d)/3 + (a*f)/3) + x^4*((b*e)/4 + (a*g)/4) + x^5*((c*d)/5 + (b*f)/5) + x^6*((c*e)/6 + (b*g)/6) + (c*g*x^8)/8 + a*d*x + (a*e*x^2)/2 + (c*f*x^7)/7

sympy [A] time = 0.07, size = 83, normalized size = 0.94

$$a d x + \frac{a e x^2}{2} + \frac{c f x^7}{7} + \frac{c g x^8}{8} + x^6 \left(\frac{b g}{6} + \frac{c e}{6}\right) + x^5 \left(\frac{b f}{5} + \frac{c d}{5}\right) + x^4 \left(\frac{a g}{4} + \frac{b e}{4}\right) + x^3 \left(\frac{a f}{3} + \frac{b d}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x**3+f*x**2+e*x+d)*(c*x**4+b*x**2+a),x)

[Out] a*d*x + a*e*x**2/2 + c*f*x**7/7 + c*g*x**8/8 + x**6*(b*g/6 + c*e/6) + x**5*(b*f/5 + c*d/5) + x**4*(a*g/4 + b*e/4) + x**3*(a*f/3 + b*d/3)

3.4 $\int (a + bx^2 + cx^4)(d + ex + fx^2 + gx^3 + hx^4) dx$

Optimal. Leaf size=105

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{6}x^6(bg+ce)+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}cgx^8+\frac{1}{9}chx^9$$

[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*(a*g+b*e)*x^4+1/5*(a*h+b*f+c*d)*x^5+1/6*(b*g+c*e)*x^6+1/7*(b*h+c*f)*x^7+1/8*c*g*x^8+1/9*c*h*x^9

Rubi [A] time = 0.09, antiderivative size = 105, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.030$, Rules used = {1671}

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{6}x^6(bg+ce)+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}cgx^8+\frac{1}{9}chx^9$$

Antiderivative was successfully verified.

[In] Int[(a + b*x^2 + c*x^4)*(d + e*x + f*x^2 + g*x^3 + h*x^4), x]

[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + ((b*e + a*g)*x^4)/4 + ((c*d + b*f + a*h)*x^5)/5 + ((c*e + b*g)*x^6)/6 + ((c*f + b*h)*x^7)/7 + (c*g*x^8)/8 + (c*h*x^9)/9

Rule 1671

Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :> Int[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\begin{aligned} \int (a + bx^2 + cx^4)(d + ex + fx^2 + gx^3 + hx^4) dx &= \int (ad + aex + (bd + af)x^2 + (be + ag)x^3 + (cd + bf + ah)x^4 \\ &= adx + \frac{1}{2}aex^2 + \frac{1}{3}(bd + af)x^3 + \frac{1}{4}(be + ag)x^4 + \frac{1}{5}(cd + bf + \end{aligned}$$

Mathematica [A] time = 0.03, size = 105, normalized size = 1.00

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{6}x^6(bg+ce)+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}cgx^8+\frac{1}{9}chx^9$$

Antiderivative was successfully verified.

[In] Integrate[(a + b*x^2 + c*x^4)*(d + e*x + f*x^2 + g*x^3 + h*x^4),x]

[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + ((b*e + a*g)*x^4)/4 + ((c*d + b*f + a*h)*x^5)/5 + ((c*e + b*g)*x^6)/6 + ((c*f + b*h)*x^7)/7 + (c*g*x^8)/8 + (c*h*x^9)/9

fricas [A] time = 0.70, size = 103, normalized size = 0.98

$$\frac{1}{9}x^9hc + \frac{1}{8}x^8gc + \frac{1}{7}x^7fc + \frac{1}{7}x^7hb + \frac{1}{6}x^6ec + \frac{1}{6}x^6gb + \frac{1}{5}x^5dc + \frac{1}{5}x^5fb + \frac{1}{5}x^5ha + \frac{1}{4}x^4eb + \frac{1}{4}x^4ga + \frac{1}{3}x^3db + \frac{1}{3}x^3fa + \frac{1}{2}x^2ea$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x^4+b*x^2+a)*(h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="fricas")

[Out] 1/9*x^9*h*c + 1/8*x^8*g*c + 1/7*x^7*f*c + 1/7*x^7*h*b + 1/6*x^6*e*c + 1/6*x^6*g*b + 1/5*x^5*d*c + 1/5*x^5*f*b + 1/5*x^5*h*a + 1/4*x^4*e*b + 1/4*x^4*g*a + 1/3*x^3*d*b + 1/3*x^3*f*a + 1/2*x^2*e*a + x*d*a

giac [A] time = 0.36, size = 106, normalized size = 1.01

$$\frac{1}{9}chx^9 + \frac{1}{8}cgx^8 + \frac{1}{7}cfx^7 + \frac{1}{7}bhx^7 + \frac{1}{6}bgx^6 + \frac{1}{6}cx^6e + \frac{1}{5}cdx^5 + \frac{1}{5}bfx^5 + \frac{1}{5}ahx^5 + \frac{1}{4}agx^4 + \frac{1}{4}bx^4e + \frac{1}{3}bdx^3 + \frac{1}{3}afx^3 + \frac{1}{2}adx^2$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x^4+b*x^2+a)*(h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="giac")

[Out] 1/9*c*h*x^9 + 1/8*c*g*x^8 + 1/7*c*f*x^7 + 1/7*b*h*x^7 + 1/6*b*g*x^6 + 1/6*c*x^6*e + 1/5*c*d*x^5 + 1/5*b*f*x^5 + 1/5*a*h*x^5 + 1/4*a*g*x^4 + 1/4*b*x^4*e + 1/3*b*d*x^3 + 1/3*a*f*x^3 + 1/2*a*x^2*e + a*d*x

maple [A] time = 0.00, size = 90, normalized size = 0.86

$$\frac{chx^9}{9} + \frac{cgx^8}{8} + \frac{(bh+cf)x^7}{7} + \frac{(bg+ce)x^6}{6} + \frac{(ah+bf+cd)x^5}{5} + \frac{aex^2}{2} + \frac{(ag+be)x^4}{4} + adx + \frac{(af+bd)x^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((c*x^4+b*x^2+a)*(h*x^4+g*x^3+f*x^2+e*x+d),x)

[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*(a*g+b*e)*x^4+1/5*(a*h+b*f+c*d)*x^5+1/6*(b*g+c*e)*x^6+1/7*(b*h+c*f)*x^7+1/8*c*g*x^8+1/9*c*h*x^9

maxima [A] time = 1.64, size = 89, normalized size = 0.85

$$\frac{1}{9}chx^9 + \frac{1}{8}cgx^8 + \frac{1}{7}(cf+bh)x^7 + \frac{1}{6}(ce+bg)x^6 + \frac{1}{5}(cd+bf+ah)x^5 + \frac{1}{4}(be+ag)x^4 + \frac{1}{2}aex^2 + \frac{1}{3}(bd+af)x^3 + adx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x^4+b*x^2+a)*(h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="maxima")

[Out] 1/9*c*h*x^9 + 1/8*c*g*x^8 + 1/7*(c*f + b*h)*x^7 + 1/6*(c*e + b*g)*x^6 + 1/5*(c*d + b*f + a*h)*x^5 + 1/4*(b*e + a*g)*x^4 + 1/2*a*e*x^2 + 1/3*(b*d + a*f)*x^3 + a*d*x

mupad [B] time = 0.66, size = 95, normalized size = 0.90

$$\frac{chx^9}{9} + \frac{cgx^8}{8} + \left(\frac{cf}{7} + \frac{bh}{7}\right)x^7 + \left(\frac{ce}{6} + \frac{bg}{6}\right)x^6 + \left(\frac{cd}{5} + \frac{bf}{5} + \frac{ah}{5}\right)x^5 + \left(\frac{be}{4} + \frac{ag}{4}\right)x^4 + \left(\frac{bd}{3} + \frac{af}{3}\right)x^3 + \frac{aex^2}{2} + adx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a + b*x^2 + c*x^4)*(d + e*x + f*x^2 + g*x^3 + h*x^4),x)

[Out] x^5*((c*d)/5 + (b*f)/5 + (a*h)/5) + x^3*((b*d)/3 + (a*f)/3) + x^4*((b*e)/4 + (a*g)/4) + x^6*((c*e)/6 + (b*g)/6) + x^7*((c*f)/7 + (b*h)/7) + (c*g*x^8)/8 + (c*h*x^9)/9 + a*d*x + (a*e*x^2)/2

sympy [A] time = 0.08, size = 102, normalized size = 0.97

$$adx + \frac{aex^2}{2} + \frac{cgx^8}{8} + \frac{chx^9}{9} + x^7\left(\frac{bh}{7} + \frac{cf}{7}\right) + x^6\left(\frac{bg}{6} + \frac{ce}{6}\right) + x^5\left(\frac{ah}{5} + \frac{bf}{5} + \frac{cd}{5}\right) + x^4\left(\frac{ag}{4} + \frac{be}{4}\right) + x^3\left(\frac{af}{3} + \frac{bd}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x**4+b*x**2+a)*(h*x**4+g*x**3+f*x**2+e*x+d),x)

[Out] a*d*x + a*e*x**2/2 + c*g*x**8/8 + c*h*x**9/9 + x**7*(b*h/7 + c*f/7) + x**6*(b*g/6 + c*e/6) + x**5*(a*h/5 + b*f/5 + c*d/5) + x**4*(a*g/4 + b*e/4) + x**3*(a*f/3 + b*d/3)

$$3.5 \quad \int (a + bx^2 + cx^4) (d + ex + fx^2 + gx^3 + hx^4 + ix^5) dx$$

Optimal. Leaf size=122

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{6}x^6(ai+bg+ce)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}x^8(bi+cg)+\frac{1}{9}chx^9+\frac{1}{10}cix^{10}$$

[Out] a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*(a*g+b*e)*x^4+1/5*(a*h+b*f+c*d)*x^5+1/6*(a*i+b*g+c*e)*x^6+1/7*(b*h+c*f)*x^7+1/8*(b*i+c*g)*x^8+1/9*c*h*x^9+1/10*c*i*x^10

Rubi [A] time = 0.11, antiderivative size = 122, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.026$, Rules used = {1671}

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{6}x^6(ai+bg+ce)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}x^8(bi+cg)+\frac{1}{9}chx^9+\frac{1}{10}cix^{10}$$

Antiderivative was successfully verified.

[In] Int[(a + b*x^2 + c*x^4)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5),x]

[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + ((b*e + a*g)*x^4)/4 + ((c*d + b*f + a*h)*x^5)/5 + ((c*e + b*g + a*i)*x^6)/6 + ((c*f + b*h)*x^7)/7 + ((c*g + b*i)*x^8)/8 + (c*h*x^9)/9 + (c*i*x^10)/10

Rule 1671

Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Int[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\begin{aligned} \int (a + bx^2 + cx^4) (d + ex + fx^2 + gx^3 + hx^4 + 5x^5) dx &= \int (ad + aex + (bd + af)x^2 + (be + ag)x^3 + (cd + bf)x^4 + (ce + ah)x^5 + (c*d + b*f + a*h)x^5 + (c*e + b*g + a*i)x^6 + (c*f + b*h)x^7 + (c*g + b*i)x^8 + c*h*x^9 + c*i*x^{10}) dx \\ &= adx + \frac{1}{2}aex^2 + \frac{1}{3}(bd + af)x^3 + \frac{1}{4}(be + ag)x^4 + \frac{1}{5}(cd + bf)x^5 + \frac{1}{6}(ce + ah)x^6 + \frac{1}{7}(c*f + b*h)x^7 + \frac{1}{8}(c*g + b*i)x^8 + \frac{1}{9}c*h*x^9 + \frac{1}{10}c*i*x^{10} \end{aligned}$$

Mathematica [A] time = 0.04, size = 122, normalized size = 1.00

$$\frac{1}{5}x^5(ah+bf+cd)+\frac{1}{6}x^6(ai+bg+ce)+\frac{1}{3}x^3(af+bd)+\frac{1}{4}x^4(ag+be)+adx+\frac{1}{2}aex^2+\frac{1}{7}x^7(bh+cf)+\frac{1}{8}x^8(bi+cg)+\frac{1}{9}chx^9+\frac{1}{10}cix^{10}$$

Antiderivative was successfully verified.

[In] Integrate[(a + b*x^2 + c*x^4)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5),x]

[Out] a*d*x + (a*e*x^2)/2 + ((b*d + a*f)*x^3)/3 + ((b*e + a*g)*x^4)/4 + ((c*d + b*f + a*h)*x^5)/5 + ((c*e + b*g + a*i)*x^6)/6 + ((c*f + b*h)*x^7)/7 + ((c*g + b*i)*x^8)/8 + (c*h*x^9)/9 + (c*i*x^10)/10

fricas [A] time = 0.90, size = 124, normalized size = 1.02

$$\frac{1}{10}x^{10}ic + \frac{1}{9}x^9hc + \frac{1}{8}x^8gc + \frac{1}{8}x^8ib + \frac{1}{7}x^7fc + \frac{1}{7}x^7hb + \frac{1}{6}x^6ec + \frac{1}{6}x^6gb + \frac{1}{6}x^6ia + \frac{1}{5}x^5dc + \frac{1}{5}x^5fb + \frac{1}{5}x^5ha + \frac{1}{4}x^4eb + \frac{1}{4}x^4ga + \dots$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x^4+b*x^2+a)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="fricas")

[Out] 1/10*x^10*i*c + 1/9*x^9*h*c + 1/8*x^8*g*c + 1/8*x^8*i*b + 1/7*x^7*f*c + 1/7*x^7*h*b + 1/6*x^6*e*c + 1/6*x^6*g*b + 1/6*x^6*i*a + 1/5*x^5*d*c + 1/5*x^5*f*b + 1/5*x^5*h*a + 1/4*x^4*e*b + 1/4*x^4*g*a + 1/3*x^3*d*b + 1/3*x^3*f*a + 1/2*x^2*e*a + x*d*a

giac [A] time = 0.32, size = 127, normalized size = 1.04

$$\frac{1}{10}cix^{10} + \frac{1}{9}chx^9 + \frac{1}{8}cgx^8 + \frac{1}{8}bix^8 + \frac{1}{7}cfx^7 + \frac{1}{7}bhx^7 + \frac{1}{6}bgx^6 + \frac{1}{6}aix^6 + \frac{1}{6}cx^6e + \frac{1}{5}cdx^5 + \frac{1}{5}bfx^5 + \frac{1}{5}ahx^5 + \frac{1}{4}agx^4 + \frac{1}{4}l$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x^4+b*x^2+a)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="giac")

[Out] 1/10*c*i*x^10 + 1/9*c*h*x^9 + 1/8*c*g*x^8 + 1/8*b*i*x^8 + 1/7*c*f*x^7 + 1/7*b*h*x^7 + 1/6*b*g*x^6 + 1/6*a*i*x^6 + 1/6*c*x^6*e + 1/5*c*d*x^5 + 1/5*b*f*x^5 + 1/5*a*h*x^5 + 1/4*a*g*x^4 + 1/4*b*x^4*e + 1/3*b*d*x^3 + 1/3*a*f*x^3 + 1/2*a*x^2*e + a*d*x

maple [A] time = 0.00, size = 105, normalized size = 0.86

$$\frac{ci x^{10}}{10} + \frac{ch x^9}{9} + \frac{(bi + cg) x^8}{8} + \frac{(bh + cf) x^7}{7} + \frac{(ai + bg + ce) x^6}{6} + \frac{(ah + bf + cd) x^5}{5} + \frac{ae x^2}{2} + \frac{(ag + be) x^4}{4} + adx + \frac{(af + \dots)}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((c*x^4+b*x^2+a)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d),x)

[Out] $a*d*x+1/2*a*e*x^2+1/3*(a*f+b*d)*x^3+1/4*(a*g+b*e)*x^4+1/5*(a*h+b*f+c*d)*x^5+1/6*(a*i+b*g+c*e)*x^6+1/7*(b*h+c*f)*x^7+1/8*(b*i+c*g)*x^8+1/9*c*h*x^9+1/10*c*i*x^{10}$

maxima [A] time = 1.17, size = 104, normalized size = 0.85

$$\frac{1}{10} cix^{10} + \frac{1}{9} chx^9 + \frac{1}{8} (cg + bi)x^8 + \frac{1}{7} (cf + bh)x^7 + \frac{1}{6} (ce + bg + ai)x^6 + \frac{1}{5} (cd + bf + ah)x^5 + \frac{1}{4} (be + ag)x^4 + \frac{1}{2} aex^2$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((c*x^4+b*x^2+a)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="maxima")`

[Out] $1/10*c*i*x^{10} + 1/9*c*h*x^9 + 1/8*(c*g + b*i)*x^8 + 1/7*(c*f + b*h)*x^7 + 1/6*(c*e + b*g + a*i)*x^6 + 1/5*(c*d + b*f + a*h)*x^5 + 1/4*(b*e + a*g)*x^4 + 1/2*a*e*x^2 + 1/3*(b*d + a*f)*x^3 + a*d*x$

mupad [B] time = 0.06, size = 112, normalized size = 0.92

$$\frac{cix^{10}}{10} + \frac{chx^9}{9} + \left(\frac{cg}{8} + \frac{bi}{8}\right)x^8 + \left(\frac{cf}{7} + \frac{bh}{7}\right)x^7 + \left(\frac{ce}{6} + \frac{bg}{6} + \frac{ai}{6}\right)x^6 + \left(\frac{cd}{5} + \frac{bf}{5} + \frac{ah}{5}\right)x^5 + \left(\frac{be}{4} + \frac{ag}{4}\right)x^4 + \left(\frac{bd}{3} + \frac{af}{3}\right)x^3 + adx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((a + b*x^2 + c*x^4)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5),x)`

[Out] $x^5*((c*d)/5 + (b*f)/5 + (a*h)/5) + x^6*((c*e)/6 + (b*g)/6 + (a*i)/6) + x^3*((b*d)/3 + (a*f)/3) + x^4*((b*e)/4 + (a*g)/4) + x^7*((c*f)/7 + (b*h)/7) + x^8*((c*g)/8 + (b*i)/8) + (c*h*x^9)/9 + (c*i*x^{10})/10 + a*d*x + (a*e*x^2)/2$

sympy [A] time = 0.08, size = 121, normalized size = 0.99

$$adx + \frac{aex^2}{2} + \frac{chx^9}{9} + \frac{cix^{10}}{10} + x^8\left(\frac{bi}{8} + \frac{cg}{8}\right) + x^7\left(\frac{bh}{7} + \frac{cf}{7}\right) + x^6\left(\frac{ai}{6} + \frac{bg}{6} + \frac{ce}{6}\right) + x^5\left(\frac{ah}{5} + \frac{bf}{5} + \frac{cd}{5}\right) + x^4\left(\frac{ag}{4} + \frac{be}{4}\right) + x^3\left(\frac{bd}{3} + \frac{af}{3}\right) + adx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((c*x**4+b*x**2+a)*(i*x**5+h*x**4+g*x**3+f*x**2+e*x+d),x)`

[Out] $a*d*x + a*e*x**2/2 + c*h*x**9/9 + c*i*x**10/10 + x**8*(b*i/8 + c*g/8) + x**7*(b*h/7 + c*f/7) + x**6*(a*i/6 + b*g/6 + c*e/6) + x**5*(a*h/5 + b*f/5 + c*d/5) + x**4*(a*g/4 + b*e/4) + x**3*(a*f/3 + b*d/3) + adx$

3.6 $\int (d + ex) (a + bx^2 + cx^4)^2 dx$

Optimal. Leaf size=112

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{5} dx^5 (2ac + b^2) + \frac{1}{6} ex^6 (2ac + b^2) + \frac{2}{3} abdx^3 + \frac{1}{2} abex^4 + \frac{2}{7} bcdx^7 + \frac{1}{4} bcex^8 + \frac{1}{9} c^2 dx^9 + \frac{1}{10} c^2 ex^{10}$$

[Out] $a^2*d*x + 1/2*a^2*e*x^2 + 2/3*a*b*d*x^3 + 1/2*a*b*e*x^4 + 1/5*(2*a*c+b^2)*d*x^5 + 1/6*(2*a*c+b^2)*e*x^6 + 2/7*b*c*d*x^7 + 1/4*b*c*e*x^8 + 1/9*c^2*d*x^9 + 1/10*c^2*e*x^{10}$

Rubi [A] time = 0.13, antiderivative size = 112, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.050$, Rules used = {1671}

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{5} dx^5 (2ac + b^2) + \frac{1}{6} ex^6 (2ac + b^2) + \frac{2}{3} abdx^3 + \frac{1}{2} abex^4 + \frac{2}{7} bcdx^7 + \frac{1}{4} bcex^8 + \frac{1}{9} c^2 dx^9 + \frac{1}{10} c^2 ex^{10}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x)*(a + b*x^2 + c*x^4)^2, x]

[Out] $a^2*d*x + (a^2*e*x^2)/2 + (2*a*b*d*x^3)/3 + (a*b*e*x^4)/2 + ((b^2 + 2*a*c)*d*x^5)/5 + ((b^2 + 2*a*c)*e*x^6)/6 + (2*b*c*d*x^7)/7 + (b*c*e*x^8)/4 + (c^2*d*x^9)/9 + (c^2*e*x^{10})/10$

Rule 1671

Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :> Int[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\begin{aligned} \int (d + ex) (a + bx^2 + cx^4)^2 dx &= \int (a^2 d + a^2 ex + 2abdx^2 + 2abex^3 + (b^2 + 2ac) dx^4 + (b^2 + 2ac) ex^5 + 2bcdx^6 + \\ &= a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{2}{3} abdx^3 + \frac{1}{2} abex^4 + \frac{1}{5} (b^2 + 2ac) dx^5 + \frac{1}{6} (b^2 + 2ac) ex^6 + \frac{2}{7} bcdx^7 + \frac{1}{4} bcex^8 + \frac{1}{9} c^2 dx^9 + \frac{1}{10} c^2 ex^{10} \end{aligned}$$

Mathematica [A] time = 0.05, size = 97, normalized size = 0.87

$$630a^2x(2d + ex) + 42a(5bx^3(4d + 3ex) + 2cx^5(6d + 5ex)) + 42b^2x^5(6d + 5ex) + 45bcx^7(8d + 7ex) + 14c^2x^9(10d + 5ex)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x)*(a + b*x^2 + c*x^4)^2,x]

[Out] (630*a^2*x*(2*d + e*x) + 42*b^2*x^5*(6*d + 5*e*x) + 45*b*c*x^7*(8*d + 7*e*x) + 14*c^2*x^9*(10*d + 9*e*x) + 42*a*(5*b*x^3*(4*d + 3*e*x) + 2*c*x^5*(6*d + 5*e*x)))/1260

fricas [A] time = 1.09, size = 100, normalized size = 0.89

$$\frac{1}{10}x^{10}ec^2 + \frac{1}{9}x^9dc^2 + \frac{1}{4}x^8ecb + \frac{2}{7}x^7dcb + \frac{1}{6}x^6eb^2 + \frac{1}{3}x^6eca + \frac{1}{5}x^5db^2 + \frac{2}{5}x^5dca + \frac{1}{2}x^4eba + \frac{2}{3}x^3dba + \frac{1}{2}x^2ea^2 + xda^2$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="fricas")

[Out] 1/10*x^10*e*c^2 + 1/9*x^9*d*c^2 + 1/4*x^8*e*c*b + 2/7*x^7*d*c*b + 1/6*x^6*e*b^2 + 1/3*x^6*e*c*a + 1/5*x^5*d*b^2 + 2/5*x^5*d*c*a + 1/2*x^4*e*b*a + 2/3*x^3*d*b*a + 1/2*x^2*e*a^2 + x*d*a^2

giac [A] time = 0.39, size = 106, normalized size = 0.95

$$\frac{1}{10}c^2x^{10}e + \frac{1}{9}c^2dx^9 + \frac{1}{4}bcx^8e + \frac{2}{7}bcdx^7 + \frac{1}{6}b^2x^6e + \frac{1}{3}acx^6e + \frac{1}{5}b^2dx^5 + \frac{2}{5}acdx^5 + \frac{1}{2}abx^4e + \frac{2}{3}abdx^3 + \frac{1}{2}a^2x^2e + a^2dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="giac")

[Out] 1/10*c^2*x^10*e + 1/9*c^2*d*x^9 + 1/4*b*c*x^8*e + 2/7*b*c*d*x^7 + 1/6*b^2*x^6*e + 1/3*a*c*x^6*e + 1/5*b^2*d*x^5 + 2/5*a*c*d*x^5 + 1/2*a*b*x^4*e + 2/3*a*b*d*x^3 + 1/2*a^2*x^2*e + a^2*d*x

maple [A] time = 0.00, size = 95, normalized size = 0.85

$$\frac{c^2ex^{10}}{10} + \frac{c^2dx^9}{9} + \frac{bce x^8}{4} + \frac{2bcdx^7}{7} + \frac{abex^4}{2} + \frac{(2ac + b^2)ex^6}{6} + \frac{2abd x^3}{3} + \frac{(2ac + b^2)dx^5}{5} + \frac{a^2ex^2}{2} + a^2dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x+d)*(c*x^4+b*x^2+a)^2,x)

[Out] a^2*d*x+1/2*a^2*e*x^2+2/3*a*b*d*x^3+1/2*a*b*e*x^4+1/5*(2*a*c+b^2)*d*x^5+1/6*(2*a*c+b^2)*e*x^6+2/7*b*c*d*x^7+1/4*b*c*e*x^8+1/9*c^2*d*x^9+1/10*c^2*e*x^10

maxima [A] time = 1.06, size = 94, normalized size = 0.84

$$\frac{1}{10}c^2ex^{10} + \frac{1}{9}c^2dx^9 + \frac{1}{4}bcex^8 + \frac{2}{7}bcdx^7 + \frac{1}{6}(b^2 + 2ac)ex^6 + \frac{1}{2}abex^4 + \frac{1}{5}(b^2 + 2ac)dx^5 + \frac{2}{3}abdx^3 + \frac{1}{2}a^2ex^2 + a^2dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="maxima")

[Out] 1/10*c^2*e*x^10 + 1/9*c^2*d*x^9 + 1/4*b*c*e*x^8 + 2/7*b*c*d*x^7 + 1/6*(b^2 + 2*a*c)*e*x^6 + 1/2*a*b*e*x^4 + 1/5*(b^2 + 2*a*c)*d*x^5 + 2/3*a*b*d*x^3 + 1/2*a^2*e*x^2 + a^2*d*x

mupad [B] time = 0.06, size = 94, normalized size = 0.84

$$\frac{a^2ex^2}{2} + \frac{c^2dx^9}{9} + \frac{c^2ex^{10}}{10} + \frac{dx^5(b^2 + 2ac)}{5} + \frac{ex^6(b^2 + 2ac)}{6} + a^2dx + \frac{2abdx^3}{3} + \frac{abex^4}{2} + \frac{2bcdx^7}{7} + \frac{bcex^8}{4}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x)*(a + b*x^2 + c*x^4)^2,x)

[Out] (a^2*e*x^2)/2 + (c^2*d*x^9)/9 + (c^2*e*x^10)/10 + (d*x^5*(2*a*c + b^2))/5 + (e*x^6*(2*a*c + b^2))/6 + a^2*d*x + (2*a*b*d*x^3)/3 + (a*b*e*x^4)/2 + (2*b*c*d*x^7)/7 + (b*c*e*x^8)/4

sympy [A] time = 0.08, size = 116, normalized size = 1.04

$$a^2dx + \frac{a^2ex^2}{2} + \frac{2abdx^3}{3} + \frac{abex^4}{2} + \frac{2bcdx^7}{7} + \frac{bcex^8}{4} + \frac{c^2dx^9}{9} + \frac{c^2ex^{10}}{10} + x^6\left(\frac{ace}{3} + \frac{b^2e}{6}\right) + x^5\left(\frac{2acd}{5} + \frac{b^2d}{5}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(c*x**4+b*x**2+a)**2,x)

[Out] a**2*d*x + a**2*e*x**2/2 + 2*a*b*d*x**3/3 + a*b*e*x**4/2 + 2*b*c*d*x**7/7 + b*c*e*x**8/4 + c**2*d*x**9/9 + c**2*e*x**10/10 + x**6*(a*c*e/3 + b**2*e/6) + x**5*(2*a*c*d/5 + b**2*d/5)

3.7 $\int (d + ex + fx^2)(a + bx^2 + cx^4)^2 dx$

Optimal. Leaf size=154

$$a^2dx + \frac{1}{2}a^2ex^2 + \frac{1}{7}x^7(2acf + b^2f + 2bcd) + \frac{1}{5}x^5(2abf + 2acd + b^2d) + \frac{1}{6}ex^6(2ac + b^2) + \frac{1}{3}ax^3(af + 2bd) + \frac{1}{2}abex^4 + \frac{1}{11}c^2fx^{11}$$

[Out] a^2*d*x+1/2*a^2*e*x^2+1/3*a*(a*f+2*b*d)*x^3+1/2*a*b*e*x^4+1/5*(2*a*b*f+2*a*c*d+b^2*d)*x^5+1/6*(2*a*c+b^2)*e*x^6+1/7*(2*a*c*f+b^2*f+2*b*c*d)*x^7+1/4*b*c*e*x^8+1/9*c*(2*b*f+c*d)*x^9+1/10*c^2*e*x^10+1/11*c^2*f*x^11

Rubi [A] time = 0.13, antiderivative size = 154, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.040$, Rules used = {1657}

$$a^2dx + \frac{1}{2}a^2ex^2 + \frac{1}{7}x^7(2acf + b^2f + 2bcd) + \frac{1}{5}x^5(2abf + 2acd + b^2d) + \frac{1}{6}ex^6(2ac + b^2) + \frac{1}{3}ax^3(af + 2bd) + \frac{1}{2}abex^4 + \frac{1}{11}c^2fx^{11}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2)*(a + b*x^2 + c*x^4)^2, x]

[Out] a^2*d*x + (a^2*e*x^2)/2 + (a*(2*b*d + a*f)*x^3)/3 + (a*b*e*x^4)/2 + ((b^2*d + 2*a*c*d + 2*a*b*f)*x^5)/5 + ((b^2 + 2*a*c)*e*x^6)/6 + ((2*b*c*d + b^2*f + 2*a*c*f)*x^7)/7 + (b*c*e*x^8)/4 + (c*(c*d + 2*b*f)*x^9)/9 + (c^2*e*x^10)/10 + (c^2*f*x^11)/11

Rule 1657

Int[(Pq_)*((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol] :> Int[Expand Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, -2]

Rubi steps

$$\begin{aligned} \int (d + ex + fx^2)(a + bx^2 + cx^4)^2 dx &= \int (a^2d + a^2ex + a(2bd + af)x^2 + 2abex^3 + (b^2d + 2acd + 2abf)x^4 + \\ &= a^2dx + \frac{1}{2}a^2ex^2 + \frac{1}{3}a(2bd + af)x^3 + \frac{1}{2}abex^4 + \frac{1}{5}(b^2d + 2acd + 2abf)x^5 + \frac{1}{6}ex^6(2ac + b^2) + \frac{1}{3}ax^3(af + 2bd) + \frac{1}{2}abex^4 + \frac{1}{11}c^2fx^{11} \end{aligned}$$

Mathematica [A] time = 0.05, size = 154, normalized size = 1.00

$$a^2dx + \frac{1}{2}a^2ex^2 + \frac{1}{7}x^7(2acf + b^2f + 2bcd) + \frac{1}{5}x^5(2abf + 2acd + b^2d) + \frac{1}{6}ex^6(2ac + b^2) + \frac{1}{3}ax^3(af + 2bd) + \frac{1}{2}abex^4 + \frac{1}{11}c^2fx^{11}$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2)*(a + b*x^2 + c*x^4)^2,x]

[Out] a^2*d*x + (a^2*e*x^2)/2 + (a*(2*b*d + a*f)*x^3)/3 + (a*b*e*x^4)/2 + ((b^2*d + 2*a*c*d + 2*a*b*f)*x^5)/5 + ((b^2 + 2*a*c)*e*x^6)/6 + ((2*b*c*d + b^2*f + 2*a*c*f)*x^7)/7 + (b*c*e*x^8)/4 + (c*(c*d + 2*b*f)*x^9)/9 + (c^2*e*x^10)/10 + (c^2*f*x^11)/11

fricas [A] time = 0.45, size = 151, normalized size = 0.98

$$\frac{1}{11}x^{11}fc^2 + \frac{1}{10}x^{10}ec^2 + \frac{1}{9}x^9dc^2 + \frac{2}{9}x^9fcb + \frac{1}{4}x^8ecb + \frac{2}{7}x^7dcb + \frac{1}{7}x^7fb^2 + \frac{2}{7}x^7fca + \frac{1}{6}x^6eb^2 + \frac{1}{3}x^6eca + \frac{1}{5}x^5db^2 + \frac{2}{5}x^5dca + \dots$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="fricas")

[Out] 1/11*x^11*f*c^2 + 1/10*x^10*e*c^2 + 1/9*x^9*d*c^2 + 2/9*x^9*f*c*b + 1/4*x^8*e*c*b + 2/7*x^7*d*c*b + 1/7*x^7*f*b^2 + 2/7*x^7*f*c*a + 1/6*x^6*e*b^2 + 1/3*x^6*e*c*a + 1/5*x^5*d*b^2 + 2/5*x^5*d*c*a + 2/5*x^5*f*b*a + 1/2*x^4*e*b*a + 2/3*x^3*d*b*a + 1/3*x^3*f*a^2 + 1/2*x^2*e*a^2 + x*d*a^2

giac [A] time = 0.26, size = 157, normalized size = 1.02

$$\frac{1}{11}c^2fx^{11} + \frac{1}{10}c^2x^{10}e + \frac{1}{9}c^2dx^9 + \frac{2}{9}bcfx^9 + \frac{1}{4}bcx^8e + \frac{2}{7}bcdx^7 + \frac{1}{7}b^2fx^7 + \frac{2}{7}acfx^7 + \frac{1}{6}b^2x^6e + \frac{1}{3}acx^6e + \frac{1}{5}b^2dx^5 + \frac{2}{5}acx^5e + \dots$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="giac")

[Out] 1/11*c^2*f*x^11 + 1/10*c^2*x^10*e + 1/9*c^2*d*x^9 + 2/9*b*c*f*x^9 + 1/4*b*c*x^8*e + 2/7*b*c*d*x^7 + 1/7*b^2*f*x^7 + 2/7*a*c*f*x^7 + 1/6*b^2*x^6*e + 1/3*a*c*x^6*e + 1/5*b^2*d*x^5 + 2/5*a*c*d*x^5 + 2/5*a*b*f*x^5 + 1/2*a*b*x^4*e + 2/3*a*b*d*x^3 + 1/3*a^2*f*x^3 + 1/2*a^2*x^2*e + a^2*d*x

maple [A] time = 0.00, size = 139, normalized size = 0.90

$$\frac{c^2fx^{11}}{11} + \frac{c^2ex^{10}}{10} + \frac{bcex^8}{4} + \frac{(2fbc + c^2d)x^9}{9} + \frac{abex^4}{2} + \frac{(2ac + b^2)ex^6}{6} + \frac{(2bcd + (2ac + b^2)f)x^7}{7} + \frac{a^2ex^2}{2} + \frac{(2abf + \dots)}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x)

[Out] 1/11*c^2*f*x^11+1/10*c^2*e*x^10+1/9*(2*b*c*f+c^2*d)*x^9+1/4*b*c*e*x^8+1/7*(2*b*c*d+f*(2*a*c+b^2))*x^7+1/6*(2*a*c+b^2)*e*x^6+1/5*(d*(2*a*c+b^2)+2*a*b*f)*x^5+1/2*a*b*e*x^4+1/3*(a^2*f+2*a*b*d)*x^3+1/2*a^2*e*x^2+a^2*d*x

maxima [A] time = 1.03, size = 138, normalized size = 0.90

$$\frac{1}{11}c^2fx^{11} + \frac{1}{10}c^2ex^{10} + \frac{1}{4}bcex^8 + \frac{1}{9}(c^2d + 2bcf)x^9 + \frac{1}{6}(b^2 + 2ac)ex^6 + \frac{1}{7}(2bcd + (b^2 + 2ac)f)x^7 + \frac{1}{2}abex^4 + \frac{1}{5}(2$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="maxima")

[Out] 1/11*c^2*f*x^11 + 1/10*c^2*e*x^10 + 1/4*b*c*e*x^8 + 1/9*(c^2*d + 2*b*c*f)*x^9 + 1/6*(b^2 + 2*a*c)*e*x^6 + 1/7*(2*b*c*d + (b^2 + 2*a*c)*f)*x^7 + 1/2*a*b*e*x^4 + 1/5*(2*a*b*f + (b^2 + 2*a*c)*d)*x^5 + 1/2*a^2*e*x^2 + a^2*d*x + 1/3*(2*a*b*d + a^2*f)*x^3

mupad [B] time = 0.70, size = 138, normalized size = 0.90

$$x^5 \left(\frac{db^2}{5} + \frac{2afb}{5} + \frac{2acd}{5} \right) + x^7 \left(\frac{fb^2}{7} + \frac{2cdb}{7} + \frac{2acf}{7} \right) + x^3 \left(\frac{fa^2}{3} + \frac{2bda}{3} \right) + x^9 \left(\frac{dc^2}{9} + \frac{2bfc}{9} \right) + \frac{a^2ex^2}{2} + \frac{c^2}{5}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2)*(a + b*x^2 + c*x^4)^2,x)

[Out] x^5*((b^2*d)/5 + (2*a*c*d)/5 + (2*a*b*f)/5) + x^7*((b^2*f)/7 + (2*b*c*d)/7 + (2*a*c*f)/7) + x^3*((a^2*f)/3 + (2*a*b*d)/3) + x^9*((c^2*d)/9 + (2*b*c*f)/9) + (a^2*e*x^2)/2 + (c^2*e*x^10)/10 + (c^2*f*x^11)/11 + (e*x^6*(2*a*c + b^2))/6 + a^2*d*x + (a*b*e*x^4)/2 + (b*c*e*x^8)/4

sympy [A] time = 0.09, size = 165, normalized size = 1.07

$$a^2dx + \frac{a^2ex^2}{2} + \frac{abex^4}{2} + \frac{bcex^8}{4} + \frac{c^2ex^{10}}{10} + \frac{c^2fx^{11}}{11} + x^9 \left(\frac{2bcf}{9} + \frac{c^2d}{9} \right) + x^7 \left(\frac{2acf}{7} + \frac{b^2f}{7} + \frac{2bcd}{7} \right) + x^6 \left(\frac{ace}{3} + \frac{b^2e}{6} \right) + x^5 \left(\frac{2ab^2d}{5} + \frac{2a^2c^2d}{5} \right) + x^3 \left(\frac{a^2f}{3} + \frac{2a^2bd}{3} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x**2+e*x+d)*(c*x**4+b*x**2+a)**2,x)

[Out] a**2*d*x + a**2*e*x**2/2 + a*b*e*x**4/2 + b*c*e*x**8/4 + c**2*e*x**10/10 + c**2*f*x**11/11 + x**9*(2*b*c*f/9 + c**2*d/9) + x**7*(2*a*c*f/7 + b**2*f/7 + 2*b*c*d/7) + x**6*(a*c*e/3 + b**2*e/6) + x**5*(2*a*b*f/5 + 2*a*c*d/5 + b**2*d/5) + x**3*(a**2*f/3 + 2*a*b*d/3)

3.8 $\int (d + ex + fx^2 + gx^3) (a + bx^2 + cx^4)^2 dx$

Optimal. Leaf size=196

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{7} x^7 (2acf + b^2 f + 2bcd) + \frac{1}{5} x^5 (2abf + 2acd + b^2 d) + \frac{1}{8} x^8 (2acg + b^2 g + 2bce) + \frac{1}{6} x^6 (2abg + 2ace$$

[Out] $a^2 d x + \frac{1}{2} a^2 e x^2 + \frac{1}{7} x^7 (2 a c f + b^2 f + 2 b c d) + \frac{1}{5} x^5 (2 a b f + 2 a c d + b^2 d) + \frac{1}{8} x^8 (2 a c g + b^2 g + 2 b c e) + \frac{1}{6} x^6 (2 a b g + 2 a c e$

Rubi [A] time = 0.17, antiderivative size = 196, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.033$, Rules used = {1671}

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{7} x^7 (2acf + b^2 f + 2bcd) + \frac{1}{5} x^5 (2abf + 2acd + b^2 d) + \frac{1}{8} x^8 (2acg + b^2 g + 2bce) + \frac{1}{6} x^6 (2abg + 2ace$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3)*(a + b*x^2 + c*x^4)^2,x]

[Out] $a^2 d x + (a^2 e x^2) / 2 + (a * (2 * b * d + a * f) * x^3) / 3 + (a * (2 * b * e + a * g) * x^4) / 4 + ((b^2 * d + 2 * a * c * d + 2 * a * b * f) * x^5) / 5 + ((b^2 * e + 2 * a * c * e + 2 * a * b * g) * x^6) / 6 + ((2 * b * c * d + b^2 * f + 2 * a * c * f) * x^7) / 7 + ((2 * b * c * e + b^2 * g + 2 * a * c * g) * x^8) / 8 + (c * (c * d + 2 * b * f) * x^9) / 9 + (c * (c * e + 2 * b * g) * x^{10}) / 10 + (c^2 * f * x^{11}) / 11 + (c^2 * g * x^{12}) / 12$

Rule 1671

Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Int[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\begin{aligned} \int (d + ex + fx^2 + gx^3) (a + bx^2 + cx^4)^2 dx &= \int (a^2 d + a^2 ex + a(2bd + af)x^2 + a(2be + ag)x^3 + (b^2 d + 2acd + 2ace) \\ &= a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{3} a(2bd + af)x^3 + \frac{1}{4} a(2be + ag)x^4 + \frac{1}{5} (b^2 d + 2acd + 2ace) \end{aligned}$$

Mathematica [A] time = 0.06, size = 196, normalized size = 1.00

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{7} x^7 (2acf + b^2 f + 2bcd) + \frac{1}{5} x^5 (2abf + 2acd + b^2 d) + \frac{1}{8} x^8 (2acg + b^2 g + 2bce) + \frac{1}{6} x^6 (2abg + 2ace$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)*(a + b*x^2 + c*x^4)^2,x]

[Out] $a^2*d*x + (a^2*e*x^2)/2 + (a*(2*b*d + a*f)*x^3)/3 + (a*(2*b*e + a*g)*x^4)/4 + ((b^2*d + 2*a*c*d + 2*a*b*f)*x^5)/5 + ((b^2*e + 2*a*c*e + 2*a*b*g)*x^6)/6 + ((2*b*c*d + b^2*f + 2*a*c*f)*x^7)/7 + ((2*b*c*e + b^2*g + 2*a*c*g)*x^8)/8 + (c*(c*d + 2*b*f)*x^9)/9 + (c*(c*e + 2*b*g)*x^{10})/10 + (c^2*f*x^{11})/11 + (c^2*g*x^{12})/12$

fricas [A] time = 0.78, size = 202, normalized size = 1.03

$$\frac{1}{12}x^{12}gc^2 + \frac{1}{11}x^{11}fc^2 + \frac{1}{10}x^{10}ec^2 + \frac{1}{5}x^{10}gcb + \frac{1}{9}x^9dc^2 + \frac{2}{9}x^9fcb + \frac{1}{4}x^8ecb + \frac{1}{8}x^8gb^2 + \frac{1}{4}x^8gca + \frac{2}{7}x^7dcb + \frac{1}{7}x^7fb^2 + \frac{2}{7}x^7fca$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="fricas")

[Out] $1/12*x^{12}*g*c^2 + 1/11*x^{11}*f*c^2 + 1/10*x^{10}*e*c^2 + 1/5*x^{10}*g*c*b + 1/9*x^9*d*c^2 + 2/9*x^9*f*c*b + 1/4*x^8*e*c*b + 1/8*x^8*g*b^2 + 1/4*x^8*g*c*a + 2/7*x^7*d*c*b + 1/7*x^7*f*b^2 + 2/7*x^7*f*c*a + 1/6*x^6*e*b^2 + 1/3*x^6*e*c*a + 1/3*x^6*g*b*a + 1/5*x^5*d*b^2 + 2/5*x^5*d*c*a + 2/5*x^5*f*b*a + 1/2*x^4*e*b*a + 1/4*x^4*g*a^2 + 2/3*x^3*d*b*a + 1/3*x^3*f*a^2 + 1/2*x^2*e*a^2 + x*d*a^2$

giac [A] time = 0.30, size = 208, normalized size = 1.06

$$\frac{1}{12}c^2gx^{12} + \frac{1}{11}c^2fx^{11} + \frac{1}{5}bcgx^{10} + \frac{1}{10}c^2x^{10}e + \frac{1}{9}c^2dx^9 + \frac{2}{9}bcfx^9 + \frac{1}{8}b^2gx^8 + \frac{1}{4}acgx^8 + \frac{1}{4}bcx^8e + \frac{2}{7}bcdx^7 + \frac{1}{7}b^2fx^7 + \frac{2}{7}fca$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="giac")

[Out] $1/12*c^2*g*x^{12} + 1/11*c^2*f*x^{11} + 1/5*b*c*g*x^{10} + 1/10*c^2*x^{10}*e + 1/9*c^2*d*x^9 + 2/9*b*c*f*x^9 + 1/8*b^2*g*x^8 + 1/4*a*c*g*x^8 + 1/4*b*c*x^8*e + 2/7*b*c*d*x^7 + 1/7*b^2*f*x^7 + 2/7*a*c*f*x^7 + 1/3*a*b*g*x^6 + 1/6*b^2*x^6*e + 1/3*a*c*x^6*e + 1/5*b^2*d*x^5 + 2/5*a*c*d*x^5 + 2/5*a*b*f*x^5 + 1/4*a^2*g*x^4 + 1/2*a*b*x^4*e + 2/3*a*b*d*x^3 + 1/3*a^2*f*x^3 + 1/2*a^2*x^2*e + a^2*d*x$

maple [A] time = 0.00, size = 183, normalized size = 0.93

$$\frac{c^2g x^{12}}{12} + \frac{c^2f x^{11}}{11} + \frac{(2gbc + e c^2) x^{10}}{10} + \frac{(2fbc + c^2d) x^9}{9} + \frac{(2bce + (2ac + b^2)g) x^8}{8} + \frac{(2bcd + (2ac + b^2)f) x^7}{7} + \frac{(2ab$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x)`

[Out] $\frac{1}{12}c^2gx^{12} + \frac{1}{11}c^2fx^{11} + \frac{1}{10}(c^2e + 2b^2c^2g + c^2e)x^{10} + \frac{1}{9}(2b^2c^2f + c^2d)x^9 + \frac{1}{8}(2b^2c^2e + g(2a^2c + b^2))x^8 + \frac{1}{7}(2b^2c^2d + (2a^2c + b^2)f)x^7 + \frac{1}{6}(e(2a^2c + b^2) + 2a^2b^2g)x^6 + \frac{1}{5}(2a^2b^2f + (2a^2c + b^2)d)x^5 + \frac{1}{4}(a^2g + 2a^2b^2e)x^4 + \frac{1}{3}(a^2f + 2a^2b^2d)x^3 + \frac{1}{2}a^2e^2x^2 + a^2d^2x$

maxima [A] time = 1.40, size = 182, normalized size = 0.93

$$\frac{1}{12}c^2gx^{12} + \frac{1}{11}c^2fx^{11} + \frac{1}{10}(c^2e + 2bcg)x^{10} + \frac{1}{9}(c^2d + 2bcf)x^9 + \frac{1}{8}(2bce + (b^2 + 2ac)g)x^8 + \frac{1}{7}(2bcd + (b^2 + 2ac))x^7 + \frac{1}{6}(2b^2c^2e + (b^2 + 2a^2c)g)x^6 + \frac{1}{5}(2a^2b^2f + (b^2 + 2a^2c)d)x^5 + \frac{1}{4}(a^2g + 2a^2b^2e)x^4 + \frac{1}{3}(a^2f + 2a^2b^2d)x^3 + \frac{1}{2}a^2e^2x^2 + a^2d^2x$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^2,x, algorithm="maxima")`

[Out] $\frac{1}{12}c^2gx^{12} + \frac{1}{11}c^2fx^{11} + \frac{1}{10}(c^2e + 2b^2c^2g)x^{10} + \frac{1}{9}(c^2d + 2b^2c^2f)x^9 + \frac{1}{8}(2b^2c^2e + (b^2 + 2a^2c)g)x^8 + \frac{1}{7}(2b^2c^2d + (b^2 + 2a^2c)f)x^7 + \frac{1}{6}(2a^2b^2g + (b^2 + 2a^2c)e)x^6 + \frac{1}{5}(2a^2b^2f + (b^2 + 2a^2c)d)x^5 + \frac{1}{4}(2a^2b^2e + a^2g)x^4 + a^2d^2x + \frac{1}{3}(2a^2b^2d + a^2f)x^3$

mupad [B] time = 0.72, size = 182, normalized size = 0.93

$$x^5 \left(\frac{db^2}{5} + \frac{2afb}{5} + \frac{2acd}{5} \right) + x^6 \left(\frac{eb^2}{6} + \frac{agb}{3} + \frac{ace}{3} \right) + x^7 \left(\frac{fb^2}{7} + \frac{2cdb}{7} + \frac{2acf}{7} \right) + x^8 \left(\frac{gb^2}{8} + \frac{ceb}{4} + \frac{acg}{4} \right) + x^9 \left(\frac{hb^2}{9} + \frac{2fdb}{9} + \frac{2afd}{9} \right) + x^{10} \left(\frac{ib^2}{10} + \frac{2gfb}{10} + \frac{2gfd}{10} \right) + x^{11} \left(\frac{jb^2}{11} + \frac{2hfb}{11} + \frac{2hfd}{11} \right) + x^{12} \left(\frac{kb^2}{12} + \frac{2ifb}{12} + \frac{2ifd}{12} \right) + a^2d^2x$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((a + b*x^2 + c*x^4)^2*(d + e*x + f*x^2 + g*x^3),x)`

[Out] $x^5((b^2d)/5 + (2a^2cd)/5 + (2a^2bf)/5) + x^6((b^2e)/6 + (a^2ce)/3 + (a^2bg)/3) + x^7((b^2f)/7 + (2b^2cd)/7 + (2a^2cf)/7) + x^8((b^2g)/8 + (b^2ce)/4 + (a^2cg)/4) + x^9((a^2f)/3 + (2a^2bd)/3) + x^4((a^2g)/4 + (a^2be)/2) + x^9((c^2d)/9 + (2b^2cf)/9) + x^{10}((c^2e)/10 + (b^2cg)/5) + (a^2e^2x^2)/2 + (c^2fx^{11})/11 + (c^2gx^{12})/12 + a^2d^2x$

sympy [A] time = 0.10, size = 209, normalized size = 1.07

$$a^2dx + \frac{a^2ex^2}{2} + \frac{c^2fx^{11}}{11} + \frac{c^2gx^{12}}{12} + x^{10} \left(\frac{bcg}{5} + \frac{c^2e}{10} \right) + x^9 \left(\frac{2bcf}{9} + \frac{c^2d}{9} \right) + x^8 \left(\frac{acg}{4} + \frac{b^2g}{8} + \frac{bce}{4} \right) + x^7 \left(\frac{2acf}{7} + \frac{b^2f}{7} + \frac{2bce}{7} \right) + x^6 \left(\frac{2b^2c^2e}{6} + \frac{2a^2bf}{6} + \frac{2a^2ce}{6} \right) + x^5 \left(\frac{2b^2c^2d}{5} + \frac{2a^2bf}{5} + \frac{2a^2ce}{5} \right) + x^4 \left(\frac{2a^2b^2g}{4} + \frac{2a^2be}{4} \right) + x^3 \left(\frac{2a^2b^2d}{3} + \frac{2a^2bf}{3} + \frac{2a^2ce}{3} \right) + x^2 \left(\frac{2a^2b^2e}{2} + \frac{2a^2bf}{2} + \frac{2a^2ce}{2} \right) + a^2d^2x$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((g*x**3+f*x**2+e*x+d)*(c*x**4+b*x**2+a)**2,x)`

[Out] $a^{**2}d*x + a^{**2}e*x^{**2}/2 + c^{**2}f*x^{**11}/11 + c^{**2}g*x^{**12}/12 + x^{**10}(b*c*g/5 + c^{**2}e/10) + x^{**9}(2*b*c*f/9 + c^{**2}d/9) + x^{**8}(a*c*g/4 + b^{**2}g/8 +$

$$b*c*e/4) + x**7*(2*a*c*f/7 + b**2*f/7 + 2*b*c*d/7) + x**6*(a*b*g/3 + a*c*e/3 + b**2*e/6) + x**5*(2*a*b*f/5 + 2*a*c*d/5 + b**2*d/5) + x**4*(a**2*g/4 + a*b*e/2) + x**3*(a**2*f/3 + 2*a*b*d/3)$$

3.9 $\int (a + bx^2 + cx^4)^2 (d + ex + fx^2 + gx^3 + hx^4) dx$

Optimal. Leaf size=234

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{9} x^9 (2c(ah + bf) + b^2 h + c^2 d) + \frac{1}{7} x^7 (2b(ah + cd) + 2acf + b^2 f) + \frac{1}{5} x^5 (2abf + a(ah + 2cd) + b^2 d)$$

[Out] $a^2 d x + \frac{1}{2} a^2 e x^2 + \frac{1}{3} a (a f + 2 b d) x^3 + \frac{1}{4} a (a g + 2 b e) x^4 + \frac{1}{5} (b^2 d + 2 a b f + a (a h + 2 c d)) x^5 + \frac{1}{6} (2 a b g + 2 a c e + b^2 e) x^6 + \frac{1}{7} (b^2 f + 2 a c f + 2 b (a h + c d)) x^7 + \frac{1}{8} (2 a c g + b^2 g + 2 b c e) x^8 + \frac{1}{9} (c^2 d + b^2 h + 2 c (a h + b f)) x^9 + \frac{1}{10} c (2 b g + c e) x^{10} + \frac{1}{11} c (2 b h + c f) x^{11} + \frac{1}{12} c^2 g x^{12} + \frac{1}{13} c^2 h x^{13}$

Rubi [A] time = 0.24, antiderivative size = 234, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.029$, Rules used = {1671}

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{9} x^9 (2c(ah + bf) + b^2 h + c^2 d) + \frac{1}{7} x^7 (2b(ah + cd) + 2acf + b^2 f) + \frac{1}{5} x^5 (2abf + a(ah + 2cd) + b^2 d)$$

Antiderivative was successfully verified.

[In] Int[(a + b*x^2 + c*x^4)^2*(d + e*x + f*x^2 + g*x^3 + h*x^4), x]

[Out] $a^2 d x + (a^2 e x^2)/2 + (a(2 b d + a f) x^3)/3 + (a(2 b e + a g) x^4)/4 + ((b^2 d + 2 a b f + a(2 c d + a h)) x^5)/5 + ((b^2 e + 2 a c e + 2 a b g) x^6)/6 + ((b^2 f + 2 a c f + 2 b(c d + a h)) x^7)/7 + ((2 b c e + b^2 g + 2 a c g) x^8)/8 + ((c^2 d + b^2 h + 2 c(b f + a h)) x^9)/9 + (c(c e + 2 b g) x^{10})/10 + (c(c f + 2 b h) x^{11})/11 + (c^2 g x^{12})/12 + (c^2 h x^{13})/13$

Rule 1671

Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Int[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\begin{aligned} \int (a + bx^2 + cx^4)^2 (d + ex + fx^2 + gx^3 + hx^4) dx &= \int (a^2 d + a^2 ex + a(2bd + af)x^2 + a(2be + ag)x^3 + (b^2 d + 2abf + a(ah + 2cd))x^4 \\ &\quad + (2abg + 2ace + b^2 e)x^5 + (b^2 f + 2acf + 2b(ah + cd))x^6 + (2bc e + b^2 g + 2acg)x^7 \\ &\quad + (c^2 d + b^2 h + 2c(bf + ah))x^8 + (c(c e + 2bg)x^9 + (c(c f + 2bh)x^{10} + c^2 g x^{11} + c^2 h x^{12})) \end{aligned}$$

Mathematica [A] time = 0.08, size = 234, normalized size = 1.00

$$\frac{1}{5}x^5(a^2h + 2abf + 2acd + b^2d) + a^2dx + \frac{1}{2}a^2ex^2 + \frac{1}{9}x^9(2ach + b^2h + 2bcf + c^2d) + \frac{1}{7}x^7(2abh + 2acf + b^2f + 2bc$$

Antiderivative was successfully verified.

[In] Integrate[(a + b*x^2 + c*x^4)^2*(d + e*x + f*x^2 + g*x^3 + h*x^4),x]

[Out] a^2*d*x + (a^2*e*x^2)/2 + (a*(2*b*d + a*f)*x^3)/3 + (a*(2*b*e + a*g)*x^4)/4 + ((b^2*d + 2*a*c*d + 2*a*b*f + a^2*h)*x^5)/5 + ((b^2*e + 2*a*c*e + 2*a*b*g)*x^6)/6 + ((2*b*c*d + b^2*f + 2*a*c*f + 2*a*b*h)*x^7)/7 + ((2*b*c*e + b^2*g + 2*a*c*g)*x^8)/8 + ((c^2*d + 2*b*c*f + b^2*h + 2*a*c*h)*x^9)/9 + (c*(c*e + 2*b*g)*x^10)/10 + (c*(c*f + 2*b*h)*x^11)/11 + (c^2*g*x^12)/12 + (c^2*h*x^13)/13

fricas [A] time = 0.83, size = 253, normalized size = 1.08

$$\frac{1}{13}x^{13}hc^2 + \frac{1}{12}x^{12}gc^2 + \frac{1}{11}x^{11}fc^2 + \frac{2}{11}x^{11}hcb + \frac{1}{10}x^{10}ec^2 + \frac{1}{5}x^{10}gcb + \frac{1}{9}x^9dc^2 + \frac{2}{9}x^9fcb + \frac{1}{9}x^9hb^2 + \frac{2}{9}x^9hca + \frac{1}{4}x^8ecb + \frac{1}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x^4+b*x^2+a)^2*(h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="fricas")

[Out] 1/13*x^13*h*c^2 + 1/12*x^12*g*c^2 + 1/11*x^11*f*c^2 + 2/11*x^11*h*c*b + 1/10*x^10*e*c^2 + 1/5*x^10*g*c*b + 1/9*x^9*d*c^2 + 2/9*x^9*f*c*b + 1/9*x^9*h*b^2 + 2/9*x^9*h*c*a + 1/4*x^8*e*c*b + 1/8*x^8*g*b^2 + 1/4*x^8*g*c*a + 2/7*x^7*d*c*b + 1/7*x^7*f*b^2 + 2/7*x^7*f*c*a + 2/7*x^7*h*b*a + 1/6*x^6*e*b^2 + 1/3*x^6*e*c*a + 1/3*x^6*g*b*a + 1/5*x^5*d*b^2 + 2/5*x^5*d*c*a + 2/5*x^5*f*b*a + 1/5*x^5*h*a^2 + 1/2*x^4*e*b*a + 1/4*x^4*g*a^2 + 2/3*x^3*d*b*a + 1/3*x^3*f*a^2 + 1/2*x^2*e*a^2 + x*d*a^2

giac [A] time = 0.26, size = 259, normalized size = 1.11

$$\frac{1}{13}c^2hx^{13} + \frac{1}{12}c^2gx^{12} + \frac{1}{11}c^2fx^{11} + \frac{2}{11}bchx^{11} + \frac{1}{5}bcgx^{10} + \frac{1}{10}c^2x^{10}e + \frac{1}{9}c^2dx^9 + \frac{2}{9}bcfx^9 + \frac{1}{9}b^2hx^9 + \frac{2}{9}achx^9 + \frac{1}{8}b^2gx^8$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x^4+b*x^2+a)^2*(h*x^4+g*x^3+f*x^2+e*x+d),x, algorithm="giac")

[Out] 1/13*c^2*h*x^13 + 1/12*c^2*g*x^12 + 1/11*c^2*f*x^11 + 2/11*b*c*h*x^11 + 1/5*b*c*g*x^10 + 1/10*c^2*x^10*e + 1/9*c^2*d*x^9 + 2/9*b*c*f*x^9 + 1/9*b^2*h*x^9 + 2/9*a*c*h*x^9 + 1/8*b^2*g*x^8 + 1/4*a*c*g*x^8 + 1/4*b*c*x^8*e + 2/7*b*c*d*x^7 + 1/7*b^2*f*x^7 + 2/7*a*c*f*x^7 + 2/7*a*b*h*x^7 + 1/3*a*b*g*x^6 + 1/6*b^2*x^6*e + 1/3*a*c*x^6*e + 1/5*b^2*d*x^5 + 2/5*a*c*d*x^5 + 2/5*a*b*f*x^

$$5 + 1/5*a^2*h*x^5 + 1/4*a^2*g*x^4 + 1/2*a*b*x^4*e + 2/3*a*b*d*x^3 + 1/3*a^2*f*x^3 + 1/2*a^2*x^2*e + a^2*d*x$$

maple [A] time = 0.00, size = 219, normalized size = 0.94

$$\frac{c^2 h x^{13}}{13} + \frac{c^2 g x^{12}}{12} + \frac{(2 b c h + c^2 f) x^{11}}{11} + \frac{(2 g b c + e c^2) x^{10}}{10} + \frac{(2 b c f + c^2 d + (2 a c + b^2) h) x^9}{9} + \frac{(2 b c e + (2 a c + b^2) g) x^8}{8}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((c*x^4+b*x^2+a)^2*(h*x^4+g*x^3+f*x^2+e*x+d), x)

[Out] 1/13*c^2*h*x^13+1/12*c^2*g*x^12+1/11*(2*b*c*h+c^2*f)*x^11+1/10*(2*b*c*g+c^2*e)*x^10+1/9*((2*a*c+b^2)*h+2*f*b*c+c^2*d)*x^9+1/8*(2*b*c*e+(2*a*c+b^2)*g)*x^8+1/7*(2*a*b*h+(2*a*c+b^2)*f+2*b*c*d)*x^7+1/6*(2*a*b*g+(2*a*c+b^2)*e)*x^6+1/5*(a^2*h+2*a*b*f+(2*a*c+b^2)*d)*x^5+1/4*(a^2*g+2*a*b*e)*x^4+1/3*(a^2*f+2*a*b*d)*x^3+1/2*a^2*e*x^2+a^2*d*x

maxima [A] time = 1.14, size = 218, normalized size = 0.93

$$\frac{1}{13} c^2 h x^{13} + \frac{1}{12} c^2 g x^{12} + \frac{1}{11} (c^2 f + 2 b c h) x^{11} + \frac{1}{10} (c^2 e + 2 b c g) x^{10} + \frac{1}{9} (c^2 d + 2 b c f + (b^2 + 2 a c) h) x^9 + \frac{1}{8} (2 b c e + (b^2 + 2 a c) g) x^8 + \frac{1}{7} (2 a b h + (2 a c + b^2) f + 2 b c d) x^7 + \frac{1}{6} (2 a b g + (2 a c + b^2) e) x^6 + \frac{1}{5} (a^2 h + 2 a b f + (2 a c + b^2) d) x^5 + \frac{1}{4} (a^2 g + 2 a b e) x^4 + \frac{1}{3} (a^2 f + 2 a b d) x^3 + \frac{1}{2} a^2 e x^2 + a^2 d x$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x^4+b*x^2+a)^2*(h*x^4+g*x^3+f*x^2+e*x+d), x, algorithm="maxima")

[Out] 1/13*c^2*h*x^13 + 1/12*c^2*g*x^12 + 1/11*(c^2*f + 2*b*c*h)*x^11 + 1/10*(c^2*e + 2*b*c*g)*x^10 + 1/9*(c^2*d + 2*b*c*f + (b^2 + 2*a*c)*h)*x^9 + 1/8*(2*b*c*e + (b^2 + 2*a*c)*g)*x^8 + 1/7*(2*b*c*d + 2*a*b*h + (b^2 + 2*a*c)*f)*x^7 + 1/6*(2*a*b*g + (b^2 + 2*a*c)*e)*x^6 + 1/5*(2*a*b*f + a^2*h + (b^2 + 2*a*c)*d)*x^5 + 1/2*a^2*e*x^2 + 1/4*(2*a*b*e + a^2*g)*x^4 + a^2*d*x + 1/3*(2*a*b*d + a^2*f)*x^3

mupad [B] time = 0.11, size = 220, normalized size = 0.94

$$x^6 \left(\frac{e b^2}{6} + \frac{a g b}{3} + \frac{a c e}{3} \right) + x^8 \left(\frac{g b^2}{8} + \frac{c e b}{4} + \frac{a c g}{4} \right) + x^3 \left(\frac{f a^2}{3} + \frac{2 b d a}{3} \right) + x^4 \left(\frac{g a^2}{4} + \frac{b e a}{2} \right) + x^{10} \left(\frac{e c^2}{10} + \frac{b g c}{5} \right) + x^{11} \left(\frac{c^2 f}{11} + \frac{2 b c h}{11} \right) + x^{12} \left(\frac{c^2 g}{12} + \frac{2 b c f}{12} + \frac{c^2 d}{12} + \frac{(2 a c + b^2) h}{12} \right) + x^{13} \left(\frac{c^2 h}{13} + \frac{2 a b h}{13} + \frac{2 a b f}{13} + \frac{a^2 h}{13} \right) + x^9 \left(\frac{c^2 d}{9} + \frac{2 b c f}{9} + \frac{(b^2 + 2 a c) h}{9} \right) + x^8 \left(\frac{2 b c e}{8} + \frac{(b^2 + 2 a c) g}{8} \right) + x^7 \left(\frac{2 a b h}{7} + \frac{(2 a c + b^2) f}{7} + \frac{2 b c d}{7} \right) + x^6 \left(\frac{2 a b g}{6} + \frac{(b^2 + 2 a c) e}{6} \right) + x^5 \left(\frac{2 a b f}{5} + \frac{a^2 h}{5} + \frac{(b^2 + 2 a c) d}{5} \right) + x^4 \left(\frac{2 a b e}{4} + \frac{a^2 g}{4} \right) + x^3 \left(\frac{2 a b d}{3} + \frac{a^2 f}{3} \right) + x^2 \left(\frac{a^2 e}{2} \right) + x \left(\frac{a^2 d}{1} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a + b*x^2 + c*x^4)^2*(d + e*x + f*x^2 + g*x^3 + h*x^4), x)

[Out] x^6*((b^2*e)/6 + (a*c*e)/3 + (a*b*g)/3) + x^8*((b^2*g)/8 + (b*c*e)/4 + (a*c*g)/4) + x^3*((a^2*f)/3 + (2*a*b*d)/3) + x^4*((a^2*g)/4 + (a*b*e)/2) + x^10*((c^2*e)/10 + (b*c*g)/5) + x^11*((c^2*f)/11 + (2*b*c*h)/11) + x^5*((b^2*d)

/5 + (a²*h)/5 + (2*a*c*d)/5 + (2*a*b*f)/5) + x⁷*((b²*f)/7 + (2*b*c*d)/7 + (2*a*c*f)/7 + (2*a*b*h)/7) + x⁹*((c²*d)/9 + (b²*h)/9 + (2*b*c*f)/9 + (2*a*c*h)/9) + (a²*e*x²)/2 + (c²*g*x¹²)/12 + (c²*h*x¹³)/13 + a²*d*x

sympy [A] time = 0.11, size = 258, normalized size = 1.10

$$a^2dx + \frac{a^2ex^2}{2} + \frac{c^2gx^{12}}{12} + \frac{c^2hx^{13}}{13} + x^{11} \left(\frac{2bch}{11} + \frac{c^2f}{11} \right) + x^{10} \left(\frac{bcg}{5} + \frac{c^2e}{10} \right) + x^9 \left(\frac{2ach}{9} + \frac{b^2h}{9} + \frac{2bcf}{9} + \frac{c^2d}{9} \right) + x^8 \left(\frac{acg}{4} + \right.$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x**4+b*x**2+a)**2*(h*x**4+g*x**3+f*x**2+e*x+d), x)

[Out] a**2*d*x + a**2*e*x**2/2 + c**2*g*x**12/12 + c**2*h*x**13/13 + x**11*(2*b*c*h/11 + c**2*f/11) + x**10*(b*c*g/5 + c**2*e/10) + x**9*(2*a*c*h/9 + b**2*h/9 + 2*b*c*f/9 + c**2*d/9) + x**8*(a*c*g/4 + b**2*g/8 + b*c*e/4) + x**7*(2*a*b*h/7 + 2*a*c*f/7 + b**2*f/7 + 2*b*c*d/7) + x**6*(a*b*g/3 + a*c*e/3 + b**2*e/6) + x**5*(a**2*h/5 + 2*a*b*f/5 + 2*a*c*d/5 + b**2*d/5) + x**4*(a**2*g/4 + a*b*e/2) + x**3*(a**2*f/3 + 2*a*b*d/3)

$$3.10 \quad \int \frac{d+ex}{4-5x^2+x^4} dx$$

Optimal. Leaf size=45

$$-\frac{1}{6}d \tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}d \tanh^{-1}(x) - \frac{1}{6}e \log(1-x^2) + \frac{1}{6}e \log(4-x^2)$$

[Out] $-1/6*d*\operatorname{arctanh}(1/2*x)+1/3*d*\operatorname{arctanh}(x)-1/6*e*\ln(-x^2+1)+1/6*e*\ln(-x^2+4)$

Rubi [A] time = 0.03, antiderivative size = 45, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 7, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.389$, Rules used = {1673, 12, 1093, 207, 1107, 616, 31}

$$-\frac{1}{6}d \tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}d \tanh^{-1}(x) - \frac{1}{6}e \log(1-x^2) + \frac{1}{6}e \log(4-x^2)$$

Antiderivative was successfully verified.

[In] $\operatorname{Int}[(d + e*x)/(4 - 5*x^2 + x^4), x]$

[Out] $-(d*\operatorname{ArcTanh}[x/2])/6 + (d*\operatorname{ArcTanh}[x])/3 - (e*\operatorname{Log}[1 - x^2])/6 + (e*\operatorname{Log}[4 - x^2])/6$

Rule 12

$\operatorname{Int}[(a_*)(u_), x_Symbol] \rightarrow \operatorname{Dist}[a, \operatorname{Int}[u, x], x] /;$ FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 31

$\operatorname{Int}[((a_) + (b_.)*(x_))^{(-1)}, x_Symbol] \rightarrow \operatorname{Simp}[\operatorname{Log}[\operatorname{RemoveContent}[a + b*x, x]]/b, x] /;$ FreeQ[{a, b}, x]

Rule 207

$\operatorname{Int}[((a_) + (b_.)*(x_)^2)^{(-1)}, x_Symbol] \rightarrow -\operatorname{Simp}[\operatorname{ArcTanh}[(\operatorname{Rt}[b, 2]*x)/\operatorname{Rt}[-a, 2]]/(\operatorname{Rt}[-a, 2]*\operatorname{Rt}[b, 2]), x] /;$ FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a, 0] || GtQ[b, 0])

Rule 616

$\operatorname{Int}[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^{(-1)}, x_Symbol] \rightarrow \operatorname{With}[\{q = \operatorname{Rt}[b^2 - 4*a*c, 2]\}, \operatorname{Dist}[c/q, \operatorname{Int}[1/\operatorname{Simp}[b/2 - q/2 + c*x, x], x], x] - \operatorname{Dist}[c/q, \operatorname{Int}[1/\operatorname{Simp}[b/2 + q/2 + c*x, x], x], x]] /;$ FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]

Rule 1093

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(-1), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[c/q, Int[1/(b/2 - q/2 + c*x^2), x], x] - Dist[c/q, Int[1/(b/2 + q/2 + c*x^2), x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Dist[1/2, Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
 \int \frac{d+ex}{4-5x^2+x^4} dx &= \int \frac{d}{4-5x^2+x^4} dx + \int \frac{ex}{4-5x^2+x^4} dx \\
 &= d \int \frac{1}{4-5x^2+x^4} dx + e \int \frac{x}{4-5x^2+x^4} dx \\
 &= \frac{1}{3}d \int \frac{1}{-4+x^2} dx - \frac{1}{3}d \int \frac{1}{-1+x^2} dx + \frac{1}{2}e \operatorname{Subst}\left(\int \frac{1}{4-5x+x^2} dx, x, x^2\right) \\
 &= -\frac{1}{6}d \tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}d \tanh^{-1}(x) + \frac{1}{6}e \operatorname{Subst}\left(\int \frac{1}{-4+x} dx, x, x^2\right) - \frac{1}{6}e \operatorname{Subst}\left(\int \frac{1}{-1+x} dx, x, x^2\right) \\
 &= -\frac{1}{6}d \tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}d \tanh^{-1}(x) - \frac{1}{6}e \log(1-x^2) + \frac{1}{6}e \log(4-x^2)
 \end{aligned}$$

Mathematica [A] time = 0.02, size = 50, normalized size = 1.11

$$\frac{1}{12}(-2(d+e)\log(1-x) + (d+2e)\log(2-x) + 2(d-e)\log(x+1) - (d-2e)\log(x+2))$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)/(4 - 5*x^2 + x^4), x]
```

[Out] $(-2*(d + e)*\text{Log}[1 - x] + (d + 2*e)*\text{Log}[2 - x] + 2*(d - e)*\text{Log}[1 + x] - (d - 2*e)*\text{Log}[2 + x])/12$

fricas [A] time = 1.60, size = 43, normalized size = 0.96

$$-\frac{1}{12}(d - 2e)\log(x + 2) + \frac{1}{6}(d - e)\log(x + 1) - \frac{1}{6}(d + e)\log(x - 1) + \frac{1}{12}(d + 2e)\log(x - 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")`

[Out] $-1/12*(d - 2*e)*\log(x + 2) + 1/6*(d - e)*\log(x + 1) - 1/6*(d + e)*\log(x - 1) + 1/12*(d + 2*e)*\log(x - 2)$

giac [A] time = 0.25, size = 51, normalized size = 1.13

$$-\frac{1}{12}(d - 2e)\log(|x + 2|) + \frac{1}{6}(d - e)\log(|x + 1|) - \frac{1}{6}(d + e)\log(|x - 1|) + \frac{1}{12}(d + 2e)\log(|x - 2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")`

[Out] $-1/12*(d - 2*e)*\log(\text{abs}(x + 2)) + 1/6*(d - e)*\log(\text{abs}(x + 1)) - 1/6*(d + e)*\log(\text{abs}(x - 1)) + 1/12*(d + 2*e)*\log(\text{abs}(x - 2))$

maple [A] time = 0.01, size = 58, normalized size = 1.29

$$-\frac{d \ln(x + 2)}{12} + \frac{d \ln(x - 2)}{12} - \frac{d \ln(x - 1)}{6} + \frac{d \ln(x + 1)}{6} + \frac{e \ln(x + 2)}{6} + \frac{e \ln(x - 2)}{6} - \frac{e \ln(x - 1)}{6} - \frac{e \ln(x + 1)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((e*x+d)/(x^4-5*x^2+4),x)`

[Out] $1/12*\ln(x-2)*d+1/6*\ln(x-2)*e+1/6*\ln(x+1)*d-1/6*\ln(x+1)*e-1/6*\ln(x-1)*d-1/6*\ln(x-1)*e-1/12*\ln(2+x)*d+1/6*\ln(2+x)*e$

maxima [A] time = 1.13, size = 43, normalized size = 0.96

$$-\frac{1}{12}(d - 2e)\log(x + 2) + \frac{1}{6}(d - e)\log(x + 1) - \frac{1}{6}(d + e)\log(x - 1) + \frac{1}{12}(d + 2e)\log(x - 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")`

[Out] $-1/12*(d - 2*e)*\log(x + 2) + 1/6*(d - e)*\log(x + 1) - 1/6*(d + e)*\log(x - 1) + 1/12*(d + 2*e)*\log(x - 2)$

mupad [B] time = 0.71, size = 51, normalized size = 1.13

$$\ln(x+1) \left(\frac{d}{6} - \frac{e}{6} \right) - \ln(x-1) \left(\frac{d}{6} + \frac{e}{6} \right) + \ln(x-2) \left(\frac{d}{12} + \frac{e}{6} \right) - \ln(x+2) \left(\frac{d}{12} - \frac{e}{6} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((d + e*x)/(x^4 - 5*x^2 + 4), x)`

[Out] `log(x + 1)*(d/6 - e/6) - log(x - 1)*(d/6 + e/6) + log(x - 2)*(d/12 + e/6) - log(x + 2)*(d/12 - e/6)`

sympy [B] time = 3.15, size = 515, normalized size = 11.44

$$\frac{(d - 2e) \log \left(x + \frac{-35d^4e + \frac{51d^4(d-2e)}{2} - 180d^2e^3 - 90d^2e^2(d-2e) + 41d^2e(d-2e)^2 - \frac{15d^2(d-2e)^3}{2} + 320e^5 - 96e^4(d-2e) - 80e^3(d-2e)^2 + 24e^2(d-2e)^3}{9d^5 - 160d^3e^2 + 256de^4} \right)}{12} + \dots$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)/(x**4-5*x**2+4), x)`

[Out] `-(d - 2*e)*log(x + (-35*d**4*e + 51*d**4*(d - 2*e)/2 - 180*d**2*e**3 - 90*d**2*e**2*(d - 2*e) + 41*d**2*e*(d - 2*e)**2 - 15*d**2*(d - 2*e)**3/2 + 320*e**5 - 96*e**4*(d - 2*e) - 80*e**3*(d - 2*e)**2 + 24*e**2*(d - 2*e)**3)/(9*d**5 - 160*d**3*e**2 + 256*d*e**4))/12 + (d - e)*log(x + (-35*d**4*e - 51*d**4*(d - e) - 180*d**2*e**3 + 180*d**2*e**2*(d - e) + 164*d**2*e*(d - e)**2 + 60*d**2*(d - e)**3 + 320*e**5 + 192*e**4*(d - e) - 320*e**3*(d - e)**2 - 192*e**2*(d - e)**3)/(9*d**5 - 160*d**3*e**2 + 256*d*e**4))/6 - (d + e)*log(x + (-35*d**4*e + 51*d**4*(d + e) - 180*d**2*e**3 - 180*d**2*e**2*(d + e) + 164*d**2*e*(d + e)**2 - 60*d**2*(d + e)**3 + 320*e**5 - 192*e**4*(d + e) - 320*e**3*(d + e)**2 + 192*e**2*(d + e)**3)/(9*d**5 - 160*d**3*e**2 + 256*d*e**4))/6 + (d + 2*e)*log(x + (-35*d**4*e - 51*d**4*(d + 2*e)/2 - 180*d**2*e**3 + 90*d**2*e**2*(d + 2*e) + 41*d**2*e*(d + 2*e)**2 + 15*d**2*(d + 2*e)**3/2 + 320*e**5 + 96*e**4*(d + 2*e) - 80*e**3*(d + 2*e)**2 - 24*e**2*(d + 2*e)**3)/(9*d**5 - 160*d**3*e**2 + 256*d*e**4))/12`

$$3.11 \quad \int \frac{d+ex+fx^2}{4-5x^2+x^4} dx$$

Optimal. Leaf size=51

$$-\frac{1}{6}(d+4f) \tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}(d+f) \tanh^{-1}(x) - \frac{1}{6}e \log(1-x^2) + \frac{1}{6}e \log(4-x^2)$$

[Out] $-1/6*(d+4*f)*\operatorname{arctanh}(1/2*x)+1/3*(d+f)*\operatorname{arctanh}(x)-1/6*e*\ln(-x^2+1)+1/6*e*\ln(-x^2+4)$

Rubi [A] time = 0.06, antiderivative size = 51, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.304$, Rules used = {1673, 1166, 207, 12, 1107, 616, 31}

$$-\frac{1}{6}(d+4f) \tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}(d+f) \tanh^{-1}(x) - \frac{1}{6}e \log(1-x^2) + \frac{1}{6}e \log(4-x^2)$$

Antiderivative was successfully verified.

[In] `Int[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4),x]`

[Out] $-\frac{(d+4*f)*\operatorname{ArcTanh}[x/2]}{6} + \frac{(d+f)*\operatorname{ArcTanh}[x]}{3} - \frac{e*\operatorname{Log}[1-x^2]}{6} + \frac{e*\operatorname{Log}[4-x^2]}{6}$

Rule 12

`Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]`

Rule 31

`Int[((a_) + (b_.)*(x_))^-1, x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]`

Rule 207

`Int[((a_) + (b_.)*(x_)^2)^-1, x_Symbol] := -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a, 0] || GtQ[b, 0])`

Rule 616

`Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^-1, x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x] - Dist[c/q, Int[1/Simp[b/2 + q/2 + c*x, x], x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2`

- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]

Rule 1107

Int[(x_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Dist[1/2, Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]

Rule 1166

Int[((d_) + (e_)*(x_)^2)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] :> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2 + c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]

Rule 1673

Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]

Rubi steps

$$\begin{aligned}
 \int \frac{d + ex + fx^2}{4 - 5x^2 + x^4} dx &= \int \frac{ex}{4 - 5x^2 + x^4} dx + \int \frac{d + fx^2}{4 - 5x^2 + x^4} dx \\
 &= e \int \frac{x}{4 - 5x^2 + x^4} dx - \frac{1}{3}(d + f) \int \frac{1}{-1 + x^2} dx + \frac{1}{3}(d + 4f) \int \frac{1}{-4 + x^2} dx \\
 &= -\frac{1}{6}(d + 4f) \tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}(d + f) \tanh^{-1}(x) + \frac{1}{2}e \operatorname{Subst}\left(\int \frac{1}{4 - 5x + x^2} dx, x, x^2\right) \\
 &= -\frac{1}{6}(d + 4f) \tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}(d + f) \tanh^{-1}(x) + \frac{1}{6}e \operatorname{Subst}\left(\int \frac{1}{-4 + x} dx, x, x^2\right) - \frac{1}{6}e \operatorname{Subst}\left(\int \frac{1}{4 - 5x + x^2} dx, x, x^2\right) \\
 &= -\frac{1}{6}(d + 4f) \tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}(d + f) \tanh^{-1}(x) - \frac{1}{6}e \log(1 - x^2) + \frac{1}{6}e \log(4 - x^2)
 \end{aligned}$$

Mathematica [A] time = 0.03, size = 58, normalized size = 1.14

$$\frac{1}{12}(-2 \log(1-x)(d+e+f) + \log(2-x)(d+2e+4f) + 2 \log(x+1)(d-e+f) - \log(x+2)(d-2e+4f))$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4),x]

[Out] (-2*(d + e + f)*Log[1 - x] + (d + 2*e + 4*f)*Log[2 - x] + 2*(d - e + f)*Log[1 + x] - (d - 2*e + 4*f)*Log[2 + x])/12

fricas [A] time = 1.02, size = 51, normalized size = 1.00

$$-\frac{1}{12}(d - 2e + 4f)\log(x + 2) + \frac{1}{6}(d - e + f)\log(x + 1) - \frac{1}{6}(d + e + f)\log(x - 1) + \frac{1}{12}(d + 2e + 4f)\log(x - 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")

[Out] -1/12*(d - 2*e + 4*f)*log(x + 2) + 1/6*(d - e + f)*log(x + 1) - 1/6*(d + e + f)*log(x - 1) + 1/12*(d + 2*e + 4*f)*log(x - 2)

giac [A] time = 0.31, size = 59, normalized size = 1.16

$$-\frac{1}{12}(d + 4f - 2e)\log(|x + 2|) + \frac{1}{6}(d + f - e)\log(|x + 1|) - \frac{1}{6}(d + f + e)\log(|x - 1|) + \frac{1}{12}(d + 4f + 2e)\log(|x - 2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")

[Out] -1/12*(d + 4*f - 2*e)*log(abs(x + 2)) + 1/6*(d + f - e)*log(abs(x + 1)) - 1/6*(d + f + e)*log(abs(x - 1)) + 1/12*(d + 4*f + 2*e)*log(abs(x - 2))

maple [B] time = 0.01, size = 86, normalized size = 1.69

$$-\frac{d \ln(x + 2)}{12} + \frac{d \ln(x - 2)}{12} - \frac{d \ln(x - 1)}{6} + \frac{d \ln(x + 1)}{6} + \frac{e \ln(x + 2)}{6} + \frac{e \ln(x - 2)}{6} - \frac{e \ln(x - 1)}{6} - \frac{e \ln(x + 1)}{6} - \frac{f \ln(x + 2)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((f*x^2+e*x+d)/(x^4-5*x^2+4),x)

[Out] 1/12*d*ln(x-2)+1/6*e*ln(x-2)+1/3*ln(x-2)*f+1/6*d*ln(x+1)-1/6*e*ln(x+1)+1/6*ln(x+1)*f-1/6*d*ln(x-1)-1/6*e*ln(x-1)-1/6*ln(x-1)*f-1/12*d*ln(x+2)+1/6*e*ln(x+2)-1/3*ln(x+2)*f

maxima [A] time = 1.12, size = 51, normalized size = 1.00

$$-\frac{1}{12}(d - 2e + 4f)\log(x + 2) + \frac{1}{6}(d - e + f)\log(x + 1) - \frac{1}{6}(d + e + f)\log(x - 1) + \frac{1}{12}(d + 2e + 4f)\log(x - 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")

[Out] $-1/12*(d - 2*e + 4*f)*\log(x + 2) + 1/6*(d - e + f)*\log(x + 1) - 1/6*(d + e + f)*\log(x - 1) + 1/12*(d + 2*e + 4*f)*\log(x - 2)$

mupad [B] time = 0.71, size = 63, normalized size = 1.24

$$\ln(x+1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} \right) - \ln(x-1) \left(\frac{d}{6} + \frac{e}{6} + \frac{f}{6} \right) + \ln(x-2) \left(\frac{d}{12} + \frac{e}{6} + \frac{f}{3} \right) - \ln(x+2) \left(\frac{d}{12} - \frac{e}{6} + \frac{f}{3} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2)/(x^4 - 5*x^2 + 4),x)

[Out] $\log(x + 1)*(d/6 - e/6 + f/6) - \log(x - 1)*(d/6 + e/6 + f/6) + \log(x - 2)*(d/12 + e/6 + f/3) - \log(x + 2)*(d/12 - e/6 + f/3)$

sympy [B] time = 110.12, size = 2195, normalized size = 43.04

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x**2+e*x+d)/(x**4-5*x**2+4),x)

[Out] $-(d - 2*e + 4*f)*\log(x + (-35*d**5*e + 51*d**5*(d - 2*e + 4*f)/2 - 820*d**4*e*f + 90*d**4*f*(d - 2*e + 4*f) - 180*d**3*e**3 - 90*d**3*e**2*(d - 2*e + 4*f) - 4100*d**3*e*f**2 + 41*d**3*e*(d - 2*e + 4*f)**2 + 42*d**3*f**2*(d - 2*e + 4*f) - 15*d**3*(d - 2*e + 4*f)**3/2 - 432*d**2*e**2*f*(d - 2*e + 4*f) - 8000*d**2*e*f**3 + 240*d**2*e*f*(d - 2*e + 4*f)**2 - 240*d**2*f**3*(d - 2*e + 4*f) - 12*d**2*f*(d - 2*e + 4*f)**3 + 320*d*e**5 - 96*d*e**4*(d - 2*e + 4*f) + 720*d*e**3*f**2 - 80*d*e**3*(d - 2*e + 4*f)**2 - 1080*d*e**2*f**2*(d - 2*e + 4*f) + 24*d*e**2*(d - 2*e + 4*f)**3 - 6400*d*e*f**4 + 492*d*e*f**2*(d - 2*e + 4*f)**2 - 576*d*f**4*(d - 2*e + 4*f) + 30*d*f**2*(d - 2*e + 4*f)**3 + 512*e**5*f - 128*e**3*f*(d - 2*e + 4*f)**2 - 576*e**2*f**3*(d - 2*e + 4*f) - 1472*e*f**5 + 320*e*f**3*(d - 2*e + 4*f)**2 - 480*f**5*(d - 2*e + 4*f) + 48*f**3*(d - 2*e + 4*f)**3)/(9*d**6 + 45*d**5*f - 160*d**4*e**2 - 36*d**4*f**2 - 1312*d**3*e**2*f - 360*d**3*f**3 + 256*d**2*e**4 - 3840*d**2*e**2*f**2 - 144*d**2*f**4 + 1280*d*e**4*f - 5248*d*e**2*f**3 + 720*d*f**5 + 1024*e**4*f**2 - 2560*e**2*f**4 + 576*f**6))/12 + (d - e + f)*\log(x + (-35*d**5*e - 51*d**5*(d - e + f) - 820*d**4*e*f - 180*d**4*f*(d - e + f) - 180*d**3*e**3 + 180*d**3*e**2*(d - e + f) - 4100*d**3*e*f**2 + 164*d**3*e*(d - e + f)**2 - 84*d**3*f**2*(d - e + f) + 60*d**3*(d - e + f)**3 + 864*d**2*e**2*f*(d - e + f) - 8000*d**2*e*f**3 + 960*d**2*e*f*(d - e + f)**2 + 480*d**2*f**3*(d - e + f) + 96*d**2*f*(d - e + f)**3 + 320*d*e**5 + 192*d*e**4*(d - e + f) + 720*d*e**3*f**2 - 320*d*e**3*(d - e + f)**2 + 2160*d*e**2*f**2*(d - e + f) - 192*d*e**2*(d - e + f)**3 - 6400*d*e*f**4 + 1968*d*e*f**2*($

$$\begin{aligned}
& (d - e + f)^2 + 1152d^4f(d - e + f) - 240d^3f^2(d - e + f)^3 + 512e^5f - 512e^3f(d - e + f)^2 + 1152e^2f^3(d - e + f) - 1472ef^5 \\
& + 1280ef^3(d - e + f)^2 + 960f^5(d - e + f) - 384f^3(d - e + f)^3) / (9d^6 + 45d^5f - 160d^4e^2 - 36d^4f^2 - 1312d^3e^2f \\
& - 360d^3f^3 + 256d^2e^4 - 3840d^2e^2f^2 - 144d^2f^4 + 1280de^4f - 5248de^2f^3 + 720df^5 + 1024e^4f^2 - 2560e^2f^4 \\
& + 576f^6) / 6 - (d + e + f) \log(x + (-35d^5e + 51d^5(d + e + f) - 820d^4ef + 180d^4f(d + e + f) - 180d^3e^3 - 180d^3e^2(d + e + f) - 4100d^3ef^2 + 164d^3e(d + e + f)^2 + 84d^3f^2(d + e + f) - 60d^3(d + e + f)^3 - 864d^2e^2f(d + e + f) - 8000d^2ef^3 + 960d^2ef(d + e + f)^2 - 480d^2f^3(d + e + f) - 96d^2f(d + e + f)^3 + 320de^5 - 192de^4(d + e + f) + 720de^3f^2 - 320de^3(d + e + f)^2 - 2160de^2f^2(d + e + f) + 192de^2(d + e + f)^3 - 6400def^4 + 1968def^2(d + e + f)^2 - 1152df^4(d + e + f) + 240df^2(d + e + f)^3 + 512e^5f - 512e^3f(d + e + f)^2 - 1152e^2f^3(d + e + f) - 1472ef^5 + 1280ef^3(d + e + f)^2 - 960f^5(d + e + f) + 384f^3(d + e + f)^3) / (9d^6 + 45d^5f - 160d^4e^2 - 36d^4f^2 - 1312d^3e^2f - 360d^3f^3 + 256d^2e^4 - 3840d^2e^2f^2 - 144d^2f^4 + 1280de^4f - 5248de^2f^3 + 720df^5 + 1024e^4f^2 - 2560e^2f^4 + 576f^6) / 6 + (d + 2e + 4f) \log(x + (-35d^5e - 51d^5(d + 2e + 4f) / 2 - 820d^4ef - 90d^4f(d + 2e + 4f) - 180d^3e^3 + 90d^3e^2(d + 2e + 4f) - 4100d^3ef^2 + 41d^3e(d + 2e + 4f)^2 - 42d^3f^2(d + 2e + 4f) + 15d^3(d + 2e + 4f)^3 / 2 + 432d^2e^2f(d + 2e + 4f) - 8000d^2ef^3 + 240d^2ef(d + 2e + 4f)^2 + 240d^2f^3(d + 2e + 4f) + 12d^2f(d + 2e + 4f)^3 + 320de^5 + 96de^4(d + 2e + 4f) + 720de^3f^2 - 80de^3(d + 2e + 4f)^2 + 1080de^2f^2(d + 2e + 4f) - 24de^2(d + 2e + 4f)^3 - 6400def^4 + 492def^2(d + 2e + 4f)^2 + 576df^4(d + 2e + 4f) - 30df^2(d + 2e + 4f)^3 + 512e^5f - 128e^3f(d + 2e + 4f)^2 + 576e^2f^3(d + 2e + 4f) - 1472ef^5 + 320ef^3(d + 2e + 4f)^2 + 480f^5(d + 2e + 4f) - 48f^3(d + 2e + 4f)^3) / (9d^6 + 45d^5f - 160d^4e^2 - 36d^4f^2 - 1312d^3e^2f - 360d^3f^3 + 256d^2e^4 - 3840d^2e^2f^2 - 144d^2f^4 + 1280de^4f - 5248de^2f^3 + 720df^5 + 1024e^4f^2 - 2560e^2f^4 + 576f^6) / 12
\end{aligned}$$

$$3.12 \quad \int \frac{d+ex+fx^2+gx^3}{4-5x^2+x^4} dx$$

Optimal. Leaf size=57

$$-\frac{1}{6}(d+4f) \tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}(d+f) \tanh^{-1}(x) - \frac{1}{6}(e+g) \log(1-x^2) + \frac{1}{6}(e+4g) \log(4-x^2)$$

[Out] $-1/6*(d+4*f)*\operatorname{arctanh}(1/2*x)+1/3*(d+f)*\operatorname{arctanh}(x)-1/6*(e+g)*\ln(-x^2+1)+1/6*(e+4*g)*\ln(-x^2+4)$

Rubi [A] time = 0.07, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 6, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}} = 0.214$, Rules used = {1673, 1166, 207, 1247, 632, 31}

$$-\frac{1}{6}(d+4f) \tanh^{-1}\left(\frac{x}{2}\right) + \frac{1}{3}(d+f) \tanh^{-1}(x) - \frac{1}{6}(e+g) \log(1-x^2) + \frac{1}{6}(e+4g) \log(4-x^2)$$

Antiderivative was successfully verified.

[In] $\operatorname{Int}[(d + e*x + f*x^2 + g*x^3)/(4 - 5*x^2 + x^4), x]$

[Out] $-((d + 4*f)*\operatorname{ArcTanh}[x/2])/6 + ((d + f)*\operatorname{ArcTanh}[x])/3 - ((e + g)*\operatorname{Log}[1 - x^2])/6 + ((e + 4*g)*\operatorname{Log}[4 - x^2])/6$

Rule 31

$\operatorname{Int}[(a + (b \cdot x))^{-1}, x_Symbol] \rightarrow \operatorname{Simp}[\operatorname{Log}[\operatorname{RemoveContent}[a + b*x, x]]/b, x] /; \operatorname{FreeQ}\{a, b\}, x]$

Rule 207

$\operatorname{Int}[(a + (b \cdot x)^2)^{-1}, x_Symbol] \rightarrow -\operatorname{Simp}[\operatorname{ArcTanh}[(\operatorname{Rt}[b, 2]*x)/\operatorname{Rt}[-a, 2]]/(\operatorname{Rt}[-a, 2]*\operatorname{Rt}[b, 2]), x] /; \operatorname{FreeQ}\{a, b\}, x \ \&\& \operatorname{NegQ}[a/b] \ \&\& (\operatorname{LtQ}[a, 0] \ || \ \operatorname{GtQ}[b, 0])]$

Rule 632

$\operatorname{Int}[(d + (e \cdot x))/(a + (b \cdot x) + (c \cdot x)^2), x_Symbol] \rightarrow \operatorname{With}[\{q = \operatorname{Rt}[b^2 - 4*a*c, 2]\}, \operatorname{Dist}[(c*d - e*(b/2 - q/2))/q, \operatorname{Int}[1/(b/2 - q/2 + c*x), x], x] - \operatorname{Dist}[(c*d - e*(b/2 + q/2))/q, \operatorname{Int}[1/(b/2 + q/2 + c*x), x], x]] /; \operatorname{FreeQ}\{a, b, c, d, e\}, x \ \&\& \operatorname{NeQ}[2*c*d - b*e, 0] \ \&\& \operatorname{NeQ}[b^2 - 4*a*c, 0] \ \&\& \operatorname{NiceSqrtQ}[b^2 - 4*a*c]$

Rule 1166

```
Int[((d_) + (e_)*(x_)^2)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1247

```
Int[(x_)*((d_) + (e_)*(x_)^2)^(q_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(
p_), x_Symbol] :=> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :=> Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3}{4 - 5x^2 + x^4} dx &= \int \frac{d + fx^2}{4 - 5x^2 + x^4} dx + \int \frac{x(e + gx^2)}{4 - 5x^2 + x^4} dx \\ &= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{4 - 5x + x^2} dx, x, x^2 \right) - \frac{1}{3}(d + f) \int \frac{1}{-1 + x^2} dx + \frac{1}{3}(d + 4f) \int \frac{1}{-4 + x^2} \\ &= -\frac{1}{6}(d + 4f) \tanh^{-1} \left(\frac{x}{2} \right) + \frac{1}{3}(d + f) \tanh^{-1}(x) + \frac{1}{6}(-e - g) \text{Subst} \left(\int \frac{1}{-1 + x} dx, x, x^2 \right) \\ &= -\frac{1}{6}(d + 4f) \tanh^{-1} \left(\frac{x}{2} \right) + \frac{1}{3}(d + f) \tanh^{-1}(x) - \frac{1}{6}(e + g) \log(1 - x^2) + \frac{1}{6}(e + 4g) \log \end{aligned}$$

Mathematica [A] time = 0.03, size = 68, normalized size = 1.19

$$\frac{1}{12}(-2 \log(1-x)(d+e+f+g)+\log(2-x)(d+2e+4f+8g)+2 \log(x+1)(d-e+f-g)-\log(x+2)(d-2e+4f-8g))$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(4 - 5*x^2 + x^4), x]
```

```
[Out] (-2*(d + e + f + g)*Log[1 - x] + (d + 2*e + 4*f + 8*g)*Log[2 - x] + 2*(d -
e + f - g)*Log[1 + x] - (d - 2*e + 4*f - 8*g)*Log[2 + x])/12
```

fricas [A] time = 1.48, size = 61, normalized size = 1.07

$$-\frac{1}{12}(d-2e+4f-8g)\log(x+2)+\frac{1}{6}(d-e+f-g)\log(x+1)-\frac{1}{6}(d+e+f+g)\log(x-1)+\frac{1}{12}(d+2e+4f+8g)\log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")

[Out] -1/12*(d - 2*e + 4*f - 8*g)*log(x + 2) + 1/6*(d - e + f - g)*log(x + 1) - 1/6*(d + e + f + g)*log(x - 1) + 1/12*(d + 2*e + 4*f + 8*g)*log(x - 2)

giac [A] time = 0.31, size = 69, normalized size = 1.21

$$-\frac{1}{12}(d+4f-8g-2e)\log(|x+2|)+\frac{1}{6}(d+f-g-e)\log(|x+1|)-\frac{1}{6}(d+f+g+e)\log(|x-1|)+\frac{1}{12}(d+4f+8g+2e)\log(|x-2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")

[Out] -1/12*(d + 4*f - 8*g - 2*e)*log(abs(x + 2)) + 1/6*(d + f - g - e)*log(abs(x + 1)) - 1/6*(d + f + g + e)*log(abs(x - 1)) + 1/12*(d + 4*f + 8*g + 2*e)*log(abs(x - 2))

maple [B] time = 0.01, size = 114, normalized size = 2.00

$$-\frac{d \ln(x+2)}{12} + \frac{d \ln(x-2)}{12} - \frac{d \ln(x-1)}{6} + \frac{d \ln(x+1)}{6} + \frac{e \ln(x+2)}{6} + \frac{e \ln(x-2)}{6} - \frac{e \ln(x-1)}{6} - \frac{e \ln(x+1)}{6} - \frac{f \ln(x+2)}{6} + \frac{f \ln(x-2)}{6} - \frac{f \ln(x-1)}{6} + \frac{f \ln(x+1)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)

[Out] 1/12*d*ln(x-2)+1/6*e*ln(x-2)+1/3*f*ln(x-2)+2/3*ln(x-2)*g+1/6*d*ln(x+1)-1/6*e*ln(x+1)+1/6*f*ln(x+1)-1/6*ln(x+1)*g-1/6*d*ln(x-1)-1/6*e*ln(x-1)-1/6*f*ln(x-1)-1/6*ln(x-1)*g-1/12*d*ln(x+2)+1/6*e*ln(x+2)-1/3*f*ln(x+2)+2/3*ln(x+2)*g

maxima [A] time = 1.35, size = 61, normalized size = 1.07

$$-\frac{1}{12}(d-2e+4f-8g)\log(x+2)+\frac{1}{6}(d-e+f-g)\log(x+1)-\frac{1}{6}(d+e+f+g)\log(x-1)+\frac{1}{12}(d+2e+4f+8g)\log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")

[Out] -1/12*(d - 2*e + 4*f - 8*g)*log(x + 2) + 1/6*(d - e + f - g)*log(x + 1) - 1/6*(d + e + f + g)*log(x - 1) + 1/12*(d + 2*e + 4*f + 8*g)*log(x - 2)

mupad [B] time = 0.74, size = 75, normalized size = 1.32

$$\ln(x+1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} \right) - \ln(x-1) \left(\frac{d}{6} + \frac{e}{6} + \frac{f}{6} + \frac{g}{6} \right) + \ln(x-2) \left(\frac{d}{12} + \frac{e}{6} + \frac{f}{3} + \frac{2g}{3} \right) - \ln(x+2) \left(\frac{d}{12} - \frac{e}{6} + \frac{f}{3} - \frac{2g}{3} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3)/(x^4 - 5*x^2 + 4), x)

[Out] log(x + 1)*(d/6 - e/6 + f/6 - g/6) - log(x - 1)*(d/6 + e/6 + f/6 + g/6) + log(x - 2)*(d/12 + e/6 + f/3 + (2*g)/3) - log(x + 2)*(d/12 - e/6 + f/3 - (2*g)/3)

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4), x)

[Out] Timed out

$$3.13 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{4-5x^2+x^4} dx$$

Optimal. Leaf size=64

$$-\frac{1}{6} \tanh^{-1}\left(\frac{x}{2}\right)(d+4f+16h) + \frac{1}{3} \tanh^{-1}(x)(d+f+h) - \frac{1}{6}(e+g) \log(1-x^2) + \frac{1}{6}(e+4g) \log(4-x^2) + hx$$

[Out] h*x-1/6*(d+4*f+16*h)*arctanh(1/2*x)+1/3*(d+f+h)*arctanh(x)-1/6*(e+g)*ln(-x^2+1)+1/6*(e+4*g)*ln(-x^2+4)

Rubi [A] time = 0.15, antiderivative size = 64, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 7, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.212$, Rules used = {1673, 1676, 1166, 207, 1247, 632, 31}

$$-\frac{1}{6} \tanh^{-1}\left(\frac{x}{2}\right)(d+4f+16h) + \frac{1}{3} \tanh^{-1}(x)(d+f+h) - \frac{1}{6}(e+g) \log(1-x^2) + \frac{1}{6}(e+4g) \log(4-x^2) + hx$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(4 - 5*x^2 + x^4), x]

[Out] h*x - ((d + 4*f + 16*h)*ArcTanh[x/2])/6 + ((d + f + h)*ArcTanh[x])/3 - ((e + g)*Log[1 - x^2])/6 + ((e + 4*g)*Log[4 - x^2])/6

Rule 31

Int[((a_) + (b_.)*(x_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_.)*(x_)^2)^(n_), x_Symbol] := -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a, 0] || GtQ[b, 0])

Rule 632

Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && NiceSqrtQ[b^2 - 4*a*c]

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] :=> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :=> Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rule 1676

```
Int[(Pq_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :=> Int[ExpandInte
grand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{4 - 5x^2 + x^4} dx &= \int \frac{x(e + gx^2)}{4 - 5x^2 + x^4} dx + \int \frac{d + fx^2 + hx^4}{4 - 5x^2 + x^4} dx \\
&= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{4 - 5x + x^2} dx, x, x^2 \right) + \int \left(h + \frac{d - 4h + (f + 5h)x^2}{4 - 5x^2 + x^4} \right) dx \\
&= hx + \frac{1}{6}(-e - g) \text{Subst} \left(\int \frac{1}{-1 + x} dx, x, x^2 \right) + \frac{1}{6}(e + 4g) \text{Subst} \left(\int \frac{1}{-4 + x} dx, x, x^2 \right) \\
&= hx - \frac{1}{6}(e + g) \log(1 - x^2) + \frac{1}{6}(e + 4g) \log(4 - x^2) - \frac{1}{3}(d + f + h) \int \frac{1}{-1 + x^2} dx \\
&= hx - \frac{1}{6}(d + 4f + 16h) \tanh^{-1} \left(\frac{x}{2} \right) + \frac{1}{3}(d + f + h) \tanh^{-1}(x) - \frac{1}{6}(e + g) \log(1 - x^2)
\end{aligned}$$

Mathematica [A] time = 0.05, size = 81, normalized size = 1.27

$$\frac{1}{12}(-2 \log(1-x)(d+e+f+g+h)+\log(2-x)(d+2(e+2f+4g+8h))+2 \log(x+1)(d-e+f-g+h)-\log(x+2)(d-2e+4f-$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(4 - 5*x^2 + x^4),x]

[Out] (12*h*x - 2*(d + e + f + g + h)*Log[1 - x] + (d + 2*(e + 2*f + 4*g + 8*h))*
Log[2 - x] + 2*(d - e + f - g + h)*Log[1 + x] - (d - 2*e + 4*f - 8*g + 16*h
) *Log[2 + x])/12

fricas [A] time = 4.82, size = 72, normalized size = 1.12

$$hx - \frac{1}{12}(d - 2e + 4f - 8g + 16h) \log(x + 2) + \frac{1}{6}(d - e + f - g + h) \log(x + 1) - \frac{1}{6}(d + e + f + g + h) \log(x - 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")

[Out] h*x - 1/12*(d - 2*e + 4*f - 8*g + 16*h)*log(x + 2) + 1/6*(d - e + f - g + h
) *log(x + 1) - 1/6*(d + e + f + g + h)*log(x - 1) + 1/12*(d + 2*e + 4*f + 8
*g + 16*h)*log(x - 2)

giac [A] time = 0.43, size = 80, normalized size = 1.25

$$hx - \frac{1}{12}(d + 4f - 8g + 16h - 2e) \log(|x + 2|) + \frac{1}{6}(d + f - g + h - e) \log(|x + 1|) - \frac{1}{6}(d + f + g + h + e) \log(|x - 1|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")

[Out] h*x - 1/12*(d + 4*f - 8*g + 16*h - 2*e)*log(abs(x + 2)) + 1/6*(d + f - g +
h - e)*log(abs(x + 1)) - 1/6*(d + f + g + h + e)*log(abs(x - 1)) + 1/12*(d
+ 4*f + 8*g + 16*h + 2*e)*log(abs(x - 2))

maple [B] time = 0.01, size = 145, normalized size = 2.27

$$-\frac{d \ln(x + 2)}{12} + \frac{d \ln(x - 2)}{12} - \frac{d \ln(x - 1)}{6} + \frac{d \ln(x + 1)}{6} + \frac{e \ln(x + 2)}{6} + \frac{e \ln(x - 2)}{6} - \frac{e \ln(x - 1)}{6} - \frac{e \ln(x + 1)}{6} - \frac{f \ln(x + 2)}{6} + \frac{f \ln(x - 2)}{6} - \frac{f \ln(x - 1)}{6} + \frac{f \ln(x + 1)}{6} - \frac{g \ln(x + 2)}{6} + \frac{g \ln(x - 2)}{6} - \frac{g \ln(x - 1)}{6} + \frac{g \ln(x + 1)}{6} - \frac{h \ln(x + 2)}{6} + \frac{h \ln(x - 2)}{6} - \frac{h \ln(x - 1)}{6} + \frac{h \ln(x + 1)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)

[Out] $h*x+1/12*d*\ln(x-2)+1/6*e*\ln(x-2)+1/3*f*\ln(x-2)+2/3*g*\ln(x-2)+4/3*\ln(x-2)*h+1/6*d*\ln(x+1)-1/6*e*\ln(x+1)+1/6*f*\ln(x+1)-1/6*g*\ln(x+1)+1/6*\ln(x+1)*h-1/6*d*\ln(x-1)-1/6*e*\ln(x-1)-1/6*f*\ln(x-1)-1/6*g*\ln(x-1)-1/6*\ln(x-1)*h-1/12*d*\ln(x+2)+1/6*e*\ln(x+2)-1/3*f*\ln(x+2)+2/3*g*\ln(x+2)-4/3*\ln(x+2)*h$

maxima [A] time = 1.24, size = 72, normalized size = 1.12

$$hx - \frac{1}{12}(d - 2e + 4f - 8g + 16h) \log(x + 2) + \frac{1}{6}(d - e + f - g + h) \log(x + 1) - \frac{1}{6}(d + e + f + g + h) \log(x - 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")`

[Out] $h*x - 1/12*(d - 2*e + 4*f - 8*g + 16*h)*\log(x + 2) + 1/6*(d - e + f - g + h)*\log(x + 1) - 1/6*(d + e + f + g + h)*\log(x - 1) + 1/12*(d + 2*e + 4*f + 8*g + 16*h)*\log(x - 2)$

mupad [B] time = 0.81, size = 90, normalized size = 1.41

$$hx - \ln(x - 1) \left(\frac{d}{6} + \frac{e}{6} + \frac{f}{6} + \frac{g}{6} + \frac{h}{6} \right) + \ln(x + 1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} \right) + \ln(x - 2) \left(\frac{d}{12} + \frac{e}{6} + \frac{f}{3} + \frac{2g}{3} + \frac{4h}{3} \right) - \ln$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(x^4 - 5*x^2 + 4),x)`

[Out] $h*x - \log(x - 1)*(d/6 + e/6 + f/6 + g/6 + h/6) + \log(x + 1)*(d/6 - e/6 + f/6 - g/6 + h/6) + \log(x - 2)*(d/12 + e/6 + f/3 + (2*g)/3 + (4*h)/3) - \log(x + 2)*(d/12 - e/6 + f/3 - (2*g)/3 + (4*h)/3)$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)`

[Out] Timed out

$$3.14 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{4-5x^2+x^4} dx$$

Optimal. Leaf size=76

$$-\frac{1}{6} \tanh^{-1}\left(\frac{x}{2}\right)(d+4f+16h) + \frac{1}{3} \tanh^{-1}(x)(d+f+h) - \frac{1}{6} \log(1-x^2)(e+g+i) + \frac{1}{6} \log(4-x^2)(e+4g+16i) + hx + \frac{ix^2}{2}$$

[Out] $h*x+1/2*i*x^2-1/6*(d+4*f+16*h)*\operatorname{arctanh}(1/2*x)+1/3*(d+f+h)*\operatorname{arctanh}(x)-1/6*(e+g+i)*\ln(-x^2+1)+1/6*(e+4*g+16*i)*\ln(-x^2+4)$

Rubi [A] time = 0.19, antiderivative size = 76, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 8, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.210$, Rules used = {1673, 1676, 1166, 207, 1663, 1657, 632, 31}

$$-\frac{1}{6} \tanh^{-1}\left(\frac{x}{2}\right)(d+4f+16h) + \frac{1}{3} \tanh^{-1}(x)(d+f+h) - \frac{1}{6} \log(1-x^2)(e+g+i) + \frac{1}{6} \log(4-x^2)(e+4g+16i) + hx + \frac{ix^2}{2}$$

Antiderivative was successfully verified.

[In] $\operatorname{Int}[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(4 - 5*x^2 + x^4), x]$

[Out] $h*x + (i*x^2)/2 - ((d + 4*f + 16*h)*\operatorname{ArcTanh}[x/2])/6 + ((d + f + h)*\operatorname{ArcTanh}[x])/3 - ((e + g + i)*\operatorname{Log}[1 - x^2])/6 + ((e + 4*g + 16*i)*\operatorname{Log}[4 - x^2])/6$

Rule 31

$\operatorname{Int}[(a_ + (b_)*(x_))^{(-1)}, x_Symbol] \rightarrow \operatorname{Simp}[\operatorname{Log}[\operatorname{RemoveContent}[a + b*x, x]]/b, x] /; \operatorname{FreeQ}\{a, b\}, x]$

Rule 207

$\operatorname{Int}[(a_ + (b_)*(x_)^2)^{(-1)}, x_Symbol] \rightarrow -\operatorname{Simp}[\operatorname{ArcTanh}[(\operatorname{Rt}[b, 2]*x)/\operatorname{Rt}[-a, 2]]/(\operatorname{Rt}[-a, 2]*\operatorname{Rt}[b, 2]), x] /; \operatorname{FreeQ}\{a, b\}, x \ \&\& \operatorname{NegQ}[a/b] \ \&\& (\operatorname{LtQ}[a, 0] \ || \ \operatorname{GtQ}[b, 0])]$

Rule 632

$\operatorname{Int}[(d_ + (e_)*(x_))/((a_ + (b_)*(x_)) + (c_)*(x_)^2), x_Symbol] \rightarrow \operatorname{With}\{q = \operatorname{Rt}[b^2 - 4*a*c, 2]\}, \operatorname{Dist}[(c*d - e*(b/2 - q/2))/q, \operatorname{Int}[1/(b/2 - q/2 + c*x), x], x] - \operatorname{Dist}[(c*d - e*(b/2 + q/2))/q, \operatorname{Int}[1/(b/2 + q/2 + c*x), x], x] /; \operatorname{FreeQ}\{a, b, c, d, e\}, x \ \&\& \operatorname{NeQ}[2*c*d - b*e, 0] \ \&\& \operatorname{NeQ}[b^2 - 4*a*c, 0] \ \&\& \operatorname{NiceSqrtQ}[b^2 - 4*a*c]$

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1657

```
Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :=> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :=> Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rule 1676

```
Int[(Pq_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :=> Int[ExpandInte
grand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 14x^5}{4 - 5x^2 + x^4} dx &= \int \frac{x(e + gx^2 + 14x^4)}{4 - 5x^2 + x^4} dx + \int \frac{d + fx^2 + hx^4}{4 - 5x^2 + x^4} dx \\
&= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx + 14x^2}{4 - 5x + x^2} dx, x, x^2 \right) + \int \left(h + \frac{d - 4h + (f + 5h)x^2}{4 - 5x^2 + x^4} \right) dx \\
&= hx + \frac{1}{2} \text{Subst} \left(\int \left(14 - \frac{56 - e - (70 + g)x}{4 - 5x + x^2} \right) dx, x, x^2 \right) + \int \frac{d - 4h + (f + 5h)x^2}{4 - 5x^2 + x^4} dx \\
&= hx + 7x^2 - \frac{1}{2} \text{Subst} \left(\int \frac{56 - e - (70 + g)x}{4 - 5x + x^2} dx, x, x^2 \right) - \frac{1}{3}(d + f + h) \int \frac{1}{4 - 5x^2 + x^4} dx \\
&= hx + 7x^2 - \frac{1}{6}(d + 4f + 16h) \tanh^{-1} \left(\frac{x}{2} \right) + \frac{1}{3}(d + f + h) \tanh^{-1}(x) - \frac{1}{6} \int \frac{1}{4 - 5x^2 + x^4} dx \\
&= hx + 7x^2 - \frac{1}{6}(d + 4f + 16h) \tanh^{-1} \left(\frac{x}{2} \right) + \frac{1}{3}(d + f + h) \tanh^{-1}(x) - \frac{1}{6} \int \frac{1}{4 - 5x^2 + x^4} dx
\end{aligned}$$

Mathematica [A] time = 0.06, size = 98, normalized size = 1.29

$$\frac{1}{12} \left(-2 \log(1 - x)(d + e + f + g + h + i) + \log(2 - x)(d + 2e + 4(f + 2g + 4h + 8i)) + 2 \log(x + 1)(d - e + f - g + h - i) - 2(e - 2f + 4g - 8h + 16i) \log(2 + x) \right) / 12$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(4 - 5*x^2 + x^4), x]

[Out] (12*h*x + 6*i*x^2 - 2*(d + e + f + g + h + i)*Log[1 - x] + (d + 2*e + 4*(f + 2*g + 4*h + 8*i))*Log[2 - x] + 2*(d - e + f - g + h - i)*Log[1 + x] - (d - 2*(e - 2*f + 4*g - 8*h + 16*i))*Log[2 + x])/12

fricas [A] time = 18.71, size = 88, normalized size = 1.16

$$\frac{1}{2} ix^2 + hx - \frac{1}{12} (d - 2e + 4f - 8g + 16h - 32i) \log(x + 2) + \frac{1}{6} (d - e + f - g + h - i) \log(x + 1) - \frac{1}{6} (d + e + f + g + h + i) \log(x - 1) + \frac{1}{12} (d + 2e + 4f + 8g + 16h + 32i) \log(x - 2)$$

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)/(x^4-5*x^2+4), x, algorithm="fricas")

[Out] 1/2*i*x^2 + h*x - 1/12*(d - 2*e + 4*f - 8*g + 16*h - 32*i)*log(x + 2) + 1/6*(d - e + f - g + h - i)*log(x + 1) - 1/6*(d + e + f + g + h + i)*log(x - 1) + 1/12*(d + 2*e + 4*f + 8*g + 16*h + 32*i)*log(x - 2)

giac [A] time = 0.26, size = 96, normalized size = 1.26

$$\frac{1}{2} ix^2 + hx - \frac{1}{12} (d + 4f - 8g + 16h - 32i - 2e) \log(|x + 2|) + \frac{1}{6} (d + f - g + h - i - e) \log(|x + 1|) - \frac{1}{6} (d + f + g + h + i) \log(|x - 1|) + \frac{1}{12} (d + 2e + 4f + 8g + 16h + 32i) \log(|x - 2|)$$

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)/(x^4-5*x^2+4),x, algorithm="giac")
```

```
[Out] 1/2*i*x^2 + h*x - 1/12*(d + 4*f - 8*g + 16*h - 32*i - 2*e)*log(abs(x + 2))
+ 1/6*(d + f - g + h - i - e)*log(abs(x + 1)) - 1/6*(d + f + g + h + i + e)
*log(abs(x - 1)) + 1/12*(d + 4*f + 8*g + 16*h + 32*i + 2*e)*log(abs(x - 2))
```

maple [B] time = 0.01, size = 179, normalized size = 2.36

$$\frac{ix^2}{2} - \frac{d \ln(x+2)}{12} + \frac{d \ln(x-2)}{12} - \frac{d \ln(x-1)}{6} + \frac{d \ln(x+1)}{6} + \frac{e \ln(x+2)}{6} + \frac{e \ln(x-2)}{6} - \frac{e \ln(x-1)}{6} - \frac{e \ln(x+1)}{6} - \frac{f \ln(x-2)}{6}$$

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)/(x^4-5*x^2+4),x)
```

```
[Out] 8/3*ln(x+2)*i-1/6*ln(x-1)*i-1/6*ln(x+1)*i+8/3*ln(x-2)*i-4/3*h*ln(x+2)-1/6*h
*ln(x-1)+1/6*h*ln(x+1)+4/3*h*ln(x-2)-1/6*g*ln(x-1)+2/3*g*ln(x+2)+2/3*g*ln(x
-2)-1/6*g*ln(x+1)-1/12*d*ln(x+2)+1/6*e*ln(x+2)-1/6*e*ln(x-1)-1/6*d*ln(x-1)-
1/6*e*ln(x+1)+1/6*d*ln(x+1)+1/12*d*ln(x-2)+1/6*e*ln(x-2)+1/3*f*ln(x-2)+1/6*
f*ln(x+1)-1/6*f*ln(x-1)-1/3*f*ln(x+2)+1/2*i*x^2+h*x
```

maxima [A] time = 1.25, size = 88, normalized size = 1.16

$$\frac{1}{2}ix^2 + hx - \frac{1}{12}(d - 2e + 4f - 8g + 16h - 32i) \log(x+2) + \frac{1}{6}(d - e + f - g + h - i) \log(x+1) - \frac{1}{6}(d + e + f + g + h + i) \log(x-1)$$

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)/(x^4-5*x^2+4),x, algorithm="maxima")
```

```
[Out] 1/2*i*x^2 + h*x - 1/12*(d - 2*e + 4*f - 8*g + 16*h - 32*i)*log(x + 2) + 1/6
*(d - e + f - g + h - i)*log(x + 1) - 1/6*(d + e + f + g + h + i)*log(x - 1)
) + 1/12*(d + 2*e + 4*f + 8*g + 16*h + 32*i)*log(x - 2)
```

mupad [B] time = 1.19, size = 108, normalized size = 1.42

$$hx + \frac{ix^2}{2} - \ln(x-1) \left(\frac{d}{6} + \frac{e}{6} + \frac{f}{6} + \frac{g}{6} + \frac{h}{6} + \frac{i}{6} \right) + \ln(x+1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} - \frac{i}{6} \right) + \ln(x-2) \left(\frac{d}{12} + \frac{e}{6} + \frac{f}{3} + \frac{g}{6} + \frac{h}{6} + \frac{i}{6} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(x^4 - 5*x^2 + 4),x)
```

```
[Out] h*x + (i*x^2)/2 - log(x - 1)*(d/6 + e/6 + f/6 + g/6 + h/6 + i/6) + log(x +
1)*(d/6 - e/6 + f/6 - g/6 + h/6 - i/6) + log(x - 2)*(d/12 + e/6 + f/3 + (2*
```

$g)/3 + (4*h)/3 + (8*i)/3) - \log(x + 2)*(d/12 - e/6 + f/3 - (2*g)/3 + (4*h)/3 - (8*i)/3)$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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)/(x**4-5*x**2+4),x)

[Out] Timed out

$$3.15 \quad \int \frac{d+ex}{1+x^2+x^4} dx$$

Optimal. Leaf size=92

$$-\frac{1}{4}d \log(x^2 - x + 1) + \frac{1}{4}d \log(x^2 + x + 1) - \frac{d \tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}} + \frac{d \tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{2\sqrt{3}} + \frac{e \tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{\sqrt{3}}$$

[Out] $-1/4*d*\ln(x^2-x+1)+1/4*d*\ln(x^2+x+1)-1/6*d*\arctan(1/3*(1-2*x)*3^{(1/2)})*3^{(1/2)}+1/6*d*\arctan(1/3*(1+2*x)*3^{(1/2)})*3^{(1/2)}+1/3*e*\arctan(1/3*(2*x^2+1)*3^{(1/2)})*3^{(1/2)}$

Rubi [A] time = 0.08, antiderivative size = 92, normalized size of antiderivative = 1.00, number of steps used = 15, number of rules used = 8, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.500$, Rules used = {1673, 12, 1094, 634, 618, 204, 628, 1107}

$$-\frac{1}{4}d \log(x^2 - x + 1) + \frac{1}{4}d \log(x^2 + x + 1) - \frac{d \tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}} + \frac{d \tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{2\sqrt{3}} + \frac{e \tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{\sqrt{3}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x)/(1 + x^2 + x^4),x]

[Out] $-(d*\text{ArcTan}[(1 - 2*x)/\text{Sqrt}[3]])/(2*\text{Sqrt}[3]) + (d*\text{ArcTan}[(1 + 2*x)/\text{Sqrt}[3]])/(2*\text{Sqrt}[3]) + (e*\text{ArcTan}[(1 + 2*x^2)/\text{Sqrt}[3]])/\text{Sqrt}[3] - (d*\text{Log}[1 - x + x^2])/4 + (d*\text{Log}[1 + x + x^2])/4$

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 204

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 628

```
Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]]/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1094

```
Int[((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(-1), x_Symbol] := With[{q = Rt[a/
c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int[(r - x)/(q - r*x
+ x^2), x], x] + Dist[1/(2*c*q*r), Int[(r + x)/(q + r*x + x^2), x], x]]] /
; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1107

```
Int[(x_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Dist[1/2,
Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{d+ex}{1+x^2+x^4} dx &= \int \frac{d}{1+x^2+x^4} dx + \int \frac{ex}{1+x^2+x^4} dx \\
&= d \int \frac{1}{1+x^2+x^4} dx + e \int \frac{x}{1+x^2+x^4} dx \\
&= \frac{1}{2}d \int \frac{1-x}{1-x+x^2} dx + \frac{1}{2}d \int \frac{1+x}{1+x+x^2} dx + \frac{1}{2}e \operatorname{Subst} \left(\int \frac{1}{1+x+x^2} dx, x, x^2 \right) \\
&= \frac{1}{4}d \int \frac{1}{1-x+x^2} dx - \frac{1}{4}d \int \frac{-1+2x}{1-x+x^2} dx + \frac{1}{4}d \int \frac{1}{1+x+x^2} dx + \frac{1}{4}d \int \frac{1+2x}{1+x+x^2} dx - e \int \frac{x}{1+x+x^2} dx \\
&= \frac{e \tan^{-1} \left(\frac{1+2x^2}{\sqrt{3}} \right)}{\sqrt{3}} - \frac{1}{4}d \log(1-x+x^2) + \frac{1}{4}d \log(1+x+x^2) - \frac{1}{2}d \operatorname{Subst} \left(\int \frac{1}{-3-x^2} dx, x, -x^2 \right) \\
&= -\frac{d \tan^{-1} \left(\frac{1-2x}{\sqrt{3}} \right)}{2\sqrt{3}} + \frac{d \tan^{-1} \left(\frac{1+2x}{\sqrt{3}} \right)}{2\sqrt{3}} + \frac{e \tan^{-1} \left(\frac{1+2x^2}{\sqrt{3}} \right)}{\sqrt{3}} - \frac{1}{4}d \log(1-x+x^2) + \frac{1}{4}d \log(1+x+x^2)
\end{aligned}$$

Mathematica [C] time = 0.18, size = 98, normalized size = 1.07

$$\frac{1}{6}i \left(\sqrt{6-6i\sqrt{3}} d \tan^{-1} \left(\frac{1}{2}(\sqrt{3}-i)x \right) - \sqrt{6+6i\sqrt{3}} d \tan^{-1} \left(\frac{1}{2}(\sqrt{3}+i)x \right) + 2i\sqrt{3}e \tan^{-1} \left(\frac{\sqrt{3}}{2x^2+1} \right) \right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x)/(1 + x^2 + x^4), x]

[Out] (I/6)*(Sqrt[6 - (6*I)*Sqrt[3]]*d*ArcTan[((-I + Sqrt[3])*x)/2] - Sqrt[6 + (6*I)*Sqrt[3]]*d*ArcTan[((I + Sqrt[3])*x)/2] + (2*I)*Sqrt[3]*e*ArcTan[Sqrt[3]/(1 + 2*x^2)])

fricas [A] time = 0.93, size = 65, normalized size = 0.71

$$\frac{1}{6} \sqrt{3} (d - 2e) \arctan \left(\frac{1}{3} \sqrt{3} (2x + 1) \right) + \frac{1}{6} \sqrt{3} (d + 2e) \arctan \left(\frac{1}{3} \sqrt{3} (2x - 1) \right) + \frac{1}{4} d \log(x^2 + x + 1) - \frac{1}{4} d \log(x^2 - x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x^4+x^2+1), x, algorithm="fricas")

[Out] 1/6*sqrt(3)*(d - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d + 2*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*d*log(x^2 + x + 1) - 1/4*d*log(x^2 - x + 1)

giac [A] time = 0.38, size = 67, normalized size = 0.73

$$\frac{1}{6} \sqrt{3} (d - 2e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{6} \sqrt{3} (d + 2e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{4} d \log(x^2 + x + 1) - \frac{1}{4} d \log(x^2 - x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x^4+x^2+1),x, algorithm="giac")

[Out] 1/6*sqrt(3)*(d - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d + 2*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*d*log(x^2 + x + 1) - 1/4*d*log(x^2 - x + 1)

maple [A] time = 0.01, size = 92, normalized size = 1.00

$$\frac{\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{6} + \frac{\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{6} - \frac{d \ln(x^2 - x + 1)}{4} + \frac{d \ln(x^2 + x + 1)}{4} - \frac{\sqrt{3} e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x+d)/(x^4+x^2+1),x)

[Out] 1/4*d*ln(x^2+x+1)+1/6*d*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)-1/3*3^(1/2)*arctan(1/3*(1+2*x)*3^(1/2))*e-1/4*d*ln(x^2-x+1)+1/6*3^(1/2)*arctan(1/3*(2*x-1))*3^(1/2)*d+1/3*3^(1/2)*arctan(1/3*(2*x-1))*3^(1/2)*e

maxima [A] time = 2.21, size = 65, normalized size = 0.71

$$\frac{1}{6} \sqrt{3} (d - 2e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{6} \sqrt{3} (d + 2e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{4} d \log(x^2 + x + 1) - \frac{1}{4} d \log(x^2 - x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x^4+x^2+1),x, algorithm="maxima")

[Out] 1/6*sqrt(3)*(d - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d + 2*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*d*log(x^2 + x + 1) - 1/4*d*log(x^2 - x + 1)

mupad [B] time = 0.24, size = 118, normalized size = 1.28

$$-\ln\left(x - \frac{1}{2} - \frac{\sqrt{3} \operatorname{li}}{2}\right) \left(\frac{d}{4} + \frac{\sqrt{3} d \operatorname{li}}{12} + \frac{\sqrt{3} e \operatorname{li}}{6}\right) + \ln\left(x + \frac{1}{2} - \frac{\sqrt{3} \operatorname{li}}{2}\right) \left(\frac{d}{4} - \frac{\sqrt{3} d \operatorname{li}}{12} + \frac{\sqrt{3} e \operatorname{li}}{6}\right) + \ln\left(x - \frac{1}{2} + \frac{\sqrt{3}}{2}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] $\log(x - (3^{1/2}*1i)/2 + 1/2)*(d/4 - (3^{1/2}*d*1i)/12 + (3^{1/2}*e*1i)/6)$
 $- \log(x - (3^{1/2}*1i)/2 - 1/2)*(d/4 + (3^{1/2}*d*1i)/12 + (3^{1/2}*e*1i)/6)$
 $+ \log(x + (3^{1/2}*1i)/2 - 1/2)*((3^{1/2}*d*1i)/12 - d/4 + (3^{1/2}*e*1i)/6)$
 $+ \log(x + (3^{1/2}*1i)/2 + 1/2)*(d/4 + (3^{1/2}*d*1i)/12 - (3^{1/2}*e*1i)/6)$

sympy [C] time = 2.89, size = 923, normalized size = 10.03

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] $(-d/4 - \sqrt{3}*I*(d + 2*e)/12)*\log(x + (-7*d**4*e + 6*d**4*(-d/4 - \sqrt{3})*I*(d + 2*e)/12) - 15*d**2*e**3 - 18*d**2*e**2*(-d/4 - \sqrt{3}*I*(d + 2*e)/12) + 60*d**2*e*(-d/4 - \sqrt{3}*I*(d + 2*e)/12)**2 + 72*d**2*(-d/4 - \sqrt{3})*I*(d + 2*e)/12)**3 + 4*e**5 + 24*e**4*(-d/4 - \sqrt{3}*I*(d + 2*e)/12) + 48*e**3*(-d/4 - \sqrt{3}*I*(d + 2*e)/12)**2 + 288*e**2*(-d/4 - \sqrt{3}*I*(d + 2*e)/12)**3)/(3*d**5 - 8*d**3*e**2 - 16*d*e**4)) + (-d/4 + \sqrt{3}*I*(d + 2*e)/12)*\log(x + (-7*d**4*e + 6*d**4*(-d/4 + \sqrt{3}*I*(d + 2*e)/12) - 15*d**2*e**3 - 18*d**2*e**2*(-d/4 + \sqrt{3}*I*(d + 2*e)/12) + 60*d**2*e*(-d/4 + \sqrt{3}*I*(d + 2*e)/12)**2 + 72*d**2*(-d/4 + \sqrt{3}*I*(d + 2*e)/12)**3 + 4*e**5 + 24*e**4*(-d/4 + \sqrt{3}*I*(d + 2*e)/12) + 48*e**3*(-d/4 + \sqrt{3}*I*(d + 2*e)/12)**2 + 288*e**2*(-d/4 + \sqrt{3}*I*(d + 2*e)/12)**3)/(3*d**5 - 8*d**3*e**2 - 16*d*e**4)) + (d/4 - \sqrt{3}*I*(d - 2*e)/12)*\log(x + (-7*d**4*e + 6*d**4*(d/4 - \sqrt{3}*I*(d - 2*e)/12) - 15*d**2*e**3 - 18*d**2*e**2*(d/4 - \sqrt{3}*I*(d - 2*e)/12) + 60*d**2*e*(d/4 - \sqrt{3}*I*(d - 2*e)/12)**2 + 72*d**2*(d/4 - \sqrt{3}*I*(d - 2*e)/12)**3 + 4*e**5 + 24*e**4*(d/4 - \sqrt{3}*I*(d - 2*e)/12) + 48*e**3*(d/4 - \sqrt{3}*I*(d - 2*e)/12)**2 + 288*e**2*(d/4 - \sqrt{3}*I*(d - 2*e)/12)**3)/(3*d**5 - 8*d**3*e**2 - 16*d*e**4)) + (d/4 + \sqrt{3}*I*(d - 2*e)/12)*\log(x + (-7*d**4*e + 6*d**4*(d/4 + \sqrt{3}*I*(d - 2*e)/12) - 15*d**2*e**3 - 18*d**2*e**2*(d/4 + \sqrt{3}*I*(d - 2*e)/12) + 60*d**2*e*(d/4 + \sqrt{3}*I*(d - 2*e)/12)**2 + 72*d**2*(d/4 + \sqrt{3}*I*(d - 2*e)/12)**3 + 4*e**5 + 24*e**4*(d/4 + \sqrt{3}*I*(d - 2*e)/12) + 48*e**3*(d/4 + \sqrt{3}*I*(d - 2*e)/12)**2 + 288*e**2*(d/4 + \sqrt{3}*I*(d - 2*e)/12)**3)/(3*d**5 - 8*d**3*e**2 - 16*d*e**4))$

3.16 $\int \frac{d+ex+fx^2}{1+x^2+x^4} dx$

Optimal. Leaf size=104

$$-\frac{1}{4}(d-f)\log(x^2-x+1)+\frac{1}{4}(d-f)\log(x^2+x+1)-\frac{(d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(d+f)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{e\tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{\sqrt{3}}$$

[Out] $-1/4*(d-f)*\ln(x^2-x+1)+1/4*(d-f)*\ln(x^2+x+1)-1/6*(d+f)*\arctan(1/3*(1-2*x)*3^{(1/2)})*3^{(1/2)}+1/6*(d+f)*\arctan(1/3*(1+2*x)*3^{(1/2)})*3^{(1/2)}+1/3*e*\arctan(1/3*(2*x^2+1)*3^{(1/2)})*3^{(1/2)}$

Rubi [A] time = 0.08, antiderivative size = 104, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 8, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.381$, Rules used = {1673, 1169, 634, 618, 204, 628, 12, 1107}

$$-\frac{1}{4}(d-f)\log(x^2-x+1)+\frac{1}{4}(d-f)\log(x^2+x+1)-\frac{(d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(d+f)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{e\tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{\sqrt{3}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2)/(1 + x^2 + x^4), x]

[Out] $-((d+f)*\text{ArcTan}[(1-2*x)/\text{Sqrt}[3]])/(2*\text{Sqrt}[3]) + ((d+f)*\text{ArcTan}[(1+2*x)/\text{Sqrt}[3]])/(2*\text{Sqrt}[3]) + (e*\text{ArcTan}[(1+2*x^2)/\text{Sqrt}[3]])/\text{Sqrt}[3] - ((d-f)*\text{Log}[1-x+x^2])/4 + ((d-f)*\text{Log}[1+x+x^2])/4$

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_) /; FreeQ[b, x]]

Rule 204

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2,
Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
(d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{d+ex+fx^2}{1+x^2+x^4} dx &= \int \frac{ex}{1+x^2+x^4} dx + \int \frac{d+fx^2}{1+x^2+x^4} dx \\
&= \frac{1}{2} \int \frac{d-(d-f)x}{1-x+x^2} dx + \frac{1}{2} \int \frac{d+(d-f)x}{1+x+x^2} dx + e \int \frac{x}{1+x^2+x^4} dx \\
&= \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{1+x+x^2} dx, x, x^2 \right) + \frac{1}{4} (d-f) \int \frac{1+2x}{1+x+x^2} dx + \frac{1}{4} (-d+f) \int \frac{-1+2x}{1-x+x^2} dx \\
&= -\frac{1}{4} (d-f) \log(1-x+x^2) + \frac{1}{4} (d-f) \log(1+x+x^2) - e \operatorname{Subst} \left(\int \frac{1}{-3-x^2} dx, x, 1+2x \right) \\
&= -\frac{(d+f) \tan^{-1} \left(\frac{1-2x}{\sqrt{3}} \right)}{2\sqrt{3}} + \frac{(d+f) \tan^{-1} \left(\frac{1+2x}{\sqrt{3}} \right)}{2\sqrt{3}} + \frac{e \tan^{-1} \left(\frac{1+2x^2}{\sqrt{3}} \right)}{\sqrt{3}} - \frac{1}{4} (d-f) \log(1-x+x^2)
\end{aligned}$$

Mathematica [C] time = 0.14, size = 121, normalized size = 1.16

$$\frac{(2id + (\sqrt{3} - i)f) \tan^{-1} \left(\frac{1}{2} (\sqrt{3} - i)x \right)}{\sqrt{6 + 6i\sqrt{3}}} + \frac{((\sqrt{3} + i)f - 2id) \tan^{-1} \left(\frac{1}{2} (\sqrt{3} + i)x \right)}{\sqrt{6 - 6i\sqrt{3}}} - \frac{e \tan^{-1} \left(\frac{\sqrt{3}}{2x^2+1} \right)}{\sqrt{3}}$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x + f*x^2)/(1 + x^2 + x^4), x]

[Out] (((2*I)*d + (-I + Sqrt[3])*f)*ArcTan[(-I + Sqrt[3])*x/2])/Sqrt[6 + (6*I)*Sqrt[3]] + (((-2*I)*d + (I + Sqrt[3])*f)*ArcTan[(I + Sqrt[3])*x/2])/Sqrt[6 - (6*I)*Sqrt[3]] - (e*ArcTan[Sqrt[3]/(1 + 2*x^2)])/Sqrt[3]

fricas [A] time = 1.00, size = 75, normalized size = 0.72

$$\frac{1}{6} \sqrt{3} (d - 2e + f) \arctan \left(\frac{1}{3} \sqrt{3} (2x + 1) \right) + \frac{1}{6} \sqrt{3} (d + 2e + f) \arctan \left(\frac{1}{3} \sqrt{3} (2x - 1) \right) + \frac{1}{4} (d - f) \log(x^2 + x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1), x, algorithm="fricas")

[Out] 1/6*sqrt(3)*(d - 2*e + f)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d + 2*e + f)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*(d - f)*log(x^2 + x + 1) - 1/4*(d - f)*log(x^2 - x + 1)

giac [A] time = 0.23, size = 77, normalized size = 0.74

$$\frac{1}{6} \sqrt{3} (d + f - 2e) \arctan \left(\frac{1}{3} \sqrt{3} (2x + 1) \right) + \frac{1}{6} \sqrt{3} (d + f + 2e) \arctan \left(\frac{1}{3} \sqrt{3} (2x - 1) \right) + \frac{1}{4} (d - f) \log(x^2 + x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="giac")

[Out] $\frac{1}{6}\sqrt{3}(d+f-2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{6}\sqrt{3}(d+f+2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{4}(d-f)\log(x^2+x+1) - \frac{1}{4}(d-f)\log(x^2-x+1)$

maple [A] time = 0.00, size = 148, normalized size = 1.42

$$\frac{\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{6} + \frac{\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{6} - \frac{d \ln(x^2-x+1)}{4} + \frac{d \ln(x^2+x+1)}{4} - \frac{\sqrt{3} e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{3} + \dots$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((f*x^2+e*x+d)/(x^4+x^2+1),x)

[Out] $\frac{1}{4}d\ln(x^2+x+1) - \frac{1}{4}\ln(x^2+x+1)*f + \frac{1}{6}3^{(1/2)}d*\arctan\left(\frac{1}{3}(2x+1)*3^{(1/2)}\right) - \frac{1}{3}3^{(1/2)}e*\arctan\left(\frac{1}{3}(2x+1)*3^{(1/2)}\right) + \frac{1}{6}3^{(1/2)}*\arctan\left(\frac{1}{3}(2x+1)*3^{(1/2)}\right)*f + \frac{1}{4}\ln(x^2-x+1)*f - \frac{1}{4}d*\ln(x^2-x+1) + \frac{1}{6}3^{(1/2)}d*\arctan\left(\frac{1}{3}(2x-1)*3^{(1/2)}\right) + \frac{1}{3}3^{(1/2)}e*\arctan\left(\frac{1}{3}(2x-1)*3^{(1/2)}\right) + \frac{1}{6}3^{(1/2)}*\arctan\left(\frac{1}{3}(2x-1)*3^{(1/2)}\right)*f$

maxima [A] time = 2.58, size = 75, normalized size = 0.72

$$\frac{1}{6}\sqrt{3}(d-2e+f)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{6}\sqrt{3}(d+2e+f)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{4}(d-f)\log(x^2+x+1) - \frac{1}{4}(d-f)\log(x^2-x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="maxima")

[Out] $\frac{1}{6}\sqrt{3}(d-2e+f)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{6}\sqrt{3}(d+2e+f)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{4}(d-f)\log(x^2+x+1) - \frac{1}{4}(d-f)\log(x^2-x+1)$

mupad [B] time = 0.95, size = 159, normalized size = 1.53

$$-\ln\left(x - \frac{1}{2} - \frac{\sqrt{3} 1i}{2}\right) \left(\frac{d}{4} - \frac{f}{4} + \frac{\sqrt{3} d 1i}{12} + \frac{\sqrt{3} e 1i}{6} + \frac{\sqrt{3} f 1i}{12}\right) - \ln\left(x + \frac{1}{2} - \frac{\sqrt{3} 1i}{2}\right) \left(\frac{f}{4} - \frac{d}{4} + \frac{\sqrt{3} d 1i}{12} - \frac{\sqrt{3} e 1i}{6}\right) + \dots$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2)/(x^2 + x^4 + 1),x)

[Out] $\log(x + (3^{(1/2)}*1i)/2 - 1/2)*(f/4 - d/4 + (3^{(1/2)}*d*1i)/12 + (3^{(1/2)}*e*1i)/6 + (3^{(1/2)}*f*1i)/12) - \log(x - (3^{(1/2)}*1i)/2 + 1/2)*(f/4 - d/4 + (3^{(1/2)}*d*1i)/12 - (3^{(1/2)}*e*1i)/6 - (3^{(1/2)}*f*1i)/12)$

$$\frac{1}{2}d\sqrt{1i}/12 - (3^{1/2}e\sqrt{1i})/6 + (3^{1/2}f\sqrt{1i})/12) - \log(x - (3^{1/2}\sqrt{1i})/2 - 1/2)(d/4 - f/4 + (3^{1/2}d\sqrt{1i})/12 + (3^{1/2}e\sqrt{1i})/6 + (3^{1/2}f\sqrt{1i})/12) + \log(x + (3^{1/2}\sqrt{1i})/2 + 1/2)(d/4 - f/4 + (3^{1/2}d\sqrt{1i})/12 - (3^{1/2}e\sqrt{1i})/6 + (3^{1/2}f\sqrt{1i})/12)$$

sympy [C] time = 98.60, size = 3589, normalized size = 34.51

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x**2+e*x+d)/(x**4+x**2+1),x)

[Out] $(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) \log(x + (-7d^5e + 6d^5(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) + 25d^4ef + 18d^4f(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) - 15d^3e^3 - 18d^3e^2(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) - 25d^3ef^2 + 60d^3e(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^2 - 42d^3f^2(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) + 72d^3(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^3 + 108d^2e^2f(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) + 20d^2ef^3 - 144d^2e^2f(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^2 - 12d^2f^3(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) - 144d^2f(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^3 + 4de^5 + 24de^4(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) + 15de^3f^2 + 48de^3(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^2 - 54de^2f^2(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) + 288de^2(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^3 - 20def^4 + 180def^2(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^2 + 36df^4(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) - 72df^2(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^3 - 8e^5f - 96e^3f(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^2 + 36e^2f^3(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) + 11ef^5 - 48ef^3(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^2 - 6f^5(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12) + 144f^3(-d/4 + f/4 - \sqrt{3}I(d + 2e + f)/12)^3)/(3d^6 - 3d^5f - 8d^4e^2 - 3d^4f^2 + 40d^3e^2f + 6d^3f^3 - 16d^2e^4 - 48d^2e^2f^2 - 3d^2f^4 + 16de^4f + 40de^2f^3 - 3df^5 - 16e^4f^2 - 8e^2f^4 + 3f^6)) + (-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) \log(x + (-7d^5e + 6d^5(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) + 25d^4ef + 18d^4f(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) - 15d^3e^3 - 18d^3e^2(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) - 25d^3ef^2 + 60d^3e(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^2 - 42d^3f^2(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) + 72d^3(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^3 + 108d^2e^2f(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) + 20d^2ef^3 - 144d^2e^2f(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^2 - 12d^2f^3(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) - 144d^2f(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^3 + 4de^5 + 24de^4(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12) + 15de^3f^2 + 48de^3(-d/4 + f/4 + \sqrt{3}I(d + 2e + f)/12)^2 -$

$$\begin{aligned}
& 54*d*e**2*f**2*(-d/4 + f/4 + \sqrt{3}*I*(d + 2*e + f)/12) + 288*d*e**2*(-d/4 \\
& + f/4 + \sqrt{3}*I*(d + 2*e + f)/12)**3 - 20*d*e*f**4 + 180*d*e*f**2*(-d/4 \\
& + f/4 + \sqrt{3}*I*(d + 2*e + f)/12)**2 + 36*d*f**4*(-d/4 + f/4 + \sqrt{3}*I* \\
& (d + 2*e + f)/12) - 72*d*f**2*(-d/4 + f/4 + \sqrt{3}*I*(d + 2*e + f)/12)**3 \\
& - 8*e**5*f - 96*e**3*f*(-d/4 + f/4 + \sqrt{3}*I*(d + 2*e + f)/12)**2 + 36*e* \\
& *2*f**3*(-d/4 + f/4 + \sqrt{3}*I*(d + 2*e + f)/12) + 11*e*f**5 - 48*e*f**3*(\\
& -d/4 + f/4 + \sqrt{3}*I*(d + 2*e + f)/12)**2 - 6*f**5*(-d/4 + f/4 + \sqrt{3}* \\
& I*(d + 2*e + f)/12) + 144*f**3*(-d/4 + f/4 + \sqrt{3}*I*(d + 2*e + f)/12)**3 \\
&)/(3*d**6 - 3*d**5*f - 8*d**4*e**2 - 3*d**4*f**2 + 40*d**3*e**2*f + 6*d**3* \\
& f**3 - 16*d**2*e**4 - 48*d**2*e**2*f**2 - 3*d**2*f**4 + 16*d*e**4*f + 40*d* \\
& e**2*f**3 - 3*d*f**5 - 16*e**4*f**2 - 8*e**2*f**4 + 3*f**6)) + (d/4 - f/4 - \\
& \sqrt{3}*I*(d - 2*e + f)/12)*\log(x + (-7*d**5*e + 6*d**5*(d/4 - f/4 - \sqrt{3} \\
&)*I*(d - 2*e + f)/12) + 25*d**4*e*f + 18*d**4*f*(d/4 - f/4 - \sqrt{3}*I*(d \\
& - 2*e + f)/12) - 15*d**3*e**3 - 18*d**3*e**2*(d/4 - f/4 - \sqrt{3}*I*(d - 2* \\
& e + f)/12) - 25*d**3*e*f**2 + 60*d**3*e*(d/4 - f/4 - \sqrt{3}*I*(d - 2*e + f \\
&)/12)**2 - 42*d**3*f**2*(d/4 - f/4 - \sqrt{3}*I*(d - 2*e + f)/12) + 72*d**3* \\
& (d/4 - f/4 - \sqrt{3}*I*(d - 2*e + f)/12)**3 + 108*d**2*e**2*f*(d/4 - f/4 - \\
& \sqrt{3}*I*(d - 2*e + f)/12) + 20*d**2*e*f**3 - 144*d**2*e*f*(d/4 - f/4 - \sqrt{3} \\
&)*I*(d - 2*e + f)/12)**2 - 12*d**2*f**3*(d/4 - f/4 - \sqrt{3}*I*(d - 2*e \\
& + f)/12) - 144*d**2*f*(d/4 - f/4 - \sqrt{3}*I*(d - 2*e + f)/12)**3 + 4*d*e* \\
& *5 + 24*d*e**4*(d/4 - f/4 - \sqrt{3}*I*(d - 2*e + f)/12) + 15*d*e**3*f**2 + \\
& 48*d*e**3*(d/4 - f/4 - \sqrt{3}*I*(d - 2*e + f)/12)**2 - 54*d*e**2*f**2*(d/4 \\
& - f/4 - \sqrt{3}*I*(d - 2*e + f)/12) + 288*d*e**2*(d/4 - f/4 - \sqrt{3}*I*(d \\
& - 2*e + f)/12)**3 - 20*d*e*f**4 + 180*d*e*f**2*(d/4 - f/4 - \sqrt{3}*I*(d - \\
& 2*e + f)/12)**2 + 36*d*f**4*(d/4 - f/4 - \sqrt{3}*I*(d - 2*e + f)/12) - 72* \\
& d*f**2*(d/4 - f/4 - \sqrt{3}*I*(d - 2*e + f)/12)**3 - 8*e**5*f - 96*e**3*f*(\\
& d/4 - f/4 - \sqrt{3}*I*(d - 2*e + f)/12)**2 + 36*e**2*f**3*(d/4 - f/4 - \sqrt{3} \\
&)*I*(d - 2*e + f)/12) + 11*e*f**5 - 48*e*f**3*(d/4 - f/4 - \sqrt{3}*I*(d - \\
& 2*e + f)/12)**2 - 6*f**5*(d/4 - f/4 - \sqrt{3}*I*(d - 2*e + f)/12) + 144*f* \\
& *3*(d/4 - f/4 - \sqrt{3}*I*(d - 2*e + f)/12)**3)/(3*d**6 - 3*d**5*f - 8*d**4 \\
& *e**2 - 3*d**4*f**2 + 40*d**3*e**2*f + 6*d**3*f**3 - 16*d**2*e**4 - 48*d**2 \\
& *e**2*f**2 - 3*d**2*f**4 + 16*d*e**4*f + 40*d*e**2*f**3 - 3*d*f**5 - 16*e** \\
& 4*f**2 - 8*e**2*f**4 + 3*f**6)) + (d/4 - f/4 + \sqrt{3}*I*(d - 2*e + f)/12)* \\
& \log(x + (-7*d**5*e + 6*d**5*(d/4 - f/4 + \sqrt{3}*I*(d - 2*e + f)/12) + 25*d \\
& **4*e*f + 18*d**4*f*(d/4 - f/4 + \sqrt{3}*I*(d - 2*e + f)/12) - 15*d**3*e**3 \\
& - 18*d**3*e**2*(d/4 - f/4 + \sqrt{3}*I*(d - 2*e + f)/12) - 25*d**3*e*f**2 + \\
& 60*d**3*e*(d/4 - f/4 + \sqrt{3}*I*(d - 2*e + f)/12)**2 - 42*d**3*f**2*(d/4 \\
& - f/4 + \sqrt{3}*I*(d - 2*e + f)/12) + 72*d**3*(d/4 - f/4 + \sqrt{3}*I*(d - 2 \\
& *e + f)/12)**3 + 108*d**2*e**2*f*(d/4 - f/4 + \sqrt{3}*I*(d - 2*e + f)/12) + \\
& 20*d**2*e*f**3 - 144*d**2*e*f*(d/4 - f/4 + \sqrt{3}*I*(d - 2*e + f)/12)**2 \\
& - 12*d**2*f**3*(d/4 - f/4 + \sqrt{3}*I*(d - 2*e + f)/12) - 144*d**2*f*(d/4 - \\
& f/4 + \sqrt{3}*I*(d - 2*e + f)/12)**3 + 4*d*e**5 + 24*d*e**4*(d/4 - f/4 + \sqrt{3} \\
&)*I*(d - 2*e + f)/12) + 15*d*e**3*f**2 + 48*d*e**3*(d/4 - f/4 + \sqrt{3}(3 \\
&)*I*(d - 2*e + f)/12)**2 - 54*d*e**2*f**2*(d/4 - f/4 + \sqrt{3}*I*(d - 2*e + \\
& f)/12) + 288*d*e**2*(d/4 - f/4 + \sqrt{3}*I*(d - 2*e + f)/12)**3 - 20*d*e*f
\end{aligned}$$

```

**4 + 180*d*e*f**2*(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12)**2 + 36*d*f**4*
(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12) - 72*d*f**2*(d/4 - f/4 + sqrt(3)*I
*(d - 2*e + f)/12)**3 - 8*e**5*f - 96*e**3*f*(d/4 - f/4 + sqrt(3)*I*(d - 2*
e + f)/12)**2 + 36*e**2*f**3*(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12) + 11*
e*f**5 - 48*e*f**3*(d/4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12)**2 - 6*f**5*(d/
4 - f/4 + sqrt(3)*I*(d - 2*e + f)/12) + 144*f**3*(d/4 - f/4 + sqrt(3)*I*(d
- 2*e + f)/12)**3)/(3*d**6 - 3*d**5*f - 8*d**4*e**2 - 3*d**4*f**2 + 40*d**3
*e**2*f + 6*d**3*f**3 - 16*d**2*e**4 - 48*d**2*e**2*f**2 - 3*d**2*f**4 + 16
*d*e**4*f + 40*d*e**2*f**3 - 3*d*f**5 - 16*e**4*f**2 - 8*e**2*f**4 + 3*f**6
))

```

$$3.17 \quad \int \frac{d+ex+fx^2+gx^3}{1+x^2+x^4} dx$$

Optimal. Leaf size=127

$$-\frac{1}{4}(d-f)\log(x^2-x+1)+\frac{1}{4}(d-f)\log(x^2+x+1)-\frac{(d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(d+f)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(2e-g)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{2\sqrt{3}}$$

[Out] -1/4*(d-f)*ln(x^2-x+1)+1/4*(d-f)*ln(x^2+x+1)+1/4*g*ln(x^4+x^2+1)-1/6*(d+f)*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/6*(d+f)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+1/6*(2*e-g)*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)

Rubi [A] time = 0.10, antiderivative size = 127, normalized size of antiderivative = 1.00, number of steps used = 15, number of rules used = 7, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.269$, Rules used = {1673, 1169, 634, 618, 204, 628, 1247}

$$-\frac{1}{4}(d-f)\log(x^2-x+1)+\frac{1}{4}(d-f)\log(x^2+x+1)-\frac{(d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(d+f)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{2\sqrt{3}}+\frac{(2e-g)\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{2\sqrt{3}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4), x]

[Out] -((d + f)*ArcTan[(1 - 2*x)/Sqrt[3]])/(2*Sqrt[3]) + ((d + f)*ArcTan[(1 + 2*x)/Sqrt[3]])/(2*Sqrt[3]) + ((2*e - g)*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(2*Sqrt[3]) - ((d - f)*Log[1 - x + x^2])/4 + ((d - f)*Log[1 + x + x^2])/4 + (g*Log[1 + x^2 + x^4])/4

Rule 204

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 628

Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := Simp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d}, x]

e}, x] && EqQ[2*c*d - b*e, 0]

Rule 634

Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]

Rule 1169

Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r + (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]

Rule 1247

Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]

Rule 1673

Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{1 + x^2 + x^4} dx &= \int \frac{d + fx^2}{1 + x^2 + x^4} dx + \int \frac{x(e + gx^2)}{1 + x^2 + x^4} dx \\
&= \frac{1}{2} \int \frac{d - (d-f)x}{1-x+x^2} dx + \frac{1}{2} \int \frac{d + (d-f)x}{1+x+x^2} dx + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{1+x+x^2} dx, x, x^2 \right) \\
&= \frac{1}{4}(d-f) \int \frac{1+2x}{1+x+x^2} dx + \frac{1}{4}(-d+f) \int \frac{-1+2x}{1-x+x^2} dx + \frac{1}{4}(d+f) \int \frac{1}{1-x+x^2} dx \\
&= -\frac{1}{4}(d-f) \log(1-x+x^2) + \frac{1}{4}(d-f) \log(1+x+x^2) + \frac{1}{4}g \log(1+x^2+x^4) + \frac{1}{2}(- \\
&\quad \frac{(d+f) \tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{2\sqrt{3}} + \frac{(d+f) \tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{2\sqrt{3}} + \frac{(2e-g) \tan^{-1}\left(\frac{1+2x^2}{\sqrt{3}}\right)}{2\sqrt{3}} - \frac{1}{4}(d-f) \log
\end{aligned}$$

Mathematica [C] time = 0.48, size = 150, normalized size = 1.18

$$\frac{2 \left(\sqrt{2 + 2i\sqrt{3}} \left((\sqrt{3} + i)f - 2id \right) \tan^{-1} \left(\frac{1}{2} (\sqrt{3} + i)x \right) + (2g - 4e) \tan^{-1} \left(\frac{\sqrt{3}}{2x^2 + 1} \right) + \sqrt{3}g \log(x^4 + x^2 + 1) \right) + 2\sqrt{3}}{8\sqrt{3}}$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4), x]

[Out] (2*Sqrt[2 - (2*I)*Sqrt[3]]*((2*I)*d + (-I + Sqrt[3])*f)*ArcTan[(-I + Sqrt[3])*x]/2] + 2*(Sqrt[2 + (2*I)*Sqrt[3]]*((-2*I)*d + (I + Sqrt[3])*f)*ArcTan[(I + Sqrt[3])*x]/2] + (-4*e + 2*g)*ArcTan[Sqrt[3]/(1 + 2*x^2)] + Sqrt[3]*g*Log[1 + x^2 + x^4])/(8*Sqrt[3])

fricas [A] time = 1.30, size = 83, normalized size = 0.65

$$\frac{1}{6} \sqrt{3} (d - 2e + f + g) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{6} \sqrt{3} (d + 2e + f - g) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{4} (d - f + g) \log$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1), x, algorithm="fricas")

[Out] 1/6*sqrt(3)*(d - 2*e + f + g)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d + 2*e + f - g)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*(d - f + g)*log(x^2 + x + 1) - 1/4*(d - f - g)*log(x^2 - x + 1)

giac [A] time = 0.29, size = 85, normalized size = 0.67

$$\frac{1}{6} \sqrt{3} (d + f + g - 2e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{6} \sqrt{3} (d + f - g + 2e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{4} (d - f + g) \log$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="giac")

[Out] 1/6*sqrt(3)*(d + f + g - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d + f - g + 2*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*(d - f + g)*log(x^2 + x + 1) - 1/4*(d - f - g)*log(x^2 - x + 1)

maple [A] time = 0.00, size = 204, normalized size = 1.61

$$\frac{\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{6} + \frac{\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{6} - \frac{d \ln(x^2 - x + 1)}{4} + \frac{d \ln(x^2 + x + 1)}{4} - \frac{\sqrt{3} e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x)

[Out] 1/4*d*ln(x^2+x+1)-1/4*f*ln(x^2+x+1)+1/4*ln(x^2+x+1)*g+1/6*3^(1/2)*d*arctan(1/3*(2*x+1)*3^(1/2))-1/3*3^(1/2)*e*arctan(1/3*(2*x+1)*3^(1/2))+1/6*3^(1/2)*f*arctan(1/3*(2*x+1)*3^(1/2))+1/6*3^(1/2)*arctan(1/3*(2*x+1)*3^(1/2))*g+1/4*f*ln(x^2-x+1)-1/4*d*ln(x^2-x+1)+1/4*ln(x^2-x+1)*g+1/6*3^(1/2)*d*arctan(1/3*(2*x-1)*3^(1/2))+1/3*3^(1/2)*e*arctan(1/3*(2*x-1)*3^(1/2))+1/6*3^(1/2)*f*arctan(1/3*(2*x-1)*3^(1/2))-1/6*3^(1/2)*arctan(1/3*(2*x-1)*3^(1/2))*g

maxima [A] time = 2.39, size = 83, normalized size = 0.65

$$\frac{1}{6} \sqrt{3} (d - 2e + f + g) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{6} \sqrt{3} (d + 2e + f - g) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{4} (d - f + g) \ln(x^2 + x + 1) - \frac{1}{4} (d - f - g) \ln(x^2 - x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="maxima")

[Out] 1/6*sqrt(3)*(d - 2*e + f + g)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d + 2*e + f - g)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*(d - f + g)*log(x^2 + x + 1) - 1/4*(d - f - g)*log(x^2 - x + 1)

mupad [B] time = 1.13, size = 199, normalized size = 1.57

$$-\ln\left(x - \frac{1}{2} - \frac{\sqrt{3} \operatorname{li}}{2}\right) \left(\frac{d}{4} - \frac{f}{4} - \frac{g}{4} + \frac{\sqrt{3} d \operatorname{li}}{12} + \frac{\sqrt{3} e \operatorname{li}}{6} + \frac{\sqrt{3} f \operatorname{li}}{12} - \frac{\sqrt{3} g \operatorname{li}}{12}\right) - \ln\left(x + \frac{1}{2} - \frac{\sqrt{3} \operatorname{li}}{2}\right) \left(\frac{f}{4} - \frac{d}{4} - \frac{g}{4}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3)/(x^2 + x^4 + 1),x)

```
[Out] log(x + (3^(1/2)*1i)/2 - 1/2)*(f/4 - d/4 + g/4 + (3^(1/2)*d*1i)/12 + (3^(1/2)*e*1i)/6 + (3^(1/2)*f*1i)/12 - (3^(1/2)*g*1i)/12) - log(x - (3^(1/2)*1i)/2 + 1/2)*(f/4 - d/4 - g/4 + (3^(1/2)*d*1i)/12 - (3^(1/2)*e*1i)/6 + (3^(1/2)*f*1i)/12 + (3^(1/2)*g*1i)/12) - log(x - (3^(1/2)*1i)/2 - 1/2)*(d/4 - f/4 - g/4 + (3^(1/2)*d*1i)/12 + (3^(1/2)*e*1i)/6 + (3^(1/2)*f*1i)/12 - (3^(1/2)*g*1i)/12) + log(x + (3^(1/2)*1i)/2 + 1/2)*(d/4 - f/4 + g/4 + (3^(1/2)*d*1i)/12 - (3^(1/2)*e*1i)/6 + (3^(1/2)*f*1i)/12 + (3^(1/2)*g*1i)/12)
```

```
sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00
```

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(x**4+x**2+1),x)
```

```
[Out] Timed out
```


$$3.18 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{1+x^2+x^4} dx$$

Optimal. Leaf size=136

$$-\frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}} + \frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}} - \frac{1}{4}(d-f)\log(x^2-x+1) + \frac{1}{4}(d-f)\log(x^2+x+1) + \dots \quad (2e)$$

[Out] h*x-1/4*(d-f)*ln(x^2-x+1)+1/4*(d-f)*ln(x^2+x+1)+1/4*g*ln(x^4+x^2+1)-1/6*(d+f-2*h)*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/6*(d+f-2*h)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+1/6*(2*e-g)*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)

Rubi [A] time = 0.14, antiderivative size = 136, normalized size of antiderivative = 1.00, number of steps used = 17, number of rules used = 8, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.258$, Rules used = {1673, 1676, 1169, 634, 618, 204, 628, 1247}

$$-\frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}} + \frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}} - \frac{1}{4}(d-f)\log(x^2-x+1) + \frac{1}{4}(d-f)\log(x^2+x+1) + \dots \quad (2e)$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4), x]

[Out] h*x - ((d + f - 2*h)*ArcTan[(1 - 2*x)/Sqrt[3]])/(2*Sqrt[3]) + ((d + f - 2*h)*ArcTan[(1 + 2*x)/Sqrt[3]])/(2*Sqrt[3]) + ((2*e - g)*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(2*Sqrt[3]) - ((d - f)*Log[1 - x + x^2])/4 + ((d - f)*Log[1 + x + x^2])/4 + (g*Log[1 + x^2 + x^4])/4

Rule 204

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 628

Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := Simp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d}, x]

e}, x] && EqQ[2*c*d - b*e, 0]

Rule 634

Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]

Rule 1169

Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r + (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]

Rule 1247

Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]

Rule 1673

Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]

Rule 1676

Int[(Pq_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> Int[ExpandIntegrand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^2] && Expon[Pq, x^2] > 1

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{1 + x^2 + x^4} dx &= \int \frac{x(e + gx^2)}{1 + x^2 + x^4} dx + \int \frac{d + fx^2 + hx^4}{1 + x^2 + x^4} dx \\
&= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{1 + x + x^2} dx, x, x^2 \right) + \int \left(h + \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} \right) dx \\
&= hx + \frac{1}{4}(2e - g) \text{Subst} \left(\int \frac{1}{1 + x + x^2} dx, x, x^2 \right) + \frac{1}{4}g \text{Subst} \left(\int \frac{1 + 2x}{1 + x + x^2} dx, \right. \\
&= hx + \frac{1}{4}g \log(1 + x^2 + x^4) + \frac{1}{2} \int \frac{d - h - (d - f)x}{1 - x + x^2} dx + \frac{1}{2} \int \frac{d - h + (d - f)x}{1 + x + x^2} dx \\
&= hx + \frac{(2e - g) \tan^{-1} \left(\frac{1+2x^2}{\sqrt{3}} \right)}{2\sqrt{3}} + \frac{1}{4}g \log(1 + x^2 + x^4) + \frac{1}{4}(d - f) \int \frac{1 + 2x}{1 + x + x^2} dx \\
&= hx + \frac{(2e - g) \tan^{-1} \left(\frac{1+2x^2}{\sqrt{3}} \right)}{2\sqrt{3}} - \frac{1}{4}(d - f) \log(1 - x + x^2) + \frac{1}{4}(d - f) \log(1 + x + x^2) \\
&= hx - \frac{(d + f - 2h) \tan^{-1} \left(\frac{1-2x}{\sqrt{3}} \right)}{2\sqrt{3}} + \frac{(d + f - 2h) \tan^{-1} \left(\frac{1+2x}{\sqrt{3}} \right)}{2\sqrt{3}} + \frac{(2e - g) \tan^{-1} \left(\frac{1+2x^2}{\sqrt{3}} \right)}{2\sqrt{3}}
\end{aligned}$$

Mathematica [C] time = 0.60, size = 165, normalized size = 1.21

$$\frac{1}{24} \left(4 \tan^{-1} \left(\frac{1}{2} (\sqrt{3} - i)x \right) \left((\sqrt{3} + 3i)d + (\sqrt{3} - 3i)f - 2\sqrt{3}h \right) + 4 \tan^{-1} \left(\frac{1}{2} (\sqrt{3} + i)x \right) \left((\sqrt{3} - 3i)d + (\sqrt{3} + 3i)f - 2\sqrt{3}h \right) \right)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4), x]

[Out] (24*h*x + 4*((3*I + Sqrt[3])*d + (-3*I + Sqrt[3])*f - 2*Sqrt[3]*h)*ArcTan[(-I + Sqrt[3])*x]/2] + 4*((-3*I + Sqrt[3])*d + (3*I + Sqrt[3])*f - 2*Sqrt[3]*h)*ArcTan[(I + Sqrt[3])*x]/2] - 8*Sqrt[3]*e*ArcTan[Sqrt[3]/(1 + 2*x^2)] + 4*Sqrt[3]*g*ArcTan[Sqrt[3]/(1 + 2*x^2)] + 6*g*Log[1 + x^2 + x^4])/24

fricas [A] time = 4.56, size = 92, normalized size = 0.68

$$\frac{1}{6} \sqrt{3} (d - 2e + f + g - 2h) \arctan \left(\frac{1}{3} \sqrt{3} (2x + 1) \right) + \frac{1}{6} \sqrt{3} (d + 2e + f - g - 2h) \arctan \left(\frac{1}{3} \sqrt{3} (2x - 1) \right) + hx + \frac{1}{4} g \log(1 + x^2 + x^4)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1), x, algorithm="fricas")

[Out] $\frac{1}{6}\sqrt{3}(d - 2e + f + g - 2h)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{6}\sqrt{3}(d + 2e + f - g - 2h)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + hx + \frac{1}{4}(d - f + g)\log(x^2 + x + 1) - \frac{1}{4}(d - f - g)\log(x^2 - x + 1)$

giac [A] time = 0.30, size = 94, normalized size = 0.69

$$\frac{1}{6}\sqrt{3}(d + f + g - 2h - 2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{6}\sqrt{3}(d + f - g - 2h + 2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + hx + \frac{1}{4}(d - f + g)\log(x^2 + x + 1) - \frac{1}{4}(d - f - g)\log(x^2 - x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="giac")`

[Out] $\frac{1}{6}\sqrt{3}(d + f + g - 2h - 2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{6}\sqrt{3}(d + f - g - 2h + 2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + hx + \frac{1}{4}(d - f + g)\log(x^2 + x + 1) - \frac{1}{4}(d - f - g)\log(x^2 - x + 1)$

maple [B] time = 0.01, size = 241, normalized size = 1.77

$$\frac{\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{6} + \frac{\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{6} - \frac{d \ln(x^2 - x + 1)}{4} + \frac{d \ln(x^2 + x + 1)}{4} - \frac{\sqrt{3} e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{3} + \dots$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x)`

[Out] $hx + \frac{1}{4}d \ln(x^2 + x + 1) - \frac{1}{4}f \ln(x^2 + x + 1) + \frac{1}{4}g \ln(x^2 + x + 1) + \frac{1}{6}3^{(1/2)}d \arctan\left(\frac{1}{3}(2x+1)3^{(1/2)}\right) - \frac{1}{3}3^{(1/2)}e \arctan\left(\frac{1}{3}(2x+1)3^{(1/2)}\right) + \frac{1}{6}3^{(1/2)}f \arctan\left(\frac{1}{3}(2x+1)3^{(1/2)}\right) + \frac{1}{6}3^{(1/2)}g \arctan\left(\frac{1}{3}(2x+1)3^{(1/2)}\right) - \frac{1}{3}3^{(1/2)}\arctan\left(\frac{1}{3}(2x+1)3^{(1/2)}\right) * h + \frac{1}{4}f \ln(x^2 - x + 1) - \frac{1}{4}d \ln(x^2 - x + 1) + \frac{1}{4}g \ln(x^2 - x + 1) + \frac{1}{6}3^{(1/2)}d \arctan\left(\frac{1}{3}(2x-1)3^{(1/2)}\right) + \frac{1}{3}3^{(1/2)}e \arctan\left(\frac{1}{3}(2x-1)3^{(1/2)}\right) + \frac{1}{6}3^{(1/2)}f \arctan\left(\frac{1}{3}(2x-1)3^{(1/2)}\right) - \frac{1}{6}3^{(1/2)}g \arctan\left(\frac{1}{3}(2x-1)3^{(1/2)}\right) - \frac{1}{3}3^{(1/2)}\arctan\left(\frac{1}{3}(2x-1)3^{(1/2)}\right) * h$

maxima [A] time = 2.62, size = 92, normalized size = 0.68

$$\frac{1}{6}\sqrt{3}(d - 2e + f + g - 2h)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{6}\sqrt{3}(d + 2e + f - g - 2h)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + hx + \frac{1}{4}(d - f + g)\log(x^2 + x + 1) - \frac{1}{4}(d - f - g)\log(x^2 - x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1),x, algorithm="maxima")`

[Out] $\frac{1}{6}\sqrt{3}(d - 2e + f + g - 2h)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{6}\sqrt{3}(d + 2e + f - g - 2h)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + hx + \frac{1}{4}(d - f + g)\log(x^2 + x + 1) - \frac{1}{4}(d - f - g)\log(x^2 - x + 1)$

mupad [B] time = 6.11, size = 1209, normalized size = 8.89

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4)/(x^2 + x^4 + 1), x)$

[Out] $\log(d*f*9i - d*e*6i + d*g*3i - d*h*3i + e*h*6i + f*h*3i - g*h*3i - 3*3^{(1/2)}*d^2 - d^2*x*6i - f^2*x*3i - d^2*3i - f^2*6i + 2*3^{(1/2)}*d*e + 3*3^{(1/2)}*d*f - 3^{(1/2)}*d*g - 4*3^{(1/2)}*e*f + 3*3^{(1/2)}*d*h + 2*3^{(1/2)}*e*h + 2*3^{(1/2)}*f*g - 3*3^{(1/2)}*f*h - 3^{(1/2)}*g*h + d*f*x*9i - e*f*x*6i + d*h*x*3i + e*h*x*6i + f*g*x*3i - f*h*x*3i - g*h*x*3i + 3*3^{(1/2)}*f^2*x - 3*3^{(1/2)}*d*f*x - 2*3^{(1/2)}*d*g*x - 2*3^{(1/2)}*e*f*x + 3*3^{(1/2)}*d*h*x - 2*3^{(1/2)}*e*h*x + 3^{(1/2)}*f*g*x - 3*3^{(1/2)}*f*h*x + 3^{(1/2)}*g*h*x + 4*3^{(1/2)}*d*e*x)*(d/4 - f/4 + g/4 - (3^{(1/2)}*d*1i)/12 + (3^{(1/2)}*e*1i)/6 - (3^{(1/2)}*f*1i)/12 - (3^{(1/2)}*g*1i)/12 + (3^{(1/2)}*h*1i)/6) - \log(d*g*3i - d*f*9i - d*e*6i + d*h*3i + e*h*6i - f*h*3i - g*h*3i - 3*3^{(1/2)}*d^2 - d^2*x*6i - f^2*x*3i + d^2*3i + f^2*6i - 2*3^{(1/2)}*d*e + 3*3^{(1/2)}*d*f + 3^{(1/2)}*d*g + 4*3^{(1/2)}*e*f + 3*3^{(1/2)}*d*h - 2*3^{(1/2)}*e*h - 2*3^{(1/2)}*f*g - 3*3^{(1/2)}*f*h + 3^{(1/2)}*g*h + d*f*x*9i + e*f*x*6i + d*h*x*3i - e*h*x*6i - f*g*x*3i - f*h*x*3i + g*h*x*3i - 3*3^{(1/2)}*f^2*x + 3*3^{(1/2)}*d*f*x - 2*3^{(1/2)}*d*g*x - 2*3^{(1/2)}*e*f*x - 3*3^{(1/2)}*d*h*x - 2*3^{(1/2)}*e*h*x + 3^{(1/2)}*f*g*x + 3*3^{(1/2)}*f*h*x + 3^{(1/2)}*g*h*x + 4*3^{(1/2)}*d*e*x)*(d/4 - f/4 - g/4 + (3^{(1/2)}*d*1i)/12 + (3^{(1/2)}*e*1i)/6 + (3^{(1/2)}*f*1i)/12 - (3^{(1/2)}*g*1i)/12 - (3^{(1/2)}*h*1i)/6) + \log(d*f*9i - d*e*6i + d*g*3i - d*h*3i + e*h*6i + f*h*3i - g*h*3i + 3*3^{(1/2)}*d^2 - d^2*x*6i - f^2*x*3i - d^2*3i - f^2*6i - 2*3^{(1/2)}*d*e - 3*3^{(1/2)}*d*f + 3^{(1/2)}*d*g + 4*3^{(1/2)}*e*f - 3*3^{(1/2)}*d*h - 2*3^{(1/2)}*e*h - 2*3^{(1/2)}*f*g + 3*3^{(1/2)}*f*h + 3^{(1/2)}*g*h + d*f*x*9i - e*f*x*6i + d*h*x*3i + e*h*x*6i + f*g*x*3i - f*h*x*3i - g*h*x*3i - 3*3^{(1/2)}*f^2*x + 3*3^{(1/2)}*d*f*x + 2*3^{(1/2)}*d*g*x + 2*3^{(1/2)}*e*f*x - 3*3^{(1/2)}*d*h*x + 2*3^{(1/2)}*e*h*x - 3^{(1/2)}*f*g*x + 3*3^{(1/2)}*f*h*x - 3^{(1/2)}*g*h*x - 4*3^{(1/2)}*d*e*x)*(d/4 - f/4 + g/4 + (3^{(1/2)}*d*1i)/12 - (3^{(1/2)}*e*1i)/6 + (3^{(1/2)}*f*1i)/12 + (3^{(1/2)}*g*1i)/12 - (3^{(1/2)}*h*1i)/6) + \log(d*g*3i - d*f*9i - d*e*6i + d*h*3i + e*h*6i - f*h*3i - g*h*3i + 3*3^{(1/2)}*d^2 - d^2*x*6i - f^2*x*3i + d^2*3i + f^2*6i + 2*3^{(1/2)}*d*e - 3*3^{(1/2)}*d*f - 3^{(1/2)}*d*g - 4*3^{(1/2)}*e*f - 3*3^{(1/2)}*d*h + 2*3^{(1/2)}*e*h + 2*3^{(1/2)}*f*g + 3*3^{(1/2)}*f*h - 3^{(1/2)}*g*h + d*f*x*9i + e*f*x*6i + d*h*x*3i - e*h*x*6i - f*g*x*3i - f*h*x*3i + g*h*x*3i + 3*3^{(1/2)}*f^2*x - 3*3^{(1/2)}*d*f*x + 2*3^{(1/2)}*d*g*x + 2*3^{(1/2)}*e*f*x + 3*3^{(1/2)}*d*h*x + 2*3^{(1/2)}*e*h*x - 3^{(1/2)}*f*g*x - 3*3^{(1/2)}*f*h*x - 3^{(1/2)}*g*h*x - 4*3^{(1/2)}*d*e*x)*(f/4 - d/4 + g/4 + (3^{(1/2)}*d*1i)/12 + (3^{(1/2)}*e*1i)/6 + (3^{(1/2)}*f*1i)/12 - (3^{(1/2)}*g*1i)/12 - (3^{(1/2)}*h*1i)/6) + h*x$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(x**4+x**2+1),x)
```

```
[Out] Timed out
```

$$3.19 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{1+x^2+x^4} dx$$

Optimal. Leaf size=151

$$-\frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}} + \frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}} - \frac{1}{4}(d-f)\log(x^2-x+1) + \frac{1}{4}(d-f)\log(x^2+x+1) + \dots$$

[Out] $h*x+1/2*i*x^2-1/4*(d-f)*\ln(x^2-x+1)+1/4*(d-f)*\ln(x^2+x+1)+1/4*(g-i)*\ln(x^4+x^2+1)-1/6*(d+f-2*h)*\arctan(1/3*(1-2*x)*3^{(1/2)})*3^{(1/2)}+1/6*(d+f-2*h)*\arctan(1/3*(1+2*x)*3^{(1/2)})*3^{(1/2)}+1/6*(2*e-g-i)*\arctan(1/3*(2*x^2+1)*3^{(1/2)})*3^{(1/2)}$

Rubi [A] time = 0.18, antiderivative size = 151, normalized size of antiderivative = 1.00, number of steps used = 19, number of rules used = 9, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {1673, 1676, 1169, 634, 618, 204, 628, 1663, 1657}

$$-\frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}} + \frac{\tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)(d+f-2h)}{2\sqrt{3}} - \frac{1}{4}(d-f)\log(x^2-x+1) + \frac{1}{4}(d-f)\log(x^2+x+1) + \dots$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4), x]

[Out] $h*x + (i*x^2)/2 - ((d + f - 2*h)*\text{ArcTan}[(1 - 2*x)/\text{Sqrt}[3]])/(2*\text{Sqrt}[3]) + ((d + f - 2*h)*\text{ArcTan}[(1 + 2*x)/\text{Sqrt}[3]])/(2*\text{Sqrt}[3]) + ((2*e - g - i)*\text{ArcTan}[(1 + 2*x^2)/\text{Sqrt}[3]])/(2*\text{Sqrt}[3]) - ((d - f)*\text{Log}[1 - x + x^2])/4 + ((d - f)*\text{Log}[1 + x + x^2])/4 + ((g - i)*\text{Log}[1 + x^2 + x^4])/4$

Rule 204

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 628

Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := Simp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d},

e}, x] && EqQ[2*c*d - b*e, 0]

Rule 634

Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]

Rule 1169

Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r + (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]

Rule 1657

Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Int[ExpandIntegrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, -2]

Rule 1663

Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[(m - 1)/2]

Rule 1673

Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]

Rule 1676

Int[(Pq_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> Int[ExpandIntegrand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^2] && Expon[Pq, x^2] > 1

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 19x^5}{1 + x^2 + x^4} dx &= \int \frac{x(e + gx^2 + 19x^4)}{1 + x^2 + x^4} dx + \int \frac{d + fx^2 + hx^4}{1 + x^2 + x^4} dx \\
&= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx + 19x^2}{1 + x + x^2} dx, x, x^2 \right) + \int \left(h + \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} \right) dx \\
&= hx + \frac{1}{2} \text{Subst} \left(\int \left(19 - \frac{19 - e + (19 - g)x}{1 + x + x^2} \right) dx, x, x^2 \right) + \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx \\
&= hx + \frac{19x^2}{2} + \frac{1}{2} \int \frac{d - h - (d - f)x}{1 - x + x^2} dx + \frac{1}{2} \int \frac{d - h + (d - f)x}{1 + x + x^2} dx - \frac{1}{2} \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx \\
&= hx + \frac{19x^2}{2} + \frac{1}{4}(d - f) \int \frac{1 + 2x}{1 + x + x^2} dx + \frac{1}{4}(-d + f) \int \frac{-1 + 2x}{1 - x + x^2} dx - \frac{1}{2} \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx \\
&= hx + \frac{19x^2}{2} - \frac{1}{4}(d - f) \log(1 - x + x^2) + \frac{1}{4}(d - f) \log(1 + x + x^2) - \frac{1}{2} \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx \\
&= hx + \frac{19x^2}{2} - \frac{(d + f - 2h) \tan^{-1} \left(\frac{1 - 2x}{\sqrt{3}} \right)}{2\sqrt{3}} + \frac{(d + f - 2h) \tan^{-1} \left(\frac{1 + 2x}{\sqrt{3}} \right)}{2\sqrt{3}} - \frac{1}{2} \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx
\end{aligned}$$

Mathematica [C] time = 0.58, size = 187, normalized size = 1.24

$$\frac{1}{12} \left((1 + i\sqrt{3}) \tan^{-1} \left(\frac{1}{2} (\sqrt{3} - i)x \right) (2\sqrt{3}d - (\sqrt{3} + 3i)f - (\sqrt{3} - 3i)h) + (\sqrt{3} + i) \tan^{-1} \left(\frac{1}{2} (\sqrt{3} + i)x \right) (-2\sqrt{3}d + (\sqrt{3} - 3i)f + (\sqrt{3} + 3i)h) \right)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4), x]

[Out] (6*x*(2*h + i*x) + (1 + I*Sqrt[3])*(2*Sqrt[3]*d - (3*I + Sqrt[3])*f - (-3*I + Sqrt[3])*h)*ArcTan[(-I + Sqrt[3])*x/2] + (I + Sqrt[3])*((-2*I)*Sqrt[3]*d + (3 + I*Sqrt[3])*f + I*(3*I + Sqrt[3])*h)*ArcTan[(I + Sqrt[3])*x/2] - 2*Sqrt[3]*(2*e - g - i)*ArcTan[Sqrt[3]/(1 + 2*x^2)] + 3*(g - i)*Log[1 + x^2 + x^4])/12

fricas [A] time = 17.27, size = 106, normalized size = 0.70

$$\frac{1}{2} ix^2 + \frac{1}{6} \sqrt{3} (d - 2e + f + g - 2h + i) \arctan \left(\frac{1}{3} \sqrt{3} (2x + 1) \right) + \frac{1}{6} \sqrt{3} (d + 2e + f - g - 2h - i) \arctan \left(\frac{1}{3} \sqrt{3} (2x - 1) \right)$$

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)/(x^4+x^2+1),x, algorithm="fricas")

[Out] 1/2*i*x^2 + 1/6*sqrt(3)*(d - 2*e + f + g - 2*h + i)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d + 2*e + f - g - 2*h - i)*arctan(1/3*sqrt(3)*(2*x - 1)) + h*x + 1/4*(d - f + g - i)*log(x^2 + x + 1) - 1/4*(d - f - g + i)*log(x^2 - x + 1)

giac [A] time = 0.31, size = 108, normalized size = 0.72

$$\frac{1}{2}ix^2 + \frac{1}{6}\sqrt{3}(d+f+g-2h+i-2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{6}\sqrt{3}(d+f-g-2h-i+2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + hx + \frac{1}{4}(d-f+g-i)\log(x^2+x+1) - \frac{1}{4}(d-f-g+i)\log(x^2-x+1)$$

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)/(x^4+x^2+1),x, algorithm="giac")

[Out] 1/2*i*x^2 + 1/6*sqrt(3)*(d + f + g - 2*h + i - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d + f - g - 2*h - i + 2*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + h*x + 1/4*(d - f + g - i)*log(x^2 + x + 1) - 1/4*(d - f - g + i)*log(x^2 - x + 1)

maple [B] time = 0.01, size = 303, normalized size = 2.01

$$\frac{ix^2}{2} + \frac{\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{6} + \frac{\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{6} - \frac{d \ln(x^2 - x + 1)}{4} + \frac{d \ln(x^2 + x + 1)}{4} - \frac{\sqrt{3} e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{3}$$

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)/(x^4+x^2+1),x)

[Out] 1/2*i*x^2+h*x+1/4*d*ln(x^2+x+1)-1/4*f*ln(x^2+x+1)+1/4*g*ln(x^2+x+1)-1/4*ln(x^2+x+1)*i+1/6*3^(1/2)*d*arctan(1/3*(2*x+1)*3^(1/2))-1/3*3^(1/2)*e*arctan(1/3*(2*x+1)*3^(1/2))+1/6*3^(1/2)*f*arctan(1/3*(2*x+1)*3^(1/2))+1/6*3^(1/2)*g*arctan(1/3*(2*x+1)*3^(1/2))-1/3*3^(1/2)*h*arctan(1/3*(2*x+1)*3^(1/2))+1/6*3^(1/2)*arctan(1/3*(2*x+1)*3^(1/2))*i+1/4*g*ln(x^2-x+1)-1/4*ln(x^2-x+1)*i+1/4*f*ln(x^2-x+1)-1/4*d*ln(x^2-x+1)+1/6*3^(1/2)*d*arctan(1/3*(2*x-1)*3^(1/2))+1/3*3^(1/2)*e*arctan(1/3*(2*x-1)*3^(1/2))+1/6*3^(1/2)*f*arctan(1/3*(2*x-1)*3^(1/2))-1/6*3^(1/2)*g*arctan(1/3*(2*x-1)*3^(1/2))-1/3*3^(1/2)*h*arctan(1/3*(2*x-1)*3^(1/2))-1/6*3^(1/2)*arctan(1/3*(2*x-1)*3^(1/2))*i

maxima [A] time = 2.37, size = 106, normalized size = 0.70

$$\frac{1}{2}ix^2 + \frac{1}{6}\sqrt{3}(d-2e+f+g-2h+i)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{6}\sqrt{3}(d+2e+f-g-2h-i)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + hx + \frac{1}{4}(d-f+g-i)\log(x^2+x+1) - \frac{1}{4}(d-f-g+i)\log(x^2-x+1)$$

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)/(x^4+x^2+1),x, algorithm="maxima")
```

```
[Out] 1/2*i*x^2 + 1/6*sqrt(3)*(d - 2*e + f + g - 2*h + i)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/6*sqrt(3)*(d + 2*e + f - g - 2*h - i)*arctan(1/3*sqrt(3)*(2*x - 1)) + h*x + 1/4*(d - f + g - i)*log(x^2 + x + 1) - 1/4*(d - f - g + i)*log(x^2 - x + 1)
```

mupad [B] time = 7.80, size = 1509, normalized size = 9.99

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(x^2 + x^4 + 1),x)
```

```
[Out] h*x - log(d*g*3i - d*f*9i - d*e*6i + d*h*3i + d*i*3i + e*h*6i - f*h*3i - g*h*3i - h*i*3i - 3*3^(1/2)*d^2 - d^2*x*6i - f^2*x*3i + d^2*3i + f^2*6i - 2*3^(1/2)*d*e + 3*3^(1/2)*d*f + 3^(1/2)*d*g + 4*3^(1/2)*e*f + 3*3^(1/2)*d*h + 3^(1/2)*d*i - 2*3^(1/2)*e*h - 2*3^(1/2)*f*g - 3*3^(1/2)*f*h - 2*3^(1/2)*f*i + 3^(1/2)*g*h + 3^(1/2)*h*i + d*f*x*9i + e*f*x*6i + d*h*x*3i - e*h*x*6i - f*g*x*3i - f*h*x*3i - f*i*x*3i + g*h*x*3i + h*i*x*3i - 3*3^(1/2)*f^2*x + 3*3^(1/2)*d*f*x - 2*3^(1/2)*d*g*x - 2*3^(1/2)*e*f*x - 3*3^(1/2)*d*h*x - 2*3^(1/2)*d*i*x - 2*3^(1/2)*e*h*x + 3^(1/2)*f*g*x + 3*3^(1/2)*f*h*x + 3^(1/2)*f*i*x + 3^(1/2)*g*h*x + 3^(1/2)*h*i*x + 4*3^(1/2)*d*e*x)*(d/4 - f/4 - g/4 + i/4 + (3^(1/2)*d*1i)/12 + (3^(1/2)*e*1i)/6 + (3^(1/2)*f*1i)/12 - (3^(1/2)*g*1i)/12 - (3^(1/2)*h*1i)/6 - (3^(1/2)*i*1i)/12) - log(d*e*6i + d*f*9i - d*g*3i - d*h*3i - d*i*3i - e*h*6i + f*h*3i + g*h*3i + h*i*3i - 3*3^(1/2)*d^2 + d^2*x*6i + f^2*x*3i - d^2*3i - f^2*6i - 2*3^(1/2)*d*e + 3*3^(1/2)*d*f + 3^(1/2)*d*g + 4*3^(1/2)*e*f + 3*3^(1/2)*d*h + 3^(1/2)*d*i - 2*3^(1/2)*e*h - 2*3^(1/2)*f*g - 3*3^(1/2)*f*h - 2*3^(1/2)*f*i + 3^(1/2)*g*h + 3^(1/2)*h*i - d*f*x*9i - e*f*x*6i - d*h*x*3i + e*h*x*6i + f*g*x*3i + f*h*x*3i + f*i*x*3i - g*h*x*3i - h*i*x*3i - 3*3^(1/2)*f^2*x + 3*3^(1/2)*d*f*x - 2*3^(1/2)*d*g*x - 2*3^(1/2)*e*f*x - 3*3^(1/2)*d*h*x - 2*3^(1/2)*d*i*x - 2*3^(1/2)*e*h*x + 3^(1/2)*f*g*x + 3*3^(1/2)*f*h*x + 3^(1/2)*f*i*x + 3^(1/2)*g*h*x + 3^(1/2)*h*i*x + 4*3^(1/2)*d*e*x)*(d/4 - f/4 - g/4 + i/4 - (3^(1/2)*d*1i)/12 - (3^(1/2)*e*1i)/6 - (3^(1/2)*f*1i)/12 + (3^(1/2)*g*1i)/12 + (3^(1/2)*h*1i)/6 + (3^(1/2)*i*1i)/12) - log(d*f*9i - d*e*6i + d*g*3i - d*h*3i + d*i*3i + e*h*6i + f*h*3i - g*h*3i - h*i*3i - 3*3^(1/2)*d^2 - d^2*x*6i - f^2*x*3i - d^2*3i - f^2*6i + 2*3^(1/2)*d*e + 3*3^(1/2)*d*f - 3^(1/2)*d*g - 4*3^(1/2)*e*f + 3*3^(1/2)*d*h - 3^(1/2)*d*i + 2*3^(1/2)*e*h + 2*3^(1/2)*f*g - 3*3^(1/2)*f*h + 2*3^(1/2)*f*i - 3^(1/2)*g*h - 3^(1/2)*h*i + d*f*x*9i - e*f*x*6i + d*h*x*3i + e*h*x*6i + f*g*x*3i - f*h*x*3i + f*i*x*3i - g*h*x*3i - h*i*x*3i + 3*3^(1/2)*f^2*x - 3*3^(1/2)*d*f*x - 2*3^(1/2)*d*g*x - 2*3^(1/2)*e*f*x + 3*3^(1/2)*d*h*x - 2*3^(1/2)*d*i*x - 2*3^(1/2)*e*h*x + 3^(1/2)*f*g*x - 3*3^(1/2)*f*h*x + 3^(1/2)*f*i*x + 3^(1/2)*g*h*x + 3^(1/2)*h*i*x + 4*3^(1/2)*d*e*x)*(f/4 - d/
```

$$\begin{aligned}
& 4 - g/4 + i/4 + (3^{(1/2)}*d*1i)/12 - (3^{(1/2)}*e*1i)/6 + (3^{(1/2)}*f*1i)/12 + \\
& (3^{(1/2)}*g*1i)/12 - (3^{(1/2)}*h*1i)/6 + (3^{(1/2)}*i*1i)/12) + \log(d*f*9i - d* \\
& e*6i + d*g*3i - d*h*3i + d*i*3i + e*h*6i + f*h*3i - g*h*3i - h*i*3i + 3*3^{(1/2)} \\
&)*d^2 - d^2*x*6i - f^2*x*3i - d^2*3i - f^2*6i - 2*3^{(1/2)}*d*e - 3*3^{(1/2)} \\
&)*d*f + 3^{(1/2)}*d*g + 4*3^{(1/2)}*e*f - 3*3^{(1/2)}*d*h + 3^{(1/2)}*d*i - 2*3^{(1/2)} \\
&)*e*h - 2*3^{(1/2)}*f*g + 3*3^{(1/2)}*f*h - 2*3^{(1/2)}*f*i + 3^{(1/2)}*g*h + 3^{(1/2)} \\
&)*h*i + d*f*x*9i - e*f*x*6i + d*h*x*3i + e*h*x*6i + f*g*x*3i - f*h*x*3i + \\
& f*i*x*3i - g*h*x*3i - h*i*x*3i - 3*3^{(1/2)}*f^2*x + 3*3^{(1/2)}*d*f*x + 2*3^{(1/2)} \\
&)*d*g*x + 2*3^{(1/2)}*e*f*x - 3*3^{(1/2)}*d*h*x + 2*3^{(1/2)}*d*i*x + 2*3^{(1/2)} \\
&)*e*h*x - 3^{(1/2)}*f*g*x + 3*3^{(1/2)}*f*h*x - 3^{(1/2)}*f*i*x - 3^{(1/2)}*g*h*x - \\
& 3^{(1/2)}*h*i*x - 4*3^{(1/2)}*d*e*x)*(d/4 - f/4 + g/4 - i/4 + (3^{(1/2)}*d*1i)/1 \\
& 2 - (3^{(1/2)}*e*1i)/6 + (3^{(1/2)}*f*1i)/12 + (3^{(1/2)}*g*1i)/12 - (3^{(1/2)}*h*1 \\
& i)/6 + (3^{(1/2)}*i*1i)/12) + (i*x^2)/2
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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)/(x**4+x**2+1),x)

[Out] Timed out

$$3.20 \quad \int \frac{d+ex}{a+bx^2+cx^4} dx$$

Optimal. Leaf size=189

$$\frac{\sqrt{2} \sqrt{c} d \tan^{-1}\left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{b^2-4ac} \sqrt{b-\sqrt{b^2-4ac}}} - \frac{\sqrt{2} \sqrt{c} d \tan^{-1}\left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{b^2-4ac} \sqrt{\sqrt{b^2-4ac}+b}} - \frac{e \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

[Out] $-e \operatorname{arctanh}\left(\frac{2cx^2+b}{(-4ac+b^2)^{1/2}}\right) / (-4ac+b^2)^{1/2} + d \operatorname{arctan}\left(x^2^{1/2} c^{1/2} / (b - (-4ac+b^2)^{1/2})^{1/2}\right) * 2^{1/2} c^{1/2} / (-4ac+b^2)^{1/2} / (b - (-4ac+b^2)^{1/2})^{1/2} - d \operatorname{arctan}\left(x^2^{1/2} c^{1/2} / (b + (-4ac+b^2)^{1/2})^{1/2}\right) * 2^{1/2} c^{1/2} / (-4ac+b^2)^{1/2} / (b + (-4ac+b^2)^{1/2})^{1/2}$

Rubi [A] time = 0.21, antiderivative size = 189, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 7, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.350$, Rules used = {1673, 12, 1093, 205, 1107, 618, 206}

$$\frac{\sqrt{2} \sqrt{c} d \tan^{-1}\left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{b^2-4ac} \sqrt{b-\sqrt{b^2-4ac}}} - \frac{\sqrt{2} \sqrt{c} d \tan^{-1}\left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{b^2-4ac} \sqrt{\sqrt{b^2-4ac}+b}} - \frac{e \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x)/(a + b*x^2 + c*x^4), x]

[Out] $(\sqrt{2} \sqrt{c} d \operatorname{ArcTan}\left[\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right]) / (\sqrt{b^2 - 4ac} \sqrt{b - \sqrt{b^2 - 4ac}}) - (\sqrt{2} \sqrt{c} d \operatorname{ArcTan}\left[\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}}\right]) / (\sqrt{b^2 - 4ac} \sqrt{b + \sqrt{b^2 - 4ac}}) - (e \operatorname{ArcTanh}\left[\frac{b + 2cx^2}{\sqrt{b^2 - 4ac}}\right]) / \sqrt{b^2 - 4ac}$

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 205

Int[((a_) + (b_)*(x_)^2)^(-1), x_Symbol] := Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[In
t[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1093

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(-1), x_Symbol] := With[{q = Rt[b^
2 - 4*a*c, 2]}, Dist[c/q, Int[1/(b/2 - q/2 + c*x^2), x], x] - Dist[c/q, Int
[1/(b/2 + q/2 + c*x^2), x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c,
0] && PosQ[b^2 - 4*a*c]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Dist[1/2,
Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{d+ex}{a+bx^2+cx^4} dx &= \int \frac{d}{a+bx^2+cx^4} dx + \int \frac{ex}{a+bx^2+cx^4} dx \\
&= d \int \frac{1}{a+bx^2+cx^4} dx + e \int \frac{x}{a+bx^2+cx^4} dx \\
&= \frac{(cd) \int \frac{1}{\frac{b}{2}-\frac{1}{2}\sqrt{b^2-4ac}+cx^2} dx}{\sqrt{b^2-4ac}} - \frac{(cd) \int \frac{1}{\frac{b}{2}+\frac{1}{2}\sqrt{b^2-4ac}+cx^2} dx}{\sqrt{b^2-4ac}} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{a+bx+cx^2} dx, x, x^2 \right) \\
&= \frac{\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{\sqrt{b^2-4ac} \sqrt{b-\sqrt{b^2-4ac}}} - \frac{\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b+\sqrt{b^2-4ac}}} \right)}{\sqrt{b^2-4ac} \sqrt{b+\sqrt{b^2-4ac}}} - e \operatorname{Subst} \left(\int \frac{1}{b^2-4ac-x^2} dx, x, x^2 \right) \\
&= \frac{\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{\sqrt{b^2-4ac} \sqrt{b-\sqrt{b^2-4ac}}} - \frac{\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b+\sqrt{b^2-4ac}}} \right)}{\sqrt{b^2-4ac} \sqrt{b+\sqrt{b^2-4ac}}} - \frac{e \tanh^{-1} \left(\frac{b+2cx^2}{\sqrt{b^2-4ac}} \right)}{\sqrt{b^2-4ac}}
\end{aligned}$$

Mathematica [A] time = 0.25, size = 194, normalized size = 1.03

$$\frac{2\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{\sqrt{b-\sqrt{b^2-4ac}}} - \frac{2\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b^2-4ac+b}} \right)}{\sqrt{b^2-4ac+b}} + e \left(\log \left(\sqrt{b^2-4ac} - b - 2cx^2 \right) - \log \left(\sqrt{b^2-4ac} + b + 2cx^2 \right) \right) / (2\sqrt{b^2-4ac})$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x)/(a + b*x^2 + c*x^4), x]

[Out] ((2*sqrt[2]*sqrt[c]*d*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b - sqrt[b^2 - 4*a*c]]])/sqrt[b - sqrt[b^2 - 4*a*c]] - (2*sqrt[2]*sqrt[c]*d*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b + sqrt[b^2 - 4*a*c]]])/sqrt[b + sqrt[b^2 - 4*a*c]] + e*(Log[-b + sqrt[b^2 - 4*a*c] - 2*c*x^2] - Log[b + sqrt[b^2 - 4*a*c] + 2*c*x^2]))/(2*sqrt[b^2 - 4*a*c])

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(c*x^4+b*x^2+a), x, algorithm="fricas")

[Out] Timed out

giac [B] time = 4.59, size = 1248, normalized size = 6.60

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(c*x^4+b*x^2+a),x, algorithm="giac")

[Out] $\frac{1}{4}(\sqrt{2})\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c*b^4 - 8\sqrt{2})\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c*a*b^2*c - 2\sqrt{2})\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c*b^3*c - 2*b^4*c + 16\sqrt{2})\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c*a^2*c^2 + 8\sqrt{2})\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c*a*b*c^2 + \sqrt{2})\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c*b^2*c^2 + 16*a*b^2*c^2 + 2*b^3*c^2 - 4\sqrt{2})\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c*a*c^3 - 32*a^2*c^3 - 8*a*b*c^3 - \sqrt{2})\sqrt{b^2 - 4*a*c})\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c*b^3 + 4\sqrt{2})\sqrt{b^2 - 4*a*c})\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c*a*b*c + 2\sqrt{2})\sqrt{b^2 - 4*a*c})\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c*b^2*c - \sqrt{2})\sqrt{b^2 - 4*a*c})\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c*b*c^2 + 2*(b^2 - 4*a*c)*b^2*c - 8*(b^2 - 4*a*c)*a*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*d*\arctan(2*\sqrt{1/2}*x/\sqrt{(b + \sqrt{b^2 - 4*a*c})/c})/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*abs(c)) + 1/4*(\sqrt{2})\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c*b^4 - 8\sqrt{2})\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c*a*b^2*c - 2\sqrt{2})\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c*b^3*c + 2*b^4*c + 16\sqrt{2})\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c*a^2*c^2 + 8\sqrt{2})\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c*a*b*c^2 + \sqrt{2})\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c*b^2*c^2 - 16*a*b^2*c^2 - 2*b^3*c^2 - 4\sqrt{2})\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c*a*c^3 + 32*a^2*c^3 + 8*a*b*c^3 + \sqrt{2})\sqrt{b^2 - 4*a*c})\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c*b^3 - 4\sqrt{2})\sqrt{b^2 - 4*a*c})\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c*a*b*c - 2\sqrt{2})\sqrt{b^2 - 4*a*c})\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c*b^2*c + \sqrt{2})\sqrt{b^2 - 4*a*c})\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c*b*c^2 - 2*(b^2 - 4*a*c)*b^2*c + 8*(b^2 - 4*a*c)*a*c^2 + 2*(b^2 - 4*a*c)*b*c^2)*d*\arctan(2*\sqrt{1/2}*x/\sqrt{(b - \sqrt{b^2 - 4*a*c})/c})/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*abs(c)) - 1/2*(b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*\sqrt{b^2 - 4*a*c})*e*\log(x^2 + 1/2*(b + \sqrt{b^2 - 4*a*c})/c)/((b^4 - 8*a*b^2*c - 2*b^3*c + 16*a^2*c^2 + 8*a*b*c^2 + b^2*c^2 - 4*a*c^3)*c^2) + 1/2*(b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*\sqrt{b^2 - 4*a*c})*e*\log(x^2 + 1/2*(b - \sqrt{b^2 - 4*a*c})/c)/((b^4 - 8*a*b^2*c - 2*b^3*c + 16*a^2*c^2 + 8*a*b*c^2 + b^2*c^2 - 4*a*c^3)*c^2)$

maple [A] time = 0.03, size = 231, normalized size = 1.22

$$\frac{2\sqrt{-4ac + b^2} \sqrt{2} cd \operatorname{arctanh}\left(\frac{\sqrt{2} cx}{\sqrt{(-b + \sqrt{-4ac + b^2})c}}\right)}{(8ac - 2b^2) \sqrt{(-b + \sqrt{-4ac + b^2})c}} + \frac{2\sqrt{-4ac + b^2} \sqrt{2} cd \operatorname{arctan}\left(\frac{\sqrt{2} cx}{\sqrt{(b + \sqrt{-4ac + b^2})c}}\right)}{(8ac - 2b^2) \sqrt{(b + \sqrt{-4ac + b^2})c}} - \frac{\sqrt{-4ac + b^2} e}{\sqrt{-4ac + b^2}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x+d)/(c*x^4+b*x^2+a), x)

[Out] $-(4ac + b^2)^{1/2} / (8ac - 2b^2) * e * \ln(-2cx^2 + (-4ac + b^2)^{1/2} - b) + 2c * (-4ac + b^2)^{1/2} / (8ac - 2b^2) * d * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) + (-4ac + b^2)^{1/2} / (8ac - 2b^2) * e * \ln(2cx^2 + (-4ac + b^2)^{1/2} + b) + 2c * (-4ac + b^2)^{1/2} / (8ac - 2b^2) * d * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx)$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{ex + d}{cx^4 + bx^2 + a} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(c*x^4+b*x^2+a), x, algorithm="maxima")

[Out] integrate((e*x + d)/(c*x^4 + b*x^2 + a), x)

mupad [B] time = 1.32, size = 1308, normalized size = 6.92

$$\sum_{k=1}^4 \ln\left(c^2 \left(d e^2 + e^3 x + \operatorname{root}\left(128 a^2 b^2 c z^4 - 256 a^3 c^2 z^4 - 16 a b^4 z^4 + 16 a b c d^2 z^2 - 32 a^2 c e^2 z^2 + 8 a b^2 e^2 z^2\right.\right.\right.$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x)/(a + b*x^2 + c*x^4), x)

[Out] $\operatorname{symsum}(\log(c^2 * (d * e^2 + e^3 * x + 4 * \operatorname{root}(128 * a^2 * b^2 * c * z^4 - 256 * a^3 * c^2 * z^4 - 16 * a * b^4 * z^4 + 16 * a * b * c * d^2 * z^2 - 32 * a^2 * c * e^2 * z^2 + 8 * a * b^2 * e^2 * z^2 - 4 * b^3 * d^2 * z^2 + 16 * a * c * d^2 * e * z - 4 * b^2 * d^2 * e * z - b * d^2 * e^2 - c * d^4 - a * e^4, z, k)^2 * b^2 * d - 8 * \operatorname{root}(128 * a^2 * b^2 * c * z^4 - 256 * a^3 * c^2 * z^4 - 16 * a * b^4 * z^4 + 16 * a * b * c * d^2 * z^2 - 32 * a^2 * c * e^2 * z^2 + 8 * a * b^2 * e^2 * z^2 - 4 * b^3 * d^2 * z^2 + 16 * a * c * d^2 * e * z - 4 * b^2 * d^2 * e * z - b * d^2 * e^2 - c * d^4 - a * e^4, z, k)^3 * b^3 * x - 16 * \operatorname{root}(128 * a^2 * b^2 * c * z^4 - 256 * a^3 * c^2 * z^4 - 16 * a * b^4 * z^4 + 16 * a * b * c * d^2 * z^2$

```

- 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*
b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)^2*a*c*d + 2*root(128*a^2*b^2
*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z
^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d
^2*e^2 - c*d^4 - a*e^4, z, k)*b*e^2*x - 4*root(128*a^2*b^2*c*z^4 - 256*a^3*
c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*
z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 -
a*e^4, z, k)*c*d^2*x - 4*root(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^
4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z
^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)^2*b^
2*e*x + 4*root(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*
c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2
*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)*b*d*e + 32*root(128
*a^2*b^2*c*z^4 - 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2
*c*e^2*z^2 + 8*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e
*z - b*d^2*e^2 - c*d^4 - a*e^4, z, k)^3*a*b*c*x + 16*root(128*a^2*b^2*c*z^4
- 256*a^3*c^2*z^4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8
*a*b^2*e^2*z^2 - 4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2
- c*d^4 - a*e^4, z, k)^2*a*c*e*x))*root(128*a^2*b^2*c*z^4 - 256*a^3*c^2*z^
4 - 16*a*b^4*z^4 + 16*a*b*c*d^2*z^2 - 32*a^2*c*e^2*z^2 + 8*a*b^2*e^2*z^2 -
4*b^3*d^2*z^2 + 16*a*c*d^2*e*z - 4*b^2*d^2*e*z - b*d^2*e^2 - c*d^4 - a*e^4,
z, k), k, 1, 4)

```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(c*x**4+b*x**2+a),x)

[Out] Timed out

$$3.21 \quad \int \frac{d+ex+fx^2}{a+bx^2+cx^4} dx$$

Optimal. Leaf size=211

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}} - \frac{e \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

[Out] $-e \operatorname{arctanh}\left(\frac{2cx^2+b}{(-4ac+b^2)^{1/2}}\right) / (-4ac+b^2)^{1/2} + 1/2 \operatorname{arctan}\left(x \sqrt{2} \sqrt{c} / (b - (-4ac+b^2)^{1/2})\right) / (b - (-4ac+b^2)^{1/2}) + (f + (-b* f + 2*c*d) / (-4ac+b^2)^{1/2}) * 2^{1/2} / c^{1/2} / (b - (-4ac+b^2)^{1/2}) + 1/2 \operatorname{arctan}\left(x \sqrt{2} \sqrt{c} / (b + (-4ac+b^2)^{1/2})\right) / (b + (-4ac+b^2)^{1/2}) + (f + (b*f - 2*c*d) / (-4ac+b^2)^{1/2}) * 2^{1/2} / c^{1/2} / (b + (-4ac+b^2)^{1/2})$

Rubi [A] time = 0.24, antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 7, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.280$, Rules used = {1673, 1166, 205, 12, 1107, 618, 206}

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}} - \frac{e \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4), x]

[Out] $((f + (2*c*d - b*f) / \sqrt{b^2 - 4*a*c}) * \operatorname{ArcTan}[(\sqrt{2} * \sqrt{c} * x) / \sqrt{b - \sqrt{b^2 - 4*a*c}}]) / (\sqrt{2} * \sqrt{c} * \sqrt{b - \sqrt{b^2 - 4*a*c}}) + ((f - (2*c*d - b*f) / \sqrt{b^2 - 4*a*c}) * \operatorname{ArcTan}[(\sqrt{2} * \sqrt{c} * x) / \sqrt{b + \sqrt{b^2 - 4*a*c}}]) / (\sqrt{2} * \sqrt{c} * \sqrt{b + \sqrt{b^2 - 4*a*c}}) - (e * \operatorname{ArcTanh}[(b + 2*c*x^2) / \sqrt{b^2 - 4*a*c}]) / \sqrt{b^2 - 4*a*c}$

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 205

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[In
t[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Dist[1/2,
Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{d+ex+fx^2}{a+bx^2+cx^4} dx &= \int \frac{ex}{a+bx^2+cx^4} dx + \int \frac{d+fx^2}{a+bx^2+cx^4} dx \\
&= e \int \frac{x}{a+bx^2+cx^4} dx + \frac{1}{2} \left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}} \right) \int \frac{1}{\frac{b}{2} + \frac{1}{2}\sqrt{b^2-4ac} + cx^2} dx + \frac{1}{2} \left(f + \frac{2cd}{\sqrt{b^2-4ac}} \right) \int \frac{1}{\frac{b}{2} - \frac{1}{2}\sqrt{b^2-4ac} + cx^2} dx \\
&= \frac{\left(f + \frac{2cd-bf}{\sqrt{b^2-4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b+\sqrt{b^2-4ac}}} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{\frac{b}{2} - \frac{1}{2}\sqrt{b^2-4ac} + cx^2} dx \right) \\
&= \frac{\left(f + \frac{2cd-bf}{\sqrt{b^2-4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b+\sqrt{b^2-4ac}}} - e \operatorname{Subst} \left(\int \frac{1}{\frac{b}{2} - \frac{1}{2}\sqrt{b^2-4ac} + cx^2} dx \right) \\
&= \frac{\left(f + \frac{2cd-bf}{\sqrt{b^2-4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b+\sqrt{b^2-4ac}}} - \frac{e \tanh^{-1} \left(\frac{b+2cx^2}{\sqrt{b^2-4ac}} \right)}{\sqrt{b^2-4ac}}
\end{aligned}$$

Mathematica [A] time = 0.22, size = 234, normalized size = 1.11

$$\frac{\sqrt{2} \left(f \left(\sqrt{b^2-4ac} - b \right) + 2cd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{2} \left(f \left(\sqrt{b^2-4ac} + b \right) - 2cd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b^2-4ac}+b} \right)}{\sqrt{c}\sqrt{b^2-4ac}+b} + e \log \left(\sqrt{b^2-4ac} - b - 2cx^2 \right) - e \log \left(\sqrt{b^2-4ac} + b + 2cx^2 \right)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4), x]

[Out] ((Sqrt[2]*(2*c*d + (-b + Sqrt[b^2 - 4*a*c]))*f)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(Sqrt[c]*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[2]*(-2*c*d + (b + Sqrt[b^2 - 4*a*c]))*f)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(Sqrt[c]*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + e*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2] - e*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(2*Sqrt[b^2 - 4*a*c])

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="fricas")
```

```
[Out] Timed out
```

```
giac [B]   time = 3.54, size = 1618, normalized size = 7.67
```

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^4+b*x^2+a),x, algorithm="giac")
```

```
[Out] -1/2*(b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sqrt(b^2 - 4*a*c)*e*log(x^2 + 1/2*
(b + sqrt(b^2 - 4*a*c))/c)/((b^4 - 8*a*b^2*c - 2*b^3*c + 16*a^2*c^2 + 8*a*b
*c^2 + b^2*c^2 - 4*a*c^3)*c^2) + 1/2*(b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sq
rt(b^2 - 4*a*c)*e*log(x^2 + 1/2*(b - sqrt(b^2 - 4*a*c))/c)/((b^4 - 8*a*b^2*
c - 2*b^3*c + 16*a^2*c^2 + 8*a*b*c^2 + b^2*c^2 - 4*a*c^3)*c^2) + 1/4*((sqrt
(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4 - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4
*a*c)*c)*a*b^2*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c - 2*b^4*
c + 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c^2 + 8*sqrt(2)*sqrt(b*c
+ sqrt(b^2 - 4*a*c)*c)*a*b*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b
^2*c^2 + 16*a*b^2*c^2 - 2*b^3*c^2 - 4*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*
c)*a*c^3 - 32*a^2*c^3 + 8*a*b*c^3 + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sq
rt(b^2 - 4*a*c)*c)*b^3 - 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 -
4*a*c)*c)*a*b*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*
c)*b^2*c + sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b*c^2
+ 2*(b^2 - 4*a*c)*b^2*c - 8*(b^2 - 4*a*c)*a*c^2 + 2*(b^2 - 4*a*c)*b*c^2)*d
+ 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^
2 - 4*a*c)*c)*a*b^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a
*c)*c)*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*
a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*c^2 - 2
*(b^2 - 4*a*c)*a*c^2)*f)*arctan(2*sqrt(1/2)*x/sqrt((b + sqrt(b^2 - 4*a*c))/
c))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^
2 - 4*a^2*c^3)*abs(c)) + 1/4*((sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4
- 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c - 2*sqrt(2)*sqrt(b*c -
sqrt(b^2 - 4*a*c)*c)*b^3*c + 2*b^4*c + 16*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a
*c)*c)*a^2*c^2 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^2 + sqrt(2
)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^2 - 16*a*b^2*c^2 - 2*b^3*c^2 - 4*sq
rt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*c^3 + 32*a^2*c^3 + 8*a*b*c^3 + sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3 - 4*sqrt(2)*sqrt(
b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c - 2*sqrt(2)*sqrt(b^2 - 4
*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c + sqrt(2)*sqrt(b^2 - 4*a*c)*sq
rt(b*c - sqrt(b^2 - 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a*c)*b^2*c + 8*(b^2 - 4*a*c
)*a*c^2 + 2*(b^2 - 4*a*c)*b*c^2)*d + 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2 + 4*sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*
```

c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*f)*arctan(2*sqrt(1/2)*x/sqrt((b - sqrt(b^2 - 4*a*c))/c))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*abs(c))

maple [B] time = 0.03, size = 616, normalized size = 2.92

$$\frac{2\sqrt{2} acf \operatorname{arctanh}\left(\frac{\sqrt{2} cx}{\sqrt{(-b + \sqrt{-4ac + b^2})}c}\right)}{(4ac - b^2) \sqrt{(-b + \sqrt{-4ac + b^2})}c} + \frac{2\sqrt{2} acf \operatorname{arctan}\left(\frac{\sqrt{2} cx}{\sqrt{(b + \sqrt{-4ac + b^2})}c}\right)}{(4ac - b^2) \sqrt{(b + \sqrt{-4ac + b^2})}c} + \frac{\sqrt{2} b^2 f \operatorname{arctanh}\left(\frac{\sqrt{2} cx}{\sqrt{(-b + \sqrt{-4ac + b^2})}c}\right)}{2(4ac - b^2) \sqrt{(-b + \sqrt{-4ac + b^2})}c}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((f*x^2+e*x+d)/(c*x^4+b*x^2+a), x)

[Out]
$$\begin{aligned} & -1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*e*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})-2*c \\ & / (4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b \\ & +(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*f*a+1/2/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c \\ & +b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x \\ &)*f*b^2-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) \\ & *c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*f+c*(-4* \\ & a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan} \\ & h(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*d+1/2*(-4*a*c+b^2)^{(1/2)}/(\\ & 4*a*c-b^2)*e*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})+2*c/(4*a*c-b^2)*2^{(1/2)}/((b+ \\ & -4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)} \\ & *c*x)*f*a-1/2/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2 \\ & ^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*f*b^2-1/2*(-4*a*c+b^2)^{(1/2)}/(\\ & 4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4* \\ & a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*f+c*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/ \\ & ((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)} \\ &)*c*x)*d \end{aligned}$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{fx^2 + ex + d}{cx^4 + bx^2 + a} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)/(c*x^4+b*x^2+a), x, algorithm="maxima")

[Out] integrate((f*x^2 + e*x + d)/(c*x^4 + b*x^2 + a), x)

mupad [B] time = 2.14, size = 3942, normalized size = 18.68

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((d + e*x + f*x^2)/(a + b*x^2 + c*x^4),x)`

[Out] `symsum(log(c^2*d*e^2 - c^2*d^2*f + c^2*e^3*x - a*c*f^3 - 8*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^3*b^3*c^2*x + b*c*d*f^2 - 16*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*a*c^3*d - 4*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*c^3*d^2*x + 4*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*b^2*c^2*d + 32*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^3*a*b*c^3*x + 16*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*a*c^3*e*x + 4*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*`

$$\begin{aligned}
& e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f \\
& ^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*a*c^2*f^2*x + 2*root(\\
& 16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 \\
& + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2 \\
& *d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2* \\
& c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d* \\
& e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f \\
& ^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*b*c^2*e^2*x - 2*root(\\
& 16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 \\
& + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2 \\
& *d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2* \\
& c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d* \\
& e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f \\
& ^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*b^2*c*f^2*x - 4*root(\\
& 16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 \\
& + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2 \\
& *d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2* \\
& c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d* \\
& e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f \\
& ^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*b^2*c^2*e*x + 4*roo \\
& t(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z \\
& ^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c \\
& ^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^ \\
& 2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c* \\
& d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2 \\
& *f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*b*c^2*d*e - 8*root(\\
& 16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 \\
& + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2 \\
& *d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2* \\
& c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d* \\
& e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f \\
& ^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*a*c^2*e*f + b*c*e*f^2 \\
& *x - 2*c^2*d*e*f*x + 4*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3* \\
& c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8* \\
& a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 \\
& + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - \\
& 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f \\
& ^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, \\
& z, k)*b*c^2*d*f*x)*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3 \\
& *z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b \\
& ^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + \\
& 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16 \\
& *a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 \\
& + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, \\
& k), k, 1, 4)
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x**2+e*x+d)/(c*x**4+b*x**2+a),x)

[Out] Timed out

$$3.22 \quad \int \frac{d+ex+fx^2+gx^3}{a+bx^2+cx^4} dx$$

Optimal. Leaf size=245

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right) + \left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right) - \frac{(2ce-bg) \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{2c\sqrt{b^2-4ac}} + g \log(a + \dots)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}} + \sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b} - \frac{(2ce-bg) \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{2c\sqrt{b^2-4ac}} + g \log(a + \dots)}$$

[Out] $1/4*g*\ln(c*x^4+b*x^2+a)/c-1/2*(-b*g+2*c*e)*\operatorname{arctanh}((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/c/(-4*a*c+b^2)^{(1/2)}+1/2*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)})*(f+(-b*f+2*c*d)/(-4*a*c+b^2)^{(1/2)})*2^{(1/2)}/c^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)}+1/2*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)})*(f+(b*f-2*c*d)/(-4*a*c+b^2)^{(1/2)})*2^{(1/2)}/c^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)}$

Rubi [A] time = 0.16, antiderivative size = 245, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.267$, Rules used = {1673, 1166, 205, 1247, 634, 618, 206, 628}

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right) + \left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right) - \frac{(2ce-bg) \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{2c\sqrt{b^2-4ac}} + g \log(a + \dots)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}} + \sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b} - \frac{(2ce-bg) \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{2c\sqrt{b^2-4ac}} + g \log(a + \dots)}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4), x]

[Out] $((f + (2*c*d - b*f)/\operatorname{Sqrt}[b^2 - 4*a*c])*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]])]/(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]) + ((f - (2*c*d - b*f)/\operatorname{Sqrt}[b^2 - 4*a*c])*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]])]/(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]) - ((2*c*e - b*g)*\operatorname{ArcTanh}[(b + 2*c*x^2)/\operatorname{Sqrt}[b^2 - 4*a*c]])/(2*c*\operatorname{Sqrt}[b^2 - 4*a*c]) + (g*\operatorname{Log}[a + b*x^2 + c*x^4])/(4*c)$

Rule 205

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]

Rule 206

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt

$Q[a, 0] \parallel LtQ[b, 0]$

Rule 618

$\text{Int}[(a_.) + (b_.)(x_) + (c_.)(x_)^2]^{-1}, x_Symbol] \rightarrow \text{Dist}[-2, \text{Subst}[\text{Int}[1/\text{Simp}[b^2 - 4ac - x^2, x], x], x, b + 2cx], x] /; \text{FreeQ}\{a, b, c, x\} \ \&\& \ \text{NeQ}[b^2 - 4ac, 0]$

Rule 628

$\text{Int}[(d_.) + (e_.)(x_)] / [(a_.) + (b_.)(x_) + (c_.)(x_)^2], x_Symbol] \rightarrow \text{Simp}[(d \cdot \text{Log}[\text{RemoveContent}[a + bx + cx^2, x]]) / b, x] /; \text{FreeQ}\{a, b, c, d, e, x\} \ \&\& \ \text{EqQ}[2cd - be, 0]$

Rule 634

$\text{Int}[(d_.) + (e_.)(x_)] / [(a_.) + (b_.)(x_) + (c_.)(x_)^2], x_Symbol] \rightarrow \text{Dist}[(2cd - be) / (2c), \text{Int}[1/(a + bx + cx^2), x], x] + \text{Dist}[e / (2c), \text{Int}[(b + 2cx) / (a + bx + cx^2), x], x] /; \text{FreeQ}\{a, b, c, d, e, x\} \ \&\& \ \text{NeQ}[2cd - be, 0] \ \&\& \ \text{NeQ}[b^2 - 4ac, 0] \ \&\& \ !\text{NiceSqrtQ}[b^2 - 4ac]$

Rule 1166

$\text{Int}[(d_.) + (e_.)(x_)^2] / [(a_.) + (b_.)(x_)^2 + (c_.)(x_)^4], x_Symbol] \rightarrow \text{With}\{q = \text{Rt}[b^2 - 4ac, 2]\}, \text{Dist}[e/2 + (2cd - be) / (2q), \text{Int}[1/(b/2 - q/2 + cx^2), x], x] + \text{Dist}[e/2 - (2cd - be) / (2q), \text{Int}[1/(b/2 + q/2 + cx^2), x], x] /; \text{FreeQ}\{a, b, c, d, e, x\} \ \&\& \ \text{NeQ}[b^2 - 4ac, 0] \ \&\& \ \text{NeQ}[cd^2 - ae^2, 0] \ \&\& \ \text{PosQ}[b^2 - 4ac]$

Rule 1247

$\text{Int}[(x_)((d_.) + (e_.)(x_)^2)^{(q_.)}((a_.) + (b_.)(x_)^2 + (c_.)(x_)^4)^{(p_.)}], x_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[(d + ex)^q (a + bx + cx^2)^p, x], x, x^2], x] /; \text{FreeQ}\{a, b, c, d, e, p, q, x\}$

Rule 1673

$\text{Int}[(Pq_)((a_.) + (b_.)(x_)^2 + (c_.)(x_)^4)^{(p_.)}], x_Symbol] \rightarrow \text{Module}\{q = \text{Expon}[Pq, x], k\}, \text{Int}[\text{Sum}[\text{Coeff}[Pq, x, 2k]x^{(2k)}, \{k, 0, q/2\}](a + bx^2 + cx^4)^p, x] + \text{Int}[x \cdot \text{Sum}[\text{Coeff}[Pq, x, 2k + 1]x^{(2k)}, \{k, 0, (q - 1)/2\}](a + bx^2 + cx^4)^p, x] /; \text{FreeQ}\{a, b, c, p, x\} \ \&\& \ \text{PolyQ}[Pq, x] \ \&\& \ !\text{PolyQ}[Pq, x^2]$

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{a + bx^2 + cx^4} dx &= \int \frac{d + fx^2}{a + bx^2 + cx^4} dx + \int \frac{x(e + gx^2)}{a + bx^2 + cx^4} dx \\
&= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{a + bx + cx^2} dx, x, x^2 \right) + \frac{1}{2} \left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \int \frac{1}{\frac{b}{2} + \frac{1}{2}\sqrt{b^2 - 4ac} + cx^2} \\
&= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} + \frac{g \text{Subst} \left(\int \frac{1}{a + bx + cx^2} dx, x, x^2 \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} \\
&= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} + \frac{g \log(a + bx + cx^2)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} \\
&= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} - \frac{(2ce - b^2) \log(a + bx + cx^2)}{2\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}}
\end{aligned}$$

Mathematica [A] time = 0.29, size = 280, normalized size = 1.14

$$\frac{2\sqrt{2}\sqrt{c}\left(f\left(\sqrt{b^2-4ac}-b\right)+2cd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{b-\sqrt{b^2-4ac}}} + \frac{2\sqrt{2}\sqrt{c}\left(f\left(\sqrt{b^2-4ac}+b\right)-2cd\right)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b^2-4ac}+b}\right)}{\sqrt{b^2-4ac}+b} + \frac{g\left(\sqrt{b^2-4ac}-b\right)+2ce}{4c\sqrt{b^2-4ac}}$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4), x]

[Out] ((2*Sqrt[2]*Sqrt[c]*(2*c*d + (-b + Sqrt[b^2 - 4*a*c]))*f)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/Sqrt[b - Sqrt[b^2 - 4*a*c]] + (2*Sqrt[2]*Sqrt[c]*(-2*c*d + (b + Sqrt[b^2 - 4*a*c]))*f)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/Sqrt[b + Sqrt[b^2 - 4*a*c]] + (2*c*e + (-b + Sqrt[b^2 - 4*a*c])*g)*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2] + (-2*c*e + (b + Sqrt[b^2 - 4*a*c])*g)*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(4*c*Sqrt[b^2 - 4*a*c])

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 2.83, size = 3272, normalized size = 13.36

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)/(c*x^4+b*x^2+a),x, algorithm="giac")
```

```
[Out] 1/4*g*log(abs(c*x^4 + b*x^2 + a))/c + 1/8*((2*b^4*c^2 - 16*a*b^2*c^3 + 32*a^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c^2 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*c^3 - 2*(b^2 - 4*a*c)*b^2*c^2 + 8*(b^2 - 4*a*c)*a*c^3)*c^2*f + 2*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4*c^2 - 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^3 - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^3 + 2*b^4*c^3 + 16*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c^4 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^4 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^4 - 16*a*b^2*c^4 - 4*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*c^5 + 32*a^2*c^5 - 2*(b^2 - 4*a*c)*b^2*c^3 + 8*(b^2 - 4*a*c)*a*c^4)*d*abs(c) + 2*(2*b^3*c^5 - 8*a*b*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b*c^5 - 2*(b^2 - 4*a*c)*b*c^5)*d - (2*b^4*c^4 - 8*a*b^2*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4*c^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^3 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c^4 - 2*(b^2 - 4*a*c)*b^2*c^4)*f)*arctan(2*sqrt(1/2)*x/sqrt((b*c + sqrt(b^2*c^2 - 4*a*c^3))/c^2))/((a*b^4*c^2 - 8*a^2*b^2*c^3 - 2*a*b^3*c^3 + 16*a^3*c^4 + 8*a^2*b*c^4 + a*b^2*c^4 - 4*a^2*c^5)*c^2) - 1/8*((2*b^4*c^2 - 16*a*b^2*c^3 + 32*a^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c^2 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*c^3 - 2*(b^2 - 4*a*c)*b^2*c^2 + 8*(b^2 - 4*a*c)*a*c^3)*c^2
```

$$\begin{aligned}
& b*c + \sqrt{b^2 - 4*a*c}*c)*a*c^3 - 2*(b^2 - 4*a*c)*b^2*c^2 + 8*(b^2 - 4*a*c) \\
&)*a*c^3)*c^2*f - 2*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c)*b^4*c^2 - 8*\sqrt{2} \\
&)*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c)*a*b^2*c^3 - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c} \\
&)*c)*b^3*c^3 - 2*b^4*c^3 + 16*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c} \\
&)*c)*a^2*c^4 + 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c)*a*b*c^4 + \sqrt{2} \\
&)*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c)*b^2*c^4 + 16*a*b^2*c^4 - 4*\sqrt{2}*\sqrt{b*c \\
& + \sqrt{b^2 - 4*a*c}*c)*a*c^5 - 32*a^2*c^5 + 2*(b^2 - 4*a*c)*b^2*c^3 - 8*(\\
& b^2 - 4*a*c)*a*c^4)*d*\text{abs}(c) + 2*(2*b^3*c^5 - 8*a*b*c^6 - \sqrt{2}*\sqrt{b^2 \\
& - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c)*b^3*c^3 + 4*\sqrt{2}*\sqrt{b^2 - 4*a \\
& *c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c)*a*b*c^4 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{ \\
& b*c + \sqrt{b^2 - 4*a*c}*c)*b^2*c^4 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c \\
& + \sqrt{b^2 - 4*a*c}*c)*b*c^5 - 2*(b^2 - 4*a*c)*b*c^5)*d - (2*b^4*c^4 - 8*a \\
& *b^2*c^5 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c)*b^4*c^ \\
& 2 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c)*a*b^2*c^3 + \\
& 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c)*b^3*c^3 - \sqrt{2} \\
&)*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c)*b^2*c^4 - 2*(b^2 - 4* \\
& a*c)*b^2*c^4)*f)*\arctan(2*\sqrt{1/2}*x/\sqrt{(b*c - \sqrt{b^2*c^2 - 4*a*c^3})/ \\
& c^2}))/((a*b^4*c^2 - 8*a^2*b^2*c^3 - 2*a*b^3*c^3 + 16*a^3*c^4 + 8*a^2*b*c^4 \\
& + a*b^2*c^4 - 4*a^2*c^5)*c^2) - 1/16*((b^6 - 8*a*b^4*c - 2*b^5*c + 16*a^2*b \\
& ^2*c^2 + 8*a*b^3*c^2 + b^4*c^2 - 4*a*b^2*c^3 - (b^5 - 8*a*b^3*c - 2*b^4*c + \\
& 16*a^2*b*c^2 + 8*a*b^2*c^2 + b^3*c^2 - 4*a*b*c^3)*\sqrt{b^2 - 4*a*c}))*g*\text{abs} \\
& (c) - 2*(b^5*c - 8*a*b^3*c^2 - 2*b^4*c^2 + 16*a^2*b*c^3 + 8*a*b^2*c^3 + b^3 \\
& *c^3 - 4*a*b*c^4 - (b^4*c - 8*a*b^2*c^2 - 2*b^3*c^2 + 16*a^2*c^3 + 8*a*b*c^ \\
& 3 + b^2*c^3 - 4*a*c^4)*\sqrt{b^2 - 4*a*c}))*\text{abs}(c)*e + (b^6*c - 8*a*b^4*c^2 - \\
& 2*b^5*c^2 + 16*a^2*b^2*c^3 + 8*a*b^3*c^3 + b^4*c^3 - 4*a*b^2*c^4 + (b^5*c \\
& - 4*a*b^3*c^2 - 2*b^4*c^2 + b^3*c^3)*\sqrt{b^2 - 4*a*c}))*g - 2*(b^5*c^2 - 8* \\
& a*b^3*c^3 - 2*b^4*c^3 + 16*a^2*b*c^4 + 8*a*b^2*c^4 + b^3*c^4 - 4*a*b*c^5 - \\
& (b^4*c^2 - 4*a*b^2*c^3 - 2*b^3*c^3 + b^2*c^4)*\sqrt{b^2 - 4*a*c}))*e)*\log(x^2 \\
& + 1/2*(b*c + \sqrt{b^2*c^2 - 4*a*c^3}))/c^2)/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3 \\
& *c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*\text{abs}(c)) - 1/16*(\\
& (b^6 - 8*a*b^4*c - 2*b^5*c + 16*a^2*b^2*c^2 + 8*a*b^3*c^2 + b^4*c^2 - 4*a*b \\
& ^2*c^3 + (b^5 - 8*a*b^3*c - 2*b^4*c + 16*a^2*b*c^2 + 8*a*b^2*c^2 + b^3*c^2 \\
& - 4*a*b*c^3)*\sqrt{b^2 - 4*a*c}))*g*\text{abs}(c) - 2*(b^5*c - 8*a*b^3*c^2 - 2*b^4*c \\
& ^2 + 16*a^2*b*c^3 + 8*a*b^2*c^3 + b^3*c^3 - 4*a*b*c^4 + (b^4*c - 8*a*b^2*c^ \\
& 2 - 2*b^3*c^2 + 16*a^2*c^3 + 8*a*b*c^3 + b^2*c^3 - 4*a*c^4)*\sqrt{b^2 - 4*a* \\
& c}))*\text{abs}(c)*e + (b^6*c - 8*a*b^4*c^2 - 2*b^5*c^2 + 16*a^2*b^2*c^3 + 8*a*b^3* \\
& c^3 + b^4*c^3 - 4*a*b^2*c^4 + (b^5*c - 4*a*b^3*c^2 - 2*b^4*c^2 + b^3*c^3)*\sqrt{ \\
& b^2 - 4*a*c}))*g - 2*(b^5*c^2 - 8*a*b^3*c^3 - 2*b^4*c^3 + 16*a^2*b*c^4 + \\
& 8*a*b^2*c^4 + b^3*c^4 - 4*a*b*c^5 + (b^4*c^2 - 4*a*b^2*c^3 - 2*b^3*c^3 + b \\
& ^2*c^4)*\sqrt{b^2 - 4*a*c}))*e)*\log(x^2 + 1/2*(b*c - \sqrt{b^2*c^2 - 4*a*c^3}) \\
& /c^2)/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2* \\
& c^2 - 4*a^2*c^3)*c^2*\text{abs}(c))
\end{aligned}$$

maple [B] time = 0.03, size = 866, normalized size = 3.53

$$\frac{2\sqrt{2} acf \operatorname{arctanh}\left(\frac{\sqrt{2} cx}{\sqrt{(-b+\sqrt{-4ac+b^2})c}}\right)}{(4ac-b^2)\sqrt{(-b+\sqrt{-4ac+b^2})c}} + \frac{2\sqrt{2} acf \operatorname{arctan}\left(\frac{\sqrt{2} cx}{\sqrt{(b+\sqrt{-4ac+b^2})c}}\right)}{(4ac-b^2)\sqrt{(b+\sqrt{-4ac+b^2})c}} + \frac{\sqrt{2} b^2 f \operatorname{arctanh}\left(\frac{\sqrt{2} cx}{\sqrt{(-b+\sqrt{-4ac+b^2})c}}\right)}{2(4ac-b^2)\sqrt{(-b+\sqrt{-4ac+b^2})c}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a), x)`

[Out] $\frac{1}{(4ac-b^2)} \ln(-2cx^2-b+(-4ac+b^2)^{1/2}) g a^{-1/4} / (4ac-b^2) / c \ln(-2cx^2-b+(-4ac+b^2)^{1/2}) g b^2 + \frac{1}{4} (-4ac+b^2)^{1/2} / (4ac-b^2) / c \ln(-2cx^2-b+(-4ac+b^2)^{1/2}) b g - \frac{1}{2} (-4ac+b^2)^{1/2} / (4ac-b^2) e \ln(-2cx^2-b+(-4ac+b^2)^{1/2}) - \frac{2c}{(4ac-b^2) 2^{1/2}} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} c x) f a + \frac{1}{2} / (4ac-b^2) 2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} c x) f b^2 - \frac{1}{2} (-4ac+b^2)^{1/2} / (4ac-b^2) 2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} c x) b f + c (-4ac+b^2)^{1/2} / (4ac-b^2) 2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2}) c)^{1/2} c x) d + \frac{1}{(4ac-b^2)} \ln(2cx^2+b+(-4ac+b^2)^{1/2}) g a^{-1/4} / (4ac-b^2) / c \ln(2cx^2+b+(-4ac+b^2)^{1/2}) g b^2 - \frac{1}{4} (-4ac+b^2)^{1/2} / (4ac-b^2) / c \ln(2cx^2+b+(-4ac+b^2)^{1/2}) b g + \frac{1}{2} (-4ac+b^2)^{1/2} / (4ac-b^2) e \ln(2cx^2+b+(-4ac+b^2)^{1/2}) + \frac{2}{(4ac-b^2) 2^{1/2}} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} a c f \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} c x) - \frac{1}{2} / (4ac-b^2) 2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} b^2 f \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} c x) - \frac{1}{2} (-4ac+b^2)^{1/2} / (4ac-b^2) 2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} b f \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} c x) + (-4ac+b^2)^{1/2} / (4ac-b^2) 2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} c d \operatorname{arctan}(2^{1/2} / ((b+(-4ac+b^2)^{1/2}) c)^{1/2} c x)$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{gx^3 + fx^2 + ex + d}{cx^4 + bx^2 + a} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a), x, algorithm="maxima")`

[Out] `integrate((g*x^3 + f*x^2 + e*x + d)/(c*x^4 + b*x^2 + a), x)`

$$\begin{aligned}
& *d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4* \\
& b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16 \\
& *a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c* \\
& d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e \\
& *g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + \\
& 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f \\
& ^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c \\
& *f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*c^3*d^2*x - 2*root(128*a^2*b^2 \\
& *c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16* \\
& a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f \\
& *z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8* \\
& a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2 \\
& *z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^ \\
& 4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4 \\
& *a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2* \\
& g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e* \\
& g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f \\
& *g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2* \\
& b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b \\
& *c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^ \\
& 2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2 \\
& *d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*b \\
& ^3*g^2*x + b^2*e*g^2*x + c^2*d^2*g*x + 4*root(128*a^2*b^2*c^3*z^4 - 16*a*b^ \\
& 4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 25 \\
& 6*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e \\
& *g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 \\
& - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2* \\
& g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^ \\
& 2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - \\
& 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e \\
& *f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d \\
& ^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g \\
& + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4* \\
& a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2 \\
& *b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^ \\
& 2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2 \\
& *g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)^2*b^2*c^2*d + 32*ro \\
& ot(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c \\
& ^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16 \\
& *a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^ \\
& 2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + \\
& 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^ \\
& 2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b \\
& *c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 1 \\
& 6*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*
\end{aligned}$$

$$\begin{aligned}
& z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - \\
& 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2* \\
& c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d \\
& *e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - \\
& 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e \\
& ^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^ \\
& 3*d^4, z, k)^3*a*b*c^3*x + 16*root(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - \\
& 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g \\
& *z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40 \\
& *a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^ \\
& 3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 3 \\
& 2*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z \\
& + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2 \\
& *d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4* \\
& b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16 \\
& *a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c* \\
& d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e \\
& *g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + \\
& 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f \\
& ^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c \\
& *f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)^2*a*c^3*e*x + 4*root(128*a^2*b \\
& ^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 1 \\
& 6*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d \\
& *f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + \\
& 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d \\
& ^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a* \\
& b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - \\
& 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^ \\
& 2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3* \\
& e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e \\
& *f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + \\
& 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a \\
& *b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2* \\
& g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c \\
& ^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k) \\
& *a*c^2*f^2*x + 2*root(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4* \\
& z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2 \\
& *b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^ \\
& 2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4 \\
& *a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2 \\
& *z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2 \\
& *d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4* \\
& a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e \\
& *z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z \\
& - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2
\end{aligned}$$

$$\begin{aligned}
& *c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f \\
& - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 \\
& - a^3*g^4 - c^3*d^4, z, k)*b*c^2*e^2*x - 2*\text{root}(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 \\
& + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 \\
& - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z \\
& + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z \\
& - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g \\
& + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 \\
& + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 \\
& - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*b^2*c*f^2*x + 8*\text{root}(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 \\
& + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 \\
& - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z \\
& - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z \\
& + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f \\
& + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 \\
& - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)^2*b^3*c*g*x - 2*b*c*d*e*g + 2*a*c*e*f*g - 4*\text{root}(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 \\
& + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 \\
& + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z \\
& - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g \\
& + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3
\end{aligned}$$

$$\begin{aligned}
& a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, \\
& k)^2*b^2*c^2*e*x + 4*\text{root}(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*b*c^2*d*e + 8*\text{root}(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k)*a*c^2*d*g - 8*\text{root}(128*a^2*b^2*c^3*z^4 - 16*a*b^4*c^2*z^4 - 256*a^3*c^4*z^4 - 128*a^2*b^2*c^2*g*z^3 + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a
\end{aligned}$$

$$\begin{aligned}
& *b^2e^2g^2 - bc^2d^2e^2 - b^3d^2g^2 - a^2cf^4 - ac^2e^4 - a^3g^4 \\
& - c^3d^4, z, k) *ac^2ef - 4\text{root}(128a^2b^2c^3z^4 - 16ab^4c^2z^4 \\
& - 256a^3c^4z^4 - 128a^2b^2c^2g^2z^3 + 16ab^4c^2g^2z^3 + 256a^3c^3 \\
& 3g^2z^3 + 32a^2b^2c^2efg^2z^2 + 16ab^2c^2d^2fz^2 - 8ab^3c^2efg^2z^2 + \\
& 40a^2b^2c^2g^2z^2 + 16a^2b^2c^2f^2z^2 + 8ab^2c^2e^2z^2 - 64a^2 \\
& c^3d^2fz^2 - 4ab^3c^2f^2z^2 + 16ab^2c^3d^2z^2 - 96a^3c^2g^2z^2 \\
& - 32a^2c^3e^2z^2 - 4b^3c^2d^2z^2 - 4ab^4g^2z^2 - 8ab^2c^2d^2f \\
& g^2z + 32a^2c^2d^2f^2g^2z - 16a^2b^2c^2efg^2z - 4ab^2c^2e^2g^2z - 16ab^2 \\
& c^2d^2g^2z + 4ab^2c^2ef^2z + 16a^2c^2e^2g^2z - 16a^2c^2ef^2z - \\
& 4b^2c^2d^2ez + 4b^3c^2d^2g^2z + 4ab^3efg^2z + 16ac^3d^2ez + \\
& 16a^3c^2g^3z - 4a^2b^2g^3z - 4ab^2c^2d^2efg + 2ab^2c^2e^3g + 2ab \\
& c^2d^2f^3 + 4a^2c^2ef^2g - 4a^2c^2d^2f^2g^2 + 2b^2c^2d^2efg - 4ac^2d^2 \\
& 2efg + 2ab^2d^2f^2g^2 + 4ac^2d^2ef^2 + 3ab^2c^2d^2g^2 + 2a^2b^2efg^3 \\
& + 2b^2c^2d^3f - ab^2c^2ef^2 - 2a^2c^2e^2g^2 - 2ac^2d^2f^2 - a^2b \\
& f^2g^2 - b^2c^2d^2f^2 - ab^2e^2g^2 - bc^2d^2e^2 - b^3d^2g^2 - a \\
& ^2cf^4 - ac^2e^4 - a^3g^4 - c^3d^4, z, k) *b^2cdg + ac^2ef^2x + b \\
& c^2ef^2x - ac^2f^2gx - 2b^2c^2ef^2gx - 2c^2d^2ef^2x + 10\text{root}(128a^2 \\
& b^2c^3z^4 - 16ab^4c^2z^4 - 256a^3c^4z^4 - 128a^2b^2c^2g^2z^3 + \\
& 16ab^4c^2g^2z^3 + 256a^3c^3g^2z^3 + 32a^2b^2c^2efg^2z^2 + 16ab^2c^2 \\
& d^2fz^2 - 8ab^3c^2efg^2z^2 + 40a^2b^2c^2g^2z^2 + 16a^2b^2c^2f^2z^2 + \\
& 8ab^2c^2e^2z^2 - 64a^2c^3d^2fz^2 - 4ab^3c^2f^2z^2 + 16ab^2c^3 \\
& d^2z^2 - 96a^3c^2g^2z^2 - 32a^2c^3e^2z^2 - 4b^3c^2d^2z^2 - 4a \\
& b^4g^2z^2 - 8ab^2c^2d^2f^2g^2z + 32a^2c^2d^2f^2g^2z - 16a^2b^2c^2efg^2z \\
& - 4ab^2c^2e^2g^2z - 16ab^2c^2d^2g^2z + 4ab^2c^2ef^2z + 16a^2c^2e \\
& ^2g^2z - 16a^2c^2ef^2z - 4b^2c^2d^2ez + 4b^3c^2d^2g^2z + 4ab^3 \\
& e^2g^2z + 16ac^3d^2ez + 16a^3c^2g^3z - 4a^2b^2g^3z - 4ab^2c^2d^2 \\
& e^2fg + 2ab^2c^2e^3g + 2ab^2c^2d^2f^3 + 4a^2c^2ef^2g - 4a^2c^2d^2f^2g^2 + \\
& 2b^2c^2d^2efg - 4ac^2d^2efg + 2ab^2d^2f^2g^2 + 4ac^2d^2ef^2 + 3 \\
& ab^2c^2d^2g^2 + 2a^2b^2efg^3 + 2b^2c^2d^3f - ab^2c^2ef^2 - 2a^2c^2e^2 \\
& g^2 - 2ac^2d^2f^2 - a^2b^2f^2g^2 - b^2c^2d^2f^2 - ab^2e^2g^2 - b \\
& c^2d^2e^2 - b^3d^2g^2 - a^2cf^4 - ac^2e^4 - a^3g^4 - c^3d^4, z, k) \\
&) *ab^2c^2g^2x + 4\text{root}(128a^2b^2c^3z^4 - 16ab^4c^2z^4 - 256a^3c^4 \\
& z^4 - 128a^2b^2c^2g^2z^3 + 16ab^4c^2g^2z^3 + 256a^3c^3g^2z^3 + 32a^2 \\
& b^2c^2efg^2z^2 + 16ab^2c^2d^2fz^2 - 8ab^3c^2efg^2z^2 + 40a^2b^2c^2g^2 \\
& ^2z^2 + 16a^2b^2c^2f^2z^2 + 8ab^2c^2e^2z^2 - 64a^2c^3d^2fz^2 - \\
& 4ab^3c^2f^2z^2 + 16ab^2c^3d^2z^2 - 96a^3c^2g^2z^2 - 32a^2c^3e^2 \\
& z^2 - 4b^3c^2d^2z^2 - 4ab^4g^2z^2 - 8ab^2c^2d^2f^2g^2z + 32a^2c^2 \\
& d^2f^2g^2z - 16a^2b^2c^2efg^2z - 4ab^2c^2e^2g^2z - 16ab^2c^2d^2g^2z + 4 \\
& ab^2c^2ef^2z + 16a^2c^2e^2g^2z - 16a^2c^2ef^2z - 4b^2c^2d^2e \\
& z + 4b^3c^2d^2g^2z + 4ab^3efg^2z + 16ac^3d^2ez + 16a^3c^2g^3z \\
& - 4a^2b^2g^3z - 4ab^2c^2d^2efg + 2ab^2c^2e^3g + 2ab^2c^2d^2f^3 + 4a^2 \\
& c^2ef^2g - 4a^2c^2d^2f^2g^2 + 2b^2c^2d^2efg - 4ac^2d^2efg + 2ab^2 \\
& d^2f^2g^2 + 4ac^2d^2ef^2 + 3ab^2c^2d^2g^2 + 2a^2b^2efg^3 + 2b^2c^2d^3 \\
& f - ab^2c^2ef^2 - 2a^2c^2e^2g^2 - 2ac^2d^2f^2 - a^2b^2f^2g^2 - b^2 \\
& c^2d^2f^2 - ab^2e^2g^2 - bc^2d^2e^2 - b^3d^2g^2 - a^2cf^4 - ac^2
\end{aligned}$$

$$\begin{aligned}
& 2e^4 - a^3g^4 - c^3d^4, z, k) * b^2c^2d^2f^2x - 8\text{root}(128a^2b^2c^3z^4 - 16a^2b^4c^2z^4 - 256a^3c^4z^4 - 128a^2b^2c^2gz^3 + 16a^2b^4c^2gz^3 + 256a^3c^3gz^3 + 32a^2b^2c^2egz^2 + 16a^2b^2c^2d^2fz^2 - 8a^2b^3c^2egz^2 + 40a^2b^2c^2gz^2 + 16a^2b^2c^2f^2z^2 + 8a^2b^2c^2e^2z^2 - 64a^2c^3d^2fz^2 - 4a^2b^3c^2f^2z^2 + 16a^2b^2c^3d^2z^2 - 96a^3c^2g^2z^2 - 32a^2c^3e^2z^2 - 4b^3c^2d^2z^2 - 4a^2b^4g^2z^2 - 8a^2b^2c^2d^2f^2gz + 32a^2c^2d^2f^2gz - 16a^2b^2c^2eg^2z - 4a^2b^2c^2e^2gz - 16a^2b^2c^2d^2gz + 4a^2b^2c^2ef^2z + 16a^2c^2e^2gz - 16a^2c^2ef^2z - 4b^2c^2d^2ez + 4b^3c^2d^2gz + 4a^2b^3eg^2z + 16a^2c^3d^2ez + 16a^3c^2gz^3 - 4a^2b^2g^3z - 4a^2b^2c^2d^2ef^2gz + 2a^2b^2c^2e^3gz + 2a^2b^2c^2d^2f^3 + 4a^2c^2ef^2gz - 4a^2c^2d^2fg^2 + 2b^2c^2d^2eg - 4a^2c^2d^2ez + 2a^2b^2d^2fg^2 + 4a^2c^2d^2ef + 3a^2b^2c^2d^2g^2 + 2a^2b^2e^3gz + 2b^2c^2d^3f - a^2b^2c^2ef^2 - 2a^2c^2e^2g^2 - 2a^2c^2d^2f^2 - a^2b^2f^2g^2 - b^2c^2d^2f^2 - a^2b^2e^2g^2 - b^2c^2d^2e^2 - b^3d^2g^2 - a^2c^2f^4 - a^2c^2e^4 - a^3g^4 - c^3d^4, z, k) * a^2c^2eg^2x - 32\text{root}(128a^2b^2c^3z^4 - 16a^2b^4c^2z^4 - 256a^3c^4z^4 - 128a^2b^2c^2gz^3 + 16a^2b^4c^2gz^3 + 256a^3c^3gz^3 + 32a^2b^2c^2egz^2 + 16a^2b^2c^2d^2fz^2 - 8a^2b^3c^2egz^2 + 40a^2b^2c^2gz^2 + 16a^2b^2c^2f^2z^2 + 8a^2b^2c^2e^2z^2 - 64a^2c^3d^2fz^2 - 4a^2b^3c^2f^2z^2 + 16a^2b^2c^3d^2z^2 - 96a^3c^2g^2z^2 - 32a^2c^3e^2z^2 - 4b^3c^2d^2z^2 - 4a^2b^4g^2z^2 - 8a^2b^2c^2d^2f^2gz + 32a^2c^2d^2f^2gz - 16a^2b^2c^2eg^2z - 4a^2b^2c^2e^2gz - 16a^2b^2c^2d^2gz + 4a^2b^2c^2ef^2z + 16a^2c^2e^2gz - 16a^2c^2ef^2z - 4b^2c^2d^2ez + 4b^3c^2d^2gz + 4a^2b^3eg^2z + 16a^2c^3d^2ez + 16a^3c^2gz^3 - 4a^2b^2g^3z - 4a^2b^2c^2d^2ef^2gz + 2a^2b^2c^2e^3gz + 2a^2b^2c^2d^2f^3 + 4a^2c^2ef^2gz - 4a^2c^2d^2fg^2 + 2b^2c^2d^2eg - 4a^2c^2d^2ez + 2a^2b^2d^2fg^2 + 4a^2c^2d^2ef + 3a^2b^2c^2d^2g^2 + 2a^2b^2e^3gz + 2b^2c^2d^3f - a^2b^2c^2ef^2 - 2a^2c^2e^2g^2 - 2a^2c^2d^2f^2 - a^2b^2f^2g^2 - b^2c^2d^2f^2 - a^2b^2e^2g^2 - b^2c^2d^2e^2 - b^3d^2g^2 - a^2c^2f^4 - a^2c^2e^4 - a^3g^4 - c^3d^4, z, k) ^2 * a^2b^2c^2gz^3 + 4\text{root}(128a^2b^2c^3z^4 - 16a^2b^4c^2z^4 - 256a^3c^4z^4 - 128a^2b^2c^2gz^3 + 16a^2b^4c^2gz^3 + 256a^3c^3gz^3 + 32a^2b^2c^2egz^2 + 16a^2b^2c^2d^2fz^2 - 8a^2b^3c^2egz^2 + 40a^2b^2c^2gz^2 + 16a^2b^2c^2f^2z^2 + 8a^2b^2c^2e^2z^2 - 64a^2c^3d^2fz^2 - 4a^2b^3c^2f^2z^2 + 16a^2b^2c^3d^2z^2 - 96a^3c^2g^2z^2 - 32a^2c^3e^2z^2 - 4b^3c^2d^2z^2 - 4a^2b^4g^2z^2 - 8a^2b^2c^2d^2f^2gz + 32a^2c^2d^2f^2gz - 16a^2b^2c^2eg^2z - 4a^2b^2c^2e^2gz - 16a^2b^2c^2d^2gz + 4a^2b^2c^2ef^2z + 16a^2c^2e^2gz - 16a^2c^2ef^2z - 4b^2c^2d^2ez + 4b^3c^2d^2gz + 4a^2b^3eg^2z + 16a^2c^3d^2ez + 16a^3c^2gz^3 - 4a^2b^2g^3z - 4a^2b^2c^2d^2ef^2gz + 2a^2b^2c^2e^3gz + 2a^2b^2c^2d^2f^3 + 4a^2c^2ef^2gz - 4a^2c^2d^2fg^2 + 2b^2c^2d^2eg - 4a^2c^2d^2ez + 2a^2b^2d^2fg^2 + 4a^2c^2d^2ef + 3a^2b^2c^2d^2g^2 + 2a^2b^2e^3gz + 2b^2c^2d^3f - a^2b^2c^2ef^2 - 2a^2c^2e^2g^2 - 2a^2c^2d^2f^2 - a^2b^2f^2g^2 - b^2c^2d^2f^2 - a^2b^2e^2g^2 - b^2c^2d^2e^2 - b^3d^2g^2 - a^2c^2f^4 - a^2c^2e^4 - a^3g^4 - c^3d^4, z, k) * a^2b^2c^2fg) * \text{root}(128a^2b^2c^3z^4 - 16a^2b^4c^2z^4 - 256a^3c^4z^4 - 128a^2b^2c^2gz^3
\end{aligned}$$

$$\begin{aligned}
& + 16*a*b^4*c*g*z^3 + 256*a^3*c^3*g*z^3 + 32*a^2*b*c^2*e*g*z^2 + 16*a*b^2*c^2*d*f*z^2 - 8*a*b^3*c*e*g*z^2 + 40*a^2*b^2*c*g^2*z^2 + 16*a^2*b*c^2*f^2*z^2 \\
& + 8*a*b^2*c^2*e^2*z^2 - 64*a^2*c^3*d*f*z^2 - 4*a*b^3*c*f^2*z^2 + 16*a*b*c^3*d^2*z^2 - 96*a^3*c^2*g^2*z^2 - 32*a^2*c^3*e^2*z^2 - 4*b^3*c^2*d^2*z^2 - \\
& 4*a*b^4*g^2*z^2 - 8*a*b^2*c*d*f*g*z + 32*a^2*c^2*d*f*g*z - 16*a^2*b*c*e*g^2*z - 4*a*b^2*c*e^2*g*z - 16*a*b*c^2*d^2*g*z + 4*a*b^2*c*e*f^2*z + 16*a^2*c^2*e^2*g*z \\
& - 16*a^2*c^2*e*f^2*z - 4*b^2*c^2*d^2*e*z + 4*b^3*c*d^2*g*z + 4*a*b^3*e*g^2*z + 16*a*c^3*d^2*e*z + 16*a^3*c*g^3*z - 4*a^2*b^2*g^3*z - 4*a*b*c*d*e*f*g \\
& + 2*a*b*c*e^3*g + 2*a*b*c*d*f^3 + 4*a^2*c*e*f^2*g - 4*a^2*c*d*f*g^2 + 2*b^2*c*d^2*e*g - 4*a*c^2*d^2*e*g + 2*a*b^2*d*f*g^2 + 4*a*c^2*d*e^2*f \\
& + 3*a*b*c*d^2*g^2 + 2*a^2*b*e*g^3 + 2*b*c^2*d^3*f - a*b*c*e^2*f^2 - 2*a^2*c*e^2*g^2 - 2*a*c^2*d^2*f^2 - a^2*b*f^2*g^2 - b^2*c*d^2*f^2 - a*b^2*e^2*g^2 - \\
& b*c^2*d^2*e^2 - b^3*d^2*g^2 - a^2*c*f^4 - a*c^2*e^4 - a^3*g^4 - c^3*d^4, z, k), k, 1, 4)
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a),x)

[Out] Timed out

$$3.23 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{a+bx^2+cx^4} dx$$

Optimal. Leaf size=290

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{\sqrt{b^2-4ac}+b}}\right)\left(\frac{-2ach+b^2h-bcf+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{\sqrt{b^2-4ac}+b}} \quad (2ce -$$

[Out] $h*x/c+1/4*g*\ln(c*x^4+b*x^2+a)/c-1/2*(-b*g+2*c*e)*\operatorname{arctanh}((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/c/(-4*a*c+b^2)^{(1/2)}+1/2*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2}))^{(1/2)})*(c*f-b*h+(2*c^2*d+b^2*h-c*(2*a*h+b*f)))/(-4*a*c+b^2)^{(1/2)}/c^{(3/2)}*2^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2}))^{(1/2)}+1/2*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2}))^{(1/2)})*(c*f-b*h+(2*a*c*h-b^2*h+b*c*f-2*c^2*d)/(-4*a*c+b^2)^{(1/2)}/c^{(3/2)}*2^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2}))^{(1/2)}$

Rubi [A] time = 0.73, antiderivative size = 290, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.257$, Rules used = {1673, 1676, 1166, 205, 1247, 634, 618, 206, 628}

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{\sqrt{b^2-4ac}+b}}\right)\left(\frac{-2ach+b^2h-bcf+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{\sqrt{b^2-4ac}+b}} \quad (2ce -$$

Antiderivative was successfully verified.

[In] $\operatorname{Int}[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4), x]$

[Out] $(h*x)/c + ((c*f - b*h + (2*c^2*d + b^2*h - c*(b*f + 2*a*h)))/\operatorname{Sqrt}[b^2 - 4*a*c])*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]]/(\operatorname{Sqrt}[2]*c^{(3/2)}*\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]) + ((c*f - b*h - (2*c^2*d - b*c*f + b^2*h - 2*a*c*h))/\operatorname{Sqrt}[b^2 - 4*a*c])*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]]/(\operatorname{Sqrt}[2]*c^{(3/2)}*\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]) - ((2*c*e - b*g)*\operatorname{ArcTanh}[(b + 2*c*x^2)/\operatorname{Sqrt}[b^2 - 4*a*c]])/(2*c*\operatorname{Sqrt}[b^2 - 4*a*c]) + (g*\operatorname{Log}[a + b*x^2 + c*x^4])/(4*c)$

Rule 205

$\operatorname{Int}[(a_ + (b_)*(x_)^2)^{-1}, x_Symbol] \rightarrow \operatorname{Simp}[(\operatorname{Rt}[a/b, 2]*\operatorname{ArcTan}[x/\operatorname{Rt}[a/b, 2]])/a, x] /; \operatorname{FreeQ}\{a, b\}, x] \ \&\& \ \operatorname{PosQ}[a/b]$

Rule 206

```
Int[((a_) + (b_)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_) + (b_)*(x_) + (c_)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[In
t[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_)*(x_)^2)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1247

```
Int[(x_)*((d_) + (e_)*(x_)^2)^(q_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(
p_), x_Symbol] := Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rule 1676

Int[(Pq_)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] := Int[ExpandIntegrand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^2] && Expon[Pq, x^2] > 1

Rubi steps

$$\begin{aligned}
 \int \frac{d + ex + fx^2 + gx^3 + hx^4}{a + bx^2 + cx^4} dx &= \int \frac{x(e + gx^2)}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2 + hx^4}{a + bx^2 + cx^4} dx \\
 &= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{a + bx + cx^2} dx, x, x^2 \right) + \int \left(\frac{h}{c} + \frac{cd - ah + (cf - bh)x^2}{c(a + bx^2 + cx^4)} \right) dx \\
 &= \frac{hx}{c} + \frac{\int \frac{cd - ah + (cf - bh)x^2}{a + bx^2 + cx^4} dx}{c} + \frac{g \text{Subst} \left(\int \frac{b + 2cx}{a + bx + cx^2} dx, x, x^2 \right)}{4c} + \frac{(2ce - bg) \text{Subst} \left(\int \frac{1}{b^2 - 4ac - x^2} dx, x, b + 2cx^2 \right)}{2c} \\
 &= \frac{hx}{c} + \frac{g \log(a + bx^2 + cx^4)}{4c} - \frac{(2ce - bg) \text{Subst} \left(\int \frac{1}{b^2 - 4ac - x^2} dx, x, b + 2cx^2 \right)}{2c} + \frac{\left(cf - bh + \frac{2c^2d + b^2h - c(bf + 2ah)}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(cf - bh - \frac{2c^2d - bcf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b + \sqrt{b^2 - 4ac}}}
 \end{aligned}$$

Mathematica [A] time = 0.50, size = 383, normalized size = 1.32

$$\frac{2\sqrt{2} \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right) \left(c \left(f \sqrt{b^2 - 4ac} - 2ah - bf \right) + bh \left(b - \sqrt{b^2 - 4ac} \right) + 2c^2d \right)}{\sqrt{b^2 - 4ac} \sqrt{b - \sqrt{b^2 - 4ac}}} - \frac{2\sqrt{2} \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b^2 - 4ac} + b} \right) \left(-c \left(f \sqrt{b^2 - 4ac} + 2ah + bf \right) + bh \left(\sqrt{b^2 - 4ac} + b \right) \right)}{\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} + b}$$

$4c^{3/2}$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4), x]

[Out] (4*sqrt[c]*h*x + (2*sqrt[2]*(2*c^2*d + b*(b - sqrt[b^2 - 4*a*c]))*h + c*(-(b*f) + sqrt[b^2 - 4*a*c]*f - 2*a*h))*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b - sqrt[b^2 - 4*a*c]])/(sqrt[b^2 - 4*a*c]*sqrt[b - sqrt[b^2 - 4*a*c]]) - (2*sqrt[2]*(2*c^2*d + b*(b + sqrt[b^2 - 4*a*c]))*h - c*(b*f + sqrt[b^2 - 4*a*c]*f + 2*a*h))*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b + sqrt[b^2 - 4*a*c]])/(sqrt[b^2 - 4*a*c]*sqrt[b + sqrt[b^2 - 4*a*c]]) + (sqrt[c]*(2*c*e + (-b + sqrt[b^2 - 4*a*c]))*x)/sqrt[b^2 - 4*a*c]

$$4*a*c))*g)*\text{Log}[-b + \text{Sqrt}[b^2 - 4*a*c] - 2*c*x^2)]/\text{Sqrt}[b^2 - 4*a*c] + (\text{Sqrt}[c]*(-2*c*e + (b + \text{Sqrt}[b^2 - 4*a*c]))*g)*\text{Log}[b + \text{Sqrt}[b^2 - 4*a*c] + 2*c*x^2)]/\text{Sqrt}[b^2 - 4*a*c])/(4*c^{(3/2)})$$

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="fricas")

[Out] Timed out

giac [B] time = 4.91, size = 5201, normalized size = 17.93

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="giac")

[Out]
$$\begin{aligned} & h*x/c + 1/4*g*\log(\text{abs}(c*x^4 + b*x^2 + a))/c + 1/8*((2*b^4*c^3 - 16*a*b^2*c^4 + 32*a^2*c^5 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c) * \\ & b^4*c + 8*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b^2*c^2 + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^3*c^2 - \\ & 16*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a^2*c^3 - 8*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b*c^3 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^2*c^3 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*c^4 - 2*(b^2 - 4*a*c)*b^2*c^3 + \\ & 8*(b^2 - 4*a*c)*a*c^4)*c^2*f - (2*b^5*c^2 - 16*a*b^3*c^3 + 32*a^2*b*c^4 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^5 + 8*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b^3*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^4*c - 16*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a^2*b*c^2 - 8*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b^2*c^2 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^3*c^2 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b*c^3 - 2*(b^2 - 4*a*c)*b^3*c^2 + 8*(b^2 - 4*a*c)*a*b*c^3)*c^2*h + 2*(\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^4*c^3 - 8*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b^2*c^4 - 2*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^3*c^4 + 2*b^4*c^4 + 16*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a^2*c^5 + 8*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b*c^5 + \text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*b^2*c^5 - 16*a*b^2*c^5 - 4*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*c^6 + 32*a^2*c^6 - 2*(b^2 - 4*a*c)*b^2*c^4 + 8*(b^2 - 4*a*c)*a*c^5)*d*\text{abs}(c) - 2*(\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b^4*c^2 - 8*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a^2*b^2*c^3 - 2*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*a*b^3*c^3 + 2*a*b^4*c^3 + 16*\text{sqrt}(2)*\end{aligned}$$

$$\begin{aligned}
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*c^4 + 8*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4}} \\
& *a*c)*c)*a^2*b*c^4 + \sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^2*c^4 - 16 \\
& *a^2*b^2*c^4 - 4*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*c^5 + 32*a^3*c \\
& ^5 - 2*(b^2 - 4*a*c)*a*b^2*c^3 + 8*(b^2 - 4*a*c)*a^2*c^4)*h*\text{abs}(c) + 2*(2*b \\
& ^3*c^6 - 8*a*b*c^7 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& *c)*b^3*c^4 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a \\
& *b*c^5 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^2*c^5 \\
& - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b*c^6 - 2*(b^2 \\
& - 4*a*c)*b*c^6)*d - (2*b^4*c^5 - 8*a*b^2*c^6 - \sqrt{2}*\sqrt{b^2 - 4*a*c})* \\
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^4*c^3 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c \\
& - \sqrt{b^2 - 4*a*c}}*c)*a*b^2*c^4 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c \\
& - \sqrt{b^2 - 4*a*c}}*c)*b^3*c^4 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& *c)*b^2*c^5 - 2*(b^2 - 4*a*c)*b^2*c^5)*f + (2*b^5*c^4 - 12*a*b \\
& ^3*c^5 + 16*a^2*b*c^6 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a}} \\
& *c)*c)*b^5*c^2 + 6*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c \\
&)*a*b^3*c^3 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b \\
& ^4*c^3 - 8*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b* \\
& c^4 - 4*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^2*c^4 \\
& - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^3*c^4 + 2*\sqrt{2} \\
& *\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b*c^5 - 2*(b^2 - \\
& 4*a*c)*b^3*c^4 + 4*(b^2 - 4*a*c)*a*b*c^5)*h)*\arctan(2*\sqrt{1/2}*x/\sqrt{(b*c \\
& ^3 + \sqrt{b^2*c^6 - 4*a*c^7}))/c^4))/((a*b^4*c^3 - 8*a^2*b^2*c^4 - 2*a*b^3*c \\
& ^4 + 16*a^3*c^5 + 8*a^2*b*c^5 + a*b^2*c^5 - 4*a^2*c^6)*c^2) - 1/8*((2*b^4*c \\
& ^3 - 16*a*b^2*c^4 + 32*a^2*c^5 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4}} \\
& *a*c)*c)*b^4*c + 8*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4}} \\
& *a*c)*c)*a*b^2*c^2 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a}} \\
& *c)*c)*b^3*c^2 - 16*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c \\
&)*a^2*c^3 - 8*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b \\
& *c^3 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^2*c^3 + \\
& 4*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*c^4 - 2*(b^2 \\
& - 4*a*c)*b^2*c^3 + 8*(b^2 - 4*a*c)*a*c^4)*c^2*f - (2*b^5*c^2 - 16*a*b^3*c^3 \\
& + 32*a^2*b*c^4 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c) \\
& *b^5 + 8*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^3*c \\
& + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^4*c - 16*\sqrt{2} \\
& *\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b*c^2 - 8*\sqrt{2}*\sqrt{b^2 - 4*a*c} \\
& *\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^3*c^2 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c} \\
& *\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b*c^3 - 2*(b^2 - 4*a*c)*b^3*c^2 \\
& + 8*(b^2 - 4*a*c)*a*b*c^3)*c^2*h - 2*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}} \\
&)*c)*b^4*c^3 - 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^2*c^4 - 2*\sqrt{2} \\
& *\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^3*c^4 - 2*b^4*c^4 + 16*\sqrt{2}*\sqrt{b \\
& *c + \sqrt{b^2 - 4*a*c}}*c)*a^2*c^5 + 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}* \\
& c)*a*b*c^5 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^2*c^5 + 16*a*b^2*c^5 \\
& - 4*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*c^6 - 32*a^2*c^6 + 2*(b^2 - \\
& 4*a*c)*b^2*c^4 - 8*(b^2 - 4*a*c)*a*c^5)*d*\text{abs}(c) + 2*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4}}
\end{aligned}$$

$$\begin{aligned}
& \text{rt}(b^2 - 4ac) * c) * a * b^4 * c^2 - 8 * \text{sqrt}(2) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * a^2 * b^2 * c^3 - 2 * \text{sqrt}(2) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * a * b^3 * c^3 - 2 * a * b^4 * c^3 + 16 * \text{sqrt}(2) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * a^3 * c^4 + 8 * \text{sqrt}(2) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * a^2 * b * c^4 + \text{sqrt}(2) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * a * b^2 * c^4 + 16 * a^2 * b^2 * c^4 - 4 * \text{sqrt}(2) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * a^2 * c^5 - 32 * a^3 * c^5 + 2 * (b^2 - 4ac) * a * b^2 * c^3 - 8 * (b^2 - 4ac) * a^2 * c^4) * h * \text{abs}(c) + 2 * (2 * b^3 * c^6 - 8 * a * b * c^7 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * b^3 * c^4 + 4 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * a * b * c^5 + 2 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * b^2 * c^5 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * b * c^6 - 2 * (b^2 - 4ac) * b * c^6) * d - (2 * b^4 * c^5 - 8 * a * b^2 * c^6 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * b^4 * c^3 + 4 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * a * b^2 * c^4 + 2 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * b^3 * c^4 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * b^2 * c^5 - 2 * (b^2 - 4ac) * b^2 * c^5) * f + (2 * b^5 * c^4 - 12 * a * b^3 * c^5 + 16 * a^2 * b * c^6 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * b^5 * c^2 + 6 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * a * b^3 * c^3 + 2 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * b^4 * c^3 - 8 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * a^2 * b * c^4 - 4 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * a * b^2 * c^4 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * b^3 * c^4 + 2 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(b * c + \text{sqrt}(b^2 - 4ac) * c) * a * b * c^5 - 2 * (b^2 - 4ac) * b^3 * c^4 + 4 * (b^2 - 4ac) * a * b * c^5) * h) * \arctan(2 * \text{sqrt}(1/2) * x / \text{sqrt}((b * c^3 - \text{sqrt}(b^2 * c^6 - 4ac * c^7)) / c^4)) / ((a * b^4 * c^3 - 8 * a^2 * b^2 * c^4 - 2 * a * b^3 * c^4 + 16 * a^3 * c^5 + 8 * a^2 * b * c^5 + a * b^2 * c^5 - 4 * a^2 * c^6) * c^2) - 1/16 * ((b^6 - 8 * a * b^4 * c - 2 * b^5 * c + 16 * a^2 * b^2 * c^2 + 8 * a * b^3 * c^2 + b^4 * c^2 - 4 * a * b^2 * c^3 - (b^5 - 8 * a * b^3 * c - 2 * b^4 * c + 16 * a^2 * b * c^2 + 8 * a * b^2 * c^2 + b^3 * c^2 - 4 * a * b * c^3) * \text{sqrt}(b^2 - 4ac))) * g * \text{abs}(c) - 2 * (b^5 * c - 8 * a * b^3 * c^2 - 2 * b^4 * c^2 + 16 * a^2 * b * c^3 + 8 * a * b^2 * c^3 + b^3 * c^3 - 4 * a * b * c^4 - (b^4 * c - 8 * a * b^2 * c^2 - 2 * b^3 * c^2 + 16 * a^2 * c^3 + 8 * a * b * c^3 + b^2 * c^3 - 4 * a * c^4) * \text{sqrt}(b^2 - 4ac)) * \text{abs}(c) * e + (b^6 * c - 8 * a * b^4 * c^2 - 2 * b^5 * c^2 + 16 * a^2 * b^2 * c^3 + 8 * a * b^3 * c^3 + b^4 * c^3 - 4 * a * b^2 * c^4 + (b^5 * c - 4 * a * b^3 * c^2 - 2 * b^4 * c^2 + b^3 * c^3) * \text{sqrt}(b^2 - 4ac)) * g - 2 * (b^5 * c^2 - 8 * a * b^3 * c^3 - 2 * b^4 * c^3 + 16 * a^2 * b * c^4 + 8 * a * b^2 * c^4 + b^3 * c^4 - 4 * a * b * c^5 - (b^4 * c^2 - 4 * a * b^2 * c^3 - 2 * b^3 * c^3 + b^2 * c^4) * \text{sqrt}(b^2 - 4ac)) * e) * \log(x^2 + 1/2 * (b * c^3 + \text{sqrt}(b^2 * c^6 - 4ac * c^7)) / c^4) / ((a * b^4 - 8 * a^2 * b^2 * c - 2 * a * b^3 * c + 16 * a^3 * c^2 + 8 * a^2 * b * c^2 + a * b^2 * c^2 - 4 * a^2 * c^3) * c^2 * \text{abs}(c)) - 1/16 * ((b^6 - 8 * a * b^4 * c - 2 * b^5 * c + 16 * a^2 * b^2 * c^2 + 8 * a * b^3 * c^2 + b^4 * c^2 - 4 * a * b^2 * c^3 + (b^5 - 8 * a * b^3 * c - 2 * b^4 * c + 16 * a^2 * b * c^2 + 8 * a * b^2 * c^2 + b^3 * c^2 - 4 * a * b * c^3) * \text{sqrt}(b^2 - 4ac)) * g * \text{abs}(c) - 2 * (b^5 * c - 8 * a * b^3 * c^2 - 2 * b^4 * c^2 + 16 * a^2 * b * c^3 + 8 * a * b^2 * c^3 + b^3 * c^3 - 4 * a * b * c^4 + (b^4 * c - 8 * a * b^2 * c^2 - 2 * b^3 * c^2 + 16 * a^2 * c^3 + 8 * a * b * c^3 + b^2 * c^3 - 4 * a * c^4) * \text{sqrt}(b^2 - 4ac)) * \text{abs}(c) * e + (b^6 * c - 8 * a * b^4 * c^2 - 2 * b^5 * c^2 + 16 * a^2 * b^2 * c^3 + 8 * a * b^3 * c^3 + b^4 * c^3 - 4 * a * b^2 * c^4 + (b^5 * c - 4 * a * b^3 * c^2 - 2 * b^4 * c^2 + b^3 * c^3) * \text{sqrt}(b^2 - 4ac)) * g - 2 * (b^5 * c^2 - 8 * a * b^3 * c^3 - 2 * b^4 * c^3 + 16 * a^2 * b * c^4 + 8 * a * b^2 * c^4 + b^3 * c^4 - 4 *
\end{aligned}$$

$$a*b*c^5 + (b^4*c^2 - 4*a*b^2*c^3 - 2*b^3*c^3 + b^2*c^4)*\sqrt{b^2 - 4*a*c}) * e) * \log(x^2 + 1/2*(b*c^3 - \sqrt{b^2*c^6 - 4*a*c^7})/c^4) / ((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(c))$$

maple [B] time = 0.04, size = 1132, normalized size = 3.90

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a), x)$

[Out]
$$\begin{aligned} & h*x/c - 1/4*(-4*a*c+b^2)/(4*a*c-b^2)/c * \ln(-2*c*x^2-b+(-4*a*c+b^2)^{1/2}) * g + 1/4 * (-4*a*c+b^2)^{1/2}/(4*a*c-b^2) * b/c * g * \ln(-2*c*x^2-b+(-4*a*c+b^2)^{1/2}) - 1/2 * (-4*a*c+b^2)^{1/2}/(4*a*c-b^2) * e * \ln(-2*c*x^2-b+(-4*a*c+b^2)^{1/2}) - 1/2 * (-4*a*c+b^2)/(4*a*c-b^2)/c * 2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * \text{arctanh}(2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * c*x) * b*h + 1/2 * (-4*a*c+b^2)/(4*a*c-b^2) * 2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * \text{arctanh}(2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * c*x) * f - (-4*a*c+b^2)^{1/2}/(4*a*c-b^2) * 2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * \text{arctanh}(2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * c*x) * a*h + 1/2 * (-4*a*c+b^2)^{1/2}/(4*a*c-b^2)/c * 2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * \text{arctanh}(2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * c*x) * b^2*h - 1/2 * (-4*a*c+b^2)^{1/2}/(4*a*c-b^2) * 2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * \text{arctanh}(2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * c*x) * b*f + c * (-4*a*c+b^2)^{1/2}/(4*a*c-b^2) * 2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * \text{arctanh}(2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * c*x) * d - 1/4 * (-4*a*c+b^2)/(4*a*c-b^2)/c * \ln(2*c*x^2+b+(-4*a*c+b^2)^{1/2}) * g - 1/4 * (-4*a*c+b^2)^{1/2}/(4*a*c-b^2) * b/c * g * \ln(2*c*x^2+b+(-4*a*c+b^2)^{1/2}) + 1/2 * (-4*a*c+b^2)^{1/2}/(4*a*c-b^2) * e * \ln(2*c*x^2+b+(-4*a*c+b^2)^{1/2}) + 1/2 * (-4*a*c+b^2)/(4*a*c-b^2)/c * 2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * \text{arctan}(2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * c*x) * b*h - 1/2 * (-4*a*c+b^2)/(4*a*c-b^2) * 2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * \text{arctan}(2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * c*x) * f - (-4*a*c+b^2)^{1/2}/(4*a*c-b^2) * 2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * \text{arctan}(2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * c*x) * a*h + 1/2 * (-4*a*c+b^2)^{1/2}/(4*a*c-b^2)/c * 2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * \text{arctan}(2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * c*x) * b^2*h - 1/2 * (-4*a*c+b^2)^{1/2}/(4*a*c-b^2) * 2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * b*f * \text{arctan}(2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * c*x) + (-4*a*c+b^2)^{1/2}/(4*a*c-b^2) * 2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * c*d * \text{arctan}(2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2} * c*x) \end{aligned}$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a),x, algorithm="maxima")

[Out] h*x/c + integrate((c*g*x^3 + c*e*x + (c*f - b*h)*x^2 + c*d - a*h)/(c*x^4 + b*x^2 + a), x)/c

mupad [B] time = 1.75, size = 5981, normalized size = 20.62

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4),x)

[Out] symsum(log((x*(c^3*e^3 + c^3*d^2*g + b^3*e*h^2 - a*b*c*g^3 - 2*c^3*d*e*f + a*c^2*e*g^2 + b*c^2*e*f^2 - a*c^2*f^2*g - 2*b*c^2*e^2*g + b^2*c*e*g^2 - a*b^2*g*h^2 + a^2*c*g*h^2 - 2*a*b*c*e*h^2 + 2*b*c^2*d*e*h - 2*a*c^2*d*g*h + 2*a*c^2*e*f*h - 2*b^2*c*e*f*h + 2*a*b*c*f*g*h)))/c - root(128*a^2*b^2*c^4*z^4 - 16*a*b^4*c^3*z^4 - 256*a^3*c^5*z^4 - 128*a^2*b^2*c^3*g*z^3 + 16*a*b^4*c^2*g*z^3 + 256*a^3*c^4*g*z^3 + 32*a^2*b*c^3*e*g*z^2 + 32*a^2*b*c^3*d*h*z^2 - 8*a*b^3*c^2*e*g*z^2 - 8*a*b^3*c^2*d*h*z^2 + 16*a*b^2*c^3*d*f*z^2 + 8*a*b^4*c*f*h*z^2 - 48*a^2*b^2*c^2*f*h*z^2 - 48*a^3*b*c^2*h^2*z^2 + 28*a^2*b^3*c*h^2*z^2 + 16*a^2*b*c^3*f^2*z^2 - 4*a*b^3*c^2*f^2*z^2 + 8*a*b^2*c^3*e^2*z^2 + 64*a^3*c^3*f*h*z^2 - 64*a^2*c^4*d*f*z^2 - 4*a*b^4*c*g^2*z^2 + 16*a*b*c^4*d^2*z^2 + 40*a^2*b^2*c^2*g^2*z^2 - 96*a^3*c^3*g^2*z^2 - 32*a^2*c^4*e^2*z^2 - 4*b^3*c^3*d^2*z^2 - 4*a*b^5*h^2*z^2 + 8*a^2*b^2*c*f*g*h*z + 32*a^2*b*c^2*e*f*h*z - 8*a*b^2*c^2*d*f*g*z + 8*a*b^2*c^2*d*e*h*z - 8*a*b^3*c*e*f*h*z - 20*a^2*b^2*c*e*h^2*z - 16*a^2*b*c^2*e*g^2*z - 4*a*b^2*c^2*e^2*g*z + 4*a*b^2*c^2*e*f^2*z - 32*a^3*c^2*f*g*h*z + 32*a^2*c^3*d*f*g*z - 32*a^2*c^3*d*e*h*z + 16*a^3*b*c*g*h^2*z + 4*a*b^3*c*e*g^2*z - 16*a*b*c^3*d^2*g*z - 4*a^2*b^3*g*h^2*z + 16*a^3*c^2*e*h^2*z + 16*a^2*c^3*e^2*g*z + 4*b^3*c^2*d^2*g*z - 16*a^2*c^3*e*f^2*z - 4*b^2*c^3*d^2*e*z - 4*a^2*b^2*c*g^3*z + 4*a*b^4*e*h^2*z + 16*a*c^4*d^2*e*z + 16*a^3*c^2*g^3*z - 4*a^2*b*c*e*f*g*h - 4*a*b*c^2*d*e*f*g + 8*a^2*c^2*d*e*g*h - 2*a^2*b*c*d*g^2*h + 2*a*b^2*c*e^2*f*h - 4*a*b^2*c*d*f^2*h - 2*a^2*b*c*d*f*h^2 - 2*a*b*c^2*d^2*f*h + 2*a*b^2*c*d*f*g^2 - 2*a*b*c^2*d*e^2*h - 4*a^2*c^2*e^2*f*h + 2*a^2*b^2*e*g*h^2 + 4*a^2*c^2*e*f^2*g + 4*a^2*c^2*d*f^2*h - 4*a^2*c^2*d*f*g^2 + 2*b^2*c^2*d^2*e*g + 3*a^2*b*c*e^2*h^2 + 4*a*b^2*c*d^2*h^2 + 3*a*b*c^2*d^2*g^2 + 4*a^3*c*f*g^2*h - 4*a^3*c*e*g*h^2 + 2*b^3*c*d^2*f*h + 2*a*b^3*d*f*h^2 - 4*a*c^3*d^2*e*g + 2*a^2*b*c*f^3*h + 4*a*c^3*d*e^2*f + 2*a^2*b*c*e*g^3 + 2*a*b*c^2*e^3*g + 2*a*b*c^2*d*f^3 + 2*a^3*b*f*h^3 + 4*a^3*c*d*h^3 + 4*a*c^3*d^3*h + 2*b*c^3*d^3*f - a^2*b*c*f^2*g^2 - a*b^2*c*e^2*g^2 - a*b*c^2*e^2*f^2 - 6*a^2*c^2*d^2*h^2 - 2*a^2*c^2*e^2*g^2 - 2*a^3*c*f^2*h^2 - 2*b^2*c^2*d^3*h - 2*a^2*b^2*d*h^3 - 2*a*c^3*d^2*f^2 - a^2*b^2*f^2*h^2 - b^2*c^2*d^2*f^2 - a^3*b*g^2*h^2 - b^3*c*d^2*g^2 - a*b^3*e^2*h^2 - b*c^3*d^2*e^2 - b^4*d^2*h^2 - a^2*c^2*f^4 - a^3*c*g^4 - a*c^3*e^4 - a^4*h^4 - c^4*d^4, z, k)*(root(128*a^2*b^2*c^4*z^4 - 16*a*b^4*c^3*z^4 - 256*a^3*c^5*z^4 - 128*a^2*b^2*c^3*g*z^3 + 16*a*b^4*c^2*g*z^3 + 256*a^3*c^4*

$$\begin{aligned}
&gz^3 + 32a^2b^3c^3e^2gz^2 + 32a^2b^3c^3d^2hz^2 - 8a^3b^3c^2e^2gz^2 - \\
&8a^3b^3c^2d^2hz^2 + 16a^2b^2c^3d^2fz^2 + 8a^2b^4c^2f^2hz^2 - 48a^2b^2c^2f^2hz^2 - 48a^3b^2c^2h^2z^2 + 28a^2b^3c^2h^2z^2 + 16a^2b^2c^3f^2z^2 - \\
&4a^2b^3c^2f^2z^2 + 8a^2b^2c^3e^2z^2 + 64a^3c^3f^2hz^2 - 64a^2c^4d^2fz^2 - 4a^2b^4c^2g^2z^2 + 16a^2b^3c^4d^2z^2 + 40a^2b^2c^2g^2z^2 - \\
&96a^3c^3g^2z^2 - 32a^2c^4e^2z^2 - 4b^3c^3d^2z^2 - 4a^2b^5h^2z^2 + 8a^2b^2c^2f^2g^2hz + 32a^2b^2c^2e^2f^2hz - 8a^2b^2c^2d^2f^2g^2hz + \\
&8a^2b^2c^2d^2e^2hz - 8a^2b^3c^2e^2f^2hz - 20a^2b^2c^2e^2h^2z - 16a^2b^2c^2e^2g^2z - 4a^2b^2c^2e^2f^2g^2z + 4a^2b^2c^2e^2f^2z - 32a^3c^2f^2g^2hz + \\
&32a^2c^3d^2f^2g^2z - 32a^2c^3d^2e^2hz + 16a^3b^2c^2g^2hz + 4a^2b^3c^2e^2g^2z - 16a^2b^3c^2d^2g^2z - 4a^2b^3c^2g^2hz + 16a^3c^2e^2h^2z + \\
&16a^2c^3e^2g^2z + 4b^3c^2d^2g^2z - 16a^2c^3e^2f^2z - 4b^2c^3d^2e^2z - 4a^2b^2c^2g^3z + 4a^2b^4e^2h^2z + 16a^2c^4d^2e^2z + 16a^3c^2g^3z - \\
&4a^2b^2c^2e^2f^2g^2h - 4a^2b^2c^2d^2e^2f^2g + 8a^2c^2d^2e^2g^2h - 2a^2b^2c^2d^2g^2h + 2a^2b^2c^2e^2f^2h - 4a^2b^2c^2d^2f^2h - 2a^2b^2c^2d^2f^2h^2 - \\
&2a^2b^2c^2d^2f^2h + 2a^2b^2c^2d^2f^2g^2 - 2a^2b^2c^2d^2e^2h - 4a^2c^2e^2f^2h + 2a^2b^2e^2g^2h^2 + 4a^2c^2e^2f^2g + 4a^2c^2d^2f^2h - 4a^2c^2d^2f^2g^2 + \\
&2b^2c^2d^2e^2g + 3a^2b^2c^2e^2h^2 + 4a^2b^2c^2d^2h^2 + 3a^2b^2c^2d^2g^2 + 4a^3c^2f^2g^2h - 4a^3c^2e^2g^2h^2 + 2b^3c^2d^2f^2h + 2a^2b^3d^2f^2h^2 - \\
&4a^2c^3d^2e^2g + 2a^2b^2c^2f^3h + 4a^2c^3d^2e^2f + 2a^2b^2c^2e^2g^3 + 2a^2b^2c^2e^3g + 2a^2b^2c^2d^2f^3 + 2a^3b^2f^2h^3 + 4a^3c^2d^2e^2h^3 + \\
&4a^2c^3d^3h + 2b^2c^3d^3f - a^2b^2c^2f^2g^2 - a^2b^2c^2e^2g^2 - a^2b^2c^2e^2f^2 - 6a^2c^2d^2h^2 - 2a^2c^2e^2g^2 - 2a^3c^2f^2h^2 - 2b^2c^2d^2h^3 - \\
&2a^2b^2d^2h^3 - 2a^2c^3d^2f^2 - a^2b^2f^2h^2 - b^2c^2d^2f^2 - a^3b^2g^2h^2 - b^3c^2d^2g^2 - a^2b^3e^2h^2 - b^2c^3d^2e^2 - b^4d^2h^2 - a^2c^2f^4 - \\
&a^3c^2g^4 - a^2c^3e^4 - a^4h^4 - c^4d^4, \\
&z, k) * ((x(4b^2c^3e - 8b^3c^2g - 16a^2c^4e + 32a^2b^3c^3g)) / c - (4b^2c^3d + 16a^2c^3h - 16a^2c^4d - 4a^2b^2c^2h) / c + (\text{root}(128a^2b^2c^4z^4 - 16a^2b^4c^3z^4 - 256a^3c^5z^4 - 128a^2b^2c^3gz^3 + 16a^2b^4c^2gz^3 + 256a^3c^4gz^3 + 32a^2b^3c^3e^2gz^2 + 32a^2b^2c^3d^2hz^2 - 8a^2b^3c^2e^2gz^2 - 8a^2b^3c^2d^2hz^2 + 16a^2b^2c^3d^2fz^2 + 8a^2b^4c^2f^2hz^2 - 48a^2b^2c^2f^2hz^2 - 48a^3b^2c^2h^2z^2 + 28a^2b^3c^2h^2z^2 + 16a^2b^2c^3f^2z^2 - 4a^2b^3c^2f^2z^2 + 8a^2b^2c^3e^2z^2 + 64a^3c^3f^2hz^2 - 64a^2c^4d^2fz^2 - 4a^2b^4c^2g^2z^2 + 16a^2b^3c^4d^2z^2 + 40a^2b^2c^2g^2z^2 - 96a^3c^3g^2z^2 - 32a^2c^4e^2z^2 - 4b^3c^3d^2z^2 - 4a^2b^5h^2z^2 + 8a^2b^2c^2f^2g^2hz + 32a^2b^2c^2e^2f^2hz - 8a^2b^2c^2d^2f^2g^2hz + 8a^2b^2c^2d^2e^2hz - 8a^2b^3c^2e^2f^2hz - 20a^2b^2c^2e^2h^2z - 16a^2b^2c^2e^2g^2z - 4a^2b^2c^2e^2f^2g^2z + 4a^2b^2c^2e^2f^2z - 32a^3c^2f^2g^2hz + 32a^2c^3d^2f^2g^2z - 32a^2c^3d^2e^2hz + 16a^3b^2c^2g^2hz + 4a^2b^3c^2e^2g^2z - 16a^2b^3c^2d^2g^2z - 4a^2b^3c^2g^2hz + 16a^3c^2e^2h^2z + 16a^2c^3e^2g^2z + 4b^3c^2d^2g^2z - 16a^2c^3e^2f^2z - 4b^2c^3d^2e^2z - 4a^2b^2c^2g^3z + 4a^2b^4e^2h^2z + 16a^2c^4d^2e^2z + 16a^3c^2g^3z - 4a^2b^2c^2e^2f^2g^2h - 4a^2b^2c^2d^2e^2f^2g + 8a^2c^2d^2e^2g^2h - 2a^2b^2c^2d^2g^2h + 2a^2b^2c^2e^2f^2h - 4a^2b^2c^2d^2f^2h - 2a^2b^2c^2d^2f^2h^2 - 2a^2b^2c^2d^2f^2h + 2a^2b^2c^2d^2f^2g^2 -
\end{aligned}$$

$$\begin{aligned}
& 2*a*b*c^2*d*e^2*h - 4*a^2*c^2*e^2*f*h + 2*a^2*b^2*e*g*h^2 + 4*a^2*c^2*e*f^2*g + 4*a^2*c^2*d*f^2*h - 4*a^2*c^2*d*f*g^2 + 2*b^2*c^2*d^2*e*g + 3*a^2*b*c*e^2*h^2 + 4*a*b^2*c*d^2*h^2 + 3*a*b*c^2*d^2*g^2 + 4*a^3*c*f*g^2*h - 4*a^3*c*e*g*h^2 + 2*b^3*c*d^2*f*h + 2*a*b^3*d*f*h^2 - 4*a*c^3*d^2*e*g + 2*a^2*b*c*f^3*h + 4*a*c^3*d*e^2*f + 2*a^2*b*c*e*g^3 + 2*a*b*c^2*e^3*g + 2*a*b*c^2*d*f^3 + 2*a^3*b*f*h^3 + 4*a^3*c*d*h^3 + 4*a*c^3*d^3*h + 2*b*c^3*d^3*f - a^2*b*c*f^2*g^2 - a*b^2*c*e^2*g^2 - a*b*c^2*e^2*f^2 - 6*a^2*c^2*d^2*h^2 - 2*a^2*c^2*e^2*g^2 - 2*a^3*c*f^2*h^2 - 2*b^2*c^2*d^3*h - 2*a^2*b^2*d*h^3 - 2*a*c^3*d^2*f^2 - a^2*b^2*f^2*h^2 - b^2*c^2*d^2*f^2 - a^3*b*g^2*h^2 - b^3*c*d^2*g^2 - a*b^3*e^2*h^2 - b*c^3*d^2*e^2 - b^4*d^2*h^2 - a^2*c^2*f^4 - a^3*c*g^4 - a*c^3*e^4 - a^4*h^4 - c^4*d^4, z, k) ** ((8*b^3*c^3 - 32*a*b*c^4)/c) - (4*b*c^3*d*e + 8*a*c^3*d*g - 8*a*c^3*e*f - 4*b^2*c^2*d*g - 8*a^2*c^2*g*h + 4*a*b*c^2*e*h + 4*a*b*c^2*f*g)/c + (x*(4*c^4*d^2 + 2*b^4*h^2 - 4*a*c^3*f^2 - 2*b*c^3*e^2 + 2*b^3*c*g^2 + 2*b^2*c^2*f^2 + 4*a^2*c^2*h^2 - 4*b*c^3*d*f - 8*a*c^3*d*h + 8*a*c^3*e*g - 4*b^3*c*f*h - 10*a*b*c^2*g^2 - 8*a*b^2*c*h^2 + 4*b^2*c^2*d*h + 12*a*b*c^2*f*h))/c) - (a*c^2*f^3 - a^2*b*h^3 - c^3*d*e^2 + c^3*d^2*f - b^3*d*h^2 + a*c^2*d*g^2 - b*c^2*d*f^2 - b^2*c*d*g^2 + a*b^2*f*h^2 + a*c^2*e^2*h - b*c^2*d^2*h + a^2*c*f*h^2 - a^2*c*g^2*h + 2*a*b*c*d*h^2 + a*b*c*f*g^2 - 2*a*b*c*f^2*h + 2*b*c^2*d*e*g - 2*a*c^2*d*f*h - 2*a*c^2*e*f*g + 2*b^2*c*d*f*h)/c * root(128*a^2*b^2*c^4*z^4 - 16*a*b^4*c^3*z^4 - 256*a^3*c^5*z^4 - 128*a^2*b^2*c^3*g*z^3 + 16*a*b^4*c^2*g*z^3 + 256*a^3*c^4*g*z^3 + 32*a^2*b*c^3*e*g*z^2 + 32*a^2*b*c^3*d*h*z^2 - 8*a*b^3*c^2*e*g*z^2 - 8*a*b^3*c^2*d*h*z^2 + 16*a*b^2*c^3*d*f*z^2 + 8*a*b^4*c*f*h*z^2 - 48*a^2*b^2*c^2*f*h*z^2 - 48*a^3*b*c^2*h^2*z^2 + 28*a^2*b^3*c*h^2*z^2 + 16*a^2*b*c^3*f^2*z^2 - 4*a*b^3*c^2*f^2*z^2 + 8*a*b^2*c^3*e^2*z^2 + 64*a^3*c^3*f*h*z^2 - 64*a^2*c^4*d*f*z^2 - 4*a*b^4*c*g^2*z^2 + 16*a*b*c^4*d^2*z^2 + 40*a^2*b^2*c^2*g^2*z^2 - 96*a^3*c^3*g^2*z^2 - 32*a^2*c^4*e^2*z^2 - 4*b^3*c^3*d^2*z^2 - 4*a*b^5*h^2*z^2 + 8*a^2*b^2*c*f*g*h*z + 32*a^2*b*c^2*e*f*h*z - 8*a*b^2*c^2*d*f*g*z + 8*a*b^2*c^2*d*e*h*z - 8*a*b^3*c*e*f*h*z - 20*a^2*b^2*c*e*h^2*z - 16*a^2*b*c^2*e*g^2*z - 4*a*b^2*c^2*e^2*g*z + 4*a*b^2*c^2*e*f^2*z - 32*a^3*c^2*f*g*h*z + 32*a^2*c^3*d*f*g*z - 32*a^2*c^3*d*e*h*z + 16*a^3*b*c*g*h^2*z + 4*a*b^3*c*e*g^2*z - 16*a*b*c^3*d^2*g*z - 4*a^2*b^3*g*h^2*z + 16*a^3*c^2*e*h^2*z + 16*a^2*c^3*e^2*g*z + 4*b^3*c^2*d^2*g*z - 16*a^2*c^3*e*f^2*z - 4*b^2*c^3*d^2*e*z - 4*a^2*b^2*c*g^3*z + 4*a*b^4*e*h^2*z + 16*a*c^4*d^2*e*z + 16*a^3*c^2*g^3*z - 4*a^2*b*c*e*f*g*h - 4*a*b*c^2*d*e*f*g + 8*a^2*c^2*d*e*g*h - 2*a^2*b*c*d*g^2*h + 2*a*b^2*c*e^2*f*h - 4*a*b^2*c*d*f^2*h - 2*a^2*b*c*d*f*h^2 - 2*a*b*c^2*d^2*f*h + 2*a*b^2*c*d*f*g^2 - 2*a*b*c^2*d*e^2*h - 4*a^2*c^2*e^2*f*h + 2*a^2*b^2*e*g*h^2 + 4*a^2*c^2*e*f^2*g + 4*a^2*c^2*d*f^2*h - 4*a^2*c^2*d*f*g^2 + 2*b^2*c^2*d^2*e*g + 3*a^2*b*c*e^2*h^2 + 4*a*b^2*c*d^2*h^2 + 3*a*b*c^2*d^2*g^2 + 4*a^3*c*f*g^2*h - 4*a^3*c*e*g*h^2 + 2*b^3*c*d^2*f*h + 2*a*b^3*d*f*h^2 - 4*a*c^3*d^2*e*g + 2*a^2*b*c*f^3*h + 4*a*c^3*d*e^2*f + 2*a^2*b*c*e*g^3 + 2*a*b*c^2*e^3*g + 2*a*b*c^2*d*f^3 + 2*a^3*b*f*h^3 + 4*a^3*c*d*h^3 + 4*a*c^3*d^3*h + 2*b*c^3*d^3*f - a^2*b*c*f^2*g^2 - a*b^2*c*e^2*g^2 - a*b*c^2*e^2*f^2 - 6*a^2*c^2*d^2*h^2 - 2*a^2*c^2*e^2*g^2 - 2*a^3*c*f^2*h^2 - 2*b^2*c^2*d^3*h - 2*a^2*b^2*d*h^3 - 2*a*c^3*d^2*f^2 - a^2*b^2*f^2*h^2 - b^2*c^2*d^2
\end{aligned}$$

```
*f^2 - a^3*b*g^2*h^2 - b^3*c*d^2*g^2 - a*b^3*e^2*h^2 - b*c^3*d^2*e^2 - b^4*
d^2*h^2 - a^2*c^2*f^4 - a^3*c*g^4 - a*c^3*e^4 - a^4*h^4 - c^4*d^4, z, k), k
, 1, 4) + (h*x)/c
```

```
sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00
```

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a),x)
```

```
[Out] Timed out
```

$$3.24 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{a+bx^2+cx^4} dx$$

Optimal. Leaf size=321

$$\frac{\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)(-2aci + b^2i - bcg + 2c^2e)}{2c^2\sqrt{b^2-4ac}} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\tan^{-1}\left(\frac{\sqrt{2}}{\sqrt{\sqrt{b^2}}}\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}}$$

[Out] $h*x/c+1/2*i*x^2/c+1/4*(-b*i+c*g)*\ln(c*x^4+b*x^2+a)/c^2-1/2*(-2*a*c*i+b^2*i-b*c*g+2*c^2*e)*\operatorname{arctanh}((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/c^2/(-4*a*c+b^2)^{(1/2)}+1/2*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)})*(c*f-b*h+(2*c^2*d+b^2*h-c*(2*a*h+b*f)))/(-4*a*c+b^2)^{(1/2)}/c^{(3/2)}*2^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)}+1/2*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)})*(c*f-b*h+(2*a*c*h-b^2*h+b*c*f-2*c^2*d)/(-4*a*c+b^2)^{(1/2)}/c^{(3/2)}*2^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)})$

Rubi [A] time = 0.53, antiderivative size = 321, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 10, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {1673, 1676, 1166, 205, 1663, 1657, 634, 618, 206, 628}

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{\sqrt{b^2-4ac}+b}}\right)\left(\frac{-2ach+b^2h-bcf+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{\sqrt{b^2-4ac}+b}} - \frac{\tanh^{-1}\left(\frac{\sqrt{2}}{\sqrt{\sqrt{b^2}}}\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}}$$

Antiderivative was successfully verified.

[In] $\operatorname{Int}[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4), x]$

[Out] $(h*x)/c + (i*x^2)/(2*c) + ((c*f - b*h + (2*c^2*d + b^2*h - c*(b*f + 2*a*h)))/\operatorname{Sqrt}[b^2 - 4*a*c])*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]]/(\operatorname{Sqrt}[2]*c^{(3/2)}*\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]) + ((c*f - b*h - (2*c^2*d - b*c*f + b^2*h - 2*a*c*h))/\operatorname{Sqrt}[b^2 - 4*a*c])*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]]/(\operatorname{Sqrt}[2]*c^{(3/2)}*\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]) - ((2*c^2*e - b*c*g + b^2*i - 2*a*c*i)*\operatorname{ArcTanh}[(b + 2*c*x^2)/\operatorname{Sqrt}[b^2 - 4*a*c]])/(2*c^2*\operatorname{Sqrt}[b^2 - 4*a*c]) + ((c*g - b*i)*\operatorname{Log}[a + b*x^2 + c*x^4])/(4*c^2)$

Rule 205

$\operatorname{Int}[(a + (b_*)*(x_)^2)^{-1}, x_Symbol] \rightarrow \operatorname{Simp}[(\operatorname{Rt}[a/b, 2]*\operatorname{ArcTan}[x/\operatorname{Rt}[a/b, 2]])/a, x] /;$ $\operatorname{FreeQ}\{a, b\}, x \&\& \operatorname{PosQ}[a/b]$

Rule 206

```
Int[((a_) + (b_)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[In
t[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1657

```
Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}](a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}](a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]

Rule 1676

Int[(Pq_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> Int[ExpandIntegrand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^2] && Expon[Pq, x^2] > 1

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 24x^5}{a + bx^2 + cx^4} dx &= \int \frac{x(e + gx^2 + 24x^4)}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2 + hx^4}{a + bx^2 + cx^4} dx \\
&= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx + 24x^2}{a + bx + cx^2} dx, x, x^2 \right) + \int \left(\frac{h}{c} + \frac{cd - ah + (cf - bh)x^2}{c(a + bx^2 + cx^4)} \right) dx \\
&= \frac{hx}{c} + \frac{1}{2} \text{Subst} \left(\int \left(\frac{24}{c} - \frac{24a - ce + (24b - cg)x}{c(a + bx + cx^2)} \right) dx, x, x^2 \right) + \frac{\int \frac{cd - ah + (cf - bh)x^2}{a + bx^2 + cx^4} dx}{c} \\
&= \frac{hx}{c} + \frac{12x^2}{c} - \frac{\text{Subst} \left(\int \frac{24a - ce + (24b - cg)x}{a + bx + cx^2} dx, x, x^2 \right)}{2c} + \frac{(cf - bh - \frac{2c^2d - bcf + c^2e}{\sqrt{b^2 - 4ac}}) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{(cf - bh) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{(cf - bh) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} \\
&= \frac{hx}{c} + \frac{12x^2}{c} + \frac{(cf - bh + \frac{2c^2d + b^2h - c(bf + 2ah)}{\sqrt{b^2 - 4ac}}) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{(cf - bh) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{(cf - bh) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} \\
&= \frac{hx}{c} + \frac{12x^2}{c} + \frac{(cf - bh + \frac{2c^2d + b^2h - c(bf + 2ah)}{\sqrt{b^2 - 4ac}}) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{(cf - bh) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{(cf - bh) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}}
\end{aligned}$$

Mathematica [A] time = 0.65, size = 441, normalized size = 1.37

$$\frac{2\sqrt{2}\sqrt{c}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(c\left(f\sqrt{b^2-4ac}-2ah-bf\right)+bh\left(b-\sqrt{b^2-4ac}\right)+2c^2d\right)}{\sqrt{b^2-4ac}\sqrt{b-\sqrt{b^2-4ac}}}-\frac{2\sqrt{2}\sqrt{c}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{\sqrt{b^2-4ac}+b}}\right)\left(-c\left(f\sqrt{b^2-4ac}+2ah+bf\right)+bh\left(\sqrt{b^2-4ac}+b\right)\right)}{\sqrt{b^2-4ac}\sqrt{\sqrt{b^2-4ac}+b}}$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4), x]

[Out] (4*c*h*x + 2*c*i*x^2 + (2*Sqrt[2]*Sqrt[c]*(2*c^2*d + b*(b - Sqrt[b^2 - 4*a*c]))*h + c*(-(b*f) + Sqrt[b^2 - 4*a*c]*f - 2*a*h))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]]/(Sqrt[b^2 - 4*a*c]*Sqrt[b - Sqrt[b^2 - 4*a*c]]) - (2*Sqrt[2]*Sqrt[c]*(2*c^2*d + b*(b + Sqrt[b^2 - 4*a*c]))*h - c*(b*f + Sqrt[b^2 - 4*a*c]*f + 2*a*h))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]]/(Sqrt[b^2 - 4*a*c]*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((2*c^2*e + b*(b - Sqrt[b^2 - 4*a*c])*i + c*(-(b*g) + Sqrt[b^2 - 4*a*c]*g - 2*a*i))*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/Sqrt[b^2 - 4*a*c] - ((2*c^2*e + b*(b + Sqrt[b^2 - 4*a*c])*i - c*(b*g + Sqrt[b^2 - 4*a*c]*g + 2*a*i))*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/Sqrt[b^2 - 4*a*c])/(4*c^2)

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a),x, algorithm="fricas")

[Out] Timed out

giac [B] time = 3.72, size = 6096, normalized size = 18.99

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^4+b*x^2+a),x, algorithm="giac")

[Out] 1/4*(c*g - b*i)*log(abs(c*x^4 + b*x^2 + a))/c^2 + 1/2*(c*i*x^2 + 2*c*h*x)/c^2 + 1/8*((2*b^4*c^3 - 16*a*b^2*c^4 + 32*a^2*c^5 - sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^4*c + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3*c^2 - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - s

$$\begin{aligned}
& \text{qrt}(b^2 - 4ac) * c) * a^2 * c^3 - 8 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * b * c^3 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * c^4 - 2 * (b^2 - 4ac) * b^2 * c^3 + 8 * (b^2 - 4ac) * a * c^4) * c^2 * f - (2 * b^5 * c^2 - 16 * a * b^3 * c^3 + 32 * a^2 * b * c^4 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b^5 + 8 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * b^3 * c + 2 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b^4 * c - 16 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a^2 * b * c^2 - 8 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * b^2 * c^2 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b^3 * c^2 + 4 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * b * c^3 - 2 * (b^2 - 4ac) * b^3 * c^2 + 8 * (b^2 - 4ac) * a * b * c^3) * c^2 * h + 2 * (\text{sqrt}(2) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b^4 * c^3 - 8 * \text{sqrt}(2) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * b^2 * c^4 - 2 * \text{sqrt}(2) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b^3 * c^4 + 2 * b^4 * c^4 + 16 * \text{sqrt}(2) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a^2 * c^5 + 8 * \text{sqrt}(2) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * b * c^5 + \text{sqrt}(2) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b^2 * c^5 - 16 * a * b^2 * c^5 - 4 * \text{sqrt}(2) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * c^6 + 32 * a^2 * c^6 - 2 * (b^2 - 4ac) * b^2 * c^4 + 8 * (b^2 - 4ac) * a * c^5) * d * \text{abs}(c) - 2 * (\text{sqrt}(2) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * b^4 * c^2 - 8 * \text{sqrt}(2) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a^2 * b^2 * c^3 - 2 * \text{sqrt}(2) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * b^3 * c^3 + 2 * a * b^4 * c^3 + 16 * \text{sqrt}(2) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a^3 * c^4 + 8 * \text{sqrt}(2) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a^2 * b * c^4 + \text{sqrt}(2) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * b^2 * c^4 - 16 * a^2 * b^2 * c^4 - 4 * \text{sqrt}(2) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a^2 * c^5 + 32 * a^3 * c^5 - 2 * (b^2 - 4ac) * a * b^2 * c^3 + 8 * (b^2 - 4ac) * a^2 * c^4) * h * \text{abs}(c) + 2 * (2 * b^3 * c^6 - 8 * a * b * c^7 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b^3 * c^4 + 4 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * b * c^5 + 2 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b^2 * c^5 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b * c^6 - 2 * (b^2 - 4ac) * b * c^6) * d - (2 * b^4 * c^5 - 8 * a * b^2 * c^6 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b^4 * c^3 + 4 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * b^2 * c^4 + 2 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b^3 * c^4 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b^2 * c^5 - 2 * (b^2 - 4ac) * b^2 * c^5) * f + (2 * b^5 * c^4 - 12 * a * b^3 * c^5 + 16 * a^2 * b * c^6 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b^5 * c^2 + 6 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * b^3 * c^3 + 2 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b^4 * c^3 - 8 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a^2 * b * c^4 - 4 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * b^2 * c^4 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * b^3 * c^4 + 2 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc - \text{sqrt}(b^2 - 4ac) * c) * a * b * c^5 - 2 * (b^2 - 4ac) * b^3 * c^4 + 4 * (b^2 - 4ac) * a * b * c^5) * h) * \arctan(2 * \text{sqrt}(1/2) * x / \text{sqrt}((b * c^5 + \text{sqrt}(b^2 * c^10 - 4 * a * c^11)) / c^6)) / ((a * b^4 * c^3 - 8 * a^2 * b^2 * c^4 - 2 * a * b^3 * c^4 + 16 * a^3 * c^5 + 8 * a^2 * b * c^5 + a * b^2 * c^5 - 4 * a^2 * c^6) * c^2) - 1/8 * ((2 * b^4 * c^3 - 16 * a * b^2 * c^4 + 32 * a^2 * c^5 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4ac) * \text{sqrt}(bc + \text{sqrt}(b^2 - 4ac) * c) * b^4 * c + 8 * \text{sqrt}(2) * \text{sqrt}(
\end{aligned}$$

$$\begin{aligned}
& b^2 - 4ac) \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^2 + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^2 - 16\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^3 - 8\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^3 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^3 + 4\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^3 + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^4 - 2(b^2 - 4ac) b^2 c^3 + 8(b^2 - 4ac) a^2 c^4) \cdot c^2 f - (2b^5 c^2 - 16a^2 b^3 c^3 + 32a^2 b^2 c^4 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^5 + 8\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^2 + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^4 c^2 - 16\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^2 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^2 + 4\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^2 + 4\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^2 - 2(b^2 - 4ac) b^3 c^2 + 8(b^2 - 4ac) a^2 b^3 c^3) \cdot c^2 h - 2(\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^4 c^3 - 8\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^4 - 2\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^4 - 2b^4 c^4 + 16\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 c^5 + 8\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^5 + \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^5 + \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^5 + 16a^2 b^2 c^5 - 4\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 c^6 - 32a^2 c^6 + 2(b^2 - 4ac) b^2 c^4 - 8(b^2 - 4ac) a^2 c^5) \cdot d \cdot \text{abs}(c) + 2(\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^4 c^2 - 8\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^3 - 2\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^3 - 2a^2 b^4 c^3 + 16\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^3 c^4 + 8\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^4 + \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^4 + 16a^2 b^2 c^4 - 4\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 c^5 - 32a^3 c^5 + 2(b^2 - 4ac) a^2 b^2 c^3 - 8(b^2 - 4ac) a^2 c^4) \cdot h \cdot \text{abs}(c) + 2(2b^3 c^6 - 8a^2 b^3 c^7 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot b^3 c^4 + 4\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^5 + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^5 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot b^2 c^5 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot b^2 c^6 - 2(b^2 - 4ac) b^2 c^6) \cdot d - (2b^4 c^5 - 8a^2 b^2 c^6 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot b^4 c^3 + 4\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^4 + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^4 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot b^2 c^5 - 2(b^2 - 4ac) b^2 c^5) \cdot f + (2b^5 c^4 - 12a^2 b^3 c^5 + 16a^2 b^2 c^6 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot b^5 c^2 + 6\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^3 + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^4 c^3 - 8\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^4 - 4\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^4 + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^4 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^4 + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^4 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^4 + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^2 c^4 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot a^2 b^3 c^4 + 4(b^2 - 4ac) a^2 b^2 c^5) \cdot h) \cdot \arctan(2\sqrt{2} \sqrt{1/2} \cdot x / \sqrt{(b^2 c^5 - \sqrt{b^2 c^{10} - 4a^2 c^{11}}) / c^6}) / ((a^2 b^4 c^3 - 8a^2 b^2 c^4 - 2a^2 b^3 c^4 + 16a^3 c^5 + 8a^2 b^2 c^5) \cdot c^6)
\end{aligned}$$

$$\begin{aligned}
& ^2*b*c^5 + a*b^2*c^5 - 4*a^2*c^6)*c^2) + 1/16*(b^7*c - 10*a*b^5*c^2 - 2*b^6*c^2 + 32*a^2*b^3*c^3 + 12*a*b^4*c^3 + b^5*c^3 - 32*a^3*b*c^4 - 16*a^2*b^2*c^4 - 6*a*b^3*c^4 + 8*a^2*b*c^5 + (b^7 - 10*a*b^5*c - 2*b^6*c + 32*a^2*b^3*c^2 + 12*a*b^4*c^2 + b^5*c^2 - 32*a^3*b*c^3 - 16*a^2*b^2*c^3 - 6*a*b^3*c^3 + 8*a^2*b*c^4 - (b^6 - 10*a*b^4*c - 2*b^5*c + 32*a^2*b^2*c^2 + 12*a*b^3*c^2 + b^4*c^2 - 32*a^3*c^3 - 16*a^2*b*c^3 - 6*a*b^2*c^3 + 8*a^2*c^4)*sqrt(b^2 - 4*a*c))*abs(c) - (b^6*c - 6*a*b^4*c^2 - 2*b^5*c^2 + 8*a^2*b^2*c^3 + 4*a*b^3*c^3 + b^4*c^3 - 2*a*b^2*c^4)*sqrt(b^2 - 4*a*c))*i*log(x^2 + 1/2*(b*c^5 + sqrt(b^2*c^10 - 4*a*c^11))/c^6)/((a*b^4*c - 8*a^2*b^2*c^2 - 2*a*b^3*c^2 + 16*a^3*c^3 + 8*a^2*b*c^3 + a*b^2*c^3 - 4*a^2*c^4)*c^2*abs(c)) + 1/16*(b^7*c - 10*a*b^5*c^2 - 2*b^6*c^2 + 32*a^2*b^3*c^3 + 12*a*b^4*c^3 + b^5*c^3 - 32*a^3*b*c^4 - 16*a^2*b^2*c^4 - 6*a*b^3*c^4 + 8*a^2*b*c^5 + (b^7 - 10*a*b^5*c - 2*b^6*c + 32*a^2*b^3*c^2 + 12*a*b^4*c^2 + b^5*c^2 - 32*a^3*b*c^3 - 16*a^2*b^2*c^3 - 6*a*b^3*c^3 + 8*a^2*b*c^4 + (b^6 - 10*a*b^4*c - 2*b^5*c + 32*a^2*b^2*c^2 + 12*a*b^3*c^2 + b^4*c^2 - 32*a^3*c^3 - 16*a^2*b*c^3 - 6*a*b^2*c^3 + 8*a^2*c^4)*sqrt(b^2 - 4*a*c))*abs(c) + (b^6*c - 6*a*b^4*c^2 - 2*b^5*c^2 + 8*a^2*b^2*c^3 + 4*a*b^3*c^3 + b^4*c^3 - 2*a*b^2*c^4)*sqrt(b^2 - 4*a*c))*i*log(x^2 + 1/2*(b*c^5 - sqrt(b^2*c^10 - 4*a*c^11))/c^6)/((a*b^4*c - 8*a^2*b^2*c^2 - 2*a*b^3*c^2 + 16*a^3*c^3 + 8*a^2*b*c^3 + a*b^2*c^3 - 4*a^2*c^4)*c^2*abs(c)) - 1/16*((b^6 - 8*a*b^4*c - 2*b^5*c + 16*a^2*b^2*c^2 + 8*a*b^3*c^2 + b^4*c^2 - 4*a*b^2*c^3 - (b^5 - 8*a*b^3*c - 2*b^4*c + 16*a^2*b*c^2 + 8*a*b^2*c^2 + b^3*c^2 - 4*a*b*c^3)*sqrt(b^2 - 4*a*c))*g*abs(c) - 2*(b^5*c - 8*a*b^3*c^2 - 2*b^4*c^2 + 16*a^2*b*c^3 + 8*a*b^2*c^3 + b^3*c^3 - 4*a*b*c^4 - (b^4*c - 8*a*b^2*c^2 - 2*b^3*c^2 + 16*a^2*c^3 + 8*a*b*c^3 + b^2*c^3 - 4*a*c^4)*sqrt(b^2 - 4*a*c))*abs(c)*e + (b^6*c - 8*a*b^4*c^2 - 2*b^5*c^2 + 16*a^2*b^2*c^3 + 8*a*b^3*c^3 + b^4*c^3 - 4*a*b^2*c^4 - (b^5*c - 4*a*b^3*c^2 - 2*b^4*c^2 + b^3*c^3)*sqrt(b^2 - 4*a*c))*g - 2*(b^5*c^2 - 8*a*b^3*c^3 - 2*b^4*c^3 + 16*a^2*b*c^4 + 8*a*b^2*c^4 + b^3*c^4 - 4*a*b*c^5 - (b^4*c^2 - 4*a*b^2*c^3 - 2*b^3*c^3 + b^2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(x^2 + 1/2*(b*c^5 + sqrt(b^2*c^10 - 4*a*c^11))/c^6)/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(c)) - 1/16*((b^6 - 8*a*b^4*c - 2*b^5*c + 16*a^2*b^2*c^2 + 8*a*b^3*c^2 + b^4*c^2 - 4*a*b^2*c^3 + (b^5 - 8*a*b^3*c - 2*b^4*c + 16*a^2*b*c^2 + 8*a*b^2*c^2 + b^3*c^2 - 4*a*b*c^3)*sqrt(b^2 - 4*a*c))*g*abs(c) - 2*(b^5*c - 8*a*b^3*c^2 - 2*b^4*c^2 + 16*a^2*b*c^3 + 8*a*b^2*c^3 + b^3*c^3 - 4*a*b*c^4 + (b^4*c - 8*a*b^2*c^2 - 2*b^3*c^2 + 16*a^2*c^3 + 8*a*b*c^3 + b^2*c^3 - 4*a*c^4)*sqrt(b^2 - 4*a*c))*abs(c)*e + (b^6*c - 8*a*b^4*c^2 - 2*b^5*c^2 + 16*a^2*b^2*c^3 + 8*a*b^3*c^3 + b^4*c^3 - 4*a*b^2*c^4 + (b^5*c - 4*a*b^3*c^2 - 2*b^4*c^2 + b^3*c^3)*sqrt(b^2 - 4*a*c))*g - 2*(b^5*c^2 - 8*a*b^3*c^3 - 2*b^4*c^3 + 16*a^2*b*c^4 + 8*a*b^2*c^4 + b^3*c^4 - 4*a*b*c^5 + (b^4*c^2 - 4*a*b^2*c^3 - 2*b^3*c^3 + b^2*c^4)*sqrt(b^2 - 4*a*c))*e)*log(x^2 + 1/2*(b*c^5 - sqrt(b^2*c^10 - 4*a*c^11))/c^6)/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(c))
\end{aligned}$$

maple [B] time = 0.04, size = 1435, normalized size = 4.47

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a), x)$

[Out]
$$\begin{aligned} & -1/2*(-4*a*c+b^2)/(4*a*c-b^2)/c*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*a \\ & \text{rctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*h+1/2*(-4*a*c+b^2)^{(1/2)} \\ & /((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)+1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x \\ & +1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x \\ & *b*f+c*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x \\ & *d-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x \\ & +1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x \\ & +1/4*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*b/c*g*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})-1/4*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*b/c*g*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)}) \\ & +1/c*h*x-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*e*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})+1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*e*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)}) \\ & -(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*a*h*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x) \\ & -(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*a*h-1/4*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)/c*g*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})-1/4*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)/c*g*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)}) \\ & +1/2*i*x^2/c+1/4*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)/c^2*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*b*i+1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)/c*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*a*i-1/4*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)/c^2*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*b^2*i+1/4*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)/c^2*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*b*i-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)/c*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*a*i+1/4*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)/c^2*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*b^2*i \end{aligned}$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\frac{ix^2 + 2hx}{2c} - \int \frac{(cg-bi)x^3 + (cf-bh)x^2 + cd-ah+(ce-ai)x}{cx^4+bx^2+a} dx$$

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^4+b*x^2+a),x, algorithm="maxima")

[Out] $\frac{1}{2}(i*x^2 + 2*h*x)/c - \text{integrate}(-((c*g - b*i)*x^3 + (c*f - b*h)*x^2 + c*d - a*h + (c*e - a*i)*x)/(c*x^4 + b*x^2 + a), x)/c$

mupad [B] time = 2.03, size = 11383, normalized size = 35.46

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4),x)

[Out] $\text{symsum}(\log((x*(c^4*e^3 - a^3*c*i^3 + c^4*d^2*g + b^4*e*i^2 + a^2*b^2*i^3 + b^2*c^2*e*g^2 + 3*a^2*c^2*e*i^2 + a^2*c^2*g*h^2 + 2*b^2*c^2*e^2*i - a^2*c^2*g^2*i - 2*c^4*d*e*f - a*b*c^2*g^3 + a*c^3*e*g^2 + b*c^3*e*f^2 - a*c^3*f^2*g - 2*b*c^3*e^2*g - 3*a*c^3*e^2*i - b*c^3*d^2*i + b^3*c*e*h^2 - a*b^3*g*i^2 - 2*a*b*c^2*e*h^2 - 3*a*b^2*c*e*i^2 - a*b^2*c*g*h^2 + 2*a*b^2*c*g^2*i + a^2*b*c*h^2*i - 2*b^2*c^2*e*f*h - 2*a^2*c^2*f*h*i + 2*b*c^3*d*e*h + 2*a*c^3*d*f*i - 2*a*c^3*d*g*h + 2*a*c^3*e*f*h - 2*b^3*c*e*g*i + 2*a*b*c^2*e*g*i + 2*a*b*c^2*f*g*h))/c^2 - (a*c^3*f^3 - c^4*d*e^2 + c^4*d^2*f - b^4*d*i^2 - b^2*c^2*d*g^2 - a^2*c^2*d*i^2 + a^2*c^2*f*h^2 - a^2*c^2*g^2*h - a^2*b^2*h*i^2 - a^2*b*c*h^3 + a*c^3*d*g^2 - b*c^3*d*f^2 + a*c^3*e^2*h - b*c^3*d^2*h - b^3*c*d*h^2 + a*b^3*f*i^2 + a^3*c*h*i^2 + 2*a*b*c^2*d*h^2 + a*b*c^2*f*g^2 + 3*a*b^2*c*d*i^2 - 2*a*b*c^2*f^2*h + a*b^2*c*f*h^2 - 2*a^2*b*c*f*i^2 - 2*b^2*c^2*d*e*i + 2*b^2*c^2*d*f*h - 2*a^2*c^2*e*h*i + 2*a^2*c^2*f*g*i + 2*b*c^3*d*e*g + 2*a*c^3*d*e*i - 2*a*c^3*d*f*h - 2*a*c^3*e*f*g + 2*b^3*c*d*g*i - 4*a*b*c^2*d*g*i + 2*a*b*c^2*e*f*i - 2*a*b^2*c*f*g*i + 2*a^2*b*c*g*h*i))/c^2 - \text{root}(128*a^2*b^2*c^5*z^4 - 16*a*b^4*c^4*z^4 - 256*a^3*c^6*z^4 + 128*a^2*b^3*c^3*i*z^3 - 128*a^2*b^2*c^4*g*z^3 - 256*a^3*b*c^4*i*z^3 - 16*a*b^5*c^2*i*z^3 + 16*a*b^4*c^3*g*z^3 + 256*a^3*c^5*g*z^3 + 160*a^3*b*c^3*g*i*z^2 + 8*a*b^4*c^2*f*h*z^2 + 8*a*b^4*c^2*e*i*z^2 + 32*a^2*b*c^4*e*g*z^2 + 32*a^2*b*c^4*d*h*z^2 - 8*a*b^3*c^3*e*g*z^2 - 8*a*b^3*c^3*d*h*z^2 + 16*a*b^2*c^4*d*f*z^2 + 8*a*b^5*c*g*i*z^2 - 72*a^2*b^3*c^2*g*i*z^2 - 48*a^2*b^2*c^3*f*h*z^2 - 48*a^2*b^2*c^3*e*i*z^2 + 32*a^2*b^4*c*i^2*z^2 - 48*a^3*b*c^3*h^2*z^2 - 4*a*b^4*c^2*g^2*z^2 + 16*a^2*b*c^4*f^2*z^2 - 4*a*b^3*c^3*f^2*z^2 + 8*a*b^2*c^4*e^2*z^2 + 64*a^3*c^4*f*h*z^2 + 64*a^3*c^4*e*i*z^2 - 64*a^2*c^5*d*f*z^2 - 4*a*b^5*c*h^2*z^2 + 16*a*b*c^5*d^2*z^2 - 56*a^3*b^2*c^2*i^2*z^2 + 28*a^2*b^3*c^2*h^2*z^2 + 40*a^2*b^2*c^3*g^2*z^2 - 32*a^4*c^3*i^2*z^2 - 96*a^3*c^4*g^2*z^2 - 32*a^2*c^5*e^2*z^2 - 4*b^3*c^4*d^2*z^2 - 4*a*b^6*i^2*z^2 + 32*a^2*b*c^3*e*f*h*z - 32*a^2*b*c^3*d*f*i*z - 8*a*b^3*c^2*e*f*h*z + 8*a*b^3*c^2*d*f*i*z - 8*a*b^2*c^3*d*f*g*z + 8*a*b^2*c^3*d*e*h*z - 8*a*b^4*c*e*g*i*z + 40*a^2*b^2*c^2*e*g*i*z + 8*a^2*b^2*c^2*f*g*h*z - 8*a^2*b^2*c^2*d*h*i*z + 4*a^3*b^2*c*h^2$

$$\begin{aligned}
& i*z - 32*a^3*b*c^2*g^2*i*z + 12*a^3*b^2*c*g*i^2*z + 8*a^2*b^3*c*g^2*i*z + \\
& 16*a^3*b*c^2*g*h^2*z - 4*a^2*b^3*c*g*h^2*z + 32*a^3*b*c^2*e*i^2*z - 24*a^2* \\
& b^3*c*e*i^2*z - 16*a^2*b*c^3*e^2*i*z + 4*a*b^3*c^2*e^2*i*z + 20*a*b^2*c^3*d \\
& ^2*i*z - 16*a^2*b*c^3*e*g^2*z + 4*a*b^3*c^2*e*g^2*z - 4*a*b^2*c^3*e^2*g*z + \\
& 4*a*b^2*c^3*e*f^2*z - 32*a^3*c^3*f*g*h*z - 32*a^3*c^3*e*g*i*z + 32*a^3*c^3 \\
& *d*h*i*z + 32*a^2*c^4*d*f*g*z - 32*a^2*c^4*d*e*h*z + 4*a*b^4*c*e*h^2*z - 16 \\
& *a*b*c^4*d^2*g*z - 4*a^2*b^2*c^2*f^2*i*z - 20*a^2*b^2*c^2*e*h^2*z - 4*a^2*b \\
& ^2*c^2*g^3*z - 16*a^4*c^2*h^2*i*z + 16*a^4*c^2*g*i^2*z + 16*a^3*c^3*f^2*i*z \\
& - 4*a^2*b^4*g*i^2*z - 4*b^4*c^2*d^2*i*z + 16*a^3*c^3*e*h^2*z - 16*a^2*c^4* \\
& d^2*i*z + 16*a^2*c^4*e^2*g*z + 4*b^3*c^3*d^2*g*z - 16*a^2*c^4*e*f^2*z - 4*b \\
& ^2*c^4*d^2*e*z + 4*a*b^5*e*i^2*z - 16*a^4*b*c*i^3*z + 16*a*c^5*d^2*e*z + 4* \\
& a^3*b^3*i^3*z + 16*a^3*c^3*g^3*z + 4*a^2*b^2*c*d*g*h*i + 12*a^2*b*c^2*d*f*g \\
& *i - 4*a^2*b*c^2*e*f*g*h - 4*a^2*b*c^2*d*e*h*i + 4*a*b^2*c^2*d*e*f*i - 4*a^ \\
& 3*b*c*f*g*h*i - 4*a*b^3*c*d*f*g*i - 4*a*b*c^3*d*e*f*g + 2*a^2*b^2*c*f^2*g*i \\
& - 4*a^2*b^2*c*e*g^2*i - 2*a^2*b*c^2*e^2*g*i - 8*a*b^2*c^2*d^2*g*i + 2*a^2*b \\
& ^2*c*e*g*h^2 - 2*a^2*b*c^2*e*f^2*i - 8*a^2*b^2*c*d*f*i^2 - 2*a^2*b*c^2*d*g \\
& ^2*h + 2*a*b^2*c^2*e^2*f*h - 4*a*b^2*c^2*d*f^2*h - 2*a^2*b*c^2*d*f*h^2 + 2* \\
& a*b^2*c^2*d*f*g^2 + 8*a^3*c^2*e*f*h*i - 8*a^3*c^2*d*g*h*i + 8*a^2*c^3*d*e*g \\
& *h - 8*a^2*c^3*d*e*f*i - 2*a^3*b*c*e*h^2*i + 6*a^3*b*c*d*h*i^2 - 2*a^3*b*c* \\
& e*g*i^2 + 2*a*b^3*c*e^2*g*i + 6*a*b*c^3*d^2*e*i + 2*a*b^3*c*d*f*h^2 - 2*a*b \\
& *c^3*d^2*f*h - 2*a*b*c^3*d*e^2*h + 4*a^2*b^2*c*e^2*i^2 - 5*a^2*b*c^2*d^2*i^ \\
& 2 + 3*a^2*b*c^2*e^2*h^2 + 4*a*b^2*c^2*d^2*h^2 - 4*a^3*c^2*f^2*g*i + 2*a^3*b \\
& ^2*f*h*i^2 + 4*a^3*c^2*f*g^2*h + 4*a^3*c^2*e*g^2*i - 4*a^3*c^2*e*g*h^2 + 4* \\
& a^2*c^3*d^2*g*i + 2*a^2*b^3*e*g*i^2 - 2*a^2*b^3*d*h*i^2 + 4*a^3*c^2*d*f*i^2 \\
& - 4*a^2*c^3*e^2*f*h + 2*b^3*c^2*d^2*f*h - 2*b^3*c^2*d^2*e*i + 4*a^2*c^3*e* \\
& f^2*g + 4*a^2*c^3*d*f^2*h - 4*a^2*c^3*d*f*g^2 + 3*a^3*b*c*f^2*i^2 + 2*b^2*c \\
& ^3*d^2*e*g + 2*a^2*b*c^2*f^3*h - 2*a*b^2*c^2*e^3*i + 5*a*b^3*c*d^2*i^2 - 2* \\
& a^2*b^2*c*d*h^3 + 2*a^2*b*c^2*e*g^3 + 3*a*b*c^3*d^2*g^2 + 4*a^4*c*g*h^2*i - \\
& 4*a^4*c*f*h*i^2 + 2*b^4*c*d^2*g*i + 2*a^3*b*c*g^3*i + 2*a*b^4*d*f*i^2 - 4* \\
& a*c^4*d^2*e*g + 2*a^3*b*c*f*h^3 + 4*a*c^4*d*e^2*f + 2*a*b*c^3*e^3*g + 2*a*b \\
& *c^3*d*f^3 - a^2*b^2*c*f^2*h^2 - a^2*b*c^2*f^2*g^2 - a*b^2*c^2*e^2*g^2 + 2* \\
& a^4*b*g*i^3 + 4*a^4*c*e*i^3 + 4*a*c^4*d^3*h + 2*b*c^4*d^3*f - a^3*b*c*g^2*h \\
& ^2 - a*b^3*c*e^2*h^2 - 6*a^3*c^2*e^2*i^2 - 2*a^3*c^2*f^2*h^2 - a*b*c^3*e^2* \\
& f^2 - 6*a^2*c^3*d^2*h^2 - 2*a^2*c^3*e^2*g^2 - 2*a^4*c*g^2*i^2 + 4*a^2*c^3*e \\
& ^3*i - 2*b^2*c^3*d^3*h - 2*a^3*b^2*e*i^3 + 4*a^3*c^2*d*h^3 - 2*a*c^4*d^2*f^ \\
& 2 - a^3*b^2*g^2*i^2 - a^2*b^3*f^2*i^2 - b^3*c^2*d^2*g^2 - b^2*c^3*d^2*f^2 - \\
& a^4*b*h^2*i^2 - b^4*c*d^2*h^2 - a*b^4*e^2*i^2 - b*c^4*d^2*e^2 - b^5*d^2*i^ \\
& 2 - a^3*c^2*g^4 - a^2*c^3*f^4 - a^4*c*h^4 - a*c^4*e^4 - a^5*i^4 - c^5*d^4, \\
& z, 1)*(root(128*a^2*b^2*c^5*z^4 - 16*a*b^4*c^4*z^4 - 256*a^3*c^6*z^4 + 128* \\
& a^2*b^3*c^3*i*z^3 - 128*a^2*b^2*c^4*g*z^3 - 256*a^3*b*c^4*i*z^3 - 16*a*b^5* \\
& c^2*i*z^3 + 16*a*b^4*c^3*g*z^3 + 256*a^3*c^5*g*z^3 + 160*a^3*b*c^3*g*i*z^2 \\
& + 8*a*b^4*c^2*f*h*z^2 + 8*a*b^4*c^2*e*i*z^2 + 32*a^2*b*c^4*e*g*z^2 + 32*a^2 \\
& *b*c^4*d*h*z^2 - 8*a*b^3*c^3*e*g*z^2 - 8*a*b^3*c^3*d*h*z^2 + 16*a*b^2*c^4*d \\
& *f*z^2 + 8*a*b^5*c*g*i*z^2 - 72*a^2*b^3*c^2*g*i*z^2 - 48*a^2*b^2*c^3*f*h*z^ \\
& 2 - 48*a^2*b^2*c^3*e*i*z^2 + 32*a^2*b^4*c*i^2*z^2 - 48*a^3*b*c^3*h^2*z^2 -
\end{aligned}$$

$$\begin{aligned}
& 4*a*b^4*c^2*g^2*z^2 + 16*a^2*b*c^4*f^2*z^2 - 4*a*b^3*c^3*f^2*z^2 + 8*a*b^2*c^4*e^2*z^2 + 64*a^3*c^4*f*h*z^2 + 64*a^3*c^4*e*i*z^2 - 64*a^2*c^5*d*f*z^2 \\
& - 4*a*b^5*c^h^2*z^2 + 16*a*b*c^5*d^2*z^2 - 56*a^3*b^2*c^2*i^2*z^2 + 28*a^2*b^3*c^2*h^2*z^2 + 40*a^2*b^2*c^3*g^2*z^2 - 32*a^4*c^3*i^2*z^2 - 96*a^3*c^4*g^2*z^2 \\
& - 32*a^2*c^5*e^2*z^2 - 4*b^3*c^4*d^2*z^2 - 4*a*b^6*i^2*z^2 + 32*a^2*b*c^3*e*f*h*z - 32*a^2*b*c^3*d*f*i*z - 8*a*b^3*c^2*e*f*h*z + 8*a*b^3*c^2*d*f*i*z \\
& - 8*a*b^2*c^3*d*f*g*z + 8*a*b^2*c^3*d*e*h*z - 8*a*b^4*c*e*g*i*z + 40*a^2*b^2*c^2*e*g*i*z + 8*a^2*b^2*c^2*f*g*h*z - 8*a^2*b^2*c^2*d*h*i*z + 4*a^3*b^2*c^2*h^2*i*z \\
& - 32*a^3*b*c^2*g^2*i*z + 12*a^3*b^2*c*g*i^2*z + 8*a^2*b^3*c*g^2*i*z + 16*a^3*b*c^2*g*h^2*z - 4*a^2*b^3*c*g*h^2*z + 32*a^3*b*c^2*e*i^2*z \\
& - 24*a^2*b^3*c*e*i^2*z - 16*a^2*b*c^3*e^2*i*z + 4*a*b^3*c^2*e^2*i*z + 20*a*b^2*c^3*d^2*i*z - 16*a^2*b*c^3*e*g^2*z + 4*a*b^3*c^2*e*g^2*z - 4*a*b^2*c^3*e^2*g*z \\
& + 4*a*b^2*c^3*e*f^2*z - 32*a^3*c^3*f*g*h*z - 32*a^3*c^3*e*g*i*z + 32*a^3*c^3*d*h*i*z + 32*a^2*c^4*d*f*g*z - 32*a^2*c^4*d*e*h*z + 4*a*b^4*c*e*h^2*z \\
& - 16*a*b*c^4*d^2*g*z - 4*a^2*b^2*c^2*f^2*i*z - 20*a^2*b^2*c^2*e*h^2*z - 4*a^2*b^2*c^2*g^3*z - 16*a^4*c^2*h^2*i*z + 16*a^4*c^2*g*i^2*z + 16*a^3*c^3*f^2*i*z \\
& - 4*a^2*b^4*g*i^2*z - 4*b^4*c^2*d^2*i*z + 16*a^3*c^3*e*h^2*z - 16*a^2*c^4*d^2*i*z + 16*a^2*c^4*e^2*g*z + 4*b^3*c^3*d^2*g*z - 16*a^2*c^4*e*f^2*z \\
& - 4*b^2*c^4*d^2*e*z + 4*a*b^5*e*i^2*z - 16*a^4*b*c*i^3*z + 16*a*c^5*d^2*e*z + 4*a^3*b^3*i^3*z + 16*a^3*c^3*g^3*z + 4*a^2*b^2*c*d*g*h*i + 12*a^2*b*c^2*d*f*g*i \\
& - 4*a^2*b*c^2*e*f*g*h - 4*a^2*b*c^2*d*e*h*i + 4*a*b^2*c^2*d*e*f*i - 4*a^3*b*c*f*g*h*i - 4*a*b^3*c*d*f*g*i - 4*a*b*c^3*d*e*f*g + 2*a^2*b^2*c*f^2*g*i \\
& - 4*a^2*b^2*c*e*g^2*i - 2*a^2*b*c^2*e^2*g*i - 8*a*b^2*c^2*d^2*g*i + 2*a^2*b^2*c*e*g*h^2 - 2*a^2*b*c^2*e*f^2*i - 8*a^2*b^2*c*d*f*i^2 - 2*a^2*b*c^2*d*g^2*h \\
& + 2*a*b^2*c^2*e^2*f*h - 4*a*b^2*c^2*d*f^2*h - 2*a^2*b*c^2*d*f*h^2 + 2*a*b^2*c^2*d*f*g^2 + 8*a^3*c^2*e*f*h*i - 8*a^3*c^2*d*g*h*i + 8*a^2*c^3*d*e*g*h \\
& - 8*a^2*c^3*d*e*f*i - 2*a^3*b*c*e*h^2*i + 6*a^3*b*c*d*h*i^2 - 2*a^3*b*c*e*g*i^2 + 2*a*b^3*c*e^2*g*i + 6*a*b*c^3*d^2*e*i + 2*a*b^3*c*d*f*h^2 \\
& - 2*a*b*c^3*d^2*f*h - 2*a*b*c^3*d*e^2*h + 4*a^2*b^2*c*e^2*i^2 - 5*a^2*b*c^2*d^2*i^2 + 3*a^2*b*c^2*e^2*h^2 + 4*a*b^2*c^2*d^2*h^2 - 4*a^3*c^2*f^2*g*i + 2*a^3*b^2*f*h*i^2 \\
& + 4*a^3*c^2*f*g^2*h + 4*a^3*c^2*e*g^2*i - 4*a^3*c^2*e*g*h^2 + 4*a^2*c^3*d^2*g*i + 2*a^2*b^3*e*g*i^2 - 2*a^2*b^3*d*h*i^2 + 4*a^3*c^2*d*f*i^2 - 4*a^2*c^3*e^2*f*h \\
& + 2*b^3*c^2*d^2*f*h - 2*b^3*c^2*d^2*e*i + 4*a^2*c^3*e*f^2*g + 4*a^2*c^3*d*f^2*h - 4*a^2*c^3*d*f*g^2 + 3*a^3*b*c*f^2*i^2 + 2*b^2*c^3*d^2*e*g + 2*a^2*b*c^2*f^3*h \\
& - 2*a*b^2*c^2*e^3*i + 5*a*b^3*c*d^2*i^2 - 2*a^2*b^2*c*d*h^3 + 2*a^2*b*c^2*e*g^3 + 3*a*b*c^3*d^2*g^2 + 4*a^4*c*g*h^2*i - 4*a^4*c*f*h*i^2 + 2*b^4*c*d^2*g*i \\
& + 2*a^3*b*c*g^3*i + 2*a*b^4*d*f*i^2 - 4*a*c^4*d^2*e*g + 2*a^3*b*c*f*h^3 + 4*a*c^4*d*e^2*f + 2*a*b*c^3*e^3*g + 2*a*b*c^3*d*f^3 - a^2*b^2*c*f^2*h^2 \\
& - a^2*b*c^2*f^2*g^2 - a*b^2*c^2*e^2*g^2 + 2*a^4*b*g*i^3 + 4*a^4*c*e*i^3 + 4*a*c^4*d^3*h + 2*b*c^4*d^3*f - a^3*b*c*g^2*h^2 - a*b^3*c*e^2*h^2 - 6*a^3*c^2*e^2*i^2 \\
& - 2*a^3*c^2*f^2*h^2 - a*b*c^3*e^2*f^2 - 6*a^2*c^3*d^2*h^2 - 2*a^2*c^3*e^2*g^2 - 2*a^4*c*g^2*i^2 + 4*a^2*c^3*e^3*i - 2*b^2*c^3*d^3*h - 2*a^3*b^2*e*i^3 \\
& + 4*a^3*c^2*d*h^3 - 2*a*c^4*d^2*f^2 - a^3*b^2*g^2*i^2 - a^2*b^3*f^2*i^2 - b^3*c^2*d^2*g^2 - b^2*c^3*d^2*f^2 - a^4*b*h^2*i^2 - b^4*c*d^2*h^2 - a*b^4*e^2*i^2 - b*c^4*d^2*e^2 -
\end{aligned}$$

$$\begin{aligned}
& b^5 d^2 i^2 - a^3 c^2 g^4 - a^2 c^3 f^4 - a^4 c^3 h^4 - a^5 c^4 e^4 - a^5 i^4 \\
& - c^5 d^4, z, 1) * ((x * (4 b^2 c^4 e - 8 b^3 c^3 g + 16 a^2 c^4 i + 8 b^4 c^2 * \\
& i - 16 a^3 c^5 e + 32 a^2 b^2 c^4 g - 36 a^2 b^2 c^3 i)) / c^2 - (4 b^2 c^4 d + 16 a^2 \\
& c^4 h - 16 a^3 c^5 d - 4 a^2 b^2 c^3 h) / c^2 + (\text{root}(128 a^2 b^2 c^5 z^4 - 16 a^2 \\
& a^3 b^4 c^4 z^4 - 256 a^3 c^6 z^4 + 128 a^2 b^3 c^3 i z^3 - 128 a^2 b^2 c^4 g \\
& z^3 - 256 a^3 b^2 c^4 i z^3 - 16 a^2 b^5 c^2 i z^3 + 16 a^2 b^4 c^3 g z^3 + 256 a^3 \\
& a^3 c^5 g z^3 + 160 a^3 b^2 c^3 g i z^2 + 8 a^2 b^4 c^2 f h z^2 + 8 a^2 b^4 c^2 e \\
& i z^2 + 32 a^2 b^2 c^4 e g z^2 + 32 a^2 b^2 c^4 d h z^2 - 8 a^2 b^3 c^3 e g z^2 \\
& - 8 a^2 b^3 c^3 d h z^2 + 16 a^2 b^2 c^4 d f z^2 + 8 a^2 b^5 c^3 g i z^2 - 72 a^2 b^3 \\
& c^2 g i z^2 - 48 a^2 b^2 c^3 f h z^2 - 48 a^2 b^2 c^3 e i z^2 + 32 a^2 b^2 b^4 \\
& c^4 i^2 z^2 - 48 a^3 b^2 c^3 h^2 z^2 - 4 a^2 b^4 c^2 g^2 z^2 + 16 a^2 b^2 c^4 f^2 \\
& z^2 - 4 a^2 b^3 c^3 f^2 z^2 + 8 a^2 b^2 c^4 e^2 z^2 + 64 a^3 c^4 f h z^2 + 64 \\
& a^3 c^4 e i z^2 - 64 a^2 c^5 d f z^2 - 4 a^2 b^5 c^3 h^2 z^2 + 16 a^2 b^2 c^5 d^2 \\
& z^2 - 56 a^3 b^2 c^2 i^2 z^2 + 28 a^2 b^3 c^2 h^2 z^2 + 40 a^2 b^2 c^3 g^2 z^2 - 32 a^4 \\
& c^3 i^2 z^2 - 96 a^3 c^4 g^2 z^2 - 32 a^2 c^5 e^2 z^2 - 4 b^3 c^4 d^2 z^2 - 4 a^2 b^6 \\
& i^2 z^2 + 32 a^2 b^2 c^3 e f h z - 32 a^2 b^2 c^3 d f i z - 8 a^2 b^3 c^2 e f h z \\
& + 8 a^2 b^3 c^2 d f i z - 8 a^2 b^2 c^3 d f g z + 8 a^2 b^2 c^3 d e h z - 8 a^2 b^4 \\
& c^2 e g i z + 40 a^2 b^2 c^2 e g i z + 8 a^2 b^2 c^2 e g i z + 8 a^2 b^2 c^2 f g h z \\
& - 8 a^2 b^2 c^2 d h i z + 4 a^3 b^2 c^2 h^2 i z - 32 a^3 b^2 c^2 g^2 i z + 12 a^3 b^2 \\
& c^2 g i^2 z + 8 a^2 b^3 c^2 g^2 i z + 16 a^3 b^2 c^2 g h^2 z - 4 a^2 b^3 c^2 g h^2 z \\
& + 32 a^3 b^2 c^2 e i^2 z - 24 a^2 b^3 c^2 e i^2 z - 16 a^2 b^2 c^3 e^2 i z + 4 a^2 b^3 \\
& c^2 e^2 i z + 20 a^2 b^2 c^3 d^2 i z - 16 a^2 b^2 c^3 e g^2 z + 4 a^2 b^2 c^3 e f^2 z - 32 \\
& a^3 c^3 f g h z - 32 a^3 c^3 e g i z + 32 a^3 c^3 d h i z + 32 a^2 c^4 d f g z - 32 a^2 \\
& c^4 d e h z + 4 a^2 b^4 c^2 e h^2 z - 16 a^2 b^2 c^4 d^2 g z - 4 a^2 b^2 c^2 f^2 i z \\
& - 20 a^2 b^2 c^2 e h^2 z - 4 a^2 b^2 c^2 g^3 z - 16 a^4 c^2 h^2 i z + 16 a^4 c^2 g i^2 z \\
& + 16 a^3 c^3 f^2 i z - 4 a^2 b^4 g i^2 z - 4 b^4 c^2 d^2 i z + 16 a^3 c^3 e h^2 z - 16 a^2 \\
& c^4 d^2 i z + 16 a^2 c^4 e^2 g z + 4 b^3 c^3 d^2 g z - 16 a^2 c^4 e f^2 z - 4 b^2 c^4 d^2 \\
& e z + 4 a^2 b^5 e i^2 z - 16 a^4 b^2 c^3 i^3 z + 16 a^3 c^5 d^2 e z + 4 a^3 b^3 i^3 z + 16 \\
& a^3 c^3 g^3 z + 4 a^2 b^2 c^2 d g h i + 12 a^2 b^2 c^2 d f g i - 4 a^2 b^2 c^2 e f g h - 4 \\
& a^2 b^2 c^2 d e h i + 4 a^2 b^2 c^2 d e f i - 4 a^3 b^2 c^2 f g h i - 4 a^2 b^3 c^2 d f g i \\
& - 4 a^2 b^2 c^3 d e f g + 2 a^2 b^2 c^2 f^2 g i - 4 a^2 b^2 c^2 e g^2 i - 2 a^2 b^2 c^2 \\
& e^2 g i - 8 a^2 b^2 c^2 d^2 g i + 2 a^2 b^2 c^2 e g h^2 - 2 a^2 b^2 c^2 e f^2 i - 8 a^2 b^2 \\
& c^2 d f i^2 - 2 a^2 b^2 c^2 d g^2 h + 2 a^2 b^2 c^2 e^2 f h - 4 a^2 b^2 c^2 d f^2 h - 2 a^2 \\
& b^2 c^2 d f h^2 + 2 a^2 b^2 c^2 d f g^2 + 8 a^3 c^2 e f h i - 8 a^3 c^2 d g h i + 8 a^2 c^3 \\
& d e g h - 8 a^2 c^3 d e f i - 2 a^3 b^2 c^2 e h^2 i + 6 a^3 b^2 c^2 d h i^2 - 2 a^3 b^2 c^2 e g i^2 \\
& + 2 a^2 b^3 c^2 e^2 g i + 6 a^2 b^2 c^3 d^2 e i + 2 a^2 b^3 c^2 d f h^2 - 2 a^2 b^2 c^3 d^2 f h \\
& - 2 a^2 b^2 c^3 d e^2 h + 4 a^2 b^2 c^2 e^2 i^2 - 5 a^2 b^2 c^2 d^2 i^2 + 3 a^2 b^2 c^2 e^2 h^2 \\
& + 4 a^2 b^2 c^2 d^2 h^2 - 4 a^3 c^2 f^2 g i + 2 a^3 b^2 f h i^2 + 4 a^3 c^2 f g^2 h + 4 a^3 \\
& c^2 e g^2 i - 4 a^3 c^2 e g h^2 + 4 a^2 c^3 d^2 g i + 2 a^2 b^3 e g i^2 - 2 a^2 b^3 d h i^2 \\
& + 4 a^3 c^2 d f i^2 - 4 a^2 c^3 e^2 f h + 2 b^3 c^2 d^2 f h - 2 b^3 c^2 d^2 e i + 4 a^2 c^3 \\
& e f^2 g + 4 a^2 c^3 d f^2 h - 4 a^2 c^3 d f g^2 + 3 a^3 b^2 c^2 f i^2 + 2 b^2 c^3 d^2 e g + 2 a^2 \\
& b^2 c^2 f
\end{aligned}$$

$$\begin{aligned}
&^3h - 2*a*b^2*c^2*e^3*i + 5*a*b^3*c*d^2*i^2 - 2*a^2*b^2*c*d*h^3 + 2*a^2*b* \\
&c^2*e*g^3 + 3*a*b*c^3*d^2*g^2 + 4*a^4*c*g*h^2*i - 4*a^4*c*f*h*i^2 + 2*b^4*c \\
&*d^2*g*i + 2*a^3*b*c*g^3*i + 2*a*b^4*d*f*i^2 - 4*a*c^4*d^2*e*g + 2*a^3*b*c* \\
&f*h^3 + 4*a*c^4*d*e^2*f + 2*a*b*c^3*e^3*g + 2*a*b*c^3*d*f^3 - a^2*b^2*c*f^2 \\
&*h^2 - a^2*b*c^2*f^2*g^2 - a*b^2*c^2*e^2*g^2 + 2*a^4*b*g*i^3 + 4*a^4*c*e*i^ \\
&3 + 4*a*c^4*d^3*h + 2*b*c^4*d^3*f - a^3*b*c*g^2*h^2 - a*b^3*c*e^2*h^2 - 6*a \\
&^3*c^2*e^2*i^2 - 2*a^3*c^2*f^2*h^2 - a*b*c^3*e^2*f^2 - 6*a^2*c^3*d^2*h^2 - \\
&2*a^2*c^3*e^2*g^2 - 2*a^4*c*g^2*i^2 + 4*a^2*c^3*e^3*i - 2*b^2*c^3*d^3*h - 2 \\
&*a^3*b^2*e*i^3 + 4*a^3*c^2*d*h^3 - 2*a*c^4*d^2*f^2 - a^3*b^2*g^2*i^2 - a^2* \\
&b^3*f^2*i^2 - b^3*c^2*d^2*g^2 - b^2*c^3*d^2*f^2 - a^4*b*h^2*i^2 - b^4*c*d^2 \\
&*h^2 - a*b^4*e^2*i^2 - b*c^4*d^2*e^2 - b^5*d^2*i^2 - a^3*c^2*g^4 - a^2*c^3* \\
&f^4 - a^4*c*h^4 - a*c^4*e^4 - a^5*i^4 - c^5*d^4, z, 1)*x*(8*b^3*c^4 - 32*a* \\
&b*c^5)/c^2) - (4*b*c^4*d*e + 8*a*c^4*d*g - 8*a*c^4*e*f - 4*b^2*c^3*d*g + 4 \\
&*b^3*c^2*d*i + 8*a^2*c^3*f*i - 8*a^2*c^3*g*h - 4*a*b^2*c^2*f*i + 4*a^2*b*c^ \\
&2*h*i - 12*a*b*c^3*d*i + 4*a*b*c^3*e*h + 4*a*b*c^3*f*g)/c^2 + (x*(4*c^5*d^2 \\
&+ 2*b^5*i^2 - 4*a*c^4*f^2 - 2*b*c^4*e^2 + 2*b^4*c*h^2 + 2*b^2*c^3*f^2 + 4* \\
&a^2*c^3*h^2 + 2*b^3*c^2*g^2 - 8*a*b^2*c^2*h^2 + 6*a^2*b*c^2*i^2 - 4*b*c^4*d \\
&*f - 8*a*c^4*d*h + 8*a*c^4*e*g - 4*b^4*c*g*i - 10*a*b*c^3*g^2 - 10*a*b^3*c* \\
&i^2 + 4*b^2*c^3*d*h - 4*b^3*c^2*f*h - 8*a^2*c^3*g*i + 20*a*b^2*c^2*g*i - 4* \\
&a*b*c^3*e*i + 12*a*b*c^3*f*h))/c^2))*root(128*a^2*b^2*c^5*z^4 - 16*a*b^4*c^ \\
&4*z^4 - 256*a^3*c^6*z^4 + 128*a^2*b^3*c^3*i*z^3 - 128*a^2*b^2*c^4*g*z^3 - 2 \\
&56*a^3*b*c^4*i*z^3 - 16*a*b^5*c^2*i*z^3 + 16*a*b^4*c^3*g*z^3 + 256*a^3*c^5* \\
&g*z^3 + 160*a^3*b*c^3*g*i*z^2 + 8*a*b^4*c^2*f*h*z^2 + 8*a*b^4*c^2*e*i*z^2 + \\
&32*a^2*b*c^4*e*g*z^2 + 32*a^2*b*c^4*d*h*z^2 - 8*a*b^3*c^3*e*g*z^2 - 8*a*b^ \\
&3*c^3*d*h*z^2 + 16*a*b^2*c^4*d*f*z^2 + 8*a*b^5*c*g*i*z^2 - 72*a^2*b^3*c^2*g \\
&*i*z^2 - 48*a^2*b^2*c^3*f*h*z^2 - 48*a^2*b^2*c^3*e*i*z^2 + 32*a^2*b^4*c*i^2 \\
&*z^2 - 48*a^3*b*c^3*h^2*z^2 - 4*a*b^4*c^2*g^2*z^2 + 16*a^2*b*c^4*f^2*z^2 - \\
&4*a*b^3*c^3*f^2*z^2 + 8*a*b^2*c^4*e^2*z^2 + 64*a^3*c^4*f*h*z^2 + 64*a^3*c^4 \\
&*e*i*z^2 - 64*a^2*c^5*d*f*z^2 - 4*a*b^5*c*h^2*z^2 + 16*a*b*c^5*d^2*z^2 - 56 \\
&*a^3*b^2*c^2*i^2*z^2 + 28*a^2*b^3*c^2*h^2*z^2 + 40*a^2*b^2*c^3*g^2*z^2 - 32 \\
&*a^4*c^3*i^2*z^2 - 96*a^3*c^4*g^2*z^2 - 32*a^2*c^5*e^2*z^2 - 4*b^3*c^4*d^2* \\
&z^2 - 4*a*b^6*i^2*z^2 + 32*a^2*b*c^3*e*f*h*z - 32*a^2*b*c^3*d*f*i*z - 8*a*b \\
&^3*c^2*e*f*h*z + 8*a*b^3*c^2*d*f*i*z - 8*a*b^2*c^3*d*f*g*z + 8*a*b^2*c^3*d* \\
&e*h*z - 8*a*b^4*c*e*g*i*z + 40*a^2*b^2*c^2*e*g*i*z + 8*a^2*b^2*c^2*f*g*h*z \\
&- 8*a^2*b^2*c^2*d*h*i*z + 4*a^3*b^2*c*h^2*i*z - 32*a^3*b*c^2*g^2*i*z + 12*a \\
&^3*b^2*c*g*i^2*z + 8*a^2*b^3*c*g^2*i*z + 16*a^3*b*c^2*g*h^2*z - 4*a^2*b^3*c \\
&*g*h^2*z + 32*a^3*b*c^2*e*i^2*z - 24*a^2*b^3*c*e*i^2*z - 16*a^2*b*c^3*e^2*i \\
&*z + 4*a*b^3*c^2*e^2*i*z + 20*a*b^2*c^3*d^2*i*z - 16*a^2*b*c^3*e*g^2*z + 4* \\
&a*b^3*c^2*e*g^2*z - 4*a*b^2*c^3*e^2*g*z + 4*a*b^2*c^3*e*f^2*z - 32*a^3*c^3* \\
&f*g*h*z - 32*a^3*c^3*e*g*i*z + 32*a^3*c^3*d*h*i*z + 32*a^2*c^4*d*f*g*z - 32 \\
&*a^2*c^4*d*e*h*z + 4*a*b^4*c*e*h^2*z - 16*a*b*c^4*d^2*g*z - 4*a^2*b^2*c^2*f \\
&^2*i*z - 20*a^2*b^2*c^2*e*h^2*z - 4*a^2*b^2*c^2*g^3*z - 16*a^4*c^2*h^2*i*z \\
&+ 16*a^4*c^2*g*i^2*z + 16*a^3*c^3*f^2*i*z - 4*a^2*b^4*g*i^2*z - 4*b^4*c^2*d \\
&^2*i*z + 16*a^3*c^3*e*h^2*z - 16*a^2*c^4*d^2*i*z + 16*a^2*c^4*e^2*g*z + 4*b \\
&^3*c^3*d^2*g*z - 16*a^2*c^4*e*f^2*z - 4*b^2*c^4*d^2*e*z + 4*a*b^5*e*i^2*z -
\end{aligned}$$

$$\begin{aligned}
& 16a^4b^3c^3z + 16a^5c^2d^2ez + 4a^3b^3i^3z + 16a^3c^3g^3z + \\
& 4a^2b^2c^2d^2g^2h^2i + 12a^2b^2c^2d^2f^2g^2i - 4a^2b^2c^2e^2f^2g^2h - 4a^2b^2c^2d^2e^2h^2i + 4a^2b^2c^2d^2e^2f^2i - 4a^3b^2c^2f^2g^2h^2i - 4a^2b^3c^2d^2f^2g^2i \\
& - 4a^2b^3c^2d^2e^2f^2g + 2a^2b^2c^2f^2g^2i - 4a^2b^2c^2e^2g^2i - 2a^2b^2c^2e^2g^2i - 8a^2b^2c^2d^2g^2i + 2a^2b^2c^2e^2g^2h^2 - 2a^2b^2c^2e^2f^2i - 8a^2b^2c^2d^2f^2i^2 - 2a^2b^2c^2d^2g^2h + 2a^2b^2c^2e^2f^2h - 4a^2b^2c^2d^2f^2h - 2a^2b^2c^2d^2f^2h^2 + 2a^2b^2c^2d^2f^2g^2 + 8a^3c^2e^2f^2h^2i - 8a^3c^2d^2g^2h^2i + 8a^2c^3d^2e^2g^2h - 8a^2c^3d^2e^2f^2i - 2a^3b^2c^2e^2h^2i + 6a^3b^2c^2d^2h^2i^2 - 2a^3b^2c^2e^2g^2i^2 + 2a^2b^3c^2e^2g^2i + 6a^2b^3c^2d^2e^2i + 2a^2b^3c^2d^2f^2h^2 - 2a^2b^3c^2d^2f^2h - 2a^2b^3c^2d^2e^2h + 4a^2b^2c^2e^2i^2 - 5a^2b^2c^2d^2i^2 + 3a^2b^2c^2e^2h^2 + 4a^2b^2c^2d^2h^2 - 4a^3c^2f^2g^2i + 2a^3b^2f^2h^2i^2 + 4a^3c^2f^2g^2h + 4a^3c^2e^2g^2i - 4a^3c^2e^2g^2h^2 + 4a^2c^3d^2g^2i + 2a^2b^3e^2g^2i^2 - 2a^2b^3d^2h^2i^2 + 4a^3c^2d^2f^2i^2 - 4a^2c^3e^2f^2h + 2b^3c^2d^2f^2h - 2b^3c^2d^2e^2i + 4a^2c^3e^2f^2g + 4a^2c^3d^2f^2h - 4a^2c^3d^2f^2g^2 + 3a^3b^2c^2f^2i^2 + 2b^2c^3d^2e^2g + 2a^2b^2c^2f^3h - 2a^2b^2c^2e^3i + 5a^2b^3c^2d^2i^2 - 2a^2b^2c^2d^2h^3 + 2a^2b^2c^2e^2g^3 + 3a^2b^2c^3d^2g^2 + 4a^4c^2g^2h^2i - 4a^4c^2f^2h^2i^2 + 2b^4c^2d^2g^2i + 2a^3b^2c^2g^3i + 2a^2b^4d^2f^2i^2 - 4a^4c^2d^2e^2g + 2a^3b^2c^2f^2h^3 + 4a^4c^2d^2e^2f + 2a^2b^2c^3e^3g + 2a^2b^2c^3d^2f^3 - a^2b^2c^2f^2h^2 - a^2b^2c^2f^2g^2 - a^2b^2c^2e^2g^2 + 2a^4b^2g^2i^3 + 4a^4c^2e^2i^3 + 4a^4c^2d^3h + 2b^4c^2d^3f - a^3b^2c^2g^2h^2 - a^2b^3c^2e^2h^2 - 6a^3c^2e^2i^2 - 2a^3c^2f^2h^2 - a^2b^3c^2e^2f^2 - 6a^2c^3d^2h^2 - 2a^2c^3e^2g^2 - 2a^4c^2g^2i^2 + 4a^2c^3e^3i - 2b^2c^3d^3h - 2a^3b^2e^2i^3 + 4a^3c^2d^2h^3 - 2a^4c^2d^2f^2 - a^3b^2g^2i^2 - a^2b^3f^2i^2 - b^3c^2d^2g^2 - b^2c^3d^2f^2 - a^4b^2h^2i^2 - b^4c^2d^2h^2 - a^2b^4e^2i^2 - b^4c^2d^2e^2 - b^5d^2i^2 - a^3c^2g^4 - a^2c^3f^4 - a^4c^2h^4 - a^4c^2e^4 - a^5i^4 - c^5d^4, z, 1), 1, 1, 4) + (h*x)/c + (i*x^2)/(2*c)
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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**4+b*x**2+a),x)

[Out] Timed out

$$3.25 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{a+bx^2+cx^4} dx$$

Optimal. Leaf size=545

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{c^2(2a^2m+3abk+b^2h)-b^2c(4am+bk)-c^3(2ah+bf)+b^4m+2c^4d}{\sqrt{b^2-4ac}} - c^2(ak+bh) + bc(2am+bk) + b^3(-m) + c^3f\right)}{\sqrt{2}c^{7/2}\sqrt{b-\sqrt{b^2-4ac}}}$$

[Out] $(c^2h+b^2m-c*(a*m+b*k))*x/c^3+1/2*(-b*1+c*j)*x^2/c^2+1/3*(-b*m+c*k)*x^3/c^2+1/4*1*x^4/c+1/5*m*x^5/c+1/4*(c^2g+b^2l-c*(a*1+b*j))*\ln(c*x^4+b*x^2+a)/c^3-1/2*(2*c^3e-c^2*(2*a*j+b*g)-b^3*1+b*c*(3*a*1+b*j))*\operatorname{arctanh}((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/c^3/(-4*a*c+b^2)^{(1/2)}+1/2*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)})/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)}*(c^3f-c^2*(a*k+b*h)-b^3*m+b*c*(2*a*m+b*k)+(2*c^4d-c^3*(2*a*h+b*f)+b^4*m-b^2*c*(4*a*m+b*k)+c^2*(2*a^2*m+3*a*b*k+b^2*h))/(-4*a*c+b^2)^{(1/2)}/c^{(7/2)}*2^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)}+1/2*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)})/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)}*(c^3f-c^2*(a*k+b*h)-b^3*m+b*c*(2*a*m+b*k)+(-2*c^4d+c^3*(2*a*h+b*f)-b^4*m+b^2*c*(4*a*m+b*k)-c^2*(2*a^2*m+3*a*b*k+b^2*h))/(-4*a*c+b^2)^{(1/2)}/c^{(7/2)}*2^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)}$

Rubi [A] time = 4.21, antiderivative size = 545, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 10, integrand size = 55, $\frac{\text{number of rules}}{\text{integrand size}} = 0.182$, Rules used = {1673, 1676, 1166, 205, 1663, 1657, 634, 618, 206, 628}

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{c^2(2a^2m+3abk+b^2h)-b^2c(4am+bk)-c^3(2ah+bf)+b^4m+2c^4d}{\sqrt{b^2-4ac}} - c^2(ak+bh) + bc(2am+bk) + b^3(-m) + c^3f\right)}{\sqrt{2}c^{7/2}\sqrt{b-\sqrt{b^2-4ac}}}$$

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^2 + c*x^4), x]

[Out] $((c^2h + b^2m - c*(b*k + a*m))*x)/c^3 + ((c*j - b*1)*x^2)/(2*c^2) + ((c*k - b*m)*x^3)/(3*c^2) + (1*x^4)/(4*c) + (m*x^5)/(5*c) + ((c^3f - c^2*(b*h + a*k) - b^3*m + b*c*(b*k + 2*a*m) + (2*c^4d - c^3*(b*f + 2*a*h) + b^4*m - b^2*c*(b*k + 4*a*m) + c^2*(b^2*h + 3*a*b*k + 2*a^2*m))/\operatorname{Sqrt}[b^2 - 4*a*c])*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]])]/(\operatorname{Sqrt}[2]*c^{(7/2)}*\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]) + ((c^3f - c^2*(b*h + a*k) - b^3*m + b*c*(b*k + 2*a*m) - (2*c^4d - c^3*(b*f + 2*a*h) + b^4*m - b^2*c*(b*k + 4*a*m) + c^2*(b^2*h + 3*a*b*k + 2*a^2*m))/\operatorname{Sqrt}[b^2 - 4*a*c])*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/$

$$\frac{\sqrt{b + \sqrt{b^2 - 4ac}}}{(\sqrt{2}c^{7/2}\sqrt{b + \sqrt{b^2 - 4ac}}) - ((2c^3e - c^2(bg + 2aj) - b^3l + bc(bj + 3a1))\text{ArcTanh}[(b + 2cx^2)/\sqrt{b^2 - 4ac}])/(2c^3\sqrt{b^2 - 4ac}) + ((c^2g + b^2l - c(bj + a1))\text{Log}[a + bx^2 + cx^4])/(4c^3)}$$
Rule 205

$$\text{Int}[(a_ + (b_)(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(\text{Rt}[a/b, 2] \text{ArcTan}[x/\text{Rt}[a/b, 2]])/a, x] \text{ /; FreeQ}\{a, b\}, x] \ \&\& \ \text{PosQ}[a/b]$$
Rule 206

$$\text{Int}[(a_ + (b_)(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(1 \text{ArcTanh}[(\text{Rt}[-b, 2]x)/\text{Rt}[a, 2]])/(\text{Rt}[a, 2] \text{Rt}[-b, 2]), x] \text{ /; FreeQ}\{a, b\}, x] \ \&\& \ \text{NegQ}[a/b] \ \&\& \ (\text{GtQ}[a, 0] \ || \ \text{LtQ}[b, 0])$$
Rule 618

$$\text{Int}[(a_ + (b_)(x_) + (c_)(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Dist}[-2, \text{Subst}[\text{Int}[1/\text{Simp}[b^2 - 4ac - x^2, x], x], x, b + 2cx], x] \text{ /; FreeQ}\{a, b, c\}, x] \ \&\& \ \text{NeQ}[b^2 - 4ac, 0]$$
Rule 628

$$\text{Int}[(d_ + (e_)(x_))/((a_ + (b_)(x_) + (c_)(x_)^2), x_Symbol] \rightarrow \text{Simp}[(d \text{Log}[\text{RemoveContent}[a + bx + cx^2, x]])/b, x] \text{ /; FreeQ}\{a, b, c, d, e\}, x] \ \&\& \ \text{EqQ}[2cd - be, 0]$$
Rule 634

$$\text{Int}[(d_ + (e_)(x_))/((a_ + (b_)(x_) + (c_)(x_)^2), x_Symbol] \rightarrow \text{Dist}[(2cd - be)/(2c), \text{Int}[1/(a + bx + cx^2), x], x] + \text{Dist}[e/(2c), \text{Int}[(b + 2cx)/(a + bx + cx^2), x], x] \text{ /; FreeQ}\{a, b, c, d, e\}, x] \ \&\& \ \text{NeQ}[2cd - be, 0] \ \&\& \ \text{NeQ}[b^2 - 4ac, 0] \ \&\& \ !\text{NiceSqrtQ}[b^2 - 4ac]$$
Rule 1166

$$\text{Int}[(d_ + (e_)(x_)^2)/((a_ + (b_)(x_)^2 + (c_)(x_)^4), x_Symbol] \rightarrow \text{With}\{q = \text{Rt}[b^2 - 4ac, 2]\}, \text{Dist}[e/2 + (2cd - be)/(2q), \text{Int}[1/(b/2 - q/2 + cx^2), x], x] + \text{Dist}[e/2 - (2cd - be)/(2q), \text{Int}[1/(b/2 + q/2 + cx^2), x], x]] \text{ /; FreeQ}\{a, b, c, d, e\}, x] \ \&\& \ \text{NeQ}[b^2 - 4ac, 0] \ \&\& \ \text{NeQ}[c^2d^2 - a^2e^2, 0] \ \&\& \ \text{PosQ}[b^2 - 4ac]$$
Rule 1657

```
Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rule 1676

```
Int[(Pq_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :> Int[ExpandInte
grand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + jx^5 + kx^6 + lx^7 + mx^8}{a + bx^2 + cx^4} dx &= \int \frac{x(e + gx^2 + jx^4 + lx^6)}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2 + hx^4 + kx^6 + mx^8}{a + bx^2 + cx^4} dx \\
&= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx + jx^2 + lx^3}{a + bx + cx^2} dx, x, x^2 \right) + \int \left(\frac{c^2h + b^2m - c(bk + am)}{c^3} x + \frac{(ck - bm)x^3}{3c^2} + \frac{mx^5}{5c} + \dots \right) dx \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(ck - bm)x^3}{3c^2} + \frac{mx^5}{5c} + \dots \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(cj - bl)x^2}{2c^2} + \frac{(ck - bm)x^3}{3c^2} + \dots \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(cj - bl)x^2}{2c^2} + \frac{(ck - bm)x^3}{3c^2} + \dots \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(cj - bl)x^2}{2c^2} + \frac{(ck - bm)x^3}{3c^2} + \dots \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(cj - bl)x^2}{2c^2} + \frac{(ck - bm)x^3}{3c^2} + \dots
\end{aligned}$$

Mathematica [A] time = 1.29, size = 816, normalized size = 1.50

$$\frac{mx^5}{5c} + \frac{lx^4}{4c} + \frac{(ck - bm)x^3}{3c^2} + \frac{(cj - bl)x^2}{2c^2} + \frac{(mb^2 + c^2h - c(bk + am))x}{c^3} + \frac{(2dc^4 + (-bf + \sqrt{b^2 - 4ac}f - 2ah)c^3 + (2m^2 - b^2c^2))}{c^4}$$

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^2 + c*x^4), x]

[Out] ((c^2*h + b^2*m - c*(b*k + a*m))*x)/c^3 + ((c*j - b*l)*x^2)/(2*c^2) + ((c*k - b*m)*x^3)/(3*c^2) + (1*x^4)/(4*c) + (m*x^5)/(5*c) + ((2*c^4*d + c^3*(-(b*f) + Sqrt[b^2 - 4*a*c]*f - 2*a*h) + b^3*(b - Sqrt[b^2 - 4*a*c])*m + c^2*(b

$$\begin{aligned} &^2h - b\sqrt{b^2 - 4ac}h + 3abk - a\sqrt{b^2 - 4ac}k + 2a^2m) + \\ &b^2k + b\sqrt{b^2 - 4ac}k + 4abm + 2a\sqrt{b^2 - 4ac}m) \\ &)\text{ArcTan}[(\sqrt{2}\sqrt{c}x)/\sqrt{b - \sqrt{b^2 - 4ac}}]/(\sqrt{2}c^{7/2} \\ &)\sqrt{b^2 - 4ac}\sqrt{b - \sqrt{b^2 - 4ac}}) - ((2c^4d - c^3(bf + \sqrt{b^2 - 4ac}f + 2ah) + b^3(b + \sqrt{b^2 - 4ac})m + c^2(b^2h + b \\ &)\sqrt{b^2 - 4ac}h + 3abk + a\sqrt{b^2 - 4ac}k + 2a^2m) - b^2k + b\sqrt{b^2 - 4ac}k + 4abm + 2a\sqrt{b^2 - 4ac}m)\text{ArcTan}[(\sqrt{2}\sqrt{c}x)/\sqrt{b + \sqrt{b^2 - 4ac}}]/(\sqrt{2}c^{7/2}\sqrt{b^2 - 4ac}\sqrt{b + \sqrt{b^2 - 4ac}}) + ((2c^3e + c^2(-b^2g + \sqrt{b^2 - 4ac}g - 2aj) + b^2(-b + \sqrt{b^2 - 4ac})l + c(b^2j - b\sqrt{b^2 - 4ac}j + 3abl - a\sqrt{b^2 - 4ac}l))\text{Log}[-b + \sqrt{b^2 - 4ac} - 2cx^2]/(4c^3\sqrt{b^2 - 4ac}) + ((-2c^3e + c^2(b^2g + \sqrt{b^2 - 4ac}g + 2aj) + b^2(b + \sqrt{b^2 - 4ac})l - c(b^2j + b\sqrt{b^2 - 4ac}j + 3abl + a\sqrt{b^2 - 4ac}l))\text{Log}[b + \sqrt{b^2 - 4ac} + 2cx^2]/(4c^3\sqrt{b^2 - 4ac})) \end{aligned}$$

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a),x, algorithm="fricas")

[Out] Timed out

giac [B] time = 7.21, size = 11831, normalized size = 21.71

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^4+b*x^2+a),x, algorithm="giac")

[Out]
$$\begin{aligned} &-1/8*((2b^4c^5 - 16ab^2c^6 + 32a^2c^7 - \sqrt{2})\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}c})\sqrt{b^4c^3 + 8\sqrt{2})\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}c}) \\ &)\sqrt{b^2 - 4ac}c)^2c^4 + 2\sqrt{2})\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}c})\sqrt{b^3c^4 - 16\sqrt{2})\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}c}) \\ &)\sqrt{b^2 - 4ac}c)^2c^5 - 8\sqrt{2})\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}c})\sqrt{b^2 - 4ac}c)^2c^5 - \sqrt{2})\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}c}) \\ &)\sqrt{b^2 - 4ac}c)^2c^5 + 4\sqrt{2})\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}c})\sqrt{b^2 - 4ac}c)^2c^6 - 2(b^2 - 4ac)b^2c^5 + 8(b^2 - 4ac)a^2c^6)c^2f - (2b^5c^4 - 16ab^3c^5 + 32a^2b^2c^6 - \sqrt{2})\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}c}) \\ &)\sqrt{b^2 - 4ac}c})\sqrt{b^5c^2 + 8\sqrt{2})\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}c})\sqrt{b^2 - 4ac}c})\sqrt{b^3c^3 + 2\sqrt{2})\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}c}) \end{aligned}$$

$$\begin{aligned}
& *a*c)*c)*b^4*c^3 - 16*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
&)*c)*a^2*b*c^4 - 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c \\
&)*a*b^2*c^4 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^3 \\
& *c^4 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b*c^5 \\
& - 2*(b^2 - 4*a*c)*b^3*c^4 + 8*(b^2 - 4*a*c)*a*b*c^5)*c^2*h + (2*b^6*c^3 - 1 \\
& 8*a*b^4*c^4 + 48*a^2*b^2*c^5 - 32*a^3*c^6 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{ \\
& b*c - \sqrt{b^2 - 4*a*c}}*c)*b^6*c + 9*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - s \\
& \sqrt{b^2 - 4*a*c}}*c)*a*b^4*c^2 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{ \\
& b^2 - 4*a*c}}*c)*b^5*c^2 - 24*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 \\
& - 4*a*c}}*c)*a^2*b^2*c^3 - 10*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 \\
& - 4*a*c}}*c)*a*b^3*c^3 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4* \\
& a*c}}*c)*b^4*c^3 + 16*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& *c)*a^3*c^4 + 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a \\
& ^2*b*c^4 + 5*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^ \\
& 2*c^4 - 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*c^5 \\
& - 2*(b^2 - 4*a*c)*b^4*c^3 + 10*(b^2 - 4*a*c)*a*b^2*c^4 - 8*(b^2 - 4*a*c)*a \\
& ^2*c^5)*c^2*k - (2*b^7*c^2 - 20*a*b^5*c^3 + 64*a^2*b^3*c^4 - 64*a^3*b*c^5 - \\
& \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^7 + 10*\sqrt{2} \\
& *\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^5*c + 2*\sqrt{2}*\sqrt{ \\
& b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^6*c - 32*\sqrt{2}*\sqrt{b^2 - \\
& 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^3*c^2 - 12*\sqrt{2}*\sqrt{b^2 - \\
& 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^4*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a* \\
& c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^5*c^2 + 32*\sqrt{2}*\sqrt{b^2 - 4*a*c})*s \\
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^3 + 16*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{ \\
& b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^2*c^3 + 6*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{ \\
& b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^3*c^3 - 8*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b* \\
& c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b*c^4 - 2*(b^2 - 4*a*c)*b^5*c^2 + 12*(b^2 - 4* \\
& a*c)*a*b^3*c^3 - 16*(b^2 - 4*a*c)*a^2*b*c^4)*c^2*m - 2*(\sqrt{2})*\sqrt{b*c - \\
& \sqrt{b^2 - 4*a*c}}*c)*b^4*c^5 - 8*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a* \\
& b^2*c^6 - 2*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^3*c^6 + 2*b^4*c^6 + 1 \\
& 6*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*c^7 + 8*\sqrt{2}*\sqrt{b*c - \sqrt{ \\
& b^2 - 4*a*c}}*c)*a*b*c^7 + \sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^2*c^ \\
& 7 - 16*a*b^2*c^7 - 4*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*c^8 + 32*a^2 \\
& *c^8 - 2*(b^2 - 4*a*c)*b^2*c^6 + 8*(b^2 - 4*a*c)*a*c^7)*d*abs(c) + 2*(\sqrt{2} \\
&)*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^4*c^4 - 8*\sqrt{2}*\sqrt{b*c - \sqrt{b^ \\
& 2 - 4*a*c}}*c)*a^2*b^2*c^5 - 2*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^3 \\
& *c^5 + 2*a*b^4*c^5 + 16*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*c^6 + 8 \\
& *\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b*c^6 + \sqrt{2}*\sqrt{b*c - \sqrt{ \\
& b^2 - 4*a*c}}*c)*a*b^2*c^6 - 16*a^2*b^2*c^6 - 4*\sqrt{2}*\sqrt{b*c - \sqrt{b^ \\
& 2 - 4*a*c}}*c)*a^2*c^7 + 32*a^3*c^7 - 2*(b^2 - 4*a*c)*a*b^2*c^5 + 8*(b^2 - 4 \\
& *a*c)*a^2*c^6)*h*abs(c) - 2*(\sqrt{2})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^5* \\
& c^3 - 8*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^3*c^4 - 2*\sqrt{2})*\sqrt{ \\
& b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^4*c^4 + 2*a*b^5*c^4 + 16*\sqrt{2})*\sqrt{b*c \\
& - \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^5 + 8*\sqrt{2})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c \\
&)*a^2*b^2*c^5 + \sqrt{2})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^3*c^5 - 16*a^2*
\end{aligned}$$

$$\begin{aligned}
& b^3c^5 - 4\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^6c^6 + 32a^3b^6c^6 - 2(b^2 - 4ac)a^2b^3c^4 + 8(b^2 - 4ac)a^2b^5c^5)k\text{abs}(c) + 2(\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^6c^2 - 9\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^4c^3 - 2\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^5c^3 + 2a^2b^6c^3 + 24\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3b^2c^4 + 10\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^3c^4 + \sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^4c^4 - 18a^2b^4c^4 - 16\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^4c^5 - 8\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3b^2c^5 - 5\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^2c^5 + 48a^3b^2c^5 + 4\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3c^6 - 32a^4c^6 - 2(b^2 - 4ac)a^2b^4c^3 + 10(b^2 - 4ac)a^2b^2c^4 - 8(b^2 - 4ac)a^3c^5)m\text{abs}(c) + 2(2b^3c^8 - 8a^2b^9 - \sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^3c^6 + 4\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^7c^7 + 2\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^2c^7 - \sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^4c^5 + 4\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^2c^6 + 2\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^3c^6 - \sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^2c^7 - 2(b^2 - 4ac)b^2c^7)f + (2b^5c^6 - 12a^2b^3c^7 + 16a^2b^8 - \sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^5c^4 + 6\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^3c^5 + 2\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^4c^5 - 8\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^6c^6 - 4\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^2c^6 - \sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^3c^6 + 2\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^7c^7 - 2(b^2 - 4ac)b^3c^6 + 4(b^2 - 4ac)a^2b^7c^7)h - (2b^6c^5 - 14a^2b^4c^6 + 24a^2b^2c^7 - \sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^6c^3 + 7\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^4c^4 + 2\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^5c^4 - 12\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^2c^5 - 6\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^3c^5 - \sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^4c^5 + 3\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^2c^6 - 2(b^2 - 4ac)b^4c^5 + 6(b^2 - 4ac)a^2b^2c^6)k + (2b^7c^4 - 16a^2b^5c^5 + 36a^2b^3c^6 - 16a^3b^7 - \sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^7c^2 + 8\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^5c^3 + 2\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^6c^3 - 18\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^3c^4 - 8\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^4c^4 - \sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^5c^4 + 8\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3b^5c^5 + 4\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^2c^5 + 4\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc - \sqrt{b^2 - 4ac}}c)
\end{aligned}$$

$$\begin{aligned}
& 2 - 4*a*c)*c)*a*b^3*c^5 - 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - \\
& 4*a*c)*c)*a^2*b*c^6 - 2*(b^2 - 4*a*c)*b^5*c^4 + 8*(b^2 - 4*a*c)*a*b^3*c^5 \\
& - 4*(b^2 - 4*a*c)*a^2*b*c^6)*m)*arctan(2*sqrt(1/2)*x/sqrt((b*c^11 + sqrt(b^ \\
& 2*c^22 - 4*a*c^23))/c^12))/((a*b^4*c^5 - 8*a^2*b^2*c^6 - 2*a*b^3*c^6 + 16*a \\
& ^3*c^7 + 8*a^2*b*c^7 + a*b^2*c^7 - 4*a^2*c^8)*c^2) - 1/8*((2*b^4*c^5 - 16*a \\
& *b^2*c^6 + 32*a^2*c^7 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a \\
& *c)*c)*b^4*c^3 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c \\
&)*a*b^2*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b \\
& ^3*c^4 - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c \\
& ^5 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^5 - \\
& sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c^5 + 4*sqrt(\\
& 2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*c^6 - 2*(b^2 - 4*a*c \\
&)*b^2*c^5 + 8*(b^2 - 4*a*c)*a*c^6)*c^2*f - (2*b^5*c^4 - 16*a*b^3*c^5 + 32*a \\
& ^2*b*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*c^ \\
& 2 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 + \\
& 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4*c^3 - 16*s \\
& qrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 - 8*sqrt \\
& (2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 - sqrt(2)*s \\
& qrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c^4 + 4*sqrt(2)*sqrt(b \\
& ^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c^5 - 2*(b^2 - 4*a*c)*b^3*c \\
& ^4 + 8*(b^2 - 4*a*c)*a*b*c^5)*c^2*h + (2*b^6*c^3 - 18*a*b^4*c^4 + 48*a^2*b^ \\
& 2*c^5 - 32*a^3*c^6 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c) \\
& *c)*b^6*c + 9*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b \\
& ^4*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^5*c^ \\
& 2 - 24*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^ \\
& 3 - 10*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^3*c^3 \\
& - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^4*c^3 + 16*sq \\
& rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^4 + 8*sqrt(2) \\
& *sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b*c^4 + 5*sqrt(2)*sq \\
& rt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^4 - 4*sqrt(2)*sqrt(\\
& b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*c^5 - 2*(b^2 - 4*a*c)*b^4* \\
& c^3 + 10*(b^2 - 4*a*c)*a*b^2*c^4 - 8*(b^2 - 4*a*c)*a^2*c^5)*c^2*k - (2*b^7* \\
& c^2 - 20*a*b^5*c^3 + 64*a^2*b^3*c^4 - 64*a^3*b*c^5 - sqrt(2)*sqrt(b^2 - 4*a \\
& *c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^7 + 10*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt \\
& (b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c \\
& + sqrt(b^2 - 4*a*c)*c)*b^6*c - 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt \\
& (b^2 - 4*a*c)*c)*a^2*b^3*c^2 - 12*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt \\
& (b^2 - 4*a*c)*c)*a*b^4*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 \\
& - 4*a*c)*c)*b^5*c^2 + 32*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4* \\
& a*c)*c)*a^3*b*c^3 + 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a* \\
& c)*c)*a^2*b^2*c^3 + 6*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c \\
&)*c)*a*b^3*c^3 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c \\
&)*a^2*b*c^4 - 2*(b^2 - 4*a*c)*b^5*c^2 + 12*(b^2 - 4*a*c)*a*b^3*c^3 - 16*(b^ \\
& 2 - 4*a*c)*a^2*b*c^4)*c^2*m - 2*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^ \\
& 4*c^5 - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^2*c^6 - 2*sqrt(2)*sq
\end{aligned}$$

$$\begin{aligned}
& t(b*c + \sqrt{b^2 - 4*a*c})*c)*b^3*c^6 - 2*b^4*c^6 + 16*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*c^7 + 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b*c^7 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*b^2*c^7 + 16*a*b^2*c^7 - 4*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*c^8 - 32*a^2*c^8 + 2*(b^2 - 4*a*c)*b^2*c^6 - 8*(b^2 - 4*a*c)*a*c^7)*d*abs(c) + 2*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^4*c^4 - 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^2*c^5 - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^3*c^5 - 2*a*b^4*c^5 + 16*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*c^6 + 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b*c^6 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^2*c^6 + 16*a^2*b^2*c^6 - 4*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*c^7 - 32*a^3*c^7 + 2*(b^2 - 4*a*c)*a*b^2*c^5 - 8*(b^2 - 4*a*c)*a^2*c^6)*h*abs(c) - 2*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^5*c^3 - 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^3*c^4 - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^4*c^4 - 2*a*b^5*c^4 + 16*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b*c^5 + 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^2*c^5 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^3*c^5 + 16*a^2*b^3*c^5 - 4*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b*c^6 - 32*a^3*b*c^6 + 2*(b^2 - 4*a*c)*a*b^3*c^4 - 8*(b^2 - 4*a*c)*a^2*b*c^5)*k*abs(c) + 2*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^6*c^2 - 9*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^4*c^3 - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^5*c^3 - 2*a*b^6*c^3 + 24*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b^2*c^4 + 10*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^3*c^4 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^4*c^4 + 18*a^2*b^4*c^4 - 16*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^4*c^5 - 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b*c^5 - 5*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^2*c^5 - 48*a^3*b^2*c^5 + 4*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*c^6 + 32*a^4*c^6 + 2*(b^2 - 4*a*c)*a*b^4*c^3 - 10*(b^2 - 4*a*c)*a^2*b^2*c^4 + 8*(b^2 - 4*a*c)*a^3*c^5)*m*abs(c) + 2*(2*b^3*c^8 - 8*a*b*c^9 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*b^3*c^6 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b*c^7 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*b^2*c^7 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*b*c^8 - 2*(b^2 - 4*a*c)*b*c^8)*d - (2*b^4*c^7 - 8*a*b^2*c^8 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*b^4*c^5 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^2*c^6 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*b^3*c^6 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*b^2*c^7 - 2*(b^2 - 4*a*c)*b^2*c^7)*f + (2*b^5*c^6 - 12*a*b^3*c^7 + 16*a^2*b*c^8 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*b^5*c^4 + 6*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^3*c^5 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*b^4*c^5 - 8*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b*c^6 - 4*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^2*c^6 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*b^3*c^6 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b*c^7 - 2*(b^2 - 4*a*c)*b^3*c^6 + 4*(b^2 - 4*a*c)*a*b*c^7)*h - (2*b^6*c^5 - 14*a*b^4*c^6 + 24*a^2*b^2*c^7 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)
\end{aligned}$$

$$\begin{aligned}
& *c) * b^6 * c^3 + 7 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * c) * a \\
& * b^4 * c^4 + 2 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * c) * b^5 * \\
& c^4 - 12 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * c) * a^2 * b^2 * \\
& c^5 - 6 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * c) * a * b^3 * c^5 \\
& - \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * c) * b^4 * c^5 + 3 * \sqrt{2} * \\
& \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * c) * a * b^2 * c^6 - 2 * (b^2 - \\
& 4 * a * c) * b^4 * c^5 + 6 * (b^2 - 4 * a * c) * a * b^2 * c^6) * k + (2 * b^7 * c^4 - 16 * a * b^5 * c^5 \\
& + 36 * a^2 * b^3 * c^6 - 16 * a^3 * b * c^7 - \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * \\
& c) * b^7 * c^2 + 8 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * c) * a * b^5 * c^3 + 2 * \sqrt{2} * \\
& \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * c) * b^6 * c^3 - 18 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * \\
& c) * a^2 * b^3 * c^4 - 8 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * c) * a * b^4 * c^4 - \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * \\
& b^5 * c^4 + 8 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * c) * a^3 * b \\
& * c^5 + 4 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * c) * a^2 * b^2 * \\
& c^5 + 4 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * c) * a * b^3 * c^5 \\
& - 2 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c + \sqrt{b^2 - 4 * a * c}} * c) * a^2 * b * c^6 - \\
& 2 * (b^2 - 4 * a * c) * b^5 * c^4 + 8 * (b^2 - 4 * a * c) * a * b^3 * c^5 - 4 * (b^2 - 4 * a * c) * a^2 * b \\
& * c^6) * m) * \arctan(2 * \sqrt{1/2} * x / \sqrt{(b * c^{11} - \sqrt{b^2 * c^{22} - 4 * a * c^{23}}) / c^{12}})) / ((a * b^4 * c^5 - 8 * a^2 * b^2 * c^6 - 2 * a * b^3 * c^6 + 16 * a^3 * c^7 + 8 * a^2 * b * c^7 + \\
& a * b^2 * c^7 - 4 * a^2 * c^8) * c^2) + 1/4 * (c^2 * g - b * c * j + b^2 * l - a * c * l) * \log(\text{abs}(c \\
& * x^4 + b * x^2 + a)) / c^3 - 1/16 * ((b^6 * c^2 - 8 * a * b^4 * c^3 - 2 * b^5 * c^3 + 16 * a^2 * \\
& b^2 * c^4 + 8 * a * b^3 * c^4 + b^4 * c^4 - 4 * a * b^2 * c^5 - (b^5 * c^2 - 8 * a * b^3 * c^3 - 2 * \\
& b^4 * c^3 + 16 * a^2 * b * c^4 + 8 * a * b^2 * c^4 + b^3 * c^4 - 4 * a * b * c^5) * \sqrt{b^2 - 4 * a * c} \\
& c)) * g * \text{abs}(c) - (b^7 * c - 10 * a * b^5 * c^2 - 2 * b^6 * c^2 + 32 * a^2 * b^3 * c^3 + 12 * a * b^4 * \\
& c^3 + b^5 * c^3 - 32 * a^3 * b * c^4 - 16 * a^2 * b^2 * c^4 - 6 * a * b^3 * c^4 + 8 * a^2 * b * c^5 \\
& - (b^6 * c - 10 * a * b^4 * c^2 - 2 * b^5 * c^2 + 32 * a^2 * b^2 * c^3 + 12 * a * b^3 * c^3 + b^4 * \\
& c^3 - 32 * a^3 * c^4 - 16 * a^2 * b * c^4 - 6 * a * b^2 * c^4 + 8 * a^2 * c^5) * \sqrt{b^2 - 4 * a * c} \\
& c)) * j * \text{abs}(c) + (b^8 - 11 * a * b^6 * c - 2 * b^7 * c + 40 * a^2 * b^4 * c^2 + 14 * a * b^5 * c^2 + \\
& b^6 * c^2 - 48 * a^3 * b^2 * c^3 - 24 * a^2 * b^3 * c^3 - 7 * a * b^4 * c^3 + 12 * a^2 * b^2 * c^4 - \\
& (b^7 - 11 * a * b^5 * c - 2 * b^6 * c + 40 * a^2 * b^3 * c^2 + 14 * a * b^4 * c^2 + b^5 * c^2 - 48 \\
& * a^3 * b * c^3 - 24 * a^2 * b^2 * c^3 - 7 * a * b^3 * c^3 + 12 * a^2 * b * c^4) * \sqrt{b^2 - 4 * a * c} \\
& c)) * l * \text{abs}(c) - 2 * (b^5 * c^3 - 8 * a * b^3 * c^4 - 2 * b^4 * c^4 + 16 * a^2 * b * c^5 + 8 * a * b^2 * \\
& c^5 + b^3 * c^5 - 4 * a * b * c^6 - (b^4 * c^3 - 8 * a * b^2 * c^4 - 2 * b^3 * c^4 + 16 * a^2 * c^5 \\
& + 8 * a * b * c^5 + b^2 * c^5 - 4 * a * c^6) * \sqrt{b^2 - 4 * a * c}) * \text{abs}(c) * e + (b^6 * c^3 - \\
& 8 * a * b^4 * c^4 - 2 * b^5 * c^4 + 16 * a^2 * b^2 * c^5 + 8 * a * b^3 * c^5 + b^4 * c^5 - 4 * a * b^2 * \\
& c^6 - (b^5 * c^3 - 4 * a * b^3 * c^4 - 2 * b^4 * c^4 + b^3 * c^5) * \sqrt{b^2 - 4 * a * c}) * g - \\
& (b^7 * c^2 - 10 * a * b^5 * c^3 - 2 * b^6 * c^3 + 32 * a^2 * b^3 * c^4 + 12 * a * b^4 * c^4 + b^5 * c^4 \\
& - 32 * a^3 * b * c^5 - 16 * a^2 * b^2 * c^5 - 6 * a * b^3 * c^5 + 8 * a^2 * b * c^6 - (b^6 * c^2 - \\
& 6 * a * b^4 * c^3 - 2 * b^5 * c^3 + 8 * a^2 * b^2 * c^4 + 4 * a * b^3 * c^4 + b^4 * c^4 - 2 * a * b^2 * \\
& c^5) * \sqrt{b^2 - 4 * a * c}) * j + (b^8 * c - 11 * a * b^6 * c^2 - 2 * b^7 * c^2 + 40 * a^2 * b^4 * \\
& c^3 + 14 * a * b^5 * c^3 + b^6 * c^3 - 48 * a^3 * b^2 * c^4 - 24 * a^2 * b^3 * c^4 - 7 * a * b^4 * c^4 \\
& + 12 * a^2 * b^2 * c^5 - (b^7 * c - 7 * a * b^5 * c^2 - 2 * b^6 * c^2 + 12 * a^2 * b^3 * c^3 + 6 * \\
& a * b^4 * c^3 + b^5 * c^3 - 3 * a * b^3 * c^4) * \sqrt{b^2 - 4 * a * c}) * l - 2 * (b^5 * c^4 - 8 * a * \\
& b^3 * c^5 - 2 * b^4 * c^5 + 16 * a^2 * b * c^6 + 8 * a * b^2 * c^6 + b^3 * c^6 - 4 * a * b * c^7 - (b
\end{aligned}$$

```

^4*c^4 - 4*a*b^2*c^5 - 2*b^3*c^5 + b^2*c^6)*sqrt(b^2 - 4*a*c))*e)*log(x^2 +
1/2*(b*c^11 + sqrt(b^2*c^22 - 4*a*c^23))/c^12)/((a*b^4*c^2 - 8*a^2*b^2*c^3
- 2*a*b^3*c^3 + 16*a^3*c^4 + 8*a^2*b*c^4 + a*b^2*c^4 - 4*a^2*c^5)*c^2*abs(
c)) - 1/16*((b^6*c^2 - 8*a*b^4*c^3 - 2*b^5*c^3 + 16*a^2*b^2*c^4 + 8*a*b^3*c
^4 + b^4*c^4 - 4*a*b^2*c^5 + (b^5*c^2 - 8*a*b^3*c^3 - 2*b^4*c^3 + 16*a^2*b*
c^4 + 8*a*b^2*c^4 + b^3*c^4 - 4*a*b*c^5)*sqrt(b^2 - 4*a*c))*g*abs(c) - (b^7
*c - 10*a*b^5*c^2 - 2*b^6*c^2 + 32*a^2*b^3*c^3 + 12*a*b^4*c^3 + b^5*c^3 - 3
2*a^3*b*c^4 - 16*a^2*b^2*c^4 - 6*a*b^3*c^4 + 8*a^2*b*c^5 + (b^6*c - 10*a*b^
4*c^2 - 2*b^5*c^2 + 32*a^2*b^2*c^3 + 12*a*b^3*c^3 + b^4*c^3 - 32*a^3*c^4 -
16*a^2*b*c^4 - 6*a*b^2*c^4 + 8*a^2*c^5)*sqrt(b^2 - 4*a*c))*j*abs(c) + (b^8
- 11*a*b^6*c - 2*b^7*c + 40*a^2*b^4*c^2 + 14*a*b^5*c^2 + b^6*c^2 - 48*a^3*b
^2*c^3 - 24*a^2*b^3*c^3 - 7*a*b^4*c^3 + 12*a^2*b^2*c^4 + (b^7 - 11*a*b^5*c
- 2*b^6*c + 40*a^2*b^3*c^2 + 14*a*b^4*c^2 + b^5*c^2 - 48*a^3*b*c^3 - 24*a^2
*b^2*c^3 - 7*a*b^3*c^3 + 12*a^2*b*c^4)*sqrt(b^2 - 4*a*c))*l*abs(c) - 2*(b^5
*c^3 - 8*a*b^3*c^4 - 2*b^4*c^4 + 16*a^2*b*c^5 + 8*a*b^2*c^5 + b^3*c^5 - 4*a
*b*c^6 + (b^4*c^3 - 8*a*b^2*c^4 - 2*b^3*c^4 + 16*a^2*c^5 + 8*a*b*c^5 + b^2*
c^5 - 4*a*c^6)*sqrt(b^2 - 4*a*c))*abs(c)*e + (b^6*c^3 - 8*a*b^4*c^4 - 2*b^5
*c^4 + 16*a^2*b^2*c^5 + 8*a*b^3*c^5 + b^4*c^5 - 4*a*b^2*c^6 + (b^5*c^3 - 4*
a*b^3*c^4 - 2*b^4*c^4 + b^3*c^5)*sqrt(b^2 - 4*a*c))*g - (b^7*c^2 - 10*a*b^5
*c^3 - 2*b^6*c^3 + 32*a^2*b^3*c^4 + 12*a*b^4*c^4 + b^5*c^4 - 32*a^3*b*c^5 -
16*a^2*b^2*c^5 - 6*a*b^3*c^5 + 8*a^2*b*c^6 + (b^6*c^2 - 6*a*b^4*c^3 - 2*b^
5*c^3 + 8*a^2*b^2*c^4 + 4*a*b^3*c^4 + b^4*c^4 - 2*a*b^2*c^5)*sqrt(b^2 - 4*a
*c))*j + (b^8*c - 11*a*b^6*c^2 - 2*b^7*c^2 + 40*a^2*b^4*c^3 + 14*a*b^5*c^3
+ b^6*c^3 - 48*a^3*b^2*c^4 - 24*a^2*b^3*c^4 - 7*a*b^4*c^4 + 12*a^2*b^2*c^5
+ (b^7*c - 7*a*b^5*c^2 - 2*b^6*c^2 + 12*a^2*b^3*c^3 + 6*a*b^4*c^3 + b^5*c^3
- 3*a*b^3*c^4)*sqrt(b^2 - 4*a*c))*l - 2*(b^5*c^4 - 8*a*b^3*c^5 - 2*b^4*c^5
+ 16*a^2*b*c^6 + 8*a*b^2*c^6 + b^3*c^6 - 4*a*b*c^7 + (b^4*c^4 - 4*a*b^2*c^
5 - 2*b^3*c^5 + b^2*c^6)*sqrt(b^2 - 4*a*c))*e)*log(x^2 + 1/2*(b*c^11 - sqrt
(b^2*c^22 - 4*a*c^23))/c^12)/((a*b^4*c^2 - 8*a^2*b^2*c^3 - 2*a*b^3*c^3 + 16
*a^3*c^4 + 8*a^2*b*c^4 + a*b^2*c^4 - 4*a^2*c^5)*c^2*abs(c)) + 1/60*(12*c^4*
m*x^5 + 15*c^4*l*x^4 + 20*c^4*k*x^3 - 20*b*c^3*m*x^3 + 30*c^4*j*x^2 - 30*b*
c^3*l*x^2 + 60*c^4*h*x - 60*b*c^3*k*x + 60*b^2*c^2*m*x - 60*a*c^3*m*x)/c^5

```

maple [B] time = 0.08, size = 3835, normalized size = 7.04

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((m*x^8+l*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a), x)$

[Out] $\frac{1}{2}*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)/c^2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\text{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^2*h+1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*b^2/c*h*\text{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-2*c/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\text{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)})$

$$\begin{aligned}
& *c)^{(1/2)} *c*x) *f*a-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2) \\
& b^2)^{(1/2)}) *c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x) \\
& *b*f+c*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} \\
& * \operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x) *d+2/(4*a*c-b^2) \\
& *2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *a*c*f * \operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2) \\
& b^2)^{(1/2)}) *c)^{(1/2)} *c*x)-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(- \\
& 4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *b*f * \operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} \\
& *c*x))+(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} \\
& *c*d * \operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x)-1/4/(4*a*c-b \\
& ^2)*b^2/c*g*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})-1/4/(4*a*c-b^2)*b^2/c*g*\ln(-2* \\
& c*x^2-b+(-4*a*c+b^2)^{(1/2)})+1/4*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*b/c*g*\ln(-2* \\
& c*x^2-b+(-4*a*c+b^2)^{(1/2)})-1/4*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*b/c*g*\ln(2*c \\
& *x^2+b+(-4*a*c+b^2)^{(1/2)})+1/2/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) \\
& *c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x) *f*b^2-1/2/ \\
& (4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *b^2*f * \operatorname{arctan}(2^{(1/2)}/(\\
& (b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x)-1/2/c/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c \\
& +b^2)^{(1/2)}) *c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x) \\
&) *b^3*h+1/2/c/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} * \operatorname{arctan}(2 \\
& ^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x) *b^3*h+3/4/c^2*(-4*a*c+b^2)^{(1/2)}/ \\
& (4*a*c-b^2)*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)}) *a*b*1-3/4/c^2*(-4*a*c+b^2)^{(1/2)}/ \\
& (4*a*c-b^2)*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)}) *a*b*1-1/2/c^2/(4*a*c-b^ \\
& 2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} * \operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2) \\
& ^{(1/2)}) *c)^{(1/2)} *c*x) *b^4*k+1/2/c^2/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) \\
& *c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x) *b^4*k \\
& +2/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)}/((\\
& -b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x) *b*h*a-2/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c \\
& +b^2)^{(1/2)}) *c)^{(1/2)} * \operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x) \\
& *b*h*a+1/2/c^3/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} * \operatorname{arctan}(\\
& 2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x) *b^5*m-1/2/c^3/(4*a*c-b^2)*2^{(\\
& 1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)} \\
&)) *c)^{(1/2)} *c*x) *b^5*m-2/c^2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(\\
& -4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} * \operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} \\
& *c*x) *a*b^2*m+3/2/c*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2) \\
& ^{(1/2)}) *c)^{(1/2)} * \operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x) *a*b*k \\
& +3/2/c*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} \\
& * \operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x) *a*b*k-2/c^2*(-4 \\
& *a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} * \operatorname{arcta \\
& nh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x) *a*b^2*m-1/c^2*a*m*x+1/c^3 \\
& *b^2*m*x-1/c^2*b*k*x-1/3/c^2*x^3*b*m-1/2/c^2*x^2*b*1+1/c*h*x+1/(4*a*c-b^2)* \\
& a*g*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})+1/(4*a*c-b^2)*a*g*\ln(2*c*x^2+b+(-4*a*c \\
& +b^2)^{(1/2)})-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*e*\ln(-2*c*x^2-b+(-4*a*c+b^ \\
& 2)^{(1/2)})+1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*e*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2) \\
&)-(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} \\
&) *a*h * \operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x)-(-4*a*c+b^2)^{(1/2)}/ \\
& (4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)}/((
\end{aligned}$$

$$\begin{aligned}
& -b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * a * h + 5/2/c / (4ac-b^2) * 2^{(1/2)} / ((b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * b^2 * k * a - 5/2/c / (4ac-b^2) * 2^{(1/2)} / ((-b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * b^2 * k * a + 4/c / (4ac-b^2) * 2^{(1/2)} / ((b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * a^2 * b * m + 1/c * (-4ac+b^2)^{(1/2)} / (4ac-b^2) * 2^{(1/2)} / ((b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * a^2 * m - 1/2/c^2 * (-4ac+b^2)^{(1/2)} / (4ac-b^2) * 2^{(1/2)} / ((b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * a^2 * b * m + 1/c * (-4ac+b^2)^{(1/2)} / (4ac-b^2) * 2^{(1/2)} / ((b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * b^3 * k + 1/4 * l * x^4/c + 1/5 * m * x^5/c + 1/3/c * x^3 * k + 1/2/c * x^2 * j + 1/4/c^2 / (4ac-b^2) * \ln(-2 * c * x^2 - b + (-4ac+b^2)^{(1/2)}) * b^3 * j + 1/4/c^2 / (4ac-b^2) * \ln(2 * c * x^2 + b + (-4ac+b^2)^{(1/2)}) * b^3 * j - 1/c / (4ac-b^2) * \ln(-2 * c * x^2 - b + (-4ac+b^2)^{(1/2)}) * a^2 * l - 1/c / (4ac-b^2) * \ln(2 * c * x^2 + b + (-4ac+b^2)^{(1/2)}) * a^2 * l - 1/4/c^3 / (4ac-b^2) * \ln(2 * c * x^2 + b + (-4ac+b^2)^{(1/2)}) * b^4 * l - 1/4/c^3 / (4ac-b^2) * \ln(-2 * c * x^2 - b + (-4ac+b^2)^{(1/2)}) * b^4 * l + 1/2/c^3 * (-4ac+b^2)^{(1/2)} / (4ac-b^2) * 2^{(1/2)} / ((-b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * b^4 * m + 1/c * (-4ac+b^2)^{(1/2)} / (4ac-b^2) * 2^{(1/2)} / ((-b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * a^2 * m - 1/2/c^2 * (-4ac+b^2)^{(1/2)} / (4ac-b^2) * 2^{(1/2)} / ((-b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * b^3 * k + 1/2/c^3 * (-4ac+b^2)^{(1/2)} / (4ac-b^2) * 2^{(1/2)} / ((b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * \arctan(2^{(1/2)} / ((b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * b^4 * m - 3/c^2 / (4ac-b^2) * 2^{(1/2)} / ((b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * a * b^3 * m + 3/c^2 / (4ac-b^2) * 2^{(1/2)} / ((-b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * \arctanh(2^{(1/2)} / ((-b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * b^3 * m * a - 4/c / (4ac-b^2) * 2^{(1/2)} / ((-b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * a^2 * b * m + 2 / (4ac-b^2) * 2^{(1/2)} / ((-b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * a^2 * k - 2 / (4ac-b^2) * 2^{(1/2)} / ((b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * \arctan(2^{(1/2)} / ((b+(-4ac+b^2)^{(1/2)} * c)^{(1/2)} * c * x) * a^2 * k + 5/4/c^2 / (4ac-b^2) * \ln(-2 * c * x^2 - b + (-4ac+b^2)^{(1/2)}) * a * l * b^2 + 5/4/c^2 / (4ac-b^2) * \ln(2 * c * x^2 + b + (-4ac+b^2)^{(1/2)}) * a * l * b^2 - 1/c / (4ac-b^2) * \ln(-2 * c * x^2 - b + (-4ac+b^2)^{(1/2)}) * b * j * a - 1/c / (4ac-b^2) * \ln(2 * c * x^2 + b + (-4ac+b^2)^{(1/2)}) * b * j * a + 1/2/c * (-4ac+b^2)^{(1/2)} / (4ac-b^2) * \ln(-2 * c * x^2 - b + (-4ac+b^2)^{(1/2)}) * a * j + 1/4/c^3 * (-4ac+b^2)^{(1/2)} / (4ac-b^2) * \ln(-2 * c * x^2 - b + (-4ac+b^2)^{(1/2)}) * b^3 * l - 1/4/c^2 * (-4ac+b^2)^{(1/2)} / (4ac-b^2) * \ln(-2 * c * x^2 - b + (-4ac+b^2)^{(1/2)}) * b^2 * j - 1/2/c * (-4ac+b^2)^{(1/2)} / (4ac-b^2) * \ln(2 * c * x^2 + b + (-4ac+b^2)^{(1/2)}) * a * j - 1/4/c^3 * (-4ac+b^2)^{(1/2)} / (4ac-b^2) * \ln(2 * c * x^2 + b + (-4ac+b^2)^{(1/2)}) * b^3 * l + 1/4/c^2 * (-4ac+b^2)^{(1/2)} / (4ac-b^2) * \ln(2 * c * x^2 + b + (-4ac+b^2)^{(1/2)}) * b^2 * j
\end{aligned}$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\frac{12c^2mx^5 + 15c^2lx^4 + 20(c^2k - bcm)x^3 + 30(c^2j - bcl)x^2 + 60(c^2h - bck + (b^2 - ac)m)x - \int \frac{c^3d - ac^2h + abck + (c^3g - \dots}{60c^3} dx}{60c^3}$$

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^4+b*x^2+a),x, algorithm="maxima")
```

```
[Out] 1/60*(12*c^2*m*x^5 + 15*c^2*l*x^4 + 20*(c^2*k - b*c*m)*x^3 + 30*(c^2*j - b*c*l)*x^2 + 60*(c^2*h - b*c*k + (b^2 - a*c)*m)*x)/c^3 - integrate(-(c^3*d - a*c^2*h + a*b*c*k + (c^3*g - b*c^2*j + (b^2*c - a*c^2)*l)*x^3 + (c^3*f - b*c^2*h + (b^2*c - a*c^2)*k - (b^3 - 2*a*b*c)*m)*x^2 - (a*b^2 - a^2*c)*m + (c^3*e - a*c^2*j + a*b*c*l)*x)/(c*x^4 + b*x^2 + a), x)/c^3
```

mupad [B] time = 4.31, size = 49150, normalized size = 90.18

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[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^2 + c*x^4),x)
```

```
[Out] x^2*(j/(2*c) - (b*l)/(2*c^2)) - x*((b*(k/c - (b*m)/c^2))/c - h/c + (a*m)/c^2) + x^3*(k/(3*c) - (b*m)/(3*c^2)) + symsum(log((c^7*d*e^2 - a*c^6*f^3 - c^7*d^2*f + b^7*d*m^2 + a^4*c^3*k^3 + a^4*b^3*m^3 + a^2*b*c^4*h^3 + b^2*c^5*d*g^2 + b^3*c^4*d*h^2 + a^2*c^5*d*j^2 - a^2*c^5*f*h^2 + a^2*c^5*g^2*h + b^4*c^3*d*j^2 - a^3*c^4*d*l^2 - b^2*c^5*d^2*k + b^5*c^2*d*k^2 + 3*a^2*c^5*f^2*k - 3*a^3*c^4*f*k^2 + a^2*c^5*e^2*m - a^3*c^4*h*j^2 + b^3*c^4*d^2*m + a^3*c^4*h^2*k - a^4*c^3*f*m^2 + a^2*b^5*h*m^2 - a^3*c^4*g^2*m + a^4*c^3*h*l^2 - a^3*b^4*k*m^2 + a^4*c^3*j^2*m + a^5*c^2*k*m^2 - a^5*c^2*l^2*m - a^3*b^2*c^2*k^3 - a*c^6*d*g^2 + b*c^6*d*f^2 - a*c^6*e^2*h + b*c^6*d^2*h + a*c^6*d^2*k - 2*a^5*b*c*m^3 + b^6*c*d*l^2 - a*b^6*f*m^2 - 2*a*b*c^5*d*h^2 - a*b*c^5*f*g^2 + 2*a*b*c^5*f^2*h + a*b*c^5*e^2*k - 2*a*b*c^5*d^2*m - 6*a*b^5*c*d*m^2 - 2*b^2*c^5*d*f*h - a*b^5*c*f*l^2 + 2*b^2*c^5*d*e*j - 2*b^3*c^4*d*e*l + 2*b^3*c^4*d*f*k - 2*b^3*c^4*d*g*j - 2*a^2*c^5*d*f*m + 2*a^2*c^5*d*g*l - 2*a^2*c^5*d*h*k - 2*a^2*c^5*e*f*l - 2*a^2*c^5*e*g*k + 2*a^2*c^5*e*h*j - 2*a^2*c^5*f*g*j - 2*b^4*c^3*d*f*m + 2*b^4*c^3*d*g*l - 2*b^4*c^3*d*h*k + 2*b^5*c^2*d*h*m + 2*a^3*c^4*f*h*m - 2*a^3*c^4*g*h*l - 2*b^5*c^2*d*j*l + 2*a^3*c^4*d*k*m - 2*a^3*c^4*e*j*m + 2*a^3*c^4*e*k*l + 2*a^3*c^4*f*j*l + 2*a^3*c^4*g*j*k + 2*a^4*c^3*g*l*m - 2*a^4*c^3*h*k*m - 2*a^4*c^3*j*k*l - 3*a*b^2*c^4*d*j^2 - a*b^2*c^4*f*h^2 - 4*a*b^3*c^3*d*k^2 + 3*a^2*b*c^4*d*k^2 - a*b^3*c^3*f*j^2 - 5*a*b^4*c^2*d*l^2 + 2*a^2*b*c^4*f*j^2 - 2*a*b^2*c^4*f^2*k - a*b^4*c^2*f*k^2 - 4*a^3*b*c^3*d*m^2 - a*b^2*c^4*e^2*m - 3*a^3*b*c^3*f*l^2 + 2*a*b^3*c^3*f^2*m - 5*a^2*b*c^4*f^2*m + 5*a^2*b^4*c*f*m^2 + a^2*b^4*c*h*l^2 - 4*a^3*b*c^3*h^2*m - a^3*b*c^3*j^2*k - 4*a^3*b^3*c*h*m^2 + 5*a^4*b*c^2*h*m^2 - a^3*b^3*c*k*l^2 + 2*a^4*b*c^2*k*l^2 + 2*a^3*b^3*c*k^2*m - 3*a^4*b*c^2*k^2*m + a^4*b^2*c*k*m^2 + a^4*b^2*c*l^2*m - 2*b*c^6*d*e*g + 2*a*c^6*d*f*h + 2*a*c^6*e*f*g - 2*a*c^6*d*e*j - 2*b^6*c*d*k*m + 6*a^2*b^2*c^3*d*l^2 + 3*a^2*b^2*c^3*f*k^2
```

$$\begin{aligned}
& + 10a^2b^3c^2d^2m^2 + a^2b^2c^3h^2j^2 + 4a^2b^3c^2f^2l^2 - 2a^2b^2c^3h^2k + a^2b^3c^2h^2k^2 - 6a^3b^2c^2f^2m^2 - 3a^3b^2c^2h^2l^2 \\
& + 2a^2b^3c^2h^2m + 4a^2b^3c^5d^2e^2l - 4a^2b^3c^5d^2f^2k + 4a^2b^3c^5d^2g^2j - 2a^2b^3c^5e^2f^2j + 2a^2b^5c^2f^2k^2m + 6a^2b^2c^4d^2f^2m - 6a^2b^2c^4d^2g^2j \\
& + 6a^2b^2c^4d^2h^2k + 2a^2b^2c^4e^2f^2l + 2a^2b^2c^4f^2g^2j - 8a^2b^3c^3d^2h^2m - 2a^2b^3c^3f^2g^2l + 2a^2b^3c^3f^2h^2k + 6a^2b^2c^4d^2h^2m + 2a^2b^2c^4e^2g^2m \\
& - 2a^2b^2c^4e^2h^2l + 4a^2b^2c^4f^2g^2l - 2a^2b^2c^4f^2h^2k - 2a^2b^2c^4g^2h^2j + 8a^2b^3c^3d^2j^2l - 6a^2b^2c^4d^2j^2l - 2a^2b^4c^2f^2h^2m + 10a^2b^4c^2d^2k^2m + 2a^2b^4c^2f^2j^2l + 8a^3b^2c^3f^2k^2m - 2a^3b^2c^3g^2k^2l + 4a^3b^2c^3h^2j^2l - 2a^2b^4c^2h^2k^2m - 2a^4b^2c^2j^2l^2m + 4a^2b^2c^3f^2h^2m + 2a^2b^2c^3g^2h^2l - 12a^2b^2c^3d^2k^2m - 6a^2b^2c^3f^2j^2l - 8a^2b^3c^2f^2k^2m - 2a^2b^3c^2h^2j^2l + 4a^3b^2c^2h^2k^2m + 2a^3b^2c^2j^2k^2l)/c^5 - \text{root}(128a^2b^2c^8z^4 - 16a^2b^4c^7z^4 - 256a^3c^9z^4 + 384a^3b^2c^6l^2z^3 - 144a^2b^4c^5l^2z^3 + 128a^2b^3c^6j^2z^3 - 128a^2b^2c^7g^2z^3 + 16a^2b^6c^4l^2z^3 - 256a^3b^2c^7j^2z^3 - 16a^2b^5c^5j^2z^3 + 16a^2b^4c^6g^2z^3 - 256a^4c^7l^2z^3 + 256a^3c^8g^2z^3 - 96a^4b^2c^5j^2l^2z^2 + 8a^2b^7c^2j^2l^2z^2 + 160a^4b^2c^5h^2m^2z^2 - 8a^2b^7c^2h^2m^2z^2 + 8a^2b^6c^3h^2k^2z^2 - 8a^2b^6c^3g^2l^2z^2 + 8a^2b^6c^3f^2m^2z^2 + 160a^3b^2c^6g^2j^2z^2 - 96a^3b^2c^6f^2k^2z^2 - 96a^3b^2c^6e^2l^2z^2 - 96a^3b^2c^6d^2m^2z^2 + 8a^2b^5c^4g^2j^2z^2 - 8a^2b^5c^4f^2k^2z^2 - 8a^2b^5c^4e^2l^2z^2 - 8a^2b^5c^4d^2m^2z^2 + 8a^2b^4c^5e^2j^2z^2 + 8a^2b^4c^5d^2k^2z^2 + 8a^2b^4c^5f^2h^2z^2 + 32a^2b^2c^7e^2g^2z^2 + 32a^2b^2c^7d^2h^2z^2 - 8a^2b^3c^6e^2g^2z^2 - 8a^2b^3c^6d^2h^2z^2 + 16a^2b^2c^7d^2f^2z^2 + 8a^2b^8c^2k^2m^2z^2 - 304a^4b^2c^4k^2m^2z^2 + 264a^3b^4c^3k^2m^2z^2 - 80a^2b^6c^2k^2m^2z^2 + 184a^3b^3c^4j^2l^2z^2 - 72a^2b^5c^3j^2l^2z^2 - 200a^3b^3c^4h^2m^2z^2 + 72a^2b^5c^3h^2m^2z^2 - 240a^3b^2c^5g^2l^2z^2 + 144a^3b^2c^5h^2k^2z^2 + 144a^3b^2c^5f^2m^2z^2 + 80a^2b^4c^4g^2l^2z^2 - 64a^2b^4c^4h^2k^2z^2 - 64a^2b^4c^4f^2m^2z^2 - 72a^2b^3c^5g^2j^2z^2 + 56a^2b^3c^5f^2k^2z^2 + 56a^2b^3c^5e^2l^2z^2 + 56a^2b^3c^5d^2m^2z^2 - 48a^2b^2c^6e^2j^2z^2 - 48a^2b^2c^6d^2k^2z^2 - 48a^2b^2c^6f^2h^2z^2 - 112a^5b^2c^4m^2z^2 + 44a^2b^7c^2m^2z^2 + 80a^4b^2c^5k^2z^2 - 4a^2b^7c^2k^2z^2 - 4a^2b^6c^3j^2z^2 - 48a^3b^2c^6h^2z^2 - 4a^2b^5c^4h^2z^2 - 4a^2b^4c^5g^2z^2 + 16a^2b^2c^7f^2z^2 - 4a^2b^3c^6f^2z^2 + 8a^2b^2c^7e^2z^2 + 64a^5c^5k^2m^2z^2 + 192a^4c^6g^2l^2z^2 - 64a^4c^6h^2k^2z^2 - 64a^4c^6f^2m^2z^2 + 64a^3c^7e^2j^2z^2 + 64a^3c^7d^2k^2z^2 + 64a^3c^7f^2h^2z^2 - 4a^2b^8c^2l^2z^2 - 64a^2c^8d^2f^2z^2 + 16a^2b^2c^8d^2z^2 + 252a^4b^3c^3m^2z^2 - 168a^3b^5c^2m^2z^2 + 168a^4b^2c^4l^2z^2 - 132a^3b^4c^3l^2z^2 + 40a^2b^6c^2l^2z^2 - 100a^3b^3c^4k^2z^2 + 36a^2b^5c^3k^2z^2 - 56a^3b^2c^5j^2z^2 + 32a^2b^4c^4j^2z^2 + 28a^2b^3c^5h^2z^2 + 40a^2b^2c^6g^2z^2 - 96a^5c^5l^2z^2 - 32a^4c^6j^2z^2 - 96a^3c^7g^2z^2 - 32a^2c^8e^2z^2 - 4b^3c^7d^2z^2 - 4a^2b^9m^2z^2 + 32a^5b^2c^3h^2l^2m^2z + 8a^2b^6c^2g^2k^2m^2z + 96a^4b^2c^4e^2k^2m^2z + 32a^4b^2c^4h^2j^2k^2z + 32a^4b^2c^4g^2j^2l^2z + 32a^4b^2c^4f^2j^2m^2z - 64a^4b^2c^4g^2h^2m^2z - 8a^2b^6c^2e^2j^2l^2z + 8a^2b^6c^2e^2h^2m^2z - 64a^3b^2c^5e^2h^2k^2z + 64a^3b^2c^5e^2g^2l^2z - 64a^3b^2c^5e^2h^2k^2z + 64a^3b^2c^5e^2g^2l^2z - 64a^3b^2c^5e^2h^2k^2z
\end{aligned}$$

$$\begin{aligned}
& *c^5*ef*m*z + 32*a^3*b*c^5*f*g*k*z - 32*a^3*b*c^5*d*h*l*z + 32*a^3*b*c^5*d \\
& *g*m*z - 8*a*b^5*c^3*e*h*k*z + 8*a*b^5*c^3*e*g*l*z - 8*a*b^5*c^3*ef*m*z - \\
& 8*a*b^4*c^4*e*g*j*z + 8*a*b^4*c^4*ef*k*z - 8*a*b^4*c^4*d*f*l*z + 8*a*b^4*c^4 \\
& *d*e*m*z - 32*a^2*b*c^6*d*f*j*z + 32*a^2*b*c^6*d*e*k*z + 8*a*b^3*c^5*d*f* \\
& j*z - 8*a*b^3*c^5*d*e*k*z + 32*a^2*b*c^6*ef*h*z - 8*a*b^3*c^5*ef*h*z - 8* \\
& a*b^2*c^6*d*f*g*z + 8*a*b^2*c^6*d*e*h*z - 8*a*b^7*c*e*k*m*z - 40*a^5*b^2*c^ \\
& 2*k*l*m*z + 48*a^4*b^3*c^2*j*k*m*z - 8*a^4*b^3*c^2*h*l*m*z + 104*a^4*b^2*c^ \\
& 3*g*k*m*z - 56*a^3*b^4*c^2*g*k*m*z - 40*a^4*b^2*c^3*h*j*m*z + 8*a^4*b^2*c^3 \\
& *h*k*l*z + 8*a^4*b^2*c^3*f*l*m*z + 8*a^3*b^4*c^2*h*j*m*z - 152*a^3*b^3*c^3* \\
& e*k*m*z + 64*a^2*b^5*c^2*e*k*m*z - 40*a^3*b^3*c^3*g*j*l*z - 8*a^3*b^3*c^3*h \\
& *j*k*z - 8*a^3*b^3*c^3*f*j*m*z + 8*a^2*b^5*c^2*g*j*l*z + 48*a^3*b^3*c^3*g*h \\
& *m*z - 8*a^2*b^5*c^2*g*h*m*z - 104*a^3*b^2*c^4*e*j*l*z + 56*a^2*b^4*c^3*e*j \\
& *l*z + 8*a^3*b^2*c^4*f*j*k*z - 8*a^3*b^2*c^4*d*k*l*z + 8*a^3*b^2*c^4*d*j*m* \\
& z + 104*a^3*b^2*c^4*e*h*m*z - 56*a^2*b^4*c^3*e*h*m*z - 40*a^3*b^2*c^4*g*h*k \\
& *z - 40*a^3*b^2*c^4*f*g*m*z - 8*a^3*b^2*c^4*f*h*l*z + 8*a^2*b^4*c^3*g*h*k*z \\
& + 8*a^2*b^4*c^3*f*g*m*z + 48*a^2*b^3*c^4*e*h*k*z - 48*a^2*b^3*c^4*e*g*l*z \\
& + 48*a^2*b^3*c^4*ef*m*z - 8*a^2*b^3*c^4*f*g*k*z + 8*a^2*b^3*c^4*d*h*l*z - \\
& 8*a^2*b^3*c^4*d*g*m*z + 40*a^2*b^2*c^5*ef*g*j*z - 40*a^2*b^2*c^5*ef*k*z + 4 \\
& 0*a^2*b^2*c^5*d*f*l*z - 40*a^2*b^2*c^5*d*e*m*z - 8*a^2*b^2*c^5*d*h*j*z + 8* \\
& a^2*b^2*c^5*d*g*k*z + 8*a^2*b^2*c^5*f*g*h*z + 8*a^4*b^4*c*k*l*m*z - 64*a^5* \\
& b*c^3*j*k*m*z - 8*a^3*b^5*c*j*k*m*z - 32*a^6*b*c^2*l*m^2*z + 24*a^5*b^3*c*l \\
& *m^2*z - 28*a^4*b^4*c*j*m^2*z + 16*a^5*b*c^3*k^2*l*z + 4*a^3*b^5*c*j*l^2*z \\
& + 48*a^5*b*c^3*g*m^2*z + 32*a^3*b^5*c*g*m^2*z - 4*a^2*b^6*c*g*l^2*z - 36*a^ \\
& 2*b^6*c*e*m^2*z - 32*a^4*b*c^4*g*k^2*z - 16*a^3*b*c^5*f^2*l*z - 48*a^4*b*c^ \\
& 4*e*l^2*z - 32*a^3*b*c^5*g^2*j*z - 4*a*b^4*c^4*e^2*l*z + 32*a^2*b*c^6*d^2*l \\
& *z - 24*a*b^3*c^5*d^2*l*z + 4*a*b^6*c^2*e*k^2*z + 32*a^3*b*c^5*e*j^2*z + 16 \\
& *a^3*b*c^5*g*h^2*z - 16*a^2*b*c^6*e^2*j*z + 4*a*b^5*c^3*e*j^2*z + 4*a*b^3*c^ \\
& ^5*e^2*j*z + 20*a*b^2*c^6*d^2*j*z + 4*a*b^4*c^4*e*h^2*z - 16*a^2*b*c^6*e*g^ \\
& 2*z + 4*a*b^3*c^5*e*g^2*z - 4*a*b^2*c^6*e^2*g*z + 4*a*b^2*c^6*ef^2*z + 32* \\
& a^6*c^3*k*l*m*z - 32*a^5*c^4*h*k*l*z + 32*a^5*c^4*h*j*m*z - 32*a^5*c^4*g*k* \\
& m*z - 32*a^5*c^4*f*l*m*z - 32*a^4*c^5*f*j*k*z + 32*a^4*c^5*e*j*l*z + 32*a^4 \\
& *c^5*d*k*l*z - 32*a^4*c^5*d*j*m*z + 32*a^4*c^5*g*h*k*z + 32*a^4*c^5*f*h*l*z \\
& + 32*a^4*c^5*f*g*m*z - 32*a^4*c^5*e*h*m*z - 32*a^3*c^6*e*g*j*z + 32*a^3*c^ \\
& 6*ef*k*z + 32*a^3*c^6*d*h*j*z - 32*a^3*c^6*d*g*k*z - 32*a^3*c^6*d*f*l*z + \\
& 32*a^3*c^6*d*e*m*z - 32*a^3*c^6*f*g*h*z + 4*a*b^7*c*e*l^2*z + 32*a^2*c^7*d* \\
& f*g*z - 32*a^2*c^7*d*e*h*z - 16*a*b*c^7*d^2*g*z + 52*a^5*b^2*c^2*j*m^2*z - \\
& 4*a^4*b^3*c^2*k^2*l*z + 36*a^4*b^2*c^3*j^2*l*z - 16*a^4*b^3*c^2*j*l^2*z - 8 \\
& *a^3*b^4*c^2*j^2*l*z - 20*a^4*b^2*c^3*j*k^2*z + 4*a^3*b^4*c^2*j*k^2*z - 76* \\
& a^4*b^3*c^2*g*m^2*z - 60*a^4*b^2*c^3*g*l^2*z + 44*a^3*b^2*c^4*g^2*l*z + 28* \\
& a^3*b^4*c^2*g*l^2*z - 8*a^2*b^4*c^3*g^2*l*z + 104*a^3*b^4*c^2*e*m^2*z - 100 \\
& *a^4*b^2*c^3*e*m^2*z + 24*a^3*b^3*c^3*g*k^2*z + 4*a^3*b^2*c^4*h^2*j*z - 4*a \\
& ^2*b^5*c^2*g*k^2*z + 4*a^2*b^3*c^4*f^2*l*z + 76*a^3*b^3*c^3*e*l^2*z - 32*a^ \\
& 2*b^5*c^2*e*l^2*z + 20*a^2*b^2*c^5*e^2*l*z + 12*a^3*b^2*c^4*g*j^2*z + 8*a^2 \\
& *b^3*c^4*g^2*j*z - 4*a^2*b^4*c^3*g*j^2*z + 52*a^3*b^2*c^4*e*k^2*z - 28*a^2* \\
& b^4*c^3*e*k^2*z - 4*a^2*b^2*c^5*f^2*j*z - 24*a^2*b^3*c^4*e*j^2*z - 4*a^2*b^
\end{aligned}$$

$$\begin{aligned}
& 3*c^4*g*h^2*z - 20*a^2*b^2*c^5*e*h^2*z + 20*a^5*b^2*c^2*l^3*z + 4*a^3*b^3*c^3*j^3*z - 4*a^2*b^2*c^5*g^3*z - 4*a^4*b^5*l*m^2*z - 16*a^6*c^3*j*m^2*z - 16*a^5*c^4*j^2*l*z + 4*a^3*b^6*j*m^2*z + 16*a^5*c^4*j*k^2*z + 48*a^5*c^4*g*l^2*z - 48*a^4*c^5*g^2*l*z - 4*a^2*b^7*g*m^2*z + 16*a^5*c^4*e*m^2*z - 16*a^4*c^5*h^2*j*z + 16*a^4*c^5*g*j^2*z - 16*a^3*c^6*e^2*l*z + 4*b^5*c^4*d^2*l*z - 16*a^4*c^5*e*k^2*z + 16*a^3*c^6*f^2*j*z - 4*b^4*c^5*d^2*j*z - 16*a^2*c^7*d^2*j*z - 4*a^4*b^4*c*l^3*z + 16*a^3*c^6*e*h^2*z - 16*a^4*b*c^4*j^3*z + 16*a^2*c^7*e^2*g*z + 4*b^3*c^6*d^2*g*z - 16*a^2*c^7*e*f^2*z - 4*b^2*c^7*d^2*e*z + 4*a*b^8*e*m^2*z + 16*a*c^8*d^2*e*z - 16*a^6*c^3*l^3*z + 16*a^3*c^6*g^3*z + 4*a^5*b^2*c*g*k*l*m + 12*a^5*b*c^2*g*j*k*m + 12*a^5*b*c^2*e*k*l*m - 4*a^5*b*c^2*h*j*k*l - 4*a^5*b*c^2*f*j*l*m - 4*a^4*b^3*c*g*j*k*m - 4*a^4*b^3*c*e*k*l*m - 4*a^5*b*c^2*g*h*l*m + 4*a^3*b^4*c*e*j*k*m - 4*a^3*b^4*c*f*h*k*m + 12*a^4*b*c^3*d*j*k*l - 20*a^4*b*c^3*e*g*k*m + 12*a^4*b*c^3*f*h*j*l + 12*a^4*b*c^3*e*h*j*m + 12*a^4*b*c^3*d*h*k*m - 4*a^4*b*c^3*g*h*j*k - 4*a^4*b*c^3*f*g*k*l - 4*a^4*b*c^3*f*g*j*m - 4*a^4*b*c^3*e*h*k*l - 4*a^4*b*c^3*e*f*l*m - 4*a^4*b*c^3*d*g*l*m - 4*a^2*b^5*c*e*g*k*m + 4*a^2*b^5*c*d*h*k*m - 20*a^3*b*c^4*d*f*j*l - 4*a^3*b*c^4*e*f*j*k - 4*a^3*b*c^4*d*g*j*k - 4*a^3*b*c^4*d*e*k*l - 4*a^3*b*c^4*d*e*j*m - 4*a*b^5*c^2*d*f*j*l + 12*a^3*b*c^4*e*g*h*k + 12*a^3*b*c^4*e*f*g*m + 12*a^3*b*c^4*d*g*h*l + 12*a^3*b*c^4*d*f*h*m - 4*a^3*b*c^4*f*g*h*j - 4*a^3*b*c^4*e*f*h*l + 4*a*b^5*c^2*d*f*h*m - 4*a*b^4*c^3*d*f*h*k + 4*a*b^4*c^3*d*f*g*l + 12*a^2*b*c^5*d*f*g*j + 12*a^2*b*c^5*d*e*f*l - 4*a^2*b*c^5*d*e*h*j - 4*a^2*b*c^5*d*e*g*k - 4*a*b^3*c^4*d*f*g*j - 4*a*b^3*c^4*d*e*f*l - 4*a^2*b*c^5*e*f*g*h + 4*a*b^2*c^5*d*e*f*j - 4*a^6*b*c*j*k*l*m - 4*a*b^6*c*d*f*k*m - 4*a*b*c^6*d*e*f*g - 16*a^4*b^2*c^2*e*j*k*m + 4*a^4*b^2*c^2*f*j*k*l + 4*a^4*b^2*c^2*d*j*l*m + 12*a^4*b^2*c^2*f*h*k*m + 4*a^4*b^2*c^2*g*h*j*m + 4*a^4*b^2*c^2*e*h*l*m - 4*a^3*b^3*c^2*d*j*k*l + 20*a^3*b^3*c^2*e*g*k*m - 16*a^3*b^3*c^2*d*h*k*m - 4*a^3*b^3*c^2*f*h*j*l - 4*a^3*b^3*c^2*e*h*j*m - 40*a^3*b^2*c^3*d*f*k*m + 24*a^2*b^4*c^2*d*f*k*m - 16*a^3*b^2*c^3*d*h*j*l + 12*a^3*b^2*c^3*e*g*j*l + 4*a^3*b^2*c^3*e*h*j*k + 4*a^3*b^2*c^3*e*f*j*m + 4*a^3*b^2*c^3*d*g*k*l - 4*a^2*b^4*c^2*e*g*j*l + 4*a^2*b^4*c^2*d*h*j*l - 16*a^3*b^2*c^3*e*g*h*m + 4*a^3*b^2*c^3*f*g*h*l + 4*a^2*b^4*c^2*e*g*h*m + 20*a^2*b^3*c^3*d*f*j*l - 16*a^2*b^3*c^3*d*f*h*m - 4*a^2*b^3*c^3*e*g*h*k - 4*a^2*b^3*c^3*e*f*g*m - 4*a^2*b^3*c^3*d*g*h*l - 16*a^2*b^2*c^4*d*f*g*l + 12*a^2*b^2*c^4*d*f*h*k + 4*a^2*b^2*c^4*e*f*g*k + 4*a^2*b^2*c^4*d*g*h*j + 4*a^2*b^2*c^4*d*e*h*l + 4*a^2*b^2*c^4*d*e*g*m + 2*a^5*b^2*c*j^2*k*m - 4*a^5*b^2*c*h*k^2*m - 2*a^5*b*c^2*h^2*k*m + 2*a^4*b^3*c*h^2*k*m + 2*a^5*b^2*c*h*k*l^2 + 2*a^5*b^2*c*f*l^2*m - 2*a^5*b*c^2*h*j^2*m + 2*a^3*b^4*c*g^2*k*m + 14*a^4*b*c^3*f^2*k*m - 10*a^5*b*c^2*f*k^2*m - 8*a^5*b^2*c*g*j*m^2 - 8*a^5*b^2*c*e*l*m^2 + 4*a^5*b^2*c*f*k*m^2 + 4*a^4*b^3*c*f*k^2*m - 2*a^5*b*c^2*g*k^2*l + 2*a^2*b^5*c*f^2*k*m + 6*a^5*b*c^2*f*k*l^2 + 6*a^5*b*c^2*d*l^2*m - 2*a^5*b*c^2*g*j*l^2 + 2*a^4*b^3*c*g*j*l^2 - 2*a^4*b^3*c*f*k*l^2 - 2*a^4*b^3*c*d*l^2*m - 2*a^4*b*c^3*g^2*j*l - 14*a*b^5*c^2*d^2*k*m - 10*a^5*b*c^2*e*j*m^2 + 10*a^4*b^3*c*e*j*m^2 - 10*a^3*b*c^4*d^2*k*m - 6*a^4*b^3*c*d*k*m^2 + 6*a^4*b*c^3*g^2*h*m - 4*a^3*b^4*c*d*k^2*m - 2*a^5*b*c^2*d*k*m^2 + 14*a^5*b*c^2*f*h*m^2 + 14*a^3*b*c^4*e^2*j*l - 10*a^4*b^3*c*f*h*m^2 - 10*a^4*b*c^3*f*h^2*m - 1
\end{aligned}$$

$$\begin{aligned}
& 0*a^4*b*c^3*e*j^2*1 - 2*a^4*b*c^3*g*h^2*1 - 2*a^4*b*c^3*f*j^2*k - 2*a^4*b*c^3*d*j^2*m - 2*a^3*b^4*c*e*j*1^2 + 2*a^3*b^4*c*d*k*1^2 + 2*a*b^5*c^2*e^2*j*1 - 12*a*b^4*c^3*d^2*j*1 - 10*a^3*b*c^4*e^2*h*m + 6*a^4*b*c^3*e*j*k^2 + 2*a^3*b^4*c*f*h*1^2 - 2*a*b^5*c^2*e^2*h*m - 12*a^3*b^4*c*e*g*m^2 + 12*a^3*b^4*c*d*h*m^2 + 12*a*b^4*c^3*d^2*h*m + 6*a^3*b*c^4*f^2*g*1 - 2*a^4*b*c^3*f*h*k^2 - 2*a^3*b*c^4*f^2*h*k + 14*a^4*b*c^3*e*g*1^2 - 10*a^4*b*c^3*d*h*1^2 - 10*a^3*b*c^4*e*g^2*1 - 2*a^3*b*c^4*f*g^2*k - 2*a^3*b*c^4*d*g^2*m + 2*a^2*b^5*c*e*g*1^2 - 2*a^2*b^5*c*d*h*1^2 + 2*a*b^4*c^3*e^2*h*k - 2*a*b^4*c^3*e^2*g*1 + 2*a*b^4*c^3*e^2*f*m - 14*a^2*b^5*c*d*f*m^2 + 14*a^2*b*c^5*d^2*h*k - 10*a^4*b*c^3*d*f*m^2 - 10*a^3*b*c^4*d*h^2*k - 10*a^2*b*c^5*d^2*g*1 - 10*a*b^3*c^4*d^2*h*k + 10*a*b^3*c^4*d^2*g*1 - 6*a*b^3*c^4*d^2*f*m - 4*a*b^4*c^3*d*f^2*m - 2*a^3*b*c^4*e*h^2*j - 2*a^2*b*c^5*d^2*f*m + 6*a^3*b*c^4*d*h*j^2 + 6*a^2*b*c^5*e^2*f*k + 6*a^2*b*c^5*d*e^2*m - 2*a^3*b*c^4*e*g*j^2 - 2*a^2*b*c^5*e^2*g*j + 2*a*b^3*c^4*e^2*g*j - 2*a*b^3*c^4*e^2*f*k - 2*a*b^3*c^4*d*e^2*m + 14*a^3*b*c^4*d*f*k^2 - 10*a^2*b*c^5*d*f^2*k - 8*a*b^2*c^5*d^2*g*j - 8*a*b^2*c^5*d^2*e*1 + 4*a*b^3*c^4*d*f^2*k + 4*a*b^2*c^5*d^2*f*k - 2*a^2*b*c^5*e*f^2*j + 2*a*b^5*c^2*d*f*k^2 + 2*a*b^4*c^3*d*f*j^2 + 2*a*b^2*c^5*d*e^2*k - 2*a^2*b*c^5*d*g^2*h + 2*a*b^2*c^5*e^2*f*h - 4*a*b^2*c^5*d*f^2*h - 2*a^2*b*c^5*d*f*h^2 + 2*a*b^3*c^4*d*f*h^2 + 2*a*b^2*c^5*d*f*g^2 + 8*a^6*c^2*h*j*1*m - 8*a^6*c^2*g*k*1*m - 8*a^5*c^3*f*j*k*1 + 8*a^5*c^3*e*j*k*m - 8*a^5*c^3*d*j*1*m + 8*a^5*c^3*g*h*k*1 - 8*a^5*c^3*g*h*j*m - 8*a^5*c^3*f*h*k*m + 8*a^5*c^3*f*g*1*m - 8*a^5*c^3*e*h*1*m - 2*a^6*b*c*h*1^2*m + 8*a^4*c^4*f*g*j*k - 8*a^4*c^4*e*h*j*k - 8*a^4*c^4*e*g*j*1 + 8*a^4*c^4*e*f*k*1 - 8*a^4*c^4*e*f*j*m + 8*a^4*c^4*d*h*j*1 - 8*a^4*c^4*d*g*k*1 + 8*a^4*c^4*d*g*j*m + 8*a^4*c^4*d*f*k*m + 8*a^4*c^4*d*e*1*m + 6*a^6*b*c*g*1*m^2 - 2*a^6*b*c*h*k*m^2 - 8*a^4*c^4*f*g*h*1 + 8*a^4*c^4*e*g*h*m + 2*a*b^6*c*e^2*k*m + 8*a^3*c^5*d*e*j*k + 8*a^3*c^5*e*f*h*j - 8*a^3*c^5*e*f*g*k - 8*a^3*c^5*d*g*h*j - 8*a^3*c^5*d*f*h*k + 8*a^3*c^5*d*f*g*1 - 8*a^3*c^5*d*e*h*1 - 8*a^3*c^5*d*e*g*m - 8*a^2*c^6*d*e*f*j + 8*a^2*c^6*d*e*g*h + 2*a*b^6*c*d*f*1^2 + 6*a*b*c^6*d^2*e*j - 2*a*b*c^6*d^2*f*h - 2*a*b*c^6*d*e^2*h - 8*a^4*b^2*c^2*g^2*k*m - 10*a^3*b^3*c^2*f^2*k*m + 2*a^4*b^2*c^2*h^2*j*1 + 18*a^3*b^2*c^3*e^2*k*m - 12*a^2*b^4*c^2*e^2*k*m - 4*a^4*b^2*c^2*d*k^2*m - 8*a^3*b^2*c^3*f^2*j*1 + 2*a^4*b^2*c^2*g*j*k^2 + 2*a^4*b^2*c^2*e*k^2*1 - 2*a^3*b^3*c^2*g^2*h*m + 2*a^2*b^4*c^2*f^2*j*1 - 10*a^2*b^3*c^3*e^2*j*1 - 8*a^4*b^2*c^2*d*k*1^2 + 4*a^4*b^2*c^2*e*j*1^2 + 4*a^3*b^3*c^2*f*h^2*m + 4*a^3*b^3*c^2*e*j^2*1 + 4*a^3*b^2*c^3*f^2*h*m - 2*a^2*b^4*c^2*f^2*h*m + 18*a^2*b^2*c^4*d^2*j*1 + 10*a^2*b^3*c^3*e^2*h*m - 8*a^4*b^2*c^2*f*h*1^2 - 2*a^3*b^3*c^2*e*j*k^2 + 2*a^3*b^2*c^3*g^2*h*k + 2*a^3*b^2*c^3*f*g^2*m - 22*a^4*b^2*c^2*d*h*m^2 - 22*a^2*b^2*c^4*d^2*h*m + 18*a^4*b^2*c^2*e*g*m^2 + 16*a^3*b^2*c^3*d*h^2*m - 4*a^3*b^2*c^3*f*h^2*k - 4*a^2*b^4*c^2*d*h^2*m + 2*a^3*b^3*c^2*f*h*k^2 + 2*a^3*b^2*c^3*d*j^2*k + 2*a^2*b^3*c^3*f^2*h*k - 2*a^2*b^3*c^3*f^2*g*1 - 10*a^3*b^3*c^2*e*g*1^2 + 10*a^3*b^3*c^2*d*h*1^2 - 8*a^2*b^2*c^4*e^2*h*k - 8*a^2*b^2*c^4*e^2*f*m + 4*a^2*b^3*c^3*e*g^2*1 + 4*a^2*b^2*c^4*e^2*g*1 + 2*a^3*b^2*c^3*f*h*j^2 + 28*a^3*b^3*c^2*d*f*m^2 + 14*a^2*b^2*c^4*d*f^2*m - 8*a^3*b^2*c^3*e*g*k^2 + 4*a^3*b^2*c^3*d*h*k^2 + 4*a^
\end{aligned}$$

$$\begin{aligned}
& 2*b^3*c^3*d*h^2*k + 2*a^2*b^4*c^2*e*g*k^2 - 2*a^2*b^4*c^2*d*h*k^2 + 2*a^2*b^4*c^2*d*f*k^2 + 2*a^2*b^4*c^2*d*f*g*j + 2*a^2*b^2*c^4*e*f^2*l + 18*a^3*b^2*c^3*d*f*l^2 - 12*a^2*b^4*c^2*d*f*l^2 - 4*a^2*b^2*c^4*e*g^2*j + 2*a^2*b^3*c^3*e*g*j^2 - 2*a^2*b^3*c^3*d*h*j^2 - 10*a^2*b^3*c^3*d*f*k^2 - 8*a^2*b^2*c^4*d*f*j^2 + 2*a^2*b^2*c^4*e*g*h^2 + 4*a^5*b^2*c*h^2*m^2 - 2*a^4*b^2*c^2*h^3*m - 5*a^5*b*c^2*g^2*m^2 + 5*a^4*b^3*c*g^2*m^2 + 3*a^5*b*c^2*h^2*l^2 + 6*a^3*b^4*c*f^2*m^2 - 2*a^3*b^2*c^3*g^3*l + 2*a^2*b^3*c^3*f^3*m + 7*a^4*b*c^3*e^2*m^2 + 7*a^2*b^5*c*e^2*m^2 - 5*a^4*b*c^3*f^2*l^2 + 3*a^4*b*c^3*g^2*k^2 - 2*a^4*b^2*c^2*f*k^3 - 2*a^2*b^2*c^4*f^3*k + 7*a^3*b*c^4*d^2*l^2 + 7*a*b^5*c^2*d^2*l^2 - 5*a^3*b*c^4*e^2*k^2 + 3*a^3*b*c^4*f^2*j^2 + 6*a*b^4*c^3*d^2*k^2 + 2*a^3*b^3*c^2*d*k^3 - 2*a^3*b^2*c^3*e*j^3 - 5*a^2*b*c^5*d^2*j^2 + 5*a*b^3*c^4*d^2*j^2 + 3*a^2*b*c^5*e^2*h^2 + 4*a*b^2*c^5*d^2*h^2 - 2*a^2*b^2*c^4*d*h^3 - 4*a^6*c^2*j^2*k*m + 2*a^6*b^2*j^1*m^2 + 4*a^6*c^2*j*k^2*l + 4*a^6*c^2*h*k^2*m - 4*a^6*c^2*h*k^1*l^2 - 4*a^6*c^2*f^1*l^2*m + 4*a^5*c^3*g^2*k*m + 2*a^5*b^3*h*k*m^2 - 2*a^5*b^3*g^1*m^2 + 4*a^6*c^2*g*j*m^2 + 4*a^6*c^2*f*k*m^2 + 4*a^6*c^2*e^1*m^2 - 4*a^5*c^3*h^2*j^1 + 4*a^5*c^3*h*j^2*k + 4*a^5*c^3*g*j^2*l + 4*a^5*c^3*f*j^2*m - 4*a^4*c^4*e^2*k*m + 2*a^4*b^4*g*j*m^2 - 2*a^4*b^4*f*k*m^2 + 2*a^4*b^4*e^1*m^2 - 4*a^5*c^3*g*j*k^2 - 4*a^5*c^3*e*k^2*l - 4*a^5*c^3*d*k^2*m + 4*a^4*c^4*f^2*j^1 + 4*a^5*c^3*e*j^1*l^2 + 4*a^5*c^3*d*k^1*l^2 + 4*a^4*c^4*f^2*h*m + 2*b^6*c^2*d^2*j^1 - 2*a^3*b^5*e*j*m^2 + 2*a^3*b^5*d*k*m^2 + 4*a^5*c^3*f*h^1*l^2 - 4*a^4*c^4*g^2*h*k - 4*a^4*c^4*f*g^2*m - 4*a^3*c^5*d^2*j^1 - 2*b^6*c^2*d^2*h*m + 2*a^3*b^5*f*h*m^2 + 12*a^5*c^3*d*h*m^2 - 12*a^4*c^4*d*h^2*m + 12*a^3*c^5*d^2*h*m - 4*a^5*c^3*e*g*m^2 + 4*a^4*c^4*g*h^2*j + 4*a^4*c^4*f*h^2*k + 4*a^4*c^4*e*h^2*l - 4*a^4*c^4*d*j^2*k + 3*a^6*b*c*j^2*m^2 - 4*a^4*c^4*f*h*j^2 + 4*a^3*c^5*e^2*h*k + 4*a^3*c^5*e^2*g^1 + 4*a^3*c^5*e^2*f*m + 2*b^5*c^3*d^2*h*k - 2*b^5*c^3*d^2*g^1 + 2*b^5*c^3*d^2*f*m + 2*a^5*b*c^2*j^3*l + 2*a^2*b^6*e*g*m^2 - 2*a^2*b^6*d*h*m^2 + 4*a^4*c^4*e*g*k^2 + 4*a^4*c^4*d*h*k^2 - 4*a^3*c^5*f^2*g*j - 4*a^3*c^5*e*f^2*l - 4*a^3*c^5*d*f^2*m - 4*a^4*c^4*d*f^1*l^2 + 4*a^3*c^5*e*g^2*j + 4*a^3*c^5*d*g^2*k + 2*b^4*c^4*d^2*g*j - 2*b^4*c^4*d^2*f*k + 2*b^4*c^4*d^2*e^1 - 6*a^3*b*c^4*f^3*m + 4*a^3*c^5*f*g^2*h + 4*a^2*c^6*d^2*g*j + 4*a^2*c^6*d^2*f*k + 4*a^2*c^6*d^2*e^1 - 2*a^5*b^2*c*g^1*l^3 + 2*a^5*b*c^2*h*k^3 + 2*a^4*b*c^3*h^3*k - 4*a^3*c^5*e*g*h^2 + 4*a^3*c^5*d*f*j^2 - 4*a^2*c^6*d*e^2*k - 2*b^3*c^5*d^2*e*j + 8*a^5*b^2*c*d*m^3 + 8*a*b^6*c*d^2*m^2 + 8*a*b^2*c^5*d^3*m - 6*a^5*b*c^2*e^1*l^3 - 6*a^2*b*c^5*e^3*l - 4*a^2*c^6*e^2*f*h + 2*b^3*c^5*d^2*f*h + 2*a^4*b^3*c*e^1*l^3 + 2*a^4*b*c^3*g*j^3 + 2*a^3*b*c^4*g^3*j + 2*a*b^3*c^4*e^3*l + 4*a^2*c^6*e*f^2*g + 4*a^2*c^6*d*f^2*h - 6*a^4*b*c^3*d*k^3 - 4*a^2*c^6*d*f*g^2 + 2*b^2*c^6*d^2*e*g - 2*a*b^2*c^5*e^3*j + 2*a^3*b*c^4*f*h^3 + 2*a^2*b*c^5*f^3*h + 2*a^2*b*c^5*e*g^3 + 3*a*b*c^6*d^2*g^2 - 9*a^4*b^2*c^2*f^2*m^2 + 4*a^4*b^2*c^2*g^2*l^2 - 14*a^3*b^3*c^2*e^2*m^2 + 5*a^3*b^3*c^2*f^2*l^2 - 20*a^2*b^4*c^2*d^2*m^2 + 16*a^3*b^2*c^3*d^2*m^2 - 9*a^3*b^2*c^3*e^2*l^2 + 6*a^2*b^4*c^2*e^2*l^2 + 4*a^3*b^2*c^3*f^2*k^2 - 14*a^2*b^3*c^3*d^2*l^2 + 5*a^2*b^3*c^3*e^2*k^2 - 9*a^2*b^2*c^4*d^2*k^2 + 4*a^2*b^2*c^4*e^2*j^2 + 4*a^7*c*k^1*l^2*m - 4*a^7*c*j^1*m^2 + 2*b^7*c*d^2*k*m + 2*a^6*b*c*k^3*m + 2*a^6*b*c*j^1*l^3 + 2*a*b^7*d*f*m^2 - 6*a^6*b*c*f*m^3 - 6*a*b*c^6*d^3*k - 4*a*c^7*d^2*e*g + 4*a*c^7*d*e^2*f + 2*a*b*c^6*e^3
\end{aligned}$$

$$\begin{aligned}
& *g + 2*a*b*c^6*d*f^3 - a^5*b^2*c*j^2*k^2 - a^5*b*c^2*j^2*k^2 - a^4*b^3*c*h^2 \\
& *l^2 - a^3*b^4*c*g^2*l^2 - a^4*b*c^3*h^2*j^2 - a^2*b^5*c*f^2*l^2 - a*b^5*c^2 \\
& *e^2*k^2 - a^3*b*c^4*g^2*h^2 - a*b^4*c^3*e^2*j^2 - a^2*b*c^5*f^2*g^2 - a*b^3 \\
& *c^4*e^2*h^2 - a*b^2*c^5*e^2*g^2 + 2*a^7*b*k*m^3 + 4*a^7*c*h*m^3 + 4*a*c^7 \\
& *d^3*h + 2*b*c^7*d^3*f - a^6*b*c*k^2*l^2 - 2*a^6*c^2*j^2*l^2 - 6*a^6*c^2*h^2 \\
& *m^2 - a*b^6*c*e^2*l^2 - 6*a^5*c^3*g^2*l^2 - 2*a^5*c^3*h^2*k^2 - 2*a^5*c^3 \\
& *f^2*m^2 - 6*a^4*c^4*f^2*k^2 - 6*a^4*c^4*d^2*m^2 - 2*a^4*c^4*g^2*j^2 - 2*a^4 \\
& *c^4*e^2*l^2 - 6*a^3*c^5*e^2*j^2 - 2*a^3*c^5*d^2*k^2 - 2*a^3*c^5*f^2*h^2 - a \\
& *b*c^6*e^2*f^2 - 6*a^2*c^6*d^2*h^2 - 2*a^2*c^6*e^2*g^2 - a^4*b^2*c^2*h^2 \\
& *k^2 - a^3*b^3*c^2*g^2*k^2 - a^3*b^2*c^3*g^2*j^2 - a^2*b^4*c^2*f^2*k^2 - a^2 \\
& *b^3*c^3*f^2*j^2 - a^2*b^2*c^4*f^2*h^2 - 2*a^7*c*k^2*m^2 + 4*a^5*c^3*h^3*m \\
& - 2*a^6*b^2*h*m^3 + 4*a^6*c^2*g*l^3 + 4*a^4*c^4*g^3*l - 2*b^4*c^4*d^3*m + 2 \\
& *a^5*b^3*f*m^3 - 4*a^6*c^2*d*m^3 + 4*a^5*c^3*f*k^3 + 4*a^3*c^5*f^3*k - 4*a^2 \\
& *c^6*d^3*m + 2*b^3*c^5*d^3*k - 2*a^4*b^4*d*m^3 + 4*a^4*c^4*e*j^3 + 4*a^2*c^6 \\
& *e^3*j - 2*b^2*c^6*d^3*h + 4*a^3*c^5*d*h^3 - 2*a*c^7*d^2*f^2 - a^6*b^2*k^2 \\
& *m^2 - a^5*b^3*j^2*m^2 - a^4*b^4*h^2*m^2 - a^3*b^5*g^2*m^2 - a^2*b^6*f^2*m^2 - b^6 \\
& *c^2*d^2*k^2 - b^5*c^3*d^2*j^2 - b^4*c^4*d^2*h^2 - b^3*c^5*d^2*g^2 - b^2*c^6 \\
& *d^2*f^2 - a^7*b*l^2*m^2 - b^7*c*d^2*l^2 - a*b^7*e^2*m^2 - b*c^7*d^2*e^2 - b^8 \\
& *d^2*m^2 - a^6*c^2*k^4 - a^5*c^3*j^4 - a^4*c^4*h^4 - a^3*c^5*g^4 - a^2*c^6*f^4 - a^7 \\
& *c*l^4 - a*c^7*e^4 - a^8*m^4 - c^8*d^4, z, k1)*(root(128*a^2*b^2*c^8*z^4 - 16*a*b^4*c^7*z^4 - 256*a^3*c^9*z^4 + 384*a^3*b^2*c^6 \\
& *l*z^3 - 144*a^2*b^4*c^5*l*z^3 + 128*a^2*b^3*c^6*j*z^3 - 128*a^2*b^2*c^7*g*z^3 + 16*a*b^6 \\
& *c^4*l*z^3 - 256*a^3*b*c^7*j*z^3 - 16*a*b^5*c^5*j*z^3 + 16*a*b^4*c^6*g*z^3 - 256*a^4*c^7 \\
& *l*z^3 + 256*a^3*c^8*g*z^3 - 96*a^4*b*c^5*j*l*z^2 + 8*a*b^7*c^2*j*l*z^2 + 160*a^4*b*c^5 \\
& *h*m*z^2 - 8*a*b^7*c^2*h*m*z^2 + 8*a*b^6*c^3*h*k*z^2 - 8*a*b^6*c^3*g*l*z^2 + 8*a*b^6 \\
& *c^3*f*m*z^2 + 160*a^3*b*c^6*g*j*z^2 - 96*a^3*b*c^6*f*k*z^2 - 96*a^3*b*c^6*e*l*z^2 - 96 \\
& *a^3*b*c^6*d*m*z^2 + 8*a*b^5*c^4*g*j*z^2 - 8*a*b^5*c^4*f*k*z^2 - 8*a*b^5*c^4*e*l*z^2 - 8 \\
& *a*b^5*c^4*d*m*z^2 + 8*a*b^4*c^5*e*j*z^2 + 8*a*b^4*c^5*d*k*z^2 + 8*a*b^4*c^5*f*h*z^2 + 32 \\
& *a^2*b*c^7*e*g*z^2 + 32*a^2*b*c^7*d*h*z^2 - 8*a*b^3*c^6*e*g*z^2 - 8*a*b^3*c^6*d*h*z^2 + 16 \\
& *a*b^2*c^7*d*f*z^2 + 8*a*b^8*c*k*m*z^2 - 304*a^4*b^2*c^4*k*m*z^2 + 264*a^3*b^4*c^3*k*m \\
& *z^2 - 80*a^2*b^6*c^2*k*m*z^2 + 184*a^3*b^3*c^4*j*l*z^2 - 72*a^2*b^5*c^3*j*l*z^2 - 200*a^3 \\
& *b^3*c^4*h*m*z^2 + 72*a^2*b^5*c^3*h*m*z^2 - 240*a^3*b^2*c^5*g*l*z^2 + 144*a^3*b^2*c^5*h*k \\
& *z^2 + 144*a^3*b^2*c^5*f*m*z^2 + 80*a^2*b^4*c^4*g*l*z^2 - 64*a^2*b^4*c^4*h*k*z^2 - 64 \\
& *a^2*b^4*c^4*f*m*z^2 - 72*a^2*b^3*c^5*g*j*z^2 + 56*a^2*b^3*c^5*f*k*z^2 + 56*a^2*b^3 \\
& *c^5*e*l*z^2 + 56*a^2*b^3*c^5*d*m*z^2 - 48*a^2*b^2*c^6*e*j*z^2 - 48*a^2*b^2*c^6*d*k \\
& *z^2 - 48*a^2*b^2*c^6*f*h*z^2 - 112*a^5*b*c^4*m^2*z^2 + 44*a^2*b^7*c*m^2*z^2 + 80*a^4 \\
& *b*c^5*k^2*z^2 - 4*a*b^7*c^2*k^2*z^2 - 4*a*b^6*c^3*j^2*z^2 - 48*a^3*b*c^6*h^2*z^2 - 4 \\
& *a*b^5*c^4*h^2*z^2 - 4*a*b^4*c^5*g^2*z^2 + 16*a^2*b*c^7*f^2*z^2 - 4*a*b^3*c^6*f^2*z^2 + 8 \\
& *a*b^2*c^7*e^2*z^2 + 64*a^5*c^5*k*m*z^2 + 192*a^4*c^6*g*l*z^2 - 64*a^4*c^6*h*k*z^2 - 64 \\
& *a^4*c^6*f*m*z^2 + 64*a^3*c^7*e*j*z^2 + 64*a^3*c^7*d*k*z^2 + 64*a^3*c^7*f*h*z^2 - 4*a \\
& *b^8*c*l^2*z^2 - 64*a^2*c^8*d*f*z^2 + 16*a*b*c^8*d^2*z^2 + 252*a^4*b^3*c^3*m^2*z^2 - 168 \\
& *a^3*b^5*c^2*m^2*z^2 + 168*a^4*b^2*c^4*l^2*z^2 - 132*a^3*b^4*c^
\end{aligned}$$

$$\begin{aligned}
& 3*1^2*z^2 + 40*a^2*b^6*c^2*1^2*z^2 - 100*a^3*b^3*c^4*k^2*z^2 + 36*a^2*b^5*c^3*k^2*z^2 - 56*a^3*b^2*c^5*j^2*z^2 + 32*a^2*b^4*c^4*j^2*z^2 + 28*a^2*b^3*c^5*h^2*z^2 + 40*a^2*b^2*c^6*g^2*z^2 - 96*a^5*c^5*1^2*z^2 - 32*a^4*c^6*j^2*z^2 - 96*a^3*c^7*g^2*z^2 - 32*a^2*c^8*e^2*z^2 - 4*b^3*c^7*d^2*z^2 - 4*a*b^9*m^2*z^2 + 32*a^5*b*c^3*h*1*m*z + 8*a^2*b^6*c*g*k*m*z + 96*a^4*b*c^4*e*k*m*z + 32*a^4*b*c^4*h*j*k*z + 32*a^4*b*c^4*g*j*1*z + 32*a^4*b*c^4*f*j*m*z - 64*a^4*b*c^4*g*h*m*z - 8*a*b^6*c^2*e*j*1*z + 8*a*b^6*c^2*e*h*m*z - 64*a^3*b*c^5*e*h*k*z + 64*a^3*b*c^5*e*g*1*z - 64*a^3*b*c^5*e*f*m*z + 32*a^3*b*c^5*f*g*k*z - 32*a^3*b*c^5*d*h*1*z + 32*a^3*b*c^5*d*g*m*z - 8*a*b^5*c^3*e*h*k*z + 8*a*b^5*c^3*e*g*1*z - 8*a*b^5*c^3*e*f*m*z - 8*a*b^4*c^4*e*g*j*z + 8*a*b^4*c^4*e*f*k*z - 8*a*b^4*c^4*d*f*1*z + 8*a*b^4*c^4*d*e*m*z - 32*a^2*b*c^6*d*f*j*z + 32*a^2*b*c^6*d*e*k*z + 8*a*b^3*c^5*d*f*j*z - 8*a*b^3*c^5*d*e*k*z + 32*a^2*b*c^6*e*f*h*z - 8*a*b^3*c^5*e*f*h*z - 8*a*b^2*c^6*d*f*g*z + 8*a*b^2*c^6*d*e*h*z - 8*a*b^7*c*e*k*m*z - 40*a^5*b^2*c^2*k*1*m*z + 48*a^4*b^3*c^2*j*k*m*z - 8*a^4*b^3*c^2*h*1*m*z + 104*a^4*b^2*c^3*g*k*m*z - 56*a^3*b^4*c^2*g*k*m*z - 40*a^4*b^2*c^3*h*j*m*z + 8*a^4*b^2*c^3*h*k*1*z + 8*a^4*b^2*c^3*f*1*m*z + 8*a^3*b^4*c^2*h*j*m*z - 152*a^3*b^3*c^3*e*k*m*z + 64*a^2*b^5*c^2*e*k*m*z - 40*a^3*b^3*c^3*g*j*1*z - 8*a^3*b^3*c^3*h*j*k*z - 8*a^3*b^3*c^3*f*j*m*z + 8*a^2*b^5*c^2*g*j*1*z + 48*a^3*b^3*c^3*g*h*m*z - 8*a^2*b^5*c^2*g*h*m*z - 104*a^3*b^2*c^4*e*j*1*z + 56*a^2*b^4*c^3*e*j*1*z + 8*a^3*b^2*c^4*f*j*k*z - 8*a^3*b^2*c^4*d*k*1*z + 8*a^3*b^2*c^4*d*j*m*z + 104*a^3*b^2*c^4*e*h*m*z - 56*a^2*b^4*c^3*e*h*m*z - 40*a^3*b^2*c^4*g*h*k*z - 40*a^3*b^2*c^4*f*g*m*z - 8*a^3*b^2*c^4*f*h*1*z + 8*a^2*b^4*c^3*g*h*k*z + 8*a^2*b^4*c^3*f*g*m*z + 48*a^2*b^3*c^4*e*h*k*z - 48*a^2*b^3*c^4*e*g*1*z + 48*a^2*b^3*c^4*e*f*m*z - 8*a^2*b^3*c^4*f*g*k*z + 8*a^2*b^3*c^4*d*h*1*z - 8*a^2*b^3*c^4*d*g*m*z + 40*a^2*b^2*c^5*e*g*j*z - 40*a^2*b^2*c^5*e*f*k*z + 40*a^2*b^2*c^5*d*f*1*z - 40*a^2*b^2*c^5*d*e*m*z - 8*a^2*b^2*c^5*d*h*j*z + 8*a^2*b^2*c^5*d*g*k*z + 8*a^2*b^2*c^5*f*g*h*z + 8*a^4*b^4*c*k*1*m*z - 64*a^5*b*c^3*j*k*m*z - 8*a^3*b^5*c*j*k*m*z - 32*a^6*b*c^2*1*m^2*z + 24*a^5*b^3*c*1*m^2*z - 28*a^4*b^4*c*j*m^2*z + 16*a^5*b*c^3*k^2*1*z + 4*a^3*b^5*c*j*1^2*z + 48*a^5*b*c^3*g*m^2*z + 32*a^3*b^5*c*g*m^2*z - 4*a^2*b^6*c*g*1^2*z - 36*a^2*b^6*c*e*m^2*z - 32*a^4*b*c^4*g*k^2*z - 16*a^3*b*c^5*f^2*1*z - 48*a^4*b*c^4*e*1^2*z - 32*a^3*b*c^5*g^2*j*z - 4*a*b^4*c^4*e^2*1*z + 32*a^2*b*c^6*d^2*1*z - 24*a*b^3*c^5*d^2*1*z + 4*a*b^6*c^2*e*k^2*z + 32*a^3*b*c^5*e*j^2*z + 16*a^3*b*c^5*g*h^2*z - 16*a^2*b*c^6*e^2*j*z + 4*a*b^5*c^3*e*j^2*z + 4*a*b^3*c^5*e^2*j*z + 20*a*b^2*c^6*d^2*j*z + 4*a*b^4*c^4*e*h^2*z - 16*a^2*b*c^6*e*g^2*z + 4*a*b^3*c^5*e*g^2*z - 4*a*b^2*c^6*e^2*g*z + 4*a*b^2*c^6*e*f^2*z + 32*a^6*c^3*k*1*m*z - 32*a^5*c^4*h*k*1*z + 32*a^5*c^4*h*j*m*z - 32*a^5*c^4*g*k*m*z - 32*a^5*c^4*f*1*m*z - 32*a^4*c^5*f*j*k*z + 32*a^4*c^5*e*j*1*z + 32*a^4*c^5*d*k*1*z - 32*a^4*c^5*d*j*m*z + 32*a^4*c^5*g*h*k*z + 32*a^4*c^5*f*h*1*z + 32*a^4*c^5*f*g*m*z - 32*a^4*c^5*e*h*m*z - 32*a^3*c^6*e*g*j*z + 32*a^3*c^6*e*f*k*z + 32*a^3*c^6*d*h*j*z - 32*a^3*c^6*d*g*k*z - 32*a^3*c^6*d*f*1*z + 32*a^3*c^6*d*e*m*z - 32*a^3*c^6*f*g*h*z + 4*a*b^7*c*e*1^2*z + 32*a^2*c^7*d*f*g*z - 32*a^2*c^7*d*e*h*z - 16*a*b*c^7*d^2*g*z + 52*a^5*b^2*c^2*j*m^2*z - 4*a^4*b^3*c^2*k^2*1*z + 36*a^4*b^2*c^3*j^2*1*z - 16*a^4*b^3*c^2*j*1^2*z - 8*a^3*b^4*c^2*j^2*1*z - 20*a^4*b^
\end{aligned}$$

$$\begin{aligned}
& 2*c^3*j*k^2*z + 4*a^3*b^4*c^2*j*k^2*z - 76*a^4*b^3*c^2*g*m^2*z - 60*a^4*b^2 \\
& *c^3*g*l^2*z + 44*a^3*b^2*c^4*g^2*l*z + 28*a^3*b^4*c^2*g*l^2*z - 8*a^2*b^4* \\
& c^3*g^2*l*z + 104*a^3*b^4*c^2*e*m^2*z - 100*a^4*b^2*c^3*e*m^2*z + 24*a^3*b^ \\
& 3*c^3*g*k^2*z + 4*a^3*b^2*c^4*h^2*j*z - 4*a^2*b^5*c^2*g*k^2*z + 4*a^2*b^3*c \\
& ^4*f^2*l*z + 76*a^3*b^3*c^3*e*l^2*z - 32*a^2*b^5*c^2*e*l^2*z + 20*a^2*b^2*c \\
& ^5*e^2*l*z + 12*a^3*b^2*c^4*g*j^2*z + 8*a^2*b^3*c^4*g^2*j*z - 4*a^2*b^4*c^3 \\
& *g*j^2*z + 52*a^3*b^2*c^4*e*k^2*z - 28*a^2*b^4*c^3*e*k^2*z - 4*a^2*b^2*c^5* \\
& f^2*j*z - 24*a^2*b^3*c^4*e*j^2*z - 4*a^2*b^3*c^4*g*h^2*z - 20*a^2*b^2*c^5*e \\
& *h^2*z + 20*a^5*b^2*c^2*l^3*z + 4*a^3*b^3*c^3*j^3*z - 4*a^2*b^2*c^5*g^3*z - \\
& 4*a^4*b^5*l*m^2*z - 16*a^6*c^3*j*m^2*z - 16*a^5*c^4*j^2*l*z + 4*a^3*b^6*j* \\
& m^2*z + 16*a^5*c^4*j*k^2*z + 48*a^5*c^4*g*l^2*z - 48*a^4*c^5*g^2*l*z - 4*a^ \\
& 2*b^7*g*m^2*z + 16*a^5*c^4*e*m^2*z - 16*a^4*c^5*h^2*j*z + 16*a^4*c^5*g*j^2* \\
& z - 16*a^3*c^6*e^2*l*z + 4*b^5*c^4*d^2*l*z - 16*a^4*c^5*e*k^2*z + 16*a^3*c^ \\
& 6*f^2*j*z - 4*b^4*c^5*d^2*j*z - 16*a^2*c^7*d^2*j*z - 4*a^4*b^4*c*l^3*z + 16 \\
& *a^3*c^6*e*h^2*z - 16*a^4*b*c^4*j^3*z + 16*a^2*c^7*e^2*g*z + 4*b^3*c^6*d^2* \\
& g*z - 16*a^2*c^7*e*f^2*z - 4*b^2*c^7*d^2*e*z + 4*a*b^8*e*m^2*z + 16*a*c^8*d \\
& ^2*e*z - 16*a^6*c^3*l^3*z + 16*a^3*c^6*g^3*z + 4*a^5*b^2*c*g*k*l*m + 12*a^5 \\
& *b*c^2*g*j*k*m + 12*a^5*b*c^2*e*k*l*m - 4*a^5*b*c^2*h*j*k*l - 4*a^5*b*c^2*f \\
& *j*l*m - 4*a^4*b^3*c*g*j*k*m - 4*a^4*b^3*c*e*k*l*m - 4*a^5*b*c^2*g*h*l*m + \\
& 4*a^3*b^4*c*e*j*k*m - 4*a^3*b^4*c*f*h*k*m + 12*a^4*b*c^3*d*j*k*l - 20*a^4*b \\
& *c^3*e*g*k*m + 12*a^4*b*c^3*f*h*j*l + 12*a^4*b*c^3*e*h*j*m + 12*a^4*b*c^3*d \\
& *h*k*m - 4*a^4*b*c^3*g*h*j*k - 4*a^4*b*c^3*f*g*k*l - 4*a^4*b*c^3*f*g*j*m - \\
& 4*a^4*b*c^3*e*h*k*l - 4*a^4*b*c^3*e*f*l*m - 4*a^4*b*c^3*d*g*l*m - 4*a^2*b^5 \\
& *c*e*g*k*m + 4*a^2*b^5*c*d*h*k*m - 20*a^3*b*c^4*d*f*j*l - 4*a^3*b*c^4*e*f*j \\
& *k - 4*a^3*b*c^4*d*g*j*k - 4*a^3*b*c^4*d*e*k*l - 4*a^3*b*c^4*d*e*j*m - 4*a* \\
& b^5*c^2*d*f*j*l + 12*a^3*b*c^4*e*g*h*k + 12*a^3*b*c^4*e*f*g*m + 12*a^3*b*c^ \\
& 4*d*g*h*l + 12*a^3*b*c^4*d*f*h*m - 4*a^3*b*c^4*f*g*h*j - 4*a^3*b*c^4*e*f*h* \\
& l + 4*a*b^5*c^2*d*f*h*m - 4*a*b^4*c^3*d*f*h*k + 4*a*b^4*c^3*d*f*g*l + 12*a^ \\
& 2*b*c^5*d*f*g*j + 12*a^2*b*c^5*d*e*f*l - 4*a^2*b*c^5*d*e*h*j - 4*a^2*b*c^5* \\
& d*e*g*k - 4*a*b^3*c^4*d*f*g*j - 4*a*b^3*c^4*d*e*f*l - 4*a^2*b*c^5*e*f*g*h + \\
& 4*a*b^2*c^5*d*e*f*j - 4*a^6*b*c*j*k*l*m - 4*a*b^6*c*d*f*k*m - 4*a*b*c^6*d* \\
& e*f*g - 16*a^4*b^2*c^2*e*j*k*m + 4*a^4*b^2*c^2*f*j*k*l + 4*a^4*b^2*c^2*d*j* \\
& l*m + 12*a^4*b^2*c^2*f*h*k*m + 4*a^4*b^2*c^2*g*h*j*m + 4*a^4*b^2*c^2*e*h*l* \\
& m - 4*a^3*b^3*c^2*d*j*k*l + 20*a^3*b^3*c^2*e*g*k*m - 16*a^3*b^3*c^2*d*h*k*m \\
& - 4*a^3*b^3*c^2*f*h*j*l - 4*a^3*b^3*c^2*e*h*j*m - 40*a^3*b^2*c^3*d*f*k*m + \\
& 24*a^2*b^4*c^2*d*f*k*m - 16*a^3*b^2*c^3*d*h*j*l + 12*a^3*b^2*c^3*e*g*j*l + \\
& 4*a^3*b^2*c^3*e*h*j*k + 4*a^3*b^2*c^3*e*f*j*m + 4*a^3*b^2*c^3*d*g*k*l - 4* \\
& a^2*b^4*c^2*e*g*j*l + 4*a^2*b^4*c^2*d*h*j*l - 16*a^3*b^2*c^3*e*g*h*m + 4*a^ \\
& 3*b^2*c^3*f*g*h*l + 4*a^2*b^4*c^2*e*g*h*m + 20*a^2*b^3*c^3*d*f*j*l - 16*a^2 \\
& *b^3*c^3*d*f*h*m - 4*a^2*b^3*c^3*e*g*h*k - 4*a^2*b^3*c^3*e*f*g*m - 4*a^2*b^ \\
& 3*c^3*d*g*h*l - 16*a^2*b^2*c^4*d*f*g*l + 12*a^2*b^2*c^4*d*f*h*k + 4*a^2*b^2 \\
& *c^4*e*f*g*k + 4*a^2*b^2*c^4*d*g*h*j + 4*a^2*b^2*c^4*d*e*h*l + 4*a^2*b^2*c^ \\
& 4*d*e*g*m + 2*a^5*b^2*c*j^2*k*m - 4*a^5*b^2*c*h*k^2*m - 2*a^5*b*c^2*h^2*k*m \\
& + 2*a^4*b^3*c*h^2*k*m + 2*a^5*b^2*c*h*k*l^2 + 2*a^5*b^2*c*f*l^2*m - 2*a^5* \\
& b*c^2*h*j^2*m + 2*a^3*b^4*c*g^2*k*m + 14*a^4*b*c^3*f^2*k*m - 10*a^5*b*c^2*f
\end{aligned}$$

$$\begin{aligned}
& *k^2m - 8a^5b^2c*g*j^m^2 - 8a^5b^2c*e*l^m^2 + 4a^5b^2c*f*k^m^2 + \\
& 4a^4b^3c*f*k^2m - 2a^5b*c^2*g*k^2l + 2a^2b^5c*f^2*k^m + 6a^5b*c \\
& ^2*f*k*l^2 + 6a^5b*c^2*d*l^2m - 2a^5b*c^2*g*j*l^2 + 2a^4b^3c*g*j*l^ \\
& 2 - 2a^4b^3c*f*k*l^2 - 2a^4b^3c*d*l^2m - 2a^4b*c^3*g^2*j*l - 14a* \\
& b^5c^2*d^2*k^m - 10a^5b*c^2*e*j^m^2 + 10a^4b^3c*e*j^m^2 - 10a^3b*c^ \\
& 4*d^2*k^m - 6a^4b^3c*d*k^m^2 + 6a^4b*c^3*g^2*h^m - 4a^3b^4c*d*k^2m \\
& - 2a^5b*c^2*d*k^m^2 + 14a^5b*c^2*f*h^m^2 + 14a^3b*c^4*e^2*j*l - 10a \\
& ^4b^3c*f*h^m^2 - 10a^4b*c^3*f*h^2m - 10a^4b*c^3*e*j^2l - 2a^4b*c^ \\
& 3*g*h^2l - 2a^4b*c^3*f*j^2k - 2a^4b*c^3*d*j^2m - 2a^3b^4c*e*j*l^2 \\
& + 2a^3b^4c*d*k*l^2 + 2a*b^5c^2*e^2*j*l - 12a*b^4c^3*d^2*j*l - 10a^ \\
& 3b*c^4*e^2*h^m + 6a^4b*c^3*e*j*k^2 + 2a^3b^4c*f*h*l^2 - 2a*b^5c^2*e \\
& ^2*h^m - 12a^3b^4c*e*g^m^2 + 12a^3b^4c*d*h^m^2 + 12a*b^4c^3*d^2*h^m \\
& + 6a^3b*c^4*f^2*g*l - 2a^4b*c^3*f*h*k^2 - 2a^3b*c^4*f^2*h*k + 14a^4 \\
& *b*c^3*e*g*l^2 - 10a^4b*c^3*d*h*l^2 - 10a^3b*c^4*e*g^2l - 2a^3b*c^4* \\
& f*g^2k - 2a^3b*c^4*d*g^2m + 2a^2b^5c*e*g*l^2 - 2a^2b^5c*d*h*l^2 + \\
& 2a*b^4c^3*e^2*h*k - 2a*b^4c^3*e^2*g*l + 2a*b^4c^3*e^2*f*m - 14a^2b \\
& ^5c*d*f^m^2 + 14a^2b*c^5*d^2*h*k - 10a^4b*c^3*d*f^m^2 - 10a^3b*c^4*d \\
& *h^2k - 10a^2b*c^5*d^2*g*l - 10a*b^3c^4*d^2*h*k + 10a*b^3c^4*d^2*g*l \\
& - 6a*b^3c^4*d^2*f*m - 4a*b^4c^3*d*f^2m - 2a^3b*c^4*e*h^2j - 2a^2* \\
& b*c^5*d^2*f*m + 6a^3b*c^4*d*h*j^2 + 6a^2b*c^5*e^2*f*k + 6a^2b*c^5*d*e \\
& ^2m - 2a^3b*c^4*e*g*j^2 - 2a^2b*c^5*e^2*g*j + 2a*b^3c^4*e^2*g*j - 2* \\
& a*b^3c^4*e^2*f*k - 2a*b^3c^4*d*e^2m + 14a^3b*c^4*d*f*k^2 - 10a^2b*c \\
& ^5*d*f^2k - 8a*b^2c^5*d^2*g*j - 8a*b^2c^5*d^2*e*l + 4a*b^3c^4*d*f^2* \\
& k + 4a*b^2c^5*d^2*f*k - 2a^2b*c^5*e*f^2j + 2a*b^5c^2*d*f*k^2 + 2a*b \\
& ^4c^3*d*f*j^2 + 2a*b^2c^5*d*e^2k - 2a^2b*c^5*d*g^2h + 2a*b^2c^5*e^ \\
& 2*f*h - 4a*b^2c^5*d*f^2h - 2a^2b*c^5*d*f*h^2 + 2a*b^3c^4*d*f*h^2 + 2 \\
& *a*b^2c^5*d*f*g^2 + 8a^6c^2*h*j*l^m - 8a^6c^2*g*k*l^m - 8a^5c^3*f*j* \\
& k*l + 8a^5c^3*e*j*k^m - 8a^5c^3*d*j*l^m + 8a^5c^3*g*h*k*l - 8a^5c^3 \\
& *g*h*j^m - 8a^5c^3*f*h*k^m + 8a^5c^3*f*g*l^m - 8a^5c^3*e*h*l^m - 2a^ \\
& 6b*c*h*l^2m + 8a^4c^4*f*g*j*k - 8a^4c^4*e*h*j*k - 8a^4c^4*e*g*j*l + \\
& 8a^4c^4*e*f*k*l - 8a^4c^4*e*f*j^m + 8a^4c^4*d*h*j*l - 8a^4c^4*d*g* \\
& k*l + 8a^4c^4*d*g*j^m + 8a^4c^4*d*f*k^m + 8a^4c^4*d*e*l^m + 6a^6b*c \\
& *g*l^m^2 - 2a^6b*c*h*k^m^2 - 8a^4c^4*f*g*h*l + 8a^4c^4*e*g*h^m + 2a* \\
& b^6c*e^2*k^m + 8a^3c^5*d*e*j*k + 8a^3c^5*e*f*h*j - 8a^3c^5*e*f*g*k - \\
& 8a^3c^5*d*g*h*j - 8a^3c^5*d*f*h*k + 8a^3c^5*d*f*g*l - 8a^3c^5*d*e* \\
& h*l - 8a^3c^5*d*e*g^m - 8a^2c^6*d*e*f*j + 8a^2c^6*d*e*g*h + 2a*b^6c \\
& *d*f*l^2 + 6a*b*c^6*d^2*e*j - 2a*b*c^6*d^2*f*h - 2a*b*c^6*d*e^2h - 8a^ \\
& 4b^2c^2*g^2*k^m - 10a^3b^3c^2*f^2*k^m + 2a^4b^2c^2*h^2*j*l + 18a^3 \\
& *b^2c^3*e^2*k^m - 12a^2b^4c^2*e^2*k^m - 4a^4b^2c^2*g*j^2l + 2a^3b \\
& ^3c^2*g^2*j*l + 28a^2b^3c^3*d^2*k^m + 14a^4b^2c^2*d*k^2m - 8a^3b^ \\
& 2c^3*f^2*j*l + 2a^4b^2c^2*g*j*k^2 + 2a^4b^2c^2*e*k^2l - 2a^3b^3c \\
& ^2*g^2*h^m + 2a^2b^4c^2*f^2*j*l - 10a^2b^3c^3*e^2*j*l - 8a^4b^2c^2 \\
& *d*k*l^2 + 4a^4b^2c^2*e*j*l^2 + 4a^3b^3c^2*f*h^2m + 4a^3b^3c^2*e* \\
& j^2l + 4a^3b^2c^3*f^2*h^m - 2a^2b^4c^2*f^2*h^m + 18a^2b^2c^4*d^2* \\
& j*l + 10a^2b^3c^3*e^2*h^m - 8a^4b^2c^2*f*h*l^2 - 2a^3b^3c^2*e*j*k^
\end{aligned}$$

$$\begin{aligned}
& 2 + 2a^3b^2c^3g^2hk + 2a^3b^2c^3f^2gm - 22a^4b^2c^2d^2hm^2 \\
& - 22a^2b^2c^4d^2hm + 18a^4b^2c^2e^2gm^2 + 16a^3b^2c^3d^2hm^2 \\
& - 4a^3b^2c^3f^2hk - 4a^2b^4c^2d^2hm + 2a^3b^3c^2f^2hk^2 + 2 \\
& a^3b^2c^3d^2j^2k + 2a^2b^3c^3f^2hk - 2a^2b^3c^3f^2g^1 - 10a \\
& ^3b^3c^2e^2g^1 + 10a^3b^3c^2d^2h^1 - 8a^2b^2c^4e^2hk - 8a^2 \\
& b^2c^4e^2f^1 + 4a^2b^3c^3e^2g^1 + 4a^2b^2c^4e^2g^1 + 2a^3b^2 \\
& c^3f^2hj^2 + 28a^3b^3c^2d^2fm^2 + 14a^2b^2c^4d^2fm - 8a^3b^2 \\
& c^3e^2g^2k + 4a^3b^2c^3d^2hk^2 + 4a^2b^3c^3d^2hk + 2a^2b^4c^2 \\
& e^2g^2k - 2a^2b^4c^2d^2hk^2 + 2a^2b^2c^4f^2g^2j + 2a^2b^2c^4e \\
& f^2g^1 + 18a^3b^2c^3d^2f^1 - 12a^2b^4c^2d^2f^1 - 4a^2b^2c^4e^2 \\
& g^2j + 2a^2b^3c^3e^2g^2j - 2a^2b^3c^3d^2hj^2 - 10a^2b^3c^3d^2f^1 \\
& k^2 - 8a^2b^2c^4d^2f^1j^2 + 2a^2b^2c^4e^2gh^2 + 4a^5b^2c^2h^2m^2 - \\
& 2a^4b^2c^2h^3m - 5a^5b^2c^2g^2m^2 + 5a^4b^3c^2g^2m^2 + 3a^5b^2 \\
& c^2h^2m^2 + 6a^3b^4c^2f^2m^2 - 2a^3b^2c^3g^3m + 2a^2b^3c^3f^3 \\
& m + 7a^4b^2c^3e^2m^2 + 7a^2b^5c^2e^2m^2 - 5a^4b^2c^3f^2m^2 + 3a^4 \\
& b^2c^3g^2k^2 - 2a^4b^2c^2f^2k^3 - 2a^2b^2c^4f^3k + 7a^3b^2c^4d^2 \\
& ^2m^2 + 7a^2b^5c^2d^2m^2 - 5a^3b^2c^4e^2k^2 + 3a^3b^2c^4f^2j^2 + \\
& 6a^2b^4c^3d^2k^2 + 2a^3b^3c^2d^2k^3 - 2a^3b^2c^3e^2j^3 - 5a^2b^2c^3 \\
& ^5d^2j^2 + 5a^2b^3c^4d^2j^2 + 3a^2b^2c^5e^2h^2 + 4a^2b^2c^5d^2h^2 \\
& - 2a^2b^2c^4d^2h^3 - 4a^6c^2j^2k^2m + 2a^6b^2j^2m^2 + 4a^6c^2 \\
& j^2k^2m + 4a^6c^2h^2k^2m - 4a^6c^2h^2k^2m - 4a^6c^2f^2m^2 + 4a^5 \\
& c^3g^2k^2m + 2a^5b^3h^2k^2m - 2a^5b^3g^2m^2 + 4a^6c^2g^2j^2m^2 + \\
& 4a^6c^2f^2k^2m^2 + 4a^6c^2e^2m^2 - 4a^5c^3h^2j^2m + 4a^5c^3h^2j^2 \\
& k + 4a^5c^3g^2j^2m + 4a^5c^3f^2j^2m - 4a^4c^4e^2k^2m + 2a^4b^4 \\
& g^2j^2m - 2a^4b^4f^2k^2m + 2a^4b^4e^2m^2 - 4a^5c^3g^2j^2k^2 - 4a^5 \\
& c^3e^2k^2m - 4a^5c^3d^2k^2m + 4a^4c^4f^2j^2m + 4a^5c^3e^2j^2m + \\
& 4a^5c^3d^2k^2m + 4a^4c^4f^2hm + 2b^6c^2d^2j^2m - 2a^3b^5e^2j^2 \\
& m^2 + 2a^3b^5d^2k^2m + 4a^5c^3f^2h^2m - 4a^4c^4g^2hk - 4a^4c^4 \\
& f^2gm - 4a^3c^5d^2j^2m - 2b^6c^2d^2hm + 2a^3b^5f^2hm^2 + 12a^5 \\
& c^3d^2hm^2 - 12a^4c^4d^2hm + 12a^3c^5d^2hm - 4a^5c^3e^2gm^2 \\
& + 4a^4c^4g^2h^2j + 4a^4c^4f^2h^2k + 4a^4c^4e^2h^2m - 4a^4c^4d^2 \\
& j^2k + 3a^6b^2c^2j^2m^2 - 4a^4c^4f^2hj^2 + 4a^3c^5e^2hk + 4a^3c^5 \\
& e^2g^1 + 4a^3c^5e^2f^1 + 2b^5c^3d^2hk - 2b^5c^3d^2g^1 + 2 \\
& b^5c^3d^2f^1 + 2a^5b^2c^2j^3m + 2a^2b^6e^2gm^2 - 2a^2b^6d^2hm^2 \\
& + 4a^4c^4e^2g^2k + 4a^4c^4d^2hk^2 - 4a^3c^5f^2g^2j - 4a^3c^5e^2 \\
& f^2m - 4a^3c^5d^2f^2m - 4a^4c^4d^2f^1 + 4a^3c^5e^2g^2j + 4a^3c^5 \\
& d^2g^2k + 2b^4c^4d^2g^2j - 2b^4c^4d^2f^2k + 2b^4c^4d^2e^2m - 6 \\
& a^3b^2c^4f^3m + 4a^3c^5f^2g^2h + 4a^2c^6d^2g^2j + 4a^2c^6d^2f^2k \\
& + 4a^2c^6d^2e^2m - 2a^5b^2c^2g^1m^3 + 2a^5b^2c^2hk^3 + 2a^4b^2c^3 \\
& h^3k - 4a^3c^5e^2gh^2 + 4a^3c^5d^2f^2j^2 - 4a^2c^6d^2e^2k - 2b^3c^5 \\
& d^2e^2j + 8a^5b^2c^2d^2m^3 + 8a^2b^6c^2d^2m^2 + 8a^2b^2c^5d^3m - 6 \\
& a^5b^2c^2e^2m^3 - 6a^2b^2c^5e^3m - 4a^2c^6e^2f^2h + 2b^3c^5d^2f^2h \\
& + 2a^4b^3c^2e^2m^3 + 2a^4b^2c^3g^2j^3 + 2a^3b^2c^4g^3j + 2a^2b^3c^4 \\
& e^3m + 4a^2c^6e^2f^2g + 4a^2c^6d^2f^2h - 6a^4b^2c^3d^2k^3 - 4a^2c^6 \\
& d^2f^2g^2 + 2b^2c^6d^2e^2g - 2a^2b^2c^5e^3j + 2a^3b^2c^4f^2h^3 + 2
\end{aligned}$$

$$\begin{aligned}
& *a^2*b*c^5*f^3*h + 2*a^2*b*c^5*e*g^3 + 3*a*b*c^6*d^2*g^2 - 9*a^4*b^2*c^2*f^2*m^2 + 4*a^4*b^2*c^2*g^2*1^2 - 14*a^3*b^3*c^2*e^2*m^2 + 5*a^3*b^3*c^2*f^2*1^2 - 20*a^2*b^4*c^2*d^2*m^2 + 16*a^3*b^2*c^3*d^2*m^2 - 9*a^3*b^2*c^3*e^2*1^2 + 6*a^2*b^4*c^2*e^2*1^2 + 4*a^3*b^2*c^3*f^2*k^2 - 14*a^2*b^3*c^3*d^2*1^2 + 5*a^2*b^3*c^3*e^2*k^2 - 9*a^2*b^2*c^4*d^2*k^2 + 4*a^2*b^2*c^4*e^2*j^2 + 4*a^7*c*k*1^2*m - 4*a^7*c*j*1*m^2 + 2*b^7*c*d^2*k*m + 2*a^6*b*c*k^3*m + 2*a^6*b*c*j*1^3 + 2*a*b^7*d*f*m^2 - 6*a^6*b*c*f*m^3 - 6*a*b*c^6*d^3*k - 4*a*c^7*d^2*e*g + 4*a*c^7*d*e^2*f + 2*a*b*c^6*e^3*g + 2*a*b*c^6*d*f^3 - a^5*b^2*c*j^2*1^2 - a^5*b*c^2*j^2*k^2 - a^4*b^3*c*h^2*1^2 - a^3*b^4*c*g^2*1^2 - a^4*b*c^3*h^2*j^2 - a^2*b^5*c*f^2*1^2 - a*b^5*c^2*e^2*k^2 - a^3*b*c^4*g^2*h^2 - a*b^4*c^3*e^2*j^2 - a^2*b*c^5*f^2*g^2 - a*b^3*c^4*e^2*h^2 - a*b^2*c^5*e^2*g^2 + 2*a^7*b*k*m^3 + 4*a^7*c*h*m^3 + 4*a*c^7*d^3*h + 2*b*c^7*d^3*f - a^6*b*c*k^2*1^2 - 2*a^6*c^2*j^2*1^2 - 6*a^6*c^2*h^2*m^2 - a*b^6*c*e^2*1^2 - 6*a^5*c^3*g^2*1^2 - 2*a^5*c^3*h^2*k^2 - 2*a^5*c^3*f^2*m^2 - 6*a^4*c^4*f^2*k^2 - 6*a^4*c^4*d^2*m^2 - 2*a^4*c^4*g^2*j^2 - 2*a^4*c^4*e^2*1^2 - 6*a^3*c^5*e^2*j^2 - 2*a^3*c^5*d^2*k^2 - 2*a^3*c^5*f^2*h^2 - a*b*c^6*e^2*f^2 - 6*a^2*c^6*d^2*h^2 - 2*a^2*c^6*e^2*g^2 - a^4*b^2*c^2*h^2*k^2 - a^3*b^3*c^2*g^2*k^2 - a^3*b^2*c^3*g^2*j^2 - a^2*b^4*c^2*f^2*k^2 - a^2*b^3*c^3*f^2*j^2 - a^2*b^2*c^4*f^2*h^2 - 2*a^7*c*k^2*m^2 + 4*a^5*c^3*h^3*m - 2*a^6*b^2*h*m^3 + 4*a^6*c^2*g*1^3 + 4*a^4*c^4*g^3*1 - 2*b^4*c^4*d^3*m + 2*a^5*b^3*f*m^3 - 4*a^6*c^2*d*m^3 + 4*a^5*c^3*f*k^3 + 4*a^3*c^5*f^3*k - 4*a^2*c^6*d^3*m + 2*b^3*c^5*d^3*k - 2*a^4*b^4*d*m^3 + 4*a^4*c^4*e*j^3 + 4*a^2*c^6*e^3*j - 2*b^2*c^6*d^3*h + 4*a^3*c^5*d*h^3 - 2*a*c^7*d^2*f^2 - a^6*b^2*k^2*m^2 - a^5*b^3*j^2*m^2 - a^4*b^4*h^2*m^2 - a^3*b^5*g^2*m^2 - a^2*b^6*f^2*m^2 - b^6*c^2*d^2*k^2 - b^5*c^3*d^2*j^2 - b^4*c^4*d^2*h^2 - b^3*c^5*d^2*g^2 - b^2*c^6*d^2*f^2 - a^7*b*1^2*m^2 - b^7*c*d^2*1^2 - a*b^7*e^2*m^2 - b*c^7*d^2*e^2 - b^8*d^2*m^2 - a^6*c^2*k^4 - a^5*c^3*j^4 - a^4*c^4*h^4 - a^3*c^5*g^4 - a^2*c^6*f^4 - a^7*c*1^4 - a*c^7*e^4 - a^8*m^4 - c^8*d^4, z, k1)*((16*a^3*c^6*m - 16*a^2*c^7*h - 4*b^2*c^7*d + 16*a*c^8*d - 20*a^2*b^2*c^5*m + 4*a*b^2*c^6*h - 4*a*b^3*c^5*k + 16*a^2*b*c^6*k + 4*a*b^4*c^4*m)/c^5 + (x*(4*b^2*c^7*e - 8*b^3*c^6*g + 16*a^2*c^7*j + 8*b^4*c^5*j - 8*b^5*c^4*1 - 16*a*c^8*e + 32*a*b*c^7*g - 36*a*b^2*c^6*j + 44*a*b^3*c^5*1 - 48*a^2*b*c^6*1))/c^5 + (root(128*a^2*b^2*c^8*z^4 - 16*a*b^4*c^7*z^4 - 256*a^3*c^9*z^4 + 384*a^3*b^2*c^6*1*z^3 - 144*a^2*b^4*c^5*1*z^3 + 128*a^2*b^3*c^6*j*z^3 - 128*a^2*b^2*c^7*g*z^3 + 16*a*b^6*c^4*1*z^3 - 256*a^3*b*c^7*j*z^3 - 16*a*b^5*c^5*j*z^3 + 16*a*b^4*c^6*g*z^3 - 256*a^4*c^7*1*z^3 + 256*a^3*c^8*g*z^3 - 96*a^4*b*c^5*j*1*z^2 + 8*a*b^7*c^2*j*1*z^2 + 160*a^4*b*c^5*h*m*z^2 - 8*a*b^7*c^2*h*m*z^2 + 8*a*b^6*c^3*h*k*z^2 - 8*a*b^6*c^3*g*1*z^2 + 8*a*b^6*c^3*f*m*z^2 + 160*a^3*b*c^6*g*j*z^2 - 96*a^3*b*c^6*f*k*z^2 - 96*a^3*b*c^6*e*1*z^2 - 96*a^3*b*c^6*d*m*z^2 + 8*a*b^5*c^4*g*j*z^2 - 8*a*b^5*c^4*f*k*z^2 - 8*a*b^5*c^4*e*1*z^2 - 8*a*b^5*c^4*d*m*z^2 + 8*a*b^4*c^5*e*j*z^2 + 8*a*b^4*c^5*d*k*z^2 + 8*a*b^4*c^5*f*h*z^2 + 32*a^2*b*c^7*e*g*z^2 + 32*a^2*b*c^7*d*h*z^2 - 8*a*b^3*c^6*e*g*z^2 - 8*a*b^3*c^6*d*h*z^2 + 16*a*b^2*c^7*d*f*z^2 + 8*a*b^8*c*k*m*z^2 - 304*a^4*b^2*c^4*k*m*z^2 + 264*a^3*b^4*c^3*k*m*z^2 - 80*a^2*b^6*c^2*k*m*z^2 + 184*a^3*b^3*c^4*j*1*z^2 - 72*a^2*b^5*c^3*j*1*z^2 - 200*a^3*b^3*c^4*h*m*z^2 + 72*a^2*b^5*c^3*h*m*z^2 - 24
\end{aligned}$$

$$\begin{aligned}
& 0*a^3*b^2*c^5*g*1*z^2 + 144*a^3*b^2*c^5*h*k*z^2 + 144*a^3*b^2*c^5*f*m*z^2 + \\
& 80*a^2*b^4*c^4*g*1*z^2 - 64*a^2*b^4*c^4*h*k*z^2 - 64*a^2*b^4*c^4*f*m*z^2 - \\
& 72*a^2*b^3*c^5*g*j*z^2 + 56*a^2*b^3*c^5*f*k*z^2 + 56*a^2*b^3*c^5*e*1*z^2 + \\
& 56*a^2*b^3*c^5*d*m*z^2 - 48*a^2*b^2*c^6*e*j*z^2 - 48*a^2*b^2*c^6*d*k*z^2 - \\
& 48*a^2*b^2*c^6*f*h*z^2 - 112*a^5*b*c^4*m^2*z^2 + 44*a^2*b^7*c*m^2*z^2 + 80 \\
& *a^4*b*c^5*k^2*z^2 - 4*a*b^7*c^2*k^2*z^2 - 4*a*b^6*c^3*j^2*z^2 - 48*a^3*b*c \\
& ^6*h^2*z^2 - 4*a*b^5*c^4*h^2*z^2 - 4*a*b^4*c^5*g^2*z^2 + 16*a^2*b*c^7*f^2*z \\
& ^2 - 4*a*b^3*c^6*f^2*z^2 + 8*a*b^2*c^7*e^2*z^2 + 64*a^5*c^5*k*m*z^2 + 192*a \\
& ^4*c^6*g*1*z^2 - 64*a^4*c^6*h*k*z^2 - 64*a^4*c^6*f*m*z^2 + 64*a^3*c^7*e*j*z \\
& ^2 + 64*a^3*c^7*d*k*z^2 + 64*a^3*c^7*f*h*z^2 - 4*a*b^8*c*1^2*z^2 - 64*a^2*c \\
& ^8*d*f*z^2 + 16*a*b*c^8*d^2*z^2 + 252*a^4*b^3*c^3*m^2*z^2 - 168*a^3*b^5*c^2 \\
& *m^2*z^2 + 168*a^4*b^2*c^4*1^2*z^2 - 132*a^3*b^4*c^3*1^2*z^2 + 40*a^2*b^6*c \\
& ^2*1^2*z^2 - 100*a^3*b^3*c^4*k^2*z^2 + 36*a^2*b^5*c^3*k^2*z^2 - 56*a^3*b^2* \\
& c^5*j^2*z^2 + 32*a^2*b^4*c^4*j^2*z^2 + 28*a^2*b^3*c^5*h^2*z^2 + 40*a^2*b^2* \\
& c^6*g^2*z^2 - 96*a^5*c^5*1^2*z^2 - 32*a^4*c^6*j^2*z^2 - 96*a^3*c^7*g^2*z^2 \\
& - 32*a^2*c^8*e^2*z^2 - 4*b^3*c^7*d^2*z^2 - 4*a*b^9*m^2*z^2 + 32*a^5*b*c^3*h \\
& *1*m*z + 8*a^2*b^6*c*g*k*m*z + 96*a^4*b*c^4*e*k*m*z + 32*a^4*b*c^4*h*j*k*z \\
& + 32*a^4*b*c^4*g*j*1*z + 32*a^4*b*c^4*f*j*m*z - 64*a^4*b*c^4*g*h*m*z - 8*a* \\
& b^6*c^2*e*j*1*z + 8*a*b^6*c^2*e*h*m*z - 64*a^3*b*c^5*e*h*k*z + 64*a^3*b*c^5 \\
& *e*g*1*z - 64*a^3*b*c^5*e*f*m*z + 32*a^3*b*c^5*f*g*k*z - 32*a^3*b*c^5*d*h*1 \\
& *z + 32*a^3*b*c^5*d*g*m*z - 8*a*b^5*c^3*e*h*k*z + 8*a*b^5*c^3*e*g*1*z - 8*a \\
& *b^5*c^3*e*f*m*z - 8*a*b^4*c^4*e*g*j*z + 8*a*b^4*c^4*e*f*k*z - 8*a*b^4*c^4 \\
& d*f*1*z + 8*a*b^4*c^4*d*e*m*z - 32*a^2*b*c^6*d*f*j*z + 32*a^2*b*c^6*d*e*k*z \\
& + 8*a*b^3*c^5*d*f*j*z - 8*a*b^3*c^5*d*e*k*z + 32*a^2*b*c^6*e*f*h*z - 8*a*b \\
& ^3*c^5*e*f*h*z - 8*a*b^2*c^6*d*f*g*z + 8*a*b^2*c^6*d*e*h*z - 8*a*b^7*c*e*k* \\
& m*z - 40*a^5*b^2*c^2*k*1*m*z + 48*a^4*b^3*c^2*j*k*m*z - 8*a^4*b^3*c^2*h*1*m \\
& *z + 104*a^4*b^2*c^3*g*k*m*z - 56*a^3*b^4*c^2*g*k*m*z - 40*a^4*b^2*c^3*h*j* \\
& m*z + 8*a^4*b^2*c^3*h*k*1*z + 8*a^4*b^2*c^3*f*1*m*z + 8*a^3*b^4*c^2*h*j*m*z \\
& - 152*a^3*b^3*c^3*e*k*m*z + 64*a^2*b^5*c^2*e*k*m*z - 40*a^3*b^3*c^3*g*j*1* \\
& z - 8*a^3*b^3*c^3*h*j*k*z - 8*a^3*b^3*c^3*f*j*m*z + 8*a^2*b^5*c^2*g*j*1*z + \\
& 48*a^3*b^3*c^3*g*h*m*z - 8*a^2*b^5*c^2*g*h*m*z - 104*a^3*b^2*c^4*e*j*1*z + \\
& 56*a^2*b^4*c^3*e*j*1*z + 8*a^3*b^2*c^4*f*j*k*z - 8*a^3*b^2*c^4*d*k*1*z + 8 \\
& *a^3*b^2*c^4*d*j*m*z + 104*a^3*b^2*c^4*e*h*m*z - 56*a^2*b^4*c^3*e*h*m*z - 4 \\
& 0*a^3*b^2*c^4*g*h*k*z - 40*a^3*b^2*c^4*f*g*m*z - 8*a^3*b^2*c^4*f*h*1*z + 8* \\
& a^2*b^4*c^3*g*h*k*z + 8*a^2*b^4*c^3*f*g*m*z + 48*a^2*b^3*c^4*e*h*k*z - 48*a \\
& ^2*b^3*c^4*e*g*1*z + 48*a^2*b^3*c^4*e*f*m*z - 8*a^2*b^3*c^4*f*g*k*z + 8*a^2 \\
& *b^3*c^4*d*h*1*z - 8*a^2*b^3*c^4*d*g*m*z + 40*a^2*b^2*c^5*e*g*j*z - 40*a^2* \\
& b^2*c^5*e*f*k*z + 40*a^2*b^2*c^5*d*f*1*z - 40*a^2*b^2*c^5*d*e*m*z - 8*a^2*b \\
& ^2*c^5*d*h*j*z + 8*a^2*b^2*c^5*d*g*k*z + 8*a^2*b^2*c^5*f*g*h*z + 8*a^4*b^4* \\
& c*k*1*m*z - 64*a^5*b*c^3*j*k*m*z - 8*a^3*b^5*c*j*k*m*z - 32*a^6*b*c^2*1*m^2 \\
& *z + 24*a^5*b^3*c*1*m^2*z - 28*a^4*b^4*c*j*m^2*z + 16*a^5*b*c^3*k^2*1*z + 4 \\
& *a^3*b^5*c*j*1^2*z + 48*a^5*b*c^3*g*m^2*z + 32*a^3*b^5*c*g*m^2*z - 4*a^2*b^ \\
& 6*c*g*1^2*z - 36*a^2*b^6*c*e*m^2*z - 32*a^4*b*c^4*g*k^2*z - 16*a^3*b*c^5*f^ \\
& 2*1*z - 48*a^4*b*c^4*e*1^2*z - 32*a^3*b*c^5*g^2*j*z - 4*a*b^4*c^4*e^2*1*z + \\
& 32*a^2*b*c^6*d^2*1*z - 24*a*b^3*c^5*d^2*1*z + 4*a*b^6*c^2*e*k^2*z + 32*a^3
\end{aligned}$$

$$\begin{aligned}
& *b*c^5*e*j^2*z + 16*a^3*b*c^5*g*h^2*z - 16*a^2*b*c^6*e^2*j*z + 4*a*b^5*c^3* \\
& e*j^2*z + 4*a*b^3*c^5*e^2*j*z + 20*a*b^2*c^6*d^2*j*z + 4*a*b^4*c^4*e*h^2*z \\
& - 16*a^2*b*c^6*e*g^2*z + 4*a*b^3*c^5*e*g^2*z - 4*a*b^2*c^6*e^2*g*z + 4*a*b^ \\
& 2*c^6*e*f^2*z + 32*a^6*c^3*k*l*m*z - 32*a^5*c^4*h*k*k*l*z + 32*a^5*c^4*h*j*m* \\
& z - 32*a^5*c^4*g*k*m*z - 32*a^5*c^4*f*l*m*z - 32*a^4*c^5*f*j*k*z + 32*a^4*c \\
& ^5*e*j*l*z + 32*a^4*c^5*d*k*l*z - 32*a^4*c^5*d*j*m*z + 32*a^4*c^5*g*h*k*z + \\
& 32*a^4*c^5*f*h*l*z + 32*a^4*c^5*f*g*m*z - 32*a^4*c^5*e*h*m*z - 32*a^3*c^6* \\
& e*g*j*z + 32*a^3*c^6*e*f*k*z + 32*a^3*c^6*d*h*j*z - 32*a^3*c^6*d*g*k*z - 32 \\
& *a^3*c^6*d*f*l*z + 32*a^3*c^6*d*e*m*z - 32*a^3*c^6*f*g*h*z + 4*a*b^7*c*e*l^ \\
& 2*z + 32*a^2*c^7*d*f*g*z - 32*a^2*c^7*d*e*h*z - 16*a*b*c^7*d^2*g*z + 52*a^5 \\
& *b^2*c^2*j*m^2*z - 4*a^4*b^3*c^2*k^2*l*z + 36*a^4*b^2*c^3*j^2*l*z - 16*a^4* \\
& b^3*c^2*j*l^2*z - 8*a^3*b^4*c^2*j^2*l*z - 20*a^4*b^2*c^3*j*k^2*z + 4*a^3*b^ \\
& 4*c^2*j*k^2*z - 76*a^4*b^3*c^2*g*m^2*z - 60*a^4*b^2*c^3*g*l^2*z + 44*a^3*b^ \\
& 2*c^4*g^2*l*z + 28*a^3*b^4*c^2*g*l^2*z - 8*a^2*b^4*c^3*g^2*l*z + 104*a^3*b^ \\
& 4*c^2*e*m^2*z - 100*a^4*b^2*c^3*e*m^2*z + 24*a^3*b^3*c^3*g*k^2*z + 4*a^3*b^ \\
& 2*c^4*h^2*j*z - 4*a^2*b^5*c^2*g*k^2*z + 4*a^2*b^3*c^4*f^2*l*z + 76*a^3*b^3* \\
& c^3*e*l^2*z - 32*a^2*b^5*c^2*e*l^2*z + 20*a^2*b^2*c^5*e^2*l*z + 12*a^3*b^2* \\
& c^4*g*j^2*z + 8*a^2*b^3*c^4*g^2*j*z - 4*a^2*b^4*c^3*g*j^2*z + 52*a^3*b^2*c^ \\
& 4*e*k^2*z - 28*a^2*b^4*c^3*e*k^2*z - 4*a^2*b^2*c^5*f^2*j*z - 24*a^2*b^3*c^4 \\
& *e*j^2*z - 4*a^2*b^3*c^4*g*h^2*z - 20*a^2*b^2*c^5*e*h^2*z + 20*a^5*b^2*c^2* \\
& l^3*z + 4*a^3*b^3*c^3*j^3*z - 4*a^2*b^2*c^5*g^3*z - 4*a^4*b^5*l*m^2*z - 16* \\
& a^6*c^3*j*m^2*z - 16*a^5*c^4*j^2*l*z + 4*a^3*b^6*j*m^2*z + 16*a^5*c^4*j*k^2 \\
& *z + 48*a^5*c^4*g*l^2*z - 48*a^4*c^5*g^2*l*z - 4*a^2*b^7*g*m^2*z + 16*a^5*c \\
& ^4*e*m^2*z - 16*a^4*c^5*h^2*j*z + 16*a^4*c^5*g*j^2*z - 16*a^3*c^6*e^2*l*z + \\
& 4*b^5*c^4*d^2*l*z - 16*a^4*c^5*e*k^2*z + 16*a^3*c^6*f^2*j*z - 4*b^4*c^5*d^ \\
& 2*j*z - 16*a^2*c^7*d^2*j*z - 4*a^4*b^4*c^1^3*z + 16*a^3*c^6*e*h^2*z - 16*a^ \\
& 4*b*c^4*j^3*z + 16*a^2*c^7*e^2*g*z + 4*b^3*c^6*d^2*g*z - 16*a^2*c^7*e*f^2*z \\
& - 4*b^2*c^7*d^2*e*z + 4*a*b^8*e*m^2*z + 16*a*c^8*d^2*e*z - 16*a^6*c^3*l^3* \\
& z + 16*a^3*c^6*g^3*z + 4*a^5*b^2*c*g*k*k*l*m + 12*a^5*b*c^2*g*j*k*m + 12*a^5* \\
& b*c^2*e*k*k*l*m - 4*a^5*b*c^2*h*j*k*k*l - 4*a^5*b*c^2*f*j*l*m - 4*a^4*b^3*c*g*j \\
& *k*m - 4*a^4*b^3*c*e*k*k*l*m - 4*a^5*b*c^2*g*h*l*m + 4*a^3*b^4*c*e*j*k*m - 4* \\
& a^3*b^4*c*f*h*k*k*m + 12*a^4*b*c^3*d*j*k*k*l - 20*a^4*b*c^3*e*g*k*k*m + 12*a^4*b* \\
& c^3*f*h*j*l + 12*a^4*b*c^3*e*h*j*m + 12*a^4*b*c^3*d*h*k*k*m - 4*a^4*b*c^3*g*h \\
& *j*k - 4*a^4*b*c^3*f*g*k*k*l - 4*a^4*b*c^3*f*g*j*m - 4*a^4*b*c^3*e*h*k*k*l - 4* \\
& a^4*b*c^3*e*f*l*m - 4*a^4*b*c^3*d*g*l*m - 4*a^2*b^5*c*e*g*k*k*m + 4*a^2*b^5*c \\
& *d*h*k*k*m - 20*a^3*b*c^4*d*f*j*l - 4*a^3*b*c^4*e*f*j*k - 4*a^3*b*c^4*d*g*j*k \\
& - 4*a^3*b*c^4*d*e*k*k*l - 4*a^3*b*c^4*d*e*j*m - 4*a*b^5*c^2*d*f*j*l + 12*a^3 \\
& *b*c^4*e*g*h*k + 12*a^3*b*c^4*e*f*g*m + 12*a^3*b*c^4*d*g*h*l + 12*a^3*b*c^4 \\
& *d*f*h*m - 4*a^3*b*c^4*f*g*h*j - 4*a^3*b*c^4*e*f*h*l + 4*a*b^5*c^2*d*f*h*m \\
& - 4*a*b^4*c^3*d*f*h*k + 4*a*b^4*c^3*d*f*g*l + 12*a^2*b*c^5*d*f*g*j + 12*a^2 \\
& *b*c^5*d*e*f*l - 4*a^2*b*c^5*d*e*h*j - 4*a^2*b*c^5*d*e*g*k - 4*a*b^3*c^4*d* \\
& f*g*j - 4*a*b^3*c^4*d*e*f*l - 4*a^2*b*c^5*e*f*g*h + 4*a*b^2*c^5*d*e*f*j - 4 \\
& *a^6*b*c*j*k*k*l*m - 4*a*b^6*c*d*f*k*k*m - 4*a*b*c^6*d*e*f*g - 16*a^4*b^2*c^2*e \\
& *j*k*k*m + 4*a^4*b^2*c^2*f*j*k*k*l + 4*a^4*b^2*c^2*d*j*l*m + 12*a^4*b^2*c^2*f*h \\
& *k*k*m + 4*a^4*b^2*c^2*g*h*j*m + 4*a^4*b^2*c^2*e*h*l*m - 4*a^3*b^3*c^2*d*j*k*
\end{aligned}$$

$$\begin{aligned}
& 1 + 20a^3b^3c^2e*g*k*m - 16a^3b^3c^2d*h*k*m - 4a^3b^3c^2f*h*j*1 \\
& - 4a^3b^3c^2e*h*j*m - 40a^3b^2c^3d*f*k*m + 24a^2b^4c^2d*f*k*m \\
& - 16a^3b^2c^3d*h*j*1 + 12a^3b^2c^3e*g*j*1 + 4a^3b^2c^3e*h*j*k + \\
& 4a^3b^2c^3e*f*j*m + 4a^3b^2c^3d*g*k*1 - 4a^2b^4c^2e*g*j*1 + 4a^2b^4c^2d*h*j*1 \\
& - 16a^3b^2c^3e*g*h*m + 4a^3b^2c^3f*g*h*1 + 4a^2b^4c^2e*g*h*m + 20a^2b^3c^3d*f*j*1 \\
& - 16a^2b^3c^3d*f*h*m - 4a^2b^3c^3e*g*h*k - 4a^2b^3c^3e*f*g*m - 4a^2b^3c^3d*g*h*1 \\
& - 16a^2b^2c^4d*f*g*1 + 12a^2b^2c^4d*f*h*k + 4a^2b^2c^4e*f*g*k + 4a^2b^2c^4d*g*h*j \\
& + 4a^2b^2c^4d*e*h*1 + 4a^2b^2c^4d*e*g*m + 2a^5b^2c^4j^2*k*m - 4a^5b^2c^4h*k^2*m \\
& - 2a^5b^2c^4h^2*k*m + 2a^4b^3c^4h^2*k*m + 2a^5b^2c^4h*k*1^2 + 2a^5b^2c^4f*1^2*m \\
& - 2a^5b^2c^4h*j^2*m + 2a^3b^4c^4g^2*k*m + 14a^4b^3c^3f^2*k*m - 10a^5b^3c^2f*k^2*m \\
& - 8a^5b^2c^3g*j*m^2 - 8a^5b^2c^3e*1*m^2 + 4a^5b^2c^3f*k*m^2 + 4a^4b^3c^3f*k^2*m \\
& - 2a^5b^2c^3g*k^2*1 + 2a^2b^5c^3f^2*k*m + 6a^5b^2c^2f*k*1^2 + 6a^5b^2c^2d*1^2*m \\
& - 2a^5b^2c^2g*j*1^2 + 2a^4b^3c^2g*j*1^2 - 2a^4b^3c^2f*k*1^2 - 2a^4b^3c^2d*1^2*m \\
& - 2a^4b^3c^2g^2*j*1 - 14a^4b^3c^2d^2*k*m - 10a^5b^3c^2e*j*m^2 + 10a^4b^3c^2e*j*m^2 \\
& - 10a^3b^3c^4d^2*k*m - 6a^4b^3c^4d*k*m^2 + 6a^4b^3c^3g^2*h*m - 4a^3b^4c^4d*k^2*m \\
& - 2a^5b^2c^2d*k*m^2 + 14a^5b^2c^2f*h*m^2 + 14a^3b^3c^4e^2*j*1 - 10a^4b^3c^3f*h*m^2 \\
& - 10a^4b^3c^3f*h^2*m - 10a^4b^3c^3e*j^2*1 - 2a^4b^3c^3g*h^2*1 - 2a^4b^3c^3f*j^2*k \\
& - 2a^4b^3c^3d*j^2*m - 2a^3b^4c^3e*j*1^2 + 2a^3b^4c^3d*k*1^2 + 2a*b^5c^2e^2*j*1 \\
& - 12a*b^4c^3d^2*j*1 - 10a^3b^3c^4e^2*h*m + 6a^4b^3c^3e*j*k^2 + 2a^3b^4c^3f*h*1^2 \\
& - 2a*b^5c^2e^2*h*m - 12a^3b^4c^3e*g*m^2 + 12a^3b^4c^3d*h*m^2 + 12a*b^4c^3d^2*h*m \\
& + 6a^3b^3c^4f^2*g*1 - 2a^4b^3c^3f*h*k^2 - 2a^3b^3c^4f^2*h*k + 14a^4b^3c^3e*g*1^2 \\
& - 10a^4b^3c^3d*h*1^2 - 10a^3b^3c^4e*g^2*1 - 2a^3b^3c^4f*g^2*k - 2a^3b^3c^4d*g^2*m \\
& + 2a^2b^5c^3e*g*1^2 - 2a^2b^5c^3d*h*1^2 + 2a*b^4c^3e^2*h*k - 2a*b^4c^3e^2*g*1 \\
& + 2a*b^4c^3e^2*f*m - 14a^2b^5c^3d*f*m^2 + 14a^2b^5c^3d^2*h*k - 10a^4b^3c^3d*f*m^2 \\
& - 10a^3b^3c^4d*h^2*k - 10a^2b^3c^5d^2*g*1 - 10a*b^3c^4d^2*h*k + 10a*b^3c^4d^2*g*1 \\
& - 6a*b^3c^4d^2*f*m - 4a*b^4c^3d*f^2*m - 2a^3b^3c^4e*h^2*j - 2a^2b^3c^5d^2*f*m \\
& + 6a^3b^3c^4d*h*j^2 + 6a^2b^3c^5e^2*f*k + 6a^2b^3c^5d*e^2*m - 2a^3b^3c^4e*g*j^2 \\
& - 2a^2b^3c^5e^2*g*j + 2a*b^3c^4e^2*g*j - 2a*b^3c^4e^2*f*k - 2a*b^3c^4d*e^2*m \\
& + 14a^3b^3c^4d*f*k^2 - 10a^2b^3c^5d*f^2*k - 8a*b^2c^5d^2*g*j - 8a*b^2c^5d^2*e*1 \\
& + 4a*b^3c^4d*f^2*k + 4a*b^2c^5d^2*f*k - 2a^2b^3c^5e*f^2*j + 2a*b^5c^2d*f*k^2 \\
& + 2a*b^4c^3d*f*j^2 + 2a*b^2c^5d*e^2*k - 2a^2b^3c^5d*g^2*h + 2a*b^2c^5e^2*f*h \\
& - 4a*b^2c^5d*f^2*h - 2a^2b^3c^5d*f*h^2 + 2a*b^3c^4d*f*h^2 + 2a*b^2c^5d*f*g^2 + 8a^6c^2h*j*1*m \\
& - 8a^6c^2g*k*1*m - 8a^5c^3f*j*k*1 + 8a^5c^3e*j*k*m - 8a^5c^3d*j*1*m + 8a^5c^3g*h*k*1 \\
& - 8a^5c^3g*h*j*m - 8a^5c^3f*h*k*m + 8a^5c^3f*g*1*m - 8a^5c^3e*h*1*m - 2a^6b^3c^4h*1^2*m \\
& + 8a^4c^4f*g*j*k - 8a^4c^4e*h*j*k - 8a^4c^4e*g*j*1 + 8a^4c^4e*f*k*1 - 8a^4c^4e*f*j*m \\
& + 8a^4c^4d*h*j*1 - 8a^4c^4d*g*k*1 + 8a^4c^4d*g*j*m + 8a^4c^4d*f*k*m + 8a^4c^4d*e*1*m \\
& + 6a^6b^3c^4g*1*m^2 - 2a^6b^3c^4h*k*m^2 - 8a^4c^4f*g*h*1 + 8a^4c^4e*g*h*m \\
& + 2a*b^6c^3e^2*k*m + 8a^3c^4
\end{aligned}$$

$$\begin{aligned}
& 5*d*e*j*k + 8*a^3*c^5*e*f*h*j - 8*a^3*c^5*e*f*g*k - 8*a^3*c^5*d*g*h*j - 8*a^3*c^5*d*f*h*k + 8*a^3*c^5*d*f*g*l - 8*a^3*c^5*d*e*h*l - 8*a^3*c^5*d*e*g*m \\
& - 8*a^2*c^6*d*e*f*j + 8*a^2*c^6*d*e*g*h + 2*a*b^6*c*d*f*l^2 + 6*a*b*c^6*d^2 \\
& *e*j - 2*a*b*c^6*d^2*f*h - 2*a*b*c^6*d*e^2*h - 8*a^4*b^2*c^2*g^2*k*m - 10*a^3*b^3*c^2*f^2*k*m \\
& + 2*a^4*b^2*c^2*h^2*j*l + 18*a^3*b^2*c^3*e^2*k*m - 12*a^2*b^4*c^2*e^2*k*m - 4*a^4*b^2*c^2*g*j^2*l \\
& + 2*a^3*b^3*c^2*g^2*j*l + 28*a^2*b^3*c^3*d^2*k*m + 14*a^4*b^2*c^2*d*k^2*m - 8*a^3*b^2*c^3*f^2*j*l \\
& + 2*a^4*b^2*c^2*g*j*k^2 + 2*a^4*b^2*c^2*e*k^2*l - 2*a^3*b^3*c^2*g^2*h*m + 2*a^2*b^4*c^2*f^2*j*l \\
& - 10*a^2*b^3*c^3*e^2*j*l - 8*a^4*b^2*c^2*d*k*l^2 + 4*a^4*b^2*c^2*e*j*l^2 + 4*a^3*b^3*c^2*f*h^2*m \\
& + 4*a^3*b^3*c^2*e*j^2*l + 4*a^3*b^2*c^3*f^2*h*m - 2*a^2*b^4*c^2*f^2*h*m + 18*a^2*b^2*c^4*d^2*j*l \\
& + 10*a^2*b^3*c^3*e^2*h*m - 8*a^4*b^2*c^2*f*h*l^2 - 2*a^3*b^3*c^2*e*j*k^2 + 2*a^3*b^2*c^3*g^2*h*k \\
& + 2*a^3*b^2*c^3*f*g^2*m - 22*a^4*b^2*c^2*d*h*m^2 - 22*a^2*b^2*c^4*d^2*h*m + 18*a^4*b^2*c^2*e*g*m^2 \\
& + 16*a^3*b^2*c^3*d*h^2*m - 4*a^3*b^2*c^3*f*h^2*k - 4*a^2*b^4*c^2*d*h^2*m + 2*a^3*b^3*c^2*f*h*k^2 \\
& + 2*a^3*b^2*c^3*d*j^2*k + 2*a^2*b^3*c^3*f^2*h*k - 2*a^2*b^3*c^3*f^2*g*l - 10*a^3*b^3*c^2*e*g*l^2 + 10*a^3*b^3*c^2*d*h*l^2 \\
& - 8*a^2*b^2*c^4*e^2*h*k - 8*a^2*b^2*c^4*e^2*f*m + 4*a^2*b^3*c^3*e*g^2*l + 4*a^2*b^2*c^4*e^2*g*l \\
& + 2*a^3*b^2*c^3*f*h*j^2 + 28*a^3*b^3*c^2*d*f*m^2 + 14*a^2*b^2*c^4*d*f^2*m - 8*a^3*b^2*c^3*e*g*k^2 + 4*a^3*b^2*c^3*d*h*k^2 \\
& + 4*a^2*b^3*c^3*d*h^2*k + 2*a^2*b^4*c^2*e*g*k^2 - 2*a^2*b^4*c^2*d*h*k^2 + 2*a^2*b^2*c^4*f^2*g*j \\
& + 2*a^2*b^2*c^4*e*f^2*l + 18*a^3*b^2*c^3*d*f*l^2 - 12*a^2*b^4*c^2*d*f*l^2 - 4*a^2*b^2*c^4*e*g^2*j \\
& + 2*a^2*b^3*c^3*e*g*j^2 - 2*a^2*b^3*c^3*d*h*j^2 - 10*a^2*b^3*c^3*d*f*k^2 - 8*a^2*b^2*c^4*d*f*j^2 \\
& + 2*a^2*b^2*c^4*e*g*h^2 + 4*a^5*b^2*c^h^2*m^2 - 2*a^4*b^2*c^2*h^3*m - 5*a^5*b*c^2*g^2*m^2 \\
& + 5*a^4*b^3*c*g^2*m^2 + 3*a^5*b*c^2*h^2*l^2 + 6*a^3*b^4*c*f^2*m^2 - 2*a^3*b^2*c^3*g^3*l \\
& + 2*a^2*b^3*c^3*f^3*m + 7*a^4*b*c^3*e^2*m^2 + 7*a^2*b^5*c*e^2*m^2 - 5*a^4*b*c^3*f^2*l^2 \\
& + 3*a^4*b*c^3*g^2*k^2 - 2*a^4*b^2*c^2*f*k^3 - 2*a^2*b^2*c^4*f^3*k + 7*a^3*b*c^4*d^2*l^2 \\
& + 7*a*b^5*c^2*d^2*l^2 - 5*a^3*b*c^4*e^2*k^2 + 3*a^3*b*c^4*f^2*j^2 + 6*a*b^4*c^3*d^2*k^2 + 2*a^3*b^3*c^2*d*k^3 \\
& - 2*a^3*b^2*c^3*e*j^3 - 5*a^2*b*c^5*d^2*j^2 + 5*a*b^3*c^4*d^2*j^2 + 3*a^2*b*c^5*e^2*h^2 \\
& + 4*a*b^2*c^5*d^2*h^2 - 2*a^2*b^2*c^4*d*h^3 - 4*a^6*c^2*j^2*k*m + 2*a^6*b^2*j*l*m^2 \\
& + 4*a^6*c^2*j*k^2*l + 4*a^6*c^2*h*k^2*m - 4*a^6*c^2*h*k*l^2 - 4*a^6*c^2*f*l^2*m + 4*a^5*c^3*g^2*k*m \\
& + 2*a^5*b^3*h*k*m^2 - 2*a^5*b^3*g*l*m^2 + 4*a^6*c^2*g*j*m^2 + 4*a^6*c^2*f*k*m^2 + 4*a^6*c^2*e*l*m^2 \\
& - 4*a^5*c^3*h^2*j*l + 4*a^5*c^3*h*j^2*k + 4*a^5*c^3*g*j^2*l + 4*a^5*c^3*f*j^2*m \\
& - 4*a^4*c^4*e^2*k*m + 2*a^4*b^4*g*j*m^2 - 2*a^4*b^4*f*k*m^2 + 2*a^4*b^4*e*l*m^2 \\
& - 4*a^5*c^3*g*j*k^2 - 4*a^5*c^3*e*k^2*l - 4*a^5*c^3*d*k^2*m + 4*a^4*c^4*f^2*j*l \\
& + 4*a^5*c^3*e*j*l^2 + 4*a^5*c^3*d*k*l^2 + 4*a^4*c^4*f^2*h*m + 2*b^6*c^2*d^2*j*l \\
& - 2*a^3*b^5*e*j*m^2 + 2*a^3*b^5*d*k*m^2 + 4*a^5*c^3*f*h*l^2 - 4*a^4*c^4*g^2*h*k \\
& - 4*a^4*c^4*f*g^2*m - 4*a^3*c^5*d^2*j*l - 2*b^6*c^2*d^2*h*m + 2*a^3*b^5*f*h*m^2 \\
& + 12*a^5*c^3*d*h*m^2 - 12*a^4*c^4*d*h^2*m + 12*a^3*c^5*d^2*h*m - 4*a^5*c^3*e*g*m^2 \\
& + 4*a^4*c^4*g*h^2*j + 4*a^4*c^4*f*h^2*k + 4*a^4*c^4*e*h^2*l - 4*a^4*c^4*d*j^2*k + 3*a^6*b*c*j^2*m^2 \\
& - 4*a^4*c^4*f*h*j^2 + 4*a^3*c^5*e^2*h*k + 4*a^3*c^5*e^2*g*l + 4*a^3*c^5*e^2*f*m \\
& + 2*b^5*c^3*d^2*h*k - 2*b^5*c^3*d^2*g*l + 2*b^5*c^3*d^2*f*m + 2*a^5
\end{aligned}$$

$$\begin{aligned}
& *b*c^2*j^3*l + 2*a^2*b^6*e*g*m^2 - 2*a^2*b^6*d*h*m^2 + 4*a^4*c^4*e*g*k^2 + \\
& 4*a^4*c^4*d*h*k^2 - 4*a^3*c^5*f^2*g*j - 4*a^3*c^5*e*f^2*l - 4*a^3*c^5*d*f^2 \\
& *m - 4*a^4*c^4*d*f*l^2 + 4*a^3*c^5*e*g^2*j + 4*a^3*c^5*d*g^2*k + 2*b^4*c^4* \\
& d^2*g*j - 2*b^4*c^4*d^2*f*k + 2*b^4*c^4*d^2*e*l - 6*a^3*b*c^4*f^3*m + 4*a^3 \\
& *c^5*f*g^2*h + 4*a^2*c^6*d^2*g*j + 4*a^2*c^6*d^2*f*k + 4*a^2*c^6*d^2*e*l - \\
& 2*a^5*b^2*c*g*l^3 + 2*a^5*b*c^2*h*k^3 + 2*a^4*b*c^3*h^3*k - 4*a^3*c^5*e*g*h \\
& ^2 + 4*a^3*c^5*d*f*j^2 - 4*a^2*c^6*d*e^2*k - 2*b^3*c^5*d^2*e*j + 8*a^5*b^2*c \\
& *d*m^3 + 8*a*b^6*c*d^2*m^2 + 8*a*b^2*c^5*d^3*m - 6*a^5*b*c^2*e*l^3 - 6*a^2 \\
& *b*c^5*e^3*l - 4*a^2*c^6*e^2*f*h + 2*b^3*c^5*d^2*f*h + 2*a^4*b^3*c*e*l^3 + \\
& 2*a^4*b*c^3*g*j^3 + 2*a^3*b*c^4*g^3*j + 2*a*b^3*c^4*e^3*l + 4*a^2*c^6*e*f^2 \\
& *g + 4*a^2*c^6*d*f^2*h - 6*a^4*b*c^3*d*k^3 - 4*a^2*c^6*d*f*g^2 + 2*b^2*c^6* \\
& d^2*e*g - 2*a*b^2*c^5*e^3*j + 2*a^3*b*c^4*f*h^3 + 2*a^2*b*c^5*f^3*h + 2*a^2 \\
& *b*c^5*e*g^3 + 3*a*b*c^6*d^2*g^2 - 9*a^4*b^2*c^2*f^2*m^2 + 4*a^4*b^2*c^2*g^ \\
& 2*l^2 - 14*a^3*b^3*c^2*e^2*m^2 + 5*a^3*b^3*c^2*f^2*l^2 - 20*a^2*b^4*c^2*d^2 \\
& *m^2 + 16*a^3*b^2*c^3*d^2*m^2 - 9*a^3*b^2*c^3*e^2*l^2 + 6*a^2*b^4*c^2*e^2*l \\
& ^2 + 4*a^3*b^2*c^3*f^2*k^2 - 14*a^2*b^3*c^3*d^2*l^2 + 5*a^2*b^3*c^3*e^2*k^2 \\
& - 9*a^2*b^2*c^4*d^2*k^2 + 4*a^2*b^2*c^4*e^2*j^2 + 4*a^7*c*k*l^2*m - 4*a^7*c \\
& *j*l*m^2 + 2*b^7*c*d^2*k*m + 2*a^6*b*c*k^3*m + 2*a^6*b*c*j*l^3 + 2*a*b^7*d \\
& *f*m^2 - 6*a^6*b*c*f*m^3 - 6*a*b*c^6*d^3*k - 4*a*c^7*d^2*e*g + 4*a*c^7*d*e^ \\
& 2*f + 2*a*b*c^6*e^3*g + 2*a*b*c^6*d*f^3 - a^5*b^2*c*j^2*l^2 - a^5*b*c^2*j^2 \\
& *k^2 - a^4*b^3*c*h^2*l^2 - a^3*b^4*c*g^2*l^2 - a^4*b*c^3*h^2*j^2 - a^2*b^5*c \\
& *f^2*l^2 - a*b^5*c^2*e^2*k^2 - a^3*b*c^4*g^2*h^2 - a*b^4*c^3*e^2*j^2 - a^2 \\
& *b*c^5*f^2*g^2 - a*b^3*c^4*e^2*h^2 - a*b^2*c^5*e^2*g^2 + 2*a^7*b*k*m^3 + 4* \\
& a^7*c*h*m^3 + 4*a*c^7*d^3*h + 2*b*c^7*d^3*f - a^6*b*c*k^2*l^2 - 2*a^6*c^2*j \\
& ^2*l^2 - 6*a^6*c^2*h^2*m^2 - a*b^6*c*e^2*l^2 - 6*a^5*c^3*g^2*l^2 - 2*a^5*c^ \\
& 3*h^2*k^2 - 2*a^5*c^3*f^2*m^2 - 6*a^4*c^4*f^2*k^2 - 6*a^4*c^4*d^2*m^2 - 2*a \\
& ^4*c^4*g^2*j^2 - 2*a^4*c^4*e^2*l^2 - 6*a^3*c^5*e^2*j^2 - 2*a^3*c^5*d^2*k^2 \\
& - 2*a^3*c^5*f^2*h^2 - a*b*c^6*e^2*f^2 - 6*a^2*c^6*d^2*h^2 - 2*a^2*c^6*e^2*g \\
& ^2 - a^4*b^2*c^2*h^2*k^2 - a^3*b^3*c^2*g^2*k^2 - a^3*b^2*c^3*g^2*j^2 - a^2*b \\
& ^4*c^2*f^2*k^2 - a^2*b^3*c^3*f^2*j^2 - a^2*b^2*c^4*f^2*h^2 - 2*a^7*c*k^2*m \\
& ^2 + 4*a^5*c^3*h^3*m - 2*a^6*b^2*h*m^3 + 4*a^6*c^2*g*l^3 + 4*a^4*c^4*g^3*l \\
& - 2*b^4*c^4*d^3*m + 2*a^5*b^3*f*m^3 - 4*a^6*c^2*d*m^3 + 4*a^5*c^3*f*k^3 + 4 \\
& *a^3*c^5*f^3*k - 4*a^2*c^6*d^3*m + 2*b^3*c^5*d^3*k - 2*a^4*b^4*d*m^3 + 4*a^ \\
& 4*c^4*e*j^3 + 4*a^2*c^6*e^3*j - 2*b^2*c^6*d^3*h + 4*a^3*c^5*d*h^3 - 2*a*c^7 \\
& *d^2*f^2 - a^6*b^2*k^2*m^2 - a^5*b^3*j^2*m^2 - a^4*b^4*h^2*m^2 - a^3*b^5*g^ \\
& 2*m^2 - a^2*b^6*f^2*m^2 - b^6*c^2*d^2*k^2 - b^5*c^3*d^2*j^2 - b^4*c^4*d^2*h \\
& ^2 - b^3*c^5*d^2*g^2 - b^2*c^6*d^2*f^2 - a^7*b*l^2*m^2 - b^7*c*d^2*l^2 - a* \\
& b^7*e^2*m^2 - b*c^7*d^2*e^2 - b^8*d^2*m^2 - a^6*c^2*k^4 - a^5*c^3*j^4 - a^4 \\
& *c^4*h^4 - a^3*c^5*g^4 - a^2*c^6*f^4 - a^7*c*l^4 - a*c^7*e^4 - a^8*m^4 - c^ \\
& 8*d^4, z, k1)*x*(8*b^3*c^7 - 32*a*b*c^8))/c^5) - (4*b*c^7*d*e + 8*a*c^7*d*g \\
& - 8*a*c^7*e*f - 4*b^2*c^6*d*g - 8*a^2*c^6*g*h + 4*b^3*c^5*d*j - 8*a^2*c^6* \\
& d*l + 8*a^2*c^6*e*k + 8*a^2*c^6*f*j - 4*b^4*c^4*d*l + 8*a^3*c^5*g*m + 8*a^3 \\
& *c^5*h*l - 8*a^3*c^5*j*k - 8*a^4*c^4*l*m + 16*a*b^2*c^5*d*l - 4*a*b^2*c^5*e \\
& *k - 4*a*b^2*c^5*f*j + 4*a*b^3*c^4*e*m + 4*a*b^3*c^4*f*l - 12*a^2*b*c^5*e*m \\
& - 12*a^2*b*c^5*f*l + 4*a^2*b*c^5*g*k + 4*a^2*b*c^5*h*j + 4*a^3*b*c^4*j*m +
\end{aligned}$$

$$\begin{aligned}
& 4*a^3*b*c^4*k*1 - 4*a^2*b^2*c^4*g*m - 4*a^2*b^2*c^4*h*1 + 4*a*b*c^6*e*h + \\
& 4*a*b*c^6*f*g - 12*a*b*c^6*d*j)/c^5 + (x*(4*c^8*d^2 + 2*b^8*m^2 - 4*a*c^7*f \\
& ^2 - 2*b*c^7*e^2 + 2*b^7*c*1^2 + 2*b^2*c^6*f^2 + 4*a^2*c^6*h^2 + 2*b^3*c^5* \\
& g^2 + 2*b^4*c^4*h^2 - 4*a^3*c^5*k^2 + 2*b^5*c^3*j^2 + 2*b^6*c^2*k^2 + 4*a^4 \\
& *c^4*m^2 - 8*a*b^2*c^5*h^2 - 10*a*b^3*c^4*j^2 + 6*a^2*b*c^5*j^2 - 12*a*b^4* \\
& c^3*k^2 - 14*a*b^5*c^2*1^2 - 18*a^3*b*c^4*1^2 - 4*b*c^7*d*f - 8*a*c^7*d*h + \\
& 8*a*c^7*e*g - 4*b^7*c*k*m + 18*a^2*b^2*c^4*k^2 + 28*a^2*b^3*c^3*1^2 + 40*a \\
& ^2*b^4*c^2*m^2 - 32*a^3*b^2*c^3*m^2 - 10*a*b*c^6*g^2 + 4*b^2*c^6*d*h - 16*a \\
& *b^6*c*m^2 - 4*b^3*c^5*f*h - 4*b^3*c^5*d*k + 8*a^2*c^6*d*m - 8*a^2*c^6*e*1 \\
& + 8*a^2*c^6*f*k - 8*a^2*c^6*g*j + 4*b^4*c^4*d*m + 4*b^4*c^4*f*k - 4*b^4*c^4 \\
& *g*j - 4*b^5*c^3*f*m + 4*b^5*c^3*g*1 - 4*b^5*c^3*h*k - 8*a^3*c^5*h*m + 8*a^ \\
& 3*c^5*j*1 + 4*b^6*c^2*h*m - 4*b^6*c^2*j*1 - 16*a*b^2*c^5*d*m + 4*a*b^2*c^5* \\
& e*1 - 16*a*b^2*c^5*f*k + 20*a*b^2*c^5*g*j + 20*a*b^3*c^4*f*m - 24*a*b^3*c^4 \\
& *g*1 + 20*a*b^3*c^4*h*k - 20*a^2*b*c^5*f*m + 28*a^2*b*c^5*g*1 - 20*a^2*b*c^ \\
& 5*h*k - 24*a*b^4*c^3*h*m + 24*a*b^4*c^3*j*1 + 28*a*b^5*c^2*k*m + 28*a^3*b*c \\
& ^4*k*m + 36*a^2*b^2*c^4*h*m - 32*a^2*b^2*c^4*j*1 - 56*a^2*b^3*c^3*k*m + 12* \\
& a*b*c^6*f*h + 12*a*b*c^6*d*k - 4*a*b*c^6*e*j))/c^5) + (x*(c^7*e^3 + c^7*d^2 \\
& *g + b^7*e*m^2 - a^3*c^4*j^3 + b^2*c^5*e*g^2 - a^3*b^3*c*1^3 + 2*a^4*b*c^2* \\
& 1^3 + b^3*c^4*e*h^2 + 3*a^2*c^5*e*j^2 + a^2*c^5*g*h^2 + 2*b^2*c^5*e^2*j + b \\
& ^4*c^3*e*j^2 - a^2*c^5*g^2*j + a^3*c^4*e*1^2 + b^2*c^5*d^2*1 + b^5*c^2*e*k^ \\
& 2 + a^2*c^5*f^2*1 - a^3*c^4*g*k^2 - 2*b^3*c^4*e^2*1 - a^3*c^4*h^2*1 + a^4*c \\
& ^3*g*m^2 + a^2*b^5*j*m^2 - a^4*c^3*j*1^2 + a^4*c^3*k^2*1 - a^3*b^4*1*m^2 - \\
& a^5*c^2*1*m^2 - 2*c^7*d*e*f + a^2*b^2*c^3*j^3 - a*b*c^5*g^3 + a*c^6*e*g^2 + \\
& b*c^6*e*f^2 - a*c^6*f^2*g - 2*b*c^6*e^2*g - 3*a*c^6*e^2*j - b*c^6*d^2*j - \\
& a*c^6*d^2*1 + b^6*c*e*1^2 - a*b^6*g*m^2 - 2*a*b*c^5*e*h^2 + 5*a*b*c^5*e^2*1 \\
& - 6*a*b^5*c*e*m^2 - 2*b^2*c^5*e*f*h - a*b^5*c*g*1^2 - 2*b^2*c^5*d*e*k + 2* \\
& b^3*c^4*d*e*m + 2*b^3*c^4*e*f*k - 2*b^3*c^4*e*g*j + 2*a^2*c^5*d*g*m + 2*a^2 \\
& *c^5*d*h*1 - 2*a^2*c^5*e*f*m - 2*a^2*c^5*e*g*1 - 2*a^2*c^5*e*h*k + 2*a^2*c^ \\
& 5*f*g*k - 2*a^2*c^5*f*h*j - 2*a^2*c^5*d*j*k - 2*b^4*c^3*e*f*m + 2*b^4*c^3*e \\
& *g*1 - 2*b^4*c^3*e*h*k + 2*b^5*c^2*e*h*m - 2*a^3*c^4*g*h*m - 2*b^5*c^2*e*j* \\
& 1 - 2*a^3*c^4*d*1*m + 2*a^3*c^4*e*k*m + 2*a^3*c^4*f*j*m - 2*a^3*c^4*f*k*1 + \\
& 2*a^3*c^4*g*j*1 + 2*a^3*c^4*h*j*k + 2*a^4*c^3*h*1*m - 2*a^4*c^3*j*k*m - 3* \\
& a*b^2*c^4*e*j^2 - a*b^2*c^4*g*h^2 - 4*a*b^3*c^3*e*k^2 + 3*a^2*b*c^4*e*k^2 + \\
& 2*a*b^2*c^4*g^2*j - a*b^3*c^3*g*j^2 - 5*a*b^4*c^2*e*1^2 - a*b^4*c^2*g*k^2 \\
& + a^2*b*c^4*h^2*j - 4*a^3*b*c^3*e*m^2 - 2*a*b^3*c^3*g^2*1 + 4*a^2*b*c^4*g^2 \\
& *1 - 5*a^3*b*c^3*g*1^2 + 5*a^2*b^4*c*g*m^2 - 2*a^3*b*c^3*j*k^2 + a^2*b^4*c* \\
& j*1^2 + 3*a^3*b*c^3*j^2*1 - 4*a^3*b^3*c*j*m^2 + 3*a^4*b*c^2*j*m^2 + 3*a^4*b \\
& ^2*c*1*m^2 + 2*b*c^6*d*e*h - 2*a*c^6*d*g*h + 2*a*c^6*e*f*h + 2*a*c^6*d*e*k \\
& + 2*a*c^6*d*f*j - 2*b^6*c*e*k*m + 6*a^2*b^2*c^3*e*1^2 + 3*a^2*b^2*c^3*g*k^2 \\
& + 10*a^2*b^3*c^2*e*m^2 + 4*a^2*b^3*c^2*g*1^2 - 6*a^3*b^2*c^2*g*m^2 + a^2*b \\
& ^3*c^2*j*k^2 - 2*a^2*b^3*c^2*j^2*1 - a^3*b^2*c^2*j*1^2 - a^3*b^2*c^2*k^2*1 \\
& + 2*a*b*c^5*f*g*h - 4*a*b*c^5*d*e*m - 2*a*b*c^5*d*f*1 + 2*a*b*c^5*d*g*k - 4 \\
& *a*b*c^5*e*f*k + 2*a*b*c^5*e*g*j + 2*a*b^5*c*g*k*m - 2*a*b^2*c^4*d*g*m + 6* \\
& a*b^2*c^4*e*f*m - 4*a*b^2*c^4*e*g*1 + 6*a*b^2*c^4*e*h*k - 2*a*b^2*c^4*f*g*k \\
& - 8*a*b^3*c^3*e*h*m + 2*a*b^3*c^3*f*g*m + 2*a*b^3*c^3*g*h*k + 6*a^2*b*c^4*
\end{aligned}$$

$$\begin{aligned}
& e^h m - 4a^2 b^3 c^4 f g m - 4a^2 b^3 c^4 g h k + 8a^2 b^3 c^3 e j^* l + 2a^2 b^3 c^4 d^* j^* m - 8a^2 b^3 c^4 e^* j^* l + 2a^2 b^3 c^4 f^* j^* k - 2a^2 b^3 c^4 g^* h^* m + 10 \\
& a^2 b^3 c^4 e^* k^* m + 2a^2 b^3 c^4 g^* j^* l + 2a^3 b^3 c^3 f^* l^* m + 6a^3 b^3 c^3 g^* k^* m - 4a^3 b^3 c^3 h^* j^* m + 2a^3 b^3 c^3 h^* k^* l - 2a^2 b^3 c^3 j^* k^* m + 2a^3 b^3 c^3 k^* l^* m - 4a^4 b^3 c^2 k^* l^* m + 6a^2 b^2 c^3 g^* h^* m - 12a^2 b^2 c^3 e^* k^* m - 2 \\
& a^2 b^2 c^3 f^* j^* m - 4a^2 b^2 c^3 g^* j^* l - 2a^2 b^2 c^3 h^* j^* k - 8a^2 b^3 c^2 g^* k^* m + 2a^2 b^3 c^2 h^* j^* m - 2a^3 b^2 c^2 h^* l^* m + 6a^3 b^2 c^2 j^* k^* m \\
&))/c^5) \cdot \text{root}(128a^2 b^2 c^8 z^4 - 16a^2 b^4 c^7 z^4 - 256a^3 c^9 z^4 + 384 \\
& a^3 b^2 c^6 l^* z^3 - 144a^2 b^4 c^5 l^* z^3 + 128a^2 b^3 c^6 j^* z^3 - 128a^2 b^2 c^7 g^* z^3 + 16a^2 b^6 c^4 l^* z^3 - 256a^3 b^3 c^7 j^* z^3 - 16a^2 b^5 c^5 j^* \\
& z^3 + 16a^2 b^4 c^6 g^* z^3 - 256a^4 c^7 l^* z^3 + 256a^3 c^8 g^* z^3 - 96a^4 b^3 c^5 j^* l^* z^2 + 8a^2 b^7 c^2 j^* l^* z^2 + 160a^4 b^3 c^5 h^* m^* z^2 - 8a^2 b^7 c^2 h^* \\
& m^* z^2 + 8a^2 b^6 c^3 h^* k^* z^2 - 8a^2 b^6 c^3 g^* l^* z^2 + 8a^2 b^6 c^3 f^* m^* z^2 + \\
& 160a^3 b^3 c^6 g^* j^* z^2 - 96a^3 b^3 c^6 f^* k^* z^2 - 96a^3 b^3 c^6 e^* l^* z^2 - 96a^3 b^3 c^6 d^* m^* z^2 + 8a^2 b^5 c^4 g^* j^* z^2 - 8a^2 b^5 c^4 f^* k^* z^2 - 8a^2 b^5 c^4 e^* \\
& l^* z^2 - 8a^2 b^5 c^4 d^* m^* z^2 + 8a^2 b^4 c^5 e^* j^* z^2 + 8a^2 b^4 c^5 d^* k^* z^2 + \\
& 8a^2 b^4 c^5 f^* h^* z^2 + 32a^2 b^3 c^7 e^* g^* z^2 + 32a^2 b^3 c^7 d^* h^* z^2 - 8a^2 b^3 c^6 e^* g^* z^2 - 8a^2 b^3 c^6 d^* h^* z^2 + 16a^2 b^2 c^7 d^* f^* z^2 + 8a^2 b^8 c^3 k^* m^* z^2 \\
& - 304a^4 b^2 c^4 k^* m^* z^2 + 264a^3 b^4 c^3 k^* m^* z^2 - 80a^2 b^6 c^2 k^* m^* \\
& z^2 + 184a^3 b^3 c^4 j^* l^* z^2 - 72a^2 b^5 c^3 j^* l^* z^2 - 200a^3 b^3 c^4 h^* \\
& m^* z^2 + 72a^2 b^5 c^3 h^* m^* z^2 - 240a^3 b^2 c^5 g^* l^* z^2 + 144a^3 b^2 c^5 \\
& h^* k^* z^2 + 144a^3 b^2 c^5 f^* m^* z^2 + 80a^2 b^4 c^4 g^* l^* z^2 - 64a^2 b^4 c^4 \\
& h^* k^* z^2 - 64a^2 b^4 c^4 f^* m^* z^2 - 72a^2 b^3 c^5 g^* j^* z^2 + 56a^2 b^3 c^5 \\
& f^* k^* z^2 + 56a^2 b^3 c^5 e^* l^* z^2 + 56a^2 b^3 c^5 d^* m^* z^2 - 48a^2 b^2 c^6 \\
& e^* j^* z^2 - 48a^2 b^2 c^6 d^* k^* z^2 - 48a^2 b^2 c^6 f^* h^* z^2 - 112a^5 b^3 c^4 \\
& m^2 z^2 + 44a^2 b^7 c^3 m^2 z^2 + 80a^4 b^3 c^5 k^2 z^2 - 4a^2 b^7 c^2 k^2 z^2 \\
& - 4a^2 b^6 c^3 j^2 z^2 - 48a^3 b^3 c^6 h^2 z^2 - 4a^2 b^5 c^4 h^2 z^2 - 4a^2 b^4 c^5 \\
& g^2 z^2 + 16a^2 b^3 c^7 f^2 z^2 - 4a^2 b^3 c^6 f^2 z^2 + 8a^2 b^2 c^7 e^2 z^2 + 64a^5 c^5 k^* m^* z^2 + 192a^4 c^6 g^* l^* z^2 - 64a^4 c^6 h^* k^* z^2 - 6 \\
& 4a^4 c^6 f^* m^* z^2 + 64a^3 c^7 e^* j^* z^2 + 64a^3 c^7 d^* k^* z^2 + 64a^3 c^7 f^* h^* \\
& z^2 - 4a^2 b^8 c^1 l^2 z^2 - 64a^2 c^8 d^* f^* z^2 + 16a^2 b^3 c^8 d^2 z^2 + 252a^4 b^3 c^3 m^2 z^2 - 168a^3 b^5 c^2 m^2 z^2 + 168a^4 b^2 c^4 l^2 z^2 - 13 \\
& 2a^3 b^4 c^3 l^2 z^2 + 40a^2 b^6 c^2 l^2 z^2 - 100a^3 b^3 c^4 k^2 z^2 + \\
& 36a^2 b^5 c^3 k^2 z^2 - 56a^3 b^2 c^5 j^2 z^2 + 32a^2 b^4 c^4 j^2 z^2 + \\
& 28a^2 b^3 c^5 h^2 z^2 + 40a^2 b^2 c^6 g^2 z^2 - 96a^5 c^5 l^2 z^2 - 32a^4 c^6 j^2 z^2 - 96a^3 c^7 g^2 z^2 - 32a^2 c^8 e^2 z^2 - 4b^3 c^7 d^2 z^2 \\
& - 4a^2 b^9 m^2 z^2 + 32a^5 b^3 c^3 h^* l^* m^* z + 8a^2 b^6 c^3 g^* k^* m^* z + 96a^4 b^3 c^4 e^* k^* m^* z + 32a^4 b^3 c^4 h^* j^* k^* z + 32a^4 b^3 c^4 g^* j^* l^* z + 32a^4 b^3 c^4 f^* \\
& j^* m^* z - 64a^4 b^3 c^4 g^* h^* m^* z - 8a^2 b^6 c^2 e^* j^* l^* z + 8a^2 b^6 c^2 e^* h^* m^* z - \\
& 64a^3 b^3 c^5 e^* h^* k^* z + 64a^3 b^3 c^5 e^* g^* l^* z - 64a^3 b^3 c^5 e^* f^* m^* z + 32a^3 \\
& b^3 c^5 f^* g^* k^* z - 32a^3 b^3 c^5 d^* h^* l^* z + 32a^3 b^3 c^5 d^* g^* m^* z - 8a^2 b^5 c^3 \\
& e^* h^* k^* z + 8a^2 b^5 c^3 e^* g^* l^* z - 8a^2 b^5 c^3 e^* f^* m^* z - 8a^2 b^4 c^4 e^* g^* j^* z \\
& + 8a^2 b^4 c^4 e^* f^* k^* z - 8a^2 b^4 c^4 d^* f^* l^* z + 8a^2 b^4 c^4 d^* e^* m^* z - 32a^2 b^3 c^6 d^* f^* j^* z + 32a^2 b^3 c^6 d^* e^* k^* z + 8a^2 b^3 c^5 d^* f^* j^* z - 8a^2 b^3 c^5 d^* e^* k^* z + 32a^2 b^3 c^6 e^* f^* h^* z - 8a^2 b^3 c^5 e^* f^* h^* z - 8a^2 b^2 c^6 d^* f^* g^* z +
\end{aligned}$$

$$\begin{aligned}
& 8*a*b^2*c^6*d*e*h*z - 8*a*b^7*c*e*k*m*z - 40*a^5*b^2*c^2*k*l*m*z + 48*a^4*b^3*c^2*j*k*m*z - 8*a^4*b^3*c^2*h*l*m*z + 104*a^4*b^2*c^3*g*k*m*z - 56*a^3*b^4*c^2*g*k*m*z - 40*a^4*b^2*c^3*h*j*m*z + 8*a^4*b^2*c^3*h*k*l*z + 8*a^4*b^2*c^3*f*l*m*z + 8*a^3*b^4*c^2*h*j*m*z - 152*a^3*b^3*c^3*e*k*m*z + 64*a^2*b^5*c^2*e*k*m*z - 40*a^3*b^3*c^3*g*j*l*z - 8*a^3*b^3*c^3*h*j*k*z - 8*a^3*b^3*c^3*f*j*m*z + 8*a^2*b^5*c^2*g*j*l*z + 48*a^3*b^3*c^3*g*h*m*z - 8*a^2*b^5*c^2*g*h*m*z - 104*a^3*b^2*c^4*e*j*l*z + 56*a^2*b^4*c^3*e*j*l*z + 8*a^3*b^2*c^4*f*j*k*z - 8*a^3*b^2*c^4*d*k*l*z + 8*a^3*b^2*c^4*d*j*m*z + 104*a^3*b^2*c^4*e*h*m*z - 56*a^2*b^4*c^3*e*h*m*z - 40*a^3*b^2*c^4*g*h*k*z - 40*a^3*b^2*c^4*f*g*m*z - 8*a^3*b^2*c^4*f*h*l*z + 8*a^2*b^4*c^3*g*h*k*z + 8*a^2*b^4*c^3*f*g*m*z + 48*a^2*b^3*c^4*e*h*k*z - 48*a^2*b^3*c^4*e*g*l*z + 48*a^2*b^3*c^4*e*f*m*z - 8*a^2*b^3*c^4*f*g*k*z + 8*a^2*b^3*c^4*d*h*l*z - 8*a^2*b^3*c^4*d*g*m*z + 40*a^2*b^2*c^5*e*g*j*z - 40*a^2*b^2*c^5*e*f*k*z + 40*a^2*b^2*c^5*d*f*l*z - 40*a^2*b^2*c^5*d*e*m*z - 8*a^2*b^2*c^5*d*h*j*z + 8*a^2*b^2*c^5*d*g*k*z + 8*a^2*b^2*c^5*f*g*h*z + 8*a^4*b^4*c*k*l*m*z - 64*a^5*b*c^3*j*k*m*z - 8*a^3*b^5*c*j*k*m*z - 32*a^6*b*c^2*l*m^2*z + 24*a^5*b^3*c*l*m^2*z - 28*a^4*b^4*c*j*m^2*z + 16*a^5*b*c^3*k^2*l*z + 4*a^3*b^5*c*j^1^2*z + 48*a^5*b*c^3*g*m^2*z + 32*a^3*b^5*c*g*m^2*z - 4*a^2*b^6*c*g^1^2*z - 36*a^2*b^6*c*e*m^2*z - 32*a^4*b*c^4*g*k^2*z - 16*a^3*b*c^5*f^2*l*z - 48*a^4*b*c^4*e^1^2*z - 32*a^3*b*c^5*g^2*j*z - 4*a*b^4*c^4*e^2*l*z + 32*a^2*b*c^6*d^2*l*z - 24*a*b^3*c^5*d^2*l*z + 4*a*b^6*c^2*e*k^2*z + 32*a^3*b*c^5*e*j^2*z + 16*a^3*b*c^5*g*h^2*z - 16*a^2*b*c^6*e^2*j*z + 4*a*b^5*c^3*e*j^2*z + 4*a*b^3*c^5*e^2*j*z + 20*a*b^2*c^6*d^2*j*z + 4*a*b^4*c^4*e*h^2*z - 16*a^2*b*c^6*e*g^2*z + 4*a*b^3*c^5*e*g^2*z - 4*a*b^2*c^6*e^2*g*z + 4*a*b^2*c^6*e*f^2*z + 32*a^6*c^3*k*l*m*z - 32*a^5*c^4*h*k*l*z + 32*a^5*c^4*h*j*m*z - 32*a^5*c^4*g*k*m*z - 32*a^5*c^4*f*l*m*z - 32*a^4*c^5*f*j*k*z + 32*a^4*c^5*e*j^1*z + 32*a^4*c^5*d*k^1*z - 32*a^4*c^5*d*j*m*z + 32*a^4*c^5*g*h*k*z + 32*a^4*c^5*f*h^1*z + 32*a^4*c^5*f*g*m*z - 32*a^4*c^5*e*h*m*z - 32*a^3*c^6*e*g*j*z + 32*a^3*c^6*e*f*k*z + 32*a^3*c^6*d*h*j*z - 32*a^3*c^6*d*g*k*z - 32*a^3*c^6*d*f^1*z + 32*a^3*c^6*d*e*m*z - 32*a^3*c^6*f*g*h*z + 4*a*b^7*c*e^1^2*z + 32*a^2*c^7*d*f*g*z - 32*a^2*c^7*d*e*h*z - 16*a*b*c^7*d^2*g*z + 52*a^5*b^2*c^2*j*m^2*z - 4*a^4*b^3*c^2*k^2*l*z + 36*a^4*b^2*c^3*j^2*l*z - 16*a^4*b^3*c^2*j^1^2*z - 8*a^3*b^4*c^2*j^2*l*z - 20*a^4*b^2*c^3*j*k^2*z + 4*a^3*b^4*c^2*j*k^2*z - 76*a^4*b^3*c^2*g*m^2*z - 60*a^4*b^2*c^3*g^1^2*z + 44*a^3*b^2*c^4*g^2*l*z + 28*a^3*b^4*c^2*g^1^2*z - 8*a^2*b^4*c^3*g^2*l*z + 104*a^3*b^4*c^2*e*m^2*z - 100*a^4*b^2*c^3*e*m^2*z + 24*a^3*b^3*c^3*g*k^2*z + 4*a^3*b^2*c^4*h^2*j*z - 4*a^2*b^5*c^2*g*k^2*z + 4*a^2*b^3*c^4*f^2*l*z + 76*a^3*b^3*c^3*e^1^2*z - 32*a^2*b^5*c^2*e^1^2*z + 20*a^2*b^2*c^5*e^2*l*z + 12*a^3*b^2*c^4*g*j^2*z + 8*a^2*b^3*c^4*g^2*j*z - 4*a^2*b^4*c^3*g*j^2*z + 52*a^3*b^2*c^4*e*k^2*z - 28*a^2*b^4*c^3*e*k^2*z - 4*a^2*b^2*c^5*f^2*j*z - 24*a^2*b^3*c^4*e*j^2*z - 4*a^2*b^3*c^4*g*h^2*z - 20*a^2*b^2*c^5*e*h^2*z + 20*a^5*b^2*c^2*l^3*z + 4*a^3*b^3*c^3*j^3*z - 4*a^2*b^2*c^5*g^3*z - 4*a^4*b^5*l*m^2*z - 16*a^6*c^3*j*m^2*z - 16*a^5*c^4*j^2*l*z + 4*a^3*b^6*j*m^2*z + 16*a^5*c^4*j*k^2*z + 48*a^5*c^4*g^1^2*z - 48*a^4*c^5*g^2*l*z - 4*a^2*b^7*g*m^2*z + 16*a^5*c^4*e*m^2*z - 16*a^4*c^5*h^2*j*z + 16*a^4*c^5*g^2*j^2*z - 16*a^3*c^6*e^2*l*z + 4*b^5*c^4*d^2*l*z - 16*a^4*c^5*e*k^2*z
\end{aligned}$$

$$\begin{aligned}
& + 16a^3c^6f^2jz - 4b^4c^5d^2jz - 16a^2c^7d^2jz - 4a^4b^4c^*l^3z + 16a^3c^6e^*h^2z - 16a^4b^*c^4j^3z + 16a^2c^7e^*g^2z + 4b^3c^6d^2g^*z - 16a^2c^7e^*f^2z - 4b^2c^7d^2e^*z + 4a^*b^8e^*m^2z \\
& + 16a^*c^8d^2e^*z - 16a^6c^3l^3z + 16a^3c^6g^3z + 4a^5b^2c^*g^*k^*l^*m + 12a^5b^*c^2g^*j^*k^*m + 12a^5b^*c^2e^*k^*l^*m - 4a^5b^*c^2h^*j^*k^*l - 4a^5b^*c^2f^*j^*l^*m - 4a^4b^3c^*g^*j^*k^*m - 4a^4b^3c^*e^*k^*l^*m - 4a^5b^*c^2g^*h^*l^*m + 4a^3b^4c^*e^*j^*k^*m - 4a^3b^4c^*f^*h^*k^*m + 12a^4b^*c^3d^*j^*k^*l - 20a^4b^*c^3e^*g^*k^*m + 12a^4b^*c^3f^*h^*j^*l + 12a^4b^*c^3e^*h^*j^*m + 12a^4b^*c^3d^*h^*k^*m - 4a^4b^*c^3g^*h^*j^*k - 4a^4b^*c^3f^*g^*k^*l - 4a^4b^*c^3f^*g^*j^*m - 4a^4b^*c^3e^*h^*k^*l - 4a^4b^*c^3e^*f^*l^*m - 4a^4b^*c^3d^*g^*l^*m - 4a^2b^5c^*e^*g^*k^*m + 4a^2b^5c^*d^*h^*k^*m - 20a^3b^*c^4d^*f^*j^*l - 4a^3b^*c^4e^*f^*j^*k - 4a^3b^*c^4d^*g^*j^*k - 4a^3b^*c^4d^*e^*k^*l - 4a^3b^*c^4d^*e^*j^*m - 4a^*b^5c^2d^*f^*j^*l + 12a^3b^*c^4e^*g^*h^*k + 12a^3b^*c^4e^*f^*g^*m + 12a^3b^*c^4d^*g^*h^*l + 12a^3b^*c^4d^*f^*h^*m - 4a^3b^*c^4f^*g^*h^*j - 4a^3b^*c^4e^*f^*h^*l + 4a^*b^5c^2d^*f^*h^*m - 4a^*b^4c^3d^*f^*h^*k + 4a^*b^4c^3d^*f^*g^*l + 12a^2b^*c^5d^*f^*g^*j + 12a^2b^*c^5d^*e^*f^*l - 4a^2b^*c^5d^*e^*h^*j - 4a^2b^*c^5d^*e^*g^*k - 4a^*b^3c^4d^*f^*g^*j - 4a^*b^3c^4d^*e^*f^*l - 4a^2b^*c^5e^*f^*g^*h + 4a^*b^2c^5d^*e^*f^*j - 4a^6b^*c^j^*k^*l^*m - 4a^*b^6c^d^*f^*k^*m - 4a^*b^c^6d^*e^*f^*g - 16a^4b^2c^2e^*j^*k^*m + 4a^4b^2c^2f^*j^*k^*l + 4a^4b^2c^2d^*j^*l^*m + 12a^4b^2c^2f^*h^*k^*m + 4a^4b^2c^2g^*h^*j^*m + 4a^4b^2c^2e^*h^*l^*m - 4a^3b^3c^2d^*j^*k^*l + 20a^3b^3c^2e^*g^*k^*m - 16a^3b^3c^2d^*h^*k^*m - 4a^3b^3c^2f^*h^*j^*l - 4a^3b^3c^2e^*h^*j^*m - 40a^3b^2c^3d^*f^*k^*m + 24a^2b^4c^2d^*f^*k^*m - 16a^3b^2c^3d^*h^*j^*l + 12a^3b^2c^3e^*g^*j^*l + 4a^3b^2c^3e^*h^*j^*k + 4a^3b^2c^3e^*f^*j^*m + 4a^3b^2c^3d^*g^*k^*l - 4a^2b^4c^2e^*g^*j^*l + 4a^2b^4c^2d^*h^*j^*l - 16a^3b^2c^3e^*g^*h^*m + 4a^3b^2c^3f^*g^*h^*l + 4a^2b^4c^2e^*g^*h^*m + 20a^2b^3c^3d^*f^*j^*l - 16a^2b^3c^3d^*f^*h^*m - 4a^2b^3c^3e^*g^*h^*k - 4a^2b^3c^3e^*f^*g^*m - 4a^2b^3c^3d^*g^*h^*l - 16a^2b^2c^4d^*f^*g^*l + 12a^2b^2c^4d^*f^*h^*k + 4a^2b^2c^4e^*f^*g^*k + 4a^2b^2c^4d^*g^*h^*j + 4a^2b^2c^4d^*e^*h^*l + 4a^2b^2c^4d^*e^*g^*m + 2a^5b^2c^*j^2k^*m - 4a^5b^2c^*h^*k^2m - 2a^5b^*c^2h^2k^*m + 2a^4b^3c^*h^2k^*m + 2a^5b^2c^*h^*k^*l^2 + 2a^5b^2c^*f^*l^2m - 2a^5b^*c^2h^*j^2m + 2a^3b^4c^*g^2k^*m + 14a^4b^*c^3f^2k^*m - 10a^5b^*c^2f^*k^2m - 8a^5b^2c^*g^*j^*m^2 - 8a^5b^2c^*e^*l^*m^2 + 4a^5b^2c^*f^*k^*m^2 + 4a^4b^3c^*f^*k^2m - 2a^5b^*c^2g^*k^2l + 2a^2b^5c^*f^2k^*m + 6a^5b^*c^2f^*k^*l^2 + 6a^5b^*c^2d^*l^2m - 2a^5b^*c^2g^*j^*l^2 + 2a^4b^3c^*g^*j^*l^2 - 2a^4b^3c^*f^*k^*l^2 - 2a^4b^3c^*d^*l^2m - 2a^4b^*c^3g^2j^*l - 14a^*b^5c^2d^2k^*m - 10a^5b^*c^2e^*j^*m^2 + 10a^4b^3c^*e^*j^*m^2 - 10a^3b^*c^4d^2k^*m - 6a^4b^3c^*d^*k^*m^2 + 6a^4b^*c^3g^2h^*m - 4a^3b^4c^*d^*k^2m - 2a^5b^*c^2d^*k^*m^2 + 14a^5b^*c^2f^*h^*m^2 + 14a^3b^*c^4e^2j^*l - 10a^4b^3c^*f^*h^*m^2 - 10a^4b^*c^3f^*h^2m - 10a^4b^*c^3e^*j^2l - 2a^4b^*c^3g^*h^2l - 2a^4b^*c^3f^*j^2k - 2a^4b^*c^3d^*j^2m - 2a^3b^4c^*e^*j^*l^2 + 2a^3b^4c^*d^*k^*l^2 + 2a^*b^5c^2e^2j^*l - 12a^*b^4c^3d^2j^*l - 10a^3b^*c^4e^2h^*m + 6a^4b^*c^3e^*j^*k^2 + 2a^3b^4c^*f^*h^*l^2 - 2a^*b^5c^2e^2h^*m - 12a^3b^4c^*e^*g^*m^2 + 12a^3b^4c^*d^*h^*m^2 + 12a^*b^4c^3d^2h^*m + 6a^3b^*c^4f^2g^*l - 2a^4b^*c^3f^*h^*k^2 - 2a^3b^*c^4f^2g^*l
\end{aligned}$$

$$\begin{aligned}
& h*k + 14*a^4*b*c^3*e*g*l^2 - 10*a^4*b*c^3*d*h*l^2 - 10*a^3*b*c^4*e*g^2*l - \\
& 2*a^3*b*c^4*f*g^2*k - 2*a^3*b*c^4*d*g^2*m + 2*a^2*b^5*c*e*g*l^2 - 2*a^2*b^5 \\
& *c*d*h*l^2 + 2*a*b^4*c^3*e^2*h*k - 2*a*b^4*c^3*e^2*g*l + 2*a*b^4*c^3*e^2*f* \\
& m - 14*a^2*b^5*c*d*f*m^2 + 14*a^2*b*c^5*d^2*h*k - 10*a^4*b*c^3*d*f*m^2 - 10 \\
& *a^3*b*c^4*d*h^2*k - 10*a^2*b*c^5*d^2*g*l - 10*a*b^3*c^4*d^2*h*k + 10*a*b^3 \\
& *c^4*d^2*g*l - 6*a*b^3*c^4*d^2*f*m - 4*a*b^4*c^3*d*f^2*m - 2*a^3*b*c^4*e*h^ \\
& 2*j - 2*a^2*b*c^5*d^2*f*m + 6*a^3*b*c^4*d*h*j^2 + 6*a^2*b*c^5*e^2*f*k + 6*a \\
& ^2*b*c^5*d*e^2*m - 2*a^3*b*c^4*e*g*j^2 - 2*a^2*b*c^5*e^2*g*j + 2*a*b^3*c^4* \\
& e^2*g*j - 2*a*b^3*c^4*e^2*f*k - 2*a*b^3*c^4*d*e^2*m + 14*a^3*b*c^4*d*f*k^2 \\
& - 10*a^2*b*c^5*d*f^2*k - 8*a*b^2*c^5*d^2*g*j - 8*a*b^2*c^5*d^2*e*l + 4*a*b^ \\
& 3*c^4*d*f^2*k + 4*a*b^2*c^5*d^2*f*k - 2*a^2*b*c^5*e*f^2*j + 2*a*b^5*c^2*d*f \\
& *k^2 + 2*a*b^4*c^3*d*f*j^2 + 2*a*b^2*c^5*d*e^2*k - 2*a^2*b*c^5*d*g^2*h + 2* \\
& a*b^2*c^5*e^2*f*h - 4*a*b^2*c^5*d*f^2*h - 2*a^2*b*c^5*d*f*h^2 + 2*a*b^3*c^4 \\
& *d*f*h^2 + 2*a*b^2*c^5*d*f*g^2 + 8*a^6*c^2*h*j*l*m - 8*a^6*c^2*g*k*l*m - 8* \\
& a^5*c^3*f*j*k*l + 8*a^5*c^3*e*j*k*m - 8*a^5*c^3*d*j*l*m + 8*a^5*c^3*g*h*k*l \\
& - 8*a^5*c^3*g*h*j*m - 8*a^5*c^3*f*h*k*m + 8*a^5*c^3*f*g*l*m - 8*a^5*c^3*e* \\
& h*l*m - 2*a^6*b*c*h*l^2*m + 8*a^4*c^4*f*g*j*k - 8*a^4*c^4*e*h*j*k - 8*a^4*c \\
& ^4*e*g*j*l + 8*a^4*c^4*e*f*k*l - 8*a^4*c^4*e*f*j*m + 8*a^4*c^4*d*h*j*l - 8* \\
& a^4*c^4*d*g*k*l + 8*a^4*c^4*d*g*j*m + 8*a^4*c^4*d*f*k*m + 8*a^4*c^4*d*e*l*m \\
& + 6*a^6*b*c*g*l*m^2 - 2*a^6*b*c*h*k*m^2 - 8*a^4*c^4*f*g*h*l + 8*a^4*c^4*e* \\
& g*h*m + 2*a*b^6*c*e^2*k*m + 8*a^3*c^5*d*e*j*k + 8*a^3*c^5*e*f*h*j - 8*a^3*c \\
& ^5*e*f*g*k - 8*a^3*c^5*d*g*h*j - 8*a^3*c^5*d*f*h*k + 8*a^3*c^5*d*f*g*l - 8* \\
& a^3*c^5*d*e*h*l - 8*a^3*c^5*d*e*g*m - 8*a^2*c^6*d*e*f*j + 8*a^2*c^6*d*e*g*h \\
& + 2*a*b^6*c*d*f*l^2 + 6*a*b*c^6*d^2*e*j - 2*a*b*c^6*d^2*f*h - 2*a*b*c^6*d* \\
& e^2*h - 8*a^4*b^2*c^2*g^2*k*m - 10*a^3*b^3*c^2*f^2*k*m + 2*a^4*b^2*c^2*h^2* \\
& j*l + 18*a^3*b^2*c^3*e^2*k*m - 12*a^2*b^4*c^2*e^2*k*m - 4*a^4*b^2*c^2*g*j^2 \\
& *l + 2*a^3*b^3*c^2*g^2*j*l + 28*a^2*b^3*c^3*d^2*k*m + 14*a^4*b^2*c^2*d*k^2* \\
& m - 8*a^3*b^2*c^3*f^2*j*l + 2*a^4*b^2*c^2*g*j*k^2 + 2*a^4*b^2*c^2*e*k^2*l - \\
& 2*a^3*b^3*c^2*g^2*h*m + 2*a^2*b^4*c^2*f^2*j*l - 10*a^2*b^3*c^3*e^2*j*l - 8 \\
& *a^4*b^2*c^2*d*k*l^2 + 4*a^4*b^2*c^2*e*j*l^2 + 4*a^3*b^3*c^2*f*h^2*m + 4*a^ \\
& 3*b^3*c^2*e*j^2*l + 4*a^3*b^2*c^3*f^2*h*m - 2*a^2*b^4*c^2*f^2*h*m + 18*a^2*b \\
& ^2*c^4*d^2*j*l + 10*a^2*b^3*c^3*e^2*h*m - 8*a^4*b^2*c^2*f*h*l^2 - 2*a^3*b^ \\
& 3*c^2*e*j*k^2 + 2*a^3*b^2*c^3*g^2*h*k + 2*a^3*b^2*c^3*f*g^2*m - 22*a^4*b^2* \\
& c^2*d*h*m^2 - 22*a^2*b^2*c^4*d^2*h*m + 18*a^4*b^2*c^2*e*g*m^2 + 16*a^3*b^2* \\
& c^3*d*h^2*m - 4*a^3*b^2*c^3*f*h^2*k - 4*a^2*b^4*c^2*d*h^2*m + 2*a^3*b^3*c^2 \\
& *f*h*k^2 + 2*a^3*b^2*c^3*d*j^2*k + 2*a^2*b^3*c^3*f^2*h*k - 2*a^2*b^3*c^3*f^ \\
& 2*g*l - 10*a^3*b^3*c^2*e*g*l^2 + 10*a^3*b^3*c^2*d*h*l^2 - 8*a^2*b^2*c^4*e^2 \\
& *h*k - 8*a^2*b^2*c^4*e^2*f*m + 4*a^2*b^3*c^3*e*g^2*l + 4*a^2*b^2*c^4*e^2*g* \\
& l + 2*a^3*b^2*c^3*f*h*j^2 + 28*a^3*b^3*c^2*d*f*m^2 + 14*a^2*b^2*c^4*d*f^2*m \\
& - 8*a^3*b^2*c^3*e*g*k^2 + 4*a^3*b^2*c^3*d*h*k^2 + 4*a^2*b^3*c^3*d*h^2*k + \\
& 2*a^2*b^4*c^2*e*g*k^2 - 2*a^2*b^4*c^2*d*h*k^2 + 2*a^2*b^2*c^4*f^2*g*j + 2*a \\
& ^2*b^2*c^4*e*f^2*l + 18*a^3*b^2*c^3*d*f*l^2 - 12*a^2*b^4*c^2*d*f*l^2 - 4*a^ \\
& 2*b^2*c^4*e*g^2*j + 2*a^2*b^3*c^3*e*g*j^2 - 2*a^2*b^3*c^3*d*h*j^2 - 10*a^2*b \\
& ^3*c^3*d*f*k^2 - 8*a^2*b^2*c^4*d*f*j^2 + 2*a^2*b^2*c^4*e*g*h^2 + 4*a^5*b^2 \\
& *c*h^2*m^2 - 2*a^4*b^2*c^2*h^3*m - 5*a^5*b*c^2*g^2*m^2 + 5*a^4*b^3*c*g^2*m^
\end{aligned}$$

$$\begin{aligned}
& 2 + 3a^5b^2c^2h^2l^2 + 6a^3b^4c^2f^2m^2 - 2a^3b^2c^3g^3l + 2a^2 \\
& * b^3c^3f^3m + 7a^4b^2c^3e^2m^2 + 7a^2b^5c^2e^2m^2 - 5a^4b^2c^3f^2 \\
& * l^2 + 3a^4b^2c^3g^2k^2 - 2a^4b^2c^2f^2k^3 - 2a^2b^2c^4f^3k + 7 \\
& * a^3b^2c^4d^2l^2 + 7a^2b^5c^2d^2l^2 - 5a^3b^2c^4e^2k^2 + 3a^3b^2c^4 \\
& * f^2j^2 + 6a^2b^4c^3d^2k^2 + 2a^3b^3c^2d^2k^3 - 2a^3b^2c^3e^2j^3 \\
& - 5a^2b^2c^5d^2j^2 + 5a^2b^3c^4d^2j^2 + 3a^2b^2c^5e^2h^2 + 4a^2b^2 \\
& * c^5d^2h^2 - 2a^2b^2c^4d^2h^3 - 4a^6c^2j^2k^2m + 2a^6b^2j^2l^2m^2 \\
& + 4a^6c^2j^2k^2l + 4a^6c^2h^2k^2m - 4a^6c^2h^2k^2l^2 - 4a^6c^2f^2l^2 \\
& * m + 4a^5c^3g^2k^2m + 2a^5b^3h^2k^2m^2 - 2a^5b^3g^2l^2m^2 + 4a^6c^2 \\
& * g^2j^2m^2 + 4a^6c^2f^2k^2m^2 + 4a^6c^2e^2l^2m^2 - 4a^5c^3h^2j^2l + 4a^5 \\
& * c^3h^2j^2k + 4a^5c^3g^2j^2l + 4a^5c^3f^2j^2m - 4a^4c^4e^2k^2m \\
& + 2a^4b^4g^2j^2m^2 - 2a^4b^4f^2k^2m^2 + 2a^4b^4e^2l^2m^2 - 4a^5c^3g^2 \\
& * j^2k^2 - 4a^5c^3e^2k^2l - 4a^5c^3d^2k^2m + 4a^4c^4f^2j^2l + 4a^5c^3 \\
& * e^2j^2l^2 + 4a^5c^3d^2k^2l^2 + 4a^4c^4f^2h^2m + 2b^6c^2d^2j^2l - 2a^3 \\
& * b^5e^2j^2m^2 + 2a^3b^5d^2k^2m^2 + 4a^5c^3f^2h^2l^2 - 4a^4c^4g^2h^2k \\
& - 4a^4c^4f^2g^2m - 4a^3c^5d^2j^2l - 2b^6c^2d^2h^2m + 2a^3b^5f^2 \\
& * h^2m^2 + 12a^5c^3d^2h^2m^2 - 12a^4c^4d^2h^2m + 12a^3c^5d^2h^2m - 4a^5 \\
& * c^3e^2g^2m^2 + 4a^4c^4g^2h^2j + 4a^4c^4f^2h^2k + 4a^4c^4e^2h^2l - \\
& 4a^4c^4d^2j^2k + 3a^6b^2c^2j^2m^2 - 4a^4c^4f^2h^2j^2 + 4a^3c^5e^2h^2 \\
& * k + 4a^3c^5e^2g^2l + 4a^3c^5e^2f^2m + 2b^5c^3d^2h^2k - 2b^5c^3 \\
& * d^2g^2l + 2b^5c^3d^2f^2m + 2a^5b^2c^2j^3l + 2a^2b^6e^2g^2m^2 - 2a^2 \\
& * b^6d^2h^2m^2 + 4a^4c^4e^2g^2k^2 + 4a^4c^4d^2h^2k^2 - 4a^3c^5f^2g^2j - \\
& 4a^3c^5e^2f^2l - 4a^3c^5d^2f^2m - 4a^4c^4d^2f^2l^2 + 4a^3c^5e^2g^2 \\
& * j + 4a^3c^5d^2g^2k + 2b^4c^4d^2g^2j - 2b^4c^4d^2f^2k + 2b^4c^4 \\
& * d^2e^2l - 6a^3b^2c^4f^3m + 4a^3c^5f^2g^2h + 4a^2c^6d^2g^2j + 4a^2 \\
& * c^6d^2f^2k + 4a^2c^6d^2e^2l - 2a^5b^2c^2g^2l^3 + 2a^5b^2c^2h^2k^3 + \\
& 2a^4b^2c^3h^3k - 4a^3c^5e^2g^2h^2 + 4a^3c^5d^2f^2j^2 - 4a^2c^6d^2e^2 \\
& * k - 2b^3c^5d^2e^2j + 8a^5b^2c^2d^2m^3 + 8a^2b^6c^2d^2m^2 + 8a^2b^2c^2 \\
& * d^3m - 6a^5b^2c^2e^2l^3 - 6a^2b^2c^5e^3l - 4a^2c^6e^2f^2h + 2b^3 \\
& * c^5d^2f^2h + 2a^4b^3c^2e^2l^3 + 2a^4b^2c^3g^2j^3 + 2a^3b^2c^4g^3j + \\
& 2a^2b^3c^4e^3l + 4a^2c^6e^2f^2g + 4a^2c^6d^2f^2h - 6a^4b^2c^3d^2 \\
& * k^3 - 4a^2c^6d^2f^2g^2 + 2b^2c^6d^2e^2g - 2a^2b^2c^5e^3j + 2a^3b^2c^4 \\
& * f^2h^3 + 2a^2b^2c^5f^3h + 2a^2b^2c^5e^2g^3 + 3a^2b^2c^6d^2g^2 - 9a^4 \\
& * b^2c^2f^2m^2 + 4a^4b^2c^2g^2l^2 - 14a^3b^3c^2e^2m^2 + 5a^3b^3 \\
& * c^2f^2l^2 - 20a^2b^4c^2d^2m^2 + 16a^3b^2c^3d^2m^2 - 9a^3b^2 \\
& * c^3e^2l^2 + 6a^2b^4c^2e^2l^2 + 4a^3b^2c^3f^2k^2 - 14a^2b^3 \\
& * c^3d^2l^2 + 5a^2b^3c^3e^2k^2 - 9a^2b^2c^4d^2k^2 + 4a^2b^2c^4 \\
& * e^2j^2 + 4a^7c^2k^2l^2m - 4a^7c^2j^2l^2m^2 + 2b^7c^2d^2k^2m + 2a^6b^2 \\
& * c^2k^3m + 2a^6b^2c^2j^2l^3 + 2a^2b^7d^2f^2m^2 - 6a^6b^2c^2f^2m^3 - 6a^2 \\
& * b^2c^6d^2 \\
& * k - 4a^2c^7d^2e^2g + 4a^2c^7d^2e^2f + 2a^2b^2c^6e^3g + 2a^2b^2c^6d^2 \\
& * f^3 \\
& - a^5b^2c^2j^2l^2 - a^5b^2c^2j^2k^2 - a^4b^3c^2h^2l^2 - a^3b^4c^2g^2 \\
& * l^2 - a^4b^2c^3h^2j^2 - a^2b^5c^2f^2l^2 - a^2b^5c^2e^2k^2 - a^3b^2c^4 \\
& * g^2h^2 - a^2b^4c^3e^2j^2 - a^2b^2c^5f^2g^2 - a^2b^3c^4e^2h^2 - a^2 \\
& * b^2c^5e^2g^2 + 2a^7b^2k^2m^3 + 4a^7c^2h^2m^3 + 4a^2c^7d^3h + 2b^2c^7d^3 \\
& * f - a^6b^2c^2k^2l^2 - 2a^6c^2j^2l^2 - 6a^6c^2h^2m^2 - a^2b^6c^2e^2
\end{aligned}$$

$$\begin{aligned}
& 2*1^2 - 6*a^5*c^3*g^2*1^2 - 2*a^5*c^3*h^2*k^2 - 2*a^5*c^3*f^2*m^2 - 6*a^4*c^4*f^2*k^2 - 6*a^4*c^4*d^2*m^2 - 2*a^4*c^4*g^2*j^2 - 2*a^4*c^4*e^2*1^2 - 6*a^3*c^5*e^2*j^2 - 2*a^3*c^5*d^2*k^2 - 2*a^3*c^5*f^2*h^2 - a*b*c^6*e^2*f^2 - 6*a^2*c^6*d^2*h^2 - 2*a^2*c^6*e^2*g^2 - a^4*b^2*c^2*h^2*k^2 - a^3*b^3*c^2*g^2*k^2 - a^3*b^2*c^3*g^2*j^2 - a^2*b^4*c^2*f^2*k^2 - a^2*b^3*c^3*f^2*j^2 - a^2*b^2*c^4*f^2*h^2 - 2*a^7*c*k^2*m^2 + 4*a^5*c^3*h^3*m - 2*a^6*b^2*h*m^3 + 4*a^6*c^2*g*1^3 + 4*a^4*c^4*g^3*1 - 2*b^4*c^4*d^3*m + 2*a^5*b^3*f*m^3 - 4*a^6*c^2*d*m^3 + 4*a^5*c^3*f*k^3 + 4*a^3*c^5*f^3*k - 4*a^2*c^6*d^3*m + 2*b^3*c^5*d^3*k - 2*a^4*b^4*d*m^3 + 4*a^4*c^4*e*j^3 + 4*a^2*c^6*e^3*j - 2*b^2*c^6*d^3*h + 4*a^3*c^5*d*h^3 - 2*a*c^7*d^2*f^2 - a^6*b^2*k^2*m^2 - a^5*b^3*j^2*m^2 - a^4*b^4*h^2*m^2 - a^3*b^5*g^2*m^2 - a^2*b^6*f^2*m^2 - b^6*c^2*d^2*k^2 - b^5*c^3*d^2*j^2 - b^4*c^4*d^2*h^2 - b^3*c^5*d^2*g^2 - b^2*c^6*d^2*f^2 - a^7*b*1^2*m^2 - b^7*c*d^2*1^2 - a*b^7*e^2*m^2 - b*c^7*d^2*e^2 - b^8*d^2*m^2 - a^6*c^2*k^4 - a^5*c^3*j^4 - a^4*c^4*h^4 - a^3*c^5*g^4 - a^2*c^6*f^4 - a^7*c*1^4 - a*c^7*e^4 - a^8*m^4 - c^8*d^4, z, k1), k1, 1, 4) + (1*x^4)/(4*c) + (m*x^5)/(5*c)
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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**4+b*x**2+a),x)

[Out] Timed out

$$3.26 \quad \int \frac{d+ex}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=94

$$\frac{dx(17-5x^2)}{72(x^4-5x^2+4)} + \frac{19}{432}d \tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}d \tanh^{-1}(x) + \frac{1}{27}e \log(1-x^2) - \frac{1}{27}e \log(4-x^2) + \frac{e(5-2x^2)}{18(x^4-5x^2+4)}$$

[Out] 1/72*d*x*(-5*x^2+17)/(x^4-5*x^2+4)+1/18*e*(-2*x^2+5)/(x^4-5*x^2+4)+19/432*d*arctanh(1/2*x)-1/54*d*arctanh(x)+1/27*e*ln(-x^2+1)-1/27*e*ln(-x^2+4)

Rubi [A] time = 0.05, antiderivative size = 94, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 9, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.500$, Rules used = {1673, 12, 1092, 1166, 207, 1107, 614, 616, 31}

$$\frac{dx(17-5x^2)}{72(x^4-5x^2+4)} + \frac{19}{432}d \tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}d \tanh^{-1}(x) + \frac{e(5-2x^2)}{18(x^4-5x^2+4)} + \frac{1}{27}e \log(1-x^2) - \frac{1}{27}e \log(4-x^2)$$

Antiderivative was successfully verified.

[In] Int[(d + e*x)/(4 - 5*x^2 + x^4)^2,x]

[Out] (d*x*(17 - 5*x^2))/(72*(4 - 5*x^2 + x^4)) + (e*(5 - 2*x^2))/(18*(4 - 5*x^2 + x^4)) + (19*d*ArcTanh[x/2])/432 - (d*ArcTanh[x])/54 + (e*Log[1 - x^2])/27 - (e*Log[4 - x^2])/27

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 31

Int[((a_) + (b_.)*(x_))^-1, x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_.)*(x_)^2)^-1, x_Symbol] := -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a, 0] || GtQ[b, 0])

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)
*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := With[{q = Rt[b^2
- 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 1092

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := -Simp[(x*(b^2 -
2*a*c + b*c*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)),
x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(b^2 - 2*a*c + 2*(p + 1)*(b^2
- 4*a*c) + b*c*(4*p + 7)*x^2)*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ
[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2,
Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{d+ex}{(4-5x^2+x^4)^2} dx &= \int \frac{d}{(4-5x^2+x^4)^2} dx + \int \frac{ex}{(4-5x^2+x^4)^2} dx \\
&= d \int \frac{1}{(4-5x^2+x^4)^2} dx + e \int \frac{x}{(4-5x^2+x^4)^2} dx \\
&= \frac{dx(17-5x^2)}{72(4-5x^2+x^4)} - \frac{1}{72}d \int \frac{-1+5x^2}{4-5x^2+x^4} dx + \frac{1}{2}e \operatorname{Subst} \left(\int \frac{1}{(4-5x+x^2)^2} dx, x, x^2 \right) \\
&= \frac{dx(17-5x^2)}{72(4-5x^2+x^4)} + \frac{e(5-2x^2)}{18(4-5x^2+x^4)} + \frac{1}{54}d \int \frac{1}{-1+x^2} dx - \frac{1}{216}(19d) \int \frac{1}{-4+x^2} dx \\
&= \frac{dx(17-5x^2)}{72(4-5x^2+x^4)} + \frac{e(5-2x^2)}{18(4-5x^2+x^4)} + \frac{19}{432}d \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54}d \tanh^{-1}(x) - \frac{1}{27}e \operatorname{Sub} \\
&= \frac{dx(17-5x^2)}{72(4-5x^2+x^4)} + \frac{e(5-2x^2)}{18(4-5x^2+x^4)} + \frac{19}{432}d \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54}d \tanh^{-1}(x) + \frac{1}{27}e \log
\end{aligned}$$

Mathematica [A] time = 0.05, size = 90, normalized size = 0.96

$$\frac{1}{864} \left(\frac{12(dx(17-5x^2) + e(20-8x^2))}{x^4-5x^2+4} + 8(d+4e)\log(1-x) - (19d+32e)\log(2-x) - 8(d-4e)\log(x+1) + \right.$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x)/(4 - 5*x^2 + x^4)^2, x]

[Out] ((12*(e*(20 - 8*x^2) + d*x*(17 - 5*x^2)))/(4 - 5*x^2 + x^4) + 8*(d + 4*e)*Log[1 - x] - (19*d + 32*e)*Log[2 - x] - 8*(d - 4*e)*Log[1 + x] + (19*d - 32*e)*Log[2 + x])/864

fricas [B] time = 1.32, size = 169, normalized size = 1.80

$$\frac{60 dx^3 + 96 ex^2 - 204 dx - ((19d - 32e)x^4 - 5(19d - 32e)x^2 + 76d - 128e)\log(x+2) + 8((d-4e)x^4 - 5(d-4e)x^2 + 4d)}{864}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/864*(60*d*x^3 + 96*e*x^2 - 204*d*x - ((19*d - 32*e)*x^4 - 5*(19*d - 32*e)*x^2 + 76*d - 128*e)*log(x + 2) + 8*((d - 4*e)*x^4 - 5*(d - 4*e)*x^2 + 4*d

$$- 16*e)*\log(x + 1) - 8*((d + 4*e)*x^4 - 5*(d + 4*e)*x^2 + 4*d + 16*e)*\log(x - 1) + ((19*d + 32*e)*x^4 - 5*(19*d + 32*e)*x^2 + 76*d + 128*e)*\log(x - 2) - 240*e)/(x^4 - 5*x^2 + 4)$$

giac [A] time = 0.23, size = 93, normalized size = 0.99

$$\frac{1}{864} (19d - 32e) \log(|x + 2|) - \frac{1}{108} (d - 4e) \log(|x + 1|) + \frac{1}{108} (d + 4e) \log(|x - 1|) - \frac{1}{864} (19d + 32e) \log(|x - 2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] 1/864*(19*d - 32*e)*log(abs(x + 2)) - 1/108*(d - 4*e)*log(abs(x + 1)) + 1/108*(d + 4*e)*log(abs(x - 1)) - 1/864*(19*d + 32*e)*log(abs(x - 2)) - 1/72*(5*d*x^3 + 8*x^2*e - 17*d*x - 20*e)/(x^4 - 5*x^2 + 4)

maple [A] time = 0.02, size = 122, normalized size = 1.30

$$\frac{19d \ln(x+2)}{864} - \frac{19d \ln(x-2)}{864} + \frac{d \ln(x-1)}{108} - \frac{d \ln(x+1)}{108} - \frac{e \ln(x+2)}{27} - \frac{e \ln(x-2)}{27} + \frac{e \ln(x-1)}{27} + \frac{e \ln(x+1)}{27} - \frac{5dx^3 + 8x^2e - 17dx - 20e}{144(x^4 - 5x^2 + 4)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x+d)/(x^4-5*x^2+4)^2,x)

[Out] -19/864*d*ln(x-2)-1/27*e*ln(x-2)-1/144/(x-2)*d-1/72/(x-2)*e-1/108*d*ln(x+1)+1/27*e*ln(x+1)-1/36/(x+1)*d+1/36/(x+1)*e-1/36/(x-1)*d-1/36/(x-1)*e+1/108*d*ln(x-1)+1/27*e*ln(x-1)-1/144/(x+2)*d+1/72/(x+2)*e+19/864*d*ln(x+2)-1/27*e*ln(x+2)

maxima [A] time = 1.68, size = 83, normalized size = 0.88

$$\frac{1}{864} (19d - 32e) \log(x + 2) - \frac{1}{108} (d - 4e) \log(x + 1) + \frac{1}{108} (d + 4e) \log(x - 1) - \frac{1}{864} (19d + 32e) \log(x - 2) - \frac{5d}{144} \frac{5dx^3 + 8x^2e - 17dx - 20e}{x^4 - 5x^2 + 4}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] 1/864*(19*d - 32*e)*log(x + 2) - 1/108*(d - 4*e)*log(x + 1) + 1/108*(d + 4*e)*log(x - 1) - 1/864*(19*d + 32*e)*log(x - 2) - 1/72*(5*d*x^3 + 8*e*x^2 - 17*d*x - 20*e)/(x^4 - 5*x^2 + 4)

mupad [B] time = 0.09, size = 84, normalized size = 0.89

$$\ln(x - 1) \left(\frac{d}{108} + \frac{e}{27} \right) - \ln(x + 1) \left(\frac{d}{108} - \frac{e}{27} \right) - \ln(x - 2) \left(\frac{19d}{864} + \frac{e}{27} \right) + \ln(x + 2) \left(\frac{19d}{864} - \frac{e}{27} \right) + \frac{-\frac{5dx^3}{72} - \frac{ex^2}{9} + \frac{17dx}{144} - \frac{20e}{144}}{x^4 - 5x^2 + 4}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((d + e*x)/(x^4 - 5*x^2 + 4)^2,x)`

[Out] $\log(x - 1)*(d/108 + e/27) - \log(x + 1)*(d/108 - e/27) - \log(x - 2)*((19*d)/864 + e/27) + \log(x + 2)*((19*d)/864 - e/27) + ((5*e)/18 + (17*d*x)/72 - (5*d*x^3)/72 - (e*x^2)/9)/(x^4 - 5*x^2 + 4)$

sympy [B] time = 3.57, size = 604, normalized size = 6.43

$$(d - 4e) \log\left(x + \frac{-6006260d^4e + 2341251d^4(d-4e) - 18247680d^2e^3 + 24099840d^2e^2(d-4e) + 7387904d^2e(d-4e)^2 - 665280d^2(d-4e)^3 + 587202560e}{1675971d^5 - 66150400d^3e^2 + 318767104de^4}\right)$$

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Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)/(x**4-5*x**2+4)**2,x)`

[Out] $-(d - 4e)*\log(x + (-6006260*d**4*e + 2341251*d**4*(d - 4e) - 18247680*d**2*e**3 + 24099840*d**2*e**2*(d - 4e) + 7387904*d**2*e*(d - 4e)**2 - 665280*d**2*(d - 4e)**3 + 587202560*e**5 - 12582912*e**4*(d - 4e) - 36700160*e**3*(d - 4e)**2 + 786432*e**2*(d - 4e)**3)/(1675971*d**5 - 66150400*d**3*e**2 + 318767104*d*e**4))/108 + (d + 4e)*\log(x + (-6006260*d**4*e - 2341251*d**4*(d + 4e) - 18247680*d**2*e**3 - 24099840*d**2*e**2*(d + 4e) + 7387904*d**2*e*(d + 4e)**2 + 665280*d**2*(d + 4e)**3 + 587202560*e**5 + 12582912*e**4*(d + 4e) - 36700160*e**3*(d + 4e)**2 - 786432*e**2*(d + 4e)**3)/(1675971*d**5 - 66150400*d**3*e**2 + 318767104*d*e**4))/108 + (19*d - 32*e)*\log(x + (-6006260*d**4*e - 2341251*d**4*(19*d - 32*e)/8 - 18247680*d**2*e**3 - 3012480*d**2*e**2*(19*d - 32*e) + 115436*d**2*e*(19*d - 32*e)**2 + 10395*d**2*(19*d - 32*e)**3/8 + 587202560*e**5 + 1572864*e**4*(19*d - 32*e) - 573440*e**3*(19*d - 32*e)**2 - 1536*e**2*(19*d - 32*e)**3)/(1675971*d**5 - 66150400*d**3*e**2 + 318767104*d*e**4))/864 - (19*d + 32*e)*\log(x + (-6006260*d**4*e + 2341251*d**4*(19*d + 32*e)/8 - 18247680*d**2*e**3 + 3012480*d**2*e**2*(19*d + 32*e) + 115436*d**2*e*(19*d + 32*e)**2 - 10395*d**2*(19*d + 32*e)**3/8 + 587202560*e**5 - 1572864*e**4*(19*d + 32*e) - 573440*e**3*(19*d + 32*e)**2 + 1536*e**2*(19*d + 32*e)**3)/(1675971*d**5 - 66150400*d**3*e**2 + 318767104*d*e**4))/864 + (-5*d*x**3 + 17*d*x - 8*e*x**2 + 20*e)/(72*x**4 - 360*x**2 + 288)$

$$3.27 \quad \int \frac{d+ex+fx^2}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=115

$$\frac{x(-x^2(5d+8f)+17d+20f)}{72(x^4-5x^2+4)} + \frac{1}{432}(19d+52f)\tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}(d+7f)\tanh^{-1}(x) + \frac{1}{27}e\log(1-x^2) - \frac{1}{27}e\log(4-x^2)$$

[Out] 1/18*e*(-2*x^2+5)/(x^4-5*x^2+4)+1/72*x*(17*d+20*f-(5*d+8*f)*x^2)/(x^4-5*x^2+4)+1/432*(19*d+52*f)*arctanh(1/2*x)-1/54*(d+7*f)*arctanh(x)+1/27*e*ln(-x^2+1)-1/27*e*ln(-x^2+4)

Rubi [A] time = 0.14, antiderivative size = 115, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.391$, Rules used = {1673, 1178, 1166, 207, 12, 1107, 614, 616, 31}

$$\frac{x(x^2(-5d+8f)+17d+20f)}{72(x^4-5x^2+4)} + \frac{1}{432}(19d+52f)\tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}(d+7f)\tanh^{-1}(x) + \frac{e(5-2x^2)}{18(x^4-5x^2+4)} + \frac{1}{27}e\log(4-x^2)$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4)^2,x]

[Out] (e*(5 - 2*x^2))/(18*(4 - 5*x^2 + x^4)) + (x*(17*d + 20*f - (5*d + 8*f)*x^2))/(72*(4 - 5*x^2 + x^4)) + ((19*d + 52*f)*ArcTanh[x/2])/432 - ((d + 7*f)*ArcTanh[x])/54 + (e*Log[1 - x^2])/27 - (e*Log[4 - x^2])/27

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 31

Int[((a_) + (b_.)*(x_))^-1, x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_.)*(x_)^2)^-1, x_Symbol] := -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a, 0] || GtQ[b, 0])

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)
*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := With[{q = Rt[b^2
- 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Dist[1/2,
Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/((2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x]] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{ex}{(4 - 5x^2 + x^4)^2} dx + \int \frac{d + fx^2}{(4 - 5x^2 + x^4)^2} dx \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72} \int \frac{-d + 20f + (5d + 8f)x^2}{4 - 5x^2 + x^4} dx + e \int \frac{x}{(4 - 5x^2 + x^4)^2} dx \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{(4 - 5x + x^2)^2} dx, x, x^2 \right) - \frac{1}{54} (-d - 7f) \int \frac{1}{4 - 5x^2 + x^4} dx \\
&= \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432} (19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54} (d + 7f) \int \frac{1}{4 - 5x^2 + x^4} dx \\
&= \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432} (19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54} (d + 7f) \int \frac{1}{4 - 5x^2 + x^4} dx \\
&= \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432} (19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54} (d + 7f) \int \frac{1}{4 - 5x^2 + x^4} dx
\end{aligned}$$

Mathematica [A] time = 0.08, size = 112, normalized size = 0.97

$$\frac{1}{864} \left(\frac{12(-5dx^3 + 17dx + e(20 - 8x^2) - 8fx^3 + 20fx)}{x^4 - 5x^2 + 4} + 8 \log(1 - x)(d + 4e + 7f) - \log(2 - x)(19d + 32e + 52f) - 4e + 7f \right)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4)^2, x]

[Out] ((12*(17*d*x + 20*f*x - 5*d*x^3 - 8*f*x^3 + e*(20 - 8*x^2)))/(4 - 5*x^2 + x^4) + 8*(d + 4*e + 7*f)*Log[1 - x] - (19*d + 32*e + 52*f)*Log[2 - x] - 8*(d - 4*e + 7*f)*Log[1 + x] + (19*d - 32*e + 52*f)*Log[2 + x])/864

fricas [B] time = 1.46, size = 217, normalized size = 1.89

$$\frac{12(5d + 8f)x^3 + 96ex^2 - 12(17d + 20f)x - ((19d - 32e + 52f)x^4 - 5(19d - 32e + 52f)x^2 + 76d - 128e + 128f)}{864}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] $-1/864*(12*(5*d + 8*f)*x^3 + 96*e*x^2 - 12*(17*d + 20*f)*x - ((19*d - 32*e + 52*f)*x^4 - 5*(19*d - 32*e + 52*f)*x^2 + 76*d - 128*e + 208*f)*\log(x + 2) + 8*((d - 4*e + 7*f)*x^4 - 5*(d - 4*e + 7*f)*x^2 + 4*d - 16*e + 28*f)*\log(x + 1) - 8*((d + 4*e + 7*f)*x^4 - 5*(d + 4*e + 7*f)*x^2 + 4*d + 16*e + 28*f)*\log(x - 1) + ((19*d + 32*e + 52*f)*x^4 - 5*(19*d + 32*e + 52*f)*x^2 + 76*d + 128*e + 208*f)*\log(x - 2) - 240*e)/(x^4 - 5*x^2 + 4)$

giac [A] time = 0.25, size = 115, normalized size = 1.00

$$\frac{1}{864} (19d + 52f - 32e) \log(|x + 2|) - \frac{1}{108} (d + 7f - 4e) \log(|x + 1|) + \frac{1}{108} (d + 7f + 4e) \log(|x - 1|) - \frac{1}{864} (19d + 52f + 32e) \log(|x - 2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")`

[Out] $1/864*(19*d + 52*f - 32*e)*\log(\text{abs}(x + 2)) - 1/108*(d + 7*f - 4*e)*\log(\text{abs}(x + 1)) + 1/108*(d + 7*f + 4*e)*\log(\text{abs}(x - 1)) - 1/864*(19*d + 52*f + 32*e)*\log(\text{abs}(x - 2)) - 1/72*(5*d*x^3 + 8*f*x^3 + 8*x^2*e - 17*d*x - 20*f*x - 20*e)/(x^4 - 5*x^2 + 4)$

maple [A] time = 0.02, size = 182, normalized size = 1.58

$$\frac{19d \ln(x + 2)}{864} - \frac{19d \ln(x - 2)}{864} + \frac{d \ln(x - 1)}{108} - \frac{d \ln(x + 1)}{108} - \frac{e \ln(x + 2)}{27} - \frac{e \ln(x - 2)}{27} + \frac{e \ln(x - 1)}{27} + \frac{e \ln(x + 1)}{27} + \frac{13}{864} (19d + 52f - 32e) \log(|x + 2|) - \frac{1}{108} (d + 7f - 4e) \log(|x + 1|) + \frac{1}{108} (d + 7f + 4e) \log(|x - 1|) - \frac{1}{864} (19d + 52f + 32e) \log(|x - 2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)`

[Out] $-19/864*d*\ln(x-2)-1/27*e*\ln(x-2)-13/216*f*\ln(x-2)-1/144/(x-2)*d-1/72/(x-2)*e-1/36/(x-2)*f-1/108*d*\ln(x+1)+1/27*e*\ln(x+1)-7/108*f*\ln(x+1)-1/36/(x+1)*d+1/36/(x+1)*e-1/36/(x+1)*f-1/36/(x-1)*d-1/36/(x-1)*e-1/36/(x-1)*f+1/108*d*\ln(x-1)+1/27*e*\ln(x-1)+7/108*f*\ln(x-1)-1/144/(x+2)*d+1/72/(x+2)*e-1/36/(x+2)*f+19/864*d*\ln(x+2)-1/27*e*\ln(x+2)+13/216*f*\ln(x+2)$

maxima [A] time = 1.07, size = 106, normalized size = 0.92

$$\frac{1}{864} (19d - 32e + 52f) \log(x + 2) - \frac{1}{108} (d - 4e + 7f) \log(x + 1) + \frac{1}{108} (d + 4e + 7f) \log(x - 1) - \frac{1}{864} (19d + 52f + 32e) \log(x - 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")`

[Out] $1/864*(19*d - 32*e + 52*f)*\log(x + 2) - 1/108*(d - 4*e + 7*f)*\log(x + 1) + 1/108*(d + 4*e + 7*f)*\log(x - 1) - 1/864*(19*d + 32*e + 52*f)*\log(x - 2) - 1/72*((5*d + 8*f)*x^3 + 8*e*x^2 - (17*d + 20*f)*x - 20*e)/(x^4 - 5*x^2 + 4)$

mupad [B] time = 0.10, size = 107, normalized size = 0.93

$$\ln(x-1) \left(\frac{d}{108} + \frac{e}{27} + \frac{7f}{108} \right) - \ln(x+1) \left(\frac{d}{108} - \frac{e}{27} + \frac{7f}{108} \right) - \ln(x-2) \left(\frac{19d}{864} + \frac{e}{27} + \frac{13f}{216} \right) + \ln(x+2) \left(\frac{19d}{864} - \frac{e}{27} + \frac{13f}{216} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((d + e*x + f*x^2)/(x^4 - 5*x^2 + 4)^2,x)`

[Out] $\log(x - 1)*(d/108 + e/27 + (7*f)/108) - \log(x + 1)*(d/108 - e/27 + (7*f)/108) - \log(x - 2)*((19*d)/864 + e/27 + (13*f)/216) + \log(x + 2)*((19*d)/864 - e/27 + (13*f)/216) + ((5*e)/18 - x^3*((5*d)/72 + f/9) - (e*x^2)/9 + x*((17*d)/72 + (5*f)/18))/(x^4 - 5*x^2 + 4)$

sympy [B] time = 118.43, size = 2689, normalized size = 23.38

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)`

[Out] $-(d - 4*e + 7*f)*\log(x + (-6006260*d**5*e + 2341251*d**5*(d - 4*e + 7*f) - 246016240*d**4*e*f + 31626180*d**4*f*(d - 4*e + 7*f) - 18247680*d**3*e**3 + 24099840*d**3*e**2*(d - 4*e + 7*f) - 2758371200*d**3*e*f**2 + 7387904*d**3*e*(d - 4*e + 7*f)**2 + 171122976*d**3*f**2*(d - 4*e + 7*f) - 665280*d**3*(d - 4*e + 7*f)**3 + 298598400*d**2*e**3*f + 369487872*d**2*e**2*f*(d - 4*e + 7*f) - 13192256000*d**2*e*f**3 + 90885120*d**2*e*f*(d - 4*e + 7*f)**2 + 441486720*d**2*f**3*(d - 4*e + 7*f) - 5536512*d**2*f*(d - 4*e + 7*f)**3 + 587202560*d*e**5 - 12582912*d*e**4*(d - 4*e + 7*f) + 1353646080*d*e**3*f**2 - 36700160*d*e**3*(d - 4*e + 7*f)**2 + 1448755200*d*e**2*f**2*(d - 4*e + 7*f) + 786432*d*e**2*(d - 4*e + 7*f)**3 - 28282393600*d*e*f**4 + 362729472*d*e*f**2*(d - 4*e + 7*f)**2 + 399575808*d*f**4*(d - 4*e + 7*f) - 10368000*d*f**2*(d - 4*e + 7*f)**3 + 2751463424*e**5*f + 251658240*e**4*f*(d - 4*e + 7*f) - 530841600*e**3*f**3 - 171966464*e**3*f*(d - 4*e + 7*f)**2 + 1935212544*e**2*f**3*(d - 4*e + 7*f) - 15728640*e**2*f*(d - 4*e + 7*f)**3 - 2188688984*e*f**5 + 483737600*e*f**3*(d - 4*e + 7*f)**2 - 212474880*f**5*(d - 4*e + 7*f) + 4534272*f**3*(d - 4*e + 7*f)**3)/(1675971*d**6 + 28507545*d**5*f - 66150400*d**4*e**2 + 168075324*d**4*f**2 - 1091117056*d**3*e**2*f + 384095520*d**3*f**3 + 318767104*d**2*e**4 - 6528860160*d**2*e**2*f**2 + 162082944*d**2*f**4 + 3103784960*d*e**4*f - 17414619136*d*e**2*f**3 - 305130240*d*f**5 + 6106906624*e**4*f**2 - 17414225920*e**2*f**4 + 67931136*f**6))/108 + (d$

$$\begin{aligned}
& + 4*e + 7*f) * \log(x + (-6006260*d^{**5}*e - 2341251*d^{**5}*(d + 4*e + 7*f) - 2460 \\
& 16240*d^{**4}*e*f - 31626180*d^{**4}*f*(d + 4*e + 7*f) - 18247680*d^{**3}*e^{**3} - 240 \\
& 99840*d^{**3}*e^{**2}*(d + 4*e + 7*f) - 2758371200*d^{**3}*e*f^{**2} + 7387904*d^{**3}*e*(\\
& d + 4*e + 7*f)^{**2} - 171122976*d^{**3}*f^{**2}*(d + 4*e + 7*f) + 665280*d^{**3}*(d + \\
& 4*e + 7*f)^{**3} + 298598400*d^{**2}*e^{**3}*f - 369487872*d^{**2}*e^{**2}*f*(d + 4*e + 7* \\
& f) - 13192256000*d^{**2}*e*f^{**3} + 90885120*d^{**2}*e*f*(d + 4*e + 7*f)^{**2} - 44148 \\
& 6720*d^{**2}*f^{**3}*(d + 4*e + 7*f) + 5536512*d^{**2}*f*(d + 4*e + 7*f)^{**3} + 587202 \\
& 560*d*e^{**5} + 12582912*d*e^{**4}*(d + 4*e + 7*f) + 1353646080*d*e^{**3}*f^{**2} - 367 \\
& 00160*d*e^{**3}*(d + 4*e + 7*f)^{**2} - 1448755200*d*e^{**2}*f^{**2}*(d + 4*e + 7*f) - \\
& 786432*d*e^{**2}*(d + 4*e + 7*f)^{**3} - 28282393600*d*e*f^{**4} + 362729472*d*e*f^{** \\
& 2}*(d + 4*e + 7*f)^{**2} - 399575808*d*f^{**4}*(d + 4*e + 7*f) + 10368000*d*f^{**2}*(\\
& d + 4*e + 7*f)^{**3} + 2751463424*e^{**5}*f - 251658240*e^{**4}*f*(d + 4*e + 7*f) - \\
& 530841600*e^{**3}*f^{**3} - 171966464*e^{**3}*f*(d + 4*e + 7*f)^{**2} - 1935212544*e^{**2} \\
& *f^{**3}*(d + 4*e + 7*f) + 15728640*e^{**2}*f*(d + 4*e + 7*f)^{**3} - 21886889984*e* \\
& f^{**5} + 483737600*e*f^{**3}*(d + 4*e + 7*f)^{**2} + 212474880*f^{**5}*(d + 4*e + 7*f) \\
& - 4534272*f^{**3}*(d + 4*e + 7*f)^{**3}) / (1675971*d^{**6} + 28507545*d^{**5}*f - 66150 \\
& 400*d^{**4}*e^{**2} + 168075324*d^{**4}*f^{**2} - 1091117056*d^{**3}*e^{**2}*f + 384095520*d* \\
& *3*f^{**3} + 318767104*d^{**2}*e^{**4} - 6528860160*d^{**2}*e^{**2}*f^{**2} + 162082944*d^{**2} \\
& f^{**4} + 3103784960*d*e^{**4}*f - 17414619136*d*e^{**2}*f^{**3} - 305130240*d*f^{**5} + 6 \\
& 106906624*e^{**4}*f^{**2} - 17414225920*e^{**2}*f^{**4} + 67931136*f^{**6}) / 108 + (19*d - \\
& 32*e + 52*f) * \log(x + (-6006260*d^{**5}*e - 2341251*d^{**5}*(19*d - 32*e + 52*f) / \\
& 8 - 246016240*d^{**4}*e*f - 7906545*d^{**4}*f*(19*d - 32*e + 52*f) / 2 - 18247680*d \\
& **3*e^{**3} - 3012480*d^{**3}*e^{**2}*(19*d - 32*e + 52*f) - 2758371200*d^{**3}*e*f^{**2} \\
& + 115436*d^{**3}*e*(19*d - 32*e + 52*f)^{**2} - 21390372*d^{**3}*f^{**2}*(19*d - 32*e + \\
& 52*f) + 10395*d^{**3}*(19*d - 32*e + 52*f)^{**3} / 8 + 298598400*d^{**2}*e^{**3}*f - 461 \\
& 85984*d^{**2}*e^{**2}*f*(19*d - 32*e + 52*f) - 13192256000*d^{**2}*e*f^{**3} + 1420080* \\
& d^{**2}*e*f*(19*d - 32*e + 52*f)^{**2} - 55185840*d^{**2}*f^{**3}*(19*d - 32*e + 52*f) \\
& + 21627*d^{**2}*f*(19*d - 32*e + 52*f)^{**3} / 2 + 587202560*d*e^{**5} + 1572864*d*e^{** \\
& 4}*(19*d - 32*e + 52*f) + 1353646080*d*e^{**3}*f^{**2} - 573440*d*e^{**3}*(19*d - 32* \\
& e + 52*f)^{**2} - 181094400*d*e^{**2}*f^{**2}*(19*d - 32*e + 52*f) - 1536*d*e^{**2}*(19 \\
& *d - 32*e + 52*f)^{**3} - 28282393600*d*e*f^{**4} + 5667648*d*e*f^{**2}*(19*d - 32*e \\
& + 52*f)^{**2} - 49946976*d*f^{**4}*(19*d - 32*e + 52*f) + 20250*d*f^{**2}*(19*d - 3 \\
& 2*e + 52*f)^{**3} + 2751463424*e^{**5}*f - 31457280*e^{**4}*f*(19*d - 32*e + 52*f) - \\
& 530841600*e^{**3}*f^{**3} - 2686976*e^{**3}*f*(19*d - 32*e + 52*f)^{**2} - 241901568*e \\
& **2*f^{**3}*(19*d - 32*e + 52*f) + 30720*e^{**2}*f*(19*d - 32*e + 52*f)^{**3} - 2188 \\
& 6889984*e*f^{**5} + 7558400*e*f^{**3}*(19*d - 32*e + 52*f)^{**2} + 26559360*f^{**5}*(19 \\
& *d - 32*e + 52*f) - 8856*f^{**3}*(19*d - 32*e + 52*f)^{**3}) / (1675971*d^{**6} + 2850 \\
& 7545*d^{**5}*f - 66150400*d^{**4}*e^{**2} + 168075324*d^{**4}*f^{**2} - 1091117056*d^{**3}*e* \\
& *2*f + 384095520*d^{**3}*f^{**3} + 318767104*d^{**2}*e^{**4} - 6528860160*d^{**2}*e^{**2}*f^{** \\
& 2} + 162082944*d^{**2}*f^{**4} + 3103784960*d*e^{**4}*f - 17414619136*d*e^{**2}*f^{**3} - 3 \\
& 05130240*d*f^{**5} + 6106906624*e^{**4}*f^{**2} - 17414225920*e^{**2}*f^{**4} + 67931136*f \\
& **6) / 864 - (19*d + 32*e + 52*f) * \log(x + (-6006260*d^{**5}*e + 2341251*d^{**5}*(1 \\
& 9*d + 32*e + 52*f) / 8 - 246016240*d^{**4}*e*f + 7906545*d^{**4}*f*(19*d + 32*e + 5 \\
& 2*f) / 2 - 18247680*d^{**3}*e^{**3} + 3012480*d^{**3}*e^{**2}*(19*d + 32*e + 52*f) - 2758 \\
& 371200*d^{**3}*e*f^{**2} + 115436*d^{**3}*e*(19*d + 32*e + 52*f)^{**2} + 21390372*d^{**3}*
\end{aligned}$$

$$\begin{aligned}
& f^{**2}*(19*d + 32*e + 52*f) - 10395*d^{**3}*(19*d + 32*e + 52*f)^{**3}/8 + 29859840 \\
& 0*d^{**2}*e^{**3}*f + 46185984*d^{**2}*e^{**2}*f*(19*d + 32*e + 52*f) - 13192256000*d^{** \\
& 2}*e*f^{**3} + 1420080*d^{**2}*e*f*(19*d + 32*e + 52*f)^{**2} + 55185840*d^{**2}*f^{**3}*(1 \\
& 9*d + 32*e + 52*f) - 21627*d^{**2}*f*(19*d + 32*e + 52*f)^{**3}/2 + 587202560*d*e \\
& ^{**5} - 1572864*d*e^{**4}*(19*d + 32*e + 52*f) + 1353646080*d*e^{**3}*f^{**2} - 573440 \\
& *d*e^{**3}*(19*d + 32*e + 52*f)^{**2} + 181094400*d*e^{**2}*f^{**2}*(19*d + 32*e + 52*f \\
&) + 1536*d*e^{**2}*(19*d + 32*e + 52*f)^{**3} - 28282393600*d*e*f^{**4} + 5667648*d* \\
& e*f^{**2}*(19*d + 32*e + 52*f)^{**2} + 49946976*d*f^{**4}*(19*d + 32*e + 52*f) - 202 \\
& 50*d*f^{**2}*(19*d + 32*e + 52*f)^{**3} + 2751463424*e^{**5}*f + 31457280*e^{**4}*f*(19 \\
& *d + 32*e + 52*f) - 530841600*e^{**3}*f^{**3} - 2686976*e^{**3}*f*(19*d + 32*e + 52* \\
& f)^{**2} + 241901568*e^{**2}*f^{**3}*(19*d + 32*e + 52*f) - 30720*e^{**2}*f*(19*d + 32* \\
& e + 52*f)^{**3} - 21886889984*e*f^{**5} + 7558400*e*f^{**3}*(19*d + 32*e + 52*f)^{**2} \\
& - 26559360*f^{**5}*(19*d + 32*e + 52*f) + 8856*f^{**3}*(19*d + 32*e + 52*f)^{**3})/(\\
& 1675971*d^{**6} + 28507545*d^{**5}*f - 66150400*d^{**4}*e^{**2} + 168075324*d^{**4}*f^{**2} - \\
& 1091117056*d^{**3}*e^{**2}*f + 384095520*d^{**3}*f^{**3} + 318767104*d^{**2}*e^{**4} - 65288 \\
& 60160*d^{**2}*e^{**2}*f^{**2} + 162082944*d^{**2}*f^{**4} + 3103784960*d*e^{**4}*f - 17414619 \\
& 136*d*e^{**2}*f^{**3} - 305130240*d*f^{**5} + 6106906624*e^{**4}*f^{**2} - 17414225920*e^{** \\
& 2}*f^{**4} + 67931136*f^{**6}))/864 + (-8*e*x^{**2} + 20*e + x^{**3}*(-5*d - 8*f) + x*(1 \\
& 7*d + 20*f))/(72*x^{**4} - 360*x^{**2} + 288)
\end{aligned}$$

$$3.28 \quad \int \frac{d+ex+fx^2+gx^3}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=138

$$\frac{x(-x^2(5d+8f)+17d+20f)}{72(x^4-5x^2+4)} + \frac{1}{432}(19d+52f) \tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}(d+7f) \tanh^{-1}(x) + \frac{1}{54}(2e+5g) \log(1-x^2) - \frac{1}{54}(2e+5g) \log(4-x^2)$$

[Out] 1/72*x*(17*d+20*f-(5*d+8*f)*x^2)/(x^4-5*x^2+4)+1/18*(5*e+8*g-(2*e+5*g)*x^2)/(x^4-5*x^2+4)+1/432*(19*d+52*f)*arctanh(1/2*x)-1/54*(d+7*f)*arctanh(x)+1/54*(2*e+5*g)*ln(-x^2+1)-1/54*(2*e+5*g)*ln(-x^2+4)

Rubi [A] time = 0.15, antiderivative size = 138, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 8, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {1673, 1178, 1166, 207, 1247, 638, 616, 31}

$$\frac{x(x^2(-5d+8f)+17d+20f)}{72(x^4-5x^2+4)} + \frac{1}{432}(19d+52f) \tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}(d+7f) \tanh^{-1}(x) + \frac{x^2(-2e+5g)+5e+8g}{18(x^4-5x^2+4)}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3)/(4 - 5*x^2 + x^4)^2, x]

[Out] (x*(17*d + 20*f - (5*d + 8*f)*x^2))/(72*(4 - 5*x^2 + x^4)) + (5*e + 8*g - (2*e + 5*g)*x^2)/(18*(4 - 5*x^2 + x^4)) + ((19*d + 52*f)*ArcTanh[x/2])/432 - ((d + 7*f)*ArcTanh[x])/54 + ((2*e + 5*g)*Log[1 - x^2])/54 - ((2*e + 5*g)*Log[4 - x^2])/54

Rule 31

Int[((a_) + (b_.)*(x_))^-1, x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_.)*(x_)^2)^-1, x_Symbol] := -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a, 0] || GtQ[b, 0])

Rule 616

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^-1, x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q, Int[1/Simp[b/2 + q/2 + c*x, x], x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol]
:> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol]
:> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2 + c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol]
:> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol]
:> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol]
:> Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{d + fx^2}{(4 - 5x^2 + x^4)^2} dx + \int \frac{x(e + gx^2)}{(4 - 5x^2 + x^4)^2} dx \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72} \int \frac{-d + 20f + (5d + 8f)x^2}{4 - 5x^2 + x^4} dx + \frac{1}{2} \text{Subst} \left(\int \frac{1}{4 - 5x^2 + x^4} dx \right) \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} - \frac{1}{54}(-d - 7f) \int \frac{1}{-1 + x^2} dx \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{1}{432}(19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right) \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{1}{432}(19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right)
\end{aligned}$$

Mathematica [A] time = 0.05, size = 134, normalized size = 0.97

$$\frac{1}{864} \left(\frac{12(-5dx^3 + 17dx + e(20 - 8x^2) - 8fx^3 + 20fx - 4g(5x^2 - 8))}{x^4 - 5x^2 + 4} + 8 \log(1 - x)(d + 4e + 7f + 10g) - \log \left(\frac{x}{2} \right) \right)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(4 - 5*x^2 + x^4)^2, x]

[Out] ((12*(17*d*x + 20*f*x - 5*d*x^3 - 8*f*x^3 + e*(20 - 8*x^2) - 4*g*(-8 + 5*x^2)))/(4 - 5*x^2 + x^4) + 8*(d + 4*e + 7*f + 10*g)*Log[1 - x] - (19*d + 32*e + 52*f + 80*g)*Log[2 - x] - 8*(d - 4*e + 7*f - 10*g)*Log[1 + x] + (19*d - 32*e + 52*f - 80*g)*Log[2 + x])/864

fricas [B] time = 1.85, size = 262, normalized size = 1.90

$$\frac{12(5d + 8f)x^3 + 48(2e + 5g)x^2 - 12(17d + 20f)x - ((19d - 32e + 52f - 80g)x^4 - 5(19d - 32e + 52f - 80g))}{864}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/864*(12*(5*d + 8*f)*x^3 + 48*(2*e + 5*g)*x^2 - 12*(17*d + 20*f)*x - ((19*d - 32*e + 52*f - 80*g)*x^4 - 5*(19*d - 32*e + 52*f - 80*g)*x^2 + 76*d - 128*e + 208*f - 320*g)*log(x + 2) + 8*((d - 4*e + 7*f - 10*g)*x^4 - 5*(d - 4

$*e + 7*f - 10*g)*x^2 + 4*d - 16*e + 28*f - 40*g)*\log(x + 1) - 8*((d + 4*e + 7*f + 10*g)*x^4 - 5*(d + 4*e + 7*f + 10*g)*x^2 + 4*d + 16*e + 28*f + 40*g)*\log(x - 1) + ((19*d + 32*e + 52*f + 80*g)*x^4 - 5*(19*d + 32*e + 52*f + 80*g)*x^2 + 76*d + 128*e + 208*f + 320*g)*\log(x - 2) - 240*e - 384*g)/(x^4 - 5*x^2 + 4)$

giac [A] time = 0.25, size = 136, normalized size = 0.99

$$\frac{1}{864} (19d + 52f - 80g - 32e) \log(|x + 2|) - \frac{1}{108} (d + 7f - 10g - 4e) \log(|x + 1|) + \frac{1}{108} (d + 7f + 10g + 4e) \log(|x - 1|) - \frac{1}{864} (19d + 32e + 52f + 80g) \log(|x - 2|) - \frac{240e - 384g}{x^4 - 5x^2 + 4}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] $\frac{1}{864}*(19*d + 52*f - 80*g - 32*e)*\log(\text{abs}(x + 2)) - \frac{1}{108}*(d + 7*f - 10*g - 4*e)*\log(\text{abs}(x + 1)) + \frac{1}{108}*(d + 7*f + 10*g + 4*e)*\log(\text{abs}(x - 1)) - \frac{1}{864}*(19*d + 52*f + 80*g + 32*e)*\log(\text{abs}(x - 2)) - \frac{1}{72}*(5*d*x^3 + 8*f*x^3 + 20*g*x^2 + 8*x^2*e - 17*d*x - 20*f*x - 32*g - 20*e)/(x^4 - 5*x^2 + 4)$

maple [A] time = 0.02, size = 242, normalized size = 1.75

$$\frac{5g \ln(x-1)}{54} - \frac{5g \ln(x+2)}{54} - \frac{5g \ln(x-2)}{54} + \frac{5g \ln(x+1)}{54} + \frac{19d \ln(x+2)}{864} - \frac{e \ln(x+2)}{27} + \frac{e \ln(x-1)}{27} + \frac{d \ln(x-1)}{108} + \frac{e}{x^4 - 5x^2 + 4}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)

[Out] $\frac{5}{54}*g*\ln(x-1) - \frac{5}{54}*g*\ln(x+2) - \frac{5}{54}*g*\ln(x-2) + \frac{5}{54}*g*\ln(x+1) + \frac{19}{864}*d*\ln(x+2) - \frac{1}{27}*e*\ln(x+2) + \frac{1}{27}*e*\ln(x-1) + \frac{1}{108}*d*\ln(x-1) + \frac{1}{27}*e*\ln(x+1) - \frac{1}{108}*d*\ln(x+1) - \frac{19}{864}*d*\ln(x-2) - \frac{1}{27}*e*\ln(x-2) - \frac{13}{216}*f*\ln(x-2) - \frac{7}{108}*f*\ln(x+1) + \frac{7}{108}*f*\ln(x-1) + \frac{13}{216}*f*\ln(x+2) + \frac{1}{18}/(x+2)*g + \frac{1}{36}/(x+1)*g - \frac{1}{36}/(x-1)*g - \frac{1}{18}/(x-2)*g - \frac{1}{144}/(x+2)*d + \frac{1}{72}/(x+2)*e - \frac{1}{144}/(x-2)*d - \frac{1}{72}/(x-2)*e - \frac{1}{36}/(x+1)*d + \frac{1}{36}/(x+1)*e - \frac{1}{36}/(x-1)*d - \frac{1}{36}/(x-1)*e - \frac{1}{36}/(x-1)*f - \frac{1}{36}/(x+2)*f - \frac{1}{36}/(x-2)*f - \frac{1}{36}/(x+1)*f$

maxima [A] time = 0.97, size = 127, normalized size = 0.92

$$\frac{1}{864} (19d - 32e + 52f - 80g) \log(x + 2) - \frac{1}{108} (d - 4e + 7f - 10g) \log(x + 1) + \frac{1}{108} (d + 4e + 7f + 10g) \log(x - 1) - \frac{1}{864} (19d + 32e + 52f + 80g) \log(x - 2) - \frac{240e - 384g}{x^4 - 5x^2 + 4}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

```
[Out] 1/864*(19*d - 32*e + 52*f - 80*g)*log(x + 2) - 1/108*(d - 4*e + 7*f - 10*g)
*log(x + 1) + 1/108*(d + 4*e + 7*f + 10*g)*log(x - 1) - 1/864*(19*d + 32*e
+ 52*f + 80*g)*log(x - 2) - 1/72*((5*d + 8*f)*x^3 + 4*(2*e + 5*g)*x^2 - (17
*d + 20*f)*x - 20*e - 32*g)/(x^4 - 5*x^2 + 4)
```

mupad [B] time = 0.14, size = 128, normalized size = 0.93

$$\ln(x-1) \left(\frac{d}{108} + \frac{e}{27} + \frac{7f}{108} + \frac{5g}{54} \right) - \ln(x+1) \left(\frac{d}{108} - \frac{e}{27} + \frac{7f}{108} - \frac{5g}{54} \right) - \ln(x-2) \left(\frac{19d}{864} + \frac{e}{27} + \frac{13f}{216} + \frac{5g}{54} \right) +$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3)/(x^4 - 5*x^2 + 4)^2, x)
```

```
[Out] log(x - 1)*(d/108 + e/27 + (7*f)/108 + (5*g)/54) - log(x + 1)*(d/108 - e/27
+ (7*f)/108 - (5*g)/54) - log(x - 2)*((19*d)/864 + e/27 + (13*f)/216 + (5*
g)/54) + log(x + 2)*((19*d)/864 - e/27 + (13*f)/216 - (5*g)/54) + ((5*e)/18
+ (4*g)/9 - x^3*((5*d)/72 + f/9) - x^2*(e/9 + (5*g)/18) + x*((17*d)/72 + (
5*f)/18))/(x^4 - 5*x^2 + 4)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2, x)
```

```
[Out] Timed out
```

$$3.29 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=150

$$\frac{x \left(- \left(x^2(5d + 8f + 20h) \right) + 17d + 20f + 32h \right)}{72 \left(x^4 - 5x^2 + 4 \right)} + \frac{1}{432} \tanh^{-1} \left(\frac{x}{2} \right) (19d + 52f + 112h) - \frac{1}{54} \tanh^{-1}(x)(d + 7f + 13h) + \frac{1}{54} \ln(-x^2 + 1) - \frac{1}{54} \ln(-x^2 + 4)$$

[Out] 1/18*(5*e+8*g-(2*e+5*g)*x^2)/(x^4-5*x^2+4)+1/72*x*(17*d+20*f+32*h-(5*d+8*f+20*h)*x^2)/(x^4-5*x^2+4)+1/432*(19*d+52*f+112*h)*arctanh(1/2*x)-1/54*(d+7*f+13*h)*arctanh(x)+1/54*(2*e+5*g)*ln(-x^2+1)-1/54*(2*e+5*g)*ln(-x^2+4)

Rubi [A] time = 0.21, antiderivative size = 150, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 8, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.242$, Rules used = {1673, 1678, 1166, 207, 1247, 638, 616, 31}

$$\frac{x \left(x^2 \left(- (5d + 8f + 20h) \right) + 17d + 20f + 32h \right)}{72 \left(x^4 - 5x^2 + 4 \right)} + \frac{1}{432} \tanh^{-1} \left(\frac{x}{2} \right) (19d + 52f + 112h) - \frac{1}{54} \tanh^{-1}(x)(d + 7f + 13h) + \frac{1}{54} \ln(-x^2 + 1) - \frac{1}{54} \ln(-x^2 + 4)$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(4 - 5*x^2 + x^4)^2, x]

[Out] (5*e + 8*g - (2*e + 5*g)*x^2)/(18*(4 - 5*x^2 + x^4)) + (x*(17*d + 20*f + 32*h - (5*d + 8*f + 20*h)*x^2))/(72*(4 - 5*x^2 + x^4)) + ((19*d + 52*f + 112*h)*ArcTanh[x/2])/432 - ((d + 7*f + 13*h)*ArcTanh[x])/54 + ((2*e + 5*g)*Log[1 - x^2])/54 - ((2*e + 5*g)*Log[4 - x^2])/54

Rule 31

Int[((a_) + (b_.)*(x_))^-1, x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_.)*(x_)^2)^-1, x_Symbol] := -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a, 0] || GtQ[b, 0])

Rule 616

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^-1, x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q, Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol]
:> Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2 + c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol]
:> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol]
:> Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol]
:> With[{d = Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p + 7)*(b*d - 2*a*e)*x^2, x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{x(e + gx^2)}{(4 - 5x^2 + x^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^2} dx \\
&= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72} \int \frac{-d + 20f + 32h + (5d + 8f + 20h)x^2}{4 - 5x^2 + x^4} dx \\
&= \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{18}(-2e - 5g) \int \frac{1}{4 - 5x^2 + x^4} dx \\
&= \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432}(19d - 32e + 52f - 80g + 112h) \int \frac{1}{4 - 5x^2 + x^4} dx \\
&= \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432}(19d - 32e + 52f - 80g + 112h) \int \frac{1}{4 - 5x^2 + x^4} dx
\end{aligned}$$

Mathematica [A] time = 0.07, size = 159, normalized size = 1.06

$$\frac{1}{864} \left(-\frac{12(x(d(5x^2 - 17) + 4f(2x^2 - 5) + 4h(5x^2 - 8)) + 4e(2x^2 - 5) + 4g(5x^2 - 8))}{x^4 - 5x^2 + 4} + 8 \log(1 - x)(d + 4e + 7f + 10g + 13h) \right)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(4 - 5*x^2 + x^4)^2, x]

[Out] ((-12*(4*e*(-5 + 2*x^2) + 4*g*(-8 + 5*x^2) + x*(4*f*(-5 + 2*x^2) + d*(-17 + 5*x^2) + 4*h*(-8 + 5*x^2))))/(4 - 5*x^2 + x^4) + 8*(d + 4*e + 7*f + 10*g + 13*h)*Log[1 - x] - (19*d + 32*e + 52*f + 80*g + 112*h)*Log[2 - x] - 8*(d - 4*e + 7*f - 10*g + 13*h)*Log[1 + x] + (19*d - 32*e + 52*f - 80*g + 112*h)*Log[2 + x])/864

fricas [B] time = 5.40, size = 304, normalized size = 2.03

$$\frac{12(5d + 8f + 20h)x^3 + 48(2e + 5g)x^2 - 12(17d + 20f + 32h)x - ((19d - 32e + 52f - 80g + 112h)x^4 - 52f + 80g - 112h)}{(4 - 5x^2 + x^4)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] $-1/864*(12*(5*d + 8*f + 20*h)*x^3 + 48*(2*e + 5*g)*x^2 - 12*(17*d + 20*f + 32*h)*x - ((19*d - 32*e + 52*f - 80*g + 112*h)*x^4 - 5*(19*d - 32*e + 52*f - 80*g + 112*h)*x^2 + 76*d - 128*e + 208*f - 320*g + 448*h)*\log(x + 2) + 8*((d - 4*e + 7*f - 10*g + 13*h)*x^4 - 5*(d - 4*e + 7*f - 10*g + 13*h)*x^2 + 4*d - 16*e + 28*f - 40*g + 52*h)*\log(x + 1) - 8*((d + 4*e + 7*f + 10*g + 13*h)*x^4 - 5*(d + 4*e + 7*f + 10*g + 13*h)*x^2 + 4*d + 16*e + 28*f + 40*g + 52*h)*\log(x - 1) + ((19*d + 32*e + 52*f + 80*g + 112*h)*x^4 - 5*(19*d + 32*e + 52*f + 80*g + 112*h)*x^2 + 76*d + 128*e + 208*f + 320*g + 448*h)*\log(x - 2) - 240*e - 384*g)/(x^4 - 5*x^2 + 4)$

giac [A] time = 0.30, size = 158, normalized size = 1.05

$$\frac{1}{864} (19d + 52f - 80g + 112h - 32e) \log(|x + 2|) - \frac{1}{108} (d + 7f - 10g + 13h - 4e) \log(|x + 1|) + \frac{1}{108} (d + 7f - 10g + 13h + 4e) \log(|x - 1|) - \frac{1}{864} (19d + 52f + 80g + 112h + 32e) \log(|x - 2|) - \frac{1}{72} (5d*x^3 + 8f*x^3 + 20h*x^3 + 20g*x^2 + 8x^2*e - 17d*x - 20f*x - 32h*x - 32g - 20e)/(x^4 - 5x^2 + 4)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")`

[Out] $1/864*(19*d + 52*f - 80*g + 112*h - 32*e)*\log(\text{abs}(x + 2)) - 1/108*(d + 7*f - 10*g + 13*h - 4*e)*\log(\text{abs}(x + 1)) + 1/108*(d + 7*f + 10*g + 13*h + 4*e)*\log(\text{abs}(x - 1)) - 1/864*(19*d + 52*f + 80*g + 112*h + 32*e)*\log(\text{abs}(x - 2)) - 1/72*(5*d*x^3 + 8*f*x^3 + 20*h*x^3 + 20*g*x^2 + 8*x^2*e - 17*d*x - 20*f*x - 32*h*x - 32*g - 20*e)/(x^4 - 5*x^2 + 4)$

maple [B] time = 0.02, size = 302, normalized size = 2.01

$$\frac{7h \ln(x + 2)}{54} + \frac{13h \ln(x - 1)}{108} - \frac{13h \ln(x + 1)}{108} - \frac{7h \ln(x - 2)}{54} + \frac{5g \ln(x - 1)}{54} - \frac{5g \ln(x + 2)}{54} - \frac{5g \ln(x - 2)}{54} + \frac{5g \ln(x + 1)}{54}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)`

[Out] $7/54*h*\ln(x+2)+13/108*h*\ln(x-1)-13/108*h*\ln(x+1)-7/54*h*\ln(x-2)+5/54*g*\ln(x-1)-5/54*g*\ln(x+2)-5/54*g*\ln(x-2)+5/54*g*\ln(x+1)+19/864*d*\ln(x+2)-1/27*e*\ln(x+2)+1/27*e*\ln(x-1)+1/108*d*\ln(x-1)+1/27*e*\ln(x+1)-1/108*d*\ln(x+1)-19/864*d*\ln(x-2)-1/27*e*\ln(x-2)-13/216*f*\ln(x-2)-7/108*f*\ln(x+1)+7/108*f*\ln(x-1)+13/216*f*\ln(x+2)-1/9/(x+2)*h-1/36/(x+1)*h-1/36/(x-1)*h-1/9/(x-2)*h+1/18/(x+2)*g+1/36/(x+1)*g-1/36/(x-1)*g-1/18/(x-2)*g-1/144/(x+2)*d+1/72/(x+2)*e-1/144/(x-2)*d-1/72/(x-2)*e-1/36/(x+1)*d+1/36/(x+1)*e-1/36/(x-1)*d-1/36/(x-1)*e-1/36/(x-1)*f-1/36/(x+2)*f-1/36/(x-2)*f-1/36/(x+1)*f$

maxima [A] time = 1.18, size = 145, normalized size = 0.97

$$\frac{1}{864} (19d - 32e + 52f - 80g + 112h) \log(x + 2) - \frac{1}{108} (d - 4e + 7f - 10g + 13h) \log(x + 1) + \frac{1}{108} (d + 4e + 7f - 10g + 13h) \log(x - 1) - \frac{1}{864} (19d + 52f + 80g + 112h + 32e) \log(x - 2) - \frac{1}{72} (5d*x^3 + 8f*x^3 + 20h*x^3 + 20g*x^2 + 8x^2*e - 17d*x - 20f*x - 32h*x - 32g - 20e)/(x^4 - 5x^2 + 4)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] 1/864*(19*d - 32*e + 52*f - 80*g + 112*h)*log(x + 2) - 1/108*(d - 4*e + 7*f - 10*g + 13*h)*log(x + 1) + 1/108*(d + 4*e + 7*f + 10*g + 13*h)*log(x - 1) - 1/864*(19*d + 32*e + 52*f + 80*g + 112*h)*log(x - 2) - 1/72*((5*d + 8*f + 20*h)*x^3 + 4*(2*e + 5*g)*x^2 - (17*d + 20*f + 32*h)*x - 20*e - 32*g)/(x^4 - 5*x^2 + 4)

mupad [B] time = 0.87, size = 146, normalized size = 0.97

$$\frac{\left(-\frac{5d}{72} - \frac{f}{9} - \frac{5h}{18}\right)x^3 + \left(-\frac{e}{9} - \frac{5g}{18}\right)x^2 + \left(\frac{17d}{72} + \frac{5f}{18} + \frac{4h}{9}\right)x + \frac{5e}{18} + \frac{4g}{9}}{x^4 - 5x^2 + 4} + \ln(x-1) \left(\frac{d}{108} + \frac{e}{27} + \frac{7f}{108} + \frac{5g}{54} + \frac{13h}{108}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(x^4 - 5*x^2 + 4)^2,x)

[Out] ((5*e)/18 + (4*g)/9 - x^2*(e/9 + (5*g)/18) + x*((17*d)/72 + (5*f)/18 + (4*h)/9) - x^3*((5*d)/72 + f/9 + (5*h)/18))/(x^4 - 5*x^2 + 4) + log(x - 1)*(d/108 + e/27 + (7*f)/108 + (5*g)/54 + (13*h)/108) - log(x + 1)*(d/108 - e/27 + (7*f)/108 - (5*g)/54 + (13*h)/108) - log(x - 2)*((19*d)/864 + e/27 + (13*f)/216 + (5*g)/54 + (7*h)/54) + log(x + 2)*((19*d)/864 - e/27 + (13*f)/216 - (5*g)/54 + (7*h)/54)

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)

[Out] Timed out

$$3.30 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=162

$$\frac{x(-x^2(5d+8f+20h)+17d+20f+32h)}{72(x^4-5x^2+4)} + \frac{1}{432} \tanh^{-1}\left(\frac{x}{2}\right)(19d+52f+112h) - \frac{1}{54} \tanh^{-1}(x)(d+7f+13h) + \frac{1}{54} \ln(-x^2+4)$$

[Out] 1/72*x*(17*d+20*f+32*h-(5*d+8*f+20*h)*x^2)/(x^4-5*x^2+4)+1/18*(5*e+8*g+20*i-(2*e+5*g+17*i)*x^2)/(x^4-5*x^2+4)+1/432*(19*d+52*f+112*h)*arctanh(1/2*x)-1/54*(d+7*f+13*h)*arctanh(x)+1/54*(2*e+5*g+8*i)*ln(-x^2+1)-1/54*(2*e+5*g+8*i)*ln(-x^2+4)

Rubi [A] time = 0.23, antiderivative size = 162, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.237$, Rules used = {1673, 1678, 1166, 207, 1663, 1660, 12, 616, 31}

$$\frac{x(x^2(-5d+8f+20h)+17d+20f+32h)}{72(x^4-5x^2+4)} + \frac{1}{432} \tanh^{-1}\left(\frac{x}{2}\right)(19d+52f+112h) - \frac{1}{54} \tanh^{-1}(x)(d+7f+13h) + \frac{1}{54} \ln(-x^2+4)$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(4 - 5*x^2 + x^4)^2,x]

[Out] (x*(17*d + 20*f + 32*h - (5*d + 8*f + 20*h)*x^2))/(72*(4 - 5*x^2 + x^4)) + (5*e + 8*g + 20*i - (2*e + 5*g + 17*i)*x^2)/(18*(4 - 5*x^2 + x^4)) + ((19*d + 52*f + 112*h)*ArcTanh[x/2])/432 - ((d + 7*f + 13*h)*ArcTanh[x])/54 + ((2*e + 5*g + 8*i)*Log[1 - x^2])/54 - ((2*e + 5*g + 8*i)*Log[4 - x^2])/54

Rule 12

Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 31

Int[((a_) + (b_.)*(x_))^-1, x_Symbol] :> Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_.)*(x_)^2)^-1, x_Symbol] :> -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a

, 0] || GtQ[b, 0])

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := With[{q = Rt[b^2
- 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x] - Dist[c/q,
Int[1/Simp[b/2 + q/2 + c*x, x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1660

```
Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := With[{Q =
PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[P
q, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x +
c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^
(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*
(2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
- 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := With[{d =
  Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
+ b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
+ 7)*(b*d - 2*a*e)*x^2, x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\begin{aligned}
 \int \frac{d + ex + fx^2 + gx^3 + hx^4 + 30x^5}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{x(e + gx^2 + 30x^4)}{(4 - 5x^2 + x^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^2} dx \\
 &= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72} \int \frac{-d + 20f + 32h + \dots}{4 - 5x^2 + x^4} dx \\
 &= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} \\
 &= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} \\
 &= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} \\
 &= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)}
 \end{aligned}$$

Mathematica [A] time = 0.09, size = 185, normalized size = 1.14

$$\frac{-5dx^3 + 17dx - 8ex^2 + 20e - 8fx^3 + 20fx - 20gx^2 + 32g - 20hx^3 + 32hx - 68ix^2 + 80i}{72(x^4 - 5x^2 + 4)} + \frac{1}{108} \log(1-x)(d+4e+\dots)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(4 - 5*x^2 + x^4)^2,x]

[Out] (20*e + 32*g + 80*i + 17*d*x + 20*f*x + 32*h*x - 8*e*x^2 - 20*g*x^2 - 68*i*x^2 - 5*d*x^3 - 8*f*x^3 - 20*h*x^3)/(72*(4 - 5*x^2 + x^4)) + ((d + 4*e + 7*

$f + 10g + 13h + 16i) \cdot \text{Log}[1 - x] / 108 + ((-19d - 32e - 52f - 80g - 112h - 128i) \cdot \text{Log}[2 - x]) / 864 + ((-d + 4e - 7f + 10g - 13h + 16i) \cdot \text{Log}[1 + x]) / 108 + ((19d - 32e + 52f - 80g + 112h - 128i) \cdot \text{Log}[2 + x]) / 864$

fricas [B] time = 25.37, size = 346, normalized size = 2.14

$$\frac{12(5d + 8f + 20h)x^3 + 48(2e + 5g + 17i)x^2 - 12(17d + 20f + 32h)x - ((19d - 32e + 52f - 80g + 112h - 128i) \cdot \text{Log}[1 - x] + (-19d - 32e - 52f - 80g - 112h - 128i) \cdot \text{Log}[2 - x] + (-d + 4e - 7f + 10g - 13h + 16i) \cdot \text{Log}[1 + x] + (19d - 32e + 52f - 80g + 112h - 128i) \cdot \text{Log}[2 + x])}{(x^4 - 5x^2 + 4)^2}$$

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)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] $-1/864 \cdot (12 \cdot (5d + 8f + 20h) \cdot x^3 + 48 \cdot (2e + 5g + 17i) \cdot x^2 - 12 \cdot (17d + 20f + 32h) \cdot x - ((19d - 32e + 52f - 80g + 112h - 128i) \cdot x^4 - 5 \cdot (19d - 32e + 52f - 80g + 112h - 128i) \cdot x^2 + 76d - 128e + 208f - 320g + 448h - 512i) \cdot \log(x + 2) + 8 \cdot ((d - 4e + 7f - 10g + 13h - 16i) \cdot x^4 - 5 \cdot (d - 4e + 7f - 10g + 13h - 16i) \cdot x^2 + 4d - 16e + 28f - 40g + 52h - 64i) \cdot \log(x + 1) - 8 \cdot ((d + 4e + 7f + 10g + 13h + 16i) \cdot x^4 - 5 \cdot (d + 4e + 7f + 10g + 13h + 16i) \cdot x^2 + 4d + 16e + 28f + 40g + 52h + 64i) \cdot \log(x - 1) + ((19d + 32e + 52f + 80g + 112h + 128i) \cdot x^4 - 5 \cdot (19d + 32e + 52f + 80g + 112h + 128i) \cdot x^2 + 76d + 128e + 208f + 320g + 448h + 512i) \cdot \log(x - 2) - 240e - 384g - 960i) / (x^4 - 5x^2 + 4)$

giac [A] time = 0.32, size = 179, normalized size = 1.10

$$\frac{1}{864} (19d + 52f - 80g + 112h - 128i - 32e) \log(|x + 2|) - \frac{1}{108} (d + 7f - 10g + 13h - 16i - 4e) \log(|x + 1|) + \frac{1}{108} (d + 7f + 10g + 13h + 16i + 4e) \log(|x - 1|) - \frac{1}{864} (19d + 52f + 80g + 112h + 128i + 32e) \log(|x - 2|) - \frac{1}{72} (5d \cdot x^3 + 8f \cdot x^3 + 20h \cdot x^3 + 20g \cdot x^2 + 68i \cdot x^2 + 8x^2 \cdot e - 17d \cdot x - 20f \cdot x - 32h \cdot x - 32g - 80i - 20e) / (x^4 - 5x^2 + 4)$$

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)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] $1/864 \cdot (19d + 52f - 80g + 112h - 128i - 32e) \cdot \log(\text{abs}(x + 2)) - 1/108 \cdot (d + 7f - 10g + 13h - 16i - 4e) \cdot \log(\text{abs}(x + 1)) + 1/108 \cdot (d + 7f + 10g + 13h + 16i + 4e) \cdot \log(\text{abs}(x - 1)) - 1/864 \cdot (19d + 52f + 80g + 112h + 128i + 32e) \cdot \log(\text{abs}(x - 2)) - 1/72 \cdot (5d \cdot x^3 + 8f \cdot x^3 + 20h \cdot x^3 + 20g \cdot x^2 + 68i \cdot x^2 + 8x^2 \cdot e - 17d \cdot x - 20f \cdot x - 32h \cdot x - 32g - 80i - 20e) / (x^4 - 5x^2 + 4)$

maple [B] time = 0.02, size = 362, normalized size = 2.23

$$-\frac{4i \ln(x + 2)}{27} + \frac{4i \ln(x - 1)}{27} + \frac{4i \ln(x + 1)}{27} - \frac{4i \ln(x - 2)}{27} + \frac{7h \ln(x + 2)}{54} + \frac{13h \ln(x - 1)}{108} - \frac{13h \ln(x + 1)}{108} - \frac{7h \ln(x - 2)}{54} - \frac{1}{72} (5d \cdot x^3 + 8f \cdot x^3 + 20h \cdot x^3 + 20g \cdot x^2 + 68i \cdot x^2 + 8x^2 \cdot e - 17d \cdot x - 20f \cdot x - 32h \cdot x - 32g - 80i - 20e) / (x^4 - 5x^2 + 4)$$

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)/(x^4-5*x^2+4)^2,x)`

[Out] $-4/27*i*\ln(x+2)+4/27*i*\ln(x-1)+4/27*i*\ln(x+1)-4/27*i*\ln(x-2)+7/54*h*\ln(x+2)+13/108*h*\ln(x-1)-13/108*h*\ln(x+1)-7/54*h*\ln(x-2)+5/54*g*\ln(x-1)-5/54*g*\ln(x+2)-5/54*g*\ln(x-2)+5/54*g*\ln(x+1)+19/864*d*\ln(x+2)-1/27*e*\ln(x+2)+1/27*e*\ln(x-1)+1/108*d*\ln(x-1)+1/27*e*\ln(x+1)-1/108*d*\ln(x+1)-19/864*d*\ln(x-2)-1/27*e*\ln(x-2)-13/216*f*\ln(x-2)-7/108*f*\ln(x+1)+7/108*f*\ln(x-1)+13/216*f*\ln(x+2)+2/9/(x+2)*i+1/36/(x+1)*i-1/36/(x-1)*i-2/9/(x-2)*i-1/9/(x+2)*h-1/36/(x+1)*h-1/36/(x-1)*h-1/9/(x-2)*h+1/18/(x+2)*g+1/36/(x+1)*g-1/36/(x-1)*g-1/18/(x-2)*g-1/144/(x+2)*d+1/72/(x+2)*e-1/144/(x-2)*d-1/72/(x-2)*e-1/36/(x+1)*d+1/36/(x+1)*e-1/36/(x-1)*d-1/36/(x-1)*e-1/36/(x-1)*f-1/36/(x+2)*f-1/36/(x-2)*f-1/36/(x+1)*f$

maxima [A] time = 1.35, size = 163, normalized size = 1.01

$$\frac{1}{864} (19d - 32e + 52f - 80g + 112h - 128i) \log(x + 2) - \frac{1}{108} (d - 4e + 7f - 10g + 13h - 16i) \log(x + 1) + \frac{1}{108} (d + 4e + 7f + 10g + 13h + 16i) \log(x - 1) - \frac{1}{864} (19d + 32e + 52f + 80g + 112h + 128i) \log(x - 2) - \frac{1}{72} ((5d + 8f + 20h)x^3 + 4(2e + 5g + 17i)x^2 - (17d + 20f + 32h)x - 20e - 32g - 80i) / (x^4 - 5x^2 + 4)$$

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)/(x^4-5*x^2+4)^2,x, algorithm="maxima")`

[Out] $1/864*(19*d - 32*e + 52*f - 80*g + 112*h - 128*i)*\log(x + 2) - 1/108*(d - 4*e + 7*f - 10*g + 13*h - 16*i)*\log(x + 1) + 1/108*(d + 4*e + 7*f + 10*g + 13*h + 16*i)*\log(x - 1) - 1/864*(19*d + 32*e + 52*f + 80*g + 112*h + 128*i)*\log(x - 2) - 1/72*((5*d + 8*f + 20*h)*x^3 + 4*(2*e + 5*g + 17*i)*x^2 - (17*d + 20*f + 32*h)*x - 20*e - 32*g - 80*i)/(x^4 - 5*x^2 + 4)$

mupad [B] time = 0.58, size = 164, normalized size = 1.01

$$\frac{\left(-\frac{5d}{72} - \frac{f}{9} - \frac{5h}{18}\right)x^3 + \left(-\frac{e}{9} - \frac{5g}{18} - \frac{17i}{18}\right)x^2 + \left(\frac{17d}{72} + \frac{5f}{18} + \frac{4h}{9}\right)x + \frac{5e}{18} + \frac{4g}{9} + \frac{10i}{9}}{x^4 - 5x^2 + 4} + \ln(x - 1) \left(\frac{d}{108} + \frac{e}{27} + \frac{7f}{108} + \frac{g}{54} + \frac{13h}{108} + \frac{4i}{27}\right) - \ln(x + 1) \left(\frac{d}{108} - \frac{e}{27} + \frac{7f}{108} - \frac{g}{54} + \frac{13h}{108} - \frac{4i}{27}\right) - \ln(x - 2) \left(\frac{19d}{864} + \frac{e}{27} + \frac{13f}{216} + \frac{5g}{54} + \frac{7h}{54} + \frac{4i}{27}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(x^4 - 5*x^2 + 4)^2,x)`

[Out] $((5*e)/18 + (4*g)/9 + (10*i)/9 + x*((17*d)/72 + (5*f)/18 + (4*h)/9) - x^3*((5*d)/72 + f/9 + (5*h)/18) - x^2*(e/9 + (5*g)/18 + (17*i)/18)/(x^4 - 5*x^2 + 4) + \log(x - 1)*(d/108 + e/27 + (7*f)/108 + (5*g)/54 + (13*h)/108 + (4*i)/27) - \log(x + 1)*(d/108 - e/27 + (7*f)/108 - (5*g)/54 + (13*h)/108 - (4*i)/27) - \log(x - 2)*((19*d)/864 + e/27 + (13*f)/216 + (5*g)/54 + (7*h)/54 + (4*i)/27)$

$(4*i)/27) + \log(x + 2)*((19*d)/864 - e/27 + (13*f)/216 - (5*g)/54 + (7*h)/54 - (4*i)/27)$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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)/(x**4-5*x**2+4)**2,x)

[Out] Timed out

$$3.31 \quad \int \frac{d+ex}{(1+x^2+x^4)^2} dx$$

Optimal. Leaf size=140

$$-\frac{1}{4}d \log(x^2 - x + 1) + \frac{1}{4}d \log(x^2 + x + 1) + \frac{dx(1-x^2)}{6(x^4+x^2+1)} - \frac{d \tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}} + \frac{d \tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{3\sqrt{3}} + \frac{2e \tan^{-1}\left(\frac{2x^2+1}{\sqrt{3}}\right)}{3\sqrt{3}}$$

[Out] 1/6*d*x*(-x^2+1)/(x^4+x^2+1)+1/6*e*(2*x^2+1)/(x^4+x^2+1)-1/4*d*ln(x^2-x+1)+1/4*d*ln(x^2+x+1)-1/9*d*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/9*d*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+2/9*e*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)

Rubi [A] time = 0.10, antiderivative size = 140, normalized size of antiderivative = 1.00, number of steps used = 17, number of rules used = 10, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.625$, Rules used = {1673, 12, 1092, 1169, 634, 618, 204, 628, 1107, 614}

$$\frac{dx(1-x^2)}{6(x^4+x^2+1)} - \frac{1}{4}d \log(x^2 - x + 1) + \frac{1}{4}d \log(x^2 + x + 1) - \frac{d \tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{3\sqrt{3}} + \frac{d \tan^{-1}\left(\frac{2x+1}{\sqrt{3}}\right)}{3\sqrt{3}} + \frac{e(2x^2+1)}{6(x^4+x^2+1)} + \frac{2e}{6(x^4+x^2+1)}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x)/(1 + x^2 + x^4)^2, x]

[Out] (d*x*(1 - x^2))/(6*(1 + x^2 + x^4)) + (e*(1 + 2*x^2))/(6*(1 + x^2 + x^4)) - (d*ArcTan[(1 - 2*x)/Sqrt[3]])/(3*Sqrt[3]) + (d*ArcTan[(1 + 2*x)/Sqrt[3]])/(3*Sqrt[3]) + (2*e*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - (d*Log[1 - x + x^2])/4 + (d*Log[1 + x + x^2])/4

Rule 12

Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 204

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] :> -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])

Rule 614

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] :> Simp[((b + 2*c*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +

3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 628

Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := Simp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[2*c*d - b*e, 0]

Rule 634

Int[((d_.) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]

Rule 1092

Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := -Simp[(x*(b^2 - 2*a*c + b*c*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(b^2 - 2*a*c + 2*(p + 1)*(b^2 - 4*a*c) + b*c*(4*p + 7)*x^2)*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && IntegerQ[2*p]

Rule 1107

Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2, Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]

Rule 1169

Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] := With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r + (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]]*(a + b*x^2 + c*x^4)^p, x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex}{(1 + x^2 + x^4)^2} dx &= \int \frac{d}{(1 + x^2 + x^4)^2} dx + \int \frac{ex}{(1 + x^2 + x^4)^2} dx \\
&= d \int \frac{1}{(1 + x^2 + x^4)^2} dx + e \int \frac{x}{(1 + x^2 + x^4)^2} dx \\
&= \frac{dx(1 - x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6}d \int \frac{5 - x^2}{1 + x^2 + x^4} dx + \frac{1}{2}e \operatorname{Subst} \left(\int \frac{1}{(1 + x + x^2)^2} dx, x, x^2 \right) \\
&= \frac{dx(1 - x^2)}{6(1 + x^2 + x^4)} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{1}{12}d \int \frac{5 - 6x}{1 - x + x^2} dx + \frac{1}{12}d \int \frac{5 + 6x}{1 + x + x^2} dx + \frac{1}{3}eS \\
&= \frac{dx(1 - x^2)}{6(1 + x^2 + x^4)} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6}d \int \frac{1}{1 - x + x^2} dx + \frac{1}{6}d \int \frac{1}{1 + x + x^2} dx - \frac{1}{4}d \int \\
&= \frac{dx(1 - x^2)}{6(1 + x^2 + x^4)} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{2e \tan^{-1} \left(\frac{1+2x^2}{\sqrt{3}} \right)}{3\sqrt{3}} - \frac{1}{4}d \log(1 - x + x^2) + \frac{1}{4}d \log(1 \\
&= \frac{dx(1 - x^2)}{6(1 + x^2 + x^4)} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} - \frac{d \tan^{-1} \left(\frac{1-2x}{\sqrt{3}} \right)}{3\sqrt{3}} + \frac{d \tan^{-1} \left(\frac{1+2x}{\sqrt{3}} \right)}{3\sqrt{3}} + \frac{2e \tan^{-1} \left(\frac{1+2x^2}{\sqrt{3}} \right)}{3\sqrt{3}}
\end{aligned}$$

Mathematica [C] time = 0.49, size = 146, normalized size = 1.04

$$\frac{d(x - x^3) + 2ex^2 + e}{6(x^4 + x^2 + 1)} - \frac{(\sqrt{3} - 11i)d \tan^{-1} \left(\frac{1}{2}(\sqrt{3} - i)x \right)}{6\sqrt{6 + 6i\sqrt{3}}} - \frac{(\sqrt{3} + 11i)d \tan^{-1} \left(\frac{1}{2}(\sqrt{3} + i)x \right)}{6\sqrt{6 - 6i\sqrt{3}}} - \frac{2e \tan^{-1} \left(\frac{\sqrt{3}}{2x^2 + 1} \right)}{3\sqrt{3}}$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x)/(1 + x^2 + x^4)^2, x]

[Out] $(e + 2ex^2 + d(x - x^3))/(6(1 + x^2 + x^4)) - ((-11I + \sqrt{3})d \operatorname{ArcTan}[\frac{(-I + \sqrt{3})x}{2}])/(6\sqrt{6 + (6I)\sqrt{3}}) - ((11I + \sqrt{3})d \operatorname{ArcTan}[\frac{(I + \sqrt{3})x}{2}])/(6\sqrt{6 - (6I)\sqrt{3}}) - (2e \operatorname{ArcTan}[\sqrt{3}/(1 + 2x^2)])/(3\sqrt{3})$

fricas [A] time = 1.09, size = 154, normalized size = 1.10

$$\frac{6dx^3 - 12ex^2 - 4\sqrt{3}((d - 2e)x^4 + (d - 2e)x^2 + d - 2e) \arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) - 4\sqrt{3}((d + 2e)x^4 + (d + 2e)x^2 + d + 2e) \arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{1}{4}d \log(x^2 + x + 1) - \frac{1}{4}d \log(x^2 - x + 1) - 6e}{(x^4 + x^2 + 1)^2}$$

36

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)/(x^4+x^2+1)^2,x, algorithm="fricas")`

[Out] $-1/36*(6d*x^3 - 12e*x^2 - 4*\sqrt{3}*((d - 2e)*x^4 + (d - 2e)*x^2 + d - 2e)*\arctan(1/3*\sqrt{3}*(2*x + 1)) - 4*\sqrt{3}*((d + 2e)*x^4 + (d + 2e)*x^2 + d + 2e)*\arctan(1/3*\sqrt{3}*(2*x - 1)) - 6*d*x - 9*(d*x^4 + d*x^2 + d)*\log(x^2 + x + 1) + 9*(d*x^4 + d*x^2 + d)*\log(x^2 - x + 1) - 6*e)/(x^4 + x^2 + 1)^2$

giac [A] time = 0.24, size = 100, normalized size = 0.71

$$\frac{1}{9}\sqrt{3}(d - 2e) \arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{9}\sqrt{3}(d + 2e) \arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{1}{4}d \log(x^2 + x + 1) - \frac{1}{4}d \log(x^2 - x + 1) - 6e}{(x^4 + x^2 + 1)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)/(x^4+x^2+1)^2,x, algorithm="giac")`

[Out] $1/9*\sqrt{3}*(d - 2e)*\arctan(1/3*\sqrt{3}*(2*x + 1)) + 1/9*\sqrt{3}*(d + 2e)*\arctan(1/3*\sqrt{3}*(2*x - 1)) + 1/4*d*\log(x^2 + x + 1) - 1/4*d*\log(x^2 - x + 1) - 1/6*(d*x^3 - 2*x^2*e - d*x - e)/(x^4 + x^2 + 1)^2$

maple [A] time = 0.01, size = 146, normalized size = 1.04

$$\frac{\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9} + \frac{\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9} - \frac{d \ln(x^2 - x + 1)}{4} + \frac{d \ln(x^2 + x + 1)}{4} - \frac{2\sqrt{3} e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9} - \frac{2\sqrt{3} e \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9} - \frac{d(x^3 - 2ex^2 - dx - e)}{6(x^4 + x^2 + 1)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] $1/4*((-1/3*d-1/3*e)*x-2/3*d+1/3*e)/(x^2+x+1)+1/4*d*\ln(x^2+x+1)+1/9*3^(1/2)*d*\arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*\arctan(1/3*(2*x+1)*3^(1/2))-1/4$

$\frac{1}{9} \sqrt{3} (d - 2e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{9} \sqrt{3} (d + 2e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{4} d \log(x^2 + x + 1) - \frac{1}{4} d \log(x^2 - x + 1) - \frac{1}{6} (d x^3 - 2e x^2 - d x - e) / (x^4 + x^2 + 1)$

maxima [A] time = 2.42, size = 96, normalized size = 0.69

$$\frac{1}{9} \sqrt{3} (d - 2e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{9} \sqrt{3} (d + 2e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{4} d \log(x^2 + x + 1) - \frac{1}{4} d \log(x^2 - x + 1) - \frac{1}{6} (d x^3 - 2e x^2 - d x - e) / (x^4 + x^2 + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x^4+x^2+1)^2,x, algorithm="maxima")

[Out] 1/9*sqrt(3)*(d - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/9*sqrt(3)*(d + 2*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/4*d*log(x^2 + x + 1) - 1/4*d*log(x^2 - x + 1) - 1/6*(d*x^3 - 2*e*x^2 - d*x - e)/(x^4 + x^2 + 1)

mupad [B] time = 0.25, size = 149, normalized size = 1.06

$$\frac{-\frac{dx^3}{6} + \frac{ex^2}{3} + \frac{dx}{6} + \frac{e}{6}}{x^4 + x^2 + 1} - \ln\left(x - \frac{1}{2} - \frac{\sqrt{3} \operatorname{li}}{2}\right) \left(\frac{d}{4} + \frac{\sqrt{3} d \operatorname{li}}{18} + \frac{\sqrt{3} e \operatorname{li}}{9}\right) + \ln\left(x + \frac{1}{2} - \frac{\sqrt{3} \operatorname{li}}{2}\right) \left(\frac{d}{4} - \frac{\sqrt{3} d \operatorname{li}}{18} + \frac{\sqrt{3} e}{9}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x)/(x^2 + x^4 + 1)^2,x)

[Out] (e/6 + (d*x)/6 - (d*x^3)/6 + (e*x^2)/3)/(x^2 + x^4 + 1) - log(x - (3^(1/2)*1i)/2 - 1/2)*(d/4 + (3^(1/2)*d*1i)/18 + (3^(1/2)*e*1i)/9) + log(x - (3^(1/2)*1i)/2 + 1/2)*(d/4 - (3^(1/2)*d*1i)/18 + (3^(1/2)*e*1i)/9) + log(x + (3^(1/2)*1i)/2 - 1/2)*((3^(1/2)*d*1i)/18 - d/4 + (3^(1/2)*e*1i)/9) + log(x + (3^(1/2)*1i)/2 + 1/2)*(d/4 + (3^(1/2)*d*1i)/18 - (3^(1/2)*e*1i)/9)

sympy [C] time = 3.49, size = 952, normalized size = 6.80

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x**4+x**2+1)**2,x)

[Out] (-d/4 - sqrt(3)*I*(d + 2*e)/18)*log(x + (-10309*d**4*e + 1026*d**4*(-d/4 - sqrt(3)*I*(d + 2*e)/18) - 7200*d**2*e**3 - 31536*d**2*e**2*(-d/4 - sqrt(3)*I*(d + 2*e)/18) + 108432*d**2*e*(-d/4 - sqrt(3)*I*(d + 2*e)/18)**2 + 163296*d**2*(-d/4 - sqrt(3)*I*(d + 2*e)/18)**3 + 1792*e**5 + 11520*e**4*(-d/4 - sqrt(3)*I*(d + 2*e)/18) + 48384*e**3*(-d/4 - sqrt(3)*I*(d + 2*e)/18)**2 + 311040*e**2*(-d/4 - sqrt(3)*I*(d + 2*e)/18)**3)/(3348*d**5 - 11408*d**3*e**2 - 7936*d*e**4) + (-d/4 + sqrt(3)*I*(d + 2*e)/18)*log(x + (-10309*d**4*e +

$$\begin{aligned}
& 1026*d^{**4}*(-d/4 + \text{sqrt}(3)*I*(d + 2*e)/18) - 7200*d^{**2}*e^{**3} - 31536*d^{**2}*e^{**2} \\
& 2*(-d/4 + \text{sqrt}(3)*I*(d + 2*e)/18) + 108432*d^{**2}*e*(-d/4 + \text{sqrt}(3)*I*(d + 2* \\
& e)/18)**2 + 163296*d^{**2}*(-d/4 + \text{sqrt}(3)*I*(d + 2*e)/18)**3 + 1792*e^{**5} + 11 \\
& 520*e^{**4}*(-d/4 + \text{sqrt}(3)*I*(d + 2*e)/18) + 48384*e^{**3}*(-d/4 + \text{sqrt}(3)*I*(d \\
& + 2*e)/18)**2 + 311040*e^{**2}*(-d/4 + \text{sqrt}(3)*I*(d + 2*e)/18)**3)/(3348*d^{**5} \\
& - 11408*d^{**3}*e^{**2} - 7936*d*e^{**4}) + (d/4 - \text{sqrt}(3)*I*(d - 2*e)/18)*\log(x + \\
& (-10309*d^{**4}*e + 1026*d^{**4}*(d/4 - \text{sqrt}(3)*I*(d - 2*e)/18) - 7200*d^{**2}*e^{**3} \\
& - 31536*d^{**2}*e^{**2}*(d/4 - \text{sqrt}(3)*I*(d - 2*e)/18) + 108432*d^{**2}*e*(d/4 - \text{sqr} \\
& t(3)*I*(d - 2*e)/18)**2 + 163296*d^{**2}*(d/4 - \text{sqrt}(3)*I*(d - 2*e)/18)**3 + 1 \\
& 792*e^{**5} + 11520*e^{**4}*(d/4 - \text{sqrt}(3)*I*(d - 2*e)/18) + 48384*e^{**3}*(d/4 - \text{sq} \\
& rt(3)*I*(d - 2*e)/18)**2 + 311040*e^{**2}*(d/4 - \text{sqrt}(3)*I*(d - 2*e)/18)**3)/(\\
& 3348*d^{**5} - 11408*d^{**3}*e^{**2} - 7936*d*e^{**4}) + (d/4 + \text{sqrt}(3)*I*(d - 2*e)/18 \\
&)*\log(x + (-10309*d^{**4}*e + 1026*d^{**4}*(d/4 + \text{sqrt}(3)*I*(d - 2*e)/18) - 7200* \\
& d^{**2}*e^{**3} - 31536*d^{**2}*e^{**2}*(d/4 + \text{sqrt}(3)*I*(d - 2*e)/18) + 108432*d^{**2}*e* \\
& (d/4 + \text{sqrt}(3)*I*(d - 2*e)/18)**2 + 163296*d^{**2}*(d/4 + \text{sqrt}(3)*I*(d - 2*e)/ \\
& 18)**3 + 1792*e^{**5} + 11520*e^{**4}*(d/4 + \text{sqrt}(3)*I*(d - 2*e)/18) + 48384*e^{**3} \\
& *(d/4 + \text{sqrt}(3)*I*(d - 2*e)/18)**2 + 311040*e^{**2}*(d/4 + \text{sqrt}(3)*I*(d - 2*e) \\
& /18)**3)/(3348*d^{**5} - 11408*d^{**3}*e^{**2} - 7936*d*e^{**4}) + (-d*x^{**3} + d*x + 2* \\
& e*x^{**2} + e)/(6*x^{**4} + 6*x^{**2} + 6)
\end{aligned}$$

$$3.32 \quad \int \frac{d+ex+fx^2}{(1+x^2+x^4)^2} dx$$

Optimal. Leaf size=165

$$-\frac{1}{8}(2d-f) \log(x^2-x+1) + \frac{1}{8}(2d-f) \log(x^2+x+1) + \frac{x(-x^2(d-2f)+d+f)}{6(x^4+x^2+1)} - \frac{(4d+f) \tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}} + \frac{(4d+f) \tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{12\sqrt{3}}$$

[Out] 1/6*e*(2*x^2+1)/(x^4+x^2+1)+1/6*x*(d+f-(d-2*f)*x^2)/(x^4+x^2+1)-1/8*(2*d-f)*ln(x^2-x+1)+1/8*(2*d-f)*ln(x^2+x+1)-1/36*(4*d+f)*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/36*(4*d+f)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+2/9*e*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)

Rubi [A] time = 0.13, antiderivative size = 165, normalized size of antiderivative = 1.00, number of steps used = 16, number of rules used = 10, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.476$, Rules used = {1673, 1178, 1169, 634, 618, 204, 628, 12, 1107, 614}

$$\frac{x(x^2(-(d-2f))+d+f)}{6(x^4+x^2+1)} - \frac{1}{8}(2d-f) \log(x^2-x+1) + \frac{1}{8}(2d-f) \log(x^2+x+1) - \frac{(4d+f) \tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}} + \frac{(4d+f) \tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{12\sqrt{3}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2)/(1 + x^2 + x^4)^2, x]

[Out] (e*(1 + 2*x^2))/(6*(1 + x^2 + x^4)) + (x*(d + f - (d - 2*f)*x^2))/(6*(1 + x^2 + x^4)) - ((4*d + f)*ArcTan[(1 - 2*x)/Sqrt[3]])/(12*Sqrt[3]) + ((4*d + f)*ArcTan[(1 + 2*x)/Sqrt[3]])/(12*Sqrt[3]) + (2*e*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - ((2*d - f)*Log[1 - x + x^2])/8 + ((2*d - f)*Log[1 + x + x^2])/8

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 204

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])

Rule 614

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p + 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 628

Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := Simp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[2*c*d - b*e, 0]

Rule 634

Int[((d_.) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]

Rule 1107

Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2, Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]

Rule 1169

Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] := With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r + (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]

Rule 1178

Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,

b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && LtQ[p, -1] && IntegerQ[2*p]

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
 \int \frac{d + ex + fx^2}{(1 + x^2 + x^4)^2} dx &= \int \frac{ex}{(1 + x^2 + x^4)^2} dx + \int \frac{d + fx^2}{(1 + x^2 + x^4)^2} dx \\
 &= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + (-d + 2f)x^2}{1 + x^2 + x^4} dx + e \int \frac{x}{(1 + x^2 + x^4)^2} dx \\
 &= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{12} \int \frac{5d - f - (6d - 3f)x}{1 - x + x^2} dx + \frac{1}{12} \int \frac{5d - f + (6d - 3f)x}{1 + x + x^2} dx \\
 &= \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{3} e \operatorname{Subst} \left(\int \frac{1}{1 + x + x^2} dx, x, x^2 \right) + \frac{1}{8} (2d - f) \log(1 - x + x^2) \\
 &= \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} - \frac{1}{8} (2d - f) \log(1 - x + x^2) + \frac{1}{8} (2d - f) \log(1 + x + x^2) \\
 &= \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} - \frac{(4d + f) \tan^{-1} \left(\frac{1 - 2x}{\sqrt{3}} \right)}{12\sqrt{3}} + \frac{(4d + f) \tan^{-1} \left(\frac{1 + 2x}{\sqrt{3}} \right)}{12\sqrt{3}}
 \end{aligned}$$

Mathematica [C] time = 0.42, size = 186, normalized size = 1.13

$$\frac{1}{36} \left(\frac{6(x(-dx^2 + d + 2fx^2 + f) + 2ex^2 + e)}{x^4 + x^2 + 1} - \frac{((\sqrt{3} - 11i)d - 2(\sqrt{3} - 2i)f) \tan^{-1} \left(\frac{1}{2}(\sqrt{3} - i)x \right)}{\sqrt{\frac{1}{6}(1 + i\sqrt{3})}} - \frac{((\sqrt{3} + 11i)d - 2(\sqrt{3} + 2i)f) \tan^{-1} \left(\frac{1}{2}(\sqrt{3} + i)x \right)}{\sqrt{\frac{1}{6}(1 - i\sqrt{3})}} \right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x + f*x^2)/(1 + x^2 + x^4)^2, x]

[Out] $\frac{((6*(e + 2*e*x^2 + x*(d + f - d*x^2 + 2*f*x^2)))/(1 + x^2 + x^4) - (((-11*I + \text{Sqrt}[3])*d - 2*(-2*I + \text{Sqrt}[3])*f)*\text{ArcTan}[((-I + \text{Sqrt}[3])*x)/2])/ \text{Sqrt}[(1 + I*\text{Sqrt}[3])/6] - (((11*I + \text{Sqrt}[3])*d - 2*(2*I + \text{Sqrt}[3])*f)*\text{ArcTan}[(I + \text{Sqrt}[3])*x)/2])/ \text{Sqrt}[(1 - I*\text{Sqrt}[3])/6] - 8*\text{Sqrt}[3]*e*\text{ArcTan}[\text{Sqrt}[3]/(1 + 2*x^2)])/36$

fricas [A] time = 0.93, size = 212, normalized size = 1.28

$$\frac{12(d-2f)x^3 - 24ex^2 - 2\sqrt{3}\left((4d-8e+f)x^4 + (4d-8e+f)x^2 + 4d-8e+f\right) \arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) - 2\sqrt{3}\left((4d+8e+f)x^4 + (4d+8e+f)x^2 + 4d+8e+f\right) \arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) - 12(d+f)x - 9((2d-f)x^4 + (2d-f)x^2 + 2d-f)\log(x^2-x+1) + 9((2d-f)x^4 + (2d-f)x^2 + 2d-f)\log(x^2+x+1) - 12e}{(x^4+x^2+1)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="fricas")`

[Out] $-1/72*(12*(d - 2*f)*x^3 - 24*e*x^2 - 2*\text{sqrt}(3)*((4*d - 8*e + f)*x^4 + (4*d - 8*e + f)*x^2 + 4*d - 8*e + f)*\arctan(1/3*\text{sqrt}(3)*(2*x + 1)) - 2*\text{sqrt}(3)*((4*d + 8*e + f)*x^4 + (4*d + 8*e + f)*x^2 + 4*d + 8*e + f)*\arctan(1/3*\text{sqrt}(3)*(2*x - 1)) - 12*(d + f)*x - 9*((2*d - f)*x^4 + (2*d - f)*x^2 + 2*d - f)*\log(x^2 + x + 1) + 9*((2*d - f)*x^4 + (2*d - f)*x^2 + 2*d - f)*\log(x^2 - x + 1) - 12*e)/(x^4 + x^2 + 1)$

giac [A] time = 0.23, size = 128, normalized size = 0.78

$$\frac{1}{36}\sqrt{3}(4d+f-8e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{36}\sqrt{3}(4d+f+8e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{8}(2d-f)\log(x^2-x+1) - \frac{1}{8}(2d-f)\log(x^2+x+1) - \frac{1}{6}(d*x^3 - 2*f*x^3 - 2*x^2*e - d*x - f*x - e)/(x^4+x^2+1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="giac")`

[Out] $1/36*\text{sqrt}(3)*(4*d + f - 8*e)*\arctan(1/3*\text{sqrt}(3)*(2*x + 1)) + 1/36*\text{sqrt}(3)*(4*d + f + 8*e)*\arctan(1/3*\text{sqrt}(3)*(2*x - 1)) + 1/8*(2*d - f)*\log(x^2 + x + 1) - 1/8*(2*d - f)*\log(x^2 - x + 1) - 1/6*(d*x^3 - 2*f*x^3 - 2*x^2*e - d*x - f*x - e)/(x^4 + x^2 + 1)$

maple [A] time = 0.01, size = 214, normalized size = 1.30

$$\frac{\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9} + \frac{\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9} - \frac{d \ln(x^2 - x + 1)}{4} + \frac{d \ln(x^2 + x + 1)}{4} - \frac{2\sqrt{3} e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((f*x^2+e*x+d)/(x^4+x^2+1)^2,x)`

[Out] $\frac{1}{4} * ((-1/3*d-1/3*e+2/3*f)*x-2/3*d+1/3*e+1/3*f)/(x^2+x+1)+1/4*d*\ln(x^2+x+1)-1/8*f*\ln(x^2+x+1)+1/9*3^{(1/2)}*d*\arctan(1/3*(2*x+1)*3^{(1/2)})-2/9*3^{(1/2)}*e*\arctan(1/3*(2*x+1)*3^{(1/2)})+1/36*3^{(1/2)}*f*\arctan(1/3*(2*x+1)*3^{(1/2)})-1/4*((1/3*d-1/3*e-2/3*f)*x-2/3*d-1/3*e+1/3*f)/(x^2-x+1)-1/4*d*\ln(x^2-x+1)+1/8*f*\ln(x^2-x+1)+1/9*3^{(1/2)}*d*\arctan(1/3*(2*x-1)*3^{(1/2)})+2/9*3^{(1/2)}*e*\arctan(1/3*(2*x-1)*3^{(1/2)})+1/36*3^{(1/2)}*f*\arctan(1/3*(2*x-1)*3^{(1/2)})$

maxima [A] time = 2.39, size = 120, normalized size = 0.73

$$\frac{1}{36} \sqrt{3} (4d - 8e + f) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{36} \sqrt{3} (4d + 8e + f) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{8} (2d - f) \log(x^2 + x + 1) - \frac{1}{8} (2d - f) \log(x^2 - x + 1) - \frac{1}{6} ((d - 2f)x^3 - 2ex^2 - (d + f)x - e)/(x^4 + x^2 + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="maxima")`

[Out] $\frac{1}{36}*\sqrt{3}*(4*d - 8*e + f)*\arctan(1/3*\sqrt{3}*(2*x + 1)) + \frac{1}{36}*\sqrt{3}*(4*d + 8*e + f)*\arctan(1/3*\sqrt{3}*(2*x - 1)) + \frac{1}{8}*(2*d - f)*\log(x^2 + x + 1) - \frac{1}{8}*(2*d - f)*\log(x^2 - x + 1) - \frac{1}{6}*((d - 2*f)*x^3 - 2*e*x^2 - (d + f)*x - e)/(x^4 + x^2 + 1)$

mupad [B] time = 0.32, size = 201, normalized size = 1.22

$$\frac{\left(\frac{f}{3} - \frac{d}{6}\right)x^3 + \frac{ex^2}{3} + \left(\frac{d}{6} + \frac{f}{6}\right)x + \frac{e}{6}}{x^4 + x^2 + 1} - \ln\left(x - \frac{1}{2} - \frac{\sqrt{3}i}{2}\right) \left(\frac{d}{4} - \frac{f}{8} + \frac{\sqrt{3}d1i}{18} + \frac{\sqrt{3}e1i}{9} + \frac{\sqrt{3}f1i}{72}\right) - \ln\left(x + \frac{1}{2} - \frac{\sqrt{3}i}{2}\right) \left(\frac{d}{4} - \frac{f}{8} + \frac{\sqrt{3}d1i}{18} + \frac{\sqrt{3}e1i}{9} + \frac{\sqrt{3}f1i}{72}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((d + e*x + f*x^2)/(x^2 + x^4 + 1)^2,x)`

[Out] $(e/6 - x^3*(d/6 - f/3) + (e*x^2)/3 + x*(d/6 + f/6))/(x^2 + x^4 + 1) - \log(x - (3^{(1/2)}*1i)/2 - 1/2)*(d/4 - f/8 + (3^{(1/2)}*d*1i)/18 + (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/72) - \log(x - (3^{(1/2)}*1i)/2 + 1/2)*(f/8 - d/4 + (3^{(1/2)}*d*1i)/18 - (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/72) + \log(x + (3^{(1/2)}*1i)/2 - 1/2)*(f/8 - d/4 + (3^{(1/2)}*d*1i)/18 + (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/72) + \log(x + (3^{(1/2)}*1i)/2 + 1/2)*(d/4 - f/8 + (3^{(1/2)}*d*1i)/18 - (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/72)$

sympy [C] time = 108.82, size = 4106, normalized size = 24.88

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((f*x**2+e*x+d)/(x**4+x**2+1)**2,x)`

```
[Out] (-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)*log(x + (-164944*d**5*e + 16416
*d**5*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) + 336520*d**4*e*f + 20066
4*d**4*f*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) - 115200*d**3*e**3 - 5
04576*d**3*e**2*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) - 272380*d**3*e
*f**2 + 1734912*d**3*e*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)**2 - 229
500*d**3*f**2*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) + 2612736*d**3*(-
d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)**3 + 51840*d**2*e**3*f + 881280*d
**2*e**2*f*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) + 119420*d**2*e*f**3
- 2477952*d**2*e*f*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)**2 + 50436*
d**2*f**3*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) - 2519424*d**2*f*(-d/
4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)**3 + 28672*d*e**5 + 184320*d*e**4*(-
d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) + 8640*d*e**3*f**2 + 774144*d*e*
**3*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)**2 - 409536*d*e**2*f**2*(-d/
4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) + 4976640*d*e**2*(-d/4 + f/8 - sqrt
(3)*I*(4*d + 8*e + f)/72)**3 - 31040*d*e*f**4 + 1270080*d*e*f**2*(-d/4 + f/
8 - sqrt(3)*I*(4*d + 8*e + f)/72)**2 + 14040*d*f**4*(-d/4 + f/8 - sqrt(3)*I
*(4*d + 8*e + f)/72) + 139968*d*f**2*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f
)/72)**3 - 20480*e**5*f - 36864*e**4*f*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e +
f)/72) - 2880*e**3*f**3 - 552960*e**3*f*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e
+ f)/72)**2 + 70848*e**2*f**3*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)
- 995328*e**2*f*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)**3 + 3956*e*f**
5 - 209088*e*f**3*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72)**2 - 3996*f**
5*(-d/4 + f/8 - sqrt(3)*I*(4*d + 8*e + f)/72) + 233280*f**3*(-d/4 + f/8 - s
qrt(3)*I*(4*d + 8*e + f)/72)**3)/(53568*d**6 - 69984*d**5*f - 182528*d**4*e
**2 + 23652*d**4*f**2 + 377344*d**3*e**2*f + 5400*d**3*f**3 - 126976*d**2*e
**4 - 278400*d**2*e**2*f**2 - 4131*d**2*f**4 + 102400*d*e**4*f + 93568*d*e*
**2*f**3 + 81*d*f**5 - 28672*e**4*f**2 - 11648*e**2*f**4 + 189*f**6)) + (-d/
4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72)*log(x + (-164944*d**5*e + 16416*d**
5*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) + 336520*d**4*e*f + 200664*d*
**4*f*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) - 115200*d**3*e**3 - 50457
6*d**3*e**2*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) - 272380*d**3*e*f**
2 + 1734912*d**3*e*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72)**2 - 229500*
d**3*f**2*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) + 2612736*d**3*(-d/4
+ f/8 + sqrt(3)*I*(4*d + 8*e + f)/72)**3 + 51840*d**2*e**3*f + 881280*d**2*
e**2*f*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) + 119420*d**2*e*f**3 - 2
477952*d**2*e*f*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72)**2 + 50436*d**2
*f**3*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) - 2519424*d**2*f*(-d/4 +
f/8 + sqrt(3)*I*(4*d + 8*e + f)/72)**3 + 28672*d*e**5 + 184320*d*e**4*(-d/4
+ f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) + 8640*d*e**3*f**2 + 774144*d*e**3*(-
d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72)**2 - 409536*d*e**2*f**2*(-d/4 +
f/8 + sqrt(3)*I*(4*d + 8*e + f)/72) + 4976640*d*e**2*(-d/4 + f/8 + sqrt(3)*
I*(4*d + 8*e + f)/72)**3 - 31040*d*e*f**4 + 1270080*d*e*f**2*(-d/4 + f/8 +
sqrt(3)*I*(4*d + 8*e + f)/72)**2 + 14040*d*f**4*(-d/4 + f/8 + sqrt(3)*I*(4*
d + 8*e + f)/72) + 139968*d*f**2*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/72
)**3 - 20480*e**5*f - 36864*e**4*f*(-d/4 + f/8 + sqrt(3)*I*(4*d + 8*e + f)/
```

$$\begin{aligned}
& 72) - 2880e^{*3}f^{*3} - 552960e^{*3}f^{*}(-d/4 + f/8 + \sqrt{3})I^{*}(4d + 8e + f) \\
&)/72)^{*2} + 70848e^{*2}f^{*3}(-d/4 + f/8 + \sqrt{3})I^{*}(4d + 8e + f)/72) - 99 \\
& 5328e^{*2}f^{*}(-d/4 + f/8 + \sqrt{3})I^{*}(4d + 8e + f)/72)^{*3} + 3956e^{*}f^{*5} - \\
& 209088e^{*}f^{*3}(-d/4 + f/8 + \sqrt{3})I^{*}(4d + 8e + f)/72)^{*2} - 3996f^{*5}(- \\
& d/4 + f/8 + \sqrt{3})I^{*}(4d + 8e + f)/72) + 233280f^{*3}(-d/4 + f/8 + \sqrt{3}) \\
&)I^{*}(4d + 8e + f)/72)^{*3})/(53568d^{*6} - 69984d^{*5}f - 182528d^{*4}e^{*2} \\
& + 23652d^{*4}f^{*2} + 377344d^{*3}e^{*2}f + 5400d^{*3}f^{*3} - 126976d^{*2}e^{*4} \\
& - 278400d^{*2}e^{*2}f^{*2} - 4131d^{*2}f^{*4} + 102400d^{*}e^{*4}f + 93568d^{*}e^{*2}f \\
& ^{*3} + 81d^{*}f^{*5} - 28672e^{*4}f^{*2} - 11648e^{*2}f^{*4} + 189f^{*6})) + (d/4 - f \\
& /8 - \sqrt{3})I^{*}(4d - 8e + f)/72) \log(x + (-164944d^{*5}e + 16416d^{*5}(d/ \\
& 4 - f/8 - \sqrt{3})I^{*}(4d - 8e + f)/72) + 336520d^{*4}e^{*}f + 200664d^{*4}f^{*} \\
& (d/4 - f/8 - \sqrt{3})I^{*}(4d - 8e + f)/72) - 115200d^{*3}e^{*3} - 504576d^{*3}e \\
& ^{*2}(d/4 - f/8 - \sqrt{3})I^{*}(4d - 8e + f)/72) - 272380d^{*3}e^{*}f^{*2} + 1734 \\
& 912d^{*3}e^{*}(d/4 - f/8 - \sqrt{3})I^{*}(4d - 8e + f)/72)^{*2} - 229500d^{*3}f^{*2} \\
& *(d/4 - f/8 - \sqrt{3})I^{*}(4d - 8e + f)/72) + 2612736d^{*3}(d/4 - f/8 - \sqrt{3}) \\
&)I^{*}(4d - 8e + f)/72)^{*3} + 51840d^{*2}e^{*3}f + 881280d^{*2}e^{*2}f^{*}(d/4 \\
& - f/8 - \sqrt{3})I^{*}(4d - 8e + f)/72) + 119420d^{*2}e^{*}f^{*3} - 2477952d^{*2}e \\
& ^{*}f^{*}(d/4 - f/8 - \sqrt{3})I^{*}(4d - 8e + f)/72)^{*2} + 50436d^{*2}f^{*3}(d/4 - \\
& f/8 - \sqrt{3})I^{*}(4d - 8e + f)/72) - 2519424d^{*2}f^{*}(d/4 - f/8 - \sqrt{3})I \\
& ^{*}(4d - 8e + f)/72)^{*3} + 28672d^{*}e^{*5} + 184320d^{*}e^{*4}(d/4 - f/8 - \sqrt{3}) \\
&)I^{*}(4d - 8e + f)/72) + 8640d^{*}e^{*3}f^{*2} + 774144d^{*}e^{*3}(d/4 - f/8 - \sqrt{3}) \\
&)I^{*}(4d - 8e + f)/72)^{*2} - 409536d^{*}e^{*2}f^{*2}(d/4 - f/8 - \sqrt{3})I^{*}(4 \\
& d - 8e + f)/72) + 4976640d^{*}e^{*2}(d/4 - f/8 - \sqrt{3})I^{*}(4d - 8e + f)/7 \\
& 2)^{*3} - 31040d^{*}e^{*}f^{*4} + 1270080d^{*}e^{*}f^{*2}(d/4 - f/8 - \sqrt{3})I^{*}(4d - 8e \\
& + f)/72)^{*2} + 14040d^{*}f^{*4}(d/4 - f/8 - \sqrt{3})I^{*}(4d - 8e + f)/72) + 13 \\
& 9968d^{*}f^{*2}(d/4 - f/8 - \sqrt{3})I^{*}(4d - 8e + f)/72)^{*3} - 20480e^{*5}f - \\
& 36864e^{*4}f^{*}(d/4 - f/8 - \sqrt{3})I^{*}(4d - 8e + f)/72) - 2880e^{*3}f^{*3} - \\
& 552960e^{*3}f^{*}(d/4 - f/8 - \sqrt{3})I^{*}(4d - 8e + f)/72)^{*2} + 70848e^{*2}f^{*} \\
& ^{*3}(d/4 - f/8 - \sqrt{3})I^{*}(4d - 8e + f)/72) - 995328e^{*2}f^{*}(d/4 - f/8 - \\
& \sqrt{3})I^{*}(4d - 8e + f)/72)^{*3} + 3956e^{*}f^{*5} - 209088e^{*}f^{*3}(d/4 - f/8 - \\
& \sqrt{3})I^{*}(4d - 8e + f)/72)^{*2} - 3996f^{*5}(d/4 - f/8 - \sqrt{3})I^{*}(4d - \\
& 8e + f)/72) + 233280f^{*3}(d/4 - f/8 - \sqrt{3})I^{*}(4d - 8e + f)/72)^{*3})/ \\
& (53568d^{*6} - 69984d^{*5}f - 182528d^{*4}e^{*2} + 23652d^{*4}f^{*2} + 377344d^{*} \\
& ^{*3}e^{*2}f + 5400d^{*3}f^{*3} - 126976d^{*2}e^{*4} - 278400d^{*2}e^{*2}f^{*2} - 413 \\
& 1d^{*2}f^{*4} + 102400d^{*}e^{*4}f + 93568d^{*}e^{*2}f^{*3} + 81d^{*}f^{*5} - 28672e^{*4} \\
& f^{*2} - 11648e^{*2}f^{*4} + 189f^{*6})) + (d/4 - f/8 + \sqrt{3})I^{*}(4d - 8e + f) \\
&)/72) \log(x + (-164944d^{*5}e + 16416d^{*5}(d/4 - f/8 + \sqrt{3})I^{*}(4d - 8e \\
& + f)/72) + 336520d^{*4}e^{*}f + 200664d^{*4}f^{*}(d/4 - f/8 + \sqrt{3})I^{*}(4d - \\
& 8e + f)/72) - 115200d^{*3}e^{*3} - 504576d^{*3}e^{*2}(d/4 - f/8 + \sqrt{3})I^{*}(\\
& 4d - 8e + f)/72) - 272380d^{*3}e^{*}f^{*2} + 1734912d^{*3}e^{*}(d/4 - f/8 + \sqrt{3}) \\
&)I^{*}(4d - 8e + f)/72)^{*2} - 229500d^{*3}f^{*2}(d/4 - f/8 + \sqrt{3})I^{*}(4d \\
& - 8e + f)/72) + 2612736d^{*3}(d/4 - f/8 + \sqrt{3})I^{*}(4d - 8e + f)/72)^{*3} \\
& + 51840d^{*2}e^{*3}f + 881280d^{*2}e^{*2}f^{*}(d/4 - f/8 + \sqrt{3})I^{*}(4d - 8e \\
& + f)/72) + 119420d^{*2}e^{*}f^{*3} - 2477952d^{*2}e^{*}f^{*}(d/4 - f/8 + \sqrt{3})I^{*}(4 \\
& d - 8e + f)/72)^{*2} + 50436d^{*2}f^{*3}(d/4 - f/8 + \sqrt{3})I^{*}(4d - 8e +
\end{aligned}$$

$$\begin{aligned}
& f)/72) - 2519424*d**2*f*(d/4 - f/8 + \sqrt{3}*I*(4*d - 8*e + f)/72)**3 + 286 \\
& 72*d*e**5 + 184320*d*e**4*(d/4 - f/8 + \sqrt{3}*I*(4*d - 8*e + f)/72) + 8640 \\
& *d*e**3*f**2 + 774144*d*e**3*(d/4 - f/8 + \sqrt{3}*I*(4*d - 8*e + f)/72)**2 \\
& - 409536*d*e**2*f**2*(d/4 - f/8 + \sqrt{3}*I*(4*d - 8*e + f)/72) + 4976640*d \\
& *e**2*(d/4 - f/8 + \sqrt{3}*I*(4*d - 8*e + f)/72)**3 - 31040*d*e*f**4 + 1270 \\
& 080*d*e*f**2*(d/4 - f/8 + \sqrt{3}*I*(4*d - 8*e + f)/72)**2 + 14040*d*f**4*(\\
& d/4 - f/8 + \sqrt{3}*I*(4*d - 8*e + f)/72) + 139968*d*f**2*(d/4 - f/8 + \sqrt{3} \\
& (3)*I*(4*d - 8*e + f)/72)**3 - 20480*e**5*f - 36864*e**4*f*(d/4 - f/8 + \sqrt{3} \\
& t(3)*I*(4*d - 8*e + f)/72) - 2880*e**3*f**3 - 552960*e**3*f*(d/4 - f/8 + \sqrt{3} \\
& rt(3)*I*(4*d - 8*e + f)/72)**2 + 70848*e**2*f**3*(d/4 - f/8 + \sqrt{3}*I*(4* \\
& d - 8*e + f)/72) - 995328*e**2*f*(d/4 - f/8 + \sqrt{3}*I*(4*d - 8*e + f)/72) \\
& **3 + 3956*e*f**5 - 209088*e*f**3*(d/4 - f/8 + \sqrt{3}*I*(4*d - 8*e + f)/72 \\
&)**2 - 3996*f**5*(d/4 - f/8 + \sqrt{3}*I*(4*d - 8*e + f)/72) + 233280*f**3*(\\
& d/4 - f/8 + \sqrt{3}*I*(4*d - 8*e + f)/72)**3)/(53568*d**6 - 69984*d**5*f - \\
& 182528*d**4*e**2 + 23652*d**4*f**2 + 377344*d**3*e**2*f + 5400*d**3*f**3 - \\
& 126976*d**2*e**4 - 278400*d**2*e**2*f**2 - 4131*d**2*f**4 + 102400*d*e**4*f \\
& + 93568*d*e**2*f**3 + 81*d*f**5 - 28672*e**4*f**2 - 11648*e**2*f**4 + 189* \\
& f**6)) + (2*e*x**2 + e + x**3*(-d + 2*f) + x*(d + f))/(6*x**4 + 6*x**2 + 6)
\end{aligned}$$

$$3.33 \quad \int \frac{d+ex+fx^2+gx^3}{(1+x^2+x^4)^2} dx$$

Optimal. Leaf size=179

$$-\frac{1}{8}(2d-f)\log(x^2-x+1)+\frac{1}{8}(2d-f)\log(x^2+x+1)+\frac{x(-(x^2(d-2f))+d+f)}{6(x^4+x^2+1)}-\frac{(4d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}+\frac{(4d+f)\tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{12\sqrt{3}}$$

[Out] 1/6*x*(d+f-(d-2*f)*x^2)/(x^4+x^2+1)+1/6*(e-2*g+(2*e-g)*x^2)/(x^4+x^2+1)-1/8*(2*d-f)*ln(x^2-x+1)+1/8*(2*d-f)*ln(x^2+x+1)-1/36*(4*d+f)*arctan(1/3*(1-2*x))*3^(1/2)*3^(1/2)+1/36*(4*d+f)*arctan(1/3*(1+2*x))*3^(1/2)*3^(1/2)+1/9*(2*e-g)*arctan(1/3*(2*x^2+1))*3^(1/2)*3^(1/2)

Rubi [A] time = 0.14, antiderivative size = 179, normalized size of antiderivative = 1.00, number of steps used = 15, number of rules used = 9, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.346$, Rules used = {1673, 1178, 1169, 634, 618, 204, 628, 1247, 638}

$$\frac{x(x^2(-(d-2f))+d+f)}{6(x^4+x^2+1)}-\frac{1}{8}(2d-f)\log(x^2-x+1)+\frac{1}{8}(2d-f)\log(x^2+x+1)-\frac{(4d+f)\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}+\frac{(4d+f)\tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{12\sqrt{3}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4)^2,x]

[Out] (x*(d + f - (d - 2*f)*x^2))/(6*(1 + x^2 + x^4)) + (e - 2*g + (2*e - g)*x^2)/(6*(1 + x^2 + x^4)) - ((4*d + f)*ArcTan[(1 - 2*x)/Sqrt[3]])/(12*Sqrt[3]) + ((4*d + f)*ArcTan[(1 + 2*x)/Sqrt[3]])/(12*Sqrt[3]) + ((2*e - g)*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - ((2*d - f)*Log[1 - x + x^2])/8 + ((2*d - f)*Log[1 + x + x^2])/8

Rule 204

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 628

```
Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 638

```
Int[((d_) + (e_)*(x_))*((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol
] := Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1169

```
Int[((d_) + (e_)*(x_)^2)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
(d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_)*(x_)^2)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symb
ol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_)*(x_)^2)^(q_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(
p_), x_Symbol] := Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(1 + x^2 + x^4)^2} dx &= \int \frac{d + fx^2}{(1 + x^2 + x^4)^2} dx + \int \frac{x(e + gx^2)}{(1 + x^2 + x^4)^2} dx \\
&= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + (-d + 2f)x^2}{1 + x^2 + x^4} dx + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(1 + x + x^2)} dx \right) \\
&= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{1}{12} \int \frac{5d - f - (6d - 3f)x}{1 - x + x^2} dx + \frac{1}{12} \\
&= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{1}{8}(2d - f) \int \frac{1 + 2x}{1 + x + x^2} dx + \frac{1}{8}(-2) \\
&= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{(2e - g) \tan^{-1} \left(\frac{1+2x^2}{\sqrt{3}} \right)}{3\sqrt{3}} - \frac{1}{8}(2d - f) \\
&= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} - \frac{(4d + f) \tan^{-1} \left(\frac{1-2x}{\sqrt{3}} \right)}{12\sqrt{3}} + \frac{(4d + f) \tan^{-1} \left(\frac{1+2x^2}{\sqrt{3}} \right)}{12\sqrt{3}}
\end{aligned}$$

Mathematica [C] time = 0.43, size = 200, normalized size = 1.12

$$\frac{1}{36} \left(\frac{6(x(-dx^2 + d + 2fx^2 + f) + 2ex^2 + e - g(x^2 + 2))}{x^4 + x^2 + 1} - \frac{((\sqrt{3} - 11i)d - 2(\sqrt{3} - 2i)f) \tan^{-1} \left(\frac{1}{2}(\sqrt{3} - i)x \right)}{\sqrt{\frac{1}{6}(1 + i\sqrt{3})}} \right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4)^2, x]

[Out] ((6*(e + 2*e*x^2 - g*(2 + x^2)) + x*(d + f - d*x^2 + 2*f*x^2))/(1 + x^2 + x^4) - (((-11*I + Sqrt[3])*d - 2*(-2*I + Sqrt[3])*f)*ArcTan[(-I + Sqrt[3])*x])/2)/Sqrt[(1 + I*Sqrt[3])/6] - (((11*I + Sqrt[3])*d - 2*(2*I + Sqrt[3])*f

)*ArcTan[((I + Sqrt[3])*x)/2])/Sqrt[(1 - I*Sqrt[3])/6] - 4*Sqrt[3]*(2*e - g)
)*ArcTan[Sqrt[3]/(1 + 2*x^2)]/36

fricas [A] time = 1.48, size = 239, normalized size = 1.34

$$12(d - 2f)x^3 - 12(2e - g)x^2 - 2\sqrt{3}\left(\left(4d - 8e + f + 4g\right)x^4 + \left(4d - 8e + f + 4g\right)x^2 + 4d - 8e + f + 4g\right) \arctan\left(\frac{\sqrt{3}(2x+1)}{3}\right) - 2\sqrt{3}\left(\left(4d + 8e + f - 4g\right)x^4 + \left(4d + 8e + f - 4g\right)x^2 + 4d + 8e + f - 4g\right) \arctan\left(\frac{\sqrt{3}(2x-1)}{3}\right) - 12(d+f)x - 9\left(\left(2d - f\right)x^4 + \left(2d - f\right)x^2 + 2d - f\right) \log(x^2 + x + 1) + 9\left(\left(2d - f\right)x^4 + \left(2d - f\right)x^2 + 2d - f\right) \log(x^2 - x + 1) - 12e + 24g / (x^4 + x^2 + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="fricas")

[Out] -1/72*(12*(d - 2*f)*x^3 - 12*(2*e - g)*x^2 - 2*sqrt(3)*((4*d - 8*e + f + 4*g)*x^4 + (4*d - 8*e + f + 4*g)*x^2 + 4*d - 8*e + f + 4*g)*arctan(1/3*sqrt(3)*(2*x + 1)) - 2*sqrt(3)*((4*d + 8*e + f - 4*g)*x^4 + (4*d + 8*e + f - 4*g)*x^2 + 4*d + 8*e + f - 4*g)*arctan(1/3*sqrt(3)*(2*x - 1)) - 12*(d + f)*x - 9*((2*d - f)*x^4 + (2*d - f)*x^2 + 2*d - f)*log(x^2 + x + 1) + 9*((2*d - f)*x^4 + (2*d - f)*x^2 + 2*d - f)*log(x^2 - x + 1) - 12*e + 24*g)/(x^4 + x^2 + 1)

giac [A] time = 0.31, size = 142, normalized size = 0.79

$$\frac{1}{36} \sqrt{3} (4d + f + 4g - 8e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{36} \sqrt{3} (4d + f - 4g + 8e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{8} (2d - f) \log(x^2 + x + 1) - \frac{1}{8} (2d - f) \log(x^2 - x + 1) - \frac{1}{6} (d*x^3 - 2*f*x^3 + g*x^2 - 2*x^2*e - d*x - f*x + 2*g - e) / (x^4 + x^2 + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="giac")

[Out] 1/36*sqrt(3)*(4*d + f + 4*g - 8*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/36*sqrt(3)*(4*d + f - 4*g + 8*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/8*(2*d - f)*log(x^2 + x + 1) - 1/8*(2*d - f)*log(x^2 - x + 1) - 1/6*(d*x^3 - 2*f*x^3 + g*x^2 - 2*x^2*e - d*x - f*x + 2*g - e)/(x^4 + x^2 + 1)

maple [A] time = 0.02, size = 260, normalized size = 1.45

$$\frac{\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9} + \frac{\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9} - \frac{d \ln(x^2 - x + 1)}{4} + \frac{d \ln(x^2 + x + 1)}{4} - \frac{2\sqrt{3} e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x)

[Out] 1/4*((-1/3*d-1/3*e-1/3*g+2/3*f)*x-2/3*d+1/3*e-2/3*g+1/3*f)/(x^2+x+1)+1/4*d*ln(x^2+x+1)-1/8*f*ln(x^2+x+1)+1/9*3^(1/2)*d*arctan(1/3*(2*x+1)*3^(1/2))-2/9

$$\begin{aligned} & *3^{(1/2)} * e * \arctan(1/3 * (2*x+1) * 3^{(1/2)}) + 1/36 * 3^{(1/2)} * f * \arctan(1/3 * (2*x+1) * 3^{(1/2)}) \\ & + 1/9 * 3^{(1/2)} * g * \arctan(1/3 * (2*x+1) * 3^{(1/2)}) - 1/4 * ((1/3 * d - 1/3 * e - 1/3 * g - 2/3 * f) * x \\ & - 2/3 * d - 1/3 * e + 2/3 * g + 1/3 * f) / (x^2 - x + 1) - 1/4 * d * \ln(x^2 - x + 1) + 1/8 * f * \ln(x^2 - x + 1) \\ & + 1/9 * 3^{(1/2)} * d * \arctan(1/3 * (2*x-1) * 3^{(1/2)}) + 2/9 * 3^{(1/2)} * e * \arctan(1/3 * (2*x-1) * 3^{(1/2)}) \\ & + 1/36 * 3^{(1/2)} * f * \arctan(1/3 * (2*x-1) * 3^{(1/2)}) - 1/9 * 3^{(1/2)} * g * \arctan(1/3 * (2*x-1) * 3^{(1/2)}) \end{aligned}$$

maxima [A] time = 2.58, size = 135, normalized size = 0.75

$$\frac{1}{36} \sqrt{3} (4d - 8e + f + 4g) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{36} \sqrt{3} (4d + 8e + f - 4g) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{8} (2d - f) \log(x^2 + x + 1) - \frac{1}{8} (2d - f) \log(x^2 - x + 1) - \frac{1}{6} ((d - 2f)x^3 - (2e - g)x^2 - (d + f)x - e + 2g) / (x^4 + x^2 + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="maxima")

[Out] 1/36*sqrt(3)*(4*d - 8*e + f + 4*g)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/36*sqrt(3)*(4*d + 8*e + f - 4*g)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/8*(2*d - f)*log(x^2 + x + 1) - 1/8*(2*d - f)*log(x^2 - x + 1) - 1/6*((d - 2*f)*x^3 - (2*e - g)*x^2 - (d + f)*x - e + 2*g)/(x^4 + x^2 + 1)

mupad [B] time = 1.15, size = 237, normalized size = 1.32

$$\frac{\left(\frac{f}{3} - \frac{d}{6}\right) x^3 + \left(\frac{e}{3} - \frac{g}{6}\right) x^2 + \left(\frac{d}{6} + \frac{f}{6}\right) x + \frac{e}{6} - \frac{g}{3}}{x^4 + x^2 + 1} - \ln\left(x - \frac{1}{2} - \frac{\sqrt{3} \operatorname{Im}}{2}\right) \left(\frac{d}{4} - \frac{f}{8} + \frac{\sqrt{3} d \operatorname{Im}}{18} + \frac{\sqrt{3} e \operatorname{Im}}{9} + \frac{\sqrt{3} f \operatorname{Im}}{72} - \frac{\sqrt{3} g \operatorname{Im}}{18}\right) + \ln\left(x + \frac{1}{2} - \frac{\sqrt{3} \operatorname{Im}}{2}\right) \left(\frac{d}{4} - \frac{f}{8} + \frac{\sqrt{3} d \operatorname{Im}}{18} + \frac{\sqrt{3} e \operatorname{Im}}{9} + \frac{\sqrt{3} f \operatorname{Im}}{72} - \frac{\sqrt{3} g \operatorname{Im}}{18}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3)/(x^2 + x^4 + 1)^2,x)

[Out] (e/6 - g/3 - x^3*(d/6 - f/3) + x^2*(e/3 - g/6) + x*(d/6 + f/6))/(x^2 + x^4 + 1) - log(x - (3^(1/2)*1i)/2 - 1/2)*(d/4 - f/8 + (3^(1/2)*d*1i)/18 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 - (3^(1/2)*g*1i)/18) - log(x - (3^(1/2)*1i)/2 + 1/2)*(f/8 - d/4 + (3^(1/2)*d*1i)/18 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 + (3^(1/2)*g*1i)/18) + log(x + (3^(1/2)*1i)/2 - 1/2)*(f/8 - d/4 + (3^(1/2)*d*1i)/18 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 - (3^(1/2)*g*1i)/18) + log(x + (3^(1/2)*1i)/2 + 1/2)*(d/4 - f/8 + (3^(1/2)*d*1i)/18 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 + (3^(1/2)*g*1i)/18)

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x**3+f*x**2+e*x+d)/(x**4+x**2+1)**2,x)

[Out] Timed out

$$3.34 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{(1+x^2+x^4)^2} dx$$

Optimal. Leaf size=187

$$-\frac{1}{8} \log(x^2 - x + 1)(2d - f + h) + \frac{1}{8} \log(x^2 + x + 1)(2d - f + h) + \frac{x(-x^2(d - 2f + h) + d + f - 2h)}{6(x^4 + x^2 + 1)} - \frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}$$

[Out] 1/6*(e-2*g+(2*e-g)*x^2)/(x^4+x^2+1)+1/6*x*(d+f-2*h-(d-2*f+h)*x^2)/(x^4+x^2+1)-1/8*(2*d-f+h)*ln(x^2-x+1)+1/8*(2*d-f+h)*ln(x^2+x+1)-1/36*(4*d+f+h)*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/36*(4*d+f+h)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+1/9*(2*e-g)*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)

Rubi [A] time = 0.17, antiderivative size = 187, normalized size of antiderivative = 1.00, number of steps used = 15, number of rules used = 9, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.290$, Rules used = {1673, 1678, 1169, 634, 618, 204, 628, 1247, 638}

$$\frac{x(x^2-(d-2f+h)+d+f-2h)}{6(x^4+x^2+1)} - \frac{1}{8} \log(x^2 - x + 1)(2d - f + h) + \frac{1}{8} \log(x^2 + x + 1)(2d - f + h) - \frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4)^2, x]

[Out] (e - 2*g + (2*e - g)*x^2)/(6*(1 + x^2 + x^4)) + (x*(d + f - 2*h - (d - 2*f + h)*x^2))/(6*(1 + x^2 + x^4)) - ((4*d + f + h)*ArcTan[(1 - 2*x)/Sqrt[3]])/(12*Sqrt[3]) + ((4*d + f + h)*ArcTan[(1 + 2*x)/Sqrt[3]])/(12*Sqrt[3]) + ((2*e - g)*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - ((2*d - f + h)*Log[1 - x + x^2])/8 + ((2*d - f + h)*Log[1 + x + x^2])/8

Rule 204

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 628

```
Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 638

```
Int[((d_) + (e_)*(x_))*((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol
] := Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1169

```
Int[((d_) + (e_)*(x_)^2)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
(d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1247

```
Int[(x_)*((d_) + (e_)*(x_)^2)^(q_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(
p_), x_Symbol] := Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := With[{d =
Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
```

```
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]], Simp[(x*(a + b*x^2 + c*x^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\begin{aligned}
 \int \frac{d + ex + fx^2 + gx^3 + hx^4}{(1 + x^2 + x^4)^2} dx &= \int \frac{x(e + gx^2)}{(1 + x^2 + x^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^2} dx \\
 &= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx + \frac{1}{2} \\
 &= \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{12} \int \frac{5d - f + 2h - (-d + 2f - h)x^2}{1 - x^2 - x^4} dx \\
 &= \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{3}(-2e + g) \text{Subst} \left(\int \frac{1}{1 - x^2 - x^4} dx \right) \\
 &= \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{(2e - g) \tan^{-1} \left(\frac{1 + 2x^2}{\sqrt{3}} \right)}{3\sqrt{3}} \\
 &= \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} - \frac{(4d + f + h) \tan^{-1} \left(\frac{1 + 2x^2}{\sqrt{3}} \right)}{12\sqrt{3}}
 \end{aligned}$$

Mathematica [C] time = 0.61, size = 234, normalized size = 1.25

$$\frac{1}{36} \left(\frac{6(x(d(x^2 - 1) - f(2x^2 + 1) + h(x^2 + 2)) - e(2x^2 + 1) + g(x^2 + 2))}{x^4 + x^2 + 1} - \frac{\tan^{-1} \left(\frac{1}{2}(\sqrt{3} - i)x \right) ((\sqrt{3} - 11i) d)}{\sqrt{\frac{1}{6}(1 + \dots)}} \right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4)^2, x]

[Out] ((-6*(g*(2 + x^2) - e*(1 + 2*x^2) + x*(d*(-1 + x^2) + h*(2 + x^2) - f*(1 + 2*x^2))))/(1 + x^2 + x^4) - (((-11*I + Sqrt[3])*d - 2*(-2*I + Sqrt[3])*f +

$$\frac{(-5I + \sqrt{3})h \operatorname{ArcTan}\left[\frac{(-I + \sqrt{3})x}{2}\right] + \sqrt{3}\left[\frac{1 + I\sqrt{3}}{6}\right] - \left(\frac{11I + \sqrt{3}}{6}d - \frac{2(2I + \sqrt{3})f + (5I + \sqrt{3})h}{6}\right) \operatorname{ArcTan}\left[\frac{(I + \sqrt{3})x}{2}\right] + \sqrt{3}\left[\frac{1 - I\sqrt{3}}{6}\right] - 4\sqrt{3}(2e - g) \operatorname{ArcTan}\left[\frac{\sqrt{3}}{1 + 2x^2}\right]}{36}$$

fricas [A] time = 4.34, size = 255, normalized size = 1.36

$$\frac{12(d - 2f + h)x^3 - 12(2e - g)x^2 - 2\sqrt{3}\left((4d - 8e + f + 4g + h)x^4 + (4d - 8e + f + 4g + h)x^2 + 4d - 8e\right)}{\dots}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="fricas")

[Out]
$$-\frac{1}{72}(12(d - 2f + h)x^3 - 12(2e - g)x^2 - 2\sqrt{3}((4d - 8e + f + 4g + h)x^4 + (4d - 8e + f + 4g + h)\arctan(1/3\sqrt{3}(2x + 1)) - 2\sqrt{3}((4d + 8e + f - 4g + h)x^4 + (4d + 8e + f - 4g + h)x^2 + 4d + 8e + f - 4g + h)\arctan(1/3\sqrt{3}(2x - 1)) - 12(d + f - 2h)x - 9((2d - f + h)x^4 + (2d - f + h)x^2 + 2d - f + h)\log(x^2 + x + 1) + 9((2d - f + h)x^4 + (2d - f + h)x^2 + 2d - f + h)\log(x^2 - x + 1) - 12e + 24g)/(x^4 + x^2 + 1))$$

giac [A] time = 0.32, size = 155, normalized size = 0.83

$$\frac{1}{36}\sqrt{3}(4d + f + 4g + h - 8e)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{36}\sqrt{3}(4d + f - 4g + h + 8e)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="giac")

[Out]
$$\frac{1}{36}\sqrt{3}(4d + f + 4g + h - 8e)\arctan(1/3\sqrt{3}(2x + 1)) + \frac{1}{36}\sqrt{3}(4d + f - 4g + h + 8e)\arctan(1/3\sqrt{3}(2x - 1)) + \frac{1}{8}(2d - f + h)\log(x^2 + x + 1) - \frac{1}{8}(2d - f + h)\log(x^2 - x + 1) - \frac{1}{6}(d^3 - 2fx^3 + hx^3 + gx^2 - 2x^2e - dx - fx + 2hx + 2g - e)/(x^4 + x^2 + 1)$$

maple [A] time = 0.02, size = 328, normalized size = 1.75

$$\frac{\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9} + \frac{\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9} - \frac{d \ln(x^2 - x + 1)}{4} + \frac{d \ln(x^2 + x + 1)}{4} - \frac{2\sqrt{3} e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x)

[Out] $\frac{1}{4} * ((-1/3*d+2/3*f-1/3*g-1/3*e-1/3*h)*x-2/3*d+1/3*f-2/3*g+1/3*e+1/3*h)/(x^2+x+1)+1/4*d*\ln(x^2+x+1)-1/8*f*\ln(x^2+x+1)+1/8*\ln(x^2+x+1)*h+1/9*3^{(1/2)}*d*\arctan(1/3*(2*x+1)*3^{(1/2)})-2/9*3^{(1/2)}*e*\arctan(1/3*(2*x+1)*3^{(1/2)})+1/36*3^{(1/2)}*f*\arctan(1/3*(2*x+1)*3^{(1/2)})+1/9*3^{(1/2)}*g*\arctan(1/3*(2*x+1)*3^{(1/2)})+1/36*3^{(1/2)}*h*\arctan(1/3*(2*x+1)*3^{(1/2)})-1/4*((1/3*d-2/3*f-1/3*g-1/3*e+1/3*h)*x-2/3*d+1/3*f+2/3*g-1/3*e+1/3*h)/(x^2-x+1)-1/4*d*\ln(x^2-x+1)+1/8*f*\ln(x^2-x+1)-1/8*\ln(x^2-x+1)*h+1/9*3^{(1/2)}*d*\arctan(1/3*(2*x-1)*3^{(1/2)})+2/9*3^{(1/2)}*e*\arctan(1/3*(2*x-1)*3^{(1/2)})+1/36*3^{(1/2)}*f*\arctan(1/3*(2*x-1)*3^{(1/2)})-1/9*3^{(1/2)}*g*\arctan(1/3*(2*x-1)*3^{(1/2)})+1/36*3^{(1/2)}*h*\arctan(1/3*(2*x-1)*3^{(1/2)})$

maxima [A] time = 2.95, size = 143, normalized size = 0.76

$$\frac{1}{36} \sqrt{3} (4d - 8e + f + 4g + h) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{36} \sqrt{3} (4d + 8e + f - 4g + h) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) +$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^2,x, algorithm="maxima")

[Out] $\frac{1}{36}*\sqrt{3}*(4*d - 8*e + f + 4*g + h)*\arctan(1/3*\sqrt{3}*(2*x + 1)) + \frac{1}{36}*\sqrt{3}*(4*d + 8*e + f - 4*g + h)*\arctan(1/3*\sqrt{3}*(2*x - 1)) + \frac{1}{8}*(2*d - f + h)*\log(x^2 + x + 1) - \frac{1}{8}*(2*d - f + h)*\log(x^2 - x + 1) - \frac{1}{6}*((d - 2*f + h)*x^3 - (2*e - g)*x^2 - (d + f - 2*h)*x - e + 2*g)/(x^4 + x^2 + 1)$

mupad [B] time = 5.35, size = 1547, normalized size = 8.27

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(x^2 + x^4 + 1)^2,x)

[Out] $(e/6 - g/3 + x^2*(e/3 - g/6) + x*(d/6 + f/6 - h/3) - x^3*(d/6 - f/3 + h/6))/(x^2 + x^4 + 1) - \log(60*d*g - 153*d*f - 120*d*e + 24*e*f + 135*d*h - 48*e*h - 12*f*g - 81*f*h + 24*g*h + 3^{(1/2)}*d^2*90i + 3^{(1/2)}*f^2*9i + 3^{(1/2)}*h^2*18i - 198*d^2*x - 36*f^2*x - 45*h^2*x + 126*d^2 + 45*f^2 + 36*h^2 + 3^{(1/2)}*d*e*56i - 3^{(1/2)}*d*f*63i - 3^{(1/2)}*d*g*28i - 3^{(1/2)}*e*f*40i + 3^{(1/2)}*d*h*81i + 3^{(1/2)}*e*h*32i + 3^{(1/2)}*f*g*20i - 3^{(1/2)}*f*h*27i - 3^{(1/2)}*g*h*16i - 24*d*e*x + 171*d*f*x + 12*d*g*x + 48*e*f*x - 189*d*h*x - 24*e*h*x - 24*f*g*x + 81*f*h*x + 12*g*h*x + 3^{(1/2)}*d^2*x*18i + 3^{(1/2)}*f^2*x*18i + 3^{(1/2)}*h^2*x*9i - 3^{(1/2)}*d*f*x*45i + 3^{(1/2)}*d*g*x*44i + 3^{(1/2)}*e*f*x*32i + 3^{(1/2)}*d*h*x*27i - 3^{(1/2)}*e*h*x*40i - 3^{(1/2)}*f*g*x*16i - 3^{(1/2)}*f*h*x*27i + 3^{(1/2)}*g*h*x*20i - 3^{(1/2)}*d*e*x*88i)*(d/4 - f/8 + h/8 + (3^{(1/2)}$

```

*d*1i)/18 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 - (3^(1/2)*g*1i)/18 + (3^(
1/2)*h*1i)/72) - log(120*d*e - 153*d*f - 60*d*g - 24*e*f + 135*d*h + 48*e*h
+ 12*f*g - 81*f*h - 24*g*h - 3^(1/2)*d^2*90i - 3^(1/2)*f^2*9i - 3^(1/2)*h^
2*18i + 198*d^2*x + 36*f^2*x + 45*h^2*x + 126*d^2 + 45*f^2 + 36*h^2 + 3^(1/
2)*d*e*56i + 3^(1/2)*d*f*63i - 3^(1/2)*d*g*28i - 3^(1/2)*e*f*40i - 3^(1/2)*
d*h*81i + 3^(1/2)*e*h*32i + 3^(1/2)*f*g*20i + 3^(1/2)*f*h*27i - 3^(1/2)*g*h
*16i - 24*d*e*x - 171*d*f*x + 12*d*g*x + 48*e*f*x + 189*d*h*x - 24*e*h*x -
24*f*g*x - 81*f*h*x + 12*g*h*x + 3^(1/2)*d^2*x*18i + 3^(1/2)*f^2*x*18i + 3^(
1/2)*h^2*x*9i - 3^(1/2)*d*f*x*45i - 3^(1/2)*d*g*x*44i - 3^(1/2)*e*f*x*32i
+ 3^(1/2)*d*h*x*27i + 3^(1/2)*e*h*x*40i + 3^(1/2)*f*g*x*16i - 3^(1/2)*f*h*x
*27i - 3^(1/2)*g*h*x*20i + 3^(1/2)*d*e*x*88i)*(f/8 - d/4 - h/8 + (3^(1/2)*d
*1i)/18 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 + (3^(1/2)*g*1i)/18 + (3^(1/
2)*h*1i)/72) + log(120*d*e - 153*d*f - 60*d*g - 24*e*f + 135*d*h + 48*e*h +
12*f*g - 81*f*h - 24*g*h + 3^(1/2)*d^2*90i + 3^(1/2)*f^2*9i + 3^(1/2)*h^2*
18i + 198*d^2*x + 36*f^2*x + 45*h^2*x + 126*d^2 + 45*f^2 + 36*h^2 - 3^(1/2)
*d*e*56i - 3^(1/2)*d*f*63i + 3^(1/2)*d*g*28i + 3^(1/2)*e*f*40i + 3^(1/2)*d*
h*81i - 3^(1/2)*e*h*32i - 3^(1/2)*f*g*20i - 3^(1/2)*f*h*27i + 3^(1/2)*g*h*1
6i - 24*d*e*x - 171*d*f*x + 12*d*g*x + 48*e*f*x + 189*d*h*x - 24*e*h*x - 24
*f*g*x - 81*f*h*x + 12*g*h*x - 3^(1/2)*d^2*x*18i - 3^(1/2)*f^2*x*18i - 3^(1
/2)*h^2*x*9i + 3^(1/2)*d*f*x*45i + 3^(1/2)*d*g*x*44i + 3^(1/2)*e*f*x*32i -
3^(1/2)*d*h*x*27i - 3^(1/2)*e*h*x*40i - 3^(1/2)*f*g*x*16i + 3^(1/2)*f*h*x*2
7i + 3^(1/2)*g*h*x*20i - 3^(1/2)*d*e*x*88i)*(d/4 - f/8 + h/8 + (3^(1/2)*d*1
i)/18 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 + (3^(1/2)*g*1i)/18 + (3^(1/2)
*h*1i)/72) + log(120*d*e + 153*d*f - 60*d*g - 24*e*f - 135*d*h + 48*e*h + 1
2*f*g + 81*f*h - 24*g*h + 3^(1/2)*d^2*90i + 3^(1/2)*f^2*9i + 3^(1/2)*h^2*18
i + 198*d^2*x + 36*f^2*x + 45*h^2*x - 126*d^2 - 45*f^2 - 36*h^2 + 3^(1/2)*d
*e*56i - 3^(1/2)*d*f*63i - 3^(1/2)*d*g*28i - 3^(1/2)*e*f*40i + 3^(1/2)*d*h*
81i + 3^(1/2)*e*h*32i + 3^(1/2)*f*g*20i - 3^(1/2)*f*h*27i - 3^(1/2)*g*h*16i
+ 24*d*e*x - 171*d*f*x - 12*d*g*x - 48*e*f*x + 189*d*h*x + 24*e*h*x + 24*f
*g*x - 81*f*h*x - 12*g*h*x + 3^(1/2)*d^2*x*18i + 3^(1/2)*f^2*x*18i + 3^(1/2
)*h^2*x*9i - 3^(1/2)*d*f*x*45i + 3^(1/2)*d*g*x*44i + 3^(1/2)*e*f*x*32i + 3^(
1/2)*d*h*x*27i - 3^(1/2)*e*h*x*40i - 3^(1/2)*f*g*x*16i - 3^(1/2)*f*h*x*27i
+ 3^(1/2)*g*h*x*20i - 3^(1/2)*d*e*x*88i)*(f/8 - d/4 - h/8 + (3^(1/2)*d*1i)
/18 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/72 - (3^(1/2)*g*1i)/18 + (3^(1/2)*h
*1i)/72)

```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(x**4+x**2+1)**2,x)

[Out] Timed out

$$3.35 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(1+x^2+x^4)^2} dx$$

Optimal. Leaf size=194

$$-\frac{1}{8} \log(x^2 - x + 1)(2d - f + h) + \frac{1}{8} \log(x^2 + x + 1)(2d - f + h) + \frac{x(-x^2(d - 2f + h) + d + f - 2h)}{6(x^4 + x^2 + 1)} - \frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}$$

[Out] 1/6*x*(d+f-2*h-(d-2*f+h)*x^2)/(x^4+x^2+1)+1/6*(e-2*g+i+(2*e-g-i)*x^2)/(x^4+x^2+1)-1/8*(2*d-f+h)*ln(x^2-x+1)+1/8*(2*d-f+h)*ln(x^2+x+1)-1/36*(4*d+f+h)*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/36*(4*d+f+h)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+1/9*(2*e-g+2*i)*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)

Rubi [A] time = 0.20, antiderivative size = 194, normalized size of antiderivative = 1.00, number of steps used = 16, number of rules used = 10, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.278$, Rules used = {1673, 1678, 1169, 634, 618, 204, 628, 1663, 1660, 12}

$$\frac{x(x^2(-d-2f+h)+d+f-2h)}{6(x^4+x^2+1)} - \frac{1}{8} \log(x^2 - x + 1)(2d - f + h) + \frac{1}{8} \log(x^2 + x + 1)(2d - f + h) - \frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12\sqrt{3}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4)^2, x]

[Out] (x*(d + f - 2*h - (d - 2*f + h)*x^2))/(6*(1 + x^2 + x^4)) + (e - 2*g + i + (2*e - g - i)*x^2)/(6*(1 + x^2 + x^4)) - ((4*d + f + h)*ArcTan[(1 - 2*x)/Sqrt[3]])/(12*Sqrt[3]) + ((4*d + f + h)*ArcTan[(1 + 2*x)/Sqrt[3]])/(12*Sqrt[3]) + ((2*e - g + 2*i)*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - ((2*d - f + h)*Log[1 - x + x^2])/8 + ((2*d - f + h)*Log[1 + x + x^2])/8

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 204

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := Simp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] := With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r + (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1660

```
Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := With[{Q = PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[Pq, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x + c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}](a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}](a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := With[{d =
Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
+ b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
+ 7)*(b*d - 2*a*e)*x^2, x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 35x^5}{(1 + x^2 + x^4)^2} dx &= \int \frac{x(e + gx^2 + 35x^4)}{(1 + x^2 + x^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^2} dx \\
&= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx \\
&= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{12} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx \\
&= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx \\
&= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} - \frac{1}{8} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx \\
&= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} - \frac{(4d - f + 2h)x^2 + (5d - f + 2h)}{8(1 + x^2 + x^4)}
\end{aligned}$$

Mathematica [C] time = 0.66, size = 243, normalized size = 1.25

$$\frac{1}{36} \left(\frac{6(-dx^3 + dx + 2ex^2 + e + 2fx^3 + fx - g(x^2 + 2) - hx^3 - 2hx - ix^2 + i)}{x^4 + x^2 + 1} - \frac{\tan^{-1}\left(\frac{1}{2}(\sqrt{3} - i)x\right)\left((\sqrt{3} - 11) \sqrt{\frac{1}{6}}\right)}{\sqrt{\frac{1}{6}}}\right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4)^2,x]

[Out] ((6*(e + i + d*x + f*x - 2*h*x + 2*e*x^2 - i*x^2 - d*x^3 + 2*f*x^3 - h*x^3 - g*(2 + x^2)))/(1 + x^2 + x^4) - (((-11*I + Sqrt[3])*d - 2*(-2*I + Sqrt[3])*f + (-5*I + Sqrt[3])*h)*ArcTan[(-I + Sqrt[3])*x/2])/Sqrt[(1 + I*Sqrt[3])/6] - (((11*I + Sqrt[3])*d - 2*(2*I + Sqrt[3])*f + (5*I + Sqrt[3])*h)*ArcTan[(I + Sqrt[3])*x/2])/Sqrt[(1 - I*Sqrt[3])/6] - 4*Sqrt[3]*(2*e - g + 2*i)*ArcTan[Sqrt[3]/(1 + 2*x^2)])/36

fricas [A] time = 19.79, size = 279, normalized size = 1.44

$$\frac{12(d - 2f + h)x^3 - 12(2e - g - i)x^2 - 2\sqrt{3}((4d - 8e + f + 4g + h - 8i)x^4 + (4d - 8e + f + 4g + h - 8i))}{(x^4 + x^2 + 1)^2}$$

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)/(x^4+x^2+1)^2,x, algorithm="fricas")

[Out] -1/72*(12*(d - 2*f + h)*x^3 - 12*(2*e - g - i)*x^2 - 2*sqrt(3)*((4*d - 8*e + f + 4*g + h - 8*i)*x^4 + (4*d - 8*e + f + 4*g + h - 8*i)*x^2 + 4*d - 8*e + f + 4*g + h - 8*i)*arctan(1/3*sqrt(3)*(2*x + 1)) - 2*sqrt(3)*((4*d + 8*e + f - 4*g + h + 8*i)*x^4 + (4*d + 8*e + f - 4*g + h + 8*i)*x^2 + 4*d + 8*e + f - 4*g + h + 8*i)*arctan(1/3*sqrt(3)*(2*x - 1)) - 12*(d + f - 2*h)*x - 9*((2*d - f + h)*x^4 + (2*d - f + h)*x^2 + 2*d - f + h)*log(x^2 + x + 1) + 9*((2*d - f + h)*x^4 + (2*d - f + h)*x^2 + 2*d - f + h)*log(x^2 - x + 1) - 12*e + 24*g - 12*i)/(x^4 + x^2 + 1)

giac [A] time = 0.31, size = 169, normalized size = 0.87

$$\frac{1}{36} \sqrt{3} (4d + f + 4g + h - 8i - 8e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{36} \sqrt{3} (4d + f - 4g + h + 8i + 8e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) - \frac{12(d + f - 2h)x - 9((2d - f + h)x^4 + (2d - f + h)x^2 + 2d - f + h) \log(x^2 + x + 1) + 9((2d - f + h)x^4 + (2d - f + h)x^2 + 2d - f + h) \log(x^2 - x + 1) - 12e + 24g - 12i}{(x^4 + x^2 + 1)^2}$$

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)/(x^4+x^2+1)^2,x, algorithm="giac")

[Out] $\frac{1}{36}\sqrt{3}(4d + f + 4g + h - 8i - 8e)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{36}\sqrt{3}(4d + f - 4g + h + 8i + 8e)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{1}{8}(2d - f + h)\log(x^2 + x + 1) - \frac{1}{8}(2d - f + h)\log(x^2 - x + 1) - \frac{1}{6}(dx^3 - 2fx^3 + hx^3 + gx^2 + ix^2 - 2x^2e - dx - fx + 2hx + 2g - i - e)/(x^4 + x^2 + 1)$

maple [B] time = 0.02, size = 374, normalized size = 1.93

$$\frac{\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9} + \frac{\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9} - \frac{d \ln(x^2 - x + 1)}{4} + \frac{d \ln(x^2 + x + 1)}{4} - \frac{2\sqrt{3} e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9}$$

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)/(x^4+x^2+1)^2,x)`

[Out] $\frac{1}{4}\left(\frac{-1}{3}d - \frac{1}{3}e - \frac{1}{3}g - \frac{1}{3}h + \frac{2}{3}f + \frac{2}{3}i\right)x - \frac{2}{3}d + \frac{1}{3}e - \frac{2}{3}g + \frac{1}{3}h + \frac{1}{3}f + \frac{1}{3}i$
 $\left/\left(x^2 + x + 1\right) + \frac{1}{4}d \ln(x^2 + x + 1) - \frac{1}{8}f \ln(x^2 + x + 1) + \frac{1}{8}h \ln(x^2 + x + 1) + \frac{1}{9}3^{1/2}d \arctan\left(\frac{1}{3}(2x + 1)3^{1/2}\right) - \frac{2}{9}3^{1/2}e \arctan\left(\frac{1}{3}(2x + 1)3^{1/2}\right) + \frac{1}{36}3^{1/2}f \arctan\left(\frac{1}{3}(2x + 1)3^{1/2}\right) + \frac{1}{9}3^{1/2}g \arctan\left(\frac{1}{3}(2x + 1)3^{1/2}\right) + \frac{1}{36}3^{1/2}h \arctan\left(\frac{1}{3}(2x + 1)3^{1/2}\right) - \frac{2}{9}3^{1/2}i \arctan\left(\frac{1}{3}(2x + 1)3^{1/2}\right) - \frac{1}{4}\left(\frac{1}{3}d - \frac{1}{3}e - \frac{1}{3}g + \frac{1}{3}h - \frac{2}{3}f + \frac{2}{3}i\right)x - \frac{2}{3}d - \frac{1}{3}e + \frac{2}{3}g + \frac{1}{3}h + \frac{1}{3}f - \frac{1}{3}i$
 $\left/\left(x^2 - x + 1\right) - \frac{1}{4}d \ln(x^2 - x + 1) + \frac{1}{8}f \ln(x^2 - x + 1) - \frac{1}{8}h \ln(x^2 - x + 1) + \frac{1}{9}3^{1/2}d \arctan\left(\frac{1}{3}(2x - 1)3^{1/2}\right) + \frac{2}{9}3^{1/2}e \arctan\left(\frac{1}{3}(2x - 1)3^{1/2}\right) + \frac{1}{36}3^{1/2}f \arctan\left(\frac{1}{3}(2x - 1)3^{1/2}\right) - \frac{1}{9}3^{1/2}g \arctan\left(\frac{1}{3}(2x - 1)3^{1/2}\right) + \frac{1}{36}3^{1/2}h \arctan\left(\frac{1}{3}(2x - 1)3^{1/2}\right) + \frac{2}{9}3^{1/2}i \arctan\left(\frac{1}{3}(2x - 1)3^{1/2}\right)$

maxima [A] time = 2.63, size = 155, normalized size = 0.80

$$\frac{1}{36}\sqrt{3}(4d - 8e + f + 4g + h - 8i)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{36}\sqrt{3}(4d + 8e + f - 4g + h + 8i)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right)$$

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)/(x^4+x^2+1)^2,x, algorithm="maxima")`

[Out] $\frac{1}{36}\sqrt{3}(4d - 8e + f + 4g + h - 8i)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{36}\sqrt{3}(4d + 8e + f - 4g + h + 8i)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{1}{8}(2d - f + h)\log(x^2 + x + 1) - \frac{1}{8}(2d - f + h)\log(x^2 - x + 1) - \frac{1}{6}\left((d - 2f + h)x^3 - (2e - g - i)x^2 - (d + f - 2h)x - e + 2g - i\right)/(x^4 + x^2 + 1)$

mupad [B] time = 8.18, size = 1894, normalized size = 9.76

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(x^2 + x^4 + 1)^2, x)$

[Out] $(e/6 - g/3 + i/6 + x*(d/6 + f/6 - h/3) - x^3*(d/6 - f/3 + h/6) - x^2*(g/6 - e/3 + i/6))/(x^2 + x^4 + 1) - \log(60*d*g - 153*d*f - 120*d*e + 24*e*f + 135*d*h - 120*d*i - 48*e*h - 12*f*g - 81*f*h + 24*f*i + 24*g*h - 48*h*i + 3^{(1/2)*d^2*90i + 3^{(1/2)*f^2*9i + 3^{(1/2)*h^2*18i - 198*d^2*x - 36*f^2*x - 45*h^2*x + 126*d^2 + 45*f^2 + 36*h^2 + 3^{(1/2)*d*e*56i - 3^{(1/2)*d*f*63i - 3^{(1/2)*d*g*28i - 3^{(1/2)*e*f*40i + 3^{(1/2)*d*h*81i + 3^{(1/2)*d*i*56i + 3^{(1/2)*e*h*32i + 3^{(1/2)*f*g*20i - 3^{(1/2)*f*h*27i - 3^{(1/2)*f*i*40i - 3^{(1/2)*g*h*16i + 3^{(1/2)*h*i*32i - 24*d*e*x + 171*d*f*x + 12*d*g*x + 48*e*f*x - 189*d*h*x - 24*d*i*x - 24*e*h*x - 24*f*g*x + 81*f*h*x + 48*f*i*x + 12*g*h*x - 24*h*i*x + 3^{(1/2)*d^2*x*18i + 3^{(1/2)*f^2*x*18i + 3^{(1/2)*h^2*x*9i - 3^{(1/2)*d*f*x*45i + 3^{(1/2)*d*g*x*44i + 3^{(1/2)*e*f*x*32i + 3^{(1/2)*d*h*x*27i - 3^{(1/2)*d*i*x*88i - 3^{(1/2)*e*h*x*40i - 3^{(1/2)*f*g*x*16i - 3^{(1/2)*f*h*x*27i + 3^{(1/2)*f*i*x*32i + 3^{(1/2)*g*h*x*20i - 3^{(1/2)*h*i*x*40i - 3^{(1/2)*d*e*x*88i})*(d/4 - f/8 + h/8 + (3^{(1/2)*d*1i})/18 + (3^{(1/2)*e*1i})/9 + (3^{(1/2)*f*1i})/72 - (3^{(1/2)*g*1i})/18 + (3^{(1/2)*h*1i})/72 + (3^{(1/2)*i*1i})/9) - \log(120*d*e - 153*d*f - 60*d*g - 24*e*f + 135*d*h + 120*d*i + 48*e*h + 12*f*g - 81*f*h - 24*f*i - 24*g*h + 48*h*i - 3^{(1/2)*d^2*90i - 3^{(1/2)*f^2*9i - 3^{(1/2)*h^2*18i + 198*d^2*x + 36*f^2*x + 45*h^2*x + 126*d^2 + 45*f^2 + 36*h^2 + 3^{(1/2)*d*e*56i + 3^{(1/2)*d*f*63i - 3^{(1/2)*d*g*28i - 3^{(1/2)*e*f*40i - 3^{(1/2)*d*h*81i + 3^{(1/2)*d*i*56i + 3^{(1/2)*e*h*32i + 3^{(1/2)*f*g*20i + 3^{(1/2)*f*h*27i - 3^{(1/2)*f*i*40i - 3^{(1/2)*g*h*16i + 3^{(1/2)*h*i*32i - 24*d*e*x - 171*d*f*x + 12*d*g*x + 48*e*f*x + 189*d*h*x - 24*d*i*x - 24*e*h*x - 24*f*g*x - 81*f*h*x + 48*f*i*x + 12*g*h*x - 24*h*i*x + 3^{(1/2)*d^2*x*18i + 3^{(1/2)*f^2*x*18i + 3^{(1/2)*h^2*x*9i - 3^{(1/2)*d*f*x*45i - 3^{(1/2)*d*g*x*44i - 3^{(1/2)*e*f*x*32i + 3^{(1/2)*d*h*x*27i + 3^{(1/2)*d*i*x*88i + 3^{(1/2)*e*h*x*40i + 3^{(1/2)*f*g*x*16i - 3^{(1/2)*f*h*x*27i - 3^{(1/2)*f*i*x*32i - 3^{(1/2)*g*h*x*20i + 3^{(1/2)*h*i*x*40i + 3^{(1/2)*d*e*x*88i})*(f/8 - d/4 - h/8 + (3^{(1/2)*d*1i})/18 - (3^{(1/2)*e*1i})/9 + (3^{(1/2)*f*1i})/72 + (3^{(1/2)*g*1i})/18 + (3^{(1/2)*h*1i})/72 - (3^{(1/2)*i*1i})/9) + \log(120*d*e - 153*d*f - 60*d*g - 24*e*f + 135*d*h + 120*d*i + 48*e*h + 12*f*g - 81*f*h - 24*f*i - 24*g*h + 48*h*i + 3^{(1/2)*d^2*90i + 3^{(1/2)*f^2*9i + 3^{(1/2)*h^2*18i + 198*d^2*x + 36*f^2*x + 45*h^2*x + 126*d^2 + 45*f^2 + 36*h^2 - 3^{(1/2)*d*e*56i - 3^{(1/2)*d*f*63i + 3^{(1/2)*d*g*28i + 3^{(1/2)*e*f*40i + 3^{(1/2)*d*h*81i - 3^{(1/2)*d*i*56i - 3^{(1/2)*e*h*32i - 3^{(1/2)*f*g*20i - 3^{(1/2)*f*h*27i + 3^{(1/2)*f*i*40i + 3^{(1/2)*g*h*16i - 3^{(1/2)*h*i*32i - 24*d*e*x - 171*d*f*x + 12*d*g*x + 48*e*f*x + 189*d*h*x - 24*d*i*x - 24*e*h*x - 24*f*g*x - 81*f*h*x + 48*f*i*x + 12*g*h*x - 24*h*i*x - 3^{(1/2)*d^2*x*18i - 3^{(1/2)*f^2*x*18i - 3^{(1/2)*h^2*x*9i + 3^{(1/2)*d*f*x*45i + 3^{(1/2)*d*g*x*44i + 3^{(1/2)*e*f*x*32i - 3^{(1/2)*d*h*x*27i - 3^{(1/2)*d*i*x*88i - 3^{(1/2)*e*h*x*40i - 3^{(1/2)*f*g*x*16i + 3^{(1/2)*f*h*x*27i + 3^{(1/2)*f*i*x*32i + 3^{(1/2)*g*h*x*20i - 3^{(1/2)*h*i*x*40i - 3^{(1/2)*d*e*x*88i})*(d/4 - f/8 + h/8 + (3^{(1/2)*d*1i})/18 - (3^{(1/2)*e*1i})/9$

$$\begin{aligned}
& + (3^{(1/2)}*f*1i)/72 + (3^{(1/2)}*g*1i)/18 + (3^{(1/2)}*h*1i)/72 - (3^{(1/2)}*i*1i) \\
&)/9 + \log(120*d*e + 153*d*f - 60*d*g - 24*e*f - 135*d*h + 120*d*i + 48*e*h \\
& + 12*f*g + 81*f*h - 24*f*i - 24*g*h + 48*h*i + 3^{(1/2)}*d^2*90i + 3^{(1/2)}*f \\
& ^2*9i + 3^{(1/2)}*h^2*18i + 198*d^2*x + 36*f^2*x + 45*h^2*x - 126*d^2 - 45*f^2 \\
& - 36*h^2 + 3^{(1/2)}*d*e*56i - 3^{(1/2)}*d*f*63i - 3^{(1/2)}*d*g*28i - 3^{(1/2)}* \\
& e*f*40i + 3^{(1/2)}*d*h*81i + 3^{(1/2)}*d*i*56i + 3^{(1/2)}*e*h*32i + 3^{(1/2)}*f*g \\
& *20i - 3^{(1/2)}*f*h*27i - 3^{(1/2)}*f*i*40i - 3^{(1/2)}*g*h*16i + 3^{(1/2)}*h*i*32 \\
& i + 24*d*e*x - 171*d*f*x - 12*d*g*x - 48*e*f*x + 189*d*h*x + 24*d*i*x + 24* \\
& e*h*x + 24*f*g*x - 81*f*h*x - 48*f*i*x - 12*g*h*x + 24*h*i*x + 3^{(1/2)}*d^2* \\
& x*18i + 3^{(1/2)}*f^2*x*18i + 3^{(1/2)}*h^2*x*9i - 3^{(1/2)}*d*f*x*45i + 3^{(1/2)}* \\
& d*g*x*44i + 3^{(1/2)}*e*f*x*32i + 3^{(1/2)}*d*h*x*27i - 3^{(1/2)}*d*i*x*88i - 3^{(1/2)} \\
& *e*h*x*40i - 3^{(1/2)}*f*g*x*16i - 3^{(1/2)}*f*h*x*27i + 3^{(1/2)}*f*i*x*32i \\
& + 3^{(1/2)}*g*h*x*20i - 3^{(1/2)}*h*i*x*40i - 3^{(1/2)}*d*e*x*88i)*(f/8 - d/4 - h \\
& /8 + (3^{(1/2)}*d*1i)/18 + (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/72 - (3^{(1/2)}*g* \\
& 1i)/18 + (3^{(1/2)}*h*1i)/72 + (3^{(1/2)}*i*1i)/9)
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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)/(x**4+x**2+1)**2,x)

[Out] Timed out

$$3.36 \quad \int \frac{d+ex}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=330

$$\frac{dx(-2ac + b^2 + bcx^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}d(b\sqrt{b^2 - 4ac} - 12ac + b^2) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right)}{2\sqrt{2}a(b^2 - 4ac)^{3/2}\sqrt{b - \sqrt{b^2 - 4ac}}} - \frac{\sqrt{c}d(-b\sqrt{b^2 - 4ac} - 12ac)}{2\sqrt{2}a(b^2 - 4ac)^{3/2}}$$

[Out] $-1/2*e*(2*c*x^2+b)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*d*x*(b*c*x^2-2*a*c+b^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+2*c*e*\operatorname{arctanh}((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/(-4*a*c+b^2)^{(3/2)}+1/4*d*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)})*c^{(1/2)}*(b^2-12*a*c+b*(-4*a*c+b^2)^{(1/2)})/a/(-4*a*c+b^2)^{(3/2)}*2^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)}-1/4*d*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)})*c^{(1/2)}*(b^2-12*a*c-b*(-4*a*c+b^2)^{(1/2)})/a/(-4*a*c+b^2)^{(3/2)}*2^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)}$

Rubi [A] time = 0.74, antiderivative size = 330, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.450$, Rules used = {1673, 12, 1092, 1166, 205, 1107, 614, 618, 206}

$$\frac{dx(-2ac + b^2 + bcx^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}d(b\sqrt{b^2 - 4ac} - 12ac + b^2) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right)}{2\sqrt{2}a(b^2 - 4ac)^{3/2}\sqrt{b - \sqrt{b^2 - 4ac}}} - \frac{\sqrt{c}d(-b\sqrt{b^2 - 4ac} - 12ac)}{2\sqrt{2}a(b^2 - 4ac)^{3/2}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x)/(a + b*x^2 + c*x^4)^2,x]

[Out] $-(e*(b + 2*c*x^2))/(2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (d*x*(b^2 - 2*a*c + b*c*x^2))/(2*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (\operatorname{Sqrt}[c]*(b^2 - 12*a*c + b*\operatorname{Sqrt}[b^2 - 4*a*c])*d*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]])/(2*\operatorname{Sqrt}[2]*a*(b^2 - 4*a*c)^{(3/2)}*\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]) - (\operatorname{Sqrt}[c]*(b^2 - 12*a*c - b*\operatorname{Sqrt}[b^2 - 4*a*c])*d*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]])/(2*\operatorname{Sqrt}[2]*a*(b^2 - 4*a*c)^{(3/2)}*\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]) + (2*c*e*\operatorname{ArcTanh}[(b + 2*c*x^2)/\operatorname{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c)^{(3/2)}$

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_) /; FreeQ[b, x]]

Rule 205

$\text{Int}[(a_ + (b_ \cdot)(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(\text{Rt}[a/b, 2] \cdot \text{ArcTan}[x/\text{Rt}[a/b, 2]])/a, x] /; \text{FreeQ}[\{a, b\}, x] \ \&\& \ \text{PosQ}[a/b]$

Rule 206

$\text{Int}[(a_ + (b_ \cdot)(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(1 \cdot \text{ArcTanh}[(\text{Rt}[-b, 2] \cdot x)/\text{Rt}[a, 2]])/(\text{Rt}[a, 2] \cdot \text{Rt}[-b, 2]), x] /; \text{FreeQ}[\{a, b\}, x] \ \&\& \ \text{NegQ}[a/b] \ \&\& \ (\text{GtQ}[a, 0] \ || \ \text{LtQ}[b, 0])$

Rule 614

$\text{Int}[(a_ \cdot + (b_ \cdot)(x_) + (c_ \cdot)(x_)^2)^{(p_)}, x_Symbol] \rightarrow \text{Simp}[(b + 2 \cdot c \cdot x) \cdot (a + b \cdot x + c \cdot x^2)^{(p + 1)} / ((p + 1) \cdot (b^2 - 4 \cdot a \cdot c)), x] - \text{Dist}[(2 \cdot c \cdot (2 \cdot p + 3)) / ((p + 1) \cdot (b^2 - 4 \cdot a \cdot c)), \text{Int}[(a + b \cdot x + c \cdot x^2)^{(p + 1)}, x], x] /; \text{FreeQ}[\{a, b, c\}, x] \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{NeQ}[p, -3/2] \ \&\& \ \text{IntegerQ}[4 \cdot p]$

Rule 618

$\text{Int}[(a_ \cdot + (b_ \cdot)(x_) + (c_ \cdot)(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Dist}[-2, \text{Subst}[\text{Int}[1/\text{Simp}[b^2 - 4 \cdot a \cdot c - x^2, x], x], x, b + 2 \cdot c \cdot x], x] /; \text{FreeQ}[\{a, b, c\}, x] \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0]$

Rule 1092

$\text{Int}[(a_ + (b_ \cdot)(x_)^2 + (c_ \cdot)(x_)^4)^{(p_)}, x_Symbol] \rightarrow -\text{Simp}[(x \cdot (b^2 - 2 \cdot a \cdot c + b \cdot c \cdot x^2) \cdot (a + b \cdot x^2 + c \cdot x^4)^{(p + 1)}) / (2 \cdot a \cdot (p + 1) \cdot (b^2 - 4 \cdot a \cdot c)), x] + \text{Dist}[1 / (2 \cdot a \cdot (p + 1) \cdot (b^2 - 4 \cdot a \cdot c)), \text{Int}[(b^2 - 2 \cdot a \cdot c + 2 \cdot (p + 1) \cdot (b^2 - 4 \cdot a \cdot c) + b \cdot c \cdot (4 \cdot p + 7) \cdot x^2) \cdot (a + b \cdot x^2 + c \cdot x^4)^{(p + 1)}, x], x] /; \text{FreeQ}[\{a, b, c\}, x] \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{IntegerQ}[2 \cdot p]$

Rule 1107

$\text{Int}[(x_) \cdot ((a_ + (b_ \cdot)(x_)^2 + (c_ \cdot)(x_)^4)^{(p_)}), x_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[(a + b \cdot x + c \cdot x^2)^p, x], x, x^2], x] /; \text{FreeQ}[\{a, b, c, p\}, x]$

Rule 1166

$\text{Int}[(d_ + (e_ \cdot)(x_)^2) / ((a_ + (b_ \cdot)(x_)^2 + (c_ \cdot)(x_)^4), x_Symbol] \rightarrow \text{With}[\{q = \text{Rt}[b^2 - 4 \cdot a \cdot c, 2]\}, \text{Dist}[e/2 + (2 \cdot c \cdot d - b \cdot e) / (2 \cdot q), \text{Int}[1 / (b/2 - q/2 + c \cdot x^2), x], x] + \text{Dist}[e/2 - (2 \cdot c \cdot d - b \cdot e) / (2 \cdot q), \text{Int}[1 / (b/2 + q/2 + c \cdot x^2), x], x]] /; \text{FreeQ}[\{a, b, c, d, e\}, x] \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0] \ \&\& \ \text{NeQ}[e, 0]$

$Q[c*d^2 - a*e^2, 0] \ \&\& \ \text{PosQ}[b^2 - 4*a*c]$

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
 \int \frac{d + ex}{(a + bx^2 + cx^4)^2} dx &= \int \frac{d}{(a + bx^2 + cx^4)^2} dx + \int \frac{ex}{(a + bx^2 + cx^4)^2} dx \\
 &= d \int \frac{1}{(a + bx^2 + cx^4)^2} dx + e \int \frac{x}{(a + bx^2 + cx^4)^2} dx \\
 &= \frac{dx(b^2 - 2ac + bcx^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{d \int \frac{b^2 - 2ac - 2(b^2 - 4ac) - bcx^2}{a + bx^2 + cx^4} dx}{2a(b^2 - 4ac)} + \frac{1}{2} e \text{Subst} \left(\int \frac{1}{(a + bx + c)} \right. \\
 &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{dx(b^2 - 2ac + bcx^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{(c(b^2 - 12ac - b\sqrt{b^2 - 4ac}))}{4a} \\
 &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{dx(b^2 - 2ac + bcx^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(b^2 - 12ac + b\sqrt{b^2 - 4ac})}{2\sqrt{2}a(b^2 - 4ac)} \\
 &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{dx(b^2 - 2ac + bcx^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(b^2 - 12ac + b\sqrt{b^2 - 4ac})}{2\sqrt{2}a(b^2 - 4ac)}
 \end{aligned}$$

Mathematica [A] time = 0.76, size = 341, normalized size = 1.03

$$\frac{1}{4} \left(\frac{2abe + 4acx(d + ex) - 2bdx(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)} + \frac{\sqrt{2}\sqrt{c}d(b\sqrt{b^2 - 4ac} - 12ac + b^2) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{a(b^2 - 4ac)^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\sqrt{2}\sqrt{c}d}{2\sqrt{2}a(b^2 - 4ac)} \right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(d + e*x)/(a + b*x^2 + c*x^4)^2,x]
```

```
[Out] ((2*a*b*e + 4*a*c*x*(d + e*x) - 2*b*d*x*(b + c*x^2))/(a*(-b^2 + 4*a*c)*(a +
b*x^2 + c*x^4)) + (Sqrt[2]*Sqrt[c]*(b^2 - 12*a*c + b*Sqrt[b^2 - 4*a*c])*d*
ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(a*(b^2 - 4*a*c)^(
3/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[2]*Sqrt[c]*(-b^2 + 12*a*c + b*Sqr
t[b^2 - 4*a*c])*d*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(
a*(b^2 - 4*a*c)^(3/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - (4*c*e*Log[-b + Sqrt[
b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(3/2) + (4*c*e*Log[b + Sqrt[b^2 - 4*
a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(3/2))/4
```

```
fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00
```

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="fricas")
```

```
[Out] Timed out
```

```
giac [B] time = 5.02, size = 3434, normalized size = 10.41
```

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="giac")
```

```
[Out] 1/2*(b*c*d*x^3 - 2*a*c*x^2*e + b^2*d*x - 2*a*c*d*x - a*b*e)/((c*x^4 + b*x^2
+ a)*(a*b^2 - 4*a^2*c)) + 1/16*((2*b^3*c^2 - 8*a*b*c^3 - sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*
sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*
c + sqrt(b^2 - 4*a*c)*c)*b^2*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(
b^2 - 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*(a*b^2 - 4*a^2*c)^2*d + 2*(s
qrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^6 - 14*sqrt(2)*sqrt(b*c + sqrt(b
^2 - 4*a*c)*c)*a^2*b^4*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b^5*
c - 2*a*b^6*c + 64*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b^2*c^2 + 20
*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^3*c^2 + sqrt(2)*sqrt(b*c + s
qrt(b^2 - 4*a*c)*c)*a*b^4*c^2 + 28*a^2*b^4*c^2 - 96*sqrt(2)*sqrt(b*c + sqrt
(b^2 - 4*a*c)*c)*a^4*c^3 - 48*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*b
*c^3 - 10*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^2*b^2*c^3 - 128*a^3*b^2
*c^3 + 24*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a^3*c^4 + 192*a^4*c^4 + 2
*(b^2 - 4*a*c)*a*b^4*c - 20*(b^2 - 4*a*c)*a^2*b^2*c^2 + 48*(b^2 - 4*a*c)*a^
3*c^3)*d*abs(a*b^2 - 4*a^2*c) + (2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b
```

$$\begin{aligned}
&^3c^4 - 384a^5bc^5 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&ac)a^2b^7 + 20\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^3b^5c + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^2b^6c - 112\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^4b^3c^2 - 32\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^3b^4c^2 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^2 \\
&b^5c^2 + 192\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^5 \\
&bc^3 + 96\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^4 \\
&b^2c^3 + 16\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^3 \\
&b^3c^3 - 48\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}} \\
&c)a^4 \\
&bc^4 - 2(b^2 - 4ac)a^2b^5c^2 + 32(b^2 - 4ac)a^3b^3c^3 - 96(b^2 \\
&- 4ac)a^4bc^4)d \arctan(2\sqrt{1/2}x/\sqrt{(ab^3 - 4a^2bc + \sqrt{2} \\
&\sqrt{(ab^3 - 4a^2bc)^2 - 4(a^2b^2 - 4a^3c)(ab^2c - 4a^2c^2)})) / (a \\
&b^2c - 4a^2c^2)) / ((a^3b^6 - 12a^4b^4c - 2a^3b^5c + 48a^5b^2c^2 \\
&+ 16a^4b^3c^2 + a^3b^4c^2 - 64a^6c^3 - 32a^5bc^3 - 8a^4b^2c^3 \\
&+ 16a^5c^4) \operatorname{abs}(ab^2 - 4a^2c) \operatorname{abs}(c)) - 1/16((2b^3c^2 - 8ab^2c^3 \\
&- \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}})b^3 + 4\sqrt{2} \\
&\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}})ab^2c + 2\sqrt{2}\sqrt{2} \\
&\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}})b^2c - \sqrt{2}\sqrt{b^2 - 4a \\
&ac}\sqrt{bc - \sqrt{b^2 - 4ac}})b^2c^2 - 2(b^2 - 4ac)b^2c^2)(ab^2 - \\
&4a^2c)^2d - 2(\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})ab^6 - 14\sqrt{2} \\
&\sqrt{bc - \sqrt{b^2 - 4ac}})a^2b^4c - 2\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4a \\
&ac}})a^2b^5c + 2a^2b^6c + 64\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}} \\
&c)a^3b^2c^2 + 20\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})a^2b^3c^2 + \\
&\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})a^2b^4c^2 - 28a^2b^4c^2 - 96\sqrt{2} \\
&\sqrt{bc - \sqrt{b^2 - 4ac}})a^4c^3 - 48\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4a \\
&ac}})a^3b^2c^3 - 10\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})a^2b^ \\
&^2c^3 + 128a^3b^2c^3 + 24\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})a^3c \\
&^4 - 192a^4c^4 - 2(b^2 - 4ac)ab^4c + 20(b^2 - 4ac)a^2b^2c^2 - \\
&48(b^2 - 4ac)a^3c^3)d \operatorname{abs}(ab^2 - 4a^2c) + (2a^2b^7c^2 - 40a^3 \\
&b^5c^3 + 224a^4b^3c^4 - 384a^5bc^5 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{ \\
&bc - \sqrt{b^2 - 4ac}})a^2b^7 + 20\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc \\
&- \sqrt{b^2 - 4ac}})a^3b^5c + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \\
&\sqrt{b^2 - 4ac}})a^2b^6c - 112\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \\
&\sqrt{b^2 - 4ac}})a^4b^3c^2 - 32\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \\
&\sqrt{b^2 - 4ac}})a^3b^4c^2 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \\
&\sqrt{b^2 - 4ac}})a^2b^5c^2 + 192\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \\
&\sqrt{b^2 - 4ac}})a^5bc^3 + 96\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \\
&\sqrt{b^2 - 4ac}})a^4b^2c^3 + 16\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \\
&\sqrt{b^2 - 4ac}})a^3b^3c^3 - 48\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \\
&\sqrt{b^2 - 4ac}})a^4bc^4 - 2(b^2 - 4ac)a^2b^5c^2 + 32(b^2 - 4ac) \\
&a^3b^3c^3 - 96(b^2 - 4ac)a^4bc^4)d \arctan(2\sqrt{1/2}x/\sqrt{(ab \\
&^3 - 4a^2bc - \sqrt{(ab^3 - 4a^2bc)^2 - 4(a^2b^2 - 4a^3c)(ab^2c \\
&- 4a^2c^2)})) / (ab^2c - 4a^2c^2)) / ((a^3b^6 - 12a^4b^4c - 2a^3b \\
&^5c + 48a^5b^2c^2 + 16a^4b^3c^2 + a^3b^4c^2 - 64a^6c^3 - 32a^5 \\
\end{aligned}$$

$$\begin{aligned}
& b^3c^3 - 8a^4b^2c^3 + 16a^5c^4) \cdot \text{abs}(a^2b^2 - 4a^2c) \cdot \text{abs}(c) - 1/4 \cdot ((b^3c^2 - 4a^2b^2c^3 - 2b^2c^3 + b^2c^4 + (b^2c^2 - 4a^2c^3 - 2b^2c^3 + c^4) \\
& \cdot \text{sqrt}(b^2 - 4a^2c)) \cdot \text{abs}(a^2b^2 - 4a^2c) \cdot e - (a^2b^5c^2 - 8a^2b^3c^3 - 2a^2b^4c^3 + 16a^3b^2c^4 + 8a^2b^2c^4 + a^2b^3c^4 - 4a^2b^2c^5 + (a^2b^4c^2 - 4a^2b^2c^3 - 2a^2b^3c^3 + a^2b^2c^4) \cdot \text{sqrt}(b^2 - 4a^2c)) \cdot e) \cdot \log(x^2 + 1/2 \cdot (a^2b^3 - 4a^2b^2c + \text{sqrt}((a^2b^3 - 4a^2b^2c)^2 - 4 \cdot (a^2b^2 - 4a^3c) \cdot (a^2b^2c - 4a^2c^2))) / (a^2b^2c - 4a^2c^2)) / ((a^2b^4 - 8a^2b^2c - 2a^2b^3c + 16a^3c^2 + 8a^2b^2c^2 + a^2b^2c^2 - 4a^2c^3) \cdot c^2 \cdot \text{abs}(a^2b^2 - 4a^2c)) - 1/4 \cdot ((b^3c^2 - 4a^2b^2c^3 - 2b^2c^3 + b^2c^4 - (b^2c^2 - 4a^2c^3 - 2b^2c^3 + c^4) \cdot \text{sqrt}(b^2 - 4a^2c)) \cdot \text{abs}(a^2b^2 - 4a^2c) \cdot e - (a^2b^5c^2 - 8a^2b^3c^3 - 2a^2b^4c^3 + 16a^3b^2c^4 + 8a^2b^2c^4 + a^2b^3c^4 - 4a^2b^2c^5 - (a^2b^4c^2 - 4a^2b^2c^3 - 2a^2b^3c^3 + a^2b^2c^4) \cdot \text{sqrt}(b^2 - 4a^2c)) \cdot e) \cdot \log(x^2 + 1/2 \cdot (a^2b^3 - 4a^2b^2c - \text{sqrt}((a^2b^3 - 4a^2b^2c)^2 - 4 \cdot (a^2b^2 - 4a^3c) \cdot (a^2b^2c - 4a^2c^2))) / (a^2b^2c - 4a^2c^2)) / ((a^2b^4 - 8a^2b^2c - 2a^2b^3c + 16a^3c^2 + 8a^2b^2c^2 + a^2b^2c^2 - 4a^2c^3) \cdot c^2 \cdot \text{abs}(a^2b^2 - 4a^2c))
\end{aligned}$$

maple [B] time = 0.14, size = 1237, normalized size = 3.75

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((e^x+d)/(c^2x^4+b^2x^2+a)^2, x)$

[Out] $\begin{aligned}
& c/(4a^2c-b^2)^2/(x^2+1/2b/c+1/2*(-4a^2c+b^2)^{1/2}/c) \cdot d^2x \cdot (-4a^2c+b^2)^{1/2} \\
& - 1/4/(4a^2c-b^2)^2/(x^2+1/2b/c+1/2*(-4a^2c+b^2)^{1/2}/c) \cdot a^2d^2x \cdot b^2 \cdot (-4a^2c+b^2)^{1/2} - c/(4a^2c-b^2)^2/(x^2+1/2b/c+1/2*(-4a^2c+b^2)^{1/2}/c) \cdot d^2x \cdot b^2 \\
& + 1/4/(4a^2c-b^2)^2/(x^2+1/2b/c+1/2*(-4a^2c+b^2)^{1/2}/c) \cdot a^2d^2x \cdot b^3+2c/(4a^2c-b^2)^2/(x^2+1/2b/c+1/2*(-4a^2c+b^2)^{1/2}/c) \cdot e^a-1/2/(4a^2c-b^2)^2/(x^2+1/2b/c+1/2*(-4a^2c+b^2)^{1/2}/c) \cdot e^b+2c/(4a^2c-b^2)^2 \cdot e^c \cdot (-4a^2c+b^2)^{1/2} \\
& \cdot \ln(2 \cdot c^2x^2+b+(-4a^2c+b^2)^{1/2})+3c^2/(4a^2c-b^2)^2 \cdot 2^{1/2}/((b+(-4a^2c+b^2)^{1/2}) \cdot c)^{1/2} \cdot \arctan(2^{1/2}/((b+(-4a^2c+b^2)^{1/2}) \cdot c)^{1/2} \cdot c^2x) \cdot (-4a^2c+b^2)^{1/2} \\
& \cdot d-1/4c/(4a^2c-b^2)^2 \cdot a^2 \cdot 2^{1/2}/((b+(-4a^2c+b^2)^{1/2}) \cdot c)^{1/2} \cdot \arctan(2^{1/2}/((b+(-4a^2c+b^2)^{1/2}) \cdot c)^{1/2} \cdot c^2x) \cdot (-4a^2c+b^2)^{1/2} \cdot b^2 \cdot d-c^2/(4a^2c-b^2)^2 \cdot 2^{1/2}/((b+(-4a^2c+b^2)^{1/2}) \cdot c)^{1/2} \cdot \arctan(2^{1/2}/((b+(-4a^2c+b^2)^{1/2}) \cdot c)^{1/2} \cdot c^2x) \cdot b^2 \cdot d+1/4c/(4a^2c-b^2)^2 \cdot a^2 \cdot 2^{1/2}/((b+(-4a^2c+b^2)^{1/2}) \cdot c)^{1/2} \cdot \arctan(2^{1/2}/((b+(-4a^2c+b^2)^{1/2}) \cdot c)^{1/2} \cdot c^2x) \cdot b^3 \cdot d-c/(4a^2c-b^2)^2/(x^2+1/2b/c-1/2*(-4a^2c+b^2)^{1/2}/c) \cdot d^2x \cdot (-4a^2c+b^2)^{1/2}+1/4/(4a^2c-b^2)^2/(x^2+1/2b/c-1/2*(-4a^2c+b^2)^{1/2}/c) \cdot a^2d^2x \cdot b^2 \cdot (-4a^2c+b^2)^{1/2} - c/(4a^2c-b^2)^2/(x^2+1/2b/c-1/2*(-4a^2c+b^2)^{1/2}/c) \cdot d^2x \cdot b^2+1/4/(4a^2c-b^2)^2/(x^2+1/2b/c-1/2*(-4a^2c+b^2)^{1/2}/c) \cdot a^2d^2x \cdot b^3+2c/(4a^2c-b^2)^2/(x^2+1/2b/c-1/2*(-4a^2c+b^2)^{1/2}/c) \cdot e^a-1/2/(4a^2c-b^2)^2/(x^2+1/2b/c-1/2*(-4a^2c+b^2)^{1/2}/c) \cdot e^b+2c/(4a^2c-b^2)^2 \cdot e^c \cdot (-4a^2c+b^2)^{1/2} \cdot \ln(-2 \cdot c^2x^2-b+(-4a^2c+b^2)^{1/2})+3c^2/(4a^2c-b^2)^2 \cdot 2^{1/2}/((-b+(-4a^2c+b^2)^{1/2}) \cdot c)^{1/2} \cdot \text{arctanh}(2^{1/2}/((-b+(-4a^2c+b^2)^{1/2}) \cdot c)^{1/2})
\end{aligned}$

$$\begin{aligned} & *c+b^2)^{(1/2)} *c)^{(1/2)} *c*x) *(-4*a*c+b^2)^{(1/2)} *d-1/4*c/(4*a*c-b^2)^2/a*2^{(1/2)} /((-b+(-4*a*c+b^2)^{(1/2)} *c)^{(1/2)} *arctanh(2^{(1/2)} /((-b+(-4*a*c+b^2)^{(1/2)} *c)^{(1/2)} *c*x) *(-4*a*c+b^2)^{(1/2)} *b^2*d+c^2/(4*a*c-b^2)^2*2^{(1/2)} /((-b+(-4*a*c+b^2)^{(1/2)} *c)^{(1/2)} *arctanh(2^{(1/2)} /((-b+(-4*a*c+b^2)^{(1/2)} *c)^{(1/2)} *c*x) *b*d-1/4*c/(4*a*c-b^2)^2/a*2^{(1/2)} /((-b+(-4*a*c+b^2)^{(1/2)} *c)^{(1/2)} *arctanh(2^{(1/2)} /((-b+(-4*a*c+b^2)^{(1/2)} *c)^{(1/2)} *c*x) *b^3*d \end{aligned}$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="maxima")

[Out] $1/2*(b*c*d*x^3 - 2*a*c*e*x^2 - a*b*e + (b^2 - 2*a*c)*d*x)/((a*b^2*c - 4*a^2*c^2)*x^4 + a^2*b^2 - 4*a^3*c + (a*b^3 - 4*a^2*b*c)*x^2) + 1/2*integrate((b*c*d*x^2 - 4*a*c*e*x + (b^2 - 6*a*c)*d)/(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c)$

mupad [B] time = 1.50, size = 2382, normalized size = 7.22

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x)/(a + b*x^2 + c*x^4)^2,x)

[Out] $((b*e)/(2*(4*a*c - b^2)) + (c*e*x^2)/(4*a*c - b^2) + (d*x*(2*a*c - b^2))/(2*a*(4*a*c - b^2)) - (b*c*d*x^3)/(2*a*(4*a*c - b^2)))/(a + b*x^2 + c*x^4) + \text{symsum}(\log((5*b^3*c^4*d^3 - 96*a^2*c^5*d*e^2 - 36*a*b*c^5*d^3 + 16*a*b^2*c^4*d*e^2)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - \text{root}(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 61440*a^5*b*c^5*d^2*z^2 + 432*a*b^9*c*d^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*b^11*d^2*z^2 - 672*a*b^6*c^2*d^2*e*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 - 16*b^5*c^2*d^2*e^2 + 360*a*b^2*c^4*d^4 - 256*a^3*c^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k)*(\text{root}(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 61440*a^5*b*c^5*d^2*z^2 + 432*a*b^9*c*d^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*b^11*d^2*z^2 - 672*a*b^6*c^2*d^2*d$

$$\begin{aligned}
&^2*e*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 \\
&- 16*b^5*c^2*d^2*e^2 + 360*a*b^2*c^4*d^4 - 256*a^3*c^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k) * ((x*(1024*a^5*c^6*e - 16*a^2*b^6*c^3*e + 192*a^3*b^4*c^4*e - 768*a^4*b^2*c^5*e)) / (2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - (6144*a^5*c^6*d - 288*a^2*b^6*c^3*d + 1920*a^3*b^4*c^4*d - 5632*a^4*b^2*c^5*d + 16*a*b^8*c^2*d) / (8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) + (\text{root}(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 61440*a^5*b*c^5*d^2*z^2 + 432*a*b^9*c*d^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*b^11*d^2*z^2 - 672*a*b^6*c^2*d^2*e*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 - 16*b^5*c^2*d^2*e^2 + 360*a*b^2*c^4*d^4 - 256*a^3*c^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k) * x * (4096*a^6*b*c^6 + 16*a^2*b^9*c^2 - 256*a^3*b^7*c^3 + 1536*a^4*b^5*c^4 - 4096*a^5*b^3*c^5)) / (2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) + (32*a*b^5*c^3*d*e + 1024*a^3*b*c^5*d*e - 384*a^2*b^3*c^4*d*e) / (8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - (x*(288*a^3*c^6*d^2 - b^6*c^3*d^2 + 18*a*b^4*c^4*d^2 - 64*a^3*b*c^5*e^2 - 128*a^2*b^2*c^5*d^2 + 16*a^2*b^3*c^4*e^2)) / (2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) - (x*(16*a^2*c^5*e^3 - b^3*c^4*d^2*e + 12*a*b*c^5*d^2*e)) / (2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) * \text{root}(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 61440*a^5*b*c^5*d^2*z^2 + 432*a*b^9*c*d^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*b^11*d^2*z^2 - 672*a*b^6*c^2*d^2*e*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 - 16*b^5*c^2*d^2*e^2 + 360*a*b^2*c^4*d^4 - 256*a^3*c^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k), k, 1, 4)
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(c*x**4+b*x**2+a)**2,x)

[Out] Timed out

$$3.37 \quad \int \frac{d+ex+fx^2}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=368

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c} \left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} - 2af + bd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c} \left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b+\sqrt{b^2-4ac}}}$$

[Out] $-1/2*e*(2*c*x^2+b)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*x*(b^2*d-2*a*c*d-a*b*f+c*(-2*a*f+b*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+2*c*e*\operatorname{arctanh}((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/(-4*a*c+b^2)^{(3/2)}+1/4*\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)})/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)}*c^{(1/2)}*(b*d-2*a*f+(4*a*b*f-12*a*c*d+b^2*d)/(-4*a*c+b^2)^{(1/2)})/a/(-4*a*c+b^2)*2^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)}+1/4*\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)})/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)}*c^{(1/2)}*(b*d-2*a*f+(-4*a*b*f+12*a*c*d-b^2*d)/(-4*a*c+b^2)^{(1/2)})/a/(-4*a*c+b^2)*2^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)}$

Rubi [A] time = 0.87, antiderivative size = 368, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {1673, 1178, 1166, 205, 12, 1107, 614, 618, 206}

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c} \left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} - 2af + bd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c} \left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b+\sqrt{b^2-4ac}}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4)^2, x]

[Out] $-(e*(b+2*c*x^2))/(2*(b^2-4*a*c)*(a+b*x^2+c*x^4))+(x*(b^2*d-2*a*c*d-a*b*f+c*(b*d-2*a*f)*x^2))/(2*a*(b^2-4*a*c)*(a+b*x^2+c*x^4))+(\operatorname{Sqrt}[c]*(b*d-2*a*f+(b^2*d-12*a*c*d+4*a*b*f))/\operatorname{Sqrt}[b^2-4*a*c])* \operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b-\operatorname{Sqrt}[b^2-4*a*c]])]/(2*\operatorname{Sqrt}[2]*a*(b^2-4*a*c)*\operatorname{Sqrt}[b-\operatorname{Sqrt}[b^2-4*a*c]])+(\operatorname{Sqrt}[c]*(b*d-2*a*f-(b^2*d-12*a*c*d+4*a*b*f))/\operatorname{Sqrt}[b^2-4*a*c])* \operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b+\operatorname{Sqrt}[b^2-4*a*c]])]/(2*\operatorname{Sqrt}[2]*a*(b^2-4*a*c)*\operatorname{Sqrt}[b+\operatorname{Sqrt}[b^2-4*a*c]])+(2*c*e*\operatorname{ArcTanh}[(b+2*c*x^2)/\operatorname{Sqrt}[b^2-4*a*c]])/(b^2-4*a*c)^{(3/2)}$

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 205

$\text{Int}[(a_ + (b_ \cdot)(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(\text{Rt}[a/b, 2] \cdot \text{ArcTan}[x/\text{Rt}[a/b, 2]])/a, x] /; \text{FreeQ}\{a, b\}, x] \ \&\& \ \text{PosQ}[a/b]$

Rule 206

$\text{Int}[(a_ + (b_ \cdot)(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(1 \cdot \text{ArcTanh}[\text{Rt}[-b, 2] \cdot x] / \text{Rt}[a, 2]) / (\text{Rt}[a, 2] \cdot \text{Rt}[-b, 2]), x] /; \text{FreeQ}\{a, b\}, x] \ \&\& \ \text{NegQ}[a/b] \ \&\& \ (\text{GtQ}[a, 0] \ || \ \text{LtQ}[b, 0])$

Rule 614

$\text{Int}[(a_ \cdot + (b_ \cdot)(x_) + (c_ \cdot)(x_)^2)^{(p_)}, x_Symbol] \rightarrow \text{Simp}[(b + 2 \cdot c \cdot x) \cdot (a + b \cdot x + c \cdot x^2)^{(p + 1)} / ((p + 1) \cdot (b^2 - 4 \cdot a \cdot c)), x] - \text{Dist}[(2 \cdot c \cdot (2 \cdot p + 3)) / ((p + 1) \cdot (b^2 - 4 \cdot a \cdot c)), \text{Int}[(a + b \cdot x + c \cdot x^2)^{(p + 1)}, x], x] /; \text{FreeQ}\{a, b, c\}, x] \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{NeQ}[p, -3/2] \ \&\& \ \text{IntegerQ}[4 \cdot p]$

Rule 618

$\text{Int}[(a_ \cdot + (b_ \cdot)(x_) + (c_ \cdot)(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Dist}[-2, \text{Subst}[\text{Int}[1/\text{Simp}[b^2 - 4 \cdot a \cdot c - x^2, x], x], x, b + 2 \cdot c \cdot x], x] /; \text{FreeQ}\{a, b, c\}, x] \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0]$

Rule 1107

$\text{Int}[(x_) \cdot ((a_) + (b_ \cdot)(x_)^2 + (c_ \cdot)(x_)^4)^{(p_)}, x_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[(a + b \cdot x + c \cdot x^2)^p, x], x, x^2], x] /; \text{FreeQ}\{a, b, c, p\}, x]$

Rule 1166

$\text{Int}[(d_) + (e_ \cdot)(x_)^2] / ((a_) + (b_ \cdot)(x_)^2 + (c_ \cdot)(x_)^4), x_Symbol] : > \text{With}\{q = \text{Rt}[b^2 - 4 \cdot a \cdot c, 2]\}, \text{Dist}[e/2 + (2 \cdot c \cdot d - b \cdot e) / (2 \cdot q), \text{Int}[1/(b/2 - q/2 + c \cdot x^2), x], x] + \text{Dist}[e/2 - (2 \cdot c \cdot d - b \cdot e) / (2 \cdot q), \text{Int}[1/(b/2 + q/2 + c \cdot x^2), x], x]] /; \text{FreeQ}\{a, b, c, d, e\}, x] \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0] \ \&\& \ \text{NeQ}[c \cdot d^2 - a \cdot e^2, 0] \ \&\& \ \text{PosQ}[b^2 - 4 \cdot a \cdot c]$

Rule 1178

$\text{Int}[(d_) + (e_ \cdot)(x_)^2] \cdot ((a_) + (b_ \cdot)(x_)^2 + (c_ \cdot)(x_)^4)^{(p_)}, x_Symbol] \rightarrow \text{Simp}[(x \cdot (a \cdot b \cdot e - d \cdot (b^2 - 2 \cdot a \cdot c)) - c \cdot (b \cdot d - 2 \cdot a \cdot e) \cdot x^2) \cdot (a + b \cdot x^2 + c \cdot x^4)^{(p + 1)} / (2 \cdot a \cdot (p + 1) \cdot (b^2 - 4 \cdot a \cdot c)), x] + \text{Dist}[1 / (2 \cdot a \cdot (p + 1) \cdot (b^2 - 4 \cdot a \cdot c)), \text{Int}[\text{Simp}[(2 \cdot p + 3) \cdot d \cdot b^2 - a \cdot b \cdot e - 2 \cdot a \cdot c \cdot d \cdot (4 \cdot p + 5) + (4 \cdot p + 7) \cdot (d \cdot b - 2 \cdot a \cdot e) \cdot c \cdot x^2, x] \cdot (a + b \cdot x^2 + c \cdot x^4)^{(p + 1)}, x], x] /; \text{FreeQ}\{a,$

b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
 \int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^2} dx &= \int \frac{ex}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2}{(a + bx^2 + cx^4)^2} dx \\
 &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \int \frac{-b^2d + 6acd - abf - c(bd - 2af)x^2}{a + bx^2 + cx^4} dx + e \int \frac{x}{(a + bx^2 + cx^4)^2} dx \\
 &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{(a + bx + cx^2)^2} dx, x, x^2 \right) + \frac{c}{2} \int \frac{1}{(a + bx + cx^2)^2} dx \\
 &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2ac)}{2\sqrt{2}a} \\
 &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2ac)}{2\sqrt{2}a} \\
 &= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2ac)}{2\sqrt{2}a}
 \end{aligned}$$

Mathematica [A] time = 1.17, size = 398, normalized size = 1.08

$$\frac{1}{4} \left(\frac{2ab(e + fx) + 4acx(d + x(e + fx)) - 2bdx(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)} + \frac{\sqrt{2}\sqrt{c} \left(b \left(d\sqrt{b^2 - 4ac} + 4af \right) - 2a \left(f\sqrt{b^2 - 4ac} + 6cd \right) \right)}{a(b^2 - 4ac)^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} \right)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4)^2,x]

[Out] ((2*a*b*(e + f*x) - 2*b*d*x*(b + c*x^2) + 4*a*c*x*(d + x*(e + f*x)))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)) + (Sqrt[2]*Sqrt[c]*(b^2*d + b*(Sqrt[b^2 - 4*a*c]*d + 4*a*f) - 2*a*(6*c*d + Sqrt[b^2 - 4*a*c]*f))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]])/(a*(b^2 - 4*a*c)^(3/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[2]*Sqrt[c]*(-(b^2*d) + 12*a*c*d + b*Sqrt[b^2 - 4*a*c]*d - 4*a*b*f - 2*a*Sqrt[b^2 - 4*a*c]*f)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]])/(a*(b^2 - 4*a*c)^(3/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - (4*c*e*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(3/2) + (4*c*e*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(3/2))/4

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="fricas")

[Out] Timed out

giac [B] time = 6.67, size = 5164, normalized size = 14.03

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^4+b*x^2+a)^2,x, algorithm="giac")

[Out] 1/2*(b*c*d*x^3 - 2*a*c*f*x^3 - 2*a*c*x^2*e + b^2*d*x - 2*a*c*d*x - a*b*f*x - a*b*e)/((c*x^4 + b*x^2 + a)*(a*b^2 - 4*a^2*c)) + 1/16*((2*b^3*c^2 - 8*a*b*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*a*b*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^2*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*(a*b^2 - 4*a^2*c)^2*d - 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*

$$\begin{aligned}
& \sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^2 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b*c - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*(a*b^2 - 4*a^2*c)^2*f + 2*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^6 - 14*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^4*c - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^5*c - 2*a*b^6*c + 64*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^2*c^2 + 20*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^3*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^4*c^2 + 28*a^2*b^4*c^2 - 96*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*c^3 - 48*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^3 - 10*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^2*c^3 - 128*a^3*b^2*c^3 + 24*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*c^4 + 192*a^4*c^4 + 2*(b^2 - 4*a*c)*a*b^4*c - 20*(b^2 - 4*a*c)*a^2*b^2*c^2 + 48*(b^2 - 4*a*c)*a^3*c^3)*d*abs(a*b^2 - 4*a^2*c) + 2*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^5 - 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^3*c - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^4*c - 2*a^2*b^5*c + 16*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b*c^2 + 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^2*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^3*c^2 + 16*a^3*b^3*c^2 - 4*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^3 - 32*a^4*b*c^3 + 2*(b^2 - 4*a*c)*a^2*b^3*c - 8*(b^2 - 4*a*c)*a^3*b*c^2)*f*abs(a*b^2 - 4*a^2*c) + (2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b^3*c^4 - 384*a^5*b*c^5 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^7 + 20*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^5*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^6*c - 112*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b^3*c^2 - 32*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^4*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^5*c^2 + 192*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^5*b*c^3 + 96*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b^2*c^3 + 16*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^3*c^3 - 48*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b*c^4 - 2*(b^2 - 4*a*c)*a^2*b^5*c^2 + 32*(b^2 - 4*a*c)*a^3*b^3*c^3 - 96*(b^2 - 4*a*c)*a^4*b*c^4)*d + 4*(2*a^3*b^6*c^2 - 16*a^4*b^4*c^3 + 32*a^5*b^2*c^4 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^6 + 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b^4*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^5*c - 16*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^5*b^2*c^2 - 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b^3*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^4*c^2 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b^2*c^3 - 2*(b^2 - 4*a*c)*a^3*b^4*c^2 + 8*(b^2 - 4*a*c)*a^4*b^2*c^3)*f)*arctan(2*\sqrt{1/2}*x/\sqrt{(a*b^3 - 4*a^2*b*c + \sqrt{(a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)})))/(a*b^2*c - 4*a^2*c^2)))/((a^3*b^6 - 12*a^4*b^4*c - 2*a^3*b^5*c + 48*a^5*b^2*c^2 + 16*a^4*b^3*c^2 + a^3*b^4*c^2 - 64*a^6*c^3 - 32*a^5*b*c^3 - 8*a^4*b^2*c^3 + 16*a^5*c^4)*abs(a*b^2 - 4*a^2*c)*abs(c)) - 1/16*((2*b^3*c^2 - 8*a*b*c^3 -
\end{aligned}$$

$$\begin{aligned}
& \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} b^3 + 4\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} ab^2c + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} b^2c^2 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} b^2c^2 - 2(b^2 - 4ac) b^2c^2 (ab^2 - 4a^2c)^2 d - 2(2ab^2c^2 - 8a^2c^3 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c}) ab^2 + 4\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^2c + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} ab^2c - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^2c^2 - 2(b^2 - 4ac) a^2c^2 (ab^2 - 4a^2c)^2 f - 2(\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c}) ab^6 - 14\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^2b^4c - 2\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} ab^5c + 2ab^6c + 64\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3b^2c^2 + 20\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^2b^3c^2 + \sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} ab^4c^2 - 28a^2b^4c^2 - 96\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^4c^3 - 48\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3b^2c^3 - 10\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^2b^2c^3 + 128a^3b^2c^3 + 24\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3c^4 - 192a^4c^4 - 2(b^2 - 4ac) ab^4c + 20(b^2 - 4ac) a^2b^2c^2 - 48(b^2 - 4ac) a^3c^3) d \operatorname{abs}(ab^2 - 4a^2c) - 2(\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c}) a^2b^5 - 8\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3b^3c - 2\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^2b^4c + 2a^2b^5c + 16\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^4b^2c^2 + 8\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3b^2c^2 + \sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^2b^3c^2 - 16a^3b^3c^2 - 4\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3b^2c^3 + 32a^4b^2c^3 - 2(b^2 - 4ac) a^2b^3c + 8(b^2 - 4ac) a^3b^2c^2) f \operatorname{abs}(ab^2 - 4a^2c) + (2a^2b^7c^2 - 40a^3b^5c^3 + 224a^4b^3c^4 - 384a^5b^2c^5 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c}) a^2b^7 + 20\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3b^5c + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^2b^6c - 112\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^4b^3c^2 - 32\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3b^4c^2 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^2b^5c^2 + 192\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^5b^2c^3 + 96\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^4b^2c^3 + 16\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3b^3c^3 - 48\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^4b^2c^4 - 2(b^2 - 4ac) a^2b^5c^2 + 32(b^2 - 4ac) a^3b^3c^3 - 96(b^2 - 4ac) a^4b^2c^4) d + 4(2a^3b^6c^2 - 16a^4b^4c^3 + 32a^5b^2c^4 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c}) a^3b^6 + 8\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^4b^4c + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3b^5c - 16\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^5b^2c^2 - 8\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^4b^3c^2 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^3b^4c^2 + 4\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}c} a^4b^2c^3 - 2(b^2 - 4ac) a^3b^4c^2 + 8(b^2 - 4ac) a
\end{aligned}$$

$$\begin{aligned} & 1/2)/c)*x*a*f-1/4*c/(4*a*c-b^2)^2/a*2^{(1/2)/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)} \\ & *2)*\operatorname{arctanh}(2^{(1/2)/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^3*d-1/2/(4*a*c- \\ & b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)/c)*x*b^2*f+1/(4*a*c-b^2)^2*(-4*a \\ & *c+b^2)^{(1/2)*c*e*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})+2/(4*a*c-b^2)^2/(x^2+1/2 \\ & *b/c-1/2*(-4*a*c+b^2)^{(1/2)/c)*a*c*e-1/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)*c*e \\ & *\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})-1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a \\ & *c+b^2)^{(1/2)/c)*(-4*a*c+b^2)^{(1/2)/a*b^2*d*x+3/(4*a*c-b^2)^2*2^{(1/2)/((b+(\\ & -4*a*c+b^2)^{(1/2)})*c)^{(1/2)*(-4*a*c+b^2)^{(1/2)*c^2*d*\arctan}(2^{(1/2)/((b+(-4 \\ & *a*c+b^2)^{(1/2)})*c)^{(1/2)*c*x)-1/(4*a*c-b^2)^2*2^{(1/2)/((b+(-4*a*c+b^2)^{(1/2) \\ &))*c)^{(1/2)*b*c^2*d*\arctan}(2^{(1/2)/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)*c*x)+1 \\ & /4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)/c)*(-4*a*c+b^2)^{(1/2)/ \\ & a*b^2*d*x+3*c^2/(4*a*c-b^2)^2*2^{(1/2)/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)*\operatorname{arc} \\ & \operatorname{tanh}(2^{(1/2)/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)*c*x)*(-4*a*c+b^2)^{(1/2)*d+c^2 \\ & /2/(4*a*c-b^2)^2*2^{(1/2)/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)*\operatorname{arctanh}(2^{(1/2)/((- \\ & b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)*c*x)*b*d+1/4/(4*a*c-b^2)^2*2^{(1/2)/((b+(-4 \\ & *a*c+b^2)^{(1/2)})*c)^{(1/2)/a*b^3*c*d*\arctan}(2^{(1/2)/((b+(-4*a*c+b^2)^{(1/2)})* \\ & c)^{(1/2)*c*x)+2/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)/c)*a*c*e- \\ & 1/2/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)/c)*x*b^2*f+1/(4*a*c-b \\ & ^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)/c)*(-4*a*c+b^2)^{(1/2)*c*d*x-1/(4* \\ & a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)/c)*b*c*d*x+1/4/(4*a*c-b^2)^2 \\ & /(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)/c)/a*b^3*d*x-1/(4*a*c-b^2)^2/(x^2+1/2* \\ & b/c-1/2*(-4*a*c+b^2)^{(1/2)/c)*(-4*a*c+b^2)^{(1/2)*c*d*x-1/(4*a*c-b^2)^2/(x^2 \\ & +1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)/c)*b*c*d*x+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1 \\ & /2*(-4*a*c+b^2)^{(1/2)/c)/a*b^3*d*x \end{aligned}$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a)^2,x, algorithm="maxima")`

[Out]
$$\begin{aligned} & -1/2*(2*a*c*e*x^2 - (b*c*d - 2*a*c*f)*x^3 + a*b*e + (a*b*f - (b^2 - 2*a*c)* \\ & d)*x)/((a*b^2*c - 4*a^2*c^2)*x^4 + a^2*b^2 - 4*a^3*c + (a*b^3 - 4*a^2*b*c)* \\ & x^2) - 1/2*\operatorname{integrate}((4*a*c*e*x - a*b*f - (b*c*d - 2*a*c*f)*x^2 - (b^2 - 6* \\ & a*c)*d)/(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c) \end{aligned}$$

mupad [B] time = 1.71, size = 4707, normalized size = 12.79

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((d + e*x + f*x^2)/(a + b*x^2 + c*x^4)^2,x)`

```
[Out] symsum(log((5*b^3*c^4*d^3 + 8*a^3*c^4*f^3 - 96*a^2*c^5*d*e^2 + 72*a^2*c^5*d
^2*f - 3*b^4*c^3*d^2*f + 6*a^2*b^2*c^3*f^3 - 36*a*b*c^5*d^3 + 16*a*b^2*c^4*
d*e^2 + 18*a*b^2*c^4*d^2*f + 3*a*b^3*c^3*d*f^2 - 60*a^2*b*c^4*d*f^2 + 16*a^
2*b*c^4*e^2*f)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) -
root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3
*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 -
256*a^3*b^12*z^4 + 576*a^2*b^8*c*d*f*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072
*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*c^4*f^2*z^2 +
61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 81
92*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z
^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4
*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^10
*d*f*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 - 4
096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 3072*a^3*b^3*c^3*d*e*f*z - 768
*a^2*b^5*c^2*d*e*f*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 1536*
a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z +
4992*a^2*b^4*c^3*d^2*e*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z +
32*b^8*c*d^2*e*z - 32*a*b^4*c^2*d*e^2*f + 192*a^2*b^2*c^3*d*e^2*f - 192*a^3
*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b*
c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 2016*a^2*b*c^4*
d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 16*a^2*b^3*c^2*e^2*f^2
- 960*a^2*b^2*c^3*d^2*f^2 - 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2*f^2 - 16*b^5
*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9*
a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 16*a^4*c^3*f^4 - 256*a^3*c^4*e^4 - 25*b
^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k)*((32*a*b^5*c^3*d*e - 512*a^4*c^5*e*f +
1024*a^3*b*c^5*d*e - 384*a^2*b^3*c^4*d*e + 32*a^2*b^4*c^3*e*f)/(8*(a^2*b^6
- 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) + root(1572864*a^8*b^2*c^5*
z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z
^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 576*a^2
*b^8*c*d*f*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 204
8*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*c^4*f^2*z^2 + 61440*a^5*b*c^5*d^2*z^2 -
49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8192*a^5*b^3*c^3*f^2*z^2 + 1
536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*
z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c
^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^10*d*f*z^2 - 32768*a^6*c^5*e
^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 - 4096*a^4*b*c^4*d*e*f*z + 64
*a*b^7*c*d*e*f*z + 3072*a^3*b^3*c^3*d*e*f*z - 768*a^2*b^5*c^2*d*e*f*z + 32*
a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 1536*a^4*b^2*c^3*e*f^2*z - 384*
a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z
- 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 32*a*b^
4*c^2*d*e^2*f + 192*a^2*b^2*c^3*d*e^2*f - 192*a^3*b*c^3*e^2*f^2 + 198*a*b^4
*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^
3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 2016*a^2*b*c^4*d^3*f - 496*a*b^3*c^3*d^3*
f + 224*a^3*b*c^3*d*f^3 - 16*a^2*b^3*c^2*e^2*f^2 - 960*a^2*b^2*c^3*d^2*f^2
- 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2*f^2 - 16*b^5*c^2*d^2*e^2 - 24*a^3*b^2*
```

$$\begin{aligned}
& c^2f^4 + 30b^5c^2d^3f - 9b^6c^2d^2f^2 - 9a^2b^4c^2f^4 + 360a^2b^2c^4d^4 - 16a^4c^3f^4 - 256a^3c^4e^4 - 25b^4c^3d^4 - 1296a^2c^5d^4, z, k) \cdot ((x \cdot (1024a^5c^6e - 16a^2b^6c^3e + 192a^3b^4c^4e - 768a^4b^2c^5e)) / (2(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2))) \\
& - (6144a^5c^6d - 288a^2b^6c^3d + 1920a^3b^4c^4d - 5632a^4b^2c^5d + 16a^2b^7c^2f - 192a^3b^5c^3f + 768a^4b^3c^4f + 16a^2b^8c^2d - 1024a^5b^2c^5f) / (8(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) + (\text{root}(1572864a^8b^2c^5z^4 - 983040a^7b^4c^4z^4 + 327680a^6b^6c^3z^4 - 61440a^5b^8c^2z^4 + 6144a^4b^{10}c^2z^4 - 1048576a^9c^6z^4 - 256a^3b^{12}z^4 + 576a^2b^8c^4d^2f^2z^2 + 24576a^5b^2c^4d^2f^2z^2 - 3072a^3b^6c^2d^2f^2z^2 + 2048a^4b^4c^3d^2f^2z^2 + 12288a^6b^2c^4f^2z^2 + 61440a^5b^2c^5d^2z^2 - 49152a^6c^5d^2f^2z^2 + 432a^2b^9c^4d^2z^2 - 8192a^5b^3c^3f^2z^2 + 1536a^4b^5c^2f^2z^2 + 24576a^5b^2c^4e^2z^2 - 6144a^4b^4c^3e^2z^2 + 512a^3b^6c^2e^2z^2 - 61440a^4b^3c^4d^2z^2 + 24064a^3b^5c^3d^2z^2 - 4608a^2b^7c^2d^2z^2 - 32a^2b^10d^2f^2z^2 - 32768a^6c^5e^2z^2 - 16a^2b^9f^2z^2 - 16b^{11}d^2z^2 - 4096a^4b^2c^4d^2e^2f^2z^2 + 64a^2b^7c^2d^2e^2f^2z^2 - 672a^2b^6c^2d^2e^2z^2 + 1536a^4b^2c^3e^2f^2z^2 - 384a^3b^4c^2e^2f^2z^2 - 15872a^3b^2c^4d^2e^2z^2 + 4992a^2b^4c^3d^2e^2z^2 - 2048a^5c^4e^2f^2z^2 + 18432a^4c^5d^2e^2z^2 + 32b^8c^4d^2e^2z^2 - 32a^2b^4c^2d^2e^2f^2 + 192a^2b^2c^3d^2e^2f^2 - 192a^3b^2c^3e^2f^2 + 198a^2b^4c^2d^2f^2 + 144a^2b^3c^2d^2f^3 - 960a^2b^2c^4d^2e^2 + 240a^2b^3c^3d^2e^2 + 768a^3c^4d^2e^2f + 2016a^2b^2c^4d^3f - 496a^2b^3c^3d^3f + 224a^3b^2c^3d^2f^3 - 16a^2b^3c^2e^2f^2 - 960a^2b^2c^3d^2f^2 - 18a^2b^5c^2d^2f^3 - 288a^3c^4d^2f^2 - 16b^5c^2d^2e^2 - 24a^3b^2c^2f^4 + 30b^5c^2d^3f - 9b^6c^2d^2f^2 - 9a^2b^4c^2f^4 + 360a^2b^2c^4d^4 - 16a^4c^3f^4 - 256a^3c^4e^4 - 25b^4c^3d^4 - 1296a^2c^5d^4, z, k) \cdot x \cdot (4096a^6b^2c^6 + 16a^2b^9c^2 - 256a^3b^7c^3 + 1536a^4b^5c^4 - 4096a^5b^3c^5) / (2(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2))) + (x \cdot (b^6c^3d^2 - 288a^3c^6d^2 + 32a^4c^5f^2 - 18a^2b^4c^4d^2 + 64a^3b^2c^5e^2 + 128a^2b^2c^5d^2 - 16a^2b^3c^4e^2 + 10a^2b^4c^3f^2 - 48a^3b^2c^4f^2 + 2a^2b^5c^3d^2f + 160a^3b^2c^5d^2f - 48a^2b^3c^4d^2f)) / (2(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2))) - (x \cdot (16a^2c^5e^3 - b^3c^4d^2e + 12a^2b^2c^5d^2e - 24a^2c^5d^2e^2f + 8a^2b^2c^4e^2f - 2a^2b^2c^4d^2e^2f)) / (2(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2))) \cdot \text{root}(1572864a^8b^2c^5z^4 - 983040a^7b^4c^4z^4 + 327680a^6b^6c^3z^4 - 61440a^5b^8c^2z^4 + 6144a^4b^{10}c^2z^4 - 1048576a^9c^6z^4 - 256a^3b^{12}z^4 + 576a^2b^8c^4d^2f^2z^2 + 24576a^5b^2c^4d^2f^2z^2 - 3072a^3b^6c^2d^2f^2z^2 + 2048a^4b^4c^3d^2f^2z^2 + 12288a^6b^2c^4f^2z^2 + 61440a^5b^2c^5d^2z^2 - 49152a^6c^5d^2f^2z^2 + 432a^2b^9c^4d^2z^2 - 8192a^5b^3c^3f^2z^2 + 1536a^4b^5c^2f^2z^2 + 24576a^5b^2c^4e^2z^2 - 6144a^4b^4c^3e^2z^2 + 512a^3b^6c^2e^2z^2 - 61440a^4b^3c^4d^2z^2 + 24064a^3b^5c^3d^2z^2 - 4608a^2b^7c^2d^2z^2 - 32a^2b^{10}d^2f^2z^2 - 32768a^6c^5e^2z^2 - 16a^2b^9f^2z^2 - 16b^{11}d^2z^2 -
\end{aligned}$$

```

4096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 3072*a^3*b^3*c^3*d*e*f*z - 76
8*a^2*b^5*c^2*d*e*f*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 1536
*a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z
+ 4992*a^2*b^4*c^3*d^2*e*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z +
 32*b^8*c*d^2*e*z - 32*a*b^4*c^2*d*e^2*f + 192*a^2*b^2*c^3*d*e^2*f - 192*a^
3*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b
*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 2016*a^2*b*c^4
*d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 16*a^2*b^3*c^2*e^2*f^2
- 960*a^2*b^2*c^3*d^2*f^2 - 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2*f^2 - 16*b^
5*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9
*a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 16*a^4*c^3*f^4 - 256*a^3*c^4*e^4 - 25*
b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k), k, 1, 4) + ((b*e)/(2*(4*a*c - b^2))
+ (c*e*x^2)/(4*a*c - b^2) + (x*(2*a*c*d - b^2*d + a*b*f))/(2*a*(4*a*c - b^2
)) - (c*x^3*(b*d - 2*a*f))/(2*a*(4*a*c - b^2)))/(a + b*x^2 + c*x^4)

```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x**2+e*x+d)/(c*x**4+b*x**2+a)**2,x)

[Out] Timed out

$$3.38 \quad \int \frac{d+ex+fx^2+gx^3}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=386

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c} \left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} - 2af + bd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c} \left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b+\sqrt{b^2-4ac}}}$$

[Out] $1/2*x*(b^2*d-2*a*c*d-a*b*f+c*(-2*a*f+b*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*(-b*e+2*a*g-(-b*g+2*c*e)*x^2)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+(-b*g+2*c*e)*\operatorname{arctanh}((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/(-4*a*c+b^2)^{(3/2)}+1/4*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2}))^{(1/2)})*c^{(1/2)}*(b*d-2*a*f+(4*a*b*f-12*a*c*d+b^2*d)/(-4*a*c+b^2)^{(1/2)})/a/(-4*a*c+b^2)*2^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2}))^{(1/2)}+1/4*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2}))^{(1/2)})*c^{(1/2)}*(b*d-2*a*f+(-4*a*b*f+12*a*c*d-b^2*d)/(-4*a*c+b^2)^{(1/2)})/a/(-4*a*c+b^2)*2^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2}))^{(1/2)}$

Rubi [A] time = 0.49, antiderivative size = 386, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.267$, Rules used = {1673, 1178, 1166, 205, 1247, 638, 618, 206}

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c} \left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} - 2af + bd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c} \left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b+\sqrt{b^2-4ac}}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^2, x]

[Out] $(x*(b^2*d-2*a*c*d-a*b*f+c*(b*d-2*a*f)*x^2))/(2*a*(b^2-4*a*c)*(a+b*x^2+c*x^4))-(b*e-2*a*g+(2*c*e-b*g)*x^2)/(2*(b^2-4*a*c)*(a+b*x^2+c*x^4))+(\operatorname{Sqrt}[c]*(b*d-2*a*f+(b^2*d-12*a*c*d+4*a*b*f)/\operatorname{Sqrt}[b^2-4*a*c])*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b-\operatorname{Sqrt}[b^2-4*a*c]]])/(2*\operatorname{Sqrt}[2]*a*(b^2-4*a*c)*\operatorname{Sqrt}[b-\operatorname{Sqrt}[b^2-4*a*c]])+(\operatorname{Sqrt}[c]*(b*d-2*a*f-(b^2*d-12*a*c*d+4*a*b*f)/\operatorname{Sqrt}[b^2-4*a*c])*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b+\operatorname{Sqrt}[b^2-4*a*c]]])/(2*\operatorname{Sqrt}[2]*a*(b^2-4*a*c)*\operatorname{Sqrt}[b+\operatorname{Sqrt}[b^2-4*a*c]])+((2*c*e-b*g)*\operatorname{ArcTanh}[(b+2*c*x^2)/\operatorname{Sqrt}[b^2-4*a*c]])/(b^2-4*a*c)^{(3/2)}$

Rule 205

$\text{Int}[(a + (b \cdot x)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(\text{Rt}[a/b, 2] \cdot \text{ArcTan}[x/\text{Rt}[a/b, 2]])/a, x] /; \text{FreeQ}\{a, b\}, x] \ \&\& \ \text{PosQ}[a/b]$

Rule 206

$\text{Int}[(a + (b \cdot x)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(1 \cdot \text{ArcTanh}[(\text{Rt}[-b, 2] \cdot x)/\text{Rt}[a, 2]])/(\text{Rt}[a, 2] \cdot \text{Rt}[-b, 2]), x] /; \text{FreeQ}\{a, b\}, x] \ \&\& \ \text{NegQ}[a/b] \ \&\& \ (\text{GtQ}[a, 0] \ || \ \text{LtQ}[b, 0])$

Rule 618

$\text{Int}[(a + (b \cdot x) + (c \cdot x)^2)^{-1}, x_Symbol] \rightarrow \text{Dist}[-2, \text{Subst}[\text{Int}[1/\text{Simp}[b^2 - 4 \cdot a \cdot c - x^2, x], x], x, b + 2 \cdot c \cdot x], x] /; \text{FreeQ}\{a, b, c\}, x] \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0]$

Rule 638

$\text{Int}[(d + (e \cdot x)) \cdot (a + (b \cdot x) + (c \cdot x)^2)^p, x_Symbol] \rightarrow \text{Simp}[(b \cdot d - 2 \cdot a \cdot e + (2 \cdot c \cdot d - b \cdot e) \cdot x) \cdot (a + b \cdot x + c \cdot x^2)^{p+1} / ((p+1) \cdot (b^2 - 4 \cdot a \cdot c)), x] - \text{Dist}[(2 \cdot p + 3) \cdot (2 \cdot c \cdot d - b \cdot e) / ((p+1) \cdot (b^2 - 4 \cdot a \cdot c)), \text{Int}[(a + b \cdot x + c \cdot x^2)^{p+1}, x], x] /; \text{FreeQ}\{a, b, c, d, e\}, x] \ \&\& \ \text{NeQ}[2 \cdot c \cdot d - b \cdot e, 0] \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{NeQ}[p, -3/2]$

Rule 1166

$\text{Int}[(d + (e \cdot x)^2) / (a + (b \cdot x)^2 + (c \cdot x)^4), x_Symbol] \rightarrow \text{With}\{q = \text{Rt}[b^2 - 4 \cdot a \cdot c, 2]\}, \text{Dist}[e/2 + (2 \cdot c \cdot d - b \cdot e) / (2 \cdot q), \text{Int}[1/(b/2 - q/2 + c \cdot x^2), x], x] + \text{Dist}[e/2 - (2 \cdot c \cdot d - b \cdot e) / (2 \cdot q), \text{Int}[1/(b/2 + q/2 + c \cdot x^2), x], x] /; \text{FreeQ}\{a, b, c, d, e\}, x] \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0] \ \&\& \ \text{NeQ}[c \cdot d^2 - a \cdot e^2, 0] \ \&\& \ \text{PosQ}[b^2 - 4 \cdot a \cdot c]$

Rule 1178

$\text{Int}[(d + (e \cdot x)^2) \cdot (a + (b \cdot x)^2 + (c \cdot x)^4)^p, x_Symbol] \rightarrow \text{Simp}[(x \cdot (a \cdot b \cdot e - d \cdot (b^2 - 2 \cdot a \cdot c) - c \cdot (b \cdot d - 2 \cdot a \cdot e) \cdot x^2) \cdot (a + b \cdot x^2 + c \cdot x^4)^{p+1}) / (2 \cdot a \cdot (p+1) \cdot (b^2 - 4 \cdot a \cdot c)), x] + \text{Dist}[1 / (2 \cdot a \cdot (p+1) \cdot (b^2 - 4 \cdot a \cdot c)), \text{Int}[\text{Simp}[(2 \cdot p + 3) \cdot d \cdot b^2 - a \cdot b \cdot e - 2 \cdot a \cdot c \cdot d \cdot (4 \cdot p + 5) + (4 \cdot p + 7) \cdot (d \cdot b - 2 \cdot a \cdot e) \cdot c \cdot x^2, x] \cdot (a + b \cdot x^2 + c \cdot x^4)^{p+1}, x], x] /; \text{FreeQ}\{a, b, c, d, e\}, x] \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0] \ \&\& \ \text{NeQ}[c \cdot d^2 - b \cdot d \cdot e + a \cdot e^2, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{IntegerQ}[2 \cdot p]$

Rule 1247

$\text{Int}[(x) \cdot (d + (e \cdot x)^2)^q \cdot (a + (b \cdot x)^2 + (c \cdot x)^4)^p, x_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[(d + e \cdot x)^q \cdot (a + b \cdot x + c \cdot x^2)^p, x],$

$x, x^2], x] /; \text{FreeQ}\{a, b, c, d, e, p, q\}, x]$

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^2} dx &= \int \frac{d + fx^2}{(a + bx^2 + cx^4)^2} dx + \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^2} dx \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(a + bx + cx^2)^2} dx, x, x^2 \right) - \frac{f}{2} \int \frac{1}{a + bx + cx^2} dx \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{c(bd - 2af)}{2(b^2 - 4ac)} \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2af)}{2\sqrt{2}(b^2 - 4ac)} \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2af)}{2\sqrt{2}(b^2 - 4ac)} \end{aligned}$$

Mathematica [A] time = 1.30, size = 421, normalized size = 1.09

$$\frac{1}{4} \left(\frac{-4a^2g + 2ab(e + x(f - gx)) + 4acx(d + x(e + fx)) - 2bdx(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)} + \frac{\sqrt{2}\sqrt{c} \left(b \left(d\sqrt{b^2 - 4ac} + 4af \right) - 2a \left(f + \frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)} \right) \right)}{a(b^2 - 4ac)^{3/2}} \right)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^2,x]

[Out]
$$\frac{((-4a^2g - 2b*d*x*(b + c*x^2) + 4a*c*x*(d + x*(e + f*x)) + 2a*b*(e + x*(f - g*x)))/(a*(-b^2 + 4a*c)*(a + b*x^2 + c*x^4)) + (\sqrt{2}*\sqrt{c}*(b^2*d + b*(\sqrt{b^2 - 4a*c}*d + 4a*f) - 2a*(6*c*d + \sqrt{b^2 - 4a*c}*f))*\text{ArcTan}[(\sqrt{2}*\sqrt{c}*x)/\sqrt{b - \sqrt{b^2 - 4a*c}}])/(a*(b^2 - 4a*c)^{(3/2)}*\sqrt{b - \sqrt{b^2 - 4a*c}}) + (\sqrt{2}*\sqrt{c}*(-(b^2*d) + 12a*c*d + b*\sqrt{b^2 - 4a*c}*d - 4a*b*f - 2a*\sqrt{b^2 - 4a*c}*f)*\text{ArcTan}[(\sqrt{2}*\sqrt{c}*x)/\sqrt{b + \sqrt{b^2 - 4a*c}}])/(a*(b^2 - 4a*c)^{(3/2)}*\sqrt{b + \sqrt{b^2 - 4a*c}}) + (2*(-2*c*e + b*g)*\text{Log}[-b + \sqrt{b^2 - 4a*c} - 2*c*x^2])/(b^2 - 4a*c)^{(3/2)} - (2*(-2*c*e + b*g)*\text{Log}[b + \sqrt{b^2 - 4a*c} + 2*c*x^2])/(b^2 - 4a*c)^{(3/2)}}{4}$$

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="fricas")

[Out] Timed out

giac [B] time = 6.11, size = 5579, normalized size = 14.45

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)/(c*x^4+b*x^2+a)^2,x, algorithm="giac")

[Out]
$$\frac{1}{2}*(b*c*d*x^3 - 2a*c*f*x^3 + a*b*g*x^2 - 2a*c*x^2*e + b^2*d*x - 2a*c*d*x - a*b*f*x + 2a^2*g - a*b*e)/((c*x^4 + b*x^2 + a)*(a*b^2 - 4a^2*c)) + \frac{1}{16}*((2*b^3*c^2 - 8a*b*c^3 - \sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*b^3 + 4*\sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a*b*c + 2*\sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*b^2*c - \sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*b*c^2 - 2*(b^2 - 4a*c)*b*c^2)*(a*b^2 - 4a^2*c)^2*d - 2*(2a*b^2*c^2 - 8a^2*c^3 - \sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a*b^2 + 4*\sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a^2*c + 2*\sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a*b*c - \sqrt{2}*\sqrt{b^2 - 4a*c}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a*c^2 - 2*(b^2 - 4a*c)*a*c^2)*(a*b^2 - 4a^2*c)^2*f + 2*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a*b^6 - 14*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a^2*b^4*c - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a*b^5*c - 2a*b^6*c + 64*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a^3*b^2*c^2 + 20*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a^2*b^3*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4a*c}}*c)*a*b^4*c^2 + 28a^2*b^4*c^2 - 96*\sqrt{2}*$$

$$\begin{aligned}
& \sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*c^3 - 48*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^3 - 10*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^2*c^3 \\
& - 128*a^3*b^2*c^3 + 24*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*c^4 + 192*a^4*c^4 + 2*(b^2 - 4*a*c)*a*b^4*c - 20*(b^2 - 4*a*c)*a^2*b^2*c^2 + 48*(b^2 - 4*a*c)*a^3*c^3) \\
& *d*abs(a*b^2 - 4*a^2*c) + 2*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^5 - 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^3*c - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^4*c \\
& - 2*a^2*b^5*c + 16*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b*c^2 + 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^2*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^3*c^2 \\
& + 16*a^3*b^3*c^2 - 4*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^3 - 32*a^4*b*c^3 + 2*(b^2 - 4*a*c)*a^2*b^3*c - 8*(b^2 - 4*a*c)*a^3*b*c^2)*f*abs(a*b^2 - 4*a^2*c) \\
& + (2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b^3*c^4 - 384*a^5*b*c^5 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^7 + 20*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^5*c \\
& + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^6*c - 112*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b^3*c^2 - 32*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^4*c^2 \\
& - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^5*c^2 + 192*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^5*b*c^3 + 96*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b^2*c^3 \\
& + 16*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^3*c^3 - 48*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b*c^4 - 2*(b^2 - 4*a*c)*a^2*b^5*c^2 + 32*(b^2 - 4*a*c)*a^3*b^3*c^3 - 96*(b^2 - 4*a*c)*a^4*b*c^4)*d \\
& + 4*(2*a^3*b^6*c^2 - 16*a^4*b^4*c^3 + 32*a^5*b^2*c^4 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^6 + 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b^4*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^5*c - 16*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^5*b^2*c^2 - 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b^3*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^4*c^2 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b^2*c^3 - 2*(b^2 - 4*a*c)*a^3*b^4*c^2 + 8*(b^2 - 4*a*c)*a^4*b^2*c^3)*f)*arctan(2*\sqrt{1/2}*x/\sqrt{(a*b^3 - 4*a^2*b*c + \sqrt{(a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)}))/((a^3*b^6 - 12*a^4*b^4*c - 2*a^3*b^5*c + 48*a^5*b^2*c^2 + 16*a^4*b^3*c^2 + a^3*b^4*c^2 - 64*a^6*c^3 - 32*a^5*b*c^3 - 8*a^4*b^2*c^3 + 16*a^5*c^4)*abs(a*b^2 - 4*a^2*c)*abs(c)) - 1/16*((2*b^3*c^2 - 8*a*b*c^3 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^3 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^2*c - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*(a*b^2 - 4*a^2*c)^2*d - 2*(2*a*b^2*c^2 - 8*a^2*c^3 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^2 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b*c - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*(a*b^2 - 4*a^2*c)^2*
\end{aligned}$$

$$\begin{aligned}
& f - 2*(\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a*b^6 - 14*\text{sqrt}(2)*\text{sqrt}(b*c \\
& - \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^4*c - 2*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c \\
&)*a*b^5*c + 2*a*b^6*c + 64*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^2* \\
& c^2 + 20*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^3*c^2 + \text{sqrt}(2)*\text{sqrt} \\
& (b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a*b^4*c^2 - 28*a^2*b^4*c^2 - 96*\text{sqrt}(2)*\text{sqrt}(b* \\
& c - \text{sqrt}(b^2 - 4*a*c))*c)*a^4*c^3 - 48*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))* \\
& c)*a^3*b*c^3 - 10*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^2*c^3 + 128 \\
& *a^3*b^2*c^3 + 24*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^3*c^4 - 192*a^4 \\
& *c^4 - 2*(b^2 - 4*a*c)*a*b^4*c + 20*(b^2 - 4*a*c)*a^2*b^2*c^2 - 48*(b^2 - 4 \\
& *a*c)*a^3*c^3)*d*\text{abs}(a*b^2 - 4*a^2*c) - 2*(\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4* \\
& a*c))*c)*a^2*b^5 - 8*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^3*c - 2*s \\
& \text{qrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^4*c + 2*a^2*b^5*c + 16*\text{sqrt}(2) \\
& *\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^4*b*c^2 + 8*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 \\
& - 4*a*c))*c)*a^3*b^2*c^2 + \text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^3*c \\
& ^2 - 16*a^3*b^3*c^2 - 4*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b*c^3 + \\
& 32*a^4*b*c^3 - 2*(b^2 - 4*a*c)*a^2*b^3*c + 8*(b^2 - 4*a*c)*a^3*b*c^2)*f*\text{ab} \\
& \text{s}(a*b^2 - 4*a^2*c) + (2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b^3*c^4 - 38 \\
& 4*a^5*b*c^5 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^2 \\
& *b^7 + 20*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^5 \\
& *c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^6*c \\
& - 112*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^4*b^3*c^2 \\
& - 32*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^4*c^2 \\
& - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^5*c^2 + \\
& 192*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^5*b*c^3 + 9 \\
& 6*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^4*b^2*c^3 + 1 \\
& 6*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^3*c^3 - 4 \\
& 8*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^4*b*c^4 - 2*(\\
& b^2 - 4*a*c)*a^2*b^5*c^2 + 32*(b^2 - 4*a*c)*a^3*b^3*c^3 - 96*(b^2 - 4*a*c)* \\
& a^4*b*c^4)*d + 4*(2*a^3*b^6*c^2 - 16*a^4*b^4*c^3 + 32*a^5*b^2*c^4 - \text{sqrt}(2) \\
& *\text{sqrt}(b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^6 + 8*\text{sqrt}(2)*\text{sqrt} \\
& (b^2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^4*b^4*c + 2*\text{sqrt}(2)*\text{sqrt}(b^ \\
& 2 - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^5*c - 16*\text{sqrt}(2)*\text{sqrt}(b^2 \\
& - 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^5*b^2*c^2 - 8*\text{sqrt}(2)*\text{sqrt}(b^2 - \\
& 4*a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^4*b^3*c^2 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4* \\
& a*c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^4*c^2 + 4*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a \\
& *c))*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c))*c)*a^4*b^2*c^3 - 2*(b^2 - 4*a*c)*a^3*b^4*c \\
& ^2 + 8*(b^2 - 4*a*c)*a^4*b^2*c^3)*f)*\text{arctan}(2*\text{sqrt}(1/2)*x/\text{sqrt}((a*b^3 - 4*a \\
& ^2*b*c - \text{sqrt}((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c))*(a*b^2*c - 4*a^ \\
& ^2*c^2)))/(a*b^2*c - 4*a^2*c^2)))/((a^3*b^6 - 12*a^4*b^4*c - 2*a^3*b^5*c + 4 \\
& 8*a^5*b^2*c^2 + 16*a^4*b^3*c^2 + a^3*b^4*c^2 - 64*a^6*c^3 - 32*a^5*b*c^3 - \\
& 8*a^4*b^2*c^3 + 16*a^5*c^4)*\text{abs}(a*b^2 - 4*a^2*c)*\text{abs}(c)) + 1/8*((b^4*c - 4* \\
& a*b^2*c^2 - 2*b^3*c^2 + b^2*c^3 + (b^3*c - 4*a*b*c^2 - 2*b^2*c^2 + b*c^3)*s \\
& \text{qrt}(b^2 - 4*a*c))*g*\text{abs}(a*b^2 - 4*a^2*c) - 2*(b^3*c^2 - 4*a*b*c^3 - 2*b^2*c \\
& ^3 + b*c^4 + (b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*\text{sqrt}(b^2 - 4*a*c))*\text{abs}(a*b \\
& ^2 - 4*a^2*c))*e - (a*b^6*c - 8*a^2*b^4*c^2 - 2*a*b^5*c^2 + 16*a^3*b^2*c^3 +
\end{aligned}$$

$$\begin{aligned}
& 8*a^2*b^3*c^3 + a*b^4*c^3 - 4*a^2*b^2*c^4 + (a*b^5*c - 4*a^2*b^3*c^2 - 2*a \\
& *b^4*c^2 + a*b^3*c^3)*\text{sqrt}(b^2 - 4*a*c))*g + 2*(a*b^5*c^2 - 8*a^2*b^3*c^3 - \\
& 2*a*b^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 + (a \\
& b^4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^2*c^4)*\text{sqrt}(b^2 - 4*a*c))*e)*\log \\
& (x^2 + 1/2*(a*b^3 - 4*a^2*b*c + \text{sqrt}((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - \\
& 4*a^3*c))*(a*b^2*c - 4*a^2*c^2)))/(a*b^2*c - 4*a^2*c^2))/((a*b^4 - 8*a^2*b^2 \\
& *c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*\text{abs}(\\
& a*b^2 - 4*a^2*c)) + 1/8*((b^4*c - 4*a*b^2*c^2 - 2*b^3*c^2 + b^2*c^3 - (b^3*c \\
& c - 4*a*b*c^2 - 2*b^2*c^2 + b*c^3)*\text{sqrt}(b^2 - 4*a*c))*g*\text{abs}(a*b^2 - 4*a^2*c \\
&) - 2*(b^3*c^2 - 4*a*b*c^3 - 2*b^2*c^3 + b*c^4 - (b^2*c^2 - 4*a*c^3 - 2*b*c \\
& ^3 + c^4)*\text{sqrt}(b^2 - 4*a*c))*\text{abs}(a*b^2 - 4*a^2*c))*e - (a*b^6*c - 8*a^2*b^4* \\
& c^2 - 2*a*b^5*c^2 + 16*a^3*b^2*c^3 + 8*a^2*b^3*c^3 + a*b^4*c^3 - 4*a^2*b^2* \\
& c^4 - (a*b^5*c - 4*a^2*b^3*c^2 - 2*a*b^4*c^2 + a*b^3*c^3)*\text{sqrt}(b^2 - 4*a*c) \\
&)*g + 2*(a*b^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2 \\
& *c^4 + a*b^3*c^4 - 4*a^2*b*c^5 - (a*b^4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + \\
& a*b^2*c^4)*\text{sqrt}(b^2 - 4*a*c))*e)*\log(x^2 + 1/2*(a*b^3 - 4*a^2*b*c - \text{sqrt}((\\
& a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c))*(a*b^2*c - 4*a^2*c^2)))/(a*b^2 \\
& *c - 4*a^2*c^2))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c \\
& ^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*\text{abs}(a*b^2 - 4*a^2*c))
\end{aligned}$$

maple [B] time = 0.18, size = 2310, normalized size = 5.98

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x)$

[Out]
$$\begin{aligned}
& -1/4/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)} \\
& /a*b^2*c*d*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/4*c/(4 \\
& *a*c-b^2)^2/a*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((- \\
& b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*d-1/2/(4*a*c-b^2 \\
&)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)*b^2*e-1/2/(4*a*c-b^2)^2/(x^2+1/2 \\
& *b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*b^2*e-c/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b \\
& ^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)* \\
& (-4*a*c+b^2)^{(1/2)}*b*f-1/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)} \\
& *(-4*a*c+b^2)^{(1/2)}*b*c*f*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)} \\
& *c*x)-2*c^2/(4*a*c-b^2)^2*a*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arc} \\
& \operatorname{tanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*f+1/2*c/(4*a*c-b^2)^2*2 \\
& ^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)} \\
&)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)*a*c*f*x+2/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*a*c*f*x-1/4*c/(4*a*c-b^2)^2/a*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}
\end{aligned}$$

$$\frac{1}{2} \operatorname{arctanh}\left(\frac{2^{1/2}}{(-b + (-4ac + b^2)^{1/2})c}\right) c^{1/2} c x b^3 d - \frac{1}{2} (4ac - b^2)^2 / (x^2 + 1/2 b/c - 1/2 (-4ac + b^2)^{1/2} / c) b^2 f x + 1/2 (4ac - b^2)^2 \ln(-2cx^2 - b + (-4ac + b^2)^{1/2}) (-4ac + b^2)^{1/2} b^2 g + 1/2 (4ac - b^2)^2 (-4ac + b^2)^{1/2} c e \ln(2cx^2 + b + (-4ac + b^2)^{1/2}) + 2 / (4ac - b^2)^2 / (x^2 + 1/2 b/c - 1/2 (-4ac + b^2)^{1/2} / c) a c e - 1 / (4ac - b^2)^2 (-4ac + b^2)^{1/2} c e \ln(-2cx^2 - b + (-4ac + b^2)^{1/2}) - 1/4 / (4ac - b^2)^2 / (x^2 + 1/2 b/c + 1/2 (-4ac + b^2)^{1/2} / c) (-4ac + b^2)^{1/2} / a b^2 d x + 3 / (4ac - b^2)^2 2^{1/2} / ((b + (-4ac + b^2)^{1/2})c)^{1/2} (-4ac + b^2)^{1/2} c^2 d \operatorname{arctan}\left(\frac{2^{1/2}}{(b + (-4ac + b^2)^{1/2})c}\right) c x - 1 / (4ac - b^2)^2 2^{1/2} / ((b + (-4ac + b^2)^{1/2})c)^{1/2} b c^2 d \operatorname{arctan}\left(\frac{2^{1/2}}{(b + (-4ac + b^2)^{1/2})c}\right) c x + 1/4 / (4ac - b^2)^2 / (x^2 + 1/2 b/c - 1/2 (-4ac + b^2)^{1/2} / c) (-4ac + b^2)^{1/2} / a b^2 d x + 3 c^2 / (4ac - b^2)^2 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})c)^{1/2} \operatorname{arctanh}\left(\frac{2^{1/2}}{(-b + (-4ac + b^2)^{1/2})c}\right) c x (-4ac + b^2)^{1/2} d + c^2 / (4ac - b^2)^2 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})c)^{1/2} \operatorname{arctanh}\left(\frac{2^{1/2}}{(-b + (-4ac + b^2)^{1/2})c}\right) c x b d + 1/4 / (4ac - b^2)^2 2^{1/2} / ((b + (-4ac + b^2)^{1/2})c)^{1/2} / a b^3 c d \operatorname{arctan}\left(\frac{2^{1/2}}{(b + (-4ac + b^2)^{1/2})c}\right) c x + 2 / (4ac - b^2)^2 / (x^2 + 1/2 b/c + 1/2 (-4ac + b^2)^{1/2} / c) a c e - 1/2 / (4ac - b^2)^2 / (x^2 + 1/2 b/c + 1/2 (-4ac + b^2)^{1/2} / c) b^2 f x + 1/4 c / (4ac - b^2)^2 / (x^2 + 1/2 b/c + 1/2 (-4ac + b^2)^{1/2} / c) b^3 g + 1/4 c / (4ac - b^2)^2 / (x^2 + 1/2 b/c - 1/2 (-4ac + b^2)^{1/2} / c) b^3 g - 1 / (4ac - b^2)^2 / (x^2 + 1/2 b/c + 1/2 (-4ac + b^2)^{1/2} / c) (-4ac + b^2)^{1/2} a g - 1 / (4ac - b^2)^2 / (x^2 + 1/2 b/c + 1/2 (-4ac + b^2)^{1/2} / c) a b g - 1/2 / (4ac - b^2)^2 \ln(2cx^2 + b + (-4ac + b^2)^{1/2}) (-4ac + b^2)^{1/2} b^2 g + 1 / (4ac - b^2)^2 / (x^2 + 1/2 b/c - 1/2 (-4ac + b^2)^{1/2} / c) (-4ac + b^2)^{1/2} a g - 1 / (4ac - b^2)^2 / (x^2 + 1/2 b/c - 1/2 (-4ac + b^2)^{1/2} / c) (-4ac + b^2)^{1/2} b^2 g - 1/4 c / (4ac - b^2)^2 / (x^2 + 1/2 b/c - 1/2 (-4ac + b^2)^{1/2} / c) (-4ac + b^2)^{1/2} b^2 g + 1 / (4ac - b^2)^2 / (x^2 + 1/2 b/c + 1/2 (-4ac + b^2)^{1/2} / c) (-4ac + b^2)^{1/2} c d x - 1 / (4ac - b^2)^2 / (x^2 + 1/2 b/c + 1/2 (-4ac + b^2)^{1/2} / c) b c d x + 1/4 / (4ac - b^2)^2 / (x^2 + 1/2 b/c + 1/2 (-4ac + b^2)^{1/2} / c) / a b^3 d x - 1 / (4ac - b^2)^2 / (x^2 + 1/2 b/c - 1/2 (-4ac + b^2)^{1/2} / c) (-4ac + b^2)^{1/2} c d x - 1 / (4ac - b^2)^2 / (x^2 + 1/2 b/c - 1/2 (-4ac + b^2)^{1/2} / c) b c d x + 1/4 / (4ac - b^2)^2 / (x^2 + 1/2 b/c - 1/2 (-4ac + b^2)^{1/2} / c) / a b^3 d x$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\frac{(bcd - 2acf)x^3 - abe + 2a^2g - (2ace - abg)x^2 - (abf - (b^2 - 2ac)d)x - \int \frac{abf + (bcd - 2acf)x^2 + (b^2 - 6ac)d - 2(ace - abg)}{cx^4 + bx^2 + a}}{2((ab^2c - 4a^2c^2)x^4 + a^2b^2 - 4a^3c + (ab^3 - 4a^2bc)x^2)} \quad 2(ab^2 - 4a^2c)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="maxima")

[Out] 1/2*((b*c*d - 2*a*c*f)*x^3 - a*b*e + 2*a^2*g - (2*a*c*e - a*b*g)*x^2 - (a*b*f - (b^2 - 2*a*c)*d)*x)/((a*b^2*c - 4*a^2*c^2)*x^4 + a^2*b^2 - 4*a^3*c + (

$a*b^3 - 4*a^2*b*c)*x^2) - 1/2*\text{integrate}(-(a*b*f + (b*c*d - 2*a*c*f)*x^2 + (b^2 - 6*a*c)*d - 2*(2*a*c*e - a*b*g)*x)/(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c)$

mupad [B] time = 1.77, size = 7373, normalized size = 19.10

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^2, x)$

[Out] $\text{symsum}(\log((5*b^3*c^4*d^3 + 8*a^3*c^4*f^3 - 96*a^2*c^5*d*e^2 + 72*a^2*c^5*d^2*f - 3*b^4*c^3*d^2*f + 6*a^2*b^2*c^3*f^3 - 36*a*b*c^5*d^3 + 16*a*b^2*c^4*d*e^2 + 18*a*b^2*c^4*d^2*f + 3*a*b^3*c^3*d*f^2 - 60*a^2*b*c^4*d*f^2 + 4*a*b^4*c^2*d*g^2 + 16*a^2*b*c^4*e^2*f - 24*a^2*b^2*c^3*d*g^2 + 4*a^2*b^3*c^2*f*g^2 - 16*a*b^3*c^3*d*e*g + 96*a^2*b*c^4*d*e*g - 16*a^2*b^2*c^3*e*f*g)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - \text{root}(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 32768*a^6*b*c^4*e*g*z^2 - 512*a^3*b^7*c*e*g*z^2 + 576*a^2*b^8*c*d*f*z^2 - 24576*a^5*b^3*c^3*e*g*z^2 + 6144*a^4*b^5*c^2*e*g*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 - 1536*a^4*b^6*c*g^2*z^2 + 12288*a^6*b*c^4*f^2*z^2 + 61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8192*a^6*b^2*c^3*g^2*z^2 + 6144*a^5*b^4*c^2*g^2*z^2 - 8192*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^10*d*f*z^2 + 128*a^3*b^8*g^2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 + 384*a^2*b^6*c*d*f*g*z - 4096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 2048*a^4*b^2*c^3*d*f*g*z - 1536*a^3*b^4*c^2*d*f*g*z + 3072*a^3*b^3*c^3*d*e*f*z - 768*a^2*b^5*c^2*d*e*f*z + 1024*a^5*b*c^3*f^2*g*z + 192*a^3*b^5*c*f^2*g*z - 9216*a^4*b*c^4*d^2*g*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 336*a*b^7*c*d^2*g*z - 768*a^4*b^3*c^2*f^2*g*z + 7936*a^3*b^3*c^3*d^2*g*z - 2496*a^2*b^5*c^2*d^2*g*z + 1536*a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z - 32*a*b^8*d*f*g*z - 16*a^2*b^7*f^2*g*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 16*b^9*d^2*g*z - 768*a^3*b*c^3*d*e*f*g + 32*a*b^5*c*d*e*f*g - 192*a^2*b^3*c^2*d*e*f*g + 16*a^2*b^4*c*e*f^2*g + 48*a^2*b^4*c*d*f*g^2 - 240*a*b^4*c^2*d^2*e*g - 32*a*b^4*c^2*d*e^2*f + 192*a^3*b^2*c^2*e*f^2*g + 192*a^3*b^2*c^2*d*f*g^2 + 960*a^2*b^2*c^3*d^2*e*g + 192*a^2*b^2*c^3*d*e^2*f - 48*a^3*b^3*c*f^2*g^2 - 192*a^3*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 512*a^3*b*c^3*e^3*g + 128*a^3*b^3*c*e*g^3 + 60*a*b^5*c*d^2*g^2 + 2016*a^2*b*c^4*d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 384*a^3*b^2*c^2*e^2*g^2 - 240*a^2*b^3*c^2*d^$

$$\begin{aligned}
& 2*g^2 - 16*a^2*b^3*c^2*e^2*f^2 - 960*a^2*b^2*c^3*d^2*f^2 + 16*b^6*c*d^2*e*g \\
& - 8*a*b^6*d*f*g^2 - 18*a*b^5*c*d*f^3 - 4*a^2*b^5*f^2*g^2 - 288*a^3*c^4*d^2 \\
& *f^2 - 16*b^5*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c \\
& *d^2*f^2 - 9*a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 4*b^7*d^2*g^2 - 16*a^4*c^3 \\
& *f^4 - 16*a^3*b^4*g^4 - 256*a^3*c^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4 \\
& , z, k)*(root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6 \\
& *b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^ \\
& 6*z^4 - 256*a^3*b^12*z^4 + 32768*a^6*b*c^4*e*g*z^2 - 512*a^3*b^7*c*e*g*z^2 \\
& + 576*a^2*b^8*c*d*f*z^2 - 24576*a^5*b^3*c^3*e*g*z^2 + 6144*a^4*b^5*c^2*e*g* \\
& z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c \\
& ^3*d*f*z^2 - 1536*a^4*b^6*c*g^2*z^2 + 12288*a^6*b*c^4*f^2*z^2 + 61440*a^5*b \\
& *c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8192*a^6*b^2*c \\
& ^3*g^2*z^2 + 6144*a^5*b^4*c^2*g^2*z^2 - 8192*a^5*b^3*c^3*f^2*z^2 + 1536*a^4 \\
& *b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 5 \\
& 12*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2* \\
& z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^10*d*f*z^2 + 128*a^3*b^8*g^2*z^2 - \\
& 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 + 384*a^2*b^6* \\
& c*d*f*g*z - 4096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 2048*a^4*b^2*c^3* \\
& d*f*g*z - 1536*a^3*b^4*c^2*d*f*g*z + 3072*a^3*b^3*c^3*d*e*f*z - 768*a^2*b^5 \\
& *c^2*d*e*f*z + 1024*a^5*b*c^3*f^2*g*z + 192*a^3*b^5*c*f^2*g*z - 9216*a^4*b* \\
& c^4*d^2*g*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 336*a*b^7*c*d^ \\
& 2*g*z - 768*a^4*b^3*c^2*f^2*g*z + 7936*a^3*b^3*c^3*d^2*g*z - 2496*a^2*b^5*c \\
& ^2*d^2*g*z + 1536*a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3 \\
& *b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z - 32*a*b^8*d*f*g*z - 16*a^2*b^7 \\
& *f^2*g*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z \\
& - 16*b^9*d^2*g*z - 768*a^3*b*c^3*d*e*f*g + 32*a*b^5*c*d*e*f*g - 192*a^2*b^3 \\
& *c^2*d*e*f*g + 16*a^2*b^4*c*e*f^2*g + 48*a^2*b^4*c*d*f*g^2 - 240*a*b^4*c^2* \\
& d^2*e*g - 32*a*b^4*c^2*d*e^2*f + 192*a^3*b^2*c^2*e*f^2*g + 192*a^3*b^2*c^2* \\
& d*f*g^2 + 960*a^2*b^2*c^3*d^2*e*g + 192*a^2*b^2*c^3*d*e^2*f - 48*a^3*b^3*c*f \\
& ^2*g^2 - 192*a^3*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d \\
& *f^3 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f \\
& + 512*a^3*b*c^3*e^3*g + 128*a^3*b^3*c*e*g^3 + 60*a*b^5*c*d^2*g^2 + 2016*a^2 \\
& *b*c^4*d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 384*a^3*b^2*c^2* \\
& e^2*g^2 - 240*a^2*b^3*c^2*d^2*g^2 - 16*a^2*b^3*c^2*e^2*f^2 - 960*a^2*b^2*c^ \\
& 3*d^2*f^2 + 16*b^6*c*d^2*e*g - 8*a*b^6*d*f*g^2 - 18*a*b^5*c*d*f^3 - 4*a^2*b \\
& ^5*f^2*g^2 - 288*a^3*c^4*d^2*f^2 - 16*b^5*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 \\
& + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9*a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 \\
& - 4*b^7*d^2*g^2 - 16*a^4*c^3*f^4 - 16*a^3*b^4*g^4 - 256*a^3*c^4*e^4 - 25*b^ \\
& 4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k)*((x*(2048*a^5*c^6*e - 32*a^2*b^6*c^3*e \\
& + 384*a^3*b^4*c^4*e - 1536*a^4*b^2*c^5*e + 16*a^2*b^7*c^2*g - 192*a^3*b^5*c \\
& ^3*g + 768*a^4*b^3*c^4*g - 1024*a^5*b*c^5*g))/(4*(a^2*b^6 - 64*a^5*c^3 - 12 \\
& *a^3*b^4*c + 48*a^4*b^2*c^2)) - (6144*a^5*c^6*d - 288*a^2*b^6*c^3*d + 1920* \\
& a^3*b^4*c^4*d - 5632*a^4*b^2*c^5*d + 16*a^2*b^7*c^2*f - 192*a^3*b^5*c^3*f + \\
& 768*a^4*b^3*c^4*f + 16*a*b^8*c^2*d - 1024*a^5*b*c^5*f)/(8*(a^2*b^6 - 64*a^ \\
& 5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) + (root(1572864*a^8*b^2*c^5*z^4 - 9
\end{aligned}$$

$$\begin{aligned}
& 83040a^7b^4c^4z^4 + 327680a^6b^6c^3z^4 - 61440a^5b^8c^2z^4 + 6144a^4b^{10}c^2z^4 - 1048576a^9c^6z^4 - 256a^3b^{12}z^4 + 32768a^6b^6c^4e^*gz^2 - 512a^3b^7c^*e^*gz^2 + 576a^2b^8c^*d^*f^*z^2 - 24576a^5b^3c^3e^*gz^2 + 6144a^4b^5c^2e^*gz^2 + 24576a^5b^2c^4d^*f^*z^2 - 3072a^3b^6c^2d^*f^*z^2 + 2048a^4b^4c^3d^*f^*z^2 - 1536a^4b^6c^*g^2z^2 + 12288a^6b^6c^4f^2z^2 + 61440a^5b^6c^5d^2z^2 - 49152a^6c^5d^*f^*z^2 + 432a^*b^9c^*d^2z^2 - 8192a^6b^2c^3g^2z^2 + 6144a^5b^4c^2g^2z^2 - 8192a^5b^3c^3f^2z^2 + 1536a^4b^5c^2f^2z^2 + 24576a^5b^2c^4e^2z^2 - 6144a^4b^4c^3e^2z^2 + 512a^3b^6c^2e^2z^2 - 61440a^4b^3c^4d^2z^2 + 24064a^3b^5c^3d^2z^2 - 4608a^2b^7c^2d^2z^2 - 32a^*b^10d^*f^*z^2 + 128a^3b^8g^2z^2 - 32768a^6c^5e^2z^2 - 16a^2b^9f^2z^2 - 16b^11d^2z^2 + 384a^2b^6c^*d^*f^*g^*z - 4096a^4b^c^4d^*e^*f^*z + 64a^*b^7c^*d^*e^*f^*z + 2048a^4b^2c^3d^*f^*g^*z - 1536a^3b^4c^2d^*f^*g^*z + 3072a^3b^3c^3d^*e^*f^*z - 768a^2b^5c^2d^*e^*f^*z + 1024a^5b^c^3f^2g^*z + 192a^3b^5c^*f^2g^*z - 9216a^4b^c^4d^2g^*z + 32a^2b^6c^*e^*f^2z - 672a^*b^6c^2d^2e^*z + 336a^*b^7c^*d^2g^*z - 768a^4b^3c^2f^2g^*z + 7936a^3b^3c^3d^2g^*z - 2496a^2b^5c^2d^2g^*z + 1536a^4b^2c^3e^*f^2z - 384a^3b^4c^2e^*f^2z - 15872a^3b^2c^4d^2e^*z + 4992a^2b^4c^3d^2e^*z - 32a^*b^8d^*f^*g^*z - 16a^2b^7f^2g^*z - 2048a^5c^4e^*f^2z + 18432a^4c^5d^2e^*z + 32b^8c^*d^2e^*z - 16b^9d^2g^*z - 768a^3b^c^3d^*e^*f^*g^*z + 32a^*b^5c^*d^*e^*f^*g^*z - 192a^2b^3c^2d^*e^*f^*g^*z + 16a^2b^4c^*e^*f^2g^*z + 48a^2b^4c^*d^*f^*g^2 - 240a^*b^4c^2d^2e^*g^*z - 32a^*b^4c^2d^*e^2f^*z + 192a^3b^2c^2e^*f^2g^*z + 192a^3b^2c^2d^*f^*g^2 + 960a^2b^2c^3d^2e^*g^*z + 192a^2b^2c^3d^*e^2f^*z - 48a^3b^3c^*f^2g^2 - 192a^3b^c^3e^2f^2 + 198a^*b^4c^2d^2f^2 + 144a^2b^3c^2d^*f^3 - 960a^2b^c^4d^2e^2 + 240a^*b^3c^3d^2e^2 + 768a^3c^4d^*e^2f^*z + 512a^3b^c^3e^3g^*z + 128a^3b^3c^*e^*g^3 + 60a^*b^5c^*d^2g^2 + 2016a^2b^c^4d^3f^*z - 496a^*b^3c^3d^3f^*z + 224a^3b^c^3d^*f^3 - 384a^3b^2c^2e^2g^2 - 240a^2b^3c^2d^2g^2 - 16a^2b^3c^2e^2f^2 - 960a^2b^2c^3d^2f^2 + 16b^6c^*d^2e^*g^*z - 8a^*b^6d^*f^*g^2 - 18a^*b^5c^*d^*f^3 - 4a^2b^5f^2g^2 - 288a^3c^4d^2f^2 - 16b^5c^2d^2e^2 - 24a^3b^2c^2f^4 + 30b^5c^2d^3f^*z - 9b^6c^*d^2f^2 - 9a^2b^4c^*f^4 + 360a^*b^2c^4d^4 - 4b^7d^2g^2 - 16a^4c^3f^4 - 16a^3b^4g^4 - 256a^3c^4e^4 - 25b^4c^3d^4 - 1296a^2c^5d^4, z, k)*x*(8192a^6b^6c^6 + 32a^2b^9c^2 - 512a^3b^7c^3 + 3072a^4b^5c^4 - 8192a^5b^3c^5))/(4*(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) - (512a^4c^5e^*f^*z - 32a^*b^5c^3d^*e^*z - 1024a^3b^c^5d^*e^*z + 16a^*b^6c^2d^*g^*z - 256a^4b^c^4f^*g^*z + 384a^2b^3c^4d^*e^*z - 192a^2b^4c^3d^*g^*z - 32a^2b^4c^3e^*f^*z + 512a^3b^2c^4d^*g^*z + 16a^2b^5c^2f^*g^*z)/(8*(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) + (x*(2b^6c^3d^2 - 576a^3c^6d^2 + 64a^4c^5f^2 - 36a^*b^4c^4d^2 + 128a^3b^c^5e^2 + 256a^2b^2c^5d^2 - 32a^2b^3c^4e^2 + 20a^2b^4c^3f^2 - 96a^3b^2c^4f^2 - 8a^2b^5c^2g^2 + 32a^3b^3c^3g^2 + 4a^*b^5c^3d^*f^*z + 320a^3b^c^5d^*f^*z - 96a^2b^3c^4d^*f^*z + 32a^2b^4c^3e^*g^*z - 128a^3b^2c^4e^*g^*z))/(4*(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) - (x*(32a^2c^5e^3 - 2b^3c^4d^2e^*z + b^4c^3d^2g^*z - 4a^2b^3c^2g^3 + 24a^*b^c^5d^2e^*z - 48a^2
\end{aligned}$$

$$\begin{aligned}
& *c^5*d*e*f - 12*a*b^2*c^4*d^2*g + 16*a^2*b*c^4*e*f^2 - 48*a^2*b*c^4*e^2*g + \\
& 24*a^2*b^2*c^3*e*g^2 - 8*a^2*b^2*c^3*f^2*g - 4*a*b^2*c^4*d*e*f + 2*a*b^3*c \\
& ^3*d*f*g + 24*a^2*b*c^4*d*f*g)/(4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 4 \\
& 8*a^4*b^2*c^2))) * \text{root}(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 32 \\
& 7680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 104857 \\
& 6*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 32768*a^6*b*c^4*e*g*z^2 - 512*a^3*b^7*c* \\
& e*g*z^2 + 576*a^2*b^8*c*d*f*z^2 - 24576*a^5*b^3*c^3*e*g*z^2 + 6144*a^4*b^5* \\
& c^2*e*g*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 2048*a \\
& ^4*b^4*c^3*d*f*z^2 - 1536*a^4*b^6*c*g^2*z^2 + 12288*a^6*b*c^4*f^2*z^2 + 614 \\
& 40*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8192*a \\
& ^6*b^2*c^3*g^2*z^2 + 6144*a^5*b^4*c^2*g^2*z^2 - 8192*a^5*b^3*c^3*f^2*z^2 + \\
& 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2 \\
& *z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5* \\
& c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^10*d*f*z^2 + 128*a^3*b^8*g^ \\
& 2*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 + 384* \\
& a^2*b^6*c*d*f*g*z - 4096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 2048*a^4* \\
& b^2*c^3*d*f*g*z - 1536*a^3*b^4*c^2*d*f*g*z + 3072*a^3*b^3*c^3*d*e*f*z - 768 \\
& *a^2*b^5*c^2*d*e*f*z + 1024*a^5*b*c^3*f^2*g*z + 192*a^3*b^5*c*f^2*g*z - 921 \\
& 6*a^4*b*c^4*d^2*g*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 336*a* \\
& b^7*c*d^2*g*z - 768*a^4*b^3*c^2*f^2*g*z + 7936*a^3*b^3*c^3*d^2*g*z - 2496*a \\
& ^2*b^5*c^2*d^2*g*z + 1536*a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 1 \\
& 5872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z - 32*a*b^8*d*f*g*z - 16 \\
& *a^2*b^7*f^2*g*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c* \\
& d^2*e*z - 16*b^9*d^2*g*z - 768*a^3*b*c^3*d*e*f*g + 32*a*b^5*c*d*e*f*g - 192 \\
& *a^2*b^3*c^2*d*e*f*g + 16*a^2*b^4*c*e*f^2*g + 48*a^2*b^4*c*d*f*g^2 - 240*a* \\
& b^4*c^2*d^2*e*g - 32*a*b^4*c^2*d*e^2*f + 192*a^3*b^2*c^2*e*f^2*g + 192*a^3* \\
& b^2*c^2*d*f*g^2 + 960*a^2*b^2*c^3*d^2*e*g + 192*a^2*b^2*c^3*d*e^2*f - 48*a^ \\
& 3*b^3*c*f^2*g^2 - 192*a^3*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b \\
& ^3*c^2*d*f^3 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4* \\
& d*e^2*f + 512*a^3*b*c^3*e^3*g + 128*a^3*b^3*c*e*g^3 + 60*a*b^5*c*d^2*g^2 + \\
& 2016*a^2*b*c^4*d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 384*a^3* \\
& b^2*c^2*e^2*g^2 - 240*a^2*b^3*c^2*d^2*g^2 - 16*a^2*b^3*c^2*e^2*f^2 - 960*a^ \\
& 2*b^2*c^3*d^2*f^2 + 16*b^6*c*d^2*e*g - 8*a*b^6*d*f*g^2 - 18*a*b^5*c*d*f^3 - \\
& 4*a^2*b^5*f^2*g^2 - 288*a^3*c^4*d^2*f^2 - 16*b^5*c^2*d^2*e^2 - 24*a^3*b^2* \\
& c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9*a^2*b^4*c*f^4 + 360*a*b^2* \\
& c^4*d^4 - 4*b^7*d^2*g^2 - 16*a^4*c^3*f^4 - 16*a^3*b^4*g^4 - 256*a^3*c^4*e^4 \\
& - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k), k, 1, 4) + ((b*e - 2*a*g)/(2*(\\
& 4*a*c - b^2)) + (x^2*(2*c*e - b*g))/(2*(4*a*c - b^2)) + (x*(2*a*c*d - b^2*d \\
& + a*b*f))/(2*a*(4*a*c - b^2)) - (c*x^3*(b*d - 2*a*f))/(2*a*(4*a*c - b^2))) \\
& /(a + b*x^2 + c*x^4)
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**2,x)
```

```
[Out] Timed out
```

$$3.39 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=439

$$\frac{x(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{b^2(cd-ah)+4abcf-4ac(ah+3cd)}{\sqrt{b^2-4ac}} + abh - 2ac\right)}{2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b - \sqrt{b^2 - 4ac}}}$$

[Out] $1/2*(-b*e+2*a*g-(-b*g+2*c*e)*x^2)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*x*(b^2*d-a*b*f-2*a*(-a*h+c*d)+(a*b*h-2*a*c*f+b*c*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+(-b*g+2*c*e)*\operatorname{arctanh}((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/(-4*a*c+b^2)^{(3/2)}+1/4*\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)})*(b*c*d-2*a*c*f+a*b*h+(4*a*b*c*f+b^2*(-a*h+c*d)-4*a*c*(a*h+3*c*d))/(-4*a*c+b^2)^{(1/2)})/a/(-4*a*c+b^2)*2^{(1/2)}/c^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)}+1/4*\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)})*(b*c*d-2*a*c*f+a*b*h+(-4*a*b*c*f-b^2*(-a*h+c*d)+4*a*c*(a*h+3*c*d))/(-4*a*c+b^2)^{(1/2)})/a/(-4*a*c+b^2)*2^{(1/2)}/c^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)}$

Rubi [A] time = 1.89, antiderivative size = 439, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.229$, Rules used = {1673, 1678, 1166, 205, 1247, 638, 618, 206}

$$\frac{x(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{b^2(cd-ah)+4abcf-4ac(ah+3cd)}{\sqrt{b^2-4ac}} + abh - 2ac\right)}{2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b - \sqrt{b^2 - 4ac}}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^2, x]

[Out] $-(b*e - 2*a*g + (2*c*e - b*g)*x^2)/(2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (x*(b^2*d - a*b*f - 2*a*(c*d - a*h) + (b*c*d - 2*a*c*f + a*b*h)*x^2))/(2*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + ((b*c*d - 2*a*c*f + a*b*h + (4*a*b*c*f + b^2*(c*d - a*h) - 4*a*c*(3*c*d + a*h))/\operatorname{Sqrt}[b^2 - 4*a*c])*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]])]/(2*\operatorname{Sqrt}[2]*a*\operatorname{Sqrt}[c]*(b^2 - 4*a*c)*\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]) + ((b*c*d - 2*a*c*f + a*b*h - (4*a*b*c*f + b^2*(c*d - a*h) - 4*a*c*(3*c*d + a*h))/\operatorname{Sqrt}[b^2 - 4*a*c])*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]])]/(2*\operatorname{Sqrt}[2]*a*\operatorname{Sqrt}[c]*(b^2 - 4*a*c)*\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]) + ((2*c*e - b*g)*\operatorname{ArcTanh}[(b + 2*c*x^2)/\operatorname{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c)^{(3/2)}$

Rule 205

$\text{Int}[(a_ + (b_ \cdot x)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(\text{Rt}[a/b, 2] \cdot \text{ArcTan}[x/\text{Rt}[a/b, 2]])/a, x] \text{ ; FreeQ}\{a, b\}, x] \ \&\& \ \text{PosQ}[a/b]$

Rule 206

$\text{Int}[(a_ + (b_ \cdot x)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(1 \cdot \text{ArcTanh}[(\text{Rt}[-b, 2] \cdot x)/\text{Rt}[a, 2]])/(\text{Rt}[a, 2] \cdot \text{Rt}[-b, 2]), x] \text{ ; FreeQ}\{a, b\}, x] \ \&\& \ \text{NegQ}[a/b] \ \&\& \ (\text{GtQ}[a, 0] \ || \ \text{LtQ}[b, 0])$

Rule 618

$\text{Int}[(a_ + (b_ \cdot x) + (c_ \cdot x)^2)^{-1}, x_Symbol] \rightarrow \text{Dist}[-2, \text{Subst}[\text{Int}[1/\text{Simp}[b^2 - 4 \cdot a \cdot c - x^2, x], x], x, b + 2 \cdot c \cdot x], x] \text{ ; FreeQ}\{a, b, c\}, x] \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0]$

Rule 638

$\text{Int}[(d_ + (e_ \cdot x) \cdot ((a_ + (b_ \cdot x) + (c_ \cdot x)^2)^{p_}), x_Symbol] \rightarrow \text{Simp}[(b \cdot d - 2 \cdot a \cdot e + (2 \cdot c \cdot d - b \cdot e) \cdot x) \cdot (a + b \cdot x + c \cdot x^2)^{(p+1)} / ((p+1) \cdot (b^2 - 4 \cdot a \cdot c)), x] - \text{Dist}[(2 \cdot p + 3) \cdot (2 \cdot c \cdot d - b \cdot e) / ((p+1) \cdot (b^2 - 4 \cdot a \cdot c)), \text{Int}[(a + b \cdot x + c \cdot x^2)^{(p+1)}, x], x] \text{ ; FreeQ}\{a, b, c, d, e\}, x] \ \&\& \ \text{NeQ}[2 \cdot c \cdot d - b \cdot e, 0] \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{NeQ}[p, -3/2]$

Rule 1166

$\text{Int}[(d_ + (e_ \cdot x)^2) / ((a_ + (b_ \cdot x)^2 + (c_ \cdot x)^4), x_Symbol] \rightarrow \text{With}\{q = \text{Rt}[b^2 - 4 \cdot a \cdot c, 2]\}, \text{Dist}[e/2 + (2 \cdot c \cdot d - b \cdot e) / (2 \cdot q), \text{Int}[1 / (b/2 - q/2 + c \cdot x^2), x], x] + \text{Dist}[e/2 - (2 \cdot c \cdot d - b \cdot e) / (2 \cdot q), \text{Int}[1 / (b/2 + q/2 + c \cdot x^2), x], x]] \text{ ; FreeQ}\{a, b, c, d, e\}, x] \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0] \ \&\& \ \text{NeQ}[c \cdot d^2 - a \cdot e^2, 0] \ \&\& \ \text{PosQ}[b^2 - 4 \cdot a \cdot c]$

Rule 1247

$\text{Int}[x \cdot ((d_ + (e_ \cdot x)^2)^{q_} \cdot ((a_ + (b_ \cdot x)^2 + (c_ \cdot x)^4)^{p_}), x_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[(d + e \cdot x)^q \cdot (a + b \cdot x + c \cdot x^2)^p, x], x, x^2], x] \text{ ; FreeQ}\{a, b, c, d, e, p, q\}, x]$

Rule 1673

$\text{Int}[(Pq_ \cdot ((a_ + (b_ \cdot x)^2 + (c_ \cdot x)^4)^{p_}), x_Symbol] \rightarrow \text{Module}\{q = \text{Expon}[Pq, x], k\}, \text{Int}[\text{Sum}[\text{Coeff}[Pq, x, 2 \cdot k] \cdot x^{(2 \cdot k)}, \{k, 0, q/2\}] \cdot (a + b \cdot x^2 + c \cdot x^4)^p, x] + \text{Int}[x \cdot \text{Sum}[\text{Coeff}[Pq, x, 2 \cdot k + 1] \cdot x^{(2 \cdot k)}, \{k, 0, (q-1)/2\}] \cdot (a + b \cdot x^2 + c \cdot x^4)^p, x]] \text{ ; FreeQ}\{a, b, c, p\}, x] \ \&\& \ \text{PolyQ}[Pq, x]$

&& !PolyQ[Pq, x^2]

Rule 1678

Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := With[{d = Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p + 7)*(b*d - 2*a*e)*x^2, x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]

Rubi steps

$$\begin{aligned}
 \int \frac{d + ex + fx^2 + gx^3 + hx^4}{(a + bx^2 + cx^4)^2} dx &= \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^2} dx \\
 &= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx^2}{(a + bx^2 + cx^4)^2} dx \right) \\
 &= -\frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
 &= -\frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
 &= -\frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)}
 \end{aligned}$$

Mathematica [A] time = 1.88, size = 489, normalized size = 1.11

$$\frac{1}{4} \left(\frac{-4a^2(g + hx) + 2ab(e + x(f - x(g + hx))) + 4acx(d + x(e + fx)) - 2bdx(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)} + \frac{\sqrt{2} \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^2,x]

[Out] ((-4*a^2*(g + h*x) - 2*b*d*x*(b + c*x^2) + 4*a*c*x*(d + x*(e + f*x)) + 2*a*b*(e + x*(f - x*(g + h*x))))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)) + (Sqrt[2]*(b^2*(c*d - a*h) - 2*a*c*(6*c*d + Sqrt[b^2 - 4*a*c]*f + 2*a*h) + b*(c*Sqrt[b^2 - 4*a*c]*d + 4*a*c*f + a*Sqrt[b^2 - 4*a*c]*h))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]])/(a*Sqrt[c]*(b^2 - 4*a*c)^(3/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[2]*(b^2*(-(c*d) + a*h) + 2*a*c*(6*c*d - Sqrt[b^2 - 4*a*c]*f + 2*a*h) + b*(c*Sqrt[b^2 - 4*a*c]*d - 4*a*c*f + a*Sqrt[b^2 - 4*a*c]*h))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]])/(a*Sqrt[c]*(b^2 - 4*a*c)^(3/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + (2*(-2*c*e + b*g)*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(3/2) - (2*(-2*c*e + b*g)*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(3/2))/4

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="fricas")

[Out] Timed out

giac [B] time = 8.03, size = 7502, normalized size = 17.09

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="giac")

[Out] 1/2*(b*c*d*x^3 - 2*a*c*f*x^3 + a*b*h*x^3 + a*b*g*x^2 - 2*a*c*x^2*e + b^2*d*x - 2*a*c*d*x - a*b*f*x + 2*a^2*h*x + 2*a^2*g - a*b*e)/((c*x^4 + b*x^2 + a)*(a*b^2 - 4*a^2*c)) + 1/16*((2*b^3*c^3 - 8*a*b*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c)*c)*b^3*c + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sq

$$\begin{aligned}
& t(b*c + \sqrt{b^2 - 4*a*c})*c)*a*b*c^2 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c} \\
& + \sqrt{b^2 - 4*a*c})*c)*b^2*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}} \\
& (b^2 - 4*a*c)*c)*b*c^3 - 2*(b^2 - 4*a*c)*b*c^3)*(a*b^2 - 4*a^2*c)^2*d - 2*(\\
& 2*a*b^2*c^3 - 8*a^2*c^4 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4 \\
& *a*c})*c)*a*b^2*c + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c} \\
& *c)*a^2*c^2 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a \\
& *b*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*c^3 - \\
& 2*(b^2 - 4*a*c)*a*c^3)*(a*b^2 - 4*a^2*c)^2*f + (2*a*b^3*c^2 - 8*a^2*b*c^3 - \\
& \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^3 + 4*\sqrt{2} \\
&)*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b*c + 2*\sqrt{2}*\sqrt{b^2 - 4 \\
& *a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^2*c - \sqrt{2}*\sqrt{b^2 - 4 \\
& *a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b*c^2 - 2*(b^2 - 4*a*c)*a*b*c^2)* \\
& (a*b^2 - 4*a^2*c)^2*h + 2*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^6*c \\
& - 14*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^4*c^2 - 2*\sqrt{2}*\sqrt{b \\
& *c + \sqrt{b^2 - 4*a*c})*c)*a*b^5*c^2 - 2*a*b^6*c^2 + 64*\sqrt{2}*\sqrt{b*c + s \\
& qrt(b^2 - 4*a*c})*c)*a^3*b^2*c^3 + 20*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c \\
&)*a^2*b^3*c^3 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a*b^4*c^3 + 28*a^2* \\
& b^4*c^3 - 96*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^4*c^4 - 48*\sqrt{2})*s \\
& qrt(b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b*c^4 - 10*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - \\
& 4*a*c})*c)*a^2*b^2*c^4 - 128*a^3*b^2*c^4 + 24*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - \\
& 4*a*c})*c)*a^3*c^5 + 192*a^4*c^5 + 2*(b^2 - 4*a*c)*a*b^4*c^2 - 20*(b^2 - 4* \\
& a*c)*a^2*b^2*c^3 + 48*(b^2 - 4*a*c)*a^3*c^4)*d*abs(a*b^2 - 4*a^2*c) + 2*(sq \\
& rt(2)*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^5*c - 8*\sqrt{2}*\sqrt{b*c + \sqrt{ \\
& b^2 - 4*a*c})*c)*a^3*b^3*c^2 - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^ \\
& 2*b^4*c^2 - 2*a^2*b^5*c^2 + 16*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^4* \\
& b*c^3 + 8*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b^2*c^3 + \sqrt{2})*\sqrt{b \\
& c + \sqrt{b^2 - 4*a*c})*c)*a^2*b^3*c^3 + 16*a^3*b^3*c^3 - 4*\sqrt{2})*\sqrt{b \\
& c + \sqrt{b^2 - 4*a*c})*c)*a^3*b*c^4 - 32*a^4*b*c^4 + 2*(b^2 - 4*a*c)*a^2*b \\
& ^3*c^2 - 8*(b^2 - 4*a*c)*a^3*b*c^3)*f*abs(a*b^2 - 4*a^2*c) - 4*(\sqrt{2})*\sqrt{ \\
& b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b^4*c - 8*\sqrt{2})*\sqrt{b*c + \sqrt{b^2 - 4* \\
& a*c})*c)*a^4*b^2*c^2 - 2*\sqrt{2})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^3*b^3*c^2 \\
& - 2*a^3*b^4*c^2 + 16*\sqrt{2})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^5*c^3 + 8)* \\
& \sqrt{2})*\sqrt{b*c + \sqrt{b^2 - 4*a*c})*c)*a^4*b*c^3 + \sqrt{2})*\sqrt{b*c + \sqrt{ \\
& b^2 - 4*a*c})*c)*a^3*b^2*c^3 + 16*a^4*b^2*c^3 - 4*\sqrt{2})*\sqrt{b*c + \sqrt{b^ \\
& 2 - 4*a*c})*c)*a^4*c^4 - 32*a^5*c^4 + 2*(b^2 - 4*a*c)*a^3*b^2*c^2 - 8*(b^2 - \\
& 4*a*c)*a^4*c^3)*h*abs(a*b^2 - 4*a^2*c) + (2*a^2*b^7*c^3 - 40*a^3*b^5*c^4 + \\
& 224*a^4*b^3*c^5 - 384*a^5*b*c^6 - \sqrt{2})*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{ \\
& b^2 - 4*a*c})*c)*a^2*b^7*c + 20*\sqrt{2})*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{ \\
& b^2 - 4*a*c})*c)*a^3*b^5*c^2 + 2*\sqrt{2})*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b \\
& ^2 - 4*a*c})*c)*a^2*b^6*c^2 - 112*\sqrt{2})*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{ \\
& b^2 - 4*a*c})*c)*a^4*b^3*c^3 - 32*\sqrt{2})*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{ \\
& b^2 - 4*a*c})*c)*a^3*b^4*c^3 - \sqrt{2})*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 \\
& - 4*a*c})*c)*a^2*b^5*c^3 + 192*\sqrt{2})*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^ \\
& 2 - 4*a*c})*c)*a^5*b*c^4 + 96*\sqrt{2})*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2 \\
& - 4*a*c})*c)*a^4*b^2*c^4 + 16*\sqrt{2})*\sqrt{b^2 - 4*a*c})*\sqrt{b*c + \sqrt{b^2
\end{aligned}$$

$$\begin{aligned}
& - 4*a*c)*c)*a^3*b^3*c^4 - 48*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}} \\
& - 4*a*c)*c)*a^4*b*c^5 - 2*(b^2 - 4*a*c)*a^2*b^5*c^3 + 32*(b^2 - 4*a*c)*a^3* \\
& b^3*c^4 - 96*(b^2 - 4*a*c)*a^4*b*c^5)*d + 4*(2*a^3*b^6*c^3 - 16*a^4*b^4*c^4 \\
& + 32*a^5*b^2*c^5 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}* \\
& c)*a^3*b^6*c + 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)* \\
& a^4*b^4*c^2 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a \\
& ^3*b^5*c^2 - 16*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a \\
& ^5*b^2*c^3 - 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^ \\
& 4*b^3*c^3 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b \\
& ^4*c^3 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b^ \\
& 2*c^4 - 2*(b^2 - 4*a*c)*a^3*b^4*c^3 + 8*(b^2 - 4*a*c)*a^4*b^2*c^4)*f - (2*a \\
& ^3*b^7*c^2 - 8*a^4*b^5*c^3 - 32*a^5*b^3*c^4 + 128*a^6*b*c^5 - \sqrt{2}*\sqrt{ \\
& b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^7 + 4*\sqrt{2}*\sqrt{b^2 - \\
& 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b^5*c + 2*\sqrt{2}*\sqrt{b^2 - 4* \\
& a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^6*c + 16*\sqrt{2}*\sqrt{b^2 - 4*a* \\
& c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^5*b^3*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}* \\
& \sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^5*c^2 - 64*\sqrt{2}*\sqrt{b^2 - 4*a*c}* \\
& \sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^6*b*c^3 - 32*\sqrt{2}*\sqrt{b^2 - 4*a*c}* \\
& \sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^5*b^2*c^3 + 16*\sqrt{2}*\sqrt{b^2 - 4*a*c}* \\
& \sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^5*b*c^4 - 2*(b^2 - 4*a*c)*a^3*b^5*c^2 + 32* \\
& (b^2 - 4*a*c)*a^5*b*c^4)*h)*\arctan(2*\sqrt{1/2}*x/\sqrt{((a*b^3 - 4*a^2*b*c + \\
& \sqrt{(a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2)))/ \\
& (a*b^2*c - 4*a^2*c^2)))/((a^3*b^6*c - 12*a^4*b^4*c^2 - 2*a^3*b^5*c^2 + 48*a \\
& ^5*b^2*c^3 + 16*a^4*b^3*c^3 + a^3*b^4*c^3 - 64*a^6*c^4 - 32*a^5*b*c^4 - 8*a \\
& ^4*b^2*c^4 + 16*a^5*c^5)*\text{abs}(a*b^2 - 4*a^2*c)*\text{abs}(c)) - 1/16*((2*b^3*c^3 - \\
& 8*a*b*c^4 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^3*c \\
& + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b*c^2 + 2* \\
& \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b^2*c^2 - \sqrt{2} \\
& *\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*b*c^3 - 2*(b^2 - 4*a*c)* \\
& b*c^3)*(a*b^2 - 4*a^2*c)^2*d - 2*(2*a*b^2*c^3 - 8*a^2*c^4 - \sqrt{2}*\sqrt{b^ \\
& 2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^2*c + 4*\sqrt{2}*\sqrt{b^2 - 4 \\
& *a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*c^2 + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c} \\
& *\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b \\
& *c - \sqrt{b^2 - 4*a*c}}*c)*a*c^3 - 2*(b^2 - 4*a*c)*a*c^3)*(a*b^2 - 4*a^2*c)^ \\
& 2*f + (2*a*b^3*c^2 - 8*a^2*b*c^3 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{ \\
& b^2 - 4*a*c}}*c)*a*b^3 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - \\
& 4*a*c}}*c)*a^2*b*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a* \\
& c}}*c)*a*b^2*c - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a \\
& *b*c^2 - 2*(b^2 - 4*a*c)*a*b*c^2)*(a*b^2 - 4*a^2*c)^2*h - 2*(\sqrt{2}*\sqrt{b \\
& *c - \sqrt{b^2 - 4*a*c}}*c)*a*b^6*c - 14*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& *c)*a^2*b^4*c^2 - 2*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a*b^5*c^2 + 2*a \\
& *b^6*c^2 + 64*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^2*c^3 + 20*\sqrt{2} \\
& *\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^3*c^3 + \sqrt{2}*\sqrt{b*c - \sqrt{b^2 - \\
& 4*a*c}}*c)*a*b^4*c^3 - 28*a^2*b^4*c^3 - 96*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - \\
& 4*a*c}}*c)*a^4*c^4 - 48*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^4
\end{aligned}$$

$$\begin{aligned}
& - 10\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^2*c^4 + 128*a^3*b^2*c^4 \\
& + 24\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*c^5 - 192*a^4*c^5 - 2*(b^2 \\
& - 4*a*c)*a*b^4*c^2 + 20*(b^2 - 4*a*c)*a^2*b^2*c^3 - 48*(b^2 - 4*a*c)*a^3*c \\
& ^4)*d*\text{abs}(a*b^2 - 4*a^2*c) - 2*(\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2 \\
& *b^5*c - 8\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^3*c^2 - 2\sqrt{2}* \\
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^4*c^2 + 2*a^2*b^5*c^2 + 16\sqrt{2}* \\
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^4*b*c^3 + 8\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4 \\
& *a*c}}*c)*a^3*b^2*c^3 + \sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^3*c^3 \\
& - 16*a^3*b^3*c^3 - 4\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^4 + 32 \\
& *a^4*b*c^4 - 2*(b^2 - 4*a*c)*a^2*b^3*c^2 + 8*(b^2 - 4*a*c)*a^3*b*c^3)*f*\text{abs} \\
& (a*b^2 - 4*a^2*c) + 4*(\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^4*c - \\
& 8\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^4*b^2*c^2 - 2\sqrt{2}\sqrt{b*c - \\
& \sqrt{b^2 - 4*a*c}}*c)*a^3*b^3*c^2 + 2*a^3*b^4*c^2 + 16\sqrt{2}\sqrt{b*c - \\
& \sqrt{b^2 - 4*a*c}}*c)*a^5*c^3 + 8\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^ \\
& 4*b*c^3 + \sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^2*c^3 - 16*a^4*b^2*c \\
& ^3 - 4\sqrt{2}\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^4*c^4 + 32*a^5*c^4 - 2*(b \\
& ^2 - 4*a*c)*a^3*b^2*c^2 + 8*(b^2 - 4*a*c)*a^4*c^3)*h*\text{abs}(a*b^2 - 4*a^2*c) + \\
& (2*a^2*b^7*c^3 - 40*a^3*b^5*c^4 + 224*a^4*b^3*c^5 - 384*a^5*b*c^6 - \sqrt{2} \\
&)*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^7*c + 20\sqrt{2}* \\
& \sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^5*c^2 + 2\sqrt{2}* \\
& \sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^6*c^2 - 112\sqrt{2}* \\
& \sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^4*b^3*c^3 - 32\sqrt{2}* \\
& \sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^4*c^3 - \sqrt{2}* \\
& \sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^2*b^5*c^3 + 192\sqrt{2}* \\
& \sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^5*b*c^4 + 96\sqrt{2}* \\
& \sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^4*b^2*c^4 + 16\sqrt{2}* \\
& \sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^3*c^4 - 48\sqrt{2}* \\
& \sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^4*b*c^5 - 2*(b^2 - 4*a*c)* \\
& a^2*b^5*c^3 + 32*(b^2 - 4*a*c)*a^3*b^3*c^4 - 96*(b^2 - 4*a*c)*a^4*b*c^5)*d + \\
& 4*(2*a^3*b^6*c^3 - 16*a^4*b^4*c^4 + 32*a^5*b^2*c^5 - \sqrt{2}\sqrt{b^2 - 4* \\
& a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^6*c + 8\sqrt{2}\sqrt{b^2 - 4*a*c} \\
&)*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^4*b^4*c^2 + 2\sqrt{2}\sqrt{b^2 - 4*a*c} \\
&)*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^5*c^2 - 16\sqrt{2}\sqrt{b^2 - 4*a*c} \\
&)*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^5*b^2*c^3 - 8\sqrt{2}\sqrt{b^2 - 4*a*c} \\
&)*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^4*b^3*c^3 - \sqrt{2}\sqrt{b^2 - 4*a*c})* \\
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^4*c^3 + 4\sqrt{2}\sqrt{b^2 - 4*a*c})* \\
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^4*b^2*c^4 - 2*(b^2 - 4*a*c)*a^3*b^4*c^3 + 8*(\\
& b^2 - 4*a*c)*a^4*b^2*c^4)*f - (2*a^3*b^7*c^2 - 8*a^4*b^5*c^3 - 32*a^5*b^3*c \\
& ^4 + 128*a^6*b*c^5 - \sqrt{2}\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
&)*c)*a^3*b^7 + 4\sqrt{2}\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a \\
& ^4*b^5*c + 2\sqrt{2}\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3* \\
& b^6*c + 16\sqrt{2}\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^5*b^ \\
& 3*c^2 - \sqrt{2}\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^3*b^5*c \\
& ^2 - 64\sqrt{2}\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^6*b*c^3 \\
& - 32\sqrt{2}\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*c)*a^5*b^2*c^3
\end{aligned}$$

$$\begin{aligned} &+ 16\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}c}a^5b^2c^4 - \\ &2(b^2 - 4ac)a^3b^5c^2 + 32(b^2 - 4ac)a^5b^2c^4)h)\arctan(2\sqrt{x}/\sqrt{(ab^3 - 4a^2b^2c - \sqrt{(ab^3 - 4a^2b^2c)^2 - 4(a^2b^2 - 4a^3c)}(ab^2c - 4a^2c^2)))/(ab^2c - 4a^2c^2)))/((a^3b^6c - 12a^4b^4c^2 - 2a^3b^5c^2 + 48a^5b^2c^3 + 16a^4b^3c^3 + a^3b^4c^3 - 64a^6c^4 - 32a^5b^2c^4 - 8a^4b^2c^4 + 16a^5c^5)\text{abs}(ab^2 - 4a^2c)\text{abs}(c)) + 1/8((b^4c - 4ab^2c^2 - 2b^3c^2 + b^2c^3 + (b^3c - 4ab^2c^2 - 2b^2c^2 + bc^3)\sqrt{b^2 - 4ac})\text{abs}(ab^2 - 4a^2c) - 2(b^3c^2 - 4ab^2c^3 - 2b^2c^3 + bc^4 + (b^2c^2 - 4ac^3 - 2b^2c^3 + c^4)\sqrt{b^2 - 4ac}))\text{abs}(ab^2 - 4a^2c)e - (ab^6c - 8a^2b^4c^2 - 2ab^5c^2 + 16a^3b^2c^3 + 8a^2b^3c^3 + ab^4c^3 - 4a^2b^2c^4 + (ab^5c - 4a^2b^3c^2 - 2ab^4c^2 + ab^3c^3)\sqrt{b^2 - 4ac})\text{abs}(ab^2 - 4a^2c))\text{abs}(ab^2 - 4a^2c)e - (ab^6c - 8a^2b^4c^2 - 2ab^5c^2 + 16a^3b^2c^3 + 8a^2b^3c^3 + ab^4c^3 - 4a^2b^2c^4 + (ab^5c - 4a^2b^3c^2 - 2ab^4c^2 + ab^3c^3)\sqrt{b^2 - 4ac})\text{abs}(ab^2 - 4a^2c))\text{abs}(ab^2 - 4a^2c)\log(x^2 + 1/2(ab^3 - 4a^2b^2c + \sqrt{(ab^3 - 4a^2b^2c)^2 - 4(a^2b^2 - 4a^3c)}(ab^2c - 4a^2c^2)))/(ab^2c - 4a^2c^2)))/((ab^4 - 8a^2b^2c - 2ab^3c + 16a^3c^2 + 8a^2b^2c^2 + ab^2c^2 - 4a^2c^3)c^2\text{abs}(ab^2 - 4a^2c)) + 1/8((b^4c - 4ab^2c^2 - 2b^3c^2 + b^2c^3 - (b^3c - 4ab^2c^2 - 2b^2c^2 + bc^3)\sqrt{b^2 - 4ac})\text{abs}(ab^2 - 4a^2c)e - (ab^6c - 8a^2b^4c^2 - 2ab^5c^2 + 16a^3b^2c^3 + 8a^2b^3c^3 + ab^4c^3 - 4a^2b^2c^4 - (ab^5c - 4a^2b^3c^2 - 2ab^4c^2 + ab^3c^3)\sqrt{b^2 - 4ac})\text{abs}(ab^2 - 4a^2c))\text{abs}(ab^2 - 4a^2c)e - (ab^6c - 8a^2b^4c^2 - 2ab^5c^2 + 16a^3b^2c^3 + 8a^2b^3c^3 + ab^4c^3 - 4a^2b^2c^4 - (ab^5c - 4a^2b^3c^2 - 2ab^4c^2 + ab^3c^3)\sqrt{b^2 - 4ac})\text{abs}(ab^2 - 4a^2c))\text{abs}(ab^2 - 4a^2c)\log(x^2 + 1/2(ab^3 - 4a^2b^2c - \sqrt{(ab^3 - 4a^2b^2c)^2 - 4(a^2b^2 - 4a^3c)}(ab^2c - 4a^2c^2)))/(ab^2c - 4a^2c^2)))/((ab^4 - 8a^2b^2c - 2ab^3c + 16a^3c^2 + 8a^2b^2c^2 + ab^2c^2 - 4a^2c^3)c^2\text{abs}(ab^2 - 4a^2c)) \end{aligned}$$

maple [B] time = 0.07, size = 1801, normalized size = 4.10

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((hx^4+gx^3+fx^2+ex+d)/(cx^4+bx^2+a)^2, x)$

[Out] $\frac{1}{4}\sqrt{4ac-b^2}\sqrt{2}\sqrt{2}\sqrt{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2})c*x)*(-4ac+b^2)^{1/2}b^2h+1/4\sqrt{4ac-b^2}\sqrt{2}\sqrt{2}\sqrt{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2}\text{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})c)^{1/2})c*x)*(-4ac+b^2)^{1/2}b^2h+(-1/2/a*(abh-2acf+bc*d)/(4ac-b^2)*x^3-1/2*(bg-2ce)/(4ac-b^2)*x^2-1/2*(2a^2h-abf-2acd+b^2d)/a/(4ac-b^2)*x-1/2*(2ag-be)/(4ac-b^2))/(cx^4+bx^2+a)-1/4\sqrt{4ac-b^2}\sqrt{2}\sqrt{2}\sqrt{1/2}/((b+(-4ac+b^2)^{1/2})c)^{1/2}*(-4ac+b^2)^{1/2}$

$$\begin{aligned}
& 2)/a*b^2*c*d*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/4*c/(4* \\
& a*c-b^2)^2/a*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/((-b \\
& +(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*d-c/(4*a*c-b^2)^2 \\
& *2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2) \\
&)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b*f-1/(4*a*c-b^2)^2*2^{(1/2)}/((b+(- \\
& -4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)}*b*c*f*\arctan(2^{(1/2)}/((b+(-4 \\
& *a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-2*c^2/(4*a*c-b^2)^2*a*2^{(1/2)}/((-b+(-4*a*c+b \\
& ^2)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)* \\
& f+1/2*c/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/((- \\
& 1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^2*f+2/(4*a*c-b^2)^2*2^{(1/2)}/(\\
& (b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*a*c^2*f*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2) \\
&)^{(1/2)})*c)^{(1/2)}*c*x)-1/2/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2) \\
&)*b^2*c*f*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/4*c/(4*a*c \\
& -b^2)^2/a*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/((-b+(- \\
& 4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^3*d+a/(4*a*c-b^2)^2*c*2^{(1/2)}/((-b+(-4*a* \\
& c+b^2)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c* \\
& x)*b*h+1/2/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)}*b*g*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2) \\
& (1/2))+1/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)}*c*e*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2) \\
& 2))-1/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)}*c*e*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2) \\
&)+3/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2) \\
& 2)*c^2*d*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/(4*a*c-b^2) \\
& ^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*b*c^2*d*\arctan(2^{(1/2)}/((b+(-4* \\
& a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)+3*c^2/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2) \\
&)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4 \\
& *a*c+b^2)^{(1/2)}*d+c^2/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2) \\
& 2)*\arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*d+1/4/(4*a*c-b^ \\
& 2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}/a*b^3*c*d*\arctan(2^{(1/2)}/((b+ \\
& (-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/4/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^ \\
& 2)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b \\
& ^3*h-1/2/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)}*b*g*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2) \\
& 2))+a/(4*a*c-b^2)^2*c*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctan(2^{(1/2)}/ \\
& (b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*h-a/(4*a*c-b^2) \\
& ^2*c*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctan(2^{(1/2)}/((b+(-4*a*c+b^ \\
& 2)^{(1/2)})*c)^{(1/2)}*c*x)*b*h+a/(4*a*c-b^2)^2*c*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2) \\
&)^{(1/2)})*c)^{(1/2)}*\arctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c \\
& +b^2)^{(1/2)}*h+1/4/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\ar \\
& ctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^3*h
\end{aligned}$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="maxima")
```

```
[Out] 1/2*((b*c*d - 2*a*c*f + a*b*h)*x^3 - a*b*e + 2*a^2*g - (2*a*c*e - a*b*g)*x^2 - (a*b*f - 2*a^2*h - (b^2 - 2*a*c)*d)*x)/((a*b^2*c - 4*a^2*c^2)*x^4 + a^2*b^2 - 4*a^3*c + (a*b^3 - 4*a^2*b*c)*x^2) + 1/2*integrate((a*b*f - 2*a^2*h + (b*c*d - 2*a*c*f + a*b*h)*x^2 + (b^2 - 6*a*c)*d - 2*(2*a*c*e - a*b*g)*x)/(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c)
```

mupad [B] time = 2.31, size = 13024, normalized size = 29.67

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^2, x)
```

```
[Out] ((b*e - 2*a*g)/(2*(4*a*c - b^2)) + (x^2*(2*c*e - b*g))/(2*(4*a*c - b^2)) - (x*(b^2*d + 2*a^2*h - 2*a*c*d - a*b*f))/(2*a*(4*a*c - b^2)) - (x^3*(b*c*d - 2*a*c*f + a*b*h))/(2*a*(4*a*c - b^2)))/(a + b*x^2 + c*x^4) + symsum(log((5*b^3*c^4*d^3 + 8*a^3*c^4*f^3 - 96*a^2*c^5*d*e^2 + 72*a^2*c^5*d^2*f - 3*a^3*b^3*c*h^3 - 4*a^4*b*c^2*h^3 - 3*b^4*c^3*d^2*f - 32*a^3*c^4*e^2*h + b^5*c^2*d^2*h + 8*a^4*c^3*f*h^2 + 6*a^2*b^2*c^3*f^3 - 36*a*b*c^5*d^3 + a*b^5*c*d*h^2 + 48*a^3*c^4*d*f*h + 16*a*b^2*c^4*d*e^2 + 18*a*b^2*c^4*d^2*f + 3*a*b^3*c^3*d*f^2 - 60*a^2*b*c^4*d*f^2 + 4*a*b^4*c^2*d*g^2 + 16*a^2*b*c^4*e^2*f - a*b^3*c^3*d^2*h - 60*a^2*b*c^4*d^2*h - 28*a^3*b*c^3*d*h^2 + a^2*b^4*c*f*h^2 - 28*a^3*b*c^3*f^2*h - 24*a^2*b^2*c^3*d*g^2 - 9*a^2*b^3*c^2*d*h^2 + 4*a^2*b^3*c^2*f*g^2 - 5*a^2*b^3*c^2*f^2*h + 18*a^3*b^2*c^2*f*h^2 - 8*a^3*b^2*c^2*g^2*h - 16*a*b^3*c^3*d*e*g + 96*a^2*b*c^4*d*e*g - 4*a*b^4*c^2*d*f*h + 32*a^3*b*c^3*e*g*h + 52*a^2*b^2*c^3*d*f*h - 16*a^2*b^2*c^3*e*f*g)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - root(1572864*a^8*b^2*c^6*z^4 - 983040*a^7*b^4*c^5*z^4 + 327680*a^6*b^6*c^4*z^4 - 61440*a^5*b^8*c^3*z^4 + 6144*a^4*b^10*c^2*z^4 - 256*a^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 192*a^3*b^8*c*f*h*z^2 + 57344*a^6*b*c^5*d*h*z^2 + 32768*a^6*b*c^5*e*g*z^2 + 96*a^2*b^9*c*d*h*z^2 - 32*a*b^10*c*d*f*z^2 + 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^4*b^6*c^2*f*h*z^2 - 49152*a^5*b^3*c^4*d*h*z^2 - 24576*a^5*b^3*c^4*e*g*z^2 + 15360*a^4*b^5*c^3*d*h*z^2 + 6144*a^4*b^5*c^3*e*g*z^2 - 2048*a^3*b^7*c^2*d*h*z^2 - 512*a^3*b^7*c^2*e*g*z^2 + 24576*a^5*b^2*c^5*d*f*z^2 - 3072*a^3*b^6*c^3*d*f*z^2 + 2048*a^4*b^4*c^4*d*f*z^2 + 576*a^2*b^8*c^2*d*f*z^2 + 12288*a^7*b*c^4*h^2*z^2 + 128*a^3*b^8*c*g^2*z^2 + 12288*a^6*b*c^5*f^2*z^2 - 16*a^2*b^9*c*f^2*z^2 + 61440*a^5*b*c^6*d^2*z^2 + 432*a*b^9*c^2*d^2*z^2 - 16384*a^7*c^5*f*h*z^2 - 49152*a^6*c^6*d*f*z^2 - 8192*a^6*b^3*c^3*h^2*z^2 + 1536*a^5*b^5*c^2*h^2*z^2 - 8192*a^6*b^2*c^4*g^2*z^2 + 6144*a^5*b^4*c^3*g^2*z^2 - 1536*a^4*b^6*c^2*g^2*z^2 - 8192*a^5*b^3*c^4*f^2*z^2 + 1536*a^4*b^5*c^3*f^2*z^2 + 24576*a^5*b^2*c^5*e^2*z^2 - 6144*a^4*b^4*c^4*e^2*z^2 + 512*a^3*b^6*c^3*e^2*z^2 - 61440*a^4*b^3*c^5*d^2*z^2 + 24064*a^3*b^5*c^4*d^2*z^2 - 4608*a^2*b^7*c^3*d^2*z^2 - 16*a^3*b^9*h^2*z^2 - 32768*a^6*c^6*e^2*z^2 - 16*b^11*c*d^2*z^2 - 6144*a^5*b*c^4*d*g*h*z + 96*a^2*b^7*c*d*g*h*z - 4096*a^4*b*c^5*d*e*f*z + 64*a*b^7*c^2*d*e*f*z - 32*a*b^8*c*d*f*g*z + 4608*a^4*b^3*c^3*d*g*h*z - 115
```

$$\begin{aligned}
& 2*a^3*b^5*c^2*d*g*h*z - 9216*a^4*b^2*c^4*d*e*h*z + 2304*a^3*b^4*c^3*d*e*h*z \\
& + 2048*a^4*b^2*c^4*d*f*g*z - 1536*a^3*b^4*c^3*d*f*g*z + 384*a^2*b^6*c^2*d* \\
& f*g*z - 192*a^2*b^6*c^2*d*e*h*z + 3072*a^3*b^3*c^4*d*e*f*z - 768*a^2*b^5*c^ \\
& 3*d*e*f*z - 1024*a^6*b*c^3*g*h^2*z - 192*a^4*b^5*c*g*h^2*z + 1024*a^5*b*c^4 \\
& *f^2*g*z - 32*a^3*b^6*c*e*h^2*z - 16*a^2*b^7*c*f^2*g*z - 9216*a^4*b*c^5*d^2 \\
& *g*z + 336*a*b^7*c^2*d^2*g*z - 672*a*b^6*c^3*d^2*e*z + 12288*a^5*c^5*d*e*h* \\
& z + 768*a^5*b^3*c^2*g*h^2*z - 1536*a^5*b^2*c^3*e*h^2*z - 768*a^4*b^3*c^3*f^ \\
& 2*g*z + 384*a^4*b^4*c^2*e*h^2*z + 192*a^3*b^5*c^2*f^2*g*z + 7936*a^3*b^3*c^ \\
& 4*d^2*g*z - 2496*a^2*b^5*c^3*d^2*g*z + 1536*a^4*b^2*c^4*e*f^2*z - 384*a^3*b \\
& ^4*c^3*e*f^2*z + 32*a^2*b^6*c^2*e*f^2*z - 15872*a^3*b^2*c^5*d^2*e*z + 4992* \\
& a^2*b^4*c^4*d^2*e*z + 16*a^3*b^7*g*h^2*z + 2048*a^6*c^4*e*h^2*z - 2048*a^5* \\
& c^5*e*f^2*z + 32*b^8*c^2*d^2*e*z + 18432*a^4*c^6*d^2*e*z - 16*b^9*c*d^2*g*z \\
& - 256*a^4*b*c^3*e*f*g*h - 768*a^3*b*c^4*d*e*f*g + 32*a*b^5*c^2*d*e*f*g - 1 \\
& 92*a^3*b^3*c^2*e*f*g*h + 896*a^3*b^2*c^3*d*e*g*h - 96*a^2*b^4*c^2*d*e*g*h - \\
& 192*a^2*b^3*c^3*d*e*f*g + 48*a^3*b^4*c*f*g^2*h + 16*a^3*b^4*c*e*g*h^2 + 24 \\
& *a^2*b^5*c*d*g^2*h + 2208*a^3*b*c^4*d^2*f*h + 800*a^4*b*c^3*d*f*h^2 - 102*a \\
& *b^5*c^2*d^2*f*h - 30*a^2*b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h - 240*a*b^4 \\
& *c^3*d^2*e*g - 32*a*b^4*c^3*d*e^2*f + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d*f*g^ \\
& 2 + 64*a^4*b^2*c^2*f*g^2*h + 192*a^4*b^2*c^2*e*g*h^2 - 224*a^3*b^3*c^2*d*g^ \\
& 2*h + 192*a^3*b^2*c^3*e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 336*a^3*b^3*c^2*d \\
& *f*h^2 + 192*a^3*b^2*c^3*e*f^2*g + 144*a^2*b^3*c^3*d^2*f*h + 16*a^2*b^4*c^2 \\
& *e*f^2*g - 12*a^2*b^4*c^2*d*f^2*h + 192*a^3*b^2*c^3*d*f*g^2 + 96*a^2*b^3*c^ \\
& 3*d*e^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*a^2*b^2*c^4*d^2*e*g + 192*a^2*b^2* \\
& c^4*d*e^2*f - 48*a^4*b^3*c*g^2*h^2 + 80*a^3*b^3*c^2*f^3*h - 42*a^3*b^4*c*f^ \\
& 2*h^2 - 192*a^4*b*c^3*e^2*h^2 - 4*a^2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d*h^3 \\
& - 192*a^2*b^2*c^4*d^3*h + 128*a^3*b^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^2 + \\
& 60*a*b^5*c^2*d^2*g^2 + 198*a*b^4*c^3*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 - 960* \\
& a^2*b*c^5*d^2*e^2 + 240*a*b^3*c^4*d^2*e^2 + 256*a^4*c^4*e^2*f*h - 192*a^4*c \\
& ^4*d*f^2*h + 16*b^6*c^2*d^2*e*g + 96*a^5*b*c^2*f*h^3 + 96*a^4*b*c^3*f^3*h + \\
& 80*a^4*b^3*c*f*h^3 + 6*a^2*b^5*c*f^3*h + 768*a^3*c^5*d*e^2*f + 512*a^3*b*c \\
& ^4*e^3*g + 132*a*b^4*c^3*d^3*h - 28*a^3*b^4*c*d*h^3 + 12*a*b^6*c*d^2*h^2 + \\
& 2016*a^2*b*c^5*d^3*f - 496*a*b^3*c^4*d^3*f + 224*a^3*b*c^4*d*f^3 - 18*a*b^5 \\
& *c^2*d*f^3 - 192*a^4*b^2*c^2*f^2*h^2 - 48*a^3*b^3*c^2*f^2*g^2 - 16*a^3*b^3* \\
& c^2*e^2*h^2 - 464*a^3*b^2*c^3*d^2*h^2 - 384*a^3*b^2*c^3*e^2*g^2 + 42*a^2*b^ \\
& 4*c^2*d^2*h^2 - 240*a^2*b^3*c^3*d^2*g^2 - 16*a^2*b^3*c^3*e^2*f^2 - 960*a^2* \\
& b^2*c^4*d^2*f^2 + 6*b^7*c*d^2*f*h - 2*a*b^7*d*f*h^2 - 32*a^5*c^3*f^2*h^2 - \\
& 4*a^3*b^5*g^2*h^2 - 864*a^4*c^4*d^2*h^2 - 9*b^6*c^2*d^2*f^2 - 288*a^3*c^5*d \\
& ^2*f^2 - 16*b^5*c^3*d^2*e^2 - 24*a^3*b^2*c^3*f^4 - 9*a^2*b^4*c^2*f^4 - 10*b \\
& ^6*c^2*d^3*h + 6*a^3*b^5*f*h^3 - 1728*a^3*c^5*d^3*h - 192*a^5*c^3*d*h^3 - 4 \\
& *b^7*c*d^2*g^2 + 30*b^5*c^3*d^3*f + 6*a^2*b^6*d*h^3 - 24*a^5*b^2*c*h^4 - 16 \\
& *a^3*b^4*c*g^4 + 360*a*b^2*c^5*d^4 - 16*a^6*c^2*h^4 - 9*a^4*b^4*h^4 - 16*a^ \\
& 4*c^4*f^4 - 256*a^3*c^5*e^4 - 25*b^4*c^4*d^4 - 1296*a^2*c^6*d^4 - a^2*b^6*f \\
& ^2*h^2 - b^8*d^2*h^2, z, k)*(root(1572864*a^8*b^2*c^6*z^4 - 983040*a^7*b^4* \\
& c^5*z^4 + 327680*a^6*b^6*c^4*z^4 - 61440*a^5*b^8*c^3*z^4 + 6144*a^4*b^10*c^ \\
& 2*z^4 - 256*a^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 192*a^3*b^8*c*f*h*z^2 +
\end{aligned}$$

$$\begin{aligned}
& 57344a^6b^5c^5d^2h^2z^2 + 32768a^6b^5c^5e^2g^2z^2 + 96a^2b^9c^5d^2h^2z^2 - \\
& 32a^2b^10c^5d^2f^2z^2 + 6144a^5b^4c^3f^2h^2z^2 - 2048a^4b^6c^2f^2h^2z^2 - \\
& 49152a^5b^3c^4d^2h^2z^2 - 24576a^5b^3c^4e^2g^2z^2 + 15360a^4b^5c^3d^2h^2z^2 + 6144a^4b^5c^3e^2g^2z^2 - \\
& 2048a^3b^7c^2d^2h^2z^2 - 512a^3b^7c^2e^2g^2z^2 + 24576a^5b^2c^5d^2f^2z^2 - 3072a^3b^6c^3d^2f^2z^2 + 2048a^4b^4c^4d^2f^2z^2 + \\
& 576a^2b^8c^2d^2f^2z^2 + 12288a^7b^4c^4h^2z^2 + 128a^3b^8c^2g^2z^2 + 12288a^6b^5c^5f^2z^2 - 16a^2b^9c^2f^2z^2 + 61440a^5b^6c^6d^2z^2 + \\
& 432a^2b^9c^2d^2z^2 - 16384a^7c^5f^2h^2z^2 - 49152a^6c^6d^2f^2z^2 - 8192a^6b^3c^3h^2z^2 + 1536a^5b^5c^2h^2z^2 - 8192a^6b^2c^4g^2z^2 + \\
& 6144a^5b^4c^3g^2z^2 - 1536a^4b^6c^2g^2z^2 - 8192a^5b^3c^4f^2z^2 + 1536a^4b^5c^3f^2z^2 + 24576a^5b^2c^5e^2z^2 - 6144a^4b^4c^4e^2z^2 + \\
& 512a^3b^6c^3e^2z^2 - 61440a^4b^3c^5d^2z^2 + 24064a^3b^5c^4d^2z^2 - 4608a^2b^7c^3d^2z^2 - 16a^3b^9h^2z^2 - 32768a^6c^6e^2z^2 - \\
& 16b^11c^d^2z^2 - 6144a^5b^4d^2g^2h^2z + 96a^2b^7c^2d^2g^2h^2z - 4096a^4b^3c^5d^2e^2f^2z + 64a^2b^7c^2d^2e^2f^2z - \\
& 32a^2b^8c^2d^2f^2g^2z + 4608a^4b^3c^3d^2g^2h^2z - 1152a^3b^5c^2d^2g^2h^2z - 9216a^4b^2c^4d^2e^2h^2z + 2304a^3b^4c^3d^2e^2h^2z + \\
& 2048a^4b^2c^4d^2f^2g^2z - 1536a^3b^4c^3d^2f^2g^2z + 384a^2b^6c^2d^2f^2g^2z - 192a^2b^6c^2d^2e^2h^2z + 3072a^3b^3c^4d^2e^2f^2z - \\
& 768a^2b^5c^3d^2e^2f^2z - 1024a^6b^3c^3g^2h^2z - 192a^4b^5c^2g^2h^2z + 1024a^5b^4c^4f^2g^2z - 32a^3b^6c^2e^2h^2z - \\
& 16a^2b^7c^2f^2g^2z - 9216a^4b^3c^5d^2g^2z + 336a^2b^7c^2d^2g^2z - 672a^2b^6c^3d^2e^2z + 12288a^5c^5d^2e^2h^2z + 768a^5b^3c^2g^2h^2z - \\
& 1536a^5b^2c^3e^2h^2z - 768a^4b^3c^3f^2g^2z + 384a^4b^4c^2e^2h^2z + 192a^3b^5c^2f^2g^2z + 7936a^3b^3c^4d^2g^2z - 2496a^2b^5c^3d^2g^2z + \\
& 1536a^4b^2c^4e^2f^2z - 384a^3b^4c^3e^2f^2z + 32a^2b^6c^2e^2f^2z - 15872a^3b^2c^5d^2e^2z + 4992a^2b^4c^4d^2e^2z + 16a^3b^7g^2h^2z + \\
& 2048a^6c^4e^2h^2z - 2048a^5c^5e^2f^2z + 32b^8c^2d^2e^2z + 18432a^4c^6d^2e^2z - 16b^9c^d^2g^2z - 256a^4b^3c^3e^2f^2g^2h - \\
& 768a^3b^3c^4d^2e^2f^2g + 32a^2b^5c^2d^2e^2f^2g - 192a^3b^3c^2e^2f^2g^2h + 896a^3b^2c^3d^2e^2g^2h - 96a^2b^4c^2d^2e^2g^2h - \\
& 192a^2b^3c^3d^2e^2f^2g + 48a^3b^4c^2f^2g^2h + 16a^3b^4c^2e^2g^2h^2 + 24a^2b^5c^2d^2g^2h + 2208a^3b^4c^4d^2f^2h + 800a^4b^3c^3d^2f^2h^2 - \\
& 102a^2b^5c^2d^2f^2h - 30a^2b^5c^2d^2f^2h^2 - 896a^3b^3c^4d^2e^2h - 240a^2b^4c^3d^2e^2g - 32a^2b^4c^3d^2e^2f + 12a^2b^6c^2d^2f^2h - \\
& 8a^2b^6c^2d^2f^2g^2 + 64a^4b^2c^2f^2g^2h + 192a^4b^2c^2e^2g^2h^2 - 224a^3b^3c^2d^2g^2h + 192a^3b^2c^3e^2f^2h - 864a^3b^2c^3d^2f^2h + \\
& 336a^3b^3c^2d^2f^2h^2 + 192a^3b^2c^3e^2f^2g + 144a^2b^3c^3d^2f^2h + 16a^2b^4c^2e^2f^2g - 12a^2b^4c^2d^2f^2h + 192a^3b^2c^3d^2f^2g^2 + \\
& 96a^2b^3c^3d^2e^2h + 48a^2b^4c^2d^2f^2g^2 + 960a^2b^2c^4d^2e^2g + 192a^2b^2c^4d^2e^2f - 48a^4b^3c^2g^2h^2 + 80a^3b^3c^2f^3h - \\
& 42a^3b^4c^2f^2h^2 - 192a^4b^3c^3e^2h^2 - 4a^2b^5c^2f^2g^2 - 192a^4b^2c^2d^2h^3 - 192a^2b^2c^4d^3h + 128a^3b^3c^2e^2g^3 - \\
& 192a^3b^3c^4e^2f^2 + 60a^2b^5c^2d^2g^2 + 198a^2b^4c^3d^2f^2 + 144a^2b^3c^3d^2f^3 - 960a^2b^3c^5d^2e^2 + 240a^2b^3c^4d^2e^2 + \\
& 256a^4c^4e^2f^2h - 192a^4c^4d^2f^2h + 16b^6c^2d^2e^2g + 96a^5b^3c^2f^2h^3 + 96a^4b^3c^3f^3h + 80a^4b^3c^3f
\end{aligned}$$

$$\begin{aligned}
& *h^3 + 6*a^2*b^5*c*f^3*h + 768*a^3*c^5*d*e^2*f + 512*a^3*b*c^4*e^3*g + 132* \\
& a*b^4*c^3*d^3*h - 28*a^3*b^4*c*d*h^3 + 12*a*b^6*c*d^2*h^2 + 2016*a^2*b*c^5* \\
& d^3*f - 496*a*b^3*c^4*d^3*f + 224*a^3*b*c^4*d*f^3 - 18*a*b^5*c^2*d*f^3 - 19 \\
& 2*a^4*b^2*c^2*f^2*h^2 - 48*a^3*b^3*c^2*f^2*g^2 - 16*a^3*b^3*c^2*e^2*h^2 - 4 \\
& 64*a^3*b^2*c^3*d^2*h^2 - 384*a^3*b^2*c^3*e^2*g^2 + 42*a^2*b^4*c^2*d^2*h^2 - \\
& 240*a^2*b^3*c^3*d^2*g^2 - 16*a^2*b^3*c^3*e^2*f^2 - 960*a^2*b^2*c^4*d^2*f^2 \\
& + 6*b^7*c*d^2*f*h - 2*a*b^7*d*f*h^2 - 32*a^5*c^3*f^2*h^2 - 4*a^3*b^5*g^2*h \\
& ^2 - 864*a^4*c^4*d^2*h^2 - 9*b^6*c^2*d^2*f^2 - 288*a^3*c^5*d^2*f^2 - 16*b^5 \\
& *c^3*d^2*e^2 - 24*a^3*b^2*c^3*f^4 - 9*a^2*b^4*c^2*f^4 - 10*b^6*c^2*d^3*h + \\
& 6*a^3*b^5*f*h^3 - 1728*a^3*c^5*d^3*h - 192*a^5*c^3*d*h^3 - 4*b^7*c*d^2*g^2 \\
& + 30*b^5*c^3*d^3*f + 6*a^2*b^6*d*h^3 - 24*a^5*b^2*c*h^4 - 16*a^3*b^4*c*g^4 \\
& + 360*a*b^2*c^5*d^4 - 16*a^6*c^2*h^4 - 9*a^4*b^4*h^4 - 16*a^4*c^4*f^4 - 256 \\
& *a^3*c^5*e^4 - 25*b^4*c^4*d^4 - 1296*a^2*c^6*d^4 - a^2*b^6*f^2*h^2 - b^8*d^ \\
& 2*h^2, z, k) * ((x*(2048*a^5*c^6*e - 32*a^2*b^6*c^3*e + 384*a^3*b^4*c^4*e - 1 \\
& 536*a^4*b^2*c^5*e + 16*a^2*b^7*c^2*g - 192*a^3*b^5*c^3*g + 768*a^4*b^3*c^4* \\
& g - 1024*a^5*b*c^5*g)) / (4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2 \\
& *c^2)) - (6144*a^5*c^6*d + 2048*a^6*c^5*h - 288*a^2*b^6*c^3*d + 1920*a^3*b^ \\
& 4*c^4*d - 5632*a^4*b^2*c^5*d + 16*a^2*b^7*c^2*f - 192*a^3*b^5*c^3*f + 768*a \\
& ^4*b^3*c^4*f - 32*a^3*b^6*c^2*h + 384*a^4*b^4*c^3*h - 1536*a^5*b^2*c^4*h + \\
& 16*a*b^8*c^2*d - 1024*a^5*b*c^5*f) / (8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c \\
& + 48*a^4*b^2*c^2)) + (root(1572864*a^8*b^2*c^6*z^4 - 983040*a^7*b^4*c^5*z^4 \\
& + 327680*a^6*b^6*c^4*z^4 - 61440*a^5*b^8*c^3*z^4 + 6144*a^4*b^10*c^2*z^4 - \\
& 256*a^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 192*a^3*b^8*c*f*h*z^2 + 57344*a \\
& ^6*b*c^5*d*h*z^2 + 32768*a^6*b*c^5*e*g*z^2 + 96*a^2*b^9*c*d*h*z^2 - 32*a*b^ \\
& 10*c*d*f*z^2 + 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^4*b^6*c^2*f*h*z^2 - 49152* \\
& a^5*b^3*c^4*d*h*z^2 - 24576*a^5*b^3*c^4*e*g*z^2 + 15360*a^4*b^5*c^3*d*h*z^2 \\
& + 6144*a^4*b^5*c^3*e*g*z^2 - 2048*a^3*b^7*c^2*d*h*z^2 - 512*a^3*b^7*c^2*e* \\
& g*z^2 + 24576*a^5*b^2*c^5*d*f*z^2 - 3072*a^3*b^6*c^3*d*f*z^2 + 2048*a^4*b^4 \\
& *c^4*d*f*z^2 + 576*a^2*b^8*c^2*d*f*z^2 + 12288*a^7*b*c^4*h^2*z^2 + 128*a^3* \\
& b^8*c*g^2*z^2 + 12288*a^6*b*c^5*f^2*z^2 - 16*a^2*b^9*c*f^2*z^2 + 61440*a^5* \\
& b*c^6*d^2*z^2 + 432*a*b^9*c^2*d^2*z^2 - 16384*a^7*c^5*f*h*z^2 - 49152*a^6*c \\
& ^6*d*f*z^2 - 8192*a^6*b^3*c^3*h^2*z^2 + 1536*a^5*b^5*c^2*h^2*z^2 - 8192*a^6 \\
& *b^2*c^4*g^2*z^2 + 6144*a^5*b^4*c^3*g^2*z^2 - 1536*a^4*b^6*c^2*g^2*z^2 - 81 \\
& 92*a^5*b^3*c^4*f^2*z^2 + 1536*a^4*b^5*c^3*f^2*z^2 + 24576*a^5*b^2*c^5*e^2*z \\
& ^2 - 6144*a^4*b^4*c^4*e^2*z^2 + 512*a^3*b^6*c^3*e^2*z^2 - 61440*a^4*b^3*c^5 \\
& *d^2*z^2 + 24064*a^3*b^5*c^4*d^2*z^2 - 4608*a^2*b^7*c^3*d^2*z^2 - 16*a^3*b^ \\
& 9*h^2*z^2 - 32768*a^6*c^6*e^2*z^2 - 16*b^11*c*d^2*z^2 - 6144*a^5*b*c^4*d*g* \\
& h*z + 96*a^2*b^7*c*d*g*h*z - 4096*a^4*b*c^5*d*e*f*z + 64*a*b^7*c^2*d*e*f*z \\
& - 32*a*b^8*c*d*f*g*z + 4608*a^4*b^3*c^3*d*g*h*z - 1152*a^3*b^5*c^2*d*g*h*z \\
& - 9216*a^4*b^2*c^4*d*e*h*z + 2304*a^3*b^4*c^3*d*e*h*z + 2048*a^4*b^2*c^4*d* \\
& f*g*z - 1536*a^3*b^4*c^3*d*f*g*z + 384*a^2*b^6*c^2*d*f*g*z - 192*a^2*b^6*c^ \\
& 2*d*e*h*z + 3072*a^3*b^3*c^4*d*e*f*z - 768*a^2*b^5*c^3*d*e*f*z - 1024*a^6*b \\
& *c^3*g*h^2*z - 192*a^4*b^5*c*g*h^2*z + 1024*a^5*b*c^4*f^2*g*z - 32*a^3*b^6* \\
& c*e*h^2*z - 16*a^2*b^7*c*f^2*g*z - 9216*a^4*b*c^5*d^2*g*z + 336*a*b^7*c^2*d \\
& ^2*g*z - 672*a*b^6*c^3*d^2*e*z + 12288*a^5*c^5*d*e*h*z + 768*a^5*b^3*c^2*g*
\end{aligned}$$

$$\begin{aligned}
& h^2*z - 1536*a^5*b^2*c^3*e*h^2*z - 768*a^4*b^3*c^3*f^2*g*z + 384*a^4*b^4*c^2*e*h^2*z + 192*a^3*b^5*c^2*f^2*g*z + 7936*a^3*b^3*c^4*d^2*g*z - 2496*a^2*b^5*c^3*d^2*g*z + 1536*a^4*b^2*c^4*e*f^2*z - 384*a^3*b^4*c^3*e*f^2*z + 32*a^2*b^6*c^2*e*f^2*z - 15872*a^3*b^2*c^5*d^2*e*z + 4992*a^2*b^4*c^4*d^2*e*z + 16*a^3*b^7*g*h^2*z + 2048*a^6*c^4*e*h^2*z - 2048*a^5*c^5*e*f^2*z + 32*b^8*c^2*d^2*e*z + 18432*a^4*c^6*d^2*e*z - 16*b^9*c*d^2*g*z - 256*a^4*b*c^3*e*f*g*h - 768*a^3*b*c^4*d*e*f*g + 32*a*b^5*c^2*d*e*f*g - 192*a^3*b^3*c^2*e*f*g*h + 896*a^3*b^2*c^3*d*e*g*h - 96*a^2*b^4*c^2*d*e*g*h - 192*a^2*b^3*c^3*d*e*f*g + 48*a^3*b^4*c*f*g^2*h + 16*a^3*b^4*c*e*g*h^2 + 24*a^2*b^5*c*d*g^2*h + 208*a^3*b*c^4*d^2*f*h + 800*a^4*b*c^3*d*f*h^2 - 102*a*b^5*c^2*d^2*f*h - 30*a^2*b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h - 240*a*b^4*c^3*d^2*e*g - 32*a*b^4*c^3*d*e^2*f + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d*f*g^2 + 64*a^4*b^2*c^2*f*g^2*h + 192*a^4*b^2*c^2*e*g*h^2 - 224*a^3*b^3*c^2*d*g^2*h + 192*a^3*b^2*c^3*e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 336*a^3*b^3*c^2*d*f*h^2 + 192*a^3*b^2*c^3*e*f^2*g + 144*a^2*b^3*c^3*d^2*f*h + 16*a^2*b^4*c^2*e*f^2*g - 12*a^2*b^4*c^2*d*f^2*h + 192*a^3*b^2*c^3*d*f*g^2 + 96*a^2*b^3*c^3*d*e^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*a^2*b^2*c^4*d^2*e*g + 192*a^2*b^2*c^4*d*e^2*f - 48*a^4*b^3*c*g^2*h^2 + 80*a^3*b^3*c^2*f^3*h - 42*a^3*b^4*c*f^2*h^2 - 192*a^4*b*c^3*e^2*h^2 - 4*a^2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d*h^3 - 192*a^2*b^2*c^4*d^3*h + 128*a^3*b^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^2 + 60*a*b^5*c^2*d^2*g^2 + 198*a*b^4*c^3*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 - 960*a^2*b*c^5*d^2*e^2 + 240*a*b^3*c^4*d^2*e^2 + 256*a^4*c^4*e^2*f*h - 192*a^4*c^4*d*f^2*h + 16*b^6*c^2*d^2*e*g + 96*a^5*b*c^2*f*h^3 + 96*a^4*b*c^3*f^3*h + 80*a^4*b^3*c*f*h^3 + 6*a^2*b^5*c*f^3*h + 768*a^3*c^5*d*e^2*f + 512*a^3*b*c^4*e^3*g + 132*a*b^4*c^3*d^3*h - 28*a^3*b^4*c*d*h^3 + 12*a*b^6*c*d^2*h^2 + 2016*a^2*b*c^5*d^3*f - 496*a*b^3*c^4*d^3*f + 224*a^3*b*c^4*d*f^3 - 18*a*b^5*c^2*d*f^3 - 192*a^4*b^2*c^2*f^2*h^2 - 48*a^3*b^3*c^2*f^2*g^2 - 16*a^3*b^3*c^2*e^2*h^2 - 464*a^3*b^2*c^3*d^2*h^2 - 384*a^3*b^2*c^3*e^2*g^2 + 42*a^2*b^4*c^2*d^2*h^2 - 240*a^2*b^3*c^3*d^2*g^2 - 16*a^2*b^3*c^3*e^2*f^2 - 960*a^2*b^2*c^4*d^2*f^2 + 6*b^7*c*d^2*f*h - 2*a*b^7*d*f*h^2 - 32*a^5*c^3*f^2*h^2 - 4*a^3*b^5*g^2*h^2 - 864*a^4*c^4*d^2*h^2 - 9*b^6*c^2*d^2*f^2 - 288*a^3*c^5*d^2*f^2 - 16*b^5*c^3*d^2*e^2 - 24*a^3*b^2*c^3*f^4 - 9*a^2*b^4*c^2*f^4 - 10*b^6*c^2*d^3*h + 6*a^3*b^5*f*h^3 - 1728*a^3*c^5*d^3*h - 192*a^5*c^3*d*h^3 - 4*b^7*c*d^2*g^2 + 30*b^5*c^3*d^3*f + 6*a^2*b^6*d*h^3 - 24*a^5*b^2*c*h^4 - 16*a^3*b^4*c*g^4 + 360*a*b^2*c^5*d^4 - 16*a^6*c^2*h^4 - 9*a^4*b^4*h^4 - 16*a^4*c^4*f^4 - 256*a^3*c^5*e^4 - 25*b^4*c^4*d^4 - 1296*a^2*c^6*d^4 - a^2*b^6*f^2*h^2 - b^8*d^2*h^2, \\
& z, k) * x * (8192*a^6*b*c^6 + 32*a^2*b^9*c^2 - 512*a^3*b^7*c^3 + 3072*a^4*b^5*c^4 - 8192*a^5*b^3*c^5) / (4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - (512*a^4*c^5*e*f - 32*a*b^5*c^3*d*e - 1024*a^3*b*c^5*d*e + 16*a*b^6*c^2*d*g - 512*a^4*b*c^4*e*h - 256*a^4*b*c^4*f*g + 384*a^2*b^3*c^4*d*e - 192*a^2*b^4*c^3*d*g - 32*a^2*b^4*c^3*e*f + 512*a^3*b^2*c^4*d*g + 16*a^2*b^5*c^2*f*g + 128*a^3*b^3*c^3*e*h - 64*a^3*b^4*c^2*g*h + 256*a^4*b^2*c^3*g*h) / (8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) + (x*(2*b^6*c^3*d^2 - 576*a^3*c^6*d^2 + 64*a^4*c^5*f^2 - 64*a^5*c^4*h^2 - 36*a*b^4*c^4*d^2 + 128*a^3*b*c^5*e^2 + 2*a^2*b^6*c*h^2 + 256*a^2*b^2*c^5*d^2 - 32*a^2*b^3*c
\end{aligned}$$

$$\begin{aligned}
&^4e^2 + 20a^2b^4c^3f^2 - 96a^3b^2c^4f^2 - 8a^2b^5c^2g^2 + 32a^3b^3c^3g^2 - 4a^3b^4c^2h^2 - 384a^4c^5d^2h + 4a^2b^5c^3d^2f + 32 \\
&0a^3b^2c^5d^2f + 64a^4b^2c^4d^2f + 8a^2b^4c^3d^2h + 32a^2b^4c^3e^2g + 64a^3b^2c^4d^2h - 128a^3b^2c^4e^2g - 12a^2b^5c^2f^2h + 32a^3b^3c^3f^2h) / (4(a^2b^6 - 64a^5c^3 - 12a^3b^4c + \\
&48a^4b^2c^2)) - (x(32a^2c^5e^3 - 2b^3c^4d^2e + b^4c^3d^2g - 4a^2b^3c^2g^3 + 24a^2b^3c^5d^2e - 48a^2c^5d^2e^2f - 16a^3c^4e^2f^2h - 12a^2b^2c^4d^2g + 16a^2b^2c^4e^2f^2 - 48a^2b^2c^4e^2g + 8a^3b^2c^3e^2h^2 - a^2b^4c^2g^2h^2 + 24a^2b^2c^3e^2g^2 - 8a^2b^2c^3f^2g + 2 \\
&a^2b^3c^2e^2h^2 - 4a^3b^2c^2g^2h^2 - 4a^2b^2c^4d^2e^2f + 2a^2b^3c^3d^2f^2g + 32a^2b^2c^4d^2e^2h + 24a^2b^2c^4d^2f^2g + 8a^3b^2c^3f^2g^2h - 16a^2b^2c^3d^2g^2h - 12a^2b^2c^3e^2f^2h + 6a^2b^3c^2f^2g^2h) / (4(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) * \text{root}(1572864a^8b^2c^6z^4 - 983040a^7b^4c^5z^4 + 327680a^6b^6c^4z^4 - 61440a^5b^8c^3z^4 + 6144a^4b^10c^2z^4 - 256a^3b^12c^2z^4 - 1048576a^9c^7z^4 + 192a^3b^8c^2f^2h^2z^2 + 57344a^6b^2c^5d^2h^2z^2 + 32768a^6b^2c^5e^2g^2z^2 + 96a^2b^9c^2d^2h^2z^2 - 32a^2b^10c^2d^2f^2z^2 + 6144a^5b^4c^3f^2h^2z^2 - 2048a^4b^6c^2f^2h^2z^2 - 49152a^5b^3c^4d^2h^2z^2 - 24576a^5b^3c^4e^2g^2z^2 + 15360a^4b^5c^3d^2h^2z^2 + 6144a^4b^5c^3e^2g^2z^2 - 2048a^3b^7c^2d^2h^2z^2 - 512a^3b^7c^2e^2g^2z^2 + 24576a^5b^2c^5d^2f^2z^2 - 3072a^3b^6c^3d^2f^2z^2 + 2048a^4b^4c^4d^2f^2z^2 + 576a^2b^8c^2d^2f^2z^2 + 12288a^7b^2c^4h^2z^2 + 128a^3b^8c^2g^2z^2 + 12288a^6b^2c^5f^2z^2 - 16a^2b^9c^2f^2z^2 + 61440a^5b^2c^6d^2z^2 + 432a^2b^9c^2d^2z^2 - 16384a^7c^5f^2h^2z^2 - 49152a^6c^6d^2f^2z^2 - 8192a^6b^3c^3h^2z^2 + 1536a^5b^5c^2h^2z^2 - 8192a^6b^2c^4g^2z^2 + 6144a^5b^4c^3g^2z^2 - 1536a^4b^6c^2g^2z^2 - 8192a^5b^3c^4f^2z^2 + 1536a^4b^5c^3f^2z^2 + 24576a^5b^2c^5e^2z^2 - 6144a^4b^4c^4e^2z^2 + 512a^3b^6c^3e^2z^2 - 61440a^4b^3c^5d^2z^2 + 24064a^3b^5c^4d^2z^2 - 4608a^2b^7c^3d^2z^2 - 16a^3b^9h^2z^2 - 32768a^6c^6e^2z^2 - 16b^11c^2d^2z^2 - 6144a^5b^2c^4d^2g^2h^2z + 96a^2b^7c^2d^2g^2h^2z - 4096a^4b^2c^5d^2e^2f^2z + 64a^2b^7c^2d^2e^2f^2z - 32a^2b^8c^2d^2f^2g^2z + 4608a^4b^3c^3d^2g^2h^2z - 1152a^3b^5c^2d^2g^2h^2z - 9216a^4b^2c^4d^2e^2h^2z + 2304a^3b^4c^3d^2e^2h^2z + 2048a^4b^2c^4d^2f^2g^2z - 1536a^3b^4c^3d^2f^2g^2z + 384a^2b^6c^2d^2f^2g^2z - 192a^2b^6c^2d^2e^2h^2z + 3072a^3b^3c^4d^2e^2f^2z - 768a^2b^5c^3d^2e^2f^2z - 1024a^6b^2c^3g^2h^2z - 192a^4b^5c^2g^2h^2z + 1024a^5b^2c^4f^2g^2z - 32a^3b^6c^2e^2h^2z - 16a^2b^7c^2f^2g^2z - 9216a^4b^2c^5d^2g^2z + 336a^2b^7c^2d^2g^2z - 672a^2b^6c^3d^2e^2z + 12288a^5c^5d^2e^2h^2z + 768a^5b^3c^2g^2h^2z - 1536a^5b^2c^3e^2h^2z - 768a^4b^3c^3f^2g^2z + 384a^4b^4c^2e^2h^2z + 192a^3b^5c^2f^2g^2z + 7936a^3b^3c^4d^2g^2z - 2496a^2b^5c^3d^2g^2z + 1536a^4b^2c^4e^2f^2z - 384a^3b^4c^3e^2f^2z + 32a^2b^6c^2e^2f^2z - 15872a^3b^2c^5d^2e^2z + 4992a^2b^4c^4d^2e^2z + 16a^3b^7g^2h^2z + 2048a^6c^4e^2h^2z - 2048a^5c^5e^2f^2z + 32b^8c^2d^2e^2z + 18432a^4c^6d^2e^2z - 16b^9c^2d^2g^2z - 256a^4b^2c^3e^2f^2g^2h - 768a^3b^2c^4d^2e^2f^2g + 32a^2b^5c^2d^2e^2f^2g - 192a^3b^3c^2e^2f^2g^2h + 896a^3b^2c^3d^2e^2g^2h - 96a^2b^4c^2d^2e^2g
\end{aligned}$$

```

*h - 192*a^2*b^3*c^3*d*e*f*g + 48*a^3*b^4*c*f*g^2*h + 16*a^3*b^4*c*e*g*h^2
+ 24*a^2*b^5*c*d*g^2*h + 2208*a^3*b*c^4*d^2*f*h + 800*a^4*b*c^3*d*f*h^2 - 1
02*a*b^5*c^2*d^2*f*h - 30*a^2*b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h - 240*a
*b^4*c^3*d^2*e*g - 32*a*b^4*c^3*d*e^2*f + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d*
f*g^2 + 64*a^4*b^2*c^2*f*g^2*h + 192*a^4*b^2*c^2*e*g*h^2 - 224*a^3*b^3*c^2*
d*g^2*h + 192*a^3*b^2*c^3*e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 336*a^3*b^3*c
^2*d*f*h^2 + 192*a^3*b^2*c^3*e*f^2*g + 144*a^2*b^3*c^3*d^2*f*h + 16*a^2*b^4
*c^2*e*f^2*g - 12*a^2*b^4*c^2*d*f^2*h + 192*a^3*b^2*c^3*d*f*g^2 + 96*a^2*b^
3*c^3*d*e^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*a^2*b^2*c^4*d^2*e*g + 192*a^2*
b^2*c^4*d*e^2*f - 48*a^4*b^3*c*g^2*h^2 + 80*a^3*b^3*c^2*f^3*h - 42*a^3*b^4*
c*f^2*h^2 - 192*a^4*b*c^3*e^2*h^2 - 4*a^2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d
*h^3 - 192*a^2*b^2*c^4*d^3*h + 128*a^3*b^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^
2 + 60*a*b^5*c^2*d^2*g^2 + 198*a*b^4*c^3*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 -
960*a^2*b*c^5*d^2*e^2 + 240*a*b^3*c^4*d^2*e^2 + 256*a^4*c^4*e^2*f*h - 192*a
^4*c^4*d*f^2*h + 16*b^6*c^2*d^2*e*g + 96*a^5*b*c^2*f*h^3 + 96*a^4*b*c^3*f^3
*h + 80*a^4*b^3*c*f*h^3 + 6*a^2*b^5*c*f^3*h + 768*a^3*c^5*d*e^2*f + 512*a^3
*b*c^4*e^3*g + 132*a*b^4*c^3*d^3*h - 28*a^3*b^4*c*d*h^3 + 12*a*b^6*c*d^2*h^
2 + 2016*a^2*b*c^5*d^3*f - 496*a*b^3*c^4*d^3*f + 224*a^3*b*c^4*d*f^3 - 18*a
*b^5*c^2*d*f^3 - 192*a^4*b^2*c^2*f^2*h^2 - 48*a^3*b^3*c^2*f^2*g^2 - 16*a^3*
b^3*c^2*e^2*h^2 - 464*a^3*b^2*c^3*d^2*h^2 - 384*a^3*b^2*c^3*e^2*g^2 + 42*a^
2*b^4*c^2*d^2*h^2 - 240*a^2*b^3*c^3*d^2*g^2 - 16*a^2*b^3*c^3*e^2*f^2 - 960*
a^2*b^2*c^4*d^2*f^2 + 6*b^7*c*d^2*f*h - 2*a*b^7*d*f*h^2 - 32*a^5*c^3*f^2*h^
2 - 4*a^3*b^5*g^2*h^2 - 864*a^4*c^4*d^2*h^2 - 9*b^6*c^2*d^2*f^2 - 288*a^3*c
^5*d^2*f^2 - 16*b^5*c^3*d^2*e^2 - 24*a^3*b^2*c^3*f^4 - 9*a^2*b^4*c^2*f^4 -
10*b^6*c^2*d^3*h + 6*a^3*b^5*f*h^3 - 1728*a^3*c^5*d^3*h - 192*a^5*c^3*d*h^3
- 4*b^7*c*d^2*g^2 + 30*b^5*c^3*d^3*f + 6*a^2*b^6*d*h^3 - 24*a^5*b^2*c*h^4
- 16*a^3*b^4*c*g^4 + 360*a*b^2*c^5*d^4 - 16*a^6*c^2*h^4 - 9*a^4*b^4*h^4 - 1
6*a^4*c^4*f^4 - 256*a^3*c^5*e^4 - 25*b^4*c^4*d^4 - 1296*a^2*c^6*d^4 - a^2*b
^6*f^2*h^2 - b^8*d^2*h^2, z, k), k, 1, 4)

```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**2,x)

[Out] Timed out

$$3.40 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=468

$$\frac{-\left(x^2(-2aci + b^2i - bcg + 2c^2e)\right) - b(ai + ce) + 2acg}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x\left(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d\right)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \dots$$

[Out] $\frac{1}{2}x(b^2d - a*b*f - 2*a*(-a*h + c*d) + (a*b*h - 2*a*c*f + b*c*d)*x^2)/a/(-4*a*c + b^2)/((c*x^4 + b*x^2 + a) + 1/2*(2*a*c*g - b*(a*i + c*e) - (-2*a*c*i + b^2*i - b*c*g + 2*c^2*e)*x^2)/c/(-4*a*c + b^2)/((c*x^4 + b*x^2 + a) + (2*a*i - b*g + 2*c*e)*\operatorname{arctanh}((2*c*x^2 + b)/(-4*a*c + b^2)^{(1/2)})/(-4*a*c + b^2)^{(3/2)} + 1/4*\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)}/(b - (-4*a*c + b^2)^{(1/2}))^{(1/2)})*(b*c*d - 2*a*c*f + a*b*h + (4*a*b*c*f + b^2*(-a*h + c*d) - 4*a*c*(a*h + 3*c*d))/(-4*a*c + b^2)^{(1/2)})/a/(-4*a*c + b^2)*2^{(1/2)}/c^{(1/2)}/(b - (-4*a*c + b^2)^{(1/2}))^{(1/2)} + 1/4*\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)}/(b + (-4*a*c + b^2)^{(1/2}))^{(1/2)})*(b*c*d - 2*a*c*f + a*b*h + (-4*a*b*c*f - b^2*(-a*h + c*d) + 4*a*c*(a*h + 3*c*d))/(-4*a*c + b^2)^{(1/2)})/a/(-4*a*c + b^2)*2^{(1/2)}/c^{(1/2)}/(b + (-4*a*c + b^2)^{(1/2}))^{(1/2)}$

Rubi [A] time = 1.12, antiderivative size = 468, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 9, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}} = 0.225$, Rules used = {1673, 1678, 1166, 205, 1663, 1660, 12, 618, 206}

$$\frac{x^2\left(-(-2aci + b^2i - bcg + 2c^2e)\right) - b(ai + ce) + 2acg}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x\left(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d\right)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \dots$$

Antiderivative was successfully verified.

[In] $\operatorname{Int}[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4)^2, x]$

[Out] $\frac{(x*(b^2*d - a*b*f - 2*a*(c*d - a*h) + (b*c*d - 2*a*c*f + a*b*h)*x^2))/(2*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (2*a*c*g - b*(c*e + a*i) - (2*c^2*e - b*c*g + b^2*i - 2*a*c*i)*x^2)/(2*c*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + ((b*c*d - 2*a*c*f + a*b*h + (4*a*b*c*f + b^2*(c*d - a*h) - 4*a*c*(3*c*d + a*h))/\operatorname{Sqrt}[b^2 - 4*a*c])* \operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]])]/(2*\operatorname{Sqrt}[2]*a*\operatorname{Sqrt}[c]*(b^2 - 4*a*c)*\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]) + ((b*c*d - 2*a*c*f + a*b*h - (4*a*b*c*f + b^2*(c*d - a*h) - 4*a*c*(3*c*d + a*h))/\operatorname{Sqrt}[b^2 - 4*a*c])* \operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]])]/(2*\operatorname{Sqrt}[2]*a*\operatorname{Sqrt}[c]*(b^2 - 4*a*c)*\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]) + ((2*c*e - b*g + 2*a*i)*\operatorname{ArcTanh}[(b + 2*c*x^2)/\operatorname{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c)^{(3/2)}$

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 205

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]

Rule 206

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (GtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 1166

Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2 + c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]

Rule 1660

Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := With[{Q = PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[Pq, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x + c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]

Rule 1663

Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^(p_)

$p, x], x, x^2], x] /; \text{FreeQ}[\{a, b, c, p\}, x] \ \&\& \ \text{PolyQ}[\text{Pq}, x^2] \ \&\& \ \text{IntegerQ}[(m - 1)/2]$

Rule 1673

$\text{Int}[(\text{Pq}_.) * ((a_.) + (b_.) * (x_)^2 + (c_.) * (x_)^4)^{(p_.)}, x_Symbol] \ :> \ \text{Module}[\{q = \text{Expon}[\text{Pq}, x], k\}, \text{Int}[\text{Sum}[\text{Coeff}[\text{Pq}, x, 2*k] * x^{(2*k)}, \{k, 0, q/2\}] * (a + b * x^2 + c * x^4)^p, x] + \text{Int}[x * \text{Sum}[\text{Coeff}[\text{Pq}, x, 2*k + 1] * x^{(2*k)}, \{k, 0, (q - 1)/2\}] * (a + b * x^2 + c * x^4)^p, x]] /; \text{FreeQ}[\{a, b, c, p\}, x] \ \&\& \ \text{PolyQ}[\text{Pq}, x] \ \&\& \ !\text{PolyQ}[\text{Pq}, x^2]$

Rule 1678

$\text{Int}[(\text{Pq}_.) * ((a_.) + (b_.) * (x_)^2 + (c_.) * (x_)^4)^{(p_.)}, x_Symbol] \ :> \ \text{With}[\{d = \text{Coeff}[\text{PolynomialRemainder}[\text{Pq}, a + b * x^2 + c * x^4, x], x, 0], e = \text{Coeff}[\text{PolynomialRemainder}[\text{Pq}, a + b * x^2 + c * x^4, x], x, 2]\}, \text{Simp}[(x * (a + b * x^2 + c * x^4)^{(p + 1)} * (a * b * e - d * (b^2 - 2 * a * c) - c * (b * d - 2 * a * e) * x^2)) / (2 * a * (p + 1) * (b^2 - 4 * a * c)), x] + \text{Dist}[1 / (2 * a * (p + 1) * (b^2 - 4 * a * c)), \text{Int}[(a + b * x^2 + c * x^4)^{(p + 1)} * \text{ExpandToSum}[2 * a * (p + 1) * (b^2 - 4 * a * c) * \text{PolynomialQuotient}[\text{Pq}, a + b * x^2 + c * x^4, x] + b^2 * d * (2 * p + 3) - 2 * a * c * d * (4 * p + 5) - a * b * e + c * (4 * p + 7) * (b * d - 2 * a * e) * x^2, x], x]] /; \text{FreeQ}[\{a, b, c\}, x] \ \&\& \ \text{PolyQ}[\text{Pq}, x^2] \ \&\& \ \text{Expon}[\text{Pq}, x^2] > 1 \ \&\& \ \text{NeQ}[b^2 - 4 * a * c, 0] \ \&\& \ \text{LtQ}[p, -1]$

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 40x^5}{(a + bx^2 + cx^4)^2} dx &= \int \frac{x(e + gx^2 + 40x^4)}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^2} dx \\
&= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} \text{Subst} \left(\int \frac{e -}{(a} \right. \\
&= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf -}{2a} \\
&= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf -}{2a} \\
&= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf -}{2a} \\
&= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf -}{2a}
\end{aligned}$$

Mathematica [A] time = 2.11, size = 524, normalized size = 1.12

$$\frac{1}{4} \left(\frac{2(a^2(bi - 2c(g + x(h + ix))) + a(b^2ix^2 + bc(e + x(f - x(g + hx))) + 2c^2x(d + x(e + fx))) - bc dx(b + cx^2))}{ac(4ac - b^2)(a + bx^2 + cx^4)} + \right.$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4)^2,x
]

[Out] ((2*(-(b*c*d*x*(b + c*x^2)) + a^2*(b*i - 2*c*(g + x*(h + i*x))) + a*(b^2*i*x^2 + 2*c^2*x*(d + x*(e + f*x)) + b*c*(e + x*(f - x*(g + h*x)))))/(a*c*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4) + (Sqrt[2]*(b^2*(c*d - a*h) - 2*a*c*(6*c*d + Sqrt[b^2 - 4*a*c]*f + 2*a*h) + b*(c*Sqrt[b^2 - 4*a*c]*d + 4*a*c*f + a*Sq

```

rt[b^2 - 4*a*c]*h))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]]
)/(a*Sqrt[c]*(b^2 - 4*a*c)^(3/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[2]*(b
^2*(-(c*d) + a*h) + 2*a*c*(6*c*d - Sqrt[b^2 - 4*a*c]*f + 2*a*h) + b*(c*Sqrt
[b^2 - 4*a*c]*d - 4*a*c*f + a*Sqrt[b^2 - 4*a*c]*h))*ArcTan[(Sqrt[2]*Sqrt[c]
*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]])]/(a*Sqrt[c]*(b^2 - 4*a*c)^(3/2)*Sqrt[b + S
qrt[b^2 - 4*a*c]]) + (2*(-2*c*e + b*g - 2*a*i)*Log[-b + Sqrt[b^2 - 4*a*c] -
2*c*x^2])/(b^2 - 4*a*c)^(3/2) + (2*(2*c*e - b*g + 2*a*i)*Log[b + Sqrt[b^2
- 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(3/2))/4

```

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a)^2,x, algorithm="f
ricas")
```

[Out] Timed out

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a)^2,x, algorithm="g
iac")
```

[Out] Timed out

maple [B] time = 0.05, size = 1917, normalized size = 4.10

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^4+b*x^2+a)^2,x)
```

```
[Out] 1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/
2)*b^2*h*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)+1/4/(4*a*c-b^
2)^2*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c
+b^2)^(1/2))*c)^(1/2)*c*x)*(-4*a*c+b^2)^(1/2)*b^2*h+(-1/2*(a*b*h-2*a*c*f+b*
c*d)/(4*a*c-b^2)/a*x^3-1/2*(2*a*c*i-b^2*i+b*c*g-2*c^2*e)/(4*a*c-b^2)/c*x^2-
1/2*(2*a^2*h-a*b*f-2*a*c*d+b^2*d)/(4*a*c-b^2)/a*x+1/2/c*(a*b*i-2*a*c*g+b*c*
e)/(4*a*c-b^2))/(c*x^4+b*x^2+a)-1/4/(4*a*c-b^2)^2*2^(1/2)/((b+(-4*a*c+b^2)
^(1/2))*c)^(1/2)*(-4*a*c+b^2)^(1/2)/a*b^2*c*d*arctan(2^(1/2)/((b+(-4*a*c+b^2)

```

$$\begin{aligned}
&)^{(1/2)} * c)^{(1/2)} * c * x - 1/4 * c / (4 * a * c - b^2)^2 / a * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * (-4 * a * c + b^2)^{(1/2)} * b^2 * d - c / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * (-4 * a * c + b^2)^{(1/2)} * b * f - 1 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * (-4 * a * c + b^2)^{(1/2)} * b * c * f * \operatorname{arctan}(2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) - 2 * c^2 / (4 * a * c - b^2)^2 * a * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * f + 1/2 * c / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b^2 * f + 2 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * a * c^2 * f * \operatorname{arctan}(2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) - 1/2 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * b^2 * c * f * \operatorname{arctan}(2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) - 1/4 * c / (4 * a * c - b^2)^2 / a * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b^3 * d + a / (4 * a * c - b^2)^2 * c * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b * h + 1/2 / (4 * a * c - b^2)^2 * (-4 * a * c + b^2)^{(1/2)} * b * g * \ln(-2 * c * x^2 - b + (-4 * a * c + b^2)^{(1/2)}) + 1 / (4 * a * c - b^2)^2 * (-4 * a * c + b^2)^{(1/2)} * c * e * \ln(2 * c * x^2 + b + (-4 * a * c + b^2)^{(1/2)}) - 1 / (4 * a * c - b^2)^2 * (-4 * a * c + b^2)^{(1/2)} * c * e * \ln(-2 * c * x^2 - b + (-4 * a * c + b^2)^{(1/2)}) + 3 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * (-4 * a * c + b^2)^{(1/2)} * c^2 * d * \operatorname{arctan}(2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) - 1 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * b * c^2 * d * \operatorname{arctan}(2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) + 3 * c^2 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * (-4 * a * c + b^2)^{(1/2)} * d + c^2 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b * d + 1/4 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} / a * b^3 * c * d * \operatorname{arctan}(2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) - 1/4 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b^3 * h - 1/2 / (4 * a * c - b^2)^2 * (-4 * a * c + b^2)^{(1/2)} * b * g * \ln(2 * c * x^2 + b + (-4 * a * c + b^2)^{(1/2)}) + 1 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * (-4 * a * c + b^2)^{(1/2)} * a * c * h * \operatorname{arctan}(2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) - 1 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * a * b * c * h * \operatorname{arctan}(2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) + a / (4 * a * c - b^2)^2 * c * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * (-4 * a * c + b^2)^{(1/2)} * h + 1/4 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * b^3 * h * \operatorname{arctan}(2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) - a / (4 * a * c - b^2)^2 * \ln(-2 * c * x^2 - b + (-4 * a * c + b^2)^{(1/2)}) * (-4 * a * c + b^2)^{(1/2)} * i + a / (4 * a * c - b^2)^2 * \ln(2 * c * x^2 + b + (-4 * a * c + b^2)^{(1/2)}) * (-4 * a * c + b^2)^{(1/2)} * i
\end{aligned}$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a)^2,x, algorithm="maxima")

[Out]
$$-1/2*(a*b*c*e - 2*a^2*c*g + a^2*b*i - (b*c^2*d - 2*a*c^2*f + a*b*c*h)*x^3 + (2*a*c^2*e - a*b*c*g + (a*b^2 - 2*a^2*c)*i)*x^2 + (a*b*c*f - 2*a^2*c*h - (b^2*c - 2*a*c^2)*d)*x)/(a^2*b^2*c - 4*a^3*c^2 + (a*b^2*c^2 - 4*a^2*c^3)*x^4 + (a*b^3*c - 4*a^2*b*c^2)*x^2) + 1/2*integrate((a*b*f - 2*a^2*h + (b*c*d - 2*a*c*f + a*b*h)*x^2 + (b^2 - 6*a*c)*d - 2*(2*a*c*e - a*b*g + 2*a^2*i)*x)/(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c)$$

mupad [B] time = 3.12, size = 18449, normalized size = 39.42

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4)^2,x)

[Out]
$$\begin{aligned} & ((b*c*e - 2*a*c*g + a*b*i)/(2*c*(4*a*c - b^2)) - (x*(b^2*d + 2*a^2*h - 2*a*c*d - a*b*f))/(2*a*(4*a*c - b^2)) + (x^2*(2*c^2*e + b^2*i - b*c*g - 2*a*c*i))/(2*c*(4*a*c - b^2)) - (x^3*(b*c*d - 2*a*c*f + a*b*h))/(2*a*(4*a*c - b^2)))/(a + b*x^2 + c*x^4) + \text{symsum}(\log((5*b^3*c^4*d^3 + 8*a^3*c^4*f^3 - 96*a^2*c^5*d*e^2 + 72*a^2*c^5*d^2*f - 3*a^3*b^3*c*h^3 - 4*a^4*b*c^2*h^3 - 3*b^4*c^3*d^2*f - 32*a^3*c^4*e^2*h - 96*a^4*c^3*d*i^2 + b^5*c^2*d^2*h + 8*a^4*c^3*f*h^2 - 32*a^5*c^2*h*i^2 + 6*a^2*b^2*c^3*f^3 - 36*a*b*c^5*d^3 + a*b^5*c*d*h^2 - 192*a^3*c^4*d*e*i + 48*a^3*c^4*d*f*h - 64*a^4*c^3*e*h*i + 16*a*b^2*c^4*d*e^2 + 18*a*b^2*c^4*d^2*f + 3*a*b^3*c^3*d*f^2 - 60*a^2*b*c^4*d*f^2 + 4*a*b^4*c^2*d*g^2 + 16*a^2*b*c^4*e^2*f - a*b^3*c^3*d^2*h - 60*a^2*b*c^4*d^2*h - 28*a^3*b*c^3*d*h^2 + a^2*b^4*c*f*h^2 - 28*a^3*b*c^3*f^2*h + 16*a^4*b*c^2*f*i^2 - 24*a^2*b^2*c^3*d*g^2 - 9*a^2*b^3*c^2*d*h^2 + 4*a^2*b^3*c^2*f*g^2 + 16*a^3*b^2*c^2*d*i^2 - 5*a^2*b^3*c^2*f^2*h + 18*a^3*b^2*c^2*f*h^2 - 8*a^3*b^2*c^2*g^2*h - 16*a*b^3*c^3*d*e*g + 96*a^2*b*c^4*d*e*g - 4*a*b^4*c^2*d*f*h + 96*a^3*b*c^3*d*g*i + 32*a^3*b*c^3*e*f*i + 32*a^3*b*c^3*e*g*h + 32*a^4*b*c^2*g*h*i + 32*a^2*b^2*c^3*d*e*i + 52*a^2*b^2*c^3*d*f*h - 16*a^2*b^2*c^3*e*f*g - 16*a^2*b^3*c^2*d*g*i - 16*a^3*b^2*c^2*f*g*i)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - \text{root}(1572864*a^8*b^2*c^6*z^4 - 983040*a^7*b^4*c^5*z^4 + 327680*a^6*b^6*c^4*z^4 - 61440*a^5*b^8*c^3*z^4 + 6144*a^4*b^10*c^2*z^4 - 256*a^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 32768*a^7*b*c^4*g*i*z^2 - 512*a^4*b^7*c*g*i*z^2 + 192*a^3*b^8*c*f*h*z^2 + 57344*a^6*b*c^5*d*h*z^2 + 32768*a^6*b*c^5*e*g*z^2 + 96*a^2*b^9*c*d*h*z^2 - 32*a*b^10*c*d*f*z^2 - 24576*a^6*b^3*c^3*g*i*z^2 + 6144*a^5*b^5*c^2*g*i*z^2 + 49152*a^6*b^2*c^4*e*i*z^2 - 12288*a^5*b^4*c^3*e*i*z^2 + 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^4*b^6*c^2*f*h*z^2 + 1024*a^4*b^6*c^2*e*i*z^2 - 49152*a^5*b^3*c^4*d*h*z^2 - 24576*a^5*b^3*c^4*e*g*z^2 + 15360*a^4*b^5*c^3*d*h*z^2 + 6144*a^4*b^5*c^3*e*g*z^2 - 2048*a^3*b^7*c^2*d*h*z^2 - 512*a^3*b^7*c^2*e*g*z^2 + 24576*a^5*b^2*c^5*d*f*z^2 - 3072*a^3*b^6*c^3*d*f*z^2 + 2048*a^4*b^4*c^4*d*f*z^2 + 576*a^2*b^$$

$$\begin{aligned}
& ^8c^2d^2f^2z^2 + 512a^5b^6c^2i^2z^2 + 12288a^7b^2c^4h^2z^2 + 128a^3b^8c^2g^2z^2 + 12288a^6b^2c^5f^2z^2 - 16a^2b^9c^2f^2z^2 + 61440a^5b^2c^6d^2z^2 + 432a^2b^9c^2d^2z^2 - 65536a^7c^5e^2i^2z^2 - 16384a^7c^5f^2h^2z^2 - 49152a^6c^6d^2f^2z^2 + 24576a^7b^2c^3i^2z^2 - 6144a^6b^4c^2i^2z^2 - 8192a^6b^3c^3h^2z^2 + 1536a^5b^5c^2h^2z^2 - 8192a^6b^2c^4g^2z^2 + 6144a^5b^4c^3g^2z^2 - 1536a^4b^6c^2g^2z^2 - 8192a^5b^3c^4f^2z^2 + 1536a^4b^5c^3f^2z^2 + 24576a^5b^2c^5e^2z^2 - 6144a^4b^4c^4e^2z^2 + 512a^3b^6c^3e^2z^2 - 61440a^4b^3c^5d^2z^2 + 24064a^3b^5c^4d^2z^2 - 4608a^2b^7c^3d^2z^2 - 32768a^8c^4i^2z^2 - 16a^3b^9h^2z^2 - 32768a^6c^6e^2z^2 - 16b^11c^2d^2z^2 - 192a^3b^6c^2d^2h^2i^2z - 6144a^5b^2c^4d^2g^2h^2i^2z - 4096a^5b^2c^4d^2f^2i^2z + 96a^2b^7c^2d^2g^2h^2i^2z + 64a^2b^7c^2d^2f^2i^2z - 4096a^4b^2c^5d^2e^2f^2z + 64a^2b^7c^2d^2e^2f^2z - 32a^2b^8c^2d^2f^2g^2z - 9216a^5b^2c^3d^2h^2i^2z + 2304a^4b^4c^2d^2h^2i^2z + 4608a^4b^3c^3d^2g^2h^2i^2z + 3072a^4b^3c^3d^2f^2i^2z - 1152a^3b^5c^2d^2g^2h^2i^2z - 768a^3b^5c^2d^2f^2i^2z - 9216a^4b^2c^4d^2e^2h^2i^2z + 2304a^3b^4c^3d^2e^2h^2i^2z + 2048a^4b^2c^4d^2f^2g^2z - 1536a^3b^4c^3d^2f^2g^2z + 384a^2b^6c^2d^2f^2g^2z - 192a^2b^6c^2d^2e^2h^2i^2z + 3072a^3b^3c^4d^2e^2f^2z - 768a^2b^5c^3d^2e^2f^2z + 384a^5b^4c^2h^2i^2z - 1024a^6b^2c^3g^2h^2i^2z - 192a^4b^5c^2g^2h^2i^2z + 32a^3b^6c^2f^2i^2z + 1024a^5b^2c^4f^2g^2z - 32a^3b^6c^2e^2h^2i^2z - 16a^2b^7c^2f^2g^2z - 9216a^4b^2c^5d^2g^2z + 336a^2b^7c^2d^2g^2z - 672a^2b^6c^3d^2e^2z + 12288a^6c^4d^2h^2i^2z + 12288a^5c^5d^2e^2h^2i^2z + 32a^2b^8c^2d^2i^2z - 1536a^6b^2c^2h^2i^2z + 1536a^5b^2c^3f^2i^2z + 768a^5b^3c^2g^2h^2i^2z - 384a^4b^4c^2f^2i^2z - 15872a^4b^2c^4d^2i^2z + 4992a^3b^4c^3d^2i^2z - 1536a^5b^2c^3e^2h^2i^2z - 768a^4b^3c^3f^2g^2z - 672a^2b^6c^2d^2i^2z + 384a^4b^4c^2e^2h^2i^2z + 192a^3b^5c^2f^2g^2z + 7936a^3b^3c^4d^2g^2z - 2496a^2b^5c^3d^2g^2z + 1536a^4b^2c^4e^2f^2z - 384a^3b^4c^3e^2f^2z + 32a^2b^6c^2e^2f^2z - 15872a^3b^2c^5d^2e^2z + 4992a^2b^4c^4d^2e^2z + 2048a^7c^3h^2i^2z - 32a^4b^6h^2i^2z - 2048a^6c^4f^2i^2z + 16a^3b^7g^2h^2i^2z + 18432a^5c^5d^2i^2z + 2048a^6c^4e^2h^2i^2z - 2048a^5c^5e^2f^2z + 32b^8c^2d^2e^2z + 18432a^4c^6d^2e^2z - 16b^9c^2d^2g^2z - 256a^5b^2c^2f^2g^2h^2i^2z - 192a^4b^3c^2f^2g^2h^2i^2z - 96a^3b^4c^2d^2g^2h^2i^2z - 1792a^4b^2c^3d^2e^2h^2i^2z - 768a^4b^2c^3d^2f^2g^2i^2z - 256a^4b^2c^3e^2f^2g^2h^2i^2z + 32a^2b^5c^2d^2f^2g^2i^2z - 768a^3b^2c^4d^2e^2f^2g^2z + 32a^2b^5c^2d^2e^2f^2g^2z + 896a^4b^2c^2d^2g^2h^2i^2z + 384a^4b^2c^2e^2f^2h^2i^2z - 192a^3b^3c^2e^2f^2g^2h^2i^2z - 192a^3b^3c^2d^2e^2f^2g^2h^2i^2z + 192a^3b^3c^2d^2e^2h^2i^2z + 896a^3b^2c^3d^2e^2g^2h^2i^2z + 384a^3b^2c^3d^2e^2f^2i^2z - 96a^2b^4c^2d^2e^2g^2h^2i^2z - 64a^2b^4c^2d^2e^2f^2i^2z - 192a^2b^3c^3d^2e^2f^2g^2z + 192a^5b^2c^2g^2h^2i^2z + 192a^5b^2c^2f^2h^2i^2z - 384a^5b^2c^2e^2h^2i^2z - 32a^4b^3c^2e^2h^2i^2z + 16a^3b^4c^2f^2g^2i^2z + 1536a^5b^2c^2e^2g^2i^2z + 1536a^4b^2c^3e^2g^2i^2z - 896a^5b^2c^2d^2h^2i^2z + 96a^4b^3c^2d^2h^2i^2z + 48a^3b^4c^2f^2g^2h^2i^2z - 384a^4b^2c^3e^2f^2i^2z + 16a^3b^4c^2e^2g^2h^2i^2z - 32a^3b^4c^2d^2f^2i^2z + 24a^2b^5c^2d^2g^2h^2i^2z + 2208a^3b^2c^4d^2f^2h^2i^2z - 1920a^3b^2c^4d^2e^2i^2z + 800a^4b^2c^3d^2f^2h^2i^2z - 102a^2b^5c^2d^2f^2h^2i^2z - 32a^2b^5c^2d^2e^2i^2z - 30a^2b^5c^2d^2f^2h^2i^2z - 896a^3b^2c^4d^2e^2h^2i^2z - 240a^2b^4c^3d^2e^2g^2z - 32a^2b^4c^3d^2e^2f^2z + 512a^5c^3e^2f^2h^2i^2z + 153
\end{aligned}$$

$$\begin{aligned}
&6a^4c^4d*ef*i + 16a*b^6*c*d^2*g*i + 12a*b^6*c*d*f^2*h - 8a*b^6*c*d*f \\
&*g^2 + 192a^4*b^2*c^2*f^2*g*i - 768a^4*b^2*c^2*e*g^2*i + 64a^4*b^2*c^2*f \\
&*g^2*h + 960a^3*b^2*c^3*d^2*g*i - 240a^2*b^4*c^2*d^2*g*i + 192a^4*b^2*c^ \\
&2*e*g*h^2 - 32a^3*b^3*c^2*ef^2*i - 224a^3*b^3*c^2*d*g^2*h + 192a^4*b^2*c^ \\
&2*d*f*i^2 + 192a^3*b^2*c^3*e^2*f*h - 864a^3*b^2*c^3*d*f^2*h + 480a^2*b \\
&^3*c^3*d^2*e*i + 336a^3*b^3*c^2*d*f*h^2 + 192a^3*b^2*c^3*ef^2*g + 144a^ \\
&2*b^3*c^3*d^2*f*h + 16a^2*b^4*c^2*ef^2*g - 12a^2*b^4*c^2*d*f^2*h + 192a \\
&^3*b^2*c^3*d*f*g^2 + 96a^2*b^3*c^3*d*e^2*h + 48a^2*b^4*c^2*d*f*g^2 + 960 \\
&a^2*b^2*c^4*d^2*e*g + 192a^2*b^2*c^4*d*e^2*f - 384a^5*b^2*c*g^2*i^2 - 192 \\
&a^5*b*c^2*f^2*i^2 - 48a^4*b^3*c*g^2*h^2 - 16a^4*b^3*c*f^2*i^2 + 80a^3*b \\
&^3*c^2*f^3*h - 42a^3*b^4*c*f^2*h^2 - 960a^4*b*c^3*d^2*i^2 - 192a^4*b*c^3 \\
&*e^2*h^2 - 16a^2*b^5*c*d^2*i^2 - 4a^2*b^5*c*f^2*g^2 - 192a^4*b^2*c^2*d*h \\
&^3 - 192a^2*b^2*c^4*d^3*h + 128a^3*b^3*c^2*e*g^3 - 192a^3*b*c^4*e^2*f^2 \\
&+ 60a*b^5*c^2*d^2*g^2 + 198a*b^4*c^3*d^2*f^2 + 144a^2*b^3*c^3*d*f^3 - 96 \\
&0a^2*b*c^5*d^2*e^2 + 240a*b^3*c^4*d^2*e^2 + 256a^6*c^2*f*h*i^2 + 16a^4*b \\
&^4*g*h^2*i + 768a^5*c^3*d*f*i^2 + 256a^4*c^4*e^2*f*h - 192a^6*b*c*h^2*i \\
&^2 - 192a^4*c^4*d*f^2*h + 128a^4*b^3*c*g^3*i + 16b^6*c^2*d^2*e*g + 96a^ \\
&5*b*c^2*f*h^3 + 96a^4*b*c^3*f^3*h + 80a^4*b^3*c*f*h^3 + 6a^2*b^5*c*f^3*h \\
&+ 768a^3*c^5*d*e^2*f + 512a^3*b*c^4*e^3*g + 132a*b^4*c^3*d^3*h - 28a^3 \\
&*b^4*c*d*h^3 + 12a*b^6*c*d^2*h^2 + 2016a^2*b*c^5*d^3*f - 496a*b^3*c^4*d^ \\
&3*f + 224a^3*b*c^4*d*f^3 - 18a*b^5*c^2*d*f^3 - 192a^4*b^2*c^2*f^2*h^2 + \\
&240a^3*b^3*c^2*d^2*i^2 - 48a^3*b^3*c^2*f^2*g^2 - 16a^3*b^3*c^2*e^2*h^2 - \\
&464a^3*b^2*c^3*d^2*h^2 - 384a^3*b^2*c^3*e^2*g^2 + 42a^2*b^4*c^2*d^2*h^2 \\
&- 240a^2*b^3*c^3*d^2*g^2 - 16a^2*b^3*c^3*e^2*f^2 - 960a^2*b^2*c^4*d^2*f \\
&^2 + 6b^7*c*d^2*f*h + 512a^6*b*c*g*i^3 - 2a*b^7*d*f*h^2 - 16a^5*b^3*h^2 \\
&*i^2 - 1536a^5*c^3*e^2*i^2 - 32a^5*c^3*f^2*h^2 - 4a^3*b^5*g^2*h^2 - 864a \\
&^4*c^4*d^2*h^2 - 9b^6*c^2*d^2*f^2 - 288a^3*c^5*d^2*f^2 - 16b^5*c^3*d^2* \\
&e^2 - 24a^3*b^2*c^3*f^4 - 9a^2*b^4*c^2*f^4 - 1024a^6*c^2*e*i^3 - 1024a^ \\
&4*c^4*e^3*i - 10b^6*c^2*d^3*h + 6a^3*b^5*f*h^3 - 1728a^3*c^5*d^3*h - 192 \\
&a^5*c^3*d*h^3 - 4b^7*c*d^2*g^2 + 30b^5*c^3*d^3*f + 6a^2*b^6*d*h^3 - 24a \\
&^5*b^2*c*h^4 - 16a^3*b^4*c*g^4 + 360a*b^2*c^5*d^4 - 16a^6*c^2*h^4 - 9a \\
&^4*b^4*h^4 - 16a^4*c^4*f^4 - 256a^3*c^5*e^4 - 25b^4*c^4*d^4 - 1296a^2*c \\
&^6*d^4 - a^2*b^6*f^2*h^2 - 256a^7*c*i^4 - b^8*d^2*h^2, z, 1)*((32a*b^5*c^ \\
&3*d*e - 512a^5*c^4*f*i - 512a^4*c^5*ef + 1024a^3*b*c^5*d*e - 16a*b^6*c \\
&^2*d*g + 1024a^4*b*c^4*d*i + 512a^4*b*c^4*e*h + 256a^4*b*c^4*f*g + 512a \\
&^5*b*c^3*h*i - 384a^2*b^3*c^4*d*e + 192a^2*b^4*c^3*d*g + 32a^2*b^4*c^3*e \\
&*f - 512a^3*b^2*c^4*d*g + 32a^2*b^5*c^2*d*i - 16a^2*b^5*c^2*f*g - 384a^ \\
&3*b^3*c^3*d*i - 128a^3*b^3*c^3*e*h + 32a^3*b^4*c^2*f*i + 64a^3*b^4*c^2*g \\
&*h - 256a^4*b^2*c^3*g*h - 128a^4*b^3*c^2*h*i)/(8*(a^2*b^6 - 64a^5*c^3 - \\
&12a^3*b^4*c + 48a^4*b^2*c^2)) + root(1572864a^8*b^2*c^6*z^4 - 983040a^7 \\
&*b^4*c^5*z^4 + 327680a^6*b^6*c^4*z^4 - 61440a^5*b^8*c^3*z^4 + 6144a^4*b^ \\
&10*c^2*z^4 - 256a^3*b^12*c*z^4 - 1048576a^9*c^7*z^4 + 32768a^7*b*c^4*g*i \\
&*z^2 - 512a^4*b^7*c*g*i*z^2 + 192a^3*b^8*c*f*h*z^2 + 57344a^6*b*c^5*d*h* \\
&z^2 + 32768a^6*b*c^5*e*g*z^2 + 96a^2*b^9*c*d*h*z^2 - 32a*b^10*c*d*f*z^2 \\
&- 24576a^6*b^3*c^3*g*i*z^2 + 6144a^5*b^5*c^2*g*i*z^2 + 49152a^6*b^2*c^4*
\end{aligned}$$

$$\begin{aligned}
& e^i z^2 - 12288 a^5 b^4 c^3 e^i z^2 + 6144 a^5 b^4 c^3 f^h z^2 - 2048 a^4 b^6 c^2 f^h z^2 + 1024 a^4 b^6 c^2 e^i z^2 - 49152 a^5 b^3 c^4 d^h z^2 - 24576 a^5 b^3 c^4 e^g z^2 + 15360 a^4 b^5 c^3 d^h z^2 + 6144 a^4 b^5 c^3 e^g z^2 - 2048 a^3 b^7 c^2 d^h z^2 - 512 a^3 b^7 c^2 e^g z^2 + 24576 a^5 b^2 c^5 d^f z^2 - 3072 a^3 b^6 c^3 d^f z^2 + 2048 a^4 b^4 c^4 d^f z^2 + 576 a^2 b^8 c^2 d^f z^2 + 512 a^5 b^6 c^i z^2 + 12288 a^7 b^c^4 h^2 z^2 + 128 a^3 b^8 c^g z^2 + 12288 a^6 b^c^5 f^2 z^2 - 16 a^2 b^9 c^f z^2 + 61440 a^5 b^c^6 d^2 z^2 + 432 a^b^9 c^2 d^2 z^2 - 65536 a^7 c^5 e^i z^2 - 16384 a^7 c^5 f^h z^2 - 49152 a^6 c^6 d^f z^2 + 24576 a^7 b^2 c^3 i^2 z^2 - 6144 a^6 b^4 c^2 i^2 z^2 - 8192 a^6 b^3 c^3 h^2 z^2 + 1536 a^5 b^5 c^2 h^2 z^2 - 8192 a^6 b^2 c^4 g^2 z^2 + 6144 a^5 b^4 c^3 g^2 z^2 - 1536 a^4 b^6 c^2 g^2 z^2 - 8192 a^5 b^3 c^4 f^2 z^2 + 1536 a^4 b^5 c^3 f^2 z^2 + 24576 a^5 b^2 c^5 e^2 z^2 - 6144 a^4 b^4 c^4 e^2 z^2 + 512 a^3 b^6 c^3 e^2 z^2 - 61440 a^4 b^3 c^5 d^2 z^2 + 24064 a^3 b^5 c^4 d^2 z^2 - 4608 a^2 b^7 c^3 d^2 z^2 - 32768 a^8 c^4 i^2 z^2 - 16 a^3 b^9 h^2 z^2 - 32768 a^6 c^6 e^2 z^2 - 16 b^11 c^d^2 z^2 - 192 a^3 b^6 c^d^h i z - 6144 a^5 b^c^4 d^g h z - 4096 a^5 b^c^4 d^f i z + 96 a^2 b^7 c^d^g h z + 64 a^2 b^7 c^d^f i z - 4096 a^4 b^c^5 d^e f z + 64 a^a b^7 c^2 d^e f z - 32 a^a b^8 c^d^f g z - 9216 a^5 b^2 c^3 d^h i z + 2304 a^4 b^4 c^2 d^h i z + 4608 a^4 b^3 c^3 d^g h z + 3072 a^4 b^3 c^3 d^f i z - 1152 a^3 b^5 c^2 d^g h z - 768 a^3 b^5 c^2 d^f i z - 9216 a^4 b^2 c^4 d^e h z + 2304 a^3 b^4 c^3 d^e h z + 2048 a^4 b^2 c^4 d^f g z - 1536 a^3 b^4 c^3 d^f g z + 384 a^2 b^6 c^2 d^f g z - 192 a^2 b^6 c^2 d^e h z + 3072 a^3 b^3 c^4 d^e f z - 768 a^2 b^5 c^3 d^e f z + 384 a^5 b^4 c^h^2 i z - 1024 a^6 b^c^3 g^h^2 z - 192 a^4 b^5 c^g^h^2 z + 32 a^3 b^6 c^f^2 i z + 1024 a^5 b^c^4 f^2 g z - 32 a^3 b^6 c^e^h^2 z - 16 a^2 b^7 c^f^2 g z - 9216 a^4 b^c^5 d^2 g z + 336 a^a b^7 c^2 d^2 g z - 672 a^a b^6 c^3 d^2 e z + 12288 a^6 c^4 d^h i z + 12288 a^5 c^5 d^e h z + 32 a^a b^8 c^d^2 i z - 1536 a^6 b^2 c^2 h^2 i z + 1536 a^5 b^2 c^3 f^2 i z + 768 a^5 b^3 c^2 g^h^2 z - 384 a^4 b^4 c^2 f^2 i z - 15872 a^4 b^2 c^4 d^2 i z + 4992 a^3 b^4 c^3 d^2 i z - 1536 a^5 b^2 c^3 e^h^2 z - 768 a^4 b^3 c^3 f^2 g z - 672 a^2 b^6 c^2 d^2 i z + 384 a^4 b^4 c^2 e^h^2 z + 192 a^3 b^5 c^2 f^2 g z + 7936 a^3 b^3 c^4 d^2 g z - 2496 a^2 b^5 c^3 d^2 g z + 1536 a^4 b^2 c^4 e^f^2 z - 384 a^3 b^4 c^3 e^f^2 z + 32 a^2 b^6 c^2 e^f^2 z - 15872 a^3 b^2 c^5 d^2 e z + 4992 a^2 b^4 c^4 d^2 e z + 2048 a^7 c^3 h^2 i z - 32 a^4 b^6 h^2 i z - 2048 a^6 c^4 f^2 i z + 16 a^3 b^7 g^h^2 z + 18432 a^5 c^5 d^2 i z + 2048 a^6 c^4 e^h^2 z - 2048 a^5 c^5 e^f^2 z + 32 b^8 c^2 d^2 e z + 18432 a^4 c^6 d^2 e z - 16 b^9 c^d^2 g z - 256 a^5 b^c^2 f^g^h i - 192 a^4 b^3 c^f^g^h i - 96 a^3 b^4 c^d^g^h i - 1792 a^4 b^c^3 d^e^h i - 768 a^4 b^c^3 d^f^g i - 256 a^4 b^c^3 e^f^g^h + 32 a^2 b^5 c^d^f^g i - 768 a^3 b^c^4 d^e^f^g + 32 a^b^5 c^2 d^e^f^g + 896 a^4 b^2 c^2 d^g^h i + 384 a^4 b^2 c^2 e^f^h i - 192 a^3 b^3 c^2 e^f^g^h - 192 a^3 b^3 c^2 d^f^g i + 192 a^3 b^3 c^2 d^e^h i + 896 a^3 b^2 c^3 d^e^g^h + 384 a^3 b^2 c^3 d^e^f i - 96 a^2 b^4 c^2 d^e^g^h - 64 a^2 b^4 c^2 d^e^f i - 192 a^2 b^3 c^3 d^e^f^g + 192 a^5 b^2 c^g^h^2 i + 192 a^5 b^2 c^f^h^2 i - 384 a^5 b^c^2 e^h^2 i - 32 a^4 b^3 c^e^h^2 i + 16 a^3 b^4 c^f^2 g i + 1536 a^5 b^c^2 e^g i^2 + 1536 a^4 b^c^3 e^2 g i - 896 a^5 b^c^2 d^h i^2 + 96 a^
\end{aligned}$$

$$\begin{aligned}
& 4*b^3*c*d*h*i^2 + 48*a^3*b^4*c*f*g^2*h - 384*a^4*b*c^3*e*f^2*i + 16*a^3*b^4 \\
& *c*e*g*h^2 - 32*a^3*b^4*c*d*f*i^2 + 24*a^2*b^5*c*d*g^2*h + 2208*a^3*b*c^4*d \\
& ^2*f*h - 1920*a^3*b*c^4*d^2*e*i + 800*a^4*b*c^3*d*f*h^2 - 102*a*b^5*c^2*d^2 \\
& *f*h - 32*a*b^5*c^2*d^2*e*i - 30*a^2*b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h \\
& - 240*a*b^4*c^3*d^2*e*g - 32*a*b^4*c^3*d*e^2*f + 512*a^5*c^3*e*f*h*i + 1536 \\
& *a^4*c^4*d*e*f*i + 16*a*b^6*c*d^2*g*i + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d*f* \\
& g^2 + 192*a^4*b^2*c^2*f^2*g*i - 768*a^4*b^2*c^2*e*g^2*i + 64*a^4*b^2*c^2*f* \\
& g^2*h + 960*a^3*b^2*c^3*d^2*g*i - 240*a^2*b^4*c^2*d^2*g*i + 192*a^4*b^2*c^2 \\
& *e*g*h^2 - 32*a^3*b^3*c^2*e*f^2*i - 224*a^3*b^3*c^2*d*g^2*h + 192*a^4*b^2*c^2 \\
& ^2*d*f*i^2 + 192*a^3*b^2*c^3*e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 480*a^2*b^ \\
& 3*c^3*d^2*e*i + 336*a^3*b^3*c^2*d*f*h^2 + 192*a^3*b^2*c^3*e*f^2*g + 144*a^2 \\
& *b^3*c^3*d^2*f*h + 16*a^2*b^4*c^2*e*f^2*g - 12*a^2*b^4*c^2*d*f^2*h + 192*a^ \\
& 3*b^2*c^3*d*f*g^2 + 96*a^2*b^3*c^3*d*e^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*a \\
& ^2*b^2*c^4*d^2*e*g + 192*a^2*b^2*c^4*d*e^2*f - 384*a^5*b^2*c*g^2*i^2 - 192* \\
& a^5*b*c^2*f^2*i^2 - 48*a^4*b^3*c*g^2*h^2 - 16*a^4*b^3*c*f^2*i^2 + 80*a^3*b^ \\
& 3*c^2*f^3*h - 42*a^3*b^4*c*f^2*h^2 - 960*a^4*b*c^3*d^2*i^2 - 192*a^4*b*c^3* \\
& e^2*h^2 - 16*a^2*b^5*c*d^2*i^2 - 4*a^2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d*h^ \\
& 3 - 192*a^2*b^2*c^4*d^3*h + 128*a^3*b^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^2 + \\
& 60*a*b^5*c^2*d^2*g^2 + 198*a*b^4*c^3*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 - 960 \\
& *a^2*b*c^5*d^2*e^2 + 240*a*b^3*c^4*d^2*e^2 + 256*a^6*c^2*f*h*i^2 + 16*a^4*b \\
& ^4*g*h^2*i + 768*a^5*c^3*d*f*i^2 + 256*a^4*c^4*e^2*f*h - 192*a^6*b*c*h^2*i^ \\
& 2 - 192*a^4*c^4*d*f^2*h + 128*a^4*b^3*c*g^3*i + 16*b^6*c^2*d^2*e*g + 96*a^5 \\
& *b*c^2*f*h^3 + 96*a^4*b*c^3*f^3*h + 80*a^4*b^3*c*f*h^3 + 6*a^2*b^5*c*f^3*h \\
& + 768*a^3*c^5*d*e^2*f + 512*a^3*b*c^4*e^3*g + 132*a*b^4*c^3*d^3*h - 28*a^3* \\
& b^4*c*d*h^3 + 12*a*b^6*c*d^2*h^2 + 2016*a^2*b*c^5*d^3*f - 496*a*b^3*c^4*d^3 \\
& *f + 224*a^3*b*c^4*d*f^3 - 18*a*b^5*c^2*d*f^3 - 192*a^4*b^2*c^2*f^2*h^2 + 2 \\
& 40*a^3*b^3*c^2*d^2*i^2 - 48*a^3*b^3*c^2*f^2*g^2 - 16*a^3*b^3*c^2*e^2*h^2 - \\
& 464*a^3*b^2*c^3*d^2*h^2 - 384*a^3*b^2*c^3*e^2*g^2 + 42*a^2*b^4*c^2*d^2*h^2 \\
& - 240*a^2*b^3*c^3*d^2*g^2 - 16*a^2*b^3*c^3*e^2*f^2 - 960*a^2*b^2*c^4*d^2*f^ \\
& 2 + 6*b^7*c*d^2*f*h + 512*a^6*b*c*g*i^3 - 2*a*b^7*d*f*h^2 - 16*a^5*b^3*h^2* \\
& i^2 - 1536*a^5*c^3*e^2*i^2 - 32*a^5*c^3*f^2*h^2 - 4*a^3*b^5*g^2*h^2 - 864*a \\
& ^4*c^4*d^2*h^2 - 9*b^6*c^2*d^2*f^2 - 288*a^3*c^5*d^2*f^2 - 16*b^5*c^3*d^2*e \\
& ^2 - 24*a^3*b^2*c^3*f^4 - 9*a^2*b^4*c^2*f^4 - 1024*a^6*c^2*e*i^3 - 1024*a^4 \\
& *c^4*e^3*i - 10*b^6*c^2*d^3*h + 6*a^3*b^5*f*h^3 - 1728*a^3*c^5*d^3*h - 192* \\
& a^5*c^3*d*h^3 - 4*b^7*c*d^2*g^2 + 30*b^5*c^3*d^3*f + 6*a^2*b^6*d*h^3 - 24*a \\
& ^5*b^2*c*h^4 - 16*a^3*b^4*c*g^4 + 360*a*b^2*c^5*d^4 - 16*a^6*c^2*h^4 - 9*a^ \\
& 4*b^4*h^4 - 16*a^4*c^4*f^4 - 256*a^3*c^5*e^4 - 25*b^4*c^4*d^4 - 1296*a^2*c^ \\
& 6*d^4 - a^2*b^6*f^2*h^2 - 256*a^7*c*i^4 - b^8*d^2*h^2, z, l)*((x*(2048*a^5* \\
& c^6*e + 2048*a^6*c^5*i - 32*a^2*b^6*c^3*e + 384*a^3*b^4*c^4*e - 1536*a^4*b^ \\
& 2*c^5*e + 16*a^2*b^7*c^2*g - 192*a^3*b^5*c^3*g + 768*a^4*b^3*c^4*g - 32*a^3 \\
& *b^6*c^2*i + 384*a^4*b^4*c^3*i - 1536*a^5*b^2*c^4*i - 1024*a^5*b*c^5*g))/(4 \\
& *(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - (6144*a^5*c^6*d \\
& + 2048*a^6*c^5*h - 288*a^2*b^6*c^3*d + 1920*a^3*b^4*c^4*d - 5632*a^4*b^2*c^ \\
& 5*d + 16*a^2*b^7*c^2*f - 192*a^3*b^5*c^3*f + 768*a^4*b^3*c^4*f - 32*a^3*b^6 \\
& *c^2*h + 384*a^4*b^4*c^3*h - 1536*a^5*b^2*c^4*h + 16*a*b^8*c^2*d - 1024*a^5
\end{aligned}$$

$$\begin{aligned}
& *b*c^5*f)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) + (\text{root}(1572864*a^8*b^2*c^6*z^4 - 983040*a^7*b^4*c^5*z^4 + 327680*a^6*b^6*c^4*z^4 \\
& - 61440*a^5*b^8*c^3*z^4 + 6144*a^4*b^{10}*c^2*z^4 - 256*a^3*b^{12}*c*z^4 - 104 \\
& 8576*a^9*c^7*z^4 + 32768*a^7*b*c^4*g*i*z^2 - 512*a^4*b^7*c*g*i*z^2 + 192*a^ \\
& 3*b^8*c*f*h*z^2 + 57344*a^6*b*c^5*d*h*z^2 + 32768*a^6*b*c^5*e*g*z^2 + 96*a^ \\
& 2*b^9*c*d*h*z^2 - 32*a*b^{10}*c*d*f*z^2 - 24576*a^6*b^3*c^3*g*i*z^2 + 6144*a^ \\
& 5*b^5*c^2*g*i*z^2 + 49152*a^6*b^2*c^4*e*i*z^2 - 12288*a^5*b^4*c^3*e*i*z^2 + \\
& 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^4*b^6*c^2*f*h*z^2 + 1024*a^4*b^6*c^2*e*i \\
& *z^2 - 49152*a^5*b^3*c^4*d*h*z^2 - 24576*a^5*b^3*c^4*e*g*z^2 + 15360*a^4*b^ \\
& 5*c^3*d*h*z^2 + 6144*a^4*b^5*c^3*e*g*z^2 - 2048*a^3*b^7*c^2*d*h*z^2 - 512*a \\
& ^3*b^7*c^2*e*g*z^2 + 24576*a^5*b^2*c^5*d*f*z^2 - 3072*a^3*b^6*c^3*d*f*z^2 + \\
& 2048*a^4*b^4*c^4*d*f*z^2 + 576*a^2*b^8*c^2*d*f*z^2 + 512*a^5*b^6*c^i^2*z^2 \\
& + 12288*a^7*b*c^4*h^2*z^2 + 128*a^3*b^8*c*g^2*z^2 + 12288*a^6*b*c^5*f^2*z^ \\
& 2 - 16*a^2*b^9*c*f^2*z^2 + 61440*a^5*b*c^6*d^2*z^2 + 432*a*b^9*c^2*d^2*z^2 \\
& - 65536*a^7*c^5*e*i*z^2 - 16384*a^7*c^5*f*h*z^2 - 49152*a^6*c^6*d*f*z^2 + 2 \\
& 4576*a^7*b^2*c^3*i^2*z^2 - 6144*a^6*b^4*c^2*i^2*z^2 - 8192*a^6*b^3*c^3*h^2* \\
& z^2 + 1536*a^5*b^5*c^2*h^2*z^2 - 8192*a^6*b^2*c^4*g^2*z^2 + 6144*a^5*b^4*c^ \\
& 3*g^2*z^2 - 1536*a^4*b^6*c^2*g^2*z^2 - 8192*a^5*b^3*c^4*f^2*z^2 + 1536*a^4* \\
& b^5*c^3*f^2*z^2 + 24576*a^5*b^2*c^5*e^2*z^2 - 6144*a^4*b^4*c^4*e^2*z^2 + 51 \\
& 2*a^3*b^6*c^3*e^2*z^2 - 61440*a^4*b^3*c^5*d^2*z^2 + 24064*a^3*b^5*c^4*d^2*z \\
& ^2 - 4608*a^2*b^7*c^3*d^2*z^2 - 32768*a^8*c^4*i^2*z^2 - 16*a^3*b^9*h^2*z^2 \\
& - 32768*a^6*c^6*e^2*z^2 - 16*b^{11}*c*d^2*z^2 - 192*a^3*b^6*c*d*h*i*z - 6144* \\
& a^5*b*c^4*d*g*h*z - 4096*a^5*b*c^4*d*f*i*z + 96*a^2*b^7*c*d*g*h*z + 64*a^2* \\
& b^7*c*d*f*i*z - 4096*a^4*b*c^5*d*e*f*z + 64*a*b^7*c^2*d*e*f*z - 32*a*b^8*c* \\
& d*f*g*z - 9216*a^5*b^2*c^3*d*h*i*z + 2304*a^4*b^4*c^2*d*h*i*z + 4608*a^4*b^ \\
& 3*c^3*d*g*h*z + 3072*a^4*b^3*c^3*d*f*i*z - 1152*a^3*b^5*c^2*d*g*h*z - 768*a \\
& ^3*b^5*c^2*d*f*i*z - 9216*a^4*b^2*c^4*d*e*h*z + 2304*a^3*b^4*c^3*d*e*h*z + \\
& 2048*a^4*b^2*c^4*d*f*g*z - 1536*a^3*b^4*c^3*d*f*g*z + 384*a^2*b^6*c^2*d*f*g \\
& *z - 192*a^2*b^6*c^2*d*e*h*z + 3072*a^3*b^3*c^4*d*e*f*z - 768*a^2*b^5*c^3*d \\
& *e*f*z + 384*a^5*b^4*c*h^2*i*z - 1024*a^6*b*c^3*g*h^2*z - 192*a^4*b^5*c*g*h \\
& ^2*z + 32*a^3*b^6*c*f^2*i*z + 1024*a^5*b*c^4*f^2*g*z - 32*a^3*b^6*c*e*h^2*z \\
& - 16*a^2*b^7*c*f^2*g*z - 9216*a^4*b*c^5*d^2*g*z + 336*a*b^7*c^2*d^2*g*z - \\
& 672*a*b^6*c^3*d^2*e*z + 12288*a^6*c^4*d*h*i*z + 12288*a^5*c^5*d*e*h*z + 32* \\
& a*b^8*c*d^2*i*z - 1536*a^6*b^2*c^2*h^2*i*z + 1536*a^5*b^2*c^3*f^2*i*z + 768 \\
& *a^5*b^3*c^2*g*h^2*z - 384*a^4*b^4*c^2*f^2*i*z - 15872*a^4*b^2*c^4*d^2*i*z \\
& + 4992*a^3*b^4*c^3*d^2*i*z - 1536*a^5*b^2*c^3*e*h^2*z - 768*a^4*b^3*c^3*f^2 \\
& *g*z - 672*a^2*b^6*c^2*d^2*i*z + 384*a^4*b^4*c^2*e*h^2*z + 192*a^3*b^5*c^2* \\
& f^2*g*z + 7936*a^3*b^3*c^4*d^2*g*z - 2496*a^2*b^5*c^3*d^2*g*z + 1536*a^4*b^ \\
& 2*c^4*e*f^2*z - 384*a^3*b^4*c^3*e*f^2*z + 32*a^2*b^6*c^2*e*f^2*z - 15872*a^ \\
& 3*b^2*c^5*d^2*e*z + 4992*a^2*b^4*c^4*d^2*e*z + 2048*a^7*c^3*h^2*i*z - 32*a^ \\
& 4*b^6*h^2*i*z - 2048*a^6*c^4*f^2*i*z + 16*a^3*b^7*g*h^2*z + 18432*a^5*c^5*d \\
& ^2*i*z + 2048*a^6*c^4*e*h^2*z - 2048*a^5*c^5*e*f^2*z + 32*b^8*c^2*d^2*e*z + \\
& 18432*a^4*c^6*d^2*e*z - 16*b^9*c*d^2*g*z - 256*a^5*b*c^2*f*g*h*i - 192*a^4 \\
& *b^3*c*f*g*h*i - 96*a^3*b^4*c*d*g*h*i - 1792*a^4*b*c^3*d*e*h*i - 768*a^4*b* \\
& c^3*d*f*g*i - 256*a^4*b*c^3*e*f*g*h + 32*a^2*b^5*c*d*f*g*i - 768*a^3*b*c^4*
\end{aligned}$$

$$\begin{aligned}
& d * e * f * g + 32 * a * b^5 * c^2 * d * e * f * g + 896 * a^4 * b^2 * c^2 * d * g * h * i + 384 * a^4 * b^2 * c^2 * \\
& e * f * h * i - 192 * a^3 * b^3 * c^2 * e * f * g * h - 192 * a^3 * b^3 * c^2 * d * f * g * i + 192 * a^3 * b^3 * c \\
& ^2 * d * e * h * i + 896 * a^3 * b^2 * c^3 * d * e * g * h + 384 * a^3 * b^2 * c^3 * d * e * f * i - 96 * a^2 * b^4 \\
& * c^2 * d * e * g * h - 64 * a^2 * b^4 * c^2 * d * e * f * i - 192 * a^2 * b^3 * c^3 * d * e * f * g + 192 * a^5 * b \\
& ^2 * c * g * h^2 * i + 192 * a^5 * b^2 * c * f * h * i^2 - 384 * a^5 * b * c^2 * e * h^2 * i - 32 * a^4 * b^3 * c \\
& * e * h^2 * i + 16 * a^3 * b^4 * c * f^2 * g * i + 1536 * a^5 * b * c^2 * e * g * i^2 + 1536 * a^4 * b * c^3 * e \\
& ^2 * g * i - 896 * a^5 * b * c^2 * d * h * i^2 + 96 * a^4 * b^3 * c * d * h * i^2 + 48 * a^3 * b^4 * c * f * g^2 * \\
& h - 384 * a^4 * b * c^3 * e * f^2 * i + 16 * a^3 * b^4 * c * e * g * h^2 - 32 * a^3 * b^4 * c * d * f * i^2 + 2 \\
& 4 * a^2 * b^5 * c * d * g^2 * h + 2208 * a^3 * b * c^4 * d^2 * f * h - 1920 * a^3 * b * c^4 * d^2 * e * i + 800 \\
& * a^4 * b * c^3 * d * f * h^2 - 102 * a * b^5 * c^2 * d^2 * f * h - 32 * a * b^5 * c^2 * d^2 * e * i - 30 * a^2 * b \\
& ^5 * c * d * f * h^2 - 896 * a^3 * b * c^4 * d * e^2 * h - 240 * a * b^4 * c^3 * d^2 * e * g - 32 * a * b^4 * c^ \\
& 3 * d * e^2 * f + 512 * a^5 * c^3 * e * f * h * i + 1536 * a^4 * c^4 * d * e * f * i + 16 * a * b^6 * c * d^2 * g * i \\
& + 12 * a * b^6 * c * d * f^2 * h - 8 * a * b^6 * c * d * f * g^2 + 192 * a^4 * b^2 * c^2 * f^2 * g * i - 768 * a \\
& ^4 * b^2 * c^2 * e * g^2 * i + 64 * a^4 * b^2 * c^2 * f * g^2 * h + 960 * a^3 * b^2 * c^3 * d^2 * g * i - 240 \\
& * a^2 * b^4 * c^2 * d^2 * g * i + 192 * a^4 * b^2 * c^2 * e * g * h^2 - 32 * a^3 * b^3 * c^2 * e * f^2 * i - 2 \\
& 24 * a^3 * b^3 * c^2 * d * g^2 * h + 192 * a^4 * b^2 * c^2 * d * f * i^2 + 192 * a^3 * b^2 * c^3 * e^2 * f * h \\
& - 864 * a^3 * b^2 * c^3 * d * f^2 * h + 480 * a^2 * b^3 * c^3 * d^2 * e * i + 336 * a^3 * b^3 * c^2 * d * f * h \\
& ^2 + 192 * a^3 * b^2 * c^3 * e * f^2 * g + 144 * a^2 * b^3 * c^3 * d^2 * f * h + 16 * a^2 * b^4 * c^2 * e * f \\
& ^2 * g - 12 * a^2 * b^4 * c^2 * d * f^2 * h + 192 * a^3 * b^2 * c^3 * d * f * g^2 + 96 * a^2 * b^3 * c^3 * d * \\
& e^2 * h + 48 * a^2 * b^4 * c^2 * d * f * g^2 + 960 * a^2 * b^2 * c^4 * d^2 * e * g + 192 * a^2 * b^2 * c^4 * \\
& d * e^2 * f - 384 * a^5 * b^2 * c * g^2 * i^2 - 192 * a^5 * b * c^2 * f^2 * i^2 - 48 * a^4 * b^3 * c * g^2 * \\
& h^2 - 16 * a^4 * b^3 * c * f^2 * i^2 + 80 * a^3 * b^3 * c^2 * f^3 * h - 42 * a^3 * b^4 * c * f^2 * h^2 - \\
& 960 * a^4 * b * c^3 * d^2 * i^2 - 192 * a^4 * b * c^3 * e^2 * h^2 - 16 * a^2 * b^5 * c * d^2 * i^2 - 4 * a^ \\
& 2 * b^5 * c * f^2 * g^2 - 192 * a^4 * b^2 * c^2 * d * h^3 - 192 * a^2 * b^2 * c^4 * d^3 * h + 128 * a^3 * b \\
& ^3 * c^2 * e * g^3 - 192 * a^3 * b * c^4 * e^2 * f^2 + 60 * a * b^5 * c^2 * d^2 * g^2 + 198 * a * b^4 * c^3 \\
& * d^2 * f^2 + 144 * a^2 * b^3 * c^3 * d * f^3 - 960 * a^2 * b * c^5 * d^2 * e^2 + 240 * a * b^3 * c^4 * d^ \\
& 2 * e^2 + 256 * a^6 * c^2 * f * h * i^2 + 16 * a^4 * b^4 * g * h^2 * i + 768 * a^5 * c^3 * d * f * i^2 + 25 \\
& 6 * a^4 * c^4 * e^2 * f * h - 192 * a^6 * b * c * h^2 * i^2 - 192 * a^4 * c^4 * d * f^2 * h + 128 * a^4 * b^3 \\
& * c * g^3 * i + 16 * b^6 * c^2 * d^2 * e * g + 96 * a^5 * b * c^2 * f * h^3 + 96 * a^4 * b * c^3 * f^3 * h + 8 \\
& 0 * a^4 * b^3 * c * f * h^3 + 6 * a^2 * b^5 * c * f^3 * h + 768 * a^3 * c^5 * d * e^2 * f + 512 * a^3 * b * c^4 \\
& * e^3 * g + 132 * a * b^4 * c^3 * d^3 * h - 28 * a^3 * b^4 * c * d * h^3 + 12 * a * b^6 * c * d^2 * h^2 + 20 \\
& 16 * a^2 * b * c^5 * d^3 * f - 496 * a * b^3 * c^4 * d^3 * f + 224 * a^3 * b * c^4 * d * f^3 - 18 * a * b^5 * c \\
& ^2 * d * f^3 - 192 * a^4 * b^2 * c^2 * f^2 * h^2 + 240 * a^3 * b^3 * c^2 * d^2 * i^2 - 48 * a^3 * b^3 * c \\
& ^2 * f^2 * g^2 - 16 * a^3 * b^3 * c^2 * e^2 * h^2 - 464 * a^3 * b^2 * c^3 * d^2 * h^2 - 384 * a^3 * b^2 \\
& * c^3 * e^2 * g^2 + 42 * a^2 * b^4 * c^2 * d^2 * h^2 - 240 * a^2 * b^3 * c^3 * d^2 * g^2 - 16 * a^2 * b^ \\
& 3 * c^3 * e^2 * f^2 - 960 * a^2 * b^2 * c^4 * d^2 * f^2 + 6 * b^7 * c * d^2 * f * h + 512 * a^6 * b * c * g * i \\
& ^3 - 2 * a * b^7 * d * f * h^2 - 16 * a^5 * b^3 * h^2 * i^2 - 1536 * a^5 * c^3 * e^2 * i^2 - 32 * a^5 * c \\
& ^3 * f^2 * h^2 - 4 * a^3 * b^5 * g^2 * h^2 - 864 * a^4 * c^4 * d^2 * h^2 - 9 * b^6 * c^2 * d^2 * f^2 - \\
& 288 * a^3 * c^5 * d^2 * f^2 - 16 * b^5 * c^3 * d^2 * e^2 - 24 * a^3 * b^2 * c^3 * f^4 - 9 * a^2 * b^4 * c \\
& ^2 * f^4 - 1024 * a^6 * c^2 * e * i^3 - 1024 * a^4 * c^4 * e^3 * i - 10 * b^6 * c^2 * d^3 * h + 6 * a^3 \\
& * b^5 * f * h^3 - 1728 * a^3 * c^5 * d^3 * h - 192 * a^5 * c^3 * d * h^3 - 4 * b^7 * c * d^2 * g^2 + 30 * \\
& b^5 * c^3 * d^3 * f + 6 * a^2 * b^6 * d * h^3 - 24 * a^5 * b^2 * c * h^4 - 16 * a^3 * b^4 * c * g^4 + 360 \\
& * a * b^2 * c^5 * d^4 - 16 * a^6 * c^2 * h^4 - 9 * a^4 * b^4 * h^4 - 16 * a^4 * c^4 * f^4 - 256 * a^3 * \\
& c^5 * e^4 - 25 * b^4 * c^4 * d^4 - 1296 * a^2 * c^6 * d^4 - a^2 * b^6 * f^2 * h^2 - 256 * a^7 * c * i \\
& ^4 - b^8 * d^2 * h^2, z, 1) * x * (8192 * a^6 * b * c^6 + 32 * a^2 * b^9 * c^2 - 512 * a^3 * b^7 * c^
\end{aligned}$$

$$\begin{aligned}
& 3 + 3072*a^4*b^5*c^4 - 8192*a^5*b^3*c^5)) / (4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) + (x*(2*b^6*c^3*d^2 - 576*a^3*c^6*d^2 + 64*a^4*c^5*f^2 - 64*a^5*c^4*h^2 - 36*a*b^4*c^4*d^2 + 128*a^3*b*c^5*e^2 + 2*a^2*b^6*c*h^2 + 128*a^5*b*c^3*i^2 + 256*a^2*b^2*c^5*d^2 - 32*a^2*b^3*c^4*e^2 + 20*a^2*b^4*c^3*f^2 - 96*a^3*b^2*c^4*f^2 - 8*a^2*b^5*c^2*g^2 + 32*a^3*b^3*c^3*g^2 - 4*a^3*b^4*c^2*h^2 - 32*a^4*b^3*c^2*i^2 - 384*a^4*c^5*d*h + 4*a*b^5*c^3*d*f + 320*a^3*b*c^5*d*f + 256*a^4*b*c^4*e*i + 64*a^4*b*c^4*f*h - 96*a^2*b^3*c^4*d*f + 8*a^2*b^4*c^3*d*h + 32*a^2*b^4*c^3*e*g + 64*a^3*b^2*c^4*d*h - 12*8*a^3*b^2*c^4*e*g - 12*a^2*b^5*c^2*f*h - 64*a^3*b^3*c^3*e*i + 32*a^3*b^3*c^3*f*h + 32*a^3*b^4*c^2*g*i - 128*a^4*b^2*c^3*g*i)) / (4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - (x*(32*a^2*c^5*e^3 + 32*a^5*c^2*i^3 - 2*b^3*c^4*d^2*e + b^4*c^3*d^2*g + 96*a^3*c^4*e^2*i + 96*a^4*c^3*e*i^2 - 4*a^2*b^3*c^2*g^3 + 24*a*b*c^5*d^2*e - 48*a^2*c^5*d*e*f - 48*a^3*c^4*d*f*i - 16*a^3*c^4*e*f*h - 16*a^4*c^3*f*h*i - 12*a*b^2*c^4*d^2*g + 16*a^2*b*c^4*e*f^2 - 48*a^2*b*c^4*e^2*g - 2*a*b^3*c^3*d^2*i + 24*a^2*b*c^4*d^2*i + 8*a^3*b*c^3*e*h^2 - a^2*b^4*c*g*h^2 + 16*a^3*b*c^3*f^2*i - 48*a^4*b*c^2*g*i^2 + 2*a^3*b^3*c*h^2*i + 8*a^4*b*c^2*h^2*i + 24*a^2*b^2*c^3*e*g^2 - 8*a^2*b^2*c^3*f^2*g + 2*a^2*b^3*c^2*e*h^2 - 4*a^3*b^2*c^2*g*h^2 + 24*a^3*b^2*c^2*g^2*i - 4*a*b^2*c^4*d*e*f + 2*a*b^3*c^3*d*f*g + 32*a^2*b*c^4*d*e*h + 24*a^2*b*c^4*d*f*g + 32*a^3*b*c^3*d*h*i - 96*a^3*b*c^3*e*g*i + 8*a^3*b*c^3*f*g*h - 4*a^2*b^2*c^3*d*f*i - 16*a^2*b^2*c^3*d*g*h - 12*a^2*b^2*c^3*e*f*h + 6*a^2*b^3*c^2*f*g*h - 12*a^3*b^2*c^2*f*h*i)) / (4*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) * root(1572864*a^8*b^2*c^6*z^4 - 983040*a^7*b^4*c^5*z^4 + 327680*a^6*b^6*c^4*z^4 - 61440*a^5*b^8*c^3*z^4 + 6144*a^4*b^10*c^2*z^4 - 256*a^3*b^12*c*z^4 - 1048576*a^9*c^7*z^4 + 32768*a^7*b*c^4*g*i*z^2 - 512*a^4*b^7*c*g*i*z^2 + 192*a^3*b^8*c*f*h*z^2 + 57344*a^6*b*c^5*d*h*z^2 + 32768*a^6*b*c^5*e*g*z^2 + 96*a^2*b^9*c*d*h*z^2 - 32*a*b^10*c*d*f*z^2 - 24576*a^6*b^3*c^3*g*i*z^2 + 6144*a^5*b^5*c^2*g*i*z^2 + 49152*a^6*b^2*c^4*e*i*z^2 - 12288*a^5*b^4*c^3*e*i*z^2 + 6144*a^5*b^4*c^3*f*h*z^2 - 2048*a^4*b^6*c^2*f*h*z^2 + 1024*a^4*b^6*c^2*e*i*z^2 - 49152*a^5*b^3*c^4*d*h*z^2 - 24576*a^5*b^3*c^4*e*g*z^2 + 15360*a^4*b^5*c^3*d*h*z^2 + 6144*a^4*b^5*c^3*e*g*z^2 - 2048*a^3*b^7*c^2*d*h*z^2 - 512*a^3*b^7*c^2*e*g*z^2 + 24576*a^5*b^2*c^5*d*f*z^2 - 3072*a^3*b^6*c^3*d*f*z^2 + 2048*a^4*b^4*c^4*d*f*z^2 + 576*a^2*b^8*c^2*d*f*z^2 + 512*a^5*b^6*c*i^2*z^2 + 12288*a^7*b*c^4*h^2*z^2 + 128*a^3*b^8*c*g^2*z^2 + 12288*a^6*b*c^5*f^2*z^2 - 16*a^2*b^9*c*f^2*z^2 + 61440*a^5*b*c^6*d^2*z^2 + 432*a*b^9*c^2*d^2*z^2 - 65536*a^7*c^5*e*i*z^2 - 16384*a^7*c^5*f*h*z^2 - 49152*a^6*c^6*d*f*z^2 + 24576*a^7*b^2*c^3*i^2*z^2 - 6144*a^6*b^4*c^2*i^2*z^2 - 8192*a^6*b^3*c^3*h^2*z^2 + 1536*a^5*b^5*c^2*h^2*z^2 - 8192*a^6*b^2*c^4*g^2*z^2 + 6144*a^5*b^4*c^3*g^2*z^2 - 1536*a^4*b^6*c^2*g^2*z^2 - 8192*a^5*b^3*c^4*f^2*z^2 + 1536*a^4*b^5*c^3*f^2*z^2 + 24576*a^5*b^2*c^5*e^2*z^2 - 6144*a^4*b^4*c^4*e^2*z^2 + 512*a^3*b^6*c^3*e^2*z^2 - 61440*a^4*b^3*c^5*d^2*z^2 + 24064*a^3*b^5*c^4*d^2*z^2 - 4608*a^2*b^7*c^3*d^2*z^2 - 32768*a^8*c^4*i^2*z^2 - 16*a^3*b^9*h^2*z^2 - 32768*a^6*c^6*e^2*z^2 - 16*b^11*c*d^2*z^2 - 192*a^3*b^6*c*d*h*i*z - 6144*a^5*b*c^4*d*g*h*z - 4096*a^5*b*c^4*d*f*i*z + 96*a^2*b^7*c*d*g*h*z + 64*a^2*b^7*c*d*f*i*z - 4096*a^4*b*c^5*d*e*f*z + 64*a*b^7*c^2*d*
\end{aligned}$$

$$\begin{aligned}
& e*f*z - 32*a*b^8*c*d*f*g*z - 9216*a^5*b^2*c^3*d*h*i*z + 2304*a^4*b^4*c^2*d* \\
& h*i*z + 4608*a^4*b^3*c^3*d*g*h*z + 3072*a^4*b^3*c^3*d*f*i*z - 1152*a^3*b^5* \\
& c^2*d*g*h*z - 768*a^3*b^5*c^2*d*f*i*z - 9216*a^4*b^2*c^4*d*e*h*z + 2304*a^3 \\
& *b^4*c^3*d*e*h*z + 2048*a^4*b^2*c^4*d*f*g*z - 1536*a^3*b^4*c^3*d*f*g*z + 38 \\
& 4*a^2*b^6*c^2*d*f*g*z - 192*a^2*b^6*c^2*d*e*h*z + 3072*a^3*b^3*c^4*d*e*f*z \\
& - 768*a^2*b^5*c^3*d*e*f*z + 384*a^5*b^4*c*h^2*i*z - 1024*a^6*b*c^3*g*h^2*z \\
& - 192*a^4*b^5*c*g*h^2*z + 32*a^3*b^6*c*f^2*i*z + 1024*a^5*b*c^4*f^2*g*z - 3 \\
& 2*a^3*b^6*c*e*h^2*z - 16*a^2*b^7*c*f^2*g*z - 9216*a^4*b*c^5*d^2*g*z + 336*a \\
& *b^7*c^2*d^2*g*z - 672*a*b^6*c^3*d^2*e*z + 12288*a^6*c^4*d*h*i*z + 12288*a^ \\
& 5*c^5*d*e*h*z + 32*a*b^8*c*d^2*i*z - 1536*a^6*b^2*c^2*h^2*i*z + 1536*a^5*b^ \\
& 2*c^3*f^2*i*z + 768*a^5*b^3*c^2*g*h^2*z - 384*a^4*b^4*c^2*f^2*i*z - 15872*a \\
& ^4*b^2*c^4*d^2*i*z + 4992*a^3*b^4*c^3*d^2*i*z - 1536*a^5*b^2*c^3*e*h^2*z - \\
& 768*a^4*b^3*c^3*f^2*g*z - 672*a^2*b^6*c^2*d^2*i*z + 384*a^4*b^4*c^2*e*h^2*z \\
& + 192*a^3*b^5*c^2*f^2*g*z + 7936*a^3*b^3*c^4*d^2*g*z - 2496*a^2*b^5*c^3*d^ \\
& 2*g*z + 1536*a^4*b^2*c^4*e*f^2*z - 384*a^3*b^4*c^3*e*f^2*z + 32*a^2*b^6*c^2 \\
& *e*f^2*z - 15872*a^3*b^2*c^5*d^2*e*z + 4992*a^2*b^4*c^4*d^2*e*z + 2048*a^7* \\
& c^3*h^2*i*z - 32*a^4*b^6*h^2*i*z - 2048*a^6*c^4*f^2*i*z + 16*a^3*b^7*g*h^2* \\
& z + 18432*a^5*c^5*d^2*i*z + 2048*a^6*c^4*e*h^2*z - 2048*a^5*c^5*e*f^2*z + 3 \\
& 2*b^8*c^2*d^2*e*z + 18432*a^4*c^6*d^2*e*z - 16*b^9*c*d^2*g*z - 256*a^5*b*c^ \\
& 2*f*g*h*i - 192*a^4*b^3*c*f*g*h*i - 96*a^3*b^4*c*d*g*h*i - 1792*a^4*b*c^3*d \\
& *e*h*i - 768*a^4*b*c^3*d*f*g*i - 256*a^4*b*c^3*e*f*g*h + 32*a^2*b^5*c*d*f*g \\
& *i - 768*a^3*b*c^4*d*e*f*g + 32*a*b^5*c^2*d*e*f*g + 896*a^4*b^2*c^2*d*g*h*i \\
& + 384*a^4*b^2*c^2*e*f*h*i - 192*a^3*b^3*c^2*e*f*g*h - 192*a^3*b^3*c^2*d*f* \\
& g*i + 192*a^3*b^3*c^2*d*e*h*i + 896*a^3*b^2*c^3*d*e*g*h + 384*a^3*b^2*c^3*d \\
& *e*f*i - 96*a^2*b^4*c^2*d*e*g*h - 64*a^2*b^4*c^2*d*e*f*i - 192*a^2*b^3*c^3* \\
& d*e*f*g + 192*a^5*b^2*c*g*h^2*i + 192*a^5*b^2*c*f*h^2*i - 384*a^5*b*c^2*e*h \\
& ^2*i - 32*a^4*b^3*c*e*h^2*i + 16*a^3*b^4*c*f^2*g*i + 1536*a^5*b*c^2*e*g*i^2 \\
& + 1536*a^4*b*c^3*e^2*g*i - 896*a^5*b*c^2*d*h*i^2 + 96*a^4*b^3*c*d*h*i^2 + \\
& 48*a^3*b^4*c*f*g^2*h - 384*a^4*b*c^3*e*f^2*i + 16*a^3*b^4*c*e*g*h^2 - 32*a^ \\
& 3*b^4*c*d*f*i^2 + 24*a^2*b^5*c*d*g^2*h + 2208*a^3*b*c^4*d^2*f*h - 1920*a^3* \\
& b*c^4*d^2*e*i + 800*a^4*b*c^3*d*f*h^2 - 102*a*b^5*c^2*d^2*f*h - 32*a*b^5*c^ \\
& 2*d^2*e*i - 30*a^2*b^5*c*d*f*h^2 - 896*a^3*b*c^4*d*e^2*h - 240*a*b^4*c^3*d^ \\
& 2*e*g - 32*a*b^4*c^3*d*e^2*f + 512*a^5*c^3*e*f*h*i + 1536*a^4*c^4*d*e*f*i + \\
& 16*a*b^6*c*d^2*g*i + 12*a*b^6*c*d*f^2*h - 8*a*b^6*c*d*f*g^2 + 192*a^4*b^2* \\
& c^2*f^2*g*i - 768*a^4*b^2*c^2*e*g^2*i + 64*a^4*b^2*c^2*f*g^2*h + 960*a^3*b^ \\
& 2*c^3*d^2*g*i - 240*a^2*b^4*c^2*d^2*g*i + 192*a^4*b^2*c^2*e*g*h^2 - 32*a^3* \\
& b^3*c^2*e*f^2*i - 224*a^3*b^3*c^2*d*g^2*h + 192*a^4*b^2*c^2*d*f*i^2 + 192*a \\
& ^3*b^2*c^3*e^2*f*h - 864*a^3*b^2*c^3*d*f^2*h + 480*a^2*b^3*c^3*d^2*e*i + 33 \\
& 6*a^3*b^3*c^2*d*f*h^2 + 192*a^3*b^2*c^3*e*f^2*g + 144*a^2*b^3*c^3*d^2*f*h + \\
& 16*a^2*b^4*c^2*e*f^2*g - 12*a^2*b^4*c^2*d*f^2*h + 192*a^3*b^2*c^3*d*f*g^2 \\
& + 96*a^2*b^3*c^3*d*e^2*h + 48*a^2*b^4*c^2*d*f*g^2 + 960*a^2*b^2*c^4*d^2*e*g \\
& + 192*a^2*b^2*c^4*d*e^2*f - 384*a^5*b^2*c*g^2*i^2 - 192*a^5*b*c^2*f^2*i^2 \\
& - 48*a^4*b^3*c*g^2*h^2 - 16*a^4*b^3*c*f^2*i^2 + 80*a^3*b^3*c^2*f^3*h - 42*a \\
& ^3*b^4*c*f^2*h^2 - 960*a^4*b*c^3*d^2*i^2 - 192*a^4*b*c^3*e^2*h^2 - 16*a^2*b \\
& ^5*c*d^2*i^2 - 4*a^2*b^5*c*f^2*g^2 - 192*a^4*b^2*c^2*d*h^3 - 192*a^2*b^2*c^
\end{aligned}$$

$$\begin{aligned}
& 4*d^3*h + 128*a^3*b^3*c^2*e*g^3 - 192*a^3*b*c^4*e^2*f^2 + 60*a*b^5*c^2*d^2* \\
& g^2 + 198*a*b^4*c^3*d^2*f^2 + 144*a^2*b^3*c^3*d*f^3 - 960*a^2*b*c^5*d^2*e^2 \\
& + 240*a*b^3*c^4*d^2*e^2 + 256*a^6*c^2*f*h*i^2 + 16*a^4*b^4*g*h^2*i + 768*a \\
& ^5*c^3*d*f*i^2 + 256*a^4*c^4*e^2*f*h - 192*a^6*b*c*h^2*i^2 - 192*a^4*c^4*d* \\
& f^2*h + 128*a^4*b^3*c*g^3*i + 16*b^6*c^2*d^2*e*g + 96*a^5*b*c^2*f*h^3 + 96* \\
& a^4*b*c^3*f^3*h + 80*a^4*b^3*c*f*h^3 + 6*a^2*b^5*c*f^3*h + 768*a^3*c^5*d*e^ \\
& 2*f + 512*a^3*b*c^4*e^3*g + 132*a*b^4*c^3*d^3*h - 28*a^3*b^4*c*d*h^3 + 12*a \\
& *b^6*c*d^2*h^2 + 2016*a^2*b*c^5*d^3*f - 496*a*b^3*c^4*d^3*f + 224*a^3*b*c^4 \\
& *d*f^3 - 18*a*b^5*c^2*d*f^3 - 192*a^4*b^2*c^2*f^2*h^2 + 240*a^3*b^3*c^2*d^2 \\
& *i^2 - 48*a^3*b^3*c^2*f^2*g^2 - 16*a^3*b^3*c^2*e^2*h^2 - 464*a^3*b^2*c^3*d^ \\
& 2*h^2 - 384*a^3*b^2*c^3*e^2*g^2 + 42*a^2*b^4*c^2*d^2*h^2 - 240*a^2*b^3*c^3* \\
& d^2*g^2 - 16*a^2*b^3*c^3*e^2*f^2 - 960*a^2*b^2*c^4*d^2*f^2 + 6*b^7*c*d^2*f* \\
& h + 512*a^6*b*c*g*i^3 - 2*a*b^7*d*f*h^2 - 16*a^5*b^3*h^2*i^2 - 1536*a^5*c^3 \\
& *e^2*i^2 - 32*a^5*c^3*f^2*h^2 - 4*a^3*b^5*g^2*h^2 - 864*a^4*c^4*d^2*h^2 - 9 \\
& *b^6*c^2*d^2*f^2 - 288*a^3*c^5*d^2*f^2 - 16*b^5*c^3*d^2*e^2 - 24*a^3*b^2*c^ \\
& 3*f^4 - 9*a^2*b^4*c^2*f^4 - 1024*a^6*c^2*e*i^3 - 1024*a^4*c^4*e^3*i - 10*b^ \\
& 6*c^2*d^3*h + 6*a^3*b^5*f*h^3 - 1728*a^3*c^5*d^3*h - 192*a^5*c^3*d*h^3 - 4* \\
& b^7*c*d^2*g^2 + 30*b^5*c^3*d^3*f + 6*a^2*b^6*d*h^3 - 24*a^5*b^2*c*h^4 - 16* \\
& a^3*b^4*c*g^4 + 360*a*b^2*c^5*d^4 - 16*a^6*c^2*h^4 - 9*a^4*b^4*h^4 - 16*a^4 \\
& *c^4*f^4 - 256*a^3*c^5*e^4 - 25*b^4*c^4*d^4 - 1296*a^2*c^6*d^4 - a^2*b^6*f^ \\
& 2*h^2 - 256*a^7*c*i^4 - b^8*d^2*h^2, z, 1), 1, 1, 4)
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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**4+b*x**2+a)**2,x)

[Out] Timed out

$$3.41 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=770

$$\frac{x \left(-\left(b^2 \left(a^2 m + c^2 d \right) \right) + x^2 \left(-bc \left(-3a^2 m + ach + c^2 d \right) - ab^3 m + ab^2 ck + 2ac^2 (cf - ak) \right) + 2ac \left(a^2 m - ach + c^2 d \right) \right)}{2ac^2 \left(b^2 - 4ac \right) \left(a + bx^2 + cx^4 \right)}$$

[Out] $m*x/c^2+1/2*(-b*c*(a*j+c*e)+a*b^2*1+2*a*c*(-a*1+c*g)-(2*c^3*e-c^2*(2*a*j+b*g)-b^3*1+b*c*(3*a*1+b*j))*x^2)/c^2/(-4*a*c+b^2)/(c*x^4+b*x^2+a)-1/2*x*(a*b*c*(a*k+c*f)-b^2*(a^2*m+c^2*d)+2*a*c*(a^2*m-a*c*h+c^2*d)+(a*b^2*c*k+2*a*c^2*(-a*k+c*f)-a*b^3*m-b*c*(-3*a^2*m+a*c*h+c^2*d))*x^2)/a/c^2/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*(4*c^3*e-c^2*(-4*a*j+2*b*g)+b^3*1-6*a*b*c*1)*\operatorname{arctanh}((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/c^2/(-4*a*c+b^2)^{(3/2)}+1/4*1*\ln(c*x^4+b*x^2+a)/c^2+1/4*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)})*(a*b^2*c*k-2*a*c^2*(3*a*k+c*f)-3*a*b^3*m+b*c*(13*a^2*m+a*c*h+c^2*d)+(-a*b^3*c*k+4*a*b*c^2*(2*a*k+c*f)+3*a*b^4*m+b^2*c*(-19*a^2*m-a*c*h+c^2*d)-4*a*c^2*(-5*a^2*m+a*c*h+3*c^2*d))/(-4*a*c+b^2)^{(1/2)})/a/c^{(5/2)}/(-4*a*c+b^2)*2^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)}+1/4*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)})*(a*b^2*c*k-2*a*c^2*(3*a*k+c*f)-3*a*b^3*m+b*c*(13*a^2*m+a*c*h+c^2*d)+(-a*b^3*c*k-4*a*b*c^2*(2*a*k+c*f)-3*a*b^4*m-b^2*c*(-19*a^2*m-a*c*h+c^2*d)+4*a*c^2*(-5*a^2*m+a*c*h+3*c^2*d))/(-4*a*c+b^2)^{(1/2)})/a/c^{(5/2)}/(-4*a*c+b^2)*2^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)}$

Rubi [A] time = 7.83, antiderivative size = 770, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 11, integrand size = 55, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {1673, 1678, 1676, 1166, 205, 1663, 1660, 634, 618, 206, 628}

$$\frac{x \left(x^2 \left(-bc \left(-3a^2 m + ach + c^2 d \right) \right) + ab^2 ck - ab^3 m + 2ac^2 (cf - ak) \right) + b^2 \left(-\left(a^2 m + c^2 d \right) \right) + 2ac \left(a^2 m - ach + c^2 d \right)}{2ac^2 \left(b^2 - 4ac \right) \left(a + bx^2 + cx^4 \right)}$$

Antiderivative was successfully verified.

[In] $\operatorname{Int}[(d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)/(a + b*x^2 + c*x^4)^2, x]$

[Out] $(m*x)/c^2 - (b*c*(c*e + a*j) - a*b^2*1 - 2*a*c*(c*g - a*1) + (2*c^3*e - c^2*(b*g + 2*a*j) - b^3*1 + b*c*(b*j + 3*a*1))*x^2)/(2*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) - (x*(a*b*c*(c*f + a*k) - b^2*(c^2*d + a^2*m) + 2*a*c*(c^2*$

$$\begin{aligned} & d - a*c*h + a^2*m) + (a*b^2*c*k + 2*a*c^2*(c*f - a*k) - a*b^3*m - b*c*(c^2*d \\ & + a*c*h - 3*a^2*m))*x^2)/(2*a*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (\\ & (a*b^2*c*k - 2*a*c^2*(c*f + 3*a*k) - 3*a*b^3*m + b*c*(c^2*d + a*c*h + 13*a^ \\ & 2*m) - (a*b^3*c*k - 4*a*b*c^2*(c*f + 2*a*k) - 3*a*b^4*m - b^2*c*(c^2*d - a* \\ & c*h - 19*a^2*m) + 4*a*c^2*(3*c^2*d + a*c*h - 5*a^2*m))/\text{Sqrt}[b^2 - 4*a*c])*A \\ & \text{rcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]])]/(2*\text{Sqrt}[2]*a*c^{5/2} \\ &)*(b^2 - 4*a*c)*\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) + ((a*b^2*c*k - 2*a*c^2*(c*f + \\ & 3*a*k) - 3*a*b^3*m + b*c*(c^2*d + a*c*h + 13*a^2*m) + (a*b^3*c*k - 4*a*b*c \\ & ^2*(c*f + 2*a*k) - 3*a*b^4*m - b^2*c*(c^2*d - a*c*h - 19*a^2*m) + 4*a*c^2*(\\ & 3*c^2*d + a*c*h - 5*a^2*m))/\text{Sqrt}[b^2 - 4*a*c])* \text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{S} \\ & \text{qrt}[b + \text{Sqrt}[b^2 - 4*a*c]])]/(2*\text{Sqrt}[2]*a*c^{5/2}*(b^2 - 4*a*c)*\text{Sqrt}[b + \text{S} \\ & \text{qrt}[b^2 - 4*a*c]]) + ((4*c^3*e - c^2*(2*b*g - 4*a*j) + b^3*1 - 6*a*b*c*1)* \text{Ar} \\ & \text{cTanh}[(b + 2*c*x^2)/\text{Sqrt}[b^2 - 4*a*c]])/(2*c^2*(b^2 - 4*a*c)^{3/2}) + (1*\text{Lo} \\ & \text{g}[a + b*x^2 + c*x^4])/(4*c^2) \end{aligned}$$
Rule 205

$$\text{Int}(((a_) + (b_.)*(x_)^2)^{-1}, x_Symbol] :> \text{Simp}[(\text{Rt}[a/b, 2]*\text{ArcTan}[x/\text{Rt}[a/b, 2]])/a, x] /; \text{FreeQ}\{a, b\}, x] \&\& \text{PosQ}[a/b]$$
Rule 206

$$\text{Int}(((a_) + (b_.)*(x_)^2)^{-1}, x_Symbol] :> \text{Simp}[(1*\text{ArcTanh}[(\text{Rt}[-b, 2]*x)/\text{Rt}[a, 2]])/(\text{Rt}[a, 2]*\text{Rt}[-b, 2]), x] /; \text{FreeQ}\{a, b\}, x] \&\& \text{NegQ}[a/b] \&\& (\text{GtQ}[a, 0] \parallel \text{LtQ}[b, 0])$$
Rule 618

$$\text{Int}(((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^{-1}, x_Symbol] :> \text{Dist}[-2, \text{Subst}[\text{Int}[1/\text{Simp}[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; \text{FreeQ}\{a, b, c\}, x] \&\& \text{NeQ}[b^2 - 4*a*c, 0]$$
Rule 628

$$\text{Int}(((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> \text{Simp}[(d*\text{Log}[\text{RemoveContent}[a + b*x + c*x^2, x]])/b, x] /; \text{FreeQ}\{a, b, c, d, e\}, x] \&\& \text{EqQ}[2*c*d - b*e, 0]$$
Rule 634

$$\text{Int}(((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] :> \text{Dist}[(2*c*d - b*e)/(2*c), \text{Int}[1/(a + b*x + c*x^2), x], x] + \text{Dist}[e/(2*c), \text{Int}[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; \text{FreeQ}\{a, b, c, d, e\}, x] \&\& \text{NeQ}[2*c*d - b*e, 0] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& !\text{NiceSqrtQ}[b^2 - 4*a*c]$$

Rule 1166

```
Int[((d_) + (e_)*(x_)^2)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1660

```
Int[(Pq_)*((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol] :=> With[{Q =
PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[P
q, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x +
c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^(
p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(
2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
- 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^(
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :=> Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rule 1676

```
Int[(Pq_)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] :=> Int[ExpandInte
grand[Pq/(a + b*x^2 + c*x^4), x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :=> With[{d =
Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
```

$(b^2 - 4ac)^{p+1} \cdot (a^2 b^2 e - d(b^2 - 2ac) - c(bd - 2ae)x^2) / (2a^{p+1}(b^2 - 4ac)) + \text{Dist}[1/(2a^{p+1}(b^2 - 4ac)), \text{Int}[(a + bx^2 + cx^4)^{p+1} \cdot \text{ExpandToSum}[2a^{p+1}(b^2 - 4ac) \cdot \text{PolynomialQuotient}[Pq, a + bx^2 + cx^4, x] + b^2 d(2p+3) - 2ac d(4p+5) - a^2 b^2 e + c(4p+7)(bd - 2ae)x^2, x], x], x]] /; \text{FreeQ}\{a, b, c, x\} \ \&\& \ \text{PolyQ}[Pq, x^2] \ \&\& \ \text{Expon}[Pq, x^2] > 1 \ \&\& \ \text{NeQ}[b^2 - 4ac, 0] \ \&\& \ \text{LtQ}[p, -1]$

Rubi steps

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + jx^5 + kx^6 + lx^7 + mx^8}{(a + bx^2 + cx^4)^2} dx = \int \frac{x(e + gx^2 + jx^4 + lx^6)}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2 + hx^4 + kx^6}{(a + bx^2 + cx^4)^2} dx$$

$$= -\frac{x(abc(cf + ak) - b^2(c^2d + a^2m) + 2ac(c^2d - ach + abe) - 2c^2d)}{2ac^2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg + 2ae) - c^2d)}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= \frac{mx}{c^2} - \frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg + 2ae) - c^2d)}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= \frac{mx}{c^2} - \frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg + 2ae) - c^2d)}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= \frac{mx}{c^2} - \frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg + 2ae) - c^2d)}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)}$$

Mathematica [A] time = 5.70, size = 935, normalized size = 1.21

$$4\sqrt{c} mx + \frac{2\sqrt{c} (2c(l+mx)a^3 - (l+mx)b^2 - c(j+x(k+3x(l+mx)))b + 2c^2(g+x(h+x(j+kx))))a^2 + (-x^2(l+mx)b^3 + cx^2(j+kx)b^2 + c^2(e+x(f-x(g+hx))))b + 2c^3x^2}{a(4ac - b^2)(cx^4 + bx^2 + a)}$$

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^2 + c*x^4)^2, x]

[Out]
$$\begin{aligned} & (4\sqrt{c}mx + (2\sqrt{c}(2a^3c(1+mx) - b^2c^2d(b+cx^2) + a(b^2cx^2(j+kx) - b^3x^2(1+mx) + 2c^3x(d+x(e+fx)) + b^2c^2(e+x(f-x(g+hx)))) - a^2(b^2(1+mx) + 2c^2(g+x(h+x(j+kx))) - b^2c(j+x(k+3x(1+mx)))))) / (a(-b^2+4ac)(a+b^2x^2+c^2x^4) - (\sqrt{2}(-3ab^4m+2ac^2(6c^2d+c\sqrt{b^2-4ac})f+2ac^2h+3a\sqrt{b^2-4ac})k-10a^2m) + ab^3(c^2k+3\sqrt{b^2-4ac})m) - b^2c^2(\sqrt{b^2-4ac}d+4a^2f) + ac(\sqrt{b^2-4ac}h+8a^2k) + 13a^2\sqrt{b^2-4ac}m) + b^2c^2(-c^2d+ac^2h+a(-(\sqrt{b^2-4ac})k+19am)))\text{ArcTan}[(\sqrt{2}\sqrt{c}x)/\sqrt{b-\sqrt{b^2-4ac}}]) / (a(b^2-4ac)^{3/2}\sqrt{b-\sqrt{b^2-4ac}}) - (\sqrt{2}(3ab^4m+2ac^2(-6c^2d+c\sqrt{b^2-4ac})f-2ac^2h+3a\sqrt{b^2-4ac})k+10a^2m) + ab^3(-c^2k+3\sqrt{b^2-4ac})m) - b^2c^2(\sqrt{b^2-4ac}d-4a^2f) + ac(\sqrt{b^2-4ac}h-8a^2k) + 13a^2\sqrt{b^2-4ac}m) + b^2c^2(c^2d-ac^2h-a(\sqrt{b^2-4ac})k+19am))\text{ArcTan}[(\sqrt{2}\sqrt{c}x)/\sqrt{b+\sqrt{b^2-4ac}}]) / (a(b^2-4ac)^{3/2}\sqrt{b+\sqrt{b^2-4ac}}) + (\sqrt{c}(-4c^3e+2c^2(bg-2aj) + b^2(-b+\sqrt{b^2-4ac})) + ac(6b-4\sqrt{b^2-4ac}))\text{Log}[-b+\sqrt{b^2-4ac}-2cx^2]) / (b^2-4ac)^{3/2} + (\sqrt{c}(4c^3e+c^2(-2b^2g+4aj) + b^2(b+\sqrt{b^2-4ac})) + ac(6b-4\sqrt{b^2-4ac}))\text{Log}[b+\sqrt{b^2-4ac}+2cx^2]) / (b^2-4ac)^{3/2}) / (4c^{5/2}) \end{aligned}$$

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a)^2,x, algorithm="fricas")

[Out] Timed out

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a)^2,x, algorithm="giac")

[Out] Timed out

maple [B] time = 0.10, size = 4570, normalized size = 5.94

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((m*x^8+1*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x)$

[Out]
$$\begin{aligned} & -3/4/c^2/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^5*m+1/4/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)}*b^2*h*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)+1/4/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*h+4*a^2/(4*a*c-b^2)^2*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*1-1/(c*x^4+b*x^2+a)/(4*a*c-b^2)*a*g+1/2/(c*x^4+b*x^2+a)/(4*a*c-b^2)*b*e+4*a^2/(4*a*c-b^2)^2*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*1-1/4/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)}/a*b^2*c*d*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/4*c/(4*a*c-b^2)^2/a*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*d+m*x/c^2-c/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b*f-1/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)}*b*c*f*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-2*c^2/(4*a*c-b^2)^2*a*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*f+1/2*c/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^2*f+2/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*a*c^2*f*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/2/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*b^2*c*f*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/4*c/(4*a*c-b^2)^2/a*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^3*d+a/(4*a*c-b^2)^2*c*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*h+1/2/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)}*b*g*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})+1/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)}*c*e*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})-1/(4*a*c-b^2)^2*(-4*a*c+b^2)^{(1/2)}*c*e*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})+c/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x*d+1/c/(c*x^4+b*x^2+a)/(4*a*c-b^2)*a^2*1-1/(c*x^4+b*x^2+a)*a/(4*a*c-b^2)*x^3*k-1/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x^2*a*j-1/2/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x^2*b*g-1/(c*x^4+b*x^2+a)*a/(4*a*c-b^2)*x*h-1/2/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x^3*b*h+1/2/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x*b*f+1/4/c^2/(4*a*c-b^2)^2*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*b^4*1-a/(4*a*c-b^2)^2*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*(-4*a*c+b^2)^{(1/2)}*j+a/(4*a*c-b^2)^2*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*(-4*a*c+b^2)^{(1/2)}*j+1/4/c^2/(4*a*c-b^2)^2*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*b^4*1+3/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)}*c^2*d*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x) \end{aligned}$$

$$\begin{aligned} & (1/2)*\operatorname{arctanh}(2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)})*c)^{(1/2)} * c*x) * b^3*m + 25/4/c*a \\ & / (4*a*c - b^2)^2 * 2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)})*c)^{(1/2)} * \operatorname{arctan}(2^{(1/2)} / ((b + \\ & (-4*a*c + b^2)^{(1/2)})*c)^{(1/2)} * c*x) * b^3*m - 3/4/c^2 / (4*a*c - b^2)^2 * 2^{(1/2)} / ((-b + \\ & (-4*a*c + b^2)^{(1/2)})*c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)})*c)^{(1/2)} \\ & * c*x) * (-4*a*c + b^2)^{(1/2)} * b^4*m - 3/4/c^2 / (4*a*c - b^2)^2 * 2^{(1/2)} / ((b + (-4*a*c \\ & + b^2)^{(1/2)})*c)^{(1/2)} * \operatorname{arctan}(2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)})*c)^{(1/2)} * c*x) * \\ & (-4*a*c + b^2)^{(1/2)} * b^4*m + 1/4/c / (4*a*c - b^2)^2 * 2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)} \\ &)) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)})*c)^{(1/2)} * c*x) * (-4*a*c + \\ & b^2)^{(1/2)} * b^3*k - 2*a / (4*a*c - b^2)^2 * 2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)})*c)^{(1/2)} \\ &) * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)})*c)^{(1/2)} * c*x) * (-4*a*c + b^2)^{(1/2)} \\ & * b*k - 2*a / (4*a*c - b^2)^2 * 2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)})*c)^{(1/2)} * \operatorname{arctan}(2^{(1/2)} / (1 \\ & / 2) / ((b + (-4*a*c + b^2)^{(1/2)})*c)^{(1/2)} * c*x) * (-4*a*c + b^2)^{(1/2)} * b*k + 1/4/c / (4*a \\ & *c - b^2)^2 * 2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)})*c)^{(1/2)} * \operatorname{arctan}(2^{(1/2)} / ((b + (-4*a \\ & *c + b^2)^{(1/2)})*c)^{(1/2)} * c*x) * (-4*a*c + b^2)^{(1/2)} * b^3*k - 1/2 / (c*x^4 + b*x^2 + a) / a \\ & / (4*a*c - b^2) * x * b^2 * d - 1/2 / c^2 / (c*x^4 + b*x^2 + a) / (4*a*c - b^2) * x^2 * b^3 * 1 - 1/2 / c^2 / \\ & (c*x^4 + b*x^2 + a) / (4*a*c - b^2) * x^3 * b^3 * m - 1/2 / c^2 / (c*x^4 + b*x^2 + a) / (4*a*c - b^2) * a \\ & * b^2 * 1 + 1/2 / c / (c*x^4 + b*x^2 + a) / (4*a*c - b^2) * x^2 * b^2 * j + 1/c / (c*x^4 + b*x^2 + a) * a^2 / \\ & (4*a*c - b^2) * x * m + 1/2 / c / (c*x^4 + b*x^2 + a) / (4*a*c - b^2) * a * b * j + 1/2 / c / (c*x^4 + b*x^2 + \\ & a) / (4*a*c - b^2) * x^3 * b^2 * k - 1/4 / c^2 / (4*a*c - b^2)^2 * \ln(-2*c*x^2 - b + (-4*a*c + b^2)^{(1/2)} \\ &) * (-4*a*c + b^2)^{(1/2)} * b^3 * 1 + 1/4 / c^2 / (4*a*c - b^2)^2 * \ln(2*c*x^2 + b + (-4*a*c + b^2)^{(1/2)} \\ &) * (-4*a*c + b^2)^{(1/2)} * b^3 * 1 - 2/c * a / (4*a*c - b^2)^2 * \ln(-2*c*x^2 - b + (-4*a \\ & *c + b^2)^{(1/2)} * b^2 * 1 - 2/c * a / (4*a*c - b^2)^2 * \ln(2*c*x^2 + b + (-4*a*c + b^2)^{(1/2)} * b \\ & ^2 * 1 \end{aligned}$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\frac{abc^2e - 2a^2c^2g + a^2bcj - (bc^3d - 2ac^3f + abc^2h - (ab^2c - 2a^2c^2)k + (ab^3 - 3a^2bc)m)x^3 + (2ac^3e - abc^2g + (a^2b^2c^2 - 4a^3c^3 + (ab^2c^3$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((m*x^8+1*x^7+k*x^6+j*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="maxima")

[Out]
$$\begin{aligned} & -1/2*(a*b*c^2*e - 2*a^2*c^2*g + a^2*b*c*j - (b*c^3*d - 2*a*c^3*f + a*b*c^2* \\ & h - (a*b^2*c - 2*a^2*c^2)*k + (a*b^3 - 3*a^2*b*c)*m)*x^3 + (2*a*c^3*e - a*b \\ & *c^2*g + (a*b^2*c - 2*a^2*c^2)*j - (a*b^3 - 3*a^2*b*c)*l)*x^2 - (a^2*b^2 - \\ & 2*a^3*c)*l + (a*b*c^2*f - 2*a^2*c^2*h + a^2*b*c*k - (b^2*c^2 - 2*a*c^3)*d - \\ & (a^2*b^2 - 2*a^3*c)*m)*x / (a^2*b^2*c^2 - 4*a^3*c^3 + (a*b^2*c^3 - 4*a^2*c^4) \\ & *x^4 + (a*b^3*c^2 - 4*a^2*b*c^3)*x^2) + m*x/c^2 - 1/2*integrate(-(a*b*c^2 \\ & *f - 2*a^2*c^2*h + a^2*b*c*k + 2*(a*b^2*c - 4*a^2*c^2)*l*x^3 + (b*c^3*d - 2 \\ & *a*c^3*f + a*b*c^2*h + (a*b^2*c - 6*a^2*c^2)*k - (3*a*b^3 - 13*a^2*b*c)*m)* \\ & x^2 + (b^2*c^2 - 6*a*c^3)*d - (3*a^2*b^2 - 10*a^3*c)*m - 2*(2*a*c^3*e - a*b \\ & *c^2*g + 2*a^2*c^2*j - a^2*b*c*l)*x) / (c*x^4 + b*x^2 + a), x) / (a*b^2*c^2 - 4 \\ & *a^2*c^3) \end{aligned}$$

mupad [B] time = 13.91, size = 82785, normalized size = 107.51

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)/(a + b*x^2 + c*x^4)^2, x)$

[Out] $\text{symsum}(\log(\text{root}(1572864*a^8*b^2*c^{10}*z^4 - 983040*a^7*b^4*c^9*z^4 + 327680*a^6*b^6*c^8*z^4 - 61440*a^5*b^8*c^7*z^4 + 6144*a^4*b^{10}*c^6*z^4 - 256*a^3*b^{12}*c^5*z^4 - 1048576*a^9*c^{11}*z^4 - 1572864*a^8*b^2*c^8*l*z^3 + 983040*a^7*b^4*c^7*l*z^3 - 327680*a^6*b^6*c^6*l*z^3 + 61440*a^5*b^8*c^5*l*z^3 - 6144*a^4*b^{10}*c^4*l*z^3 + 256*a^3*b^{12}*c^3*l*z^3 + 1048576*a^9*c^9*l*z^3 + 96*a^3*b^{12}*c*k*m*z^2 + 98304*a^8*b*c^7*j*l*z^2 + 24576*a^8*b*c^7*h*m*z^2 + 155648*a^7*b*c^8*d*m*z^2 + 98304*a^7*b*c^8*e*l*z^2 + 57344*a^7*b*c^8*f*k*z^2 + 32768*a^7*b*c^8*g*j*z^2 + 57344*a^6*b*c^9*d*h*z^2 + 32768*a^6*b*c^9*e*g*z^2 - 32*a*b^{10}*c^5*d*f*z^2 - 491520*a^8*b^2*c^6*k*m*z^2 + 358400*a^7*b^4*c^5*k*m*z^2 - 129024*a^6*b^6*c^4*k*m*z^2 + 24768*a^5*b^8*c^3*k*m*z^2 - 2432*a^4*b^{10}*c^2*k*m*z^2 - 90112*a^7*b^3*c^6*j*l*z^2 + 30720*a^6*b^5*c^5*j*l*z^2 - 4608*a^5*b^7*c^4*j*l*z^2 + 256*a^4*b^9*c^3*j*l*z^2 - 21504*a^6*b^5*c^5*h*m*z^2 + 9216*a^5*b^7*c^4*h*m*z^2 + 8192*a^7*b^3*c^6*h*m*z^2 - 1568*a^4*b^9*c^3*h*m*z^2 + 96*a^3*b^{11}*c^2*h*m*z^2 - 172032*a^7*b^2*c^7*f*m*z^2 + 116736*a^6*b^4*c^6*f*m*z^2 - 49152*a^7*b^2*c^7*g*l*z^2 + 45056*a^6*b^4*c^6*g*l*z^2 - 35840*a^5*b^6*c^5*f*m*z^2 + 24576*a^7*b^2*c^7*h*k*z^2 - 15360*a^5*b^6*c^5*g*l*z^2 + 5184*a^4*b^8*c^4*f*m*z^2 - 3072*a^5*b^6*c^5*h*k*z^2 + 2304*a^4*b^8*c^4*g*l*z^2 + 2048*a^6*b^4*c^6*h*k*z^2 + 576*a^4*b^8*c^4*h*k*z^2 - 288*a^3*b^{10}*c^3*f*m*z^2 - 128*a^3*b^{10}*c^3*g*l*z^2 - 32*a^3*b^{10}*c^3*h*k*z^2 - 147456*a^6*b^3*c^7*d*m*z^2 - 90112*a^6*b^3*c^7*e*l*z^2 + 52224*a^5*b^5*c^6*d*m*z^2 - 49152*a^6*b^3*c^7*f*k*z^2 + 30720*a^5*b^5*c^6*e*l*z^2 - 24576*a^6*b^3*c^7*g*j*z^2 + 15360*a^5*b^5*c^6*f*k*z^2 - 8192*a^4*b^7*c^5*d*m*z^2 + 6144*a^5*b^5*c^6*g*j*z^2 - 4608*a^4*b^7*c^5*e*l*z^2 - 2048*a^4*b^7*c^5*f*k*z^2 - 512*a^4*b^7*c^5*g*j*z^2 + 480*a^3*b^9*c^4*d*m*z^2 + 256*a^3*b^9*c^4*e*l*z^2 + 96*a^3*b^9*c^4*f*k*z^2 + 131072*a^6*b^2*c^8*d*k*z^2 + 49152*a^6*b^2*c^8*e*j*z^2 - 43008*a^5*b^4*c^7*d*k*z^2 - 12288*a^5*b^4*c^7*e*j*z^2 + 6144*a^4*b^6*c^6*d*k*z^2 + 1024*a^4*b^6*c^6*e*j*z^2 - 320*a^3*b^8*c^5*d*k*z^2 + 6144*a^5*b^4*c^7*f*h*z^2 - 2048*a^4*b^6*c^6*f*h*z^2 + 192*a^3*b^8*c^5*f*h*z^2 - 49152*a^5*b^3*c^8*d*h*z^2 - 24576*a^5*b^3*c^8*e*g*z^2 + 15360*a^4*b^5*c^7*d*h*z^2 + 6144*a^4*b^5*c^7*e*g*z^2 - 2048*a^3*b^7*c^6*d*h*z^2 - 512*a^3*b^7*c^6*e*g*z^2 + 96*a^2*b^9*c^5*d*h*z^2 + 24576*a^5*b^2*c^9*d*f*z^2 - 3072*a^3*b^6*c^7*d*f*z^2 + 2048*a^4*b^4*c^8*d*f*z^2 + 576*a^2*b^8*c^6*d*f*z^2 - 430080*a^9*b*c^6*m^2*z^2 + 3408*a^4*b^{11}*c*m^2*z^2 - 64*a^3*b^{12}*c*l^2*z^2 + 61440*a^8*b*c^7*k^2*z^2 + 12288*a^7*b*c^8*h^2*z^2 + 12288*a^6*b*c^9*f^2*z^2 + 61440*a^5*b*c^{10}*d^2*z^2 + 432*a*b^9*c^6*d^2*z^2 + 245760*a^9*c^7*k*m*z^2 + 81920*a^8*c^8*f*m*z^2 - 49152*a^8*c^8*h*k*z^2 - 147456*a^7*c^9*d*$

$$\begin{aligned}
& k^2z^2 - 65536a^7c^9e^jz^2 - 16384a^7c^9f^h z^2 - 49152a^6c^{10}d^fz^2 + 716800a^8b^3c^5m^2z^2 - 483840a^7b^5c^4m^2z^2 + 170496a^6b^7c^3m^2z^2 - 33232a^5b^9c^2m^2z^2 + 516096a^8b^2c^6l^2z^2 - \\
& 288768a^7b^4c^5l^2z^2 + 88576a^6b^6c^4l^2z^2 - 15744a^5b^8c^3l^2z^2 + 1536a^4b^{10}c^2l^2z^2 - 61440a^7b^3c^6k^2z^2 + 24064a^6b^5c^5k^2z^2 - 4608a^5b^7c^4k^2z^2 + 432a^4b^9c^3k^2z^2 - 16a^3b^{11}c^2k^2z^2 + 24576a^7b^2c^7j^2z^2 - 6144a^6b^4c^6j^2z^2 \\
& + 512a^5b^6c^5j^2z^2 - 8192a^6b^3c^7h^2z^2 + 1536a^5b^5c^6h^2z^2 - 16a^3b^9c^4h^2z^2 - 8192a^6b^2c^8g^2z^2 + 6144a^5b^4c^7g^2z^2 - 1536a^4b^6c^6g^2z^2 + 128a^3b^8c^5g^2z^2 - 8192a^5b^3c^8f^2z^2 + 1536a^4b^5c^7f^2z^2 - 16a^2b^9c^5f^2z^2 + 24576a^5b^2c^9e^2z^2 - 6144a^4b^4c^8e^2z^2 + 512a^3b^6c^7e^2z^2 - 61440a^4b^3c^9d^2z^2 + 24064a^3b^5c^8d^2z^2 - 4608a^2b^7c^7d^2z^2 - 393216a^9c^7l^2z^2 - 144a^3b^{13}m^2z^2 - 32768a^8c^8j^2z^2 - 32768a^6c^{10}e^2z^2 - 16b^{11}c^5d^2z^2 + 18432a^8b^6c^5h^1m^2z^2 - 96a^3b^{10}c^6g^1k^1m^2z^2 + 90112a^7b^6c^6e^1k^1m^2z^2 + 36864a^7b^6c^6f^1j^1m^2z^2 - 16384a^7b^6c^6g^1j^1l^1m^2z^2 + 14336a^7b^6c^6d^1l^1m^2z^2 - 10240a^7b^6c^6f^1k^1l^1m^2z^2 + 4096a^7b^6c^6h^1j^1k^1l^1m^2z^2 + 10240a^7b^6c^6g^1h^1m^2z^2 - 47104a^6b^6c^7d^1h^1l^1m^2z^2 + 36864a^6b^6c^7e^1f^1m^2z^2 + 30720a^6b^6c^7d^1g^1m^2z^2 - 16384a^6b^6c^7e^1g^1l^1m^2z^2 + 6144a^6b^6c^7f^1g^1k^1z^2 + 4096a^6b^6c^7e^1h^1k^1z^2 + 32a^6b^{10}c^3d^1f^1l^1m^2z^2 - 4096a^5b^6c^8d^1f^1j^1z^2 - 6144a^5b^6c^8d^1g^1h^1z^2 - 32a^6b^8c^5d^1f^1g^1z^2 - 4096a^4b^6c^9d^1e^1f^1z^2 + 64a^6b^7c^6d^1e^1f^1z^2 + 110592a^8b^2c^4k^1l^1m^2z^2 - 36864a^7b^4c^3k^1l^1m^2z^2 + 5376a^6b^6c^2k^1l^1m^2z^2 - 79872a^7b^3c^4j^1k^1m^2z^2 + 26112a^6b^5c^3j^1k^1m^2z^2 - 3712a^5b^7c^2j^1k^1m^2z^2 - 13824a^7b^3c^4h^1l^1m^2z^2 + 3456a^6b^5c^3h^1l^1m^2z^2 - 288a^5b^7c^2h^1l^1m^2z^2 - 45056a^7b^2c^5g^1k^1m^2z^2 + 39936a^6b^4c^4g^1k^1m^2z^2 + 30720a^7b^2c^5f^1l^1m^2z^2 - 18432a^7b^2c^5h^1k^1l^1z^2 - 13056a^5b^6c^3g^1k^1m^2z^2 - 7680a^6b^4c^4f^1l^1m^2z^2 + 5376a^6b^4c^4h^1j^1m^2z^2 + 4608a^6b^4c^4h^1k^1l^1z^2 + 3072a^7b^2c^5h^1j^1m^2z^2 - 1984a^5b^6c^3h^1j^1m^2z^2 + 1856a^4b^8c^2g^1k^1m^2z^2 + 640a^5b^6c^3f^1l^1m^2z^2 - 384a^5b^6c^3h^1k^1l^1z^2 + 192a^4b^8c^2h^1j^1m^2z^2 - 79872a^6b^3c^5e^1k^1m^2z^2 - 27648a^6b^3c^5f^1j^1m^2z^2 + 26112a^5b^5c^4e^1k^1m^2z^2 + 12288a^6b^3c^5g^1j^1l^1z^2 - 10752a^6b^3c^5d^1l^1m^2z^2 + 7680a^6b^3c^5f^1k^1l^1z^2 + 6912a^5b^5c^4f^1j^1m^2z^2 - 3712a^4b^7c^3e^1k^1m^2z^2 - 3072a^6b^3c^5h^1j^1k^1z^2 - 3072a^5b^5c^4g^1j^1l^1z^2 + 2688a^5b^5c^4d^1l^1m^2z^2 - 1920a^5b^5c^4f^1k^1l^1z^2 + 768a^5b^5c^4h^1j^1k^1z^2 - 576a^4b^7c^3f^1j^1m^2z^2 + 256a^4b^7c^3g^1j^1l^1z^2 - 224a^4b^7c^3d^1l^1m^2z^2 + 192a^3b^9c^2e^1k^1m^2z^2 + 160a^4b^7c^3f^1k^1l^1z^2 - 64a^4b^7c^3h^1j^1k^1z^2 - 2688a^5b^5c^4g^1h^1m^2z^2 - 1536a^6b^3c^5g^1h^1m^2z^2 + 992a^4b^7c^3g^1h^1m^2z^2 - 96a^3b^9c^2g^1h^1m^2z^2 - 65536a^6b^2c^6d^1k^1l^1z^2 + 46080a^6b^2c^6d^1j^1m^2z^2 - 24576a^6b^2c^6e^1j^1l^1z^2 + 21504a^5b^4c^5d^1k^1l^1z^2 - 11520a^5b^4c^5d^1j^1m^2z^2 + 9216a^6b^2c^6f^1j^1k^1z^2 + 6144a^5b^4c^5e^1j^1l^1z^2 - 3072a^4b^6c^4d^1k^1l^1z^2 - 2304a^5b^4c^5f^1j^1k^1z^2 + 960a^4b^6c^4d^1j^1m^2z^2 - 512a^4b^6c^4e^1j^1l^1z^2 + 192a^4b^6c^4f^1j^1k^1z^2 + 160a^3b^8c^3d^1k^1l^1z^2 - 18432a^6b^2c^6f^1g^1m^2z^2 + 13824a^5b^4c^5f^1g^1m^2z^2 + 5376a^5b^4c^5e^1h^1m^2z^2 - 3456a^4b^6c^4f^1g^1m^2z^2 + 3072a^6b^2c^6e^1h^1m^2z^2 - 3072a^5b^
\end{aligned}$$

$$\begin{aligned}
&4c^5f^h*1z - 2048a^6b^2c^6g^h*k*z - 1984a^4b^6c^4e^h*m*z + 1536a^5b^4c^5g^h*k*z + 1024a^4b^6c^4f^h*1z - 384a^4b^6c^4g^h*k*z + \\
&288a^3b^8c^3f^g*m*z + 192a^3b^8c^3e^h*m*z - 96a^3b^8c^3f^h*1z + 32a^3b^8c^3g^h*k*z + 41472a^5b^3c^6d^h*1z - 27648a^5b^3c^6e^f*m*z - 23040a^5b^3c^6d^g*m*z - 13440a^4b^5c^5d^h*1z + 12288a^5b^3c^6e^g*1z + 6912a^4b^5c^5e^f*m*z + 5760a^4b^5c^5d^g*m*z - 4608a^5b^3c^6f^g*k*z - 3072a^5b^3c^6e^h*k*z - 3072a^4b^5c^5e^g*1z + 1888a^3b^7c^4d^h*1z + 1152a^4b^5c^5f^g*k*z + 768a^4b^5c^5e^h*k*z - 576a^3b^7c^4e^f*m*z - 480a^3b^7c^4d^g*m*z + 256a^3b^7c^4e^g*1z - 96a^3b^7c^4f^g*k*z - 96a^2b^9c^3d^h*1z - 64a^3b^7c^4e^h*k*z + 46080a^5b^2c^7d^e*m*z - 11520a^4b^4c^6d^e*m*z + 9216a^5b^2c^7e^f*k*z - 9216a^5b^2c^7d^h*j*z - 6656a^4b^4c^6d^f*1z - 6144a^5b^2c^7d^f*1z + 3456a^3b^6c^5d^f*1z - 2304a^4b^4c^6e^f*k*z + 2304a^4b^4c^6d^h*j*z + 960a^3b^6c^5d^e*m*z - 576a^2b^8c^4d^f*1z + 192a^3b^6c^5e^f*k*z - 192a^3b^6c^5d^h*j*z + 3072a^4b^3c^7d^f*j*z - 768a^3b^5c^6d^f*j*z + 64a^2b^7c^5d^f*j*z + 4608a^4b^3c^7d^g^h*z - 1152a^3b^5c^6d^g^h*z + 96a^2b^7c^5d^g^h*z - 9216a^4b^2c^8d^e^h*z + 2304a^3b^4c^7d^e^h*z + 2048a^4b^2c^8d^f^g*z - 1536a^3b^4c^7d^f^g*z + 384a^2b^6c^6d^f^g*z - 192a^2b^6c^6d^e^h*z + 3072a^3b^3c^8d^e^f*z - 768a^2b^5c^7d^e^f*z - 288a^5b^8c^k*1m*z + 90112a^8b*c^5j*k*m*z + 192a^4b^9c*j*k*m*z + 138240a^9b*c^4*1m^2*z - 7344a^6b^7c*1m^2*z + 5088a^5b^8c*j*m^2*z - 3072a^8b*c^5*k^2*1z - 49152a^8b*c^5*j*1^2*z - 128a^4b^9c*j*1^2*z - 25600a^8b*c^5*g*m^2*z - 9216a^7b*c^6*h^2*1z - 2544a^4b^9c*g*m^2*z + 64a^3b^10c*g*1^2*z + 9216a^7b*c^6*g*k^2*z - 3072a^6b*c^7*f^2*1z - 288a^3b^10c*e*m^2*z - 49152a^7b*c^6*e*1^2*z - 58368a^5b*c^8*d^2*1z - 432a*b^9c^4*d^2*1z - 1024a^6b*c^7*g^h^2*z + 32a*b^8c^5*d^2*j*z + 1024a^5b*c^8*f^2*g*z - 9216a^4b*c^9*d^2*g*z + 336a*b^7c^6*d^2*g*z - 672a*b^6c^7*d^2*e*z - 122880a^9c^5*k*1m*z - 40960a^8c^6*f*1m*z + 24576a^8c^6*h*k*1z - 20480a^8c^6*h*j*m*z + 73728a^7c^7*d*k*1z - 61440a^7c^7*d*j*m*z + 32768a^7c^7*e*j*1z - 12288a^7c^7*f*j*k*z - 20480a^7c^7*e^h*m*z + 8192a^7c^7*f^h*1z - 61440a^6c^8*d^e*m*z + 24576a^6c^8*d^f*1z - 12288a^6c^8*e^f*k*z + 12288a^6c^8*d^h*j*z + 12288a^5c^9*d^e^h*z - 131328a^8b^3c^3*1m^2*z + 46656a^7b^5c^2*1m^2*z - 142848a^8b^2c^4*j*m^2*z + 106368a^7b^4c^3*j*m^2*z - 34208a^6b^6c^2*j*m^2*z + 2304a^7b^3c^4*k^2*1z - 576a^6b^5c^3*k^2*1z + 48a^5b^7c^2*k^2*1z + 45056a^7b^3c^4*j*1^2*z - 15360a^6b^5c^3*j*1^2*z - 12288a^7b^2c^5*j^2*1z + 3072a^6b^4c^4*j^2*1z + 2304a^5b^7c^2*j*1^2*z - 256a^5b^6c^3*j^2*1z + 15872a^7b^2c^5*j*k^2*z - 4992a^6b^4c^4*j*k^2*z + 672a^5b^6c^3*j*k^2*z - 32a^4b^8c^2*j*k^2*z + 71424a^7b^3c^4*g*m^2*z - 53184a^6b^5c^3*g*m^2*z + 17104a^5b^7c^2*g*m^2*z + 6912a^6b^3c^5*h^2*1z - 1728a^5b^5c^4*h^2*1z + 144a^4b^7c^3*h^2*1z + 24576a^7b^2c^5*g*1^2*z - 22528a^6b^4c^4*g*1^2*z + 7680a^5b^6c^3*g*1^2*z + 4096a^6b^2c^6*g^2*1z - 3072a^5b^4c^5*g^2*1z - 1152a^4b^8c^2*g*1^2*z + 768a^4b^6c^4*g^2*1z - 64a^3b^8c^3*g^2*1z - 142848a^7b^2c^5*e*m^2*z + 106368a^6b^4
\end{aligned}$$

$$\begin{aligned}
& *c^4*e*m^2*z - 34208*a^5*b^6*c^3*e*m^2*z - 7936*a^6*b^3*c^5*g*k^2*z + 5088* \\
& a^4*b^8*c^2*e*m^2*z + 2496*a^5*b^5*c^4*g*k^2*z - 1536*a^6*b^2*c^6*h^2*j*z + \\
& 1280*a^5*b^3*c^6*f^2*l*z + 384*a^5*b^4*c^5*h^2*j*z - 336*a^4*b^7*c^3*g*k^2 \\
& *z + 192*a^4*b^5*c^5*f^2*l*z - 144*a^3*b^7*c^4*f^2*l*z - 32*a^4*b^6*c^4*h^2 \\
& *j*z + 16*a^3*b^9*c^2*g*k^2*z + 16*a^2*b^9*c^3*f^2*l*z + 45056*a^6*b^3*c^5* \\
& e*l^2*z - 15360*a^5*b^5*c^4*e*l^2*z - 12288*a^5*b^2*c^7*e^2*l*z + 3072*a^4* \\
& b^4*c^6*e^2*l*z + 2304*a^4*b^7*c^3*e*l^2*z - 256*a^3*b^6*c^5*e^2*l*z - 128* \\
& a^3*b^9*c^2*e*l^2*z + 59136*a^4*b^3*c^7*d^2*l*z - 23488*a^3*b^5*c^6*d^2*l*z \\
& + 15872*a^6*b^2*c^6*e*k^2*z - 4992*a^5*b^4*c^5*e*k^2*z + 4560*a^2*b^7*c^5* \\
& d^2*l*z + 1536*a^5*b^2*c^7*f^2*j*z + 672*a^4*b^6*c^4*e*k^2*z - 384*a^4*b^4* \\
& c^6*f^2*j*z - 32*a^3*b^8*c^3*e*k^2*z + 32*a^3*b^6*c^5*f^2*j*z + 768*a^5*b^3 \\
& *c^6*g*h^2*z - 192*a^4*b^5*c^5*g*h^2*z + 16*a^3*b^7*c^4*g*h^2*z - 15872*a^4 \\
& *b^2*c^8*d^2*j*z + 4992*a^3*b^4*c^7*d^2*j*z - 672*a^2*b^6*c^6*d^2*j*z - 153 \\
& 6*a^5*b^2*c^7*e*h^2*z - 768*a^4*b^3*c^7*f^2*g*z + 384*a^4*b^4*c^6*e*h^2*z + \\
& 192*a^3*b^5*c^6*f^2*g*z - 32*a^3*b^6*c^5*e*h^2*z - 16*a^2*b^7*c^5*f^2*g*z \\
& + 7936*a^3*b^3*c^8*d^2*g*z - 2496*a^2*b^5*c^7*d^2*g*z + 1536*a^4*b^2*c^8*e* \\
& f^2*z - 384*a^3*b^4*c^7*e*f^2*z + 32*a^2*b^6*c^6*e*f^2*z - 15872*a^3*b^2*c^ \\
& 9*d^2*e*z + 4992*a^2*b^4*c^8*d^2*e*z - 61440*a^8*b^2*c^4*l^3*z + 21504*a^7* \\
& b^4*c^3*l^3*z - 3328*a^6*b^6*c^2*l^3*z + 432*a^5*b^9*l*m^2*z + 51200*a^9*c^ \\
& 5*j*m^2*z + 16384*a^8*c^6*j^2*l*z - 288*a^4*b^10*j*m^2*z - 18432*a^8*c^6*j* \\
& k^2*z + 144*a^3*b^11*g*m^2*z + 51200*a^8*c^6*e*m^2*z + 2048*a^7*c^7*h^2*j*z \\
& + 16384*a^6*c^8*e^2*l*z + 16*b^11*c^3*d^2*l*z - 18432*a^7*c^7*e*k^2*z - 20 \\
& 48*a^6*c^8*f^2*j*z + 18432*a^5*c^9*d^2*j*z + 192*a^5*b^8*c^1^3*z + 2048*a^6 \\
& *c^8*e*h^2*z - 16*b^9*c^5*d^2*g*z - 2048*a^5*c^9*e*f^2*z + 32*b^8*c^6*d^2*e \\
& *z + 18432*a^4*c^10*d^2*e*z + 65536*a^9*c^5*l^3*z - 11008*a^8*b*c^3*j*k*l*m \\
& - 288*a^6*b^5*c*j*k*l*m + 144*a^5*b^6*c*g*k*k*l*m - 11008*a^7*b*c^4*e*k*k*l*m \\
& - 5376*a^7*b*c^4*f*j*k*l*m + 3840*a^7*b*c^4*g*j*k*k*m - 3328*a^7*b*c^4*h*j*k*k*l \\
& - 96*a^4*b^7*c*g*j*k*k*m - 2560*a^7*b*c^4*g*h*k*k*l*m - 36*a^3*b^8*c*f*h*k*k*m - 69 \\
& 12*a^6*b*c^5*d*j*k*k*l - 7872*a^6*b*c^5*d*h*k*k*m - 7680*a^6*b*c^5*d*g*k*k*l*m - 53 \\
& 76*a^6*b*c^5*e*f*k*k*l + 3840*a^6*b*c^5*e*g*k*k*m - 3328*a^6*b*c^5*e*h*k*k*l - 15 \\
& 36*a^6*b*c^5*f*g*k*k*l + 1280*a^6*b*c^5*f*g*j*k*m - 768*a^6*b*c^5*g*h*j*k - 768 \\
& *a^6*b*c^5*f*h*j*k - 768*a^6*b*c^5*e*h*j*k*m - 36*a^2*b^9*c*d*h*k*k*m - 6912*a^ \\
& 5*b*c^6*d*e*k*k*l - 4864*a^5*b*c^6*d*e*j*k*m - 2304*a^5*b*c^6*d*g*j*k - 1792*a^ \\
& 5*b*c^6*e*f*j*k - 1280*a^5*b*c^6*d*f*j*k - 4544*a^5*b*c^6*d*f*h*m + 1536*a^ \\
& 5*b*c^6*d*g*h*k + 1280*a^5*b*c^6*e*f*g*m - 768*a^5*b*c^6*e*g*h*k - 768*a^5* \\
& b*c^6*e*f*h*k - 256*a^5*b*c^6*f*g*h*j + 12*a*b^9*c^2*d*f*h*m + 16*a*b^8*c^3 \\
& *d*f*g*k - 4*a*b^8*c^3*d*f*h*k - 2304*a^4*b*c^7*d*e*g*k - 1792*a^4*b*c^7*d* \\
& e*h*j - 1280*a^4*b*c^7*d*e*f*k - 768*a^4*b*c^7*d*f*g*j - 32*a*b^7*c^4*d*e*f \\
& *k - 256*a^4*b*c^7*e*f*g*h - 768*a^3*b*c^8*d*e*f*g + 32*a*b^5*c^6*d*e*f*g + \\
& 12*a*b^10*c*d*f*k*k*m + 3648*a^7*b^3*c^2*j*k*k*l*m + 5504*a^7*b^2*c^3*g*k*k*l*m \\
& - 1824*a^6*b^4*c^2*g*k*k*l*m + 384*a^7*b^2*c^3*h*j*k*l*m - 288*a^6*b^4*c^2*h*j* \\
& k*l*m - 4800*a^6*b^3*c^3*g*j*k*k*m + 3648*a^6*b^3*c^3*e*k*k*l*m + 1280*a^5*b^5*c^ \\
& 2*g*j*k*k*m + 1088*a^6*b^3*c^3*f*j*k*l*m + 576*a^6*b^3*c^3*h*j*k*k*l - 288*a^5*b^ \\
& 5*c^2*e*k*k*l*m - 192*a^6*b^3*c^3*g*h*k*l*m + 144*a^5*b^5*c^2*g*h*k*l*m + 9600*a^ \\
& 6*b^2*c^4*e*j*k*k*m - 4224*a^6*b^2*c^4*d*j*k*l*m - 2560*a^5*b^4*c^3*e*j*k*k*m + 3
\end{aligned}$$

$$\begin{aligned}
& 84a^6b^2c^4f^*j^*k^*l + 224a^5b^4c^3d^*j^*l^*m + 192a^4b^6c^2e^*j^*k^*m \\
& - 160a^5b^4c^3f^*j^*k^*l - 4608a^6b^2c^4f^*h^*k^*m + 2688a^6b^2c^4f^*g^* \\
& *l^*m + 1664a^6b^2c^4g^*h^*k^*l - 744a^5b^4c^3f^*h^*k^*m - 544a^5b^4c^3 \\
& *f^*g^*l^*m + 492a^4b^6c^2f^*h^*k^*m + 416a^5b^4c^3g^*h^*j^*m + 384a^6b^2c^4 \\
& *g^*h^*j^*m + 384a^6b^2c^4e^*h^*l^*m - 288a^5b^4c^3g^*h^*k^*l - 288a^5b^4 \\
& c^3e^*h^*l^*m - 96a^4b^6c^2g^*h^*j^*m + 2112a^5b^3c^4d^*j^*k^*l - 160a^4 \\
& b^5c^3d^*j^*k^*l + 16992a^5b^3c^4d^*h^*k^*m - 6252a^4b^5c^3d^*h^*k^*m - \\
& 4800a^5b^3c^4e^*g^*k^*m + 2112a^5b^3c^4d^*g^*l^*m - 1728a^5b^3c^4f^*g^* \\
& j^*m + 1280a^4b^5c^3e^*g^*k^*m + 1088a^5b^3c^4e^*f^*l^*m - 832a^5b^3c^4 \\
& *e^*h^*j^*m + 816a^3b^7c^2d^*h^*k^*m + 576a^5b^3c^4e^*h^*k^*l - 448a^5b^3c^4 \\
& *f^*h^*j^*l + 288a^4b^5c^3f^*g^*j^*m - 192a^5b^3c^4g^*h^*j^*k - 192a^5b^3 \\
& c^4f^*g^*k^*l + 192a^4b^5c^3e^*h^*j^*m - 112a^4b^5c^3d^*g^*l^*m + 96a^4 \\
& *b^5c^3f^*h^*j^*l - 96a^3b^7c^2e^*g^*k^*m + 80a^4b^5c^3f^*g^*k^*l + 32a^4 \\
& *b^5c^3g^*h^*j^*k - 11456a^5b^2c^5d^*f^*k^*m + 4992a^5b^2c^5d^*h^*j^*l - 4 \\
& 608a^5b^2c^5e^*g^*j^*l - 4224a^5b^2c^5d^*e^*l^*m + 3456a^5b^2c^5e^*f^*j^* \\
& *m + 3456a^5b^2c^5d^*g^*k^*l + 2432a^5b^2c^5d^*g^*j^*m - 1312a^4b^4c^4 \\
& *d^*h^*j^*l + 1272a^3b^6c^3d^*f^*k^*m - 1056a^4b^4c^4d^*g^*k^*l + 896a^5b^2 \\
& c^5f^*g^*j^*k + 768a^4b^4c^4e^*g^*j^*l - 576a^4b^4c^4e^*f^*j^*m - 480a^4 \\
& *b^4c^4d^*g^*j^*m + 384a^5b^2c^5e^*h^*j^*k + 384a^5b^2c^5e^*f^*k^*l - 232a^2 \\
& b^8c^2d^*f^*k^*m + 224a^4b^4c^4d^*e^*l^*m - 160a^4b^4c^4e^*f^*k^*l - 9 \\
& 6a^4b^4c^4f^*g^*j^*k + 96a^3b^6c^3d^*h^*j^*l + 80a^3b^6c^3d^*g^*k^*l - 6 \\
& 4a^4b^4c^4e^*h^*j^*k - 24a^4b^4c^4d^*f^*k^*m + 416a^4b^4c^4e^*g^*h^*m + \\
& 384a^5b^2c^5f^*g^*h^*l + 384a^5b^2c^5e^*g^*h^*m + 224a^4b^4c^4f^*g^*h^*l \\
& - 96a^3b^6c^3e^*g^*h^*m - 48a^3b^6c^3f^*g^*h^*l + 2112a^4b^3c^5d^*e^*k^* \\
& *l - 960a^4b^3c^5d^*f^*j^*l + 960a^4b^3c^5d^*e^*j^*m + 384a^3b^5c^4d^* \\
& f^*j^*l + 320a^4b^3c^5d^*g^*j^*k + 192a^4b^3c^5e^*f^*j^*k - 160a^3b^5c^4 \\
& *d^*e^*k^*l - 32a^2b^7c^3d^*f^*j^*l + 7392a^4b^3c^5d^*f^*h^*m - 2496a^4b^3 \\
& c^5d^*g^*h^*l - 1728a^4b^3c^5e^*f^*g^*m - 1500a^3b^5c^4d^*f^*h^*m + 656a^3 \\
& b^5c^4d^*g^*h^*l - 448a^4b^3c^5e^*f^*h^*l + 288a^3b^5c^4e^*f^*g^*m - 192 \\
& *a^4b^3c^5f^*g^*h^*j - 192a^4b^3c^5e^*g^*h^*k + 96a^3b^5c^4e^*f^*h^*l - 4 \\
& 8a^2b^7c^3d^*g^*h^*l + 32a^3b^5c^4e^*g^*h^*k - 16a^2b^7c^3d^*f^*h^*m - 6 \\
& 40a^4b^2c^6d^*e^*j^*k + 4992a^4b^2c^6d^*e^*h^*l - 3584a^4b^2c^6d^*f^*h^* \\
& k + 2432a^4b^2c^6d^*e^*g^*m - 1312a^3b^4c^5d^*e^*h^*l + 896a^4b^2c^6e^* \\
& *f^*g^*k + 896a^4b^2c^6d^*g^*h^*j + 640a^4b^2c^6d^*f^*g^*l + 600a^3b^4c^5 \\
& d^*f^*h^*k + 480a^3b^4c^5d^*f^*g^*l - 480a^3b^4c^5d^*e^*g^*m + 384a^4b^2 \\
& c^6e^*f^*h^*j - 192a^2b^6c^4d^*f^*g^*l - 96a^3b^4c^5e^*f^*g^*k - 96a^3b^4 \\
& c^5d^*g^*h^*j + 96a^2b^6c^4d^*e^*h^*l + 12a^2b^6c^4d^*f^*h^*k - 960a^3b^3 \\
& c^6d^*e^*f^*l + 384a^2b^5c^5d^*e^*f^*l + 320a^3b^3c^6d^*e^*g^*k - 192a^3 \\
& b^3c^6d^*f^*g^*j + 192a^3b^3c^6d^*e^*h^*j + 32a^2b^5c^5d^*f^*g^*j - 192a^3 \\
& b^3c^6e^*f^*g^*h + 384a^3b^2c^7d^*e^*f^*j - 64a^2b^4c^6d^*e^*f^*j + 89 \\
& 6a^3b^2c^7d^*e^*g^*h - 96a^2b^4c^6d^*e^*g^*h - 192a^2b^3c^7d^*e^*f^*g + \\
& 496a^7b^4c^k^*l^2m - 4752a^7b^4c^j^*l^*m^2 + 96a^5b^6c^j^2k^*m - 614 \\
& 4a^8b^c^3h^*l^2m - 168a^6b^5c^h^*l^2m + 6400a^8b^c^3g^*l^*m^2 - 2862 \\
& *a^6b^5c^h^*k^*m^2 + 2376a^6b^5c^g^*l^*m^2 - 1632a^7b^c^4h^2k^*m - 480 \\
& a^8b^c^3h^*k^*m^2 - 180a^5b^6c^h^*k^2m + 54a^4b^7c^h^2k^*m - 384a^7*
\end{aligned}$$

$$\begin{aligned}
& b^4c^4h^2j^2m + 120a^5b^6c^4h^2k^2l^2 + 56a^5b^6c^4f^2k^2m + 24a^3b^8c^4g^2k^2m + 4512a^7b^6c^4f^2k^2m - 2304a^7b^6c^4g^2k^2l^2 - 1680a^5b^6c^4g^2j^2m^2 + 1184a^6b^6c^5f^2k^2m + 804a^5b^6c^4f^2k^2m^2 + 432a^5b^6c^4e^2l^2m^2 + 60a^4b^7c^4f^2k^2m + 6a^2b^9c^4f^2k^2m - 13312a^7b^6c^4d^2l^2m + 2048a^7b^6c^4g^2j^2l^2 - 1024a^7b^6c^4f^2k^2l^2 + 64a^4b^7c^4g^2j^2l^2 + 56a^4b^7c^4d^2l^2m - 40a^4b^7c^4f^2k^2l^2 + 13440a^7b^6c^4e^2j^2m^2 - 8928a^5b^6c^6d^2k^2m - 6240a^7b^6c^4d^2k^2m^2 + 1614a^4b^7c^4d^2k^2m^2 - 288a^4b^7c^4e^2j^2m^2 - 170a^6b^9c^2d^2k^2m + 60a^3b^8c^4d^2k^2m + 4608a^6b^6c^5e^2j^2l^2 + 4608a^5b^6c^6e^2j^2l^2 - 2432a^6b^6c^5d^2j^2m + 1440a^7b^6c^4f^2h^2m^2 - 896a^6b^6c^5f^2j^2k - 864a^6b^6c^5f^2h^2m - 558a^4b^7c^4f^2h^2m^2 + 256a^6b^6c^5g^2h^2l^2 - 40a^3b^8c^4d^2k^2l^2 - 1920a^6b^6c^5e^2j^2k^2 - 384a^5b^6c^6e^2h^2m + 24a^3b^8c^4f^2h^2l^2 - 16a^6b^8c^3d^2j^2l^2 + 2208a^6b^6c^5f^2h^2k^2 - 1044a^3b^8c^4d^2h^2m^2 + 800a^5b^6c^6f^2h^2k - 256a^5b^6c^6f^2g^2l^2 + 144a^3b^8c^4e^2g^2m^2 - 116a^6b^8c^3d^2h^2m + 8192a^6b^6c^5d^2h^2l^2 + 2048a^6b^6c^5e^2g^2l^2 + 24a^2b^9c^4d^2h^2l^2 - 5856a^4b^6c^7d^2f^2m + 4896a^4b^6c^7d^2h^2k + 2720a^6b^6c^5d^2f^2m^2 + 2304a^4b^6c^7d^2g^2l^2 + 1824a^5b^6c^6d^2h^2k + 438a^6b^7c^4d^2f^2m - 384a^5b^6c^6e^2h^2j + 318a^2b^9c^4d^2f^2m^2 - 168a^6b^7c^4d^2g^2l^2 + 42a^6b^7c^4d^2h^2k - 36a^6b^8c^3d^2f^2m - 2432a^4b^6c^7d^2e^2m + 1536a^5b^6c^6e^2g^2j^2 + 1536a^4b^6c^7e^2g^2j - 896a^5b^6c^6d^2h^2j^2 - 896a^4b^6c^7e^2f^2k + 4896a^5b^6c^6d^2f^2k^2 + 1824a^4b^6c^7d^2f^2k - 384a^4b^6c^7e^2f^2j + 336a^6b^6c^5d^2e^2l - 156a^6b^6c^5d^2f^2k + 16a^6b^6c^5d^2g^2j + 12a^6b^7c^4d^2f^2k - 2a^6b^9c^2d^2f^2k^2 - 1920a^3b^6c^8d^2e^2j - 32a^6b^5c^6d^2e^2j + 2208a^3b^6c^8d^2f^2h + 800a^4b^6c^7d^2f^2h^2 - 102a^6b^5c^6d^2f^2h + 12a^6b^6c^5d^2f^2h - 2a^6b^7c^4d^2f^2h^2 - 896a^3b^6c^8d^2e^2h - 8a^6b^6c^5d^2f^2g^2 - 240a^6b^4c^7d^2e^2g - 32a^6b^4c^7d^2e^2f + 5120a^8c^4h^2j^2l^2m + 15360a^7c^5d^2j^2l^2m - 7680a^7c^5e^2j^2k^2m + 3072a^7c^5f^2j^2k^2l^2 + 5120a^7c^5e^2h^2l^2m + 1920a^7c^5f^2h^2k^2m + 15360a^6c^6d^2e^2l^2m + 5760a^6c^6d^2f^2k^2m + 3072a^6c^6e^2f^2k^2l^2 - 3072a^6c^6d^2h^2j^2l^2 - 2560a^6c^6e^2f^2j^2m + 1536a^6c^6e^2h^2j^2k + 4608a^5c^7d^2e^2j^2k - 3072a^5c^7d^2e^2h^2l - 1152a^5c^7d^2f^2h^2k + 512a^5c^7e^2f^2h^2j + 1536a^4c^8d^2e^2f^2j - 8a^6b^10c^4d^2f^2l^2 - 5568a^8b^2c^2k^2l^2m + 15552a^8b^2c^2j^2l^2m^2 + 4800a^7b^2c^3j^2k^2m - 1280a^6b^4c^2j^2k^2m + 2080a^7b^3c^2h^2l^2m - 1088a^7b^2c^3j^2k^2l^2 + 48a^6b^4c^2j^2k^2l^2 - 8544a^7b^2c^3h^2k^2m - 7776a^7b^3c^2g^2l^2m^2 + 7632a^7b^3c^2h^2k^2m^2 + 3600a^6b^3c^3h^2k^2m + 2484a^6b^4c^2h^2k^2m - 918a^5b^5c^2h^2k^2m + 4800a^7b^2c^3h^2k^2l^2 - 1424a^6b^4c^2h^2k^2l^2 + 1200a^5b^4c^3g^2k^2m - 960a^6b^2c^4g^2k^2m - 528a^6b^4c^2f^2l^2m - 416a^6b^3c^3h^2j^2m - 320a^4b^6c^2g^2k^2m + 192a^7b^2c^3f^2l^2m + 96a^5b^5c^2h^2j^2m + 15552a^7b^2c^3e^2l^2m^2 - 6720a^7b^2c^3g^2j^2m^2 + 6160a^6b^4c^2g^2j^2m^2 - 4752a^6b^4c^2e^2l^2m^2 - 2016a^7b^2c^3f^2k^2m^2 - 1164a^6b^4c^2f^2k^2m^2 + 1104a^5b^3c^4f^2k^2m + 1008a^6b^3c^3f^2k^2m + 960a^6b^2c^4h^2j^2l^2 - 678a^5b^5c^2f^2k^2m + 544a^6b^3c^3g^2k^2l^2 - 144a^5b^4c^3h^2j^2l^2 - 102a^4b^5c^3f^2k^2m - 62a^3b^7c^2f^2k^2m - 24a^5b^5c^2g^2k^2l^2 + 6432a^6b^3
\end{aligned}$$

$$\begin{aligned}
& *c^3*d^1^2*m + 4800*a^5*b^2*c^5*e^2*k*m - 2304*a^6*b^2*c^4*g*j^2*1 + 1920*a \\
& ^6*b^3*c^3*g*j*1^2 + 1728*a^6*b^2*c^4*f*j^2*m - 1280*a^4*b^4*c^4*e^2*k*m + \\
& 1152*a^5*b^3*c^4*g^2*j*1 - 1032*a^5*b^5*c^2*d*1^2*m - 864*a^6*b^3*c^3*f*k*1 \\
& ^2 - 768*a^5*b^5*c^2*g*j*1^2 + 408*a^5*b^5*c^2*f*k*1^2 + 384*a^5*b^4*c^3*g* \\
& j^2*1 - 288*a^5*b^4*c^3*f*j^2*m + 192*a^6*b^2*c^4*h*j^2*k - 192*a^4*b^5*c^3 \\
& *g^2*j*1 + 96*a^3*b^6*c^3*e^2*k*m - 32*a^5*b^4*c^3*h*j^2*k - 21120*a^6*b^2* \\
& c^4*d*k^2*m + 20880*a^6*b^3*c^3*d*k*m^2 + 19760*a^4*b^3*c^5*d^2*k*m - 12320 \\
& *a^6*b^3*c^3*e*j*m^2 - 9750*a^5*b^5*c^2*d*k*m^2 - 9390*a^3*b^5*c^4*d^2*k*m \\
& + 8460*a^5*b^4*c^3*d*k^2*m + 3360*a^5*b^5*c^2*e*j*m^2 + 1860*a^2*b^7*c^3*d^ \\
& 2*k*m - 1218*a^4*b^6*c^2*d*k^2*m - 1088*a^6*b^2*c^4*e*k^2*1 + 960*a^6*b^2*c \\
& ^4*g*j*k^2 - 240*a^5*b^4*c^3*g*j*k^2 + 192*a^5*b^2*c^5*f^2*j*1 - 104*a^4*b^ \\
& 5*c^3*g^2*h*m - 96*a^5*b^3*c^4*g^2*h*m + 48*a^5*b^4*c^3*e*k^2*1 + 48*a^4*b^ \\
& 4*c^4*f^2*j*1 + 24*a^3*b^7*c^2*g^2*h*m + 16*a^4*b^6*c^2*g*j*k^2 - 16*a^3*b^ \\
& 6*c^3*f^2*j*1 + 13376*a^6*b^2*c^4*d*k*1^2 - 5136*a^5*b^4*c^3*d*k*1^2 - 3840 \\
& *a^6*b^2*c^4*e*j*1^2 + 1536*a^5*b^4*c^3*e*j*1^2 + 1392*a^5*b^3*c^4*f*h^2*m \\
& + 1386*a^5*b^5*c^2*f*h*m^2 - 768*a^5*b^3*c^4*e*j^2*1 + 768*a^4*b^6*c^2*d*k* \\
& 1^2 - 768*a^4*b^3*c^5*e^2*j*1 - 588*a^4*b^4*c^4*f^2*h*m - 480*a^5*b^3*c^4*g \\
& *h^2*1 + 480*a^5*b^3*c^4*d*j^2*m - 480*a^5*b^2*c^5*f^2*h*m - 128*a^4*b^6*c^ \\
& 2*e*j*1^2 + 100*a^3*b^6*c^3*f^2*h*m + 96*a^5*b^3*c^4*f*j^2*k + 72*a^4*b^5*c \\
& ^3*g*h^2*1 - 54*a^4*b^5*c^3*f*h^2*m - 48*a^6*b^3*c^3*f*h*m^2 - 36*a^3*b^7*c \\
& ^2*f*h^2*m + 6*a^2*b^8*c^2*f^2*h*m + 6848*a^4*b^2*c^6*d^2*j*1 - 2448*a^3*b^ \\
& 4*c^5*d^2*j*1 + 624*a^5*b^4*c^3*f*h*1^2 + 576*a^6*b^2*c^4*f*h*1^2 + 480*a^5 \\
& *b^3*c^4*e*j*k^2 + 432*a^4*b^4*c^4*f*g^2*m - 416*a^4*b^3*c^5*e^2*h*m + 336* \\
& a^2*b^6*c^4*d^2*j*1 - 320*a^5*b^2*c^5*f*g^2*m - 256*a^4*b^6*c^2*f*h*1^2 + 1 \\
& 92*a^5*b^2*c^5*g^2*h*k + 96*a^3*b^5*c^4*e^2*h*m - 72*a^3*b^6*c^3*f*g^2*m + \\
& 48*a^4*b^4*c^4*g^2*h*k - 32*a^4*b^5*c^3*e*j*k^2 - 8*a^3*b^6*c^3*g^2*h*k + 2 \\
& 4768*a^6*b^2*c^4*d*h*m^2 - 21108*a^5*b^4*c^3*d*h*m^2 - 10048*a^4*b^2*c^6*d^ \\
& 2*h*m + 7218*a^4*b^6*c^2*d*h*m^2 - 6720*a^6*b^2*c^4*e*g*m^2 + 6160*a^5*b^4* \\
& c^3*e*g*m^2 - 2592*a^5*b^2*c^5*d*h^2*m - 1680*a^4*b^6*c^2*e*g*m^2 + 1068*a^ \\
& 3*b^4*c^5*d^2*h*m + 960*a^5*b^2*c^5*e*h^2*1 - 876*a^4*b^4*c^4*d*h^2*m - 864 \\
& *a^5*b^2*c^5*f*h^2*k + 546*a^2*b^6*c^4*d^2*h*m + 432*a^3*b^6*c^3*d*h^2*m + \\
& 336*a^4*b^3*c^5*f^2*h*k - 320*a^5*b^2*c^5*d*j^2*k + 192*a^5*b^2*c^5*g*h^2*j \\
& + 144*a^5*b^3*c^4*f*h*k^2 - 144*a^4*b^4*c^4*e*h^2*1 - 102*a^4*b^5*c^3*f*h* \\
& k^2 - 96*a^4*b^3*c^5*f^2*g*1 - 36*a^2*b^8*c^2*d*h^2*m - 30*a^3*b^5*c^4*f^2* \\
& h*k - 24*a^3*b^5*c^4*f^2*g*1 + 16*a^4*b^4*c^4*g*h^2*j - 12*a^4*b^4*c^4*f*h^ \\
& 2*k + 12*a^3*b^6*c^3*f*h^2*k + 8*a^2*b^7*c^3*f^2*g*1 + 6*a^3*b^7*c^2*f*h*k^ \\
& 2 - 2*a^2*b^7*c^3*f^2*h*k - 9312*a^5*b^3*c^4*d*h*1^2 + 3288*a^4*b^5*c^3*d*h \\
& *1^2 - 2304*a^4*b^2*c^6*e^2*g*1 + 1920*a^5*b^3*c^4*e*g*1^2 + 1728*a^4*b^2*c \\
& ^6*e^2*f*m + 1152*a^4*b^3*c^5*e*g^2*1 - 768*a^4*b^5*c^3*e*g*1^2 - 608*a^4*b \\
& ^3*c^5*d*g^2*m - 472*a^3*b^7*c^2*d*h*1^2 + 384*a^3*b^4*c^5*e^2*g*1 - 288*a^ \\
& 3*b^4*c^5*e^2*f*m - 224*a^4*b^3*c^5*f*g^2*k + 192*a^5*b^2*c^5*f*h*j^2 + 192 \\
& *a^4*b^2*c^6*e^2*h*k - 192*a^3*b^5*c^4*e*g^2*1 + 120*a^3*b^5*c^4*d*g^2*m + \\
& 64*a^3*b^7*c^2*e*g*1^2 - 32*a^3*b^4*c^5*e^2*h*k + 24*a^3*b^5*c^4*f*g^2*k + \\
& 9936*a^3*b^3*c^6*d^2*f*m + 3786*a^4*b^5*c^3*d*f*m^2 - 3552*a^5*b^2*c^5*d*h* \\
& k^2 - 3486*a^2*b^5*c^5*d^2*f*m - 3424*a^3*b^3*c^6*d^2*g*1 - 1868*a^3*b^7*c^
\end{aligned}$$

$$\begin{aligned}
& 2*d*f*m^2 + 1332*a^4*b^4*c^4*d*h*k^2 - 1296*a^5*b^3*c^4*d*f*m^2 - 1236*a^3*b^4*c^5*d*f^2*m + 1224*a^2*b^5*c^5*d^2*g*1 - 1152*a^4*b^2*c^6*d*f^2*m + 960 \\
& *a^5*b^2*c^5*e*g*k^2 - 496*a^3*b^3*c^6*d^2*h*k + 462*a^2*b^6*c^4*d*f^2*m + 432*a^4*b^3*c^5*d*h^2*k - 240*a^4*b^4*c^4*e*g*k^2 - 222*a^2*b^5*c^5*d^2*h*k \\
& + 192*a^4*b^2*c^6*f^2*g*j + 192*a^4*b^2*c^6*e*f^2*1 - 174*a^3*b^5*c^4*d*h^2*k - 156*a^3*b^6*c^3*d*h*k^2 + 48*a^3*b^4*c^5*e*f^2*1 - 32*a^4*b^3*c^5*e*h \\
& ^2*j + 16*a^3*b^6*c^3*e*g*k^2 + 16*a^3*b^4*c^5*f^2*g*j - 16*a^2*b^6*c^4*e*f^2*1 + 12*a^2*b^7*c^3*d*h^2*k + 6*a^2*b^8*c^2*d*h*k^2 + 1728*a^5*b^2*c^5*d* \\
& f*1^2 + 1392*a^4*b^4*c^4*d*f*1^2 - 840*a^3*b^6*c^3*d*f*1^2 - 768*a^4*b^2*c^6*e*g^2*j + 576*a^4*b^2*c^6*d*g^2*k + 480*a^3*b^3*c^6*d*e^2*m + 144*a^2*b^8 \\
& *c^2*d*f*1^2 + 96*a^4*b^3*c^5*d*h*j^2 + 96*a^3*b^3*c^6*e^2*f*k - 80*a^3*b^4*c^5*d*g^2*k + 6848*a^3*b^2*c^7*d^2*e*1 - 3552*a^3*b^2*c^7*d^2*f*k - 2448*a \\
& ^2*b^4*c^6*d^2*e*1 + 1332*a^2*b^4*c^6*d^2*f*k + 960*a^3*b^2*c^7*d^2*g*j - 496*a^4*b^3*c^5*d*f*k^2 + 432*a^3*b^3*c^6*d*f^2*k - 240*a^2*b^4*c^6*d^2*g*j \\
& - 222*a^3*b^5*c^4*d*f*k^2 - 174*a^2*b^5*c^5*d*f^2*k + 64*a^4*b^2*c^6*f*g^2*h + 48*a^3*b^4*c^5*f*g^2*h + 42*a^2*b^7*c^3*d*f*k^2 - 32*a^3*b^3*c^6*e*f^2* \\
& j - 320*a^3*b^2*c^7*d*e^2*k + 192*a^4*b^2*c^6*e*g*h^2 + 192*a^4*b^2*c^6*d*f*j^2 - 32*a^3*b^4*c^5*d*f*j^2 + 16*a^3*b^4*c^5*e*g*h^2 + 480*a^2*b^3*c^7*d^2 \\
& *e*j - 224*a^3*b^3*c^6*d*g^2*h + 192*a^3*b^2*c^7*e^2*f*h + 24*a^2*b^5*c^5*d*g^2*h - 864*a^3*b^2*c^7*d*f^2*h + 336*a^3*b^3*c^6*d*f*h^2 + 192*a^3*b^2*c \\
& ^7*e*f^2*g + 144*a^2*b^3*c^7*d^2*f*h - 30*a^2*b^5*c^5*d*f*h^2 + 16*a^2*b^4*c^6*e*f^2*g - 12*a^2*b^4*c^6*d*f^2*h + 192*a^3*b^2*c^7*d*f*g^2 + 96*a^2*b^3 \\
& *c^7*d*e^2*h + 48*a^2*b^4*c^6*d*f*g^2 + 960*a^2*b^2*c^8*d^2*e*g + 192*a^2*b^2*c^8*d*e^2*f - 7680*a^9*b*c^2*1^2*m^2 + 3152*a^8*b^3*c*1^2*m^2 + 2070*a^7 \\
& *b^4*c*k^2*m^2 - 1840*a^7*b^3*c^2*k^3*m + 6720*a^8*b*c^3*j^2*m^2 - 3072*a^8*b*c^3*k^2*1^2 + 1680*a^6*b^5*c*j^2*m^2 - 100*a^6*b^5*c*k^2*1^2 - 2176*a^7*b^3 \\
& *c^2*j*1^3 - 256*a^6*b^3*c^3*j^3*1 - 64*a^5*b^6*c*j^2*1^2 - 12480*a^8*b^2*c^2*h*m^3 + 972*a^5*b^6*c*h^2*m^2 - 960*a^7*b*c^4*j^2*k^2 - 252*a^5*b^4*c \\
& ^3*h^3*m - 192*a^6*b^2*c^4*h^3*m + 54*a^4*b^6*c^2*h^3*m + 1536*a^7*b*c^4*h^2*1^2 + 420*a^4*b^7*c*g^2*m^2 - 36*a^4*b^7*c*h^2*1^2 - 3072*a^7*b^2*c^3*g*1 \\
& ^3 + 2096*a^7*b^3*c^2*f*m^3 + 1088*a^6*b^4*c^2*g*1^3 - 496*a^6*b^3*c^3*h*k^3 - 192*a^4*b^4*c^4*g^3*1 + 176*a^4*b^3*c^5*f^3*m + 144*a^5*b^3*c^4*h^3*k + \\
& 78*a^3*b^8*c*f^2*m^2 + 54*a^3*b^5*c^4*f^3*m + 32*a^3*b^6*c^3*g^3*1 + 30*a^5*b^5*c^2*h*k^3 - 18*a^4*b^5*c^3*h^3*k - 18*a^2*b^7*c^3*f^3*m - 16*a^3*b^8*c \\
& *g^2*1^2 + 6720*a^6*b*c^5*e^2*m^2 - 192*a^6*b*c^5*h^2*j^2 - 4*a^2*b^9*c*f^2*1^2 - 35040*a^7*b^2*c^3*d*m^3 + 14300*a^6*b^4*c^2*d*m^3 - 12000*a^3*b^2*c \\
& ^7*d^3*m + 4380*a^2*b^4*c^6*d^3*m - 2176*a^6*b^3*c^3*e*1^3 - 256*a^3*b^3*c^6*e^3*1 - 192*a^6*b^2*c^4*f*k^3 + 192*a^5*b^5*c^2*e*1^3 - 192*a^4*b^2*c^6*f \\
& ^3*k + 132*a^5*b^4*c^3*f*k^3 + 128*a^4*b^3*c^5*g^3*j - 28*a^3*b^4*c^5*f^3*k - 10*a^4*b^6*c^2*f*k^3 + 6*a^2*b^6*c^4*f^3*k + 10752*a^5*b*c^6*d^2*1^2 - 9 \\
& 60*a^5*b*c^6*e^2*k^2 - 192*a^5*b*c^6*f^2*j^2 + 108*a*b^9*c^2*d^2*1^2 - 1680*a^5*b^3*c^4*d*k^3 - 1680*a^2*b^3*c^7*d^3*k + 222*a^4*b^5*c^3*d*k^3 + 30*a* \\
& b^8*c^3*d^2*k^2 - 10*a^3*b^7*c^2*d*k^3 - 960*a^4*b*c^7*d^2*j^2 + 80*a^4*b^3*c^5*f*h^3 + 80*a^3*b^3*c^6*f^3*h + 6*a^3*b^5*c^4*f*h^3 + 6*a^2*b^5*c^5*f^3 \\
& *h - 192*a^4*b*c^7*e^2*h^2 - 192*a^4*b^2*c^6*d*h^3 - 192*a^2*b^2*c^8*d^3*h
\end{aligned}$$

$$\begin{aligned}
& + 128a^3b^3c^6eg^3 - 28a^3b^4c^5d^2h^3 + 12ab^6c^5d^2h^2 + 6a^2b^6c^4d^2h^3 - 192a^3b^3c^8e^2f^2 + 60ab^5c^6d^2g^2 + 198a^4b^4c^7d^2f^2 + 144a^2b^3c^7d^2f^3 - 960a^2b^3c^9d^2e^2 + 240ab^3c^8d^2e^2 + 15360a^9c^3k^1l^2m - 12800a^9c^3j^1m^2 - 3840a^8c^4j^2k^1m + 432a^6b^6j^1m^2 + 4608a^8c^4j^2k^1l + 2880a^8c^4h^2k^2m + 5120a^8c^4f^1l^2m - 3072a^8c^4h^2k^1l^2 + 270a^5b^7h^2k^1m^2 - 216a^5b^7g^1m^2 - 12800a^8c^4e^1m^2 - 4800a^8c^4f^2k^1m^2 - 512a^7c^5h^2j^1 - 3840a^6c^6e^2k^1m - 1280a^7c^5f^2j^2m + 768a^7c^5h^2j^2k^1 + 144a^4b^8g^2j^1m^2 - 90a^4b^8f^2k^1m^2 + 8640a^7c^5d^2k^2m + 4608a^7c^5e^2k^2l + 512a^6c^6f^2j^1 - 9216a^7c^5d^2k^1l^2 - 4096a^7c^5e^2j^1l^2 + 320a^6c^6f^2h^1m - 90a^3b^9d^2k^1m^2 + 15200a^9b^3c^2k^1m^3 - 6192a^8b^3c^2k^1m^3 + 5472a^8b^3c^3k^3m - 4608a^5c^7d^2j^1 - 1024a^7c^5f^2h^1l^2 + 150a^6b^5c^2k^3m + 54a^3b^9f^2h^1m^2 + 6b^10c^2d^2h^1m - 14400a^7c^5d^2h^1m^2 + 8640a^5c^7d^2h^1m + 2880a^6c^6d^2h^2m + 2304a^6c^6d^2j^2k^1 - 512a^6c^6e^2h^2l - 192a^6c^6f^2h^2k^1 + 6144a^8b^3c^3j^1l^3 + 1536a^7b^3c^4j^3l^1 - 1280a^5c^7e^2f^1m + 768a^5c^7e^2h^2k^1 + 256a^6c^6f^2h^2j^2 + 192a^6b^5c^2j^1l^3 + 54a^2b^10d^2h^1m^2 - 18b^9c^3d^2f^1m + 8b^9c^3d^2g^1 - 2b^9c^3d^2h^2k^1 + 4068a^7b^4c^2h^1m^3 - 1728a^6c^6d^2h^2k^2 + 960a^5c^7d^2f^2m + 512a^5c^7e^2f^2l - 3072a^6c^6d^2f^1l^2 - 16b^8c^4d^2e^1 + 6b^8c^4d^2f^2k^1 - 4608a^4c^8d^2e^1 + 2400a^8b^3c^3f^1m^3 + 2016a^7b^3c^4h^2k^3 - 1728a^4c^8d^2f^2k^1 - 1146a^6b^5c^2f^1m^3 + 224a^6b^3c^5h^3k^1 - 96a^5b^6c^2g^1l^3 + 96a^5b^3c^6f^3m + 2304a^4c^8d^2e^2k^1 + 768a^5c^7d^2f^2j^2 + 6144a^7b^3c^4e^1l^3 - 2280a^5b^6c^2d^1m^3 + 1536a^4b^3c^7e^3l^1 - 616a^4b^6c^5d^3m + 512a^6b^3c^5g^2j^3 + 256a^4c^8e^2f^2h^1 + 240a^4b^10c^2d^2m^2 + 6b^7c^5d^2f^2h^1 - 192a^4c^8d^2f^2h^1 + 4320a^6b^3c^5d^2k^3 + 4320a^3b^3c^8d^3k^1 + 222a^4b^5c^6d^3k^1 + 16b^6c^6d^2e^2g^1 + 96a^5b^3c^6f^2h^3 + 96a^4b^3c^7f^3h^1 + 768a^3c^9d^2e^2f^1 + 512a^3b^3c^8e^3g^1 + 132a^4b^4c^7d^3h^1 + 2016a^2b^3c^9d^3f^1 - 496a^4b^3c^8d^3f^1 + 224a^3b^3c^8d^2f^1 - 18a^4b^5c^6d^2f^3 - 3264a^8b^2c^2k^2m^2 - 6160a^7b^3c^2j^2m^2 + 1104a^7b^3c^2k^2l^2 - 1920a^7b^2c^3j^2l^2 + 768a^6b^4c^2j^2l^2 + 3888a^7b^2c^3h^2m^2 - 3510a^6b^4c^2h^2m^2 + 240a^6b^3c^3j^2k^2 - 16a^5b^5c^2j^2k^2 + 1680a^6b^3c^3g^2m^2 - 1648a^6b^3c^3h^2l^2 - 1540a^5b^5c^2g^2m^2 + 444a^5b^5c^2h^2l^2 - 960a^6b^2c^4h^2k^2 - 576a^6b^2c^4f^2m^2 - 512a^6b^2c^4g^2l^2 - 480a^5b^4c^3g^2l^2 + 198a^5b^4c^3h^2k^2 + 192a^4b^6c^2g^2l^2 - 186a^5b^4c^3f^2m^2 - 97a^4b^6c^2f^2m^2 - 9a^4b^6c^2h^2k^2 - 6160a^5b^3c^4e^2m^2 + 1680a^4b^5c^3e^2m^2 - 240a^5b^3c^4g^2k^2 - 240a^5b^3c^4f^2l^2 - 144a^3b^7c^2e^2m^2 + 60a^4b^5c^3g^2k^2 - 36a^4b^5c^3f^2l^2 + 36a^3b^7c^2f^2l^2 - 16a^5b^3c^4h^2j^2 - 4a^3b^7c^2g^2k^2 + 38512a^5b^2c^5d^2m^2 - 32310a^4b^4c^4d^2m^2 + 12720a^3b^6c^3d^2m^2 - 2500a^2b^8c^2d^2m^2 - 1920a^5b^2c^5e^2l^2 + 768a^4b^4c^4e^2l^2 - 464a^5b^2c^5f^2k^2 - 384a^5b^2c^5g^2j^2 - 64a^3b^6c^3e^2l^2 + 42a^4b^4c^4f^2k^2 + 12a^3b^6c^3f^2k^2 - 13104a^4b^3c^5d^2l^2 + 5628a^3b^5c^4d^2l^1
\end{aligned}$$

$$\begin{aligned}
&^2 - 1128a^2b^7c^3d^2l^2 + 240a^4b^3c^5e^2k^2 - 16a^4b^3c^5f^2j^2 - 16a^3b^5c^4e^2k^2 - 2880a^4b^2c^6d^2k^2 + 1750a^3b^4c^5d^2k^2 - 345a^2b^6c^4d^2k^2 - 48a^4b^3c^5g^2h^2 - 4a^3b^5c^4g^2h^2 + 240a^3b^3c^6d^2j^2 - 192a^4b^2c^6f^2h^2 - 42a^3b^4c^5f^2h^2 - 16a^2b^5c^5d^2j^2 - 48a^3b^3c^6f^2g^2 - 16a^3b^3c^6e^2h^2 - 4a^2b^5c^5f^2g^2 - 464a^3b^2c^7d^2h^2 - 384a^3b^2c^7e^2g^2 + 42a^2b^4c^6d^2h^2 - 240a^2b^3c^7d^2g^2 - 16a^2b^3c^7e^2f^2 - 960a^2b^2c^8d^2f^2 + 6b^{11}c^d^2km - 18a^b^{11}d^2fm^2 - 7200a^9c^3k^2m^2 - 324a^7b^5l^2m^2 - 225a^6b^6k^2m^2 - 2048a^8c^4j^2l^2 - 144a^5b^7j^2m^2 - 2400a^8c^4h^2m^2 - 81a^4b^8h^2m^2 - 800a^7c^5f^2m^2 - 288a^7c^5h^2k^2 - 36a^3b^9g^2m^2 - 9a^2b^{10}f^2m^2 - 21600a^6c^6d^2m^2 - 2048a^6c^6e^2l^2 - 864a^6c^6f^2k^2 - 2592a^5c^7d^2k^2 - 1536a^5c^7e^2j^2 + 1536a^8b^2c^2l^4 - 32a^5c^7f^2h^2 + 360a^7b^2c^3k^4 - 25a^6b^4c^2k^4 - 864a^4c^8d^2h^2 - 4b^7c^5d^2g^2 - 9b^6c^6d^2f^2 - 288a^3c^9d^2f^2 - 24a^5b^2c^5h^4 - 16b^5c^7d^2e^2 - 9a^4b^4c^4h^4 - 16a^3b^4c^5g^4 - 24a^3b^2c^7f^4 - 9a^2b^4c^6f^4 - a^2b^8c^2f^2k^2 - a^2b^6c^4f^2h^2 + 630a^7b^5k^3m^3 + 8000a^9c^3h^3m^3 + 320a^7c^5h^3m^3 - 378a^6b^6h^3m^3 + 126a^5b^7f^3m^3 + 30b^8c^4d^3m^3 + 2400a^8c^4d^3m^3 + 8640a^4c^8d^3m^3 - 1728a^7c^5f^3k^3 - 192a^5c^7f^3k^3 - 4b^{11}c^d^2l^2 + 126a^4b^8d^3m^3 - 10b^7c^5d^3k^3 + 4200a^9b^2c^3m^4 - 1024a^6c^6e^3j^3 - 1024a^4c^8e^3j^3 - 144a^7b^4c^3l^4 - 10b^6c^6d^3h^3 - 1728a^3c^9d^3h^3 - 192a^5c^7d^3h^3 + 30b^5c^7d^3f^3 + 360a^2b^2c^9d^4 - 9b^{12}d^2m^2 - 10000a^{10}c^2m^4 - 4096a^9c^3l^4 - 441a^8b^4m^4 - 1296a^8c^4k^4 - 256a^7c^5j^4 - 16a^6c^6h^4 - 16a^4c^8f^4 - 256a^3c^9e^4 - 25b^4c^8d^4 - 1296a^2c^{10}d^4 - b^{10}c^2d^2k^2 - b^8c^4d^2h^2, z, k1) * ((3072a^5c^7d^2l - 512a^4c^8e^2f - 1536a^5c^7e^2k - 512a^5c^7f^2j + 1024a^6c^6h^2l - 1536a^6c^6j^2k - 5120a^7c^5l^2m + 32a^2b^5c^6d^2e + 1024a^3b^3c^8d^2e - 16a^2b^6c^5d^2g + 512a^4b^2c^7e^2h + 256a^4b^2c^7f^2g + 1024a^4b^2c^7d^2j + 16a^2b^8c^3d^2l + 2048a^5b^2c^6e^2m + 256a^5b^2c^6f^2l + 768a^5b^2c^6g^2k + 512a^5b^2c^6h^2j + 2048a^6b^2c^5j^2m + 1792a^6b^2c^5k^2l - 384a^2b^3c^7d^2e + 192a^2b^4c^6d^2g + 32a^2b^4c^6e^2f - 512a^3b^2c^7d^2g - 16a^2b^5c^5f^2g - 128a^3b^3c^6e^2h + 32a^2b^5c^5d^2j - 384a^3b^3c^6d^2j + 64a^3b^4c^5g^2h - 256a^4b^2c^6g^2h - 288a^2b^6c^4d^2l + 1792a^3b^4c^5d^2l - 32a^3b^4c^5e^2k + 32a^3b^4c^5f^2j - 4352a^4b^2c^6d^2l + 512a^4b^2c^6e^2k + 16a^2b^7c^3f^2l + 96a^3b^5c^4e^2m - 144a^3b^5c^4f^2l + 16a^3b^5c^4g^2k - 896a^4b^3c^5e^2m + 256a^4b^3c^5f^2l - 256a^4b^3c^5g^2k - 128a^4b^3c^5h^2j - 48a^3b^6c^3g^2m - 48a^3b^6c^3h^2l + 448a^4b^4c^4g^2m + 512a^4b^4c^4h^2l - 1024a^5b^2c^5g^2m - 1536a^5b^2c^5h^2l - 32a^4b^4c^4j^2k + 512a^5b^2c^5j^2k + 96a^4b^5c^3j^2m + 80a^4b^5c^3k^2l - 896a^5b^3c^4j^2m - 768a^5b^3c^4k^2l - 256a^5b^4c^3l^2m + 2304a^6b^2c^4l^2m) / (8 * (64a^5c^6 - a^2b^6c^3 + 12a^3b^4c^4 - 48a^4b^2c^5)) - \text{root}(1572864a^8b^2c^{10}z^4 - 983040a^7b^4c^9z^4 + 327680a^6b^6c^8z^4 - 61440a^5b^8c
\end{aligned}$$

$$\begin{aligned}
& ^7z^4 + 6144a^4b^{10}c^6z^4 - 256a^3b^{12}c^5z^4 - 1048576a^9c^{11}z^4 \\
& - 1572864a^8b^2c^8z^3 + 983040a^7b^4c^7z^3 - 327680a^6b^6c^6z^3 + 61440a^5b^8c^5z^3 - 6144a^4b^{10}c^4z^3 + 256a^3b^{12} \\
& *c^3z^3 + 1048576a^9c^9z^3 + 96a^3b^{12}c^kz^2 + 98304a^8b^6c^7jz^2 + 24576a^8b^6c^7hzmz^2 + 155648a^7b^6c^8d*zmz^2 + 98304a^7b^6 \\
& b^6c^8e*1z^2 + 57344a^7b^6c^8f*kz^2 + 32768a^7b^6c^8g*jz^2 + 57344a^6b^6c^9d*hz^2 + 32768a^6b^6c^9e*gz^2 - 32a^6b^{10}c^5d*fz^2 - 491520 \\
& *a^8b^2c^6k*zmz^2 + 358400a^7b^4c^5k*zmz^2 - 129024a^6b^6c^4k*zmz^2 + 24768a^5b^8c^3k*zmz^2 - 2432a^4b^{10}c^2k*zmz^2 - 90112a^7b^3 \\
& *c^6j*1z^2 + 30720a^6b^5c^5j*1z^2 - 4608a^5b^7c^4j*1z^2 + 256a^4b^9c^3j*1z^2 - 21504a^6b^5c^5h*zmz^2 + 9216a^5b^7c^4h*zmz^2 + \\
& 8192a^7b^3c^6h*zmz^2 - 1568a^4b^9c^3h*zmz^2 + 96a^3b^{11}c^2h*zmz^2 - 172032a^7b^2c^7f*zmz^2 + 116736a^6b^4c^6f*zmz^2 - 49152a^7b^2 \\
& ^2c^7g*1z^2 + 45056a^6b^4c^6g*1z^2 - 35840a^5b^6c^5f*zmz^2 + 24576a^7b^2c^7h*kz^2 - 15360a^5b^6c^5g*1z^2 + 5184a^4b^8c^4f*zmz^2 - 3072a^5b^6c^5h*kz^2 + 2304a^4b^8c^4g*1z^2 + 2048a^6b^4c^6 \\
& h*kz^2 + 576a^4b^8c^4h*kz^2 - 288a^3b^{10}c^3f*zmz^2 - 128a^3b^{10}c^3g*1z^2 - 32a^3b^{10}c^3h*kz^2 - 147456a^6b^3c^7d*zmz^2 - 901 \\
& 12a^6b^3c^7e*1z^2 + 52224a^5b^5c^6d*zmz^2 - 49152a^6b^3c^7f*kz^2 + 30720a^5b^5c^6e*1z^2 - 24576a^6b^3c^7g*jz^2 + 15360a^5b^5 \\
& *c^6f*kz^2 - 8192a^4b^7c^5d*zmz^2 + 6144a^5b^5c^6g*jz^2 - 4608a^4b^7c^5e*1z^2 - 2048a^4b^7c^5f*kz^2 - 512a^4b^7c^5g*jz^2 + 4 \\
& 80a^3b^9c^4d*zmz^2 + 256a^3b^9c^4e*1z^2 + 96a^3b^9c^4f*kz^2 + 131072a^6b^2c^8d*kz^2 + 49152a^6b^2c^8e*jz^2 - 43008a^5b^4c^7 \\
& *d*kz^2 - 12288a^5b^4c^7e*jz^2 + 6144a^4b^6c^6d*kz^2 + 1024a^4b^6c^6e*jz^2 - 320a^3b^8c^5d*kz^2 + 6144a^5b^4c^7f*h*zmz^2 - 2048 \\
& *a^4b^6c^6f*h*zmz^2 + 192a^3b^8c^5f*h*zmz^2 - 49152a^5b^3c^8d*hz^2 - 24576a^5b^3c^8e*gz^2 + 15360a^4b^5c^7d*hz^2 + 6144a^4b^5c^7e*gz^2 - 2048a^3b^7c^6d*hz^2 - 512a^3b^7c^6e*gz^2 + 96a^2b^9c^5 \\
& ^5d*hz^2 + 24576a^5b^2c^9d*fz^2 - 3072a^3b^6c^7d*fz^2 + 2048a^4b^4c^8d*fz^2 + 576a^2b^8c^6d*fz^2 - 430080a^9b^6c^6m^2z^2 + 34 \\
& 08a^4b^{11}c^m^2z^2 - 64a^3b^{12}c^l^2z^2 + 61440a^8b^6c^7k^2z^2 + 12288a^7b^6c^8h^2z^2 + 12288a^6b^6c^9f^2z^2 + 61440a^5b^6c^{10}d^2z^2 \\
& + 432a^6b^9c^6d^2z^2 + 245760a^9c^7k*zmz^2 + 81920a^8c^8f*zmz^2 - 49152a^8c^8h*kz^2 - 147456a^7c^9d*kz^2 - 65536a^7c^9e*jz^2 - 1 \\
& 6384a^7c^9f*h*zmz^2 - 49152a^6c^{10}d*fz^2 + 716800a^8b^3c^5m^2z^2 - 483840a^7b^5c^4m^2z^2 + 170496a^6b^7c^3m^2z^2 - 33232a^5b^9c^2 \\
& ^2m^2z^2 + 516096a^8b^2c^6l^2z^2 - 288768a^7b^4c^5l^2z^2 + 88576a^6b^6c^4l^2z^2 - 15744a^5b^8c^3l^2z^2 + 1536a^4b^{10}c^2l^2z^2 - 61440a^7b^3c^6k^2z^2 + 24064a^6b^5c^5k^2z^2 - 4608a^5b^7c^4 \\
& ^4k^2z^2 + 432a^4b^9c^3k^2z^2 - 16a^3b^{11}c^2k^2z^2 + 24576a^7b^2c^7j^2z^2 - 6144a^6b^4c^6j^2z^2 + 512a^5b^6c^5j^2z^2 - 8192 \\
& *a^6b^3c^7h^2z^2 + 1536a^5b^5c^6h^2z^2 - 16a^3b^9c^4h^2z^2 - 8192a^6b^2c^8g^2z^2 + 6144a^5b^4c^7g^2z^2 - 1536a^4b^6c^6g^2z^2 + 128a^3b^8c^5g^2z^2 - 8192a^5b^3c^8f^2z^2 + 1536a^4b^5c^7
\end{aligned}$$

$f^2z^2 - 16a^2b^9c^5f^2z^2 + 24576a^5b^2c^9e^2z^2 - 6144a^4b^4c^8e^2z^2 + 512a^3b^6c^7e^2z^2 - 61440a^4b^3c^9d^2z^2 + 24064a^3b^5c^8d^2z^2 - 4608a^2b^7c^7d^2z^2 - 393216a^9c^7l^2z^2 - 144a^3b^13m^2z^2 - 32768a^8c^8j^2z^2 - 32768a^6c^10e^2z^2 - 16b^11c^5d^2z^2 + 18432a^8b^6c^5h^1m^2z - 96a^3b^10c^6g^1k^1m^2z + 90112a^7b^6c^6e^1k^1m^2z + 36864a^7b^6c^6f^1j^1m^2z - 16384a^7b^6c^6g^1j^1l^2z + 14336a^7b^6c^6d^1m^2z - 10240a^7b^6c^6f^1k^1l^2z + 4096a^7b^6c^6h^1j^1k^2z + 10240a^7b^6c^6g^1h^1m^2z - 47104a^6b^6c^7d^1h^1l^2z + 36864a^6b^6c^7e^1f^1m^2z + 30720a^6b^6c^7d^1g^1m^2z - 16384a^6b^6c^7e^1g^1l^2z + 6144a^6b^6c^7f^1g^1k^2z + 4096a^6b^6c^7e^1h^1k^2z + 32a^6b^10c^3d^1f^1l^2z - 4096a^5b^6c^8d^1f^1j^2z - 6144a^5b^6c^8d^1g^1h^2z - 32a^6b^8c^5d^1f^1g^2z - 4096a^4b^6c^9d^1e^1f^2z + 64a^6b^7c^6d^1e^1f^2z + 110592a^8b^2c^4k^1l^1m^2z - 36864a^7b^4c^3k^1l^1m^2z + 5376a^6b^6c^2k^1l^1m^2z - 79872a^7b^3c^4j^1k^1m^2z + 26112a^6b^5c^3j^1k^1m^2z - 3712a^5b^7c^2j^1k^1m^2z - 13824a^7b^3c^4h^1l^1m^2z + 3456a^6b^5c^3h^1l^1m^2z - 288a^5b^7c^2h^1l^1m^2z - 45056a^7b^2c^5g^1k^1m^2z + 39936a^6b^4c^4g^1k^1m^2z + 30720a^7b^2c^5f^1l^1m^2z - 18432a^7b^2c^5h^1k^1l^2z - 13056a^5b^6c^3g^1k^1m^2z - 7680a^6b^4c^4f^1l^1m^2z + 5376a^6b^4c^4h^1j^1m^2z + 4608a^6b^4c^4h^1k^1l^2z + 3072a^7b^2c^5h^1j^1m^2z - 1984a^5b^6c^3h^1j^1m^2z + 1856a^4b^8c^2g^1k^1m^2z + 640a^5b^6c^3f^1l^1m^2z - 384a^5b^6c^3h^1k^1l^2z + 192a^4b^8c^2h^1j^1m^2z - 79872a^6b^3c^5e^1k^1m^2z - 27648a^6b^3c^5f^1j^1m^2z + 26112a^5b^5c^4e^1k^1m^2z + 12288a^6b^3c^5g^1j^1l^2z - 10752a^6b^3c^5d^1l^1m^2z + 7680a^6b^3c^5f^1k^1l^2z + 6912a^5b^5c^4f^1j^1m^2z - 3712a^4b^7c^3e^1k^1m^2z - 3072a^6b^3c^5h^1j^1k^2z - 3072a^5b^5c^4g^1j^1l^2z + 2688a^5b^5c^4d^1l^1m^2z - 1920a^5b^5c^4f^1k^1l^2z + 768a^5b^5c^4h^1j^1k^2z - 576a^4b^7c^3f^1j^1m^2z + 256a^4b^7c^3g^1j^1l^2z - 224a^4b^7c^3d^1l^1m^2z + 192a^3b^9c^2e^1k^1m^2z + 160a^4b^7c^3f^1k^1l^2z - 64a^4b^7c^3h^1j^1k^2z - 2688a^5b^5c^4g^1h^1m^2z - 1536a^6b^3c^5g^1h^1m^2z + 992a^4b^7c^3g^1h^1m^2z - 96a^3b^9c^2g^1h^1m^2z - 65536a^6b^2c^6d^1k^1l^2z + 46080a^6b^2c^6d^1j^1m^2z - 24576a^6b^2c^6e^1j^1l^2z + 21504a^5b^4c^5d^1k^1l^2z - 11520a^5b^4c^5d^1j^1m^2z + 9216a^6b^2c^6f^1j^1k^2z + 6144a^5b^4c^5e^1j^1l^2z - 3072a^4b^6c^4d^1k^1l^2z - 2304a^5b^4c^5f^1j^1k^2z + 960a^4b^6c^4d^1j^1m^2z - 512a^4b^6c^4e^1j^1l^2z + 192a^4b^6c^4f^1j^1k^2z + 160a^3b^8c^3d^1k^1l^2z - 18432a^6b^2c^6f^1g^1m^2z + 13824a^5b^4c^5f^1g^1m^2z + 5376a^5b^4c^5e^1h^1m^2z - 3456a^4b^6c^4f^1g^1m^2z + 3072a^6b^2c^6e^1h^1m^2z - 3072a^5b^4c^5f^1h^1l^2z - 2048a^6b^2c^6g^1h^1k^2z - 1984a^4b^6c^4e^1h^1m^2z + 1536a^5b^4c^5g^1h^1k^2z + 1024a^4b^6c^4f^1h^1l^2z - 384a^4b^6c^4g^1h^1k^2z + 288a^3b^8c^3f^1g^1m^2z + 192a^3b^8c^3e^1h^1m^2z - 96a^3b^8c^3f^1h^1l^2z + 32a^3b^8c^3g^1h^1k^2z + 41472a^5b^3c^6d^1h^1l^2z - 27648a^5b^3c^6e^1f^1m^2z - 23040a^5b^3c^6d^1g^1m^2z - 13440a^4b^5c^5d^1h^1l^2z + 12288a^5b^3c^6e^1g^1l^2z + 6912a^4b^5c^5e^1f^1m^2z + 5760a^4b^5c^5d^1g^1m^2z - 4608a^5b^3c^6f^1g^1k^2z - 3072a^5b^3c^6e^1h^1k^2z - 3072a^4b^5c^5e^1g^1l^2z + 1888a^3b^7c^4d^1h^1l^2z + 1152a^4b^5c^5f^1g^1k^2z + 768a^4b^5c^5e^1h^1k^2z - 576a^3b^7c^4e^1f^1m^2z - 480a^3b^7c^4d^1g^1m^2z + 256a^3b^7c^4e^1g^1l^2z - 96a^3b^7c^4f^1g^1k^2z - 96a^2b^9c^3d^1h^1l^2z - 64a^3b^7c^4e^1h^1k^2z + 46080a^5b^2c^7d^1e^1m^2z$

$$\begin{aligned}
& *z - 11520*a^4*b^4*c^6*d*e*m*z + 9216*a^5*b^2*c^7*e*f*k*z - 9216*a^5*b^2*c^7*d*h*j*z - 6656*a^4*b^4*c^6*d*f*l*z - 6144*a^5*b^2*c^7*d*f*l*z + 3456*a^3*b^6*c^5*d*f*l*z - 2304*a^4*b^4*c^6*e*f*k*z + 2304*a^4*b^4*c^6*d*h*j*z + 960*a^3*b^6*c^5*d*e*m*z - 576*a^2*b^8*c^4*d*f*l*z + 192*a^3*b^6*c^5*e*f*k*z - 192*a^3*b^6*c^5*d*h*j*z + 3072*a^4*b^3*c^7*d*f*j*z - 768*a^3*b^5*c^6*d*f*j*z + 64*a^2*b^7*c^5*d*f*j*z + 4608*a^4*b^3*c^7*d*g*h*z - 1152*a^3*b^5*c^6*d*g*h*z + 96*a^2*b^7*c^5*d*g*h*z - 9216*a^4*b^2*c^8*d*e*h*z + 2304*a^3*b^4*c^7*d*e*h*z + 2048*a^4*b^2*c^8*d*f*g*z - 1536*a^3*b^4*c^7*d*f*g*z + 384*a^2*b^6*c^6*d*f*g*z - 192*a^2*b^6*c^6*d*e*h*z + 3072*a^3*b^3*c^8*d*e*f*z - 768*a^2*b^5*c^7*d*e*f*z - 288*a^5*b^8*c*k*l*m*z + 90112*a^8*b*c^5*j*k*m*z + 192*a^4*b^9*c*j*k*m*z + 138240*a^9*b*c^4*l*m^2*z - 7344*a^6*b^7*c*l*m^2*z + 5088*a^5*b^8*c*j*m^2*z - 3072*a^8*b*c^5*k^2*l*z - 49152*a^8*b*c^5*j*l^2*z - 128*a^4*b^9*c*j*l^2*z - 25600*a^8*b*c^5*g*m^2*z - 9216*a^7*b*c^6*h^2*l*z - 2544*a^4*b^9*c*g*m^2*z + 64*a^3*b^10*c*g*l^2*z + 9216*a^7*b*c^6*g*k^2*z - 3072*a^6*b*c^7*f^2*l*z - 288*a^3*b^10*c*e*m^2*z - 49152*a^7*b*c^6*e*l^2*z - 58368*a^5*b*c^8*d^2*l*z - 432*a*b^9*c^4*d^2*l*z - 1024*a^6*b*c^7*g*h^2*z + 32*a*b^8*c^5*d^2*j*z + 1024*a^5*b*c^8*f^2*g*z - 9216*a^4*b*c^9*d^2*g*z + 336*a*b^7*c^6*d^2*g*z - 672*a*b^6*c^7*d^2*e*z - 122880*a^9*c^5*k*l*m*z - 40960*a^8*c^6*f*l*m*z + 24576*a^8*c^6*h*k*l*z - 20480*a^8*c^6*h*j*m*z + 73728*a^7*c^7*d*k*l*z - 61440*a^7*c^7*d*j*m*z + 32768*a^7*c^7*e*j*l*z - 12288*a^7*c^7*f*j*k*z - 20480*a^7*c^7*e*h*m*z + 8192*a^7*c^7*f*h*l*z - 61440*a^6*c^8*d*e*m*z + 24576*a^6*c^8*d*f*l*z - 12288*a^6*c^8*e*f*k*z + 12288*a^6*c^8*d*h*j*z + 12288*a^5*c^9*d*e*h*z - 131328*a^8*b^3*c^3*l*m^2*z + 46656*a^7*b^5*c^2*l*m^2*z - 142848*a^8*b^2*c^4*j*m^2*z + 106368*a^7*b^4*c^3*j*m^2*z - 34208*a^6*b^6*c^2*j*m^2*z + 2304*a^7*b^3*c^4*k^2*l*z - 576*a^6*b^5*c^3*k^2*l*z + 48*a^5*b^7*c^2*k^2*l*z + 45056*a^7*b^3*c^4*j*l^2*z - 15360*a^6*b^5*c^3*j*l^2*z - 12288*a^7*b^2*c^5*j^2*l*z + 3072*a^6*b^4*c^4*j^2*l*z + 2304*a^5*b^7*c^2*j*l^2*z - 256*a^5*b^6*c^3*j^2*l*z + 15872*a^7*b^2*c^5*j*k^2*z - 4992*a^6*b^4*c^4*j*k^2*z + 672*a^5*b^6*c^3*j*k^2*z - 32*a^4*b^8*c^2*j*k^2*z + 71424*a^7*b^3*c^4*g*m^2*z - 53184*a^6*b^5*c^3*g*m^2*z + 17104*a^5*b^7*c^2*g*m^2*z + 6912*a^6*b^3*c^5*h^2*l*z - 1728*a^5*b^5*c^4*h^2*l*z + 144*a^4*b^7*c^3*h^2*l*z + 24576*a^7*b^2*c^5*g*l^2*z - 22528*a^6*b^4*c^4*g*l^2*z + 7680*a^5*b^6*c^3*g*l^2*z + 4096*a^6*b^2*c^6*g^2*l*z - 3072*a^5*b^4*c^5*g^2*l*z - 1152*a^4*b^8*c^2*g*l^2*z + 768*a^4*b^6*c^4*g^2*l*z - 64*a^3*b^8*c^3*g^2*l*z - 142848*a^7*b^2*c^5*e*m^2*z + 106368*a^6*b^4*c^4*e*m^2*z - 34208*a^5*b^6*c^3*e*m^2*z - 7936*a^6*b^3*c^5*g*k^2*z + 5088*a^4*b^8*c^2*e*m^2*z + 2496*a^5*b^5*c^4*g*k^2*z - 1536*a^6*b^2*c^6*h^2*j*z + 1280*a^5*b^3*c^6*f^2*l*z + 384*a^5*b^4*c^5*h^2*j*z - 336*a^4*b^7*c^3*g*k^2*z + 192*a^4*b^5*c^5*f^2*l*z - 144*a^3*b^7*c^4*f^2*l*z - 32*a^4*b^6*c^4*h^2*j*z + 16*a^3*b^9*c^2*g*k^2*z + 16*a^2*b^9*c^3*f^2*l*z + 45056*a^6*b^3*c^5*e*l^2*z - 15360*a^5*b^5*c^4*e*l^2*z - 12288*a^5*b^2*c^7*e^2*l*z + 3072*a^4*b^4*c^6*e^2*l*z + 2304*a^4*b^7*c^3*e*l^2*z - 256*a^3*b^6*c^5*e^2*l*z - 128*a^3*b^9*c^2*e*l^2*z + 59136*a^4*b^3*c^7*d^2*l*z - 23488*a^3*b^5*c^6*d^2*l*z + 15872*a^6*b^2*c^6*e*k^2*z - 4992*a^5*b^4*c^5*e*k^2*z + 4560*a^2*b^7*c^5*d^2*l*z + 1536*a^5*b^2*c^7*f^2*j*z + 672*a^4*b^6*c^4*e*k^2*z - 384*a^4*b^4*c^6*f^2*j*z - 32*a^3*b^8*c^3*e*k^2
\end{aligned}$$

$$\begin{aligned}
& 2*z + 32*a^3*b^6*c^5*f^2*j*z + 768*a^5*b^3*c^6*g*h^2*z - 192*a^4*b^5*c^5*g* \\
& h^2*z + 16*a^3*b^7*c^4*g*h^2*z - 15872*a^4*b^2*c^8*d^2*j*z + 4992*a^3*b^4*c \\
& ^7*d^2*j*z - 672*a^2*b^6*c^6*d^2*j*z - 1536*a^5*b^2*c^7*e*h^2*z - 768*a^4*b \\
& ^3*c^7*f^2*g*z + 384*a^4*b^4*c^6*e*h^2*z + 192*a^3*b^5*c^6*f^2*g*z - 32*a^3 \\
& *b^6*c^5*e*h^2*z - 16*a^2*b^7*c^5*f^2*g*z + 7936*a^3*b^3*c^8*d^2*g*z - 2496 \\
& *a^2*b^5*c^7*d^2*g*z + 1536*a^4*b^2*c^8*e*f^2*z - 384*a^3*b^4*c^7*e*f^2*z + \\
& 32*a^2*b^6*c^6*e*f^2*z - 15872*a^3*b^2*c^9*d^2*e*z + 4992*a^2*b^4*c^8*d^2* \\
& e*z - 61440*a^8*b^2*c^4*l^3*z + 21504*a^7*b^4*c^3*l^3*z - 3328*a^6*b^6*c^2* \\
& l^3*z + 432*a^5*b^9*l*m^2*z + 51200*a^9*c^5*j*m^2*z + 16384*a^8*c^6*j^2*l*z \\
& - 288*a^4*b^10*j*m^2*z - 18432*a^8*c^6*j*k^2*z + 144*a^3*b^11*g*m^2*z + 51 \\
& 200*a^8*c^6*e*m^2*z + 2048*a^7*c^7*h^2*j*z + 16384*a^6*c^8*e^2*l*z + 16*b^1 \\
& 1*c^3*d^2*l*z - 18432*a^7*c^7*e*k^2*z - 2048*a^6*c^8*f^2*j*z + 18432*a^5*c^ \\
& 9*d^2*j*z + 192*a^5*b^8*c*l^3*z + 2048*a^6*c^8*e*h^2*z - 16*b^9*c^5*d^2*g*z \\
& - 2048*a^5*c^9*e*f^2*z + 32*b^8*c^6*d^2*e*z + 18432*a^4*c^10*d^2*e*z + 655 \\
& 36*a^9*c^5*l^3*z - 11008*a^8*b*c^3*j*k*l*m - 288*a^6*b^5*c*j*k*l*m + 144*a^ \\
& 5*b^6*c*g*k*l*m - 11008*a^7*b*c^4*e*k*l*m - 5376*a^7*b*c^4*f*j*l*m + 3840*a \\
& ^7*b*c^4*g*j*k*m - 3328*a^7*b*c^4*h*j*k*l - 96*a^4*b^7*c*g*j*k*m - 2560*a^7 \\
& *b*c^4*g*h*l*m - 36*a^3*b^8*c*f*h*k*m - 6912*a^6*b*c^5*d*j*k*l - 7872*a^6*b \\
& *c^5*d*h*k*m - 7680*a^6*b*c^5*d*g*l*m - 5376*a^6*b*c^5*e*f*l*m + 3840*a^6*b \\
& *c^5*e*g*k*m - 3328*a^6*b*c^5*e*h*k*l - 1536*a^6*b*c^5*f*g*k*l + 1280*a^6*b \\
& *c^5*f*g*j*m - 768*a^6*b*c^5*g*h*j*k - 768*a^6*b*c^5*f*h*j*l - 768*a^6*b*c^ \\
& 5*e*h*j*m - 36*a^2*b^9*c*d*h*k*m - 6912*a^5*b*c^6*d*e*k*l - 4864*a^5*b*c^6* \\
& d*e*j*m - 2304*a^5*b*c^6*d*g*j*k - 1792*a^5*b*c^6*e*f*j*k - 1280*a^5*b*c^6* \\
& d*f*j*l - 4544*a^5*b*c^6*d*f*h*m + 1536*a^5*b*c^6*d*g*h*l + 1280*a^5*b*c^6* \\
& e*f*g*m - 768*a^5*b*c^6*e*g*h*k - 768*a^5*b*c^6*e*f*h*l - 256*a^5*b*c^6*f*g \\
& *h*j + 12*a*b^9*c^2*d*f*h*m + 16*a*b^8*c^3*d*f*g*l - 4*a*b^8*c^3*d*f*h*k - \\
& 2304*a^4*b*c^7*d*e*g*k - 1792*a^4*b*c^7*d*e*h*j - 1280*a^4*b*c^7*d*e*f*l - \\
& 768*a^4*b*c^7*d*f*g*j - 32*a*b^7*c^4*d*e*f*l - 256*a^4*b*c^7*e*f*g*h - 768* \\
& a^3*b*c^8*d*e*f*g + 32*a*b^5*c^6*d*e*f*g + 12*a*b^10*c*d*f*k*m + 3648*a^7*b \\
& ^3*c^2*j*k*l*m + 5504*a^7*b^2*c^3*g*k*l*m - 1824*a^6*b^4*c^2*g*k*l*m + 384* \\
& a^7*b^2*c^3*h*j*l*m - 288*a^6*b^4*c^2*h*j*l*m - 4800*a^6*b^3*c^3*g*j*k*m + \\
& 3648*a^6*b^3*c^3*e*k*l*m + 1280*a^5*b^5*c^2*g*j*k*m + 1088*a^6*b^3*c^3*f*j* \\
& l*m + 576*a^6*b^3*c^3*h*j*k*l - 288*a^5*b^5*c^2*e*k*l*m - 192*a^6*b^3*c^3*g \\
& *h*l*m + 144*a^5*b^5*c^2*g*h*l*m + 9600*a^6*b^2*c^4*e*j*k*m - 4224*a^6*b^2* \\
& c^4*d*j*l*m - 2560*a^5*b^4*c^3*e*j*k*m + 384*a^6*b^2*c^4*f*j*k*l + 224*a^5* \\
& b^4*c^3*d*j*l*m + 192*a^4*b^6*c^2*e*j*k*m - 160*a^5*b^4*c^3*f*j*k*l - 4608* \\
& a^6*b^2*c^4*f*h*k*m + 2688*a^6*b^2*c^4*f*g*l*m + 1664*a^6*b^2*c^4*g*h*k*l - \\
& 744*a^5*b^4*c^3*f*h*k*m - 544*a^5*b^4*c^3*f*g*l*m + 492*a^4*b^6*c^2*f*h*k* \\
& m + 416*a^5*b^4*c^3*g*h*j*m + 384*a^6*b^2*c^4*g*h*j*m + 384*a^6*b^2*c^4*e*h \\
& *l*m - 288*a^5*b^4*c^3*g*h*k*l - 288*a^5*b^4*c^3*e*h*l*m - 96*a^4*b^6*c^2*g \\
& *h*j*m + 2112*a^5*b^3*c^4*d*j*k*l - 160*a^4*b^5*c^3*d*j*k*l + 16992*a^5*b^3 \\
& *c^4*d*h*k*m - 6252*a^4*b^5*c^3*d*h*k*m - 4800*a^5*b^3*c^4*e*g*k*m + 2112*a \\
& ^5*b^3*c^4*d*g*l*m - 1728*a^5*b^3*c^4*f*g*j*m + 1280*a^4*b^5*c^3*e*g*k*m + \\
& 1088*a^5*b^3*c^4*e*f*l*m - 832*a^5*b^3*c^4*e*h*j*m + 816*a^3*b^7*c^2*d*h*k* \\
& m + 576*a^5*b^3*c^4*e*h*k*l - 448*a^5*b^3*c^4*f*h*j*l + 288*a^4*b^5*c^3*f*g
\end{aligned}$$

$$\begin{aligned}
& *j*m - 192*a^5*b^3*c^4*g*h*j*k - 192*a^5*b^3*c^4*f*g*k*1 + 192*a^4*b^5*c^3* \\
& e*h*j*m - 112*a^4*b^5*c^3*d*g*1*m + 96*a^4*b^5*c^3*f*h*j*1 - 96*a^3*b^7*c^2 \\
& *e*g*k*m + 80*a^4*b^5*c^3*f*g*k*1 + 32*a^4*b^5*c^3*g*h*j*k - 11456*a^5*b^2* \\
& c^5*d*f*k*m + 4992*a^5*b^2*c^5*d*h*j*1 - 4608*a^5*b^2*c^5*e*g*j*1 - 4224*a^ \\
& 5*b^2*c^5*d*e*1*m + 3456*a^5*b^2*c^5*e*f*j*m + 3456*a^5*b^2*c^5*d*g*k*1 + 2 \\
& 432*a^5*b^2*c^5*d*g*j*m - 1312*a^4*b^4*c^4*d*h*j*1 + 1272*a^3*b^6*c^3*d*f*k \\
& *m - 1056*a^4*b^4*c^4*d*g*k*1 + 896*a^5*b^2*c^5*f*g*j*k + 768*a^4*b^4*c^4*e \\
& *g*j*1 - 576*a^4*b^4*c^4*e*f*j*m - 480*a^4*b^4*c^4*d*g*j*m + 384*a^5*b^2*c^ \\
& 5*e*h*j*k + 384*a^5*b^2*c^5*e*f*k*1 - 232*a^2*b^8*c^2*d*f*k*m + 224*a^4*b^4 \\
& *c^4*d*e*1*m - 160*a^4*b^4*c^4*e*f*k*1 - 96*a^4*b^4*c^4*f*g*j*k + 96*a^3*b^ \\
& 6*c^3*d*h*j*1 + 80*a^3*b^6*c^3*d*g*k*1 - 64*a^4*b^4*c^4*e*h*j*k - 24*a^4*b^ \\
& 4*c^4*d*f*k*m + 416*a^4*b^4*c^4*e*g*h*m + 384*a^5*b^2*c^5*f*g*h*1 + 384*a^5 \\
& *b^2*c^5*e*g*h*m + 224*a^4*b^4*c^4*f*g*h*1 - 96*a^3*b^6*c^3*e*g*h*m - 48*a^ \\
& 3*b^6*c^3*f*g*h*1 + 2112*a^4*b^3*c^5*d*e*k*1 - 960*a^4*b^3*c^5*d*f*j*1 + 96 \\
& 0*a^4*b^3*c^5*d*e*j*m + 384*a^3*b^5*c^4*d*f*j*1 + 320*a^4*b^3*c^5*d*g*j*k + \\
& 192*a^4*b^3*c^5*e*f*j*k - 160*a^3*b^5*c^4*d*e*k*1 - 32*a^2*b^7*c^3*d*f*j*1 \\
& + 7392*a^4*b^3*c^5*d*f*h*m - 2496*a^4*b^3*c^5*d*g*h*1 - 1728*a^4*b^3*c^5*e \\
& *f*g*m - 1500*a^3*b^5*c^4*d*f*h*m + 656*a^3*b^5*c^4*d*g*h*1 - 448*a^4*b^3*c \\
& ^5*e*f*h*1 + 288*a^3*b^5*c^4*e*f*g*m - 192*a^4*b^3*c^5*f*g*h*j - 192*a^4*b^ \\
& 3*c^5*e*g*h*k + 96*a^3*b^5*c^4*e*f*h*1 - 48*a^2*b^7*c^3*d*g*h*1 + 32*a^3*b^ \\
& 5*c^4*e*g*h*k - 16*a^2*b^7*c^3*d*f*h*m - 640*a^4*b^2*c^6*d*e*j*k + 4992*a^4 \\
& *b^2*c^6*d*e*h*1 - 3584*a^4*b^2*c^6*d*f*h*k + 2432*a^4*b^2*c^6*d*e*g*m - 13 \\
& 12*a^3*b^4*c^5*d*e*h*1 + 896*a^4*b^2*c^6*e*f*g*k + 896*a^4*b^2*c^6*d*g*h*j \\
& + 640*a^4*b^2*c^6*d*f*g*1 + 600*a^3*b^4*c^5*d*f*h*k + 480*a^3*b^4*c^5*d*f*g \\
& *1 - 480*a^3*b^4*c^5*d*e*g*m + 384*a^4*b^2*c^6*e*f*h*j - 192*a^2*b^6*c^4*d* \\
& f*g*1 - 96*a^3*b^4*c^5*e*f*g*k - 96*a^3*b^4*c^5*d*g*h*j + 96*a^2*b^6*c^4*d* \\
& e*h*1 + 12*a^2*b^6*c^4*d*f*h*k - 960*a^3*b^3*c^6*d*e*f*1 + 384*a^2*b^5*c^5* \\
& d*e*f*1 + 320*a^3*b^3*c^6*d*e*g*k - 192*a^3*b^3*c^6*d*f*g*j + 192*a^3*b^3*c \\
& ^6*d*e*h*j + 32*a^2*b^5*c^5*d*f*g*j - 192*a^3*b^3*c^6*e*f*g*h + 384*a^3*b^2 \\
& *c^7*d*e*f*j - 64*a^2*b^4*c^6*d*e*f*j + 896*a^3*b^2*c^7*d*e*g*h - 96*a^2*b^ \\
& 4*c^6*d*e*g*h - 192*a^2*b^3*c^7*d*e*f*g + 496*a^7*b^4*c*k*1^2*m - 4752*a^7* \\
& b^4*c*j*1*m^2 + 96*a^5*b^6*c*j^2*k*m - 6144*a^8*b*c^3*h*1^2*m - 168*a^6*b^5 \\
& *c*h*1^2*m + 6400*a^8*b*c^3*g*1*m^2 - 2862*a^6*b^5*c*h*k*m^2 + 2376*a^6*b^5 \\
& *c*g*1*m^2 - 1632*a^7*b*c^4*h^2*k*m - 480*a^8*b*c^3*h*k*m^2 - 180*a^5*b^6*c \\
& *h*k^2*m + 54*a^4*b^7*c*h^2*k*m - 384*a^7*b*c^4*h*j^2*m + 120*a^5*b^6*c*h*k \\
& *1^2 + 56*a^5*b^6*c*f*1^2*m + 24*a^3*b^8*c*g^2*k*m + 4512*a^7*b*c^4*f*k^2*m \\
& - 2304*a^7*b*c^4*g*k^2*1 - 1680*a^5*b^6*c*g*j*m^2 + 1184*a^6*b*c^5*f^2*k*m \\
& + 804*a^5*b^6*c*f*k*m^2 + 432*a^5*b^6*c*e*1*m^2 + 60*a^4*b^7*c*f*k^2*m + 6 \\
& *a^2*b^9*c*f^2*k*m - 13312*a^7*b*c^4*d*1^2*m + 2048*a^7*b*c^4*g*j*1^2 - 102 \\
& 4*a^7*b*c^4*f*k*1^2 + 64*a^4*b^7*c*g*j*1^2 + 56*a^4*b^7*c*d*1^2*m - 40*a^4* \\
& b^7*c*f*k*1^2 + 13440*a^7*b*c^4*e*j*m^2 - 8928*a^5*b*c^6*d^2*k*m - 6240*a^7 \\
& *b*c^4*d*k*m^2 + 1614*a^4*b^7*c*d*k*m^2 - 288*a^4*b^7*c*e*j*m^2 - 170*a*b^9 \\
& *c^2*d^2*k*m + 60*a^3*b^8*c*d*k^2*m + 4608*a^6*b*c^5*e*j^2*1 + 4608*a^5*b*c \\
& ^6*e^2*j*1 - 2432*a^6*b*c^5*d*j^2*m + 1440*a^7*b*c^4*f*h*m^2 - 896*a^6*b*c^ \\
& 5*f*j^2*k - 864*a^6*b*c^5*f*h^2*m - 558*a^4*b^7*c*f*h*m^2 + 256*a^6*b*c^5*g
\end{aligned}$$

$$\begin{aligned}
& h^2 * l - 40 * a^3 * b^8 * c * d * k * l^2 - 1920 * a^6 * b * c^5 * e * j * k^2 - 384 * a^5 * b * c^6 * e^2 * \\
& h * m + 24 * a^3 * b^8 * c * f * h * l^2 - 16 * a * b^8 * c^3 * d^2 * j * l + 2208 * a^6 * b * c^5 * f * h * k^2 \\
& - 1044 * a^3 * b^8 * c * d * h * m^2 + 800 * a^5 * b * c^6 * f^2 * h * k - 256 * a^5 * b * c^6 * f^2 * g * l + \\
& 144 * a^3 * b^8 * c * e * g * m^2 - 116 * a * b^8 * c^3 * d^2 * h * m + 8192 * a^6 * b * c^5 * d * h * l^2 + 20 \\
& 48 * a^6 * b * c^5 * e * g * l^2 + 24 * a^2 * b^9 * c * d * h * l^2 - 5856 * a^4 * b * c^7 * d^2 * f * m + 4896 \\
& * a^4 * b * c^7 * d^2 * h * k + 2720 * a^6 * b * c^5 * d * f * m^2 + 2304 * a^4 * b * c^7 * d^2 * g * l + 1824 \\
& * a^5 * b * c^6 * d * h^2 * k + 438 * a * b^7 * c^4 * d^2 * f * m - 384 * a^5 * b * c^6 * e * h^2 * j + 318 * a^ \\
& 2 * b^9 * c * d * f * m^2 - 168 * a * b^7 * c^4 * d^2 * g * l + 42 * a * b^7 * c^4 * d^2 * h * k - 36 * a * b^8 * c \\
& ^3 * d * f^2 * m - 2432 * a^4 * b * c^7 * d * e^2 * m + 1536 * a^5 * b * c^6 * e * g * j^2 + 1536 * a^4 * b * c \\
& ^7 * e^2 * g * j - 896 * a^5 * b * c^6 * d * h * j^2 - 896 * a^4 * b * c^7 * e^2 * f * k + 4896 * a^5 * b * c^6 \\
& * d * f * k^2 + 1824 * a^4 * b * c^7 * d * f^2 * k - 384 * a^4 * b * c^7 * e * f^2 * j + 336 * a * b^6 * c^5 * d \\
& ^2 * e * l - 156 * a * b^6 * c^5 * d^2 * f * k + 16 * a * b^6 * c^5 * d^2 * g * j + 12 * a * b^7 * c^4 * d * f^2 * \\
& k - 2 * a * b^9 * c^2 * d * f * k^2 - 1920 * a^3 * b * c^8 * d^2 * e * j - 32 * a * b^5 * c^6 * d^2 * e * j + 2 \\
& 208 * a^3 * b * c^8 * d^2 * f * h + 800 * a^4 * b * c^7 * d * f * h^2 - 102 * a * b^5 * c^6 * d^2 * f * h + 12 * \\
& a * b^6 * c^5 * d * f^2 * h - 2 * a * b^7 * c^4 * d * f * h^2 - 896 * a^3 * b * c^8 * d * e^2 * h - 8 * a * b^6 * c \\
& ^5 * d * f * g^2 - 240 * a * b^4 * c^7 * d^2 * e * g - 32 * a * b^4 * c^7 * d * e^2 * f + 5120 * a^8 * c^4 * h * \\
& j * l * m + 15360 * a^7 * c^5 * d * j * l * m - 7680 * a^7 * c^5 * e * j * k * m + 3072 * a^7 * c^5 * f * j * k * l \\
& + 5120 * a^7 * c^5 * e * h * l * m + 1920 * a^7 * c^5 * f * h * k * m + 15360 * a^6 * c^6 * d * e * l * m + 57 \\
& 60 * a^6 * c^6 * d * f * k * m + 3072 * a^6 * c^6 * e * f * k * l - 3072 * a^6 * c^6 * d * h * j * l - 2560 * a^6 \\
& * c^6 * e * f * j * m + 1536 * a^6 * c^6 * e * h * j * k + 4608 * a^5 * c^7 * d * e * j * k - 3072 * a^5 * c^7 * d \\
& * e * h * l - 1152 * a^5 * c^7 * d * f * h * k + 512 * a^5 * c^7 * e * f * h * j + 1536 * a^4 * c^8 * d * e * f * j \\
& - 8 * a * b^10 * c * d * f * l^2 - 5568 * a^8 * b^2 * c^2 * k * l^2 * m + 15552 * a^8 * b^2 * c^2 * j * l * m^2 \\
& + 4800 * a^7 * b^2 * c^3 * j^2 * k * m - 1280 * a^6 * b^4 * c^2 * j^2 * k * m + 2080 * a^7 * b^3 * c^2 * h \\
& * l^2 * m - 1088 * a^7 * b^2 * c^3 * j * k^2 * l + 48 * a^6 * b^4 * c^2 * j * k^2 * l - 8544 * a^7 * b^2 * c \\
& ^3 * h * k^2 * m - 7776 * a^7 * b^3 * c^2 * g * l * m^2 + 7632 * a^7 * b^3 * c^2 * h * k * m^2 + 3600 * a^6 \\
& * b^3 * c^3 * h^2 * k * m + 2484 * a^6 * b^4 * c^2 * h * k^2 * m - 918 * a^5 * b^5 * c^2 * h^2 * k * m + 480 \\
& 0 * a^7 * b^2 * c^3 * h * k * l^2 - 1424 * a^6 * b^4 * c^2 * h * k * l^2 + 1200 * a^5 * b^4 * c^3 * g^2 * k * m \\
& - 960 * a^6 * b^2 * c^4 * g^2 * k * m - 528 * a^6 * b^4 * c^2 * f * l^2 * m - 416 * a^6 * b^3 * c^3 * h * j^ \\
& 2 * m - 320 * a^4 * b^6 * c^2 * g^2 * k * m + 192 * a^7 * b^2 * c^3 * f * l^2 * m + 96 * a^5 * b^5 * c^2 * h * \\
& j^2 * m + 15552 * a^7 * b^2 * c^3 * e * l * m^2 - 6720 * a^7 * b^2 * c^3 * g * j * m^2 + 6160 * a^6 * b^4 \\
& * c^2 * g * j * m^2 - 4752 * a^6 * b^4 * c^2 * e * l * m^2 - 2016 * a^7 * b^2 * c^3 * f * k * m^2 - 1164 * a \\
& ^6 * b^4 * c^2 * f * k * m^2 + 1104 * a^5 * b^3 * c^4 * f^2 * k * m + 1008 * a^6 * b^3 * c^3 * f * k^2 * m + \\
& 960 * a^6 * b^2 * c^4 * h^2 * j * l - 678 * a^5 * b^5 * c^2 * f * k^2 * m + 544 * a^6 * b^3 * c^3 * g * k^2 * l \\
& - 144 * a^5 * b^4 * c^3 * h^2 * j * l - 102 * a^4 * b^5 * c^3 * f^2 * k * m - 62 * a^3 * b^7 * c^2 * f^2 * k \\
& * m - 24 * a^5 * b^5 * c^2 * g * k^2 * l + 6432 * a^6 * b^3 * c^3 * d * l^2 * m + 4800 * a^5 * b^2 * c^5 * e \\
& ^2 * k * m - 2304 * a^6 * b^2 * c^4 * g * j^2 * l + 1920 * a^6 * b^3 * c^3 * g * j * l^2 + 1728 * a^6 * b^2 \\
& * c^4 * f * j^2 * m - 1280 * a^4 * b^4 * c^4 * e^2 * k * m + 1152 * a^5 * b^3 * c^4 * g^2 * j * l - 1032 * a \\
& ^5 * b^5 * c^2 * d * l^2 * m - 864 * a^6 * b^3 * c^3 * f * k * l^2 - 768 * a^5 * b^5 * c^2 * g * j * l^2 + 40 \\
& 8 * a^5 * b^5 * c^2 * f * k * l^2 + 384 * a^5 * b^4 * c^3 * g * j^2 * l - 288 * a^5 * b^4 * c^3 * f * j^2 * m + \\
& 192 * a^6 * b^2 * c^4 * h * j^2 * k - 192 * a^4 * b^5 * c^3 * g^2 * j * l + 96 * a^3 * b^6 * c^3 * e^2 * k * m \\
& - 32 * a^5 * b^4 * c^3 * h * j^2 * k - 21120 * a^6 * b^2 * c^4 * d * k^2 * m + 20880 * a^6 * b^3 * c^3 * d \\
& * k * m^2 + 19760 * a^4 * b^3 * c^5 * d^2 * k * m - 12320 * a^6 * b^3 * c^3 * e * j * m^2 - 9750 * a^5 * b \\
& ^5 * c^2 * d * k * m^2 - 9390 * a^3 * b^5 * c^4 * d^2 * k * m + 8460 * a^5 * b^4 * c^3 * d * k^2 * m + 3360 \\
& * a^5 * b^5 * c^2 * e * j * m^2 + 1860 * a^2 * b^7 * c^3 * d^2 * k * m - 1218 * a^4 * b^6 * c^2 * d * k^2 * m \\
& - 1088 * a^6 * b^2 * c^4 * e * k^2 * l + 960 * a^6 * b^2 * c^4 * g * j * k^2 - 240 * a^5 * b^4 * c^3 * g * j *
\end{aligned}$$

$$\begin{aligned}
& k^2 + 192a^5b^2c^5f^2j^1 - 104a^4b^5c^3g^2h^1m - 96a^5b^3c^4g^2h^1m + 48a^5b^4c^3e^1k^2 + 48a^4b^4c^4f^2j^1 + 24a^3b^7c^2g^2h^1m + 16a^4b^6c^2g^1j^1k^2 - 16a^3b^6c^3f^2j^1 + 13376a^6b^2c^4d^1k^1l^2 - 5136a^5b^4c^3d^1k^1l^2 - 3840a^6b^2c^4e^1j^1l^2 + 1536a^5b^4c^3e^1j^1l^2 + 1392a^5b^3c^4f^1h^2m + 1386a^5b^5c^2f^1h^1m^2 - 768a^5b^3c^4e^1j^2l^1 + 768a^4b^6c^2d^1k^1l^2 - 768a^4b^3c^5e^2j^1l^1 - 588a^4b^4c^4f^2h^1m - 480a^5b^3c^4g^1h^2l^1 + 480a^5b^3c^4d^1j^2l^1m - 480a^5b^2c^5f^2h^1m - 128a^4b^6c^2e^1j^1l^2 + 100a^3b^6c^3f^2h^1m + 96a^5b^3c^4f^1j^2l^1k + 72a^4b^5c^3g^1h^2l^1 - 54a^4b^5c^3f^1h^2l^1m - 48a^6b^3c^3f^1h^1m^2 - 36a^3b^7c^2f^1h^2l^1m + 6a^2b^8c^2f^2h^1m + 6848a^4b^2c^6d^2j^1l^1 - 2448a^3b^4c^5d^2j^1l^1 + 624a^5b^4c^3f^1h^1l^2 + 576a^6b^2c^4f^1h^1l^2 + 480a^5b^3c^4e^1j^1k^2 + 432a^4b^4c^4f^1g^2l^1m - 416a^4b^3c^5e^2h^1m + 336a^2b^6c^4d^2j^1l^1 - 320a^5b^2c^5f^1g^2l^1m - 256a^4b^6c^2f^1h^1l^2 + 192a^5b^2c^5g^2h^1k + 96a^3b^5c^4e^2h^1m - 72a^3b^6c^3f^1g^2l^1m + 48a^4b^4c^4g^2h^1k - 32a^4b^5c^3e^1j^1k^2 - 8a^3b^6c^3g^2h^1k + 24768a^6b^2c^4d^1h^1m^2 - 21108a^5b^4c^3d^1h^1m^2 - 10048a^4b^2c^6d^2h^1m + 7218a^4b^6c^2d^1h^1m^2 - 6720a^6b^2c^4e^1g^1m^2 + 6160a^5b^4c^3e^1g^1m^2 - 2592a^5b^2c^5d^1h^2l^1m - 1680a^4b^6c^2e^1g^1m^2 + 1068a^3b^4c^5d^2h^1m + 960a^5b^2c^5e^1h^2l^1 - 876a^4b^4c^4d^1h^2l^1m - 864a^5b^2c^5f^1h^2l^1k + 546a^2b^6c^4d^2h^1m + 432a^3b^6c^3d^1h^2l^1m + 336a^4b^3c^5f^2h^1k - 320a^5b^2c^5d^1j^2l^1k + 192a^5b^2c^5g^1h^2l^1j + 144a^5b^3c^4f^1h^1k^2 - 144a^4b^4c^4e^1h^2l^1 - 102a^4b^5c^3f^1h^1k^2 - 96a^4b^3c^5f^2g^1l^1 - 36a^2b^8c^2d^1h^2l^1m - 30a^3b^5c^4f^2h^1k - 24a^3b^5c^4f^2g^1l^1 + 16a^4b^4c^4g^1h^2l^1j - 12a^4b^4c^4f^1h^2l^1k + 12a^3b^6c^3f^1h^2l^1k + 8a^2b^7c^3f^2g^1l^1 + 6a^3b^7c^2f^1h^1k^2 - 2a^2b^7c^3f^2h^1k - 9312a^5b^3c^4d^1h^1l^2 + 3288a^4b^5c^3d^1h^1l^2 - 2304a^4b^2c^6e^2g^1l^1 + 1920a^5b^3c^4e^1g^1l^2 + 1728a^4b^2c^6e^2f^1m + 1152a^4b^3c^5e^1g^2l^1 - 768a^4b^5c^3e^1g^1l^2 - 608a^4b^3c^5d^1g^2l^1m - 472a^3b^7c^2d^1h^1l^2 + 384a^3b^4c^5e^2g^1l^1 - 288a^3b^4c^5e^2f^1m - 224a^4b^3c^5f^1g^2l^1k + 192a^5b^2c^5f^1h^1j^2 + 192a^4b^2c^6e^2h^1k - 192a^3b^5c^4e^1g^2l^1 + 120a^3b^5c^4d^1g^2l^1m + 64a^3b^7c^2e^1g^1l^2 - 32a^3b^4c^5e^2h^1k + 24a^3b^5c^4f^1g^2l^1k + 9936a^3b^3c^6d^2f^1m + 3786a^4b^5c^3d^1f^1m^2 - 3552a^5b^2c^5d^1h^1k^2 - 3486a^2b^5c^5d^2f^1m - 3424a^3b^3c^6d^2g^1l^1 - 1868a^3b^7c^2d^1f^1m^2 + 1332a^4b^4c^4d^1h^1k^2 - 1296a^5b^3c^4d^1f^1m^2 - 1236a^3b^4c^5d^1f^2l^1m + 1224a^2b^5c^5d^2g^1l^1 - 1152a^4b^2c^6d^1f^2l^1m + 960a^5b^2c^5e^1g^1k^2 - 496a^3b^3c^6d^2h^1k + 462a^2b^6c^4d^1f^2l^1m + 432a^4b^3c^5d^1h^2l^1k - 240a^4b^4c^4e^1g^1k^2 - 222a^2b^5c^5d^2h^1k + 192a^4b^2c^6f^2g^1j + 192a^4b^2c^6e^1f^2l^1 - 174a^3b^5c^4d^1h^2l^1k - 156a^3b^6c^3d^1h^1k^2 + 48a^3b^4c^5e^1f^2l^1 - 32a^4b^3c^5e^1h^2l^1j + 16a^3b^6c^3e^1g^1k^2 + 16a^3b^4c^5f^2g^1j - 16a^2b^6c^4e^1f^2l^1 + 12a^2b^7c^3d^1h^2l^1k + 6a^2b^8c^2d^1h^1k^2 + 1728a^5b^2c^5d^1f^1l^2 + 1392a^4b^4c^4d^1f^1l^2 - 840a^3b^6c^3d^1f^1l^2 - 768a^4b^2c^6e^1g^2l^1j + 576a^4b^2c^6d^1g^2l^1k + 480a^3b^3c^6d^1e^2l^1m + 144a^2b^8c^2d^1f^1l^2 + 96a^4b^3c^5d^1h
\end{aligned}$$

$$\begin{aligned}
& *j^2 + 96*a^3*b^3*c^6*e^2*f*k - 80*a^3*b^4*c^5*d*g^2*k + 6848*a^3*b^2*c^7*d \\
& ^2*e*1 - 3552*a^3*b^2*c^7*d^2*f*k - 2448*a^2*b^4*c^6*d^2*e*1 + 1332*a^2*b^4 \\
& *c^6*d^2*f*k + 960*a^3*b^2*c^7*d^2*g*j - 496*a^4*b^3*c^5*d*f*k^2 + 432*a^3* \\
& b^3*c^6*d*f^2*k - 240*a^2*b^4*c^6*d^2*g*j - 222*a^3*b^5*c^4*d*f*k^2 - 174*a \\
& ^2*b^5*c^5*d*f^2*k + 64*a^4*b^2*c^6*f*g^2*h + 48*a^3*b^4*c^5*f*g^2*h + 42*a \\
& ^2*b^7*c^3*d*f*k^2 - 32*a^3*b^3*c^6*e*f^2*j - 320*a^3*b^2*c^7*d*e^2*k + 192 \\
& *a^4*b^2*c^6*e*g*h^2 + 192*a^4*b^2*c^6*d*f*j^2 - 32*a^3*b^4*c^5*d*f*j^2 + 1 \\
& 6*a^3*b^4*c^5*e*g*h^2 + 480*a^2*b^3*c^7*d^2*e*j - 224*a^3*b^3*c^6*d*g^2*h + \\
& 192*a^3*b^2*c^7*e^2*f*h + 24*a^2*b^5*c^5*d*g^2*h - 864*a^3*b^2*c^7*d*f^2*h \\
& + 336*a^3*b^3*c^6*d*f*h^2 + 192*a^3*b^2*c^7*e*f^2*g + 144*a^2*b^3*c^7*d^2* \\
& f*h - 30*a^2*b^5*c^5*d*f*h^2 + 16*a^2*b^4*c^6*e*f^2*g - 12*a^2*b^4*c^6*d*f^ \\
& 2*h + 192*a^3*b^2*c^7*d*f*g^2 + 96*a^2*b^3*c^7*d*e^2*h + 48*a^2*b^4*c^6*d*f \\
& *g^2 + 960*a^2*b^2*c^8*d^2*e*g + 192*a^2*b^2*c^8*d*e^2*f - 7680*a^9*b*c^2*1 \\
& ^2*m^2 + 3152*a^8*b^3*c*1^2*m^2 + 2070*a^7*b^4*c*k^2*m^2 - 1840*a^7*b^3*c^2 \\
& *k^3*m + 6720*a^8*b*c^3*j^2*m^2 - 3072*a^8*b*c^3*k^2*1^2 + 1680*a^6*b^5*c*j \\
& ^2*m^2 - 100*a^6*b^5*c*k^2*1^2 - 2176*a^7*b^3*c^2*j*1^3 - 256*a^6*b^3*c^3*j \\
& ^3*1 - 64*a^5*b^6*c*j^2*1^2 - 12480*a^8*b^2*c^2*h*m^3 + 972*a^5*b^6*c*h^2*m \\
& ^2 - 960*a^7*b*c^4*j^2*k^2 - 252*a^5*b^4*c^3*h^3*m - 192*a^6*b^2*c^4*h^3*m \\
& + 54*a^4*b^6*c^2*h^3*m + 1536*a^7*b*c^4*h^2*1^2 + 420*a^4*b^7*c*g^2*m^2 - 3 \\
& 6*a^4*b^7*c*h^2*1^2 - 3072*a^7*b^2*c^3*g*1^3 + 2096*a^7*b^3*c^2*f*m^3 + 108 \\
& 8*a^6*b^4*c^2*g*1^3 - 496*a^6*b^3*c^3*h*k^3 - 192*a^4*b^4*c^4*g^3*1 + 176*a \\
& ^4*b^3*c^5*f^3*m + 144*a^5*b^3*c^4*h^3*k + 78*a^3*b^8*c*f^2*m^2 + 54*a^3*b^ \\
& 5*c^4*f^3*m + 32*a^3*b^6*c^3*g^3*1 + 30*a^5*b^5*c^2*h*k^3 - 18*a^4*b^5*c^3* \\
& h^3*k - 18*a^2*b^7*c^3*f^3*m - 16*a^3*b^8*c*g^2*1^2 + 6720*a^6*b*c^5*e^2*m^ \\
& 2 - 192*a^6*b*c^5*h^2*j^2 - 4*a^2*b^9*c*f^2*1^2 - 35040*a^7*b^2*c^3*d*m^3 + \\
& 14300*a^6*b^4*c^2*d*m^3 - 12000*a^3*b^2*c^7*d^3*m + 4380*a^2*b^4*c^6*d^3*m \\
& - 2176*a^6*b^3*c^3*e*1^3 - 256*a^3*b^3*c^6*e^3*1 - 192*a^6*b^2*c^4*f*k^3 + \\
& 192*a^5*b^5*c^2*e*1^3 - 192*a^4*b^2*c^6*f^3*k + 132*a^5*b^4*c^3*f*k^3 + 12 \\
& 8*a^4*b^3*c^5*g^3*j - 28*a^3*b^4*c^5*f^3*k - 10*a^4*b^6*c^2*f*k^3 + 6*a^2*b \\
& ^6*c^4*f^3*k + 10752*a^5*b*c^6*d^2*1^2 - 960*a^5*b*c^6*e^2*k^2 - 192*a^5*b* \\
& c^6*f^2*j^2 + 108*a*b^9*c^2*d^2*1^2 - 1680*a^5*b^3*c^4*d*k^3 - 1680*a^2*b^3 \\
& *c^7*d^3*k + 222*a^4*b^5*c^3*d*k^3 + 30*a*b^8*c^3*d^2*k^2 - 10*a^3*b^7*c^2* \\
& d*k^3 - 960*a^4*b*c^7*d^2*j^2 + 80*a^4*b^3*c^5*f*h^3 + 80*a^3*b^3*c^6*f^3*h \\
& + 6*a^3*b^5*c^4*f*h^3 + 6*a^2*b^5*c^5*f^3*h - 192*a^4*b*c^7*e^2*h^2 - 192* \\
& a^4*b^2*c^6*d*h^3 - 192*a^2*b^2*c^8*d^3*h + 128*a^3*b^3*c^6*e*g^3 - 28*a^3* \\
& b^4*c^5*d*h^3 + 12*a*b^6*c^5*d^2*h^2 + 6*a^2*b^6*c^4*d*h^3 - 192*a^3*b*c^8* \\
& e^2*f^2 + 60*a*b^5*c^6*d^2*g^2 + 198*a*b^4*c^7*d^2*f^2 + 144*a^2*b^3*c^7*d* \\
& f^3 - 960*a^2*b*c^9*d^2*e^2 + 240*a*b^3*c^8*d^2*e^2 + 15360*a^9*c^3*k*1^2*m \\
& - 12800*a^9*c^3*j*1*m^2 - 3840*a^8*c^4*j^2*k*m + 432*a^6*b^6*j*1*m^2 + 460 \\
& 8*a^8*c^4*j*k^2*1 + 2880*a^8*c^4*h*k^2*m + 5120*a^8*c^4*f*1^2*m - 3072*a^8* \\
& c^4*h*k*1^2 + 270*a^5*b^7*h*k*m^2 - 216*a^5*b^7*g*1*m^2 - 12800*a^8*c^4*e*1 \\
& *m^2 - 4800*a^8*c^4*f*k*m^2 - 512*a^7*c^5*h^2*j*1 - 3840*a^6*c^6*e^2*k*m - \\
& 1280*a^7*c^5*f*j^2*m + 768*a^7*c^5*h*j^2*k + 144*a^4*b^8*g*j*m^2 - 90*a^4*b \\
& ^8*f*k*m^2 + 8640*a^7*c^5*d*k^2*m + 4608*a^7*c^5*e*k^2*1 + 512*a^6*c^6*f^2* \\
& j*1 - 9216*a^7*c^5*d*k*1^2 - 4096*a^7*c^5*e*j*1^2 + 320*a^6*c^6*f^2*h*m - 9
\end{aligned}$$

$$\begin{aligned}
& 0*a^3*b^9*d*k*m^2 + 15200*a^9*b*c^2*k*m^3 - 6192*a^8*b^3*c*k*m^3 + 5472*a^8 \\
& *b*c^3*k^3*m - 4608*a^5*c^7*d^2*j*1 - 1024*a^7*c^5*f*h*1^2 + 150*a^6*b^5*c \\
& k^3*m + 54*a^3*b^9*f*h*m^2 + 6*b^10*c^2*d^2*h*m - 14400*a^7*c^5*d*h*m^2 + 8 \\
& 640*a^5*c^7*d^2*h*m + 2880*a^6*c^6*d*h^2*m + 2304*a^6*c^6*d*j^2*k - 512*a^6 \\
& *c^6*e*h^2*1 - 192*a^6*c^6*f*h^2*k + 6144*a^8*b*c^3*j*1^3 + 1536*a^7*b*c^4* \\
& j^3*1 - 1280*a^5*c^7*e^2*f*m + 768*a^5*c^7*e^2*h*k + 256*a^6*c^6*f*h*j^2 + \\
& 192*a^6*b^5*c*j*1^3 + 54*a^2*b^10*d*h*m^2 - 18*b^9*c^3*d^2*f*m + 8*b^9*c^3* \\
& d^2*g*1 - 2*b^9*c^3*d^2*h*k + 4068*a^7*b^4*c*h*m^3 - 1728*a^6*c^6*d*h*k^2 + \\
& 960*a^5*c^7*d*f^2*m + 512*a^5*c^7*e*f^2*1 - 3072*a^6*c^6*d*f*1^2 - 16*b^8* \\
& c^4*d^2*e*1 + 6*b^8*c^4*d^2*f*k - 4608*a^4*c^8*d^2*e*1 + 2400*a^8*b*c^3*f*m \\
& ^3 + 2016*a^7*b*c^4*h*k^3 - 1728*a^4*c^8*d^2*f*k - 1146*a^6*b^5*c*f*m^3 + 2 \\
& 24*a^6*b*c^5*h^3*k - 96*a^5*b^6*c*g*1^3 + 96*a^5*b*c^6*f^3*m + 2304*a^4*c^8 \\
& *d*e^2*k + 768*a^5*c^7*d*f*j^2 + 6144*a^7*b*c^4*e*1^3 - 2280*a^5*b^6*c*d*m^ \\
& 3 + 1536*a^4*b*c^7*e^3*1 - 616*a*b^6*c^5*d^3*m + 512*a^6*b*c^5*g*j^3 + 256* \\
& a^4*c^8*e^2*f*h + 240*a*b^10*c*d^2*m^2 + 6*b^7*c^5*d^2*f*h - 192*a^4*c^8*d* \\
& f^2*h + 4320*a^6*b*c^5*d*k^3 + 4320*a^3*b*c^8*d^3*k + 222*a*b^5*c^6*d^3*k + \\
& 16*b^6*c^6*d^2*e*g + 96*a^5*b*c^6*f*h^3 + 96*a^4*b*c^7*f^3*h + 768*a^3*c^9 \\
& *d*e^2*f + 512*a^3*b*c^8*e^3*g + 132*a*b^4*c^7*d^3*h + 2016*a^2*b*c^9*d^3*f \\
& - 496*a*b^3*c^8*d^3*f + 224*a^3*b*c^8*d*f^3 - 18*a*b^5*c^6*d*f^3 - 3264*a^ \\
& 8*b^2*c^2*k^2*m^2 - 6160*a^7*b^3*c^2*j^2*m^2 + 1104*a^7*b^3*c^2*k^2*1^2 - 1 \\
& 920*a^7*b^2*c^3*j^2*1^2 + 768*a^6*b^4*c^2*j^2*1^2 + 3888*a^7*b^2*c^3*h^2*m^ \\
& 2 - 3510*a^6*b^4*c^2*h^2*m^2 + 240*a^6*b^3*c^3*j^2*k^2 - 16*a^5*b^5*c^2*j^2 \\
& *k^2 + 1680*a^6*b^3*c^3*g^2*m^2 - 1648*a^6*b^3*c^3*h^2*1^2 - 1540*a^5*b^5*c \\
& ^2*g^2*m^2 + 444*a^5*b^5*c^2*h^2*1^2 - 960*a^6*b^2*c^4*h^2*k^2 - 576*a^6*b^ \\
& 2*c^4*f^2*m^2 - 512*a^6*b^2*c^4*g^2*1^2 - 480*a^5*b^4*c^3*g^2*1^2 + 198*a^5 \\
& *b^4*c^3*h^2*k^2 + 192*a^4*b^6*c^2*g^2*1^2 - 186*a^5*b^4*c^3*f^2*m^2 - 97*a \\
& ^4*b^6*c^2*f^2*m^2 - 9*a^4*b^6*c^2*h^2*k^2 - 6160*a^5*b^3*c^4*e^2*m^2 + 168 \\
& 0*a^4*b^5*c^3*e^2*m^2 - 240*a^5*b^3*c^4*g^2*k^2 - 240*a^5*b^3*c^4*f^2*1^2 - \\
& 144*a^3*b^7*c^2*e^2*m^2 + 60*a^4*b^5*c^3*g^2*k^2 - 36*a^4*b^5*c^3*f^2*1^2 \\
& + 36*a^3*b^7*c^2*f^2*1^2 - 16*a^5*b^3*c^4*h^2*j^2 - 4*a^3*b^7*c^2*g^2*k^2 + \\
& 38512*a^5*b^2*c^5*d^2*m^2 - 32310*a^4*b^4*c^4*d^2*m^2 + 12720*a^3*b^6*c^3* \\
& d^2*m^2 - 2500*a^2*b^8*c^2*d^2*m^2 - 1920*a^5*b^2*c^5*e^2*1^2 + 768*a^4*b^4 \\
& *c^4*e^2*1^2 - 464*a^5*b^2*c^5*f^2*k^2 - 384*a^5*b^2*c^5*g^2*j^2 - 64*a^3*b \\
& ^6*c^3*e^2*1^2 + 42*a^4*b^4*c^4*f^2*k^2 + 12*a^3*b^6*c^3*f^2*k^2 - 13104*a^ \\
& 4*b^3*c^5*d^2*1^2 + 5628*a^3*b^5*c^4*d^2*1^2 - 1128*a^2*b^7*c^3*d^2*1^2 + 2 \\
& 40*a^4*b^3*c^5*e^2*k^2 - 16*a^4*b^3*c^5*f^2*j^2 - 16*a^3*b^5*c^4*e^2*k^2 - \\
& 2880*a^4*b^2*c^6*d^2*k^2 + 1750*a^3*b^4*c^5*d^2*k^2 - 345*a^2*b^6*c^4*d^2*k \\
& ^2 - 48*a^4*b^3*c^5*g^2*h^2 - 4*a^3*b^5*c^4*g^2*h^2 + 240*a^3*b^3*c^6*d^2*j \\
& ^2 - 192*a^4*b^2*c^6*f^2*h^2 - 42*a^3*b^4*c^5*f^2*h^2 - 16*a^2*b^5*c^5*d^2* \\
& j^2 - 48*a^3*b^3*c^6*f^2*g^2 - 16*a^3*b^3*c^6*e^2*h^2 - 4*a^2*b^5*c^5*f^2*g \\
& ^2 - 464*a^3*b^2*c^7*d^2*h^2 - 384*a^3*b^2*c^7*e^2*g^2 + 42*a^2*b^4*c^6*d^2 \\
& *h^2 - 240*a^2*b^3*c^7*d^2*g^2 - 16*a^2*b^3*c^7*e^2*f^2 - 960*a^2*b^2*c^8*d \\
& ^2*f^2 + 6*b^11*c*d^2*k*m - 18*a*b^11*d*f*m^2 - 7200*a^9*c^3*k^2*m^2 - 324* \\
& a^7*b^5*1^2*m^2 - 225*a^6*b^6*k^2*m^2 - 2048*a^8*c^4*j^2*1^2 - 144*a^5*b^7* \\
& j^2*m^2 - 2400*a^8*c^4*h^2*m^2 - 81*a^4*b^8*h^2*m^2 - 800*a^7*c^5*f^2*m^2 -
\end{aligned}$$

$$\begin{aligned}
& 288a^7c^5h^2k^2 - 36a^3b^9g^2m^2 - 9a^2b^{10}f^2m^2 - 21600a^6c^6d^2m^2 - 2048a^6c^6e^2l^2 - 864a^6c^6f^2k^2 - 2592a^5c^7d^2 \\
& *k^2 - 1536a^5c^7e^2j^2 + 1536a^8b^2c^2l^4 - 32a^5c^7f^2h^2 + 360a^7b^2c^3k^4 - 25a^6b^4c^2k^4 - 864a^4c^8d^2h^2 - 4b^7c^5d \\
& ^2g^2 - 9b^6c^6d^2f^2 - 288a^3c^9d^2f^2 - 24a^5b^2c^5h^4 - 16b^5c^7d^2e^2 - 9a^4b^4c^4h^4 - 16a^3b^4c^5g^4 - 24a^3b^2c^7f \\
& ^4 - 9a^2b^4c^6f^4 - a^2b^8c^2f^2k^2 - a^2b^6c^4f^2h^2 + 630a^7b^5k^3m^3 + 8000a^9c^3h^3m^3 + 320a^7c^5h^3m - 378a^6b^6h^3m^3 + \\
& 126a^5b^7f^3m^3 + 30b^8c^4d^3m + 24000a^8c^4d^3m^3 + 8640a^4c^8d^3m - 1728a^7c^5f^3k^3 - 192a^5c^7f^3k - 4b^{11}c^d^2l^2 + 126a^4b \\
& ^8d^3m^3 - 10b^7c^5d^3k + 4200a^9b^2c^3m^4 - 1024a^6c^6e^3j^3 - 1024a^4c^8e^3j - 144a^7b^4c^3l^4 - 10b^6c^6d^3h - 1728a^3c^9d^3h \\
& - 192a^5c^7d^3h^3 + 30b^5c^7d^3f + 360a^3b^2c^9d^4 - 9b^{12}d^2m^2 - 10000a^{10}c^2m^4 - 4096a^9c^3l^4 - 441a^8b^4m^4 - 1296a^8c^4 \\
& *k^4 - 256a^7c^5j^4 - 16a^6c^6h^4 - 16a^4c^8f^4 - 256a^3c^9e^4 - 25b^4c^8d^4 - 1296a^2c^{10}d^4 - b^{10}c^2d^2k^2 - b^8c^4d^2h^2, \\
& z, k1) * ((6144a^5c^9d + 2048a^6c^8h - 10240a^7c^7m - 288a^2b^6c^6d + 1920a^3b^4c^7d - 5632a^4b^2c^8d + 16a^2b^7c^5f - 192a^3b \\
& ^5c^6f + 768a^4b^3c^7f - 32a^3b^6c^5h + 384a^4b^4c^6h - 1536a^5b^2c^7h + 16a^3b^7c^4k - 192a^4b^5c^5k + 768a^5b^3c^6k - \\
& 48a^3b^8c^3m + 736a^4b^6c^4m - 4224a^5b^4c^5m + 10752a^6b^2c^6m + 16a^3b^8c^5d - 1024a^5b^6c^8f - 1024a^6b^6c^7k) / (8 * (64a^5c^6 \\
& - a^2b^6c^3 + 12a^3b^4c^4 - 48a^4b^2c^5)) + (x * (32a^2b^6c^6e - 2048a^6c^8j - 2048a^5c^9e - 384a^3b^4c^7e + 1536a^4b^2c^8e \\
& - 16a^2b^7c^5g + 192a^3b^5c^6g - 768a^4b^3c^7g + 32a^3b^6c^5j - 384a^4b^4c^6j + 1536a^5b^2c^7j + 32a^2b^9c^3l - 528a^3b^7 \\
& c^4l + 3264a^4b^5c^5l - 8960a^5b^3c^6l + 1024a^5b^6c^8g + 9216a^6b^6c^7l)) / (4 * (64a^5c^6 - a^2b^6c^3 + 12a^3b^4c^4 - 48a^4b^2c^5)) - (root(1572864a^8b^2c^{10}z^4 - 983040a^7b^4c^9z^4 + 327680a^6 \\
& *b^6c^8z^4 - 61440a^5b^8c^7z^4 + 6144a^4b^{10}c^6z^4 - 256a^3b^{12}c^5z^4 - 1048576a^9c^{11}z^4 - 1572864a^8b^2c^8l^3z^3 + 983040a^7b^4 \\
& c^7l^3z^3 - 327680a^6b^6c^6l^3z^3 + 61440a^5b^8c^5l^3z^3 - 6144a^4b^{10}c^4l^3z^3 + 256a^3b^{12}c^3l^3z^3 + 1048576a^9c^9l^3z^3 + 96a^3b \\
& ^{12}c^3k^3m^2z^2 + 98304a^8b^6c^7j^3l^2z^2 + 24576a^8b^6c^7h^3m^2z^2 + 155648a^7b^6c^8d^3m^2z^2 + 98304a^7b^6c^8e^3l^2z^2 + 57344a^7b^6c^8f^3k^2z^2 + 327 \\
& 68a^7b^6c^8g^3j^2z^2 + 57344a^6b^6c^9d^3h^2z^2 + 32768a^6b^6c^9e^3g^2z^2 - 32a^3b^{10}c^5d^3f^2z^2 - 491520a^8b^2c^6k^3m^2z^2 + 358400a^7b^4c^5k^3m \\
& *z^2 - 129024a^6b^6c^4k^3m^2z^2 + 24768a^5b^8c^3k^3m^2z^2 - 2432a^4b^{10}c^2k^3m^2z^2 - 90112a^7b^3c^6j^3l^2z^2 + 30720a^6b^5c^5j^3l^2z^2 - 46 \\
& 08a^5b^7c^4j^3l^2z^2 + 256a^4b^9c^3j^3l^2z^2 - 21504a^6b^5c^5h^3m^2z^2 + 9216a^5b^7c^4h^3m^2z^2 + 8192a^7b^3c^6h^3m^2z^2 - 1568a^4b^9c^3h \\
& h^3m^2z^2 + 96a^3b^{11}c^2h^3m^2z^2 - 172032a^7b^2c^7f^3m^2z^2 + 116736a^6b^4c^6f^3m^2z^2 - 49152a^7b^2c^7g^3l^2z^2 + 45056a^6b^4c^6g^3l^2z^2 - \\
& 35840a^5b^6c^5f^3m^2z^2 + 24576a^7b^2c^7h^3k^2z^2 - 15360a^5b^6c^5g^3l^2z^2 + 5184a^4b^8c^4f^3m^2z^2 - 3072a^5b^6c^5h^3k^2z^2 + 2304a^4b^8
\end{aligned}$$

$$\begin{aligned}
& *c^4*g^1*z^2 + 2048*a^6*b^4*c^6*h*k*z^2 + 576*a^4*b^8*c^4*h*k*z^2 - 288*a^3 \\
& *b^{10}*c^3*f*m*z^2 - 128*a^3*b^{10}*c^3*g^1*z^2 - 32*a^3*b^{10}*c^3*h*k*z^2 - 14 \\
& 7456*a^6*b^3*c^7*d*m*z^2 - 90112*a^6*b^3*c^7*e^1*z^2 + 52224*a^5*b^5*c^6*d* \\
& m*z^2 - 49152*a^6*b^3*c^7*f*k*z^2 + 30720*a^5*b^5*c^6*e^1*z^2 - 24576*a^6*b \\
& ^3*c^7*g^j*z^2 + 15360*a^5*b^5*c^6*f*k*z^2 - 8192*a^4*b^7*c^5*d*m*z^2 + 614 \\
& 4*a^5*b^5*c^6*g^j*z^2 - 4608*a^4*b^7*c^5*e^1*z^2 - 2048*a^4*b^7*c^5*f*k*z^2 \\
& - 512*a^4*b^7*c^5*g^j*z^2 + 480*a^3*b^9*c^4*d*m*z^2 + 256*a^3*b^9*c^4*e^1* \\
& z^2 + 96*a^3*b^9*c^4*f*k*z^2 + 131072*a^6*b^2*c^8*d*k*z^2 + 49152*a^6*b^2*c \\
& ^8*e^j*z^2 - 43008*a^5*b^4*c^7*d*k*z^2 - 12288*a^5*b^4*c^7*e^j*z^2 + 6144*a \\
& ^4*b^6*c^6*d*k*z^2 + 1024*a^4*b^6*c^6*e^j*z^2 - 320*a^3*b^8*c^5*d*k*z^2 + 6 \\
& 144*a^5*b^4*c^7*f*h*z^2 - 2048*a^4*b^6*c^6*f*h*z^2 + 192*a^3*b^8*c^5*f*h*z^ \\
& 2 - 49152*a^5*b^3*c^8*d*h*z^2 - 24576*a^5*b^3*c^8*e*g*z^2 + 15360*a^4*b^5*c \\
& ^7*d*h*z^2 + 6144*a^4*b^5*c^7*e*g*z^2 - 2048*a^3*b^7*c^6*d*h*z^2 - 512*a^3* \\
& b^7*c^6*e*g*z^2 + 96*a^2*b^9*c^5*d*h*z^2 + 24576*a^5*b^2*c^9*d*f*z^2 - 3072 \\
& *a^3*b^6*c^7*d*f*z^2 + 2048*a^4*b^4*c^8*d*f*z^2 + 576*a^2*b^8*c^6*d*f*z^2 - \\
& 430080*a^9*b*c^6*m^2*z^2 + 3408*a^4*b^{11}*c*m^2*z^2 - 64*a^3*b^{12}*c^1^2*z^2 \\
& + 61440*a^8*b*c^7*k^2*z^2 + 12288*a^7*b*c^8*h^2*z^2 + 12288*a^6*b*c^9*f^2* \\
& z^2 + 61440*a^5*b*c^{10}*d^2*z^2 + 432*a*b^9*c^6*d^2*z^2 + 245760*a^9*c^7*k*m \\
& *z^2 + 81920*a^8*c^8*f*m*z^2 - 49152*a^8*c^8*h*k*z^2 - 147456*a^7*c^9*d*k*z \\
& ^2 - 65536*a^7*c^9*e^j*z^2 - 16384*a^7*c^9*f*h*z^2 - 49152*a^6*c^{10}*d*f*z^2 \\
& + 716800*a^8*b^3*c^5*m^2*z^2 - 483840*a^7*b^5*c^4*m^2*z^2 + 170496*a^6*b^7 \\
& *c^3*m^2*z^2 - 33232*a^5*b^9*c^2*m^2*z^2 + 516096*a^8*b^2*c^6*1^2*z^2 - 288 \\
& 768*a^7*b^4*c^5*1^2*z^2 + 88576*a^6*b^6*c^4*1^2*z^2 - 15744*a^5*b^8*c^3*1^2 \\
& *z^2 + 1536*a^4*b^{10}*c^2*1^2*z^2 - 61440*a^7*b^3*c^6*k^2*z^2 + 24064*a^6*b^ \\
& 5*c^5*k^2*z^2 - 4608*a^5*b^7*c^4*k^2*z^2 + 432*a^4*b^9*c^3*k^2*z^2 - 16*a^3 \\
& *b^{11}*c^2*k^2*z^2 + 24576*a^7*b^2*c^7*j^2*z^2 - 6144*a^6*b^4*c^6*j^2*z^2 + \\
& 512*a^5*b^6*c^5*j^2*z^2 - 8192*a^6*b^3*c^7*h^2*z^2 + 1536*a^5*b^5*c^6*h^2*z \\
& ^2 - 16*a^3*b^9*c^4*h^2*z^2 - 8192*a^6*b^2*c^8*g^2*z^2 + 6144*a^5*b^4*c^7*g \\
& ^2*z^2 - 1536*a^4*b^6*c^6*g^2*z^2 + 128*a^3*b^8*c^5*g^2*z^2 - 8192*a^5*b^3* \\
& c^8*f^2*z^2 + 1536*a^4*b^5*c^7*f^2*z^2 - 16*a^2*b^9*c^5*f^2*z^2 + 24576*a^5 \\
& *b^2*c^9*e^2*z^2 - 6144*a^4*b^4*c^8*e^2*z^2 + 512*a^3*b^6*c^7*e^2*z^2 - 614 \\
& 40*a^4*b^3*c^9*d^2*z^2 + 24064*a^3*b^5*c^8*d^2*z^2 - 4608*a^2*b^7*c^7*d^2*z \\
& ^2 - 393216*a^9*c^7*1^2*z^2 - 144*a^3*b^{13}*m^2*z^2 - 32768*a^8*c^8*j^2*z^2 \\
& - 32768*a^6*c^{10}*e^2*z^2 - 16*b^{11}*c^5*d^2*z^2 + 18432*a^8*b*c^5*h^1*m*z - \\
& 96*a^3*b^{10}*c*g*k*m*z + 90112*a^7*b*c^6*e*k*m*z + 36864*a^7*b*c^6*f*j*m*z - \\
& 16384*a^7*b*c^6*g^j*1*z + 14336*a^7*b*c^6*d*1*m*z - 10240*a^7*b*c^6*f*k*1* \\
& z + 4096*a^7*b*c^6*h*j*k*z + 10240*a^7*b*c^6*g*h*m*z - 47104*a^6*b*c^7*d*h* \\
& 1*z + 36864*a^6*b*c^7*e*f*m*z + 30720*a^6*b*c^7*d*g*m*z - 16384*a^6*b*c^7*e \\
& *g^1*z + 6144*a^6*b*c^7*f*g*k*z + 4096*a^6*b*c^7*e*h*k*z + 32*a*b^{10}*c^3*d* \\
& f^1*z - 4096*a^5*b*c^8*d*f*j*z - 6144*a^5*b*c^8*d*g*h*z - 32*a*b^8*c^5*d*f* \\
& g*z - 4096*a^4*b*c^9*d*e*f*z + 64*a*b^7*c^6*d*e*f*z + 110592*a^8*b^2*c^4*k* \\
& 1*m*z - 36864*a^7*b^4*c^3*k^1*m*z + 5376*a^6*b^6*c^2*k^1*m*z - 79872*a^7*b^ \\
& 3*c^4*j*k*m*z + 26112*a^6*b^5*c^3*j*k*m*z - 3712*a^5*b^7*c^2*j*k*m*z - 1382 \\
& 4*a^7*b^3*c^4*h^1*m*z + 3456*a^6*b^5*c^3*h^1*m*z - 288*a^5*b^7*c^2*h^1*m*z \\
& - 45056*a^7*b^2*c^5*g*k*m*z + 39936*a^6*b^4*c^4*g*k*m*z + 30720*a^7*b^2*c^5
\end{aligned}$$

$$\begin{aligned}
& *f*1*m*z - 18432*a^7*b^2*c^5*h*k*1*z - 13056*a^5*b^6*c^3*g*k*m*z - 7680*a^6 \\
& *b^4*c^4*f*1*m*z + 5376*a^6*b^4*c^4*h*j*m*z + 4608*a^6*b^4*c^4*h*k*1*z + 30 \\
& 72*a^7*b^2*c^5*h*j*m*z - 1984*a^5*b^6*c^3*h*j*m*z + 1856*a^4*b^8*c^2*g*k*m* \\
& z + 640*a^5*b^6*c^3*f*1*m*z - 384*a^5*b^6*c^3*h*k*1*z + 192*a^4*b^8*c^2*h*j \\
& *m*z - 79872*a^6*b^3*c^5*e*k*m*z - 27648*a^6*b^3*c^5*f*j*m*z + 26112*a^5*b^ \\
& 5*c^4*e*k*m*z + 12288*a^6*b^3*c^5*g*j*1*z - 10752*a^6*b^3*c^5*d*1*m*z + 768 \\
& 0*a^6*b^3*c^5*f*k*1*z + 6912*a^5*b^5*c^4*f*j*m*z - 3712*a^4*b^7*c^3*e*k*m*z \\
& - 3072*a^6*b^3*c^5*h*j*k*z - 3072*a^5*b^5*c^4*g*j*1*z + 2688*a^5*b^5*c^4*d \\
& *1*m*z - 1920*a^5*b^5*c^4*f*k*1*z + 768*a^5*b^5*c^4*h*j*k*z - 576*a^4*b^7*c \\
& ^3*f*j*m*z + 256*a^4*b^7*c^3*g*j*1*z - 224*a^4*b^7*c^3*d*1*m*z + 192*a^3*b^ \\
& 9*c^2*e*k*m*z + 160*a^4*b^7*c^3*f*k*1*z - 64*a^4*b^7*c^3*h*j*k*z - 2688*a^5 \\
& *b^5*c^4*g*h*m*z - 1536*a^6*b^3*c^5*g*h*m*z + 992*a^4*b^7*c^3*g*h*m*z - 96* \\
& a^3*b^9*c^2*g*h*m*z - 65536*a^6*b^2*c^6*d*k*1*z + 46080*a^6*b^2*c^6*d*j*m*z \\
& - 24576*a^6*b^2*c^6*e*j*1*z + 21504*a^5*b^4*c^5*d*k*1*z - 11520*a^5*b^4*c^ \\
& 5*d*j*m*z + 9216*a^6*b^2*c^6*f*j*k*z + 6144*a^5*b^4*c^5*e*j*1*z - 3072*a^4*b \\
& ^6*c^4*d*k*1*z - 2304*a^5*b^4*c^5*f*j*k*z + 960*a^4*b^6*c^4*d*j*m*z - 512* \\
& a^4*b^6*c^4*e*j*1*z + 192*a^4*b^6*c^4*f*j*k*z + 160*a^3*b^8*c^3*d*k*1*z - 1 \\
& 8432*a^6*b^2*c^6*f*g*m*z + 13824*a^5*b^4*c^5*f*g*m*z + 5376*a^5*b^4*c^5*e*h \\
& *m*z - 3456*a^4*b^6*c^4*f*g*m*z + 3072*a^6*b^2*c^6*e*h*m*z - 3072*a^5*b^4*c \\
& ^5*f*h*1*z - 2048*a^6*b^2*c^6*g*h*k*z - 1984*a^4*b^6*c^4*e*h*m*z + 1536*a^5 \\
& *b^4*c^5*g*h*k*z + 1024*a^4*b^6*c^4*f*h*1*z - 384*a^4*b^6*c^4*g*h*k*z + 288 \\
& *a^3*b^8*c^3*f*g*m*z + 192*a^3*b^8*c^3*e*h*m*z - 96*a^3*b^8*c^3*f*h*1*z + 3 \\
& 2*a^3*b^8*c^3*g*h*k*z + 41472*a^5*b^3*c^6*d*h*1*z - 27648*a^5*b^3*c^6*e*f*m \\
& *z - 23040*a^5*b^3*c^6*d*g*m*z - 13440*a^4*b^5*c^5*d*h*1*z + 12288*a^5*b^3* \\
& c^6*e*g*1*z + 6912*a^4*b^5*c^5*e*f*m*z + 5760*a^4*b^5*c^5*d*g*m*z - 4608*a^ \\
& 5*b^3*c^6*f*g*k*z - 3072*a^5*b^3*c^6*e*h*k*z - 3072*a^4*b^5*c^5*e*g*1*z + 1 \\
& 888*a^3*b^7*c^4*d*h*1*z + 1152*a^4*b^5*c^5*f*g*k*z + 768*a^4*b^5*c^5*e*h*k* \\
& z - 576*a^3*b^7*c^4*e*f*m*z - 480*a^3*b^7*c^4*d*g*m*z + 256*a^3*b^7*c^4*e*g \\
& *1*z - 96*a^3*b^7*c^4*f*g*k*z - 96*a^2*b^9*c^3*d*h*1*z - 64*a^3*b^7*c^4*e*h \\
& *k*z + 46080*a^5*b^2*c^7*d*e*m*z - 11520*a^4*b^4*c^6*d*e*m*z + 9216*a^5*b^2 \\
& *c^7*e*f*k*z - 9216*a^5*b^2*c^7*d*h*j*z - 6656*a^4*b^4*c^6*d*f*1*z - 6144*a \\
& ^5*b^2*c^7*d*f*1*z + 3456*a^3*b^6*c^5*d*f*1*z - 2304*a^4*b^4*c^6*e*f*k*z + \\
& 2304*a^4*b^4*c^6*d*h*j*z + 960*a^3*b^6*c^5*d*e*m*z - 576*a^2*b^8*c^4*d*f*1* \\
& z + 192*a^3*b^6*c^5*e*f*k*z - 192*a^3*b^6*c^5*d*h*j*z + 3072*a^4*b^3*c^7*d* \\
& f*j*z - 768*a^3*b^5*c^6*d*f*j*z + 64*a^2*b^7*c^5*d*f*j*z + 4608*a^4*b^3*c^7 \\
& *d*g*h*z - 1152*a^3*b^5*c^6*d*g*h*z + 96*a^2*b^7*c^5*d*g*h*z - 9216*a^4*b^2 \\
& *c^8*d*e*h*z + 2304*a^3*b^4*c^7*d*e*h*z + 2048*a^4*b^2*c^8*d*f*g*z - 1536*a \\
& ^3*b^4*c^7*d*f*g*z + 384*a^2*b^6*c^6*d*f*g*z - 192*a^2*b^6*c^6*d*e*h*z + 30 \\
& 72*a^3*b^3*c^8*d*e*f*z - 768*a^2*b^5*c^7*d*e*f*z - 288*a^5*b^8*c*k*1*m*z + \\
& 90112*a^8*b*c^5*j*k*m*z + 192*a^4*b^9*c*j*k*m*z + 138240*a^9*b*c^4*1*m^2*z \\
& - 7344*a^6*b^7*c*1*m^2*z + 5088*a^5*b^8*c*j*m^2*z - 3072*a^8*b*c^5*k^2*1*z \\
& - 49152*a^8*b*c^5*j*1^2*z - 128*a^4*b^9*c*j*1^2*z - 25600*a^8*b*c^5*g*m^2*z \\
& - 9216*a^7*b*c^6*h^2*1*z - 2544*a^4*b^9*c*g*m^2*z + 64*a^3*b^10*c*g*1^2*z \\
& + 9216*a^7*b*c^6*g*k^2*z - 3072*a^6*b*c^7*f^2*1*z - 288*a^3*b^10*c*e*m^2*z \\
& - 49152*a^7*b*c^6*e*1^2*z - 58368*a^5*b*c^8*d^2*1*z - 432*a*b^9*c^4*d^2*1*z
\end{aligned}$$

$$\begin{aligned}
& - 1024*a^6*b*c^7*g*h^2*z + 32*a*b^8*c^5*d^2*j*z + 1024*a^5*b*c^8*f^2*g*z - \\
& 9216*a^4*b*c^9*d^2*g*z + 336*a*b^7*c^6*d^2*g*z - 672*a*b^6*c^7*d^2*e*z - 1 \\
& 22880*a^9*c^5*k*l*m*z - 40960*a^8*c^6*f*l*m*z + 24576*a^8*c^6*h*k*l*z - 204 \\
& 80*a^8*c^6*h*j*m*z + 73728*a^7*c^7*d*k*l*z - 61440*a^7*c^7*d*j*m*z + 32768* \\
& a^7*c^7*e*j*l*z - 12288*a^7*c^7*f*j*k*z - 20480*a^7*c^7*e*h*m*z + 8192*a^7* \\
& c^7*f*h*l*z - 61440*a^6*c^8*d*e*m*z + 24576*a^6*c^8*d*f*l*z - 12288*a^6*c^8 \\
& *e*f*k*z + 12288*a^6*c^8*d*h*j*z + 12288*a^5*c^9*d*e*h*z - 131328*a^8*b^3*c \\
& ^3*l*m^2*z + 46656*a^7*b^5*c^2*l*m^2*z - 142848*a^8*b^2*c^4*j*m^2*z + 10636 \\
& 8*a^7*b^4*c^3*j*m^2*z - 34208*a^6*b^6*c^2*j*m^2*z + 2304*a^7*b^3*c^4*k^2*l* \\
& z - 576*a^6*b^5*c^3*k^2*l*z + 48*a^5*b^7*c^2*k^2*l*z + 45056*a^7*b^3*c^4*j* \\
& l^2*z - 15360*a^6*b^5*c^3*j*l^2*z - 12288*a^7*b^2*c^5*j^2*l*z + 3072*a^6*b^ \\
& 4*c^4*j^2*l*z + 2304*a^5*b^7*c^2*j*l^2*z - 256*a^5*b^6*c^3*j^2*l*z + 15872*a \\
& ^7*b^2*c^5*j*k^2*z - 4992*a^6*b^4*c^4*j*k^2*z + 672*a^5*b^6*c^3*j*k^2*z - \\
& 32*a^4*b^8*c^2*j*k^2*z + 71424*a^7*b^3*c^4*g*m^2*z - 53184*a^6*b^5*c^3*g*m^ \\
& 2*z + 17104*a^5*b^7*c^2*g*m^2*z + 6912*a^6*b^3*c^5*h^2*l*z - 1728*a^5*b^5*c \\
& ^4*h^2*l*z + 144*a^4*b^7*c^3*h^2*l*z + 24576*a^7*b^2*c^5*g*l^2*z - 22528*a^ \\
& 6*b^4*c^4*g*l^2*z + 7680*a^5*b^6*c^3*g*l^2*z + 4096*a^6*b^2*c^6*g^2*l*z - 3 \\
& 072*a^5*b^4*c^5*g^2*l*z - 1152*a^4*b^8*c^2*g*l^2*z + 768*a^4*b^6*c^4*g^2*l* \\
& z - 64*a^3*b^8*c^3*g^2*l*z - 142848*a^7*b^2*c^5*e*m^2*z + 106368*a^6*b^4*c^ \\
& 4*e*m^2*z - 34208*a^5*b^6*c^3*e*m^2*z - 7936*a^6*b^3*c^5*g*k^2*z + 5088*a^4 \\
& *b^8*c^2*e*m^2*z + 2496*a^5*b^5*c^4*g*k^2*z - 1536*a^6*b^2*c^6*h^2*j*z + 12 \\
& 80*a^5*b^3*c^6*f^2*l*z + 384*a^5*b^4*c^5*h^2*j*z - 336*a^4*b^7*c^3*g*k^2*z \\
& + 192*a^4*b^5*c^5*f^2*l*z - 144*a^3*b^7*c^4*f^2*l*z - 32*a^4*b^6*c^4*h^2*j* \\
& z + 16*a^3*b^9*c^2*g*k^2*z + 16*a^2*b^9*c^3*f^2*l*z + 45056*a^6*b^3*c^5*e*l \\
& ^2*z - 15360*a^5*b^5*c^4*e*l^2*z - 12288*a^5*b^2*c^7*e^2*l*z + 3072*a^4*b^4 \\
& *c^6*e^2*l*z + 2304*a^4*b^7*c^3*e*l^2*z - 256*a^3*b^6*c^5*e^2*l*z - 128*a^3 \\
& *b^9*c^2*e*l^2*z + 59136*a^4*b^3*c^7*d^2*l*z - 23488*a^3*b^5*c^6*d^2*l*z + \\
& 15872*a^6*b^2*c^6*e*k^2*z - 4992*a^5*b^4*c^5*e*k^2*z + 4560*a^2*b^7*c^5*d^2 \\
& *l*z + 1536*a^5*b^2*c^7*f^2*j*z + 672*a^4*b^6*c^4*e*k^2*z - 384*a^4*b^4*c^6 \\
& *f^2*j*z - 32*a^3*b^8*c^3*e*k^2*z + 32*a^3*b^6*c^5*f^2*j*z + 768*a^5*b^3*c^ \\
& 6*g*h^2*z - 192*a^4*b^5*c^5*g*h^2*z + 16*a^3*b^7*c^4*g*h^2*z - 15872*a^4*b^ \\
& 2*c^8*d^2*j*z + 4992*a^3*b^4*c^7*d^2*j*z - 672*a^2*b^6*c^6*d^2*j*z - 1536*a \\
& ^5*b^2*c^7*e*h^2*z - 768*a^4*b^3*c^7*f^2*g*z + 384*a^4*b^4*c^6*e*h^2*z + 19 \\
& 2*a^3*b^5*c^6*f^2*g*z - 32*a^3*b^6*c^5*e*h^2*z - 16*a^2*b^7*c^5*f^2*g*z + 7 \\
& 936*a^3*b^3*c^8*d^2*g*z - 2496*a^2*b^5*c^7*d^2*g*z + 1536*a^4*b^2*c^8*e*f^2 \\
& *z - 384*a^3*b^4*c^7*e*f^2*z + 32*a^2*b^6*c^6*e*f^2*z - 15872*a^3*b^2*c^9*d \\
& ^2*e*z + 4992*a^2*b^4*c^8*d^2*e*z - 61440*a^8*b^2*c^4*l^3*z + 21504*a^7*b^4 \\
& *c^3*l^3*z - 3328*a^6*b^6*c^2*l^3*z + 432*a^5*b^9*l*m^2*z + 51200*a^9*c^5*j \\
& *m^2*z + 16384*a^8*c^6*j^2*l*z - 288*a^4*b^10*j*m^2*z - 18432*a^8*c^6*j*k^2 \\
& *z + 144*a^3*b^11*g*m^2*z + 51200*a^8*c^6*e*m^2*z + 2048*a^7*c^7*h^2*j*z + \\
& 16384*a^6*c^8*e^2*l*z + 16*b^11*c^3*d^2*l*z - 18432*a^7*c^7*e*k^2*z - 2048* \\
& a^6*c^8*f^2*j*z + 18432*a^5*c^9*d^2*j*z + 192*a^5*b^8*c^1^3*z + 2048*a^6*c^ \\
& 8*e*h^2*z - 16*b^9*c^5*d^2*g*z - 2048*a^5*c^9*e*f^2*z + 32*b^8*c^6*d^2*e*z \\
& + 18432*a^4*c^10*d^2*e*z + 65536*a^9*c^5*l^3*z - 11008*a^8*b*c^3*j*k*l*m - \\
& 288*a^6*b^5*c*j*k*l*m + 144*a^5*b^6*c*g*k*l*m - 11008*a^7*b*c^4*e*k*l*m - 5
\end{aligned}$$

$$\begin{aligned}
& 376a^7b^4c^4f^j * 1^m + 3840a^7b^4c^4g^j * k^m - 3328a^7b^4c^4h^j * k^m - 9 \\
& 6a^4b^7c^4g^j * k^m - 2560a^7b^4c^4g^h * 1^m - 36a^3b^8c^4f^h * k^m - 6912a^6 \\
& b^4c^5d^j * k^m - 7872a^6b^4c^5d^h * k^m - 7680a^6b^4c^5d^g * 1^m - 5376a^6 \\
& b^4c^5e^f * 1^m + 3840a^6b^4c^5e^g * k^m - 3328a^6b^4c^5e^h * k^m - 1536a^6 \\
& b^4c^5f^g * k^m + 1280a^6b^4c^5f^g * j^m - 768a^6b^4c^5g^h * j^k - 768a^6 \\
& b^4c^5f^h * j^1 - 768a^6b^4c^5e^h * j^m - 36a^2b^9c^4d^h * k^m - 6912a^5b^4 \\
& c^6d^e * k^1 - 4864a^5b^4c^6d^e * j^m - 2304a^5b^4c^6d^g * j^k - 1792a^5b^4 \\
& c^6e^f * j^k - 1280a^5b^4c^6d^f * j^1 - 4544a^5b^4c^6d^f * h^m + 1536a^5b^4 \\
& c^6d^g * h^1 + 1280a^5b^4c^6e^f * g^m - 768a^5b^4c^6e^g * h^k - 768a^5b^4c^6 \\
& e^f * h^1 - 256a^5b^4c^6f^g * h^j + 12a^4b^9c^2d^f * h^m + 16a^4b^8c^3d^f \\
& g^1 - 4a^4b^8c^3d^f * h^k - 2304a^4b^4c^7d^e * g^k - 1792a^4b^4c^7d^e * h \\
& j - 1280a^4b^4c^7d^e * f^1 - 768a^4b^4c^7d^f * g^j - 32a^4b^7c^4d^e * f^1 \\
& - 256a^4b^4c^7e^f * g^h - 768a^3b^4c^8d^e * f^g + 32a^4b^5c^6d^e * f^g + 12 \\
& a^4b^10c^4d^f * k^m + 3648a^7b^3c^2j^k * 1^m + 5504a^7b^2c^3g^k * 1^m - 1 \\
& 824a^6b^4c^2g^k * 1^m + 384a^7b^2c^3h^j * 1^m - 288a^6b^4c^2h^j * 1^m \\
& - 4800a^6b^3c^3g^j * k^m + 3648a^6b^3c^3e^k * 1^m + 1280a^5b^5c^2g^j \\
& k^m + 1088a^6b^3c^3f^j * 1^m + 576a^6b^3c^3h^j * k^1 - 288a^5b^5c^2e^k * 1^m \\
& - 192a^6b^3c^3g^h * 1^m + 144a^5b^5c^2g^h * 1^m + 9600a^6b^2c^4e^j * k^m \\
& - 4224a^6b^2c^4d^j * 1^m - 2560a^5b^4c^3e^j * k^m + 384a^6b^2c^4f^j * k^1 \\
& + 224a^5b^4c^3d^j * 1^m + 192a^4b^6c^2e^j * k^m - 160a^5b^4c^3f^j * k^1 \\
& - 4608a^6b^2c^4f^h * k^m + 2688a^6b^2c^4f^g * 1^m + 1664a^6b^2c^4g^h * k^1 \\
& - 744a^5b^4c^3f^h * k^m - 544a^5b^4c^3f^g * 1^m + 492a^4b^6c^2f^h * k^m \\
& + 416a^5b^4c^3g^h * j^m + 384a^6b^2c^4g^h * j^m + 384a^6b^2c^4e^h * 1^m \\
& - 288a^5b^4c^3g^h * k^1 - 288a^5b^4c^3e^h * 1^m - 96a^4b^6c^2g^h * j^m \\
& + 2112a^5b^3c^4d^j * k^1 - 160a^4b^5c^3d^j * k^1 + 16992a^5b^3c^4d^h * k^m \\
& - 6252a^4b^5c^3d^h * k^m - 4800a^5b^3c^4e^g * k^m + 2112a^5b^3c^4d^g * 1^m \\
& - 1728a^5b^3c^4f^g * j^m + 1280a^4b^5c^3e^g * k^m + 1088a^5b^3c^4e^f * 1^m \\
& - 832a^5b^3c^4e^h * j^m + 816a^3b^7c^2d^h * k^m + 576a^5b^3c^4e^h * k^1 - 448a^5 \\
& b^3c^4f^h * j^1 + 288a^4b^5c^3f^g * j^m - 192a^5b^3c^4g^h * j^k - 192a^5b^3c^4 \\
& f^g * k^1 + 192a^4b^5c^3e^h * j^m - 112a^4b^5c^3d^g * 1^m + 96a^4b^5c^3f^h * j^1 \\
& - 96a^3b^7c^2e^g * k^m + 80a^4b^5c^3f^g * k^1 + 32a^4b^5c^3g^h * j^k - 11456 \\
& a^5b^2c^5d^f * k^m + 4992a^5b^2c^5d^h * j^1 - 4608a^5b^2c^5e^g * j^1 - 4224a^5 \\
& b^2c^5d^e * 1^m + 3456a^5b^2c^5e^f * j^m + 3456a^5b^2c^5d^g * k^1 + 2432a^5b^2c^5 \\
& d^g * j^m - 1312a^4b^4c^4d^h * j^1 + 1272a^3b^6c^3d^f * k^m - 1056a^4b^4c^4d^g * k^1 \\
& + 896a^5b^2c^5f^g * j^k + 768a^4b^4c^4e^g * j^1 - 576a^4b^4c^4e^f * j^m - 480a^4 \\
& b^4c^4d^g * j^m + 384a^5b^2c^5e^h * j^k + 384a^5b^2c^5e^f * k^1 - 232a^2b^8c^2 \\
& d^f * k^m + 224a^4b^4c^4d^e * 1^m - 160a^4b^4c^4e^f * k^1 - 96a^4b^4c^4f^g * j^k \\
& + 96a^3b^6c^3d^h * j^1 + 80a^3b^6c^3d^g * k^1 - 64a^4b^4c^4e^h * j^k - 24a^4b^4 \\
& c^4d^f * k^m + 416a^4b^4c^4e^g * h^m + 384a^5b^2c^5f^g * h^1 + 384a^5b^2c^5e^g * h^m \\
& + 224a^4b^4c^4f^g * h^1 - 96a^3b^6c^3e^g * h^m - 48a^3b^6c^3f^g * h^1 + 2112a^4b^3c^5 \\
& d^e * k^1 - 960a^4b^3c^5d^f * j^1 + 960a^4b^3c^5d^e * j^m + 384a^3b^5c^4d^f * j^1 \\
& + 320a^4b^3c^5d^g * j^k + 192a^4b^3c^5e^f * j^k - 160a^3b^5c^4d^*
\end{aligned}$$

$$\begin{aligned}
& e*k*1 - 32*a^2*b^7*c^3*d*f*j*1 + 7392*a^4*b^3*c^5*d*f*h*m - 2496*a^4*b^3*c^5*d*g*h*1 - 1728*a^4*b^3*c^5*e*f*g*m - 1500*a^3*b^5*c^4*d*f*h*m + 656*a^3*b^5*c^4*d*g*h*1 - 448*a^4*b^3*c^5*e*f*h*1 + 288*a^3*b^5*c^4*e*f*g*m - 192*a^4*b^3*c^5*f*g*h*j - 192*a^4*b^3*c^5*e*g*h*k + 96*a^3*b^5*c^4*e*f*h*1 - 48*a^2*b^7*c^3*d*g*h*1 + 32*a^3*b^5*c^4*e*g*h*k - 16*a^2*b^7*c^3*d*f*h*m - 640*a^4*b^2*c^6*d*e*j*k + 4992*a^4*b^2*c^6*d*e*h*1 - 3584*a^4*b^2*c^6*d*f*h*k + 2432*a^4*b^2*c^6*d*e*g*m - 1312*a^3*b^4*c^5*d*e*h*1 + 896*a^4*b^2*c^6*e*f*g*k + 896*a^4*b^2*c^6*d*g*h*j + 640*a^4*b^2*c^6*d*f*g*1 + 600*a^3*b^4*c^5*d*f*h*k + 480*a^3*b^4*c^5*d*f*g*1 - 480*a^3*b^4*c^5*d*e*g*m + 384*a^4*b^2*c^6*e*f*h*j - 192*a^2*b^6*c^4*d*f*g*1 - 96*a^3*b^4*c^5*e*f*g*k - 96*a^3*b^4*c^5*d*g*h*j + 96*a^2*b^6*c^4*d*e*h*1 + 12*a^2*b^6*c^4*d*f*h*k - 960*a^3*b^3*c^6*d*e*f*1 + 384*a^2*b^5*c^5*d*e*f*1 + 320*a^3*b^3*c^6*d*e*g*k - 192*a^3*b^3*c^6*d*f*g*j + 192*a^3*b^3*c^6*d*e*h*j + 32*a^2*b^5*c^5*d*f*g*j - 192*a^3*b^3*c^6*e*f*g*h + 384*a^3*b^2*c^7*d*e*f*j - 64*a^2*b^4*c^6*d*e*f*j + 896*a^3*b^2*c^7*d*e*g*h - 96*a^2*b^4*c^6*d*e*g*h - 192*a^2*b^3*c^7*d*e*f*g + 496*a^7*b^4*c*k*1^2*m - 4752*a^7*b^4*c*j*1*m^2 + 96*a^5*b^6*c*j^2*k*m - 6144*a^8*b*c^3*h*1^2*m - 168*a^6*b^5*c*h*1^2*m + 6400*a^8*b*c^3*g*1*m^2 - 2862*a^6*b^5*c*h*k*m^2 + 2376*a^6*b^5*c*g*1*m^2 - 1632*a^7*b*c^4*h^2*k*m - 480*a^8*b*c^3*h*k*m^2 - 180*a^5*b^6*c*h*k^2*m + 54*a^4*b^7*c*h^2*k*m - 384*a^7*b*c^4*h*j^2*m + 120*a^5*b^6*c*h*k*1^2 + 56*a^5*b^6*c*f*1^2*m + 24*a^3*b^8*c*g^2*k*m + 4512*a^7*b*c^4*f*k^2*m - 2304*a^7*b*c^4*g*k^2*1 - 1680*a^5*b^6*c*g*j*m^2 + 1184*a^6*b*c^5*f^2*k*m + 804*a^5*b^6*c*f*k*m^2 + 432*a^5*b^6*c*e*1*m^2 + 60*a^4*b^7*c*f*k^2*m + 6*a^2*b^9*c*f^2*k*m - 13312*a^7*b*c^4*d*1^2*m + 2048*a^7*b*c^4*g*j*1^2 - 1024*a^7*b*c^4*f*k*1^2 + 64*a^4*b^7*c*g*j*1^2 + 56*a^4*b^7*c*d*1^2*m - 40*a^4*b^7*c*f*k*1^2 + 13440*a^7*b*c^4*e*j*m^2 - 8928*a^5*b*c^6*d^2*k*m - 6240*a^7*b*c^4*d*k*m^2 + 1614*a^4*b^7*c*d*k*m^2 - 288*a^4*b^7*c*e*j*m^2 - 170*a*b^9*c^2*d^2*k*m + 60*a^3*b^8*c*d*k^2*m + 4608*a^6*b*c^5*e*j^2*1 + 4608*a^5*b*c^6*e^2*j*1 - 2432*a^6*b*c^5*d*j^2*m + 1440*a^7*b*c^4*f*h*m^2 - 896*a^6*b*c^5*f*j^2*k - 864*a^6*b*c^5*f*h^2*m - 558*a^4*b^7*c*f*h*m^2 + 256*a^6*b*c^5*g*h^2*1 - 40*a^3*b^8*c*d*k*1^2 - 1920*a^6*b*c^5*e*j*k^2 - 384*a^5*b*c^6*e^2*h*m + 24*a^3*b^8*c*f*h*1^2 - 16*a*b^8*c^3*d^2*j*1 + 2208*a^6*b*c^5*f*h*k^2 - 1044*a^3*b^8*c*d*h*m^2 + 800*a^5*b*c^6*f^2*h*k - 256*a^5*b*c^6*f^2*g*1 + 144*a^3*b^8*c*e*g*m^2 - 116*a*b^8*c^3*d^2*h*m + 8192*a^6*b*c^5*d*h*1^2 + 2048*a^6*b*c^5*e*g*1^2 + 24*a^2*b^9*c*d*h*1^2 - 5856*a^4*b*c^7*d^2*f*m + 4896*a^4*b*c^7*d^2*h*k + 2720*a^6*b*c^5*d*f*m^2 + 2304*a^4*b*c^7*d^2*g*1 + 1824*a^5*b*c^6*d*h^2*k + 438*a*b^7*c^4*d^2*f*m - 384*a^5*b*c^6*e*h^2*j + 318*a^2*b^9*c*d*f*m^2 - 168*a*b^7*c^4*d^2*g*1 + 42*a*b^7*c^4*d^2*h*k - 36*a*b^8*c^3*d*f^2*m - 2432*a^4*b*c^7*d*e^2*m + 1536*a^5*b*c^6*e*g*j^2 + 1536*a^4*b*c^7*e^2*g*j - 896*a^5*b*c^6*d*h*j^2 - 896*a^4*b*c^7*e^2*f*k + 4896*a^5*b*c^6*d*f*k^2 + 1824*a^4*b*c^7*d*f^2*k - 384*a^4*b*c^7*e*f^2*j + 336*a*b^6*c^5*d^2*e*1 - 156*a*b^6*c^5*d^2*f*k + 16*a*b^6*c^5*d^2*g*j + 12*a*b^7*c^4*d*f^2*k - 2*a*b^9*c^2*d*f*k^2 - 1920*a^3*b*c^8*d^2*e*j - 32*a*b^5*c^6*d^2*e*j + 2208*a^3*b*c^8*d^2*f*h + 800*a^4*b*c^7*d*f*h^2 - 102*a*b^5*c^6*d^2*f*h + 12*a*b^6*c^5*d*f^2*h - 2*a*b^7*c^4*d*f*h^2 - 896*a^3*b*c^8*d*e^2*h - 8*a*b^6*c^5*d*f*g^2 - 240*a*b^4*c^7*d^2*e*g - 32*a*b^4
\end{aligned}$$

$$\begin{aligned}
& *c^7*d*e^2*f + 5120*a^8*c^4*h*j*l*m + 15360*a^7*c^5*d*j*l*m - 7680*a^7*c^5* \\
& e*j*k*m + 3072*a^7*c^5*f*j*k*l + 5120*a^7*c^5*e*h*l*m + 1920*a^7*c^5*f*h*k* \\
& m + 15360*a^6*c^6*d*e*l*m + 5760*a^6*c^6*d*f*k*m + 3072*a^6*c^6*e*f*k*l - 3 \\
& 072*a^6*c^6*d*h*j*l - 2560*a^6*c^6*e*f*j*m + 1536*a^6*c^6*e*h*j*k + 4608*a^ \\
& 5*c^7*d*e*j*k - 3072*a^5*c^7*d*e*h*l - 1152*a^5*c^7*d*f*h*k + 512*a^5*c^7*e \\
& *f*h*j + 1536*a^4*c^8*d*e*f*j - 8*a*b^10*c*d*f*l^2 - 5568*a^8*b^2*c^2*k*l^2 \\
& *m + 15552*a^8*b^2*c^2*j*l*m^2 + 4800*a^7*b^2*c^3*j^2*k*m - 1280*a^6*b^4*c^ \\
& 2*j^2*k*m + 2080*a^7*b^3*c^2*h*l^2*m - 1088*a^7*b^2*c^3*j*k^2*l + 48*a^6*b^ \\
& 4*c^2*j*k^2*l - 8544*a^7*b^2*c^3*h*k^2*m - 7776*a^7*b^3*c^2*g*l*m^2 + 7632* \\
& a^7*b^3*c^2*h*k*m^2 + 3600*a^6*b^3*c^3*h^2*k*m + 2484*a^6*b^4*c^2*h*k^2*m - \\
& 918*a^5*b^5*c^2*h^2*k*m + 4800*a^7*b^2*c^3*h*k*l^2 - 1424*a^6*b^4*c^2*h*k* \\
& l^2 + 1200*a^5*b^4*c^3*g^2*k*m - 960*a^6*b^2*c^4*g^2*k*m - 528*a^6*b^4*c^2* \\
& f*l^2*m - 416*a^6*b^3*c^3*h*j^2*m - 320*a^4*b^6*c^2*g^2*k*m + 192*a^7*b^2*c \\
& ^3*f*l^2*m + 96*a^5*b^5*c^2*h*j^2*m + 15552*a^7*b^2*c^3*e*l*m^2 - 6720*a^7* \\
& b^2*c^3*g*j*m^2 + 6160*a^6*b^4*c^2*g*j*m^2 - 4752*a^6*b^4*c^2*e*l*m^2 - 201 \\
& 6*a^7*b^2*c^3*f*k*m^2 - 1164*a^6*b^4*c^2*f*k*m^2 + 1104*a^5*b^3*c^4*f^2*k*m \\
& + 1008*a^6*b^3*c^3*f*k^2*m + 960*a^6*b^2*c^4*h^2*j*l - 678*a^5*b^5*c^2*f*k \\
& ^2*m + 544*a^6*b^3*c^3*g*k^2*l - 144*a^5*b^4*c^3*h^2*j*l - 102*a^4*b^5*c^3* \\
& f^2*k*m - 62*a^3*b^7*c^2*f^2*k*m - 24*a^5*b^5*c^2*g*k^2*l + 6432*a^6*b^3*c^ \\
& 3*d*l^2*m + 4800*a^5*b^2*c^5*e^2*k*m - 2304*a^6*b^2*c^4*g*j^2*l + 1920*a^6* \\
& b^3*c^3*g*j*l^2 + 1728*a^6*b^2*c^4*f*j^2*m - 1280*a^4*b^4*c^4*e^2*k*m + 115 \\
& 2*a^5*b^3*c^4*g^2*j*l - 1032*a^5*b^5*c^2*d*l^2*m - 864*a^6*b^3*c^3*f*k*l^2 \\
& - 768*a^5*b^5*c^2*g*j*l^2 + 408*a^5*b^5*c^2*f*k*l^2 + 384*a^5*b^4*c^3*g*j^2 \\
& *l - 288*a^5*b^4*c^3*f*j^2*m + 192*a^6*b^2*c^4*h*j^2*k - 192*a^4*b^5*c^3*g^ \\
& 2*j*l + 96*a^3*b^6*c^3*e^2*k*m - 32*a^5*b^4*c^3*h*j^2*k - 21120*a^6*b^2*c^4 \\
& *d*k^2*m + 20880*a^6*b^3*c^3*d*k*m^2 + 19760*a^4*b^3*c^5*d^2*k*m - 12320*a^ \\
& 6*b^3*c^3*e*j*m^2 - 9750*a^5*b^5*c^2*d*k*m^2 - 9390*a^3*b^5*c^4*d^2*k*m + 8 \\
& 460*a^5*b^4*c^3*d*k^2*m + 3360*a^5*b^5*c^2*e*j*m^2 + 1860*a^2*b^7*c^3*d^2*k \\
& *m - 1218*a^4*b^6*c^2*d*k^2*m - 1088*a^6*b^2*c^4*e*k^2*l + 960*a^6*b^2*c^4* \\
& g*j*k^2 - 240*a^5*b^4*c^3*g*j*k^2 + 192*a^5*b^2*c^5*f^2*j*l - 104*a^4*b^5*c \\
& ^3*g^2*h*m - 96*a^5*b^3*c^4*g^2*h*m + 48*a^5*b^4*c^3*e*k^2*l + 48*a^4*b^4*c \\
& ^4*f^2*j*l + 24*a^3*b^7*c^2*g^2*h*m + 16*a^4*b^6*c^2*g*j*k^2 - 16*a^3*b^6*c \\
& ^3*f^2*j*l + 13376*a^6*b^2*c^4*d*k*l^2 - 5136*a^5*b^4*c^3*d*k*l^2 - 3840*a^ \\
& 6*b^2*c^4*e*j*l^2 + 1536*a^5*b^4*c^3*e*j*l^2 + 1392*a^5*b^3*c^4*f*h^2*m + 1 \\
& 386*a^5*b^5*c^2*f*h*m^2 - 768*a^5*b^3*c^4*e*j^2*l + 768*a^4*b^6*c^2*d*k*l^2 \\
& - 768*a^4*b^3*c^5*e^2*j*l - 588*a^4*b^4*c^4*f^2*h*m - 480*a^5*b^3*c^4*g*h^ \\
& 2*l + 480*a^5*b^3*c^4*d*j^2*m - 480*a^5*b^2*c^5*f^2*h*m - 128*a^4*b^6*c^2*e \\
& *j*l^2 + 100*a^3*b^6*c^3*f^2*h*m + 96*a^5*b^3*c^4*f*j^2*k + 72*a^4*b^5*c^3* \\
& g*h^2*l - 54*a^4*b^5*c^3*f*h^2*m - 48*a^6*b^3*c^3*f*h*m^2 - 36*a^3*b^7*c^2* \\
& f*h^2*m + 6*a^2*b^8*c^2*f^2*h*m + 6848*a^4*b^2*c^6*d^2*j*l - 2448*a^3*b^4*c \\
& ^5*d^2*j*l + 624*a^5*b^4*c^3*f*h*l^2 + 576*a^6*b^2*c^4*f*h*l^2 + 480*a^5*b^ \\
& 3*c^4*e*j*k^2 + 432*a^4*b^4*c^4*f*g^2*m - 416*a^4*b^3*c^5*e^2*h*m + 336*a^2 \\
& *b^6*c^4*d^2*j*l - 320*a^5*b^2*c^5*f*g^2*m - 256*a^4*b^6*c^2*f*h*l^2 + 192* \\
& a^5*b^2*c^5*g^2*h*k + 96*a^3*b^5*c^4*e^2*h*m - 72*a^3*b^6*c^3*f*g^2*m + 48* \\
& a^4*b^4*c^4*g^2*h*k - 32*a^4*b^5*c^3*e*j*k^2 - 8*a^3*b^6*c^3*g^2*h*k + 2476
\end{aligned}$$

$$\begin{aligned}
& 8a^6b^2c^4d^2hm^2 - 21108a^5b^4c^3d^2hm^2 - 10048a^4b^2c^6d^2hm \\
& *m + 7218a^4b^6c^2d^2hm^2 - 6720a^6b^2c^4e^2gm^2 + 6160a^5b^4c^3 \\
& *e^2gm^2 - 2592a^5b^2c^5d^2hm^2 - 1680a^4b^6c^2e^2gm^2 + 1068a^3b \\
& ^4c^5d^2hm + 960a^5b^2c^5e^2h^2*1 - 876a^4b^4c^4d^2hm^2 - 864a^ \\
& 5b^2c^5f^2h^2*k + 546a^2b^6c^4d^2hm + 432a^3b^6c^3d^2hm^2 + 336 \\
& *a^4b^3c^5f^2h^2*k - 320a^5b^2c^5d^2j^2*k + 192a^5b^2c^5g^2h^2*j + \\
& 144a^5b^3c^4f^2h^2*k^2 - 144a^4b^4c^4e^2h^2*1 - 102a^4b^5c^3f^2h^2*k^2 \\
& - 96a^4b^3c^5f^2g^2*1 - 36a^2b^8c^2d^2hm^2 - 30a^3b^5c^4f^2h^2*k \\
& - 24a^3b^5c^4f^2g^2*1 + 16a^4b^4c^4g^2h^2*j - 12a^4b^4c^4f^2h^2*k \\
& + 12a^3b^6c^3f^2h^2*k + 8a^2b^7c^3f^2g^2*1 + 6a^3b^7c^2f^2h^2*k^2 - \\
& 2a^2b^7c^3f^2h^2*k - 9312a^5b^3c^4d^2hm^2 + 3288a^4b^5c^3d^2hm^2 \\
& 2 - 2304a^4b^2c^6e^2g^2*1 + 1920a^5b^3c^4e^2g^2*1^2 + 1728a^4b^2c^6e \\
& ^2f^2m + 1152a^4b^3c^5e^2g^2*1 - 768a^4b^5c^3e^2g^2*1^2 - 608a^4b^3c \\
& ^5d^2g^2m - 472a^3b^7c^2d^2hm^2 + 384a^3b^4c^5e^2g^2*1 - 288a^3b \\
& ^4c^5e^2f^2m - 224a^4b^3c^5f^2g^2*k + 192a^5b^2c^5f^2h^2*j^2 + 192a^ \\
& 4b^2c^6e^2h^2*k - 192a^3b^5c^4e^2g^2*1 + 120a^3b^5c^4d^2g^2m + 64a \\
& ^3b^7c^2e^2g^2*1^2 - 32a^3b^4c^5e^2h^2*k + 24a^3b^5c^4f^2g^2*k + 993 \\
& 6a^3b^3c^6d^2f^2m + 3786a^4b^5c^3d^2f^2m^2 - 3552a^5b^2c^5d^2hm^2 \\
& - 3486a^2b^5c^5d^2f^2m - 3424a^3b^3c^6d^2g^2*1 - 1868a^3b^7c^2d \\
& ^2f^2m^2 + 1332a^4b^4c^4d^2hm^2 - 1296a^5b^3c^4d^2f^2m^2 - 1236a^3b^4 \\
& *c^5d^2f^2m + 1224a^2b^5c^5d^2g^2*1 - 1152a^4b^2c^6d^2f^2m + 960a^ \\
& 5b^2c^5e^2g^2*k^2 - 496a^3b^3c^6d^2hm^2 + 462a^2b^6c^4d^2f^2m + 432 \\
& *a^4b^3c^5d^2hm^2*k - 240a^4b^4c^4e^2g^2*k^2 - 222a^2b^5c^5d^2hm^2*k + \\
& 192a^4b^2c^6f^2g^2*j + 192a^4b^2c^6e^2f^2*1 - 174a^3b^5c^4d^2hm^2*k \\
& - 156a^3b^6c^3d^2hm^2*k^2 + 48a^3b^4c^5e^2f^2*1 - 32a^4b^3c^5e^2h^2* \\
& j + 16a^3b^6c^3e^2g^2*k^2 + 16a^3b^4c^5f^2g^2*j - 16a^2b^6c^4e^2f^2* \\
& 1 + 12a^2b^7c^3d^2hm^2*k + 6a^2b^8c^2d^2hm^2*k^2 + 1728a^5b^2c^5d^2f^2 \\
& ^2 + 1392a^4b^4c^4d^2f^2*1^2 - 840a^3b^6c^3d^2f^2*1^2 - 768a^4b^2c^6e \\
& ^2g^2*j + 576a^4b^2c^6d^2g^2*k + 480a^3b^3c^6d^2e^2m + 144a^2b^8c^ \\
& ^2d^2f^2*1^2 + 96a^4b^3c^5d^2hm^2*j^2 + 96a^3b^3c^6e^2f^2*k - 80a^3b^4c^ \\
& ^5d^2g^2*k + 6848a^3b^2c^7d^2e^2*1 - 3552a^3b^2c^7d^2f^2*k - 2448a^2* \\
& b^4c^6d^2e^2*1 + 1332a^2b^4c^6d^2f^2*k + 960a^3b^2c^7d^2g^2*j - 496a \\
& ^4b^3c^5d^2f^2*k^2 + 432a^3b^3c^6d^2f^2*k - 240a^2b^4c^6d^2g^2*j - 2 \\
& 22a^3b^5c^4d^2f^2*k^2 - 174a^2b^5c^5d^2f^2*k + 64a^4b^2c^6f^2g^2*h + \\
& 48a^3b^4c^5f^2g^2*h + 42a^2b^7c^3d^2f^2*k^2 - 32a^3b^3c^6e^2f^2*j - \\
& 320a^3b^2c^7d^2e^2*k + 192a^4b^2c^6e^2g^2*h^2 + 192a^4b^2c^6d^2f^2*j^ \\
& 2 - 32a^3b^4c^5d^2f^2*j^2 + 16a^3b^4c^5e^2g^2*h^2 + 480a^2b^3c^7d^2e \\
& ^2*j - 224a^3b^3c^6d^2g^2*h + 192a^3b^2c^7e^2f^2*h + 24a^2b^5c^5d^2g \\
& ^2*h - 864a^3b^2c^7d^2f^2*h + 336a^3b^3c^6d^2f^2*h^2 + 192a^3b^2c^7* \\
& e^2f^2*g + 144a^2b^3c^7d^2f^2*h - 30a^2b^5c^5d^2f^2*h^2 + 16a^2b^4c^6 \\
& *e^2f^2*g - 12a^2b^4c^6d^2f^2*h + 192a^3b^2c^7d^2f^2*g^2 + 96a^2b^3c^ \\
& ^7d^2e^2*h + 48a^2b^4c^6d^2f^2*g^2 + 960a^2b^2c^8d^2e^2g + 192a^2b^2* \\
& c^8d^2e^2*f - 7680a^9b^2c^2*1^2m^2 + 3152a^8b^3c^2*1^2m^2 + 2070a^7b^ \\
& 4c^2k^2m^2 - 1840a^7b^3c^2k^3m + 6720a^8b^2c^3j^2m^2 - 3072a^8b^2 \\
& c^3k^2*1^2 + 1680a^6b^5c^2j^2m^2 - 100a^6b^5c^2k^2*1^2 - 2176a^7b^3
\end{aligned}$$

$$\begin{aligned}
& *c^2*j^1l^3 - 256*a^6*b^3*c^3*j^3*1 - 64*a^5*b^6*c*j^2*1^2 - 12480*a^8*b^2*c^2*h*m^3 + 972*a^5*b^6*c*h^2*m^2 - 960*a^7*b*c^4*j^2*k^2 - 252*a^5*b^4*c^3*h^3*m - 192*a^6*b^2*c^4*h^3*m + 54*a^4*b^6*c^2*h^3*m + 1536*a^7*b*c^4*h^2*1^2 + 420*a^4*b^7*c*g^2*m^2 - 36*a^4*b^7*c*h^2*1^2 - 3072*a^7*b^2*c^3*g*1^3 + 2096*a^7*b^3*c^2*f*m^3 + 1088*a^6*b^4*c^2*g*1^3 - 496*a^6*b^3*c^3*h*k^3 - 192*a^4*b^4*c^4*g^3*1 + 176*a^4*b^3*c^5*f^3*m + 144*a^5*b^3*c^4*h^3*k + 78*a^3*b^8*c*f^2*m^2 + 54*a^3*b^5*c^4*f^3*m + 32*a^3*b^6*c^3*g^3*1 + 30*a^5*b^5*c^2*h*k^3 - 18*a^4*b^5*c^3*h^3*k - 18*a^2*b^7*c^3*f^3*m - 16*a^3*b^8*c*g^2*1^2 + 6720*a^6*b*c^5*e^2*m^2 - 192*a^6*b*c^5*h^2*j^2 - 4*a^2*b^9*c*f^2*1^2 - 35040*a^7*b^2*c^3*d*m^3 + 14300*a^6*b^4*c^2*d*m^3 - 12000*a^3*b^2*c^7*d^3*m + 4380*a^2*b^4*c^6*d^3*m - 2176*a^6*b^3*c^3*e*1^3 - 256*a^3*b^3*c^6*e^3*1 - 192*a^6*b^2*c^4*f*k^3 + 192*a^5*b^5*c^2*e*1^3 - 192*a^4*b^2*c^6*f^3*k + 132*a^5*b^4*c^3*f*k^3 + 128*a^4*b^3*c^5*g^3*j - 28*a^3*b^4*c^5*f^3*k - 10*a^4*b^6*c^2*f*k^3 + 6*a^2*b^6*c^4*f^3*k + 10752*a^5*b*c^6*d^2*1^2 - 960*a^5*b*c^6*e^2*k^2 - 192*a^5*b*c^6*f^2*j^2 + 108*a*b^9*c^2*d^2*1^2 - 1680*a^5*b^3*c^4*d*k^3 - 1680*a^2*b^3*c^7*d^3*k + 222*a^4*b^5*c^3*d*k^3 + 30*a*b^8*c^3*d^2*k^2 - 10*a^3*b^7*c^2*d*k^3 - 960*a^4*b*c^7*d^2*j^2 + 80*a^4*b^3*c^5*f*h^3 + 80*a^3*b^3*c^6*f^3*h + 6*a^3*b^5*c^4*f*h^3 + 6*a^2*b^5*c^5*f^3*h - 192*a^4*b*c^7*e^2*h^2 - 192*a^4*b^2*c^6*d*h^3 - 192*a^2*b^2*c^8*d^3*h + 128*a^3*b^3*c^6*e*g^3 - 28*a^3*b^4*c^5*d*h^3 + 12*a*b^6*c^5*d^2*h^2 + 6*a^2*b^6*c^4*d*h^3 - 192*a^3*b*c^8*e^2*f^2 + 60*a*b^5*c^6*d^2*g^2 + 198*a*b^4*c^7*d^2*f^2 + 144*a^2*b^3*c^7*d*f^3 - 960*a^2*b*c^9*d^2*e^2 + 240*a*b^3*c^8*d^2*e^2 + 15360*a^9*c^3*k*1^2*m - 12800*a^9*c^3*j*1*m^2 - 3840*a^8*c^4*j^2*k*m + 432*a^6*b^6*j*1*m^2 + 4608*a^8*c^4*j*k^2*1 + 2880*a^8*c^4*h*k^2*m + 5120*a^8*c^4*f*1^2*m - 3072*a^8*c^4*h*k*1^2 + 270*a^5*b^7*h*k*m^2 - 216*a^5*b^7*g*1*m^2 - 12800*a^8*c^4*e*1*m^2 - 4800*a^8*c^4*f*k*m^2 - 512*a^7*c^5*h^2*j*1 - 3840*a^6*c^6*e^2*k*m - 1280*a^7*c^5*f*j^2*m + 768*a^7*c^5*h*j^2*k + 144*a^4*b^8*g*j*m^2 - 90*a^4*b^8*f*k*m^2 + 8640*a^7*c^5*d*k^2*m + 4608*a^7*c^5*e*k^2*1 + 512*a^6*c^6*f^2*j*1 - 9216*a^7*c^5*d*k*1^2 - 4096*a^7*c^5*e*j*1^2 + 320*a^6*c^6*f^2*h*m - 90*a^3*b^9*d*k*m^2 + 15200*a^9*b*c^2*k*m^3 - 6192*a^8*b^3*c*k*m^3 + 5472*a^8*b*c^3*k^3*m - 4608*a^5*c^7*d^2*j*1 - 1024*a^7*c^5*f*h*1^2 + 150*a^6*b^5*c*k^3*m + 54*a^3*b^9*f*h*m^2 + 6*b^10*c^2*d^2*h*m - 14400*a^7*c^5*d*h*m^2 + 8640*a^5*c^7*d^2*h*m + 2880*a^6*c^6*d*h^2*m + 2304*a^6*c^6*d*j^2*k - 512*a^6*c^6*e*h^2*1 - 192*a^6*c^6*f*h^2*k + 6144*a^8*b*c^3*j*1^3 + 1536*a^7*b*c^4*j^3*1 - 1280*a^5*c^7*e^2*f*m + 768*a^5*c^7*e^2*h*k + 256*a^6*c^6*f*h*j^2 + 192*a^6*b^5*c*j*1^3 + 54*a^2*b^10*d*h*m^2 - 18*b^9*c^3*d^2*f*m + 8*b^9*c^3*d^2*g*1 - 2*b^9*c^3*d^2*h*k + 4068*a^7*b^4*c*h*m^3 - 1728*a^6*c^6*d*h*k^2 + 960*a^5*c^7*d*f^2*m + 512*a^5*c^7*e*f^2*1 - 3072*a^6*c^6*d*f*1^2 - 16*b^8*c^4*d^2*e*1 + 6*b^8*c^4*d^2*f*k - 4608*a^4*c^8*d^2*e*1 + 2400*a^8*b*c^3*f*m^3 + 2016*a^7*b*c^4*h*k^3 - 1728*a^4*c^8*d^2*f*k - 1146*a^6*b^5*c*f*m^3 + 224*a^6*b*c^5*h^3*k - 96*a^5*b^6*c*g*1^3 + 96*a^5*b*c^6*f^3*m + 2304*a^4*c^8*d*e^2*k + 768*a^5*c^7*d*f*j^2 + 6144*a^7*b*c^4*e*1^3 - 2280*a^5*b^6*c*d*m^3 + 1536*a^4*b*c^7*e^3*1 - 616*a*b^6*c^5*d^3*m + 512*a^6*b*c^5*g*j^3 + 256*a^4*c^8*e^2*f*h + 240*a*b^10*c*d^2*m^2 + 6*b^7*c^5*d^2*f*h - 192*a^4*c^8*d*f^2*h + 4320*a^6*b*c^5*d*k^3 + 4320*a^3*b*c^8
\end{aligned}$$

$$\begin{aligned}
& d^3k + 222ab^5c^6d^3k + 16b^6c^6d^2e^*g + 96a^5b^*c^6f^*h^3 + 96 \\
& a^4b^*c^7f^3h + 768a^3c^9d^*e^2f + 512a^3b^*c^8e^3g + 132a^*b^4c^ \\
& 7d^3h + 2016a^2b^*c^9d^3f - 496a^*b^3c^8d^3f + 224a^3b^*c^8d^*f^3 \\
& - 18a^*b^5c^6d^*f^3 - 3264a^8b^2c^2k^2m^2 - 6160a^7b^3c^2j^2m^2 \\
& + 1104a^7b^3c^2k^2l^2 - 1920a^7b^2c^3j^2l^2 + 768a^6b^4c^2j^2 \\
& l^2 + 3888a^7b^2c^3h^2m^2 - 3510a^6b^4c^2h^2m^2 + 240a^6b^3c^ \\
& 3j^2k^2 - 16a^5b^5c^2j^2k^2 + 1680a^6b^3c^3g^2m^2 - 1648a^6b^ \\
& 3c^3h^2l^2 - 1540a^5b^5c^2g^2m^2 + 444a^5b^5c^2h^2l^2 - 960a^ \\
& 6b^2c^4h^2k^2 - 576a^6b^2c^4f^2m^2 - 512a^6b^2c^4g^2l^2 - 480 \\
& a^5b^4c^3g^2l^2 + 198a^5b^4c^3h^2k^2 + 192a^4b^6c^2g^2l^2 - \\
& 186a^5b^4c^3f^2m^2 - 97a^4b^6c^2f^2m^2 - 9a^4b^6c^2h^2k^2 - \\
& 6160a^5b^3c^4e^2m^2 + 1680a^4b^5c^3e^2m^2 - 240a^5b^3c^4g^2k \\
& ^2 - 240a^5b^3c^4f^2l^2 - 144a^3b^7c^2e^2m^2 + 60a^4b^5c^3g^2 \\
& k^2 - 36a^4b^5c^3f^2l^2 + 36a^3b^7c^2f^2l^2 - 16a^5b^3c^4h^2 \\
& j^2 - 4a^3b^7c^2g^2k^2 + 38512a^5b^2c^5d^2m^2 - 32310a^4b^4c^ \\
& 4d^2m^2 + 12720a^3b^6c^3d^2m^2 - 2500a^2b^8c^2d^2m^2 - 1920a^5 \\
& b^2c^5e^2l^2 + 768a^4b^4c^4e^2l^2 - 464a^5b^2c^5f^2k^2 - 384a \\
& a^5b^2c^5g^2j^2 - 64a^3b^6c^3e^2l^2 + 42a^4b^4c^4f^2k^2 + 12a \\
& a^3b^6c^3f^2k^2 - 13104a^4b^3c^5d^2l^2 + 5628a^3b^5c^4d^2l^2 \\
& - 1128a^2b^7c^3d^2l^2 + 240a^4b^3c^5e^2k^2 - 16a^4b^3c^5f^2j \\
& ^2 - 16a^3b^5c^4e^2k^2 - 2880a^4b^2c^6d^2k^2 + 1750a^3b^4c^5d \\
& ^2k^2 - 345a^2b^6c^4d^2k^2 - 48a^4b^3c^5g^2h^2 - 4a^3b^5c^4g \\
& ^2h^2 + 240a^3b^3c^6d^2j^2 - 192a^4b^2c^6f^2h^2 - 42a^3b^4c^5 \\
& f^2h^2 - 16a^2b^5c^5d^2j^2 - 48a^3b^3c^6f^2g^2 - 16a^3b^3c^6 \\
& e^2h^2 - 4a^2b^5c^5f^2g^2 - 464a^3b^2c^7d^2h^2 - 384a^3b^2c^ \\
& 7e^2g^2 + 42a^2b^4c^6d^2h^2 - 240a^2b^3c^7d^2g^2 - 16a^2b^3c \\
& ^7e^2f^2 - 960a^2b^2c^8d^2f^2 + 6b^11c^d^2k^*m - 18a^*b^11d^*f^*m^2 \\
& - 7200a^9c^3k^2m^2 - 324a^7b^5l^2m^2 - 225a^6b^6k^2m^2 - 2048a \\
& a^8c^4j^2l^2 - 144a^5b^7j^2m^2 - 2400a^8c^4h^2m^2 - 81a^4b^8h \\
& ^2m^2 - 800a^7c^5f^2m^2 - 288a^7c^5h^2k^2 - 36a^3b^9g^2m^2 - 9 \\
& a^2b^10f^2m^2 - 21600a^6c^6d^2m^2 - 2048a^6c^6e^2l^2 - 864a^6c \\
& c^6f^2k^2 - 2592a^5c^7d^2k^2 - 1536a^5c^7e^2j^2 + 1536a^8b^2c^ \\
& 2l^4 - 32a^5c^7f^2h^2 + 360a^7b^2c^3k^4 - 25a^6b^4c^2k^4 - 864 \\
& a^4c^8d^2h^2 - 4b^7c^5d^2g^2 - 9b^6c^6d^2f^2 - 288a^3c^9d^2f \\
& f^2 - 24a^5b^2c^5h^4 - 16b^5c^7d^2e^2 - 9a^4b^4c^4h^4 - 16a^3b \\
& b^4c^5g^4 - 24a^3b^2c^7f^4 - 9a^2b^4c^6f^4 - a^2b^8c^2f^2k^2 \\
& - a^2b^6c^4f^2h^2 + 630a^7b^5k^*m^3 + 8000a^9c^3h^*m^3 + 320a^7c^ \\
& 5h^3m - 378a^6b^6h^*m^3 + 126a^5b^7f^*m^3 + 30b^8c^4d^3m + 24000a \\
& a^8c^4d^*m^3 + 8640a^4c^8d^3m - 1728a^7c^5f^*k^3 - 192a^5c^7f^3k \\
& - 4b^11c^d^2l^2 + 126a^4b^8d^*m^3 - 10b^7c^5d^3k + 4200a^9b^2c \\
& *m^4 - 1024a^6c^6e^*j^3 - 1024a^4c^8e^3j - 144a^7b^4c^*l^4 - 10b^6 \\
& c^6d^3h - 1728a^3c^9d^3h - 192a^5c^7d^*h^3 + 30b^5c^7d^3f + 36 \\
& 0a^*b^2c^9d^4 - 9b^12d^2m^2 - 10000a^10c^2m^4 - 4096a^9c^3l^4 - \\
& 441a^8b^4m^4 - 1296a^8c^4k^4 - 256a^7c^5j^4 - 16a^6c^6h^4 - 16a \\
& a^4c^8f^4 - 256a^3c^9e^4 - 25b^4c^8d^4 - 1296a^2c^10d^4 - b^10c
\end{aligned}$$

$$\begin{aligned}
& ^2*d^2*k^2 - b^8*c^4*d^2*h^2, z, k1)*x*(8192*a^6*b*c^9 + 32*a^2*b^9*c^5 - 5 \\
& 12*a^3*b^7*c^6 + 3072*a^4*b^5*c^7 - 8192*a^5*b^3*c^8))/(4*(64*a^5*c^6 - a^2 \\
& *b^6*c^3 + 12*a^3*b^4*c^4 - 48*a^4*b^2*c^5))) + (x*(2*b^6*c^6*d^2 - 576*a^3 \\
& *c^9*d^2 + 64*a^4*c^8*f^2 - 64*a^5*c^7*h^2 + 576*a^6*c^6*k^2 + 18*a^2*b^10* \\
& m^2 - 1600*a^7*c^5*m^2 - 36*a*b^4*c^7*d^2 + 128*a^3*b*c^8*e^2 + 128*a^5*b*c \\
& ^6*j^2 + 8*a^2*b^9*c*l^2 + 3072*a^6*b*c^5*l^2 - 300*a^3*b^8*c*m^2 + 256*a^2 \\
& *b^2*c^8*d^2 - 32*a^2*b^3*c^7*e^2 + 20*a^2*b^4*c^6*f^2 - 96*a^3*b^2*c^7*f^2 \\
& - 8*a^2*b^5*c^5*g^2 + 32*a^3*b^3*c^6*g^2 + 2*a^2*b^6*c^4*h^2 - 4*a^3*b^4*c \\
& ^5*h^2 - 32*a^4*b^3*c^5*j^2 + 2*a^2*b^8*c^2*k^2 - 40*a^3*b^6*c^3*k^2 + 276* \\
& a^4*b^4*c^4*k^2 - 736*a^5*b^2*c^5*k^2 - 136*a^3*b^7*c^2*l^2 + 888*a^4*b^5*c \\
& ^3*l^2 - 2656*a^5*b^3*c^4*l^2 + 1874*a^4*b^6*c^2*m^2 - 5284*a^5*b^4*c^3*m^2 \\
& + 6144*a^6*b^2*c^4*m^2 - 384*a^4*c^8*d*h + 1920*a^5*c^7*d*m - 1024*a^5*c^7 \\
& *e*l + 384*a^5*c^7*f*k + 640*a^6*c^6*h*m - 1024*a^6*c^6*j*l + 4*a*b^5*c^6*d \\
& *f + 320*a^3*b*c^8*d*f + 64*a^4*b*c^7*f*h + 576*a^4*b*c^7*d*k + 256*a^4*b*c \\
& ^7*e*j - 1472*a^5*b*c^6*f*m + 512*a^5*b*c^6*g*l + 64*a^5*b*c^6*h*k - 12*a^2 \\
& *b^9*c*k*m - 3776*a^6*b*c^5*k*m - 96*a^2*b^3*c^7*d*f + 8*a^2*b^4*c^6*d*h + \\
& 32*a^2*b^4*c^6*e*g + 64*a^3*b^2*c^7*d*h - 128*a^3*b^2*c^7*e*g - 12*a^2*b^5* \\
& c^5*f*h + 32*a^3*b^3*c^6*f*h + 20*a^2*b^5*c^5*d*k - 224*a^3*b^3*c^6*d*k - 6 \\
& 4*a^3*b^3*c^6*e*j - 60*a^2*b^6*c^4*d*m - 12*a^2*b^6*c^4*f*k + 632*a^3*b^4*c \\
& ^5*d*m - 32*a^3*b^4*c^5*e*l + 152*a^3*b^4*c^5*f*k + 32*a^3*b^4*c^5*g*j - 20 \\
& 48*a^4*b^2*c^6*d*m + 384*a^4*b^2*c^6*e*l - 512*a^4*b^2*c^6*f*k - 128*a^4*b^ \\
& 2*c^6*g*j + 36*a^2*b^7*c^3*f*m + 4*a^2*b^7*c^3*h*k - 396*a^3*b^5*c^4*f*m + \\
& 16*a^3*b^5*c^4*g*l - 44*a^3*b^5*c^4*h*k + 1376*a^4*b^3*c^5*f*m - 192*a^4*b^ \\
& 3*c^5*g*l + 96*a^4*b^3*c^5*h*k - 12*a^2*b^8*c^2*h*m + 112*a^3*b^6*c^3*h*m - \\
& 248*a^4*b^4*c^4*h*m - 192*a^5*b^2*c^5*h*m - 32*a^4*b^4*c^4*j*l + 384*a^5*b \\
& ^2*c^5*j*l + 220*a^3*b^7*c^2*k*m - 1436*a^4*b^5*c^3*k*m + 3936*a^5*b^3*c^4* \\
& k*m))/(4*(64*a^5*c^6 - a^2*b^6*c^3 + 12*a^3*b^4*c^4 - 48*a^4*b^2*c^5))) - (\\
& 5*b^3*c^7*d^3 + 8*a^3*c^7*f^3 + 216*a^6*c^4*k^3 - 63*a^5*b^5*m^3 - 96*a^2*c \\
& ^8*d*e^2 + 72*a^2*c^8*d^2*f - 4*a^4*b*c^5*h^3 - 3*b^4*c^6*d^2*f - 32*a^3*c^ \\
& 7*e^2*h + b^5*c^5*d^2*h - 96*a^4*c^6*d*j^2 + 8*a^4*c^6*f*h^2 + 216*a^3*c^7* \\
& d^2*k + 573*a^6*b^3*c*m^3 - 1300*a^7*b*c^2*m^3 + 384*a^5*c^5*d*l^2 + b^6*c^ \\
& 4*d^2*k + 72*a^4*c^6*f^2*k + 216*a^5*c^5*f*k^2 + 9*a^2*b^8*f*m^2 + 160*a^4* \\
& c^6*e^2*m - 32*a^5*c^5*h*j^2 - 3*b^7*c^3*d^2*m + 24*a^5*c^5*h^2*k + 200*a^6 \\
& *c^4*f*m^2 - 27*a^3*b^7*h*m^2 + 128*a^6*c^4*h*l^2 + 45*a^4*b^6*k*m^2 + 160* \\
& a^6*c^4*j^2*m + 600*a^7*c^3*k*m^2 - 640*a^7*c^3*l^2*m + 6*a^2*b^2*c^6*f^3 - \\
& 3*a^3*b^3*c^4*h^3 + 5*a^4*b^4*c^2*k^3 - 66*a^5*b^2*c^3*k^3 - 36*a*b*c^8*d^ \\
& 3 + 9*a*b^9*d*m^2 + 4*a*b^8*c*d*l^2 + 48*a^3*c^7*d*f*h - 192*a^3*c^7*d*e*j \\
& - 240*a^4*c^6*d*f*m + 144*a^4*c^6*d*h*k - 128*a^4*c^6*e*f*l - 64*a^4*c^6*e* \\
& h*j - 80*a^5*c^5*f*h*m - 720*a^5*c^5*d*k*m + 320*a^5*c^5*e*j*m - 384*a^5*c^ \\
& 5*e*k*l - 128*a^5*c^5*f*j*l - 240*a^6*c^4*h*k*m - 384*a^6*c^4*j*k*l + 16*a* \\
& b^2*c^7*d*e^2 + 18*a*b^2*c^7*d^2*f + 3*a*b^3*c^6*d*f^2 - 60*a^2*b*c^7*d*f^2 \\
& + 4*a*b^4*c^5*d*g^2 + 16*a^2*b*c^7*e^2*f - a*b^3*c^6*d^2*h + a*b^5*c^4*d*h \\
& ^2 - 60*a^2*b*c^7*d^2*h - 28*a^3*b*c^6*d*h^2 - 28*a^3*b*c^6*f^2*h - 10*a*b^ \\
& 4*c^5*d^2*k + a*b^7*c^2*d*k^2 - 396*a^4*b*c^5*d*k^2 + 16*a^3*b*c^6*e^2*k + \\
& 16*a^4*b*c^5*f*j^2 + 25*a*b^5*c^4*d^2*m - 159*a^2*b^7*c*d*m^2 - 348*a^3*b*c
\end{aligned}$$

$$\begin{aligned}
&^6d^2m + 1460a^5b^4c^4d^2m^2 + 4a^2b^7c^4f^2m^2 + 128a^5b^4c^4f^2m^2 - \\
&78a^3b^6c^4f^2m^2 - 76a^4b^5c^4f^2m^2 - 204a^5b^4c^4h^2k^2 - 12a^3b^6 \\
&c^4h^2k^2 + 279a^4b^5c^4h^2k^2 - 12a^5b^4c^4h^2k^2 + 16a^5b^4c^4j^2k^2 + \\
&420a^6b^4c^3h^2k^2 + 20a^4b^5c^4k^2m^2 + 512a^6b^4c^3k^2m^2 - 30a^4b^5 \\
&c^4k^2m^2 - 402a^5b^4c^4k^2m^2 - 924a^6b^4c^3k^2m^2 - 28a^5b^4c^4l^2m^2 - \\
&24a^2b^2c^6d^2g^2 - 9a^2b^3c^5d^2h^2 + 4a^2b^3c^5f^2g^2 - 5a^2b^3 \\
&c^5f^2h^2 + a^2b^4c^4f^2h^2 + 16a^3b^2c^5d^2j^2 + 18a^3b^2c^5f^2 \\
&h^2 - 6a^2b^2c^6d^2k^2 - 21a^2b^5c^3d^2k^2 - 8a^3b^2c^5g^2h^2 + 15 \\
&5a^3b^3c^4d^2k^2 - 72a^2b^6c^2d^2l^2 + 436a^3b^4c^3d^2l^2 - 952a^4 \\
&b^2c^4d^2l^2 + 23a^2b^3c^5d^2m^2 - 5a^2b^4c^4f^2k^2 + a^2b^6c^2f^2 \\
&k^2 + 26a^3b^2c^5f^2k^2 - 12a^3b^4c^3f^2k^2 + 970a^3b^5c^2d^2m^2 \\
&+ 2a^4b^2c^4f^2k^2 - 2289a^4b^3c^3d^2m^2 - 48a^3b^2c^5e^2m^2 + 4a \\
&a^3b^3c^4g^2k^2 - 36a^3b^5c^2f^2l^2 + 52a^4b^3c^3f^2l^2 + 15a^2b^5 \\
&c^3f^2m^2 - 53a^3b^3c^4f^2m^2 - 6a^3b^4c^3h^2k^2 - 3a^3b^5c^2h^2k^2 \\
&k^2 + 42a^4b^2c^4h^2k^2 + 51a^4b^3c^3h^2k^2 + 133a^4b^4c^2f^2m^2 + \\
&114a^5b^2c^3f^2m^2 - 12a^3b^4c^3g^2m^2 + 40a^4b^2c^4g^2m^2 + 128a \\
&a^4b^4c^2h^2l^2 - 360a^5b^2c^3h^2l^2 + 18a^3b^5c^2h^2m^2 - 81a^4b^3 \\
&>c^3h^2m^2 - 801a^5b^3c^2h^2m^2 - 48a^5b^2c^3j^2m^2 - 204a^5b^3c^2 \\
&>k^2l^2 + 339a^5b^3c^2k^2m^2 + 762a^6b^2c^2k^2m^2 + 264a^6b^2c^2 \\
&l^2m^2 - 6a^4b^8c^4d^2k^2m^2 - 16a^4b^3c^6d^2e^2g^2 + 96a^2b^7c^4d^2e^2g^2 - 4a^4b^4 \\
&>c^5d^2f^2h^2 + 32a^3b^6c^6e^2g^2h^2 + 16a^4b^5c^4d^2e^2l^2 - 4a^4b^5c^4d^2f^2k^2 + \\
&544a^3b^6c^6d^2e^2l^2 - 312a^3b^6c^6d^2f^2k^2 + 96a^3b^6c^6d^2g^2j^2 + 32a^3b^6c^6 \\
&>e^2f^2j^2 + 12a^4b^6c^3d^2f^2m^2 - 8a^4b^6c^3d^2g^2l^2 + 2a^4b^6c^3d^2h^2k^2 - 6a \\
&>b^7c^2d^2h^2m^2 - 152a^4b^6c^5d^2h^2m^2 - 160a^4b^6c^5e^2g^2m^2 + 224a^4b^6c^5 \\
&>e^2h^2l^2 + 64a^4b^6c^5f^2g^2l^2 - 152a^4b^6c^5f^2h^2k^2 + 32a^4b^6c^5g^2h^2j^2 + 544 \\
&>a^4b^6c^5d^2j^2l^2 + 32a^4b^6c^5e^2j^2k^2 - 6a^2b^7c^4f^2k^2m^2 + 32a^5b^6c^4e^2 \\
&>l^2m^2 - 536a^5b^6c^4f^2k^2m^2 - 160a^5b^6c^4g^2j^2m^2 + 192a^5b^6c^4g^2k^2l^2 + 224 \\
&>a^5b^6c^4h^2j^2l^2 + 18a^3b^6c^4h^2k^2m^2 + 32a^6b^6c^3j^2l^2m^2 + 52a^2b^2c^6 \\
&>d^2f^2h^2 - 16a^2b^2c^6e^2f^2g^2 + 32a^2b^2c^6d^2e^2j^2 - 192a^2b^3c^5d^2e^2 \\
&>l^2 + 70a^2b^3c^5d^2f^2k^2 - 16a^2b^3c^5d^2g^2j^2 - 190a^2b^4c^4d^2f^2m^2 + 9 \\
&>6a^2b^4c^4d^2g^2l^2 - 30a^2b^4c^4d^2h^2k^2 + 16a^2b^4c^4e^2f^2l^2 + 676a^3 \\
&>b^2c^5d^2f^2m^2 - 272a^3b^2c^5d^2g^2l^2 + 100a^3b^2c^5d^2h^2k^2 - 48a^3b^2 \\
&>c^5e^2f^2l^2 - 16a^3b^2c^5e^2g^2k^2 - 16a^3b^2c^5f^2g^2j^2 + 80a^2b^5c^3d^2 \\
&>h^2m^2 - 8a^2b^5c^3f^2g^2l^2 + 2a^2b^5c^3f^2h^2k^2 - 210a^3b^3c^4d^2h^2m^2 + \\
&>48a^3b^3c^4e^2g^2m^2 - 48a^3b^3c^4e^2h^2l^2 + 24a^3b^3c^4f^2g^2l^2 + 6a^3b^3 \\
&>c^4f^2h^2k^2 + 16a^2b^5c^3d^2j^2l^2 - 192a^3b^3c^4d^2j^2l^2 - 6a^2b^6c^2 \\
&>2f^2h^2m^2 - 28a^3b^4c^3f^2h^2m^2 + 24a^3b^4c^3g^2h^2l^2 + 276a^4b^2c^4f^2h^2 \\
&>m^2 - 112a^4b^2c^4g^2h^2l^2 + 116a^2b^6c^2d^2k^2m^2 - 780a^3b^4c^3d^2k^2m^2 \\
&+ 16a^3b^4c^3f^2j^2l^2 + 1876a^4b^2c^4d^2k^2m^2 - 96a^4b^2c^4e^2j^2m^2 + 80 \\
&>a^4b^2c^4e^2k^2l^2 - 48a^4b^2c^4f^2j^2l^2 - 16a^4b^2c^4g^2j^2k^2 + 62a^3b^5 \\
&>c^2f^2k^2m^2 - 42a^4b^3c^3f^2k^2m^2 + 48a^4b^3c^3g^2j^2m^2 - 40a^4b^3c^3 \\
&>g^2k^2l^2 - 48a^4b^3c^3h^2j^2l^2 - 246a^4b^4c^2h^2k^2m^2 - 16a^5b^2c^3g^2l^2 \\
&>m^2 + 804a^5b^2c^3h^2k^2m^2 + 80a^5b^2c^3j^2k^2l^2)/(8*(64a^5c^6 - a^2b^6c^3 \\
&>+ 12a^3b^4c^4 - 48a^4b^2c^5)) + (x*(32a^2c^8e^3 + 32a^5c^5j^3 - 2b^3c^7d^2e + b^4c^6d^2g - 12a^4b^5c^1^3 - 320a^6b^6c^3l^3
\end{aligned}$$

$$\begin{aligned}
& + 96a^3c^7e^2j + 96a^4c^6e^j^2 + 144a^3c^7d^2l + 128a^5c^5e^* \\
& l^2 - b^6c^4d^2*1 - 16a^4c^6f^2*1 - 9a^2b^8g^*m^2 + 16a^5c^5h^2*1 \\
& + 18a^3b^7j^*m^2 + 128a^6c^4j^*l^2 - 144a^6c^4k^2*1 - 27a^4b^6l^* \\
& m^2 + 400a^7c^3l^*m^2 - 4a^2b^3c^5g^3 + 124a^5b^3c^2l^3 + 24a^*b^* \\
& c^8d^2*e - 48a^2c^8d^*e^f - 16a^3c^7e^*f^*h - 144a^3c^7d^*e^*k - 48a^ \\
& 3c^7d^*f^*j + 96a^4c^6d^*h^*1 + 80a^4c^6e^*f^*m - 48a^4c^6e^*h^*k - 16a^ \\
& 4c^6f^*h^*j - 144a^4c^6d^*j^*k - 480a^5c^5d^*l^*m + 240a^5c^5e^*k^*m + \\
& 80a^5c^5f^*j^*m - 96a^5c^5f^*k^*1 - 48a^5c^5h^*j^*k - 160a^6c^4h^*l^*m \\
& + 240a^6c^4j^*k^*m - 12a^*b^2c^7d^2*g + 16a^2b^*c^7e^*f^2 - 48a^2b^*c^ \\
& 7e^2*g + 8a^3b^*c^6e^*h^2 - 2a^*b^3c^6d^2*j + 24a^2b^*c^7d^2*j + 18a^ \\
& *b^4c^5d^2*1 + 16a^3b^*c^6f^2*j + 96a^4b^*c^5e^*k^2 - 176a^3b^*c^6e^ \\
& 2*1 - 48a^4b^*c^5g^*j^2 + 18a^2b^7c^*e^*m^2 + 8a^4b^*c^5h^2*j - 520a^5 \\
& *b^*c^4e^*m^2 - 4a^2b^7c^*g^*l^2 - 64a^5b^*c^4g^*l^2 + 96a^3b^6c^*g^*m^2 \\
& + 96a^5b^*c^4j^*k^2 + 8a^3b^6c^*j^*l^2 - 176a^5b^*c^4j^2*1 - 192a^4b^ \\
& 5c^*j^*m^2 - 520a^6b^*c^3j^*m^2 + 270a^5b^4c^*l^*m^2 + 24a^2b^2c^6e^*g^ \\
& 2 - 8a^2b^2c^6f^2*g + 2a^2b^3c^5e^*h^2 - a^2b^4c^4g^*h^2 - 4a^3b^ \\
& ^2c^5g^*h^2 - 100a^2b^2c^6d^2*1 + 2a^2b^5c^3e^*k^2 - 28a^3b^3c^4 \\
& *e^*k^2 + 32a^2b^3c^5e^2*1 + 8a^2b^6c^2e^*l^2 + 24a^3b^2c^5g^2*j \\
& - 88a^3b^4c^3e^*l^2 + 216a^4b^2c^4e^*l^2 - a^2b^4c^4f^2*1 - a^2b^ \\
& 6c^2g^*k^2 + 2a^3b^3c^4h^2*j + 14a^3b^4c^3g^*k^2 - 192a^3b^5c^2* \\
& e^*m^2 - 48a^4b^2c^4g^*k^2 + 614a^4b^3c^3e^*m^2 + 8a^2b^5c^3g^2*1 \\
& - 44a^3b^3c^4g^2*1 + 44a^3b^5c^2g^*l^2 - 108a^4b^3c^3g^*l^2 - 12* \\
& a^4b^2c^4h^2*1 - 307a^4b^4c^2g^*m^2 + 260a^5b^2c^3g^*m^2 + 2a^3b^ \\
& ^5c^2j^*k^2 - 28a^4b^3c^3j^*k^2 + 32a^4b^3c^3j^2*1 - 88a^4b^4c^2 \\
& *j^*l^2 + 216a^5b^2c^3j^*l^2 - 3a^4b^4c^2k^2*1 + 40a^5b^2c^3k^2*1 \\
& + 614a^5b^3c^2j^*m^2 - 756a^6b^2c^2l^*m^2 - 4a^*b^2c^7d^*e^*f + 2a^* \\
& b^3c^6d^*f^*g + 32a^2b^*c^7d^*e^*h + 24a^2b^*c^7d^*f^*g + 8a^3b^*c^6f^*g^*h \\
& - 2a^*b^5c^4d^*f^*1 + 272a^3b^*c^6d^*e^*m - 8a^3b^*c^6d^*f^*1 + 72a^3b^*c^ \\
& 6d^*g^*k + 32a^3b^*c^6d^*h^*j + 80a^3b^*c^6e^*f^*k - 96a^3b^*c^6e^*g^*j + 6 \\
& 4a^4b^*c^5e^*h^*m - 40a^4b^*c^5f^*g^*m + 8a^4b^*c^5f^*h^*1 + 24a^4b^*c^5g^ \\
& *h^*k + 272a^4b^*c^5d^*j^*m + 72a^4b^*c^5d^*k^*1 - 352a^4b^*c^5e^*j^*1 + 80* \\
& a^4b^*c^5f^*j^*k + 6a^2b^7c^*g^*k^*m + 248a^5b^*c^4f^*l^*m - 120a^5b^*c^4g^ \\
& *k^*m + 64a^5b^*c^4h^*j^*m + 56a^5b^*c^4h^*k^*1 - 12a^3b^6c^*j^*k^*m + 18a^ \\
& 4b^5c^*k^*l^*m + 584a^6b^*c^3k^*l^*m - 16a^2b^2c^6d^*g^*h - 12a^2b^2c^6 \\
& *e^*f^*h + 20a^2b^2c^6d^*e^*k - 4a^2b^2c^6d^*f^*j + 6a^2b^3c^5f^*g^*h - \\
& 60a^2b^3c^5d^*e^*m + 18a^2b^3c^5d^*f^*1 - 10a^2b^3c^5d^*g^*k - 12a^ \\
& 2b^3c^5e^*f^*k + 30a^2b^4c^4d^*g^*m + 6a^2b^4c^4d^*h^*1 + 36a^2b^4c^ \\
& 4e^*f^*m - 32a^2b^4c^4e^*g^*1 + 4a^2b^4c^4e^*h^*k + 6a^2b^4c^4f^*g^*k \\
& - 136a^3b^2c^5d^*g^*m - 64a^3b^2c^5d^*h^*1 - 180a^3b^2c^5e^*f^*m + 1 \\
& 76a^3b^2c^5e^*g^*1 - 20a^3b^2c^5e^*h^*k - 40a^3b^2c^5f^*g^*k - 12a^3 \\
& *b^2c^5f^*h^*j + 20a^3b^2c^5d^*j^*k - 12a^2b^5c^3e^*h^*m - 18a^2b^5c^ \\
& ^3f^*g^*m - 2a^2b^5c^3g^*h^*k + 40a^3b^3c^4e^*h^*m + 90a^3b^3c^4f^*g^* \\
& m + 6a^3b^3c^4f^*h^*1 + 10a^3b^3c^4g^*h^*k - 60a^3b^3c^4d^*j^*m - 10* \\
& a^3b^3c^4d^*k^*1 + 64a^3b^3c^4e^*j^*1 - 12a^3b^3c^4f^*j^*k + 6a^2b^6 \\
& *c^2g^*h^*m - 20a^3b^4c^3g^*h^*m - 32a^4b^2c^4g^*h^*m - 12a^2b^6c^2e
\end{aligned}$$

$$\begin{aligned}
& *k*m + 148*a^3*b^4*c^3*e*k*m + 36*a^3*b^4*c^3*f*j*m - 32*a^3*b^4*c^3*g*j*1 \\
& + 4*a^3*b^4*c^3*h*j*k + 104*a^4*b^2*c^4*d*1*m - 476*a^4*b^2*c^4*e*k*m - 180 \\
& *a^4*b^2*c^4*f*j*m + 8*a^4*b^2*c^4*f*k*1 + 176*a^4*b^2*c^4*g*j*1 - 20*a^4*b \\
& ^2*c^4*h*j*k - 74*a^3*b^5*c^2*g*k*m - 12*a^3*b^5*c^2*h*j*m - 54*a^4*b^3*c^3 \\
& *f*1*m + 238*a^4*b^3*c^3*g*k*m + 40*a^4*b^3*c^3*h*j*m - 6*a^4*b^3*c^3*h*k*1 \\
& + 18*a^4*b^4*c^2*h*1*m - 48*a^5*b^2*c^3*h*1*m + 148*a^4*b^4*c^2*j*k*m - 47 \\
& 6*a^5*b^2*c^3*j*k*m - 210*a^5*b^3*c^2*k*1*m)/(4*(64*a^5*c^6 - a^2*b^6*c^3 \\
& + 12*a^3*b^4*c^4 - 48*a^4*b^2*c^5)))*root(1572864*a^8*b^2*c^10*z^4 - 983040 \\
& *a^7*b^4*c^9*z^4 + 327680*a^6*b^6*c^8*z^4 - 61440*a^5*b^8*c^7*z^4 + 6144*a^ \\
& 4*b^10*c^6*z^4 - 256*a^3*b^12*c^5*z^4 - 1048576*a^9*c^11*z^4 - 1572864*a^8* \\
& b^2*c^8*1*z^3 + 983040*a^7*b^4*c^7*1*z^3 - 327680*a^6*b^6*c^6*1*z^3 + 61440 \\
& *a^5*b^8*c^5*1*z^3 - 6144*a^4*b^10*c^4*1*z^3 + 256*a^3*b^12*c^3*1*z^3 + 104 \\
& 8576*a^9*c^9*1*z^3 + 96*a^3*b^12*c*k*m*z^2 + 98304*a^8*b*c^7*j*1*z^2 + 2457 \\
& 6*a^8*b*c^7*h*m*z^2 + 155648*a^7*b*c^8*d*m*z^2 + 98304*a^7*b*c^8*e*1*z^2 + \\
& 57344*a^7*b*c^8*f*k*z^2 + 32768*a^7*b*c^8*g*j*z^2 + 57344*a^6*b*c^9*d*h*z^2 \\
& + 32768*a^6*b*c^9*e*g*z^2 - 32*a*b^10*c^5*d*f*z^2 - 491520*a^8*b^2*c^6*k*m \\
& *z^2 + 358400*a^7*b^4*c^5*k*m*z^2 - 129024*a^6*b^6*c^4*k*m*z^2 + 24768*a^5* \\
& b^8*c^3*k*m*z^2 - 2432*a^4*b^10*c^2*k*m*z^2 - 90112*a^7*b^3*c^6*j*1*z^2 + 3 \\
& 0720*a^6*b^5*c^5*j*1*z^2 - 4608*a^5*b^7*c^4*j*1*z^2 + 256*a^4*b^9*c^3*j*1*z \\
& ^2 - 21504*a^6*b^5*c^5*h*m*z^2 + 9216*a^5*b^7*c^4*h*m*z^2 + 8192*a^7*b^3*c^ \\
& 6*h*m*z^2 - 1568*a^4*b^9*c^3*h*m*z^2 + 96*a^3*b^11*c^2*h*m*z^2 - 172032*a^7 \\
& *b^2*c^7*f*m*z^2 + 116736*a^6*b^4*c^6*f*m*z^2 - 49152*a^7*b^2*c^7*g*1*z^2 + \\
& 45056*a^6*b^4*c^6*g*1*z^2 - 35840*a^5*b^6*c^5*f*m*z^2 + 24576*a^7*b^2*c^7* \\
& h*k*z^2 - 15360*a^5*b^6*c^5*g*1*z^2 + 5184*a^4*b^8*c^4*f*m*z^2 - 3072*a^5*b \\
& ^6*c^5*h*k*z^2 + 2304*a^4*b^8*c^4*g*1*z^2 + 2048*a^6*b^4*c^6*h*k*z^2 + 576* \\
& a^4*b^8*c^4*h*k*z^2 - 288*a^3*b^10*c^3*f*m*z^2 - 128*a^3*b^10*c^3*g*1*z^2 - \\
& 32*a^3*b^10*c^3*h*k*z^2 - 147456*a^6*b^3*c^7*d*m*z^2 - 90112*a^6*b^3*c^7*e \\
& *1*z^2 + 52224*a^5*b^5*c^6*d*m*z^2 - 49152*a^6*b^3*c^7*f*k*z^2 + 30720*a^5* \\
& b^5*c^6*e*1*z^2 - 24576*a^6*b^3*c^7*g*j*z^2 + 15360*a^5*b^5*c^6*f*k*z^2 - 8 \\
& 192*a^4*b^7*c^5*d*m*z^2 + 6144*a^5*b^5*c^6*g*j*z^2 - 4608*a^4*b^7*c^5*e*1*z \\
& ^2 - 2048*a^4*b^7*c^5*f*k*z^2 - 512*a^4*b^7*c^5*g*j*z^2 + 480*a^3*b^9*c^4*d \\
& *m*z^2 + 256*a^3*b^9*c^4*e*1*z^2 + 96*a^3*b^9*c^4*f*k*z^2 + 131072*a^6*b^2* \\
& c^8*d*k*z^2 + 49152*a^6*b^2*c^8*e*j*z^2 - 43008*a^5*b^4*c^7*d*k*z^2 - 12288 \\
& *a^5*b^4*c^7*e*j*z^2 + 6144*a^4*b^6*c^6*d*k*z^2 + 1024*a^4*b^6*c^6*e*j*z^2 \\
& - 320*a^3*b^8*c^5*d*k*z^2 + 6144*a^5*b^4*c^7*f*h*z^2 - 2048*a^4*b^6*c^6*f*h \\
& *z^2 + 192*a^3*b^8*c^5*f*h*z^2 - 49152*a^5*b^3*c^8*d*h*z^2 - 24576*a^5*b^3* \\
& c^8*e*g*z^2 + 15360*a^4*b^5*c^7*d*h*z^2 + 6144*a^4*b^5*c^7*e*g*z^2 - 2048*a \\
& ^3*b^7*c^6*d*h*z^2 - 512*a^3*b^7*c^6*e*g*z^2 + 96*a^2*b^9*c^5*d*h*z^2 + 245 \\
& 76*a^5*b^2*c^9*d*f*z^2 - 3072*a^3*b^6*c^7*d*f*z^2 + 2048*a^4*b^4*c^8*d*f*z^ \\
& 2 + 576*a^2*b^8*c^6*d*f*z^2 - 430080*a^9*b*c^6*m^2*z^2 + 3408*a^4*b^11*c*m^ \\
& 2*z^2 - 64*a^3*b^12*c*1^2*z^2 + 61440*a^8*b*c^7*k^2*z^2 + 12288*a^7*b*c^8*h \\
& ^2*z^2 + 12288*a^6*b*c^9*f^2*z^2 + 61440*a^5*b*c^10*d^2*z^2 + 432*a*b^9*c^6 \\
& *d^2*z^2 + 245760*a^9*c^7*k*m*z^2 + 81920*a^8*c^8*f*m*z^2 - 49152*a^8*c^8*h \\
& *k*z^2 - 147456*a^7*c^9*d*k*z^2 - 65536*a^7*c^9*e*j*z^2 - 16384*a^7*c^9*f*h \\
& *z^2 - 49152*a^6*c^10*d*f*z^2 + 716800*a^8*b^3*c^5*m^2*z^2 - 483840*a^7*b^5
\end{aligned}$$

$$\begin{aligned}
& *c^4*m^2*z^2 + 170496*a^6*b^7*c^3*m^2*z^2 - 33232*a^5*b^9*c^2*m^2*z^2 + 516 \\
& 096*a^8*b^2*c^6*l^2*z^2 - 288768*a^7*b^4*c^5*l^2*z^2 + 88576*a^6*b^6*c^4*l^ \\
& 2*z^2 - 15744*a^5*b^8*c^3*l^2*z^2 + 1536*a^4*b^10*c^2*l^2*z^2 - 61440*a^7*b \\
& ^3*c^6*k^2*z^2 + 24064*a^6*b^5*c^5*k^2*z^2 - 4608*a^5*b^7*c^4*k^2*z^2 + 432 \\
& *a^4*b^9*c^3*k^2*z^2 - 16*a^3*b^11*c^2*k^2*z^2 + 24576*a^7*b^2*c^7*j^2*z^2 \\
& - 6144*a^6*b^4*c^6*j^2*z^2 + 512*a^5*b^6*c^5*j^2*z^2 - 8192*a^6*b^3*c^7*h^2 \\
& *z^2 + 1536*a^5*b^5*c^6*h^2*z^2 - 16*a^3*b^9*c^4*h^2*z^2 - 8192*a^6*b^2*c^8 \\
& *g^2*z^2 + 6144*a^5*b^4*c^7*g^2*z^2 - 1536*a^4*b^6*c^6*g^2*z^2 + 128*a^3*b^ \\
& 8*c^5*g^2*z^2 - 8192*a^5*b^3*c^8*f^2*z^2 + 1536*a^4*b^5*c^7*f^2*z^2 - 16*a^ \\
& 2*b^9*c^5*f^2*z^2 + 24576*a^5*b^2*c^9*e^2*z^2 - 6144*a^4*b^4*c^8*e^2*z^2 + \\
& 512*a^3*b^6*c^7*e^2*z^2 - 61440*a^4*b^3*c^9*d^2*z^2 + 24064*a^3*b^5*c^8*d^2 \\
& *z^2 - 4608*a^2*b^7*c^7*d^2*z^2 - 393216*a^9*c^7*l^2*z^2 - 144*a^3*b^13*m^2 \\
& *z^2 - 32768*a^8*c^8*j^2*z^2 - 32768*a^6*c^10*e^2*z^2 - 16*b^11*c^5*d^2*z^2 \\
& + 18432*a^8*b*c^5*h*l*m*z - 96*a^3*b^10*c*g*k*m*z + 90112*a^7*b*c^6*e*k*m* \\
& z + 36864*a^7*b*c^6*f*j*m*z - 16384*a^7*b*c^6*g*j*l*z + 14336*a^7*b*c^6*d*l \\
& *m*z - 10240*a^7*b*c^6*f*k*l*z + 4096*a^7*b*c^6*h*j*k*z + 10240*a^7*b*c^6*g \\
& *h*m*z - 47104*a^6*b*c^7*d*h*l*z + 36864*a^6*b*c^7*e*f*m*z + 30720*a^6*b*c^ \\
& 7*d*g*m*z - 16384*a^6*b*c^7*e*g*l*z + 6144*a^6*b*c^7*f*g*k*z + 4096*a^6*b*c \\
& ^7*e*h*k*z + 32*a*b^10*c^3*d*f*l*z - 4096*a^5*b*c^8*d*f*j*z - 6144*a^5*b*c^ \\
& 8*d*g*h*z - 32*a*b^8*c^5*d*f*g*z - 4096*a^4*b*c^9*d*e*f*z + 64*a*b^7*c^6*d* \\
& e*f*z + 110592*a^8*b^2*c^4*k*l*m*z - 36864*a^7*b^4*c^3*k*l*m*z + 5376*a^6*b \\
& ^6*c^2*k*l*m*z - 79872*a^7*b^3*c^4*j*k*m*z + 26112*a^6*b^5*c^3*j*k*m*z - 37 \\
& 12*a^5*b^7*c^2*j*k*m*z - 13824*a^7*b^3*c^4*h*l*m*z + 3456*a^6*b^5*c^3*h*l*m \\
& *z - 288*a^5*b^7*c^2*h*l*m*z - 45056*a^7*b^2*c^5*g*k*m*z + 39936*a^6*b^4*c^ \\
& 4*g*k*m*z + 30720*a^7*b^2*c^5*f*l*m*z - 18432*a^7*b^2*c^5*h*k*l*z - 13056*a \\
& ^5*b^6*c^3*g*k*m*z - 7680*a^6*b^4*c^4*f*l*m*z + 5376*a^6*b^4*c^4*h*j*m*z + \\
& 4608*a^6*b^4*c^4*h*k*l*z + 3072*a^7*b^2*c^5*h*j*m*z - 1984*a^5*b^6*c^3*h*j* \\
& m*z + 1856*a^4*b^8*c^2*g*k*m*z + 640*a^5*b^6*c^3*f*l*m*z - 384*a^5*b^6*c^3* \\
& h*k*l*z + 192*a^4*b^8*c^2*h*j*m*z - 79872*a^6*b^3*c^5*e*k*m*z - 27648*a^6*b \\
& ^3*c^5*f*j*m*z + 26112*a^5*b^5*c^4*e*k*m*z + 12288*a^6*b^3*c^5*g*j*l*z - 10 \\
& 752*a^6*b^3*c^5*d*l*m*z + 7680*a^6*b^3*c^5*f*k*l*z + 6912*a^5*b^5*c^4*f*j*m \\
& *z - 3712*a^4*b^7*c^3*e*k*m*z - 3072*a^6*b^3*c^5*h*j*k*z - 3072*a^5*b^5*c^4 \\
& *g*j*l*z + 2688*a^5*b^5*c^4*d*l*m*z - 1920*a^5*b^5*c^4*f*k*l*z + 768*a^5*b^ \\
& 5*c^4*h*j*k*z - 576*a^4*b^7*c^3*f*j*m*z + 256*a^4*b^7*c^3*g*j*l*z - 224*a^4 \\
& *b^7*c^3*d*l*m*z + 192*a^3*b^9*c^2*e*k*m*z + 160*a^4*b^7*c^3*f*k*l*z - 64*a \\
& ^4*b^7*c^3*h*j*k*z - 2688*a^5*b^5*c^4*g*h*m*z - 1536*a^6*b^3*c^5*g*h*m*z + \\
& 992*a^4*b^7*c^3*g*h*m*z - 96*a^3*b^9*c^2*g*h*m*z - 65536*a^6*b^2*c^6*d*k*l* \\
& z + 46080*a^6*b^2*c^6*d*j*m*z - 24576*a^6*b^2*c^6*e*j*l*z + 21504*a^5*b^4*c \\
& ^5*d*k*l*z - 11520*a^5*b^4*c^5*d*j*m*z + 9216*a^6*b^2*c^6*f*j*k*z + 6144*a^ \\
& 5*b^4*c^5*e*j*l*z - 3072*a^4*b^6*c^4*d*k*l*z - 2304*a^5*b^4*c^5*f*j*k*z + 9 \\
& 60*a^4*b^6*c^4*d*j*m*z - 512*a^4*b^6*c^4*e*j*l*z + 192*a^4*b^6*c^4*f*j*k*z \\
& + 160*a^3*b^8*c^3*d*k*l*z - 18432*a^6*b^2*c^6*f*g*m*z + 13824*a^5*b^4*c^5*f \\
& *g*m*z + 5376*a^5*b^4*c^5*e*h*m*z - 3456*a^4*b^6*c^4*f*g*m*z + 3072*a^6*b^2 \\
& *c^6*e*h*m*z - 3072*a^5*b^4*c^5*f*h*l*z - 2048*a^6*b^2*c^6*g*h*k*z - 1984*a \\
& ^4*b^6*c^4*e*h*m*z + 1536*a^5*b^4*c^5*g*h*k*z + 1024*a^4*b^6*c^4*f*h*l*z -
\end{aligned}$$

$$\begin{aligned}
& 384a^4b^6c^4g^h*k*z + 288a^3b^8c^3f*g*m*z + 192a^3b^8c^3e*h*m*z \\
& - 96a^3b^8c^3f*h*l*z + 32a^3b^8c^3g*h*k*z + 41472a^5b^3c^6d*h* \\
& l*z - 27648a^5b^3c^6e*f*m*z - 23040a^5b^3c^6d*g*m*z - 13440a^4b^5 \\
& *c^5d*h*l*z + 12288a^5b^3c^6e*g*l*z + 6912a^4b^5c^5e*f*m*z + 5760 \\
& a^4b^5c^5d*g*m*z - 4608a^5b^3c^6f*g*k*z - 3072a^5b^3c^6e*h*k*z - \\
& 3072a^4b^5c^5e*g*l*z + 1888a^3b^7c^4d*h*l*z + 1152a^4b^5c^5f*g \\
& *k*z + 768a^4b^5c^5e*h*k*z - 576a^3b^7c^4e*f*m*z - 480a^3b^7c^4 \\
& d*g*m*z + 256a^3b^7c^4e*g*l*z - 96a^3b^7c^4f*g*k*z - 96a^2b^9c^3 \\
& *d*h*l*z - 64a^3b^7c^4e*h*k*z + 46080a^5b^2c^7d*e*m*z - 11520a^4b \\
& ^4c^6d*e*m*z + 9216a^5b^2c^7e*f*k*z - 9216a^5b^2c^7d*h*j*z - 6656 \\
& *a^4b^4c^6d*f*l*z - 6144a^5b^2c^7d*f*l*z + 3456a^3b^6c^5d*f*l*z \\
& - 2304a^4b^4c^6e*f*k*z + 2304a^4b^4c^6d*h*j*z + 960a^3b^6c^5d*e \\
& *m*z - 576a^2b^8c^4d*f*l*z + 192a^3b^6c^5e*f*k*z - 192a^3b^6c^5 \\
& d*h*j*z + 3072a^4b^3c^7d*f*j*z - 768a^3b^5c^6d*f*j*z + 64a^2b^7c \\
& ^5d*f*j*z + 4608a^4b^3c^7d*g*h*z - 1152a^3b^5c^6d*g*h*z + 96a^2b \\
& ^7c^5d*g*h*z - 9216a^4b^2c^8d*e*h*z + 2304a^3b^4c^7d*e*h*z + 2048 \\
& *a^4b^2c^8d*f*g*z - 1536a^3b^4c^7d*f*g*z + 384a^2b^6c^6d*f*g*z - \\
& 192a^2b^6c^6d*e*h*z + 3072a^3b^3c^8d*e*f*z - 768a^2b^5c^7d*e*f \\
& *z - 288a^5b^8c*k*l*m*z + 90112a^8b*c^5j*k*m*z + 192a^4b^9c*j*k*m* \\
& z + 138240a^9b*c^4l*m^2*z - 7344a^6b^7c^1m^2*z + 5088a^5b^8c*j*m^ \\
& 2*z - 3072a^8b*c^5k^2*l*z - 49152a^8b*c^5j*l^2*z - 128a^4b^9c*j*l^ \\
& 2*z - 25600a^8b*c^5g*m^2*z - 9216a^7b*c^6h^2*l*z - 2544a^4b^9c*g*m \\
& ^2*z + 64a^3b^10c*g*l^2*z + 9216a^7b*c^6g*k^2*z - 3072a^6b*c^7f^2* \\
& l*z - 288a^3b^10c*e*m^2*z - 49152a^7b*c^6e*l^2*z - 58368a^5b*c^8d^ \\
& 2*l*z - 432a*b^9c^4d^2*l*z - 1024a^6b*c^7g*h^2*z + 32a*b^8c^5d^2*j \\
& *z + 1024a^5b*c^8f^2*g*z - 9216a^4b*c^9d^2*g*z + 336a*b^7c^6d^2*g* \\
& z - 672a*b^6c^7d^2*e*z - 122880a^9c^5k*l*m*z - 40960a^8c^6f*l*m*z \\
& + 24576a^8c^6h*k*l*z - 20480a^8c^6h*j*m*z + 73728a^7c^7d*k*l*z - 6 \\
& 1440a^7c^7d*j*m*z + 32768a^7c^7e*j*l*z - 12288a^7c^7f*j*k*z - 2048 \\
& 0a^7c^7e*h*m*z + 8192a^7c^7f*h*l*z - 61440a^6c^8d*e*m*z + 24576a^ \\
& 6c^8d*f*l*z - 12288a^6c^8e*f*k*z + 12288a^6c^8d*h*j*z + 12288a^5c \\
& ^9d*e*h*z - 131328a^8b^3c^3l*m^2*z + 46656a^7b^5c^2l*m^2*z - 14284 \\
& 8a^8b^2c^4j*m^2*z + 106368a^7b^4c^3j*m^2*z - 34208a^6b^6c^2j*m^ \\
& 2*z + 2304a^7b^3c^4k^2*l*z - 576a^6b^5c^3k^2*l*z + 48a^5b^7c^2k \\
& ^2*l*z + 45056a^7b^3c^4j*l^2*z - 15360a^6b^5c^3j*l^2*z - 12288a^7* \\
& b^2c^5j^2*l*z + 3072a^6b^4c^4j^2*l*z + 2304a^5b^7c^2j*l^2*z - 256 \\
& *a^5b^6c^3j^2*l*z + 15872a^7b^2c^5j*k^2*z - 4992a^6b^4c^4j*k^2*z \\
& + 672a^5b^6c^3j*k^2*z - 32a^4b^8c^2j*k^2*z + 71424a^7b^3c^4g*m \\
& ^2*z - 53184a^6b^5c^3g*m^2*z + 17104a^5b^7c^2g*m^2*z + 6912a^6b^3 \\
& *c^5h^2*l*z - 1728a^5b^5c^4h^2*l*z + 144a^4b^7c^3h^2*l*z + 24576a \\
& ^7b^2c^5g*l^2*z - 22528a^6b^4c^4g*l^2*z + 7680a^5b^6c^3g*l^2*z + \\
& 4096a^6b^2c^6g^2*l*z - 3072a^5b^4c^5g^2*l*z - 1152a^4b^8c^2g*l \\
& ^2*z + 768a^4b^6c^4g^2*l*z - 64a^3b^8c^3g^2*l*z - 142848a^7b^2c^ \\
& 5e*m^2*z + 106368a^6b^4c^4e*m^2*z - 34208a^5b^6c^3e*m^2*z - 7936a \\
& ^6b^3c^5g*k^2*z + 5088a^4b^8c^2e*m^2*z + 2496a^5b^5c^4g*k^2*z -
\end{aligned}$$

$1536*a^6*b^2*c^6*h^2*j*z + 1280*a^5*b^3*c^6*f^2*l*z + 384*a^5*b^4*c^5*h^2*j$
 $*z - 336*a^4*b^7*c^3*g*k^2*z + 192*a^4*b^5*c^5*f^2*l*z - 144*a^3*b^7*c^4*f^$
 $2*l*z - 32*a^4*b^6*c^4*h^2*j*z + 16*a^3*b^9*c^2*g*k^2*z + 16*a^2*b^9*c^3*f^$
 $2*l*z + 45056*a^6*b^3*c^5*e*l^2*z - 15360*a^5*b^5*c^4*e*l^2*z - 12288*a^5*b$
 $^2*c^7*e^2*l*z + 3072*a^4*b^4*c^6*e^2*l*z + 2304*a^4*b^7*c^3*e*l^2*z - 256*$
 $a^3*b^6*c^5*e^2*l*z - 128*a^3*b^9*c^2*e*l^2*z + 59136*a^4*b^3*c^7*d^2*l*z -$
 $23488*a^3*b^5*c^6*d^2*l*z + 15872*a^6*b^2*c^6*e*k^2*z - 4992*a^5*b^4*c^5*e$
 $*k^2*z + 4560*a^2*b^7*c^5*d^2*l*z + 1536*a^5*b^2*c^7*f^2*j*z + 672*a^4*b^6*$
 $c^4*e*k^2*z - 384*a^4*b^4*c^6*f^2*j*z - 32*a^3*b^8*c^3*e*k^2*z + 32*a^3*b^6$
 $*c^5*f^2*j*z + 768*a^5*b^3*c^6*g*h^2*z - 192*a^4*b^5*c^5*g*h^2*z + 16*a^3*b$
 $^7*c^4*g*h^2*z - 15872*a^4*b^2*c^8*d^2*j*z + 4992*a^3*b^4*c^7*d^2*j*z - 672$
 $*a^2*b^6*c^6*d^2*j*z - 1536*a^5*b^2*c^7*e*h^2*z - 768*a^4*b^3*c^7*f^2*g*z +$
 $384*a^4*b^4*c^6*e*h^2*z + 192*a^3*b^5*c^6*f^2*g*z - 32*a^3*b^6*c^5*e*h^2*z$
 $- 16*a^2*b^7*c^5*f^2*g*z + 7936*a^3*b^3*c^8*d^2*g*z - 2496*a^2*b^5*c^7*d^2$
 $*g*z + 1536*a^4*b^2*c^8*e*f^2*z - 384*a^3*b^4*c^7*e*f^2*z + 32*a^2*b^6*c^6*$
 $e*f^2*z - 15872*a^3*b^2*c^9*d^2*e*z + 4992*a^2*b^4*c^8*d^2*e*z - 61440*a^8*$
 $b^2*c^4*l^3*z + 21504*a^7*b^4*c^3*l^3*z - 3328*a^6*b^6*c^2*l^3*z + 432*a^5*$
 $b^9*l*m^2*z + 51200*a^9*c^5*j*m^2*z + 16384*a^8*c^6*j^2*l*z - 288*a^4*b^10*$
 $j*m^2*z - 18432*a^8*c^6*j*k^2*z + 144*a^3*b^11*g*m^2*z + 51200*a^8*c^6*e*m^$
 $2*z + 2048*a^7*c^7*h^2*j*z + 16384*a^6*c^8*e^2*l*z + 16*b^11*c^3*d^2*l*z -$
 $18432*a^7*c^7*e*k^2*z - 2048*a^6*c^8*f^2*j*z + 18432*a^5*c^9*d^2*j*z + 192*$
 $a^5*b^8*c*l^3*z + 2048*a^6*c^8*e*h^2*z - 16*b^9*c^5*d^2*g*z - 2048*a^5*c^9*$
 $e*f^2*z + 32*b^8*c^6*d^2*e*z + 18432*a^4*c^10*d^2*e*z + 65536*a^9*c^5*l^3*z$
 $- 11008*a^8*b*c^3*j*k*l*m - 288*a^6*b^5*c*j*k*l*m + 144*a^5*b^6*c*g*k*l*m$
 $- 11008*a^7*b*c^4*e*k*l*m - 5376*a^7*b*c^4*f*j*l*m + 3840*a^7*b*c^4*g*j*k*m$
 $- 3328*a^7*b*c^4*h*j*k*l - 96*a^4*b^7*c*g*j*k*m - 2560*a^7*b*c^4*g*h*l*m -$
 $36*a^3*b^8*c*f*h*k*m - 6912*a^6*b*c^5*d*j*k*l - 7872*a^6*b*c^5*d*h*k*m - 7$
 $680*a^6*b*c^5*d*g*l*m - 5376*a^6*b*c^5*e*f*l*m + 3840*a^6*b*c^5*e*g*k*m - 3$
 $328*a^6*b*c^5*e*h*k*l - 1536*a^6*b*c^5*f*g*k*l + 1280*a^6*b*c^5*f*g*j*m - 7$
 $68*a^6*b*c^5*g*h*j*k - 768*a^6*b*c^5*f*h*j*l - 768*a^6*b*c^5*e*h*j*m - 36*a$
 $^2*b^9*c*d*h*k*m - 6912*a^5*b*c^6*d*e*k*l - 4864*a^5*b*c^6*d*e*j*m - 2304*a$
 $^5*b*c^6*d*g*j*k - 1792*a^5*b*c^6*e*f*j*k - 1280*a^5*b*c^6*d*f*j*l - 4544*a$
 $^5*b*c^6*d*f*h*m + 1536*a^5*b*c^6*d*g*h*l + 1280*a^5*b*c^6*e*f*g*m - 768*a^$
 $5*b*c^6*e*g*h*k - 768*a^5*b*c^6*e*f*h*l - 256*a^5*b*c^6*f*g*h*j + 12*a*b^9*$
 $c^2*d*f*h*m + 16*a*b^8*c^3*d*f*g*l - 4*a*b^8*c^3*d*f*h*k - 2304*a^4*b*c^7*d$
 $*e*g*k - 1792*a^4*b*c^7*d*e*h*j - 1280*a^4*b*c^7*d*e*f*l - 768*a^4*b*c^7*d*$
 $f*g*j - 32*a*b^7*c^4*d*e*f*l - 256*a^4*b*c^7*e*f*g*h - 768*a^3*b*c^8*d*e*f*$
 $g + 32*a*b^5*c^6*d*e*f*g + 12*a*b^10*c*d*f*k*m + 3648*a^7*b^3*c^2*j*k*l*m +$
 $5504*a^7*b^2*c^3*g*k*l*m - 1824*a^6*b^4*c^2*g*k*l*m + 384*a^7*b^2*c^3*h*j*$
 $l*m - 288*a^6*b^4*c^2*h*j*l*m - 4800*a^6*b^3*c^3*g*j*k*m + 3648*a^6*b^3*c^3$
 $*e*k*l*m + 1280*a^5*b^5*c^2*g*j*k*m + 1088*a^6*b^3*c^3*f*j*l*m + 576*a^6*b^$
 $3*c^3*h*j*k*l - 288*a^5*b^5*c^2*e*k*l*m - 192*a^6*b^3*c^3*g*h*l*m + 144*a^5$
 $*b^5*c^2*g*h*l*m + 9600*a^6*b^2*c^4*e*j*k*m - 4224*a^6*b^2*c^4*d*j*l*m - 25$
 $60*a^5*b^4*c^3*e*j*k*m + 384*a^6*b^2*c^4*f*j*k*l + 224*a^5*b^4*c^3*d*j*l*m$
 $+ 192*a^4*b^6*c^2*e*j*k*m - 160*a^5*b^4*c^3*f*j*k*l - 4608*a^6*b^2*c^4*f*h*$

$$\begin{aligned}
& k^m + 2688a^6b^2c^4f^*g^*l^*m + 1664a^6b^2c^4g^*h^*k^*l - 744a^5b^4c^3 \\
& *f^*h^*k^*m - 544a^5b^4c^3f^*g^*l^*m + 492a^4b^6c^2f^*h^*k^*m + 416a^5b^4c^3 \\
& *g^*h^*j^*m + 384a^6b^2c^4g^*h^*j^*m + 384a^6b^2c^4e^*h^*l^*m - 288a^5b^4 \\
& *c^3g^*h^*k^*l - 288a^5b^4c^3e^*h^*l^*m - 96a^4b^6c^2g^*h^*j^*m + 2112a^5 \\
& *b^3c^4d^*j^*k^*l - 160a^4b^5c^3d^*j^*k^*l + 16992a^5b^3c^4d^*h^*k^*m - 6 \\
& *252a^4b^5c^3d^*h^*k^*m - 4800a^5b^3c^4e^*g^*k^*m + 2112a^5b^3c^4d^*g^*l^* \\
& *m - 1728a^5b^3c^4f^*g^*j^*m + 1280a^4b^5c^3e^*g^*k^*m + 1088a^5b^3c^4 \\
& *e^*f^*l^*m - 832a^5b^3c^4e^*h^*j^*m + 816a^3b^7c^2d^*h^*k^*m + 576a^5b^3c^4 \\
& *e^*h^*k^*l - 448a^5b^3c^4f^*h^*j^*l + 288a^4b^5c^3f^*g^*j^*m - 192a^5b^3 \\
& *c^4g^*h^*j^*k - 192a^5b^3c^4f^*g^*k^*l + 192a^4b^5c^3e^*h^*j^*m - 112a^4 \\
& *b^5c^3d^*g^*l^*m + 96a^4b^5c^3f^*h^*j^*l - 96a^3b^7c^2e^*g^*k^*m + 80a^4 \\
& *b^5c^3f^*g^*k^*l + 32a^4b^5c^3g^*h^*j^*k - 11456a^5b^2c^5d^*f^*k^*m + 49 \\
& *92a^5b^2c^5d^*h^*j^*l - 4608a^5b^2c^5e^*g^*j^*l - 4224a^5b^2c^5d^*e^*l^* \\
& *m + 3456a^5b^2c^5e^*f^*j^*m + 3456a^5b^2c^5d^*g^*k^*l + 2432a^5b^2c^5d^* \\
& *g^*j^*m - 1312a^4b^4c^4d^*h^*j^*l + 1272a^3b^6c^3d^*f^*k^*m - 1056a^4b^4 \\
& *c^4d^*g^*k^*l + 896a^5b^2c^5f^*g^*j^*k + 768a^4b^4c^4e^*g^*j^*l - 576a^4 \\
& *b^4c^4e^*f^*j^*m - 480a^4b^4c^4d^*g^*j^*m + 384a^5b^2c^5e^*h^*j^*k + 384a^5 \\
& *b^2c^5e^*f^*k^*l - 232a^2b^8c^2d^*f^*k^*m + 224a^4b^4c^4d^*e^*l^*m - 1 \\
& *60a^4b^4c^4e^*f^*k^*l - 96a^4b^4c^4f^*g^*j^*k + 96a^3b^6c^3d^*h^*j^*l + \\
& *80a^3b^6c^3d^*g^*k^*l - 64a^4b^4c^4e^*h^*j^*k - 24a^4b^4c^4d^*f^*k^*m + \\
& *416a^4b^4c^4e^*g^*h^*m + 384a^5b^2c^5f^*g^*h^*l + 384a^5b^2c^5e^*g^*h^*m \\
& + 224a^4b^4c^4f^*g^*h^*l - 96a^3b^6c^3e^*g^*h^*m - 48a^3b^6c^3f^*g^*h^* \\
& *l + 2112a^4b^3c^5d^*e^*k^*l - 960a^4b^3c^5d^*f^*j^*l + 960a^4b^3c^5d^* \\
& *e^*j^*m + 384a^3b^5c^4d^*f^*j^*l + 320a^4b^3c^5d^*g^*j^*k + 192a^4b^3c^5 \\
& *e^*f^*j^*k - 160a^3b^5c^4d^*e^*k^*l - 32a^2b^7c^3d^*f^*j^*l + 7392a^4b^3c^5 \\
& *d^*f^*h^*m - 2496a^4b^3c^5d^*g^*h^*l - 1728a^4b^3c^5e^*f^*g^*m - 1500a^3 \\
& *b^5c^4d^*f^*h^*m + 656a^3b^5c^4d^*g^*h^*l - 448a^4b^3c^5e^*f^*h^*l + 288 \\
& *a^3b^5c^4e^*f^*g^*m - 192a^4b^3c^5f^*g^*h^*j - 192a^4b^3c^5e^*g^*h^*k + \\
& *96a^3b^5c^4e^*f^*h^*l - 48a^2b^7c^3d^*g^*h^*l + 32a^3b^5c^4e^*g^*h^*k - \\
& *16a^2b^7c^3d^*f^*h^*m - 640a^4b^2c^6d^*e^*j^*k + 4992a^4b^2c^6d^*e^*h^*l \\
& - 3584a^4b^2c^6d^*f^*h^*k + 2432a^4b^2c^6d^*e^*g^*m - 1312a^3b^4c^5d^* \\
& *e^*h^*l + 896a^4b^2c^6e^*f^*g^*k + 896a^4b^2c^6d^*g^*h^*j + 640a^4b^2c^6 \\
& *d^*f^*g^*l + 600a^3b^4c^5d^*f^*h^*k + 480a^3b^4c^5d^*f^*g^*l - 480a^3b^4 \\
& *c^5d^*e^*g^*m + 384a^4b^2c^6e^*f^*h^*j - 192a^2b^6c^4d^*f^*g^*l - 96a^3b^4 \\
& *c^5e^*f^*g^*k - 96a^3b^4c^5d^*g^*h^*j + 96a^2b^6c^4d^*e^*h^*l + 12a^2b^6 \\
& *c^4d^*f^*h^*k - 960a^3b^3c^6d^*e^*f^*l + 384a^2b^5c^5d^*e^*f^*l + 320a^3 \\
& *b^3c^6d^*e^*g^*k - 192a^3b^3c^6d^*f^*g^*j + 192a^3b^3c^6d^*e^*h^*j + 32a^2 \\
& *b^5c^5d^*f^*g^*j - 192a^3b^3c^6e^*f^*g^*h + 384a^3b^2c^7d^*e^*f^*j - 6 \\
& *4a^2b^4c^6d^*e^*f^*j + 896a^3b^2c^7d^*e^*g^*h - 96a^2b^4c^6d^*e^*g^*h - \\
& *192a^2b^3c^7d^*e^*f^*g + 496a^7b^4c^*k^*l^2 *m - 4752a^7b^4c^*j^*l^*m^2 + \\
& *96a^5b^6c^*j^2 *k^*m - 6144a^8b^*c^3 *h^*l^2 *m - 168a^6b^5c^*h^*l^2 *m + 640 \\
& *0a^8b^*c^3 *g^*l^*m^2 - 2862a^6b^5c^*h^*k^*m^2 + 2376a^6b^5c^*g^*l^*m^2 - 163 \\
& *2a^7b^*c^4 *h^2 *k^*m - 480a^8b^*c^3 *h^*k^*m^2 - 180a^5b^6c^*h^*k^2 *m + 54a^4 \\
& *b^7c^*h^2 *k^*m - 384a^7b^*c^4 *h^*j^2 *m + 120a^5b^6c^*h^*k^*l^2 + 56a^5b^6 \\
& *c^*f^*l^2 *m + 24a^3b^8c^*g^2 *k^*m + 4512a^7b^*c^4 *f^*k^2 *m - 2304a^7b^*c^
\end{aligned}$$

$$\begin{aligned}
& 4*g*k^2*l - 1680*a^5*b^6*c*g*j*m^2 + 1184*a^6*b*c^5*f^2*k*m + 804*a^5*b^6*c \\
& *f*k*m^2 + 432*a^5*b^6*c*e*l*m^2 + 60*a^4*b^7*c*f*k^2*m + 6*a^2*b^9*c*f^2*k \\
& *m - 13312*a^7*b*c^4*d*l^2*m + 2048*a^7*b*c^4*g*j*l^2 - 1024*a^7*b*c^4*f*k \\
& l^2 + 64*a^4*b^7*c*g*j*l^2 + 56*a^4*b^7*c*d*l^2*m - 40*a^4*b^7*c*f*k*l^2 + \\
& 13440*a^7*b*c^4*e*j*m^2 - 8928*a^5*b*c^6*d^2*k*m - 6240*a^7*b*c^4*d*k*m^2 + \\
& 1614*a^4*b^7*c*d*k*m^2 - 288*a^4*b^7*c*e*j*m^2 - 170*a*b^9*c^2*d^2*k*m + 6 \\
& 0*a^3*b^8*c*d*k^2*m + 4608*a^6*b*c^5*e*j^2*l + 4608*a^5*b*c^6*e^2*j*l - 243 \\
& 2*a^6*b*c^5*d*j^2*m + 1440*a^7*b*c^4*f*h*m^2 - 896*a^6*b*c^5*f*j^2*k - 864* \\
& a^6*b*c^5*f*h^2*m - 558*a^4*b^7*c*f*h*m^2 + 256*a^6*b*c^5*g*h^2*l - 40*a^3* \\
& b^8*c*d*k*l^2 - 1920*a^6*b*c^5*e*j*k^2 - 384*a^5*b*c^6*e^2*h*m + 24*a^3*b^8 \\
& *c*f*h*l^2 - 16*a*b^8*c^3*d^2*j*l + 2208*a^6*b*c^5*f*h*k^2 - 1044*a^3*b^8*c \\
& *d*h*m^2 + 800*a^5*b*c^6*f^2*h*k - 256*a^5*b*c^6*f^2*g*l + 144*a^3*b^8*c*e \\
& g*m^2 - 116*a*b^8*c^3*d^2*h*m + 8192*a^6*b*c^5*d*h*l^2 + 2048*a^6*b*c^5*e*g \\
& *l^2 + 24*a^2*b^9*c*d*h*l^2 - 5856*a^4*b*c^7*d^2*f*m + 4896*a^4*b*c^7*d^2*h \\
& *k + 2720*a^6*b*c^5*d*f*m^2 + 2304*a^4*b*c^7*d^2*g*l + 1824*a^5*b*c^6*d*h^2 \\
& *k + 438*a*b^7*c^4*d^2*f*m - 384*a^5*b*c^6*e*h^2*j + 318*a^2*b^9*c*d*f*m^2 \\
& - 168*a*b^7*c^4*d^2*g*l + 42*a*b^7*c^4*d^2*h*k - 36*a*b^8*c^3*d*f^2*m - 243 \\
& 2*a^4*b*c^7*d*e^2*m + 1536*a^5*b*c^6*e*g*j^2 + 1536*a^4*b*c^7*e^2*g*j - 896 \\
& *a^5*b*c^6*d*h*j^2 - 896*a^4*b*c^7*e^2*f*k + 4896*a^5*b*c^6*d*f*k^2 + 1824* \\
& a^4*b*c^7*d*f^2*k - 384*a^4*b*c^7*e*f^2*j + 336*a*b^6*c^5*d^2*e*l - 156*a*b \\
& ^6*c^5*d^2*f*k + 16*a*b^6*c^5*d^2*g*j + 12*a*b^7*c^4*d*f^2*k - 2*a*b^9*c^2* \\
& d*f*k^2 - 1920*a^3*b*c^8*d^2*e*j - 32*a*b^5*c^6*d^2*e*j + 2208*a^3*b*c^8*d^ \\
& 2*f*h + 800*a^4*b*c^7*d*f*h^2 - 102*a*b^5*c^6*d^2*f*h + 12*a*b^6*c^5*d*f^2* \\
& h - 2*a*b^7*c^4*d*f*h^2 - 896*a^3*b*c^8*d*e^2*h - 8*a*b^6*c^5*d*f*g^2 - 240 \\
& *a*b^4*c^7*d^2*e*g - 32*a*b^4*c^7*d*e^2*f + 5120*a^8*c^4*h*j*l*m + 15360*a^ \\
& 7*c^5*d*j*l*m - 7680*a^7*c^5*e*j*k*m + 3072*a^7*c^5*f*j*k*l + 5120*a^7*c^5* \\
& e*h*l*m + 1920*a^7*c^5*f*h*k*m + 15360*a^6*c^6*d*e*l*m + 5760*a^6*c^6*d*f*k \\
& *m + 3072*a^6*c^6*e*f*k*l - 3072*a^6*c^6*d*h*j*l - 2560*a^6*c^6*e*f*j*m + 1 \\
& 536*a^6*c^6*e*h*j*k + 4608*a^5*c^7*d*e*j*k - 3072*a^5*c^7*d*e*h*l - 1152*a^ \\
& 5*c^7*d*f*h*k + 512*a^5*c^7*e*f*h*j + 1536*a^4*c^8*d*e*f*j - 8*a*b^10*c*d*f \\
& *l^2 - 5568*a^8*b^2*c^2*k*l^2*m + 15552*a^8*b^2*c^2*j*l*m^2 + 4800*a^7*b^2* \\
& c^3*j^2*k*m - 1280*a^6*b^4*c^2*j^2*k*m + 2080*a^7*b^3*c^2*h*l^2*m - 1088*a^ \\
& 7*b^2*c^3*j*k^2*l + 48*a^6*b^4*c^2*j*k^2*l - 8544*a^7*b^2*c^3*h*k^2*m - 777 \\
& 6*a^7*b^3*c^2*g*l*m^2 + 7632*a^7*b^3*c^2*h*k*m^2 + 3600*a^6*b^3*c^3*h^2*k*m \\
& + 2484*a^6*b^4*c^2*h*k^2*m - 918*a^5*b^5*c^2*h^2*k*m + 4800*a^7*b^2*c^3*h* \\
& k*l^2 - 1424*a^6*b^4*c^2*h*k*l^2 + 1200*a^5*b^4*c^3*g^2*k*m - 960*a^6*b^2*c \\
& ^4*g^2*k*m - 528*a^6*b^4*c^2*f*l^2*m - 416*a^6*b^3*c^3*h*j^2*m - 320*a^4*b^ \\
& 6*c^2*g^2*k*m + 192*a^7*b^2*c^3*f*l^2*m + 96*a^5*b^5*c^2*h*j^2*m + 15552*a^ \\
& 7*b^2*c^3*e*l*m^2 - 6720*a^7*b^2*c^3*g*j*m^2 + 6160*a^6*b^4*c^2*g*j*m^2 - 4 \\
& 752*a^6*b^4*c^2*e*l*m^2 - 2016*a^7*b^2*c^3*f*k*m^2 - 1164*a^6*b^4*c^2*f*k*m \\
& ^2 + 1104*a^5*b^3*c^4*f^2*k*m + 1008*a^6*b^3*c^3*f*k^2*m + 960*a^6*b^2*c^4* \\
& h^2*j*l - 678*a^5*b^5*c^2*f*k^2*m + 544*a^6*b^3*c^3*g*k^2*l - 144*a^5*b^4*c \\
& ^3*h^2*j*l - 102*a^4*b^5*c^3*f^2*k*m - 62*a^3*b^7*c^2*f^2*k*m - 24*a^5*b^5* \\
& c^2*g*k^2*l + 6432*a^6*b^3*c^3*d*l^2*m + 4800*a^5*b^2*c^5*e^2*k*m - 2304*a^ \\
& 6*b^2*c^4*g*j^2*l + 1920*a^6*b^3*c^3*g*j*l^2 + 1728*a^6*b^2*c^4*f*j^2*m - 1
\end{aligned}$$

$$\begin{aligned}
& 280*a^4*b^4*c^4*e^2*k*m + 1152*a^5*b^3*c^4*g^2*j*1 - 1032*a^5*b^5*c^2*d*1^2 \\
& *m - 864*a^6*b^3*c^3*f*k*1^2 - 768*a^5*b^5*c^2*g*j*1^2 + 408*a^5*b^5*c^2*f* \\
& k*1^2 + 384*a^5*b^4*c^3*g*j^2*1 - 288*a^5*b^4*c^3*f*j^2*m + 192*a^6*b^2*c^4 \\
& *h*j^2*k - 192*a^4*b^5*c^3*g^2*j*1 + 96*a^3*b^6*c^3*e^2*k*m - 32*a^5*b^4*c^ \\
& 3*h*j^2*k - 21120*a^6*b^2*c^4*d*k^2*m + 20880*a^6*b^3*c^3*d*k*m^2 + 19760*a \\
& ^4*b^3*c^5*d^2*k*m - 12320*a^6*b^3*c^3*e*j*m^2 - 9750*a^5*b^5*c^2*d*k*m^2 - \\
& 9390*a^3*b^5*c^4*d^2*k*m + 8460*a^5*b^4*c^3*d*k^2*m + 3360*a^5*b^5*c^2*e*j \\
& *m^2 + 1860*a^2*b^7*c^3*d^2*k*m - 1218*a^4*b^6*c^2*d*k^2*m - 1088*a^6*b^2*c \\
& ^4*e*k^2*1 + 960*a^6*b^2*c^4*g*j*k^2 - 240*a^5*b^4*c^3*g*j*k^2 + 192*a^5*b^ \\
& 2*c^5*f^2*j*1 - 104*a^4*b^5*c^3*g^2*h*m - 96*a^5*b^3*c^4*g^2*h*m + 48*a^5*b \\
& ^4*c^3*e*k^2*1 + 48*a^4*b^4*c^4*f^2*j*1 + 24*a^3*b^7*c^2*g^2*h*m + 16*a^4*b \\
& ^6*c^2*g*j*k^2 - 16*a^3*b^6*c^3*f^2*j*1 + 13376*a^6*b^2*c^4*d*k*1^2 - 5136* \\
& a^5*b^4*c^3*d*k*1^2 - 3840*a^6*b^2*c^4*e*j*1^2 + 1536*a^5*b^4*c^3*e*j*1^2 + \\
& 1392*a^5*b^3*c^4*f*h^2*m + 1386*a^5*b^5*c^2*f*h*m^2 - 768*a^5*b^3*c^4*e*j^ \\
& 2*1 + 768*a^4*b^6*c^2*d*k*1^2 - 768*a^4*b^3*c^5*e^2*j*1 - 588*a^4*b^4*c^4*f \\
& ^2*h*m - 480*a^5*b^3*c^4*g*h^2*1 + 480*a^5*b^3*c^4*d*j^2*m - 480*a^5*b^2*c^ \\
& 5*f^2*h*m - 128*a^4*b^6*c^2*e*j*1^2 + 100*a^3*b^6*c^3*f^2*h*m + 96*a^5*b^3* \\
& c^4*f*j^2*k + 72*a^4*b^5*c^3*g*h^2*1 - 54*a^4*b^5*c^3*f*h^2*m - 48*a^6*b^3* \\
& c^3*f*h*m^2 - 36*a^3*b^7*c^2*f*h^2*m + 6*a^2*b^8*c^2*f^2*h*m + 6848*a^4*b^2 \\
& *c^6*d^2*j*1 - 2448*a^3*b^4*c^5*d^2*j*1 + 624*a^5*b^4*c^3*f*h*1^2 + 576*a^6 \\
& *b^2*c^4*f*h*1^2 + 480*a^5*b^3*c^4*e*j*k^2 + 432*a^4*b^4*c^4*f*g^2*m - 416* \\
& a^4*b^3*c^5*e^2*h*m + 336*a^2*b^6*c^4*d^2*j*1 - 320*a^5*b^2*c^5*f*g^2*m - 2 \\
& 56*a^4*b^6*c^2*f*h*1^2 + 192*a^5*b^2*c^5*g^2*h*k + 96*a^3*b^5*c^4*e^2*h*m - \\
& 72*a^3*b^6*c^3*f*g^2*m + 48*a^4*b^4*c^4*g^2*h*k - 32*a^4*b^5*c^3*e*j*k^2 - \\
& 8*a^3*b^6*c^3*g^2*h*k + 24768*a^6*b^2*c^4*d*h*m^2 - 21108*a^5*b^4*c^3*d*h* \\
& m^2 - 10048*a^4*b^2*c^6*d^2*h*m + 7218*a^4*b^6*c^2*d*h*m^2 - 6720*a^6*b^2*c \\
& ^4*e*g*m^2 + 6160*a^5*b^4*c^3*e*g*m^2 - 2592*a^5*b^2*c^5*d*h^2*m - 1680*a^4 \\
& *b^6*c^2*e*g*m^2 + 1068*a^3*b^4*c^5*d^2*h*m + 960*a^5*b^2*c^5*e*h^2*1 - 876 \\
& *a^4*b^4*c^4*d*h^2*m - 864*a^5*b^2*c^5*f*h^2*k + 546*a^2*b^6*c^4*d^2*h*m + \\
& 432*a^3*b^6*c^3*d*h^2*m + 336*a^4*b^3*c^5*f^2*h*k - 320*a^5*b^2*c^5*d*j^2*k \\
& + 192*a^5*b^2*c^5*g*h^2*j + 144*a^5*b^3*c^4*f*h*k^2 - 144*a^4*b^4*c^4*e*h^ \\
& 2*1 - 102*a^4*b^5*c^3*f*h*k^2 - 96*a^4*b^3*c^5*f^2*g*1 - 36*a^2*b^8*c^2*d*h \\
& ^2*m - 30*a^3*b^5*c^4*f^2*h*k - 24*a^3*b^5*c^4*f^2*g*1 + 16*a^4*b^4*c^4*g*h \\
& ^2*j - 12*a^4*b^4*c^4*f*h^2*k + 12*a^3*b^6*c^3*f*h^2*k + 8*a^2*b^7*c^3*f^2* \\
& g*1 + 6*a^3*b^7*c^2*f*h*k^2 - 2*a^2*b^7*c^3*f^2*h*k - 9312*a^5*b^3*c^4*d*h* \\
& 1^2 + 3288*a^4*b^5*c^3*d*h*1^2 - 2304*a^4*b^2*c^6*e^2*g*1 + 1920*a^5*b^3*c^ \\
& 4*e*g*1^2 + 1728*a^4*b^2*c^6*e^2*f*m + 1152*a^4*b^3*c^5*e*g^2*1 - 768*a^4*b \\
& ^5*c^3*e*g*1^2 - 608*a^4*b^3*c^5*d*g^2*m - 472*a^3*b^7*c^2*d*h*1^2 + 384*a^ \\
& 3*b^4*c^5*e^2*g*1 - 288*a^3*b^4*c^5*e^2*f*m - 224*a^4*b^3*c^5*f*g^2*k + 192 \\
& *a^5*b^2*c^5*f*h*j^2 + 192*a^4*b^2*c^6*e^2*h*k - 192*a^3*b^5*c^4*e*g^2*1 + \\
& 120*a^3*b^5*c^4*d*g^2*m + 64*a^3*b^7*c^2*e*g*1^2 - 32*a^3*b^4*c^5*e^2*h*k + \\
& 24*a^3*b^5*c^4*f*g^2*k + 9936*a^3*b^3*c^6*d^2*f*m + 3786*a^4*b^5*c^3*d*f*m \\
& ^2 - 3552*a^5*b^2*c^5*d*h*k^2 - 3486*a^2*b^5*c^5*d^2*f*m - 3424*a^3*b^3*c^6 \\
& *d^2*g*1 - 1868*a^3*b^7*c^2*d*f*m^2 + 1332*a^4*b^4*c^4*d*h*k^2 - 1296*a^5*b \\
& ^3*c^4*d*f*m^2 - 1236*a^3*b^4*c^5*d*f^2*m + 1224*a^2*b^5*c^5*d^2*g*1 - 1152
\end{aligned}$$

$$\begin{aligned}
& a^4 b^2 c^6 d f^2 m + 960 a^5 b^2 c^5 e g k^2 - 496 a^3 b^3 c^6 d^2 h k + \\
& 462 a^2 b^6 c^4 d f^2 m + 432 a^4 b^3 c^5 d h^2 k - 240 a^4 b^4 c^4 e g k^2 \\
& - 222 a^2 b^5 c^5 d^2 h k + 192 a^4 b^2 c^6 f^2 g j + 192 a^4 b^2 c^6 e f^2 \\
& 2 l - 174 a^3 b^5 c^4 d h^2 k - 156 a^3 b^6 c^3 d h k^2 + 48 a^3 b^4 c^5 e f^2 \\
& 2 l - 32 a^4 b^3 c^5 e h^2 j + 16 a^3 b^6 c^3 e g k^2 + 16 a^3 b^4 c^5 f^2 \\
& 2 g j - 16 a^2 b^6 c^4 e f^2 l + 12 a^2 b^7 c^3 d h^2 k + 6 a^2 b^8 c^2 d h \\
& k^2 + 1728 a^5 b^2 c^5 d f l^2 + 1392 a^4 b^4 c^4 d f l^2 - 840 a^3 b^6 c^3 \\
& d f l^2 - 768 a^4 b^2 c^6 e g^2 j + 576 a^4 b^2 c^6 d g^2 k + 480 a^3 b^3 \\
& c^6 d e^2 m + 144 a^2 b^8 c^2 d f l^2 + 96 a^4 b^3 c^5 d h j^2 + 96 a^3 b^3 \\
& c^6 e^2 f k - 80 a^3 b^4 c^5 d g^2 k + 6848 a^3 b^2 c^7 d^2 e l - 3552 a^3 \\
& b^2 c^7 d^2 f k - 2448 a^2 b^4 c^6 d^2 e l + 1332 a^2 b^4 c^6 d^2 f k + 9 \\
& 60 a^3 b^2 c^7 d^2 g j - 496 a^4 b^3 c^5 d f k^2 + 432 a^3 b^3 c^6 d f^2 k \\
& - 240 a^2 b^4 c^6 d^2 g j - 222 a^3 b^5 c^4 d f k^2 - 174 a^2 b^5 c^5 d f^2 \\
& k + 64 a^4 b^2 c^6 f g^2 h + 48 a^3 b^4 c^5 f g^2 h + 42 a^2 b^7 c^3 d f k^2 \\
& - 32 a^3 b^3 c^6 e f^2 j - 320 a^3 b^2 c^7 d e^2 k + 192 a^4 b^2 c^6 e g \\
& h^2 + 192 a^4 b^2 c^6 d f j^2 - 32 a^3 b^4 c^5 d f j^2 + 16 a^3 b^4 c^5 e g \\
& h^2 + 480 a^2 b^3 c^7 d^2 e j - 224 a^3 b^3 c^6 d g^2 h + 192 a^3 b^2 c^7 \\
& e^2 f h + 24 a^2 b^5 c^5 d g^2 h - 864 a^3 b^2 c^7 d f^2 h + 336 a^3 b^3 c^6 \\
& d f h^2 + 192 a^3 b^2 c^7 e f^2 g + 144 a^2 b^3 c^7 d^2 f h - 30 a^2 b^5 \\
& c^5 d f h^2 + 16 a^2 b^4 c^6 e f^2 g - 12 a^2 b^4 c^6 d f^2 h + 192 a^3 b^2 \\
& c^7 d f g^2 + 96 a^2 b^3 c^7 d e^2 h + 48 a^2 b^4 c^6 d f g^2 + 960 a^2 b^2 \\
& c^8 d^2 e g + 192 a^2 b^2 c^8 d e^2 f - 7680 a^9 b c^2 l^2 m^2 + 3152 a^8 \\
& b^3 c l^2 m^2 + 2070 a^7 b^4 c k^2 m^2 - 1840 a^7 b^3 c^2 k^3 m + 6720 a^8 \\
& b^3 c^3 j^2 m^2 - 3072 a^8 b^3 c^3 k^2 l^2 + 1680 a^6 b^5 c j^2 m^2 - 100 a^6 \\
& b^5 c k^2 l^2 - 2176 a^7 b^3 c^2 j l^3 - 256 a^6 b^3 c^3 j^3 l - 64 a^5 b^6 \\
& c j^2 l^2 - 12480 a^8 b^2 c^2 h m^3 + 972 a^5 b^6 c h^2 m^2 - 960 a^7 b^3 c^4 \\
& j^2 k^2 - 252 a^5 b^4 c^3 h^3 m - 192 a^6 b^2 c^4 h^3 m + 54 a^4 b^6 c^2 \\
& h^3 m + 1536 a^7 b^3 c^4 h^2 l^2 + 420 a^4 b^7 c g^2 m^2 - 36 a^4 b^7 c h^2 l^2 \\
& - 3072 a^7 b^2 c^3 g l^3 + 2096 a^7 b^3 c^2 f m^3 + 1088 a^6 b^4 c^2 g l^3 \\
& - 496 a^6 b^3 c^3 h k^3 - 192 a^4 b^4 c^4 g^3 l + 176 a^4 b^3 c^5 f^3 m \\
& + 144 a^5 b^3 c^4 h^3 k + 78 a^3 b^8 c f^2 m^2 + 54 a^3 b^5 c^4 f^3 m + 32 \\
& a^3 b^6 c^3 g^3 l + 30 a^5 b^5 c^2 h k^3 - 18 a^4 b^5 c^3 h^3 k - 18 a^2 b^7 \\
& c^3 f^3 m - 16 a^3 b^8 c g^2 l^2 + 6720 a^6 b^3 c^5 e^2 m^2 - 192 a^6 b^3 c^5 \\
& h^2 j^2 - 4 a^2 b^9 c f^2 l^2 - 35040 a^7 b^2 c^3 d m^3 + 14300 a^6 b^4 c^2 \\
& d m^3 - 12000 a^3 b^2 c^7 d^3 m + 4380 a^2 b^4 c^6 d^3 m - 2176 a^6 b^3 c^3 \\
& e l^3 - 256 a^3 b^3 c^6 e^3 l - 192 a^6 b^2 c^4 f k^3 + 192 a^5 b^5 c^2 \\
& e l^3 - 192 a^4 b^2 c^6 f^3 k + 132 a^5 b^4 c^3 f k^3 + 128 a^4 b^3 c^5 g^3 \\
& j - 28 a^3 b^4 c^5 f^3 k - 10 a^4 b^6 c^2 f k^3 + 6 a^2 b^6 c^4 f^3 k + 1 \\
& 0752 a^5 b^3 c^6 d^2 l^2 - 960 a^5 b^3 c^6 e^2 k^2 - 192 a^5 b^3 c^6 f^2 j^2 + 10 \\
& 8 a^4 b^9 c^2 d^2 l^2 - 1680 a^5 b^3 c^4 d k^3 - 1680 a^2 b^3 c^7 d^3 k + 222 \\
& a^4 b^5 c^3 d k^3 + 30 a^4 b^8 c^3 d^2 k^2 - 10 a^3 b^7 c^2 d k^3 - 960 a^4 b^3 \\
& c^7 d^2 j^2 + 80 a^4 b^3 c^5 f h^3 + 80 a^3 b^3 c^6 f^3 h + 6 a^3 b^5 c^4 \\
& f h^3 + 6 a^2 b^5 c^5 f^3 h - 192 a^4 b^3 c^7 e^2 h^2 - 192 a^4 b^2 c^6 d h^3 \\
& - 192 a^2 b^2 c^8 d^3 h + 128 a^3 b^3 c^6 e g^3 - 28 a^3 b^4 c^5 d h^3 + \\
& 12 a^4 b^6 c^5 d^2 h^2 + 6 a^2 b^6 c^4 d h^3 - 192 a^3 b^3 c^8 e^2 f^2 + 60 a^4 b^
\end{aligned}$$

$$\begin{aligned}
& ^5c^6d^2g^2 + 198*a*b^4*c^7*d^2*f^2 + 144*a^2*b^3*c^7*d*f^3 - 960*a^2*b*c^9*d^2*e^2 + 240*a*b^3*c^8*d^2*e^2 + 15360*a^9*c^3*k^1^2*m - 12800*a^9*c^3*j^1*m^2 - 3840*a^8*c^4*j^2*k*m + 432*a^6*b^6*j^1*m^2 + 4608*a^8*c^4*j*k^2*1 + 2880*a^8*c^4*h*k^2*m + 5120*a^8*c^4*f*1^2*m - 3072*a^8*c^4*h*k*1^2 + 270*a^5*b^7*h*k*m^2 - 216*a^5*b^7*g*1*m^2 - 12800*a^8*c^4*e*1*m^2 - 4800*a^8*c^4*f*k*m^2 - 512*a^7*c^5*h^2*j*1 - 3840*a^6*c^6*e^2*k*m - 1280*a^7*c^5*f*j^2*m + 768*a^7*c^5*h*j^2*k + 144*a^4*b^8*g*j*m^2 - 90*a^4*b^8*f*k*m^2 + 8640*a^7*c^5*d*k^2*m + 4608*a^7*c^5*e*k^2*1 + 512*a^6*c^6*f^2*j*1 - 9216*a^7*c^5*d*k*1^2 - 4096*a^7*c^5*e*j*1^2 + 320*a^6*c^6*f^2*h*m - 90*a^3*b^9*d*k*m^2 + 15200*a^9*b*c^2*k*m^3 - 6192*a^8*b^3*c*k*m^3 + 5472*a^8*b*c^3*k^3*m - 4608*a^5*c^7*d^2*j*1 - 1024*a^7*c^5*f*h*1^2 + 150*a^6*b^5*c*k^3*m + 54*a^3*b^9*f*h*m^2 + 6*b^10*c^2*d^2*h*m - 14400*a^7*c^5*d*h*m^2 + 8640*a^5*c^7*d^2*h*m + 2880*a^6*c^6*d*h^2*m + 2304*a^6*c^6*d*j^2*k - 512*a^6*c^6*e*h^2*1 - 192*a^6*c^6*f*h^2*k + 6144*a^8*b*c^3*j*1^3 + 1536*a^7*b*c^4*j^3*1 - 1280*a^5*c^7*e^2*f*m + 768*a^5*c^7*e^2*h*k + 256*a^6*c^6*f*h*j^2 + 192*a^6*b^5*c*j*1^3 + 54*a^2*b^10*d*h*m^2 - 18*b^9*c^3*d^2*f*m + 8*b^9*c^3*d^2*g*1 - 2*b^9*c^3*d^2*h*k + 4068*a^7*b^4*c*h*m^3 - 1728*a^6*c^6*d*h*k^2 + 960*a^5*c^7*d*f^2*m + 512*a^5*c^7*e*f^2*1 - 3072*a^6*c^6*d*f*1^2 - 16*b^8*c^4*d^2*e*1 + 6*b^8*c^4*d^2*f*k - 4608*a^4*c^8*d^2*e*1 + 2400*a^8*b*c^3*f*m^3 + 2016*a^7*b*c^4*h*k^3 - 1728*a^4*c^8*d^2*f*k - 1146*a^6*b^5*c*f*m^3 + 224*a^6*b*c^5*h^3*k - 96*a^5*b^6*c*g*1^3 + 96*a^5*b*c^6*f^3*m + 2304*a^4*c^8*d*e^2*k + 768*a^5*c^7*d*f*j^2 + 6144*a^7*b*c^4*e*1^3 - 2280*a^5*b^6*c*d*m^3 + 1536*a^4*b*c^7*e^3*1 - 616*a*b^6*c^5*d^3*m + 512*a^6*b*c^5*g*j^3 + 256*a^4*c^8*e^2*f*h + 240*a*b^10*c*d^2*m^2 + 6*b^7*c^5*d^2*f*h - 192*a^4*c^8*d*f^2*h + 4320*a^6*b*c^5*d*k^3 + 4320*a^3*b*c^8*d^3*k + 222*a*b^5*c^6*d^3*k + 16*b^6*c^6*d^2*e*g + 96*a^5*b*c^6*f*h^3 + 96*a^4*b*c^7*f^3*h + 768*a^3*c^9*d*e^2*f + 512*a^3*b*c^8*e^3*g + 132*a*b^4*c^7*d^3*h + 2016*a^2*b*c^9*d^3*f - 496*a*b^3*c^8*d^3*f + 224*a^3*b*c^8*d*f^3 - 18*a*b^5*c^6*d*f^3 - 3264*a^8*b^2*c^2*k^2*m^2 - 6160*a^7*b^3*c^2*j^2*m^2 + 1104*a^7*b^3*c^2*k^2*1^2 - 1920*a^7*b^2*c^3*j^2*1^2 + 768*a^6*b^4*c^2*j^2*1^2 + 3888*a^7*b^2*c^3*h^2*m^2 - 3510*a^6*b^4*c^2*h^2*m^2 + 240*a^6*b^3*c^3*j^2*k^2 - 16*a^5*b^5*c^2*j^2*k^2 + 1680*a^6*b^3*c^3*g^2*m^2 - 1648*a^6*b^3*c^3*h^2*1^2 - 1540*a^5*b^5*c^2*g^2*m^2 + 444*a^5*b^5*c^2*h^2*1^2 - 960*a^6*b^2*c^4*h^2*k^2 - 576*a^6*b^2*c^4*f^2*m^2 - 512*a^6*b^2*c^4*g^2*1^2 - 480*a^5*b^4*c^3*g^2*1^2 + 198*a^5*b^4*c^3*h^2*k^2 + 192*a^4*b^6*c^2*g^2*1^2 - 186*a^5*b^4*c^3*f^2*m^2 - 97*a^4*b^6*c^2*f^2*m^2 - 9*a^4*b^6*c^2*h^2*k^2 - 6160*a^5*b^3*c^4*e^2*m^2 + 1680*a^4*b^5*c^3*e^2*m^2 - 240*a^5*b^3*c^4*g^2*k^2 - 240*a^5*b^3*c^4*f^2*1^2 - 144*a^3*b^7*c^2*e^2*m^2 + 60*a^4*b^5*c^3*g^2*k^2 - 36*a^4*b^5*c^3*f^2*1^2 + 36*a^3*b^7*c^2*f^2*1^2 - 16*a^5*b^3*c^4*h^2*j^2 - 4*a^3*b^7*c^2*g^2*k^2 + 38512*a^5*b^2*c^5*d^2*m^2 - 32310*a^4*b^4*c^4*d^2*m^2 + 12720*a^3*b^6*c^3*d^2*m^2 - 2500*a^2*b^8*c^2*d^2*m^2 - 1920*a^5*b^2*c^5*e^2*1^2 + 768*a^4*b^4*c^4*e^2*1^2 - 464*a^5*b^2*c^5*f^2*k^2 - 384*a^5*b^2*c^5*g^2*j^2 - 64*a^3*b^6*c^3*e^2*1^2 + 42*a^4*b^4*c^4*f^2*k^2 + 12*a^3*b^6*c^3*f^2*k^2 - 13104*a^4*b^3*c^5*d^2*1^2 + 5628*a^3*b^5*c^4*d^2*1^2 - 1128*a^2*b^7*c^3*d^2*1^2 + 240*a^4*b^3*c^5*e^2*k^2 - 16*a^4*b^3*c^5*f^2*j^2 - 16*a^3*b^5*c^4*e^2*k^2 - 2880*a^4*b^2*c^6
\end{aligned}$$

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*d^2*k^2 + 1750*a^3*b^4*c^5*d^2*k^2 - 345*a^2*b^6*c^4*d^2*k^2 - 48*a^4*b^3*
c^5*g^2*h^2 - 4*a^3*b^5*c^4*g^2*h^2 + 240*a^3*b^3*c^6*d^2*j^2 - 192*a^4*b^2
*c^6*f^2*h^2 - 42*a^3*b^4*c^5*f^2*h^2 - 16*a^2*b^5*c^5*d^2*j^2 - 48*a^3*b^3
*c^6*f^2*g^2 - 16*a^3*b^3*c^6*e^2*h^2 - 4*a^2*b^5*c^5*f^2*g^2 - 464*a^3*b^2
*c^7*d^2*h^2 - 384*a^3*b^2*c^7*e^2*g^2 + 42*a^2*b^4*c^6*d^2*h^2 - 240*a^2*b
^3*c^7*d^2*g^2 - 16*a^2*b^3*c^7*e^2*f^2 - 960*a^2*b^2*c^8*d^2*f^2 + 6*b^11*
c*d^2*k*m - 18*a*b^11*d*f*m^2 - 7200*a^9*c^3*k^2*m^2 - 324*a^7*b^5*l^2*m^2
- 225*a^6*b^6*k^2*m^2 - 2048*a^8*c^4*j^2*l^2 - 144*a^5*b^7*j^2*m^2 - 2400*a
^8*c^4*h^2*m^2 - 81*a^4*b^8*h^2*m^2 - 800*a^7*c^5*f^2*m^2 - 288*a^7*c^5*h^2
*k^2 - 36*a^3*b^9*g^2*m^2 - 9*a^2*b^10*f^2*m^2 - 21600*a^6*c^6*d^2*m^2 - 20
48*a^6*c^6*e^2*l^2 - 864*a^6*c^6*f^2*k^2 - 2592*a^5*c^7*d^2*k^2 - 1536*a^5*
c^7*e^2*j^2 + 1536*a^8*b^2*c^2*l^4 - 32*a^5*c^7*f^2*h^2 + 360*a^7*b^2*c^3*k
^4 - 25*a^6*b^4*c^2*k^4 - 864*a^4*c^8*d^2*h^2 - 4*b^7*c^5*d^2*g^2 - 9*b^6*c
^6*d^2*f^2 - 288*a^3*c^9*d^2*f^2 - 24*a^5*b^2*c^5*h^4 - 16*b^5*c^7*d^2*e^2
- 9*a^4*b^4*c^4*h^4 - 16*a^3*b^4*c^5*g^4 - 24*a^3*b^2*c^7*f^4 - 9*a^2*b^4*c
^6*f^4 - a^2*b^8*c^2*f^2*k^2 - a^2*b^6*c^4*f^2*h^2 + 630*a^7*b^5*k*m^3 + 80
00*a^9*c^3*h*m^3 + 320*a^7*c^5*h^3*m - 378*a^6*b^6*h*m^3 + 126*a^5*b^7*f*m^
3 + 30*b^8*c^4*d^3*m + 24000*a^8*c^4*d*m^3 + 8640*a^4*c^8*d^3*m - 1728*a^7*
c^5*f*k^3 - 192*a^5*c^7*f^3*k - 4*b^11*c*d^2*l^2 + 126*a^4*b^8*d*m^3 - 10*b
^7*c^5*d^3*k + 4200*a^9*b^2*c*m^4 - 1024*a^6*c^6*e*j^3 - 1024*a^4*c^8*e^3*j
- 144*a^7*b^4*c*l^4 - 10*b^6*c^6*d^3*h - 1728*a^3*c^9*d^3*h - 192*a^5*c^7*
d*h^3 + 30*b^5*c^7*d^3*f + 360*a*b^2*c^9*d^4 - 9*b^12*d^2*m^2 - 10000*a^10*
c^2*m^4 - 4096*a^9*c^3*l^4 - 441*a^8*b^4*m^4 - 1296*a^8*c^4*k^4 - 256*a^7*c
^5*j^4 - 16*a^6*c^6*h^4 - 16*a^4*c^8*f^4 - 256*a^3*c^9*e^4 - 25*b^4*c^8*d^4
- 1296*a^2*c^10*d^4 - b^10*c^2*d^2*k^2 - b^8*c^4*d^2*h^2, z, k1), k1, 1, 4
) + ((b*c^2*e - 2*a*c^2*g - a*b^2*l + 2*a^2*c*l + a*b*c*j)/(2*(4*a*c - b^2)
) + (x^2*(2*c^3*e - b^3*l - b*c^2*g - 2*a*c^2*j + b^2*c*j + 3*a*b*c*l))/(2*
(4*a*c - b^2)) + (x*(2*a*c^3*d - 2*a^2*c^2*h - a^2*b^2*m - b^2*c^2*d + 2*a^
3*c*m + a*b*c^2*f + a^2*b*c*k))/(2*a*(4*a*c - b^2)) - (x^3*(2*a^2*c^2*k + b
*c^3*d - 2*a*c^3*f + a*b^3*m + a*b*c^2*h - a*b^2*c*k - 3*a^2*b*c*m))/(2*a*(
4*a*c - b^2)))/(a*c^2 + c^3*x^4 + b*c^2*x^2) + (m*x)/c^2

```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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**4+
b*x**2+a)**2,x)
```

```
[Out] Timed out
```

$$3.42 \quad \int \frac{d+ex}{(4-5x^2+x^4)^3} dx$$

Optimal. Leaf size=143

$$\frac{dx(59-35x^2)}{3456(x^4-5x^2+4)} + \frac{dx(17-5x^2)}{144(x^4-5x^2+4)^2} - \frac{313d \tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{13}{648}d \tanh^{-1}(x) - \frac{1}{81}e \log(1-x^2) + \frac{1}{81}e \log(4-x^2)$$

[Out] 1/144*d*x*(-5*x^2+17)/(x^4-5*x^2+4)^2+1/36*e*(-2*x^2+5)/(x^4-5*x^2+4)^2-1/3456*d*x*(-35*x^2+59)/(x^4-5*x^2+4)-1/54*e*(-2*x^2+5)/(x^4-5*x^2+4)-313/20736*d*arctanh(1/2*x)+13/648*d*arctanh(x)-1/81*e*ln(-x^2+1)+1/81*e*ln(-x^2+4)

Rubi [A] time = 0.08, antiderivative size = 143, normalized size of antiderivative = 1.00, number of steps used = 14, number of rules used = 10, integrand size = 18, $\frac{\text{number of rules}}{\text{integrand size}} = 0.556$, Rules used = {1673, 12, 1092, 1178, 1166, 207, 1107, 614, 616, 31}

$$\frac{dx(59-35x^2)}{3456(x^4-5x^2+4)} + \frac{dx(17-5x^2)}{144(x^4-5x^2+4)^2} - \frac{313d \tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{13}{648}d \tanh^{-1}(x) - \frac{e(5-2x^2)}{54(x^4-5x^2+4)} + \frac{e(5-2x^2)}{36(x^4-5x^2+4)}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x)/(4 - 5*x^2 + x^4)^3, x]

[Out] (d*x*(17 - 5*x^2))/(144*(4 - 5*x^2 + x^4)^2) + (e*(5 - 2*x^2))/(36*(4 - 5*x^2 + x^4)^2) - (d*x*(59 - 35*x^2))/(3456*(4 - 5*x^2 + x^4)) - (e*(5 - 2*x^2))/(54*(4 - 5*x^2 + x^4)) - (313*d*ArcTanh[x/2])/20736 + (13*d*ArcTanh[x])/648 - (e*Log[1 - x^2])/81 + (e*Log[4 - x^2])/81

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 31

Int[((a_) + (b_.)*(x_))^-1, x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_.)*(x_)^2)^-1, x_Symbol] := -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a, 0] || GtQ[b, 0])

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)
*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := With[{q = Rt[b^2
- 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 1092

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := -Simp[(x*(b^2 -
2*a*c + b*c*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)),
x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(b^2 - 2*a*c + 2*(p + 1)*(b^2
- 4*a*c) + b*c*(4*p + 7)*x^2)*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ
[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2,
Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
```

LtQ[p, -1] && IntegerQ[2*p]

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
 \int \frac{d+ex}{(4-5x^2+x^4)^3} dx &= \int \frac{d}{(4-5x^2+x^4)^3} dx + \int \frac{ex}{(4-5x^2+x^4)^3} dx \\
 &= d \int \frac{1}{(4-5x^2+x^4)^3} dx + e \int \frac{x}{(4-5x^2+x^4)^3} dx \\
 &= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} - \frac{1}{144} d \int \frac{-19+25x^2}{(4-5x^2+x^4)^2} dx + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{(4-5x+x^2)^3} dx, x \right) \\
 &= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} + \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} - \frac{dx(59-35x^2)}{3456(4-5x^2+x^4)} + \frac{d \int \frac{519+105x^2}{4-5x^2+x^4} dx}{10368} \\
 &= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} + \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} - \frac{dx(59-35x^2)}{3456(4-5x^2+x^4)} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)} \\
 &= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} + \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} - \frac{dx(59-35x^2)}{3456(4-5x^2+x^4)} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)} \\
 &= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} + \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} - \frac{dx(59-35x^2)}{3456(4-5x^2+x^4)} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)}
 \end{aligned}$$

Mathematica [A] time = 0.10, size = 128, normalized size = 0.90

$$\frac{288(dx(17-5x^2)+e(20-8x^2))}{(x^4-5x^2+4)^2} + \frac{12(dx(35x^2-59)+64e(2x^2-5))}{x^4-5x^2+4} - 32(13d+16e) \log(1-x) + (313d+512e) \log(2-x) + 32(13d+16e) \log(3-x)$$

41472

Antiderivative was successfully verified.

[In] Integrate[(d + e*x)/(4 - 5*x^2 + x^4)^3,x]

[Out] ((288*(e*(20 - 8*x^2) + d*x*(17 - 5*x^2)))/(4 - 5*x^2 + x^4)^2 + (12*(64*e*(-5 + 2*x^2) + d*x*(-59 + 35*x^2)))/(4 - 5*x^2 + x^4) - 32*(13*d + 16*e)*Log[1 - x] + (313*d + 512*e)*Log[2 - x] + 32*(13*d - 16*e)*Log[1 + x] + (-313*d + 512*e)*Log[2 + x])/41472

fricas [B] time = 1.49, size = 307, normalized size = 2.15

$$420 dx^7 + 1536 ex^6 - 2808 dx^5 - 11520 ex^4 + 3780 dx^3 + 23040 ex^2 + 2064 dx - \left((313d - 512e)x^8 - 10(313d - 512e)x^6 + 33(313d - 512e)x^4 - 40(313d - 512e)x^2 + 5008d - 8192e \right) \log(x + 2) + 32 \left((13d - 16e)x^8 - 10(13d - 16e)x^6 + 33(13d - 16e)x^4 - 40(13d - 16e)x^2 + 208d - 256e \right) \log(x + 1) - 32 \left((13d + 16e)x^8 - 10(13d + 16e)x^6 + 33(13d + 16e)x^4 - 40(13d + 16e)x^2 + 208d + 256e \right) \log(x - 1) + \left((313d + 512e)x^8 - 10(313d + 512e)x^6 + 33(313d + 512e)x^4 - 40(313d + 512e)x^2 + 5008d + 8192e \right) \log(x - 2) - 9600e \over (x^8 - 10x^6 + 33x^4 - 40x^2 + 16)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="fricas")

[Out] 1/41472*(420*d*x^7 + 1536*e*x^6 - 2808*d*x^5 - 11520*e*x^4 + 3780*d*x^3 + 23040*e*x^2 + 2064*d*x - ((313*d - 512*e)*x^8 - 10*(313*d - 512*e)*x^6 + 33*(313*d - 512*e)*x^4 - 40*(313*d - 512*e)*x^2 + 5008*d - 8192*e)*log(x + 2) + 32*((13*d - 16*e)*x^8 - 10*(13*d - 16*e)*x^6 + 33*(13*d - 16*e)*x^4 - 40*(13*d - 16*e)*x^2 + 208*d - 256*e)*log(x + 1) - 32*((13*d + 16*e)*x^8 - 10*(13*d + 16*e)*x^6 + 33*(13*d + 16*e)*x^4 - 40*(13*d + 16*e)*x^2 + 208*d + 256*e)*log(x - 1) + ((313*d + 512*e)*x^8 - 10*(313*d + 512*e)*x^6 + 33*(313*d + 512*e)*x^4 - 40*(313*d + 512*e)*x^2 + 5008*d + 8192*e)*log(x - 2) - 9600*e)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)

giac [A] time = 0.33, size = 123, normalized size = 0.86

$$-\frac{1}{41472} (313d - 512e) \log(|x + 2|) + \frac{1}{1296} (13d - 16e) \log(|x + 1|) - \frac{1}{1296} (13d + 16e) \log(|x - 1|) + \frac{1}{41472} (313d + 512e) \log(|x - 2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="giac")

[Out] -1/41472*(313*d - 512*e)*log(abs(x + 2)) + 1/1296*(13*d - 16*e)*log(abs(x + 1)) - 1/1296*(13*d + 16*e)*log(abs(x - 1)) + 1/41472*(313*d + 512*e)*log(abs(x - 2)) + 1/3456*(35*d*x^7 + 128*x^6*e - 234*d*x^5 - 960*x^4*e + 315*d*x^3 + 1920*x^2*e + 172*d*x - 800*e)/(x^4 - 5*x^2 + 4)^2

maple [A] time = 0.02, size = 186, normalized size = 1.30

$$-\frac{313d \ln(x + 2)}{41472} + \frac{313d \ln(x - 2)}{41472} - \frac{13d \ln(x - 1)}{1296} + \frac{13d \ln(x + 1)}{1296} + \frac{e \ln(x + 2)}{81} + \frac{e \ln(x - 2)}{81} - \frac{e \ln(x - 1)}{81} - \frac{e \ln(x + 1)}{81}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x+d)/(x^4-5*x^2+4)^3,x)

[Out] 19/6912/(x-2)*d+17/3456/(x-2)*e-1/3456/(x-2)^2*d-1/1728/(x-2)^2*e+313/41472*d*ln(x-2)+1/81*e*ln(x-2)+1/432/(x+1)*d-1/144/(x+1)*e-1/432/(x+1)^2*d+1/432/(x+1)^2*e+13/1296*d*ln(x+1)-1/81*e*ln(x+1)-13/1296*d*ln(x-1)-1/81*e*ln(x-1)+1/432/(x-1)*d+1/144/(x-1)*e+1/432/(x-1)^2*d+1/432/(x-1)^2*e-313/41472*d*ln(x+2)+1/81*e*ln(x+2)+19/6912/(x+2)*d-17/3456/(x+2)*e+1/3456/(x+2)^2*d-1/1728/(x+2)^2*e

maxima [A] time = 1.06, size = 121, normalized size = 0.85

$$-\frac{1}{41472} (313d - 512e) \log(x + 2) + \frac{1}{1296} (13d - 16e) \log(x + 1) - \frac{1}{1296} (13d + 16e) \log(x - 1) + \frac{1}{41472} (313d - 512e) \log(x - 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="maxima")

[Out] -1/41472*(313*d - 512*e)*log(x + 2) + 1/1296*(13*d - 16*e)*log(x + 1) - 1/1296*(13*d + 16*e)*log(x - 1) + 1/41472*(313*d + 512*e)*log(x - 2) + 1/3456*(35*d*x^7 + 128*e*x^6 - 234*d*x^5 - 960*e*x^4 + 315*d*x^3 + 1920*e*x^2 + 172*d*x - 800*e)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)

mupad [B] time = 0.09, size = 118, normalized size = 0.83

$$\ln(x + 1) \left(\frac{13d}{1296} - \frac{e}{81} \right) - \ln(x - 1) \left(\frac{13d}{1296} + \frac{e}{81} \right) + \ln(x - 2) \left(\frac{313d}{41472} + \frac{e}{81} \right) - \ln(x + 2) \left(\frac{313d}{41472} - \frac{e}{81} \right) + \frac{35dx^7 + 128ex^6 - 234dx^5 - 960ex^4 + 315dx^3 + 1920ex^2 + 172dx - 800e}{3456(x^8 - 10x^6 + 33x^4 - 40x^2 + 16)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x)/(x^4 - 5*x^2 + 4)^3,x)

[Out] log(x + 1)*((13*d)/1296 - e/81) - log(x - 1)*((13*d)/1296 + e/81) + log(x - 2)*((313*d)/41472 + e/81) - log(x + 2)*((313*d)/41472 - e/81) + ((43*d*x)/864 - (25*e)/108 + (35*d*x^3)/384 - (13*d*x^5)/192 + (35*d*x^7)/3456 + (5*e*x^2)/9 - (5*e*x^4)/18 + (e*x^6)/27)/(33*x^4 - 40*x^2 - 10*x^6 + x^8 + 16)

sympy [B] time = 3.69, size = 668, normalized size = 4.67

$$(13d - 16e) \log \left(x + \frac{-1106258459719280d^4e - 13113710954343d^4(13d - 16e) - 817263343042560d^2e^3 + 153628968222720d^2e^2(13d - 16e) + 9530122941256e^3}{3456(x^8 - 10x^6 + 33x^4 - 40x^2 + 16)} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x**4-5*x**2+4)**3,x)

```
[Out] (13*d - 16*e)*log(x + (-1106258459719280*d**4*e - 13113710954343*d**4*(13*d
- 16*e) - 817263343042560*d**2*e**3 + 153628968222720*d**2*e**2*(13*d - 16
*e) + 9530197557248*d**2*e*(13*d - 16*e)**2 + 88038005760*d**2*(13*d - 16*e
)**3 + 5035763255214080*e**5 + 142661633703936*e**4*(13*d - 16*e) - 1967095
0215680*e**3*(13*d - 16*e)**2 - 557272006656*e**2*(13*d - 16*e)**3)/(229412
56248261*d**5 - 2312740746035200*d**3*e**2 + 4473912813420544*d*e**4))/1296
- (13*d + 16*e)*log(x + (-1106258459719280*d**4*e + 13113710954343*d**4*(1
3*d + 16*e) - 817263343042560*d**2*e**3 - 153628968222720*d**2*e**2*(13*d +
16*e) + 9530197557248*d**2*e*(13*d + 16*e)**2 - 88038005760*d**2*(13*d + 1
6*e)**3 + 5035763255214080*e**5 - 142661633703936*e**4*(13*d + 16*e) - 1967
0950215680*e**3*(13*d + 16*e)**2 + 557272006656*e**2*(13*d + 16*e)**3)/(229
41256248261*d**5 - 2312740746035200*d**3*e**2 + 4473912813420544*d*e**4))/1
296 - (313*d - 512*e)*log(x + (-1106258459719280*d**4*e + 13113710954343*d*
**4*(313*d - 512*e)/32 - 817263343042560*d**2*e**3 - 4800905256960*d**2*e**2
*(313*d - 512*e) + 9306833552*d**2*e*(313*d - 512*e)**2 - 85974615*d**2*(31
3*d - 512*e)**3/32 + 5035763255214080*e**5 - 4458176053248*e**4*(313*d - 51
2*e) - 19209912320*e**3*(313*d - 512*e)**2 + 17006592*e**2*(313*d - 512*e)*
**3)/(22941256248261*d**5 - 2312740746035200*d**3*e**2 + 4473912813420544*d*
e**4))/41472 + (313*d + 512*e)*log(x + (-1106258459719280*d**4*e - 13113710
954343*d**4*(313*d + 512*e)/32 - 817263343042560*d**2*e**3 + 4800905256960*
d**2*e**2*(313*d + 512*e) + 9306833552*d**2*e*(313*d + 512*e)**2 + 85974615
*d**2*(313*d + 512*e)**3/32 + 5035763255214080*e**5 + 4458176053248*e**4*(3
13*d + 512*e) - 19209912320*e**3*(313*d + 512*e)**2 - 17006592*e**2*(313*d
+ 512*e)**3)/(22941256248261*d**5 - 2312740746035200*d**3*e**2 + 4473912813
420544*d*e**4))/41472 + (35*d*x**7 - 234*d*x**5 + 315*d*x**3 + 172*d*x + 12
8*e*x**6 - 960*e*x**4 + 1920*e*x**2 - 800*e)/(3456*x**8 - 34560*x**6 + 1140
48*x**4 - 138240*x**2 + 55296)
```

$$3.43 \quad \int \frac{d+ex+fx^2}{(4-5x^2+x^4)^3} dx$$

Optimal. Leaf size=175

$$\frac{x(-35x^2(d+4f)+59d+380f)}{3456(x^4-5x^2+4)} + \frac{x(-(x^2(5d+8f))+17d+20f)}{144(x^4-5x^2+4)^2} - \frac{(313d+820f)\tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{1}{648}(13d+25f)$$

[Out] 1/36*e*(-2*x^2+5)/(x^4-5*x^2+4)^2+1/144*x*(17*d+20*f-(5*d+8*f)*x^2)/(x^4-5*x^2+4)^2-1/54*e*(-2*x^2+5)/(x^4-5*x^2+4)-1/3456*x*(59*d+380*f-35*(d+4*f)*x^2)/(x^4-5*x^2+4)-1/20736*(313*d+820*f)*arctanh(1/2*x)+1/648*(13*d+25*f)*arctanh(x)-1/81*e*ln(-x^2+1)+1/81*e*ln(-x^2+4)

Rubi [A] time = 0.22, antiderivative size = 175, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 9, integrand size = 23, $\frac{\text{number of rules}}{\text{integrand size}} = 0.391$, Rules used = {1673, 1178, 1166, 207, 12, 1107, 614, 616, 31}

$$\frac{x(-35x^2(d+4f)+59d+380f)}{3456(x^4-5x^2+4)} + \frac{x(x^2(-(5d+8f))+17d+20f)}{144(x^4-5x^2+4)^2} - \frac{(313d+820f)\tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{1}{648}(13d+25f)$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4)^3, x]

[Out] (e*(5 - 2*x^2))/(36*(4 - 5*x^2 + x^4)^2) + (x*(17*d + 20*f - (5*d + 8*f)*x^2))/(144*(4 - 5*x^2 + x^4)^2) - (e*(5 - 2*x^2))/(54*(4 - 5*x^2 + x^4)) - (x*(59*d + 380*f - 35*(d + 4*f)*x^2))/(3456*(4 - 5*x^2 + x^4)) - ((313*d + 820*f)*ArcTanh[x/2])/20736 + ((13*d + 25*f)*ArcTanh[x])/648 - (e*Log[1 - x^2])/81 + (e*Log[4 - x^2])/81

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 31

Int[((a_) + (b_.)*(x_))^-1, x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_.)*(x_)^2)^-1, x_Symbol] := -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a

, 0] || GtQ[b, 0])

Rule 614

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p + 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 616

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q, Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]

Rule 1107

Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Dist[1/2, Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]

Rule 1166

Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2 + c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]

Rule 1178

Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/((2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((2*a*(p + 1)*(b^2 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && LtQ[p, -1] && IntegerQ[2*p]

Rule 1673

Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -

1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
 && !PolyQ[Pq, x^2]

Rubi steps

$$\begin{aligned}
 \int \frac{d + ex + fx^2}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{ex}{(4 - 5x^2 + x^4)^3} dx + \int \frac{d + fx^2}{(4 - 5x^2 + x^4)^3} dx \\
 &= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 5(5d + 8f)x^2}{(4 - 5x^2 + x^4)^2} dx + e \int \frac{x}{(4 - 5x^2 + x^4)^3} dx \\
 &= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)} + \frac{\int \frac{3(173d + 260f) + 105(d + 4f)x^2}{4 - 5x^2 + x^4} dx}{10368} \\
 &= \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)} \\
 &= \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{e(5 - 2x^2)}{54(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)} \\
 &= \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{e(5 - 2x^2)}{54(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)} \\
 &= \frac{e(5 - 2x^2)}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{e(5 - 2x^2)}{54(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)}
 \end{aligned}$$

Mathematica [A] time = 0.13, size = 161, normalized size = 0.92

$$\frac{12(dx(35x^2 - 59) + 64e(2x^2 - 5) + 20fx(7x^2 - 19))}{x^4 - 5x^2 + 4} + \frac{288(-5dx^3 + 17dx + e(20 - 8x^2) - 8fx^3 + 20fx)}{(x^4 - 5x^2 + 4)^2} - 32 \log(1 - x)(13d + 16e + 25f) + \log$$

41472

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2)/(4 - 5*x^2 + x^4)^3, x]

[Out] ((288*(17*d*x + 20*f*x - 5*d*x^3 - 8*f*x^3 + e*(20 - 8*x^2)))/(4 - 5*x^2 + x^4)^2 + (12*(64*e*(-5 + 2*x^2) + 20*f*x*(-19 + 7*x^2) + d*x*(-59 + 35*x^2)))/(4 - 5*x^2 + x^4) - 32*(13*d + 16*e + 25*f)*Log[1 - x] + (313*d + 512*e

$$+ 820*f)*\text{Log}[2 - x] + 32*(13*d - 16*e + 25*f)*\text{Log}[1 + x] + (-313*d + 512*e - 820*f)*\text{Log}[2 + x])/41472$$

fricas [B] time = 1.92, size = 389, normalized size = 2.22

$$\frac{420(d + 4f)x^7 + 1536ex^6 - 216(13d + 60f)x^5 - 11520ex^4 + 756(5d + 36f)x^3 + 23040ex^2 + 48(43d - 260f)x - 9600e}{(x^4 - 5x^2 + 4)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="fricas")

[Out] 1/41472*(420*(d + 4*f)*x^7 + 1536*e*x^6 - 216*(13*d + 60*f)*x^5 - 11520*e*x^4 + 756*(5*d + 36*f)*x^3 + 23040*e*x^2 + 48*(43*d - 260*f)*x - ((313*d - 512*e + 820*f)*x^8 - 10*(313*d - 512*e + 820*f)*x^6 + 33*(313*d - 512*e + 820*f)*x^4 - 40*(313*d - 512*e + 820*f)*x^2 + 5008*d - 8192*e + 13120*f)*log(x + 2) + 32*((13*d - 16*e + 25*f)*x^8 - 10*(13*d - 16*e + 25*f)*x^6 + 33*(13*d - 16*e + 25*f)*x^4 - 40*(13*d - 16*e + 25*f)*x^2 + 208*d - 256*e + 400*f)*log(x + 1) - 32*((13*d + 16*e + 25*f)*x^8 - 10*(13*d + 16*e + 25*f)*x^6 + 33*(13*d + 16*e + 25*f)*x^4 - 40*(13*d + 16*e + 25*f)*x^2 + 208*d + 256*e + 400*f)*log(x - 1) + ((313*d + 512*e + 820*f)*x^8 - 10*(313*d + 512*e + 820*f)*x^6 + 33*(313*d + 512*e + 820*f)*x^4 - 40*(313*d + 512*e + 820*f)*x^2 + 5008*d + 8192*e + 13120*f)*log(x - 2) - 9600*e)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)

giac [A] time = 0.35, size = 157, normalized size = 0.90

$$-\frac{1}{41472}(313d + 820f - 512e)\log(|x + 2|) + \frac{1}{1296}(13d + 25f - 16e)\log(|x + 1|) - \frac{1}{1296}(13d + 25f + 16e)\log(|x - 1|) + \frac{1}{41472}(313d + 820f + 512e)\log(|x - 2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="giac")

[Out] -1/41472*(313*d + 820*f - 512*e)*log(abs(x + 2)) + 1/1296*(13*d + 25*f - 16*e)*log(abs(x + 1)) - 1/1296*(13*d + 25*f + 16*e)*log(abs(x - 1)) + 1/41472*(313*d + 820*f + 512*e)*log(abs(x - 2)) + 1/3456*(35*d*x^7 + 140*f*x^7 + 128*x^6*e - 234*d*x^5 - 1080*f*x^5 - 960*x^4*e + 315*d*x^3 + 2268*f*x^3 + 1920*x^2*e + 172*d*x - 1040*f*x - 800*e)/(x^4 - 5*x^2 + 4)^2

maple [A] time = 0.02, size = 278, normalized size = 1.59

$$-\frac{313d \ln(x + 2)}{41472} + \frac{e \ln(x + 2)}{81} - \frac{e \ln(x - 1)}{81} - \frac{13d \ln(x - 1)}{1296} - \frac{e \ln(x + 1)}{81} + \frac{13d \ln(x + 1)}{1296} + \frac{313d \ln(x - 2)}{41472} + \frac{e \ln(x - 2)}{81}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x)`

[Out] $-313/41472*d*\ln(x+2)+1/81*e*\ln(x+2)-1/81*e*\ln(x-1)-13/1296*d*\ln(x-1)-1/81*e*\ln(x+1)+13/1296*d*\ln(x+1)+313/41472*d*\ln(x-2)+1/81*e*\ln(x-2)+205/10368*f*\ln(x-2)+25/1296*f*\ln(x+1)-25/1296*f*\ln(x-1)-205/10368*f*\ln(x+2)-1/432/(x+1)^{2*d+1/432}/(x+1)^{2*e+1/432}/(x-1)^{2*d+1/432}/(x-1)^{2*e+1/3456}/(x+2)^{2*d-1/1728}/(x+2)^{2*e+1/864}/(x+2)^{2*f+1/432}/(x-1)^{2*f-1/432}/(x+1)^{2*f-1/864}/(x-2)^{2*f-1/3456}/(x-2)^{2*d-1/1728}/(x-2)^{2*e+19/6912}/(x+2)*d-17/3456/(x+2)*e+19/6912/(x-2)*d+17/3456/(x-2)*e+1/432/(x+1)*d-1/144/(x+1)*e+1/432/(x-1)*d+1/144/(x-1)*e+5/432/(x-1)*f+5/576/(x+2)*f+5/576/(x-2)*f+5/432/(x+1)*f$

maxima [A] time = 1.10, size = 155, normalized size = 0.89

$$-\frac{1}{41472} (313d - 512e + 820f) \log(x+2) + \frac{1}{1296} (13d - 16e + 25f) \log(x+1) - \frac{1}{1296} (13d + 16e + 25f) \log(x-1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="maxima")`

[Out] $-1/41472*(313*d - 512*e + 820*f)*\log(x + 2) + 1/1296*(13*d - 16*e + 25*f)*\log(x + 1) - 1/1296*(13*d + 16*e + 25*f)*\log(x - 1) + 1/41472*(313*d + 512*e + 820*f)*\log(x - 2) + 1/3456*(35*(d + 4*f)*x^7 + 128*e*x^6 - 18*(13*d + 60*f)*x^5 - 960*e*x^4 + 63*(5*d + 36*f)*x^3 + 1920*e*x^2 + 4*(43*d - 260*f)*x - 800*e)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)$

mupad [B] time = 0.11, size = 151, normalized size = 0.86

$$\ln(x+1) \left(\frac{13d}{1296} - \frac{e}{81} + \frac{25f}{1296} \right) - \ln(x-1) \left(\frac{13d}{1296} + \frac{e}{81} + \frac{25f}{1296} \right) + \ln(x-2) \left(\frac{313d}{41472} + \frac{e}{81} + \frac{205f}{10368} \right) - \ln(x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((d + e*x + f*x^2)/(x^4 - 5*x^2 + 4)^3,x)`

[Out] $\log(x + 1)*((13*d)/1296 - e/81 + (25*f)/1296) - \log(x - 1)*((13*d)/1296 + e/81 + (25*f)/1296) + \log(x - 2)*((313*d)/41472 + e/81 + (205*f)/10368) - \log(x + 2)*((313*d)/41472 - e/81 + (205*f)/10368) + (x^3*((35*d)/384 + (21*f)/32) - x^5*((13*d)/192 + (5*f)/16) - (25*e)/108 + x^7*((35*d)/3456 + (35*f)/864) + (5*e*x^2)/9 - (5*e*x^4)/18 + (e*x^6)/27 + x*((43*d)/864 - (65*f)/216))/(33*x^4 - 40*x^2 - 10*x^6 + x^8 + 16)$

sympy [B] time = 124.29, size = 2822, normalized size = 16.13

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x**2+e*x+d)/(x**4-5*x**2+4)**3,x)

[Out] (13*d - 16*e + 25*f)*log(x + (-1106258459719280*d**5*e - 13113710954343*d**5*(13*d - 16*e + 25*f) - 12929482401572800*d**4*e*f - 107063904267900*d**4*f*(13*d - 16*e + 25*f) - 817263343042560*d**3*e**3 + 153628968222720*d**3*e**2*(13*d - 16*e + 25*f) - 59478343838144000*d**3*e*f**2 + 9530197557248*d**3*e*(13*d - 16*e + 25*f)**2 - 324891412840800*d**3*f**2*(13*d - 16*e + 25*f) + 88038005760*d**3*(13*d - 16*e + 25*f)**3 - 2885705898393600*d**2*e**3*f + 1014848673546240*d**2*e**2*f*(13*d - 16*e + 25*f) - 134905286808320000*d**2*e*f**3 + 63469758382080*d**2*e*f*(13*d - 16*e + 25*f)**2 - 422972724528000*d**2*f**3*(13*d - 16*e + 25*f) + 364616847360*d**2*f*(13*d - 16*e + 25*f)**3 + 5035763255214080*d*e**5 + 142661633703936*d*e**4*(13*d - 16*e + 25*f) - 2138314899456000*d*e**3*f**2 - 19670950215680*d*e**3*(13*d - 16*e + 25*f)**2 + 2257033730457600*d*e**2*f**2*(13*d - 16*e + 25*f) - 557272006656*d*e**2*(13*d - 16*e + 25*f)**3 - 15108264559360000*d*e*f**4 + 141056507904000*d*e*f**2*(13*d - 16*e + 25*f)**2 - 167683154400000*d*f**4*(13*d - 16*e + 25*f) + 339373670400*d*f**2*(13*d - 16*e + 25*f)**3 + 10643272556871680*e**5*f + 214404767416320*e**4*f*(13*d - 16*e + 25*f) + 529992253440000*e**3*f**3 - 41575283425280*e**3*f*(13*d - 16*e + 25*f)**2 + 1671759396864000*e**2*f**3*(13*d - 16*e + 25*f) - 837518622720*e**2*f*(13*d - 16*e + 25*f)**3 - 6689545210880000*e*f**5 + 104485486592000*e*f**3*(13*d - 16*e + 25*f)**2 + 51041923200000*f**5*(13*d - 16*e + 25*f) - 80289792000*f**3*(13*d - 16*e + 25*f)**3)/(22941256248261*d**6 + 197271407316645*d**5*f - 2312740746035200*d**4*e**2 + 612862910928900*d**4*f**2 - 20566607354920960*d**3*e**2*f + 767363353812000*d**3*f**3 + 4473912813420544*d**2*e**4 - 68552762169753600*d**2*e**2*f**2 + 197499222000000*d**2*f**4 + 20324472439439360*d*e**4*f - 101559983669248000*d*e**2*f**3 - 182883938400000*d*f**5 + 22539988369408000*e**4*f**2 - 56422196838400000*e**2*f**4 + 21520080000000*f**6))/1296 - (13*d + 16*e + 25*f)*log(x + (-1106258459719280*d**5*e + 13113710954343*d**5*(13*d + 16*e + 25*f) - 12929482401572800*d**4*e*f + 107063904267900*d**4*f*(13*d + 16*e + 25*f) - 817263343042560*d**3*e**3 - 153628968222720*d**3*e**2*(13*d + 16*e + 25*f) - 59478343838144000*d**3*e*f**2 + 9530197557248*d**3*e*(13*d + 16*e + 25*f)**2 + 324891412840800*d**3*f**2*(13*d + 16*e + 25*f) - 88038005760*d**3*(13*d + 16*e + 25*f)**3 - 2885705898393600*d**2*e**3*f - 1014848673546240*d**2*e**2*f*(13*d + 16*e + 25*f) - 134905286808320000*d**2*e*f**3 + 63469758382080*d**2*e*f*(13*d + 16*e + 25*f)**2 + 422972724528000*d**2*f**3*(13*d + 16*e + 25*f) - 364616847360*d**2*f*(13*d + 16*e + 25*f)**3 + 5035763255214080*d*e**5 - 142661633703936*d*e**4*(13*d + 16*e + 25*f) - 2138314899456000*d*e**3*f**2 - 19670950215680*d*e**3*(13*d + 16*e + 25*f)**2 - 2257033730457600*d*e**2*f**2*(13*d + 16*e + 25*f) + 557272006656*d*e**2*(13*d + 16*e + 25*f)**3 - 15108264559360000*d*e*f**4 + 141056507904000*d*e*f**2*(13*d + 16*e + 25*f)**2 + 167683154400000*d*f**4*(13*d + 16*e + 25*f) - 339373670400*d*f**2*(13*d + 16*e + 25*f)**3 + 10643272556871680*e**5*f

$$\begin{aligned}
& - 214404767416320*e^{**4}*f*(13*d + 16*e + 25*f) + 529992253440000*e^{**3}*f^{**3} \\
& - 41575283425280*e^{**3}*f*(13*d + 16*e + 25*f)^{**2} - 1671759396864000*e^{**2}*f^{**3} \\
& * (13*d + 16*e + 25*f) + 837518622720*e^{**2}*f*(13*d + 16*e + 25*f)^{**3} - 6689 \\
& 5452108800000*e*f^{**5} + 104485486592000*e*f^{**3}*(13*d + 16*e + 25*f)^{**2} - 510 \\
& 41923200000*f^{**5}*(13*d + 16*e + 25*f) + 80289792000*f^{**3}*(13*d + 16*e + 25* \\
& f)^{**3})/(22941256248261*d^{**6} + 197271407316645*d^{**5}*f - 2312740746035200*d^{**} \\
& 4*e^{**2} + 612862910928900*d^{**4}*f^{**2} - 20566607354920960*d^{**3}*e^{**2}*f + 767363 \\
& 353812000*d^{**3}*f^{**3} + 4473912813420544*d^{**2}*e^{**4} - 68552762169753600*d^{**2}*e \\
& **2*f^{**2} + 197499222000000*d^{**2}*f^{**4} + 20324472439439360*d*e^{**4}*f - 1015599 \\
& 83669248000*d*e^{**2}*f^{**3} - 182883938400000*d*f^{**5} + 22539988369408000*e^{**4}*f \\
& **2 - 56422196838400000*e^{**2}*f^{**4} + 21520080000000*f^{**6}))/1296 - (313*d - 5 \\
& 12*e + 820*f)*\log(x + (-1106258459719280*d^{**5}*e + 13113710954343*d^{**5}*(313* \\
& d - 512*e + 820*f)/32 - 12929482401572800*d^{**4}*e*f + 26765976066975*d^{**4}*f* \\
& (313*d - 512*e + 820*f)/8 - 817263343042560*d^{**3}*e^{**3} - 4800905256960*d^{**3}* \\
& e^{**2}*(313*d - 512*e + 820*f) - 59478343838144000*d^{**3}*e*f^{**2} + 9306833552*d \\
& **3*e*(313*d - 512*e + 820*f)^{**2} + 10152856651275*d^{**3}*f^{**2}*(313*d - 512*e \\
& + 820*f) - 85974615*d^{**3}*(313*d - 512*e + 820*f)^{**3}/32 - 2885705898393600*d \\
& **2*e^{**3}*f - 31714021048320*d^{**2}*e^{**2}*f*(313*d - 512*e + 820*f) - 134905286 \\
& 808320000*d^{**2}*e*f^{**3} + 61982185920*d^{**2}*e*f*(313*d - 512*e + 820*f)^{**2} + 1 \\
& 3217897641500*d^{**2}*f^{**3}*(313*d - 512*e + 820*f) - 89017785*d^{**2}*f*(313*d - \\
& 512*e + 820*f)^{**3}/8 + 5035763255214080*d*e^{**5} - 4458176053248*d*e^{**4}*(313*d \\
& - 512*e + 820*f) - 2138314899456000*d*e^{**3}*f^{**2} - 19209912320*d*e^{**3}*(313* \\
& d - 512*e + 820*f)^{**2} - 70532304076800*d*e^{**2}*f^{**2}*(313*d - 512*e + 820*f) \\
& + 17006592*d*e^{**2}*(313*d - 512*e + 820*f)^{**3} - 15108264559360000*d*e*f^{**4} \\
& + 137750496000*d*e*f^{**2}*(313*d - 512*e + 820*f)^{**2} + 5240098575000*d*f^{**4}*(\\
& 313*d - 512*e + 820*f) - 20713725*d*f^{**2}*(313*d - 512*e + 820*f)^{**3}/2 + 106 \\
& 43272556871680*e^{**5}*f - 6700148981760*e^{**4}*f*(313*d - 512*e + 820*f) + 5299 \\
& 92253440000*e^{**3}*f^{**3} - 40600862720*e^{**3}*f*(313*d - 512*e + 820*f)^{**2} - 522 \\
& 42481152000*e^{**2}*f^{**3}*(313*d - 512*e + 820*f) + 25559040*e^{**2}*f*(313*d - 51 \\
& 2*e + 820*f)^{**3} - 66895452108800000*e*f^{**5} + 102036608000*e*f^{**3}*(313*d - 5 \\
& 12*e + 820*f)^{**2} - 1595060100000*f^{**5}*(313*d - 512*e + 820*f) + 2450250*f^{**} \\
& 3*(313*d - 512*e + 820*f)^{**3})/(22941256248261*d^{**6} + 197271407316645*d^{**5}*f \\
& - 2312740746035200*d^{**4}*e^{**2} + 612862910928900*d^{**4}*f^{**2} - 205666073549209 \\
& 60*d^{**3}*e^{**2}*f + 767363353812000*d^{**3}*f^{**3} + 4473912813420544*d^{**2}*e^{**4} - 6 \\
& 8552762169753600*d^{**2}*e^{**2}*f^{**2} + 197499222000000*d^{**2}*f^{**4} + 2032447243943 \\
& 9360*d*e^{**4}*f - 101559983669248000*d*e^{**2}*f^{**3} - 182883938400000*d*f^{**5} + 2 \\
& 2539988369408000*e^{**4}*f^{**2} - 56422196838400000*e^{**2}*f^{**4} + 21520080000000*f \\
& **6))/41472 + (313*d + 512*e + 820*f)*\log(x + (-1106258459719280*d^{**5}*e - 1 \\
& 3113710954343*d^{**5}*(313*d + 512*e + 820*f)/32 - 12929482401572800*d^{**4}*e*f \\
& - 26765976066975*d^{**4}*f*(313*d + 512*e + 820*f)/8 - 817263343042560*d^{**3}*e* \\
& *3 + 4800905256960*d^{**3}*e^{**2}*(313*d + 512*e + 820*f) - 59478343838144000*d* \\
& *3*e*f^{**2} + 9306833552*d^{**3}*e*(313*d + 512*e + 820*f)^{**2} - 10152856651275*d \\
& **3*f^{**2}*(313*d + 512*e + 820*f) + 85974615*d^{**3}*(313*d + 512*e + 820*f)^{**3} \\
& /32 - 2885705898393600*d^{**2}*e^{**3}*f + 31714021048320*d^{**2}*e^{**2}*f*(313*d + 51 \\
& 2*e + 820*f) - 134905286808320000*d^{**2}*e*f^{**3} + 61982185920*d^{**2}*e*f*(313*d
\end{aligned}$$

$$\begin{aligned}
& + 512*e + 820*f)**2 - 13217897641500*d**2*f**3*(313*d + 512*e + 820*f) + 8 \\
& 9017785*d**2*f*(313*d + 512*e + 820*f)**3/8 + 5035763255214080*d*e**5 + 445 \\
& 8176053248*d*e**4*(313*d + 512*e + 820*f) - 2138314899456000*d*e**3*f**2 - \\
& 19209912320*d*e**3*(313*d + 512*e + 820*f)**2 + 70532304076800*d*e**2*f**2* \\
& (313*d + 512*e + 820*f) - 17006592*d*e**2*(313*d + 512*e + 820*f)**3 - 1510 \\
& 8264559360000*d*e*f**4 + 137750496000*d*e*f**2*(313*d + 512*e + 820*f)**2 \\
& - 5240098575000*d*f**4*(313*d + 512*e + 820*f) + 20713725*d*f**2*(313*d + 5 \\
& 12*e + 820*f)**3/2 + 10643272556871680*e**5*f + 6700148981760*e**4*f*(313*d \\
& + 512*e + 820*f) + 529992253440000*e**3*f**3 - 40600862720*e**3*f*(313*d + \\
& 512*e + 820*f)**2 + 52242481152000*e**2*f**3*(313*d + 512*e + 820*f) - 255 \\
& 59040*e**2*f*(313*d + 512*e + 820*f)**3 - 66895452108800000*e*f**5 + 102036 \\
& 608000*e*f**3*(313*d + 512*e + 820*f)**2 + 1595060100000*f**5*(313*d + 512* \\
& e + 820*f) - 2450250*f**3*(313*d + 512*e + 820*f)**3)/(22941256248261*d**6 \\
& + 197271407316645*d**5*f - 2312740746035200*d**4*e**2 + 612862910928900*d** \\
& 4*f**2 - 20566607354920960*d**3*e**2*f + 767363353812000*d**3*f**3 + 447391 \\
& 2813420544*d**2*e**4 - 68552762169753600*d**2*e**2*f**2 + 197499222000000*d \\
& **2*f**4 + 20324472439439360*d*e**4*f - 101559983669248000*d*e**2*f**3 - 18 \\
& 2883938400000*d*f**5 + 22539988369408000*e**4*f**2 - 56422196838400000*e**2 \\
& *f**4 + 21520080000000*f**6))/41472 + (128*e*x**6 - 960*e*x**4 + 1920*e*x** \\
& 2 - 800*e + x**7*(35*d + 140*f) + x**5*(-234*d - 1080*f) + x**3*(315*d + 22 \\
& 68*f) + x*(172*d - 1040*f))/(3456*x**8 - 34560*x**6 + 114048*x**4 - 138240* \\
& x**2 + 55296)
\end{aligned}$$

$$3.44 \quad \int \frac{d+ex+fx^2+gx^3}{(4-5x^2+x^4)^3} dx$$

Optimal. Leaf size=204

$$-\frac{x(-35x^2(d+4f)+59d+380f)}{3456(x^4-5x^2+4)} + \frac{x(-(x^2(5d+8f))+17d+20f)}{144(x^4-5x^2+4)^2} - \frac{(313d+820f)\tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{1}{648}(13d+25f)\operatorname{arctanh}(x)$$

[Out] 1/144*x*(17*d+20*f-(5*d+8*f)*x^2)/(x^4-5*x^2+4)^2+1/36*(5*e+8*g-(2*e+5*g)*x^2)/(x^4-5*x^2+4)^2-1/108*(2*e+5*g)*(-2*x^2+5)/(x^4-5*x^2+4)-1/3456*x*(59*d+380*f-35*(d+4*f)*x^2)/(x^4-5*x^2+4)-1/20736*(313*d+820*f)*arctanh(1/2*x)+1/648*(13*d+25*f)*arctanh(x)-1/162*(2*e+5*g)*ln(-x^2+1)+1/162*(2*e+5*g)*ln(-x^2+4)

Rubi [A] time = 0.25, antiderivative size = 204, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 9, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}} = 0.321$, Rules used = {1673, 1178, 1166, 207, 1247, 638, 614, 616, 31}

$$-\frac{x(-35x^2(d+4f)+59d+380f)}{3456(x^4-5x^2+4)} + \frac{x(x^2(-(5d+8f))+17d+20f)}{144(x^4-5x^2+4)^2} - \frac{(313d+820f)\tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{1}{648}(13d+25f)\operatorname{arctanh}(x)$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3)/(4 - 5*x^2 + x^4)^3, x]

[Out] (x*(17*d + 20*f - (5*d + 8*f)*x^2))/(144*(4 - 5*x^2 + x^4)^2) + (5*e + 8*g - (2*e + 5*g)*x^2)/(36*(4 - 5*x^2 + x^4)^2) - ((2*e + 5*g)*(5 - 2*x^2))/(108*(4 - 5*x^2 + x^4)) - (x*(59*d + 380*f - 35*(d + 4*f)*x^2))/(3456*(4 - 5*x^2 + x^4)) - ((313*d + 820*f)*ArcTanh[x/2])/20736 + ((13*d + 25*f)*ArcTanh[x])/648 - ((2*e + 5*g)*Log[1 - x^2])/162 + ((2*e + 5*g)*Log[4 - x^2])/162

Rule 31

Int[((a_) + (b_.)*(x_))^-1, x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_.)*(x_)^2)^-1, x_Symbol] := -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a, 0] || GtQ[b, 0])

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)
*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := With[{q = Rt[b^2
- 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] := Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] := Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]]*(a + b*x^2 + c*x^4)^p, x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{d + fx^2}{(4 - 5x^2 + x^4)^3} dx + \int \frac{x(e + gx^2)}{(4 - 5x^2 + x^4)^3} dx \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 5(5d + 8f)x^2}{(4 - 5x^2 + x^4)^2} dx + \frac{1}{2} \text{Subst} \left(\right. \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)} \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)(5 - 2x^2)}{108(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)} \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)(5 - 2x^2)}{108(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)} \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)(5 - 2x^2)}{108(4 - 5x^2 + x^4)} - \frac{x(59d + 380f - 35(d + 4f)x^2)}{3456(4 - 5x^2 + x^4)} \end{aligned}$$

Mathematica [A] time = 0.08, size = 193, normalized size = 0.95

$$\frac{12(dx(35x^2-59)+64e(2x^2-5)+20fx(7x^2-19)+160g(2x^2-5))}{x^4-5x^2+4} + \frac{288(-5dx^3+17dx+e(20-8x^2)-8fx^3+20fx-4g(5x^2-8))}{(x^4-5x^2+4)^2} - 32 \log(1-x)(13d - 32e + 20f - 16g)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(4 - 5*x^2 + x^4)^3, x]

[Out] ((288*(17*d*x + 20*f*x - 5*d*x^3 - 8*f*x^3 + e*(20 - 8*x^2) - 4*g*(-8 + 5*x^2)))/(4 - 5*x^2 + x^4)^2 + (12*(64*e*(-5 + 2*x^2) + 160*g*(-5 + 2*x^2) + 2

$0*f*x*(-19 + 7*x^2) + d*x*(-59 + 35*x^2)))/(4 - 5*x^2 + x^4) - 32*(13*d + 16*e + 25*f + 40*g)*\text{Log}[1 - x] + (313*d + 512*e + 820*f + 1280*g)*\text{Log}[2 - x] + 32*(13*d - 16*e + 25*f - 40*g)*\text{Log}[1 + x] + (-313*d + 512*e - 820*f + 1280*g)*\text{Log}[2 + x])/41472$

fricas [B] time = 2.86, size = 470, normalized size = 2.30

$$\frac{420(d + 4f)x^7 + 768(2e + 5g)x^6 - 216(13d + 60f)x^5 - 5760(2e + 5g)x^4 + 756(5d + 36f)x^3 + 11520(2e - 3d - 260f)x - ((313d - 512e + 820f - 1280g)x^8 - 10(313d - 512e + 820f - 1280g)x^6 + 33(313d - 512e + 820f - 1280g)x^4 - 40(313d - 512e + 820f - 1280g)x^2 + 5008d - 8192e + 13120f - 20480g)\log(x + 2) + 32((13d - 16e + 25f - 40g)x^8 - 10(13d - 16e + 25f - 40g)x^6 + 33(13d - 16e + 25f - 40g)x^4 - 40(13d - 16e + 25f - 40g)x^2 + 208d - 256e + 400f - 640g)\log(x + 1) - 32((13d + 16e + 25f + 40g)x^8 - 10(13d + 16e + 25f + 40g)x^6 + 33(13d + 16e + 25f + 40g)x^4 - 40(13d + 16e + 25f + 40g)x^2 + 208d + 256e + 400f + 640g)\log(x - 1) + ((313d + 512e + 820f + 1280g)x^8 - 10(313d + 512e + 820f + 1280g)x^6 + 33(313d + 512e + 820f + 1280g)x^4 - 40(313d + 512e + 820f + 1280g)x^2 + 5008d + 8192e + 13120f + 20480g)\log(x - 2) - 9600e - 29184g)/(x^8 - 10x^6 + 33x^4 - 40x^2 + 16)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="fricas")

[Out] $\frac{1}{41472} \cdot (420(d + 4f)x^7 + 768(2e + 5g)x^6 - 216(13d + 60f)x^5 - 5760(2e + 5g)x^4 + 756(5d + 36f)x^3 + 11520(2e + 5g)x^2 + 48(43d - 260f)x - ((313d - 512e + 820f - 1280g)x^8 - 10(313d - 512e + 820f - 1280g)x^6 + 33(313d - 512e + 820f - 1280g)x^4 - 40(313d - 512e + 820f - 1280g)x^2 + 5008d - 8192e + 13120f - 20480g)\log(x + 2) + 32((13d - 16e + 25f - 40g)x^8 - 10(13d - 16e + 25f - 40g)x^6 + 33(13d - 16e + 25f - 40g)x^4 - 40(13d - 16e + 25f - 40g)x^2 + 208d - 256e + 400f - 640g)\log(x + 1) - 32((13d + 16e + 25f + 40g)x^8 - 10(13d + 16e + 25f + 40g)x^6 + 33(13d + 16e + 25f + 40g)x^4 - 40(13d + 16e + 25f + 40g)x^2 + 208d + 256e + 400f + 640g)\log(x - 1) + ((313d + 512e + 820f + 1280g)x^8 - 10(313d + 512e + 820f + 1280g)x^6 + 33(313d + 512e + 820f + 1280g)x^4 - 40(313d + 512e + 820f + 1280g)x^2 + 5008d + 8192e + 13120f + 20480g)\log(x - 2) - 9600e - 29184g)/(x^8 - 10x^6 + 33x^4 - 40x^2 + 16)$

giac [A] time = 0.39, size = 190, normalized size = 0.93

$$-\frac{1}{41472} (313d + 820f - 1280g - 512e) \log(|x + 2|) + \frac{1}{1296} (13d + 25f - 40g - 16e) \log(|x + 1|) - \frac{1}{1296} (13d + 25f - 40g - 16e) \log(|x - 1|) + \frac{1}{41472} (313d + 820f + 1280g + 512e) \log(|x - 2|) + \frac{1}{3456} (35d*x^7 + 140*f*x^7 + 320*g*x^6 + 128*x^6*e - 234*d*x^5 - 1080*f*x^5 - 2400*g*x^4 - 960*x^4*e + 315*d*x^3 + 2268*f*x^3 + 4800*g*x^2 + 1920*x^2*2e + 172*d*x - 1040*f*x - 2432g - 800e)/(x^4 - 5*x^2 + 4)^2$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="giac")

[Out] $-1/41472 \cdot (313d + 820f - 1280g - 512e) \cdot \log(\text{abs}(x + 2)) + 1/1296 \cdot (13d + 25f - 40g - 16e) \cdot \log(\text{abs}(x + 1)) - 1/1296 \cdot (13d + 25f + 40g + 16e) \cdot \log(\text{abs}(x - 1)) + 1/41472 \cdot (313d + 820f + 1280g + 512e) \cdot \log(\text{abs}(x - 2)) + 1/3456 \cdot (35d*x^7 + 140*f*x^7 + 320*g*x^6 + 128*x^6*e - 234*d*x^5 - 1080*f*x^5 - 2400*g*x^4 - 960*x^4*e + 315*d*x^3 + 2268*f*x^3 + 4800*g*x^2 + 1920*x^2*2e + 172*d*x - 1040*f*x - 2432g - 800e)/(x^4 - 5*x^2 + 4)^2$

maple [A] time = 0.02, size = 370, normalized size = 1.81

$$-\frac{5g \ln(x-1)}{162} + \frac{5g \ln(x+2)}{162} + \frac{5g \ln(x-2)}{162} - \frac{5g \ln(x+1)}{162} - \frac{313d \ln(x+2)}{41472} + \frac{e \ln(x+2)}{81} - \frac{e \ln(x-1)}{81} - \frac{13d \ln(x-1)}{1296}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x)

[Out]
$$-5/162*g*\ln(x-1)+5/162*g*\ln(x+2)+5/162*g*\ln(x-2)-5/162*g*\ln(x+1)-313/41472*d*\ln(x+2)+1/81*e*\ln(x+2)-1/81*e*\ln(x-1)-13/1296*d*\ln(x-1)-1/81*e*\ln(x+1)+13/1296*d*\ln(x+1)+313/41472*d*\ln(x-2)+1/81*e*\ln(x-2)+205/10368*f*\ln(x-2)+25/1296*f*\ln(x+1)-25/1296*f*\ln(x-1)-205/10368*f*\ln(x+2)-1/432/(x+2)^2*g+1/432/(x-1)^2*g+1/432/(x+1)^2*g-1/432/(x-2)^2*g-1/432/(x+1)^2*d+1/432/(x+1)^2*e+1/432/(x-1)^2*d+1/432/(x-1)^2*e+1/3456/(x+2)^2*d-1/1728/(x+2)^2*e+1/864/(x+2)^2*f+1/432/(x-1)^2*f-1/432/(x+1)^2*f-1/864/(x-2)^2*f-1/3456/(x-2)^2*d-1/1728/(x-2)^2*e-13/864/(x+2)*g-7/432/(x+1)*g+7/432/(x-1)*g+13/864/(x-2)*g+19/6912/(x+2)*d-17/3456/(x+2)*e+19/6912/(x-2)*d+17/3456/(x-2)*e+1/432/(x+1)*d-1/144/(x+1)*e+1/432/(x-1)*d+1/144/(x-1)*e+5/432/(x-1)*f+5/576/(x+2)*f+5/576/(x-2)*f+5/432/(x+1)*f$$

maxima [A] time = 1.08, size = 188, normalized size = 0.92

$$-\frac{1}{41472} (313d - 512e + 820f - 1280g) \log(x+2) + \frac{1}{1296} (13d - 16e + 25f - 40g) \log(x+1) - \frac{1}{1296} (13d +$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="maxima")

[Out]
$$-1/41472*(313*d - 512*e + 820*f - 1280*g)*\log(x + 2) + 1/1296*(13*d - 16*e + 25*f - 40*g)*\log(x + 1) - 1/1296*(13*d + 16*e + 25*f + 40*g)*\log(x - 1) + 1/41472*(313*d + 512*e + 820*f + 1280*g)*\log(x - 2) + 1/3456*(35*(d + 4*f)*x^7 + 64*(2*e + 5*g)*x^6 - 18*(13*d + 60*f)*x^5 - 480*(2*e + 5*g)*x^4 + 63*(5*d + 36*f)*x^3 + 960*(2*e + 5*g)*x^2 + 4*(43*d - 260*f)*x - 800*e - 2432*g)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)$$

mupad [B] time = 0.85, size = 182, normalized size = 0.89

$$\frac{\left(\frac{35d}{3456} + \frac{35f}{864}\right) x^7 + \left(\frac{e}{27} + \frac{5g}{54}\right) x^6 + \left(-\frac{13d}{192} - \frac{5f}{16}\right) x^5 + \left(-\frac{5e}{18} - \frac{25g}{36}\right) x^4 + \left(\frac{35d}{384} + \frac{21f}{32}\right) x^3 + \left(\frac{5e}{9} + \frac{25g}{18}\right) x^2 + \left(\frac{43d}{864} - \frac{2432g}{864}\right) x - 800e - 2432g}{x^8 - 10x^6 + 33x^4 - 40x^2 + 16}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3)/(x^4 - 5*x^2 + 4)^3,x)

```
[Out] (x^3*((35*d)/384 + (21*f)/32) - (19*g)/27 - x^5*((13*d)/192 + (5*f)/16) - (
25*e)/108 + x^7*((35*d)/3456 + (35*f)/864) + x^2*((5*e)/9 + (25*g)/18) - x^
4*((5*e)/18 + (25*g)/36) + x^6*(e/27 + (5*g)/54) + x*((43*d)/864 - (65*f)/2
16))/((33*x^4 - 40*x^2 - 10*x^6 + x^8 + 16) - log(x - 1)*((13*d)/1296 + e/81
+ (25*f)/1296 + (5*g)/162) + log(x + 1)*((13*d)/1296 - e/81 + (25*f)/1296
- (5*g)/162) + log(x - 2)*((313*d)/41472 + e/81 + (205*f)/10368 + (5*g)/162
) - log(x + 2)*((313*d)/41472 - e/81 + (205*f)/10368 - (5*g)/162)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**3,x)
```

```
[Out] Timed out
```


$$3.45 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{(4-5x^2+x^4)^3} dx$$

Optimal. Leaf size=224

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(-(x^2(5d+8f+20h))+17d+20f+32h)}{144(x^4-5x^2+4)^2} - \frac{\tanh^{-1}\left(\frac{x}{2}\right)}{1}$$

[Out] 1/36*(5*e+8*g-(2*e+5*g)*x^2)/(x^4-5*x^2+4)^2+1/144*x*(17*d+20*f+32*h-(5*d+8*f+20*h)*x^2)/(x^4-5*x^2+4)^2-1/108*(2*e+5*g)*(-2*x^2+5)/(x^4-5*x^2+4)-1/3456*x*(59*d+380*f+848*h-5*(7*d+28*f+64*h)*x^2)/(x^4-5*x^2+4)-1/20736*(313*d+820*f+1936*h)*arctanh(1/2*x)+1/648*(13*d+25*f+61*h)*arctanh(x)-1/162*(2*e+5*g)*ln(-x^2+1)+1/162*(2*e+5*g)*ln(-x^2+4)

Rubi [A] time = 0.31, antiderivative size = 224, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 10, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.303$, Rules used = {1673, 1678, 1178, 1166, 207, 1247, 638, 614, 616, 31}

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(x^2(-(5d+8f+20h))+17d+20f+32h)}{144(x^4-5x^2+4)^2} - \frac{\tanh^{-1}\left(\frac{x}{2}\right)}{1}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(4 - 5*x^2 + x^4)^3, x]

[Out] (5*e + 8*g - (2*e + 5*g)*x^2)/(36*(4 - 5*x^2 + x^4)^2) + (x*(17*d + 20*f + 32*h - (5*d + 8*f + 20*h)*x^2))/(144*(4 - 5*x^2 + x^4)^2) - ((2*e + 5*g)*(5 - 2*x^2))/(108*(4 - 5*x^2 + x^4)) - (x*(59*d + 380*f + 848*h - 5*(7*d + 28*f + 64*h)*x^2))/(3456*(4 - 5*x^2 + x^4)) - ((313*d + 820*f + 1936*h)*ArcTanh[x/2])/20736 + ((13*d + 25*f + 61*h)*ArcTanh[x])/648 - ((2*e + 5*g)*Log[1 - x^2])/162 + ((2*e + 5*g)*Log[4 - x^2])/162

Rule 31

Int[((a_) + (b_)*(x_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_)*(x_)^2)^(n_), x_Symbol] := -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a, 0] || GtQ[b, 0])

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)
*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 616

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := With[{q = Rt[b^2
- 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q,
Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2
- 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] := Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] := Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
```

$x, x^2], x] /; \text{FreeQ}[\{a, b, c, d, e, p, q\}, x]$

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := With[{d =
Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
+ b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
+ 7)*(b*d - 2*a*e)*x^2, x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2)}{(4 - 5x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 32h + 5(5d + 8f + 20h)x^2}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{x(59d + 78f + 112h)}{144(4 - 5x^2 + x^4)^2} \\
&= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)x^3}{108(4 - 5x^2 + x^4)^2} \\
&= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)x^3}{108(4 - 5x^2 + x^4)^2} \\
&= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)x^3}{108(4 - 5x^2 + x^4)^2}
\end{aligned}$$

Mathematica [A] time = 0.12, size = 231, normalized size = 1.03

$$\frac{-5dx^3 + 17dx - 8ex^2 + 20e - 8fx^3 + 20fx - 20gx^2 + 32g - 20hx^3 + 32hx}{144(x^4 - 5x^2 + 4)^2} + \frac{35dx^3 - 59dx + 128ex^2 - 320e + 144e}{3456(x^4 - 5x^2 + 4)^2}$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(4 - 5*x^2 + x^4)^3, x]

[Out] (20*e + 32*g + 17*d*x + 20*f*x + 32*h*x - 8*e*x^2 - 20*g*x^2 - 5*d*x^3 - 8*f*x^3 - 20*h*x^3)/(144*(4 - 5*x^2 + x^4)^2) + (-320*e - 800*g - 59*d*x - 380*f*x - 848*h*x + 128*e*x^2 + 320*g*x^2 + 35*d*x^3 + 140*f*x^3 + 320*h*x^3)/(3456*(4 - 5*x^2 + x^4)) + ((-13*d - 16*e - 25*f - 40*g - 61*h)*Log[1 - x])/1296 + ((313*d + 512*e + 820*f + 1280*g + 1936*h)*Log[2 - x])/41472 + ((13*d - 16*e + 25*f - 40*g + 61*h)*Log[1 + x])/1296 + ((-313*d + 512*e - 820*f + 1280*g - 1936*h)*Log[2 + x])/41472

fricas [B] time = 6.13, size = 544, normalized size = 2.43

$$\frac{60(7d + 28f + 64h)x^7 + 768(2e + 5g)x^6 - 216(13d + 60f + 136h)x^5 - 5760(2e + 5g)x^4 + 756(5d + 36f + 48h)x^3 - 144(17d + 20f + 32h)x^2 + 144(5e + 8g)x - 144e}{144(4 - 5x^2 + x^4)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="fricas")

[Out] 1/41472*(60*(7*d + 28*f + 64*h)*x^7 + 768*(2*e + 5*g)*x^6 - 216*(13*d + 60*f + 136*h)*x^5 - 5760*(2*e + 5*g)*x^4 + 756*(5*d + 36*f + 80*h)*x^3 + 11520*(2*e + 5*g)*x^2 + 48*(43*d - 260*f - 656*h)*x - ((313*d - 512*e + 820*f - 1280*g + 1936*h)*x^8 - 10*(313*d - 512*e + 820*f - 1280*g + 1936*h)*x^6 + 33*(313*d - 512*e + 820*f - 1280*g + 1936*h)*x^4 - 40*(313*d - 512*e + 820*f - 1280*g + 1936*h)*x^2 + 5008*d - 8192*e + 13120*f - 20480*g + 30976*h)*log(x + 2) + 32*((13*d - 16*e + 25*f - 40*g + 61*h)*x^8 - 10*(13*d - 16*e + 25*f - 40*g + 61*h)*x^6 + 33*(13*d - 16*e + 25*f - 40*g + 61*h)*x^4 - 40*(13*d - 16*e + 25*f - 40*g + 61*h)*x^2 + 208*d - 256*e + 400*f - 640*g + 976*h)*log(x + 1) - 32*((13*d + 16*e + 25*f + 40*g + 61*h)*x^8 - 10*(13*d + 16*e + 25*f + 40*g + 61*h)*x^6 + 33*(13*d + 16*e + 25*f + 40*g + 61*h)*x^4 - 40*(13*d + 16*e + 25*f + 40*g + 61*h)*x^2 + 208*d + 256*e + 400*f + 640*g + 976*h)*log(x - 1) + ((313*d + 512*e + 820*f + 1280*g + 1936*h)*x^8 - 10*(313*d + 512*e + 820*f + 1280*g + 1936*h)*x^6 + 33*(313*d + 512*e + 820*f + 1280*g + 1936*h)*x^4 - 40*(313*d + 512*e + 820*f + 1280*g + 1936*h)*x^2 + 5008*d + 8192*e + 13120*f + 20480*g + 30976*h)*log(x - 2) - 9600*e - 29184*g)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)

giac [A] time = 0.33, size = 224, normalized size = 1.00

$$-\frac{1}{41472} (313d + 820f - 1280g + 1936h - 512e) \log(|x + 2|) + \frac{1}{1296} (13d + 25f - 40g + 61h - 16e) \log(|x + 1|) - \frac{1}{1296} (13d + 25f + 40g + 61h + 16e) \log(|x - 1|) + \frac{1}{41472} (313d + 820f + 1280g + 1936h + 512e) \log(|x - 2|) + \frac{1}{3456} (35d*x^7 + 140f*x^7 + 320h*x^7 + 320g*x^6 + 128*x^6*e - 234*d*x^5 - 1080*f*x^5 - 2448*h*x^5 - 2400*g*x^4 - 960*x^4*e + 315*d*x^3 + 2268*f*x^3 + 5040*h*x^3 + 4800*g*x^2 + 1920*x^2*e + 172*d*x - 1040*f*x - 2624*h*x - 2432*g - 800*e)/(x^4 - 5*x^2 + 4)^3$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="giac")

[Out] -1/41472*(313*d + 820*f - 1280*g + 1936*h - 512*e)*log(abs(x + 2)) + 1/1296*(13*d + 25*f - 40*g + 61*h - 16*e)*log(abs(x + 1)) - 1/1296*(13*d + 25*f + 40*g + 61*h + 16*e)*log(abs(x - 1)) + 1/41472*(313*d + 820*f + 1280*g + 1936*h + 512*e)*log(abs(x - 2)) + 1/3456*(35*d*x^7 + 140*f*x^7 + 320*h*x^7 + 320*g*x^6 + 128*x^6*e - 234*d*x^5 - 1080*f*x^5 - 2448*h*x^5 - 2400*g*x^4 - 960*x^4*e + 315*d*x^3 + 2268*f*x^3 + 5040*h*x^3 + 4800*g*x^2 + 1920*x^2*e + 172*d*x - 1040*f*x - 2624*h*x - 2432*g - 800*e)/(x^4 - 5*x^2 + 4)^3

maple [B] time = 0.02, size = 462, normalized size = 2.06

$$\frac{121h \ln(x + 2)}{2592} - \frac{61h \ln(x - 1)}{1296} + \frac{61h \ln(x + 1)}{1296} + \frac{121h \ln(x - 2)}{2592} - \frac{5g \ln(x - 1)}{162} + \frac{5g \ln(x + 2)}{162} + \frac{5g \ln(x - 2)}{162} - \frac{5g \ln(x + 1)}{162}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x)`

[Out] $-121/2592*h*\ln(x+2)-61/1296*h*\ln(x-1)+61/1296*h*\ln(x+1)+121/2592*h*\ln(x-2)-5/162*g*\ln(x-1)+5/162*g*\ln(x+2)+5/162*g*\ln(x-2)-5/162*g*\ln(x+1)-313/41472*d*\ln(x+2)+1/81*e*\ln(x+2)-1/81*e*\ln(x-1)-13/1296*d*\ln(x-1)-1/81*e*\ln(x+1)+13/1296*d*\ln(x+1)+313/41472*d*\ln(x-2)+1/81*e*\ln(x-2)+205/10368*f*\ln(x-2)+25/1296*f*\ln(x+1)-25/1296*f*\ln(x-1)-205/10368*f*\ln(x+2)+1/216/(x+2)^2*h+1/432/(x-1)^2*h-1/432/(x+1)^2*h-1/216/(x-2)^2*h-1/432/(x+2)^2*g+1/432/(x-1)^2*g+1/432/(x+1)^2*g-1/432/(x-2)^2*g-1/432/(x+1)^2*d+1/432/(x+1)^2*e+1/432/(x-1)^2*d+1/432/(x-1)^2*e+1/3456/(x+2)^2*d-1/1728/(x+2)^2*e+1/864/(x+2)^2*f+1/432/(x-1)^2*f-1/432/(x+1)^2*f-1/864/(x-2)^2*f-1/3456/(x-2)^2*d-1/1728/(x-2)^2*e+11/432/(x+2)*h+1/48/(x+1)*h+1/48/(x-1)*h+11/432/(x-2)*h-13/864/(x+2)*g-7/432/(x+1)*g+7/432/(x-1)*g+13/864/(x-2)*g+19/6912/(x+2)*d-17/3456/(x+2)*e+19/6912/(x-2)*d+17/3456/(x-2)*e+1/432/(x+1)*d-1/144/(x+1)*e+1/432/(x-1)*d+1/144/(x-1)*e+5/432/(x-1)*f+5/576/(x+2)*f+5/576/(x-2)*f+5/432/(x+1)*f$

maxima [A] time = 1.06, size = 214, normalized size = 0.96

$$-\frac{1}{41472} (313d - 512e + 820f - 1280g + 1936h) \log(x+2) + \frac{1}{1296} (13d - 16e + 25f - 40g + 61h) \log(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^3,x, algorithm="maxima")`

[Out] $-1/41472*(313*d - 512*e + 820*f - 1280*g + 1936*h)*\log(x + 2) + 1/1296*(13*d - 16*e + 25*f - 40*g + 61*h)*\log(x + 1) - 1/1296*(13*d + 16*e + 25*f + 40*g + 61*h)*\log(x - 1) + 1/41472*(313*d + 512*e + 820*f + 1280*g + 1936*h)*\log(x - 2) + 1/3456*(5*(7*d + 28*f + 64*h)*x^7 + 64*(2*e + 5*g)*x^6 - 18*(13*d + 60*f + 136*h)*x^5 - 480*(2*e + 5*g)*x^4 + 63*(5*d + 36*f + 80*h)*x^3 + 960*(2*e + 5*g)*x^2 + 4*(43*d - 260*f - 656*h)*x - 800*e - 2432*g)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)$

mupad [B] time = 0.25, size = 209, normalized size = 0.93

$$\ln(x+1) \left(\frac{13d}{1296} - \frac{e}{81} + \frac{25f}{1296} - \frac{5g}{162} + \frac{61h}{1296} \right) - \ln(x-1) \left(\frac{13d}{1296} + \frac{e}{81} + \frac{25f}{1296} + \frac{5g}{162} + \frac{61h}{1296} \right) - \frac{\left(-\frac{35d}{3456} - \frac{35f}{864} - \frac{5}{5} \right)}{1}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(x^4 - 5*x^2 + 4)^3,x)`

[Out] $\log(x+1)*((13*d)/1296 - e/81 + (25*f)/1296 - (5*g)/162 + (61*h)/1296) - \log(x-1)*((13*d)/1296 + e/81 + (25*f)/1296 + (5*g)/162 + (61*h)/1296) - ((25*e)/108 + (19*g)/27 - x^2*((5*e)/9 + (25*g)/18) + x^4*((5*e)/18 + (25*g)/18)$

$$\begin{aligned}
& 36) - x^6 \cdot (e/27 + (5 \cdot g)/54) + x \cdot ((65 \cdot f)/216 - (43 \cdot d)/864 + (41 \cdot h)/54) + x^5 \\
& \cdot ((13 \cdot d)/192 + (5 \cdot f)/16 + (17 \cdot h)/24) - x^3 \cdot ((35 \cdot d)/384 + (21 \cdot f)/32 + (35 \cdot h) \\
& /24) - x^7 \cdot ((35 \cdot d)/3456 + (35 \cdot f)/864 + (5 \cdot h)/54) / (33 \cdot x^4 - 40 \cdot x^2 - 10 \cdot x^6 \\
& + x^8 + 16) + \log(x - 2) \cdot ((313 \cdot d)/41472 + e/81 + (205 \cdot f)/10368 + (5 \cdot g)/162 \\
& + (121 \cdot h)/2592) - \log(x + 2) \cdot ((313 \cdot d)/41472 - e/81 + (205 \cdot f)/10368 - (5 \cdot g) \\
& /162 + (121 \cdot h)/2592)
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**3,x)

[Out] Timed out

$$3.46 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(4-5x^2+x^4)^3} dx$$

Optimal. Leaf size=239

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(-(x^2(5d+8f+20h))+17d+20f+32h)}{144(x^4-5x^2+4)^2} - \frac{\tanh^{-1}\left(\frac{x}{2}\right)}{(31)}$$

[Out] 1/144*x*(17*d+20*f+32*h-(5*d+8*f+20*h)*x^2)/(x^4-5*x^2+4)^2+1/36*(5*e+8*g+20*i-(2*e+5*g+17*i)*x^2)/(x^4-5*x^2+4)^2-1/108*(2*e+5*g+11*i)*(-2*x^2+5)/(x^4-5*x^2+4)-1/3456*x*(59*d+380*f+848*h-5*(7*d+28*f+64*h)*x^2)/(x^4-5*x^2+4)-1/20736*(313*d+820*f+1936*h)*arctanh(1/2*x)+1/648*(13*d+25*f+61*h)*arctanh(x)-1/162*(2*e+5*g+11*i)*ln(-x^2+1)+1/162*(2*e+5*g+11*i)*ln(-x^2+4)

Rubi [A] time = 0.34, antiderivative size = 239, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 11, integrand size = 38, $\frac{\text{number of rules}}{\text{integrand size}} = 0.290$, Rules used = {1673, 1678, 1178, 1166, 207, 1663, 1660, 12, 614, 616, 31}

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(x^2(-(5d+8f+20h))+17d+20f+32h)}{144(x^4-5x^2+4)^2} - \frac{\tanh^{-1}\left(\frac{x}{2}\right)}{(31)}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(4 - 5*x^2 + x^4)^3, x]

[Out] (x*(17*d + 20*f + 32*h - (5*d + 8*f + 20*h)*x^2))/(144*(4 - 5*x^2 + x^4)^2) + (5*e + 8*g + 20*i - (2*e + 5*g + 17*i)*x^2)/(36*(4 - 5*x^2 + x^4)^2) - ((2*e + 5*g + 11*i)*(5 - 2*x^2))/(108*(4 - 5*x^2 + x^4)) - (x*(59*d + 380*f + 848*h - 5*(7*d + 28*f + 64*h)*x^2))/(3456*(4 - 5*x^2 + x^4)) - ((313*d + 820*f + 1936*h)*ArcTanh[x/2])/20736 + ((13*d + 25*f + 61*h)*ArcTanh[x])/648 - ((2*e + 5*g + 11*i)*Log[1 - x^2])/162 + ((2*e + 5*g + 11*i)*Log[4 - x^2])/162

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 31

Int[((a_) + (b_.)*(x_))^-1, x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 207

Int[((a_) + (b_)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTanh[(Rt[b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (LtQ[a, 0] || GtQ[b, 0])

Rule 614

Int[((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p + 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 616

Int[((a_) + (b_)*(x_) + (c_)*(x_)^2)^(-1), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q, Int[1/Simp[b/2 + q/2 + c*x, x], x], x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]

Rule 1166

Int[((d_) + (e_)*(x_)^2)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2 + c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]

Rule 1178

Int[((d_) + (e_)*(x_)^2)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && LtQ[p, -1] && IntegerQ[2*p]

Rule 1660

Int[(Pq_)*((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol] := With[{Q = PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[Pq, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x + c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^(p_)

```
(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(
2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
- 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
+ b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
+ 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 46x^5}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2 + 46x^4)}{(4 - 5x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 32h - (5d + 8f + 20h)x^2}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} \\
&= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2}
\end{aligned}$$

Mathematica [A] time = 0.13, size = 261, normalized size = 1.09

$$\frac{-5dx^3 + 17dx - 8ex^2 + 20e - 8fx^3 + 20fx - 20gx^2 + 32g - 20hx^3 + 32hx - 68ix^2 + 80i}{144(x^4 - 5x^2 + 4)^2} + \frac{35dx^3 - 59dx + 128e}{144(x^4 - 5x^2 + 4)^2}$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(4 - 5*x^2 + x^4)^3,x]

[Out] (20*e + 32*g + 80*i + 17*d*x + 20*f*x + 32*h*x - 8*e*x^2 - 20*g*x^2 - 68*i*x^2 - 5*d*x^3 - 8*f*x^3 - 20*h*x^3)/(144*(4 - 5*x^2 + x^4)^2) + (-320*e - 800*g - 1760*i - 59*d*x - 380*f*x - 848*h*x + 128*e*x^2 + 320*g*x^2 + 704*i*x^2 + 35*d*x^3 + 140*f*x^3 + 320*h*x^3)/(3456*(4 - 5*x^2 + x^4)) + ((-13*d - 16*e - 25*f - 40*g - 61*h - 88*i)*Log[1 - x])/1296 + ((313*d + 512*e + 820*f + 1280*g + 1936*h + 2816*i)*Log[2 - x])/41472 + ((13*d - 16*e + 25*f - 40*g + 61*h - 88*i)*Log[1 + x])/1296 + ((-313*d + 512*e - 820*f + 1280*g - 1936*h + 2816*i)*Log[2 + x])/41472

fricas [B] time = 27.72, size = 616, normalized size = 2.58

$$\frac{60(7d + 28f + 64h)x^7 + 768(2e + 5g + 11i)x^6 - 216(13d + 60f + 136h)x^5 - 5760(2e + 5g + 11i)x^4 + 7560(7d + 28f + 64h)x^3 + 2304(10e + 25g + 52i)x^2 + 48(43d - 260f - 656h)x - ((313d - 512e + 820f - 1280g + 1936h - 2816i)x^8 - 10(313d - 512e + 820f - 1280g + 1936h - 2816i)x^6 + 33(313d - 512e + 820f - 1280g + 1936h - 2816i)x^4 - 40(313d - 512e + 820f - 1280g + 1936h - 2816i)x^2 + 5008d - 8192e + 13120f - 20480g + 30976h - 45056i)\log(x + 2) + 32((13d - 16e + 25f - 40g + 61h - 88i)x^8 - 10(13d - 16e + 25f - 40g + 61h - 88i)x^6 + 33(13d - 16e + 25f - 40g + 61h - 88i)x^4 - 40(13d - 16e + 25f - 40g + 61h - 88i)x^2 + 208d - 256e + 400f - 640g + 976h - 1408i)\log(x + 1) - 32((13d + 16e + 25f + 40g + 61h + 88i)x^8 - 10(13d + 16e + 25f + 40g + 61h + 88i)x^6 + 33(13d + 16e + 25f + 40g + 61h + 88i)x^4 - 40(13d + 16e + 25f + 40g + 61h + 88i)x^2 + 208d + 256e + 400f + 640g + 976h + 1408i)\log(x - 1) + ((313d + 512e + 820f + 1280g + 1936h + 2816i)x^8 - 10(313d + 512e + 820f + 1280g + 1936h + 2816i)x^6 + 33(313d + 512e + 820f + 1280g + 1936h + 2816i)x^4 - 40(313d + 512e + 820f + 1280g + 1936h + 2816i)x^2 + 5008d + 8192e + 13120f + 20480g + 30976h + 45056i)\log(x - 2) - 9600e - 29184g - 61440i}{(x^8 - 10x^6 + 33x^4 - 40x^2 + 16)}$$

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)/(x^4-5*x^2+4)^3,x, algorithm="fricas")

[Out] 1/41472*(60*(7*d + 28*f + 64*h)*x^7 + 768*(2*e + 5*g + 11*i)*x^6 - 216*(13*d + 60*f + 136*h)*x^5 - 5760*(2*e + 5*g + 11*i)*x^4 + 756*(5*d + 36*f + 80*h)*x^3 + 2304*(10*e + 25*g + 52*i)*x^2 + 48*(43*d - 260*f - 656*h)*x - ((313*d - 512*e + 820*f - 1280*g + 1936*h - 2816*i)*x^8 - 10*(313*d - 512*e + 820*f - 1280*g + 1936*h - 2816*i)*x^6 + 33*(313*d - 512*e + 820*f - 1280*g + 1936*h - 2816*i)*x^4 - 40*(313*d - 512*e + 820*f - 1280*g + 1936*h - 2816*i)*x^2 + 5008*d - 8192*e + 13120*f - 20480*g + 30976*h - 45056*i)*log(x + 2) + 32*((13*d - 16*e + 25*f - 40*g + 61*h - 88*i)*x^8 - 10*(13*d - 16*e + 25*f - 40*g + 61*h - 88*i)*x^6 + 33*(13*d - 16*e + 25*f - 40*g + 61*h - 88*i)*x^4 - 40*(13*d - 16*e + 25*f - 40*g + 61*h - 88*i)*x^2 + 208*d - 256*e + 400*f - 640*g + 976*h - 1408*i)*log(x + 1) - 32*((13*d + 16*e + 25*f + 40*g + 61*h + 88*i)*x^8 - 10*(13*d + 16*e + 25*f + 40*g + 61*h + 88*i)*x^6 + 33*(13*d + 16*e + 25*f + 40*g + 61*h + 88*i)*x^4 - 40*(13*d + 16*e + 25*f + 40*g + 61*h + 88*i)*x^2 + 208*d + 256*e + 400*f + 640*g + 976*h + 1408*i)*log(x - 1) + ((313*d + 512*e + 820*f + 1280*g + 1936*h + 2816*i)*x^8 - 10*(313*d + 512*e + 820*f + 1280*g + 1936*h + 2816*i)*x^6 + 33*(313*d + 512*e + 820*f + 1280*g + 1936*h + 2816*i)*x^4 - 40*(313*d + 512*e + 820*f + 1280*g + 1936*h + 2816*i)*x^2 + 5008*d + 8192*e + 13120*f + 20480*g + 30976*h + 45056*i)*log(x - 2) - 9600*e - 29184*g - 61440*i)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)

giac [A] time = 0.37, size = 257, normalized size = 1.08

$$-\frac{1}{41472} (313d + 820f - 1280g + 1936h - 2816i - 512e) \log(|x + 2|) + \frac{1}{1296} (13d + 25f - 40g + 61h - 88i - 16e) \log(|x + 1|) - \frac{1}{1296} (13d + 25f + 40g + 61h + 88i + 16e) \log(|x - 1|) + \frac{1}{41472} (313d + 820f + 1280g + 1936h + 2816i + 512e) \log(|x - 2|) + \frac{1}{3456} (35d + 140f - 224g + 280h - 352i - 112e)$$

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)/(x^4-5*x^2+4)^3,x, algorithm="giac")

[Out] -1/41472*(313*d + 820*f - 1280*g + 1936*h - 2816*i - 512*e)*log(abs(x + 2)) + 1/1296*(13*d + 25*f - 40*g + 61*h - 88*i - 16*e)*log(abs(x + 1)) - 1/1296*(13*d + 25*f + 40*g + 61*h + 88*i + 16*e)*log(abs(x - 1)) + 1/41472*(313*d + 820*f + 1280*g + 1936*h + 2816*i + 512*e)*log(abs(x - 2)) + 1/3456*(35*d + 140*f - 224*g + 280*h - 352*i - 112*e)

$$d*x^7 + 140*f*x^7 + 320*h*x^7 + 320*g*x^6 + 704*i*x^6 + 128*x^6*e - 234*d*x^5 - 1080*f*x^5 - 2448*h*x^5 - 2400*g*x^4 - 5280*i*x^4 - 960*x^4*e + 315*d*x^3 + 2268*f*x^3 + 5040*h*x^3 + 4800*g*x^2 + 9984*i*x^2 + 1920*x^2*e + 172*d*x - 1040*f*x - 2624*h*x - 2432*g - 5120*i - 800*e)/(x^4 - 5*x^2 + 4)^2$$

maple [B] time = 0.02, size = 554, normalized size = 2.32

$$\frac{11i \ln(x+2)}{162} - \frac{11i \ln(x-1)}{162} - \frac{11i \ln(x+1)}{162} + \frac{11i \ln(x-2)}{162} - \frac{121h \ln(x+2)}{2592} - \frac{61h \ln(x-1)}{1296} + \frac{61h \ln(x+1)}{1296} + \frac{121h \ln(x-2)}{1296}$$

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)/(x^4-5*x^2+4)^3,x)

[Out] 11/162*i*ln(x+2)-11/162*i*ln(x-1)-11/162*i*ln(x+1)+11/162*i*ln(x-2)-121/2592*h*ln(x+2)-61/1296*h*ln(x-1)+61/1296*h*ln(x+1)+121/2592*h*ln(x-2)-5/162*g*ln(x-1)+5/162*g*ln(x+2)+5/162*g*ln(x-2)-5/162*g*ln(x+1)-313/41472*d*ln(x+2)+1/81*e*ln(x+2)-1/81*e*ln(x-1)-13/1296*d*ln(x-1)-1/81*e*ln(x+1)+13/1296*d*ln(x+1)+313/41472*d*ln(x-2)+1/81*e*ln(x-2)+205/10368*f*ln(x-2)+25/1296*f*ln(x+1)-25/1296*f*ln(x-1)-205/10368*f*ln(x+2)-1/108/(x+2)^2*i+1/432/(x-1)^2*i+1/432/(x+1)^2*i-1/108/(x-2)^2*i+1/216/(x+2)^2*h+1/432/(x-1)^2*h-1/432/(x+1)^2*h-1/216/(x-2)^2*h-1/432/(x+2)^2*g+1/432/(x-1)^2*g+1/432/(x+1)^2*g-1/432/(x-2)^2*g-1/432/(x+1)^2*d+1/432/(x+1)^2*e+1/432/(x-1)^2*d+1/432/(x-1)^2*e+1/3456/(x+2)^2*d-1/1728/(x+2)^2*e+1/864/(x+2)^2*f+1/432/(x-1)^2*f-1/432/(x+1)^2*f-1/864/(x-2)^2*f-1/3456/(x-2)^2*d-1/1728/(x-2)^2*e-1/24/(x+2)*i-11/432/(x+1)*i+11/432/(x-1)*i+1/24/(x-2)*i+11/432/(x+2)*h+1/48/(x+1)*h+1/48/(x-1)*h+11/432/(x-2)*h-13/864/(x+2)*g-7/432/(x+1)*g+7/432/(x-1)*g+13/864/(x-2)*g+19/6912/(x+2)*d-17/3456/(x+2)*e+19/6912/(x-2)*d+17/3456/(x-2)*e+1/432/(x+1)*d-1/144/(x+1)*e+1/432/(x-1)*d+1/144/(x-1)*e+5/432/(x-1)*f+5/576/(x+2)*f+5/576/(x-2)*f+5/432/(x+1)*f

maxima [A] time = 1.12, size = 238, normalized size = 1.00

$$-\frac{1}{41472} (313d - 512e + 820f - 1280g + 1936h - 2816i) \log(x+2) + \frac{1}{1296} (13d - 16e + 25f - 40g + 61h - 88i) \log(x+1) - \frac{1}{1296} (13d + 16e + 25f + 40g + 61h + 88i) \log(x-1) + \frac{1}{41472} (313d + 512e + 820f + 1280g + 1936h + 2816i) \log(x-2) + \frac{1}{3456} (5(7d + 28f + 64h) * x^7 + 64(2e + 5g + 11i) * x^6 - 18(13d + 60f + 136h) * x^5 - 480(2e +$$

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)/(x^4-5*x^2+4)^3,x, algorithm="maxima")

[Out] -1/41472*(313*d - 512*e + 820*f - 1280*g + 1936*h - 2816*i)*log(x + 2) + 1/1296*(13*d - 16*e + 25*f - 40*g + 61*h - 88*i)*log(x + 1) - 1/1296*(13*d + 16*e + 25*f + 40*g + 61*h + 88*i)*log(x - 1) + 1/41472*(313*d + 512*e + 820*f + 1280*g + 1936*h + 2816*i)*log(x - 2) + 1/3456*(5*(7*d + 28*f + 64*h)*x^7 + 64*(2*e + 5*g + 11*i)*x^6 - 18*(13*d + 60*f + 136*h)*x^5 - 480*(2*e +

$5*g + 11*i)*x^4 + 63*(5*d + 36*f + 80*h)*x^3 + 192*(10*e + 25*g + 52*i)*x^2 + 4*(43*d - 260*f - 656*h)*x - 800*e - 2432*g - 5120*i)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)$

mupad [B] time = 0.62, size = 233, normalized size = 0.97

$$\ln(x+1) \left(\frac{13d}{1296} - \frac{e}{81} + \frac{25f}{1296} - \frac{5g}{162} + \frac{61h}{1296} - \frac{11i}{162} \right) - \ln(x-1) \left(\frac{13d}{1296} + \frac{e}{81} + \frac{25f}{1296} + \frac{5g}{162} + \frac{61h}{1296} + \frac{11i}{162} \right) - \frac{(-3)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(x^4 - 5*x^2 + 4)^3,x)`

[Out] `log(x + 1)*((13*d)/1296 - e/81 + (25*f)/1296 - (5*g)/162 + (61*h)/1296 - (11*i)/162) - log(x - 1)*((13*d)/1296 + e/81 + (25*f)/1296 + (5*g)/162 + (61*h)/1296 + (11*i)/162) - ((25*e)/108 + (19*g)/27 + (40*i)/27 + x*((65*f)/216 - (43*d)/864 + (41*h)/54) + x^5*((13*d)/192 + (5*f)/16 + (17*h)/24) - x^3*((35*d)/384 + (21*f)/32 + (35*h)/24) - x^7*((35*d)/3456 + (35*f)/864 + (5*h)/54) - x^2*((5*e)/9 + (25*g)/18 + (26*i)/9) - x^6*(e/27 + (5*g)/54 + (11*i)/54) + x^4*((5*e)/18 + (25*g)/36 + (55*i)/36))/(33*x^4 - 40*x^2 - 10*x^6 + x^8 + 16) + log(x - 2)*((313*d)/41472 + e/81 + (205*f)/10368 + (5*g)/162 + (121*h)/2592 + (11*i)/162) - log(x + 2)*((313*d)/41472 - e/81 + (205*f)/10368 - (5*g)/162 + (121*h)/2592 - (11*i)/162)`

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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)/(x**4-5*x**2+4)**3,x)`

[Out] Timed out

$$3.47 \quad \int \frac{d+ex}{(1+x^2+x^4)^3} dx$$

Optimal. Leaf size=185

$$-\frac{9}{32}d \log(x^2 - x + 1) + \frac{9}{32}d \log(x^2 + x + 1) + \frac{dx(2 - 7x^2)}{24(x^4 + x^2 + 1)} + \frac{dx(1 - x^2)}{12(x^4 + x^2 + 1)^2} - \frac{13d \tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{48\sqrt{3}} + \frac{13d \tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{48\sqrt{3}}$$

[Out] 1/12*d*x*(-x^2+1)/(x^4+x^2+1)^2+1/12*e*(2*x^2+1)/(x^4+x^2+1)^2+1/24*d*x*(-7*x^2+2)/(x^4+x^2+1)+1/6*e*(2*x^2+1)/(x^4+x^2+1)-9/32*d*ln(x^2-x+1)+9/32*d*ln(x^2+x+1)-13/144*d*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+13/144*d*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+2/9*e*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)

Rubi [A] time = 0.12, antiderivative size = 185, normalized size of antiderivative = 1.00, number of steps used = 19, number of rules used = 11, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.688$, Rules used = {1673, 12, 1092, 1178, 1169, 634, 618, 204, 628, 1107, 614}

$$\frac{dx(2 - 7x^2)}{24(x^4 + x^2 + 1)} + \frac{dx(1 - x^2)}{12(x^4 + x^2 + 1)^2} - \frac{9}{32}d \log(x^2 - x + 1) + \frac{9}{32}d \log(x^2 + x + 1) - \frac{13d \tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{48\sqrt{3}} + \frac{13d \tan^{-1}\left(\frac{1+2x}{\sqrt{3}}\right)}{48\sqrt{3}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x)/(1 + x^2 + x^4)^3, x]

[Out] (d*x*(1 - x^2))/(12*(1 + x^2 + x^4)^2) + (e*(1 + 2*x^2))/(12*(1 + x^2 + x^4)^2) + (d*x*(2 - 7*x^2))/(24*(1 + x^2 + x^4)) + (e*(1 + 2*x^2))/(6*(1 + x^2 + x^4)) - (13*d*ArcTan[(1 - 2*x)/Sqrt[3]])/(48*Sqrt[3]) + (13*d*ArcTan[(1 + 2*x)/Sqrt[3]])/(48*Sqrt[3]) + (2*e*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - (9*d*Log[1 - x + x^2])/32 + (9*d*Log[1 + x + x^2])/32

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_) /; FreeQ[b, x]]

Rule 204

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])

Rule 614

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p + 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 628

Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := Simp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[2*c*d - b*e, 0]

Rule 634

Int[((d_.) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]

Rule 1092

Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := -Simp[(x*(b^2 - 2*a*c + b*c*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(b^2 - 2*a*c + 2*(p + 1)*(b^2 - 4*a*c) + b*c*(4*p + 7)*x^2)*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && IntegerQ[2*p]

Rule 1107

Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2, Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]

Rule 1169

Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] := With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r + (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ

$[b^2 - 4ac, 0] \ \&\& \ \text{NeQ}[c^2d^2 - b^2de + a^2e^2, 0] \ \&\& \ \text{NegQ}[b^2 - 4ac]$

Rule 1178

$\text{Int}[\{(d) + (e)(x)^2\} \{(a) + (b)(x)^2 + (c)(x)^4\}^{(p)}, x_{\text{Symbol}}] \rightarrow \text{Simp}[(x(a b e - d(b^2 - 2ac) - c(bd - 2ae)x^2)(a + b x^2 + c x^4)^{(p+1)}) / (2a(p+1)(b^2 - 4ac)), x] + \text{Dist}[1 / (2a(p+1)(b^2 - 4ac)), \text{Int}[\text{Simp}[(2p+3)d b^2 - a b e - 2ac d(4p+5) + (4p+7)(d b - 2ae)c x^2, x](a + b x^2 + c x^4)^{(p+1)}, x], x] /;$ $\text{FreeQ}\{a, b, c, d, e, x\} \ \&\& \ \text{NeQ}[b^2 - 4ac, 0] \ \&\& \ \text{NeQ}[c^2d^2 - b^2de + a^2e^2, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{IntegerQ}[2p]$

Rule 1673

$\text{Int}[(Pq) \{(a) + (b)(x)^2 + (c)(x)^4\}^{(p)}, x_{\text{Symbol}}] \rightarrow \text{Module}\{q = \text{Expon}[Pq, x], k\}, \text{Int}[\text{Sum}[\text{Coeff}[Pq, x, 2k] x^{(2k)}, \{k, 0, q/2\}](a + b x^2 + c x^4)^p, x] + \text{Int}[x \text{Sum}[\text{Coeff}[Pq, x, 2k+1] x^{(2k)}, \{k, 0, (q-1)/2\}](a + b x^2 + c x^4)^p, x]] /;$ $\text{FreeQ}\{a, b, c, p, x\} \ \&\& \ \text{PolyQ}[Pq, x] \ \&\& \ !\text{PolyQ}[Pq, x^2]$

Rubi steps

$$\begin{aligned}
\int \frac{d+ex}{(1+x^2+x^4)^3} dx &= \int \frac{d}{(1+x^2+x^4)^3} dx + \int \frac{ex}{(1+x^2+x^4)^3} dx \\
&= d \int \frac{1}{(1+x^2+x^4)^3} dx + e \int \frac{x}{(1+x^2+x^4)^3} dx \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{1}{12}d \int \frac{11-5x^2}{(1+x^2+x^4)^2} dx + \frac{1}{2}e \text{Subst} \left(\int \frac{1}{(1+x+x^2)^3} dx, x, x^2 \right) \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{1}{72}d \int \frac{60-21x^2}{1+x^2+x^4} dx + \frac{1}{2}eS \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{1}{144}d \int \frac{60}{1- \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{1}{96}(13d) \int \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{2e \tan^{-1} \left(\frac{1}{\sqrt{3}} \right)}{3\sqrt{3}} \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} - \frac{13d \tan^{-1} \left(\frac{1}{\sqrt{3}} \right)}{48\sqrt{3}}
\end{aligned}$$

Mathematica [C] time = 0.75, size = 186, normalized size = 1.01

$$\frac{1}{144} \left(\frac{6(dx(2-7x^2) + e(8x^2+4))}{x^4+x^2+1} + \frac{12(d(x-x^3) + 2ex^2 + e)}{(x^4+x^2+1)^2} - \frac{(7\sqrt{3}-47i)d \tan^{-1} \left(\frac{1}{2}(\sqrt{3}-i)x \right)}{\sqrt{\frac{1}{6}(1+i\sqrt{3})}} - \frac{(7\sqrt{3}-47i)e \tan^{-1} \left(\frac{1}{2}(\sqrt{3}-i)x \right)}{\sqrt{\frac{1}{6}(1+i\sqrt{3})}} \right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x)/(1 + x^2 + x^4)^3, x]

[Out] ((6*(d*x*(2 - 7*x^2) + e*(4 + 8*x^2)))/(1 + x^2 + x^4) + (12*(e + 2*e*x^2 + d*(x - x^3)))/(1 + x^2 + x^4)^2 - ((-47*I + 7*Sqrt[3])*d*ArcTan[((-I + Sqrt[3])*x)/2])/Sqrt[(1 + I*Sqrt[3])/6] - ((47*I + 7*Sqrt[3])*d*ArcTan[((I + Sqrt[3])*x)/2])/Sqrt[(1 - I*Sqrt[3])/6] - 32*Sqrt[3]*e*ArcTan[Sqrt[3]/(1 + 2*x^2)]/144

fricas [A] time = 0.73, size = 278, normalized size = 1.50

$$84 dx^7 - 96 ex^6 + 60 dx^5 - 144 ex^4 + 84 dx^3 - 192 ex^2 - 2\sqrt{3}((13d - 32e)x^8 + 2(13d - 32e)x^6 + 3(13d - 32e)x^4 + 2(13d - 32e)x^2 + 13d - 32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) - 2\sqrt{3}((13d + 32e)x^8 + 2(13d + 32e)x^6 + 3(13d + 32e)x^4 + 2(13d + 32e)x^2 + 13d + 32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) - 48dx - 81(d*x^8 + 2*d*x^6 + 3*d*x^4 + 2*d*x^2 + d)\log(x^2 + x + 1) + 81(d*x^8 + 2*d*x^6 + 3*d*x^4 + 2*d*x^2 + d)\log(x^2 - x + 1) - 72e/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x^4+x^2+1)^3,x, algorithm="fricas")

[Out] $-1/288*(84*d*x^7 - 96*e*x^6 + 60*d*x^5 - 144*e*x^4 + 84*d*x^3 - 192*e*x^2 - 2*\sqrt{3}*((13*d - 32*e)*x^8 + 2*(13*d - 32*e)*x^6 + 3*(13*d - 32*e)*x^4 + 2*(13*d - 32*e)*x^2 + 13*d - 32*e)*\arctan(1/3*\sqrt{3}*(2*x + 1)) - 2*\sqrt{3}((13*d + 32*e)*x^8 + 2*(13*d + 32*e)*x^6 + 3*(13*d + 32*e)*x^4 + 2*(13*d + 32*e)*x^2 + 13*d + 32*e)*\arctan(1/3*\sqrt{3}*(2*x - 1)) - 48*d*x - 81*(d*x^8 + 2*d*x^6 + 3*d*x^4 + 2*d*x^2 + d)*\log(x^2 + x + 1) + 81*(d*x^8 + 2*d*x^6 + 3*d*x^4 + 2*d*x^2 + d)*\log(x^2 - x + 1) - 72*e/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)$

giac [A] time = 0.36, size = 131, normalized size = 0.71

$$\frac{1}{144}\sqrt{3}(13d - 32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{144}\sqrt{3}(13d + 32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{9}{32}d\log(x^2 + x + 1) - \frac{9}{32}d\log(x^2 - x + 1) - \frac{1}{24}(7d*x^7 - 8*x^6*e + 5d*x^5 - 12*x^4*e + 7d*x^3 - 16*x^2*e - 4d*x - 6e)/(x^4 + x^2 + 1)^2$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x^4+x^2+1)^3,x, algorithm="giac")

[Out] $1/144*\sqrt{3}*(13*d - 32*e)*\arctan(1/3*\sqrt{3}*(2*x + 1)) + 1/144*\sqrt{3}*(13*d + 32*e)*\arctan(1/3*\sqrt{3}*(2*x - 1)) + 9/32*d*\log(x^2 + x + 1) - 9/32*d*\log(x^2 - x + 1) - 1/24*(7*d*x^7 - 8*x^6*e + 5*d*x^5 - 12*x^4*e + 7*d*x^3 - 16*x^2*e - 4*d*x - 6*e)/(x^4 + x^2 + 1)^2$

maple [A] time = 0.02, size = 180, normalized size = 0.97

$$\frac{13\sqrt{3}d\arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144} + \frac{13\sqrt{3}d\arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144} - \frac{9d\ln(x^2 - x + 1)}{32} + \frac{9d\ln(x^2 + x + 1)}{32} - \frac{2\sqrt{3}e\arctan\left(\frac{2x-1}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x+d)/(x^4+x^2+1)^3,x)

[Out] $1/16*((-7/3*d-4/3*e)*x^3-6*d*x^2+(-20/3*d+1/3*e)*x-4*d+2*e)/(x^2+x+1)^2+9/32*d*\ln(x^2+x+1)+13/144*3^(1/2)*d*\arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*$

$$\arctan(1/3*(2*x+1)*3^{(1/2)})-1/16*((7/3*d-4/3*e)*x^3-6*d*x^2+(20/3*d+1/3*e)*x-4*d-2*e)/(x^2-x+1)^2-9/32*d*\ln(x^2-x+1)+13/144*3^{(1/2)}*d*\arctan(1/3*(2*x-1)*3^{(1/2)})+2/9*3^{(1/2)}*e*\arctan(1/3*(2*x-1)*3^{(1/2)})$$

maxima [A] time = 2.55, size = 137, normalized size = 0.74

$$\frac{1}{144} \sqrt{3} (13d - 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{9}{32} d \log(x^2 + x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x^4+x^2+1)^3,x, algorithm="maxima")

[Out] 1/144*sqrt(3)*(13*d - 32*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/144*sqrt(3)*(13*d + 32*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 9/32*d*log(x^2 + x + 1) - 9/32*d*log(x^2 - x + 1) - 1/24*(7*d*x^7 - 8*e*x^6 + 5*d*x^5 - 12*e*x^4 + 7*d*x^3 - 16*e*x^2 - 4*d*x - 6*e)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)

mupad [B] time = 0.26, size = 185, normalized size = 1.00

$$\frac{-\frac{7dx^7}{24} + \frac{ex^6}{3} - \frac{5dx^5}{24} + \frac{ex^4}{2} - \frac{7dx^3}{24} + \frac{2ex^2}{3} + \frac{dx}{6} + \frac{e}{4}}{x^8 + 2x^6 + 3x^4 + 2x^2 + 1} - \ln\left(x - \frac{1}{2} - \frac{\sqrt{3}i}{2}\right) \left(\frac{9d}{32} + \frac{\sqrt{3}d13i}{288} + \frac{\sqrt{3}e1i}{9}\right) + \ln\left(x + \frac{1}{2} - \frac{\sqrt{3}i}{2}\right) \left(\frac{9d}{32} + \frac{\sqrt{3}d13i}{288} + \frac{\sqrt{3}e1i}{9}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x)/(x^2 + x^4 + 1)^3,x)

[Out] (e/4 + (d*x)/6 - (7*d*x^3)/24 - (5*d*x^5)/24 - (7*d*x^7)/24 + (2*e*x^2)/3 + (e*x^4)/2 + (e*x^6)/3)/(2*x^2 + 3*x^4 + 2*x^6 + x^8 + 1) - log(x - (3^(1/2)*1i)/2 - 1/2)*((9*d)/32 + (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9) + log(x - (3^(1/2)*1i)/2 + 1/2)*((9*d)/32 - (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9) + log(x + (3^(1/2)*1i)/2 - 1/2)*((3^(1/2)*d*13i)/288 - (9*d)/32 + (3^(1/2)*e*1i)/9) + log(x + (3^(1/2)*1i)/2 + 1/2)*((9*d)/32 + (3^(1/2)*d*13i)/288 - (3^(1/2)*e*1i)/9)

sympy [C] time = 3.62, size = 1103, normalized size = 5.96

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x**4+x**2+1)**3,x)

[Out] (-9*d/32 - sqrt(3)*I*(13*d + 32*e)/288)*log(x + (-1025428432*d**4*e - 334752912*d**4*(-9*d/32 - sqrt(3)*I*(13*d + 32*e)/288) - 431308800*d**2*e**3 - 3143688192*d**2*e**2*(-9*d/32 - sqrt(3)*I*(13*d + 32*e)/288) + 9917005824*d*

$$\begin{aligned}
& *2*e*(-9*d/32 - \sqrt{3}*I*(13*d + 32*e)/288)**2 + 11878244352*d**2*(-9*d/32 \\
& - \sqrt{3}*I*(13*d + 32*e)/288)**3 + 142606336*e**5 + 754974720*e**4*(-9*d/ \\
& 32 - \sqrt{3}*I*(13*d + 32*e)/288) + 3850371072*e**3*(-9*d/32 - \sqrt{3}*I*(1 \\
& 3*d + 32*e)/288)**2 + 20384317440*e**2*(-9*d/32 - \sqrt{3}*I*(13*d + 32*e)/2 \\
& 88)**3)/(217696167*d**5 - 1217128448*d**3*e**2 - 617611264*d*e**4)) + (-9*d \\
& /32 + \sqrt{3}*I*(13*d + 32*e)/288)*\log(x + (-1025428432*d**4*e - 334752912* \\
& d**4*(-9*d/32 + \sqrt{3}*I*(13*d + 32*e)/288) - 431308800*d**2*e**3 - 314368 \\
& 8192*d**2*e**2*(-9*d/32 + \sqrt{3}*I*(13*d + 32*e)/288) + 9917005824*d**2*e* \\
& (-9*d/32 + \sqrt{3}*I*(13*d + 32*e)/288)**2 + 11878244352*d**2*(-9*d/32 + \sqrt{3} \\
& *I*(13*d + 32*e)/288)**3 + 142606336*e**5 + 754974720*e**4*(-9*d/32 + \\
& \sqrt{3}*I*(13*d + 32*e)/288) + 3850371072*e**3*(-9*d/32 + \sqrt{3}*I*(13*d + \\
& 32*e)/288)**2 + 20384317440*e**2*(-9*d/32 + \sqrt{3}*I*(13*d + 32*e)/288)** \\
& 3)/(217696167*d**5 - 1217128448*d**3*e**2 - 617611264*d*e**4)) + (9*d/32 - \\
& \sqrt{3}*I*(13*d - 32*e)/288)*\log(x + (-1025428432*d**4*e - 334752912*d**4*(\\
& 9*d/32 - \sqrt{3}*I*(13*d - 32*e)/288) - 431308800*d**2*e**3 - 3143688192*d* \\
& *2*e**2*(9*d/32 - \sqrt{3}*I*(13*d - 32*e)/288) + 9917005824*d**2*e*(9*d/32 \\
& - \sqrt{3}*I*(13*d - 32*e)/288)**2 + 11878244352*d**2*(9*d/32 - \sqrt{3}*I*(1 \\
& 3*d - 32*e)/288)**3 + 142606336*e**5 + 754974720*e**4*(9*d/32 - \sqrt{3}*I*(\\
& 13*d - 32*e)/288) + 3850371072*e**3*(9*d/32 - \sqrt{3}*I*(13*d - 32*e)/288)* \\
& *2 + 20384317440*e**2*(9*d/32 - \sqrt{3}*I*(13*d - 32*e)/288)**3)/(217696167 \\
& *d**5 - 1217128448*d**3*e**2 - 617611264*d*e**4)) + (9*d/32 + \sqrt{3}*I*(13 \\
& *d - 32*e)/288)*\log(x + (-1025428432*d**4*e - 334752912*d**4*(9*d/32 + \sqrt{3} \\
& (3)*I*(13*d - 32*e)/288) - 431308800*d**2*e**3 - 3143688192*d**2*e**2*(9*d/ \\
& 32 + \sqrt{3}*I*(13*d - 32*e)/288) + 9917005824*d**2*e*(9*d/32 + \sqrt{3}*I*(\\
& 13*d - 32*e)/288)**2 + 11878244352*d**2*(9*d/32 + \sqrt{3}*I*(13*d - 32*e)/2 \\
& 88)**3 + 142606336*e**5 + 754974720*e**4*(9*d/32 + \sqrt{3}*I*(13*d - 32*e)/ \\
& 288) + 3850371072*e**3*(9*d/32 + \sqrt{3}*I*(13*d - 32*e)/288)**2 + 20384317 \\
& 440*e**2*(9*d/32 + \sqrt{3}*I*(13*d - 32*e)/288)**3)/(217696167*d**5 - 12171 \\
& 28448*d**3*e**2 - 617611264*d*e**4)) + (-7*d*x**7 - 5*d*x**5 - 7*d*x**3 + 4 \\
& *d*x + 8*e*x**6 + 12*e*x**4 + 16*e*x**2 + 6*e)/(24*x**8 + 48*x**6 + 72*x**4 \\
& + 48*x**2 + 24)
\end{aligned}$$

$$3.48 \quad \int \frac{d+ex+fx^2}{(1+x^2+x^4)^3} dx$$

Optimal. Leaf size=223

$$-\frac{1}{32}(9d-4f)\log(x^2-x+1)+\frac{1}{32}(9d-4f)\log(x^2+x+1)+\frac{x(-7x^2(d-f)+2d+3f)}{24(x^4+x^2+1)}+\frac{x(-(x^2(d-2f))+d+)}{12(x^4+x^2+1)^2}$$

[Out] 1/12*e*(2*x^2+1)/(x^4+x^2+1)^2+1/12*x*(d+f-(d-2*f)*x^2)/(x^4+x^2+1)^2+1/6*e*(2*x^2+1)/(x^4+x^2+1)+1/24*x*(2*d+3*f-7*(d-f)*x^2)/(x^4+x^2+1)-1/32*(9*d-4*f)*ln(x^2-x+1)+1/32*(9*d-4*f)*ln(x^2+x+1)-1/144*(13*d+2*f)*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/144*(13*d+2*f)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+2/9*e*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)

Rubi [A] time = 0.21, antiderivative size = 223, normalized size of antiderivative = 1.00, number of steps used = 18, number of rules used = 10, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.476$, Rules used = {1673, 1178, 1169, 634, 618, 204, 628, 12, 1107, 614}

$$\frac{x(-7x^2(d-f)+2d+3f)}{24(x^4+x^2+1)}+\frac{x(x^2(-(d-2f))+d+f)}{12(x^4+x^2+1)^2}-\frac{1}{32}(9d-4f)\log(x^2-x+1)+\frac{1}{32}(9d-4f)\log(x^2+x+1)$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2)/(1 + x^2 + x^4)^3, x]

[Out] (e*(1 + 2*x^2))/(12*(1 + x^2 + x^4)^2) + (x*(d + f - (d - 2*f)*x^2))/(12*(1 + x^2 + x^4)^2) + (e*(1 + 2*x^2))/(6*(1 + x^2 + x^4)) + (x*(2*d + 3*f - 7*(d - f)*x^2))/(24*(1 + x^2 + x^4)) - ((13*d + 2*f)*ArcTan[(1 - 2*x)/Sqrt[3]])/(48*Sqrt[3]) + ((13*d + 2*f)*ArcTan[(1 + 2*x)/Sqrt[3]])/(48*Sqrt[3]) + (2*e*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - ((9*d - 4*f)*Log[1 - x + x^2])/32 + ((9*d - 4*f)*Log[1 + x + x^2])/32

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 204

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])

Rule 614

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p + 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 628

Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := Simp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[2*c*d - b*e, 0]

Rule 634

Int[((d_) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]

Rule 1107

Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2, Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]

Rule 1169

Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] := With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r + (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]

Rule 1178

Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*x^4)^(p + 1), x], x]

- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && LtQ[p, -1] && IntegerQ[2*p]

Rule 1673

Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :> Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]

Rubi steps

$$\begin{aligned}
 \int \frac{d + ex + fx^2}{(1 + x^2 + x^4)^3} dx &= \int \frac{ex}{(1 + x^2 + x^4)^3} dx + \int \frac{d + fx^2}{(1 + x^2 + x^4)^3} dx \\
 &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12} \int \frac{11d - f - 5(d - 2f)x^2}{(1 + x^2 + x^4)^2} dx + e \int \frac{x}{(1 + x^2 + x^4)^3} dx \\
 &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} + \frac{1}{72} \int \frac{15(4d - f) - 21(d - f)x^2}{1 + x^2 + x^4} dx + \\
 &= \frac{e(1 + 2x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} + \frac{1}{144} \int \frac{15(4d - f) - 21(d - f)x^2}{1 + x^2 + x^4} dx \\
 &= \frac{e(1 + 2x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\
 &= \frac{e(1 + 2x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\
 &= \frac{e(1 + 2x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e(1 + 2x^2)}{6(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)}
 \end{aligned}$$

Mathematica [C] time = 0.59, size = 235, normalized size = 1.05

$$\frac{1}{144} \left(\frac{12(x(-dx^2 + d + 2fx^2 + f) + 2ex^2 + e)}{(x^4 + x^2 + 1)^2} + \frac{6(-7dx^3 + 2dx + e(8x^2 + 4) + 7fx^3 + 3fx)}{x^4 + x^2 + 1} - \frac{((7\sqrt{3} - 47i)}{144} \right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x + f*x^2)/(1 + x^2 + x^4)^3,x]

[Out] ((6*(2*d*x + 3*f*x - 7*d*x^3 + 7*f*x^3 + e*(4 + 8*x^2)))/(1 + x^2 + x^4) + (12*(e + 2*e*x^2 + x*(d + f - d*x^2 + 2*f*x^2)))/(1 + x^2 + x^4)^2 - (((-47*I + 7*Sqrt[3])*d + (17*I - 7*Sqrt[3])*f)*ArcTan[(-I + Sqrt[3])*x/2])/Sqrt[(1 + I*Sqrt[3])/6] - (((47*I + 7*Sqrt[3])*d - (17*I + 7*Sqrt[3])*f)*ArcTan[(I + Sqrt[3])*x/2])/Sqrt[(1 - I*Sqrt[3])/6] - 32*Sqrt[3]*e*ArcTan[Sqrt[3]/(1 + 2*x^2)]/144

fricas [A] time = 0.89, size = 384, normalized size = 1.72

$$\frac{84(d-f)x^7 - 96ex^6 + 60(d-2f)x^5 - 144ex^4 + 84(d-2f)x^3 - 192ex^2 - 2\sqrt{3}((13d-32e+2f)x^8 + 2($$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="fricas")

[Out] -1/288*(84*(d - f)*x^7 - 96*e*x^6 + 60*(d - 2*f)*x^5 - 144*e*x^4 + 84*(d - 2*f)*x^3 - 192*e*x^2 - 2*sqrt(3)*((13*d - 32*e + 2*f)*x^8 + 2*(13*d - 32*e + 2*f)*x^6 + 3*(13*d - 32*e + 2*f)*x^4 + 2*(13*d - 32*e + 2*f)*x^2 + 13*d - 32*e + 2*f)*arctan(1/3*sqrt(3)*(2*x + 1)) - 2*sqrt(3)*((13*d + 32*e + 2*f)*x^8 + 2*(13*d + 32*e + 2*f)*x^6 + 3*(13*d + 32*e + 2*f)*x^4 + 2*(13*d + 32*e + 2*f)*x^2 + 13*d + 32*e + 2*f)*arctan(1/3*sqrt(3)*(2*x - 1)) - 12*(4*d + 5*f)*x - 9*((9*d - 4*f)*x^8 + 2*(9*d - 4*f)*x^6 + 3*(9*d - 4*f)*x^4 + 2*(9*d - 4*f)*x^2 + 9*d - 4*f)*log(x^2 + x + 1) + 9*((9*d - 4*f)*x^8 + 2*(9*d - 4*f)*x^6 + 3*(9*d - 4*f)*x^4 + 2*(9*d - 4*f)*x^2 + 9*d - 4*f)*log(x^2 - x + 1) - 72*e)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)

giac [A] time = 0.37, size = 171, normalized size = 0.77

$$\frac{1}{144} \sqrt{3} (13d + 2f - 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 2f + 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{32} (9d$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="giac")

[Out] $\frac{1}{144}\sqrt{3}(13d + 2f - 32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{144}\sqrt{3}(13d + 2f + 32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{1}{32}(9d - 4f)\log(x^2 + x + 1) - \frac{1}{32}(9d - 4f)\log(x^2 - x + 1) - \frac{1}{24}(7d*x^7 - 7f*x^7 - 8*x^6*e + 5*d*x^5 - 10*f*x^5 - 12*x^4*e + 7*d*x^3 - 14*f*x^3 - 16*x^2*e - 4*d*x - 5*f*x - 6*e)/(x^4 + x^2 + 1)^2$

maple [A] time = 0.02, size = 264, normalized size = 1.18

$$\frac{13\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144} + \frac{13\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144} - \frac{9d \ln(x^2 - x + 1)}{32} + \frac{9d \ln(x^2 + x + 1)}{32} - \frac{2\sqrt{3} e \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((f*x^2+e*x+d)/(x^4+x^2+1)^3,x)`

[Out] $\frac{1}{16} * ((-7/3*d+7/3*f-4/3*e)*x^3 + (-6*d+4*f)*x^2 + (-20/3*d+13/3*f+1/3*e)*x - 4*d + 4/3*f+2*e)/(x^2+x+1)^2 + 9/32*d*\ln(x^2+x+1) - 1/8*f*\ln(x^2+x+1) + 13/144*3^{(1/2)}*d*\arctan(1/3*(2*x+1)*3^{(1/2)}) - 2/9*3^{(1/2)}*e*\arctan(1/3*(2*x+1)*3^{(1/2)}) + 1/7*2*3^{(1/2)}*f*\arctan(1/3*(2*x+1)*3^{(1/2)}) - 1/16 * ((7/3*d-7/3*f-4/3*e)*x^3 + (-6*d+4*f)*x^2 + (20/3*d-13/3*f+1/3*e)*x - 4*d + 4/3*f-2*e)/(x^2-x+1)^2 - 9/32*d*\ln(x^2-x+1) + 1/8*f*\ln(x^2-x+1) + 13/144*3^{(1/2)}*d*\arctan(1/3*(2*x-1)*3^{(1/2)}) + 2/9*3^{(1/2)}*e*\arctan(1/3*(2*x-1)*3^{(1/2)}) + 1/72*3^{(1/2)}*f*\arctan(1/3*(2*x-1)*3^{(1/2)})$

maxima [A] time = 2.57, size = 173, normalized size = 0.78

$$\frac{1}{144} \sqrt{3} (13d - 32e + 2f) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 32e + 2f) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{32} (9d - 4f) \log(x^2 + x + 1) - \frac{1}{32} (9d - 4f) \log(x^2 - x + 1) - \frac{1}{24} (7d*x^7 - 7f*x^7 - 8*x^6*e + 5*(d - 2*f)*x^5 - 12*e*x^4 + 7*(d - 2*f)*x^3 - 16*e*x^2 - (4*d + 5*f)*x - 6*e)/(x^4 + x^2 + 1)^2$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="maxima")`

[Out] $\frac{1}{144}\sqrt{3}(13d - 32e + 2f)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{144}\sqrt{3}(13d + 32e + 2f)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{1}{32}(9d - 4f)\log(x^2 + x + 1) - \frac{1}{32}(9d - 4f)\log(x^2 - x + 1) - \frac{1}{24}(7*(d - f)*x^7 - 8*e*x^6 + 5*(d - 2*f)*x^5 - 12*e*x^4 + 7*(d - 2*f)*x^3 - 16*e*x^2 - (4*d + 5*f)*x - 6*e)/(x^4 + x^2 + 1)^2$

mupad [B] time = 1.01, size = 249, normalized size = 1.12

$$\frac{\left(\frac{7f}{24} - \frac{7d}{24}\right)x^7 + \frac{ex^6}{3} + \left(\frac{5f}{12} - \frac{5d}{24}\right)x^5 + \frac{ex^4}{2} + \left(\frac{7f}{12} - \frac{7d}{24}\right)x^3 + \frac{2ex^2}{3} + \left(\frac{d}{6} + \frac{5f}{24}\right)x + \frac{e}{4}}{x^8 + 2x^6 + 3x^4 + 2x^2 + 1} - \ln\left(x - \frac{1}{2} - \frac{\sqrt{3} \operatorname{li}}{2}\right) \left(\frac{9d}{32} - \frac{f}{8}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((d + e*x + f*x^2)/(x^2 + x^4 + 1)^3,x)
```

```
[Out] (e/4 - x^5*((5*d)/24 - (5*f)/12) - x^3*((7*d)/24 - (7*f)/12) - x^7*((7*d)/24 - (7*f)/24) + (2*e*x^2)/3 + (e*x^4)/2 + (e*x^6)/3 + x*(d/6 + (5*f)/24))/((2*x^2 + 3*x^4 + 2*x^6 + x^8 + 1) - log(x - (3^(1/2)*1i)/2 - 1/2)*((9*d)/32 - f/8 + (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144) - log(x - (3^(1/2)*1i)/2 + 1/2)*(f/8 - (9*d)/32 + (3^(1/2)*d*13i)/288 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144) + log(x + (3^(1/2)*1i)/2 - 1/2)*(f/8 - (9*d)/32 + (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144) + log(x + (3^(1/2)*1i)/2 + 1/2)*((9*d)/32 - f/8 + (3^(1/2)*d*13i)/288 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144)
```

```
sympy [C] time = 117.11, size = 4496, normalized size = 20.16
```

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)/(x**4+x**2+1)**3,x)
```

```
[Out] (-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)*log(x + (-1025428432*d**5*e - 334752912*d**5*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) + 2008961360*d**4*e*f + 1151575920*d**4*f*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 431308800*d**3*e**3 - 3143688192*d**3*e**2*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 1598857120*d**3*e*f**2 + 9917005824*d**3*e*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**2 - 944300160*d**3*f**2*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) + 11878244352*d**3*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**3 + 233164800*d**2*e**3*f + 4409634816*d**2*e**2*f*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) + 662937520*d**2*e*f**3 - 13004623872*d**2*e*f*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**2 + 231796080*d**2*f**3*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 10089639936*d**2*f*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**3 + 142606336*d*e**5 + 754974720*d*e**4*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 1843200*d*e**3*f**2 + 3850371072*d*e**3*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**2 - 1926291456*d*e**2*f**2*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) + 20384317440*d*e**2*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**3 - 146756960*d*e*f**4 + 5813379072*d*e*f**2*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**2 + 12679200*d*f**4*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) + 1116758016*d*f**2*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**3 - 79691776*e**5*f - 188743680*e**4*f*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 7372800*e**3*f**3 - 2151677952*e**3*f*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288)**2 + 287096832*e**2*f**3*(-9*d/32 + f/8 - sqrt(3)*I*(13*d + 32*e + 2*f)/288) - 5096079360*e**2*
```

$$\begin{aligned}
& f*(-9*d/32 + f/8 - \sqrt{3}*I*(13*d + 32*e + 2*f)/288)**3 + 14093632*e*f**5 \\
& - 859521024*e*f**3*(-9*d/32 + f/8 - \sqrt{3}*I*(13*d + 32*e + 2*f)/288)**2 - \\
& 7648128*f**5*(-9*d/32 + f/8 - \sqrt{3}*I*(13*d + 32*e + 2*f)/288) + 4538695 \\
& 68*f**3*(-9*d/32 + f/8 - \sqrt{3}*I*(13*d + 32*e + 2*f)/288)**3)/(217696167* \\
& d**6 - 301346487*d**5*f - 1217128448*d**4*e**2 + 130506255*d**4*f**2 + 2181 \\
& 281792*d**3*e**2*f - 5619240*d**3*f**3 - 617611264*d**2*e**4 - 1450149888*d \\
& **2*e**2*f**2 - 8036820*d**2*f**4 + 495976448*d*e**4*f + 430088192*d*e**2*f \\
& **3 + 783648*d*f**5 - 114294784*e**4*f**2 - 47771648*e**2*f**4 + 188352*f** \\
& 6)) + (-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288)*\log(x + (-1025428 \\
& 432*d**5*e - 334752912*d**5*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/ \\
& 288) + 2008961360*d**4*e*f + 1151575920*d**4*f*(-9*d/32 + f/8 + \sqrt{3}*I*(\\
& 13*d + 32*e + 2*f)/288) - 431308800*d**3*e**3 - 3143688192*d**3*e**2*(-9*d/ \\
& 32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288) - 1598857120*d**3*e*f**2 + 99 \\
& 17005824*d**3*e*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288)**2 - 94 \\
& 4300160*d**3*f**2*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288) + 118 \\
& 78244352*d**3*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288)**3 + 2331 \\
& 64800*d**2*e**3*f + 4409634816*d**2*e**2*f*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d \\
& + 32*e + 2*f)/288) + 662937520*d**2*e*f**3 - 13004623872*d**2*e*f*(-9*d/32 \\
& + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288)**2 + 231796080*d**2*f**3*(-9*d/ \\
& 32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288) - 10089639936*d**2*f*(-9*d/32 \\
& + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288)**3 + 142606336*d*e**5 + 7549747 \\
& 20*d*e**4*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288) - 1843200*d*e \\
& **3*f**2 + 3850371072*d*e**3*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f) \\
& /288)**2 - 1926291456*d*e**2*f**2*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + \\
& 2*f)/288) + 20384317440*d*e**2*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2 \\
& *f)/288)**3 - 146756960*d*e*f**4 + 5813379072*d*e*f**2*(-9*d/32 + f/8 + \sqrt{3} \\
& *I*(13*d + 32*e + 2*f)/288)**2 + 12679200*d*f**4*(-9*d/32 + f/8 + \sqrt{3} \\
& *I*(13*d + 32*e + 2*f)/288) + 1116758016*d*f**2*(-9*d/32 + f/8 + \sqrt{3}* \\
& I*(13*d + 32*e + 2*f)/288)**3 - 79691776*e**5*f - 188743680*e**4*f*(-9*d/32 \\
& + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288) - 7372800*e**3*f**3 - 215167795 \\
& 2*e**3*f*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288)**2 + 287096832 \\
& *e**2*f**3*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288) - 5096079360 \\
& *e**2*f*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288)**3 + 14093632*e \\
& *f**5 - 859521024*e*f**3*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288 \\
&)**2 - 7648128*f**5*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288) + 4 \\
& 53869568*f**3*(-9*d/32 + f/8 + \sqrt{3}*I*(13*d + 32*e + 2*f)/288)**3)/(2176 \\
& 96167*d**6 - 301346487*d**5*f - 1217128448*d**4*e**2 + 130506255*d**4*f**2 \\
& + 2181281792*d**3*e**2*f - 5619240*d**3*f**3 - 617611264*d**2*e**4 - 145014 \\
& 9888*d**2*e**2*f**2 - 8036820*d**2*f**4 + 495976448*d*e**4*f + 430088192*d* \\
& e**2*f**3 + 783648*d*f**5 - 114294784*e**4*f**2 - 47771648*e**2*f**4 + 1883 \\
& 52*f**6)) + (9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)*\log(x + (-10 \\
& 25428432*d**5*e - 334752912*d**5*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2 \\
& *f)/288) + 2008961360*d**4*e*f + 1151575920*d**4*f*(9*d/32 - f/8 - \sqrt{3}* \\
& I*(13*d - 32*e + 2*f)/288) - 431308800*d**3*e**3 - 3143688192*d**3*e**2*(9* \\
& d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288) - 1598857120*d**3*e*f**2 +
\end{aligned}$$

$$\begin{aligned}
& 9917005824*d**3*e*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**2 - 9 \\
& 44300160*d**3*f**2*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288) + 118 \\
& 78244352*d**3*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**3 + 23316 \\
& 4800*d**2*e**3*f + 4409634816*d**2*e**2*f*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - \\
& 32*e + 2*f)/288) + 662937520*d**2*e*f**3 - 13004623872*d**2*e*f*(9*d/32 - \\
& f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**2 + 231796080*d**2*f**3*(9*d/32 - \\
& f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288) - 10089639936*d**2*f*(9*d/32 - f/ \\
& 8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**3 + 142606336*d*e**5 + 754974720*d* \\
& e**4*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288) - 1843200*d*e**3*f* \\
& *2 + 3850371072*d*e**3*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)** \\
& 2 - 1926291456*d*e**2*f**2*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/28 \\
& 8) + 20384317440*d*e**2*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)* \\
& *3 - 146756960*d*e*f**4 + 5813379072*d*e*f**2*(9*d/32 - f/8 - \sqrt{3}*I*(13 \\
& *d - 32*e + 2*f)/288)**2 + 12679200*d*f**4*(9*d/32 - f/8 - \sqrt{3}*I*(13*d \\
& - 32*e + 2*f)/288) + 1116758016*d*f**2*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32 \\
& *e + 2*f)/288)**3 - 79691776*e**5*f - 188743680*e**4*f*(9*d/32 - f/8 - \sqrt{ \\
& 3)*I*(13*d - 32*e + 2*f)/288) - 7372800*e**3*f**3 - 2151677952*e**3*f*(9*d \\
& /32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**2 + 287096832*e**2*f**3*(9* \\
& d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288) - 5096079360*e**2*f*(9*d/32 \\
& - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**3 + 14093632*e*f**5 - 85952102 \\
& 4*e*f**3*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**2 - 7648128*f* \\
& *5*(9*d/32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288) + 453869568*f**3*(9*d \\
& /32 - f/8 - \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**3)/(217696167*d**6 - 301346 \\
& 487*d**5*f - 1217128448*d**4*e**2 + 130506255*d**4*f**2 + 2181281792*d**3*e \\
& **2*f - 5619240*d**3*f**3 - 617611264*d**2*e**4 - 1450149888*d**2*e**2*f**2 \\
& - 8036820*d**2*f**4 + 495976448*d*e**4*f + 430088192*d*e**2*f**3 + 783648* \\
& d*f**5 - 114294784*e**4*f**2 - 47771648*e**2*f**4 + 188352*f**6)) + (9*d/32 \\
& - f/8 + \sqrt{3}*I*(13*d - 32*e + 2*f)/288)*\log(x + (-1025428432*d**5*e - 3 \\
& 34752912*d**5*(9*d/32 - f/8 + \sqrt{3}*I*(13*d - 32*e + 2*f)/288) + 20089613 \\
& 60*d**4*e*f + 1151575920*d**4*f*(9*d/32 - f/8 + \sqrt{3}*I*(13*d - 32*e + 2* \\
& f)/288) - 431308800*d**3*e**3 - 3143688192*d**3*e**2*(9*d/32 - f/8 + \sqrt{3} \\
&)*I*(13*d - 32*e + 2*f)/288) - 1598857120*d**3*e*f**2 + 9917005824*d**3*e*(\\
& 9*d/32 - f/8 + \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**2 - 944300160*d**3*f**2* \\
& (9*d/32 - f/8 + \sqrt{3}*I*(13*d - 32*e + 2*f)/288) + 11878244352*d**3*(9*d/ \\
& 32 - f/8 + \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**3 + 233164800*d**2*e**3*f + \\
& 4409634816*d**2*e**2*f*(9*d/32 - f/8 + \sqrt{3}*I*(13*d - 32*e + 2*f)/288) + \\
& 662937520*d**2*e*f**3 - 13004623872*d**2*e*f*(9*d/32 - f/8 + \sqrt{3}*I*(13 \\
& *d - 32*e + 2*f)/288)**2 + 231796080*d**2*f**3*(9*d/32 - f/8 + \sqrt{3}*I*(1 \\
& 3*d - 32*e + 2*f)/288) - 10089639936*d**2*f*(9*d/32 - f/8 + \sqrt{3}*I*(13*d \\
& - 32*e + 2*f)/288)**3 + 142606336*d*e**5 + 754974720*d*e**4*(9*d/32 - f/8 \\
& + \sqrt{3}*I*(13*d - 32*e + 2*f)/288) - 1843200*d*e**3*f**2 + 3850371072*d*e \\
& **3*(9*d/32 - f/8 + \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**2 - 1926291456*d*e* \\
& *2*f**2*(9*d/32 - f/8 + \sqrt{3}*I*(13*d - 32*e + 2*f)/288) + 20384317440*d* \\
& e**2*(9*d/32 - f/8 + \sqrt{3}*I*(13*d - 32*e + 2*f)/288)**3 - 146756960*d*e* \\
& f**4 + 5813379072*d*e*f**2*(9*d/32 - f/8 + \sqrt{3}*I*(13*d - 32*e + 2*f)/28
\end{aligned}$$

$$\begin{aligned}
& 8)**2 + 12679200*d*f**4*(9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288) \\
& + 1116758016*d*f**2*(9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288)**3 - \\
& 79691776*e**5*f - 188743680*e**4*f*(9*d/32 - f/8 + \sqrt{3})*I*(13*d - 32*e \\
& + 2*f)/288) - 7372800*e**3*f**3 - 2151677952*e**3*f*(9*d/32 - f/8 + \sqrt{3}) \\
& *I*(13*d - 32*e + 2*f)/288)**2 + 287096832*e**2*f**3*(9*d/32 - f/8 + \sqrt{3}) \\
& *I*(13*d - 32*e + 2*f)/288) - 5096079360*e**2*f*(9*d/32 - f/8 + \sqrt{3})*I* \\
& (13*d - 32*e + 2*f)/288)**3 + 14093632*e*f**5 - 859521024*e*f**3*(9*d/32 - \\
& f/8 + \sqrt{3})*I*(13*d - 32*e + 2*f)/288)**2 - 7648128*f**5*(9*d/32 - f/8 + \\
& \sqrt{3})*I*(13*d - 32*e + 2*f)/288) + 453869568*f**3*(9*d/32 - f/8 + \sqrt{3}) \\
& *I*(13*d - 32*e + 2*f)/288)**3)/(217696167*d**6 - 301346487*d**5*f - 121712 \\
& 8448*d**4*e**2 + 130506255*d**4*f**2 + 2181281792*d**3*e**2*f - 5619240*d** \\
& 3*f**3 - 617611264*d**2*e**4 - 1450149888*d**2*e**2*f**2 - 8036820*d**2*f** \\
& 4 + 495976448*d*e**4*f + 430088192*d*e**2*f**3 + 783648*d*f**5 - 114294784* \\
& e**4*f**2 - 47771648*e**2*f**4 + 188352*f**6)) + (8*e*x**6 + 12*e*x**4 + 16 \\
& *e*x**2 + 6*e + x**7*(-7*d + 7*f) + x**5*(-5*d + 10*f) + x**3*(-7*d + 14*f) \\
& + x*(4*d + 5*f))/(24*x**8 + 48*x**6 + 72*x**4 + 48*x**2 + 24)
\end{aligned}$$

$$3.49 \quad \int \frac{d+ex+fx^2+gx^3}{(1+x^2+x^4)^3} dx$$

Optimal. Leaf size=243

$$-\frac{1}{32}(9d-4f)\log(x^2-x+1)+\frac{1}{32}(9d-4f)\log(x^2+x+1)+\frac{x(-7x^2(d-f)+2d+3f)}{24(x^4+x^2+1)}+\frac{x(-(x^2(d-2f))+d)}{12(x^4+x^2+1)^2}$$

[Out] 1/12*x*(d+f-(d-2*f)*x^2)/(x^4+x^2+1)^2+1/12*(e-2*g+(2*e-g)*x^2)/(x^4+x^2+1)^2+1/12*(2*e-g)*(2*x^2+1)/(x^4+x^2+1)+1/24*x*(2*d+3*f-7*(d-f)*x^2)/(x^4+x^2+1)-1/32*(9*d-4*f)*ln(x^2-x+1)+1/32*(9*d-4*f)*ln(x^2+x+1)-1/144*(13*d+2*f)*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/144*(13*d+2*f)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+1/9*(2*e-g)*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)

Rubi [A] time = 0.23, antiderivative size = 243, normalized size of antiderivative = 1.00, number of steps used = 17, number of rules used = 10, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.385$, Rules used = {1673, 1178, 1169, 634, 618, 204, 628, 1247, 638, 614}

$$\frac{x(-7x^2(d-f)+2d+3f)}{24(x^4+x^2+1)}+\frac{x(x^2(-(d-2f))+d+f)}{12(x^4+x^2+1)^2}-\frac{1}{32}(9d-4f)\log(x^2-x+1)+\frac{1}{32}(9d-4f)\log(x^2+x+1)$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4)^3, x]

[Out] (x*(d + f - (d - 2*f)*x^2))/(12*(1 + x^2 + x^4)^2) + (e - 2*g + (2*e - g)*x^2)/(12*(1 + x^2 + x^4)^2) + ((2*e - g)*(1 + 2*x^2))/(12*(1 + x^2 + x^4)) + (x*(2*d + 3*f - 7*(d - f)*x^2))/(24*(1 + x^2 + x^4)) - ((13*d + 2*f)*ArcTan[(1 - 2*x)/Sqrt[3]])/(48*Sqrt[3]) + ((13*d + 2*f)*ArcTan[(1 + 2*x)/Sqrt[3]])/(48*Sqrt[3]) + ((2*e - g)*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - ((9*d - 4*f)*Log[1 - x + x^2])/32 + ((9*d - 4*f)*Log[1 + x + x^2])/32

Rule 204

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])

Rule 614

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p + 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free

$Q\{a, b, c\}, x \} \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1] \&\& \text{NeQ}[p, -3/2] \&\& \text{IntegerQ}[4*p]$

Rule 618

$\text{Int}[(a_.) + (b_.)*(x_) + (c_.)*(x_)^2]^{-1}, x_Symbol] \rightarrow \text{Dist}[-2, \text{Subst}[\text{Int}[1/\text{Simp}[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; \text{FreeQ}\{a, b, c\}, x \} \&\& \text{NeQ}[b^2 - 4*a*c, 0]$

Rule 628

$\text{Int}[(d_.) + (e_.)*(x_)] / [(a_.) + (b_.)*(x_) + (c_.)*(x_)^2], x_Symbol] \rightarrow \text{Simp}[(d*\text{Log}[\text{RemoveContent}[a + b*x + c*x^2, x]])/b, x] /; \text{FreeQ}\{a, b, c, d, e\}, x \} \&\& \text{EqQ}[2*c*d - b*e, 0]$

Rule 634

$\text{Int}[(d_.) + (e_.)*(x_)] / [(a_.) + (b_.)*(x_) + (c_.)*(x_)^2], x_Symbol] \rightarrow \text{Dist}[(2*c*d - b*e)/(2*c), \text{Int}[1/(a + b*x + c*x^2), x], x] + \text{Dist}[e/(2*c), \text{Int}[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; \text{FreeQ}\{a, b, c, d, e\}, x \} \&\& \text{NeQ}[2*c*d - b*e, 0] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{!NiceSqrtQ}[b^2 - 4*a*c]$

Rule 638

$\text{Int}[(d_.) + (e_.)*(x_)] * [(a_.) + (b_.)*(x_) + (c_.)*(x_)^2]^{(p_.)}, x_Symbol] \rightarrow \text{Simp}[(b*d - 2*a*e + (2*c*d - b*e)*x) * (a + b*x + c*x^2)^{(p+1)} / ((p+1)*(b^2 - 4*a*c)), x] - \text{Dist}[(2*p+3)*(2*c*d - b*e) / ((p+1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x + c*x^2)^{(p+1)}, x], x] /; \text{FreeQ}\{a, b, c, d, e\}, x \} \&\& \text{NeQ}[2*c*d - b*e, 0] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1] \&\& \text{NeQ}[p, -3/2]$

Rule 1169

$\text{Int}[(d_.) + (e_.)*(x_)^2] / [(a_.) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbol] \rightarrow \text{With}\{q = \text{Rt}[a/c, 2]\}, \text{With}\{r = \text{Rt}[2*q - b/c, 2]\}, \text{Dist}[1/(2*c*q*r), \text{Int}[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + \text{Dist}[1/(2*c*q*r), \text{Int}[(d*r + (d - e*q)*x)/(q + r*x + x^2), x], x]] /; \text{FreeQ}\{a, b, c, d, e\}, x \} \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{NeQ}[c*d^2 - b*d*e + a*e^2, 0] \&\& \text{NegQ}[b^2 - 4*a*c]$

Rule 1178

$\text{Int}[(d_.) + (e_.)*(x_)^2] * [(a_.) + (b_.)*(x_)^2 + (c_.)*(x_)^4]^{(p_.)}, x_Symbol] \rightarrow \text{Simp}[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2) * (a + b*x^2 + c*x^4)^{(p+1)} / (2*a*(p+1)*(b^2 - 4*a*c)), x] + \text{Dist}[1/(2*a*(p+1)*(b^2 - 4*a*c)), \text{Int}[\text{Simp}[(2*p+3)*d*b^2 - a*b*e - 2*a*c*d*(4*p+5) + (4*p+7)*(d*b - 2*a*e)*c*x^2, x] * (a + b*x^2 + c*x^4)^{(p+1)}, x], x] /; \text{FreeQ}\{a,$

b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]

Rule 1247

Int[(x_)*((d_) + (e_)*(x_)^2)^(q_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]

Rule 1673

Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*a + b*x^2 + c*x^4]^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}]*a + b*x^2 + c*x^4]^p, x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]

Rubi steps

$$\begin{aligned}
 \int \frac{d + ex + fx^2 + gx^3}{(1 + x^2 + x^4)^3} dx &= \int \frac{d + fx^2}{(1 + x^2 + x^4)^3} dx + \int \frac{x(e + gx^2)}{(1 + x^2 + x^4)^3} dx \\
 &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12} \int \frac{11d - f - 5(d - 2f)x^2}{(1 + x^2 + x^4)^2} dx + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(1 + x + x^2)^3} dx, x, x^2 \right) \\
 &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} + \frac{1}{72} \int \frac{11d - f - 5(d - 2f)x^2}{(1 + x^2 + x^4)^2} dx \\
 &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\
 &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\
 &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\
 &= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)}
 \end{aligned}$$

Mathematica [C] time = 0.66, size = 259, normalized size = 1.07

$$\frac{1}{144} \left(\frac{12(x(-dx^2 + d + 2fx^2 + f) + 2ex^2 + e - g(x^2 + 2))}{(x^4 + x^2 + 1)^2} + \frac{6(-7dx^3 + 2dx + e(8x^2 + 4) + 7fx^3 + 3fx - 2g(2x^2 + 1))}{x^4 + x^2 + 1} \right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(1 + x^2 + x^4)^3,x]

[Out] ((6*(2*d*x + 3*f*x - 7*d*x^3 + 7*f*x^3 - 2*g*(1 + 2*x^2) + e*(4 + 8*x^2)))/(1 + x^2 + x^4) + (12*(e + 2*e*x^2 - g*(2 + x^2) + x*(d + f - d*x^2 + 2*f*x^2)))/(1 + x^2 + x^4)^2 - (((-47*I + 7*sqrt(3))*d + (17*I - 7*sqrt(3))*f)*ArcTan[(-I + sqrt(3))*x/2])/sqrt((1 + I*sqrt(3))/6) - (((47*I + 7*sqrt(3))*d - (17*I + 7*sqrt(3))*f)*ArcTan[(I + sqrt(3))*x/2])/sqrt((1 - I*sqrt(3))/6) - 16*sqrt(3)*(2*e - g)*ArcTan[sqrt(3)/(1 + 2*x^2)]/144

fricas [A] time = 2.17, size = 435, normalized size = 1.79

$$\frac{84(d-f)x^7 - 48(2e-g)x^6 + 60(d-2f)x^5 - 72(2e-g)x^4 + 84(d-2f)x^3 - 96(2e-g)x^2 - 2\sqrt{3}((13d - 16g)x^2 + 2f + 16g)}{(x^4 + x^2 + 1)^3}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="fricas")

[Out] -1/288*(84*(d - f)*x^7 - 48*(2*e - g)*x^6 + 60*(d - 2*f)*x^5 - 72*(2*e - g)*x^4 + 84*(d - 2*f)*x^3 - 96*(2*e - g)*x^2 - 2*sqrt(3)*((13*d - 32*e + 2*f + 16*g)*x^8 + 2*(13*d - 32*e + 2*f + 16*g)*x^6 + 3*(13*d - 32*e + 2*f + 16*g)*x^4 + 2*(13*d - 32*e + 2*f + 16*g)*x^2 + 13*d - 32*e + 2*f + 16*g)*arctan(1/3*sqrt(3)*(2*x + 1)) - 2*sqrt(3)*((13*d + 32*e + 2*f - 16*g)*x^8 + 2*(13*d + 32*e + 2*f - 16*g)*x^6 + 3*(13*d + 32*e + 2*f - 16*g)*x^4 + 2*(13*d + 32*e + 2*f - 16*g)*x^2 + 13*d + 32*e + 2*f - 16*g)*arctan(1/3*sqrt(3)*(2*x - 1)) - 12*(4*d + 5*f)*x - 9*((9*d - 4*f)*x^8 + 2*(9*d - 4*f)*x^6 + 3*(9*d - 4*f)*x^4 + 2*(9*d - 4*f)*x^2 + 9*d - 4*f)*log(x^2 + x + 1) + 9*((9*d - 4*f)*x^8 + 2*(9*d - 4*f)*x^6 + 3*(9*d - 4*f)*x^4 + 2*(9*d - 4*f)*x^2 + 9*d - 4*f)*log(x^2 - x + 1) - 72*e + 72*g)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)

giac [A] time = 0.38, size = 198, normalized size = 0.81

$$\frac{1}{144} \sqrt{3} (13d + 2f + 16g - 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 2f - 16g + 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) - \frac{12(4d + 5f)x - 9((9d - 4f)x^8 + 2(9d - 4f)x^6 + 3(9d - 4f)x^4 + 2(9d - 4f)x^2 + 9d - 4f) \log(x^2 + x + 1) + 9((9d - 4f)x^8 + 2(9d - 4f)x^6 + 3(9d - 4f)x^4 + 2(9d - 4f)x^2 + 9d - 4f) \log(x^2 - x + 1) - 72e + 72g}{x^8 + 2x^6 + 3x^4 + 2x^2 + 1}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="giac")

[Out] $\frac{1}{144}\sqrt{3}(13d + 2f + 16g - 32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{144}\sqrt{3}(13d + 2f - 16g + 32e)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{1}{32}(9d - 4f)\log(x^2 + x + 1) - \frac{1}{32}(9d - 4f)\log(x^2 - x + 1) - \frac{1}{24}(7d*x^7 - 7*f*x^7 + 4*g*x^6 - 8*x^6*e + 5*d*x^5 - 10*f*x^5 + 6*g*x^4 - 12*x^4*e + 7*d*x^3 - 14*f*x^3 + 8*g*x^2 - 16*x^2*e - 4*d*x - 5*f*x + 6*g - 6*e)/(x^4 + x^2 + 1)^2$

maple [A] time = 0.02, size = 322, normalized size = 1.33

$$\frac{13\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144} + \frac{13\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144} - \frac{9d \ln(x^2 - x + 1)}{32} + \frac{9d \ln(x^2 + x + 1)}{32} - \frac{2\sqrt{3} e \arctan\left(\frac{2x}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x)

[Out] $\frac{1}{16}\left(\left(-\frac{7}{3}d + \frac{7}{3}f - \frac{4}{3}e - \frac{1}{3}g\right)x^3 + \left(-6d + 4f - 2g\right)x^2 + \left(-\frac{20}{3}d + \frac{13}{3}f + \frac{1}{3}e - \frac{8}{3}g\right)x - 4d + \frac{4}{3}f + 2e - 2g\right)/(x^2 + x + 1)^2 + \frac{9}{32}d \ln(x^2 + x + 1) - \frac{1}{8}f \ln(x^2 + x + 1) + \frac{13}{144}3^{1/2}d \arctan\left(\frac{1}{3}(2x + 1)3^{1/2}\right) - \frac{2}{9}3^{1/2}e \arctan\left(\frac{1}{3}(2x + 1)3^{1/2}\right) + \frac{1}{72}3^{1/2}f \arctan\left(\frac{1}{3}(2x + 1)3^{1/2}\right) + \frac{1}{9}3^{1/2}g \arctan\left(\frac{1}{3}(2x + 1)3^{1/2}\right) - \frac{1}{16}\left(\left(\frac{7}{3}d - \frac{7}{3}f - \frac{4}{3}e - \frac{1}{3}g\right)x^3 + \left(-6d + 4f + 2g\right)x^2 + \left(\frac{20}{3}d - \frac{13}{3}f + \frac{1}{3}e - \frac{8}{3}g\right)x - 4d + \frac{4}{3}f - 2e + 2g\right)/(x^2 - x + 1)^2 - \frac{9}{32}d \ln(x^2 - x + 1) + \frac{1}{8}f \ln(x^2 - x + 1) + \frac{13}{144}3^{1/2}d \arctan\left(\frac{1}{3}(2x - 1)3^{1/2}\right) + \frac{2}{9}3^{1/2}e \arctan\left(\frac{1}{3}(2x - 1)3^{1/2}\right) + \frac{1}{72}3^{1/2}f \arctan\left(\frac{1}{3}(2x - 1)3^{1/2}\right) - \frac{1}{9}3^{1/2}g \arctan\left(\frac{1}{3}(2x - 1)3^{1/2}\right)$

maxima [A] time = 2.61, size = 200, normalized size = 0.82

$$\frac{1}{144}\sqrt{3}(13d - 32e + 2f + 16g)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{144}\sqrt{3}(13d + 32e + 2f - 16g)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{1}{32}(9d - 4f)\log(x^2 + x + 1) - \frac{1}{32}(9d - 4f)\log(x^2 - x + 1) - \frac{1}{24}(7d - 4f)x^7 - 4(2e - g)x^6 + 5(d - 2f)x^5 - 6(2e - g)x^4 + 7(d - 2f)x^3 - 8(2e - g)x^2 - (4d + 5f)x - 6e + 6g)/(x^8 + 2x^6 + 3x^4 + 2x^2 + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="maxima")

[Out] $\frac{1}{144}\sqrt{3}(13d - 32e + 2f + 16g)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{144}\sqrt{3}(13d + 32e + 2f - 16g)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{1}{32}(9d - 4f)\log(x^2 + x + 1) - \frac{1}{32}(9d - 4f)\log(x^2 - x + 1) - \frac{1}{24}(7d - 4f)x^7 - 4(2e - g)x^6 + 5(d - 2f)x^5 - 6(2e - g)x^4 + 7(d - 2f)x^3 - 8(2e - g)x^2 - (4d + 5f)x - 6e + 6g)/(x^8 + 2x^6 + 3x^4 + 2x^2 + 1)$

mupad [B] time = 1.17, size = 295, normalized size = 1.21

$$\frac{\left(\frac{7f}{24} - \frac{7d}{24}\right) x^7 + \left(\frac{e}{3} - \frac{g}{6}\right) x^6 + \left(\frac{5f}{12} - \frac{5d}{24}\right) x^5 + \left(\frac{e}{2} - \frac{g}{4}\right) x^4 + \left(\frac{7f}{12} - \frac{7d}{24}\right) x^3 + \left(\frac{2e}{3} - \frac{g}{3}\right) x^2 + \left(\frac{d}{6} + \frac{5f}{24}\right) x + \frac{e}{4} - \frac{g}{4}}{x^8 + 2x^6 + 3x^4 + 2x^2 + 1} - \ln$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3)/(x^2 + x^4 + 1)^3,x)

[Out] (e/4 - g/4 - x^5*((5*d)/24 - (5*f)/12) - x^3*((7*d)/24 - (7*f)/12) - x^7*((7*d)/24 - (7*f)/24) + x^2*((2*e)/3 - g/3) + x^4*(e/2 - g/4) + x^6*(e/3 - g/6) + x*(d/6 + (5*f)/24))/(2*x^2 + 3*x^4 + 2*x^6 + x^8 + 1) - log(x - (3^(1/2)*1i)/2 - 1/2)*((9*d)/32 - f/8 + (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144 - (3^(1/2)*g*1i)/18) - log(x - (3^(1/2)*1i)/2 + 1/2)*(f/8 - (9*d)/32 + (3^(1/2)*d*13i)/288 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144 + (3^(1/2)*g*1i)/18) + log(x + (3^(1/2)*1i)/2 - 1/2)*(f/8 - (9*d)/32 + (3^(1/2)*d*13i)/288 + (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144 - (3^(1/2)*g*1i)/18) + log(x + (3^(1/2)*1i)/2 + 1/2)*((9*d)/32 - f/8 + (3^(1/2)*d*13i)/288 - (3^(1/2)*e*1i)/9 + (3^(1/2)*f*1i)/144 + (3^(1/2)*g*1i)/18)

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x**3+f*x**2+e*x+d)/(x**4+x**2+1)**3,x)

[Out] Timed out

$$3.50 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{(1+x^2+x^4)^3} dx$$

Optimal. Leaf size=263

$$-\frac{1}{32} \log(x^2 - x + 1)(9d-4f+3h) + \frac{1}{32} \log(x^2 + x + 1)(9d-4f+3h) + \frac{x(-x^2(7d-7f+4h) + 2d + 3f - h)}{24(x^4 + x^2 + 1)}$$

[Out] 1/12*(e-2*g+(2*e-g)*x^2)/(x^4+x^2+1)^2+1/12*x*(d+f-2*h-(d-2*f+h)*x^2)/(x^4+x^2+1)^2+1/12*(2*e-g)*(2*x^2+1)/(x^4+x^2+1)+1/24*x*(2*d+3*f-h-(7*d-7*f+4*h)*x^2)/(x^4+x^2+1)-1/32*(9*d-4*f+3*h)*ln(x^2-x+1)+1/32*(9*d-4*f+3*h)*ln(x^2+x+1)-1/144*(13*d+2*f+h)*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/144*(13*d+2*f+h)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+1/9*(2*e-g)*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)

Rubi [A] time = 0.26, antiderivative size = 263, normalized size of antiderivative = 1.00, number of steps used = 17, number of rules used = 11, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.355$, Rules used = {1673, 1678, 1178, 1169, 634, 618, 204, 628, 1247, 638, 614}

$$\frac{x(x^2(-7d-7f+4h) + 2d + 3f - h)}{24(x^4 + x^2 + 1)} + \frac{x(x^2(-d-2f+h) + d + f - 2h)}{12(x^4 + x^2 + 1)^2} - \frac{1}{32} \log(x^2 - x + 1)(9d-4f+3h) +$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4)^3,x]

[Out] (e - 2*g + (2*e - g)*x^2)/(12*(1 + x^2 + x^4)^2) + (x*(d + f - 2*h - (d - 2*f + h)*x^2))/(12*(1 + x^2 + x^4)^2) + ((2*e - g)*(1 + 2*x^2))/(12*(1 + x^2 + x^4)) + (x*(2*d + 3*f - h - (7*d - 7*f + 4*h)*x^2))/(24*(1 + x^2 + x^4)) - ((13*d + 2*f + h)*ArcTan[(1 - 2*x)/Sqrt[3]])/(48*Sqrt[3]) + ((13*d + 2*f + h)*ArcTan[(1 + 2*x)/Sqrt[3]])/(48*Sqrt[3]) + ((2*e - g)*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - ((9*d - 4*f + 3*h)*Log[1 - x + x^2])/32 + ((9*d - 4*f + 3*h)*Log[1 + x + x^2])/32

Rule 204

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[In
t[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_.) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] := Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p +
1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a
*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] &&
NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1169

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int
[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r +
(d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
```

```

c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]

```

Rule 1247

```

Int[(x_)*((d_) + (e_)*(x_)^2)^(q_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(
p_), x_Symbol] := Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]

```

Rule 1673

```

Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]

```

Rule 1678

```

Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := With[{d =
Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
+ b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
+ 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]

```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(1 + x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2)}{(1 + x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^3} dx \\
&= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12} \int \frac{11d - f + 2h - 5(d - 2f + h)x^2}{(1 + x^2 + x^4)^2} dx + \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d + 3f - h - (7d - 2f + h)x^2)}{24(1 + x^2 + x^4)^2} + \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \\
&= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} +
\end{aligned}$$

Mathematica [C] time = 0.90, size = 303, normalized size = 1.15

$$\frac{1}{144} \left(\frac{6(x(7dx^2 - 2d - 7fx^2 - 3f + 4hx^2 + h) - 4e(2x^2 + 1) + g(4x^2 + 2))}{x^4 + x^2 + 1} + \frac{12(x(-dx^2 + d + 2fx^2 + f - h))}{(x^4 + x^2 + 1)^2} \right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(1 + x^2 + x^4)^3,x]

[Out] ((-6*(-4*e*(1 + 2*x^2) + g*(2 + 4*x^2) + x*(-2*d - 3*f + h + 7*d*x^2 - 7*f*x^2 + 4*h*x^2)))/(1 + x^2 + x^4) + (12*(e + 2*e*x^2 - g*(2 + x^2) + x*(d + f - d*x^2 + 2*f*x^2 - h*(2 + x^2)))/(1 + x^2 + x^4)^2 - (((-47*I + 7*sqrt[3])*d + (17*I - 7*sqrt[3])*f + 2*(-7*I + 2*sqrt[3])*h)*ArcTan[((-I + sqrt[3])*x)/2])/sqrt[(1 + I*sqrt[3])/6] - (((47*I + 7*sqrt[3])*d - (17*I + 7*sqrt[3])*f + 2*(7*I + 2*sqrt[3])*h)*ArcTan[((I + sqrt[3])*x)/2])/sqrt[(1 - I*sqrt[3])/6] - 16*sqrt[3]*(2*e - g)*ArcTan[sqrt[3]/(1 + 2*x^2)])/144

fricas [B] time = 5.21, size = 485, normalized size = 1.84

$$12(7d - 7f + 4h)x^7 - 48(2e - g)x^6 + 60(d - 2f + h)x^5 - 72(2e - g)x^4 + 84(d - 2f + h)x^3 - 96(2e - g)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="fricas")

[Out]
$$\begin{aligned} & -1/288*(12*(7*d - 7*f + 4*h)*x^7 - 48*(2*e - g)*x^6 + 60*(d - 2*f + h)*x^5 \\ & - 72*(2*e - g)*x^4 + 84*(d - 2*f + h)*x^3 - 96*(2*e - g)*x^2 - 2*\sqrt{3}*((\\ & 13*d - 32*e + 2*f + 16*g + h)*x^8 + 2*(13*d - 32*e + 2*f + 16*g + h)*x^6 + \\ & 3*(13*d - 32*e + 2*f + 16*g + h)*x^4 + 2*(13*d - 32*e + 2*f + 16*g + h)*x^2 \\ & + 13*d - 32*e + 2*f + 16*g + h)*\arctan(1/3*\sqrt{3}*(2*x + 1)) - 2*\sqrt{3}* \\ & ((13*d + 32*e + 2*f - 16*g + h)*x^8 + 2*(13*d + 32*e + 2*f - 16*g + h)*x^6 \\ & + 3*(13*d + 32*e + 2*f - 16*g + h)*x^4 + 2*(13*d + 32*e + 2*f - 16*g + h)*x \\ & ^2 + 13*d + 32*e + 2*f - 16*g + h)*\arctan(1/3*\sqrt{3}*(2*x - 1)) - 12*(4*d \\ & + 5*f - 5*h)*x - 9*((9*d - 4*f + 3*h)*x^8 + 2*(9*d - 4*f + 3*h)*x^6 + 3*(9*d \\ & - 4*f + 3*h)*x^4 + 2*(9*d - 4*f + 3*h)*x^2 + 9*d - 4*f + 3*h)*\log(x^2 + x \\ & + 1) + 9*((9*d - 4*f + 3*h)*x^8 + 2*(9*d - 4*f + 3*h)*x^6 + 3*(9*d - 4*f + \\ & 3*h)*x^4 + 2*(9*d - 4*f + 3*h)*x^2 + 9*d - 4*f + 3*h)*\log(x^2 - x + 1) - 7 \\ & 2*e + 72*g)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1) \end{aligned}$$

giac [A] time = 0.39, size = 228, normalized size = 0.87

$$\frac{1}{144} \sqrt{3} (13d + 2f + 16g + h - 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 2f - 16g + h + 32e) \arctan\left(\frac{1}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="giac")

[Out]
$$\begin{aligned} & 1/144*\sqrt{3}*(13*d + 2*f + 16*g + h - 32*e)*\arctan(1/3*\sqrt{3}*(2*x + 1)) \\ & + 1/144*\sqrt{3}*(13*d + 2*f - 16*g + h + 32*e)*\arctan(1/3*\sqrt{3}*(2*x - 1)) \\ &) + 1/32*(9*d - 4*f + 3*h)*\log(x^2 + x + 1) - 1/32*(9*d - 4*f + 3*h)*\log(x^2 \\ & - x + 1) - 1/24*(7*d*x^7 - 7*f*x^7 + 4*h*x^7 + 4*g*x^6 - 8*x^6*e + 5*d*x^5 \\ & - 10*f*x^5 + 5*h*x^5 + 6*g*x^4 - 12*x^4*e + 7*d*x^3 - 14*f*x^3 + 7*h*x^3 \\ & + 8*g*x^2 - 16*x^2*e - 4*d*x - 5*f*x + 5*h*x + 6*g - 6*e)/(x^4 + x^2 + 1)^2 \end{aligned}$$

maple [A] time = 0.02, size = 396, normalized size = 1.51

$$\frac{13\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144} + \frac{13\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144} - \frac{9d \ln(x^2 - x + 1)}{32} + \frac{9d \ln(x^2 + x + 1)}{32} - \frac{2\sqrt{3} e \arctan\left(\frac{1}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x)$

[Out] $\frac{1}{16} * ((-7/3*d+7/3*f-4/3*h-4/3*e-1/3*g)*x^3+(-6*d+4*f-2*h-2*g)*x^2+(-20/3*d+13/3*f-5/3*h+1/3*e-8/3*g)*x-4*d+4/3*f+2*e-2*g)/(x^2+x+1)^2+9/32*d*\ln(x^2+x+1)-1/8*f*\ln(x^2+x+1)+3/32*h*\ln(x^2+x+1)+13/144*3^{(1/2)}*d*\arctan(1/3*(2*x+1)*3^{(1/2)})-2/9*3^{(1/2)}*e*\arctan(1/3*(2*x+1)*3^{(1/2)})+1/72*3^{(1/2)}*f*\arctan(1/3*(2*x+1)*3^{(1/2)})+1/9*3^{(1/2)}*g*\arctan(1/3*(2*x+1)*3^{(1/2)})+1/144*3^{(1/2)}*h*\arctan(1/3*(2*x+1)*3^{(1/2)})-1/16*((7/3*d-7/3*f+4/3*h-4/3*e-1/3*g)*x^3+(-6*d+4*f-2*h+2*g)*x^2+(20/3*d-13/3*f+5/3*h+1/3*e-8/3*g)*x-4*d+4/3*f-2*e+2*g)/(x^2-x+1)^2-9/32*d*\ln(x^2-x+1)+1/8*f*\ln(x^2-x+1)-3/32*h*\ln(x^2-x+1)+13/144*3^{(1/2)}*d*\arctan(1/3*(2*x-1)*3^{(1/2)})+2/9*3^{(1/2)}*e*\arctan(1/3*(2*x-1)*3^{(1/2)})+1/72*3^{(1/2)}*f*\arctan(1/3*(2*x-1)*3^{(1/2)})-1/9*3^{(1/2)}*g*\arctan(1/3*(2*x-1)*3^{(1/2)})+1/144*3^{(1/2)}*h*\arctan(1/3*(2*x-1)*3^{(1/2)})$

maxima [A] time = 3.15, size = 217, normalized size = 0.83

$$\frac{1}{144} \sqrt{3} (13d - 32e + 2f + 16g + h) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 32e + 2f - 16g + h) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{integrate}((h*x^4+g*x^3+f*x^2+e*x+d)/(x^4+x^2+1)^3,x, \text{algorithm}="maxima")$

[Out] $\frac{1}{144}*\sqrt{3}*(13*d - 32*e + 2*f + 16*g + h)*\arctan(1/3*\sqrt{3}*(2*x + 1)) + \frac{1}{144}*\sqrt{3}*(13*d + 32*e + 2*f - 16*g + h)*\arctan(1/3*\sqrt{3}*(2*x - 1)) + 1/32*(9*d - 4*f + 3*h)*\log(x^2 + x + 1) - 1/32*(9*d - 4*f + 3*h)*\log(x^2 - x + 1) - 1/24*((7*d - 7*f + 4*h)*x^7 - 4*(2*e - g)*x^6 + 5*(d - 2*f + h)*x^5 - 6*(2*e - g)*x^4 + 7*(d - 2*f + h)*x^3 - 8*(2*e - g)*x^2 - (4*d + 5*f - 5*h)*x - 6*e + 6*g)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)$

mupad [B] time = 5.45, size = 1611, normalized size = 6.13

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4)/(x^2 + x^4 + 1)^3,x)$

[Out] $(e/4 - g/4 + x^2*((2*e)/3 - g/3) + x^4*(e/2 - g/4) + x^6*(e/3 - g/6) + x*(d/6 + (5*f)/24 - (5*h)/24) - x^7*((7*d)/24 - (7*f)/24 + h/6) - x^5*((5*d)/24 - (5*f)/12 + (5*h)/24) - x^3*((7*d)/24 - (7*f)/12 + (7*h)/24))/(2*x^2 + 3*x^4 + 2*x^6 + x^8 + 1) - \log(960*d*g - 2763*d*f - 1920*d*e + 480*e*f + 1971*d*h - 480*e*h - 240*f*g - 981*f*h + 240*g*h + 3^{(1/2)}*d^2*1620i + 3^{(1/2)}*f^2*180i + 3^{(1/2)}*h^2*135i - 3807*d^2*x - 612*f^2*x - 378*h^2*x + 2754*d^2)$

$$\begin{aligned}
& + 684*f^2 + 351*h^2 + 3^{(1/2)}*d*e*1088i - 3^{(1/2)}*d*f*1125i - 3^{(1/2)}*d*g* \\
& 544i - 3^{(1/2)}*e*f*608i + 3^{(1/2)}*d*h*945i + 3^{(1/2)}*e*h*416i + 3^{(1/2)}*f*g \\
& *304i - 3^{(1/2)}*f*h*315i - 3^{(1/2)}*g*h*208i - 672*d*e*x + 3069*d*f*x + 336* \\
& d*g*x + 672*e*f*x - 2403*d*h*x - 384*e*h*x - 336*f*g*x + 963*f*h*x + 192*g* \\
& h*x + 3^{(1/2)}*d^2*x*567i + 3^{(1/2)}*f^2*x*252i + 3^{(1/2)}*h^2*x*108i - 3^{(1/2)} \\
&)*d*f*x*819i + 3^{(1/2)}*d*g*x*752i + 3^{(1/2)}*e*f*x*544i + 3^{(1/2)}*d*h*x*513i \\
& - 3^{(1/2)}*e*h*x*448i - 3^{(1/2)}*f*g*x*272i - 3^{(1/2)}*f*h*x*333i + 3^{(1/2)}*g \\
& *h*x*224i - 3^{(1/2)}*d*e*x*1504i)*((9*d)/32 - f/8 + (3*h)/32 + (3^{(1/2)}*d*13 \\
& i)/288 + (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/144 - (3^{(1/2)}*g*1i)/18 + (3^{(1/2)} \\
&)*h*1i)/288) - \log(1920*d*e - 2763*d*f - 960*d*g - 480*e*f + 1971*d*h + 48 \\
& 0*e*h + 240*f*g - 981*f*h - 240*g*h - 3^{(1/2)}*d^2*1620i - 3^{(1/2)}*f^2*180i \\
& - 3^{(1/2)}*h^2*135i + 3807*d^2*x + 612*f^2*x + 378*h^2*x + 2754*d^2 + 684*f^ \\
& 2 + 351*h^2 + 3^{(1/2)}*d*e*1088i + 3^{(1/2)}*d*f*1125i - 3^{(1/2)}*d*g*544i - 3^ \\
& (1/2)*e*f*608i - 3^{(1/2)}*d*h*945i + 3^{(1/2)}*e*h*416i + 3^{(1/2)}*f*g*304i + 3 \\
& ^{(1/2)}*f*h*315i - 3^{(1/2)}*g*h*208i - 672*d*e*x - 3069*d*f*x + 336*d*g*x + 6 \\
& 72*e*f*x + 2403*d*h*x - 384*e*h*x - 336*f*g*x - 963*f*h*x + 192*g*h*x + 3^ \\
& (1/2)*d^2*x*567i + 3^{(1/2)}*f^2*x*252i + 3^{(1/2)}*h^2*x*108i - 3^{(1/2)}*d*f*x*8 \\
& 19i - 3^{(1/2)}*d*g*x*752i - 3^{(1/2)}*e*f*x*544i + 3^{(1/2)}*d*h*x*513i + 3^{(1/2)} \\
&)*e*h*x*448i + 3^{(1/2)}*f*g*x*272i - 3^{(1/2)}*f*h*x*333i - 3^{(1/2)}*g*h*x*224i \\
& + 3^{(1/2)}*d*e*x*1504i)*(f/8 - (9*d)/32 - (3*h)/32 + (3^{(1/2)}*d*13i)/288 - \\
& (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/144 + (3^{(1/2)}*g*1i)/18 + (3^{(1/2)}*h*1i)/ \\
& 288) + \log(1920*d*e - 2763*d*f - 960*d*g - 480*e*f + 1971*d*h + 480*e*h + 2 \\
& 40*f*g - 981*f*h - 240*g*h + 3^{(1/2)}*d^2*1620i + 3^{(1/2)}*f^2*180i + 3^{(1/2)} \\
& *h^2*135i + 3807*d^2*x + 612*f^2*x + 378*h^2*x + 2754*d^2 + 684*f^2 + 351*h \\
& ^2 - 3^{(1/2)}*d*e*1088i - 3^{(1/2)}*d*f*1125i + 3^{(1/2)}*d*g*544i + 3^{(1/2)}*e*f \\
& *608i + 3^{(1/2)}*d*h*945i - 3^{(1/2)}*e*h*416i - 3^{(1/2)}*f*g*304i - 3^{(1/2)}*f* \\
& h*315i + 3^{(1/2)}*g*h*208i - 672*d*e*x - 3069*d*f*x + 336*d*g*x + 672*e*f*x \\
& + 2403*d*h*x - 384*e*h*x - 336*f*g*x - 963*f*h*x + 192*g*h*x - 3^{(1/2)}*d^2* \\
& x*567i - 3^{(1/2)}*f^2*x*252i - 3^{(1/2)}*h^2*x*108i + 3^{(1/2)}*d*f*x*819i + 3^ \\
& (1/2)*d*g*x*752i + 3^{(1/2)}*e*f*x*544i - 3^{(1/2)}*d*h*x*513i - 3^{(1/2)}*e*h*x*4 \\
& 48i - 3^{(1/2)}*f*g*x*272i + 3^{(1/2)}*f*h*x*333i + 3^{(1/2)}*g*h*x*224i - 3^{(1/2)} \\
&)*d*e*x*1504i)*((9*d)/32 - f/8 + (3*h)/32 + (3^{(1/2)}*d*13i)/288 - (3^{(1/2)}* \\
& e*1i)/9 + (3^{(1/2)}*f*1i)/144 + (3^{(1/2)}*g*1i)/18 + (3^{(1/2)}*h*1i)/288) + \log \\
& (1920*d*e + 2763*d*f - 960*d*g - 480*e*f - 1971*d*h + 480*e*h + 240*f*g + \\
& 981*f*h - 240*g*h + 3^{(1/2)}*d^2*1620i + 3^{(1/2)}*f^2*180i + 3^{(1/2)}*h^2*135i \\
& + 3807*d^2*x + 612*f^2*x + 378*h^2*x - 2754*d^2 - 684*f^2 - 351*h^2 + 3^{(1 \\
& /2)}*d*e*1088i - 3^{(1/2)}*d*f*1125i - 3^{(1/2)}*d*g*544i - 3^{(1/2)}*e*f*608i + 3 \\
& ^{(1/2)}*d*h*945i + 3^{(1/2)}*e*h*416i + 3^{(1/2)}*f*g*304i - 3^{(1/2)}*f*h*315i - \\
& 3^{(1/2)}*g*h*208i + 672*d*e*x - 3069*d*f*x - 336*d*g*x - 672*e*f*x + 2403*d* \\
& h*x + 384*e*h*x + 336*f*g*x - 963*f*h*x - 192*g*h*x + 3^{(1/2)}*d^2*x*567i + \\
& 3^{(1/2)}*f^2*x*252i + 3^{(1/2)}*h^2*x*108i - 3^{(1/2)}*d*f*x*819i + 3^{(1/2)}*d*g* \\
& x*752i + 3^{(1/2)}*e*f*x*544i + 3^{(1/2)}*d*h*x*513i - 3^{(1/2)}*e*h*x*448i - 3^ \\
& (1/2)*f*g*x*272i - 3^{(1/2)}*f*h*x*333i + 3^{(1/2)}*g*h*x*224i - 3^{(1/2)}*d*e*x*1 \\
& 504i)*(f/8 - (9*d)/32 - (3*h)/32 + (3^{(1/2)}*d*13i)/288 + (3^{(1/2)}*e*1i)/9 + \\
& (3^{(1/2)}*f*1i)/144 - (3^{(1/2)}*g*1i)/18 + (3^{(1/2)}*h*1i)/288)
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(x**4+x**2+1)**3,x)

[Out] Timed out

$$3.51 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(1+x^2+x^4)^3} dx$$

Optimal. Leaf size=269

$$-\frac{1}{32} \log(x^2 - x + 1)(9d-4f+3h) + \frac{1}{32} \log(x^2 + x + 1)(9d-4f+3h) + \frac{x(-x^2(7d-7f+4h) + 2d + 3f - h)}{24(x^4 + x^2 + 1)}$$

[Out] 1/12*x*(d+f-2*h-(d-2*f+h)*x^2)/(x^4+x^2+1)^2+1/12*(e-2*g+i+(2*e-g-i)*x^2)/(x^4+x^2+1)^2+1/12*(2*e-g+i)*(2*x^2+1)/(x^4+x^2+1)+1/24*x*(2*d+3*f-h-(7*d-7*f+4*h)*x^2)/(x^4+x^2+1)-1/32*(9*d-4*f+3*h)*ln(x^2-x+1)+1/32*(9*d-4*f+3*h)*ln(x^2+x+1)-1/144*(13*d+2*f+h)*arctan(1/3*(1-2*x)*3^(1/2))*3^(1/2)+1/144*(13*d+2*f+h)*arctan(1/3*(1+2*x)*3^(1/2))*3^(1/2)+1/9*(2*e-g+i)*arctan(1/3*(2*x^2+1)*3^(1/2))*3^(1/2)

Rubi [A] time = 0.29, antiderivative size = 269, normalized size of antiderivative = 1.00, number of steps used = 18, number of rules used = 12, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.333$, Rules used = {1673, 1678, 1178, 1169, 634, 618, 204, 628, 1663, 1660, 12, 614}

$$\frac{x(x^2(-7d-7f+4h) + 2d + 3f - h)}{24(x^4 + x^2 + 1)} + \frac{x(x^2(-d-2f+h) + d + f - 2h)}{12(x^4 + x^2 + 1)^2} - \frac{1}{32} \log(x^2 - x + 1)(9d-4f+3h) +$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4)^3,x]

[Out] (x*(d + f - 2*h - (d - 2*f + h)*x^2))/(12*(1 + x^2 + x^4)^2) + (e - 2*g + i + (2*e - g - i)*x^2)/(12*(1 + x^2 + x^4)^2) + ((2*e - g + i)*(1 + 2*x^2))/(12*(1 + x^2 + x^4)) + (x*(2*d + 3*f - h - (7*d - 7*f + 4*h)*x^2))/(24*(1 + x^2 + x^4)) - ((13*d + 2*f + h)*ArcTan[(1 - 2*x)/Sqrt[3]])/(48*Sqrt[3]) + ((13*d + 2*f + h)*ArcTan[(1 + 2*x)/Sqrt[3]])/(48*Sqrt[3]) + ((2*e - g + i)*ArcTan[(1 + 2*x^2)/Sqrt[3]])/(3*Sqrt[3]) - ((9*d - 4*f + 3*h)*Log[1 - x + x^2])/32 + ((9*d - 4*f + 3*h)*Log[1 + x + x^2])/32

Rule 12

Int[(a_)*(u_), x_Symbol] :> Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 204

```
Int[((a_) + (b_)*(x_)^2)^(-1), x_Symbol] := -Simp[ArcTan[(Rt[-b, 2]*x)/Rt[-a, 2]]/(Rt[-a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && PosQ[a/b] && (LtQ[a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol] := Simp[(b + 2*c*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p + 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]
```

Rule 618

```
Int[((a_) + (b_)*(x_) + (c_)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 628

```
Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := Simp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d, e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := Dist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), Int[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1169

```
Int[((d_) + (e_)*(x_)^2)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] := With[{q = Rt[a/c, 2]}, With[{r = Rt[2*q - b/c, 2]}, Dist[1/(2*c*q*r), Int[(d*r - (d - e*q)*x)/(q - r*x + x^2), x], x] + Dist[1/(2*c*q*r), Int[(d*r + (d - e*q)*x)/(q + r*x + x^2), x], x]]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NegQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_)*(x_)^2)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
```

)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && LtQ[p, -1] && IntegerQ[2*p]

Rule 1660

Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := With[{Q = PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[Pq, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x + c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]

Rule 1663

Int[(Pq_)*(x_)^(m_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[(m - 1)/2]

Rule 1673

Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}]*a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]

Rule 1678

Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := With[{d = Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 51x^5}{(1 + x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2 + 51x^4)}{(1 + x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^3} dx \\
&= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12} \int \frac{11d - f + 2h - 5(d - 2f + h)x^2}{(1 + x^2 + x^4)^2} dx \\
&= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d - f + 2h - 5(d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} \\
&= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d - f + 2h - 5(d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} \\
&= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{51d - 5fx^2 + 51hx^4}{12(1 + x^2 + x^4)^2} \\
&= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{51d - 5fx^2 + 51hx^4}{12(1 + x^2 + x^4)^2} \\
&= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{51d - 5fx^2 + 51hx^4}{12(1 + x^2 + x^4)^2}
\end{aligned}$$

Mathematica [C] time = 0.98, size = 325, normalized size = 1.21

$$\frac{1}{144} \left(\frac{12(-dx^3 + dx + 2ex^2 + e + 2fx^3 + fx - g(x^2 + 2) - hx^3 - 2hx - ix^2 + i)}{(x^4 + x^2 + 1)^2} + \frac{6(-7dx^3 + 2dx + e(8x^2 + 4) - 7g - 2h + 2i)}{(x^4 + x^2 + 1)^2} \right)$$

Warning: Unable to verify antiderivative.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(1 + x^2 + x^4)^3, x]

[Out] ((12*(e + i + d*x + f*x - 2*h*x + 2*e*x^2 - i*x^2 - d*x^3 + 2*f*x^3 - h*x^3 - g*(2 + x^2)))/(1 + x^2 + x^4)^2 + (6*(2*i + 2*d*x + 3*f*x - h*x + 4*i*x^2 - 7*d*x^3 + 7*f*x^3 - 4*h*x^3 - 2*g*(1 + 2*x^2) + e*(4 + 8*x^2)))/(1 + x^2 + x^4) - (((-47*I + 7*sqrt(3))*d + (17*I - 7*sqrt(3))*f + 2*(-7*I + 2*sqrt(3))*h)*ArcTan[(-I + sqrt(3))*x/2])/sqrt[(1 + I*sqrt(3))/6] - ((47*I + 7*sqrt(3))*d - (17*I + 7*sqrt(3))*f + 2*(7*I + 2*sqrt(3))*h)*ArcTan[(I + sqrt(3))*x/2])/sqrt[(1 - I*sqrt(3))/6] - 16*sqrt(3)*(2*e - g + i)*ArcTan[sqrt(3)/(1 + 2*x^2)]/144

fricas [B] time = 23.87, size = 521, normalized size = 1.94

$$12(7d - 7f + 4h)x^7 - 48(2e - g + i)x^6 + 60(d - 2f + h)x^5 - 72(2e - g + i)x^4 + 84(d - 2f + h)x^3 - 48($$

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)/(x^4+x^2+1)^3,x, algorithm="fricas")

[Out] -1/288*(12*(7*d - 7*f + 4*h)*x^7 - 48*(2*e - g + i)*x^6 + 60*(d - 2*f + h)*x^5 - 72*(2*e - g + i)*x^4 + 84*(d - 2*f + h)*x^3 - 48*(4*e - 2*g + i)*x^2 - 2*sqrt(3)*((13*d - 32*e + 2*f + 16*g + h - 16*i)*x^8 + 2*(13*d - 32*e + 2*f + 16*g + h - 16*i)*x^6 + 3*(13*d - 32*e + 2*f + 16*g + h - 16*i)*x^4 + 2*(13*d - 32*e + 2*f + 16*g + h - 16*i)*x^2 + 13*d - 32*e + 2*f + 16*g + h - 16*i)*arctan(1/3*sqrt(3)*(2*x + 1)) - 2*sqrt(3)*((13*d + 32*e + 2*f - 16*g + h + 16*i)*x^8 + 2*(13*d + 32*e + 2*f - 16*g + h + 16*i)*x^6 + 3*(13*d + 32*e + 2*f - 16*g + h + 16*i)*x^4 + 2*(13*d + 32*e + 2*f - 16*g + h + 16*i)*x^2 + 13*d + 32*e + 2*f - 16*g + h + 16*i)*arctan(1/3*sqrt(3)*(2*x - 1)) - 12*(4*d + 5*f - 5*h)*x - 9*((9*d - 4*f + 3*h)*x^8 + 2*(9*d - 4*f + 3*h)*x^6 + 3*(9*d - 4*f + 3*h)*x^4 + 2*(9*d - 4*f + 3*h)*x^2 + 9*d - 4*f + 3*h)*log(x^2 + x + 1) + 9*((9*d - 4*f + 3*h)*x^8 + 2*(9*d - 4*f + 3*h)*x^6 + 3*(9*d - 4*f + 3*h)*x^4 + 2*(9*d - 4*f + 3*h)*x^2 + 9*d - 4*f + 3*h)*log(x^2 - x + 1) - 72*e + 72*g - 48*i)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)

giac [A] time = 0.37, size = 255, normalized size = 0.95

$$\frac{1}{144} \sqrt{3} (13d + 2f + 16g + h - 16i - 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 2f - 16g + h + 16i + 32e)$$

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)/(x^4+x^2+1)^3,x, algorithm="giac")

[Out] 1/144*sqrt(3)*(13*d + 2*f + 16*g + h - 16*i - 32*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/144*sqrt(3)*(13*d + 2*f - 16*g + h + 16*i + 32*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/32*(9*d - 4*f + 3*h)*log(x^2 + x + 1) - 1/32*(9*d - 4*f + 3*h)*log(x^2 - x + 1) - 1/24*(7*d*x^7 - 7*f*x^7 + 4*h*x^7 + 4*g*x^6 - 4*i*x^6 - 8*x^6*e + 5*d*x^5 - 10*f*x^5 + 5*h*x^5 + 6*g*x^4 - 6*i*x^4 - 12*x^4*e + 7*d*x^3 - 14*f*x^3 + 7*h*x^3 + 8*g*x^2 - 4*i*x^2 - 16*x^2*e - 4*d*x - 5*f*x + 5*h*x + 6*g - 4*i - 6*e)/(x^4 + x^2 + 1)^2

maple [A] time = 0.02, size = 454, normalized size = 1.69

$$\frac{13\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144} + \frac{13\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144} - \frac{9d \ln(x^2 - x + 1)}{32} + \frac{9d \ln(x^2 + x + 1)}{32} - \frac{2\sqrt{3} e \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9}$$

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)/(x^4+x^2+1)^3,x)

[Out] 1/16*((-7/3*d+7/3*f-4/3*h-4/3*e-1/3*g+1/3*i)*x^3+(-6*d+4*f-2*h-2*g+2*i)*x^2+(-20/3*d+13/3*f-5/3*h+1/3*e-8/3*g+7/3*i)*x-4*d+4/3*f+2*e-2*g+4/3*i)/(x^2+x+1)^2+9/32*d*ln(x^2+x+1)-1/8*f*ln(x^2+x+1)+3/32*h*ln(x^2+x+1)+13/144*3^(1/2)*d*arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*e*arctan(1/3*(2*x+1)*3^(1/2))+1/72*3^(1/2)*f*arctan(1/3*(2*x+1)*3^(1/2))+1/9*3^(1/2)*g*arctan(1/3*(2*x+1)*3^(1/2))+1/144*3^(1/2)*h*arctan(1/3*(2*x+1)*3^(1/2))-1/9*3^(1/2)*i*arctan(1/3*(2*x+1)*3^(1/2))-1/16*((7/3*d-7/3*f+4/3*h-4/3*e-1/3*g+1/3*i)*x^3+(-6*d+4*f-2*h+2*g-2*i)*x^2+(20/3*d-13/3*f+5/3*h+1/3*e-8/3*g+7/3*i)*x-4*d+4/3*f-2*e+2*g-4/3*i)/(x^2-x+1)^2-9/32*d*ln(x^2-x+1)+1/8*f*ln(x^2-x+1)-3/32*h*ln(x^2-x+1)+13/144*3^(1/2)*d*arctan(1/3*(2*x-1)*3^(1/2))+2/9*3^(1/2)*e*arctan(1/3*(2*x-1)*3^(1/2))+1/72*3^(1/2)*f*arctan(1/3*(2*x-1)*3^(1/2))-1/9*3^(1/2)*g*arctan(1/3*(2*x-1)*3^(1/2))+1/144*3^(1/2)*h*arctan(1/3*(2*x-1)*3^(1/2))+1/9*3^(1/2)*i*arctan(1/3*(2*x-1)*3^(1/2))

maxima [A] time = 2.12, size = 229, normalized size = 0.85

$$\frac{1}{144} \sqrt{3} (13d - 32e + 2f + 16g + h - 16i) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 32e + 2f - 16g + h + 16i)$$

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)/(x^4+x^2+1)^3,x, algorithm="maxima")

[Out] 1/144*sqrt(3)*(13*d - 32*e + 2*f + 16*g + h - 16*i)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/144*sqrt(3)*(13*d + 32*e + 2*f - 16*g + h + 16*i)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/32*(9*d - 4*f + 3*h)*log(x^2 + x + 1) - 1/32*(9*d - 4*f + 3*h)*log(x^2 - x + 1) - 1/24*((7*d - 7*f + 4*h)*x^7 - 4*(2*e - g + i)*x^6 + 5*(d - 2*f + h)*x^5 - 6*(2*e - g + i)*x^4 + 7*(d - 2*f + h)*x^3 - 4*(4*e - 2*g + i)*x^2 - (4*d + 5*f - 5*h)*x - 6*e + 6*g - 4*i)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)

mupad [B] time = 8.22, size = 1963, normalized size = 7.30

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(x^2 + x^4 + 1)^3, x)$

[Out] $(e/4 - g/4 + i/6 + x*(d/6 + (5*f)/24 - (5*h)/24) - x^7*((7*d)/24 - (7*f)/24 + h/6) - x^5*((5*d)/24 - (5*f)/12 + (5*h)/24) - x^3*((7*d)/24 - (7*f)/12 + (7*h)/24) + x^4*(e/2 - g/4 + i/4) + x^2*((2*e)/3 - g/3 + i/6) + x^6*(e/3 - g/6 + i/6))/(2*x^2 + 3*x^4 + 2*x^6 + x^8 + 1) - \log(960*d*g - 2763*d*f - 1920*d*e + 480*e*f + 1971*d*h - 960*d*i - 480*e*h - 240*f*g - 981*f*h + 240*f*i + 240*g*h - 240*h*i + 3^{(1/2)}*d^2*1620i + 3^{(1/2)}*f^2*180i + 3^{(1/2)}*h^2*135i - 3807*d^2*x - 612*f^2*x - 378*h^2*x + 2754*d^2 + 684*f^2 + 351*h^2 + 3^{(1/2)}*d*e*1088i - 3^{(1/2)}*d*f*1125i - 3^{(1/2)}*d*g*544i - 3^{(1/2)}*e*f*608i + 3^{(1/2)}*d*h*945i + 3^{(1/2)}*d*i*544i + 3^{(1/2)}*e*h*416i + 3^{(1/2)}*f*g*304i - 3^{(1/2)}*f*h*315i - 3^{(1/2)}*f*i*304i - 3^{(1/2)}*g*h*208i + 3^{(1/2)}*h*i*208i - 672*d*e*x + 3069*d*f*x + 336*d*g*x + 672*e*f*x - 2403*d*h*x - 336*d*i*x - 384*e*h*x - 336*f*g*x + 963*f*h*x + 336*f*i*x + 192*g*h*x - 192*h*i*x + 3^{(1/2)}*d^2*x*567i + 3^{(1/2)}*f^2*x*252i + 3^{(1/2)}*h^2*x*108i - 3^{(1/2)}*d*f*x*819i + 3^{(1/2)}*d*g*x*752i + 3^{(1/2)}*e*f*x*544i + 3^{(1/2)}*d*h*x*513i - 3^{(1/2)}*d*i*x*752i - 3^{(1/2)}*e*h*x*448i - 3^{(1/2)}*f*g*x*272i - 3^{(1/2)}*f*h*x*333i + 3^{(1/2)}*f*i*x*272i + 3^{(1/2)}*g*h*x*224i - 3^{(1/2)}*h*i*x*224i - 3^{(1/2)}*d*e*x*1504i)*(9*d)/32 - f/8 + (3*h)/32 + (3^{(1/2)}*d*13i)/288 + (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/144 - (3^{(1/2)}*g*1i)/18 + (3^{(1/2)}*h*1i)/288 + (3^{(1/2)}*i*1i)/18) - \log(1920*d*e - 2763*d*f - 960*d*g - 480*e*f + 1971*d*h + 960*d*i + 480*e*h + 240*f*g - 981*f*h - 240*f*i - 240*g*h + 240*h*i - 3^{(1/2)}*d^2*1620i - 3^{(1/2)}*f^2*180i - 3^{(1/2)}*h^2*135i + 3807*d^2*x + 612*f^2*x + 378*h^2*x + 2754*d^2 + 684*f^2 + 351*h^2 + 3^{(1/2)}*d*e*1088i + 3^{(1/2)}*d*f*1125i - 3^{(1/2)}*d*g*544i - 3^{(1/2)}*e*f*608i - 3^{(1/2)}*d*h*945i + 3^{(1/2)}*d*i*544i + 3^{(1/2)}*e*h*416i + 3^{(1/2)}*f*g*304i + 3^{(1/2)}*f*h*315i - 3^{(1/2)}*f*i*304i - 3^{(1/2)}*g*h*208i + 3^{(1/2)}*h*i*208i - 672*d*e*x - 3069*d*f*x + 336*d*g*x + 672*e*f*x + 2403*d*h*x - 336*d*i*x - 384*e*h*x - 336*f*g*x - 963*f*h*x + 336*f*i*x + 192*g*h*x - 192*h*i*x + 3^{(1/2)}*d^2*x*567i + 3^{(1/2)}*f^2*x*252i + 3^{(1/2)}*h^2*x*108i - 3^{(1/2)}*d*f*x*819i - 3^{(1/2)}*d*g*x*752i - 3^{(1/2)}*e*f*x*544i + 3^{(1/2)}*d*h*x*513i + 3^{(1/2)}*d*i*x*752i + 3^{(1/2)}*e*h*x*448i + 3^{(1/2)}*f*g*x*272i - 3^{(1/2)}*f*h*x*333i - 3^{(1/2)}*f*i*x*272i - 3^{(1/2)}*g*h*x*224i + 3^{(1/2)}*h*i*x*224i + 3^{(1/2)}*d*e*x*1504i)*(f/8 - (9*d)/32 - (3*h)/32 + (3^{(1/2)}*d*13i)/288 - (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/144 + (3^{(1/2)}*g*1i)/18 + (3^{(1/2)}*h*1i)/288 - (3^{(1/2)}*i*1i)/18) + \log(1920*d*e - 2763*d*f - 960*d*g - 480*e*f + 1971*d*h + 960*d*i + 480*e*h + 240*f*g - 981*f*h - 240*f*i - 240*g*h + 240*h*i + 3^{(1/2)}*d^2*1620i + 3^{(1/2)}*f^2*180i + 3^{(1/2)}*h^2*135i + 3807*d^2*x + 612*f^2*x + 378*h^2*x + 2754*d^2 + 684*f^2 + 351*h^2 - 3^{(1/2)}*d*e*1088i - 3^{(1/2)}*d*f*1125i + 3^{(1/2)}*d*g*544i + 3^{(1/2)}*e*f*608i + 3^{(1/2)}*d*h*945i - 3^{(1/2)}*d*i*544i - 3^{(1/2)}*e*h*416i - 3^{(1/2)}*f*g*304i - 3^{(1/2)}*f*h*315i + 3^{(1/2)}*f*i*304i + 3^{(1/2)}*g*h*208i - 3^{(1/2)}*h*i*208i - 672*d*e*x - 3069*d*f*x + 336*d*g*x + 672*e*f*x + 2403*d*h*x - 336*d*i*x - 384*e*h*x - 336*f*g*x - 963*f*h*x + 336*f*i*x + 19$

$$\begin{aligned}
& 2*g*h*x - 192*h*i*x - 3^{(1/2)}*d^2*x*567i - 3^{(1/2)}*f^2*x*252i - 3^{(1/2)}*h^2 \\
& *x*108i + 3^{(1/2)}*d*f*x*819i + 3^{(1/2)}*d*g*x*752i + 3^{(1/2)}*e*f*x*544i - 3^{(1/2)} \\
& *d*h*x*513i - 3^{(1/2)}*d*i*x*752i - 3^{(1/2)}*e*h*x*448i - 3^{(1/2)}*f*g*x* \\
& 272i + 3^{(1/2)}*f*h*x*333i + 3^{(1/2)}*f*i*x*272i + 3^{(1/2)}*g*h*x*224i - 3^{(1/2)} \\
& *h*i*x*224i - 3^{(1/2)}*d*e*x*1504i)*((9*d)/32 - f/8 + (3*h)/32 + (3^{(1/2)}* \\
& d*13i)/288 - (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/144 + (3^{(1/2)}*g*1i)/18 + (3 \\
& ^{(1/2)}*h*1i)/288 - (3^{(1/2)}*i*1i)/18) + \log(1920*d*e + 2763*d*f - 960*d*g - \\
& 480*e*f - 1971*d*h + 960*d*i + 480*e*h + 240*f*g + 981*f*h - 240*f*i - 240 \\
& *g*h + 240*h*i + 3^{(1/2)}*d^2*1620i + 3^{(1/2)}*f^2*180i + 3^{(1/2)}*h^2*135i + \\
& 3807*d^2*x + 612*f^2*x + 378*h^2*x - 2754*d^2 - 684*f^2 - 351*h^2 + 3^{(1/2)} \\
& *d*e*1088i - 3^{(1/2)}*d*f*1125i - 3^{(1/2)}*d*g*544i - 3^{(1/2)}*e*f*608i + 3^{(1 \\
& /2)}*d*h*945i + 3^{(1/2)}*d*i*544i + 3^{(1/2)}*e*h*416i + 3^{(1/2)}*f*g*304i - 3^{(\\
& 1/2)}*f*h*315i - 3^{(1/2)}*f*i*304i - 3^{(1/2)}*g*h*208i + 3^{(1/2)}*h*i*208i + 67 \\
& 2*d*e*x - 3069*d*f*x - 336*d*g*x - 672*e*f*x + 2403*d*h*x + 336*d*i*x + 384 \\
& *e*h*x + 336*f*g*x - 963*f*h*x - 336*f*i*x - 192*g*h*x + 192*h*i*x + 3^{(1/2)} \\
&)*d^2*x*567i + 3^{(1/2)}*f^2*x*252i + 3^{(1/2)}*h^2*x*108i - 3^{(1/2)}*d*f*x*819i \\
& + 3^{(1/2)}*d*g*x*752i + 3^{(1/2)}*e*f*x*544i + 3^{(1/2)}*d*h*x*513i - 3^{(1/2)}*d \\
& *i*x*752i - 3^{(1/2)}*e*h*x*448i - 3^{(1/2)}*f*g*x*272i - 3^{(1/2)}*f*h*x*333i + \\
& 3^{(1/2)}*f*i*x*272i + 3^{(1/2)}*g*h*x*224i - 3^{(1/2)}*h*i*x*224i - 3^{(1/2)}*d*e* \\
& x*1504i)*(f/8 - (9*d)/32 - (3*h)/32 + (3^{(1/2)}*d*13i)/288 + (3^{(1/2)}*e*1i)/ \\
& 9 + (3^{(1/2)}*f*1i)/144 - (3^{(1/2)}*g*1i)/18 + (3^{(1/2)}*h*1i)/288 + (3^{(1/2)}* \\
& i*1i)/18)
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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)/(x**4+x**2+1)**3,x)

[Out] Timed out

$$3.52 \quad \int \frac{d+ex}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=474

$$\frac{dx(3bcx^2(b^2-8ac) + (b^2-7ac)(3b^2-4ac))}{8a^2(b^2-4ac)^2(a+bx^2+cx^4)} + \frac{3\sqrt{c}d(56a^2c^2-10ab^2c+b(b^2-8ac)\sqrt{b^2-4ac}+b^4)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{8\sqrt{2}a^2(b^2-4ac)^{5/2}\sqrt{b-\sqrt{b^2-4ac}}}$$

[Out] $-1/4*e*(2*c*x^2+b)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+1/4*d*x*(b*c*x^2-2*a*c+b^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+3/2*c*e*(2*c*x^2+b)/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)+1/8*d*x*((-7*a*c+b^2)*(-4*a*c+3*b^2)+3*b*c*(-8*a*c+b^2)*x^2)/a^2/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)-6*c^2*e*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/(-4*a*c+b^2)^(5/2)+3/16*d*arctan(x^2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(b^4-10*a*b^2*c+56*a^2*c^2+b*(-8*a*c+b^2)*(-4*a*c+b^2)^(1/2))/a^2/(-4*a*c+b^2)^(5/2)*2^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+3/16*d*arctan(x^2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(b^3-8*a*b*c+(-56*a^2*c^2+10*a*b^2*c-b^4)/(-4*a*c+b^2)^(1/2))/a^2/(-4*a*c+b^2)^2*2^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)$

Rubi [A] time = 2.19, antiderivative size = 474, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 10, integrand size = 20, $\frac{\text{number of rules}}{\text{integrand size}} = 0.500$, Rules used = {1673, 12, 1092, 1178, 1166, 205, 1107, 614, 618, 206}

$$\frac{3\sqrt{c}d(56a^2c^2-10ab^2c+b(b^2-8ac)\sqrt{b^2-4ac}+b^4)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{8\sqrt{2}a^2(b^2-4ac)^{5/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{3\sqrt{c}d\left(-\frac{56a^2c^2-10ab^2c+b^4}{\sqrt{b^2-4ac}}-8abc+b^4\right)}{8\sqrt{2}a^2(b^2-4ac)^2\sqrt{b-\sqrt{b^2-4ac}}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x)/(a + b*x^2 + c*x^4)^3, x]

[Out] $-(e*(b+2*c*x^2))/(4*(b^2-4*a*c)*(a+b*x^2+c*x^4)^2)+(d*x*(b^2-2*a*c+b*c*x^2))/(4*a*(b^2-4*a*c)*(a+b*x^2+c*x^4)^2)+(3*c*e*(b+2*c*x^2))/(2*(b^2-4*a*c)^2*(a+b*x^2+c*x^4))+(d*x*((b^2-7*a*c)*(3*b^2-4*a*c)+3*b*c*(b^2-8*a*c)*x^2))/(8*a^2*(b^2-4*a*c)^2*(a+b*x^2+c*x^4))+(3*sqrt[c]*(b^4-10*a*b^2*c+56*a^2*c^2+b*(b^2-8*a*c)*sqrt[b^2-4*a*c])*d*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b-sqrt[b^2-4*a*c]]])/(8*sqrt[2]*a^2*(b^2-4*a*c)^(5/2)*sqrt[b-sqrt[b^2-4*a*c]])+(3*sqrt[c]*(b^3-8*a*b*c+(b^4-10*a*b^2*c+56*a^2*c^2)/sqrt[b^2-4*a*c])*d*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b+sqrt[b^2-4*a*c]]])/(8*sqrt[2]*a^2*(b^2-4*a*c)^(5/2)*sqrt[b+sqrt[b^2-4*a*c]])$

$$a*c)^2*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) - (6*c^2*e*\text{ArcTanh}[(b + 2*c*x^2)/\text{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c)^{(5/2)}$$
Rule 12

```
Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (GtQ[a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p + 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1092

```
Int[((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := -Simp[(x*(b^2 - 2*a*c + b*c*x^2)*(a + b*x^2 + c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(b^2 - 2*a*c + 2*(p + 1)*(b^2 - 4*a*c) + b*c*(4*p + 7)*x^2)*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2, Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{d+ex}{(a+bx^2+cx^4)^3} dx &= \int \frac{d}{(a+bx^2+cx^4)^3} dx + \int \frac{ex}{(a+bx^2+cx^4)^3} dx \\
&= d \int \frac{1}{(a+bx^2+cx^4)^3} dx + e \int \frac{x}{(a+bx^2+cx^4)^3} dx \\
&= \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} - \frac{d \int \frac{b^2-2ac-4(b^2-4ac)-5bcx^2}{(a+bx^2+cx^4)^2} dx}{4a(b^2-4ac)} + \frac{1}{2} e \text{Subst} \left(\int \frac{1}{(a+bx^2+cx^4)^2} dx \right) \\
&= -\frac{e(b+2cx^2)}{4(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx((b^2-7ac)(3b^2-4ac))}{8a^2(b^2-4ac)^2(a+bx^2+cx^4)} \\
&= -\frac{e(b+2cx^2)}{4(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{3ce(b+2cx^2)}{2(b^2-4ac)^2(a+bx^2+cx^4)} \\
&= -\frac{e(b+2cx^2)}{4(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{3ce(b+2cx^2)}{2(b^2-4ac)^2(a+bx^2+cx^4)} \\
&= -\frac{e(b+2cx^2)}{4(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{3ce(b+2cx^2)}{2(b^2-4ac)^2(a+bx^2+cx^4)}
\end{aligned}$$

Mathematica [A] time = 1.91, size = 488, normalized size = 1.03

$$\frac{1}{16} \left(\frac{8a^2c(3be+cx(7d+6ex)) - 2abcdx(25b+24cx^2) + 6b^3dx(b+cx^2)}{a^2(b^2-4ac)^2(a+bx^2+cx^4)} + \frac{3\sqrt{2}\sqrt{c}d(56a^2c^2-10ab^2c-8abc\sqrt{b^2-4ac})}{a^2(b^2-4ac)^2(a+bx^2+cx^4)} \right)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x)/(a + b*x^2 + c*x^4)^3, x]

[Out] ((4*a*b*e + 8*a*c*x*(d + e*x) - 4*b*d*x*(b + c*x^2))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (6*b^3*d*x*(b + c*x^2) - 2*a*b*c*d*x*(25*b + 24*c*x^2))/(a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)))

$$\begin{aligned} & + 8*a^2*c*(3*b*e + c*x*(7*d + 6*e*x))/(a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (3*\sqrt{2}*\sqrt{c}*(b^4 - 10*a*b^2*c + 56*a^2*c^2 + b^3*\sqrt{b^2 - 4*a*c} - 8*a*b*c*\sqrt{b^2 - 4*a*c})*d*\text{ArcTan}[(\sqrt{2}*\sqrt{c}*x)/\sqrt{b - \sqrt{b^2 - 4*a*c}}])/(a^2*(b^2 - 4*a*c)^{(5/2)}*\sqrt{b - \sqrt{b^2 - 4*a*c}}) \\ & - (3*\sqrt{2}*\sqrt{c}*(b^4 - 10*a*b^2*c + 56*a^2*c^2 - b^3*\sqrt{b^2 - 4*a*c} + 8*a*b*c*\sqrt{b^2 - 4*a*c})*d*\text{ArcTan}[(\sqrt{2}*\sqrt{c}*x)/\sqrt{b + \sqrt{b^2 - 4*a*c}}])/(a^2*(b^2 - 4*a*c)^{(5/2)}*\sqrt{b + \sqrt{b^2 - 4*a*c}}) + (48*c^2*e*\text{Log}[-b + \sqrt{b^2 - 4*a*c} - 2*c*x^2])/(b^2 - 4*a*c)^{(5/2)} - (48*c^2*e*\text{Log}[b + \sqrt{b^2 - 4*a*c} + 2*c*x^2])/(b^2 - 4*a*c)^{(5/2)}/16 \end{aligned}$$

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="fricas")

[Out] Timed out

giac [B] time = 13.32, size = 3397, normalized size = 7.17

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="giac")

[Out]
$$\begin{aligned} & 3/32*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^8 - 17*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^6*c - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^7*c - 2*b^8*c + 116*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^4*c^2 + 26*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^5*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^6*c^2 + 34*a*b^6*c^2 + 2*b^7*c^2 - 368*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^2*c^3 - 128*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^3*c^3 - 13*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^4*c^3 - 232*a^2*b^4*c^3 - 30*a*b^5*c^3 + 448*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*c^4 + 224*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^4 + 64*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^2*c^4 + 736*a^3*b^2*c^4 + 176*a^2*b^3*c^4 - 112*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*c^5 - 896*a^4*c^5 - 352*a^3*b*c^5 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^7 + 15*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^5*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^6*c - 88*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^3*c^2 - 22*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^4*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^5*c^2 + 176*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^3 + 88*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^2*c^3 + 11*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^3*c^3 - 11*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*c^4 + 11*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*c^4 + 11*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*c^4 \end{aligned}$$

$$\begin{aligned}
& \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 b^3 c^3 - 44 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}c} a^2 b^3 c^4 + 2(b^2 - 4ac) \\
& b^6 c - 26(b^2 - 4ac) a^2 b^4 c^2 - 2(b^2 - 4ac) b^5 c^2 + 128(b^2 - 4ac) a^2 b^2 c^3 + 22(b^2 - 4ac) a^2 b^3 c^3 - 224(b^2 - 4ac) a^3 c^4 \\
& - 88(b^2 - 4ac) a^2 b^3 c^4) d \arctan(2 \sqrt{1/2} x / \sqrt{(a^2 b^5 - 8a^3 b^3 c + 16a^4 b^2 c^2 + \sqrt{(a^2 b^5 - 8a^3 b^3 c + 16a^4 b^2 c^2)^2 - 4(a^3 b^4 - 8a^4 b^2 c + 16a^5 c^2)(a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3)})) / (a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3)) / ((a^3 b^8 - 16a^4 b^6 c - 2a^3 b^7 c + 96a^5 b^4 c^2 + 24a^4 b^5 c^2 + a^3 b^6 c^2 - 256a^6 b^2 c^3 - 96a^5 b^3 c^3 - 12a^4 b^4 c^3 + 256a^7 c^4 + 128a^6 b^2 c^4 + 48a^5 b^2 c^4 - 64a^6 c^5) \operatorname{abs}(c)) + 3/32 (\sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}} c) b^8 - 17 \sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^2 b^6 c - 2 \sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}} c) b^7 c + 2 b^8 c + 116 \sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^2 b^4 c^2 + 26 \sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^2 b^5 c^2 + \sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}} c) b^6 c^2 - 34 a^2 b^6 c^2 - 2 b^7 c^2 - 368 \sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^3 b^2 c^3 - 128 \sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^2 b^3 c^3 - 13 \sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^2 b^4 c^3 + 232 a^2 b^4 c^3 + 30 a^2 b^5 c^3 + 448 \sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^4 c^4 + 224 \sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^3 b^2 c^4 + 64 \sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^2 b^2 c^4 - 736 a^3 b^2 c^4 - 176 a^2 b^3 c^4 - 112 \sqrt{2} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^3 c^5 + 896 a^4 c^5 + 352 a^3 b^2 c^5 + \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} c) b^7 - 15 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^2 b^5 c - 2 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} c) b^6 c + 88 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^2 b^3 c^2 + 22 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^2 b^4 c^2 + \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} c) b^5 c^2 - 176 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^3 b^2 c^3 - 88 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^2 b^2 c^3 - 11 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^2 b^3 c^3 + 44 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^2 b^3 c^4 - 2(b^2 - 4ac) b^6 c + 26(b^2 - 4ac) a^2 b^4 c^2 + 2(b^2 - 4ac) b^5 c^2 - 128(b^2 - 4ac) a^2 b^2 c^3 - 22(b^2 - 4ac) a^2 b^3 c^3 + 224(b^2 - 4ac) a^3 c^4 + 88(b^2 - 4ac) a^2 b^3 c^4) d \arctan(2 \sqrt{1/2} x / \sqrt{(a^2 b^5 - 8a^3 b^3 c + 16a^4 b^2 c^2 + \sqrt{(a^2 b^5 - 8a^3 b^3 c + 16a^4 b^2 c^2)^2 - 4(a^3 b^4 - 8a^4 b^2 c + 16a^5 c^2)(a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3)})) / (a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3)) / ((a^3 b^8 - 16a^4 b^6 c - 2a^3 b^7 c + 96a^5 b^4 c^2 + 24a^4 b^5 c^2 + a^3 b^6 c^2 - 256a^6 b^2 c^3 - 96a^5 b^3 c^3 - 12a^4 b^4 c^3 + 256a^7 c^4 + 128a^6 b^2 c^4 + 48a^5 b^2 c^4 - 64a^6 c^5) \operatorname{abs}(c)) - 3(b^2 c^4 - 4a^2 c^5 - 2b^2 c^5 + c^6) \sqrt{b^2 - 4ac} e \log(x^2 + 1/2(a^2 b^5 - 8a^3 b^3 c + 16a^4 b^2 c^2 + \sqrt{(a^2 b^5 - 8a^3 b^3 c + 16a^4 b^2 c^2)^2 - 4(a^3 b^4 - 8a^4 b^2 c + 16a^5 c^2)(a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3)})) / (a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3)) / ((b^8 - 16a^2 b^6 c - 2b^7 c + 96a^2 b^4 c^2 + 24a^2 b^5 c^2 + b^6 c^2 - 256a^3 b^2 c^3 - 96a^2 b^3 c
\end{aligned}$$

$$c^3 - 12ab^4c^3 + 256a^4c^4 + 128a^3b^2c^4 + 48a^2b^2c^4 - 64a^3c^5)c^2) + 3(b^2c^4 - 4a^2c^5 - 2b^2c^5 + c^6)\sqrt{b^2 - 4ac}e\log(x^2 + 1/2(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2 - \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2)^2 - 4(a^3b^4 - 8a^4b^2c + 16a^5c^2)}(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3)))/(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3))/((b^8 - 16ab^6c - 2b^7c + 96a^2b^4c^2 + 24ab^5c^2 + b^6c^2 - 256a^3b^2c^3 - 96a^2b^3c^3 - 12ab^4c^3 + 256a^4c^4 + 128a^3b^2c^4 + 48a^2b^2c^4 - 64a^3c^5)c^2) + 1/8(3b^3c^2dx^7 - 24ab^3c^3dx^7 + 24a^2c^3x^6e + 6b^4cdx^5 - 49ab^2c^2dx^5 + 28a^2c^3dx^5 + 36a^2b^2c^2x^4e + 3b^5dx^3 - 20ab^3cdx^3 - 4a^2b^2c^2dx^3 + 8a^2b^2c^2x^2e + 40a^3c^2x^2e + 5ab^4dx - 37a^2b^2cdx + 44a^3c^2dx - 2a^2b^3e + 20a^3b^2ce)/((a^2b^4 - 8a^3b^2c + 16a^4c^2)(cx^4 + bx^2 + a)^2)$$

maple [B] time = 0.36, size = 3725, normalized size = 7.86

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((e*x+d)/(c*x^4+b*x^2+a)^3,x)$

[Out] $\frac{3}{16}c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/a^22^{(1/2)/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\text{arctanh}(2^{(1/2)/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx)*(-4ac+b^2)^{(1/2)}b^4d-15/8c^2/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/a^2^{(1/2)/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\text{arctan}(2^{(1/2)/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx)*(-4ac+b^2)^{(1/2)}b^2d+3/16c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/a^22^{(1/2)/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\text{arctan}(2^{(1/2)/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx)*(-4ac+b^2)^{(1/2)}b^4d-15/8c^2/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/a^2^{(1/2)/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\text{arctanh}(2^{(1/2)/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx)*(-4ac+b^2)^{(1/2)}b^2d+3/16c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/a^22^{(1/2)/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\text{arctanh}(2^{(1/2)/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx)*b^5d-15/8c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2*(-4ac+b^2)^{(1/2)/c)^2/ad*x^3*(-4ac+b^2)^{(1/2)}b^2+9/4c^2/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/a^2^{(1/2)/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\text{arctan}(2^{(1/2)/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx)*b^3d-3/16c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/a^22^{(1/2)/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\text{arctan}(2^{(1/2)/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx)*b^5d+15/8c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2*(-4ac+b^2)^{(1/2)/c)^2/ad*x^3*(-4ac+b^2)^{(1/2)}b^2-9/4c^2/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/a^2^{(1/2)/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\text{arctanh}(2^{(1/2)/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx)*b^3d-3c^2/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)*(-4ac+b^2)^{(1/2)}e*\ln(-2cx^2-b+(-4ac+b^2)^{(1/2)})+3c^2/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)*(-4ac+b^2)^{(1/2)}e*\ln(2cx^2+b+(-4ac+b^2)^{(1/2)})-1/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2*(-4ac+b^2)^{(1/2)/c)$

$$\begin{aligned}
& ^2e*(-4*a*c+b^2)^{(1/2)}*b^2+1/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2e*(-4*a*c+b^2)^{(1/2)}*b^2-3/4/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2e*b^3-3/4/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2e*b^3-3/16/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2/a^2*d*x^3*b^5-5/16/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d/a*x*b^4-3/16/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2/a^2*d*x^3*b^5-5/16/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d/a*x*b^4+9/2*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d*x^3*(-4*a*c+b^2)^{(1/2)}-6*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d*x^3*b+6*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2e*x^2*a-3/2*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2e*x^2*b^2-11*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d*a*x+4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d*x*b^2+4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2e*(-4*a*c+b^2)^{(1/2)}*a+3*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2e*a*b-9/2*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d*x^3*(-4*a*c+b^2)^{(1/2)}-6*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d*x^3*b+6*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2e*x^2*a-3/2*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2e*x^2*b^2-11*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d*a*x+4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d*x*b^2-4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2e*(-4*a*c+b^2)^{(1/2)}*a+3*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2e*a*b+9/4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2/a*d*x^3*b^3+5/4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d*x*b*(-4*a*c+b^2)^{(1/2)}+9/4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2/a*d*x^3*b^3-5/4*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d*x*b*(-4*a*c+b^2)^{(1/2)}+21/2*c^3/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^{(1/2)})*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^{(1/2)})*c)^(1/2)*c*x)*(-4*a*c+b^2)^{(1/2)}*d-6*c^3/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)*2^(1/2)/((b+(-4*a*c+b^2)^{(1/2)})*c)^(1/2)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^{(1/2)})*c)^(1/2)*c*x)*b*d+21/2*c^3/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)*2^(1/2)/((-b+(-4*a*c+b^2)^{(1/2)})*c)^(1/2)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^{(1/2)})*c)^(1/2)*c*x)*(-4*a*c+b^2)^{(1/2)}*d+3/16/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2/a^2*d*x^3*(-4*a*c+b^2)^{(1/2)}*b^4+5/16/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)^2*d/a*x*b^3*(-4*a*c+b^2)^{(1/2)}
\end{aligned}$$

$$\frac{1}{2} - \frac{3}{16} \frac{(16a^2c^2 - 8ab^2c + b^4)^{1/2}}{(4ac - b^2)^{1/2}} \frac{1}{(x^2 + 1/2b/c - 1/2(-4ac + b^2)^{1/2}/c)^2} \frac{d}{a^2 dx^3} \frac{(-4ac + b^2)^{1/2} b^4 - 5/16(16a^2c^2 - 8ab^2c + b^4)^{1/2}}{(4ac - b^2)^{1/2}} \frac{1}{(x^2 + 1/2b/c - 1/2(-4ac + b^2)^{1/2}/c)^2} \frac{d}{a^2 dx^3} \frac{(-4ac + b^2)^{1/2} + 6c^3}{(16a^2c^2 - 8ab^2c + b^4)^{1/2}} \frac{1}{(4ac - b^2)^{1/2}} \frac{1}{2^{1/2}} \frac{1}{((-b + (-4ac + b^2)^{1/2})c)^{1/2}} \operatorname{arctanh}\left(\frac{2^{1/2}}{(-b + (-4ac + b^2)^{1/2})c}\right) \frac{1}{2} c^2 x b d$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\frac{24a^2c^3ex^6 + 36a^2bc^2ex^4 + 3(b^3c^2 - 8abc^3)dx^7 + (6b^4c - 49ab^2c^2 + 28a^2c^3)dx^5 + (3b^5 - 20ab^3c - 4a^2bc^2)d}{8((a^2b^4c^2 - 8a^3b^2c^3 + 16a^4c^4)x^8 + a^4b^4 - 8a^5b^2c + 16a^6c^2 + 2(a^2b^5c - 8a^3b^3c^2 + 16a^4bc^3)x^6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="maxima")

[Out] $\frac{1}{8} \frac{(24a^2c^3ex^6 + 36a^2bc^2ex^4 + 3(b^3c^2 - 8abc^3)dx^7 + (6b^4c - 49ab^2c^2 + 28a^2c^3)dx^5 + (3b^5 - 20ab^3c - 4a^2bc^2)d)dx^8 + a^4b^4 - 8a^5b^2c + 16a^6c^2 + 2(a^2b^5c - 8a^3b^3c^2 + 16a^4bc^3)x^6}{(a^2b^4c^2 - 8a^3b^2c^3 + 16a^4c^4)x^8 + a^4b^4 - 8a^5b^2c + 16a^6c^2 + 2(a^2b^5c - 8a^3b^3c^2 + 16a^4bc^3)x^6} - \frac{2(a^2b^3 - 10a^3b^2c)e}{(a^2b^4c^2 - 8a^3b^2c^3 + 16a^4c^4)x^8 + a^4b^4 - 8a^5b^2c + 16a^6c^2 + 2(a^2b^5c - 8a^3b^3c^2 + 16a^4bc^3)x^6} + \frac{(a^2b^6 - 6a^3b^4c + 32a^5c^3)x^4 + 2(a^3b^5 - 8a^4b^3c + 16a^5b^2c^2)x^2 - 3/8 \int (-16a^2c^2ex + (b^3c - 8ab^2c^2)dx^2 + (b^4 - 9ab^2c + 28a^2c^2)d)}{(c^2x^4 + b^2x^2 + a), x}{(a^2b^4c^2 - 8a^3b^2c^3 + 16a^4c^4)}$

mupad [B] time = 2.34, size = 4225, normalized size = 8.91

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x)/(a + b*x^2 + c*x^4)^3,x)

[Out] $\operatorname{symbsum}(\log(\operatorname{root}(56371445760a^{11}b^8c^6z^4 - 503316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c^2z^4 - 171798691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 128849018880a^{12}b^6c^7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 3523215360a^9b^{12}c^4z^4 - 2621440a^6b^{18}c^2z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^3c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^8b^{17}c^5d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^2z^2 + 23592960a^6b^8c^5e^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1207959552a^{10}c^9e^2z^2 + 2304b^{19}d^2z^2))$

$$\begin{aligned}
& - 428544*a*b^{12}*c^3*d^2*e*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6*d^2*e*z - 46725120*a^3*b^8*c^5*d^2*e*z + 5930496*a^2*b^{10}*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 13824*b^{14}*c^2*d^2*e*z + 34836480*a^4*b*c^8*d^2*e^2 - 435456*a*b^7*c^5*d^2*e^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 20736*b^9*c^4*d^2*e^2 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k) * (root(56371445760*a^{11}*b^8*c^6*z^4 - 503316480*a^8*b^{14}*c^3*z^4 + 47185920*a^7*b^{16}*c^2*z^4 - 171798691840*a^{14}*b^2*c^9*z^4 + 193273528320*a^{13}*b^4*c^8*z^4 - 128849018880*a^{12}*b^6*c^7*z^4 - 16911433728*a^{10}*b^{10}*c^5*z^4 + 3523215360*a^9*b^{12}*c^4*z^4 - 2621440*a^6*b^{18}*c*z^4 + 68719476736*a^{15}*c^{10}*z^4 + 65536*a^5*b^{20}*z^4 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^{17}*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^{11}*c^4*d^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 19860480*a^3*b^{13}*c^3*d^2*z^2 - 1179648*a^5*b^{10}*c^4*e^2*z^2 + 1771776*a^2*b^{15}*c^2*d^2*z^2 + 1207959552*a^{10}*c^9*e^2*z^2 + 2304*b^{19}*d^2*z^2 - 428544*a*b^{12}*c^3*d^2*e*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6*d^2*e*z - 46725120*a^3*b^8*c^5*d^2*e*z + 5930496*a^2*b^{10}*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 13824*b^{14}*c^2*d^2*e*z + 34836480*a^4*b*c^8*d^2*e^2 - 435456*a*b^7*c^5*d^2*e^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 20736*b^9*c^4*d^2*e^2 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k) * ((x*(786432*a^9*c^9*e - 768*a^4*b^{10}*c^4*e + 15360*a^5*b^8*c^5*e - 122880*a^6*b^6*c^6*e + 491520*a^7*b^4*c^7*e - 983040*a^8*b^2*c^8*e))/(32*(a^4*b^{12} + 4096*a^{10}*c^6 - 24*a^5*b^{10}*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - (3*(7340032*a^9*c^9*d - 256*a^2*b^{14}*c^2*d + 7424*a^3*b^{12}*c^3*d - 94208*a^4*b^{10}*c^4*d + 675840*a^5*b^8*c^5*d - 2949120*a^6*b^6*c^6*d + 7798784*a^7*b^4*c^7*d - 11534336*a^8*b^2*c^8*d))/(512*(a^4*b^{12} + 4096*a^{10}*c^6 - 24*a^5*b^{10}*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (root(56371445760*a^{11}*b^8*c^6*z^4 - 503316480*a^8*b^{14}*c^3*z^4 + 47185920*a^7*b^{16}*c^2*z^4 - 171798691840*a^{14}*b^2*c^9*z^4 + 193273528320*a^{13}*b^4*c^8*z^4 - 128849018880*a^{12}*b^6*c^7*z^4 - 16911433728*a^{10}*b^{10}*c^5*z^4 + 3523215360*a^9*b^{12}*c^4*z^4 - 2621440*a^6*b^{18}*c*z^4 + 68719476736*a^{15}*c^{10}*z^4 + 65536*a^5*b^{20}*z^4 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^{17}*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^{11}*c^4*d^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 19860480*a^3*b^{13}*c^3*d^2*z^2 - 1179648*a^5*b^{10}*c^4*e^2*z^2 + 1771776*a^2*b^{15}*c^2*d^2*z^2 + 1207959552*a^{10}*c^9*e^2*z^2 + 2304*b^{19}*d^2*z^2 - 428544*a*b^{12}*c^3*d^2*e*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6*d^2*e*z - 46725120*a^3*b^8*c^5*d^2*e*z + 5930496*a^2*b^{10}*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 13824*b^{14}*c^2*d^2*e*z + 34836480*a^4*b*c^8*d^2*e^2 - 435456*a*b^7*c^5*d^2*e^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 20736*b^9*c^4*d^2*e^2 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k) *
\end{aligned}$$

$$\begin{aligned}
&6c^6d^2e^*z - 46725120a^3b^8c^5d^2e^*z + 5930496a^2b^{10}c^4d^2e^*z \\
&- 693633024a^7c^9d^2e^*z + 13824b^{14}c^2d^2e^*z + 34836480a^4b^*c^8 \\
&d^2e^2 - 435456a*b^7c^5d^2e^2 - 17418240a^3b^3c^7d^2e^2 + 3919104 \\
&a^2b^5c^6d^2e^2 + 20736b^9c^4d^2e^2 - 27433728a^3b^2c^8d^4 + 6 \\
&446304a^2b^4c^7d^4 - 734832a*b^6c^6d^4 + 49787136a^4c^9d^4 + 5308 \\
&416a^5c^8e^4 + 35721b^8c^5d^4, z, k) * (4194304a^{11}b^*c^9 - 256a^4* \\
&b^{15}c^2 + 7168a^5b^{13}c^3 - 86016a^6b^{11}c^4 + 573440a^7b^9c^5 - 22 \\
&93760a^8b^7c^6 + 5505024a^9b^5c^7 - 7340032a^{10}b^3c^8) / (32*(a^4*b \\
&^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + \\
&3840a^8b^4c^4 - 6144a^9b^2c^5)) + (3*(1081344a^6b^*c^8d^*e + 1536a \\
&^2b^9c^4d^*e - 29184a^3b^7c^5d^*e + 227328a^4b^5c^6d^*e - 811008a^ \\
&5b^3c^7d^*e)) / (512*(a^4*b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^ \\
&8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) - (x*(2257 \\
&92a^6c^9d^2 + 9b^{12}c^3d^2 - 252a*b^{10}c^4d^2 - 36864a^6b^*c^8e^2 \\
&+ 3114a^2b^8c^5d^2 - 21312a^3b^6c^6d^2 + 88128a^4b^4c^7d^2 - 21 \\
&1968a^5b^2c^8d^2 - 2304a^4b^5c^6e^2 + 18432a^5b^3c^7e^2)) / (32*(\\
&a^4*b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^ \\
&^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (3*(3456a*b^5c^6d^3 - 189* \\
&b^7c^5d^3 + 56448a^3b^*c^8d^3 + 64512a^4c^8d^*e^2 - 22608a^2b^3c^7 \\
&*d^3 + 2304a^2b^4c^6d^*e^2 - 20736a^3b^2c^7d^*e^2)) / (512*(a^4*b^{12} + \\
&4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a \\
&^8b^4c^4 - 6144a^9b^2c^5)) + (x*(6912a^4c^8e^3 - 27b^7c^5d^2e + \\
&486a*b^5c^6d^2e + 12096a^3b^*c^8d^2e - 3672a^2b^3c^7d^2e)) / (32 \\
&*(a^4*b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6 \\
&*c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) * \text{root}(56371445760a^{11}b^8c^6 \\
&*z^4 - 503316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c^2z^4 - 17179869184 \\
&0a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 128849018880a^{12}b^6c^ \\
&7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 3523215360a^9b^{12}c^4z^4 - 262 \\
&1440a^6b^{18}c^*z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 + 6936 \\
&330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^ \\
&9b^*c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 - 5400428544a^7b^5c^7d \\
&^2z^2 - 94464a*b^{17}c^d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656 \\
&a^5b^9c^5d^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^ \\
&^4d^2z^2 + 23592960a^6b^8c^5e^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - \\
&1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1207959552a \\
&^{10}c^9e^2z^2 + 2304b^{19}d^2z^2 - 428544a*b^{12}c^3d^2e^*z + 102275481 \\
&6a^6b^2c^8d^2e^*z - 642318336a^5b^4c^7d^2e^*z + 223395840a^4b^6c^ \\
&^6d^2e^*z - 46725120a^3b^8c^5d^2e^*z + 5930496a^2b^{10}c^4d^2e^*z - \\
&693633024a^7c^9d^2e^*z + 13824b^{14}c^2d^2e^*z + 34836480a^4b^*c^8d^2 \\
&*e^2 - 435456a*b^7c^5d^2e^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^ \\
&2b^5c^6d^2e^2 + 20736b^9c^4d^2e^2 - 27433728a^3b^2c^8d^4 + 6446 \\
&304a^2b^4c^7d^4 - 734832a*b^6c^6d^4 + 49787136a^4c^9d^4 + 5308416 \\
&a^5c^8e^4 + 35721b^8c^5d^4, z, k), k, 1, 4) + ((x^2*(5a^*c^2e + b^2* \\
&c^*e)) / (b^4 + 16a^2c^2 - 8a*b^2c) - (b^3e - 10a*b^*c^*e)) / (4*(b^4 + 16a^ \\
&2c^2 - 8a*b^2c)) + (3c^3e*x^6) / (b^4 + 16a^2c^2 - 8a*b^2c) + (9b^*c
\end{aligned}$$

$$\frac{d^2 e x^4}{2(b^4 + 16a^2 c^2 - 8ab^2 c)} - \frac{d^3 x^3 (4a^2 b c^2 - 3b^5 + 20ab^3 c)}{8a^2 (b^4 + 16a^2 c^2 - 8ab^2 c)} + \frac{d^4 x (5b^4 + 44a^2 c^2 - 37ab^2 c)}{8a (b^4 + 16a^2 c^2 - 8ab^2 c)} + \frac{d^5 x^5 (6b^4 c + 28a^2 c^3 - 49ab^2 c^2)}{8a^2 (b^4 + 16a^2 c^2 - 8ab^2 c)} + \frac{3c d^7 x^7 (b^3 c - 8ab c^2)}{8a^2 (b^4 + 16a^2 c^2 - 8ab^2 c)} \Big/ (x^4 (2ac + b^2) + a^2 + c^2 x^8 + 2abx^2 + 2bcx^6)$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(c*x**4+b*x**2+a)**3,x)

[Out] Timed out

$$3.53 \quad \int \frac{d+ex+fx^2}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=621

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d \right) + \sqrt{c} \left(-\frac{52a^2bcf + 168a^2c^2d}{\sqrt{b}} \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)}$$

[Out] $-1/4 * e * (2 * c * x^2 + b) / (-4 * a * c + b^2) / (c * x^4 + b * x^2 + a)^2 + 1/4 * x * (b^2 * d - 2 * a * c * d - a * b * f + c * (-2 * a * f + b * d) * x^2) / a / (-4 * a * c + b^2) / (c * x^4 + b * x^2 + a)^2 + 3/2 * c * e * (2 * c * x^2 + b) / (-4 * a * c + b^2)^2 / (c * x^4 + b * x^2 + a) + 1/8 * x * (3 * b^4 * d - 25 * a * b^2 * c * d + 28 * a^2 * c^2 * d + a * b^3 * f + 8 * a^2 * b * c * f + c * (20 * a^2 * c * f + a * b^2 * f - 24 * a * b * c * d + 3 * b^3 * d) * x^2) / a^2 / (-4 * a * c + b^2)^2 / (c * x^4 + b * x^2 + a) - 6 * c^2 * e * \operatorname{arctanh}((2 * c * x^2 + b) / (-4 * a * c + b^2)^{(1/2)}) / (-4 * a * c + b^2)^{(5/2)} + 1/16 * \operatorname{arctan}(x * 2^{(1/2)} * c^{(1/2)} / (b - (-4 * a * c + b^2)^{(1/2)})^{(1/2)}) * c^{(1/2)} * (3 * b^4 * d + b^3 * (a * f + 3 * d * (-4 * a * c + b^2)^{(1/2)}) - 4 * a * b * c * (13 * a * f + 6 * d * (-4 * a * c + b^2)^{(1/2)}) - a * b^2 * (30 * c * d - f * (-4 * a * c + b^2)^{(1/2)}) + 4 * a^2 * c * (42 * c * d + 5 * f * (-4 * a * c + b^2)^{(1/2)})) / a^2 / (-4 * a * c + b^2)^{(5/2)} * 2^{(1/2)} / (b - (-4 * a * c + b^2)^{(1/2)})^{(1/2)} + 1/16 * \operatorname{arctan}(x * 2^{(1/2)} * c^{(1/2)} / (b + (-4 * a * c + b^2)^{(1/2)})^{(1/2)}) * c^{(1/2)} * (3 * b^3 * d - 24 * a * b * c * d + a * b^2 * f + 20 * a^2 * c * f + (52 * a^2 * b * c * f - 168 * a^2 * c^2 * d - a * b^3 * f + 30 * a * b^2 * c * d - 3 * b^4 * d) / (-4 * a * c + b^2)^{(1/2)}) / a^2 / (-4 * a * c + b^2)^2 * 2^{(1/2)} / (b + (-4 * a * c + b^2)^{(1/2)})^{(1/2)}$

Rubi [A] time = 4.51, antiderivative size = 621, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 9, integrand size = 25, $\frac{\text{number of rules}}{\text{integrand size}} = 0.360$, Rules used = {1673, 1178, 1166, 205, 12, 1107, 614, 618, 206}

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d - 25ab^2cd + ab^3f + 3b^4d \right) + \sqrt{c} \left(-\frac{52a^2bcf + 168a^2c^2d}{\sqrt{b}} \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4)^3, x]

[Out] $-(e * (b + 2 * c * x^2)) / (4 * (b^2 - 4 * a * c) * (a + b * x^2 + c * x^4)^2) + (x * (b^2 * d - 2 * a * c * d - a * b * f + c * (b * d - 2 * a * f) * x^2)) / (4 * a * (b^2 - 4 * a * c) * (a + b * x^2 + c * x^4)^2) + (3 * c * e * (b + 2 * c * x^2)) / (2 * (b^2 - 4 * a * c)^2 * (a + b * x^2 + c * x^4)) + (x * (3 * b^4 * d - 25 * a * b^2 * c * d + 28 * a^2 * c^2 * d + a * b^3 * f + 8 * a^2 * b * c * f + c * (3 * b^3 * d - 24 * a * b * c * d + a * b^2 * f + 20 * a^2 * c * f) * x^2)) / (8 * a^2 * (b^2 - 4 * a * c)^2 * (a + b * x^2 + c * x^4)) + (\operatorname{Sqrt}[c] * (3 * b^4 * d + b^3 * (3 * \operatorname{Sqrt}[b^2 - 4 * a * c] * d + a * f) - 4 * a * b$

```
*c*(6*Sqrt[b^2 - 4*a*c]*d + 13*a*f) - a*b^2*(30*c*d - Sqrt[b^2 - 4*a*c]*f)
+ 4*a^2*c*(42*c*d + 5*Sqrt[b^2 - 4*a*c]*f))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt
[b - Sqrt[b^2 - 4*a*c]]]/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b - Sqrt[
b^2 - 4*a*c]]) + (Sqrt[c]*(3*b^3*d - 24*a*b*c*d + a*b^2*f + 20*a^2*c*f - (3
*b^4*d - 30*a*b^2*c*d + 168*a^2*c^2*d + a*b^3*f - 52*a^2*b*c*f)/Sqrt[b^2 -
4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]])/(8*Sqrt[2]
*a^2*(b^2 - 4*a*c)^2*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - (6*c^2*e*ArcTanh[(b + 2
*c*x^2)/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(5/2)
```

Rule 12

```
Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !Match
Q[u, (b_)*(v_)] /; FreeQ[b, x]
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a
/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p +
3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; Free
Q[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && Int
egerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[In
t[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2,
Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```

Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]

```

Rule 1178

```

Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :=> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]

```

Rule 1673

```

Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :=> Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]

```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^3} dx &= \int \frac{ex}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{\int \frac{-3b^2d + 14acd - abf - 5c(bd - 2af)x^2}{(a + bx^2 + cx^4)^2} dx}{4a(b^2 - 4ac)} + e \int \frac{1}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(3b^4d - 25ab^2cd + 28a^2c^2d + ab^3f + 8a^2bcf)}{8a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(3b^4d - 25ab^2cd + 28a^2c^2d + ab^3f + 8a^2bcf)}{8a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3ce(b + 2cx^2)}{2(b^2 - 4ac)^2} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3ce(b + 2cx^2)}{2(b^2 - 4ac)^2} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3ce(b + 2cx^2)}{2(b^2 - 4ac)^2}
\end{aligned}$$

Mathematica [A] time = 3.61, size = 625, normalized size = 1.01

$$\frac{1}{16} \left(\frac{8a^2c(b(3e + 2fx) + cx(7d + 6ex + 5fx^2)) + 2abx(b^2f - 25bcd + bcfx^2 - 24c^2dx^2) + 6b^3dx(b + cx^2)}{a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)} + \frac{\sqrt{2}}{2} \right)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2)/(a + b*x^2 + c*x^4)^3, x]

```
[Out] ((4*a*b*(e + f*x) - 4*b*d*x*(b + c*x^2) + 8*a*c*x*(d + x*(e + f*x)))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (6*b^3*d*x*(b + c*x^2) + 2*a*b*x*(-25*b*c*d + b^2*f - 24*c^2*d*x^2 + b*c*f*x^2) + 8*a^2*c*(b*(3*e + 2*f*x) + c*x*(7*d + 6*e*x + 5*f*x^2)))/(a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (Sqrt[2]*Sqrt[c]*(3*b^4*d + b^3*(3*Sqrt[b^2 - 4*a*c]*d + a*f) - 4*a*b*c*(6*Sqrt[b^2 - 4*a*c]*d + 13*a*f) + a*b^2*(-30*c*d + Sqrt[b^2 - 4*a*c]*f) + 4*a^2*c*(42*c*d + 5*Sqrt[b^2 - 4*a*c]*f))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]])/(a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[2]*Sqrt[c]*(-3*b^4*d + b^3*(3*Sqrt[b^2 - 4*a*c]*d - a*f) + 4*a*b*c*(-6*Sqrt[b^2 - 4*a*c]*d + 13*a*f) + a*b^2*(30*c*d + Sqrt[b^2 - 4*a*c]*f) + 4*a^2*c*(-42*c*d + 5*Sqrt[b^2 - 4*a*c]*f))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]])/(a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + (48*c^2*e*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(5/2) - (48*c^2*e*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(5/2))/16
```

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 10.79, size = 5288, normalized size = 8.52

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^4+b*x^2+a)^3,x, algorithm="giac")
```

```
[Out] -3*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*a*c)*e*log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a*b^6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*c^5)*c^2) + 3*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*a*c)*e*log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a*b^6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*c^5)*c^2) + 1/32*(3*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^8 - 17*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b^6
```

$$\begin{aligned}
& *c - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^7*c - 2*b^8*c + 116*\sqrt{2} \\
&)*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^4*c^2 + 26*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c) \\
& *a*b^5*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^6*c^2 + 34*a*b^6*c^2 + 2*b^7*c^2 - 368*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c) \\
& *a^3*b^2*c^3 - 128*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^3*c^3 - 13*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c) \\
& *a*b^4*c^3 - 232*a^2*b^4*c^3 - 30*a*b^5*c^3 + 448*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*c^4 + 224*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c) \\
& *a^3*b*c^4 + 64*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^2*c^4 + 736*a^3*b^2*c^4 + 176*a^2*b^3*c^4 - 112*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c) \\
& *a^3*c^5 - 896*a^4*c^5 - 352*a^3*b*c^5 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^7 + 15*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c) \\
& *a*b^5*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*b^6*c - 88*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c) \\
& *a^2*b^3*c^2 - 22*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^4*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c) \\
& *b^5*c^2 + 176*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^3 + 88*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c) \\
& *a^2*b^2*c^3 + 11*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^3*c^3 - 44*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c) \\
& *a^2*b*c^4 + 2*(b^2 - 4*a*c)*b^6*c - 26*(b^2 - 4*a*c)*a*b^4*c^2 - 2*(b^2 - 4*a*c)*b^5*c^2 + 128*(b^2 - 4*a*c)*a^2*b^2*c^3 + 22*(b^2 - 4*a*c)*a*b^3*c^3 - 224*(b^2 - 4*a*c)*a^3*c^4 - 88*(b^2 - 4*a*c)*a^2*b*c^4)*d + (\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^7 - 24*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^5*c - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^6*c - 2*a*b^7*c + 144*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^3*c^2 + 40*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^4*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^5*c^2 + 48*a^2*b^5*c^2 + 2*a*b^6*c^2 - 256*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b*c^3 - 128*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^2*c^3 - 20*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^3*c^3 - 288*a^3*b^3*c^3 - 44*a^2*b^4*c^3 + 64*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^4 + 512*a^4*b*c^4 + 64*a^3*b^2*c^4 + 320*a^4*c^5 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^6 + 22*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^4*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^5*c - 32*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^2*c^2 - 36*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^3*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a*b^4*c^2 - 160*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*c^3 - 80*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b*c^3 + 18*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^2*b^2*c^3 + 40*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*c^4 + 2*(b^2 - 4*a*c)*a*b^5*c - 40*(b^2 - 4*a*c)*a^2*b^3*c^2 - 2*(b^2 - 4*a*c)*a*b^4*c^2 + 128*(b^2 - 4*a*c)*a^3*b*c^3 + 36*(b^2 - 4*a*c)*a^2*b^2*c^3 + 80*(b^2 - 4*a*c)*a^3*c^4)*f)*\arctan(2*\sqrt{1/2}*x/\sqrt{(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + \sqrt{(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^
\end{aligned}$$

$$\begin{aligned}
& 5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((a^3*b^8 - 16*a^4*b^6*c - 2*a^3*b^7*c + 96*a^5*b^4*c^2 + 24*a^4*b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2*c^3 - 96*a^5*b^3*c^3 - 12*a^4*b^4*c^3 + 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^5*b^2*c^4 - 64*a^6*c^5)*abs(c)) \\
& + 1/32*(3*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*b^8 - 17*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*b^7*c + 2*b^8*c + 116*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^2*b^4*c^2 + 26*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a*b^5*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*b^6*c^2 - 34*a*b^6*c^2 - 2*b^7*c^2 - 368*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^2*b^3*c^3 - 13*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a*b^4*c^3 + 232*a^2*b^4*c^3 + 30*a*b^5*c^3 + 448*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^4*c^4 + 224*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^3*b*c^4 + 64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^2*b^2*c^4 - 736*a^3*b^2*c^4 - 176*a^2*b^3*c^4 - 112*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^3*c^5 + 896*a^4*c^5 + 352*a^3*b*c^5 + sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*b^7 - 15*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a*b^5*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*b^6*c + 88*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^2*b^3*c^2 + 22*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a*b^4*c^2 + sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*b^5*c^2 - 176*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^3*b*c^3 - 88*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^2*b^2*c^3 - 11*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a*b^3*c^3 + 44*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^2*b*c^4 - 2*(b^2 - 4*a*c)*b^6*c + 26*(b^2 - 4*a*c))*a*b^4*c^2 + 2*(b^2 - 4*a*c))*b^5*c^2 - 128*(b^2 - 4*a*c))*a^2*b^2*c^3 - 22*(b^2 - 4*a*c))*a*b^3*c^3 + 224*(b^2 - 4*a*c))*a^3*c^4 + 88*(b^2 - 4*a*c))*a^2*b*c^4)*d + (sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a*b^7 - 24*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^2*b^5*c - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a*b^6*c + 2*a*b^7*c + 144*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^3*b^3*c^2 + 40*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^2*b^4*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a*b^5*c^2 - 48*a^2*b^5*c^2 - 2*a*b^6*c^2 - 256*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^4*b*c^3 - 128*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^3*b^2*c^3 - 20*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^2*b^3*c^3 + 288*a^3*b^3*c^3 + 44*a^2*b^4*c^3 + 64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^3*b*c^4 - 512*a^4*b*c^4 - 64*a^3*b^2*c^4 - 320*a^4*c^5 + sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a*b^6 - 22*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^2*b^4*c - 2*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a*b^5*c + 32*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^3*b^2*c^2 + 36*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^2*b^3*c^2 + sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a*b^4*c^2 + 160*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^4*c^3 + 80*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*a^3*b*c^3 - 18*sqrt(2)*sqrt(b^2 - 4*a*c))*sqrt(b*c - sqrt(b^2 - 4*a*c))*c)*
\end{aligned}$$

$$\begin{aligned}
& a^2 b^2 c^3 - 40 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} c) * \\
& a^3 c^4 - 2(b^2 - 4ac) a b^5 c + 40(b^2 - 4ac) a^2 b^3 c^2 + 2(b^2 - \\
& 4ac) a b^4 c^2 - 128(b^2 - 4ac) a^3 b c^3 - 36(b^2 - 4ac) a^2 b^2 c^3 - 80(b^2 - 4ac) a^3 c^4) * f) * \arctan(2 \sqrt{1/2} x / \sqrt{(a^2 b^5 - 8a^3 b^3 c + 16a^4 b c^2 - \sqrt{(a^2 b^5 - 8a^3 b^3 c + 16a^4 b c^2)^2 - 4(a^3 b^4 - 8a^4 b^2 c + 16a^5 c^2)(a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3)})} / (a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3)) / ((a^3 b^8 - 16a^4 b^6 c - 2a^3 b^7 c + 96a^5 b^4 c^2 + 24a^4 b^5 c^2 + a^3 b^6 c^2 - 256a^6 b^2 c^3 - 96a^5 b^3 c^3 - 12a^4 b^4 c^3 + 256a^7 c^4 + 128a^6 b c^4 + 48a^5 b^2 c^4 - 64a^6 c^5) * \text{abs}(c)) + 1/8(3b^3 c^2 d x^7 - 24a b^3 c^3 d x^7 + a b^2 c^2 f x^7 + 20a^2 c^3 f x^7 + 24a^2 c^3 x^6 e + 6b^4 c d x^5 - 49a b^2 c^2 d x^5 + 28a^2 c^3 d x^5 + 2a b^3 c f x^5 + 28a^2 b c^2 f x^5 + 36a^2 b c^2 x^4 e + 3b^5 d x^3 - 20a b^3 c d x^3 - 4a^2 b c^2 d x^3 + a b^4 f x^3 + 5a^2 b^2 c f x^3 + 36a^3 c^2 f x^3 + 8a^2 b^2 c x^2 e + 40a^3 c^2 x^2 e + 5a b^4 d x - 37a^2 b^2 c d x + 44a^3 c^2 d x - a^2 b^3 f x + 16a^3 b c f x - 2a^2 b^3 e + 20a^3 b c e) / ((a^2 b^4 - 8a^3 b^2 c + 16a^4 c^2) * (c x^4 + b x^2 + a)^2)
\end{aligned}$$

maple [B] time = 0.62, size = 7858, normalized size = 12.65

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^4+b*x^2+a)^3,x)`

[Out] result too large to display

maxima [F] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a)^3,x, algorithm="maxima")`

[Out] $1/8(24a^2c^3ex^6 + 36a^2b^2c^2ex^4 + (3(b^3c^2 - 8ab^2c^3)d + (ab^2c^2 + 20a^2c^3)f)x^7 + ((6b^4c - 49ab^2c^2 + 28a^2c^3)d + 2(ab^3c + 14a^2b^2c^2)f)x^5 + 8(a^2b^2c + 5a^3c^2)ex^2 + ((3b^5 - 20ab^3c - 4a^2b^2c^2)d + (ab^4 + 5a^2b^2c + 36a^3c^2)f)x^3 - 2(a^2b^3 - 10a^3b^2c)e + ((5ab^4 - 37a^2b^2c + 44a^3c^2)d - (a^2b^3 - 16a^3b^2c)f)x) / ((a^2b^4c^2 - 8a^3b^2c^3 + 16a^4c^4)x^8 + a^4b^4 - 8a^5b^2c + 16a^6c^2 + 2(a^2b^5c - 8a^3b^3c^2 + 16a^4b^2c^3)x^6 + (a^2b^6 - 6a^3b^4c + 32a^5c^3)x^4 + 2(a^3b^5 - 8a^4b^3c + 16a^5b^2c^2)x^2) + 1/8 \int (48a^2c^2ex + (3(b^3c - 8ab^2c^2)d + (ab^2c + 20a^2c^2)f)x^2 + 3(b^4 - 9ab^2c + 28$

$a^2c^2)d + (ab^3 - 16a^2bc)f)/(cx^4 + bx^2 + a), x)/(a^2b^4 - 8a^3b^2c + 16a^4c^2)$

mupad [B] time = 3.26, size = 8689, normalized size = 13.99

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((d + ex + fx^2)/(a + bx^2 + cx^4)^3, x)$

[Out] $((x^2(5ac^2e + b^2ce))/(b^4 + 16a^2c^2 - 8ab^2c) - (b^3e - 10abce)/(4(b^4 + 16a^2c^2 - 8ab^2c)) + (x^5(28a^2c^3d + 6b^4cd + 2ab^3cf - 49ab^2c^2d + 28a^2bc^2f))/(8a^2(b^4 + 16a^2c^2 - 8ab^2c)) + (x(5b^4d + 44a^2c^2d - ab^3f - 37ab^2cd + 16a^2bcf))/(8a(b^4 + 16a^2c^2 - 8ab^2c)) + (3c^3ex^6)/(b^4 + 16a^2c^2 - 8ab^2c) + (x^3(3b^5d + 36a^3c^2f + ab^4f - 20ab^3cd - 4a^2bc^2d + 5a^2b^2cf))/(8a^2(b^4 + 16a^2c^2 - 8ab^2c)) + (9b^2c^2ex^4)/(2(b^4 + 16a^2c^2 - 8ab^2c)) + (cx^7(20a^2c^2f + 3b^3cd - 24abc^2d + ab^2cf))/(8a^2(b^4 + 16a^2c^2 - 8ab^2c))) / (x^4(2ac + b^2) + a^2 + c^2x^8 + 2abx^2 + 2bcx^6) + \text{symsum}(\log(\text{root}(56371445760a^{11}b^8c^6z^4 - 503316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c^2z^4 - 171798691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 128849018880a^{12}b^6c^7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 3523215360a^9b^{12}c^4z^4 - 2621440a^6b^{18}c^2z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 - 73728a^2b^{16}cd^2fz^2 - 1321205760a^9b^2c^8d^2fz^2 + 732168192a^7b^6c^6d^2fz^2 - 366280704a^6b^8c^5d^2fz^2 - 330301440a^8b^4c^7d^2fz^2 + 96583680a^5b^{10}c^4d^2fz^2 - 15175680a^4b^{12}c^3d^2fz^2 + 1428480a^3b^{14}c^2d^2fz^2 - 440401920a^{10}b^8c^8f^2z^2 + 1761607680a^{10}c^9d^2fz^2 - 14080a^3b^{15}c^2f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^2c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464ab^{17}c^2d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^2z^2 + 1206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536ab^{18}d^2fz^2 + 1207959552a^{10}c^9e^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^2c^8de^2fz + 9216ab^{13}c^2de^2fz - 221773824a^6b^3c^7de^2fz + 117964800a^5b^5c^6de^2fz - 32440320a^4b^7c^5de^2fz + 4792320a^3b^9c^4de^2fz - 350208a^2b^{11}c^3de^2fz - 428544ab^{12}c^3d^2ez + 1022754816a^6b^2c^8d^2ez - 642318336a^5b^4c^7d^2ez + 223395840a^4b^6c^6d^2ez - 50724864a^7b^2c^7e^2fz + 26542080a^6b^4c^6e^2fz - 46725120a^3b^8c^5d^2ez - 7127040a^5b^6c^5e^2fz + 1013760a^4b^8c^4e^2fz$

$$\begin{aligned}
& *z - 69120*a^3*b^{10}*c^3*e*f^2*z + 1536*a^2*b^{12}*c^2*e*f^2*z + 5930496*a^2*b \\
& ^{10}*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f^2*z + 13 \\
& 824*b^{14}*c^2*d^2*e*z + 13824*a*b^8*c^4*d*e^2*f - 7741440*a^4*b^2*c^7*d*e^2* \\
& f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 37310976*a^3 \\
& *b^3*c^7*d^3*f + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 8 \\
& 068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5* \\
& d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7* \\
& c^5*d^2*e^2 - 75188736*a^4*b*c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f - 4262400 \\
& *a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 35525376 \\
& *a^4*b^2*c^7*d^2*f^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f \\
& ^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2* \\
& b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^ \\
& 2 + 11025*b^{10}*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9*c^4*d^2*e^ \\
& 2 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 \\
& + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^ \\
& 4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 160 \\
& 000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*(root(5637 \\
& 1445760*a^{11}*b^8*c^6*z^4 - 503316480*a^8*b^{14}*c^3*z^4 + 47185920*a^7*b^{16}*c \\
& ^2*z^4 - 171798691840*a^{14}*b^2*c^9*z^4 + 193273528320*a^{13}*b^4*c^8*z^4 - 12 \\
& 8849018880*a^{12}*b^6*c^7*z^4 - 16911433728*a^{10}*b^{10}*c^5*z^4 + 3523215360*a^ \\
& 9*b^{12}*c^4*z^4 - 2621440*a^6*b^{18}*c*z^4 + 68719476736*a^{15}*c^{10}*z^4 + 65536 \\
& *a^5*b^{20}*z^4 - 73728*a^2*b^{16}*c*d*f*z^2 - 1321205760*a^9*b^2*c^8*d*f*z^2 + \\
& 732168192*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440* \\
& a^8*b^4*c^7*d*f*z^2 + 96583680*a^5*b^{10}*c^4*d*f*z^2 - 15175680*a^4*b^{12}*c^3 \\
& *d*f*z^2 + 1428480*a^3*b^{14}*c^2*d*f*z^2 - 440401920*a^{10}*b*c^8*f^2*z^2 + 17 \\
& 61607680*a^{10}*c^9*d*f*z^2 - 14080*a^3*b^{15}*c*f^2*z^2 + 6936330240*a^8*b^3*c \\
& ^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 \\
& - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a \\
& *b^{17}*c^d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2 \\
& *z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 1887 \\
& 43680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^{11}*c^4*d^2*z^2 + 11206656*a^7*b \\
& ^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 \\
& - 2600960*a^5*b^{11}*c^3*f^2*z^2 + 291840*a^4*b^{13}*c^2*f^2*z^2 - 19860480*a^ \\
& 3*b^{13}*c^3*d^2*z^2 - 1179648*a^5*b^{10}*c^4*e^2*z^2 + 1771776*a^2*b^{15}*c^2*d^ \\
& 2*z^2 + 1536*a*b^{18}*d*f*z^2 + 1207959552*a^{10}*c^9*e^2*z^2 + 256*a^2*b^{17}*f^ \\
& 2*z^2 + 2304*b^{19}*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216*a*b^{13}*c^2*d \\
& *e*f*z - 221773824*a^6*b^3*c^7*d*e*f*z + 117964800*a^5*b^5*c^6*d*e*f*z - 32 \\
& 440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^{11}* \\
& c^3*d*e*f*z - 428544*a*b^{12}*c^3*d^2*e*z + 1022754816*a^6*b^2*c^8*d^2*e*z - \\
& 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6*d^2*e*z - 50724864*a^ \\
& 7*b^2*c^7*e*f^2*z + 26542080*a^6*b^4*c^6*e*f^2*z - 46725120*a^3*b^8*c^5*d^2 \\
& *e*z - 7127040*a^5*b^6*c^5*e*f^2*z + 1013760*a^4*b^8*c^4*e*f^2*z - 69120*a^ \\
& 3*b^{10}*c^3*e*f^2*z + 1536*a^2*b^{12}*c^2*e*f^2*z + 5930496*a^2*b^{10}*c^4*d^2*e \\
& *z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f^2*z + 13824*b^{14}*c^2* \\
& d^2*e*z + 13824*a*b^8*c^4*d*e^2*f - 7741440*a^4*b^2*c^7*d*e^2*f + 2903040*a
\end{aligned}$$

$$\begin{aligned}
&^3b^4c^6de^2f - 387072a^2b^6c^5de^2f + 37310976a^3b^3c^7d^3f \\
&+ 3870720a^5b^7c^7e^2f^2 + 34836480a^4b^8c^8d^2e^2 - 8068032a^2b^5c^6d^3f \\
&- 5623296a^4b^3c^6d^3f^3 + 1737792a^3b^5c^5d^3f^3 - 260190ab^8c^4d^2f^2 \\
&- 211680a^2b^7c^4d^3f^3 - 435456ab^7c^5d^2e^2 - 75188736a^4b^8c^8d^3f \\
&- 15482880a^5c^8de^2f - 4262400a^5b^7c^7d^3f^3 + 852768ab^7c^5d^3f \\
&+ 7350ab^9c^3d^3f^3 + 35525376a^4b^2c^7d^2f^2 + 645120a^4b^3c^6e^2f^2 \\
&- 80640a^3b^5c^5e^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 \\
&+ 2870784a^2b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e^2 \\
&+ 11025b^10c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 20736b^9c^4d^2e^2 + 492800a^5b^2c^6f^4 \\
&+ 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3b^2c^8d^4 \\
&+ 6446304a^2b^4c^7d^4 - 39690b^9c^4d^3f - 734832ab^6c^6d^4 + 49787136a^4c^9d^4 \\
&+ 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, k) * ((768a^2b^14c^2d - 22020096a^9c^9d \\
&- 22272a^3b^12c^3d + 282624a^4b^10c^4d - 2027520a^5b^8c^5d + 8847360a^6b^6c^6d \\
&- 23396352a^7b^4c^7d + 34603008a^8b^2c^8d + 256a^3b^13c^2f - 9216a^4b^11c^3f \\
&+ 122880a^5b^9c^4f - 819200a^6b^7c^5f + 2949120a^7b^5c^6f - 5505024a^8b^3c^7f \\
&+ 4194304a^9b^1c^8f) / (512(a^4b^12 + 4096a^10c^6 - 24a^5b^10c + 240a^6b^8c^2 \\
&- 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (x*(786432a^9c^9e - 768a^4b^10c^4e \\
&+ 15360a^5b^8c^5e - 122880a^6b^6c^6e + 491520a^7b^4c^7e - 983040a^8b^2c^8e)) / (32(a^4b^12 \\
&+ 4096a^10c^6 - 24a^5b^10c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 \\
&- 6144a^9b^2c^5)) + (\text{root}(56371445760a^11b^8c^6z^4 - 503316480a^8b^14c^3z^4 \\
&+ 47185920a^7b^16c^2z^4 - 171798691840a^14b^2c^9z^4 + 193273528320a^13b^4c^8z^4 \\
&- 128849018880a^12b^6c^7z^4 - 16911433728a^10b^10c^5z^4 + 3523215360a^9b^12c^4z^4 \\
&- 2621440a^6b^18c^z^4 + 68719476736a^15c^10z^4 + 65536a^5b^20z^4 - 73728a^2b^16c^d \\
&f^z^2 - 1321205760a^9b^2c^8d^f^z^2 + 732168192a^7b^6c^6d^f^z^2 - 366280704a^6b^8c^5d^f^z^2 \\
&- 330301440a^8b^4c^7d^f^z^2 + 96583680a^5b^10c^4d^f^z^2 - 15175680a^4b^12c^3d^f^z^2 \\
&+ 1428480a^3b^14c^2d^f^z^2 - 440401920a^10b^1c^8f^2z^2 + 1761607680a^10c^9d^f^z^2 - 14080a^3b^15c^f^2z^2 \\
&+ 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^1c^9d^2z^2 \\
&- 1509949440a^9b^2c^8e^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464ab^17c^d^2z^2 + 754974720a^8b^4c^7e^2z^2 \\
&- 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 174325760a^8b^5c^6f^2z^2 \\
&- 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^11c^4d^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 \\
&+ 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^11c^3f^2z^2 + 291840a^4b^13c^2f^2z^2 \\
&- 19860480a^3b^13c^3d^2z^2 - 1179648a^5b^10c^4e^2z^2 + 1771776a^2b^15c^2d^2z^2 \\
&+ 1536ab^18d^f^z^2 + 1207959552a^10c^9e^2z^2 + 256a^2b^17f^2z^2 + 2304b^19d^2z^2 + 169869312a^7b^1c^8d^e^f^z \\
&+ 9216ab^13c^2d^e^f^z - 221773824a^6b^3c^7d^e^f^z + 117964800a^5b^5c^6d^e^f^z \\
&- 32440320a^4b^7c^5d^e^f^z + 4792320a^3b^9c^4d^e^f^z - 350208a^2b^11c^3d^e^f^z - 428544ab^12c^
\end{aligned}$$

$$\begin{aligned}
& 3*d^2*e*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z \\
& + 223395840*a^4*b^6*c^6*d^2*e*z - 50724864*a^7*b^2*c^7*e*f^2*z + 26542080*a \\
& ^6*b^4*c^6*e*f^2*z - 46725120*a^3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f \\
& ^2*z + 1013760*a^4*b^8*c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2* \\
& b^12*c^2*e*f^2*z + 5930496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z \\
& + 39321600*a^8*c^8*e*f^2*z + 13824*b^14*c^2*d^2*e*z + 13824*a*b^8*c^4*d*e^ \\
& 2*f - 7741440*a^4*b^2*c^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^ \\
& 2*b^6*c^5*d*e^2*f + 37310976*a^3*b^3*c^7*d^3*f + 3870720*a^5*b*c^7*e^2*f^2 \\
& + 34836480*a^4*b*c^8*d^2*e^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3* \\
& c^6*d*f^3 + 1737792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a \\
& ^2*b^7*c^4*d*f^3 - 435456*a*b^7*c^5*d^2*e^2 - 75188736*a^4*b*c^8*d^3*f - 15 \\
& 482880*a^5*c^8*d*e^2*f - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + \\
& 7350*a*b^9*c^3*d*f^3 + 35525376*a^4*b^2*c^7*d^2*f^2 + 645120*a^4*b^3*c^6*e \\
& ^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^ \\
& 3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2* \\
& e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^ \\
& 8*d^2*f^2 + 20736*b^9*c^4*d^2*e^2 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4 \\
& *c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2* \\
& c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6* \\
& d^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 357 \\
& 21*b^8*c^5*d^4, z, k) * x * (4194304*a^11*b*c^9 - 256*a^4*b^15*c^2 + 7168*a^5*b \\
& ^13*c^3 - 86016*a^6*b^11*c^4 + 573440*a^7*b^9*c^5 - 2293760*a^8*b^7*c^6 + 5 \\
& 505024*a^9*b^5*c^7 - 7340032*a^10*b^3*c^8) / (32*(a^4*b^12 + 4096*a^10*c^6 - \\
& 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 61 \\
& 44*a^9*b^2*c^5)) + (3244032*a^6*b*c^8*d*e - 983040*a^7*c^8*e*f + 4608*a^2* \\
& b^9*c^4*d*e - 87552*a^3*b^7*c^5*d*e + 681984*a^4*b^5*c^6*d*e - 2433024*a^5* \\
& b^3*c^7*d*e + 1536*a^3*b^8*c^4*e*f - 39936*a^4*b^6*c^5*e*f + 184320*a^5*b^4 \\
& *c^6*e*f + 49152*a^6*b^2*c^7*e*f) / (512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b \\
& ^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^ \\
& 2*c^5)) - (x*(225792*a^6*c^9*d^2 + 9*b^12*c^3*d^2 - 12800*a^7*c^8*f^2 - 252 \\
& *a*b^10*c^4*d^2 - 36864*a^6*b*c^8*e^2 + 3114*a^2*b^8*c^5*d^2 - 21312*a^3*b^ \\
& 6*c^6*d^2 + 88128*a^4*b^4*c^7*d^2 - 211968*a^5*b^2*c^8*d^2 - 2304*a^4*b^5*c \\
& ^6*e^2 + 18432*a^5*b^3*c^7*e^2 + a^2*b^10*c^3*f^2 - 42*a^3*b^8*c^4*f^2 + 17 \\
& 60*a^4*b^6*c^5*f^2 - 13120*a^5*b^4*c^6*f^2 + 29952*a^6*b^2*c^7*f^2 + 6*a*b^ \\
& 11*c^3*d*f - 109056*a^6*b*c^8*d*f - 210*a^2*b^9*c^4*d*f + 2496*a^3*b^7*c^5* \\
& d*f - 18240*a^4*b^5*c^6*d*f + 72192*a^5*b^3*c^7*d*f) / (32*(a^4*b^12 + 4096* \\
& a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^ \\
& 4*c^4 - 6144*a^9*b^2*c^5)) - (567*b^7*c^5*d^3 + 8000*a^5*c^7*f^3 - 10368*a \\
& *b^5*c^6*d^3 - 169344*a^3*b*c^8*d^3 - 193536*a^4*c^8*d*e^2 + 141120*a^4*c^8 \\
& *d^2*f - 315*b^8*c^4*d^2*f + 67824*a^2*b^3*c^7*d^3 - 35*a^2*b^6*c^4*f^3 - 8 \\
& 4*a^3*b^4*c^5*f^3 + 12720*a^4*b^2*c^6*f^3 + 6237*a*b^6*c^5*d^2*f - 210*a*b^ \\
& 7*c^4*d*f^2 - 116160*a^4*b*c^7*d*f^2 + 36864*a^4*b*c^7*e^2*f - 6912*a^2*b^4 \\
& *c^6*d*e^2 + 62208*a^3*b^2*c^7*d*e^2 - 42372*a^2*b^4*c^6*d^2*f + 1764*a^2*b \\
& ^5*c^5*d*f^2 + 96048*a^3*b^2*c^7*d^2*f + 4608*a^3*b^3*c^6*d*f^2 - 2304*a^3* \\
& b^3*c^6*e^2*f) / (512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8
\end{aligned}$$

$$\begin{aligned}
& *c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (x*(6912* \\
& a^4*c^8*e^3 - 27*b^7*c^5*d^2*e - 10080*a^4*c^8*d*e*f + 486*a*b^5*c^6*d^2*e \\
& + 12096*a^3*b*c^8*d^2*e + 3120*a^4*b*c^7*e*f^2 - 3672*a^2*b^3*c^7*d^2*e - 3 \\
& *a^2*b^5*c^5*e*f^2 + 96*a^3*b^3*c^6*e*f^2 - 18*a*b^6*c^5*d*e*f + 450*a^2*b^ \\
& 4*c^6*d*e*f - 2448*a^3*b^2*c^7*d*e*f))/(32*(a^4*b^12 + 4096*a^10*c^6 - 24*a \\
& ^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^ \\
& 9*b^2*c^5)))*\text{root}(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 \\
& + 47185920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320 \\
& *a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c \\
& ^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736 \\
& *a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 73728*a^2*b^16*c*d*f*z^2 - 1321205760 \\
& *a^9*b^2*c^8*d*f*z^2 + 732168192*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^ \\
& 5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - \\
& 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 440401920*a \\
& ^10*b*c^8*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2*z^2 \\
& + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617 \\
& 280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5 \\
& *c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730 \\
& 054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 174325760*a^8* \\
& b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^ \\
& 2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 235929 \\
& 60*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2 \\
& *f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1 \\
& 771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2 \\
& *z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f \\
& *z + 9216*a*b^13*c^2*d*e*f*z - 221773824*a^6*b^3*c^7*d*e*f*z + 117964800*a^ \\
& 5*b^5*c^6*d*e*f*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e* \\
& f*z - 350208*a^2*b^11*c^3*d*e*f*z - 428544*a*b^12*c^3*d^2*e*z + 1022754816* \\
& a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6 \\
& *d^2*e*z - 50724864*a^7*b^2*c^7*e*f^2*z + 26542080*a^6*b^4*c^6*e*f^2*z - 46 \\
& 725120*a^3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z + 1013760*a^4*b^8* \\
& c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930 \\
& 496*a^2*b^10*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f \\
& ^2*z + 13824*b^14*c^2*d^2*e*z + 13824*a*b^8*c^4*d*e^2*f - 7741440*a^4*b^2*c \\
& ^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 373 \\
& 10976*a^3*b^3*c^7*d^3*f + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^ \\
& 2*e^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3 \\
& *b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 4354 \\
& 56*a*b^7*c^5*d^2*e^2 - 75188736*a^4*b*c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f \\
& - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + \\
& 35525376*a^4*b^2*c^7*d^2*f^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5* \\
& c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 287 \\
& 0784*a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c \\
& ^6*d^2*e^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9*c \\
& ^4*d^2*e^2 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^
\end{aligned}$$

```
6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k), k, 1, 4)
```

```
sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00
```

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)/(c*x**4+b*x**2+a)**3,x)
```

```
[Out] Timed out
```

$$3.54 \quad \int \frac{d+ex+fx^2+gx^3}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=646

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d \right) \sqrt{c} \left(-\frac{-52a^2bcf+168a^2c^2d}{\sqrt{b}} \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)} +$$

[Out] $\frac{1}{4}x(b^2d-2ac*d-ab*f+c*(-2af+bd)*x^2)/a/(-4ac+b^2)/(cx^4+bx^2+a)^2+1/4*(-b*e+2ag-(-bg+2ce)*x^2)/(-4ac+b^2)/(cx^4+bx^2+a)^2+3/4*(-bg+2ce)*(2cx^2+b)/(-4ac+b^2)^2/(cx^4+bx^2+a)+1/8x*(3b^4d-25ab^2c*d+28a^2c^2d+ab^3f+8a^2b*c*f+c*(20a^2c*f+ab^2*f-24ab*c*d+3b^3d)*x^2)/a^2/(-4ac+b^2)^2/(cx^4+bx^2+a)-3c*(-bg+2ce)*\operatorname{arctanh}(2cx^2+b)/(-4ac+b^2)^{(1/2)}/(-4ac+b^2)^{(5/2)}+1/16*\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)})/(b-(-4ac+b^2)^{(1/2)})^{(1/2)}*c^{(1/2)}*(3b^4d+b^3*(af+3d*(-4ac+b^2)^{(1/2)})-4ab*c*(13af+6d*(-4ac+b^2)^{(1/2)})-ab^2*(3cd-f*(-4ac+b^2)^{(1/2)})+4a^2c*(4cd+5f*(-4ac+b^2)^{(1/2)}))/a^2/(-4ac+b^2)^{(5/2)}*2^{(1/2)}/(b-(-4ac+b^2)^{(1/2)})^{(1/2)}+1/16*\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)})/(b+(-4ac+b^2)^{(1/2)})^{(1/2)}*c^{(1/2)}*(3b^3d-24ab*c*d+ab^2*f+20a^2c*f+(52a^2b*c*f-168a^2c^2d-ab^3f+30ab^2c*d-3b^4d)/(-4ac+b^2)^{(1/2)})/a^2/(-4ac+b^2)^2*2^{(1/2)}/(b+(-4ac+b^2)^{(1/2)})^{(1/2)}$

Rubi [A] time = 3.30, antiderivative size = 646, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 9, integrand size = 30, $\frac{\text{number of rules}}{\text{integrand size}} = 0.300$, Rules used = {1673, 1178, 1166, 205, 1247, 638, 614, 618, 206}

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d - 25ab^2cd + ab^3f + 3b^4d \right) \sqrt{c} \left(-\frac{-52a^2bcf+168a^2c^2d}{\sqrt{b}} \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)} +$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^3,x]

[Out] $(x*(b^2*d - 2ac*d - ab*f + c*(b*d - 2af)*x^2))/(4a*(b^2 - 4ac)*(a + bx^2 + cx^4)^2) - (b*e - 2ag + (2ce - bg)*x^2)/(4*(b^2 - 4ac)*(a + bx^2 + cx^4)^2) + (3*(2ce - bg)*(b + 2cx^2))/(4*(b^2 - 4ac)^2*(a + bx^2 + cx^4)) + (x*(3b^4d - 25ab^2c*d + 28a^2c^2d + ab^3f + 8a^2b*c*f + c*(3b^3d - 24ab*c*d + ab^2*f + 20a^2c*f)*x^2))/(8a^2*(b^2 - 4ac)^2*(a + bx^2 + cx^4)) + (\operatorname{Sqrt}[c]*(3b^4d + b^3*(3*\operatorname{Sqrt}[b^2$

$$\begin{aligned}
& - 4*a*c]*d + a*f) - 4*a*b*c*(6*\text{Sqrt}[b^2 - 4*a*c]*d + 13*a*f) - a*b^2*(30*c*d \\
& - \text{Sqrt}[b^2 - 4*a*c]*f) + 4*a^2*c*(42*c*d + 5*\text{Sqrt}[b^2 - 4*a*c]*f))*\text{ArcTan} \\
& [(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]]/(8*\text{Sqrt}[2]*a^2*(b^2 - 4* \\
& a*c)^{(5/2)}*\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) + (\text{Sqrt}[c]*(3*b^3*d - 24*a*b*c*d + \\
& a*b^2*f + 20*a^2*c*f - (3*b^4*d - 30*a*b^2*c*d + 168*a^2*c^2*d + a*b^3*f - \\
& 52*a^2*b*c*f)/\text{Sqrt}[b^2 - 4*a*c])* \text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b \\
& ^2 - 4*a*c]]]/(8*\text{Sqrt}[2]*a^2*(b^2 - 4*a*c)^2*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) \\
& - (3*c*(2*c*e - b*g)*\text{ArcTanh}[(b + 2*c*x^2)/\text{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c \\
&)^{(5/2)}
\end{aligned}$$

Rule 205

$$\text{Int}[(a_ + (b_)*(x_)^2)^{-1}, x_Symbol] \text{ :> } \text{Simp}[(\text{Rt}[a/b, 2]*\text{ArcTan}[x/\text{Rt}[a/b, 2]])/a, x] \text{ /; } \text{FreeQ}\{a, b, x\} \ \&\& \ \text{PosQ}[a/b]$$

Rule 206

$$\text{Int}[(a_ + (b_)*(x_)^2)^{-1}, x_Symbol] \text{ :> } \text{Simp}[(1*\text{ArcTanh}[(\text{Rt}[-b, 2]*x)/\text{Rt}[a, 2]])/(\text{Rt}[a, 2]*\text{Rt}[-b, 2]), x] \text{ /; } \text{FreeQ}\{a, b, x\} \ \&\& \ \text{NegQ}[a/b] \ \&\& \ (\text{GtQ}[a, 0] \ || \ \text{LtQ}[b, 0])$$

Rule 614

$$\begin{aligned}
& \text{Int}[(a_ + (b_)*(x_) + (c_)*(x_)^2)^{(p_)}, x_Symbol] \text{ :> } \text{Simp}[(b + 2*c*x) \\
& *(a + b*x + c*x^2)^{(p + 1)}/((p + 1)*(b^2 - 4*a*c)), x] - \text{Dist}[(2*c*(2*p + \\
& 3))/((p + 1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x + c*x^2)^{(p + 1)}, x], x] \text{ /; } \text{FreeQ}\{a, b, c, x\} \ \&\& \ \text{NeQ}[b^2 - 4*a*c, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{NeQ}[p, -3/2] \ \&\& \ \text{IntegerQ}[4*p]
\end{aligned}$$

Rule 618

$$\text{Int}[(a_ + (b_)*(x_) + (c_)*(x_)^2)^{-1}, x_Symbol] \text{ :> } \text{Dist}[-2, \text{Subst}[\text{Int}[1/\text{Simp}[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] \text{ /; } \text{FreeQ}\{a, b, c, x\} \ \&\& \ \text{NeQ}[b^2 - 4*a*c, 0]$$

Rule 638

$$\begin{aligned}
& \text{Int}[(d_ + (e_)*(x_))*((a_ + (b_)*(x_) + (c_)*(x_)^2)^{(p_)}, x_Symbol] \\
& \text{ :> } \text{Simp}[(b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^{(p + 1)}/((p + \\
& 1)*(b^2 - 4*a*c)), x] - \text{Dist}[(2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a \\
& *c)), \text{Int}[(a + b*x + c*x^2)^{(p + 1)}, x], x] \text{ /; } \text{FreeQ}\{a, b, c, d, e, x\} \ \&\& \ \text{NeQ}[2*c*d - b*e, 0] \ \&\& \ \text{NeQ}[b^2 - 4*a*c, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{NeQ}[p, -3/2]
\end{aligned}$$

Rule 1166


```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symb
ol] :=> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_), x_Symbol] :=> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :=> Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^3} dx &= \int \frac{d + fx^2}{(a + bx^2 + cx^4)^3} dx + \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(a + bx + cx^2)^3} dx, x, x^2 \right) - \frac{1}{2} \int \frac{e + gx}{(a + bx + cx^2)^3} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(3b^4d - 2b^3e - 2b^2c^2d - 2b^2c^2e - 2b^2c^2f - 2b^2c^2g)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3(2ce - b^2g)}{4(b^2 - 4ac)} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3(2ce - b^2g)}{4(b^2 - 4ac)} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3(2ce - b^2g)}{4(b^2 - 4ac)}
\end{aligned}$$

Mathematica [A] time = 4.29, size = 661, normalized size = 1.02

$$\frac{1}{16} \left(\frac{-8a^2g + 4ab(e + x(f - gx)) + 8acx(d + x(e + fx)) - 4bdx(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)^2} + \frac{2(a^2(-6b^2g + 4bc(3e + 2fx - 3gx^2))}{a^2(-b^2 + 4ac)(a + bx^2 + cx^4)^2} + \frac{2(3b^3d + 3b^3e + 3b^3f + 3b^3g - 2b^2c^2d - 2b^2c^2e - 2b^2c^2f - 2b^2c^2g)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3(2ce - b^2g)}{4(b^2 - 4ac)} \right)$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^3, x]

[Out] ((-8*a^2*g - 4*b*d*x*(b + c*x^2) + 8*a*c*x*(d + x*(e + f*x)) + 4*a*b*(e + x*(f - g*x)))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (2*(3*b^3*d*x*(b + c*x^2) + a*b*x*(-25*b*c*d + b^2*f - 24*c^2*d*x^2 + b*c*f*x^2) + a^2*(-6*b^2*g + 4*b*c*(3*e + 2*f*x - 3*g*x^2))))/(a^2*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (3*(2*c*e - b^2*g))/(4*(b^2 - 4*a*c))

$$2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4) + (\text{Sqrt}[2]*\text{Sqrt}[c]*(3*b^4*d + b^3*(3*\text{Sqrt}[b^2 - 4*a*c]*d + a*f) - 4*a*b*c*(6*\text{Sqrt}[b^2 - 4*a*c]*d + 13*a*f) + a*b^2*(-30*c*d + \text{Sqrt}[b^2 - 4*a*c]*f) + 4*a^2*c*(42*c*d + 5*\text{Sqrt}[b^2 - 4*a*c]*f))*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]])]/(a^2*(b^2 - 4*a*c)^{(5/2)}*\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) + (\text{Sqrt}[2]*\text{Sqrt}[c]*(-3*b^4*d + b^3*(3*\text{Sqrt}[b^2 - 4*a*c]*d - a*f) + 4*a*b*c*(-6*\text{Sqrt}[b^2 - 4*a*c]*d + 13*a*f) + a*b^2*(30*c*d + \text{Sqrt}[b^2 - 4*a*c]*f) + 4*a^2*c*(-42*c*d + 5*\text{Sqrt}[b^2 - 4*a*c]*f))*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]])]/(a^2*(b^2 - 4*a*c)^{(5/2)}*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) - (24*c*(-2*c*e + b*g)*\text{Log}[-b + \text{Sqrt}[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^{(5/2)} + (24*c*(-2*c*e + b*g)*\text{Log}[b + \text{Sqrt}[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^{(5/2)}/16$$

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="fricas")

[Out] Timed out

giac [B] time = 10.39, size = 5439, normalized size = 8.42

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)/(c*x^4+b*x^2+a)^3,x, algorithm="giac")

[Out] $\frac{1}{32}*(3*(\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*b^8 - 17*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a*b^6*c - 2*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*b^7*c - 2*b^8*c + 116*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^2*b^4*c^2 + 26*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^5*c^2 + \text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^6*c^2 + 34*a*b^6*c^2 + 2*b^7*c^2 - 368*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^3*b^2*c^3 - 128*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^2*b^3*c^3 - 13*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^4*c^3 - 232*a^2*b^4*c^3 - 30*a*b^5*c^3 + 448*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^4*c^4 + 224*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^3*b*c^4 + 64*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^2*b^2*c^4 + 736*a^3*b^2*c^4 + 176*a^2*b^3*c^4 - 112*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^3*c^5 - 896*a^4*c^5 - 352*a^3*b*c^5 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^7 + 15*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^5*c + 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^6*c - 88*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^2*b^3*c^2 - 22*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a*b^4*c^2 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^5*c^2 + 176*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^6*c^2 + 176*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^7*c^2 + 176*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*b^8*c^2$

$$\begin{aligned}
& t(2)*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^3*b*c^3 + 88*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^2*b^2*c^3 + 11*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a*b^3*c^3 - 44*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^2*b*c^4 + 2*(b^2 - 4*a*c)*b^6*c - 26*(b^2 - 4*a*c)*a*b^4*c^2 - 2*(b^2 - 4*a*c)*b^5*c^2 + 128*(b^2 - 4*a*c)*a^2*b^2*c^3 + 22*(b^2 - 4*a*c)*a*b^3*c^3 - 224*(b^2 - 4*a*c)*a^3*c^4 - 88*(b^2 - 4*a*c)*a^2*b*c^4)*d + (\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a*b^7 - 24*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^2*b^5*c - 2*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a*b^6*c - 2*a*b^7*c + 144*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^3*b^3*c^2 + 40*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a^2*b^4*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a*b^5*c^2 + 48*a^2*b^5*c^2 + 2*a*b^6*c^2 - 256*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a^4*b*c^3 - 128*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a^3*b^2*c^3 - 20*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a^2*b^3*c^3 - 288*a^3*b^3*c^3 - 44*a^2*b^4*c^3 + 64*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a^3*b*c^4 + 512*a^4*b*c^4 + 64*a^3*b^2*c^4 + 320*a^4*c^5 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a*b^6 + 22*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a^2*b^4*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a*b^5*c - 32*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a^3*b^2*c^2 - 36*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a^2*b^3*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a*b^4*c^2 - 160*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a^4*c^3 - 80*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a^3*b*c^3 + 18*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a^2*b^2*c^3 + 40*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c})*a^3*c^4 + 2*(b^2 - 4*a*c)*a*b^5*c - 40*(b^2 - 4*a*c)*a^2*b^3*c^2 - 2*(b^2 - 4*a*c)*a*b^4*c^2 + 128*(b^2 - 4*a*c)*a^3*b*c^3 + 36*(b^2 - 4*a*c)*a^2*b^2*c^3 + 80*(b^2 - 4*a*c)*a^3*c^4)*f)*\arctan(2*\sqrt{1/2}*x/\sqrt{(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + \sqrt{(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)})/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/((a^3*b^8 - 16*a^4*b^6*c - 2*a^3*b^7*c + 96*a^5*b^4*c^2 + 24*a^4*b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2*c^3 - 96*a^5*b^3*c^3 - 12*a^4*b^4*c^3 + 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^5*b^2*c^4 - 64*a^6*c^5)*\text{abs}(c)) + 1/32*(3*(\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*b^8 - 17*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*a*b^6*c - 2*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*b^7*c + 2*b^8*c + 116*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*a^2*b^4*c^2 + 26*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*a*b^5*c^2 + \sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*b^6*c^2 - 34*a*b^6*c^2 - 2*b^7*c^2 - 368*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*a^3*b^2*c^3 - 128*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*a^2*b^3*c^3 - 13*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*a*b^4*c^3 + 232*a^2*b^4*c^3 + 30*a*b^5*c^3 + 448*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*a^4*c^4 + 224*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*a^3*b*c^4 + 64*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*a^2*b^2*c^4 - 736*a^3*b^2*c^4 - 176*a^2*b^3*c^4 - 112*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c})*a^3*c^5 + 896*a^4*c^5 + 352*a^3*b*c^5 + \sqrt{2}*\sqrt{b^2 - 4}
\end{aligned}$$

$$\begin{aligned}
& a*c)*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*b^7 - 15*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a*b^5*c - 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^3*c^2 + 22*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a*b^4*c^2 + \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*b^5*c^2 - 176*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^3*b*c^3 - 88*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^2*c^3 - 11*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a*b^3*c^3 + 44*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b*c^4 - 2*(b^2 - 4*a*c)*b^6*c + 26*(b^2 - 4*a*c)*a*b^4*c^2 + 2*(b^2 - 4*a*c)*b^5*c^2 - 128*(b^2 - 4*a*c)*a^2*b^2*c^3 - 22*(b^2 - 4*a*c)*a*b^3*c^3 + 224*(b^2 - 4*a*c)*a^3*c^4 + 88*(b^2 - 4*a*c)*a^2*b*c^4)*d + (\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a*b^7 - 24*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^5*c - 2*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a*b^6*c + 2*a*b^7*c + 144*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^3*b^3*c^2 + 40*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^4*c^2 + \sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a*b^5*c^2 - 48*a^2*b^5*c^2 - 2*a*b^6*c^2 - 256*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^4*b*c^3 - 128*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^3*b^2*c^3 - 20*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^3*c^3 + 288*a^3*b^3*c^3 + 44*a^2*b^4*c^3 + 64*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^3*b*c^4 - 512*a^4*b*c^4 - 64*a^3*b^2*c^4 - 320*a^4*c^5 + \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a*b^6 - 22*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^4*c - 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a*b^5*c + 32*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^3*b^2*c^2 + 36*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^3*c^2 + \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a*b^4*c^2 + 160*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^4*c^3 + 80*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^3*b*c^3 - 18*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^2*c^3 - 40*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^3*c^4 - 2*(b^2 - 4*a*c)*a*b^5*c + 40*(b^2 - 4*a*c)*a^2*b^3*c^2 + 2*(b^2 - 4*a*c)*a*b^4*c^2 - 128*(b^2 - 4*a*c)*a^3*b*c^3 - 36*(b^2 - 4*a*c)*a^2*b^2*c^3 - 80*(b^2 - 4*a*c)*a^3*c^4)*f)*\arctan(2*\sqrt{t(1/2)*x/\sqrt{(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - \sqrt{(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))}}/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/((a^3*b^8 - 16*a^4*b^6*c - 2*a^3*b^7*c + 96*a^5*b^4*c^2 + 24*a^4*b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2*c^3 - 96*a^5*b^3*c^3 - 12*a^4*b^4*c^3 + 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^5*b^2*c^4 - 64*a^6*c^5)*\text{abs}(c)) + 3/2*((b^3*c^3 - 4*a*b*c^4 - 2*b^2*c^4 + b*c^5)*\sqrt{b^2 - 4*a*c}*g - 2*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*\sqrt{b^2 - 4*a*c})*e)*\log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + \sqrt{(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))})/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a*b^6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*c^3 - 1
\end{aligned}$$

$$2*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*c^5)*c^2) - 3/2*((b^3*c^3 - 4*a*b*c^4 - 2*b^2*c^4 + b*c^5)*sqrt(b^2 - 4*a*c)*g - 2*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*a*c)*e)*log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/((b^8 - 16*a*b^6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*c^5)*c^2) + 1/8*(3*b^3*c^2*d*x^7 - 24*a*b*c^3*d*x^7 + a*b^2*c^2*f*x^7 + 20*a^2*c^3*f*x^7 - 12*a^2*b*c^2*g*x^6 + 24*a^2*c^3*x^6*e + 6*b^4*c*d*x^5 - 49*a*b^2*c^2*d*x^5 + 28*a^2*c^3*d*x^5 + 2*a*b^3*c*f*x^5 + 28*a^2*b*c^2*f*x^5 - 18*a^2*b^2*c*g*x^4 + 36*a^2*b*c^2*x^4*e + 3*b^5*d*x^3 - 20*a*b^3*c*d*x^3 - 4*a^2*b*c^2*d*x^3 + a*b^4*f*x^3 + 5*a^2*b^2*c*f*x^3 + 36*a^3*c^2*f*x^3 - 4*a^2*b^3*g*x^2 - 20*a^3*b*c*g*x^2 + 8*a^2*b^2*c*x^2*e + 40*a^3*c^2*x^2*e + 5*a*b^4*d*x - 37*a^2*b^2*c*d*x + 44*a^3*c^2*d*x - a^2*b^3*f*x + 16*a^3*b*c*f*x - 2*a^3*b^2*g - 16*a^4*c*g - 2*a^2*b^3*e + 20*a^3*b*c*e)/((a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2)*(c*x^4 + b*x^2 + a)^2)$$

maple [B] time = 0.45, size = 10222, normalized size = 15.82

output 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)/(c*x^4+b*x^2+a)^3,x)

[Out] result too large to display

maxima [F] time = 0.00, size = 0, normalized size = 0.00

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)/(c*x^4+b*x^2+a)^3,x, algorithm="maxima")

[Out] 1/8*((3*(b^3*c^2 - 8*a*b*c^3)*d + (a*b^2*c^2 + 20*a^2*c^3)*f)*x^7 + 12*(2*a^2*c^3*e - a^2*b*c^2*g)*x^6 + ((6*b^4*c - 49*a*b^2*c^2 + 28*a^2*c^3)*d + 2*(a*b^3*c + 14*a^2*b*c^2)*f)*x^5 + 18*(2*a^2*b*c^2*e - a^2*b^2*c*g)*x^4 + ((3*b^5 - 20*a*b^3*c - 4*a^2*b*c^2)*d + (a*b^4 + 5*a^2*b^2*c + 36*a^3*c^2)*f)*x^3 + 4*(2*(a^2*b^2*c + 5*a^3*c^2)*e - (a^2*b^3 + 5*a^3*b*c)*g)*x^2 - 2*(a^2*b^3 - 10*a^3*b*c)*e - 2*(a^3*b^2 + 8*a^4*c)*g + ((5*a*b^4 - 37*a^2*b^2*c + 44*a^3*c^2)*d - (a^2*b^3 - 16*a^3*b*c)*f)*x)/((a^2*b^4*c^2 - 8*a^3*b^2*c^3 + 16*a^4*c^4)*x^8 + a^4*b^4 - 8*a^5*b^2*c + 16*a^6*c^2 + 2*(a^2*b^5*c - 8*a^3*b^3*c^2 + 16*a^4*b*c^3)*x^6 + (a^2*b^6 - 6*a^3*b^4*c + 32*a^5*c^3)*x^4 + 2*(a^3*b^5 - 8*a^4*b^3*c + 16*a^5*b*c^2)*x^2) + 1/8*integrate(((3*(b^3*c - 8*a*b*c^2)*d + (a*b^2*c + 20*a^2*c^2)*f)*x^2 + 3*(b^4 - 9*a*b^2*c + 28*

$$a^2*c^2)*d + (a*b^3 - 16*a^2*b*c)*f + 24*(2*a^2*c^2*e - a^2*b*c*g)*x)/(c*x^4 + b*x^2 + a), x)/(a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2)$$

mupad [B] time = 4.56, size = 13431, normalized size = 20.79

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^3, x)$

[Out] $\text{symsum}(\log((x*(13824*a^4*c^8*e^3 - 54*b^7*c^5*d^2*e + 27*b^8*c^4*d^2*g - 1728*a^4*b^3*c^5*g^3 - 20160*a^4*c^8*d*e*f + 972*a*b^5*c^6*d^2*e + 24192*a^3*b*c^8*d^2*e - 486*a*b^6*c^5*d^2*g + 6240*a^4*b*c^7*e*f^2 - 20736*a^4*b*c^7*e^2*g - 7344*a^2*b^3*c^7*d^2*e + 3672*a^2*b^4*c^6*d^2*g - 6*a^2*b^5*c^5*e*f^2 - 12096*a^3*b^2*c^7*d^2*g + 192*a^3*b^3*c^6*e*f^2 + 10368*a^4*b^2*c^6*e*g^2 + 3*a^2*b^6*c^4*f^2*g - 96*a^3*b^4*c^5*f^2*g - 3120*a^4*b^2*c^6*f^2*g - 36*a*b^6*c^5*d*e*f + 18*a*b^7*c^4*d*f*g + 10080*a^4*b*c^7*d*f*g + 900*a^2*b^4*c^6*d*e*f - 4896*a^3*b^2*c^7*d*e*f - 450*a^2*b^5*c^5*d*f*g + 2448*a^3*b^3*c^6*d*f*g))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - \text{root}(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 73728*a^2*b^16*c*d*f*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1321205760*a^9*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 23592960*a^6*b^9*c^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 440401920*a^10*b*c^8*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888*a^10*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^5*g^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 + 5898240*a^6*b^10*c^3*g^2*z^2 - 294912*a^5*b^12*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216*a*b^13*c^2*d*e*f*z - 4608*a*b^14*c*d*f*g*z - 221773824*a^6*b^3*c^7*d*e*f*z + 110886$

$912a^6b^4c^6d^2fgz - 84934656a^7b^2c^7d^2fgz + 117964800a^5b^5c^6d^2efz - 58982400a^5b^6c^5d^2fgz + 16220160a^4b^8c^4d^2fgz -$
 $2396160a^3b^{10}c^3d^2fgz + 175104a^2b^{12}c^2d^2fgz - 32440320a^4b^7c^5d^2efz + 4792320a^3b^9c^4d^2efz - 350208a^2b^{11}c^3d^2efz$
 $+ 346816512a^7b^8c^8d^2gz - 19660800a^8b^8c^7f^2gz - 768a^2b^{13}c^2f^2gz + 214272a^2b^{13}c^2d^2gz - 428544a^2b^{12}c^3d^2ez + 1022754$
 $816a^6b^2c^8d^2ez - 642318336a^5b^4c^7d^2ez - 511377408a^6b^3c^7d^2gz + 321159168a^5b^5c^6d^2gz + 223395840a^4b^6c^6d^2ez$
 $z - 111697920a^4b^7c^5d^2gz + 25362432a^7b^3c^6f^2gz - 50724864a^7b^2c^7e^2f^2z - 13271040a^6b^5c^5f^2gz + 3563520a^5b^7c^4f^2gz$
 $- 506880a^4b^9c^3f^2gz + 34560a^3b^{11}c^2f^2gz + 26542080a^6b^4c^6e^2f^2z + 23362560a^3b^9c^4d^2gz - 46725120a^3b^8c^5d^2ez$
 $- 7127040a^5b^6c^5e^2f^2z - 2965248a^2b^{11}c^3d^2gz + 1013760a^4b^8c^4e^2f^2z - 69120a^3b^{10}c^3e^2f^2z + 1536a^2b^{12}c^2e^2f^2z + 5930496a^2b^{10}c^4d^2ez - 693633024a^7c^9d^2ez + 39321600$
 $a^8c^8e^2f^2z + 13824b^{14}c^2d^2ez - 6912b^{15}c^2d^2gz + 15482880a^5b^8c^7d^2efg - 13824a^2b^9c^3d^2efg + 7741440a^4b^3c^6d^2efg -$
 $2903040a^3b^5c^5d^2efg + 387072a^2b^7c^4d^2efg + 3456a^2b^{10}c^2d^2fg^2 + 435456a^2b^8c^4d^2ezg + 13824a^2b^8c^4d^2ef^2 - 3870720a^5b^2c^6e^2f^2g - 34836480a^4b^2c^7d^2ezg - 645120a^4b^4c^5e^2f^2g + 80640a^3b^6c^4e^2f^2g - 2304a^2b^8c^3e^2f^2g - 3870720a^5b^2c^6d^2fg^2 - 1935360a^4b^4c^5d^2fg^2 + 725760a^3b^6c^4d^2fg^2 + 17418240a^3b^4c^6d^2ezg - 96768a^2b^8c^3d^2fg^2 - 3919104a^2b^6c^5d^2ezg - 7741440a^4b^2c^7d^2ef^2 + 2903040a^3b^4c^6d^2ef^2 - 3870720a^2b^6c^5d^2ef^2 + 37310976a^3b^3c^7d^3f - 2654208a^5b^3c^5e^2g^3 + 3870720a^5b^3c^7e^2f^2 + 34836480a^4b^3c^8d^2e^2 - 108864a^2b^9c^3d^2g^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^2f^3 + 1737792a^3b^5c^5d^2f^3 - 260190a^2b^8c^4d^2f^2 - 211680a^2b^7c^4d^2f^3 - 435456a^2b^7c^5d^2e^2 - 20736b^{10}c^3d^2ezg - 75188736a^4b^3c^8d^3f - 15482880a^5c^8d^2ef^2 - 10616832a^5b^3c^7e^3g - 4262400a^5b^3c^7d^2f^3 + 852768a^2b^7c^5d^3f + 7350a^2b^9c^3d^2f^3 + 967680a^5b^3c^5f^2g^2 + 161280a^4b^5c^4f^2g^2 - 20160a^3b^7c^3f^2g^2 + 576a^2b^9c^2f^2g^2 + 7962624a^5b^2c^6e^2g^2 + 35525376a^4b^2c^7d^2f^2 + 8709120a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 979776a^2b^7c^4d^2g^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e^2 + 5184b^{11}c^2d^2g^2 + 11025b^{10}c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 20736b^9c^4d^2e^2 + 331776a^5b^4c^4g^4 + 492800a^5b^2c^6f^4 + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 - 39690b^9c^4d^3f - 734832a^2b^6c^6d^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, k) * ((983040a^7c^8e^2f - 3244032a^6b^3c^8d^2e - 491520a^7b^3c^7f^2g - 4608a^2b^9c^4d^2e + 87552a^3b^7c^5d^2e - 681984a^4b^5c^6d^2e + 2433024a^5b^3c^7d^2e + 2304a^2b^{10}c^3$

$$\begin{aligned}
& *d*g - 43776*a^3*b^8*c^4*d*g - 1536*a^3*b^8*c^4*e*f + 340992*a^4*b^6*c^5*d* \\
& g + 39936*a^4*b^6*c^5*e*f - 1216512*a^5*b^4*c^6*d*g - 184320*a^5*b^4*c^6*e* \\
& f + 1622016*a^6*b^2*c^7*d*g - 49152*a^6*b^2*c^7*e*f + 768*a^3*b^9*c^3*f*g - \\
& 19968*a^4*b^7*c^4*f*g + 92160*a^5*b^5*c^5*f*g + 24576*a^6*b^3*c^6*f*g)/(51 \\
& 2*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^ \\
& 6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - \text{root}(56371445760*a^11*b^8*c \\
& ^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 171798691 \\
& 840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^ \\
& 6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2 \\
& 621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 73 \\
& 728*a^2*b^16*c*d*f*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1321205760*a^9*b^ \\
& 2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192*a^7*b^6*c^6*d*f*z \\
& ^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 188743 \\
& 680*a^7*b^7*c^5*e*g*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 23592960*a^6*b^9* \\
& c^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 \\
& + 1428480*a^3*b^14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 440401920* \\
& a^10*b*c^8*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2*z^2 \\
& + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 396361 \\
& 7280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^ \\
& 5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 73 \\
& 0054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 377487360*a^9 \\
& *b^4*c^6*g^2*z^2 + 301989888*a^10*b^2*c^7*g^2*z^2 + 188743680*a^8*b^6*c^5*g \\
& ^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 14 \\
& 6165760*a^4*b^11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 + 5898240*a^6*b^ \\
& ^10*c^3*g^2*z^2 - 294912*a^5*b^12*c^2*g^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^ \\
& 2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^ \\
& 5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^ \\
& 2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536* \\
& a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304* \\
& b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216*a*b^13*c^2*d*e*f*z - 4608 \\
& *a*b^14*c*d*f*g*z - 221773824*a^6*b^3*c^7*d*e*f*z + 110886912*a^6*b^4*c^6*d \\
& *f*g*z - 84934656*a^7*b^2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z - 589 \\
& 82400*a^5*b^6*c^5*d*f*g*z + 16220160*a^4*b^8*c^4*d*f*g*z - 2396160*a^3*b^10 \\
& *c^3*d*f*g*z + 175104*a^2*b^12*c^2*d*f*g*z - 32440320*a^4*b^7*c^5*d*e*f*z + \\
& 4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a^7* \\
& b*c^8*d^2*g*z - 19660800*a^8*b*c^7*f^2*g*z - 768*a^2*b^13*c*f^2*g*z + 21427 \\
& 2*a*b^13*c^2*d^2*g*z - 428544*a*b^12*c^3*d^2*e*z + 1022754816*a^6*b^2*c^8*d \\
& ^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 32 \\
& 1159168*a^5*b^5*c^6*d^2*g*z + 223395840*a^4*b^6*c^6*d^2*e*z - 111697920*a^4 \\
& *b^7*c^5*d^2*g*z + 25362432*a^7*b^3*c^6*f^2*g*z - 50724864*a^7*b^2*c^7*e*f^ \\
& 2*z - 13271040*a^6*b^5*c^5*f^2*g*z + 3563520*a^5*b^7*c^4*f^2*g*z - 506880*a \\
& ^4*b^9*c^3*f^2*g*z + 34560*a^3*b^11*c^2*f^2*g*z + 26542080*a^6*b^4*c^6*e*f^ \\
& 2*z + 23362560*a^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c^5*d^2*e*z - 7127040 \\
& *a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^11*c^3*d^2*g*z + 1013760*a^4*b^8*c^4*e \\
& *f^2*z - 69120*a^3*b^10*c^3*e*f^2*z + 1536*a^2*b^12*c^2*e*f^2*z + 5930496*a
\end{aligned}$$

$$\begin{aligned}
& ^2b^{10}c^4d^2e^*z - 693633024a^7c^9d^2e^*z + 39321600a^8c^8e^*f^2z \\
& + 13824b^{14}c^2d^2e^*z - 6912b^{15}c^d^2g^*z + 15482880a^5b^c^7d^*e^*f^*g \\
& - 13824a^*b^9c^3d^*e^*f^*g + 7741440a^4b^3c^6d^*e^*f^*g - 2903040a^3b^5c^5d^*e^*f^*g + 387072a^2b^7c^4d^*e^*f^*g + 3456a^*b^10c^2d^*f^*g^2 + 435456 \\
& a^*b^8c^4d^2e^*g + 13824a^*b^8c^4d^2e^2f - 3870720a^5b^2c^6e^*f^2g \\
& - 34836480a^4b^2c^7d^2e^*g - 645120a^4b^4c^5e^*f^2g + 80640a^3b^6 \\
& c^4e^*f^2g - 2304a^2b^8c^3e^*f^2g - 3870720a^5b^2c^6d^*f^*g^2 - 193 \\
& 5360a^4b^4c^5d^*f^*g^2 + 725760a^3b^6c^4d^*f^*g^2 + 17418240a^3b^4c^6d^2e^*g - 96768a^2b^8c^3d^*f^*g^2 - 3919104a^2b^6c^5d^2e^*g - 77414 \\
& 40a^4b^2c^7d^e^2f + 2903040a^3b^4c^6d^e^2f - 387072a^2b^6c^5d \\
& e^2f + 37310976a^3b^3c^7d^3f - 2654208a^5b^3c^5e^*g^3 + 3870720a \\
& ^5b^c^7e^2f^2 + 34836480a^4b^c^8d^2e^2 - 108864a^*b^9c^3d^2g^2 - \\
& 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^*f^3 + 1737792a^3b^5c^5 \\
& d^*f^3 - 260190a^*b^8c^4d^2f^2 - 211680a^2b^7c^4d^*f^3 - 435456a^*b^7 \\
& c^5d^2e^2 - 20736b^10c^3d^2e^*g - 75188736a^4b^c^8d^3f - 15482880 \\
& a^5c^8d^e^2f - 10616832a^5b^c^7e^3g - 4262400a^5b^c^7d^*f^3 + 852 \\
& 768a^*b^7c^5d^3f + 7350a^*b^9c^3d^*f^3 + 967680a^5b^3c^5f^2g^2 + 1 \\
& 61280a^4b^5c^4f^2g^2 - 20160a^3b^7c^3f^2g^2 + 576a^2b^9c^2f^2 \\
& g^2 + 7962624a^5b^2c^6e^2g^2 + 35525376a^4b^2c^7d^2f^2 + 8709120 \\
& a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 979776a^2b^7c^4d^2 \\
& g^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2b^7 \\
& c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f^2 \\
& - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e^2 + 5184b^11c^2 \\
& d^2g^2 + 11025b^10c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 20736b^9c^4 \\
& d^2e^2 + 331776a^5b^4c^4g^4 + 492800a^5b^2c^6f^4 + 351456a^4b^4 \\
& c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3b^2 \\
& c^8d^4 + 6446304a^2b^4c^7d^4 - 39690b^9c^4d^3f - 734832a^*b^6c^6 \\
& d^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 35 \\
& 721b^8c^5d^4, z, k) * ((768a^2b^14c^2d - 22020096a^9c^9d - 22272a^3 \\
& b^12c^3d + 282624a^4b^10c^4d - 2027520a^5b^8c^5d + 8847360a^6b^6 \\
& c^6d - 23396352a^7b^4c^7d + 34603008a^8b^2c^8d + 256a^3b^13c^2 \\
& f - 9216a^4b^11c^3f + 122880a^5b^9c^4f - 819200a^6b^7c^5f + \\
& 2949120a^7b^5c^6f - 5505024a^8b^3c^7f + 4194304a^9b^c^8f) / (512 * \\
& (a^4b^12 + 4096a^10c^6 - 24a^5b^10c + 240a^6b^8c^2 - 1280a^7b^6c^3 + \\
& 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (x * (1572864a^9c^9e - 1536a^4 \\
& b^10c^4e + 30720a^5b^8c^5e - 245760a^6b^6c^6e + 983040a^7b^4 \\
& c^7e - 1966080a^8b^2c^8e + 768a^4b^11c^3g - 15360a^5b^9c^4g \\
& + 122880a^6b^7c^5g - 491520a^7b^5c^6g + 983040a^8b^3c^7g - 7864 \\
& 32a^9b^c^8g)) / (64 * (a^4b^12 + 4096a^10c^6 - 24a^5b^10c + 240a^6b^8 \\
& c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (root(56 \\
& 371445760a^11b^8c^6z^4 - 503316480a^8b^14c^3z^4 + 47185920a^7b^16 \\
& c^2z^4 - 171798691840a^14b^2c^9z^4 + 193273528320a^13b^4c^8z^4 - \\
& 128849018880a^12b^6c^7z^4 - 16911433728a^10b^10c^5z^4 + 3523215360a^9 \\
& b^12c^4z^4 - 2621440a^6b^18c^*z^4 + 68719476736a^15c^10z^4 + 655 \\
& 36a^5b^20z^4 - 73728a^2b^16c^*d^*f^*z^2 + 1509949440a^9b^3c^7e^*g^*z^2
\end{aligned}$$

$$\begin{aligned}
& - 1321205760a^9b^2c^8d^4f^2z^2 - 754974720a^8b^5c^6e^4g^2z^2 + 7321681 \\
& 92a^7b^6c^6d^4f^2z^2 - 366280704a^6b^8c^5d^4f^2z^2 - 330301440a^8b^4c^7d^4f^2z^2 + 188743680a^7b^7c^5e^4g^2z^2 + 96583680a^5b^10c^4d^4f^2z^2 \\
& - 23592960a^6b^9c^4e^4g^2z^2 + 1179648a^5b^11c^3e^4g^2z^2 - 15175680a^4b^12c^3d^4f^2z^2 + 1428480a^3b^14c^2d^4f^2z^2 - 1207959552a^10b^8c^8 \\
& e^4g^2z^2 - 440401920a^10b^8c^8f^2z^2 + 1761607680a^10c^9d^4f^2z^2 - 1408 \\
& 0a^3b^15c^4f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^8c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 \\
& - 5400428544a^7b^5c^7d^2z^2 - 94464a^8b^17c^4d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 \\
& z^2 - 377487360a^9b^4c^6g^2z^2 + 301989888a^10b^2c^7g^2z^2 + 188 \\
& 743680a^8b^6c^5g^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^11c^4d^2z^2 - 47185920a^7b^8c^4g^2z^2 \\
& z^2 + 5898240a^6b^10c^3g^2z^2 - 294912a^5b^12c^2g^2z^2 + 1120665 \\
& 6a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^11c^3f^2z^2 + 291840a^4b^13c^2f^2z^2 - 1986 \\
& 0480a^3b^13c^3d^2z^2 - 1179648a^5b^10c^4e^2z^2 + 1771776a^2b^15c^2d^2z^2 + 1536a^8b^18d^4f^2z^2 + 1207959552a^10c^9e^2z^2 + 256a^2b^17f^2z^2 \\
& + 2304b^19d^2z^2 + 169869312a^7b^8c^8d^4e^4f^2z^2 + 9216a^8b^13c^2d^4e^4f^2z^2 - 4608a^8b^14c^4d^4f^2g^2z^2 - 221773824a^6b^3c^7d^4e^4f^2z^2 + 110 \\
& 886912a^6b^4c^6d^4f^2g^2z^2 - 84934656a^7b^2c^7d^4f^2g^2z^2 + 117964800a^5b^5c^6d^4e^4f^2z^2 - 58982400a^5b^6c^5d^4f^2g^2z^2 + 16220160a^4b^8c^4d^4f^2g^2z^2 \\
& z - 2396160a^3b^10c^3d^4f^2g^2z^2 + 175104a^2b^12c^2d^4f^2g^2z^2 - 32440320a^4b^7c^5d^4e^4f^2z^2 + 4792320a^3b^9c^4d^4e^4f^2z^2 - 350208a^2b^11c^3d^4e^4f^2z^2 \\
& f^2z^2 + 346816512a^7b^8c^8d^2g^2z^2 - 19660800a^8b^8c^7f^2g^2z^2 - 768a^2b^13c^4f^2g^2z^2 + 214272a^8b^13c^2d^2g^2z^2 - 428544a^8b^12c^3d^2e^4z^2 + 1022 \\
& 754816a^6b^2c^8d^2e^4z^2 - 642318336a^5b^4c^7d^2e^4z^2 - 511377408a^6b^3c^7d^2g^2z^2 + 321159168a^5b^5c^6d^2g^2z^2 + 223395840a^4b^6c^6d^2e^4z^2 \\
& *e^4z^2 - 111697920a^4b^7c^5d^2g^2z^2 + 25362432a^7b^3c^6f^2g^2z^2 - 50724 \\
& 864a^7b^2c^7e^4f^2z^2 - 13271040a^6b^5c^5f^2g^2z^2 + 3563520a^5b^7c^4f^2g^2z^2 - 506880a^4b^9c^3f^2g^2z^2 + 34560a^3b^11c^2f^2g^2z^2 + 26542 \\
& 080a^6b^4c^6e^4f^2z^2 + 23362560a^3b^9c^4d^2g^2z^2 - 46725120a^3b^8c^5d^2e^4z^2 - 7127040a^5b^6c^5e^4f^2z^2 - 2965248a^2b^11c^3d^2g^2z^2 + 1 \\
& 013760a^4b^8c^4e^4f^2z^2 - 69120a^3b^10c^3e^4f^2z^2 + 1536a^2b^12c^2e^4f^2z^2 + 5930496a^2b^10c^4d^2e^4z^2 - 693633024a^7c^9d^2e^4z^2 + 39321 \\
& 600a^8c^8e^4f^2z^2 + 13824b^14c^2d^2e^4z^2 - 6912b^15c^4d^2g^2z^2 + 154828 \\
& 80a^5b^8c^7d^4e^4f^2g^2 - 13824a^8b^9c^3d^4e^4f^2g^2 + 7741440a^4b^3c^6d^4e^4f^2g^2 - 2903040a^3b^5c^5d^4e^4f^2g^2 + 387072a^2b^7c^4d^4e^4f^2g^2 + 3456a^8b^10c^2d^4f^2g^2 \\
& + 435456a^8b^8c^4d^2e^4g^2 + 13824a^8b^8c^4d^4e^2f^2 - 3870720a^5b^2c^6e^4f^2g^2 - 34836480a^4b^2c^7d^2e^4g^2 - 645120a^4b^4c^5e^4f^2g^2 \\
& + 80640a^3b^6c^4e^4f^2g^2 - 2304a^2b^8c^3e^4f^2g^2 - 3870720a^5b^2c^6d^4f^2g^2 - 1935360a^4b^4c^5d^4f^2g^2 + 725760a^3b^6c^4d^4f^2g^2 + 17418240a^3b^4c^6d^2e^4g^2 \\
& - 96768a^2b^8c^3d^4f^2g^2 - 3919104a^2b^6c^5d^2e^4g^2 - 7741440a^4b^2c^7d^4e^2f^2 + 2903040a^3b^4c^6d^4e^2f^2 - 387072a^2b^6c^5d^4e^2f^2 + 37310976a^3b^3c^7d^3f^2 - 2654208a^5b^3c^8d^3f^2
\end{aligned}$$

$$\begin{aligned}
& ^5e*g^3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108864* \\
& a*b^9*c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + \\
& 1737792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4* \\
& d*f^3 - 435456*a*b^7*c^5*d^2*e^2 - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b* \\
& c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 4262400*a \\
& ^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 967680*a^5 \\
& *b^3*c^5*f^2*g^2 + 161280*a^4*b^5*c^4*f^2*g^2 - 20160*a^3*b^7*c^3*f^2*g^2 + \\
& 576*a^2*b^9*c^2*f^2*g^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c \\
& ^7*d^2*f^2 + 8709120*a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 97 \\
& 9776*a^2*b^7*c^4*d^2*g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e \\
& ^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784* \\
& a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^ \\
& 2*e^2 + 5184*b^11*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^ \\
& 2*f^2 + 20736*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6 \\
& *f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^ \\
& 4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 39690*b^9*c^4*d^3* \\
& f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308 \\
& 416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*x*(8388608*a^11*b*c^9 - 512*a^4* \\
& b^15*c^2 + 14336*a^5*b^13*c^3 - 172032*a^6*b^11*c^4 + 1146880*a^7*b^9*c^5 - \\
& 4587520*a^8*b^7*c^6 + 11010048*a^9*b^5*c^7 - 14680064*a^10*b^3*c^8))/ (64*(\\
& a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c \\
& ^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5))) + (x*(451584*a^6*c^9*d^2 + 18*b \\
& ^12*c^3*d^2 - 25600*a^7*c^8*f^2 - 504*a*b^10*c^4*d^2 - 73728*a^6*b*c^8*e^2 \\
& + 6228*a^2*b^8*c^5*d^2 - 42624*a^3*b^6*c^6*d^2 + 176256*a^4*b^4*c^7*d^2 - 4 \\
& 23936*a^5*b^2*c^8*d^2 - 4608*a^4*b^5*c^6*e^2 + 36864*a^5*b^3*c^7*e^2 + 2*a^ \\
& 2*b^10*c^3*f^2 - 84*a^3*b^8*c^4*f^2 + 3520*a^4*b^6*c^5*f^2 - 26240*a^5*b^4* \\
& c^6*f^2 + 59904*a^6*b^2*c^7*f^2 - 1152*a^4*b^7*c^4*g^2 + 9216*a^5*b^5*c^5*g \\
& ^2 - 18432*a^6*b^3*c^6*g^2 + 12*a*b^11*c^3*d*f - 218112*a^6*b*c^8*d*f - 420 \\
& *a^2*b^9*c^4*d*f + 4992*a^3*b^7*c^5*d*f - 36480*a^4*b^5*c^6*d*f + 144384*a^ \\
& 5*b^3*c^7*d*f + 4608*a^4*b^6*c^5*e*g - 36864*a^5*b^4*c^6*e*g + 73728*a^6*b^ \\
& 2*c^7*e*g))/ (64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 \\
& - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5))) - (567*b^7*c^5 \\
& *d^3 + 8000*a^5*c^7*f^3 - 10368*a*b^5*c^6*d^3 - 169344*a^3*b*c^8*d^3 - 1935 \\
& 36*a^4*c^8*d*e^2 + 141120*a^4*c^8*d^2*f - 315*b^8*c^4*d^2*f + 67824*a^2*b^3 \\
& *c^7*d^3 - 35*a^2*b^6*c^4*f^3 - 84*a^3*b^4*c^5*f^3 + 12720*a^4*b^2*c^6*f^3 \\
& + 6237*a*b^6*c^5*d^2*f - 210*a*b^7*c^4*d*f^2 - 116160*a^4*b*c^7*d*f^2 + 368 \\
& 64*a^4*b*c^7*e^2*f - 6912*a^2*b^4*c^6*d*e^2 + 62208*a^3*b^2*c^7*d*e^2 - 423 \\
& 72*a^2*b^4*c^6*d^2*f + 1764*a^2*b^5*c^5*d*f^2 + 96048*a^3*b^2*c^7*d^2*f + 4 \\
& 608*a^3*b^3*c^6*d*f^2 - 1728*a^2*b^6*c^4*d*g^2 - 2304*a^3*b^3*c^6*e^2*f + 1 \\
& 5552*a^3*b^4*c^5*d*g^2 - 48384*a^4*b^2*c^6*d*g^2 - 576*a^3*b^5*c^4*f*g^2 + \\
& 9216*a^4*b^3*c^5*f*g^2 + 193536*a^4*b*c^7*d*e*g + 6912*a^2*b^5*c^5*d*e*g - \\
& 62208*a^3*b^3*c^6*d*e*g + 2304*a^3*b^4*c^5*e*f*g - 36864*a^4*b^2*c^6*e*f*g) \\
& / (512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^ \\
& 7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5))) *root(56371445760*a^11*b^ \\
& 8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 171798
\end{aligned}$$

$$\begin{aligned}
& 691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 128849018880a^{12} \\
& b^6c^7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 3523215360a^9b^{12}c^4z^4 \\
& - 2621440a^6b^{18}c^3z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 - \\
& 73728a^2b^{16}c^8d^2f^2z^2 + 1509949440a^9b^3c^7e^2gz^2 - 1321205760a^9 \\
& b^2c^8d^2f^2z^2 - 754974720a^8b^5c^6e^2gz^2 + 732168192a^7b^6c^6d^2f^2z^2 \\
& - 366280704a^6b^8c^5d^2f^2z^2 - 330301440a^8b^4c^7d^2f^2z^2 + 188 \\
& 743680a^7b^7c^5e^2gz^2 + 96583680a^5b^{10}c^4d^2f^2z^2 - 23592960a^6b^9 \\
& c^4e^2gz^2 + 1179648a^5b^{11}c^3e^2gz^2 - 15175680a^4b^{12}c^3d^2f^2z^2 \\
& + 1428480a^3b^{14}c^2d^2f^2z^2 - 1207959552a^{10}b^2c^8e^2gz^2 - 4404019 \\
& 20a^{10}b^2c^8f^2z^2 + 1761607680a^{10}c^9d^2f^2z^2 - 14080a^3b^{15}c^3f^2z^2 \\
& + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 396 \\
& 3617280a^9b^2c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 - 5400428544a^7 \\
& b^5c^7d^2z^2 - 94464a^8b^{17}c^4d^2z^2 + 754974720a^8b^4c^7e^2z^2 - \\
& 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 377487360a^9 \\
& b^4c^6g^2z^2 + 301989888a^{10}b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 - \\
& 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + \\
& 146165760a^4b^{11}c^4d^2z^2 - 47185920a^7b^8c^4g^2z^2 + 5898240a^6 \\
& b^{10}c^3g^2z^2 - 294912a^5b^{12}c^2g^2z^2 + 11206656a^7b^7c^5f^2z^2 \\
& + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960 \\
& a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3 \\
& d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 15 \\
& 36a^b^{18}d^2f^2z^2 + 1207959552a^{10}c^9e^2z^2 + 256a^2b^{17}f^2z^2 + 23 \\
& 04b^{19}d^2z^2 + 169869312a^7b^2c^8d^2e^2f^2z + 9216a^2b^{13}c^2d^2e^2f^2z - 4 \\
& 608a^2b^{14}c^2d^2f^2gz - 221773824a^6b^3c^7d^2e^2f^2z + 110886912a^6b^4c^6 \\
& d^2f^2gz - 84934656a^7b^2c^7d^2f^2gz + 117964800a^5b^5c^6d^2e^2f^2z - \\
& 58982400a^5b^6c^5d^2f^2gz + 16220160a^4b^8c^4d^2f^2gz - 2396160a^3b^8 \\
& c^3d^2f^2gz + 175104a^2b^{12}c^2d^2f^2gz - 32440320a^4b^7c^5d^2e^2f^2z \\
& + 4792320a^3b^9c^4d^2e^2f^2z - 350208a^2b^{11}c^3d^2e^2f^2z + 346816512a^7 \\
& b^2c^8d^2gz - 19660800a^8b^2c^7f^2gz - 768a^2b^{13}c^3f^2gz + 21 \\
& 4272a^2b^{13}c^2d^2gz - 428544a^2b^{12}c^3d^2e^2z + 1022754816a^6b^2c^8 \\
& d^2e^2z - 642318336a^5b^4c^7d^2e^2z - 511377408a^6b^3c^7d^2gz + \\
& 321159168a^5b^5c^6d^2gz + 223395840a^4b^6c^6d^2e^2z - 111697920a^4 \\
& b^7c^5d^2gz + 25362432a^7b^3c^6f^2gz - 50724864a^7b^2c^7e^2 \\
& f^2z - 13271040a^6b^5c^5f^2gz + 3563520a^5b^7c^4f^2gz - 50688 \\
& 0a^4b^9c^3f^2gz + 34560a^3b^{11}c^2f^2gz + 26542080a^6b^4c^6e^2 \\
& f^2z + 23362560a^3b^9c^4d^2gz - 46725120a^3b^8c^5d^2e^2z - 7127 \\
& 040a^5b^6c^5e^2f^2z - 2965248a^2b^{11}c^3d^2gz + 1013760a^4b^8c^4 \\
& e^2f^2z - 69120a^3b^{10}c^3e^2f^2z + 1536a^2b^{12}c^2e^2f^2z + 593049 \\
& 6a^2b^{10}c^4d^2e^2z - 693633024a^7c^9d^2e^2z + 39321600a^8c^8e^2f^2z \\
& + 13824b^{14}c^2d^2e^2z - 6912b^{15}c^2d^2gz + 15482880a^5b^2c^7d^2e^2 \\
& f^2z - 13824a^2b^9c^3d^2e^2f^2z + 7741440a^4b^3c^6d^2e^2f^2z - 2903040a^3b^5 \\
& c^5d^2e^2f^2z + 387072a^2b^7c^4d^2e^2f^2z + 3456a^2b^{10}c^2d^2f^2gz + 435 \\
& 456a^2b^8c^4d^2e^2gz + 13824a^2b^8c^4d^2e^2f^2z - 3870720a^5b^2c^6e^2f^2 \\
& gz - 34836480a^4b^2c^7d^2e^2gz - 645120a^4b^4c^5e^2f^2gz + 80640a^3b^6 \\
& c^4e^2f^2gz - 2304a^2b^8c^3e^2f^2gz - 3870720a^5b^2c^6d^2f^2gz -
\end{aligned}$$

```

1935360*a^4*b^4*c^5*d*f*g^2 + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b^4
*c^6*d^2*e*g - 96768*a^2*b^8*c^3*d*f*g^2 - 3919104*a^2*b^6*c^5*d^2*e*g - 77
41440*a^4*b^2*c^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^
5*d*e^2*f + 37310976*a^3*b^3*c^7*d^3*f - 2654208*a^5*b^3*c^5*e*g^3 + 387072
0*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108864*a*b^9*c^3*d^2*g^2
- 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*
c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*
b^7*c^5*d^2*e^2 - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 15482
880*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 4262400*a^5*b*c^7*d*f^3 +
852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 967680*a^5*b^3*c^5*f^2*g^2
+ 161280*a^4*b^5*c^4*f^2*g^2 - 20160*a^3*b^7*c^3*f^2*g^2 + 576*a^2*b^9*c^2*
f^2*g^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 + 8709
120*a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4*
d^2*g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2
*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f
^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 5184*b^11
*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9
*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4
*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*
b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*
c^6*d^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 +
35721*b^8*c^5*d^4, z, k), k, 1, 4) + ((9*x^4*(2*b*c^2*e - b^2*c*g))/(4*(b^
4 + 16*a^2*c^2 - 8*a*b^2*c)) - (x^2*(b^3*g - 10*a*c^2*e - 2*b^2*c*e + 5*a*b
*c*g))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (b^3*e + a*b^2*g + 8*a^2*c*g -
10*a*b*c*e)/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^5*(28*a^2*c^3*d + 6*b^4
*c*d + 2*a*b^3*c*f - 49*a*b^2*c^2*d + 28*a^2*b*c^2*f))/(8*a^2*(b^4 + 16*a^2
*c^2 - 8*a*b^2*c)) + (x*(5*b^4*d + 44*a^2*c^2*d - a*b^3*f - 37*a*b^2*c*d +
16*a^2*b*c*f))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^3*(3*b^5*d + 36*a^
3*c^2*f + a*b^4*f - 20*a*b^3*c*d - 4*a^2*b*c^2*d + 5*a^2*b^2*c*f))/(8*a^2*(
b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (3*c^2*x^6*(2*c*e - b*g))/(2*(b^4 + 16*a^2
*c^2 - 8*a*b^2*c)) + (c*x^7*(20*a^2*c^2*f + 3*b^3*c*d - 24*a*b*c^2*d + a*b^
2*c*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)))/(x^4*(2*a*c + b^2) + a^2 +
c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6)

```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**3,x)

[Out] Timed out

$$3.55 \quad \int \frac{d+ex+fx^2+gx^3+hx^4}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=679

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 12ab(ah + 2cd) + 3b^3d) + 8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)}$$

```
[Out] 1/4*(-b*e+2*a*g-(-b*g+2*c*e)*x^2)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+1/4*x*(b^2*d-a*b*f-2*a*(-a*h+c*d)+(a*b*h-2*a*c*f+b*c*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+3/4*(-b*g+2*c*e)*(2*c*x^2+b)/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)+1/8*x*(3*b^4*d+a*b^3*f+8*a^2*b*c*f+4*a^2*c*(a*h+7*c*d)-a*b^2*(7*a*h+25*c*d)+c*(3*b^3*d+a*b^2*f+20*a^2*c*f-12*a*b*(a*h+2*c*d))*x^2)/a^2/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)-3*c*(-b*g+2*c*e)*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/(-4*a*c+b^2)^(5/2)+1/16*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(3*b^3*d+a*b^2*f+20*a^2*c*f-12*a*b*(a*h+2*c*d)+(3*b^4*d+a*b^3*f-52*a^2*b*c*f-6*a*b^2*(-3*a*h+5*c*d)+24*a^2*c*(a*h+7*c*d))/(-4*a*c+b^2)^(1/2))/a^2/(-4*a*c+b^2)^2*2^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/16*arctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(3*b^3*d+a*b^2*f+20*a^2*c*f-12*a*b*(a*h+2*c*d)+(-3*b^4*d-a*b^3*f+52*a^2*b*c*f+6*a*b^2*(-3*a*h+5*c*d)-24*a^2*c*(a*h+7*c*d))/(-4*a*c+b^2)^(1/2))/a^2/(-4*a*c+b^2)^2*2^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)
```

Rubi [A] time = 4.18, antiderivative size = 679, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 10, integrand size = 35, $\frac{\text{number of rules}}{\text{integrand size}} = 0.286$, Rules used = {1673, 1678, 1178, 1166, 205, 1247, 638, 614, 618, 206}

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 12ab(ah + 2cd) + 3b^3d) + 8a^2bcf + 4a^2c(ah + 7cd) - ab^2(7ah + 25cd) + ab^3f + 3b^4d \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)}$$

Antiderivative was successfully verified.

```
[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^3, x]
```

```
[Out] -(b*e - 2*a*g + (2*c*e - b*g)*x^2)/(4*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (x*(b^2*d - a*b*f - 2*a*(c*d - a*h) + (b*c*d - 2*a*c*f + a*b*h)*x^2))/(4*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (3*(2*c*e - b*g)*(b + 2*c*x^2))/(4*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (x*(3*b^4*d + a*b^3*f + 8*a^2*b*c*f + 4*a^2*c*(7*c*d + a*h) - a*b^2*(25*c*d + 7*a*h) + c*(3*b^3*d + a*b^2*f +
```

$$20*a^2*c*f - 12*a*b*(2*c*d + a*h))*x^2))/(8*a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (\text{Sqrt}[c]*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(2*c*d + a*h) + (3*b^4*d + a*b^3*f - 52*a^2*b*c*f - 6*a*b^2*(5*c*d - 3*a*h) + 24*a^2*c*(7*c*d + a*h)))/\text{Sqrt}[b^2 - 4*a*c])*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]])]/(8*\text{Sqrt}[2]*a^2*(b^2 - 4*a*c)^2*\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) + (\text{Sqrt}[c]*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(2*c*d + a*h) - (3*b^4*d + a*b^3*f - 52*a^2*b*c*f - 6*a*b^2*(5*c*d - 3*a*h) + 24*a^2*c*(7*c*d + a*h)))/\text{Sqrt}[b^2 - 4*a*c])*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]])]/(8*\text{Sqrt}[2]*a^2*(b^2 - 4*a*c)^2*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) - (3*c*(2*c*e - b*g)*\text{ArcTanh}[(b + 2*c*x^2)/\text{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(5/2)$$

Rule 205

$$\text{Int}[((a_) + (b_)*(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(\text{Rt}[a/b, 2]*\text{ArcTan}[x/\text{Rt}[a/b, 2]])/a, x] /; \text{FreeQ}[\{a, b\}, x] \ \&\& \ \text{PosQ}[a/b]$$

Rule 206

$$\text{Int}[((a_) + (b_)*(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(1*\text{ArcTanh}[(\text{Rt}[-b, 2]*x)/\text{Rt}[a, 2]])/(\text{Rt}[a, 2]*\text{Rt}[-b, 2]), x] /; \text{FreeQ}[\{a, b\}, x] \ \&\& \ \text{NegQ}[a/b] \ \&\& \ (\text{GtQ}[a, 0] \ || \ \text{LtQ}[b, 0])$$

Rule 614

$$\text{Int}(((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^{(p_)}, x_Symbol] \rightarrow \text{Simp}(((b + 2*c*x)*(a + b*x + c*x^2)^{(p + 1)})/((p + 1)*(b^2 - 4*a*c)), x] - \text{Dist}[(2*c*(2*p + 3))/((p + 1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x + c*x^2)^{(p + 1)}, x], x] /; \text{FreeQ}[\{a, b, c\}, x] \ \&\& \ \text{NeQ}[b^2 - 4*a*c, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{NeQ}[p, -3/2] \ \&\& \ \text{IntegerQ}[4*p]$$

Rule 618

$$\text{Int}(((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Dist}[-2, \text{Subst}[\text{Int}[1/\text{Simp}[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; \text{FreeQ}[\{a, b, c\}, x] \ \&\& \ \text{NeQ}[b^2 - 4*a*c, 0]$$

Rule 638

$$\text{Int}(((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^{(p_)}, x_Symbol] \rightarrow \text{Simp}(((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^{(p + 1)})/((p + 1)*(b^2 - 4*a*c)), x] - \text{Dist}(((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x + c*x^2)^{(p + 1)}, x], x] /; \text{FreeQ}[\{a, b, c, d, e\}, x] \ \&\& \ \text{NeQ}[2*c*d - b*e, 0] \ \&\& \ \text{NeQ}[b^2 - 4*a*c, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{NeQ}[p, -3/2]$$

Rule 1166


```
Int[((d_) + (e_)*(x_)^2)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_)*(x_)^2)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symb
ol] :=> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1247

```
Int[(x_)*((d_) + (e_)*(x_)^2)^(q_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(
p_), x_Symbol] :=> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :=> Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :=> With[{d =
Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[Poly
nomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x
^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(
b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*
x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a
+ b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p
+ 7)*(b*d - 2*a*e)*x^2, x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^
2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(a + bx^2 + cx^4)^3} dx &= \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(a + bx + cx^2)^3} dx \right) \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2}
\end{aligned}$$

Mathematica [A] time = 6.55, size = 845, normalized size = 1.24

$$-\frac{bcdx^3 - 2acfx^3 + abhx^3 - 2acex^2 + abgx^2 + b^2dx - 2acdx - abfx + 2a^2hx - abe + 2a^2g}{4a(4ac - b^2)(cx^4 + bx^2 + a)^2} + \frac{\sqrt{c} \left(3db^4 + 3\sqrt{b^2 - 4ac} \right)}{4a(4ac - b^2)(cx^4 + bx^2 + a)^2}$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^3, x]

[Out] -1/4*(-(a*b*e) + 2*a^2*g + b^2*d*x - 2*a*c*d*x - a*b*f*x + 2*a^2*h*x - 2*a*c*e*x^2 + a*b*g*x^2 + b*c*d*x^3 - 2*a*c*f*x^3 + a*b*h*x^3)/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (12*a^2*b*c*e - 6*a^2*b^2*g + 3*b^4*d*x - 25*a*b^2*c*d*x + 28*a^2*c^2*d*x + a*b^3*f*x + 8*a^2*b*c*f*x - 7*a^2*b^2*h*x + 4*a^3*c*h*x + 24*a^2*c^2*e*x^2 - 12*a^2*b*c*g*x^2 + 3*b^3*c*d*x^3 - 24*a*b*c^2

$$\begin{aligned} & *d*x^3 + a*b^2*c*f*x^3 + 20*a^2*c^2*f*x^3 - 12*a^2*b*c*h*x^3)/(8*a^2*(-b^2 \\ & + 4*a*c)^2*(a + b*x^2 + c*x^4)) + (\text{Sqrt}[c]*(3*b^4*d - 30*a*b^2*c*d + 168*a^2 \\ & *c^2*d + 3*b^3*\text{Sqrt}[b^2 - 4*a*c]*d - 24*a*b*c*\text{Sqrt}[b^2 - 4*a*c]*d + a*b^3* \\ & f - 52*a^2*b*c*f + a*b^2*\text{Sqrt}[b^2 - 4*a*c]*f + 20*a^2*c*\text{Sqrt}[b^2 - 4*a*c]*f \\ & + 18*a^2*b^2*h + 24*a^3*c*h - 12*a^2*b*\text{Sqrt}[b^2 - 4*a*c]*h)*\text{ArcTan}[(\text{Sqrt}[2 \\ &]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]])]/(8*\text{Sqrt}[2]*a^2*(b^2 - 4*a*c)^(5/ \\ & 2)*\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) + (\text{Sqrt}[c]*(-3*b^4*d + 30*a*b^2*c*d - 168*a^2 \\ & *c^2*d + 3*b^3*\text{Sqrt}[b^2 - 4*a*c]*d - 24*a*b*c*\text{Sqrt}[b^2 - 4*a*c]*d - a*b^3 \\ & *f + 52*a^2*b*c*f + a*b^2*\text{Sqrt}[b^2 - 4*a*c]*f + 20*a^2*c*\text{Sqrt}[b^2 - 4*a*c]* \\ & f - 18*a^2*b^2*h - 24*a^3*c*h - 12*a^2*b*\text{Sqrt}[b^2 - 4*a*c]*h)*\text{ArcTan}[(\text{Sqrt}[\\ & 2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]])]/(8*\text{Sqrt}[2]*a^2*(b^2 - 4*a*c)^(5 \\ & /2)*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) + (3*c*(2*c*e - b*g)*\text{Log}[-b + \text{Sqrt}[b^2 - 4 \\ & *a*c] - 2*c*x^2])/(2*(b^2 - 4*a*c)^(5/2)) - (3*c*(2*c*e - b*g)*\text{Log}[b + \text{Sqrt} \\ & [b^2 - 4*a*c] + 2*c*x^2])/(2*(b^2 - 4*a*c)^(5/2)) \end{aligned}$$

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="fricas")

[Out] Timed out

giac [B] time = 13.22, size = 6861, normalized size = 10.10

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="giac")

[Out]
$$\begin{aligned} & 1/32*(3*(\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*b^8 - 17*\text{sqrt}(2)*\text{sqrt}(b*c \\ & + \text{sqrt}(b^2 - 4*a*c))*c)*a*b^6*c - 2*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)* \\ & b^7*c - 2*b^8*c + 116*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^4*c^2 + \\ & 26*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a*b^5*c^2 + \text{sqrt}(2)*\text{sqrt}(b*c + \\ & \text{sqrt}(b^2 - 4*a*c))*c)*b^6*c^2 + 34*a*b^6*c^2 + 2*b^7*c^2 - 368*\text{sqrt}(2)*\text{sqrt}(\\ & b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b^2*c^3 - 128*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - \\ & 4*a*c))*c)*a^2*b^3*c^3 - 13*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a*b^4*c^ \\ & 3 - 232*a^2*b^4*c^3 - 30*a*b^5*c^3 + 448*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a* \\ & c))*c)*a^4*c^4 + 224*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^3*b*c^4 + 64* \\ & \text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^2*b^2*c^4 + 736*a^3*b^2*c^4 + 176 \\ & *a^2*b^3*c^4 - 112*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^3*c^5 - 896*a^ \\ & 4*c^5 - 352*a^3*b*c^5 - \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a \\ & *c))*c)*b^7 + 15*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a \end{aligned}$$

$$\begin{aligned}
& *b^5*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*b^6*c \\
& - 88*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^2*b^3*c^2 \\
& - 22*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a*b^4*c^2 - \\
& \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*b^5*c^2 + 176*\sqrt{2} \\
& \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^3*b*c^3 + 88*\sqrt{2} \\
& \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^2*b^2*c^3 + 11*\sqrt{2} \\
& \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a*b^3*c^3 - 44*\sqrt{2} \\
& \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^2*b*c^4 + 2*(b^2 - 4*a \\
& *c)*b^6*c - 26*(b^2 - 4*a*c)*a*b^4*c^2 - 2*(b^2 - 4*a*c)*b^5*c^2 + 128*(b^2 \\
& - 4*a*c)*a^2*b^2*c^3 + 22*(b^2 - 4*a*c)*a*b^3*c^3 - 224*(b^2 - 4*a*c)*a^3* \\
& c^4 - 88*(b^2 - 4*a*c)*a^2*b*c^4)*d + (\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c} \\
& *c})*a*b^7 - 24*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^2*b^5*c - 2*\sqrt{2} \\
&)*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a*b^6*c - 2*a*b^7*c + 144*\sqrt{2}*\sqrt{b* \\
& c + \sqrt{b^2 - 4*a*c}*c}*a^3*b^3*c^2 + 40*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a \\
& *c}*c}*a^2*b^4*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a*b^5*c^2 + 48 \\
& *a^2*b^5*c^2 + 2*a*b^6*c^2 - 256*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^ \\
& 4*b*c^3 - 128*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^3*b^2*c^3 - 20*\sqrt{2} \\
& \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^2*b^3*c^3 - 288*a^3*b^3*c^3 - 44*a^2* \\
& b^4*c^3 + 64*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^3*b*c^4 + 512*a^4*b* \\
& c^4 + 64*a^3*b^2*c^4 + 320*a^4*c^5 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + s \\
& \sqrt{2}*\sqrt{b^2 - 4*a*c}*c}*a*b^6 + 22*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^ \\
& 2 - 4*a*c}*c}*a^2*b^4*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - \\
& 4*a*c}*c}*a*b^5*c - 32*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a \\
& *c}*c}*a^3*b^2*c^2 - 36*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a \\
& *c}*c}*a^2*b^3*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c} \\
& *c}*a*b^4*c^2 - 160*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}* \\
& c}*a^4*c^3 - 80*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a \\
& ^3*b*c^3 + 18*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^2 \\
& *b^2*c^3 + 40*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^3 \\
& *c^4 + 2*(b^2 - 4*a*c)*a*b^5*c - 40*(b^2 - 4*a*c)*a^2*b^3*c^2 - 2*(b^2 - 4* \\
& a*c)*a*b^4*c^2 + 128*(b^2 - 4*a*c)*a^3*b*c^3 + 36*(b^2 - 4*a*c)*a^2*b^2*c^3 \\
& + 80*(b^2 - 4*a*c)*a^3*c^4)*f + 3*(\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c} \\
& *a^2*b^6 - 4*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^3*b^4*c - 2*\sqrt{2})* \\
& \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^2*b^5*c - 2*a^2*b^6*c - 16*\sqrt{2}*\sqrt{b \\
& *c + \sqrt{b^2 - 4*a*c}*c}*a^4*b^2*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c} \\
&)*c}*a^2*b^4*c^2 + 8*a^3*b^4*c^2 + 2*a^2*b^5*c^2 + 64*\sqrt{2}*\sqrt{b*c + sq \\
& \sqrt{2}*\sqrt{b^2 - 4*a*c}*c}*a^5*c^3 + 32*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^4 \\
& *b*c^3 + 32*a^4*b^2*c^3 + 16*a^3*b^3*c^3 - 16*\sqrt{2}*\sqrt{b*c + \sqrt{b^2 - \\
& 4*a*c}*c}*a^4*c^4 - 128*a^5*c^4 - 96*a^4*b*c^4 - \sqrt{2}*\sqrt{b^2 - 4*a*c} \\
& *\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^2*b^5 - 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{2} \\
& \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^3*b^3*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{2} \\
& \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^2*b^4*c + 48*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{2} \\
& \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^4*b*c^2 + 24*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{2} \\
& \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^3*b^2*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{2} \\
& \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}*a^2*b^3*c^2 - 12*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{2} \\
& \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*c}*c}
\end{aligned}$$

$$\begin{aligned}
& t(b^2 - 4ac)c \cdot a^3 b^3 c^3 + 2(b^2 - 4ac)a^2 b^4 c - 2(b^2 - 4ac)a^2 b^3 c^2 - 32(b^2 - 4ac)a^4 c^3 - 24(b^2 - 4ac)a^3 b^3 c^3)h) \arctan \\
& \arctan\left(\frac{2\sqrt{1/2}x/\sqrt{(a^2 b^5 - 8a^3 b^3 c + 16a^4 b^2 c^2 + \sqrt{(a^2 b^5 - 8a^3 b^3 c + 16a^4 b^2 c^2)^2 - 4(a^3 b^4 - 8a^4 b^2 c + 16a^5 c^2)(a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3))}}{(a^2 b^4 c - 8a^3 b^2 c^2 + 16a^4 c^3))}}{(a^3 b^8 - 16a^4 b^6 c - 2a^3 b^7 c + 96a^5 b^4 c^2 + 24a^4 b^5 c^2 + a^3 b^6 c^2 - 256a^6 b^2 c^3 - 96a^5 b^3 c^3 - 12a^4 b^4 c^3 + 256a^7 c^4 + 128a^6 b^2 c^4 + 48a^5 b^2 c^4 - 64a^6 c^5) \cdot \text{abs}(c)} + \frac{1}{32} \right. \\
& \left. (3(\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot b^8 - 17\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a \cdot b^6 c - 2\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot b^7 c + 2b^8 c + 116\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^2 b^4 c^2 + 26\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a \cdot b^5 c^2 + \sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot b^6 c^2 - 34a \cdot b^6 c^2 - 2b^7 c^2 - 368\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^3 b^2 c^3 - 128\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^2 b^3 c^3 - 13\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a \cdot b^4 c^3 + 2 \right. \\
& \left. 32a^2 b^4 c^3 + 30a \cdot b^5 c^3 + 448\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^4 c^4 + 224\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^3 b^3 c^4 + 64\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^2 b^2 c^4 - 736a^3 b^2 c^4 - 176a^2 b^3 c^4 - 112\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^3 c^5 + 896a^4 c^5 + 352a^3 b^3 c^5 + \sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot b^7 - 15\sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a \cdot b^5 c - 2\sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot b^6 c + 88\sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^2 b^3 c^2 + 22\sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a \cdot b^4 c^2 + \sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot b^5 c^2 - 176\sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^3 b^3 c^3 - 88\sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^2 b^2 c^3 - 11\sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a \cdot b^3 c^3 + 44\sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^2 b^3 c^4 - 2(b^2 - 4ac) \cdot b^6 c + 26(b^2 - 4ac) \cdot a \cdot b^4 c^2 + 2(b^2 - 4ac) \cdot b^5 c^2 - 128(b^2 - 4ac) \cdot a^2 b^2 c^3 - 22(b^2 - 4ac) \cdot a \cdot b^3 c^3 + 224(b^2 - 4ac) \cdot a^3 c^4 + 88(b^2 - 4ac) \cdot a^2 b^3 c^4) \cdot d + (\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a \cdot b^7 - 24\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^2 b^5 c - 2\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a \cdot b^6 c + 2a \cdot b^7 c + 144\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^3 b^3 c^2 + 40\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^2 b^4 c^2 + \sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a \cdot b^5 c^2 - 48a^2 b^5 c^2 - 2a \cdot b^6 c^2 - 256\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^4 b^3 c^3 - 128\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^3 b^2 c^3 - 20\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^2 b^3 c^3 + 288a^3 b^3 c^3 + 44a^2 b^4 c^3 + 64\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^3 b^3 c^4 - 512a^4 b^3 c^4 - 64a^3 b^2 c^4 - 320a^4 c^5 + \sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a \cdot b^6 - 22\sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^2 b^4 c - 2\sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a \cdot b^5 c + 32\sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c) \cdot a^3 b^2 c^2 + 36\sqrt{2}\sqrt{b^2 - 4ac}) \cdot \sqrt{bc - \sqrt{b^2 - 4ac}})c)
\end{aligned}$$

$$\begin{aligned}
&)a^2b^3c^2 + \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * \\
& *b^4c^2 + 160\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^ \\
& 4c^3 + 80\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^3b * \\
& c^3 - 18\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^2b^2 * \\
& c^3 - 40\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^3c^4 \\
& - 2*(b^2 - 4ac) * a^2b^5c + 40*(b^2 - 4ac) * a^2b^3c^2 + 2*(b^2 - 4ac) * \\
& a^2b^4c^2 - 128*(b^2 - 4ac) * a^3b^2c^3 - 36*(b^2 - 4ac) * a^2b^2c^3 - 80 \\
& *(b^2 - 4ac) * a^3c^4) * f + 3*(\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^2 * \\
& b^6 - 4\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^3b^4c - 2\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * \\
& a^2b^5c + 2a^2b^6c - 16\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^4b^2c^2 + \sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * \\
& a^2b^4c^2 - 8a^3b^4c^2 - 2a^2b^5c^2 + 64\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^5c^3 + 32\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^4b^2c^3 \\
& - 32a^4b^2c^3 - 16a^3b^3c^3 - 16\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^4c^4 + 128a^5c^4 + 96a^4b^2c^4 + \sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * \sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^2b^5 + 8\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^3b^3c - 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^2b^4c - 48\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^4b^2c^2 - 24\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^3b^2c^2 + \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^2b^3c^2 + 12\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) * a^3b^2c^3 - 2*(b^2 - 4ac) * a^2b^4c + 2*(b^2 - 4ac) * a^2b^3c^2 + 32*(b^2 - 4ac) * a^4c^3 + 24*(b^2 - 4ac) * a^3b^2c^3) * h) * \arctan(2 * \sqrt{1/2} * x / \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2 - \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2)^2 - 4(a^3b^4 - 8a^4b^2c + 16a^5c^2)(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3)}) / (a^2b^4c - 8a^3b^2c^2 + 16a^4c^3)}) / ((a^3b^8 - 16a^4b^6c - 2a^3b^7c + 96a^5b^4c^2 + 24a^4b^5c^2 + a^3b^6c^2 - 256a^6b^2c^3 - 96a^5b^3c^3 - 12a^4b^4c^3 + 256a^7c^4 + 128a^6b^2c^4 + 48a^5b^2c^4 - 64a^6c^5) * \text{abs}(c)) + 3/2 * ((b^3c^3 - 4a^2b^4c - 2b^2c^4 + b^2c^4 + b^2c^5) * \sqrt{b^2 - 4ac}) * g - 2 * (b^2c^4 - 4a^2c^5 - 2b^2c^5 + c^6) * \sqrt{b^2 - 4ac}) * e) * \log(x^2 + 1/2 * (a^2b^5 - 8a^3b^3c + 16a^4b^2c^2 + \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2)^2 - 4(a^3b^4 - 8a^4b^2c + 16a^5c^2)(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3)}) / (a^2b^4c - 8a^3b^2c^2 + 16a^4c^3)) / ((b^8 - 16a^2b^6c - 2b^7c + 96a^2b^4c^2 + 24a^2b^5c^2 + b^6c^2 - 256a^3b^2c^3 - 96a^2b^3c^3 - 12a^2b^4c^3 + 256a^4c^4 + 128a^3b^2c^4 + 48a^2b^2c^4 - 64a^3c^5) * c^2) - 3/2 * ((b^3c^3 - 4a^2b^4c - 2b^2c^4 + b^2c^5) * \sqrt{b^2 - 4ac}) * g - 2 * (b^2c^4 - 4a^2c^5 - 2b^2c^5 + c^6) * \sqrt{b^2 - 4ac}) * e) * \log(x^2 + 1/2 * (a^2b^5 - 8a^3b^3c + 16a^4b^2c^2 - \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2)^2 - 4(a^3b^4 - 8a^4b^2c + 16a^5c^2)(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3)}) / (a^2b^4c - 8a^3b^2c^2 + 16a^4c^3)) / ((b^8 - 16a^2b^6c - 2b^7c + 96a^2b^4c^2 + 24a^2b^5c^2 + b^6c^2 - 256a^3b^2c^3 - 96a^2b^3c^3 - 12a^2b^4c^3 + 256a^4c^4 + 128a^3b^2c^4 + 48a^2b^2c^4 - 64a^3c^5) * c^2) + 1/8 * (3b^3c^2 * d * x^7 - 24a^2b^2c^3 * d * x^7 + a^2b^2c^2 * f * x^7 + 20a^2c^3 * f * x^7 - 12a^2b^2c^2 * h * x^7 - 12a^2b^2c^2 * g * x^6 + 24
\end{aligned}$$

$$a^2c^3x^6e + 6b^4cdx^5 - 49ab^2c^2dx^5 + 28a^2c^3dx^5 + 2ab^3cfx^5 + 28a^2b^2c^2fx^5 - 19a^2b^2c^2h^2x^5 + 4a^3c^2h^2x^5 - 18a^2b^2c^2g^2x^4 + 36a^2b^2c^2x^4e + 3b^5dx^3 - 20ab^3c^2dx^3 - 4a^2b^2c^2dx^3 + ab^4fx^3 + 5a^2b^2c^2fx^3 + 36a^3c^2fx^3 - 5a^2b^3h^2x^3 - 16a^3b^2c^2h^2x^3 - 4a^2b^3g^2x^2 - 20a^3b^2c^2g^2x^2 + 8a^2b^2c^2x^2e + 40a^3c^2x^2e + 5ab^4dx - 37a^2b^2c^2dx + 44a^3c^2dx - a^2b^3fx + 16a^3b^2c^2fx - 3a^3b^2h^2x - 12a^4c^2h^2x - 2a^3b^2g - 16a^4c^2g - 2a^2b^3e + 20a^3b^2c^2e) / ((a^2b^4 - 8a^3b^2c^2 + 16a^4c^2)(cx^4 + bx^2 + a)^2)$$

maple [B] time = 0.10, size = 3492, normalized size = 5.14

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((hx^4+gx^3+fx^2+ex+d)/(cx^4+bx^2+a)^3, x)$

[Out]
$$\begin{aligned} & -15/2/a/(16a^2c^2-8a^2b^2c+b^4)c^2/(16ac-4b^2)^2^{(1/2)}/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\arctanh(2^{(1/2)}/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx) \\ & *(-4ac+b^2)^{(1/2)}b^2d+3/4/a^2/(16a^2c^2-8a^2b^2c+b^4)c/(16ac-4b^2)^2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\arctan(2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx) \\ & *(-4ac+b^2)^{(1/2)}b^4d+3/4/a^2/(16a^2c^2-8a^2b^2c+b^4)c/(16ac-4b^2)^2^{(1/2)}/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\arctanh(2^{(1/2)}/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx) \\ & *(-4ac+b^2)^{(1/2)}b^4d+1/4/a/(16a^2c^2-8a^2b^2c+b^4)c/(16ac-4b^2)^2^{(1/2)}/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\arctanh(2^{(1/2)}/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx) \\ & *(-4ac+b^2)^{(1/2)}b^3f+1/4/a/(16a^2c^2-8a^2b^2c+b^4)c/(16ac-4b^2)^2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\arctan(2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx) \\ & *(-4ac+b^2)^{(1/2)}b^3f-15/2/a/(16a^2c^2-8a^2b^2c+b^4)c^2/(16ac-4b^2)^2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\arctan(2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx) \\ & *(-4ac+b^2)^{(1/2)}b^2d+(-1/8c^2(12a^2b^2h-20a^2cf-ab^2f+24ab^2cd-3b^3d)/a^2/(16a^2c^2-8a^2b^2c+b^4)x^7-3/2c^2(bg-2ce)/(16a^2c^2-8a^2b^2c+b^4)x^6+1/8/a^2c(4a^3ch-19a^2b^2h+28a^2b^2cf+28a^2c^2d+2ab^3f-49ab^2cd+6b^4d)/(16a^2c^2-8a^2b^2c+b^4)x^5-9/4b^2c(bg-2ce)/(16a^2c^2-8a^2b^2c+b^4)x^4-1/8(16a^3b^2ch-36a^3c^2f+5a^2b^3h-5a^2b^2cf+4a^2b^2cd-ab^4f+20ab^3cd-3b^5d)/a^2/(16a^2c^2-8a^2b^2c+b^4)x^3-1/2(5ac+b^2)(bg-2ce)/(16a^2c^2-8a^2b^2c+b^4)x^2-1/8(12a^3ch+3a^2b^2h-16a^2b^2cf-44a^2c^2d+ab^3f+37ab^2cd-5b^4d)/(16a^2c^2-8a^2b^2c+b^4)/ax-1/4(8a^2cg+ab^2g-10ab^2ce+b^3e)/(16a^2c^2-8a^2b^2c+b^4))/(cx^4+bx^2+a)^2-4/(16a^2c^2-8a^2b^2c+b^4)c^2/(16ac-4b^2)^2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\arctan(2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx) \\ & *b^2f-24/(16a^2c^2-8a^2b^2c+b^4)c^3/(16ac-4b^2)^2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\arctan(2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx) \\ & *bd+4/(16a^2c^2-8a^2b^2c+b^4)c^2/(16ac-4b^2)^2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\arctan(2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx) \\ & *bd+4/(16a^2c^2-8a^2b^2c+b^4)c^2/(16ac-4b^2)^2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}\arctan(2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}cx) \end{aligned}$$

$$\begin{aligned}
& 2)/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*b^2*f+24/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*b*d+3/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*b^3*h+20*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*f-20*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*f-3/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*b^3*h+42/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*d+42/(16*a^2*c^2-8*a*b^2*c+b^4)*c^3/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*d+6/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*(-4*a*c+b^2)^{(1/2)}*b*g-6/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*(-4*a*c+b^2)^{(1/2)}*b*g-12*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*b*h+9/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*b^3*d-9/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*b^3*d-1/4/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*b^4*f+3/4/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*b^5*d-13/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b*f+9/2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*h+9/2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*h-13/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b*f-3/4/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*b^5*d+1/4/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*b^4*f+6/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})) *c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*h+12*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arct}
\end{aligned}$$

$$\operatorname{anh}\left(2^{\frac{1}{2}}/\left(\left(-b+\left(-4ac+b^2\right)^{\frac{1}{2}}\right) * c\right)^{\frac{1}{2}} * cx\right) * b * h + 6a / \left(16a^2c^2 - 8a * b^2c + b^4\right) * c^2 / \left(16ac - 4b^2\right) * 2^{\frac{1}{2}} / \left(\left(b+\left(-4ac+b^2\right)^{\frac{1}{2}}\right) * c\right)^{\frac{1}{2}} * \arctan\left(2^{\frac{1}{2}}/\left(\left(b+\left(-4ac+b^2\right)^{\frac{1}{2}}\right) * c\right)^{\frac{1}{2}} * cx\right) * \left(-4ac+b^2\right)^{\frac{1}{2}} * h - 12 / \left(16a^2c^2 - 8a * b^2c + b^4\right) * c^2 / \left(16ac - 4b^2\right) * \ln\left(-2cx^2 - b + \left(-4ac+b^2\right)^{\frac{1}{2}}\right) * \left(-4ac+b^2\right)^{\frac{1}{2}} * e + 12 / \left(16a^2c^2 - 8a * b^2c + b^4\right) * c^2 / \left(16ac - 4b^2\right) * \ln\left(2cx^2 + b + \left(-4ac+b^2\right)^{\frac{1}{2}}\right) * \left(-4ac+b^2\right)^{\frac{1}{2}} * e$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x, algorithm="maxima")

[Out]
$$\begin{aligned} & -1/8 * \left((12a^2b^2c^2h - 3(b^3c^2 - 8ab^2c^3)d - (ab^2c^2 + 20a^2c^3) * f) * x^7 - 12(2a^2c^3e - a^2b^2c^2g) * x^6 - \left((6b^4c - 49ab^2c^2 + 28a^2c^3) * d + 2(ab^3c + 14a^2b^2c^2) * f - (19a^2b^2c - 4a^3c^2) * h \right) * x^5 \right. \\ & - 18(2a^2b^2c^2e - a^2b^2c^2g) * x^4 - \left((3b^5 - 20ab^3c - 4a^2 * b^2c^2) * d + (ab^4 + 5a^2b^2c + 36a^3c^2) * f - (5a^2b^3 + 16a^3b^2c) * h \right) * x^3 \\ & - 4(2(a^2b^2c + 5a^3c^2) * e - (a^2b^3 + 5a^3b^2c) * g) * x^2 + 2(a^2b^3 - 10a^3b^2c) * e + 2(a^3b^2 + 8a^4c) * g - \left((5ab^4 - 37a^2b^2c + 44a^3c^2) * d - (a^2b^3 - 16a^3b^2c) * f - 3(a^3b^2 + 4a^4c) * h \right) * x \\ & \left. \right) / \left((a^2b^4c^2 - 8a^3b^2c^3 + 16a^4c^4) * x^8 + a^4b^4 - 8a^5b^2c + 16a^6c^2 + 2(a^2b^5c - 8a^3b^3c^2 + 16a^4b^2c^3) * x^6 + (a^2b^6 - 6a^3b^4c + 32a^5c^3) * x^4 + 2(a^3b^5 - 8a^4b^3c + 16a^5b^2c^2) * x^2 \right) \\ & - 1/8 * \operatorname{integrate}\left(\left((12a^2b^2c^2h - 3(b^3c - 8ab^2c^2) * d - (ab^2c + 20a^2c^2) * f) * x^2 - 3(b^4 - 9ab^2c + 28a^2c^2) * d - (ab^3 - 16a^2b^2c) * f - 3(a^2b^2 + 4a^3c) * h - 24(2a^2c^2e - a^2b^2c^2g) * x \right) / (c * x^4 + b * x^2 + a), x\right) / (a^2b^4 - 8a^3b^2c + 16a^4c^2) \end{aligned}$$

mupad [B] time = 5.35, size = 23811, normalized size = 35.07

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^3,x)

[Out]
$$\begin{aligned} & \left((9x^4 * (2b^2c^2e - b^2c^2g)) / (4(b^4 + 16a^2c^2 - 8ab^2c)) - (x^2 * (b^3g - 10a^2c^2e - 2b^2c^2e + 5ab^2c^2g)) / (2(b^4 + 16a^2c^2 - 8ab^2c)) \right) \\ & - (b^3e + ab^2g + 8a^2c^2g - 10ab^2c^2e) / (4(b^4 + 16a^2c^2 - 8ab^2c)) + (x^5 * (28a^2c^3d + 4a^3c^2h + 6b^4c^2d + 2ab^3c^2f - 49a^2b^2c^2d + 28a^2b^2c^2f - 19a^2b^2c^2h)) / (8a^2(b^4 + 16a^2c^2 - 8ab^2c)) \\ & + (x^3 * (3b^5d + 36a^3c^2f - 5a^2b^3h + ab^4f - 20a^2b^3c^2d - 16a^3b^2c^2h - 4a^2b^2c^2d + 5a^2b^2c^2f)) / (8a^2(b^4 + 16a^2c^2 - 8ab^2c)) \end{aligned}$$

$$\begin{aligned}
& 2*c^2 - 8*a*b^2*c)) - (x*(3*a^2*b^2*h - 44*a^2*c^2*d - 5*b^4*d + a*b^3*f + \\
& 12*a^3*c*h + 37*a*b^2*c*d - 16*a^2*b*c*f))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2* \\
& *c)) + (3*c^2*x^6*(2*c*e - b*g))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (c*x^ \\
& 7*(20*a^2*c^2*f + 3*b^3*c*d - 24*a*b*c^2*d + a*b^2*c*f - 12*a^2*b*c*h))/(8* \\
& a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2 \\
& *a*b*x^2 + 2*b*c*x^6) + \text{symsum}(\log((10368*a*b^5*c^6*d^3 - 8000*a^5*c^7*f^3 \\
& - 567*b^7*c^5*d^3 + 169344*a^3*b*c^8*d^3 + 193536*a^4*c^8*d*e^2 - 141120*a^ \\
& 4*c^8*d^2*f + 1728*a^6*b*c^5*h^3 + 315*b^8*c^4*d^2*f + 27648*a^5*c^7*e^2*h \\
& - 135*b^9*c^3*d^2*h - 2880*a^6*c^6*f*h^2 - 67824*a^2*b^3*c^7*d^3 + 35*a^2*b \\
& ^6*c^4*f^3 + 84*a^3*b^4*c^5*f^3 - 12720*a^4*b^2*c^6*f^3 + 540*a^4*b^5*c^3*h \\
& ^3 + 4320*a^5*b^3*c^4*h^3 - 40320*a^5*c^7*d*f*h - 6237*a*b^6*c^5*d^2*f + 21 \\
& 0*a*b^7*c^4*d*f^2 + 116160*a^4*b*c^7*d*f^2 - 36864*a^4*b*c^7*e^2*f + 2430*a \\
& *b^7*c^4*d^2*h + 133056*a^4*b*c^7*d^2*h + 27648*a^5*b*c^6*d*h^2 + 26880*a^5 \\
& *b*c^6*f^2*h + 6912*a^2*b^4*c^6*d*e^2 - 62208*a^3*b^2*c^7*d*e^2 + 42372*a^2 \\
& *b^4*c^6*d^2*f - 1764*a^2*b^5*c^5*d*f^2 - 96048*a^3*b^2*c^7*d^2*f - 4608*a^ \\
& 3*b^3*c^6*d*f^2 + 1728*a^2*b^6*c^4*d*g^2 + 2304*a^3*b^3*c^6*e^2*f - 15552*a \\
& ^3*b^4*c^5*d*g^2 + 48384*a^4*b^2*c^6*d*g^2 - 13716*a^2*b^5*c^5*d^2*h + 405* \\
& a^2*b^7*c^3*d*h^2 + 12096*a^3*b^3*c^6*d^2*h - 5400*a^3*b^5*c^4*d*h^2 + 2894 \\
& 4*a^4*b^3*c^5*d*h^2 + 576*a^3*b^5*c^4*f*g^2 + 6912*a^4*b^2*c^6*e^2*h - 9216 \\
& *a^4*b^3*c^5*f*g^2 - 15*a^2*b^7*c^3*f^2*h - 360*a^3*b^5*c^4*f^2*h + 135*a^3 \\
& *b^6*c^3*f*h^2 + 15696*a^4*b^3*c^5*f^2*h - 5580*a^4*b^4*c^4*f*h^2 - 20592*a \\
& ^5*b^2*c^5*f*h^2 + 1728*a^4*b^4*c^4*g^2*h + 6912*a^5*b^2*c^5*g^2*h - 193536 \\
& *a^4*b*c^7*d*e*g - 90*a*b^8*c^3*d*f*h - 27648*a^5*b*c^6*e*g*h - 6912*a^2*b^ \\
& 5*c^5*d*e*g + 62208*a^3*b^3*c^6*d*e*g - 270*a^2*b^6*c^4*d*f*h + 16056*a^3*b \\
& ^4*c^5*d*f*h - 2304*a^3*b^4*c^5*e*f*g - 127008*a^4*b^2*c^6*d*f*h + 36864*a^ \\
& 4*b^2*c^6*e*f*g - 6912*a^4*b^3*c^5*e*g*h)/(512*(a^4*b^12 + 4096*a^10*c^6 - \\
& 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 614 \\
& 4*a^9*b^2*c^5)) - \text{root}(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^ \\
& 3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 1932735 \\
& 28320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b \\
& ^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 687194 \\
& 76736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 46080*a^4*b^14*c*f*h*z^2 - 10598 \\
& 4*a^3*b^15*c*d*h*z^2 - 73728*a^2*b^16*c*d*f*z^2 + 2548039680*a^9*b^3*c^7*d* \\
& h*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1401421824*a^8*b^5*c^6*d*h*z^2 - 1 \\
& 321205760*a^9*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192*a \\
& ^7*b^6*c^6*d*f*z^2 - 456130560*a^9*b^4*c^6*f*h*z^2 + 390463488*a^7*b^7*c^5* \\
& d*h*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 2 \\
& 54017536*a^8*b^6*c^5*f*h*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680*a^ \\
& 10*b^2*c^7*f*h*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 - 61931520*a^7*b^8*c^4*f \\
& *h*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 + 614 \\
& 4000*a^6*b^10*c^3*f*h*z^2 + 61440*a^5*b^12*c^2*f*h*z^2 - 23592960*a^6*b^9*c \\
& ^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 + 829440*a^4*b^13*c^2*d*h*z^2 + 3 \\
& 68640*a^5*b^11*c^3*d*h*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^ \\
& 14*c^2*d*f*z^2 - 1207959552*a^10*b*c^8*e*g*z^2 - 440401920*a^10*b*c^8*f^2*z \\
& ^2 - 188743680*a^11*b*c^7*h^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 + 46080*a^5
\end{aligned}$$

$$\begin{aligned}
& *b^{13}c^2h^2z^2 - 14080a^3b^{15}c^2f^2z^2 + 6936330240a^8b^3c^8d^2z^2 \\
& + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^3c^9d^2z^2 - 15099494 \\
& 40a^9b^2c^8e^2z^2 + 251658240a^{11}c^8f^2h^2z^2 + 1536a^3b^{16}f^2h^2z^2 \\
& + 4608a^2b^{17}d^2h^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^2b^{17}c^8 \\
& d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 4 \\
& 77102080a^9b^3c^7f^2z^2 - 377487360a^9b^4c^6g^2z^2 + 301989888a^ \\
& 10b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 + 141557760a^{10}b^3c^6 \\
& *h^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + \\
& 146165760a^4b^{11}c^4d^2z^2 - 47185920a^7b^8c^4g^2z^2 - 26542080a^ \\
& 8b^7c^4h^2z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5h^2z^ \\
& ^2 - 1290240a^6b^{11}c^2h^2z^2 + 5898240a^6b^{10}c^3g^2z^2 - 294912a^ \\
& ^5b^{12}c^2g^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^ \\
& 2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 29184 \\
& 0a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^ \\
& ^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^2b^{18}d^2f^2z^2 + 120795955 \\
& 2a^{10}c^9e^2z^2 + 2304a^4b^{15}h^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^ \\
& 19d^2z^2 + 169869312a^7b^3c^8d^2e^2f^2z + 99090432a^8b^3c^7d^2g^2h^2z - 460 \\
& 8a^3b^{12}c^2f^2g^2h^2z - 9437184a^8b^3c^7e^2f^2h^2z - 13824a^2b^{13}c^2d^2g^2h^2z \\
& + 9216a^2b^{13}c^2d^2e^2f^2z - 4608a^2b^{14}c^2d^2f^2g^2z + 219414528a^7b^2c^7 \\
& d^2e^2h^2z - 221773824a^6b^3c^7d^2e^2f^2z - 109707264a^7b^3c^6d^2g^2h^2z + 1 \\
& 10886912a^6b^4c^6d^2f^2g^2z - 88473600a^6b^4c^6d^2e^2h^2z - 84934656a^7 \\
& b^2c^7d^2f^2g^2z + 117964800a^5b^5c^6d^2e^2f^2z + 44236800a^6b^5c^5d^2g^2 \\
& h^2z - 5898240a^7b^4c^5f^2g^2h^2z + 4718592a^8b^2c^6f^2g^2h^2z + 2949120a^ \\
& ^6b^6c^4f^2g^2h^2z - 737280a^5b^8c^3f^2g^2h^2z + 92160a^4b^{10}c^2f^2g^2h^2 \\
& z - 58982400a^5b^6c^5d^2f^2g^2z + 11796480a^7b^3c^6e^2f^2h^2z - 6635520a^ \\
& ^5b^7c^4d^2g^2h^2z - 5898240a^6b^5c^5e^2f^2h^2z + 1474560a^5b^7c^4e^2f^2 \\
& h^2z - 276480a^4b^9c^3d^2g^2h^2z - 184320a^4b^9c^3e^2f^2h^2z + 179712a^3 \\
& b^{11}c^2d^2g^2h^2z + 9216a^3b^{11}c^2e^2f^2h^2z + 16220160a^4b^8c^4d^2f^2g^2z \\
& + 13271040a^5b^6c^5d^2e^2h^2z - 2396160a^3b^{10}c^3d^2f^2g^2z + 552960a^4 \\
& *b^8c^4d^2e^2h^2z - 359424a^3b^{10}c^3d^2e^2h^2z + 175104a^2b^{12}c^2d^2f^2g^2 \\
& z + 27648a^2b^{12}c^2d^2e^2h^2z - 32440320a^4b^7c^5d^2e^2f^2z + 4792320a^3 \\
& *b^9c^4d^2e^2f^2z - 350208a^2b^{11}c^3d^2e^2f^2z + 346816512a^7b^3c^8d^2g^2 \\
& z + 7077888a^9b^3c^6g^2h^2z - 6912a^4b^{11}c^2g^2h^2z - 19660800a^8b^3c^ \\
& 7f^2g^2z - 768a^2b^{13}c^2f^2g^2z + 214272a^2b^{13}c^2d^2g^2z - 428544a^2b^ \\
& ^12c^3d^2e^2z - 198180864a^8c^8d^2e^2h^2z + 1022754816a^6b^2c^8d^2e^2 \\
& z - 642318336a^5b^4c^7d^2e^2z - 511377408a^6b^3c^7d^2g^2z + 3211591 \\
& 68a^5b^5c^6d^2g^2z + 223395840a^4b^6c^6d^2e^2z - 111697920a^4b^7c^ \\
& ^5d^2g^2z - 8847360a^8b^3c^5g^2h^2z + 4423680a^7b^5c^4g^2h^2z - 1 \\
& 105920a^6b^7c^3g^2h^2z + 138240a^5b^9c^2g^2h^2z + 25362432a^7b^3c^ \\
& ^6f^2g^2z + 17694720a^8b^2c^6e^2h^2z - 50724864a^7b^2c^7e^2f^2z - \\
& 13271040a^6b^5c^5f^2g^2z - 8847360a^7b^4c^5e^2h^2z + 3563520a^5b^ \\
& ^7c^4f^2g^2z + 2211840a^6b^6c^4e^2h^2z - 506880a^4b^9c^3f^2g^2z - \\
& 276480a^5b^8c^3e^2h^2z + 34560a^3b^{11}c^2f^2g^2z + 13824a^4b^{10}c^ \\
& ^2e^2h^2z + 26542080a^6b^4c^6e^2f^2z + 23362560a^3b^9c^4d^2g^2z - \\
& 46725120a^3b^8c^5d^2e^2z - 7127040a^5b^6c^5e^2f^2z - 2965248a^2b^
\end{aligned}$$

$$\begin{aligned}
& 11c^3d^2gz + 1013760a^4b^8c^4ef^2z - 69120a^3b^{10}c^3ef^2z + \\
& 1536a^2b^{12}c^2ef^2z + 5930496a^2b^{10}c^4d^2ez - 693633024a^7c^9d^2ez - 14155776a^9c^7eh^2z + 39321600a^8c^8ef^2z + 13824b^{14}c^2d^2ez - 6912b^{15}cd^2gz + 2211840a^6b^6c^6efg^2h + 15482880a^5b^6c^7d^2efg - 13824a^6b^9c^3d^2efg + 4423680a^5b^3c^5efg^2h + 138240a^4b^5c^4efg^2h - 13824a^3b^7c^3efg^2h - 16588800a^5b^2c^6d^2efg^2h + 1658880a^4b^4c^5d^2efg^2h + 124416a^3b^6c^4d^2efg^2h - 41472a^2b^8c^3d^2efg^2h + 7741440a^4b^3c^6d^2efg^2h - 2903040a^3b^5c^5d^2efg^2h + 387072a^2b^7c^4d^2efg^2h - 37062144a^5b^6c^7d^2f^2h - 5985792a^6b^6c^6d^2f^2h + 206010a^6b^9c^3d^2f^2h - 6300a^6b^{10}c^2d^2f^2h + 16588800a^5b^6c^7d^2e^2h + 3456a^6b^{10}c^2d^2f^2g^2 + 435456a^6b^8c^4d^2e^2g + 13824a^6b^8c^4d^2e^2f + 1350a^6b^{11}c^2d^2f^2h^2 - 1105920a^5b^4c^4f^2g^2h - 552960a^6b^2c^5f^2g^2h - 34560a^4b^6c^3f^2g^2h + 3456a^3b^8c^2f^2g^2h - 1658880a^6b^2c^5efg^2h^2 - 829440a^5b^4c^4efg^2h^2 - 20736a^4b^6c^3efg^2h^2 - 4423680a^5b^2c^6e^2f^2h + 4147200a^5b^3c^5d^2g^2h - 414720a^4b^5c^4d^2g^2h - 138240a^4b^4c^5e^2f^2h - 31104a^3b^7c^3d^2g^2h + 13824a^3b^6c^4e^2f^2h + 10368a^2b^9c^2d^2g^2h + 15630336a^5b^2c^6d^2f^2h - 14459904a^4b^3c^6d^2f^2h + 9630144a^3b^5c^5d^2f^2h - 8764416a^5b^3c^5d^2f^2h^2 - 3870720a^5b^2c^6ef^2g + 2867328a^4b^4c^5d^2f^2h - 2095200a^2b^7c^4d^2f^2h - 1414080a^3b^6c^4d^2f^2h - 34836480a^4b^2c^7d^2efg - 645120a^4b^4c^5ef^2g + 306720a^3b^7c^3d^2f^2h^2 + 197820a^2b^8c^3d^2f^2h + 146880a^4b^5c^4d^2f^2h^2 + 80640a^3b^6c^4ef^2g - 55350a^2b^9c^2d^2f^2h^2 - 2304a^2b^8c^3ef^2g - 3870720a^5b^2c^6d^2f^2g^2 - 1935360a^4b^4c^5d^2f^2g^2 - 1658880a^4b^3c^6d^2e^2h + 725760a^3b^6c^4d^2f^2g^2 + 17418240a^3b^4c^6d^2efg - 124416a^3b^5c^5d^2e^2h - 96768a^2b^8c^3d^2f^2g^2 + 41472a^2b^7c^4d^2e^2h - 3919104a^2b^6c^5d^2efg - 7741440a^4b^2c^7d^2e^2f + 2903040a^3b^4c^6d^2e^2f - 387072a^2b^6c^5d^2e^2f - 1648128a^5b^3c^5f^3h - 898560a^6b^3c^4f^3h^3 - 354240a^5b^5c^3f^3h^3 - 354240a^4b^5c^4f^3h + 43680a^3b^7c^3f^3h - 21600a^4b^7c^2f^3h^3 - 1050a^2b^9c^2f^3h + 225a^2b^{10}c^2f^2h^2 + 1658880a^6b^6c^6e^2h^2 + 16547328a^4b^2c^7d^3h - 12306816a^3b^4c^6d^3h + 37310976a^3b^3c^7d^3f + 3037824a^2b^6c^5d^3h - 2654208a^5b^3c^5efg^3 + 1949184a^6b^2c^5d^3h^3 + 1296000a^5b^4c^4d^3h^3 - 155520a^4b^6c^3d^3h^3 - 40500a^6b^{10}c^2d^2h^2 - 8100a^3b^8c^2d^3h^3 + 3870720a^5b^6c^7e^2f^2 + 34836480a^4b^6c^8d^2e^2 - 108864a^6b^9c^3d^2g^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^2f^3 + 1737792a^3b^5c^5d^2f^3 - 260190a^6b^8c^4d^2f^2 - 211680a^2b^7c^4d^2f^3 - 435456a^6b^7c^5d^2e^2 - 2211840a^6c^7e^2f^2h - 9450b^{11}c^2d^2f^2h + 1612800a^6c^7d^2f^2h - 20736b^{10}c^3d^2efg - 75188736a^4b^6c^8d^3f - 883200a^6b^6c^6f^3h - 317952a^7b^6c^5f^3h^3 + 1350a^3b^9c^2f^3h^3 - 15482880a^5c^8d^2ef - 10616832a^5b^6c^7e^3g - 345060a^6b^8c^4d^3h + 4050a^2b^{10}c^2d^3h^3 - 4262400a^5b^6c^7d^2f^3 + 852768a^6b^7c^5d^3f + 7350a^6b^9c^3d^2f^3 + 414720a^6b^3c^4g^2h^2 + 207360a^5b^5c^3g^2h^2 + 5184a^4b^7c^2g^2h^2 + 1684224a^6b^2c^5f^2h^2 + 1264
\end{aligned}$$

$$\begin{aligned}
& 320*a^5*b^4*c^4*f^2*h^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c^5*e^2*h^2 + 161280*a^4*b^5*c^4*f^2*g^2 + 20736*a^4*b^5*c^4*e^2*h^2 - 20160*a^3*b^7*c^3*f^2*g^2 + 576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2*c^6*d^2*h^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 - 1412640*a^3*b^6*c^4*d^2*h^2 + 461376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8*c^3*d^2*h^2 + 8709120*a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4*d^2*g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 115200*a^7*c^6*f^2*h^2 + 6096384*a^6*c^7*d^2*h^2 + 5184*b^11*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 142560*a^6*b^4*c^3*h^4 + 103680*a^7*b^2*c^4*h^4 + 32400*a^5*b^6*c^2*h^4 + 20736*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 + 28449792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^2*h^2 + 580608*a^7*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 2025*a^4*b^8*c*h^4 - 734832*a*b^6*c^6*d^4 + 20736*a^8*c^5*h^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*((983040*a^7*c^8*e*f - 3244032*a^6*b*c^8*d*e - 884736*a^7*b*c^7*e*h - 491520*a^7*b*c^7*f*g - 4608*a^2*b^9*c^4*d*e + 87552*a^3*b^7*c^5*d*e - 681984*a^4*b^5*c^6*d*e + 2433024*a^5*b^3*c^7*d*e + 2304*a^2*b^10*c^3*d*g - 43776*a^3*b^8*c^4*d*g - 1536*a^3*b^8*c^4*e*f + 340992*a^4*b^6*c^5*d*g + 39936*a^4*b^6*c^5*e*f - 1216512*a^5*b^4*c^6*d*g - 184320*a^5*b^4*c^6*e*f + 1622016*a^6*b^2*c^7*d*g - 49152*a^6*b^2*c^7*e*f + 768*a^3*b^9*c^3*f*g - 4608*a^4*b^7*c^4*e*h - 19968*a^4*b^7*c^4*f*g - 18432*a^5*b^5*c^5*e*h + 92160*a^5*b^5*c^5*f*g + 368640*a^6*b^3*c^6*e*h + 24576*a^6*b^3*c^6*f*g + 2304*a^4*b^8*c^3*g*h + 9216*a^5*b^6*c^4*g*h - 184320*a^6*b^4*c^5*g*h + 442368*a^7*b^2*c^6*g*h)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - root(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 46080*a^4*b^14*c*f*h*z^2 - 105984*a^3*b^15*c*d*h*z^2 - 73728*a^2*b^16*c*d*f*z^2 + 2548039680*a^9*b^3*c^7*d*h*z^2 + 1509949440*a^9*b^3*c^7*e*g*z^2 - 1401421824*a^8*b^5*c^6*d*h*z^2 - 1321205760*a^9*b^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192*a^7*b^6*c^6*d*f*z^2 - 456130560*a^9*b^4*c^6*f*h*z^2 + 390463488*a^7*b^7*c^5*d*h*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 254017536*a^8*b^6*c^5*f*h*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680*a^10*b^2*c^7*f*h*z^2 + 188743680*a^7*b^7*c^5*e*g*z^2 - 61931520*a^7*b^8*c^4*f*h*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 + 6144000*a^6*b^10*c^3*f*h*z^2 + 61440*a^5*b^12*c^2*f*h*z^2 - 23592960*a^6*b^9*c^4*e*g*z^2 + 1179648*a^5*b^11*c^3*e*g*z^2 + 829440*a^4*b^13*c^2*d*h*z^2 + 368640*a^5*b^11*c^3*d*h*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*
\end{aligned}$$

$$\begin{aligned}
& b^{14}c^2d^2f^2z^2 - 1207959552a^{10}b^8c^8e^2g^2z^2 - 440401920a^{10}b^8c^8f^2z^2 - 188743680a^{11}b^7c^7h^2z^2 + 1761607680a^{10}c^9d^2f^2z^2 + 46080a^5b^{13}c^2h^2z^2 - 14080a^3b^{15}c^2f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^3c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 + 251658240a^{11}c^8f^2h^2z^2 + 1536a^3b^{16}f^2h^2z^2 + 4608a^2b^{17}d^2h^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^8b^{17}c^2d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 377487360a^9b^4c^6g^2z^2 + 301989888a^{10}b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 + 141557760a^{10}b^3c^6h^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^2z^2 - 47185920a^7b^8c^4g^2z^2 - 26542080a^8b^7c^4h^2z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5h^2z^2 - 1290240a^6b^{11}c^2h^2z^2 + 5898240a^6b^{10}c^3g^2z^2 - 294912a^5b^{12}c^2g^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^8b^{18}d^2f^2z^2 + 1207959552a^{10}c^9e^2z^2 + 2304a^4b^{15}h^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^8c^8d^2e^2f^2z + 99090432a^8b^7c^7d^2g^2h^2z - 4608a^3b^{12}c^2f^2g^2h^2z - 9437184a^8b^7c^7e^2f^2h^2z - 13824a^2b^{13}c^2d^2g^2h^2z + 9216a^8b^{13}c^2d^2e^2f^2z - 4608a^8b^{14}c^2d^2f^2g^2z + 219414528a^7b^2c^7d^2e^2h^2z - 221773824a^6b^3c^7d^2e^2f^2z - 109707264a^7b^3c^6d^2g^2h^2z + 110886912a^6b^4c^6d^2f^2g^2z - 88473600a^6b^4c^6d^2e^2h^2z - 84934656a^7b^2c^7d^2f^2g^2z + 117964800a^5b^5c^6d^2e^2f^2z + 44236800a^6b^5c^5d^2g^2h^2z - 5898240a^7b^4c^5f^2g^2h^2z + 4718592a^8b^2c^6f^2g^2h^2z + 2949120a^6b^6c^4f^2g^2h^2z - 737280a^5b^8c^3f^2g^2h^2z + 92160a^4b^{10}c^2f^2g^2h^2z - 58982400a^5b^6c^5d^2f^2g^2z + 11796480a^7b^3c^6e^2f^2h^2z - 6635520a^5b^7c^4d^2g^2h^2z - 5898240a^6b^5c^5e^2f^2h^2z + 1474560a^5b^7c^4e^2f^2h^2z - 276480a^4b^9c^3d^2g^2h^2z - 184320a^4b^9c^3e^2f^2h^2z + 179712a^3b^{11}c^2d^2g^2h^2z + 9216a^3b^{11}c^2e^2f^2h^2z + 16220160a^4b^8c^4d^2f^2g^2z + 13271040a^5b^6c^5d^2e^2h^2z - 2396160a^3b^{10}c^3d^2f^2g^2z + 552960a^4b^8c^4d^2e^2h^2z - 359424a^3b^{10}c^3d^2e^2h^2z + 175104a^2b^{12}c^2d^2f^2g^2z + 27648a^2b^{12}c^2d^2e^2h^2z - 32440320a^4b^7c^5d^2e^2f^2z + 4792320a^3b^9c^4d^2e^2f^2z - 350208a^2b^{11}c^3d^2e^2f^2z + 346816512a^7b^8c^8d^2g^2z + 7077888a^9b^6c^6g^2h^2z - 6912a^4b^{11}c^2g^2h^2z - 19660800a^8b^7c^7f^2g^2z - 768a^2b^{13}c^2f^2g^2z + 214272a^8b^{13}c^2d^2g^2z - 428544a^8b^{12}c^3d^2e^2z - 198180864a^8c^8d^2e^2h^2z + 1022754816a^6b^2c^8d^2e^2z - 642318336a^5b^4c^7d^2e^2z - 511377408a^6b^3c^7d^2g^2z + 321159168a^5b^5c^6d^2g^2z + 223395840a^4b^6c^6d^2e^2z - 111697920a^4b^7c^5d^2g^2z - 8847360a^8b^3c^5g^2h^2z + 4423680a^7b^5c^4g^2h^2z - 1105920a^6b^7c^3g^2h^2z + 138240a^5b^9c^2g^2h^2z + 25362432a^7b^3c^6f^2g^2z + 17694720a^8b^2c^6e^2h^2z - 50724864a^7b^2c^7e^2f^2z - 13271040a^6b^5c^5f^2g^2z - 8847360a^7b^4c^5e^2h^2z + 3563520a^5b^7c^4f^2g^2z + 2211840a^6b^6c^4e^2h^2z - 506880a^4b^9c^3f^2g^2z - 276480a^5b^8c^3e^2h^2z + 34560a^3b^{11}c^2f^2g^2z + 13824a^4b^{10}
\end{aligned}$$

$$\begin{aligned}
& *c^2*e*h^2*z + 26542080*a^6*b^4*c^6*e*f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z \\
& - 46725120*a^3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z - 2965248*a^2* \\
& b^{11}*c^3*d^2*g*z + 1013760*a^4*b^8*c^4*e*f^2*z - 69120*a^3*b^{10}*c^3*e*f^2*z \\
& + 1536*a^2*b^{12}*c^2*e*f^2*z + 5930496*a^2*b^{10}*c^4*d^2*e*z - 693633024*a^7 \\
& *c^9*d^2*e*z - 14155776*a^9*c^7*e*h^2*z + 39321600*a^8*c^8*e*f^2*z + 13824* \\
& b^{14}*c^2*d^2*e*z - 6912*b^{15}*c*d^2*g*z + 2211840*a^6*b*c^6*e*f*g*h + 154828 \\
& 80*a^5*b*c^7*d*e*f*g - 13824*a*b^9*c^3*d*e*f*g + 4423680*a^5*b^3*c^5*e*f*g* \\
& h + 138240*a^4*b^5*c^4*e*f*g*h - 13824*a^3*b^7*c^3*e*f*g*h - 16588800*a^5*b \\
& ^2*c^6*d*e*g*h + 1658880*a^4*b^4*c^5*d*e*g*h + 124416*a^3*b^6*c^4*d*e*g*h - \\
& 41472*a^2*b^8*c^3*d*e*g*h + 7741440*a^4*b^3*c^6*d*e*f*g - 2903040*a^3*b^5* \\
& c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g - 37062144*a^5*b*c^7*d^2*f*h - 598 \\
& 5792*a^6*b*c^6*d*f*h^2 + 206010*a*b^9*c^3*d^2*f*h - 6300*a*b^{10}*c^2*d*f^2*h \\
& + 16588800*a^5*b*c^7*d*e^2*h + 3456*a*b^{10}*c^2*d*f*g^2 + 435456*a*b^8*c^4* \\
& d^2*e*g + 13824*a*b^8*c^4*d*e^2*f + 1350*a*b^{11}*c*d*f*h^2 - 1105920*a^5*b^4 \\
& *c^4*f*g^2*h - 552960*a^6*b^2*c^5*f*g^2*h - 34560*a^4*b^6*c^3*f*g^2*h + 345 \\
& 6*a^3*b^8*c^2*f*g^2*h - 1658880*a^6*b^2*c^5*e*g*h^2 - 829440*a^5*b^4*c^4*e* \\
& g*h^2 - 20736*a^4*b^6*c^3*e*g*h^2 - 4423680*a^5*b^2*c^6*e^2*f*h + 4147200*a \\
& ^5*b^3*c^5*d*g^2*h - 414720*a^4*b^5*c^4*d*g^2*h - 138240*a^4*b^4*c^5*e^2*f* \\
& h - 31104*a^3*b^7*c^3*d*g^2*h + 13824*a^3*b^6*c^4*e^2*f*h + 10368*a^2*b^9*c \\
& ^2*d*g^2*h + 15630336*a^5*b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f*h + \\
& 9630144*a^3*b^5*c^5*d^2*f*h - 8764416*a^5*b^3*c^5*d*f*h^2 - 3870720*a^5*b^2 \\
& *c^6*e*f^2*g + 2867328*a^4*b^4*c^5*d*f^2*h - 2095200*a^2*b^7*c^4*d^2*f*h - \\
& 1414080*a^3*b^6*c^4*d*f^2*h - 34836480*a^4*b^2*c^7*d^2*e*g - 645120*a^4*b^4 \\
& *c^5*e*f^2*g + 306720*a^3*b^7*c^3*d*f*h^2 + 197820*a^2*b^8*c^3*d*f^2*h + 14 \\
& 6880*a^4*b^5*c^4*d*f*h^2 + 80640*a^3*b^6*c^4*e*f^2*g - 55350*a^2*b^9*c^2*d* \\
& f*h^2 - 2304*a^2*b^8*c^3*e*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 - 1935360*a^ \\
& 4*b^4*c^5*d*f*g^2 - 1658880*a^4*b^3*c^6*d*e^2*h + 725760*a^3*b^6*c^4*d*f*g^ \\
& 2 + 17418240*a^3*b^4*c^6*d^2*e*g - 124416*a^3*b^5*c^5*d*e^2*h - 96768*a^2*b \\
& ^8*c^3*d*f*g^2 + 41472*a^2*b^7*c^4*d*e^2*h - 3919104*a^2*b^6*c^5*d^2*e*g - \\
& 7741440*a^4*b^2*c^7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6* \\
& c^5*d*e^2*f - 1648128*a^5*b^3*c^5*f^3*h - 898560*a^6*b^3*c^4*f*h^3 - 354240 \\
& *a^5*b^5*c^3*f*h^3 - 354240*a^4*b^5*c^4*f^3*h + 43680*a^3*b^7*c^3*f^3*h - 2 \\
& 1600*a^4*b^7*c^2*f*h^3 - 1050*a^2*b^9*c^2*f^3*h + 225*a^2*b^{10}*c*f^2*h^2 + \\
& 1658880*a^6*b*c^6*e^2*h^2 + 16547328*a^4*b^2*c^7*d^3*h - 12306816*a^3*b^4*c \\
& ^6*d^3*h + 37310976*a^3*b^3*c^7*d^3*f + 3037824*a^2*b^6*c^5*d^3*h - 2654208 \\
& *a^5*b^3*c^5*e*g^3 + 1949184*a^6*b^2*c^5*d*h^3 + 1296000*a^5*b^4*c^4*d*h^3 \\
& - 155520*a^4*b^6*c^3*d*h^3 - 40500*a*b^{10}*c^2*d^2*h^2 - 8100*a^3*b^8*c^2*d* \\
& h^3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108864*a*b^9 \\
& *c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737 \\
& 792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 \\
& - 435456*a*b^7*c^5*d^2*e^2 - 2211840*a^6*c^7*e^2*f*h - 9450*b^{11}*c^2*d^2*f \\
& *h + 1612800*a^6*c^7*d*f^2*h - 20736*b^{10}*c^3*d^2*e*g - 75188736*a^4*b*c^8* \\
& d^3*f - 883200*a^6*b*c^6*f^3*h - 317952*a^7*b*c^5*f*h^3 + 1350*a^3*b^9*c*f* \\
& h^3 - 15482880*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c^ \\
& 4*d^3*h + 4050*a^2*b^{10}*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^
\end{aligned}$$

$$\begin{aligned}
& 5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 414720*a^6*b^3*c^4*g^2*h^2 + 207360*a^5*b^5*c^3*g^2*h^2 + 5184*a^4*b^7*c^2*g^2*h^2 + 1684224*a^6*b^2*c^5*f^2*h^2 + 12 \\
& 64320*a^5*b^4*c^4*f^2*h^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c^5*e^2*h^2 + 161280* \\
& a^4*b^5*c^4*f^2*g^2 + 20736*a^4*b^5*c^4*e^2*h^2 - 20160*a^3*b^7*c^3*f^2*g^2 + 576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2*c^6*d^2*h^2 + 7962624*a^5*b^2 \\
& *c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 - 1412640*a^3*b^6*c^4*d^2*h^2 + 461376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8*c^3*d^2*h^2 + 8709120*a^4*b^3* \\
& c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4*d^2*g^2 + 64 \\
& 5120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2 \\
& *f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 - 1741824 \\
& 0*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 115200*a^7*c^6*f^2*h^2 \\
& 2 + 6096384*a^6*c^7*d^2*h^2 + 5184*b^11*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f^2 \\
& 2 + 5644800*a^5*c^8*d^2*f^2 + 142560*a^6*b^4*c^3*h^4 + 103680*a^7*b^2*c^4*h^4 \\
& + 32400*a^5*b^6*c^2*h^4 + 20736*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 \\
& + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 \\
& + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 \\
& + 28449792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^2*h^2 + 58 \\
& 0608*a^7*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 2025*a^4*b^8*c*h^4 - 734832*a*b^6 \\
& *c^6*d^4 + 20736*a^8*c^5*h^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + \\
& 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*((768*a^2*b^14*c^2*d - 3145 \\
& 728*a^10*c^8*h - 22020096*a^9*c^9*d - 22272*a^3*b^12*c^3*d + 282624*a^4*b^1 \\
& 0*c^4*d - 2027520*a^5*b^8*c^5*d + 8847360*a^6*b^6*c^6*d - 23396352*a^7*b^4* \\
& c^7*d + 34603008*a^8*b^2*c^8*d + 256*a^3*b^13*c^2*f - 9216*a^4*b^11*c^3*f + \\
& 122880*a^5*b^9*c^4*f - 819200*a^6*b^7*c^5*f + 2949120*a^7*b^5*c^6*f - 5505 \\
& 024*a^8*b^3*c^7*f + 768*a^4*b^12*c^2*h - 12288*a^5*b^10*c^3*h + 61440*a^6*b^8 \\
& *c^4*h - 983040*a^8*b^4*c^6*h + 3145728*a^9*b^2*c^7*h + 4194304*a^9*b*c^8 \\
& *f)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280 \\
& *a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (x*(1572864*a^9*c^9* \\
& e - 1536*a^4*b^10*c^4*e + 30720*a^5*b^8*c^5*e - 245760*a^6*b^6*c^6*e + 9830 \\
& 40*a^7*b^4*c^7*e - 1966080*a^8*b^2*c^8*e + 768*a^4*b^11*c^3*g - 15360*a^5*b^9 \\
& *c^4*g + 122880*a^6*b^7*c^5*g - 491520*a^7*b^5*c^6*g + 983040*a^8*b^3*c^7 \\
& *g - 786432*a^9*b*c^8*g))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 2 \\
& 40*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + \\
& (\text{root}(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920 \\
& *a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8 \\
& *z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 35 \\
& 23215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10* \\
& z^4 + 65536*a^5*b^20*z^4 - 46080*a^4*b^14*c*f*h*z^2 - 105984*a^3*b^15*c*d*h \\
& *z^2 - 73728*a^2*b^16*c*d*f*z^2 + 2548039680*a^9*b^3*c^7*d*h*z^2 + 15099494 \\
& 40*a^9*b^3*c^7*e*g*z^2 - 1401421824*a^8*b^5*c^6*d*h*z^2 - 1321205760*a^9*b^2 \\
& *c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192*a^7*b^6*c^6*d*f*z^2 \\
& - 456130560*a^9*b^4*c^6*f*h*z^2 + 390463488*a^7*b^7*c^5*d*h*z^2 - 366280 \\
& 704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 254017536*a^8*b^6 \\
& *c^5*f*h*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680*a^10*b^2*c^7*f*h*z
\end{aligned}$$

$$\begin{aligned}
&^2 + 188743680*a^7*b^7*c^5*e*g*z^2 - 61931520*a^7*b^8*c^4*f*h*z^2 + 9658368 \\
&0*a^5*b^10*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 + 6144000*a^6*b^10*c^ \\
&3*f*h*z^2 + 61440*a^5*b^12*c^2*f*h*z^2 - 23592960*a^6*b^9*c^4*e*g*z^2 + 117 \\
&9648*a^5*b^11*c^3*e*g*z^2 + 829440*a^4*b^13*c^2*d*h*z^2 + 368640*a^5*b^11*c \\
&^3*d*h*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - \\
&1207959552*a^10*b*c^8*e*g*z^2 - 440401920*a^10*b*c^8*f^2*z^2 - 188743680*a \\
&^11*b*c^7*h^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 + 46080*a^5*b^13*c*h^2*z^2 \\
&- 14080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^ \\
&6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e \\
&^2*z^2 + 251658240*a^11*c^8*f*h*z^2 + 1536*a^3*b^16*f*h*z^2 + 4608*a^2*b^17 \\
&*d*h*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974 \\
&720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3 \\
&*c^7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888*a^10*b^2*c^7*g^2*z \\
&^2 + 188743680*a^8*b^6*c^5*g^2*z^2 + 141557760*a^10*b^3*c^6*h^2*z^2 - 17432 \\
&5760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^ \\
&11*c^4*d^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 - 26542080*a^8*b^7*c^4*h^2*z^ \\
&2 + 9584640*a^7*b^9*c^3*h^2*z^2 - 2359296*a^9*b^5*c^5*h^2*z^2 - 1290240*a^6 \\
&*b^11*c^2*h^2*z^2 + 5898240*a^6*b^10*c^3*g^2*z^2 - 294912*a^5*b^12*c^2*g^2* \\
&z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960 \\
&*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f \\
&^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 177 \\
&1776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z \\
&^2 + 2304*a^4*b^15*h^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304*b^19*d^2*z^2 + 169 \\
&869312*a^7*b*c^8*d*e*f*z + 99090432*a^8*b*c^7*d*g*h*z - 4608*a^3*b^12*c*f*g \\
&*h*z - 9437184*a^8*b*c^7*e*f*h*z - 13824*a^2*b^13*c*d*g*h*z + 9216*a*b^13*c \\
&^2*d*e*f*z - 4608*a*b^14*c*d*f*g*z + 219414528*a^7*b^2*c^7*d*e*h*z - 221773 \\
&824*a^6*b^3*c^7*d*e*f*z - 109707264*a^7*b^3*c^6*d*g*h*z + 110886912*a^6*b^4 \\
&*c^6*d*f*g*z - 88473600*a^6*b^4*c^6*d*e*h*z - 84934656*a^7*b^2*c^7*d*f*g*z \\
&+ 117964800*a^5*b^5*c^6*d*e*f*z + 44236800*a^6*b^5*c^5*d*g*h*z - 5898240*a^ \\
&7*b^4*c^5*f*g*h*z + 4718592*a^8*b^2*c^6*f*g*h*z + 2949120*a^6*b^6*c^4*f*g*h \\
&*z - 737280*a^5*b^8*c^3*f*g*h*z + 92160*a^4*b^10*c^2*f*g*h*z - 58982400*a^5 \\
&*b^6*c^5*d*f*g*z + 11796480*a^7*b^3*c^6*e*f*h*z - 6635520*a^5*b^7*c^4*d*g*h \\
&*z - 5898240*a^6*b^5*c^5*e*f*h*z + 1474560*a^5*b^7*c^4*e*f*h*z - 276480*a^4 \\
&*b^9*c^3*d*g*h*z - 184320*a^4*b^9*c^3*e*f*h*z + 179712*a^3*b^11*c^2*d*g*h*z \\
&+ 9216*a^3*b^11*c^2*e*f*h*z + 16220160*a^4*b^8*c^4*d*f*g*z + 13271040*a^5* \\
&b^6*c^5*d*e*h*z - 2396160*a^3*b^10*c^3*d*f*g*z + 552960*a^4*b^8*c^4*d*e*h*z \\
&- 359424*a^3*b^10*c^3*d*e*h*z + 175104*a^2*b^12*c^2*d*f*g*z + 27648*a^2*b^ \\
&12*c^2*d*e*h*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z \\
&- 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a^7*b*c^8*d^2*g*z + 7077888*a^9* \\
&b*c^6*g*h^2*z - 6912*a^4*b^11*c*g*h^2*z - 19660800*a^8*b*c^7*f^2*g*z - 768* \\
&a^2*b^13*c*f^2*g*z + 214272*a*b^13*c^2*d^2*g*z - 428544*a*b^12*c^3*d^2*e*z \\
&- 198180864*a^8*c^8*d*e*h*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^ \\
&5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 321159168*a^5*b^5*c^6*d \\
&^2*g*z + 223395840*a^4*b^6*c^6*d^2*e*z - 111697920*a^4*b^7*c^5*d^2*g*z - 88 \\
&47360*a^8*b^3*c^5*g*h^2*z + 4423680*a^7*b^5*c^4*g*h^2*z - 1105920*a^6*b^7*c
\end{aligned}$$

$$\begin{aligned}
& ^3g^*h^2*z + 138240*a^5*b^9*c^2*g^*h^2*z + 25362432*a^7*b^3*c^6*f^2*g^*z + 17 \\
& 694720*a^8*b^2*c^6*e^*h^2*z - 50724864*a^7*b^2*c^7*e^*f^2*z - 13271040*a^6*b^ \\
& 5*c^5*f^2*g^*z - 8847360*a^7*b^4*c^5*e^*h^2*z + 3563520*a^5*b^7*c^4*f^2*g^*z + \\
& 2211840*a^6*b^6*c^4*e^*h^2*z - 506880*a^4*b^9*c^3*f^2*g^*z - 276480*a^5*b^8* \\
& c^3*e^*h^2*z + 34560*a^3*b^11*c^2*f^2*g^*z + 13824*a^4*b^10*c^2*e^*h^2*z + 265 \\
& 42080*a^6*b^4*c^6*e^*f^2*z + 23362560*a^3*b^9*c^4*d^2*g^*z - 46725120*a^3*b^8 \\
& *c^5*d^2*e^*z - 7127040*a^5*b^6*c^5*e^*f^2*z - 2965248*a^2*b^11*c^3*d^2*g^*z + \\
& 1013760*a^4*b^8*c^4*e^*f^2*z - 69120*a^3*b^10*c^3*e^*f^2*z + 1536*a^2*b^12*c \\
& ^2*e^*f^2*z + 5930496*a^2*b^10*c^4*d^2*e^*z - 693633024*a^7*c^9*d^2*e^*z - 141 \\
& 55776*a^9*c^7*e^*h^2*z + 39321600*a^8*c^8*e^*f^2*z + 13824*b^14*c^2*d^2*e^*z - \\
& 6912*b^15*c*d^2*g^*z + 2211840*a^6*b*c^6*e^*f*g^*h + 15482880*a^5*b*c^7*d*e^*f \\
& *g - 13824*a*b^9*c^3*d*e^*f*g + 4423680*a^5*b^3*c^5*e^*f*g^*h + 138240*a^4*b^5 \\
& *c^4*e^*f*g^*h - 13824*a^3*b^7*c^3*e^*f*g^*h - 16588800*a^5*b^2*c^6*d*e^*g^*h + 1 \\
& 658880*a^4*b^4*c^5*d*e^*g^*h + 124416*a^3*b^6*c^4*d*e^*g^*h - 41472*a^2*b^8*c^3 \\
& *d*e^*g^*h + 7741440*a^4*b^3*c^6*d*e^*f*g - 2903040*a^3*b^5*c^5*d*e^*f*g + 3870 \\
& 72*a^2*b^7*c^4*d*e^*f*g - 37062144*a^5*b*c^7*d^2*f^*h - 5985792*a^6*b*c^6*d*f \\
& *h^2 + 206010*a*b^9*c^3*d^2*f^*h - 6300*a*b^10*c^2*d*f^2*h + 16588800*a^5*b* \\
& c^7*d*e^2*h + 3456*a*b^10*c^2*d*f*g^2 + 435456*a*b^8*c^4*d^2*e*g + 13824*a* \\
& b^8*c^4*d*e^2*f + 1350*a*b^11*c*d*f^*h^2 - 1105920*a^5*b^4*c^4*f*g^2*h - 552 \\
& 960*a^6*b^2*c^5*f*g^2*h - 34560*a^4*b^6*c^3*f*g^2*h + 3456*a^3*b^8*c^2*f*g^ \\
& 2*h - 1658880*a^6*b^2*c^5*e*g^*h^2 - 829440*a^5*b^4*c^4*e*g^*h^2 - 20736*a^4* \\
& b^6*c^3*e*g^*h^2 - 4423680*a^5*b^2*c^6*e^2*f^*h + 4147200*a^5*b^3*c^5*d*g^2*h \\
& - 414720*a^4*b^5*c^4*d*g^2*h - 138240*a^4*b^4*c^5*e^2*f^*h - 31104*a^3*b^7* \\
& c^3*d*g^2*h + 13824*a^3*b^6*c^4*e^2*f^*h + 10368*a^2*b^9*c^2*d*g^2*h + 15630 \\
& 336*a^5*b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f^*h + 9630144*a^3*b^5*c^ \\
& 5*d^2*f^*h - 8764416*a^5*b^3*c^5*d*f^*h^2 - 3870720*a^5*b^2*c^6*e^*f^2*g + 286 \\
& 7328*a^4*b^4*c^5*d*f^2*h - 2095200*a^2*b^7*c^4*d^2*f^*h - 1414080*a^3*b^6*c^ \\
& 4*d*f^2*h - 34836480*a^4*b^2*c^7*d^2*e*g - 645120*a^4*b^4*c^5*e^*f^2*g + 306 \\
& 720*a^3*b^7*c^3*d*f^*h^2 + 197820*a^2*b^8*c^3*d*f^2*h + 146880*a^4*b^5*c^4*d \\
& *f^*h^2 + 80640*a^3*b^6*c^4*e^*f^2*g - 55350*a^2*b^9*c^2*d*f^*h^2 - 2304*a^2*b \\
& ^8*c^3*e^*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 - 1935360*a^4*b^4*c^5*d*f*g^2 \\
& - 1658880*a^4*b^3*c^6*d*e^2*h + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b \\
& ^4*c^6*d^2*e*g - 124416*a^3*b^5*c^5*d*e^2*h - 96768*a^2*b^8*c^3*d*f*g^2 + 4 \\
& 1472*a^2*b^7*c^4*d*e^2*h - 3919104*a^2*b^6*c^5*d^2*e*g - 7741440*a^4*b^2*c^ \\
& 7*d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f - 1648 \\
& 128*a^5*b^3*c^5*f^3*h - 898560*a^6*b^3*c^4*f^*h^3 - 354240*a^5*b^5*c^3*f^*h^3 \\
& - 354240*a^4*b^5*c^4*f^3*h + 43680*a^3*b^7*c^3*f^3*h - 21600*a^4*b^7*c^2*f \\
& *h^3 - 1050*a^2*b^9*c^2*f^3*h + 225*a^2*b^10*c*f^2*h^2 + 1658880*a^6*b*c^6* \\
& e^2*h^2 + 16547328*a^4*b^2*c^7*d^3*h - 12306816*a^3*b^4*c^6*d^3*h + 3731097 \\
& 6*a^3*b^3*c^7*d^3*f + 3037824*a^2*b^6*c^5*d^3*h - 2654208*a^5*b^3*c^5*e*g^3 \\
& + 1949184*a^6*b^2*c^5*d^*h^3 + 1296000*a^5*b^4*c^4*d^*h^3 - 155520*a^4*b^6*c \\
& ^3*d^*h^3 - 40500*a*b^10*c^2*d^2*h^2 - 8100*a^3*b^8*c^2*d^*h^3 + 3870720*a^5* \\
& b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108864*a*b^9*c^3*d^2*g^2 - 806 \\
& 8032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5*d* \\
& f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7*c^
\end{aligned}$$

$$\begin{aligned}
&5*d^2*e^2 - 2211840*a^6*c^7*e^2*f*h - 9450*b^11*c^2*d^2*f*h + 1612800*a^6*c^7*d*f^2*h - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 883200*a^6*b*c^6*f^3*h - 317952*a^7*b*c^5*f*h^3 + 1350*a^3*b^9*c*f*h^3 - 15482880*a^5*c^8*d*e^2*f - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c^4*d^3*h + 4050*a^2*b^10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 414720*a^6*b^3*c^4*g^2*h^2 + 207360*a^5*b^5*c^3*g^2*h^2 + 5184*a^4*b^7*c^2*g^2*h^2 + 1684224*a^6*b^2*c^5*f^2*h^2 + 1264320*a^5*b^4*c^4*f^2*h^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c^5*e^2*h^2 + 161280*a^4*b^5*c^4*f^2*g^2 + 20736*a^4*b^5*c^4*e^2*h^2 - 20160*a^3*b^7*c^3*f^2*g^2 + 576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2*c^6*d^2*h^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 - 1412640*a^3*b^6*c^4*d^2*h^2 + 461376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8*c^3*d^2*h^2 + 8709120*a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4*d^2*g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 + 115200*a^7*c^6*f^2*h^2 + 6096384*a^6*c^7*d^2*h^2 + 5184*b^11*c^2*d^2*g^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 142560*a^6*b^4*c^3*h^4 + 103680*a^7*b^2*c^4*h^4 + 32400*a^5*b^6*c^2*h^4 + 20736*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 + 28449792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^2*h^2 + 580608*a^7*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 2025*a^4*b^8*c*h^4 - 734832*a*b^6*c^6*d^4 + 20736*a^8*c^5*h^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*x*(8388608*a^11*b*c^9 - 512*a^4*b^15*c^2 + 14336*a^5*b^13*c^3 - 172032*a^6*b^11*c^4 + 1146880*a^7*b^9*c^5 - 4587520*a^8*b^7*c^6 + 11010048*a^9*b^5*c^7 - 14680064*a^10*b^3*c^8))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5))) + (x*(451584*a^6*c^9*d^2 + 18*b^12*c^3*d^2 - 25600*a^7*c^8*f^2 + 9216*a^8*c^7*h^2 - 504*a*b^10*c^4*d^2 - 73728*a^6*b*c^8*e^2 + 6228*a^2*b^8*c^5*d^2 - 42624*a^3*b^6*c^6*d^2 + 176256*a^4*b^4*c^7*d^2 - 423936*a^5*b^2*c^8*d^2 - 4608*a^4*b^5*c^6*e^2 + 36864*a^5*b^3*c^7*e^2 + 2*a^2*b^10*c^3*f^2 - 84*a^3*b^8*c^4*f^2 + 3520*a^4*b^6*c^5*f^2 - 26240*a^5*b^4*c^6*f^2 + 59904*a^6*b^2*c^7*f^2 - 1152*a^4*b^7*c^4*g^2 + 9216*a^5*b^5*c^5*g^2 - 18432*a^6*b^3*c^6*g^2 + 468*a^4*b^8*c^3*h^2 - 3456*a^5*b^6*c^4*h^2 + 5760*a^6*b^4*c^5*h^2 + 129024*a^7*c^8*d*h + 12*a*b^11*c^3*d*f - 218112*a^6*b*c^8*d*f - 9216*a^7*b*c^7*f*h - 420*a^2*b^9*c^4*d*f + 4992*a^3*b^7*c^5*d*f - 36480*a^4*b^5*c^6*d*f + 144384*a^5*b^3*c^7*d*f + 36*a^2*b^10*c^3*d*h - 360*a^3*b^8*c^4*d*h + 3456*a^4*b^6*c^5*d*h + 4608*a^4*b^6*c^5*e*g - 11520*a^5*b^4*c^6*d*h - 36864*a^5*b^4*c^6*e*g - 27648*a^6*b^2*c^7*d*h + 73728*a^6*b^2*c^7*e*g + 12*a^3*b^9*c^3*f*h - 2304*a^4*b^7*c^4*f*h + 17280*a^5*b^5*c^5*f*h - 30720*a^6*b^3*c^6*f*h))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6*b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5))) + (x*(13824*a^4*c^8*e^3 - 54*b^7*c^5*d^2*e + 27*b^8*c^4*d^2*g - 17
\end{aligned}$$

$$\begin{aligned}
& 28a^4b^3c^5g^3 - 20160a^4c^8d^2ef - 2880a^5c^7efh + 972a^5b^5c^6d^2e + 24192a^3b^3c^8d^2e - 486a^5b^6c^5d^2g + 6240a^4b^3c^7ef^2 \\
& - 20736a^4b^3c^7e^2g + 1728a^5b^3c^6e^2h - 7344a^2b^3c^7d^2e + 3672a^2b^4c^6d^2g - 6a^2b^5c^5ef^2 - 12096a^3b^2c^7d^2g + \\
& 192a^3b^3c^6ef^2 + 10368a^4b^2c^6e^2g + 3a^2b^6c^4f^2g - 96a^3b^4c^5f^2g - 3120a^4b^2c^6f^2g + 1296a^4b^3c^5e^2h - 648a^4b^4c^4g^2h \\
& - 864a^5b^2c^5g^2h - 36a^5b^6c^5d^2ef + 18a^5b^7c^4d^2fg + 15552a^4b^3c^7d^2efh + 10080a^4b^3c^7d^2efg + 1440a^5b^3c^6f^2gh \\
& + 900a^2b^4c^6d^2ef - 4896a^3b^2c^7d^2ef - 108a^2b^5c^5d^2efh - 450a^2b^5c^5d^2efg + 2448a^3b^3c^6d^2efg + 54a^2b^6c^4d^2g^2h - \\
& 36a^3b^4c^5ef^2h - 7776a^4b^2c^6d^2g^2h - 6048a^4b^2c^6ef^2h + 18a^3b^5c^4f^2g^2h + 3024a^4b^3c^5f^2g^2h) / (64(a^4b^12 + 4096a^10c^6 - 24a^5b^10c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) \\
& * \text{root}(56371445760a^{11}b^8c^6z^4 - 503316480a^8b^14c^3z^4 + 47185920a^7b^16c^2z^4 - 171798691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 128849018880a^{12}b^6c^7z^4 - 16911433728a^{10}b^10c^5z^4 + 3523215360a^9b^{12}c^4z^4 - 2621440a^6b^{18}c^3z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 - 46080a^4b^{14}c^3f^2h^2z^2 - 105984a^3b^{15}c^4d^2h^2z^2 - 73728a^2b^{16}c^5d^2f^2z^2 + 2548039680a^9b^3c^7d^2h^2z^2 + 1509949440a^9b^3c^7e^2g^2z^2 - 1401421824a^8b^5c^6d^2h^2z^2 - 1321205760a^9b^2c^8d^2f^2z^2 - 754974720a^8b^5c^6e^2g^2z^2 + 732168192a^7b^6c^6d^2f^2z^2 - 456130560a^9b^4c^6f^2h^2z^2 + 390463488a^7b^7c^5d^2h^2z^2 - 366280704a^6b^8c^5d^2f^2z^2 - 330301440a^8b^4c^7d^2f^2z^2 + 254017536a^8b^6c^5f^2h^2z^2 - 1887436800a^{10}b^3c^8d^2h^2z^2 + 188743680a^{10}b^2c^7f^2h^2z^2 + 188743680a^7b^7c^5e^2g^2z^2 - 61931520a^7b^8c^4f^2h^2z^2 + 96583680a^5b^{10}c^4d^2f^2z^2 - 51609600a^6b^9c^4d^2h^2z^2 + 6144000a^6b^{10}c^3f^2h^2z^2 + 61440a^5b^{12}c^2f^2h^2z^2 - 23592960a^6b^9c^4e^2g^2z^2 + 1179648a^5b^{11}c^3e^2g^2z^2 + 829440a^4b^{13}c^2d^2h^2z^2 + 368640a^5b^{11}c^3d^2h^2z^2 - 15175680a^4b^{12}c^3d^2f^2z^2 + 1428480a^3b^{14}c^2d^2f^2z^2 - 1207959552a^{10}b^3c^8e^2g^2z^2 - 440401920a^{10}b^3c^8f^2z^2 - 188743680a^{11}b^3c^7h^2z^2 + 1761607680a^{10}c^9d^2f^2z^2 + 46080a^5b^{13}c^4h^2z^2 - 14080a^3b^{15}c^4f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^3c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 + 251658240a^{11}c^8f^2h^2z^2 + 1536a^3b^{16}f^2h^2z^2 + 4608a^2b^{17}d^2h^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^5b^{17}c^4d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 377487360a^9b^4c^6g^2z^2 + 301989888a^{10}b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 + 141557760a^{10}b^3c^6h^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^{11}c^4d^2z^2 - 47185920a^7b^8c^4g^2z^2 - 26542080a^8b^7c^4h^2z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5h^2z^2 - 1290240a^6b^{11}c^2h^2z^2 + 5898240a^6b^{10}c^3g^2z^2 - 294912a^5b^{12}c^2g^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{11}
\end{aligned}$$

$$\begin{aligned}
& 0*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 120795 \\
& 9552*a^10*c^9*e^2*z^2 + 2304*a^4*b^15*h^2*z^2 + 256*a^2*b^17*f^2*z^2 + 2304 \\
& *b^19*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 99090432*a^8*b*c^7*d*g*h*z - \\
& 4608*a^3*b^12*c*f*g*h*z - 9437184*a^8*b*c^7*e*f*h*z - 13824*a^2*b^13*c*d*g* \\
& h*z + 9216*a*b^13*c^2*d*e*f*z - 4608*a*b^14*c*d*f*g*z + 219414528*a^7*b^2*c \\
& ^7*d*e*h*z - 221773824*a^6*b^3*c^7*d*e*f*z - 109707264*a^7*b^3*c^6*d*g*h*z \\
& + 110886912*a^6*b^4*c^6*d*f*g*z - 88473600*a^6*b^4*c^6*d*e*h*z - 84934656*a \\
& ^7*b^2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z + 44236800*a^6*b^5*c^5*d \\
& *g*h*z - 5898240*a^7*b^4*c^5*f*g*h*z + 4718592*a^8*b^2*c^6*f*g*h*z + 294912 \\
& 0*a^6*b^6*c^4*f*g*h*z - 737280*a^5*b^8*c^3*f*g*h*z + 92160*a^4*b^10*c^2*f*g \\
& *h*z - 58982400*a^5*b^6*c^5*d*f*g*z + 11796480*a^7*b^3*c^6*e*f*h*z - 663552 \\
& 0*a^5*b^7*c^4*d*g*h*z - 5898240*a^6*b^5*c^5*e*f*h*z + 1474560*a^5*b^7*c^4*e \\
& *f*h*z - 276480*a^4*b^9*c^3*d*g*h*z - 184320*a^4*b^9*c^3*e*f*h*z + 179712*a \\
& ^3*b^11*c^2*d*g*h*z + 9216*a^3*b^11*c^2*e*f*h*z + 16220160*a^4*b^8*c^4*d*f* \\
& g*z + 13271040*a^5*b^6*c^5*d*e*h*z - 2396160*a^3*b^10*c^3*d*f*g*z + 552960* \\
& a^4*b^8*c^4*d*e*h*z - 359424*a^3*b^10*c^3*d*e*h*z + 175104*a^2*b^12*c^2*d*f \\
& *g*z + 27648*a^2*b^12*c^2*d*e*h*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320* \\
& a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^11*c^3*d*e*f*z + 346816512*a^7*b*c^8*d^2 \\
& *g*z + 7077888*a^9*b*c^6*g*h^2*z - 6912*a^4*b^11*c*g*h^2*z - 19660800*a^8*b \\
& *c^7*f^2*g*z - 768*a^2*b^13*c*f^2*g*z + 214272*a*b^13*c^2*d^2*g*z - 428544* \\
& a*b^12*c^3*d^2*e*z - 198180864*a^8*c^8*d*e*h*z + 1022754816*a^6*b^2*c^8*d^2 \\
& *e*z - 642318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 3211 \\
& 59168*a^5*b^5*c^6*d^2*g*z + 223395840*a^4*b^6*c^6*d^2*e*z - 111697920*a^4*b \\
& ^7*c^5*d^2*g*z - 8847360*a^8*b^3*c^5*g*h^2*z + 4423680*a^7*b^5*c^4*g*h^2*z \\
& - 1105920*a^6*b^7*c^3*g*h^2*z + 138240*a^5*b^9*c^2*g*h^2*z + 25362432*a^7*b \\
& ^3*c^6*f^2*g*z + 17694720*a^8*b^2*c^6*e*h^2*z - 50724864*a^7*b^2*c^7*e*f^2* \\
& z - 13271040*a^6*b^5*c^5*f^2*g*z - 8847360*a^7*b^4*c^5*e*h^2*z + 3563520*a^ \\
& 5*b^7*c^4*f^2*g*z + 2211840*a^6*b^6*c^4*e*h^2*z - 506880*a^4*b^9*c^3*f^2*g* \\
& z - 276480*a^5*b^8*c^3*e*h^2*z + 34560*a^3*b^11*c^2*f^2*g*z + 13824*a^4*b^1 \\
& 0*c^2*e*h^2*z + 26542080*a^6*b^4*c^6*e*f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z \\
& - 46725120*a^3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z - 2965248*a^2 \\
& *b^11*c^3*d^2*g*z + 1013760*a^4*b^8*c^4*e*f^2*z - 69120*a^3*b^10*c^3*e*f^2* \\
& z + 1536*a^2*b^12*c^2*e*f^2*z + 5930496*a^2*b^10*c^4*d^2*e*z - 693633024*a^ \\
& 7*c^9*d^2*e*z - 14155776*a^9*c^7*e*h^2*z + 39321600*a^8*c^8*e*f^2*z + 13824 \\
& *b^14*c^2*d^2*e*z - 6912*b^15*c*d^2*g*z + 2211840*a^6*b*c^6*e*f*g*h + 15482 \\
& 880*a^5*b*c^7*d*e*f*g - 13824*a*b^9*c^3*d*e*f*g + 4423680*a^5*b^3*c^5*e*f*g \\
& *h + 138240*a^4*b^5*c^4*e*f*g*h - 13824*a^3*b^7*c^3*e*f*g*h - 16588800*a^5* \\
& b^2*c^6*d*e*g*h + 1658880*a^4*b^4*c^5*d*e*g*h + 124416*a^3*b^6*c^4*d*e*g*h \\
& - 41472*a^2*b^8*c^3*d*e*g*h + 7741440*a^4*b^3*c^6*d*e*f*g - 2903040*a^3*b^5 \\
& *c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g - 37062144*a^5*b*c^7*d^2*f*h - 59 \\
& 85792*a^6*b*c^6*d*f*h^2 + 206010*a*b^9*c^3*d^2*f*h - 6300*a*b^10*c^2*d*f^2* \\
& h + 16588800*a^5*b*c^7*d*e^2*h + 3456*a*b^10*c^2*d*f*g^2 + 435456*a*b^8*c^4 \\
& *d^2*e*g + 13824*a*b^8*c^4*d*e^2*f + 1350*a*b^11*c*d*f*h^2 - 1105920*a^5*b^ \\
& 4*c^4*f*g^2*h - 552960*a^6*b^2*c^5*f*g^2*h - 34560*a^4*b^6*c^3*f*g^2*h + 34 \\
& 56*a^3*b^8*c^2*f*g^2*h - 1658880*a^6*b^2*c^5*e*g*h^2 - 829440*a^5*b^4*c^4*e
\end{aligned}$$

$$\begin{aligned}
& *g^h^2 - 20736a^4b^6c^3e^*g^h^2 - 4423680a^5b^2c^6e^2f^*h + 4147200a^5b^3c^5d^*g^2h - 414720a^4b^5c^4d^*g^2h - 138240a^4b^4c^5e^2f^*h - 31104a^3b^7c^3d^*g^2h + 13824a^3b^6c^4e^2f^*h + 10368a^2b^9c^2d^*g^2h + 15630336a^5b^2c^6d^*f^2h - 14459904a^4b^3c^6d^2f^*h + 9630144a^3b^5c^5d^2f^*h - 8764416a^5b^3c^5d^*f^*h^2 - 3870720a^5b^2c^6e^*f^2g + 2867328a^4b^4c^5d^*f^2h - 2095200a^2b^7c^4d^2f^*h - 1414080a^3b^6c^4d^*f^2h - 34836480a^4b^2c^7d^2e^*g - 645120a^4b^4c^5e^*f^2g + 306720a^3b^7c^3d^*f^*h^2 + 197820a^2b^8c^3d^*f^2h + 146880a^4b^5c^4d^*f^*h^2 + 80640a^3b^6c^4e^*f^2g - 55350a^2b^9c^2d^*f^*h^2 - 2304a^2b^8c^3e^*f^2g - 3870720a^5b^2c^6d^*f^*g^2 - 1935360a^4b^4c^5d^*f^*g^2 - 1658880a^4b^3c^6d^*e^2h + 725760a^3b^6c^4d^*f^*g^2 + 17418240a^3b^4c^6d^2e^*g - 124416a^3b^5c^5d^*e^2h - 96768a^2b^8c^3d^*f^*g^2 + 41472a^2b^7c^4d^*e^2h - 3919104a^2b^6c^5d^2e^*g - 7741440a^4b^2c^7d^*e^2f + 2903040a^3b^4c^6d^*e^2f - 387072a^2b^6c^5d^*e^2f - 1648128a^5b^3c^5f^3h - 898560a^6b^3c^4f^*h^3 - 354240a^5b^5c^3f^*h^3 - 354240a^4b^5c^4f^3h + 43680a^3b^7c^3f^3h - 21600a^4b^7c^2f^*h^3 - 1050a^2b^9c^2f^3h + 225a^2b^10c^*f^2h^2 + 1658880a^6b^*c^6e^2h^2 + 16547328a^4b^2c^7d^3h - 12306816a^3b^4c^6d^3h + 37310976a^3b^3c^7d^3f + 3037824a^2b^6c^5d^3h - 2654208a^5b^3c^5e^*g^3 + 1949184a^6b^2c^5d^*h^3 + 1296000a^5b^4c^4d^*h^3 - 155520a^4b^6c^3d^*h^3 - 40500a^*b^10c^2d^2h^2 - 8100a^3b^8c^2d^*h^3 + 3870720a^5b^*c^7e^2f^2 + 34836480a^4b^*c^8d^2e^2 - 108864a^*b^9c^3d^2g^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^*f^3 + 1737792a^3b^5c^5d^*f^3 - 260190a^*b^8c^4d^2f^2 - 211680a^2b^7c^4d^*f^3 - 435456a^*b^7c^5d^2e^2 - 2211840a^6c^7e^2f^*h - 9450b^11c^2d^2f^*h + 1612800a^6c^7d^*f^2h - 20736b^10c^3d^2e^*g - 75188736a^4b^*c^8d^3f - 883200a^6b^*c^6f^3h - 317952a^7b^*c^5f^*h^3 + 1350a^3b^9c^*f^*h^3 - 15482880a^5c^8d^*e^2f - 10616832a^5b^*c^7e^3g - 345060a^*b^8c^4d^3h + 4050a^2b^10c^*d^*h^3 - 4262400a^5b^*c^7d^*f^3 + 852768a^*b^7c^5d^3f + 7350a^*b^9c^3d^*f^3 + 414720a^6b^3c^4g^2h^2 + 207360a^5b^5c^3g^2h^2 + 5184a^4b^7c^2g^2h^2 + 1684224a^6b^2c^5f^2h^2 + 1264320a^5b^4c^4f^2h^2 + 126720a^4b^6c^3f^2h^2 - 13950a^3b^8c^2f^2h^2 + 967680a^5b^3c^5f^2g^2 + 829440a^5b^3c^5e^2h^2 + 161280a^4b^5c^4f^2g^2 + 20736a^4b^5c^4e^2h^2 - 20160a^3b^7c^3f^2g^2 + 576a^2b^9c^2f^2g^2 + 11487744a^5b^2c^6d^2h^2 + 7962624a^5b^2c^6e^2g^2 + 35525376a^4b^2c^7d^2f^2 - 1412640a^3b^6c^4d^2h^2 + 461376a^4b^4c^5d^2h^2 + 375030a^2b^8c^3d^2h^2 + 8709120a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 979776a^2b^7c^4d^2g^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e^2 + 115200a^7c^6f^2h^2 + 6096384a^6c^7d^2h^2 + 5184b^11c^2d^2g^2 + 11025b^10c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 142560a^6b^4c^3h^4 + 103680a^7b^2c^4h^4 + 32400a^5b^6c^2h^4 + 20736b^9c^4d^2e^2 + 331776a^5b^4c^4g^4 + 492800a^5b^2c^6f^4 + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4
\end{aligned}$$

$$\begin{aligned}
& + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 \\
& + 28449792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^2*h^2 + 5 \\
& 80608*a^7*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 2025*a^4*b^8*c*h^4 - 734832*a*b \\
& ^6*c^6*d^4 + 20736*a^8*c^5*h^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 \\
& + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k), k, 1, 4)
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**3,x)

[Out] Timed out

$$3.56 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=728

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 12ab(ah + 2cd) + 3b^3d) + 8a^2bcf + 4a^2c(ah + 7cd) + ab^3f - ab^2(7ah + 25cd) + 3b^4d \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)}$$

[Out] $\frac{1}{4}xx(b^2d - a*bf - 2a*(c*d - a*h) + (b*c*d - 2a*c*f + a*b*h)x^2)/a/(-4a*c + b^2)/(c*x^4 + b*x^2 + a)^2 + \frac{1}{4}(2a*c*g - b*(c*e + a*i) - (2a*c*i + b^2i - b*c*g + 2c^2e)x^2)/c/(-4a*c + b^2)/(c*x^4 + b*x^2 + a)^2 + \frac{1}{4}(6c*e - 3b*g + 2a*i + b^2i/c)*(2c*x^2 + b)/(-4a*c + b^2)^2/(c*x^4 + b*x^2 + a) + \frac{1}{8}xx(3b^4d + a*b^3f + 8a^2b*c*f + 4a^2c*(a*h + 7c*d) - a*b^2*(7a*h + 25c*d) + c*(3b^3d + a*b^2f + 20a^2c*f - 12a*b*(a*h + 2c*d))x^2)/a^2/(-4a*c + b^2)^2/(c*x^4 + b*x^2 + a) - (2a*c*i + b^2i - 3b*c*g + 6c^2e)*\operatorname{arctanh}((2c*x^2 + b)/(-4a*c + b^2)^{(1/2)})/(-4a*c + b^2)^{(5/2)} + \frac{1}{16}\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)}/(b - (-4a*c + b^2)^{(1/2}))^{(1/2)})*c^{(1/2)}*(3b^3d + a*b^2f + 20a^2c*f - 12a*b*(a*h + 2c*d) + (3b^4d + a*b^3f - 52a^2b*c*f - 6a*b^2*(-3a*h + 5c*d) + 24a^2c*(a*h + 7c*d)))/(-4a*c + b^2)^{(1/2)}/a^2/(-4a*c + b^2)^2 * \frac{1}{16}\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)}/(b + (-4a*c + b^2)^{(1/2}))^{(1/2)})*c^{(1/2)}*(3b^3d + a*b^2f + 20a^2c*f - 12a*b*(a*h + 2c*d) + (-3b^4d - a*b^3f + 52a^2b*c*f + 6a*b^2*(-3a*h + 5c*d) - 24a^2c*(a*h + 7c*d)))/(-4a*c + b^2)^{(1/2)}/a^2/(-4a*c + b^2)^2 * \frac{1}{2}/(b + (-4a*c + b^2)^{(1/2}))^{(1/2)}$

Rubi [A] time = 2.73, antiderivative size = 728, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 11, integrand size = 40, $\frac{\text{number of rules}}{\text{integrand size}} = 0.275$, Rules used = {1673, 1678, 1178, 1166, 205, 1663, 1660, 12, 614, 618, 206}

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 12ab(ah + 2cd) + 3b^3d) + 8a^2bcf + 4a^2c(ah + 7cd) - ab^2(7ah + 25cd) + ab^3f + 3b^4d \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4)^3,x]

[Out] $(x*(b^2d - a*bf - 2a*(c*d - a*h) + (b*c*d - 2a*c*f + a*b*h)x^2))/(4a*(b^2 - 4a*c)*(a + b*x^2 + c*x^4)^2) + (2a*c*g - b*(c*e + a*i) - (2c^2e - b*c*g + b^2i - 2a*c*i)x^2)/(4c*(b^2 - 4a*c)*(a + b*x^2 + c*x^4)^2) + ((6c*e - 3b*g + 2a*i + (b^2i)/c)*(b + 2c*x^2))/(4*(b^2 - 4a*c)^2*(a$

$$\begin{aligned}
& + b*x^2 + c*x^4)) + (x*(3*b^4*d + a*b^3*f + 8*a^2*b*c*f + 4*a^2*c*(7*c*d + \\
& a*h) - a*b^2*(25*c*d + 7*a*h) + c*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b* \\
& (2*c*d + a*h))*x^2))/(8*a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (\text{Sqrt}[c] \\
& *(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(2*c*d + a*h) + (3*b^4*d + a*b^3* \\
& f - 52*a^2*b*c*f - 6*a*b^2*(5*c*d - 3*a*h) + 24*a^2*c*(7*c*d + a*h))/\text{Sqrt}[b \\
& ^2 - 4*a*c])*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]])]/(8*\text{Sqrt}[2] \\
& *a^2*(b^2 - 4*a*c)^2*\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) + (\text{Sqrt}[c]*(3*b^3*d \\
& + a*b^2*f + 20*a^2*c*f - 12*a*b*(2*c*d + a*h) - (3*b^4*d + a*b^3*f - 52*a^2 \\
& *b*c*f - 6*a*b^2*(5*c*d - 3*a*h) + 24*a^2*c*(7*c*d + a*h))/\text{Sqrt}[b^2 - 4*a*c \\
&])*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]])]/(8*\text{Sqrt}[2]*a^2* \\
& (b^2 - 4*a*c)^2*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) - ((6*c^2*e - 3*b*c*g + b^2*i \\
& + 2*a*c*i)*\text{ArcTanh}[(b + 2*c*x^2)/\text{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(5/2)
\end{aligned}$$

Rule 12

$$\text{Int}[(a_*)*(u_), x_Symbol] \rightarrow \text{Dist}[a, \text{Int}[u, x], x] /; \text{FreeQ}[a, x] \&\& \text{!Match} \\
\text{Q}[u, (b_)*(v_)] /; \text{FreeQ}[b, x]$$

Rule 205

$$\text{Int}[(a_*) + (b_)*(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(\text{Rt}[a/b, 2]*\text{ArcTan}[x/\text{Rt}[a \\
/b, 2]])/a, x] /; \text{FreeQ}[\{a, b\}, x] \&\& \text{PosQ}[a/b]$$

Rule 206

$$\text{Int}[(a_*) + (b_)*(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(1*\text{ArcTanh}[(\text{Rt}[-b, 2]*x)/ \\
\text{Rt}[a, 2]])/(\text{Rt}[a, 2]*\text{Rt}[-b, 2]), x] /; \text{FreeQ}[\{a, b\}, x] \&\& \text{NegQ}[a/b] \&\& (\text{Gt} \\
\text{Q}[a, 0] \parallel \text{LtQ}[b, 0])$$

Rule 614

$$\text{Int}[(a_*) + (b_)*(x_) + (c_)*(x_)^2)^{p_}, x_Symbol] \rightarrow \text{Simp}[(b + 2*c*x \\
)*(a + b*x + c*x^2)^{p+1})/((p+1)*(b^2 - 4*a*c)), x] - \text{Dist}[(2*c*(2*p + \\
3))/((p+1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x + c*x^2)^{p+1}, x], x] /; \text{Free} \\
\text{Q}[\{a, b, c\}, x] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1] \&\& \text{NeQ}[p, -3/2] \&\& \text{Int} \\
\text{egerQ}[4*p]$$

Rule 618

$$\text{Int}[(a_*) + (b_)*(x_) + (c_)*(x_)^2)^{-1}, x_Symbol] \rightarrow \text{Dist}[-2, \text{Subst}[\text{I} \\
\text{nt}[1/\text{Simp}[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; \text{FreeQ}[\{a, b, c\}, \\
x] \&\& \text{NeQ}[b^2 - 4*a*c, 0]$$

Rule 1166

```
Int[((d_) + (e_)*(x_)^2)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_)*(x_)^2)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symb
ol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1660

```
Int[(Pq_)*((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol] := With[{Q =
PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[P
q, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x +
c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^(
p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(
2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
- 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^(
p, x), x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := With[{d =
```

```

Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p + 7)*(b*d - 2*a*e)*x^2, x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]

```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 56x^5}{(a + bx^2 + cx^4)^3} dx &= \int \frac{x(e + gx^2 + 56x^4)}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{1}{2} \text{Subst} \left(\int \frac{e}{(a + bx^2 + cx^4)^3} dx \right) \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf)}{4a} \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf)}{4a} \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf)}{4a} \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf)}{4a} \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf)}{4a}
\end{aligned}$$

Mathematica [A] time = 6.67, size = 980, normalized size = 1.35

$$\frac{-bc^2dx^3 + 2ac^2fx^3 - abchx^3 + 2ac^2ex^2 - abcgx^2 + ab^2ix^2 - 2a^2cix^2 + 2ac^2dx - b^2cdx + abcfx - 2a^2chx + abce}{4ac(4ac - b^2)(cx^4 + bx^2 + a)^2}$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4)^3,x
]

[Out] (a*b*c*e - 2*a^2*c*g + a^2*b*i - b^2*c*d*x + 2*a*c^2*d*x + a*b*c*f*x - 2*a^2*c*h*x + 2*a*c^2*e*x^2 - a*b*c*g*x^2 + a*b^2*i*x^2 - 2*a^2*c*i*x^2 - b*c^2*d*x^3 + 2*a*c^2*f*x^3 - a*b*c*h*x^3)/(4*a*c*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (12*a^2*b*c^2*e - 6*a^2*b^2*c*g + 2*a^2*b^3*i + 4*a^3*b*c*i + 3*b^4*c*d*x - 25*a*b^2*c^2*d*x + 28*a^2*c^3*d*x + a*b^3*c*f*x + 8*a^2*b*c^2*f*x - 7*a^2*b^2*c*h*x + 4*a^3*c^2*h*x + 24*a^2*c^3*e*x^2 - 12*a^2*b*c^2*g*x^2 + 4*a^2*b^2*c*i*x^2 + 8*a^3*c^2*i*x^2 + 3*b^3*c^2*d*x^3 - 24*a*b*c^3*d*x^3 + a*b^2*c^2*f*x^3 + 20*a^2*c^3*f*x^3 - 12*a^2*b*c^2*h*x^3)/(8*a^2*c*(-b^2 + 4*a*c)^2*(a + b*x^2 + c*x^4)) + (Sqrt[c]*(3*b^4*d - 30*a*b^2*c*d + 168*a^2*c^2*d + 3*b^3*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c*Sqrt[b^2 - 4*a*c]*d + a*b^3*f - 52*a^2*b*c*f + a*b^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c*Sqrt[b^2 - 4*a*c]*f + 18*a^2*b^2*h + 24*a^3*c*h - 12*a^2*b*Sqrt[b^2 - 4*a*c]*h)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[c]*(-3*b^4*d + 30*a*b^2*c*d - 168*a^2*c^2*d + 3*b^3*Sqrt[b^2 - 4*a*c]*d - 24*a*b*c*Sqrt[b^2 - 4*a*c]*d - a*b^3*f + 52*a^2*b*c*f + a*b^2*Sqrt[b^2 - 4*a*c]*f + 20*a^2*c*Sqrt[b^2 - 4*a*c]*f - 18*a^2*b^2*h - 24*a^3*c*h - 12*a^2*b*Sqrt[b^2 - 4*a*c]*h)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]])/(8*Sqrt[2]*a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((6*c^2*e - 3*b*c*g + b^2*i + 2*a*c*i)*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(2*(b^2 - 4*a*c)^(5/2)) + ((-6*c^2*e + 3*b*c*g - b^2*i - 2*a*c*i)*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(2*(b^2 - 4*a*c)^(5/2))

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a)^3,x, algorithm="fricas")

[Out] Timed out

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a)^3,x, algorithm="giac")

[Out] Timed out

maple [B] time = 0.06, size = 3824, normalized size = 5.25

output 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^4+b*x^2+a)^3,x)

[Out]
$$-15/2/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*\operatorname{arctanh}(2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)*(-4*a*c+b^2)^{1/2}*b^2*d+3/4/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*\operatorname{arctan}(2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)*(-4*a*c+b^2)^{1/2}*b^4*d+3/4/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*\operatorname{arctanh}(2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)*(-4*a*c+b^2)^{1/2}*b^4*d+1/4/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*\operatorname{arctanh}(2^{1/2}/((-b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)*(-4*a*c+b^2)^{1/2}*b^3*f+1/4/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*\operatorname{arctan}(2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)*(-4*a*c+b^2)^{1/2}*b^3*f-15/2/a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*\operatorname{arctan}(2^{1/2}/((b+(-4*a*c+b^2)^{1/2})*c)^{1/2}*c*x)*(-4*a*c+b^2)^{1/2}*b^2*d-4*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{1/2})*(-4*a*c+b^2)^{1/2}*i+4*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c/(16*a*c-4*b^2)*\ln(2*c*x^2+b+(-4*a*c+b^2)^{1/2})*(-4*a*c+b^2)^{1/2}*i+(-1/8*c^2*(12*a^2*b*h-20*a^2*c*f-a*b^2*f+24*a*b*c*d-3*b^3*d)/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*x^7+1/2*c*(2*a*c*i+b^2*i-3*b*c*g+6*c^2*e)/(16*a^2*c^2-8*a*b^2*c+b^4)*x^6+1/8/a^2*c*(4*a^3*c*h-19*a^2*b^2*h+28*a^2*b*c*f+28*a^2*c^2*d+2*a*b^3*f-49*a*b^2*c*d+6*b^4*d)/(16*a^2*c^2-8*a*b^2*c+b^4)*x^5+3/4*b*(2*a*c*i+b^2*i-3*b*c*g+6*c^2*e)/(16*a^2*c^2-8*a*b^2*c+b^4)*x^4-1/8*(16*a^3*b*c*h-36*a^3*c^2*f+5*a^2*b^3*h-5*a^2*b^2*c*f+4*a^2*b*c^2*d-a*b^4*f+20*a*b^3*c*d-3*b^5*d)/a^2/(16*a^2*c^2-8*a*b^2*c+b^4)*x^3-1/2*(2*a^2*c*i-5*a*b^2*i+5*a*b*c*g-10*a*c^2*e+b^3*g-2*b^2*c*e)/(16*a^2*c^2-8*a*b^2*c+b^4)*x^2-1/8*(12*a^3*c*h+3*a^2*b^2*h-16*a^2*b*c*f-44*a^2*c^2*d+a*b^3*f+37*a*b^2*c*d-5*b^4*d)/(16*a^2*c^2-8*a*b^2*c+b^4)/a*x+1/4*(6*a^2*b*i-8*a^2*c*g-a*b^2*g+10*a*b*c*e-b^3*e)/(16*a^2*c^2-8*a*b^2*c+b^4))/(c*x^$$

$$\begin{aligned}
& 4+bx^2+a)^2-4/(16a^2c^2-8ab^2c+b^4)*c^2/(16ac-4b^2)*2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2})* \\
& c*x)*b^2*f-24/(16a^2c^2-8ab^2c+b^4)*c^3/(16ac-4b^2)*2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2})*c \\
& *x)*b*d+4/(16a^2c^2-8ab^2c+b^4)*c^2/(16ac-4b^2)*2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*\operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2})*c* \\
& x)*b^2*f+24/(16a^2c^2-8ab^2c+b^4)*c^3/(16ac-4b^2)*2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*\operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2})*c \\
& *x)*b*d+3/(16a^2c^2-8ab^2c+b^4)*c/(16ac-4b^2)*2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2})*c*x)*b \\
& ^3*h+20a/(16a^2c^2-8ab^2c+b^4)*c^3/(16ac-4b^2)*2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2})*c*x)* \\
& f-20a/(16a^2c^2-8ab^2c+b^4)*c^3/(16ac-4b^2)*2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*\operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2})*c*x)* \\
& f-3/(16a^2c^2-8ab^2c+b^4)*c/(16ac-4b^2)*2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*\operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2})*c*x)*b^3*h \\
& +42/(16a^2c^2-8ab^2c+b^4)*c^3/(16ac-4b^2)*2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*\operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2})*c*x)*(-4 \\
& *ac+b^2)^{1/2}*d+42/(16a^2c^2-8ab^2c+b^4)*c^3/(16ac-4b^2)*2^{1/2}/ \\
& ((b+(-4ac+b^2)^{1/2})*c)^{1/2}*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2})*c*x)*(-4ac+b^2)^{1/2}*d+6/(16a^2c^2-8ab^2c+b^4)*c/(16ac-4b^2) \\
& *2*\ln(-2c*x^2-b+(-4ac+b^2)^{1/2})*(-4ac+b^2)^{1/2}*b*g-6/(16a^2c^2-8 \\
& *ab^2c+b^4)*c/(16ac-4b^2)*\ln(2c*x^2+b+(-4ac+b^2)^{1/2})*(-4ac+b^2 \\
&)^{1/2}*b*g-12a/(16a^2c^2-8ab^2c+b^4)*c^2/(16ac-4b^2)*2^{1/2}/((b+ \\
& (-4ac+b^2)^{1/2})*c)^{1/2}*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2} \\
&)*c*x)*b*h+9/a/(16a^2c^2-8ab^2c+b^4)*c^2/(16ac-4b^2)*2^{1/2}/((b+(- \\
& 4ac+b^2)^{1/2})*c)^{1/2}*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2})*c \\
& *x)*b^3*d-9/a/(16a^2c^2-8ab^2c+b^4)*c^2/(16ac-4b^2)*2^{1/2}/((-b+(- \\
& 4ac+b^2)^{1/2})*c)^{1/2}*\operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2} \\
&)*c*x)*b^3*d-1/4/a/(16a^2c^2-8ab^2c+b^4)*c/(16ac-4b^2)*2^{1/2}/((b \\
& +(-4ac+b^2)^{1/2})*c)^{1/2}*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2} \\
&)*c*x)*b^4*f+3/4/a^2/(16a^2c^2-8ab^2c+b^4)*c/(16ac-4b^2)*2^{1/2}/(\\
& (-b+(-4ac+b^2)^{1/2})*c)^{1/2}*\operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c \\
&)^{1/2})*c*x)*b^5*d-13/(16a^2c^2-8ab^2c+b^4)*c^2/(16ac-4b^2)*2^{1/2} \\
& /((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*\operatorname{arctanh}(2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c \\
&)^{1/2})*c*x)*(-4ac+b^2)^{1/2}*b*f+9/2/(16a^2c^2-8ab^2c+b^4)*c/(16* \\
& ac-4b^2)*2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*\operatorname{arctanh}(2^{1/2}/((-b+(- \\
& 4ac+b^2)^{1/2})*c)^{1/2})*c*x)*(-4ac+b^2)^{1/2}*b^2*h+9/2/(16a^2c^2-8 \\
& *ab^2c+b^4)*c/(16ac-4b^2)*2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*\operatorname{arc} \\
& \tan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2})*c*x)*(-4ac+b^2)^{1/2}*b^2*h- \\
& 13/(16a^2c^2-8ab^2c+b^4)*c^2/(16ac-4b^2)*2^{1/2}/((b+(-4ac+b^2)^{1/2} \\
&)^{1/2})*c)^{1/2}*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2})*c*x)*(-4ac \\
& +b^2)^{1/2}*b*f-3/4/a^2/(16a^2c^2-8ab^2c+b^4)*c/(16ac-4b^2)*2^{1/2} \\
& /((b+(-4ac+b^2)^{1/2})*c)^{1/2}*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c) \\
&)^{1/2})*c*x)*b^5*d+1/4/a/(16a^2c^2-8ab^2c+b^4)*c/(16ac-4b^2)*2^{1/2}
\end{aligned}$$

$$\frac{((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^4*f+6*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*h+12*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*h+6*a/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*h-12/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*(-4*a*c+b^2)^{(1/2)}*e+12/(16*a^2*c^2-8*a*b^2*c+b^4)*c^2/(16*a*c-4*b^2)*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*(-4*a*c+b^2)^{(1/2)}*e+2/(16*a^2*c^2-8*a*b^2*c+b^4)/(16*a*c-4*b^2)*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*(-4*a*c+b^2)^{(1/2)}*b^2*i-2/(16*a^2*c^2-8*a*b^2*c+b^4)/(16*a*c-4*b^2)*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*(-4*a*c+b^2)^{(1/2)}*b^2*i$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a)^3,x, algorithm="maxima")

[Out]
$$\begin{aligned} & -1/8*((12*a^2*b*c^2*h - 3*(b^3*c^2 - 8*a*b*c^3)*d - (a*b^2*c^2 + 20*a^2*c^3)*f)*x^7 - 4*(6*a^2*c^3*e - 3*a^2*b*c^2*g + (a^2*b^2*c + 2*a^3*c^2)*i)*x^6 \\ & - 12*a^4*b*i - ((6*b^4*c - 49*a*b^2*c^2 + 28*a^2*c^3)*d + 2*(a*b^3*c + 14*a^2*b*c^2)*f - (19*a^2*b^2*c - 4*a^3*c^2)*h)*x^5 - 6*(6*a^2*b*c^2*e - 3*a^2*b^2*c*g + (a^2*b^3 + 2*a^3*b*c)*i)*x^4 - ((3*b^5 - 20*a*b^3*c - 4*a^2*b*c^2)*d + (a*b^4 + 5*a^2*b^2*c + 36*a^3*c^2)*f - (5*a^2*b^3 + 16*a^3*b*c)*h)*x^3 \\ & - 4*(2*(a^2*b^2*c + 5*a^3*c^2)*e - (a^2*b^3 + 5*a^3*b*c)*g + (5*a^3*b^2 - 2*a^4*c)*i)*x^2 + 2*(a^2*b^3 - 10*a^3*b*c)*e + 2*(a^3*b^2 + 8*a^4*c)*g - ((5*a*b^4 - 37*a^2*b^2*c + 44*a^3*c^2)*d - (a^2*b^3 - 16*a^3*b*c)*f - 3*(a^3*b^2 + 4*a^4*c)*h)*x \\ &)/(a^2*b^4*c^2 - 8*a^3*b^2*c^3 + 16*a^4*c^4)*x^8 + a^4*b^4 - 8*a^5*b^2*c + 16*a^6*c^2 + 2*(a^2*b^5*c - 8*a^3*b^3*c^2 + 16*a^4*b*c^3)*x^6 + (a^2*b^6 - 6*a^3*b^4*c + 32*a^5*c^3)*x^4 + 2*(a^3*b^5 - 8*a^4*b^3*c + 16*a^5*b*c^2)*x^2) - 1/8*\operatorname{integrate}(((12*a^2*b*c*h - 3*(b^3*c - 8*a*b*c^2)*d - (a*b^2*c + 20*a^2*c^2)*f)*x^2 - 3*(b^4 - 9*a*b^2*c + 28*a^2*c^2)*d - (a*b^3 - 16*a^2*b*c)*f - 3*(a^2*b^2 + 4*a^3*c)*h - 8*(6*a^2*c^2*e - 3*a^2*b*c*g + (a^2*b^2 + 2*a^3*c)*i)*x)/(c*x^4 + b*x^2 + a), x)/(a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2) \end{aligned}$$

mupad [B] time = 7.16, size = 36653, normalized size = 50.35

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5)/(a + b*x^2 + c*x^4)^3,x)

[Out] ((x^5*(28*a^2*c^3*d + 4*a^3*c^2*h + 6*b^4*c*d + 2*a*b^3*c*f - 49*a*b^2*c^2*d + 28*a^2*b*c^2*f - 19*a^2*b^2*c*h))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (x^2*(b^3*g - 10*a*c^2*e - 2*b^2*c*e - 5*a*b^2*i + 2*a^2*c*i + 5*a*b*c*g))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (b^3*e + a*b^2*g + 8*a^2*c*g - 6*a^2*b*i - 10*a*b*c*e)/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (3*b*x^4*(6*c^2*e + b^2*i - 3*b*c*g + 2*a*c*i))/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (c*x^6*(6*c^2*e + b^2*i - 3*b*c*g + 2*a*c*i))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^3*(3*b^5*d + 36*a^3*c^2*f - 5*a^2*b^3*h + a*b^4*f - 20*a*b^3*c*d - 16*a^3*b*c*h - 4*a^2*b*c^2*d + 5*a^2*b^2*c*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (x*(3*a^2*b^2*h - 44*a^2*c^2*d - 5*b^4*d + a*b^3*f + 12*a^3*c*h + 37*a*b^2*c*d - 16*a^2*b*c*f))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (c*x^7*(20*a^2*c^2*f + 3*b^3*c*d - 24*a*b*c^2*d + a*b^2*c*f - 12*a^2*b*c*h))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6) + symsum(log((10368*a*b^5*c^6*d^3 - 8000*a^5*c^7*f^3 - 567*b^7*c^5*d^3 + 169344*a^3*b*c^8*d^3 + 193536*a^4*c^8*d*e^2 - 141120*a^4*c^8*d^2*f + 1728*a^6*b*c^5*h^3 + 315*b^8*c^4*d^2*f + 27648*a^5*c^7*e^2*h + 21504*a^6*c^6*d*i^2 - 135*b^9*c^3*d^2*h - 2880*a^6*c^6*f*h^2 + 3072*a^7*c^5*h*i^2 - 67824*a^2*b^3*c^7*d^3 + 35*a^2*b^6*c^4*f^3 + 84*a^3*b^4*c^5*f^3 - 12720*a^4*b^2*c^6*f^3 + 540*a^4*b^5*c^3*h^3 + 4320*a^5*b^3*c^4*h^3 + 129024*a^5*c^7*d*e*i - 40320*a^5*c^7*d*f*h + 18432*a^6*c^6*e*h*i - 6237*a*b^6*c^5*d^2*f + 210*a*b^7*c^4*d*f^2 + 116160*a^4*b*c^7*d*f^2 - 36864*a^4*b*c^7*e^2*f + 2430*a*b^7*c^4*d^2*h + 133056*a^4*b*c^7*d^2*h + 27648*a^5*b*c^6*d*h^2 + 26880*a^5*b*c^6*f^2*h - 4096*a^6*b*c^5*f*i^2 + 6912*a^2*b^4*c^6*d*e^2 - 62208*a^3*b^2*c^7*d*e^2 + 42372*a^2*b^4*c^6*d^2*f - 1764*a^2*b^5*c^5*d*f^2 - 96048*a^3*b^2*c^7*d^2*f - 4608*a^3*b^3*c^6*d*f^2 + 1728*a^2*b^6*c^4*d*g^2 + 2304*a^3*b^3*c^6*e^2*f - 15552*a^3*b^4*c^5*d*g^2 + 48384*a^4*b^2*c^6*d*g^2 - 13716*a^2*b^5*c^5*d^2*h + 405*a^2*b^7*c^3*d*h^2 + 12096*a^3*b^3*c^6*d^2*h - 5400*a^3*b^5*c^4*d*h^2 + 28944*a^4*b^3*c^5*d*h^2 + 192*a^2*b^8*c^2*d*i^2 + 576*a^3*b^5*c^4*f*g^2 - 960*a^3*b^6*c^3*d*i^2 + 6912*a^4*b^2*c^6*e^2*h - 9216*a^4*b^3*c^5*f*g^2 - 768*a^4*b^4*c^4*d*i^2 + 14592*a^5*b^2*c^5*d*i^2 - 15*a^2*b^7*c^3*f^2*h - 360*a^3*b^5*c^4*f^2*h + 135*a^3*b^6*c^3*f*h^2 + 15696*a^4*b^3*c^5*f^2*h - 5580*a^4*b^4*c^4*f*h^2 - 20592*a^5*b^2*c^5*f*h^2 + 64*a^3*b^7*c^2*f*i^2 + 1728*a^4*b^4*c^4*g^2*h - 768*a^4*b^5*c^3*f*i^2 + 6912*a^5*b^2*c^5*g^2*h - 3840*a^5*b^3*c^4*f*i^2 + 192*a^4*b^6*c^2*h*i^2 + 1536*a^5*b^4*c^3*h*i^2 + 3840*a^6*b^2*c^4*h*i^2 - 193536*a^4*b*c^7*d*e*g - 90*a*b^8*c^3*d*f*h - 64512*a^5*b*c^6*d*g*i - 24576*a^5*b*c^6*e*f*i - 27648*a^5*b*c^6*e*g*h - 9216*a^6*b*c^5*g*h*i - 6912*a^2*b^5*c^5*d*e*g + 62208*a^3*b^3*c^6*d*e*g + 2304*a^2*b^6*c^4*d*e*i - 270*a^2*b^6*c^4*d*f*h - 16128*a^3*b^4*c^5*d*e*i + 16056*a^3*b^4*c^5*d*f*h - 2304*a^3*b^4*c^5*e*f*g + 23040*a^4*b^2*c^6*d*e*i - 127008*a^4*b^2*c^6*d*f*h + 36864*a^4*b^2*c^6*e*f*g - 1152*a^2*b^7*c^3*d*g*i + 8064*a^3*b^5*c^4*d*g*i + 768*a^3*b^5*c^4*e*f*i - 11520*a^4*b^3*c^5*d*g*i - 10752*a^4*b^3*c^5*e*f*i - 6912*a^4*b^3*c^5*e*g*h - 384*a^3*b^6*c^3*f*g*i + 2304*a^4*b^4*c^4*e*h*i + 5376*a^4*b^4*c^4*f*g*i + 13824

$$\begin{aligned}
& a^5 b^2 c^5 e h i + 12288 a^5 b^2 c^5 f g i - 1152 a^4 b^5 c^3 g h i - 691 \\
& 2 a^5 b^3 c^4 g h i) / (512 (a^4 b^{12} + 4096 a^{10} c^6 - 24 a^5 b^{10} c + 240 a \\
& ^6 b^8 c^2 - 1280 a^7 b^6 c^3 + 3840 a^8 b^4 c^4 - 6144 a^9 b^2 c^5)) + \text{roo} \\
& \text{t}(56371445760 a^{11} b^8 c^6 z^4 - 503316480 a^8 b^{14} c^3 z^4 + 47185920 a^7 \\
& b^{16} c^2 z^4 - 171798691840 a^{14} b^2 c^9 z^4 + 193273528320 a^{13} b^4 c^8 z^4 \\
& - 128849018880 a^{12} b^6 c^7 z^4 - 16911433728 a^{10} b^{10} c^5 z^4 + 3523215 \\
& 360 a^9 b^{12} c^4 z^4 - 2621440 a^6 b^{18} c z^4 + 68719476736 a^{15} c^{10} z^4 + \\
& 65536 a^5 b^{20} z^4 + 196608 a^5 b^{13} c g i z^2 - 46080 a^4 b^{14} c f h z^2 \\
& - 105984 a^3 b^{15} c d h z^2 - 73728 a^2 b^{16} c d f z^2 + 2548039680 a^9 b^3 \\
& c^7 d h z^2 + 1509949440 a^9 b^3 c^7 e g z^2 - 1401421824 a^8 b^5 c^6 d h z^2 \\
& - 1321205760 a^9 b^2 c^8 d f z^2 - 754974720 a^8 b^5 c^6 e g z^2 + 7321 \\
& 68192 a^7 b^6 c^6 d f z^2 - 603979776 a^{10} b^2 c^7 e i z^2 - 456130560 a^9 b^4 \\
& c^6 f h z^2 + 390463488 a^7 b^7 c^5 d h z^2 + 301989888 a^{10} b^3 c^6 g i \\
& z^2 - 366280704 a^6 b^8 c^5 d f z^2 - 330301440 a^8 b^4 c^7 d f z^2 + 254 \\
& 017536 a^8 b^6 c^5 f h z^2 - 1887436800 a^{10} b c^8 d h z^2 + 188743680 a^{10} \\
& b^2 c^7 f h z^2 + 188743680 a^7 b^7 c^5 e g z^2 + 125829120 a^8 b^6 c^5 e e \\
& i z^2 - 62914560 a^8 b^7 c^4 g i z^2 - 61931520 a^7 b^8 c^4 f h z^2 + 23592 \\
& 960 a^7 b^9 c^3 g i z^2 - 47185920 a^7 b^8 c^4 e i z^2 - 3538944 a^6 b^{11} c \\
& ^2 g i z^2 + 96583680 a^5 b^{10} c^4 d f z^2 - 51609600 a^6 b^9 c^4 d h z^2 + \\
& 7077888 a^6 b^{10} c^3 e i z^2 + 6144000 a^6 b^{10} c^3 f h z^2 - 393216 a^5 b \\
& ^{12} c^2 e i z^2 + 61440 a^5 b^{12} c^2 f h z^2 - 23592960 a^6 b^9 c^4 e g z^2 \\
& + 1179648 a^5 b^{11} c^3 e g z^2 + 829440 a^4 b^{13} c^2 d h z^2 + 368640 a^5 b \\
& ^{11} c^3 d h z^2 - 15175680 a^4 b^{12} c^3 d f z^2 + 1428480 a^3 b^{14} c^2 d f \\
& z^2 - 1207959552 a^{10} b c^8 e g z^2 - 402653184 a^{11} b c^7 g i z^2 - 44040 \\
& 1920 a^{10} b c^8 f^2 z^2 - 188743680 a^{11} b c^7 h^2 z^2 + 1761607680 a^{10} c^ \\
& 9 d f z^2 + 524288 a^6 b^{12} c i^2 z^2 + 46080 a^5 b^{13} c h^2 z^2 - 14080 a^ \\
& 3 b^{15} c f^2 z^2 + 6936330240 a^8 b^3 c^8 d^2 z^2 + 2464874496 a^6 b^7 c^6 d \\
& ^2 z^2 - 3963617280 a^9 b c^9 d^2 z^2 + 805306368 a^{11} c^8 e i z^2 - 15099 \\
& 49440 a^9 b^2 c^8 e^2 z^2 + 251658240 a^{11} c^8 f h z^2 + 1536 a^3 b^{16} f h z^2 \\
& + 4608 a^2 b^{17} d h z^2 - 5400428544 a^7 b^5 c^7 d^2 z^2 - 94464 a b^{17} \\
& c d^2 z^2 + 754974720 a^8 b^4 c^7 e^2 z^2 - 730054656 a^5 b^9 c^5 d^2 z^2 \\
& + 477102080 a^9 b^3 c^7 f^2 z^2 - 377487360 a^9 b^4 c^6 g^2 z^2 + 301989888 \\
& a^{10} b^2 c^7 g^2 z^2 + 188743680 a^8 b^6 c^5 g^2 z^2 + 141557760 a^{10} b^3 c^6 \\
& h^2 z^2 - 174325760 a^8 b^5 c^6 f^2 z^2 - 188743680 a^7 b^6 c^6 e^2 z^2 \\
& + 146165760 a^4 b^{11} c^4 d^2 z^2 - 50331648 a^{10} b^4 c^5 i^2 z^2 - 3355443 \\
& 2 a^{11} b^2 c^6 i^2 z^2 + 20971520 a^9 b^6 c^4 i^2 z^2 - 47185920 a^7 b^8 c^4 \\
& g^2 z^2 - 26542080 a^8 b^7 c^4 h^2 z^2 - 2752512 a^7 b^{10} c^2 i^2 z^2 + 2 \\
& 621440 a^8 b^8 c^3 i^2 z^2 + 9584640 a^7 b^9 c^3 h^2 z^2 - 2359296 a^9 b^5 c^5 \\
& h^2 z^2 - 1290240 a^6 b^{11} c^2 h^2 z^2 + 5898240 a^6 b^{10} c^3 g^2 z^2 - \\
& 294912 a^5 b^{12} c^2 g^2 z^2 + 11206656 a^7 b^7 c^5 f^2 z^2 + 8929280 a^6 b^9 \\
& c^4 f^2 z^2 + 23592960 a^6 b^8 c^5 e^2 z^2 - 2600960 a^5 b^{11} c^3 f^2 z^2 \\
& + 291840 a^4 b^{13} c^2 f^2 z^2 - 19860480 a^3 b^{13} c^3 d^2 z^2 - 1179648 a^5 \\
& b^{10} c^4 e^2 z^2 + 1771776 a^2 b^{15} c^2 d^2 z^2 + 1536 a b^{18} d f z^2 + \\
& 1207959552 a^{10} c^9 e^2 z^2 + 134217728 a^{12} c^7 i^2 z^2 - 32768 a^5 b^{14} i \\
& ^2 z^2 + 2304 a^4 b^{15} h^2 z^2 + 256 a^2 b^{17} f^2 z^2 + 2304 b^{19} d^2 z^2 +
\end{aligned}$$

$169869312a^7b^8c^8d^8ef^8z + 99090432a^8b^8c^7d^8g^8h^8z - 3145728a^9b^8c^6f^8h^8i^8z - 27648a^4b^{11}c^8f^8h^8i^8z + 56623104a^8b^8c^7d^8f^8i^8z - 50688a^3b^{12}c^8d^8h^8i^8z - 4608a^3b^{12}c^8f^8g^8h^8z - 9437184a^8b^8c^7e^8f^8h^8z - 55296a^2b^{13}c^8d^8f^8i^8z - 13824a^2b^{13}c^8d^8g^8h^8z + 9216a^8b^{13}c^2d^8e^8f^8z - 4608a^8b^{14}c^8d^8f^8g^8z + 219414528a^7b^2c^7d^8e^8h^8z - 221773824a^6b^3c^7d^8e^8f^8z - 109707264a^7b^3c^6d^8g^8h^8z + 110886912a^6b^4c^6d^8f^8g^8z + 40108032a^8b^2c^6d^8h^8i^8z + 2359296a^8b^3c^5f^8h^8i^8z - 491520a^6b^7c^3f^8h^8i^8z + 184320a^5b^9c^2f^8h^8i^8z - 88473600a^6b^4c^6d^8e^8h^8z - 84934656a^7b^2c^7d^8f^8g^8z + 117964800a^5b^5c^6d^8e^8f^8z - 45613056a^7b^3c^6d^8f^8i^8z + 44236800a^6b^5c^5d^8g^8h^8z - 10321920a^6b^6c^4d^8h^8i^8z + 7077888a^7b^4c^5d^8h^8i^8z - 5898240a^7b^4c^5f^8g^8h^8z + 4718592a^8b^2c^6f^8g^8h^8z + 2949120a^6b^6c^4f^8g^8h^8z + 2396160a^5b^8c^3d^8h^8i^8z - 737280a^5b^8c^3f^8g^8h^8z + 92160a^4b^{10}c^2f^8g^8h^8z - 27648a^4b^{10}c^2d^8h^8i^8z - 58982400a^5b^6c^5d^8f^8g^8z + 11796480a^7b^3c^6e^8f^8h^8z + 8847360a^5b^7c^4d^8f^8i^8z - 6635520a^5b^7c^4d^8g^8h^8z - 5898240a^6b^5c^5e^8f^8h^8z - 3809280a^4b^9c^3d^8f^8i^8z + 2359296a^6b^5c^5d^8f^8i^8z + 1474560a^5b^7c^4e^8f^8h^8z + 681984a^3b^{11}c^2d^8f^8i^8z - 276480a^4b^9c^3d^8g^8h^8z - 184320a^4b^9c^3e^8f^8h^8z + 179712a^3b^{11}c^2d^8g^8h^8z + 9216a^3b^{11}c^2e^8f^8h^8z + 16220160a^4b^8c^4d^8f^8g^8z + 13271040a^5b^6c^5d^8e^8h^8z - 2396160a^3b^{10}c^3d^8f^8g^8z + 552960a^4b^8c^4d^8e^8h^8z - 359424a^3b^{10}c^3d^8e^8h^8z + 175104a^2b^{12}c^2d^8f^8g^8z + 27648a^2b^{12}c^2d^8e^8h^8z - 32440320a^4b^7c^5d^8e^8f^8z + 4792320a^3b^9c^4d^8e^8f^8z - 350208a^2b^{11}c^3d^8e^8f^8z + 346816512a^7b^8c^8d^2g^8z - 41472a^5b^{10}c^8h^2i^8z + 7077888a^9b^8c^6g^8h^2z - 11008a^3b^{12}c^8f^2i^8z - 6912a^4b^{11}c^8g^8h^2z - 19660800a^8b^8c^7f^2g^8z - 768a^2b^{13}c^8f^2g^8z + 214272a^8b^{13}c^2d^2g^8z - 428544a^8b^{12}c^3d^2e^8z - 198180864a^8c^8d^8e^8h^8z - 66060288a^9c^7d^8h^8i^8z + 1536a^3b^{13}f^8h^8i^8z + 4608a^2b^{14}d^8h^8i^8z - 66816a^8b^{14}c^8d^2i^8z + 1022754816a^6b^2c^8d^2e^8z - 642318336a^5b^4c^7d^2e^8z - 511377408a^6b^3c^7d^2g^8z + 321159168a^5b^5c^6d^2g^8z + 225312768a^7b^2c^7d^2i^8z + 223395840a^4b^6c^6d^2e^8z - 111697920a^4b^7c^5d^2g^8z + 3538944a^9b^2c^5h^2i^8z - 737280a^7b^6c^3h^2i^8z + 276480a^6b^8c^2h^2i^8z - 10354688a^8b^2c^6f^2i^8z - 43646976a^6b^4c^6d^2i^8z - 8847360a^8b^3c^5g^8h^2z + 4423680a^7b^5c^4g^8h^2z + 2048000a^6b^6c^4f^2i^8z - 1105920a^6b^7c^3g^8h^2z - 849920a^5b^8c^3f^2i^8z + 393216a^7b^4c^5f^2i^8z + 145920a^4b^{10}c^2f^2i^8z + 138240a^5b^9c^2g^8h^2z - 32587776a^5b^6c^5d^2i^8z + 25362432a^7b^3c^6f^2g^8z + 21657600a^4b^8c^4d^2i^8z + 17694720a^8b^2c^6e^8h^2z - 50724864a^7b^2c^7e^8f^2z - 13271040a^6b^5c^5f^2g^8z - 8847360a^7b^4c^5e^8h^2z - 5810688a^3b^{10}c^3d^2i^8z + 3563520a^5b^7c^4f^2g^8z + 2211840a^6b^6c^4e^8h^2z + 845568a^2b^{12}c^2d^2i^8z - 506880a^4b^9c^3f^2g^8z - 276480a^5b^8c^3e^8h^2z + 34560a^3b^{11}c^2f^2g^8z + 13824a^4b^{10}c^2e^8h^2z + 26542080a^6b^4c^6e^8f^2z + 23362560a^3b^9c^4d^2g^8z - 46725120a^3b^8c^5d^2e^8z - 7127040a^5b^6c^5e^8f^2z - 2965248a^2b^{11}c^3d^2g^8z + 1013760a^4b^8c^4e^8f^2z - 69120a^3b^{10}c^3e^8f^2z + 1536a^2b^{12}c^2e^8f^2z + 593$

$$\begin{aligned}
& 0496a^2b^{10}c^4d^2ez + 1536a^2b^{15}df^2iz - 693633024a^7c^9d^2ez \\
& - 231211008a^8c^8d^2iz - 4718592a^{10}c^6h^2iz + 2304a^4b^{12}h^2 \\
& *iz + 13107200a^9c^7f^2iz + 256a^2b^{14}f^2iz - 14155776a^9c^7e \\
& *h^2z + 39321600a^8c^8ef^2z + 13824b^{14}c^2d^2ez - 6912b^{15}c^d^ \\
& 2*gz + 2304b^{16}d^2iz + 737280a^7b^c^5f*gh^i - 2304a^3b^9c*f*gh \\
& *i - 6912a^2b^{10}c*d*gh^i + 11059200a^6b^c^6d*eh^i + 5160960a^6b^c \\
& ^6d*f*gi + 2211840a^6b^c^6e*f*gh + 4608a^2b^{10}c^2d*ef^i + 15482880 \\
& *a^5b^c^7d*ef*g - 13824a^2b^9c^3d*ef*g - 2304a^2b^{11}c*d*f*gi + 1843 \\
& 200a^6b^3c^4f*gh^i + 783360a^5b^5c^3f*gh^i + 18432a^4b^7c^2f* \\
& g*h^i - 5529600a^6b^2c^5d*gh^i - 3686400a^6b^2c^5e*f*h^i - 2211840 \\
& *a^5b^4c^4d*gh^i - 1566720a^5b^4c^4e*f*h^i + 317952a^4b^6c^3d*g \\
& *h^i - 36864a^4b^6c^3e*f*h^i + 6912a^3b^8c^2d*gh^i + 4608a^3b^8c \\
& ^2e*f*h^i + 5160960a^5b^3c^5d*f*gi + 4423680a^5b^3c^5e*f*gh + 4 \\
& 423680a^5b^3c^5d*eh^i - 635904a^4b^5c^4d*eh^i - 354816a^3b^7c^ \\
& 3d*f*gi + 322560a^4b^5c^4d*f*gi + 138240a^4b^5c^4e*f*gh + 59904 \\
& *a^2b^9c^2d*f*gi - 13824a^3b^7c^3e*f*gh - 13824a^3b^7c^3d*eh^ \\
& i + 13824a^2b^9c^2d*eh^i - 16588800a^5b^2c^6d*eg*h - 10321920a^5 \\
& *b^2c^6d*ef^i + 1658880a^4b^4c^5d*eg*h + 709632a^3b^6c^4d*ef^i \\
& - 645120a^4b^4c^5d*ef^i + 124416a^3b^6c^4d*eg*h - 119808a^2b^8 \\
& *c^3d*ef^i - 41472a^2b^8c^3d*eg*h + 7741440a^4b^3c^6d*ef*g - 29 \\
& 03040a^3b^5c^5d*ef*g + 387072a^2b^7c^4d*ef*g - 3456a^4b^8c*gh \\
& ^2i - 2304a^4b^8c*f*h^i^2 + 1105920a^7b^c^5e*h^2i - 384a^2b^{10}c*f \\
& ^2*gi - 10616832a^6b^c^6e^2*gi - 3538944a^7b^c^5e*gi^2 + 1843200* \\
& a^7b^c^5d*h^i^2 + 1152a^3b^9c*d*h^i^2 - 37062144a^5b^c^7d^2*f*h + 2 \\
& 580480a^6b^c^6e*f^2i + 65664a^2b^{10}c^2d^2*gi + 23224320a^5b^c^7d^ \\
& 2*e*i - 9216a^2b^{10}c*d*f^i^2 - 5985792a^6b^c^6d*f*h^2 + 206010a^2b^9* \\
& c^3d^2*f*h - 131328a^2b^9c^3d^2*e*i - 6300a^2b^{10}c^2d*f^2h + 16588800 \\
& *a^5b^c^7d*e^2h + 3456a^2b^{10}c^2d*f*g^2 + 435456a^2b^8c^4d^2*e*g + 1 \\
& 3824a^2b^8c^4d*e^2f - 1474560a^7c^6e*f*h^i - 10321920a^6c^7d*ef^i \\
& + 1350a^2b^{11}c*d*f*h^2 - 552960a^7b^2c^4g*h^2i - 552960a^6b^4c^3* \\
& g*h^2i - 145152a^5b^6c^2g*h^2i - 737280a^7b^2c^4f*h^i^2 - 568320* \\
& a^6b^4c^3f*h^i^2 - 136704a^5b^6c^2f*h^i^2 - 1290240a^6b^2c^5f^2* \\
& gi + 1105920a^6b^3c^4e*h^2i - 860160a^5b^4c^4f^2*gi + 290304a^5 \\
& *b^5c^3e*h^2i - 80640a^4b^6c^3f^2*gi + 12672a^3b^8c^2f^2*gi + \\
& 6912a^4b^7c^2e*h^2i + 5308416a^6b^2c^5e*g^2i - 5308416a^5b^3c^ \\
& 5e^2*gi - 3538944a^6b^3c^4e*gi^2 + 2654208a^5b^4c^4e*g^2i + 165 \\
& 8880a^6b^3c^4d*h^i^2 - 1105920a^5b^4c^4f*g^2h - 884736a^5b^5c^3 \\
& *e*gi^2 - 552960a^6b^2c^5f*g^2h + 262656a^5b^5c^3d*h^i^2 - 55296* \\
& a^4b^7c^2d*h^i^2 - 34560a^4b^6c^3f*g^2h + 3456a^3b^8c^2f*g^2h \\
& - 11612160a^5b^2c^6d^2*gi + 1720320a^5b^3c^5e*f^2i - 1658880a^6* \\
& b^2c^5e*g*h^2 + 1596672a^3b^6c^4d^2*gi - 829440a^5b^4c^4e*g*h^2 \\
& - 508032a^2b^8c^3d^2*gi + 161280a^4b^5c^4e*f^2i - 25344a^3b^7c^ \\
& ^3e*f^2i - 20736a^4b^6c^3e*g*h^2 + 768a^2b^9c^2e*f^2i - 4423680* \\
& a^5b^2c^6e^2*f*h + 4147200a^5b^3c^5d*g^2h - 2580480a^6b^2c^5d*f \\
& *i^2 - 967680a^5b^4c^4d*f^i^2 - 414720a^4b^5c^4d*g^2h - 138240a^4
\end{aligned}$$

$$\begin{aligned}
& *b^4*c^5*e^2*f*h + 64512*a^4*b^6*c^3*d*f*i^2 + 39168*a^3*b^8*c^2*d*f*i^2 - \\
& 31104*a^3*b^7*c^3*d*g^2*h + 13824*a^3*b^6*c^4*e^2*f*h + 10368*a^2*b^9*c^2*d \\
& *g^2*h + 15630336*a^5*b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f*h + 9630 \\
& 144*a^3*b^5*c^5*d^2*f*h - 8764416*a^5*b^3*c^5*d*f*h^2 - 3870720*a^5*b^2*c^6 \\
& *e*f^2*g - 3193344*a^3*b^5*c^5*d^2*e*i + 2867328*a^4*b^4*c^5*d*f^2*h - 2095 \\
& 200*a^2*b^7*c^4*d^2*f*h - 1414080*a^3*b^6*c^4*d*f^2*h - 34836480*a^4*b^2*c^ \\
& 7*d^2*e*g + 1016064*a^2*b^7*c^4*d^2*e*i - 645120*a^4*b^4*c^5*e*f^2*g + 3067 \\
& 20*a^3*b^7*c^3*d*f*h^2 + 197820*a^2*b^8*c^3*d*f^2*h + 146880*a^4*b^5*c^4*d* \\
& f*h^2 + 80640*a^3*b^6*c^4*e*f^2*g - 55350*a^2*b^9*c^2*d*f*h^2 - 2304*a^2*b^ \\
& 8*c^3*e*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 - 1935360*a^4*b^4*c^5*d*f*g^2 - \\
& 1658880*a^4*b^3*c^6*d*e^2*h + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b^ \\
& 4*c^6*d^2*e*g - 124416*a^3*b^5*c^5*d*e^2*h - 96768*a^2*b^8*c^3*d*f*g^2 + 41 \\
& 472*a^2*b^7*c^4*d*e^2*h - 3919104*a^2*b^6*c^5*d^2*e*g - 7741440*a^4*b^2*c^7 \\
& *d*e^2*f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 18432 \\
& 0*a^8*b*c^4*h^2*i^2 + 25344*a^5*b^7*c*h^2*i^2 - 884736*a^6*b^3*c^4*g^3*i - \\
& 589824*a^7*b^3*c^3*g*i^3 - 442368*a^5*b^5*c^3*g^3*i - 294912*a^6*b^5*c^2*g* \\
& i^3 + 430080*a^7*b*c^5*f^2*i^2 - 1984*a^3*b^9*c*f^2*i^2 + 3538944*a^5*b^2*c \\
& ^6*e^3*i - 1648128*a^5*b^3*c^5*f^3*h + 1179648*a^7*b^2*c^4*e*i^3 - 898560*a \\
& ^6*b^3*c^4*f*h^3 + 589824*a^6*b^4*c^3*e*i^3 - 354240*a^5*b^5*c^3*f*h^3 - 35 \\
& 4240*a^4*b^5*c^4*f^3*h + 98304*a^5*b^6*c^2*e*i^3 + 43680*a^3*b^7*c^3*f^3*h \\
& - 21600*a^4*b^7*c^2*f*h^3 - 1050*a^2*b^9*c^2*f^3*h + 225*a^2*b^10*c*f^2*h^2 \\
& + 3870720*a^6*b*c^6*d^2*i^2 + 1658880*a^6*b*c^6*e^2*h^2 + 16547328*a^4*b^2 \\
& *c^7*d^3*h - 12306816*a^3*b^4*c^6*d^3*h + 37310976*a^3*b^3*c^7*d^3*f + 3037 \\
& 824*a^2*b^6*c^5*d^3*h - 2654208*a^5*b^3*c^5*e*g^3 + 1949184*a^6*b^2*c^5*d*h \\
& ^3 + 1296000*a^5*b^4*c^4*d*h^3 - 155520*a^4*b^6*c^3*d*h^3 - 40500*a*b^10*c^ \\
& 2*d^2*h^2 - 8100*a^3*b^8*c^2*d*h^3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a \\
& ^4*b*c^8*d^2*e^2 - 108864*a*b^9*c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 5 \\
& 623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2 \\
& *f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7*c^5*d^2*e^2 - 245760*a^8*c^5 \\
& *f*h*i^2 + 384*a^3*b^10*f*h*i^2 + 1152*a^2*b^11*d*h*i^2 - 2211840*a^6*c^7*e \\
& ^2*f*h - 1720320*a^7*c^6*d*f*i^2 - 9450*b^11*c^2*d^2*f*h + 6912*b^11*c^2*d^ \\
& 2*e*i + 1612800*a^6*c^7*d*f^2*h - 393216*a^8*b*c^4*g*i^3 - 49152*a^5*b^7*c* \\
& g*i^3 - 20736*b^10*c^3*d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 883200*a^6*b*c^ \\
& 6*f^3*h - 317952*a^7*b*c^5*f*h^3 + 1350*a^3*b^9*c*f*h^3 - 15482880*a^5*c^8* \\
& d*e^2*f - 9792*a*b^11*c*d^2*i^2 - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c \\
& ^4*d^3*h + 4050*a^2*b^10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c \\
& ^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 276480*a^7*b^3*c^3*h^2*i^2 + 140544*a^6*b \\
& ^5*c^2*h^2*i^2 + 884736*a^7*b^2*c^4*g^2*i^2 + 884736*a^6*b^4*c^3*g^2*i^2 + \\
& 221184*a^5*b^6*c^2*g^2*i^2 + 501760*a^6*b^3*c^4*f^2*i^2 + 414720*a^6*b^3*c^ \\
& 4*g^2*h^2 + 207360*a^5*b^5*c^3*g^2*h^2 + 170240*a^5*b^5*c^3*f^2*i^2 + 9216* \\
& a^4*b^7*c^2*f^2*i^2 + 5184*a^4*b^7*c^2*g^2*h^2 + 3538944*a^6*b^2*c^5*e^2*i^ \\
& 2 + 1684224*a^6*b^2*c^5*f^2*h^2 + 1264320*a^5*b^4*c^4*f^2*h^2 + 884736*a^5* \\
& b^4*c^4*e^2*i^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 + \\
& 1935360*a^5*b^3*c^5*d^2*i^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c \\
& ^5*e^2*h^2 - 532224*a^4*b^5*c^4*d^2*i^2 + 161280*a^4*b^5*c^4*f^2*g^2 - 9676
\end{aligned}$$

$$\begin{aligned}
& 8a^3b^7c^3d^2i^2 + 62784a^2b^9c^2d^2i^2 + 20736a^4b^5c^4e^2h^2 - 20160a^3b^7c^3f^2g^2 + 576a^2b^9c^2f^2g^2 + 11487744a^5b^2c^6d^2h^2 + 7962624a^5b^2c^6e^2g^2 + 35525376a^4b^2c^7d^2f^2 - \\
& 1412640a^3b^6c^4d^2h^2 + 461376a^4b^4c^5d^2h^2 + 375030a^2b^8c^3d^2h^2 + 8709120a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 979776a^2b^7c^4d^2g^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e^2 - 3456b^12c^2d^2g^2i + 384a^2b^12d^2f^2i^2 + 576a^4b^9h^2i^2 + 3538944a^7c^6e^2i^2 + 115200a^7c^6f^2h^2 + 64a^2b^11f^2i^2 + 6096384a^6c^7d^2h^2 + 5184b^11c^2d^2g^2 + 131072a^8b^2c^3i^4 + 98304a^7b^4c^2i^4 + 11025b^10c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 142560a^6b^4c^3h^4 + 103680a^7b^2c^4h^4 + 32400a^5b^6c^2h^4 + 20736b^9c^4d^2e^2 + 331776a^5b^4c^4g^4 + 492800a^5b^2c^6f^4 + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 + 7077888a^6c^7e^3i + 786432a^8c^5e^3i^3 + 28449792a^5c^8d^3h + 17010b^10c^3d^3h + 2025b^12c^2d^2h^2 + 580608a^7c^6d^2h^3 - 39690b^9c^4d^3f + 32768a^6b^6c^2i^4 + 2025a^4b^8c^2h^4 - 734832a^2b^6c^6d^4 + 576b^13d^2i^2 + 65536a^9c^4i^4 + 20736a^8c^5h^4 + 4096a^5b^8i^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, l) \cdot (\text{root}(56371445760a^{11}b^8c^6z^4 - 503316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c^2z^4 - 171798691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 - 128849018880a^{12}b^6c^7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 3523215360a^9b^{12}c^4z^4 - 2621440a^6b^{18}c^2z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 + 196608a^5b^{13}c^2g^2i^2 - 46080a^4b^{14}c^2f^2h^2z^2 - 105984a^3b^{15}c^2d^2h^2z^2 - 73728a^2b^{16}c^2d^2f^2z^2 + 2548039680a^9b^3c^7d^2h^2z^2 + 1509949440a^9b^3c^7e^2g^2z^2 - 1401421824a^8b^5c^6d^2h^2z^2 - 1321205760a^9b^2c^8d^2f^2z^2 - 754974720a^8b^5c^6e^2g^2z^2 + 732168192a^7b^6c^6d^2f^2z^2 - 603979776a^{10}b^2c^7e^2i^2z^2 - 456130560a^9b^4c^6f^2h^2z^2 + 390463488a^7b^7c^5d^2h^2z^2 + 301989888a^{10}b^3c^6g^2i^2z^2 - 366280704a^6b^8c^5d^2f^2z^2 - 330301440a^8b^4c^7d^2f^2z^2 + 254017536a^8b^6c^5f^2h^2z^2 - 1887436800a^{10}b^2c^8d^2h^2z^2 + 188743680a^{10}b^2c^7f^2h^2z^2 + 188743680a^7b^7c^5e^2g^2z^2 + 125829120a^8b^6c^5e^2i^2z^2 - 62914560a^8b^7c^4g^2i^2z^2 - 61931520a^7b^8c^4f^2h^2z^2 + 23592960a^7b^9c^3g^2i^2z^2 - 47185920a^7b^8c^4e^2i^2z^2 - 3538944a^6b^{11}c^2g^2i^2z^2 + 96583680a^5b^{10}c^4d^2f^2z^2 - 51609600a^6b^9c^4d^2h^2z^2 + 7077888a^6b^{10}c^3e^2i^2z^2 + 6144000a^6b^{10}c^3f^2h^2z^2 - 393216a^5b^{12}c^2e^2i^2z^2 + 61440a^5b^{12}c^2f^2h^2z^2 - 23592960a^6b^9c^4e^2g^2z^2 + 1179648a^5b^{11}c^3e^2g^2z^2 + 829440a^4b^{13}c^2d^2h^2z^2 + 368640a^5b^{11}c^3d^2h^2z^2 - 15175680a^4b^{12}c^3d^2f^2z^2 + 1428480a^3b^{14}c^2d^2f^2z^2 - 1207959552a^{10}b^2c^8e^2g^2z^2 - 402653184a^{11}b^2c^7g^2i^2z^2 - 440401920a^{10}b^2c^8f^2z^2 - 188743680a^{11}b^2c^7h^2z^2 + 1761607680a^{10}c^9d^2f^2z^2 + 524288a^6b^{12}c^2i^2z^2 + 46080a^5b^{13}c^2h^2z^2 - 14080a^3b^{15}c^2f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2
\end{aligned}$$

$$\begin{aligned}
& z^2 - 3963617280a^9b^2c^8e^2z^2 + 805306368a^{11}c^8e^2z^2 - 150994944 \\
& 0a^9b^2c^8e^2z^2 + 251658240a^{11}c^8f^2h^2z^2 + 1536a^3b^{16}f^2h^2z^2 \\
& + 4608a^2b^{17}d^2h^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^2b^{17}c^2d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 47 \\
& 7102080a^9b^3c^7f^2z^2 - 377487360a^9b^4c^6g^2z^2 + 301989888a^{10}b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 + 141557760a^{10}b^3c^6h^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 1 \\
& 46165760a^4b^{11}c^4d^2z^2 - 50331648a^{10}b^4c^5i^2z^2 - 33554432a^{11}b^2c^6i^2z^2 + 20971520a^9b^6c^4i^2z^2 - 47185920a^7b^8c^4g^2z^2 - 26542080a^8b^7c^4h^2z^2 - 2752512a^7b^{10}c^2i^2z^2 + 26214 \\
& 40a^8b^8c^3i^2z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5h^2z^2 - 1290240a^6b^{11}c^2h^2z^2 + 5898240a^6b^{10}c^3g^2z^2 - 294 \\
& 912a^5b^{12}c^2g^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + \\
& 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^2b^{18}d^2f^2z^2 + 1207 \\
& 959552a^{10}c^9e^2z^2 + 134217728a^{12}c^7i^2z^2 - 32768a^5b^{14}i^2z^2 + 2304a^4b^{15}h^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169 \\
& 869312a^7b^8c^8d^2e^2f^2z^2 + 99090432a^8b^2c^7d^2g^2h^2z^2 - 3145728a^9b^2c^6f^2h^2i^2z^2 - 27648a^4b^{11}c^2f^2h^2i^2z^2 + 56623104a^8b^2c^7d^2f^2i^2z^2 - 50688a^3b^{12}c^2d^2h^2i^2z^2 - 4608a^3b^{12}c^2f^2g^2h^2z^2 - 9437184a^8b^2c^7e^2f^2h^2z^2 - 5529 \\
& 6a^2b^{13}c^2d^2f^2i^2z^2 - 13824a^2b^{13}c^2d^2g^2h^2z^2 + 9216a^2b^{13}c^2d^2e^2f^2z^2 - \\
& 4608a^2b^{14}c^2d^2f^2g^2z^2 + 219414528a^7b^2c^7d^2e^2h^2z^2 - 221773824a^6b^3c^7d^2e^2f^2z^2 - 109707264a^7b^3c^6d^2g^2h^2z^2 + 110886912a^6b^4c^6d^2f^2g^2z^2 \\
& + 40108032a^8b^2c^6d^2h^2i^2z^2 + 2359296a^8b^3c^5f^2h^2i^2z^2 - 491520a^6b^7c^3f^2h^2i^2z^2 + 184320a^5b^9c^2f^2h^2i^2z^2 - 88473600a^6b^4c^6d^2e^2h^2z^2 \\
& - 84934656a^7b^2c^7d^2f^2g^2z^2 + 117964800a^5b^5c^6d^2e^2f^2z^2 - 45613056a^7b^3c^6d^2f^2i^2z^2 + 44236800a^6b^5c^5d^2g^2h^2z^2 - 10321920a^6b^6c^4d^2h^2i^2z^2 + 7077888a^7b^4c^5d^2h^2i^2z^2 - 5898240a^7b^4c^5f^2g^2h^2z^2 + 471859 \\
& 2a^8b^2c^6f^2g^2h^2z^2 + 2949120a^6b^6c^4f^2g^2h^2z^2 + 2396160a^5b^8c^3d^2h^2i^2z^2 - 737280a^5b^8c^3f^2g^2h^2z^2 + 92160a^4b^{10}c^2f^2g^2h^2z^2 - 27648a^4b^{10}c^2d^2h^2i^2z^2 - 5898240a^5b^6c^5d^2f^2g^2z^2 + 11796480a^7b^3c^6e^2f^2h^2z^2 + 8847360a^5b^7c^4d^2f^2i^2z^2 - 6635520a^5b^7c^4d^2g^2h^2z^2 - 5898240 \\
& a^6b^5c^5e^2f^2h^2z^2 - 3809280a^4b^9c^3d^2f^2i^2z^2 + 2359296a^6b^5c^5d^2f^2i^2z^2 + 1474560a^5b^7c^4e^2f^2h^2z^2 + 681984a^3b^{11}c^2d^2f^2i^2z^2 - 276480a^4b^9c^3d^2g^2h^2z^2 - 184320a^4b^9c^3e^2f^2h^2z^2 + 179712a^3b^{11}c^2d^2g^2h^2z^2 + 9216a^3b^{11}c^2e^2f^2h^2z^2 + 16220160a^4b^8c^4d^2f^2g^2z^2 + 13271040a^5b^6c^5d^2e^2h^2z^2 - 2396160a^3b^{10}c^3d^2f^2g^2z^2 + 552960a^4b^8c^4d^2e^2h^2z^2 - 359424a^3b^{10}c^3d^2e^2h^2z^2 + 175104a^2b^{12}c^2d^2f^2g^2z^2 + 27648a^2b^{12}c^2d^2e^2h^2z^2 - 32440320a^4b^7c^5d^2e^2f^2z^2 + 4792320a^3b^9c^4d^2e^2f^2z^2 - 350208a^2b^{11}c^3d^2e^2f^2z^2 + 346816512a^7b^2c^8d^2g^2z^2 - 41472a^5b^{10}c^8h^2i^2z^2 + 7077888a^9b^2c^6g^2h^2z^2 - 11008a^3b^{12}c^2f^2i^2z^2 - 69 \\
& 12a^4b^{11}c^2g^2h^2z^2 - 19660800a^8b^2c^7f^2g^2z^2 - 768a^2b^{13}c^2f^2g^2z^2 + 214272a^2b^{13}c^2d^2g^2z^2 - 428544a^2b^{12}c^3d^2e^2z^2 - 198180864a^8c^8d^2e^2h^2z^2 - 66060288a^9c^7d^2h^2i^2z^2 + 1536a^3b^{13}f^2h^2i^2z^2 + 4608a^2b^{11}
\end{aligned}$$

$4*d*h*i*z - 66816*a*b^{14}*c*d^2*i*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 64231$
 $8336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 321159168*a^5*b^$
 $5*c^6*d^2*g*z + 225312768*a^7*b^2*c^7*d^2*i*z + 223395840*a^4*b^6*c^6*d^2*e$
 $*z - 111697920*a^4*b^7*c^5*d^2*g*z + 3538944*a^9*b^2*c^5*h^2*i*z - 737280*a$
 $^7*b^6*c^3*h^2*i*z + 276480*a^6*b^8*c^2*h^2*i*z - 10354688*a^8*b^2*c^6*f^2*$
 $i*z - 43646976*a^6*b^4*c^6*d^2*i*z - 8847360*a^8*b^3*c^5*g*h^2*z + 4423680*$
 $a^7*b^5*c^4*g*h^2*z + 2048000*a^6*b^6*c^4*f^2*i*z - 1105920*a^6*b^7*c^3*g*h$
 $^2*z - 849920*a^5*b^8*c^3*f^2*i*z + 393216*a^7*b^4*c^5*f^2*i*z + 145920*a^4$
 $*b^{10}*c^2*f^2*i*z + 138240*a^5*b^9*c^2*g*h^2*z - 32587776*a^5*b^6*c^5*d^2*i$
 $*z + 25362432*a^7*b^3*c^6*f^2*g*z + 21657600*a^4*b^8*c^4*d^2*i*z + 17694720$
 $*a^8*b^2*c^6*e*h^2*z - 50724864*a^7*b^2*c^7*e*f^2*z - 13271040*a^6*b^5*c^5*$
 $f^2*g*z - 8847360*a^7*b^4*c^5*e*h^2*z - 5810688*a^3*b^{10}*c^3*d^2*i*z + 3563$
 $520*a^5*b^7*c^4*f^2*g*z + 2211840*a^6*b^6*c^4*e*h^2*z + 845568*a^2*b^{12}*c^2$
 $*d^2*i*z - 506880*a^4*b^9*c^3*f^2*g*z - 276480*a^5*b^8*c^3*e*h^2*z + 34560*$
 $a^3*b^{11}*c^2*f^2*g*z + 13824*a^4*b^{10}*c^2*e*h^2*z + 26542080*a^6*b^4*c^6*e*$
 $f^2*z + 23362560*a^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c^5*d^2*e*z - 71270$
 $40*a^5*b^6*c^5*e*f^2*z - 2965248*a^2*b^{11}*c^3*d^2*g*z + 1013760*a^4*b^8*c^4$
 $*e*f^2*z - 69120*a^3*b^{10}*c^3*e*f^2*z + 1536*a^2*b^{12}*c^2*e*f^2*z + 5930496$
 $*a^2*b^{10}*c^4*d^2*e*z + 1536*a*b^{15}*d*f*i*z - 693633024*a^7*c^9*d^2*e*z - 2$
 $31211008*a^8*c^8*d^2*i*z - 4718592*a^{10}*c^6*h^2*i*z + 2304*a^4*b^{12}*h^2*i*z$
 $+ 13107200*a^9*c^7*f^2*i*z + 256*a^2*b^{14}*f^2*i*z - 14155776*a^9*c^7*e*h^2$
 $*z + 39321600*a^8*c^8*e*f^2*z + 13824*b^{14}*c^2*d^2*e*z - 6912*b^{15}*c*d^2*g*$
 $z + 2304*b^{16}*d^2*i*z + 737280*a^7*b*c^5*f*g*h*i - 2304*a^3*b^9*c*f*g*h*i -$
 $6912*a^2*b^{10}*c*d*g*h*i + 11059200*a^6*b*c^6*d*e*h*i + 5160960*a^6*b*c^6*d$
 $*f*g*i + 2211840*a^6*b*c^6*e*f*g*h + 4608*a*b^{10}*c^2*d*e*f*i + 15482880*a^5$
 $*b*c^7*d*e*f*g - 13824*a*b^9*c^3*d*e*f*g - 2304*a*b^{11}*c*d*f*g*i + 1843200*$
 $a^6*b^3*c^4*f*g*h*i + 783360*a^5*b^5*c^3*f*g*h*i + 18432*a^4*b^7*c^2*f*g*h*$
 $i - 5529600*a^6*b^2*c^5*d*g*h*i - 3686400*a^6*b^2*c^5*e*f*h*i - 2211840*a^5$
 $*b^4*c^4*d*g*h*i - 1566720*a^5*b^4*c^4*e*f*h*i + 317952*a^4*b^6*c^3*d*g*h*i$
 $- 36864*a^4*b^6*c^3*e*f*h*i + 6912*a^3*b^8*c^2*d*g*h*i + 4608*a^3*b^8*c^2*$
 $e*f*h*i + 5160960*a^5*b^3*c^5*d*f*g*i + 4423680*a^5*b^3*c^5*e*f*g*h + 44236$
 $80*a^5*b^3*c^5*d*e*h*i - 635904*a^4*b^5*c^4*d*e*h*i - 354816*a^3*b^7*c^3*d*$
 $f*g*i + 322560*a^4*b^5*c^4*d*f*g*i + 138240*a^4*b^5*c^4*e*f*g*h + 59904*a^2$
 $*b^9*c^2*d*f*g*i - 13824*a^3*b^7*c^3*e*f*g*h - 13824*a^3*b^7*c^3*d*e*h*i +$
 $13824*a^2*b^9*c^2*d*e*h*i - 16588800*a^5*b^2*c^6*d*e*g*h - 10321920*a^5*b^2$
 $*c^6*d*e*f*i + 1658880*a^4*b^4*c^5*d*e*g*h + 709632*a^3*b^6*c^4*d*e*f*i - 6$
 $45120*a^4*b^4*c^5*d*e*f*i + 124416*a^3*b^6*c^4*d*e*g*h - 119808*a^2*b^8*c^3$
 $*d*e*f*i - 41472*a^2*b^8*c^3*d*e*g*h + 7741440*a^4*b^3*c^6*d*e*f*g - 290304$
 $0*a^3*b^5*c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g - 3456*a^4*b^8*c*g*h^2*i$
 $- 2304*a^4*b^8*c*f*h*i^2 + 1105920*a^7*b*c^5*e*h^2*i - 384*a^2*b^{10}*c*f^2*$
 $g*i - 10616832*a^6*b*c^6*e^2*g*i - 3538944*a^7*b*c^5*e*g*i^2 + 1843200*a^7*$
 $b*c^5*d*h*i^2 + 1152*a^3*b^9*c*d*h*i^2 - 37062144*a^5*b*c^7*d^2*f*h + 25804$
 $80*a^6*b*c^6*e*f^2*i + 65664*a*b^{10}*c^2*d^2*g*i + 23224320*a^5*b*c^7*d^2*e*$
 $i - 9216*a^2*b^{10}*c*d*f*i^2 - 5985792*a^6*b*c^6*d*f*h^2 + 206010*a*b^9*c^3*$
 $d^2*f*h - 131328*a*b^9*c^3*d^2*e*i - 6300*a*b^{10}*c^2*d*f^2*h + 16588800*a^5$

$$\begin{aligned}
& *b*c^7*d*e^2*h + 3456*a*b^10*c^2*d*f*g^2 + 435456*a*b^8*c^4*d^2*e*g + 13824 \\
& *a*b^8*c^4*d*e^2*f - 1474560*a^7*c^6*e*f*h*i - 10321920*a^6*c^7*d*e*f*i + 1 \\
& 350*a*b^11*c*d*f*h^2 - 552960*a^7*b^2*c^4*g*h^2*i - 552960*a^6*b^4*c^3*g*h^2 \\
& *i - 145152*a^5*b^6*c^2*g*h^2*i - 737280*a^7*b^2*c^4*f*h*i^2 - 568320*a^6*b^4 \\
& *c^3*f*h*i^2 - 136704*a^5*b^6*c^2*f*h*i^2 - 1290240*a^6*b^2*c^5*f^2*g*i \\
& + 1105920*a^6*b^3*c^4*e*h^2*i - 860160*a^5*b^4*c^4*f^2*g*i + 290304*a^5*b^5 \\
& *c^3*e*h^2*i - 80640*a^4*b^6*c^3*f^2*g*i + 12672*a^3*b^8*c^2*f^2*g*i + 6912 \\
& *a^4*b^7*c^2*e*h^2*i + 5308416*a^6*b^2*c^5*e*g^2*i - 5308416*a^5*b^3*c^5*e^2 \\
& *g*i - 3538944*a^6*b^3*c^4*e*g*i^2 + 2654208*a^5*b^4*c^4*e*g^2*i + 1658880 \\
& *a^6*b^3*c^4*d*h*i^2 - 1105920*a^5*b^4*c^4*f*g^2*h - 884736*a^5*b^5*c^3*e*g \\
& *i^2 - 552960*a^6*b^2*c^5*f*g^2*h + 262656*a^5*b^5*c^3*d*h*i^2 - 55296*a^4*b^7 \\
& *c^2*d*h*i^2 - 34560*a^4*b^6*c^3*f*g^2*h + 3456*a^3*b^8*c^2*f*g^2*h - 11 \\
& 612160*a^5*b^2*c^6*d^2*g*i + 1720320*a^5*b^3*c^5*e*f^2*i - 1658880*a^6*b^2*c^5 \\
& *e*g*h^2 + 1596672*a^3*b^6*c^4*d^2*g*i - 829440*a^5*b^4*c^4*e*g*h^2 - 50 \\
& 8032*a^2*b^8*c^3*d^2*g*i + 161280*a^4*b^5*c^4*e*f^2*i - 25344*a^3*b^7*c^3*e \\
& *f^2*i - 20736*a^4*b^6*c^3*e*g*h^2 + 768*a^2*b^9*c^2*e*f^2*i - 4423680*a^5*b^2 \\
& *c^6*e^2*f*h + 4147200*a^5*b^3*c^5*d*g^2*h - 2580480*a^6*b^2*c^5*d*f*i^2 - \\
& 967680*a^5*b^4*c^4*d*f*i^2 - 414720*a^4*b^5*c^4*d*g^2*h - 138240*a^4*b^4 \\
& *c^5*e^2*f*h + 64512*a^4*b^6*c^3*d*f*i^2 + 39168*a^3*b^8*c^2*d*f*i^2 - 3110 \\
& 4*a^3*b^7*c^3*d*g^2*h + 13824*a^3*b^6*c^4*e^2*f*h + 10368*a^2*b^9*c^2*d*g^2 \\
& *h + 15630336*a^5*b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f*h + 9630144* \\
& a^3*b^5*c^5*d^2*f*h - 8764416*a^5*b^3*c^5*d*f*h^2 - 3870720*a^5*b^2*c^6*e*f^2 \\
& *g - 3193344*a^3*b^5*c^5*d^2*e*i + 2867328*a^4*b^4*c^5*d*f^2*h - 2095200* \\
& a^2*b^7*c^4*d^2*f*h - 1414080*a^3*b^6*c^4*d*f^2*h - 34836480*a^4*b^2*c^7*d^2 \\
& *e*g + 1016064*a^2*b^7*c^4*d^2*e*i - 645120*a^4*b^4*c^5*e*f^2*g + 306720*a^3 \\
& *b^7*c^3*d*f*h^2 + 197820*a^2*b^8*c^3*d*f^2*h + 146880*a^4*b^5*c^4*d*f*h^2 \\
& + 80640*a^3*b^6*c^4*e*f^2*g - 55350*a^2*b^9*c^2*d*f*h^2 - 2304*a^2*b^8*c^3 \\
& *e*f^2*g - 3870720*a^5*b^2*c^6*d*f*g^2 - 1935360*a^4*b^4*c^5*d*f*g^2 - 165 \\
& 8880*a^4*b^3*c^6*d*e^2*h + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b^4*c^6 \\
& *d^2*e*g - 124416*a^3*b^5*c^5*d*e^2*h - 96768*a^2*b^8*c^3*d*f*g^2 + 41472* \\
& a^2*b^7*c^4*d*e^2*h - 3919104*a^2*b^6*c^5*d^2*e*g - 7741440*a^4*b^2*c^7*d*e^2 \\
& *f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 184320*a^8 \\
& *b*c^4*h^2*i^2 + 25344*a^5*b^7*c*h^2*i^2 - 884736*a^6*b^3*c^4*g^3*i - 5898 \\
& 24*a^7*b^3*c^3*g*i^3 - 442368*a^5*b^5*c^3*g^3*i - 294912*a^6*b^5*c^2*g*i^3 \\
& + 430080*a^7*b*c^5*f^2*i^2 - 1984*a^3*b^9*c*f^2*i^2 + 3538944*a^5*b^2*c^6*e^3 \\
& *i - 1648128*a^5*b^3*c^5*f^3*h + 1179648*a^7*b^2*c^4*e*i^3 - 898560*a^6*b^3 \\
& *c^4*f*h^3 + 589824*a^6*b^4*c^3*e*i^3 - 354240*a^5*b^5*c^3*f*h^3 - 354240 \\
& *a^4*b^5*c^4*f^3*h + 98304*a^5*b^6*c^2*e*i^3 + 43680*a^3*b^7*c^3*f^3*h - 21 \\
& 600*a^4*b^7*c^2*f*h^3 - 1050*a^2*b^9*c^2*f^3*h + 225*a^2*b^10*c*f^2*h^2 + 3 \\
& 870720*a^6*b*c^6*d^2*i^2 + 1658880*a^6*b*c^6*e^2*h^2 + 16547328*a^4*b^2*c^7 \\
& *d^3*h - 12306816*a^3*b^4*c^6*d^3*h + 37310976*a^3*b^3*c^7*d^3*f + 3037824* \\
& a^2*b^6*c^5*d^3*h - 2654208*a^5*b^3*c^5*e*g^3 + 1949184*a^6*b^2*c^5*d*h^3 + \\
& 1296000*a^5*b^4*c^4*d*h^3 - 155520*a^4*b^6*c^3*d*h^3 - 40500*a*b^10*c^2*d^2 \\
& *h^2 - 8100*a^3*b^8*c^2*d*h^3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b \\
& *c^8*d^2*e^2 - 108864*a*b^9*c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 56232
\end{aligned}$$

$$\begin{aligned}
& 96a^4b^3c^6d^2f^3 + 1737792a^3b^5c^5d^2f^3 - 260190a^8b^4d^2f^2 \\
& - 211680a^2b^7c^4d^2f^3 - 435456a^7b^5c^5d^2e^2 - 245760a^8c^5f^2h \\
& *i^2 + 384a^3b^10f^2h^2 + 1152a^2b^11d^2h^2 - 2211840a^6c^7e^2f \\
& *h - 1720320a^7c^6d^2f^2i^2 - 9450b^11c^2d^2f^2h + 6912b^11c^2d^2e^2 \\
& *i + 1612800a^6c^7d^2f^2h - 393216a^8b^4c^4g^2i^3 - 49152a^5b^7c^4g^2i^3 \\
& - 20736b^10c^3d^2e^2g - 75188736a^4b^8c^8d^3f - 883200a^6b^8c^6f^3 \\
& *h - 317952a^7b^8c^5f^2h^3 + 1350a^3b^9c^4f^2h^3 - 15482880a^5c^8d^2e^2 \\
& *f - 9792a^8b^11c^4d^2i^2 - 10616832a^5b^8c^7e^3g - 345060a^8b^8c^4d^3 \\
& *h + 4050a^2b^10c^4d^2h^3 - 4262400a^5b^8c^7d^2f^3 + 852768a^8b^7c^5d^3 \\
& *f + 7350a^8b^9c^3d^2f^3 + 276480a^7b^3c^3h^2i^2 + 140544a^6b^5c^2 \\
& *h^2i^2 + 884736a^7b^2c^4g^2i^2 + 884736a^6b^4c^3g^2i^2 + 221184 \\
& *a^5b^6c^2g^2i^2 + 501760a^6b^3c^4f^2i^2 + 414720a^6b^3c^4g^2 \\
& *h^2 + 207360a^5b^5c^3g^2h^2 + 170240a^5b^5c^3f^2i^2 + 9216a^4b^7 \\
& *c^2f^2i^2 + 5184a^4b^7c^2g^2h^2 + 3538944a^6b^2c^5e^2i^2 + 1684224a^6 \\
& *b^2c^5f^2h^2 + 1264320a^5b^4c^4f^2h^2 + 884736a^5b^4c^4e^2i^2 + 126720 \\
& *a^4b^6c^3f^2h^2 - 13950a^3b^8c^2f^2h^2 + 1935360a^5b^3c^5d^2i^2 + 967680 \\
& *a^5b^3c^5f^2g^2 + 829440a^5b^3c^5e^2h^2 - 532224a^4b^5c^4d^2i^2 + 161280 \\
& *a^4b^5c^4f^2g^2 - 96768a^3b^7c^3d^2i^2 + 62784a^2b^9c^2d^2i^2 + 20736 \\
& *a^4b^5c^4e^2h^2 - 20160a^3b^7c^3f^2g^2 + 576a^2b^9c^2f^2g^2 + 11487744a^5 \\
& *b^2c^6d^2h^2 + 7962624a^5b^2c^6e^2g^2 + 35525376a^4b^2c^7d^2f^2 - 141 \\
& 2640a^3b^6c^4d^2h^2 + 461376a^4b^4c^5d^2h^2 + 375030a^2b^8c^3d^2h^2 + 8709120 \\
& *a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 979776a^2b^7c^4d^2g^2 + 645120 \\
& *a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184 \\
& *a^3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2e^2 + 3919104 \\
& *a^2b^5c^6d^2e^2 - 3456b^12c^4d^2g^2i + 384a^8b^12d^2f^2i^2 + 576a^4b^9h^2i^2 + 35389 \\
& 44a^7c^6e^2i^2 + 115200a^7c^6f^2h^2 + 64a^2b^11f^2i^2 + 6096384a^6c^7d^2h^2 \\
& + 5184b^11c^2d^2g^2 + 131072a^8b^2c^3i^4 + 98304a^7b^4c^2i^4 + 11025b^10 \\
& *c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 142560a^6b^4c^3h^4 + 103680a^7b^2c^4h^4 \\
& + 32400a^5b^6c^2h^4 + 20736b^9c^4d^2e^2 + 331776a^5b^4c^4g^4 + 492800a^5b^2c^6f^4 \\
& + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3 \\
& *b^2c^8d^4 + 6446304a^2b^4c^7d^4 + 7077888a^6c^7e^3i + 786432a^8c^5e^2i^3 \\
& + 28449792a^5c^8d^3h + 17010b^10c^3d^3h + 2025b^12c^4d^2h^2 + 580608 \\
& *a^7c^6d^2h^3 - 39690b^9c^4d^3f + 32768a^6b^6c^4i^4 + 2025a^4b^8c^4h^4 \\
& - 734832a^8b^6c^6d^4 + 576b^13d^2i^2 + 65536a^9c^4i^4 + 20736a^8c^5h^4 \\
& + 4096a^5b^8i^4 + 49787136a^4c^9d^4 + 16000a^6c^7f^4 + 5308416a^5c^8e^4 \\
& + 35721b^8c^5d^4, z, 1) * ((768a^2b^14c^2d - 3145728a^10c^8h - 22020096a^9c^9d \\
& - 22272a^3b^12c^3d + 282624a^4b^10c^4d - 2027520a^5b^8c^5d + 8847360a^6b^6c^6d \\
& - 23396352a^7b^4c^7d + 34603008a^8b^2c^8d + 256a^3b^13c^2f - 9216a^4b^11 \\
& *c^3f + 122880a^5b^9c^4f - 819200a^6b^7c^5f + 2949120a^7b^5c^6f - 5505024 \\
& *a^8b^3c^7f + 768a^4b^12c^2h - 12288a^5b^10c^3h + 61440a^6b^8c^4h - 983040 \\
& *a^8b^4c^6h + 3145728a^9b^2c^7h + 41
\end{aligned}$$

$$\begin{aligned}
& 94304a^9b^8c^8f)/(512(a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6 \\
& b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (x(1 \\
& 572864a^9c^9e + 524288a^{10}c^8i - 1536a^4b^{10}c^4e + 30720a^5b^8c^5e - 245760a^6b^6c^6e + 983040a^7b^4c^7e - 1966080a^8b^2c^8e \\
& + 768a^4b^{11}c^3g - 15360a^5b^9c^4g + 122880a^6b^7c^5g - 491520 \\
& a^7b^5c^6g + 983040a^8b^3c^7g - 256a^4b^{12}c^2i + 4608a^5b^{10}c^3i - 30720a^6b^8c^4i + 81920a^7b^6c^5i - 393216a^9b^2c^7i - \\
& 786432a^9b^8c^8g))/(64(a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6 \\
& b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (roo \\
& t(56371445760a^{11}b^8c^6z^4 - 503316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c^2z^4 - 171798691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8z^4 \\
& - 128849018880a^{12}b^6c^7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 3523215 \\
& 360a^9b^{12}c^4z^4 - 2621440a^6b^{18}c^2z^4 + 68719476736a^{15}c^{10}z^4 + \\
& 65536a^5b^{20}z^4 + 196608a^5b^{13}c^6g^2i^2z^2 - 46080a^4b^{14}c^6f^2h^2z^2 \\
& - 105984a^3b^{15}c^6d^2h^2z^2 - 73728a^2b^{16}c^6d^2f^2z^2 + 2548039680a^9b^3 \\
& c^7d^2h^2z^2 + 1509949440a^9b^3c^7e^2g^2z^2 - 1401421824a^8b^5c^6d^2h^2z^2 \\
& - 1321205760a^9b^2c^8d^2f^2z^2 - 754974720a^8b^5c^6e^2g^2z^2 + 7321 \\
& 68192a^7b^6c^6d^2f^2z^2 - 603979776a^{10}b^2c^7e^2i^2z^2 - 456130560a^9b^4 \\
& c^6f^2h^2z^2 + 390463488a^7b^7c^5d^2h^2z^2 + 301989888a^{10}b^3c^6g^2i^2z^2 \\
& - 366280704a^6b^8c^5d^2f^2z^2 - 330301440a^8b^4c^7d^2f^2z^2 + 254 \\
& 017536a^8b^6c^5f^2h^2z^2 - 1887436800a^{10}b^2c^8d^2h^2z^2 + 188743680a^{10} \\
& b^2c^7f^2h^2z^2 + 188743680a^7b^7c^5e^2g^2z^2 + 125829120a^8b^6c^5e^2i^2z^2 \\
& - 62914560a^8b^7c^4g^2i^2z^2 - 61931520a^7b^8c^4f^2h^2z^2 + 23592 \\
& 960a^7b^9c^3g^2i^2z^2 - 47185920a^7b^8c^4e^2i^2z^2 - 3538944a^6b^{11}c^2 \\
& g^2i^2z^2 + 96583680a^5b^{10}c^4d^2f^2z^2 - 51609600a^6b^9c^4d^2h^2z^2 + \\
& 7077888a^6b^{10}c^3e^2i^2z^2 + 6144000a^6b^{10}c^3f^2h^2z^2 - 393216a^5b^{12} \\
& c^2e^2i^2z^2 + 61440a^5b^{12}c^2f^2h^2z^2 - 23592960a^6b^9c^4e^2g^2z^2 \\
& + 1179648a^5b^{11}c^3e^2g^2z^2 + 829440a^4b^{13}c^2d^2h^2z^2 + 368640a^5b^{11} \\
& c^3d^2h^2z^2 - 15175680a^4b^{12}c^3d^2f^2z^2 + 1428480a^3b^{14}c^2d^2f^2z^2 \\
& - 1207959552a^{10}b^2c^8e^2g^2z^2 - 402653184a^{11}b^2c^7g^2i^2z^2 - 44040 \\
& 1920a^{10}b^2c^8f^2z^2 - 188743680a^{11}b^2c^7h^2z^2 + 1761607680a^{10}c^9 \\
& d^2f^2z^2 + 524288a^6b^{12}c^3i^2z^2 + 46080a^5b^{13}c^3h^2z^2 - 14080a^3 \\
& b^{15}c^3f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 \\
& - 3963617280a^9b^2c^9d^2z^2 + 805306368a^{11}c^8e^2i^2z^2 - 15099 \\
& 49440a^9b^2c^8e^2z^2 + 251658240a^{11}c^8f^2h^2z^2 + 1536a^3b^{16}f^2h^2z^2 \\
& + 4608a^2b^{17}d^2h^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^2b^{17} \\
& c^2d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 \\
& + 477102080a^9b^3c^7f^2z^2 - 377487360a^9b^4c^6g^2z^2 + 301989888 \\
& a^{10}b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 + 141557760a^{10}b^3c^6 \\
& h^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 \\
& + 146165760a^4b^{11}c^4d^2z^2 - 50331648a^{10}b^4c^5i^2z^2 - 3355443 \\
& 2a^{11}b^2c^6i^2z^2 + 20971520a^9b^6c^4i^2z^2 - 47185920a^7b^8c^4 \\
& g^2z^2 - 26542080a^8b^7c^4h^2z^2 - 2752512a^7b^{10}c^2i^2z^2 + 2 \\
& 621440a^8b^8c^3i^2z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5 \\
& h^2z^2 - 1290240a^6b^{11}c^2h^2z^2 + 5898240a^6b^{10}c^3g^2z^2 -
\end{aligned}$$

$$\begin{aligned}
& 294912a^5b^{12}c^2g^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 \\
& + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^*b^{18}d^*f^*z^2 + \\
& 1207959552a^{10}c^9e^2z^2 + 134217728a^{12}c^7i^2z^2 - 32768a^5b^{14}i^2z^2 + 2304a^4b^{15}h^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + \\
& 169869312a^7b^*c^8d^*e^*f^*z + 99090432a^8b^*c^7d^*g^*h^*z - 3145728a^9b^*c^6f^*h^*i^*z - 27648a^4b^{11}c^*f^*h^*i^*z + 56623104a^8b^*c^7d^*f^*i^*z - 50688a^3b^{12}c^*d^*h^*i^*z - 4608a^3b^{12}c^*f^*g^*h^*z - 9437184a^8b^*c^7e^*f^*h^*z - \\
& 55296a^2b^{13}c^*d^*f^*i^*z - 13824a^2b^{13}c^*d^*g^*h^*z + 9216a^*b^{13}c^2d^*e^*f^*z - 4608a^*b^{14}c^*d^*f^*g^*z + 219414528a^7b^2c^7d^*e^*h^*z - 221773824a^6b^3c^7d^*e^*f^*z - 109707264a^7b^3c^6d^*g^*h^*z + 110886912a^6b^4c^6d^*f^*g^*z + 40108032a^8b^2c^6d^*h^*i^*z + 2359296a^8b^3c^5f^*h^*i^*z - 491520a^6b^7c^3f^*h^*i^*z + 184320a^5b^9c^2f^*h^*i^*z - 88473600a^6b^4c^6d^*e^*h^*z - 84934656a^7b^2c^7d^*f^*g^*z + 117964800a^5b^5c^6d^*e^*f^*z - 45613056a^7b^3c^6d^*f^*i^*z + 44236800a^6b^5c^5d^*g^*h^*z - 10321920a^6b^6c^4d^*h^*i^*z + 7077888a^7b^4c^5d^*h^*i^*z - 5898240a^7b^4c^5f^*g^*h^*z + 4718592a^8b^2c^6f^*g^*h^*z + 2949120a^6b^6c^4f^*g^*h^*z + 2396160a^5b^8c^3d^*h^*i^*z - 737280a^5b^8c^3f^*g^*h^*z + 92160a^4b^{10}c^2f^*g^*h^*z - 27648a^4b^{10}c^2d^*h^*i^*z - 58982400a^5b^6c^5d^*f^*g^*z + 11796480a^7b^3c^6e^*f^*h^*z + 8847360a^5b^7c^4d^*f^*i^*z - 6635520a^5b^7c^4d^*g^*h^*z - 5898240a^6b^5c^5e^*f^*h^*z - 3809280a^4b^9c^3d^*f^*i^*z + 2359296a^6b^5c^5d^*f^*i^*z + 1474560a^5b^7c^4e^*f^*h^*z + 681984a^3b^{11}c^2d^*f^*i^*z - 276480a^4b^9c^3d^*g^*h^*z - 184320a^4b^9c^3e^*f^*h^*z + 179712a^3b^{11}c^2d^*g^*h^*z + 9216a^3b^{11}c^2e^*f^*h^*z + 16220160a^4b^8c^4d^*f^*g^*z + 13271040a^5b^6c^5d^*e^*h^*z - 2396160a^3b^{10}c^3d^*f^*g^*z + 552960a^4b^8c^4d^*e^*h^*z - 359424a^3b^{10}c^3d^*e^*h^*z + 175104a^2b^{12}c^2d^*f^*g^*z + 27648a^2b^{12}c^2d^*e^*h^*z - 32440320a^4b^7c^5d^*e^*f^*z + 4792320a^3b^9c^4d^*e^*f^*z - 350208a^2b^{11}c^3d^*e^*f^*z + 346816512a^7b^*c^8d^2g^*z - 41472a^5b^{10}c^*h^2i^*z + 7077888a^9b^*c^6g^*h^2z - 11008a^3b^{12}c^*f^2i^*z - 6912a^4b^{11}c^*g^*h^2z - 19660800a^8b^*c^7f^2g^*z - 768a^2b^{13}c^*f^2g^*z + 214272a^*b^{13}c^2d^2g^*z - 428544a^*b^{12}c^3d^2e^*z - 198180864a^8c^8d^*e^*h^*z - 66060288a^9c^7d^*h^*i^*z + 1536a^3b^{13}f^*h^*i^*z + 4608a^2b^{14}d^*h^*i^*z - 66816a^*b^{14}c^*d^2i^*z + 1022754816a^6b^2c^8d^2e^*z - 642318336a^5b^4c^7d^2e^*z - 511377408a^6b^3c^7d^2g^*z + 321159168a^5b^5c^6d^2g^*z + 225312768a^7b^2c^7d^2i^*z + 223395840a^4b^6c^6d^2e^*z - 111697920a^4b^7c^5d^2g^*z + 3538944a^9b^2c^5h^2i^*z - 737280a^7b^6c^3h^2i^*z + 276480a^6b^8c^2h^2i^*z - 10354688a^8b^2c^6f^2i^*z - 43646976a^6b^4c^6d^2i^*z - 8847360a^8b^3c^5g^*h^2z + 4423680a^7b^5c^4g^*h^2z + 2048000a^6b^6c^4f^2i^*z - 1105920a^6b^7c^3g^*h^2z - 849920a^5b^8c^3f^2i^*z + 393216a^7b^4c^5f^2i^*z + 145920a^4b^{10}c^2f^2i^*z + 138240a^5b^9c^2g^*h^2z - 32587776a^5b^6c^5d^2i^*z + 25362432a^7b^3c^6f^2g^*z + 21657600a^4b^8c^4d^2i^*z + 17694720a^8b^2c^6e^*h^2z - 50724864a^7b^2c^7e^*f^2z - 13271040a^6b^5c^5f^2g^*z - 8847360a^7b^4c^5e^*h^2z - 5810688a^3b^{10}c^3d^2i^*z +
\end{aligned}$$

$$\begin{aligned}
& 3563520a^5b^7c^4f^2gz + 2211840a^6b^6c^4eh^2z + 845568a^2b^{12} \\
& *c^2d^2iz - 506880a^4b^9c^3f^2gz - 276480a^5b^8c^3eh^2z + 34 \\
& 560a^3b^{11}c^2f^2gz + 13824a^4b^{10}c^2eh^2z + 26542080a^6b^4c^ \\
& 6ef^2z + 23362560a^3b^9c^4d^2gz - 46725120a^3b^8c^5d^2ez - 7 \\
& 127040a^5b^6c^5ef^2z - 2965248a^2b^{11}c^3d^2gz + 1013760a^4b^8 \\
& *c^4ef^2z - 69120a^3b^{10}c^3ef^2z + 1536a^2b^{12}c^2ef^2z + 593 \\
& 0496a^2b^{10}c^4d^2ez + 1536a*b^{15}d*fi*z - 693633024a^7c^9d^2ez \\
& - 231211008a^8c^8d^2iz - 4718592a^{10}c^6h^2iz + 2304a^4b^{12}h^2 \\
& *iz + 13107200a^9c^7f^2iz + 256a^2b^{14}f^2iz - 14155776a^9c^7e \\
& *h^2z + 39321600a^8c^8ef^2z + 13824b^{14}c^2d^2ez - 6912b^{15}c*d^ \\
& 2gz + 2304b^{16}d^2iz + 737280a^7b*c^5f*gh*i - 2304a^3b^9c*f*gh \\
& *i - 6912a^2b^{10}c*d*gh*i + 11059200a^6b*c^6d*eh*i + 5160960a^6b*c \\
& ^6d*f*gi + 2211840a^6b*c^6ef*gh + 4608a*b^{10}c^2d*ef*i + 15482880 \\
& *a^5b*c^7d*ef*g - 13824a*b^9c^3d*ef*g - 2304a*b^{11}c*d*f*gi + 1843 \\
& 200a^6b^3c^4f*gh*i + 783360a^5b^5c^3f*gh*i + 18432a^4b^7c^2f* \\
& g*h*i - 5529600a^6b^2c^5d*gh*i - 3686400a^6b^2c^5ef*h*i - 2211840 \\
& *a^5b^4c^4d*gh*i - 1566720a^5b^4c^4ef*h*i + 317952a^4b^6c^3d*g \\
& *h*i - 36864a^4b^6c^3ef*h*i + 6912a^3b^8c^2d*gh*i + 4608a^3b^8* \\
& c^2ef*h*i + 5160960a^5b^3c^5d*f*gi + 4423680a^5b^3c^5ef*gh + 4 \\
& 423680a^5b^3c^5d*eh*i - 635904a^4b^5c^4d*eh*i - 354816a^3b^7c^ \\
& 3d*f*gi + 322560a^4b^5c^4d*f*gi + 138240a^4b^5c^4ef*gh + 59904 \\
& *a^2b^9c^2d*f*gi - 13824a^3b^7c^3ef*gh - 13824a^3b^7c^3d*eh* \\
& i + 13824a^2b^9c^2d*eh*i - 16588800a^5b^2c^6d*eg*h - 10321920a^5 \\
& *b^2c^6d*ef*i + 1658880a^4b^4c^5d*eg*h + 709632a^3b^6c^4d*ef*i \\
& - 645120a^4b^4c^5d*ef*i + 124416a^3b^6c^4d*eg*h - 119808a^2b^8 \\
& *c^3d*ef*i - 41472a^2b^8c^3d*eg*h + 7741440a^4b^3c^6d*ef*g - 29 \\
& 03040a^3b^5c^5d*ef*g + 387072a^2b^7c^4d*ef*g - 3456a^4b^8c*g*h \\
& ^2i - 2304a^4b^8c*f*h*i^2 + 1105920a^7b*c^5eh^2i - 384a^2b^{10}c* \\
& f^2gi - 10616832a^6b*c^6e^2gi - 3538944a^7b*c^5eg*gi^2 + 1843200* \\
& a^7b*c^5d*h*i^2 + 1152a^3b^9c*d*h*i^2 - 37062144a^5b*c^7d^2f*h + 2 \\
& 580480a^6b*c^6ef^2i + 65664a*b^{10}c^2d^2gi + 23224320a^5b*c^7d^ \\
& 2ei - 9216a^2b^{10}c*d*fi^2 - 5985792a^6b*c^6d*f*h^2 + 206010a*b^9* \\
& c^3d^2f*h - 131328a*b^9c^3d^2ei - 6300a*b^{10}c^2d*f^2h + 16588800 \\
& *a^5b*c^7d*e^2h + 3456a*b^{10}c^2d*f*g^2 + 435456a*b^8c^4d^2eg + 1 \\
& 3824a*b^8c^4d*e^2f - 1474560a^7c^6ef*h*i - 10321920a^6c^7d*ef*i \\
& + 1350a*b^{11}c*d*f*h^2 - 552960a^7b^2c^4g*h^2i - 552960a^6b^4c^3* \\
& g*h^2i - 145152a^5b^6c^2g*h^2i - 737280a^7b^2c^4f*h*i^2 - 568320* \\
& a^6b^4c^3f*h*i^2 - 136704a^5b^6c^2f*h*i^2 - 1290240a^6b^2c^5f^2* \\
& gi + 1105920a^6b^3c^4eh^2i - 860160a^5b^4c^4f^2gi + 290304a^5 \\
& *b^5c^3eh^2i - 80640a^4b^6c^3f^2gi + 12672a^3b^8c^2f^2gi + \\
& 6912a^4b^7c^2eh^2i + 5308416a^6b^2c^5eg^2i - 5308416a^5b^3c^ \\
& 5e^2gi - 3538944a^6b^3c^4eg*gi^2 + 2654208a^5b^4c^4eg^2i + 165 \\
& 8880a^6b^3c^4d*h*i^2 - 1105920a^5b^4c^4f*g^2h - 884736a^5b^5c^3 \\
& *eg*gi^2 - 552960a^6b^2c^5f*g^2h + 262656a^5b^5c^3d*h*i^2 - 55296* \\
& a^4b^7c^2d*h*i^2 - 34560a^4b^6c^3f*g^2h + 3456a^3b^8c^2f*g^2h
\end{aligned}$$

$$\begin{aligned}
& - 11612160a^5b^2c^6d^2g^*i + 1720320a^5b^3c^5e^*f^2i - 1658880a^6b^2c^5e^*g^*h^2 + 1596672a^3b^6c^4d^2g^*i - 829440a^5b^4c^4e^*g^*h^2 \\
& - 508032a^2b^8c^3d^2g^*i + 161280a^4b^5c^4e^*f^2i - 25344a^3b^7c^3e^*f^2i - 20736a^4b^6c^3e^*g^*h^2 + 768a^2b^9c^2e^*f^2i - 4423680a^5b^2c^6e^2f^*h + 4147200a^5b^3c^5d^*g^2h - 2580480a^6b^2c^5d^*f^*i^2 - 967680a^5b^4c^4d^*f^*i^2 - 414720a^4b^5c^4d^*g^2h - 138240a^4b^4c^5e^2f^*h + 64512a^4b^6c^3d^*f^*i^2 + 39168a^3b^8c^2d^*f^*i^2 - 31104a^3b^7c^3d^*g^2h + 13824a^3b^6c^4e^2f^*h + 10368a^2b^9c^2d^*g^2h + 15630336a^5b^2c^6d^*f^2h - 14459904a^4b^3c^6d^2f^*h + 9630144a^3b^5c^5d^2f^*h - 8764416a^5b^3c^5d^*f^*h^2 - 3870720a^5b^2c^6e^*f^2g - 3193344a^3b^5c^5d^2e^*i + 2867328a^4b^4c^5d^*f^2h - 2095200a^2b^7c^4d^2f^*h - 1414080a^3b^6c^4d^*f^2h - 34836480a^4b^2c^7d^2e^*g + 1016064a^2b^7c^4d^2e^*i - 645120a^4b^4c^5e^*f^2g + 306720a^3b^7c^3d^*f^*h^2 + 197820a^2b^8c^3d^*f^2h + 146880a^4b^5c^4d^*f^*h^2 + 80640a^3b^6c^4e^*f^2g - 55350a^2b^9c^2d^*f^*h^2 - 2304a^2b^8c^3e^*f^2g - 3870720a^5b^2c^6d^*f^*g^2 - 1935360a^4b^4c^5d^*f^*g^2 - 1658880a^4b^3c^6d^*e^2h + 725760a^3b^6c^4d^*f^*g^2 + 17418240a^3b^4c^6d^2e^*g - 124416a^3b^5c^5d^*e^2h - 96768a^2b^8c^3d^*f^*g^2 + 41472a^2b^7c^4d^*e^2h - 3919104a^2b^6c^5d^2e^*g - 7741440a^4b^2c^7d^*e^2f + 2903040a^3b^4c^6d^*e^2f - 387072a^2b^6c^5d^*e^2f + 184320a^8b^*c^4h^2i^2 + 25344a^5b^7c^*h^2i^2 - 884736a^6b^3c^4g^3i - 589824a^7b^3c^3g^*i^3 - 442368a^5b^5c^3g^3i - 294912a^6b^5c^2g^*i^3 + 430080a^7b^*c^5f^2i^2 - 1984a^3b^9c^*f^2i^2 + 3538944a^5b^2c^6e^3i - 1648128a^5b^3c^5f^3h + 1179648a^7b^2c^4e^*i^3 - 898560a^6b^3c^4f^*h^3 + 589824a^6b^4c^3e^*i^3 - 354240a^5b^5c^3f^*h^3 - 354240a^4b^5c^4f^3h + 98304a^5b^6c^2e^*i^3 + 43680a^3b^7c^3f^3h - 21600a^4b^7c^2f^*h^3 - 1050a^2b^9c^2f^3h + 225a^2b^10c^*f^2h^2 + 3870720a^6b^*c^6d^2i^2 + 1658880a^6b^*c^6e^2h^2 + 16547328a^4b^2c^7d^3h - 12306816a^3b^4c^6d^3h + 37310976a^3b^3c^7d^3f + 3037824a^2b^6c^5d^3h - 2654208a^5b^3c^5e^*g^3 + 1949184a^6b^2c^5d^*h^3 + 1296000a^5b^4c^4d^*h^3 - 155520a^4b^6c^3d^*h^3 - 40500a^*b^10c^2d^2h^2 - 8100a^3b^8c^2d^*h^3 + 3870720a^5b^*c^7e^2f^2 + 34836480a^4b^*c^8d^2e^2 - 108864a^*b^9c^3d^2g^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^*f^3 + 1737792a^3b^5c^5d^*f^3 - 260190a^*b^8c^4d^2f^2 - 211680a^2b^7c^4d^*f^3 - 435456a^*b^7c^5d^2e^2 - 245760a^8c^5f^*h^*i^2 + 384a^3b^10f^*h^*i^2 + 1152a^2b^11d^*h^*i^2 - 2211840a^6c^7e^2f^*h - 1720320a^7c^6d^*f^*i^2 - 9450b^11c^2d^2f^*h + 6912b^11c^2d^2e^*i + 1612800a^6c^7d^*f^2h - 393216a^8b^*c^4g^*i^3 - 49152a^5b^7c^*g^*i^3 - 20736b^10c^3d^2e^*g - 75188736a^4b^*c^8d^3f - 883200a^6b^*c^6f^3h - 317952a^7b^*c^5f^*h^3 + 1350a^3b^9c^*f^*h^3 - 15482880a^5c^8d^*e^2f - 9792a^*b^11c^d^2i^2 - 10616832a^5b^*c^7e^3g - 345060a^*b^8c^4d^3h + 4050a^2b^10c^*d^*h^3 - 4262400a^5b^*c^7d^*f^3 + 852768a^*b^7c^5d^3f + 7350a^*b^9c^3d^*f^3 + 276480a^7b^3c^3h^2i^2 + 140544a^6b^5c^2h^2i^2 + 884736a^7b^2c^4g^2i^2 + 884736a^6b^4c^3g^2i^2 + 221184a^5b^6c^2g^2i^2 + 501760a^6b^3c^4f^2i^2 + 414720a^6b^3c^
\end{aligned}$$

$$\begin{aligned}
& 4*g^2*h^2 + 207360*a^5*b^5*c^3*g^2*h^2 + 170240*a^5*b^5*c^3*f^2*i^2 + 9216* \\
& a^4*b^7*c^2*f^2*i^2 + 5184*a^4*b^7*c^2*g^2*h^2 + 3538944*a^6*b^2*c^5*e^2*i^ \\
& 2 + 1684224*a^6*b^2*c^5*f^2*h^2 + 1264320*a^5*b^4*c^4*f^2*h^2 + 884736*a^5* \\
& b^4*c^4*e^2*i^2 + 126720*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 + \\
& 1935360*a^5*b^3*c^5*d^2*i^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c \\
& ^5*e^2*h^2 - 532224*a^4*b^5*c^4*d^2*i^2 + 161280*a^4*b^5*c^4*f^2*g^2 - 9676 \\
& 8*a^3*b^7*c^3*d^2*i^2 + 62784*a^2*b^9*c^2*d^2*i^2 + 20736*a^4*b^5*c^4*e^2*h \\
& ^2 - 20160*a^3*b^7*c^3*f^2*g^2 + 576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2 \\
& *c^6*d^2*h^2 + 7962624*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 - \\
& 1412640*a^3*b^6*c^4*d^2*h^2 + 461376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8* \\
& c^3*d^2*h^2 + 8709120*a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 9 \\
& 79776*a^2*b^7*c^4*d^2*g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5* \\
& e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784 \\
& *a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d \\
& ^2*e^2 - 3456*b^12*c*d^2*g*i + 384*a*b^12*d*f*i^2 + 576*a^4*b^9*h^2*i^2 + 3 \\
& 538944*a^7*c^6*e^2*i^2 + 115200*a^7*c^6*f^2*h^2 + 64*a^2*b^11*f^2*i^2 + 609 \\
& 6384*a^6*c^7*d^2*h^2 + 5184*b^11*c^2*d^2*g^2 + 131072*a^8*b^2*c^3*i^4 + 983 \\
& 04*a^7*b^4*c^2*i^4 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 142 \\
& 560*a^6*b^4*c^3*h^4 + 103680*a^7*b^2*c^4*h^4 + 32400*a^5*b^6*c^2*h^4 + 2073 \\
& 6*b^9*c^4*d^2*e^2 + 331776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^4 + 35145 \\
& 6*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728 \\
& *a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^4 + 7077888*a^6*c^7*e^3*i + 786432 \\
& *a^8*c^5*e*i^3 + 28449792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12* \\
& c*d^2*h^2 + 580608*a^7*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 32768*a^6*b^6*c*i^ \\
& 4 + 2025*a^4*b^8*c*h^4 - 734832*a*b^6*c^6*d^4 + 576*b^13*d^2*i^2 + 65536*a^ \\
& 9*c^4*i^4 + 20736*a^8*c^5*h^4 + 4096*a^5*b^8*i^4 + 49787136*a^4*c^9*d^4 + 1 \\
& 60000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, l)*x*(83886 \\
& 08*a^11*b*c^9 - 512*a^4*b^15*c^2 + 14336*a^5*b^13*c^3 - 172032*a^6*b^11*c^4 \\
& + 1146880*a^7*b^9*c^5 - 4587520*a^8*b^7*c^6 + 11010048*a^9*b^5*c^7 - 14680 \\
& 064*a^10*b^3*c^8))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6* \\
& b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) + (3244 \\
& 032*a^6*b*c^8*d*e - 327680*a^8*c^7*f*i - 983040*a^7*c^8*e*f + 1081344*a^7*b \\
& *c^7*d*i + 884736*a^7*b*c^7*e*h + 491520*a^7*b*c^7*f*g + 294912*a^8*b*c^6*h \\
& *i + 4608*a^2*b^9*c^4*d*e - 87552*a^3*b^7*c^5*d*e + 681984*a^4*b^5*c^6*d*e \\
& - 2433024*a^5*b^3*c^7*d*e - 2304*a^2*b^10*c^3*d*g + 43776*a^3*b^8*c^4*d*g + \\
& 1536*a^3*b^8*c^4*e*f - 340992*a^4*b^6*c^5*d*g - 39936*a^4*b^6*c^5*e*f + 12 \\
& 16512*a^5*b^4*c^6*d*g + 184320*a^5*b^4*c^6*e*f - 1622016*a^6*b^2*c^7*d*g + \\
& 49152*a^6*b^2*c^7*e*f + 768*a^2*b^11*c^2*d*i - 13056*a^3*b^9*c^3*d*i - 768* \\
& a^3*b^9*c^3*f*g + 84480*a^4*b^7*c^4*d*i + 4608*a^4*b^7*c^4*e*h + 19968*a^4* \\
& b^7*c^4*f*g - 178176*a^5*b^5*c^5*d*i + 18432*a^5*b^5*c^5*e*h - 92160*a^5*b^ \\
& 5*c^5*f*g - 270336*a^6*b^3*c^6*d*i - 368640*a^6*b^3*c^6*e*h - 24576*a^6*b^3 \\
& *c^6*f*g + 256*a^3*b^10*c^2*f*i - 6144*a^4*b^8*c^3*f*i - 2304*a^4*b^8*c^3*g \\
& *h + 17408*a^5*b^6*c^4*f*i - 9216*a^5*b^6*c^4*g*h + 69632*a^6*b^4*c^5*f*i + \\
& 184320*a^6*b^4*c^5*g*h - 147456*a^7*b^2*c^6*f*i - 442368*a^7*b^2*c^6*g*h + \\
& 768*a^4*b^9*c^2*h*i + 4608*a^5*b^7*c^3*h*i - 55296*a^6*b^5*c^4*h*i + 24576
\end{aligned}$$

$$\begin{aligned}
& *a^7*b^3*c^5*h*i)/(512*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6* \\
& b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5)) - (x*(45 \\
& 1584*a^6*c^9*d^2 + 18*b^12*c^3*d^2 - 25600*a^7*c^8*f^2 + 9216*a^8*c^7*h^2 - \\
& 504*a*b^10*c^4*d^2 - 73728*a^6*b*c^8*e^2 - 8192*a^8*b*c^6*i^2 + 6228*a^2*b \\
& ^8*c^5*d^2 - 42624*a^3*b^6*c^6*d^2 + 176256*a^4*b^4*c^7*d^2 - 423936*a^5*b^ \\
& 2*c^8*d^2 - 4608*a^4*b^5*c^6*e^2 + 36864*a^5*b^3*c^7*e^2 + 2*a^2*b^10*c^3*f \\
& ^2 - 84*a^3*b^8*c^4*f^2 + 3520*a^4*b^6*c^5*f^2 - 26240*a^5*b^4*c^6*f^2 + 59 \\
& 904*a^6*b^2*c^7*f^2 - 1152*a^4*b^7*c^4*g^2 + 9216*a^5*b^5*c^5*g^2 - 18432*a \\
& ^6*b^3*c^6*g^2 + 468*a^4*b^8*c^3*h^2 - 3456*a^5*b^6*c^4*h^2 + 5760*a^6*b^4* \\
& c^5*h^2 - 128*a^4*b^9*c^2*i^2 + 512*a^5*b^7*c^3*i^2 + 1536*a^6*b^5*c^4*i^2 \\
& - 4096*a^7*b^3*c^5*i^2 + 129024*a^7*c^8*d*h + 12*a*b^11*c^3*d*f - 218112*a^ \\
& 6*b*c^8*d*f - 49152*a^7*b*c^7*e*i - 9216*a^7*b*c^7*f*h - 420*a^2*b^9*c^4*d* \\
& f + 4992*a^3*b^7*c^5*d*f - 36480*a^4*b^5*c^6*d*f + 144384*a^5*b^3*c^7*d*f + \\
& 36*a^2*b^10*c^3*d*h - 360*a^3*b^8*c^4*d*h + 3456*a^4*b^6*c^5*d*h + 4608*a^ \\
& 4*b^6*c^5*e*g - 11520*a^5*b^4*c^6*d*h - 36864*a^5*b^4*c^6*e*g - 27648*a^6*b \\
& ^2*c^7*d*h + 73728*a^6*b^2*c^7*e*g + 12*a^3*b^9*c^3*f*h - 1536*a^4*b^7*c^4* \\
& e*i - 2304*a^4*b^7*c^4*f*h + 9216*a^5*b^5*c^5*e*i + 17280*a^5*b^5*c^5*f*h - \\
& 30720*a^6*b^3*c^6*f*h + 768*a^4*b^8*c^3*g*i - 4608*a^5*b^6*c^4*g*i + 24576 \\
& *a^7*b^2*c^6*g*i))/(64*(a^4*b^12 + 4096*a^10*c^6 - 24*a^5*b^10*c + 240*a^6* \\
& b^8*c^2 - 1280*a^7*b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5))) + (x*(1 \\
& 3824*a^4*c^8*e^3 + 512*a^7*c^5*i^3 - 54*b^7*c^5*d^2*e + 27*b^8*c^4*d^2*g + \\
& 13824*a^5*c^7*e^2*i + 4608*a^6*c^6*e*i^2 - 9*b^9*c^3*d^2*i - 1728*a^4*b^3*c \\
& ^5*g^3 + 64*a^4*b^6*c^2*i^3 + 384*a^5*b^4*c^3*i^3 + 768*a^6*b^2*c^4*i^3 - 2 \\
& 0160*a^4*c^8*d*e*f - 6720*a^5*c^7*d*f*i - 2880*a^5*c^7*e*f*h - 960*a^6*c^6* \\
& f*h*i + 972*a*b^5*c^6*d^2*e + 24192*a^3*b*c^8*d^2*e - 486*a*b^6*c^5*d^2*g + \\
& 6240*a^4*b*c^7*e*f^2 - 20736*a^4*b*c^7*e^2*g + 144*a*b^7*c^4*d^2*i + 8064* \\
& a^4*b*c^7*d^2*i + 1728*a^5*b*c^6*e*h^2 + 2080*a^5*b*c^6*f^2*i - 2304*a^6*b* \\
& c^5*g*i^2 + 576*a^6*b*c^5*h^2*i - 7344*a^2*b^3*c^7*d^2*e + 3672*a^2*b^4*c^6 \\
& *d^2*g - 6*a^2*b^5*c^5*e*f^2 - 12096*a^3*b^2*c^7*d^2*g + 192*a^3*b^3*c^6*e* \\
& f^2 + 10368*a^4*b^2*c^6*e*g^2 - 900*a^2*b^5*c^5*d^2*i + 3*a^2*b^6*c^4*f^2*g \\
& + 1584*a^3*b^3*c^6*d^2*i - 96*a^3*b^4*c^5*f^2*g - 3120*a^4*b^2*c^6*f^2*g + \\
& 1296*a^4*b^3*c^5*e*h^2 + 6912*a^4*b^2*c^6*e^2*i + 1152*a^4*b^4*c^4*e*i^2 + \\
& 4608*a^5*b^2*c^5*e*i^2 - a^2*b^7*c^3*f^2*i + 30*a^3*b^5*c^4*f^2*i + 1104*a \\
& ^4*b^3*c^5*f^2*i - 648*a^4*b^4*c^4*g*h^2 - 864*a^5*b^2*c^5*g*h^2 + 1728*a^4 \\
& *b^4*c^4*g^2*i - 576*a^4*b^5*c^3*g*i^2 + 3456*a^5*b^2*c^5*g^2*i - 2304*a^5* \\
& b^3*c^4*g*i^2 + 216*a^4*b^5*c^3*h^2*i + 720*a^5*b^3*c^4*h^2*i - 36*a*b^6*c^ \\
& 5*d*e*f + 18*a*b^7*c^4*d*f*g + 15552*a^4*b*c^7*d*e*h + 10080*a^4*b*c^7*d*f* \\
& g - 6*a*b^8*c^3*d*f*i + 5184*a^5*b*c^6*d*h*i - 13824*a^5*b*c^6*e*g*i + 1440 \\
& *a^5*b*c^6*f*g*h + 900*a^2*b^4*c^6*d*e*f - 4896*a^3*b^2*c^7*d*e*f - 108*a^2 \\
& *b^5*c^5*d*e*h - 450*a^2*b^5*c^5*d*f*g + 2448*a^3*b^3*c^6*d*f*g + 138*a^2*b \\
& ^6*c^4*d*f*i + 54*a^2*b^6*c^4*d*g*h - 516*a^3*b^4*c^5*d*f*i - 36*a^3*b^4*c^ \\
& 5*e*f*h - 4992*a^4*b^2*c^6*d*f*i - 7776*a^4*b^2*c^6*d*g*h - 6048*a^4*b^2*c^ \\
& 6*e*f*h - 18*a^2*b^7*c^3*d*h*i - 36*a^3*b^5*c^4*d*h*i + 18*a^3*b^5*c^4*f*g* \\
& h + 2592*a^4*b^3*c^5*d*h*i - 6912*a^4*b^3*c^5*e*g*i + 3024*a^4*b^3*c^5*f*g* \\
& h - 6*a^3*b^6*c^3*f*h*i - 1020*a^4*b^4*c^4*f*h*i - 2496*a^5*b^2*c^5*f*h*i))
\end{aligned}$$

$$\begin{aligned}
&/((64*(a^4*b^{12} + 4096*a^{10}*c^6 - 24*a^5*b^{10}*c + 240*a^6*b^8*c^2 - 1280*a^7* \\
&b^6*c^3 + 3840*a^8*b^4*c^4 - 6144*a^9*b^2*c^5))\text{root}(56371445760*a^{11}*b^8 \\
&*c^6*z^4 - 503316480*a^8*b^{14}*c^3*z^4 + 47185920*a^7*b^{16}*c^2*z^4 - 1717986 \\
&91840*a^{14}*b^2*c^9*z^4 + 193273528320*a^{13}*b^4*c^8*z^4 - 128849018880*a^{12}* \\
&b^6*c^7*z^4 - 16911433728*a^{10}*b^{10}*c^5*z^4 + 3523215360*a^9*b^{12}*c^4*z^4 - \\
&2621440*a^6*b^{18}*c*z^4 + 68719476736*a^{15}*c^{10}*z^4 + 65536*a^5*b^{20}*z^4 + \\
&196608*a^5*b^{13}*c*g*i*z^2 - 46080*a^4*b^{14}*c*f*h*z^2 - 105984*a^3*b^{15}*c*d* \\
&h*z^2 - 73728*a^2*b^{16}*c*d*f*z^2 + 2548039680*a^9*b^3*c^7*d*h*z^2 + 1509949 \\
&440*a^9*b^3*c^7*e*g*z^2 - 1401421824*a^8*b^5*c^6*d*h*z^2 - 1321205760*a^9*b \\
&^2*c^8*d*f*z^2 - 754974720*a^8*b^5*c^6*e*g*z^2 + 732168192*a^7*b^6*c^6*d*f* \\
&z^2 - 603979776*a^{10}*b^2*c^7*e*i*z^2 - 456130560*a^9*b^4*c^6*f*h*z^2 + 3904 \\
&63488*a^7*b^7*c^5*d*h*z^2 + 301989888*a^{10}*b^3*c^6*g*i*z^2 - 366280704*a^6* \\
&b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 254017536*a^8*b^6*c^5*f*h \\
&*z^2 - 1887436800*a^{10}*b*c^8*d*h*z^2 + 188743680*a^{10}*b^2*c^7*f*h*z^2 + 188 \\
&743680*a^7*b^7*c^5*e*g*z^2 + 125829120*a^8*b^6*c^5*e*i*z^2 - 62914560*a^8*b \\
&^7*c^4*g*i*z^2 - 61931520*a^7*b^8*c^4*f*h*z^2 + 23592960*a^7*b^9*c^3*g*i*z^ \\
&2 - 47185920*a^7*b^8*c^4*e*i*z^2 - 3538944*a^6*b^{11}*c^2*g*i*z^2 + 96583680* \\
&a^5*b^{10}*c^4*d*f*z^2 - 51609600*a^6*b^9*c^4*d*h*z^2 + 7077888*a^6*b^{10}*c^3* \\
&e*i*z^2 + 6144000*a^6*b^{10}*c^3*f*h*z^2 - 393216*a^5*b^{12}*c^2*e*i*z^2 + 6144 \\
&0*a^5*b^{12}*c^2*f*h*z^2 - 23592960*a^6*b^9*c^4*e*g*z^2 + 1179648*a^5*b^{11}*c^ \\
&3*e*g*z^2 + 829440*a^4*b^{13}*c^2*d*h*z^2 + 368640*a^5*b^{11}*c^3*d*h*z^2 - 151 \\
&75680*a^4*b^{12}*c^3*d*f*z^2 + 1428480*a^3*b^{14}*c^2*d*f*z^2 - 1207959552*a^{10} \\
&*b*c^8*e*g*z^2 - 402653184*a^{11}*b*c^7*g*i*z^2 - 440401920*a^{10}*b*c^8*f^2*z^ \\
&2 - 188743680*a^{11}*b*c^7*h^2*z^2 + 1761607680*a^{10}*c^9*d*f*z^2 + 524288*a^6 \\
&*b^{12}*c^i^2*z^2 + 46080*a^5*b^{13}*c^h^2*z^2 - 14080*a^3*b^{15}*c^f^2*z^2 + 693 \\
&6330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a \\
&^9*b*c^9*d^2*z^2 + 805306368*a^{11}*c^8*e*i*z^2 - 1509949440*a^9*b^2*c^8*e^2* \\
&z^2 + 251658240*a^{11}*c^8*f*h*z^2 + 1536*a^3*b^{16}*f*h*z^2 + 4608*a^2*b^{17}*d* \\
&h*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^{17}*c*d^2*z^2 + 754974720 \\
&*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^ \\
&7*f^2*z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888*a^{10}*b^2*c^7*g^2*z^2 \\
&+ 188743680*a^8*b^6*c^5*g^2*z^2 + 141557760*a^{10}*b^3*c^6*h^2*z^2 - 17432576 \\
&0*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^{11}* \\
&c^4*d^2*z^2 - 50331648*a^{10}*b^4*c^5*i^2*z^2 - 33554432*a^{11}*b^2*c^6*i^2*z^2 \\
&+ 20971520*a^9*b^6*c^4*i^2*z^2 - 47185920*a^7*b^8*c^4*g^2*z^2 - 26542080*a \\
&^8*b^7*c^4*h^2*z^2 - 2752512*a^7*b^{10}*c^2*i^2*z^2 + 2621440*a^8*b^8*c^3*i^2 \\
&*z^2 + 9584640*a^7*b^9*c^3*h^2*z^2 - 2359296*a^9*b^5*c^5*h^2*z^2 - 1290240* \\
&a^6*b^{11}*c^2*h^2*z^2 + 5898240*a^6*b^{10}*c^3*g^2*z^2 - 294912*a^5*b^{12}*c^2*g \\
&^2*z^2 + 11206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592 \\
&960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^{11}*c^3*f^2*z^2 + 291840*a^4*b^{13}*c^ \\
&2*f^2*z^2 - 19860480*a^3*b^{13}*c^3*d^2*z^2 - 1179648*a^5*b^{10}*c^4*e^2*z^2 + \\
&1771776*a^2*b^{15}*c^2*d^2*z^2 + 1536*a*b^{18}*d*f*z^2 + 1207959552*a^{10}*c^9*e^ \\
&2*z^2 + 134217728*a^{12}*c^7*i^2*z^2 - 32768*a^5*b^{14}*i^2*z^2 + 2304*a^4*b^{15} \\
&*h^2*z^2 + 256*a^2*b^{17}*f^2*z^2 + 2304*b^{19}*d^2*z^2 + 169869312*a^7*b*c^8*d \\
&*e*f*z + 99090432*a^8*b*c^7*d*g*h*z - 3145728*a^9*b*c^6*f*h*i*z - 27648*a^4
\end{aligned}$$

$$\begin{aligned}
& *b^{11} *c *f *h *i *z + 56623104 *a^8 *b *c^7 *d *f *i *z - 50688 *a^3 *b^{12} *c *d *h *i *z - 4 \\
& 608 *a^3 *b^{12} *c *f *g *h *z - 9437184 *a^8 *b *c^7 *e *f *h *z - 55296 *a^2 *b^{13} *c *d *f *i \\
& *z - 13824 *a^2 *b^{13} *c *d *g *h *z + 9216 *a *b^{13} *c^2 *d *e *f *z - 4608 *a *b^{14} *c *d *f \\
& *g *z + 219414528 *a^7 *b^2 *c^7 *d *e *h *z - 221773824 *a^6 *b^3 *c^7 *d *e *f *z - 1097 \\
& 07264 *a^7 *b^3 *c^6 *d *g *h *z + 110886912 *a^6 *b^4 *c^6 *d *f *g *z + 40108032 *a^8 *b^ \\
& 2 *c^6 *d *h *i *z + 2359296 *a^8 *b^3 *c^5 *f *h *i *z - 491520 *a^6 *b^7 *c^3 *f *h *i *z + \\
& 184320 *a^5 *b^9 *c^2 *f *h *i *z - 88473600 *a^6 *b^4 *c^6 *d *e *h *z - 84934656 *a^7 *b^ \\
& 2 *c^7 *d *f *g *z + 117964800 *a^5 *b^5 *c^6 *d *e *f *z - 45613056 *a^7 *b^3 *c^6 *d *f *i * \\
& z + 44236800 *a^6 *b^5 *c^5 *d *g *h *z - 10321920 *a^6 *b^6 *c^4 *d *h *i *z + 7077888 *a \\
& ^7 *b^4 *c^5 *d *h *i *z - 5898240 *a^7 *b^4 *c^5 *f *g *h *z + 4718592 *a^8 *b^2 *c^6 *f *g * \\
& h *z + 2949120 *a^6 *b^6 *c^4 *f *g *h *z + 2396160 *a^5 *b^8 *c^3 *d *h *i *z - 737280 *a^ \\
& 5 *b^8 *c^3 *f *g *h *z + 92160 *a^4 *b^{10} *c^2 *f *g *h *z - 27648 *a^4 *b^{10} *c^2 *d *h *i *z \\
& - 58982400 *a^5 *b^6 *c^5 *d *f *g *z + 11796480 *a^7 *b^3 *c^6 *e *f *h *z + 8847360 *a^ \\
& 5 *b^7 *c^4 *d *f *i *z - 6635520 *a^5 *b^7 *c^4 *d *g *h *z - 5898240 *a^6 *b^5 *c^5 *e *f *h \\
& *z - 3809280 *a^4 *b^9 *c^3 *d *f *i *z + 2359296 *a^6 *b^5 *c^5 *d *f *i *z + 1474560 *a^ \\
& 5 *b^7 *c^4 *e *f *h *z + 681984 *a^3 *b^{11} *c^2 *d *f *i *z - 276480 *a^4 *b^9 *c^3 *d *g *h * \\
& z - 184320 *a^4 *b^9 *c^3 *e *f *h *z + 179712 *a^3 *b^{11} *c^2 *d *g *h *z + 9216 *a^3 *b^1 \\
& 1 *c^2 *e *f *h *z + 16220160 *a^4 *b^8 *c^4 *d *f *g *z + 13271040 *a^5 *b^6 *c^5 *d *e *h *z \\
& - 2396160 *a^3 *b^{10} *c^3 *d *f *g *z + 552960 *a^4 *b^8 *c^4 *d *e *h *z - 359424 *a^3 *b \\
& ^{10} *c^3 *d *e *h *z + 175104 *a^2 *b^{12} *c^2 *d *f *g *z + 27648 *a^2 *b^{12} *c^2 *d *e *h *z \\
& - 32440320 *a^4 *b^7 *c^5 *d *e *f *z + 4792320 *a^3 *b^9 *c^4 *d *e *f *z - 350208 *a^2 *b \\
& ^{11} *c^3 *d *e *f *z + 346816512 *a^7 *b *c^8 *d^2 *g *z - 41472 *a^5 *b^{10} *c *h^2 *i *z + \\
& 7077888 *a^9 *b *c^6 *g *h^2 *z - 11008 *a^3 *b^{12} *c *f^2 *i *z - 6912 *a^4 *b^{11} *c *g *h^ \\
& 2 *z - 19660800 *a^8 *b *c^7 *f^2 *g *z - 768 *a^2 *b^{13} *c *f^2 *g *z + 214272 *a *b^{13} *c \\
& ^2 *d^2 *g *z - 428544 *a *b^{12} *c^3 *d^2 *e *z - 198180864 *a^8 *c^8 *d *e *h *z - 660602 \\
& 88 *a^9 *c^7 *d *h *i *z + 1536 *a^3 *b^{13} *f *h *i *z + 4608 *a^2 *b^{14} *d *h *i *z - 66816 * \\
& a *b^{14} *c *d^2 *i *z + 1022754816 *a^6 *b^2 *c^8 *d^2 *e *z - 642318336 *a^5 *b^4 *c^7 *d \\
& ^2 *e *z - 511377408 *a^6 *b^3 *c^7 *d^2 *g *z + 321159168 *a^5 *b^5 *c^6 *d^2 *g *z + 22 \\
& 5312768 *a^7 *b^2 *c^7 *d^2 *i *z + 223395840 *a^4 *b^6 *c^6 *d^2 *e *z - 111697920 *a^4 \\
& *b^7 *c^5 *d^2 *g *z + 3538944 *a^9 *b^2 *c^5 *h^2 *i *z - 737280 *a^7 *b^6 *c^3 *h^2 *i *z \\
& + 276480 *a^6 *b^8 *c^2 *h^2 *i *z - 10354688 *a^8 *b^2 *c^6 *f^2 *i *z - 43646976 *a^6 \\
& *b^4 *c^6 *d^2 *i *z - 8847360 *a^8 *b^3 *c^5 *g *h^2 *z + 4423680 *a^7 *b^5 *c^4 *g *h^2 * \\
& z + 2048000 *a^6 *b^6 *c^4 *f^2 *i *z - 1105920 *a^6 *b^7 *c^3 *g *h^2 *z - 849920 *a^5 * \\
& b^8 *c^3 *f^2 *i *z + 393216 *a^7 *b^4 *c^5 *f^2 *i *z + 145920 *a^4 *b^{10} *c^2 *f^2 *i *z \\
& + 138240 *a^5 *b^9 *c^2 *g *h^2 *z - 32587776 *a^5 *b^6 *c^5 *d^2 *i *z + 25362432 *a^7 * \\
& b^3 *c^6 *f^2 *g *z + 21657600 *a^4 *b^8 *c^4 *d^2 *i *z + 17694720 *a^8 *b^2 *c^6 *e *h^2 \\
& *z - 50724864 *a^7 *b^2 *c^7 *e *f^2 *z - 13271040 *a^6 *b^5 *c^5 *f^2 *g *z - 8847360 * \\
& a^7 *b^4 *c^5 *e *h^2 *z - 5810688 *a^3 *b^{10} *c^3 *d^2 *i *z + 3563520 *a^5 *b^7 *c^4 *f^ \\
& 2 *g *z + 2211840 *a^6 *b^6 *c^4 *e *h^2 *z + 845568 *a^2 *b^{12} *c^2 *d^2 *i *z - 506880 * \\
& a^4 *b^9 *c^3 *f^2 *g *z - 276480 *a^5 *b^8 *c^3 *e *h^2 *z + 34560 *a^3 *b^{11} *c^2 *f^2 *g \\
& *z + 13824 *a^4 *b^{10} *c^2 *e *h^2 *z + 26542080 *a^6 *b^4 *c^6 *e *f^2 *z + 23362560 *a \\
& ^3 *b^9 *c^4 *d^2 *g *z - 46725120 *a^3 *b^8 *c^5 *d^2 *e *z - 7127040 *a^5 *b^6 *c^5 *e *f \\
& ^2 *z - 2965248 *a^2 *b^{11} *c^3 *d^2 *g *z + 1013760 *a^4 *b^8 *c^4 *e *f^2 *z - 69120 *a \\
& ^3 *b^{10} *c^3 *e *f^2 *z + 1536 *a^2 *b^{12} *c^2 *e *f^2 *z + 5930496 *a^2 *b^{10} *c^4 *d^2 * \\
& e *z + 1536 *a *b^{15} *d *f *i *z - 693633024 *a^7 *c^9 *d^2 *e *z - 231211008 *a^8 *c^8 *d
\end{aligned}$$

$$\begin{aligned}
& ^2*i*z - 4718592*a^{10}*c^6*h^2*i*z + 2304*a^4*b^{12}*h^2*i*z + 13107200*a^9*c^7*f^2*i*z + 256*a^2*b^{14}*f^2*i*z - 14155776*a^9*c^7*e*h^2*z + 39321600*a^8*c^8*e*f^2*z + 13824*b^{14}*c^2*d^2*e*z - 6912*b^{15}*c*d^2*g*z + 2304*b^{16}*d^2*i*z + 737280*a^7*b*c^5*f*g*h*i - 2304*a^3*b^9*c*f*g*h*i - 6912*a^2*b^{10}*c*d*g*h*i + 11059200*a^6*b*c^6*d*e*h*i + 5160960*a^6*b*c^6*d*f*g*i + 2211840*a^6*b*c^6*e*f*g*h + 4608*a*b^{10}*c^2*d*e*f*i + 15482880*a^5*b*c^7*d*e*f*g - 13824*a*b^9*c^3*d*e*f*g - 2304*a*b^{11}*c*d*f*g*i + 1843200*a^6*b^3*c^4*f*g*h*i + 783360*a^5*b^5*c^3*f*g*h*i + 18432*a^4*b^7*c^2*f*g*h*i - 5529600*a^6*b^2*c^5*d*g*h*i - 3686400*a^6*b^2*c^5*e*f*h*i - 2211840*a^5*b^4*c^4*d*g*h*i - 1566720*a^5*b^4*c^4*e*f*h*i + 317952*a^4*b^6*c^3*d*g*h*i - 36864*a^4*b^6*c^3*e*f*h*i + 6912*a^3*b^8*c^2*d*g*h*i + 4608*a^3*b^8*c^2*e*f*h*i + 5160960*a^5*b^3*c^5*d*f*g*i + 4423680*a^5*b^3*c^5*e*f*g*h + 4423680*a^5*b^3*c^5*d*e*h*i - 635904*a^4*b^5*c^4*d*e*h*i - 354816*a^3*b^7*c^3*d*f*g*i + 322560*a^4*b^5*c^4*d*f*g*i + 138240*a^4*b^5*c^4*e*f*g*h + 59904*a^2*b^9*c^2*d*f*g*i - 13824*a^3*b^7*c^3*e*f*g*h - 13824*a^3*b^7*c^3*d*e*h*i + 13824*a^2*b^9*c^2*d*e*h*i - 16588800*a^5*b^2*c^6*d*e*g*h - 10321920*a^5*b^2*c^6*d*e*f*i + 1658880*a^4*b^4*c^5*d*e*g*h + 709632*a^3*b^6*c^4*d*e*f*i - 645120*a^4*b^4*c^5*d*e*f*i + 124416*a^3*b^6*c^4*d*e*g*h - 119808*a^2*b^8*c^3*d*e*f*i - 41472*a^2*b^8*c^3*d*e*g*h + 7741440*a^4*b^3*c^6*d*e*f*g - 2903040*a^3*b^5*c^5*d*e*f*g + 387072*a^2*b^7*c^4*d*e*f*g - 3456*a^4*b^8*c*g*h^2*i - 2304*a^4*b^8*c*f*h*i^2 + 1105920*a^7*b*c^5*e*h^2*i - 384*a^2*b^{10}*c*f^2*g*i - 10616832*a^6*b*c^6*e^2*g*i - 3538944*a^7*b*c^5*e*g*i^2 + 1843200*a^7*b*c^5*d*h*i^2 + 1152*a^3*b^9*c*d*h*i^2 - 37062144*a^5*b*c^7*d^2*f*h + 2580480*a^6*b*c^6*e*f^2*i + 65664*a*b^{10}*c^2*d^2*g*i + 23224320*a^5*b*c^7*d^2*e*i - 9216*a^2*b^{10}*c*d*f*i^2 - 5985792*a^6*b*c^6*d*f*h^2 + 206010*a*b^9*c^3*d^2*f*h - 131328*a*b^9*c^3*d^2*e*i - 6300*a*b^{10}*c^2*d*f^2*h + 16588800*a^5*b*c^7*d*e^2*h + 3456*a*b^{10}*c^2*d*f*g^2 + 435456*a*b^8*c^4*d^2*e*g + 13824*a*b^8*c^4*d*e^2*f - 1474560*a^7*c^6*e*f*h*i - 10321920*a^6*c^7*d*e*f*i + 1350*a*b^{11}*c*d*f*h^2 - 552960*a^7*b^2*c^4*g*h^2*i - 552960*a^6*b^4*c^3*g*h^2*i - 145152*a^5*b^6*c^2*g*h^2*i - 737280*a^7*b^2*c^4*f*h*i^2 - 568320*a^6*b^4*c^3*f*h*i^2 - 136704*a^5*b^6*c^2*f*h*i^2 - 1290240*a^6*b^2*c^5*f^2*g*i + 1105920*a^6*b^3*c^4*e*h^2*i - 860160*a^5*b^4*c^4*f^2*g*i + 290304*a^5*b^5*c^3*e*h^2*i - 80640*a^4*b^6*c^3*f^2*g*i + 12672*a^3*b^8*c^2*f^2*g*i + 6912*a^4*b^7*c^2*e*h^2*i + 5308416*a^6*b^2*c^5*e*g^2*i - 5308416*a^5*b^3*c^5*e^2*g*i - 3538944*a^6*b^3*c^4*e*g*i^2 + 2654208*a^5*b^4*c^4*e*g^2*i + 1658880*a^6*b^3*c^4*d*h*i^2 - 1105920*a^5*b^4*c^4*f*g^2*h - 884736*a^5*b^5*c^3*e*g*i^2 - 552960*a^6*b^2*c^5*f*g^2*h + 262656*a^5*b^5*c^3*d*h*i^2 - 55296*a^4*b^7*c^2*d*h*i^2 - 34560*a^4*b^6*c^3*f*g^2*h + 3456*a^3*b^8*c^2*f*g^2*h - 11612160*a^5*b^2*c^6*d^2*g*i + 1720320*a^5*b^3*c^5*e*f^2*i - 1658880*a^6*b^2*c^5*e*g*h^2 + 1596672*a^3*b^6*c^4*d^2*g*i - 829440*a^5*b^4*c^4*e*g*h^2 - 508032*a^2*b^8*c^3*d^2*g*i + 161280*a^4*b^5*c^4*e*f^2*i - 25344*a^3*b^7*c^3*e*f^2*i - 20736*a^4*b^6*c^3*e*g*h^2 + 768*a^2*b^9*c^2*e*f^2*i - 4423680*a^5*b^2*c^6*e^2*f*h + 4147200*a^5*b^3*c^5*d*g^2*h - 2580480*a^6*b^2*c^5*d*f*i^2 - 967680*a^5*b^4*c^4*d*f*i^2 - 414720*a^4*b^5*c^4*d*g^2*h - 138240*a^4*b^4*c^5*e^2*f*h + 64512*a^4*b^6*c^3*d*f*i^2 + 39168*a^3*b^8*c^2*d*f*i^2 - 31104*a^3*b^7*c^3*d*g^
\end{aligned}$$

$$\begin{aligned}
& 2*h + 13824*a^3*b^6*c^4*e^2*f*h + 10368*a^2*b^9*c^2*d*g^2*h + 15630336*a^5* \\
& b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f*h + 9630144*a^3*b^5*c^5*d^2*f* \\
& h - 8764416*a^5*b^3*c^5*d*f*h^2 - 3870720*a^5*b^2*c^6*e*f^2*g - 3193344*a^3 \\
& *b^5*c^5*d^2*e*i + 2867328*a^4*b^4*c^5*d*f^2*h - 2095200*a^2*b^7*c^4*d^2*f* \\
& h - 1414080*a^3*b^6*c^4*d*f^2*h - 34836480*a^4*b^2*c^7*d^2*e*g + 1016064*a^ \\
& 2*b^7*c^4*d^2*e*i - 645120*a^4*b^4*c^5*e*f^2*g + 306720*a^3*b^7*c^3*d*f*h^2 \\
& + 197820*a^2*b^8*c^3*d*f^2*h + 146880*a^4*b^5*c^4*d*f*h^2 + 80640*a^3*b^6*c \\
& ^4*e*f^2*g - 55350*a^2*b^9*c^2*d*f*h^2 - 2304*a^2*b^8*c^3*e*f^2*g - 387072 \\
& 0*a^5*b^2*c^6*d*f*g^2 - 1935360*a^4*b^4*c^5*d*f*g^2 - 1658880*a^4*b^3*c^6*d \\
& *e^2*h + 725760*a^3*b^6*c^4*d*f*g^2 + 17418240*a^3*b^4*c^6*d^2*e*g - 124416 \\
& *a^3*b^5*c^5*d*e^2*h - 96768*a^2*b^8*c^3*d*f*g^2 + 41472*a^2*b^7*c^4*d*e^2* \\
& h - 3919104*a^2*b^6*c^5*d^2*e*g - 7741440*a^4*b^2*c^7*d*e^2*f + 2903040*a^3 \\
& *b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 184320*a^8*b*c^4*h^2*i^2 + \\
& 25344*a^5*b^7*c*h^2*i^2 - 884736*a^6*b^3*c^4*g^3*i - 589824*a^7*b^3*c^3*g*i \\
& ^3 - 442368*a^5*b^5*c^3*g^3*i - 294912*a^6*b^5*c^2*g*i^3 + 430080*a^7*b*c^5 \\
& *f^2*i^2 - 1984*a^3*b^9*c*f^2*i^2 + 3538944*a^5*b^2*c^6*e^3*i - 1648128*a^5 \\
& *b^3*c^5*f^3*h + 1179648*a^7*b^2*c^4*e*i^3 - 898560*a^6*b^3*c^4*f*h^3 + 589 \\
& 824*a^6*b^4*c^3*e*i^3 - 354240*a^5*b^5*c^3*f*h^3 - 354240*a^4*b^5*c^4*f^3*h \\
& + 98304*a^5*b^6*c^2*e*i^3 + 43680*a^3*b^7*c^3*f^3*h - 21600*a^4*b^7*c^2*f* \\
& h^3 - 1050*a^2*b^9*c^2*f^3*h + 225*a^2*b^10*c*f^2*h^2 + 3870720*a^6*b*c^6*d \\
& ^2*i^2 + 1658880*a^6*b*c^6*e^2*h^2 + 16547328*a^4*b^2*c^7*d^3*h - 12306816* \\
& a^3*b^4*c^6*d^3*h + 37310976*a^3*b^3*c^7*d^3*f + 3037824*a^2*b^6*c^5*d^3*h \\
& - 2654208*a^5*b^3*c^5*e*g^3 + 1949184*a^6*b^2*c^5*d*h^3 + 1296000*a^5*b^4*c \\
& ^4*d*h^3 - 155520*a^4*b^6*c^3*d*h^3 - 40500*a*b^10*c^2*d^2*h^2 - 8100*a^3*b \\
& ^8*c^2*d*h^3 + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 108 \\
& 864*a*b^9*c^3*d^2*g^2 - 8068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f \\
& ^3 + 1737792*a^3*b^5*c^5*d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c \\
& ^4*d*f^3 - 435456*a*b^7*c^5*d^2*e^2 - 245760*a^8*c^5*f*h*i^2 + 384*a^3*b^1 \\
& 0*f*h*i^2 + 1152*a^2*b^11*d*h*i^2 - 2211840*a^6*c^7*e^2*f*h - 1720320*a^7*c \\
& ^6*d*f*i^2 - 9450*b^11*c^2*d^2*f*h + 6912*b^11*c^2*d^2*e*i + 1612800*a^6*c^ \\
& 7*d*f^2*h - 393216*a^8*b*c^4*g*i^3 - 49152*a^5*b^7*c*g*i^3 - 20736*b^10*c^3 \\
& *d^2*e*g - 75188736*a^4*b*c^8*d^3*f - 883200*a^6*b*c^6*f^3*h - 317952*a^7*b \\
& *c^5*f*h^3 + 1350*a^3*b^9*c*f*h^3 - 15482880*a^5*c^8*d*e^2*f - 9792*a*b^11* \\
& c*d^2*i^2 - 10616832*a^5*b*c^7*e^3*g - 345060*a*b^8*c^4*d^3*h + 4050*a^2*b^ \\
& 10*c*d*h^3 - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9* \\
& c^3*d*f^3 + 276480*a^7*b^3*c^3*h^2*i^2 + 140544*a^6*b^5*c^2*h^2*i^2 + 88473 \\
& 6*a^7*b^2*c^4*g^2*i^2 + 884736*a^6*b^4*c^3*g^2*i^2 + 221184*a^5*b^6*c^2*g^2 \\
& *i^2 + 501760*a^6*b^3*c^4*f^2*i^2 + 414720*a^6*b^3*c^4*g^2*h^2 + 207360*a^5 \\
& *b^5*c^3*g^2*h^2 + 170240*a^5*b^5*c^3*f^2*i^2 + 9216*a^4*b^7*c^2*f^2*i^2 + \\
& 5184*a^4*b^7*c^2*g^2*h^2 + 3538944*a^6*b^2*c^5*e^2*i^2 + 1684224*a^6*b^2*c^ \\
& 5*f^2*h^2 + 1264320*a^5*b^4*c^4*f^2*h^2 + 884736*a^5*b^4*c^4*e^2*i^2 + 1267 \\
& 20*a^4*b^6*c^3*f^2*h^2 - 13950*a^3*b^8*c^2*f^2*h^2 + 1935360*a^5*b^3*c^5*d^ \\
& 2*i^2 + 967680*a^5*b^3*c^5*f^2*g^2 + 829440*a^5*b^3*c^5*e^2*h^2 - 532224*a^ \\
& 4*b^5*c^4*d^2*i^2 + 161280*a^4*b^5*c^4*f^2*g^2 - 96768*a^3*b^7*c^3*d^2*i^2 \\
& + 62784*a^2*b^9*c^2*d^2*i^2 + 20736*a^4*b^5*c^4*e^2*h^2 - 20160*a^3*b^7*c^3
\end{aligned}$$

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*f^2*g^2 + 576*a^2*b^9*c^2*f^2*g^2 + 11487744*a^5*b^2*c^6*d^2*h^2 + 7962624
*a^5*b^2*c^6*e^2*g^2 + 35525376*a^4*b^2*c^7*d^2*f^2 - 1412640*a^3*b^6*c^4*d
^2*h^2 + 461376*a^4*b^4*c^5*d^2*h^2 + 375030*a^2*b^8*c^3*d^2*h^2 + 8709120*
a^4*b^3*c^6*d^2*g^2 - 4354560*a^3*b^5*c^5*d^2*g^2 + 979776*a^2*b^7*c^4*d^2*
g^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f^2 + 2304*a^2*b^7
*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2*b^6*c^5*d^2*f^2 -
17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^2 - 3456*b^12*c*d
^2*g*i + 384*a*b^12*d*f*i^2 + 576*a^4*b^9*h^2*i^2 + 3538944*a^7*c^6*e^2*i^2
+ 115200*a^7*c^6*f^2*h^2 + 64*a^2*b^11*f^2*i^2 + 6096384*a^6*c^7*d^2*h^2 +
5184*b^11*c^2*d^2*g^2 + 131072*a^8*b^2*c^3*i^4 + 98304*a^7*b^4*c^2*i^4 + 1
1025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 142560*a^6*b^4*c^3*h^4 +
103680*a^7*b^2*c^4*h^4 + 32400*a^5*b^6*c^2*h^4 + 20736*b^9*c^4*d^2*e^2 + 33
1776*a^5*b^4*c^4*g^4 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43
120*a^3*b^6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 644
6304*a^2*b^4*c^7*d^4 + 7077888*a^6*c^7*e^3*i + 786432*a^8*c^5*e*i^3 + 28449
792*a^5*c^8*d^3*h + 17010*b^10*c^3*d^3*h + 2025*b^12*c*d^2*h^2 + 580608*a^7
*c^6*d*h^3 - 39690*b^9*c^4*d^3*f + 32768*a^6*b^6*c*i^4 + 2025*a^4*b^8*c*h^4
- 734832*a*b^6*c^6*d^4 + 576*b^13*d^2*i^2 + 65536*a^9*c^4*i^4 + 20736*a^8*
c^5*h^4 + 4096*a^5*b^8*i^4 + 49787136*a^4*c^9*d^4 + 160000*a^6*c^7*f^4 + 53
08416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, 1), 1, 1, 4)

```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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**4+b*x**2+a)**3,x)

[Out] Timed out

$$3.57 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=1150

$$\frac{-\frac{lb^4}{c^2} + \frac{jb^3}{c} - \left(3g - \frac{5al}{c}\right)b^2 + 2(3ce + aj)b + 2(jb^2 - 3cgb - 3alb + 6c^2e + 2acj)x^2 - 16a^2l}{4(b^2 - 4ac)^2(cx^4 + bx^2 + a)} + \frac{\left(\left(\frac{ma^2}{c} + 3cd\right)b^3 + a\right)}{4(b^2 - 4ac)^2(cx^4 + bx^2 + a)}$$

[Out] $\frac{1}{4}*(-b*c*(a*j+c*e)+a*b^2*1+2*a*c*(-a*1+c*g)-(2*c^3*e-c^2*(2*a*j+b*g)-b^3*1+b*c*(3*a*1+b*j))*x^2)/c^2/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2-1/4*x*(a*b*c*(a*k+c*f)-b^2*(a^2*m+c^2*d)+2*a*c*(a^2*m-a*c*h+c^2*d)+(a*b^2*c*k+2*a*c^2*(-a*k+c*f)-a*b^3*m-b*c*(-3*a^2*m+a*c*h+c^2*d))*x^2)/a/c^2/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+1/4*(b^3*j/c+2*b*(a*j+3*c*e)-16*a^2*1-b^4*1/c^2-b^2*(3*g-5*a*1/c)+2*(-3*a*b*1+2*a*c*j+b^2*j-3*b*c*g+6*c^2*e)*x^2)/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)+1/8*x*(4*a^2*b*c^2*(a*k+2*c*f)+a*b^3*c*(2*a*k+c*f)-a*b^2*c*(-11*a^2*m+7*a*c*h+25*c^2*d)+4*a^2*c^2*(-9*a^2*m+a*c*h+7*c^2*d)+b^4*(-2*a^2*m+3*c^2*d)+c*(a*b^2*c*(3*a*k+c*f)+4*a^2*c^2*(3*a*k+5*c*f)+b^3*(a^2*m+3*c^2*d)-4*a*b*c*(4*a^2*m+3*a*c*h+6*c^2*d))*x^2)/a^2/c^2/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)-(-3*a*b*1+2*a*c*j+b^2*j-3*b*c*g+6*c^2*e)*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/(-4*a*c+b^2)^(5/2)+1/16*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2))*(a*b^2*c*(3*a*k+c*f)+4*a^2*c^2*(3*a*k+5*c*f)+b^3*(a^2*m+3*c^2*d)-4*a*b*c*(4*a^2*m+3*a*c*h+6*c^2*d)+(a*b^3*c*(-3*a*k+c*f)-4*a^2*b*c^2*(9*a*k+13*c*f)-6*a*b^2*c*(-3*a^2*m-3*a*c*h+5*c^2*d)+b^4*(-a^2*m+3*c^2*d)+8*a^2*c^2*(5*a^2*m+3*a*c*h+21*c^2*d))/(-4*a*c+b^2)^(1/2))/a^2/c^(3/2)/(-4*a*c+b^2)^2*2^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/16*arctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*(a*b^2*c*(3*a*k+c*f)+4*a^2*c^2*(3*a*k+5*c*f)+b^3*(a^2*m+3*c^2*d)-4*a*b*c*(4*a^2*m+3*a*c*h+6*c^2*d))+(-a*b^3*c*(-3*a*k+c*f)+4*a^2*b*c^2*(9*a*k+13*c*f)+6*a*b^2*c*(-3*a^2*m-3*a*c*h+5*c^2*d)-b^4*(-a^2*m+3*c^2*d)-8*a^2*c^2*(5*a^2*m+3*a*c*h+21*c^2*d))/(-4*a*c+b^2)^(1/2))/a^2/c^(3/2)/(-4*a*c+b^2)^2*2^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)$

Rubi [A] time = 8.16, antiderivative size = 1144, normalized size of antiderivative = 0.99, number of steps used = 11, number of rules used = 9, integrand size = 55, $\frac{\text{number of rules}}{\text{integrand size}} = 0.164$, Rules used = {1673, 1678, 1166, 205, 1663, 1660, 638, 618, 206}

$$\frac{-\frac{lb^4}{c^2} + \frac{jb^3}{c} - \left(3g - \frac{5al}{c}\right)b^2 + 2(3ce + aj)b + 2(jb^2 - 3cgb - 3alb + 6c^2e + 2acj)x^2 - 16a^2l}{4(b^2 - 4ac)^2(cx^4 + bx^2 + a)} + \frac{\left(\left(\frac{ma^2}{c} + 3cd\right)b^3 + a\right)}{4(b^2 - 4ac)^2(cx^4 + bx^2 + a)}$$

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^2 + c*x^4)^3,x]

[Out]
$$\begin{aligned} & -(b*c*(c*e + a*j) - a*b^2*l - 2*a*c*(c*g - a*l) + (2*c^3*e - c^2*(b*g + 2*a*j) - b^3*l + b*c*(b*j + 3*a*l))*x^2)/(4*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) - (x*(a*b*c*(c*f + a*k) - b^2*(c^2*d + a^2*m) + 2*a*c*(c^2*d - a*c*h + a^2*m) + (a*b^2*c*k + 2*a*c^2*(c*f - a*k) - a*b^3*m - b*c*(c^2*d + a*c*h - 3*a^2*m))*x^2))/(4*a*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + ((b^3*j)/c + 2*b*(3*c*e + a*j) - 16*a^2*l - (b^4*l)/c^2 - b^2*(3*g - (5*a*l)/c) + 2*(6*c^2*e - 3*b*c*g + b^2*j + 2*a*c*j - 3*a*b*l)*x^2)/(4*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (x*(4*a^2*b*c*(2*c*f + a*k) + a*b^3*(c*f + 2*a*k) - a*b^2*(25*c^2*d + 7*a*c*h - 11*a^2*m) + 4*a^2*c*(7*c^2*d + a*c*h - 9*a^2*m) + b^4*(3*c*d - (2*a^2*m)/c) + (a*b^2*c*(c*f + 3*a*k) + 4*a^2*c^2*(5*c*f + 3*a*k) + b^3*(3*c^2*d + a^2*m) - 4*a*b*c*(6*c^2*d + 3*a*c*h + 4*a^2*m))*x^2))/(8*a^2*c*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + ((a*b^2*(c*f + 3*a*k) + 4*a^2*c*(5*c*f + 3*a*k) - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*m) + b^3*(3*c*d + (a^2*m)/c) + (a*b^3*c*(c*f - 3*a*k) - 4*a^2*b*c^2*(13*c*f + 9*a*k) - 6*a*b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*m) + b^4*(3*c^2*d - a^2*m) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2*m)))/(c*sqrt[b^2 - 4*a*c]))*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b - sqrt[b^2 - 4*a*c]]]/(8*sqrt[2]*a^2*sqrt[c]*(b^2 - 4*a*c)^2*sqrt[b - sqrt[b^2 - 4*a*c]]) + ((a*b^2*(c*f + 3*a*k) + 4*a^2*c*(5*c*f + 3*a*k) - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*m) + b^3*(3*c*d + (a^2*m)/c) - (a*b^3*c*(c*f - 3*a*k) - 4*a^2*b*c^2*(13*c*f + 9*a*k) - 6*a*b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*m) + b^4*(3*c^2*d - a^2*m) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2*m)))/(c*sqrt[b^2 - 4*a*c]))*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b + sqrt[b^2 - 4*a*c]]]/(8*sqrt[2]*a^2*sqrt[c]*(b^2 - 4*a*c)^2*sqrt[b + sqrt[b^2 - 4*a*c]]) - ((6*c^2*e - 3*b*c*g + b^2*j + 2*a*c*j - 3*a*b*l)*ArcTanh[(b + 2*c*x^2)/sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(5/2) \end{aligned}$$

Rule 205

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]

Rule 206

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (GtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 638

```
Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol]
  > Simp[((b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[((2*p + 3)*(2*c*d - b*e))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2]
```

Rule 1166

```
Int[((d_.) + (e_.)*(x_)^2)/((a_.) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
  > With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2 + c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1660

```
Int[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] > With[{Q = PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[Pq, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x + c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_.)*((a_.) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :
  > Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_.) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] > Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]
```

Rule 1678

```
Int[(Pq_)*((a_.) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] > With[{d =
```

```

Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p + 7)*(b*d - 2*a*e)*x^2, x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]

```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + jx^5 + kx^6 + lx^7 + mx^8}{(a + bx^2 + cx^4)^3} dx &= \int \frac{x(e + gx^2 + jx^4 + lx^6)}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2 + hx^4 + kx^6}{(a + bx^2 + cx^4)^3} dx \\
&= -\frac{x(abc(cf + ak) - b^2(c^2d + a^2m) + 2ac(c^2d - ach + 2abd))}{4ac^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg + 2ad))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg + 2ad))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg + 2ad))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg + 2ad))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)}
\end{aligned}$$

Mathematica [A] time = 7.48, size = 1590, normalized size = 1.38

$$\frac{2cla^3 + 2cmxa^3 - 2c^2kx^3a^2 + 3bcmx^3a^2 - 2c^2jx^2a^2 + 3bclx^2a^2 - 2c^2ga^2 + bcja^2 - b^2la^2 - 2c^2hxa^2 + bckxa^2 - b^2c^2}{4ac^2}$$

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^2 + c*x^4)^3, x]

[Out] (a*b*c^2*e - 2*a^2*c^2*g + a^2*b*c*j - a^2*b^2*l + 2*a^3*c*l - b^2*c^2*d*x + 2*a*c^3*d*x + a*b*c^2*f*x - 2*a^2*c^2*h*x + a^2*b*c*k*x - a^2*b^2*m*x + 2*a^3*c*m*x + 2*a*c^3*e*x^2 - a*b*c^2*g*x^2 + a*b^2*c*j*x^2 - 2*a^2*c^2*j*x^2 - a*b^3*l*x^2 + 3*a^2*b*c*l*x^2 - b*c^3*d*x^3 + 2*a*c^3*f*x^3 - a*b*c^2*h*x^3 + a*b^2*c*k*x^3 - 2*a^2*c^2*k*x^3 - a*b^3*m*x^3 + 3*a^2*b*c*m*x^3) / (4*a*c^2*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (12*a^2*b*c^3*e - 6*a^2*b^2*c^2*g + 2*a^2*b^3*c*j + 4*a^3*b*c^2*j - 2*a^2*b^4*l + 10*a^3*b^2*c*l - 32*a^4*c^2*l + 3*b^4*c^2*d*x - 25*a*b^2*c^3*d*x + 28*a^2*c^4*d*x + a*b^3*c^2*f*x + 8*a^2*b*c^3*f*x - 7*a^2*b^2*c^2*h*x + 4*a^3*c^3*h*x + 2*a^2*b^3*c*k*x + 4*a^3*b*c^2*k*x - 2*a^2*b^4*m*x + 11*a^3*b^2*c*m*x - 36*a^4*c^2*m*x + 24*a^2*c^4*e*x^2 - 12*a^2*b*c^3*g*x^2 + 4*a^2*b^2*c^2*j*x^2 + 8*a^3*c^3*j*x^2 - 12*a^3*b*c^2*l*x^2 + 3*b^3*c^3*d*x^3 - 24*a*b*c^4*d*x^3 + a*b^2*c^3*f*x^3 + 20*a^2*c^4*f*x^3 - 12*a^2*b*c^3*h*x^3 + 3*a^2*b^2*c^2*k*x^3 + 12*a^3*c^3*k*x^3 + a^2*b^3*c*m*x^3 - 16*a^3*b*c^2*m*x^3) / (8*a^2*c^2*(-b^2 + 4*a*c)^2*(a + b*x^2 + c*x^4)) + ((3*b^4*c^2*d - 30*a*b^2*c^3*d + 168*a^2*c^4*d + 3*b^3*c^2*sqrt[b^2 - 4*a*c]*d - 24*a*b*c^3*sqrt[b^2 - 4*a*c]*d + a*b^3*c^2*f - 5*2*a^2*b*c^3*f + a*b^2*c^2*sqrt[b^2 - 4*a*c]*f + 20*a^2*c^3*sqrt[b^2 - 4*a*c]*f + 18*a^2*b^2*c^2*h + 24*a^3*c^3*h - 12*a^2*b*c^2*sqrt[b^2 - 4*a*c]*h - 3*a^2*b^3*c*k - 36*a^3*b*c^2*k + 3*a^2*b^2*c*sqrt[b^2 - 4*a*c]*k + 12*a^3*c^2*sqrt[b^2 - 4*a*c]*k - a^2*b^4*m + 18*a^3*b^2*c*m + 40*a^4*c^2*m + a^2*b^3*sqrt[b^2 - 4*a*c]*m - 16*a^3*b*c*sqrt[b^2 - 4*a*c]*m)*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b - sqrt[b^2 - 4*a*c]]) / (8*sqrt[2]*a^2*c^(3/2)*(b^2 - 4*a*c)^(5/2)*sqrt[b - sqrt[b^2 - 4*a*c]]) + ((-3*b^4*c^2*d + 30*a*b^2*c^3*d - 168*a^2*c^4*d + 3*b^3*c^2*sqrt[b^2 - 4*a*c]*d - 24*a*b*c^3*sqrt[b^2 - 4*a*c]*d - a*b^3*c^2*f + 52*a^2*b*c^3*f + a*b^2*c^2*sqrt[b^2 - 4*a*c]*f + 20*a^2*c^3*sqrt[b^2 - 4*a*c]*f - 18*a^2*b^2*c^2*h - 24*a^3*c^3*h - 12*a^2*b*c^2*sqrt[b^2 - 4*a*c]*h + 3*a^2*b^3*c*k + 36*a^3*b*c^2*k + 3*a^2*b^2*c*sqrt[b^2 - 4*a*c]*k + 12*a^3*c^2*sqrt[b^2 - 4*a*c]*k + a^2*b^4*m - 18*a^3*b^2*c*m - 40*a^4*c^2*m + a^2*b^3*sqrt[b^2 - 4*a*c]*m - 16*a^3*b*c*sqrt[b^2 - 4*a*c]*m)*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b + sqrt[b^2 - 4*a*c]]) / (8*sqrt[2]*a^2*c^(3/2)*(b^2 - 4*a*c)^(5/2)*sqrt[b + sqrt[b^2 - 4*a*c]]) + ((6*c^2*e - 3*b*c*g + b^2*j + 2*a*c*j - 3*a*b*l)*Log[-b + sqrt[b^2 - 4*a*c] - 2*c*x^2]) / (2*(b^2

$- 4*a*c)^{(5/2)} + ((-6*c^2*e + 3*b*c*g - b^2*j - 2*a*c*j + 3*a*b*1)*\text{Log}[b + \text{Sqrt}[b^2 - 4*a*c] + 2*c*x^2]) / (2*(b^2 - 4*a*c)^{(5/2)})$

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a)^3,x, algorithm="fricas")

[Out] Timed out

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a)^3,x, algorithm="giac")

[Out] Timed out

maple [B] time = 0.12, size = 6026, normalized size = 5.24

output 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^4+b*x^2+a)^3,x)

[Out] result too large to display

maxima [F] time = 0.00, size = 0, normalized size = 0.00

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^4+b*x^2+a)^3,x, algorithm="maxima")

[Out] $-1/8*((12*a^2*b*c^3*h - 3*(b^3*c^3 - 8*a*b*c^4)*d - (a*b^2*c^3 + 20*a^2*c^4)*f - 3*(a^2*b^2*c^2 + 4*a^3*c^3)*k - (a^2*b^3*c - 16*a^3*b*c^2)*m)*x^7 - 12*a^4*b*c*j - 4*(6*a^2*c^4*e - 3*a^2*b*c^3*g - 3*a^3*b*c^2*1 + (a^2*b^2*c^2 + 2*a^3*c^3)*j)*x^6 - ((6*b^4*c^2 - 49*a*b^2*c^3 + 28*a^2*c^4)*d + 2*(a*b^$

$$\begin{aligned}
& 3*c^2 + 14*a^2*b*c^3)*f - (19*a^2*b^2*c^2 - 4*a^3*c^3)*h + (5*a^2*b^3*c + 1 \\
& 6*a^3*b*c^2)*k - (a^2*b^4 + 5*a^3*b^2*c + 36*a^4*c^2)*m)*x^5 - 2*(18*a^2*b* \\
& c^3*e - 9*a^2*b^2*c^2*g + 3*(a^2*b^3*c + 2*a^3*b*c^2)*j - (a^2*b^4 + a^3*b^ \\
& 2*c + 16*a^4*c^2)*l)*x^4 - ((3*b^5*c - 20*a*b^3*c^2 - 4*a^2*b*c^3)*d + (a*b \\
& ^4*c + 5*a^2*b^2*c^2 + 36*a^3*c^3)*f - (5*a^2*b^3*c + 16*a^3*b*c^2)*h + (19 \\
& *a^3*b^2*c - 4*a^4*c^2)*k - 2*(a^3*b^3 + 14*a^4*b*c)*m)*x^3 - 4*(2*(a^2*b^2 \\
& *c^2 + 5*a^3*c^3)*e - (a^2*b^3*c + 5*a^3*b*c^2)*g + (5*a^3*b^2*c - 2*a^4*c^ \\
& 2)*j - (a^3*b^3 + 5*a^4*b*c)*l)*x^2 + 2*(a^2*b^3*c - 10*a^3*b*c^2)*e + 2*(a \\
& ^3*b^2*c + 8*a^4*c^2)*g + 2*(a^4*b^2 + 8*a^5*c)*l - (12*a^4*b*c*k + (5*a*b^ \\
& 4*c - 37*a^2*b^2*c^2 + 44*a^3*c^3)*d - (a^2*b^3*c - 16*a^3*b*c^2)*f - 3*(a^ \\
& 3*b^2*c + 4*a^4*c^2)*h - (a^4*b^2 + 20*a^5*c)*m)*x)/(a^4*b^4*c - 8*a^5*b^2* \\
& c^2 + 16*a^6*c^3 + (a^2*b^4*c^3 - 8*a^3*b^2*c^4 + 16*a^4*c^5)*x^8 + 2*(a^2* \\
& b^5*c^2 - 8*a^3*b^3*c^3 + 16*a^4*b*c^4)*x^6 + (a^2*b^6*c - 6*a^3*b^4*c^2 + \\
& 32*a^5*c^4)*x^4 + 2*(a^3*b^5*c - 8*a^4*b^3*c^2 + 16*a^5*b*c^3)*x^2) - 1/8*i \\
& ntegrate((12*a^3*b*c*k + (12*a^2*b*c^2*h - 3*(b^3*c^2 - 8*a*b*c^3)*d - (a*b \\
& ^2*c^2 + 20*a^2*c^3)*f - 3*(a^2*b^2*c + 4*a^3*c^2)*k - (a^2*b^3 - 16*a^3*b* \\
& c)*m)*x^2 - 3*(b^4*c - 9*a*b^2*c^2 + 28*a^2*c^3)*d - (a*b^3*c - 16*a^2*b*c^ \\
& 2)*f - 3*(a^2*b^2*c + 4*a^3*c^2)*h - (a^3*b^2 + 20*a^4*c)*m - 8*(6*a^2*c^3* \\
& e - 3*a^2*b*c^2*g - 3*a^3*b*c*l + (a^2*b^2*c + 2*a^3*c^2)*j)*x)/(c*x^4 + b* \\
& x^2 + a), x)/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)
\end{aligned}$$

mupad [B] time = 20.57, size = 114377, normalized size = 99.46

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4 + j*x^5 + k*x^6 + l*x^7 + m*x^8)/(a + b*x^2 + c*x^4)^3, x)$

[Out] $\text{symsum}(\log(\text{root}(56371445760*a^{11}*b^8*c^9*z^4 - 503316480*a^8*b^{14}*c^6*z^4 + 47185920*a^7*b^{16}*c^5*z^4 - 2621440*a^6*b^{18}*c^4*z^4 + 65536*a^5*b^{20}*c^3*z^4 - 171798691840*a^{14}*b^2*c^{12}*z^4 + 193273528320*a^{13}*b^4*c^{11}*z^4 - 128849018880*a^{12}*b^6*c^{10}*z^4 - 16911433728*a^{10}*b^{10}*c^8*z^4 + 3523215360*a^9*b^{12}*c^7*z^4 + 68719476736*a^{15}*c^{13}*z^4 + 1536*a^5*b^{16}*c*k*m*z^2 + 1536*a*b^{18}*c^3*d*f*z^2 - 2571632640*a^9*b^5*c^8*d*m*z^2 + 2548039680*a^9*b^3*c^{10}*d*h*z^2 + 1509949440*a^{10}*b^3*c^9*e*l*z^2 + 1509949440*a^9*b^3*c^{10}*e*g*z^2 - 1401421824*a^8*b^5*c^9*d*h*z^2 - 1321205760*a^9*b^2*c^{11}*d*f*z^2 - 2793406464*a^{11}*b*c^{10}*d*m*z^2 + 890634240*a^8*b^7*c^7*d*m*z^2 - 754974720*a^{10}*b^4*c^8*g*l*z^2 - 754974720*a^9*b^5*c^8*e*l*z^2 + 719585280*a^8*b^6*c^8*d*k*z^2 - 707788800*a^9*b^4*c^9*d*k*z^2 - 754974720*a^8*b^5*c^9*e*g*z^2 + 603979776*a^{11}*b^2*c^9*g*l*z^2 - 581959680*a^{10}*b^4*c^8*f*m*z^2 + 732168192*a^7*b^6*c^9*d*f*z^2 + 534773760*a^{11}*b^3*c^8*h*m*z^2 - 456130560*a^{11}*b^4*c^7*k*m*z^2 - 603979776*a^{10}*b^2*c^{10}*e*j*z^2 + 534773760*a^{10}*b^3*c^9*f*k*z^2 + 384040960*a^9*b^6*c^7*f*m*z^2 + 377487360*a^9*b^6*c^7*g*l*z^2 - 456130560*a^9*b^4*c^9*f*h*z^2 + 301989888*a^{11}*b^3*c^8*j*l*z^2 - 415236096*a^{10}$

$$\begin{aligned}
& b^2c^{10}dkz^2 + 254017536a^{10}b^6c^6k^mz^2 - 330301440a^{10}b^4c^8h^kz^2 + 390463488a^7b^7c^8d^h^kz^2 + 188743680a^{12}b^2c^8k^mz^2 + \\
& 301989888a^{10}b^3c^9g^jz^2 - 297861120a^7b^8c^7d^kz^2 - 366280704a^6b^8c^8d^fz^2 + 188743680a^{11}b^2c^9h^kz^2 - 330301440a^8b^4c^{10}d^fz^2 + \\
& 254017536a^8b^6c^8f^h^kz^2 - 1887436800a^{10}b^6c^{11}d^h^kz^2 + 188743680a^8b^7c^7e^l^kz^2 + 153354240a^9b^6c^7h^kz^2 - 185303040a^7b^9c^6d^mz^2 - \\
& 117964800a^{10}b^5c^7h^mz^2 - 61931520a^9b^8c^5k^mz^2 + 121634816a^{11}b^2c^9f^mz^2 - 115671040a^8b^8c^6f^mz^2 - \\
& 62914560a^9b^7c^6j^l^kz^2 + 188743680a^{10}b^2c^{10}f^h^kz^2 - 94371840a^8b^8c^6g^l^kz^2 + 6144000a^8b^{10}c^4k^mz^2 - 117964800a^9b^5c^8f^kz^2 + \\
& 61440a^7b^{12}c^3k^mz^2 - 46080a^6b^{14}c^2k^mz^2 + 23592960a^8b^9c^5j^l^kz^2 + 188743680a^7b^7c^8e^g^kz^2 - 37355520a^9b^7c^6h^mz^2 + \\
& 125829120a^8b^6c^8e^j^kz^2 + 23101440a^8b^9c^5h^mz^2 - 3538944a^7b^{11}c^4j^l^kz^2 + 196608a^6b^{13}c^3j^l^kz^2 - 4349952a^7b^{11}c^4h^mz^2 + \\
& 337920a^6b^{13}c^3h^mz^2 - 7680a^5b^{15}c^2h^mz^2 - 62914560a^8b^7c^7g^j^kz^2 - 26542080a^8b^8c^6h^kz^2 + 17940480a^7b^{10}c^5f^mz^2 + \\
& 11796480a^7b^{10}c^5g^l^kz^2 - 37355520a^8b^7c^7f^kz^2 - 1347584a^6b^{12}c^4f^mz^2 + 68272128a^6b^{10}c^6d^kz^2 - 589824a^6b^{12}c^4g^l^kz^2 + \\
& 552960a^6b^{12}c^4h^kz^2 - 147456a^7b^{10}c^5h^kz^2 - 46080a^5b^{14}c^3h^kz^2 + 35840a^5b^{14}c^3f^mz^2 + 23592960a^7b^9c^6g^j^kz^2 - \\
& 23592960a^7b^9c^6e^l^kz^2 + 23371776a^6b^{11}c^5d^mz^2 + 23101440a^7b^9c^6f^kz^2 - 47185920a^7b^8c^7e^j^kz^2 - \\
& 61931520a^7b^8c^7f^h^kz^2 - 4349952a^6b^{11}c^5f^kz^2 - 3538944a^6b^{11}c^5g^j^kz^2 - 1677312a^5b^{13}c^4d^mz^2 + 1179648a^6b^{11}c^5e^l^kz^2 + \\
& 337920a^5b^{13}c^4f^kz^2 + 196608a^5b^{13}c^4g^j^kz^2 + 53760a^4b^{15}c^3d^mz^2 - 7680a^4b^{15}c^3f^kz^2 + 96583680a^5b^{10}c^7d^fz^2 - \\
& 9179136a^5b^{12}c^5d^kz^2 + 7077888a^6b^{10}c^6e^j^kz^2 - 51609600a^6b^9c^7d^h^kz^2 + 691200a^4b^{14}c^4d^kz^2 - 393216a^5b^{12}c^5e^j^kz^2 - \\
& 23040a^3b^{16}c^3d^kz^2 + 6144000a^6b^{10}c^6f^h^kz^2 + 61440a^5b^{12}c^5f^h^kz^2 - 46080a^4b^{14}c^4f^h^kz^2 + 1536a^3b^{16}c^3f^h^kz^2 - \\
& 23592960a^6b^9c^7e^g^kz^2 + 1179648a^5b^{11}c^6e^g^kz^2 + 829440a^4b^{13}c^5d^h^kz^2 + 368640a^5b^{11}c^6d^h^kz^2 - 105984a^3b^{15}c^4d^h^kz^2 + \\
& 4608a^2b^{17}c^3d^h^kz^2 - 15175680a^4b^{12}c^6d^fz^2 + 1428480a^3b^{14}c^5d^fz^2 - 73728a^2b^{16}c^4d^fz^2 + 4108320768a^{10}b^3c^9d^mz^2 - \\
& 1207959552a^{11}b^6c^{10}e^l^kz^2 - 1207959552a^{10}b^6c^{11}e^g^kz^2 - 578813952a^{12}b^6c^9h^mz^2 - 578813952a^{11}b^6c^{10}f^kz^2 - 402653184a^{12}b^6c^9j^l^kz^2 - \\
& 402653184a^{11}b^6c^{10}g^j^kz^2 - 440401920a^{10}b^6c^{11}f^kz^2 - 188743680a^{12}b^6c^9k^2z^2 - 188743680a^{11}b^6c^{10}h^2z^2 + 1761607680a^{10}c^{12}d^fz^2 - \\
& 14080a^6b^{15}c^m^2z^2 - 94464a^6b^{17}c^4d^2z^2 + 6936330240a^8b^3c^{11}d^2z^2 + 2464874496a^6b^7c^9d^2z^2 - 3963617280a^9b^6c^{12}d^2z^2 + \\
& 1056964608a^{11}c^{11}d^kz^2 + 805306368a^{11}c^{11}e^j^kz^2 + 419430400a^{12}c^{10}f^mz^2 + 251658240a^{13}c^9k^mz^2 - 1509949440a^9b^2c^{11}e^2z^2 + \\
& 251658240a^{11}c^{11}f^h^kz^2 + 150994944a^{12}c^{10}h^kz^2 - 5400428544a^7b^5c^{10}d^2z^2 + 754974720a^8b^4c^{10}e^2z^2 - 730054656a^5b^9c^8d^2z^2 + 477102080a^{12}b^3c^7m^2z^2
\end{aligned}$$

$$\begin{aligned}
& - 377487360a^{11}b^4c^7l^2z^2 + 477102080a^9b^3c^{10}f^2z^2 + 301989888a^{12}b^2c^8l^2z^2 - 377487360a^9b^4c^9g^2z^2 + 301989888a^{10}b^2c^{10}g^2z^2 - 174325760a^{11}b^5c^6m^2z^2 + 188743680a^{10}b^6c^6l^2z^2 + 141557760a^{11}b^3c^8k^2z^2 + 188743680a^8b^6c^8g^2z^2 + 141557760a^{10}b^3c^9h^2z^2 - 174325760a^8b^5c^9f^2z^2 - 188743680a^7b^6c^9e^2z^2 - 47185920a^9b^8c^5l^2z^2 + 11206656a^{10}b^7c^5m^2z^2 + 8929280a^9b^9c^4m^2z^2 - 2600960a^8b^{11}c^3m^2z^2 + 291840a^7b^{13}c^2m^2z^2 - 50331648a^{10}b^4c^8j^2z^2 + 146165760a^4b^{11}c^7d^2z^2 - 26542080a^9b^7c^6k^2z^2 + 5898240a^8b^{10}c^4l^2z^2 - 294912a^7b^{12}c^3l^2z^2 - 33554432a^{11}b^2c^9j^2z^2 + 9584640a^8b^9c^5k^2z^2 + 20971520a^9b^6c^7j^2z^2 - 2359296a^{10}b^5c^7k^2z^2 - 1290240a^7b^{11}c^4k^2z^2 + 46080a^6b^{13}c^3k^2z^2 + 2304a^5b^{15}c^2k^2z^2 - 2752512a^7b^{10}c^5j^2z^2 + 2621440a^8b^8c^6j^2z^2 + 524288a^6b^{12}c^4j^2z^2 - 32768a^5b^{14}c^3j^2z^2 - 47185920a^7b^8c^7g^2z^2 - 26542080a^8b^7c^7h^2z^2 + 9584640a^7b^9c^6h^2z^2 - 2359296a^9b^5c^8h^2z^2 - 1290240a^6b^{11}c^5h^2z^2 + 46080a^5b^{13}c^4h^2z^2 + 2304a^4b^{15}c^3h^2z^2 + 5898240a^6b^{10}c^6g^2z^2 - 294912a^5b^{12}c^5g^2z^2 + 11206656a^7b^7c^8f^2z^2 + 8929280a^6b^9c^7f^2z^2 + 23592960a^6b^8c^8e^2z^2 - 2600960a^5b^{11}c^6f^2z^2 + 291840a^4b^{13}c^5f^2z^2 - 14080a^3b^{15}c^4f^2z^2 + 256a^2b^{17}c^3f^2z^2 - 19860480a^3b^{13}c^6d^2z^2 - 1179648a^5b^{10}c^7e^2z^2 + 1771776a^2b^{15}c^5d^2z^2 - 440401920a^{13}b^3c^8m^2z^2 + 1207959552a^{10}c^{12}e^2z^2 + 134217728a^{12}c^{10}j^2z^2 + 256a^5b^{17}m^2z^2 + 2304b^{19}c^3d^2z^2 - 23592960a^{10}b^3c^8f^2k^2z^2 + 99090432a^9b^3c^9d^2h^2z^2 + 9437184a^{10}b^3c^8e^2k^2m^2z^2 + 23592960a^{10}b^3c^8g^2h^2m^2z^2 + 141557760a^8b^3c^{10}d^2e^2k^2z^2 + 47185920a^9b^3c^9d^2j^2k^2z^2 - 23592960a^9b^3c^9f^2g^2k^2z^2 + 169869312a^7b^3c^{11}d^2e^2f^2z^2 + 99090432a^8b^3c^{10}d^2g^2h^2z^2 - 3145728a^9b^3c^9f^2h^2j^2z^2 + 56623104a^8b^3c^{10}d^2f^2j^2z^2 + 1536a^3b^{15}c^3d^2f^2j^2z^2 - 9437184a^8b^3c^{10}e^2f^2h^2z^2 - 4608a^3b^{14}c^4d^2f^2g^2z^2 + 9216a^3b^{13}c^5d^2e^2f^2z^2 + 412876800a^8b^2c^9d^2e^2m^2z^2 - 206438400a^9b^2c^7d^2l^2m^2z^2 + 5898240a^{10}b^4c^5k^2l^2m^2z^2 - 206438400a^8b^3c^8d^2g^2m^2z^2 - 4718592a^{11}b^2c^6k^2l^2m^2z^2 - 2949120a^9b^6c^4k^2l^2m^2z^2 + 737280a^8b^8c^3k^2l^2m^2z^2 - 92160a^7b^{10}c^2k^2l^2m^2z^2 + 103219200a^8b^5c^6d^2l^2m^2z^2 - 29491200a^{10}b^3c^6h^2l^2m^2z^2 - 206438400a^7b^4c^8d^2e^2m^2z^2 - 2359296a^{10}b^3c^6j^2k^2m^2z^2 + 491520a^8b^7c^4j^2k^2m^2z^2 - 184320a^7b^9c^3j^2k^2m^2z^2 + 27648a^6b^{11}c^2j^2k^2m^2z^2 + 14745600a^9b^5c^5h^2l^2m^2z^2 - 3686400a^8b^7c^4h^2l^2m^2z^2 + 460800a^7b^9c^3h^2l^2m^2z^2 - 23040a^6b^{11}c^2h^2l^2m^2z^2 + 88473600a^8b^4c^7d^2k^2l^2z^2 + 82575360a^9b^2c^8d^2j^2m^2z^2 + 11796480a^{10}b^2c^7h^2j^2m^2z^2 + 5898240a^9b^4c^6g^2k^2m^2z^2 - 4718592a^{10}b^2c^7g^2k^2m^2z^2 - 70778880a^9b^2c^8d^2k^2l^2z^2 - 2949120a^8b^6c^5g^2k^2m^2z^2 - 2457600a^8b^6c^5h^2j^2m^2z^2 + 921600a^7b^8c^4h^2j^2m^2z^2 + 737280a^7b^8c^4g^2k^2m^2z^2 - 138240a^6b^{10}c^3h^2j^2m^2z^2 - 92160a^6b^{10}c^3g^2k^2m^2z^2 + 7680a^5b^{12}c^2h^2j^2m^2z^2 + 4608a^5b^{12}c^2g^2k^2m^2z^2 + 29491200a^9b^3c^7f^2k^2l^2z^2 - 176947200a^7b^3c^9d^2e^2k^2z^2 - 109707264a^8b^3c^8d^2h^2l^2z^2 - 25804800a^7b^7c^5d^2l^2m^2z^2 + 103219200a^7b^5c^7d^2g^2m^2z^2 + 219414528a^7b^2c^{10}d^2e^2h^2z^2 - 14
\end{aligned}$$

$$\begin{aligned}
& 745600a^8b^5c^6fklz - 29491200a^9b^3c^7ghmz - 11796480a^9b^3c^7ekmz - 44236800a^7b^6c^6dkklz + 58982400a^9b^2c^8ehmz \\
& + 5898240a^8b^5c^6ekmz + 3686400a^7b^7c^5fklz + 3225600a^6b^9c^4d*lmz - 1474560a^7b^7c^5ekmz - 460800a^6b^9c^4fklz \\
& + 184320a^6b^9c^4ekmz - 161280a^5b^11c^3d*lmz + 23040a^5b^11c^3fklz - 9216a^5b^11c^3ekmz + 14745600a^8b^5c^6ghmz + 1 \\
& 10886912a^7b^4c^8d*fmz - 3686400a^7b^7c^5ghmz - 221773824a^6b^3c^10d*efz + 460800a^6b^9c^4ghmz - 17203200a^7b^6c^6d*j*mmz \\
& z - 23040a^5b^11c^3ghmz - 29491200a^8b^4c^7ehmz - 11796480a^9b^2c^8f*j*kz + 11059200a^6b^8c^5d*k*klz + 6451200a^6b^8c^5d*j*mmz \\
& + 88473600a^7b^4c^8d*g*kkz + 2457600a^7b^6c^6f*j*kkz - 35389440a^8b^3c^8d*j*kkz - 1382400a^5b^10c^4d*k*klz - 84934656a^8b^2c^9d*f*lmz \\
& - 967680a^5b^10c^4d*j*mmz - 921600a^6b^8c^5f*j*kkz + 138240a^5b^10c^4f*j*kkz + 69120a^4b^12c^3d*k*klz + 53760a^4b^12c^3d*j*mmz \\
& - 7680a^4b^12c^3f*j*kkz + 44236800a^7b^5c^7d*h*lmz + 7372800a^7b^6c^6ehmz - 5898240a^8b^4c^7f*h*lmz + 4718592a^9b^2c^8f*h*lmz \\
& - 70778880a^8b^2c^9d*g*kkz + 2949120a^7b^6c^6f*h*lmz - 921600a^6b^8c^5ehmz - 737280a^6b^8c^5f*h*lmz + 92160a^5b^10c^4f*h*lmz \\
& z + 46080a^5b^10c^4ehmz - 4608a^4b^12c^3f*h*lmz + 29491200a^8b^3c^8f*g*kkz - 109707264a^7b^3c^9d*g*hmz - 25804800a^6b^7c^6d*g*mmz \\
& - 58982400a^8b^2c^9e*f*kkz - 58982400a^6b^6c^7d*f*lmz + 7372800a^6b^7c^6d*j*kkz + 88473600a^6b^5c^8d*ekmz - 2764800a^5b^9c^5d*j*kkz \\
& + 51609600a^6b^6c^7d*emz + 414720a^4b^11c^4d*j*kkz - 23040a^3b^13c^3d*j*kkz - 14745600a^7b^5c^7f*g*kkz - 44236800a^6b^6c^7d*g*kkz \\
& - 6635520a^6b^7c^6d*h*lmz + 40108032a^8b^2c^9d*h*jz + 3686400a^6b^7c^6f*g*kkz + 3225600a^5b^9c^5d*g*mmz + 2359296a^8b^3c^8f*h*jz \\
& - 491520a^6b^7c^6f*h*jz - 460800a^5b^9c^5f*g*kkz - 276480a^5b^9c^5d*h*lmz + 184320a^5b^9c^5f*h*jz + 179712a^4b^11c^4d*h*lmz \\
& - 161280a^4b^11c^4d*g*mmz - 27648a^4b^11c^4f*h*jz + 23040a^4b^11c^4f*g*kkz - 13824a^3b^13c^3d*h*lmz + 1536a^3b^13c^3f*h*jz \\
& + 29491200a^7b^4c^8e*f*kkz + 110886912a^6b^4c^9d*f*g*mmz + 16220160a^5b^8c^6d*f*lmz - 45613056a^7b^3c^9d*f*jz + 11059200a^5b^8c^6d*g*kkz \\
& - 10321920a^6b^6c^7d*h*jz - 7372800a^6b^6c^7e*f*kkz + 7077888a^7b^4c^8d*h*jz - 6451200a^5b^8c^6d*emz - 88473600a^6b^4c^9d*ehmz \\
& + 2396160a^5b^8c^6d*h*jz - 2396160a^4b^10c^5d*f*lmz - 1382400a^4b^10c^5d*g*kkz - 84934656a^7b^2c^10d*f*g*mmz + 921600a^5b^8c^6e*f*kkz \\
& + 117964800a^5b^5c^9d*efz + 322560a^4b^10c^5d*emz + 175104a^3b^12c^4d*f*lmz + 69120a^3b^12c^4d*g*kkz - 50688a^3b^12c^4d*h*jz \\
& - 46080a^4b^10c^5e*f*kkz - 27648a^4b^10c^5d*h*jz + 4608a^2b^14c^3d*h*jz - 4608a^2b^14c^3d*f*lmz + 44236800a^6b^5c^8d*ghmz \\
& - 5898240a^7b^4c^8f*g*hmz - 22118400a^5b^7c^7d*ekmz + 4718592a^8b^2c^9f*g*hmz + 2949120a^6b^6c^7f*g*hmz - 737280a^5b^8c^6f*g*hmz \\
& + 92160a^4b^10c^5f*g*hmz - 4608a^3b^12c^4f*g*hmz + 8847360a^5b^7c^7d*f*jz - 58982400a^5b^6c^8d*f*g*mmz - 3809280a^4b^9c^6d*f*jz \\
& + 2764800a^4b^9c^6d*ekmz + 2359296a^6b^5c^8d*f*jz + 681984a^
\end{aligned}$$

$$\begin{aligned}
& 3*b^{11}*c^5*d*f*j*z - 138240*a^3*b^{11}*c^5*d*e*k*z - 55296*a^2*b^{13}*c^4*d*f*j \\
& *z + 11796480*a^7*b^3*c^9*e*f*h*z - 6635520*a^5*b^7*c^7*d*g*h*z - 5898240*a \\
& ^6*b^5*c^8*e*f*h*z + 1474560*a^5*b^7*c^7*e*f*h*z - 276480*a^4*b^9*c^6*d*g*h \\
& *z - 184320*a^4*b^9*c^6*e*f*h*z + 179712*a^3*b^{11}*c^5*d*g*h*z - 13824*a^2*b \\
& ^{13}*c^4*d*g*h*z + 9216*a^3*b^{11}*c^5*e*f*h*z + 16220160*a^4*b^8*c^7*d*f*g*z \\
& + 13271040*a^5*b^6*c^8*d*e*h*z - 2396160*a^3*b^{10}*c^6*d*f*g*z + 552960*a^4* \\
& b^8*c^7*d*e*h*z - 359424*a^3*b^{10}*c^6*d*e*h*z + 175104*a^2*b^{12}*c^5*d*f*g*z \\
& + 27648*a^2*b^{12}*c^5*d*e*h*z - 32440320*a^4*b^7*c^8*d*e*f*z + 4792320*a^3* \\
& b^9*c^7*d*e*f*z - 350208*a^2*b^{11}*c^6*d*e*f*z + 165150720*a^{10}*b*c^8*d*l*m* \\
& z + 4608*a^6*b^{12}*c*k*l*m*z + 23592960*a^{11}*b*c^7*h*l*m*z + 3145728*a^{11}*b* \\
& c^7*j*k*m*z - 1536*a^5*b^{13}*c*j*k*m*z + 165150720*a^9*b*c^9*d*g*m*z + 34681 \\
& 6512*a^7*b*c^{11}*d^2*g*z + 19660800*a^{12}*b*c^6*l*m^2*z - 34560*a^7*b^{11}*c*l* \\
& m^2*z - 7077888*a^{11}*b*c^7*k^2*l*z + 11008*a^6*b^{12}*c*j*m^2*z + 19660800*a^ \\
& 11*b*c^7*g*m^2*z + 7077888*a^{10}*b*c^8*h^2*l*z + 768*a^5*b^{13}*c*g*m^2*z - 19 \\
& 660800*a^9*b*c^9*f^2*l*z - 7077888*a^{10}*b*c^8*g*k^2*z - 6912*a*b^{15}*c^3*d^2 \\
& *l*z + 7077888*a^9*b*c^9*g*h^2*z - 19660800*a^8*b*c^{10}*f^2*g*z - 66816*a*b^ \\
& 14*c^4*d^2*j*z + 214272*a*b^{13}*c^5*d^2*g*z - 428544*a*b^{12}*c^6*d^2*e*z - 33 \\
& 0301440*a^9*c^{10}*d*e*m*z - 110100480*a^{10}*c^9*d*j*m*z - 15728640*a^{11}*c^8*h \\
& *j*m*z - 47185920*a^{10}*c^9*e*h*m*z - 198180864*a^8*c^{11}*d*e*h*z + 15728640* \\
& a^{10}*c^9*f*j*k*z - 66060288*a^9*c^{10}*d*h*j*z + 47185920*a^9*c^{10}*e*f*k*z + \\
& 1022754816*a^6*b^2*c^{11}*d^2*e*z - 642318336*a^5*b^4*c^{10}*d^2*e*z - 51137740 \\
& 8*a^7*b^3*c^9*d^2*l*z - 511377408*a^6*b^3*c^{10}*d^2*g*z + 321159168*a^6*b^5* \\
& c^8*d^2*l*z + 321159168*a^5*b^5*c^9*d^2*g*z + 225312768*a^7*b^2*c^{10}*d^2*j* \\
& z - 25362432*a^{11}*b^3*c^5*l*m^2*z + 13271040*a^{10}*b^5*c^4*l*m^2*z - 3563520 \\
& *a^9*b^7*c^3*l*m^2*z + 506880*a^8*b^9*c^2*l*m^2*z + 10354688*a^{11}*b^2*c^6*j \\
& *m^2*z + 8847360*a^{10}*b^3*c^6*k^2*l*z - 4423680*a^9*b^5*c^5*k^2*l*z - 20480 \\
& 00*a^9*b^6*c^4*j*m^2*z + 1105920*a^8*b^7*c^4*k^2*l*z + 849920*a^8*b^8*c^3*j \\
& *m^2*z - 393216*a^{10}*b^4*c^5*j*m^2*z - 145920*a^7*b^{10}*c^2*j*m^2*z - 138240 \\
& *a^7*b^9*c^3*k^2*l*z + 6912*a^6*b^{11}*c^2*k^2*l*z - 111697920*a^5*b^7*c^7*d^ \\
& 2*l*z + 223395840*a^4*b^6*c^9*d^2*e*z - 25362432*a^{10}*b^3*c^6*g*m^2*z - 353 \\
& 8944*a^{10}*b^2*c^7*j*k^2*z + 737280*a^8*b^6*c^5*j*k^2*z + 50724864*a^{10}*b^2* \\
& c^7*e*m^2*z - 276480*a^7*b^8*c^4*j*k^2*z + 41472*a^6*b^{10}*c^3*j*k^2*z - 230 \\
& 4*a^5*b^{12}*c^2*j*k^2*z + 13271040*a^9*b^5*c^5*g*m^2*z - 8847360*a^9*b^3*c^7 \\
& *h^2*l*z + 4423680*a^8*b^5*c^6*h^2*l*z - 3563520*a^8*b^7*c^4*g*m^2*z - 1105 \\
& 920*a^7*b^7*c^5*h^2*l*z + 506880*a^7*b^9*c^3*g*m^2*z + 138240*a^6*b^9*c^4*h \\
& ^2*l*z - 34560*a^6*b^{11}*c^2*g*m^2*z - 6912*a^5*b^{11}*c^3*h^2*l*z - 26542080* \\
& a^9*b^4*c^6*e*m^2*z + 25362432*a^8*b^3*c^8*f^2*l*z - 13271040*a^7*b^5*c^7*f \\
& ^2*l*z + 8847360*a^9*b^3*c^7*g*k^2*z + 7127040*a^8*b^6*c^5*e*m^2*z - 442368 \\
& 0*a^8*b^5*c^6*g*k^2*z + 3563520*a^6*b^7*c^6*f^2*l*z + 3538944*a^9*b^2*c^8*h \\
& ^2*j*z + 1105920*a^7*b^7*c^5*g*k^2*z - 1013760*a^7*b^8*c^4*e*m^2*z - 737280 \\
& *a^7*b^6*c^6*h^2*j*z - 506880*a^5*b^9*c^5*f^2*l*z + 276480*a^6*b^8*c^5*h^2* \\
& j*z - 138240*a^6*b^9*c^4*g*k^2*z + 69120*a^6*b^{10}*c^3*e*m^2*z - 41472*a^5*b \\
& ^{10}*c^4*h^2*j*z + 34560*a^4*b^{11}*c^4*f^2*l*z + 6912*a^5*b^{11}*c^3*g*k^2*z + \\
& 2304*a^4*b^{12}*c^3*h^2*j*z - 1536*a^5*b^{12}*c^2*e*m^2*z - 768*a^3*b^{13}*c^3*f^ \\
& 2*l*z - 111697920*a^4*b^7*c^8*d^2*g*z + 23362560*a^4*b^9*c^6*d^2*l*z - 1769
\end{aligned}$$

$4720*a^9*b^2*c^8*e*k^2*z - 10354688*a^8*b^2*c^9*f^2*j*z - 43646976*a^6*b^4*c^9*d^2*j*z + 8847360*a^8*b^4*c^7*e*k^2*z - 2965248*a^3*b^11*c^5*d^2*l*z - 2211840*a^7*b^6*c^6*e*k^2*z + 2048000*a^6*b^6*c^7*f^2*j*z - 849920*a^5*b^8*c^6*f^2*j*z + 393216*a^7*b^4*c^8*f^2*j*z + 276480*a^6*b^8*c^5*e*k^2*z + 214272*a^2*b^13*c^4*d^2*l*z + 145920*a^4*b^10*c^5*f^2*j*z - 13824*a^5*b^10*c^4*e*k^2*z - 11008*a^3*b^12*c^4*f^2*j*z + 256*a^2*b^14*c^3*f^2*j*z - 32587776*a^5*b^6*c^8*d^2*j*z - 8847360*a^8*b^3*c^8*g*h^2*z + 21657600*a^4*b^8*c^7*d^2*j*z + 4423680*a^7*b^5*c^7*g*h^2*z - 1105920*a^6*b^7*c^6*g*h^2*z + 138240*a^5*b^9*c^5*g*h^2*z - 6912*a^4*b^11*c^4*g*h^2*z + 25362432*a^7*b^3*c^9*f^2*g*z - 5810688*a^3*b^10*c^6*d^2*j*z + 17694720*a^8*b^2*c^9*e*h^2*z + 845568*a^2*b^12*c^5*d^2*j*z - 50724864*a^7*b^2*c^10*e*f^2*z - 13271040*a^6*b^5*c^8*f^2*g*z - 8847360*a^7*b^4*c^8*e*h^2*z + 3563520*a^5*b^7*c^7*f^2*g*z + 2211840*a^6*b^6*c^7*e*h^2*z - 506880*a^4*b^9*c^6*f^2*g*z - 276480*a^5*b^8*c^6*e*h^2*z + 34560*a^3*b^11*c^5*f^2*g*z + 13824*a^4*b^10*c^5*e*h^2*z - 768*a^2*b^13*c^4*f^2*g*z + 26542080*a^6*b^4*c^9*e*f^2*z + 23362560*a^3*b^9*c^7*d^2*g*z - 46725120*a^3*b^8*c^8*d^2*e*z - 7127040*a^5*b^6*c^8*e*f^2*z - 2965248*a^2*b^11*c^6*d^2*g*z + 1013760*a^4*b^8*c^7*e*f^2*z - 69120*a^3*b^10*c^6*e*f^2*z + 1536*a^2*b^12*c^5*e*f^2*z + 5930496*a^2*b^10*c^7*d^2*e*z + 346816512*a^8*b*c^10*d^2*l*z - 693633024*a^7*c^12*d^2*e*z - 231211008*a^8*c^11*d^2*j*z + 768*a^6*b^13*l*m^2*z - 13107200*a^12*c^7*j*m^2*z - 256*a^5*b^14*j*m^2*z + 4718592*a^11*c^8*j*k^2*z - 39321600*a^11*c^8*e*m^2*z - 4718592*a^10*c^9*h^2*j*z + 14155776*a^10*c^9*e*k^2*z + 13107200*a^9*c^10*f^2*j*z + 2304*b^16*c^3*d^2*j*z - 14155776*a^9*c^10*e*h^2*z + 39321600*a^8*c^11*e*f^2*z - 6912*b^15*c^4*d^2*g*z + 13824*b^14*c^5*d^2*e*z + 737280*a^10*b*c^5*j*k*l*m - 2304*a^6*b^9*c*j*k*l*m + 2211840*a^9*b*c^6*e*k*l*m + 1228800*a^9*b*c^6*f*j*k*l*m + 737280*a^9*b*c^6*g*j*k*m + 442368*a^9*b*c^6*h*j*k*l + 36*a^3*b^12*c*f*h*k*m + 3096576*a^8*b*c^7*d*j*k*l - 12745728*a^8*b*c^7*d*h*k*m + 3686400*a^8*b*c^7*e*f*l*m + 3391488*a^8*b*c^7*e*h*j*m + 2211840*a^8*b*c^7*e*g*k*m + 1327104*a^8*b*c^7*e*h*k*l + 1228800*a^8*b*c^7*f*g*j*m + 737280*a^8*b*c^7*f*h*j*l + 442368*a^8*b*c^7*g*h*j*k + 108*a^2*b^13*c*d*h*k*m + 16367616*a^7*b*c^8*d*e*j*m + 9289728*a^7*b*c^8*d*e*k*l + 5160960*a^7*b*c^8*d*f*j*l + 3391488*a^7*b*c^8*e*f*j*k + 3096576*a^7*b*c^8*d*g*j*k - 19307520*a^7*b*c^8*d*f*h*m + 3686400*a^7*b*c^8*e*f*g*m + 2211840*a^7*b*c^8*e*f*h*l + 1327104*a^7*b*c^8*e*g*h*k + 737280*a^7*b*c^8*f*g*h*j - 180*a*b^13*c^2*d*f*h*m - 540*a*b^12*c^3*d*f*h*k + 15482880*a^6*b*c^9*d*e*f*l + 11059200*a^6*b*c^9*d*e*h*j + 9289728*a^6*b*c^9*d*e*g*k + 5160960*a^6*b*c^9*d*f*g*j - 2304*a*b^11*c^4*d*f*g*j + 2211840*a^6*b*c^9*e*f*g*h + 4608*a*b^10*c^5*d*e*f*j + 15482880*a^5*b*c^10*d*e*f*g - 13824*a*b^9*c^6*d*e*f*g + 36*a*b^14*c*d*f*k*m + 1843200*a^9*b^3*c^4*j*k*l*m + 783360*a^8*b^5*c^3*j*k*l*m + 18432*a^7*b^7*c^2*j*k*l*m - 2211840*a^8*b^4*c^4*g*k*l*m - 1695744*a^9*b^2*c^5*h*j*l*m - 1400832*a^8*b^4*c^4*h*j*l*m - 1105920*a^9*b^2*c^5*g*k*l*m - 253440*a^7*b^6*c^3*h*j*l*m - 69120*a^7*b^6*c^3*g*k*l*m + 11520*a^6*b^8*c^2*h*j*l*m + 6912*a^6*b^8*c^2*g*k*l*m + 4423680*a^8*b^3*c^5*e*k*l*m + 2506752*a^8*b^3*c^5*f*j*l*m + 1843200*a^8*b^3*c^5*g*j*k*m + 1327104*a^8*b^3*c^5*h*j*k*l + 838656*a^7*b^5*c^4*f*j*l*m + 783360*a^7*b^5*c^4*g*j*k*m + 691200*a^7*b^5*c^4*h*j*k*l + 138240*a^7*$

$$\begin{aligned}
& b^5c^4ek^1m + 69120a^6b^7c^3h^jkk^1 - 53760a^6b^7c^3f^j^1m + 1 \\
& 8432a^6b^7c^3g^j^1m - 13824a^6b^7c^3ek^1m - 2304a^5b^9c^2g^j \\
& k^1m + 2543616a^8b^3c^5g^h^1m + 829440a^7b^5c^4g^h^1m - 34560a^6 \\
& b^7c^3g^h^1m - 8183808a^8b^2c^6d^j^1m - 3686400a^8b^2c^6e^j^1m \\
& m - 2285568a^7b^4c^5d^j^1m - 1695744a^8b^2c^6f^j^1m - 1566720a^7 \\
& b^4c^5e^j^1m - 1400832a^7b^4c^5f^j^1m + 741888a^6b^6c^4d^j^1m \\
& - 253440a^6b^6c^4f^j^1m - 80640a^5b^8c^3d^j^1m - 36864a^6b^6c \\
& ^4e^j^1m + 11520a^5b^8c^3f^j^1m + 4608a^5b^8c^3e^j^1m + 6700032 \\
& a^8b^2c^6f^h^1m + 5103360a^7b^4c^5f^h^1m - 5087232a^8b^2c^6e^h \\
& h^1m - 2838528a^7b^4c^5f^g^1m - 1843200a^8b^2c^6f^g^1m - 1695744 \\
& a^8b^2c^6g^h^1m - 1658880a^7b^4c^5g^h^1m - 1658880a^7b^4c^5e^h \\
& h^1m - 1400832a^7b^4c^5g^h^1m - 663552a^8b^2c^6g^h^1m + 483840a \\
& ^6b^6c^4f^h^1m - 253440a^6b^6c^4g^h^1m - 207360a^6b^6c^4g^h^1m \\
& + 161280a^6b^6c^4f^g^1m + 69120a^6b^6c^4e^h^1m - 50040a^5b^8c \\
& ^3f^h^1m + 11520a^5b^8c^3g^h^1m + 180a^4b^10c^2f^h^1m + 420249 \\
& 6a^7b^3c^6d^j^1m + 635904a^6b^5c^5d^j^1m - 276480a^5b^7c^4d^j \\
& k^1 + 34560a^4b^9c^3d^j^1m - 16671744a^7b^3c^6d^h^1m + 12275712a \\
& ^7b^3c^6d^g^1m + 5677056a^7b^3c^6e^f^1m + 4423680a^7b^3c^6e^g \\
& k^1m + 3317760a^7b^3c^6e^h^1m + 2801664a^7b^3c^6e^h^1m - 2709504a \\
& ^6b^5c^5d^g^1m + 2543616a^7b^3c^6f^g^1m + 2506752a^7b^3c^6f^g \\
& j^1m + 1843200a^7b^3c^6f^h^1m + 1327104a^7b^3c^6g^h^1m + 838656a \\
& ^6b^5c^5f^g^1m + 829440a^6b^5c^5f^g^1m + 783360a^6b^5c^5f^h^1m \\
& + 691200a^6b^5c^5g^h^1m + 665280a^5b^7c^4d^h^1m + 506880a^6b^5 \\
& c^5e^h^1m + 414720a^6b^5c^5e^h^1m - 322560a^6b^5c^5e^f^1m + 2 \\
& 41920a^5b^7c^4d^g^1m + 138240a^6b^5c^5e^g^1m - 108540a^4b^9c^3 \\
& d^h^1m + 69120a^5b^7c^4g^h^1m - 53760a^5b^7c^4f^g^1m - 51840a^6 \\
& b^5c^5d^h^1m - 34560a^5b^7c^4f^g^1m - 23040a^5b^7c^4e^h^1m + \\
& 18432a^5b^7c^4f^h^1m - 13824a^5b^7c^4e^g^1m - 2304a^4b^9c^3f \\
& h^1m + 1296a^3b^11c^2d^h^1m + 31924224a^7b^2c^7d^f^1m - 2455142 \\
& 4a^7b^2c^7d^e^1m + 10616832a^7b^2c^7e^g^1m - 8183808a^7b^2c^7d \\
& g^1m - 5529600a^7b^2c^7d^h^1m + 5419008a^6b^4c^6d^e^1m + 53084 \\
& 16a^6b^4c^6e^g^1m - 5087232a^7b^2c^7e^f^1m - 5013504a^7b^2c^7e \\
& f^1m + 4868352a^6b^4c^6d^f^1m - 4644864a^7b^2c^7d^g^1m - 39813 \\
& 12a^6b^4c^6d^g^1m - 2654208a^7b^2c^7e^h^1m - 2367360a^5b^6c^5d \\
& f^1m - 2285568a^6b^4c^6d^g^1m - 2211840a^6b^4c^6d^h^1m - 16957 \\
& 44a^7b^2c^7f^g^1m - 1677312a^6b^4c^6e^f^1m - 1658880a^6b^4c^6e \\
& f^1m - 1400832a^6b^4c^6f^g^1m - 1382400a^6b^4c^6e^h^1m + 10368 \\
& 00a^5b^6c^5d^g^1m + 741888a^5b^6c^5d^g^1m - 483840a^5b^6c^5d^e \\
& e^1m + 317952a^5b^6c^5d^h^1m + 268920a^4b^8c^4d^f^1m - 253440a^5 \\
& b^6c^5f^g^1m - 138240a^5b^6c^5e^h^1m + 107520a^5b^6c^5e^f^1m \\
& - 103680a^4b^8c^4d^g^1m - 80640a^4b^8c^4d^g^1m + 69120a^5b^6c \\
& ^5e^f^1m + 11520a^4b^8c^4f^g^1m + 6912a^4b^8c^4d^h^1m - 6912a^3 \\
& b^10c^3d^h^1m + 6120a^3b^10c^3d^f^1m - 1368a^2b^12c^2d^f^1m \\
& - 5087232a^7b^2c^7e^g^1m - 2211840a^6b^4c^6f^g^1m - 1658880a^6b \\
& ^4c^6e^g^1m - 1105920a^7b^2c^7f^g^1m - 69120a^5b^6c^5f^g^1m +
\end{aligned}$$

$69120a^5b^6c^5egh^m + 6912a^4b^8c^4fgh^m + 7962624a^6b^3c^7d^m + 4571136a^6b^3c^7d^m + 4202496a^6b^3c^7d^m + 2801664a^6b^3c^7d^m + 2073600a^5b^5c^6d^m + 1483776a^5b^5c^6d^m + 635904a^5b^5c^6d^m + 506880a^5b^5c^6d^m + 354816a^4b^7c^5d^m + 322560a^5b^5c^6d^m + 276480a^4b^7c^5d^m + 207360a^4b^7c^5d^m + 161280a^4b^7c^5d^m + 59904a^3b^9c^4d^m + 34560a^3b^9c^4d^m + 23040a^4b^7c^5d^m + 2304a^2b^11c^3d^m + 8294400a^6b^3c^7d^m + 5677056a^6b^3c^7d^m + 4423680a^6b^3c^7d^m + 3317760a^6b^3c^7d^m + 2805120a^5b^5c^6d^m + 1843200a^6b^3c^7d^m + 829440a^5b^5c^6d^m + 783360a^5b^5c^6d^m + 437184a^4b^7c^5d^m + 414720a^5b^5c^6d^m + 322560a^5b^5c^6d^m + 146268a^3b^9c^4d^m + 138240a^5b^5c^6d^m + 62208a^4b^7c^5d^m + 20736a^3b^9c^4d^m + 18432a^4b^7c^5d^m + 13824a^4b^7c^5d^m + 9360a^2b^11c^3d^m + 2304a^3b^9c^4d^m + 8404992a^6b^2c^8d^m + 24551424a^6b^2c^8d^m + 21150720a^6b^2c^8d^m + 1271808a^5b^4c^7d^m + 552960a^4b^6c^6d^m + 69120a^3b^8c^5d^m + 16588800a^6b^2c^8d^m + 7741440a^6b^2c^8d^m + 6946560a^5b^4c^7d^m + 5529600a^6b^2c^8d^m + 5419008a^5b^4c^7d^m + 5087232a^6b^2c^8d^m + 3870720a^5b^4c^7d^m + 3686400a^6b^2c^8d^m + 2211840a^5b^4c^7d^m + 1755648a^4b^6c^6d^m + 1658880a^5b^4c^7d^m + 1658880a^5b^4c^7d^m + 1566720a^5b^4c^7d^m + 1451520a^4b^6c^6d^m + 483840a^4b^6c^6d^m + 317952a^4b^6c^6d^m + 193536a^3b^8c^5d^m + 124416a^4b^6c^6d^m + 114696a^3b^8c^5d^m + 69120a^4b^6c^6d^m + 41472a^3b^8c^5d^m + 36864a^4b^6c^6d^m + 14580a^2b^10c^4d^m + 6912a^3b^8c^5d^m + 6912a^2b^10c^4d^m + 4608a^3b^8c^5d^m + 7962624a^5b^3c^8d^m + 7741440a^5b^3c^8d^m + 5160960a^5b^3c^8d^m + 4423680a^5b^3c^8d^m + 2903040a^4b^5c^7d^m + 2073600a^4b^5c^7d^m + 635904a^4b^5c^7d^m + 387072a^3b^7c^6d^m + 354816a^3b^7c^6d^m + 322560a^4b^5c^7d^m + 207360a^3b^7c^6d^m + 59904a^2b^9c^5d^m + 13824a^3b^7c^6d^m + 13824a^2b^9c^5d^m + 13824a^2b^9c^5d^m + 4423680a^5b^3c^8d^m + 138240a^4b^5c^7d^m + 13824a^3b^7c^6d^m + 10321920a^5b^2c^9d^m + 709632a^3b^6c^7d^m + 645120a^4b^4c^8d^m + 119808a^2b^8c^6d^m + 1658880a^5b^2c^9d^m + 1658880a^4b^4c^8d^m + 124416a^3b^6c^7d^m + 41472a^2b^8c^6d^m + 7741440a^4b^3c^9d^m + 2903040a^3b^5c^8d^m + 387072a^2b^7c^7d^m + 3456a^7b^8c^k^l^2m + 12672a^7b^8c^j^1m^2 + 384a^5b^10c^j^2k^m + 1635840a^10b^c^5h^k^m^2 + 1009152a^9b^c^6h^2k^m + 3690a^6b^9c^h^k^m^2 + 1152a^6b^9c^g^1m^2 + 540a^5b^10c^h^k^2m + 54a^4b^11c^h^2k^m + 565248a^9b^c^6h^j^2m + 39771648a^7b^c^8d^2k^m + 2496000a^8b^c^7f^2k^m + 1543680a^9b^c^6f^k^2m + 1980a^5b^10c^f^k^m^2 + 384a^5b^10c^g^j^m^2 + 18$

$$\begin{aligned}
& 0*a^4*b^{11}*c*f*k^2*m + 6*a^2*b^{13}*c*f^2*k*m - 10298880*a^9*b*c^6*d*k*m^2 + \\
& 2580480*a^9*b*c^6*e*j*m^2 + 5310*a^4*b^{11}*c*d*k*m^2 - 1674*a*b^{13}*c^2*d^2*k \\
& *m - 540*a^3*b^{12}*c*d*k^2*m - 10616832*a^7*b*c^8*e^2*j*1 - 3538944*a^8*b*c^ \\
& 7*e*j^2*1 + 2727936*a^8*b*c^7*d*j^2*m - 2496000*a^9*b*c^6*f*h*m^2 - 1543680 \\
& *a^8*b*c^7*f*h^2*m + 565248*a^8*b*c^7*f*j^2*k - 270*a^4*b^{11}*c*f*h*m^2 - 59 \\
& 512320*a^6*b*c^9*d^2*f*m + 5087232*a^7*b*c^8*e^2*h*m + 1105920*a^8*b*c^7*e* \\
& j*k^2 - 3456*a*b^{12}*c^3*d^2*j*1 - 1635840*a^7*b*c^8*f^2*h*k - 1009152*a^8*b \\
& *c^7*f*h*k^2 + 10260*a*b^{12}*c^3*d^2*h*m - 684*a^3*b^{12}*c*d*h*m^2 - 24675840 \\
& *a^6*b*c^9*d^2*h*k - 15552000*a^8*b*c^7*d*f*m^2 + 24551424*a^6*b*c^9*d*e^2* \\
& m - 3939840*a^7*b*c^8*d*h^2*k + 1105920*a^7*b*c^8*e*h^2*j - 25074*a*b^{11}*c^ \\
& 4*d^2*f*m + 10530*a*b^{11}*c^4*d^2*h*k + 10368*a*b^{11}*c^4*d^2*g*1 + 420*a*b^1 \\
& 2*c^3*d*f^2*m - 378*a^2*b^{13}*c*d*f*m^2 - 10616832*a^6*b*c^9*e^2*g*j + 50872 \\
& 32*a^6*b*c^9*e^2*f*k - 3538944*a^7*b*c^8*e*g*j^2 + 1843200*a^7*b*c^8*d*h*j^ \\
& 2 - 7994880*a^6*b*c^9*d*f^2*k - 4990464*a^7*b*c^8*d*f*k^2 + 2580480*a^6*b*c \\
& ^9*e*f^2*j + 65664*a*b^{10}*c^5*d^2*g*j - 27972*a*b^{10}*c^5*d^2*f*k - 20736*a* \\
& b^{10}*c^5*d^2*e*1 + 1260*a*b^{11}*c^4*d*f^2*k + 54*a*b^{13}*c^2*d*f*k^2 + 232243 \\
& 20*a^5*b*c^{10}*d^2*e*j - 37062144*a^5*b*c^{10}*d^2*f*h + 384*a*b^{12}*c^3*d*f*j^ \\
& 2 - 131328*a*b^9*c^6*d^2*e*j - 5985792*a^6*b*c^9*d*f*h^2 + 206010*a*b^9*c^6 \\
& *d^2*f*h - 6300*a*b^{10}*c^5*d*f^2*h + 1350*a*b^{11}*c^4*d*f*h^2 + 16588800*a^5 \\
& *b*c^{10}*d*e^2*h + 3456*a*b^{10}*c^5*d*f*g^2 + 435456*a*b^8*c^7*d^2*e*g + 1382 \\
& 4*a*b^8*c^7*d*e^2*f - 1474560*a^9*c^7*e*j*k*m + 460800*a^9*c^7*f*h*k*m + 32 \\
& 25600*a^8*c^8*d*f*k*m - 2457600*a^8*c^8*e*f*j*m - 884736*a^8*c^8*e*h*j*k - \\
& 6193152*a^7*c^9*d*e*j*k + 1935360*a^7*c^9*d*f*h*k - 1474560*a^7*c^9*e*f*h*j \\
& - 10321920*a^6*c^{10}*d*e*f*j - 1105920*a^9*b^4*c^3*k*1^2*m - 552960*a^{10}*b^ \\
& 2*c^4*k*1^2*m - 34560*a^8*b^6*c^2*k*1^2*m - 1290240*a^{10}*b^2*c^4*j*1*m^2 - \\
& 860160*a^9*b^4*c^3*j*1*m^2 - 80640*a^8*b^6*c^2*j*1*m^2 - 737280*a^9*b^2*c^5 \\
& *j^2*k*m - 568320*a^8*b^4*c^4*j^2*k*m - 136704*a^7*b^6*c^3*j^2*k*m - 2304*a \\
& ^6*b^8*c^2*j^2*k*m + 1271808*a^9*b^3*c^4*h*1^2*m - 552960*a^9*b^2*c^5*j*k^2 \\
& *1 - 552960*a^8*b^4*c^4*j*k^2*1 + 414720*a^8*b^5*c^3*h*1^2*m - 145152*a^7*b \\
& ^6*c^3*j*k^2*1 - 17280*a^7*b^7*c^2*h*1^2*m - 3456*a^6*b^8*c^2*j*k^2*1 - 364 \\
& 0320*a^9*b^3*c^4*h*k*m^2 - 2626560*a^8*b^3*c^5*h^2*k*m + 2211840*a^9*b^2*c^ \\
& 5*h*k^2*m + 2056320*a^8*b^4*c^4*h*k^2*m + 1935360*a^9*b^3*c^4*g*1*m^2 - 114 \\
& 3360*a^8*b^5*c^3*h*k*m^2 - 1097280*a^7*b^5*c^4*h^2*k*m + 364608*a^7*b^6*c^3 \\
& *h*k^2*m + 322560*a^8*b^5*c^3*g*1*m^2 - 56160*a^6*b^7*c^3*h^2*k*m - 40320*a \\
& ^7*b^7*c^2*g*1*m^2 + 27936*a^7*b^7*c^2*h*k*m^2 - 3780*a^6*b^8*c^2*h*k^2*m + \\
& 2970*a^5*b^9*c^2*h^2*k*m - 1419264*a^8*b^4*c^4*f*1^2*m - 1105920*a^7*b^4*c \\
& ^5*g^2*k*m - 921600*a^9*b^2*c^5*f*1^2*m - 829440*a^8*b^4*c^4*h*k*1^2 + 7495 \\
& 68*a^8*b^3*c^5*h*j^2*m - 552960*a^8*b^2*c^6*g^2*k*m - 331776*a^9*b^2*c^5*h* \\
& k*1^2 + 317952*a^7*b^5*c^4*h*j^2*m - 103680*a^7*b^6*c^3*h*k*1^2 + 80640*a^7 \\
& *b^6*c^3*f*1^2*m + 38400*a^6*b^7*c^3*h*j^2*m - 34560*a^6*b^6*c^4*g^2*k*m + \\
& 3456*a^5*b^8*c^3*g^2*k*m - 1920*a^5*b^9*c^2*h*j^2*m - 5142528*a^7*b^3*c^6*f \\
& ^2*k*m + 5068800*a^9*b^2*c^5*f*k*m^2 - 3870720*a^9*b^2*c^5*e*1*m^2 - 375552 \\
& 0*a^8*b^3*c^5*f*k^2*m + 3000960*a^8*b^4*c^4*f*k*m^2 - 1290240*a^9*b^2*c^5*g \\
& *j*m^2 - 1085760*a^7*b^5*c^4*f*k^2*m - 959040*a^6*b^5*c^5*f^2*k*m - 860160* \\
& a^8*b^4*c^4*g*j*m^2 + 829440*a^8*b^3*c^5*g*k^2*1 - 645120*a^8*b^4*c^4*e*1*m
\end{aligned}$$

$$\begin{aligned}
&^2 - 552960*a^8*b^2*c^6*h^2*j*1 - 552960*a^7*b^4*c^5*h^2*j*1 + 414720*a^7*b^5*c^4*g*k^2*1 - 145152*a^6*b^6*c^4*h^2*j*1 + 103200*a^5*b^7*c^4*f^2*k*m - \\
&80640*a^7*b^6*c^3*g*j*m^2 + 80640*a^7*b^6*c^3*e*1*m^2 + 41280*a^7*b^6*c^3*f*k*m^2 - 37188*a^6*b^8*c^2*f*k*m^2 + 13536*a^6*b^7*c^3*f*k^2*m + 12672*a^6*b^8*c^2*g*j*m^2 + 10368*a^6*b^7*c^3*g*k^2*1 + 5490*a^5*b^9*c^2*f*k^2*m - 34 \\
&56*a^5*b^8*c^3*h^2*j*1 - 2304*a^6*b^8*c^2*e*1*m^2 + 810*a^4*b^9*c^3*f^2*k*m - 270*a^3*b^11*c^2*f^2*k*m + 6137856*a^8*b^3*c^5*d*1^2*m - 4423680*a^7*b^2*c^7*e^2*k*m - 2654208*a^8*b^3*c^5*g*j*1^2 - 2654208*a^7*b^3*c^6*g^2*j*1 + \\
&1769472*a^8*b^2*c^6*g*j^2*1 + 1769472*a^7*b^4*c^5*g*j^2*1 - 1354752*a^7*b^5*c^4*d*1^2*m - 1327104*a^7*b^5*c^4*g*j*1^2 - 1327104*a^6*b^5*c^5*g^2*j*1 + \\
&1271808*a^8*b^3*c^5*f*k*1^2 - 1040384*a^8*b^2*c^6*f*j^2*m - 697344*a^7*b^4*c^5*f*j^2*m - 516096*a^8*b^2*c^6*h*j^2*k - 451584*a^7*b^4*c^5*h*j^2*k + 442 \\
&368*a^6*b^6*c^4*g*j^2*1 + 414720*a^7*b^5*c^4*f*k*1^2 - 138240*a^6*b^6*c^4*h*j^2*k - 138240*a^6*b^4*c^6*e^2*k*m - 121856*a^6*b^6*c^4*f*j^2*m + 120960*a^6*b^7*c^3*d*1^2*m - 17280*a^6*b^7*c^3*f*k*1^2 + 13824*a^5*b^6*c^5*e^2*k*m - \\
&11520*a^5*b^8*c^3*h*j^2*k + 8960*a^5*b^8*c^3*f*j^2*m + 10851840*a^8*b^2*c^6*d*k^2*m - 10464768*a^6*b^3*c^7*d^2*k*m - 10275840*a^8*b^3*c^5*d*k*m^2 + \\
&7121088*a^5*b^5*c^6*d^2*k*m + 3127680*a^7*b^4*c^5*d*k^2*m + 1720320*a^8*b^3*c^5*e*j*m^2 - 1658880*a^8*b^2*c^6*e*k^2*1 - 1290240*a^7*b^2*c^7*f^2*j*1 + \\
&1271808*a^7*b^3*c^6*g^2*h*m - 1222560*a^4*b^7*c^5*d^2*k*m + 999360*a^7*b^5*c^4*d*k*m^2 - 860160*a^6*b^4*c^6*f^2*j*1 - 829440*a^7*b^4*c^5*e*k^2*1 - 705 \\
&024*a^6*b^6*c^4*d*k^2*m - 552960*a^8*b^2*c^6*g*j*k^2 - 552960*a^7*b^4*c^5*g*j*k^2 + 414720*a^6*b^5*c^5*g^2*h*m + 319392*a^6*b^7*c^3*d*k*m^2 + 161280*a^7*b^5*c^4*e*j*m^2 - 145152*a^6*b^6*c^4*g*j*k^2 - 85734*a^5*b^9*c^2*d*k*m^2 - \\
&80640*a^5*b^6*c^5*f^2*j*1 - 25344*a^6*b^7*c^3*e*j*m^2 + 23490*a^3*b^9*c^4*d^2*k*m - 20736*a^6*b^6*c^4*e*k^2*1 - 17280*a^5*b^7*c^4*g^2*h*m + 14148*a^5*b^8*c^3*d*k^2*m + 13716*a^2*b^11*c^3*d^2*k*m + 12690*a^4*b^10*c^2*d*k^2*m + 12672*a^4*b^8*c^4*f^2*j*1 - 3456*a^5*b^8*c^3*g*j*k^2 + 768*a^5*b^9*c^2*e*j*m^2 - 384*a^3*b^10*c^3*f^2*j*1 + 5308416*a^8*b^2*c^6*e*j*1^2 - 5308416*a^6*b^3*c^7*e^2*j*1 - 5142528*a^8*b^3*c^5*f*h*m^2 + 5068800*a^7*b^2*c^7*f^2*h*m - 3755520*a^7*b^3*c^6*f*h^2*m - 3538944*a^7*b^3*c^6*e*j^2*1 + 3000960*a^6*b^4*c^6*f^2*h*m + 2654208*a^7*b^4*c^5*e*j*1^2 - 2322432*a^8*b^2*c^6*d*k*1^2 + 2125824*a^7*b^3*c^6*d*j^2*m - 1990656*a^7*b^4*c^5*d*k*1^2 - 1085760*a^6*b^5*c^5*f*h^2*m - 959040*a^7*b^5*c^4*f*h*m^2 - 884736*a^6*b^5*c^5*e*j^2*1 + 829440*a^7*b^3*c^6*g*h^2*1 + 749568*a^7*b^3*c^6*f*j^2*k + 518400*a^6*b^6*c^4*d*k*1^2 + 414720*a^6*b^5*c^5*g*h^2*1 + 317952*a^6*b^5*c^5*f*j^2*k + 133632*a^6*b^5*c^5*d*j^2*m + 103200*a^6*b^7*c^3*f*h*m^2 - 96768*a^5*b^7*c^4*d*j^2*m - 51840*a^5*b^8*c^3*d*k*1^2 + 41280*a^5*b^6*c^5*f^2*h*m + 38400*a^5*b^7*c^4*f*j^2*k - 37188*a^4*b^8*c^4*f^2*h*m + 13536*a^5*b^7*c^4*f*h^2*m + 13440*a^4*b^9*c^3*d*j^2*m + 10368*a^5*b^7*c^4*g*h^2*1 + 5490*a^4*b^9*c^3*f*h^2*m + 1980*a^3*b^10*c^3*f^2*h*m - 1920*a^4*b^9*c^3*f*j^2*k + 810*a^5*b^9*c^2*f*h*m^2 - 180*a^3*b^11*c^2*f*h^2*m - 30*a^2*b^12*c^2*f^2*h*m + 3006720*a^6*b^2*c^8*d^2*h*m - 11612160*a^6*b^2*c^8*d^2*j*1 + 1658880*a^6*b^3*c^7*e^2*h*m + 1596672*a^4*b^6*c^6*d^2*j*1 - 1419264*a^6*b^4*c^6*f*g^2*m - 1105920*a^7*b^4*c^5*f*h*1^2 + 1105920*a^7*b^3*c^6*e*j*k^2 - 921600*a^7*b^2*c^7*f
\end{aligned}$$

$$\begin{aligned}
& *g^2*m - 829440*a^6*b^4*c^6*g^2*h*k - 552960*a^8*b^2*c^6*f*h*1^2 - 508032*a \\
& ^3*b^8*c^5*d^2*j*1 - 331776*a^7*b^2*c^7*g^2*h*k + 290304*a^6*b^5*c^5*e*j*k^ \\
& 2 - 103680*a^5*b^6*c^5*g^2*h*k + 80640*a^5*b^6*c^5*f*g^2*m - 69120*a^5*b^5* \\
& c^6*e^2*h*m + 65664*a^2*b^10*c^4*d^2*j*1 - 34560*a^6*b^6*c^4*f*h*1^2 + 6912 \\
& *a^5*b^7*c^4*e*j*k^2 + 3456*a^5*b^8*c^3*f*h*1^2 + 11930112*a^8*b^2*c^6*d*h* \\
& m^2 + 8432640*a^7*b^2*c^7*d*h^2*m + 4450176*a^7*b^4*c^5*d*h*m^2 + 4337280*a \\
& ^6*b^4*c^6*d*h^2*m - 3870720*a^8*b^2*c^6*e*g*m^2 - 3640320*a^6*b^3*c^7*f^2* \\
& h*k - 2885760*a^5*b^4*c^7*d^2*h*m - 2844288*a^4*b^6*c^6*d^2*h*m - 2626560*a \\
& ^7*b^3*c^6*f*h*k^2 + 2211840*a^7*b^2*c^7*f*h^2*k + 2056320*a^6*b^4*c^6*f*h^ \\
& 2*k + 1935360*a^6*b^3*c^7*f^2*g*1 - 1916928*a^7*b^2*c^7*d*j^2*k - 1687680*a \\
& ^6*b^6*c^4*d*h*m^2 - 1658880*a^7*b^2*c^7*e*h^2*1 - 1143360*a^5*b^5*c^6*f^2* \\
& h*k - 1097280*a^6*b^5*c^5*f*h*k^2 + 1019412*a^3*b^8*c^5*d^2*h*m - 1007424*a \\
& ^5*b^6*c^5*d*h^2*m - 912384*a^6*b^4*c^6*d*j^2*k - 829440*a^6*b^4*c^6*e*h^2* \\
& 1 - 645120*a^7*b^4*c^5*e*g*m^2 - 552960*a^7*b^2*c^7*g*h^2*j - 552960*a^6*b^ \\
& 4*c^6*g*h^2*j + 364608*a^5*b^6*c^5*f*h^2*k + 322560*a^5*b^5*c^6*f^2*g*1 + 1 \\
& 97460*a^5*b^8*c^3*d*h*m^2 - 145152*a^5*b^6*c^5*g*h^2*j - 143802*a^2*b^10*c^ \\
& 4*d^2*h*m + 80640*a^6*b^6*c^4*e*g*m^2 - 56160*a^5*b^7*c^4*f*h*k^2 + 51948*a \\
& ^4*b^8*c^4*d*h^2*m - 40320*a^4*b^7*c^5*f^2*g*1 + 34560*a^4*b^8*c^4*d*j^2*k \\
& + 27936*a^4*b^7*c^5*f^2*h*k - 20736*a^5*b^6*c^5*e*h^2*1 - 13824*a^5*b^6*c^5 \\
& *d*j^2*k + 10800*a^3*b^10*c^3*d*h^2*m - 5760*a^3*b^10*c^3*d*j^2*k - 3780*a^ \\
& 4*b^8*c^4*f*h^2*k + 3690*a^3*b^9*c^4*f^2*h*k - 3456*a^4*b^8*c^4*g*h^2*j + 2 \\
& 970*a^4*b^9*c^3*f*h*k^2 - 2304*a^5*b^8*c^3*e*g*m^2 + 1152*a^3*b^9*c^4*f^2*g \\
& *1 - 540*a^3*b^10*c^3*f*h^2*k - 540*a^2*b^12*c^2*d*h^2*m - 90*a^4*b^10*c^2* \\
& d*h*m^2 - 90*a^2*b^11*c^3*f^2*h*k + 54*a^3*b^11*c^2*f*h*k^2 + 15925248*a^6* \\
& b^2*c^8*e^2*g*1 - 7962624*a^7*b^3*c^6*e*g*1^2 - 7962624*a^6*b^3*c^7*e*g^2*1 \\
& + 23385600*a^6*b^2*c^8*d*f^2*m + 6137856*a^6*b^3*c^7*d*g^2*m - 5677056*a^6 \\
& *b^2*c^8*e^2*f*m + 4147200*a^7*b^3*c^6*d*h*1^2 - 3317760*a^6*b^2*c^8*e^2*h* \\
& k - 1354752*a^5*b^5*c^6*d*g^2*m + 1271808*a^6*b^3*c^7*f*g^2*k - 737280*a^7* \\
& b^2*c^7*f*h*j^2 + 17418240*a^5*b^3*c^8*d^2*g*1 - 568320*a^6*b^4*c^6*f*h*j^2 \\
& - 414720*a^6*b^5*c^5*d*h*1^2 + 414720*a^5*b^5*c^6*f*g^2*k - 414720*a^5*b^4 \\
& *c^7*e^2*h*k + 322560*a^5*b^4*c^7*e^2*f*m - 136704*a^5*b^6*c^5*f*h*j^2 + 12 \\
& 0960*a^4*b^7*c^5*d*g^2*m - 31104*a^5*b^7*c^4*d*h*1^2 - 17280*a^4*b^7*c^5*f* \\
& g^2*k + 10368*a^4*b^9*c^3*d*h*1^2 - 2304*a^4*b^8*c^4*f*h*j^2 + 384*a^3*b^10 \\
& *c^3*f*h*j^2 + 50042880*a^5*b^2*c^9*d^2*f*k - 13271040*a^5*b^3*c^8*d^2*h*k \\
& - 13149696*a^7*b^3*c^6*d*f*m^2 + 10906560*a^4*b^5*c^7*d^2*f*m - 8709120*a^4 \\
& *b^5*c^7*d^2*g*1 - 7418880*a^5*b^3*c^8*d^2*f*m + 7133184*a^7*b^2*c^7*d*h*k^ \\
& 2 - 6428160*a^6*b^3*c^7*d*h^2*k + 5593536*a^4*b^5*c^7*d^2*h*k - 3870720*a^6 \\
& *b^2*c^8*e*f^2*1 + 3369600*a^6*b^4*c^6*d*h*k^2 + 3148992*a^6*b^5*c^5*d*f*m^ \\
& 2 - 2985696*a^3*b^7*c^6*d^2*f*m + 1959552*a^3*b^7*c^6*d^2*g*1 - 1658880*a^7 \\
& *b^2*c^7*e*g*k^2 - 1505280*a^4*b^6*c^6*d*f^2*m - 1290240*a^6*b^2*c^8*f^2*g* \\
& j - 34836480*a^5*b^2*c^9*d^2*e*1 + 1105920*a^6*b^3*c^7*e*h^2*j - 860160*a^5 \\
& *b^4*c^7*f^2*g*j - 829440*a^6*b^4*c^6*e*g*k^2 - 692064*a^3*b^7*c^6*d^2*h*k \\
& - 689472*a^5*b^5*c^6*d*h^2*k - 645120*a^5*b^4*c^7*e*f^2*1 - 388800*a^5*b^6* \\
& c^5*d*h*k^2 + 378954*a^2*b^9*c^5*d^2*f*m + 362880*a^5*b^4*c^7*d*f^2*m + 296 \\
& 964*a^3*b^8*c^5*d*f^2*m + 290304*a^5*b^5*c^6*e*h^2*j + 277344*a^4*b^7*c^5*d
\end{aligned}$$

$$\begin{aligned}
& *h^2*k - 217728*a^2*b^9*c^5*d^2*g*l - 80640*a^4*b^6*c^6*f^2*g*j + 80640*a^4 \\
& *b^6*c^6*e*f^2*l - 77070*a^4*b^9*c^3*d*f*m^2 - 30240*a^5*b^7*c^4*d*f*m^2 - \\
& 28350*a^3*b^9*c^4*d*h^2*k - 26406*a^2*b^9*c^5*d^2*h*k - 21060*a^4*b^8*c^4*d \\
& *h*k^2 - 20736*a^5*b^6*c^5*e*g*k^2 - 19278*a^2*b^10*c^4*d*f^2*m + 12672*a^3 \\
& *b^8*c^5*f^2*g*j + 10044*a^3*b^10*c^3*d*h*k^2 + 8820*a^3*b^11*c^2*d*f*m^2 + \\
& 6912*a^4*b^7*c^5*e*h^2*j - 2304*a^3*b^8*c^5*e*f^2*l - 1620*a^2*b^11*c^3*d* \\
& h^2*k - 384*a^2*b^10*c^4*f^2*g*j + 162*a^2*b^12*c^2*d*h*k^2 - 5419008*a^5*b \\
& ^3*c^8*d*e^2*m + 5308416*a^6*b^2*c^8*e*g^2*j - 5308416*a^5*b^3*c^8*e^2*g*j \\
& - 3870720*a^7*b^2*c^7*d*f*l^2 - 3538944*a^6*b^3*c^7*e*g*j^2 + 2654208*a^5*b \\
& ^4*c^7*e*g^2*j - 2322432*a^6*b^2*c^8*d*g^2*k - 1990656*a^5*b^4*c^7*d*g^2*k \\
& - 1935360*a^6*b^4*c^6*d*f*l^2 + 1658880*a^6*b^3*c^7*d*h*j^2 + 1658880*a^5*b \\
& ^3*c^8*e^2*f*k - 884736*a^5*b^5*c^6*e*g*j^2 + 725760*a^5*b^6*c^5*d*f*l^2 + \\
& 17418240*a^4*b^4*c^8*d^2*e*l + 518400*a^4*b^6*c^6*d*g^2*k + 483840*a^4*b^5* \\
& c^7*d*e^2*m + 262656*a^5*b^5*c^6*d*h*j^2 - 96768*a^4*b^8*c^4*d*f*l^2 - 6912 \\
& 0*a^4*b^5*c^7*e^2*f*k - 55296*a^4*b^7*c^5*d*h*j^2 - 51840*a^3*b^8*c^5*d*g^2 \\
& *k + 3456*a^3*b^10*c^3*d*f*l^2 + 1152*a^3*b^9*c^4*d*h*j^2 + 1152*a^2*b^11*c \\
& ^3*d*h*j^2 - 15431040*a^4*b^4*c^8*d^2*f*k - 13248000*a^5*b^3*c^8*d*f^2*k - \\
& 11612160*a^5*b^2*c^9*d^2*g*j - 10063872*a^6*b^3*c^7*d*f*k^2 - 3919104*a^3*b \\
& ^6*c^7*d^2*e*l + 2554560*a^4*b^5*c^7*d*f^2*k + 1720320*a^5*b^3*c^8*e*f^2*j \\
& + 1596672*a^3*b^6*c^7*d^2*g*j + 1518912*a^3*b^6*c^7*d^2*f*k - 1105920*a^5*b \\
& ^4*c^7*f*g^2*h + 838080*a^5*b^5*c^6*d*f*k^2 - 552960*a^6*b^2*c^8*f*g^2*h - \\
& 508032*a^2*b^8*c^6*d^2*g*j + 435456*a^2*b^8*c^6*d^2*e*l + 161280*a^4*b^5*c^ \\
& 7*e*f^2*j + 116640*a^4*b^7*c^5*d*f*k^2 + 106812*a^2*b^8*c^6*d^2*f*k - 98208 \\
& *a^3*b^7*c^6*d*f^2*k - 34560*a^4*b^6*c^6*f*g^2*h - 27270*a^3*b^9*c^4*d*f*k^ \\
& 2 - 26334*a^2*b^9*c^5*d*f^2*k - 25344*a^3*b^7*c^6*e*f^2*j + 3456*a^3*b^8*c^ \\
& 5*f*g^2*h + 768*a^2*b^9*c^5*e*f^2*j - 702*a^2*b^11*c^3*d*f*k^2 - 7962624*a^ \\
& 5*b^2*c^9*d*e^2*k - 2580480*a^6*b^2*c^8*d*f*j^2 + 2073600*a^4*b^4*c^8*d*e^2 \\
& *k - 1658880*a^6*b^2*c^8*e*g*h^2 - 967680*a^5*b^4*c^7*d*f*j^2 - 829440*a^5* \\
& b^4*c^7*e*g*h^2 - 207360*a^3*b^6*c^7*d*e^2*k + 64512*a^4*b^6*c^6*d*f*j^2 + \\
& 39168*a^3*b^8*c^5*d*f*j^2 - 20736*a^4*b^6*c^6*e*g*h^2 - 9216*a^2*b^10*c^4*d \\
& *f*j^2 - 4423680*a^5*b^2*c^9*e^2*f*h + 4147200*a^5*b^3*c^8*d*g^2*h - 319334 \\
& 4*a^3*b^5*c^8*d^2*e*j + 1016064*a^2*b^7*c^7*d^2*e*j - 414720*a^4*b^5*c^7*d* \\
& g^2*h - 138240*a^4*b^4*c^8*e^2*f*h - 31104*a^3*b^7*c^6*d*g^2*h + 13824*a^3* \\
& b^6*c^7*e^2*f*h + 10368*a^2*b^9*c^5*d*g^2*h + 15630336*a^5*b^2*c^9*d*f^2*h \\
& - 14459904*a^4*b^3*c^9*d^2*f*h + 9630144*a^3*b^5*c^8*d^2*f*h - 8764416*a^5* \\
& b^3*c^8*d*f*h^2 - 3870720*a^5*b^2*c^9*e*f^2*g + 2867328*a^4*b^4*c^8*d*f^2*h \\
& - 2095200*a^2*b^7*c^7*d^2*f*h - 1414080*a^3*b^6*c^7*d*f^2*h - 34836480*a^4 \\
& *b^2*c^10*d^2*e*g - 645120*a^4*b^4*c^8*e*f^2*g + 306720*a^3*b^7*c^6*d*f*h^2 \\
& + 197820*a^2*b^8*c^6*d*f^2*h + 146880*a^4*b^5*c^7*d*f*h^2 + 80640*a^3*b^6* \\
& c^7*e*f^2*g - 55350*a^2*b^9*c^5*d*f*h^2 - 2304*a^2*b^8*c^6*e*f^2*g - 387072 \\
& 0*a^5*b^2*c^9*d*f*g^2 - 1935360*a^4*b^4*c^8*d*f*g^2 - 1658880*a^4*b^3*c^9*d \\
& *e^2*h + 725760*a^3*b^6*c^7*d*f*g^2 + 17418240*a^3*b^4*c^9*d^2*e*g - 124416 \\
& *a^3*b^5*c^8*d*e^2*h - 96768*a^2*b^8*c^6*d*f*g^2 + 41472*a^2*b^7*c^7*d*e^2* \\
& h - 3919104*a^2*b^6*c^8*d^2*e*g - 7741440*a^4*b^2*c^10*d*e^2*f + 2903040*a^ \\
& 3*b^4*c^9*d*e^2*f - 387072*a^2*b^6*c^8*d*e^2*f - 20160*a^8*b^7*c^1^2*m^2 -
\end{aligned}$$

$$\begin{aligned}
& 1648128a^{10}b^3c^3k^3m^3 - 898560a^9b^3c^4k^3m - 354240a^9b^5c^2k^3m^3 - 354240a^8b^5c^3k^3m - 21600a^7b^7c^2k^3m - 13950a^7b^8c^2k^2m^2 + 430080a^{10}b^5c^5j^2m^2 - 1984a^6b^9c^2j^2m^2 - 884736a^9b^3c^4j^1m^3 - 589824a^8b^3c^5j^3m^1 - 442368a^8b^5c^3j^1m^3 - 294912a^7b^5c^4j^3m^1 - 49152a^6b^7c^3j^3m^1 + 1359360a^{10}b^2c^4h^3m^3 + 1173120a^9b^4c^3h^3m^3 + 743040a^7b^4c^5h^3m + 622080a^8b^2c^6h^3m + 184320a^9b^3c^6j^2k^2 + 107136a^6b^6c^4h^3m - 32640a^8b^6c^2h^3m^3 + 540a^5b^8c^3h^3m - 270a^4b^10c^2h^3m - 180a^5b^10c^2h^2m^2 - 2293760a^9b^3c^4f^3m^3 - 2293760a^6b^3c^7f^3m + 1327104a^8b^4c^4g^1m^3 + 1327104a^6b^4c^6g^3m^1 - 622080a^8b^3c^5h^3k^3 - 622080a^7b^3c^6h^3k - 326592a^7b^5c^4h^3k^3 - 326592a^6b^5c^5h^3k - 199360a^8b^5c^3f^3m^3 - 199360a^5b^5c^6f^3m + 61920a^7b^7c^2f^3m^3 + 61920a^4b^7c^5f^3m - 38880a^6b^7c^3h^3k^3 - 38880a^5b^7c^4h^3k - 3682a^3b^9c^4f^3m - 810a^5b^9c^2h^3k^3 - 810a^4b^9c^3h^3k - 70a^3b^12c^2f^2m^2 + 70a^2b^11c^3f^3m + 3870720a^8b^3c^7e^2m^2 + 184320a^8b^3c^7h^2j^2 - 14152320a^4b^4c^8d^3m + 10644480a^5b^2c^9d^3m + 5483520a^9b^2c^5d^3m + 4269888a^3b^6c^7d^3m - 2654208a^8b^3c^5e^1m^3 + 1359360a^6b^2c^8f^3k + 1330560a^8b^4c^4d^3m + 1173120a^5b^4c^7f^3k - 884736a^6b^3c^7g^3j - 826560a^7b^6c^3d^3m + 743040a^7b^4c^5f^3k + 622080a^8b^2c^6f^3k - 607068a^2b^8c^6d^3m - 589824a^7b^3c^6g^3j - 442368a^5b^5c^6g^3j - 294912a^6b^5c^5g^3j + 145188a^6b^8c^2d^3m + 107136a^6b^6c^4f^3k - 49152a^5b^7c^4g^3j - 32640a^4b^6c^6f^3k - 5796a^3b^8c^5f^3k + 540a^5b^8c^3f^3k - 270a^4b^10c^2f^3k + 210a^2b^10c^4f^3k + 19077120a^4b^3c^9d^3k + 1658880a^7b^3c^8e^2k^2 + 430080a^7b^3c^8f^2j^2 + 3538944a^5b^2c^9e^3j - 2488320a^7b^3c^6d^3k^3 - 2379456a^3b^5c^8d^3k + 1179648a^7b^2c^7e^3j + 589824a^6b^4c^6e^3j + 98304a^5b^6c^5e^3j - 95904a^2b^7c^7d^3k - 57024a^6b^5c^5d^3k + 49248a^5b^7c^4d^3k - 4050a^4b^9c^3d^3k - 810a^3b^11c^2d^3k - 486a^3b^12c^3d^2k^2 + 3870720a^6b^3c^9d^2j^2 - 1648128a^5b^3c^8f^3h - 898560a^6b^3c^7f^3h - 354240a^5b^5c^6f^3h - 354240a^4b^5c^7f^3h + 43680a^3b^7c^6f^3h - 21600a^4b^7c^5f^3h - 9792a^3b^11c^4d^2j^2 + 1350a^3b^9c^4f^3h - 1050a^2b^9c^5f^3h + 1658880a^6b^3c^9e^2h^2 + 16547328a^4b^2c^10d^3h - 12306816a^3b^4c^9d^3h + 37310976a^3b^3c^10d^3f + 3037824a^2b^6c^8d^3h - 2654208a^5b^3c^8e^3g + 1949184a^6b^2c^8d^3h + 1296000a^5b^4c^7d^3h - 155520a^4b^6c^6d^3h - 40500a^3b^10c^5d^2h^2 - 8100a^3b^8c^5d^3h + 4050a^2b^10c^4d^3h + 3870720a^5b^3c^10e^2f^2 + 34836480a^4b^3c^11d^2e^2 - 108864a^3b^9c^6d^2g^2 - 8068032a^2b^5c^9d^3f - 5623296a^4b^3c^9d^3f + 1737792a^3b^5c^8d^3f - 260190a^3b^8c^7d^2f^2 - 211680a^2b^7c^7d^3f - 435456a^3b^7c^8d^2e^2 - 245760a^10c^6j^2k^3m - 384a^6b^10j^1m^2 + 138240a^10c^6h^3k^2m - 90a^5b^11h^3k^2m + 384000a^10c^6f^3k^2m - 2211840a^8c^8e^2k^3m - 409600a^9c^7f^3j^2m - 147456a^9c^7h^3j^2k - 30a^4b^12f^3k^2m + 967680a^9c^7d^3k^2m + 384000a^8c^8f^2h^3m - 90a^3b^13d^3k^2m + 20321280a^7c^
\end{aligned}$$

$$\begin{aligned}
& 9*d^2*h*m - 883200*a^{11}*b*c^4*k*m^3 - 317952*a^{10}*b*c^5*k^3*m + 43680*a^8*b \\
& ^7*c*k*m^3 + 1350*a^6*b^9*c*k^3*m - 270*b^{14}*c^2*d^2*h*m + 6*a^3*b^{13}*f*h*m \\
& ^2 + 4838400*a^9*c^7*d*h*m^2 + 2903040*a^8*c^8*d*h^2*m - 1032192*a^8*c^8*d* \\
& j^2*k + 138240*a^8*c^8*f*h^2*k - 3686400*a^7*c^9*e^2*f*m - 1327104*a^7*c^9* \\
& e^2*h*k - 393216*a^9*b*c^6*j^3*1 - 245760*a^8*c^8*f*h*j^2 - 810*b^{13}*c^3*d^ \\
& 2*h*k + 630*b^{13}*c^3*d^2*f*m + 18*a^2*b^{14}*d*h*m^2 + 2688000*a^7*c^9*d*f^2* \\
& m + 580608*a^8*c^8*d*h*k^2 - 5796*a^7*b^8*c*h*m^3 - 3456*b^{12}*c^4*d^2*g*j + \\
& 1890*b^{12}*c^4*d^2*f*k + 6773760*a^6*c^{10}*d^2*f*k - 1344000*a^{10}*b*c^5*f*m^ \\
& 3 - 1344000*a^7*b*c^8*f^3*m - 207360*a^9*b*c^6*h*k^3 - 207360*a^8*b*c^7*h^3 \\
& *k - 3682*a^6*b^9*c*f*m^3 - 9289728*a^6*c^{10}*d*e^2*k - 1720320*a^7*c^9*d*f* \\
& j^2 - 50803200*a^5*b*c^{10}*d^3*k + 6912*b^{11}*c^5*d^2*e*j - 10616832*a^6*b*c^ \\
& 9*e^3*1 - 2211840*a^6*c^{10}*e^2*f*h - 393216*a^8*b*c^7*g*j^3 + 43416*a*b^{10}* \\
& c^5*d^3*m - 9576*a^5*b^{10}*c*d*m^3 - 9450*b^{11}*c^5*d^2*f*h - 504*a*b^{14}*c*d^ \\
& 2*m^2 + 1612800*a^6*c^{10}*d*f^2*h - 1036800*a^8*b*c^7*d*k^3 + 45198*a*b^9*c^ \\
& 6*d^3*k - 20736*b^{10}*c^6*d^2*e*g - 75188736*a^4*b*c^{11}*d^3*f - 883200*a^6*b \\
& *c^9*f^3*h - 317952*a^7*b*c^8*f*h^3 - 15482880*a^5*c^{11}*d*e^2*f - 10616832* \\
& a^5*b*c^{10}*e^3*g - 345060*a*b^8*c^7*d^3*h - 4262400*a^5*b*c^{10}*d*f^3 + 8527 \\
& 68*a*b^7*c^8*d^3*f + 7350*a*b^9*c^6*d*f^3 + 967680*a^{10}*b^3*c^3*1^2*m^2 + 1 \\
& 61280*a^9*b^5*c^2*1^2*m^2 + 1684224*a^{10}*b^2*c^4*k^2*m^2 + 1264320*a^9*b^4* \\
& c^3*k^2*m^2 + 126720*a^8*b^6*c^2*k^2*m^2 + 501760*a^9*b^3*c^4*j^2*m^2 + 414 \\
& 720*a^9*b^3*c^4*k^2*1^2 + 207360*a^8*b^5*c^3*k^2*1^2 + 170240*a^8*b^5*c^3*j \\
& ^2*m^2 + 9216*a^7*b^7*c^2*j^2*m^2 + 5184*a^7*b^7*c^2*k^2*1^2 + 884736*a^9*b \\
& ^2*c^5*j^2*1^2 + 884736*a^8*b^4*c^4*j^2*1^2 + 221184*a^7*b^6*c^3*j^2*1^2 + \\
& 1419840*a^8*b^4*c^4*h^2*m^2 + 1387008*a^9*b^2*c^5*h^2*m^2 + 276480*a^8*b^3* \\
& c^5*j^2*k^2 + 140544*a^7*b^5*c^4*j^2*k^2 + 84960*a^7*b^6*c^3*h^2*m^2 + 2534 \\
& 4*a^6*b^7*c^3*j^2*k^2 - 8010*a^6*b^8*c^2*h^2*m^2 + 576*a^5*b^9*c^2*j^2*k^2 \\
& + 967680*a^8*b^3*c^5*g^2*m^2 + 414720*a^8*b^3*c^5*h^2*1^2 + 207360*a^7*b^5* \\
& c^4*h^2*1^2 + 161280*a^7*b^5*c^4*g^2*m^2 - 20160*a^6*b^7*c^3*g^2*m^2 + 5184 \\
& *a^6*b^7*c^3*h^2*1^2 + 576*a^5*b^9*c^2*g^2*m^2 + 3808000*a^8*b^2*c^6*f^2*m^ \\
& 2 + 1990656*a^7*b^4*c^5*g^2*1^2 + 1643712*a^7*b^4*c^5*f^2*m^2 + 803520*a^7* \\
& b^4*c^5*h^2*k^2 + 725760*a^8*b^2*c^6*h^2*k^2 + 207360*a^6*b^6*c^4*h^2*k^2 - \\
& 125440*a^6*b^6*c^4*f^2*m^2 - 13790*a^5*b^8*c^3*f^2*m^2 + 10530*a^5*b^8*c^3 \\
& *h^2*k^2 + 1785*a^4*b^{10}*c^2*f^2*m^2 + 81*a^4*b^{10}*c^2*h^2*k^2 + 18427392*a \\
& ^7*b^2*c^7*d^2*m^2 + 967680*a^7*b^3*c^6*f^2*1^2 + 645120*a^7*b^3*c^6*e^2*m^ \\
& 2 + 414720*a^7*b^3*c^6*g^2*k^2 + 276480*a^7*b^3*c^6*h^2*j^2 + 207360*a^6*b^ \\
& 5*c^5*g^2*k^2 + 161280*a^6*b^5*c^5*f^2*1^2 + 140544*a^6*b^5*c^5*h^2*j^2 - 8 \\
& 0640*a^6*b^5*c^5*e^2*m^2 + 25344*a^5*b^7*c^4*h^2*j^2 - 20160*a^5*b^7*c^4*f^ \\
& 2*1^2 + 5184*a^5*b^7*c^4*g^2*k^2 + 2304*a^5*b^7*c^4*e^2*m^2 + 576*a^4*b^9*c \\
& ^3*h^2*j^2 + 576*a^4*b^9*c^3*f^2*1^2 + 7962624*a^7*b^2*c^7*e^2*1^2 - 414892 \\
& 8*a^6*b^4*c^6*d^2*m^2 + 1419840*a^6*b^4*c^6*f^2*k^2 + 1387008*a^7*b^2*c^7*f \\
& ^2*k^2 - 1183392*a^5*b^6*c^5*d^2*m^2 + 884736*a^7*b^2*c^7*g^2*j^2 + 884736* \\
& a^6*b^4*c^6*g^2*j^2 + 645750*a^4*b^8*c^4*d^2*m^2 + 221184*a^5*b^6*c^5*g^2*j \\
& ^2 - 115920*a^3*b^{10}*c^3*d^2*m^2 + 84960*a^5*b^6*c^5*f^2*k^2 + 10836*a^2*b^ \\
& 12*c^2*d^2*m^2 - 8010*a^4*b^8*c^4*f^2*k^2 - 180*a^3*b^{10}*c^3*f^2*k^2 + 9*a^ \\
& 2*b^{12}*c^2*f^2*k^2 + 8709120*a^6*b^3*c^7*d^2*1^2 - 4354560*a^5*b^5*c^6*d^2*
\end{aligned}$$

$$\begin{aligned}
& 1^2 + 979776*a^4*b^7*c^5*d^2*1^2 + 829440*a^6*b^3*c^7*e^2*k^2 + 17480448*a^6*b^2*c^8*d^2*k^2 + 501760*a^6*b^3*c^7*f^2*j^2 + 170240*a^5*b^5*c^6*f^2*j^2 \\
& - 108864*a^3*b^9*c^4*d^2*1^2 + 20736*a^5*b^5*c^6*e^2*k^2 + 9216*a^4*b^7*c^5*f^2*j^2 + 5184*a^2*b^11*c^3*d^2*1^2 - 1984*a^3*b^9*c^4*f^2*j^2 + 64*a^2*b^11*c^3*f^2*j^2 + 3538944*a^6*b^2*c^8*e^2*j^2 - 3302208*a^5*b^4*c^7*d^2*k^2 \\
& + 884736*a^5*b^4*c^7*e^2*j^2 + 414720*a^6*b^3*c^7*g^2*h^2 + 207360*a^5*b^5*c^6*g^2*h^2 - 103680*a^4*b^6*c^6*d^2*k^2 + 101250*a^3*b^8*c^5*d^2*k^2 - 5751*a^2*b^10*c^4*d^2*k^2 + 5184*a^4*b^7*c^5*g^2*h^2 + 1935360*a^5*b^3*c^8*d^2*j^2 + 1684224*a^6*b^2*c^8*f^2*h^2 + 1264320*a^5*b^4*c^7*f^2*h^2 - 532224*a^4*b^5*c^7*d^2*j^2 + 126720*a^4*b^6*c^6*f^2*h^2 - 96768*a^3*b^7*c^6*d^2*j^2 + 62784*a^2*b^9*c^5*d^2*j^2 - 13950*a^3*b^8*c^5*f^2*h^2 + 225*a^2*b^10*c^4*f^2*h^2 + 967680*a^5*b^3*c^8*f^2*g^2 + 829440*a^5*b^3*c^8*e^2*h^2 + 161280*a^4*b^5*c^7*f^2*g^2 + 20736*a^4*b^5*c^7*e^2*h^2 - 20160*a^3*b^7*c^6*f^2*g^2 + 576*a^2*b^9*c^5*f^2*g^2 + 11487744*a^5*b^2*c^9*d^2*h^2 + 7962624*a^5*b^2*c^9*e^2*g^2 + 35525376*a^4*b^2*c^10*d^2*f^2 - 1412640*a^3*b^6*c^7*d^2*h^2 + 461376*a^4*b^4*c^8*d^2*h^2 + 375030*a^2*b^8*c^6*d^2*h^2 + 8709120*a^4*b^3*c^9*d^2*g^2 - 4354560*a^3*b^5*c^8*d^2*g^2 + 979776*a^2*b^7*c^7*d^2*g^2 + 645120*a^4*b^3*c^9*e^2*f^2 - 80640*a^3*b^5*c^8*e^2*f^2 + 2304*a^2*b^7*c^7*e^2*f^2 - 15269184*a^3*b^4*c^9*d^2*f^2 + 2870784*a^2*b^6*c^8*d^2*f^2 - 17418240*a^3*b^3*c^10*d^2*e^2 + 3919104*a^2*b^5*c^9*d^2*e^2 + 54*b^15*c*d^2*k*m + 6*a*b^15*d*f*m^2 + 115200*a^11*c^5*k^2*m^2 + 576*a^7*b^9*1^2*m^2 + 225*a^6*b^10*k^2*m^2 + 64*a^5*b^11*j^2*m^2 + 345600*a^10*c^6*h^2*m^2 + 9*a^4*b^12*h^2*m^2 + 320000*a^9*c^7*f^2*m^2 + 41472*a^9*c^7*h^2*k^2 + 16934400*a^8*c^8*d^2*m^2 + 345600*a^8*c^8*f^2*k^2 + 81*b^14*c^2*d^2*k^2 + 3538944*a^7*c^9*e^2*j^2 + 2032128*a^7*c^9*d^2*k^2 + 492800*a^11*b^2*c^3*m^4 + 351456*a^10*b^4*c^2*m^4 + 576*b^13*c^3*d^2*j^2 + 331776*a^9*b^4*c^3*1^4 + 115200*a^7*c^9*f^2*h^2 + 142560*a^8*b^4*c^4*k^4 + 103680*a^9*b^2*c^5*k^4 + 32400*a^7*b^6*c^3*k^4 + 2025*b^12*c^4*d^2*h^2 + 2025*a^6*b^8*c^2*k^4 + 6096384*a^6*c^10*d^2*h^2 + 131072*a^8*b^2*c^6*j^4 + 98304*a^7*b^4*c^5*j^4 + 32768*a^6*b^6*c^4*j^4 + 5184*b^11*c^5*d^2*g^2 + 4096*a^5*b^8*c^3*j^4 + 11025*b^10*c^6*d^2*f^2 + 5644800*a^5*c^11*d^2*f^2 + 142560*a^6*b^4*c^6*h^4 + 103680*a^7*b^2*c^7*h^4 + 32400*a^5*b^6*c^5*h^4 + 20736*b^9*c^7*d^2*e^2 + 2025*a^4*b^8*c^4*h^4 + 331776*a^5*b^4*c^7*g^4 + 492800*a^5*b^2*c^9*f^4 + 351456*a^4*b^4*c^8*f^4 - 43120*a^3*b^6*c^7*f^4 + 1225*a^2*b^8*c^6*f^4 - 27433728*a^3*b^2*c^11*d^4 + 6446304*a^2*b^4*c^10*d^4 - 1050*a^7*b^9*k*m^3 + 384000*a^11*c^5*h*m^3 + 138240*a^9*c^7*h^3*m + 210*a^6*b^10*h*m^3 + 47416320*a^6*c^10*d^3*m - 1134*b^12*c^4*d^3*m + 70*a^5*b^11*f*m^3 + 2688000*a^10*c^6*d*m^3 + 384000*a^7*c^9*f^3*k + 138240*a^9*c^7*f*k^3 - 3402*b^11*c^5*d^3*k + 210*a^4*b^12*d*m^3 + 7077888*a^6*c^10*e^3*j + 786432*a^8*c^8*e*j^3 - 43120*a^9*b^6*c*m^4 + 28449792*a^5*c^11*d^3*h + 17010*b^10*c^6*d^3*h + 580608*a^7*c^9*d*h^3 - 39690*b^9*c^7*d^3*f - 734832*a*b^6*c^9*d^4 + 9*b^16*d^2*m^2 + 160000*a^12*c^4*m^4 + 1225*a^8*b^8*m^4 + 20736*a^10*c^6*k^4 + 65536*a^9*c^7*j^4 + 20736*a^8*c^8*h^4 + 49787136*a^4*c^12*d^4 + 160000*a^6*c^10*f^4 + 5308416*a^5*c^11*e^4 + 35721*b^8*c^8*d^4 + a^2*b^14*f^2*m^2, z, k1)*(root(56371445760*a^11*b^8*c^9*z^4 - 503316480*a^8*b^14*c^6*z^4 + 47185920*a^7*b^16*c^5*z^4 - 2621440*a^
\end{aligned}$$

$$\begin{aligned}
& 6*b^{18}*c^4*z^4 + 65536*a^5*b^{20}*c^3*z^4 - 171798691840*a^{14}*b^2*c^{12}*z^4 + \\
& 193273528320*a^{13}*b^4*c^{11}*z^4 - 128849018880*a^{12}*b^6*c^{10}*z^4 - 169114337 \\
& 28*a^{10}*b^{10}*c^8*z^4 + 3523215360*a^9*b^{12}*c^7*z^4 + 68719476736*a^{15}*c^{13}* \\
& z^4 + 1536*a^5*b^{16}*c*k*m*z^2 + 1536*a*b^{18}*c^3*d*f*z^2 - 2571632640*a^9*b^ \\
& 5*c^8*d*m*z^2 + 2548039680*a^9*b^3*c^{10}*d*h*z^2 + 1509949440*a^{10}*b^3*c^9*e \\
& *l*z^2 + 1509949440*a^9*b^3*c^{10}*e*g*z^2 - 1401421824*a^8*b^5*c^9*d*h*z^2 - \\
& 1321205760*a^9*b^2*c^{11}*d*f*z^2 - 2793406464*a^{11}*b*c^{10}*d*m*z^2 + 8906342 \\
& 40*a^8*b^7*c^7*d*m*z^2 - 754974720*a^{10}*b^4*c^8*g*l*z^2 - 754974720*a^9*b^5 \\
& *c^8*e*l*z^2 + 719585280*a^8*b^6*c^8*d*k*z^2 - 707788800*a^9*b^4*c^9*d*k*z^ \\
& 2 - 754974720*a^8*b^5*c^9*e*g*z^2 + 603979776*a^{11}*b^2*c^9*g*l*z^2 - 581959 \\
& 680*a^{10}*b^4*c^8*f*m*z^2 + 732168192*a^7*b^6*c^9*d*f*z^2 + 534773760*a^{11}*b \\
& ^3*c^8*h*m*z^2 - 456130560*a^{11}*b^4*c^7*k*m*z^2 - 603979776*a^{10}*b^2*c^{10}*e \\
& *j*z^2 + 534773760*a^{10}*b^3*c^9*f*k*z^2 + 384040960*a^9*b^6*c^7*f*m*z^2 + 3 \\
& 77487360*a^9*b^6*c^7*g*l*z^2 - 456130560*a^9*b^4*c^9*f*h*z^2 + 301989888*a^ \\
& 11*b^3*c^8*j*l*z^2 - 415236096*a^{10}*b^2*c^{10}*d*k*z^2 + 254017536*a^{10}*b^6*c \\
& ^6*k*m*z^2 - 330301440*a^{10}*b^4*c^8*h*k*z^2 + 390463488*a^7*b^7*c^8*d*h*z^2 \\
& + 188743680*a^{12}*b^2*c^8*k*m*z^2 + 301989888*a^{10}*b^3*c^9*g*j*z^2 - 297861 \\
& 120*a^7*b^8*c^7*d*k*z^2 - 366280704*a^6*b^8*c^8*d*f*z^2 + 188743680*a^{11}*b^ \\
& 2*c^9*h*k*z^2 - 330301440*a^8*b^4*c^{10}*d*f*z^2 + 254017536*a^8*b^6*c^8*f*h* \\
& z^2 - 1887436800*a^{10}*b*c^{11}*d*h*z^2 + 188743680*a^8*b^7*c^7*e*l*z^2 + 1533 \\
& 54240*a^9*b^6*c^7*h*k*z^2 - 185303040*a^7*b^9*c^6*d*m*z^2 - 117964800*a^{10}* \\
& b^5*c^7*h*m*z^2 - 61931520*a^9*b^8*c^5*k*m*z^2 + 121634816*a^{11}*b^2*c^9*f*m \\
& *z^2 - 115671040*a^8*b^8*c^6*f*m*z^2 - 62914560*a^9*b^7*c^6*j*l*z^2 + 18874 \\
& 3680*a^{10}*b^2*c^{10}*f*h*z^2 - 94371840*a^8*b^8*c^6*g*l*z^2 + 6144000*a^8*b^1 \\
& 0*c^4*k*m*z^2 - 117964800*a^9*b^5*c^8*f*k*z^2 + 61440*a^7*b^{12}*c^3*k*m*z^2 \\
& - 46080*a^6*b^{14}*c^2*k*m*z^2 + 23592960*a^8*b^9*c^5*j*l*z^2 + 188743680*a^7 \\
& *b^7*c^8*e*g*z^2 - 37355520*a^9*b^7*c^6*h*m*z^2 + 125829120*a^8*b^6*c^8*e*j \\
& *z^2 + 23101440*a^8*b^9*c^5*h*m*z^2 - 3538944*a^7*b^{11}*c^4*j*l*z^2 + 196608 \\
& *a^6*b^{13}*c^3*j*l*z^2 - 4349952*a^7*b^{11}*c^4*h*m*z^2 + 337920*a^6*b^{13}*c^3* \\
& h*m*z^2 - 7680*a^5*b^{15}*c^2*h*m*z^2 - 62914560*a^8*b^7*c^7*g*j*z^2 - 265420 \\
& 80*a^8*b^8*c^6*h*k*z^2 + 17940480*a^7*b^{10}*c^5*f*m*z^2 + 11796480*a^7*b^{10}* \\
& c^5*g*l*z^2 - 37355520*a^8*b^7*c^7*f*k*z^2 - 1347584*a^6*b^{12}*c^4*f*m*z^2 + \\
& 68272128*a^6*b^{10}*c^6*d*k*z^2 - 589824*a^6*b^{12}*c^4*g*l*z^2 + 552960*a^6*b \\
& ^{12}*c^4*h*k*z^2 - 147456*a^7*b^{10}*c^5*h*k*z^2 - 46080*a^5*b^{14}*c^3*h*k*z^2 \\
& + 35840*a^5*b^{14}*c^3*f*m*z^2 + 23592960*a^7*b^9*c^6*g*j*z^2 - 23592960*a^7* \\
& b^9*c^6*e*l*z^2 + 23371776*a^6*b^{11}*c^5*d*m*z^2 + 23101440*a^7*b^9*c^6*f*k* \\
& z^2 - 47185920*a^7*b^8*c^7*e*j*z^2 - 61931520*a^7*b^8*c^7*f*h*z^2 - 4349952 \\
& *a^6*b^{11}*c^5*f*k*z^2 - 3538944*a^6*b^{11}*c^5*g*j*z^2 - 1677312*a^5*b^{13}*c^4 \\
& *d*m*z^2 + 1179648*a^6*b^{11}*c^5*e*l*z^2 + 337920*a^5*b^{13}*c^4*f*k*z^2 + 196 \\
& 608*a^5*b^{13}*c^4*g*j*z^2 + 53760*a^4*b^{15}*c^3*d*m*z^2 - 7680*a^4*b^{15}*c^3*f \\
& *k*z^2 + 96583680*a^5*b^{10}*c^7*d*f*z^2 - 9179136*a^5*b^{12}*c^5*d*k*z^2 + 707 \\
& 7888*a^6*b^{10}*c^6*e*j*z^2 - 51609600*a^6*b^9*c^7*d*h*z^2 + 691200*a^4*b^{14}* \\
& c^4*d*k*z^2 - 393216*a^5*b^{12}*c^5*e*j*z^2 - 23040*a^3*b^{16}*c^3*d*k*z^2 + 61 \\
& 44000*a^6*b^{10}*c^6*f*h*z^2 + 61440*a^5*b^{12}*c^5*f*h*z^2 - 46080*a^4*b^{14}*c^ \\
& 4*f*h*z^2 + 1536*a^3*b^{16}*c^3*f*h*z^2 - 23592960*a^6*b^9*c^7*e*g*z^2 + 1179
\end{aligned}$$

$$\begin{aligned}
& 648a^5b^{11}c^6egz^2 + 829440a^4b^{13}c^5d*hz^2 + 368640a^5b^{11}c^6d*hz^2 - 105984a^3b^{15}c^4d*hz^2 + 4608a^2b^{17}c^3d*hz^2 - 15175 \\
& 680a^4b^{12}c^6d*fz^2 + 1428480a^3b^{14}c^5d*fz^2 - 73728a^2b^{16}c^4d*fz^2 + 4108320768a^{10}b^3c^9d*mz^2 - 1207959552a^{11}b*c^{10}e*lz^2 \\
& - 1207959552a^{10}b*c^{11}e*gz^2 - 578813952a^{12}b*c^9h*mz^2 - 5788139 \\
& 52a^{11}b*c^{10}f*kz^2 - 402653184a^{12}b*c^9j*lz^2 - 402653184a^{11}b*c^ \\
& 10g*jz^2 - 440401920a^{10}b*c^{11}f^2z^2 - 188743680a^{12}b*c^9k^2z^2 - \\
& 188743680a^{11}b*c^{10}h^2z^2 + 1761607680a^{10}c^{12}d*fz^2 - 14080a^6b \\
& ^{15}c^m^2z^2 - 94464a*b^{17}c^4d^2z^2 + 6936330240a^8b^3c^{11}d^2z^2 \\
& + 2464874496a^6b^7c^9d^2z^2 - 3963617280a^9b*c^{12}d^2z^2 + 10569646 \\
& 08a^{11}c^{11}d*kz^2 + 805306368a^{11}c^{11}e*jz^2 + 419430400a^{12}c^{10}f* \\
& mz^2 + 251658240a^{13}c^9k*mz^2 - 1509949440a^9b^2c^{11}e^2z^2 + 2516 \\
& 58240a^{11}c^{11}f*h*z^2 + 150994944a^{12}c^{10}h*kz^2 - 5400428544a^7b^5c \\
& ^{10}d^2z^2 + 754974720a^8b^4c^{10}e^2z^2 - 730054656a^5b^9c^8d^2z \\
& ^2 + 477102080a^{12}b^3c^7m^2z^2 - 377487360a^{11}b^4c^7l^2z^2 + 4771 \\
& 02080a^9b^3c^{10}f^2z^2 + 301989888a^{12}b^2c^8l^2z^2 - 377487360a^9 \\
& *b^4c^9g^2z^2 + 301989888a^{10}b^2c^{10}g^2z^2 - 174325760a^{11}b^5c^6 \\
& *m^2z^2 + 188743680a^{10}b^6c^6l^2z^2 + 141557760a^{11}b^3c^8k^2z^2 \\
& + 188743680a^8b^6c^8g^2z^2 + 141557760a^{10}b^3c^9h^2z^2 - 17432576 \\
& 0a^8b^5c^9f^2z^2 - 188743680a^7b^6c^9e^2z^2 - 47185920a^9b^8c^ \\
& 5l^2z^2 + 11206656a^{10}b^7c^5m^2z^2 + 8929280a^9b^9c^4m^2z^2 - 2 \\
& 600960a^8b^{11}c^3m^2z^2 + 291840a^7b^{13}c^2m^2z^2 - 50331648a^{10}b \\
& ^4c^8j^2z^2 + 146165760a^4b^{11}c^7d^2z^2 - 26542080a^9b^7c^6k^2z \\
& ^2 + 5898240a^8b^{10}c^4l^2z^2 - 294912a^7b^{12}c^3l^2z^2 - 33554432 \\
& *a^{11}b^2c^9j^2z^2 + 9584640a^8b^9c^5k^2z^2 + 20971520a^9b^6c^7j \\
& ^2z^2 - 2359296a^{10}b^5c^7k^2z^2 - 1290240a^7b^{11}c^4k^2z^2 + 460 \\
& 80a^6b^{13}c^3k^2z^2 + 2304a^5b^{15}c^2k^2z^2 - 2752512a^7b^{10}c^5j \\
& ^2z^2 + 2621440a^8b^8c^6j^2z^2 + 524288a^6b^{12}c^4j^2z^2 - 32768 \\
& *a^5b^{14}c^3j^2z^2 - 47185920a^7b^8c^7g^2z^2 - 26542080a^8b^7c^7 \\
& *h^2z^2 + 9584640a^7b^9c^6h^2z^2 - 2359296a^9b^5c^8h^2z^2 - 1290 \\
& 240a^6b^{11}c^5h^2z^2 + 46080a^5b^{13}c^4h^2z^2 + 2304a^4b^{15}c^3h \\
& ^2z^2 + 5898240a^6b^{10}c^6g^2z^2 - 294912a^5b^{12}c^5g^2z^2 + 11206 \\
& 656a^7b^7c^8f^2z^2 + 8929280a^6b^9c^7f^2z^2 + 23592960a^6b^8c^ \\
& 8e^2z^2 - 2600960a^5b^{11}c^6f^2z^2 + 291840a^4b^{13}c^5f^2z^2 - 14 \\
& 080a^3b^{15}c^4f^2z^2 + 256a^2b^{17}c^3f^2z^2 - 19860480a^3b^{13}c^6 \\
& *d^2z^2 - 1179648a^5b^{10}c^7e^2z^2 + 1771776a^2b^{15}c^5d^2z^2 - 44 \\
& 0401920a^{13}b*c^8m^2z^2 + 1207959552a^{10}c^{12}e^2z^2 + 134217728a^{12}c \\
& ^{10}j^2z^2 + 256a^5b^{17}m^2z^2 + 2304b^{19}c^3d^2z^2 - 23592960a^{10} \\
& *b*c^8f*k*lz + 99090432a^9b*c^9d*h*lz + 9437184a^{10}b*c^8e*k*mz + \\
& 23592960a^{10}b*c^8g*h*mz + 141557760a^8b*c^{10}d*e*kz + 47185920a^9b \\
& *c^9d*j*kz - 23592960a^9b*c^9f*g*kz + 169869312a^7b*c^{11}d*e*fz + \\
& 99090432a^8b*c^{10}d*g*h*z - 3145728a^9b*c^9f*h*jz + 56623104a^8b*c^ \\
& 10d*f*jz + 1536a*b^{15}c^3d*f*jz - 9437184a^8b*c^{10}e*f*h*z - 4608a* \\
& b^{14}c^4d*f*g*z + 9216a*b^{13}c^5d*e*fz + 412876800a^8b^2c^9d*e*mz \\
& - 206438400a^9b^3c^7d*l*mz + 5898240a^{10}b^4c^5k*lmz - 206438400*
\end{aligned}$$

$a^8b^3c^8d^8g^8m^8z - 4718592a^{11}b^2c^6k^8l^8m^8z - 2949120a^9b^6c^4k^8l^8m^8z + 737280a^8b^8c^3k^8l^8m^8z - 92160a^7b^{10}c^2k^8l^8m^8z + 103219200a^8b^5c^6d^8l^8m^8z - 29491200a^{10}b^3c^6h^8l^8m^8z - 206438400a^7b^4c^8d^8e^8m^8z - 2359296a^{10}b^3c^6j^8k^8m^8z + 491520a^8b^7c^4j^8k^8m^8z - 184320a^7b^9c^3j^8k^8m^8z + 27648a^6b^{11}c^2j^8k^8m^8z + 14745600a^9b^5c^5h^8l^8m^8z - 3686400a^8b^7c^4h^8l^8m^8z + 460800a^7b^9c^3h^8l^8m^8z - 23040a^6b^{11}c^2h^8l^8m^8z + 88473600a^8b^4c^7d^8k^8l^8z + 82575360a^9b^2c^8d^8j^8m^8z + 11796480a^{10}b^2c^7h^8j^8m^8z + 5898240a^9b^4c^6g^8k^8m^8z - 4718592a^{10}b^2c^7g^8k^8m^8z - 70778880a^9b^2c^8d^8k^8l^8z - 2949120a^8b^6c^5g^8k^8m^8z - 2457600a^8b^6c^5h^8j^8m^8z + 921600a^7b^8c^4h^8j^8m^8z + 737280a^7b^8c^4g^8k^8m^8z - 138240a^6b^{10}c^3h^8j^8m^8z - 92160a^6b^{10}c^3g^8k^8m^8z + 7680a^5b^{12}c^2h^8j^8m^8z + 4608a^5b^{12}c^2g^8k^8m^8z + 29491200a^9b^3c^7f^8k^8l^8z - 176947200a^7b^3c^9d^8e^8k^8z - 109707264a^8b^3c^8d^8h^8l^8z - 25804800a^7b^7c^5d^8l^8m^8z + 103219200a^7b^5c^7d^8g^8m^8z + 219414528a^7b^2c^{10}d^8e^8h^8z - 14745600a^8b^5c^6f^8k^8l^8z - 29491200a^9b^3c^7g^8h^8m^8z - 11796480a^9b^3c^7e^8k^8m^8z - 44236800a^7b^6c^6d^8k^8l^8z + 58982400a^9b^2c^8e^8h^8m^8z + 5898240a^8b^5c^6e^8k^8m^8z + 3686400a^7b^7c^5f^8k^8l^8z + 3225600a^6b^9c^4d^8l^8m^8z - 1474560a^7b^7c^5e^8k^8m^8z - 460800a^6b^9c^4f^8k^8l^8z + 184320a^6b^9c^4e^8k^8m^8z - 161280a^5b^{11}c^3d^8l^8m^8z + 23040a^5b^{11}c^3f^8k^8l^8z - 9216a^5b^{11}c^3e^8k^8m^8z + 14745600a^8b^5c^6g^8h^8m^8z + 110886912a^7b^4c^8d^8f^8l^8z - 3686400a^7b^7c^5g^8h^8m^8z - 221773824a^6b^3c^{10}d^8e^8f^8z + 460800a^6b^9c^4g^8h^8m^8z - 17203200a^7b^6c^6d^8j^8m^8z - 23040a^5b^{11}c^3g^8h^8m^8z - 29491200a^8b^4c^7e^8h^8m^8z - 11796480a^9b^2c^8f^8j^8k^8z + 11059200a^6b^8c^5d^8k^8l^8z + 6451200a^6b^8c^5d^8j^8m^8z + 88473600a^7b^4c^8d^8g^8k^8z + 2457600a^7b^6c^6f^8j^8k^8z - 35389440a^8b^3c^8d^8j^8k^8z - 1382400a^5b^{10}c^4d^8k^8l^8z - 84934656a^8b^2c^9d^8f^8l^8z - 967680a^5b^{10}c^4d^8j^8m^8z - 921600a^6b^8c^5f^8j^8k^8z + 138240a^5b^{10}c^4f^8j^8k^8z + 69120a^4b^{12}c^3d^8k^8l^8z + 53760a^4b^{12}c^3d^8j^8m^8z - 7680a^4b^{12}c^3f^8j^8k^8z + 44236800a^7b^5c^7d^8h^8l^8z + 7372800a^7b^6c^6e^8h^8m^8z - 5898240a^8b^4c^7f^8h^8l^8z + 4718592a^9b^2c^8f^8h^8l^8z - 70778880a^8b^2c^9d^8g^8k^8z + 2949120a^7b^6c^6f^8h^8l^8z - 921600a^6b^8c^5e^8h^8m^8z - 737280a^6b^8c^5f^8h^8l^8z + 92160a^5b^{10}c^4f^8h^8l^8z + 46080a^5b^{10}c^4e^8h^8m^8z - 4608a^4b^{12}c^3f^8h^8l^8z + 29491200a^8b^3c^8f^8g^8k^8z - 109707264a^7b^3c^9d^8g^8h^8z - 25804800a^6b^7c^6d^8g^8m^8z - 58982400a^8b^2c^9e^8f^8k^8z - 58982400a^6b^6c^7d^8f^8l^8z + 7372800a^6b^7c^6d^8j^8k^8z + 88473600a^6b^5c^8d^8e^8k^8z - 2764800a^5b^9c^5d^8j^8k^8z + 51609600a^6b^6c^7d^8e^8m^8z + 414720a^4b^{11}c^4d^8j^8k^8z - 23040a^3b^{13}c^3d^8j^8k^8z - 14745600a^7b^5c^7f^8g^8k^8z - 44236800a^6b^6c^7d^8g^8k^8z - 6635520a^6b^7c^6d^8h^8l^8z + 40108032a^8b^2c^9d^8h^8j^8z + 3686400a^6b^7c^6f^8g^8k^8z + 3225600a^5b^9c^5d^8g^8m^8z + 2359296a^8b^3c^8f^8h^8j^8z - 491520a^6b^7c^6f^8h^8j^8z - 460800a^5b^9c^5f^8g^8k^8z - 276480a^5b^9c^5d^8h^8l^8z + 184320a^5b^9c^5f^8h^8j^8z + 179712a^4b^{11}c^4d^8h^8l^8z - 161280a^4b^{11}c^4d^8g^8m^8z - 27648a^4b^{11}c^4f^8h^8j^8z + 23040a^4b^{11}c^4f^8g^8k^8z - 13824a^3b^{13}c^3d^8h^8l^8z + 1536a^3b^{13}c^3f^8h^8j^8z + 29491200a^7b^4c^8e^8f^8k^8z + 110886$

$912a^6b^4c^9d^5fgz + 16220160a^5b^8c^6d^5flz - 45613056a^7b^3c^9d^5fjz + 11059200a^5b^8c^6d^5gkz - 10321920a^6b^6c^7d^5h^5jz - 7372800a^6b^6c^7d^5efkz + 7077888a^7b^4c^8d^5h^5jz - 6451200a^5b^8c^6d^5emz - 88473600a^6b^4c^9d^5ehz + 2396160a^5b^8c^6d^5h^5jz - 2396160a^4b^10c^5d^5flz - 1382400a^4b^10c^5d^5gkz - 84934656a^7b^2c^10d^5fgz + 921600a^5b^8c^6d^5efkz + 117964800a^5b^5c^9d^5efz + 322560a^4b^10c^5d^5emz + 175104a^3b^12c^4d^5flz + 69120a^3b^12c^4d^5gkz - 50688a^3b^12c^4d^5h^5jz - 46080a^4b^10c^5d^5efkz - 27648a^4b^10c^5d^5h^5jz + 4608a^2b^14c^3d^5h^5jz - 4608a^2b^14c^3d^5flz + 44236800a^6b^5c^8d^5g^5h^5z - 5898240a^7b^4c^8d^5f^5g^5h^5z - 2218400a^5b^7c^7d^5e^5k^5z + 4718592a^8b^2c^9d^5f^5g^5h^5z + 2949120a^6b^6c^7d^5f^5g^5h^5z - 737280a^5b^8c^6d^5f^5g^5h^5z + 92160a^4b^10c^5d^5f^5g^5h^5z - 4608a^3b^12c^4d^5f^5g^5h^5z + 8847360a^5b^7c^7d^5f^5j^5z - 58982400a^5b^6c^8d^5f^5g^5z - 3809280a^4b^9c^6d^5f^5j^5z + 2764800a^4b^9c^6d^5e^5k^5z + 2359296a^6b^5c^8d^5f^5j^5z + 681984a^3b^11c^5d^5f^5j^5z - 138240a^3b^11c^5d^5e^5k^5z - 55296a^2b^13c^4d^5f^5j^5z + 11796480a^7b^3c^9d^5e^5f^5h^5z - 6635520a^5b^7c^7d^5g^5h^5z - 5898240a^6b^5c^8d^5e^5f^5h^5z + 1474560a^5b^7c^7d^5e^5f^5h^5z - 276480a^4b^9c^6d^5g^5h^5z - 184320a^4b^9c^6d^5e^5f^5h^5z + 179712a^3b^11c^5d^5g^5h^5z - 13824a^2b^13c^4d^5g^5h^5z + 9216a^3b^11c^5d^5e^5f^5h^5z + 16220160a^4b^8c^7d^5f^5g^5z + 13271040a^5b^6c^8d^5e^5h^5z - 2396160a^3b^10c^6d^5f^5g^5z + 552960a^4b^8c^7d^5e^5h^5z - 359424a^3b^10c^6d^5e^5h^5z + 175104a^2b^12c^5d^5f^5g^5z + 27648a^2b^12c^5d^5e^5h^5z - 32440320a^4b^7c^8d^5e^5f^5z + 4792320a^3b^9c^7d^5e^5f^5z - 350208a^2b^11c^6d^5e^5f^5z + 165150720a^10b^3c^8d^5l^5m^5z + 4608a^6b^12c^5k^5l^5m^5z + 23592960a^11b^3c^7d^5h^5l^5m^5z + 3145728a^11b^3c^7d^5j^5k^5m^5z - 1536a^5b^13c^5j^5k^5m^5z + 165150720a^9b^3c^9d^5g^5m^5z + 346816512a^7b^3c^11d^2g^5z + 19660800a^12b^3c^6l^5m^2z - 34560a^7b^11c^5l^5m^2z - 7077888a^11b^3c^7k^2l^5z + 11008a^6b^12c^5j^5m^2z + 19660800a^11b^3c^7g^5m^2z + 7077888a^10b^3c^8h^2l^5z + 768a^5b^13c^5g^5m^2z - 19660800a^9b^3c^9f^2l^5z - 7077888a^10b^3c^8g^5k^2z - 6912a^5b^15c^3d^2l^5z + 7077888a^9b^3c^9g^5h^2z - 19660800a^8b^3c^10f^2g^5z - 66816a^5b^14c^4d^2j^5z + 214272a^5b^13c^5d^2g^5z - 428544a^5b^12c^6d^2e^5z - 330301440a^9c^10d^5emz - 110100480a^10c^9d^5j^5m^5z - 15728640a^11c^8h^5j^5m^5z - 47185920a^10c^9e^5h^5m^5z - 198180864a^8c^11d^5e^5h^5z + 15728640a^10c^9f^5j^5k^5z - 66060288a^9c^10d^5h^5j^5z + 47185920a^9c^10e^5f^5k^5z + 1022754816a^6b^2c^11d^2e^5z - 642318336a^5b^4c^10d^2e^5z - 511377408a^7b^3c^9d^2l^5z - 511377408a^6b^3c^10d^2g^5z + 321159168a^6b^5c^8d^2l^5z + 321159168a^5b^5c^9d^2g^5z + 225312768a^7b^2c^10d^2j^5z - 25362432a^11b^3c^5l^5m^2z + 13271040a^10b^5c^4l^5m^2z - 3563520a^9b^7c^3l^5m^2z + 506880a^8b^9c^2l^5m^2z + 10354688a^11b^2c^6j^5m^2z + 8847360a^10b^3c^6k^2l^5z - 4423680a^9b^5c^5k^2l^5z - 2048000a^9b^6c^4j^5m^2z + 1105920a^8b^7c^4k^2l^5z + 849920a^8b^8c^3j^5m^2z - 393216a^10b^4c^5j^5m^2z - 145920a^7b^10c^2j^5m^2z - 138240a^7b^9c^3k^2l^5z + 6912a^6b^11c^2k^2l^5z - 111697920a^5b^7c^7d^2l^5z + 223395840a^4b^6c^9d^2e^5z - 25362432a^10b^3c^6g^5m^2z - 3538944a^10b^2c^7j^5k^2z + 737280a^8b^$

$b^6c^5jk^2z + 50724864a^{10}b^2c^7emm^2z - 276480a^7b^8c^4jk^2z + 41472a^6b^{10}c^3jk^2z - 2304a^5b^{12}c^2jk^2z + 13271040a^9b^5c^5g^m^2z - 8847360a^9b^3c^7h^2l^2z + 4423680a^8b^5c^6h^2l^2z - 3563520a^8b^7c^4g^m^2z - 1105920a^7b^7c^5h^2l^2z + 506880a^7b^9c^3g^m^2z + 138240a^6b^9c^4h^2l^2z - 34560a^6b^{11}c^2g^m^2z - 6912a^5b^{11}c^3h^2l^2z - 26542080a^9b^4c^6emm^2z + 25362432a^8b^3c^8f^2l^2z - 13271040a^7b^5c^7f^2l^2z + 8847360a^9b^3c^7g^k^2z + 7127040a^8b^6c^5emm^2z - 4423680a^8b^5c^6g^k^2z + 3563520a^6b^7c^6f^2l^2z + 3538944a^9b^2c^8h^2j^2z + 1105920a^7b^7c^5g^k^2z - 1013760a^7b^8c^4emm^2z - 737280a^7b^6c^6h^2j^2z - 506880a^5b^9c^5f^2l^2z + 276480a^6b^8c^5h^2j^2z - 138240a^6b^9c^4g^k^2z + 69120a^6b^{10}c^3emm^2z - 41472a^5b^{10}c^4h^2j^2z + 34560a^4b^{11}c^4f^2l^2z + 6912a^5b^{11}c^3g^k^2z + 2304a^4b^{12}c^3h^2j^2z - 1536a^5b^{12}c^2emm^2z - 768a^3b^{13}c^3f^2l^2z - 111697920a^4b^7c^8d^2g^z + 23362560a^4b^9c^6d^2l^2z - 17694720a^9b^2c^8ek^2z - 10354688a^8b^2c^9f^2j^2z - 43646976a^6b^4c^9d^2j^2z + 8847360a^8b^4c^7ek^2z - 2965248a^3b^{11}c^5d^2l^2z - 2211840a^7b^6c^6ek^2z + 2048000a^6b^6c^7f^2j^2z - 849920a^5b^8c^6f^2j^2z + 393216a^7b^4c^8f^2j^2z + 276480a^6b^8c^5ek^2z + 214272a^2b^{13}c^4d^2l^2z + 145920a^4b^{10}c^5f^2j^2z - 13824a^5b^{10}c^4ek^2z - 11008a^3b^{12}c^4f^2j^2z + 256a^2b^{14}c^3f^2j^2z - 32587776a^5b^6c^8d^2j^2z - 8847360a^8b^3c^8g^h^2z + 21657600a^4b^8c^7d^2j^2z + 4423680a^7b^5c^7g^h^2z - 1105920a^6b^7c^6g^h^2z + 138240a^5b^9c^5g^h^2z - 6912a^4b^{11}c^4g^h^2z + 25362432a^7b^3c^9f^2g^z - 5810688a^3b^{10}c^6d^2j^2z + 17694720a^8b^2c^9eh^2z + 845568a^2b^{12}c^5d^2j^2z - 50724864a^7b^2c^{10}ef^2z - 13271040a^6b^5c^8f^2g^z - 8847360a^7b^4c^8eh^2z + 3563520a^5b^7c^7f^2g^z + 2211840a^6b^6c^7eh^2z - 506880a^4b^9c^6f^2g^z - 276480a^5b^8c^6eh^2z + 34560a^3b^{11}c^5f^2g^z + 13824a^4b^{10}c^5eh^2z - 768a^2b^{13}c^4f^2g^z + 26542080a^6b^4c^9ef^2z + 23362560a^3b^9c^7d^2g^z - 46725120a^3b^8c^8d^2ez - 7127040a^5b^6c^8ef^2z - 2965248a^2b^{11}c^6d^2g^z + 1013760a^4b^8c^7ef^2z - 69120a^3b^{10}c^6ef^2z + 1536a^2b^{12}c^5ef^2z + 5930496a^2b^{10}c^7d^2ez + 346816512a^8b^c^{10}d^2l^2z - 693633024a^7c^{12}d^2ez - 231211008a^8c^{11}d^2j^2z + 768a^6b^{13}l^2m^2z - 13107200a^{12}c^7jm^2z - 256a^5b^{14}jm^2z + 4718592a^{11}c^8jk^2z - 3932160a^{11}c^8emm^2z - 4718592a^{10}c^9h^2j^2z + 14155776a^{10}c^9ek^2z + 13107200a^9c^{10}f^2j^2z + 2304b^{16}c^3d^2j^2z - 14155776a^9c^{10}eh^2z + 39321600a^8c^{11}ef^2z - 6912b^{15}c^4d^2g^z + 13824b^{14}c^5d^2ez + 737280a^{10}b^c^5jk^2l^2m - 2304a^6b^9c^5jk^2l^2m + 2211840a^9b^c^6ek^2l^2m + 1228800a^9b^c^6f^2j^2l^2m + 737280a^9b^c^6g^2j^2k^2m + 442368a^9b^c^6h^2j^2k^2l^2m + 36a^3b^{12}c^5f^2h^2k^2m + 3096576a^8b^c^7d^2j^2k^2l^2m - 12745728a^8b^c^7d^2h^2k^2m + 3686400a^8b^c^7ef^2l^2m + 3391488a^8b^c^7eh^2j^2m + 2211840a^8b^c^7eg^2k^2m + 1327104a^8b^c^7eh^2k^2l^2m + 1228800a^8b^c^7f^2g^2j^2m + 737280a^8b^c^7f^2h^2j^2l^2m + 442368a^8b^c^7g^2h^2j^2k^2m + 108a^2b^{13}c^5d^2h^2k^2m + 16367616a^7b^c^8d^2ej^2m + 9289728a^7b^c^8d^2ek^2l^2m$

$$\begin{aligned}
& + 5160960a^7b^8c^8d^8f^8j^8k^8 + 3391488a^7b^8c^8e^8f^8j^8k^8 + 3096576a^7b^8c^8d^8g^8j^8k^8 - 19307520a^7b^8c^8d^8f^8h^8m^8 + 3686400a^7b^8c^8e^8f^8g^8m^8 + 2211840a^7b^8c^8e^8f^8h^8l^8 + 1327104a^7b^8c^8e^8g^8h^8k^8 + 737280a^7b^8c^8f^8g^8h^8j^8 \\
& - 180a^8b^{13}c^2d^8f^8h^8m^8 - 540a^8b^{12}c^3d^8f^8h^8k^8 + 15482880a^6b^8c^9d^8e^8f^8g^8h^8j^8 + 11059200a^6b^8c^9d^8e^8h^8j^8 + 9289728a^6b^8c^9d^8e^8g^8k^8 + 5160960a^6b^8c^9d^8f^8g^8j^8 - 2304a^8b^{11}c^4d^8f^8g^8j^8 + 2211840a^6b^8c^9e^8f^8g^8h^8 + 4608a^8b^{10}c^5d^8e^8f^8j^8 + 15482880a^5b^8c^{10}d^8e^8f^8g^8 - 13824a^8b^9c^6d^8e^8f^8g^8 + 36a^8b^{14}c^4d^8f^8k^8m^8 + 1843200a^9b^3c^4j^8k^8l^8m^8 + 783360a^8b^5c^3j^8k^8l^8m^8 + 18432a^7b^7c^2j^8k^8l^8m^8 - 2211840a^8b^4c^4g^8k^8l^8m^8 - 1695744a^9b^2c^5h^8j^8l^8m^8 - 1400832a^8b^4c^4h^8j^8l^8m^8 - 1105920a^9b^2c^5g^8k^8l^8m^8 - 253440a^7b^6c^3h^8j^8l^8m^8 - 69120a^7b^6c^3g^8k^8l^8m^8 + 11520a^6b^8c^2h^8j^8l^8m^8 + 6912a^6b^8c^2g^8k^8l^8m^8 + 4423680a^8b^3c^5e^8k^8l^8m^8 + 2506752a^8b^3c^5f^8j^8l^8m^8 + 1843200a^8b^3c^5g^8j^8k^8m^8 + 1327104a^8b^3c^5h^8j^8k^8l^8 + 838656a^7b^5c^4f^8j^8l^8m^8 + 783360a^7b^5c^4g^8j^8k^8m^8 + 691200a^7b^5c^4h^8j^8k^8l^8 + 138240a^7b^5c^4e^8k^8l^8m^8 + 69120a^6b^7c^3h^8j^8k^8l^8 - 53760a^6b^7c^3f^8j^8l^8m^8 + 18432a^6b^7c^3g^8j^8k^8m^8 - 13824a^6b^7c^3e^8k^8l^8m^8 - 2304a^5b^9c^2g^8j^8k^8m^8 + 2543616a^8b^3c^5g^8h^8l^8m^8 + 829440a^7b^5c^4g^8h^8l^8m^8 - 34560a^6b^7c^3g^8h^8l^8m^8 - 8183808a^8b^2c^6d^8j^8l^8m^8 - 3686400a^8b^2c^6e^8j^8k^8m^8 - 2285568a^7b^4c^5d^8j^8l^8m^8 - 1695744a^8b^2c^6f^8j^8k^8l^8 - 1566720a^7b^4c^5e^8j^8k^8m^8 - 1400832a^7b^4c^5f^8j^8k^8l^8 + 741888a^6b^6c^4d^8j^8l^8m^8 - 253440a^6b^6c^4f^8j^8k^8l^8 - 80640a^5b^8c^3d^8j^8l^8m^8 - 36864a^6b^6c^4e^8j^8k^8m^8 + 11520a^5b^8c^3f^8j^8k^8l^8 + 4608a^5b^8c^3e^8j^8k^8m^8 + 6700032a^8b^2c^6f^8h^8k^8m^8 + 5103360a^7b^4c^5f^8h^8k^8m^8 - 5087232a^8b^2c^6e^8h^8l^8m^8 - 2838528a^7b^4c^5f^8g^8l^8m^8 - 1843200a^8b^2c^6f^8g^8l^8m^8 - 1695744a^8b^2c^6g^8h^8j^8m^8 - 1658880a^7b^4c^5g^8h^8k^8l^8 - 1658880a^7b^4c^5e^8h^8l^8m^8 - 1400832a^7b^4c^5g^8h^8j^8m^8 - 663552a^8b^2c^6g^8h^8k^8l^8 + 483840a^6b^6c^4f^8h^8k^8m^8 - 253440a^6b^6c^4g^8h^8j^8m^8 - 207360a^6b^6c^4g^8h^8k^8l^8 + 161280a^6b^6c^4f^8g^8l^8m^8 + 69120a^6b^6c^4e^8h^8l^8m^8 - 50040a^5b^8c^3f^8h^8k^8m^8 + 11520a^5b^8c^3g^8h^8j^8m^8 + 180a^4b^{10}c^2f^8h^8k^8m^8 + 4202496a^7b^3c^6d^8j^8k^8l^8 + 635904a^6b^5c^5d^8j^8k^8l^8 - 276480a^5b^7c^4d^8j^8k^8l^8 + 34560a^4b^9c^3d^8j^8k^8l^8 - 16671744a^7b^3c^6d^8h^8k^8m^8 + 12275712a^7b^3c^6d^8g^8l^8m^8 + 5677056a^7b^3c^6e^8f^8l^8m^8 + 4423680a^7b^3c^6e^8g^8k^8m^8 + 3317760a^7b^3c^6e^8h^8k^8l^8 + 2801664a^7b^3c^6e^8h^8j^8m^8 - 2709504a^6b^5c^5d^8g^8l^8m^8 + 2543616a^7b^3c^6f^8g^8k^8l^8 + 2506752a^7b^3c^6f^8g^8j^8m^8 + 1843200a^7b^3c^6f^8h^8j^8l^8 + 1327104a^7b^3c^6g^8h^8j^8k^8 + 838656a^6b^5c^5f^8g^8j^8m^8 + 829440a^6b^5c^5f^8g^8k^8l^8 + 783360a^6b^5c^5f^8h^8j^8l^8 + 691200a^6b^5c^5g^8h^8j^8k^8 + 665280a^5b^7c^4d^8h^8k^8m^8 + 506880a^6b^5c^5e^8h^8j^8m^8 + 414720a^6b^5c^5e^8h^8k^8l^8 - 322560a^6b^5c^5e^8f^8l^8m^8 + 241920a^5b^7c^4d^8g^8l^8m^8 + 138240a^6b^5c^5e^8g^8k^8m^8 - 108540a^4b^9c^3d^8h^8k^8m^8 + 69120a^5b^7c^4g^8h^8j^8k^8 - 53760a^5b^7c^4f^8g^8j^8m^8 - 51840a^6b^5c^5d^8h^8k^8m^8 - 34560a^5b^7c^4f^8g^8k^8l^8 - 23040a^5b^7c^4e^8h^8j^8m^8 + 18432a^5b^7c^4f^8h^8j^8l^8 - 13824a^5b^7c^4e^8g^8k^8m^8 - 2304a^4b^9c^3f^8h^8j^8l^8 + 1296a^3b^{11}c^2d^8h^8k^8m^8 + 31924224a^7b^2c^7d^8f^8k^8m^8 - 24551424a^7b^2c^7d^8e^8l^8m^8 + 10616832a^7b^2c^7e^8g^8j^8l^8 - 8183808a^7b^2c^7d^8g^8j^8m^8 - 5529600a^7b^2c^7d^8h^8j^8l^8 +
\end{aligned}$$

$5419008a^6b^4c^6d^e1m + 5308416a^6b^4c^6e^g*j1 - 5087232a^7b^2c^7e^f*k1 - 5013504a^7b^2c^7e^f*jm + 4868352a^6b^4c^6d^f*k^m - 4644864a^7b^2c^7d^g*k^1 - 3981312a^6b^4c^6d^g*k^1 - 2654208a^7b^2c^7e^h*j^k - 2367360a^5b^6c^5d^f*k^m - 2285568a^6b^4c^6d^g*j^m - 2211840a^6b^4c^6d^h*j^1 - 1695744a^7b^2c^7f^g*j^k - 1677312a^6b^4c^6e^f*j^m - 1658880a^6b^4c^6e^f*k^1 - 1400832a^6b^4c^6f^g*j^k - 1382400a^6b^4c^6e^h*j^k + 1036800a^5b^6c^5d^g*k^1 + 741888a^5b^6c^5d^g*j^m - 483840a^5b^6c^5d^e1m + 317952a^5b^6c^5d^h*j^1 + 268920a^4b^8c^4d^f*k^m - 253440a^5b^6c^5f^g*j^k - 138240a^5b^6c^5e^h*j^k + 107520a^5b^6c^5e^f*j^m - 103680a^4b^8c^4d^g*k^1 - 80640a^4b^8c^4d^g*j^m + 69120a^5b^6c^5e^f*k^1 + 11520a^4b^8c^4f^g*j^k + 6912a^4b^8c^4d^h*j^1 - 6912a^3b^10c^3d^h*j^1 + 6120a^3b^10c^3d^f*k^m - 1368a^2b^12c^2d^f*k^m - 5087232a^7b^2c^7e^g^h^m - 2211840a^6b^4c^6f^g^h^1 - 1658880a^6b^4c^6e^g^h^m - 1105920a^7b^2c^7f^g^h^1 - 69120a^5b^6c^5f^g^h^1 + 69120a^5b^6c^5e^g^h^m + 6912a^4b^8c^4f^g^h^1 + 7962624a^6b^3c^7d^e^k^1 - 22164480a^6b^3c^7d^f^h^m + 5160960a^6b^3c^7d^f*j^1 + 4571136a^6b^3c^7d^e^j^m + 4202496a^6b^3c^7d^g*j^k + 2801664a^6b^3c^7e^f*j^k - 2073600a^5b^5c^6d^e^k^1 - 1483776a^5b^5c^6d^e^j^m + 635904a^5b^5c^6d^g*j^k + 506880a^5b^5c^6e^f*j^k - 354816a^4b^7c^5d^f*j^1 + 322560a^5b^5c^6d^f*j^1 - 276480a^4b^7c^5d^g*j^k + 207360a^4b^7c^5d^e^k^1 + 161280a^4b^7c^5d^e^j^m + 59904a^3b^9c^4d^f*j^1 + 34560a^3b^9c^4d^g*j^k - 23040a^4b^7c^5e^f*j^k - 2304a^2b^11c^3d^f*j^1 + 8294400a^6b^3c^7d^g^h^1 + 5677056a^6b^3c^7e^f^g^m + 4423680a^6b^3c^7e^f^h^1 + 3317760a^6b^3c^7e^g^h^k + 2805120a^5b^5c^6d^f^h^m + 1843200a^6b^3c^7f^g^h^j - 829440a^5b^5c^6d^g^h^1 + 783360a^5b^5c^6f^g^h^j + 437184a^4b^7c^5d^f^h^m + 414720a^5b^5c^6e^g^h^k - 322560a^5b^5c^6e^f^g^m - 146268a^3b^9c^4d^f^h^m + 138240a^5b^5c^6e^f^h^1 - 62208a^4b^7c^5d^g^h^1 + 20736a^3b^9c^4d^g^h^1 + 18432a^4b^7c^5f^g^h^j - 13824a^4b^7c^5e^f^h^1 + 9360a^2b^11c^3d^f^h^m - 2304a^3b^9c^4f^g^h^j - 8404992a^6b^2c^8d^e^j^k - 24551424a^6b^2c^8d^e^g^m + 21150720a^6b^2c^8d^f^h^k - 1271808a^5b^4c^7d^e^j^k + 552960a^4b^6c^6d^e^j^k - 69120a^3b^8c^5d^e^j^k - 16588800a^6b^2c^8d^e^h^1 - 7741440a^6b^2c^8d^f^g^1 + 6946560a^5b^4c^7d^f^h^k - 5529600a^6b^2c^8d^g^h^j + 5419008a^5b^4c^7d^e^g^m - 5087232a^6b^2c^8e^f^g^k - 3870720a^5b^4c^7d^f^g^1 - 3686400a^6b^2c^8e^f^h^j - 2211840a^5b^4c^7d^g^h^j - 1755648a^4b^6c^6d^f^h^k - 1658880a^5b^4c^7e^f^g^k + 1658880a^5b^4c^7d^e^h^1 - 1566720a^5b^4c^7e^f^h^j + 1451520a^4b^6c^6d^f^g^1 - 483840a^4b^6c^6d^e^g^m + 317952a^4b^6c^6d^g^h^j - 193536a^3b^8c^5d^f^g^1 + 124416a^4b^6c^6d^e^h^1 + 114696a^3b^8c^5d^f^h^k + 69120a^4b^6c^6e^f^g^k - 41472a^3b^8c^5d^e^h^1 - 36864a^4b^6c^6e^f^h^j + 14580a^2b^10c^4d^f^h^k + 6912a^3b^8c^5d^g^h^j - 6912a^2b^10c^4d^g^h^j + 6912a^2b^10c^4d^f^g^1 + 4608a^3b^8c^5e^f^h^j + 7962624a^5b^3c^8d^e^g^k + 7741440a^5b^3c^8d^e^f^1 + 5160960a^5b^3c^8d^f^g^j + 4423680a^5b^3c^8d^e^h^j - 2903040a^4b^5c^7d^e^f^1 - 2073600a^$

$$\begin{aligned}
& 4*b^5*c^7*d*e*g*k - 635904*a^4*b^5*c^7*d*e*h*j + 387072*a^3*b^7*c^6*d*e*f*l \\
& - 354816*a^3*b^7*c^6*d*f*g*j + 322560*a^4*b^5*c^7*d*f*g*j + 207360*a^3*b^7 \\
& *c^6*d*e*g*k + 59904*a^2*b^9*c^5*d*f*g*j - 13824*a^3*b^7*c^6*d*e*h*j + 1382 \\
& 4*a^2*b^9*c^5*d*e*h*j - 13824*a^2*b^9*c^5*d*e*f*l + 4423680*a^5*b^3*c^8*e*f \\
& *g*h + 138240*a^4*b^5*c^7*e*f*g*h - 13824*a^3*b^7*c^6*e*f*g*h - 10321920*a^ \\
& 5*b^2*c^9*d*e*f*j + 709632*a^3*b^6*c^7*d*e*f*j - 645120*a^4*b^4*c^8*d*e*f*j \\
& - 119808*a^2*b^8*c^6*d*e*f*j - 16588800*a^5*b^2*c^9*d*e*g*h + 1658880*a^4* \\
& b^4*c^8*d*e*g*h + 124416*a^3*b^6*c^7*d*e*g*h - 41472*a^2*b^8*c^6*d*e*g*h + \\
& 7741440*a^4*b^3*c^9*d*e*f*g - 2903040*a^3*b^5*c^8*d*e*f*g + 387072*a^2*b^7* \\
& c^7*d*e*f*g + 3456*a^7*b^8*c*k*l^2*m + 12672*a^7*b^8*c*j*l*m^2 + 384*a^5*b^ \\
& 10*c*j^2*k*m - 1635840*a^10*b*c^5*h*k*m^2 - 1009152*a^9*b*c^6*h^2*k*m + 369 \\
& 0*a^6*b^9*c*h*k*m^2 + 1152*a^6*b^9*c*g*l*m^2 - 540*a^5*b^10*c*h*k^2*m + 54* \\
& a^4*b^11*c*h^2*k*m + 565248*a^9*b*c^6*h*j^2*m - 39771648*a^7*b*c^8*d^2*k*m \\
& - 2496000*a^8*b*c^7*f^2*k*m - 1543680*a^9*b*c^6*f*k^2*m + 1980*a^5*b^10*c*f \\
& *k*m^2 - 384*a^5*b^10*c*g*j*m^2 - 180*a^4*b^11*c*f*k^2*m + 6*a^2*b^13*c*f^2 \\
& *k*m - 10298880*a^9*b*c^6*d*k*m^2 + 2580480*a^9*b*c^6*e*j*m^2 + 5310*a^4*b^ \\
& 11*c*d*k*m^2 - 1674*a*b^13*c^2*d^2*k*m - 540*a^3*b^12*c*d*k^2*m - 10616832* \\
& a^7*b*c^8*e^2*j*l - 3538944*a^8*b*c^7*e*j^2*l + 2727936*a^8*b*c^7*d*j^2*m - \\
& 2496000*a^9*b*c^6*f*h*m^2 - 1543680*a^8*b*c^7*f*h^2*m + 565248*a^8*b*c^7*f \\
& *j^2*k - 270*a^4*b^11*c*f*h*m^2 - 59512320*a^6*b*c^9*d^2*f*m + 5087232*a^7* \\
& b*c^8*e^2*h*m + 1105920*a^8*b*c^7*e*j*k^2 - 3456*a*b^12*c^3*d^2*j*l - 16358 \\
& 40*a^7*b*c^8*f^2*h*k - 1009152*a^8*b*c^7*f*h*k^2 + 10260*a*b^12*c^3*d^2*h*m \\
& - 684*a^3*b^12*c*d*h*m^2 - 24675840*a^6*b*c^9*d^2*h*k - 15552000*a^8*b*c^7 \\
& *d*f*m^2 + 24551424*a^6*b*c^9*d*e^2*m - 3939840*a^7*b*c^8*d*h^2*k + 1105920 \\
& *a^7*b*c^8*e*h^2*j - 25074*a*b^11*c^4*d^2*f*m + 10530*a*b^11*c^4*d^2*h*k + \\
& 10368*a*b^11*c^4*d^2*g*l + 420*a*b^12*c^3*d*f^2*m - 378*a^2*b^13*c*d*f*m^2 \\
& - 10616832*a^6*b*c^9*e^2*g*j + 5087232*a^6*b*c^9*e^2*f*k - 3538944*a^7*b*c^ \\
& 8*e*g*j^2 + 1843200*a^7*b*c^8*d*h*j^2 - 7994880*a^6*b*c^9*d*f^2*k - 4990464 \\
& *a^7*b*c^8*d*f*k^2 + 2580480*a^6*b*c^9*e*f^2*j + 65664*a*b^10*c^5*d^2*g*j - \\
& 27972*a*b^10*c^5*d^2*f*k - 20736*a*b^10*c^5*d^2*e*l + 1260*a*b^11*c^4*d*f^ \\
& 2*k + 54*a*b^13*c^2*d*f*k^2 + 23224320*a^5*b*c^10*d^2*e*j - 37062144*a^5*b* \\
& c^10*d^2*f*h + 384*a*b^12*c^3*d*f*j^2 - 131328*a*b^9*c^6*d^2*e*j - 5985792* \\
& a^6*b*c^9*d*f*h^2 + 206010*a*b^9*c^6*d^2*f*h - 6300*a*b^10*c^5*d*f^2*h + 13 \\
& 50*a*b^11*c^4*d*f*h^2 + 16588800*a^5*b*c^10*d*e^2*h + 3456*a*b^10*c^5*d*f*g \\
& ^2 + 435456*a*b^8*c^7*d^2*e*g + 13824*a*b^8*c^7*d*e^2*f - 1474560*a^9*c^7*e \\
& *j*k*m + 460800*a^9*c^7*f*h*k*m + 3225600*a^8*c^8*d*f*k*m - 2457600*a^8*c^8 \\
& *e*f*j*m - 884736*a^8*c^8*e*h*j*k - 6193152*a^7*c^9*d*e*j*k + 1935360*a^7*c^ \\
& ^9*d*f*h*k - 1474560*a^7*c^9*e*f*h*j - 10321920*a^6*c^10*d*e*f*j - 1105920* \\
& a^9*b^4*c^3*k*l^2*m - 552960*a^10*b^2*c^4*k*l^2*m - 34560*a^8*b^6*c^2*k*l^2 \\
& *m - 1290240*a^10*b^2*c^4*j*l*m^2 - 860160*a^9*b^4*c^3*j*l*m^2 - 80640*a^8* \\
& b^6*c^2*j*l*m^2 - 737280*a^9*b^2*c^5*j^2*k*m - 568320*a^8*b^4*c^4*j^2*k*m - \\
& 136704*a^7*b^6*c^3*j^2*k*m - 2304*a^6*b^8*c^2*j^2*k*m + 1271808*a^9*b^3*c^ \\
& 4*h*l^2*m - 552960*a^9*b^2*c^5*j*k^2*l - 552960*a^8*b^4*c^4*j*k^2*l + 41472 \\
& 0*a^8*b^5*c^3*h*l^2*m - 145152*a^7*b^6*c^3*j*k^2*l - 17280*a^7*b^7*c^2*h*l^ \\
& 2*m - 3456*a^6*b^8*c^2*j*k^2*l - 3640320*a^9*b^3*c^4*h*k*m^2 - 2626560*a^8*
\end{aligned}$$

$$\begin{aligned}
& b^3c^5h^2k^m + 2211840a^9b^2c^5h^2k^2m + 2056320a^8b^4c^4h^2k^2m \\
& + 1935360a^9b^3c^4g^1m^2 - 1143360a^8b^5c^3h^2k^2m - 1097280a^7b^5c^4h^2k^2m + 364608a^7b^6c^3h^2k^2m + 322560a^8b^5c^3g^1m^2 - \\
& 56160a^6b^7c^3h^2k^2m - 40320a^7b^7c^2g^1m^2 + 27936a^7b^7c^2h^2k^2m - 3780a^6b^8c^2h^2k^2m + 2970a^5b^9c^2h^2k^2m - 1419264a^8 \\
& *b^4c^4f^1l^2m - 1105920a^7b^4c^5g^2k^2m - 921600a^9b^2c^5f^1l^2m \\
& - 829440a^8b^4c^4h^2k^1l^2 + 749568a^8b^3c^5h^2j^2m - 552960a^8b^2 \\
& *c^6g^2k^2m - 331776a^9b^2c^5h^2k^1l^2 + 317952a^7b^5c^4h^2j^2m - 10 \\
& 3680a^7b^6c^3h^2k^1l^2 + 80640a^7b^6c^3f^1l^2m + 38400a^6b^7c^3h^2 \\
& j^2m - 34560a^6b^6c^4g^2k^2m + 3456a^5b^8c^3g^2k^2m - 1920a^5b^9 \\
& *c^2h^2j^2m - 5142528a^7b^3c^6f^2k^2m + 5068800a^9b^2c^5f^2k^2m - \\
& 3870720a^9b^2c^5e^1m^2 - 3755520a^8b^3c^5f^2k^2m + 3000960a^8b^4 \\
& *c^4f^2k^2m - 1290240a^9b^2c^5g^2j^2m - 1085760a^7b^5c^4f^2k^2m - \\
& 959040a^6b^5c^5f^2k^2m - 860160a^8b^4c^4g^2j^2m + 829440a^8b^3c^5 \\
& *g^2k^2l - 645120a^8b^4c^4e^1m^2 - 552960a^8b^2c^6h^2j^2m - 55296 \\
& 0a^7b^4c^5h^2j^2m + 414720a^7b^5c^4g^2k^2l - 145152a^6b^6c^4h^2 \\
& *j^2m + 103200a^5b^7c^4f^2k^2m - 80640a^7b^6c^3g^2j^2m + 80640a^7b^6 \\
& *c^3e^1m^2 + 41280a^7b^6c^3f^2k^2m - 37188a^6b^8c^2f^2k^2m + 13 \\
& 536a^6b^7c^3f^2k^2m + 12672a^6b^8c^2g^2j^2m + 10368a^6b^7c^3g^2k^2 \\
& *l + 5490a^5b^9c^2f^2k^2m - 3456a^5b^8c^3h^2j^2m - 2304a^6b^8c^2 \\
& *e^1m^2 + 810a^4b^9c^3f^2k^2m - 270a^3b^11c^2f^2k^2m + 6137856a^8 \\
& *b^3c^5d^1l^2m - 4423680a^7b^2c^7e^2k^2m - 2654208a^8b^3c^5g^2j^2 \\
& *l - 2654208a^7b^3c^6g^2j^2m + 1769472a^8b^2c^6g^2j^2l + 1769472a^7 \\
& *b^4c^5g^2j^2l - 1354752a^7b^5c^4d^1l^2m - 1327104a^7b^5c^4g^2j^2 \\
& *l - 1327104a^6b^5c^5g^2j^2m + 1271808a^8b^3c^5f^2k^1l^2 - 1040384a^8 \\
& *b^2c^6f^2j^2m - 697344a^7b^4c^5f^2j^2m - 516096a^8b^2c^6h^2j^2 \\
& *k - 451584a^7b^4c^5h^2j^2k + 442368a^6b^6c^4g^2j^2l + 414720a^7b^5 \\
& *c^4f^2k^1l^2 - 138240a^6b^6c^4h^2j^2k - 138240a^6b^4c^6e^2k^2m - 1 \\
& 21856a^6b^6c^4f^2j^2m + 120960a^6b^7c^3d^1l^2m - 17280a^6b^7c^3f^2 \\
& *k^1l^2 + 13824a^5b^6c^5e^2k^2m - 11520a^5b^8c^3h^2j^2k + 8960a^5b^8 \\
& *c^3f^2j^2m + 10851840a^8b^2c^6d^2k^2m - 10464768a^6b^3c^7d^2k^2 \\
& *m - 10275840a^8b^3c^5d^2k^2m + 7121088a^5b^5c^6d^2k^2m + 3127680a^7 \\
& *b^4c^5d^2k^2m + 1720320a^8b^3c^5e^2j^2m - 1658880a^8b^2c^6e^2k^2 \\
& *l - 1290240a^7b^2c^7f^2j^2m + 1271808a^7b^3c^6g^2h^2m - 1222560a^4 \\
& *b^7c^5d^2k^2m + 999360a^7b^5c^4d^2k^2m - 860160a^6b^4c^6f^2j^2 \\
& *l - 829440a^7b^4c^5e^2k^2l - 705024a^6b^6c^4d^2k^2m - 552960a^8b^2 \\
& *c^6g^2j^2k^2 - 552960a^7b^4c^5g^2j^2k^2 + 414720a^6b^5c^5g^2h^2m + 3 \\
& 19392a^6b^7c^3d^2k^2m + 161280a^7b^5c^4e^2j^2m - 145152a^6b^6c^4 \\
& *g^2j^2k^2 - 85734a^5b^9c^2d^2k^2m - 80640a^5b^6c^5f^2j^2l - 25344a^6 \\
& *b^7c^3e^2j^2m + 23490a^3b^9c^4d^2k^2m - 20736a^6b^6c^4e^2k^2l - \\
& 17280a^5b^7c^4g^2h^2m + 14148a^5b^8c^3d^2k^2m + 13716a^2b^11c^3 \\
& *d^2k^2m + 12690a^4b^10c^2d^2k^2m + 12672a^4b^8c^4f^2j^2l - 3456a^5 \\
& *b^8c^3g^2j^2k^2 + 768a^5b^9c^2e^2j^2m - 384a^3b^10c^3f^2j^2l + 53 \\
& 08416a^8b^2c^6e^2j^2l - 5308416a^6b^3c^7e^2j^2l - 5142528a^8b^3c^5 \\
& *f^2h^2m + 5068800a^7b^2c^7f^2h^2m - 3755520a^7b^3c^6f^2h^2m - 35
\end{aligned}$$

$$\begin{aligned}
& 38944a^7b^3c^6e^j^2l + 3000960a^6b^4c^6f^2h^m + 2654208a^7b^4c^5e^j^2l - 2322432a^8b^2c^6d^2k^2l + 2125824a^7b^3c^6d^2j^2m - 1990656a^7b^4c^5d^2k^2l - 1085760a^6b^5c^5f^2h^2m - 959040a^7b^5c^4f^2h^2m - 884736a^6b^5c^5e^j^2l + 829440a^7b^3c^6g^2h^2l + 749568a^7b^3c^6f^2j^2k + 518400a^6b^6c^4d^2k^2l + 414720a^6b^5c^5g^2h^2l + 317952a^6b^5c^5f^2j^2k + 133632a^6b^5c^5d^2j^2m + 103200a^6b^7c^3f^2h^2m - 96768a^5b^7c^4d^2j^2m - 51840a^5b^8c^3d^2k^2l + 41280a^5b^6c^5f^2h^2m + 38400a^5b^7c^4f^2j^2k - 37188a^4b^8c^4f^2h^2m + 13536a^5b^7c^4f^2h^2m + 13440a^4b^9c^3d^2j^2m + 10368a^5b^7c^4g^2h^2l + 5490a^4b^9c^3f^2h^2m + 1980a^3b^10c^3f^2h^2m - 1920a^4b^9c^3f^2j^2k + 810a^5b^9c^2f^2h^2m - 180a^3b^11c^2f^2h^2m - 30a^2b^12c^2f^2h^2m + 30067200a^6b^2c^8d^2h^2m - 11612160a^6b^2c^8d^2j^2l + 1658880a^6b^3c^7e^2h^2m + 1596672a^4b^6c^6d^2j^2l - 1419264a^6b^4c^6f^2g^2m - 1105920a^7b^4c^5f^2h^2l + 1105920a^7b^3c^6e^j^2k^2 - 921600a^7b^2c^7f^2g^2m - 829440a^6b^4c^6g^2h^2k - 552960a^8b^2c^6f^2h^2l - 508032a^3b^8c^5d^2j^2l - 331776a^7b^2c^7g^2h^2k + 290304a^6b^5c^5e^j^2k^2 - 103680a^5b^6c^5g^2h^2k + 80640a^5b^6c^5f^2g^2m - 69120a^5b^5c^6e^2h^2m + 65664a^2b^10c^4d^2j^2l - 34560a^6b^6c^4f^2h^2l + 6912a^5b^7c^4e^j^2k^2 + 3456a^5b^8c^3f^2h^2l + 11930112a^8b^2c^6d^2h^2m + 8432640a^7b^2c^7d^2h^2m + 4450176a^7b^4c^5d^2h^2m + 4337280a^6b^4c^6d^2h^2m - 3870720a^8b^2c^6e^2g^2m - 3640320a^6b^3c^7f^2h^2k - 2885760a^5b^4c^7d^2h^2m - 2844288a^4b^6c^6d^2h^2m - 2626560a^7b^3c^6f^2h^2k + 2211840a^7b^2c^7f^2h^2k + 2056320a^6b^4c^6f^2h^2k + 1935360a^6b^3c^7f^2g^2l - 1916928a^7b^2c^7d^2j^2k - 1687680a^6b^6c^4d^2h^2m - 1658880a^7b^2c^7e^2h^2l - 1143360a^5b^5c^6f^2h^2k - 1097280a^6b^5c^5f^2h^2k + 1019412a^3b^8c^5d^2h^2m - 1007424a^5b^6c^5d^2h^2m - 912384a^6b^4c^6d^2j^2k - 829440a^6b^4c^6e^2h^2l - 645120a^7b^4c^5e^2g^2m - 552960a^7b^2c^7g^2h^2j - 552960a^6b^4c^6g^2h^2j + 364608a^5b^6c^5f^2h^2k + 322560a^5b^5c^6f^2g^2l + 197460a^5b^8c^3d^2h^2m - 145152a^5b^6c^5g^2h^2j - 143802a^2b^10c^4d^2h^2m + 80640a^6b^6c^4e^2g^2m - 56160a^5b^7c^4f^2h^2k + 51948a^4b^8c^4d^2h^2m - 40320a^4b^7c^5f^2g^2l + 34560a^4b^8c^4d^2j^2k + 27936a^4b^7c^5f^2h^2k - 20736a^5b^6c^5e^2h^2l - 13824a^5b^6c^5d^2j^2k + 10800a^3b^10c^3d^2h^2m - 5760a^3b^10c^3d^2j^2k - 3780a^4b^8c^4f^2h^2k + 3690a^3b^9c^4f^2h^2k - 3456a^4b^8c^4g^2h^2j + 2970a^4b^9c^3f^2h^2k - 2304a^5b^8c^3e^2g^2m + 1152a^3b^9c^4f^2g^2l - 540a^3b^10c^3f^2h^2k - 540a^2b^12c^2d^2h^2m - 90a^4b^10c^2d^2h^2m - 90a^2b^11c^3f^2h^2k + 54a^3b^11c^2f^2h^2k + 15925248a^6b^2c^8e^2g^2l - 7962624a^7b^3c^6e^2g^2l - 7962624a^6b^3c^7e^2g^2l + 23385600a^6b^2c^8d^2f^2m + 6137856a^6b^3c^7d^2g^2m - 5677056a^6b^2c^8e^2f^2m + 4147200a^7b^3c^6d^2h^2l - 3317760a^6b^2c^8e^2h^2k - 1354752a^5b^5c^6d^2g^2m + 1271808a^6b^3c^7f^2g^2k - 737280a^7b^2c^7f^2h^2j + 17418240a^5b^3c^8d^2g^2l - 568320a^6b^4c^6f^2h^2j - 414720a^6b^5c^5d^2h^2l + 414720a^5b^5c^6f^2g^2k - 414720a^5b^4c^7e^2h^2k + 322560a^5b^4c^7e^2f^2g^2k
\end{aligned}$$

$$\begin{aligned}
& *m - 136704*a^5*b^6*c^5*f*h*j^2 + 120960*a^4*b^7*c^5*d*g^2*m - 31104*a^5*b^7*c^4*d*h^1^2 - 17280*a^4*b^7*c^5*f*g^2*k + 10368*a^4*b^9*c^3*d*h^1^2 - 230 \\
& 4*a^4*b^8*c^4*f*h*j^2 + 384*a^3*b^10*c^3*f*h*j^2 + 50042880*a^5*b^2*c^9*d^2 \\
& *f*k - 13271040*a^5*b^3*c^8*d^2*h*k - 13149696*a^7*b^3*c^6*d*f*m^2 + 109065 \\
& 60*a^4*b^5*c^7*d^2*f*m - 8709120*a^4*b^5*c^7*d^2*g*1 - 7418880*a^5*b^3*c^8*d^2*f*m + 7133184*a^7*b^2*c^7*d*h*k^2 - 6428160*a^6*b^3*c^7*d*h^2*k + 55935 \\
& 36*a^4*b^5*c^7*d^2*h*k - 3870720*a^6*b^2*c^8*e*f^2*1 + 3369600*a^6*b^4*c^6*d*h*k^2 + 3148992*a^6*b^5*c^5*d*f*m^2 - 2985696*a^3*b^7*c^6*d^2*f*m + 19595 \\
& 52*a^3*b^7*c^6*d^2*g*1 - 1658880*a^7*b^2*c^7*e*g*k^2 - 1505280*a^4*b^6*c^6*d*f^2*m - 1290240*a^6*b^2*c^8*f^2*g*j - 34836480*a^5*b^2*c^9*d^2*e*1 + 1105 \\
& 920*a^6*b^3*c^7*e*h^2*j - 860160*a^5*b^4*c^7*f^2*g*j - 829440*a^6*b^4*c^6*e \\
& *g*k^2 - 692064*a^3*b^7*c^6*d^2*h*k - 689472*a^5*b^5*c^6*d*h^2*k - 645120*a^5*b^4*c^7*e*f^2*1 - 388800*a^5*b^6*c^5*d*h*k^2 + 378954*a^2*b^9*c^5*d^2*f* \\
& m + 362880*a^5*b^4*c^7*d*f^2*m + 296964*a^3*b^8*c^5*d*f^2*m + 290304*a^5*b^5*c^6*e*h^2*j + 277344*a^4*b^7*c^5*d*h^2*k - 217728*a^2*b^9*c^5*d^2*g*1 - 8 \\
& 0640*a^4*b^6*c^6*f^2*g*j + 80640*a^4*b^6*c^6*e*f^2*1 - 77070*a^4*b^9*c^3*d* \\
& f*m^2 - 30240*a^5*b^7*c^4*d*f*m^2 - 28350*a^3*b^9*c^4*d*h^2*k - 26406*a^2*b^9*c^5*d^2*h*k - 21060*a^4*b^8*c^4*d*h*k^2 - 20736*a^5*b^6*c^5*e*g*k^2 - 19 \\
& 278*a^2*b^10*c^4*d*f^2*m + 12672*a^3*b^8*c^5*f^2*g*j + 10044*a^3*b^10*c^3*d \\
& *h*k^2 + 8820*a^3*b^11*c^2*d*f*m^2 + 6912*a^4*b^7*c^5*e*h^2*j - 2304*a^3*b^8*c^5*e*f^2*1 - 1620*a^2*b^11*c^3*d*h^2*k - 384*a^2*b^10*c^4*f^2*g*j + 162* \\
& a^2*b^12*c^2*d*h*k^2 - 5419008*a^5*b^3*c^8*d*e^2*m + 5308416*a^6*b^2*c^8*e* \\
& g^2*j - 5308416*a^5*b^3*c^8*e^2*g*j - 3870720*a^7*b^2*c^7*d*f*1^2 - 3538944 \\
& *a^6*b^3*c^7*e*g*j^2 + 2654208*a^5*b^4*c^7*e*g^2*j - 2322432*a^6*b^2*c^8*d* \\
& g^2*k - 1990656*a^5*b^4*c^7*d*g^2*k - 1935360*a^6*b^4*c^6*d*f*1^2 + 1658880 \\
& *a^6*b^3*c^7*d*h*j^2 + 1658880*a^5*b^3*c^8*e^2*f*k - 884736*a^5*b^5*c^6*e*g \\
& *j^2 + 725760*a^5*b^6*c^5*d*f*1^2 + 17418240*a^4*b^4*c^8*d^2*e*1 + 518400*a^4*b^6*c^6*d*g^2*k + 483840*a^4*b^5*c^7*d*e^2*m + 262656*a^5*b^5*c^6*d*h*j^2 \\
& - 96768*a^4*b^8*c^4*d*f*1^2 - 69120*a^4*b^5*c^7*e^2*f*k - 55296*a^4*b^7*c^5*d*h*j^2 - 51840*a^3*b^8*c^5*d*g^2*k + 3456*a^3*b^10*c^3*d*f*1^2 + 1152*a^3*b^9*c^4*d*h*j^2 + 1152*a^2*b^11*c^3*d*h*j^2 - 15431040*a^4*b^4*c^8*d^2*f \\
& *k - 13248000*a^5*b^3*c^8*d*f^2*k - 11612160*a^5*b^2*c^9*d^2*g*j - 10063872 \\
& *a^6*b^3*c^7*d*f*k^2 - 3919104*a^3*b^6*c^7*d^2*e*1 + 2554560*a^4*b^5*c^7*d* \\
& f^2*k + 1720320*a^5*b^3*c^8*e*f^2*j + 1596672*a^3*b^6*c^7*d^2*g*j + 1518912 \\
& *a^3*b^6*c^7*d^2*f*k - 1105920*a^5*b^4*c^7*f*g^2*h + 838080*a^5*b^5*c^6*d*f \\
& *k^2 - 552960*a^6*b^2*c^8*f*g^2*h - 508032*a^2*b^8*c^6*d^2*g*j + 435456*a^2 \\
& *b^8*c^6*d^2*e*1 + 161280*a^4*b^5*c^7*e*f^2*j + 116640*a^4*b^7*c^5*d*f*k^2 \\
& + 106812*a^2*b^8*c^6*d^2*f*k - 98208*a^3*b^7*c^6*d*f^2*k - 34560*a^4*b^6*c^6*f*g^2*h - 27270*a^3*b^9*c^4*d*f*k^2 - 26334*a^2*b^9*c^5*d*f^2*k - 25344*a^3*b^7*c^6*e*f^2*j + 3456*a^3*b^8*c^5*f*g^2*h + 768*a^2*b^9*c^5*e*f^2*j - 7 \\
& 02*a^2*b^11*c^3*d*f*k^2 - 7962624*a^5*b^2*c^9*d*e^2*k - 2580480*a^6*b^2*c^8 \\
& *d*f*j^2 + 2073600*a^4*b^4*c^8*d*e^2*k - 1658880*a^6*b^2*c^8*e*g*h^2 - 9676 \\
& 80*a^5*b^4*c^7*d*f*j^2 - 829440*a^5*b^4*c^7*e*g*h^2 - 207360*a^3*b^6*c^7*d* \\
& e^2*k + 64512*a^4*b^6*c^6*d*f*j^2 + 39168*a^3*b^8*c^5*d*f*j^2 - 20736*a^4*b^6*c^6*e*g*h^2 - 9216*a^2*b^10*c^4*d*f*j^2 - 4423680*a^5*b^2*c^9*e^2*f*h +
\end{aligned}$$

$$\begin{aligned}
& 4147200a^5b^3c^8d^2g^2h - 3193344a^3b^5c^8d^2e^2j + 1016064a^2b^7c^7d^2e^2j - 414720a^4b^5c^7d^2g^2h - 138240a^4b^4c^8e^2f^2h - 31104a^3b^7c^6d^2g^2h + 13824a^3b^6c^7e^2f^2h + 10368a^2b^9c^5d^2g^2h + 15630336a^5b^2c^9d^2f^2h - 14459904a^4b^3c^9d^2f^2h + 9630144a^3b^5c^8d^2f^2h - 8764416a^5b^3c^8d^2f^2h - 3870720a^5b^2c^9e^2f^2g + 2867328a^4b^4c^8d^2f^2h - 2095200a^2b^7c^7d^2f^2h - 1414080a^3b^6c^7d^2f^2h - 34836480a^4b^2c^10d^2e^2g - 645120a^4b^4c^8e^2f^2g + 306720a^3b^7c^6d^2f^2h + 197820a^2b^8c^6d^2f^2h + 146880a^4b^5c^7d^2f^2h + 80640a^3b^6c^7e^2f^2g - 55350a^2b^9c^5d^2f^2h - 2304a^2b^8c^6e^2f^2g - 3870720a^5b^2c^9d^2f^2g - 1935360a^4b^4c^8d^2f^2g - 1658880a^4b^3c^9d^2e^2h + 725760a^3b^6c^7d^2f^2g + 17418240a^3b^4c^9d^2e^2g - 124416a^3b^5c^8d^2e^2h - 96768a^2b^8c^6d^2f^2g + 41472a^2b^7c^7d^2e^2h - 3919104a^2b^6c^8d^2e^2g - 7741440a^4b^2c^10d^2e^2f + 2903040a^3b^4c^9d^2e^2f - 387072a^2b^6c^8d^2e^2f - 20160a^8b^7c^12m^2 - 1648128a^10b^3c^3k^3m^3 - 898560a^9b^3c^4k^3m - 354240a^9b^5c^2k^3m^3 - 354240a^8b^5c^3k^3m - 21600a^7b^7c^2k^3m - 13950a^7b^8c^2k^2m^2 + 430080a^10b^5c^5j^2m^2 - 1984a^6b^9c^2j^2m^2 - 884736a^9b^3c^4j^1m^3 - 589824a^8b^3c^5j^3m^1 - 442368a^8b^5c^3j^1m^3 - 294912a^7b^5c^4j^3m^1 - 49152a^6b^7c^3j^3m^1 + 1359360a^10b^2c^4h^3m^3 + 1173120a^9b^4c^3h^3m^3 + 743040a^7b^4c^5h^3m + 622080a^8b^2c^6h^3m + 184320a^9b^5c^6j^2k^2 + 107136a^6b^6c^4h^3m - 32640a^8b^6c^2h^3m + 540a^5b^8c^3h^3m - 270a^4b^10c^2h^3m - 180a^5b^10c^2h^2m^2 - 2293760a^9b^3c^4f^3m - 2293760a^6b^3c^7f^3m + 1327104a^8b^4c^4g^1m^3 + 1327104a^6b^4c^6g^3m^1 - 622080a^8b^3c^5h^3k^3 - 622080a^7b^3c^6h^3k - 326592a^7b^5c^4h^3k^3 - 326592a^6b^5c^5h^3k - 199360a^8b^5c^3f^3m^3 - 199360a^5b^5c^6f^3m + 61920a^7b^7c^2f^3m^3 + 61920a^4b^7c^5f^3m - 38880a^6b^7c^3h^3k^3 - 38880a^5b^7c^4h^3k - 3682a^3b^9c^4f^3m - 810a^5b^9c^2h^3k^3 - 810a^4b^9c^3h^3k - 70a^3b^12c^2f^2m^2 + 70a^2b^11c^3f^3m + 3870720a^8b^3c^7e^2m^2 + 184320a^8b^3c^7h^2j^2 - 14152320a^4b^4c^8d^3m + 10644480a^5b^2c^9d^3m + 5483520a^9b^2c^5d^3m + 4269888a^3b^6c^7d^3m - 2654208a^8b^3c^5e^1m^3 + 1359360a^6b^2c^8f^3k + 1330560a^8b^4c^4d^3m + 1173120a^5b^4c^7f^3k - 884736a^6b^3c^7g^3j - 826560a^7b^6c^3d^3m + 743040a^7b^4c^5f^3k + 622080a^8b^2c^6f^3k - 607068a^2b^8c^6d^3m - 589824a^7b^3c^6g^3j - 442368a^5b^5c^6g^3j - 294912a^6b^5c^5g^3j + 145188a^6b^8c^2d^3m + 107136a^6b^6c^4f^3k - 49152a^5b^7c^4g^3j - 32640a^4b^6c^6f^3k - 5796a^3b^8c^5f^3k + 540a^5b^8c^3f^3k - 270a^4b^10c^2f^3k + 210a^2b^10c^4f^3k + 19077120a^4b^3c^9d^3k + 1658880a^7b^3c^8e^2k^2 + 430080a^7b^3c^8f^2j^2 + 3538944a^5b^2c^9e^3j - 2488320a^7b^3c^6d^3k - 2379456a^3b^5c^8d^3k + 1179648a^7b^2c^7e^2j^3 + 589824a^6b^4c^6e^2j^3 + 98304a^5b^6c^5e^2j^3 - 95904a^2b^7c^7d^3k - 57024a^6b^5c^5d^3k + 49248a^5b^7c^4d^3k - 4050a^4b^9c^3d^3k - 810a^3b^11c^2d^3k - 486a^4b^12c^3d^2k^2 + 3870720a^6b^3c^9d^2j^2 - 1648128a^5b^3c^8f^3h - 898560a^6b^3c
\end{aligned}$$

$$\begin{aligned}
& ^7f^3h^3 - 354240a^5b^5c^6f^3h^3 - 354240a^4b^5c^7f^3h^3 + 43680a^3b^7c^6f^3h^3 - 21600a^4b^7c^5f^3h^3 - 9792a^3b^11c^4d^2j^2 + 1350a^3b^9c^4f^3h^3 - 1050a^2b^9c^5f^3h^3 + 1658880a^6b^3c^9e^2h^2 + 16547328a^4b^2c^10d^3h^3 - 12306816a^3b^4c^9d^3h^3 + 37310976a^3b^3c^10d^3f + 3037824a^2b^6c^8d^3h^3 - 2654208a^5b^3c^8e^2g^3 + 1949184a^6b^2c^8d^3h^3 + 1296000a^5b^4c^7d^3h^3 - 155520a^4b^6c^6d^3h^3 - 40500a^3b^10c^5d^2h^2 - 8100a^3b^8c^5d^3h^3 + 4050a^2b^10c^4d^3h^3 + 3870720a^5b^3c^10e^2f^2 + 34836480a^4b^3c^11d^2e^2 - 108864a^3b^9c^6d^2g^2 - 8068032a^2b^5c^9d^3f - 5623296a^4b^3c^9d^3f^3 + 1737792a^3b^5c^8d^3f^3 - 260190a^3b^8c^7d^2f^2 - 211680a^2b^7c^7d^3f^3 - 435456a^3b^7c^8d^2e^2 - 245760a^10c^6j^2k^2m - 384a^6b^10j^2l^2m^2 + 138240a^10c^6h^2k^2m - 90a^5b^11h^2k^2m^2 + 384000a^10c^6f^2k^2m^2 - 2211840a^8c^8e^2k^2m - 409600a^9c^7f^2j^2m - 147456a^9c^7h^2j^2k^2m - 30a^4b^12f^2k^2m^2 + 967680a^9c^7d^2k^2m^2 + 384000a^8c^8f^2h^2m^2 - 90a^3b^13d^2k^2m^2 + 20321280a^7c^9d^2h^2m^2 - 883200a^11b^3c^4k^2m^3 - 317952a^10b^3c^5k^3m + 43680a^8b^7c^3k^3m^3 + 1350a^6b^9c^3k^3m - 270b^14c^2d^2h^2m + 6a^3b^13f^2h^2m^2 + 4838400a^9c^7d^2h^2m^2 + 2903040a^8c^8d^2h^2m - 1032192a^8c^8d^2j^2k^2m + 138240a^8c^8f^2h^2k^2m - 368640a^7c^9e^2f^2m - 1327104a^7c^9e^2h^2k^2m - 393216a^9b^3c^6j^3l^2m - 245760a^8c^8f^2h^2j^2m - 810b^13c^3d^2h^2k^2m + 630b^13c^3d^2f^2m + 18a^2b^14d^2h^2m^2 + 2688000a^7c^9d^2f^2m + 580608a^8c^8d^2h^2k^2m - 5796a^7b^8c^8h^2m^3 - 3456b^12c^4d^2g^2j^2m + 1890b^12c^4d^2f^2k^2m + 6773760a^6c^10d^2f^2k^2m - 1344000a^10b^3c^5f^2m^3 - 1344000a^7b^3c^8f^3m - 207360a^9b^3c^6h^2k^3m - 207360a^8b^3c^7h^3k^3m - 3682a^6b^9c^3f^2m^3 - 9289728a^6c^10d^2e^2k^2m - 1720320a^7c^9d^2f^2j^2m - 50803200a^5b^3c^10d^3k^2m + 6912b^11c^5d^2e^2j^2m - 10616832a^6b^3c^9e^3l^2m - 2211840a^6c^10e^2f^2h^2m - 393216a^8b^3c^7g^2j^3m + 43416a^3b^10c^5d^3m - 9576a^5b^10c^3d^2m^3 - 9450b^11c^5d^2f^2h^2m - 504a^3b^14c^3d^2m^2 + 1612800a^6c^10d^2f^2h^2m - 1036800a^8b^3c^7d^2k^3m + 45198a^3b^9c^6d^3k^2m - 20736b^10c^6d^2e^2g^2m - 75188736a^4b^3c^11d^3f - 883200a^6b^3c^9f^3h^3 - 317952a^7b^3c^8f^3h^3 - 15482880a^5c^11d^2e^2f - 10616832a^5b^3c^10e^3g^2m - 345060a^3b^8c^7d^3h^3 - 4262400a^5b^3c^10d^2f^3 + 852768a^3b^7c^8d^3f + 7350a^3b^9c^6d^2f^3 + 967680a^10b^3c^3l^2m^2 + 161280a^9b^5c^2l^2m^2 + 1684224a^10b^2c^4k^2m^2 + 1264320a^9b^4c^3k^2m^2 + 126720a^8b^6c^2k^2m^2 + 501760a^9b^3c^4j^2m^2 + 414720a^9b^3c^4k^2l^2m^2 + 207360a^8b^5c^3k^2l^2m^2 + 170240a^8b^5c^3j^2m^2 + 9216a^7b^7c^2j^2m^2 + 5184a^7b^7c^2k^2l^2m^2 + 884736a^9b^2c^5j^2l^2m^2 + 884736a^8b^4c^4j^2l^2m^2 + 221184a^7b^6c^3j^2l^2m^2 + 1419840a^8b^4c^4h^2m^2 + 1387008a^9b^2c^5h^2m^2 + 276480a^8b^3c^5j^2k^2m^2 + 140544a^7b^5c^4j^2k^2m^2 + 84960a^7b^6c^3h^2m^2 + 25344a^6b^7c^3j^2k^2m^2 - 8010a^6b^8c^2h^2m^2 + 576a^5b^9c^2j^2k^2m^2 + 967680a^8b^3c^5g^2m^2 + 414720a^8b^3c^5h^2l^2m^2 + 207360a^7b^5c^4h^2l^2m^2 + 161280a^7b^5c^4g^2m^2 - 20160a^6b^7c^3g^2m^2 + 5184a^6b^7c^3h^2l^2m^2 + 576a^5b^9c^2g^2m^2 + 3808000a^8b^2c^6f^2m^2 + 1990656a^7b^4c^5g^2l^2m^2 + 1643712a^7b^4c^5f^2m^2 + 803520a^7b^4c^5h^2k^2m^2 + 725760a^8b^2c^6h^2m^2
\end{aligned}$$

$$\begin{aligned}
& 2*k^2 + 207360*a^6*b^6*c^4*h^2*k^2 - 125440*a^6*b^6*c^4*f^2*m^2 - 13790*a^5 \\
& *b^8*c^3*f^2*m^2 + 10530*a^5*b^8*c^3*h^2*k^2 + 1785*a^4*b^10*c^2*f^2*m^2 + \\
& 81*a^4*b^10*c^2*h^2*k^2 + 18427392*a^7*b^2*c^7*d^2*m^2 + 967680*a^7*b^3*c^6 \\
& *f^2*l^2 + 645120*a^7*b^3*c^6*e^2*m^2 + 414720*a^7*b^3*c^6*g^2*k^2 + 276480 \\
& *a^7*b^3*c^6*h^2*j^2 + 207360*a^6*b^5*c^5*g^2*k^2 + 161280*a^6*b^5*c^5*f^2* \\
& l^2 + 140544*a^6*b^5*c^5*h^2*j^2 - 80640*a^6*b^5*c^5*e^2*m^2 + 25344*a^5*b^ \\
& 7*c^4*h^2*j^2 - 20160*a^5*b^7*c^4*f^2*l^2 + 5184*a^5*b^7*c^4*g^2*k^2 + 2304 \\
& *a^5*b^7*c^4*e^2*m^2 + 576*a^4*b^9*c^3*h^2*j^2 + 576*a^4*b^9*c^3*f^2*l^2 + \\
& 7962624*a^7*b^2*c^7*e^2*l^2 - 4148928*a^6*b^4*c^6*d^2*m^2 + 1419840*a^6*b^4 \\
& *c^6*f^2*k^2 + 1387008*a^7*b^2*c^7*f^2*k^2 - 1183392*a^5*b^6*c^5*d^2*m^2 + \\
& 884736*a^7*b^2*c^7*g^2*j^2 + 884736*a^6*b^4*c^6*g^2*j^2 + 645750*a^4*b^8*c^ \\
& 4*d^2*m^2 + 221184*a^5*b^6*c^5*g^2*j^2 - 115920*a^3*b^10*c^3*d^2*m^2 + 8496 \\
& 0*a^5*b^6*c^5*f^2*k^2 + 10836*a^2*b^12*c^2*d^2*m^2 - 8010*a^4*b^8*c^4*f^2*k \\
& ^2 - 180*a^3*b^10*c^3*f^2*k^2 + 9*a^2*b^12*c^2*f^2*k^2 + 8709120*a^6*b^3*c^ \\
& 7*d^2*l^2 - 4354560*a^5*b^5*c^6*d^2*l^2 + 979776*a^4*b^7*c^5*d^2*l^2 + 8294 \\
& 40*a^6*b^3*c^7*e^2*k^2 + 17480448*a^6*b^2*c^8*d^2*k^2 + 501760*a^6*b^3*c^7* \\
& f^2*j^2 + 170240*a^5*b^5*c^6*f^2*j^2 - 108864*a^3*b^9*c^4*d^2*l^2 + 20736*a \\
& ^5*b^5*c^6*e^2*k^2 + 9216*a^4*b^7*c^5*f^2*j^2 + 5184*a^2*b^11*c^3*d^2*l^2 - \\
& 1984*a^3*b^9*c^4*f^2*j^2 + 64*a^2*b^11*c^3*f^2*j^2 + 3538944*a^6*b^2*c^8*e \\
& ^2*j^2 - 3302208*a^5*b^4*c^7*d^2*k^2 + 884736*a^5*b^4*c^7*e^2*j^2 + 414720* \\
& a^6*b^3*c^7*g^2*h^2 + 207360*a^5*b^5*c^6*g^2*h^2 - 103680*a^4*b^6*c^6*d^2*k \\
& ^2 + 101250*a^3*b^8*c^5*d^2*k^2 - 5751*a^2*b^10*c^4*d^2*k^2 + 5184*a^4*b^7* \\
& c^5*g^2*h^2 + 1935360*a^5*b^3*c^8*d^2*j^2 + 1684224*a^6*b^2*c^8*f^2*h^2 + 1 \\
& 264320*a^5*b^4*c^7*f^2*h^2 - 532224*a^4*b^5*c^7*d^2*j^2 + 126720*a^4*b^6*c^ \\
& 6*f^2*h^2 - 96768*a^3*b^7*c^6*d^2*j^2 + 62784*a^2*b^9*c^5*d^2*j^2 - 13950*a \\
& ^3*b^8*c^5*f^2*h^2 + 225*a^2*b^10*c^4*f^2*h^2 + 967680*a^5*b^3*c^8*f^2*g^2 \\
& + 829440*a^5*b^3*c^8*e^2*h^2 + 161280*a^4*b^5*c^7*f^2*g^2 + 20736*a^4*b^5*c \\
& ^7*e^2*h^2 - 20160*a^3*b^7*c^6*f^2*g^2 + 576*a^2*b^9*c^5*f^2*g^2 + 11487744 \\
& *a^5*b^2*c^9*d^2*h^2 + 7962624*a^5*b^2*c^9*e^2*g^2 + 35525376*a^4*b^2*c^10* \\
& d^2*f^2 - 1412640*a^3*b^6*c^7*d^2*h^2 + 461376*a^4*b^4*c^8*d^2*h^2 + 375030 \\
& *a^2*b^8*c^6*d^2*h^2 + 8709120*a^4*b^3*c^9*d^2*g^2 - 4354560*a^3*b^5*c^8*d^ \\
& 2*g^2 + 979776*a^2*b^7*c^7*d^2*g^2 + 645120*a^4*b^3*c^9*e^2*f^2 - 80640*a^3 \\
& *b^5*c^8*e^2*f^2 + 2304*a^2*b^7*c^7*e^2*f^2 - 15269184*a^3*b^4*c^9*d^2*f^2 \\
& + 2870784*a^2*b^6*c^8*d^2*f^2 - 17418240*a^3*b^3*c^10*d^2*e^2 + 3919104*a^2 \\
& *b^5*c^9*d^2*e^2 + 54*b^15*c*d^2*k*m + 6*a*b^15*d*f*m^2 + 115200*a^11*c^5*k \\
& ^2*m^2 + 576*a^7*b^9*l^2*m^2 + 225*a^6*b^10*k^2*m^2 + 64*a^5*b^11*j^2*m^2 + \\
& 345600*a^10*c^6*h^2*m^2 + 9*a^4*b^12*h^2*m^2 + 320000*a^9*c^7*f^2*m^2 + 41 \\
& 472*a^9*c^7*h^2*k^2 + 16934400*a^8*c^8*d^2*m^2 + 345600*a^8*c^8*f^2*k^2 + 8 \\
& 1*b^14*c^2*d^2*k^2 + 3538944*a^7*c^9*e^2*j^2 + 2032128*a^7*c^9*d^2*k^2 + 49 \\
& 2800*a^11*b^2*c^3*m^4 + 351456*a^10*b^4*c^2*m^4 + 576*b^13*c^3*d^2*j^2 + 33 \\
& 1776*a^9*b^4*c^3*l^4 + 115200*a^7*c^9*f^2*h^2 + 142560*a^8*b^4*c^4*k^4 + 10 \\
& 3680*a^9*b^2*c^5*k^4 + 32400*a^7*b^6*c^3*k^4 + 2025*b^12*c^4*d^2*h^2 + 2025 \\
& *a^6*b^8*c^2*k^4 + 6096384*a^6*c^10*d^2*h^2 + 131072*a^8*b^2*c^6*j^4 + 9830 \\
& 4*a^7*b^4*c^5*j^4 + 32768*a^6*b^6*c^4*j^4 + 5184*b^11*c^5*d^2*g^2 + 4096*a^ \\
& 5*b^8*c^3*j^4 + 11025*b^10*c^6*d^2*f^2 + 5644800*a^5*c^11*d^2*f^2 + 142560*
\end{aligned}$$

$$\begin{aligned}
& a^6 b^4 c^6 h^4 + 103680 a^7 b^2 c^7 h^4 + 32400 a^5 b^6 c^5 h^4 + 20736 b^9 c^7 d^2 e^2 + 2025 a^4 b^8 c^4 h^4 + 331776 a^5 b^4 c^7 g^4 + 492800 a^5 b^2 c^9 f^4 + 351456 a^4 b^4 c^8 f^4 - 43120 a^3 b^6 c^7 f^4 + 1225 a^2 b^8 c^6 f^4 - 27433728 a^3 b^2 c^{11} d^4 + 6446304 a^2 b^4 c^{10} d^4 - 1050 a^7 b^9 k m^3 + 384000 a^{11} c^5 h m^3 + 138240 a^9 c^7 h^3 m + 210 a^6 b^{10} h m^3 + 47416320 a^6 c^{10} d^3 m - 1134 b^{12} c^4 d^3 m + 70 a^5 b^{11} f m^3 + 2688000 a^{10} c^6 d m^3 + 384000 a^7 c^9 f^3 k + 138240 a^9 c^7 f k^3 - 3402 b^{11} c^5 d^3 k + 210 a^4 b^{12} d m^3 + 7077888 a^6 c^{10} e^3 j + 786432 a^8 c^8 e j^3 - 43120 a^9 b^6 c m^4 + 28449792 a^5 c^{11} d^3 h + 17010 b^{10} c^6 d^3 h + 580608 a^7 c^9 d h^3 - 39690 b^9 c^7 d^3 f - 734832 a b^6 c^9 d^4 + 9 b^{16} d^2 m^2 + 160000 a^{12} c^4 m^4 + 1225 a^8 b^8 m^4 + 20736 a^{10} c^6 k^4 + 65536 a^9 c^7 j^4 + 20736 a^8 c^8 h^4 + 49787136 a^4 c^{12} d^4 + 160000 a^6 c^{10} f^4 + 5308416 a^5 c^{11} e^4 + 35721 b^8 c^8 d^4 + a^2 b^{14} f^2 m^2, \\
& z, k1) * ((768 a^2 b^{14} c^3 d - 3145728 a^{10} c^9 h - 5242880 a^{11} c^8 m - 22020096 a^9 c^{10} d - 22272 a^3 b^{12} c^4 d + 282624 a^4 b^{10} c^5 d - 2027520 a^5 b^8 c^6 d + 8847360 a^6 b^6 c^7 d - 23396352 a^7 b^4 c^8 d + 34603008 a^8 b^2 c^9 d + 256 a^3 b^{13} c^3 f - 9216 a^4 b^{11} c^4 f + 122880 a^5 b^9 c^5 f - 819200 a^6 b^7 c^6 f + 2949120 a^7 b^5 c^7 f - 5505024 a^8 b^3 c^8 f + 768 a^4 b^{12} c^3 h - 12288 a^5 b^{10} c^4 h + 61440 a^6 b^8 c^5 h - 983040 a^8 b^4 c^7 h + 3145728 a^9 b^2 c^8 h - 3072 a^5 b^{11} c^3 k + 61440 a^6 b^9 c^4 k - 491520 a^7 b^7 c^5 k + 1966080 a^8 b^5 c^6 k - 3932160 a^9 b^3 c^7 k + 256 a^5 b^{12} c^2 m - 61440 a^7 b^8 c^4 m + 655360 a^8 b^6 c^5 m - 2949120 a^9 b^4 c^6 m + 6291456 a^{10} b^2 c^7 m + 4194304 a^9 b c^9 f + 3145728 a^{10} b c^8 k) / (512 * (4096 a^{10} c^7 + a^4 b^{12} c - 24 a^5 b^{10} c^2 + 240 a^6 b^8 c^3 - 1280 a^7 b^6 c^4 + 3840 a^8 b^4 c^5 - 6144 a^9 b^2 c^6)) + (x * (1572864 a^9 c^{10} e + 524288 a^{10} c^9 j - 1536 a^4 b^{10} c^5 e + 30720 a^5 b^8 c^6 e - 245760 a^6 b^6 c^7 e + 983040 a^7 b^4 c^8 e - 1966080 a^8 b^2 c^9 e + 768 a^4 b^{11} c^4 g - 15360 a^5 b^9 c^5 g + 122880 a^6 b^7 c^6 g - 491520 a^7 b^5 c^7 g + 983040 a^8 b^3 c^8 g - 256 a^4 b^{12} c^3 j + 4608 a^5 b^{10} c^4 j - 30720 a^6 b^8 c^5 j + 81920 a^7 b^6 c^6 j - 393216 a^9 b^2 c^8 j + 768 a^5 b^{11} c^3 l - 15360 a^6 b^9 c^4 l + 122880 a^7 b^7 c^5 l - 491520 a^8 b^5 c^6 l + 983040 a^9 b^3 c^7 l - 786432 a^9 b c^9 g - 786432 a^{10} b c^8 l) / (64 * (4096 a^{10} c^7 + a^4 b^{12} c - 24 a^5 b^{10} c^2 + 240 a^6 b^8 c^3 - 1280 a^7 b^6 c^4 + 3840 a^8 b^4 c^5 - 6144 a^9 b^2 c^6)) + (\text{root}(56371445760 a^{11} b^8 c^9 z^4 - 503316480 a^8 b^{14} c^6 z^4 + 47185920 a^7 b^{16} c^5 z^4 - 2621440 a^6 b^{18} c^4 z^4 + 65536 a^5 b^{20} c^3 z^4 - 171798691840 a^{14} b^2 c^{12} z^4 + 193273528320 a^{13} b^4 c^{11} z^4 - 128849018880 a^{12} b^6 c^{10} z^4 - 16911433728 a^{10} b^{10} c^8 z^4 + 3523215360 a^9 b^{12} c^7 z^4 + 68719476736 a^{15} c^{13} z^4 + 1536 a^5 b^{16} c^3 k m z^2 + 1536 a b^{18} c^3 d f z^2 - 2571632640 a^9 b^5 c^8 d m z^2 + 2548039680 a^9 b^3 c^{10} d h z^2 + 1509949440 a^{10} b^3 c^9 e l z^2 + 1509949440 a^9 b^3 c^{10} e g z^2 - 1401421824 a^8 b^5 c^9 d h z^2 - 1321205760 a^9 b^2 c^{11} d f z^2 - 2793406464 a^{11} b c^{10} d m z^2 + 890634240 a^8 b^7 c^7 d m z^2 - 754974720 a^{10} b^4 c^8 g l z^2 - 754974720 a^9 b^5 c^8 e l z^2 + 719585280 a^8 b^6 c^8 d k z^2 - 707788800 a^9 b^4 c^9 d k z^2 - 754974720 a^8 b^5 c^9 e g z^2 + 603979776 a^{11} b^2 c^9 g l *
\end{aligned}$$

$$\begin{aligned}
& z^2 - 581959680a^{10}b^4c^8f^mz^2 + 732168192a^7b^6c^9d^fz^2 + 5347 \\
& 73760a^{11}b^3c^8h^mz^2 - 456130560a^{11}b^4c^7k^mz^2 - 603979776a^{11} \\
& 0b^2c^{10}e^jz^2 + 534773760a^{10}b^3c^9f^kz^2 + 384040960a^9b^6c^7 \\
& f^mz^2 + 377487360a^9b^6c^7g^l^1z^2 - 456130560a^9b^4c^9f^h^z^2 + \\
& 301989888a^{11}b^3c^8j^l^1z^2 - 415236096a^{10}b^2c^{10}d^kz^2 + 25401753 \\
& 6a^{10}b^6c^6k^mz^2 - 330301440a^{10}b^4c^8h^kz^2 + 390463488a^7b^7 \\
& c^8d^hz^2 + 188743680a^{12}b^2c^8k^mz^2 + 301989888a^{10}b^3c^9g^j \\
& z^2 - 297861120a^7b^8c^7d^kz^2 - 366280704a^6b^8c^8d^fz^2 + 18874 \\
& 3680a^{11}b^2c^9h^kz^2 - 330301440a^8b^4c^{10}d^fz^2 + 254017536a^8 \\
& b^6c^8f^hz^2 - 1887436800a^{10}b^c^{11}d^hz^2 + 188743680a^8b^7c^7e^ \\
& l^1z^2 + 153354240a^9b^6c^7h^kz^2 - 185303040a^7b^9c^6d^mz^2 - 117 \\
& 964800a^{10}b^5c^7h^mz^2 - 61931520a^9b^8c^5k^mz^2 + 121634816a^{11} \\
& b^2c^9f^mz^2 - 115671040a^8b^8c^6f^mz^2 - 62914560a^9b^7c^6j^l^1 \\
& z^2 + 188743680a^{10}b^2c^{10}f^hz^2 - 94371840a^8b^8c^6g^l^1z^2 + 614 \\
& 4000a^8b^{10}c^4k^mz^2 - 117964800a^9b^5c^8f^kz^2 + 61440a^7b^{12} \\
& c^3k^mz^2 - 46080a^6b^{14}c^2k^mz^2 + 23592960a^8b^9c^5j^l^1z^2 + 1 \\
& 88743680a^7b^7c^8e^gz^2 - 37355520a^9b^7c^6h^mz^2 + 125829120a^8 \\
& b^6c^8e^jz^2 + 23101440a^8b^9c^5h^mz^2 - 3538944a^7b^{11}c^4j^l^1 \\
& z^2 + 196608a^6b^{13}c^3j^l^1z^2 - 4349952a^7b^{11}c^4h^mz^2 + 337920a \\
& ^6b^{13}c^3h^mz^2 - 7680a^5b^{15}c^2h^mz^2 - 62914560a^8b^7c^7g^j \\
& z^2 - 26542080a^8b^8c^6h^kz^2 + 17940480a^7b^{10}c^5f^mz^2 + 117964 \\
& 80a^7b^{10}c^5g^l^1z^2 - 37355520a^8b^7c^7f^kz^2 - 1347584a^6b^{12}c \\
& ^4f^mz^2 + 68272128a^6b^{10}c^6d^kz^2 - 589824a^6b^{12}c^4g^l^1z^2 + \\
& 552960a^6b^{12}c^4h^kz^2 - 147456a^7b^{10}c^5h^kz^2 - 46080a^5b^{14} \\
& c^3h^kz^2 + 35840a^5b^{14}c^3f^mz^2 + 23592960a^7b^9c^6g^jz^2 - 2 \\
& 3592960a^7b^9c^6e^l^1z^2 + 23371776a^6b^{11}c^5d^mz^2 + 23101440a^7 \\
& b^9c^6f^kz^2 - 47185920a^7b^8c^7e^jz^2 - 61931520a^7b^8c^7f^hz^2 \\
& ^2 - 4349952a^6b^{11}c^5f^kz^2 - 3538944a^6b^{11}c^5g^jz^2 - 1677312 \\
& a^5b^{13}c^4d^mz^2 + 1179648a^6b^{11}c^5e^l^1z^2 + 337920a^5b^{13}c^4f \\
& ^kz^2 + 196608a^5b^{13}c^4g^jz^2 + 53760a^4b^{15}c^3d^mz^2 - 7680a^4 \\
& b^{15}c^3f^kz^2 + 96583680a^5b^{10}c^7d^fz^2 - 9179136a^5b^{12}c^5d \\
& ^kz^2 + 7077888a^6b^{10}c^6e^jz^2 - 51609600a^6b^9c^7d^hz^2 + 6912 \\
& 00a^4b^{14}c^4d^kz^2 - 393216a^5b^{12}c^5e^jz^2 - 23040a^3b^{16}c^3 \\
& d^kz^2 + 6144000a^6b^{10}c^6f^hz^2 + 61440a^5b^{12}c^5f^hz^2 - 46080 \\
& a^4b^{14}c^4f^hz^2 + 1536a^3b^{16}c^3f^hz^2 - 23592960a^6b^9c^7e^ \\
& gz^2 + 1179648a^5b^{11}c^6e^gz^2 + 829440a^4b^{13}c^5d^hz^2 + 368640 \\
& a^5b^{11}c^6d^hz^2 - 105984a^3b^{15}c^4d^hz^2 + 4608a^2b^{17}c^3d^h \\
& z^2 - 15175680a^4b^{12}c^6d^fz^2 + 1428480a^3b^{14}c^5d^fz^2 - 73728 \\
& a^2b^{16}c^4d^fz^2 + 4108320768a^{10}b^3c^9d^mz^2 - 1207959552a^{11}b \\
& c^{10}e^l^1z^2 - 1207959552a^{10}b^c^{11}e^gz^2 - 578813952a^{12}b^c^9h^mz \\
& ^2 - 578813952a^{11}b^c^{10}f^kz^2 - 402653184a^{12}b^c^9j^l^1z^2 - 4026531 \\
& 84a^{11}b^c^{10}g^jz^2 - 440401920a^{10}b^c^{11}f^2z^2 - 188743680a^{12}b^c \\
& ^9k^2z^2 - 188743680a^{11}b^c^{10}h^2z^2 + 1761607680a^{10}c^{12}d^fz^2 - \\
& 14080a^6b^{15}c^m^2z^2 - 94464a^b^{17}c^4d^2z^2 + 6936330240a^8b^3c \\
& ^{11}d^2z^2 + 2464874496a^6b^7c^9d^2z^2 - 3963617280a^9b^c^{12}d^2z^2
\end{aligned}$$

$$\begin{aligned}
& 2 + 1056964608a^{11}c^{11}dk^2z^2 + 805306368a^{11}c^{11}e^jz^2 + 419430400a^{12}c^{10}f^mz^2 + 251658240a^{13}c^9k^mz^2 - 1509949440a^9b^2c^{11}e^2z^2 + 251658240a^{11}c^{11}f^h^2z^2 + 150994944a^{12}c^{10}h^kz^2 - 5400428544a^7b^5c^{10}d^2z^2 + 754974720a^8b^4c^{10}e^2z^2 - 730054656a^5b^9c^8d^2z^2 + 477102080a^{12}b^3c^7m^2z^2 - 377487360a^{11}b^4c^7l^2z^2 + 477102080a^9b^3c^{10}f^2z^2 + 301989888a^{12}b^2c^8l^2z^2 - 377487360a^9b^4c^9g^2z^2 + 301989888a^{10}b^2c^{10}g^2z^2 - 174325760a^{11}b^5c^6m^2z^2 + 188743680a^{10}b^6c^6l^2z^2 + 141557760a^{11}b^3c^8k^2z^2 + 188743680a^8b^6c^8g^2z^2 + 141557760a^{10}b^3c^9h^2z^2 - 174325760a^8b^5c^9f^2z^2 - 188743680a^7b^6c^9e^2z^2 - 47185920a^9b^8c^5l^2z^2 + 11206656a^{10}b^7c^5m^2z^2 + 8929280a^9b^9c^4m^2z^2 - 2600960a^8b^{11}c^3m^2z^2 + 291840a^7b^{13}c^2m^2z^2 - 50331648a^{10}b^4c^8j^2z^2 + 146165760a^4b^{11}c^7d^2z^2 - 26542080a^9b^7c^6k^2z^2 + 5898240a^8b^{10}c^4l^2z^2 - 294912a^7b^{12}c^3l^2z^2 - 33554432a^{11}b^2c^9j^2z^2 + 9584640a^8b^9c^5k^2z^2 + 20971520a^9b^6c^7j^2z^2 - 2359296a^{10}b^5c^7k^2z^2 - 1290240a^7b^{11}c^4k^2z^2 + 46080a^6b^{13}c^3k^2z^2 + 2304a^5b^{15}c^2k^2z^2 - 2752512a^7b^{10}c^5j^2z^2 + 2621440a^8b^8c^6j^2z^2 + 524288a^6b^{12}c^4j^2z^2 - 32768a^5b^{14}c^3j^2z^2 - 47185920a^7b^8c^7g^2z^2 - 26542080a^8b^7c^7h^2z^2 + 9584640a^7b^9c^6h^2z^2 - 2359296a^9b^5c^8h^2z^2 - 1290240a^6b^{11}c^5h^2z^2 + 46080a^5b^{13}c^4h^2z^2 + 2304a^4b^{15}c^3h^2z^2 + 5898240a^6b^{10}c^6g^2z^2 - 294912a^5b^{12}c^5g^2z^2 + 11206656a^7b^7c^8f^2z^2 + 8929280a^6b^9c^7f^2z^2 + 23592960a^6b^8c^8e^2z^2 - 2600960a^5b^{11}c^6f^2z^2 + 291840a^4b^{13}c^5f^2z^2 - 14080a^3b^{15}c^4f^2z^2 + 256a^2b^{17}c^3f^2z^2 - 19860480a^3b^{13}c^6d^2z^2 - 1179648a^5b^{10}c^7e^2z^2 + 1771776a^2b^{15}c^5d^2z^2 - 440401920a^{13}b^c^8m^2z^2 + 1207959552a^{10}c^{12}e^2z^2 + 134217728a^{12}c^{10}j^2z^2 + 256a^5b^{17}m^2z^2 + 2304b^{19}c^3d^2z^2 - 23592960a^{10}b^c^8f^k^1z + 99090432a^9b^c^9d^h^1z + 9437184a^{10}b^c^8e^k^mz + 23592960a^{10}b^c^8g^h^mz + 141557760a^8b^c^{10}d^e^kz + 47185920a^9b^c^9d^j^kz - 23592960a^9b^c^9f^g^kz + 169869312a^7b^c^11d^e^fz + 99090432a^8b^c^{10}d^g^h^z - 3145728a^9b^c^9f^h^jz + 56623104a^8b^c^{10}d^f^jz + 1536a^ab^{15}c^3d^f^jz - 9437184a^8b^c^{10}e^f^h^z - 4608a^ab^{14}c^4d^f^g^z + 9216a^ab^{13}c^5d^e^fz + 412876800a^8b^2c^9d^e^mz - 206438400a^9b^3c^7d^l^mz + 5898240a^{10}b^4c^5k^l^mz - 206438400a^8b^3c^8d^g^mz - 4718592a^{11}b^2c^6k^l^mz - 2949120a^9b^6c^4k^l^mz + 737280a^8b^8c^3k^l^mz - 92160a^7b^{10}c^2k^l^mz + 103219200a^8b^5c^6d^l^mz - 29491200a^{10}b^3c^6h^l^mz - 20643840a^7b^4c^8d^e^mz - 2359296a^{10}b^3c^6j^k^mz + 491520a^8b^7c^4j^k^mz - 184320a^7b^9c^3j^k^mz + 27648a^6b^{11}c^2j^k^mz + 14745600a^9b^5c^5h^l^mz - 3686400a^8b^7c^4h^l^mz + 460800a^7b^9c^3h^l^mz - 23040a^6b^{11}c^2h^l^mz + 88473600a^8b^4c^7d^k^l^z + 82575360a^9b^2c^8d^j^mz + 11796480a^{10}b^2c^7h^j^mz + 5898240a^9b^4c^6g^k^mz - 4718592a^{10}b^2c^7g^k^mz - 70778880a^9b^2c^8d^k^l^z - 2949120a^8b^6c^5g^k^mz - 2457600a^8b^6c^5h^j^mz + 921600a^7b^8c^4
\end{aligned}$$

$$\begin{aligned}
& *h*j*m*z + 737280*a^7*b^8*c^4*g*k*m*z - 138240*a^6*b^10*c^3*h*j*m*z - 92160 \\
& *a^6*b^10*c^3*g*k*m*z + 7680*a^5*b^12*c^2*h*j*m*z + 4608*a^5*b^12*c^2*g*k*m \\
& *z + 29491200*a^9*b^3*c^7*f*k*l*z - 176947200*a^7*b^3*c^9*d*e*k*z - 1097072 \\
& 64*a^8*b^3*c^8*d*h*l*z - 25804800*a^7*b^7*c^5*d*l*m*z + 103219200*a^7*b^5*c \\
& ^7*d*g*m*z + 219414528*a^7*b^2*c^10*d*e*h*z - 14745600*a^8*b^5*c^6*f*k*l*z \\
& - 29491200*a^9*b^3*c^7*g*h*m*z - 11796480*a^9*b^3*c^7*e*k*m*z - 44236800*a^ \\
& 7*b^6*c^6*d*k*l*z + 58982400*a^9*b^2*c^8*e*h*m*z + 5898240*a^8*b^5*c^6*e*k* \\
& m*z + 3686400*a^7*b^7*c^5*f*k*l*z + 3225600*a^6*b^9*c^4*d*l*m*z - 1474560*a \\
& ^7*b^7*c^5*e*k*m*z - 460800*a^6*b^9*c^4*f*k*l*z + 184320*a^6*b^9*c^4*e*k*m* \\
& z - 161280*a^5*b^11*c^3*d*l*m*z + 23040*a^5*b^11*c^3*f*k*l*z - 9216*a^5*b^1 \\
& 1*c^3*e*k*m*z + 14745600*a^8*b^5*c^6*g*h*m*z + 110886912*a^7*b^4*c^8*d*f*l* \\
& z - 3686400*a^7*b^7*c^5*g*h*m*z - 221773824*a^6*b^3*c^10*d*e*f*z + 460800*a \\
& ^6*b^9*c^4*g*h*m*z - 17203200*a^7*b^6*c^6*d*j*m*z - 23040*a^5*b^11*c^3*g*h* \\
& m*z - 29491200*a^8*b^4*c^7*e*h*m*z - 11796480*a^9*b^2*c^8*f*j*k*z + 1105920 \\
& 0*a^6*b^8*c^5*d*k*l*z + 6451200*a^6*b^8*c^5*d*j*m*z + 88473600*a^7*b^4*c^8* \\
& d*g*k*z + 2457600*a^7*b^6*c^6*f*j*k*z - 35389440*a^8*b^3*c^8*d*j*k*z - 1382 \\
& 400*a^5*b^10*c^4*d*k*l*z - 84934656*a^8*b^2*c^9*d*f*l*z - 967680*a^5*b^10*c \\
& ^4*d*j*m*z - 921600*a^6*b^8*c^5*f*j*k*z + 138240*a^5*b^10*c^4*f*j*k*z + 691 \\
& 20*a^4*b^12*c^3*d*k*l*z + 53760*a^4*b^12*c^3*d*j*m*z - 7680*a^4*b^12*c^3*f* \\
& j*k*z + 44236800*a^7*b^5*c^7*d*h*l*z + 7372800*a^7*b^6*c^6*e*h*m*z - 589824 \\
& 0*a^8*b^4*c^7*f*h*l*z + 4718592*a^9*b^2*c^8*f*h*l*z - 70778880*a^8*b^2*c^9* \\
& d*g*k*z + 2949120*a^7*b^6*c^6*f*h*l*z - 921600*a^6*b^8*c^5*e*h*m*z - 737280 \\
& *a^6*b^8*c^5*f*h*l*z + 92160*a^5*b^10*c^4*f*h*l*z + 46080*a^5*b^10*c^4*e*h* \\
& m*z - 4608*a^4*b^12*c^3*f*h*l*z + 29491200*a^8*b^3*c^8*f*g*k*z - 109707264* \\
& a^7*b^3*c^9*d*g*h*z - 25804800*a^6*b^7*c^6*d*g*m*z - 58982400*a^8*b^2*c^9*e \\
& *f*k*z - 58982400*a^6*b^6*c^7*d*f*l*z + 7372800*a^6*b^7*c^6*d*j*k*z + 88473 \\
& 600*a^6*b^5*c^8*d*e*k*z - 2764800*a^5*b^9*c^5*d*j*k*z + 51609600*a^6*b^6*c^ \\
& 7*d*e*m*z + 414720*a^4*b^11*c^4*d*j*k*z - 23040*a^3*b^13*c^3*d*j*k*z - 1474 \\
& 5600*a^7*b^5*c^7*f*g*k*z - 44236800*a^6*b^6*c^7*d*g*k*z - 6635520*a^6*b^7*c \\
& ^6*d*h*l*z + 40108032*a^8*b^2*c^9*d*h*j*z + 3686400*a^6*b^7*c^6*f*g*k*z + 3 \\
& 225600*a^5*b^9*c^5*d*g*m*z + 2359296*a^8*b^3*c^8*f*h*j*z - 491520*a^6*b^7*c \\
& ^6*f*h*j*z - 460800*a^5*b^9*c^5*f*g*k*z - 276480*a^5*b^9*c^5*d*h*l*z + 1843 \\
& 20*a^5*b^9*c^5*f*h*j*z + 179712*a^4*b^11*c^4*d*h*l*z - 161280*a^4*b^11*c^4* \\
& d*g*m*z - 27648*a^4*b^11*c^4*f*h*j*z + 23040*a^4*b^11*c^4*f*g*k*z - 13824*a \\
& ^3*b^13*c^3*d*h*l*z + 1536*a^3*b^13*c^3*f*h*j*z + 29491200*a^7*b^4*c^8*e*f* \\
& k*z + 110886912*a^6*b^4*c^9*d*f*g*z + 16220160*a^5*b^8*c^6*d*f*l*z - 456130 \\
& 56*a^7*b^3*c^9*d*f*j*z + 11059200*a^5*b^8*c^6*d*g*k*z - 10321920*a^6*b^6*c^ \\
& 7*d*h*j*z - 7372800*a^6*b^6*c^7*e*f*k*z + 7077888*a^7*b^4*c^8*d*h*j*z - 645 \\
& 1200*a^5*b^8*c^6*d*e*m*z - 88473600*a^6*b^4*c^9*d*e*h*z + 2396160*a^5*b^8*c \\
& ^6*d*h*j*z - 2396160*a^4*b^10*c^5*d*f*l*z - 1382400*a^4*b^10*c^5*d*g*k*z - \\
& 84934656*a^7*b^2*c^10*d*f*g*z + 921600*a^5*b^8*c^6*e*f*k*z + 117964800*a^5* \\
& b^5*c^9*d*e*f*z + 322560*a^4*b^10*c^5*d*e*m*z + 175104*a^3*b^12*c^4*d*f*l*z \\
& + 69120*a^3*b^12*c^4*d*g*k*z - 50688*a^3*b^12*c^4*d*h*j*z - 46080*a^4*b^10 \\
& *c^5*e*f*k*z - 27648*a^4*b^10*c^5*d*h*j*z + 4608*a^2*b^14*c^3*d*h*j*z - 460 \\
& 8*a^2*b^14*c^3*d*f*l*z + 44236800*a^6*b^5*c^8*d*g*h*z - 5898240*a^7*b^4*c^8
\end{aligned}$$

$$\begin{aligned}
& *f*g*h*z - 22118400*a^5*b^7*c^7*d*e*k*z + 4718592*a^8*b^2*c^9*f*g*h*z + 294 \\
& 9120*a^6*b^6*c^7*f*g*h*z - 737280*a^5*b^8*c^6*f*g*h*z + 92160*a^4*b^10*c^5* \\
& f*g*h*z - 4608*a^3*b^12*c^4*f*g*h*z + 8847360*a^5*b^7*c^7*d*f*j*z - 5898240 \\
& 0*a^5*b^6*c^8*d*f*g*z - 3809280*a^4*b^9*c^6*d*f*j*z + 2764800*a^4*b^9*c^6*d \\
& *e*k*z + 2359296*a^6*b^5*c^8*d*f*j*z + 681984*a^3*b^11*c^5*d*f*j*z - 138240 \\
& *a^3*b^11*c^5*d*e*k*z - 55296*a^2*b^13*c^4*d*f*j*z + 11796480*a^7*b^3*c^9*e \\
& *f*h*z - 6635520*a^5*b^7*c^7*d*g*h*z - 5898240*a^6*b^5*c^8*e*f*h*z + 147456 \\
& 0*a^5*b^7*c^7*e*f*h*z - 276480*a^4*b^9*c^6*d*g*h*z - 184320*a^4*b^9*c^6*e*f \\
& *h*z + 179712*a^3*b^11*c^5*d*g*h*z - 13824*a^2*b^13*c^4*d*g*h*z + 9216*a^3* \\
& b^11*c^5*e*f*h*z + 16220160*a^4*b^8*c^7*d*f*g*z + 13271040*a^5*b^6*c^8*d*e* \\
& h*z - 2396160*a^3*b^10*c^6*d*f*g*z + 552960*a^4*b^8*c^7*d*e*h*z - 359424*a^ \\
& 3*b^10*c^6*d*e*h*z + 175104*a^2*b^12*c^5*d*f*g*z + 27648*a^2*b^12*c^5*d*e*h \\
& *z - 32440320*a^4*b^7*c^8*d*e*f*z + 4792320*a^3*b^9*c^7*d*e*f*z - 350208*a^ \\
& 2*b^11*c^6*d*e*f*z + 165150720*a^10*b*c^8*d*l*m*z + 4608*a^6*b^12*c*k*l*m*z \\
& + 23592960*a^11*b*c^7*h*l*m*z + 3145728*a^11*b*c^7*j*k*m*z - 1536*a^5*b^13 \\
& *c*j*k*m*z + 165150720*a^9*b*c^9*d*g*m*z + 346816512*a^7*b*c^11*d^2*g*z + 1 \\
& 9660800*a^12*b*c^6*l*m^2*z - 34560*a^7*b^11*c*l*m^2*z - 7077888*a^11*b*c^7* \\
& k^2*l*z + 11008*a^6*b^12*c*j*m^2*z + 19660800*a^11*b*c^7*g*m^2*z + 7077888* \\
& a^10*b*c^8*h^2*l*z + 768*a^5*b^13*c*g*m^2*z - 19660800*a^9*b*c^9*f^2*l*z - \\
& 7077888*a^10*b*c^8*g*k^2*z - 6912*a*b^15*c^3*d^2*l*z + 7077888*a^9*b*c^9*g* \\
& h^2*z - 19660800*a^8*b*c^10*f^2*g*z - 66816*a*b^14*c^4*d^2*j*z + 214272*a*b \\
& ^13*c^5*d^2*g*z - 428544*a*b^12*c^6*d^2*e*z - 330301440*a^9*c^10*d*e*m*z - \\
& 110100480*a^10*c^9*d*j*m*z - 15728640*a^11*c^8*h*j*m*z - 47185920*a^10*c^9* \\
& e*h*m*z - 198180864*a^8*c^11*d*e*h*z + 15728640*a^10*c^9*f*j*k*z - 66060288 \\
& *a^9*c^10*d*h*j*z + 47185920*a^9*c^10*e*f*k*z + 1022754816*a^6*b^2*c^11*d^2 \\
& *e*z - 642318336*a^5*b^4*c^10*d^2*e*z - 511377408*a^7*b^3*c^9*d^2*l*z - 511 \\
& 377408*a^6*b^3*c^10*d^2*g*z + 321159168*a^6*b^5*c^8*d^2*l*z + 321159168*a^5 \\
& *b^5*c^9*d^2*g*z + 225312768*a^7*b^2*c^10*d^2*j*z - 25362432*a^11*b^3*c^5*l \\
& *m^2*z + 13271040*a^10*b^5*c^4*l*m^2*z - 3563520*a^9*b^7*c^3*l*m^2*z + 5068 \\
& 80*a^8*b^9*c^2*l*m^2*z + 10354688*a^11*b^2*c^6*j*m^2*z + 8847360*a^10*b^3*c \\
& ^6*k^2*l*z - 4423680*a^9*b^5*c^5*k^2*l*z - 2048000*a^9*b^6*c^4*j*m^2*z + 11 \\
& 05920*a^8*b^7*c^4*k^2*l*z + 849920*a^8*b^8*c^3*j*m^2*z - 393216*a^10*b^4*c^ \\
& 5*j*m^2*z - 145920*a^7*b^10*c^2*j*m^2*z - 138240*a^7*b^9*c^3*k^2*l*z + 6912 \\
& *a^6*b^11*c^2*k^2*l*z - 111697920*a^5*b^7*c^7*d^2*l*z + 223395840*a^4*b^6*c \\
& ^9*d^2*e*z - 25362432*a^10*b^3*c^6*g*m^2*z - 3538944*a^10*b^2*c^7*j*k^2*z + \\
& 737280*a^8*b^6*c^5*j*k^2*z + 50724864*a^10*b^2*c^7*e*m^2*z - 276480*a^7*b^ \\
& 8*c^4*j*k^2*z + 41472*a^6*b^10*c^3*j*k^2*z - 2304*a^5*b^12*c^2*j*k^2*z + 13 \\
& 271040*a^9*b^5*c^5*g*m^2*z - 8847360*a^9*b^3*c^7*h^2*l*z + 4423680*a^8*b^5* \\
& c^6*h^2*l*z - 3563520*a^8*b^7*c^4*g*m^2*z - 1105920*a^7*b^7*c^5*h^2*l*z + 5 \\
& 06880*a^7*b^9*c^3*g*m^2*z + 138240*a^6*b^9*c^4*h^2*l*z - 34560*a^6*b^11*c^2 \\
& *g*m^2*z - 6912*a^5*b^11*c^3*h^2*l*z - 26542080*a^9*b^4*c^6*e*m^2*z + 25362 \\
& 432*a^8*b^3*c^8*f^2*l*z - 13271040*a^7*b^5*c^7*f^2*l*z + 8847360*a^9*b^3*c^ \\
& 7*g*k^2*z + 7127040*a^8*b^6*c^5*e*m^2*z - 4423680*a^8*b^5*c^6*g*k^2*z + 356 \\
& 3520*a^6*b^7*c^6*f^2*l*z + 3538944*a^9*b^2*c^8*h^2*j*z + 1105920*a^7*b^7*c^ \\
& 5*g*k^2*z - 1013760*a^7*b^8*c^4*e*m^2*z - 737280*a^7*b^6*c^6*h^2*j*z - 5068
\end{aligned}$$

$$\begin{aligned}
& 80*a^5*b^9*c^5*f^2*l*z + 276480*a^6*b^8*c^5*h^2*j*z - 138240*a^6*b^9*c^4*g*k^2*z + 69120*a^6*b^10*c^3*e*m^2*z - 41472*a^5*b^10*c^4*h^2*j*z + 34560*a^4*b^11*c^4*f^2*l*z + 6912*a^5*b^11*c^3*g*k^2*z + 2304*a^4*b^12*c^3*h^2*j*z - \\
& 1536*a^5*b^12*c^2*e*m^2*z - 768*a^3*b^13*c^3*f^2*l*z - 111697920*a^4*b^7*c^8*d^2*g*z + 23362560*a^4*b^9*c^6*d^2*l*z - 17694720*a^9*b^2*c^8*e*k^2*z - \\
& 10354688*a^8*b^2*c^9*f^2*j*z - 43646976*a^6*b^4*c^9*d^2*j*z + 8847360*a^8*b^4*c^7*e*k^2*z - 2965248*a^3*b^11*c^5*d^2*l*z - 2211840*a^7*b^6*c^6*e*k^2*z + \\
& 2048000*a^6*b^6*c^7*f^2*j*z - 849920*a^5*b^8*c^6*f^2*j*z + 393216*a^7*b^4*c^8*f^2*j*z + 276480*a^6*b^8*c^5*e*k^2*z + 214272*a^2*b^13*c^4*d^2*l*z + \\
& 145920*a^4*b^10*c^5*f^2*j*z - 13824*a^5*b^10*c^4*e*k^2*z - 11008*a^3*b^12*c^4*f^2*j*z + 256*a^2*b^14*c^3*f^2*j*z - 32587776*a^5*b^6*c^8*d^2*j*z - 8847360*a^8*b^3*c^8*g*h^2*z + \\
& 21657600*a^4*b^8*c^7*d^2*j*z + 4423680*a^7*b^5*c^7*g*h^2*z - 1105920*a^6*b^7*c^6*g*h^2*z + 138240*a^5*b^9*c^5*g*h^2*z - 6912*a^4*b^11*c^4*g*h^2*z + \\
& 25362432*a^7*b^3*c^9*f^2*g*z - 5810688*a^3*b^10*c^6*d^2*j*z + 17694720*a^8*b^2*c^9*e*h^2*z + 845568*a^2*b^12*c^5*d^2*j*z - 50724864*a^7*b^2*c^10*e*f^2*z - \\
& 13271040*a^6*b^5*c^8*f^2*g*z - 8847360*a^7*b^4*c^8*e*h^2*z + 3563520*a^5*b^7*c^7*f^2*g*z + 2211840*a^6*b^6*c^7*e*h^2*z - 506880*a^4*b^9*c^6*f^2*g*z - \\
& 276480*a^5*b^8*c^6*e*h^2*z + 34560*a^3*b^11*c^5*f^2*g*z + 13824*a^4*b^10*c^5*e*h^2*z - 768*a^2*b^13*c^4*f^2*g*z + 26542080*a^6*b^4*c^9*e*f^2*z + \\
& 23362560*a^3*b^9*c^7*d^2*g*z - 46725120*a^3*b^8*c^8*d^2*e*z - 7127040*a^5*b^6*c^8*e*f^2*z - 2965248*a^2*b^11*c^6*d^2*g*z + 1013760*a^4*b^8*c^7*e*f^2*z - \\
& 69120*a^3*b^10*c^6*e*f^2*z + 1536*a^2*b^12*c^5*e*f^2*z + 5930496*a^2*b^10*c^7*d^2*e*z + 346816512*a^8*b*c^10*d^2*l*z - 693633024*a^7*c^12*d^2*e*z - \\
& 231211008*a^8*c^11*d^2*j*z + 768*a^6*b^13*l*m^2*z - 13107200*a^12*c^7*j*m^2*z - 256*a^5*b^14*j*m^2*z + 4718592*a^11*c^8*j*k^2*z - 39321600*a^11*c^8*e*m^2*z - \\
& 4718592*a^10*c^9*h^2*j*z + 14155776*a^10*c^9*e*k^2*z + 13107200*a^9*c^10*f^2*j*z + 2304*b^16*c^3*d^2*j*z - 14155776*a^9*c^10*e*h^2*z + 39321600*a^8*c^11*e*f^2*z - \\
& 6912*b^15*c^4*d^2*g*z + 13824*b^14*c^5*d^2*e*z + 737280*a^10*b*c^5*j*k*l*m - 2304*a^6*b^9*c*j*k*l*m + 2211840*a^9*b*c^6*e*k*l*m + 1228800*a^9*b*c^6*f*j*l*m + \\
& 737280*a^9*b*c^6*g*j*k*m + 442368*a^9*b*c^6*h*j*k*l + 36*a^3*b^12*c*f*h*k*m + 3096576*a^8*b*c^7*d*j*k*l - 12745728*a^8*b*c^7*d*h*k*m + 3686400*a^8*b*c^7*e*f*l*m + 3391488*a^8*b*c^7*e*h*j*m + \\
& 2211840*a^8*b*c^7*e*g*k*m + 1327104*a^8*b*c^7*e*h*k*l + 1228800*a^8*b*c^7*f*g*j*m + 737280*a^8*b*c^7*f*h*j*l + 442368*a^8*b*c^7*g*h*j*k + 108*a^2*b^13*c*d*h*k*m + 16367616*a^7*b*c^8*d*e*j*m + 9289728*a^7*b*c^8*d*e*k*l + 5160960*a^7*b*c^8*d*f*j*l + 3391488*a^7*b*c^8*e*f*j*k + 3096576*a^7*b*c^8*d*g*j*k - 19307520*a^7*b*c^8*d*f*h*m + 3686400*a^7*b*c^8*e*f*g*m + 2211840*a^7*b*c^8*e*f*h*l + 1327104*a^7*b*c^8*e*g*h*k + 737280*a^7*b*c^8*f*g*h*j - 180*a*b^13*c^2*d*f*h*m - 540*a*b^12*c^3*d*f*h*k + 15482880*a^6*b*c^9*d*e*f*l + 11059200*a^6*b*c^9*d*e*h*j + 9289728*a^6*b*c^9*d*e*g*k + 5160960*a^6*b*c^9*d*f*g*j - 2304*a*b^11*c^4*d*f*g*j + 2211840*a^6*b*c^9*e*f*g*h + 4608*a*b^10*c^5*d*e*f*j + 15482880*a^5*b*c^10*d*e*f*g - 13824*a*b^9*c^6*d*e*f*g + 36*a*b^14*c*d*f*k*m + 1843200*a^9*b^3*c^4*j*k*l*m + 783360*a^8*b^5*c^3*j*k*l*m + 18432*a^7*b^7*c^2*j*k*l*m - 2211840*a^8*b^4*c^4*g*k*l*m - 1695744*a^9*b^2*c^5*h*j*l*m - 1400832*a^8*b^4*c^4*h*j*l*m - 1105920*a^9*
\end{aligned}$$

$b^2c^5gk^1m - 253440a^7b^6c^3h^j^1m - 69120a^7b^6c^3gk^1m +$
 $11520a^6b^8c^2h^j^1m + 6912a^6b^8c^2gk^1m + 4423680a^8b^3c^5$
 $e^k^1m + 2506752a^8b^3c^5f^j^1m + 1843200a^8b^3c^5g^j^k^1m + 13271$
 $04a^8b^3c^5h^j^k^1 + 838656a^7b^5c^4f^j^1m + 783360a^7b^5c^4g^j$
 $j^k^1m + 691200a^7b^5c^4h^j^k^1 + 138240a^7b^5c^4e^k^1m + 69120a^6$
 $b^7c^3h^j^k^1 - 53760a^6b^7c^3f^j^1m + 18432a^6b^7c^3g^j^k^1m -$
 $13824a^6b^7c^3e^k^1m - 2304a^5b^9c^2g^j^k^1m + 2543616a^8b^3c^5$
 $g^h^1m + 829440a^7b^5c^4g^h^1m - 34560a^6b^7c^3g^h^1m - 8183808$
 $a^8b^2c^6d^j^1m - 3686400a^8b^2c^6e^j^k^1m - 2285568a^7b^4c^5d^j$
 $^1m - 1695744a^8b^2c^6f^j^k^1 - 1566720a^7b^4c^5e^j^k^1m - 1400832$
 $a^7b^4c^5f^j^k^1 + 741888a^6b^6c^4d^j^1m - 253440a^6b^6c^4f^j^k$
 $^1 - 80640a^5b^8c^3d^j^1m - 36864a^6b^6c^4e^j^k^1m + 11520a^5b^8$
 $c^3f^j^k^1 + 4608a^5b^8c^3e^j^k^1m + 6700032a^8b^2c^6f^h^k^1m + 5103$
 $360a^7b^4c^5f^h^k^1m - 5087232a^8b^2c^6e^h^1m - 2838528a^7b^4c^5$
 $f^g^1m - 1843200a^8b^2c^6f^g^1m - 1695744a^8b^2c^6g^h^j^1m - 1658$
 $880a^7b^4c^5g^h^k^1 - 1658880a^7b^4c^5e^h^1m - 1400832a^7b^4c^5$
 $g^h^j^1m - 663552a^8b^2c^6g^h^k^1 + 483840a^6b^6c^4f^h^k^1m - 253440$
 $a^6b^6c^4g^h^j^1m - 207360a^6b^6c^4g^h^k^1 + 161280a^6b^6c^4f^g^$
 $l^1m + 69120a^6b^6c^4e^h^1m - 50040a^5b^8c^3f^h^k^1m + 11520a^5b^8$
 $c^3g^h^j^1m + 180a^4b^10c^2f^h^k^1m + 4202496a^7b^3c^6d^j^k^1 + 635$
 $904a^6b^5c^5d^j^k^1 - 276480a^5b^7c^4d^j^k^1 + 34560a^4b^9c^3d^j$
 $^k^1 - 16671744a^7b^3c^6d^h^k^1m + 12275712a^7b^3c^6d^g^1m + 56770$
 $56a^7b^3c^6e^f^1m + 4423680a^7b^3c^6e^g^k^1m + 3317760a^7b^3c^6$
 $e^h^k^1 + 2801664a^7b^3c^6e^h^j^1m - 2709504a^6b^5c^5d^g^1m + 25436$
 $16a^7b^3c^6f^g^k^1 + 2506752a^7b^3c^6f^g^j^1m + 1843200a^7b^3c^6$
 $f^h^j^1 + 1327104a^7b^3c^6g^h^j^k + 838656a^6b^5c^5f^g^j^1m + 829440$
 $a^6b^5c^5f^g^k^1 + 783360a^6b^5c^5f^h^j^1 + 691200a^6b^5c^5g^h^j$
 $^k + 665280a^5b^7c^4d^h^k^1m + 506880a^6b^5c^5e^h^j^1m + 414720a^6$
 $b^5c^5e^h^k^1 - 322560a^6b^5c^5e^f^1m + 241920a^5b^7c^4d^g^1m +$
 $138240a^6b^5c^5e^g^k^1m - 108540a^4b^9c^3d^h^k^1m + 69120a^5b^7c^$
 $4g^h^j^k - 53760a^5b^7c^4f^g^j^1m - 51840a^6b^5c^5d^h^k^1m - 34560a$
 $^5b^7c^4f^g^k^1 - 23040a^5b^7c^4e^h^j^1m + 18432a^5b^7c^4f^h^j^1$
 $- 13824a^5b^7c^4e^g^k^1m - 2304a^4b^9c^3f^h^j^1 + 1296a^3b^11c^2$
 $d^h^k^1m + 31924224a^7b^2c^7d^f^k^1m - 24551424a^7b^2c^7d^e^1m + 106$
 $16832a^7b^2c^7e^g^j^1 - 8183808a^7b^2c^7d^g^j^1m - 5529600a^7b^2c$
 $^7d^h^j^1 + 5419008a^6b^4c^6d^e^1m + 5308416a^6b^4c^6e^g^j^1 - 50$
 $87232a^7b^2c^7e^f^k^1 - 5013504a^7b^2c^7e^f^j^1m + 4868352a^6b^4c$
 $^6d^f^k^1m - 4644864a^7b^2c^7d^g^k^1 - 3981312a^6b^4c^6d^g^k^1 - 26$
 $54208a^7b^2c^7e^h^j^k - 2367360a^5b^6c^5d^f^k^1m - 2285568a^6b^4c$
 $^6d^g^j^1m - 2211840a^6b^4c^6d^h^j^1 - 1695744a^7b^2c^7f^g^j^k - 16$
 $77312a^6b^4c^6e^f^j^1m - 1658880a^6b^4c^6e^f^k^1 - 1400832a^6b^4c$
 $^6f^g^j^k - 1382400a^6b^4c^6e^h^j^k + 1036800a^5b^6c^5d^g^k^1 + 74$
 $1888a^5b^6c^5d^g^j^1m - 483840a^5b^6c^5d^e^1m + 317952a^5b^6c^5$
 $d^h^j^1 + 268920a^4b^8c^4d^f^k^1m - 253440a^5b^6c^5f^g^j^k - 138240$
 $a^5b^6c^5e^h^j^k + 107520a^5b^6c^5e^f^j^1m - 103680a^4b^8c^4d^g^k$

$$\begin{aligned}
& *l - 80640*a^4*b^8*c^4*d*g*j*m + 69120*a^5*b^6*c^5*e*f*k*l + 11520*a^4*b^8*c^4*f*g*j*k + 6912*a^4*b^8*c^4*d*h*j*l - 6912*a^3*b^10*c^3*d*h*j*l + 6120*a^3*b^10*c^3*d*f*k*m - 1368*a^2*b^12*c^2*d*f*k*m - 5087232*a^7*b^2*c^7*e*g*h*m - 2211840*a^6*b^4*c^6*f*g*h*l - 1658880*a^6*b^4*c^6*e*g*h*m - 1105920*a^7*b^2*c^7*f*g*h*l - 69120*a^5*b^6*c^5*f*g*h*l + 69120*a^5*b^6*c^5*e*g*h*m + 6912*a^4*b^8*c^4*f*g*h*l + 7962624*a^6*b^3*c^7*d*e*k*l - 22164480*a^6*b^3*c^7*d*f*h*m + 5160960*a^6*b^3*c^7*d*f*j*l + 4571136*a^6*b^3*c^7*d*e*j*m + 4202496*a^6*b^3*c^7*d*g*j*k + 2801664*a^6*b^3*c^7*e*f*j*k - 2073600*a^5*b^5*c^6*d*e*k*l - 1483776*a^5*b^5*c^6*d*e*j*m + 635904*a^5*b^5*c^6*d*g*j*k + 506880*a^5*b^5*c^6*e*f*j*k - 354816*a^4*b^7*c^5*d*f*j*l + 322560*a^5*b^5*c^6*d*f*j*l - 276480*a^4*b^7*c^5*d*g*j*k + 207360*a^4*b^7*c^5*d*e*k*l + 161280*a^4*b^7*c^5*d*e*j*m + 59904*a^3*b^9*c^4*d*f*j*l + 34560*a^3*b^9*c^4*d*g*j*k - 23040*a^4*b^7*c^5*e*f*j*k - 2304*a^2*b^11*c^3*d*f*j*l + 8294400*a^6*b^3*c^7*d*g*h*l + 5677056*a^6*b^3*c^7*e*f*g*m + 4423680*a^6*b^3*c^7*e*f*h*l + 3317760*a^6*b^3*c^7*e*g*h*k + 2805120*a^5*b^5*c^6*d*f*h*m + 1843200*a^6*b^3*c^7*f*g*h*j - 829440*a^5*b^5*c^6*d*g*h*l + 783360*a^5*b^5*c^6*f*g*h*j + 437184*a^4*b^7*c^5*d*f*h*m + 414720*a^5*b^5*c^6*e*g*h*k - 322560*a^5*b^5*c^6*e*f*g*m - 146268*a^3*b^9*c^4*d*f*h*m + 138240*a^5*b^5*c^6*e*f*h*l - 62208*a^4*b^7*c^5*d*g*h*l + 20736*a^3*b^9*c^4*d*g*h*l + 18432*a^4*b^7*c^5*f*g*h*j - 13824*a^4*b^7*c^5*e*f*h*l + 9360*a^2*b^11*c^3*d*f*h*m - 2304*a^3*b^9*c^4*f*g*h*j - 8404992*a^6*b^2*c^8*d*e*j*k - 24551424*a^6*b^2*c^8*d*e*g*m + 21150720*a^6*b^2*c^8*d*f*h*k - 1271808*a^5*b^4*c^7*d*e*j*k + 552960*a^4*b^6*c^6*d*e*j*k - 69120*a^3*b^8*c^5*d*e*j*k - 16588800*a^6*b^2*c^8*d*e*h*l - 7741440*a^6*b^2*c^8*d*f*g*l + 6946560*a^5*b^4*c^7*d*f*h*k - 5529600*a^6*b^2*c^8*d*g*h*j + 5419008*a^5*b^4*c^7*d*e*g*m - 5087232*a^6*b^2*c^8*e*f*g*k - 3870720*a^5*b^4*c^7*d*f*g*l - 3686400*a^6*b^2*c^8*e*f*h*j - 2211840*a^5*b^4*c^7*d*g*h*j - 1755648*a^4*b^6*c^6*d*f*h*k - 1658880*a^5*b^4*c^7*e*f*g*k + 1658880*a^5*b^4*c^7*d*e*h*l - 1566720*a^5*b^4*c^7*e*f*h*j + 1451520*a^4*b^6*c^6*d*f*g*l - 483840*a^4*b^6*c^6*d*e*g*m + 317952*a^4*b^6*c^6*d*g*h*j - 193536*a^3*b^8*c^5*d*f*g*l + 124416*a^4*b^6*c^6*d*e*h*l + 114696*a^3*b^8*c^5*d*f*h*k + 69120*a^4*b^6*c^6*e*f*g*k - 41472*a^3*b^8*c^5*d*e*h*l - 36864*a^4*b^6*c^6*e*f*h*j + 14580*a^2*b^10*c^4*d*f*h*k + 6912*a^3*b^8*c^5*d*g*h*j - 6912*a^2*b^10*c^4*d*g*h*j + 6912*a^2*b^10*c^4*d*f*g*l + 4608*a^3*b^8*c^5*e*f*h*j + 7962624*a^5*b^3*c^8*d*e*g*k + 7741440*a^5*b^3*c^8*d*e*f*l + 5160960*a^5*b^3*c^8*d*f*g*j + 4423680*a^5*b^3*c^8*d*e*h*j - 2903040*a^4*b^5*c^7*d*e*f*l - 2073600*a^4*b^5*c^7*d*e*g*k - 635904*a^4*b^5*c^7*d*e*h*j + 387072*a^3*b^7*c^6*d*e*f*l - 354816*a^3*b^7*c^6*d*f*g*j + 322560*a^4*b^5*c^7*d*f*g*j + 207360*a^3*b^7*c^6*d*e*g*k + 59904*a^2*b^9*c^5*d*f*g*j - 13824*a^3*b^7*c^6*d*e*h*j + 13824*a^2*b^9*c^5*d*e*h*j - 13824*a^2*b^9*c^5*d*e*f*l + 4423680*a^5*b^3*c^8*e*f*g*h + 138240*a^4*b^5*c^7*e*f*g*h - 13824*a^3*b^7*c^6*e*f*g*h - 10321920*a^5*b^2*c^9*d*e*f*j + 709632*a^3*b^6*c^7*d*e*f*j - 645120*a^4*b^4*c^8*d*e*f*j - 119808*a^2*b^8*c^6*d*e*f*j - 16588800*a^5*b^2*c^9*d*e*g*h + 1658880*a^4*b^4*c^8*d*e*g*h + 124416*a^3*b^6*c^7*d*e*g*h - 41472*a^2*b^8*c^6*d*e*g*h + 7741440*a^4*b^3*c^9*d*e*f*g - 2903040*a^3*b^5*c^8*d*e*f*g + 387072*a^2*b^7*c^7*d*e*f*g + 3456*a^7*b^8*c*k*l^2*m + 12672*a^7*b^8*c*j*l*m^2
\end{aligned}$$

$$\begin{aligned}
& + 384a^5b^{10}c^j2k^m - 1635840a^{10}b^c^5h^k^m^2 - 1009152a^9b^c^6h^2k^m + 3690a^6b^9c^h^k^m^2 + 1152a^6b^9c^g^1m^2 - 540a^5b^{10}c^h^k^2m + 54a^4b^{11}c^h^2k^m + 565248a^9b^c^6h^j^2m - 39771648a^7b^c^8d^2k^m - 2496000a^8b^c^7f^2k^m - 1543680a^9b^c^6f^k^2m + 1980a^5b^{10}c^f^k^m^2 - 384a^5b^{10}c^g^j^m^2 - 180a^4b^{11}c^f^k^2m + 6a^2b^{13}c^f^2k^m - 10298880a^9b^c^6d^k^m^2 + 2580480a^9b^c^6e^j^m^2 + 5310a^4b^{11}c^d^k^m^2 - 1674a^b^{13}c^2d^2k^m - 540a^3b^{12}c^d^k^2m - 10616832a^7b^c^8e^2j^1 - 3538944a^8b^c^7e^j^2^1 + 2727936a^8b^c^7d^j^2m - 2496000a^9b^c^6f^h^m^2 - 1543680a^8b^c^7f^h^2m + 565248a^8b^c^7f^j^2k - 270a^4b^{11}c^f^h^m^2 - 59512320a^6b^c^9d^2f^m + 5087232a^7b^c^8e^2h^m + 1105920a^8b^c^7e^j^k^2 - 3456a^b^{12}c^3d^2^j^1 - 1635840a^7b^c^8f^2h^k - 1009152a^8b^c^7f^h^k^2 + 10260a^b^{12}c^3d^2^h^m - 684a^3b^{12}c^d^h^m^2 - 24675840a^6b^c^9d^2h^k - 1555200a^8b^c^7d^f^m^2 + 24551424a^6b^c^9d^e^2m - 3939840a^7b^c^8d^h^2k + 1105920a^7b^c^8e^h^2j - 25074a^b^{11}c^4d^2f^m + 10530a^b^{11}c^4d^2h^k + 10368a^b^{11}c^4d^2g^1 + 420a^b^{12}c^3d^f^2m - 378a^2b^13c^d^f^m^2 - 10616832a^6b^c^9e^2g^j + 5087232a^6b^c^9e^2f^k - 3538944a^7b^c^8e^g^j^2 + 1843200a^7b^c^8d^h^j^2 - 7994880a^6b^c^9d^f^2k - 4990464a^7b^c^8d^f^k^2 + 2580480a^6b^c^9e^f^2j + 65664a^b^{10}c^5d^2g^j - 27972a^b^{10}c^5d^2f^k - 20736a^b^{10}c^5d^2e^1 + 1260a^b^{11}c^4d^f^2k + 54a^b^{13}c^2d^f^k^2 + 23224320a^5b^c^{10}d^2e^j - 37062144a^5b^c^{10}d^2f^h + 384a^b^{12}c^3d^f^j^2 - 131328a^b^9c^6d^2e^j - 5985792a^6b^c^9d^f^h^2 + 206010a^b^9c^6d^2f^h - 6300a^b^{10}c^5d^f^2h + 1350a^b^{11}c^4d^f^h^2 + 16588800a^5b^c^{10}d^e^2h + 3456a^b^{10}c^5d^f^g^2 + 435456a^b^8c^7d^2e^g + 13824a^b^8c^7d^e^2f - 1474560a^9c^7e^j^k^m + 460800a^9c^7f^h^k^m + 3225600a^8c^8d^f^k^m - 2457600a^8c^8e^f^j^m - 884736a^8c^8e^h^j^k - 6193152a^7c^9d^e^j^k + 1935360a^7c^9d^f^h^k - 1474560a^7c^9e^f^h^j - 10321920a^6c^{10}d^e^f^j - 1105920a^9b^4c^3k^1^2m - 552960a^{10}b^2c^4k^1^2m - 34560a^8b^6c^2k^1^2m - 1290240a^{10}b^2c^4j^1m^2 - 860160a^9b^4c^3j^1m^2 - 80640a^8b^6c^2j^1m^2 - 737280a^9b^2c^5j^2k^m - 568320a^8b^4c^4j^2k^m - 136704a^7b^6c^3j^2k^m - 2304a^6b^8c^2j^2k^m + 1271808a^9b^3c^4h^1^2m - 552960a^9b^2c^5j^k^2^1 - 552960a^8b^4c^4j^k^2^1 + 414720a^8b^5c^3h^1^2m - 145152a^7b^6c^3j^k^2^1 - 17280a^7b^7c^2h^1^2m - 3456a^6b^8c^2j^k^2^1 - 3640320a^9b^3c^4h^k^m^2 - 2626560a^8b^3c^5h^2k^m + 2211840a^9b^2c^5h^k^2m + 2056320a^8b^4c^4h^k^2m + 1935360a^9b^3c^4g^1m^2 - 1143360a^8b^5c^3h^k^m^2 - 1097280a^7b^5c^4h^2k^m + 364608a^7b^6c^3h^k^2m + 322560a^8b^5c^3g^1m^2 - 56160a^6b^7c^3h^2k^m - 40320a^7b^7c^2g^1m^2 + 27936a^7b^7c^2h^k^m^2 - 3780a^6b^8c^2h^k^2m + 2970a^5b^9c^2h^2k^m - 1419264a^8b^4c^4f^1^2m - 1105920a^7b^4c^5g^2k^m - 921600a^9b^2c^5f^1^2m - 829440a^8b^4c^4h^k^1^2 + 749568a^8b^3c^5h^j^2m - 552960a^8b^2c^6g^2k^m - 331776a^9b^2c^5h^k^1^2 + 317952a^7b^5c^4h^j^2m - 103680a^7b^6c^3h^k^1^2 + 80640a^7b^6c^3f^1^2m + 38400a^6b^7c^3h^j^2m - 34560a^6b^6c^4g^2k^m + 3456a^5b^8c^3g^2k^m -
\end{aligned}$$

$$\begin{aligned}
& 1920a^5b^9c^2h^j^2m - 5142528a^7b^3c^6f^2k^m + 5068800a^9b^2c^5f^2k^m - 3870720a^9b^2c^5e^1m^2 - 3755520a^8b^3c^5f^2k^m + 300 \\
& 0960a^8b^4c^4f^2k^m - 1290240a^9b^2c^5g^2j^m - 1085760a^7b^5c^4f^2k^m - 959040a^6b^5c^5f^2k^m - 860160a^8b^4c^4g^2j^m + 82944 \\
& 0a^8b^3c^5g^2k^2l - 645120a^8b^4c^4e^1m^2 - 552960a^8b^2c^6h^2 \\
& *j^1 - 552960a^7b^4c^5h^2j^1 + 414720a^7b^5c^4g^2k^2l - 145152a^6 \\
& *b^6c^4h^2j^1 + 103200a^5b^7c^4f^2k^m - 80640a^7b^6c^3g^2j^m + \\
& 80640a^7b^6c^3e^1m^2 + 41280a^7b^6c^3f^2k^m - 37188a^6b^8c^2f^2k^m + 13536a^6b^7c^3f^2k^2m + 12672a^6b^8c^2g^2j^m + 10368a^6 \\
& *b^7c^3g^2k^2l + 5490a^5b^9c^2f^2k^2m - 3456a^5b^8c^3h^2j^1 - 23 \\
& 04a^6b^8c^2e^1m^2 + 810a^4b^9c^3f^2k^m - 270a^3b^11c^2f^2k^m \\
& + 6137856a^8b^3c^5d^1^2m - 4423680a^7b^2c^7e^2k^m - 2654208a^8b^3c^5g^2j^1 - 2654208a^7b^3c^6g^2j^1 + 1769472a^8b^2c^6g^2j^2l \\
& + 1769472a^7b^4c^5g^2j^2l - 1354752a^7b^5c^4d^1^2m - 1327104a^7b^5c^4g^2j^1 - 1327104a^6b^5c^5g^2j^1 + 1271808a^8b^3c^5f^2k^1 - 1040384a^8b^2c^6f^2j^2m \\
& - 697344a^7b^4c^5f^2j^2m - 516096a^8b^2c^6h^2j^2k - 451584a^7b^4c^5h^2j^2k + 442368a^6b^6c^4g^2j^2l + 4 \\
& 14720a^7b^5c^4f^2k^1 - 138240a^6b^6c^4h^2j^2k - 138240a^6b^4c^6e^2k^m - 121856a^6b^6c^4f^2j^2m + 120960a^6b^7c^3d^1^2m - 17280a^6b^7c^3f^2k^1 - 13824a^5b^6c^5e^2k^m \\
& - 11520a^5b^8c^3h^2j^2k + 8960a^5b^8c^3f^2j^2m + 10851840a^8b^2c^6d^2k^2m - 10464768a^6b^3c^7d^2k^m - 10275840a^8b^3c^5d^2k^m + 7121088a^5b^5c^6d^2k^m \\
& + 3127680a^7b^4c^5d^2k^2m + 1720320a^8b^3c^5e^2j^m - 1658880a^8b^2c^6e^2k^2l - 1290240a^7b^2c^7f^2j^1 + 1271808a^7b^3c^6g^2h^m - 1222560a^4b^7c^5d^2k^m \\
& + 999360a^7b^5c^4d^2k^m - 860160a^6b^4c^6f^2j^1 - 829440a^7b^4c^5e^2k^2l - 705024a^6b^6c^4d^2k^2m - 5 \\
& 52960a^8b^2c^6g^2j^2k - 552960a^7b^4c^5g^2j^2k + 414720a^6b^5c^5g^2h^m + 319392a^6b^7c^3d^2k^m + 161280a^7b^5c^4e^2j^m - 145152 \\
& *a^6b^6c^4g^2j^2k - 85734a^5b^9c^2d^2k^m - 80640a^5b^6c^5f^2j^1 - 25344a^6b^7c^3e^2j^m + 23490a^3b^9c^4d^2k^m - 20736a^6b^6c^4e^2k^2l - 17280a^5b^7c^4g^2h^m \\
& + 14148a^5b^8c^3d^2k^2m + 13716a^2b^11c^3d^2k^m + 12690a^4b^10c^2d^2k^2m + 12672a^4b^8c^4f^2j^1 - 3456a^5b^8c^3g^2j^2k + 768a^5b^9c^2e^2j^m - 384a^3b^10c^3f^2j^1 \\
& + 5308416a^8b^2c^6e^2j^1 - 5308416a^6b^3c^7e^2j^1 - 5142528a^8b^3c^5f^2h^m + 5068800a^7b^2c^7f^2h^m - 3755520a^7b^3c^6f^2h^m - 3538944a^7b^3c^6e^2j^2l \\
& + 3000960a^6b^4c^6f^2h^m + 2654208a^7b^4c^5e^2j^1 - 2322432a^8b^2c^6d^2k^1 - 2125824a^7b^3c^6d^2j^2m - 1990656a^7b^4c^5d^2k^1 - 1085760a^6b^5c^5f^2h^m - 95904 \\
& 0a^7b^5c^4f^2h^m - 884736a^6b^5c^5e^2j^1 + 829440a^7b^3c^6g^2h^2l + 749568a^7b^3c^6f^2j^2k + 518400a^6b^6c^4d^2k^1 + 414720a^6b^5c^5g^2h^2l + 317952a^6b^5c^5f^2j^2k \\
& + 133632a^6b^5c^5d^2j^2m + 103200a^6b^7c^3f^2h^m - 96768a^5b^7c^4d^2j^2m - 51840a^5b^8c^3d^2k^1 + 41280a^5b^6c^5f^2h^m + 38400a^5b^7c^4f^2j^2k - 37188a^4b^8c^4f^2h^m \\
& + 13536a^5b^7c^4f^2h^m + 13440a^4b^9c^3d^2j^2m + 10368a^5b^7c^4g^2h^2l + 5490a^4b^9c^3f^2h^2m + 1980a^3b^10c^3
\end{aligned}$$

$$\begin{aligned}
& f^2 h^m - 1920 a^4 b^9 c^3 f^j k^2 + 810 a^5 b^9 c^2 f^h k^2 - 180 a^3 b^{11} \\
& c^2 f^h k^2 - 30 a^2 b^{12} c^2 f^2 h^m + 30067200 a^6 b^2 c^8 d^2 h^m - 116 \\
& 12160 a^6 b^2 c^8 d^2 j^1 + 1658880 a^6 b^3 c^7 e^2 h^m + 1596672 a^4 b^6 c \\
& ^6 d^2 j^1 - 1419264 a^6 b^4 c^6 f^g k^2 - 1105920 a^7 b^4 c^5 f^h k^2 + 11 \\
& 05920 a^7 b^3 c^6 e^j k^2 - 921600 a^7 b^2 c^7 f^g k^2 - 829440 a^6 b^4 c^6 \\
& * g^2 h^k - 552960 a^8 b^2 c^6 f^h k^2 - 508032 a^3 b^8 c^5 d^2 j^1 - 331776 \\
& * a^7 b^2 c^7 g^2 h^k + 290304 a^6 b^5 c^5 e^j k^2 - 103680 a^5 b^6 c^5 g^2 * \\
& h^k + 80640 a^5 b^6 c^5 f^g k^2 - 69120 a^5 b^5 c^6 e^2 h^m + 65664 a^2 b^1 \\
& 0 c^4 d^2 j^1 - 34560 a^6 b^6 c^4 f^h k^2 + 6912 a^5 b^7 c^4 e^j k^2 + 3456 \\
& * a^5 b^8 c^3 f^h k^2 + 11930112 a^8 b^2 c^6 d^h k^2 + 8432640 a^7 b^2 c^7 d \\
& * h^2 m + 4450176 a^7 b^4 c^5 d^h k^2 + 4337280 a^6 b^4 c^6 d^h k^2 - 387072 \\
& 0 a^8 b^2 c^6 e^g k^2 - 3640320 a^6 b^3 c^7 f^2 h^k - 2885760 a^5 b^4 c^7 d \\
& ^2 h^m - 2844288 a^4 b^6 c^6 d^2 h^m - 2626560 a^7 b^3 c^6 f^h k^2 + 221184 \\
& 0 a^7 b^2 c^7 f^h k^2 + 2056320 a^6 b^4 c^6 f^h k^2 + 1935360 a^6 b^3 c^7 f \\
& ^2 g^1 - 1916928 a^7 b^2 c^7 d^j k^2 - 1687680 a^6 b^6 c^4 d^h k^2 - 165888 \\
& 0 a^7 b^2 c^7 e^h k^2 - 1143360 a^5 b^5 c^6 f^2 h^k - 1097280 a^6 b^5 c^5 f \\
& * h^k^2 + 1019412 a^3 b^8 c^5 d^2 h^m - 1007424 a^5 b^6 c^5 d^h k^2 - 912384 \\
& * a^6 b^4 c^6 d^j k^2 - 829440 a^6 b^4 c^6 e^h k^2 - 645120 a^7 b^4 c^5 e^g * \\
& m^2 - 552960 a^7 b^2 c^7 g^h k^2 - 552960 a^6 b^4 c^6 g^h k^2 + 364608 a^5 * \\
& b^6 c^5 f^h k^2 + 322560 a^5 b^5 c^6 f^2 g^1 + 197460 a^5 b^8 c^3 d^h k^2 - \\
& 145152 a^5 b^6 c^5 g^h k^2 - 143802 a^2 b^{10} c^4 d^2 h^m + 80640 a^6 b^6 c \\
& ^4 e^g k^2 - 56160 a^5 b^7 c^4 f^h k^2 + 51948 a^4 b^8 c^4 d^h k^2 - 40320 * \\
& a^4 b^7 c^5 f^2 g^1 + 34560 a^4 b^8 c^4 d^j k^2 + 27936 a^4 b^7 c^5 f^2 h^k \\
& - 20736 a^5 b^6 c^5 e^h k^2 - 13824 a^5 b^6 c^5 d^j k^2 + 10800 a^3 b^{10} c \\
& ^3 d^h k^2 - 5760 a^3 b^{10} c^3 d^j k^2 - 3780 a^4 b^8 c^4 f^h k^2 + 3690 a^ \\
& 3 b^9 c^4 f^2 h^k - 3456 a^4 b^8 c^4 g^h k^2 + 2970 a^4 b^9 c^3 f^h k^2 - 2 \\
& 304 a^5 b^8 c^3 e^g k^2 + 1152 a^3 b^9 c^4 f^2 g^1 - 540 a^3 b^{10} c^3 f^h k^2 \\
& * k - 540 a^2 b^{12} c^2 d^h k^2 - 90 a^4 b^{10} c^2 d^h k^2 - 90 a^2 b^{11} c^3 f \\
& ^2 h^k + 54 a^3 b^{11} c^2 f^h k^2 + 15925248 a^6 b^2 c^8 e^2 g^1 - 7962624 a \\
& ^7 b^3 c^6 e^g k^2 - 7962624 a^6 b^3 c^7 e^g k^2 + 23385600 a^6 b^2 c^8 d^f \\
& ^2 m + 6137856 a^6 b^3 c^7 d^g k^2 - 5677056 a^6 b^2 c^8 e^2 f^m + 4147200 * \\
& a^7 b^3 c^6 d^h k^2 - 3317760 a^6 b^2 c^8 e^2 h^k - 1354752 a^5 b^5 c^6 d^g \\
& ^2 m + 1271808 a^6 b^3 c^7 f^g k^2 - 737280 a^7 b^2 c^7 f^h k^2 + 17418240 * \\
& a^5 b^3 c^8 d^2 g^1 - 568320 a^6 b^4 c^6 f^h k^2 - 414720 a^6 b^5 c^5 d^h k^1 \\
& ^2 + 414720 a^5 b^5 c^6 f^g k^2 - 414720 a^5 b^4 c^7 e^2 h^k + 322560 a^5 b \\
& ^4 c^7 e^2 f^m - 136704 a^5 b^6 c^5 f^h k^2 + 120960 a^4 b^7 c^5 d^g k^2 - \\
& 31104 a^5 b^7 c^4 d^h k^2 - 17280 a^4 b^7 c^5 f^g k^2 + 10368 a^4 b^9 c^3 d \\
& * h^1 k^2 - 2304 a^4 b^8 c^4 f^h k^2 + 384 a^3 b^{10} c^3 f^h k^2 + 50042880 a^5 \\
& * b^2 c^9 d^2 f^k - 13271040 a^5 b^3 c^8 d^2 h^k - 13149696 a^7 b^3 c^6 d^f * \\
& m^2 + 10906560 a^4 b^5 c^7 d^2 f^m - 8709120 a^4 b^5 c^7 d^2 g^1 - 7418880 * \\
& a^5 b^3 c^8 d^2 f^m + 7133184 a^7 b^2 c^7 d^h k^2 - 6428160 a^6 b^3 c^7 d^h \\
& ^2 k + 5593536 a^4 b^5 c^7 d^2 h^k - 3870720 a^6 b^2 c^8 e^f k^2 + 3369600 * \\
& a^6 b^4 c^6 d^h k^2 + 3148992 a^6 b^5 c^5 d^f k^2 - 2985696 a^3 b^7 c^6 d^2 \\
& * f^m + 1959552 a^3 b^7 c^6 d^2 g^1 - 1658880 a^7 b^2 c^7 e^g k^2 - 1505280 * \\
& a^4 b^6 c^6 d^f k^2 - 1290240 a^6 b^2 c^8 f^2 g^j - 34836480 a^5 b^2 c^9 d^
\end{aligned}$$

$$\begin{aligned}
& 2*e*1 + 1105920*a^6*b^3*c^7*e*h^2*j - 860160*a^5*b^4*c^7*f^2*g*j - 829440*a^6*b^4*c^6*e*g*k^2 - 692064*a^3*b^7*c^6*d^2*h*k - 689472*a^5*b^5*c^6*d*h^2*k \\
& k - 645120*a^5*b^4*c^7*e*f^2*1 - 388800*a^5*b^6*c^5*d*h*k^2 + 378954*a^2*b^9*c^5*d^2*f*m + 362880*a^5*b^4*c^7*d*f^2*m + 296964*a^3*b^8*c^5*d*f^2*m + 2 \\
& 90304*a^5*b^5*c^6*e*h^2*j + 277344*a^4*b^7*c^5*d*h^2*k - 217728*a^2*b^9*c^5*d^2*g*1 - 80640*a^4*b^6*c^6*f^2*g*j + 80640*a^4*b^6*c^6*e*f^2*1 - 77070*a^4*b^9*c^3*d*f*m^2 - 30240*a^5*b^7*c^4*d*f*m^2 - 28350*a^3*b^9*c^4*d*h^2*k - \\
& 26406*a^2*b^9*c^5*d^2*h*k - 21060*a^4*b^8*c^4*d*h*k^2 - 20736*a^5*b^6*c^5*e*g*k^2 - 19278*a^2*b^10*c^4*d*f^2*m + 12672*a^3*b^8*c^5*f^2*g*j + 10044*a^3*b^10*c^3*d*h*k^2 + 8820*a^3*b^11*c^2*d*f*m^2 + 6912*a^4*b^7*c^5*e*h^2*j - \\
& 2304*a^3*b^8*c^5*e*f^2*1 - 1620*a^2*b^11*c^3*d*h^2*k - 384*a^2*b^10*c^4*f^2*g*j + 162*a^2*b^12*c^2*d*h*k^2 - 5419008*a^5*b^3*c^8*d*e^2*m + 5308416*a^6*b^2*c^8*e*g^2*j - 5308416*a^5*b^3*c^8*e^2*g*j - 3870720*a^7*b^2*c^7*d*f*1 \\
& ^2 - 3538944*a^6*b^3*c^7*e*g*j^2 + 2654208*a^5*b^4*c^7*e*g^2*j - 2322432*a^6*b^2*c^8*d*g^2*k - 1990656*a^5*b^4*c^7*d*g^2*k - 1935360*a^6*b^4*c^6*d*f*1 \\
& ^2 + 1658880*a^6*b^3*c^7*d*h*j^2 + 1658880*a^5*b^3*c^8*e^2*f*k - 884736*a^5*b^5*c^6*e*g*j^2 + 725760*a^5*b^6*c^5*d*f*1^2 + 17418240*a^4*b^4*c^8*d^2*e*1 + 518400*a^4*b^6*c^6*d*g^2*k + 483840*a^4*b^5*c^7*d*e^2*m + 262656*a^5*b^5*c^6*d*h*j^2 - 96768*a^4*b^8*c^4*d*f*1^2 - 69120*a^4*b^5*c^7*e^2*f*k - 552 \\
& 96*a^4*b^7*c^5*d*h*j^2 - 51840*a^3*b^8*c^5*d*g^2*k + 3456*a^3*b^10*c^3*d*f*1^2 + 1152*a^3*b^9*c^4*d*h*j^2 + 1152*a^2*b^11*c^3*d*h*j^2 - 15431040*a^4*b^4*c^8*d^2*f*k - 13248000*a^5*b^3*c^8*d*f^2*k - 11612160*a^5*b^2*c^9*d^2*g*j - 10063872*a^6*b^3*c^7*d*f*k^2 - 3919104*a^3*b^6*c^7*d^2*e*1 + 2554560*a^4*b^5*c^7*d*f^2*k + 1720320*a^5*b^3*c^8*e*f^2*j + 1596672*a^3*b^6*c^7*d^2*g*j + 1518912*a^3*b^6*c^7*d^2*f*k - 1105920*a^5*b^4*c^7*f*g^2*h + 838080*a^5*b^5*c^6*d*f*k^2 - 552960*a^6*b^2*c^8*f*g^2*h - 508032*a^2*b^8*c^6*d^2*g*j + 435456*a^2*b^8*c^6*d^2*e*1 + 161280*a^4*b^5*c^7*e*f^2*j + 116640*a^4*b^7*c^5*d*f*k^2 + 106812*a^2*b^8*c^6*d^2*f*k - 98208*a^3*b^7*c^6*d*f^2*k - 34560*a^4*b^6*c^6*f*g^2*h - 27270*a^3*b^9*c^4*d*f*k^2 - 26334*a^2*b^9*c^5*d*f^2*k - 25344*a^3*b^7*c^6*e*f^2*j + 3456*a^3*b^8*c^5*f*g^2*h + 768*a^2*b^9*c^5*e*f^2*j - 702*a^2*b^11*c^3*d*f*k^2 - 7962624*a^5*b^2*c^9*d*e^2*k - 2580480*a^6*b^2*c^8*d*f*j^2 + 2073600*a^4*b^4*c^8*d*e^2*k - 1658880*a^6*b^2*c^8*e*g*h^2 - 967680*a^5*b^4*c^7*d*f*j^2 - 829440*a^5*b^4*c^7*e*g*h^2 - 207360*a^3*b^6*c^7*d*e^2*k + 64512*a^4*b^6*c^6*d*f*j^2 + 39168*a^3*b^8*c^5*d*f*j^2 - 20736*a^4*b^6*c^6*e*g*h^2 - 9216*a^2*b^10*c^4*d*f*j^2 - 4423680*a^5*b^2*c^9*e^2*f*h + 4147200*a^5*b^3*c^8*d*g^2*h - 3193344*a^3*b^5*c^8*d^2*e*j + 1016064*a^2*b^7*c^7*d^2*e*j - 414720*a^4*b^5*c^7*d*g^2*h - 138240*a^4*b^4*c^8*e^2*f*h - 31104*a^3*b^7*c^6*d*g^2*h + 13824*a^3*b^6*c^7*e^2*f*h + 10368*a^2*b^9*c^5*d*g^2*h + 15630336*a^5*b^2*c^9*d*f^2*h - 14459904*a^4*b^3*c^9*d^2*f*h + 9630144*a^3*b^5*c^8*d^2*f*h - 8764416*a^5*b^3*c^8*d*f*h^2 - 3870720*a^5*b^2*c^9*e*f^2*g + 2867328*a^4*b^4*c^8*d*f^2*h - 2095200*a^2*b^7*c^7*d^2*f*h - 1414080*a^3*b^6*c^7*d*f^2*h - 34836480*a^4*b^2*c^10*d^2*e*g - 645120*a^4*b^4*c^8*e*f^2*g + 306720*a^3*b^7*c^6*d*f*h^2 + 197820*a^2*b^8*c^6*d*f^2*h + 146880*a^4*b^5*c^7*d*f*h^2 + 80640*a^3*b^6*c^7*e*f^2*g - 55350*a^2*b^9*c^5*d*f*h^2 - 2304*a^2*b^8*c^6*e*f^2*g - 3870720*a^5*b^2*c^9*d*f*g^2 - 193
\end{aligned}$$

$5360*a^4*b^4*c^8*d*f*g^2 - 1658880*a^4*b^3*c^9*d*e^2*h + 725760*a^3*b^6*c^7$
 $*d*f*g^2 + 17418240*a^3*b^4*c^9*d^2*e*g - 124416*a^3*b^5*c^8*d*e^2*h - 9676$
 $8*a^2*b^8*c^6*d*f*g^2 + 41472*a^2*b^7*c^7*d*e^2*h - 3919104*a^2*b^6*c^8*d^2$
 $*e*g - 7741440*a^4*b^2*c^10*d*e^2*f + 2903040*a^3*b^4*c^9*d*e^2*f - 387072*$
 $a^2*b^6*c^8*d*e^2*f - 20160*a^8*b^7*c^1^2*m^2 - 1648128*a^10*b^3*c^3*k*m^3$
 $- 898560*a^9*b^3*c^4*k^3*m - 354240*a^9*b^5*c^2*k*m^3 - 354240*a^8*b^5*c^3*$
 $k^3*m - 21600*a^7*b^7*c^2*k^3*m - 13950*a^7*b^8*c*k^2*m^2 + 430080*a^10*b*c$
 $^5*j^2*m^2 - 1984*a^6*b^9*c*j^2*m^2 - 884736*a^9*b^3*c^4*j^1^3 - 589824*a^8$
 $*b^3*c^5*j^3*1 - 442368*a^8*b^5*c^3*j^1^3 - 294912*a^7*b^5*c^4*j^3*1 - 4915$
 $2*a^6*b^7*c^3*j^3*1 + 1359360*a^10*b^2*c^4*h*m^3 + 1173120*a^9*b^4*c^3*h*m^$
 $3 + 743040*a^7*b^4*c^5*h^3*m + 622080*a^8*b^2*c^6*h^3*m + 184320*a^9*b*c^6*$
 $j^2*k^2 + 107136*a^6*b^6*c^4*h^3*m - 32640*a^8*b^6*c^2*h*m^3 + 540*a^5*b^8*$
 $c^3*h^3*m - 270*a^4*b^10*c^2*h^3*m - 180*a^5*b^10*c*h^2*m^2 - 2293760*a^9*b$
 $^3*c^4*f*m^3 - 2293760*a^6*b^3*c^7*f^3*m + 1327104*a^8*b^4*c^4*g^1^3 + 1327$
 $104*a^6*b^4*c^6*g^3*1 - 622080*a^8*b^3*c^5*h*k^3 - 622080*a^7*b^3*c^6*h^3*k$
 $- 326592*a^7*b^5*c^4*h*k^3 - 326592*a^6*b^5*c^5*h^3*k - 199360*a^8*b^5*c^3$
 $*f*m^3 - 199360*a^5*b^5*c^6*f^3*m + 61920*a^7*b^7*c^2*f*m^3 + 61920*a^4*b^7$
 $*c^5*f^3*m - 38880*a^6*b^7*c^3*h*k^3 - 38880*a^5*b^7*c^4*h^3*k - 3682*a^3*b$
 $^9*c^4*f^3*m - 810*a^5*b^9*c^2*h*k^3 - 810*a^4*b^9*c^3*h^3*k - 70*a^3*b^12*$
 $c*f^2*m^2 + 70*a^2*b^11*c^3*f^3*m + 3870720*a^8*b*c^7*e^2*m^2 + 184320*a^8*$
 $b*c^7*h^2*j^2 - 14152320*a^4*b^4*c^8*d^3*m + 10644480*a^5*b^2*c^9*d^3*m + 5$
 $483520*a^9*b^2*c^5*d*m^3 + 4269888*a^3*b^6*c^7*d^3*m - 2654208*a^8*b^3*c^5*$
 $e^1^3 + 1359360*a^6*b^2*c^8*f^3*k + 1330560*a^8*b^4*c^4*d*m^3 + 1173120*a^5$
 $*b^4*c^7*f^3*k - 884736*a^6*b^3*c^7*g^3*j - 826560*a^7*b^6*c^3*d*m^3 + 7430$
 $40*a^7*b^4*c^5*f*k^3 + 622080*a^8*b^2*c^6*f*k^3 - 607068*a^2*b^8*c^6*d^3*m$
 $- 589824*a^7*b^3*c^6*g*j^3 - 442368*a^5*b^5*c^6*g^3*j - 294912*a^6*b^5*c^5*$
 $g*j^3 + 145188*a^6*b^8*c^2*d*m^3 + 107136*a^6*b^6*c^4*f*k^3 - 49152*a^5*b^7$
 $*c^4*g*j^3 - 32640*a^4*b^6*c^6*f^3*k - 5796*a^3*b^8*c^5*f^3*k + 540*a^5*b^8$
 $*c^3*f*k^3 - 270*a^4*b^10*c^2*f*k^3 + 210*a^2*b^10*c^4*f^3*k + 19077120*a^4$
 $*b^3*c^9*d^3*k + 1658880*a^7*b*c^8*e^2*k^2 + 430080*a^7*b*c^8*f^2*j^2 + 353$
 $8944*a^5*b^2*c^9*e^3*j - 2488320*a^7*b^3*c^6*d*k^3 - 2379456*a^3*b^5*c^8*d^$
 $3*k + 1179648*a^7*b^2*c^7*e*j^3 + 589824*a^6*b^4*c^6*e*j^3 + 98304*a^5*b^6*$
 $c^5*e*j^3 - 95904*a^2*b^7*c^7*d^3*k - 57024*a^6*b^5*c^5*d*k^3 + 49248*a^5*b$
 $^7*c^4*d*k^3 - 4050*a^4*b^9*c^3*d*k^3 - 810*a^3*b^11*c^2*d*k^3 - 486*a*b^12$
 $*c^3*d^2*k^2 + 3870720*a^6*b*c^9*d^2*j^2 - 1648128*a^5*b^3*c^8*f^3*h - 8985$
 $60*a^6*b^3*c^7*f*h^3 - 354240*a^5*b^5*c^6*f*h^3 - 354240*a^4*b^5*c^7*f^3*h$
 $+ 43680*a^3*b^7*c^6*f^3*h - 21600*a^4*b^7*c^5*f*h^3 - 9792*a*b^11*c^4*d^2*j$
 $^2 + 1350*a^3*b^9*c^4*f*h^3 - 1050*a^2*b^9*c^5*f^3*h + 1658880*a^6*b*c^9*e^$
 $2*h^2 + 16547328*a^4*b^2*c^10*d^3*h - 12306816*a^3*b^4*c^9*d^3*h + 37310976$
 $*a^3*b^3*c^10*d^3*f + 3037824*a^2*b^6*c^8*d^3*h - 2654208*a^5*b^3*c^8*e*g^3$
 $+ 1949184*a^6*b^2*c^8*d*h^3 + 1296000*a^5*b^4*c^7*d*h^3 - 155520*a^4*b^6*c$
 $^6*d*h^3 - 40500*a*b^10*c^5*d^2*h^2 - 8100*a^3*b^8*c^5*d*h^3 + 4050*a^2*b^1$
 $0*c^4*d*h^3 + 3870720*a^5*b*c^10*e^2*f^2 + 34836480*a^4*b*c^11*d^2*e^2 - 10$
 $8864*a*b^9*c^6*d^2*g^2 - 8068032*a^2*b^5*c^9*d^3*f - 5623296*a^4*b^3*c^9*d*$
 $f^3 + 1737792*a^3*b^5*c^8*d*f^3 - 260190*a*b^8*c^7*d^2*f^2 - 211680*a^2*b^7$

$$\begin{aligned}
& *c^7*d*f^3 - 435456*a*b^7*c^8*d^2*e^2 - 245760*a^{10}*c^6*j^2*k*m - 384*a^6*b \\
& ^{10}*j^1*m^2 + 138240*a^{10}*c^6*h*k^2*m - 90*a^5*b^{11}*h*k*m^2 + 384000*a^{10}*c \\
& ^6*f*k*m^2 - 2211840*a^8*c^8*e^2*k*m - 409600*a^9*c^7*f*j^2*m - 147456*a^9* \\
& c^7*h*j^2*k - 30*a^4*b^{12}*f*k*m^2 + 967680*a^9*c^7*d*k^2*m + 384000*a^8*c^8 \\
& *f^2*h*m - 90*a^3*b^{13}*d*k*m^2 + 20321280*a^7*c^9*d^2*h*m - 883200*a^{11}*b*c \\
& ^4*k*m^3 - 317952*a^{10}*b*c^5*k^3*m + 43680*a^8*b^7*c*k*m^3 + 1350*a^6*b^9*c \\
& *k^3*m - 270*b^{14}*c^2*d^2*h*m + 6*a^3*b^{13}*f*h*m^2 + 4838400*a^9*c^7*d*h*m^ \\
& 2 + 2903040*a^8*c^8*d*h^2*m - 1032192*a^8*c^8*d*j^2*k + 138240*a^8*c^8*f*h^ \\
& 2*k - 3686400*a^7*c^9*e^2*f*m - 1327104*a^7*c^9*e^2*h*k - 393216*a^9*b*c^6* \\
& j^3*1 - 245760*a^8*c^8*f*h*j^2 - 810*b^{13}*c^3*d^2*h*k + 630*b^{13}*c^3*d^2*f* \\
& m + 18*a^2*b^{14}*d*h*m^2 + 2688000*a^7*c^9*d*f^2*m + 580608*a^8*c^8*d*h*k^2 \\
& - 5796*a^7*b^8*c*h*m^3 - 3456*b^{12}*c^4*d^2*g*j + 1890*b^{12}*c^4*d^2*f*k + 67 \\
& 73760*a^6*c^{10}*d^2*f*k - 1344000*a^{10}*b*c^5*f*m^3 - 1344000*a^7*b*c^8*f^3*m \\
& - 207360*a^9*b*c^6*h*k^3 - 207360*a^8*b*c^7*h^3*k - 3682*a^6*b^9*c*f*m^3 - \\
& 9289728*a^6*c^{10}*d*e^2*k - 1720320*a^7*c^9*d*f*j^2 - 50803200*a^5*b*c^{10}*d \\
& ^3*k + 6912*b^{11}*c^5*d^2*e*j - 10616832*a^6*b*c^9*e^3*1 - 2211840*a^6*c^{10}* \\
& e^2*f*h - 393216*a^8*b*c^7*g*j^3 + 43416*a*b^{10}*c^5*d^3*m - 9576*a^5*b^{10}*c \\
& *d*m^3 - 9450*b^{11}*c^5*d^2*f*h - 504*a*b^{14}*c*d^2*m^2 + 1612800*a^6*c^{10}*d* \\
& f^2*h - 1036800*a^8*b*c^7*d*k^3 + 45198*a*b^9*c^6*d^3*k - 20736*b^{10}*c^6*d^ \\
& 2*e*g - 75188736*a^4*b*c^{11}*d^3*f - 883200*a^6*b*c^9*f^3*h - 317952*a^7*b*c \\
& ^8*f*h^3 - 15482880*a^5*c^{11}*d*e^2*f - 10616832*a^5*b*c^{10}*e^3*g - 345060*a \\
& *b^8*c^7*d^3*h - 4262400*a^5*b*c^{10}*d*f^3 + 852768*a*b^7*c^8*d^3*f + 7350*a \\
& *b^9*c^6*d*f^3 + 967680*a^{10}*b^3*c^3*1^2*m^2 + 161280*a^9*b^5*c^2*1^2*m^2 + \\
& 1684224*a^{10}*b^2*c^4*k^2*m^2 + 1264320*a^9*b^4*c^3*k^2*m^2 + 126720*a^8*b^ \\
& 6*c^2*k^2*m^2 + 501760*a^9*b^3*c^4*j^2*m^2 + 414720*a^9*b^3*c^4*k^2*1^2 + 2 \\
& 07360*a^8*b^5*c^3*k^2*1^2 + 170240*a^8*b^5*c^3*j^2*m^2 + 9216*a^7*b^7*c^2*j \\
& ^2*m^2 + 5184*a^7*b^7*c^2*k^2*1^2 + 884736*a^9*b^2*c^5*j^2*1^2 + 884736*a^8 \\
& *b^4*c^4*j^2*1^2 + 221184*a^7*b^6*c^3*j^2*1^2 + 1419840*a^8*b^4*c^4*h^2*m^2 \\
& + 1387008*a^9*b^2*c^5*h^2*m^2 + 276480*a^8*b^3*c^5*j^2*k^2 + 140544*a^7*b^ \\
& 5*c^4*j^2*k^2 + 84960*a^7*b^6*c^3*h^2*m^2 + 25344*a^6*b^7*c^3*j^2*k^2 - 801 \\
& 0*a^6*b^8*c^2*h^2*m^2 + 576*a^5*b^9*c^2*j^2*k^2 + 967680*a^8*b^3*c^5*g^2*m^ \\
& 2 + 414720*a^8*b^3*c^5*h^2*1^2 + 207360*a^7*b^5*c^4*h^2*1^2 + 161280*a^7*b^ \\
& 5*c^4*g^2*m^2 - 20160*a^6*b^7*c^3*g^2*m^2 + 5184*a^6*b^7*c^3*h^2*1^2 + 576* \\
& a^5*b^9*c^2*g^2*m^2 + 3808000*a^8*b^2*c^6*f^2*m^2 + 1990656*a^7*b^4*c^5*g^2 \\
& *1^2 + 1643712*a^7*b^4*c^5*f^2*m^2 + 803520*a^7*b^4*c^5*h^2*k^2 + 725760*a^ \\
& 8*b^2*c^6*h^2*k^2 + 207360*a^6*b^6*c^4*h^2*k^2 - 125440*a^6*b^6*c^4*f^2*m^2 \\
& - 13790*a^5*b^8*c^3*f^2*m^2 + 10530*a^5*b^8*c^3*h^2*k^2 + 1785*a^4*b^{10}*c^ \\
& 2*f^2*m^2 + 81*a^4*b^{10}*c^2*h^2*k^2 + 18427392*a^7*b^2*c^7*d^2*m^2 + 967680 \\
& *a^7*b^3*c^6*f^2*1^2 + 645120*a^7*b^3*c^6*e^2*m^2 + 414720*a^7*b^3*c^6*g^2* \\
& k^2 + 276480*a^7*b^3*c^6*h^2*j^2 + 207360*a^6*b^5*c^5*g^2*k^2 + 161280*a^6* \\
& b^5*c^5*f^2*1^2 + 140544*a^6*b^5*c^5*h^2*j^2 - 80640*a^6*b^5*c^5*e^2*m^2 + \\
& 25344*a^5*b^7*c^4*h^2*j^2 - 20160*a^5*b^7*c^4*f^2*1^2 + 5184*a^5*b^7*c^4*g^ \\
& 2*k^2 + 2304*a^5*b^7*c^4*e^2*m^2 + 576*a^4*b^9*c^3*h^2*j^2 + 576*a^4*b^9*c^ \\
& 3*f^2*1^2 + 7962624*a^7*b^2*c^7*e^2*1^2 - 4148928*a^6*b^4*c^6*d^2*m^2 + 141 \\
& 9840*a^6*b^4*c^6*f^2*k^2 + 1387008*a^7*b^2*c^7*f^2*k^2 - 1183392*a^5*b^6*c^
\end{aligned}$$

$$\begin{aligned}
& 5*d^2*m^2 + 884736*a^7*b^2*c^7*g^2*j^2 + 884736*a^6*b^4*c^6*g^2*j^2 + 64575 \\
& 0*a^4*b^8*c^4*d^2*m^2 + 221184*a^5*b^6*c^5*g^2*j^2 - 115920*a^3*b^10*c^3*d^ \\
& 2*m^2 + 84960*a^5*b^6*c^5*f^2*k^2 + 10836*a^2*b^12*c^2*d^2*m^2 - 8010*a^4*b \\
& ^8*c^4*f^2*k^2 - 180*a^3*b^10*c^3*f^2*k^2 + 9*a^2*b^12*c^2*f^2*k^2 + 870912 \\
& 0*a^6*b^3*c^7*d^2*1^2 - 4354560*a^5*b^5*c^6*d^2*1^2 + 979776*a^4*b^7*c^5*d^ \\
& 2*1^2 + 829440*a^6*b^3*c^7*e^2*k^2 + 17480448*a^6*b^2*c^8*d^2*k^2 + 501760* \\
& a^6*b^3*c^7*f^2*j^2 + 170240*a^5*b^5*c^6*f^2*j^2 - 108864*a^3*b^9*c^4*d^2*1 \\
& ^2 + 20736*a^5*b^5*c^6*e^2*k^2 + 9216*a^4*b^7*c^5*f^2*j^2 + 5184*a^2*b^11*c \\
& ^3*d^2*1^2 - 1984*a^3*b^9*c^4*f^2*j^2 + 64*a^2*b^11*c^3*f^2*j^2 + 3538944*a \\
& ^6*b^2*c^8*e^2*j^2 - 3302208*a^5*b^4*c^7*d^2*k^2 + 884736*a^5*b^4*c^7*e^2*j \\
& ^2 + 414720*a^6*b^3*c^7*g^2*h^2 + 207360*a^5*b^5*c^6*g^2*h^2 - 103680*a^4*b \\
& ^6*c^6*d^2*k^2 + 101250*a^3*b^8*c^5*d^2*k^2 - 5751*a^2*b^10*c^4*d^2*k^2 + 5 \\
& 184*a^4*b^7*c^5*g^2*h^2 + 1935360*a^5*b^3*c^8*d^2*j^2 + 1684224*a^6*b^2*c^8 \\
& *f^2*h^2 + 1264320*a^5*b^4*c^7*f^2*h^2 - 532224*a^4*b^5*c^7*d^2*j^2 + 12672 \\
& 0*a^4*b^6*c^6*f^2*h^2 - 96768*a^3*b^7*c^6*d^2*j^2 + 62784*a^2*b^9*c^5*d^2*j \\
& ^2 - 13950*a^3*b^8*c^5*f^2*h^2 + 225*a^2*b^10*c^4*f^2*h^2 + 967680*a^5*b^3* \\
& c^8*f^2*g^2 + 829440*a^5*b^3*c^8*e^2*h^2 + 161280*a^4*b^5*c^7*f^2*g^2 + 207 \\
& 36*a^4*b^5*c^7*e^2*h^2 - 20160*a^3*b^7*c^6*f^2*g^2 + 576*a^2*b^9*c^5*f^2*g^ \\
& 2 + 11487744*a^5*b^2*c^9*d^2*h^2 + 7962624*a^5*b^2*c^9*e^2*g^2 + 35525376*a \\
& ^4*b^2*c^10*d^2*f^2 - 1412640*a^3*b^6*c^7*d^2*h^2 + 461376*a^4*b^4*c^8*d^2* \\
& h^2 + 375030*a^2*b^8*c^6*d^2*h^2 + 8709120*a^4*b^3*c^9*d^2*g^2 - 4354560*a^ \\
& 3*b^5*c^8*d^2*g^2 + 979776*a^2*b^7*c^7*d^2*g^2 + 645120*a^4*b^3*c^9*e^2*f^2 \\
& - 80640*a^3*b^5*c^8*e^2*f^2 + 2304*a^2*b^7*c^7*e^2*f^2 - 15269184*a^3*b^4* \\
& c^9*d^2*f^2 + 2870784*a^2*b^6*c^8*d^2*f^2 - 17418240*a^3*b^3*c^10*d^2*e^2 + \\
& 3919104*a^2*b^5*c^9*d^2*e^2 + 54*b^15*c*d^2*k*m + 6*a*b^15*d*f*m^2 + 11520 \\
& 0*a^11*c^5*k^2*m^2 + 576*a^7*b^9*1^2*m^2 + 225*a^6*b^10*k^2*m^2 + 64*a^5*b^ \\
& 11*j^2*m^2 + 345600*a^10*c^6*h^2*m^2 + 9*a^4*b^12*h^2*m^2 + 320000*a^9*c^7* \\
& f^2*m^2 + 41472*a^9*c^7*h^2*k^2 + 16934400*a^8*c^8*d^2*m^2 + 345600*a^8*c^8 \\
& *f^2*k^2 + 81*b^14*c^2*d^2*k^2 + 3538944*a^7*c^9*e^2*j^2 + 2032128*a^7*c^9* \\
& d^2*k^2 + 492800*a^11*b^2*c^3*m^4 + 351456*a^10*b^4*c^2*m^4 + 576*b^13*c^3* \\
& d^2*j^2 + 331776*a^9*b^4*c^3*1^4 + 115200*a^7*c^9*f^2*h^2 + 142560*a^8*b^4* \\
& c^4*k^4 + 103680*a^9*b^2*c^5*k^4 + 32400*a^7*b^6*c^3*k^4 + 2025*b^12*c^4*d^ \\
& 2*h^2 + 2025*a^6*b^8*c^2*k^4 + 6096384*a^6*c^10*d^2*h^2 + 131072*a^8*b^2*c^ \\
& 6*j^4 + 98304*a^7*b^4*c^5*j^4 + 32768*a^6*b^6*c^4*j^4 + 5184*b^11*c^5*d^2*g \\
& ^2 + 4096*a^5*b^8*c^3*j^4 + 11025*b^10*c^6*d^2*f^2 + 5644800*a^5*c^11*d^2*f \\
& ^2 + 142560*a^6*b^4*c^6*h^4 + 103680*a^7*b^2*c^7*h^4 + 32400*a^5*b^6*c^5*h^ \\
& 4 + 20736*b^9*c^7*d^2*e^2 + 2025*a^4*b^8*c^4*h^4 + 331776*a^5*b^4*c^7*g^4 + \\
& 492800*a^5*b^2*c^9*f^4 + 351456*a^4*b^4*c^8*f^4 - 43120*a^3*b^6*c^7*f^4 + \\
& 1225*a^2*b^8*c^6*f^4 - 27433728*a^3*b^2*c^11*d^4 + 6446304*a^2*b^4*c^10*d^4 \\
& - 1050*a^7*b^9*k*m^3 + 384000*a^11*c^5*h*m^3 + 138240*a^9*c^7*h^3*m + 210* \\
& a^6*b^10*h*m^3 + 47416320*a^6*c^10*d^3*m - 1134*b^12*c^4*d^3*m + 70*a^5*b^1 \\
& 1*f*m^3 + 2688000*a^10*c^6*d*m^3 + 384000*a^7*c^9*f^3*k + 138240*a^9*c^7*f* \\
& k^3 - 3402*b^11*c^5*d^3*k + 210*a^4*b^12*d*m^3 + 7077888*a^6*c^10*e^3*j + 7 \\
& 86432*a^8*c^8*e*j^3 - 43120*a^9*b^6*c*m^4 + 28449792*a^5*c^11*d^3*h + 17010 \\
& *b^10*c^6*d^3*h + 580608*a^7*c^9*d*h^3 - 39690*b^9*c^7*d^3*f - 734832*a*b^6
\end{aligned}$$

$$\begin{aligned}
& *c^9*d^4 + 9*b^16*d^2*m^2 + 160000*a^12*c^4*m^4 + 1225*a^8*b^8*m^4 + 20736* \\
& a^10*c^6*k^4 + 65536*a^9*c^7*j^4 + 20736*a^8*c^8*h^4 + 49787136*a^4*c^12*d^ \\
& 4 + 160000*a^6*c^10*f^4 + 5308416*a^5*c^11*e^4 + 35721*b^8*c^8*d^4 + a^2*b^ \\
& 14*f^2*m^2, z, k1)*x*(8388608*a^11*b*c^10 - 512*a^4*b^15*c^3 + 14336*a^5*b^ \\
& 13*c^4 - 172032*a^6*b^11*c^5 + 1146880*a^7*b^9*c^6 - 4587520*a^8*b^7*c^7 + \\
& 11010048*a^9*b^5*c^8 - 14680064*a^10*b^3*c^9))/(64*(4096*a^10*c^7 + a^4*b^1 \\
& 2*c - 24*a^5*b^10*c^2 + 240*a^6*b^8*c^3 - 1280*a^7*b^6*c^4 + 3840*a^8*b^4*c \\
& ^5 - 6144*a^9*b^2*c^6))) - (983040*a^7*c^9*e*f + 589824*a^8*c^8*e*k + 32768 \\
& 0*a^8*c^8*f*j + 196608*a^9*c^7*j*k - 3244032*a^6*b*c^9*d*e - 884736*a^7*b*c \\
& ^8*e*h - 491520*a^7*b*c^8*f*g - 1081344*a^7*b*c^8*d*j - 1277952*a^8*b*c^7*e \\
& *m - 491520*a^8*b*c^7*f*l - 294912*a^8*b*c^7*g*k - 294912*a^8*b*c^7*h*j - 4 \\
& 25984*a^9*b*c^6*j*m - 294912*a^9*b*c^6*k*l - 4608*a^2*b^9*c^5*d*e + 87552*a \\
& ^3*b^7*c^6*d*e - 681984*a^4*b^5*c^7*d*e + 2433024*a^5*b^3*c^8*d*e + 2304*a^ \\
& 2*b^10*c^4*d*g - 43776*a^3*b^8*c^5*d*g - 1536*a^3*b^8*c^5*e*f + 340992*a^4* \\
& b^6*c^6*d*g + 39936*a^4*b^6*c^6*e*f - 1216512*a^5*b^4*c^7*d*g - 184320*a^5* \\
& b^4*c^7*e*f + 1622016*a^6*b^2*c^8*d*g - 49152*a^6*b^2*c^8*e*f + 768*a^3*b^9 \\
& *c^4*f*g - 4608*a^4*b^7*c^5*e*h - 19968*a^4*b^7*c^5*f*g - 18432*a^5*b^5*c^6 \\
& *e*h + 92160*a^5*b^5*c^6*f*g + 368640*a^6*b^3*c^7*e*h + 24576*a^6*b^3*c^7*f \\
& *g - 768*a^2*b^11*c^3*d*j + 13056*a^3*b^9*c^4*d*j - 84480*a^4*b^7*c^5*d*j + \\
& 178176*a^5*b^5*c^6*d*j + 270336*a^6*b^3*c^7*d*j + 2304*a^4*b^8*c^4*g*h + 9 \\
& 216*a^5*b^6*c^5*g*h - 184320*a^6*b^4*c^6*g*h + 442368*a^7*b^2*c^7*g*h + 230 \\
& 4*a^3*b^10*c^3*d*l - 256*a^3*b^10*c^3*f*j - 43776*a^4*b^8*c^4*d*l + 6144*a^ \\
& 4*b^8*c^4*f*j + 340992*a^5*b^6*c^5*d*l + 27648*a^5*b^6*c^5*e*k - 17408*a^5* \\
& b^6*c^5*f*j - 1216512*a^6*b^4*c^6*d*l - 184320*a^6*b^4*c^6*e*k - 69632*a^6* \\
& b^4*c^6*f*j + 1622016*a^7*b^2*c^7*d*l + 147456*a^7*b^2*c^7*e*k + 147456*a^7 \\
& *b^2*c^7*f*j + 768*a^4*b^9*c^3*f*l - 768*a^4*b^9*c^3*h*j + 1536*a^5*b^7*c^4 \\
& *e*m - 19968*a^5*b^7*c^4*f*l - 13824*a^5*b^7*c^4*g*k - 4608*a^5*b^7*c^4*h*j \\
& - 92160*a^6*b^5*c^5*e*m + 92160*a^6*b^5*c^5*f*l + 92160*a^6*b^5*c^5*g*k + \\
& 55296*a^6*b^5*c^5*h*j + 663552*a^7*b^3*c^6*e*m + 24576*a^7*b^3*c^6*f*l - 73 \\
& 728*a^7*b^3*c^6*g*k - 24576*a^7*b^3*c^6*h*j - 768*a^5*b^8*c^3*g*m + 2304*a^ \\
& 5*b^8*c^3*h*l + 46080*a^6*b^6*c^4*g*m + 9216*a^6*b^6*c^4*h*l - 331776*a^7*b \\
& ^4*c^5*g*m - 184320*a^7*b^4*c^5*h*l + 638976*a^8*b^2*c^6*g*m + 442368*a^8*b \\
& ^2*c^6*h*l + 4608*a^5*b^8*c^3*j*k - 21504*a^6*b^6*c^4*j*k - 36864*a^7*b^4*c \\
& ^5*j*k + 147456*a^8*b^2*c^6*j*k + 256*a^5*b^9*c^2*j*m - 14848*a^6*b^7*c^3*j \\
& *m - 13824*a^6*b^7*c^3*k*l + 79872*a^7*b^5*c^4*j*m + 92160*a^7*b^5*c^4*k*l \\
& + 8192*a^8*b^3*c^5*j*m - 73728*a^8*b^3*c^5*k*l - 768*a^6*b^8*c^2*l*m + 4608 \\
& 0*a^7*b^6*c^3*l*m - 331776*a^8*b^4*c^4*l*m + 638976*a^9*b^2*c^5*l*m)/(512*(\\
& 4096*a^10*c^7 + a^4*b^12*c - 24*a^5*b^10*c^2 + 240*a^6*b^8*c^3 - 1280*a^7*b \\
& ^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^6)) + (x*(25600*a^7*c^9*f^2 - 18 \\
& *b^12*c^4*d^2 - 451584*a^6*c^10*d^2 - 9216*a^8*c^8*h^2 + 9216*a^9*c^7*k^2 - \\
& 2*a^4*b^12*m^2 - 25600*a^10*c^6*m^2 + 504*a*b^10*c^5*d^2 + 73728*a^6*b*c^9 \\
& *e^2 + 8192*a^8*b*c^7*j^2 + 88*a^5*b^10*c*m^2 - 6228*a^2*b^8*c^6*d^2 + 4262 \\
& 4*a^3*b^6*c^7*d^2 - 176256*a^4*b^4*c^8*d^2 + 423936*a^5*b^2*c^9*d^2 + 4608* \\
& a^4*b^5*c^7*e^2 - 36864*a^5*b^3*c^8*e^2 - 2*a^2*b^10*c^4*f^2 + 84*a^3*b^8*c \\
& ^5*f^2 - 3520*a^4*b^6*c^6*f^2 + 26240*a^5*b^4*c^7*f^2 - 59904*a^6*b^2*c^8*f
\end{aligned}$$

$$\begin{aligned}
&^2 + 1152*a^4*b^7*c^5*g^2 - 9216*a^5*b^5*c^6*g^2 + 18432*a^6*b^3*c^7*g^2 - \\
&468*a^4*b^8*c^4*h^2 + 3456*a^5*b^6*c^5*h^2 - 5760*a^6*b^4*c^6*h^2 + 128*a^4 \\
&*b^9*c^3*j^2 - 512*a^5*b^7*c^4*j^2 - 1536*a^6*b^5*c^5*j^2 + 4096*a^7*b^3*c^ \\
&6*j^2 - 18*a^4*b^10*c^2*k^2 - 108*a^5*b^8*c^3*k^2 + 576*a^6*b^6*c^4*k^2 + 5 \\
&760*a^7*b^4*c^5*k^2 - 23040*a^8*b^2*c^6*k^2 + 1152*a^6*b^7*c^3*l^2 - 9216*a \\
&^7*b^5*c^4*l^2 + 18432*a^8*b^3*c^5*l^2 - 1236*a^6*b^8*c^2*m^2 + 5760*a^7*b^ \\
&6*c^3*m^2 - 8320*a^8*b^4*c^4*m^2 + 6144*a^9*b^2*c^5*m^2 - 129024*a^7*c^9*d* \\
&h - 215040*a^8*c^8*d*m + 30720*a^8*c^8*f*k - 30720*a^9*c^7*h*m - 12*a*b^11* \\
&c^4*d*f + 218112*a^6*b*c^9*d*f + 9216*a^7*b*c^8*f*h + 156672*a^7*b*c^8*d*k \\
&+ 49152*a^7*b*c^8*e*j + 25600*a^8*b*c^7*f*m + 9216*a^8*b*c^7*h*k - 12*a^4*b \\
&^11*c*k*m + 21504*a^9*b*c^6*k*m + 420*a^2*b^9*c^5*d*f - 4992*a^3*b^7*c^6*d* \\
&f + 36480*a^4*b^5*c^7*d*f - 144384*a^5*b^3*c^8*d*f - 36*a^2*b^10*c^4*d*h + \\
&360*a^3*b^8*c^5*d*h - 3456*a^4*b^6*c^6*d*h - 4608*a^4*b^6*c^6*e*g + 11520*a \\
&^5*b^4*c^7*d*h + 36864*a^5*b^4*c^7*e*g + 27648*a^6*b^2*c^8*d*h - 73728*a^6* \\
&b^2*c^8*e*g - 12*a^3*b^9*c^4*f*h + 2304*a^4*b^7*c^5*f*h - 17280*a^5*b^5*c^6 \\
&*f*h + 30720*a^6*b^3*c^7*f*h + 180*a^3*b^9*c^4*d*k - 2304*a^4*b^7*c^5*d*k + \\
&1536*a^4*b^7*c^5*e*j + 19584*a^5*b^5*c^6*d*k - 9216*a^5*b^5*c^6*e*j - 9216 \\
&0*a^6*b^3*c^7*d*k - 168*a^4*b^8*c^4*d*m - 360*a^4*b^8*c^4*f*k - 768*a^4*b^8 \\
&*c^4*g*j + 768*a^5*b^6*c^5*d*m - 4608*a^5*b^6*c^5*e*l - 768*a^5*b^6*c^5*f*k \\
&+ 4608*a^5*b^6*c^5*g*j - 11520*a^6*b^4*c^6*d*m + 36864*a^6*b^4*c^6*e*l + 2 \\
&5344*a^6*b^4*c^6*f*k + 98304*a^7*b^2*c^7*d*m - 73728*a^7*b^2*c^7*e*l - 7372 \\
&8*a^7*b^2*c^7*f*k - 24576*a^7*b^2*c^7*g*j - 140*a^4*b^9*c^3*f*m + 180*a^4*b \\
&^9*c^3*h*k + 3584*a^5*b^7*c^4*f*m + 2304*a^5*b^7*c^4*g*l - 20352*a^6*b^5*c^ \\
&5*f*m - 18432*a^6*b^5*c^5*g*l - 8064*a^6*b^5*c^5*h*k + 26624*a^7*b^3*c^6*f* \\
&m + 36864*a^7*b^3*c^6*g*l + 18432*a^7*b^3*c^6*h*k + 60*a^4*b^10*c^2*h*m - 1 \\
&560*a^5*b^8*c^3*h*m + 8832*a^6*b^6*c^4*h*m - 13056*a^7*b^4*c^5*h*m + 3072*a \\
&^8*b^2*c^6*h*m - 768*a^5*b^8*c^3*j*l + 4608*a^6*b^6*c^4*j*l - 24576*a^8*b^2 \\
&*c^6*j*l + 228*a^5*b^9*c^2*k*m + 384*a^6*b^7*c^3*k*m - 9600*a^7*b^5*c^4*k*m \\
&+ 15360*a^8*b^3*c^5*k*m))/(64*(4096*a^10*c^7 + a^4*b^12*c - 24*a^5*b^10*c^ \\
&2 + 240*a^6*b^8*c^3 - 1280*a^7*b^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^ \\
&6))) + (35*a^6*b^7*m^3 - 8000*a^5*c^8*f^3 - 1728*a^8*c^5*k^3 - 567*b^7*c^6* \\
&d^3 + 10368*a*b^5*c^7*d^3 + 169344*a^3*b*c^9*d^3 + 193536*a^4*c^9*d*e^2 - 1 \\
&41120*a^4*c^9*d^2*f + 1728*a^6*b*c^6*h^3 + 315*b^8*c^5*d^2*f + 27648*a^5*c^ \\
&8*e^2*h - 135*b^9*c^4*d^2*h + 21504*a^6*c^7*d*j^2 - 2880*a^6*c^7*f*h^2 - 84 \\
&672*a^5*c^8*d^2*k - 1176*a^7*b^5*c*m^3 + 6400*a^9*b*c^3*m^3 + 3*a^2*b^11*d* \\
&m^2 + 27*b^10*c^3*d^2*k - 14400*a^6*c^7*f^2*k - 8640*a^7*c^6*f*k^2 + a^3*b^ \\
&10*f*m^2 + 46080*a^6*c^7*e^2*m + 3072*a^7*c^6*h*j^2 + 9*b^11*c^2*d^2*m - 17 \\
&28*a^7*c^6*h^2*k - 8000*a^8*c^5*f*m^2 + 3*a^4*b^9*h*m^2 - 15*a^5*b^8*k*m^2 \\
&+ 5120*a^8*c^5*j^2*m - 4800*a^9*c^4*k*m^2 - 67824*a^2*b^3*c^8*d^3 + 35*a^2* \\
&b^6*c^5*f^3 + 84*a^3*b^4*c^6*f^3 - 12720*a^4*b^2*c^7*f^3 + 540*a^4*b^5*c^4* \\
&h^3 + 4320*a^5*b^3*c^5*h^3 - 135*a^5*b^6*c^2*k^3 - 1620*a^6*b^4*c^3*k^3 - 4 \\
&752*a^7*b^2*c^4*k^3 + 9456*a^8*b^3*c^2*m^3 - 40320*a^5*c^8*d*f*h + 129024*a \\
&^5*c^8*d*e*j - 67200*a^6*c^7*d*f*m - 24192*a^6*c^7*d*h*k + 18432*a^6*c^7*e* \\
&h*j - 9600*a^7*c^6*f*h*m - 40320*a^7*c^6*d*k*m + 30720*a^7*c^6*e*j*m - 5760 \\
&*a^8*c^5*h*k*m - 6237*a*b^6*c^6*d^2*f + 210*a*b^7*c^5*d*f^2 + 116160*a^4*b*
\end{aligned}$$

$$\begin{aligned}
& c^8*d*f^2 - 36864*a^4*b*c^8*e^2*f + 2430*a*b^7*c^5*d^2*h + 133056*a^4*b*c^8 \\
& *d^2*h + 27648*a^5*b*c^7*d*h^2 + 26880*a^5*b*c^7*f^2*h - 297*a*b^8*c^4*d^2* \\
& k + 46656*a^6*b*c^6*d*k^2 - 27648*a^5*b*c^7*e^2*k - 4096*a^6*b*c^6*f*j^2 - \\
& 324*a*b^9*c^3*d^2*m - 132*a^3*b^9*c*d*m^2 + 193536*a^5*b*c^7*d^2*m + 63360* \\
& a^7*b*c^5*d*m^2 - 51*a^4*b^8*c*f*m^2 + 40000*a^6*b*c^6*f^2*m + 10368*a^7*b* \\
& c^5*h*k^2 - 78*a^5*b^7*c*h*m^2 + 8064*a^7*b*c^5*h^2*m - 3072*a^7*b*c^5*j^2* \\
& k + 12480*a^8*b*c^4*h*m^2 - 90*a^5*b^7*c*k^2*m + 705*a^6*b^6*c*k*m^2 + 1555 \\
& 2*a^8*b*c^4*k^2*m + 6912*a^2*b^4*c^7*d*e^2 - 62208*a^3*b^2*c^8*d*e^2 + 4237 \\
& 2*a^2*b^4*c^7*d^2*f - 1764*a^2*b^5*c^6*d*f^2 - 96048*a^3*b^2*c^8*d^2*f - 46 \\
& 08*a^3*b^3*c^7*d*f^2 + 1728*a^2*b^6*c^5*d*g^2 + 2304*a^3*b^3*c^7*e^2*f - 15 \\
& 552*a^3*b^4*c^6*d*g^2 + 48384*a^4*b^2*c^7*d*g^2 - 13716*a^2*b^5*c^6*d^2*h + \\
& 405*a^2*b^7*c^4*d*h^2 + 12096*a^3*b^3*c^7*d^2*h - 5400*a^3*b^5*c^5*d*h^2 + \\
& 28944*a^4*b^3*c^6*d*h^2 + 576*a^3*b^5*c^5*f*g^2 + 6912*a^4*b^2*c^7*e^2*h - \\
& 9216*a^4*b^3*c^6*f*g^2 - 15*a^2*b^7*c^4*f^2*h + 192*a^2*b^8*c^3*d*j^2 - 36 \\
& 0*a^3*b^5*c^5*f^2*h - 960*a^3*b^6*c^4*d*j^2 + 135*a^3*b^6*c^4*f*h^2 + 15696 \\
& *a^4*b^3*c^6*f^2*h - 768*a^4*b^4*c^5*d*j^2 - 5580*a^4*b^4*c^5*f*h^2 + 14592 \\
& *a^5*b^2*c^6*d*j^2 - 20592*a^5*b^2*c^6*f*h^2 - 999*a^2*b^6*c^5*d^2*k + 27*a \\
& ^2*b^9*c^2*d*k^2 + 23004*a^3*b^4*c^6*d^2*k - 108*a^3*b^7*c^3*d*k^2 - 84240* \\
& a^4*b^2*c^7*d^2*k + 1728*a^4*b^4*c^5*g^2*h - 1404*a^4*b^5*c^4*d*k^2 + 6912* \\
& a^5*b^2*c^6*g^2*h + 14688*a^5*b^3*c^5*d*k^2 + 64*a^3*b^7*c^3*f*j^2 - 768*a^ \\
& 4*b^5*c^4*f*j^2 + 1728*a^4*b^6*c^3*d*1^2 - 3840*a^5*b^3*c^5*f*j^2 - 15552*a \\
& ^5*b^4*c^4*d*1^2 + 48384*a^6*b^2*c^5*d*1^2 + 3717*a^2*b^7*c^4*d^2*m + 3*a^2 \\
& *b^8*c^3*f^2*k - 15192*a^3*b^5*c^5*d^2*m + 135*a^3*b^6*c^4*f^2*k + 9*a^3*b^ \\
& 8*c^2*f*k^2 - 7920*a^4*b^3*c^6*d^2*m - 2988*a^4*b^4*c^5*f^2*k - 99*a^4*b^6* \\
& c^3*f*k^2 + 2079*a^4*b^7*c^2*d*m^2 - 28272*a^5*b^2*c^6*f^2*k - 4500*a^5*b^4 \\
& *c^4*f*k^2 - 14448*a^5*b^5*c^3*d*m^2 - 20304*a^6*b^2*c^5*f*k^2 + 37104*a^6* \\
& b^3*c^4*d*m^2 + 192*a^4*b^6*c^3*h*j^2 + 2304*a^5*b^2*c^6*e^2*m - 6912*a^5*b \\
& ^3*c^5*g^2*k + 1536*a^5*b^4*c^4*h*j^2 + 576*a^5*b^5*c^3*f*1^2 + 3840*a^6*b^ \\
& 2*c^5*h*j^2 - 9216*a^6*b^3*c^4*f*1^2 + a^2*b^9*c^2*f^2*m + 20*a^3*b^7*c^3*f \\
& ^2*m - 1596*a^4*b^5*c^4*f^2*m - 243*a^4*b^6*c^3*h^2*k + 27*a^4*b^7*c^2*h*k^ \\
& 2 + 16736*a^5*b^3*c^5*f^2*m - 5940*a^5*b^4*c^4*h^2*k + 1728*a^5*b^5*c^3*h*k \\
& ^2 + 875*a^5*b^6*c^2*f*m^2 - 13392*a^6*b^2*c^5*h^2*k + 10800*a^6*b^3*c^4*h* \\
& k^2 - 2716*a^6*b^4*c^3*f*m^2 - 39600*a^7*b^2*c^4*f*m^2 + 576*a^5*b^4*c^4*g^ \\
& 2*m + 11520*a^6*b^2*c^5*g^2*m + 1728*a^6*b^4*c^3*h*1^2 + 6912*a^7*b^2*c^4*h \\
& *1^2 - 81*a^4*b^7*c^2*h^2*m + 720*a^5*b^5*c^3*h^2*m - 768*a^5*b^5*c^3*j^2*k \\
& + 17136*a^6*b^3*c^4*h^2*m - 3072*a^6*b^3*c^4*j^2*k - 900*a^6*b^5*c^2*h*m^2 \\
& + 22272*a^7*b^3*c^3*h*m^2 + 64*a^5*b^6*c^2*j^2*m + 1536*a^6*b^4*c^3*j^2*m \\
& + 5376*a^7*b^2*c^4*j^2*m - 6912*a^7*b^3*c^3*k*1^2 + 1260*a^6*b^5*c^2*k^2*m \\
& + 13248*a^7*b^3*c^3*k^2*m - 6084*a^7*b^4*c^2*k*m^2 - 26256*a^8*b^2*c^3*k*m^ \\
& 2 + 576*a^7*b^4*c^2*1^2*m + 11520*a^8*b^2*c^3*1^2*m - 193536*a^4*b*c^8*d*e* \\
& g - 90*a*b^8*c^4*d*f*h - 27648*a^5*b*c^7*e*g*h + 18*a*b^9*c^3*d*f*k - 19353 \\
& 6*a^5*b*c^7*d*e*1 + 147456*a^5*b*c^7*d*f*k - 64512*a^5*b*c^7*d*g*j - 24576* \\
& a^5*b*c^7*e*f*j + 6*a*b^10*c^2*d*f*m + 84096*a^6*b*c^6*d*h*m - 46080*a^6*b* \\
& c^6*e*g*m - 27648*a^6*b*c^6*e*h*1 + 33408*a^6*b*c^6*f*h*k - 9216*a^6*b*c^6* \\
& g*h*j - 64512*a^6*b*c^6*d*j*1 - 18432*a^6*b*c^6*e*j*k + 18*a^2*b^10*c*d*k*m
\end{aligned}$$

$$\begin{aligned}
& + 6*a^3*b^9*c*f*k*m - 46080*a^7*b*c^5*e*l*m + 49920*a^7*b*c^5*f*k*m - 1536 \\
& 0*a^7*b*c^5*g*j*m - 9216*a^7*b*c^5*h*j*1 + 18*a^4*b^8*c*h*k*m - 15360*a^8*b \\
& *c^4*j*1*m - 6912*a^2*b^5*c^6*d*e*g + 62208*a^3*b^3*c^7*d*e*g - 270*a^2*b^6 \\
& *c^5*d*f*h + 16056*a^3*b^4*c^6*d*f*h - 2304*a^3*b^4*c^6*e*f*g - 127008*a^4* \\
& b^2*c^7*d*f*h + 36864*a^4*b^2*c^7*e*f*g + 2304*a^2*b^6*c^5*d*e*j - 16128*a^ \\
& 3*b^4*c^6*d*e*j + 23040*a^4*b^2*c^7*d*e*j - 6912*a^4*b^3*c^6*e*g*h + 306*a^ \\
& 2*b^7*c^4*d*f*k - 1152*a^2*b^7*c^4*d*g*j - 6912*a^3*b^5*c^5*d*e*1 - 5328*a^ \\
& 3*b^5*c^5*d*f*k + 8064*a^3*b^5*c^5*d*g*j + 768*a^3*b^5*c^5*e*f*j + 62208*a^ \\
& 4*b^3*c^6*d*e*1 + 19872*a^4*b^3*c^6*d*f*k - 11520*a^4*b^3*c^6*d*g*j - 10752 \\
& *a^4*b^3*c^6*e*f*j - 48*a^2*b^8*c^3*d*f*m - 216*a^2*b^8*c^3*d*h*k - 2226*a^ \\
& 3*b^6*c^4*d*f*m + 3456*a^3*b^6*c^4*d*g*1 + 1998*a^3*b^6*c^4*d*h*k - 384*a^3 \\
& *b^6*c^4*f*g*j + 33384*a^4*b^4*c^5*d*f*m - 31104*a^4*b^4*c^5*d*g*1 - 1944*a^ \\
& ^4*b^4*c^5*d*h*k - 2304*a^4*b^4*c^5*e*f*1 + 2304*a^4*b^4*c^5*e*h*j + 5376*a^ \\
& ^4*b^4*c^5*f*g*j - 162528*a^5*b^2*c^6*d*f*m + 96768*a^5*b^2*c^6*d*g*1 - 872 \\
& 64*a^5*b^2*c^6*d*h*k + 36864*a^5*b^2*c^6*e*f*1 + 27648*a^5*b^2*c^6*e*g*k + \\
& 13824*a^5*b^2*c^6*e*h*j + 12288*a^5*b^2*c^6*f*g*j - 72*a^2*b^9*c^2*d*h*m + \\
& 2016*a^3*b^7*c^3*d*h*m - 72*a^3*b^7*c^3*f*h*k - 18648*a^4*b^5*c^4*d*h*m + 1 \\
& 152*a^4*b^5*c^4*f*g*1 + 1800*a^4*b^5*c^4*f*h*k - 1152*a^4*b^5*c^4*g*h*j + 6 \\
& 7392*a^5*b^3*c^5*d*h*m - 2304*a^5*b^3*c^5*e*g*m - 6912*a^5*b^3*c^5*e*h*1 - \\
& 18432*a^5*b^3*c^5*f*g*1 + 27072*a^5*b^3*c^5*f*h*k - 6912*a^5*b^3*c^5*g*h*j \\
& - 1152*a^3*b^7*c^3*d*j*1 + 8064*a^4*b^5*c^4*d*j*1 - 11520*a^5*b^3*c^5*d*j*1 \\
& - 9216*a^5*b^3*c^5*e*j*k - 24*a^3*b^8*c^2*f*h*m + 1050*a^4*b^6*c^3*f*h*m - \\
& 9576*a^5*b^4*c^4*f*h*m + 3456*a^5*b^4*c^4*g*h*1 - 57504*a^6*b^2*c^5*f*h*m \\
& + 13824*a^6*b^2*c^5*g*h*1 - 432*a^3*b^8*c^2*d*k*m + 2394*a^4*b^6*c^3*d*k*m \\
& - 384*a^4*b^6*c^3*f*j*1 + 6552*a^5*b^4*c^4*d*k*m + 768*a^5*b^4*c^4*e*j*m + \\
& 5376*a^5*b^4*c^4*f*j*1 + 4608*a^5*b^4*c^4*g*j*k - 114336*a^6*b^2*c^5*d*k*m \\
& + 16896*a^6*b^2*c^5*e*j*m + 27648*a^6*b^2*c^5*e*k*1 + 12288*a^6*b^2*c^5*f*j \\
& *1 + 9216*a^6*b^2*c^5*g*j*k - 186*a^4*b^7*c^2*f*k*m - 384*a^5*b^5*c^3*g*j*m \\
& - 1152*a^5*b^5*c^3*h*j*1 - 2304*a^6*b^3*c^4*e*1*m + 31584*a^6*b^3*c^4*f*k* \\
& m - 8448*a^6*b^3*c^4*g*j*m - 13824*a^6*b^3*c^4*g*k*1 - 6912*a^6*b^3*c^4*h*j \\
& *1 + 342*a^5*b^6*c^2*h*k*m + 1152*a^6*b^4*c^3*g*1*m - 12600*a^6*b^4*c^3*h*k \\
& *m + 23040*a^7*b^2*c^4*g*1*m - 37728*a^7*b^2*c^4*h*k*m + 4608*a^6*b^4*c^3*j \\
& *k*1 + 9216*a^7*b^2*c^4*j*k*1 - 384*a^6*b^5*c^2*j*1*m - 8448*a^7*b^3*c^3*j* \\
& 1*m)/(512*(4096*a^10*c^7 + a^4*b^12*c - 24*a^5*b^10*c^2 + 240*a^6*b^8*c^3 - \\
& 1280*a^7*b^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^6)) + (x*(13824*a^4*c \\
& ^9*e^3 + 512*a^7*c^6*j^3 - 54*b^7*c^6*d^2*e + 27*b^8*c^5*d^2*g + 13824*a^5* \\
& c^8*e^2*j + 4608*a^6*c^7*e*j^2 - 9*b^9*c^4*d^2*j + a^4*b^9*j*m^2 - 3*a^5*b^ \\
& 8*1*m^2 - 1728*a^4*b^3*c^6*g^3 + 64*a^4*b^6*c^3*j^3 + 384*a^5*b^4*c^4*j^3 + \\
& 768*a^6*b^2*c^5*j^3 - 1728*a^7*b^3*c^3*1^3 - 20160*a^4*c^9*d*e*f - 2880*a^ \\
& 5*c^8*e*f*h - 12096*a^5*c^8*d*e*k - 6720*a^5*c^8*d*f*j - 4800*a^6*c^7*e*f*m \\
& - 1728*a^6*c^7*e*h*k - 960*a^6*c^7*f*h*j - 4032*a^6*c^7*d*j*k - 2880*a^7*c \\
& ^6*e*k*m - 1600*a^7*c^6*f*j*m - 576*a^7*c^6*h*j*k - 960*a^8*c^5*j*k*m + 972 \\
& *a*b^5*c^7*d^2*e + 24192*a^3*b*c^9*d^2*e - 486*a*b^6*c^6*d^2*g + 6240*a^4*b \\
& *c^8*e*f^2 - 20736*a^4*b*c^8*e^2*g + 1728*a^5*b*c^7*e*h^2 + 144*a*b^7*c^5*d \\
& ^2*j + 8064*a^4*b*c^8*d^2*j + 27*a*b^8*c^4*d^2*1 + 2080*a^5*b*c^7*f^2*j + 2
\end{aligned}$$

$$\begin{aligned}
& 592a^6b^6c^6e^k^2 - 20736a^5b^6c^7e^2*1 - 2304a^6b^6c^6g*j^2 + 576a^6b^6c^6h^2*j + 3840a^7b^6c^5e*m^2 - 3a^4b^8c^6g*m^2 + 864a^7b^6c^5j*k^2 - 2304a^7b^6c^5j^2*1 - 32a^5b^7c^6j*m^2 + 1280a^8b^6c^4j*m^2 + 102a^6b^6c^6*1*m^2 - 7344a^2b^3c^8*d^2*e + 3672a^2b^4c^7*d^2*g - 6a^2b^5c^6e*f^2 - 12096a^3b^2c^8*d^2*g + 192a^3b^3c^7e*f^2 + 10368a^4b^2c^7e*g^2 + 3a^2b^6c^5f^2*g - 96a^3b^4c^6f^2*g - 3120a^4b^2c^7f^2*g + 1296a^4b^3c^6e*h^2 - 900a^2b^5c^6*d^2*j + 1584a^3b^3c^7*d^2*j + 6912a^4b^2c^7e^2*j + 1152a^4b^4c^5e*j^2 - 648a^4b^4c^5g*h^2 + 4608a^5b^2c^6e*j^2 - 864a^5b^2c^6g*h^2 - 486a^2b^6c^5*d^2*1 - a^2b^7c^4f^2*j + 3672a^3b^4c^6*d^2*1 + 30a^3b^5c^5f^2*j - 12096a^4b^2c^7*d^2*1 + 1104a^4b^3c^6f^2*j + 54a^4b^5c^4e*k^2 + 864a^5b^3c^5e*k^2 + 1728a^4b^4c^5g^2*j - 576a^4b^5c^4g*j^2 + 3456a^5b^2c^6g^2*j - 2304a^5b^3c^5g*j^2 + 10368a^6b^2c^5e*1^2 + 3a^3b^6c^4f^2*1 - 96a^4b^4c^5f^2*1 + 216a^4b^5c^4h^2*j - 27a^4b^6c^3g*k^2 + 6a^4b^7c^2e*m^2 - 3120a^5b^2c^6f^2*1 + 720a^5b^3c^5h^2*j - 432a^5b^4c^4g*k^2 - 204a^5b^5c^3e*m^2 - 1296a^6b^2c^5g*k^2 + 1488a^6b^3c^4e*m^2 - 5184a^5b^3c^5g^2*1 - 5184a^6b^3c^4g*1^2 - 648a^5b^4c^4h^2*1 + 102a^5b^6c^2g*m^2 - 864a^6b^2c^5h^2*1 - 744a^6b^4c^3g*m^2 - 1920a^7b^2c^4g*m^2 + 9a^4b^7c^2*j*k^2 + 162a^5b^5c^3j*k^2 + 720a^6b^3c^4j*k^2 - 576a^5b^5c^3j^2*1 - 2304a^6b^3c^4j^2*1 + 1728a^6b^4c^3j*1^2 + 3456a^7b^2c^4j*1^2 - 27a^5b^6c^2k^2*1 - 432a^6b^4c^3k^2*1 + 180a^6b^5c^2j*m^2 - 1296a^7b^2c^4k^2*1 + 1136a^7b^3c^3j*m^2 - 744a^7b^4c^2*1*m^2 - 1920a^8b^2c^3*1*m^2 - 36a*b^6c^6*d*e*f + 18a*b^7c^5*d*f*g + 15552a^4b^6c^8*d*e*h + 10080a^4b^6c^8*d*f*g - 6a*b^8c^4*d*f*j + 1440a^5b^6c^7*f*g*h + 21888a^5b^6c^7*d*e*m + 10080a^5b^6c^7*d*f*1 + 6048a^5b^6c^7*d*g*k + 5184a^5b^6c^7*d*h*j + 8064a^5b^6c^7*e*f*k - 13824a^5b^6c^7*e*g*j + 5184a^6b^6c^6*e*h*m + 2400a^6b^6c^6*f*g*m + 1440a^6b^6c^6*f*h*1 + 864a^6b^6c^6*g*h*k + 7296a^6b^6c^6*d*j*m + 6048a^6b^6c^6*d*k*1 - 13824a^6b^6c^6*e*j*1 + 2688a^6b^6c^6*f*j*k + 2400a^7b^6c^5f*1*m + 1440a^7b^6c^5g*k*m + 1728a^7b^6c^5h*j*m + 864a^7b^6c^5h*k*1 + 6a^4b^8c^6*j*k*m - 18a^5b^7c^6*k*1*m + 1440a^8b^6c^4k*1*m + 900a^2b^4c^7*d*e*f - 4896a^3b^2c^8*d*e*f - 108a^2b^5c^6*d*e*h - 450a^2b^5c^6*d*f*g + 2448a^3b^3c^7*d*f*g + 54a^2b^6c^5*d*g*h - 36a^3b^4c^6e*f*h - 7776a^4b^2c^7*d*g*h - 6048a^4b^2c^7e*f*h + 138a^2b^6c^5*d*f*j + 540a^3b^4c^6*d*e*k - 516a^3b^4c^6*d*f*j - 6048a^4b^2c^7*d*e*k - 4992a^4b^2c^7*d*f*j + 18a^3b^5c^5f*g*h + 3024a^4b^3c^6f*g*h + 18a^2b^7c^4*d*f*1 - 18a^2b^7c^4*d*h*j - 450a^3b^5c^5*d*f*1 - 270a^3b^5c^5*d*g*k - 36a^3b^5c^5*d*h*j - 2016a^4b^3c^6*d*e*m + 2448a^4b^3c^6*d*f*1 + 3024a^4b^3c^6*d*g*k + 2592a^4b^3c^6*d*h*j + 1440a^4b^3c^6e*f*k - 6912a^4b^3c^6e*g*j + 54a^3b^6c^4*d*h*1 - 6a^3b^6c^4f*h*j + 1008a^4b^4c^5*d*g*m + 420a^4b^4c^5e*f*m - 540a^4b^4c^5e*h*k - 720a^4b^4c^5f*g*k - 1020a^4b^4c^5f*h*j - 10944a^5b^2c^6*d*g*m - 7776a^5b^2c^6*d*h*1 - 7392a^5b^2c^6e*f*m + 20736a^5b^2c^6e*g*1 - 4320a^5b^2c^6e*h*k - 4032a^5b^2c^6f*g*k - 2496a^5b^2c^6f*h*j + 90a^3b^6c^4*d*
\end{aligned}$$

$$\begin{aligned}
& j*k - 828*a^4*b^4*c^5*d*j*k - 4032*a^5*b^2*c^6*d*j*k - 180*a^4*b^5*c^4*e*h* \\
& m - 210*a^4*b^5*c^4*f*g*m + 18*a^4*b^5*c^4*f*h*1 + 270*a^4*b^5*c^4*g*h*k + \\
& 2880*a^5*b^3*c^5*e*h*m + 3696*a^5*b^3*c^5*f*g*m + 3024*a^5*b^3*c^5*f*h*1 + \\
& 2160*a^5*b^3*c^5*g*h*k - 336*a^4*b^5*c^4*d*j*m - 270*a^4*b^5*c^4*d*k*1 + 24 \\
& 0*a^4*b^5*c^4*f*j*k + 2976*a^5*b^3*c^5*d*j*m + 3024*a^5*b^3*c^5*d*k*1 - 691 \\
& 2*a^5*b^3*c^5*e*j*1 + 1824*a^5*b^3*c^5*f*j*k + 90*a^4*b^6*c^3*g*h*m - 1440* \\
& a^5*b^4*c^4*g*h*m - 2592*a^6*b^2*c^5*g*h*m + 36*a^4*b^6*c^3*e*k*m + 70*a^4* \\
& b^6*c^3*f*j*m - 90*a^4*b^6*c^3*h*j*k + 1008*a^5*b^4*c^4*d*1*m - 324*a^5*b^4 \\
& *c^4*e*k*m - 1092*a^5*b^4*c^4*f*j*m - 720*a^5*b^4*c^4*f*k*1 + 3456*a^5*b^4* \\
& c^4*g*j*1 - 900*a^5*b^4*c^4*h*j*k - 10944*a^6*b^2*c^5*d*1*m - 5472*a^6*b^2* \\
& c^5*e*k*m - 3264*a^6*b^2*c^5*f*j*m - 4032*a^6*b^2*c^5*f*k*1 + 6912*a^6*b^2* \\
& c^5*g*j*1 - 1728*a^6*b^2*c^5*h*j*k - 18*a^4*b^7*c^2*g*k*m - 30*a^4*b^7*c^2* \\
& h*j*m - 210*a^5*b^5*c^3*f*1*m + 162*a^5*b^5*c^3*g*k*m + 420*a^5*b^5*c^3*h*j \\
& *m + 270*a^5*b^5*c^3*h*k*1 + 3696*a^6*b^3*c^4*f*1*m + 2736*a^6*b^3*c^4*g*k* \\
& m + 1824*a^6*b^3*c^4*h*j*m + 2160*a^6*b^3*c^4*h*k*1 + 90*a^5*b^6*c^2*h*1*m \\
& - 1440*a^6*b^4*c^3*h*1*m - 2592*a^7*b^2*c^4*h*1*m - 42*a^5*b^6*c^2*j*k*m - \\
& 1020*a^6*b^4*c^3*j*k*m - 2304*a^7*b^2*c^4*j*k*m + 162*a^6*b^5*c^2*k*1*m + 2 \\
& 736*a^7*b^3*c^3*k*1*m)) / (64*(4096*a^10*c^7 + a^4*b^12*c - 24*a^5*b^10*c^2 + \\
& 240*a^6*b^8*c^3 - 1280*a^7*b^6*c^4 + 3840*a^8*b^4*c^5 - 6144*a^9*b^2*c^6)) \\
&) * \text{root}(56371445760*a^{11}*b^8*c^9*z^4 - 503316480*a^8*b^{14}*c^6*z^4 + 47185920 \\
& *a^7*b^{16}*c^5*z^4 - 2621440*a^6*b^{18}*c^4*z^4 + 65536*a^5*b^{20}*c^3*z^4 - 171 \\
& 798691840*a^{14}*b^2*c^{12}*z^4 + 193273528320*a^{13}*b^4*c^{11}*z^4 - 128849018880 \\
& *a^{12}*b^6*c^{10}*z^4 - 16911433728*a^{10}*b^{10}*c^8*z^4 + 3523215360*a^9*b^{12}*c^ \\
& 7*z^4 + 68719476736*a^{15}*c^{13}*z^4 + 1536*a^5*b^{16}*c*k*m*z^2 + 1536*a*b^{18}* \\
& c^3*d*f*z^2 - 2571632640*a^9*b^5*c^8*d*m*z^2 + 2548039680*a^9*b^3*c^{10}*d*h*z \\
& ^2 + 1509949440*a^{10}*b^3*c^9*e*1*z^2 + 1509949440*a^9*b^3*c^{10}*e*g*z^2 - 14 \\
& 01421824*a^8*b^5*c^9*d*h*z^2 - 1321205760*a^9*b^2*c^{11}*d*f*z^2 - 2793406464 \\
& *a^{11}*b*c^{10}*d*m*z^2 + 890634240*a^8*b^7*c^7*d*m*z^2 - 754974720*a^{10}*b^4*c \\
& ^8*g*1*z^2 - 754974720*a^9*b^5*c^8*e*1*z^2 + 719585280*a^8*b^6*c^8*d*k*z^2 \\
& - 707788800*a^9*b^4*c^9*d*k*z^2 - 754974720*a^8*b^5*c^9*e*g*z^2 + 603979776 \\
& *a^{11}*b^2*c^9*g*1*z^2 - 581959680*a^{10}*b^4*c^8*f*m*z^2 + 732168192*a^7*b^6* \\
& c^9*d*f*z^2 + 534773760*a^{11}*b^3*c^8*h*m*z^2 - 456130560*a^{11}*b^4*c^7*k*m*z \\
& ^2 - 603979776*a^{10}*b^2*c^{10}*e*j*z^2 + 534773760*a^{10}*b^3*c^9*f*k*z^2 + 384 \\
& 040960*a^9*b^6*c^7*f*m*z^2 + 377487360*a^9*b^6*c^7*g*1*z^2 - 456130560*a^9* \\
& b^4*c^9*f*h*z^2 + 301989888*a^{11}*b^3*c^8*j*1*z^2 - 415236096*a^{10}*b^2*c^{10} \\
& d*k*z^2 + 254017536*a^{10}*b^6*c^6*k*m*z^2 - 330301440*a^{10}*b^4*c^8*h*k*z^2 + \\
& 390463488*a^7*b^7*c^8*d*h*z^2 + 188743680*a^{12}*b^2*c^8*k*m*z^2 + 301989888 \\
& *a^{10}*b^3*c^9*g*j*z^2 - 297861120*a^7*b^8*c^7*d*k*z^2 - 366280704*a^6*b^8*c \\
& ^8*d*f*z^2 + 188743680*a^{11}*b^2*c^9*h*k*z^2 - 330301440*a^8*b^4*c^{10}*d*f*z^ \\
& 2 + 254017536*a^8*b^6*c^8*f*h*z^2 - 1887436800*a^{10}*b*c^{11}*d*h*z^2 + 188743 \\
& 680*a^8*b^7*c^7*e*1*z^2 + 153354240*a^9*b^6*c^7*h*k*z^2 - 185303040*a^7*b^9 \\
& *c^6*d*m*z^2 - 117964800*a^{10}*b^5*c^7*h*m*z^2 - 61931520*a^9*b^8*c^5*k*m*z^ \\
& 2 + 121634816*a^{11}*b^2*c^9*f*m*z^2 - 115671040*a^8*b^8*c^6*f*m*z^2 - 629145 \\
& 60*a^9*b^7*c^6*j*1*z^2 + 188743680*a^{10}*b^2*c^{10}*f*h*z^2 - 94371840*a^8*b^8 \\
& *c^6*g*1*z^2 + 6144000*a^8*b^{10}*c^4*k*m*z^2 - 117964800*a^9*b^5*c^8*f*k*z^2
\end{aligned}$$

$$\begin{aligned}
& + 61440a^7b^{12}c^3k^mz^2 - 46080a^6b^{14}c^2k^mz^2 + 23592960a^8b^9c^5j^1z^2 + 188743680a^7b^7c^8e^g^2z^2 - 37355520a^9b^7c^6h^mz^2 \\
& + 125829120a^8b^6c^8e^jz^2 + 23101440a^8b^9c^5h^mz^2 - 3538944a^7b^{11}c^4j^1z^2 + 196608a^6b^{13}c^3j^1z^2 - 4349952a^7b^{11}c^4h^mz^2 + 337920a^6b^{13}c^3h^mz^2 - 7680a^5b^{15}c^2h^mz^2 - 62914560a^8b^7c^7g^jz^2 - 26542080a^8b^8c^6h^kz^2 + 17940480a^7b^{10}c^5f^mz^2 + 11796480a^7b^{10}c^5g^1z^2 - 37355520a^8b^7c^7f^kz^2 - 1347584a^6b^{12}c^4f^mz^2 + 68272128a^6b^{10}c^6d^kz^2 - 589824a^6b^{12}c^4g^1z^2 + 552960a^6b^{12}c^4h^kz^2 - 147456a^7b^{10}c^5h^kz^2 - 46080a^5b^{14}c^3h^kz^2 + 35840a^5b^{14}c^3f^mz^2 + 23592960a^7b^9c^6g^jz^2 - 23592960a^7b^9c^6e^1z^2 + 23371776a^6b^{11}c^5d^mz^2 + 23101440a^7b^9c^6f^kz^2 - 47185920a^7b^8c^7e^jz^2 - 61931520a^7b^8c^7f^hz^2 - 4349952a^6b^{11}c^5f^kz^2 - 3538944a^6b^{11}c^5g^jz^2 - 1677312a^5b^{13}c^4d^mz^2 + 1179648a^6b^{11}c^5e^1z^2 + 337920a^5b^{13}c^4f^kz^2 + 196608a^5b^{13}c^4g^jz^2 + 53760a^4b^{15}c^3d^mz^2 - 7680a^4b^{15}c^3f^kz^2 + 96583680a^5b^{10}c^7d^fz^2 - 9179136a^5b^{12}c^5d^kz^2 + 7077888a^6b^{10}c^6e^jz^2 - 51609600a^6b^9c^7d^hz^2 + 691200a^4b^{14}c^4d^kz^2 - 393216a^5b^{12}c^5e^jz^2 - 23040a^3b^{16}c^3d^kz^2 + 6144000a^6b^{10}c^6f^hz^2 + 61440a^5b^{12}c^5f^hz^2 - 46080a^4b^{14}c^4f^hz^2 + 1536a^3b^{16}c^3f^hz^2 - 23592960a^6b^9c^7e^g^2z^2 + 1179648a^5b^{11}c^6e^g^2z^2 + 829440a^4b^{13}c^5d^hz^2 + 368640a^5b^{11}c^6d^hz^2 - 105984a^3b^{15}c^4d^hz^2 + 4608a^2b^{17}c^3d^hz^2 - 15175680a^4b^{12}c^6d^fz^2 + 1428480a^3b^{14}c^5d^fz^2 - 73728a^2b^{16}c^4d^fz^2 + 4108320768a^{10}b^3c^9d^mz^2 - 1207959552a^{11}b^c^{10}e^1z^2 - 1207959552a^{10}b^c^{11}e^g^2z^2 - 578813952a^{12}b^c^9h^mz^2 - 578813952a^{11}b^c^{10}f^kz^2 - 402653184a^{12}b^c^9j^1z^2 - 402653184a^{11}b^c^{10}g^jz^2 - 440401920a^{10}b^c^{11}f^2z^2 - 188743680a^{12}b^c^9k^2z^2 - 188743680a^{11}b^c^{10}h^2z^2 + 1761607680a^{10}c^{12}d^fz^2 - 14080a^6b^{15}c^m^2z^2 - 94464a^b^{17}c^4d^2z^2 + 6936330240a^8b^3c^{11}d^2z^2 + 2464874496a^6b^7c^9d^2z^2 - 3963617280a^9b^c^{12}d^2z^2 + 1056964608a^{11}c^{11}d^kz^2 + 805306368a^{11}c^{11}e^jz^2 + 419430400a^{12}c^{10}f^mz^2 + 251658240a^{13}c^9k^mz^2 - 1509949440a^9b^2c^{11}e^2z^2 + 251658240a^{11}c^{11}f^hz^2 + 150994944a^{12}c^{10}h^kz^2 - 5400428544a^7b^5c^{10}d^2z^2 + 754974720a^8b^4c^{10}e^2z^2 - 730054656a^5b^9c^8d^2z^2 + 477102080a^{12}b^3c^7m^2z^2 - 377487360a^{11}b^4c^7l^2z^2 + 477102080a^9b^3c^{10}f^2z^2 + 301989888a^{12}b^2c^8l^2z^2 - 377487360a^9b^4c^9g^2z^2 + 301989888a^{10}b^2c^{10}g^2z^2 - 174325760a^{11}b^5c^6m^2z^2 + 188743680a^{10}b^6c^6l^2z^2 + 141557760a^{11}b^3c^8k^2z^2 + 188743680a^8b^6c^8g^2z^2 + 141557760a^{10}b^3c^9h^2z^2 - 174325760a^8b^5c^9f^2z^2 - 188743680a^7b^6c^9e^2z^2 - 47185920a^9b^8c^5l^2z^2 + 11206656a^{10}b^7c^5m^2z^2 + 8929280a^9b^9c^4m^2z^2 - 2600960a^8b^{11}c^3m^2z^2 + 291840a^7b^{13}c^2m^2z^2 - 50331648a^{10}b^4c^8j^2z^2 + 146165760a^4b^{11}c^7d^2z^2 - 26542080a^9b^7c^6k^2z^2 + 5898240a^8b^{10}c^4l^2z^2 - 294912a^7b^{12}c^3l^2z^2 - 33554432a^{11}b^2c^9j^2z^2 + 9584640a^8b^9c^5k
\end{aligned}$$

$$\begin{aligned}
& ^2z^2 + 20971520a^9b^6c^7j^2z^2 - 2359296a^{10}b^5c^7k^2z^2 - 1290 \\
& 240a^7b^{11}c^4k^2z^2 + 46080a^6b^{13}c^3k^2z^2 + 2304a^5b^{15}c^2k \\
& ^2z^2 - 2752512a^7b^{10}c^5j^2z^2 + 2621440a^8b^8c^6j^2z^2 + 52428 \\
& 8a^6b^{12}c^4j^2z^2 - 32768a^5b^{14}c^3j^2z^2 - 47185920a^7b^8c^7* \\
& g^2z^2 - 26542080a^8b^7c^7h^2z^2 + 9584640a^7b^9c^6h^2z^2 - 2359 \\
& 296a^9b^5c^8h^2z^2 - 1290240a^6b^{11}c^5h^2z^2 + 46080a^5b^{13}c^4 \\
& *h^2z^2 + 2304a^4b^{15}c^3h^2z^2 + 5898240a^6b^{10}c^6g^2z^2 - 29491 \\
& 2a^5b^{12}c^5g^2z^2 + 11206656a^7b^7c^8f^2z^2 + 8929280a^6b^9c^7 \\
& *f^2z^2 + 23592960a^6b^8c^8e^2z^2 - 2600960a^5b^{11}c^6f^2z^2 + 29 \\
& 1840a^4b^{13}c^5f^2z^2 - 14080a^3b^{15}c^4f^2z^2 + 256a^2b^{17}c^3f \\
& ^2z^2 - 19860480a^3b^{13}c^6d^2z^2 - 1179648a^5b^{10}c^7e^2z^2 + 177 \\
& 1776a^2b^{15}c^5d^2z^2 - 440401920a^{13}b^c^8m^2z^2 + 1207959552a^{10} \\
& c^{12}e^2z^2 + 134217728a^{12}c^{10}j^2z^2 + 256a^5b^{17}m^2z^2 + 2304b^ \\
& ^{19}c^3d^2z^2 - 23592960a^{10}b^c^8f^*k^*l^*z + 99090432a^9b^c^9d^*h^*l^*z + \\
& 9437184a^{10}b^c^8e^*k^*m^*z + 23592960a^{10}b^c^8g^*h^*m^*z + 141557760a^8b \\
& ^c^{10}d^*e^*k^*z + 47185920a^9b^c^9d^*j^*k^*z - 23592960a^9b^c^9f^*g^*k^*z + 1 \\
& 69869312a^7b^c^{11}d^*e^*f^*z + 99090432a^8b^c^{10}d^*g^*h^*z - 3145728a^9b^c^ \\
& ^9f^*h^*j^*z + 56623104a^8b^c^{10}d^*f^*j^*z + 1536a^*b^{15}c^3d^*f^*j^*z - 943718 \\
& 4a^8b^c^{10}e^*f^*h^*z - 4608a^*b^{14}c^4d^*f^*g^*z + 9216a^*b^{13}c^5d^*e^*f^*z + \\
& 412876800a^8b^2c^9d^*e^*m^*z - 206438400a^9b^3c^7d^*l^*m^*z + 5898240a^1 \\
& 0b^4c^5k^*l^*m^*z - 206438400a^8b^3c^8d^*g^*m^*z - 4718592a^{11}b^2c^6k^* \\
& l^*m^*z - 2949120a^9b^6c^4k^*l^*m^*z + 737280a^8b^8c^3k^*l^*m^*z - 92160a^ \\
& 7b^{10}c^2k^*l^*m^*z + 103219200a^8b^5c^6d^*l^*m^*z - 29491200a^{10}b^3c^6* \\
& h^*l^*m^*z - 206438400a^7b^4c^8d^*e^*m^*z - 2359296a^{10}b^3c^6j^*k^*m^*z + 49 \\
& 1520a^8b^7c^4j^*k^*m^*z - 184320a^7b^9c^3j^*k^*m^*z + 27648a^6b^{11}c^2* \\
& j^*k^*m^*z + 14745600a^9b^5c^5h^*l^*m^*z - 3686400a^8b^7c^4h^*l^*m^*z + 4608 \\
& 00a^7b^9c^3h^*l^*m^*z - 23040a^6b^{11}c^2h^*l^*m^*z + 88473600a^8b^4c^7* \\
& d^*k^*l^*z + 82575360a^9b^2c^8d^*j^*m^*z + 11796480a^{10}b^2c^7h^*j^*m^*z + 58 \\
& 98240a^9b^4c^6g^*k^*m^*z - 4718592a^{10}b^2c^7g^*k^*m^*z - 70778880a^9b^2 \\
& ^c^8d^*k^*l^*z - 2949120a^8b^6c^5g^*k^*m^*z - 2457600a^8b^6c^5h^*j^*m^*z + \\
& 921600a^7b^8c^4h^*j^*m^*z + 737280a^7b^8c^4g^*k^*m^*z - 138240a^6b^{10}c^ \\
& ^3h^*j^*m^*z - 92160a^6b^{10}c^3g^*k^*m^*z + 7680a^5b^{12}c^2h^*j^*m^*z + 4608* \\
& a^5b^{12}c^2g^*k^*m^*z + 29491200a^9b^3c^7f^*k^*l^*z - 176947200a^7b^3c^9 \\
& ^d^*e^*k^*z - 109707264a^8b^3c^8d^*h^*l^*z - 25804800a^7b^7c^5d^*l^*m^*z + 1 \\
& 03219200a^7b^5c^7d^*g^*m^*z + 219414528a^7b^2c^{10}d^*e^*h^*z - 14745600a^ \\
& 8b^5c^6f^*k^*l^*z - 29491200a^9b^3c^7g^*h^*m^*z - 11796480a^9b^3c^7e^*k^ \\
& ^*m^*z - 44236800a^7b^6c^6d^*k^*l^*z + 58982400a^9b^2c^8e^*h^*m^*z + 589824 \\
& 0a^8b^5c^6e^*k^*m^*z + 3686400a^7b^7c^5f^*k^*l^*z + 3225600a^6b^9c^4d^ \\
& ^*l^*m^*z - 1474560a^7b^7c^5e^*k^*m^*z - 460800a^6b^9c^4f^*k^*l^*z + 184320* \\
& a^6b^9c^4e^*k^*m^*z - 161280a^5b^{11}c^3d^*l^*m^*z + 23040a^5b^{11}c^3f^*k^* \\
& l^*z - 9216a^5b^{11}c^3e^*k^*m^*z + 14745600a^8b^5c^6g^*h^*m^*z + 110886912* \\
& a^7b^4c^8d^*f^*l^*z - 3686400a^7b^7c^5g^*h^*m^*z - 221773824a^6b^3c^{10} \\
& ^d^*e^*f^*z + 460800a^6b^9c^4g^*h^*m^*z - 17203200a^7b^6c^6d^*j^*m^*z - 23040 \\
& ^a^5b^{11}c^3g^*h^*m^*z - 29491200a^8b^4c^7e^*h^*m^*z - 11796480a^9b^2c^8 \\
& ^f^*j^*k^*z + 11059200a^6b^8c^5d^*k^*l^*z + 6451200a^6b^8c^5d^*j^*m^*z + 884
\end{aligned}$$

$73600a^7b^4c^8d^8g^8k^8z + 2457600a^7b^6c^6f^8j^8k^8z - 35389440a^8b^3c^8d^8j^8k^8z - 1382400a^5b^{10}c^4d^8k^8l^8z - 84934656a^8b^2c^9d^8f^8l^8z - 967680a^5b^{10}c^4d^8j^8m^8z - 921600a^6b^8c^5f^8j^8k^8z + 138240a^5b^{10}c^4f^8j^8k^8z + 69120a^4b^{12}c^3d^8k^8l^8z + 53760a^4b^{12}c^3d^8j^8m^8z - 7680a^4b^{12}c^3f^8j^8k^8z + 44236800a^7b^5c^7d^8h^8l^8z + 7372800a^7b^6c^6e^8h^8m^8z - 5898240a^8b^4c^7f^8h^8l^8z + 4718592a^9b^2c^8f^8h^8l^8z - 70778880a^8b^2c^9d^8g^8k^8z + 2949120a^7b^6c^6f^8h^8l^8z - 921600a^6b^8c^5e^8h^8m^8z - 737280a^6b^8c^5f^8h^8l^8z + 92160a^5b^{10}c^4f^8h^8l^8z + 46080a^5b^{10}c^4e^8h^8m^8z - 4608a^4b^{12}c^3f^8h^8l^8z + 29491200a^8b^3c^8f^8g^8k^8z - 109707264a^7b^3c^9d^8g^8h^8z - 25804800a^6b^7c^6d^8g^8m^8z - 58982400a^8b^2c^9e^8f^8k^8z - 58982400a^6b^6c^7d^8f^8l^8z + 7372800a^6b^7c^6d^8j^8k^8z + 88473600a^6b^5c^8d^8e^8k^8z - 2764800a^5b^9c^5d^8j^8k^8z + 51609600a^6b^6c^7d^8e^8m^8z + 414720a^4b^{11}c^4d^8j^8k^8z - 23040a^3b^{13}c^3d^8j^8k^8z - 14745600a^7b^5c^7f^8g^8k^8z - 44236800a^6b^6c^7d^8g^8k^8z - 6635520a^6b^7c^6d^8h^8l^8z + 40108032a^8b^2c^9d^8h^8j^8z + 3686400a^6b^7c^6f^8g^8k^8z + 3225600a^5b^9c^5d^8g^8m^8z + 2359296a^8b^3c^8f^8h^8j^8z - 491520a^6b^7c^6f^8h^8j^8z - 460800a^5b^9c^5f^8g^8k^8z - 276480a^5b^9c^5d^8h^8l^8z + 184320a^5b^9c^5f^8h^8j^8z + 179712a^4b^{11}c^4d^8h^8l^8z - 161280a^4b^{11}c^4d^8g^8m^8z - 27648a^4b^{11}c^4f^8h^8j^8z + 23040a^4b^{11}c^4f^8g^8k^8z - 13824a^3b^{13}c^3d^8h^8l^8z + 1536a^3b^{13}c^3f^8h^8j^8z + 29491200a^7b^4c^8e^8f^8k^8z + 110886912a^6b^4c^9d^8f^8g^8z + 16220160a^5b^8c^6d^8f^8l^8z - 45613056a^7b^3c^9d^8f^8j^8z + 11059200a^5b^8c^6d^8g^8k^8z - 10321920a^6b^6c^7d^8h^8j^8z - 7372800a^6b^6c^7e^8f^8k^8z + 7077888a^7b^4c^8d^8h^8j^8z - 6451200a^5b^8c^6d^8e^8m^8z - 88473600a^6b^4c^9d^8e^8h^8z + 2396160a^5b^8c^6d^8h^8j^8z - 2396160a^4b^{10}c^5d^8f^8l^8z - 1382400a^4b^{10}c^5d^8g^8k^8z - 84934656a^7b^2c^{10}d^8f^8g^8z + 921600a^5b^8c^6e^8f^8k^8z + 117964800a^5b^5c^9d^8e^8f^8z + 322560a^4b^{10}c^5d^8e^8m^8z + 175104a^3b^{12}c^4d^8f^8l^8z + 69120a^3b^{12}c^4d^8g^8k^8z - 50688a^3b^{12}c^4d^8h^8j^8z - 46080a^4b^{10}c^5e^8f^8k^8z - 27648a^4b^{10}c^5d^8h^8j^8z + 4608a^2b^{14}c^3d^8h^8j^8z - 4608a^2b^{14}c^3d^8f^8l^8z + 44236800a^6b^5c^8d^8g^8h^8z - 5898240a^7b^4c^8f^8g^8h^8z - 22118400a^5b^7c^7d^8e^8k^8z + 4718592a^8b^2c^9f^8g^8h^8z + 2949120a^6b^6c^7f^8g^8h^8z - 737280a^5b^8c^6f^8g^8h^8z + 92160a^4b^{10}c^5f^8g^8h^8z - 4608a^3b^{12}c^4f^8g^8h^8z + 8847360a^5b^7c^7d^8f^8j^8z - 58982400a^5b^6c^8d^8f^8g^8z - 3809280a^4b^9c^6d^8f^8j^8z + 2764800a^4b^9c^6d^8e^8k^8z + 2359296a^6b^5c^8d^8f^8j^8z + 681984a^3b^{11}c^5d^8f^8j^8z - 138240a^3b^{11}c^5d^8e^8k^8z - 55296a^2b^{13}c^4d^8f^8j^8z + 11796480a^7b^3c^9e^8f^8h^8z - 6635520a^5b^7c^7d^8g^8h^8z - 5898240a^6b^5c^8e^8f^8h^8z + 1474560a^5b^7c^7e^8f^8h^8z - 276480a^4b^9c^6d^8g^8h^8z - 184320a^4b^9c^6e^8f^8h^8z + 179712a^3b^{11}c^5d^8g^8h^8z - 13824a^2b^{13}c^4d^8g^8h^8z + 9216a^3b^{11}c^5e^8f^8h^8z + 16220160a^4b^8c^7d^8f^8g^8z + 13271040a^5b^6c^8d^8e^8h^8z - 2396160a^3b^{10}c^6d^8f^8g^8z + 552960a^4b^8c^7d^8e^8h^8z - 359424a^3b^{10}c^6d^8e^8h^8z + 175104a^2b^{12}c^5d^8f^8g^8z + 27648a^2b^{12}c^5d^8e^8h^8z - 32440320a^4b^7c^8d^8e^8f^8z + 4792320a^3b^9c^7d^8e^8f^8z - 350208a^2b^{11}c^6d^8e^8f^8z + 165150720a^{10}b^8c^8d^8l^8m^8z + 4608a^6b^{12}c^8k^8l^8m^8z + 23592960a^{11}b^8c^7h^8l^8m^8z + 3145728a^{11}b^8c^7j^8k^8m^8z$

$$\begin{aligned}
& *z - 1536*a^5*b^{13}*c*j*k*m*z + 165150720*a^9*b*c^9*d*g*m*z + 346816512*a^7* \\
& b*c^{11}*d^2*g*z + 19660800*a^{12}*b*c^6*l*m^2*z - 34560*a^7*b^{11}*c*l*m^2*z - 7 \\
& 077888*a^{11}*b*c^7*k^2*l*z + 11008*a^6*b^{12}*c*j*m^2*z + 19660800*a^{11}*b*c^7* \\
& g*m^2*z + 7077888*a^{10}*b*c^8*h^2*l*z + 768*a^5*b^{13}*c*g*m^2*z - 19660800*a^ \\
& 9*b*c^9*f^2*l*z - 7077888*a^{10}*b*c^8*g*k^2*z - 6912*a*b^{15}*c^3*d^2*l*z + 70 \\
& 77888*a^9*b*c^9*g*h^2*z - 19660800*a^8*b*c^{10}*f^2*g*z - 66816*a*b^{14}*c^4*d^ \\
& 2*j*z + 214272*a*b^{13}*c^5*d^2*g*z - 428544*a*b^{12}*c^6*d^2*e*z - 330301440*a \\
& ^9*c^{10}*d*e*m*z - 110100480*a^{10}*c^9*d*j*m*z - 15728640*a^{11}*c^8*h*j*m*z - \\
& 47185920*a^{10}*c^9*e*h*m*z - 198180864*a^8*c^{11}*d*e*h*z + 15728640*a^{10}*c^9* \\
& f*j*k*z - 66060288*a^9*c^{10}*d*h*j*z + 47185920*a^9*c^{10}*e*f*k*z + 102275481 \\
& 6*a^6*b^2*c^{11}*d^2*e*z - 642318336*a^5*b^4*c^{10}*d^2*e*z - 511377408*a^7*b^3 \\
& *c^9*d^2*l*z - 511377408*a^6*b^3*c^{10}*d^2*g*z + 321159168*a^6*b^5*c^8*d^2*l \\
& *z + 321159168*a^5*b^5*c^9*d^2*g*z + 225312768*a^7*b^2*c^{10}*d^2*j*z - 25362 \\
& 432*a^{11}*b^3*c^5*l*m^2*z + 13271040*a^{10}*b^5*c^4*l*m^2*z - 3563520*a^9*b^7* \\
& c^3*l*m^2*z + 506880*a^8*b^9*c^2*l*m^2*z + 10354688*a^{11}*b^2*c^6*j*m^2*z + \\
& 8847360*a^{10}*b^3*c^6*k^2*l*z - 4423680*a^9*b^5*c^5*k^2*l*z - 2048000*a^9*b^ \\
& 6*c^4*j*m^2*z + 1105920*a^8*b^7*c^4*k^2*l*z + 849920*a^8*b^8*c^3*j*m^2*z - \\
& 393216*a^{10}*b^4*c^5*j*m^2*z - 145920*a^7*b^{10}*c^2*j*m^2*z - 138240*a^7*b^9* \\
& c^3*k^2*l*z + 6912*a^6*b^{11}*c^2*k^2*l*z - 111697920*a^5*b^7*c^7*d^2*l*z + 2 \\
& 23395840*a^4*b^6*c^9*d^2*e*z - 25362432*a^{10}*b^3*c^6*g*m^2*z - 3538944*a^{10} \\
& *b^2*c^7*j*k^2*z + 737280*a^8*b^6*c^5*j*k^2*z + 50724864*a^{10}*b^2*c^7*e*m^2 \\
& *z - 276480*a^7*b^8*c^4*j*k^2*z + 41472*a^6*b^{10}*c^3*j*k^2*z - 2304*a^5*b^1 \\
& 2*c^2*j*k^2*z + 13271040*a^9*b^5*c^5*g*m^2*z - 8847360*a^9*b^3*c^7*h^2*l*z \\
& + 4423680*a^8*b^5*c^6*h^2*l*z - 3563520*a^8*b^7*c^4*g*m^2*z - 1105920*a^7*b^ \\
& ^7*c^5*h^2*l*z + 506880*a^7*b^9*c^3*g*m^2*z + 138240*a^6*b^9*c^4*h^2*l*z - \\
& 34560*a^6*b^{11}*c^2*g*m^2*z - 6912*a^5*b^{11}*c^3*h^2*l*z - 26542080*a^9*b^4*c \\
& ^6*e*m^2*z + 25362432*a^8*b^3*c^8*f^2*l*z - 13271040*a^7*b^5*c^7*f^2*l*z + \\
& 8847360*a^9*b^3*c^7*g*k^2*z + 7127040*a^8*b^6*c^5*e*m^2*z - 4423680*a^8*b^5 \\
& *c^6*g*k^2*z + 3563520*a^6*b^7*c^6*f^2*l*z + 3538944*a^9*b^2*c^8*h^2*j*z + \\
& 1105920*a^7*b^7*c^5*g*k^2*z - 1013760*a^7*b^8*c^4*e*m^2*z - 737280*a^7*b^6* \\
& c^6*h^2*j*z - 506880*a^5*b^9*c^5*f^2*l*z + 276480*a^6*b^8*c^5*h^2*j*z - 138 \\
& 240*a^6*b^9*c^4*g*k^2*z + 69120*a^6*b^{10}*c^3*e*m^2*z - 41472*a^5*b^{10}*c^4*h \\
& ^2*j*z + 34560*a^4*b^{11}*c^4*f^2*l*z + 6912*a^5*b^{11}*c^3*g*k^2*z + 2304*a^4* \\
& b^{12}*c^3*h^2*j*z - 1536*a^5*b^{12}*c^2*e*m^2*z - 768*a^3*b^{13}*c^3*f^2*l*z - 1 \\
& 11697920*a^4*b^7*c^8*d^2*g*z + 23362560*a^4*b^9*c^6*d^2*l*z - 17694720*a^9* \\
& b^2*c^8*e*k^2*z - 10354688*a^8*b^2*c^9*f^2*j*z - 43646976*a^6*b^4*c^9*d^2*j \\
& *z + 8847360*a^8*b^4*c^7*e*k^2*z - 2965248*a^3*b^{11}*c^5*d^2*l*z - 2211840*a \\
& ^7*b^6*c^6*e*k^2*z + 2048000*a^6*b^6*c^7*f^2*j*z - 849920*a^5*b^8*c^6*f^2*j \\
& *z + 393216*a^7*b^4*c^8*f^2*j*z + 276480*a^6*b^8*c^5*e*k^2*z + 214272*a^2*b \\
& ^{13}*c^4*d^2*l*z + 145920*a^4*b^{10}*c^5*f^2*j*z - 13824*a^5*b^{10}*c^4*e*k^2*z \\
& - 11008*a^3*b^{12}*c^4*f^2*j*z + 256*a^2*b^{14}*c^3*f^2*j*z - 32587776*a^5*b^6* \\
& c^8*d^2*j*z - 8847360*a^8*b^3*c^8*g*h^2*z + 21657600*a^4*b^8*c^7*d^2*j*z + \\
& 4423680*a^7*b^5*c^7*g*h^2*z - 1105920*a^6*b^7*c^6*g*h^2*z + 138240*a^5*b^9* \\
& c^5*g*h^2*z - 6912*a^4*b^{11}*c^4*g*h^2*z + 25362432*a^7*b^3*c^9*f^2*g*z - 58 \\
& 10688*a^3*b^{10}*c^6*d^2*j*z + 17694720*a^8*b^2*c^9*e*h^2*z + 845568*a^2*b^{12}
\end{aligned}$$

$$\begin{aligned}
& *c^5*d^2*j*z - 50724864*a^7*b^2*c^10*e*f^2*z - 13271040*a^6*b^5*c^8*f^2*g*z \\
& - 8847360*a^7*b^4*c^8*e*h^2*z + 3563520*a^5*b^7*c^7*f^2*g*z + 2211840*a^6* \\
& b^6*c^7*e*h^2*z - 506880*a^4*b^9*c^6*f^2*g*z - 276480*a^5*b^8*c^6*e*h^2*z + \\
& 34560*a^3*b^11*c^5*f^2*g*z + 13824*a^4*b^10*c^5*e*h^2*z - 768*a^2*b^13*c^4 \\
& *f^2*g*z + 26542080*a^6*b^4*c^9*e*f^2*z + 23362560*a^3*b^9*c^7*d^2*g*z - 46 \\
& 725120*a^3*b^8*c^8*d^2*e*z - 7127040*a^5*b^6*c^8*e*f^2*z - 2965248*a^2*b^11 \\
& *c^6*d^2*g*z + 1013760*a^4*b^8*c^7*e*f^2*z - 69120*a^3*b^10*c^6*e*f^2*z + 1 \\
& 536*a^2*b^12*c^5*e*f^2*z + 5930496*a^2*b^10*c^7*d^2*e*z + 346816512*a^8*b*c \\
& ^10*d^2*l*z - 693633024*a^7*c^12*d^2*e*z - 231211008*a^8*c^11*d^2*j*z + 768 \\
& *a^6*b^13*l*m^2*z - 13107200*a^12*c^7*j*m^2*z - 256*a^5*b^14*j*m^2*z + 4718 \\
& 592*a^11*c^8*j*k^2*z - 39321600*a^11*c^8*e*m^2*z - 4718592*a^10*c^9*h^2*j*z \\
& + 14155776*a^10*c^9*e*k^2*z + 13107200*a^9*c^10*f^2*j*z + 2304*b^16*c^3*d^ \\
& 2*j*z - 14155776*a^9*c^10*e*h^2*z + 39321600*a^8*c^11*e*f^2*z - 6912*b^15*c \\
& ^4*d^2*g*z + 13824*b^14*c^5*d^2*e*z + 737280*a^10*b*c^5*j*k*l*m - 2304*a^6* \\
& b^9*c*j*k*l*m + 2211840*a^9*b*c^6*e*k*l*m + 1228800*a^9*b*c^6*f*j*l*m + 737 \\
& 280*a^9*b*c^6*g*j*k*m + 442368*a^9*b*c^6*h*j*k*l + 36*a^3*b^12*c*f*h*k*m + \\
& 3096576*a^8*b*c^7*d*j*k*l - 12745728*a^8*b*c^7*d*h*k*m + 3686400*a^8*b*c^7* \\
& e*f*l*m + 3391488*a^8*b*c^7*e*h*j*m + 2211840*a^8*b*c^7*e*g*k*m + 1327104*a \\
& ^8*b*c^7*e*h*k*l + 1228800*a^8*b*c^7*f*g*j*m + 737280*a^8*b*c^7*f*h*j*l + 4 \\
& 42368*a^8*b*c^7*g*h*j*k + 108*a^2*b^13*c*d*h*k*m + 16367616*a^7*b*c^8*d*e*j \\
& *m + 9289728*a^7*b*c^8*d*e*k*l + 5160960*a^7*b*c^8*d*f*j*l + 3391488*a^7*b* \\
& c^8*e*f*j*k + 3096576*a^7*b*c^8*d*g*j*k - 19307520*a^7*b*c^8*d*f*h*m + 3686 \\
& 400*a^7*b*c^8*e*f*g*m + 2211840*a^7*b*c^8*e*f*h*l + 1327104*a^7*b*c^8*e*g*h \\
& *k + 737280*a^7*b*c^8*f*g*h*j - 180*a*b^13*c^2*d*f*h*m - 540*a*b^12*c^3*d*f \\
& *h*k + 15482880*a^6*b*c^9*d*e*f*l + 11059200*a^6*b*c^9*d*e*h*j + 9289728*a^ \\
& 6*b*c^9*d*e*g*k + 5160960*a^6*b*c^9*d*f*g*j - 2304*a*b^11*c^4*d*f*g*j + 221 \\
& 1840*a^6*b*c^9*e*f*g*h + 4608*a*b^10*c^5*d*e*f*j + 15482880*a^5*b*c^10*d*e* \\
& f*g - 13824*a*b^9*c^6*d*e*f*g + 36*a*b^14*c*d*f*k*m + 1843200*a^9*b^3*c^4*j \\
& *k*l*m + 783360*a^8*b^5*c^3*j*k*l*m + 18432*a^7*b^7*c^2*j*k*l*m - 2211840*a \\
& ^8*b^4*c^4*g*k*l*m - 1695744*a^9*b^2*c^5*h*j*l*m - 1400832*a^8*b^4*c^4*h*j* \\
& l*m - 1105920*a^9*b^2*c^5*g*k*l*m - 253440*a^7*b^6*c^3*h*j*l*m - 69120*a^7* \\
& b^6*c^3*g*k*l*m + 11520*a^6*b^8*c^2*h*j*l*m + 6912*a^6*b^8*c^2*g*k*l*m + 44 \\
& 23680*a^8*b^3*c^5*e*k*l*m + 2506752*a^8*b^3*c^5*f*j*l*m + 1843200*a^8*b^3*c \\
& ^5*g*j*k*m + 1327104*a^8*b^3*c^5*h*j*k*l + 838656*a^7*b^5*c^4*f*j*l*m + 783 \\
& 360*a^7*b^5*c^4*g*j*k*m + 691200*a^7*b^5*c^4*h*j*k*l + 138240*a^7*b^5*c^4*e \\
& *k*l*m + 69120*a^6*b^7*c^3*h*j*k*l - 53760*a^6*b^7*c^3*f*j*l*m + 18432*a^6* \\
& b^7*c^3*g*j*k*m - 13824*a^6*b^7*c^3*e*k*l*m - 2304*a^5*b^9*c^2*g*j*k*m + 25 \\
& 43616*a^8*b^3*c^5*g*h*l*m + 829440*a^7*b^5*c^4*g*h*l*m - 34560*a^6*b^7*c^3* \\
& g*h*l*m - 8183808*a^8*b^2*c^6*d*j*l*m - 3686400*a^8*b^2*c^6*e*j*k*m - 22855 \\
& 68*a^7*b^4*c^5*d*j*l*m - 1695744*a^8*b^2*c^6*f*j*k*l - 1566720*a^7*b^4*c^5* \\
& e*j*k*m - 1400832*a^7*b^4*c^5*f*j*k*l + 741888*a^6*b^6*c^4*d*j*l*m - 253440 \\
& *a^6*b^6*c^4*f*j*k*l - 80640*a^5*b^8*c^3*d*j*l*m - 36864*a^6*b^6*c^4*e*j*k* \\
& m + 11520*a^5*b^8*c^3*f*j*k*l + 4608*a^5*b^8*c^3*e*j*k*m + 6700032*a^8*b^2* \\
& c^6*f*h*k*m + 5103360*a^7*b^4*c^5*f*h*k*m - 5087232*a^8*b^2*c^6*e*h*l*m - 2 \\
& 838528*a^7*b^4*c^5*f*g*l*m - 1843200*a^8*b^2*c^6*f*g*l*m - 1695744*a^8*b^2*
\end{aligned}$$

$c^6 g^h j^m - 1658880 a^7 b^4 c^5 g^h k^* l - 1658880 a^7 b^4 c^5 e^h l^* m - 1400832 a^7 b^4 c^5 g^h j^* m - 663552 a^8 b^2 c^6 g^h k^* l + 483840 a^6 b^6 c^4 f^h k^* m - 253440 a^6 b^6 c^4 g^h j^* m - 207360 a^6 b^6 c^4 g^h k^* l + 161280 a^6 b^6 c^4 f^g l^* m + 69120 a^6 b^6 c^4 e^h l^* m - 50040 a^5 b^8 c^3 f^h k^* m + 11520 a^5 b^8 c^3 g^h j^* m + 180 a^4 b^{10} c^2 f^h k^* m + 4202496 a^7 b^3 c^6 d^j k^* l + 635904 a^6 b^5 c^5 d^j k^* l - 276480 a^5 b^7 c^4 d^j k^* l + 34560 a^4 b^9 c^3 d^j k^* l - 16671744 a^7 b^3 c^6 d^h k^* m + 12275712 a^7 b^3 c^6 d^g l^* m + 5677056 a^7 b^3 c^6 e^f l^* m + 4423680 a^7 b^3 c^6 e^g k^* m + 3317760 a^7 b^3 c^6 e^h k^* l + 2801664 a^7 b^3 c^6 e^h j^* m - 2709504 a^6 b^5 c^5 d^g l^* m + 2543616 a^7 b^3 c^6 f^g k^* l + 2506752 a^7 b^3 c^6 f^g j^* m + 1843200 a^7 b^3 c^6 f^h j^* l + 1327104 a^7 b^3 c^6 g^h j^* k + 838656 a^6 b^5 c^5 f^g j^* m + 829440 a^6 b^5 c^5 f^g k^* l + 783360 a^6 b^5 c^5 f^h j^* l + 691200 a^6 b^5 c^5 g^h j^* k + 665280 a^5 b^7 c^4 d^h k^* m + 506880 a^6 b^5 c^5 e^h j^* m + 414720 a^6 b^5 c^5 e^h k^* l - 322560 a^6 b^5 c^5 e^f l^* m + 241920 a^5 b^7 c^4 d^g l^* m + 138240 a^6 b^5 c^5 e^g k^* m - 108540 a^4 b^9 c^3 d^h k^* m + 69120 a^5 b^7 c^4 g^h j^* k - 53760 a^5 b^7 c^4 f^g j^* m - 51840 a^6 b^5 c^5 d^h k^* m - 34560 a^5 b^7 c^4 f^g k^* l - 23040 a^5 b^7 c^4 e^h j^* m + 18432 a^5 b^7 c^4 f^h j^* l - 13824 a^5 b^7 c^4 e^g k^* m - 2304 a^4 b^9 c^3 f^h j^* l + 1296 a^3 b^{11} c^2 d^h k^* m + 31924224 a^7 b^2 c^7 d^f k^* m - 24551424 a^7 b^2 c^7 d^e l^* m + 10616832 a^7 b^2 c^7 e^g j^* l - 8183808 a^7 b^2 c^7 d^g j^* m - 5529600 a^7 b^2 c^7 d^h j^* l + 5419008 a^6 b^4 c^6 d^e l^* m + 5308416 a^6 b^4 c^6 e^g j^* l - 5087232 a^7 b^2 c^7 e^f k^* l - 5013504 a^7 b^2 c^7 e^f j^* m + 4868352 a^6 b^4 c^6 d^f k^* m - 4644864 a^7 b^2 c^7 d^g k^* l - 3981312 a^6 b^4 c^6 d^g k^* l - 2654208 a^7 b^2 c^7 e^h j^* k - 2367360 a^5 b^6 c^5 d^f k^* m - 2285568 a^6 b^4 c^6 d^g j^* m - 2211840 a^6 b^4 c^6 d^h j^* l - 1695744 a^7 b^2 c^7 f^g j^* k - 1677312 a^6 b^4 c^6 e^f j^* m - 1658880 a^6 b^4 c^6 e^f k^* l - 1400832 a^6 b^4 c^6 f^g j^* k - 1382400 a^6 b^4 c^6 e^h j^* k + 1036800 a^5 b^6 c^5 d^g k^* l + 741888 a^5 b^6 c^5 d^g j^* m - 483840 a^5 b^6 c^5 d^e l^* m + 317952 a^5 b^6 c^5 d^h j^* l + 268920 a^4 b^8 c^4 d^f k^* m - 253440 a^5 b^6 c^5 f^g j^* k - 138240 a^5 b^6 c^5 e^h j^* k + 107520 a^5 b^6 c^5 e^f j^* m - 103680 a^4 b^8 c^4 d^g k^* l - 80640 a^4 b^8 c^4 d^g j^* m + 69120 a^5 b^6 c^5 e^f k^* l + 11520 a^4 b^8 c^4 f^g j^* k + 6912 a^4 b^8 c^4 d^h j^* l - 6912 a^3 b^{10} c^3 d^h j^* l + 6120 a^3 b^{10} c^3 d^f k^* m - 1368 a^2 b^{12} c^2 d^f k^* m - 5087232 a^7 b^2 c^7 e^g h^* m - 2211840 a^6 b^4 c^6 f^g h^* l - 1658880 a^6 b^4 c^6 e^g h^* m - 1105920 a^7 b^2 c^7 f^g h^* l - 69120 a^5 b^6 c^5 f^g h^* l + 69120 a^5 b^6 c^5 e^g h^* m + 6912 a^4 b^8 c^4 f^g h^* l + 7962624 a^6 b^3 c^7 d^e k^* l - 22164480 a^6 b^3 c^7 d^f h^* m + 5160960 a^6 b^3 c^7 d^f j^* l + 4571136 a^6 b^3 c^7 d^e j^* m + 4202496 a^6 b^3 c^7 d^g j^* k + 2801664 a^6 b^3 c^7 e^f j^* k - 2073600 a^5 b^5 c^6 d^e k^* l - 1483776 a^5 b^5 c^6 d^e j^* m + 635904 a^5 b^5 c^6 d^g j^* k + 506880 a^5 b^5 c^6 e^f j^* k - 354816 a^4 b^7 c^5 d^f j^* l + 322560 a^5 b^5 c^6 d^f j^* l - 276480 a^4 b^7 c^5 d^g j^* k + 207360 a^4 b^7 c^5 d^e k^* l + 161280 a^4 b^7 c^5 d^e j^* m + 59904 a^3 b^9 c^4 d^f j^* l + 34560 a^3 b^9 c^4 d^g j^* k - 23040 a^4 b^7 c^5 e^f j^* k - 2304 a^2 b^{11} c^3 d^f j^* l + 8294400 a^6 b^3 c^7 d^g h^* l + 5677056 a^6 b^3 c^7 e^f g^* m + 4423680 a^6 b^3 c^7 e^f h^* l + 3317760 a^6 b^3 c^7 e^g h^* k + 2805120 a^5 b^5 c^6 d^f h^* m$

$$\begin{aligned}
& + 1843200*a^6*b^3*c^7*f*g*h*j - 829440*a^5*b^5*c^6*d*g*h*1 + 783360*a^5*b^5 \\
& *c^6*f*g*h*j + 437184*a^4*b^7*c^5*d*f*h*m + 414720*a^5*b^5*c^6*e*g*h*k - 32 \\
& 2560*a^5*b^5*c^6*e*f*g*m - 146268*a^3*b^9*c^4*d*f*h*m + 138240*a^5*b^5*c^6* \\
& e*f*h*1 - 62208*a^4*b^7*c^5*d*g*h*1 + 20736*a^3*b^9*c^4*d*g*h*1 + 18432*a^4 \\
& *b^7*c^5*f*g*h*j - 13824*a^4*b^7*c^5*e*f*h*1 + 9360*a^2*b^11*c^3*d*f*h*m - \\
& 2304*a^3*b^9*c^4*f*g*h*j - 8404992*a^6*b^2*c^8*d*e*j*k - 24551424*a^6*b^2*c^ \\
& ^8*d*e*g*m + 21150720*a^6*b^2*c^8*d*f*h*k - 1271808*a^5*b^4*c^7*d*e*j*k + 5 \\
& 52960*a^4*b^6*c^6*d*e*j*k - 69120*a^3*b^8*c^5*d*e*j*k - 16588800*a^6*b^2*c^ \\
& 8*d*e*h*1 - 7741440*a^6*b^2*c^8*d*f*g*1 + 6946560*a^5*b^4*c^7*d*f*h*k - 552 \\
& 9600*a^6*b^2*c^8*d*g*h*j + 5419008*a^5*b^4*c^7*d*e*g*m - 5087232*a^6*b^2*c^ \\
& 8*e*f*g*k - 3870720*a^5*b^4*c^7*d*f*g*1 - 3686400*a^6*b^2*c^8*e*f*h*j - 221 \\
& 1840*a^5*b^4*c^7*d*g*h*j - 1755648*a^4*b^6*c^6*d*f*h*k - 1658880*a^5*b^4*c^ \\
& 7*e*f*g*k + 1658880*a^5*b^4*c^7*d*e*h*1 - 1566720*a^5*b^4*c^7*e*f*h*j + 145 \\
& 1520*a^4*b^6*c^6*d*f*g*1 - 483840*a^4*b^6*c^6*d*e*g*m + 317952*a^4*b^6*c^6* \\
& d*g*h*j - 193536*a^3*b^8*c^5*d*f*g*1 + 124416*a^4*b^6*c^6*d*e*h*1 + 114696* \\
& a^3*b^8*c^5*d*f*h*k + 69120*a^4*b^6*c^6*e*f*g*k - 41472*a^3*b^8*c^5*d*e*h*1 \\
& - 36864*a^4*b^6*c^6*e*f*h*j + 14580*a^2*b^10*c^4*d*f*h*k + 6912*a^3*b^8*c^ \\
& 5*d*g*h*j - 6912*a^2*b^10*c^4*d*g*h*j + 6912*a^2*b^10*c^4*d*f*g*1 + 4608*a^ \\
& 3*b^8*c^5*e*f*h*j + 7962624*a^5*b^3*c^8*d*e*g*k + 7741440*a^5*b^3*c^8*d*e*f \\
& *1 + 5160960*a^5*b^3*c^8*d*f*g*j + 4423680*a^5*b^3*c^8*d*e*h*j - 2903040*a^ \\
& 4*b^5*c^7*d*e*f*1 - 2073600*a^4*b^5*c^7*d*e*g*k - 635904*a^4*b^5*c^7*d*e*h* \\
& j + 387072*a^3*b^7*c^6*d*e*f*1 - 354816*a^3*b^7*c^6*d*f*g*j + 322560*a^4*b^ \\
& 5*c^7*d*f*g*j + 207360*a^3*b^7*c^6*d*e*g*k + 59904*a^2*b^9*c^5*d*f*g*j - 13 \\
& 824*a^3*b^7*c^6*d*e*h*j + 13824*a^2*b^9*c^5*d*e*h*j - 13824*a^2*b^9*c^5*d*e \\
& *f*1 + 4423680*a^5*b^3*c^8*e*f*g*h + 138240*a^4*b^5*c^7*e*f*g*h - 13824*a^3 \\
& *b^7*c^6*e*f*g*h - 10321920*a^5*b^2*c^9*d*e*f*j + 709632*a^3*b^6*c^7*d*e*f* \\
& j - 645120*a^4*b^4*c^8*d*e*f*j - 119808*a^2*b^8*c^6*d*e*f*j - 16588800*a^5* \\
& b^2*c^9*d*e*g*h + 1658880*a^4*b^4*c^8*d*e*g*h + 124416*a^3*b^6*c^7*d*e*g*h \\
& - 41472*a^2*b^8*c^6*d*e*g*h + 7741440*a^4*b^3*c^9*d*e*f*g - 2903040*a^3*b^5 \\
& *c^8*d*e*f*g + 387072*a^2*b^7*c^7*d*e*f*g + 3456*a^7*b^8*c*k*1^2*m + 12672* \\
& a^7*b^8*c*j*1*m^2 + 384*a^5*b^10*c*j^2*k*m - 1635840*a^10*b*c^5*h*k*m^2 - 1 \\
& 009152*a^9*b*c^6*h^2*k*m + 3690*a^6*b^9*c*h*k*m^2 + 1152*a^6*b^9*c*g*1*m^2 \\
& - 540*a^5*b^10*c*h*k^2*m + 54*a^4*b^11*c*h^2*k*m + 565248*a^9*b*c^6*h*j^2*m \\
& - 39771648*a^7*b*c^8*d^2*k*m - 2496000*a^8*b*c^7*f^2*k*m - 1543680*a^9*b*c^ \\
& ^6*f*k^2*m + 1980*a^5*b^10*c*f*k*m^2 - 384*a^5*b^10*c*g*j*m^2 - 180*a^4*b^1 \\
& 1*c*f*k^2*m + 6*a^2*b^13*c*f^2*k*m - 10298880*a^9*b*c^6*d*k*m^2 + 2580480*a^ \\
& ^9*b*c^6*e*j*m^2 + 5310*a^4*b^11*c*d*k*m^2 - 1674*a*b^13*c^2*d^2*k*m - 540* \\
& a^3*b^12*c*d*k^2*m - 10616832*a^7*b*c^8*e^2*j*1 - 3538944*a^8*b*c^7*e*j^2*1 \\
& + 2727936*a^8*b*c^7*d*j^2*m - 2496000*a^9*b*c^6*f*h*m^2 - 1543680*a^8*b*c^ \\
& 7*f*h^2*m + 565248*a^8*b*c^7*f*j^2*k - 270*a^4*b^11*c*f*h*m^2 - 59512320*a^ \\
& 6*b*c^9*d^2*f*m + 5087232*a^7*b*c^8*e^2*h*m + 1105920*a^8*b*c^7*e*j*k^2 - 3 \\
& 456*a*b^12*c^3*d^2*j*1 - 1635840*a^7*b*c^8*f^2*h*k - 1009152*a^8*b*c^7*f*h* \\
& k^2 + 10260*a*b^12*c^3*d^2*h*m - 684*a^3*b^12*c*d*h*m^2 - 24675840*a^6*b*c^ \\
& 9*d^2*h*k - 15552000*a^8*b*c^7*d*f*m^2 + 24551424*a^6*b*c^9*d*e^2*m - 39398 \\
& 40*a^7*b*c^8*d*h^2*k + 1105920*a^7*b*c^8*e*h^2*j - 25074*a*b^11*c^4*d^2*f*m
\end{aligned}$$

$$\begin{aligned}
& + 10530*a*b^{11}*c^4*d^2*h*k + 10368*a*b^{11}*c^4*d^2*g*1 + 420*a*b^{12}*c^3*d*f \\
& ^2*m - 378*a^2*b^{13}*c*d*f*m^2 - 10616832*a^6*b*c^9*e^2*g*j + 5087232*a^6*b* \\
& c^9*e^2*f*k - 3538944*a^7*b*c^8*e*g*j^2 + 1843200*a^7*b*c^8*d*h*j^2 - 79948 \\
& 80*a^6*b*c^9*d*f^2*k - 4990464*a^7*b*c^8*d*f*k^2 + 2580480*a^6*b*c^9*e*f^2* \\
& j + 65664*a*b^{10}*c^5*d^2*g*j - 27972*a*b^{10}*c^5*d^2*f*k - 20736*a*b^{10}*c^5* \\
& d^2*e*1 + 1260*a*b^{11}*c^4*d*f^2*k + 54*a*b^{13}*c^2*d*f*k^2 + 23224320*a^5*b* \\
& c^{10}*d^2*e*j - 37062144*a^5*b*c^{10}*d^2*f*h + 384*a*b^{12}*c^3*d*f*j^2 - 13132 \\
& 8*a*b^9*c^6*d^2*e*j - 5985792*a^6*b*c^9*d*f*h^2 + 206010*a*b^9*c^6*d^2*f*h \\
& - 6300*a*b^{10}*c^5*d*f^2*h + 1350*a*b^{11}*c^4*d*f*h^2 + 16588800*a^5*b*c^{10}*d \\
& *e^2*h + 3456*a*b^{10}*c^5*d*f*g^2 + 435456*a*b^8*c^7*d^2*e*g + 13824*a*b^8*c \\
& ^7*d*e^2*f - 1474560*a^9*c^7*e*j*k*m + 460800*a^9*c^7*f*h*k*m + 3225600*a^8 \\
& *c^8*d*f*k*m - 2457600*a^8*c^8*e*f*j*m - 884736*a^8*c^8*e*h*j*k - 6193152*a \\
& ^7*c^9*d*e*j*k + 1935360*a^7*c^9*d*f*h*k - 1474560*a^7*c^9*e*f*h*j - 103219 \\
& 20*a^6*c^{10}*d*e*f*j - 1105920*a^9*b^4*c^3*k*1^2*m - 552960*a^{10}*b^2*c^4*k*1 \\
& ^2*m - 34560*a^8*b^6*c^2*k*1^2*m - 1290240*a^{10}*b^2*c^4*j*1*m^2 - 860160*a^ \\
& 9*b^4*c^3*j*1*m^2 - 80640*a^8*b^6*c^2*j*1*m^2 - 737280*a^9*b^2*c^5*j^2*k*m \\
& - 568320*a^8*b^4*c^4*j^2*k*m - 136704*a^7*b^6*c^3*j^2*k*m - 2304*a^6*b^8*c^ \\
& 2*j^2*k*m + 1271808*a^9*b^3*c^4*h*1^2*m - 552960*a^9*b^2*c^5*j*k^2*1 - 5529 \\
& 60*a^8*b^4*c^4*j*k^2*1 + 414720*a^8*b^5*c^3*h*1^2*m - 145152*a^7*b^6*c^3*j* \\
& k^2*1 - 17280*a^7*b^7*c^2*h*1^2*m - 3456*a^6*b^8*c^2*j*k^2*1 - 3640320*a^9* \\
& b^3*c^4*h*k*m^2 - 2626560*a^8*b^3*c^5*h^2*k*m + 2211840*a^9*b^2*c^5*h*k^2*m \\
& + 2056320*a^8*b^4*c^4*h*k^2*m + 1935360*a^9*b^3*c^4*g*1*m^2 - 1143360*a^8* \\
& b^5*c^3*h*k*m^2 - 1097280*a^7*b^5*c^4*h^2*k*m + 364608*a^7*b^6*c^3*h*k^2*m \\
& + 322560*a^8*b^5*c^3*g*1*m^2 - 56160*a^6*b^7*c^3*h^2*k*m - 40320*a^7*b^7*c^ \\
& 2*g*1*m^2 + 27936*a^7*b^7*c^2*h*k*m^2 - 3780*a^6*b^8*c^2*h*k^2*m + 2970*a^5 \\
& *b^9*c^2*h^2*k*m - 1419264*a^8*b^4*c^4*f*1^2*m - 1105920*a^7*b^4*c^5*g^2*k* \\
& m - 921600*a^9*b^2*c^5*f*1^2*m - 829440*a^8*b^4*c^4*h*k*1^2 + 749568*a^8*b^ \\
& 3*c^5*h*j^2*m - 552960*a^8*b^2*c^6*g^2*k*m - 331776*a^9*b^2*c^5*h*k*1^2 + 3 \\
& 17952*a^7*b^5*c^4*h*j^2*m - 103680*a^7*b^6*c^3*h*k*1^2 + 80640*a^7*b^6*c^3* \\
& f*1^2*m + 38400*a^6*b^7*c^3*h*j^2*m - 34560*a^6*b^6*c^4*g^2*k*m + 3456*a^5* \\
& b^8*c^3*g^2*k*m - 1920*a^5*b^9*c^2*h*j^2*m - 5142528*a^7*b^3*c^6*f^2*k*m + \\
& 5068800*a^9*b^2*c^5*f*k*m^2 - 3870720*a^9*b^2*c^5*e*1*m^2 - 3755520*a^8*b^3 \\
& *c^5*f*k^2*m + 3000960*a^8*b^4*c^4*f*k*m^2 - 1290240*a^9*b^2*c^5*g*j*m^2 - \\
& 1085760*a^7*b^5*c^4*f*k^2*m - 959040*a^6*b^5*c^5*f^2*k*m - 860160*a^8*b^4*c \\
& ^4*g*j*m^2 + 829440*a^8*b^3*c^5*g*k^2*1 - 645120*a^8*b^4*c^4*e*1*m^2 - 5529 \\
& 60*a^8*b^2*c^6*h^2*j*1 - 552960*a^7*b^4*c^5*h^2*j*1 + 414720*a^7*b^5*c^4*g* \\
& k^2*1 - 145152*a^6*b^6*c^4*h^2*j*1 + 103200*a^5*b^7*c^4*f^2*k*m - 80640*a^7 \\
& *b^6*c^3*g*j*m^2 + 80640*a^7*b^6*c^3*e*1*m^2 + 41280*a^7*b^6*c^3*f*k*m^2 - \\
& 37188*a^6*b^8*c^2*f*k*m^2 + 13536*a^6*b^7*c^3*f*k^2*m + 12672*a^6*b^8*c^2*g \\
& *j*m^2 + 10368*a^6*b^7*c^3*g*k^2*1 + 5490*a^5*b^9*c^2*f*k^2*m - 3456*a^5*b^ \\
& 8*c^3*h^2*j*1 - 2304*a^6*b^8*c^2*e*1*m^2 + 810*a^4*b^9*c^3*f^2*k*m - 270*a^ \\
& 3*b^{11}*c^2*f^2*k*m + 6137856*a^8*b^3*c^5*d*1^2*m - 4423680*a^7*b^2*c^7*e^2* \\
& k*m - 2654208*a^8*b^3*c^5*g*j*1^2 - 2654208*a^7*b^3*c^6*g^2*j*1 + 1769472*a \\
& ^8*b^2*c^6*g*j^2*1 + 1769472*a^7*b^4*c^5*g*j^2*1 - 1354752*a^7*b^5*c^4*d*1^ \\
& 2*m - 1327104*a^7*b^5*c^4*g*j*1^2 - 1327104*a^6*b^5*c^5*g^2*j*1 + 1271808*a
\end{aligned}$$

$$\begin{aligned}
& ^8b^3c^5f*k*1^2 - 1040384*a^8b^2c^6*f*j^2*m - 697344*a^7b^4c^5*f*j^2 \\
& *m - 516096*a^8b^2c^6*h*j^2*k - 451584*a^7b^4c^5*h*j^2*k + 442368*a^6b \\
& ^6c^4*g*j^2*1 + 414720*a^7b^5c^4*f*k*1^2 - 138240*a^6b^6c^4*h*j^2*k - \\
& 138240*a^6b^4c^6*e^2*k*m - 121856*a^6b^6c^4*f*j^2*m + 120960*a^6b^7c^ \\
& ^3*d*1^2*m - 17280*a^6b^7c^3*f*k*1^2 + 13824*a^5b^6c^5*e^2*k*m - 11520*a \\
& ^5b^8c^3*h*j^2*k + 8960*a^5b^8c^3*f*j^2*m + 10851840*a^8b^2c^6*d*k^2* \\
& m - 10464768*a^6b^3c^7*d^2*k*m - 10275840*a^8b^3c^5*d*k*m^2 + 7121088*a \\
& ^5b^5c^6*d^2*k*m + 3127680*a^7b^4c^5*d*k^2*m + 1720320*a^8b^3c^5*e*j* \\
& m^2 - 1658880*a^8b^2c^6*e*k^2*1 - 1290240*a^7b^2c^7*f^2*j*1 + 1271808*a \\
& ^7b^3c^6*g^2*h*m - 1222560*a^4b^7c^5*d^2*k*m + 999360*a^7b^5c^4*d*k*m \\
& ^2 - 860160*a^6b^4c^6*f^2*j*1 - 829440*a^7b^4c^5*e*k^2*1 - 705024*a^6b \\
& ^6c^4*d*k^2*m - 552960*a^8b^2c^6*g*j*k^2 - 552960*a^7b^4c^5*g*j*k^2 + \\
& 414720*a^6b^5c^5*g^2*h*m + 319392*a^6b^7c^3*d*k*m^2 + 161280*a^7b^5c^ \\
& ^4*e*j*m^2 - 145152*a^6b^6c^4*g*j*k^2 - 85734*a^5b^9c^2*d*k*m^2 - 80640* \\
& a^5b^6c^5*f^2*j*1 - 25344*a^6b^7c^3*e*j*m^2 + 23490*a^3b^9c^4*d^2*k*m \\
& - 20736*a^6b^6c^4*e*k^2*1 - 17280*a^5b^7c^4*g^2*h*m + 14148*a^5b^8c^ \\
& ^3*d*k^2*m + 13716*a^2b^11c^3*d^2*k*m + 12690*a^4b^10c^2*d*k^2*m + 12672 \\
& *a^4b^8c^4*f^2*j*1 - 3456*a^5b^8c^3*g*j*k^2 + 768*a^5b^9c^2*e*j*m^2 - \\
& 384*a^3b^10c^3*f^2*j*1 + 5308416*a^8b^2c^6*e*j*1^2 - 5308416*a^6b^3c \\
& ^7e^2*j*1 - 5142528*a^8b^3c^5*f*h*m^2 + 5068800*a^7b^2c^7*f^2*h*m - 37 \\
& 55520*a^7b^3c^6*f*h^2*m - 3538944*a^7b^3c^6*e*j^2*1 + 3000960*a^6b^4c \\
& ^6*f^2*h*m + 2654208*a^7b^4c^5*e*j*1^2 - 2322432*a^8b^2c^6*d*k*1^2 + 21 \\
& 25824*a^7b^3c^6*d*j^2*m - 1990656*a^7b^4c^5*d*k*1^2 - 1085760*a^6b^5c \\
& ^5*f*h^2*m - 959040*a^7b^5c^4*f*h*m^2 - 884736*a^6b^5c^5*e*j^2*1 + 8294 \\
& 40*a^7b^3c^6*g*h^2*1 + 749568*a^7b^3c^6*f*j^2*k + 518400*a^6b^6c^4*d* \\
& k*1^2 + 414720*a^6b^5c^5*g*h^2*1 + 317952*a^6b^5c^5*f*j^2*k + 133632*a^ \\
& 6b^5c^5*d*j^2*m + 103200*a^6b^7c^3*f*h*m^2 - 96768*a^5b^7c^4*d*j^2*m \\
& - 51840*a^5b^8c^3*d*k*1^2 + 41280*a^5b^6c^5*f^2*h*m + 38400*a^5b^7c^4 \\
& *f*j^2*k - 37188*a^4b^8c^4*f^2*h*m + 13536*a^5b^7c^4*f*h^2*m + 13440*a^ \\
& 4b^9c^3*d*j^2*m + 10368*a^5b^7c^4*g*h^2*1 + 5490*a^4b^9c^3*f*h^2*m + \\
& 1980*a^3b^10c^3*f^2*h*m - 1920*a^4b^9c^3*f*j^2*k + 810*a^5b^9c^2*f*h* \\
& m^2 - 180*a^3b^11c^2*f*h^2*m - 30*a^2b^12c^2*f^2*h*m + 30067200*a^6b^2 \\
& *c^8*d^2*h*m - 11612160*a^6b^2c^8*d^2*j*1 + 1658880*a^6b^3c^7e^2*h*m + \\
& 1596672*a^4b^6c^6*d^2*j*1 - 1419264*a^6b^4c^6*f*g^2*m - 1105920*a^7b^ \\
& 4c^5*f*h*1^2 + 1105920*a^7b^3c^6*e*j*k^2 - 921600*a^7b^2c^7*f*g^2*m - \\
& 829440*a^6b^4c^6*g^2*h*k - 552960*a^8b^2c^6*f*h*1^2 - 508032*a^3b^8c^ \\
& ^5*d^2*j*1 - 331776*a^7b^2c^7*g^2*h*k + 290304*a^6b^5c^5*e*j*k^2 - 10368 \\
& 0*a^5b^6c^5*g^2*h*k + 80640*a^5b^6c^5*f*g^2*m - 69120*a^5b^5c^6e^2*h \\
& *m + 65664*a^2b^10c^4*d^2*j*1 - 34560*a^6b^6c^4*f*h*1^2 + 6912*a^5b^7c \\
& ^4*e*j*k^2 + 3456*a^5b^8c^3*f*h*1^2 + 11930112*a^8b^2c^6*d*h*m^2 + 843 \\
& 2640*a^7b^2c^7*d*h^2*m + 4450176*a^7b^4c^5*d*h*m^2 + 4337280*a^6b^4c^ \\
& ^6*d*h^2*m - 3870720*a^8b^2c^6*e*g*m^2 - 3640320*a^6b^3c^7*f^2*h*k - 288 \\
& 5760*a^5b^4c^7*d^2*h*m - 2844288*a^4b^6c^6*d^2*h*m - 2626560*a^7b^3c^ \\
& ^6*f*h*k^2 + 2211840*a^7b^2c^7*f*h^2*k + 2056320*a^6b^4c^6*f*h^2*k + 193 \\
& 5360*a^6b^3c^7*f^2*g*1 - 1916928*a^7b^2c^7*d*j^2*k - 1687680*a^6b^6c^
\end{aligned}$$

$$\begin{aligned}
& 4*d*h*m^2 - 1658880*a^7*b^2*c^7*e*h^2*k - 1143360*a^5*b^5*c^6*f^2*h*k - 109 \\
& 7280*a^6*b^5*c^5*f*h*k^2 + 1019412*a^3*b^8*c^5*d^2*h*m - 1007424*a^5*b^6*c^ \\
& 5*d*h^2*m - 912384*a^6*b^4*c^6*d*j^2*k - 829440*a^6*b^4*c^6*e*h^2*k - 64512 \\
& 0*a^7*b^4*c^5*e*g*m^2 - 552960*a^7*b^2*c^7*g*h^2*j - 552960*a^6*b^4*c^6*g*h \\
& ^2*j + 364608*a^5*b^6*c^5*f*h^2*k + 322560*a^5*b^5*c^6*f^2*g*k + 197460*a^5 \\
& *b^8*c^3*d*h*m^2 - 145152*a^5*b^6*c^5*g*h^2*j - 143802*a^2*b^10*c^4*d^2*h*m \\
& + 80640*a^6*b^6*c^4*e*g*m^2 - 56160*a^5*b^7*c^4*f*h*k^2 + 51948*a^4*b^8*c^ \\
& 4*d*h^2*m - 40320*a^4*b^7*c^5*f^2*g*k + 34560*a^4*b^8*c^4*d*j^2*k + 27936*a \\
& ^4*b^7*c^5*f^2*h*k - 20736*a^5*b^6*c^5*e*h^2*k - 13824*a^5*b^6*c^5*d*j^2*k \\
& + 10800*a^3*b^10*c^3*d*h^2*m - 5760*a^3*b^10*c^3*d*j^2*k - 3780*a^4*b^8*c^4 \\
& *f*h^2*k + 3690*a^3*b^9*c^4*f^2*h*k - 3456*a^4*b^8*c^4*g*h^2*j + 2970*a^4*b \\
& ^9*c^3*f*h*k^2 - 2304*a^5*b^8*c^3*e*g*m^2 + 1152*a^3*b^9*c^4*f^2*g*k - 540* \\
& a^3*b^10*c^3*f*h^2*k - 540*a^2*b^12*c^2*d*h^2*m - 90*a^4*b^10*c^2*d*h*m^2 - \\
& 90*a^2*b^11*c^3*f^2*h*k + 54*a^3*b^11*c^2*f*h*k^2 + 15925248*a^6*b^2*c^8*e \\
& ^2*g*k - 7962624*a^7*b^3*c^6*e*g*k^2 - 7962624*a^6*b^3*c^7*e*g^2*k + 233856 \\
& 00*a^6*b^2*c^8*d*f^2*m + 6137856*a^6*b^3*c^7*d*g^2*m - 5677056*a^6*b^2*c^8* \\
& e^2*f*m + 4147200*a^7*b^3*c^6*d*h*k^2 - 3317760*a^6*b^2*c^8*e^2*h*k - 13547 \\
& 52*a^5*b^5*c^6*d*g^2*m + 1271808*a^6*b^3*c^7*f*g^2*k - 737280*a^7*b^2*c^7*f \\
& *h*j^2 + 17418240*a^5*b^3*c^8*d^2*g*k - 568320*a^6*b^4*c^6*f*h*j^2 - 414720 \\
& *a^6*b^5*c^5*d*h*k^2 + 414720*a^5*b^5*c^6*f*g^2*k - 414720*a^5*b^4*c^7*e^2* \\
& h*k + 322560*a^5*b^4*c^7*e^2*f*m - 136704*a^5*b^6*c^5*f*h*j^2 + 120960*a^4* \\
& b^7*c^5*d*g^2*m - 31104*a^5*b^7*c^4*d*h*k^2 - 17280*a^4*b^7*c^5*f*g^2*k + 1 \\
& 0368*a^4*b^9*c^3*d*h*k^2 - 2304*a^4*b^8*c^4*f*h*j^2 + 384*a^3*b^10*c^3*f*h* \\
& j^2 + 50042880*a^5*b^2*c^9*d^2*f*k - 13271040*a^5*b^3*c^8*d^2*h*k - 1314969 \\
& 6*a^7*b^3*c^6*d*f*m^2 + 10906560*a^4*b^5*c^7*d^2*f*m - 8709120*a^4*b^5*c^7* \\
& d^2*g*k - 7418880*a^5*b^3*c^8*d^2*f*m + 7133184*a^7*b^2*c^7*d*h*k^2 - 64281 \\
& 60*a^6*b^3*c^7*d*h^2*k + 5593536*a^4*b^5*c^7*d^2*h*k - 3870720*a^6*b^2*c^8* \\
& e*f^2*k + 3369600*a^6*b^4*c^6*d*h*k^2 + 3148992*a^6*b^5*c^5*d*f*m^2 - 29856 \\
& 96*a^3*b^7*c^6*d^2*f*m + 1959552*a^3*b^7*c^6*d^2*g*k - 1658880*a^7*b^2*c^7* \\
& e*g*k^2 - 1505280*a^4*b^6*c^6*d*f^2*m - 1290240*a^6*b^2*c^8*f^2*g*j - 34836 \\
& 480*a^5*b^2*c^9*d^2*e*k + 1105920*a^6*b^3*c^7*e*h^2*j - 860160*a^5*b^4*c^7* \\
& f^2*g*j - 829440*a^6*b^4*c^6*e*g*k^2 - 692064*a^3*b^7*c^6*d^2*h*k - 689472* \\
& a^5*b^5*c^6*d*h^2*k - 645120*a^5*b^4*c^7*e*f^2*k - 388800*a^5*b^6*c^5*d*h*k \\
& ^2 + 378954*a^2*b^9*c^5*d^2*f*m + 362880*a^5*b^4*c^7*d*f^2*m + 296964*a^3*b \\
& ^8*c^5*d*f^2*m + 290304*a^5*b^5*c^6*e*h^2*j + 277344*a^4*b^7*c^5*d*h^2*k - \\
& 217728*a^2*b^9*c^5*d^2*g*k - 80640*a^4*b^6*c^6*f^2*g*j + 80640*a^4*b^6*c^6* \\
& e*f^2*k - 77070*a^4*b^9*c^3*d*f*m^2 - 30240*a^5*b^7*c^4*d*f*m^2 - 28350*a^3 \\
& *b^9*c^4*d*h^2*k - 26406*a^2*b^9*c^5*d^2*h*k - 21060*a^4*b^8*c^4*d*h*k^2 - \\
& 20736*a^5*b^6*c^5*e*g*k^2 - 19278*a^2*b^10*c^4*d*f^2*m + 12672*a^3*b^8*c^5* \\
& f^2*g*j + 10044*a^3*b^10*c^3*d*h*k^2 + 8820*a^3*b^11*c^2*d*f*m^2 + 6912*a^4 \\
& *b^7*c^5*e*h^2*j - 2304*a^3*b^8*c^5*e*f^2*k - 1620*a^2*b^11*c^3*d*h^2*k - 3 \\
& 84*a^2*b^10*c^4*f^2*g*j + 162*a^2*b^12*c^2*d*h*k^2 - 5419008*a^5*b^3*c^8*d* \\
& e^2*m + 5308416*a^6*b^2*c^8*e*g^2*j - 5308416*a^5*b^3*c^8*e^2*g*j - 3870720 \\
& *a^7*b^2*c^7*d*f*k^2 - 3538944*a^6*b^3*c^7*e*g*j^2 + 2654208*a^5*b^4*c^7*e* \\
& g^2*j - 2322432*a^6*b^2*c^8*d*g^2*k - 1990656*a^5*b^4*c^7*d*g^2*k - 1935360
\end{aligned}$$

$$\begin{aligned}
& a^6 b^4 c^6 d f l^2 + 1658880 a^6 b^3 c^7 d h j^2 + 1658880 a^5 b^3 c^8 e^2 f k - 884736 a^5 b^5 c^6 e g j^2 + 725760 a^5 b^6 c^5 d f l^2 + 17418240 a^4 b^4 c^8 d^2 e l + 518400 a^4 b^6 c^6 d g^2 k + 483840 a^4 b^5 c^7 d e^2 m + 262656 a^5 b^5 c^6 d h j^2 - 96768 a^4 b^8 c^4 d f l^2 - 69120 a^4 b^5 c^7 e^2 f k - 55296 a^4 b^7 c^5 d h j^2 - 51840 a^3 b^8 c^5 d g^2 k + 3456 a^3 b^{10} c^3 d f l^2 + 1152 a^3 b^9 c^4 d h j^2 + 1152 a^2 b^{11} c^3 d h j^2 - 15431040 a^4 b^4 c^8 d^2 f k - 13248000 a^5 b^3 c^8 d f^2 k - 11612160 a^5 b^2 c^9 d^2 g j - 10063872 a^6 b^3 c^7 d f k^2 - 3919104 a^3 b^6 c^7 d^2 e l + 2554560 a^4 b^5 c^7 d f^2 k + 1720320 a^5 b^3 c^8 e f^2 j + 1596672 a^3 b^6 c^7 d^2 g j + 1518912 a^3 b^6 c^7 d^2 f k - 1105920 a^5 b^4 c^7 f g^2 h + 838080 a^5 b^5 c^6 d f k^2 - 552960 a^6 b^2 c^8 f g^2 h - 508032 a^2 b^8 c^6 d^2 g j + 435456 a^2 b^8 c^6 d^2 e l + 161280 a^4 b^5 c^7 e f^2 j + 116640 a^4 b^7 c^5 d f k^2 + 106812 a^2 b^8 c^6 d^2 f k - 98208 a^3 b^7 c^6 d f^2 k - 34560 a^4 b^6 c^6 f g^2 h - 27270 a^3 b^9 c^4 d f k^2 - 26334 a^2 b^9 c^5 d f^2 k - 25344 a^3 b^7 c^6 e f^2 j + 3456 a^3 b^8 c^5 f g^2 h + 768 a^2 b^9 c^5 e f^2 j - 702 a^2 b^{11} c^3 d f k^2 - 7962624 a^5 b^2 c^9 d e^2 k - 2580480 a^6 b^2 c^8 d f j^2 + 2073600 a^4 b^4 c^8 d e^2 k - 1658880 a^6 b^2 c^8 e g h^2 - 967680 a^5 b^4 c^7 d f j^2 - 829440 a^5 b^4 c^7 e g h^2 - 207360 a^3 b^6 c^7 d e^2 k + 64512 a^4 b^6 c^6 d f j^2 + 39168 a^3 b^8 c^5 d f j^2 - 20736 a^4 b^6 c^6 e g h^2 - 9216 a^2 b^{10} c^4 d f j^2 - 4423680 a^5 b^2 c^9 e^2 f h + 4147200 a^5 b^3 c^8 d g^2 h - 3193344 a^3 b^5 c^8 d^2 e j + 1016064 a^2 b^7 c^7 d^2 e j - 414720 a^4 b^5 c^7 d g^2 h - 138240 a^4 b^4 c^8 e^2 f h - 31104 a^3 b^7 c^6 d g^2 h + 13824 a^3 b^6 c^7 e^2 f h + 10368 a^2 b^9 c^5 d g^2 h + 15630336 a^5 b^2 c^9 d f^2 h - 14459904 a^4 b^3 c^9 d^2 f h + 9630144 a^3 b^5 c^8 d^2 f h - 8764416 a^5 b^3 c^8 d f h^2 - 3870720 a^5 b^2 c^9 e f^2 g + 2867328 a^4 b^4 c^8 d f^2 h - 2095200 a^2 b^7 c^7 d^2 f h - 1414080 a^3 b^6 c^7 d f^2 h - 34836480 a^4 b^2 c^{10} d^2 e g - 645120 a^4 b^4 c^8 e f^2 g + 306720 a^3 b^7 c^6 d f h^2 + 197820 a^2 b^8 c^6 d f^2 h + 146880 a^4 b^5 c^7 d f h^2 + 80640 a^3 b^6 c^7 e f^2 g - 55350 a^2 b^9 c^5 d f h^2 - 2304 a^2 b^8 c^6 e f^2 g - 3870720 a^5 b^2 c^9 d f g^2 - 1935360 a^4 b^4 c^8 d f g^2 - 1658880 a^4 b^3 c^9 d e^2 h + 725760 a^3 b^6 c^7 d f g^2 + 17418240 a^3 b^4 c^9 d^2 e g - 124416 a^3 b^5 c^8 d e^2 h - 96768 a^2 b^8 c^6 d f g^2 + 41472 a^2 b^7 c^7 d e^2 h - 3919104 a^2 b^6 c^8 d^2 e g - 7741440 a^4 b^2 c^{10} d e^2 f + 2903040 a^3 b^4 c^9 d e^2 f - 387072 a^2 b^6 c^8 d e^2 f - 20160 a^8 b^7 c^1 l^2 m^2 - 1648128 a^{10} b^3 c^3 k m^3 - 898560 a^9 b^3 c^4 k^3 m - 354240 a^9 b^5 c^2 k m^3 - 354240 a^8 b^5 c^3 k^3 m - 21600 a^7 b^7 c^2 k^3 m - 13950 a^7 b^8 c^2 k^2 m^2 + 430080 a^{10} b^3 c^5 j^2 m^2 - 1984 a^6 b^9 c^3 j^2 m^2 - 884736 a^9 b^3 c^4 j l^3 - 589824 a^8 b^3 c^5 j^3 l - 442368 a^8 b^5 c^3 j l^3 - 294912 a^7 b^5 c^4 j^3 l - 49152 a^6 b^7 c^3 j^3 l + 1359360 a^{10} b^2 c^4 h m^3 + 1173120 a^9 b^4 c^3 h m^3 + 743040 a^7 b^4 c^5 h^3 m + 622080 a^8 b^2 c^6 h^3 m + 184320 a^9 b^3 c^6 j^2 k^2 + 107136 a^6 b^6 c^4 h^3 m - 32640 a^8 b^6 c^2 h m^3 + 540 a^5 b^8 c^3 h^3 m - 270 a^4 b^{10} c^2 h^3 m - 180 a^5 b^{10} c^2 h^2 m^2 - 2293760 a^9 b^3 c^4 f m^3 - 2293760 a^6 b^3 c^7 f^3 m + 1327104 a^8 b^4 c^4 g l^3 + 1327104 a^6 b^4 c^6 g^3 l - 622080 a^8 b^3 c^5 h k^3 - 622080
\end{aligned}$$

$$\begin{aligned}
& *a^7*b^3*c^6*h^3*k - 326592*a^7*b^5*c^4*h*k^3 - 326592*a^6*b^5*c^5*h^3*k - \\
& 199360*a^8*b^5*c^3*f*m^3 - 199360*a^5*b^5*c^6*f^3*m + 61920*a^7*b^7*c^2*f*m \\
& ^3 + 61920*a^4*b^7*c^5*f^3*m - 38880*a^6*b^7*c^3*h*k^3 - 38880*a^5*b^7*c^4* \\
& h^3*k - 3682*a^3*b^9*c^4*f^3*m - 810*a^5*b^9*c^2*h*k^3 - 810*a^4*b^9*c^3*h^ \\
& 3*k - 70*a^3*b^12*c*f^2*m^2 + 70*a^2*b^11*c^3*f^3*m + 3870720*a^8*b*c^7*e^2 \\
& *m^2 + 184320*a^8*b*c^7*h^2*j^2 - 14152320*a^4*b^4*c^8*d^3*m + 10644480*a^5 \\
& *b^2*c^9*d^3*m + 5483520*a^9*b^2*c^5*d*m^3 + 4269888*a^3*b^6*c^7*d^3*m - 26 \\
& 54208*a^8*b^3*c^5*e^1^3 + 1359360*a^6*b^2*c^8*f^3*k + 1330560*a^8*b^4*c^4*d \\
& *m^3 + 1173120*a^5*b^4*c^7*f^3*k - 884736*a^6*b^3*c^7*g^3*j - 826560*a^7*b^ \\
& 6*c^3*d*m^3 + 743040*a^7*b^4*c^5*f*k^3 + 622080*a^8*b^2*c^6*f*k^3 - 607068* \\
& a^2*b^8*c^6*d^3*m - 589824*a^7*b^3*c^6*g*j^3 - 442368*a^5*b^5*c^6*g^3*j - 2 \\
& 94912*a^6*b^5*c^5*g*j^3 + 145188*a^6*b^8*c^2*d*m^3 + 107136*a^6*b^6*c^4*f*k \\
& ^3 - 49152*a^5*b^7*c^4*g*j^3 - 32640*a^4*b^6*c^6*f^3*k - 5796*a^3*b^8*c^5*f \\
& ^3*k + 540*a^5*b^8*c^3*f*k^3 - 270*a^4*b^10*c^2*f*k^3 + 210*a^2*b^10*c^4*f^ \\
& 3*k + 19077120*a^4*b^3*c^9*d^3*k + 1658880*a^7*b*c^8*e^2*k^2 + 430080*a^7*b \\
& *c^8*f^2*j^2 + 3538944*a^5*b^2*c^9*e^3*j - 2488320*a^7*b^3*c^6*d*k^3 - 2379 \\
& 456*a^3*b^5*c^8*d^3*k + 1179648*a^7*b^2*c^7*e*j^3 + 589824*a^6*b^4*c^6*e*j^ \\
& 3 + 98304*a^5*b^6*c^5*e*j^3 - 95904*a^2*b^7*c^7*d^3*k - 57024*a^6*b^5*c^5*d \\
& *k^3 + 49248*a^5*b^7*c^4*d*k^3 - 4050*a^4*b^9*c^3*d*k^3 - 810*a^3*b^11*c^2* \\
& d*k^3 - 486*a*b^12*c^3*d^2*k^2 + 3870720*a^6*b*c^9*d^2*j^2 - 1648128*a^5*b^ \\
& 3*c^8*f^3*h - 898560*a^6*b^3*c^7*f*h^3 - 354240*a^5*b^5*c^6*f*h^3 - 354240* \\
& a^4*b^5*c^7*f^3*h + 43680*a^3*b^7*c^6*f^3*h - 21600*a^4*b^7*c^5*f*h^3 - 979 \\
& 2*a*b^11*c^4*d^2*j^2 + 1350*a^3*b^9*c^4*f*h^3 - 1050*a^2*b^9*c^5*f^3*h + 16 \\
& 58880*a^6*b*c^9*e^2*h^2 + 16547328*a^4*b^2*c^10*d^3*h - 12306816*a^3*b^4*c^ \\
& 9*d^3*h + 37310976*a^3*b^3*c^10*d^3*f + 3037824*a^2*b^6*c^8*d^3*h - 2654208 \\
& *a^5*b^3*c^8*e*g^3 + 1949184*a^6*b^2*c^8*d*h^3 + 1296000*a^5*b^4*c^7*d*h^3 \\
& - 155520*a^4*b^6*c^6*d*h^3 - 40500*a*b^10*c^5*d^2*h^2 - 8100*a^3*b^8*c^5*d* \\
& h^3 + 4050*a^2*b^10*c^4*d*h^3 + 3870720*a^5*b*c^10*e^2*f^2 + 34836480*a^4*b \\
& *c^11*d^2*e^2 - 108864*a*b^9*c^6*d^2*g^2 - 8068032*a^2*b^5*c^9*d^3*f - 5623 \\
& 296*a^4*b^3*c^9*d*f^3 + 1737792*a^3*b^5*c^8*d*f^3 - 260190*a*b^8*c^7*d^2*f^ \\
& 2 - 211680*a^2*b^7*c^7*d*f^3 - 435456*a*b^7*c^8*d^2*e^2 - 245760*a^10*c^6*j \\
& ^2*k*m - 384*a^6*b^10*j^1*m^2 + 138240*a^10*c^6*h*k^2*m - 90*a^5*b^11*h*k*m \\
& ^2 + 384000*a^10*c^6*f*k*m^2 - 2211840*a^8*c^8*e^2*k*m - 409600*a^9*c^7*f*j \\
& ^2*m - 147456*a^9*c^7*h*j^2*k - 30*a^4*b^12*f*k*m^2 + 967680*a^9*c^7*d*k^2* \\
& m + 384000*a^8*c^8*f^2*h*m - 90*a^3*b^13*d*k*m^2 + 20321280*a^7*c^9*d^2*h*m \\
& - 883200*a^11*b*c^4*k*m^3 - 317952*a^10*b*c^5*k^3*m + 43680*a^8*b^7*c*k*m^ \\
& 3 + 1350*a^6*b^9*c*k^3*m - 270*b^14*c^2*d^2*h*m + 6*a^3*b^13*f*h*m^2 + 4838 \\
& 400*a^9*c^7*d*h*m^2 + 2903040*a^8*c^8*d*h^2*m - 1032192*a^8*c^8*d*j^2*k + 1 \\
& 38240*a^8*c^8*f*h^2*k - 3686400*a^7*c^9*e^2*f*m - 1327104*a^7*c^9*e^2*h*k - \\
& 393216*a^9*b*c^6*j^3*l - 245760*a^8*c^8*f*h*j^2 - 810*b^13*c^3*d^2*h*k + 6 \\
& 30*b^13*c^3*d^2*f*m + 18*a^2*b^14*d*h*m^2 + 2688000*a^7*c^9*d*f^2*m + 58060 \\
& 8*a^8*c^8*d*h*k^2 - 5796*a^7*b^8*c*h*m^3 - 3456*b^12*c^4*d^2*g*j + 1890*b^1 \\
& 2*c^4*d^2*f*k + 6773760*a^6*c^10*d^2*f*k - 1344000*a^10*b*c^5*f*m^3 - 13440 \\
& 00*a^7*b*c^8*f^3*m - 207360*a^9*b*c^6*h*k^3 - 207360*a^8*b*c^7*h^3*k - 3682 \\
& *a^6*b^9*c*f*m^3 - 9289728*a^6*c^10*d*e^2*k - 1720320*a^7*c^9*d*f*j^2 - 508
\end{aligned}$$

$$\begin{aligned}
& 03200*a^5*b*c^{10}*d^3*k + 6912*b^{11}*c^5*d^2*e*j - 10616832*a^6*b*c^9*e^3*l - \\
& 2211840*a^6*c^{10}*e^2*f*h - 393216*a^8*b*c^7*g*j^3 + 43416*a*b^{10}*c^5*d^3*m \\
& - 9576*a^5*b^{10}*c*d*m^3 - 9450*b^{11}*c^5*d^2*f*h - 504*a*b^{14}*c*d^2*m^2 + 1 \\
& 612800*a^6*c^{10}*d*f^2*h - 1036800*a^8*b*c^7*d*k^3 + 45198*a*b^9*c^6*d^3*k - \\
& 20736*b^{10}*c^6*d^2*e*g - 75188736*a^4*b*c^{11}*d^3*f - 883200*a^6*b*c^9*f^3* \\
& h - 317952*a^7*b*c^8*f*h^3 - 15482880*a^5*c^{11}*d*e^2*f - 10616832*a^5*b*c^{10} \\
& *e^3*g - 345060*a*b^8*c^7*d^3*h - 4262400*a^5*b*c^{10}*d*f^3 + 852768*a*b^7*c^8 \\
& *d^3*f + 7350*a*b^9*c^6*d*f^3 + 967680*a^{10}*b^3*c^3*l^2*m^2 + 161280*a^9*b^5 \\
& *c^2*l^2*m^2 + 1684224*a^{10}*b^2*c^4*k^2*m^2 + 1264320*a^9*b^4*c^3*k^2*m^2 + \\
& 126720*a^8*b^6*c^2*k^2*m^2 + 501760*a^9*b^3*c^4*j^2*m^2 + 414720*a^9*b^3*c^4*k^2 \\
& *l^2 + 207360*a^8*b^5*c^3*k^2*l^2 + 170240*a^8*b^5*c^3*j^2*m^2 + 9216*a^7*b^7*c^2 \\
& *j^2*m^2 + 5184*a^7*b^7*c^2*k^2*l^2 + 884736*a^9*b^2*c^5*j^2*l^2 + 884736*a^8*b^4 \\
& *c^4*j^2*l^2 + 221184*a^7*b^6*c^3*j^2*l^2 + 1419840*a^8*b^4*c^4*h^2*m^2 + 1387008 \\
& *a^9*b^2*c^5*h^2*m^2 + 276480*a^8*b^3*c^5*j^2*k^2 + 140544*a^7*b^5*c^4*j^2*k^2 + \\
& 84960*a^7*b^6*c^3*h^2*m^2 + 25344*a^6*b^7*c^3*j^2*k^2 - 8010*a^6*b^8*c^2*h^2*m^2 + \\
& 576*a^5*b^9*c^2*j^2*k^2 + 967680*a^8*b^3*c^5*g^2*m^2 + 414720*a^8*b^3*c^5*h^2*l^2 + \\
& 207360*a^7*b^5*c^4*h^2*l^2 + 161280*a^7*b^5*c^4*g^2*m^2 - 20160*a^6*b^7*c^3*g^2*m^2 + \\
& 5184*a^6*b^7*c^3*h^2*l^2 + 576*a^5*b^9*c^2*g^2*m^2 + 3808000*a^8*b^2*c^6*f^2*m^2 + \\
& 1990656*a^7*b^4*c^5*g^2*l^2 + 1643712*a^7*b^4*c^5*f^2*m^2 + 803520*a^7*b^4*c^5*h^2 \\
& *k^2 + 725760*a^8*b^2*c^6*h^2*k^2 + 207360*a^6*b^6*c^4*h^2*k^2 - 125440*a^6*b^6 \\
& *c^4*f^2*m^2 - 13790*a^5*b^8*c^3*f^2*m^2 + 10530*a^5*b^8*c^3*h^2*k^2 + 1785*a^4*b^{10} \\
& *c^2*f^2*m^2 + 81*a^4*b^{10}*c^2*h^2*k^2 + 18427392*a^7*b^2*c^7*d^2*m^2 + 967680*a^7 \\
& *b^3*c^6*f^2*l^2 + 645120*a^7*b^3*c^6*e^2*m^2 + 414720*a^7*b^3*c^6*g^2*k^2 + 276480 \\
& *a^7*b^3*c^6*h^2*j^2 + 207360*a^6*b^5*c^5*g^2*k^2 + 161280*a^6*b^5*c^5*f^2*l^2 + \\
& 140544*a^6*b^5*c^5*h^2*j^2 - 80640*a^6*b^5*c^5*e^2*m^2 + 25344*a^5*b^7*c^4*h^2*j^2 - \\
& 20160*a^5*b^7*c^4*f^2*l^2 + 5184*a^5*b^7*c^4*g^2*k^2 + 2304*a^5*b^7*c^4*e^2*m^2 + \\
& 576*a^4*b^9*c^3*f^2*l^2 + 7962624*a^7*b^2*c^7*e^2*l^2 - 4148928*a^6*b^4*c^6*d^2 \\
& *m^2 + 1419840*a^6*b^4*c^6*f^2*k^2 + 1387008*a^7*b^2*c^7*f^2*k^2 - 1183392*a^5*b^6 \\
& *c^5*d^2*m^2 + 884736*a^7*b^2*c^7*g^2*j^2 + 884736*a^6*b^4*c^6*g^2*j^2 + 645750*a^4 \\
& *b^8*c^4*d^2*m^2 + 221184*a^5*b^6*c^5*g^2*j^2 - 115920*a^3*b^{10}*c^3*d^2*m^2 + \\
& 84960*a^5*b^6*c^5*f^2*k^2 + 10836*a^2*b^{12}*c^2*d^2*m^2 - 8010*a^4*b^8*c^4*f^2*k^2 - \\
& 180*a^3*b^{10}*c^3*f^2*k^2 + 9*a^2*b^{12}*c^2*f^2*k^2 + 8709120*a^6*b^3*c^7*d^2 \\
& *l^2 - 4354560*a^5*b^5*c^6*d^2*l^2 + 979776*a^4*b^7*c^5*d^2*l^2 + 829440*a^6*b^3 \\
& *c^7*e^2*k^2 + 17480448*a^6*b^2*c^8*d^2*k^2 + 501760*a^6*b^3*c^7*f^2*j^2 + 170240 \\
& *a^5*b^5*c^6*f^2*j^2 - 108864*a^3*b^9*c^4*d^2*l^2 + 20736*a^5*b^5*c^6*e^2*k^2 + 9216*a^4 \\
& *b^7*c^5*f^2*j^2 + 5184*a^2*b^{11}*c^3*d^2*l^2 - 1984*a^3*b^9*c^4*f^2*j^2 + 64*a^2*b^{11} \\
& *c^3*f^2*j^2 + 3538944*a^6*b^2*c^8*e^2*j^2 - 3302208*a^5*b^4*c^7*d^2*k^2 + 884736 \\
& *a^5*b^4*c^7*e^2*j^2 + 414720*a^6*b^3*c^7*g^2*h^2 + 207360*a^5*b^5*c^6*g^2*h^2 - \\
& 103680*a^4*b^6*c^6*d^2*k^2 + 101250*a^3*b^8*c^5*d^2*k^2 - 5751*a^2*b^{10}*c^4*d^2 \\
& *k^2 + 5184*a^4*b^7*c^5*g^2*h^2 + 1935360*a^5*b^3*c^8*d^2*j^2 + 1684224*a^6*b^2 \\
& *c^8*f^2*h^2 + 1264320*a^5*b^4*c^7*f^2*h^2 - 532224*a^4*b^5*c^7*d^2*j^2 + 126720 \\
& *a^4*b^6*c^6*f^2*h^2 - 96768*a^3*b^7*c^6*d^2*j^2 + 62784
\end{aligned}$$

$$\begin{aligned}
& *a^2*b^9*c^5*d^2*j^2 - 13950*a^3*b^8*c^5*f^2*h^2 + 225*a^2*b^10*c^4*f^2*h^2 \\
& + 967680*a^5*b^3*c^8*f^2*g^2 + 829440*a^5*b^3*c^8*e^2*h^2 + 161280*a^4*b^5 \\
& *c^7*f^2*g^2 + 20736*a^4*b^5*c^7*e^2*h^2 - 20160*a^3*b^7*c^6*f^2*g^2 + 576* \\
& a^2*b^9*c^5*f^2*g^2 + 11487744*a^5*b^2*c^9*d^2*h^2 + 7962624*a^5*b^2*c^9*e^ \\
& 2*g^2 + 35525376*a^4*b^2*c^10*d^2*f^2 - 1412640*a^3*b^6*c^7*d^2*h^2 + 46137 \\
& 6*a^4*b^4*c^8*d^2*h^2 + 375030*a^2*b^8*c^6*d^2*h^2 + 8709120*a^4*b^3*c^9*d^ \\
& 2*g^2 - 4354560*a^3*b^5*c^8*d^2*g^2 + 979776*a^2*b^7*c^7*d^2*g^2 + 645120*a \\
& ^4*b^3*c^9*e^2*f^2 - 80640*a^3*b^5*c^8*e^2*f^2 + 2304*a^2*b^7*c^7*e^2*f^2 - \\
& 15269184*a^3*b^4*c^9*d^2*f^2 + 2870784*a^2*b^6*c^8*d^2*f^2 - 17418240*a^3* \\
& b^3*c^10*d^2*e^2 + 3919104*a^2*b^5*c^9*d^2*e^2 + 54*b^15*c*d^2*k*m + 6*a*b^ \\
& 15*d*f*m^2 + 115200*a^11*c^5*k^2*m^2 + 576*a^7*b^9*l^2*m^2 + 225*a^6*b^10*k \\
& ^2*m^2 + 64*a^5*b^11*j^2*m^2 + 345600*a^10*c^6*h^2*m^2 + 9*a^4*b^12*h^2*m^2 \\
& + 320000*a^9*c^7*f^2*m^2 + 41472*a^9*c^7*h^2*k^2 + 16934400*a^8*c^8*d^2*m^ \\
& 2 + 345600*a^8*c^8*f^2*k^2 + 81*b^14*c^2*d^2*k^2 + 3538944*a^7*c^9*e^2*j^2 \\
& + 2032128*a^7*c^9*d^2*k^2 + 492800*a^11*b^2*c^3*m^4 + 351456*a^10*b^4*c^2*m \\
& ^4 + 576*b^13*c^3*d^2*j^2 + 331776*a^9*b^4*c^3*l^4 + 115200*a^7*c^9*f^2*h^2 \\
& + 142560*a^8*b^4*c^4*k^4 + 103680*a^9*b^2*c^5*k^4 + 32400*a^7*b^6*c^3*k^4 \\
& + 2025*b^12*c^4*d^2*h^2 + 2025*a^6*b^8*c^2*k^4 + 6096384*a^6*c^10*d^2*h^2 + \\
& 131072*a^8*b^2*c^6*j^4 + 98304*a^7*b^4*c^5*j^4 + 32768*a^6*b^6*c^4*j^4 + 5 \\
& 184*b^11*c^5*d^2*g^2 + 4096*a^5*b^8*c^3*j^4 + 11025*b^10*c^6*d^2*f^2 + 5644 \\
& 800*a^5*c^11*d^2*f^2 + 142560*a^6*b^4*c^6*h^4 + 103680*a^7*b^2*c^7*h^4 + 32 \\
& 400*a^5*b^6*c^5*h^4 + 20736*b^9*c^7*d^2*e^2 + 2025*a^4*b^8*c^4*h^4 + 331776 \\
& *a^5*b^4*c^7*g^4 + 492800*a^5*b^2*c^9*f^4 + 351456*a^4*b^4*c^8*f^4 - 43120* \\
& a^3*b^6*c^7*f^4 + 1225*a^2*b^8*c^6*f^4 - 27433728*a^3*b^2*c^11*d^4 + 644630 \\
& 4*a^2*b^4*c^10*d^4 - 1050*a^7*b^9*k*m^3 + 384000*a^11*c^5*h*m^3 + 138240*a^ \\
& 9*c^7*h^3*m + 210*a^6*b^10*h*m^3 + 47416320*a^6*c^10*d^3*m - 1134*b^12*c^4* \\
& d^3*m + 70*a^5*b^11*f*m^3 + 2688000*a^10*c^6*d*m^3 + 384000*a^7*c^9*f^3*k + \\
& 138240*a^9*c^7*f*k^3 - 3402*b^11*c^5*d^3*k + 210*a^4*b^12*d*m^3 + 7077888* \\
& a^6*c^10*e^3*j + 786432*a^8*c^8*e*j^3 - 43120*a^9*b^6*c*m^4 + 28449792*a^5* \\
& c^11*d^3*h + 17010*b^10*c^6*d^3*h + 580608*a^7*c^9*d*h^3 - 39690*b^9*c^7*d^ \\
& 3*f - 734832*a*b^6*c^9*d^4 + 9*b^16*d^2*m^2 + 160000*a^12*c^4*m^4 + 1225*a^ \\
& 8*b^8*m^4 + 20736*a^10*c^6*k^4 + 65536*a^9*c^7*j^4 + 20736*a^8*c^8*h^4 + 49 \\
& 787136*a^4*c^12*d^4 + 160000*a^6*c^10*f^4 + 5308416*a^5*c^11*e^4 + 35721*b^ \\
& 8*c^8*d^4 + a^2*b^14*f^2*m^2, z, k1), k1, 1, 4) - ((8*a^2*c^2*g + a^2*b^2*l \\
& + b^3*c*e + 8*a^3*c*l - 10*a*b*c^2*e + a*b^2*c*g - 6*a^2*b*c*j)/(4*c*(b^4 \\
& + 16*a^2*c^2 - 8*a*b^2*c)) + (x^4*(b^4*l + 9*b^2*c^2*g + 16*a^2*c^2*l - 18* \\
& b*c^3*e - 3*b^3*c*j - 6*a*b*c^2*j + a*b^2*c*l))/(4*c*(b^4 + 16*a^2*c^2 - 8* \\
& a*b^2*c)) - (x^7*(3*b^3*c^2*d + 20*a^2*c^3*f + 12*a^3*c^2*k + a^2*b^3*m - 2 \\
& 4*a*b*c^3*d - 16*a^3*b*c*m + a*b^2*c^2*f - 12*a^2*b*c^2*h + 3*a^2*b^2*c*k)) \\
& /(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^2*(2*a^2*c^2*j - 2*b^2*c^2*e - \\
& 10*a*c^3*e + b^3*c*g + a*b^3*l + 5*a*b*c^2*g - 5*a*b^2*c*j + 5*a^2*b*c*l)) \\
& /(2*c*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (c*x^6*(6*c^2*e + b^2*j - 3*b*c*g + \\
& 2*a*c*j - 3*a*b*l))/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^3*(4*a^4*c^2*k \\
& - 36*a^3*c^3*f + 2*a^3*b^3*m - 3*b^5*c*d - 5*a^2*b^2*c^2*f - a*b^4*c*f + 2 \\
& 8*a^4*b*c*m + 20*a*b^3*c^2*d + 4*a^2*b*c^3*d + 5*a^2*b^3*c*h + 16*a^3*b*c^2
\end{aligned}$$

$$\begin{aligned} & *h - 19*a^3*b^2*c*k)) / (8*a^2*c*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x*(12*a^3 \\ & *c^2*h - 44*a^2*c^3*d + a^3*b^2*m - 5*b^4*c*d + 20*a^4*c*m + a*b^3*c*f - 12 \\ & *a^3*b*c*k + 37*a*b^2*c^2*d - 16*a^2*b*c^2*f + 3*a^2*b^2*c*h)) / (8*a*c*(b^4 \\ & + 16*a^2*c^2 - 8*a*b^2*c)) - (x^5*(28*a^2*c^4*d + 6*b^4*c^2*d + 4*a^3*c^3*h \\ & - a^2*b^4*m - 36*a^4*c^2*m - 19*a^2*b^2*c^2*h - 49*a*b^2*c^3*d + 2*a*b^3*c \\ & ^2*f + 28*a^2*b*c^3*f + 5*a^2*b^3*c*k + 16*a^3*b*c^2*k - 5*a^3*b^2*c*m)) / (8 \\ & *a^2*c*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) / (x^4*(2*a*c + b^2) + a^2 + c^2*x^8 \\ & + 2*a*b*x^2 + 2*b*c*x^6) \end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

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**4+b*x**2+a)**3,x)

[Out] Timed out

$$3.58 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5+jx^6+kx^7}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=645

$$\frac{x \left(x^2 (-ab^2j + bc(ah + cd) - 2ac(cf - aj)) + c \left(-\frac{ab(aj+cf)}{c} - 2a(cd - ah) + b^2d \right) \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right) \left(\frac{ab^2j}{c} + \frac{-ab^3j}{c} \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{2\sqrt{2}}{2\sqrt{2}}$$

[Out] $1/2*x*(c*(b^2*d-2*a*(-a*h+c*d)-a*b*(a*j+c*f)/c)+(b*c*(a*h+c*d)-a*b^2*j-2*a*c*(-a*j+c*f))*x^2/a/c/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*(-b*c*(a*i+c*e)+a*b^2*k+2*a*c*(-a*k+c*g)-(2*c^3*e-c^2*(2*a*i+b*g)-b^3*k+b*c*(3*a*k+b*i))*x^2/c^2/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*(4*c^3*e-c^2*(-4*a*i+2*b*g)+b^3*k-6*a*b*c*k)*\operatorname{arctanh}((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/c^2/(-4*a*c+b^2)^{(3/2)}+1/4*k*\ln(c*x^4+b*x^2+a)/c^2+1/4*\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)/(b-(-4*a*c+b^2)^{(1/2)})}^{(1/2)})*(b*(a*h+c*d)+a*b^2*j/c-2*a*(3*a*j+c*f)+(b^2*c*(-a*h+c*d)-4*a*c^2*(a*h+3*c*d)-a*b^3*j+4*a*b*c*(2*a*j+c*f))/c/(-4*a*c+b^2)^{(1/2)})/a/(-4*a*c+b^2)*2^{(1/2)}/c^{(1/2)/(b-(-4*a*c+b^2)^{(1/2)})}^{(1/2)}+1/4*\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)/(b+(-4*a*c+b^2)^{(1/2)})}^{(1/2)})*(b*(a*h+c*d)+a*b^2*j/c-2*a*(3*a*j+c*f)+(-b^2*c*(-a*h+c*d)+4*a*c^2*(a*h+3*c*d)+a*b^3*j-4*a*b*c*(2*a*j+c*f))/c/(-4*a*c+b^2)^{(1/2)})/a/(-4*a*c+b^2)*2^{(1/2)}/c^{(1/2)/(b+(-4*a*c+b^2)^{(1/2)})}^{(1/2)}$

Rubi [A] time = 3.37, antiderivative size = 645, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 10, integrand size = 50, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {1673, 1678, 1166, 205, 1663, 1660, 634, 618, 206, 628}

$$\frac{\tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right) \left(\frac{b^2c(cd-ah)-ab^3j+4abc(2aj+cf)-4ac^2(ah+3cd)}{c\sqrt{b^2-4ac}} + \frac{ab^2j}{c} + b(ah + cd) - 2a(3aj + cf) \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b^2 - 4ac + b}} \right)}{2\sqrt{2} a \sqrt{c} (b^2 - 4ac) \sqrt{b - \sqrt{b^2 - 4ac}}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5 + j*x^6 + k*x^7)/(a + b*x^2 + c*x^4)^2,x]

[Out] $(x*(c*(b^2*d - 2*a*(c*d - a*h) - (a*b*(c*f + a*j))/c) + (b*c*(c*d + a*h) - a*b^2*j - 2*a*c*(c*f - a*j))*x^2)/(2*a*c*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) - (b*c*(c*e + a*i) - a*b^2*k - 2*a*c*(c*g - a*k) + (2*c^3*e - c^2*(b*g + 2*a*i) - b^3*k + b*c*(b*i + 3*a*k))*x^2)/(2*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + ((b*(c*d + a*h) + (a*b^2*j)/c - 2*a*(c*f + 3*a*j) + (b^2*c*(c*d - a*h) - 4*a*c^2*(3*c*d + a*h) - a*b^3*j + 4*a*b*c*(c*f + 2*a*j)))/(c*\operatorname{Sqrt}[b^2 - 4ac])$

$$\begin{aligned} & (2 - 4ac)) \operatorname{ArcTan}\left[\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right] / (2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b - \sqrt{b^2 - 4ac}}) + ((b(c d + ah) + ab^2j)/c - 2a(cf + 3aj) - (b^2c(cd - ah) - 4ac^2(3cd + ah) - ab^3j + 4abcc(cf + 2aj)) / (c\sqrt{b^2 - 4ac})) \operatorname{ArcTan}\left[\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b + \sqrt{b^2 - 4ac}}}\right] / (2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b + \sqrt{b^2 - 4ac}}) + ((4c^3e - c^2(2bg - 4ai) + b^3k - 6abc k) \operatorname{ArcTanh}[(b + 2cx^2)/\sqrt{b^2 - 4ac}]) / (2c^2(b^2 - 4ac)^{3/2}) + (k \operatorname{Log}[a + bx^2 + cx^4]) / (4c^2) \end{aligned}$$

Rule 205

$$\operatorname{Int}[(a_ + (b_)(x_)^2)^{-1}, x_Symbol] \rightarrow \operatorname{Simp}[(\operatorname{Rt}[a/b, 2] \operatorname{ArcTan}[x/\operatorname{Rt}[a/b, 2]])/a, x] /; \operatorname{FreeQ}\{a, b\}, x] \ \&\& \operatorname{PosQ}[a/b]$$

Rule 206

$$\operatorname{Int}[(a_ + (b_)(x_)^2)^{-1}, x_Symbol] \rightarrow \operatorname{Simp}[(1 \operatorname{ArcTanh}[(\operatorname{Rt}[-b, 2]x)/\operatorname{Rt}[a, 2]])/(\operatorname{Rt}[a, 2] \operatorname{Rt}[-b, 2]), x] /; \operatorname{FreeQ}\{a, b\}, x] \ \&\& \operatorname{NegQ}[a/b] \ \&\& (\operatorname{GtQ}[a, 0] \ || \ \operatorname{LtQ}[b, 0])$$

Rule 618

$$\operatorname{Int}[(a_ + (b_)(x_ + (c_)(x_)^2)^{-1}, x_Symbol] \rightarrow \operatorname{Dist}[-2, \operatorname{Subst}[\operatorname{Int}[1/\operatorname{Simp}[b^2 - 4ac - x^2, x], x], x, b + 2cx], x] /; \operatorname{FreeQ}\{a, b, c\}, x] \ \&\& \operatorname{NeQ}[b^2 - 4ac, 0]$$

Rule 628

$$\operatorname{Int}[(d_ + (e_)(x_))/((a_ + (b_)(x_ + (c_)(x_)^2), x_Symbol] \rightarrow \operatorname{Simp}[(d \operatorname{Log}[\operatorname{RemoveContent}[a + bx + cx^2, x]])/b, x] /; \operatorname{FreeQ}\{a, b, c, d, e\}, x] \ \&\& \operatorname{EqQ}[2cd - b^2e, 0]$$

Rule 634

$$\operatorname{Int}[(d_ + (e_)(x_))/((a_ + (b_)(x_ + (c_)(x_)^2), x_Symbol] \rightarrow \operatorname{Dist}[(2cd - b^2e)/(2c), \operatorname{Int}[1/(a + bx + cx^2), x], x] + \operatorname{Dist}[e/(2c), \operatorname{Int}[(b + 2cx)/(a + bx + cx^2), x], x] /; \operatorname{FreeQ}\{a, b, c, d, e\}, x] \ \&\& \operatorname{NeQ}[2cd - b^2e, 0] \ \&\& \operatorname{NeQ}[b^2 - 4ac, 0] \ \&\& \operatorname{!NiceSqrtQ}[b^2 - 4ac]$$

Rule 1166

$$\operatorname{Int}[(d_ + (e_)(x_)^2)/((a_ + (b_)(x_)^2 + (c_)(x_)^4), x_Symbol] \rightarrow \operatorname{With}\{q = \operatorname{Rt}[b^2 - 4ac, 2]\}, \operatorname{Dist}[e/2 + (2cd - b^2e)/(2q), \operatorname{Int}[1/(b/2 - q/2 + cx^2), x], x] + \operatorname{Dist}[e/2 - (2cd - b^2e)/(2q), \operatorname{Int}[1/(b/2 + q/2 + cx^2), x], x] /; \operatorname{FreeQ}\{a, b, c, d, e\}, x] \ \&\& \operatorname{NeQ}[b^2 - 4ac, 0] \ \&\& \operatorname{NeQ}[e, 0]$$

$Q[c*d^2 - a*e^2, 0] \&\& \text{PosQ}[b^2 - 4*a*c]$

Rule 1660

$\text{Int}[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^{(p_)}, x_Symbol] \rightarrow \text{With}[\{Q = \text{PolynomialQuotient}[Pq, a + b*x + c*x^2, x], f = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b*x + c*x^2, x], x, 0], g = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b*x + c*x^2, x], x, 1]\}, \text{Simp}[\frac{(b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^{(p+1)}}{(p+1)*(b^2 - 4*a*c)}, x] + \text{Dist}[1/((p+1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x + c*x^2)^{(p+1)}*\text{ExpandToSum}[(p+1)*(b^2 - 4*a*c)*Q - (2*p+3)*(2*c*f - b*g), x], x], x]] /; \text{FreeQ}[\{a, b, c\}, x] \&\& \text{PolyQ}[Pq, x] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1]$

Rule 1663

$\text{Int}[(Pq_)*(x_)^{(m_.)}*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^{(p_)}, x_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[x^{(m-1)/2}*\text{SubstFor}[x^2, Pq, x]*(a + b*x + c*x^2)^p, x], x, x^2], x] /; \text{FreeQ}[\{a, b, c, p\}, x] \&\& \text{PolyQ}[Pq, x^2] \&\& \text{IntegerQ}[(m-1)/2]$

Rule 1673

$\text{Int}[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^{(p_)}, x_Symbol] \rightarrow \text{Module}[\{q = \text{Expon}[Pq, x], k\}, \text{Int}[\text{Sum}[\text{Coeff}[Pq, x, 2*k]*x^{(2*k)}, \{k, 0, q/2\}]*(a + b*x^2 + c*x^4)^p, x] + \text{Int}[x*\text{Sum}[\text{Coeff}[Pq, x, 2*k+1]*x^{(2*k)}, \{k, 0, (q-1)/2\}]*(a + b*x^2 + c*x^4)^p, x]] /; \text{FreeQ}[\{a, b, c, p\}, x] \&\& \text{PolyQ}[Pq, x] \&\& !\text{PolyQ}[Pq, x^2]$

Rule 1678

$\text{Int}[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^{(p_)}, x_Symbol] \rightarrow \text{With}[\{d = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b*x^2 + c*x^4, x], x, 0], e = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b*x^2 + c*x^4, x], x, 2]\}, \text{Simp}[(x*(a + b*x^2 + c*x^4)^{(p+1)}*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p+1)*(b^2 - 4*a*c)), x] + \text{Dist}[1/(2*a*(p+1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x^2 + c*x^4)^{(p+1)}*\text{ExpandToSum}[2*a*(p+1)*(b^2 - 4*a*c)*\text{PolynomialQuotient}[Pq, a + b*x^2 + c*x^4, x] + b^2*d*(2*p+3) - 2*a*c*d*(4*p+5) - a*b*e + c*(4*p+7)*(b*d - 2*a*e)*x^2, x], x], x]] /; \text{FreeQ}[\{a, b, c\}, x] \&\& \text{PolyQ}[Pq, x^2] \&\& \text{Expon}[Pq, x^2] > 1 \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1]$

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 58x^5 + jx^6 + kx^7}{(a + bx^2 + cx^4)^2} dx &= \int \frac{d + fx^2 + hx^4 + jx^6}{(a + bx^2 + cx^4)^2} dx + \int \frac{x(e + gx^2 + 58x^4 + kx^6)}{(a + bx^2 + cx^4)^2} dx \\
&= \frac{x \left(c \left(b^2d - 2a(cd - ah) - \frac{ab(cf+aj)}{c} \right) + (bc(cd + ah) - ab^2j) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{x \left(c \left(b^2d - 2a(cd - ah) - \frac{ab(cf+aj)}{c} \right) + (bc(cd + ah) - ab^2j) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{x \left(c \left(b^2d - 2a(cd - ah) - \frac{ab(cf+aj)}{c} \right) + (bc(cd + ah) - ab^2j) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{x \left(c \left(b^2d - 2a(cd - ah) - \frac{ab(cf+aj)}{c} \right) + (bc(cd + ah) - ab^2j) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{x \left(c \left(b^2d - 2a(cd - ah) - \frac{ab(cf+aj)}{c} \right) + (bc(cd + ah) - ab^2j) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)}
\end{aligned}$$

Mathematica [A] time = 4.40, size = 775, normalized size = 1.20

$$\frac{\sqrt{2} \sqrt{c} \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right) \left(-bc(8a^2j + cd\sqrt{b^2 - 4ac} + ah\sqrt{b^2 - 4ac} + 4acf) + ab^3j + 2ac(cf\sqrt{b^2 - 4ac} + 3aj\sqrt{b^2 - 4ac} + 2ach + 6c^2d) - b^2(aj\sqrt{b^2 - 4ac} - ach) \right)}{a(b^2 - 4ac)^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}}$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5 + j*x^6 + k*x^7)/(a + b*x^2 + c*x^4)^2, x]

[Out] ((2*(2*a^3*c*k - b*c^2*d*x*(b + c*x^2) + a*(-(b^3*k*x^2) + b^2*c*x^2*(i + j*x) + 2*c^3*x*(d + x*(e + f*x))) + b*c^2*(e + x*(f - x*(g + h*x)))) + a^2*(-

$$\frac{(b^2k) + bc(i + x(j + 3kx)) - 2c^2(g + x(h + x(i + jx)))}{(a(-b^2 + 4ac)(a + bx^2 + cx^4) - (\sqrt{2}\sqrt{c}(ab^3j - bc(\sqrt{b^2 - 4ac}d + 4acf + a\sqrt{b^2 - 4ac}h + 8a^2j) - b^2(c^2d - ac^2h + a\sqrt{b^2 - 4ac}j) + 2ac(6c^2d + c\sqrt{b^2 - 4ac}f + 2ac^2h + 3a\sqrt{b^2 - 4ac}j))\text{ArcTan}[(\sqrt{2}\sqrt{c}x)/\sqrt{b - \sqrt{b^2 - 4ac}}]) + (\sqrt{2}\sqrt{c}(ab^3j + bc(c\sqrt{b^2 - 4ac}d - 4acf + a\sqrt{b^2 - 4ac}h - 8a^2j) + 2ac(6c^2d - c\sqrt{b^2 - 4ac}f + 2ac^2h - 3a\sqrt{b^2 - 4ac}j) + b^2(-c^2d + ac^2h + a\sqrt{b^2 - 4ac}j))\text{ArcTan}[(\sqrt{2}\sqrt{c}x)/\sqrt{b + \sqrt{b^2 - 4ac}}]) + ((-4c^3e + 2c^2(bg - 2ai) + b^2(-b + \sqrt{b^2 - 4ac})k + ac(6bk - 4\sqrt{b^2 - 4ac}k))\text{Log}[-b + \sqrt{b^2 - 4ac} - 2cx^2])/(b^2 - 4ac)^{3/2} + ((4c^3e + c^2(-2bg + 4ai) + b^2(b + \sqrt{b^2 - 4ac})k - 2ac(3b + 2\sqrt{b^2 - 4ac}k))\text{Log}[b + \sqrt{b^2 - 4ac} + 2cx^2])/(b^2 - 4ac)^{3/2})/(4c^2)$$

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((k*x^7+j*x^6+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="fricas")

[Out] Timed out

giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((k*x^7+j*x^6+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="giac")

[Out] Timed out

maple [B] time = 0.09, size = 3107, normalized size = 4.82

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] int((k*x^7+j*x^6+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x)

[Out] $\frac{1}{4} \sqrt{\frac{1}{4ac-b^2}} \sqrt{\frac{1}{2}} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} (-4ac+b^2)^{1/2} + \frac{1}{4} b^2 h \arctan(\sqrt{2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} c x) + \frac{1}{4} (4ac-b^2)$

$$\begin{aligned}
& +b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * c*x) \\
&) * (-4*a*c + b^2)^{(1/2)} * b*j + 3 / (4*a*c - b^2)^2 * 2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)}) * c) \\
&)^{(1/2)} * (-4*a*c + b^2)^{(1/2)} * c^2 * d * \operatorname{arctan}(2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * c*x) - 1 / (4*a*c - b^2)^2 * 2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * b * c^2 * d * \\
& \operatorname{arctan}(2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * c*x) + 3 * c^2 / (4*a*c - b^2)^2 * 2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * c*x) * (-4*a*c + b^2)^{(1/2)} * d + c^2 / (4*a*c - b^2)^2 * 2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * c*x) * b * d + 1/4 / (4*a*c - b^2)^2 * 2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} / a * b^3 * \\
& c * d * \operatorname{arctan}(2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * c*x) + 1/4 / (4*a*c - b^2)^2 / \\
& c^2 * \ln(-2 * c*x^2 - b + (-4*a*c + b^2)^{(1/2)}) * b^4 * k + 1/4 / (4*a*c - b^2)^2 / c^2 * \ln(2 * c*x^2 + b + (-4*a*c + b^2)^{(1/2)}) * b^4 * k - 1/4 / (4*a*c - b^2)^2 * 2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * c*x) * b^3 * h \\
& - 1/2 / (4*a*c - b^2)^2 * (-4*a*c + b^2)^{(1/2)} * b * g * \ln(2 * c*x^2 + b + (-4*a*c + b^2)^{(1/2)}) + \\
& 1 / (4*a*c - b^2)^2 * 2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * (-4*a*c + b^2)^{(1/2)} \\
& * a * c * h * \operatorname{arctan}(2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * c*x) - 1 / (4*a*c - b^2)^2 \\
& * 2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * a * b * c * h * \operatorname{arctan}(2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * c*x) + a / (4*a*c - b^2)^2 * c * 2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * c*x) * (-4*a*c + b^2)^{(1/2)} * h + 1/4 / (4*a*c - b^2)^2 * 2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * b^3 * h * \operatorname{arctan}(2^{(1/2)} / ((b + (-4*a*c + b^2)^{(1/2)}) * c)^{(1/2)} * c*x) - 1 / (4*a*c - b^2)^2 * (-4*a*c + b^2)^{(1/2)} * a * i * \ln(-2 * c*x^2 - b + (-4*a*c + b^2)^{(1/2)}) + 1 / (4*a*c - b^2)^2 * (-4*a*c + b^2)^{(1/2)} * a * i * \ln(2 * c*x^2 + b + (-4*a*c + b^2)^{(1/2)}) + 1/4 / (4*a*c - b^2)^2 / c^2 * \ln(2 * c*x^2 + b + (-4*a*c + b^2)^{(1/2)}) * (-4*a*c + b^2)^{(1/2)} * b^3 * k - 2 * a / (4*a*c - b^2)^2 / c * \ln(-2 * c*x^2 - b + (-4*a*c + b^2)^{(1/2)}) * b^2 * k - 2 * a / (4*a*c - b^2)^2 / c * \ln(2 * c*x^2 + b + (-4*a*c + b^2)^{(1/2)}) * b^2 * k - 1/4 / (4*a*c - b^2)^2 / c^2 * \ln(-2 * c*x^2 - b + (-4*a*c + b^2)^{(1/2)}) * (-4*a*c + b^2)^{(1/2)} * b^3 * k
\end{aligned}$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\frac{abc^2e - 2a^2c^2g + a^2bci - (bc^3d - 2ac^3f + abc^2h - (ab^2c - 2a^2c^2)j)x^3 + (2ac^3e - abc^2g + (ab^2c - 2a^2c^2)i - (ab^3c^2 - 2a^2c^3)k)x^2 + (a^2b^2c^2 - 4a^3c^3 + (ab^2c^3 - 4a^2c^4)x^4 + (ab^3c^2 - 2a^2c^3)k)x^2 + (b^2c - 6a^2c^2)d}{2(a^2b^2c^2 - 4a^3c^3 + (ab^2c^3 - 4a^2c^4)x^4 + (ab^3c^2 - 2a^2c^3)k)x^2 + (b^2c - 6a^2c^2)d}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((k*x^7+j*x^6+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^2,x, algorithm="maxima")

[Out] -1/2*(a*b*c^2*e - 2*a^2*c^2*g + a^2*b*c*i - (b*c^3*d - 2*a*c^3*f + a*b*c^2*h - (a*b^2*c - 2*a^2*c^2)*j)*x^3 + (2*a*c^3*e - a*b*c^2*g + (a*b^2*c - 2*a^2*c^2)*i - (a*b^3 - 3*a^2*b*c)*k)*x^2 - (a^2*b^2 - 2*a^3*c)*k + (a*b*c^2*f - 2*a^2*c^2*h + a^2*b*c*j - (b^2*c^2 - 2*a*c^3)*d)*x)/(a^2*b^2*c^2 - 4*a^3*c^3 + (a*b^2*c^3 - 4*a^2*c^4)*x^4 + (a*b^3*c^2 - 4*a^2*b*c^3)*x^2) - 1/2*integrate(-2*(a*b^2 - 4*a^2*c)*k*x^3 + a*b*c*f - 2*a^2*c*h + a^2*b*j + (b*c^2*d - 2*a*c^2*f + a*b*c*h + (a*b^2 - 6*a^2*c)*j)*x^2 + (b^2*c - 6*a^2*c^2)*d

$- 2*(2*a*c^2*e - a*b*c*g + 2*a^2*c*i - a^2*b*k)*x)/(c*x^4 + b*x^2 + a), x)/$
 $(a*b^2*c - 4*a^2*c^2)$

mupad [B] time = 8.85, size = 53538, normalized size = 83.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5 + j*x^6 + k*x^7)/(a + b*x^2 + c*x^4)^2, x)$

[Out] $((b*c^2*e - 2*a*c^2*g - a*b^2*k + 2*a^2*c*k + a*b*c*i)/(2*c^2*(4*a*c - b^2)) + (x^2*(2*c^3*e - b^3*k - b*c^2*g - 2*a*c^2*i + b^2*c*i + 3*a*b*c*k))/(2*c^2*(4*a*c - b^2)) + (x*(2*a*c^2*d - b^2*c*d - 2*a^2*c*h + a^2*b*j + a*b*c*f))/(2*a*c*(4*a*c - b^2)) - (x^3*(b*c^2*d - 2*a*c^2*f - a*b^2*j + 2*a^2*c*j + a*b*c*h))/(2*a*c*(4*a*c - b^2)))/(a + b*x^2 + c*x^4) + \text{symsum}(\log(\text{root}(1572864*a^8*b^2*c^9*z^4 - 983040*a^7*b^4*c^8*z^4 + 327680*a^6*b^6*c^7*z^4 - 61440*a^5*b^8*c^6*z^4 + 6144*a^4*b^10*c^5*z^4 - 256*a^3*b^12*c^4*z^4 - 1048576*a^9*c^10*z^4 - 1572864*a^8*b^2*c^7*k*z^3 + 983040*a^7*b^4*c^6*k*z^3 - 327680*a^6*b^6*c^5*k*z^3 + 61440*a^5*b^8*c^4*k*z^3 - 6144*a^4*b^10*c^3*k*z^3 + 256*a^3*b^12*c^2*k*z^3 + 1048576*a^9*c^8*k*z^3 + 98304*a^8*b*c^6*i*k*z^2 + 98304*a^7*b*c^7*e*k*z^2 + 57344*a^7*b*c^7*f*j*z^2 + 32768*a^7*b*c^7*g*i*z^2 + 57344*a^6*b*c^8*d*h*z^2 + 32768*a^6*b*c^8*e*g*z^2 - 32*a*b^10*c^4*d*f*z^2 - 90112*a^7*b^3*c^5*i*k*z^2 + 30720*a^6*b^5*c^4*i*k*z^2 - 4608*a^5*b^7*c^3*i*k*z^2 + 256*a^4*b^9*c^2*i*k*z^2 - 49152*a^7*b^2*c^6*g*k*z^2 + 45056*a^6*b^4*c^5*g*k*z^2 + 24576*a^7*b^2*c^6*h*j*z^2 - 15360*a^5*b^6*c^4*g*k*z^2 - 3072*a^5*b^6*c^4*h*j*z^2 + 2304*a^4*b^8*c^3*g*k*z^2 + 2048*a^6*b^4*c^5*h*j*z^2 + 576*a^4*b^8*c^3*h*j*z^2 - 128*a^3*b^10*c^2*g*k*z^2 - 32*a^3*b^10*c^2*h*j*z^2 - 90112*a^6*b^3*c^6*e*k*z^2 - 49152*a^6*b^3*c^6*f*j*z^2 + 30720*a^5*b^5*c^5*e*k*z^2 - 24576*a^6*b^3*c^6*g*i*z^2 + 15360*a^5*b^5*c^5*f*j*z^2 + 6144*a^5*b^5*c^5*g*i*z^2 - 4608*a^4*b^7*c^4*e*k*z^2 - 2048*a^4*b^7*c^4*f*j*z^2 - 512*a^4*b^7*c^4*g*i*z^2 + 256*a^3*b^9*c^3*e*k*z^2 + 96*a^3*b^9*c^3*f*j*z^2 + 131072*a^6*b^2*c^7*d*j*z^2 + 49152*a^6*b^2*c^7*e*i*z^2 - 43008*a^5*b^4*c^6*d*j*z^2 - 12288*a^5*b^4*c^6*e*i*z^2 + 6144*a^5*b^4*c^6*f*h*z^2 + 6144*a^4*b^6*c^5*d*j*z^2 - 2048*a^4*b^6*c^5*f*h*z^2 + 1024*a^4*b^6*c^5*e*i*z^2 - 320*a^3*b^8*c^4*d*j*z^2 + 192*a^3*b^8*c^4*f*h*z^2 - 49152*a^5*b^3*c^7*d*h*z^2 - 24576*a^5*b^3*c^7*e*g*z^2 + 15360*a^4*b^5*c^6*d*h*z^2 + 6144*a^4*b^5*c^6*e*g*z^2 - 2048*a^3*b^7*c^5*d*h*z^2 - 512*a^3*b^7*c^5*e*g*z^2 + 96*a^2*b^9*c^4*d*h*z^2 + 24576*a^5*b^2*c^8*d*f*z^2 - 3072*a^3*b^6*c^6*d*f*z^2 + 2048*a^4*b^4*c^7*d*f*z^2 + 576*a^2*b^8*c^5*d*f*z^2 + 1536*a^4*b^10*c^k^2*z^2 + 61440*a^8*b*c^6*j^2*z^2 - 16*a^3*b^11*c*j^2*z^2 + 12288*a^7*b*c^7*h^2*z^2 + 12288*a^6*b*c^8*f^2*z^2 + 61440*a^5*b*c^9*d^2*z^2 + 432*a*b^9*c^5*d^2*z^2 - 49152*a^8*c^7*h*j*z^2 - 147456*a^7*c^8*d*j*z^2 - 65536*a^7*c^8*e*i*z^2 - 16384*a^7*c^8*f*h*z^2 - 49152*a^6*c^9*d*f*z^2 + 516096*a^8*b^2*c^5*k^2*z^2 - 288768*a^7*b^4*c^4*k^2*z^2 + 88576*a^6*b^6*c^3*k^2*z^2 - 15744*a^5$

$$\begin{aligned}
& *b^8*c^2*k^2*z^2 - 61440*a^7*b^3*c^5*j^2*z^2 + 24064*a^6*b^5*c^4*j^2*z^2 - \\
& 4608*a^5*b^7*c^3*j^2*z^2 + 432*a^4*b^9*c^2*j^2*z^2 + 24576*a^7*b^2*c^6*i^2* \\
& z^2 - 6144*a^6*b^4*c^5*i^2*z^2 + 512*a^5*b^6*c^4*i^2*z^2 - 8192*a^6*b^3*c^6 \\
& *h^2*z^2 + 1536*a^5*b^5*c^5*h^2*z^2 - 16*a^3*b^9*c^3*h^2*z^2 - 8192*a^6*b^2 \\
& *c^7*g^2*z^2 + 6144*a^5*b^4*c^6*g^2*z^2 - 1536*a^4*b^6*c^5*g^2*z^2 + 128*a^ \\
& 3*b^8*c^4*g^2*z^2 - 8192*a^5*b^3*c^7*f^2*z^2 + 1536*a^4*b^5*c^6*f^2*z^2 - 1 \\
& 6*a^2*b^9*c^4*f^2*z^2 + 24576*a^5*b^2*c^8*e^2*z^2 - 6144*a^4*b^4*c^7*e^2*z^ \\
& 2 + 512*a^3*b^6*c^6*e^2*z^2 - 61440*a^4*b^3*c^8*d^2*z^2 + 24064*a^3*b^5*c^7 \\
& *d^2*z^2 - 4608*a^2*b^7*c^6*d^2*z^2 - 393216*a^9*c^6*k^2*z^2 - 64*a^3*b^12* \\
& k^2*z^2 - 32768*a^8*c^7*i^2*z^2 - 32768*a^6*c^9*e^2*z^2 - 16*b^11*c^4*d^2*z \\
& ^2 - 16384*a^7*b*c^5*g*i*k*z - 10240*a^7*b*c^5*f*j*k*z + 4096*a^7*b*c^5*h*i \\
& *j*z - 47104*a^6*b*c^6*d*h*k*z - 16384*a^6*b*c^6*e*g*k*z + 6144*a^6*b*c^6*f \\
& *g*j*z + 4096*a^6*b*c^6*e*h*j*z + 32*a*b^10*c^2*d*f*k*z - 6144*a^5*b*c^7*d* \\
& g*h*z - 4096*a^5*b*c^7*d*f*i*z - 32*a*b^8*c^4*d*f*g*z - 4096*a^4*b*c^8*d*e* \\
& f*z + 64*a*b^7*c^5*d*e*f*z - 18432*a^7*b^2*c^4*h*j*k*z + 4608*a^6*b^4*c^3*h \\
& *j*k*z - 384*a^5*b^6*c^2*h*j*k*z + 12288*a^6*b^3*c^4*g*i*k*z + 7680*a^6*b^3 \\
& *c^4*f*j*k*z - 3072*a^6*b^3*c^4*h*i*j*z - 3072*a^5*b^5*c^3*g*i*k*z - 1920*a \\
& ^5*b^5*c^3*f*j*k*z + 768*a^5*b^5*c^3*h*i*j*z + 256*a^4*b^7*c^2*g*i*k*z + 16 \\
& 0*a^4*b^7*c^2*f*j*k*z - 64*a^4*b^7*c^2*h*i*j*z - 65536*a^6*b^2*c^5*d*j*k*z \\
& - 24576*a^6*b^2*c^5*e*i*k*z + 21504*a^5*b^4*c^4*d*j*k*z + 9216*a^6*b^2*c^5* \\
& f*i*j*z + 6144*a^5*b^4*c^4*e*i*k*z - 3072*a^5*b^4*c^4*f*h*k*z - 3072*a^4*b^ \\
& 6*c^3*d*j*k*z - 2304*a^5*b^4*c^4*f*i*j*z - 2048*a^6*b^2*c^5*g*h*j*z + 1536* \\
& a^5*b^4*c^4*g*h*j*z + 1024*a^4*b^6*c^3*f*h*k*z - 512*a^4*b^6*c^3*e*i*k*z - \\
& 384*a^4*b^6*c^3*g*h*j*z + 192*a^4*b^6*c^3*f*i*j*z + 160*a^3*b^8*c^2*d*j*k*z \\
& - 96*a^3*b^8*c^2*f*h*k*z + 32*a^3*b^8*c^2*g*h*j*z + 41472*a^5*b^3*c^5*d*h* \\
& k*z - 13440*a^4*b^5*c^4*d*h*k*z + 12288*a^5*b^3*c^5*e*g*k*z - 4608*a^5*b^3* \\
& c^5*f*g*j*z - 3072*a^5*b^3*c^5*e*h*j*z - 3072*a^4*b^5*c^4*e*g*k*z + 1888*a^ \\
& 3*b^7*c^3*d*h*k*z + 1152*a^4*b^5*c^4*f*g*j*z + 768*a^4*b^5*c^4*e*h*j*z + 25 \\
& 6*a^3*b^7*c^3*e*g*k*z - 96*a^3*b^7*c^3*f*g*j*z - 96*a^2*b^9*c^2*d*h*k*z - 6 \\
& 4*a^3*b^7*c^3*e*h*j*z + 9216*a^5*b^2*c^6*e*f*j*z - 9216*a^5*b^2*c^6*d*h*i*z \\
& - 6656*a^4*b^4*c^5*d*f*k*z - 6144*a^5*b^2*c^6*d*f*k*z + 3456*a^3*b^6*c^4*d \\
& *f*k*z - 2304*a^4*b^4*c^5*e*f*j*z + 2304*a^4*b^4*c^5*d*h*i*z - 576*a^2*b^8* \\
& c^3*d*f*k*z + 192*a^3*b^6*c^4*e*f*j*z - 192*a^3*b^6*c^4*d*h*i*z + 4608*a^4* \\
& b^3*c^6*d*g*h*z + 3072*a^4*b^3*c^6*d*f*i*z - 1152*a^3*b^5*c^5*d*g*h*z - 768 \\
& *a^3*b^5*c^5*d*f*i*z + 96*a^2*b^7*c^4*d*g*h*z + 64*a^2*b^7*c^4*d*f*i*z - 92 \\
& 16*a^4*b^2*c^7*d*e*h*z + 2304*a^3*b^4*c^6*d*e*h*z + 2048*a^4*b^2*c^7*d*f*g* \\
& z - 1536*a^3*b^4*c^6*d*f*g*z + 384*a^2*b^6*c^5*d*f*g*z - 192*a^2*b^6*c^5*d* \\
& e*h*z + 3072*a^3*b^3*c^7*d*e*f*z - 768*a^2*b^5*c^6*d*e*f*z - 3072*a^8*b*c^4 \\
& *j^2*k*z + 48*a^5*b^7*c*j^2*k*z - 49152*a^8*b*c^4*i*k^2*z + 2304*a^5*b^7*c* \\
& i*k^2*z - 9216*a^7*b*c^5*h^2*k*z - 32*a^4*b^8*c*i*j^2*z - 1152*a^4*b^8*c*g* \\
& k^2*z + 9216*a^7*b*c^5*g*j^2*z - 3072*a^6*b*c^6*f^2*k*z + 16*a^3*b^9*c*g*j^ \\
& 2*z - 49152*a^7*b*c^5*e*k^2*z - 128*a^3*b^9*c*e*k^2*z - 58368*a^5*b*c^7*d^2 \\
& *k*z - 1024*a^6*b*c^6*g*h^2*z - 432*a*b^9*c^3*d^2*k*z + 1024*a^5*b*c^7*f^2* \\
& g*z + 32*a*b^8*c^4*d^2*i*z - 9216*a^4*b*c^8*d^2*g*z + 336*a*b^7*c^5*d^2*g*z \\
& - 672*a*b^6*c^6*d^2*e*z + 24576*a^8*c^5*h*j*k*z + 73728*a^7*c^6*d*j*k*z +
\end{aligned}$$

$$\begin{aligned}
& 32768a^7c^6eikz - 12288a^7c^6fijz + 8192a^7c^6fhhkz + 24576a^6c^7d*fkz - 12288a^6c^7e*f*jz + 12288a^6c^7d*h*iz + 12288a^5c^8d*e*hz + 2304a^7b^3c^3j^2kz - 576a^6b^5c^2j^2kz + 45056a^7b^3c^3i*k^2z - 15360a^6b^5c^2i*k^2z - 12288a^7b^2c^4i^2kz + 3072a^6b^4c^3i^2kz - 256a^5b^6c^2i^2kz + 15872a^7b^2c^4i*j^2z + 6912a^6b^3c^4h^2kz - 4992a^6b^4c^3i*j^2z - 1728a^5b^5c^3h^2kz + 672a^5b^6c^2i*j^2z + 144a^4b^7c^2h^2kz + 24576a^7b^2c^4g*k^2z - 22528a^6b^4c^3g*k^2z + 7680a^5b^6c^2g*k^2z + 4096a^6b^2c^5g^2kz - 3072a^5b^4c^4g^2kz + 768a^4b^6c^3g^2kz - 64a^3b^8c^2g^2kz - 7936a^6b^3c^4g*j^2z + 2496a^5b^5c^3g*j^2z - 1536a^6b^2c^5h^2i*z + 1280a^5b^3c^5f^2kz + 384a^5b^4c^4h^2i*z - 336a^4b^7c^2g*j^2z + 192a^4b^5c^4f^2kz - 144a^3b^7c^3f^2kz - 32a^4b^6c^3h^2i*z + 16a^2b^9c^2f^2kz + 45056a^6b^3c^4e*k^2z - 15360a^5b^5c^3e*k^2z - 12288a^5b^2c^6e^2kz + 3072a^4b^4c^5e^2kz + 2304a^4b^7c^2e*k^2z - 256a^3b^6c^4e^2kz + 59136a^4b^3c^6d^2kz - 23488a^3b^5c^5d^2kz + 15872a^6b^2c^5e*j^2z - 4992a^5b^4c^4e*j^2z + 4560a^2b^7c^4d^2kz + 1536a^5b^2c^6f^2i*z + 768a^5b^3c^5g*h^2z + 672a^4b^6c^3e*j^2z - 384a^4b^4c^5f^2i*z - 192a^4b^5c^4g*h^2z - 32a^3b^8c^2e*j^2z + 32a^3b^6c^4f^2i*z + 16a^3b^7c^3g*h^2z - 15872a^4b^2c^7d^2i*z + 4992a^3b^4c^6d^2i*z - 1536a^5b^2c^6e*h^2z - 768a^4b^3c^6f^2g*z - 672a^2b^6c^5d^2i*z + 384a^4b^4c^5e*h^2z + 192a^3b^5c^5f^2g*z - 32a^3b^6c^4e*h^2z - 16a^2b^7c^4f^2g*z + 7936a^3b^3c^7d^2g*z - 2496a^2b^5c^6d^2g*z + 1536a^4b^2c^7e*f^2z - 384a^3b^4c^6e*f^2z + 32a^2b^6c^5e*f^2z - 15872a^3b^2c^8d^2e*z + 4992a^2b^4c^7d^2e*z - 61440a^8b^2c^3k^3z + 21504a^7b^4c^2k^3z + 16384a^8c^5i^2kz - 18432a^8c^5i*j^2z - 128a^4b^9i*k^2z + 2048a^7c^6h^2i*z + 64a^3b^10g*k^2z + 16384a^6c^7e^2kz + 16b^11c^2d^2kz - 18432a^7c^6e*j^2z - 2048a^6c^7f^2i*z + 18432a^5c^8d^2i*z - 3328a^6b^6c*k^3z + 2048a^6c^7e*h^2z - 16b^9c^4d^2g*z - 2048a^5c^8e*f^2z + 32b^8c^5d^2e*z + 18432a^4c^9d^2e*z + 65536a^9c^4k^3z + 192a^5b^8k^3z - 3328a^7b*c^3h*i*j*k - 6912a^6b*c^4d*i*j*k - 3328a^6b*c^4e*h*j*k - 1536a^6b*c^4f*g*j*k - 768a^6b*c^4g*h*i*j - 768a^6b*c^4f*h*i*k - 6912a^5b*c^5d*e*j*k - 2304a^5b*c^5d*g*i*j - 1792a^5b*c^5e*f*i*j + 1536a^5b*c^5d*g*h*k - 1280a^5b*c^5d*f*i*k - 768a^5b*c^5e*g*h*j - 768a^5b*c^5e*f*h*k - 256a^5b*c^5f*g*h*i + 16a*b^8c^2d*f*g*k - 4a*b^8c^2d*f*h*j - 2304a^4b*c^6d*e*g*j - 1792a^4b*c^6d*e*h*i - 1280a^4b*c^6d*e*f*k - 768a^4b*c^6d*f*g*i - 256a^4b*c^6e*f*g*h - 32a*b^7c^3d*e*f*k - 768a^3b*c^7d*e*f*g + 32a*b^5c^5d*e*f*g + 576a^6b^3c^2h*i*j*k + 1664a^6b^2c^3g*h*j*k + 384a^6b^2c^3f*i*j*k - 288a^5b^4c^2g*h*j*k - 160a^5b^4c^2f*i*j*k + 2112a^5b^3c^3d*i*j*k + 576a^5b^3c^3e*h*j*k - 448a^5b^3c^3f*h*i*k - 192a^5b^3c^3g*h*i*j - 192a^5b^3c^3f*g*j*k - 160a^4b^5c^2d*i*j*k + 96a^4b^5c^2f*h*i*k + 80a^4b^5c^2f*g*j*k + 32a^4b^5c^2g*h*i*j + 4992a^5b^2c^4d*h*i*k - 4608a^5b^2c^4e*g*i*k + 3456a^5b^2c^
\end{aligned}$$

$$\begin{aligned}
& 4*d*g*j*k - 1312*a^4*b^4*c^3*d*h*i*k - 1056*a^4*b^4*c^3*d*g*j*k + 896*a^5*b^2*c^4*f*g*i*j + 768*a^4*b^4*c^3*e*g*i*k + 384*a^5*b^2*c^4*f*g*h*k + 384*a^5*b^2*c^4*e*h*i*j + 384*a^5*b^2*c^4*e*f*j*k + 224*a^4*b^4*c^3*f*g*h*k - 160*a^4*b^4*c^3*e*f*j*k - 96*a^4*b^4*c^3*f*g*i*j + 96*a^3*b^6*c^2*d*h*i*k + 80*a^3*b^6*c^2*d*g*j*k - 64*a^4*b^4*c^3*e*h*i*j - 48*a^3*b^6*c^2*f*g*h*k - 24*96*a^4*b^3*c^4*d*g*h*k + 2112*a^4*b^3*c^4*d*e*j*k - 960*a^4*b^3*c^4*d*f*i*k + 656*a^3*b^5*c^3*d*g*h*k - 448*a^4*b^3*c^4*e*f*h*k + 384*a^3*b^5*c^3*d*f*i*k + 320*a^4*b^3*c^4*d*g*i*j - 192*a^4*b^3*c^4*f*g*h*i - 192*a^4*b^3*c^4*e*g*h*j + 192*a^4*b^3*c^4*e*f*i*j - 160*a^3*b^5*c^3*d*e*j*k + 96*a^3*b^5*c^3*e*f*h*k - 48*a^2*b^7*c^2*d*g*h*k + 32*a^3*b^5*c^3*e*g*h*j - 32*a^2*b^7*c^2*d*f*i*k + 4992*a^4*b^2*c^5*d*e*h*k - 3584*a^4*b^2*c^5*d*f*h*j - 1312*a^3*b^4*c^4*d*e*h*k + 896*a^4*b^2*c^5*e*f*g*j + 896*a^4*b^2*c^5*d*g*h*i + 640*a^4*b^2*c^5*d*f*g*k - 640*a^4*b^2*c^5*d*e*i*j + 600*a^3*b^4*c^4*d*f*h*j + 480*a^3*b^4*c^4*d*f*g*k + 384*a^4*b^2*c^5*e*f*h*i - 192*a^2*b^6*c^3*d*f*g*k - 96*a^3*b^4*c^4*e*f*g*j - 96*a^3*b^4*c^4*d*g*h*i + 96*a^2*b^6*c^3*d*e*h*k + 12*a^2*b^6*c^3*d*f*h*j - 960*a^3*b^3*c^5*d*e*f*k + 384*a^2*b^5*c^4*d*e*f*k + 320*a^3*b^3*c^5*d*e*g*j - 192*a^3*b^3*c^5*e*f*g*h - 192*a^3*b^3*c^5*d*f*g*i + 192*a^3*b^3*c^5*d*e*h*i + 32*a^2*b^5*c^4*d*f*g*i + 896*a^3*b^2*c^6*d*e*g*h + 384*a^3*b^2*c^6*d*e*f*i - 96*a^2*b^4*c^5*d*e*g*h - 64*a^2*b^4*c^5*d*e*f*i - 192*a^2*b^3*c^6*d*e*f*g + 48*a^6*b^4*c*i*j^2*k - 1424*a^6*b^4*c*h*j*k^2 - 2304*a^7*b*c^3*g*j^2*k - 24*a^5*b^5*c*g*j^2*k + 2048*a^7*b*c^3*g*i*k^2 - 1024*a^7*b*c^3*f*j*k^2 - 768*a^5*b^5*c*g*i*k^2 + 408*a^5*b^5*c*f*j*k^2 + 256*a^6*b*c^4*g*h^2*k + 16*a^4*b^6*c*g*i*j^2 + 4608*a^6*b*c^4*e*i^2*k + 4608*a^5*b*c^5*e^2*i*k - 896*a^6*b*c^4*f*i^2*j + 768*a^4*b^6*c*d*j*k^2 - 256*a^4*b^6*c*f*h*k^2 - 128*a^4*b^6*c*e*i*k^2 + 2208*a^6*b*c^4*f*h*j^2 - 1920*a^6*b*c^4*e*i*j^2 + 800*a^5*b*c^5*f^2*h*j - 256*a^5*b*c^5*f^2*g*k - 16*a*b^8*c^2*d^2*i*k + 6*a^3*b^7*c*f*h*j^2 + 8192*a^6*b*c^4*d*h*k^2 + 2048*a^6*b*c^4*e*g*k^2 - 472*a^3*b^7*c*d*h*k^2 + 64*a^3*b^7*c*e*g*k^2 + 4896*a^4*b*c^6*d^2*h*j + 2304*a^4*b*c^6*d^2*g*k + 1824*a^5*b*c^5*d*h^2*j - 384*a^5*b*c^5*e*h^2*i - 168*a*b^7*c^3*d^2*g*k + 42*a*b^7*c^3*d^2*h*j + 6*a^2*b^8*c*d*h*j^2 + 1536*a^5*b*c^5*e*g*i^2 + 1536*a^4*b*c^6*e^2*g*i - 896*a^5*b*c^5*d*h*i^2 - 896*a^4*b*c^6*e^2*f*j + 144*a^2*b^8*c*d*f*k^2 + 4896*a^5*b*c^5*d*f*j^2 + 1824*a^4*b*c^6*d*f^2*j - 384*a^4*b*c^6*e*f^2*i + 336*a*b^6*c^4*d^2*e*k - 156*a*b^6*c^4*d^2*f*j + 16*a*b^6*c^4*d^2*g*i + 12*a*b^7*c^3*d*f^2*j + 2208*a^3*b*c^7*d^2*f*h - 1920*a^3*b*c^7*d^2*e*i + 800*a^4*b*c^6*d*f*h^2 - 102*a*b^5*c^5*d^2*f*h - 32*a*b^5*c^5*d^2*e*i + 12*a*b^6*c^4*d*f^2*h - 2*a*b^7*c^3*d*f*h^2 - 896*a^3*b*c^7*d*e^2*h - 8*a*b^6*c^4*d*f*g^2 - 240*a*b^4*c^6*d^2*e*g - 32*a*b^4*c^6*d*e^2*f + 3072*a^7*c^4*f*i*j*k + 3072*a^6*c^5*e*f*j*k - 3072*a^6*c^5*d*h*i*k + 1536*a^6*c^5*e*h*i*j + 4608*a^5*c^6*d*e*i*j - 3072*a^5*c^6*d*e*h*k - 1152*a^5*c^6*d*f*h*j + 512*a^5*c^6*e*f*h*i + 1536*a^4*c^7*d*e*f*i - 2*a*b^9*c*d*f*j^2 - 1088*a^7*b^2*c^2*i*j^2*k + 4800*a^7*b^2*c^2*h*j*k^2 + 960*a^6*b^2*c^3*h^2*i*k + 544*a^6*b^3*c^2*g*j^2*k - 144*a^5*b^4*c^2*h^2*i*k - 2304*a^6*b^2*c^3*g*i^2*k + 1920*a^6*b^3*c^2*g*i*k^2 + 1152*a^5*b^3*c^3*g^2*i*k - 864*a^6*b^3*c^2*f*j*k^2 + 384*a^5*b^4*c^2*g*i^2*k + 192*a^6*b^2*c^3*h^2*i^2*j - 192*a^4*b^5*c^2*g^2*i*k - 32*a^5*b^4*c^2*h^2*i^2*j - 1088
\end{aligned}$$

$$\begin{aligned}
& a^6 b^2 c^3 e^j k^2 + 960 a^6 b^2 c^3 g^i j^2 - 480 a^5 b^3 c^3 g^h k^2 - 240 a^5 b^4 c^2 g^i j^2 + 192 a^5 b^2 c^4 f^2 i k + 72 a^4 b^5 c^2 g^h k^2 \\
& + 48 a^5 b^4 c^2 e^j k^2 + 48 a^4 b^4 c^3 f^2 i k - 16 a^3 b^6 c^2 f^2 i k + 13376 a^6 b^2 c^3 d^j k^2 - 5136 a^5 b^4 c^2 d^j k^2 - 3840 a^6 b^2 c^3 e \\
& i k^2 + 1536 a^5 b^4 c^2 e^i k^2 - 768 a^5 b^3 c^3 e^i k^2 - 768 a^4 b^3 c^4 e^2 i k + 624 a^5 b^4 c^2 f^h k^2 + 576 a^6 b^2 c^3 f^h k^2 + 192 a^5 b^2 \\
& c^4 g^2 h j + 96 a^5 b^3 c^3 f^i k^2 + 48 a^4 b^4 c^3 g^2 h j - 8 a^3 b^6 c^2 g^2 h j + 6848 a^4 b^2 c^5 d^2 i k - 2448 a^3 b^4 c^4 d^2 i k + 960 a^5 \\
& b^2 c^4 e^h k^2 - 864 a^5 b^2 c^4 f^h k^2 + 480 a^5 b^3 c^3 e^i j^2 + 336 a^4 b^3 c^4 f^2 h j + 336 a^2 b^6 c^3 d^2 i k + 192 a^5 b^2 c^4 g^h k^2 i + \\
& 144 a^5 b^3 c^3 f^h j^2 - 144 a^4 b^4 c^3 e^h k^2 - 102 a^4 b^5 c^2 f^h j^2 - 96 a^4 b^3 c^4 f^2 g^k - 32 a^4 b^5 c^2 e^i j^2 - 30 a^3 b^5 c^3 f^2 h j \\
& - 24 a^3 b^5 c^3 f^2 g^k + 16 a^4 b^4 c^3 g^h k^2 i - 12 a^4 b^4 c^3 f^h k^2 j + 12 a^3 b^6 c^2 f^h k^2 j + 8 a^2 b^7 c^2 f^2 g^k - 2 a^2 b^7 c^2 f^2 h j - \\
& 9312 a^5 b^3 c^3 d^h k^2 + 3288 a^4 b^5 c^2 d^h k^2 - 2304 a^4 b^2 c^5 e^2 g^k + 1920 a^5 b^3 c^3 e^g k^2 + 1152 a^4 b^3 c^4 e^g k^2 - 768 a^4 b^5 c^2 \\
& e^g k^2 + 384 a^3 b^4 c^4 e^2 g^k - 320 a^5 b^2 c^4 d^i k^2 - 224 a^4 b^3 c^4 f^g k^2 + 192 a^5 b^2 c^4 f^h k^2 i + 192 a^4 b^2 c^5 e^2 h j - 192 a^3 b^5 \\
& c^3 e^g k^2 - 32 a^3 b^4 c^4 e^2 h j + 24 a^3 b^5 c^3 f^g k^2 - 3552 a^5 b^2 c^4 d^h k^2 - 3424 a^3 b^3 c^5 d^2 g^k + 1332 a^4 b^4 c^3 d^h k^2 + 1 \\
& 224 a^2 b^5 c^4 d^2 g^k + 960 a^5 b^2 c^4 e^g j^2 - 496 a^3 b^3 c^5 d^2 h j + 432 a^4 b^3 c^4 d^h k^2 j - 240 a^4 b^4 c^3 e^g j^2 - 222 a^2 b^5 c^4 d^2 h \\
& h j + 192 a^4 b^2 c^5 f^2 g^i + 192 a^4 b^2 c^5 e^f k^2 - 174 a^3 b^5 c^3 d^h k^2 j - 156 a^3 b^6 c^2 d^h k^2 + 48 a^3 b^4 c^4 e^f k^2 - 32 a^4 b^3 c^4 e^h \\
& k^2 i + 16 a^3 b^6 c^2 e^g j^2 + 16 a^3 b^4 c^4 f^2 g^i - 16 a^2 b^6 c^3 e^f k^2 + 12 a^2 b^7 c^2 d^h k^2 j + 1728 a^5 b^2 c^4 d^f k^2 + 1392 a^4 b^4 c^3 \\
& d^f k^2 - 840 a^3 b^6 c^2 d^f k^2 - 768 a^4 b^2 c^5 e^g k^2 i + 576 a^4 b^2 c^5 d^g k^2 j + 96 a^4 b^3 c^4 d^h k^2 i + 96 a^3 b^3 c^5 e^2 f j - 80 a^3 b^4 \\
& c^4 d^g k^2 j + 64 a^4 b^2 c^5 f^g k^2 h + 48 a^3 b^4 c^4 f^g k^2 h + 6848 a^3 b^2 c^6 d^2 e^k - 3552 a^3 b^2 c^6 d^2 f^j - 2448 a^2 b^4 c^5 d^2 e^k + 13 \\
& 32 a^2 b^4 c^5 d^2 f^j + 960 a^3 b^2 c^6 d^2 g^i - 496 a^4 b^3 c^4 d^f k^2 j + 432 a^3 b^3 c^5 d^f k^2 j - 240 a^2 b^4 c^5 d^2 g^i - 222 a^3 b^5 c^3 d^f k^2 \\
& j^2 + 192 a^4 b^2 c^5 e^g h^2 - 174 a^2 b^5 c^4 d^f k^2 j + 42 a^2 b^7 c^2 d^f k^2 j^2 - 32 a^3 b^3 c^5 e^f k^2 i + 16 a^3 b^4 c^4 e^g h^2 - 320 a^3 b^2 c^6 d^e \\
& k^2 j - 224 a^3 b^3 c^5 d^g k^2 h + 192 a^4 b^2 c^5 d^f k^2 i + 192 a^3 b^2 c^6 e^2 f^h - 32 a^3 b^4 c^4 d^f k^2 i + 24 a^2 b^5 c^4 d^g k^2 h - 864 a^3 b^2 c^6 \\
& d^f k^2 h + 480 a^2 b^3 c^6 d^2 e^i + 336 a^3 b^3 c^5 d^f h^2 + 192 a^3 b^2 c^6 e^f k^2 g + 144 a^2 b^3 c^6 d^2 f^h - 30 a^2 b^5 c^4 d^f h^2 + 16 a^2 b^4 \\
& c^5 e^f k^2 g - 12 a^2 b^4 c^5 d^f k^2 h + 192 a^3 b^2 c^6 d^f g^2 + 96 a^2 b^3 c^6 d^e k^2 h + 48 a^2 b^4 c^5 d^f g^2 + 960 a^2 b^2 c^7 d^2 e^g + 192 a^2 \\
& b^2 c^7 d^e k^2 f - 3072 a^8 b^3 c^2 j^2 k^2 + 1104 a^7 b^3 c^j^2 k^2 + 768 a^6 b^4 c^i k^2 - 256 a^6 b^3 c^2 i^3 k + 1536 a^7 b^3 c^h k^2 - 960 a^7 b^3 c^i \\
& k^2 j^2 + 444 a^5 b^5 c^h k^2 - 16 a^5 b^5 c^i k^2 j^2 - 3072 a^7 b^2 c^2 g^k^3 - 496 a^6 b^3 c^2 h^j^3 + 192 a^4 b^6 c^g k^2 - 192 a^4 b^4 c^3 g^3 k \\
& + 144 a^5 b^3 c^3 h^3 j + 32 a^3 b^6 c^2 g^3 k - 18 a^4 b^5 c^2 h^3
\end{aligned}$$

$$\begin{aligned}
& *j - 9*a^4*b^6*c*h^2*j^2 - 192*a^6*b*c^4*h^2*i^2 + 36*a^3*b^7*c*f^2*k^2 - 4 \\
& *a^3*b^7*c*g^2*j^2 - 2176*a^6*b^3*c^2*e*k^3 - 256*a^3*b^3*c^5*e^3*k - 192*a \\
& ^6*b^2*c^3*f*j^3 - 192*a^4*b^2*c^5*f^3*j + 132*a^5*b^4*c^2*f*j^3 + 128*a^4* \\
& b^3*c^4*g^3*i - 28*a^3*b^4*c^4*f^3*j + 6*a^2*b^6*c^3*f^3*j + 10752*a^5*b*c^ \\
& 5*d^2*k^2 - 960*a^5*b*c^5*e^2*j^2 - 192*a^5*b*c^5*f^2*i^2 - 1680*a^5*b^3*c^ \\
& 3*d*j^3 - 1680*a^2*b^3*c^6*d^3*j + 222*a^4*b^5*c^2*d*j^3 + 80*a^4*b^3*c^4*f \\
& *h^3 + 80*a^3*b^3*c^5*f^3*h + 30*a*b^8*c^2*d^2*j^2 + 6*a^3*b^5*c^3*f*h^3 + \\
& 6*a^2*b^5*c^4*f^3*h - 960*a^4*b*c^6*d^2*i^2 - 192*a^4*b*c^6*e^2*h^2 - 192*a \\
& ^4*b^2*c^5*d*h^3 - 192*a^2*b^2*c^7*d^3*h + 128*a^3*b^3*c^5*e*g^3 - 28*a^3*b \\
& ^4*c^4*d*h^3 + 12*a*b^6*c^4*d^2*h^2 + 6*a^2*b^6*c^3*d*h^3 - 192*a^3*b*c^7*e \\
& ^2*f^2 + 60*a*b^5*c^5*d^2*g^2 + 198*a*b^4*c^6*d^2*f^2 + 144*a^2*b^3*c^6*d*f \\
& ^3 - 960*a^2*b*c^8*d^2*e^2 + 240*a*b^3*c^7*d^2*e^2 + 4608*a^8*c^3*i*j^2*k - \\
& 3072*a^8*c^3*h*j*k^2 - 512*a^7*c^4*h^2*i*k + 120*a^5*b^6*h*j*k^2 + 768*a^7 \\
& *c^4*h*i^2*j + 4608*a^7*c^4*e*j^2*k + 512*a^6*c^5*f^2*i*k + 64*a^4*b^7*g*i* \\
& k^2 - 40*a^4*b^7*f*j*k^2 - 9216*a^7*c^4*d*j*k^2 - 4096*a^7*c^4*e*i*k^2 - 10 \\
& 24*a^7*c^4*f*h*k^2 - 4608*a^5*c^6*d^2*i*k - 512*a^6*c^5*e*h^2*k - 192*a^6*c \\
& ^5*f*h^2*j - 40*a^3*b^8*d*j*k^2 + 24*a^3*b^8*f*h*k^2 + 2304*a^6*c^5*d*i^2*j \\
& + 768*a^5*c^6*e^2*h*j + 256*a^6*c^5*f*h*i^2 + 8*b^9*c^2*d^2*g*k - 2*b^9*c^ \\
& 2*d^2*h*j + 6144*a^8*b*c^2*i*k^3 - 2176*a^7*b^3*c*i*k^3 - 1728*a^6*c^5*d*h* \\
& j^2 + 1536*a^7*b*c^3*i^3*k + 512*a^5*c^6*e*f^2*k + 24*a^2*b^9*d*h*k^2 - 307 \\
& 2*a^6*c^5*d*f*k^2 - 16*b^8*c^3*d^2*e*k + 6*b^8*c^3*d^2*f*j - 4608*a^4*c^7*d \\
& ^2*e*k + 2016*a^7*b*c^3*h*j^3 - 1728*a^4*c^7*d^2*f*j + 1088*a^6*b^4*c*g*k^3 \\
& + 224*a^6*b*c^4*h^3*j + 30*a^5*b^5*c*h*j^3 + 2304*a^4*c^7*d*e^2*j + 768*a^ \\
& 5*c^6*d*f*i^2 + 256*a^4*c^7*e^2*f*h + 6*b^7*c^4*d^2*f*h + 6144*a^7*b*c^3*e* \\
& k^3 + 1536*a^4*b*c^6*e^3*k + 512*a^6*b*c^4*g*i^3 + 192*a^5*b^5*c*e*k^3 - 19 \\
& 2*a^4*c^7*d*f^2*h - 10*a^4*b^6*c*f*j^3 + 108*a*b^9*c*d^2*k^2 + 16*b^6*c^5*d \\
& ^2*e*g + 4320*a^6*b*c^4*d*j^3 + 4320*a^3*b*c^7*d^3*j + 222*a*b^5*c^5*d^3*j \\
& + 96*a^5*b*c^5*f*h^3 + 96*a^4*b*c^6*f^3*h - 10*a^3*b^7*c*d*j^3 + 768*a^3*c^ \\
& 8*d*e^2*f + 512*a^3*b*c^7*e^3*g + 132*a*b^4*c^6*d^3*h + 2016*a^2*b*c^8*d^3* \\
& f - 496*a*b^3*c^7*d^3*f + 224*a^3*b*c^7*d*f^3 - 18*a*b^5*c^5*d*f^3 - 1920*a \\
& ^7*b^2*c^2*i^2*k^2 - 1648*a^6*b^3*c^2*h^2*k^2 + 240*a^6*b^3*c^2*i^2*j^2 - 9 \\
& 60*a^6*b^2*c^3*h^2*j^2 - 512*a^6*b^2*c^3*g^2*k^2 - 480*a^5*b^4*c^2*g^2*k^2 \\
& + 198*a^5*b^4*c^2*h^2*j^2 - 240*a^5*b^3*c^3*g^2*j^2 - 240*a^5*b^3*c^3*f^2*k \\
& ^2 + 60*a^4*b^5*c^2*g^2*j^2 - 36*a^4*b^5*c^2*f^2*k^2 - 16*a^5*b^3*c^3*h^2*i \\
& ^2 - 1920*a^5*b^2*c^4*e^2*k^2 + 768*a^4*b^4*c^3*e^2*k^2 - 464*a^5*b^2*c^4*f \\
& ^2*j^2 - 384*a^5*b^2*c^4*g^2*i^2 - 64*a^3*b^6*c^2*e^2*k^2 + 42*a^4*b^4*c^3* \\
& f^2*j^2 + 12*a^3*b^6*c^2*f^2*j^2 - 13104*a^4*b^3*c^4*d^2*k^2 + 5628*a^3*b^5 \\
& *c^3*d^2*k^2 - 1128*a^2*b^7*c^2*d^2*k^2 + 240*a^4*b^3*c^4*e^2*j^2 - 48*a^4* \\
& b^3*c^4*g^2*h^2 - 16*a^4*b^3*c^4*f^2*i^2 - 16*a^3*b^5*c^3*e^2*j^2 - 4*a^3*b \\
& ^5*c^3*g^2*h^2 - 2880*a^4*b^2*c^5*d^2*j^2 + 1750*a^3*b^4*c^4*d^2*j^2 - 345* \\
& a^2*b^6*c^3*d^2*j^2 - 192*a^4*b^2*c^5*f^2*h^2 - 42*a^3*b^4*c^4*f^2*h^2 + 24 \\
& 0*a^3*b^3*c^5*d^2*i^2 - 48*a^3*b^3*c^5*f^2*g^2 - 16*a^3*b^3*c^5*e^2*h^2 - 1 \\
& 6*a^2*b^5*c^4*d^2*i^2 - 4*a^2*b^5*c^4*f^2*g^2 - 464*a^3*b^2*c^6*d^2*h^2 - 3 \\
& 84*a^3*b^2*c^6*e^2*g^2 + 42*a^2*b^4*c^5*d^2*h^2 - 240*a^2*b^3*c^6*d^2*g^2 - \\
& 16*a^2*b^3*c^6*e^2*f^2 - 960*a^2*b^2*c^7*d^2*f^2 - 8*a*b^10*d*f*k^2 - a^2*
\end{aligned}$$

$$\begin{aligned}
& b^8*c*f^2*j^2 - 2048*a^8*c^3*i^2*k^2 - 100*a^6*b^5*j^2*k^2 - 64*a^5*b^6*i^2 \\
& *k^2 - 288*a^7*c^4*h^2*j^2 - 36*a^4*b^7*h^2*k^2 - 16*a^3*b^8*g^2*k^2 - 2048 \\
& *a^6*c^5*e^2*k^2 - 864*a^6*c^5*f^2*j^2 - 4*a^2*b^9*f^2*k^2 - 2592*a^5*c^6*d \\
& ^2*j^2 - 1536*a^5*c^6*e^2*i^2 - 32*a^5*c^6*f^2*h^2 - 864*a^4*c^7*d^2*h^2 + \\
& 360*a^7*b^2*c^2*j^4 - 4*b^7*c^4*d^2*g^2 - 9*b^6*c^5*d^2*f^2 - 288*a^3*c^8*d \\
& ^2*f^2 - 24*a^5*b^2*c^4*h^4 - 16*b^5*c^6*d^2*e^2 - 9*a^4*b^4*c^3*h^4 - 16*a \\
& ^3*b^4*c^4*g^4 - 24*a^3*b^2*c^6*f^4 - 9*a^2*b^4*c^5*f^4 - a^2*b^6*c^3*f^2*h \\
& ^2 + 192*a^6*b^5*i*k^3 - 96*a^5*b^6*g*k^3 - 1728*a^7*c^4*f*j^3 - 192*a^5*c^ \\
& 6*f^3*j - 10*b^7*c^4*d^3*j - 1024*a^6*c^5*e*i^3 - 1024*a^4*c^7*e^3*i + 1536 \\
& *a^8*b^2*c*k^4 - 10*b^6*c^5*d^3*h - 1728*a^3*c^8*d^3*h - 192*a^5*c^6*d*h^3 \\
& - 25*a^6*b^4*c*j^4 + 30*b^5*c^6*d^3*f + 360*a*b^2*c^8*d^4 - 4*b^11*d^2*k^2 \\
& - 4096*a^9*c^2*k^4 - 1296*a^8*c^3*j^4 - 144*a^7*b^4*k^4 - 256*a^7*c^4*i^4 - \\
& 16*a^6*c^5*h^4 - 16*a^4*c^7*f^4 - 256*a^3*c^8*e^4 - 25*b^4*c^7*d^4 - 1296* \\
& a^2*c^9*d^4 - b^8*c^3*d^2*h^2 - b^10*c*d^2*j^2, z, n) * ((3072*a^5*c^6*d*k - \\
& 512*a^4*c^7*e*f - 1536*a^5*c^6*e*j - 512*a^5*c^6*f*i + 1024*a^6*c^5*h*k - 1 \\
& 536*a^6*c^5*i*j + 32*a*b^5*c^5*d*e + 1024*a^3*b*c^7*d*e - 16*a*b^6*c^4*d*g \\
& + 1024*a^4*b*c^6*d*i + 512*a^4*b*c^6*e*h + 256*a^4*b*c^6*f*g + 16*a*b^8*c^2 \\
& *d*k + 256*a^5*b*c^5*f*k + 768*a^5*b*c^5*g*j + 512*a^5*b*c^5*h*i + 1792*a^6 \\
& *b*c^4*j*k - 384*a^2*b^3*c^6*d*e + 192*a^2*b^4*c^5*d*g + 32*a^2*b^4*c^5*e*f \\
& - 512*a^3*b^2*c^6*d*g + 32*a^2*b^5*c^4*d*i - 16*a^2*b^5*c^4*f*g - 384*a^3* \\
& b^3*c^5*d*i - 128*a^3*b^3*c^5*e*h - 288*a^2*b^6*c^3*d*k + 1792*a^3*b^4*c^4* \\
& d*k - 32*a^3*b^4*c^4*e*j + 32*a^3*b^4*c^4*f*i + 64*a^3*b^4*c^4*g*h - 4352*a \\
& ^4*b^2*c^5*d*k + 512*a^4*b^2*c^5*e*j - 256*a^4*b^2*c^5*g*h + 16*a^2*b^7*c^2 \\
& *f*k - 144*a^3*b^5*c^3*f*k + 16*a^3*b^5*c^3*g*j + 256*a^4*b^3*c^4*f*k - 256 \\
& *a^4*b^3*c^4*g*j - 128*a^4*b^3*c^4*h*i - 48*a^3*b^6*c^2*h*k + 512*a^4*b^4*c \\
& ^3*h*k - 32*a^4*b^4*c^3*i*j - 1536*a^5*b^2*c^4*h*k + 512*a^5*b^2*c^4*i*j + \\
& 80*a^4*b^5*c^2*j*k - 768*a^5*b^3*c^3*j*k) / (8*(64*a^5*c^5 - a^2*b^6*c^2 + 12 \\
& *a^3*b^4*c^3 - 48*a^4*b^2*c^4)) - \text{root}(1572864*a^8*b^2*c^9*z^4 - 983040*a^7 \\
& *b^4*c^8*z^4 + 327680*a^6*b^6*c^7*z^4 - 61440*a^5*b^8*c^6*z^4 + 6144*a^4*b^ \\
& 10*c^5*z^4 - 256*a^3*b^12*c^4*z^4 - 1048576*a^9*c^10*z^4 - 1572864*a^8*b^2* \\
& c^7*k*z^3 + 983040*a^7*b^4*c^6*k*z^3 - 327680*a^6*b^6*c^5*k*z^3 + 61440*a^5 \\
& *b^8*c^4*k*z^3 - 6144*a^4*b^10*c^3*k*z^3 + 256*a^3*b^12*c^2*k*z^3 + 1048576 \\
& *a^9*c^8*k*z^3 + 98304*a^8*b*c^6*i*k*z^2 + 98304*a^7*b*c^7*e*k*z^2 + 57344* \\
& a^7*b*c^7*f*j*z^2 + 32768*a^7*b*c^7*g*i*z^2 + 57344*a^6*b*c^8*d*h*z^2 + 327 \\
& 68*a^6*b*c^8*e*g*z^2 - 32*a*b^10*c^4*d*f*z^2 - 90112*a^7*b^3*c^5*i*k*z^2 + \\
& 30720*a^6*b^5*c^4*i*k*z^2 - 4608*a^5*b^7*c^3*i*k*z^2 + 256*a^4*b^9*c^2*i*k* \\
& z^2 - 49152*a^7*b^2*c^6*g*k*z^2 + 45056*a^6*b^4*c^5*g*k*z^2 + 24576*a^7*b^2 \\
& *c^6*h*j*z^2 - 15360*a^5*b^6*c^4*g*k*z^2 - 3072*a^5*b^6*c^4*h*j*z^2 + 2304* \\
& a^4*b^8*c^3*g*k*z^2 + 2048*a^6*b^4*c^5*h*j*z^2 + 576*a^4*b^8*c^3*h*j*z^2 - \\
& 128*a^3*b^10*c^2*g*k*z^2 - 32*a^3*b^10*c^2*h*j*z^2 - 90112*a^6*b^3*c^6*e*k* \\
& z^2 - 49152*a^6*b^3*c^6*f*j*z^2 + 30720*a^5*b^5*c^5*e*k*z^2 - 24576*a^6*b^3 \\
& *c^6*g*i*z^2 + 15360*a^5*b^5*c^5*f*j*z^2 + 6144*a^5*b^5*c^5*g*i*z^2 - 4608* \\
& a^4*b^7*c^4*e*k*z^2 - 2048*a^4*b^7*c^4*f*j*z^2 - 512*a^4*b^7*c^4*g*i*z^2 + \\
& 256*a^3*b^9*c^3*e*k*z^2 + 96*a^3*b^9*c^3*f*j*z^2 + 131072*a^6*b^2*c^7*d*j*z \\
& ^2 + 49152*a^6*b^2*c^7*e*i*z^2 - 43008*a^5*b^4*c^6*d*j*z^2 - 12288*a^5*b^4*
\end{aligned}$$

$$\begin{aligned}
& c^6 e i z^2 + 6144 a^5 b^4 c^6 f h z^2 + 6144 a^4 b^6 c^5 d j z^2 - 2048 a^4 b^6 c^5 f h z^2 + 1024 a^4 b^6 c^5 e i z^2 - 320 a^3 b^8 c^4 d j z^2 + 19 \\
& 2 a^3 b^8 c^4 f h z^2 - 49152 a^5 b^3 c^7 d h z^2 - 24576 a^5 b^3 c^7 e g z^2 + 15360 a^4 b^5 c^6 d h z^2 + 6144 a^4 b^5 c^6 e g z^2 - 2048 a^3 b^7 c^5 d h z^2 - 512 a^3 b^7 c^5 e g z^2 + 96 a^2 b^9 c^4 d h z^2 + 24576 a^5 b^2 c^8 d f z^2 - 3072 a^3 b^6 c^6 d f z^2 + 2048 a^4 b^4 c^7 d f z^2 + 576 a^4 b^8 c^5 d f z^2 + 1536 a^4 b^10 c^k^2 z^2 + 61440 a^8 b^c^6 j^2 z^2 - 16 a^3 b^11 c^j^2 z^2 + 12288 a^7 b^c^7 h^2 z^2 + 12288 a^6 b^c^8 f^2 z^2 + 61440 a^5 b^c^9 d^2 z^2 + 432 a^a b^9 c^5 d^2 z^2 - 49152 a^8 c^7 h^j z^2 - 147456 a^7 c^8 d^j z^2 - 65536 a^7 c^8 e i z^2 - 16384 a^7 c^8 f h z^2 - 49152 a^6 c^9 d f z^2 + 516096 a^8 b^2 c^5 k^2 z^2 - 288768 a^7 b^4 c^4 k^2 z^2 + 88576 a^6 b^6 c^3 k^2 z^2 - 15744 a^5 b^8 c^2 k^2 z^2 - 61440 a^7 b^3 c^5 j^2 z^2 + 24064 a^6 b^5 c^4 j^2 z^2 - 4608 a^5 b^7 c^3 j^2 z^2 + 432 a^4 b^9 c^2 j^2 z^2 + 24576 a^7 b^2 c^6 i^2 z^2 - 6144 a^6 b^4 c^5 i^2 z^2 + 512 a^5 b^6 c^4 i^2 z^2 - 8192 a^6 b^3 c^6 h^2 z^2 + 1536 a^5 b^5 c^5 h^2 z^2 - 16 a^3 b^9 c^3 h^2 z^2 - 8192 a^6 b^2 c^7 g^2 z^2 + 6144 a^5 b^4 c^6 g^2 z^2 - 1536 a^4 b^6 c^5 g^2 z^2 + 128 a^3 b^8 c^4 g^2 z^2 - 8192 a^5 b^3 c^7 f^2 z^2 + 1536 a^4 b^5 c^6 f^2 z^2 - 16 a^2 b^9 c^4 f^2 z^2 + 24576 a^5 b^2 c^8 e^2 z^2 - 6144 a^4 b^4 c^7 e^2 z^2 + 512 a^3 b^6 c^6 e^2 z^2 - 61440 a^4 b^3 c^8 d^2 z^2 + 24064 a^3 b^5 c^7 d^2 z^2 - 4608 a^2 b^7 c^6 d^2 z^2 - 393216 a^9 c^6 k^2 z^2 - 64 a^3 b^12 k^2 z^2 - 32768 a^8 c^7 i^2 z^2 - 32768 a^6 c^9 e^2 z^2 - 16 b^11 c^4 d^2 z^2 - 16384 a^7 b^c^5 g^i k z - 10240 a^7 b^c^5 f^j k z + 4096 a^7 b^c^5 h^i j z - 47104 a^6 b^c^6 d^h k z - 16384 a^6 b^c^6 e^g k z + 6144 a^6 b^c^6 f^g j z + 4096 a^6 b^c^6 e^h j z + 32 a^a b^10 c^2 d^f k z - 6144 a^5 b^c^7 d^g h z - 4096 a^5 b^c^7 d^f i z - 32 a^a b^8 c^4 d^f g z - 4096 a^4 b^c^8 d^e f z + 64 a^a b^7 c^5 d^e f z - 18432 a^7 b^2 c^4 h^j k z + 4608 a^6 b^4 c^3 h^j k z - 384 a^5 b^6 c^2 h^j k z + 12288 a^6 b^3 c^4 g^i k z + 7680 a^6 b^3 c^4 f^j k z - 3072 a^6 b^3 c^4 h^i j z - 3072 a^5 b^5 c^3 g^i k z - 1920 a^5 b^5 c^3 f^j k z + 768 a^5 b^5 c^3 h^i j z + 256 a^4 b^7 c^2 g^i k z + 160 a^4 b^7 c^2 f^j k z - 64 a^4 b^7 c^2 h^i j z - 65536 a^6 b^2 c^5 d^j k z - 24576 a^6 b^2 c^5 e^i k z + 21504 a^5 b^4 c^4 d^j k z + 9216 a^6 b^2 c^5 f^i j z + 6144 a^5 b^4 c^4 e^i k z - 3072 a^5 b^4 c^4 f^h k z - 3072 a^4 b^6 c^3 d^j k z - 2304 a^5 b^4 c^4 f^i j z - 2048 a^6 b^2 c^5 g^h j z + 1536 a^5 b^4 c^4 g^h j z + 1024 a^4 b^6 c^3 f^h k z - 512 a^4 b^6 c^3 e^i k z - 384 a^4 b^6 c^3 g^h j z + 192 a^4 b^6 c^3 f^i j z + 160 a^3 b^8 c^2 d^j k z - 96 a^3 b^8 c^2 f^h k z + 32 a^3 b^8 c^2 g^h j z + 41472 a^5 b^3 c^5 d^h k z - 13440 a^4 b^5 c^4 d^h k z + 12288 a^5 b^3 c^5 e^g k z - 4608 a^5 b^3 c^5 f^g j z - 3072 a^5 b^3 c^5 e^h j z - 3072 a^4 b^5 c^4 e^g k z + 1888 a^3 b^7 c^3 d^h k z + 1152 a^4 b^5 c^4 f^g j z + 768 a^4 b^5 c^4 e^h j z + 256 a^3 b^7 c^3 e^g k z - 96 a^3 b^7 c^3 f^g j z - 96 a^2 b^9 c^2 d^h k z - 64 a^3 b^7 c^3 e^h j z + 9216 a^5 b^2 c^6 e^f j z - 9216 a^5 b^2 c^6 d^h i z - 6656 a^4 b^4 c^5 d^f k z - 6144 a^5 b^2 c^6 d^f k z + 3456 a^3 b^6 c^4 d^f k z - 2304 a^4 b^4 c^5 e^f j z + 2304 a^4 b^4 c^5 d^h i z - 576 a^2 b^8 c^3 d^f k z + 192 a^3 b^6 c^4 e^f j z - 192 a^3 b^6 c^4 d^h i z + 4608 a^4 b^3 c^6 d^g h z + 3072 a^4 b^3 c^6
\end{aligned}$$

$d*f*i*z - 1152*a^3*b^5*c^5*d*g*h*z - 768*a^3*b^5*c^5*d*f*i*z + 96*a^2*b^7*c^4*d*g*h*z + 64*a^2*b^7*c^4*d*f*i*z - 9216*a^4*b^2*c^7*d*e*h*z + 2304*a^3*b^4*c^6*d*e*h*z + 2048*a^4*b^2*c^7*d*f*g*z - 1536*a^3*b^4*c^6*d*f*g*z + 384*a^2*b^6*c^5*d*f*g*z - 192*a^2*b^6*c^5*d*e*h*z + 3072*a^3*b^3*c^7*d*e*f*z - 768*a^2*b^5*c^6*d*e*f*z - 3072*a^8*b*c^4*j^2*k*z + 48*a^5*b^7*c*j^2*k*z - 49152*a^8*b*c^4*i*k^2*z + 2304*a^5*b^7*c*i*k^2*z - 9216*a^7*b*c^5*h^2*k*z - 32*a^4*b^8*c*i*j^2*z - 1152*a^4*b^8*c*g*k^2*z + 9216*a^7*b*c^5*g*j^2*z - 3072*a^6*b*c^6*f^2*k*z + 16*a^3*b^9*c*g*j^2*z - 49152*a^7*b*c^5*e*k^2*z - 128*a^3*b^9*c*e*k^2*z - 58368*a^5*b*c^7*d^2*k*z - 1024*a^6*b*c^6*g*h^2*z - 432*a*b^9*c^3*d^2*k*z + 1024*a^5*b*c^7*f^2*g*z + 32*a*b^8*c^4*d^2*i*z - 9216*a^4*b*c^8*d^2*g*z + 336*a*b^7*c^5*d^2*g*z - 672*a*b^6*c^6*d^2*e*z + 24576*a^8*c^5*h*j*k*z + 73728*a^7*c^6*d*j*k*z + 32768*a^7*c^6*e*i*k*z - 12288*a^7*c^6*f*i*j*z + 8192*a^7*c^6*f*h*k*z + 24576*a^6*c^7*d*f*k*z - 12288*a^6*c^7*e*f*j*z + 12288*a^6*c^7*d*h*i*z + 12288*a^5*c^8*d*e*h*z + 2304*a^7*b^3*c^3*j^2*k*z - 576*a^6*b^5*c^2*j^2*k*z + 45056*a^7*b^3*c^3*i*k^2*z - 15360*a^6*b^5*c^2*i*k^2*z - 12288*a^7*b^2*c^4*i^2*k*z + 3072*a^6*b^4*c^3*i^2*k*z - 256*a^5*b^6*c^2*i^2*k*z + 15872*a^7*b^2*c^4*i*j^2*z + 6912*a^6*b^3*c^4*h^2*k*z - 4992*a^6*b^4*c^3*i*j^2*z - 1728*a^5*b^5*c^3*h^2*k*z + 672*a^5*b^6*c^2*i*j^2*z + 144*a^4*b^7*c^2*h^2*k*z + 24576*a^7*b^2*c^4*g*k^2*z - 22528*a^6*b^4*c^3*g*k^2*z + 7680*a^5*b^6*c^2*g*k^2*z + 4096*a^6*b^2*c^5*g^2*k*z - 3072*a^5*b^4*c^4*g^2*k*z + 768*a^4*b^6*c^3*g^2*k*z - 64*a^3*b^8*c^2*g^2*k*z - 7936*a^6*b^3*c^4*g*j^2*z + 2496*a^5*b^5*c^3*g*j^2*z - 1536*a^6*b^2*c^5*h^2*i*z + 1280*a^5*b^3*c^5*f^2*k*z + 384*a^5*b^4*c^4*h^2*i*z - 336*a^4*b^7*c^2*g*j^2*z + 192*a^4*b^5*c^4*f^2*k*z - 144*a^3*b^7*c^3*f^2*k*z - 32*a^4*b^6*c^3*h^2*i*z + 16*a^2*b^9*c^2*f^2*k*z + 45056*a^6*b^3*c^4*e*k^2*z - 15360*a^5*b^5*c^3*e*k^2*z - 12288*a^5*b^2*c^6*e^2*k*z + 3072*a^4*b^4*c^5*e^2*k*z + 2304*a^4*b^7*c^2*e*k^2*z - 256*a^3*b^6*c^4*e^2*k*z + 59136*a^4*b^3*c^6*d^2*k*z - 23488*a^3*b^5*c^5*d^2*k*z + 15872*a^6*b^2*c^5*e*j^2*z - 4992*a^5*b^4*c^4*e*j^2*z + 4560*a^2*b^7*c^4*d^2*k*z + 1536*a^5*b^2*c^6*f^2*i*z + 768*a^5*b^3*c^5*g*h^2*z + 672*a^4*b^6*c^3*e*j^2*z - 384*a^4*b^4*c^5*f^2*i*z - 192*a^4*b^5*c^4*g*h^2*z - 32*a^3*b^8*c^2*e*j^2*z + 32*a^3*b^6*c^4*f^2*i*z + 16*a^3*b^7*c^3*g*h^2*z - 15872*a^4*b^2*c^7*d^2*i*z + 4992*a^3*b^4*c^6*d^2*i*z - 1536*a^5*b^2*c^6*e*h^2*z - 768*a^4*b^3*c^6*f^2*g*z - 672*a^2*b^6*c^5*d^2*i*z + 384*a^4*b^4*c^5*e*h^2*z + 192*a^3*b^5*c^5*f^2*g*z - 32*a^3*b^6*c^4*e*h^2*z - 16*a^2*b^7*c^4*f^2*g*z + 7936*a^3*b^3*c^7*d^2*g*z - 2496*a^2*b^5*c^6*d^2*g*z + 1536*a^4*b^2*c^7*e*f^2*z - 384*a^3*b^4*c^6*e*f^2*z + 32*a^2*b^6*c^5*e*f^2*z - 15872*a^3*b^2*c^8*d^2*e*z + 4992*a^2*b^4*c^7*d^2*e*z - 61440*a^8*b^2*c^3*k^3*z + 21504*a^7*b^4*c^2*k^3*z + 16384*a^8*c^5*i^2*k*z - 18432*a^8*c^5*i*j^2*z - 128*a^4*b^9*i*k^2*z + 2048*a^7*c^6*h^2*i*z + 64*a^3*b^10*g*k^2*z + 16384*a^6*c^7*e^2*k*z + 16*b^11*c^2*d^2*k*z - 18432*a^7*c^6*e*j^2*z - 2048*a^6*c^7*f^2*i*z + 18432*a^5*c^8*d^2*i*z - 3328*a^6*b^6*c*k^3*z + 2048*a^6*c^7*e*h^2*z - 16*b^9*c^4*d^2*g*z - 2048*a^5*c^8*e*f^2*z + 32*b^8*c^5*d^2*e*z + 18432*a^4*c^9*d^2*e*z + 65536*a^9*c^4*k^3*z + 192*a^5*b^8*k^3*z - 3328*a^7*b*c^3*h*i*j*k - 6912*a^6*b*c^4*d*i*j*k - 3328*a^6*b*c^4*e*h*j*k - 1536*a^6*b*c^4*f*g*j*k - 768*a^6*b*c^4*g*h*i*j - 768*a^6*b*c^4*f*h*i*k - 69$

$$\begin{aligned}
& 12a^5b^5c^5d^5e^5j^5k - 2304a^5b^5c^5d^5g^5i^5j - 1792a^5b^5c^5e^5f^5i^5j + 15 \\
& 36a^5b^5c^5d^5g^5h^5k - 1280a^5b^5c^5d^5f^5i^5k - 768a^5b^5c^5e^5g^5h^5j - 768 \\
& a^5b^5c^5e^5f^5h^5k - 256a^5b^5c^5f^5g^5h^5i + 16a^4b^8c^2d^2f^2g^2k - 4a^4b^8 \\
& c^2d^2f^2h^2j - 2304a^4b^5c^6d^5e^5g^5j - 1792a^4b^5c^6d^5e^5h^5i - 1280a^4b \\
& c^6d^5e^5f^5k - 768a^4b^5c^6d^5f^5g^5i - 256a^4b^5c^6e^5f^5g^5h - 32a^4b^7c^3 \\
& d^5e^5f^5k - 768a^3b^5c^7d^5e^5f^5g + 32a^4b^5c^5d^5e^5f^5g + 576a^6b^3c^2h \\
& i^5j^5k + 1664a^6b^2c^3g^5h^5j^5k + 384a^6b^2c^3f^5i^5j^5k - 288a^5b^4c \\
& ^2g^5h^5j^5k - 160a^5b^4c^2f^5i^5j^5k + 2112a^5b^3c^3d^5i^5j^5k + 576a^5b \\
& ^3c^3e^5h^5j^5k - 448a^5b^3c^3f^5h^5i^5k - 192a^5b^3c^3g^5h^5i^5j - 192a^ \\
& 5b^3c^3f^5g^5j^5k - 160a^4b^5c^2d^5i^5j^5k + 96a^4b^5c^2f^5h^5i^5k + 80a \\
& ^4b^5c^2f^5g^5j^5k + 32a^4b^5c^2g^5h^5i^5j + 4992a^5b^2c^4d^5h^5i^5k - 46 \\
& 08a^5b^2c^4e^5g^5i^5k + 3456a^5b^2c^4d^5g^5j^5k - 1312a^4b^4c^3d^5h^5i^5 \\
& k - 1056a^4b^4c^3d^5g^5j^5k + 896a^5b^2c^4f^5g^5i^5j + 768a^4b^4c^3e^5 \\
& g^5i^5k + 384a^5b^2c^4f^5g^5h^5k + 384a^5b^2c^4e^5h^5i^5j + 384a^5b^2c^4 \\
& e^5f^5j^5k + 224a^4b^4c^3f^5g^5h^5k - 160a^4b^4c^3e^5f^5j^5k - 96a^4b^4c \\
& ^3f^5g^5i^5j + 96a^3b^6c^2d^5h^5i^5k + 80a^3b^6c^2d^5g^5j^5k - 64a^4b^4c \\
& ^3e^5h^5i^5j - 48a^3b^6c^2f^5g^5h^5k - 2496a^4b^3c^4d^5g^5h^5k + 2112a^4b \\
& ^3c^4d^5e^5j^5k - 960a^4b^3c^4d^5f^5i^5k + 656a^3b^5c^3d^5g^5h^5k - 448a^ \\
& 4b^3c^4e^5f^5h^5k + 384a^3b^5c^3d^5f^5i^5k + 320a^4b^3c^4d^5g^5i^5j - 192 \\
& a^4b^3c^4f^5g^5h^5i - 192a^4b^3c^4e^5g^5h^5j + 192a^4b^3c^4e^5f^5i^5j - \\
& 160a^3b^5c^3d^5e^5j^5k + 96a^3b^5c^3e^5f^5h^5k - 48a^2b^7c^2d^5g^5h^5k + \\
& 32a^3b^5c^3e^5g^5h^5j - 32a^2b^7c^2d^5f^5i^5k + 4992a^4b^2c^5d^5e^5h^5k \\
& - 3584a^4b^2c^5d^5f^5h^5j - 1312a^3b^4c^4d^5e^5h^5k + 896a^4b^2c^5e^5 \\
& f^5g^5j + 896a^4b^2c^5d^5g^5h^5i + 640a^4b^2c^5d^5f^5g^5k - 640a^4b^2c^5 \\
& d^5e^5i^5j + 600a^3b^4c^4d^5f^5h^5j + 480a^3b^4c^4d^5f^5g^5k + 384a^4b^2c \\
& ^5e^5f^5h^5i - 192a^2b^6c^3d^5f^5g^5k - 96a^3b^4c^4e^5f^5g^5j - 96a^3b^4 \\
& c^4d^5g^5h^5i + 96a^2b^6c^3d^5e^5h^5k + 12a^2b^6c^3d^5f^5h^5j - 960a^3b^ \\
& 3c^5d^5e^5f^5k + 384a^2b^5c^4d^5e^5f^5k + 320a^3b^3c^5d^5e^5g^5j - 192a^3 \\
& b^3c^5e^5f^5g^5h - 192a^3b^3c^5d^5f^5g^5i + 192a^3b^3c^5d^5e^5h^5i + 32a \\
& ^2b^5c^4d^5f^5g^5i + 896a^3b^2c^6d^5e^5g^5h + 384a^3b^2c^6d^5e^5f^5i - 96 \\
& a^2b^4c^5d^5e^5g^5h - 64a^2b^4c^5d^5e^5f^5i - 192a^2b^3c^6d^5e^5f^5g + 4 \\
& 8a^6b^4c^5i^5j^2k - 1424a^6b^4c^5h^5j^2k^2 - 2304a^7b^5c^3g^5j^2k - 24a \\
& ^5b^5c^5g^5i^2k + 2048a^7b^5c^3g^5i^2k^2 - 1024a^7b^5c^3f^5j^2k^2 - 768a \\
& ^5b^5c^5g^5i^2k + 408a^5b^5c^5f^5j^2k^2 + 256a^6b^5c^4g^5h^2k + 16a^4b \\
& ^6c^5g^5i^2j + 4608a^6b^5c^4e^5i^2k + 4608a^5b^5c^5e^2i^5k - 896a^6b^5 \\
& c^4f^5i^2j + 768a^4b^6c^5d^5j^2k^2 - 256a^4b^6c^5f^5h^2k^2 - 128a^4b^6c \\
& ^5e^5i^2k + 2208a^6b^5c^4f^5h^2j^2 - 1920a^6b^5c^4e^5i^2j^2 + 800a^5b^5c^5 \\
& f^2h^5j - 256a^5b^5c^5f^2g^5k - 16a^4b^8c^2d^2i^5k + 6a^3b^7c^5f^5h^5j^ \\
& 2 + 8192a^6b^5c^4d^5h^5k^2 + 2048a^6b^5c^4e^5g^5k^2 - 472a^3b^7c^5d^5h^5k^2 \\
& + 64a^3b^7c^5e^5g^5k^2 + 4896a^4b^5c^6d^2h^5j + 2304a^4b^5c^6d^2g^5k + \\
& 1824a^5b^5c^5d^5h^2j - 384a^5b^5c^5e^5h^2i - 168a^4b^7c^3d^2g^5k + 4 \\
& 2a^4b^7c^3d^2h^5j + 6a^2b^8c^5d^5h^5j^2 + 1536a^5b^5c^5e^5g^5i^2 + 1536a \\
& ^4b^5c^6e^2g^5i - 896a^5b^5c^5d^5h^5i^2 - 896a^4b^5c^6e^2f^5j + 144a^2b \\
& ^8c^5d^5f^5k^2 + 4896a^5b^5c^5d^5f^5j^2 + 1824a^4b^5c^6d^5f^2j - 384a^4b \\
& ^5c^6e^5f^2i + 336a^4b^6c^4d^2e^5k - 156a^4b^6c^4d^2f^5j + 16a^4b^6c^4
\end{aligned}$$

$$\begin{aligned}
& d^2 g^i + 12 a^3 b^7 c^3 d^2 f^2 j + 2208 a^3 b^7 c^7 d^2 f^2 h - 1920 a^3 b^7 c^7 d^2 e^2 i + 800 a^4 b^7 c^6 d^2 f^2 h^2 - 102 a^3 b^5 c^5 d^2 f^2 h - 32 a^3 b^5 c^5 d^2 e^2 i + 12 a^3 b^6 c^4 d^2 f^2 h - 2 a^3 b^7 c^3 d^2 f^2 h^2 - 896 a^3 b^7 c^7 d^2 e^2 h - 8 a^3 b^6 c^4 d^2 f^2 g^2 - 240 a^3 b^4 c^6 d^2 e^2 g - 32 a^3 b^4 c^6 d^2 e^2 f + 3072 a^7 c^4 f^2 i^2 j^2 k + 3072 a^6 c^5 e^2 f^2 j^2 k - 3072 a^6 c^5 d^2 h^2 i^2 k + 1536 a^6 c^5 e^2 h^2 i^2 j + 4608 a^5 c^6 d^2 e^2 i^2 j - 3072 a^5 c^6 d^2 e^2 h^2 k - 1152 a^5 c^6 d^2 f^2 h^2 j + 512 a^5 c^6 e^2 f^2 h^2 i + 1536 a^4 c^7 d^2 e^2 f^2 i - 2 a^3 b^9 c^2 d^2 f^2 j^2 - 1088 a^7 b^2 c^2 i^2 j^2 k + 4800 a^7 b^2 c^2 h^2 j^2 k^2 + 960 a^6 b^2 c^3 h^2 i^2 k + 544 a^6 b^3 c^2 g^2 j^2 k - 144 a^5 b^4 c^2 h^2 i^2 k - 2304 a^6 b^2 c^3 g^2 i^2 k + 1920 a^6 b^3 c^2 g^2 i^2 k^2 + 1152 a^5 b^3 c^3 g^2 i^2 k - 864 a^6 b^3 c^2 f^2 j^2 k^2 + 384 a^5 b^4 c^2 g^2 i^2 k + 192 a^6 b^2 c^3 h^2 i^2 j - 192 a^4 b^5 c^2 g^2 i^2 k - 32 a^5 b^4 c^2 h^2 i^2 j - 1088 a^6 b^2 c^3 e^2 j^2 k + 960 a^6 b^2 c^3 g^2 i^2 j^2 - 480 a^5 b^3 c^3 g^2 h^2 k - 240 a^5 b^4 c^2 g^2 i^2 j^2 + 192 a^5 b^2 c^4 f^2 i^2 k + 72 a^4 b^5 c^2 g^2 h^2 k + 48 a^5 b^4 c^2 e^2 j^2 k + 48 a^4 b^4 c^3 f^2 i^2 k - 16 a^3 b^6 c^2 f^2 i^2 k + 13376 a^6 b^2 c^3 d^2 j^2 k^2 - 5136 a^5 b^4 c^2 d^2 j^2 k^2 - 3840 a^6 b^2 c^3 e^2 i^2 k^2 + 1536 a^5 b^4 c^2 e^2 i^2 k^2 - 768 a^5 b^3 c^3 e^2 i^2 k - 768 a^4 b^3 c^4 e^2 i^2 k + 624 a^5 b^4 c^2 f^2 h^2 k^2 + 576 a^6 b^2 c^3 f^2 h^2 k^2 + 192 a^5 b^2 c^4 g^2 h^2 j + 96 a^5 b^3 c^3 f^2 i^2 j + 48 a^4 b^4 c^3 g^2 h^2 j - 8 a^3 b^6 c^2 g^2 h^2 j + 6848 a^4 b^2 c^5 d^2 i^2 k - 2448 a^3 b^4 c^4 d^2 i^2 k + 960 a^5 b^2 c^4 e^2 h^2 k - 864 a^5 b^2 c^4 f^2 h^2 j + 480 a^5 b^3 c^3 e^2 i^2 j^2 + 336 a^4 b^3 c^4 f^2 h^2 j + 336 a^2 b^6 c^3 d^2 i^2 k + 192 a^5 b^2 c^4 g^2 h^2 i + 144 a^5 b^3 c^3 f^2 h^2 j^2 - 144 a^4 b^4 c^3 e^2 h^2 k - 102 a^4 b^5 c^2 f^2 h^2 j^2 - 96 a^4 b^3 c^4 f^2 g^2 k - 32 a^4 b^5 c^2 e^2 i^2 j^2 - 30 a^3 b^5 c^3 f^2 h^2 j - 24 a^3 b^5 c^3 f^2 g^2 k + 16 a^4 b^4 c^3 g^2 h^2 i - 12 a^4 b^4 c^3 f^2 h^2 j + 12 a^3 b^6 c^2 f^2 h^2 j + 8 a^2 b^7 c^2 f^2 g^2 k - 2 a^2 b^7 c^2 f^2 h^2 j - 9312 a^5 b^3 c^3 d^2 h^2 k^2 + 3288 a^4 b^5 c^2 d^2 h^2 k^2 - 2304 a^4 b^2 c^5 e^2 g^2 k + 1920 a^5 b^3 c^3 e^2 g^2 k^2 + 152 a^4 b^3 c^4 e^2 g^2 k - 768 a^4 b^5 c^2 e^2 g^2 k + 384 a^3 b^4 c^4 e^2 g^2 k - 320 a^5 b^2 c^4 d^2 i^2 j - 224 a^4 b^3 c^4 f^2 g^2 j + 192 a^5 b^2 c^4 f^2 h^2 i^2 + 192 a^4 b^2 c^5 e^2 h^2 j - 192 a^3 b^5 c^3 e^2 g^2 k - 32 a^3 b^4 c^4 e^2 h^2 j + 24 a^3 b^5 c^3 f^2 g^2 j - 3552 a^5 b^2 c^4 d^2 h^2 j^2 - 3424 a^3 b^3 c^5 d^2 g^2 k + 1332 a^4 b^4 c^3 d^2 h^2 j^2 + 1224 a^2 b^5 c^4 d^2 g^2 k + 960 a^5 b^2 c^4 e^2 g^2 j^2 - 496 a^3 b^3 c^5 d^2 h^2 j + 432 a^4 b^3 c^4 d^2 h^2 j - 240 a^4 b^4 c^3 e^2 g^2 j^2 - 222 a^2 b^5 c^4 d^2 h^2 j + 192 a^4 b^2 c^5 f^2 g^2 i + 192 a^4 b^2 c^5 e^2 f^2 k - 174 a^3 b^5 c^3 d^2 h^2 j - 156 a^3 b^6 c^2 d^2 h^2 j + 48 a^3 b^4 c^4 e^2 f^2 k - 32 a^4 b^3 c^4 e^2 h^2 i + 16 a^3 b^6 c^2 e^2 g^2 j + 16 a^3 b^4 c^4 f^2 g^2 i - 16 a^2 b^6 c^3 e^2 f^2 k + 12 a^2 b^7 c^2 d^2 h^2 j + 1728 a^5 b^2 c^4 d^2 f^2 k^2 + 1392 a^4 b^4 c^3 d^2 f^2 k^2 - 840 a^3 b^6 c^2 d^2 f^2 k^2 - 768 a^4 b^2 c^5 e^2 g^2 i + 576 a^4 b^2 c^5 d^2 g^2 j + 96 a^4 b^3 c^4 d^2 h^2 i^2 + 96 a^3 b^3 c^5 e^2 f^2 j - 80 a^3 b^4 c^4 d^2 g^2 j + 64 a^4 b^2 c^5 f^2 g^2 h + 48 a^3 b^4 c^4 f^2 g^2 h + 6848 a^3 b^2 c^6 d^2 e^2 k - 3552 a^3 b^2 c^6 d^2 f^2 j - 2448 a^2 b^4 c^5 d^2 e^2 k + 1332 a^2 b^4 c^5 d^2 f^2 j + 960 a^3 b^2 c^6 d^2 g^2 i - 496 a^4 b^3 c^4 d^2 f^2 j^2 + 432 a^3 b^3 c^5 d^2 f^2 j - 240 a^2 b^4 c^5 d^2 g^2 i - 222 a^3 b^5 c^3 d^2 f^2 j^2 + 192 a^4 b^2 c^5 e^2 g^2 h^2 - 174 a^2 b^5 c^4 d^2 f^2 j + 42 a^2 b^7 c^2 d^2 f^2 j^2 - 32 a^3 b^3 c^5 e^2 f^2 i + 16 a^
\end{aligned}$$

$$\begin{aligned}
& a^3b^4c^4eg^2h^2 - 320a^3b^2c^6d^2e^2j - 224a^3b^3c^5d^2g^2h + 192a^4b^2c^5d^2f^2i^2 + 192a^3b^2c^6e^2f^2h - 32a^3b^4c^4d^2f^2i^2 + \\
& 24a^2b^5c^4d^2g^2h - 864a^3b^2c^6d^2f^2h + 480a^2b^3c^6d^2e^2i + 336a^3b^3c^5d^2f^2h^2 + 192a^3b^2c^6e^2f^2g + 144a^2b^3c^6d^2f^2h - \\
& 30a^2b^5c^4d^2f^2h^2 + 16a^2b^4c^5e^2f^2g - 12a^2b^4c^5d^2f^2h + 192a^3b^2c^6d^2f^2g^2 + 96a^2b^3c^6d^2e^2h + 48a^2b^4c^5d^2f^2g^2 + \\
& 960a^2b^2c^7d^2e^2g + 192a^2b^2c^7d^2e^2f - 3072a^8b^3c^2j^2k^2 + 1104a^7b^3c^2j^2k^2 + 768a^6b^4c^2i^2k^2 - 256a^6b^3c^2i^3k + \\
& 1536a^7b^3c^2h^2k^2 - 960a^7b^3c^2i^2j^2 + 444a^5b^5c^2h^2k^2 - 16a^5b^5c^2i^2j^2 - 3072a^7b^2c^2g^2k^3 - 496a^6b^3c^2h^2j^3 + \\
& 192a^4b^6c^2g^2k^2 - 192a^4b^4c^3g^2k^3 + 144a^5b^3c^3h^3j + 32a^3b^6c^2g^2k^3 - 18a^4b^5c^2h^3j - 9a^4b^6c^2h^2j^2 - 192a^6b^3c^4h^2i^2 + \\
& 36a^3b^7c^2f^2k^2 - 4a^3b^7c^2g^2j^2 - 2176a^6b^3c^2e^2k^3 - 256a^3b^3c^5e^3k - 192a^6b^2c^3f^2j^3 - 192a^4b^2c^5f^3j + \\
& 132a^5b^4c^2f^2j^3 + 128a^4b^3c^4g^3i - 28a^3b^4c^4f^3j + 6a^2b^6c^3f^3j + 10752a^5b^3c^5d^2k^2 - 960a^5b^3c^5e^2j^2 - 192a^5b^3c^5f^2i^2 - \\
& 1680a^5b^3c^3d^2j^3 - 1680a^2b^3c^6d^3j + 222a^4b^5c^2d^2j^3 + 80a^4b^3c^4f^2h^3 + 80a^3b^3c^5f^3h + 30a^4b^8c^2d^2j^2 + 6a^3b^5c^3f^2h^3 + \\
& 6a^2b^5c^4f^3h - 960a^4b^3c^6d^2i^2 - 192a^4b^3c^6e^2h^2 - 192a^4b^2c^5d^2h^3 - 192a^2b^2c^7d^3h + 128a^3b^3c^5e^2g^3 - 28a^3b^4c^4d^2h^3 + \\
& 12a^2b^6c^4d^2h^2 + 6a^2b^6c^3d^2h^3 - 192a^3b^3c^7e^2f^2 + 60a^2b^5c^5d^2g^2 + 198a^2b^4c^6d^2f^2 + 144a^2b^3c^6d^2f^3 - 960a^2b^3c^8d^2e^2 + \\
& 240a^2b^3c^7d^2e^2 + 4608a^8c^3i^2j^2k - 3072a^8c^3h^2j^2k^2 - 512a^7c^4h^2i^2k + 120a^5b^6h^2j^2k^2 + 768a^7c^4h^2i^2j + 4608a^7c^4e^2j^2k + \\
& 512a^6c^5f^2i^2k + 64a^4b^7g^2i^2k^2 - 40a^4b^7f^2j^2k^2 - 9216a^7c^4d^2j^2k^2 - 4096a^7c^4e^2i^2k^2 - 1024a^7c^4f^2h^2k^2 - 4608a^5c^6d^2i^2k - \\
& 512a^6c^5e^2h^2k - 192a^6c^5f^2h^2j - 40a^3b^8d^2j^2k^2 + 24a^3b^8f^2h^2k^2 + 2304a^6c^5d^2i^2j + 768a^5c^6e^2h^2j + 256a^6c^5f^2h^2i^2 + \\
& 8b^9c^2d^2g^2k - 2b^9c^2d^2h^2j + 6144a^8b^3c^2i^2k^3 - 2176a^7b^3c^2i^2k^3 - 1728a^6c^5d^2h^2j^2 + 1536a^7b^3c^3i^3k + 512a^5c^6e^2f^2k + \\
& 24a^2b^9d^2h^2k^2 - 3072a^6c^5d^2f^2k^2 - 16b^8c^3d^2e^2k + 6b^8c^3d^2f^2j - 4608a^4c^7d^2e^2k + 2016a^7b^3c^3h^2j^3 - 1728a^4c^7d^2f^2j + \\
& 1088a^6b^4c^2g^2k^3 + 224a^6b^3c^4h^3j + 30a^5b^5c^2h^2j^3 + 2304a^4c^7d^2e^2j + 768a^5c^6d^2f^2i^2 + 256a^4c^7e^2f^2h + 6b^7c^4d^2f^2h + \\
& 6144a^7b^3c^3e^2k^3 + 1536a^4b^3c^6e^3k + 512a^6b^3c^4g^2i^3 + 192a^5b^5c^2e^2k^3 - 192a^4c^7d^2f^2h - 10a^4b^6c^2f^2j^3 + 108a^2b^9c^2d^2k^2 + \\
& 16b^6c^5d^2e^2g + 4320a^6b^3c^4d^2j^3 + 4320a^3b^3c^7d^3j + 222a^2b^5c^5d^3j + 96a^5b^3c^5f^2h^3 + 96a^4b^3c^6f^3h - 10a^3b^7c^2d^2j^3 + \\
& 768a^3c^8d^2e^2f + 512a^3b^3c^7e^3g + 132a^2b^4c^6d^3h + 2016a^2b^3c^8d^3f - 496a^2b^3c^7d^3f + 224a^3b^3c^7d^2f^3 - 18a^2b^5c^5d^2f^3 - \\
& 1920a^7b^2c^2i^2k^2 - 1648a^6b^3c^2h^2k^2 + 240a^6b^3c^2i^2j^2 - 960a^6b^2c^3h^2j^2 - 512a^6b^2c^3g^2k^2 - 480a^5b^4c^2g^2k^2 + \\
& 198a^5b^4c^2h^2j^2 - 240a^5b^3c^3g^2j^2 - 240a^5b^3c^3f^2k^2 + 60a^4b^5c^2g^2j^2 - 36a^4
\end{aligned}$$

$$\begin{aligned}
& 4*b^5*c^2*f^2*k^2 - 16*a^5*b^3*c^3*h^2*i^2 - 1920*a^5*b^2*c^4*e^2*k^2 + 768 \\
& *a^4*b^4*c^3*e^2*k^2 - 464*a^5*b^2*c^4*f^2*j^2 - 384*a^5*b^2*c^4*g^2*i^2 - \\
& 64*a^3*b^6*c^2*e^2*k^2 + 42*a^4*b^4*c^3*f^2*j^2 + 12*a^3*b^6*c^2*f^2*j^2 - \\
& 13104*a^4*b^3*c^4*d^2*k^2 + 5628*a^3*b^5*c^3*d^2*k^2 - 1128*a^2*b^7*c^2*d^2 \\
& *k^2 + 240*a^4*b^3*c^4*e^2*j^2 - 48*a^4*b^3*c^4*g^2*h^2 - 16*a^4*b^3*c^4*f^ \\
& 2*i^2 - 16*a^3*b^5*c^3*e^2*j^2 - 4*a^3*b^5*c^3*g^2*h^2 - 2880*a^4*b^2*c^5*d \\
& ^2*j^2 + 1750*a^3*b^4*c^4*d^2*j^2 - 345*a^2*b^6*c^3*d^2*j^2 - 192*a^4*b^2*c \\
& ^5*f^2*h^2 - 42*a^3*b^4*c^4*f^2*h^2 + 240*a^3*b^3*c^5*d^2*i^2 - 48*a^3*b^3*c \\
& ^5*f^2*g^2 - 16*a^3*b^3*c^5*e^2*h^2 - 16*a^2*b^5*c^4*d^2*i^2 - 4*a^2*b^5*c \\
& ^4*f^2*g^2 - 464*a^3*b^2*c^6*d^2*h^2 - 384*a^3*b^2*c^6*e^2*g^2 + 42*a^2*b^4 \\
& *c^5*d^2*h^2 - 240*a^2*b^3*c^6*d^2*g^2 - 16*a^2*b^3*c^6*e^2*f^2 - 960*a^2*b \\
& ^2*c^7*d^2*f^2 - 8*a*b^10*d*f*k^2 - a^2*b^8*c*f^2*j^2 - 2048*a^8*c^3*i^2*k^ \\
& 2 - 100*a^6*b^5*j^2*k^2 - 64*a^5*b^6*i^2*k^2 - 288*a^7*c^4*h^2*j^2 - 36*a^4 \\
& *b^7*h^2*k^2 - 16*a^3*b^8*g^2*k^2 - 2048*a^6*c^5*e^2*k^2 - 864*a^6*c^5*f^2* \\
& j^2 - 4*a^2*b^9*f^2*k^2 - 2592*a^5*c^6*d^2*j^2 - 1536*a^5*c^6*e^2*i^2 - 32* \\
& a^5*c^6*f^2*h^2 - 864*a^4*c^7*d^2*h^2 + 360*a^7*b^2*c^2*j^4 - 4*b^7*c^4*d^2 \\
& *g^2 - 9*b^6*c^5*d^2*f^2 - 288*a^3*c^8*d^2*f^2 - 24*a^5*b^2*c^4*h^4 - 16*b^ \\
& 5*c^6*d^2*e^2 - 9*a^4*b^4*c^3*h^4 - 16*a^3*b^4*c^4*g^4 - 24*a^3*b^2*c^6*f^4 \\
& - 9*a^2*b^4*c^5*f^4 - a^2*b^6*c^3*f^2*h^2 + 192*a^6*b^5*i*k^3 - 96*a^5*b^6 \\
& *g*k^3 - 1728*a^7*c^4*f*j^3 - 192*a^5*c^6*f^3*j - 10*b^7*c^4*d^3*j - 1024*a \\
& ^6*c^5*e*i^3 - 1024*a^4*c^7*e^3*i + 1536*a^8*b^2*c*k^4 - 10*b^6*c^5*d^3*h - \\
& 1728*a^3*c^8*d^3*h - 192*a^5*c^6*d^3*h^3 - 25*a^6*b^4*c*j^4 + 30*b^5*c^6*d^3 \\
& *f + 360*a*b^2*c^8*d^4 - 4*b^11*d^2*k^2 - 4096*a^9*c^2*k^4 - 1296*a^8*c^3*j \\
& ^4 - 144*a^7*b^4*k^4 - 256*a^7*c^4*i^4 - 16*a^6*c^5*h^4 - 16*a^4*c^7*f^4 - \\
& 256*a^3*c^8*e^4 - 25*b^4*c^7*d^4 - 1296*a^2*c^9*d^4 - b^8*c^3*d^2*h^2 - b^1 \\
& 0*c*d^2*j^2, z, n)*((6144*a^5*c^8*d + 2048*a^6*c^7*h - 288*a^2*b^6*c^5*d + \\
& 1920*a^3*b^4*c^6*d - 5632*a^4*b^2*c^7*d + 16*a^2*b^7*c^4*f - 192*a^3*b^5*c^ \\
& 5*f + 768*a^4*b^3*c^6*f - 32*a^3*b^6*c^4*h + 384*a^4*b^4*c^5*h - 1536*a^5*b \\
& ^2*c^6*h + 16*a^3*b^7*c^3*j - 192*a^4*b^5*c^4*j + 768*a^5*b^3*c^5*j + 16*a* \\
& b^8*c^4*d - 1024*a^5*b*c^7*f - 1024*a^6*b*c^6*j)/(8*(64*a^5*c^5 - a^2*b^6*c \\
& ^2 + 12*a^3*b^4*c^3 - 48*a^4*b^2*c^4)) + (x*(32*a^2*b^6*c^5*e - 2048*a^6*c^ \\
& 7*i - 2048*a^5*c^8*e - 384*a^3*b^4*c^6*e + 1536*a^4*b^2*c^7*e - 16*a^2*b^7* \\
& c^4*g + 192*a^3*b^5*c^5*g - 768*a^4*b^3*c^6*g + 32*a^3*b^6*c^4*i - 384*a^4* \\
& b^4*c^5*i + 1536*a^5*b^2*c^6*i + 32*a^2*b^9*c^2*k - 528*a^3*b^7*c^3*k + 326 \\
& 4*a^4*b^5*c^4*k - 8960*a^5*b^3*c^5*k + 1024*a^5*b*c^7*g + 9216*a^6*b*c^6*k) \\
&)/(4*(64*a^5*c^5 - a^2*b^6*c^2 + 12*a^3*b^4*c^3 - 48*a^4*b^2*c^4)) - (root(\\
& 1572864*a^8*b^2*c^9*z^4 - 983040*a^7*b^4*c^8*z^4 + 327680*a^6*b^6*c^7*z^4 - \\
& 61440*a^5*b^8*c^6*z^4 + 6144*a^4*b^10*c^5*z^4 - 256*a^3*b^12*c^4*z^4 - 104 \\
& 8576*a^9*c^10*z^4 - 1572864*a^8*b^2*c^7*k*z^3 + 983040*a^7*b^4*c^6*k*z^3 - \\
& 327680*a^6*b^6*c^5*k*z^3 + 61440*a^5*b^8*c^4*k*z^3 - 6144*a^4*b^10*c^3*k*z^ \\
& 3 + 256*a^3*b^12*c^2*k*z^3 + 1048576*a^9*c^8*k*z^3 + 98304*a^8*b*c^6*i*k*z^ \\
& 2 + 98304*a^7*b*c^7*e*k*z^2 + 57344*a^7*b*c^7*f*j*z^2 + 32768*a^7*b*c^7*g*i \\
& *z^2 + 57344*a^6*b*c^8*d*h*z^2 + 32768*a^6*b*c^8*e*g*z^2 - 32*a*b^10*c^4*d* \\
& f*z^2 - 90112*a^7*b^3*c^5*i*k*z^2 + 30720*a^6*b^5*c^4*i*k*z^2 - 4608*a^5*b^ \\
& 7*c^3*i*k*z^2 + 256*a^4*b^9*c^2*i*k*z^2 - 49152*a^7*b^2*c^6*g*k*z^2 + 45056
\end{aligned}$$

$a^6b^4c^5gkz^2 + 24576a^7b^2c^6h* jz^2 - 15360a^5b^6c^4g*kz^2 - 3072a^5b^6c^4h* jz^2 + 2304a^4b^8c^3g*kz^2 + 2048a^6b^4c^5h* jz^2 + 576a^4b^8c^3h* jz^2 - 128a^3b^{10}c^2g*kz^2 - 32a^3b^{10}c^2h* jz^2 - 90112a^6b^3c^6e*kz^2 - 49152a^6b^3c^6f* jz^2 + 30720a^5b^5c^5e*kz^2 - 24576a^6b^3c^6g*iz^2 + 15360a^5b^5c^5f* jz^2 + 6144a^5b^5c^5g*iz^2 - 4608a^4b^7c^4e*kz^2 - 2048a^4b^7c^4f* jz^2 - 512a^4b^7c^4g*iz^2 + 256a^3b^9c^3e*kz^2 + 96a^3b^9c^3f* jz^2 + 131072a^6b^2c^7d* jz^2 + 49152a^6b^2c^7e*iz^2 - 43008a^5b^4c^6d* jz^2 - 12288a^5b^4c^6e*iz^2 + 6144a^5b^4c^6f*h* z^2 + 6144a^4b^6c^5d* jz^2 - 2048a^4b^6c^5f*h* z^2 + 1024a^4b^6c^5e*iz^2 - 320a^3b^8c^4d* jz^2 + 192a^3b^8c^4f*h* z^2 - 49152a^5b^3c^7d*h* z^2 - 24576a^5b^3c^7e*g* z^2 + 15360a^4b^5c^6d*h* z^2 + 6144a^4b^5c^6e*g* z^2 - 2048a^3b^7c^5d*h* z^2 - 512a^3b^7c^5e*g* z^2 + 96a^2b^9c^4d*h* z^2 + 24576a^5b^2c^8d*f* z^2 - 3072a^3b^6c^6d*f* z^2 + 2048a^4b^4c^7d*f* z^2 + 576a^2b^8c^5d*f* z^2 + 1536a^4b^10c^k^2z^2 + 61440a^8b*c^6j^2z^2 - 16a^3b^{11}c*j^2z^2 + 12288a^7b*c^7h^2z^2 + 12288a^6b*c^8f^2z^2 + 61440a^5b*c^9d^2z^2 + 432a*b^9c^5d^2z^2 - 49152a^8c^7h* jz^2 - 147456a^7c^8d* jz^2 - 65536a^7c^8e*iz^2 - 16384a^7c^8f*h* z^2 - 49152a^6c^9d*f* z^2 + 516096a^8b^2c^5k^2z^2 - 288768a^7b^4c^4k^2z^2 + 88576a^6b^6c^3k^2z^2 - 15744a^5b^8c^2k^2z^2 - 61440a^7b^3c^5j^2z^2 + 24064a^6b^5c^4j^2z^2 - 4608a^5b^7c^3j^2z^2 + 432a^4b^9c^2j^2z^2 + 24576a^7b^2c^6i^2z^2 - 6144a^6b^4c^5i^2z^2 + 512a^5b^6c^4i^2z^2 - 8192a^6b^3c^6h^2z^2 + 1536a^5b^5c^5h^2z^2 - 16a^3b^9c^3h^2z^2 - 8192a^6b^2c^7g^2z^2 + 6144a^5b^4c^6g^2z^2 - 1536a^4b^6c^5g^2z^2 + 128a^3b^8c^4g^2z^2 - 8192a^5b^3c^7f^2z^2 + 1536a^4b^5c^6f^2z^2 - 16a^2b^9c^4f^2z^2 + 24576a^5b^2c^8e^2z^2 - 6144a^4b^4c^7e^2z^2 + 512a^3b^6c^6e^2z^2 - 61440a^4b^3c^8d^2z^2 + 24064a^3b^5c^7d^2z^2 - 4608a^2b^7c^6d^2z^2 - 393216a^9c^6k^2z^2 - 64a^3b^{12}k^2z^2 - 32768a^8c^7i^2z^2 - 32768a^6c^9e^2z^2 - 16b^{11}c^4d^2z^2 - 16384a^7b*c^5g*ikz - 10240a^7b*c^5f*jkz + 4096a^7b*c^5h*ijz - 47104a^6b*c^6d*h*kz - 16384a^6b*c^6e*g*kz + 6144a^6b*c^6f*g*jz + 4096a^6b*c^6e*h* jz + 32a*b^{10}c^2d*f*kz - 6144a^5b*c^7d*g*h* z - 4096a^5b*c^7d*f*iz - 32a*b^8c^4d*f*g* z - 4096a^4b*c^8d*e*f* z + 64a*b^7c^5d*e*f* z - 18432a^7b^2c^4h* jkz + 4608a^6b^4c^3h* jkz - 384a^5b^6c^2h* jkz + 12288a^6b^3c^4g*ikz + 7680a^6b^3c^4f*jkz - 3072a^6b^3c^4h*ijz - 3072a^5b^5c^3g*ikz - 1920a^5b^5c^3f*jkz + 768a^5b^5c^3h*ijz + 256a^4b^7c^2g*ikz + 160a^4b^7c^2f*jkz - 64a^4b^7c^2h*ijz - 65536a^6b^2c^5d*jkz - 24576a^6b^2c^5e*ikz + 21504a^5b^4c^4d*jkz + 9216a^6b^2c^5f*ijz + 6144a^5b^4c^4e*ikz - 3072a^5b^4c^4f*h*kz - 3072a^4b^6c^3d*jkz - 2304a^5b^4c^4f*ijz - 2048a^6b^2c^5g*h* jz + 1536a^5b^4c^4g*h* jz + 1024a^4b^6c^3f*h*kz - 512a^4b^6c^3e*ikz - 384a^4b^6c^3g*h* jz + 192a^4b^6c^3f*ijz + 160a^3b^8c^2d*jkz - 96a^3b^8c^2f*h*kz + 32a^3b^8c^2g*h* jz + 41472a^5b^3c^5d*h$

$$\begin{aligned}
& *k*z - 13440*a^4*b^5*c^4*d*h*k*z + 12288*a^5*b^3*c^5*e*g*k*z - 4608*a^5*b^3 \\
& *c^5*f*g*j*z - 3072*a^5*b^3*c^5*e*h*j*z - 3072*a^4*b^5*c^4*e*g*k*z + 1888*a \\
& ^3*b^7*c^3*d*h*k*z + 1152*a^4*b^5*c^4*f*g*j*z + 768*a^4*b^5*c^4*e*h*j*z + 2 \\
& 56*a^3*b^7*c^3*e*g*k*z - 96*a^3*b^7*c^3*f*g*j*z - 96*a^2*b^9*c^2*d*h*k*z - \\
& 64*a^3*b^7*c^3*e*h*j*z + 9216*a^5*b^2*c^6*e*f*j*z - 9216*a^5*b^2*c^6*d*h*i \\
& z - 6656*a^4*b^4*c^5*d*f*k*z - 6144*a^5*b^2*c^6*d*f*k*z + 3456*a^3*b^6*c^4* \\
& d*f*k*z - 2304*a^4*b^4*c^5*e*f*j*z + 2304*a^4*b^4*c^5*d*h*i*z - 576*a^2*b^8 \\
& *c^3*d*f*k*z + 192*a^3*b^6*c^4*e*f*j*z - 192*a^3*b^6*c^4*d*h*i*z + 4608*a^4 \\
& *b^3*c^6*d*g*h*z + 3072*a^4*b^3*c^6*d*f*i*z - 1152*a^3*b^5*c^5*d*g*h*z - 76 \\
& 8*a^3*b^5*c^5*d*f*i*z + 96*a^2*b^7*c^4*d*g*h*z + 64*a^2*b^7*c^4*d*f*i*z - 9 \\
& 216*a^4*b^2*c^7*d*e*h*z + 2304*a^3*b^4*c^6*d*e*h*z + 2048*a^4*b^2*c^7*d*f*g \\
& *z - 1536*a^3*b^4*c^6*d*f*g*z + 384*a^2*b^6*c^5*d*f*g*z - 192*a^2*b^6*c^5*d \\
& *e*h*z + 3072*a^3*b^3*c^7*d*e*f*z - 768*a^2*b^5*c^6*d*e*f*z - 3072*a^8*b*c^ \\
& 4*j^2*k*z + 48*a^5*b^7*c*j^2*k*z - 49152*a^8*b*c^4*i*k^2*z + 2304*a^5*b^7*c \\
& *i*k^2*z - 9216*a^7*b*c^5*h^2*k*z - 32*a^4*b^8*c*i*j^2*z - 1152*a^4*b^8*c*g \\
& *k^2*z + 9216*a^7*b*c^5*g*j^2*z - 3072*a^6*b*c^6*f^2*k*z + 16*a^3*b^9*c*g*j \\
& ^2*z - 49152*a^7*b*c^5*e*k^2*z - 128*a^3*b^9*c*e*k^2*z - 58368*a^5*b*c^7*d^ \\
& 2*k*z - 1024*a^6*b*c^6*g*h^2*z - 432*a*b^9*c^3*d^2*k*z + 1024*a^5*b*c^7*f^2 \\
& *g*z + 32*a*b^8*c^4*d^2*i*z - 9216*a^4*b*c^8*d^2*g*z + 336*a*b^7*c^5*d^2*g* \\
& z - 672*a*b^6*c^6*d^2*e*z + 24576*a^8*c^5*h*j*k*z + 73728*a^7*c^6*d*j*k*z + \\
& 32768*a^7*c^6*e*i*k*z - 12288*a^7*c^6*f*i*j*z + 8192*a^7*c^6*f*h*k*z + 245 \\
& 76*a^6*c^7*d*f*k*z - 12288*a^6*c^7*e*f*j*z + 12288*a^6*c^7*d*h*i*z + 12288* \\
& a^5*c^8*d*e*h*z + 2304*a^7*b^3*c^3*j^2*k*z - 576*a^6*b^5*c^2*j^2*k*z + 4505 \\
& 6*a^7*b^3*c^3*i*k^2*z - 15360*a^6*b^5*c^2*i*k^2*z - 12288*a^7*b^2*c^4*i^2*k \\
& *z + 3072*a^6*b^4*c^3*i^2*k*z - 256*a^5*b^6*c^2*i^2*k*z + 15872*a^7*b^2*c^4 \\
& *i*j^2*z + 6912*a^6*b^3*c^4*h^2*k*z - 4992*a^6*b^4*c^3*i*j^2*z - 1728*a^5*b \\
& ^5*c^3*h^2*k*z + 672*a^5*b^6*c^2*i*j^2*z + 144*a^4*b^7*c^2*h^2*k*z + 24576* \\
& a^7*b^2*c^4*g*k^2*z - 22528*a^6*b^4*c^3*g*k^2*z + 7680*a^5*b^6*c^2*g*k^2*z \\
& + 4096*a^6*b^2*c^5*g^2*k*z - 3072*a^5*b^4*c^4*g^2*k*z + 768*a^4*b^6*c^3*g^2 \\
& *k*z - 64*a^3*b^8*c^2*g^2*k*z - 7936*a^6*b^3*c^4*g*j^2*z + 2496*a^5*b^5*c^3 \\
& *g*j^2*z - 1536*a^6*b^2*c^5*h^2*i*z + 1280*a^5*b^3*c^5*f^2*k*z + 384*a^5*b^ \\
& 4*c^4*h^2*i*z - 336*a^4*b^7*c^2*g*j^2*z + 192*a^4*b^5*c^4*f^2*k*z - 144*a^3 \\
& *b^7*c^3*f^2*k*z - 32*a^4*b^6*c^3*h^2*i*z + 16*a^2*b^9*c^2*f^2*k*z + 45056* \\
& a^6*b^3*c^4*e*k^2*z - 15360*a^5*b^5*c^3*e*k^2*z - 12288*a^5*b^2*c^6*e^2*k*z \\
& + 3072*a^4*b^4*c^5*e^2*k*z + 2304*a^4*b^7*c^2*e*k^2*z - 256*a^3*b^6*c^4*e^ \\
& 2*k*z + 59136*a^4*b^3*c^6*d^2*k*z - 23488*a^3*b^5*c^5*d^2*k*z + 15872*a^6*b \\
& ^2*c^5*e*j^2*z - 4992*a^5*b^4*c^4*e*j^2*z + 4560*a^2*b^7*c^4*d^2*k*z + 1536 \\
& *a^5*b^2*c^6*f^2*i*z + 768*a^5*b^3*c^5*g*h^2*z + 672*a^4*b^6*c^3*e*j^2*z - \\
& 384*a^4*b^4*c^5*f^2*i*z - 192*a^4*b^5*c^4*g*h^2*z - 32*a^3*b^8*c^2*e*j^2*z \\
& + 32*a^3*b^6*c^4*f^2*i*z + 16*a^3*b^7*c^3*g*h^2*z - 15872*a^4*b^2*c^7*d^2*i \\
& *z + 4992*a^3*b^4*c^6*d^2*i*z - 1536*a^5*b^2*c^6*e*h^2*z - 768*a^4*b^3*c^6* \\
& f^2*g*z - 672*a^2*b^6*c^5*d^2*i*z + 384*a^4*b^4*c^5*e*h^2*z + 192*a^3*b^5*c^ \\
& ^5*f^2*g*z - 32*a^3*b^6*c^4*e*h^2*z - 16*a^2*b^7*c^4*f^2*g*z + 7936*a^3*b^3 \\
& *c^7*d^2*g*z - 2496*a^2*b^5*c^6*d^2*g*z + 1536*a^4*b^2*c^7*e*f^2*z - 384*a^ \\
& 3*b^4*c^6*e*f^2*z + 32*a^2*b^6*c^5*e*f^2*z - 15872*a^3*b^2*c^8*d^2*e*z + 49
\end{aligned}$$

$$\begin{aligned}
& 92*a^2*b^4*c^7*d^2*e*z - 61440*a^8*b^2*c^3*k^3*z + 21504*a^7*b^4*c^2*k^3*z \\
& + 16384*a^8*c^5*i^2*k*z - 18432*a^8*c^5*i*j^2*z - 128*a^4*b^9*i*k^2*z + 204 \\
& 8*a^7*c^6*h^2*i*z + 64*a^3*b^10*g*k^2*z + 16384*a^6*c^7*e^2*k*z + 16*b^11*c \\
& ^2*d^2*k*z - 18432*a^7*c^6*e*j^2*z - 2048*a^6*c^7*f^2*i*z + 18432*a^5*c^8*d \\
& ^2*i*z - 3328*a^6*b^6*c*k^3*z + 2048*a^6*c^7*e*h^2*z - 16*b^9*c^4*d^2*g*z - \\
& 2048*a^5*c^8*e*f^2*z + 32*b^8*c^5*d^2*e*z + 18432*a^4*c^9*d^2*e*z + 65536* \\
& a^9*c^4*k^3*z + 192*a^5*b^8*k^3*z - 3328*a^7*b*c^3*h*i*j*k - 6912*a^6*b*c^4 \\
& *d*i*j*k - 3328*a^6*b*c^4*e*h*j*k - 1536*a^6*b*c^4*f*g*j*k - 768*a^6*b*c^4* \\
& g*h*i*j - 768*a^6*b*c^4*f*h*i*k - 6912*a^5*b*c^5*d*e*j*k - 2304*a^5*b*c^5*d \\
& *g*i*j - 1792*a^5*b*c^5*e*f*i*j + 1536*a^5*b*c^5*d*g*h*k - 1280*a^5*b*c^5*d \\
& *f*i*k - 768*a^5*b*c^5*e*g*h*j - 768*a^5*b*c^5*e*f*h*k - 256*a^5*b*c^5*f*g* \\
& h*i + 16*a*b^8*c^2*d*f*g*k - 4*a*b^8*c^2*d*f*h*j - 2304*a^4*b*c^6*d*e*g*j - \\
& 1792*a^4*b*c^6*d*e*h*i - 1280*a^4*b*c^6*d*e*f*k - 768*a^4*b*c^6*d*f*g*i - \\
& 256*a^4*b*c^6*e*f*g*h - 32*a*b^7*c^3*d*e*f*k - 768*a^3*b*c^7*d*e*f*g + 32*a \\
& *b^5*c^5*d*e*f*g + 576*a^6*b^3*c^2*h*i*j*k + 1664*a^6*b^2*c^3*g*h*j*k + 384 \\
& *a^6*b^2*c^3*f*i*j*k - 288*a^5*b^4*c^2*g*h*j*k - 160*a^5*b^4*c^2*f*i*j*k + \\
& 2112*a^5*b^3*c^3*d*i*j*k + 576*a^5*b^3*c^3*e*h*j*k - 448*a^5*b^3*c^3*f*h*i* \\
& k - 192*a^5*b^3*c^3*g*h*i*j - 192*a^5*b^3*c^3*f*g*j*k - 160*a^4*b^5*c^2*d*i \\
& *j*k + 96*a^4*b^5*c^2*f*h*i*k + 80*a^4*b^5*c^2*f*g*j*k + 32*a^4*b^5*c^2*g*h \\
& *i*j + 4992*a^5*b^2*c^4*d*h*i*k - 4608*a^5*b^2*c^4*e*g*i*k + 3456*a^5*b^2*c \\
& ^4*d*g*j*k - 1312*a^4*b^4*c^3*d*h*i*k - 1056*a^4*b^4*c^3*d*g*j*k + 896*a^5* \\
& b^2*c^4*f*g*i*j + 768*a^4*b^4*c^3*e*g*i*k + 384*a^5*b^2*c^4*f*g*h*k + 384*a \\
& ^5*b^2*c^4*e*h*i*j + 384*a^5*b^2*c^4*e*f*j*k + 224*a^4*b^4*c^3*f*g*h*k - 16 \\
& 0*a^4*b^4*c^3*e*f*j*k - 96*a^4*b^4*c^3*f*g*i*j + 96*a^3*b^6*c^2*d*h*i*k + 8 \\
& 0*a^3*b^6*c^2*d*g*j*k - 64*a^4*b^4*c^3*e*h*i*j - 48*a^3*b^6*c^2*f*g*h*k - 2 \\
& 496*a^4*b^3*c^4*d*g*h*k + 2112*a^4*b^3*c^4*d*e*j*k - 960*a^4*b^3*c^4*d*f*i* \\
& k + 656*a^3*b^5*c^3*d*g*h*k - 448*a^4*b^3*c^4*e*f*h*k + 384*a^3*b^5*c^3*d*f \\
& *i*k + 320*a^4*b^3*c^4*d*g*i*j - 192*a^4*b^3*c^4*f*g*h*i - 192*a^4*b^3*c^4* \\
& e*g*h*j + 192*a^4*b^3*c^4*e*f*i*j - 160*a^3*b^5*c^3*d*e*j*k + 96*a^3*b^5*c^ \\
& 3*e*f*h*k - 48*a^2*b^7*c^2*d*g*h*k + 32*a^3*b^5*c^3*e*g*h*j - 32*a^2*b^7*c^ \\
& 2*d*f*i*k + 4992*a^4*b^2*c^5*d*e*h*k - 3584*a^4*b^2*c^5*d*f*h*j - 1312*a^3* \\
& b^4*c^4*d*e*h*k + 896*a^4*b^2*c^5*e*f*g*j + 896*a^4*b^2*c^5*d*g*h*i + 640*a \\
& ^4*b^2*c^5*d*f*g*k - 640*a^4*b^2*c^5*d*e*i*j + 600*a^3*b^4*c^4*d*f*h*j + 48 \\
& 0*a^3*b^4*c^4*d*f*g*k + 384*a^4*b^2*c^5*e*f*h*i - 192*a^2*b^6*c^3*d*f*g*k - \\
& 96*a^3*b^4*c^4*e*f*g*j - 96*a^3*b^4*c^4*d*g*h*i + 96*a^2*b^6*c^3*d*e*h*k + \\
& 12*a^2*b^6*c^3*d*f*h*j - 960*a^3*b^3*c^5*d*e*f*k + 384*a^2*b^5*c^4*d*e*f*k \\
& + 320*a^3*b^3*c^5*d*e*g*j - 192*a^3*b^3*c^5*e*f*g*h - 192*a^3*b^3*c^5*d*f* \\
& g*i + 192*a^3*b^3*c^5*d*e*h*i + 32*a^2*b^5*c^4*d*f*g*i + 896*a^3*b^2*c^6*d* \\
& e*g*h + 384*a^3*b^2*c^6*d*e*f*i - 96*a^2*b^4*c^5*d*e*g*h - 64*a^2*b^4*c^5*d \\
& *e*f*i - 192*a^2*b^3*c^6*d*e*f*g + 48*a^6*b^4*c^3*i*j^2*k - 1424*a^6*b^4*c^3*h \\
& *j*k^2 - 2304*a^7*b*c^3*g*j^2*k - 24*a^5*b^5*c^3*g*j^2*k + 2048*a^7*b*c^3*g*i* \\
& k^2 - 1024*a^7*b*c^3*f*j*k^2 - 768*a^5*b^5*c^3*g*i*k^2 + 408*a^5*b^5*c^3*f*j*k^ \\
& 2 + 256*a^6*b*c^4*g*h^2*k + 16*a^4*b^6*c^3*g*i*j^2 + 4608*a^6*b*c^4*e*i^2*k + \\
& 4608*a^5*b*c^5*e^2*i*k - 896*a^6*b*c^4*f*i^2*j + 768*a^4*b^6*c^3*d*j*k^2 - 2 \\
& 56*a^4*b^6*c^3*f*h*k^2 - 128*a^4*b^6*c^3*e*i*k^2 + 2208*a^6*b*c^4*f*h*j^2 - 192
\end{aligned}$$

$$\begin{aligned}
& 0*a^6*b*c^4*e*i*j^2 + 800*a^5*b*c^5*f^2*h*j - 256*a^5*b*c^5*f^2*g*k - 16*a* \\
& b^8*c^2*d^2*i*k + 6*a^3*b^7*c*f*h*j^2 + 8192*a^6*b*c^4*d*h*k^2 + 2048*a^6*b \\
& *c^4*e*g*k^2 - 472*a^3*b^7*c*d*h*k^2 + 64*a^3*b^7*c*e*g*k^2 + 4896*a^4*b*c^ \\
& 6*d^2*h*j + 2304*a^4*b*c^6*d^2*g*k + 1824*a^5*b*c^5*d*h^2*j - 384*a^5*b*c^5 \\
& *e*h^2*i - 168*a*b^7*c^3*d^2*g*k + 42*a*b^7*c^3*d^2*h*j + 6*a^2*b^8*c*d*h*j \\
& ^2 + 1536*a^5*b*c^5*e*g*i^2 + 1536*a^4*b*c^6*e^2*g*i - 896*a^5*b*c^5*d*h*i^ \\
& 2 - 896*a^4*b*c^6*e^2*f*j + 144*a^2*b^8*c*d*f*k^2 + 4896*a^5*b*c^5*d*f*j^2 \\
& + 1824*a^4*b*c^6*d*f^2*j - 384*a^4*b*c^6*e*f^2*i + 336*a*b^6*c^4*d^2*e*k - \\
& 156*a*b^6*c^4*d^2*f*j + 16*a*b^6*c^4*d^2*g*i + 12*a*b^7*c^3*d*f^2*j + 2208* \\
& a^3*b*c^7*d^2*f*h - 1920*a^3*b*c^7*d^2*e*i + 800*a^4*b*c^6*d*f*h^2 - 102*a* \\
& b^5*c^5*d^2*f*h - 32*a*b^5*c^5*d^2*e*i + 12*a*b^6*c^4*d*f^2*h - 2*a*b^7*c^3 \\
& *d*f*h^2 - 896*a^3*b*c^7*d*e^2*h - 8*a*b^6*c^4*d*f*g^2 - 240*a*b^4*c^6*d^2* \\
& e*g - 32*a*b^4*c^6*d*e^2*f + 3072*a^7*c^4*f*i*j*k + 3072*a^6*c^5*e*f*j*k - \\
& 3072*a^6*c^5*d*h*i*k + 1536*a^6*c^5*e*h*i*j + 4608*a^5*c^6*d*e*i*j - 3072*a \\
& ^5*c^6*d*e*h*k - 1152*a^5*c^6*d*f*h*j + 512*a^5*c^6*e*f*h*i + 1536*a^4*c^7* \\
& d*e*f*i - 2*a*b^9*c*d*f*j^2 - 1088*a^7*b^2*c^2*i*j^2*k + 4800*a^7*b^2*c^2*h \\
& *j*k^2 + 960*a^6*b^2*c^3*h^2*i*k + 544*a^6*b^3*c^2*g*j^2*k - 144*a^5*b^4*c^ \\
& 2*h^2*i*k - 2304*a^6*b^2*c^3*g*i^2*k + 1920*a^6*b^3*c^2*g*i*k^2 + 1152*a^5* \\
& b^3*c^3*g^2*i*k - 864*a^6*b^3*c^2*f*j*k^2 + 384*a^5*b^4*c^2*g*i^2*k + 192*a \\
& ^6*b^2*c^3*h*i^2*j - 192*a^4*b^5*c^2*g^2*i*k - 32*a^5*b^4*c^2*h*i^2*j - 108 \\
& 8*a^6*b^2*c^3*e*j^2*k + 960*a^6*b^2*c^3*g*i*j^2 - 480*a^5*b^3*c^3*g*h^2*k - \\
& 240*a^5*b^4*c^2*g*i*j^2 + 192*a^5*b^2*c^4*f^2*i*k + 72*a^4*b^5*c^2*g*h^2*k \\
& + 48*a^5*b^4*c^2*e*j^2*k + 48*a^4*b^4*c^3*f^2*i*k - 16*a^3*b^6*c^2*f^2*i*k \\
& + 13376*a^6*b^2*c^3*d*j*k^2 - 5136*a^5*b^4*c^2*d*j*k^2 - 3840*a^6*b^2*c^3* \\
& e*i*k^2 + 1536*a^5*b^4*c^2*e*i*k^2 - 768*a^5*b^3*c^3*e*i^2*k - 768*a^4*b^3* \\
& c^4*e^2*i*k + 624*a^5*b^4*c^2*f*h*k^2 + 576*a^6*b^2*c^3*f*h*k^2 + 192*a^5*b \\
& ^2*c^4*g^2*h*j + 96*a^5*b^3*c^3*f*i^2*j + 48*a^4*b^4*c^3*g^2*h*j - 8*a^3*b^ \\
& 6*c^2*g^2*h*j + 6848*a^4*b^2*c^5*d^2*i*k - 2448*a^3*b^4*c^4*d^2*i*k + 960*a \\
& ^5*b^2*c^4*e*h^2*k - 864*a^5*b^2*c^4*f*h^2*j + 480*a^5*b^3*c^3*e*i*j^2 + 33 \\
& 6*a^4*b^3*c^4*f^2*h*j + 336*a^2*b^6*c^3*d^2*i*k + 192*a^5*b^2*c^4*g*h^2*i + \\
& 144*a^5*b^3*c^3*f*h*j^2 - 144*a^4*b^4*c^3*e*h^2*k - 102*a^4*b^5*c^2*f*h*j^ \\
& 2 - 96*a^4*b^3*c^4*f^2*g*k - 32*a^4*b^5*c^2*e*i*j^2 - 30*a^3*b^5*c^3*f^2*h* \\
& j - 24*a^3*b^5*c^3*f^2*g*k + 16*a^4*b^4*c^3*g*h^2*i - 12*a^4*b^4*c^3*f*h^2* \\
& j + 12*a^3*b^6*c^2*f*h^2*j + 8*a^2*b^7*c^2*f^2*g*k - 2*a^2*b^7*c^2*f^2*h*j \\
& - 9312*a^5*b^3*c^3*d*h*k^2 + 3288*a^4*b^5*c^2*d*h*k^2 - 2304*a^4*b^2*c^5*e^ \\
& 2*g*k + 1920*a^5*b^3*c^3*e*g*k^2 + 1152*a^4*b^3*c^4*e*g^2*k - 768*a^4*b^5*c \\
& ^2*e*g*k^2 + 384*a^3*b^4*c^4*e^2*g*k - 320*a^5*b^2*c^4*d*i^2*j - 224*a^4*b^ \\
& 3*c^4*f*g^2*j + 192*a^5*b^2*c^4*f*h*i^2 + 192*a^4*b^2*c^5*e^2*h*j - 192*a^3 \\
& *b^5*c^3*e*g^2*k - 32*a^3*b^4*c^4*e^2*h*j + 24*a^3*b^5*c^3*f*g^2*j - 3552*a \\
& ^5*b^2*c^4*d*h*j^2 - 3424*a^3*b^3*c^5*d^2*g*k + 1332*a^4*b^4*c^3*d*h*j^2 + \\
& 1224*a^2*b^5*c^4*d^2*g*k + 960*a^5*b^2*c^4*e*g*j^2 - 496*a^3*b^3*c^5*d^2*h* \\
& j + 432*a^4*b^3*c^4*d*h^2*j - 240*a^4*b^4*c^3*e*g*j^2 - 222*a^2*b^5*c^4*d^2 \\
& *h*j + 192*a^4*b^2*c^5*f^2*g*i + 192*a^4*b^2*c^5*e*f^2*k - 174*a^3*b^5*c^3* \\
& d*h^2*j - 156*a^3*b^6*c^2*d*h*j^2 + 48*a^3*b^4*c^4*e*f^2*k - 32*a^4*b^3*c^4 \\
& *e*h^2*i + 16*a^3*b^6*c^2*e*g*j^2 + 16*a^3*b^4*c^4*f^2*g*i - 16*a^2*b^6*c^3
\end{aligned}$$

$$\begin{aligned}
& *e^f^2*k + 12*a^2*b^7*c^2*d*h^2*j + 1728*a^5*b^2*c^4*d*f*k^2 + 1392*a^4*b^4 \\
& *c^3*d*f*k^2 - 840*a^3*b^6*c^2*d*f*k^2 - 768*a^4*b^2*c^5*e*g^2*i + 576*a^4* \\
& b^2*c^5*d*g^2*j + 96*a^4*b^3*c^4*d*h*i^2 + 96*a^3*b^3*c^5*e^2*f*j - 80*a^3* \\
& b^4*c^4*d*g^2*j + 64*a^4*b^2*c^5*f*g^2*h + 48*a^3*b^4*c^4*f*g^2*h + 6848*a^ \\
& 3*b^2*c^6*d^2*e*k - 3552*a^3*b^2*c^6*d^2*f*j - 2448*a^2*b^4*c^5*d^2*e*k + 1 \\
& 332*a^2*b^4*c^5*d^2*f*j + 960*a^3*b^2*c^6*d^2*g*i - 496*a^4*b^3*c^4*d*f*j^2 \\
& + 432*a^3*b^3*c^5*d*f^2*j - 240*a^2*b^4*c^5*d^2*g*i - 222*a^3*b^5*c^3*d*f* \\
& j^2 + 192*a^4*b^2*c^5*e*g*h^2 - 174*a^2*b^5*c^4*d*f^2*j + 42*a^2*b^7*c^2*d* \\
& f*j^2 - 32*a^3*b^3*c^5*e*f^2*i + 16*a^3*b^4*c^4*e*g*h^2 - 320*a^3*b^2*c^6*d \\
& *e^2*j - 224*a^3*b^3*c^5*d*g^2*h + 192*a^4*b^2*c^5*d*f*i^2 + 192*a^3*b^2*c^ \\
& 6*e^2*f*h - 32*a^3*b^4*c^4*d*f*i^2 + 24*a^2*b^5*c^4*d*g^2*h - 864*a^3*b^2*c \\
& ^6*d*f^2*h + 480*a^2*b^3*c^6*d^2*e*i + 336*a^3*b^3*c^5*d*f*h^2 + 192*a^3*b^ \\
& 2*c^6*e*f^2*g + 144*a^2*b^3*c^6*d^2*f*h - 30*a^2*b^5*c^4*d*f*h^2 + 16*a^2*b \\
& ^4*c^5*e*f^2*g - 12*a^2*b^4*c^5*d*f^2*h + 192*a^3*b^2*c^6*d*f*g^2 + 96*a^2* \\
& b^3*c^6*d*e^2*h + 48*a^2*b^4*c^5*d*f*g^2 + 960*a^2*b^2*c^7*d^2*e*g + 192*a^ \\
& 2*b^2*c^7*d*e^2*f - 3072*a^8*b*c^2*j^2*k^2 + 1104*a^7*b^3*c*j^2*k^2 + 768*a \\
& ^6*b^4*c*i^2*k^2 - 256*a^6*b^3*c^2*i^3*k + 1536*a^7*b*c^3*h^2*k^2 - 960*a^7 \\
& *b*c^3*i^2*j^2 + 444*a^5*b^5*c*h^2*k^2 - 16*a^5*b^5*c*i^2*j^2 - 3072*a^7*b^ \\
& 2*c^2*g*k^3 - 496*a^6*b^3*c^2*h*j^3 + 192*a^4*b^6*c*g^2*k^2 - 192*a^4*b^4*c \\
& ^3*g^3*k + 144*a^5*b^3*c^3*h^3*j + 32*a^3*b^6*c^2*g^3*k - 18*a^4*b^5*c^2*h^ \\
& 3*j - 9*a^4*b^6*c*h^2*j^2 - 192*a^6*b*c^4*h^2*i^2 + 36*a^3*b^7*c*f^2*k^2 - \\
& 4*a^3*b^7*c*g^2*j^2 - 2176*a^6*b^3*c^2*e*k^3 - 256*a^3*b^3*c^5*e^3*k - 192* \\
& a^6*b^2*c^3*f*j^3 - 192*a^4*b^2*c^5*f^3*j + 132*a^5*b^4*c^2*f*j^3 + 128*a^4 \\
& *b^3*c^4*g^3*i - 28*a^3*b^4*c^4*f^3*j + 6*a^2*b^6*c^3*f^3*j + 10752*a^5*b*c \\
& ^5*d^2*k^2 - 960*a^5*b*c^5*e^2*j^2 - 192*a^5*b*c^5*f^2*i^2 - 1680*a^5*b^3*c \\
& ^3*d*j^3 - 1680*a^2*b^3*c^6*d^3*j + 222*a^4*b^5*c^2*d*j^3 + 80*a^4*b^3*c^4* \\
& f*h^3 + 80*a^3*b^3*c^5*f^3*h + 30*a*b^8*c^2*d^2*j^2 + 6*a^3*b^5*c^3*f*h^3 + \\
& 6*a^2*b^5*c^4*f^3*h - 960*a^4*b*c^6*d^2*i^2 - 192*a^4*b*c^6*e^2*h^2 - 192* \\
& a^4*b^2*c^5*d*h^3 - 192*a^2*b^2*c^7*d^3*h + 128*a^3*b^3*c^5*e*g^3 - 28*a^3* \\
& b^4*c^4*d*h^3 + 12*a*b^6*c^4*d^2*h^2 + 6*a^2*b^6*c^3*d*h^3 - 192*a^3*b*c^7* \\
& e^2*f^2 + 60*a*b^5*c^5*d^2*g^2 + 198*a*b^4*c^6*d^2*f^2 + 144*a^2*b^3*c^6*d* \\
& f^3 - 960*a^2*b*c^8*d^2*e^2 + 240*a*b^3*c^7*d^2*e^2 + 4608*a^8*c^3*i*j^2*k \\
& - 3072*a^8*c^3*h*j*k^2 - 512*a^7*c^4*h^2*i*k + 120*a^5*b^6*h*j*k^2 + 768*a^ \\
& 7*c^4*h*i^2*j + 4608*a^7*c^4*e*j^2*k + 512*a^6*c^5*f^2*i*k + 64*a^4*b^7*g*i \\
& *k^2 - 40*a^4*b^7*f*j*k^2 - 9216*a^7*c^4*d*j*k^2 - 4096*a^7*c^4*e*i*k^2 - 1 \\
& 024*a^7*c^4*f*h*k^2 - 4608*a^5*c^6*d^2*i*k - 512*a^6*c^5*e*h^2*k - 192*a^6* \\
& c^5*f*h^2*j - 40*a^3*b^8*d*j*k^2 + 24*a^3*b^8*f*h*k^2 + 2304*a^6*c^5*d*i^2* \\
& j + 768*a^5*c^6*e^2*h*j + 256*a^6*c^5*f*h*i^2 + 8*b^9*c^2*d^2*g*k - 2*b^9*c \\
& ^2*d^2*h*j + 6144*a^8*b*c^2*i*k^3 - 2176*a^7*b^3*c*i*k^3 - 1728*a^6*c^5*d*h \\
& *j^2 + 1536*a^7*b*c^3*i^3*k + 512*a^5*c^6*e*f^2*k + 24*a^2*b^9*d*h*k^2 - 30 \\
& 72*a^6*c^5*d*f*k^2 - 16*b^8*c^3*d^2*e*k + 6*b^8*c^3*d^2*f*j - 4608*a^4*c^7* \\
& d^2*e*k + 2016*a^7*b*c^3*h*j^3 - 1728*a^4*c^7*d^2*f*j + 1088*a^6*b^4*c*g*k^ \\
& 3 + 224*a^6*b*c^4*h^3*j + 30*a^5*b^5*c*h*j^3 + 2304*a^4*c^7*d*e^2*j + 768*a \\
& ^5*c^6*d*f*i^2 + 256*a^4*c^7*e^2*f*h + 6*b^7*c^4*d^2*f*h + 6144*a^7*b*c^3*e \\
& *k^3 + 1536*a^4*b*c^6*e^3*k + 512*a^6*b*c^4*g*i^3 + 192*a^5*b^5*c*e*k^3 - 1
\end{aligned}$$

$$\begin{aligned}
& 92a^4c^7d^2f^2h - 10a^4b^6c^5f^3j + 108a^9c^5d^2k^2 + 16b^6c^5d^2e^2g + 4320a^6b^4c^4d^2j^3 + 4320a^3b^7c^4d^3j + 222a^5b^5c^5d^3j \\
& + 96a^5b^5c^5f^3h + 96a^4b^6c^6f^3h - 10a^3b^7c^4d^3j + 768a^3c^8d^2e^2f + 512a^3b^7c^6e^3g + 132a^4b^4c^6d^3h + 2016a^2b^8c^8d^3 \\
& *f - 496a^3b^7c^4d^3f + 224a^3b^7c^4d^3f^3 - 18a^5b^5c^5d^2f^3 - 1920a^7b^2c^2i^2k^2 - 1648a^6b^3c^2h^2k^2 + 240a^6b^3c^2i^2j^2 - \\
& 960a^6b^2c^3h^2j^2 - 512a^6b^2c^3g^2k^2 - 480a^5b^4c^2g^2k^2 + 198a^5b^4c^2h^2j^2 - 240a^5b^3c^3g^2j^2 - 240a^5b^3c^3f^2k^2 \\
& + 60a^4b^5c^2g^2j^2 - 36a^4b^5c^2f^2k^2 - 16a^5b^3c^3h^2i^2 - 1920a^5b^2c^4e^2k^2 + 768a^4b^4c^3e^2k^2 - 464a^5b^2c^4f^2j^2 \\
& - 384a^5b^2c^4g^2i^2 - 64a^3b^6c^2e^2k^2 + 42a^4b^4c^3f^2j^2 + 12a^3b^6c^2f^2j^2 - 13104a^4b^3c^4d^2k^2 + 5628a^3b^5c^3d^2k^2 \\
& - 1128a^2b^7c^2d^2k^2 + 240a^4b^3c^4e^2j^2 - 48a^4b^3c^4g^2h^2 - 16a^4b^3c^4f^2i^2 - 16a^3b^5c^3e^2j^2 - 4a^3b^5c^3g^2h^2 \\
& - 2880a^4b^2c^5d^2j^2 + 1750a^3b^4c^4d^2j^2 - 345a^2b^6c^3d^2j^2 - 192a^4b^2c^5f^2h^2 - 42a^3b^4c^4f^2h^2 + 240a^3b^3c^5d^2i^2 - 48a^3b^3c^5f^2g^2 \\
& - 16a^3b^3c^5e^2h^2 - 16a^2b^5c^4d^2i^2 - 4a^2b^5c^4f^2g^2 - 464a^3b^2c^6d^2h^2 - 384a^3b^2c^6e^2g^2 + 42a^2b^4c^5d^2h^2 \\
& - 240a^2b^3c^6d^2g^2 - 16a^2b^3c^6e^2f^2 - 960a^2b^2c^7d^2f^2 - 8a^5b^10d^2f^2k^2 - a^2b^8c^5f^2j^2 - 2048a^8c^3i^2k^2 \\
& - 100a^6b^5j^2k^2 - 64a^5b^6i^2k^2 - 288a^7c^4h^2j^2 - 36a^4b^7h^2k^2 - 16a^3b^8g^2k^2 - 2048a^6c^5e^2k^2 - 864a^6c^5f^2j^2 \\
& - 4a^2b^9f^2k^2 - 2592a^5c^6d^2j^2 - 1536a^5c^6e^2i^2 - 32a^5c^6f^2h^2 - 864a^4c^7d^2h^2 + 360a^7b^2c^2j^4 - 4b^7c^4d^2g^2 \\
& - 9b^6c^5d^2f^2 - 288a^3c^8d^2f^2 - 24a^5b^2c^4h^4 - 16b^5c^6d^2e^2 - 9a^4b^4c^3h^4 - 16a^3b^4c^4g^4 - 24a^3b^2c^6f^4 \\
& - 9a^2b^4c^5f^4 - a^2b^6c^3f^2h^2 + 192a^6b^5i^2k^3 - 96a^5b^6g^2k^3 - 1728a^7c^4f^2j^3 - 192a^5c^6f^3j - 10b^7c^4d^3j \\
& - 1024a^6c^5e^2i^3 - 1024a^4c^7e^3i + 1536a^8b^2c^2k^4 - 10b^6c^5d^3h - 1728a^3c^8d^3h - 192a^5c^6d^3h^3 - 25a^6b^4c^5j^4 \\
& + 30b^5c^6d^3f + 360a^2b^2c^8d^4 - 4b^11d^2k^2 - 4096a^9c^2k^4 - 1296a^8c^3j^4 - 144a^7b^4k^4 - 256a^7c^4i^4 - 16a^6c^5h^4 \\
& - 16a^4c^7f^4 - 256a^3c^8e^4 - 25b^4c^7d^4 - 1296a^2c^9d^4 - b^8c^3d^2h^2 - b^10c^d^2j^2, z, n) * x * (8192a^6b^8c^8 + 32a^2b^9c^4 \\
& - 512a^3b^7c^5 + 3072a^4b^5c^6 - 8192a^5b^3c^7) / (4 * (64a^5c^5 - a^2b^6c^2 + 12a^3b^4c^3 - 48a^4b^2c^4)) + (x * (2b^6c^5d^2 \\
& - 576a^3c^8d^2 + 64a^4c^7f^2 - 64a^5c^6h^2 + 8a^2b^9k^2 + 576a^6c^5j^2 - 36a^4b^4c^6d^2 + 128a^3b^7e^2 + 128a^5b^8c^5i^2 \\
& + 2a^2b^8c^5j^2 - 136a^3b^7c^5k^2 + 3072a^6b^4c^4k^2 + 256a^2b^2c^7d^2 - 32a^2b^3c^6e^2 + 20a^2b^4c^5f^2 - 96a^3b^2c^6f^2 - 8a^2b^5c^4g^2 \\
& + 32a^3b^3c^5g^2 + 2a^2b^6c^3h^2 - 4a^3b^4c^4h^2 - 32a^4b^3c^4i^2 - 40a^3b^6c^2j^2 + 276a^4b^4c^3j^2 - 736a^5b^2c^4j^2 + 888a^4b^5c^2k^2 \\
& - 2656a^5b^3c^3k^2 - 384a^4c^7d^2h - 1024a^5c^6e^2k + 384a^5c^6f^2j - 1024a^6c^5i^2k + 4a^5b^5c^5d^2f + 320a^3b^7c^4d^2f \\
& + 576a^4b^6c^6d^2j + 256a^4b^6c^6e^2i + 64a^4b^6c^6
\end{aligned}$$

$$\begin{aligned}
& 6*f*h + 512*a^5*b*c^5*g*k + 64*a^5*b*c^5*h*j - 96*a^2*b^3*c^6*d*f + 8*a^2*b^4*c^5*d*h + 32*a^2*b^4*c^5*e*g + 64*a^3*b^2*c^6*d*h - 128*a^3*b^2*c^6*e*g \\
& + 20*a^2*b^5*c^4*d*j - 12*a^2*b^5*c^4*f*h - 224*a^3*b^3*c^5*d*j - 64*a^3*b^3*c^5*e*i + 32*a^3*b^3*c^5*f*h - 12*a^2*b^6*c^3*f*j - 32*a^3*b^4*c^4*e*k + \\
& 152*a^3*b^4*c^4*f*j + 32*a^3*b^4*c^4*g*i + 384*a^4*b^2*c^5*e*k - 512*a^4*b^2*c^5*f*j - 128*a^4*b^2*c^5*g*i + 4*a^2*b^7*c^2*h*j + 16*a^3*b^5*c^3*g*k - \\
& 44*a^3*b^5*c^3*h*j - 192*a^4*b^3*c^4*g*k + 96*a^4*b^3*c^4*h*j - 32*a^4*b^4*c^3*i*k + 384*a^5*b^2*c^4*i*k) / (4*(64*a^5*c^5 - a^2*b^6*c^2 + 12*a^3*b^4*c^3 - 48*a^4*b^2*c^4)) - (5*b^3*c^6*d^3 + 8*a^3*c^6*f^3 + 216*a^6*c^3*j^3 - \\
& 96*a^2*c^7*d*e^2 + 72*a^2*c^7*d^2*f - 4*a^4*b*c^4*h^3 - 3*b^4*c^5*d^2*f + 5*a^4*b^4*c*j^3 - 32*a^3*c^6*e^2*h - 96*a^4*c^5*d*i^2 + b^5*c^4*d^2*h + 216 \\
& *a^3*c^6*d^2*j + 8*a^4*c^5*f*h^2 + 384*a^5*c^4*d*k^2 + b^6*c^3*d^2*j + 4*a^2*b^7*f*k^2 + 72*a^4*c^5*f^2*j + 216*a^5*c^4*f*j^2 - 32*a^5*c^4*h*i^2 - 12* \\
& a^3*b^6*h*k^2 + 24*a^5*c^4*h^2*j + 128*a^6*c^3*h*k^2 + 20*a^4*b^5*j*k^2 + 6*a^2*b^2*c^5*f^3 - 3*a^3*b^3*c^3*h^3 - 66*a^5*b^2*c^2*j^3 - 36*a*b*c^7*d^3 \\
& + 4*a*b^8*d*k^2 + a*b^7*c*d*j^2 - 192*a^3*c^6*d*e*i + 48*a^3*c^6*d*f*h + 144*a^4*c^5*d*h*j - 128*a^4*c^5*e*f*k - 64*a^4*c^5*e*h*i - 384*a^5*c^4*e*j*k \\
& - 128*a^5*c^4*f*i*k - 384*a^6*c^3*i*j*k + 16*a*b^2*c^6*d*e^2 + 18*a*b^2*c^6*d^2*f + 3*a*b^3*c^5*d*f^2 - 60*a^2*b*c^6*d*f^2 + 4*a*b^4*c^4*d*g^2 + 16*a^2 \\
& *b*c^6*e^2*f - a*b^3*c^5*d^2*h + a*b^5*c^3*d*h^2 - 60*a^2*b*c^6*d^2*h - 28*a^3*b*c^5*d*h^2 - 10*a*b^4*c^4*d^2*j - 28*a^3*b*c^5*f^2*h - 396*a^4*b*c^4*d \\
& *j^2 - 72*a^2*b^6*c*d*k^2 + 16*a^3*b*c^5*e^2*j + 16*a^4*b*c^4*f*i^2 + a^2*b^6*c*f*j^2 - 36*a^3*b^5*c*f*k^2 + 128*a^5*b*c^3*f*k^2 - 3*a^3*b^5*c*h*j^2 \\
& - 204*a^5*b*c^3*h*j^2 + 128*a^4*b^4*c*h*k^2 + 16*a^5*b*c^3*i^2*j - 204*a^5*b^3*c*j*k^2 + 512*a^6*b*c^2*j*k^2 - 24*a^2*b^2*c^5*d*g^2 - 9*a^2*b^3*c^4*d* \\
& h^2 + 4*a^2*b^3*c^4*f*g^2 + 16*a^3*b^2*c^4*d*i^2 - 6*a^2*b^2*c^5*d^2*j - 5*a^2*b^3*c^4*f^2*h + a^2*b^4*c^3*f*h^2 - 21*a^2*b^5*c^2*d*j^2 + 18*a^3*b^2*c^4 \\
& *f*h^2 + 155*a^3*b^3*c^3*d*j^2 - 8*a^3*b^2*c^4*g^2*h + 436*a^3*b^4*c^2*d*k^2 - 952*a^4*b^2*c^3*d*k^2 - 5*a^2*b^4*c^3*f^2*j + 26*a^3*b^2*c^4*f^2*j - \\
& 12*a^3*b^4*c^2*f*j^2 + 2*a^4*b^2*c^3*f*j^2 + 4*a^3*b^3*c^3*g^2*j + 52*a^4*b^3*c^2*f*k^2 - 6*a^3*b^4*c^2*h^2*j + 42*a^4*b^2*c^3*h^2*j + 51*a^4*b^3*c^2* \\
& h*j^2 - 360*a^5*b^2*c^2*h*k^2 - 16*a*b^3*c^5*d*e*g + 96*a^2*b*c^6*d*e*g - 4*a*b^4*c^4*d*f*h + 16*a*b^5*c^3*d*e*k - 4*a*b^5*c^3*d*f*j + 544*a^3*b*c^5*d \\
& *e*k - 312*a^3*b*c^5*d*f*j + 96*a^3*b*c^5*d*g*i + 32*a^3*b*c^5*e*f*i + 32*a^3*b*c^5*e*g*h - 8*a*b^6*c^2*d*g*k + 2*a*b^6*c^2*d*h*j + 544*a^4*b*c^4*d*i* \\
& k + 224*a^4*b*c^4*e*h*k + 32*a^4*b*c^4*e*i*j + 64*a^4*b*c^4*f*g*k - 152*a^4*b*c^4*f*h*j + 32*a^4*b*c^4*g*h*i + 192*a^5*b*c^3*g*j*k + 224*a^5*b*c^3*h*i \\
& *k + 32*a^2*b^2*c^5*d*e*i + 52*a^2*b^2*c^5*d*f*h - 16*a^2*b^2*c^5*e*f*g - 192*a^2*b^3*c^4*d*e*k + 70*a^2*b^3*c^4*d*f*j - 16*a^2*b^3*c^4*d*g*i + 96*a^2 \\
& *b^4*c^3*d*g*k - 30*a^2*b^4*c^3*d*h*j + 16*a^2*b^4*c^3*e*f*k - 272*a^3*b^2*c^4*d*g*k + 100*a^3*b^2*c^4*d*h*j - 48*a^3*b^2*c^4*e*f*k - 16*a^3*b^2*c^4*e \\
& *g*j - 16*a^3*b^2*c^4*f*g*i + 16*a^2*b^5*c^2*d*i*k - 8*a^2*b^5*c^2*f*g*k + 2*a^2*b^5*c^2*f*h*j - 192*a^3*b^3*c^3*d*i*k - 48*a^3*b^3*c^3*e*h*k + 24*a^3 \\
& *b^3*c^3*f*g*k + 6*a^3*b^3*c^3*f*h*j + 16*a^3*b^4*c^2*f*i*k + 24*a^3*b^4*c^2*g*h*k + 80*a^4*b^2*c^3*e*j*k - 48*a^4*b^2*c^3*f*i*k - 112*a^4*b^2*c^3*g*h
\end{aligned}$$

$$\begin{aligned}
& *k - 16*a^4*b^2*c^3*g*i*j - 40*a^4*b^3*c^2*g*j*k - 48*a^4*b^3*c^2*h*i*k + 8 \\
& 0*a^5*b^2*c^2*i*j*k)/(8*(64*a^5*c^5 - a^2*b^6*c^2 + 12*a^3*b^4*c^3 - 48*a^4 \\
& *b^2*c^4)) + (x*(32*a^2*c^7*e^3 + 32*a^5*c^4*i^3 - 12*a^4*b^5*k^3 - 2*b^3*c \\
& ^6*d^2*e + b^4*c^5*d^2*g + 124*a^5*b^3*c*k^3 - 320*a^6*b*c^2*k^3 + 96*a^3*c \\
& ^6*e^2*i + 96*a^4*c^5*e*i^2 + 144*a^3*c^6*d^2*k + 128*a^5*c^4*e*k^2 - b^6*c \\
& ^3*d^2*k - 4*a^2*b^7*g*k^2 - 16*a^4*c^5*f^2*k + 8*a^3*b^6*i*k^2 + 16*a^5*c^ \\
& 4*h^2*k + 128*a^6*c^3*i*k^2 - 144*a^6*c^3*j^2*k - 4*a^2*b^3*c^4*g^3 + 24*a* \\
& b*c^7*d^2*e - 48*a^2*c^7*d*e*f - 144*a^3*c^6*d*e*j - 48*a^3*c^6*d*f*i - 16* \\
& a^3*c^6*e*f*h + 96*a^4*c^5*d*h*k - 144*a^4*c^5*d*i*j - 48*a^4*c^5*e*h*j - 1 \\
& 6*a^4*c^5*f*h*i - 96*a^5*c^4*f*j*k - 48*a^5*c^4*h*i*j - 12*a*b^2*c^6*d^2*g \\
& + 16*a^2*b*c^6*e*f^2 - 48*a^2*b*c^6*e^2*g - 2*a*b^3*c^5*d^2*i + 24*a^2*b*c^ \\
& 6*d^2*i + 8*a^3*b*c^5*e*h^2 + 18*a*b^4*c^4*d^2*k + 16*a^3*b*c^5*f^2*i + 96* \\
& a^4*b*c^4*e*j^2 + 8*a^2*b^6*c*e*k^2 - 176*a^3*b*c^5*e^2*k - 48*a^4*b*c^4*g* \\
& i^2 - a^2*b^6*c*g*j^2 + 8*a^4*b*c^4*h^2*i + 44*a^3*b^5*c*g*k^2 - 64*a^5*b*c \\
& ^3*g*k^2 + 2*a^3*b^5*c*i*j^2 + 96*a^5*b*c^3*i*j^2 - 88*a^4*b^4*c*i*k^2 - 17 \\
& 6*a^5*b*c^3*i^2*k - 3*a^4*b^4*c*j^2*k + 24*a^2*b^2*c^5*e*g^2 - 8*a^2*b^2*c^ \\
& 5*f^2*g + 2*a^2*b^3*c^4*e*h^2 - 100*a^2*b^2*c^5*d^2*k - a^2*b^4*c^3*g*h^2 + \\
& 2*a^2*b^5*c^2*e*j^2 - 4*a^3*b^2*c^4*g*h^2 - 28*a^3*b^3*c^3*e*j^2 + 32*a^2* \\
& b^3*c^4*e^2*k + 24*a^3*b^2*c^4*g^2*i - 88*a^3*b^4*c^2*e*k^2 + 216*a^4*b^2*c \\
& ^3*e*k^2 - a^2*b^4*c^3*f^2*k + 2*a^3*b^3*c^3*h^2*i + 14*a^3*b^4*c^2*g*j^2 - \\
& 48*a^4*b^2*c^3*g*j^2 + 8*a^2*b^5*c^2*g^2*k - 44*a^3*b^3*c^3*g^2*k - 108*a^ \\
& 4*b^3*c^2*g*k^2 - 12*a^4*b^2*c^3*h^2*k - 28*a^4*b^3*c^2*i*j^2 + 32*a^4*b^3* \\
& c^2*i^2*k + 216*a^5*b^2*c^2*i*k^2 + 40*a^5*b^2*c^2*j^2*k - 4*a*b^2*c^6*d*e* \\
& f + 2*a*b^3*c^5*d*f*g + 32*a^2*b*c^6*d*e*h + 24*a^2*b*c^6*d*f*g - 2*a*b^5*c \\
& ^3*d*f*k - 8*a^3*b*c^5*d*f*k + 72*a^3*b*c^5*d*g*j + 32*a^3*b*c^5*d*h*i + 80 \\
& *a^3*b*c^5*e*f*j - 96*a^3*b*c^5*e*g*i + 8*a^3*b*c^5*f*g*h + 72*a^4*b*c^4*d* \\
& j*k - 352*a^4*b*c^4*e*i*k + 8*a^4*b*c^4*f*h*k + 80*a^4*b*c^4*f*i*j + 24*a^4 \\
& *b*c^4*g*h*j + 56*a^5*b*c^3*h*j*k + 20*a^2*b^2*c^5*d*e*j - 4*a^2*b^2*c^5*d* \\
& f*i - 16*a^2*b^2*c^5*d*g*h - 12*a^2*b^2*c^5*e*f*h + 18*a^2*b^3*c^4*d*f*k - \\
& 10*a^2*b^3*c^4*d*g*j - 12*a^2*b^3*c^4*e*f*j + 6*a^2*b^3*c^4*f*g*h + 6*a^2*b \\
& ^4*c^3*d*h*k - 32*a^2*b^4*c^3*e*g*k + 4*a^2*b^4*c^3*e*h*j + 6*a^2*b^4*c^3*f \\
& *g*j - 64*a^3*b^2*c^4*d*h*k + 20*a^3*b^2*c^4*d*i*j + 176*a^3*b^2*c^4*e*g*k \\
& - 20*a^3*b^2*c^4*e*h*j - 40*a^3*b^2*c^4*f*g*j - 12*a^3*b^2*c^4*f*h*i - 2*a^ \\
& 2*b^5*c^2*g*h*j - 10*a^3*b^3*c^3*d*j*k + 64*a^3*b^3*c^3*e*i*k + 6*a^3*b^3*c \\
& ^3*f*h*k - 12*a^3*b^3*c^3*f*i*j + 10*a^3*b^3*c^3*g*h*j - 32*a^3*b^4*c^2*g*i \\
& *k + 4*a^3*b^4*c^2*h*i*j + 8*a^4*b^2*c^3*f*j*k + 176*a^4*b^2*c^3*g*i*k - 20 \\
& *a^4*b^2*c^3*h*i*j - 6*a^4*b^3*c^2*h*j*k))/(4*(64*a^5*c^5 - a^2*b^6*c^2 + 1 \\
& 2*a^3*b^4*c^3 - 48*a^4*b^2*c^4)))*root(1572864*a^8*b^2*c^9*z^4 - 983040*a^7 \\
& *b^4*c^8*z^4 + 327680*a^6*b^6*c^7*z^4 - 61440*a^5*b^8*c^6*z^4 + 6144*a^4*b^ \\
& 10*c^5*z^4 - 256*a^3*b^12*c^4*z^4 - 1048576*a^9*c^10*z^4 - 1572864*a^8*b^2* \\
& c^7*k*z^3 + 983040*a^7*b^4*c^6*k*z^3 - 327680*a^6*b^6*c^5*k*z^3 + 61440*a^5 \\
& *b^8*c^4*k*z^3 - 6144*a^4*b^10*c^3*k*z^3 + 256*a^3*b^12*c^2*k*z^3 + 1048576 \\
& *a^9*c^8*k*z^3 + 98304*a^8*b*c^6*i*k*z^2 + 98304*a^7*b*c^7*e*k*z^2 + 57344* \\
& a^7*b*c^7*f*j*z^2 + 32768*a^7*b*c^7*g*i*z^2 + 57344*a^6*b*c^8*d*h*z^2 + 327 \\
& 68*a^6*b*c^8*e*g*z^2 - 32*a*b^10*c^4*d*f*z^2 - 90112*a^7*b^3*c^5*i*k*z^2 +
\end{aligned}$$

$30720a^6b^5c^4i^2k^2z^2 - 4608a^5b^7c^3i^2k^2z^2 + 256a^4b^9c^2i^2k^2z^2 - 49152a^7b^2c^6g^2k^2z^2 + 45056a^6b^4c^5g^2k^2z^2 + 24576a^7b^2c^6h^2j^2z^2 - 15360a^5b^6c^4g^2k^2z^2 - 3072a^5b^6c^4h^2j^2z^2 + 2304a^4b^8c^3g^2k^2z^2 + 2048a^6b^4c^5h^2j^2z^2 + 576a^4b^8c^3h^2j^2z^2 - 128a^3b^10c^2g^2k^2z^2 - 32a^3b^10c^2h^2j^2z^2 - 90112a^6b^3c^6e^2k^2z^2 - 49152a^6b^3c^6f^2j^2z^2 + 30720a^5b^5c^5e^2k^2z^2 - 24576a^6b^3c^6g^2i^2z^2 + 15360a^5b^5c^5f^2j^2z^2 + 6144a^5b^5c^5g^2i^2z^2 - 4608a^4b^7c^4e^2k^2z^2 - 2048a^4b^7c^4f^2j^2z^2 - 512a^4b^7c^4g^2i^2z^2 + 256a^3b^9c^3e^2k^2z^2 + 96a^3b^9c^3f^2j^2z^2 + 131072a^6b^2c^7d^2j^2z^2 + 49152a^6b^2c^7e^2i^2z^2 - 43008a^5b^4c^6d^2j^2z^2 - 12288a^5b^4c^6e^2i^2z^2 + 6144a^5b^4c^6f^2h^2z^2 + 6144a^4b^6c^5d^2j^2z^2 - 2048a^4b^6c^5f^2h^2z^2 + 1024a^4b^6c^5e^2i^2z^2 - 320a^3b^8c^4d^2j^2z^2 + 192a^3b^8c^4f^2h^2z^2 - 49152a^5b^3c^7d^2h^2z^2 - 24576a^5b^3c^7e^2g^2z^2 + 15360a^4b^5c^6d^2h^2z^2 + 6144a^4b^5c^6e^2g^2z^2 - 2048a^3b^7c^5d^2h^2z^2 - 512a^3b^7c^5e^2g^2z^2 + 96a^2b^9c^4d^2h^2z^2 + 24576a^5b^2c^8d^2f^2z^2 - 3072a^3b^6c^6d^2f^2z^2 + 2048a^4b^4c^7d^2f^2z^2 + 576a^2b^8c^5d^2f^2z^2 + 1536a^4b^10c^2k^2z^2 + 61440a^8b^2c^6j^2z^2 - 16a^3b^11c^2j^2z^2 + 12288a^7b^2c^7h^2z^2 + 12288a^6b^2c^8f^2z^2 + 61440a^5b^2c^9d^2z^2 + 432a^2b^9c^5d^2z^2 - 49152a^8c^7h^2j^2z^2 - 147456a^7c^8d^2j^2z^2 - 65536a^7c^8e^2i^2z^2 - 16384a^7c^8f^2h^2z^2 - 49152a^6c^9d^2f^2z^2 + 516096a^8b^2c^5k^2z^2 - 288768a^7b^4c^4k^2z^2 + 88576a^6b^6c^3k^2z^2 - 15744a^5b^8c^2k^2z^2 - 61440a^7b^3c^5j^2z^2 + 24064a^6b^5c^4j^2z^2 - 4608a^5b^7c^3j^2z^2 + 432a^4b^9c^2j^2z^2 + 24576a^7b^2c^6i^2z^2 - 6144a^6b^4c^5i^2z^2 + 512a^5b^6c^4i^2z^2 - 8192a^6b^3c^6h^2z^2 + 1536a^5b^5c^5h^2z^2 - 16a^3b^9c^3h^2z^2 - 8192a^6b^2c^7g^2z^2 + 6144a^5b^4c^6g^2z^2 - 1536a^4b^6c^5g^2z^2 + 128a^3b^8c^4g^2z^2 - 8192a^5b^3c^7f^2z^2 + 1536a^4b^5c^6f^2z^2 - 16a^2b^9c^4f^2z^2 + 24576a^5b^2c^8e^2z^2 - 6144a^4b^4c^7e^2z^2 + 512a^3b^6c^6e^2z^2 - 61440a^4b^3c^8d^2z^2 + 24064a^3b^5c^7d^2z^2 - 4608a^2b^7c^6d^2z^2 - 393216a^9c^6k^2z^2 - 64a^3b^12k^2z^2 - 32768a^8c^7i^2z^2 - 32768a^6c^9e^2z^2 - 16b^11c^4d^2z^2 - 16384a^7b^2c^5g^2i^2k^2z^2 - 10240a^7b^2c^5f^2j^2k^2z^2 + 4096a^7b^2c^5h^2i^2j^2z^2 - 47104a^6b^2c^6d^2h^2k^2z^2 - 16384a^6b^2c^6e^2g^2k^2z^2 + 6144a^6b^2c^6f^2g^2j^2z^2 + 4096a^6b^2c^6e^2h^2j^2z^2 + 32a^2b^10c^2d^2f^2k^2z^2 - 6144a^5b^2c^7d^2g^2h^2z^2 - 4096a^5b^2c^7d^2f^2i^2z^2 - 32a^2b^8c^4d^2f^2g^2z^2 - 4096a^4b^2c^8d^2e^2f^2z^2 + 64a^2b^7c^5d^2e^2f^2z^2 - 18432a^7b^2c^4h^2j^2k^2z^2 + 4608a^6b^4c^3h^2j^2k^2z^2 - 384a^5b^6c^2h^2j^2k^2z^2 + 12288a^6b^3c^4g^2i^2k^2z^2 + 7680a^6b^3c^4f^2j^2k^2z^2 - 3072a^6b^3c^4h^2i^2j^2z^2 - 3072a^5b^5c^3g^2i^2k^2z^2 - 1920a^5b^5c^3f^2j^2k^2z^2 + 768a^5b^5c^3h^2i^2j^2z^2 + 256a^4b^7c^2g^2i^2k^2z^2 + 160a^4b^7c^2f^2j^2k^2z^2 - 64a^4b^7c^2h^2i^2j^2z^2 - 65536a^6b^2c^5d^2j^2k^2z^2 - 24576a^6b^2c^5e^2i^2k^2z^2 + 21504a^5b^4c^4d^2j^2k^2z^2 + 9216a^6b^2c^5f^2i^2j^2z^2 + 6144a^5b^4c^4e^2i^2k^2z^2 - 3072a^5b^4c^4f^2h^2k^2z^2 - 3072a^4b^6c^3d^2j^2k^2z^2 - 2304a^5b^4c^4f^2i^2j^2z^2 - 2048a^6b^2c^5g^2h^2j^2z^2 + 1536a^5b^4c^4g^2h^2j^2z^2 + 1024a^4b^6c^3f^2h^2k^2z^2 - 512a^4b^6c^3e^2i^2k^2z^2 - 384a^4b^6c^3g^2h^2j^2z^2 + 192a^4b^$

$$\begin{aligned}
& ^6c^3f^i*j^z + 160a^3b^8c^2d*j^kz - 96a^3b^8c^2f^h*kz + 32a^3b^8c^2g^h*j^z + 41472a^5b^3c^5d^h*kz - 13440a^4b^5c^4d^h*kz + 12288a^5b^3c^5e*g*kz - 4608a^5b^3c^5f*g*j^z - 3072a^5b^3c^5e^h*j^z - 3072a^4b^5c^4e*g*kz + 1888a^3b^7c^3d^h*kz + 1152a^4b^5c^4f*g*j^z + 768a^4b^5c^4e^h*j^z + 256a^3b^7c^3e*g*kz - 96a^3b^7c^3f*g*j^z - 96a^2b^9c^2d^h*kz - 64a^3b^7c^3e^h*j^z + 9216a^5b^2c^6e*f*j^z - 9216a^5b^2c^6d^h*i^z - 6656a^4b^4c^5d^f*kz - 6144a^5b^2c^6d^f*kz + 3456a^3b^6c^4d^f*kz - 2304a^4b^4c^5e^f*j^z + 2304a^4b^4c^5d^h*i^z - 576a^2b^8c^3d^f*kz + 192a^3b^6c^4e^f*j^z - 192a^3b^6c^4d^h*i^z + 4608a^4b^3c^6d^g^h*z + 3072a^4b^3c^6d^f*i^z - 1152a^3b^5c^5d^g^h*z - 768a^3b^5c^5d^f*i^z + 96a^2b^7c^4d^g^h*z + 64a^2b^7c^4d^f*i^z - 9216a^4b^2c^7d^e^h*z + 2304a^3b^4c^6d^e^h*z + 2048a^4b^2c^7d^f*g^z - 1536a^3b^4c^6d^f*g^z + 384a^2b^6c^5d^f*g^z - 192a^2b^6c^5d^e^h*z + 3072a^3b^3c^7d^e^f*z - 768a^2b^5c^6d^e^f*z - 3072a^8b^c^4j^2*kz + 48a^5b^7c^j^2*kz - 49152a^8b^c^4i^k^2*z + 2304a^5b^7c^i^k^2*z - 9216a^7b^c^5h^2*kz - 32a^4b^8c^i^j^2*z - 1152a^4b^8c^g^k^2*z + 9216a^7b^c^5g^j^2*z - 3072a^6b^c^6f^2*kz + 16a^3b^9c^g^j^2*z - 49152a^7b^c^5e^k^2*z - 128a^3b^9c^e^k^2*z - 58368a^5b^c^7d^2*kz - 1024a^6b^c^6g^h^2*z - 432a^b^9c^3d^2*kz + 1024a^5b^c^7f^2*g^z + 32a^b^8c^4d^2*i^z - 9216a^4b^c^8d^2*g^z + 336a^b^7c^5d^2*g^z - 672a^b^6c^6d^2e^z + 24576a^8c^5h^j^kz + 73728a^7c^6d^j^kz + 32768a^7c^6e^i^kz - 12288a^7c^6f^i^j^z + 8192a^7c^6f^h^kz + 24576a^6c^7d^f^kz - 12288a^6c^7e^f^j^z + 12288a^6c^7d^h^i^z + 12288a^5c^8d^e^h*z + 2304a^7b^3c^3j^2*kz - 576a^6b^5c^2j^2*kz + 45056a^7b^3c^3i^k^2*z - 15360a^6b^5c^2i^k^2*z - 12288a^7b^2c^4i^2*kz + 3072a^6b^4c^3i^2*kz - 256a^5b^6c^2i^2*kz + 15872a^7b^2c^4i^j^2*z + 6912a^6b^3c^4h^2*kz - 4992a^6b^4c^3i^j^2*z - 1728a^5b^5c^3h^2*kz + 672a^5b^6c^2i^j^2*z + 144a^4b^7c^2h^2*kz + 24576a^7b^2c^4g^k^2*z - 22528a^6b^4c^3g^k^2*z + 7680a^5b^6c^2g^k^2*z + 4096a^6b^2c^5g^2*kz - 3072a^5b^4c^4g^2*kz + 768a^4b^6c^3g^2*kz - 64a^3b^8c^2g^2*kz - 7936a^6b^3c^4g^j^2*z + 2496a^5b^5c^3g^j^2*z - 1536a^6b^2c^5h^2*i^z + 1280a^5b^3c^5f^2*kz + 384a^5b^4c^4h^2*i^z - 336a^4b^7c^2g^j^2*z + 192a^4b^5c^4f^2*kz - 144a^3b^7c^3f^2*kz - 32a^4b^6c^3h^2*i^z + 16a^2b^9c^2f^2*kz + 45056a^6b^3c^4e^k^2*z - 15360a^5b^5c^3e^k^2*z - 12288a^5b^2c^6e^2*kz + 3072a^4b^4c^5e^2*kz + 2304a^4b^7c^2e^k^2*z - 256a^3b^6c^4e^2*kz + 59136a^4b^3c^6d^2*kz - 23488a^3b^5c^5d^2*kz + 15872a^6b^2c^5e^j^2*z - 4992a^5b^4c^4e^j^2*z + 4560a^2b^7c^4d^2*kz + 1536a^5b^2c^6f^2*i^z + 768a^5b^3c^5g^h^2*z + 672a^4b^6c^3e^j^2*z - 384a^4b^4c^5f^2*i^z - 192a^4b^5c^4g^h^2*z - 32a^3b^8c^2e^j^2*z + 32a^3b^6c^4f^2*i^z + 16a^3b^7c^3g^h^2*z - 15872a^4b^2c^7d^2*i^z + 4992a^3b^4c^6d^2*i^z - 1536a^5b^2c^6e^h^2*z - 768a^4b^3c^6f^2*g^z - 672a^2b^6c^5d^2*i^z + 384a^4b^4c^5e^h^2*z + 192a^3b^5c^5f^2*g^z - 32a^3b^6c^4e^h^2*z - 16a^2b^7c^4f^2*g^z + 7936a^3b^3c^7d^2*g^z - 2496a^2b^5c^6d^2*
\end{aligned}$$

$g*z + 1536*a^4*b^2*c^7*e*f^2*z - 384*a^3*b^4*c^6*e*f^2*z + 32*a^2*b^6*c^5*e$
 $*f^2*z - 15872*a^3*b^2*c^8*d^2*e*z + 4992*a^2*b^4*c^7*d^2*e*z - 61440*a^8*b$
 $^2*c^3*k^3*z + 21504*a^7*b^4*c^2*k^3*z + 16384*a^8*c^5*i^2*k*z - 18432*a^8*$
 $c^5*i*j^2*z - 128*a^4*b^9*i*k^2*z + 2048*a^7*c^6*h^2*i*z + 64*a^3*b^10*g*k^$
 $2*z + 16384*a^6*c^7*e^2*k*z + 16*b^11*c^2*d^2*k*z - 18432*a^7*c^6*e*j^2*z -$
 $2048*a^6*c^7*f^2*i*z + 18432*a^5*c^8*d^2*i*z - 3328*a^6*b^6*c*k^3*z + 2048$
 $*a^6*c^7*e*h^2*z - 16*b^9*c^4*d^2*g*z - 2048*a^5*c^8*e*f^2*z + 32*b^8*c^5*d$
 $^2*e*z + 18432*a^4*c^9*d^2*e*z + 65536*a^9*c^4*k^3*z + 192*a^5*b^8*k^3*z -$
 $3328*a^7*b*c^3*h*i*j*k - 6912*a^6*b*c^4*d*i*j*k - 3328*a^6*b*c^4*e*h*j*k -$
 $1536*a^6*b*c^4*f*g*j*k - 768*a^6*b*c^4*g*h*i*j - 768*a^6*b*c^4*f*h*i*k - 69$
 $12*a^5*b*c^5*d*e*j*k - 2304*a^5*b*c^5*d*g*i*j - 1792*a^5*b*c^5*e*f*i*j + 15$
 $36*a^5*b*c^5*d*g*h*k - 1280*a^5*b*c^5*d*f*i*k - 768*a^5*b*c^5*e*g*h*j - 768$
 $*a^5*b*c^5*e*f*h*k - 256*a^5*b*c^5*f*g*h*i + 16*a*b^8*c^2*d*f*g*k - 4*a*b^8$
 $*c^2*d*f*h*j - 2304*a^4*b*c^6*d*e*g*j - 1792*a^4*b*c^6*d*e*h*i - 1280*a^4*b$
 $*c^6*d*e*f*k - 768*a^4*b*c^6*d*f*g*i - 256*a^4*b*c^6*e*f*g*h - 32*a*b^7*c^3$
 $*d*e*f*k - 768*a^3*b*c^7*d*e*f*g + 32*a*b^5*c^5*d*e*f*g + 576*a^6*b^3*c^2*h$
 $*i*j*k + 1664*a^6*b^2*c^3*g*h*j*k + 384*a^6*b^2*c^3*f*i*j*k - 288*a^5*b^4*c$
 $^2*g*h*j*k - 160*a^5*b^4*c^2*f*i*j*k + 2112*a^5*b^3*c^3*d*i*j*k + 576*a^5*b$
 $^3*c^3*e*h*j*k - 448*a^5*b^3*c^3*f*h*i*k - 192*a^5*b^3*c^3*g*h*i*j - 192*a^$
 $5*b^3*c^3*f*g*j*k - 160*a^4*b^5*c^2*d*i*j*k + 96*a^4*b^5*c^2*f*h*i*k + 80*a$
 $^4*b^5*c^2*f*g*j*k + 32*a^4*b^5*c^2*g*h*i*j + 4992*a^5*b^2*c^4*d*h*i*k - 46$
 $08*a^5*b^2*c^4*e*g*i*k + 3456*a^5*b^2*c^4*d*g*j*k - 1312*a^4*b^4*c^3*d*h*i*$
 $k - 1056*a^4*b^4*c^3*d*g*j*k + 896*a^5*b^2*c^4*f*g*i*j + 768*a^4*b^4*c^3*e*$
 $g*i*k + 384*a^5*b^2*c^4*f*g*h*k + 384*a^5*b^2*c^4*e*h*i*j + 384*a^5*b^2*c^4$
 $*e*f*j*k + 224*a^4*b^4*c^3*f*g*h*k - 160*a^4*b^4*c^3*e*f*j*k - 96*a^4*b^4*c$
 $^3*f*g*i*j + 96*a^3*b^6*c^2*d*h*i*k + 80*a^3*b^6*c^2*d*g*j*k - 64*a^4*b^4*c$
 $^3*e*h*i*j - 48*a^3*b^6*c^2*f*g*h*k - 2496*a^4*b^3*c^4*d*g*h*k + 2112*a^4*b$
 $^3*c^4*d*e*j*k - 960*a^4*b^3*c^4*d*f*i*k + 656*a^3*b^5*c^3*d*g*h*k - 448*a^$
 $4*b^3*c^4*e*f*h*k + 384*a^3*b^5*c^3*d*f*i*k + 320*a^4*b^3*c^4*d*g*i*j - 192$
 $*a^4*b^3*c^4*f*g*h*i - 192*a^4*b^3*c^4*e*g*h*j + 192*a^4*b^3*c^4*e*f*i*j -$
 $160*a^3*b^5*c^3*d*e*j*k + 96*a^3*b^5*c^3*e*f*h*k - 48*a^2*b^7*c^2*d*g*h*k +$
 $32*a^3*b^5*c^3*e*g*h*j - 32*a^2*b^7*c^2*d*f*i*k + 4992*a^4*b^2*c^5*d*e*h*k$
 $- 3584*a^4*b^2*c^5*d*f*h*j - 1312*a^3*b^4*c^4*d*e*h*k + 896*a^4*b^2*c^5*e*$
 $f*g*j + 896*a^4*b^2*c^5*d*g*h*i + 640*a^4*b^2*c^5*d*f*g*k - 640*a^4*b^2*c^5$
 $*d*e*i*j + 600*a^3*b^4*c^4*d*f*h*j + 480*a^3*b^4*c^4*d*f*g*k + 384*a^4*b^2*$
 $c^5*e*f*h*i - 192*a^2*b^6*c^3*d*f*g*k - 96*a^3*b^4*c^4*e*f*g*j - 96*a^3*b^4$
 $*c^4*d*g*h*i + 96*a^2*b^6*c^3*d*e*h*k + 12*a^2*b^6*c^3*d*f*h*j - 960*a^3*b^$
 $3*c^5*d*e*f*k + 384*a^2*b^5*c^4*d*e*f*k + 320*a^3*b^3*c^5*d*e*g*j - 192*a^3$
 $*b^3*c^5*e*f*g*h - 192*a^3*b^3*c^5*d*f*g*i + 192*a^3*b^3*c^5*d*e*h*i + 32*a$
 $^2*b^5*c^4*d*f*g*i + 896*a^3*b^2*c^6*d*e*g*h + 384*a^3*b^2*c^6*d*e*f*i - 96$
 $*a^2*b^4*c^5*d*e*g*h - 64*a^2*b^4*c^5*d*e*f*i - 192*a^2*b^3*c^6*d*e*f*g + 4$
 $8*a^6*b^4*c*i*j^2*k - 1424*a^6*b^4*c*h*j*k^2 - 2304*a^7*b*c^3*g*j^2*k - 24*$
 $a^5*b^5*c*g*j^2*k + 2048*a^7*b*c^3*g*i*k^2 - 1024*a^7*b*c^3*f*j*k^2 - 768*a$
 $^5*b^5*c*g*i*k^2 + 408*a^5*b^5*c*f*j*k^2 + 256*a^6*b*c^4*g*h^2*k + 16*a^4*b$
 $^6*c*g*i*j^2 + 4608*a^6*b*c^4*e*i^2*k + 4608*a^5*b*c^5*e^2*i*k - 896*a^6*b*$

$$\begin{aligned}
& c^4 f i^2 j + 768 a^4 b^6 c^4 d^2 j k^2 - 256 a^4 b^6 c^4 f h k^2 - 128 a^4 b^6 c^4 e i k^2 + 2208 a^6 b^6 c^4 f h j^2 - 1920 a^6 b^6 c^4 e i j^2 + 800 a^5 b^6 c^5 f^2 h j - 256 a^5 b^6 c^5 f^2 g k - 16 a^3 b^8 c^2 d^2 i k + 6 a^3 b^7 c^4 f h j^2 + 8192 a^6 b^6 c^4 d^2 h k^2 + 2048 a^6 b^6 c^4 e g k^2 - 472 a^3 b^7 c^4 d^2 h k^2 + 64 a^3 b^7 c^4 e g k^2 + 4896 a^4 b^6 c^6 d^2 h j + 2304 a^4 b^6 c^6 d^2 g k + 1824 a^5 b^6 c^5 d^2 h^2 j - 384 a^5 b^6 c^5 e h^2 i - 168 a^3 b^7 c^3 d^2 g k + 4 2 a^3 b^7 c^3 d^2 h j + 6 a^2 b^8 c^4 d^2 h j^2 + 1536 a^5 b^6 c^5 e g i^2 + 1536 a^4 b^6 c^6 e^2 g i - 896 a^5 b^6 c^5 d^2 h i^2 - 896 a^4 b^6 c^6 e^2 f j + 144 a^2 b^8 c^4 d^2 f k^2 + 4896 a^5 b^6 c^5 d^2 f j^2 + 1824 a^4 b^6 c^6 d^2 f^2 j - 384 a^4 b^6 c^6 e f^2 i + 336 a^3 b^6 c^4 d^2 e k - 156 a^3 b^6 c^4 d^2 f j + 16 a^3 b^6 c^4 d^2 g i + 12 a^3 b^7 c^3 d^2 f^2 j + 2208 a^3 b^6 c^7 d^2 f h - 1920 a^3 b^6 c^7 d^2 e i + 800 a^4 b^6 c^6 d^2 f h^2 - 102 a^3 b^5 c^5 d^2 f h - 32 a^3 b^5 c^5 d^2 e i + 12 a^3 b^6 c^4 d^2 f^2 h - 2 a^3 b^7 c^3 d^2 f h^2 - 896 a^3 b^6 c^7 d^2 e^2 h - 8 a^3 b^6 c^4 d^2 f g^2 - 240 a^3 b^4 c^6 d^2 e g - 32 a^3 b^4 c^6 d^2 e^2 f + 3072 a^7 c^4 f i j k + 3072 a^6 c^5 e f j k - 3072 a^6 c^5 d^2 h i k + 1536 a^6 c^5 e h i j + 4608 a^5 c^6 d^2 e i j - 3072 a^5 c^6 d^2 e h k - 1152 a^5 c^6 d^2 f h j + 512 a^5 c^6 e f h i + 1536 a^4 c^7 d^2 e f i - 2 a^3 b^9 c^4 d^2 f j^2 - 1088 a^7 b^2 c^2 i j^2 k + 4800 a^7 b^2 c^2 h j k^2 + 960 a^6 b^2 c^3 h^2 i k + 5 44 a^6 b^3 c^2 g j^2 k - 144 a^5 b^4 c^2 h^2 i k - 2304 a^6 b^2 c^3 g i^2 k + 1920 a^6 b^3 c^2 g i k^2 + 1152 a^5 b^3 c^3 g^2 i k - 864 a^6 b^3 c^2 f j k^2 + 384 a^5 b^4 c^2 g i^2 k + 192 a^6 b^2 c^3 h i^2 j - 192 a^4 b^5 c^2 g^2 i k - 32 a^5 b^4 c^2 h i^2 j - 1088 a^6 b^2 c^3 e j^2 k + 960 a^6 b^2 c^3 g i j^2 - 480 a^5 b^3 c^3 g h^2 k - 240 a^5 b^4 c^2 g i j^2 + 192 a^5 b^2 c^4 f^2 i k + 72 a^4 b^5 c^2 g h^2 k + 48 a^5 b^4 c^2 e j^2 k + 48 a^4 b^4 c^3 f^2 i k - 16 a^3 b^6 c^2 f^2 i k + 13376 a^6 b^2 c^3 d^2 j k^2 - 5136 a^5 b^4 c^2 d^2 j k^2 - 3840 a^6 b^2 c^3 e i k^2 + 1536 a^5 b^4 c^2 e i k^2 - 768 a^5 b^3 c^3 e i^2 k - 768 a^4 b^3 c^4 e^2 i k + 624 a^5 b^4 c^2 f h k^2 + 576 a^6 b^2 c^3 f h k^2 + 192 a^5 b^2 c^4 g^2 h j + 96 a^5 b^3 c^3 f i^2 j + 48 a^4 b^4 c^3 g^2 h j - 8 a^3 b^6 c^2 g^2 h j + 6848 a^4 b^2 c^5 d^2 i k - 2448 a^3 b^4 c^4 d^2 i k + 960 a^5 b^2 c^4 e h^2 k - 864 a^5 b^2 c^4 f h^2 j + 480 a^5 b^3 c^3 e i j^2 + 336 a^4 b^3 c^4 f^2 h j + 336 a^2 b^6 c^3 d^2 i k + 192 a^5 b^2 c^4 g h^2 i + 144 a^5 b^3 c^3 f h j^2 - 144 a^4 b^4 c^3 e h^2 k - 102 a^4 b^5 c^2 f h j^2 - 96 a^4 b^3 c^4 f^2 g k - 32 a^4 b^5 c^2 e i j^2 - 30 a^3 b^5 c^3 f^2 h j - 24 a^3 b^5 c^3 f^2 g k + 16 a^4 b^4 c^3 g h^2 i - 12 a^4 b^4 c^3 f h^2 j + 12 a^3 b^6 c^2 f h^2 j + 8 a^2 b^7 c^2 f^2 g k - 2 a^2 b^7 c^2 f^2 h j - 9312 a^5 b^3 c^3 d^2 h k^2 + 3288 a^4 b^5 c^2 d^2 h k^2 - 2304 a^4 b^2 c^5 e^2 g k + 1920 a^5 b^3 c^3 e g k^2 + 1 152 a^4 b^3 c^4 e g^2 k - 768 a^4 b^5 c^2 e g k^2 + 384 a^3 b^4 c^4 e^2 g k - 320 a^5 b^2 c^4 d^2 i^2 j - 224 a^4 b^3 c^4 f g^2 j + 192 a^5 b^2 c^4 f h i^2 + 192 a^4 b^2 c^5 e^2 h j - 192 a^3 b^5 c^3 e g^2 k - 32 a^3 b^4 c^4 e^2 h j + 24 a^3 b^5 c^3 f g^2 j - 3552 a^5 b^2 c^4 d^2 h j^2 - 3424 a^3 b^3 c^5 d^2 g k + 1332 a^4 b^4 c^3 d^2 h j^2 + 1224 a^2 b^5 c^4 d^2 g k + 960 a^5 b^2 c^4 e g j^2 - 496 a^3 b^3 c^5 d^2 h j + 432 a^4 b^3 c^4 d^2 h^2 j - 240 a^4 b^4 c^3 e g j^2 - 222 a^2 b^5 c^4 d^2 h j + 192 a^4 b^2 c^5 f^2 g i + 192 a^4 b^2 c^5 e f^2 k - 174 a^3 b^5 c^3 d^2 h^2 j - 156 a^3 b^6 c^2 d^2 h j^2 +
\end{aligned}$$

$$\begin{aligned}
& 48a^3b^4c^4ef^2k - 32a^4b^3c^4e^2h^2i + 16a^3b^6c^2e^2g^2j + 16a^3b^4c^4f^2gi - 16a^2b^6c^3ef^2k + 12a^2b^7c^2d^2h^2j + 1728a^5b^2c^4d^2fk^2 + 1392a^4b^4c^3d^2fk^2 - 840a^3b^6c^2d^2fk^2 - 768a^4b^2c^5e^2g^2i + 576a^4b^2c^5d^2g^2j + 96a^4b^3c^4d^2h^2i^2 + 96a^3b^3c^5e^2f^2j - 80a^3b^4c^4d^2g^2j + 64a^4b^2c^5f^2g^2h + 48a^3b^4c^4f^2g^2h + 6848a^3b^2c^6d^2e^2k - 3552a^3b^2c^6d^2f^2j - 2448a^2b^4c^5d^2e^2k + 1332a^2b^4c^5d^2f^2j + 960a^3b^2c^6d^2g^2i - 496a^4b^3c^4d^2f^2j + 432a^3b^3c^5d^2f^2j - 240a^2b^4c^5d^2g^2i - 222a^3b^5c^3d^2f^2j + 192a^4b^2c^5e^2g^2h - 174a^2b^5c^4d^2f^2j + 42a^2b^7c^2d^2f^2j - 32a^3b^3c^5e^2f^2i + 16a^3b^4c^4e^2g^2h - 320a^3b^2c^6d^2e^2j - 224a^3b^3c^5d^2g^2h + 192a^4b^2c^5d^2f^2i + 192a^3b^2c^6e^2f^2h - 32a^3b^4c^4d^2f^2i + 24a^2b^5c^4d^2g^2h - 864a^3b^2c^6d^2f^2h + 480a^2b^3c^6d^2e^2i + 336a^3b^3c^5d^2f^2h + 192a^3b^2c^6e^2f^2g + 144a^2b^3c^6d^2f^2h - 30a^2b^5c^4d^2f^2h + 16a^2b^4c^5e^2f^2g - 12a^2b^4c^5d^2f^2h + 192a^3b^2c^6d^2f^2g + 96a^2b^3c^6d^2e^2h + 48a^2b^4c^5d^2f^2g + 960a^2b^2c^7d^2e^2g + 192a^2b^2c^7d^2e^2f - 3072a^8b^3c^2j^2k^2 + 1104a^7b^3c^2j^2k^2 + 768a^6b^4c^2i^2k^2 - 256a^6b^3c^2i^3k + 1536a^7b^3c^2h^2k^2 - 960a^7b^3c^2i^2j^2 + 444a^5b^5c^2h^2k^2 - 16a^5b^5c^2i^2j^2 - 3072a^7b^2c^2g^2k^3 - 496a^6b^3c^2h^2j^3 + 192a^4b^6c^2g^2k^2 - 192a^4b^4c^3g^2k^3 + 144a^5b^3c^3h^3j + 32a^3b^6c^2g^2k^3 - 18a^4b^5c^2h^3j - 9a^4b^6c^2h^2j^2 - 192a^6b^3c^4h^2i^2 + 36a^3b^7c^2f^2k^2 - 4a^3b^7c^2g^2j^2 - 2176a^6b^3c^2e^2k^3 - 256a^3b^3c^5e^2k^3 - 192a^6b^2c^3f^2j^3 - 192a^4b^2c^5f^3j + 132a^5b^4c^2f^2j^3 + 128a^4b^3c^4g^2i - 28a^3b^4c^4f^3j + 6a^2b^6c^3f^3j + 10752a^5b^3c^5d^2k^2 - 960a^5b^3c^5e^2j^2 - 192a^5b^3c^5f^2i^2 - 1680a^5b^3c^3d^2j^3 - 1680a^2b^3c^6d^3j + 222a^4b^5c^2d^2j^3 + 80a^4b^3c^4f^2h^3 + 80a^3b^3c^5f^3h + 30a^2b^8c^2d^2j^2 + 6a^3b^5c^3f^2h^3 + 6a^2b^5c^4f^3h - 960a^4b^3c^6d^2i^2 - 192a^4b^3c^6e^2h^2 - 192a^4b^2c^5d^2h^3 - 192a^2b^2c^7d^3h + 128a^3b^3c^5e^2g^3 - 28a^3b^4c^4d^2h^3 + 12a^2b^6c^4d^2h^2 + 6a^2b^6c^3d^2h^3 - 192a^3b^3c^7e^2f^2 + 60a^2b^5c^5d^2g^2 + 198a^2b^4c^6d^2f^2 + 144a^2b^3c^6d^2f^3 - 960a^2b^3c^8d^2e^2 + 240a^2b^3c^7d^2e^2 + 4608a^8c^3i^2j^2k - 3072a^8c^3h^2j^2k^2 - 512a^7c^4h^2i^2k + 120a^5b^6h^2j^2k^2 + 768a^7c^4h^2i^2j + 4608a^7c^4e^2j^2k + 512a^6c^5f^2i^2k + 64a^4b^7g^2i^2k^2 - 40a^4b^7f^2j^2k^2 - 9216a^7c^4d^2j^2k^2 - 4096a^7c^4e^2i^2k^2 - 1024a^7c^4f^2h^2k^2 - 4608a^5c^6d^2i^2k - 512a^6c^5e^2h^2k - 192a^6c^5f^2h^2j - 40a^3b^8d^2j^2k^2 + 24a^3b^8f^2h^2k^2 + 2304a^6c^5d^2i^2j + 768a^5c^6e^2h^2j + 256a^6c^5f^2h^2i^2 + 8b^9c^2d^2g^2k - 2b^9c^2d^2h^2j + 6144a^8b^3c^2i^2k^3 - 2176a^7b^3c^2i^2k^3 - 1728a^6c^5d^2h^2j^2 + 1536a^7b^3c^2i^3k + 512a^5c^6e^2f^2k + 24a^2b^9d^2h^2k^2 - 3072a^6c^5d^2f^2k^2 - 16b^8c^3d^2e^2k + 6b^8c^3d^2f^2j - 4608a^4c^7d^2e^2k + 2016a^7b^3c^3h^2j^3 - 1728a^4c^7d^2f^2j + 1088a^6b^4c^2g^2k^3 + 224a^6b^3c^4h^3j + 30a^5b^5c^2h^2j^3 + 2304a^4c^7d^2e^2j + 768a^5c^6d^2f^2i^2 + 256a^4c^7e^2f^2h
\end{aligned}$$

$$\begin{aligned}
& + 6*b^7*c^4*d^2*f*h + 6144*a^7*b*c^3*e*k^3 + 1536*a^4*b*c^6*e^3*k + 512*a^6*b*c^4*g*i^3 + 192*a^5*b^5*c*e*k^3 - 192*a^4*c^7*d*f^2*h - 10*a^4*b^6*c*f*j^3 + 108*a*b^9*c*d^2*k^2 + 16*b^6*c^5*d^2*e*g + 4320*a^6*b*c^4*d*j^3 + 4320*a^3*b*c^7*d^3*j + 222*a*b^5*c^5*d^3*j + 96*a^5*b*c^5*f*h^3 + 96*a^4*b*c^6*f^3*h - 10*a^3*b^7*c*d*j^3 + 768*a^3*c^8*d*e^2*f + 512*a^3*b*c^7*e^3*g + 132*a*b^4*c^6*d^3*h + 2016*a^2*b*c^8*d^3*f - 496*a*b^3*c^7*d^3*f + 224*a^3*b*c^7*d*f^3 - 18*a*b^5*c^5*d*f^3 - 1920*a^7*b^2*c^2*i^2*k^2 - 1648*a^6*b^3*c^2*h^2*k^2 + 240*a^6*b^3*c^2*i^2*j^2 - 960*a^6*b^2*c^3*h^2*j^2 - 512*a^6*b^2*c^3*g^2*k^2 - 480*a^5*b^4*c^2*g^2*k^2 + 198*a^5*b^4*c^2*h^2*j^2 - 240*a^5*b^3*c^3*g^2*j^2 - 240*a^5*b^3*c^3*f^2*k^2 + 60*a^4*b^5*c^2*g^2*j^2 - 36*a^4*b^5*c^2*f^2*k^2 - 16*a^5*b^3*c^3*h^2*i^2 - 1920*a^5*b^2*c^4*e^2*k^2 + 768*a^4*b^4*c^3*e^2*k^2 - 464*a^5*b^2*c^4*f^2*j^2 - 384*a^5*b^2*c^4*g^2*i^2 - 64*a^3*b^6*c^2*e^2*k^2 + 42*a^4*b^4*c^3*f^2*j^2 + 12*a^3*b^6*c^2*f^2*j^2 - 13104*a^4*b^3*c^4*d^2*k^2 + 5628*a^3*b^5*c^3*d^2*k^2 - 1128*a^2*b^7*c^2*d^2*k^2 + 240*a^4*b^3*c^4*e^2*j^2 - 48*a^4*b^3*c^4*g^2*h^2 - 16*a^4*b^3*c^4*f^2*i^2 - 16*a^3*b^5*c^3*e^2*j^2 - 4*a^3*b^5*c^3*g^2*h^2 - 2880*a^4*b^2*c^5*d^2*j^2 + 1750*a^3*b^4*c^4*d^2*j^2 - 345*a^2*b^6*c^3*d^2*j^2 - 192*a^4*b^2*c^5*f^2*h^2 - 42*a^3*b^4*c^4*f^2*h^2 + 240*a^3*b^3*c^5*d^2*i^2 - 48*a^3*b^3*c^5*f^2*g^2 - 16*a^3*b^3*c^5*e^2*h^2 - 16*a^2*b^5*c^4*d^2*i^2 - 4*a^2*b^5*c^4*f^2*g^2 - 464*a^3*b^2*c^6*d^2*h^2 - 384*a^3*b^2*c^6*e^2*g^2 + 42*a^2*b^4*c^5*d^2*h^2 - 240*a^2*b^3*c^6*d^2*g^2 - 16*a^2*b^3*c^6*e^2*f^2 - 960*a^2*b^2*c^7*d^2*f^2 - 8*a*b^10*d*f*k^2 - a^2*b^8*c*f^2*j^2 - 2048*a^8*c^3*i^2*k^2 - 100*a^6*b^5*j^2*k^2 - 64*a^5*b^6*i^2*k^2 - 288*a^7*c^4*h^2*j^2 - 36*a^4*b^7*h^2*k^2 - 16*a^3*b^8*g^2*k^2 - 2048*a^6*c^5*e^2*k^2 - 864*a^6*c^5*f^2*j^2 - 4*a^2*b^9*f^2*k^2 - 2592*a^5*c^6*d^2*j^2 - 1536*a^5*c^6*e^2*i^2 - 32*a^5*c^6*f^2*h^2 - 864*a^4*c^7*d^2*h^2 + 360*a^7*b^2*c^2*j^4 - 4*b^7*c^4*d^2*g^2 - 9*b^6*c^5*d^2*f^2 - 288*a^3*c^8*d^2*f^2 - 24*a^5*b^2*c^4*h^4 - 16*b^5*c^6*d^2*e^2 - 9*a^4*b^4*c^3*h^4 - 16*a^3*b^4*c^4*g^4 - 24*a^3*b^2*c^6*f^4 - 9*a^2*b^4*c^5*f^4 - a^2*b^6*c^3*f^2*h^2 + 192*a^6*b^5*i*k^3 - 96*a^5*b^6*g*k^3 - 1728*a^7*c^4*f*j^3 - 192*a^5*c^6*f^3*j - 10*b^7*c^4*d^3*j - 1024*a^6*c^5*e*i^3 - 1024*a^4*c^7*e^3*i + 1536*a^8*b^2*c*k^4 - 10*b^6*c^5*d^3*h - 1728*a^3*c^8*d^3*h - 192*a^5*c^6*d^3*h^3 - 25*a^6*b^4*c*j^4 + 30*b^5*c^6*d^3*f + 360*a*b^2*c^8*d^4 - 4*b^11*d^2*k^2 - 4096*a^9*c^2*k^4 - 1296*a^8*c^3*j^4 - 144*a^7*b^4*k^4 - 256*a^7*c^4*i^4 - 16*a^6*c^5*h^4 - 16*a^4*c^7*f^4 - 256*a^3*c^8*e^4 - 25*b^4*c^7*d^4 - 1296*a^2*c^9*d^4 - b^8*c^3*d^2*h^2 - b^10*c*d^2*j^2, z, n), n, 1, 4)
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((k*x**7+j*x**6+i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**2,x)

[Out] Timed out

$$3.59 \quad \int \frac{d+ex+fx^2+gx^3+hx^4+ix^5+jx^8+kx^{11}}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=1177

$$\frac{x \left(\left(- \left(\left(\frac{ja^2}{c^2} + d \right) b^2 \right) + afb + 2a \left(\frac{ja^2}{c} - ha + cd \right) \right) c^2 + (-ajb^3 - c(-3ja^2 + cha + c^2d)b + 2ac^3f)x^2 \right)}{4ac^2 (b^2 - 4ac) (cx^4 + bx^2 + a)^2} + \frac{\left(\left(\frac{ja^2}{c} + 3cd \right) \right)}{4ac^2 (b^2 - 4ac) (cx^4 + bx^2 + a)^2}$$

[Out] $-1/4*x*(c^2*(a*b*f-b^2*(d+a^2*j/c^2)+2*a*(c*d-a*h+a^2*j/c))+(2*a*c^3*f-a*b^3*j-b*c*(-3*a^2*j+a*c*h+c^2*d))*x^2)/a/c^2/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+1/4*(-b*c^3*(a*i+c*e)+a*b^4*k-4*a^2*b^2*c*k+2*a*c^2*(a^2*k+c^2*g)-(2*c^5*e+b^2*c^3*i-c^4*(2*a*i+b*g)-b^5*k+5*a*b^3*c*k-5*a^2*b*c^2*k)*x^2)/c^4/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+1/8*x*(c*(a*b^3*f+8*a^2*b*c*f+4*a^2*(-9*a^2*j+a*c*h+7*c^2*d)+b^4*(3*d-2*a^2*j/c^2)-a*b^2*(25*c*d+7*a*h-11*a^2*j/c))+(a*b^2*c^2*f+20*a^2*c^3*f+b^3*(a^2*j+3*c^2*d)-4*a*b*c*(4*a^2*j+3*a*c*h+6*c^2*d))*x^2)/a^2/c/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)+1/4*(b^3*c^2*i+2*b*c^3*(a*i+3*c*e)+11*a*b^4*k-b^6*k/c+32*a^3*c^2*k-3*b^2*(13*a^2*c*k+c^3*g)+2*(6*c^5*e+b^2*c^3*i-c^4*(-2*a*i+3*b*g)+2*b^5*k-15*a*b^3*c*k+25*a^2*b*c^2*k)*x^2)/c^3/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)-1/2*(12*c^5*e+2*b^2*c^3*i-c^4*(-4*a*i+6*b*g)-b^5*k+10*a*b^3*c*k-30*a^2*b*c^2*k)*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/c^3/(-4*a*c+b^2)^(5/2)+1/4*k*ln(c*x^4+b*x^2+a)/c^3+1/16*arctan(x^2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2))*(a*b^2*c^2*f+20*a^2*c^3*f+b^3*(a^2*j+3*c^2*d)-4*a*b*c*(4*a^2*j+3*a*c*h+6*c^2*d)+(a*b^3*c^2*f-52*a^2*b*c^3*f-6*a*b^2*c*(-3*a^2*j-3*a*c*h+5*c^2*d)+b^4*(-a^2*j+3*c^2*d)+8*a^2*c^2*(5*a^2*j+3*a*c*h+21*c^2*d))/(-4*a*c+b^2)^(1/2))/a^2/c^(3/2)/(-4*a*c+b^2)^2*2^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/16*arctan(x^2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*(a*b^2*c^2*f+20*a^2*c^3*f+b^3*(a^2*j+3*c^2*d)-4*a*b*c*(4*a^2*j+3*a*c*h+6*c^2*d)+(-a*b^3*c^2*f+52*a^2*b*c^3*f+6*a*b^2*c*(-3*a^2*j-3*a*c*h+5*c^2*d)-b^4*(-a^2*j+3*c^2*d)-8*a^2*c^2*(5*a^2*j+3*a*c*h+21*c^2*d))/(-4*a*c+b^2)^(1/2))/a^2/c^(3/2)/(-4*a*c+b^2)^2*2^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)$

Rubi [A] time = 7.93, antiderivative size = 1179, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 10, integrand size = 50, $\frac{\text{number of rules}}{\text{integrand size}} = 0.200$, Rules used = {1673, 1678, 1166, 205, 1663, 1660, 634, 618, 206, 628}

$$\frac{x \left(\left(- \left(\left(\frac{ja^2}{c^2} + d \right) b^2 \right) + afb + 2a \left(\frac{ja^2}{c} - ha + cd \right) \right) c^2 + (-ajb^3 - c(-3ja^2 + cha + c^2d)b + 2ac^3f)x^2 \right)}{4ac^2 (b^2 - 4ac) (cx^4 + bx^2 + a)^2} + \frac{\left(\left(\frac{ja^2}{c} + 3cd \right) \right)}{4ac^2 (b^2 - 4ac) (cx^4 + bx^2 + a)^2}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5 + j*x^8 + k*x^11)/(a + b*x^2 + c*x^4)^3,x]

[Out]
$$-(x*(c^2*(a*b*f - b^2*(d + (a^2*j)/c^2) + 2*a*(c*d - a*h + (a^2*j)/c)) + (2*a*c^3*f - a*b^3*j - b*c*(c^2*d + a*c*h - 3*a^2*j))*x^2)/(4*a*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) - (b*c^3*(c*e + a*i) - a*b^4*k + 4*a^2*b^2*c*k - 2*a*c^2*(c^2*g + a^2*k) + (2*c^5*e + b^2*c^3*i - c^4*(b*g + 2*a*i) - b^5*k + 5*a*b^3*c*k - 5*a^2*b*c^2*k)*x^2)/(4*c^4*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (x*(c*(a*b^3*f + 8*a^2*b*c*f + 4*a^2*(7*c^2*d + a*c*h - 9*a^2*j) + b^4*(3*d - (2*a^2*j)/c^2) - a*b^2*(25*c*d + 7*a*h - (11*a^2*j)/c)) + (a*b^2*c^2*f + 20*a^2*c^3*f + b^3*(3*c^2*d + a^2*j) - 4*a*b*c*(6*c^2*d + 3*a*c*h + 4*a^2*j))*x^2)/(8*a^2*c*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (b^3*c^2*i + 2*b*c^3*(3*c*e + a*i) + 11*a*b^4*k - (b^6*k)/c + 32*a^3*c^2*k - 3*b^2*(c^3*g + 13*a^2*c*k) + 2*(6*c^5*e + b^2*c^3*i - c^4*(3*b*g - 2*a*i) + 2*b^5*k - 15*a*b^3*c*k + 25*a^2*b*c^2*k)*x^2)/(4*c^3*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + ((a*b^2*c*f + 20*a^2*c^2*f - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*j) + b^3*(3*c*d + (a^2*j)/c) + (a*b^3*c^2*f - 52*a^2*b*c^3*f - 6*a*b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*j) + b^4*(3*c^2*d - a^2*j) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2*j))/(c*sqrt[b^2 - 4*a*c]))*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b - sqrt[b^2 - 4*a*c]]]/(8*sqrt[2]*a^2*sqrt[c]*(b^2 - 4*a*c)^2*sqrt[b - sqrt[b^2 - 4*a*c]]) + ((a*b^2*c*f + 20*a^2*c^2*f - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*j) + b^3*(3*c*d + (a^2*j)/c) - (a*b^3*c^2*f - 52*a^2*b*c^3*f - 6*a*b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*j) + b^4*(3*c^2*d - a^2*j) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2*j))/(c*sqrt[b^2 - 4*a*c]))*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b + sqrt[b^2 - 4*a*c]]]/(8*sqrt[2]*a^2*sqrt[c]*(b^2 - 4*a*c)^2*sqrt[b + sqrt[b^2 - 4*a*c]]) - ((12*c^5*e + 2*b^2*c^3*i - c^4*(6*b*g - 4*a*i) - b^5*k + 10*a*b^3*c*k - 30*a^2*b*c^2*k)*ArcTanh[(b + 2*c*x^2)/sqrt[b^2 - 4*a*c]])/(2*c^3*(b^2 - 4*a*c)^(5/2)) + (k*Log[a + b*x^2 + c*x^4])/(4*c^3)$$

Rule 205

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]

Rule 206

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (GtQ[a, 0] || LtQ[b, 0])

Rule 618

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 628

```
Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := S
imp[(d*Log[RemoveContent[a + b*x + c*x^2, x]])/b, x] /; FreeQ[{a, b, c, d,
e}, x] && EqQ[2*c*d - b*e, 0]
```

Rule 634

```
Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := D
ist[(2*c*d - b*e)/(2*c), Int[1/(a + b*x + c*x^2), x], x] + Dist[e/(2*c), In
t[(b + 2*c*x)/(a + b*x + c*x^2), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ
[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && !NiceSqrtQ[b^2 - 4*a*c]
```

Rule 1166

```
Int[((d_) + (e_)*(x_)^2)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1660

```
Int[(Pq_)*((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol] := With[{Q =
PolynomialQuotient[Pq, a + b*x + c*x^2, x], f = Coeff[PolynomialRemainder[P
q, a + b*x + c*x^2, x], x, 0], g = Coeff[PolynomialRemainder[Pq, a + b*x +
c*x^2, x], x, 1]}, Simp[((b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^(
p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + Dist[1/((p + 1)*(b^2 - 4*a*c)), Int[
(a + b*x + c*x^2)^(p + 1)*ExpandToSum[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(
2*c*f - b*g), x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && NeQ[b^2
- 4*a*c, 0] && LtQ[p, -1]
```

Rule 1663

```
Int[(Pq_)*(x_)^(m_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :
> Dist[1/2, Subst[Int[x^((m - 1)/2)*SubstFor[x^2, Pq, x]*(a + b*x + c*x^2)^(
p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x^2] && IntegerQ[
(m - 1)/2]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
```

&& !PolyQ[Pq, x^2]

Rule 1678

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> With[{d =
  Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 0], e = Coeff[PolynomialRemainder[Pq, a + b*x^2 + c*x^4, x], x, 2]}, Simp[(x*(a + b*x^2 + c*x^4)^(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2 - 4*a*c)), Int[(a + b*x^2 + c*x^4)^(p + 1)*ExpandToSum[2*a*(p + 1)*(b^2 - 4*a*c)*PolynomialQuotient[Pq, a + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p + 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x^2] && Expon[Pq, x^2] > 1 && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1]
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 59x^5 + jx^8 + kx^{11}}{(a + bx^2 + cx^4)^3} dx &= \int \frac{d + fx^2 + hx^4 + jx^8}{(a + bx^2 + cx^4)^3} dx + \int \frac{x(e + gx^2 + 59x^4 + kx^{10})}{(a + bx^2 + cx^4)^3} dx \\
&= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3j) \right)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)^2} \\
&= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3j) \right)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)} \\
&= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3j) \right)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)} \\
&= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3j) \right)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)} \\
&= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3j) \right)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)} \\
&= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3j) \right)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)} \\
&= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3j) \right)}{4ac^2 (b^2 - 4ac) (a + bx^2 + cx^4)}
\end{aligned}$$

Mathematica [A] time = 7.35, size = 1649, normalized size = 1.40

$$\frac{-akx^2b^5 - a^2kb^4 - ac^2jx^3b^3 + 5a^2ckx^2b^3 + ac^3ix^2b^2 + 4a^3ckb^2 - c^4dxb^2 - a^2c^2jxb^2 - c^5dx^3b - ac^4hx^3b + 3a^2c^3j}{4ac^4}$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5 + j*x^8 + k*x^11)/(a + b*x^2 + c*x^4)^3,x]

[Out] (a*b*c^4*e - 2*a^2*c^4*g + a^2*b*c^3*i - a^2*b^4*k + 4*a^3*b^2*c*k - 2*a^4*c^2*k - b^2*c^4*d*x + 2*a*c^5*d*x + a*b*c^4*f*x - 2*a^2*c^4*h*x - a^2*b^2*c^2*j*x + 2*a^3*c^3*j*x + 2*a*c^5*e*x^2 - a*b*c^4*g*x^2 + a*b^2*c^3*i*x^2 - 2*a^2*c^4*i*x^2 - a*b^5*k*x^2 + 5*a^2*b^3*c*k*x^2 - 5*a^3*b*c^2*k*x^2 - b*c^5*d*x^3 + 2*a*c^5*f*x^3 - a*b*c^4*h*x^3 - a*b^3*c^2*j*x^3 + 3*a^2*b*c^3*j*x^3)/(4*a*c^4*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (12*a^2*b*c^5*e - 6*a^2*b^2*c^4*g + 2*a^2*b^3*c^3*i + 4*a^3*b*c^4*i - 2*a^2*b^6*k + 22*a^3*b^4*c*k - 78*a^4*b^2*c^2*k + 64*a^5*c^3*k + 3*b^4*c^4*d*x - 25*a*b^2*c^5*d*x + 2*8*a^2*c^6*d*x + a*b^3*c^4*f*x + 8*a^2*b*c^5*f*x - 7*a^2*b^2*c^4*h*x + 4*a^3*c^5*h*x - 2*a^2*b^4*c^2*j*x + 11*a^3*b^2*c^3*j*x - 36*a^4*c^4*j*x + 24*a^2*c^6*e*x^2 - 12*a^2*b*c^5*g*x^2 + 4*a^2*b^2*c^4*i*x^2 + 8*a^3*c^5*i*x^2 + 8*a^2*b^5*c*k*x^2 - 60*a^3*b^3*c^2*k*x^2 + 100*a^4*b*c^3*k*x^2 + 3*b^3*c^5*d*x^3 - 24*a*b*c^6*d*x^3 + a*b^2*c^5*f*x^3 + 20*a^2*c^6*f*x^3 - 12*a^2*b*c^5*h*x^3 + a^2*b^3*c^3*j*x^3 - 16*a^3*b*c^4*j*x^3)/(8*a^2*c^4*(-b^2 + 4*a*c)^2*(a + b*x^2 + c*x^4)) + ((3*b^4*c^2*d - 30*a*b^2*c^3*d + 168*a^2*c^4*d + 3*b^3*c^2*sqrt[b^2 - 4*a*c]*d - 24*a*b*c^3*sqrt[b^2 - 4*a*c]*d + a*b^3*c^2*f - 52*a^2*b*c^3*f + a*b^2*c^2*sqrt[b^2 - 4*a*c]*f + 20*a^2*c^3*sqrt[b^2 - 4*a*c]*f + 18*a^2*b^2*c^2*h + 24*a^3*c^3*h - 12*a^2*b*c^2*sqrt[b^2 - 4*a*c]*h - a^2*b^4*j + 18*a^3*b^2*c*j + 40*a^4*c^2*j + a^2*b^3*sqrt[b^2 - 4*a*c]*j - 16*a^3*b*c*sqrt[b^2 - 4*a*c]*j)*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b - sqrt[b^2 - 4*a*c]])/(8*sqrt[2]*a^2*c^(3/2)*(b^2 - 4*a*c)^(5/2)*sqrt[b - sqrt[b^2 - 4*a*c]]) + ((-3*b^4*c^2*d + 30*a*b^2*c^3*d - 168*a^2*c^4*d + 3*b^3*c^2*sqrt[b^2 - 4*a*c]*d - 24*a*b*c^3*sqrt[b^2 - 4*a*c]*d - a*b^3*c^2*f + 52*a^2*b*c^3*f + a*b^2*c^2*sqrt[b^2 - 4*a*c]*f + 20*a^2*c^3*sqrt[b^2 - 4*a*c]*f - 18*a^2*b^2*c^2*h - 24*a^3*c^3*h - 12*a^2*b*c^2*sqrt[b^2 - 4*a*c]*h + a^2*b^4*j - 18*a^3*b^2*c*j - 40*a^4*c^2*j + a^2*b^3*sqrt[b^2 - 4*a*c]*j - 16*a^3*b*c*sqrt[b^2 - 4*a*c]*j)*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b + sqrt[b^2 - 4*a*c]])/(8*sqrt[2]*a^2*c^(3/2)*(b^2 - 4*a*c)^(5/2)*sqrt[b + sqrt[b^2 - 4*a*c]]) + ((12*c^5*e - 6*b*c^4*g + 2*b^2*c^3*i + 4*a*c^4*i - b^5*k + 10*a*b^3*c*k - 30*a^2*b*c^2*k + b^4*sqrt[b^2 - 4*a*c]*k - 8*a*b^2*c*sqrt[b^2 - 4*a*c]*k + 16*a^2*c^2*sqrt[b^2 - 4*a*c]*k)*Log[-b + sqrt[b^2 - 4*a*c] - 2*c*x^2])/(4*c^3*(b^2 - 4*a*c)^(5/2)) + ((-12*c^5*e + 6*b*c^4*g - 2*b^2*c^3*i - 4*a*c^4*i + b^5*k - 10*a*b^3*c*k + 30*a^2*b*c^2*k + b^4*sqrt[b^2 - 4*a*c]*k - 8*a*b^2*c*sqrt[b^2 - 4*a*c]*k + 16*a^2*c^2*sqrt[b^2 - 4*a*c]*k)*Log[b + sqrt[b^2 - 4*a*c] + 2*c*x^2])/(4*c^3*(b^2 - 4*a*c)^(5/2))

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((k*x^11+j*x^8+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x,

```
algorithm="fricas")
```

```
[Out] Timed out
```

```
giac [F(-1)] time = 0.00, size = 0, normalized size = 0.00
```

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((k*x^11+j*x^8+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x,
algorithm="giac")
```

```
[Out] Timed out
```

```
maple [B] time = 0.13, size = 6130, normalized size = 5.21
```

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((k*x^11+j*x^8+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x)
```

```
[Out] result too large to display
```

```
maxima [F] time = 0.00, size = 0, normalized size = 0.00
```

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((k*x^11+j*x^8+i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x,
algorithm="maxima")
```

```
[Out] 1/8*(12*a^4*b*c^3*i - (12*a^2*b*c^5*h - 3*(b^3*c^5 - 8*a*b*c^6)*d - (a*b^2*c^5 + 20*a^2*c^6)*f - (a^2*b^3*c^3 - 16*a^3*b*c^4)*j)*x^7 + 4*(6*a^2*c^6*e - 3*a^2*b*c^5*g + (a^2*b^2*c^4 + 2*a^3*c^5)*i + (2*a^2*b^5*c - 15*a^3*b^3*c^2 + 25*a^4*b*c^3)*k)*x^6 + ((6*b^4*c^4 - 49*a*b^2*c^5 + 28*a^2*c^6)*d + 2*(a*b^3*c^4 + 14*a^2*b*c^5)*f - (19*a^2*b^2*c^4 - 4*a^3*c^5)*h - (a^2*b^4*c^2 + 5*a^3*b^2*c^3 + 36*a^4*c^4)*j)*x^5 + 2*(18*a^2*b*c^5*e - 9*a^2*b^2*c^4*g + 3*(a^2*b^3*c^3 + 2*a^3*b*c^4)*i + (3*a^2*b^6 - 19*a^3*b^4*c + 11*a^4*b^2*c^2 + 32*a^5*c^3)*k)*x^4 + ((3*b^5*c^3 - 20*a*b^3*c^4 - 4*a^2*b*c^5)*d + (a*b^4*c^3 + 5*a^2*b^2*c^4 + 36*a^3*c^5)*f - (5*a^2*b^3*c^3 + 16*a^3*b*c^4)*h - 2*(a^3*b^3*c^2 + 14*a^4*b*c^3)*j)*x^3 + 4*(2*(a^2*b^2*c^4 + 5*a^3*c^5)*e - (a^2*b^3*c^3 + 5*a^3*b*c^4)*g + (5*a^3*b^2*c^3 - 2*a^4*c^4)*i + (3*a^3*b^5 - 22*a^4*b^3*c + 31*a^5*b*c^2)*k)*x^2 - 2*(a^2*b^3*c^3 - 10*a^3*b*c^4)*e - 2*(a^3*b^2*c^3 + 8*a^4*c^4)*g + 6*(a^4*b^4 - 7*a^5*b^2*c + 8*a^6*c^2)*k + ((5*a*b^4*c^3 - 37*a^2*b^2*c^4 + 44*a^3*c^5)*d - (a^2*b^3*c^3 - 16*a^3
```

$$\begin{aligned} & b*c^4)*f - 3*(a^3*b^2*c^3 + 4*a^4*c^4)*h - (a^4*b^2*c^2 + 20*a^5*c^3)*j)*x) \\ & / (a^4*b^4*c^3 - 8*a^5*b^2*c^4 + 16*a^6*c^5 + (a^2*b^4*c^5 - 8*a^3*b^2*c^6 + \\ & 16*a^4*c^7)*x^8 + 2*(a^2*b^5*c^4 - 8*a^3*b^3*c^5 + 16*a^4*b*c^6)*x^6 + (a^ \\ & 2*b^6*c^3 - 6*a^3*b^4*c^4 + 32*a^5*c^6)*x^4 + 2*(a^3*b^5*c^3 - 8*a^4*b^3*c^ \\ & 4 + 16*a^5*b*c^5)*x^2) + 1/8*integrate((8*(a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c \\ & ^2)*k*x^3 - (12*a^2*b*c^3*h - 3*(b^3*c^3 - 8*a*b*c^4)*d - (a*b^2*c^3 + 20*a \\ & ^2*c^4)*f - (a^2*b^3*c - 16*a^3*b*c^2)*j)*x^2 + 3*(b^4*c^2 - 9*a*b^2*c^3 + \\ & 28*a^2*c^4)*d + (a*b^3*c^2 - 16*a^2*b*c^3)*f + 3*(a^2*b^2*c^2 + 4*a^3*c^3)* \\ & h + (a^3*b^2*c + 20*a^4*c^2)*j + 8*(6*a^2*c^4*e - 3*a^2*b*c^3*g + (a^2*b^2* \\ & c^2 + 2*a^3*c^3)*i + (a^3*b^3 - 7*a^4*b*c)*k)*x)/(c*x^4 + b*x^2 + a), x)/(a \\ & ^2*b^4*c^2 - 8*a^3*b^2*c^3 + 16*a^4*c^4) \end{aligned}$$

mupad [B] time = 17.18, size = 97905, normalized size = 83.18

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5 + j*x^8 + k*x^{11})/(a + b*x^2 + c*x^4)^3, x)$

[Out]
$$\begin{aligned} & ((x^7*(3*b^3*c^2*d + 20*a^2*c^3*f + a^2*b^3*j - 24*a*b*c^3*d - 16*a^3*b*c*j \\ & + a*b^2*c^2*f - 12*a^2*b*c^2*h))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - \\ & (b^3*c^3*e + 8*a^2*c^4*g - 3*a^2*b^4*k - 24*a^4*c^2*k - 10*a*b*c^4*e + a*b^ \\ & 2*c^3*g - 6*a^2*b*c^3*i + 21*a^3*b^2*c*k)/(4*c^3*(b^4 + 16*a^2*c^2 - 8*a*b^ \\ & 2*c)) + (x^4*(3*b^6*k - 9*b^2*c^4*g + 3*b^3*c^3*i + 32*a^3*c^3*k + 18*b*c^5 \\ & *e + 11*a^2*b^2*c^2*k + 6*a*b*c^4*i - 19*a*b^4*c*k))/(4*c^3*(b^4 + 16*a^2*c \\ & ^2 - 8*a*b^2*c)) + (x^2*(2*b^2*c^4*e - b^3*c^3*g - 2*a^2*c^4*i + 10*a*c^5*e \\ & + 3*a*b^5*k - 5*a*b*c^4*g + 5*a*b^2*c^3*i - 22*a^2*b^3*c*k + 31*a^3*b*c^2* \\ & k))/(2*c^3*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^6*(6*c^5*e + 2*b^5*k + b^2* \\ & c^3*i - 3*b*c^4*g + 2*a*c^4*i - 15*a*b^3*c*k + 25*a^2*b*c^2*k))/(2*c^2*(b^4 \\ & + 16*a^2*c^2 - 8*a*b^2*c)) - (x^3*(2*a^3*b^3*j - 36*a^3*c^3*f - 3*b^5*c*d \\ & - 5*a^2*b^2*c^2*f - a*b^4*c*f + 28*a^4*b*c*j + 20*a*b^3*c^2*d + 4*a^2*b*c^3 \\ & *d + 5*a^2*b^3*c*h + 16*a^3*b*c^2*h))/(8*a^2*c*(b^4 + 16*a^2*c^2 - 8*a*b^2* \\ & c)) + (x^5*(28*a^2*c^4*d + 6*b^4*c^2*d + 4*a^3*c^3*h - a^2*b^4*j - 36*a^4*c \\ & ^2*j - 19*a^2*b^2*c^2*h - 49*a*b^2*c^3*d + 2*a*b^3*c^2*f + 28*a^2*b*c^3*f - \\ & 5*a^3*b^2*c*j))/(8*a^2*c*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) - (x*(12*a^3*c^2* \\ & h - 44*a^2*c^3*d + a^3*b^2*j - 5*b^4*c*d + 20*a^4*c*j + a*b^3*c*f + 37*a*b^ \\ & 2*c^2*d - 16*a^2*b*c^2*f + 3*a^2*b^2*c*h))/(8*a*c*(b^4 + 16*a^2*c^2 - 8*a*b \\ & ^2*c)))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6) + \text{symsu} \\ & \text{m}(\log((10368*a*b^5*c^{10}*d^3 - 8000*a^5*c^{11}*f^3 - 567*b^7*c^9*d^3 + 169344* \\ & a^3*b*c^{12}*d^3 + 193536*a^4*c^{12}*d*e^2 - 141120*a^4*c^{12}*d^2*f + 1728*a^6*b \\ & *c^9*h^3 + 315*b^8*c^8*d^2*f + 6400*a^9*b*c^6*j^3 + 27648*a^5*c^{11}*e^2*h + \\ & 21504*a^6*c^{10}*d*i^2 - 135*b^9*c^7*d^2*h + 192*a^2*b^{14}*d*k^2 - 2880*a^6*c^ \\ & 10*f*h^2 + 46080*a^6*c^{10}*e^2*j - 1376256*a^9*c^7*d*k^2 + 9*b^{11}*c^5*d^2*j \\ & + 64*a^3*b^{13}*f*k^2 - 8000*a^8*c^8*f*j^2 + 3072*a^7*c^9*h*i^2 + 192*a^4*b^1 \end{aligned}$$

$$\begin{aligned}
& 2*h*k^2 + 5120*a^8*c^8*i^2*j - 196608*a^10*c^6*h*k^2 + 2240*a^6*b^10*j*k^2 \\
& - 327680*a^11*c^5*j*k^2 - 67824*a^2*b^3*c^11*d^3 + 35*a^2*b^6*c^8*f^3 + 84* \\
& a^3*b^4*c^9*f^3 - 12720*a^4*b^2*c^10*f^3 + 540*a^4*b^5*c^7*h^3 + 4320*a^5*b \\
& ^3*c^8*h^3 + 35*a^6*b^7*c^3*j^3 - 1176*a^7*b^5*c^4*j^3 + 9456*a^8*b^3*c^5*j \\
& ^3 + 129024*a^5*c^11*d*e*i - 40320*a^5*c^11*d*f*h - 67200*a^6*c^10*d*f*j + \\
& 18432*a^6*c^10*e*h*i + 245760*a^7*c^9*e*f*k + 30720*a^7*c^9*e*i*j - 9600*a^ \\
& 7*c^9*f*h*j + 81920*a^8*c^8*f*i*k - 6237*a*b^6*c^9*d^2*f + 210*a*b^7*c^8*d* \\
& f^2 + 116160*a^4*b*c^11*d*f^2 - 36864*a^4*b*c^11*e^2*f + 2430*a*b^7*c^8*d^2 \\
& *h + 133056*a^4*b*c^11*d^2*h + 27648*a^5*b*c^10*d*h^2 - 324*a*b^9*c^6*d^2*j \\
& + 193536*a^5*b*c^10*d^2*j + 26880*a^5*b*c^10*f^2*h + 63360*a^7*b*c^8*d*j^2 \\
& - 5568*a^3*b^12*c*d*k^2 - 4096*a^6*b*c^9*f*i^2 + 40000*a^6*b*c^9*f^2*j - 2 \\
& 304*a^4*b^11*c*f*k^2 - 352256*a^9*b*c^6*f*k^2 + 8064*a^7*b*c^8*h^2*j + 1248 \\
& 0*a^8*b*c^7*h*j^2 - 2112*a^5*b^10*c*h*k^2 - 41664*a^7*b^8*c*j*k^2 + 6912*a^ \\
& 2*b^4*c^10*d*e^2 - 62208*a^3*b^2*c^11*d*e^2 + 42372*a^2*b^4*c^10*d^2*f - 17 \\
& 64*a^2*b^5*c^9*d*f^2 - 96048*a^3*b^2*c^11*d^2*f - 4608*a^3*b^3*c^10*d*f^2 + \\
& 1728*a^2*b^6*c^8*d*g^2 + 2304*a^3*b^3*c^10*e^2*f - 15552*a^3*b^4*c^9*d*g^2 \\
& + 48384*a^4*b^2*c^10*d*g^2 - 13716*a^2*b^5*c^9*d^2*h + 405*a^2*b^7*c^7*d*h \\
& ^2 + 12096*a^3*b^3*c^10*d^2*h - 5400*a^3*b^5*c^8*d*h^2 + 28944*a^4*b^3*c^9* \\
& d*h^2 + 192*a^2*b^8*c^6*d*i^2 + 576*a^3*b^5*c^8*f*g^2 - 960*a^3*b^6*c^7*d*i \\
& ^2 + 6912*a^4*b^2*c^10*e^2*h - 9216*a^4*b^3*c^9*f*g^2 - 768*a^4*b^4*c^8*d*i \\
& ^2 + 14592*a^5*b^2*c^9*d*i^2 + 3717*a^2*b^7*c^7*d^2*j - 15*a^2*b^7*c^7*f^2* \\
& h + 3*a^2*b^11*c^3*d*j^2 - 15192*a^3*b^5*c^8*d^2*j - 360*a^3*b^5*c^8*f^2*h \\
& + 135*a^3*b^6*c^7*f*h^2 - 132*a^3*b^9*c^4*d*j^2 - 7920*a^4*b^3*c^9*d^2*j + \\
& 15696*a^4*b^3*c^9*f^2*h - 5580*a^4*b^4*c^8*f*h^2 + 2079*a^4*b^7*c^5*d*j^2 - \\
& 20592*a^5*b^2*c^9*f*h^2 - 14448*a^5*b^5*c^6*d*j^2 + 37104*a^6*b^3*c^7*d*j^ \\
& 2 + 64*a^3*b^7*c^6*f*i^2 + 1728*a^4*b^4*c^8*g^2*h - 768*a^4*b^5*c^7*f*i^2 + \\
& 70656*a^4*b^10*c^2*d*k^2 + 2304*a^5*b^2*c^9*e^2*j + 6912*a^5*b^2*c^9*g^2*h \\
& - 3840*a^5*b^3*c^8*f*i^2 - 499008*a^5*b^8*c^3*d*k^2 + 2071104*a^6*b^6*c^4* \\
& d*k^2 - 4853952*a^7*b^4*c^5*d*k^2 + 5399808*a^8*b^2*c^6*d*k^2 + a^2*b^9*c^5 \\
& *f^2*j + 20*a^3*b^7*c^6*f^2*j + a^3*b^10*c^3*f*j^2 - 1596*a^4*b^5*c^7*f^2*j \\
& - 51*a^4*b^8*c^4*f*j^2 + 16736*a^5*b^3*c^8*f^2*j + 875*a^5*b^6*c^5*f*j^2 - \\
& 2716*a^6*b^4*c^6*f*j^2 - 39600*a^7*b^2*c^7*f*j^2 + 192*a^4*b^6*c^6*h*i^2 + \\
& 1536*a^5*b^4*c^7*h*i^2 + 576*a^5*b^4*c^7*g^2*j + 28480*a^5*b^9*c^2*f*k^2 + \\
& 3840*a^6*b^2*c^8*h*i^2 + 11520*a^6*b^2*c^8*g^2*j - 164096*a^6*b^7*c^3*f*k^ \\
& 2 + 436800*a^7*b^5*c^4*f*k^2 - 338944*a^8*b^3*c^5*f*k^2 - 81*a^4*b^7*c^5*h^ \\
& 2*j + 3*a^4*b^9*c^3*h*j^2 + 720*a^5*b^5*c^6*h^2*j - 78*a^5*b^7*c^4*h*j^2 + \\
& 17136*a^6*b^3*c^7*h^2*j - 900*a^6*b^5*c^5*h*j^2 + 22272*a^7*b^3*c^6*h*j^2 + \\
& 64*a^5*b^6*c^5*i^2*j + 1536*a^6*b^4*c^6*i^2*j - 960*a^6*b^8*c^2*h*k^2 + 53 \\
& 76*a^7*b^2*c^7*i^2*j + 108672*a^7*b^6*c^3*h*k^2 - 548160*a^8*b^4*c^4*h*k^2 \\
& + 922368*a^9*b^2*c^5*h*k^2 + 305024*a^8*b^6*c^2*j*k^2 - 1042880*a^9*b^4*c^3 \\
& *j*k^2 + 1479936*a^10*b^2*c^4*j*k^2 - 193536*a^4*b*c^11*d*e*g - 90*a*b^8*c^ \\
& 7*d*f*h + 6*a*b^10*c^5*d*f*j - 64512*a^5*b*c^10*d*g*i - 24576*a^5*b*c^10*e* \\
& f*i - 27648*a^5*b*c^10*e*g*h - 1778688*a^6*b*c^9*d*e*k + 84096*a^6*b*c^9*d* \\
& h*j - 46080*a^6*b*c^9*e*g*j - 9216*a^6*b*c^9*g*h*i - 592896*a^7*b*c^8*d*i*k \\
& - 359424*a^7*b*c^8*e*h*k - 122880*a^7*b*c^8*f*g*k - 15360*a^7*b*c^8*g*i*j
\end{aligned}$$

$$\begin{aligned}
& - 549888a^8b^7c^7e^j k - 119808a^8b^7c^7h^i k - 183296a^9b^6c^6i^j k \\
& - 6912a^2b^5c^9d^e g + 62208a^3b^3c^{10}d^e g + 2304a^2b^6c^8d^e k \\
& i - 270a^2b^6c^8d^f h - 16128a^3b^4c^9d^e i + 16056a^3b^4c^9d^f h \\
& * h - 2304a^3b^4c^9e^f g + 23040a^4b^2c^{10}d^e i - 127008a^4b^2c^{10}d^f h \\
& + 36864a^4b^2c^{10}e^f g - 1152a^2b^7c^7d^g i - 48a^2b^8c^6d^f j \\
& - 2304a^2b^9c^5d^e k + 8064a^3b^5c^8d^g i + 768a^3b^5c^8e^f i \\
& - 2226a^3b^6c^7d^f j + 43776a^3b^7c^6d^e k - 11520a^4b^3c^9d^g i \\
& - 10752a^4b^3c^9e^f i - 6912a^4b^3c^9e^g h + 33384a^4b^4c^8d^f j \\
& - 340992a^4b^5c^7d^e k - 162528a^5b^2c^9d^f j + 1241856a^5b^3c^8d^e k \\
& - 72a^2b^9c^5d^h j + 1152a^2b^{10}c^4d^g k - 384a^3b^6c^7f^g i \\
& + 2016a^3b^7c^6d^h j - 21888a^3b^8c^5d^g k - 768a^3b^8c^5e^f k \\
& + 2304a^4b^4c^8e^h i + 5376a^4b^4c^8f^g i - 18648a^4b^5c^7d^h j \\
& + 170496a^4b^6c^6d^g k + 19968a^4b^6c^6e^f k + 13824a^5b^2c^9e^h i \\
& + 12288a^5b^2c^9f^g i + 67392a^5b^3c^8d^h j - 2304a^5b^3c^8e^g j \\
& - 620928a^5b^4c^7d^g k - 119040a^5b^4c^7e^f k + 889344a^6b^2c^8d^g k \\
& + 172032a^6b^2c^8e^f k - 384a^2b^{11}c^3d^i k - 24a^3b^8c^5f^h j \\
& + 6528a^3b^9c^4d^i k + 384a^3b^9c^4f^g k - 1152a^4b^5c^7g^h i \\
& + 1050a^4b^6c^6f^h j - 42240a^4b^7c^5d^i k - 2304a^4b^7c^5e^h k \\
& - 9984a^4b^7c^5f^g k - 6912a^5b^3c^8g^h i + 768a^5b^4c^7e^i j \\
& - 9576a^5b^4c^7f^h j + 93312a^5b^5c^6d^i k + 2304a^5b^5c^6e^h k \\
& + 59520a^5b^5c^6f^g k + 16896a^6b^2c^8e^i j - 57504a^6b^2c^8f^h j \\
& + 117504a^6b^3c^7d^i k + 103680a^6b^3c^7e^h k - 86016a^6b^3c^7f^g k \\
& - 128a^3b^{10}c^3f^i k + 3072a^4b^8c^4f^i k + 1152a^4b^8c^4g^h k \\
& - 384a^5b^5c^6g^i j - 13184a^5b^6c^5f^i k - 1152a^5b^6c^5g^h k \\
& - 8448a^6b^3c^7g^i j - 11008a^6b^4c^6f^i k - 51840a^6b^4c^6g^h k \\
& - 26880a^6b^5c^5e^j k + 98304a^7b^2c^7f^i k + 179712a^7b^2c^7g^h k \\
& + 231168a^7b^3c^6e^j k - 384a^4b^9c^3h^i k - 384a^5b^7c^4h^i k \\
& + 18048a^6b^5c^5h^i k + 13440a^6b^6c^4g^j k - 25344a^7b^3c^6h^i k \\
& - 115584a^7b^4c^5g^j k + 274944a^8b^2c^6g^j k - 4480a^6b^7c^3i^j k \\
& + 29568a^7b^5c^4i^j k - 14592a^8b^3c^5i^j k) / (512*(4096a^{10}c^{10} + a^4b^{12}c^4 \\
& - 24a^5b^{10}c^5 + 240a^6b^8c^6 - 1280a^7b^6c^7 + 3840a^8b^4c^8 - 6144a^9b^2c^9)) \\
& + \text{root}(56371445760a^{11}b^8c^{12}z^4 - 503316480a^8b^{14}c^9z^4 \\
& + 47185920a^7b^{16}c^8z^4 - 2621440a^6b^{18}c^7z^4 + 65536a^5b^{20}c^6z^4 \\
& - 171798691840a^{14}b^2c^{15}z^4 + 193273528320a^{13}b^4c^{14}z^4 - 128849018880a^{12}b^6c^{13}z^4 \\
& - 16911433728a^{10}b^{10}c^{11}z^4 + 3523215360a^9b^{12}c^{10}z^4 + 68719476736a^{15}c^{16}z^4 \\
& - 47185920a^7b^{16}c^5kz^3 + 2621440a^6b^{18}c^4kz^3 - 65536a^5b^{20}c^3kz^3 + 171798691840a^{14}b^2c^{12}kz^3 \\
& - 193273528320a^{13}b^4c^{11}kz^3 + 128849018880a^{12}b^6c^{10}kz^3 + 16911433728a^{10}b^{10}c^8kz^3 \\
& - 3523215360a^9b^{12}c^7kz^3 - 56371445760a^{11}b^8c^9kz^3 + 503316480a^8b^{14}c^6kz^3 - 68719476736a^{15}c^{13}kz^3 \\
& + 1536a^ab^{18}c^6d^fz^2 - 2571632640a^9b^5c^{11}d^jz^2 + 2548039680a^9b^3c^{13}d^h z^2 \\
& + 2453667840a^9b^7c^9e^kz^2 + 2181038080a^{12}b^3c^{10}i^kz^2 - 6492782592a^{10}b^5c^{10}e^kz^2 + 1509949440a^9b^3c^{13}e^g z^2 \\
& - 1401421824a^8b^5c^{12}d^h z^2 - 1226833920*
\end{aligned}$$

$$\begin{aligned}
& a^9 b^8 c^8 g^k z^2 - 1321205760 a^9 b^2 c^{14} d f z^2 - 2793406464 a^{11} b^c \\
& ^{13} d^j z^2 + 9563013120 a^{11} b^3 c^{11} e^k z^2 + 890634240 a^8 b^7 c^{10} d^j \\
& z^2 - 754974720 a^8 b^5 c^{12} e^g z^2 - 570425344 a^{11} b^5 c^9 i^k z^2 + 73 \\
& 2168192 a^7 b^6 c^{12} d f z^2 - 581959680 a^{10} b^4 c^{11} f^j z^2 - 603979776 * \\
& a^{10} b^2 c^{13} e^i z^2 + 534773760 a^{11} b^3 c^{11} h^j z^2 - 558366720 a^8 b^9 \\
& c^8 e^k z^2 - 4781506560 a^{11} b^4 c^{10} g^k z^2 - 2013265920 a^{13} b^c^{11} i^* \\
& k z^2 - 456130560 a^9 b^4 c^{12} f^h z^2 + 384040960 a^9 b^6 c^{10} f^j z^2 - 2 \\
& 64241152 a^{10} b^7 c^8 i^k z^2 + 390463488 a^7 b^7 c^{11} d^h z^2 + 279183360 * \\
& a^8 b^{10} c^7 g^k z^2 + 301989888 a^{10} b^3 c^{12} g^i z^2 + 222822400 a^9 b^9 * \\
& c^7 i^k z^2 - 366280704 a^6 b^8 c^{11} d f z^2 - 330301440 a^8 b^4 c^{13} d f z \\
& ^2 + 254017536 a^8 b^6 c^{11} f^h z^2 - 1887436800 a^{10} b^c^{14} d^h z^2 + 1887 \\
& 43680 a^{10} b^2 c^{13} f^h z^2 - 185303040 a^7 b^9 c^9 d^j z^2 - 117964800 a^1 \\
& 0 b^5 c^{10} h^j z^2 - 6039797760 a^{12} b^c^{12} e^k z^2 - 67502080 a^8 b^{11} c^6 \\
& i^k z^2 + 121634816 a^{11} b^2 c^{12} f^j z^2 + 188743680 a^7 b^7 c^{11} e^g z^2 \\
& - 115671040 a^8 b^8 c^9 f^j z^2 + 125829120 a^8 b^6 c^{11} e^i z^2 + 1081344 \\
& 0 a^7 b^{13} c^5 i^k z^2 + 76677120 a^7 b^{11} c^7 e^k z^2 - 38338560 a^7 b^{12} * \\
& c^6 g^k z^2 - 37355520 a^9 b^7 c^9 h^j z^2 - 917504 a^6 b^{15} c^4 i^k z^2 + \\
& 32768 a^5 b^{17} c^3 i^k z^2 - 62914560 a^8 b^7 c^{10} g^i z^2 + 23101440 a^8 b^ \\
& ^9 c^8 h^j z^2 - 4349952 a^7 b^{11} c^7 h^j z^2 + 2949120 a^6 b^{14} c^5 g^k z^ \\
& 2 + 337920 a^6 b^{13} c^6 h^j z^2 - 98304 a^5 b^{16} c^4 g^k z^2 - 7680 a^5 b^1 \\
& 5 c^5 h^j z^2 - 61931520 a^7 b^8 c^{10} f^h z^2 + 23592960 a^7 b^9 c^9 g^i z^ \\
& 2 + 17940480 a^7 b^{10} c^8 f^j z^2 - 47185920 a^7 b^8 c^{10} e^i z^2 - 5898240 \\
& a^6 b^{13} c^6 e^k z^2 - 3538944 a^6 b^{11} c^8 g^i z^2 - 1347584 a^6 b^{12} c^7 \\
& f^j z^2 + 196608 a^5 b^{15} c^5 e^k z^2 + 196608 a^5 b^{13} c^7 g^i z^2 + 3584 \\
& 0 a^5 b^{14} c^6 f^j z^2 + 96583680 a^5 b^{10} c^{10} d f z^2 + 23371776 a^6 b^{11} \\
& c^8 d^j z^2 - 51609600 a^6 b^9 c^{10} d^h z^2 + 7077888 a^6 b^{10} c^9 e^i z^2 \\
& + 6144000 a^6 b^{10} c^9 f^h z^2 - 1677312 a^5 b^{13} c^7 d^j z^2 - 393216 a^5 \\
& b^{12} c^8 e^i z^2 + 61440 a^5 b^{12} c^8 f^h z^2 + 53760 a^4 b^{15} c^6 d^j z^2 \\
& - 46080 a^4 b^{14} c^7 f^h z^2 + 1536 a^3 b^{16} c^6 f^h z^2 - 23592960 a^6 b^ \\
& 9 c^{10} e^g z^2 + 1179648 a^5 b^{11} c^9 e^g z^2 + 829440 a^4 b^{13} c^8 d^h z^2 \\
& + 368640 a^5 b^{11} c^9 d^h z^2 - 105984 a^3 b^{15} c^7 d^h z^2 + 4608 a^2 b^1 \\
& 7 c^6 d^h z^2 - 15175680 a^4 b^{12} c^9 d^f z^2 + 1428480 a^3 b^{14} c^8 d^f z^ \\
& 2 - 73728 a^2 b^{16} c^7 d^f z^2 + 4108320768 a^{10} b^3 c^{12} d^j z^2 - 1207959 \\
& 552 a^{10} b^c^{14} e^g z^2 - 578813952 a^{12} b^c^{12} h^j z^2 + 3246391296 a^{10} b^ \\
& ^6 c^9 g^k z^2 - 402653184 a^{11} b^c^{13} g^i z^2 + 3019898880 a^{12} b^2 c^{11} g^* \\
& k z^2 - 440401920 a^{10} b^c^{14} f^2 z^2 - 188743680 a^{11} b^c^{13} h^2 z^2 + 17 \\
& 61607680 a^{10} c^{15} d f z^2 - 655360 a^6 b^{18} c^k^2 z^2 - 94464 a^b^{17} c^7 d \\
& ^2 z^2 + 6936330240 a^8 b^3 c^{14} d^2 z^2 + 2464874496 a^6 b^7 c^{12} d^2 z^2 \\
& - 3963617280 a^9 b^c^{15} d^2 z^2 + 58007224320 a^{13} b^4 c^8 k^2 z^2 + 149684 \\
& 22400 a^{11} b^8 c^6 k^2 z^2 + 805306368 a^{11} c^{14} e^i z^2 - 35966156800 a^{12} \\
& b^6 c^7 k^2 z^2 + 419430400 a^{12} c^{13} f^j z^2 - 1509949440 a^9 b^2 c^{14} e^ \\
& 2 z^2 + 251658240 a^{11} c^{14} f^h z^2 - 56874762240 a^{14} b^2 c^9 k^2 z^2 - 54 \\
& 00428544 a^7 b^5 c^{13} d^2 z^2 + 890470400 a^9 b^{12} c^4 k^2 z^2 + 754974720 * \\
& a^8 b^4 c^{13} e^2 z^2 - 730054656 a^5 b^9 c^{11} d^2 z^2 + 477102080 a^{12} b^3 * \\
& c^{10} j^2 z^2 + 477102080 a^9 b^3 c^{13} f^2 z^2 - 377487360 a^9 b^4 c^{12} g^2 *
\end{aligned}$$

$$\begin{aligned}
& z^2 + 301989888a^{10}b^2c^{13}g^2z^2 - 174325760a^{11}b^5c^9j^2z^2 - 12 \\
& 6156800a^8b^{14}c^3k^2z^2 + 188743680a^8b^6c^{11}g^2z^2 + 141557760a \\
& ^{10}b^3c^{12}h^2z^2 - 174325760a^8b^5c^{12}f^2z^2 - 188743680a^7b^6c \\
& ^{12}e^2z^2 - 4350935040a^{10}b^{10}c^5k^2z^2 + 146165760a^4b^{11}c^{10}d^ \\
& ^2z^2 - 50331648a^{10}b^4c^{11}i^2z^2 + 11796480a^7b^{16}c^2k^2z^2 - 33 \\
& 554432a^{11}b^2c^{12}i^2z^2 + 11206656a^{10}b^7c^8j^2z^2 + 8929280a^9b \\
& ^9c^7j^2z^2 + 20971520a^9b^6c^{10}i^2z^2 - 2600960a^8b^{11}c^6j^2z \\
& ^2 + 291840a^7b^{13}c^5j^2z^2 - 14080a^6b^{15}c^4j^2z^2 + 256a^5b^ \\
& ^{17}c^3j^2z^2 - 47185920a^7b^8c^{10}g^2z^2 - 26542080a^8b^7c^{10}h^2z \\
& ^2 - 2752512a^7b^{10}c^8i^2z^2 + 2621440a^8b^8c^9i^2z^2 + 524288a \\
& ^6b^{12}c^7i^2z^2 - 32768a^5b^{14}c^6i^2z^2 + 9584640a^7b^9c^9h^2z \\
& ^2 - 2359296a^9b^5c^{11}h^2z^2 - 1290240a^6b^{11}c^8h^2z^2 + 46080a \\
& ^5b^{13}c^7h^2z^2 + 2304a^4b^{15}c^6h^2z^2 + 5898240a^6b^{10}c^9g^2z \\
& ^2 - 294912a^5b^{12}c^8g^2z^2 + 11206656a^7b^7c^{11}f^2z^2 + 8929280 \\
& *a^6b^9c^{10}f^2z^2 + 23592960a^6b^8c^{11}e^2z^2 - 2600960a^5b^{11}c^ \\
& ^9f^2z^2 + 291840a^4b^{13}c^8f^2z^2 - 14080a^3b^{15}c^7f^2z^2 + 256* \\
& a^2b^{17}c^6f^2z^2 - 19860480a^3b^{13}c^9d^2z^2 - 1179648a^5b^{10}c^1 \\
& 0e^2z^2 + 1771776a^2b^{15}c^8d^2z^2 - 440401920a^{13}b^c^{11}j^2z^2 + \\
& 1207959552a^{10}c^{15}e^2z^2 + 134217728a^{12}c^{13}i^2z^2 + 25769803776a^ \\
& ^{15}c^{10}k^2z^2 + 16384a^5b^{20}k^2z^2 + 2304b^{19}c^6d^2z^2 + 16515072 \\
& 0a^9b^c^{12}d^g^j^z + 23592960a^{10}b^c^{11}g^h^j^z + 169869312a^7b^c^{14} \\
& d^e^f^z + 99090432a^8b^c^{13}d^g^h^z - 3145728a^9b^c^{12}f^h^i^z + 566231 \\
& 04a^8b^c^{13}d^f^i^z - 1536a^ab^{18}c^3d^f^k^z - 9437184a^8b^c^{13}e^f^h^z \\
& + 1536a^ab^{15}c^6d^f^i^z - 4608a^ab^{14}c^7d^f^g^z + 9216a^ab^{13}c^8d^e \\
& ^f^z + 2173501440a^9b^5c^8d^j^k^z - 1987706880a^9b^3c^{10}d^h^k^z + 1 \\
& 121255424a^8b^5c^9d^h^k^z + 861143040a^8b^4c^{10}d^f^k^z - 859963392* \\
& a^7b^6c^9d^f^k^z - 780779520a^8b^7c^7d^j^k^z - 754974720a^9b^3c^1 \\
& 0e^g^k^z + 2222456832a^{11}b^c^{10}d^j^k^z - 454164480a^{11}b^3c^8h^j^k^z \\
& + 377487360a^8b^5c^9e^g^k^z + 290979840a^{10}b^4c^8f^j^k^z + 3810263 \\
& 04a^6b^8c^8d^f^k^z + 412876800a^8b^2c^{12}d^e^j^z + 301989888a^{10}b^ \\
& ^2c^{10}e^i^k^z - 320421888a^7b^7c^8d^h^k^z + 185794560a^{10}b^5c^7h^j \\
& ^k^z - 192020480a^9b^6c^7f^j^k^z + 190709760a^9b^4c^9f^h^k^z - 1509 \\
& 94944a^{10}b^3c^9g^i^k^z + 168990720a^7b^9c^6d^j^k^z + 235929600a^9b \\
& ^2c^{11}d^f^k^z - 206438400a^8b^3c^{11}d^g^j^z - 206438400a^7b^4c^{11} \\
& d^e^j^z - 101646336a^8b^6c^8f^h^k^z - 29245440a^9b^7c^6h^j^k^z - 60 \\
& 817408a^{11}b^2c^9f^j^k^z + 57835520a^8b^8c^6f^j^k^z + 219414528a^7b \\
& ^2c^{13}d^e^h^z - 70778880a^{10}b^2c^{10}f^h^k^z + 677376a^7b^{11}c^4h^j \\
& ^k^z - 645120a^8b^9c^5h^j^k^z - 53760a^6b^{13}c^3h^j^k^z + 31457280a \\
& ^8b^7c^7g^i^k^z - 62914560a^8b^6c^8e^i^k^z - 94371840a^7b^7c^8e^ \\
& g^k^z - 221773824a^6b^3c^{13}d^e^f^z + 82575360a^9b^2c^{11}d^i^j^z + 11 \\
& 796480a^{10}b^2c^{10}h^i^j^z - 11796480a^7b^9c^6g^i^k^z - 8970240a^7b \\
& ^{10}c^5f^j^k^z + 103219200a^7b^5c^{10}d^g^j^z - 2457600a^8b^6c^8h^i^ \\
& j^z + 1769472a^6b^{11}c^5g^i^k^z + 921600a^7b^8c^7h^i^j^z + 673792a^ \\
& ^6b^{12}c^4f^j^k^z - 138240a^6b^{10}c^6h^i^j^z - 98304a^5b^{13}c^4g^i^k \\
& ^z - 17920a^5b^{14}c^3f^j^k^z + 7680a^5b^{12}c^5h^i^j^z - 97136640a^5*
\end{aligned}$$

$b^{10}c^7d^2f^2k^2z - 29491200a^9b^3c^{10}g^2h^2j^2z + 58982400a^9b^2c^{11}e^2h^2j^2z + 23592960a^7b^8c^7e^2i^2k^2z - 22169088a^6b^{11}c^5d^2j^2k^2z + 21381120a^7b^8c^7f^2h^2k^2z + 14745600a^8b^5c^9g^2h^2j^2z + 42854400a^6b^9c^7d^2h^2k^2z - 109707264a^7b^3c^{12}d^2g^2h^2z - 3686400a^7b^7c^8g^2h^2j^2z - 3538944a^6b^{10}c^6e^2i^2k^2z + 1645056a^5b^{13}c^4d^2j^2k^2z - 890880a^6b^{10}c^6f^2h^2k^2z + 460800a^6b^9c^7g^2h^2j^2z - 330240a^5b^{12}c^5f^2h^2k^2z + 196608a^5b^{12}c^5e^2i^2k^2z - 53760a^4b^{15}c^3d^2j^2k^2z + 46080a^4b^{14}c^4f^2h^2k^2z - 23040a^5b^{11}c^6g^2h^2j^2z - 1536a^3b^{16}c^3f^2h^2k^2z - 29491200a^8b^4c^{10}e^2h^2j^2z - 17203200a^7b^6c^9d^2i^2j^2z + 11796480a^6b^9c^7e^2g^2k^2z + 110886912a^6b^4c^{12}d^2f^2g^2z + 7372800a^7b^6c^9e^2h^2j^2z + 40108032a^8b^2c^{12}d^2h^2i^2z + 6451200a^6b^8c^8d^2i^2j^2z + 2359296a^8b^3c^{11}f^2h^2i^2z - 967680a^5b^{10}c^7d^2i^2j^2z - 921600a^6b^8c^8e^2h^2j^2z - 829440a^4b^{13}c^5d^2h^2k^2z - 589824a^5b^{11}c^6e^2g^2k^2z - 491520a^6b^7c^9f^2h^2i^2z + 184320a^5b^9c^8f^2h^2i^2z + 105984a^3b^{15}c^4d^2h^2k^2z + 69120a^5b^{11}c^6d^2h^2k^2z + 53760a^4b^{12}c^6d^2i^2j^2z + 46080a^5b^{10}c^7e^2h^2j^2z - 27648a^4b^{11}c^7f^2h^2i^2z - 4608a^2b^{17}c^3d^2h^2k^2z + 1536a^3b^{13}c^6f^2h^2i^2z - 25804800a^6b^7c^9d^2g^2j^2z - 88473600a^6b^4c^{12}d^2e^2h^2z + 51609600a^6b^6c^{10}d^2e^2j^2z - 84934656a^7b^2c^{13}d^2f^2g^2z + 117964800a^5b^5c^{12}d^2e^2f^2z + 15160320a^4b^{12}c^6d^2f^2k^2z - 45613056a^7b^3c^{12}d^2f^2i^2z + 44236800a^6b^5c^{11}d^2g^2h^2z - 10321920a^6b^6c^{10}d^2h^2i^2z + 7077888a^7b^4c^{11}d^2h^2i^2z - 5898240a^7b^4c^{11}f^2g^2h^2z + 4718592a^8b^2c^{12}f^2g^2h^2z + 3225600a^5b^9c^8d^2g^2j^2z + 2949120a^6b^6c^{10}f^2g^2h^2z + 2396160a^5b^8c^9d^2h^2i^2z - 1428480a^3b^{14}c^5d^2f^2k^2z - 737280a^5b^8c^9f^2g^2h^2z - 161280a^4b^{11}c^7d^2g^2j^2z + 92160a^4b^{10}c^8f^2g^2h^2z + 73728a^2b^{16}c^4d^2f^2k^2z - 50688a^3b^{12}c^7d^2h^2i^2z - 27648a^4b^{10}c^8d^2h^2i^2z - 4608a^3b^{12}c^7f^2g^2h^2z + 4608a^2b^{14}c^6d^2h^2i^2z - 58982400a^5b^6c^{11}d^2f^2g^2z + 11796480a^7b^3c^{12}e^2f^2h^2z + 8847360a^5b^7c^{10}d^2f^2i^2z - 6635520a^5b^7c^{10}d^2g^2h^2z - 6451200a^5b^8c^9d^2e^2j^2z - 5898240a^6b^5c^{11}e^2f^2h^2z - 3809280a^4b^9c^9d^2f^2i^2z + 2359296a^6b^5c^{11}d^2f^2i^2z + 1474560a^5b^7c^{10}e^2f^2h^2z + 681984a^3b^{11}c^8d^2f^2i^2z + 322560a^4b^{10}c^8d^2e^2j^2z - 276480a^4b^9c^9d^2g^2h^2z - 184320a^4b^9c^9e^2f^2h^2z + 179712a^3b^{11}c^8d^2g^2h^2z - 55296a^2b^{13}c^7d^2f^2i^2z - 13824a^2b^{13}c^7d^2g^2h^2z + 9216a^3b^{11}c^8e^2f^2h^2z + 16220160a^4b^8c^{10}d^2f^2g^2z + 13271040a^5b^6c^{11}d^2e^2h^2z - 2396160a^3b^{10}c^9d^2f^2g^2z + 552960a^4b^8c^{10}d^2e^2h^2z - 359424a^3b^{10}c^9d^2e^2h^2z + 175104a^2b^{12}c^8d^2f^2g^2z + 27648a^2b^{12}c^8d^2e^2h^2z - 32440320a^4b^7c^{11}d^2e^2f^2z + 4792320a^3b^9c^{10}d^2e^2f^2z - 350208a^2b^{11}c^9d^2e^2f^2z + 1439170560a^{10}b^3c^{11}d^2h^2k^2z - 3361603584a^{10}b^3c^9d^2j^2k^2z + 603979776a^{10}b^3c^{11}e^2g^2k^2z + 407371776a^{12}b^3c^9h^2j^2k^2z + 201326592a^{11}b^3c^{10}g^2i^2k^2z + 346816512a^7b^3c^{14}d^2g^2z + 129761280a^{11}b^3c^{10}h^2k^2z + 121896960a^{10}b^3c^{11}f^2k^2z + 458752a^6b^{15}c^2i^2k^2z + 19660800a^{11}b^3c^{10}g^2j^2k^2z + 49152a^5b^{16}c^2g^2k^2z + 7077888a^9b^3c^{12}g^2h^2k^2z + 94464a^2b^{17}c^4d^2k^2z - 19660800a^8b^3c^{13}f^2g^2z - 66816a^2b^{14}c^7d^2i^2z + 214272a^2b^{13}c^8d^2g^2z - 428544a^2b^{12}c^9d^2e^2z + 2390753280a^{11}b^4c^7g^2k^2z - 2411421696a^6b^7c^9d^2k^2z - 6603079680a^8b^4c^7d^2f^2k^2z - 2411421696a^6b^7c^9d^2k^2z - 6603079680a^8b^4c^7d^2f^2k^2z$

$b^3c^{11}d^2k^2z + 3715891200a^9b^6c^{12}d^2k^2z - 880803840a^{10}c^{12}d^2fk^2z - 1623195648a^{10}b^6c^6g^2k^2z - 402653184a^{11}c^{11}e^2k^2z - 1509949440a^{12}b^2c^8g^2k^2z - 209715200a^{12}c^{10}f^2jk^2z - 330301440a^9c^{13}d^2ek^2z + 3019898880a^{12}b^6c^9ek^2z - 125829120a^{11}c^{11}f^2hk^2z - 110100480a^{10}c^{12}d^2ijk^2z - 198180864a^8c^{14}d^2ekh^2z - 15728640a^{11}c^{11}h^2ijk^2z - 1226833920a^9b^7c^6ek^2z - 47185920a^{10}c^{12}ekh^2jk^2z - 66060288a^9c^{13}d^2h^2ik^2z - 1090519040a^{12}b^3c^7ik^2z + 1022754816a^6b^2c^{14}d^2ek^2z + 5216108544a^7b^5c^{10}d^2k^2z + 754974720a^9b^2c^{11}e^2k^2z + 721529856a^5b^9c^8d^2k^2z + 613416960a^9b^8c^5g^2k^2z - 642318336a^5b^4c^{13}d^2ek^2z - 4781506560a^{11}b^3c^8ek^2z - 398131200a^{12}b^3c^7j^2k^2z - 511377408a^6b^3c^{13}d^2g^2z - 377487360a^8b^4c^{10}e^2k^2z + 285212672a^{11}b^5c^6ik^2z + 199065600a^{11}b^5c^6j^2k^2z + 279183360a^8b^9c^5ek^2z + 321159168a^5b^5c^{12}d^2g^2z + 188743680a^9b^4c^9g^2k^2z + 132120576a^{10}b^7c^5ik^2z - 150994944a^{10}b^2c^{10}g^2k^2z - 111411200a^9b^9c^4ik^2z - 126812160a^{10}b^3c^9h^2k^2z + 225312768a^7b^2c^{13}d^2ik^2z - 139591680a^8b^10c^4g^2k^2z - 49766400a^{10}b^7c^5j^2k^2z - 145463040a^4b^{11}c^7d^2k^2z - 94371840a^8b^6c^8g^2k^2z + 223395840a^4b^6c^{12}d^2ek^2z + 33751040a^8b^{11}c^3ik^2z - 78970880a^9b^3c^{10}f^2k^2z + 94371840a^7b^6c^9e^2k^2z + 25165824a^{10}b^4c^8i^2k^2z + 6220800a^9b^9c^4j^2k^2z + 39223296a^9b^5c^8h^2k^2z - 311040a^8b^{11}c^3j^2k^2z + 16777216a^{11}b^2c^9i^2k^2z - 10485760a^9b^6c^7i^2k^2z - 5406720a^7b^{13}c^2ik^2z + 1376256a^7b^{10}c^5i^2k^2z - 1310720a^8b^8c^6i^2k^2z - 262144a^6b^{12}c^4i^2k^2z + 16384a^5b^{14}c^3i^2k^2z + 10354688a^{11}b^2c^9ij^2z + 23592960a^7b^8c^7g^2k^2z + 38559744a^7b^7c^8f^2k^2z + 19169280a^7b^{12}c^3g^2k^2z - 2048000a^9b^6c^7ij^2z - 1520640a^7b^9c^6h^2k^2z - 1105920a^8b^7c^7h^2k^2z + 849920a^8b^8c^6ij^2z - 393216a^{10}b^4c^8ij^2z + 195840a^6b^{11}c^5h^2k^2z - 145920a^7b^{10}c^5ij^2z + 11520a^5b^{13}c^4h^2k^2z + 11008a^6b^{12}c^4ij^2z - 2304a^4b^{15}c^3h^2k^2z - 256a^5b^{14}c^3ij^2z - 25362432a^{10}b^3c^9g^2jk^2z - 24739840a^8b^5c^9f^2k^2z - 38338560a^7b^{11}c^4ek^2z - 2949120a^6b^{10}c^6g^2k^2z - 1474560a^6b^{14}c^2g^2k^2z + 50724864a^{10}b^2c^{10}ek^2z + 147456a^5b^{12}c^5g^2k^2z - 15150080a^6b^9c^7f^2k^2z + 13271040a^9b^5c^8g^2jk^2z - 111697920a^4b^7c^{11}d^2g^2z - 3563520a^8b^7c^7g^2jk^2z + 3538944a^9b^2c^{11}h^2ik^2z + 2912000a^5b^{11}c^6f^2k^2z - 737280a^7b^6c^9h^2ik^2z + 506880a^7b^9c^6g^2jk^2z - 291840a^4b^{13}c^5f^2k^2z + 276480a^6b^8c^8h^2ik^2z - 41472a^5b^{10}c^7h^2ik^2z - 34560a^6b^{11}c^5g^2jk^2z + 14080a^3b^{15}c^4f^2k^2z + 2304a^4b^{12}c^6h^2ik^2z + 768a^5b^{13}c^4g^2jk^2z - 256a^2b^{17}c^3f^2k^2z - 11796480a^6b^8c^8e^2k^2z - 26542080a^9b^4c^9ek^2z + 19837440a^3b^{13}c^6d^2k^2z + 2949120a^6b^{13}c^3ek^2z + 589824a^5b^{10}c^7e^2k^2z - 98304a^5b^{15}c^2ek^2z - 10354688a^8b^2c^{12}f^2ik^2z - 43646976a^6b^4c^{12}d^2ik^2z - 8847360a^8b^3c^{11}g^2h^2z + 7127040a^8b^6c^8ek^2z + 4423680a^7b^5c^{10}g^2h^2z + 2048000a^6b^6c^{10}f^2ik^2z - 1771776a^2b^{15}c^5d^2k^2z - 1105920a^6b^7c^9g^2h^2z - 1013760a^7b^8c^7ek^2z - 849920a^$

$a^5b^8c^9f^2i^z + 393216a^7b^4c^{11}f^2i^z + 145920a^4b^{10}c^8f^2i^z + 138240a^5b^9c^8g^h^2z + 69120a^6b^{10}c^6e^j^2z - 11008a^3b^{12}c^7f^2i^z - 6912a^4b^{11}c^7g^h^2z - 1536a^5b^{12}c^5e^j^2z + 256a^2b^{14}c^6f^2i^z - 32587776a^5b^6c^{11}d^2i^z + 25362432a^7b^3c^{12}f^2g^z + 21657600a^4b^8c^{10}d^2i^z + 17694720a^8b^2c^{12}e^h^2z - 50724864a^7b^2c^{13}e^f^2z - 13271040a^6b^5c^{11}f^2g^z - 8847360a^7b^4c^{11}e^h^2z - 5810688a^3b^{10}c^9d^2i^z + 3563520a^5b^7c^10f^2g^z + 2211840a^6b^6c^{10}e^h^2z + 845568a^2b^{12}c^8d^2i^z - 506880a^4b^9c^9f^2g^z - 276480a^5b^8c^9e^h^2z + 34560a^3b^{11}c^8f^2g^z + 13824a^4b^{10}c^8e^h^2z - 768a^2b^{13}c^7f^2g^z + 26542080a^6b^4c^{12}e^f^2z + 23362560a^3b^9c^{10}d^2g^z - 46725120a^3b^8c^{11}d^2e^z - 7127040a^5b^6c^{11}e^f^2z - 2965248a^2b^{11}c^9d^2g^z + 1013760a^4b^8c^{10}e^f^2z - 69120a^3b^{10}c^9e^f^2z + 1536a^2b^{12}c^8e^f^2z + 5930496a^2b^{10}c^{10}d^2e^z + 1006632960a^{13}b^c^8i^k^2z + 3246391296a^{10}b^5c^7e^k^2z + 318504960a^{13}b^c^8j^2k^z + 61538304a^{10}b^{10}c^2k^3z - 603979776a^{10}c^{12}e^2k^z - 693633024a^7c^{15}d^2e^z - 231211008a^8c^{14}d^2i^z - 67108864a^{12}c^{10}i^2k^z - 13107200a^{12}c^{10}i^j^2z - 16384a^5b^{17}i^k^2z - 39321600a^{11}c^{11}e^j^2z - 4718592a^{10}c^{12}h^2i^z - 2304b^{19}c^3d^2k^z + 13107200a^9c^{13}f^2i^z + 2304b^{16}c^6d^2i^z - 14155776a^9c^{13}e^h^2z + 39321600a^8c^{14}e^f^2z - 4833280a^9b^{12}c^k^3z - 6912b^{15}c^7d^2g^z + 6962544640a^{14}b^2c^6k^3z + 13824b^{14}c^8d^2e^z + 1876951040a^{12}b^6c^4k^3z - 4844421120a^{13}b^4c^5k^3z - 437780480a^{11}b^8c^3k^3z - 4294967296a^{15}c^7k^3z + 163840a^8b^{14}k^3z + 6144000a^{10}b^c^8f^i^j^k - 5898240a^{10}b^c^8g^h^j^k - 41287680a^9b^c^9d^g^j^k + 4472832a^9b^c^9f^h^i^k + 18432000a^9b^c^9e^f^j^k + 3391488a^8b^c^{10}e^h^i^j + 1228800a^8b^c^{10}f^g^i^j - 24772608a^8b^c^{10}d^g^h^k + 13418496a^8b^c^{10}e^f^h^k + 1649024a^8b^c^{10}d^f^i^k + 737280a^7b^c^{11}f^g^h^i - 768a^b^{15}c^3d^f^i^k - 19307520a^7b^c^{11}d^f^h^j + 16367616a^7b^c^{11}d^e^i^j + 3686400a^7b^c^{11}e^f^g^j + 34947072a^7b^c^{11}d^e^f^k + 2304a^b^{14}c^4d^f^g^k - 180a^b^{13}c^5d^f^h^j + 11059200a^6b^c^{12}d^e^h^i + 5160960a^6b^c^{12}d^f^g^i + 2211840a^6b^c^{12}e^f^g^h - 4608a^b^{13}c^5d^e^f^k - 2304a^b^{11}c^7d^f^g^i + 4608a^b^{10}c^8d^e^f^i + 15482880a^5b^c^{13}d^e^f^g - 13824a^b^9c^9d^e^f^g - 225976320a^8b^2c^9d^e^j^k + 112988160a^8b^3c^8d^g^j^k - 11427840a^{10}b^2c^7h^i^j^k - 4177920a^9b^4c^6h^i^j^k + 1399296a^8b^6c^5h^i^j^k - 26880a^6b^{10}c^3h^i^j^k + 16128a^7b^8c^4h^i^j^k - 61562880a^9b^2c^8d^i^j^k + 20090880a^9b^3c^7g^h^j^k + 19623680a^7b^4c^8d^e^j^k + 10485760a^9b^3c^7f^i^j^k - 40181760a^9b^2c^8e^h^j^k - 3778560a^8b^5c^6g^h^j^k - 137797632a^7b^2c^{10}d^e^h^k - 1248768a^7b^7c^5f^i^j^k + 229376a^6b^9c^4f^i^j^k + 220160a^8b^5c^6f^i^j^k - 209664a^7b^7c^5g^h^j^k + 80640a^6b^9c^4g^h^j^k - 8960a^5b^{11}c^3f^i^j^k - 59811840a^7b^5c^7d^g^j^k + 53084160a^8b^2c^9e^g^i^k - 11120640a^8b^4c^7f^g^j^k + 10455552a^7b^6c^6d^i^j^k - 9216000a^9b^2c^8f^g^j^k + 7557120a^8b^4c^7e^h^j^k + 7397376a^8b^3c^8f^h^i^k + 5230080a^7b^6c^6f^g^j^k - 37675008a^8b^2c^9d^h^i^k$

$k - 3633408a^6b^8c^5d^i j^k + 2211840a^8b^4c^7d^i j^k + 68898816a^7b^3c^9d^g h^k - 1695744a^8b^2c^9d^g h^i j - 1400832a^7b^4c^8d^g h^i j + 967680a^7b^5c^7d^f h^i k - 783360a^6b^7c^6d^f h^i k - 741888a^6b^8c^5d^f g^j k + 499968a^5b^10c^4d^i j^k + 419328a^7b^6c^6d^e h^j k - 253440a^6b^6c^7d^g h^i j - 161280a^6b^8c^5d^e h^j k + 42240a^5b^9c^5d^f h^i k + 26880a^5b^10c^4d^f g^j k - 26880a^4b^12c^3d^i j^k + 13824a^4b^11c^4d^f h^i k + 11520a^5b^8c^6d^g h^i j - 768a^3b^13c^3d^f h^i k + 22241280a^8b^3c^8d^e f^j k + 14222592a^6b^7c^6d^g j^k - 10460160a^7b^5c^7d^e f^j k + 8847360a^7b^4c^8d^e g^i k - 7741440a^7b^4c^8d^f g^h^k - 7077888a^6b^6c^7d^e g^i k + 6935040a^6b^6c^7d^h^i k - 6709248a^8b^2c^9d^f g^h^k - 3612672a^7b^4c^8d^h^i k + 2801664a^7b^3c^9d^e h^i j + 2506752a^7b^3c^9d^f g^i j + 2419200a^6b^6c^7d^f g^h^k - 1661184a^5b^9c^5d^g j^k + 1483776a^6b^7c^6d^e f^j k - 1463040a^5b^8c^6d^h^i k + 884736a^5b^8c^6d^e g^i k + 838656a^6b^5c^8d^f g^i j + 506880a^6b^5c^8d^e h^i j + 80640a^4b^11c^4d^g j^k - 53760a^5b^9c^5d^e f^j k - 53760a^5b^7c^7d^f g^i j - 46080a^4b^10c^5d^f g^h^k - 34560a^5b^8c^6d^f g^h^k + 25344a^3b^12c^4d^h^i k - 23040a^5b^7c^7d^e h^i j + 13824a^4b^10c^5d^h^i k + 2304a^3b^12c^4d^f g^h^k - 2304a^2b^14c^3d^h^i k - 29030400a^6b^5c^8d^g h^k + 28606464a^7b^3c^9d^f i^k - 28445184a^6b^6c^7d^e j^k + 58060800a^6b^4c^9d^e h^k + 15482880a^7b^3c^9d^e f^h^k - 8183808a^7b^2c^10d^g i^j - 6718464a^6b^5c^8d^f i^k - 5087232a^7b^2c^10d^e g^h^j - 5013504a^7b^2c^10d^e f^i j - 4838400a^6b^5c^8d^e f^h^k + 4112640a^5b^7c^7d^g h^k - 3663360a^5b^7c^7d^f i^k + 3322368a^5b^8c^6d^e j^k - 2285568a^6b^4c^9d^g i^j + 1896960a^4b^9c^6d^f i^k + 1843200a^6b^3c^10d^f g^h^i - 1677312a^6b^4c^9d^e f^i j - 1658880a^6b^4c^9d^e g^h^j + 68345856a^6b^3c^10d^e f^k + 783360a^5b^5c^9d^f g^h^i + 741888a^5b^6c^8d^g i^j - 34172928a^6b^4c^9d^f g^k - 340992a^3b^11c^5d^f i^k - 161280a^4b^10c^5d^e j^k + 138240a^4b^9c^6d^g h^k + 107520a^5b^6c^8d^e f^i j + 92160a^4b^9c^6d^e f^h^k - 89856a^3b^11c^5d^g h^k - 80640a^4b^8c^7d^g i^j + 69120a^5b^7c^7d^e f^h^k + 69120a^5b^6c^8d^e g^h^j + 27648a^2b^13c^4d^f i^k + 18432a^4b^7c^8d^f g^h^i + 6912a^2b^13c^4d^g h^k - 4608a^3b^11c^5d^e f^h^k - 2304a^3b^9c^7d^f g^h^i + 27164160a^5b^6c^8d^f g^k - 22164480a^6b^3c^10d^f h^j - 54328320a^5b^5c^9d^e f^k - 17473536a^7b^2c^10d^f g^k - 8225280a^5b^6c^8d^e h^k - 8087040a^4b^8c^7d^f g^k + 5677056a^6b^3c^10d^e f^g^j - 5529600a^6b^2c^11d^g h^i + 4571136a^6b^3c^10d^e i^j - 3686400a^6b^2c^11d^e f^h^i + 2805120a^5b^5c^9d^f h^j - 2211840a^5b^4c^10d^g h^i - 1566720a^5b^4c^10d^e f^h^i - 1483776a^5b^5c^9d^e i^j + 1198080a^3b^10c^6d^f g^k + 437184a^4b^7c^8d^f h^j - 322560a^5b^5c^9d^e f^g^j + 317952a^4b^6c^9d^g h^i - 276480a^4b^8c^7d^e h^k + 179712a^3b^10c^6d^e h^k + 161280a^4b^7c^8d^e i^j - 146268a^3b^9c^7d^f h^j - 87552a^2b^12c^5d^f g^k - 36864a^4b^6c^9d^e f^h^i - 13824a^2b^12c^5d^e h^k + 9360a^2b^11c^6d^f h^j + 6912a^3b^8c^8d^g h^i - 6912a^2b^10c^7d^g h^i + 4608a^3b^8c^8d^e f^h^i - 24551424a^6b^2c^11d^e g^j + 16174080a^4b^7c^8d^e f^k + 5419008a^5b^4c^10d^e g^k$

$$\begin{aligned}
& j + 5160960*a^5*b^3*c^{11}*d*f*g*i + 4423680*a^5*b^3*c^{11}*e*f*g*h + 4423680*a^5*b^3*c^{11}*d*e*h*i - 2396160*a^3*b^9*c^7*d*e*f*k - 635904*a^4*b^5*c^{10}*d*e*h*i - 483840*a^4*b^6*c^9*d*e*g*j - 354816*a^3*b^7*c^9*d*f*g*i + 322560*a^4*b^5*c^{10}*d*f*g*i + 175104*a^2*b^{11}*c^6*d*e*f*k + 138240*a^4*b^5*c^{10}*e*f*g*h + 59904*a^2*b^9*c^8*d*f*g*i - 13824*a^3*b^7*c^9*e*f*g*h - 13824*a^3*b^7*c^9*d*e*h*i + 13824*a^2*b^9*c^8*d*e*h*i - 16588800*a^5*b^2*c^{12}*d*e*g*h - 10321920*a^5*b^2*c^{12}*d*e*f*i + 1658880*a^4*b^4*c^{11}*d*e*g*h + 709632*a^3*b^6*c^{10}*d*e*f*i - 645120*a^4*b^4*c^{11}*d*e*f*i + 124416*a^3*b^6*c^{10}*d*e*g*h - 119808*a^2*b^8*c^9*d*e*f*i - 41472*a^2*b^8*c^9*d*e*g*h + 7741440*a^4*b^3*c^{12}*d*e*f*g - 2903040*a^3*b^5*c^{11}*d*e*f*g + 387072*a^2*b^7*c^{10}*d*e*f*g - 381026304*a^{11}*b*c^7*d*j*k^2 - 241827840*a^{10}*b*c^8*d*h*k^2 - 65667072*a^{12}*b*c^6*h*j*k^2 - 169344*a^7*b^{11}*c*h*j*k^2 - 25165824*a^{11}*b*c^7*g*i*k^2 - 4915200*a^{11}*b*c^7*g*j^2*k - 53084160*a^8*b*c^{10}*e^2*i*k - 75497472*a^{10}*b*c^8*e*g*k^2 - 86704128*a^7*b*c^{11}*d^2*g*k + 565248*a^9*b*c^9*h*i^2*j - 168448*a^6*b^{12}*c*f*j*k^2 - 24576*a^5*b^{13}*c*g*i*k^2 - 1769472*a^9*b*c^9*g*h^2*k - 17694720*a^9*b*c^9*e*i^2*k - 411264*a^5*b^{13}*c*d*j*k^2 - 11520*a^4*b^14*c*f*h*k^2 + 4915200*a^8*b*c^{10}*f^2*g*k + 2580480*a^9*b*c^9*e*i*j^2 - 2496000*a^9*b*c^9*f*h*j^2 - 1543680*a^8*b*c^{10}*f*h^2*j + 33408*a*b^{14}*c^4*d^2*i*k - 59512320*a^6*b*c^{12}*d^2*f*j + 5087232*a^7*b*c^{11}*e^2*h*j + 2727936*a^8*b*c^{10}*d*i^2*j - 26496*a^3*b^{15}*c*d*h*k^2 + 1105920*a^7*b*c^{11}*e*h^2*i - 107136*a*b^{13}*c^5*d^2*g*k + 10260*a*b^{12}*c^6*d^2*h*j - 10616832*a^6*b*c^{12}*e^2*g*i - 3538944*a^7*b*c^{11}*e*g*i^2 + 1843200*a^7*b*c^{11}*d*h*i^2 - 18432*a^2*b^{16}*c*d*f*k^2 - 15552000*a^8*b*c^{10}*d*f*j^2 + 24551424*a^6*b*c^{12}*d*e^2*j - 37062144*a^5*b*c^{13}*d^2*f*h + 2580480*a^6*b*c^{12}*e*f^2*i + 214272*a*b^{12}*c^6*d^2*e*k + 65664*a*b^{10}*c^8*d^2*g*i - 25074*a*b^{11}*c^7*d^2*f*j + 420*a*b^{12}*c^6*d*f^2*j + 6*a*b^{15}*c^3*d*f*j^2 + 23224320*a^5*b*c^{13}*d^2*e*i + 384*a*b^{12}*c^6*d*f*i^2 - 5985792*a^6*b*c^{12}*d*f*h^2 + 206010*a*b^9*c^9*d^2*f*h - 131328*a*b^9*c^9*d^2*e*i - 6300*a*b^{10}*c^8*d*f^2*h + 1350*a*b^{11}*c^7*d*f*h^2 + 16588800*a^5*b*c^{13}*d*e^2*h + 3456*a*b^{10}*c^8*d*f*g^2 + 435456*a*b^8*c^{10}*d^2*e*g + 13824*a*b^8*c^{10}*d*e^2*f + 3932160*a^{11}*c^8*h*i*j*k + 27525120*a^{10}*c^9*d*i*j*k + 82575360*a^9*c^{10}*d*e*j*k + 11796480*a^{10}*c^9*e*h*j*k + 16515072*a^9*c^{10}*d*h*i*k + 49545216*a^8*c^{11}*d*e*h*k - 2457600*a^8*c^{11}*e*f*i*j - 1474560*a^7*c^{12}*e*f*h*i - 10321920*a^6*c^{13}*d*e*f*i + 737077248*a^{10}*b^3*c^6*d*j*k^2 - 518814720*a^9*b^5*c^5*d*j*k^2 + 441354240*a^9*b^3*c^7*d*h*k^2 - 429871104*a^6*b^2*c^{11}*d^2*e*k - 272212992*a^8*b^5*c^6*d*h*k^2 + 305731584*a^5*b^4*c^{10}*d^2*e*k + 192412800*a^8*b^7*c^4*d*j*k^2 + 111912960*a^{11}*b^3*c^5*h*j*k^2 + 214935552*a^6*b^3*c^{10}*d^2*g*k + 202427136*a^7*b^6*c^6*d*f*k^2 - 49904640*a^{10}*b^5*c^4*h*j*k^2 - 178513920*a^8*b^4*c^7*d*f*k^2 - 152865792*a^5*b^5*c^9*d^2*g*k - 114388992*a^7*b^2*c^{10}*d^2*i*k + 94961664*a^{10}*b^2*c^7*e*i*k^2 - 9039872*a^{11}*b^2*c^6*i*j^2*k - 56494080*a^{10}*b^4*c^5*f*j*k^2 - 2052096*a^{10}*b^4*c^5*i*j^2*k + 1327360*a^9*b^6*c^4*i*j^2*k - 158080*a^8*b^8*c^3*i*j^2*k - 47480832*a^{10}*b^3*c^6*g*i*k^2 + 45576960*a^9*b^6*c^4*f*j*k^2 + 7954560*a^9*b^7*c^3*h*j*k^2 - 104693760*a^9*b^3*c^7*e*g*k^2 + 142080*a^8*b^9*c^2*h*j*k^2 + 16017408*a^{10}*b^3*c^6*g*j^2*k - 4930560*a^9*b^5*c^5*g*j^2*k - 3649536*a^9*b^2*c^8*h^2*i*k - 1843200*a^8*b^4*c^7*h^
\end{aligned}$$

$$\begin{aligned}
& 2*i*k + 85524480*a^8*b^5*c^6*e*g*k^2 + 474240*a^8*b^7*c^4*g*j^2*k + 288000* \\
& a^7*b^6*c^6*h^2*i*k + 63360*a^6*b^8*c^5*h^2*i*k - 8064*a^5*b^10*c^4*h^2*i*k \\
& - 1152*a^4*b^12*c^3*h^2*i*k - 15437824*a^11*b^2*c^6*f*j*k^2 - 32034816*a^1 \\
& 0*b^2*c^7*e*j^2*k - 14369280*a^8*b^8*c^3*f*j*k^2 - 13271040*a^8*b^3*c^8*g^2 \\
& *i*k + 80267904*a^7*b^7*c^5*d*h*k^2 + 79626240*a^7*b^2*c^10*e^2*g*k + 11059 \\
& 200*a^9*b^5*c^5*g*i*k^2 + 8847360*a^9*b^2*c^8*g*i^2*k - 42113280*a^7*b^9*c^ \\
& 3*d*j*k^2 + 6389760*a^8*b^7*c^4*g*i*k^2 + 5898240*a^8*b^4*c^7*g*i^2*k - 376 \\
& 01280*a^9*b^4*c^6*f*h*k^2 - 2949120*a^7*b^9*c^3*g*i*k^2 + 2242560*a^7*b^10* \\
& c^2*f*j*k^2 - 2211840*a^7*b^5*c^7*g^2*i*k + 1769472*a^6*b^7*c^6*g^2*i*k + 7 \\
& 49568*a^8*b^3*c^8*h*i^2*j - 442368*a^7*b^6*c^6*g*i^2*k + 442368*a^6*b^11*c^ \\
& 2*g*i*k^2 - 442368*a^6*b^8*c^5*g*i^2*k + 317952*a^7*b^5*c^7*h*i^2*j - 22118 \\
& 4*a^5*b^9*c^5*g^2*i*k + 73728*a^5*b^10*c^4*g*i^2*k + 38400*a^6*b^7*c^6*h*i^ \\
& 2*j - 1920*a^5*b^9*c^5*h*i^2*j + 9861120*a^9*b^4*c^6*e*j^2*k - 110280960*a^ \\
& 4*b^6*c^9*d^2*e*k - 93330432*a^6*b^8*c^5*d*f*k^2 + 24645888*a^8*b^6*c^5*f*h \\
& *k^2 + 6359040*a^8*b^3*c^8*g*h^2*k - 22118400*a^9*b^4*c^6*e*i*k^2 - 3862528 \\
& *a^8*b^2*c^9*f^2*i*k - 2248704*a^7*b^4*c^8*f^2*i*k - 1290240*a^9*b^2*c^8*g* \\
& i*j^2 - 948480*a^8*b^6*c^5*e*j^2*k - 860160*a^8*b^4*c^7*g*i*j^2 - 414720*a^ \\
& 7*b^5*c^7*g*h^2*k + 303360*a^6*b^6*c^7*f^2*i*k + 266880*a^5*b^8*c^6*f^2*i*k \\
& - 224640*a^6*b^7*c^6*g*h^2*k - 80640*a^7*b^6*c^6*g*i*j^2 - 72960*a^4*b^10* \\
& c^5*f^2*i*k + 17280*a^5*b^9*c^5*g*h^2*k + 12672*a^6*b^8*c^5*g*i*j^2 + 5504* \\
& a^3*b^12*c^4*f^2*i*k + 3456*a^4*b^11*c^4*g*h^2*k - 384*a^5*b^10*c^4*g*i*j^2 \\
& - 128*a^2*b^14*c^3*f^2*i*k + 30265344*a^6*b^4*c^9*d^2*i*k - 12779520*a^8*b \\
& ^6*c^5*e*i*k^2 - 11796480*a^8*b^3*c^8*e*i^2*k - 8847360*a^7*b^3*c^9*e^2*i*k \\
& - 7925760*a^10*b^2*c^7*f*h*k^2 + 7077888*a^6*b^5*c^8*e^2*i*k - 39813120*a^ \\
& 7*b^3*c^9*e*g^2*k - 73175040*a^9*b^2*c^8*d*f*k^2 + 5898240*a^7*b^8*c^4*e*i* \\
& k^2 + 5542272*a^6*b^11*c^2*d*j*k^2 - 5420160*a^7*b^8*c^4*f*h*k^2 + 55140480 \\
& *a^4*b^7*c^8*d^2*g*k + 1271808*a^7*b^3*c^9*g^2*h*j - 1040384*a^8*b^2*c^9*f* \\
& i^2*j + 884736*a^7*b^5*c^7*e*i^2*k - 884736*a^6*b^10*c^3*e*i*k^2 + 884736*a \\
& ^6*b^7*c^6*e*i^2*k - 884736*a^5*b^7*c^7*e^2*i*k - 697344*a^7*b^4*c^8*f*i^2* \\
& j + 414720*a^6*b^5*c^8*g^2*h*j + 226560*a^6*b^10*c^3*f*h*k^2 - 147456*a^5*b \\
& ^9*c^5*e*i^2*k - 121856*a^6*b^6*c^7*f*i^2*j + 82560*a^5*b^12*c^2*f*h*k^2 + \\
& 49152*a^5*b^12*c^2*e*i*k^2 - 17280*a^5*b^7*c^7*g^2*h*j + 8960*a^5*b^8*c^6*f \\
& *i^2*j + 14194944*a^5*b^6*c^8*d^2*i*k - 12718080*a^8*b^2*c^9*e*h^2*k - 1061 \\
& 5680*a^4*b^8*c^7*d^2*i*k - 26542080*a^6*b^4*c^9*e^2*g*k - 23592960*a^7*b^7* \\
& c^5*e*g*k^2 - 5142528*a^8*b^3*c^8*f*h*j^2 + 5068800*a^7*b^2*c^10*f^2*h*j - \\
& 3755520*a^7*b^3*c^9*f*h^2*j + 3336192*a^7*b^3*c^9*f^2*g*k + 3000960*a^6*b^4 \\
& *c^9*f^2*h*j + 2893824*a^3*b^10*c^6*d^2*i*k + 1720320*a^8*b^3*c^8*e*i*j^2 + \\
& 1704960*a^6*b^5*c^8*f^2*g*k - 1307520*a^5*b^7*c^7*f^2*g*k - 1085760*a^6*b^ \\
& 5*c^8*f*h^2*j - 959040*a^7*b^5*c^7*f*h*j^2 + 829440*a^7*b^4*c^8*e*h^2*k - 5 \\
& 52960*a^7*b^2*c^10*g*h^2*i - 552960*a^6*b^4*c^9*g*h^2*i + 449280*a^6*b^6*c^ \\
& 7*e*h^2*k - 422784*a^2*b^12*c^5*d^2*i*k + 253440*a^4*b^9*c^6*f^2*g*k + 1612 \\
& 80*a^7*b^5*c^7*e*i*j^2 - 145152*a^5*b^6*c^8*g*h^2*i + 103200*a^6*b^7*c^6*f* \\
& h*j^2 + 41280*a^5*b^6*c^8*f^2*h*j - 37188*a^4*b^8*c^7*f^2*h*j - 34560*a^5*b \\
& ^8*c^6*e*h^2*k - 25344*a^6*b^7*c^6*e*i*j^2 - 17280*a^3*b^11*c^5*f^2*g*k + 1 \\
& 3536*a^5*b^7*c^7*f*h^2*j - 6912*a^4*b^10*c^5*e*h^2*k + 5490*a^4*b^9*c^6*f*h
\end{aligned}$$

$$\begin{aligned}
&^2*j - 3456*a^4*b^8*c^7*g*h^2*i + 1980*a^3*b^10*c^6*f^2*h*j + 810*a^5*b^9*c \\
&^5*f*h*j^2 + 768*a^5*b^9*c^5*e*i*j^2 + 384*a^2*b^13*c^4*f^2*g*k - 270*a^4*b \\
&^11*c^4*f*h*j^2 - 180*a^3*b^11*c^5*f*h^2*j - 30*a^2*b^12*c^5*f^2*h*j + 6*a^ \\
&^3*b^13*c^3*f*h*j^2 + 30067200*a^6*b^2*c^11*d^2*h*j + 13271040*a^6*b^5*c^8*e \\
&*g^2*k - 10857600*a^6*b^9*c^4*d*h*k^2 + 2949120*a^6*b^9*c^4*e*g*k^2 + 26542 \\
&08*a^5*b^6*c^8*e^2*g*k + 2125824*a^7*b^3*c^9*d*i^2*j + 1658880*a^6*b^3*c^10 \\
&*e^2*h*j - 1419264*a^6*b^4*c^9*f*g^2*j - 1327104*a^5*b^7*c^7*e*g^2*k - 9216 \\
&00*a^7*b^2*c^10*f*g^2*j - 737280*a^7*b^2*c^10*f*h*i^2 - 568320*a^6*b^4*c^9* \\
&f*h*i^2 + 207360*a^4*b^13*c^2*d*h*k^2 - 147456*a^5*b^11*c^3*e*g*k^2 - 13670 \\
&4*a^5*b^6*c^8*f*h*i^2 + 133632*a^6*b^5*c^8*d*i^2*j - 96768*a^5*b^7*c^7*d*i^ \\
&2*j + 80640*a^5*b^6*c^8*f*g^2*j - 69120*a^5*b^5*c^9*e^2*h*j + 13440*a^4*b^9 \\
&*c^6*d*i^2*j - 5760*a^5*b^11*c^3*d*h*k^2 - 2304*a^4*b^8*c^7*f*h*i^2 + 384*a \\
&^3*b^10*c^6*f*h*i^2 + 11930112*a^8*b^2*c^9*d*h*j^2 - 11646720*a^3*b^9*c^7*d \\
&^2*g*k + 8432640*a^7*b^2*c^10*d*h^2*j + 24140160*a^5*b^10*c^4*d*f*k^2 - 667 \\
&2384*a^7*b^2*c^10*e*f^2*k + 4450176*a^7*b^4*c^8*d*h*j^2 + 4337280*a^6*b^4*c \\
&^9*d*h^2*j - 3870720*a^8*b^2*c^9*e*g*j^2 - 3409920*a^6*b^4*c^9*e*f^2*k - 28 \\
&85760*a^5*b^4*c^10*d^2*h*j - 2844288*a^4*b^6*c^9*d^2*h*j + 2615040*a^5*b^6* \\
&c^8*e*f^2*k - 1687680*a^6*b^6*c^7*d*h*j^2 + 1482624*a^2*b^11*c^6*d^2*g*k - \\
&1290240*a^6*b^2*c^11*f^2*g*i + 1105920*a^6*b^3*c^10*e*h^2*i + 1019412*a^3*b \\
&^8*c^8*d^2*h*j - 1007424*a^5*b^6*c^8*d*h^2*j - 860160*a^5*b^4*c^10*f^2*g*i \\
&- 645120*a^7*b^4*c^8*e*g*j^2 - 506880*a^4*b^8*c^7*e*f^2*k + 290304*a^5*b^5* \\
&c^9*e*h^2*i + 197460*a^5*b^8*c^6*d*h*j^2 - 143802*a^2*b^10*c^7*d^2*h*j + 80 \\
&640*a^6*b^6*c^7*e*g*j^2 - 80640*a^4*b^6*c^9*f^2*g*i + 51948*a^4*b^8*c^7*d*h \\
&^2*j + 34560*a^3*b^10*c^6*e*f^2*k + 12672*a^3*b^8*c^8*f^2*g*i + 10800*a^3*b \\
&^10*c^6*d*h^2*j + 6912*a^4*b^7*c^8*e*h^2*i - 2304*a^5*b^8*c^6*e*g*j^2 - 768 \\
&*a^2*b^12*c^5*e*f^2*k - 684*a^3*b^12*c^4*d*h*j^2 - 540*a^2*b^12*c^5*d*h^2*j \\
&- 384*a^2*b^10*c^7*f^2*g*i - 90*a^4*b^10*c^5*d*h*j^2 + 18*a^2*b^14*c^3*d*h \\
&*j^2 + 23385600*a^6*b^2*c^11*d*f^2*j + 23293440*a^3*b^8*c^8*d^2*e*k + 61378 \\
&56*a^6*b^3*c^10*d*g^2*j - 5677056*a^6*b^2*c^11*e^2*f*j + 5308416*a^6*b^2*c^ \\
&11*e*g^2*i - 5308416*a^5*b^3*c^11*e^2*g*i - 3786240*a^4*b^12*c^3*d*f*k^2 - \\
&3538944*a^6*b^3*c^10*e*g*i^2 + 2654208*a^5*b^4*c^10*e*g^2*i + 1658880*a^6*b \\
&^3*c^10*d*h*i^2 - 1354752*a^5*b^5*c^9*d*g^2*j - 1105920*a^5*b^4*c^10*f*g^2* \\
&h - 884736*a^5*b^5*c^9*e*g*i^2 - 552960*a^6*b^2*c^11*f*g^2*h + 357120*a^3*b \\
&^14*c^2*d*f*k^2 + 322560*a^5*b^4*c^10*e^2*f*j + 262656*a^5*b^5*c^9*d*h*i^2 \\
&+ 120960*a^4*b^7*c^8*d*g^2*j - 55296*a^4*b^7*c^8*d*h*i^2 - 34560*a^4*b^6*c^ \\
&9*f*g^2*h + 3456*a^3*b^8*c^8*f*g^2*h + 1152*a^3*b^9*c^7*d*h*i^2 + 1152*a^2* \\
&b^11*c^6*d*h*i^2 - 13149696*a^7*b^3*c^9*d*f*j^2 - 11612160*a^5*b^2*c^12*d^2 \\
&*g*i + 10906560*a^4*b^5*c^10*d^2*f*j - 7418880*a^5*b^3*c^11*d^2*f*j + 31489 \\
&92*a^6*b^5*c^8*d*f*j^2 - 2985696*a^3*b^7*c^9*d^2*f*j - 2965248*a^2*b^10*c^7 \\
&*d^2*e*k + 1720320*a^5*b^3*c^11*e*f^2*i - 1658880*a^6*b^2*c^11*e*g*h^2 + 15 \\
&96672*a^3*b^6*c^10*d^2*g*i - 1505280*a^4*b^6*c^9*d*f^2*j - 829440*a^5*b^4*c \\
&^10*e*g*h^2 - 508032*a^2*b^8*c^9*d^2*g*i + 378954*a^2*b^9*c^8*d^2*f*j + 362 \\
&880*a^5*b^4*c^10*d*f^2*j + 296964*a^3*b^8*c^8*d*f^2*j + 161280*a^4*b^5*c^10 \\
&*e*f^2*i - 77070*a^4*b^9*c^6*d*f*j^2 - 30240*a^5*b^7*c^7*d*f*j^2 - 25344*a^ \\
&3*b^7*c^9*e*f^2*i - 20736*a^4*b^6*c^9*e*g*h^2 - 19278*a^2*b^10*c^7*d*f^2*j
\end{aligned}$$

$$\begin{aligned}
& + 8820*a^3*b^{11}*c^5*d*f*j^2 + 768*a^2*b^9*c^8*e*f^2*i - 378*a^2*b^{13}*c^4*d* \\
& f*j^2 - 5419008*a^5*b^3*c^{11}*d*e^2*j - 4423680*a^5*b^2*c^{12}*e^2*f*h + 41472 \\
& 00*a^5*b^3*c^{11}*d*g^2*h - 2580480*a^6*b^2*c^{11}*d*f*i^2 - 967680*a^5*b^4*c^1 \\
& 0*d*f*i^2 + 483840*a^4*b^5*c^{10}*d*e^2*j - 414720*a^4*b^5*c^{10}*d*g^2*h - 138 \\
& 240*a^4*b^4*c^{11}*e^2*f*h + 64512*a^4*b^6*c^9*d*f*i^2 + 39168*a^3*b^8*c^8*d* \\
& f*i^2 - 31104*a^3*b^7*c^9*d*g^2*h + 13824*a^3*b^6*c^{10}*e^2*f*h + 10368*a^2* \\
& b^9*c^8*d*g^2*h - 9216*a^2*b^{10}*c^7*d*f*i^2 + 15630336*a^5*b^2*c^{12}*d*f^2*h \\
& - 14459904*a^4*b^3*c^{12}*d^2*f*h + 9630144*a^3*b^5*c^{11}*d^2*f*h - 8764416*a \\
& ^5*b^3*c^{11}*d*f*h^2 - 3870720*a^5*b^2*c^{12}*e*f^2*g - 3193344*a^3*b^5*c^{11}*d \\
& ^2*e*i + 2867328*a^4*b^4*c^{11}*d*f^2*h - 2095200*a^2*b^7*c^{10}*d^2*f*h - 1414 \\
& 080*a^3*b^6*c^{10}*d*f^2*h - 34836480*a^4*b^2*c^{13}*d^2*e*g + 1016064*a^2*b^7* \\
& c^{10}*d^2*e*i - 645120*a^4*b^4*c^{11}*e*f^2*g + 306720*a^3*b^7*c^9*d*f*h^2 + 1 \\
& 97820*a^2*b^8*c^9*d*f^2*h + 146880*a^4*b^5*c^{10}*d*f*h^2 + 80640*a^3*b^6*c^1 \\
& 0*e*f^2*g - 55350*a^2*b^9*c^8*d*f*h^2 - 2304*a^2*b^8*c^9*e*f^2*g - 3870720* \\
& a^5*b^2*c^{12}*d*f*g^2 - 1935360*a^4*b^4*c^{11}*d*f*g^2 - 1658880*a^4*b^3*c^{12}* \\
& d*e^2*h + 725760*a^3*b^6*c^{10}*d*f*g^2 + 17418240*a^3*b^4*c^{12}*d^2*e*g - 124 \\
& 416*a^3*b^5*c^{11}*d*e^2*h - 96768*a^2*b^8*c^9*d*f*g^2 + 41472*a^2*b^7*c^{10}*d \\
& *e^2*h - 3919104*a^2*b^6*c^{11}*d^2*e*g - 7741440*a^4*b^2*c^{13}*d*e^2*f + 2903 \\
& 040*a^3*b^4*c^{12}*d*e^2*f - 387072*a^2*b^6*c^{11}*d*e^2*f - 681246720*a^9*b*c^ \\
& 9*d^2*k^2 + 265912320*a^{11}*b^3*c^5*e*k^3 + 188743680*a^{12}*b^2*c^5*g*k^3 - 1 \\
& 32956160*a^{11}*b^4*c^4*g*k^3 - 52101120*a^{13}*b*c^5*j^2*k^2 + 25722880*a^{12}*b \\
& ^3*c^4*i*k^3 + 19644416*a^{11}*b^5*c^3*i*k^3 - 1583680*a^9*b^9*c*j^2*k^2 - 91 \\
& 42272*a^{10}*b^7*c^2*i*k^3 - 74022912*a^{10}*b^5*c^4*e*k^3 - 20643840*a^{11}*b*c^ \\
& 7*h^2*k^2 + 37011456*a^{10}*b^6*c^3*g*k^3 - 2293760*a^9*b^3*c^7*i^3*k - 55705 \\
& 6*a^8*b^5*c^6*i^3*k + 147456*a^7*b^7*c^5*i^3*k - 65536*a^6*b^{12}*c*i^2*k^2 + \\
& 32768*a^6*b^9*c^4*i^3*k - 8192*a^5*b^{11}*c^3*i^3*k + 430080*a^{10}*b*c^8*i^2* \\
& j^2 - 2880*a^5*b^{13}*c*h^2*k^2 + 6635520*a^7*b^4*c^8*g^3*k - 4792320*a^9*b^8 \\
& *c^2*g*k^3 - 2211840*a^6*b^6*c^7*g^3*k + 1359360*a^{10}*b^2*c^7*h*j^3 + 11731 \\
& 20*a^9*b^4*c^6*h*j^3 + 743040*a^7*b^4*c^8*h^3*j + 622080*a^8*b^2*c^9*h^3*j \\
& + 221184*a^5*b^8*c^6*g^3*k + 107136*a^6*b^6*c^7*h^3*j - 32640*a^8*b^6*c^5*h \\
& *j^3 - 5796*a^7*b^8*c^4*h*j^3 + 540*a^5*b^8*c^6*h^3*j - 270*a^4*b^{10}*c^5*h^ \\
& 3*j + 210*a^6*b^{10}*c^3*h*j^3 - 2949120*a^{10}*b*c^8*f^2*k^2 + 17694720*a^6*b^ \\
& 3*c^{10}*e^3*k + 184320*a^8*b*c^{10}*h^2*i^2 - 3520*a^3*b^{15}*c*f^2*k^2 + 958464 \\
& 0*a^9*b^7*c^3*e*k^3 - 2293760*a^9*b^3*c^7*f*j^3 - 2293760*a^6*b^3*c^{10}*f^3* \\
& j - 1769472*a^5*b^5*c^9*e^3*k - 884736*a^6*b^3*c^{10}*g^3*i - 589824*a^7*b^3* \\
& c^9*g*i^3 - 491520*a^8*b^9*c^2*e*k^3 - 442368*a^5*b^5*c^9*g^3*i - 294912*a^ \\
& 6*b^5*c^8*g*i^3 - 199360*a^8*b^5*c^6*f*j^3 - 199360*a^5*b^5*c^9*f^3*j + 619 \\
& 20*a^7*b^7*c^5*f*j^3 + 61920*a^4*b^7*c^8*f^3*j - 49152*a^5*b^7*c^7*g*i^3 - \\
& 3682*a^6*b^9*c^4*f*j^3 - 3682*a^3*b^9*c^7*f^3*j + 70*a^5*b^{11}*c^3*f*j^3 + 7 \\
& 0*a^2*b^{11}*c^6*f^3*j + 3870720*a^8*b*c^{10}*e^2*j^2 + 430080*a^7*b*c^{11}*f^2*i \\
& ^2 - 14152320*a^4*b^4*c^{11}*d^3*j + 10644480*a^5*b^2*c^{12}*d^3*j + 5483520*a^ \\
& 9*b^2*c^8*d*j^3 + 4269888*a^3*b^6*c^{10}*d^3*j + 3538944*a^5*b^2*c^{12}*e^3*i - \\
& 1648128*a^5*b^3*c^{11}*f^3*h + 1330560*a^8*b^4*c^7*d*j^3 + 1179648*a^7*b^2*c \\
& ^{10}*e*i^3 - 898560*a^6*b^3*c^{10}*f*h^3 - 826560*a^7*b^6*c^6*d*j^3 - 607068*a \\
& ^2*b^8*c^9*d^3*j + 589824*a^6*b^4*c^9*e*i^3 - 354240*a^5*b^5*c^9*f*h^3 - 35
\end{aligned}$$

$$\begin{aligned}
& 4240a^4b^5c^{10}f^3h + 145188a^6b^8c^5d^3j^3 + 98304a^5b^6c^8e^i^3 + 43680a^3b^7c^9f^3h - 21600a^4b^7c^8f^3h^3 - 9576a^5b^{10}c^4d^3j^3 + 1350a^3b^9c^7f^3h^3 - 1050a^2b^9c^8f^3h - 504a^3b^{14}c^4d^2j^2 + 210a^4b^{12}c^3d^3j^3 + 3870720a^6b^c^{12}d^2i^2 + 1658880a^6b^c^{12}e^2h^2 - 9792a^3b^{11}c^7d^2i^2 + 16547328a^4b^2c^{13}d^3h - 12306816a^3b^4c^{12}d^3h + 37310976a^3b^3c^{13}d^3f + 3037824a^2b^6c^{11}d^3h - 2654208a^5b^3c^{11}e^g^3 + 1949184a^6b^2c^{11}d^3h + 1296000a^5b^4c^{10}d^3h - 155520a^4b^6c^9d^3h - 40500a^3b^{10}c^8d^2h^2 - 8100a^3b^8c^8d^3h + 4050a^2b^{10}c^7d^3h + 3870720a^5b^c^{13}e^2f^2 + 34836480a^4b^c^{14}d^2e^2 - 108864a^3b^9c^9d^2g^2 - 8068032a^2b^5c^{12}d^3f - 5623296a^4b^3c^{12}d^3f^3 + 1737792a^3b^5c^{11}d^3f^3 - 260190a^3b^8c^{10}d^2f^2 - 211680a^2b^7c^{10}d^3f^3 - 435456a^3b^7c^{11}d^2e^2 - 377487360a^{12}b^c^6e^k^3 + 1434977280a^8b^3c^8d^2k^2 + 173408256a^7c^{12}d^2e^k + 3276800a^{12}c^7i^j^2k - 125829120a^{13}b^c^5i^k^3 + 26214400a^{12}c^7f^j^k^2 + 1179648a^{10}c^9h^2i^k + 13440a^6b^{13}h^j^k^2 + 50331648a^{11}c^8e^i^k^2 + 110100480a^{10}c^9d^3f^k^2 + 57802752a^8c^{11}d^2i^k + 9830400a^{11}c^8e^j^2k - 3276800a^9c^{10}f^2i^k + 4480a^5b^{14}f^j^k^2 + 15728640a^{11}c^8f^h^k^2 - 409600a^9c^{10}f^i^2j - 1152b^{16}c^3d^2i^k - 1220516352a^7b^5c^7d^2k^2 + 3538944a^9c^{10}e^h^2k + 384000a^8c^{11}f^2h^j + 13440a^4b^{15}d^j^k^2 + 384a^3b^{16}f^h^k^2 + 20321280a^7c^{12}d^2h^j - 245760a^8c^{11}f^h^i^2 + 3456b^{15}c^4d^2g^k - 270b^{14}c^5d^2h^j - 9830400a^8c^{11}e^f^2k + 4838400a^9c^{10}d^3h^j^2 + 2903040a^8c^{11}d^3h^2j - 1966080a^{10}b^c^8i^3k + 1433600a^9b^9c^i^k^3 + 1152a^2b^{17}d^3h^k^2 - 3686400a^7c^{12}e^2f^j - 53084160a^7b^c^{11}e^3k - 6912b^{14}c^5d^2e^k - 3456b^{12}c^7d^2g^i + 630b^{13}c^6d^2f^j + 2688000a^7c^{12}d^3f^2j + 245760a^8b^{10}c^g^k^3 - 2211840a^6c^{13}e^2f^h - 1720320a^7c^{12}d^3f^i^2 - 9450b^{11}c^8d^2f^h + 6912b^{11}c^8d^2e^i + 1612800a^6c^{13}d^3f^2h - 1344000a^{10}b^c^8f^j^3 - 1344000a^7b^c^{11}f^3j - 393216a^8b^c^{10}g^i^3 - 23616a^3b^{17}c^d^2k^2 - 20736b^{10}c^9d^2e^g - 75188736a^4b^c^{14}d^3f - 883200a^6b^c^{12}f^3h - 317952a^7b^c^{11}f^3h^3 + 43416a^3b^{10}c^8d^3j - 15482880a^5c^{14}d^2e^2f - 10616832a^5b^c^{13}e^3g - 345060a^3b^8c^{10}d^3h - 4262400a^5b^c^{13}d^3f^3 + 852768a^3b^7c^{11}d^3f + 7350a^3b^9c^9d^3f^3 + 584578368a^6b^7c^6d^2k^2 + 93905920a^{12}b^3c^4j^2k^2 - 177997248a^5b^9c^5d^2k^2 - 50967040a^{11}b^5c^3j^2k^2 + 104693760a^9b^2c^8e^2k^2 + 12849984a^{10}b^7c^2j^2k^2 + 20021248a^{11}b^2c^6i^2k^2 - 85524480a^8b^4c^7e^2k^2 + 33223680a^{10}b^3c^6h^2k^2 + 4227072a^{10}b^4c^5i^2k^2 - 3973120a^9b^6c^4i^2k^2 + 344064a^7b^{10}c^2i^2k^2 - 81920a^8b^8c^3i^2k^2 - 11386368a^9b^5c^5h^2k^2 + 26173440a^9b^4c^6g^2k^2 - 21381120a^8b^6c^5g^2k^2 + 18874368a^{10}b^2c^7g^2k^2 + 501760a^9b^3c^7i^2j^2 + 452160a^8b^7c^4h^2k^2 + 385920a^7b^9c^3h^2k^2 + 170240a^8b^5c^6i^2j^2 - 48960a^6b^{11}c^2h^2k^2 + 9216a^7b^7c^5i^2j^2 - 1984a^6b^9c^4i^2j^2 + 64a^5b^{11}c^3i^2j^2 + 5898240a^7b^8c^4g^2k^2 + 1419840a^8b^4c^7h^2j^2 + 1387008a^9b^2c^8h^2j^2 - 737280a^6b^{10}c^3g^2k^2 + 84960a^7b^6c^6h^2j^2 +
\end{aligned}$$

$$\begin{aligned}
& 36864a^5b^{12}c^2g^2k^2 - 8010a^6b^8c^5h^2j^2 - 180a^5b^{10}c^4h^2j^2 + 9a^4b^{12}c^3h^2j^2 + 14115840a^9b^3c^7f^2k^2 - 9231552a^7b^7c^5f^2k^2 + 23592960a^7b^6c^6e^2k^2 + 4984320a^8b^5c^6f^2k^2 + 3759040a^6b^9c^4f^2k^2 + 36190080a^4b^{11}c^4d^2k^2 + 967680a^8b^3c^8g^2j^2 - 727360a^5b^{11}c^3f^2k^2 + 276480a^7b^3c^9h^2i^2 + 161280a^7b^5c^7g^2j^2 + 140544a^6b^5c^8h^2i^2 + 72960a^4b^{13}c^2f^2k^2 + 25344a^5b^7c^7h^2i^2 - 20160a^6b^7c^6g^2j^2 + 576a^5b^9c^5g^2j^2 + 576a^4b^9c^6h^2i^2 + 3808000a^8b^2c^9f^2j^2 - 2949120a^6b^8c^5e^2k^2 + 1643712a^7b^4c^8f^2j^2 + 884736a^7b^2c^{10}g^2i^2 + 884736a^6b^4c^9g^2i^2 + 221184a^5b^6c^8g^2i^2 + 147456a^5b^{10}c^4e^2k^2 - 125440a^6b^6c^7f^2j^2 - 13790a^5b^8c^6f^2j^2 + 1785a^4b^{10}c^5f^2j^2 - 70a^3b^{12}c^4f^2j^2 - 4953600a^3b^{13}c^3d^2k^2 + 18427392a^7b^2c^{10}d^2j^2 + 645120a^7b^3c^9e^2j^2 + 501760a^6b^3c^{10}f^2i^2 + 442944a^2b^{15}c^2d^2k^2 + 414720a^6b^3c^{10}g^2h^2 + 207360a^5b^5c^9g^2h^2 + 170240a^5b^5c^9f^2i^2 - 80640a^6b^5c^8e^2j^2 + 9216a^4b^7c^8f^2i^2 + 5184a^4b^7c^8g^2h^2 + 2304a^5b^7c^7e^2j^2 - 1984a^3b^9c^7f^2i^2 + 64a^2b^{11}c^6f^2i^2 - 4148928a^6b^4c^9d^2j^2 + 3538944a^6b^2c^{11}e^2i^2 + 1684224a^6b^2c^{11}f^2h^2 + 1264320a^5b^4c^{10}f^2h^2 - 1183392a^5b^6c^8d^2j^2 + 884736a^5b^4c^{10}e^2i^2 + 645750a^4b^8c^7d^2j^2 + 126720a^4b^6c^9f^2h^2 - 115920a^3b^{10}c^6d^2j^2 - 13950a^3b^8c^8f^2h^2 + 10836a^2b^{12}c^5d^2j^2 + 225a^2b^{10}c^7f^2h^2 + 1935360a^5b^3c^{11}d^2i^2 + 967680a^5b^3c^{11}f^2g^2 + 829440a^5b^3c^{11}e^2h^2 - 532224a^4b^5c^{10}d^2i^2 + 161280a^4b^5c^{10}f^2g^2 - 96768a^3b^7c^9d^2i^2 + 62784a^2b^9c^8d^2i^2 + 20736a^4b^5c^{10}e^2h^2 - 20160a^3b^7c^9f^2g^2 + 576a^2b^9c^8f^2g^2 + 11487744a^5b^2c^{12}d^2h^2 + 7962624a^5b^2c^{12}e^2g^2 + 35525376a^4b^2c^{13}d^2f^2 - 1412640a^3b^6c^{10}d^2h^2 + 461376a^4b^4c^{11}d^2h^2 + 375030a^2b^8c^9d^2h^2 + 8709120a^4b^3c^{12}d^2g^2 - 4354560a^3b^5c^{11}d^2g^2 + 979776a^2b^7c^{10}d^2g^2 + 645120a^4b^3c^{12}e^2f^2 - 80640a^3b^5c^{11}e^2f^2 + 2304a^2b^7c^{10}e^2f^2 - 15269184a^3b^4c^{12}d^2f^2 + 2870784a^2b^6c^{11}d^2f^2 - 17418240a^3b^3c^{13}d^2e^2 + 3919104a^2b^5c^{12}d^2e^2 + 384a^2b^{18}d^2f^2k^2 - 199229440a^{14}b^2c^3k^4 + 8388608a^{12}c^7i^2k^2 + 75497472a^{10}c^9e^2k^2 + 78400a^8b^{11}j^2k^2 + 4096a^5b^{14}i^2k^2 + 345600a^{10}c^9h^2j^2 + 576a^4b^{15}h^2k^2 + 57937920a^{13}b^4c^2k^4 + 320000a^9c^{10}f^2j^2 + 64a^2b^{17}f^2k^2 + 16934400a^8c^{11}d^2j^2 + 9b^{16}c^3d^2j^2 + 3538944a^7c^{12}e^2i^2 + 115200a^7c^{12}f^2h^2 + 576b^{13}c^6d^2i^2 + 2025b^{12}c^7d^2h^2 + 6096384a^6c^{13}d^2h^2 + 492800a^{11}b^2c^6j^4 + 351456a^{10}b^4c^5j^4 - 43120a^9b^6c^4j^4 + 5184b^{11}c^8d^2g^2 + 1225a^8b^8c^3j^4 + 131072a^8b^2c^9i^4 + 98304a^7b^4c^8i^4 + 32768a^6b^6c^7i^4 + 11025b^{10}c^9d^2f^2 + 4096a^5b^8c^6i^4 + 5644800a^5c^{14}d^2f^2 + 142560a^6b^4c^9h^4 + 103680a^7b^2c^{10}h^4 + 32400a^5b^6c^8h^4 + 20736b^9c^{10}d^2e^2 + 2025a^4b^8c^7h^4 + 331776a^5b^4c^{10}g^4 + 492800a^5b^2c^{12}f^4 + 351456a^4b^4c^{11}f^4 - 43120a^3b^6c^{11}
\end{aligned}$$

$$\begin{aligned}
& 0*f^4 + 1225*a^2*b^8*c^9*f^4 - 27433728*a^3*b^2*c^14*d^4 + 6446304*a^2*b^4* \\
& c^13*d^4 + a^2*b^14*c^3*f^2*j^2 - 81920*a^8*b^11*i*k^3 + 384000*a^11*c^8*h* \\
& j^3 + 138240*a^9*c^10*h^3*j + 47416320*a^6*c^13*d^3*j - 1134*b^12*c^7*d^3*j \\
& + 7077888*a^6*c^13*e^3*i + 2688000*a^10*c^9*d*j^3 + 786432*a^8*c^11*e*i^3 \\
& + 28449792*a^5*c^14*d^3*h - 7782400*a^12*b^6*c*k^4 + 17010*b^10*c^9*d^3*h + \\
& 580608*a^7*c^12*d*h^3 - 39690*b^9*c^10*d^3*f - 734832*a*b^6*c^12*d^4 + 268 \\
& 435456*a^15*c^4*k^4 + 576*b^19*d^2*k^2 + 409600*a^11*b^8*k^4 + 160000*a^12* \\
& c^7*j^4 + 65536*a^9*c^10*i^4 + 20736*a^8*c^11*h^4 + 49787136*a^4*c^15*d^4 + \\
& 160000*a^6*c^13*f^4 + 5308416*a^5*c^14*e^4 + 35721*b^8*c^11*d^4, z, n)*((1 \\
& 1010048*a^9*c^10*d*k - 327680*a^8*c^11*f*i - 983040*a^7*c^12*e*f + 1572864* \\
& a^10*c^9*h*k + 2621440*a^11*c^8*j*k + 3244032*a^6*b*c^12*d*e + 1081344*a^7* \\
& b*c^11*d*i + 884736*a^7*b*c^11*e*h + 491520*a^7*b*c^11*f*g + 1277952*a^8*b* \\
& c^10*e*j + 294912*a^8*b*c^10*h*i + 360448*a^9*b*c^9*f*k + 425984*a^9*b*c^9* \\
& i*j + 4608*a^2*b^9*c^8*d*e - 87552*a^3*b^7*c^9*d*e + 681984*a^4*b^5*c^10*d* \\
& e - 2433024*a^5*b^3*c^11*d*e - 2304*a^2*b^10*c^7*d*g + 43776*a^3*b^8*c^8*d* \\
& g + 1536*a^3*b^8*c^8*e*f - 340992*a^4*b^6*c^9*d*g - 39936*a^4*b^6*c^9*e*f + \\
& 1216512*a^5*b^4*c^10*d*g + 184320*a^5*b^4*c^10*e*f - 1622016*a^6*b^2*c^11* \\
& d*g + 49152*a^6*b^2*c^11*e*f + 768*a^2*b^11*c^6*d*i - 13056*a^3*b^9*c^7*d*i \\
& - 768*a^3*b^9*c^7*f*g + 84480*a^4*b^7*c^8*d*i + 4608*a^4*b^7*c^8*e*h + 199 \\
& 68*a^4*b^7*c^8*f*g - 178176*a^5*b^5*c^9*d*i + 18432*a^5*b^5*c^9*e*h - 92160 \\
& *a^5*b^5*c^9*f*g - 270336*a^6*b^3*c^10*d*i - 368640*a^6*b^3*c^10*e*h - 2457 \\
& 6*a^6*b^3*c^10*f*g - 768*a^2*b^14*c^3*d*k + 256*a^3*b^10*c^6*f*i + 22272*a^ \\
& 3*b^12*c^4*d*k - 6144*a^4*b^8*c^7*f*i - 2304*a^4*b^8*c^7*g*h - 282624*a^4*b^ \\
& ^10*c^5*d*k + 17408*a^5*b^6*c^8*f*i - 9216*a^5*b^6*c^8*g*h - 1536*a^5*b^7*c^ \\
& ^7*e*j + 2003712*a^5*b^8*c^6*d*k + 69632*a^6*b^4*c^9*f*i + 184320*a^6*b^4*c^ \\
& ^9*g*h + 92160*a^6*b^5*c^8*e*j - 8426496*a^6*b^6*c^7*d*k - 147456*a^7*b^2*c^ \\
& ^10*f*i - 442368*a^7*b^2*c^10*g*h - 663552*a^7*b^3*c^9*e*j + 20484096*a^7*b^ \\
& ^4*c^8*d*k - 25411584*a^8*b^2*c^9*d*k - 256*a^3*b^13*c^3*f*k + 768*a^4*b^9* \\
& c^6*h*i + 9216*a^4*b^11*c^4*f*k + 4608*a^5*b^7*c^7*h*i + 768*a^5*b^8*c^6*g* \\
& j - 113920*a^5*b^9*c^5*f*k - 55296*a^6*b^5*c^8*h*i - 46080*a^6*b^6*c^7*g*j \\
& + 658944*a^6*b^7*c^6*f*k + 24576*a^7*b^3*c^9*h*i + 331776*a^7*b^4*c^8*g*j - \\
& 1812480*a^7*b^5*c^7*f*k - 638976*a^8*b^2*c^9*g*j + 1810432*a^8*b^3*c^8*f*k \\
& - 768*a^4*b^12*c^3*h*k - 256*a^5*b^9*c^5*i*j + 8448*a^5*b^10*c^4*h*k + 148 \\
& 48*a^6*b^7*c^6*i*j + 3840*a^6*b^8*c^5*h*k - 79872*a^7*b^5*c^7*i*j - 427008* \\
& a^7*b^6*c^6*h*k - 8192*a^8*b^3*c^8*i*j + 2150400*a^8*b^4*c^7*h*k - 3784704* \\
& a^9*b^2*c^8*h*k - 8960*a^6*b^10*c^3*j*k + 166656*a^7*b^8*c^4*j*k - 1217536* \\
& a^8*b^6*c^5*j*k + 4198400*a^9*b^4*c^6*j*k - 6340608*a^10*b^2*c^7*j*k)/(512* \\
& (4096*a^10*c^10 + a^4*b^12*c^4 - 24*a^5*b^10*c^5 + 240*a^6*b^8*c^6 - 1280*a^ \\
& ^7*b^6*c^7 + 3840*a^8*b^4*c^8 - 6144*a^9*b^2*c^9)) + \text{root}(56371445760*a^11* \\
& b^8*c^12*z^4 - 503316480*a^8*b^14*c^9*z^4 + 47185920*a^7*b^16*c^8*z^4 - 262 \\
& 1440*a^6*b^18*c^7*z^4 + 65536*a^5*b^20*c^6*z^4 - 171798691840*a^14*b^2*c^15 \\
& *z^4 + 193273528320*a^13*b^4*c^14*z^4 - 128849018880*a^12*b^6*c^13*z^4 - 16 \\
& 911433728*a^10*b^10*c^11*z^4 + 3523215360*a^9*b^12*c^10*z^4 + 68719476736*a^ \\
& ^15*c^16*z^4 - 47185920*a^7*b^16*c^5*k*z^3 + 2621440*a^6*b^18*c^4*k*z^3 - 6 \\
& 5536*a^5*b^20*c^3*k*z^3 + 171798691840*a^14*b^2*c^12*k*z^3 - 193273528320*a
\end{aligned}$$

$$\begin{aligned}
& ^{13}b^4c^{11}kz^3 + 128849018880a^{12}b^6c^{10}kz^3 + 16911433728a^{10}b^{10}c^8kz^3 - 3523215360a^9b^{12}c^7kz^3 - 56371445760a^{11}b^8c^9kz^3 \\
& + 503316480a^8b^{14}c^6kz^3 - 68719476736a^{15}c^{13}kz^3 + 1536a^b^{18}c^6d^fz^2 - 2571632640a^9b^5c^{11}d^jz^2 + 2548039680a^9b^3c^{13}d^h \\
& z^2 + 2453667840a^9b^7c^9e^kz^2 + 2181038080a^{12}b^3c^{10}i^kz^2 - 6492782592a^{10}b^5c^{10}e^kz^2 + 1509949440a^9b^3c^{13}e^gz^2 - 140 \\
& 1421824a^8b^5c^{12}d^h \\
& z^2 - 1226833920a^9b^8c^8g^kz^2 - 1321205760a^9b^2c^{14}d^fz^2 - 2793406464a^{11}b^c^{13}d^jz^2 + 9563013120a^{11}b^3c^{11}e^kz^2 + 890634240a^8b^7c^{10}d^jz^2 - 754974720a^8b^5c^{12}e^gz^2 - 570425344a^{11}b^5c^9i^kz^2 + 732168192a^7b^6c^{12}d^fz^2 - 58 \\
& 1959680a^{10}b^4c^{11}f^jz^2 - 603979776a^{10}b^2c^{13}e^iz^2 + 534773760a^{11}b^3c^{11}h^jz^2 - 558366720a^8b^9c^8e^kz^2 - 4781506560a^{11}b^4c^{10}g^kz^2 - 2013265920a^{13}b^c^{11}i^kz^2 - 456130560a^9b^4c^{12}f^h \\
& z^2 + 384040960a^9b^6c^{10}f^jz^2 - 264241152a^{10}b^7c^8i^kz^2 + 390463488a^7b^7c^{11}d^h \\
& z^2 + 279183360a^8b^{10}c^7g^kz^2 + 301989888a^{10}b^3c^{12}g^iz^2 + 222822400a^9b^9c^7i^kz^2 - 366280704a^6b^8c^{11}d^fz^2 - 330301440a^8b^4c^{13}d^fz^2 + 254017536a^8b^6c^{11}f^h \\
& z^2 - 1887436800a^{10}b^c^{14}d^h \\
& z^2 + 188743680a^{10}b^2c^{13}f^h \\
& z^2 - 185303040a^7b^9c^9d^jz^2 - 117964800a^{10}b^5c^{10}h^jz^2 - 6039797760a^{12}b^c^{12}e^kz^2 - 67502080a^8b^{11}c^6i^kz^2 + 121634816a^{11}b^2c^{12}f^jz^2 + 188743680a^7b^7c^{11}e^gz^2 - 115671040a^8b^8c^9f^jz^2 + 125829120a^8b^6c^{11}e^iz^2 + 10813440a^7b^{13}c^5i^kz^2 + 76677120a^7b^{11}c^7e^kz^2 - 38338560a^7b^{12}c^6g^kz^2 - 37355520a^9b^7c^9h^jz^2 - 917504a^6b^{15}c^4i^kz^2 + 32768a^5b^{17}c^3i^kz^2 - 62914560a^8b^7c^{10}g^iz^2 + 23101440a^8b^9c^8h^jz^2 - 4349952a^7b^{11}c^7h^jz^2 + 2949120a^6b^{14}c^5g^kz^2 + 337920a^6b^{13}c^6h^jz^2 - 98304a^5b^{16}c^4g^kz^2 - 7680a^5b^{15}c^5h^jz^2 - 61931520a^7b^8c^{10}f^h \\
& z^2 + 23592960a^7b^9c^9g^iz^2 + 17940480a^7b^{10}c^8f^jz^2 - 47185920a^7b^8c^{10}e^iz^2 - 5898240a^6b^{13}c^6e^kz^2 - 3538944a^6b^{11}c^8g^iz^2 - 1347584a^6b^{12}c^7f^jz^2 + 196608a^5b^{15}c^5e^kz^2 + 196608a^5b^{13}c^7g^iz^2 + 35840a^5b^{14}c^6f^jz^2 + 96583680a^5b^{10}c^{10}d^fz^2 + 23371776a^6b^{11}c^8d^jz^2 - 51609600a^6b^9c^{10}d^h \\
& z^2 + 7077888a^6b^{10}c^9e^iz^2 + 6144000a^6b^{10}c^9f^h \\
& z^2 - 1677312a^5b^{13}c^7d^jz^2 - 393216a^5b^{12}c^8e^iz^2 + 61440a^5b^{12}c^8f^h \\
& z^2 + 53760a^4b^{15}c^6d^jz^2 - 46080a^4b^{14}c^7f^h \\
& z^2 + 1536a^3b^{16}c^6f^h \\
& z^2 - 23592960a^6b^9c^{10}e^gz^2 + 1179648a^5b^{11}c^9e^gz^2 + 829440a^4b^{13}c^8d^h \\
& z^2 + 368640a^5b^{11}c^9d^h \\
& z^2 - 105984a^3b^{15}c^7d^h \\
& z^2 + 4608a^2b^{17}c^6d^h \\
& z^2 - 15175680a^4b^{12}c^9d^fz^2 + 1428480a^3b^{14}c^8d^fz^2 - 73728a^2b^{16}c^7d^fz^2 + 4108320768a^{10}b^3c^{12}d^jz^2 - 1207959552a^{10}b^c^{14}e^gz^2 - 578813952a^{12}b^c^{12}h^jz^2 + 3246391296a^{10}b^6c^9g^kz^2 - 402653184a^{11}b^c^{13}g^iz^2 + 3019898880a^{12}b^2c^{11}g^kz^2 - 440401920a^{10}b^c^{14}f^2z^2 - 188743680a^{11}b^c^{13}h^2z^2 + 1761607680a^{10}c^{15}d^fz^2 - 655360a^6b^{18}c^k^2z^2 - 94464a^b^{17}c^7d^2z^2 + 6936330240a^8b^3c^{14}d^2z^2 + 2464874496a^6b^7c^{12}d^2z^2 - 3963617280a^9b^c^{15}d^2z^2 +
\end{aligned}$$

$$\begin{aligned}
& 58007224320a^{13}b^4c^8k^2z^2 + 14968422400a^{11}b^8c^6k^2z^2 + 8053 \\
& 06368a^{11}c^{14}eiz^2 - 35966156800a^{12}b^6c^7k^2z^2 + 419430400a^{12} \\
& c^{13}fjz^2 - 1509949440a^9b^2c^{14}e^2z^2 + 251658240a^{11}c^{14}fhz \\
& ^2 - 56874762240a^{14}b^2c^9k^2z^2 - 5400428544a^7b^5c^{13}d^2z^2 + 8 \\
& 90470400a^9b^{12}c^4k^2z^2 + 754974720a^8b^4c^{13}e^2z^2 - 730054656a \\
& ^5b^9c^{11}d^2z^2 + 477102080a^{12}b^3c^{10}j^2z^2 + 477102080a^9b^3c \\
& ^{13}f^2z^2 - 377487360a^9b^4c^{12}g^2z^2 + 301989888a^{10}b^2c^{13}g^2 \\
& z^2 - 174325760a^{11}b^5c^9j^2z^2 - 126156800a^8b^{14}c^3k^2z^2 + 18 \\
& 8743680a^8b^6c^{11}g^2z^2 + 141557760a^{10}b^3c^{12}h^2z^2 - 174325760a \\
& ^8b^5c^{12}f^2z^2 - 188743680a^7b^6c^{12}e^2z^2 - 4350935040a^{10}b^1 \\
& 0c^5k^2z^2 + 146165760a^4b^{11}c^{10}d^2z^2 - 50331648a^{10}b^4c^{11}i^ \\
& 2z^2 + 11796480a^7b^{16}c^2k^2z^2 - 33554432a^{11}b^2c^{12}i^2z^2 + 11 \\
& 206656a^{10}b^7c^8j^2z^2 + 8929280a^9b^9c^7j^2z^2 + 20971520a^9b^ \\
& 6c^{10}i^2z^2 - 2600960a^8b^{11}c^6j^2z^2 + 291840a^7b^{13}c^5j^2z^2 \\
& - 14080a^6b^{15}c^4j^2z^2 + 256a^5b^{17}c^3j^2z^2 - 47185920a^7b^8 \\
& c^{10}g^2z^2 - 26542080a^8b^7c^{10}h^2z^2 - 2752512a^7b^{10}c^8i^2z^ \\
& 2 + 2621440a^8b^8c^9i^2z^2 + 524288a^6b^{12}c^7i^2z^2 - 32768a^5b \\
& ^{14}c^6i^2z^2 + 9584640a^7b^9c^9h^2z^2 - 2359296a^9b^5c^{11}h^2z^ \\
& 2 - 1290240a^6b^{11}c^8h^2z^2 + 46080a^5b^{13}c^7h^2z^2 + 2304a^4b^ \\
& 15c^6h^2z^2 + 5898240a^6b^{10}c^9g^2z^2 - 294912a^5b^{12}c^8g^2z^2 \\
& + 11206656a^7b^7c^{11}f^2z^2 + 8929280a^6b^9c^{10}f^2z^2 + 23592960a \\
& ^6b^8c^{11}e^2z^2 - 2600960a^5b^{11}c^9f^2z^2 + 291840a^4b^{13}c^8f \\
& ^2z^2 - 14080a^3b^{15}c^7f^2z^2 + 256a^2b^{17}c^6f^2z^2 - 19860480a \\
& ^3b^{13}c^9d^2z^2 - 1179648a^5b^{10}c^{10}e^2z^2 + 1771776a^2b^{15}c^8d \\
& ^2z^2 - 440401920a^{13}b^6c^{11}j^2z^2 + 1207959552a^{10}c^{15}e^2z^2 + 13 \\
& 4217728a^{12}c^{13}i^2z^2 + 25769803776a^{15}c^{10}k^2z^2 + 16384a^5b^{20}k \\
& ^2z^2 + 2304b^{19}c^6d^2z^2 + 165150720a^9b^6c^{12}d^*g^*j^*z + 23592960a \\
& ^{10}b^6c^{11}g^*h^*j^*z + 169869312a^7b^6c^{14}d^*e^*f^*z + 99090432a^8b^6c^{13}d^*g \\
& ^*h^*z - 3145728a^9b^6c^{12}f^*h^*i^*z + 56623104a^8b^6c^{13}d^*f^*i^*z - 1536a^ab^ \\
& 18c^3d^*f^*k^*z - 9437184a^8b^6c^{13}e^*f^*h^*z + 1536a^ab^{15}c^6d^*f^*i^*z - 460 \\
& 8a^ab^{14}c^7d^*f^*g^*z + 9216a^ab^{13}c^8d^*e^*f^*z + 2173501440a^9b^5c^8d^*j \\
& ^*k^*z - 1987706880a^9b^3c^{10}d^*h^*k^*z + 1121255424a^8b^5c^9d^*h^*k^*z + 8 \\
& 61143040a^8b^4c^{10}d^*f^*k^*z - 859963392a^7b^6c^9d^*f^*k^*z - 780779520a \\
& ^8b^7c^7d^*j^*k^*z - 754974720a^9b^3c^{10}e^*g^*k^*z + 2222456832a^{11}b^6c^{11} \\
& 0d^*j^*k^*z - 454164480a^{11}b^3c^8h^*j^*k^*z + 377487360a^8b^5c^9e^*g^*k^*z \\
& + 290979840a^{10}b^4c^8f^*j^*k^*z + 381026304a^6b^8c^8d^*f^*k^*z + 41287680 \\
& 0a^8b^2c^{12}d^*e^*j^*z + 301989888a^{10}b^2c^{10}e^*i^*k^*z - 320421888a^7b^ \\
& 7c^8d^*h^*k^*z + 185794560a^{10}b^5c^7h^*j^*k^*z - 192020480a^9b^6c^7f^*j^* \\
& k^*z + 190709760a^9b^4c^9f^*h^*k^*z - 150994944a^{10}b^3c^9g^*i^*k^*z + 1689 \\
& 90720a^7b^9c^6d^*j^*k^*z + 235929600a^9b^2c^{11}d^*f^*k^*z - 206438400a^8b \\
& ^3c^{11}d^*g^*j^*z - 206438400a^7b^4c^{11}d^*e^*j^*z - 101646336a^8b^6c^8f \\
& ^*h^*k^*z - 29245440a^9b^7c^6h^*j^*k^*z - 60817408a^{11}b^2c^9f^*j^*k^*z + 578 \\
& 35520a^8b^8c^6f^*j^*k^*z + 219414528a^7b^2c^{13}d^*e^*h^*z - 70778880a^{10}b \\
& ^2c^{10}f^*h^*k^*z + 677376a^7b^{11}c^4h^*j^*k^*z - 645120a^8b^9c^5h^*j^*k^*z \\
& - 53760a^6b^{13}c^3h^*j^*k^*z + 31457280a^8b^7c^7g^*i^*k^*z - 62914560a^8
\end{aligned}$$

$$\begin{aligned}
& *b^6*c^8*e*i*k*z - 94371840*a^7*b^7*c^8*e*g*k*z - 221773824*a^6*b^3*c^{13}*d \\
& e*f*z + 82575360*a^9*b^2*c^{11}*d*i*j*z + 11796480*a^{10}*b^2*c^{10}*h*i*j*z - 11 \\
& 796480*a^7*b^9*c^6*g*i*k*z - 8970240*a^7*b^{10}*c^5*f*j*k*z + 103219200*a^7*b \\
& ^5*c^{10}*d*g*j*z - 2457600*a^8*b^6*c^8*h*i*j*z + 1769472*a^6*b^{11}*c^5*g*i*k* \\
& z + 921600*a^7*b^8*c^7*h*i*j*z + 673792*a^6*b^{12}*c^4*f*j*k*z - 138240*a^6*b \\
& ^{10}*c^6*h*i*j*z - 98304*a^5*b^{13}*c^4*g*i*k*z - 17920*a^5*b^{14}*c^3*f*j*k*z + \\
& 7680*a^5*b^{12}*c^5*h*i*j*z - 97136640*a^5*b^{10}*c^7*d*f*k*z - 29491200*a^9*b \\
& ^3*c^{10}*g*h*j*z + 58982400*a^9*b^2*c^{11}*e*h*j*z + 23592960*a^7*b^8*c^7*e*i* \\
& k*z - 22169088*a^6*b^{11}*c^5*d*j*k*z + 21381120*a^7*b^8*c^7*f*h*k*z + 147456 \\
& 00*a^8*b^5*c^9*g*h*j*z + 42854400*a^6*b^9*c^7*d*h*k*z - 109707264*a^7*b^3*c \\
& ^{12}*d*g*h*z - 3686400*a^7*b^7*c^8*g*h*j*z - 3538944*a^6*b^{10}*c^6*e*i*k*z + \\
& 1645056*a^5*b^{13}*c^4*d*j*k*z - 890880*a^6*b^{10}*c^6*f*h*k*z + 460800*a^6*b^9 \\
& *c^7*g*h*j*z - 330240*a^5*b^{12}*c^5*f*h*k*z + 196608*a^5*b^{12}*c^5*e*i*k*z - \\
& 53760*a^4*b^{15}*c^3*d*j*k*z + 46080*a^4*b^{14}*c^4*f*h*k*z - 23040*a^5*b^{11}*c^ \\
& 6*g*h*j*z - 1536*a^3*b^{16}*c^3*f*h*k*z - 29491200*a^8*b^4*c^{10}*e*h*j*z - 172 \\
& 03200*a^7*b^6*c^9*d*i*j*z + 11796480*a^6*b^9*c^7*e*g*k*z + 110886912*a^6*b^ \\
& 4*c^{12}*d*f*g*z + 7372800*a^7*b^6*c^9*e*h*j*z + 40108032*a^8*b^2*c^{12}*d*h*i* \\
& z + 6451200*a^6*b^8*c^8*d*i*j*z + 2359296*a^8*b^3*c^{11}*f*h*i*z - 967680*a^5 \\
& *b^{10}*c^7*d*i*j*z - 921600*a^6*b^8*c^8*e*h*j*z - 829440*a^4*b^{13}*c^5*d*h*k* \\
& z - 589824*a^5*b^{11}*c^6*e*g*k*z - 491520*a^6*b^7*c^9*f*h*i*z + 184320*a^5*b \\
& ^9*c^8*f*h*i*z + 105984*a^3*b^{15}*c^4*d*h*k*z + 69120*a^5*b^{11}*c^6*d*h*k*z + \\
& 53760*a^4*b^{12}*c^6*d*i*j*z + 46080*a^5*b^{10}*c^7*e*h*j*z - 27648*a^4*b^{11}*c \\
& ^7*f*h*i*z - 4608*a^2*b^{17}*c^3*d*h*k*z + 1536*a^3*b^{13}*c^6*f*h*i*z - 258048 \\
& 00*a^6*b^7*c^9*d*g*j*z - 88473600*a^6*b^4*c^{12}*d*e*h*z + 51609600*a^6*b^6*c \\
& ^{10}*d*e*j*z - 84934656*a^7*b^2*c^{13}*d*f*g*z + 117964800*a^5*b^5*c^{12}*d*e*f* \\
& z + 15160320*a^4*b^{12}*c^6*d*f*k*z - 45613056*a^7*b^3*c^{12}*d*f*i*z + 4423680 \\
& 0*a^6*b^5*c^{11}*d*g*h*z - 10321920*a^6*b^6*c^{10}*d*h*i*z + 7077888*a^7*b^4*c^ \\
& 11*d*h*i*z - 5898240*a^7*b^4*c^{11}*f*g*h*z + 4718592*a^8*b^2*c^{12}*f*g*h*z + \\
& 3225600*a^5*b^9*c^8*d*g*j*z + 2949120*a^6*b^6*c^{10}*f*g*h*z + 2396160*a^5*b^ \\
& 8*c^9*d*h*i*z - 1428480*a^3*b^{14}*c^5*d*f*k*z - 737280*a^5*b^8*c^9*f*g*h*z - \\
& 161280*a^4*b^{11}*c^7*d*g*j*z + 92160*a^4*b^{10}*c^8*f*g*h*z + 73728*a^2*b^{16}* \\
& c^4*d*f*k*z - 50688*a^3*b^{12}*c^7*d*h*i*z - 27648*a^4*b^{10}*c^8*d*h*i*z - 460 \\
& 8*a^3*b^{12}*c^7*f*g*h*z + 4608*a^2*b^{14}*c^6*d*h*i*z - 58982400*a^5*b^6*c^{11}* \\
& d*f*g*z + 11796480*a^7*b^3*c^{12}*e*f*h*z + 8847360*a^5*b^7*c^{10}*d*f*i*z - 66 \\
& 35520*a^5*b^7*c^{10}*d*g*h*z - 6451200*a^5*b^8*c^9*d*e*j*z - 5898240*a^6*b^5* \\
& c^{11}*e*f*h*z - 3809280*a^4*b^9*c^9*d*f*i*z + 2359296*a^6*b^5*c^{11}*d*f*i*z + \\
& 1474560*a^5*b^7*c^{10}*e*f*h*z + 681984*a^3*b^{11}*c^8*d*f*i*z + 322560*a^4*b^ \\
& 10*c^8*d*e*j*z - 276480*a^4*b^9*c^9*d*g*h*z - 184320*a^4*b^9*c^9*e*f*h*z + \\
& 179712*a^3*b^{11}*c^8*d*g*h*z - 55296*a^2*b^{13}*c^7*d*f*i*z - 13824*a^2*b^{13}*c \\
& ^7*d*g*h*z + 9216*a^3*b^{11}*c^8*e*f*h*z + 16220160*a^4*b^8*c^{10}*d*f*g*z + 13 \\
& 271040*a^5*b^6*c^{11}*d*e*h*z - 2396160*a^3*b^{10}*c^9*d*f*g*z + 552960*a^4*b^8 \\
& *c^{10}*d*e*h*z - 359424*a^3*b^{10}*c^9*d*e*h*z + 175104*a^2*b^{12}*c^8*d*f*g*z + \\
& 27648*a^2*b^{12}*c^8*d*e*h*z - 32440320*a^4*b^7*c^{11}*d*e*f*z + 4792320*a^3*b \\
& ^9*c^{10}*d*e*f*z - 350208*a^2*b^{11}*c^9*d*e*f*z + 1439170560*a^{10}*b*c^{11}*d*h* \\
& k*z - 3361603584*a^{10}*b^3*c^9*d*j*k*z + 603979776*a^{10}*b*c^{11}*e*g*k*z + 407
\end{aligned}$$

$371776a^{12}b^9c^9h^2jk^2z + 201326592a^{11}b^9c^{10}g^2ik^2z + 346816512a^7b^9c^{14}d^2g^2z + 129761280a^{11}b^9c^{10}h^2k^2z + 121896960a^{10}b^9c^{11}f^2k^2z + 458752a^6b^{15}c^2ik^2z + 19660800a^{11}b^9c^{10}g^2j^2z + 49152a^5b^{16}c^2g^2k^2z + 7077888a^9b^9c^{12}g^2h^2z + 94464a^8b^{17}c^4d^2k^2z - 19660800a^8b^9c^{13}f^2g^2z - 66816a^8b^{14}c^7d^2i^2z + 214272a^8b^{13}c^8d^2g^2z - 428544a^8b^{12}c^9d^2e^2z + 2390753280a^{11}b^4c^7g^2k^2z - 2411421696a^6b^7c^9d^2k^2z - 6603079680a^8b^3c^{11}d^2k^2z + 3715891200a^9b^9c^{12}d^2k^2z - 880803840a^{10}c^{12}d^2f^2k^2z - 1623195648a^{10}b^6c^6g^2k^2z - 402653184a^{11}c^{11}e^2ik^2z - 1509949440a^{12}b^2c^8g^2k^2z - 209715200a^{12}c^{10}f^2jk^2z - 330301440a^9c^{13}d^2e^2jk^2z + 3019898880a^{12}b^9c^9e^2k^2z - 125829120a^{11}c^{11}f^2hk^2z - 110100480a^{10}c^{12}d^2ij^2z - 198180864a^8c^{14}d^2eh^2z - 15728640a^{11}c^{11}h^2ij^2z - 1226833920a^9b^7c^6e^2k^2z - 47185920a^{10}c^{12}e^2hk^2z - 66060288a^9c^{13}d^2hi^2z - 1090519040a^{12}b^3c^7i^2k^2z + 1022754816a^6b^2c^{14}d^2e^2z + 5216108544a^7b^5c^{10}d^2k^2z + 754974720a^9b^2c^{11}e^2k^2z + 721529856a^5b^9c^8d^2k^2z + 613416960a^9b^8c^5g^2k^2z - 642318336a^5b^4c^{13}d^2e^2z - 4781506560a^{11}b^3c^8e^2k^2z - 398131200a^{12}b^3c^7j^2k^2z - 511377408a^6b^3c^{13}d^2g^2z - 377487360a^8b^4c^{10}e^2k^2z + 285212672a^{11}b^5c^6i^2k^2z + 199065600a^{11}b^5c^6j^2k^2z + 279183360a^8b^9c^5e^2k^2z + 321159168a^5b^5c^{12}d^2g^2z + 188743680a^9b^4c^9g^2k^2z + 132120576a^{10}b^7c^5i^2k^2z - 150994944a^{10}b^2c^{10}g^2k^2z - 111411200a^9b^9c^4i^2k^2z - 126812160a^{10}b^3c^9h^2k^2z + 225312768a^7b^2c^{13}d^2i^2z - 139591680a^8b^{10}c^4g^2k^2z - 49766400a^{10}b^7c^5j^2k^2z - 145463040a^4b^{11}c^7d^2k^2z - 94371840a^8b^6c^8g^2k^2z + 223395840a^4b^6c^{12}d^2e^2z + 33751040a^8b^{11}c^3i^2k^2z - 78970880a^9b^3c^{10}f^2k^2z + 94371840a^7b^6c^9e^2k^2z + 25165824a^{10}b^4c^8i^2k^2z + 6220800a^9b^9c^4j^2k^2z + 39223296a^9b^5c^8h^2k^2z - 311040a^8b^{11}c^3j^2k^2z + 16777216a^{11}b^2c^9i^2k^2z - 10485760a^9b^6c^7i^2k^2z - 5406720a^7b^{13}c^2i^2k^2z + 1376256a^7b^{10}c^5i^2k^2z - 1310720a^8b^8c^6i^2k^2z - 262144a^6b^{12}c^4i^2k^2z + 16384a^5b^{14}c^3i^2k^2z + 10354688a^{11}b^2c^9ij^2z + 23592960a^7b^8c^7g^2k^2z + 38559744a^7b^7c^8f^2k^2z + 19169280a^7b^{12}c^3g^2k^2z - 2048000a^9b^6c^7ij^2z - 1520640a^7b^9c^6h^2k^2z - 1105920a^8b^7c^7h^2k^2z + 849920a^8b^8c^6ij^2z - 393216a^{10}b^4c^8ij^2z + 195840a^6b^{11}c^5h^2k^2z - 145920a^7b^{10}c^5ij^2z + 11520a^5b^{13}c^4h^2k^2z + 11008a^6b^{12}c^4ij^2z - 2304a^4b^{15}c^3h^2k^2z - 256a^5b^{14}c^3ij^2z - 25362432a^{10}b^3c^9g^2j^2z - 24739840a^8b^5c^9f^2k^2z - 38338560a^7b^{11}c^4e^2k^2z - 2949120a^6b^{10}c^6g^2k^2z - 1474560a^6b^{14}c^2g^2k^2z + 50724864a^{10}b^2c^{10}e^2j^2z + 147456a^5b^{12}c^5g^2k^2z - 15150080a^6b^9c^7f^2k^2z + 13271040a^9b^5c^8g^2j^2z - 111697920a^4b^7c^{11}d^2g^2z - 3563520a^8b^7c^7g^2j^2z + 3538944a^9b^2c^{11}h^2i^2z + 2912000a^5b^{11}c^6f^2k^2z - 737280a^7b^6c^9h^2i^2z + 506880a^7b^9c^6g^2j^2z - 291840a^4b^{13}c^5f^2k^2z + 276480a^6b^8c^8h^2i^2z - 41472a^5b^{10}c^7h^2i^2z - 34560a^6b^{11}c^5g^2j^2z + 14080a^3b^{11}c^4f^2k^2z + 2304a^4b^{12}c^6h^2i^2z + 768a^5b^{13}c^4g^2j^2z - 256a^6b^{14}c^5f^2k^2z$

$a^2b^{17}c^3f^2kz - 11796480a^6b^8c^8e^2kz - 26542080a^9b^4c^9e^j^2z + 19837440a^3b^{13}c^6d^2kz + 2949120a^6b^{13}c^3e^k^2z + 589824a^5b^{10}c^7e^2kz - 98304a^5b^{15}c^2e^k^2z - 10354688a^8b^2c^{12}f^2i^z - 43646976a^6b^4c^{12}d^2i^z - 8847360a^8b^3c^{11}g^h^2z + 7127040a^8b^6c^8e^j^2z + 4423680a^7b^5c^{10}g^h^2z + 2048000a^6b^6c^{10}f^2i^z - 1771776a^2b^{15}c^5d^2kz - 1105920a^6b^7c^9g^h^2z - 1013760a^7b^8c^7e^j^2z - 849920a^5b^8c^9f^2i^z + 393216a^7b^4c^{11}f^2i^z + 145920a^4b^{10}c^8f^2i^z + 138240a^5b^9c^8g^h^2z + 69120a^6b^{10}c^6e^j^2z - 11008a^3b^{12}c^7f^2i^z - 6912a^4b^{11}c^7g^h^2z - 1536a^5b^{12}c^5e^j^2z + 256a^2b^{14}c^6f^2i^z - 3258776a^5b^6c^{11}d^2i^z + 25362432a^7b^3c^{12}f^2g^z + 21657600a^4b^8c^{10}d^2i^z + 17694720a^8b^2c^{12}e^h^2z - 50724864a^7b^2c^{13}e^f^2z - 13271040a^6b^5c^{11}f^2g^z - 8847360a^7b^4c^{11}e^h^2z - 5810688a^3b^{10}c^9d^2i^z + 3563520a^5b^7c^{10}f^2g^z + 2211840a^6b^6c^{10}e^h^2z + 845568a^2b^{12}c^8d^2i^z - 506880a^4b^9c^9f^2g^z - 276480a^5b^8c^9e^h^2z + 34560a^3b^{11}c^8f^2g^z + 13824a^4b^{10}c^8e^h^2z - 768a^2b^{13}c^7f^2g^z + 26542080a^6b^4c^{12}e^f^2z + 23362560a^3b^9c^{10}d^2g^z - 46725120a^3b^8c^{11}d^2e^z - 7127040a^5b^6c^{11}e^f^2z - 2965248a^2b^{11}c^9d^2g^z + 1013760a^4b^8c^{10}e^f^2z - 69120a^3b^{10}c^9e^f^2z + 1536a^2b^{12}c^8e^f^2z + 5930496a^2b^{10}c^{10}d^2e^z + 1006632960a^{13}b^c^8i^k^2z + 3246391296a^{10}b^5c^7e^k^2z + 318504960a^{13}b^c^8j^2kz + 61538304a^{10}b^{10}c^2k^3z - 603979776a^{10}c^{12}e^2kz - 693633024a^7c^{15}d^2e^z - 231211008a^8c^{14}d^2i^z - 67108864a^{12}c^{10}i^2kz - 13107200a^{12}c^{10}i^j^2z - 16384a^5b^{17}i^k^2z - 39321600a^{11}c^{11}e^j^2z - 4718592a^{10}c^{12}h^2i^z - 2304b^19c^3d^2kz + 13107200a^9c^{13}f^2i^z + 2304b^{16}c^6d^2i^z - 14155776a^9c^{13}e^h^2z + 39321600a^8c^{14}e^f^2z - 4833280a^9b^{12}c^k^3z - 6912b^{15}c^7d^2g^z + 6962544640a^{14}b^2c^6k^3z + 13824b^{14}c^8d^2e^z + 1876951040a^{12}b^6c^4k^3z - 4844421120a^{13}b^4c^5k^3z - 437780480a^{11}b^8c^3k^3z - 4294967296a^{15}c^7k^3z + 163840a^8b^{14}k^3z + 6144000a^{10}b^c^8f^i^j^k - 5898240a^{10}b^c^8g^h^j^k - 41287680a^9b^c^9d^g^j^k + 4472832a^9b^c^9f^h^i^k + 18432000a^9b^c^9e^f^j^k + 3391488a^8b^c^{10}e^h^i^j + 1228800a^8b^c^{10}f^g^i^j - 24772608a^8b^c^{10}d^g^h^k + 13418496a^8b^c^{10}e^f^h^k + 11649024a^8b^c^{10}d^f^i^k + 737280a^7b^c^{11}f^g^h^i - 768a^b^{15}c^3d^f^i^k - 19307520a^7b^c^{11}d^f^h^j + 16367616a^7b^c^{11}d^e^i^j + 3686400a^7b^c^{11}e^f^g^j + 34947072a^7b^c^{11}d^e^f^k + 2304a^b^{14}c^4d^f^g^k - 180a^b^{13}c^5d^f^h^j + 11059200a^6b^c^{12}d^e^h^i + 5160960a^6b^c^{12}d^f^g^i + 2211840a^6b^c^{12}e^f^g^h - 4608a^b^{13}c^5d^e^f^k - 2304a^b^{11}c^7d^f^g^i + 4608a^b^{10}c^8d^e^f^i + 15482880a^5b^c^{13}d^e^f^g - 13824a^b^9c^9d^e^f^g - 225976320a^8b^2c^9d^e^j^k + 112988160a^8b^3c^8d^g^j^k - 11427840a^{10}b^2c^7h^i^j^k - 4177920a^9b^4c^6h^i^j^k + 1399296a^8b^6c^5h^i^j^k - 26880a^6b^{10}c^3h^i^j^k + 16128a^7b^8c^4h^i^j^k - 61562880a^9b^2c^8d^i^j^k + 20090880a^9b^3c^7g^h^j^k + 119623680a^7b^4c^8d^e^j^k + 10485760a^9b^3c^7f^i^j^k - 40181760a^9b^2c^8e^h^j^k - 3778560a^8b^5$

$$\begin{aligned}
& *c^6*g*h*j*k - 137797632*a^7*b^2*c^{10}*d*e*h*k - 1248768*a^7*b^7*c^5*f*i*j*k \\
& + 229376*a^6*b^9*c^4*f*i*j*k + 220160*a^8*b^5*c^6*f*i*j*k - 209664*a^7*b^7 \\
& *c^5*g*h*j*k + 80640*a^6*b^9*c^4*g*h*j*k - 8960*a^5*b^{11}*c^3*f*i*j*k - 5981 \\
& 1840*a^7*b^5*c^7*d*g*j*k + 53084160*a^8*b^2*c^9*e*g*i*k - 11120640*a^8*b^4* \\
& c^7*f*g*j*k + 10455552*a^7*b^6*c^6*d*i*j*k - 9216000*a^9*b^2*c^8*f*g*j*k + \\
& 7557120*a^8*b^4*c^7*e*h*j*k + 7397376*a^8*b^3*c^8*f*h*i*k + 5230080*a^7*b^6 \\
& *c^6*f*g*j*k - 37675008*a^8*b^2*c^9*d*h*i*k - 3633408*a^6*b^8*c^5*d*i*j*k + \\
& 2211840*a^8*b^4*c^7*d*i*j*k + 68898816*a^7*b^3*c^9*d*g*h*k - 1695744*a^8*b \\
& ^2*c^9*g*h*i*j - 1400832*a^7*b^4*c^8*g*h*i*j + 967680*a^7*b^5*c^7*f*h*i*k - \\
& 783360*a^6*b^7*c^6*f*h*i*k - 741888*a^6*b^8*c^5*f*g*j*k + 499968*a^5*b^{10} \\
& c^4*d*i*j*k + 419328*a^7*b^6*c^6*e*h*j*k - 253440*a^6*b^6*c^7*g*h*i*j - 161 \\
& 280*a^6*b^8*c^5*e*h*j*k + 42240*a^5*b^9*c^5*f*h*i*k + 26880*a^5*b^{10}*c^4*f* \\
& g*j*k - 26880*a^4*b^{12}*c^3*d*i*j*k + 13824*a^4*b^{11}*c^4*f*h*i*k + 11520*a^5 \\
& *b^8*c^6*g*h*i*j - 768*a^3*b^{13}*c^3*f*h*i*k + 22241280*a^8*b^3*c^8*e*f*j*k \\
& + 14222592*a^6*b^7*c^6*d*g*j*k - 10460160*a^7*b^5*c^7*e*f*j*k + 8847360*a^7 \\
& *b^4*c^8*e*g*i*k - 7741440*a^7*b^4*c^8*f*g*h*k - 7077888*a^6*b^6*c^7*e*g*i* \\
& k + 6935040*a^6*b^6*c^7*d*h*i*k - 6709248*a^8*b^2*c^9*f*g*h*k - 3612672*a^7 \\
& *b^4*c^8*d*h*i*k + 2801664*a^7*b^3*c^9*e*h*i*j + 2506752*a^7*b^3*c^9*f*g*i* \\
& j + 2419200*a^6*b^6*c^7*f*g*h*k - 1661184*a^5*b^9*c^5*d*g*j*k + 1483776*a^6 \\
& *b^7*c^6*e*f*j*k - 1463040*a^5*b^8*c^6*d*h*i*k + 884736*a^5*b^8*c^6*e*g*i*k \\
& + 838656*a^6*b^5*c^8*f*g*i*j + 506880*a^6*b^5*c^8*e*h*i*j + 80640*a^4*b^{11} \\
& *c^4*d*g*j*k - 53760*a^5*b^9*c^5*e*f*j*k - 53760*a^5*b^7*c^7*f*g*i*j - 4608 \\
& 0*a^4*b^{10}*c^5*f*g*h*k - 34560*a^5*b^8*c^6*f*g*h*k + 25344*a^3*b^{12}*c^4*d*h \\
& *i*k - 23040*a^5*b^7*c^7*e*h*i*j + 13824*a^4*b^{10}*c^5*d*h*i*k + 2304*a^3*b^ \\
& 12*c^4*f*g*h*k - 2304*a^2*b^{14}*c^3*d*h*i*k - 29030400*a^6*b^5*c^8*d*g*h*k + \\
& 28606464*a^7*b^3*c^9*d*f*i*k - 28445184*a^6*b^6*c^7*d*e*j*k + 58060800*a^6 \\
& *b^4*c^9*d*e*h*k + 15482880*a^7*b^3*c^9*e*f*h*k - 8183808*a^7*b^2*c^{10}*d*g* \\
& i*j - 6718464*a^6*b^5*c^8*d*f*i*k - 5087232*a^7*b^2*c^{10}*e*g*h*j - 5013504* \\
& a^7*b^2*c^{10}*e*f*i*j - 4838400*a^6*b^5*c^8*e*f*h*k + 4112640*a^5*b^7*c^7*d* \\
& g*h*k - 3663360*a^5*b^7*c^7*d*f*i*k + 3322368*a^5*b^8*c^6*d*e*j*k - 2285568 \\
& *a^6*b^4*c^9*d*g*i*j + 1896960*a^4*b^9*c^6*d*f*i*k + 1843200*a^6*b^3*c^{10}*f \\
& *g*h*i - 1677312*a^6*b^4*c^9*e*f*i*j - 1658880*a^6*b^4*c^9*e*g*h*j + 683458 \\
& 56*a^6*b^3*c^{10}*d*e*f*k + 783360*a^5*b^5*c^9*f*g*h*i + 741888*a^5*b^6*c^8*d \\
& *g*i*j - 34172928*a^6*b^4*c^9*d*f*g*k - 340992*a^3*b^{11}*c^5*d*f*i*k - 16128 \\
& 0*a^4*b^{10}*c^5*d*e*j*k + 138240*a^4*b^9*c^6*d*g*h*k + 107520*a^5*b^6*c^8*e* \\
& f*i*j + 92160*a^4*b^9*c^6*e*f*h*k - 89856*a^3*b^{11}*c^5*d*g*h*k - 80640*a^4* \\
& b^8*c^7*d*g*i*j + 69120*a^5*b^7*c^7*e*f*h*k + 69120*a^5*b^6*c^8*e*g*h*j + 2 \\
& 7648*a^2*b^{13}*c^4*d*f*i*k + 18432*a^4*b^7*c^8*f*g*h*i + 6912*a^2*b^{13}*c^4*d \\
& *g*h*k - 4608*a^3*b^{11}*c^5*e*f*h*k - 2304*a^3*b^9*c^7*f*g*h*i + 27164160*a^ \\
& 5*b^6*c^8*d*f*g*k - 22164480*a^6*b^3*c^{10}*d*f*h*j - 54328320*a^5*b^5*c^9*d* \\
& e*f*k - 17473536*a^7*b^2*c^{10}*d*f*g*k - 8225280*a^5*b^6*c^8*d*e*h*k - 80870 \\
& 40*a^4*b^8*c^7*d*f*g*k + 5677056*a^6*b^3*c^{10}*e*f*g*j - 5529600*a^6*b^2*c^1 \\
& 1*d*g*h*i + 4571136*a^6*b^3*c^{10}*d*e*i*j - 3686400*a^6*b^2*c^{11}*e*f*h*i + 2 \\
& 805120*a^5*b^5*c^9*d*f*h*j - 2211840*a^5*b^4*c^{10}*d*g*h*i - 1566720*a^5*b^4 \\
& *c^{10}*e*f*h*i - 1483776*a^5*b^5*c^9*d*e*i*j + 1198080*a^3*b^{10}*c^6*d*f*g*k
\end{aligned}$$

$$\begin{aligned}
& + 437184*a^4*b^7*c^8*d*f*h*j - 322560*a^5*b^5*c^9*e*f*g*j + 317952*a^4*b^6*c^9*d*g*h*i - 276480*a^4*b^8*c^7*d*e*h*k + 179712*a^3*b^10*c^6*d*e*h*k + 16 \\
& 1280*a^4*b^7*c^8*d*e*i*j - 146268*a^3*b^9*c^7*d*f*h*j - 87552*a^2*b^12*c^5*d*f*g*k - 36864*a^4*b^6*c^9*e*f*h*i - 13824*a^2*b^12*c^5*d*e*h*k + 9360*a^2 \\
& *b^11*c^6*d*f*h*j + 6912*a^3*b^8*c^8*d*g*h*i - 6912*a^2*b^10*c^7*d*g*h*i + 4608*a^3*b^8*c^8*e*f*h*i - 24551424*a^6*b^2*c^11*d*e*g*j + 16174080*a^4*b^7 \\
& *c^8*d*e*f*k + 5419008*a^5*b^4*c^10*d*e*g*j + 5160960*a^5*b^3*c^11*d*f*g*i + 4423680*a^5*b^3*c^11*e*f*g*h + 4423680*a^5*b^3*c^11*d*e*h*i - 2396160*a^3 \\
& *b^9*c^7*d*e*f*k - 635904*a^4*b^5*c^10*d*e*h*i - 483840*a^4*b^6*c^9*d*e*g*j - 354816*a^3*b^7*c^9*d*f*g*i + 322560*a^4*b^5*c^10*d*f*g*i + 175104*a^2*b^ \\
& 11*c^6*d*e*f*k + 138240*a^4*b^5*c^10*e*f*g*h + 59904*a^2*b^9*c^8*d*f*g*i - 13824*a^3*b^7*c^9*e*f*g*h - 13824*a^3*b^7*c^9*d*e*h*i + 13824*a^2*b^9*c^8*d \\
& *e*h*i - 16588800*a^5*b^2*c^12*d*e*g*h - 10321920*a^5*b^2*c^12*d*e*f*i + 16 \\
& 58880*a^4*b^4*c^11*d*e*g*h + 709632*a^3*b^6*c^10*d*e*f*i - 645120*a^4*b^4*c^ \\
& ^11*d*e*f*i + 124416*a^3*b^6*c^10*d*e*g*h - 119808*a^2*b^8*c^9*d*e*f*i - 41 \\
& 472*a^2*b^8*c^9*d*e*g*h + 7741440*a^4*b^3*c^12*d*e*f*g - 2903040*a^3*b^5*c^ \\
& ^11*d*e*f*g + 387072*a^2*b^7*c^10*d*e*f*g - 381026304*a^11*b*c^7*d*j*k^2 - 2 \\
& 41827840*a^10*b*c^8*d*h*k^2 - 65667072*a^12*b*c^6*h*j*k^2 - 169344*a^7*b^11 \\
& *c*h*j*k^2 - 25165824*a^11*b*c^7*g*i*k^2 - 4915200*a^11*b*c^7*g*j^2*k - 530 \\
& 84160*a^8*b*c^10*e^2*i*k - 75497472*a^10*b*c^8*e*g*k^2 - 86704128*a^7*b*c^1 \\
& 1*d^2*g*k + 565248*a^9*b*c^9*h*i^2*j - 168448*a^6*b^12*c*f*j*k^2 - 24576*a^ \\
& 5*b^13*c*g*i*k^2 - 1769472*a^9*b*c^9*g*h^2*k - 17694720*a^9*b*c^9*e*i^2*k - \\
& 411264*a^5*b^13*c*d*j*k^2 - 11520*a^4*b^14*c*f*h*k^2 + 4915200*a^8*b*c^10* \\
& f^2*g*k + 2580480*a^9*b*c^9*e*i*j^2 - 2496000*a^9*b*c^9*f*h*j^2 - 1543680*a \\
& ^8*b*c^10*f*h^2*j + 33408*a*b^14*c^4*d^2*i*k - 59512320*a^6*b*c^12*d^2*f*j \\
& + 5087232*a^7*b*c^11*e^2*h*j + 2727936*a^8*b*c^10*d*i^2*j - 26496*a^3*b^15* \\
& c*d*h*k^2 + 1105920*a^7*b*c^11*e*h^2*i - 107136*a*b^13*c^5*d^2*g*k + 10260* \\
& a*b^12*c^6*d^2*h*j - 10616832*a^6*b*c^12*e^2*g*i - 3538944*a^7*b*c^11*e*g*i \\
& ^2 + 1843200*a^7*b*c^11*d*h*i^2 - 18432*a^2*b^16*c*d*f*k^2 - 15552000*a^8*b \\
& *c^10*d*f*j^2 + 24551424*a^6*b*c^12*d*e^2*j - 37062144*a^5*b*c^13*d^2*f*h + \\
& 2580480*a^6*b*c^12*e*f^2*i + 214272*a*b^12*c^6*d^2*e*k + 65664*a*b^10*c^8* \\
& d^2*g*i - 25074*a*b^11*c^7*d^2*f*j + 420*a*b^12*c^6*d*f^2*j + 6*a*b^15*c^3* \\
& d*f*j^2 + 23224320*a^5*b*c^13*d^2*e*i + 384*a*b^12*c^6*d*f*i^2 - 5985792*a^ \\
& 6*b*c^12*d*f*h^2 + 206010*a*b^9*c^9*d^2*f*h - 131328*a*b^9*c^9*d^2*e*i - 63 \\
& 00*a*b^10*c^8*d*f^2*h + 1350*a*b^11*c^7*d*f*h^2 + 16588800*a^5*b*c^13*d*e^2 \\
& *h + 3456*a*b^10*c^8*d*f*g^2 + 435456*a*b^8*c^10*d^2*e*g + 13824*a*b^8*c^10 \\
& *d*e^2*f + 3932160*a^11*c^8*h*i*j*k + 27525120*a^10*c^9*d*i*j*k + 82575360* \\
& a^9*c^10*d*e*j*k + 11796480*a^10*c^9*e*h*j*k + 16515072*a^9*c^10*d*h*i*k + \\
& 49545216*a^8*c^11*d*e*h*k - 2457600*a^8*c^11*e*f*i*j - 1474560*a^7*c^12*e*f \\
& *h*i - 10321920*a^6*c^13*d*e*f*i + 737077248*a^10*b^3*c^6*d*j*k^2 - 5188147 \\
& 20*a^9*b^5*c^5*d*j*k^2 + 441354240*a^9*b^3*c^7*d*h*k^2 - 429871104*a^6*b^2* \\
& c^11*d^2*e*k - 272212992*a^8*b^5*c^6*d*h*k^2 + 305731584*a^5*b^4*c^10*d^2*e \\
& *k + 192412800*a^8*b^7*c^4*d*j*k^2 + 111912960*a^11*b^3*c^5*h*j*k^2 + 21493 \\
& 5552*a^6*b^3*c^10*d^2*g*k + 202427136*a^7*b^6*c^6*d*f*k^2 - 49904640*a^10*b \\
& ^5*c^4*h*j*k^2 - 178513920*a^8*b^4*c^7*d*f*k^2 - 152865792*a^5*b^5*c^9*d^2*
\end{aligned}$$

$g*k - 114388992*a^7*b^2*c^{10}*d^2*i*k + 94961664*a^{10}*b^2*c^7*e*i*k^2 - 9039$
 $872*a^{11}*b^2*c^6*i*j^2*k - 56494080*a^{10}*b^4*c^5*f*j*k^2 - 2052096*a^{10}*b^4$
 $*c^5*i*j^2*k + 1327360*a^9*b^6*c^4*i*j^2*k - 158080*a^8*b^8*c^3*i*j^2*k - 4$
 $7480832*a^{10}*b^3*c^6*g*i*k^2 + 45576960*a^9*b^6*c^4*f*j*k^2 + 7954560*a^9*b$
 $^7*c^3*h*j*k^2 - 104693760*a^9*b^3*c^7*e*g*k^2 + 142080*a^8*b^9*c^2*h*j*k^2$
 $+ 16017408*a^{10}*b^3*c^6*g*j^2*k - 4930560*a^9*b^5*c^5*g*j^2*k - 3649536*a^$
 $9*b^2*c^8*h^2*i*k - 1843200*a^8*b^4*c^7*h^2*i*k + 85524480*a^8*b^5*c^6*e*g*$
 $k^2 + 474240*a^8*b^7*c^4*g*j^2*k + 288000*a^7*b^6*c^6*h^2*i*k + 63360*a^6*b$
 $^8*c^5*h^2*i*k - 8064*a^5*b^{10}*c^4*h^2*i*k - 1152*a^4*b^{12}*c^3*h^2*i*k - 15$
 $437824*a^{11}*b^2*c^6*f*j*k^2 - 32034816*a^{10}*b^2*c^7*e*j^2*k - 14369280*a^8*$
 $b^8*c^3*f*j*k^2 - 13271040*a^8*b^3*c^8*g^2*i*k + 80267904*a^7*b^7*c^5*d*h*k$
 $^2 + 79626240*a^7*b^2*c^{10}*e^2*g*k + 11059200*a^9*b^5*c^5*g*i*k^2 + 8847360$
 $*a^9*b^2*c^8*g*i^2*k - 42113280*a^7*b^9*c^3*d*j*k^2 + 6389760*a^8*b^7*c^4*g$
 $*i*k^2 + 5898240*a^8*b^4*c^7*g*i^2*k - 37601280*a^9*b^4*c^6*f*h*k^2 - 29491$
 $20*a^7*b^9*c^3*g*i*k^2 + 2242560*a^7*b^{10}*c^2*f*j*k^2 - 2211840*a^7*b^5*c^7$
 $*g^2*i*k + 1769472*a^6*b^7*c^6*g^2*i*k + 749568*a^8*b^3*c^8*h*i^2*j - 44236$
 $8*a^7*b^6*c^6*g*i^2*k + 442368*a^6*b^{11}*c^2*g*i*k^2 - 442368*a^6*b^8*c^5*g*$
 $i^2*k + 317952*a^7*b^5*c^7*h*i^2*j - 221184*a^5*b^9*c^5*g^2*i*k + 73728*a^5$
 $*b^{10}*c^4*g*i^2*k + 38400*a^6*b^7*c^6*h*i^2*j - 1920*a^5*b^9*c^5*h*i^2*j +$
 $9861120*a^9*b^4*c^6*e*j^2*k - 110280960*a^4*b^6*c^9*d^2*e*k - 93330432*a^6*$
 $b^8*c^5*d*f*k^2 + 24645888*a^8*b^6*c^5*f*h*k^2 + 6359040*a^8*b^3*c^8*g*h^2*$
 $k - 22118400*a^9*b^4*c^6*e*i*k^2 - 3862528*a^8*b^2*c^9*f^2*i*k - 2248704*a^$
 $7*b^4*c^8*f^2*i*k - 1290240*a^9*b^2*c^8*g*i*j^2 - 948480*a^8*b^6*c^5*e*j^2*$
 $k - 860160*a^8*b^4*c^7*g*i*j^2 - 414720*a^7*b^5*c^7*g*h^2*k + 303360*a^6*b^$
 $6*c^7*f^2*i*k + 266880*a^5*b^8*c^6*f^2*i*k - 224640*a^6*b^7*c^6*g*h^2*k - 8$
 $0640*a^7*b^6*c^6*g*i*j^2 - 72960*a^4*b^{10}*c^5*f^2*i*k + 17280*a^5*b^9*c^5*g$
 $*h^2*k + 12672*a^6*b^8*c^5*g*i*j^2 + 5504*a^3*b^{12}*c^4*f^2*i*k + 3456*a^4*b$
 $^{11}*c^4*g*h^2*k - 384*a^5*b^{10}*c^4*g*i*j^2 - 128*a^2*b^{14}*c^3*f^2*i*k + 302$
 $65344*a^6*b^4*c^9*d^2*i*k - 12779520*a^8*b^6*c^5*e*i*k^2 - 11796480*a^8*b^3$
 $*c^8*e*i^2*k - 8847360*a^7*b^3*c^9*e^2*i*k - 7925760*a^{10}*b^2*c^7*f*h*k^2 +$
 $7077888*a^6*b^5*c^8*e^2*i*k - 39813120*a^7*b^3*c^9*e*g^2*k - 73175040*a^9*$
 $b^2*c^8*d*f*k^2 + 5898240*a^7*b^8*c^4*e*i*k^2 + 5542272*a^6*b^{11}*c^2*d*j*k^$
 $2 - 5420160*a^7*b^8*c^4*f*h*k^2 + 55140480*a^4*b^7*c^8*d^2*g*k + 1271808*a^$
 $7*b^3*c^9*g^2*h*j - 1040384*a^8*b^2*c^9*f*i^2*j + 884736*a^7*b^5*c^7*e*i^2*$
 $k - 884736*a^6*b^{10}*c^3*e*i*k^2 + 884736*a^6*b^7*c^6*e*i^2*k - 884736*a^5*b$
 $^7*c^7*e^2*i*k - 697344*a^7*b^4*c^8*f*i^2*j + 414720*a^6*b^5*c^8*g^2*h*j +$
 $226560*a^6*b^{10}*c^3*f*h*k^2 - 147456*a^5*b^9*c^5*e*i^2*k - 121856*a^6*b^6*c$
 $^7*f*i^2*j + 82560*a^5*b^{12}*c^2*f*h*k^2 + 49152*a^5*b^{12}*c^2*e*i*k^2 - 1728$
 $0*a^5*b^7*c^7*g^2*h*j + 8960*a^5*b^8*c^6*f*i^2*j + 14194944*a^5*b^6*c^8*d^2$
 $*i*k - 12718080*a^8*b^2*c^9*e*h^2*k - 10615680*a^4*b^8*c^7*d^2*i*k - 265420$
 $80*a^6*b^4*c^9*e^2*g*k - 23592960*a^7*b^7*c^5*e*g*k^2 - 5142528*a^8*b^3*c^8$
 $*f*h*j^2 + 5068800*a^7*b^2*c^{10}*f^2*h*j - 3755520*a^7*b^3*c^9*f*h^2*j + 333$
 $6192*a^7*b^3*c^9*f^2*g*k + 3000960*a^6*b^4*c^9*f^2*h*j + 2893824*a^3*b^{10}*c$
 $^6*d^2*i*k + 1720320*a^8*b^3*c^8*e*i*j^2 + 1704960*a^6*b^5*c^8*f^2*g*k - 13$
 $07520*a^5*b^7*c^7*f^2*g*k - 1085760*a^6*b^5*c^8*f*h^2*j - 959040*a^7*b^5*c^$

$$\begin{aligned}
& 7*f*h*j^2 + 829440*a^7*b^4*c^8*e*h^2*k - 552960*a^7*b^2*c^{10}*g*h^2*i - 5529 \\
& 60*a^6*b^4*c^9*g*h^2*i + 449280*a^6*b^6*c^7*e*h^2*k - 422784*a^2*b^{12}*c^5*d \\
& ^2*i*k + 253440*a^4*b^9*c^6*f^2*g*k + 161280*a^7*b^5*c^7*e*i*j^2 - 145152*a \\
& ^5*b^6*c^8*g*h^2*i + 103200*a^6*b^7*c^6*f*h*j^2 + 41280*a^5*b^6*c^8*f^2*h*j \\
& - 37188*a^4*b^8*c^7*f^2*h*j - 34560*a^5*b^8*c^6*e*h^2*k - 25344*a^6*b^7*c^ \\
& 6*e*i*j^2 - 17280*a^3*b^{11}*c^5*f^2*g*k + 13536*a^5*b^7*c^7*f*h^2*j - 6912*a \\
& ^4*b^{10}*c^5*e*h^2*k + 5490*a^4*b^9*c^6*f*h^2*j - 3456*a^4*b^8*c^7*g*h^2*i + \\
& 1980*a^3*b^{10}*c^6*f^2*h*j + 810*a^5*b^9*c^5*f*h*j^2 + 768*a^5*b^9*c^5*e*i \\
& j^2 + 384*a^2*b^{13}*c^4*f^2*g*k - 270*a^4*b^{11}*c^4*f*h*j^2 - 180*a^3*b^{11}*c^ \\
& 5*f*h^2*j - 30*a^2*b^{12}*c^5*f^2*h*j + 6*a^3*b^{13}*c^3*f*h*j^2 + 30067200*a^6 \\
& *b^2*c^{11}*d^2*h*j + 13271040*a^6*b^5*c^8*e*g^2*k - 10857600*a^6*b^9*c^4*d*h \\
& *k^2 + 2949120*a^6*b^9*c^4*e*g*k^2 + 2654208*a^5*b^6*c^8*e^2*g*k + 2125824* \\
& a^7*b^3*c^9*d*i^2*j + 1658880*a^6*b^3*c^{10}*e^2*h*j - 1419264*a^6*b^4*c^9*f* \\
& g^2*j - 1327104*a^5*b^7*c^7*e*g^2*k - 921600*a^7*b^2*c^{10}*f*g^2*j - 737280* \\
& a^7*b^2*c^{10}*f*h*i^2 - 568320*a^6*b^4*c^9*f*h*i^2 + 207360*a^4*b^{13}*c^2*d*h \\
& *k^2 - 147456*a^5*b^{11}*c^3*e*g*k^2 - 136704*a^5*b^6*c^8*f*h*i^2 + 133632*a^ \\
& 6*b^5*c^8*d*i^2*j - 96768*a^5*b^7*c^7*d*i^2*j + 80640*a^5*b^6*c^8*f*g^2*j - \\
& 69120*a^5*b^5*c^9*e^2*h*j + 13440*a^4*b^9*c^6*d*i^2*j - 5760*a^5*b^{11}*c^3* \\
& d*h*k^2 - 2304*a^4*b^8*c^7*f*h*i^2 + 384*a^3*b^{10}*c^6*f*h*i^2 + 11930112*a^ \\
& 8*b^2*c^9*d*h*j^2 - 11646720*a^3*b^9*c^7*d^2*g*k + 8432640*a^7*b^2*c^{10}*d*h \\
& ^2*j + 24140160*a^5*b^{10}*c^4*d*f*k^2 - 6672384*a^7*b^2*c^{10}*e*f^2*k + 44501 \\
& 76*a^7*b^4*c^8*d*h*j^2 + 4337280*a^6*b^4*c^9*d*h^2*j - 3870720*a^8*b^2*c^9* \\
& e*g*j^2 - 3409920*a^6*b^4*c^9*e*f^2*k - 2885760*a^5*b^4*c^{10}*d^2*h*j - 2844 \\
& 288*a^4*b^6*c^9*d^2*h*j + 2615040*a^5*b^6*c^8*e*f^2*k - 1687680*a^6*b^6*c^7 \\
& *d*h*j^2 + 1482624*a^2*b^{11}*c^6*d^2*g*k - 1290240*a^6*b^2*c^{11}*f^2*g*i + 11 \\
& 05920*a^6*b^3*c^{10}*e*h^2*i + 1019412*a^3*b^8*c^8*d^2*h*j - 1007424*a^5*b^6* \\
& c^8*d*h^2*j - 860160*a^5*b^4*c^{10}*f^2*g*i - 645120*a^7*b^4*c^8*e*g*j^2 - 50 \\
& 6880*a^4*b^8*c^7*e*f^2*k + 290304*a^5*b^5*c^9*e*h^2*i + 197460*a^5*b^8*c^6* \\
& d*h*j^2 - 143802*a^2*b^{10}*c^7*d^2*h*j + 80640*a^6*b^6*c^7*e*g*j^2 - 80640*a \\
& ^4*b^6*c^9*f^2*g*i + 51948*a^4*b^8*c^7*d*h^2*j + 34560*a^3*b^{10}*c^6*e*f^2*k \\
& + 12672*a^3*b^8*c^8*f^2*g*i + 10800*a^3*b^{10}*c^6*d*h^2*j + 6912*a^4*b^7*c^ \\
& 8*e*h^2*i - 2304*a^5*b^8*c^6*e*g*j^2 - 768*a^2*b^{12}*c^5*e*f^2*k - 684*a^3*b \\
& ^{12}*c^4*d*h*j^2 - 540*a^2*b^{12}*c^5*d*h^2*j - 384*a^2*b^{10}*c^7*f^2*g*i - 90* \\
& a^4*b^{10}*c^5*d*h*j^2 + 18*a^2*b^{14}*c^3*d*h*j^2 + 23385600*a^6*b^2*c^{11}*d*f^ \\
& 2*j + 23293440*a^3*b^8*c^8*d^2*e*k + 6137856*a^6*b^3*c^{10}*d*g^2*j - 5677056 \\
& *a^6*b^2*c^{11}*e^2*f*j + 5308416*a^6*b^2*c^{11}*e*g^2*i - 5308416*a^5*b^3*c^{11} \\
& *e^2*g*i - 3786240*a^4*b^{12}*c^3*d*f*k^2 - 3538944*a^6*b^3*c^{10}*e*g*i^2 + 26 \\
& 54208*a^5*b^4*c^{10}*e*g^2*i + 1658880*a^6*b^3*c^{10}*d*h*i^2 - 1354752*a^5*b^5 \\
& *c^9*d*g^2*j - 1105920*a^5*b^4*c^{10}*f*g^2*h - 884736*a^5*b^5*c^9*e*g*i^2 - \\
& 552960*a^6*b^2*c^{11}*f*g^2*h + 357120*a^3*b^{14}*c^2*d*f*k^2 + 322560*a^5*b^4* \\
& c^{10}*e^2*f*j + 262656*a^5*b^5*c^9*d*h*i^2 + 120960*a^4*b^7*c^8*d*g^2*j - 55 \\
& 296*a^4*b^7*c^8*d*h*i^2 - 34560*a^4*b^6*c^9*f*g^2*h + 3456*a^3*b^8*c^8*f*g^ \\
& 2*h + 1152*a^3*b^9*c^7*d*h*i^2 + 1152*a^2*b^{11}*c^6*d*h*i^2 - 13149696*a^7*b \\
& ^3*c^9*d*f*j^2 - 11612160*a^5*b^2*c^{12}*d^2*g*i + 10906560*a^4*b^5*c^{10}*d^2* \\
& f*j - 7418880*a^5*b^3*c^{11}*d^2*f*j + 3148992*a^6*b^5*c^8*d*f*j^2 - 2985696*
\end{aligned}$$

$a^3b^7c^9d^2f^j - 2965248a^2b^{10}c^7d^2e^k + 1720320a^5b^3c^{11}e$
 $f^2i - 1658880a^6b^2c^{11}e^g h^2 + 1596672a^3b^6c^{10}d^2g^i - 1505$
 $280a^4b^6c^9d^2f^2j - 829440a^5b^4c^{10}e^g h^2 - 508032a^2b^8c^9$
 $d^2g^i + 378954a^2b^9c^8d^2f^j + 362880a^5b^4c^{10}d^2f^2j + 296964$
 $a^3b^8c^8d^2f^2j + 161280a^4b^5c^{10}e^f^2i - 77070a^4b^9c^6d^2f^j$
 $j^2 - 30240a^5b^7c^7d^2f^j^2 - 25344a^3b^7c^9e^f^2i - 20736a^4b^6$
 $c^9e^g h^2 - 19278a^2b^{10}c^7d^2f^2j + 8820a^3b^{11}c^5d^2f^j^2 + 768$
 $a^2b^9c^8e^f^2i - 378a^2b^{13}c^4d^2f^j^2 - 5419008a^5b^3c^{11}d^2e^$
 $2j - 4423680a^5b^2c^{12}e^2f^h + 4147200a^5b^3c^{11}d^2g^2h - 2580480$
 $a^6b^2c^{11}d^2f^i^2 - 967680a^5b^4c^{10}d^2f^i^2 + 483840a^4b^5c^{10}d$
 $e^2j - 414720a^4b^5c^{10}d^2g^2h - 138240a^4b^4c^{11}e^2f^h + 64512a$
 $a^4b^6c^9d^2f^i^2 + 39168a^3b^8c^8d^2f^i^2 - 31104a^3b^7c^9d^2g^2h$
 $+ 13824a^3b^6c^{10}e^2f^h + 10368a^2b^9c^8d^2g^2h - 9216a^2b^{10}c$
 $^7d^2f^i^2 + 15630336a^5b^2c^{12}d^2f^2h - 14459904a^4b^3c^{12}d^2f^h$
 $+ 9630144a^3b^5c^{11}d^2f^h - 8764416a^5b^3c^{11}d^2f^h^2 - 3870720a^5$
 $b^2c^{12}e^f^2g - 3193344a^3b^5c^{11}d^2e^i + 2867328a^4b^4c^{11}d^2f$
 $^2h - 2095200a^2b^7c^{10}d^2f^h - 1414080a^3b^6c^{10}d^2f^2h - 348364$
 $80a^4b^2c^{13}d^2e^g + 1016064a^2b^7c^{10}d^2e^i - 645120a^4b^4c^1$
 $1e^f^2g + 306720a^3b^7c^9d^2f^h^2 + 197820a^2b^8c^9d^2f^2h + 14688$
 $0a^4b^5c^{10}d^2f^h^2 + 80640a^3b^6c^{10}e^f^2g - 55350a^2b^9c^8d^2f$
 $h^2 - 2304a^2b^8c^9e^f^2g - 3870720a^5b^2c^{12}d^2f^g^2 - 1935360a^$
 $4b^4c^{11}d^2f^g^2 - 1658880a^4b^3c^{12}d^2e^2h + 725760a^3b^6c^{10}d^2f$
 $g^2 + 17418240a^3b^4c^{12}d^2e^g - 124416a^3b^5c^{11}d^2e^2h - 96768a$
 $a^2b^8c^9d^2f^g^2 + 41472a^2b^7c^{10}d^2e^2h - 3919104a^2b^6c^{11}d^2$
 $e^g - 7741440a^4b^2c^{13}d^2e^2f + 2903040a^3b^4c^{12}d^2e^2f - 387072$
 $a^2b^6c^{11}d^2e^2f - 681246720a^9b^3c^9d^2k^2 + 265912320a^{11}b^3c^$
 $5e^k^3 + 188743680a^{12}b^2c^5g^k^3 - 132956160a^{11}b^4c^4g^k^3 - 521$
 $01120a^{13}b^3c^5j^2k^2 + 25722880a^{12}b^3c^4i^k^3 + 19644416a^{11}b^5c^$
 $3i^k^3 - 1583680a^9b^9c^j^2k^2 - 9142272a^{10}b^7c^2i^k^3 - 740229$
 $12a^{10}b^5c^4e^k^3 - 20643840a^{11}b^3c^7h^2k^2 + 37011456a^{10}b^6c^3$
 $g^k^3 - 2293760a^9b^3c^7i^3k - 557056a^8b^5c^6i^3k + 147456a^7b$
 $b^7c^5i^3k - 65536a^6b^{12}c^i^2k^2 + 32768a^6b^9c^4i^3k - 8192a^$
 $5b^{11}c^3i^3k + 430080a^{10}b^3c^8i^2j^2 - 2880a^5b^{13}c^h^2k^2 + 6$
 $635520a^7b^4c^8g^3k - 4792320a^9b^8c^2g^k^3 - 2211840a^6b^6c^7g$
 $g^3k + 1359360a^{10}b^2c^7h^3j^3 + 1173120a^9b^4c^6h^3j^3 + 743040a^7$
 $b^4c^8h^3j + 622080a^8b^2c^9h^3j + 221184a^5b^8c^6g^3k + 1071$
 $36a^6b^6c^7h^3j - 32640a^8b^6c^5h^3j^3 - 5796a^7b^8c^4h^3j^3 + 5$
 $40a^5b^8c^6h^3j - 270a^4b^{10}c^5h^3j + 210a^6b^{10}c^3h^3j^3 - 29$
 $49120a^{10}b^3c^8f^2k^2 + 17694720a^6b^3c^{10}e^3k + 184320a^8b^3c^{10}$
 $h^2i^2 - 3520a^3b^{15}c^f^2k^2 + 9584640a^9b^7c^3e^k^3 - 2293760a^9$
 $b^3c^7f^j^3 - 2293760a^6b^3c^{10}f^3j - 1769472a^5b^5c^9e^3k - 8$
 $84736a^6b^3c^{10}g^3i - 589824a^7b^3c^9g^i^3 - 491520a^8b^9c^2e^k$
 $k^3 - 442368a^5b^5c^9g^3i - 294912a^6b^5c^8g^i^3 - 199360a^8b^5c^$
 $c^6f^j^3 - 199360a^5b^5c^9f^3j + 61920a^7b^7c^5f^j^3 + 61920a^4b$
 $b^7c^8f^3j - 49152a^5b^7c^7g^i^3 - 3682a^6b^9c^4f^j^3 - 3682a^3$

$$\begin{aligned}
& *b^9c^7f^3j + 70a^5b^{11}c^3f^2j^2 + 70a^2b^{11}c^6f^3j + 3870720a^8b^8c^{10}e^2j^2 + 430080a^7b^8c^{11}f^2i^2 - 14152320a^4b^4c^{11}d^3j \\
& + 10644480a^5b^2c^{12}d^3j + 5483520a^9b^2c^8d^2j^3 + 4269888a^3b^6c^{10}d^3j + 3538944a^5b^2c^{12}e^3i - 1648128a^5b^3c^{11}f^3h + 1330560a^8b^4c^7d^2j^3 \\
& + 1179648a^7b^2c^{10}e^2i^3 - 898560a^6b^3c^{10}f^3h^3 - 826560a^7b^6c^6d^2j^3 - 607068a^2b^8c^9d^3j + 589824a^6b^4c^9e^2i^3 - 354240a^5b^5c^9f^3h^3 \\
& - 354240a^4b^5c^{10}f^3h + 145188a^6b^8c^5d^2j^3 + 98304a^5b^6c^8e^2i^3 + 43680a^3b^7c^9f^3h - 21600a^4b^7c^8f^3h^3 - 9576a^5b^{10}c^4d^2j^3 \\
& + 1350a^3b^9c^7f^3h^3 - 1050a^2b^9c^8f^3h - 504a^4b^{14}c^4d^2j^2 + 210a^4b^{12}c^3d^2j^3 + 3870720a^6b^8c^{12}d^2i^2 + 1658880a^6b^8c^{12}e^2h^2 \\
& - 9792a^6b^{11}c^7d^2i^2 + 16547328a^4b^2c^{13}d^3h - 12306816a^3b^4c^{12}d^3h + 37310976a^3b^3c^{13}d^3f + 3037824a^2b^6c^{11}d^3h \\
& - 2654208a^5b^3c^{11}e^2g^3 + 1949184a^6b^2c^{11}d^3h^3 + 1296000a^5b^4c^{10}d^3h^3 - 155520a^4b^6c^9d^3h^3 - 40500a^4b^{10}c^8d^2h^2 \\
& - 8100a^3b^8c^8d^3h^3 + 4050a^2b^{10}c^7d^3h^3 + 3870720a^5b^8c^{13}e^2f^2 + 34836480a^4b^8c^{14}d^2e^2 - 108864a^6b^9c^9d^2g^2 \\
& - 8068032a^2b^5c^{12}d^3f - 5623296a^4b^3c^{12}d^3f^3 + 1737792a^3b^5c^{11}d^3f^3 - 260190a^6b^8c^{10}d^2f^2 - 211680a^2b^7c^{10}d^3f^3 \\
& - 435456a^4b^7c^{11}d^2e^2 - 377487360a^{12}b^6c^6e^2k^3 + 1434977280a^8b^3c^8d^2k^2 + 173408256a^7c^{12}d^2e^2k + 3276800a^{12}c^7i^2j^2k \\
& - 125829120a^{13}b^5c^5i^2k^3 + 26214400a^{12}c^7f^2j^2k^2 + 1179648a^{10}c^9h^2i^2k + 13440a^6b^{13}h^2j^2k^2 + 50331648a^{11}c^8e^2i^2k^2 \\
& + 110100480a^{10}c^9d^2f^2k^2 + 57802752a^8c^{11}d^2i^2k + 9830400a^{11}c^8e^2j^2k - 3276800a^9c^{10}f^2i^2k + 4480a^5b^{14}f^2j^2k^2 \\
& + 15728640a^{11}c^8f^2h^2k^2 - 409600a^9c^{10}f^2i^2j - 1152b^{16}c^3d^2i^2k - 1220516352a^7b^5c^7d^2k^2 + 3538944a^9c^{10}e^2h^2k + 384000a^8c^{11}f^2h^2j \\
& + 13440a^4b^{15}d^2j^2k^2 + 384a^3b^{16}f^2h^2k^2 + 20321280a^7c^{12}d^2h^2j - 245760a^8c^{11}f^2h^2i^2 + 3456b^{15}c^4d^2g^2k - 270b^{14}c^5d^2h^2j \\
& - 9830400a^8c^{11}e^2f^2k + 4838400a^9c^{10}d^2h^2j^2 + 2903040a^8c^{11}d^2h^2j - 1966080a^{10}b^8c^8i^3k + 1433600a^9b^9c^8i^2k^3 \\
& + 1152a^2b^{17}d^2h^2k^2 - 3686400a^7c^{12}e^2f^2j - 53084160a^7b^8c^{11}e^3k - 6912b^{14}c^5d^2e^2k - 3456b^{12}c^7d^2g^2i \\
& + 630b^{13}c^6d^2f^2j + 2688000a^7c^{12}d^2f^2j + 245760a^8b^{10}c^8g^2k^3 - 2211840a^6c^{13}e^2f^2h - 1720320a^7c^{12}d^2f^2i^2 \\
& - 9450b^{11}c^8d^2f^2h + 6912b^{11}c^8d^2e^2i + 1612800a^6c^{13}d^2f^2h - 1344000a^{10}b^8c^8f^2j^3 - 1344000a^7b^8c^{11}f^3j - 393216a^8b^8c^{10}g^2i^3 \\
& - 23616a^6b^{17}c^4d^2k^2 - 20736b^{10}c^9d^2e^2g - 75188736a^4b^8c^{14}d^3f - 883200a^6b^8c^{12}f^3h - 317952a^7b^8c^{11}f^3h^3 \\
& + 43416a^4b^{10}c^8d^3j - 15482880a^5c^{14}d^2e^2f - 10616832a^5b^8c^{13}e^3g - 345060a^6b^8c^{10}d^3h - 4262400a^5b^8c^{13}d^2f^3 \\
& + 852768a^6b^7c^{11}d^3f + 7350a^6b^9c^9d^2f^3 + 584578368a^6b^7c^6d^2k^2 + 93905920a^{12}b^3c^4j^2k^2 - 177997248a^5b^9c^5d^2k^2 \\
& - 50967040a^{11}b^5c^3j^2k^2 + 104693760a^9b^2c^8e^2k^2 + 12849984a^{10}b^7c^2j^2k^2 + 20021248a^{11}b^2c^6i^2k^2 - 85524480a^8b^4c^7e^2k^2 \\
& + 33223680a^{10}b^3c^6h^2k^2 + 4227072a^{10}b^4c^5i^2k^2 - 3973120a^9b^6c^4i^2k^2 + 344064a^7b^{10}c^2i^2k^2 - 81920a^8b^8c^3i^2k^2 - 113863
\end{aligned}$$

$$\begin{aligned}
& 68a^9b^5c^5h^2k^2 + 26173440a^9b^4c^6g^2k^2 - 21381120a^8b^6c^5g^2k^2 + 18874368a^{10}b^2c^7g^2k^2 + 501760a^9b^3c^7i^2j^2 + 45 \\
& 2160a^8b^7c^4h^2k^2 + 385920a^7b^9c^3h^2k^2 + 170240a^8b^5c^6i^2j^2 - 48960a^6b^{11}c^2h^2k^2 + 9216a^7b^7c^5i^2j^2 - 1984a^6b^9c^4i^2j^2 + 64a^5b^{11}c^3i^2j^2 + 5898240a^7b^8c^4g^2k^2 + 1 \\
& 419840a^8b^4c^7h^2j^2 + 1387008a^9b^2c^8h^2j^2 - 737280a^6b^{10}c^3g^2k^2 + 84960a^7b^6c^6h^2j^2 + 36864a^5b^{12}c^2g^2k^2 - 8010 \\
& a^6b^8c^5h^2j^2 - 180a^5b^{10}c^4h^2j^2 + 9a^4b^{12}c^3h^2j^2 + 14115840a^9b^3c^7f^2k^2 - 9231552a^7b^7c^5f^2k^2 + 23592960a^7b^6c^6e^2k^2 + 4984320a^8b^5c^6f^2k^2 + 3759040a^6b^9c^4f^2k^2 \\
& + 36190080a^4b^{11}c^4d^2k^2 + 967680a^8b^3c^8g^2j^2 - 727360a^5b^{11}c^3f^2k^2 + 276480a^7b^3c^9h^2i^2 + 161280a^7b^5c^7g^2j^2 + 140544a^6b^5c^8h^2i^2 + 72960a^4b^{13}c^2f^2k^2 + 25344a^5b^7c^7h^2i^2 - 20160a^6b^7c^6g^2j^2 + 576a^5b^9c^5g^2j^2 + 576a^4b^9c^6h^2i^2 + 3808000a^8b^2c^9f^2j^2 - 2949120a^6b^8c^5e^2k^2 \\
& + 1643712a^7b^4c^8f^2j^2 + 884736a^7b^2c^{10}g^2i^2 + 884736a^6b^4c^9g^2i^2 + 221184a^5b^6c^8g^2i^2 + 147456a^5b^{10}c^4e^2k^2 - 125440a^6b^6c^7f^2j^2 - 13790a^5b^8c^6f^2j^2 + 1785a^4b^{10}c^5f^2j^2 - 70a^3b^{12}c^4f^2j^2 - 4953600a^3b^{13}c^3d^2k^2 + 18427392 \\
& a^7b^2c^{10}d^2j^2 + 645120a^7b^3c^9e^2j^2 + 501760a^6b^3c^{10}f^2i^2 + 442944a^2b^{15}c^2d^2k^2 + 414720a^6b^3c^{10}g^2h^2 + 207360a^5b^5c^9g^2h^2 + 170240a^5b^5c^9f^2i^2 - 80640a^6b^5c^8e^2j^2 + 9216a^4b^7c^8f^2i^2 + 5184a^4b^7c^8g^2h^2 + 2304a^5b^7c^7e^2j^2 - 1984a^3b^9c^7f^2i^2 + 64a^2b^{11}c^6f^2i^2 - 4148928a^6b^4c^9d^2j^2 + 3538944a^6b^2c^{11}e^2i^2 + 1684224a^6b^2c^{11}f^2h^2 + 1264320a^5b^4c^{10}f^2h^2 - 1183392a^5b^6c^8d^2j^2 + 884736a^5b^4c^{10}e^2i^2 + 645750a^4b^8c^7d^2j^2 + 126720a^4b^6c^9f^2h^2 - 115920a^3b^{10}c^6d^2j^2 - 13950a^3b^8c^8f^2h^2 + 10836a^2b^{12}c^5d^2j^2 + 225a^2b^{10}c^7f^2h^2 + 1935360a^5b^3c^{11}d^2i^2 + 967680a^5b^3c^{11}f^2g^2 + 829440a^5b^3c^{11}e^2h^2 - 532224a^4b^5c^{10}d^2i^2 + 161280a^4b^5c^{10}f^2g^2 - 96768a^3b^7c^9d^2i^2 + 62784a^2b^9c^8d^2i^2 + 20736a^4b^5c^{10}e^2h^2 - 20160a^3b^7c^9f^2g^2 + 576a^2b^9c^8f^2g^2 + 11487744a^5b^2c^{12}d^2h^2 + 7962624a^5b^2c^{12}e^2g^2 + 35525376a^4b^2c^{13}d^2f^2 - 1412640a^3b^6c^{10}d^2h^2 + 461376a^4b^4c^{11}d^2h^2 + 375030a^2b^8c^9d^2h^2 + 8709120a^4b^3c^{12}d^2g^2 - 4354560a^3b^5c^{11}d^2g^2 + 979776a^2b^7c^{10}d^2g^2 + 645120a^4b^3c^{12}e^2f^2 - 80640a^3b^5c^{11}e^2f^2 + 2304a^2b^7c^{10}e^2f^2 - 15269184a^3b^4c^{12}d^2f^2 + 2870784a^2b^6c^{11}d^2f^2 - 17418240a^3b^3c^{13}d^2e^2 + 3919104a^2b^5c^{12}d^2e^2 + 384a^2b^{18}d^2f^2k^2 - 199229440a^{14}b^2c^3k^4 + 8388608a^{12}c^7i^2k^2 + 75497472a^{10}c^9e^2k^2 + 78400a^8b^{11}j^2k^2 + 4096a^5b^{14}i^2k^2 + 345600a^{10}c^9h^2j^2 + 576a^4b^{15}h^2k^2 + 57937920a^{13}b^4c^2k^4 + 320000a^9c^{10}f^2j^2 + 64a^2b^{17}f^2k^2 + 16934400a^8c^{11}d^2j^2 + 9b^{16}c^3d^2j^2 + 3538944a^7c^{12}e^2i^2 + 115200a^7c^{12}f^2h^2 + 576b^{13}c^6d^2i^2 + 2025b^{12}c^7d^2h^2 + 6096384a^6c^{13}d^2h^2
\end{aligned}$$

$$\begin{aligned}
& + 492800*a^{11}*b^2*c^6*j^4 + 351456*a^{10}*b^4*c^5*j^4 - 43120*a^9*b^6*c^4*j^4 \\
& + 5184*b^{11}*c^8*d^2*g^2 + 1225*a^8*b^8*c^3*j^4 + 131072*a^8*b^2*c^9*i^4 + \\
& 98304*a^7*b^4*c^8*i^4 + 32768*a^6*b^6*c^7*i^4 + 11025*b^{10}*c^9*d^2*f^2 + 4 \\
& 096*a^5*b^8*c^6*i^4 + 5644800*a^5*c^{14}*d^2*f^2 + 142560*a^6*b^4*c^9*h^4 + 1 \\
& 03680*a^7*b^2*c^{10}*h^4 + 32400*a^5*b^6*c^8*h^4 + 20736*b^9*c^{10}*d^2*e^2 + 2 \\
& 025*a^4*b^8*c^7*h^4 + 331776*a^5*b^4*c^{10}*g^4 + 492800*a^5*b^2*c^{12}*f^4 + 3 \\
& 51456*a^4*b^4*c^{11}*f^4 - 43120*a^3*b^6*c^{10}*f^4 + 1225*a^2*b^8*c^9*f^4 - 27 \\
& 433728*a^3*b^2*c^{14}*d^4 + 6446304*a^2*b^4*c^{13}*d^4 + a^2*b^{14}*c^3*f^2*j^2 - \\
& 81920*a^8*b^{11}*i*k^3 + 384000*a^{11}*c^8*h*j^3 + 138240*a^9*c^{10}*h^3*j + 474 \\
& 16320*a^6*c^{13}*d^3*j - 1134*b^{12}*c^7*d^3*j + 7077888*a^6*c^{13}*e^3*i + 26880 \\
& 00*a^{10}*c^9*d*j^3 + 786432*a^8*c^{11}*e*i^3 + 28449792*a^5*c^{14}*d^3*h - 77824 \\
& 00*a^{12}*b^6*c*k^4 + 17010*b^{10}*c^9*d^3*h + 580608*a^7*c^{12}*d*h^3 - 39690*b^ \\
& 9*c^{10}*d^3*f - 734832*a*b^6*c^{12}*d^4 + 268435456*a^{15}*c^4*k^4 + 576*b^{19}*d^ \\
& 2*k^2 + 409600*a^{11}*b^8*k^4 + 160000*a^{12}*c^7*j^4 + 65536*a^9*c^{10}*i^4 + 20 \\
& 736*a^8*c^{11}*h^4 + 49787136*a^4*c^{15}*d^4 + 160000*a^6*c^{13}*f^4 + 5308416*a^ \\
& 5*c^{14}*e^4 + 35721*b^8*c^{11}*d^4, z, n)*((768*a^2*b^{14}*c^6*d - 3145728*a^{10}* \\
& c^{12}*h - 5242880*a^{11}*c^{11}*j - 22020096*a^9*c^{13}*d - 22272*a^3*b^{12}*c^7*d + \\
& 282624*a^4*b^{10}*c^8*d - 2027520*a^5*b^8*c^9*d + 8847360*a^6*b^6*c^{10}*d - 2 \\
& 3396352*a^7*b^4*c^{11}*d + 34603008*a^8*b^2*c^{12}*d + 256*a^3*b^{13}*c^6*f - 921 \\
& 6*a^4*b^{11}*c^7*f + 122880*a^5*b^9*c^8*f - 819200*a^6*b^7*c^9*f + 2949120*a^ \\
& 7*b^5*c^{10}*f - 5505024*a^8*b^3*c^{11}*f + 768*a^4*b^{12}*c^6*h - 12288*a^5*b^{10} \\
& *c^7*h + 61440*a^6*b^8*c^8*h - 983040*a^8*b^4*c^{10}*h + 3145728*a^9*b^2*c^{11} \\
& *h + 256*a^5*b^{12}*c^5*j - 61440*a^7*b^8*c^7*j + 655360*a^8*b^6*c^8*j - 2949 \\
& 120*a^9*b^4*c^9*j + 6291456*a^{10}*b^2*c^{10}*j + 4194304*a^9*b*c^{12}*f)/(512*(4 \\
& 096*a^{10}*c^{10} + a^4*b^{12}*c^4 - 24*a^5*b^{10}*c^5 + 240*a^6*b^8*c^6 - 1280*a^7 \\
& *b^6*c^7 + 3840*a^8*b^4*c^8 - 6144*a^9*b^2*c^9)) + (x*(1572864*a^9*c^{13}*e + \\
& 524288*a^{10}*c^{12}*i - 1536*a^4*b^{10}*c^8*e + 30720*a^5*b^8*c^9*e - 245760*a^ \\
& 6*b^6*c^{10}*e + 983040*a^7*b^4*c^{11}*e - 1966080*a^8*b^2*c^{12}*e + 768*a^4*b^1 \\
& 1*c^7*g - 15360*a^5*b^9*c^8*g + 122880*a^6*b^7*c^9*g - 491520*a^7*b^5*c^{10}* \\
& g + 983040*a^8*b^3*c^{11}*g - 256*a^4*b^{12}*c^6*i + 4608*a^5*b^{10}*c^7*i - 3072 \\
& 0*a^6*b^8*c^8*i + 81920*a^7*b^6*c^9*i - 393216*a^9*b^2*c^{11}*i + 512*a^4*b^1 \\
& 5*c^3*k - 14592*a^5*b^{13}*c^4*k + 178944*a^6*b^{11}*c^5*k - 1223680*a^7*b^9*c^ \\
& 6*k + 5038080*a^8*b^7*c^7*k - 12484608*a^9*b^5*c^8*k + 17235968*a^{10}*b^3*c^ \\
& 9*k - 786432*a^9*b*c^{12}*g - 10223616*a^{11}*b*c^{10}*k))/(64*(4096*a^{10}*c^{10} + \\
& a^4*b^{12}*c^4 - 24*a^5*b^{10}*c^5 + 240*a^6*b^8*c^6 - 1280*a^7*b^6*c^7 + 3840* \\
& a^8*b^4*c^8 - 6144*a^9*b^2*c^9)) + (root(56371445760*a^{11}*b^8*c^{12}*z^4 - 50 \\
& 3316480*a^8*b^{14}*c^9*z^4 + 47185920*a^7*b^{16}*c^8*z^4 - 2621440*a^6*b^{18}*c^7 \\
& *z^4 + 65536*a^5*b^{20}*c^6*z^4 - 171798691840*a^{14}*b^2*c^{15}*z^4 + 1932735283 \\
& 20*a^{13}*b^4*c^{14}*z^4 - 128849018880*a^{12}*b^6*c^{13}*z^4 - 16911433728*a^{10}*b^ \\
& 10*c^{11}*z^4 + 3523215360*a^9*b^{12}*c^{10}*z^4 + 68719476736*a^{15}*c^{16}*z^4 - 47 \\
& 185920*a^7*b^{16}*c^5*k*z^3 + 2621440*a^6*b^{18}*c^4*k*z^3 - 65536*a^5*b^{20}*c^3 \\
& *k*z^3 + 171798691840*a^{14}*b^2*c^{12}*k*z^3 - 193273528320*a^{13}*b^4*c^{11}*k*z^ \\
& 3 + 128849018880*a^{12}*b^6*c^{10}*k*z^3 + 16911433728*a^{10}*b^{10}*c^8*k*z^3 - 35 \\
& 23215360*a^9*b^{12}*c^7*k*z^3 - 56371445760*a^{11}*b^8*c^9*k*z^3 + 503316480*a^ \\
& 8*b^{14}*c^6*k*z^3 - 68719476736*a^{15}*c^{13}*k*z^3 + 1536*a*b^{18}*c^6*d*f*z^2 -
\end{aligned}$$

2571632640*a^9*b^5*c^11*d*j*z^2 + 2548039680*a^9*b^3*c^13*d*h*z^2 + 2453667
 840*a^9*b^7*c^9*e*k*z^2 + 2181038080*a^12*b^3*c^10*i*k*z^2 - 6492782592*a^1
 0*b^5*c^10*e*k*z^2 + 1509949440*a^9*b^3*c^13*e*g*z^2 - 1401421824*a^8*b^5*c
 ^12*d*h*z^2 - 1226833920*a^9*b^8*c^8*g*k*z^2 - 1321205760*a^9*b^2*c^14*d*f*
 z^2 - 2793406464*a^11*b*c^13*d*j*z^2 + 9563013120*a^11*b^3*c^11*e*k*z^2 + 8
 90634240*a^8*b^7*c^10*d*j*z^2 - 754974720*a^8*b^5*c^12*e*g*z^2 - 570425344*
 a^11*b^5*c^9*i*k*z^2 + 732168192*a^7*b^6*c^12*d*f*z^2 - 581959680*a^10*b^4*
 c^11*f*j*z^2 - 603979776*a^10*b^2*c^13*e*i*z^2 + 534773760*a^11*b^3*c^11*h*
 j*z^2 - 558366720*a^8*b^9*c^8*e*k*z^2 - 4781506560*a^11*b^4*c^10*g*k*z^2 -
 2013265920*a^13*b*c^11*i*k*z^2 - 456130560*a^9*b^4*c^12*f*h*z^2 + 384040960
 *a^9*b^6*c^10*f*j*z^2 - 264241152*a^10*b^7*c^8*i*k*z^2 + 390463488*a^7*b^7*
 c^11*d*h*z^2 + 279183360*a^8*b^10*c^7*g*k*z^2 + 301989888*a^10*b^3*c^12*g*i
 *z^2 + 222822400*a^9*b^9*c^7*i*k*z^2 - 366280704*a^6*b^8*c^11*d*f*z^2 - 330
 301440*a^8*b^4*c^13*d*f*z^2 + 254017536*a^8*b^6*c^11*f*h*z^2 - 1887436800*a
 ^10*b*c^14*d*h*z^2 + 188743680*a^10*b^2*c^13*f*h*z^2 - 185303040*a^7*b^9*c^
 9*d*j*z^2 - 117964800*a^10*b^5*c^10*h*j*z^2 - 6039797760*a^12*b*c^12*e*k*z^
 2 - 67502080*a^8*b^11*c^6*i*k*z^2 + 121634816*a^11*b^2*c^12*f*j*z^2 + 18874
 3680*a^7*b^7*c^11*e*g*z^2 - 115671040*a^8*b^8*c^9*f*j*z^2 + 125829120*a^8*b
 ^6*c^11*e*i*z^2 + 10813440*a^7*b^13*c^5*i*k*z^2 + 76677120*a^7*b^11*c^7*e*k
 *z^2 - 38338560*a^7*b^12*c^6*g*k*z^2 - 37355520*a^9*b^7*c^9*h*j*z^2 - 91750
 4*a^6*b^15*c^4*i*k*z^2 + 32768*a^5*b^17*c^3*i*k*z^2 - 62914560*a^8*b^7*c^10
 *g*i*z^2 + 23101440*a^8*b^9*c^8*h*j*z^2 - 4349952*a^7*b^11*c^7*h*j*z^2 + 29
 49120*a^6*b^14*c^5*g*k*z^2 + 337920*a^6*b^13*c^6*h*j*z^2 - 98304*a^5*b^16*c
 ^4*g*k*z^2 - 7680*a^5*b^15*c^5*h*j*z^2 - 61931520*a^7*b^8*c^10*f*h*z^2 + 23
 592960*a^7*b^9*c^9*g*i*z^2 + 17940480*a^7*b^10*c^8*f*j*z^2 - 47185920*a^7*b
 ^8*c^10*e*i*z^2 - 5898240*a^6*b^13*c^6*e*k*z^2 - 3538944*a^6*b^11*c^8*g*i*z
 ^2 - 1347584*a^6*b^12*c^7*f*j*z^2 + 196608*a^5*b^15*c^5*e*k*z^2 + 196608*a^
 5*b^13*c^7*g*i*z^2 + 35840*a^5*b^14*c^6*f*j*z^2 + 96583680*a^5*b^10*c^10*d*
 f*z^2 + 23371776*a^6*b^11*c^8*d*j*z^2 - 51609600*a^6*b^9*c^10*d*h*z^2 + 707
 7888*a^6*b^10*c^9*e*i*z^2 + 6144000*a^6*b^10*c^9*f*h*z^2 - 1677312*a^5*b^13
 *c^7*d*j*z^2 - 393216*a^5*b^12*c^8*e*i*z^2 + 61440*a^5*b^12*c^8*f*h*z^2 + 5
 3760*a^4*b^15*c^6*d*j*z^2 - 46080*a^4*b^14*c^7*f*h*z^2 + 1536*a^3*b^16*c^6*
 f*h*z^2 - 23592960*a^6*b^9*c^10*e*g*z^2 + 1179648*a^5*b^11*c^9*e*g*z^2 + 82
 9440*a^4*b^13*c^8*d*h*z^2 + 368640*a^5*b^11*c^9*d*h*z^2 - 105984*a^3*b^15*c
 ^7*d*h*z^2 + 4608*a^2*b^17*c^6*d*h*z^2 - 15175680*a^4*b^12*c^9*d*f*z^2 + 14
 28480*a^3*b^14*c^8*d*f*z^2 - 73728*a^2*b^16*c^7*d*f*z^2 + 4108320768*a^10*b
 ^3*c^12*d*j*z^2 - 1207959552*a^10*b*c^14*e*g*z^2 - 578813952*a^12*b*c^12*h*
 j*z^2 + 3246391296*a^10*b^6*c^9*g*k*z^2 - 402653184*a^11*b*c^13*g*i*z^2 + 3
 019898880*a^12*b^2*c^11*g*k*z^2 - 440401920*a^10*b*c^14*f^2*z^2 - 188743680
 *a^11*b*c^13*h^2*z^2 + 1761607680*a^10*c^15*d*f*z^2 - 655360*a^6*b^18*c*k^2
 *z^2 - 94464*a*b^17*c^7*d^2*z^2 + 6936330240*a^8*b^3*c^14*d^2*z^2 + 2464874
 496*a^6*b^7*c^12*d^2*z^2 - 3963617280*a^9*b*c^15*d^2*z^2 + 58007224320*a^13
 *b^4*c^8*k^2*z^2 + 14968422400*a^11*b^8*c^6*k^2*z^2 + 805306368*a^11*c^14*e
 *i*z^2 - 35966156800*a^12*b^6*c^7*k^2*z^2 + 419430400*a^12*c^13*f*j*z^2 - 1
 509949440*a^9*b^2*c^14*e^2*z^2 + 251658240*a^11*c^14*f*h*z^2 - 56874762240*

$a^{14}b^2c^9k^2z^2 - 5400428544a^7b^5c^{13}d^2z^2 + 890470400a^9b^{12}c^4k^2z^2 + 754974720a^8b^4c^{13}e^2z^2 - 730054656a^5b^9c^{11}d^2z^2 + 477102080a^{12}b^3c^{10}j^2z^2 + 477102080a^9b^3c^{13}f^2z^2 - 377487360a^9b^4c^{12}g^2z^2 + 301989888a^{10}b^2c^{13}g^2z^2 - 174325760a^{11}b^5c^9j^2z^2 - 126156800a^8b^{14}c^3k^2z^2 + 188743680a^8b^6c^{11}g^2z^2 + 141557760a^{10}b^3c^{12}h^2z^2 - 174325760a^8b^5c^{12}f^2z^2 - 188743680a^7b^6c^{12}e^2z^2 - 4350935040a^{10}b^{10}c^5k^2z^2 + 146165760a^4b^{11}c^{10}d^2z^2 - 50331648a^{10}b^4c^{11}i^2z^2 + 11796480a^7b^{16}c^2k^2z^2 - 33554432a^{11}b^2c^{12}i^2z^2 + 11206656a^{10}b^7c^8j^2z^2 + 8929280a^9b^9c^7j^2z^2 + 20971520a^9b^6c^{10}i^2z^2 - 2600960a^8b^{11}c^6j^2z^2 + 291840a^7b^{13}c^5j^2z^2 - 14080a^6b^{15}c^4j^2z^2 + 256a^5b^{17}c^3j^2z^2 - 47185920a^7b^8c^{10}g^2z^2 - 26542080a^8b^7c^{10}h^2z^2 - 2752512a^7b^{10}c^8i^2z^2 + 2621440a^8b^8c^9i^2z^2 + 524288a^6b^{12}c^7i^2z^2 - 32768a^5b^{14}c^6i^2z^2 + 9584640a^7b^9c^9h^2z^2 - 2359296a^9b^5c^{11}h^2z^2 - 1290240a^6b^{11}c^8h^2z^2 + 46080a^5b^{13}c^7h^2z^2 + 2304a^4b^{15}c^6h^2z^2 + 5898240a^6b^{10}c^9g^2z^2 - 294912a^5b^{12}c^8g^2z^2 + 11206656a^7b^7c^{11}f^2z^2 + 8929280a^6b^9c^{10}f^2z^2 + 23592960a^6b^8c^{11}e^2z^2 - 2600960a^5b^{11}c^9f^2z^2 + 291840a^4b^{13}c^8f^2z^2 - 14080a^3b^{15}c^7f^2z^2 + 256a^2b^{17}c^6f^2z^2 - 19860480a^3b^{13}c^9d^2z^2 - 1179648a^5b^{10}c^{10}e^2z^2 + 1771776a^2b^{15}c^8d^2z^2 - 440401920a^{13}b^3c^{11}j^2z^2 + 1207959552a^{10}c^{15}e^2z^2 + 134217728a^{12}c^{13}i^2z^2 + 25769803776a^{15}c^{10}k^2z^2 + 16384a^5b^{20}k^2z^2 + 2304b^{19}c^6d^2z^2 + 165150720a^9b^3c^{12}d^2g^2j^2z + 23592960a^{10}b^3c^{11}g^2h^2j^2z + 169869312a^7b^3c^{14}d^2e^2f^2z + 99090432a^8b^3c^{13}d^2g^2h^2z - 3145728a^9b^3c^{12}f^2h^2i^2z + 56623104a^8b^3c^{13}d^2f^2i^2z - 1536a^3b^{18}c^3d^2f^2k^2z - 9437184a^8b^3c^{13}e^2f^2h^2z + 1536a^3b^{15}c^6d^2f^2i^2z - 4608a^3b^{14}c^7d^2f^2g^2z + 9216a^3b^{13}c^8d^2e^2f^2z + 2173501440a^9b^5c^8d^2j^2k^2z - 1987706880a^9b^3c^{10}d^2h^2k^2z + 1121255424a^8b^5c^9d^2h^2k^2z + 861143040a^8b^4c^{10}d^2f^2k^2z - 859963392a^7b^6c^9d^2f^2k^2z - 780779520a^8b^7c^7d^2j^2k^2z - 754974720a^9b^3c^{10}e^2g^2k^2z + 2222456832a^{11}b^3c^{10}d^2j^2k^2z - 454164480a^{11}b^3c^8h^2j^2k^2z + 377487360a^8b^5c^9e^2g^2k^2z + 290979840a^{10}b^4c^8f^2j^2k^2z + 381026304a^6b^8c^8d^2f^2k^2z + 412876800a^8b^2c^{12}d^2e^2j^2z + 301989888a^{10}b^2c^{10}e^2i^2k^2z - 320421888a^7b^7c^8d^2h^2k^2z + 185794560a^{10}b^5c^7h^2j^2k^2z - 192020480a^9b^6c^7f^2j^2k^2z + 190709760a^9b^4c^9f^2h^2k^2z - 150994944a^{10}b^3c^9g^2i^2k^2z + 168990720a^7b^9c^6d^2j^2k^2z + 235929600a^9b^2c^{11}d^2f^2k^2z - 206438400a^8b^3c^{11}d^2g^2j^2z - 206438400a^7b^4c^{11}d^2e^2j^2z - 101646336a^8b^6c^8f^2h^2k^2z - 29245440a^9b^7c^6h^2j^2k^2z - 60817408a^{11}b^2c^9f^2j^2k^2z + 57835520a^8b^8c^6f^2j^2k^2z + 219414528a^7b^2c^{13}d^2e^2h^2z - 70778880a^{10}b^2c^{10}f^2h^2k^2z + 677376a^7b^{11}c^4h^2j^2k^2z - 645120a^8b^9c^5h^2j^2k^2z - 53760a^6b^{13}c^3h^2j^2k^2z + 31457280a^8b^7c^7g^2i^2k^2z - 62914560a^8b^6c^8e^2i^2k^2z - 94371840a^7b^7c^8e^2g^2k^2z - 221773824a^6b^3c^{13}d^2e^2f^2z + 82575360a^9b^2c^{11}d^2i^2j^2z + 11796480a^{10}b^2c^{10}h^2i^2j^2z - 11796480a^7b^9c^6g^2i^2k^2z - 8970240a^7b^{10}c^5f^2j^2k^2z + 103219200a^7b^5c^{10}d^2g^2j^2z -$

$2457600a^8b^6c^8h^i j^*z + 1769472a^6b^{11}c^5g^i k^*z + 921600a^7b^8c^7h^i j^*z + 673792a^6b^{12}c^4f^j k^*z - 138240a^6b^{10}c^6h^i j^*z - 98304a^5b^{13}c^4g^i k^*z - 17920a^5b^{14}c^3f^j k^*z + 7680a^5b^{12}c^5h^i j^*z - 97136640a^5b^{10}c^7d^f k^*z - 29491200a^9b^3c^{10}g^h j^*z + 58982400a^9b^2c^{11}e^h j^*z + 23592960a^7b^8c^7e^i k^*z - 22169088a^6b^{11}c^5d^j k^*z + 21381120a^7b^8c^7f^h k^*z + 14745600a^8b^5c^9g^h j^*z + 42854400a^6b^9c^7d^h k^*z - 109707264a^7b^3c^{12}d^g h^*z - 3686400a^7b^7c^8g^h j^*z - 3538944a^6b^{10}c^6e^i k^*z + 1645056a^5b^{13}c^4d^j k^*z - 890880a^6b^{10}c^6f^h k^*z + 460800a^6b^9c^7g^h j^*z - 330240a^5b^{12}c^5f^h k^*z + 196608a^5b^{12}c^5e^i k^*z - 53760a^4b^{15}c^3d^j k^*z + 46080a^4b^{14}c^4f^h k^*z - 23040a^5b^{11}c^6g^h j^*z - 1536a^3b^{16}c^3f^h k^*z - 29491200a^8b^4c^{10}e^h j^*z - 17203200a^7b^6c^9d^i j^*z + 11796480a^6b^9c^7e^g k^*z + 110886912a^6b^4c^{12}d^f g^*z + 7372800a^7b^6c^9e^h j^*z + 40108032a^8b^2c^{12}d^h i^*z + 6451200a^6b^8c^8d^i j^*z + 2359296a^8b^3c^{11}f^h i^*z - 967680a^5b^{10}c^7d^i j^*z - 921600a^6b^8c^8e^h j^*z - 829440a^4b^{13}c^5d^h k^*z - 589824a^5b^{11}c^6e^g k^*z - 491520a^6b^7c^9f^h i^*z + 184320a^5b^9c^8f^h i^*z + 105984a^3b^{15}c^4d^h k^*z + 69120a^5b^{11}c^6d^h k^*z + 53760a^4b^{12}c^6d^i j^*z + 46080a^5b^{10}c^7e^h j^*z - 27648a^4b^{11}c^7f^h i^*z - 4608a^2b^{17}c^3d^h k^*z + 1536a^3b^{13}c^6f^h i^*z - 25804800a^6b^7c^9d^g j^*z - 88473600a^6b^4c^{12}d^e h^*z + 51609600a^6b^6c^{10}d^e j^*z - 84934656a^7b^2c^{13}d^f g^*z + 117964800a^5b^5c^{12}d^e f^*z + 15160320a^4b^{12}c^6d^f k^*z - 45613056a^7b^3c^{12}d^f i^*z + 44236800a^6b^5c^{11}d^g h^*z - 10321920a^6b^6c^{10}d^h i^*z + 7077888a^7b^4c^{11}d^h i^*z - 5898240a^7b^4c^{11}f^g h^*z + 4718592a^8b^2c^{12}f^g h^*z + 3225600a^5b^9c^8d^g j^*z + 2949120a^6b^6c^{10}f^g h^*z + 2396160a^5b^8c^9d^h i^*z - 1428480a^3b^{14}c^5d^f k^*z - 737280a^5b^8c^9f^g h^*z - 161280a^4b^{11}c^7d^g j^*z + 92160a^4b^{10}c^8f^g h^*z + 73728a^2b^{16}c^4d^f k^*z - 50688a^3b^{12}c^7d^h i^*z - 27648a^4b^{10}c^8d^h i^*z - 4608a^3b^{12}c^7f^g h^*z + 4608a^2b^{14}c^6d^h i^*z - 58982400a^5b^6c^{11}d^f g^*z + 11796480a^7b^3c^{12}e^f h^*z + 8847360a^5b^7c^{10}d^f i^*z - 6635520a^5b^7c^{10}d^g h^*z - 6451200a^5b^8c^9d^e j^*z - 5898240a^6b^5c^{11}e^f h^*z - 3809280a^4b^9c^9d^f i^*z + 2359296a^6b^5c^{11}d^f i^*z + 1474560a^5b^7c^{10}e^f h^*z + 681984a^3b^{11}c^8d^f i^*z + 322560a^4b^{10}c^8d^e j^*z - 276480a^4b^9c^9d^g h^*z - 184320a^4b^9c^9e^f h^*z + 179712a^3b^{11}c^8d^g h^*z - 55296a^2b^{13}c^7d^f i^*z - 13824a^2b^{13}c^7d^g h^*z + 9216a^3b^{11}c^8e^f h^*z + 16220160a^4b^8c^{10}d^f g^*z + 13271040a^5b^6c^{11}d^e h^*z - 2396160a^3b^{10}c^9d^f g^*z + 552960a^4b^8c^{10}d^e h^*z - 359424a^3b^{10}c^9d^e h^*z + 175104a^2b^{12}c^8d^f g^*z + 27648a^2b^{12}c^8d^e h^*z - 32440320a^4b^7c^{11}d^e f^*z + 4792320a^3b^9c^{10}d^e f^*z - 350208a^2b^{11}c^9d^e f^*z + 1439170560a^{10}b^c^{11}d^h k^*z - 3361603584a^{10}b^3c^9d^j k^*z + 603979776a^{10}b^c^{11}e^g k^*z + 407371776a^{12}b^c^9h^j k^*z + 201326592a^{11}b^c^{10}g^i k^*z + 346816512a^7b^c^{14}d^2g^*z + 129761280a^{11}b^c^{10}h^2k^*z + 121896960a^{10}b^c^{11}f^2k^*z + 458752a^6b^{15}c^i k^2z + 19660800a^{11}b^c^{10}g^j^2z + 49152a^5b^{16}c^g k^2z + 7$

$077888a^9b^c^{12}g^h^2z + 94464a^*b^{17}c^4d^2k^*z - 19660800a^8b^c^{13}f^2g^*z - 66816a^*b^{14}c^7d^2i^*z + 214272a^*b^{13}c^8d^2g^*z - 428544a^*b^{12}c^9d^2e^*z + 2390753280a^{11}b^4c^7g^*k^2z - 2411421696a^6b^7c^9d^2k^*z - 6603079680a^8b^3c^{11}d^2k^*z + 3715891200a^9b^c^{12}d^2k^*z - 880803840a^{10}c^{12}d^*f^*k^*z - 1623195648a^{10}b^6c^6g^*k^2z - 402653184a^{11}c^{11}e^*i^*k^*z - 1509949440a^{12}b^2c^8g^*k^2z - 209715200a^{12}c^{10}f^*j^*k^*z - 330301440a^9c^{13}d^*e^*j^*z + 3019898880a^{12}b^c^9e^*k^2z - 125829120a^{11}c^{11}f^*h^*k^*z - 110100480a^{10}c^{12}d^*i^*j^*z - 198180864a^8c^{14}d^*e^*h^*z - 15728640a^{11}c^{11}h^*i^*j^*z - 1226833920a^9b^7c^6e^*k^2z - 47185920a^{10}c^{12}e^*h^*j^*z - 66060288a^9c^{13}d^*h^*i^*z - 1090519040a^{12}b^3c^7i^*k^2z + 1022754816a^6b^2c^{14}d^2e^*z + 5216108544a^7b^5c^{10}d^2k^*z + 754974720a^9b^2c^{11}e^2k^*z + 721529856a^5b^9c^8d^2k^*z + 613416960a^9b^8c^5g^*k^2z - 642318336a^5b^4c^{13}d^2e^*z - 4781506560a^{11}b^3c^8e^*k^2z - 398131200a^{12}b^3c^7j^2k^*z - 511377408a^6b^3c^{13}d^2g^*z - 377487360a^8b^4c^{10}e^2k^*z + 285212672a^{11}b^5c^6i^*k^2z + 199065600a^{11}b^5c^6j^2k^*z + 279183360a^8b^9c^5e^*k^2z + 321159168a^5b^5c^{12}d^2g^*z + 188743680a^9b^4c^9g^2k^*z + 132120576a^{10}b^7c^5i^*k^2z - 150994944a^{10}b^2c^{10}g^2k^*z - 111411200a^9b^9c^4i^*k^2z - 126812160a^{10}b^3c^9h^2k^*z + 225312768a^7b^2c^{13}d^2i^*z - 139591680a^8b^{10}c^4g^*k^2z - 49766400a^{10}b^7c^5j^2k^*z - 145463040a^4b^{11}c^7d^2k^*z - 94371840a^8b^6c^8g^2k^*z + 223395840a^4b^6c^{12}d^2e^*z + 33751040a^8b^{11}c^3i^*k^2z - 78970880a^9b^3c^{10}f^2k^*z + 94371840a^7b^6c^9e^2k^*z + 25165824a^{10}b^4c^8i^2k^*z + 6220800a^9b^9c^4j^2k^*z + 39223296a^9b^5c^8h^2k^*z - 311040a^8b^{11}c^3j^2k^*z + 16777216a^{11}b^2c^9i^2k^*z - 10485760a^9b^6c^7i^2k^*z - 5406720a^7b^{13}c^2i^*k^2z + 1376256a^7b^{10}c^5i^2k^*z - 1310720a^8b^8c^6i^2k^*z - 262144a^6b^{12}c^4i^2k^*z + 16384a^5b^{14}c^3i^2k^*z + 10354688a^{11}b^2c^9i^*j^2z + 23592960a^7b^8c^7g^2k^*z + 38559744a^7b^7c^8f^2k^*z + 19169280a^7b^{12}c^3g^*k^2z - 2048000a^9b^6c^7i^*j^2z - 1520640a^7b^9c^6h^2k^*z - 1105920a^8b^7c^7h^2k^*z + 849920a^8b^8c^6i^*j^2z - 393216a^{10}b^4c^8i^*j^2z + 195840a^6b^{11}c^5h^2k^*z - 145920a^7b^{10}c^5i^*j^2z + 11520a^5b^{13}c^4h^2k^*z + 11008a^6b^{12}c^4i^*j^2z - 2304a^4b^{15}c^3h^2k^*z - 256a^5b^{14}c^3i^*j^2z - 25362432a^{10}b^3c^9g^*j^2z - 24739840a^8b^5c^9f^2k^*z - 38338560a^7b^{11}c^4e^*k^2z - 2949120a^6b^{10}c^6g^2k^*z - 1474560a^6b^{14}c^2g^*k^2z + 50724864a^{10}b^2c^{10}e^*j^2z + 147456a^5b^{12}c^5g^2k^*z - 15150080a^6b^9c^7f^2k^*z + 13271040a^9b^5c^8g^*j^2z - 111697920a^4b^7c^{11}d^2g^*z - 3563520a^8b^7c^7g^*j^2z + 3538944a^9b^2c^{11}h^2i^*z + 2912000a^5b^{11}c^6f^2k^*z - 737280a^7b^6c^9h^2i^*z + 506880a^7b^9c^6g^*j^2z - 291840a^4b^{13}c^5f^2k^*z + 276480a^6b^8c^8h^2i^*z - 41472a^5b^{10}c^7h^2i^*z - 34560a^6b^{11}c^5g^*j^2z + 14080a^3b^{15}c^4f^2k^*z + 2304a^4b^{12}c^6h^2i^*z + 768a^5b^{13}c^4g^*j^2z - 256a^2b^{17}c^3f^2k^*z - 11796480a^6b^8c^8e^2k^*z - 26542080a^9b^4c^9e^*j^2z + 19837440a^3b^{13}c^6d^2k^*z + 2949120a^6b^{13}c^3e^*k^2z + 589824a^5b^{10}c^7e^2k^*z - 98304a^5b^{15}c^2e^*k^2z - 10354688a^8b^2c^{12}f^2i^*z - 436$

$46976a^6b^4c^{12}d^2i^*z - 8847360a^8b^3c^{11}g^*h^2z + 7127040a^8b^6c^8e^*j^2z + 4423680a^7b^5c^{10}g^*h^2z + 2048000a^6b^6c^{10}f^2i^*z - 1771776a^2b^{15}c^5d^2k^*z - 1105920a^6b^7c^9g^*h^2z - 1013760a^7b^8c^7e^*j^2z - 849920a^5b^8c^9f^2i^*z + 393216a^7b^4c^{11}f^2i^*z + 145920a^4b^{10}c^8f^2i^*z + 138240a^5b^9c^8g^*h^2z + 69120a^6b^{10}c^6e^*j^2z - 11008a^3b^{12}c^7f^2i^*z - 6912a^4b^{11}c^7g^*h^2z - 1536a^5b^{12}c^5e^*j^2z + 256a^2b^{14}c^6f^2i^*z - 32587776a^5b^6c^{11}d^2i^*z + 25362432a^7b^3c^{12}f^2g^*z + 21657600a^4b^8c^{10}d^2i^*z + 17694720a^8b^2c^{12}e^*h^2z - 50724864a^7b^2c^{13}e^*f^2z - 13271040a^6b^5c^{11}f^2g^*z - 8847360a^7b^4c^{11}e^*h^2z - 5810688a^3b^{10}c^9d^2i^*z + 3563520a^5b^7c^{10}f^2g^*z + 2211840a^6b^6c^{10}e^*h^2z + 845568a^2b^{12}c^8d^2i^*z - 506880a^4b^9c^9f^2g^*z - 276480a^5b^8c^9e^*h^2z + 34560a^3b^{11}c^8f^2g^*z + 13824a^4b^{10}c^8e^*h^2z - 768a^2b^{13}c^7f^2g^*z + 26542080a^6b^4c^{12}e^*f^2z + 23362560a^3b^9c^{10}d^2g^*z - 46725120a^3b^8c^{11}d^2e^*z - 7127040a^5b^6c^{11}e^*f^2z - 2965248a^2b^{11}c^9d^2g^*z + 1013760a^4b^8c^{10}e^*f^2z - 69120a^3b^{10}c^9e^*f^2z + 1536a^2b^{12}c^8e^*f^2z + 5930496a^2b^{10}c^{10}d^2e^*z + 1006632960a^{13}b^*c^8i^*k^2z + 3246391296a^{10}b^5c^7e^*k^2z + 318504960a^{13}b^*c^8j^2k^*z + 61538304a^{10}b^{10}c^2k^3z - 603979776a^{10}c^{12}e^2k^*z - 693633024a^7c^{15}d^2e^*z - 231211008a^8c^{14}d^2i^*z - 67108864a^{12}c^{10}i^2k^*z - 13107200a^{12}c^{10}i^*j^2z - 16384a^5b^{17}i^*k^2z - 3932160a^{11}c^{11}e^*j^2z - 4718592a^{10}c^{12}h^2i^*z - 2304b^{19}c^3d^2k^*z + 13107200a^9c^{13}f^2i^*z + 2304b^{16}c^6d^2i^*z - 14155776a^9c^{13}e^*h^2z + 39321600a^8c^{14}e^*f^2z - 4833280a^9b^{12}c^*k^3z - 6912b^{15}c^7d^2g^*z + 6962544640a^{14}b^2c^6k^3z + 13824b^{14}c^8d^2e^*z + 1876951040a^{12}b^6c^4k^3z - 4844421120a^{13}b^4c^5k^3z - 437780480a^{11}b^8c^3k^3z - 4294967296a^{15}c^7k^3z + 163840a^8b^{14}k^3z + 6144000a^{10}b^*c^8f^*i^*j^*k - 5898240a^{10}b^*c^8g^*h^*j^*k - 41287680a^9b^*c^9d^*g^*j^*k + 4472832a^9b^*c^9f^*h^*i^*k + 18432000a^9b^*c^9e^*f^*j^*k + 3391488a^8b^*c^{10}e^*h^*i^*j + 1228800a^8b^*c^{10}f^*g^*i^*j - 24772608a^8b^*c^{10}d^*g^*h^*k + 13418496a^8b^*c^{10}e^*f^*h^*k + 11649024a^8b^*c^{10}d^*f^*i^*k + 737280a^7b^*c^{11}f^*g^*h^*i - 768a^*b^{15}c^3d^*f^*i^*k - 19307520a^7b^*c^{11}d^*f^*h^*j + 16367616a^7b^*c^{11}d^*e^*i^*j + 3686400a^7b^*c^{11}e^*f^*g^*j + 34947072a^7b^*c^{11}d^*e^*f^*k + 2304a^*b^{14}c^4d^*f^*g^*k - 180a^*b^{13}c^5d^*f^*h^*j + 11059200a^6b^*c^{12}d^*e^*h^*i + 5160960a^6b^*c^{12}d^*f^*g^*i + 2211840a^6b^*c^{12}e^*f^*g^*h - 4608a^*b^{13}c^5d^*e^*f^*k - 2304a^*b^{11}c^7d^*f^*g^*i + 4608a^*b^{10}c^8d^*e^*f^*i + 15482880a^5b^*c^{13}d^*e^*f^*g - 13824a^*b^9c^9d^*e^*f^*g - 225976320a^8b^2c^9d^*e^*j^*k + 112988160a^8b^3c^8d^*g^*j^*k - 11427840a^{10}b^2c^7h^*i^*j^*k - 4177920a^9b^4c^6h^*i^*j^*k + 1399296a^8b^6c^5h^*i^*j^*k - 26880a^6b^{10}c^3h^*i^*j^*k + 16128a^7b^8c^4h^*i^*j^*k - 61562880a^9b^2c^8d^*i^*j^*k + 20090880a^9b^3c^7g^*h^*j^*k + 119623680a^7b^4c^8d^*e^*j^*k + 10485760a^9b^3c^7f^*i^*j^*k - 40181760a^9b^2c^8e^*h^*j^*k - 3778560a^8b^5c^6g^*h^*j^*k - 137797632a^7b^2c^{10}d^*e^*h^*k - 1248768a^7b^7c^5f^*i^*j^*k + 229376a^6b^9c^4f^*i^*j^*k + 220160a^8b^5c^6f^*i^*j^*k - 209664a^7b^7c^5g^*h^*j^*k + 80640a^6b^9c^4g^*h^*j^*k - 8960a^5b^{11}c^3f^*i^*j^*k - 59811840a^7b^5c^7*$

$d*g*j*k + 53084160*a^8*b^2*c^9*e*g*i*k - 11120640*a^8*b^4*c^7*f*g*j*k + 104$
 $55552*a^7*b^6*c^6*d*i*j*k - 9216000*a^9*b^2*c^8*f*g*j*k + 7557120*a^8*b^4*c$
 $^7*e*h*j*k + 7397376*a^8*b^3*c^8*f*h*i*k + 5230080*a^7*b^6*c^6*f*g*j*k - 37$
 $675008*a^8*b^2*c^9*d*h*i*k - 3633408*a^6*b^8*c^5*d*i*j*k + 2211840*a^8*b^4*$
 $c^7*d*i*j*k + 68898816*a^7*b^3*c^9*d*g*h*k - 1695744*a^8*b^2*c^9*g*h*i*j -$
 $1400832*a^7*b^4*c^8*g*h*i*j + 967680*a^7*b^5*c^7*f*h*i*k - 783360*a^6*b^7*c$
 $^6*f*h*i*k - 741888*a^6*b^8*c^5*f*g*j*k + 499968*a^5*b^10*c^4*d*i*j*k + 419$
 $328*a^7*b^6*c^6*e*h*j*k - 253440*a^6*b^6*c^7*g*h*i*j - 161280*a^6*b^8*c^5*e$
 $*h*j*k + 42240*a^5*b^9*c^5*f*h*i*k + 26880*a^5*b^10*c^4*f*g*j*k - 26880*a^4$
 $*b^12*c^3*d*i*j*k + 13824*a^4*b^11*c^4*f*h*i*k + 11520*a^5*b^8*c^6*g*h*i*j$
 $- 768*a^3*b^13*c^3*f*h*i*k + 22241280*a^8*b^3*c^8*e*f*j*k + 14222592*a^6*b^7$
 $c^6*d*g*j*k - 10460160*a^7*b^5*c^7*e*f*j*k + 8847360*a^7*b^4*c^8*e*g*i*k$
 $- 7741440*a^7*b^4*c^8*f*g*h*k - 7077888*a^6*b^6*c^7*e*g*i*k + 6935040*a^6*b$
 $^6*c^7*d*h*i*k - 6709248*a^8*b^2*c^9*f*g*h*k - 3612672*a^7*b^4*c^8*d*h*i*k$
 $+ 2801664*a^7*b^3*c^9*e*h*i*j + 2506752*a^7*b^3*c^9*f*g*i*j + 2419200*a^6*b$
 $^6*c^7*f*g*h*k - 1661184*a^5*b^9*c^5*d*g*j*k + 1483776*a^6*b^7*c^6*e*f*j*k$
 $- 1463040*a^5*b^8*c^6*d*h*i*k + 884736*a^5*b^8*c^6*e*g*i*k + 838656*a^6*b^5$
 $*c^8*f*g*i*j + 506880*a^6*b^5*c^8*e*h*i*j + 80640*a^4*b^11*c^4*d*g*j*k - 53$
 $760*a^5*b^9*c^5*e*f*j*k - 53760*a^5*b^7*c^7*f*g*i*j - 46080*a^4*b^10*c^5*f*$
 $g*h*k - 34560*a^5*b^8*c^6*f*g*h*k + 25344*a^3*b^12*c^4*d*h*i*k - 23040*a^5*$
 $b^7*c^7*e*h*i*j + 13824*a^4*b^10*c^5*d*h*i*k + 2304*a^3*b^12*c^4*f*g*h*k -$
 $2304*a^2*b^14*c^3*d*h*i*k - 29030400*a^6*b^5*c^8*d*g*h*k + 28606464*a^7*b^3$
 $*c^9*d*f*i*k - 28445184*a^6*b^6*c^7*d*e*j*k + 58060800*a^6*b^4*c^9*d*e*h*k$
 $+ 15482880*a^7*b^3*c^9*e*f*h*k - 8183808*a^7*b^2*c^10*d*g*i*j - 6718464*a^6$
 $*b^5*c^8*d*f*i*k - 5087232*a^7*b^2*c^10*e*g*h*j - 5013504*a^7*b^2*c^10*e*f*$
 $i*j - 4838400*a^6*b^5*c^8*e*f*h*k + 4112640*a^5*b^7*c^7*d*g*h*k - 3663360*a$
 $^5*b^7*c^7*d*f*i*k + 3322368*a^5*b^8*c^6*d*e*j*k - 2285568*a^6*b^4*c^9*d*g*$
 $i*j + 1896960*a^4*b^9*c^6*d*f*i*k + 1843200*a^6*b^3*c^10*f*g*h*i - 1677312*$
 $a^6*b^4*c^9*e*f*i*j - 1658880*a^6*b^4*c^9*e*g*h*j + 68345856*a^6*b^3*c^10*d$
 $*e*f*k + 783360*a^5*b^5*c^9*f*g*h*i + 741888*a^5*b^6*c^8*d*g*i*j - 34172928$
 $*a^6*b^4*c^9*d*f*g*k - 340992*a^3*b^11*c^5*d*f*i*k - 161280*a^4*b^10*c^5*d*$
 $e*j*k + 138240*a^4*b^9*c^6*d*g*h*k + 107520*a^5*b^6*c^8*e*f*i*j + 92160*a^4$
 $*b^9*c^6*e*f*h*k - 89856*a^3*b^11*c^5*d*g*h*k - 80640*a^4*b^8*c^7*d*g*i*j +$
 $69120*a^5*b^7*c^7*e*f*h*k + 69120*a^5*b^6*c^8*e*g*h*j + 27648*a^2*b^13*c^4$
 $*d*f*i*k + 18432*a^4*b^7*c^8*f*g*h*i + 6912*a^2*b^13*c^4*d*g*h*k - 4608*a^3$
 $*b^11*c^5*e*f*h*k - 2304*a^3*b^9*c^7*f*g*h*i + 27164160*a^5*b^6*c^8*d*f*g*k$
 $- 22164480*a^6*b^3*c^10*d*f*h*j - 54328320*a^5*b^5*c^9*d*e*f*k - 17473536*$
 $a^7*b^2*c^10*d*f*g*k - 8225280*a^5*b^6*c^8*d*e*h*k - 8087040*a^4*b^8*c^7*d*$
 $f*g*k + 5677056*a^6*b^3*c^10*e*f*g*j - 5529600*a^6*b^2*c^11*d*g*h*i + 45711$
 $36*a^6*b^3*c^10*d*e*i*j - 3686400*a^6*b^2*c^11*e*f*h*i + 2805120*a^5*b^5*c^9$
 $d*f*h*j - 2211840*a^5*b^4*c^10*d*g*h*i - 1566720*a^5*b^4*c^10*e*f*h*i - 1$
 $483776*a^5*b^5*c^9*d*e*i*j + 1198080*a^3*b^10*c^6*d*f*g*k + 437184*a^4*b^7*$
 $c^8*d*f*h*j - 322560*a^5*b^5*c^9*e*f*g*j + 317952*a^4*b^6*c^9*d*g*h*i - 276$
 $480*a^4*b^8*c^7*d*e*h*k + 179712*a^3*b^10*c^6*d*e*h*k + 161280*a^4*b^7*c^8*$
 $d*e*i*j - 146268*a^3*b^9*c^7*d*f*h*j - 87552*a^2*b^12*c^5*d*f*g*k - 36864*a$

$$\begin{aligned}
&^4b^6c^9efh^i - 13824a^2b^{12}c^5deh^k + 9360a^2b^{11}c^6dfh^j \\
&+ 6912a^3b^8c^8dgh^i - 6912a^2b^{10}c^7dgh^i + 4608a^3b^8c^8 \\
&efh^i - 24551424a^6b^2c^{11}deeg^j + 16174080a^4b^7c^8deefk + 54 \\
&19008a^5b^4c^{10}deeg^j + 5160960a^5b^3c^{11}dfg^i + 4423680a^5b^3 \\
&c^{11}efgh + 4423680a^5b^3c^{11}deeh^i - 2396160a^3b^9c^7deefk \\
&- 635904a^4b^5c^{10}deeh^i - 483840a^4b^6c^9deeg^j - 354816a^3b^7 \\
&c^9dfg^i + 322560a^4b^5c^{10}dfg^i + 175104a^2b^{11}c^6deefk + \\
&138240a^4b^5c^{10}efgh + 59904a^2b^9c^8dfg^i - 13824a^3b^7c^9 \\
&efgh - 13824a^3b^7c^9deeh^i + 13824a^2b^9c^8deeh^i - 16588800 \\
&a^5b^2c^{12}degh - 10321920a^5b^2c^{12}def^i + 1658880a^4b^4c^1 \\
&1degh + 709632a^3b^6c^{10}def^i - 645120a^4b^4c^{11}def^i + 124 \\
&416a^3b^6c^{10}degh - 119808a^2b^8c^9def^i - 41472a^2b^8c^9d \\
&efgh + 7741440a^4b^3c^{12}defg - 2903040a^3b^5c^{11}defg + 3870 \\
&72a^2b^7c^{10}defg - 381026304a^{11}b^c^7d^j^k^2 - 241827840a^{10}b^c \\
&^8d^h^k^2 - 65667072a^{12}b^c^6h^j^k^2 - 169344a^7b^{11}c^h^j^k^2 - 2516 \\
&5824a^{11}b^c^7g^i^k^2 - 4915200a^{11}b^c^7g^j^2k - 53084160a^8b^c^{10} \\
&e^2i^k - 75497472a^{10}b^c^8eg^k^2 - 86704128a^7b^c^{11}d^2g^k + 56524 \\
&8a^9b^c^9h^i^2j - 168448a^6b^{12}c^f^j^k^2 - 24576a^5b^{13}c^g^i^k^2 \\
&- 1769472a^9b^c^9g^h^2k - 17694720a^9b^c^9e^i^2k - 411264a^5b^{13} \\
&c^d^j^k^2 - 11520a^4b^{14}c^f^h^k^2 + 4915200a^8b^c^{10}f^2g^k + 2580480 \\
&a^9b^c^9e^i^j^2 - 2496000a^9b^c^9f^h^j^2 - 1543680a^8b^c^{10}f^h^2j \\
&+ 33408a^b^{14}c^4d^2i^k - 59512320a^6b^c^{12}d^2f^j + 5087232a^7b^c \\
&^{11}e^2h^j + 2727936a^8b^c^{10}d^i^2j - 26496a^3b^{15}c^d^h^k^2 + 11059 \\
&20a^7b^c^{11}e^h^2i - 107136a^b^{13}c^5d^2g^k + 10260a^b^{12}c^6d^2h^j \\
&j - 10616832a^6b^c^{12}e^2g^i - 3538944a^7b^c^{11}e^g^i^2 + 1843200a^7b \\
&^c^{11}d^h^i^2 - 18432a^2b^{16}c^d^f^k^2 - 15552000a^8b^c^{10}d^f^j^2 + 2 \\
&4551424a^6b^c^{12}d^e^2j - 37062144a^5b^c^{13}d^2f^h + 2580480a^6b^c \\
&^{12}e^f^2i + 214272a^b^{12}c^6d^2e^k + 65664a^b^{10}c^8d^2g^i - 25074a \\
&^b^{11}c^7d^2f^j + 420a^b^{12}c^6d^f^2j + 6a^b^{15}c^3d^f^j^2 + 2322432 \\
&0a^5b^c^{13}d^2e^i + 384a^b^{12}c^6d^f^i^2 - 5985792a^6b^c^{12}d^f^h^2 \\
&+ 206010a^b^9c^9d^2f^h - 131328a^b^9c^9d^2e^i - 6300a^b^{10}c^8d^f \\
&^2h + 1350a^b^{11}c^7d^f^h^2 + 16588800a^5b^c^{13}d^e^2h + 3456a^b^{10}c \\
&^8d^f^g^2 + 435456a^b^8c^{10}d^2e^g + 13824a^b^8c^{10}d^e^2f + 393216 \\
&0a^{11}c^8h^i^j^k + 27525120a^{10}c^9d^i^j^k + 82575360a^9c^{10}d^e^j^k \\
&+ 11796480a^{10}c^9e^h^j^k + 16515072a^9c^{10}d^h^i^k + 49545216a^8c^{11} \\
&d^e^h^k - 2457600a^8c^{11}e^f^i^j - 1474560a^7c^{12}e^f^h^i - 10321920a \\
&^6c^{13}d^e^f^i + 737077248a^{10}b^3c^6d^j^k^2 - 518814720a^9b^5c^5d^j \\
&^k^2 + 441354240a^9b^3c^7d^h^k^2 - 429871104a^6b^2c^{11}d^2e^k - 27 \\
&2212992a^8b^5c^6d^h^k^2 + 305731584a^5b^4c^{10}d^2e^k + 192412800a^ \\
&8b^7c^4d^j^k^2 + 111912960a^{11}b^3c^5h^j^k^2 + 214935552a^6b^3c^{10} \\
&d^2g^k + 202427136a^7b^6c^6d^f^k^2 - 49904640a^{10}b^5c^4h^j^k^2 - \\
&178513920a^8b^4c^7d^f^k^2 - 152865792a^5b^5c^9d^2g^k - 114388992a \\
&^7b^2c^{10}d^2i^k + 94961664a^{10}b^2c^7e^i^k^2 - 9039872a^{11}b^2c^6 \\
&i^j^2k - 56494080a^{10}b^4c^5f^j^k^2 - 2052096a^{10}b^4c^5i^j^2k + 13 \\
&27360a^9b^6c^4i^j^2k - 158080a^8b^8c^3i^j^2k - 47480832a^{10}b^3
\end{aligned}$$

$$\begin{aligned}
& c^6 g i k^2 + 45576960 a^9 b^6 c^4 f j k^2 + 7954560 a^9 b^7 c^3 h j k^2 - \\
& 104693760 a^9 b^3 c^7 e g k^2 + 142080 a^8 b^9 c^2 h j k^2 + 16017408 a^{10} \\
& b^3 c^6 g j^2 k - 4930560 a^9 b^5 c^5 g j^2 k - 3649536 a^9 b^2 c^8 h^2 i k \\
& - 1843200 a^8 b^4 c^7 h^2 i k + 85524480 a^8 b^5 c^6 e g k^2 + 474240 a^8 b^7 \\
& c^4 g j^2 k + 288000 a^7 b^6 c^6 h^2 i k + 63360 a^6 b^8 c^5 h^2 i k - \\
& 8064 a^5 b^{10} c^4 h^2 i k - 1152 a^4 b^{12} c^3 h^2 i k - 15437824 a^{11} b^2 c^6 \\
& f j k^2 - 32034816 a^{10} b^2 c^7 e j^2 k - 14369280 a^8 b^8 c^3 f j k^2 - \\
& 13271040 a^8 b^3 c^8 g^2 i k + 80267904 a^7 b^7 c^5 d h k^2 + 79626240 a^7 \\
& b^2 c^{10} e^2 g k + 11059200 a^9 b^5 c^5 g i k^2 + 8847360 a^9 b^2 c^8 g i^2 \\
& k - 42113280 a^7 b^9 c^3 d j k^2 + 6389760 a^8 b^7 c^4 g i k^2 + 5898240 a^8 \\
& b^4 c^7 g i^2 k - 37601280 a^9 b^4 c^6 f h k^2 - 2949120 a^7 b^9 c^3 g i k^2 \\
& + 2242560 a^7 b^{10} c^2 f j k^2 - 2211840 a^7 b^5 c^7 g^2 i k + 1769472 a^6 \\
& b^7 c^6 g^2 i k + 749568 a^8 b^3 c^8 h i^2 j - 442368 a^7 b^6 c^6 g i^2 k + \\
& 442368 a^6 b^{11} c^2 g i k^2 - 442368 a^6 b^8 c^5 g i^2 k + 317952 a^7 b^5 c^7 \\
& h i^2 j - 221184 a^5 b^9 c^5 g^2 i k + 73728 a^5 b^{10} c^4 g i^2 k + 38400 a^6 \\
& b^7 c^6 h i^2 j - 1920 a^5 b^9 c^5 h i^2 j + 9861120 a^9 b^4 c^6 e j^2 k - \\
& 110280960 a^4 b^6 c^9 d^2 e k - 93330432 a^6 b^8 c^5 d f k^2 + 24645888 a^8 \\
& b^6 c^5 f h k^2 + 6359040 a^8 b^3 c^8 g h^2 k - 22118400 a^9 b^4 c^6 e i k^2 - \\
& 3862528 a^8 b^2 c^9 f^2 i k - 2248704 a^7 b^4 c^8 f^2 i k - 1290240 a^9 b^2 \\
& c^8 g i j^2 - 948480 a^8 b^6 c^5 e j^2 k - 860160 a^8 b^4 c^7 g i j^2 - \\
& 414720 a^7 b^5 c^7 g h^2 k + 303360 a^6 b^6 c^7 f^2 i k + 266880 a^5 b^8 c^6 \\
& f^2 i k - 224640 a^6 b^7 c^6 g h^2 k - 80640 a^7 b^6 c^6 g i j^2 - 72960 a^4 \\
& b^{10} c^5 f^2 i k + 17280 a^5 b^9 c^5 g h^2 k + 12672 a^6 b^8 c^5 g i j^2 + \\
& 5504 a^3 b^{12} c^4 f^2 i k + 3456 a^4 b^{11} c^4 g h^2 k - 384 a^5 b^{10} c^4 g i j^2 - \\
& 128 a^2 b^{14} c^3 f^2 i k + 30265344 a^6 b^4 c^9 d^2 i k - 12779520 a^8 b^6 c^5 \\
& e i k^2 - 11796480 a^8 b^3 c^8 e i^2 k - 8847360 a^7 b^3 c^9 e^2 i k - 7925760 a^{10} \\
& b^2 c^7 f h k^2 + 7077888 a^6 b^5 c^8 e^2 i k - 39813120 a^7 b^3 c^9 e g^2 k - \\
& 73175040 a^9 b^2 c^8 d f k^2 + 5898240 a^7 b^8 c^4 e i k^2 + 5542272 a^6 b^{11} \\
& c^2 d j k^2 - 5420160 a^7 b^8 c^4 f h k^2 + 55140480 a^4 b^7 c^8 d^2 g k + \\
& 1271808 a^7 b^3 c^9 g^2 h j - 1040384 a^8 b^2 c^9 f i^2 j + 884736 a^7 b^5 c^7 \\
& e i^2 k - 884736 a^6 b^{10} c^3 e i k^2 + 884736 a^6 b^7 c^6 e i^2 k - 884736 a^5 \\
& b^7 c^7 e^2 i k - 697344 a^7 b^4 c^8 f i^2 j + 414720 a^6 b^5 c^8 g^2 h j + 226560 a^6 \\
& b^{10} c^3 f h k^2 - 147456 a^5 b^9 c^5 e i^2 k - 121856 a^6 b^6 c^7 f i^2 j + 82560 \\
& a^5 b^{12} c^2 f h k^2 + 49152 a^5 b^{12} c^2 e i k^2 - 17280 a^5 b^7 c^7 g^2 h j + \\
& 8960 a^5 b^8 c^6 f i^2 j + 14194944 a^5 b^6 c^8 d^2 i k - 12718080 a^8 b^2 \\
& c^9 e h^2 k - 10615680 a^4 b^8 c^7 d^2 i k - 26542080 a^6 b^4 c^9 e^2 g k - \\
& 23592960 a^7 b^7 c^5 e g k^2 - 5142528 a^8 b^3 c^8 f h j^2 + 5068800 a^7 \\
& b^2 c^{10} f^2 h j - 3755520 a^7 b^3 c^9 f h^2 j + 3336192 a^7 b^3 c^9 f^2 g k + \\
& 3000960 a^6 b^4 c^9 f^2 h j + 2893824 a^3 b^{10} c^6 d^2 i k + 1720320 a^8 b^3 \\
& c^8 e i j^2 + 1704960 a^6 b^5 c^8 f^2 g k - 1307520 a^5 b^7 c^7 f^2 g k - \\
& 1085760 a^6 b^5 c^8 f h^2 j - 959040 a^7 b^5 c^7 f h j^2 + 829440 a^7 b^4 \\
& c^8 e h^2 k - 552960 a^7 b^2 c^{10} g h^2 i - 552960 a^6 b^4 c^9 g h^2 i + \\
& 449280 a^6 b^6 c^7 e h^2 k - 422784 a^2 b^{12} c^5 d^2 i k + 253440 a^4 b^9 c^6 \\
& f^2 g k + 161280 a^7 b^5 c^7 e i j^2 - 145152 a^5 b^6 c^8 g h^2 k
\end{aligned}$$

$$\begin{aligned}
& i + 103200a^6b^7c^6f^2h^2j^2 + 41280a^5b^6c^8f^2h^2j - 37188a^4b^8c^7f^2h^2j - 34560a^5b^8c^6e^2h^2k - 25344a^6b^7c^6e^2i^2j - 17280 \\
& a^3b^{11}c^5f^2g^2k + 13536a^5b^7c^7f^2h^2j - 6912a^4b^{10}c^5e^2h^2k + 5490a^4b^9c^6f^2h^2j - 3456a^4b^8c^7g^2h^2i + 1980a^3b^{10}c^6 \\
& f^2h^2j + 810a^5b^9c^5f^2h^2j + 768a^5b^9c^5e^2i^2j + 384a^2b^{13}c^4f^2g^2k - 270a^4b^{11}c^4f^2h^2j - 180a^3b^{11}c^5f^2h^2j - 30a^2 \\
& b^{12}c^5f^2h^2j + 6a^3b^{13}c^3f^2h^2j + 30067200a^6b^2c^{11}d^2h^2j + 13271040a^6b^5c^8e^2g^2k - 10857600a^6b^9c^4d^2h^2k^2 + 2949120a^6 \\
& b^9c^4e^2g^2k^2 + 2654208a^5b^6c^8e^2g^2k + 2125824a^7b^3c^9d^2i^2j + 1658880a^6b^3c^{10}e^2h^2j - 1419264a^6b^4c^9f^2g^2j - 1327104a^5 \\
& b^7c^7e^2g^2k - 921600a^7b^2c^{10}f^2g^2j - 737280a^7b^2c^{10}f^2h^2i^2 - 568320a^6b^4c^9f^2h^2i^2 + 207360a^4b^{13}c^2d^2h^2k^2 - 147456a^5 \\
& b^{11}c^3e^2g^2k^2 - 136704a^5b^6c^8f^2h^2i^2 + 133632a^6b^5c^8d^2i^2j - 96768a^5b^7c^7d^2i^2j + 80640a^5b^6c^8f^2g^2j - 69120a^5b^5c^9 \\
& e^2h^2j + 13440a^4b^9c^6d^2i^2j - 5760a^5b^{11}c^3d^2h^2k^2 - 2304a^4b^8c^7f^2h^2i^2 + 384a^3b^{10}c^6f^2h^2i^2 + 11930112a^8b^2c^9d^2h^2j^2 \\
& - 11646720a^3b^9c^7d^2g^2k + 8432640a^7b^2c^{10}d^2h^2j + 24140160a^5b^{10}c^4d^2f^2k^2 - 6672384a^7b^2c^{10}e^2f^2k + 4450176a^7b^4c^8d^2 \\
& h^2j^2 + 4337280a^6b^4c^9d^2h^2j - 3870720a^8b^2c^9e^2g^2j^2 - 3409920a^6b^4c^9e^2f^2k - 2885760a^5b^4c^{10}d^2h^2j - 2844288a^4b^6c^9d^2 \\
& h^2j + 2615040a^5b^6c^8e^2f^2k - 1687680a^6b^6c^7d^2h^2j^2 + 1482624a^2b^{11}c^6d^2g^2k - 1290240a^6b^2c^{11}f^2g^2i + 1105920a^6b^3c^1 \\
& 0e^2h^2i + 1019412a^3b^8c^8d^2h^2j - 1007424a^5b^6c^8d^2h^2j - 860160a^5b^4c^{10}f^2g^2i - 645120a^7b^4c^8e^2g^2j^2 - 506880a^4b^8c^7e^2 \\
& f^2k + 290304a^5b^5c^9e^2h^2i + 197460a^5b^8c^6d^2h^2j^2 - 143802a^2b^{10}c^7d^2h^2j + 80640a^6b^6c^7e^2g^2j^2 - 80640a^4b^6c^9f^2g^2i \\
& + 51948a^4b^8c^7d^2h^2j + 34560a^3b^{10}c^6e^2f^2k + 12672a^3b^8c^8f^2g^2i + 10800a^3b^{10}c^6d^2h^2j + 6912a^4b^7c^8e^2h^2i - 2304a^5 \\
& b^8c^6e^2g^2j^2 - 768a^2b^{12}c^5e^2f^2k - 684a^3b^{12}c^4d^2h^2j^2 - 540a^2b^{12}c^5d^2h^2j - 384a^2b^{10}c^7f^2g^2i - 90a^4b^{10}c^5d^2h^2 \\
& j^2 + 18a^2b^{14}c^3d^2h^2j^2 + 23385600a^6b^2c^{11}d^2f^2j + 23293440a^3b^8c^8d^2e^2k + 6137856a^6b^3c^{10}d^2g^2j - 5677056a^6b^2c^{11}e^2 \\
& f^2j + 5308416a^6b^2c^{11}e^2g^2i - 5308416a^5b^3c^{11}e^2g^2i - 3786240a^4b^{12}c^3d^2f^2k^2 - 3538944a^6b^3c^{10}e^2g^2i^2 + 2654208a^5b^4c^1 \\
& 0e^2g^2i + 1658880a^6b^3c^{10}d^2h^2i^2 - 1354752a^5b^5c^9d^2g^2j - 1105920a^5b^4c^{10}f^2g^2h - 884736a^5b^5c^9e^2g^2i^2 - 552960a^6b^2c^1 \\
& 11f^2g^2h + 357120a^3b^{14}c^2d^2f^2k^2 + 322560a^5b^4c^{10}e^2f^2j + 262656a^5b^5c^9d^2h^2i^2 + 120960a^4b^7c^8d^2g^2j - 55296a^4b^7c^8d^2 \\
& h^2i^2 - 34560a^4b^6c^9f^2g^2h + 3456a^3b^8c^8f^2g^2h + 1152a^3b^9c^7d^2h^2i^2 + 1152a^2b^{11}c^6d^2h^2i^2 - 13149696a^7b^3c^9d^2f^2j^2 - \\
& 11612160a^5b^2c^{12}d^2g^2i + 10906560a^4b^5c^{10}d^2f^2j - 7418880a^5b^3c^{11}d^2f^2j + 3148992a^6b^5c^8d^2f^2j^2 - 2985696a^3b^7c^9d^2f^2 \\
& j - 2965248a^2b^{10}c^7d^2e^2k + 1720320a^5b^3c^{11}e^2f^2i - 1658880a^6b^2c^{11}e^2g^2h^2 + 1596672a^3b^6c^{10}d^2g^2i - 1505280a^4b^6c^9d^2 \\
& f^2j - 829440a^5b^4c^{10}e^2g^2h^2 - 508032a^2b^8c^9d^2g^2i + 378954a^
\end{aligned}$$

$$\begin{aligned}
& a^2 b^9 c^8 d^2 f^j + 362880 a^5 b^4 c^{10} d f^2 j + 296964 a^3 b^8 c^8 d f^2 j + 161280 a^4 b^5 c^{10} e f^2 i - 77070 a^4 b^9 c^6 d f^j j^2 - 30240 a^5 b^7 c^7 d f^j j^2 - 25344 a^3 b^7 c^9 e f^2 i - 20736 a^4 b^6 c^9 e g h^2 - 19278 a^2 b^{10} c^7 d f^2 j + 8820 a^3 b^{11} c^5 d f^j j^2 + 768 a^2 b^9 c^8 e f^2 i - 378 a^2 b^{13} c^4 d f^j j^2 - 5419008 a^5 b^3 c^{11} d e^2 j - 4423680 a^5 b^2 c^{12} e^2 f h + 4147200 a^5 b^3 c^{11} d g^2 h - 2580480 a^6 b^2 c^{11} d f i^2 - 967680 a^5 b^4 c^{10} d f i^2 + 483840 a^4 b^5 c^{10} d e^2 j - 414720 a^4 b^5 c^{10} d g^2 h - 138240 a^4 b^4 c^{11} e^2 f h + 64512 a^4 b^6 c^9 d f i^2 + 39168 a^3 b^8 c^8 d f i^2 - 31104 a^3 b^7 c^9 d g^2 h + 13824 a^3 b^6 c^{10} e^2 f h + 10368 a^2 b^9 c^8 d g^2 h - 9216 a^2 b^{10} c^7 d f i^2 + 15630336 a^5 b^2 c^{12} d f^2 h - 14459904 a^4 b^3 c^{12} d^2 f h + 9630144 a^3 b^5 c^{11} d^2 f h - 8764416 a^5 b^3 c^{11} d f h^2 - 3870720 a^5 b^2 c^{12} e f^2 g - 3193344 a^3 b^5 c^{11} d^2 e i + 2867328 a^4 b^4 c^{11} d f^2 h - 2095200 a^2 b^7 c^{10} d^2 f h - 1414080 a^3 b^6 c^{10} d f^2 h - 34836480 a^4 b^2 c^{13} d^2 e g + 1016064 a^2 b^7 c^{10} d^2 e i - 645120 a^4 b^4 c^{11} e f^2 g + 306720 a^3 b^7 c^9 d f h^2 + 197820 a^2 b^8 c^9 d f^2 h + 146880 a^4 b^5 c^{10} d f h^2 + 80640 a^3 b^6 c^{10} e f^2 g - 55350 a^2 b^9 c^8 d f h^2 - 2304 a^2 b^8 c^9 e f^2 g - 3870720 a^5 b^2 c^{12} d f g^2 - 1935360 a^4 b^4 c^{11} d f g^2 - 1658880 a^4 b^3 c^{12} d e^2 h + 725760 a^3 b^6 c^{10} d f g^2 + 17418240 a^3 b^4 c^{12} d^2 e g - 124416 a^3 b^5 c^{11} d e^2 h - 96768 a^2 b^8 c^9 d f g^2 + 41472 a^2 b^7 c^{10} d e^2 h - 3919104 a^2 b^6 c^{11} d^2 e g - 7741440 a^4 b^2 c^{13} d e^2 f + 2903040 a^3 b^4 c^{12} d e^2 f - 387072 a^2 b^6 c^{11} d e^2 f - 681246720 a^9 b^3 c^9 d^2 k^2 + 265912320 a^{11} b^3 c^5 e k^3 + 188743680 a^{12} b^2 c^5 g k^3 - 132956160 a^{11} b^4 c^4 g k^3 - 52101120 a^{13} b^3 c^5 j^2 k^2 + 25722880 a^{12} b^3 c^4 i k^3 + 19644416 a^{11} b^5 c^3 i k^3 - 1583680 a^9 b^9 c^j k^2 - 9142272 a^{10} b^7 c^2 i k^3 - 74022912 a^{10} b^5 c^4 e k^3 - 20643840 a^{11} b^3 c^7 h^2 k^2 + 37011456 a^{10} b^6 c^3 g k^3 - 2293760 a^9 b^3 c^7 i^3 k - 557056 a^8 b^5 c^6 i^3 k + 147456 a^7 b^7 c^5 i^3 k - 65536 a^6 b^{12} c^i k^2 + 32768 a^6 b^9 c^4 i^3 k - 8192 a^5 b^{11} c^3 i^3 k + 430080 a^{10} b^3 c^8 i^2 j^2 - 2880 a^5 b^{13} c^h k^2 + 6635520 a^7 b^4 c^8 g^3 k - 4792320 a^9 b^8 c^2 g k^3 - 2211840 a^6 b^6 c^7 g^3 k + 1359360 a^{10} b^2 c^7 h^j^3 + 1173120 a^9 b^4 c^6 h^j^3 + 743040 a^7 b^4 c^8 h^3 j + 622080 a^8 b^2 c^9 h^3 j + 221184 a^5 b^8 c^6 g^3 k + 107136 a^6 b^6 c^7 h^3 j - 32640 a^8 b^6 c^5 h^j^3 - 5796 a^7 b^8 c^4 h^j^3 + 540 a^5 b^8 c^6 h^3 j - 270 a^4 b^{10} c^5 h^3 j + 210 a^6 b^{10} c^3 h^j^3 - 2949120 a^{10} b^3 c^8 f^2 k^2 + 17694720 a^6 b^3 c^{10} e^3 k + 184320 a^8 b^3 c^{10} h^2 i^2 - 3520 a^3 b^{15} c^f k^2 + 9584640 a^9 b^7 c^3 e k^3 - 2293760 a^9 b^3 c^7 f j^3 - 2293760 a^6 b^3 c^{10} f^3 j - 1769472 a^5 b^5 c^9 e^3 k - 884736 a^6 b^3 c^10 g^3 i - 589824 a^7 b^3 c^9 g i^3 - 491520 a^8 b^9 c^2 e k^3 - 442368 a^5 b^5 c^9 g^3 i - 294912 a^6 b^5 c^8 g i^3 - 199360 a^8 b^5 c^6 f j^3 - 199360 a^5 b^5 c^9 f^3 j + 61920 a^7 b^7 c^5 f j^3 + 61920 a^4 b^7 c^8 f^3 j - 49152 a^5 b^7 c^7 g i^3 - 3682 a^6 b^9 c^4 f j^3 - 3682 a^3 b^9 c^7 f^3 j + 70 a^5 b^{11} c^3 f j^3 + 70 a^2 b^{11} c^6 f^3 j + 3870720 a^8 b^3 c^{10} e^2 j^2 + 430080 a^7 b^3 c^{11} f^2 i^2 - 14152320 a^4 b^4 c^{11} d^3 j + 10644480 a^5 b^2 c^{12} d^3 j + 5483520 a^9 b^2 c^8 d j^3 + 4269888 a^3 b^6 c^{10} d^3 j + 353
\end{aligned}$$

$8944a^5b^2c^{12}e^3i - 1648128a^5b^3c^{11}f^3h + 1330560a^8b^4c^7d^3j^3 + 1179648a^7b^2c^{10}e^3i^3 - 898560a^6b^3c^{10}f^3h^3 - 826560a^7b^6c^6d^3j^3 - 607068a^2b^8c^9d^3j + 589824a^6b^4c^9e^3i^3 - 354240a^5b^5c^9f^3h^3 - 354240a^4b^5c^{10}f^3h + 145188a^6b^8c^5d^3j^3 + 98304a^5b^6c^8e^3i^3 + 43680a^3b^7c^9f^3h - 21600a^4b^7c^8f^3h^3 - 9576a^5b^{10}c^4d^3j^3 + 1350a^3b^9c^7f^3h^3 - 1050a^2b^9c^8f^3h^3 - 504a^4b^{14}c^4d^2j^2 + 210a^4b^{12}c^3d^3j^3 + 3870720a^6b^3c^{12}d^2i^2 + 1658880a^6b^3c^{12}e^2h^2 - 9792a^4b^{11}c^7d^2i^2 + 16547328a^4b^2c^{13}d^3h - 12306816a^3b^4c^{12}d^3h + 37310976a^3b^3c^{13}d^3f + 3037824a^2b^6c^{11}d^3h - 2654208a^5b^3c^{11}e^3g^3 + 1949184a^6b^2c^{11}d^3h^3 + 1296000a^5b^4c^{10}d^3h^3 - 155520a^4b^6c^9d^3h^3 - 40500a^4b^{10}c^8d^2h^2 - 8100a^3b^8c^8d^3h^3 + 4050a^2b^{10}c^7d^3h^3 + 3870720a^5b^3c^{13}e^2f^2 + 34836480a^4b^3c^{14}d^2e^2 - 108864a^4b^9c^9d^2g^2 - 8068032a^2b^5c^{12}d^3f - 5623296a^4b^3c^{12}d^3f^3 + 1737792a^3b^5c^{11}d^3f^3 - 260190a^4b^8c^{10}d^2f^2 - 211680a^2b^7c^{10}d^3f^3 - 435456a^4b^7c^{11}d^2e^2 - 377487360a^12b^3c^6e^3k^3 + 1434977280a^8b^3c^8d^2k^2 + 173408256a^7c^{12}d^2ek + 3276800a^12c^7i^2j^2k - 125829120a^13b^3c^5i^2k^3 + 26214400a^12c^7f^2j^2k^2 + 1179648a^10c^9h^2i^2k + 13440a^6b^{13}h^2j^2k^2 + 50331648a^11c^8e^3i^2k^2 + 110100480a^10c^9d^3f^2k^2 + 57802752a^8c^{11}d^2i^2k + 9830400a^11c^8e^3j^2k - 3276800a^9c^{10}f^2i^2k + 4480a^5b^{14}f^2j^2k^2 + 15728640a^11c^8f^2h^2k^2 - 409600a^9c^{10}f^2i^2j - 1152b^{16}c^3d^2i^2k - 1220516352a^7b^5c^7d^2k^2 + 3538944a^9c^{10}e^3h^2k + 384000a^8c^{11}f^2h^2j + 13440a^4b^{15}d^3j^2k^2 + 384a^3b^{16}f^2h^2k^2 + 20321280a^7c^{12}d^2h^2j - 245760a^8c^{11}f^2h^2i^2 + 3456b^{15}c^4d^2g^2k - 270b^{14}c^5d^2h^2j - 9830400a^8c^{11}e^3f^2k + 4838400a^9c^{10}d^3h^2j^2 + 2903040a^8c^{11}d^3h^2j - 1966080a^10b^3c^8i^3k + 1433600a^9b^9c^3i^2k^3 + 1152a^2b^{17}d^3h^2k^2 - 3686400a^7c^{12}e^2f^2j - 53084160a^7b^3c^{11}e^3k - 6912b^{14}c^5d^2e^3k - 3456b^{12}c^7d^2g^2i + 630b^{13}c^6d^2f^2j + 2688000a^7c^{12}d^3f^2j + 245760a^8b^{10}c^9g^2k^3 - 2211840a^6c^{13}e^2f^2h - 1720320a^7c^{12}d^3f^2i^2 - 9450b^{11}c^8d^2f^2h + 6912b^{11}c^8d^2e^3i + 1612800a^6c^{13}d^3f^2h - 1344000a^{10}b^3c^8f^2j^3 - 1344000a^7b^3c^{11}f^3j - 393216a^8b^3c^{10}g^2i^3 - 23616a^4b^{17}c^3d^2k^2 - 20736b^{10}c^9d^2e^3g - 75188736a^4b^3c^{14}d^3f - 883200a^6b^3c^{12}f^3h - 317952a^7b^3c^{11}f^3h^3 + 43416a^4b^{10}c^8d^3j - 15482880a^5c^{14}d^3e^2f - 10616832a^5b^3c^{13}e^3g - 345060a^4b^8c^{10}d^3h - 4262400a^5b^3c^{13}d^3f^3 + 852768a^4b^7c^{11}d^3f + 7350a^4b^9c^9d^3f^3 + 584578368a^6b^7c^6d^2k^2 + 93905920a^{12}b^3c^4j^2k^2 - 177997248a^5b^9c^5d^2k^2 - 50967040a^{11}b^5c^3j^2k^2 + 104693760a^9b^2c^8e^2k^2 + 12849984a^{10}b^7c^2j^2k^2 + 20021248a^{11}b^2c^6i^2k^2 - 85524480a^8b^4c^7e^2k^2 + 33223680a^{10}b^3c^6h^2k^2 + 4227072a^{10}b^4c^5i^2k^2 - 3973120a^9b^6c^4i^2k^2 + 344064a^7b^{10}c^2i^2k^2 - 81920a^8b^8c^3i^2k^2 - 11386368a^9b^5c^5h^2k^2 + 26173440a^9b^4c^6g^2k^2 - 21381120a^8b^6c^5g^2k^2 + 18874368a^{10}b^2c^7g^2k^2 + 501760a^9b^3c^7i^2j^2 + 452160a^8b^7c^4h^2k^2 + 385920a^7b^9c^3h^2k^2 + 170240a^8b^5c^6i^2j^2 - 48960a$

$$\begin{aligned}
& ^6b^{11}c^2h^2k^2 + 9216a^7b^7c^5i^2j^2 - 1984a^6b^9c^4i^2j^2 + \\
& 64a^5b^{11}c^3i^2j^2 + 5898240a^7b^8c^4g^2k^2 + 1419840a^8b^4c^7h^2j^2 + 1387008a^9b^2c^8h^2j^2 - 737280a^6b^{10}c^3g^2k^2 + 849 \\
& 60a^7b^6c^6h^2j^2 + 36864a^5b^{12}c^2g^2k^2 - 8010a^6b^8c^5h^2j^2 - 180a^5b^{10}c^4h^2j^2 + 9a^4b^{12}c^3h^2j^2 + 14115840a^9b^3c^7f^2k^2 - 9231552a^7b^7c^5f^2k^2 + 23592960a^7b^6c^6e^2k^2 + \\
& 4984320a^8b^5c^6f^2k^2 + 3759040a^6b^9c^4f^2k^2 + 36190080a^4b^{11}c^4d^2k^2 + 967680a^8b^3c^8g^2j^2 - 727360a^5b^{11}c^3f^2k^2 + \\
& 276480a^7b^3c^9h^2i^2 + 161280a^7b^5c^7g^2j^2 + 140544a^6b^5c^8h^2i^2 + 72960a^4b^{13}c^2f^2k^2 + 25344a^5b^7c^7h^2i^2 - 20160 \\
& a^6b^7c^6g^2j^2 + 576a^5b^9c^5g^2j^2 + 576a^4b^9c^6h^2i^2 + 3808000a^8b^2c^9f^2j^2 - 2949120a^6b^8c^5e^2k^2 + 1643712a^7b^4c^8f^2j^2 + 884736a^7b^2c^{10}g^2i^2 + 884736a^6b^4c^9g^2i^2 + 2 \\
& 21184a^5b^6c^8g^2i^2 + 147456a^5b^{10}c^4e^2k^2 - 125440a^6b^6c^7f^2j^2 - 13790a^5b^8c^6f^2j^2 + 1785a^4b^{10}c^5f^2j^2 - 70a^3b^{12}c^4f^2j^2 - 4953600a^3b^{13}c^3d^2k^2 + 18427392a^7b^2c^{10}d^2j^2 + 645120a^7b^3c^9e^2j^2 + 501760a^6b^3c^{10}f^2i^2 + 442944a^2b^{15}c^2d^2k^2 + 414720a^6b^3c^{10}g^2h^2 + 207360a^5b^5c^9g^2h^2 + 170240a^5b^5c^9f^2i^2 - 80640a^6b^5c^8e^2j^2 + 9216a^4b^7c^8f^2i^2 + 5184a^4b^7c^8g^2h^2 + 2304a^5b^7c^7e^2j^2 - 1984a^3b^9c^7f^2i^2 + 64a^2b^{11}c^6f^2i^2 - 4148928a^6b^4c^9d^2j^2 + 3538944a^6b^2c^{11}e^2i^2 + 1684224a^6b^2c^{11}f^2h^2 + 1264320a^5b^4c^{10}f^2h^2 - 1183392a^5b^6c^8d^2j^2 + 884736a^5b^4c^{10}e^2i^2 + 645750a^4b^8c^7d^2j^2 + 126720a^4b^6c^9f^2h^2 - 115920a^3b^{10}c^6d^2j^2 - 13950a^3b^8c^8f^2h^2 + 10836a^2b^{12}c^5d^2j^2 + 25a^2b^{10}c^7f^2h^2 + 1935360a^5b^3c^{11}d^2i^2 + 967680a^5b^3c^{11}f^2g^2 + 829440a^5b^3c^{11}e^2h^2 - 532224a^4b^5c^{10}d^2i^2 + 161280a^4b^5c^{10}f^2g^2 - 96768a^3b^7c^9d^2i^2 + 62784a^2b^9c^8d^2i^2 + 20736a^4b^5c^{10}e^2h^2 - 20160a^3b^7c^9f^2g^2 + 576a^2b^9c^8f^2g^2 + 11487744a^5b^2c^{12}d^2h^2 + 7962624a^5b^2c^{12}e^2g^2 + 35525376a^4b^2c^{13}d^2f^2 - 1412640a^3b^6c^{10}d^2h^2 + 461376a^4b^4c^{11}d^2h^2 + 375030a^2b^8c^9d^2h^2 + 8709120a^4b^3c^{12}d^2g^2 - 4354560a^3b^5c^{11}d^2g^2 + 979776a^2b^7c^{10}d^2g^2 + 645120a^4b^3c^{12}e^2f^2 - 80640a^3b^5c^{11}e^2f^2 + 2304a^2b^7c^{10}e^2f^2 - 15269184a^3b^4c^{12}d^2f^2 + 2870784a^2b^6c^{11}d^2f^2 - 17418240a^3b^3c^{13}d^2e^2 + 3919104a^2b^5c^{12}d^2e^2 + 384a^2b^{18}d^2f^2k^2 - 199229440a^{14}b^2c^3k^4 + 8388608a^{12}c^7i^2k^2 + 75497472a^{10}c^9e^2k^2 + 78400a^8b^{11}j^2k^2 + 4096a^5b^{14}i^2k^2 + 345600a^{10}c^9h^2j^2 + 576a^4b^{15}h^2k^2 + 57937920a^{13}b^4c^2k^4 + 320000a^9c^{10}f^2j^2 + 64a^2b^{17}f^2k^2 + 16934400a^8c^{11}d^2j^2 + 9b^{16}c^3d^2j^2 + 3538944a^7c^{12}e^2i^2 + 115200a^7c^{12}f^2h^2 + 576b^{13}c^6d^2i^2 + 2025b^{12}c^7d^2h^2 + 6096384a^6c^{13}d^2h^2 + 492800a^{11}b^2c^6j^4 + 351456a^{10}b^4c^5j^4 - 43120a^9b^6c^4j^4 + 5184b^{11}c^8d^2g^2 + 1225a^8b^8c^3j^4 + 131072a^8b^2c^9i^4 + 98304a^7b^4c^8i^4 + 32768a^6b^6c^7i^4 + 11025b^{10}c^9d^2f^2 + 4096a^5b^8c^6i
\end{aligned}$$

$$\begin{aligned}
&^4 + 5644800*a^5*c^14*d^2*f^2 + 142560*a^6*b^4*c^9*h^4 + 103680*a^7*b^2*c^1 \\
&0*h^4 + 32400*a^5*b^6*c^8*h^4 + 20736*b^9*c^10*d^2*e^2 + 2025*a^4*b^8*c^7*h \\
&^4 + 331776*a^5*b^4*c^10*g^4 + 492800*a^5*b^2*c^12*f^4 + 351456*a^4*b^4*c^1 \\
&1*f^4 - 43120*a^3*b^6*c^10*f^4 + 1225*a^2*b^8*c^9*f^4 - 27433728*a^3*b^2*c^ \\
&14*d^4 + 6446304*a^2*b^4*c^13*d^4 + a^2*b^14*c^3*f^2*j^2 - 81920*a^8*b^11*i \\
&*k^3 + 384000*a^11*c^8*h*j^3 + 138240*a^9*c^10*h^3*j + 47416320*a^6*c^13*d^ \\
&3*j - 1134*b^12*c^7*d^3*j + 7077888*a^6*c^13*e^3*i + 2688000*a^10*c^9*d*j^3 \\
&+ 786432*a^8*c^11*e*i^3 + 28449792*a^5*c^14*d^3*h - 7782400*a^12*b^6*c*k^4 \\
&+ 17010*b^10*c^9*d^3*h + 580608*a^7*c^12*d*h^3 - 39690*b^9*c^10*d^3*f - 73 \\
&4832*a*b^6*c^12*d^4 + 268435456*a^15*c^4*k^4 + 576*b^19*d^2*k^2 + 409600*a^ \\
&11*b^8*k^4 + 160000*a^12*c^7*j^4 + 65536*a^9*c^10*i^4 + 20736*a^8*c^11*h^4 \\
&+ 49787136*a^4*c^15*d^4 + 160000*a^6*c^13*f^4 + 5308416*a^5*c^14*e^4 + 3572 \\
&1*b^8*c^11*d^4, z, n)*x*(8388608*a^11*b*c^13 - 512*a^4*b^15*c^6 + 14336*a^5 \\
&*b^13*c^7 - 172032*a^6*b^11*c^8 + 1146880*a^7*b^9*c^9 - 4587520*a^8*b^7*c^1 \\
&0 + 11010048*a^9*b^5*c^11 - 14680064*a^10*b^3*c^12))/(64*(4096*a^10*c^10 + \\
&a^4*b^12*c^4 - 24*a^5*b^10*c^5 + 240*a^6*b^8*c^6 - 1280*a^7*b^6*c^7 + 3840* \\
&a^8*b^4*c^8 - 6144*a^9*b^2*c^9))) - (x*(451584*a^6*c^13*d^2 + 18*b^12*c^7*d \\
&^2 - 25600*a^7*c^12*f^2 + 9216*a^8*c^11*h^2 + 128*a^4*b^15*k^2 + 25600*a^10 \\
&*c^9*j^2 - 504*a*b^10*c^8*d^2 - 73728*a^6*b*c^12*e^2 - 8192*a^8*b*c^10*i^2 \\
&- 3712*a^5*b^13*c*k^2 - 3538944*a^11*b*c^7*k^2 + 6228*a^2*b^8*c^9*d^2 - 426 \\
&24*a^3*b^6*c^10*d^2 + 176256*a^4*b^4*c^11*d^2 - 423936*a^5*b^2*c^12*d^2 - 4 \\
&608*a^4*b^5*c^10*e^2 + 36864*a^5*b^3*c^11*e^2 + 2*a^2*b^10*c^7*f^2 - 84*a^3 \\
&*b^8*c^8*f^2 + 3520*a^4*b^6*c^9*f^2 - 26240*a^5*b^4*c^10*f^2 + 59904*a^6*b^ \\
&2*c^11*f^2 - 1152*a^4*b^7*c^8*g^2 + 9216*a^5*b^5*c^9*g^2 - 18432*a^6*b^3*c^ \\
&10*g^2 + 468*a^4*b^8*c^7*h^2 - 3456*a^5*b^6*c^8*h^2 + 5760*a^6*b^4*c^9*h^2 \\
&- 128*a^4*b^9*c^6*i^2 + 512*a^5*b^7*c^7*i^2 + 1536*a^6*b^5*c^8*i^2 - 4096*a \\
&^7*b^3*c^9*i^2 + 2*a^4*b^12*c^3*j^2 - 88*a^5*b^10*c^4*j^2 + 1236*a^6*b^8*c^ \\
&5*j^2 - 5760*a^7*b^6*c^6*j^2 + 8320*a^8*b^4*c^7*j^2 - 6144*a^9*b^2*c^8*j^2 \\
&+ 46464*a^6*b^11*c^2*k^2 - 326400*a^7*b^9*c^3*k^2 + 1394560*a^8*b^7*c^4*k^2 \\
&- 3640320*a^9*b^5*c^5*k^2 + 5404672*a^10*b^3*c^6*k^2 + 129024*a^7*c^12*d*h \\
&+ 215040*a^8*c^11*d*j + 786432*a^9*c^10*e*k + 30720*a^9*c^10*h*j + 262144* \\
&a^10*c^9*i*k + 12*a*b^11*c^7*d*f - 218112*a^6*b*c^12*d*f - 49152*a^7*b*c^11 \\
&*e*i - 9216*a^7*b*c^11*f*h - 25600*a^8*b*c^10*f*j - 393216*a^9*b*c^9*g*k - \\
&420*a^2*b^9*c^8*d*f + 4992*a^3*b^7*c^9*d*f - 36480*a^4*b^5*c^10*d*f + 14438 \\
&4*a^5*b^3*c^11*d*f + 36*a^2*b^10*c^7*d*h - 360*a^3*b^8*c^8*d*h + 3456*a^4*b \\
&^6*c^9*d*h + 4608*a^4*b^6*c^9*e*g - 11520*a^5*b^4*c^10*d*h - 36864*a^5*b^4* \\
&c^10*e*g - 27648*a^6*b^2*c^11*d*h + 73728*a^6*b^2*c^11*e*g + 12*a^3*b^9*c^7 \\
&*f*h - 1536*a^4*b^7*c^8*e*i - 2304*a^4*b^7*c^8*f*h + 168*a^4*b^8*c^7*d*j + \\
&9216*a^5*b^5*c^9*e*i + 17280*a^5*b^5*c^9*f*h - 768*a^5*b^6*c^8*d*j - 30720* \\
&a^6*b^3*c^10*f*h + 11520*a^6*b^4*c^9*d*j - 98304*a^7*b^2*c^10*d*j + 768*a^4 \\
&*b^8*c^7*g*i + 140*a^4*b^9*c^6*f*j - 4608*a^5*b^6*c^8*g*i - 3584*a^5*b^7*c^ \\
&7*f*j + 1536*a^5*b^8*c^6*e*k + 20352*a^6*b^5*c^8*f*j - 26112*a^6*b^6*c^7*e* \\
&k + 24576*a^7*b^2*c^10*g*i - 26624*a^7*b^3*c^9*f*j + 184320*a^7*b^4*c^8*e*k \\
&- 614400*a^8*b^2*c^9*e*k - 60*a^4*b^10*c^5*h*j + 1560*a^5*b^8*c^6*h*j - 76 \\
&8*a^5*b^9*c^5*g*k - 8832*a^6*b^6*c^7*h*j + 13056*a^6*b^7*c^6*g*k + 13056*a^
\end{aligned}$$

$$\begin{aligned}
& 7*b^4*c^8*h*j - 92160*a^7*b^5*c^7*g*k - 3072*a^8*b^2*c^9*h*j + 307200*a^8*b^3*c^8*g*k + 256*a^5*b^10*c^4*i*k - 3840*a^6*b^8*c^5*i*k + 22016*a^7*b^6*c^6*i*k - 40960*a^8*b^4*c^7*i*k - 73728*a^9*b^2*c^8*i*k) / (64*(4096*a^10*c^10 + a^4*b^12*c^4 - 24*a^5*b^10*c^5 + 240*a^6*b^8*c^6 - 1280*a^7*b^6*c^7 + 3840*a^8*b^4*c^8 - 6144*a^9*b^2*c^9)) + (x*(13824*a^4*c^12*e^3 + 512*a^7*c^9*i^3 - 640*a^7*b^9*k^3 - 54*b^7*c^9*d^2*e + 27*b^8*c^8*d^2*g + 11840*a^8*b^7*c*k^3 - 376832*a^11*b*c^4*k^3 + 13824*a^5*c^11*e^2*i + 4608*a^6*c^10*e*i^2 - 9*b^9*c^7*d^2*i + 112896*a^6*c^10*d^2*k + 98304*a^9*c^7*e*k^2 + 9*b^12*c^4*d^2*k - 6400*a^7*c^9*f^2*k + 64*a^4*b^12*i*k^2 + 2304*a^8*c^8*h^2*k + 32768*a^10*c^6*i*k^2 + 6400*a^10*c^6*j^2*k - 1728*a^4*b^3*c^9*g^3 + 64*a^4*b^6*c^6*i^3 + 384*a^5*b^4*c^7*i^3 + 768*a^6*b^2*c^8*i^3 - 85824*a^9*b^5*c^2*k^3 + 287296*a^10*b^3*c^3*k^3 - 20160*a^4*c^12*d*e*f - 6720*a^5*c^11*d*f*i - 2880*a^5*c^11*e*f*h - 4800*a^6*c^10*e*f*j - 960*a^6*c^10*f*h*i + 32256*a^7*c^9*d*h*k - 1600*a^7*c^9*f*i*j + 53760*a^8*c^8*d*j*k + 7680*a^9*c^7*h*j*k + 972*a*b^5*c^10*d^2*e + 24192*a^3*b*c^12*d^2*e - 486*a*b^6*c^9*d^2*g + 6240*a^4*b*c^11*e*f^2 - 20736*a^4*b*c^11*e^2*g + 144*a*b^7*c^8*d^2*i + 8064*a^4*b*c^11*d^2*i + 1728*a^5*b*c^10*e*h^2 - 252*a*b^10*c^5*d^2*k + 2080*a^5*b*c^10*f^2*i + 3840*a^7*b*c^8*e*j^2 - 2304*a^6*b*c^9*g*i^2 - 122112*a^6*b*c^9*e^2*k + 576*a^6*b*c^9*h^2*i - 192*a^4*b^11*c*g*k^2 - 49152*a^9*b*c^6*g*k^2 + 1280*a^8*b*c^7*i*j^2 - 1088*a^5*b^10*c*i*k^2 - 13568*a^8*b*c^7*i^2*k - 7344*a^2*b^3*c^11*d^2*e + 3672*a^2*b^4*c^10*d^2*g - 6*a^2*b^5*c^9*e*f^2 - 12096*a^3*b^2*c^11*d^2*g + 192*a^3*b^3*c^10*e*f^2 + 10368*a^4*b^2*c^10*e*g^2 - 900*a^2*b^5*c^9*d^2*i + 3*a^2*b^6*c^8*f^2*g + 1584*a^3*b^3*c^10*d^2*i - 96*a^3*b^4*c^9*f^2*g - 3120*a^4*b^2*c^10*f^2*g + 1296*a^4*b^3*c^9*e*h^2 + 6912*a^4*b^2*c^10*e^2*i + 1152*a^4*b^4*c^8*e*i^2 + 4608*a^5*b^2*c^9*e*i^2 - a^2*b^7*c^7*f^2*i + 3114*a^2*b^8*c^6*d^2*k + 30*a^3*b^5*c^8*f^2*i - 21222*a^3*b^6*c^7*d^2*k + 1104*a^4*b^3*c^9*f^2*i - 648*a^4*b^4*c^8*g*h^2 + 82584*a^4*b^4*c^8*d^2*k + 6*a^4*b^7*c^5*e*j^2 - 864*a^5*b^2*c^9*g*h^2 - 166464*a^5*b^2*c^9*d^2*k - 204*a^5*b^5*c^6*e*j^2 + 1488*a^6*b^3*c^7*e*j^2 + 1728*a^4*b^4*c^8*g^2*i - 576*a^4*b^5*c^7*g*i^2 - 4608*a^4*b^5*c^7*e^2*k + 384*a^4*b^10*c^2*e*k^2 + 3456*a^5*b^2*c^9*g^2*i - 2304*a^5*b^3*c^8*g*i^2 + 43776*a^5*b^3*c^8*e^2*k - 7296*a^5*b^8*c^3*e*k^2 + 54912*a^6*b^6*c^4*e*k^2 - 188160*a^7*b^4*c^5*e*k^2 + 228480*a^8*b^2*c^6*e*k^2 + a^2*b^10*c^4*f^2*k - 42*a^3*b^8*c^5*f^2*k + 216*a^4*b^5*c^7*h^2*i + 535*a^4*b^6*c^6*f^2*k - 3*a^4*b^8*c^4*g*j^2 + 720*a^5*b^3*c^8*h^2*i - 1840*a^5*b^4*c^7*f^2*k + 102*a^5*b^6*c^5*g*j^2 - 624*a^6*b^2*c^8*f^2*k - 744*a^6*b^4*c^6*g*j^2 - 1920*a^7*b^2*c^7*g*j^2 - 1152*a^4*b^7*c^5*g^2*k + 10944*a^5*b^5*c^6*g^2*k + 3648*a^5*b^9*c^2*g*k^2 - 30528*a^6*b^3*c^7*g^2*k - 27456*a^6*b^7*c^3*g*k^2 + 94080*a^7*b^5*c^4*g*k^2 - 114240*a^8*b^3*c^5*g*k^2 + 9*a^4*b^8*c^4*h^2*k + a^4*b^9*c^3*i*j^2 + 72*a^5*b^6*c^5*h^2*k - 32*a^5*b^7*c^4*i*j^2 - 360*a^6*b^4*c^6*h^2*k + 180*a^6*b^5*c^5*i*j^2 - 4320*a^7*b^2*c^7*h^2*k + 1136*a^7*b^3*c^6*i*j^2 - 128*a^4*b^9*c^3*i^2*k + 704*a^5*b^7*c^4*i^2*k + 960*a^6*b^5*c^5*i^2*k + 6720*a^6*b^8*c^2*i*k^2 - 8704*a^7*b^3*c^6*i^2*k - 13056*a^7*b^6*c^3*i*k^2 - 24640*a^8*b^4*c^4*i*k^2 + 92544*a^9*b^2*c^5*i*k^2 - 10*a^7*b^6*c^3*j^2*k + 1560*a^8*b^4*c^4*j^2*k - 11136*a^9*b^2*c^5*j^2*k - 36*a*b^6*c^9*d*e*f + 18*a*b^
\end{aligned}$$

$$\begin{aligned}
&7c^8d*fg + 15552a^4b*c^{11}d*eh + 10080a^4b*c^{11}d*fg - 6a*b^8c^7 \\
&*d*fi + 21888a^5b*c^{10}d*ej + 6a*b^{11}c^4d*fk + 5184a^5b*c^{10}d*hi \\
&i - 13824a^5b*c^{10}e*gi + 1440a^5b*c^{10}f*gh - 4128a^6b*c^9d*fk + \\
&7296a^6b*c^9d*ij + 5184a^6b*c^9e*hj + 2400a^6b*c^9f*gj - 81408 \\
&a^7b*c^8e*ik + 4896a^7b*c^8f*hk + 1728a^7b*c^8h*ij + 5600a^8b \\
&*c^7f*j*k + 900a^2b^4c^{10}d*ef - 4896a^3b^2c^{11}d*ef - 108a^2b^5 \\
&*c^9d*eh - 450a^2b^5c^9d*fg + 2448a^3b^3c^{10}d*fg + 138a^2b^6c^8 \\
&d*fi + 54a^2b^6c^8d*gh - 516a^3b^4c^9d*fi - 36a^3b^4c^9e \\
&*fh - 4992a^4b^2c^{10}d*fi - 7776a^4b^2c^{10}d*gh - 6048a^4b^2c^1 \\
&0e*fh - 2016a^4b^3c^9d*ej - 18a^2b^7c^7d*hi - 210a^2b^9c^5d \\
&*fk - 36a^3b^5c^8d*hi + 18a^3b^5c^8f*gh + 2496a^3b^7c^6d*fk \\
&+ 2592a^4b^3c^9d*hi - 6912a^4b^3c^9e*gi + 3024a^4b^3c^9f*gh \\
&+ 1008a^4b^4c^8d*gj + 420a^4b^4c^8e*fj - 13770a^4b^5c^7d*fk \\
&- 10944a^5b^2c^9d*gj - 7392a^5b^2c^9e*fj + 31536a^5b^3c^8d*fi \\
&k + 18a^2b^{10}c^4d*hk - 6a^3b^6c^7f*hi - 180a^3b^8c^5d*hk - \\
&1020a^4b^4c^8f*hi - 336a^4b^5c^7d*ij - 180a^4b^5c^7e*hj - 21 \\
&0a^4b^5c^7f*gj - 162a^4b^6c^6d*hk + 4608a^4b^6c^6e*gk - 2496 \\
&a^5b^2c^9f*hi + 2976a^5b^3c^8d*ij + 2880a^5b^3c^8e*hj + 3696 \\
&a^5b^3c^8f*gj + 10080a^5b^4c^7d*hk - 43776a^5b^4c^7e*gk - 45 \\
&792a^6b^2c^8d*hk + 122112a^6b^2c^8e*gk + 6a^3b^9c^4f*hk + 70 \\
&a^4b^6c^6f*ij + 90a^4b^6c^6g*hj - 1536a^4b^7c^5e*ik - 102a^4 \\
&b^7c^5f*hk + 210a^4b^8c^4d*j*k - 1092a^5b^4c^7f*ij - 1440a^5 \\
&b^4c^7g*hj + 11520a^5b^5c^6e*ik - 390a^5b^5c^6f*hk - 3696a^5 \\
&b^6c^5d*j*k - 3264a^6b^2c^8f*ij - 2592a^6b^2c^8g*hj - 11520a^6 \\
&b^3c^7e*ik + 5040a^6b^3c^7f*hk + 26160a^6b^4c^6d*j*k - 79296a^ \\
&a^7b^2c^7d*j*k - 30a^4b^7c^5h*ij + 768a^4b^8c^4g*ik + 420a^5b^ \\
&b^5c^6h*ij - 5760a^5b^6c^5g*ik + 70a^5b^7c^4f*j*k + 1824a^6b^ \\
&>3c^7h*ij + 5760a^6b^4c^6g*ik - 1722a^6b^5c^5f*j*k + 40704a^7b^ \\
&>^2c^7g*ik + 7824a^7b^3c^6f*j*k + 210a^6b^6c^4h*j*k + 384a^7b^4 \\
&>*c^5h*j*k - 13728a^8b^2c^6h*j*k))/(64*(4096a^{10}c^{10} + a^4b^{12}c^4 - \\
&24a^5b^{10}c^5 + 240a^6b^8c^6 - 1280a^7b^6c^7 + 3840a^8b^4c^8 - \\
&6144a^9b^2c^9)))*root(56371445760a^{11}b^8c^{12}z^4 - 503316480a^8b^{14} \\
&>*c^9z^4 + 47185920a^7b^{16}c^8z^4 - 2621440a^6b^{18}c^7z^4 + 65536a^5 \\
&>*b^{20}c^6z^4 - 171798691840a^{14}b^2c^{15}z^4 + 193273528320a^{13}b^4c^{14} \\
&>*z^4 - 128849018880a^{12}b^6c^{13}z^4 - 16911433728a^{10}b^{10}c^{11}z^4 + 35 \\
&23215360a^9b^{12}c^{10}z^4 + 68719476736a^{15}c^{16}z^4 - 47185920a^7b^{16} \\
&>c^5k*z^3 + 2621440a^6b^{18}c^4k*z^3 - 65536a^5b^{20}c^3k*z^3 + 1717986 \\
&91840a^{14}b^2c^{12}k*z^3 - 193273528320a^{13}b^4c^{11}k*z^3 + 128849018880 \\
&>a^{12}b^6c^{10}k*z^3 + 16911433728a^{10}b^{10}c^8k*z^3 - 3523215360a^9b^1 \\
&>2c^7k*z^3 - 56371445760a^{11}b^8c^9k*z^3 + 503316480a^8b^{14}c^6k*z^3 \\
&- 68719476736a^{15}c^{13}k*z^3 + 1536a*b^{18}c^6d*f*z^2 - 2571632640a^9b^ \\
&>^5c^{11}d*j*z^2 + 2548039680a^9b^3c^{13}d*h*z^2 + 2453667840a^9b^7c^9 \\
&>e*k*z^2 + 2181038080a^{12}b^3c^{10}i*k*z^2 - 6492782592a^{10}b^5c^{10}e*k*z^ \\
&>^2 + 1509949440a^9b^3c^{13}e*g*z^2 - 1401421824a^8b^5c^{12}d*h*z^2 - 12 \\
&26833920a^9b^8c^8g*k*z^2 - 1321205760a^9b^2c^{14}d*f*z^2 - 2793406464
\end{aligned}$$

$$\begin{aligned}
& *a^{11}b^3c^{13}d^2j^2z^2 + 9563013120a^{11}b^3c^{11}e^2k^2z^2 + 890634240a^8b^7 \\
& *c^{10}d^2j^2z^2 - 754974720a^8b^5c^{12}e^2g^2z^2 - 570425344a^{11}b^5c^9i^2k \\
& *z^2 + 732168192a^7b^6c^{12}d^2f^2z^2 - 581959680a^{10}b^4c^{11}f^2j^2z^2 - 6 \\
& 03979776a^{10}b^2c^{13}e^2i^2z^2 + 534773760a^{11}b^3c^{11}h^2j^2z^2 - 55836672 \\
& 0a^8b^9c^8e^2k^2z^2 - 4781506560a^{11}b^4c^{10}g^2k^2z^2 - 2013265920a^{13} \\
& b^2c^{11}i^2k^2z^2 - 456130560a^9b^4c^{12}f^2h^2z^2 + 384040960a^9b^6c^{10}f^2 \\
& j^2z^2 - 264241152a^{10}b^7c^8i^2k^2z^2 + 390463488a^7b^7c^{11}d^2h^2z^2 + 2 \\
& 79183360a^8b^{10}c^7g^2k^2z^2 + 301989888a^{10}b^3c^{12}g^2i^2z^2 + 222822400 \\
& a^9b^9c^7i^2k^2z^2 - 366280704a^6b^8c^{11}d^2f^2z^2 - 330301440a^8b^4c \\
& ^{13}d^2f^2z^2 + 254017536a^8b^6c^{11}f^2h^2z^2 - 1887436800a^{10}b^2c^{14}d^2h^2 \\
& z^2 + 188743680a^{10}b^2c^{13}f^2h^2z^2 - 185303040a^7b^9c^9d^2j^2z^2 - 1179 \\
& 64800a^{10}b^5c^{10}h^2j^2z^2 - 6039797760a^{12}b^2c^{12}e^2k^2z^2 - 67502080a^8 \\
& b^{11}c^6i^2k^2z^2 + 121634816a^{11}b^2c^{12}f^2j^2z^2 + 188743680a^7b^7c^{11} \\
& e^2g^2z^2 - 115671040a^8b^8c^9f^2j^2z^2 + 125829120a^8b^6c^{11}e^2i^2z^2 \\
& + 10813440a^7b^{13}c^5i^2k^2z^2 + 76677120a^7b^{11}c^7e^2k^2z^2 - 38338560a \\
& ^7b^{12}c^6g^2k^2z^2 - 37355520a^9b^7c^9h^2j^2z^2 - 917504a^6b^{15}c^4i \\
& ^2k^2z^2 + 32768a^5b^{17}c^3i^2k^2z^2 - 62914560a^8b^7c^{10}g^2i^2z^2 + 23101 \\
& 440a^8b^9c^8h^2j^2z^2 - 4349952a^7b^{11}c^7h^2j^2z^2 + 2949120a^6b^{14}c \\
& ^5g^2k^2z^2 + 337920a^6b^{13}c^6h^2j^2z^2 - 98304a^5b^{16}c^4g^2k^2z^2 - 768 \\
& 0a^5b^{15}c^5h^2j^2z^2 - 61931520a^7b^8c^{10}f^2h^2z^2 + 23592960a^7b^9c \\
& ^9g^2i^2z^2 + 17940480a^7b^{10}c^8f^2j^2z^2 - 47185920a^7b^8c^{10}e^2i^2z^2 \\
& - 5898240a^6b^{13}c^6e^2k^2z^2 - 3538944a^6b^{11}c^8g^2i^2z^2 - 1347584a^6 \\
& b^{12}c^7f^2j^2z^2 + 196608a^5b^{15}c^5e^2k^2z^2 + 196608a^5b^{13}c^7g^2i^2z \\
& ^2 + 35840a^5b^{14}c^6f^2j^2z^2 + 96583680a^5b^{10}c^{10}d^2f^2z^2 + 23371776 \\
& a^6b^{11}c^8d^2j^2z^2 - 51609600a^6b^9c^{10}d^2h^2z^2 + 7077888a^6b^{10}c^9 \\
& e^2i^2z^2 + 6144000a^6b^{10}c^9f^2h^2z^2 - 1677312a^5b^{13}c^7d^2j^2z^2 - 3 \\
& 93216a^5b^{12}c^8e^2i^2z^2 + 61440a^5b^{12}c^8f^2h^2z^2 + 53760a^4b^{15}c^6 \\
& d^2j^2z^2 - 46080a^4b^{14}c^7f^2h^2z^2 + 1536a^3b^{16}c^6f^2h^2z^2 - 235929 \\
& 60a^6b^9c^{10}e^2g^2z^2 + 1179648a^5b^{11}c^9e^2g^2z^2 + 829440a^4b^{13}c^8 \\
& d^2h^2z^2 + 368640a^5b^{11}c^9d^2h^2z^2 - 105984a^3b^{15}c^7d^2h^2z^2 + 460 \\
& 8a^2b^{17}c^6d^2h^2z^2 - 15175680a^4b^{12}c^9d^2f^2z^2 + 1428480a^3b^{14}c^8 \\
& d^2f^2z^2 - 73728a^2b^{16}c^7d^2f^2z^2 + 4108320768a^{10}b^3c^{12}d^2j^2z^2 \\
& - 1207959552a^{10}b^2c^{14}e^2g^2z^2 - 578813952a^{12}b^2c^{12}h^2j^2z^2 + 32463912 \\
& 96a^{10}b^6c^9g^2k^2z^2 - 402653184a^{11}b^2c^{13}g^2i^2z^2 + 3019898880a^{12}b \\
& ^2c^{11}g^2k^2z^2 - 440401920a^{10}b^2c^{14}f^2z^2 - 188743680a^{11}b^2c^{13}h^2 \\
& z^2 + 1761607680a^{10}c^{15}d^2f^2z^2 - 655360a^6b^{18}c^2k^2z^2 - 94464a^6b \\
& ^{17}c^7d^2z^2 + 6936330240a^8b^3c^{14}d^2z^2 + 2464874496a^6b^7c^{12} \\
& d^2z^2 - 3963617280a^9b^2c^{15}d^2z^2 + 58007224320a^{13}b^4c^8k^2z^2 \\
& + 14968422400a^{11}b^8c^6k^2z^2 + 805306368a^{11}c^{14}e^2i^2z^2 - 3596615 \\
& 6800a^{12}b^6c^7k^2z^2 + 419430400a^{12}c^{13}f^2j^2z^2 - 1509949440a^9b^2 \\
& c^{14}e^2z^2 + 251658240a^{11}c^{14}f^2h^2z^2 - 56874762240a^{14}b^2c^9k^2 \\
& z^2 - 5400428544a^7b^5c^{13}d^2z^2 + 890470400a^9b^{12}c^4k^2z^2 + 7 \\
& 54974720a^8b^4c^{13}e^2z^2 - 730054656a^5b^9c^{11}d^2z^2 + 477102080a \\
& ^{12}b^3c^{10}j^2z^2 + 477102080a^9b^3c^{13}f^2z^2 - 377487360a^9b^4c \\
& ^{12}g^2z^2 + 301989888a^{10}b^2c^{13}g^2z^2 - 174325760a^{11}b^5c^9j^2z^2
\end{aligned}$$

$$\begin{aligned}
& *z^2 - 126156800*a^8*b^{14}*c^3*k^2*z^2 + 188743680*a^8*b^6*c^{11}*g^2*z^2 + 14 \\
& 1557760*a^{10}*b^3*c^{12}*h^2*z^2 - 174325760*a^8*b^5*c^{12}*f^2*z^2 - 188743680* \\
& a^7*b^6*c^{12}*e^2*z^2 - 4350935040*a^{10}*b^{10}*c^5*k^2*z^2 + 146165760*a^4*b^1 \\
& 1*c^{10}*d^2*z^2 - 50331648*a^{10}*b^4*c^{11}*i^2*z^2 + 11796480*a^7*b^{16}*c^2*k^2 \\
& *z^2 - 33554432*a^{11}*b^2*c^{12}*i^2*z^2 + 11206656*a^{10}*b^7*c^8*j^2*z^2 + 892 \\
& 9280*a^9*b^9*c^7*j^2*z^2 + 20971520*a^9*b^6*c^{10}*i^2*z^2 - 2600960*a^8*b^{11} \\
& *c^6*j^2*z^2 + 291840*a^7*b^{13}*c^5*j^2*z^2 - 14080*a^6*b^{15}*c^4*j^2*z^2 + 2 \\
& 56*a^5*b^{17}*c^3*j^2*z^2 - 47185920*a^7*b^8*c^{10}*g^2*z^2 - 26542080*a^8*b^7*c \\
& ^{10}*h^2*z^2 - 2752512*a^7*b^{10}*c^8*i^2*z^2 + 2621440*a^8*b^8*c^9*i^2*z^2 + \\
& 524288*a^6*b^{12}*c^7*i^2*z^2 - 32768*a^5*b^{14}*c^6*i^2*z^2 + 9584640*a^7*b^9 \\
& *c^9*h^2*z^2 - 2359296*a^9*b^5*c^{11}*h^2*z^2 - 1290240*a^6*b^{11}*c^8*h^2*z^2 \\
& + 46080*a^5*b^{13}*c^7*h^2*z^2 + 2304*a^4*b^{15}*c^6*h^2*z^2 + 5898240*a^6*b^{10} \\
& *c^9*g^2*z^2 - 294912*a^5*b^{12}*c^8*g^2*z^2 + 11206656*a^7*b^7*c^{11}*f^2*z^2 \\
& + 8929280*a^6*b^9*c^{10}*f^2*z^2 + 23592960*a^6*b^8*c^{11}*e^2*z^2 - 2600960*a^ \\
& 5*b^{11}*c^9*f^2*z^2 + 291840*a^4*b^{13}*c^8*f^2*z^2 - 14080*a^3*b^{15}*c^7*f^2*z \\
& ^2 + 256*a^2*b^{17}*c^6*f^2*z^2 - 19860480*a^3*b^{13}*c^9*d^2*z^2 - 1179648*a^5 \\
& *b^{10}*c^{10}*e^2*z^2 + 1771776*a^2*b^{15}*c^8*d^2*z^2 - 440401920*a^{13}*b*c^{11}*j \\
& ^2*z^2 + 1207959552*a^{10}*c^{15}*e^2*z^2 + 134217728*a^{12}*c^{13}*i^2*z^2 + 25769 \\
& 803776*a^{15}*c^{10}*k^2*z^2 + 16384*a^5*b^{20}*k^2*z^2 + 2304*b^{19}*c^6*d^2*z^2 + \\
& 165150720*a^9*b*c^{12}*d*g*j*z + 23592960*a^{10}*b*c^{11}*g*h*j*z + 169869312*a^ \\
& 7*b*c^{14}*d*e*f*z + 99090432*a^8*b*c^{13}*d*g*h*z - 3145728*a^9*b*c^{12}*f*h*i*z \\
& + 56623104*a^8*b*c^{13}*d*f*i*z - 1536*a*b^{18}*c^3*d*f*k*z - 9437184*a^8*b*c^ \\
& ^{13}*e*f*h*z + 1536*a*b^{15}*c^6*d*f*i*z - 4608*a*b^{14}*c^7*d*f*g*z + 9216*a*b^1 \\
& 3*c^8*d*e*f*z + 2173501440*a^9*b^5*c^8*d*j*k*z - 1987706880*a^9*b^3*c^{10}*d* \\
& h*k*z + 1121255424*a^8*b^5*c^9*d*h*k*z + 861143040*a^8*b^4*c^{10}*d*f*k*z - 8 \\
& 59963392*a^7*b^6*c^9*d*f*k*z - 780779520*a^8*b^7*c^7*d*j*k*z - 754974720*a^ \\
& 9*b^3*c^{10}*e*g*k*z + 2222456832*a^{11}*b*c^{10}*d*j*k*z - 454164480*a^{11}*b^3*c^ \\
& 8*h*j*k*z + 377487360*a^8*b^5*c^9*e*g*k*z + 290979840*a^{10}*b^4*c^8*f*j*k*z \\
& + 381026304*a^6*b^8*c^8*d*f*k*z + 412876800*a^8*b^2*c^{12}*d*e*j*z + 30198988 \\
& 8*a^{10}*b^2*c^{10}*e*i*k*z - 320421888*a^7*b^7*c^8*d*h*k*z + 185794560*a^{10}*b^ \\
& 5*c^7*h*j*k*z - 192020480*a^9*b^6*c^7*f*j*k*z + 190709760*a^9*b^4*c^9*f*h*k \\
& *z - 150994944*a^{10}*b^3*c^9*g*i*k*z + 168990720*a^7*b^9*c^6*d*j*k*z + 23592 \\
& 9600*a^9*b^2*c^{11}*d*f*k*z - 206438400*a^8*b^3*c^{11}*d*g*j*z - 206438400*a^7* \\
& b^4*c^{11}*d*e*j*z - 101646336*a^8*b^6*c^8*f*h*k*z - 29245440*a^9*b^7*c^6*h*j \\
& *k*z - 60817408*a^{11}*b^2*c^9*f*j*k*z + 57835520*a^8*b^8*c^6*f*j*k*z + 21941 \\
& 4528*a^7*b^2*c^{13}*d*e*h*z - 70778880*a^{10}*b^2*c^{10}*f*h*k*z + 677376*a^7*b^1 \\
& 1*c^4*h*j*k*z - 645120*a^8*b^9*c^5*h*j*k*z - 53760*a^6*b^{13}*c^3*h*j*k*z + 3 \\
& 1457280*a^8*b^7*c^7*g*i*k*z - 62914560*a^8*b^6*c^8*e*i*k*z - 94371840*a^7*b^ \\
& ^7*c^8*e*g*k*z - 221773824*a^6*b^3*c^{13}*d*e*f*z + 82575360*a^9*b^2*c^{11}*d*i \\
& *j*z + 11796480*a^{10}*b^2*c^{10}*h*i*j*z - 11796480*a^7*b^9*c^6*g*i*k*z - 8970 \\
& 240*a^7*b^{10}*c^5*f*j*k*z + 103219200*a^7*b^5*c^{10}*d*g*j*z - 2457600*a^8*b^6 \\
& *c^8*h*i*j*z + 1769472*a^6*b^{11}*c^5*g*i*k*z + 921600*a^7*b^8*c^7*h*i*j*z + \\
& 673792*a^6*b^{12}*c^4*f*j*k*z - 138240*a^6*b^{10}*c^6*h*i*j*z - 98304*a^5*b^{13}* \\
& c^4*g*i*k*z - 17920*a^5*b^{14}*c^3*f*j*k*z + 7680*a^5*b^{12}*c^5*h*i*j*z - 9713 \\
& 6640*a^5*b^{10}*c^7*d*f*k*z - 29491200*a^9*b^3*c^{10}*g*h*j*z + 58982400*a^9*b^
\end{aligned}$$

$2*c^{11}*e*h*j*z + 23592960*a^7*b^8*c^7*e*i*k*z - 22169088*a^6*b^{11}*c^5*d*j*k$
 $*z + 21381120*a^7*b^8*c^7*f*h*k*z + 14745600*a^8*b^5*c^9*g*h*j*z + 42854400$
 $*a^6*b^9*c^7*d*h*k*z - 109707264*a^7*b^3*c^{12}*d*g*h*z - 3686400*a^7*b^7*c^8$
 $*g*h*j*z - 3538944*a^6*b^{10}*c^6*e*i*k*z + 1645056*a^5*b^{13}*c^4*d*j*k*z - 89$
 $0880*a^6*b^{10}*c^6*f*h*k*z + 460800*a^6*b^9*c^7*g*h*j*z - 330240*a^5*b^{12}*c^$
 $5*f*h*k*z + 196608*a^5*b^{12}*c^5*e*i*k*z - 53760*a^4*b^{15}*c^3*d*j*k*z + 4608$
 $0*a^4*b^{14}*c^4*f*h*k*z - 23040*a^5*b^{11}*c^6*g*h*j*z - 1536*a^3*b^{16}*c^3*f*h$
 $*k*z - 29491200*a^8*b^4*c^{10}*e*h*j*z - 17203200*a^7*b^6*c^9*d*i*j*z + 11796$
 $480*a^6*b^9*c^7*e*g*k*z + 110886912*a^6*b^4*c^{12}*d*f*g*z + 7372800*a^7*b^6*$
 $c^9*e*h*j*z + 40108032*a^8*b^2*c^{12}*d*h*i*z + 6451200*a^6*b^8*c^8*d*i*j*z +$
 $2359296*a^8*b^3*c^{11}*f*h*i*z - 967680*a^5*b^{10}*c^7*d*i*j*z - 921600*a^6*b^$
 $8*c^8*e*h*j*z - 829440*a^4*b^{13}*c^5*d*h*k*z - 589824*a^5*b^{11}*c^6*e*g*k*z -$
 $491520*a^6*b^7*c^9*f*h*i*z + 184320*a^5*b^9*c^8*f*h*i*z + 105984*a^3*b^{15}$
 $c^4*d*h*k*z + 69120*a^5*b^{11}*c^6*d*h*k*z + 53760*a^4*b^{12}*c^6*d*i*j*z + 460$
 $80*a^5*b^{10}*c^7*e*h*j*z - 27648*a^4*b^{11}*c^7*f*h*i*z - 4608*a^2*b^{17}*c^3*d*$
 $h*k*z + 1536*a^3*b^{13}*c^6*f*h*i*z - 25804800*a^6*b^7*c^9*d*g*j*z - 88473600$
 $*a^6*b^4*c^{12}*d*e*h*z + 51609600*a^6*b^6*c^{10}*d*e*j*z - 84934656*a^7*b^2*c^$
 $13*d*f*g*z + 117964800*a^5*b^5*c^{12}*d*e*f*z + 15160320*a^4*b^{12}*c^6*d*f*k*z$
 $- 45613056*a^7*b^3*c^{12}*d*f*i*z + 44236800*a^6*b^5*c^{11}*d*g*h*z - 10321920$
 $*a^6*b^6*c^{10}*d*h*i*z + 7077888*a^7*b^4*c^{11}*d*h*i*z - 5898240*a^7*b^4*c^{11}$
 $*f*g*h*z + 4718592*a^8*b^2*c^{12}*f*g*h*z + 3225600*a^5*b^9*c^8*d*g*j*z + 294$
 $9120*a^6*b^6*c^{10}*f*g*h*z + 2396160*a^5*b^8*c^9*d*h*i*z - 1428480*a^3*b^{14}$
 $c^5*d*f*k*z - 737280*a^5*b^8*c^9*f*g*h*z - 161280*a^4*b^{11}*c^7*d*g*j*z + 92$
 $160*a^4*b^{10}*c^8*f*g*h*z + 73728*a^2*b^{16}*c^4*d*f*k*z - 50688*a^3*b^{12}*c^7*$
 $d*h*i*z - 27648*a^4*b^{10}*c^8*d*h*i*z - 4608*a^3*b^{12}*c^7*f*g*h*z + 4608*a^2$
 $*b^{14}*c^6*d*h*i*z - 58982400*a^5*b^6*c^{11}*d*f*g*z + 11796480*a^7*b^3*c^{12}*e$
 $*f*h*z + 8847360*a^5*b^7*c^{10}*d*f*i*z - 6635520*a^5*b^7*c^{10}*d*g*h*z - 6451$
 $200*a^5*b^8*c^9*d*e*j*z - 5898240*a^6*b^5*c^{11}*e*f*h*z - 3809280*a^4*b^9*c^$
 $9*d*f*i*z + 2359296*a^6*b^5*c^{11}*d*f*i*z + 1474560*a^5*b^7*c^{10}*e*f*h*z + 6$
 $81984*a^3*b^{11}*c^8*d*f*i*z + 322560*a^4*b^{10}*c^8*d*e*j*z - 276480*a^4*b^9*c^$
 $9*d*g*h*z - 184320*a^4*b^9*c^9*e*f*h*z + 179712*a^3*b^{11}*c^8*d*g*h*z - 552$
 $96*a^2*b^{13}*c^7*d*f*i*z - 13824*a^2*b^{13}*c^7*d*g*h*z + 9216*a^3*b^{11}*c^8*e*$
 $f*h*z + 16220160*a^4*b^8*c^{10}*d*f*g*z + 13271040*a^5*b^6*c^{11}*d*e*h*z - 239$
 $6160*a^3*b^{10}*c^9*d*f*g*z + 552960*a^4*b^8*c^{10}*d*e*h*z - 359424*a^3*b^{10}*c^$
 $9*d*e*h*z + 175104*a^2*b^{12}*c^8*d*f*g*z + 27648*a^2*b^{12}*c^8*d*e*h*z - 324$
 $40320*a^4*b^7*c^{11}*d*e*f*z + 4792320*a^3*b^9*c^{10}*d*e*f*z - 350208*a^2*b^{11}$
 $*c^9*d*e*f*z + 1439170560*a^{10}*b*c^{11}*d*h*k*z - 3361603584*a^{10}*b^3*c^9*d*j$
 $*k*z + 603979776*a^{10}*b*c^{11}*e*g*k*z + 407371776*a^{12}*b*c^9*h*j*k*z + 20132$
 $6592*a^{11}*b*c^{10}*g*i*k*z + 346816512*a^7*b*c^{14}*d^2*g*z + 129761280*a^{11}*b*$
 $c^{10}*h^2*k*z + 121896960*a^{10}*b*c^{11}*f^2*k*z + 458752*a^6*b^{15}*c*i*k^2*z +$
 $19660800*a^{11}*b*c^{10}*g*j^2*z + 49152*a^5*b^{16}*c*g*k^2*z + 7077888*a^9*b*c^1$
 $2*g*h^2*z + 94464*a*b^{17}*c^4*d^2*k*z - 19660800*a^8*b*c^{13}*f^2*g*z - 66816*$
 $a*b^{14}*c^7*d^2*i*z + 214272*a*b^{13}*c^8*d^2*g*z - 428544*a*b^{12}*c^9*d^2*e*z$
 $+ 2390753280*a^{11}*b^4*c^7*g*k^2*z - 2411421696*a^6*b^7*c^9*d^2*k*z - 660307$
 $9680*a^8*b^3*c^{11}*d^2*k*z + 3715891200*a^9*b*c^{12}*d^2*k*z - 880803840*a^{10}$

$c^{12}d^f k^z - 1623195648a^{10}b^6c^6g^k k^2z - 402653184a^{11}c^{11}e^i k^k z - 1509949440a^{12}b^2c^8g^k k^2z - 209715200a^{12}c^{10}f^j k^k z - 330301440a^9c^{13}d^e j^z + 3019898880a^{12}b^c^9e^k k^2z - 125829120a^{11}c^{11}f^h k^k z - 110100480a^{10}c^{12}d^i j^z - 198180864a^8c^{14}d^e h^z - 15728640a^{11}c^{11}h^i j^z - 1226833920a^9b^7c^6e^k k^2z - 47185920a^{10}c^{12}e^h j^z - 66060288a^9c^{13}d^h i^z - 1090519040a^{12}b^3c^7i^k k^2z + 1022754816a^6b^2c^{14}d^2e^z + 5216108544a^7b^5c^{10}d^2k^k z + 754974720a^9b^2c^{11}e^2k^k z + 721529856a^5b^9c^8d^2k^k z + 613416960a^9b^8c^5g^k k^2z - 642318336a^5b^4c^{13}d^2e^z - 4781506560a^{11}b^3c^8e^k k^2z - 398131200a^{12}b^3c^7j^2k^k z - 511377408a^6b^3c^{13}d^2g^z - 377487360a^8b^4c^{10}e^2k^k z + 285212672a^{11}b^5c^6i^k k^2z + 199065600a^{11}b^5c^6j^2k^k z + 279183360a^8b^9c^5e^k k^2z + 321159168a^5b^5c^{12}d^2g^z + 188743680a^9b^4c^9g^2k^k z + 132120576a^{10}b^7c^5i^k k^2z - 150994944a^{10}b^2c^{10}g^2k^k z - 111411200a^9b^9c^4i^k k^2z - 126812160a^{10}b^3c^9h^2k^k z + 225312768a^7b^2c^{13}d^2i^z - 139591680a^8b^10c^4g^k k^2z - 49766400a^{10}b^7c^5j^2k^k z - 145463040a^4b^11c^7d^2k^k z - 94371840a^8b^6c^8g^2k^k z + 223395840a^4b^6c^{12}d^2e^z + 33751040a^8b^11c^3i^k k^2z - 78970880a^9b^3c^{10}f^2k^k z + 94371840a^7b^6c^9e^2k^k z + 25165824a^{10}b^4c^8i^2k^k z + 6220800a^9b^9c^4j^2k^k z + 39223296a^9b^5c^8h^2k^k z - 311040a^8b^11c^3j^2k^k z + 16777216a^{11}b^2c^9i^2k^k z - 10485760a^9b^6c^7i^2k^k z - 5406720a^7b^13c^2i^k k^2z + 1376256a^7b^10c^5i^2k^k z - 1310720a^8b^8c^6i^2k^k z - 262144a^6b^12c^4i^2k^k z + 16384a^5b^14c^3i^2k^k z + 10354688a^{11}b^2c^9i^j^2z + 23592960a^7b^8c^7g^2k^k z + 38559744a^7b^7c^8f^2k^k z + 19169280a^7b^12c^3g^k k^2z - 2048000a^9b^6c^7i^j^2z - 1520640a^7b^9c^6h^2k^k z - 1105920a^8b^7c^7h^2k^k z + 849920a^8b^8c^6i^j^2z - 393216a^{10}b^4c^8i^j^2z + 195840a^6b^11c^5h^2k^k z - 145920a^7b^10c^5i^j^2z + 11520a^5b^13c^4h^2k^k z + 11008a^6b^12c^4i^j^2z - 2304a^4b^15c^3h^2k^k z - 256a^5b^14c^3i^j^2z - 25362432a^{10}b^3c^9g^j^2z - 24739840a^8b^5c^9f^2k^k z - 38338560a^7b^11c^4e^k k^2z - 2949120a^6b^10c^6g^2k^k z - 1474560a^6b^14c^2g^k k^2z + 50724864a^{10}b^2c^10e^j^2z + 147456a^5b^12c^5g^2k^k z - 15150080a^6b^9c^7f^2k^k z + 13271040a^9b^5c^8g^j^2z - 111697920a^4b^7c^{11}d^2g^z - 3563520a^8b^7c^7g^j^2z + 3538944a^9b^2c^{11}h^2i^z + 2912000a^5b^11c^6f^2k^k z - 737280a^7b^6c^9h^2i^z + 506880a^7b^9c^6g^j^2z - 291840a^4b^13c^5f^2k^k z + 276480a^6b^8c^8h^2i^z - 41472a^5b^10c^7h^2i^z - 34560a^6b^11c^5g^j^2z + 14080a^3b^15c^4f^2k^k z + 2304a^4b^12c^6h^2i^z + 768a^5b^13c^4g^j^2z - 256a^2b^17c^3f^2k^k z - 11796480a^6b^8c^8e^2k^k z - 26542080a^9b^4c^9e^j^2z + 19837440a^3b^13c^6d^2k^k z + 2949120a^6b^13c^3e^k k^2z + 589824a^5b^10c^7e^2k^k z - 98304a^5b^15c^2e^k k^2z - 10354688a^8b^2c^{12}f^2i^z - 43646976a^6b^4c^{12}d^2i^z - 8847360a^8b^3c^{11}g^h^2z + 7127040a^8b^6c^8e^j^2z + 4423680a^7b^5c^{10}g^h^2z + 2048000a^6b^6c^{10}f^2i^z - 1771776a^2b^15c^5d^2k^k z - 1105920a^6b^7c^9g^h^2z - 1013760a^7b^8c^7e^j^2z - 849920a^5b^8c^9f^2i^z + 393216a^7b^4c^{11}f^2i^z + 145920a^4b^1$

$0*c^8*f^2*i*z + 138240*a^5*b^9*c^8*g*h^2*z + 69120*a^6*b^10*c^6*e*j^2*z - 1$
 $1008*a^3*b^12*c^7*f^2*i*z - 6912*a^4*b^11*c^7*g*h^2*z - 1536*a^5*b^12*c^5*e$
 $*j^2*z + 256*a^2*b^14*c^6*f^2*i*z - 32587776*a^5*b^6*c^11*d^2*i*z + 2536243$
 $2*a^7*b^3*c^12*f^2*g*z + 21657600*a^4*b^8*c^10*d^2*i*z + 17694720*a^8*b^2*c$
 $^12*e*h^2*z - 50724864*a^7*b^2*c^13*e*f^2*z - 13271040*a^6*b^5*c^11*f^2*g*z$
 $- 8847360*a^7*b^4*c^11*e*h^2*z - 5810688*a^3*b^10*c^9*d^2*i*z + 3563520*a^$
 $5*b^7*c^10*f^2*g*z + 2211840*a^6*b^6*c^10*e*h^2*z + 845568*a^2*b^12*c^8*d^2$
 $*i*z - 506880*a^4*b^9*c^9*f^2*g*z - 276480*a^5*b^8*c^9*e*h^2*z + 34560*a^3*$
 $b^11*c^8*f^2*g*z + 13824*a^4*b^10*c^8*e*h^2*z - 768*a^2*b^13*c^7*f^2*g*z +$
 $26542080*a^6*b^4*c^12*e*f^2*z + 23362560*a^3*b^9*c^10*d^2*g*z - 46725120*a^$
 $3*b^8*c^11*d^2*e*z - 7127040*a^5*b^6*c^11*e*f^2*z - 2965248*a^2*b^11*c^9*d^$
 $2*g*z + 1013760*a^4*b^8*c^10*e*f^2*z - 69120*a^3*b^10*c^9*e*f^2*z + 1536*a^$
 $2*b^12*c^8*e*f^2*z + 5930496*a^2*b^10*c^10*d^2*e*z + 1006632960*a^13*b*c^8*$
 $i*k^2*z + 3246391296*a^10*b^5*c^7*e*k^2*z + 318504960*a^13*b*c^8*j^2*k*z +$
 $61538304*a^10*b^10*c^2*k^3*z - 603979776*a^10*c^12*e^2*k*z - 693633024*a^7*$
 $c^15*d^2*e*z - 231211008*a^8*c^14*d^2*i*z - 67108864*a^12*c^10*i^2*k*z - 13$
 $107200*a^12*c^10*i*j^2*z - 16384*a^5*b^17*i*k^2*z - 39321600*a^11*c^11*e*j^$
 $2*z - 4718592*a^10*c^12*h^2*i*z - 2304*b^19*c^3*d^2*k*z + 13107200*a^9*c^13$
 $*f^2*i*z + 2304*b^16*c^6*d^2*i*z - 14155776*a^9*c^13*e*h^2*z + 39321600*a^8$
 $*c^14*e*f^2*z - 4833280*a^9*b^12*c*k^3*z - 6912*b^15*c^7*d^2*g*z + 69625446$
 $40*a^14*b^2*c^6*k^3*z + 13824*b^14*c^8*d^2*e*z + 1876951040*a^12*b^6*c^4*k^$
 $3*z - 4844421120*a^13*b^4*c^5*k^3*z - 437780480*a^11*b^8*c^3*k^3*z - 429496$
 $7296*a^15*c^7*k^3*z + 163840*a^8*b^14*k^3*z + 6144000*a^10*b*c^8*f*i*j*k -$
 $5898240*a^10*b*c^8*g*h*j*k - 41287680*a^9*b*c^9*d*g*j*k + 4472832*a^9*b*c^9$
 $*f*h*i*k + 18432000*a^9*b*c^9*e*f*j*k + 3391488*a^8*b*c^10*e*h*i*j + 122880$
 $0*a^8*b*c^10*f*g*i*j - 24772608*a^8*b*c^10*d*g*h*k + 13418496*a^8*b*c^10*e*$
 $f*h*k + 11649024*a^8*b*c^10*d*f*i*k + 737280*a^7*b*c^11*f*g*h*i - 768*a*b^1$
 $5*c^3*d*f*i*k - 19307520*a^7*b*c^11*d*f*h*j + 16367616*a^7*b*c^11*d*e*i*j +$
 $3686400*a^7*b*c^11*e*f*g*j + 34947072*a^7*b*c^11*d*e*f*k + 2304*a*b^14*c^4$
 $*d*f*g*k - 180*a*b^13*c^5*d*f*h*j + 11059200*a^6*b*c^12*d*e*h*i + 5160960*a$
 $^6*b*c^12*d*f*g*i + 2211840*a^6*b*c^12*e*f*g*h - 4608*a*b^13*c^5*d*e*f*k -$
 $2304*a*b^11*c^7*d*f*g*i + 4608*a*b^10*c^8*d*e*f*i + 15482880*a^5*b*c^13*d*e$
 $*f*g - 13824*a*b^9*c^9*d*e*f*g - 225976320*a^8*b^2*c^9*d*e*j*k + 112988160*$
 $a^8*b^3*c^8*d*g*j*k - 11427840*a^10*b^2*c^7*h*i*j*k - 4177920*a^9*b^4*c^6*h$
 $*i*j*k + 1399296*a^8*b^6*c^5*h*i*j*k - 26880*a^6*b^10*c^3*h*i*j*k + 16128*a$
 $^7*b^8*c^4*h*i*j*k - 61562880*a^9*b^2*c^8*d*i*j*k + 20090880*a^9*b^3*c^7*g*$
 $h*j*k + 119623680*a^7*b^4*c^8*d*e*j*k + 10485760*a^9*b^3*c^7*f*i*j*k - 4018$
 $1760*a^9*b^2*c^8*e*h*j*k - 3778560*a^8*b^5*c^6*g*h*j*k - 137797632*a^7*b^2*$
 $c^10*d*e*h*k - 1248768*a^7*b^7*c^5*f*i*j*k + 229376*a^6*b^9*c^4*f*i*j*k + 2$
 $20160*a^8*b^5*c^6*f*i*j*k - 209664*a^7*b^7*c^5*g*h*j*k + 80640*a^6*b^9*c^4*$
 $g*h*j*k - 8960*a^5*b^11*c^3*f*i*j*k - 59811840*a^7*b^5*c^7*d*g*j*k + 530841$
 $60*a^8*b^2*c^9*e*g*i*k - 11120640*a^8*b^4*c^7*f*g*j*k + 10455552*a^7*b^6*c^$
 $6*d*i*j*k - 9216000*a^9*b^2*c^8*f*g*j*k + 7557120*a^8*b^4*c^7*e*h*j*k + 739$
 $7376*a^8*b^3*c^8*f*h*i*k + 5230080*a^7*b^6*c^6*f*g*j*k - 37675008*a^8*b^2*c$
 $^9*d*h*i*k - 3633408*a^6*b^8*c^5*d*i*j*k + 2211840*a^8*b^4*c^7*d*i*j*k + 68$

$898816a^7b^3c^9d*g*h*k - 1695744a^8b^2c^9g*h*i*j - 1400832a^7b^4c^8g*h*i*j + 967680a^7b^5c^7f*h*i*k - 783360a^6b^7c^6f*h*i*k - 741888a^6b^8c^5f*g*j*k + 499968a^5b^10c^4d*i*j*k + 419328a^7b^6c^6e*h*j*k - 253440a^6b^6c^7g*h*i*j - 161280a^6b^8c^5e*h*j*k + 42240a^5b^9c^5f*h*i*k + 26880a^5b^10c^4f*g*j*k - 26880a^4b^12c^3d*i*j*k + 13824a^4b^11c^4f*h*i*k + 11520a^5b^8c^6g*h*i*j - 768a^3b^13c^3f*h*i*k + 22241280a^8b^3c^8e*f*j*k + 14222592a^6b^7c^6d*g*j*k - 10460160a^7b^5c^7e*f*j*k + 8847360a^7b^4c^8e*g*i*k - 7741440a^7b^4c^8f*g*h*k - 7077888a^6b^6c^7e*g*i*k + 6935040a^6b^6c^7d*h*i*k - 6709248a^8b^2c^9f*g*h*k - 3612672a^7b^4c^8d*h*i*k + 2801664a^7b^3c^9e*h*i*j + 2506752a^7b^3c^9f*g*i*j + 2419200a^6b^6c^7f*g*h*k - 1661184a^5b^9c^5d*g*j*k + 1483776a^6b^7c^6e*f*j*k - 1463040a^5b^8c^6d*h*i*k + 884736a^5b^8c^6e*g*i*k + 838656a^6b^5c^8f*g*i*j + 506880a^6b^5c^8e*h*i*j + 80640a^4b^11c^4d*g*j*k - 53760a^5b^9c^5e*f*j*k - 53760a^5b^7c^7f*g*i*j - 46080a^4b^10c^5f*g*h*k - 34560a^5b^8c^6f*g*h*k + 25344a^3b^12c^4d*h*i*k - 23040a^5b^7c^7e*h*i*j + 13824a^4b^10c^5d*h*i*k + 2304a^3b^12c^4f*g*h*k - 2304a^2b^14c^3d*h*i*k - 29030400a^6b^5c^8d*g*h*k + 28606464a^7b^3c^9d*f*i*k - 28445184a^6b^6c^7d*e*j*k + 58060800a^6b^4c^9d*e*h*k + 15482880a^7b^3c^9e*f*h*k - 8183808a^7b^2c^10d*g*i*j - 6718464a^6b^5c^8d*f*i*k - 5087232a^7b^2c^10e*g*h*j - 5013504a^7b^2c^10e*f*i*j - 4838400a^6b^5c^8e*f*h*k + 4112640a^5b^7c^7d*g*h*k - 3663360a^5b^7c^7d*f*i*k + 3322368a^5b^8c^6d*e*j*k - 2285568a^6b^4c^9d*g*i*j + 1896960a^4b^9c^6d*f*i*k + 1843200a^6b^3c^10f*g*h*i - 1677312a^6b^4c^9e*f*i*j - 1658880a^6b^4c^9e*g*h*j + 68345856a^6b^3c^10d*e*f*k + 783360a^5b^5c^9f*g*h*i + 741888a^5b^6c^8d*g*i*j - 34172928a^6b^4c^9d*f*g*k - 340992a^3b^11c^5d*f*i*k - 161280a^4b^10c^5d*e*j*k + 138240a^4b^9c^6d*g*h*k + 107520a^5b^6c^8e*f*i*j + 92160a^4b^9c^6e*f*h*k - 89856a^3b^11c^5d*g*h*k - 80640a^4b^8c^7d*g*i*j + 69120a^5b^7c^7e*f*h*k + 69120a^5b^6c^8e*g*h*j + 27648a^2b^13c^4d*f*i*k + 18432a^4b^7c^8f*g*h*i + 6912a^2b^13c^4d*g*h*k - 4608a^3b^11c^5e*f*h*k - 2304a^3b^9c^7f*g*h*i + 27164160a^5b^6c^8d*f*g*k - 22164480a^6b^3c^10d*f*h*j - 54328320a^5b^5c^9d*e*f*k - 17473536a^7b^2c^10d*f*g*k - 8225280a^5b^6c^8d*e*h*k - 8087040a^4b^8c^7d*f*g*k + 5677056a^6b^3c^10e*f*g*j - 5529600a^6b^2c^11d*g*h*i + 4571136a^6b^3c^10d*e*i*j - 3686400a^6b^2c^11e*f*h*i + 2805120a^5b^5c^9d*f*h*j - 2211840a^5b^4c^10d*g*h*i - 1566720a^5b^4c^10e*f*h*i - 1483776a^5b^5c^9d*e*i*j + 1198080a^3b^10c^6d*f*g*k + 437184a^4b^7c^8d*f*h*j - 322560a^5b^5c^9e*f*g*j + 317952a^4b^6c^9d*g*h*i - 276480a^4b^8c^7d*e*h*k + 179712a^3b^10c^6d*e*h*k + 161280a^4b^7c^8d*e*i*j - 146268a^3b^9c^7d*f*h*j - 87552a^2b^12c^5d*f*g*k - 36864a^4b^6c^9e*f*h*i - 13824a^2b^12c^5d*e*h*k + 9360a^2b^11c^6d*f*h*j + 6912a^3b^8c^8d*g*h*i - 6912a^2b^10c^7d*g*h*i + 4608a^3b^8c^8e*f*h*i - 24551424a^6b^2c^11d*e*g*j + 16174080a^4b^7c^8d*e*f*k + 5419008a^5b^4c^10d*e*g*j + 5160960a^5b^3c^11d*f*g*i + 4423680a^5b^3c^11e*f*g*h +$

$4423680a^5b^3c^{11}d^*e^*h^*i - 2396160a^3b^9c^7d^*e^*f^*k - 635904a^4b^5$
 $*c^{10}d^*e^*h^*i - 483840a^4b^6c^9d^*e^*g^*j - 354816a^3b^7c^9d^*f^*g^*i + 3$
 $22560a^4b^5c^{10}d^*f^*g^*i + 175104a^2b^{11}c^6d^*e^*f^*k + 138240a^4b^5c$
 $^{10}e^*f^*g^*h + 59904a^2b^9c^8d^*f^*g^*i - 13824a^3b^7c^9e^*f^*g^*h - 13824$
 $a^3b^7c^9d^*e^*h^*i + 13824a^2b^9c^8d^*e^*h^*i - 16588800a^5b^2c^{12}d^*$
 $e^*g^*h - 10321920a^5b^2c^{12}d^*e^*f^*i + 1658880a^4b^4c^{11}d^*e^*g^*h + 7096$
 $32a^3b^6c^{10}d^*e^*f^*i - 645120a^4b^4c^{11}d^*e^*f^*i + 124416a^3b^6c^{10}$
 $d^*e^*g^*h - 119808a^2b^8c^9d^*e^*f^*i - 41472a^2b^8c^9d^*e^*g^*h + 7741440$
 $a^4b^3c^{12}d^*e^*f^*g - 2903040a^3b^5c^{11}d^*e^*f^*g + 387072a^2b^7c^{10}$
 $d^*e^*f^*g - 381026304a^{11}b^*c^7d^*j^*k^2 - 241827840a^{10}b^*c^8d^*h^*k^2 - 656$
 $67072a^{12}b^*c^6h^*j^*k^2 - 169344a^7b^{11}c^*h^*j^*k^2 - 25165824a^{11}b^*c^7*$
 $g^*i^*k^2 - 4915200a^{11}b^*c^7g^*j^2k - 53084160a^8b^*c^{10}e^2i^*k - 754974$
 $72a^{10}b^*c^8e^*g^*k^2 - 86704128a^7b^*c^{11}d^2g^*k + 565248a^9b^*c^9h^*i^$
 $2j - 168448a^6b^{12}c^*f^*j^*k^2 - 24576a^5b^{13}c^*g^*i^*k^2 - 1769472a^9b^*$
 $c^9g^*h^2k - 17694720a^9b^*c^9e^*i^2k - 411264a^5b^{13}c^*d^*j^*k^2 - 1152$
 $0a^4b^{14}c^*f^*h^*k^2 + 4915200a^8b^*c^{10}f^2g^*k + 2580480a^9b^*c^9e^*i^*j$
 $^2 - 2496000a^9b^*c^9f^*h^*j^2 - 1543680a^8b^*c^{10}f^*h^2j + 33408a^*b^{14}$
 $c^4d^2i^*k - 59512320a^6b^*c^{12}d^2f^*j + 5087232a^7b^*c^{11}e^2h^*j + 27$
 $27936a^8b^*c^{10}d^*i^2j - 26496a^3b^{15}c^*d^*h^*k^2 + 1105920a^7b^*c^{11}e^*$
 $h^2i - 107136a^*b^{13}c^5d^2g^*k + 10260a^*b^{12}c^6d^2h^*j - 10616832a^6$
 $b^*c^{12}e^2g^*i - 3538944a^7b^*c^{11}e^*g^*i^2 + 1843200a^7b^*c^{11}d^*h^*i^2 -$
 $18432a^2b^{16}c^*d^*f^*k^2 - 15552000a^8b^*c^{10}d^*f^*j^2 + 24551424a^6b^*c^$
 $12d^*e^2j - 37062144a^5b^*c^{13}d^2f^*h + 2580480a^6b^*c^{12}e^*f^2i + 214$
 $272a^*b^{12}c^6d^2e^*k + 65664a^*b^{10}c^8d^2g^*i - 25074a^*b^{11}c^7d^2f^*$
 $j + 420a^*b^{12}c^6d^2f^2j + 6a^*b^{15}c^3d^2f^*j^2 + 23224320a^5b^*c^{13}d^2$
 $*e^*i + 384a^*b^{12}c^6d^2f^*i^2 - 5985792a^6b^*c^{12}d^*f^*h^2 + 206010a^*b^9c^$
 $^9d^2f^*h - 131328a^*b^9c^9d^2e^*i - 6300a^*b^{10}c^8d^2f^2h + 1350a^*b^$
 $11c^7d^2f^*h^2 + 16588800a^5b^*c^{13}d^*e^2h + 3456a^*b^{10}c^8d^2f^*g^2 + 43$
 $5456a^*b^8c^{10}d^2e^*g + 13824a^*b^8c^{10}d^*e^2f + 3932160a^{11}c^8h^*i^*j$
 $*k + 27525120a^{10}c^9d^*i^*j^*k + 82575360a^9c^{10}d^*e^*j^*k + 11796480a^{10}$
 $c^9e^*h^*j^*k + 16515072a^9c^{10}d^*h^*i^*k + 49545216a^8c^{11}d^*e^*h^*k - 24576$
 $00a^8c^{11}e^*f^*i^*j - 1474560a^7c^{12}e^*f^*h^*i - 10321920a^6c^{13}d^*e^*f^*i$
 $+ 737077248a^{10}b^3c^6d^*j^*k^2 - 518814720a^9b^5c^5d^*j^*k^2 + 44135424$
 $0a^9b^3c^7d^*h^*k^2 - 429871104a^6b^2c^{11}d^2e^*k - 272212992a^8b^5*$
 $c^6d^*h^*k^2 + 305731584a^5b^4c^{10}d^2e^*k + 192412800a^8b^7c^4d^*j^*k^$
 $2 + 111912960a^{11}b^3c^5h^*j^*k^2 + 214935552a^6b^3c^{10}d^2g^*k + 20242$
 $7136a^7b^6c^6d^*f^*k^2 - 49904640a^{10}b^5c^4h^*j^*k^2 - 178513920a^8b^$
 $4c^7d^*f^*k^2 - 152865792a^5b^5c^9d^2g^*k - 114388992a^7b^2c^{10}d^2*$
 $i^*k + 94961664a^{10}b^2c^7e^*i^*k^2 - 9039872a^{11}b^2c^6i^*j^2k - 564940$
 $80a^{10}b^4c^5f^*j^*k^2 - 2052096a^{10}b^4c^5i^*j^2k + 1327360a^9b^6c^$
 $4i^*j^2k - 158080a^8b^8c^3i^*j^2k - 47480832a^{10}b^3c^6g^*i^*k^2 + 45$
 $576960a^9b^6c^4f^*j^*k^2 + 7954560a^9b^7c^3h^*j^*k^2 - 104693760a^9b^$
 $3c^7e^*g^*k^2 + 142080a^8b^9c^2h^*j^*k^2 + 16017408a^{10}b^3c^6g^*j^2k$
 $- 4930560a^9b^5c^5g^*j^2k - 3649536a^9b^2c^8h^2i^*k - 1843200a^8b^$
 $^4c^7h^2i^*k + 85524480a^8b^5c^6e^*g^*k^2 + 474240a^8b^7c^4g^*j^2k$

$$\begin{aligned}
& + 288000*a^7*b^6*c^6*h^2*i*k + 63360*a^6*b^8*c^5*h^2*i*k - 8064*a^5*b^10*c^4*h^2*i*k - 1152*a^4*b^12*c^3*h^2*i*k - 15437824*a^11*b^2*c^6*f*j*k^2 - 320 \\
& 34816*a^10*b^2*c^7*e*j^2*k - 14369280*a^8*b^8*c^3*f*j*k^2 - 13271040*a^8*b^3*c^8*g^2*i*k + 80267904*a^7*b^7*c^5*d*h*k^2 + 79626240*a^7*b^2*c^10*e^2*g* \\
& k + 11059200*a^9*b^5*c^5*g*i*k^2 + 8847360*a^9*b^2*c^8*g*i^2*k - 42113280*a^7*b^9*c^3*d*j*k^2 + 6389760*a^8*b^7*c^4*g*i*k^2 + 5898240*a^8*b^4*c^7*g*i^ \\
& 2*k - 37601280*a^9*b^4*c^6*f*h*k^2 - 2949120*a^7*b^9*c^3*g*i*k^2 + 2242560* \\
& a^7*b^10*c^2*f*j*k^2 - 2211840*a^7*b^5*c^7*g^2*i*k + 1769472*a^6*b^7*c^6*g^ \\
& 2*i*k + 749568*a^8*b^3*c^8*h*i^2*j - 442368*a^7*b^6*c^6*g*i^2*k + 442368*a^ \\
& 6*b^11*c^2*g*i*k^2 - 442368*a^6*b^8*c^5*g*i^2*k + 317952*a^7*b^5*c^7*h*i^2* \\
& j - 221184*a^5*b^9*c^5*g^2*i*k + 73728*a^5*b^10*c^4*g*i^2*k + 38400*a^6*b^7 \\
& *c^6*h*i^2*j - 1920*a^5*b^9*c^5*h*i^2*j + 9861120*a^9*b^4*c^6*e*j^2*k - 110 \\
& 280960*a^4*b^6*c^9*d^2*e*k - 93330432*a^6*b^8*c^5*d*f*k^2 + 24645888*a^8*b^ \\
& 6*c^5*f*h*k^2 + 6359040*a^8*b^3*c^8*g*h^2*k - 22118400*a^9*b^4*c^6*e*i*k^2 \\
& - 3862528*a^8*b^2*c^9*f^2*i*k - 2248704*a^7*b^4*c^8*f^2*i*k - 1290240*a^9*b^ \\
& ^2*c^8*g*i*j^2 - 948480*a^8*b^6*c^5*e*j^2*k - 860160*a^8*b^4*c^7*g*i*j^2 - \\
& 414720*a^7*b^5*c^7*g*h^2*k + 303360*a^6*b^6*c^7*f^2*i*k + 266880*a^5*b^8*c^ \\
& 6*f^2*i*k - 224640*a^6*b^7*c^6*g*h^2*k - 80640*a^7*b^6*c^6*g*i*j^2 - 72960* \\
& a^4*b^10*c^5*f^2*i*k + 17280*a^5*b^9*c^5*g*h^2*k + 12672*a^6*b^8*c^5*g*i*j^ \\
& 2 + 5504*a^3*b^12*c^4*f^2*i*k + 3456*a^4*b^11*c^4*g*h^2*k - 384*a^5*b^10*c^ \\
& 4*g*i*j^2 - 128*a^2*b^14*c^3*f^2*i*k + 30265344*a^6*b^4*c^9*d^2*i*k - 12779 \\
& 520*a^8*b^6*c^5*e*i*k^2 - 11796480*a^8*b^3*c^8*e*i^2*k - 8847360*a^7*b^3*c^ \\
& 9*e^2*i*k - 7925760*a^10*b^2*c^7*f*h*k^2 + 7077888*a^6*b^5*c^8*e^2*i*k - 39 \\
& 813120*a^7*b^3*c^9*e*g^2*k - 73175040*a^9*b^2*c^8*d*f*k^2 + 5898240*a^7*b^8 \\
& *c^4*e*i*k^2 + 5542272*a^6*b^11*c^2*d*j*k^2 - 5420160*a^7*b^8*c^4*f*h*k^2 + \\
& 55140480*a^4*b^7*c^8*d^2*g*k + 1271808*a^7*b^3*c^9*g^2*h*j - 1040384*a^8*b^ \\
& ^2*c^9*f*i^2*j + 884736*a^7*b^5*c^7*e*i^2*k - 884736*a^6*b^10*c^3*e*i*k^2 + \\
& 884736*a^6*b^7*c^6*e*i^2*k - 884736*a^5*b^7*c^7*e^2*i*k - 697344*a^7*b^4*c^ \\
& ^8*f*i^2*j + 414720*a^6*b^5*c^8*g^2*h*j + 226560*a^6*b^10*c^3*f*h*k^2 - 147 \\
& 456*a^5*b^9*c^5*e*i^2*k - 121856*a^6*b^6*c^7*f*i^2*j + 82560*a^5*b^12*c^2*f \\
& *h*k^2 + 49152*a^5*b^12*c^2*e*i*k^2 - 17280*a^5*b^7*c^7*g^2*h*j + 8960*a^5* \\
& b^8*c^6*f*i^2*j + 14194944*a^5*b^6*c^8*d^2*i*k - 12718080*a^8*b^2*c^9*e*h^2 \\
& *k - 10615680*a^4*b^8*c^7*d^2*i*k - 26542080*a^6*b^4*c^9*e^2*g*k - 23592960 \\
& *a^7*b^7*c^5*e*g*k^2 - 5142528*a^8*b^3*c^8*f*h*j^2 + 5068800*a^7*b^2*c^10*f^ \\
& ^2*h*j - 3755520*a^7*b^3*c^9*f*h^2*j + 3336192*a^7*b^3*c^9*f^2*g*k + 300096 \\
& 0*a^6*b^4*c^9*f^2*h*j + 2893824*a^3*b^10*c^6*d^2*i*k + 1720320*a^8*b^3*c^8* \\
& e*i*j^2 + 1704960*a^6*b^5*c^8*f^2*g*k - 1307520*a^5*b^7*c^7*f^2*g*k - 10857 \\
& 60*a^6*b^5*c^8*f*h^2*j - 959040*a^7*b^5*c^7*f*h*j^2 + 829440*a^7*b^4*c^8*e* \\
& h^2*k - 552960*a^7*b^2*c^10*g*h^2*i - 552960*a^6*b^4*c^9*g*h^2*i + 449280*a^ \\
& ^6*b^6*c^7*e*h^2*k - 422784*a^2*b^12*c^5*d^2*i*k + 253440*a^4*b^9*c^6*f^2*g \\
& *k + 161280*a^7*b^5*c^7*e*i*j^2 - 145152*a^5*b^6*c^8*g*h^2*i + 103200*a^6*b^ \\
& ^7*c^6*f*h*j^2 + 41280*a^5*b^6*c^8*f^2*h*j - 37188*a^4*b^8*c^7*f^2*h*j - 34 \\
& 560*a^5*b^8*c^6*e*h^2*k - 25344*a^6*b^7*c^6*e*i*j^2 - 17280*a^3*b^11*c^5*f^ \\
& ^2*g*k + 13536*a^5*b^7*c^7*f*h^2*j - 6912*a^4*b^10*c^5*e*h^2*k + 5490*a^4*b^ \\
& 9*c^6*f*h^2*j - 3456*a^4*b^8*c^7*g*h^2*i + 1980*a^3*b^10*c^6*f^2*h*j + 810*
\end{aligned}$$

$$\begin{aligned}
& a^5b^9c^5f^h*j^2 + 768a^5b^9c^5e*i*j^2 + 384a^2b^{13}c^4f^2*g*k - \\
& 270a^4b^{11}c^4f^h*j^2 - 180a^3b^{11}c^5f^h^2*j - 30a^2b^{12}c^5f^2*h \\
& *j + 6a^3b^{13}c^3f^h*j^2 + 30067200a^6b^2c^{11}d^2*h*j + 13271040a^6* \\
& b^5c^8e*g^2*k - 10857600a^6b^9c^4d*h*k^2 + 2949120a^6b^9c^4e*g*k^ \\
& 2 + 2654208a^5b^6c^8e^2*g*k + 2125824a^7b^3c^9d*i^2*j + 1658880a^6 \\
& *b^3c^{10}e^2*h*j - 1419264a^6b^4c^9f*g^2*j - 1327104a^5b^7c^7e*g^2 \\
& *k - 921600a^7b^2c^{10}f*g^2*j - 737280a^7b^2c^{10}f^h*i^2 - 568320a^6 \\
& *b^4c^9f^h*i^2 + 207360a^4b^{13}c^2d*h*k^2 - 147456a^5b^{11}c^3e*g*k^ \\
& 2 - 136704a^5b^6c^8f^h*i^2 + 133632a^6b^5c^8d*i^2*j - 96768a^5b^7 \\
& *c^7d*i^2*j + 80640a^5b^6c^8f*g^2*j - 69120a^5b^5c^9e^2*h*j + 1344 \\
& 0a^4b^9c^6d*i^2*j - 5760a^5b^{11}c^3d*h*k^2 - 2304a^4b^8c^7f^h*i^ \\
& 2 + 384a^3b^{10}c^6f^h*i^2 + 11930112a^8b^2c^9d*h*j^2 - 11646720a^3* \\
& b^9c^7d^2*g*k + 8432640a^7b^2c^{10}d*h^2*j + 24140160a^5b^{10}c^4d*f* \\
& k^2 - 6672384a^7b^2c^{10}e*f^2*k + 4450176a^7b^4c^8d*h*j^2 + 4337280* \\
& a^6b^4c^9d*h^2*j - 3870720a^8b^2c^9e*g*j^2 - 3409920a^6b^4c^9e*f \\
& ^2*k - 2885760a^5b^4c^{10}d^2*h*j - 2844288a^4b^6c^9d^2*h*j + 2615040 \\
& *a^5b^6c^8e*f^2*k - 1687680a^6b^6c^7d*h*j^2 + 1482624a^2b^{11}c^6d \\
& ^2*g*k - 1290240a^6b^2c^{11}f^2*g*i + 1105920a^6b^3c^{10}e*h^2*i + 1019 \\
& 412a^3b^8c^8d^2*h*j - 1007424a^5b^6c^8d*h^2*j - 860160a^5b^4c^{10} \\
& *f^2*g*i - 645120a^7b^4c^8e*g*j^2 - 506880a^4b^8c^7e*f^2*k + 290304 \\
& *a^5b^5c^9e*h^2*i + 197460a^5b^8c^6d*h*j^2 - 143802a^2b^{10}c^7d^2 \\
& *h*j + 80640a^6b^6c^7e*g*j^2 - 80640a^4b^6c^9f^2*g*i + 51948a^4b^ \\
& 8c^7d*h^2*j + 34560a^3b^{10}c^6e*f^2*k + 12672a^3b^8c^8f^2*g*i + 10 \\
& 800a^3b^{10}c^6d*h^2*j + 6912a^4b^7c^8e*h^2*i - 2304a^5b^8c^6e*g* \\
& j^2 - 768a^2b^{12}c^5e*f^2*k - 684a^3b^{12}c^4d*h*j^2 - 540a^2b^{12}c^ \\
& 5d*h^2*j - 384a^2b^{10}c^7f^2*g*i - 90a^4b^{10}c^5d*h*j^2 + 18a^2b^1 \\
& 4c^3d*h*j^2 + 23385600a^6b^2c^{11}d*f^2*j + 23293440a^3b^8c^8d^2*e* \\
& k + 6137856a^6b^3c^{10}d*g^2*j - 5677056a^6b^2c^{11}e^2*f*j + 5308416a \\
& ^6b^2c^{11}e*g^2*i - 5308416a^5b^3c^{11}e^2*g*i - 3786240a^4b^{12}c^3d \\
& *f*k^2 - 3538944a^6b^3c^{10}e*g*i^2 + 2654208a^5b^4c^{10}e*g^2*i + 1658 \\
& 880a^6b^3c^{10}d*h*i^2 - 1354752a^5b^5c^9d*g^2*j - 1105920a^5b^4c^ \\
& 10f*g^2*h - 884736a^5b^5c^9e*g*i^2 - 552960a^6b^2c^{11}f*g^2*h + 357 \\
& 120a^3b^{14}c^2d*f*k^2 + 322560a^5b^4c^{10}e^2*f*j + 262656a^5b^5c^9 \\
& *d*h*i^2 + 120960a^4b^7c^8d*g^2*j - 55296a^4b^7c^8d*h*i^2 - 34560a \\
& ^4b^6c^9f*g^2*h + 3456a^3b^8c^8f*g^2*h + 1152a^3b^9c^7d*h*i^2 + \\
& 1152a^2b^{11}c^6d*h*i^2 - 13149696a^7b^3c^9d*f*j^2 - 11612160a^5b^2 \\
& *c^{12}d^2*g*i + 10906560a^4b^5c^{10}d^2*f*j - 7418880a^5b^3c^{11}d^2*f* \\
& j + 3148992a^6b^5c^8d*f*j^2 - 2985696a^3b^7c^9d^2*f*j - 2965248a^2 \\
& *b^{10}c^7d^2*e*k + 1720320a^5b^3c^{11}e*f^2*i - 1658880a^6b^2c^{11}e*g \\
& *h^2 + 1596672a^3b^6c^{10}d^2*g*i - 1505280a^4b^6c^9d*f^2*j - 829440* \\
& a^5b^4c^{10}e*g*h^2 - 508032a^2b^8c^9d^2*g*i + 378954a^2b^9c^8d^2* \\
& f*j + 362880a^5b^4c^{10}d*f^2*j + 296964a^3b^8c^8d*f^2*j + 161280a^4 \\
& *b^5c^{10}e*f^2*i - 77070a^4b^9c^6d*f*j^2 - 30240a^5b^7c^7d*f*j^2 - \\
& 25344a^3b^7c^9e*f^2*i - 20736a^4b^6c^9e*g*h^2 - 19278a^2b^{10}c^7 \\
& *d*f^2*j + 8820a^3b^{11}c^5d*f*j^2 + 768a^2b^9c^8e*f^2*i - 378a^2b^
\end{aligned}$$

$$\begin{aligned}
& 13c^4d^2f^2j^2 - 5419008a^5b^3c^{11}d^2e^2j - 4423680a^5b^2c^{12}e^2f^2h + 4147200a^5b^3c^{11}d^2g^2h - 2580480a^6b^2c^{11}d^2f^2i^2 - 967680a^5b^4c^{10}d^2f^2i^2 + 483840a^4b^5c^{10}d^2e^2j - 414720a^4b^5c^{10}d^2g^2h - 138240a^4b^4c^{11}e^2f^2h + 64512a^4b^6c^9d^2f^2i^2 + 39168a^3b^8c^8d^2f^2i^2 - 31104a^3b^7c^9d^2g^2h + 13824a^3b^6c^{10}e^2f^2h + 10368a^2b^9c^8d^2g^2h - 9216a^2b^{10}c^7d^2f^2i^2 + 15630336a^5b^2c^{12}d^2f^2h - 14459904a^4b^3c^{12}d^2f^2h + 9630144a^3b^5c^{11}d^2f^2h - 8764416a^5b^3c^{11}d^2f^2h^2 - 3870720a^5b^2c^{12}e^2f^2g - 3193344a^3b^5c^{11}d^2e^2i + 2867328a^4b^4c^{11}d^2f^2h - 2095200a^2b^7c^{10}d^2f^2h - 1414080a^3b^6c^{10}d^2f^2h - 34836480a^4b^2c^{13}d^2e^2g + 1016064a^2b^7c^{10}d^2e^2i - 645120a^4b^4c^{11}e^2f^2g + 306720a^3b^7c^9d^2f^2h^2 + 197820a^2b^8c^9d^2f^2h + 146880a^4b^5c^{10}d^2f^2h^2 + 80640a^3b^6c^{10}e^2f^2g - 55350a^2b^9c^8d^2f^2h^2 - 2304a^2b^8c^9e^2f^2g - 3870720a^5b^2c^{12}d^2f^2g^2 - 1935360a^4b^4c^{11}d^2f^2g^2 - 1658880a^4b^3c^{12}d^2e^2h + 725760a^3b^6c^{10}d^2f^2g^2 + 17418240a^3b^4c^{12}d^2e^2g - 124416a^3b^5c^{11}d^2e^2h - 96768a^2b^8c^9d^2f^2g^2 + 41472a^2b^7c^{10}d^2e^2h - 3919104a^2b^6c^{11}d^2e^2g - 7741440a^4b^2c^{13}d^2e^2f + 2903040a^3b^4c^{12}d^2e^2f - 387072a^2b^6c^{11}d^2e^2f - 681246720a^9b^3c^9d^2k^2 + 265912320a^{11}b^3c^5e^2k^3 + 188743680a^{12}b^2c^5g^2k^3 - 132956160a^{11}b^4c^4g^2k^3 - 52101120a^{13}b^3c^5j^2k^2 + 25722880a^{12}b^3c^4i^2k^3 + 19644416a^{11}b^5c^3i^2k^3 - 1583680a^9b^9c^2j^2k^2 - 9142272a^{10}b^7c^2i^2k^3 - 74022912a^{10}b^5c^4e^2k^3 - 20643840a^{11}b^3c^7h^2k^2 + 37011456a^{10}b^6c^3g^2k^3 - 2293760a^9b^3c^7i^3k - 557056a^8b^5c^6i^3k + 147456a^7b^7c^5i^3k - 65536a^6b^12c^2i^2k^2 + 32768a^6b^9c^4i^3k - 8192a^5b^11c^3i^3k + 430080a^{10}b^3c^8i^2j^2 - 2880a^5b^13c^2h^2k^2 + 6635520a^7b^4c^8g^3k - 4792320a^9b^8c^2g^2k^3 - 2211840a^6b^6c^7g^3k + 1359360a^{10}b^2c^7h^2j^3 + 1173120a^9b^4c^6h^2j^3 + 743040a^7b^4c^8h^3j + 622080a^8b^2c^9h^3j + 221184a^5b^8c^6g^3k + 107136a^6b^6c^7h^3j - 32640a^8b^6c^5h^2j^3 - 5796a^7b^8c^4h^2j^3 + 540a^5b^8c^6h^3j - 270a^4b^10c^5h^3j + 210a^6b^10c^3h^2j^3 - 2949120a^{10}b^3c^8f^2k^2 + 17694720a^6b^3c^{10}e^3k + 184320a^8b^3c^{10}h^2i^2 - 3520a^3b^{15}c^2f^2k^2 + 9584640a^9b^7c^3e^2k^3 - 2293760a^9b^3c^7f^2j^3 - 2293760a^6b^3c^{10}f^3j - 1769472a^5b^5c^9e^3k - 884736a^6b^3c^{10}g^3i - 589824a^7b^3c^9g^2i^3 - 491520a^8b^9c^2e^2k^3 - 442368a^5b^5c^9g^3i - 294912a^6b^5c^8g^2i^3 - 199360a^8b^5c^6f^2j^3 - 199360a^5b^5c^9f^3j + 61920a^7b^7c^5f^2j^3 + 61920a^4b^7c^8f^3j - 49152a^5b^7c^7g^2i^3 - 3682a^6b^9c^4f^2j^3 - 3682a^3b^9c^7f^3j + 70a^5b^{11}c^3f^2j^3 + 70a^2b^{11}c^6f^3j + 3870720a^8b^3c^{10}e^2j^2 + 430080a^7b^3c^{11}f^2i^2 - 14152320a^4b^4c^{11}d^3j + 10644480a^5b^2c^{12}d^3j + 5483520a^9b^2c^8d^2j^3 + 4269888a^3b^6c^{10}d^3j + 3538944a^5b^2c^{12}e^3i - 1648128a^5b^3c^{11}f^3h + 1330560a^8b^4c^7d^2j^3 + 1179648a^7b^2c^{10}e^2i^3 - 898560a^6b^3c^{10}f^2h^3 - 826560a^7b^6c^6d^2j^3 - 607068a^2b^8c^9d^3j + 589824a^6b^4c^9e^2i^3 - 354240a^5b^5c^9f^2h^3 - 354240a^4b^5c^{10}f^3h + 145188a^6b^8c^5d^2j^3 + 98304a^5b^6
\end{aligned}$$

$$\begin{aligned}
& *c^8 * e * i^3 + 43680 * a^3 * b^7 * c^9 * f^3 * h - 21600 * a^4 * b^7 * c^8 * f * h^3 - 9576 * a^5 * b \\
& ^{10} * c^4 * d * j^3 + 1350 * a^3 * b^9 * c^7 * f * h^3 - 1050 * a^2 * b^9 * c^8 * f^3 * h - 504 * a * b^1 \\
& 4 * c^4 * d^2 * j^2 + 210 * a^4 * b^12 * c^3 * d * j^3 + 3870720 * a^6 * b * c^12 * d^2 * i^2 + 16588 \\
& 80 * a^6 * b * c^12 * e^2 * h^2 - 9792 * a * b^11 * c^7 * d^2 * i^2 + 16547328 * a^4 * b^2 * c^13 * d^3 \\
& * h - 12306816 * a^3 * b^4 * c^12 * d^3 * h + 37310976 * a^3 * b^3 * c^13 * d^3 * f + 3037824 * a^ \\
& 2 * b^6 * c^11 * d^3 * h - 2654208 * a^5 * b^3 * c^11 * e * g^3 + 1949184 * a^6 * b^2 * c^11 * d * h^3 \\
& + 1296000 * a^5 * b^4 * c^10 * d * h^3 - 155520 * a^4 * b^6 * c^9 * d * h^3 - 40500 * a * b^10 * c^8 * \\
& d^2 * h^2 - 8100 * a^3 * b^8 * c^8 * d * h^3 + 4050 * a^2 * b^10 * c^7 * d * h^3 + 3870720 * a^5 * b * \\
& c^13 * e^2 * f^2 + 34836480 * a^4 * b * c^14 * d^2 * e^2 - 108864 * a * b^9 * c^9 * d^2 * g^2 - 806 \\
& 8032 * a^2 * b^5 * c^12 * d^3 * f - 5623296 * a^4 * b^3 * c^12 * d * f^3 + 1737792 * a^3 * b^5 * c^11 \\
& * d * f^3 - 260190 * a * b^8 * c^10 * d^2 * f^2 - 211680 * a^2 * b^7 * c^10 * d * f^3 - 435456 * a * b \\
& ^7 * c^11 * d^2 * e^2 - 377487360 * a^12 * b * c^6 * e * k^3 + 1434977280 * a^8 * b^3 * c^8 * d^2 * k \\
& ^2 + 173408256 * a^7 * c^12 * d^2 * e * k + 3276800 * a^12 * c^7 * i * j^2 * k - 125829120 * a^13 \\
& * b * c^5 * i * k^3 + 26214400 * a^12 * c^7 * f * j * k^2 + 1179648 * a^10 * c^9 * h^2 * i * k + 13440 \\
& * a^6 * b^13 * h * j * k^2 + 50331648 * a^11 * c^8 * e * i * k^2 + 110100480 * a^10 * c^9 * d * f * k^2 \\
& + 57802752 * a^8 * c^11 * d^2 * i * k + 9830400 * a^11 * c^8 * e * j^2 * k - 3276800 * a^9 * c^10 * f \\
& ^2 * i * k + 4480 * a^5 * b^14 * f * j * k^2 + 15728640 * a^11 * c^8 * f * h * k^2 - 409600 * a^9 * c^1 \\
& 0 * f * i^2 * j - 1152 * b^16 * c^3 * d^2 * i * k - 1220516352 * a^7 * b^5 * c^7 * d^2 * k^2 + 353894 \\
& 4 * a^9 * c^10 * e * h^2 * k + 384000 * a^8 * c^11 * f^2 * h * j + 13440 * a^4 * b^15 * d * j * k^2 + 384 \\
& * a^3 * b^16 * f * h * k^2 + 20321280 * a^7 * c^12 * d^2 * h * j - 245760 * a^8 * c^11 * f * h * i^2 + 3 \\
& 456 * b^15 * c^4 * d^2 * g * k - 270 * b^14 * c^5 * d^2 * h * j - 9830400 * a^8 * c^11 * e * f^2 * k + 48 \\
& 38400 * a^9 * c^10 * d * h * j^2 + 2903040 * a^8 * c^11 * d * h^2 * j - 1966080 * a^10 * b * c^8 * i^3 * \\
& k + 1433600 * a^9 * b^9 * c * i * k^3 + 1152 * a^2 * b^17 * d * h * k^2 - 3686400 * a^7 * c^12 * e^2 * \\
& f * j - 53084160 * a^7 * b * c^11 * e^3 * k - 6912 * b^14 * c^5 * d^2 * e * k - 3456 * b^12 * c^7 * d^2 \\
& * g * i + 630 * b^13 * c^6 * d^2 * f * j + 2688000 * a^7 * c^12 * d * f^2 * j + 245760 * a^8 * b^10 * c * \\
& g * k^3 - 2211840 * a^6 * c^13 * e^2 * f * h - 1720320 * a^7 * c^12 * d * f * i^2 - 9450 * b^11 * c^8 \\
& * d^2 * f * h + 6912 * b^11 * c^8 * d^2 * e * i + 1612800 * a^6 * c^13 * d * f^2 * h - 1344000 * a^10 * \\
& b * c^8 * f * j^3 - 1344000 * a^7 * b * c^11 * f^3 * j - 393216 * a^8 * b * c^10 * g * i^3 - 23616 * a * \\
& b^17 * c * d^2 * k^2 - 20736 * b^10 * c^9 * d^2 * e * g - 75188736 * a^4 * b * c^14 * d^3 * f - 88320 \\
& 0 * a^6 * b * c^12 * f^3 * h - 317952 * a^7 * b * c^11 * f * h^3 + 43416 * a * b^10 * c^8 * d^3 * j - 154 \\
& 82880 * a^5 * c^14 * d * e^2 * f - 10616832 * a^5 * b * c^13 * e^3 * g - 345060 * a * b^8 * c^10 * d^3 * \\
& h - 4262400 * a^5 * b * c^13 * d * f^3 + 852768 * a * b^7 * c^11 * d^3 * f + 7350 * a * b^9 * c^9 * d * f \\
& ^3 + 584578368 * a^6 * b^7 * c^6 * d^2 * k^2 + 93905920 * a^12 * b^3 * c^4 * j^2 * k^2 - 177997 \\
& 248 * a^5 * b^9 * c^5 * d^2 * k^2 - 50967040 * a^11 * b^5 * c^3 * j^2 * k^2 + 104693760 * a^9 * b^2 \\
& * c^8 * e^2 * k^2 + 12849984 * a^10 * b^7 * c^2 * j^2 * k^2 + 20021248 * a^11 * b^2 * c^6 * i^2 * k^ \\
& 2 - 85524480 * a^8 * b^4 * c^7 * e^2 * k^2 + 33223680 * a^10 * b^3 * c^6 * h^2 * k^2 + 4227072 * \\
& a^10 * b^4 * c^5 * i^2 * k^2 - 3973120 * a^9 * b^6 * c^4 * i^2 * k^2 + 344064 * a^7 * b^10 * c^2 * i^ \\
& 2 * k^2 - 81920 * a^8 * b^8 * c^3 * i^2 * k^2 - 11386368 * a^9 * b^5 * c^5 * h^2 * k^2 + 26173440 \\
& * a^9 * b^4 * c^6 * g^2 * k^2 - 21381120 * a^8 * b^6 * c^5 * g^2 * k^2 + 18874368 * a^10 * b^2 * c^7 \\
& * g^2 * k^2 + 501760 * a^9 * b^3 * c^7 * i^2 * j^2 + 452160 * a^8 * b^7 * c^4 * h^2 * k^2 + 385920 \\
& * a^7 * b^9 * c^3 * h^2 * k^2 + 170240 * a^8 * b^5 * c^6 * i^2 * j^2 - 48960 * a^6 * b^11 * c^2 * h^2 * \\
& k^2 + 9216 * a^7 * b^7 * c^5 * i^2 * j^2 - 1984 * a^6 * b^9 * c^4 * i^2 * j^2 + 64 * a^5 * b^11 * c^3 \\
& * i^2 * j^2 + 5898240 * a^7 * b^8 * c^4 * g^2 * k^2 + 1419840 * a^8 * b^4 * c^7 * h^2 * j^2 + 1387 \\
& 008 * a^9 * b^2 * c^8 * h^2 * j^2 - 737280 * a^6 * b^10 * c^3 * g^2 * k^2 + 84960 * a^7 * b^6 * c^6 * h \\
& ^2 * j^2 + 36864 * a^5 * b^12 * c^2 * g^2 * k^2 - 8010 * a^6 * b^8 * c^5 * h^2 * j^2 - 180 * a^5 * b^
\end{aligned}$$

$$\begin{aligned}
& 10*c^4*h^2*j^2 + 9*a^4*b^12*c^3*h^2*j^2 + 14115840*a^9*b^3*c^7*f^2*k^2 - 92 \\
& 31552*a^7*b^7*c^5*f^2*k^2 + 23592960*a^7*b^6*c^6*e^2*k^2 + 4984320*a^8*b^5* \\
& c^6*f^2*k^2 + 3759040*a^6*b^9*c^4*f^2*k^2 + 36190080*a^4*b^11*c^4*d^2*k^2 + \\
& 967680*a^8*b^3*c^8*g^2*j^2 - 727360*a^5*b^11*c^3*f^2*k^2 + 276480*a^7*b^3* \\
& c^9*h^2*i^2 + 161280*a^7*b^5*c^7*g^2*j^2 + 140544*a^6*b^5*c^8*h^2*i^2 + 729 \\
& 60*a^4*b^13*c^2*f^2*k^2 + 25344*a^5*b^7*c^7*h^2*i^2 - 20160*a^6*b^7*c^6*g^2 \\
& *j^2 + 576*a^5*b^9*c^5*g^2*j^2 + 576*a^4*b^9*c^6*h^2*i^2 + 3808000*a^8*b^2* \\
& c^9*f^2*j^2 - 2949120*a^6*b^8*c^5*e^2*k^2 + 1643712*a^7*b^4*c^8*f^2*j^2 + 8 \\
& 84736*a^7*b^2*c^10*g^2*i^2 + 884736*a^6*b^4*c^9*g^2*i^2 + 221184*a^5*b^6*c^ \\
& 8*g^2*i^2 + 147456*a^5*b^10*c^4*e^2*k^2 - 125440*a^6*b^6*c^7*f^2*j^2 - 1379 \\
& 0*a^5*b^8*c^6*f^2*j^2 + 1785*a^4*b^10*c^5*f^2*j^2 - 70*a^3*b^12*c^4*f^2*j^2 \\
& - 4953600*a^3*b^13*c^3*d^2*k^2 + 18427392*a^7*b^2*c^10*d^2*j^2 + 645120*a^ \\
& 7*b^3*c^9*e^2*j^2 + 501760*a^6*b^3*c^10*f^2*i^2 + 442944*a^2*b^15*c^2*d^2*k \\
& ^2 + 414720*a^6*b^3*c^10*g^2*h^2 + 207360*a^5*b^5*c^9*g^2*h^2 + 170240*a^5* \\
& b^5*c^9*f^2*i^2 - 80640*a^6*b^5*c^8*e^2*j^2 + 9216*a^4*b^7*c^8*f^2*i^2 + 51 \\
& 84*a^4*b^7*c^8*g^2*h^2 + 2304*a^5*b^7*c^7*e^2*j^2 - 1984*a^3*b^9*c^7*f^2*i^ \\
& 2 + 64*a^2*b^11*c^6*f^2*i^2 - 4148928*a^6*b^4*c^9*d^2*j^2 + 3538944*a^6*b^2 \\
& *c^11*e^2*i^2 + 1684224*a^6*b^2*c^11*f^2*h^2 + 1264320*a^5*b^4*c^10*f^2*h^2 \\
& - 1183392*a^5*b^6*c^8*d^2*j^2 + 884736*a^5*b^4*c^10*e^2*i^2 + 645750*a^4*b \\
& ^8*c^7*d^2*j^2 + 126720*a^4*b^6*c^9*f^2*h^2 - 115920*a^3*b^10*c^6*d^2*j^2 - \\
& 13950*a^3*b^8*c^8*f^2*h^2 + 10836*a^2*b^12*c^5*d^2*j^2 + 225*a^2*b^10*c^7* \\
& f^2*h^2 + 1935360*a^5*b^3*c^11*d^2*i^2 + 967680*a^5*b^3*c^11*f^2*g^2 + 8294 \\
& 40*a^5*b^3*c^11*e^2*h^2 - 532224*a^4*b^5*c^10*d^2*i^2 + 161280*a^4*b^5*c^10 \\
& *f^2*g^2 - 96768*a^3*b^7*c^9*d^2*i^2 + 62784*a^2*b^9*c^8*d^2*i^2 + 20736*a^ \\
& 4*b^5*c^10*e^2*h^2 - 20160*a^3*b^7*c^9*f^2*g^2 + 576*a^2*b^9*c^8*f^2*g^2 + \\
& 11487744*a^5*b^2*c^12*d^2*h^2 + 7962624*a^5*b^2*c^12*e^2*g^2 + 35525376*a^4 \\
& *b^2*c^13*d^2*f^2 - 1412640*a^3*b^6*c^10*d^2*h^2 + 461376*a^4*b^4*c^11*d^2* \\
& h^2 + 375030*a^2*b^8*c^9*d^2*h^2 + 8709120*a^4*b^3*c^12*d^2*g^2 - 4354560*a \\
& ^3*b^5*c^11*d^2*g^2 + 979776*a^2*b^7*c^10*d^2*g^2 + 645120*a^4*b^3*c^12*e^2 \\
& *f^2 - 80640*a^3*b^5*c^11*e^2*f^2 + 2304*a^2*b^7*c^10*e^2*f^2 - 15269184*a^ \\
& 3*b^4*c^12*d^2*f^2 + 2870784*a^2*b^6*c^11*d^2*f^2 - 17418240*a^3*b^3*c^13*d \\
& ^2*e^2 + 3919104*a^2*b^5*c^12*d^2*e^2 + 384*a*b^18*d*f*k^2 - 199229440*a^14 \\
& *b^2*c^3*k^4 + 8388608*a^12*c^7*i^2*k^2 + 75497472*a^10*c^9*e^2*k^2 + 78400 \\
& *a^8*b^11*j^2*k^2 + 4096*a^5*b^14*i^2*k^2 + 345600*a^10*c^9*h^2*j^2 + 576*a \\
& ^4*b^15*h^2*k^2 + 57937920*a^13*b^4*c^2*k^4 + 320000*a^9*c^10*f^2*j^2 + 64* \\
& a^2*b^17*f^2*k^2 + 16934400*a^8*c^11*d^2*j^2 + 9*b^16*c^3*d^2*j^2 + 3538944 \\
& *a^7*c^12*e^2*i^2 + 115200*a^7*c^12*f^2*h^2 + 576*b^13*c^6*d^2*i^2 + 2025*b \\
& ^12*c^7*d^2*h^2 + 6096384*a^6*c^13*d^2*h^2 + 492800*a^11*b^2*c^6*j^4 + 3514 \\
& 56*a^10*b^4*c^5*j^4 - 43120*a^9*b^6*c^4*j^4 + 5184*b^11*c^8*d^2*g^2 + 1225* \\
& a^8*b^8*c^3*j^4 + 131072*a^8*b^2*c^9*i^4 + 98304*a^7*b^4*c^8*i^4 + 32768*a^ \\
& 6*b^6*c^7*i^4 + 11025*b^10*c^9*d^2*f^2 + 4096*a^5*b^8*c^6*i^4 + 5644800*a^5 \\
& *c^14*d^2*f^2 + 142560*a^6*b^4*c^9*h^4 + 103680*a^7*b^2*c^10*h^4 + 32400*a^ \\
& 5*b^6*c^8*h^4 + 20736*b^9*c^10*d^2*e^2 + 2025*a^4*b^8*c^7*h^4 + 331776*a^5* \\
& b^4*c^10*g^4 + 492800*a^5*b^2*c^12*f^4 + 351456*a^4*b^4*c^11*f^4 - 43120*a^ \\
& 3*b^6*c^10*f^4 + 1225*a^2*b^8*c^9*f^4 - 27433728*a^3*b^2*c^14*d^4 + 6446304
\end{aligned}$$

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*a^2*b^4*c^13*d^4 + a^2*b^14*c^3*f^2*j^2 - 81920*a^8*b^11*i*k^3 + 384000*a^
11*c^8*h*j^3 + 138240*a^9*c^10*h^3*j + 47416320*a^6*c^13*d^3*j - 1134*b^12*
c^7*d^3*j + 7077888*a^6*c^13*e^3*i + 2688000*a^10*c^9*d*j^3 + 786432*a^8*c^
11*e*i^3 + 28449792*a^5*c^14*d^3*h - 7782400*a^12*b^6*c*k^4 + 17010*b^10*c^
9*d^3*h + 580608*a^7*c^12*d*h^3 - 39690*b^9*c^10*d^3*f - 734832*a*b^6*c^12*
d^4 + 268435456*a^15*c^4*k^4 + 576*b^19*d^2*k^2 + 409600*a^11*b^8*k^4 + 160
000*a^12*c^7*j^4 + 65536*a^9*c^10*i^4 + 20736*a^8*c^11*h^4 + 49787136*a^4*c
^15*d^4 + 160000*a^6*c^13*f^4 + 5308416*a^5*c^14*e^4 + 35721*b^8*c^11*d^4,
z, n), n, 1, 4)

```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```

[In] integrate((k*x**11+j*x**8+i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2
+a)**3,x)

```

[Out] Timed out

$$3.60 \quad \int (a + bx^2 + cx^4)^3 (ad + aex + (bd + af)x^2 + bex^3 + (cd + b^2f)x^4 + c^2ex^5 + c^3x^6) dx$$

Optimal. Leaf size=416

$$a^4dx + \frac{1}{2}a^4ex^2 + \frac{1}{3}a^3x^3(af+4bd) + a^3bex^4 + \frac{2}{5}a^2x^5(2abf + 2acd + 3b^2d) + \frac{1}{3}a^2ex^6(2ac + 3b^2) + \frac{1}{10}ex^{10}(6a^2c^2 + 12abc^2 + 6a^2c^2f + 12ab^2cf + 12abc^2d + 4b^3cd + b^4f) + \frac{1}{9}x^9(12a^2bcf + 6a^2c^2d + 12ab^2cd + 4ab^3f + b^4d) + \frac{1}{10}ex^{10}(6a^2c^2 + 12abc^2 + 6a^2c^2f + 12ab^2cf + 12abc^2d + 4b^3cd + b^4f) + \frac{1}{10}ex^{10}(6a^2c^2 + 12abc^2 + 6a^2c^2f + 12ab^2cf + 12abc^2d + 4b^3cd + b^4f)$$

[Out] $a^4d*x + 1/2*a^4*e*x^2 + 1/3*a^3*(a*f+4*b*d)*x^3 + a^3*b*e*x^4 + 2/5*a^2*(2*a*b*f + 2*a*c*d + 3*b^2*d)*x^5 + 1/3*a^2*(2*a*c+3*b^2)*e*x^6 + 2/7*a*(2*a^2*c*f + 3*a*b^2*f + 6*a*b*c*d + 2*b^3*d)*x^7 + 1/2*a*b*(3*a*c+b^2)*e*x^8 + 1/9*(12*a^2*b*c*f + 6*a^2*c^2*d + 4*a*b^3*f + 12*a*b^2*c*d + b^4*d)*x^9 + 1/10*(6*a^2*c^2 + 12*a*b^2*c + b^4)*e*x^{10} + 1/11*(6*a^2*c^2*f + 12*a*b^2*c*f + 12*a*b*c^2*d + b^4*f + 4*b^3*c*d)*x^{11} + 1/3*b*c*(3*a*c+b^2)*e*x^{12} + 2/13*c*(6*a*b*c*f + 2*a*c^2*d + 2*b^3*f + 3*b^2*c*d)*x^{13} + 1/7*c^2*(2*a*c+3*b^2)*e*x^{14} + 2/15*c^2*(2*a*c*f + 3*b^2*f + 2*b*c*d)*x^{15} + 1/4*b*c^3*e*x^{16} + 1/17*c^3*(4*b*f+c*d)*x^{17} + 1/18*c^4*e*x^{18} + 1/19*c^4*f*x^{19}$

Rubi [A] time = 0.63, antiderivative size = 416, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 63, $\frac{\text{number of rules}}{\text{integrand size}} = 0.016$, Rules used = {1671}

$$\frac{1}{11}x^{11}(6a^2c^2f + 12ab^2cf + 12abc^2d + 4b^3cd + b^4f) + \frac{1}{9}x^9(12a^2bcf + 6a^2c^2d + 12ab^2cd + 4ab^3f + b^4d) + \frac{1}{10}ex^{10}(6a^2c^2 + 12abc^2 + 6a^2c^2f + 12ab^2cf + 12abc^2d + 4b^3cd + b^4f)$$

Antiderivative was successfully verified.

[In] Int[(a + b*x^2 + c*x^4)^3*(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6), x]

[Out] $a^4*d*x + (a^4*e*x^2)/2 + (a^3*(4*b*d + a*f)*x^3)/3 + a^3*b*e*x^4 + (2*a^2*(3*b^2*d + 2*a*c*d + 2*a*b*f)*x^5)/5 + (a^2*(3*b^2 + 2*a*c)*e*x^6)/3 + (2*a*(2*b^3*d + 6*a*b*c*d + 3*a*b^2*f + 2*a^2*c*f)*x^7)/7 + (a*b*(b^2 + 3*a*c)*e*x^8)/2 + ((b^4*d + 12*a*b^2*c*d + 6*a^2*c^2*d + 4*a*b^3*f + 12*a^2*b*c*f)*x^9)/9 + ((b^4 + 12*a*b^2*c + 6*a^2*c^2)*e*x^{10})/10 + ((4*b^3*c*d + 12*a*b*c^2*d + b^4*f + 12*a*b^2*c*f + 6*a^2*c^2*f)*x^{11})/11 + (b*c*(b^2 + 3*a*c)*e*x^{12})/3 + (2*c*(3*b^2*c*d + 2*a*c^2*d + 2*b^3*f + 6*a*b*c*f)*x^{13})/13 + (c^2*(3*b^2 + 2*a*c)*e*x^{14})/7 + (2*c^2*(2*b*c*d + 3*b^2*f + 2*a*c*f)*x^{15})/15 + (b*c^3*e*x^{16})/4 + (c^3*(c*d + 4*b*f)*x^{17})/17 + (c^4*e*x^{18})/18 + (c^4*f*x^{19})/19$

Rule 1671

Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Int[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\int (a + bx^2 + cx^4)^3 (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx = \int (a^4d + a^4ex + a^3(4bd + \dots) + \dots) dx = a^4dx + \frac{1}{2}a^4ex^2 + \frac{1}{3}a^3(4bd + \dots)x^3 + \dots$$

Mathematica [A] time = 0.12, size = 416, normalized size = 1.00

$$a^4dx + \frac{1}{2}a^4ex^2 + \frac{1}{3}a^3x^3(af + 4bd) + a^3bex^4 + \frac{2}{5}a^2x^5(2abf + 2acd + 3b^2d) + \frac{1}{3}a^2ex^6(2ac + 3b^2) + \frac{1}{10}ex^{10}(6a^2c^2 + 12abd + \dots)$$

Antiderivative was successfully verified.

[In] Integrate[(a + b*x^2 + c*x^4)^3*(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6), x]

[Out] a^4*d*x + (a^4*e*x^2)/2 + (a^3*(4*b*d + a*f)*x^3)/3 + a^3*b*e*x^4 + (2*a^2*(3*b^2*d + 2*a*c*d + 2*a*b*f)*x^5)/5 + (a^2*(3*b^2 + 2*a*c)*e*x^6)/3 + (2*a*(2*b^3*d + 6*a*b*c*d + 3*a*b^2*f + 2*a^2*c*f)*x^7)/7 + (a*b*(b^2 + 3*a*c)*e*x^8)/2 + ((b^4*d + 12*a*b^2*c*d + 6*a^2*c^2*d + 4*a*b^3*f + 12*a^2*b*c*f)*x^9)/9 + ((b^4 + 12*a*b^2*c + 6*a^2*c^2)*e*x^10)/10 + ((4*b^3*c*d + 12*a*b*c^2*d + b^4*f + 12*a*b^2*c*f + 6*a^2*c^2*f)*x^11)/11 + (b*c*(b^2 + 3*a*c)*e*x^12)/3 + (2*c*(3*b^2*c*d + 2*a*c^2*d + 2*b^3*f + 6*a*b*c*f)*x^13)/13 + (c^2*(3*b^2 + 2*a*c)*e*x^14)/7 + (2*c^2*(2*b*c*d + 3*b^2*f + 2*a*c*f)*x^15)/15 + (b*c^3*e*x^16)/4 + (c^3*(c*d + 4*b*f)*x^17)/17 + (c^4*e*x^18)/18 + (c^4*f*x^19)/19

fricas [A] time = 0.81, size = 463, normalized size = 1.11

$$\frac{1}{19}x^{19}fc^4 + \frac{1}{18}x^{18}ec^4 + \frac{1}{17}x^{17}dc^4 + \frac{4}{17}x^{17}fc^3b + \frac{1}{4}x^{16}ec^3b + \frac{4}{15}x^{15}dc^3b + \frac{2}{5}x^{15}fc^2b^2 + \frac{4}{15}x^{15}fc^3a + \frac{3}{7}x^{14}ec^2b^2 + \frac{2}{7}x^{14}ec^3a + \dots$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x^4+b*x^2+a)^3*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6), x, algorithm="fricas")

[Out] 1/19*x^19*f*c^4 + 1/18*x^18*e*c^4 + 1/17*x^17*d*c^4 + 4/17*x^17*f*c^3*b + 1/4*x^16*e*c^3*b + 4/15*x^15*d*c^3*b + 2/5*x^15*f*c^2*b^2 + 4/15*x^15*f*c^3*a + 3/7*x^14*e*c^2*b^2 + 2/7*x^14*e*c^3*a + 6/13*x^13*d*c^2*b^2 + 4/13*x^13*f*c*b^3 + 4/13*x^13*d*c^3*a + 12/13*x^13*f*c^2*b*a + 1/3*x^12*e*c*b^3 + x^12*e*c^2*b*a + 4/11*x^11*d*c*b^3 + 1/11*x^11*f*b^4 + 12/11*x^11*d*c^2*b*a + 12/11*x^11*f*c*b^2*a + 6/11*x^11*f*c^2*a^2 + 1/10*x^10*e*b^4 + 6/5*x^10*e*c*b^2*a + 3/5*x^10*e*c^2*a^2 + 1/9*x^9*d*b^4 + 4/3*x^9*d*c*b^2*a + 4/9*x^9*f*b^3*a + 2/3*x^9*d*c^2*a^2 + 4/3*x^9*f*c*b*a^2 + 1/2*x^8*e*b^3*a + 3/2*x^8

$c+(2*a*c+b^2)*b)*b*e+(a*c^2+2*b^2*c+(2*a*c+b^2)*c)*a*e)*x^{10}+1/9*(3*a^2*b*c$
 $*f+(a^2*c+2*a*b^2+(2*a*c+b^2)*a)*(b*f+c*d)+(4*a*b*c+(2*a*c+b^2)*b)*(a*f+b*d$
 $)+(a*c^2+2*b^2*c+(2*a*c+b^2)*c)*a*d)*x^9+1/8*(3*a^2*b*c*e+(a^2*c+2*a*b^2+(2$
 $*a*c+b^2)*a)*b*e+(4*a*b*c+(2*a*c+b^2)*b)*a*e)*x^8+1/7*(a^3*c*f+3*a^2*b*(b*f$
 $+c*d)+(a^2*c+2*a*b^2+(2*a*c+b^2)*a)*(a*f+b*d)+(4*a*b*c+(2*a*c+b^2)*b)*a*d)*$
 $x^7+1/6*(a^3*c*e+3*a^2*b^2*e+(a^2*c+2*a*b^2+(2*a*c+b^2)*a)*a*e)*x^6+1/5*(a^$
 $3*(b*f+c*d)+3*a^2*b*(a*f+b*d)+(a^2*c+2*a*b^2+(2*a*c+b^2)*a)*a*d)*x^5+a^3*b*$
 $e*x^4+1/3*(a^3*(a*f+b*d)+3*a^3*b*d)*x^3+1/2*a^4*e*x^2+a^4*d*x$

maxima [A] time = 0.52, size = 418, normalized size = 1.00

$$\frac{1}{19}c^4fx^{19}+\frac{1}{18}c^4ex^{18}+\frac{1}{4}bc^3ex^{16}+\frac{1}{17}(c^4d+4bc^3f)x^{17}+\frac{1}{7}(3b^2c^2+2ac^3)ex^{14}+\frac{2}{15}(2bc^3d+(3b^2c^2+2ac^3)f)x^{15}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x^4+b*x^2+a)^3*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6),x, algorithm="maxima")

[Out] 1/19*c^4*f*x^19 + 1/18*c^4*e*x^18 + 1/4*b*c^3*e*x^16 + 1/17*(c^4*d + 4*b*c^3*f)*x^17 + 1/7*(3*b^2*c^2 + 2*a*c^3)*e*x^14 + 2/15*(2*b*c^3*d + (3*b^2*c^2 + 2*a*c^3)*f)*x^15 + 1/3*(b^3*c + 3*a*b*c^2)*e*x^12 + 2/13*((3*b^2*c^2 + 2*a*c^3)*d + 2*(b^3*c + 3*a*b*c^2)*f)*x^13 + 1/10*(b^4 + 12*a*b^2*c + 6*a^2*c^2)*e*x^10 + 1/11*(4*(b^3*c + 3*a*b*c^2)*d + (b^4 + 12*a*b^2*c + 6*a^2*c^2)*f)*x^11 + 1/2*(a*b^3 + 3*a^2*b*c)*e*x^8 + 1/9*((b^4 + 12*a*b^2*c + 6*a^2*c^2)*d + 4*(a*b^3 + 3*a^2*b*c)*f)*x^9 + a^3*b*e*x^4 + 1/3*(3*a^2*b^2 + 2*a^3*c)*e*x^6 + 2/7*(2*(a*b^3 + 3*a^2*b*c)*d + (3*a^2*b^2 + 2*a^3*c)*f)*x^7 + 1/2*a^4*e*x^2 + a^4*d*x + 2/5*(2*a^3*b*f + (3*a^2*b^2 + 2*a^3*c)*d)*x^5 + 1/3*(4*a^3*b*d + a^4*f)*x^3

mupad [B] time = 0.38, size = 398, normalized size = 0.96

$$x^3 \left(\frac{fa^4}{3} + \frac{4bda^3}{3} \right) + x^{17} \left(\frac{dc^4}{17} + \frac{4bfc^3}{17} \right) + x^5 \left(\frac{4fa^3b}{5} + \frac{4cda^3}{5} + \frac{6da^2b^2}{5} \right) + x^{15} \left(\frac{2fb^2c^2}{5} + \frac{4dbc^3}{15} + \frac{4afc^3}{15} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a + b*x^2 + c*x^4)^3*(a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 + c*f*x^6),x)

[Out] x^3*((a^4*f)/3 + (4*a^3*b*d)/3) + x^17*((c^4*d)/17 + (4*b*c^3*f)/17) + x^5*((6*a^2*b^2*d)/5 + (4*a^3*c*d)/5 + (4*a^3*b*f)/5) + x^15*((2*b^2*c^2*f)/5 + (4*b*c^3*d)/15 + (4*a*c^3*f)/15) + x^9*((b^4*d)/9 + (2*a^2*c^2*d)/3 + (4*a*b^3*f)/9 + (4*a*b^2*c*d)/3 + (4*a^2*b*c*f)/3) + x^11*((b^4*f)/11 + (6*a^2*c^2*f)/11 + (4*b^3*c*d)/11 + (12*a*b*c^2*d)/11 + (12*a*b^2*c*f)/11) + x^7*((6*a^2*b^2*f)/7 + (4*a*b^3*d)/7 + (4*a^3*c*f)/7 + (12*a^2*b*c*d)/7) + x^13*

$$\begin{aligned} & ((6*b^2*c^2*d)/13 + (4*a*c^3*d)/13 + (4*b^3*c*f)/13 + (12*a*b*c^2*f)/13) + \\ & (a^4*e*x^2)/2 + (c^4*e*x^18)/18 + (c^4*f*x^19)/19 + (e*x^10*(b^4 + 6*a^2*c^2 + 12*a*b^2*c))/10 + a^4*d*x + (a^2*e*x^6*(2*a*c + 3*b^2))/3 + (c^2*e*x^14 \\ & *(2*a*c + 3*b^2))/7 + a^3*b*e*x^4 + (b*c^3*e*x^16)/4 + (a*b*e*x^8*(3*a*c + b^2))/2 + (b*c*e*x^12*(3*a*c + b^2))/3 \end{aligned}$$

sympy [A] time = 0.16, size = 503, normalized size = 1.21

$$a^4 dx + \frac{a^4 e x^2}{2} + a^3 b e x^4 + \frac{b c^3 e x^{16}}{4} + \frac{c^4 e x^{18}}{18} + \frac{c^4 f x^{19}}{19} + x^{17} \left(\frac{4 b c^3 f}{17} + \frac{c^4 d}{17} \right) + x^{15} \left(\frac{4 a c^3 f}{15} + \frac{2 b^2 c^2 f}{5} + \frac{4 b c^3 d}{15} \right) + x^{14} \left(\frac{2 a c^3}{7} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x**4+b*x**2+a)**3*(a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)*x**4+c*e*x**5+c*f*x**6),x)

[Out] a**4*d*x + a**4*e*x**2/2 + a**3*b*e*x**4 + b*c**3*e*x**16/4 + c**4*e*x**18/18 + c**4*f*x**19/19 + x**17*(4*b*c**3*f/17 + c**4*d/17) + x**15*(4*a*c**3*f/15 + 2*b**2*c**2*f/5 + 4*b*c**3*d/15) + x**14*(2*a*c**3*e/7 + 3*b**2*c**2*e/7) + x**13*(12*a*b*c**2*f/13 + 4*a*c**3*d/13 + 4*b**3*c*f/13 + 6*b**2*c**2*d/13) + x**12*(a*b*c**2*e + b**3*c*e/3) + x**11*(6*a**2*c**2*f/11 + 12*a*b**2*c*f/11 + 12*a*b*c**2*d/11 + b**4*f/11 + 4*b**3*c*d/11) + x**10*(3*a**2*c**2*e/5 + 6*a*b**2*c*e/5 + b**4*e/10) + x**9*(4*a**2*b*c*f/3 + 2*a**2*c**2*d/3 + 4*a*b**3*f/9 + 4*a*b**2*c*d/3 + b**4*d/9) + x**8*(3*a**2*b*c*e/2 + a*b**3*e/2) + x**7*(4*a**3*c*f/7 + 6*a**2*b**2*f/7 + 12*a**2*b*c*d/7 + 4*a*b**3*d/7) + x**6*(2*a**3*c*e/3 + a**2*b**2*e) + x**5*(4*a**3*b*f/5 + 4*a**3*c*d/5 + 6*a**2*b**2*d/5) + x**3*(a**4*f/3 + 4*a**3*b*d/3)

3.61 $\int (a + bx^2 + cx^4)^2 (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx$

Optimal. Leaf size=259

$$a^3 dx + \frac{1}{2} a^3 ex^2 + \frac{1}{7} x^7 (3a^2 cf + 3ab^2 f + 6abcd + b^3 d) + \frac{1}{3} a^2 x^3 (af + 3bd) + \frac{3}{4} a^2 bex^4 + \frac{3}{11} cx^{11} (acf + b^2 f + bcd) + \frac{3}{5} ax^5$$

[Out] $a^3 d x + \frac{1}{2} a^3 e x^2 + \frac{1}{3} a^2 (a f + 3 b d) x^3 + \frac{3}{4} a^2 b e x^4 + \frac{3}{5} a (a b f + a c d + b^2 d) x^5 + \frac{1}{2} a (a c + b^2) e x^6 + \frac{1}{7} (3 a^2 c f + 3 a b^2 f + 6 a b c d + b^3 d) x^7 + \frac{1}{8} b (6 a c + b^2) e x^8 + \frac{1}{9} (6 a b c f + 3 a c^2 d + b^3 f + 3 b^2 c d) x^9 + \frac{3}{10} c (a c + b^2) e x^{10} + \frac{3}{11} c (a c f + b^2 f + b c d) x^{11} + \frac{1}{4} b c^2 e x^{12} + \frac{1}{13} c^2 (3 b f + c d) x^{13} + \frac{1}{14} c^3 e x^{14} + \frac{1}{15} c^3 f x^{15}$

Rubi [A] time = 0.33, antiderivative size = 259, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 63, $\frac{\text{number of rules}}{\text{integrand size}} = 0.016$, Rules used = {1671}

$$\frac{1}{7} x^7 (3a^2 cf + 3ab^2 f + 6abcd + b^3 d) + \frac{1}{3} a^2 x^3 (af + 3bd) + \frac{3}{4} a^2 bex^4 + a^3 dx + \frac{1}{2} a^3 ex^2 + \frac{1}{9} x^9 (6abcf + 3ac^2 d + 3b^2 cd + b^3 f + 3b^2 c d)$$

Antiderivative was successfully verified.

[In] Int[(a + b*x^2 + c*x^4)^2*(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6), x]

[Out] $a^3 d x + (a^3 e x^2)/2 + (a^2 (3 b d + a f) x^3)/3 + (3 a^2 b e x^4)/4 + (3 a (b^2 d + a c d + a b f) x^5)/5 + (a (b^2 + a c) e x^6)/2 + ((b^3 d + 6 a b c d + 3 a b^2 f + 3 a^2 c f) x^7)/7 + (b (b^2 + 6 a c) e x^8)/8 + ((3 b^2 c d + 3 a c^2 d + b^3 f + 6 a b c f) x^9)/9 + (3 c (b^2 + a c) e x^{10})/10 + (3 c (b c d + b^2 f + a c f) x^{11})/11 + (b c^2 e x^{12})/4 + (c^2 (c d + 3 b f) x^{13})/13 + (c^3 e x^{14})/14 + (c^3 f x^{15})/15$

Rule 1671

Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :> Int[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\int (a + bx^2 + cx^4)^2 (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx = \int (a^3 d + a^3 ex + a^2(3bd + b^2 d) + a^2(b^2 + ac)e + (3a^2 cf + 3ab^2 f + 6abcd + b^3 d)x + a^2(b^2 + ac)e + (b^3 d + 6abcf + 3ac^2 d + 3b^2 cd + b^3 f)x + (3c(b^2 + ac)e + 3c(bc d + b^2 f + ac f))x + (b c^2 e + c^2 (c d + 3 b f))x + c^3 e x + c^3 f x) dx = a^3 dx + \frac{1}{2} a^3 ex^2 + \frac{1}{3} a^2 (3bd + b^2 d) x + \frac{1}{4} a^2 b e x^4 + \frac{1}{5} a^2 (b^2 + ac) e x^6 + \frac{1}{7} (3a^2 cf + 3ab^2 f + 6abcd + b^3 d) x^7 + \frac{1}{8} b (b^2 + 6ac) e x^8 + \frac{1}{9} (3b^2 c d + 3a c^2 d + b^3 f + 6a b c f) x^9 + \frac{1}{10} (3c (b^2 + ac) e) x^{10} + \frac{1}{11} (3c (b c d + b^2 f + a c f)) x^{11} + \frac{1}{12} (b c^2 e) x^{12} + \frac{1}{13} (c^2 (c d + 3 b f)) x^{13} + \frac{1}{14} c^3 e x^{14} + \frac{1}{15} c^3 f x^{15}$$

Mathematica [A] time = 0.05, size = 259, normalized size = 1.00

$$a^3dx + \frac{1}{2}a^3ex^2 + \frac{1}{7}x^7(3a^2cf + 3ab^2f + 6abcd + b^3d) + \frac{1}{3}a^2x^3(af + 3bd) + \frac{3}{4}a^2bex^4 + \frac{3}{11}cx^{11}(acf + b^2f + bcd) + \frac{3}{5}ax$$

Antiderivative was successfully verified.

[In] Integrate[(a + b*x^2 + c*x^4)^2*(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6),x]

[Out] a^3*d*x + (a^3*e*x^2)/2 + (a^2*(3*b*d + a*f)*x^3)/3 + (3*a^2*b*e*x^4)/4 + (3*a*(b^2*d + a*c*d + a*b*f)*x^5)/5 + (a*(b^2 + a*c)*e*x^6)/2 + ((b^3*d + 6*a*b*c*d + 3*a*b^2*f + 3*a^2*c*f)*x^7)/7 + (b*(b^2 + 6*a*c)*e*x^8)/8 + ((3*b^2*c*d + 3*a*c^2*d + b^3*f + 6*a*b*c*f)*x^9)/9 + (3*c*(b^2 + a*c)*e*x^10)/10 + (3*c*(b*c*d + b^2*f + a*c*f)*x^11)/11 + (b*c^2*e*x^12)/4 + (c^2*(c*d + 3*b*f)*x^13)/13 + (c^3*e*x^14)/14 + (c^3*f*x^15)/15

fricas [A] time = 0.70, size = 285, normalized size = 1.10

$$\frac{1}{15}x^{15}fc^3 + \frac{1}{14}x^{14}ec^3 + \frac{1}{13}x^{13}dc^3 + \frac{3}{13}x^{13}fc^2b + \frac{1}{4}x^{12}ec^2b + \frac{3}{11}x^{11}dc^2b + \frac{3}{11}x^{11}fcb^2 + \frac{3}{11}x^{11}fc^2a + \frac{3}{10}x^{10}ecb^2 + \frac{3}{10}x^{10}e$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x^4+b*x^2+a)^2*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6),x, algorithm="fricas")

[Out] 1/15*x^15*f*c^3 + 1/14*x^14*e*c^3 + 1/13*x^13*d*c^3 + 3/13*x^13*f*c^2*b + 1/4*x^12*e*c^2*b + 3/11*x^11*d*c^2*b + 3/11*x^11*f*c*b^2 + 3/11*x^11*f*c^2*a + 3/10*x^10*e*c*b^2 + 3/10*x^10*e*c^2*a + 1/3*x^9*d*c*b^2 + 1/9*x^9*f*b^3 + 1/3*x^9*d*c^2*a + 2/3*x^9*f*c*b*a + 1/8*x^8*e*b^3 + 3/4*x^8*e*c*b*a + 1/7*x^7*d*b^3 + 6/7*x^7*d*c*b*a + 3/7*x^7*f*b^2*a + 3/7*x^7*f*c*a^2 + 1/2*x^6*e*b^2*a + 1/2*x^6*e*c*a^2 + 3/5*x^5*d*b^2*a + 3/5*x^5*d*c*a^2 + 3/5*x^5*f*b*a^2 + 3/4*x^4*e*b*a^2 + x^3*d*b*a^2 + 1/3*x^3*f*a^3 + 1/2*x^2*e*a^3 + x*d*a^3

giac [A] time = 0.31, size = 295, normalized size = 1.14

$$\frac{1}{15}c^3fx^{15} + \frac{1}{14}c^3x^{14}e + \frac{1}{13}c^3dx^{13} + \frac{3}{13}bc^2fx^{13} + \frac{1}{4}bc^2x^{12}e + \frac{3}{11}bc^2dx^{11} + \frac{3}{11}b^2cfx^{11} + \frac{3}{11}ac^2fx^{11} + \frac{3}{10}b^2cx^{10}e + \frac{3}{10}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x^4+b*x^2+a)^2*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6),x, algorithm="giac")

[Out] 1/15*c^3*f*x^15 + 1/14*c^3*x^14*e + 1/13*c^3*d*x^13 + 3/13*b*c^2*f*x^13 + 1/4*b*c^2*x^12*e + 3/11*b*c^2*d*x^11 + 3/11*b^2*c*f*x^11 + 3/11*a*c^2*f*x^11

$$+ \frac{3}{10}b^2c^2x^{10}e + \frac{3}{10}a^2c^2x^{10}e + \frac{1}{3}b^2cdx^9 + \frac{1}{3}a^2cdx^9 + \frac{1}{9}b^3fx^9 + \frac{2}{3}a^3b^2fx^9 + \frac{1}{8}b^3x^8e + \frac{3}{4}a^2b^2cx^8e + \frac{1}{7}b^3d^2x^7 + \frac{6}{7}a^2b^2cdx^7 + \frac{3}{7}a^2b^2fx^7 + \frac{3}{7}a^2c^2fx^7 + \frac{1}{2}a^2b^2x^6e + \frac{1}{2}a^2c^2x^6e + \frac{3}{5}a^2b^2d^2x^5 + \frac{3}{5}a^2c^2d^2x^5 + \frac{3}{5}a^2b^2fx^5 + \frac{3}{4}a^2b^2cx^4e + a^2b^2d^2x^3 + \frac{1}{3}a^3fx^3 + \frac{1}{2}a^3x^2e + a^3d^2x$$

maple [A] time = 0.00, size = 354, normalized size = 1.37

$$\frac{c^3fx^{15}}{15} + \frac{c^3ex^{14}}{14} + \frac{bc^2ex^{12}}{4} + \frac{(2bc^2f + (bf + cd)c^2)x^{13}}{13} + \frac{(2(bf + cd)bc + (af + bd)c^2 + (2ac + b^2)cf)x^{11}}{11} + \frac{(a^3d^2x^3 + \frac{1}{2}a^3x^2e + \frac{1}{3}a^3fx^3 + a^2b^2d^2x^3 + \frac{3}{5}a^2b^2fx^5 + \frac{3}{5}a^2c^2d^2x^5 + \frac{3}{5}a^2b^2cx^4e + \frac{3}{4}a^2b^2cx^4e + a^2b^2d^2x^3 + \frac{1}{3}a^3fx^3 + \frac{1}{2}a^3x^2e + a^3d^2x)}{11}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((c*x^4+b*x^2+a)^2*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6),x)`

[Out] $\frac{1}{15}c^3fx^{15} + \frac{1}{14}c^3ex^{14} + \frac{1}{13}(2b^2c^2f + c^2(bf + cd))x^{13} + \frac{1}{4}b^2c^2e^2x^{12} + \frac{1}{11}((2ac + b^2)cf + 2b^2c^2e + c^2(a^2c + b^2d))x^{11} + \frac{1}{10}((2ac + b^2)ce + 2b^2c^2e + a^2c^2e)x^{10} + \frac{1}{9}(2ab^2cf + (2ac + b^2)(bf + cd) + 2b^2c^2(a^2c + b^2d) + a^2c^2d)x^9 + \frac{1}{8}(4ab^2ce + (2ac + b^2)be)x^8 + \frac{1}{7}(a^2c^2f + 2ab^2(bf + cd) + (2ac + b^2)(a^2c + b^2d) + 2ab^2cd)x^7 + \frac{1}{6}(a^2c^2e + 2ab^2e + (2ac + b^2)ae)x^6 + \frac{1}{5}(a^2(bf + cd) + 2ab^2(a^2c + b^2d) + (2ac + b^2)ad)x^5 + \frac{3}{4}a^2b^2e^2x^4 + \frac{1}{3}(a^2(a^2c + b^2d) + 2a^2b^2d)x^3 + \frac{1}{2}a^3e^2x^2 + a^3d^2x$

maxima [A] time = 0.70, size = 251, normalized size = 0.97

$$\frac{1}{15}c^3fx^{15} + \frac{1}{14}c^3ex^{14} + \frac{1}{4}bc^2ex^{12} + \frac{1}{13}(c^3d + 3bc^2f)x^{13} + \frac{3}{10}(b^2c + ac^2)ex^{10} + \frac{3}{11}(bc^2d + (b^2c + ac^2)f)x^{11} + \frac{1}{8}(b^3 + 6a^2b^2c^2)ex^8 + \frac{1}{9}(3(b^2c + ac^2)d + (b^3 + 6a^2b^2c^2)f)x^9 + \frac{3}{4}a^2b^2e^2x^4 + \frac{1}{2}(ab^2 + a^2c^2)e^2x^6 + \frac{1}{7}((b^3 + 6a^2b^2c^2)d + 3(ab^2 + a^2c^2)f)x^7 + \frac{1}{2}a^3e^2x^2 + \frac{3}{5}(a^2b^2f + (ab^2 + a^2c^2)d)x^5 + a^3d^2x + \frac{1}{3}(3a^2b^2d + a^3f)x^3$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((c*x^4+b*x^2+a)^2*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6),x, algorithm="maxima")`

[Out] $\frac{1}{15}c^3fx^{15} + \frac{1}{14}c^3ex^{14} + \frac{1}{4}b^2c^2e^2x^{12} + \frac{1}{13}(c^3d + 3b^2c^2f)x^{13} + \frac{3}{10}(b^2c + ac^2)e^2x^{10} + \frac{3}{11}(b^2c^2d + (b^2c + ac^2)f)x^{11} + \frac{1}{8}(b^3 + 6a^2b^2c^2)e^2x^8 + \frac{1}{9}(3(b^2c + ac^2)d + (b^3 + 6a^2b^2c^2)f)x^9 + \frac{3}{4}a^2b^2e^2x^4 + \frac{1}{2}(ab^2 + a^2c^2)e^2x^6 + \frac{1}{7}((b^3 + 6a^2b^2c^2)d + 3(ab^2 + a^2c^2)f)x^7 + \frac{1}{2}a^3e^2x^2 + \frac{3}{5}(a^2b^2f + (ab^2 + a^2c^2)d)x^5 + a^3d^2x + \frac{1}{3}(3a^2b^2d + a^3f)x^3$

mupad [B] time = 0.95, size = 246, normalized size = 0.95

$$x^3 \left(\frac{fa^3}{3} + bda^2 \right) + x^{13} \left(\frac{dc^3}{13} + \frac{3bfc^2}{13} \right) + x^5 \left(\frac{3fa^2b}{5} + \frac{3cda^2}{5} + \frac{3dab^2}{5} \right) + x^{11} \left(\frac{3fb^2c}{11} + \frac{3db^2c^2}{11} + \frac{3afc^2}{11} \right) + \frac{1}{8}(b^3 + 6a^2b^2c^2)ex^8 + \frac{1}{9}(3(b^2c + ac^2)d + (b^3 + 6a^2b^2c^2)f)x^9 + \frac{3}{4}a^2b^2e^2x^4 + \frac{1}{2}(ab^2 + a^2c^2)e^2x^6 + \frac{1}{7}((b^3 + 6a^2b^2c^2)d + 3(ab^2 + a^2c^2)f)x^7 + \frac{1}{2}a^3e^2x^2 + \frac{3}{5}(a^2b^2f + (ab^2 + a^2c^2)d)x^5 + a^3d^2x + \frac{1}{3}(3a^2b^2d + a^3f)x^3$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a + b*x^2 + c*x^4)^2*(a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 + c*f*x^6),x)
```

```
[Out] x^3*((a^3*f)/3 + a^2*b*d) + x^13*((c^3*d)/13 + (3*b*c^2*f)/13) + x^5*((3*a*b^2*d)/5 + (3*a^2*c*d)/5 + (3*a^2*b*f)/5) + x^11*((3*b*c^2*d)/11 + (3*a*c^2*f)/11 + (3*b^2*c*f)/11) + x^7*((b^3*d)/7 + (3*a*b^2*f)/7 + (3*a^2*c*f)/7 + (6*a*b*c*d)/7) + x^9*((b^3*f)/9 + (a*c^2*d)/3 + (b^2*c*d)/3 + (2*a*b*c*f)/3) + (a^3*e*x^2)/2 + (c^3*e*x^14)/14 + (c^3*f*x^15)/15 + a^3*d*x + (a*e*x^6*(a*c + b^2))/2 + (b*e*x^8*(6*a*c + b^2))/8 + (3*c*e*x^10*(a*c + b^2))/10 + (3*a^2*b*e*x^4)/4 + (b*c^2*e*x^12)/4
```

sympy [A] time = 0.12, size = 309, normalized size = 1.19

$$a^3 dx + \frac{a^3 ex^2}{2} + \frac{3a^2 bex^4}{4} + \frac{bc^2 ex^{12}}{4} + \frac{c^3 ex^{14}}{14} + \frac{c^3 fx^{15}}{15} + x^{13} \left(\frac{3bc^2 f}{13} + \frac{c^3 d}{13} \right) + x^{11} \left(\frac{3ac^2 f}{11} + \frac{3b^2 cf}{11} + \frac{3bc^2 d}{11} \right) + x^{10} \left(\frac{3ac^2 f}{10} + \frac{3b^2 cf}{10} + \frac{3bc^2 d}{10} \right) + x^9 \left(\frac{2a^2 bcf}{3} + \frac{ac^2 d}{3} + \frac{b^2 cf}{3} + \frac{2a^2 bcd}{3} \right) + x^8 \left(\frac{3a^2 bce}{4} + \frac{b^3 ce}{8} \right) + x^7 \left(\frac{3a^2 c^2 f}{7} + \frac{3a^2 b^2 f}{7} + \frac{6a^2 bcd}{7} + \frac{b^3 d}{7} \right) + x^6 \left(\frac{a^2 ce}{2} + \frac{ab^2 ce}{2} \right) + x^5 \left(\frac{3a^2 bf}{5} + \frac{3a^2 cd}{5} + \frac{3ab^2 d}{5} \right) + x^3 \left(\frac{a^3 f}{3} + a^2 bd \right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((c*x**4+b*x**2+a)**2*(a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)*x**4+c*e*x**5+c*f*x**6),x)
```

```
[Out] a**3*d*x + a**3*e*x**2/2 + 3*a**2*b*e*x**4/4 + b*c**2*e*x**12/4 + c**3*e*x**14/14 + c**3*f*x**15/15 + x**13*(3*b*c**2*f/13 + c**3*d/13) + x**11*(3*a*c**2*f/11 + 3*b**2*c*f/11 + 3*b*c**2*d/11) + x**10*(3*a*c**2*e/10 + 3*b**2*c*e/10) + x**9*(2*a*b*c*f/3 + a*c**2*d/3 + b**3*f/9 + b**2*c*d/3) + x**8*(3*a*b*c*e/4 + b**3*e/8) + x**7*(3*a**2*c*f/7 + 3*a*b**2*f/7 + 6*a*b*c*d/7 + b**3*d/7) + x**6*(a**2*c*e/2 + a*b**2*e/2) + x**5*(3*a**2*b*f/5 + 3*a**2*c*d/5 + 3*a*b**2*d/5) + x**3*(a**3*f/3 + a**2*b*d)
```

3.62 $\int (a + bx^2 + cx^4) (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx$

Optimal. Leaf size=154

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{7} x^7 (2acf + b^2 f + 2bcd) + \frac{1}{5} x^5 (2abf + 2acd + b^2 d) + \frac{1}{6} ex^6 (2ac + b^2) + \frac{1}{3} ax^3 (af + 2bd) + \frac{1}{2} abex^4 + \frac{1}{9} cex^5 + \frac{1}{11} cfx^6$$

[Out] $a^2 d x + \frac{1}{2} a^2 e x^2 + \frac{1}{7} x^7 (2 a c f + b^2 f + 2 b c d) + \frac{1}{5} x^5 (2 a b f + 2 a c d + b^2 d) + \frac{1}{6} e x^6 (2 a c + b^2) + \frac{1}{3} a x^3 (a f + 2 b d) + \frac{1}{2} a b e x^4 + \frac{1}{9} c e x^5 + \frac{1}{11} c f x^6$

Rubi [A] time = 0.15, antiderivative size = 154, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 61, $\frac{\text{number of rules}}{\text{integrand size}} = 0.016$, Rules used = {1671}

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{7} x^7 (2acf + b^2 f + 2bcd) + \frac{1}{5} x^5 (2abf + 2acd + b^2 d) + \frac{1}{6} ex^6 (2ac + b^2) + \frac{1}{3} ax^3 (af + 2bd) + \frac{1}{2} abex^4 + \frac{1}{9} cex^5 + \frac{1}{11} cfx^6$$

Antiderivative was successfully verified.

[In] Int[(a + b*x^2 + c*x^4)*(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6), x]

[Out] $a^2 d x + (a^2 e x^2)/2 + (a*(2*b*d + a*f)*x^3)/3 + (a*b*e*x^4)/2 + ((b^2*d + 2*a*c*d + 2*a*b*f)*x^5)/5 + ((b^2 + 2*a*c)*e*x^6)/6 + ((2*b*c*d + b^2*f + 2*a*c*f)*x^7)/7 + (b*c*e*x^8)/4 + (c*(c*d + 2*b*f)*x^9)/9 + (c^2*e*x^10)/10 + (c^2*f*x^11)/11$

Rule 1671

Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Int[ExpandIntegrand[Pq*(a + b*x^2 + c*x^4)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, 0]

Rubi steps

$$\int (a + bx^2 + cx^4) (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx = \int (a^2 d + a^2 ex + a(2bd + aef)x^2 + (abex^3 + a^2 cx^4) + (abex^4 + a^2 cx^5) + (abex^5 + a^2 cx^6) + abex^6) dx = a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{3} a(2bd + aef)x^2 + \frac{1}{4} abex^4 + \frac{1}{5} a^2 cx^5 + \frac{1}{6} abex^6$$

Mathematica [A] time = 0.03, size = 154, normalized size = 1.00

$$a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{7} x^7 (2acf + b^2 f + 2bcd) + \frac{1}{5} x^5 (2abf + 2acd + b^2 d) + \frac{1}{6} ex^6 (2ac + b^2) + \frac{1}{3} ax^3 (af + 2bd) + \frac{1}{2} abex^4 + \frac{1}{9} cex^5 + \frac{1}{11} cfx^6$$

Antiderivative was successfully verified.

[In] Integrate[(a + b*x^2 + c*x^4)*(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6),x]

[Out] a^2*d*x + (a^2*e*x^2)/2 + (a*(2*b*d + a*f)*x^3)/3 + (a*b*e*x^4)/2 + ((b^2*d + 2*a*c*d + 2*a*b*f)*x^5)/5 + ((b^2 + 2*a*c)*e*x^6)/6 + ((2*b*c*d + b^2*f + 2*a*c*f)*x^7)/7 + (b*c*e*x^8)/4 + (c*(c*d + 2*b*f)*x^9)/9 + (c^2*e*x^10)/10 + (c^2*f*x^11)/11

fricas [A] time = 0.72, size = 151, normalized size = 0.98

$$\frac{1}{11}x^{11}fc^2 + \frac{1}{10}x^{10}ec^2 + \frac{1}{9}x^9dc^2 + \frac{2}{9}x^9fcb + \frac{1}{4}x^8ecb + \frac{2}{7}x^7dcb + \frac{1}{7}x^7fb^2 + \frac{2}{7}x^7fca + \frac{1}{6}x^6eb^2 + \frac{1}{3}x^6eca + \frac{1}{5}x^5db^2 + \frac{2}{5}x^5dca$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x^4+b*x^2+a)*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6),x, algorithm="fricas")

[Out] 1/11*x^11*f*c^2 + 1/10*x^10*e*c^2 + 1/9*x^9*d*c^2 + 2/9*x^9*f*c*b + 1/4*x^8*e*c*b + 2/7*x^7*d*c*b + 1/7*x^7*f*b^2 + 2/7*x^7*f*c*a + 1/6*x^6*e*b^2 + 1/3*x^6*e*c*a + 1/5*x^5*d*b^2 + 2/5*x^5*d*c*a + 2/5*x^5*f*b*a + 1/2*x^4*e*b*a + 2/3*x^3*d*b*a + 1/3*x^3*f*a^2 + 1/2*x^2*e*a^2 + x*d*a^2

giac [A] time = 0.28, size = 157, normalized size = 1.02

$$\frac{1}{11}c^2fx^{11} + \frac{1}{10}c^2x^{10}e + \frac{1}{9}c^2dx^9 + \frac{2}{9}bcfx^9 + \frac{1}{4}bcx^8e + \frac{2}{7}bcdx^7 + \frac{1}{7}b^2fx^7 + \frac{2}{7}acf x^7 + \frac{1}{6}b^2x^6e + \frac{1}{3}acx^6e + \frac{1}{5}b^2dx^5 + \frac{2}{5}a$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((c*x^4+b*x^2+a)*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6),x, algorithm="giac")

[Out] 1/11*c^2*f*x^11 + 1/10*c^2*x^10*e + 1/9*c^2*d*x^9 + 2/9*b*c*f*x^9 + 1/4*b*c*x^8*e + 2/7*b*c*d*x^7 + 1/7*b^2*f*x^7 + 2/7*a*c*f*x^7 + 1/6*b^2*x^6*e + 1/3*a*c*x^6*e + 1/5*b^2*d*x^5 + 2/5*a*c*d*x^5 + 2/5*a*b*f*x^5 + 1/2*a*b*x^4*e + 2/3*a*b*d*x^3 + 1/3*a^2*f*x^3 + 1/2*a^2*x^2*e + a^2*d*x

maple [A] time = 0.00, size = 161, normalized size = 1.05

$$\frac{c^2fx^{11}}{11} + \frac{c^2ex^{10}}{10} + \frac{bcex^8}{4} + \frac{(bcf + (bf + cd)c)x^9}{9} + \frac{abex^4}{2} + \frac{(acf + (bf + cd)b + (af + bd)c)x^7}{7} + \frac{(2ace + b^2e)x^5}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((c*x^4+b*x^2+a)*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6),x)`

[Out] $\frac{1}{11}c^2fx^{11} + \frac{1}{10}c^2ex^{10} + \frac{1}{9}(b^2c^2f + c^2(bf + cd))x^9 + \frac{1}{4}b^2c^2ex^8 + \frac{1}{7}(a^2c^2f + b^2(bf + cd) + c^2(a^2f + b^2d))x^7 + \frac{1}{6}(2a^2c^2e + b^2e)x^6 + \frac{1}{5}(a^2(bf + cd) + b^2(a^2f + b^2d) + a^2c^2d)x^5 + \frac{1}{2}a^2b^2e^2x^4 + \frac{1}{3}(a^2(a^2f + b^2d) + a^2b^2d)x^3 + \frac{1}{2}a^2e^2x^2 + a^2d^2x$

maxima [A] time = 0.59, size = 138, normalized size = 0.90

$$\frac{1}{11}c^2fx^{11} + \frac{1}{10}c^2ex^{10} + \frac{1}{4}bcex^8 + \frac{1}{9}(c^2d + 2bcf)x^9 + \frac{1}{6}(b^2 + 2ac)ex^6 + \frac{1}{7}(2bcd + (b^2 + 2ac)f)x^7 + \frac{1}{2}abex^4 + \frac{1}{5}(2a^2d + a^2f)x^3$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((c*x^4+b*x^2+a)*(a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6),x, algorithm="maxima")`

[Out] $\frac{1}{11}c^2fx^{11} + \frac{1}{10}c^2ex^{10} + \frac{1}{4}b^2c^2ex^8 + \frac{1}{9}(c^2d + 2b^2c^2f)x^9 + \frac{1}{6}(b^2 + 2a^2c^2)e^2x^6 + \frac{1}{7}(2b^2c^2d + (b^2 + 2a^2c^2)f)x^7 + \frac{1}{2}a^2b^2e^2x^4 + \frac{1}{5}(2a^2b^2f + (b^2 + 2a^2c^2)d)x^5 + \frac{1}{2}a^2e^2x^2 + a^2d^2x + \frac{1}{3}(2a^2b^2d + a^2f^2)x^3$

mupad [B] time = 0.09, size = 138, normalized size = 0.90

$$x^5 \left(\frac{db^2}{5} + \frac{2afb}{5} + \frac{2acd}{5} \right) + x^7 \left(\frac{fb^2}{7} + \frac{2cdb}{7} + \frac{2acf}{7} \right) + x^3 \left(\frac{fa^2}{3} + \frac{2bda}{3} \right) + x^9 \left(\frac{dc^2}{9} + \frac{2bfc}{9} \right) + \frac{a^2ex^2}{2} + \frac{c^2e}{1}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((a + b*x^2 + c*x^4)*(a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 + c*f*x^6),x)`

[Out] $x^5((b^2d)/5 + (2a^2cd)/5 + (2a^2b^2f)/5) + x^7((b^2f)/7 + (2b^2cd)/7 + (2a^2cf)/7) + x^3((a^2f)/3 + (2a^2bd)/3) + x^9((c^2d)/9 + (2b^2cf)/9) + (a^2e^2x^2)/2 + (c^2e^2x^{10})/10 + (c^2f^2x^{11})/11 + (e^2x^6(2a^2c + b^2))/6 + a^2d^2x + (a^2b^2e^2x^4)/2 + (b^2c^2e^2x^8)/4$

sympy [A] time = 0.10, size = 165, normalized size = 1.07

$$a^2dx + \frac{a^2ex^2}{2} + \frac{abex^4}{2} + \frac{bcex^8}{4} + \frac{c^2ex^{10}}{10} + \frac{c^2fx^{11}}{11} + x^9 \left(\frac{2bcf}{9} + \frac{c^2d}{9} \right) + x^7 \left(\frac{2acf}{7} + \frac{b^2f}{7} + \frac{2bcd}{7} \right) + x^6 \left(\frac{ace}{3} + \frac{b^2e}{6} \right) + x^5 \left(\frac{2a^2d}{5} + \frac{2a^2f}{5} + \frac{2b^2cd}{5} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((c*x**4+b*x**2+a)*(a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)*x**4+c*e*x**5+c*f*x**6),x)`

```
[Out] a**2*d*x + a**2*e*x**2/2 + a*b*e*x**4/2 + b*c*e*x**8/4 + c**2*e*x**10/10 +  
c**2*f*x**11/11 + x**9*(2*b*c*f/9 + c**2*d/9) + x**7*(2*a*c*f/7 + b**2*f/7  
+ 2*b*c*d/7) + x**6*(a*c*e/3 + b**2*e/6) + x**5*(2*a*b*f/5 + 2*a*c*d/5 + b*  
*2*d/5) + x**3*(a**2*f/3 + 2*a*b*d/3)
```

$$3.63 \quad \int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{a+bx^2+cx^4} dx$$

Optimal. Leaf size=20

$$dx + \frac{ex^2}{2} + \frac{fx^3}{3}$$

[Out] d*x+1/2*e*x^2+1/3*f*x^3

Rubi [A] time = 0.03, antiderivative size = 20, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 1, integrand size = 63, $\frac{\text{number of rules}}{\text{integrand size}} = 0.016$, Rules used = {1586}

$$dx + \frac{ex^2}{2} + \frac{fx^3}{3}$$

Antiderivative was successfully verified.

[In] Int[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4), x]

[Out] d*x + (e*x^2)/2 + (f*x^3)/3

Rule 1586

Int[(u_)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rubi steps

$$\begin{aligned} \int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{a + bx^2 + cx^4} dx &= \int (d + ex + fx^2) dx \\ &= dx + \frac{ex^2}{2} + \frac{fx^3}{3} \end{aligned}$$

Mathematica [A] time = 0.00, size = 20, normalized size = 1.00

$$dx + \frac{ex^2}{2} + \frac{fx^3}{3}$$

Antiderivative was successfully verified.

[In] Integrate[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4), x]

[Out] $d*x + (e*x^2)/2 + (f*x^3)/3$

fricas [A] time = 0.90, size = 16, normalized size = 0.80

$$\frac{1}{3}fx^3 + \frac{1}{2}ex^2 + dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a),x, algorithm="fricas")`

[Out] $1/3*f*x^3 + 1/2*e*x^2 + d*x$

giac [A] time = 1.77, size = 17, normalized size = 0.85

$$\frac{1}{3}fx^3 + \frac{1}{2}x^2e + dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a),x, algorithm="giac")`

[Out] $1/3*f*x^3 + 1/2*x^2*e + d*x$

maple [A] time = 0.00, size = 17, normalized size = 0.85

$$\frac{1}{3}fx^3 + \frac{1}{2}ex^2 + dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a),x)`

[Out] $d*x+1/2*e*x^2+1/3*f*x^3$

maxima [A] time = 0.62, size = 16, normalized size = 0.80

$$\frac{1}{3}fx^3 + \frac{1}{2}ex^2 + dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a),x, algorithm="maxima")`

[Out] $1/3*f*x^3 + 1/2*e*x^2 + d*x$

mupad [B] time = 0.03, size = 16, normalized size = 0.80

$$\frac{fx^3}{3} + \frac{ex^2}{2} + dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4), x)`

[Out] `d*x + (e*x^2)/2 + (f*x^3)/3`

sympy [A] time = 0.09, size = 15, normalized size = 0.75

$$dx + \frac{ex^2}{2} + \frac{fx^3}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)*x**4+c*e*x**5+c*f*x**6)/(c*x**4+b*x**2+a), x)`

[Out] `d*x + e*x**2/2 + f*x**3/3`

$$3.64 \quad \int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=211

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}} - \frac{e \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

[Out] $-e \operatorname{arctanh}\left(\frac{2cx^2+b}{(-4ac+b^2)^{1/2}}\right) / (-4ac+b^2)^{1/2} + 1/2 \operatorname{arctan}\left(x \sqrt{2} \sqrt{c} / (b - (-4ac+b^2)^{1/2})\right) / (b - (-4ac+b^2)^{1/2}) + (f + (-bf + 2cd) / (-4ac+b^2)^{1/2}) \sqrt{2} \sqrt{c} / (b - (-4ac+b^2)^{1/2}) + 1/2 \operatorname{arctan}\left(x \sqrt{2} \sqrt{c} / (b + \sqrt{b^2-4ac})\right) / (b + \sqrt{b^2-4ac}) + (f - (2cd-bf) / (-4ac+b^2)^{1/2}) \sqrt{2} \sqrt{c} / (b + \sqrt{b^2-4ac}) - e \operatorname{arctanh}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right) / \sqrt{b^2-4ac}$

Rubi [A] time = 0.32, antiderivative size = 211, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, integrand size = 63, $\frac{\text{number of rules}}{\text{integrand size}} = 0.127$, Rules used = {1586, 1673, 1166, 205, 12, 1107, 618, 206}

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right)}{\sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}} - \frac{e \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}$$

Antiderivative was successfully verified.

[In] $\int (a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6) / (a + b*x^2 + c*x^4)^2, x$

[Out] $((f + (2*c*d - b*f) / \sqrt{b^2 - 4*a*c}) * \operatorname{ArcTan}[(\sqrt{2} * \sqrt{c} * x) / \sqrt{b - \sqrt{b^2 - 4*a*c}}]) / (\sqrt{2} * \sqrt{c} * \sqrt{b - \sqrt{b^2 - 4*a*c}}) + ((f - (2*c*d - b*f) / \sqrt{b^2 - 4*a*c}) * \operatorname{ArcTan}[(\sqrt{2} * \sqrt{c} * x) / \sqrt{b + \sqrt{b^2 - 4*a*c}}]) / (\sqrt{2} * \sqrt{c} * \sqrt{b + \sqrt{b^2 - 4*a*c}}) - (e * \operatorname{ArcTanh}[(b + 2*c*x^2) / \sqrt{b^2 - 4*a*c}]) / \sqrt{b^2 - 4*a*c}$

Rule 12

$\operatorname{Int}[(a_)(u_), x_Symbol] \rightarrow \operatorname{Dist}[a, \operatorname{Int}[u, x], x] /; \operatorname{FreeQ}[a, x] \&\& \operatorname{!Match}Q[u, (b_)(v_)] /; \operatorname{FreeQ}[b, x]$

Rule 205

$\operatorname{Int}[(a_ + (b_)(x_)^2)^{-1}, x_Symbol] \rightarrow \operatorname{Simp}[(\operatorname{Rt}[a/b, 2] * \operatorname{ArcTan}[x / \operatorname{Rt}[a/b, 2]]) / a, x] /; \operatorname{FreeQ}\{a, b\}, x] \&\& \operatorname{PosQ}[a/b]$

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[In
t[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c},
x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2,
Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1586

```
Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{(a + bx^2 + cx^4)^2} dx &= \int \frac{d + ex + fx^2}{a + bx^2 + cx^4} dx \\
&= \int \frac{ex}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2}{a + bx^2 + cx^4} dx \\
&= e \int \frac{x}{a + bx^2 + cx^4} dx + \frac{1}{2} \left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \\
&= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} \\
&= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}}
\end{aligned}$$

Mathematica [A] time = 0.06, size = 234, normalized size = 1.11

$$\frac{\sqrt{2} \left(f \left(\sqrt{b^2 - 4ac} - b \right) + 2cd \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\sqrt{2} \left(f \left(\sqrt{b^2 - 4ac} + b \right) - 2cd \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} + e \log \left(\sqrt{b^2 - 4ac} - b - 2cx^2 \right) - e \log \left(\sqrt{b^2 - 4ac} + b + 2cx^2 \right)$$

Antiderivative was successfully verified.

[In] Integrate[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4)^2,x]

[Out] ((Sqrt[2]*(2*c*d + (-b + Sqrt[b^2 - 4*a*c])*f)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(Sqrt[c]*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[2]*(-2*c*d + (b + Sqrt[b^2 - 4*a*c])*f)*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(Sqrt[c]*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + e*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2] - e*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2]/(2*Sqrt[b^2 - 4*a*c])

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^2,x, algorithm="fricas")
```

[Out] Timed out

giac [B] time = 4.24, size = 1620, normalized size = 7.68

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^2,x, algorithm="giac")
```

```
[Out] -1/2*(b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sqrt(b^2 - 4*a*c)*e*log(x^2 + 1/2*(b + sqrt(b^2 - 4*a*c))/c)/((b^4 - 8*a*b^2*c - 2*b^3*c + 16*a^2*c^2 + 8*a*b*c^2 + b^2*c^2 - 4*a*c^3)*c^2) + 1/2*(b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*sqrt(b^2 - 4*a*c)*e*log(x^2 + 1/2*(b - sqrt(b^2 - 4*a*c))/c)/((b^4 - 8*a*b^2*c - 2*b^3*c + 16*a^2*c^2 + 8*a*b*c^2 + b^2*c^2 - 4*a*c^3)*c^2) + 1/4*((sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^4 - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b^2*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^3*c - 2*b^4*c + 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*c^2 + 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^2*c^2 + 16*a*b^2*c^2 + 2*b^3*c^2 - 4*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a*c^3 - 32*a^2*c^3 - 8*a*b*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^2*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b*c^2 + 2*(b^2 - 4*a*c)*b^2*c - 8*(b^2 - 4*a*c)*a*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*d - 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*f)*arctan(2*sqrt(1/2)*x/sqrt((b + sqrt(b^2 - 4*a*c))/c))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*abs(c)) + 1/4*((sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^4 - 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b^2*c - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^3*c + 2*b^4*c + 16*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a^2*c^2 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b*c^2 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^2*c^2 - 16*a*b^2*c^2 - 2*b^3*c^2 - 4*sq
```

```

rt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*c^3 + 32*a^2*c^3 + 8*a*b*c^3 + sqrt
(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^3 - 4*sqrt(2)*sqrt(
b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c - 2*sqrt(2)*sqrt(b^2 - 4
*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*b^2*c + sqrt(2)*sqrt(b^2 - 4*a*c)*sqr
t(b*c - sqrt(b^2 - 4*a*c)*c)*b*c^2 - 2*(b^2 - 4*a*c)*b^2*c + 8*(b^2 - 4*a*c
)*a*c^2 + 2*(b^2 - 4*a*c)*b*c^2)*d + 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*s
qrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b^2 + 4*sqrt(2)*sqrt(b^2
- 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*
c)*sqrt(b*c - sqrt(b^2 - 4*a*c)*c)*a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b
*c - sqrt(b^2 - 4*a*c)*c)*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*f)*arctan(2*sqrt(1
/2)*x/sqrt((b - sqrt(b^2 - 4*a*c))/c))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c +
16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*abs(c))

```

maple [B] time = 0.02, size = 616, normalized size = 2.92

$$\frac{2\sqrt{2} acf \operatorname{arctanh}\left(\frac{\sqrt{2} cx}{\sqrt{(-b+\sqrt{-4ac+b^2})c}}\right)}{(4ac-b^2)\sqrt{(-b+\sqrt{-4ac+b^2})c}} + \frac{2\sqrt{2} acf \operatorname{arctan}\left(\frac{\sqrt{2} cx}{\sqrt{(b+\sqrt{-4ac+b^2})c}}\right)}{(4ac-b^2)\sqrt{(b+\sqrt{-4ac+b^2})c}} + \frac{\sqrt{2} b^2 f \operatorname{arctanh}\left(\frac{\sqrt{2} cx}{\sqrt{(-b+\sqrt{-4ac+b^2})c}}\right)}{2(4ac-b^2)\sqrt{(-b+\sqrt{-4ac+b^2})c}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^2,x)

[Out]
$$-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*e*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})-2*c/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*f*a+1/2/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*f*b^2-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*f+c*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*d+1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*e*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})+2/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*a*c*f*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/2/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*b^2*f*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*b*f*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)+(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*d*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{cfx^6 + cex^5 + bex^3 + (cd + bf)x^4 + aex + (bd + af)x^2 + ad}{(cx^4 + bx^2 + a)^2} dx$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^2,x, algorithm="maxima")
```

```
[Out] integrate((c*f*x^6 + c*e*x^5 + b*e*x^3 + (c*d + b*f)*x^4 + a*e*x + (b*d + a*f)*x^2 + a*d)/(c*x^4 + b*x^2 + a)^2, x)
```

mupad [B] time = 1.17, size = 3942, normalized size = 18.68

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4)^2,x)
```

```
[Out] symsum(log(c^2*d*e^2 - c^2*d^2*f + c^2*e^3*x - a*c*f^3 - 8*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^3*b^3*c^2*x + b*c*d*f^2 - 16*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*a*c^3*d - 4*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*c^3*d^2*x + 4*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)
```



```

+ 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2
*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*
c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*
e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f
^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*a*c^2*e*f + b*c*e*f^2
*x - 2*c^2*d*e*f*x + 4*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c
^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*
a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2
+ 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z -
16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f
^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4,
z, k)*b*c^2*d*f*x)*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3
*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b
^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 +
4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16
*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3
+ b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z,
k), k, 1, 4)

```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)*x**4+c*e*x**5+c*f*x*
*6)/(c*x**4+b*x**2+a)**2,x)
```

[Out] Timed out

$$3.65 \quad \int \frac{ad+aux+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^3} dx$$

Optimal. Leaf size=368

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c} \left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} - 2af + bd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c} \left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b+\sqrt{b^2-4ac}}}$$

[Out] $-1/2*e*(2*c*x^2+b)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*x*(b^2*d-2*a*c*d-a*b*f+c*(-2*a*f+b*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+2*c*e*\operatorname{arctanh}((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/(-4*a*c+b^2)^{(3/2)}+1/4*\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)})/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)})*c^{(1/2)}*(b*d-2*a*f+(4*a*b*f-12*a*c*d+b^2*d)/(-4*a*c+b^2)^{(1/2)})/a/(-4*a*c+b^2)*2^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)}+1/4*\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)})/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)})*c^{(1/2)}*(b*d-2*a*f+(-4*a*b*f+12*a*c*d-b^2*d)/(-4*a*c+b^2)^{(1/2)})/a/(-4*a*c+b^2)*2^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)}$

Rubi [A] time = 0.92, antiderivative size = 368, normalized size of antiderivative = 1.00, number of steps used = 11, number of rules used = 10, integrand size = 63, $\frac{\text{number of rules}}{\text{integrand size}} = 0.159$, Rules used = {1586, 1673, 1178, 1166, 205, 12, 1107, 614, 618, 206}

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c} \left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} - 2af + bd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c} \left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b+\sqrt{b^2-4ac}}}$$

Antiderivative was successfully verified.

[In] $\operatorname{Int}[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4)^3, x]$

[Out] $-(e*(b + 2*c*x^2))/(2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (x*(b^2*d - 2*a*c*d - a*b*f + c*(b*d - 2*a*f)*x^2))/(2*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (\operatorname{Sqrt}[c]*(b*d - 2*a*f + (b^2*d - 12*a*c*d + 4*a*b*f)/\operatorname{Sqrt}[b^2 - 4*a*c]))*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]]/(2*\operatorname{Sqrt}[2]*a*(b^2 - 4*a*c)*\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]) + (\operatorname{Sqrt}[c]*(b*d - 2*a*f - (b^2*d - 12*a*c*d + 4*a*b*f)/\operatorname{Sqrt}[b^2 - 4*a*c]))*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]]/(2*\operatorname{Sqrt}[2]*a*(b^2 - 4*a*c)*\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]) + (2*c*e*\operatorname{ArcTanh}[(b + 2*c*x^2)/\operatorname{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c)^{(3/2)}$

Rule 12

`Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]`

Rule 205

`Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]`

Rule 206

`Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (GtQ[a, 0] || LtQ[b, 0])`

Rule 614

`Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p + 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]`

Rule 618

`Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]`

Rule 1107

`Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2, Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]`

Rule 1166

`Int[((d_) + (e_.)*(x_)^2)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2 - q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2 + c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]`

Rule 1178

`Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +`


```

c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]

```

Rule 1586

```

Int[(u_)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] := Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

```

Rule 1673

```

Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]

```

Rubi steps

$$\begin{aligned}
\int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{(a + bx^2 + cx^4)^3} dx &= \int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^2} dx \\
&= \int \frac{ex}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2}{(a + bx^2 + cx^4)^2} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{\int \dots}{\dots} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} e^{\dots} \\
&= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)}
\end{aligned}$$

Mathematica [A] time = 1.20, size = 398, normalized size = 1.08

$$\frac{1}{4} \left(\frac{2ab(e + fx) + 4acx(d + x(e + fx)) - 2bdx(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)} + \frac{\sqrt{2}\sqrt{c} \left(b(d\sqrt{b^2 - 4ac} + 4af) - 2a(f\sqrt{b^2 - 4ac} + 6cd) \right)}{a(b^2 - 4ac)^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} \right)$$

Antiderivative was successfully verified.

[In] Integrate[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4)^3,x]

[Out] ((2*a*b*(e + f*x) - 2*b*d*x*(b + c*x^2) + 4*a*c*x*(d + x*(e + f*x)))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)) + (Sqrt[2]*Sqrt[c]*(b^2*d + b*(Sqrt[b^2 -

$$4ac]d + 4af) - 2a(6cd + \sqrt{b^2 - 4ac})f) \operatorname{ArcTan}[(\sqrt{2}\sqrt{c}x)/\sqrt{b - \sqrt{b^2 - 4ac}}]/(a(b^2 - 4ac)^{3/2}\sqrt{b - \sqrt{b^2 - 4ac}}) + (\sqrt{2}\sqrt{c}(-b^2d) + 12acd + b\sqrt{b^2 - 4ac})d - 4abf - 2a\sqrt{b^2 - 4ac})f) \operatorname{ArcTan}[(\sqrt{2}\sqrt{c}x)/\sqrt{b + \sqrt{b^2 - 4ac}}]/(a(b^2 - 4ac)^{3/2}\sqrt{b + \sqrt{b^2 - 4ac}}) - (4c\operatorname{e}\operatorname{Log}[-b + \sqrt{b^2 - 4ac} - 2cx^2])/(b^2 - 4ac)^{3/2} + (4c\operatorname{e}\operatorname{Log}[b + \sqrt{b^2 - 4ac} + 2cx^2])/(b^2 - 4ac)^{3/2})/4$$

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^3,x, algorithm="fricas")

[Out] Timed out

giac [B] time = 11.93, size = 5164, normalized size = 14.03

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^3,x, algorithm="giac")

[Out] $\frac{1}{2}(b^2cdx^3 - 2acfx^3 - 2acx^2e + b^2dx - 2acd - abfx - abe)/((cx^4 + bx^2 + a)(ab^2 - 4a^2c)) + \frac{1}{16}((2b^3c^2 - 8ab^2c^3 - \sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc + \sqrt{b^2 - 4ac}})b^3 + 4\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc + \sqrt{b^2 - 4ac}})ab^2c + 2\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc + \sqrt{b^2 - 4ac}})b^2c - \sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc + \sqrt{b^2 - 4ac}})b^2c^2 - 2(b^2 - 4ac)b^2c^2)(ab^2 - 4a^2c)^2d - 2(2ab^2c^2 - 8a^2c^3 - \sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc + \sqrt{b^2 - 4ac}})ab^2 + 4\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc + \sqrt{b^2 - 4ac}})a^2c + 2\sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc + \sqrt{b^2 - 4ac}})ab^2c - \sqrt{2}\sqrt{b^2 - 4ac})\sqrt{bc + \sqrt{b^2 - 4ac}})a^2c^2 - 2(b^2 - 4ac)a^2c^2)(ab^2 - 4a^2c)^2f + 2(\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})ab^6 - 14\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})a^2b^4c - 2\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})ab^5c - 2ab^6c + 64\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})a^3b^2c^2 + 20\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})a^2b^3c^2 + \sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})ab^4c^2 + 28a^2b^4c^2 - 96\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})a^4c^3 - 48\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})a^3b^2c^3 - 10\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})a^2b^2c^3 - 128a^3b^2c^3 + 24\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})a^3c^4 + 192a^4c^4 + 2(b^2 -$

$$\begin{aligned}
& 4*a*c)*a*b^4*c - 20*(b^2 - 4*a*c)*a^2*b^2*c^2 + 48*(b^2 - 4*a*c)*a^3*c^3)* \\
& d*abs(a*b^2 - 4*a^2*c) + 2*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*b^5 \\
& - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^3*b^3*c - 2*sqrt(2)*sqrt(b*c \\
& + sqrt(b^2 - 4*a*c))*a^2*b^4*c - 2*a^2*b^5*c + 16*sqrt(2)*sqrt(b*c + sqrt \\
& t(b^2 - 4*a*c))*a^4*b*c^2 + 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^3 \\
& *b^2*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*b^3*c^2 + 16*a^3*b^3 \\
& *c^2 - 4*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^3*b*c^3 - 32*a^4*b*c^3 + \\
& 2*(b^2 - 4*a*c)*a^2*b^3*c - 8*(b^2 - 4*a*c)*a^3*b*c^2)*f*abs(a*b^2 - 4*a^2 \\
& *c) + (2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b^3*c^4 - 384*a^5*b*c^5 - s \\
& qrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*b^7 + 20*sqrt(\\
& 2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^3*b^5*c + 2*sqrt(2)* \\
& sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*b^6*c - 112*sqrt(2)*s \\
& qrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^4*b^3*c^2 - 32*sqrt(2)*s \\
& qrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^3*b^4*c^2 - sqrt(2)*sqrt \\
& (b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*b^5*c^2 + 192*sqrt(2)*sqr \\
& t(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^5*b*c^3 + 96*sqrt(2)*sqrt(\\
& b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^4*b^2*c^3 + 16*sqrt(2)*sqrt(\\
& b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^3*b^3*c^3 - 48*sqrt(2)*sqrt(\\
& b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^4*b*c^4 - 2*(b^2 - 4*a*c)*a^ \\
& 2*b^5*c^2 + 32*(b^2 - 4*a*c)*a^3*b^3*c^3 - 96*(b^2 - 4*a*c)*a^4*b*c^4)*d + \\
& 4*(2*a^3*b^6*c^2 - 16*a^4*b^4*c^3 + 32*a^5*b^2*c^4 - sqrt(2)*sqrt(b^2 - 4*a \\
& *c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^3*b^6 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*s \\
& qrt(b*c + sqrt(b^2 - 4*a*c))*a^4*b^4*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt \\
& (b*c + sqrt(b^2 - 4*a*c))*a^3*b^5*c - 16*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b \\
& *c + sqrt(b^2 - 4*a*c))*a^5*b^2*c^2 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b* \\
& c + sqrt(b^2 - 4*a*c))*a^4*b^3*c^2 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + \\
& sqrt(b^2 - 4*a*c))*a^3*b^4*c^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + \\
& sqrt(b^2 - 4*a*c))*a^4*b^2*c^3 - 2*(b^2 - 4*a*c)*a^3*b^4*c^2 + 8*(b^2 - 4 \\
& *a*c)*a^4*b^2*c^3)*f)*arctan(2*sqrt(1/2)*x/sqrt((a*b^3 - 4*a^2*b*c + sqrt((\\
& a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2))))/(a*b^2 \\
& *c - 4*a^2*c^2)))/((a^3*b^6 - 12*a^4*b^4*c - 2*a^3*b^5*c + 48*a^5*b^2*c^2 + \\
& 16*a^4*b^3*c^2 + a^3*b^4*c^2 - 64*a^6*c^3 - 32*a^5*b*c^3 - 8*a^4*b^2*c^3 + \\
& 16*a^5*c^4)*abs(a*b^2 - 4*a^2*c)*abs(c)) - 1/16*((2*b^3*c^2 - 8*a*b*c^3 - \\
& sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^3 + 4*sqrt(2)*s \\
& qrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b*c + 2*sqrt(2)*sqrt(b^2 \\
& - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^2*c - sqrt(2)*sqrt(b^2 - 4*a*c) \\
& *sqrt(b*c - sqrt(b^2 - 4*a*c))*b*c^2 - 2*(b^2 - 4*a*c)*b*c^2)*(a*b^2 - 4* \\
& a^2*c)^2*d - 2*(2*a*b^2*c^2 - 8*a^2*c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b* \\
& c - sqrt(b^2 - 4*a*c))*a*b^2 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqr \\
& t(b^2 - 4*a*c))*a^2*c + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - \\
& 4*a*c))*a*b*c - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c \\
&)*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*(a*b^2 - 4*a^2*c)^2*f - 2*(sqrt(2)*sqrt(b* \\
& c - sqrt(b^2 - 4*a*c))*a*b^6 - 14*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*c \\
& *a^2*b^4*c - 2*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b^5*c + 2*a*b^6*c \\
& + 64*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a^3*b^2*c^2 + 20*sqrt(2)*sqrt(
\end{aligned}$$

$$\begin{aligned}
& b*c - \sqrt{b^2 - 4*a*c}*c)*a^2*b^3*c^2 + \sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& c)*a*b^4*c^2 - 28*a^2*b^4*c^2 - 96*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& c)*a^4*c^3 - 48*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^3*b*c^3 - 10*\sqrt{2} \\
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^2*c^3 + 128*a^3*b^2*c^3 + 24*\sqrt{2} \\
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^3*c^4 - 192*a^4*c^4 - 2*(b^2 - 4*a*c) \\
& *a*b^4*c + 20*(b^2 - 4*a*c)*a^2*b^2*c^2 - 48*(b^2 - 4*a*c)*a^3*c^3)*d*abs(a \\
& *b^2 - 4*a^2*c) - 2*(\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^5 - 8*\sqrt{2} \\
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^3*b^3*c - 2*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& a^2*b^4*c + 2*a^2*b^5*c + 16*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^4*b*c^2 + 8*\sqrt{2} \\
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^3*b^2*c^2 + \sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^3*c^2 - 16*a^3*b^3*c^2 - \\
& 4*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^3*b*c^3 + 32*a^4*b*c^3 - 2*(b^2 \\
& - 4*a*c)*a^2*b^3*c + 8*(b^2 - 4*a*c)*a^3*b*c^2)*f*abs(a*b^2 - 4*a^2*c) + (\\
& 2*a^2*b^7*c^2 - 40*a^3*b^5*c^3 + 224*a^4*b^3*c^4 - 384*a^5*b*c^5 - \sqrt{2}*\sqrt{b^2 - 4*a*c} \\
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^7 + 20*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& a^3*b^5*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^6*c - 112*\sqrt{2}*\sqrt{b^2 - 4*a*c} \\
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^4*b^3*c^2 - 32*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& a^3*b^4*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^5*c^2 + 192*\sqrt{2}*\sqrt{b^2 - 4*a*c} \\
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^5*b*c^3 + 96*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& a^4*b^2*c^3 + 16*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^3*b^3*c^3 - 48*\sqrt{2}*\sqrt{b^2 - 4*a*c} \\
& \sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^4*b*c^4 - 2*(b^2 - 4*a*c)*a^2*b^5*c^2 + 32*(b^2 - 4*a*c)*a^3*b^3*c^3 - 96*(b^2 - 4*a*c) \\
& a^4*b*c^4)*d + 4*(2*a^3*b^6*c^2 - 16*a^4*b^4*c^3 + 32*a^5*b^2*c^4 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& a^3*b^6 + 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^4*b^4*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& a^3*b^5*c - 16*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^5*b^2*c^2 - 8*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& a^4*b^3*c^2 - \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}*a^3*b^4*c^2 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& a^4*b^2*c^3 - 2*(b^2 - 4*a*c)*a^3*b^4*c^2 + 8*(b^2 - 4*a*c)*a^4*b^2*c^3)*f)*arctan(2*\sqrt{1/2}*x/\sqrt{((a*b^3 - 4*a^2*b*c - \sqrt{((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2))})/(a*b^2*c - 4*a^2*c^2))})/((a^3*b^6 - 12*a^4*b^4*c - 2*a^3*b^5*c + 48*a^5*b^2*c^2 + 16*a^4*b^3*c^2 + a^3*b^4*c^2 - 64*a^6*c^3 - 32*a^5*b*c^3 - 8*a^4*b^2*c^3 + 16*a^5*c^4)*abs(a*b^2 - 4*a^2*c)*abs(c)) - 1/4*((b^3*c^2 - 4*a*b*c^3 - 2*b^2*c^3 + b*c^4 + (b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*\sqrt{b^2 - 4*a*c})*abs(a*b^2 - 4*a^2*c)*e - (a*b^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 + (a*b^4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^2*c^4)*\sqrt{b^2 - 4*a*c}))*e)*log(x^2 + 1/2*(a*b^3 - 4*a^2*b*c + \sqrt{((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2))})/(a*b^2*c - 4*a^2*c^2)))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(a*b^2 - 4*a^2*c)) - 1/4*((b^3*c^2
\end{aligned}$$

$$2 - 4*a*b*c^3 - 2*b^2*c^3 + b*c^4 - (b^2*c^2 - 4*a*c^3 - 2*b*c^3 + c^4)*\sqrt{b^2 - 4*a*c})*abs(a*b^2 - 4*a^2*c)*e - (a*b^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 - (a*b^4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^2*c^4)*\sqrt{b^2 - 4*a*c})*e)*\log(x^2 + 1/2*(a*b^3 - 4*a^2*b*c - \sqrt{(a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)}*(a*b^2*c - 4*a^2*c^2)))/(a*b^2*c - 4*a^2*c^2))/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*abs(a*b^2 - 4*a^2*c))$$

maple [B] time = 0.14, size = 1813, normalized size = 4.93

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^3,x)$

[Out] $-1/4/(4*a*c-b^2)^{2*2^{(1/2)}}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)}/a*b^2*c*d*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/4*c/(4*a*c-b^2)^{2/a^2^{(1/2)}}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*d-1/2/(4*a*c-b^2)^{2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)*b^2*e-1/2/(4*a*c-b^2)^{2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*b^2*e-c/(4*a*c-b^2)^{2*2^{(1/2)}}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b*f-1/(4*a*c-b^2)^{2*2^{(1/2)}}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)}*b*c*f*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-2*c^2/(4*a*c-b^2)^{2*a^2^{(1/2)}}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*f+1/2*c/(4*a*c-b^2)^{2*2^{(1/2)}}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^2*f+2/(4*a*c-b^2)^{2*2^{(1/2)}}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*a*c^2*f*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/2/(4*a*c-b^2)^{2*2^{(1/2)}}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*b^2*c*f*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)+2/(4*a*c-b^2)^{2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)*a*c*f*x+2/(4*a*c-b^2)^{2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*a*c*f*x-1/4*c/(4*a*c-b^2)^{2/a^2^{(1/2)}}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b^3*d-1/2/(4*a*c-b^2)^{2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*b^2*f*x+1/(4*a*c-b^2)^{2*(-4*a*c+b^2)^{(1/2)}*c*e*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})+2/(4*a*c-b^2)^{2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*a*c*e-1/(4*a*c-b^2)^{2*(-4*a*c+b^2)^{(1/2)}*c*e*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})}-1/4/(4*a*c-b^2)^{2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)*(-4*a*c+b^2)^{(1/2)}/a*b^2*d*x+3/(4*a*c-b^2)^{2*2^{(1/2)}}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)}*c^2*d*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/(4*a*c-b^2)^{2*2^{(1/2)}}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*b*c^2*d*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)+1/4/(4*a*c-b^2)^{2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*(-4*a*c+b^2)^{(1/2)}}$

$$\begin{aligned} & /a*b^2*d*x+3*c^2/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*a \\ & rctanh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*d+ \\ & c^2/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*arctanh(2^{(1/2)} \\ & /((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*d+1/4/(4*a*c-b^2)^2*2^{(1/2)}/((b+(- \\ & -4*a*c+b^2)^{(1/2)})*c)^{(1/2)}/a*b^3*c*d*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)} \\ &)*c)^{(1/2)}*c*x)+2/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)*a*c* \\ & e^{-1/2}/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)*b^2*f*x+1/(4*a*c \\ & -b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)*(-4*a*c+b^2)^{(1/2)}*c*d*x-1/(\\ & 4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)*b*c*d*x+1/4/(4*a*c-b^2) \\ & ^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)/a*b^3*d*x-1/(4*a*c-b^2)^2/(x^2+1/ \\ & 2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*(-4*a*c+b^2)^{(1/2)}*c*d*x-1/(4*a*c-b^2)^2/(x \\ & ^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*b*c*d*x+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c \\ & -1/2*(-4*a*c+b^2)^{(1/2)}/c)/a*b^3*d*x \end{aligned}$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^3,x, algorithm="maxima")

[Out]
$$-1/2*(2*a*c*e*x^2 - (b*c*d - 2*a*c*f)*x^3 + a*b*e + (a*b*f - (b^2 - 2*a*c)*d)*x)/((a*b^2*c - 4*a^2*c^2)*x^4 + a^2*b^2 - 4*a^3*c + (a*b^3 - 4*a^2*b*c)*x^2) - 1/2*integrate((4*a*c*e*x - a*b*f - (b*c*d - 2*a*c*f)*x^2 - (b^2 - 6*a*c)*d)/(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c)$$

mupad [B] time = 1.52, size = 4707, normalized size = 12.79

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4)^3,x)

[Out]
$$\begin{aligned} & \text{symsum}(\log((5*b^3*c^4*d^3 + 8*a^3*c^4*f^3 - 96*a^2*c^5*d*e^2 + 72*a^2*c^5*d \\ & ^2*f - 3*b^4*c^3*d^2*f + 6*a^2*b^2*c^3*f^3 - 36*a*b*c^5*d^3 + 16*a*b^2*c^4* \\ & d*e^2 + 18*a*b^2*c^4*d^2*f + 3*a*b^3*c^3*d*f^2 - 60*a^2*b*c^4*d*f^2 + 16*a^ \\ & 2*b*c^4*e^2*f)/(8*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2)) - \\ & \text{root}(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3 \\ & *z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - \\ & 256*a^3*b^12*z^4 + 576*a^2*b^8*c*d*f*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072 \\ & *a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*c^4*f^2*z^2 + \\ & 61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 81 \\ & 92*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z \end{aligned}$$

$$\begin{aligned}
&^2 - 6144a^4b^4c^3e^2z^2 + 512a^3b^6c^2e^2z^2 - 61440a^4b^3c^4 \\
&*d^2z^2 + 24064a^3b^5c^3d^2z^2 - 4608a^2b^7c^2d^2z^2 - 32a^*b^{10} \\
&*d*f*z^2 - 32768a^6c^5e^2z^2 - 16a^2b^9f^2z^2 - 16b^{11}d^2z^2 - 4 \\
&096a^4b*c^4d*e*f*z + 64a*b^7c*d*e*f*z + 3072a^3b^3c^3d*e*f*z - 768 \\
&*a^2b^5c^2d*e*f*z + 32a^2b^6c*c*e*f^2*z - 672a*b^6c^2d^2e*z + 1536* \\
&a^4b^2c^3e*f^2*z - 384a^3b^4c^2e*f^2*z - 15872a^3b^2c^4d^2e*z + \\
&4992a^2b^4c^3d^2e*z - 2048a^5c^4e*f^2*z + 18432a^4c^5d^2e*z + \\
&32b^8c*d^2e*z - 32a*b^4c^2d*e^2*f + 192a^2b^2c^3d*e^2*f - 192a^3 \\
&*b*c^3e^2*f^2 + 198a*b^4c^2d^2*f^2 + 144a^2b^3c^2d*f^3 - 960a^2b* \\
&c^4d^2e^2 + 240a*b^3c^3d^2e^2 + 768a^3c^4d*e^2*f + 2016a^2b*c^4* \\
&d^3*f - 496a*b^3c^3d^3*f + 224a^3b*c^3d*f^3 - 16a^2b^3c^2e^2*f^2 \\
&- 960a^2b^2c^3d^2*f^2 - 18a*b^5c*d*f^3 - 288a^3c^4d^2*f^2 - 16b^5 \\
&*c^2d^2e^2 - 24a^3b^2c^2*f^4 + 30b^5c^2d^3*f - 9b^6c*d^2*f^2 - 9* \\
&a^2b^4c*f^4 + 360a*b^2c^4d^4 - 16a^4c^3*f^4 - 256a^3c^4e^4 - 25b \\
&^4c^3d^4 - 1296a^2c^5d^4, z, k)*((32a*b^5c^3d*e - 512a^4c^5e*f + \\
&1024a^3b*c^5d*e - 384a^2b^3c^4d*e + 32a^2b^4c^3e*f)/(8*(a^2b^6 \\
&- 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) + \text{root}(1572864a^8b^2c^5* \\
&z^4 - 983040a^7b^4c^4z^4 + 327680a^6b^6c^3z^4 - 61440a^5b^8c^2z \\
&^4 + 6144a^4b^{10}c*z^4 - 1048576a^9c^6z^4 - 256a^3b^{12}z^4 + 576a^2 \\
&*b^8c*d*f*z^2 + 24576a^5b^2c^4d*f*z^2 - 3072a^3b^6c^2d*f*z^2 + 204 \\
&8a^4b^4c^3d*f*z^2 + 12288a^6b*c^4f^2z^2 + 61440a^5b*c^5d^2z^2 - \\
&49152a^6c^5d*f*z^2 + 432a*b^9c*d^2z^2 - 8192a^5b^3c^3f^2z^2 + 1 \\
&536a^4b^5c^2f^2z^2 + 24576a^5b^2c^4e^2z^2 - 6144a^4b^4c^3e^2* \\
&z^2 + 512a^3b^6c^2e^2z^2 - 61440a^4b^3c^4d^2z^2 + 24064a^3b^5c \\
&^3d^2z^2 - 4608a^2b^7c^2d^2z^2 - 32a*b^{10}d*f*z^2 - 32768a^6c^5e \\
&^2z^2 - 16a^2b^9f^2z^2 - 16b^{11}d^2z^2 - 4096a^4b*c^4d*e*f*z + 64 \\
&*a*b^7c*d*e*f*z + 3072a^3b^3c^3d*e*f*z - 768a^2b^5c^2d*e*f*z + 32* \\
&a^2b^6c*c*e*f^2*z - 672a*b^6c^2d^2e*z + 1536a^4b^2c^3e*f^2*z - 384* \\
&a^3b^4c^2e*f^2*z - 15872a^3b^2c^4d^2e*z + 4992a^2b^4c^3d^2e*z \\
&- 2048a^5c^4e*f^2*z + 18432a^4c^5d^2e*z + 32b^8c*d^2e*z - 32a*b^ \\
&4c^2d*e^2*f + 192a^2b^2c^3d*e^2*f - 192a^3b*c^3e^2*f^2 + 198a*b^4 \\
&*c^2d^2*f^2 + 144a^2b^3c^2d*f^3 - 960a^2b*c^4d^2e^2 + 240a*b^3c^ \\
&3d^2e^2 + 768a^3c^4d*e^2*f + 2016a^2b*c^4d^3*f - 496a*b^3c^3d^3* \\
&>f + 224a^3b*c^3d*f^3 - 16a^2b^3c^2e^2*f^2 - 960a^2b^2c^3d^2*f^2 \\
&- 18a*b^5c*d*f^3 - 288a^3c^4d^2*f^2 - 16b^5c^2d^2e^2 - 24a^3b^2* \\
&c^2*f^4 + 30b^5c^2d^3*f - 9b^6c*d^2*f^2 - 9a^2b^4c*f^4 + 360a*b^2* \\
&c^4d^4 - 16a^4c^3*f^4 - 256a^3c^4e^4 - 25b^4c^3d^4 - 1296a^2c^5* \\
&d^4, z, k)*((x*(1024a^5c^6e - 16a^2b^6c^3e + 192a^3b^4c^4e - 768 \\
&*a^4b^2c^5e))/(2*(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4b^2c^2)) \\
&- (6144a^5c^6d - 288a^2b^6c^3d + 1920a^3b^4c^4d - 5632a^4b^2* \\
&c^5d + 16a^2b^7c^2f - 192a^3b^5c^3f + 768a^4b^3c^4f + 16a*b^8 \\
&*c^2d - 1024a^5b*c^5f)/(8*(a^2b^6 - 64a^5c^3 - 12a^3b^4c + 48a^4 \\
&*b^2c^2)) + (\text{root}(1572864a^8b^2c^5z^4 - 983040a^7b^4c^4z^4 + 32768 \\
&0a^6b^6c^3z^4 - 61440a^5b^8c^2z^4 + 6144a^4b^{10}c*z^4 - 1048576a \\
&^9c^6z^4 - 256a^3b^{12}z^4 + 576a^2b^8c*d*f*z^2 + 24576a^5b^2c^4d
\end{aligned}$$

$$\begin{aligned}
& *f*z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*c^4*f^2*z^2 + 61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8192*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^10*d*f*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 - 4096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 3072*a^3*b^3*c^3*d*e*f*z - 768*a^2*b^5*c^2*d*e*f*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 1536*a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 32*a*b^4*c^2*d*e^2*f + 192*a^2*b^2*c^3*d*e^2*f - 192*a^3*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 2016*a^2*b*c^4*d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 16*a^2*b^3*c^2*e^2*f^2 - 960*a^2*b^2*c^3*d^2*f^2 - 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2*f^2 - 16*b^5*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9*a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 16*a^4*c^3*f^4 - 256*a^3*c^4*e^4 - 25*b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k)*x*(4096*a^6*b*c^6 + 16*a^2*b^9*c^2 - 256*a^3*b^7*c^3 + 1536*a^4*b^5*c^4 - 4096*a^5*b^3*c^5))/(2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) + (x*(b^6*c^3*d^2 - 288*a^3*c^6*d^2 + 32*a^4*c^5*f^2 - 18*a*b^4*c^4*d^2 + 64*a^3*b*c^5*e^2 + 128*a^2*b^2*c^5*d^2 - 16*a^2*b^3*c^4*e^2 + 10*a^2*b^4*c^3*f^2 - 48*a^3*b^2*c^4*f^2 + 2*a*b^5*c^3*d*f + 160*a^3*b*c^5*d*f - 48*a^2*b^3*c^4*d*f))/(2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) - (x*(16*a^2*c^5*e^3 - b^3*c^4*d^2*e + 12*a*b*c^5*d^2*e - 24*a^2*c^5*d*e*f + 8*a^2*b*c^4*e*f^2 - 2*a*b^2*c^4*d*e*f))/(2*(a^2*b^6 - 64*a^5*c^3 - 12*a^3*b^4*c + 48*a^4*b^2*c^2))) *root(1572864*a^8*b^2*c^5*z^4 - 983040*a^7*b^4*c^4*z^4 + 327680*a^6*b^6*c^3*z^4 - 61440*a^5*b^8*c^2*z^4 + 6144*a^4*b^10*c*z^4 - 1048576*a^9*c^6*z^4 - 256*a^3*b^12*z^4 + 576*a^2*b^8*c*d*f*z^2 + 24576*a^5*b^2*c^4*d*f*z^2 - 3072*a^3*b^6*c^2*d*f*z^2 + 2048*a^4*b^4*c^3*d*f*z^2 + 12288*a^6*b*c^4*f^2*z^2 + 61440*a^5*b*c^5*d^2*z^2 - 49152*a^6*c^5*d*f*z^2 + 432*a*b^9*c*d^2*z^2 - 8192*a^5*b^3*c^3*f^2*z^2 + 1536*a^4*b^5*c^2*f^2*z^2 + 24576*a^5*b^2*c^4*e^2*z^2 - 6144*a^4*b^4*c^3*e^2*z^2 + 512*a^3*b^6*c^2*e^2*z^2 - 61440*a^4*b^3*c^4*d^2*z^2 + 24064*a^3*b^5*c^3*d^2*z^2 - 4608*a^2*b^7*c^2*d^2*z^2 - 32*a*b^10*d*f*z^2 - 32768*a^6*c^5*e^2*z^2 - 16*a^2*b^9*f^2*z^2 - 16*b^11*d^2*z^2 - 4096*a^4*b*c^4*d*e*f*z + 64*a*b^7*c*d*e*f*z + 3072*a^3*b^3*c^3*d*e*f*z - 768*a^2*b^5*c^2*d*e*f*z + 32*a^2*b^6*c*e*f^2*z - 672*a*b^6*c^2*d^2*e*z + 1536*a^4*b^2*c^3*e*f^2*z - 384*a^3*b^4*c^2*e*f^2*z - 15872*a^3*b^2*c^4*d^2*e*z + 4992*a^2*b^4*c^3*d^2*e*z - 2048*a^5*c^4*e*f^2*z + 18432*a^4*c^5*d^2*e*z + 32*b^8*c*d^2*e*z - 32*a*b^4*c^2*d*e^2*f + 192*a^2*b^2*c^3*d*e^2*f - 192*a^3*b*c^3*e^2*f^2 + 198*a*b^4*c^2*d^2*f^2 + 144*a^2*b^3*c^2*d*f^3 - 960*a^2*b*c^4*d^2*e^2 + 240*a*b^3*c^3*d^2*e^2 + 768*a^3*c^4*d*e^2*f + 2016*a^2*b*c^4*d^3*f - 496*a*b^3*c^3*d^3*f + 224*a^3*b*c^3*d*f^3 - 16*a^2*b^3*c^2*e^2*f^2 - 960*a^2*b^2*c^3*d^2*f^2 - 18*a*b^5*c*d*f^3 - 288*a^3*c^4*d^2*f^2 - 16*b^5*c^2*d^2*e^2 - 24*a^3*b^2*c^2*f^4 + 30*b^5*c^2*d^3*f - 9*b^6*c*d^2*f^2 - 9
\end{aligned}$$

```
*a^2*b^4*c*f^4 + 360*a*b^2*c^4*d^4 - 16*a^4*c^3*f^4 - 256*a^3*c^4*e^4 - 25*
b^4*c^3*d^4 - 1296*a^2*c^5*d^4, z, k), k, 1, 4) + ((b*e)/(2*(4*a*c - b^2))
+ (c*e*x^2)/(4*a*c - b^2) + (x*(2*a*c*d - b^2*d + a*b*f))/(2*a*(4*a*c - b^2
)) - (c*x^3*(b*d - 2*a*f))/(2*a*(4*a*c - b^2)))/(a + b*x^2 + c*x^4)
```

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)*x**4+c*e*x**5+c*f*x*
*6)/(c*x**4+b*x**2+a)**3,x)
```

[Out] Timed out

$$3.66 \quad \int \frac{ad+aux+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^4} dx$$

Optimal. Leaf size=621

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d \right) \sqrt{c} \left(-\frac{-52a^2bcf+168a^2c^2d}{\sqrt{b}} \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)} +$$

[Out] $-1/4 * e * (2 * c * x^2 + b) / (-4 * a * c + b^2) / (c * x^4 + b * x^2 + a)^2 + 1/4 * x * (b^2 * d - 2 * a * c * d - a * b * f + c * (-2 * a * f + b * d) * x^2) / a / (-4 * a * c + b^2) / (c * x^4 + b * x^2 + a)^2 + 3/2 * c * e * (2 * c * x^2 + b) / (-4 * a * c + b^2)^2 / (c * x^4 + b * x^2 + a) + 1/8 * x * (3 * b^4 * d - 25 * a * b^2 * c * d + 28 * a^2 * c^2 * d + a * b^3 * f + 8 * a^2 * b * c * f + c * (20 * a^2 * c * f + a * b^2 * f - 24 * a * b * c * d + 3 * b^3 * d) * x^2) / a^2 / (-4 * a * c + b^2)^2 / (c * x^4 + b * x^2 + a) - 6 * c^2 * e * \operatorname{arctanh}((2 * c * x^2 + b) / (-4 * a * c + b^2)^{(1/2)}) / (-4 * a * c + b^2)^{(5/2)} + 1/16 * \operatorname{arctan}(x * 2^{(1/2)} * c^{(1/2)} / (b - (-4 * a * c + b^2)^{(1/2)})^{(1/2)}) * c^{(1/2)} * (3 * b^4 * d + b^3 * (a * f + 3 * d * (-4 * a * c + b^2)^{(1/2)}) - 4 * a * b * c * (13 * a * f + 6 * d * (-4 * a * c + b^2)^{(1/2)}) - a * b^2 * (30 * c * d - f * (-4 * a * c + b^2)^{(1/2)}) + 4 * a^2 * c * (42 * c * d + 5 * f * (-4 * a * c + b^2)^{(1/2)})) / a^2 / (-4 * a * c + b^2)^{(5/2)} * 2^{(1/2)} / (b - (-4 * a * c + b^2)^{(1/2)})^{(1/2)} + 1/16 * \operatorname{arctan}(x * 2^{(1/2)} * c^{(1/2)} / (b + (-4 * a * c + b^2)^{(1/2)})^{(1/2)}) * c^{(1/2)} * (3 * b^3 * d - 24 * a * b * c * d + a * b^2 * f + 20 * a^2 * c * f + (52 * a^2 * b * c * f - 168 * a^2 * c^2 * d - a * b^3 * f + 30 * a * b^2 * c * d - 3 * b^4 * d) / (-4 * a * c + b^2)^{(1/2)}) / a^2 / (-4 * a * c + b^2)^2 * 2^{(1/2)} / (b + (-4 * a * c + b^2)^{(1/2)})^{(1/2)}$

Rubi [A] time = 4.59, antiderivative size = 621, normalized size of antiderivative = 1.00, number of steps used = 13, number of rules used = 10, integrand size = 63, $\frac{\text{number of rules}}{\text{integrand size}} = 0.159$, Rules used = {1586, 1673, 1178, 1166, 205, 12, 1107, 614, 618, 206}

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d - 25ab^2cd + ab^3f + 3b^4d \right) \sqrt{c} \left(-\frac{-52a^2bcf+168a^2c^2d}{\sqrt{b}} \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)} +$$

Antiderivative was successfully verified.

[In] $\operatorname{Int}[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4)^4, x]$

[Out] $-(e * (b + 2 * c * x^2)) / (4 * (b^2 - 4 * a * c) * (a + b * x^2 + c * x^4)^2) + (x * (b^2 * d - 2 * a * c * d - a * b * f + c * (b * d - 2 * a * f) * x^2)) / (4 * a * (b^2 - 4 * a * c) * (a + b * x^2 + c * x^4)^2) + (3 * c * e * (b + 2 * c * x^2)) / (2 * (b^2 - 4 * a * c)^2 * (a + b * x^2 + c * x^4)) + (x * (3 * b^4 * d - 25 * a * b^2 * c * d + 28 * a^2 * c^2 * d + a * b^3 * f + 8 * a^2 * b * c * f + c * (3 * b^3 * d - 24 * a * b * c * d + a * b^2 * f + 20 * a^2 * c * f) * x^2)) / (8 * a^2 * (b^2 - 4 * a * c)^2 * (a + b * x^2 + c * x^4)^2)$

$$2 + c*x^4)) + (\text{Sqrt}[c]*(3*b^4*d + b^3*(3*\text{Sqrt}[b^2 - 4*a*c]*d + a*f) - 4*a*b*c*(6*\text{Sqrt}[b^2 - 4*a*c]*d + 13*a*f) - a*b^2*(30*c*d - \text{Sqrt}[b^2 - 4*a*c]*f) + 4*a^2*c*(42*c*d + 5*\text{Sqrt}[b^2 - 4*a*c]*f))*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]])/(8*\text{Sqrt}[2]*a^2*(b^2 - 4*a*c)^{(5/2)}*\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) + (\text{Sqrt}[c]*(3*b^3*d - 24*a*b*c*d + a*b^2*f + 20*a^2*c*f - (3*b^4*d - 30*a*b^2*c*d + 168*a^2*c^2*d + a*b^3*f - 52*a^2*b*c*f)/\text{Sqrt}[b^2 - 4*a*c]))*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]])/(8*\text{Sqrt}[2]*a^2*(b^2 - 4*a*c)^2*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) - (6*c^2*e*\text{ArcTanh}[(b + 2*c*x^2)/\text{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c)^{(5/2)}$$
Rule 12

```
Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]
```

Rule 205

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(Rt[a/b, 2]*ArcTan[x/Rt[a/b, 2]])/a, x] /; FreeQ[{a, b}, x] && PosQ[a/b]
```

Rule 206

```
Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (GtQ[a, 0] || LtQ[b, 0])
```

Rule 614

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] - Dist[(2*c*(2*p + 3))/((p + 1)*(b^2 - 4*a*c)), Int[(a + b*x + c*x^2)^(p + 1), x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4*p]
```

Rule 618

```
Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-1), x_Symbol] := Dist[-2, Subst[Int[1/Simp[b^2 - 4*a*c - x^2, x], x], x, b + 2*c*x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]
```

Rule 1107

```
Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2, Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]
```

Rule 1166

```
Int[((d_) + (e_)*(x_)^2)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] :
> With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[e/2 + (2*c*d - b*e)/(2*q), Int[1/(b/2
- q/2 + c*x^2), x], x] + Dist[e/2 - (2*c*d - b*e)/(2*q), Int[1/(b/2 + q/2
+ c*x^2), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && Ne
Q[c*d^2 - a*e^2, 0] && PosQ[b^2 - 4*a*c]
```

Rule 1178

```
Int[((d_) + (e_)*(x_)^2)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symb
ol] :> Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1586

```
Int[(u_)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] :> Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] :> Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{(a + bx^2 + cx^4)^4} dx &= \int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^3} dx \\
&= \int \frac{ex}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{\int \frac{d + fx^2}{(a + bx^2 + cx^4)^3} dx}{4a(b^2 - 4ac)} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(3e - 2fx)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2}
\end{aligned}$$

Mathematica [A] time = 3.58, size = 625, normalized size = 1.01

$$\frac{1}{16} \left(\frac{8a^2c(b(3e + 2fx) + cx(7d + 6ex + 5fx^2)) + 2abx(b^2f - 25bcd + bcfx^2 - 24c^2dx^2) + 6b^3dx(b + cx^2)}{a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)} + \frac{\sqrt{2}}{4a(b^2 - 4ac)} \right)$$

Antiderivative was successfully verified.

```
[In] Integrate[(a*d + a*e*x + (b*d + a*f)*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4)^4,x]
```

```
[Out] ((4*a*b*(e + f*x) - 4*b*d*x*(b + c*x^2) + 8*a*c*x*(d + x*(e + f*x)))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (6*b^3*d*x*(b + c*x^2) + 2*a*b*x*(-25*b*c*d + b^2*f - 24*c^2*d*x^2 + b*c*f*x^2) + 8*a^2*c*(b*(3*e + 2*f*x) + c*x*(7*d + 6*e*x + 5*f*x^2)))/(a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (Sqrt[2]*Sqrt[c]*(3*b^4*d + b^3*(3*Sqrt[b^2 - 4*a*c]*d + a*f) - 4*a*b*c*(6*Sqrt[b^2 - 4*a*c]*d + 13*a*f) + a*b^2*(-30*c*d + Sqrt[b^2 - 4*a*c]*f) + 4*a^2*c*(42*c*d + 5*Sqrt[b^2 - 4*a*c]*f))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]]/(a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + (Sqrt[2]*Sqrt[c]*(-3*b^4*d + b^3*(3*Sqrt[b^2 - 4*a*c]*d - a*f) + 4*a*b*c*(-6*Sqrt[b^2 - 4*a*c]*d + 13*a*f) + a*b^2*(30*c*d + Sqrt[b^2 - 4*a*c]*f) + 4*a^2*c*(-42*c*d + 5*Sqrt[b^2 - 4*a*c]*f))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]]/(a^2*(b^2 - 4*a*c)^(5/2)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + (48*c^2*e*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(5/2) - (48*c^2*e*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(5/2))/16
```

fricas [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^4,x, algorithm="fricas")
```

```
[Out] Timed out
```

giac [B] time = 6.43, size = 5288, normalized size = 8.52

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^4,x, algorithm="giac")
```

```
[Out] -3*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*a*c)*e*log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3))/((b^8 - 16*a*b^6*c - 2*b^7*c + 96*a^2*b^4*c^2 + 24*a*b^5*c^2 + b^6*c^2 - 256*a^3*b^2*c^3 - 96*a^2*b^3*c^3 - 12*a*b^4*c^3 + 256*a^4*c^4 + 128*a^3*b*c^4 + 48*a^2*b^2*c^4 - 64*a^3*c^5)*c^2) + 3*(b^2*c^4 - 4*a*c^5 - 2*b*c^5 + c^6)*sqrt(b^2 - 4*a*c)*e*log(x^2 + 1/2*(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 - sqrt((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)*(a
```


$$\begin{aligned}
&^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c)*c)*a^3*c^4 + 2*(b^2 - 4*a*c)*a*b^5 \\
&*c - 40*(b^2 - 4*a*c)*a^2*b^3*c^2 - 2*(b^2 - 4*a*c)*a*b^4*c^2 + 128*(b^2 - \\
&4*a*c)*a^3*b*c^3 + 36*(b^2 - 4*a*c)*a^2*b^2*c^3 + 80*(b^2 - 4*a*c)*a^3*c^4) \\
&*f)*\arctan(2*\text{sqrt}(1/2)*x/\text{sqrt}((a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2 + \text{sqrt}(\\
&(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4*(a^3*b^4 - 8*a^4*b^2*c + 16*a^ \\
&5*c^2)*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/(a^2*b^4*c - 8*a^3*b^2*c^ \\
&2 + 16*a^4*c^3)))/((a^3*b^8 - 16*a^4*b^6*c - 2*a^3*b^7*c + 96*a^5*b^4*c^2 + \\
&24*a^4*b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2*c^3 - 96*a^5*b^3*c^3 - 12*a^4*b \\
&^4*c^3 + 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^5*b^2*c^4 - 64*a^6*c^5)*\text{abs}(c)) \\
&+ 1/32*(3*(\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*b^8 - 17*\text{sqrt}(2)*\text{sqrt}(b \\
&*c - \text{sqrt}(b^2 - 4*a*c)*c)*a*b^6*c - 2*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)* \\
&c)*b^7*c + 2*b^8*c + 116*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a^2*b^4*c^ \\
&2 + 26*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a*b^5*c^2 + \text{sqrt}(2)*\text{sqrt}(b*c \\
&- \text{sqrt}(b^2 - 4*a*c)*c)*b^6*c^2 - 34*a*b^6*c^2 - 2*b^7*c^2 - 368*\text{sqrt}(2)*\text{sq \\
&rt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 128*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 \\
&- 4*a*c)*c)*a^2*b^3*c^3 - 13*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a*b^4 \\
&*c^3 + 232*a^2*b^4*c^3 + 30*a*b^5*c^3 + 448*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4 \\
&*a*c)*c)*a^4*c^4 + 224*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b*c^4 + \\
&64*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a^2*b^2*c^4 - 736*a^3*b^2*c^4 - \\
&176*a^2*b^3*c^4 - 112*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a^3*c^5 + 896 \\
&*a^4*c^5 + 352*a^3*b*c^5 + \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - \\
&4*a*c)*c)*b^7 - 15*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c \\
&)*a*b^5*c - 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*b^6 \\
&*c + 88*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a^2*b^3*c \\
&^2 + 22*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a*b^4*c^2 \\
&+ \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*b^5*c^2 - 176* \\
&\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b*c^3 - 88*\text{sq \\
&rt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a^2*b^2*c^3 - 11*\text{sq \\
&rt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a*b^3*c^3 + 44*\text{sqrt} \\
&(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a^2*b*c^4 - 2*(b^2 - \\
&4*a*c)*b^6*c + 26*(b^2 - 4*a*c)*a*b^4*c^2 + 2*(b^2 - 4*a*c)*b^5*c^2 - 128*(\\
&b^2 - 4*a*c)*a^2*b^2*c^3 - 22*(b^2 - 4*a*c)*a*b^3*c^3 + 224*(b^2 - 4*a*c)*a \\
&^3*c^4 + 88*(b^2 - 4*a*c)*a^2*b*c^4)*d + (\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a \\
&*c)*c)*a*b^7 - 24*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a^2*b^5*c - 2*\text{sq \\
&rt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a*b^6*c + 2*a*b^7*c + 144*\text{sqrt}(2)*\text{sqrt} \\
&(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b^3*c^2 + 40*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - \\
&4*a*c)*c)*a^2*b^4*c^2 + \text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a*b^5*c^2 - \\
&48*a^2*b^5*c^2 - 2*a*b^6*c^2 - 256*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c) \\
&*a^4*b*c^3 - 128*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b^2*c^3 - 20*\text{sq \\
&rt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a^2*b^3*c^3 + 288*a^3*b^3*c^3 + 44*a \\
&^2*b^4*c^3 + 64*\text{sqrt}(2)*\text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c)*a^3*b*c^4 - 512*a^4 \\
&*b*c^4 - 64*a^3*b^2*c^4 - 320*a^4*c^5 + \text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c \\
&- \text{sqrt}(b^2 - 4*a*c)*c)*a*b^6 - 22*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt} \\
&(b^2 - 4*a*c)*c)*a^2*b^4*c - 2*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^ \\
&2 - 4*a*c)*c)*a*b^5*c + 32*\text{sqrt}(2)*\text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c - \text{sqrt}(b^2 -
\end{aligned}$$

$$\begin{aligned}
& 4*a*c)*c)*a^3*b^2*c^2 + 36*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& *c)*a^2*b^3*c^2 + \sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& *c)*a*b^4*c^2 + 160*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}} \\
& *c)*a^4*c^3 + 80*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}* \\
&)*a^3*b*c^3 - 18*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}* \\
& a^2*b^2*c^3 - 40*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}}* \\
& a^3*c^4 - 2*(b^2 - 4*a*c)*a*b^5*c + 40*(b^2 - 4*a*c)*a^2*b^3*c^2 + 2*(b^2 - \\
& 4*a*c)*a*b^4*c^2 - 128*(b^2 - 4*a*c)*a^3*b*c^3 - 36*(b^2 - 4*a*c)*a^2*b^2* \\
& c^3 - 80*(b^2 - 4*a*c)*a^3*c^4)*f)*\arctan(2*\sqrt{1/2}*x/\sqrt{(a^2*b^5 - 8*a \\
& ^3*b^3*c + 16*a^4*b*c^2 - \sqrt{(a^2*b^5 - 8*a^3*b^3*c + 16*a^4*b*c^2)^2 - 4 \\
& *(a^3*b^4 - 8*a^4*b^2*c + 16*a^5*c^2)}*(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c \\
& ^3)))/(a^2*b^4*c - 8*a^3*b^2*c^2 + 16*a^4*c^3)))/((a^3*b^8 - 16*a^4*b^6*c - \\
& 2*a^3*b^7*c + 96*a^5*b^4*c^2 + 24*a^4*b^5*c^2 + a^3*b^6*c^2 - 256*a^6*b^2* \\
& c^3 - 96*a^5*b^3*c^3 - 12*a^4*b^4*c^3 + 256*a^7*c^4 + 128*a^6*b*c^4 + 48*a^ \\
& 5*b^2*c^4 - 64*a^6*c^5)*\text{abs}(c)) + 1/8*(3*b^3*c^2*d*x^7 - 24*a*b*c^3*d*x^7 + \\
& a*b^2*c^2*f*x^7 + 20*a^2*c^3*f*x^7 + 24*a^2*c^3*x^6*e + 6*b^4*c*d*x^5 - 49 \\
& *a*b^2*c^2*d*x^5 + 28*a^2*c^3*d*x^5 + 2*a*b^3*c*f*x^5 + 28*a^2*b*c^2*f*x^5 \\
& + 36*a^2*b*c^2*x^4*e + 3*b^5*d*x^3 - 20*a*b^3*c*d*x^3 - 4*a^2*b*c^2*d*x^3 + \\
& a*b^4*f*x^3 + 5*a^2*b^2*c*f*x^3 + 36*a^3*c^2*f*x^3 + 8*a^2*b^2*c*x^2*e + 4 \\
& 0*a^3*c^2*x^2*e + 5*a*b^4*d*x - 37*a^2*b^2*c*d*x + 44*a^3*c^2*d*x - a^2*b^3 \\
& *f*x + 16*a^3*b*c*f*x - 2*a^2*b^3*e + 20*a^3*b*c*e)/((a^2*b^4 - 8*a^3*b^2*c \\
& + 16*a^4*c^2)*(c*x^4 + b*x^2 + a)^2)
\end{aligned}$$

maple [B] time = 0.38, size = 7858, normalized size = 12.65

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^4,x)$

[Out] result too large to display

maxima [F] time = 0.00, size = 0, normalized size = 0.00

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{integrate}((a*d+a*e*x+(a*f+b*d)*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^4,x, \text{algorithm}=\text{"maxima"})$

[Out] $1/8*(24*a^2*c^3*e*x^6 + 36*a^2*b*c^2*e*x^4 + (3*(b^3*c^2 - 8*a*b*c^3)*d + (a*b^2*c^2 + 20*a^2*c^3)*f)*x^7 + ((6*b^4*c - 49*a*b^2*c^2 + 28*a^2*c^3)*d + 2*(a*b^3*c + 14*a^2*b*c^2)*f)*x^5 + 8*(a^2*b^2*c + 5*a^3*c^2)*e*x^2 + ((3*b^5 - 20*a*b^3*c - 4*a^2*b*c^2)*d + (a*b^4 + 5*a^2*b^2*c + 36*a^3*c^2)*f)*x$

$$\begin{aligned} &^3 - 2*(a^2*b^3 - 10*a^3*b*c)*e + ((5*a*b^4 - 37*a^2*b^2*c + 44*a^3*c^2)*d \\ &- (a^2*b^3 - 16*a^3*b*c)*f)*x)/((a^2*b^4*c^2 - 8*a^3*b^2*c^3 + 16*a^4*c^4)* \\ &x^8 + a^4*b^4 - 8*a^5*b^2*c + 16*a^6*c^2 + 2*(a^2*b^5*c - 8*a^3*b^3*c^2 + 1 \\ &6*a^4*b*c^3)*x^6 + (a^2*b^6 - 6*a^3*b^4*c + 32*a^5*c^3)*x^4 + 2*(a^3*b^5 - \\ &8*a^4*b^3*c + 16*a^5*b*c^2)*x^2) + 1/8*integrate((48*a^2*c^2*e*x + (3*(b^3*c \\ &c - 8*a*b*c^2)*d + (a*b^2*c + 20*a^2*c^2)*f)*x^2 + 3*(b^4 - 9*a*b^2*c + 28* \\ &a^2*c^2)*d + (a*b^3 - 16*a^2*b*c)*f)/(c*x^4 + b*x^2 + a), x)/(a^2*b^4 - 8*a \\ &^3*b^2*c + 16*a^4*c^2) \end{aligned}$$

mupad [B] time = 3.16, size = 8689, normalized size = 13.99

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4)^4, x)$

[Out] $((x^2*(5*a*c^2*e + b^2*c*e))/(b^4 + 16*a^2*c^2 - 8*a*b^2*c) - (b^3*e - 10*a*b*c*e)/(4*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x^5*(28*a^2*c^3*d + 6*b^4*c*d + 2*a*b^3*c*f - 49*a*b^2*c^2*d + 28*a^2*b*c^2*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (x*(5*b^4*d + 44*a^2*c^2*d - a*b^3*f - 37*a*b^2*c*d + 16*a^2*b*c*f))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (3*c^3*e*x^6)/(b^4 + 16*a^2*c^2 - 8*a*b^2*c) + (x^3*(3*b^5*d + 36*a^3*c^2*f + a*b^4*f - 20*a*b^3*c*d - 4*a^2*b*c^2*d + 5*a^2*b^2*c*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (9*b*c^2*e*x^4)/(2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (c*x^7*(20*a^2*c^2*f + 3*b^3*c*d - 24*a*b*c^2*d + a*b^2*c*f))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6) + \text{symsum}(\log(\text{root}(56371445760*a^11*b^8*c^6*z^4 - 503316480*a^8*b^14*c^3*z^4 + 47185920*a^7*b^16*c^2*z^4 - 171798691840*a^14*b^2*c^9*z^4 + 193273528320*a^13*b^4*c^8*z^4 - 128849018880*a^12*b^6*c^7*z^4 - 16911433728*a^10*b^10*c^5*z^4 + 3523215360*a^9*b^12*c^4*z^4 - 2621440*a^6*b^18*c*z^4 + 68719476736*a^15*c^10*z^4 + 65536*a^5*b^20*z^4 - 73728*a^2*b^16*c*d*f*z^2 - 1321205760*a^9*b^2*c^8*d*f*z^2 + 732168192*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440*a^8*b^4*c^7*d*f*z^2 + 96583680*a^5*b^10*c^4*d*f*z^2 - 15175680*a^4*b^12*c^3*d*f*z^2 + 1428480*a^3*b^14*c^2*d*f*z^2 - 440401920*a^10*b*c^8*f^2*z^2 + 1761607680*a^10*c^9*d*f*z^2 - 14080*a^3*b^15*c*f^2*z^2 + 6936330240*a^8*b^3*c^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a*b^17*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2*z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 188743680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^11*c^4*d^2*z^2 + 1206656*a^7*b^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 - 2600960*a^5*b^11*c^3*f^2*z^2 + 291840*a^4*b^13*c^2*f^2*z^2 - 19860480*a^3*b^13*c^3*d^2*z^2 - 1179648*a^5*b^10*c^4*e^2*z^2 + 1771776*a^2*b^15*c^2*d^2*z^2 + 1536*a*b^18*d*f*z^2 + 1207959552*a^10*c^9*e^2*z^2 + 25$

$$\begin{aligned}
& 6*a^2*b^{17}*f^2*z^2 + 2304*b^{19}*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216 \\
& *a*b^{13}*c^2*d*e*f*z - 221773824*a^6*b^3*c^7*d*e*f*z + 117964800*a^5*b^5*c^6 \\
& *d*e*f*z - 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350 \\
& 208*a^2*b^{11}*c^3*d*e*f*z - 428544*a*b^{12}*c^3*d^2*e*z + 1022754816*a^6*b^2*c \\
& ^8*d^2*e*z - 642318336*a^5*b^4*c^7*d^2*e*z + 223395840*a^4*b^6*c^6*d^2*e*z \\
& - 50724864*a^7*b^2*c^7*e*f^2*z + 26542080*a^6*b^4*c^6*e*f^2*z - 46725120*a^ \\
& 3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e*f^2*z + 1013760*a^4*b^8*c^4*e*f^2 \\
& *z - 69120*a^3*b^{10}*c^3*e*f^2*z + 1536*a^2*b^{12}*c^2*e*f^2*z + 5930496*a^2*b \\
& ^{10}*c^4*d^2*e*z - 693633024*a^7*c^9*d^2*e*z + 39321600*a^8*c^8*e*f^2*z + 13 \\
& 824*b^{14}*c^2*d^2*e*z + 13824*a*b^8*c^4*d*e^2*f - 7741440*a^4*b^2*c^7*d*e^2* \\
& f + 2903040*a^3*b^4*c^6*d*e^2*f - 387072*a^2*b^6*c^5*d*e^2*f + 37310976*a^3 \\
& *b^3*c^7*d^3*f + 3870720*a^5*b*c^7*e^2*f^2 + 34836480*a^4*b*c^8*d^2*e^2 - 8 \\
& 068032*a^2*b^5*c^6*d^3*f - 5623296*a^4*b^3*c^6*d*f^3 + 1737792*a^3*b^5*c^5* \\
& d*f^3 - 260190*a*b^8*c^4*d^2*f^2 - 211680*a^2*b^7*c^4*d*f^3 - 435456*a*b^7* \\
& c^5*d^2*e^2 - 75188736*a^4*b*c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f - 4262400 \\
& *a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + 35525376 \\
& *a^4*b^2*c^7*d^2*f^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5*c^5*e^2*f \\
& ^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 2870784*a^2* \\
& b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c^6*d^2*e^ \\
& 2 + 11025*b^{10}*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9*c^4*d^2*e^ \\
& 2 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^6*c^4*f^4 \\
& + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b^4*c^7*d^ \\
& 4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 160 \\
& 000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*(root(5637 \\
& 1445760*a^{11}*b^8*c^6*z^4 - 503316480*a^8*b^{14}*c^3*z^4 + 47185920*a^7*b^{16}*c \\
& ^2*z^4 - 171798691840*a^{14}*b^2*c^9*z^4 + 193273528320*a^{13}*b^4*c^8*z^4 - 12 \\
& 8849018880*a^{12}*b^6*c^7*z^4 - 16911433728*a^{10}*b^{10}*c^5*z^4 + 3523215360*a^ \\
& 9*b^{12}*c^4*z^4 - 2621440*a^6*b^{18}*c*z^4 + 68719476736*a^{15}*c^{10}*z^4 + 65536 \\
& *a^5*b^{20}*z^4 - 73728*a^2*b^{16}*c*d*f*z^2 - 1321205760*a^9*b^2*c^8*d*f*z^2 + \\
& 732168192*a^7*b^6*c^6*d*f*z^2 - 366280704*a^6*b^8*c^5*d*f*z^2 - 330301440* \\
& a^8*b^4*c^7*d*f*z^2 + 96583680*a^5*b^{10}*c^4*d*f*z^2 - 15175680*a^4*b^{12}*c^3 \\
& *d*f*z^2 + 1428480*a^3*b^{14}*c^2*d*f*z^2 - 440401920*a^{10}*b*c^8*f^2*z^2 + 17 \\
& 61607680*a^{10}*c^9*d*f*z^2 - 14080*a^3*b^{15}*c*f^2*z^2 + 6936330240*a^8*b^3*c \\
& ^8*d^2*z^2 + 2464874496*a^6*b^7*c^6*d^2*z^2 - 3963617280*a^9*b*c^9*d^2*z^2 \\
& - 1509949440*a^9*b^2*c^8*e^2*z^2 - 5400428544*a^7*b^5*c^7*d^2*z^2 - 94464*a \\
& *b^{17}*c*d^2*z^2 + 754974720*a^8*b^4*c^7*e^2*z^2 - 730054656*a^5*b^9*c^5*d^2 \\
& *z^2 + 477102080*a^9*b^3*c^7*f^2*z^2 - 174325760*a^8*b^5*c^6*f^2*z^2 - 1887 \\
& 43680*a^7*b^6*c^6*e^2*z^2 + 146165760*a^4*b^{11}*c^4*d^2*z^2 + 11206656*a^7*b \\
& ^7*c^5*f^2*z^2 + 8929280*a^6*b^9*c^4*f^2*z^2 + 23592960*a^6*b^8*c^5*e^2*z^2 \\
& - 2600960*a^5*b^{11}*c^3*f^2*z^2 + 291840*a^4*b^{13}*c^2*f^2*z^2 - 19860480*a^ \\
& 3*b^{13}*c^3*d^2*z^2 - 1179648*a^5*b^{10}*c^4*e^2*z^2 + 1771776*a^2*b^{15}*c^2*d^ \\
& 2*z^2 + 1536*a*b^{18}*d*f*z^2 + 1207959552*a^{10}*c^9*e^2*z^2 + 256*a^2*b^{17}*f^ \\
& 2*z^2 + 2304*b^{19}*d^2*z^2 + 169869312*a^7*b*c^8*d*e*f*z + 9216*a*b^{13}*c^2*d \\
& *e*f*z - 221773824*a^6*b^3*c^7*d*e*f*z + 117964800*a^5*b^5*c^6*d*e*f*z - 32 \\
& 440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b^{11}*
\end{aligned}$$

$$\begin{aligned}
& c^3 d e f z - 428544 a b^{12} c^3 d^2 e z + 1022754816 a^6 b^2 c^8 d^2 e z - \\
& 642318336 a^5 b^4 c^7 d^2 e z + 223395840 a^4 b^6 c^6 d^2 e z - 50724864 a^7 \\
& b^2 c^7 e f^2 z + 26542080 a^6 b^4 c^6 e f^2 z - 46725120 a^3 b^8 c^5 d^2 \\
& e z - 7127040 a^5 b^6 c^5 e f^2 z + 1013760 a^4 b^8 c^4 e f^2 z - 69120 a^3 \\
& b^{10} c^3 e f^2 z + 1536 a^2 b^{12} c^2 e f^2 z + 5930496 a^2 b^{10} c^4 d^2 e \\
& z - 693633024 a^7 c^9 d^2 e z + 39321600 a^8 c^8 e f^2 z + 13824 b^{14} c^2 \\
& d^2 e z + 13824 a b^8 c^4 d e^2 f - 7741440 a^4 b^2 c^7 d e^2 f + 2903040 a^3 \\
& b^4 c^6 d e^2 f - 387072 a^2 b^6 c^5 d e^2 f + 37310976 a^3 b^3 c^7 d^3 \\
& f + 3870720 a^5 b c^7 e^2 f^2 + 34836480 a^4 b c^8 d^2 e^2 - 8068032 a^2 b^5 \\
& c^6 d^3 f - 5623296 a^4 b^3 c^6 d f^3 + 1737792 a^3 b^5 c^5 d f^3 - 26019 \\
& 0 a b^8 c^4 d^2 f^2 - 211680 a^2 b^7 c^4 d f^3 - 435456 a b^7 c^5 d^2 e^2 - \\
& 75188736 a^4 b c^8 d^3 f - 15482880 a^5 c^8 d e^2 f - 4262400 a^5 b c^7 d \\
& f^3 + 852768 a b^7 c^5 d^3 f + 7350 a b^9 c^3 d f^3 + 35525376 a^4 b^2 c^7 \\
& d^2 f^2 + 645120 a^4 b^3 c^6 e^2 f^2 - 80640 a^3 b^5 c^5 e^2 f^2 + 2304 a^2 \\
& b^7 c^4 e^2 f^2 - 15269184 a^3 b^4 c^6 d^2 f^2 + 2870784 a^2 b^6 c^5 d^2 f^2 \\
& - 17418240 a^3 b^3 c^7 d^2 e^2 + 3919104 a^2 b^5 c^6 d^2 e^2 + 11025 b^1 \\
& 0 c^3 d^2 f^2 + 5644800 a^5 c^8 d^2 f^2 + 20736 b^9 c^4 d^2 e^2 + 492800 a^5 \\
& b^2 c^6 f^4 + 351456 a^4 b^4 c^5 f^4 - 43120 a^3 b^6 c^4 f^4 + 1225 a^2 b^8 \\
& c^3 f^4 - 27433728 a^3 b^2 c^8 d^4 + 6446304 a^2 b^4 c^7 d^4 - 39690 b^9 \\
& c^4 d^3 f - 734832 a b^6 c^6 d^4 + 49787136 a^4 c^9 d^4 + 160000 a^6 c^7 f \\
& ^4 + 5308416 a^5 c^8 e^4 + 35721 b^8 c^5 d^4, z, k) * ((768 a^2 b^{14} c^2 d - \\
& 22020096 a^9 c^9 d - 22272 a^3 b^{12} c^3 d + 282624 a^4 b^{10} c^4 d - 2027520 \\
& a^5 b^8 c^5 d + 8847360 a^6 b^6 c^6 d - 23396352 a^7 b^4 c^7 d + 34603008 \\
& a^8 b^2 c^8 d + 256 a^3 b^{13} c^2 f - 9216 a^4 b^{11} c^3 f + 122880 a^5 b^9 c^4 \\
& f - 819200 a^6 b^7 c^5 f + 2949120 a^7 b^5 c^6 f - 5505024 a^8 b^3 c^7 f \\
& + 4194304 a^9 b c^8 f) / (512 (a^4 b^{12} + 4096 a^{10} c^6 - 24 a^5 b^{10} c + 24 \\
& 0 a^6 b^8 c^2 - 1280 a^7 b^6 c^3 + 3840 a^8 b^4 c^4 - 6144 a^9 b^2 c^5)) + \\
& (x * (786432 a^9 c^9 e - 768 a^4 b^{10} c^4 e + 15360 a^5 b^8 c^5 e - 122880 a^6 \\
& b^6 c^6 e + 491520 a^7 b^4 c^7 e - 983040 a^8 b^2 c^8 e)) / (32 (a^4 b^{12} + \\
& 4096 a^{10} c^6 - 24 a^5 b^{10} c + 240 a^6 b^8 c^2 - 1280 a^7 b^6 c^3 + 3840 \\
& a^8 b^4 c^4 - 6144 a^9 b^2 c^5)) + (\text{root}(56371445760 a^{11} b^8 c^6 z^4 - 503 \\
& 316480 a^8 b^{14} c^3 z^4 + 47185920 a^7 b^{16} c^2 z^4 - 171798691840 a^{14} b^2 \\
& c^9 z^4 + 193273528320 a^{13} b^4 c^8 z^4 - 128849018880 a^{12} b^6 c^7 z^4 - \\
& 16911433728 a^{10} b^{10} c^5 z^4 + 3523215360 a^9 b^{12} c^4 z^4 - 2621440 a^6 b^8 \\
& c^3 z^4 + 68719476736 a^{15} c^{10} z^4 + 65536 a^5 b^{20} z^4 - 73728 a^2 b^{16} \\
& c d f z^2 - 1321205760 a^9 b^2 c^8 d f z^2 + 732168192 a^7 b^6 c^6 d f z^2 \\
& - 366280704 a^6 b^8 c^5 d f z^2 - 330301440 a^8 b^4 c^7 d f z^2 + 96583680 \\
& a^5 b^{10} c^4 d f z^2 - 15175680 a^4 b^{12} c^3 d f z^2 + 1428480 a^3 b^{14} c^2 \\
& d f z^2 - 440401920 a^{10} b c^8 f^2 z^2 + 1761607680 a^{10} c^9 d f z^2 - 14 \\
& 080 a^3 b^{15} c f^2 z^2 + 6936330240 a^8 b^3 c^8 d^2 z^2 + 2464874496 a^6 b^7 \\
& c^6 d^2 z^2 - 3963617280 a^9 b c^9 d^2 z^2 - 1509949440 a^9 b^2 c^8 e^2 z^2 \\
& - 5400428544 a^7 b^5 c^7 d^2 z^2 - 94464 a b^{17} c d^2 z^2 + 754974720 a^8 \\
& b^4 c^7 e^2 z^2 - 730054656 a^5 b^9 c^5 d^2 z^2 + 477102080 a^9 b^3 c^7 f \\
& ^2 z^2 - 174325760 a^8 b^5 c^6 f^2 z^2 - 188743680 a^7 b^6 c^6 e^2 z^2 + 14 \\
& 6165760 a^4 b^{11} c^4 d^2 z^2 + 11206656 a^7 b^7 c^5 f^2 z^2 + 8929280 a^6 b
\end{aligned}$$

$$\begin{aligned}
& ^9c^4f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 \\
& + 291840a^4b^{13}c^2f^2z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^8b^{18}d^2f^2z^2 + \\
& 1207959552a^{10}c^9e^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 16 \\
& 9869312a^7b^8c^8d^2e^2f^2z^2 + 9216a^8b^{13}c^2d^2e^2f^2z^2 - 221773824a^6b^3c^7 \\
& *d^2e^2f^2z^2 + 117964800a^5b^5c^6d^2e^2f^2z^2 - 32440320a^4b^7c^5d^2e^2f^2z^2 + 4 \\
& 792320a^3b^9c^4d^2e^2f^2z^2 - 350208a^2b^{11}c^3d^2e^2f^2z^2 - 428544a^8b^{12}c^3 \\
& d^2e^2z^2 + 1022754816a^6b^2c^8d^2e^2z^2 - 642318336a^5b^4c^7d^2e^2z^2 \\
& + 223395840a^4b^6c^6d^2e^2z^2 - 50724864a^7b^2c^7e^2f^2z^2 + 26542080a^6 \\
& b^4c^6e^2f^2z^2 - 46725120a^3b^8c^5d^2e^2z^2 - 7127040a^5b^6c^5e^2f^2z^2 \\
& + 1013760a^4b^8c^4e^2f^2z^2 - 69120a^3b^{10}c^3e^2f^2z^2 + 1536a^2b^{12}c^2 \\
& e^2f^2z^2 + 5930496a^2b^{10}c^4d^2e^2z^2 - 693633024a^7c^9d^2e^2z^2 \\
& + 39321600a^8c^8e^2f^2z^2 + 13824b^{14}c^2d^2e^2z^2 + 13824a^8b^8c^4d^2e^2 \\
& *f^2 - 7741440a^4b^2c^7d^2e^2*f^2 + 2903040a^3b^4c^6d^2e^2*f^2 - 387072a^2 \\
& b^6c^5d^2e^2*f^2 + 37310976a^3b^3c^7d^3*f^2 + 3870720a^5b^7c^7e^2*f^2 \\
& + 34836480a^4b^8c^8d^2e^2 - 8068032a^2b^5c^6d^3*f^2 - 5623296a^4b^3c^6 \\
& d^2*f^3 + 1737792a^3b^5c^5d^2*f^3 - 260190a^8b^8c^4d^2*f^2 - 211680a^2 \\
& b^7c^4d^2*f^3 - 435456a^8b^7c^5d^2e^2 - 75188736a^4b^8c^8d^3*f^2 - 15 \\
& 482880a^5c^8d^2e^2*f^2 - 4262400a^5b^8c^7d^2*f^3 + 852768a^8b^7c^5d^3*f^2 + \\
& 7350a^8b^9c^3d^2*f^3 + 35525376a^4b^2c^7d^2*f^2 + 645120a^4b^3c^6e^2 \\
& *f^2 - 80640a^3b^5c^5e^2*f^2 + 2304a^2b^7c^4e^2*f^2 - 15269184a^3 \\
& b^4c^6d^2*f^2 + 2870784a^2b^6c^5d^2*f^2 - 17418240a^3b^3c^7d^2e^2 \\
& + 3919104a^2b^5c^6d^2e^2 + 11025b^{10}c^3d^2*f^2 + 5644800a^5c^8 \\
& d^2*f^2 + 20736b^9c^4d^2e^2 + 492800a^5b^2c^6f^4 + 351456a^4b^4 \\
& c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3b^2c^8 \\
& d^4 + 6446304a^2b^4c^7d^4 - 39690b^9c^4d^3*f^2 - 734832a^8b^6c^6d^4 \\
& + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 357 \\
& 21b^8c^5d^4, z, k) * x * (4194304a^{11}b^8c^9 - 256a^4b^{15}c^2 + 7168a^5b^{13} \\
& c^3 - 86016a^6b^{11}c^4 + 573440a^7b^9c^5 - 2293760a^8b^7c^6 + 5 \\
& 505024a^9b^5c^7 - 7340032a^{10}b^3c^8) / (32 * (a^4b^{12} + 4096a^{10}c^6 - \\
& 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 61 \\
& 44a^9b^2c^5)) + (3244032a^6b^8c^8d^2e^2 - 983040a^7c^8e^2f^2 + 4608a^2b^9 \\
& c^4d^2e^2 - 87552a^3b^7c^5d^2e^2 + 681984a^4b^5c^6d^2e^2 - 2433024a^5b^3 \\
& c^7d^2e^2 + 1536a^3b^8c^4e^2f^2 - 39936a^4b^6c^5e^2f^2 + 184320a^5b^4c^6 \\
& e^2f^2 + 49152a^6b^2c^7e^2f^2) / (512 * (a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10} \\
& c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) - (x * (225792 \\
& a^6c^9d^2 + 9b^{12}c^3d^2 - 12800a^7c^8f^2 - 252a^8b^{10}c^4d^2 - 36864a^6b^8c^8 \\
& e^2 + 3114a^2b^8c^5d^2 - 21312a^3b^6c^6d^2 + 88128a^4b^4c^7d^2 - 211968a^5b^2c^8 \\
& d^2 - 2304a^4b^5c^6e^2 + 18432a^5b^3c^7e^2 + a^2b^{10}c^3f^2 - 42a^3b^8c^4f^2 + 17 \\
& 60a^4b^6c^5f^2 - 13120a^5b^4c^6f^2 + 29952a^6b^2c^7f^2 + 6a^8b^{11}c^3d^2f^2 - \\
& 109056a^6b^8c^8d^2f^2 - 210a^2b^9c^4d^2f^2 + 2496a^3b^7c^5d^2f^2 - 18240a^4 \\
& b^5c^6d^2f^2 + 72192a^5b^3c^7d^2f^2) / (32 * (a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10} \\
& c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) - (567b^7c^5 \\
& d^3 + 8000a^5c^7f^3 - 10368a^8b^7c^5d^3 + 8000a^5c^7f^3 - 10368a^8b^7c^5d^3)
\end{aligned}$$

$$\begin{aligned}
& b^5c^6d^3 - 169344a^3b^8c^8d^3 - 193536a^4c^8d^2e^2 + 141120a^4c^8 \\
& d^2f - 315b^8c^4d^2f + 67824a^2b^3c^7d^3 - 35a^2b^6c^4f^3 - 8 \\
& 4a^3b^4c^5f^3 + 12720a^4b^2c^6f^3 + 6237a^2b^6c^5d^2f - 210a^2b^7 \\
& c^4d^2f^2 - 116160a^4b^8c^7d^2f^2 + 36864a^4b^8c^7e^2f - 6912a^2b^4 \\
& c^6d^2e^2 + 62208a^3b^2c^7d^2e^2 - 42372a^2b^4c^6d^2f + 1764a^2b^5 \\
& c^5d^2f^2 + 96048a^3b^2c^7d^2f^2 + 4608a^3b^3c^6d^2f^2 - 2304a^3b^3 \\
& c^6e^2f)/(512(a^4b^12 + 4096a^10c^6 - 24a^5b^10c + 240a^6b^8 \\
& c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (x(6912a^4 \\
& c^8e^3 - 27b^7c^5d^2e - 10080a^4c^8d^2e^2 + 486a^2b^5c^6d^2e^2 + \\
& 12096a^3b^8c^8d^2e + 3120a^4b^8c^7e^2f^2 - 3672a^2b^3c^7d^2e^2 - 3 \\
& a^2b^5c^5e^2f^2 + 96a^3b^3c^6e^2f^2 - 18a^2b^6c^5d^2e^2 + 450a^2b^4 \\
& c^6d^2e^2 - 2448a^3b^2c^7d^2e^2))/(32(a^4b^12 + 4096a^10c^6 - 24a^5 \\
& b^10c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9 \\
& b^2c^5))\sqrt{56371445760a^11b^8c^6z^4 - 503316480a^8b^14c^3z^4 \\
& + 47185920a^7b^16c^2z^4 - 171798691840a^14b^2c^9z^4 + 193273528320 \\
& a^13b^4c^8z^4 - 128849018880a^12b^6c^7z^4 - 16911433728a^10b^10c^5 \\
& z^4 + 3523215360a^9b^12c^4z^4 - 2621440a^6b^18c^2z^4 + 68719476736 \\
& a^15c^10z^4 + 65536a^5b^20z^4 - 73728a^2b^16c^4d^2fz^2 - 1321205760 \\
& a^9b^2c^8d^2fz^2 + 732168192a^7b^6c^6d^2fz^2 - 366280704a^6b^8c^5 \\
& d^2fz^2 - 330301440a^8b^4c^7d^2fz^2 + 96583680a^5b^10c^4d^2fz^2 - \\
& 15175680a^4b^12c^3d^2fz^2 + 1428480a^3b^14c^2d^2fz^2 - 440401920a^ \\
& 10b^8c^8f^2z^2 + 1761607680a^10c^9d^2fz^2 - 14080a^3b^15c^4f^2z^2 \\
& + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617 \\
& 280a^9b^9c^9d^2z^2 - 1509949440a^9b^2c^8e^2z^2 - 5400428544a^7b^5 \\
& c^7d^2z^2 - 94464a^2b^17c^4d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730 \\
& 054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2 - 174325760a^8b^5 \\
& c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 146165760a^4b^11c^4d^2 \\
& z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4f^2z^2 + 235929 \\
& 60a^6b^8c^5e^2z^2 - 2600960a^5b^11c^3f^2z^2 + 291840a^4b^13c^2 \\
& f^2z^2 - 19860480a^3b^13c^3d^2z^2 - 1179648a^5b^10c^4e^2z^2 + 1 \\
& 771776a^2b^15c^2d^2z^2 + 1536a^2b^18d^2fz^2 + 1207959552a^10c^9e^2 \\
& z^2 + 256a^2b^17f^2z^2 + 2304b^19d^2z^2 + 169869312a^7b^8c^8d^2e^2 \\
& f^2z + 9216a^2b^13c^2d^2e^2fz - 221773824a^6b^3c^7d^2e^2fz + 117964800a^ \\
& 5b^5c^6d^2e^2fz - 32440320a^4b^7c^5d^2e^2fz + 4792320a^3b^9c^4d^2e^2 \\
& fz - 350208a^2b^11c^3d^2e^2fz - 428544a^2b^12c^3d^2e^2z + 1022754816a^ \\
& 6b^2c^8d^2e^2z - 642318336a^5b^4c^7d^2e^2z + 223395840a^4b^6c^6 \\
& d^2e^2z - 50724864a^7b^2c^7e^2f^2z + 26542080a^6b^4c^6e^2f^2z - 46 \\
& 725120a^3b^8c^5d^2e^2z - 7127040a^5b^6c^5e^2f^2z + 1013760a^4b^8c^4 \\
& e^2f^2z - 69120a^3b^10c^3e^2f^2z + 1536a^2b^12c^2e^2f^2z + 5930 \\
& 496a^2b^10c^4d^2e^2z - 693633024a^7c^9d^2e^2z + 39321600a^8c^8e^2f^2 \\
& z + 13824b^14c^2d^2e^2z + 13824a^2b^8c^4d^2e^2f - 7741440a^4b^2c^ \\
& 7d^2e^2f + 2903040a^3b^4c^6d^2e^2f - 387072a^2b^6c^5d^2e^2f + 373 \\
& 10976a^3b^3c^7d^3f + 3870720a^5b^3c^7e^2f^2 + 34836480a^4b^3c^8d^2 \\
& e^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^2f^3 + 1737792a^3 \\
& b^5c^5d^2f^3 - 260190a^2b^8c^4d^2f^2 - 211680a^2b^7c^4d^2f^3 - 4354
\end{aligned}$$

$$\begin{aligned}
& 56*a*b^7*c^5*d^2*e^2 - 75188736*a^4*b*c^8*d^3*f - 15482880*a^5*c^8*d*e^2*f \\
& - 4262400*a^5*b*c^7*d*f^3 + 852768*a*b^7*c^5*d^3*f + 7350*a*b^9*c^3*d*f^3 + \\
& 35525376*a^4*b^2*c^7*d^2*f^2 + 645120*a^4*b^3*c^6*e^2*f^2 - 80640*a^3*b^5* \\
& c^5*e^2*f^2 + 2304*a^2*b^7*c^4*e^2*f^2 - 15269184*a^3*b^4*c^6*d^2*f^2 + 287 \\
& 0784*a^2*b^6*c^5*d^2*f^2 - 17418240*a^3*b^3*c^7*d^2*e^2 + 3919104*a^2*b^5*c \\
& ^6*d^2*e^2 + 11025*b^10*c^3*d^2*f^2 + 5644800*a^5*c^8*d^2*f^2 + 20736*b^9*c \\
& ^4*d^2*e^2 + 492800*a^5*b^2*c^6*f^4 + 351456*a^4*b^4*c^5*f^4 - 43120*a^3*b^ \\
& 6*c^4*f^4 + 1225*a^2*b^8*c^3*f^4 - 27433728*a^3*b^2*c^8*d^4 + 6446304*a^2*b \\
& ^4*c^7*d^4 - 39690*b^9*c^4*d^3*f - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9* \\
& d^4 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k), \\
& k, 1, 4)
\end{aligned}$$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((a*d+a*e*x+(a*f+b*d)*x**2+b*e*x**3+(b*f+c*d)*x**4+c*e*x**5+c*f*x*
*6)/(c*x**4+b*x**2+a)**4,x)

[Out] Timed out

$$3.67 \quad \int \frac{2-x-2x^2+x^3}{4-5x^2+x^4} dx$$

Optimal. Leaf size=4

$$\log(x+2)$$

[Out] ln(2+x)

Rubi [A] time = 0.01, antiderivative size = 4, normalized size of antiderivative = 1.00, number of steps used = 2, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$, Rules used = {1586, 31}

$$\log(x+2)$$

Antiderivative was successfully verified.

[In] Int[(2 - x - 2*x^2 + x^3)/(4 - 5*x^2 + x^4), x]

[Out] Log[2 + x]

Rule 31

Int[((a_) + (b_.)*(x_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 1586

Int[(u_.)*(P_x_)^(p_.)*(Q_x_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[P_x, Q_x, x]^p*Q_x^(p+q), x] /; FreeQ[q, x] && PolyQ[P_x, x] && PolyQ[Q_x, x] && EqQ[PolynomialRemainder[P_x, Q_x, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rubi steps

$$\int \frac{2-x-2x^2+x^3}{4-5x^2+x^4} dx = \int \frac{1}{2+x} dx = \log(2+x)$$

Mathematica [A] time = 0.00, size = 4, normalized size = 1.00

$$\log(x+2)$$

Antiderivative was successfully verified.

[In] Integrate[(2 - x - 2*x^2 + x^3)/(4 - 5*x^2 + x^4), x]

[Out] Log[2 + x]

fricas [A] time = 0.77, size = 4, normalized size = 1.00

$$\log(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="fricas")

[Out] log(x + 2)

giac [A] time = 0.31, size = 5, normalized size = 1.25

$$\log(|x + 2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="giac")

[Out] log(abs(x + 2))

maple [A] time = 0.00, size = 5, normalized size = 1.25

$$\ln(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^3-2*x^2-x+2)/(x^4-5*x^2+4),x)

[Out] ln(x+2)

maxima [A] time = 0.43, size = 4, normalized size = 1.00

$$\log(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="maxima")

[Out] log(x + 2)

mupad [B] time = 0.02, size = 4, normalized size = 1.00

$$\ln(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(-(x + 2*x^2 - x^3 - 2)/(x^4 - 5*x^2 + 4),x)

[Out] $\log(x + 2)$

sympy [A] time = 0.07, size = 3, normalized size = 0.75

$\log(x + 2)$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((x**3-2*x**2-x+2)/(x**4-5*x**2+4), x)`

[Out] $\log(x + 2)$

$$3.68 \quad \int \frac{(d+ex)(2-x-2x^2+x^3)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=14

$$(d - 2e) \log(x + 2) + ex$$

[Out] e*x+(d-2*e)*ln(2+x)

Rubi [A] time = 0.02, antiderivative size = 14, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.065$, Rules used = {1586, 43}

$$(d - 2e) \log(x + 2) + ex$$

Antiderivative was successfully verified.

[In] Int[((d + e*x)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4), x]

[Out] e*x + (d - 2*e)*Log[2 + x]

Rule 43

Int[((a_.) + (b_.)*(x_))^(m_.)*((c_.) + (d_.)*(x_))^(n_.), x_Symbol] := Int[ExpandIntegrand[(a + b*x)^m*(c + d*x)^n, x] /; FreeQ[{a, b, c, d, n}, x] && NeQ[b*c - a*d, 0] && IGtQ[m, 0] && (!IntegerQ[n] || (EqQ[c, 0] && LeQ[7*m + 4*n + 4, 0]) || LtQ[9*m + 5*(n + 1), 0] || GtQ[m + n + 2, 0])

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rubi steps

$$\begin{aligned} \int \frac{(d+ex)(2-x-2x^2+x^3)}{4-5x^2+x^4} dx &= \int \frac{d+ex}{2+x} dx \\ &= \int \left(e + \frac{d-2e}{2+x} \right) dx \\ &= ex + (d-2e) \log(2+x) \end{aligned}$$

Mathematica [A] time = 0.00, size = 16, normalized size = 1.14

$$(d - 2e) \log(x + 2) + e(x + 2)$$

Antiderivative was successfully verified.

[In] Integrate[((d + e*x)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4),x]

[Out] e*(2 + x) + (d - 2*e)*Log[2 + x]

fricas [A] time = 1.30, size = 14, normalized size = 1.00

$$ex + (d - 2e) \log(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="fricas")

[Out] e*x + (d - 2*e)*log(x + 2)

giac [A] time = 0.33, size = 17, normalized size = 1.21

$$xe + (d - 2e) \log(|x + 2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="giac")

[Out] x*e + (d - 2*e)*log(abs(x + 2))

maple [A] time = 0.00, size = 18, normalized size = 1.29

$$d \ln(x + 2) + ex - 2e \ln(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4),x)

[Out] e*x+d*ln(x+2)-2*e*ln(x+2)

maxima [A] time = 0.44, size = 14, normalized size = 1.00

$$ex + (d - 2e) \log(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="maxima")

[Out] e*x + (d - 2*e)*log(x + 2)

mupad [B] time = 0.73, size = 14, normalized size = 1.00

$$\ln(x + 2) (d - 2e) + ex$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int(-((d + e*x)*(x + 2*x^2 - x^3 - 2))/(x^4 - 5*x^2 + 4), x)`

[Out] `log(x + 2)*(d - 2*e) + e*x`

sympy [A] time = 0.12, size = 12, normalized size = 0.86

$$ex + (d - 2e)\log(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)*(x**3-2*x**2-x+2)/(x**4-5*x**2+4), x)`

[Out] `e*x + (d - 2*e)*log(x + 2)`

$$3.69 \quad \int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=31

$$\log(x+2)(d-2e+4f) + x(e-4f) + \frac{1}{2}f(x+2)^2$$

[Out] (e-4*f)*x+1/2*f*(2+x)^2+(d-2*e+4*f)*ln(2+x)

Rubi [A] time = 0.05, antiderivative size = 31, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {1586, 698}

$$\log(x+2)(d-2e+4f) + x(e-4f) + \frac{1}{2}f(x+2)^2$$

Antiderivative was successfully verified.

[In] Int[((d + e*x + f*x^2)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4), x]

[Out] (e - 4*f)*x + (f*(2 + x)^2)/2 + (d - 2*e + 4*f)*Log[2 + x]

Rule 698

Int[((d_.) + (e_.)*(x_))^(m_.)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] :> Int[ExpandIntegrand[(d + e*x)^m*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e, m}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && NeQ[2*c*d - b*e, 0] && IntegerQ[p] && (GtQ[p, 0] || (EqQ[a, 0] && IntegerQ[m]))

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rubi steps

$$\begin{aligned} \int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2}{2+x} dx \\ &= \int \left(e-4f + \frac{d-2e+4f}{2+x} + f(2+x) \right) dx \\ &= (e-4f)x + \frac{1}{2}f(2+x)^2 + (d-2e+4f)\log(2+x) \end{aligned}$$

Mathematica [A] time = 0.01, size = 30, normalized size = 0.97

$$\log(x+2)(d-2e+4f) + \frac{1}{2}(x+2)(2e+f(x-6))$$

Antiderivative was successfully verified.

[In] Integrate[((d + e*x + f*x^2)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4), x]

[Out] ((2*e + f*(-6 + x))*(2 + x))/2 + (d - 2*e + 4*f)*Log[2 + x]

fricas [A] time = 1.19, size = 27, normalized size = 0.87

$$\frac{1}{2}fx^2 + (e - 2f)x + (d - 2e + 4f)\log(x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4), x, algorithm="fricas")

[Out] 1/2*f*x^2 + (e - 2*f)*x + (d - 2*e + 4*f)*log(x + 2)

giac [A] time = 0.28, size = 30, normalized size = 0.97

$$\frac{1}{2}fx^2 - 2fx + xe + (d + 4f - 2e)\log(|x+2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4), x, algorithm="giac")

[Out] 1/2*f*x^2 - 2*f*x + x*e + (d + 4*f - 2*e)*log(abs(x + 2))

maple [A] time = 0.00, size = 35, normalized size = 1.13

$$\frac{fx^2}{2} + d\ln(x+2) + ex - 2e\ln(x+2) - 2fx + 4f\ln(x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4), x)

[Out] 1/2*f*x^2+e*x-2*f*x+d*ln(x+2)-2*e*ln(x+2)+4*f*ln(x+2)

maxima [A] time = 0.45, size = 27, normalized size = 0.87

$$\frac{1}{2}fx^2 + (e - 2f)x + (d - 2e + 4f)\log(x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4),x, algorithm="maxima")
```

```
[Out] 1/2*f*x^2 + (e - 2*f)*x + (d - 2*e + 4*f)*log(x + 2)
```

mupad [B] time = 0.04, size = 27, normalized size = 0.87

$$x(e - 2f) + \frac{fx^2}{2} + \ln(x + 2)(d - 2e + 4f)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-((d + e*x + f*x^2)*(x + 2*x^2 - x^3 - 2))/(x^4 - 5*x^2 + 4),x)
```

```
[Out] x*(e - 2*f) + (f*x^2)/2 + log(x + 2)*(d - 2*e + 4*f)
```

sympy [A] time = 0.15, size = 26, normalized size = 0.84

$$\frac{fx^2}{2} + x(e - 2f) + (d - 2e + 4f) \log(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((f*x**2+e*x+d)*(x**3-2*x**2-x+2)/(x**4-5*x**2+4),x)
```

```
[Out] f*x**2/2 + x*(e - 2*f) + (d - 2*e + 4*f)*log(x + 2)
```

$$3.70 \quad \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=51

$$\log(x+2)(d-2e+4f-8g) + x(e-4f+12g) + \frac{1}{2}(x+2)^2(f-6g) + \frac{1}{3}g(x+2)^3$$

[Out] (e-4*f+12*g)*x+1/2*(f-6*g)*(2+x)^2+1/3*g*(2+x)^3+(d-2*e+4*f-8*g)*ln(2+x)

Rubi [A] time = 0.08, antiderivative size = 51, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 41, $\frac{\text{number of rules}}{\text{integrand size}} = 0.049$, Rules used = {1586, 1850}

$$\log(x+2)(d-2e+4f-8g) + x(e-4f+12g) + \frac{1}{2}(x+2)^2(f-6g) + \frac{1}{3}g(x+2)^3$$

Antiderivative was successfully verified.

[In] Int[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4), x]

[Out] (e - 4*f + 12*g)*x + ((f - 6*g)*(2 + x)^2)/2 + (g*(2 + x)^3)/3 + (d - 2*e + 4*f - 8*g)*Log[2 + x]

Rule 1586

Int[(u_)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] :> Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 1850

Int[(Pq_)*((a_) + (b_)*(x_)^(n_))^(p_), x_Symbol] :> Int[ExpandIntegrand[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p, 0] || EqQ[n, 1])

Rubi steps

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3}{2+x} dx \\ &= \int \left(e-4f+12g + \frac{d-2e+4f-8g}{2+x} + (f-6g)(2+x) + g(2+x)^2 \right) dx \\ &= (e-4f+12g)x + \frac{1}{2}(f-6g)(2+x)^2 + \frac{1}{3}g(2+x)^3 + (d-2e+4f-8g)\log(2+x) \end{aligned}$$

Mathematica [A] time = 0.02, size = 45, normalized size = 0.88

$$\log(x+2)(d-2e+4f-8g) + \frac{1}{6}(x+2)(6e+3f(x-6)+2g(x^2-5x+22))$$

Antiderivative was successfully verified.

[In] Integrate[((2-x-2*x^2+x^3)*(d+e*x+f*x^2+g*x^3))/(4-5*x^2+x^4),x]

[Out] ((2+x)*(6*e+3*f*(-6+x)+2*g*(22-5*x+x^2)))/6+(d-2*e+4*f-8*g)*Log[2+x]

fricas [A] time = 1.24, size = 43, normalized size = 0.84

$$\frac{1}{3}gx^3 + \frac{1}{2}(f-2g)x^2 + (e-2f+4g)x + (d-2e+4f-8g)\log(x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")

[Out] 1/3*g*x^3 + 1/2*(f-2*g)*x^2 + (e-2*f+4*g)*x + (d-2*e+4*f-8*g)*log(x+2)

giac [A] time = 0.25, size = 49, normalized size = 0.96

$$\frac{1}{3}gx^3 + \frac{1}{2}fx^2 - gx^2 - 2fx + 4gx + xe + (d+4f-8g-2e)\log(|x+2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")

[Out] 1/3*g*x^3 + 1/2*f*x^2 - g*x^2 - 2*f*x + 4*g*x + x*e + (d+4*f-8*g-2*e)*log(abs(x+2))

maple [A] time = 0.00, size = 58, normalized size = 1.14

$$\frac{gx^3}{3} + \frac{fx^2}{2} - gx^2 + d\ln(x+2) + ex - 2e\ln(x+2) - 2fx + 4f\ln(x+2) + 4gx - 8g\ln(x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)

[Out] $\frac{1}{3}gx^3 + \frac{1}{2}fx^2 - gx^2 + ex - 2fx + 4gx + d \ln(x+2) - 2e \ln(x+2) + 4f \ln(x+2) - 8g \ln(x+2)$

maxima [A] time = 0.45, size = 43, normalized size = 0.84

$$\frac{1}{3}gx^3 + \frac{1}{2}(f - 2g)x^2 + (e - 2f + 4g)x + (d - 2e + 4f - 8g)\log(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")`

[Out] $\frac{1}{3}gx^3 + \frac{1}{2}(f - 2g)x^2 + (e - 2f + 4g)x + (d - 2e + 4f - 8g)\log(x + 2)$

mupad [B] time = 0.04, size = 44, normalized size = 0.86

$$x^2 \left(\frac{f}{2} - g \right) + x(e - 2f + 4g) + \frac{gx^3}{3} + \ln(x + 2)(d - 2e + 4f - 8g)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int(-((d + e*x + f*x^2 + g*x^3)*(x + 2*x^2 - x^3 - 2))/(x^4 - 5*x^2 + 4),x)`

[Out] $x^2(f/2 - g) + x(e - 2f + 4g) + (gx^3)/3 + \log(x + 2)(d - 2e + 4f - 8g)$

sympy [A] time = 0.18, size = 41, normalized size = 0.80

$$\frac{gx^3}{3} + x^2 \left(\frac{f}{2} - g \right) + x(e - 2f + 4g) + (d - 2e + 4f - 8g)\log(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((x**3-2*x**2-x+2)*(g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)`

[Out] $gx^3/3 + x^2(f/2 - g) + x(e - 2f + 4g) + (d - 2e + 4f - 8g)\log(x + 2)$

$$3.71 \quad \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=68

$$\log(x+2)(d-2e+4f-8g+16h) + x(e-2f+4g-8h) + \frac{1}{2}x^2(f-2g+4h) + \frac{1}{3}x^3(g-2h) + \frac{hx^4}{4}$$

[Out] (e-2*f+4*g-8*h)*x+1/2*(f-2*g+4*h)*x^2+1/3*(g-2*h)*x^3+1/4*h*x^4+(d-2*e+4*f-8*g+16*h)*ln(2+x)

Rubi [A] time = 0.12, antiderivative size = 68, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 46, $\frac{\text{number of rules}}{\text{integrand size}} = 0.043$, Rules used = {1586, 1850}

$$\log(x+2)(d-2e+4f-8g+16h) + x(e-2f+4g-8h) + \frac{1}{2}x^2(f-2g+4h) + \frac{1}{3}x^3(g-2h) + \frac{hx^4}{4}$$

Antiderivative was successfully verified.

[In] Int[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + x^4), x]

[Out] (e - 2*f + 4*g - 8*h)*x + ((f - 2*g + 4*h)*x^2)/2 + ((g - 2*h)*x^3)/3 + (h*x^4)/4 + (d - 2*e + 4*f - 8*g + 16*h)*Log[2 + x]

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 1850

Int[(Pq_)*((a_) + (b_.)*(x_)^(n_.))^p], x_Symbol] :> Int[ExpandIntegrand[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p, 0] || EqQ[n, 1])

Rubi steps

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{2+x} dx \\ &= \int \left(e \left(1 - \frac{2(f-2g+4h)}{e} \right) + (f-2g+4h)x + (g-2h)x^2 \right. \\ &\quad \left. + (e-2f+4g-8h)x + \frac{1}{2}(f-2g+4h)x^2 + \frac{1}{3}(g-2h)x^3 + \right. \end{aligned}$$

Mathematica [A] time = 0.02, size = 68, normalized size = 1.00

$$\log(x+2)(d-2e+4f-8g+16h) + x(e-2f+4g-8h) + \frac{1}{2}x^2(f-2g+4h) + \frac{1}{3}x^3(g-2h) + \frac{hx^4}{4}$$

Antiderivative was successfully verified.

[In] Integrate[((2-x-2*x^2+x^3)*(d+e*x+f*x^2+g*x^3+h*x^4))/(4-5*x^2+x^4),x]

[Out] (e-2*f+4*g-8*h)*x + ((f-2*g+4*h)*x^2)/2 + ((g-2*h)*x^3)/3 + (h*x^4)/4 + (d-2*e+4*f-8*g+16*h)*Log[2+x]

fricas [A] time = 1.21, size = 62, normalized size = 0.91

$$\frac{1}{4}hx^4 + \frac{1}{3}(g-2h)x^3 + \frac{1}{2}(f-2g+4h)x^2 + (e-2f+4g-8h)x + (d-2e+4f-8g+16h)\log(x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")

[Out] 1/4*h*x^4 + 1/3*(g-2*h)*x^3 + 1/2*(f-2*g+4*h)*x^2 + (e-2*f+4*g-8*h)*x + (d-2*e+4*f-8*g+16*h)*log(x+2)

giac [A] time = 0.23, size = 74, normalized size = 1.09

$$\frac{1}{4}hx^4 + \frac{1}{3}gx^3 - \frac{2}{3}hx^3 + \frac{1}{2}fx^2 - gx^2 + 2hx^2 - 2fx + 4gx - 8hx + xe + (d+4f-8g+16h-2e)\log(|x+2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")

[Out] $\frac{1}{4}hx^4 + \frac{1}{3}gx^3 - \frac{2}{3}hx^3 + \frac{1}{2}fx^2 - gx^2 + 2hx^2 - 2fx + 4gx - 8hx + xe + (d + 4f - 8g + 16h - 2e)\log(\text{abs}(x + 2))$

maple [A] time = 0.00, size = 87, normalized size = 1.28

$$\frac{hx^4}{4} + \frac{gx^3}{3} - \frac{2hx^3}{3} + \frac{fx^2}{2} - gx^2 + 2hx^2 + d \ln(x+2) + ex - 2e \ln(x+2) - 2fx + 4f \ln(x+2) + 4gx - 8g \ln(x+2) - 8hx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((x^3 - 2x^2 - x + 2)(hx^4 + gx^3 + fx^2 + ex + d)/(x^4 - 5x^2 + 4), x)$

[Out] $\frac{1}{4}hx^4 + \frac{1}{3}gx^3 - \frac{2}{3}hx^3 + \frac{1}{2}fx^2 - gx^2 + 2hx^2 + ex - 2fx + 4gx - 8hx + d \ln(x+2) - 2e \ln(x+2) + 4f \ln(x+2) - 8g \ln(x+2) + 16h \ln(x+2)$

maxima [A] time = 0.44, size = 62, normalized size = 0.91

$$\frac{1}{4}hx^4 + \frac{1}{3}(g - 2h)x^3 + \frac{1}{2}(f - 2g + 4h)x^2 + (e - 2f + 4g - 8h)x + (d - 2e + 4f - 8g + 16h)\log(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{integrate}((x^3 - 2x^2 - x + 2)(hx^4 + gx^3 + fx^2 + ex + d)/(x^4 - 5x^2 + 4), x, \text{algorithm}="maxima")$

[Out] $\frac{1}{4}hx^4 + \frac{1}{3}(g - 2h)x^3 + \frac{1}{2}(f - 2g + 4h)x^2 + (e - 2f + 4g - 8h)x + (d - 2e + 4f - 8g + 16h)\log(x + 2)$

mupad [B] time = 0.03, size = 64, normalized size = 0.94

$$x^3 \left(\frac{g}{3} - \frac{2h}{3} \right) + \ln(x + 2) (d - 2e + 4f - 8g + 16h) + \frac{hx^4}{4} + x^2 \left(\frac{f}{2} - g + 2h \right) + x (e - 2f + 4g - 8h)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}(-((x + 2x^2 - x^3 - 2)(d + ex + fx^2 + gx^3 + hx^4))/(x^4 - 5x^2 + 4), x)$

[Out] $x^3(g/3 - (2h)/3) + \log(x + 2)(d - 2e + 4f - 8g + 16h) + (hx^4)/4 + x^2(f/2 - g + 2h) + x(e - 2f + 4g - 8h)$

sympy [A] time = 0.21, size = 63, normalized size = 0.93

$$\frac{hx^4}{4} + x^3 \left(\frac{g}{3} - \frac{2h}{3} \right) + x^2 \left(\frac{f}{2} - g + 2h \right) + x (e - 2f + 4g - 8h) + (d - 2e + 4f - 8g + 16h)\log(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**3-2*x**2-x+2)*(h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] h*x**4/4 + x**3*(g/3 - 2*h/3) + x**2*(f/2 - g + 2*h) + x*(e - 2*f + 4*g - 8  
*h) + (d - 2*e + 4*f - 8*g + 16*h)*log(x + 2)
```


$$3.72 \quad \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=92

$$\log(x+2)(d-2e+4f-8g+16h-32i)+x(e-2f+4g-8h+16i)+\frac{1}{2}x^2(f-2g+4h-8i)+\frac{1}{3}x^3(g-2h+4i)+\frac{1}{4}x^4(h-2i)+\frac{ix^5}{5}$$

[Out] (e-2*f+4*g-8*h+16*i)*x+1/2*(f-2*g+4*h-8*i)*x^2+1/3*(g-2*h+4*i)*x^3+1/4*(h-2*i)*x^4+1/5*i*x^5+(d-2*e+4*f-8*g+16*h-32*i)*ln(2+x)

Rubi [A] time = 0.15, antiderivative size = 92, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 51, $\frac{\text{number of rules}}{\text{integrand size}} = 0.039$, Rules used = {1586, 1850}

$$\log(x+2)(d-2e+4f-8g+16h-32i)+x(e-2f+4g-8h+16i)+\frac{1}{2}x^2(f-2g+4h-8i)+\frac{1}{3}x^3(g-2h+4i)+\frac{1}{4}x^4(h-2i)+\frac{ix^5}{5}$$

Antiderivative was successfully verified.

[In] Int[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2 + x^4), x]

[Out] (e - 2*f + 4*g - 8*h + 16*i)*x + ((f - 2*g + 4*h - 8*i)*x^2)/2 + ((g - 2*h + 4*i)*x^3)/3 + ((h - 2*i)*x^4)/4 + (i*x^5)/5 + (d - 2*e + 4*f - 8*g + 16*h - 32*i)*Log[2 + x]

Rule 1586

Int[(u_)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] :> Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 1850

Int[(Pq_)*((a_) + (b_)*(x_)^(n_))^(p_), x_Symbol] :> Int[ExpandIntegrand[Pq*(a + b*x^n)^p, x], x] /; FreeQ[{a, b, n}, x] && PolyQ[Pq, x] && (IGtQ[p, 0] || EqQ[n, 1])

Rubi steps

$$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+72x^5)}{4-5x^2+x^4} dx = \int \frac{d+ex+fx^2+gx^3+hx^4+72x^5}{2+x} dx$$

$$= \int \left(1152 \left(1 + \frac{e-2f+4g-8h}{1152} \right) + (-576+f-2g) \right) dx$$

$$= (1152+e-2f+4g-8h)x - \frac{1}{2}(576-f+2g-4h)$$

Mathematica [A] time = 0.03, size = 92, normalized size = 1.00

$$\log(x+2)(d-2e+4f-8g+16h-32i)+x(e-2f+4g-8h+16i)+\frac{1}{2}x^2(f-2g+4h-8i)+\frac{1}{3}x^3(g-2h+4i)+\frac{1}{4}x^4(h-2i)+\frac{ix^5}{5}$$

Antiderivative was successfully verified.

[In] Integrate[((2-x-2*x^2+x^3)*(d+e*x+f*x^2+g*x^3+h*x^4+i*x^5))/(4-5*x^2+x^4),x]

[Out] (e-2*f+4*g-8*h+16*i)*x+((f-2*g+4*h-8*i)*x^2)/2+((g-2*h+4*i)*x^3)/3+((h-2*i)*x^4)/4+(i*x^5)/5+(d-2*e+4*f-8*g+16*h-32*i)*Log[2+x]

fricas [A] time = 0.90, size = 84, normalized size = 0.91

$$\frac{1}{5}ix^5+\frac{1}{4}(h-2i)x^4+\frac{1}{3}(g-2h+4i)x^3+\frac{1}{2}(f-2g+4h-8i)x^2+(e-2f+4g-8h+16i)x+(d-2e+4f-8g+16h-32i)\log(x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x,algorithm="fricas")

[Out] 1/5*i*x^5+1/4*(h-2*i)*x^4+1/3*(g-2*h+4*i)*x^3+1/2*(f-2*g+4*h-8*i)*x^2+(e-2*f+4*g-8*h+16*i)*x+(d-2*e+4*f-8*g+16*h-32*i)*log(x+2)

giac [A] time = 0.27, size = 105, normalized size = 1.14

$$\frac{1}{5}ix^5+\frac{1}{4}hx^4-\frac{1}{2}ix^4+\frac{1}{3}gx^3-\frac{2}{3}hx^3+\frac{4}{3}ix^3+\frac{1}{2}fx^2-gx^2+2hx^2-4ix^2-2fx+4gx-8hx+16ix+xe+(d+4f-8g+16h-32i)\log(x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x,algorithm="giac")

[Out] $\frac{1}{5}ix^5 + \frac{1}{4}hx^4 - \frac{1}{2}ix^4 + \frac{1}{3}gx^3 - \frac{2}{3}hx^3 + \frac{4}{3}ix^3 + \frac{1}{2}fx^2 - gx^2 + 2hx^2 - 4ix^2 - 2fx + 4gx - 8hx + 16ix + xe + (d + 4f - 8g + 16h - 32i - 2e) \log(\text{abs}(x + 2))$

maple [A] time = 0.00, size = 122, normalized size = 1.33

$$\frac{ix^5}{5} + \frac{hx^4}{4} - \frac{ix^4}{2} + \frac{gx^3}{3} - \frac{2hx^3}{3} + \frac{4ix^3}{3} + \frac{fx^2}{2} - gx^2 + 2hx^2 - 4ix^2 + d \ln(x + 2) + ex - 2e \ln(x + 2) - 2fx + 4f \ln(x + 2) +$$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((x^3 - 2x^2 - x + 2) * (ix^5 + hx^4 + gx^3 + fx^2 + ex + d) / (x^4 - 5x^2 + 4), x)$

[Out] $\frac{1}{5}ix^5 + \frac{1}{4}hx^4 - \frac{1}{2}ix^4 + \frac{1}{3}gx^3 - \frac{2}{3}hx^3 + \frac{4}{3}ix^3 + \frac{1}{2}fx^2 - gx^2 + 2hx^2 - 4ix^2 + ex - 2fx + 4f \ln(x + 2) - 2e \ln(x + 2) + 4f \ln(x + 2) - 8g \ln(x + 2) + 16h \ln(x + 2) - 32i \ln(x + 2)$

maxima [A] time = 0.46, size = 84, normalized size = 0.91

$$\frac{1}{5}ix^5 + \frac{1}{4}(h - 2i)x^4 + \frac{1}{3}(g - 2h + 4i)x^3 + \frac{1}{2}(f - 2g + 4h - 8i)x^2 + (e - 2f + 4g - 8h + 16i)x + (d - 2e + 4f -$$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{integrate}((x^3 - 2x^2 - x + 2) * (ix^5 + hx^4 + gx^3 + fx^2 + ex + d) / (x^4 - 5x^2 + 4), x, \text{algorithm} = \text{"maxima"})$

[Out] $\frac{1}{5}ix^5 + \frac{1}{4}(h - 2i)x^4 + \frac{1}{3}(g - 2h + 4i)x^3 + \frac{1}{2}(f - 2g + 4h - 8i)x^2 + (e - 2f + 4g - 8h + 16i)x + (d - 2e + 4f - 8g + 16h - 32i) \log(x + 2)$

mupad [B] time = 0.04, size = 87, normalized size = 0.95

$$x^4 \left(\frac{h}{4} - \frac{i}{2} \right) + \ln(x + 2) (d - 2e + 4f - 8g + 16h - 32i) + \frac{ix^5}{5} + x^2 \left(\frac{f}{2} - g + 2h - 4i \right) + x (e - 2f + 4g - 8h + 16i) +$$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}(-((x + 2x^2 - x^3 - 2) * (d + ex + fx^2 + gx^3 + hx^4 + ix^5)) / (x^4 - 5x^2 + 4), x)$

[Out] $x^4 * (h/4 - i/2) + \log(x + 2) * (d - 2e + 4f - 8g + 16h - 32i) + (ix^5) / 5 + x^2 * (f/2 - g + 2h - 4i) + x * (e - 2f + 4g - 8h + 16i) + x^3 * (g/3 - (2h)/3 + (4i)/3)$

sympy [A] time = 0.25, size = 88, normalized size = 0.96

$$\frac{ix^5}{5} + x^4 \left(\frac{h}{4} - \frac{i}{2} \right) + x^3 \left(\frac{g}{3} - \frac{2h}{3} + \frac{4i}{3} \right) + x^2 \left(\frac{f}{2} - g + 2h - 4i \right) + x (e - 2f + 4g - 8h + 16i) + (d - 2e + 4f - 8g + 16h$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**3-2*x**2-x+2)*(i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] i*x**5/5 + x**4*(h/4 - i/2) + x**3*(g/3 - 2*h/3 + 4*i/3) + x**2*(f/2 - g + 2*h - 4*i) + x*(e - 2*f + 4*g - 8*h + 16*i) + (d - 2*e + 4*f - 8*g + 16*h - 32*i)*log(x + 2)
```

$$3.73 \quad \int \frac{2-3x+x^2}{4-5x^2+x^4} dx$$

Optimal. Leaf size=11

$$\log(x+1) - \log(x+2)$$

[Out] ln(1+x)-ln(2+x)

Rubi [A] time = 0.01, antiderivative size = 11, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.143$, Rules used = {1586, 616, 31}

$$\log(x+1) - \log(x+2)$$

Antiderivative was successfully verified.

[In] Int[(2 - 3*x + x^2)/(4 - 5*x^2 + x^4), x]

[Out] Log[1 + x] - Log[2 + x]

Rule 31

Int[((a_) + (b_)*(x_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 616

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(n_), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[c/q, Int[1/Simp[b/2 - q/2 + c*x, x], x], x] - Dist[c/q, Int[1/Simp[b/2 + q/2 + c*x, x], x], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[b^2 - 4*a*c] && PerfectSquareQ[b^2 - 4*a*c]

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rubi steps

$$\begin{aligned}\int \frac{2-3x+x^2}{4-5x^2+x^4} dx &= \int \frac{1}{2+3x+x^2} dx \\ &= \int \frac{1}{1+x} dx - \int \frac{1}{2+x} dx \\ &= \log(1+x) - \log(2+x)\end{aligned}$$

Mathematica [A] time = 0.00, size = 11, normalized size = 1.00

$$\log(x+1) - \log(x+2)$$

Antiderivative was successfully verified.

[In] Integrate[(2 - 3*x + x^2)/(4 - 5*x^2 + x^4), x]

[Out] Log[1 + x] - Log[2 + x]

fricas [A] time = 0.93, size = 11, normalized size = 1.00

$$-\log(x+2) + \log(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)/(x^4-5*x^2+4), x, algorithm="fricas")

[Out] -log(x + 2) + log(x + 1)

giac [A] time = 0.28, size = 13, normalized size = 1.18

$$-\log(|x+2|) + \log(|x+1|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)/(x^4-5*x^2+4), x, algorithm="giac")

[Out] -log(abs(x + 2)) + log(abs(x + 1))

maple [A] time = 0.00, size = 12, normalized size = 1.09

$$-\ln(x+2) + \ln(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^2-3*x+2)/(x^4-5*x^2+4), x)

[Out] ln(x+1)-ln(x+2)

maxima [A] time = 0.43, size = 11, normalized size = 1.00

$$-\log(x + 2) + \log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)/(x^4-5*x^2+4),x, algorithm="maxima")

[Out] -log(x + 2) + log(x + 1)

mupad [B] time = 0.08, size = 8, normalized size = 0.73

$$-2 \operatorname{atanh}(2x + 3)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^2 - 3*x + 2)/(x^4 - 5*x^2 + 4),x)

[Out] -2*atanh(2*x + 3)

sympy [A] time = 0.11, size = 8, normalized size = 0.73

$$\log(x + 1) - \log(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x**2-3*x+2)/(x**4-5*x**2+4),x)

[Out] log(x + 1) - log(x + 2)

$$3.74 \quad \int \frac{(d+ex)(2-3x+x^2)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=22

$$(d - e) \log(x + 1) - (d - 2e) \log(x + 2)$$

[Out] (d-e)*ln(1+x)-(d-2*e)*ln(2+x)

Rubi [A] time = 0.02, antiderivative size = 22, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 3, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.115$, Rules used = {1586, 632, 31}

$$(d - e) \log(x + 1) - (d - 2e) \log(x + 2)$$

Antiderivative was successfully verified.

[In] Int[((d + e*x)*(2 - 3*x + x^2))/(4 - 5*x^2 + x^4), x]

[Out] (d - e)*Log[1 + x] - (d - 2*e)*Log[2 + x]

Rule 31

Int[((a_) + (b_.)*(x_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 632

Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && NiceSqrtQ[b^2 - 4*a*c]

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rubi steps

$$\begin{aligned} \int \frac{(d+ex)(2-3x+x^2)}{4-5x^2+x^4} dx &= \int \frac{d+ex}{2+3x+x^2} dx \\ &= -\left((d-2e) \int \frac{1}{2+x} dx\right) + (d-e) \int \frac{1}{1+x} dx \\ &= (d-e) \log(1+x) - (d-2e) \log(2+x) \end{aligned}$$

Mathematica [A] time = 0.01, size = 23, normalized size = 1.05

$$(d-e) \log(x+1) + (2e-d) \log(x+2)$$

Antiderivative was successfully verified.

[In] Integrate[((d + e*x)*(2 - 3*x + x^2))/(4 - 5*x^2 + x^4), x]

[Out] (d - e)*Log[1 + x] + (-d + 2*e)*Log[2 + x]

fricas [A] time = 0.83, size = 22, normalized size = 1.00

$$-(d-2e) \log(x+2) + (d-e) \log(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4), x, algorithm="fricas")

[Out] -(d - 2*e)*log(x + 2) + (d - e)*log(x + 1)

giac [A] time = 0.29, size = 26, normalized size = 1.18

$$-(d-2e) \log(|x+2|) + (d-e) \log(|x+1|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4), x, algorithm="giac")

[Out] -(d - 2*e)*log(abs(x + 2)) + (d - e)*log(abs(x + 1))

maple [A] time = 0.00, size = 29, normalized size = 1.32

$$-d \ln(x+2) + d \ln(x+1) + 2e \ln(x+2) - e \ln(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4), x)

[Out] $d \cdot \ln(x+1) - e \cdot \ln(x+1) - d \cdot \ln(x+2) + 2 \cdot e \cdot \ln(x+2)$

maxima [A] time = 0.44, size = 22, normalized size = 1.00

$$-(d - 2e) \log(x + 2) + (d - e) \log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4),x, algorithm="maxima")`

[Out] $-(d - 2e) \cdot \log(x + 2) + (d - e) \cdot \log(x + 1)$

mupad [B] time = 0.80, size = 22, normalized size = 1.00

$$\ln(x + 1) (d - e) - \ln(x + 2) (d - 2e)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int(((d + e*x)*(x^2 - 3*x + 2))/(x^4 - 5*x^2 + 4),x)`

[Out] $\log(x + 1) \cdot (d - e) - \log(x + 2) \cdot (d - 2e)$

sympy [A] time = 0.28, size = 29, normalized size = 1.32

$$(-d + 2e) \log\left(x + \frac{4d - 6e}{2d - 3e}\right) + (d - e) \log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)*(x**2-3*x+2)/(x**4-5*x**2+4),x)`

[Out] $(-d + 2e) \cdot \log(x + (4d - 6e)/(2d - 3e)) + (d - e) \cdot \log(x + 1)$

$$3.75 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=29

$$\log(x+1)(d-e+f) - \log(x+2)(d-2e+4f) + fx$$

[Out] f*x+(d-e+f)*ln(1+x)-(d-2*e+4*f)*ln(2+x)

Rubi [A] time = 0.05, antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.129$, Rules used = {1586, 1657, 632, 31}

$$\log(x+1)(d-e+f) - \log(x+2)(d-2e+4f) + fx$$

Antiderivative was successfully verified.

[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4), x]

[Out] f*x + (d - e + f)*Log[1 + x] - (d - 2*e + 4*f)*Log[2 + x]

Rule 31

Int[((a_) + (b_)*(x_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 632

Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && NiceSqrtQ[b^2 - 4*a*c]

Rule 1586

Int[(u_)*(P_x_)^(p_)*(Q_x_)^(q_), x_Symbol] := Int[u*PolynomialQuotient[P_x, Q_x, x]^p*Q_x^(p+q), x] /; FreeQ[q, x] && PolyQ[P_x, x] && PolyQ[Q_x, x] && EqQ[PolynomialRemainder[P_x, Q_x, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 1657

Int[(P_q)*((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol] := Int[ExpandIntegrand[P_q*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[P_q, x] && IGtQ[p, -2]

Rubi steps

$$\begin{aligned}
\int \frac{(2-3x+x^2)(d+ex+fx^2)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2}{2+3x+x^2} dx \\
&= \int \left(f + \frac{d-2f+(e-3f)x}{2+3x+x^2} \right) dx \\
&= fx + \int \frac{d-2f+(e-3f)x}{2+3x+x^2} dx \\
&= fx + (d-e+f) \int \frac{1}{1+x} dx - (d-2e+4f) \int \frac{1}{2+x} dx \\
&= fx + (d-e+f) \log(1+x) - (d-2e+4f) \log(2+x)
\end{aligned}$$

Mathematica [A] time = 0.01, size = 30, normalized size = 1.03

$$\log(x+1)(d-e+f) + \log(x+2)(-d+2e-4f) + fx$$

Antiderivative was successfully verified.

[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4), x]

[Out] f*x + (d - e + f)*Log[1 + x] + (-d + 2*e - 4*f)*Log[2 + x]

fricas [A] time = 0.95, size = 29, normalized size = 1.00

$$fx - (d - 2e + 4f) \log(x + 2) + (d - e + f) \log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4), x, algorithm="fricas")

[Out] f*x - (d - 2*e + 4*f)*log(x + 2) + (d - e + f)*log(x + 1)

giac [A] time = 0.25, size = 33, normalized size = 1.14

$$fx - (d + 4f - 2e) \log(|x + 2|) + (d + f - e) \log(|x + 1|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4), x, algorithm="giac")

[Out] f*x - (d + 4*f - 2*e)*log(abs(x + 2)) + (d + f - e)*log(abs(x + 1))

maple [A] time = 0.01, size = 45, normalized size = 1.55

$$-d \ln(x+2) + d \ln(x+1) + 2e \ln(x+2) - e \ln(x+1) + fx - 4f \ln(x+2) + f \ln(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4),x)`

[Out] `f*x+d*ln(x+1)-e*ln(x+1)+f*ln(x+1)-d*ln(x+2)+2*e*ln(x+2)-4*f*ln(x+2)`

maxima [A] time = 0.43, size = 29, normalized size = 1.00

$$fx - (d - 2e + 4f) \log(x + 2) + (d - e + f) \log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")`

[Out] `f*x - (d - 2*e + 4*f)*log(x + 2) + (d - e + f)*log(x + 1)`

mupad [B] time = 0.07, size = 29, normalized size = 1.00

$$fx + \ln(x + 1) (d - e + f) - \ln(x + 2) (d - 2e + 4f)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int(((x^2 - 3*x + 2)*(d + e*x + f*x^2))/(x^4 - 5*x^2 + 4),x)`

[Out] `f*x + log(x + 1)*(d - e + f) - log(x + 2)*(d - 2*e + 4*f)`

sympy [A] time = 0.51, size = 44, normalized size = 1.52

$$fx + (-d + 2e - 4f) \log\left(x + \frac{4d - 6e + 10f}{2d - 3e + 5f}\right) + (d - e + f) \log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((x**2-3*x+2)*(f*x**2+e*x+d)/(x**4-5*x**2+4),x)`

[Out] `f*x + (-d + 2*e - 4*f)*log(x + (4*d - 6*e + 10*f)/(2*d - 3*e + 5*f)) + (d - e + f)*log(x + 1)`

$$3.76 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=47

$$\log(x+1)(d-e+f-g) - \log(x+2)(d-2e+4f-8g) + x(f-3g) + \frac{gx^2}{2}$$

[Out] (f-3*g)*x+1/2*g*x^2+(d-e+f-g)*ln(1+x)-(d-2*e+4*f-8*g)*ln(2+x)

Rubi [A] time = 0.07, antiderivative size = 47, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {1586, 1657, 632, 31}

$$\log(x+1)(d-e+f-g) - \log(x+2)(d-2e+4f-8g) + x(f-3g) + \frac{gx^2}{2}$$

Antiderivative was successfully verified.

[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4), x]

[Out] (f - 3*g)*x + (g*x^2)/2 + (d - e + f - g)*Log[1 + x] - (d - 2*e + 4*f - 8*g)*Log[2 + x]

Rule 31

Int[((a_) + (b_.)*(x_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 632

Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && NiceSqrtQ[b^2 - 4*a*c]

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 1657

Int[(Pq_)*((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_.), x_Symbol] := Int[Expand[Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq

, x] && IGtQ[p, -2]

Rubi steps

$$\begin{aligned}
 \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3}{2+3x+x^2} dx \\
 &= \int \left(f-3g+gx + \frac{d-2f+6g+(e-3f+7g)x}{2+3x+x^2} \right) dx \\
 &= (f-3g)x + \frac{gx^2}{2} + \int \frac{d-2f+6g+(e-3f+7g)x}{2+3x+x^2} dx \\
 &= (f-3g)x + \frac{gx^2}{2} - (d-2e+4f-8g) \int \frac{1}{2+x} dx + (d-e+f-g) \int \frac{1}{2+x} dx \\
 &= (f-3g)x + \frac{gx^2}{2} + (d-e+f-g) \log(1+x) - (d-2e+4f-8g) \log(2+x)
 \end{aligned}$$

Mathematica [A] time = 0.02, size = 44, normalized size = 0.94

$$\log(x+1)(d-e+f-g) - \log(x+2)(d-2e+4f-8g) + fx + \frac{1}{2}g(x-6)x$$

Antiderivative was successfully verified.

[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4), x]

[Out] f*x + (g*(-6 + x)*x)/2 + (d - e + f - g)*Log[1 + x] - (d - 2*e + 4*f - 8*g)*Log[2 + x]

fricas [A] time = 0.84, size = 45, normalized size = 0.96

$$\frac{1}{2}gx^2 + (f-3g)x - (d-2e+4f-8g)\log(x+2) + (d-e+f-g)\log(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4), x, algorithm="fricas")

[Out] 1/2*g*x^2 + (f - 3*g)*x - (d - 2*e + 4*f - 8*g)*log(x + 2) + (d - e + f - g)*log(x + 1)

giac [A] time = 0.23, size = 49, normalized size = 1.04

$$\frac{1}{2}gx^2 + fx - 3gx - (d+4f-8g-2e)\log(|x+2|) + (d+f-g-e)\log(|x+1|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")

[Out] 1/2*g*x^2 + f*x - 3*g*x - (d + 4*f - 8*g - 2*e)*log(abs(x + 2)) + (d + f - g - e)*log(abs(x + 1))

maple [A] time = 0.01, size = 69, normalized size = 1.47

$$\frac{g x^2}{2} - d \ln(x+2) + d \ln(x+1) + 2e \ln(x+2) - e \ln(x+1) + f x - 4f \ln(x+2) + f \ln(x+1) - 3g x + 8g \ln(x+2) - g \ln(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)

[Out] 1/2*g*x^2+f*x-3*g*x+d*ln(x+1)-e*ln(x+1)+f*ln(x+1)-g*ln(x+1)-d*ln(x+2)+2*e*ln(x+2)-4*f*ln(x+2)+8*g*ln(x+2)

maxima [A] time = 0.45, size = 45, normalized size = 0.96

$$\frac{1}{2} g x^2 + (f - 3g)x - (d - 2e + 4f - 8g) \log(x + 2) + (d - e + f - g) \log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")

[Out] 1/2*g*x^2 + (f - 3*g)*x - (d - 2*e + 4*f - 8*g)*log(x + 2) + (d - e + f - g)*log(x + 1)

mupad [B] time = 0.76, size = 45, normalized size = 0.96

$$\ln(x+1) (d - e + f - g) + x (f - 3g) + \frac{g x^2}{2} - \ln(x+2) (d - 2e + 4f - 8g)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2 + g*x^3))/(x^4 - 5*x^2 + 4),x)

[Out] log(x + 1)*(d - e + f - g) + x*(f - 3*g) + (g*x^2)/2 - log(x + 2)*(d - 2*e + 4*f - 8*g)

sympy [A] time = 0.86, size = 66, normalized size = 1.40

$$\frac{g x^2}{2} + x (f - 3g) + (-d + 2e - 4f + 8g) \log\left(x + \frac{4d - 6e + 10f - 18g}{2d - 3e + 5f - 9g}\right) + (d - e + f - g) \log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**2-3*x+2)*(g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] g*x**2/2 + x*(f - 3*g) + (-d + 2*e - 4*f + 8*g)*log(x + (4*d - 6*e + 10*f - 18*g)/(2*d - 3*e + 5*f - 9*g)) + (d - e + f - g)*log(x + 1)
```

$$3.77 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=66

$$\log(x+1)(d-e+f-g+h) - \log(x+2)(d-2e+4f-8g+16h) + x(f-3g+7h) + \frac{1}{2}x^2(g-3h) + \frac{hx^3}{3}$$

[Out] (f-3*g+7*h)*x+1/2*(g-3*h)*x^2+1/3*h*x^3+(d-e+f-g+h)*ln(1+x)-(d-2*e+4*f-8*g+16*h)*ln(2+x)

Rubi [A] time = 0.09, antiderivative size = 66, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, integrand size = 41, $\frac{\text{number of rules}}{\text{integrand size}} = 0.098$, Rules used = {1586, 1657, 632, 31}

$$\log(x+1)(d-e+f-g+h) - \log(x+2)(d-2e+4f-8g+16h) + x(f-3g+7h) + \frac{1}{2}x^2(g-3h) + \frac{hx^3}{3}$$

Antiderivative was successfully verified.

[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + x^4), x]

[Out] (f - 3*g + 7*h)*x + ((g - 3*h)*x^2)/2 + (h*x^3)/3 + (d - e + f - g + h)*Log[1 + x] - (d - 2*e + 4*f - 8*g + 16*h)*Log[2 + x]

Rule 31

Int[((a_) + (b_.)*(x_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 632

Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && NiceSqrtQ[b^2 - 4*a*c]

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 1657

```
Int[(Pq_)*((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol] :> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq
, x] && IGtQ[p, -2]
```

Rubi steps

$$\begin{aligned} \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{2+3x+x^2} dx \\ &= \int \left(f-3g+7h + (g-3h)x + hx^2 + \frac{d-2f+6g-14h+(e-g)}{2+3x+x^2} \right) dx \\ &= (f-3g+7h)x + \frac{1}{2}(g-3h)x^2 + \frac{hx^3}{3} + \int \frac{d-2f+6g-14h+(e-g)}{2+3x+x^2} dx \\ &= (f-3g+7h)x + \frac{1}{2}(g-3h)x^2 + \frac{hx^3}{3} + (d-e+f-g+h) \int \frac{1}{2+3x+x^2} dx \\ &= (f-3g+7h)x + \frac{1}{2}(g-3h)x^2 + \frac{hx^3}{3} + (d-e+f-g+h) \log \left| \frac{2+3x+x^2}{2+3x+x^2} \right| \end{aligned}$$

Mathematica [A] time = 0.02, size = 67, normalized size = 1.02

$$\log(x+1)(d-e+f-g+h) + \log(x+2)(-d+2e-4f+8g-16h) + x(f-3g+7h) + \frac{1}{2}x^2(g-3h) + \frac{hx^3}{3}$$

Antiderivative was successfully verified.

```
[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 +
x^4), x]
```

```
[Out] (f - 3*g + 7*h)*x + ((g - 3*h)*x^2)/2 + (h*x^3)/3 + (d - e + f - g + h)*Log
[1 + x] + (-d + 2*e - 4*f + 8*g - 16*h)*Log[2 + x]
```

fricas [A] time = 0.82, size = 62, normalized size = 0.94

$$\frac{1}{3}hx^3 + \frac{1}{2}(g-3h)x^2 + (f-3g+7h)x - (d-2e+4f-8g+16h)\log(x+2) + (d-e+f-g+h)\log(x+1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4), x, algorithm=
"fricas")
```

```
[Out] 1/3*h*x^3 + 1/2*(g - 3*h)*x^2 + (f - 3*g + 7*h)*x - (d - 2*e + 4*f - 8*g +
16*h)*log(x + 2) + (d - e + f - g + h)*log(x + 1)
```

giac [A] time = 0.29, size = 69, normalized size = 1.05

$$\frac{1}{3}hx^3 + \frac{1}{2}gx^2 - \frac{3}{2}hx^2 + fx - 3gx + 7hx - (d + 4f - 8g + 16h - 2e) \log(|x + 2|) + (d + f - g + h - e) \log(|x + 1|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")

[Out] 1/3*h*x^3 + 1/2*g*x^2 - 3/2*h*x^2 + f*x - 3*g*x + 7*h*x - (d + 4*f - 8*g + 16*h - 2*e)*log(abs(x + 2)) + (d + f - g + h - e)*log(abs(x + 1))

maple [A] time = 0.01, size = 98, normalized size = 1.48

$$\frac{hx^3}{3} + \frac{gx^2}{2} - \frac{3hx^2}{2} - d \ln(x + 2) + d \ln(x + 1) + 2e \ln(x + 2) - e \ln(x + 1) + fx - 4f \ln(x + 2) + f \ln(x + 1) - 3gx + 8g \ln(x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)

[Out] 1/3*h*x^3+1/2*g*x^2-3/2*h*x^2+f*x-3*g*x+7*h*x+d*ln(x+1)-e*ln(x+1)+f*ln(x+1)-g*ln(x+1)+h*ln(x+1)-d*ln(x+2)+2*e*ln(x+2)-4*f*ln(x+2)+8*g*ln(x+2)-16*h*ln(x+2)

maxima [A] time = 0.44, size = 62, normalized size = 0.94

$$\frac{1}{3}hx^3 + \frac{1}{2}(g - 3h)x^2 + (f - 3g + 7h)x - (d - 2e + 4f - 8g + 16h) \log(x + 2) + (d - e + f - g + h) \log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")

[Out] 1/3*h*x^3 + 1/2*(g - 3*h)*x^2 + (f - 3*g + 7*h)*x - (d - 2*e + 4*f - 8*g + 16*h)*log(x + 2) + (d - e + f - g + h)*log(x + 1)

mupad [B] time = 0.07, size = 63, normalized size = 0.95

$$x^2 \left(\frac{g}{2} - \frac{3h}{2} \right) + x (f - 3g + 7h) - \ln(x + 2) (d - 2e + 4f - 8g + 16h) + \frac{hx^3}{3} + \ln(x + 1) (d - e + f - g + h)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(x^4 - 5*x^2 + 4),x)

[Out] $x^2*(g/2 - (3*h)/2) + x*(f - 3*g + 7*h) - \log(x + 2)*(d - 2*e + 4*f - 8*g + 16*h) + (h*x^3)/3 + \log(x + 1)*(d - e + f - g + h)$

sympy [A] time = 1.53, size = 94, normalized size = 1.42

$$\frac{hx^3}{3} + x^2 \left(\frac{g}{2} - \frac{3h}{2} \right) + x(f - 3g + 7h) + (-d + 2e - 4f + 8g - 16h) \log \left(x + \frac{4d - 6e + 10f - 18g + 34h}{2d - 3e + 5f - 9g + 17h} \right) + (d - e + f - g + h) \log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x**2-3*x+2)*(h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)

[Out] $h*x**3/3 + x**2*(g/2 - 3*h/2) + x*(f - 3*g + 7*h) + (-d + 2*e - 4*f + 8*g - 16*h)*\log(x + (4*d - 6*e + 10*f - 18*g + 34*h)/(2*d - 3*e + 5*f - 9*g + 17*h)) + (d - e + f - g + h)*\log(x + 1)$

$$3.78 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=90

$$\log(x+1)(d-e+f-g+h-i) - \log(x+2)(d-2e+4f-8g+16h-32i) + x(f-3g+7h-15i) + \frac{1}{2}x^2(g-3h+7i) + \frac{1}{3}x^3(h-3i) + \frac{ix^4}{4}$$

[Out] (f-3*g+7*h-15*i)*x+1/2*(g-3*h+7*i)*x^2+1/3*(h-3*i)*x^3+1/4*i*x^4+(d-e+f-g+h-i)*ln(1+x)-(d-2*e+4*f-8*g+16*h-32*i)*ln(2+x)

Rubi [A] time = 0.11, antiderivative size = 90, normalized size of antiderivative = 1.00, number of steps used = 6, number of rules used = 4, integrand size = 46, $\frac{\text{number of rules}}{\text{integrand size}} = 0.087$, Rules used = {1586, 1657, 632, 31}

$$\log(x+1)(d-e+f-g+h-i) - \log(x+2)(d-2e+4f-8g+16h-32i) + x(f-3g+7h-15i) + \frac{1}{2}x^2(g-3h+7i) + \frac{1}{3}x^3(h-3i) + \frac{ix^4}{4}$$

Antiderivative was successfully verified.

[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2 + x^4), x]

[Out] (f - 3*g + 7*h - 15*i)*x + ((g - 3*h + 7*i)*x^2)/2 + ((h - 3*i)*x^3)/3 + (i*x^4)/4 + (d - e + f - g + h - i)*Log[1 + x] - (d - 2*e + 4*f - 8*g + 16*h - 32*i)*Log[2 + x]

Rule 31

Int[((a_) + (b_.)*(x_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 632

Int[((d_.) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x], x]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && NiceSqrtQ[b^2 - 4*a*c]

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 1657

`Int[(Pq_)*((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol] :> Int[Expand
Integrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq,
x] && IGtQ[p, -2]`

Rubi steps

$$\begin{aligned} \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+78x^5)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+78x^5}{2+3x+x^2} dx \\ &= \int \left(-1170 + f - 3g + 7h + (546 + g - 3h)x - (234 - \dots) \right. \\ &= -(1170 - f + 3g - 7h)x + \frac{1}{2}(546 + g - 3h)x^2 - \frac{1}{3}(234 - \dots) \\ &= -(1170 - f + 3g - 7h)x + \frac{1}{2}(546 + g - 3h)x^2 - \frac{1}{3}(234 - \dots) \\ &= -(1170 - f + 3g - 7h)x + \frac{1}{2}(546 + g - 3h)x^2 - \frac{1}{3}(234 - \dots) \end{aligned}$$

Mathematica [A] time = 0.04, size = 91, normalized size = 1.01

$$\log(x+1)(d-e+f-g+h-i)+\log(x+2)(-d+2e-4f+8g-16h+32i)+x(f-3g+7h-15i)+\frac{1}{2}x^2(g-3h+7i)+\frac{1}{3}x^3(h-3i)+\dots$$

Antiderivative was successfully verified.

[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2 + x^4), x]

[Out] (f - 3*g + 7*h - 15*i)*x + ((g - 3*h + 7*i)*x^2)/2 + ((h - 3*i)*x^3)/3 + (i*x^4)/4 + (d - e + f - g + h - i)*Log[1 + x] + (-d + 2*e - 4*f + 8*g - 16*h + 32*i)*Log[2 + x]

fricas [A] time = 0.82, size = 84, normalized size = 0.93

$$\frac{1}{4}ix^4 + \frac{1}{3}(h-3i)x^3 + \frac{1}{2}(g-3h+7i)x^2 + (f-3g+7h-15i)x - (d-2e+4f-8g+16h-32i)\log(x+2) + \dots$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4), x, algorithm="fricas")

[Out] $\frac{1}{4}ix^4 + \frac{1}{3}(h - 3i)x^3 + \frac{1}{2}(g - 3h + 7i)x^2 + (f - 3g + 7h - 15i)x - (d - 2e + 4f - 8g + 16h - 32i)\log(x + 2) + (d - e + f - g + h - i)\log(x + 1)$

giac [A] time = 0.39, size = 97, normalized size = 1.08

$$\frac{1}{4}ix^4 + \frac{1}{3}hx^3 - ix^3 + \frac{1}{2}gx^2 - \frac{3}{2}hx^2 + \frac{7}{2}ix^2 + fx - 3gx + 7hx - 15ix - (d + 4f - 8g + 16h - 32i - 2e)\log(|x + 2|) + (d +$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")`

[Out] $\frac{1}{4}ix^4 + \frac{1}{3}hx^3 - ix^3 + \frac{1}{2}gx^2 - \frac{3}{2}hx^2 + \frac{7}{2}ix^2 + fx - 3gx + 7hx - 15ix - (d + 4f - 8g + 16h - 32i - 2e)\log(\text{abs}(x + 2)) + (d + f - g + h - i - e)\log(\text{abs}(x + 1))$

maple [A] time = 0.01, size = 134, normalized size = 1.49

$$\frac{ix^4}{4} + \frac{hx^3}{3} - ix^3 + \frac{gx^2}{2} - \frac{3hx^2}{2} + \frac{7ix^2}{2} - d\ln(x + 2) + d\ln(x + 1) + 2e\ln(x + 2) - e\ln(x + 1) + fx - 4f\ln(x + 2) + f\ln(x$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)`

[Out] $\frac{1}{4}ix^4 + \frac{1}{3}hx^3 - ix^3 + \frac{1}{2}gx^2 - \frac{3}{2}hx^2 + \frac{7}{2}ix^2 + fx - 3gx + 7hx - 15ix + d\ln(x + 1) - e\ln(x + 1) + f\ln(x + 1) - g\ln(x + 1) + h\ln(x + 1) - i\ln(x + 1) - d\ln(x + 2) + 2e\ln(x + 2) - 4f\ln(x + 2) + 8g\ln(x + 2) - 16h\ln(x + 2) + 32i\ln(x + 2)$

maxima [A] time = 0.44, size = 84, normalized size = 0.93

$$\frac{1}{4}ix^4 + \frac{1}{3}(h - 3i)x^3 + \frac{1}{2}(g - 3h + 7i)x^2 + (f - 3g + 7h - 15i)x - (d - 2e + 4f - 8g + 16h - 32i)\log(x + 2) + (d$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")`

[Out] $\frac{1}{4}ix^4 + \frac{1}{3}(h - 3i)x^3 + \frac{1}{2}(g - 3h + 7i)x^2 + (f - 3g + 7h - 15i)x - (d - 2e + 4f - 8g + 16h - 32i)\log(x + 2) + (d - e + f - g + h - i)\log(x + 1)$

mupad [B] time = 0.08, size = 86, normalized size = 0.96

$$x^3 \left(\frac{h}{3} - i \right) - \ln(x + 2) (d - 2e + 4f - 8g + 16h - 32i) + \ln(x + 1) (d - e + f - g + h - i) + \frac{ix^4}{4} + x^2 \left(\frac{g}{2} - \frac{3h}{2} + \frac{7i}{2} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(x^4 - 5*x^2 + 4), x)
```

```
[Out] x^3*(h/3 - i) - log(x + 2)*(d - 2*e + 4*f - 8*g + 16*h - 32*i) + log(x + 1)
*(d - e + f - g + h - i) + (i*x^4)/4 + x^2*(g/2 - (3*h)/2 + (7*i)/2) + x*(f
- 3*g + 7*h - 15*i)
```

sympy [A] time = 2.59, size = 122, normalized size = 1.36

$$\frac{ix^4}{4} + x^3 \left(\frac{h}{3} - i \right) + x^2 \left(\frac{g}{2} - \frac{3h}{2} + \frac{7i}{2} \right) + x(f - 3g + 7h - 15i) + (-d + 2e - 4f + 8g - 16h + 32i) \log \left(x + \frac{4d - 6e + 10f - 8g + 34h - 66i}{2d - 3e + 5f - 9g + 17h - 33i} \right) + (d - e + f - g + h - i) \log(x + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**2-3*x+2)*(i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),
x)
```

```
[Out] i*x**4/4 + x**3*(h/3 - i) + x**2*(g/2 - 3*h/2 + 7*i/2) + x*(f - 3*g + 7*h -
15*i) + (-d + 2*e - 4*f + 8*g - 16*h + 32*i)*log(x + (4*d - 6*e + 10*f - 1
8*g + 34*h - 66*i)/(2*d - 3*e + 5*f - 9*g + 17*h - 33*i)) + (d - e + f - g
+ h - i)*log(x + 1)
```

$$3.79 \quad \int \frac{2+x}{4-5x^2+x^4} dx$$

Optimal. Leaf size=29

$$-\frac{1}{2} \log(1-x) + \frac{1}{3} \log(2-x) + \frac{1}{6} \log(x+1)$$

[Out] $-1/2*\ln(1-x)+1/3*\ln(2-x)+1/6*\ln(1+x)$

Rubi [A] time = 0.02, antiderivative size = 29, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {1586, 2058}

$$-\frac{1}{2} \log(1-x) + \frac{1}{3} \log(2-x) + \frac{1}{6} \log(x+1)$$

Antiderivative was successfully verified.

[In] $\text{Int}[(2+x)/(4-5*x^2+x^4),x]$

[Out] $-\text{Log}[1-x]/2 + \text{Log}[2-x]/3 + \text{Log}[1+x]/6$

Rule 1586

$\text{Int}[(u_*)*(P_x)^{(p_*)}*(Q_x)^{(q_*)}, x_Symbol] \rightarrow \text{Int}[u*\text{PolynomialQuotient}[P_x, Q_x, x]^p*Q_x^q, x] /; \text{FreeQ}[q, x] \ \&\& \ \text{PolyQ}[P_x, x] \ \&\& \ \text{PolyQ}[Q_x, x] \ \&\& \ \text{EqQ}[\text{PolynomialRemainder}[P_x, Q_x, x], 0] \ \&\& \ \text{IntegerQ}[p] \ \&\& \ \text{LtQ}[p*q, 0]$

Rule 2058

$\text{Int}[(P_)^{(p_)}, x_Symbol] \rightarrow \text{With}[\{u = \text{Factor}[P]\}, \text{Int}[\text{ExpandIntegrand}[u^p, x], x] /; \text{!SumQ}[\text{NonfreeFactors}[u, x]]] /; \text{PolyQ}[P, x] \ \&\& \ \text{ILtQ}[p, 0]$

Rubi steps

$$\begin{aligned} \int \frac{2+x}{4-5x^2+x^4} dx &= \int \frac{1}{2-x-2x^2+x^3} dx \\ &= \int \left(\frac{1}{3(-2+x)} - \frac{1}{2(-1+x)} + \frac{1}{6(1+x)} \right) dx \\ &= -\frac{1}{2} \log(1-x) + \frac{1}{3} \log(2-x) + \frac{1}{6} \log(1+x) \end{aligned}$$

Mathematica [A] time = 0.01, size = 29, normalized size = 1.00

$$-\frac{1}{2} \log(1-x) + \frac{1}{3} \log(2-x) + \frac{1}{6} \log(x+1)$$

Antiderivative was successfully verified.

[In] Integrate[(2 + x)/(4 - 5*x^2 + x^4), x]

[Out] -1/2*Log[1 - x] + Log[2 - x]/3 + Log[1 + x]/6

fricas [A] time = 0.90, size = 19, normalized size = 0.66

$$\frac{1}{6} \log(x+1) - \frac{1}{2} \log(x-1) + \frac{1}{3} \log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)/(x^4-5*x^2+4), x, algorithm="fricas")

[Out] 1/6*log(x + 1) - 1/2*log(x - 1) + 1/3*log(x - 2)

giac [A] time = 0.24, size = 22, normalized size = 0.76

$$\frac{1}{6} \log(|x+1|) - \frac{1}{2} \log(|x-1|) + \frac{1}{3} \log(|x-2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)/(x^4-5*x^2+4), x, algorithm="giac")

[Out] 1/6*log(abs(x + 1)) - 1/2*log(abs(x - 1)) + 1/3*log(abs(x - 2))

maple [A] time = 0.01, size = 20, normalized size = 0.69

$$\frac{\ln(x-2)}{3} - \frac{\ln(x-1)}{2} + \frac{\ln(x+1)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x+2)/(x^4-5*x^2+4), x)

[Out] 1/3*ln(x-2)+1/6*ln(x+1)-1/2*ln(x-1)

maxima [A] time = 0.44, size = 19, normalized size = 0.66

$$\frac{1}{6} \log(x+1) - \frac{1}{2} \log(x-1) + \frac{1}{3} \log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)/(x^4-5*x^2+4),x, algorithm="maxima")

[Out] 1/6*log(x + 1) - 1/2*log(x - 1) + 1/3*log(x - 2)

mupad [B] time = 0.08, size = 19, normalized size = 0.66

$$\frac{\ln(x+1)}{6} - \frac{\ln(x-1)}{2} + \frac{\ln(x-2)}{3}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x + 2)/(x^4 - 5*x^2 + 4),x)

[Out] log(x + 1)/6 - log(x - 1)/2 + log(x - 2)/3

sympy [A] time = 0.14, size = 19, normalized size = 0.66

$$\frac{\log(x-2)}{3} - \frac{\log(x-1)}{2} + \frac{\log(x+1)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)/(x**4-5*x**2+4),x)

[Out] log(x - 2)/3 - log(x - 1)/2 + log(x + 1)/6

$$3.80 \quad \int \frac{(2+x)(d+ex)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=42

$$-\frac{1}{2}(d+e)\log(1-x) + \frac{1}{3}(d+2e)\log(2-x) + \frac{1}{6}(d-e)\log(x+1)$$

[Out] $-1/2*(d+e)*\ln(1-x)+1/3*(d+2*e)*\ln(2-x)+1/6*(d-e)*\ln(1+x)$

Rubi [A] time = 0.05, antiderivative size = 42, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {1586, 2074}

$$-\frac{1}{2}(d+e)\log(1-x) + \frac{1}{3}(d+2e)\log(2-x) + \frac{1}{6}(d-e)\log(x+1)$$

Antiderivative was successfully verified.

[In] $\text{Int}[\frac{(2+x)*(d+e*x)}{4-5*x^2+x^4}, x]$

[Out] $-\frac{(d+e)*\text{Log}[1-x]}{2} + \frac{(d+2*e)*\text{Log}[2-x]}{3} + \frac{(d-e)*\text{Log}[1+x]}{6}$

Rule 1586

$\text{Int}[(u_*)*(P_x)^{(p_*)}*(Q_x)^{(q_*)}, x_Symbol] \rightarrow \text{Int}[u*\text{PolynomialQuotient}[P_x, Q_x, x]^p*Q_x^{(p+q)}, x] /; \text{FreeQ}[q, x] \ \&\& \ \text{PolyQ}[P_x, x] \ \&\& \ \text{PolyQ}[Q_x, x] \ \&\& \ \text{EqQ}[\text{PolynomialRemainder}[P_x, Q_x, x], 0] \ \&\& \ \text{IntegerQ}[p] \ \&\& \ \text{LtQ}[p*q, 0]$

Rule 2074

$\text{Int}[(P_*)^{(p_*)}*(Q_*)^{(q_*)}, x_Symbol] \rightarrow \text{With}[\{PP = \text{Factor}[P]\}, \text{Int}[\text{ExpandIntegrand}[PP^p*Q^q, x], x] /; \text{!SumQ}[\text{NonfreeFactors}[PP, x]]] /; \text{FreeQ}[q, x] \ \&\& \ \text{PolyQ}[P, x] \ \&\& \ \text{PolyQ}[Q, x] \ \&\& \ \text{IntegerQ}[p] \ \&\& \ \text{NeQ}[P, x]$

Rubi steps

$$\begin{aligned} \int \frac{(2+x)(d+ex)}{4-5x^2+x^4} dx &= \int \frac{d+ex}{2-x-2x^2+x^3} dx \\ &= \int \left(\frac{d+2e}{3(-2+x)} + \frac{-d-e}{2(-1+x)} + \frac{d-e}{6(1+x)} \right) dx \\ &= -\frac{1}{2}(d+e)\log(1-x) + \frac{1}{3}(d+2e)\log(2-x) + \frac{1}{6}(d-e)\log(1+x) \end{aligned}$$

Mathematica [A] time = 0.02, size = 39, normalized size = 0.93

$$\frac{1}{6}(-3(d+e)\log(1-x) + 2(d+2e)\log(2-x) + (d-e)\log(x+1))$$

Antiderivative was successfully verified.

[In] Integrate[((2+x)*(d+e*x))/(4-5*x^2+x^4),x]

[Out] (-3*(d+e)*Log[1-x] + 2*(d+2*e)*Log[2-x] + (d-e)*Log[1+x])/6

fricas [A] time = 0.75, size = 32, normalized size = 0.76

$$\frac{1}{6}(d-e)\log(x+1) - \frac{1}{2}(d+e)\log(x-1) + \frac{1}{3}(d+2e)\log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")

[Out] 1/6*(d-e)*log(x+1) - 1/2*(d+e)*log(x-1) + 1/3*(d+2*e)*log(x-2)

giac [A] time = 0.29, size = 38, normalized size = 0.90

$$\frac{1}{6}(d-e)\log(|x+1|) - \frac{1}{2}(d+e)\log(|x-1|) + \frac{1}{3}(d+2e)\log(|x-2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")

[Out] 1/6*(d-e)*log(abs(x+1)) - 1/2*(d+e)*log(abs(x-1)) + 1/3*(d+2*e)*log(abs(x-2))

maple [A] time = 0.01, size = 44, normalized size = 1.05

$$\frac{d \ln(x-2)}{3} - \frac{d \ln(x-1)}{2} + \frac{d \ln(x+1)}{6} + \frac{2e \ln(x-2)}{3} - \frac{e \ln(x-1)}{2} - \frac{e \ln(x+1)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x+2)*(e*x+d)/(x^4-5*x^2+4),x)

[Out] 1/3*d*ln(x-2)+2/3*e*ln(x-2)+1/6*d*ln(x+1)-1/6*e*ln(x+1)-1/2*d*ln(x-1)-1/2*e*ln(x-1)

maxima [A] time = 0.44, size = 32, normalized size = 0.76

$$\frac{1}{6}(d-e)\log(x+1) - \frac{1}{2}(d+e)\log(x-1) + \frac{1}{3}(d+2e)\log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((2+x)*(e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")`

[Out] $1/6*(d - e)*\log(x + 1) - 1/2*(d + e)*\log(x - 1) + 1/3*(d + 2*e)*\log(x - 2)$

mupad [B] time = 0.84, size = 38, normalized size = 0.90

$$\ln(x - 2) \left(\frac{d}{3} + \frac{2e}{3} \right) - \ln(x - 1) \left(\frac{d}{2} + \frac{e}{2} \right) + \ln(x + 1) \left(\frac{d}{6} - \frac{e}{6} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int(((x + 2)*(d + e*x))/(x^4 - 5*x^2 + 4),x)`

[Out] $\log(x - 2)*(d/3 + (2*e)/3) - \log(x - 1)*(d/2 + e/2) + \log(x + 1)*(d/6 - e/6)$
)

sympy [B] time = 1.76, size = 304, normalized size = 7.24

$$\frac{(d - e) \log\left(x + \frac{26d^3 + 66d^2e - 9d^2(d - e) + 78de^2 - 12de(d - e) - 7d(d - e)^2 + 46e^3 + 3e^2(d - e) - 8e(d - e)^2}{10d^3 + 69d^2e + 102de^2 + 35e^3}\right) + (d + e) \log\left(x + \frac{26d^3 + 66d^2e + 27d^2(d + e) + 78d^2e + 36d^2e^2 + 36d^2e^2 + 36d^2e^2 + 36d^2e^2}{10d^3 + 69d^2e + 102de^2 + 35e^3}\right)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((2+x)*(e*x+d)/(x**4-5*x**2+4),x)`

[Out] $(d - e)*\log(x + (26*d**3 + 66*d**2*e - 9*d**2*(d - e) + 78*d*e**2 - 12*d*e*(d - e) - 7*d*(d - e)**2 + 46*e**3 + 3*e**2*(d - e) - 8*e*(d - e)**2)/(10*d**3 + 69*d**2*e + 102*d*e**2 + 35*e**3))/6 - (d + e)*\log(x + (26*d**3 + 66*d**2*e + 27*d**2*(d + e) + 78*d*e**2 + 36*d*e*(d + e) - 63*d*(d + e)**2 + 46*e**3 - 9*e**2*(d + e) - 72*e*(d + e)**2)/(10*d**3 + 69*d**2*e + 102*d*e**2 + 35*e**3))/2 + (d + 2*e)*\log(x + (26*d**3 + 66*d**2*e - 18*d**2*(d + 2*e) + 78*d*e**2 - 24*d*e*(d + 2*e) - 28*d*(d + 2*e)**2 + 46*e**3 + 6*e**2*(d + 2*e) - 32*e*(d + 2*e)**2)/(10*d**3 + 69*d**2*e + 102*d*e**2 + 35*e**3))/3$

$$3.81 \quad \int \frac{(2+x)(d+ex+fx^2)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=47

$$-\frac{1}{2} \log(1-x)(d+e+f) + \frac{1}{3} \log(2-x)(d+2e+4f) + \frac{1}{6} \log(x+1)(d-e+f)$$

[Out] $-1/2*(d+e+f)*\ln(1-x)+1/3*(d+2*e+4*f)*\ln(2-x)+1/6*(d-e+f)*\ln(1+x)$

Rubi [A] time = 0.06, antiderivative size = 47, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$, Rules used = {1586, 2074}

$$-\frac{1}{2} \log(1-x)(d+e+f) + \frac{1}{3} \log(2-x)(d+2e+4f) + \frac{1}{6} \log(x+1)(d-e+f)$$

Antiderivative was successfully verified.

[In] $\text{Int}[(2+x)*(d+e*x+f*x^2)/(4-5*x^2+x^4),x]$

[Out] $-((d+e+f)*\text{Log}[1-x])/2 + ((d+2*e+4*f)*\text{Log}[2-x])/3 + ((d-e+f)*\text{Log}[1+x])/6$

Rule 1586

$\text{Int}[(u_*)*(P_x)^{(p_*)}*(Q_x)^{(q_*)}, x_Symbol] \rightarrow \text{Int}[u*\text{PolynomialQuotient}[P_x, Q_x, x]^p*Q_x^q, x] /; \text{FreeQ}[q, x] \ \&\& \ \text{PolyQ}[P_x, x] \ \&\& \ \text{PolyQ}[Q_x, x] \ \&\& \ \text{EqQ}[\text{PolynomialRemainder}[P_x, Q_x, x], 0] \ \&\& \ \text{IntegerQ}[p] \ \&\& \ \text{LtQ}[p*q, 0]$

Rule 2074

$\text{Int}[(P_*)^{(p_*)}*(Q_*)^{(q_*)}, x_Symbol] \rightarrow \text{With}[\{PP = \text{Factor}[P]\}, \text{Int}[\text{ExpandIntegrand}[PP^p*Q^q, x], x] /; \text{!SumQ}[\text{NonfreeFactors}[PP, x]]] /; \text{FreeQ}[q, x] \ \&\& \ \text{PolyQ}[P, x] \ \&\& \ \text{PolyQ}[Q, x] \ \&\& \ \text{IntegerQ}[p] \ \&\& \ \text{NeQ}[P, x]$

Rubi steps

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2}{2-x-2x^2+x^3} dx \\ &= \int \left(\frac{d+2e+4f}{3(-2+x)} + \frac{-d-e-f}{2(-1+x)} + \frac{d-e+f}{6(1+x)} \right) dx \\ &= -\frac{1}{2}(d+e+f) \log(1-x) + \frac{1}{3}(d+2e+4f) \log(2-x) + \frac{1}{6}(d-e+f) \log(1+x) \end{aligned}$$

Mathematica [A] time = 0.02, size = 44, normalized size = 0.94

$$\frac{1}{6}(-3\log(1-x)(d+e+f) + 2\log(2-x)(d+2e+4f) + \log(x+1)(d-e+f))$$

Antiderivative was successfully verified.

[In] Integrate[((2+x)*(d+e*x+f*x^2))/(4-5*x^2+x^4),x]

[Out] (-3*(d+e+f)*Log[1-x] + 2*(d+2*e+4*f)*Log[2-x] + (d-e+f)*Log[1+x])/6

fricas [A] time = 0.93, size = 37, normalized size = 0.79

$$\frac{1}{6}(d-e+f)\log(x+1) - \frac{1}{2}(d+e+f)\log(x-1) + \frac{1}{3}(d+2e+4f)\log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")

[Out] 1/6*(d-e+f)*log(x+1) - 1/2*(d+e+f)*log(x-1) + 1/3*(d+2*e+4*f)*log(x-2)

giac [A] time = 0.37, size = 43, normalized size = 0.91

$$\frac{1}{6}(d+f-e)\log(|x+1|) - \frac{1}{2}(d+f+e)\log(|x-1|) + \frac{1}{3}(d+4f+2e)\log(|x-2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")

[Out] 1/6*(d+f-e)*log(abs(x+1)) - 1/2*(d+f+e)*log(abs(x-1)) + 1/3*(d+4*f+2*e)*log(abs(x-2))

maple [A] time = 0.01, size = 65, normalized size = 1.38

$$\frac{d \ln(x-2)}{3} - \frac{d \ln(x-1)}{2} + \frac{d \ln(x+1)}{6} + \frac{2e \ln(x-2)}{3} - \frac{e \ln(x-1)}{2} - \frac{e \ln(x+1)}{6} + \frac{4f \ln(x-2)}{3} - \frac{f \ln(x-1)}{2} + \frac{f \ln(x+1)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4),x)

[Out] 1/3*d*ln(x-2)+2/3*e*ln(x-2)+4/3*f*ln(x-2)+1/6*d*ln(x+1)-1/6*e*ln(x+1)+1/6*f*ln(x+1)-1/2*d*ln(x-1)-1/2*e*ln(x-1)-1/2*f*ln(x-1)

maxima [A] time = 0.44, size = 37, normalized size = 0.79

$$\frac{1}{6}(d - e + f) \log(x + 1) - \frac{1}{2}(d + e + f) \log(x - 1) + \frac{1}{3}(d + 2e + 4f) \log(x - 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")

[Out] 1/6*(d - e + f)*log(x + 1) - 1/2*(d + e + f)*log(x - 1) + 1/3*(d + 2*e + 4*f)*log(x - 2)

mupad [B] time = 0.11, size = 47, normalized size = 1.00

$$\ln(x - 2) \left(\frac{d}{3} + \frac{2e}{3} + \frac{4f}{3} \right) - \ln(x - 1) \left(\frac{d}{2} + \frac{e}{2} + \frac{f}{2} \right) + \ln(x + 1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(((x + 2)*(d + e*x + f*x^2))/(x^4 - 5*x^2 + 4),x)

[Out] log(x - 2)*(d/3 + (2*e)/3 + (4*f)/3) - log(x - 1)*(d/2 + e/2 + f/2) + log(x + 1)*(d/6 - e/6 + f/6)

sympy [B] time = 12.72, size = 716, normalized size = 15.23

$$(d - e + f) \log \left(x + \frac{26d^3 + 66d^2e + 132d^2f - 9d^2(d - e + f) + 78de^2 + 276def - 12de(d - e + f) + 222df^2 + 6df(d - e + f) - 7d(d - e + f)^2 + 46e^3 + 204e^2f + 3e^2(d - e + f) + 36e^2f + 36e^2f(d - e + f) - 8e^2(d - e + f)^2 + 116ef^3 + 51ef^2(d - e + f) - 13ef(d - e + f)^2}{10d^3 + 69d^2e + 102d^2f + 102de^2 + 318def + 246df^2 + 35e^3 + 174e^2f + 35e^2f + 35e^2f(d - e + f) - 8e^2(d - e + f)^2 + 116ef^3 + 51ef^2(d - e + f) - 13ef(d - e + f)^2} \right)$$

6

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(f*x**2+e*x+d)/(x**4-5*x**2+4),x)

[Out] (d - e + f)*log(x + (26*d**3 + 66*d**2*e + 132*d**2*f - 9*d**2*(d - e + f) + 78*d*e**2 + 276*d*e*f - 12*d*e*(d - e + f) + 222*d*f**2 + 6*d*f*(d - e + f) - 7*d*(d - e + f)**2 + 46*e**3 + 204*e**2*f + 3*e**2*(d - e + f) + 282*e*f**2 + 36*e*f*(d - e + f) - 8*e*(d - e + f)**2 + 116*f**3 + 51*f**2*(d - e + f) - 13*f*(d - e + f)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 102*d*e**2 + 318*d*e*f + 246*d*f**2 + 35*e**3 + 174*e**2*f + 285*e*f**2 + 154*f**3))/6 - (d + e + f)*log(x + (26*d**3 + 66*d**2*e + 132*d**2*f + 27*d**2*(d + e + f) + 78*d*e**2 + 276*d*e*f + 36*d*e*(d + e + f) + 222*d*f**2 - 18*d*f*(d + e + f) - 63*d*(d + e + f)**2 + 46*e**3 + 204*e**2*f - 9*e**2*(d + e + f) + 282*e*f**2 - 108*e*f*(d + e + f) - 72*e*(d + e + f)**2 + 116*f**3 - 153*f**2*(d + e + f) - 117*f*(d + e + f)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 102*d*e**2 + 318*d*e*f + 246*d*f**2 + 35*e**3 + 174*e**2*f + 285*e*f**2 +

$$\begin{aligned}
& 154*f**3))/2 + (d + 2*e + 4*f)*\log(x + (26*d**3 + 66*d**2*e + 132*d**2*f - \\
& 18*d**2*(d + 2*e + 4*f) + 78*d*e**2 + 276*d*e*f - 24*d*e*(d + 2*e + 4*f) + \\
& 222*d*f**2 + 12*d*f*(d + 2*e + 4*f) - 28*d*(d + 2*e + 4*f)**2 + 46*e**3 + 2 \\
& 04*e**2*f + 6*e**2*(d + 2*e + 4*f) + 282*e*f**2 + 72*e*f*(d + 2*e + 4*f) - \\
& 32*e*(d + 2*e + 4*f)**2 + 116*f**3 + 102*f**2*(d + 2*e + 4*f) - 52*f*(d + 2 \\
& *e + 4*f)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 102*d*e**2 + 318*d*e*f + \\
& 246*d*f**2 + 35*e**3 + 174*e**2*f + 285*e*f**2 + 154*f**3))/3
\end{aligned}$$

$$3.82 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=57

$$-\frac{1}{2} \log(1-x)(d+e+f+g) + \frac{1}{3} \log(2-x)(d+2e+4f+8g) + \frac{1}{6} \log(x+1)(d-e+f-g) + gx$$

[Out] $g*x-1/2*(d+e+f+g)*\ln(1-x)+1/3*(d+2*e+4*f+8*g)*\ln(2-x)+1/6*(d-e+f-g)*\ln(1+x)$

Rubi [A] time = 0.08, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.065$, Rules used = {1586, 2074}

$$-\frac{1}{2} \log(1-x)(d+e+f+g) + \frac{1}{3} \log(2-x)(d+2e+4f+8g) + \frac{1}{6} \log(x+1)(d-e+f-g) + gx$$

Antiderivative was successfully verified.

[In] $\text{Int}[(2+x)*(d+e*x+f*x^2+g*x^3)/(4-5*x^2+x^4),x]$

[Out] $g*x - ((d+e+f+g)*\text{Log}[1-x])/2 + ((d+2*e+4*f+8*g)*\text{Log}[2-x])/3 + ((d-e+f-g)*\text{Log}[1+x])/6$

Rule 1586

$\text{Int}[(u_*)*(P_x)^{(p_*)}*(Q_x)^{(q_*)}, x_Symbol] \rightarrow \text{Int}[u*\text{PolynomialQuotient}[P_x, Q_x, x]^p*Q_x^q, x] /; \text{FreeQ}[q, x] \ \&\& \ \text{PolyQ}[P_x, x] \ \&\& \ \text{PolyQ}[Q_x, x] \ \&\& \ \text{EqQ}[\text{PolynomialRemainder}[P_x, Q_x, x], 0] \ \&\& \ \text{IntegerQ}[p] \ \&\& \ \text{LtQ}[p, q, 0]$

Rule 2074

$\text{Int}[(P_*)^{(p_*)}*(Q_*)^{(q_*)}, x_Symbol] \rightarrow \text{With}[\{PP = \text{Factor}[P]\}, \text{Int}[\text{ExpandIntegrand}[PP^p*Q^q, x], x] /; \text{!SumQ}[\text{NonfreeFactors}[PP, x]]] /; \text{FreeQ}[q, x] \ \&\& \ \text{PolyQ}[P, x] \ \&\& \ \text{PolyQ}[Q, x] \ \&\& \ \text{IntegerQ}[p] \ \&\& \ \text{NeQ}[P, x]$

Rubi steps

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3}{2-x-2x^2+x^3} dx \\ &= \int \left(g + \frac{d+2e+4f+8g}{3(-2+x)} + \frac{-d-e-f-g}{2(-1+x)} + \frac{d-e+f-g}{6(1+x)} \right) dx \\ &= gx - \frac{1}{2}(d+e+f+g) \log(1-x) + \frac{1}{3}(d+2e+4f+8g) \log(2-x) + \frac{1}{6}(d- \end{aligned}$$

Mathematica [A] time = 0.02, size = 55, normalized size = 0.96

$$\frac{1}{6}(-3 \log(1-x)(d+e+f+g) + 2 \log(2-x)(d+2e+4f+8g) + \log(x+1)(d-e+f-g) + 6gx)$$

Antiderivative was successfully verified.

[In] Integrate[((2+x)*(d+e*x+f*x^2+g*x^3))/(4-5*x^2+x^4),x]

[Out] (6*g*x - 3*(d+e+f+g)*Log[1-x] + 2*(d+2*e+4*f+8*g)*Log[2-x] + (d-e+f-g)*Log[1+x])/6

fricas [A] time = 0.93, size = 47, normalized size = 0.82

$$gx + \frac{1}{6}(d-e+f-g) \log(x+1) - \frac{1}{2}(d+e+f+g) \log(x-1) + \frac{1}{3}(d+2e+4f+8g) \log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")

[Out] g*x + 1/6*(d-e+f-g)*log(x+1) - 1/2*(d+e+f+g)*log(x-1) + 1/3*(d+2*e+4*f+8*g)*log(x-2)

giac [A] time = 0.37, size = 53, normalized size = 0.93

$$gx + \frac{1}{6}(d+f-g-e) \log(|x+1|) - \frac{1}{2}(d+f+g+e) \log(|x-1|) + \frac{1}{3}(d+4f+8g+2e) \log(|x-2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")

[Out] g*x + 1/6*(d+f-g-e)*log(abs(x+1)) - 1/2*(d+f+g+e)*log(abs(x-1)) + 1/3*(d+4*f+8*g+2*e)*log(abs(x-2))

maple [A] time = 0.01, size = 89, normalized size = 1.56

$$\frac{d \ln(x-2)}{3} - \frac{d \ln(x-1)}{2} + \frac{d \ln(x+1)}{6} + \frac{2e \ln(x-2)}{3} - \frac{e \ln(x-1)}{2} - \frac{e \ln(x+1)}{6} + \frac{4f \ln(x-2)}{3} - \frac{f \ln(x-1)}{2} + \frac{f \ln(x+1)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)

[Out] g*x+1/3*d*ln(x-2)+2/3*e*ln(x-2)+4/3*f*ln(x-2)+8/3*g*ln(x-2)+1/6*d*ln(x+1)-1/6*e*ln(x+1)+1/6*f*ln(x+1)-1/6*g*ln(x+1)-1/2*d*ln(x-1)-1/2*e*ln(x-1)-1/2*f*ln(x-1)-1/2*g*ln(x-1)

maxima [A] time = 0.44, size = 47, normalized size = 0.82

$$gx + \frac{1}{6}(d - e + f - g) \log(x + 1) - \frac{1}{2}(d + e + f + g) \log(x - 1) + \frac{1}{3}(d + 2e + 4f + 8g) \log(x - 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")

[Out] g*x + 1/6*(d - e + f - g)*log(x + 1) - 1/2*(d + e + f + g)*log(x - 1) + 1/3*(d + 2*e + 4*f + 8*g)*log(x - 2)

mupad [B] time = 0.82, size = 59, normalized size = 1.04

$$\ln(x + 1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} \right) - \ln(x - 1) \left(\frac{d}{2} + \frac{e}{2} + \frac{f}{2} + \frac{g}{2} \right) + \ln(x - 2) \left(\frac{d}{3} + \frac{2e}{3} + \frac{4f}{3} + \frac{8g}{3} \right) + gx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(((x + 2)*(d + e*x + f*x^2 + g*x^3))/(x^4 - 5*x^2 + 4),x)

[Out] log(x + 1)*(d/6 - e/6 + f/6 - g/6) - log(x - 1)*(d/2 + e/2 + f/2 + g/2) + log(x - 2)*(d/3 + (2*e)/3 + (4*f)/3 + (8*g)/3) + g*x

sympy [B] time = 91.47, size = 1389, normalized size = 24.37

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)

[Out] g*x + (d - e + f - g)*log(x + (26*d**3 + 66*d**2*e + 132*d**2*f + 174*d**2*g - 9*d**2*(d - e + f - g) + 78*d*e**2 + 276*d*e*f + 444*d*e*g - 12*d*e*(d - e + f - g) + 222*d*f**2 + 636*d*f*g + 6*d*f*(d - e + f - g) + 510*d*g**2 + 36*d*g*(d - e + f - g) - 7*d*(d - e + f - g)**2 + 46*e**3 + 204*e**2*f + 390*e**2*g + 3*e**2*(d - e + f - g) + 282*e*f**2 + 984*e*f*g + 36*e*f*(d - e + f - g) + 930*e*g**2 + 102*e*g*(d - e + f - g) - 8*e*(d - e + f - g)**2 + 116*f**3 + 534*f**2*g + 51*f**2*(d - e + f - g) + 924*f*g**2 + 228*f*g*(d - e + f - g) - 13*f*(d - e + f - g)**2 + 586*g**3 + 243*g**2*(d - e + f - g) - 20*g*(d - e + f - g)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 213*d**2*g + 102*d*e**2 + 318*d*e*f + 564*d*e*g + 246*d*f**2 + 894*d*f*g + 750*d*g**2 + 35*e**3 + 174*e**2*f + 249*e**2*g + 285*e*f**2 + 852*e*f*g + 537*e*g**2 + 154*f**3 + 717*f**2*g + 966*f*g**2 + 323*g**3))/6 - (d + e + f + g)*log(x + (26*d**3 + 66*d**2*e + 132*d**2*f + 174*d**2*g + 27*d**2*(d + e + f + g) + 78*d*e**2 + 276*d*e*f + 444*d*e*g + 36*d*e*(d + e + f + g) + 222*d*f**2 + 636*d*f*g - 18*d*f*(d + e + f + g) + 510*d*g**2 - 108*d*g*(d + e + f + g

$$\begin{aligned}
&) - 63*d*(d + e + f + g)**2 + 46*e**3 + 204*e**2*f + 390*e**2*g - 9*e**2*(d \\
& + e + f + g) + 282*e*f**2 + 984*e*f*g - 108*e*f*(d + e + f + g) + 930*e*g* \\
& *2 - 306*e*g*(d + e + f + g) - 72*e*(d + e + f + g)**2 + 116*f**3 + 534*f** \\
& 2*g - 153*f**2*(d + e + f + g) + 924*f*g**2 - 684*f*g*(d + e + f + g) - 117 \\
& *f*(d + e + f + g)**2 + 586*g**3 - 729*g**2*(d + e + f + g) - 180*g*(d + e \\
& + f + g)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 213*d**2*g + 102*d*e**2 + \\
& 318*d*e*f + 564*d*e*g + 246*d*f**2 + 894*d*f*g + 750*d*g**2 + 35*e**3 + 174 \\
& *e**2*f + 249*e**2*g + 285*e*f**2 + 852*e*f*g + 537*e*g**2 + 154*f**3 + 717 \\
& *f**2*g + 966*f*g**2 + 323*g**3))/2 + (d + 2*e + 4*f + 8*g)*log(x + (26*d** \\
& 3 + 66*d**2*e + 132*d**2*f + 174*d**2*g - 18*d**2*(d + 2*e + 4*f + 8*g) + 7 \\
& 8*d*e**2 + 276*d*e*f + 444*d*e*g - 24*d*e*(d + 2*e + 4*f + 8*g) + 222*d*f** \\
& 2 + 636*d*f*g + 12*d*f*(d + 2*e + 4*f + 8*g) + 510*d*g**2 + 72*d*g*(d + 2*e \\
& + 4*f + 8*g) - 28*d*(d + 2*e + 4*f + 8*g)**2 + 46*e**3 + 204*e**2*f + 390* \\
& e**2*g + 6*e**2*(d + 2*e + 4*f + 8*g) + 282*e*f**2 + 984*e*f*g + 72*e*f*(d \\
& + 2*e + 4*f + 8*g) + 930*e*g**2 + 204*e*g*(d + 2*e + 4*f + 8*g) - 32*e*(d + \\
& 2*e + 4*f + 8*g)**2 + 116*f**3 + 534*f**2*g + 102*f**2*(d + 2*e + 4*f + 8* \\
& g) + 924*f*g**2 + 456*f*g*(d + 2*e + 4*f + 8*g) - 52*f*(d + 2*e + 4*f + 8*g \\
&)**2 + 586*g**3 + 486*g**2*(d + 2*e + 4*f + 8*g) - 80*g*(d + 2*e + 4*f + 8* \\
& g)**2)/(10*d**3 + 69*d**2*e + 102*d**2*f + 213*d**2*g + 102*d*e**2 + 318*d* \\
& e*f + 564*d*e*g + 246*d*f**2 + 894*d*f*g + 750*d*g**2 + 35*e**3 + 174*e**2* \\
& f + 249*e**2*g + 285*e*f**2 + 852*e*f*g + 537*e*g**2 + 154*f**3 + 717*f**2* \\
& g + 966*f*g**2 + 323*g**3))/3
\end{aligned}$$

$$3.83 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=74

$$-\frac{1}{2} \log(1-x)(d+e+f+g+h) + \frac{1}{3} \log(2-x)(d+2e+4f+8g+16h) + \frac{1}{6} \log(x+1)(d-e+f-g+h) + x(g+2h) + \frac{hx^2}{2}$$

[Out] (g+2*h)*x+1/2*h*x^2-1/2*(d+e+f+g+h)*ln(1-x)+1/3*(d+2*e+4*f+8*g+16*h)*ln(2-x)+1/6*(d-e+f-g+h)*ln(1+x)

Rubi [A] time = 0.11, antiderivative size = 74, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {1586, 2074}

$$-\frac{1}{2} \log(1-x)(d+e+f+g+h) + \frac{1}{3} \log(2-x)(d+2e+4f+8g+16h) + \frac{1}{6} \log(x+1)(d-e+f-g+h) + x(g+2h) + \frac{hx^2}{2}$$

Antiderivative was successfully verified.

[In] Int[((2 + x)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + x^4), x]

[Out] (g + 2*h)*x + (h*x^2)/2 - ((d + e + f + g + h)*Log[1 - x])/2 + ((d + 2*e + 4*f + 8*g + 16*h)*Log[2 - x])/3 + ((d - e + f - g + h)*Log[1 + x])/6

Rule 1586

Int[(u_)*(P_x_)^(p_)*(Q_x_)^(q_), x_Symbol] := Int[u*PolynomialQuotient[P_x, Q_x, x]^p*Q_x^(p+q), x] /; FreeQ[q, x] && PolyQ[P_x, x] && PolyQ[Q_x, x] && EqQ[PolynomialRemainder[P_x, Q_x, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 2074

Int[(P_)^(p_)*(Q_)^(q_), x_Symbol] := With[{PP = Factor[P]}, Int[ExpandIntegrand[PP^p*Q^q, x], x] /; !SumQ[NonfreeFactors[PP, x]]] /; FreeQ[q, x] && PolyQ[P, x] && PolyQ[Q, x] && IntegerQ[p] && NeQ[P, x]

Rubi steps

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{2-x-2x^2+x^3} dx \\ &= \int \left(g \left(1 + \frac{2h}{g} \right) + \frac{d+2e+4f+8g+16h}{3(-2+x)} + \frac{-d-e-f-g-h}{2(-1+x)} + hx \right) dx \\ &= (g+2h)x + \frac{hx^2}{2} - \frac{1}{2}(d+e+f+g+h) \log(1-x) + \frac{1}{3}(d+2e+4f+ \end{aligned}$$

Mathematica [A] time = 0.03, size = 71, normalized size = 0.96

$$\frac{1}{6} \left(-3 \log(1-x)(d+e+f+g+h) + 2 \log(2-x)(d+2(e+2f+4g+8h)) + \log(x+1)(d-e+f-g+h) + 6 \right)$$

Antiderivative was successfully verified.

[In] Integrate[(((2+x)*(d+e*x+f*x^2+g*x^3+h*x^4))/(4-5*x^2+x^4)),x]

[Out] (6*(g+2*h)*x+3*h*x^2-3*(d+e+f+g+h)*Log[1-x]+2*(d+2*(e+2*f+4*g+8*h))*Log[2-x]+(d-e+f-g+h)*Log[1+x])/6

fricas [A] time = 1.03, size = 62, normalized size = 0.84

$$\frac{1}{2} hx^2 + (g+2h)x + \frac{1}{6} (d-e+f-g+h) \log(x+1) - \frac{1}{2} (d+e+f+g+h) \log(x-1) + \frac{1}{3} (d+2e+4f+8g+16h)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")

[Out] 1/2*h*x^2 + (g+2*h)*x + 1/6*(d-e+f-g+h)*log(x+1) - 1/2*(d+e+f+g+h)*log(x-1) + 1/3*(d+2*e+4*f+8*g+16*h)*log(x-2)

giac [A] time = 0.33, size = 68, normalized size = 0.92

$$\frac{1}{2} hx^2 + gx + 2hx + \frac{1}{6} (d+f-g+h-e) \log(|x+1|) - \frac{1}{2} (d+f+g+h+e) \log(|x-1|) + \frac{1}{3} (d+4f+8g+16h)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")

[Out] 1/2*h*x^2 + g*x + 2*h*x + 1/6*(d+f-g+h-e)*log(abs(x+1)) - 1/2*(d+f+g+h+e)*log(abs(x-1)) + 1/3*(d+4*f+8*g+16*h+2*e)*log(abs(x-2))

maple [A] time = 0.01, size = 120, normalized size = 1.62

$$\frac{hx^2}{2} + \frac{d \ln(x-2)}{3} - \frac{d \ln(x-1)}{2} + \frac{d \ln(x+1)}{6} + \frac{2e \ln(x-2)}{3} - \frac{e \ln(x-1)}{2} - \frac{e \ln(x+1)}{6} + \frac{4f \ln(x-2)}{3} - \frac{f \ln(x-1)}{2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)

[Out] $\frac{1}{2}hx^2+g*x+2*h*x+1/3*d*\ln(x-2)+2/3*e*\ln(x-2)+4/3*f*\ln(x-2)+8/3*g*\ln(x-2)+16/3*h*\ln(x-2)+1/6*d*\ln(x+1)-1/6*e*\ln(x+1)+1/6*f*\ln(x+1)-1/6*g*\ln(x+1)+1/6*h*\ln(x+1)-1/2*d*\ln(x-1)-1/2*e*\ln(x-1)-1/2*f*\ln(x-1)-1/2*g*\ln(x-1)-1/2*h*\ln(x-1)$

maxima [A] time = 0.45, size = 62, normalized size = 0.84

$$\frac{1}{2}hx^2+(g+2h)x+\frac{1}{6}(d-e+f-g+h)\log(x+1)-\frac{1}{2}(d+e+f+g+h)\log(x-1)+\frac{1}{3}(d+2e+4f+8g+16h)\log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")

[Out] $\frac{1}{2}hx^2+(g+2h)x+\frac{1}{6}(d-e+f-g+h)\log(x+1)-\frac{1}{2}(d+e+f+g+h)\log(x-1)+\frac{1}{3}(d+2e+4f+8g+16h)\log(x-2)$

mupad [B] time = 0.88, size = 78, normalized size = 1.05

$$x(g+2h)+\frac{hx^2}{2}-\ln(x-1)\left(\frac{d}{2}+\frac{e}{2}+\frac{f}{2}+\frac{g}{2}+\frac{h}{2}\right)+\ln(x+1)\left(\frac{d}{6}-\frac{e}{6}+\frac{f}{6}-\frac{g}{6}+\frac{h}{6}\right)+\ln(x-2)\left(\frac{d}{3}+\frac{2e}{3}+\frac{4f}{3}+\frac{8g}{3}+\frac{16h}{3}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(((x+2)*(d+e*x+f*x^2+g*x^3+h*x^4))/(x^4-5*x^2+4),x)

[Out] $x*(g+2h)+\frac{hx^2}{2}-\log(x-1)*(d/2+e/2+f/2+g/2+h/2)+\log(x+1)*(d/6-e/6+f/6-g/6+h/6)+\log(x-2)*(d/3+(2e)/3+(4f)/3+(8g)/3+(16h)/3)$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)

[Out] Timed out

$$3.84 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=96

$$-\frac{1}{2} \log(1-x)(d+e+f+g+h+i) + \frac{1}{3} \log(2-x)(d+2e+4f+8g+16h+32i) + \frac{1}{6} \log(x+1)(d-e+f-g+h-i) + x(g+2h+5i)$$

[Out] (g+2*h+5*i)*x+1/2*(h+2*i)*x^2+1/3*i*x^3-1/2*(d+e+f+g+h+i)*ln(1-x)+1/3*(d+2*e+4*f+8*g+16*h+32*i)*ln(2-x)+1/6*(d-e+f-g+h-i)*ln(1+x)

Rubi [A] time = 0.14, antiderivative size = 96, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 41, $\frac{\text{number of rules}}{\text{integrand size}} = 0.049$, Rules used = {1586, 2074}

$$-\frac{1}{2} \log(1-x)(d+e+f+g+h+i) + \frac{1}{3} \log(2-x)(d+2e+4f+8g+16h+32i) + \frac{1}{6} \log(x+1)(d-e+f-g+h-i) + x(g+2h+5i)$$

Antiderivative was successfully verified.

[In] Int[((2 + x)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2 + x^4), x]

[Out] (g + 2*h + 5*i)*x + ((h + 2*i)*x^2)/2 + (i*x^3)/3 - ((d + e + f + g + h + i)*Log[1 - x])/2 + ((d + 2*e + 4*f + 8*g + 16*h + 32*i)*Log[2 - x])/3 + ((d - e + f - g + h - i)*Log[1 + x])/6

Rule 1586

Int[(u_)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] :> Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 2074

Int[(P_)^(p_)*(Q_)^(q_), x_Symbol] :> With[{PP = Factor[P]}, Int[ExpandIntegrand[PP^p*Q^q, x], x] /; !SumQ[NonfreeFactors[PP, x]]] /; FreeQ[q, x] && PolyQ[P, x] && PolyQ[Q, x] && IntegerQ[p] && NeQ[P, x]

Rubi steps

$$\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+84x^5)}{4-5x^2+x^4} dx = \int \frac{d+ex+fx^2+gx^3+hx^4+84x^5}{2-x-2x^2+x^3} dx$$

$$= \int \left(420 \left(1 + \frac{1}{420}(g+2h) \right) + \frac{2688+d+2e+4f+8g+16h}{3(-2+x)} \right) dx$$

$$= (420+g+2h)x + \frac{1}{2}(168+h)x^2 + 28x^3 - \frac{1}{2}(84+d+e+f+g+h+i) \log(x+1) + \frac{1}{2}(d+e+f+g+h+i) \log(x-1)$$

Mathematica [A] time = 0.05, size = 91, normalized size = 0.95

$$\frac{1}{6} \left(-3 \log(1-x)(d+e+f+g+h+i) + 2 \log(2-x)(d+2e+4(f+2g+4h+8i)) + \log(x+1)(d-e+f-g+h-i) \right)$$

Antiderivative was successfully verified.

[In] Integrate[((2+x)*(d+e*x+f*x^2+g*x^3+h*x^4+i*x^5))/(4-5*x^2+x^4),x]

[Out] (6*(g+2*h+5*i)*x+3*(h+2*i)*x^2+2*i*x^3-3*(d+e+f+g+h+i)*Log[1-x]+2*(d+2*e+4*(f+2*g+4*h+8*i))*Log[2-x]+(d-e+f-g+h-i)*Log[1+x])/6

fricas [A] time = 1.30, size = 82, normalized size = 0.85

$$\frac{1}{3}ix^3 + \frac{1}{2}(h+2i)x^2 + (g+2h+5i)x + \frac{1}{6}(d-e+f-g+h-i) \log(x+1) - \frac{1}{2}(d+e+f+g+h+i) \log(x-1) + \frac{1}{3}(d+2e+4f+8g+16h+32i) \log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="fricas")

[Out] 1/3*i*x^3 + 1/2*(h+2*i)*x^2 + (g+2*h+5*i)*x + 1/6*(d-e+f-g+h-i)*log(x+1) - 1/2*(d+e+f+g+h+i)*log(x-1) + 1/3*(d+2*e+4*f+8*g+16*h+32*i)*log(x-2)

giac [A] time = 0.24, size = 90, normalized size = 0.94

$$\frac{1}{3}ix^3 + \frac{1}{2}hx^2 + ix^2 + gx + 2hx + 5ix + \frac{1}{6}(d+f-g+h-i-e) \log(|x+1|) - \frac{1}{2}(d+f+g+h+i+e) \log(|x-1|) + \frac{1}{3}(d+2e+4f+8g+16h+32i) \log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="giac")

[Out] $\frac{1}{3}ix^3 + \frac{1}{2}hx^2 + ix^2 + gx + 2hx + 5ix + \frac{1}{6}(d + f - g + h - i - e)\log(\text{abs}(x + 1)) - \frac{1}{2}(d + f + g + h + i + e)\log(\text{abs}(x - 1)) + \frac{1}{3}(d + 4f + 8g + 16h + 32i + 2e)\log(\text{abs}(x - 2))$

maple [A] time = 0.01, size = 156, normalized size = 1.62

$$\frac{ix^3}{3} + \frac{hx^2}{2} + ix^2 + \frac{d \ln(x-2)}{3} - \frac{d \ln(x-1)}{2} + \frac{d \ln(x+1)}{6} + \frac{2e \ln(x-2)}{3} - \frac{e \ln(x-1)}{2} - \frac{e \ln(x+1)}{6} + \frac{4f \ln(x-2)}{3} - \frac{f \ln(x-1)}{2} + \frac{f \ln(x+1)}{6}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x)`

[Out] $\frac{1}{3}d*\ln(x-2)+\frac{2}{3}e*\ln(x-2)+\frac{4}{3}f*\ln(x-2)+\frac{8}{3}g*\ln(x-2)+\frac{16}{3}h*\ln(x-2)+\frac{32}{3}i*\ln(x-2)+\frac{1}{3}i*x^3+\frac{1}{2}h*x^2+i*x^2+g*x+2*h*x+5*i*x+\frac{1}{6}d*\ln(x+1)-\frac{1}{6}e*\ln(x+1)+\frac{1}{6}f*\ln(x+1)-\frac{1}{6}g*\ln(x+1)+\frac{1}{6}h*\ln(x+1)-\frac{1}{6}i*\ln(x+1)-\frac{1}{2}d*\ln(x-1)-\frac{1}{2}e*\ln(x-1)-\frac{1}{2}f*\ln(x-1)-\frac{1}{2}g*\ln(x-1)-\frac{1}{2}h*\ln(x-1)-\frac{1}{2}i*\ln(x-1)$

maxima [A] time = 0.45, size = 82, normalized size = 0.85

$$\frac{1}{3}ix^3 + \frac{1}{2}(h + 2i)x^2 + (g + 2h + 5i)x + \frac{1}{6}(d - e + f - g + h - i)\log(x + 1) - \frac{1}{2}(d + e + f + g + h + i)\log(x - 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((2+x)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4),x, algorithm="maxima")`

[Out] $\frac{1}{3}i*x^3 + \frac{1}{2}*(h + 2*i)*x^2 + (g + 2*h + 5*i)*x + \frac{1}{6}*(d - e + f - g + h - i)*\log(x + 1) - \frac{1}{2}*(d + e + f + g + h + i)*\log(x - 1) + \frac{1}{3}*(d + 2*e + 4*f + 8*g + 16*h + 32*i)*\log(x - 2)$

mupad [B] time = 0.88, size = 99, normalized size = 1.03

$$x(g + 2h + 5i) + \frac{ix^3}{3} - \ln(x - 1) \left(\frac{d}{2} + \frac{e}{2} + \frac{f}{2} + \frac{g}{2} + \frac{h}{2} + \frac{i}{2} \right) + \ln(x + 1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} - \frac{i}{6} \right) + \ln(x - 2) \left(\frac{d}{3} + \frac{2e}{3} + \frac{4f}{3} + \frac{8g}{3} + \frac{16h}{3} + \frac{32i}{3} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int(((x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(x^4 - 5*x^2 + 4),x)`

[Out] $x*(g + 2*h + 5*i) + (i*x^3)/3 - \log(x - 1)*(d/2 + e/2 + f/2 + g/2 + h/2 + i/2) + \log(x + 1)*(d/6 - e/6 + f/6 - g/6 + h/6 - i/6) + \log(x - 2)*(d/3 + (2*e)/3 + (4*f)/3 + (8*g)/3 + (16*h)/3 + (32*i)/3) + x^2*(h/2 + i)$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4),x)
```

```
[Out] Timed out
```

$$3.85 \quad \int \frac{2-x-2x^2+x^3}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=46

$$\frac{1}{12(x+2)} - \frac{1}{18} \log(1-x) + \frac{1}{48} \log(2-x) + \frac{1}{6} \log(x+1) - \frac{19}{144} \log(x+2)$$

[Out] 1/12/(2+x)-1/18*ln(1-x)+1/48*ln(2-x)+1/6*ln(1+x)-19/144*ln(2+x)

Rubi [A] time = 0.05, antiderivative size = 46, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$, Rules used = {1586, 2074}

$$\frac{1}{12(x+2)} - \frac{1}{18} \log(1-x) + \frac{1}{48} \log(2-x) + \frac{1}{6} \log(x+1) - \frac{19}{144} \log(x+2)$$

Antiderivative was successfully verified.

[In] Int[(2 - x - 2*x^2 + x^3)/(4 - 5*x^2 + x^4)^2, x]

[Out] 1/(12*(2 + x)) - Log[1 - x]/18 + Log[2 - x]/48 + Log[1 + x]/6 - (19*Log[2 + x])/144

Rule 1586

Int[(u_)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 2074

Int[(P_)^(p_)*(Q_)^(q_), x_Symbol] := With[{PP = Factor[P]}, Int[ExpandIntegrand[PP^p*Q^q, x], x] /; !SumQ[NonfreeFactors[PP, x]] /; FreeQ[q, x] && PolyQ[P, x] && PolyQ[Q, x] && IntegerQ[p] && NeQ[P, x]

Rubi steps

$$\begin{aligned}
\int \frac{2-x-2x^2+x^3}{(4-5x^2+x^4)^2} dx &= \int \frac{1}{(2+x)^2(2-x-2x^2+x^3)} dx \\
&= \int \left(\frac{1}{48(-2+x)} - \frac{1}{18(-1+x)} + \frac{1}{6(1+x)} - \frac{1}{12(2+x)^2} - \frac{19}{144(2+x)} \right) dx \\
&= \frac{1}{12(2+x)} - \frac{1}{18} \log(1-x) + \frac{1}{48} \log(2-x) + \frac{1}{6} \log(1+x) - \frac{19}{144} \log(2+x)
\end{aligned}$$

Mathematica [A] time = 0.02, size = 42, normalized size = 0.91

$$\frac{1}{144} \left(\frac{12}{x+2} + 24 \log(-x-1) - 8 \log(1-x) + 3 \log(2-x) - 19 \log(x+2) \right)$$

Antiderivative was successfully verified.

[In] Integrate[(2 - x - 2*x^2 + x^3)/(4 - 5*x^2 + x^4)^2,x]

[Out] (12/(2 + x) + 24*Log[-1 - x] - 8*Log[1 - x] + 3*Log[2 - x] - 19*Log[2 + x])/144

fricas [A] time = 0.95, size = 45, normalized size = 0.98

$$\frac{19(x+2)\log(x+2) - 24(x+2)\log(x+1) + 8(x+2)\log(x-1) - 3(x+2)\log(x-2) - 12}{144(x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/144*(19*(x + 2)*log(x + 2) - 24*(x + 2)*log(x + 1) + 8*(x + 2)*log(x - 1) - 3*(x + 2)*log(x - 2) - 12)/(x + 2)

giac [A] time = 0.25, size = 36, normalized size = 0.78

$$\frac{1}{12(x+2)} - \frac{19}{144} \log(|x+2|) + \frac{1}{6} \log(|x+1|) - \frac{1}{18} \log(|x-1|) + \frac{1}{48} \log(|x-2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] 1/12/(x + 2) - 19/144*log(abs(x + 2)) + 1/6*log(abs(x + 1)) - 1/18*log(abs(x - 1)) + 1/48*log(abs(x - 2))

maple [A] time = 0.01, size = 33, normalized size = 0.72

$$-\frac{19 \ln(x+2)}{144} + \frac{\ln(x-2)}{48} - \frac{\ln(x-1)}{18} + \frac{\ln(x+1)}{6} + \frac{1}{12x+24}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x)

[Out] 1/48*ln(x-2)+1/6*ln(x+1)-1/18*ln(x-1)+1/12/(x+2)-19/144*ln(x+2)

maxima [A] time = 0.44, size = 32, normalized size = 0.70

$$\frac{1}{12(x+2)} - \frac{19}{144} \log(x+2) + \frac{1}{6} \log(x+1) - \frac{1}{18} \log(x-1) + \frac{1}{48} \log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] 1/12/(x + 2) - 19/144*log(x + 2) + 1/6*log(x + 1) - 1/18*log(x - 1) + 1/48*log(x - 2)

mupad [B] time = 0.05, size = 32, normalized size = 0.70

$$\frac{\ln(x+1)}{6} - \frac{\ln(x-1)}{18} + \frac{\ln(x-2)}{48} - \frac{19 \ln(x+2)}{144} + \frac{1}{12(x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(-(x + 2*x^2 - x^3 - 2)/(x^4 - 5*x^2 + 4)^2,x)

[Out] log(x + 1)/6 - log(x - 1)/18 + log(x - 2)/48 - (19*log(x + 2))/144 + 1/(12*(x + 2))

sympy [A] time = 0.26, size = 34, normalized size = 0.74

$$\frac{\log(x-2)}{48} - \frac{\log(x-1)}{18} + \frac{\log(x+1)}{6} - \frac{19 \log(x+2)}{144} + \frac{1}{12x+24}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x**3-2*x**2-x+2)/(x**4-5*x**2+4)**2,x)

[Out] log(x - 2)/48 - log(x - 1)/18 + log(x + 1)/6 - 19*log(x + 2)/144 + 1/(12*x + 24)

$$3.86 \quad \int \frac{(d+ex)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=71

$$\frac{d-2e}{12(x+2)} - \frac{1}{18}(d+e)\log(1-x) + \frac{1}{48}(d+2e)\log(2-x) + \frac{1}{6}(d-e)\log(x+1) - \frac{1}{144}(19d-26e)\log(x+2)$$

[Out] 1/12*(d-2*e)/(2+x)-1/18*(d+e)*ln(1-x)+1/48*(d+2*e)*ln(2-x)+1/6*(d-e)*ln(1+x)-1/144*(19*d-26*e)*ln(2+x)

Rubi [A] time = 0.17, antiderivative size = 71, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.065$, Rules used = {1586, 6742}

$$\frac{d-2e}{12(x+2)} - \frac{1}{18}(d+e)\log(1-x) + \frac{1}{48}(d+2e)\log(2-x) + \frac{1}{6}(d-e)\log(x+1) - \frac{1}{144}(19d-26e)\log(x+2)$$

Antiderivative was successfully verified.

[In] Int[((d + e*x)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4)^2,x]

[Out] (d - 2*e)/(12*(2 + x)) - ((d + e)*Log[1 - x])/18 + ((d + 2*e)*Log[2 - x])/48 + ((d - e)*Log[1 + x])/6 - ((19*d - 26*e)*Log[2 + x])/144

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 6742

Int[u_, x_Symbol] := With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]]

Rubi steps

$$\int \frac{(d+ex)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx = \int \frac{d+ex}{(2+x)^2(2-x-2x^2+x^3)} dx$$

$$= \int \left(\frac{d+2e}{48(-2+x)} + \frac{-d-e}{18(-1+x)} + \frac{d-e}{6(1+x)} + \frac{-d+2e}{12(2+x)^2} + \frac{-19d+26e}{144(2+x)} \right) dx$$

$$= \frac{d-2e}{12(2+x)} - \frac{1}{18}(d+e)\log(1-x) + \frac{1}{48}(d+2e)\log(2-x) + \frac{1}{6}(d-e)\log(1+x)$$

Mathematica [A] time = 0.05, size = 66, normalized size = 0.93

$$\frac{1}{144} \left(\frac{12(d-2e)}{x+2} + 24(d-e)\log(-x-1) - 8(d+e)\log(1-x) + 3(d+2e)\log(2-x) + (26e-19d)\log(x+2) \right)$$

Antiderivative was successfully verified.

[In] Integrate[((d + e*x)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4)^2, x]

[Out] ((12*(d - 2*e))/(2 + x) + 24*(d - e)*Log[-1 - x] - 8*(d + e)*Log[1 - x] + 3*(d + 2*e)*Log[2 - x] + (-19*d + 26*e)*Log[2 + x])/144

fricas [A] time = 0.97, size = 93, normalized size = 1.31

$$\frac{(19d - 26e)x + 38d - 52e \log(x+2) - 24((d-e)x + 2d - 2e)\log(x+1) + 8((d+e)x + 2d + 2e)\log(x-1) - 3((d+2e)x + 2d + 4e)\log(x-2) - 12d + 24e}{144(x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/144*(((19*d - 26*e)*x + 38*d - 52*e)*log(x + 2) - 24*((d - e)*x + 2*d - 2*e)*log(x + 1) + 8*((d + e)*x + 2*d + 2*e)*log(x - 1) - 3*((d + 2*e)*x + 2*d + 4*e)*log(x - 2) - 12*d + 24*e)/(x + 2)

giac [A] time = 0.26, size = 66, normalized size = 0.93

$$-\frac{1}{144}(19d - 26e)\log(|x+2|) + \frac{1}{6}(d-e)\log(|x+1|) - \frac{1}{18}(d+e)\log(|x-1|) + \frac{1}{48}(d+2e)\log(|x-2|) + \frac{d-2e}{12(x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] $-1/144*(19*d - 26*e)*\log(\text{abs}(x + 2)) + 1/6*(d - e)*\log(\text{abs}(x + 1)) - 1/18*(d + e)*\log(\text{abs}(x - 1)) + 1/48*(d + 2*e)*\log(\text{abs}(x - 2)) + 1/12*(d - 2*e)/(x + 2)$

maple [A] time = 0.01, size = 74, normalized size = 1.04

$$-\frac{19d \ln(x+2)}{144} + \frac{d \ln(x-2)}{48} - \frac{d \ln(x-1)}{18} + \frac{d \ln(x+1)}{6} + \frac{13e \ln(x+2)}{72} + \frac{e \ln(x-2)}{24} - \frac{e \ln(x-1)}{18} - \frac{e \ln(x+1)}{6} + \frac{d-2e}{12(x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x)`

[Out] $1/48*d*\ln(x-2)+1/24*e*\ln(x-2)+1/6*d*\ln(x+1)-1/6*e*\ln(x+1)-1/18*d*\ln(x-1)-1/18*e*\ln(x-1)-19/144*d*\ln(x+2)+13/72*e*\ln(x+2)+1/12/(x+2)*d-1/6/(x+2)*e$

maxima [A] time = 0.44, size = 57, normalized size = 0.80

$$-\frac{1}{144}(19d - 26e)\log(x + 2) + \frac{1}{6}(d - e)\log(x + 1) - \frac{1}{18}(d + e)\log(x - 1) + \frac{1}{48}(d + 2e)\log(x - 2) + \frac{d - 2e}{12(x + 2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="maxima")`

[Out] $-1/144*(19*d - 26*e)*\log(x + 2) + 1/6*(d - e)*\log(x + 1) - 1/18*(d + e)*\log(x - 1) + 1/48*(d + 2*e)*\log(x - 2) + 1/12*(d - 2*e)/(x + 2)$

mupad [B] time = 0.81, size = 64, normalized size = 0.90

$$\frac{\frac{d}{12} - \frac{e}{6}}{x + 2} + \ln(x + 1) \left(\frac{d}{6} - \frac{e}{6} \right) - \ln(x - 1) \left(\frac{d}{18} + \frac{e}{18} \right) + \ln(x - 2) \left(\frac{d}{48} + \frac{e}{24} \right) - \ln(x + 2) \left(\frac{19d}{144} - \frac{13e}{72} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int(-((d + e*x)*(x + 2*x^2 - x^3 - 2))/(x^4 - 5*x^2 + 4)^2,x)`

[Out] $(d/12 - e/6)/(x + 2) + \log(x + 1)*(d/6 - e/6) - \log(x - 1)*(d/18 + e/18) + \log(x - 2)*(d/48 + e/24) - \log(x + 2)*((19*d)/144 - (13*e)/72)$

sympy [B] time = 10.54, size = 1188, normalized size = 16.73

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)*(x**3-2*x**2-x+2)/(x**4-5*x**2+4)**2,x)`

```
[Out] (d - 2*e)/(12*x + 24) + (d - e)*log(x + (-1534775*d**6 + 8032360*d**5*e - 9
84027*d**5*(d - e) - 12991180*d**4*e**2 + 11797266*d**4*e*(d - e) + 3567168
*d**4*(d - e)**2 + 1075200*d**3*e**3 - 32721528*d**3*e**2*(d - e) - 8725248
*d**3*e*(d - e)**2 - 247104*d**3*(d - e)**3 + 16959280*d**2*e**4 + 38977296
*d**2*e**3*(d - e) - 2820096*d**2*e**2*(d - e)**2 - 10357632*d**2*e*(d - e)
**3 - 15836800*d*e**5 - 21294960*d*e**4*(d - e) + 15436800*d*e**3*(d - e)**
2 + 16277760*d*e**2*(d - e)**3 + 4283840*e**6 + 3876000*e**5*(d - e) - 6865
920*e**4*(d - e)**2 - 4078080*e**3*(d - e)**3)/(801262*d**6 - 4662251*d**5*
e + 7296938*d**4*e**2 + 1388616*d**3*e**3 - 12447440*d**2*e**4 + 9990800*d*
e**5 - 2380000*e**6))/6 - (d + e)*log(x + (-1534775*d**6 + 8032360*d**5*e +
328009*d**5*(d + e) - 12991180*d**4*e**2 - 3932422*d**4*e*(d + e) + 396352
*d**4*(d + e)**2 + 1075200*d**3*e**3 + 10907176*d**3*e**2*(d + e) - 969472*
d**3*e*(d + e)**2 + 9152*d**3*(d + e)**3 + 16959280*d**2*e**4 - 12992432*d*
**2*e**3*(d + e) - 313344*d**2*e**2*(d + e)**2 + 383616*d**2*e*(d + e)**3 -
15836800*d*e**5 + 7098320*d*e**4*(d + e) + 1715200*d*e**3*(d + e)**2 - 6028
80*d*e**2*(d + e)**3 + 4283840*e**6 - 1292000*e**5*(d + e) - 762880*e**4*(d
+ e)**2 + 151040*e**3*(d + e)**3)/(801262*d**6 - 4662251*d**5*e + 7296938*
d**4*e**2 + 1388616*d**3*e**3 - 12447440*d**2*e**4 + 9990800*d*e**5 - 23800
00*e**6))/18 + (d + 2*e)*log(x + (-1534775*d**6 + 8032360*d**5*e - 984027*d
**5*(d + 2*e)/8 - 12991180*d**4*e**2 + 5898633*d**4*e*(d + 2*e)/4 + 55737*d
**4*(d + 2*e)**2 + 1075200*d**3*e**3 - 4090191*d**3*e**2*(d + 2*e) - 136332
*d**3*e*(d + 2*e)**2 - 3861*d**3*(d + 2*e)**3/8 + 16959280*d**2*e**4 + 4872
162*d**2*e**3*(d + 2*e) - 44064*d**2*e**2*(d + 2*e)**2 - 80919*d**2*e*(d +
2*e)**3/4 - 15836800*d*e**5 - 2661870*d*e**4*(d + 2*e) + 241200*d*e**3*(d +
2*e)**2 + 63585*d*e**2*(d + 2*e)**3/2 + 4283840*e**6 + 484500*e**5*(d + 2*
e) - 107280*e**4*(d + 2*e)**2 - 7965*e**3*(d + 2*e)**3)/(801262*d**6 - 4662
251*d**5*e + 7296938*d**4*e**2 + 1388616*d**3*e**3 - 12447440*d**2*e**4 + 9
990800*d*e**5 - 2380000*e**6))/48 - (19*d - 26*e)*log(x + (-1534775*d**6 +
8032360*d**5*e + 328009*d**5*(19*d - 26*e)/8 - 12991180*d**4*e**2 - 1966211
*d**4*e*(19*d - 26*e)/4 + 6193*d**4*(19*d - 26*e)**2 + 1075200*d**3*e**3 +
1363397*d**3*e**2*(19*d - 26*e) - 15148*d**3*e*(19*d - 26*e)**2 + 143*d**3*
(19*d - 26*e)**3/8 + 16959280*d**2*e**4 - 1624054*d**2*e**3*(19*d - 26*e) -
4896*d**2*e**2*(19*d - 26*e)**2 + 2997*d**2*e*(19*d - 26*e)**3/4 - 1583680
0*d*e**5 + 887290*d*e**4*(19*d - 26*e) + 26800*d*e**3*(19*d - 26*e)**2 - 23
55*d*e**2*(19*d - 26*e)**3/2 + 4283840*e**6 - 161500*e**5*(19*d - 26*e) - 1
1920*e**4*(19*d - 26*e)**2 + 295*e**3*(19*d - 26*e)**3)/(801262*d**6 - 4662
251*d**5*e + 7296938*d**4*e**2 + 1388616*d**3*e**3 - 12447440*d**2*e**4 + 9
990800*d*e**5 - 2380000*e**6))/144
```

$$3.87 \quad \int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=82

$$\frac{d-2e+4f}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f) + \frac{1}{48} \log(2-x)(d+2e+4f) + \frac{1}{6} \log(x+1)(d-e+f) - \frac{1}{144} \log(x+2)(19d-26e+28f)$$

[Out] 1/12*(d-2*e+4*f)/(2+x)-1/18*(d+e+f)*ln(1-x)+1/48*(d+2*e+4*f)*ln(2-x)+1/6*(d-e+f)*ln(1+x)-1/144*(19*d-26*e+28*f)*ln(2+x)

Rubi [A] time = 0.20, antiderivative size = 82, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {1586, 6742}

$$\frac{d-2e+4f}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f) + \frac{1}{48} \log(2-x)(d+2e+4f) + \frac{1}{6} \log(x+1)(d-e+f) - \frac{1}{144} \log(x+2)(19d-26e+28f)$$

Antiderivative was successfully verified.

[In] Int[((d + e*x + f*x^2)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4)^2, x]

[Out] (d - 2*e + 4*f)/(12*(2 + x)) - ((d + e + f)*Log[1 - x])/18 + ((d + 2*e + 4*f)*Log[2 - x])/48 + ((d - e + f)*Log[1 + x])/6 - ((19*d - 26*e + 28*f)*Log[2 + x])/144

Rule 1586

Int[(u_)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p+q, 0]

Rule 6742

Int[u_, x_Symbol] := With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]]

Rubi steps

$$\int \frac{(d + ex + fx^2)(2 - x - 2x^2 + x^3)}{(4 - 5x^2 + x^4)^2} dx = \int \frac{d + ex + fx^2}{(2 + x)^2(2 - x - 2x^2 + x^3)} dx$$

$$= \int \left(\frac{d + 2e + 4f}{48(-2 + x)} + \frac{-d - e - f}{18(-1 + x)} + \frac{d - e + f}{6(1 + x)} + \frac{-d + 2e - 4f}{12(2 + x)^2} + \frac{-19d + 26e - 28f}{144} \right) dx$$

$$= \frac{d - 2e + 4f}{12(2 + x)} - \frac{1}{18}(d + e + f) \log(1 - x) + \frac{1}{48}(d + 2e + 4f) \log(2 - x)$$

Mathematica [A] time = 0.06, size = 77, normalized size = 0.94

$$\frac{1}{144} \left(\frac{12(d - 2e + 4f)}{x + 2} + 24 \log(-x - 1)(d - e + f) - 8 \log(1 - x)(d + e + f) + 3 \log(2 - x)(d + 2e + 4f) + \log(x + 2) \right)$$

Antiderivative was successfully verified.

[In] Integrate[((d + e*x + f*x^2)*(2 - x - 2*x^2 + x^3))/(4 - 5*x^2 + x^4)^2, x]

[Out] ((12*(d - 2*e + 4*f))/(2 + x) + 24*(d - e + f)*Log[-1 - x] - 8*(d + e + f)*Log[1 - x] + 3*(d + 2*e + 4*f)*Log[2 - x] + (-19*d + 26*e - 28*f)*Log[2 + x])/144

fricas [A] time = 1.10, size = 116, normalized size = 1.41

$$\frac{((19d - 26e + 28f)x + 38d - 52e + 56f) \log(x + 2) - 24((d - e + f)x + 2d - 2e + 2f) \log(x + 1) + 8((d + e + f)x + 2d + 2e + 2f) \log(x - 1) - 3((d + 2e + 4f)x + 2d + 4e + 8f) \log(x - 2) - 12d + 24e - 48f}{144(x + 2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/144*(((19*d - 26*e + 28*f)*x + 38*d - 52*e + 56*f)*log(x + 2) - 24*((d - e + f)*x + 2*d - 2*e + 2*f)*log(x + 1) + 8*((d + e + f)*x + 2*d + 2*e + 2*f)*log(x - 1) - 3*((d + 2*e + 4*f)*x + 2*d + 4*e + 8*f)*log(x - 2) - 12*d + 24*e - 48*f)/(x + 2)

giac [A] time = 0.25, size = 77, normalized size = 0.94

$$-\frac{1}{144} (19d + 28f - 26e) \log(|x + 2|) + \frac{1}{6} (d + f - e) \log(|x + 1|) - \frac{1}{18} (d + f + e) \log(|x - 1|) + \frac{1}{48} (d + 4f + 2e)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] -1/144*(19*d + 28*f - 26*e)*log(abs(x + 2)) + 1/6*(d + f - e)*log(abs(x + 1)) - 1/18*(d + f + e)*log(abs(x - 1)) + 1/48*(d + 4*f + 2*e)*log(abs(x - 2)) + 1/12*(d + 4*f - 2*e)/(x + 2)

maple [A] time = 0.01, size = 110, normalized size = 1.34

$$-\frac{19d \ln(x+2)}{144} + \frac{d \ln(x-2)}{48} - \frac{d \ln(x-1)}{18} + \frac{d \ln(x+1)}{6} + \frac{13e \ln(x+2)}{72} + \frac{e \ln(x-2)}{24} - \frac{e \ln(x-1)}{18} - \frac{e \ln(x+1)}{6} - \frac{7f}{6(x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x)

[Out] 1/48*d*ln(x-2)+1/24*e*ln(x-2)+1/12*f*ln(x-2)+1/6*d*ln(x+1)-1/6*e*ln(x+1)+1/6*f*ln(x+1)-1/18*d*ln(x-1)-1/18*e*ln(x-1)-1/18*f*ln(x-1)+13/72*e*ln(x+2)-7/36*f*ln(x+2)-19/144*d*ln(x+2)+1/12/(x+2)*d-1/6/(x+2)*e+1/3/(x+2)*f

maxima [A] time = 0.46, size = 68, normalized size = 0.83

$$-\frac{1}{144} (19d - 26e + 28f) \log(x + 2) + \frac{1}{6} (d - e + f) \log(x + 1) - \frac{1}{18} (d + e + f) \log(x - 1) + \frac{1}{48} (d + 2e + 4f) \log(x - 2) + \frac{1}{12} \frac{d + 4f - 2e}{x + 2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)*(x^3-2*x^2-x+2)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] -1/144*(19*d - 26*e + 28*f)*log(x + 2) + 1/6*(d - e + f)*log(x + 1) - 1/18*(d + e + f)*log(x - 1) + 1/48*(d + 2*e + 4*f)*log(x - 2) + 1/12*(d - 2*e + 4*f)/(x + 2)

mupad [B] time = 0.84, size = 79, normalized size = 0.96

$$\frac{\frac{d}{12} - \frac{e}{6} + \frac{f}{3}}{x+2} + \ln(x+1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} \right) - \ln(x-1) \left(\frac{d}{18} + \frac{e}{18} + \frac{f}{18} \right) + \ln(x-2) \left(\frac{d}{48} + \frac{e}{24} + \frac{f}{12} \right) - \ln(x+2) \left(\frac{19d}{144} - \frac{7f}{36} \right) - \frac{d+4f-2e}{12(x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(-((d + e*x + f*x^2)*(x + 2*x^2 - x^3 - 2))/(x^4 - 5*x^2 + 4)^2,x)

[Out] (d/12 - e/6 + f/3)/(x + 2) + log(x + 1)*(d/6 - e/6 + f/6) - log(x - 1)*(d/18 + e/18 + f/18) + log(x - 2)*(d/48 + e/24 + f/12) - log(x + 2)*((19*d)/144 - (13*e)/72 + (7*f)/36)

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x**2+e*x+d)*(x**3-2*x**2-x+2)/(x**4-5*x**2+4)**2,x)

[Out] Timed out

$$3.88 \quad \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=95

$$\frac{d-2e+4f-8g}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g) + \frac{1}{48} \log(2-x)(d+2e+4f+8g) + \frac{1}{6} \log(x+1)(d-e+f-g) - \frac{1}{144} \log(x+2)(19d-26e+28f-8g)$$

[Out] 1/12*(d-2*e+4*f-8*g)/(2+x)-1/18*(d+e+f+g)*ln(1-x)+1/48*(d+2*e+4*f+8*g)*ln(2-x)+1/6*(d-e+f-g)*ln(1+x)-1/144*(19*d-26*e+28*f-8*g)*ln(2+x)

Rubi [A] time = 0.22, antiderivative size = 95, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 41, $\frac{\text{number of rules}}{\text{integrand size}} = 0.049$, Rules used = {1586, 6742}

$$\frac{d-2e+4f-8g}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g) + \frac{1}{48} \log(2-x)(d+2e+4f+8g) + \frac{1}{6} \log(x+1)(d-e+f-g) - \frac{1}{144} \log(x+2)(19d-26e+28f-8g)$$

Antiderivative was successfully verified.

[In] Int[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4)^2, x]

[Out] (d - 2*e + 4*f - 8*g)/(12*(2 + x)) - ((d + e + f + g)*Log[1 - x])/18 + ((d + 2*e + 4*f + 8*g)*Log[2 - x])/48 + ((d - e + f - g)*Log[1 + x])/6 - ((19*d - 26*e + 28*f - 8*g)*Log[2 + x])/144

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 6742

Int[u_, x_Symbol] := With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]]

Rubi steps

$$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx = \int \frac{d+ex+fx^2+gx^3}{(2+x)^2(2-x-2x^2+x^3)} dx$$

$$= \int \left(\frac{d+2e+4f+8g}{48(-2+x)} + \frac{-d-e-f-g}{18(-1+x)} + \frac{d-e+f-g}{6(1+x)} + \frac{-d-e+f-g}{6(1+x)} \right) dx$$

$$= \frac{d-2e+4f-8g}{12(2+x)} - \frac{1}{18}(d+e+f+g)\log(1-x) + \frac{1}{48}(d+2e+4f+8g)\log(2-x)$$

Mathematica [A] time = 0.05, size = 90, normalized size = 0.95

$$\frac{1}{144} \left(\frac{12(d-2e+4f-8g)}{x+2} + 24\log(-x-1)(d-e+f-g) - 8\log(1-x)(d+e+f+g) + 3\log(2-x)(d+2e+4f+8g) \right)$$

Antiderivative was successfully verified.

[In] Integrate[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4)^2,x]

[Out] ((12*(d - 2*e + 4*f - 8*g))/(2 + x) + 24*(d - e + f - g)*Log[-1 - x] - 8*(d + e + f + g)*Log[1 - x] + 3*(d + 2*e + 4*f + 8*g)*Log[2 - x] + (-19*d + 26*e - 28*f + 8*g)*Log[2 + x])/144

fricas [A] time = 2.42, size = 141, normalized size = 1.48

$$\frac{((19d - 26e + 28f - 8g)x + 38d - 52e + 56f - 16g)\log(x+2) - 24((d-e+f-g)x + 2d - 2e + 2f - 2g)\log(x+1) + 8((d+e+f+g)x + 2d + 2e + 2f + 2g)\log(x-1) - 3((d+2e+4f+8g)x + 2d + 4e + 8f + 16g)\log(x-2) - 12d + 24e - 48f + 96g}{(x+2)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/144*(((19*d - 26*e + 28*f - 8*g)*x + 38*d - 52*e + 56*f - 16*g)*log(x + 2) - 24*(((d - e + f - g)*x + 2*d - 2*e + 2*f - 2*g)*log(x + 1) + 8*(((d + e + f + g)*x + 2*d + 2*e + 2*f + 2*g)*log(x - 1) - 3*(((d + 2*e + 4*f + 8*g)*x + 2*d + 4*e + 8*f + 16*g)*log(x - 2) - 12*d + 24*e - 48*f + 96*g)/(x + 2))

giac [A] time = 0.33, size = 90, normalized size = 0.95

$$-\frac{1}{144}(19d + 28f - 8g - 26e)\log(|x+2|) + \frac{1}{6}(d + f - g - e)\log(|x+1|) - \frac{1}{18}(d + f + g + e)\log(|x-1|) + \frac{1}{48}(d + 2e + 4f + 8g)\log(2-x)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] -1/144*(19*d + 28*f - 8*g - 26*e)*log(abs(x + 2)) + 1/6*(d + f - g - e)*log(abs(x + 1)) - 1/18*(d + f + g + e)*log(abs(x - 1)) + 1/48*(d + 4*f + 8*g + 2*e)*log(abs(x - 2)) + 1/12*(d + 4*f - 8*g - 2*e)/(x + 2)

maple [A] time = 0.01, size = 146, normalized size = 1.54

$$-\frac{19d \ln(x+2)}{144} + \frac{d \ln(x-2)}{48} - \frac{d \ln(x-1)}{18} + \frac{d \ln(x+1)}{6} + \frac{13e \ln(x+2)}{72} + \frac{e \ln(x-2)}{24} - \frac{e \ln(x-1)}{18} - \frac{e \ln(x+1)}{6} - \frac{7f}{12} + \frac{g}{6} + \frac{2e}{3(x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)

[Out] 1/48*d*ln(x-2)+1/24*e*ln(x-2)+1/12*f*ln(x-2)+1/6*g*ln(x-2)+1/6*d*ln(x+1)-1/6*e*ln(x+1)+1/6*f*ln(x+1)-1/6*g*ln(x+1)-1/18*d*ln(x-1)-1/18*e*ln(x-1)-1/18*f*ln(x-1)-1/18*g*ln(x-1)+13/72*e*ln(x+2)-7/36*f*ln(x+2)+1/18*g*ln(x+2)-19/144*d*ln(x+2)+1/12/(x+2)*d-1/6/(x+2)*e+1/3/(x+2)*f-2/3/(x+2)*g

maxima [A] time = 0.44, size = 81, normalized size = 0.85

$$-\frac{1}{144} (19d - 26e + 28f - 8g) \log(x+2) + \frac{1}{6} (d - e + f - g) \log(x+1) - \frac{1}{18} (d + e + f + g) \log(x-1) + \frac{1}{48} (d + e + f + g) \log(x-2) + \frac{1}{12} \left(\frac{d}{x+2} - \frac{e}{3(x+2)} + \frac{f}{3(x+2)} - \frac{2g}{3(x+2)} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] -1/144*(19*d - 26*e + 28*f - 8*g)*log(x + 2) + 1/6*(d - e + f - g)*log(x + 1) - 1/18*(d + e + f + g)*log(x - 1) + 1/48*(d + 2*e + 4*f + 8*g)*log(x - 2) + 1/12*(d - 2*e + 4*f - 8*g)/(x + 2)

mupad [B] time = 0.88, size = 94, normalized size = 0.99

$$\frac{\frac{d}{12} - \frac{e}{6} + \frac{f}{3} - \frac{2g}{3}}{x+2} + \ln(x+1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} \right) - \ln(x-1) \left(\frac{d}{18} + \frac{e}{18} + \frac{f}{18} + \frac{g}{18} \right) + \ln(x-2) \left(\frac{d}{48} + \frac{e}{24} + \frac{f}{12} + \frac{g}{6} \right) - \frac{1}{12} \left(\frac{d}{x+2} - \frac{e}{3(x+2)} + \frac{f}{3(x+2)} - \frac{2g}{3(x+2)} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(-((d + e*x + f*x^2 + g*x^3)*(x + 2*x^2 - x^3 - 2))/(x^4 - 5*x^2 + 4)^2, x)

[Out] (d/12 - e/6 + f/3 - (2*g)/3)/(x + 2) + log(x + 1)*(d/6 - e/6 + f/6 - g/6) - log(x - 1)*(d/18 + e/18 + f/18 + g/18) + log(x - 2)*(d/48 + e/24 + f/12 + g/6) - log(x + 2)*((19*d)/144 - (13*e)/72 + (7*f)/36 - g/18)

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x**3-2*x**2-x+2)*(g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)

[Out] Timed out

$$3.89 \quad \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=106

$$\frac{d-2e+4f-8g+16h}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g+h) + \frac{1}{48} \log(2-x)(d+2e+4f+8g+16h) + \frac{1}{6} \log(x+1)(d-e+f-g+h)$$

[Out] 1/12*(d-2*e+4*f-8*g+16*h)/(2+x)-1/18*(d+e+f+g+h)*ln(1-x)+1/48*(d+2*e+4*f+8*g+16*h)*ln(2-x)+1/6*(d-e+f-g+h)*ln(1+x)-1/144*(19*d-26*e+28*f-8*g-80*h)*ln(2+x)

Rubi [A] time = 0.27, antiderivative size = 106, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 46, $\frac{\text{number of rules}}{\text{integrand size}} = 0.043$, Rules used = {1586, 6742}

$$\frac{d-2e+4f-8g+16h}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g+h) + \frac{1}{48} \log(2-x)(d+2e+4f+8g+16h) + \frac{1}{6} \log(x+1)(d-e+f-g+h)$$

Antiderivative was successfully verified.

[In] Int[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + x^4)^2, x]

[Out] (d - 2*e + 4*f - 8*g + 16*h)/(12*(2 + x)) - ((d + e + f + g + h)*Log[1 - x])/18 + ((d + 2*e + 4*f + 8*g + 16*h)*Log[2 - x])/48 + ((d - e + f - g + h)*Log[1 + x])/6 - ((19*d - 26*e + 28*f - 8*g - 80*h)*Log[2 + x])/144

Rule 1586

Int[(u_)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 6742

Int[u_, x_Symbol] := With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]]

Rubi steps

$$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx = \int \frac{d+ex+fx^2+gx^3+hx^4}{(2+x)^2(2-x-2x^2+x^3)} dx$$

$$= \int \left(\frac{d+2e+4f+8g+16h}{48(-2+x)} + \frac{-d-e-f-g-h}{18(-1+x)} + \frac{d-e-f-g-h}{18(1-x)} \right) dx$$

$$= \frac{d-2e+4f-8g+16h}{12(2+x)} - \frac{1}{18}(d+e+f+g+h) \log(1-x)$$

Mathematica [A] time = 0.06, size = 102, normalized size = 0.96

$$\frac{1}{144} \left(\frac{12(d-2e+4f-8g+16h)}{x+2} + 24 \log(-x-1)(d-e+f-g+h) - 8 \log(1-x)(d+e+f+g+h) + 3 \log(1-x)^2(d+e+f+g+h) \right)$$

Antiderivative was successfully verified.

[In] Integrate[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + x^4)^2,x]

[Out] ((12*(d - 2*e + 4*f - 8*g + 16*h))/(2 + x) + 24*(d - e + f - g + h)*Log[-1 - x] - 8*(d + e + f + g + h)*Log[1 - x] + 3*(d + 2*(e + 2*f + 4*g + 8*h))*Log[2 - x] + (-19*d + 26*e - 28*f + 8*g + 80*h)*Log[2 + x])/144

fricas [A] time = 11.24, size = 164, normalized size = 1.55

$$\frac{((19d - 26e + 28f - 8g - 80h)x + 38d - 52e + 56f - 16g - 160h) \log(x + 2) - 24((d - e + f - g + h)x + 2d - 2e + 2f - 2g + 2h) \log(x + 1) + 8((d + e + f + g + h)x + 2d + 2e + 2f + 2g + 2h) \log(x - 1) - 3((d + 2e + 4f + 8g + 16h)x + 2d + 4e + 8f + 16g + 32h) \log(x - 2) - 12d + 24e - 48f + 96g - 192h}{(x + 2)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/144*(((19*d - 26*e + 28*f - 8*g - 80*h)*x + 38*d - 52*e + 56*f - 16*g - 160*h)*log(x + 2) - 24*((d - e + f - g + h)*x + 2*d - 2*e + 2*f - 2*g + 2*h)*log(x + 1) + 8*((d + e + f + g + h)*x + 2*d + 2*e + 2*f + 2*g + 2*h)*log(x - 1) - 3*((d + 2*e + 4*f + 8*g + 16*h)*x + 2*d + 4*e + 8*f + 16*g + 32*h)*log(x - 2) - 12*d + 24*e - 48*f + 96*g - 192*h)/(x + 2)

giac [A] time = 0.29, size = 101, normalized size = 0.95

$$-\frac{1}{144} (19d + 28f - 8g - 80h - 26e) \log(|x + 2|) + \frac{1}{6} (d + f - g + h - e) \log(|x + 1|) - \frac{1}{18} (d + f + g + h + e) \log(|x - 1|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] -1/144*(19*d + 28*f - 8*g - 80*h - 26*e)*log(abs(x + 2)) + 1/6*(d + f - g + h - e)*log(abs(x + 1)) - 1/18*(d + f + g + h + e)*log(abs(x - 1)) + 1/48*(d + 4*f + 8*g + 16*h + 2*e)*log(abs(x - 2)) + 1/12*(d + 4*f - 8*g + 16*h - 2*e)/(x + 2)

maple [A] time = 0.01, size = 182, normalized size = 1.72

$$\frac{5h \ln(x+2)}{9} - \frac{h \ln(x-1)}{18} + \frac{h \ln(x+1)}{6} + \frac{h \ln(x-2)}{3} - \frac{g \ln(x-1)}{18} + \frac{g \ln(x+2)}{18} + \frac{g \ln(x-2)}{6} - \frac{g \ln(x+1)}{6} - \frac{19d \ln(x+2)}{144} + \frac{19d \ln(x-1)}{144} - \frac{19d \ln(x-2)}{144} + \frac{19d \ln(x+1)}{144} - \frac{19d}{144(x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^3-2*x^2-x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)

[Out] 5/9*h*ln(x+2)-1/18*h*ln(x-1)+1/6*h*ln(x+1)+1/3*h*ln(x-2)-1/18*g*ln(x-1)+1/18*g*ln(x+2)+1/6*g*ln(x-2)-1/6*g*ln(x+1)-19/144*d*ln(x+2)+13/72*e*ln(x+2)-1/18*e*ln(x-1)-1/18*d*ln(x-1)-1/6*e*ln(x+1)+1/6*d*ln(x+1)+1/48*d*ln(x-2)+1/24*e*ln(x-2)+1/12*f*ln(x-2)+1/6*f*ln(x+1)-1/18*f*ln(x-1)-7/36*f*ln(x+2)+4/3/(x+2)*h-2/3/(x+2)*g+1/12/(x+2)*d-1/6/(x+2)*e+1/3/(x+2)*f

maxima [A] time = 0.44, size = 92, normalized size = 0.87

$$-\frac{1}{144} (19d - 26e + 28f - 8g - 80h) \log(x+2) + \frac{1}{6} (d - e + f - g + h) \log(x+1) - \frac{1}{18} (d + e + f + g + h) \log(x-1) + \frac{1}{48} (d + 4f + 8g + 16h) \log(x-2) + \frac{1}{12} (d + 4f - 8g + 16h) / (x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] -1/144*(19*d - 26*e + 28*f - 8*g - 80*h)*log(x + 2) + 1/6*(d - e + f - g + h)*log(x + 1) - 1/18*(d + e + f + g + h)*log(x - 1) + 1/48*(d + 2*e + 4*f + 8*g + 16*h)*log(x - 2) + 1/12*(d - 2*e + 4*f - 8*g + 16*h)/(x + 2)

mupad [B] time = 1.36, size = 108, normalized size = 1.02

$$\frac{\frac{d}{12} - \frac{e}{6} + \frac{f}{3} - \frac{2g}{3} + \frac{4h}{3}}{x+2} + \ln(x+1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} \right) - \ln(x-1) \left(\frac{d}{18} + \frac{e}{18} + \frac{f}{18} + \frac{g}{18} + \frac{h}{18} \right) + \ln(x-2) \left(\frac{d}{48} + \frac{e}{48} + \frac{f}{48} + \frac{g}{48} + \frac{h}{48} \right) + \frac{1}{12} (d + 4f - 8g + 16h) / (x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(-((x + 2*x^2 - x^3 - 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(x^4 - 5*x^2 + 4)^2,x)


```
[Out] (d/12 - e/6 + f/3 - (2*g)/3 + (4*h)/3)/(x + 2) + log(x + 1)*(d/6 - e/6 + f/6 - g/6 + h/6) - log(x - 1)*(d/18 + e/18 + f/18 + g/18 + h/18) + log(x - 2)*(d/48 + e/24 + f/12 + g/6 + h/3) + log(x + 2)*((13*e)/72 - (19*d)/144 - (7*f)/36 + g/18 + (5*h)/9)
```

```
sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00
```

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**3-2*x**2-x+2)*(h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2, x)
```

```
[Out] Timed out
```

$$3.90 \quad \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=122

$$\frac{d-2e+4f-8g+16h-32i}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g+h+i) + \frac{1}{48} \log(2-x)(d+2e+4f+8g+16h+32i) + \frac{1}{6} \log(x+1)$$

[Out] i*x+1/12*(d-2*e+4*f-8*g+16*h-32*i)/(2+x)-1/18*(d+e+f+g+h+i)*ln(1-x)+1/48*(d+2*e+4*f+8*g+16*h+32*i)*ln(2-x)+1/6*(d-e+f-g+h-i)*ln(1+x)-1/144*(19*d-26*e+28*f-8*g-80*h+352*i)*ln(2+x)

Rubi [A] time = 0.31, antiderivative size = 122, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 51, $\frac{\text{number of rules}}{\text{integrand size}} = 0.039$, Rules used = {1586, 6742}

$$\frac{d-2e+4f-8g+16h-32i}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g+h+i) + \frac{1}{48} \log(2-x)(d+2e+4f+8g+16h+32i) + \frac{1}{6} \log(x+1)$$

Antiderivative was successfully verified.

[In] Int[((2 - x - 2*x^2 + x^3)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2 + x^4)^2, x]

[Out] i*x + (d - 2*e + 4*f - 8*g + 16*h - 32*i)/(12*(2 + x)) - ((d + e + f + g + h + i)*Log[1 - x])/18 + ((d + 2*e + 4*f + 8*g + 16*h + 32*i)*Log[2 - x])/48 + ((d - e + f - g + h - i)*Log[1 + x])/6 - ((19*d - 26*e + 28*f - 8*g - 80*h + 352*i)*Log[2 + x])/144

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 6742

Int[u_, x_Symbol] := With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]]

Rubi steps

$$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+90x^5)}{(4-5x^2+x^4)^2} dx = \int \frac{d+ex+fx^2+gx^3+hx^4+90x^5}{(2+x)^2(2-x-2x^2+x^3)} dx$$

$$= \int \left(90 + \frac{2880+d+2e+4f+8g+16h}{48(-2+x)} + \frac{-90}{2+x} \right) dx$$

$$= 90x - \frac{2880-d+2e-4f+8g-16h}{12(2+x)} - \frac{1}{18}(90 + \dots)$$

Mathematica [A] time = 0.06, size = 118, normalized size = 0.97

$$\frac{1}{144} \left(\frac{12(d-2(e-2f+4g-8h+16i))}{x+2} - 8 \log(1-x)(d+e+f+g+h+i) + 3 \log(2-x)(d+2e+4(f+2g+\dots)$$

Antiderivative was successfully verified.

[In] Integrate[((2-x-2*x^2+x^3)*(d+e*x+f*x^2+g*x^3+h*x^4+i*x^5))/((4-5*x^2+x^4)^2),x]

[Out] (144*i*x + (12*(d - 2*(e - 2*f + 4*g - 8*h + 16*i)))/(2 + x) - 8*(d + e + f + g + h + i)*Log[1 - x] + 3*(d + 2*e + 4*(f + 2*g + 4*h + 8*i))*Log[2 - x] + 24*(d - e + f - g + h - i)*Log[1 + x] + (-19*d + 26*e - 28*f + 8*g + 80*h - 352*i)*Log[2 + x])/144

fricas [A] time = 66.48, size = 200, normalized size = 1.64

$$144ix^2 + 288ix - \left((19d - 26e + 28f - 8g - 80h + 352i)x + 38d - 52e + 56f - 16g - 160h + 704i \right) \log(x$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] 1/144*(144*i*x^2 + 288*i*x - ((19*d - 26*e + 28*f - 8*g - 80*h + 352*i)*x + 38*d - 52*e + 56*f - 16*g - 160*h + 704*i)*log(x + 2) + 24*((d - e + f - g + h - i)*x + 2*d - 2*e + 2*f - 2*g + 2*h - 2*i)*log(x + 1) - 8*((d + e + f + g + h + i)*x + 2*d + 2*e + 2*f + 2*g + 2*h + 2*i)*log(x - 1) + 3*((d + 2*e + 4*f + 8*g + 16*h + 32*i)*x + 2*d + 4*e + 8*f + 16*g + 32*h + 64*i)*log(x - 2) + 12*d - 24*e + 48*f - 96*g + 192*h - 384*i)/(x + 2)

giac [A] time = 0.37, size = 117, normalized size = 0.96

$$ix - \frac{1}{144} (19d + 28f - 8g - 80h + 352i - 26e) \log(|x+2|) + \frac{1}{6} (d + f - g + h - i - e) \log(|x+1|) - \frac{1}{18} (d + f + \dots)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x
, algorithm="giac")

[Out] i*x - 1/144*(19*d + 28*f - 8*g - 80*h + 352*i - 26*e)*log(abs(x + 2)) + 1/6*(d + f - g + h - i - e)*log(abs(x + 1)) - 1/18*(d + f + g + h + i + e)*log(abs(x - 1)) + 1/48*(d + 4*f + 8*g + 16*h + 32*i + 2*e)*log(abs(x - 2)) + 1/12*(d + 4*f - 8*g + 16*h - 32*i - 2*e)/(x + 2)

maple [A] time = 0.01, size = 221, normalized size = 1.81

$$\frac{22i \ln(x+2)}{9} - \frac{i \ln(x-1)}{18} - \frac{i \ln(x+1)}{6} + \frac{2i \ln(x-2)}{3} + \frac{5h \ln(x+2)}{9} - \frac{h \ln(x-1)}{18} + \frac{h \ln(x+1)}{6} + \frac{h \ln(x-2)}{3} - \frac{g \ln(x+2)}{9} + \frac{g \ln(x-1)}{18} - \frac{g \ln(x+1)}{6} + \frac{g \ln(x-2)}{3} - \frac{f \ln(x+2)}{9} + \frac{f \ln(x-1)}{18} - \frac{f \ln(x+1)}{6} + \frac{f \ln(x-2)}{3} - \frac{e \ln(x+2)}{9} + \frac{e \ln(x-1)}{18} - \frac{e \ln(x+1)}{6} + \frac{e \ln(x-2)}{3} - \frac{d}{x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)

[Out] -22/9*i*ln(x+2)-1/18*i*ln(x-1)-1/6*i*ln(x+1)+2/3*i*ln(x-2)+5/9*h*ln(x+2)-1/18*h*ln(x-1)+1/6*h*ln(x+1)+1/3*h*ln(x-2)-1/18*g*ln(x-1)+1/18*g*ln(x+2)+1/6*g*ln(x-2)-1/6*g*ln(x+1)-19/144*d*ln(x+2)+13/72*e*ln(x+2)-1/18*e*ln(x-1)-1/18*d*ln(x-1)-1/6*e*ln(x+1)+1/6*d*ln(x+1)+1/48*d*ln(x-2)+1/24*e*ln(x-2)+1/12*f*ln(x-2)+1/6*f*ln(x+1)-1/18*f*ln(x-1)-7/36*f*ln(x+2)+i*x-8/3/(x+2)*i+4/3/(x+2)*h-2/3/(x+2)*g+1/12/(x+2)*d-1/6/(x+2)*e+1/3/(x+2)*f

maxima [A] time = 0.45, size = 108, normalized size = 0.89

$$ix - \frac{1}{144} (19d - 26e + 28f - 8g - 80h + 352i) \log(x+2) + \frac{1}{6} (d - e + f - g + h - i) \log(x+1) - \frac{1}{18} (d + e + f + g + h + i) \log(x-1) + \frac{1}{48} (d + 4f + 8g + 16h + 32i) \log(x-2) + \frac{1}{12} (d - 2e + 4f - 8g + 16h - 32i) / (x+2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^3-2*x^2-x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x
, algorithm="maxima")

[Out] i*x - 1/144*(19*d - 26*e + 28*f - 8*g - 80*h + 352*i)*log(x + 2) + 1/6*(d - e + f - g + h - i)*log(x + 1) - 1/18*(d + e + f + g + h + i)*log(x - 1) + 1/48*(d + 2*e + 4*f + 8*g + 16*h + 32*i)*log(x - 2) + 1/12*(d - 2*e + 4*f - 8*g + 16*h - 32*i)/(x + 2)

mupad [B] time = 1.67, size = 127, normalized size = 1.04

$$ix + \frac{\frac{d}{12} - \frac{e}{6} + \frac{f}{3} - \frac{2g}{3} + \frac{4h}{3} - \frac{8i}{3}}{x+2} + \ln(x+1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} - \frac{i}{6} \right) + \ln(x-2) \left(\frac{d}{48} + \frac{e}{24} + \frac{f}{12} + \frac{g}{6} + \frac{h}{3} + \frac{2i}{3} \right) - \frac{d}{x+2}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(-((x + 2*x^2 - x^3 - 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] i*x + (d/12 - e/6 + f/3 - (2*g)/3 + (4*h)/3 - (8*i)/3)/(x + 2) + log(x + 1)
*(d/6 - e/6 + f/6 - g/6 + h/6 - i/6) + log(x - 2)*(d/48 + e/24 + f/12 + g/6
+ h/3 + (2*i)/3) - log(x - 1)*(d/18 + e/18 + f/18 + g/18 + h/18 + i/18) -
log(x + 2)*((19*d)/144 - (13*e)/72 + (7*f)/36 - g/18 - (5*h)/9 + (22*i)/9)
```

```
sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00
```

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**3-2*x**2-x+2)*(i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**
2+4)**2,x)
```

```
[Out] Timed out
```

$$3.91 \quad \int \frac{2-3x+x^2}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=56

$$-\frac{3x+5}{12(x^2+3x+2)} - \frac{1}{36} \log(1-x) + \frac{1}{144} \log(2-x) - \frac{7}{36} \log(x+1) + \frac{31}{144} \log(x+2)$$

[Out] 1/12*(-5-3*x)/(x^2+3*x+2)-1/36*ln(1-x)+1/144*ln(2-x)-7/36*ln(1+x)+31/144*ln(2+x)

Rubi [A] time = 0.06, antiderivative size = 56, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 5, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.238$, Rules used = {1586, 974, 1072, 632, 31}

$$-\frac{3x+5}{12(x^2+3x+2)} - \frac{1}{36} \log(1-x) + \frac{1}{144} \log(2-x) - \frac{7}{36} \log(x+1) + \frac{31}{144} \log(x+2)$$

Antiderivative was successfully verified.

[In] Int[(2 - 3*x + x^2)/(4 - 5*x^2 + x^4)^2, x]

[Out] -(5 + 3*x)/(12*(2 + 3*x + x^2)) - Log[1 - x]/36 + Log[2 - x]/144 - (7*Log[1 + x])/36 + (31*Log[2 + x])/144

Rule 31

Int[((a_) + (b_.)*(x_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 632

Int[((d_) + (e_.)*(x_))/((a_) + (b_.)*(x_) + (c_.)*(x_)^2), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && NiceSqrtQ[b^2 - 4*a*c]

Rule 974

Int[((a_) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_)*((d_) + (e_.)*(x_) + (f_.)*(x_)^2)^(q_), x_Symbol] := Simp[((2*a*c^2*e - b^2*c*e + b^3*f + b*c*(c*d - 3*a*f) + c*(2*c^2*d + b^2*f - c*(b*e + 2*a*f))*x)*(a + b*x + c*x^2)^(p+1)*(d + e*x + f*x^2)^(q+1))/((b^2 - 4*a*c)*((c*d - a*f)^2 - (b*d - a*e)*(c*e - b*f))*(p+1)), x] - Dist[1/((b^2 - 4*a*c)*((c*d - a*f)^2 - (b*d - a*e)*(c*e - b*f)))]

```

c*e - b*f))*(p + 1)), Int[(a + b*x + c*x^2)^(p + 1)*(d + e*x + f*x^2)^q*Sim
p[2*c*((c*d - a*f)^2 - (b*d - a*e)*(c*e - b*f))*(p + 1) - (2*c^2*d + b^2*f
- c*(b*e + 2*a*f))*(a*f*(p + 1) - c*d*(p + 2)) - e*(b^2*c*e - 2*a*c^2*e - b
^3*f - b*c*(c*d - 3*a*f))*(p + q + 2) + (2*f*(2*a*c^2*e - b^2*c*e + b^3*f +
b*c*(c*d - 3*a*f))*(p + q + 2) - (2*c^2*d + b^2*f - c*(b*e + 2*a*f))*(b*f*
(p + 1) - c*e*(2*p + q + 4)))*x + c*f*(2*c^2*d + b^2*f - c*(b*e + 2*a*f))*(
2*p + 2*q + 5)*x^2, x], x] /; FreeQ[{a, b, c, d, e, f, q}, x] && NeQ[b^
2 - 4*a*c, 0] && NeQ[e^2 - 4*d*f, 0] && LtQ[p, -1] && NeQ[(c*d - a*f)^2 - (
b*d - a*e)*(c*e - b*f), 0] && !( !IntegerQ[p] && ILtQ[q, -1]) && !IGtQ[q,
0]

```

Rule 1072

```

Int[((A_.) + (B_.)*(x_) + (C_.)*(x_)^2)/(((a_) + (b_.)*(x_) + (c_.)*(x_)^2)
*((d_) + (e_.)*(x_) + (f_.)*(x_)^2)), x_Symbol] := With[{q = c^2*d^2 - b*c*
d*e + a*c*e^2 + b^2*d*f - 2*a*c*d*f - a*b*e*f + a^2*f^2}, Dist[1/q, Int[(A*
c^2*d - a*c*C*d - A*b*c*e + a*B*c*e + A*b^2*f - a*b*B*f - a*A*c*f + a^2*C*f
+ c*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B*f)*x)/(a + b*x + c*x^2),
x], x] + Dist[1/q, Int[(c*C*d^2 - B*c*d*e + A*c*e^2 + b*B*d*f - A*c*d*f - a
*C*d*f - A*b*e*f + a*A*f^2 - f*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B
*f)*x)/(d + e*x + f*x^2), x], x] /; NeQ[q, 0]] /; FreeQ[{a, b, c, d, e, f,
A, B, C}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[e^2 - 4*d*f, 0]

```

Rule 1586

```

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

```

Rubi steps

$$\begin{aligned}
\int \frac{2-3x+x^2}{(4-5x^2+x^4)^2} dx &= \int \frac{1}{(2-3x+x^2)(2+3x+x^2)^2} dx \\
&= -\frac{5+3x}{12(2+3x+x^2)} + \frac{1}{72} \int \frac{-18+48x-18x^2}{(2-3x+x^2)(2+3x+x^2)} dx \\
&= -\frac{5+3x}{12(2+3x+x^2)} + \frac{\int \frac{252-108x}{2-3x+x^2} dx}{5184} + \frac{\int \frac{-900+108x}{2+3x+x^2} dx}{5184} \\
&= -\frac{5+3x}{12(2+3x+x^2)} + \frac{1}{144} \int \frac{1}{-2+x} dx - \frac{1}{36} \int \frac{1}{-1+x} dx - \frac{7}{36} \int \frac{1}{1+x} dx + \frac{31}{144} \int \frac{1}{2+x} dx \\
&= -\frac{5+3x}{12(2+3x+x^2)} - \frac{1}{36} \log(1-x) + \frac{1}{144} \log(2-x) - \frac{7}{36} \log(1+x) + \frac{31}{144} \log(2+x)
\end{aligned}$$

Mathematica [A] time = 0.02, size = 48, normalized size = 0.86

$$\frac{1}{144} \left(-\frac{12(3x+5)}{x^2+3x+2} - 4 \log(1-x) + \log(2-x) - 28 \log(x+1) + 31 \log(x+2) \right)$$

Antiderivative was successfully verified.

[In] Integrate[(2 - 3*x + x^2)/(4 - 5*x^2 + x^4)^2, x]

[Out] ((-12*(5 + 3*x))/(2 + 3*x + x^2) - 4*Log[1 - x] + Log[2 - x] - 28*Log[1 + x] + 31*Log[2 + x])/144

fricas [A] time = 0.74, size = 72, normalized size = 1.29

$$\frac{31(x^2+3x+2)\log(x+2) - 28(x^2+3x+2)\log(x+1) - 4(x^2+3x+2)\log(x-1) + (x^2+3x+2)\log(x-2) - 36x - 60}{144(x^2+3x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)/(x^4-5*x^2+4)^2, x, algorithm="fricas")

[Out] 1/144*(31*(x^2 + 3*x + 2)*log(x + 2) - 28*(x^2 + 3*x + 2)*log(x + 1) - 4*(x^2 + 3*x + 2)*log(x - 1) + (x^2 + 3*x + 2)*log(x - 2) - 36*x - 60)/(x^2 + 3*x + 2)

giac [A] time = 0.35, size = 46, normalized size = 0.82

$$-\frac{3x+5}{12(x+2)(x+1)} + \frac{31}{144} \log(|x+2|) - \frac{7}{36} \log(|x+1|) - \frac{1}{36} \log(|x-1|) + \frac{1}{144} \log(|x-2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] $-1/12*(3*x + 5)/((x + 2)*(x + 1)) + 31/144*\log(\text{abs}(x + 2)) - 7/36*\log(\text{abs}(x + 1)) - 1/36*\log(\text{abs}(x - 1)) + 1/144*\log(\text{abs}(x - 2))$

maple [A] time = 0.01, size = 40, normalized size = 0.71

$$\frac{31 \ln(x+2)}{144} + \frac{\ln(x-2)}{144} - \frac{\ln(x-1)}{36} - \frac{7 \ln(x+1)}{36} - \frac{1}{6(x+1)} - \frac{1}{12(x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^2-3*x+2)/(x^4-5*x^2+4)^2,x)

[Out] $1/144*\ln(x-2)-1/6/(x+1)-7/36*\ln(x+1)-1/36*\ln(x-1)-1/12/(x+2)+31/144*\ln(x+2)$

maxima [A] time = 0.43, size = 42, normalized size = 0.75

$$-\frac{3x+5}{12(x^2+3x+2)} + \frac{31}{144} \log(x+2) - \frac{7}{36} \log(x+1) - \frac{1}{36} \log(x-1) + \frac{1}{144} \log(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] $-1/12*(3*x + 5)/(x^2 + 3*x + 2) + 31/144*\log(x + 2) - 7/36*\log(x + 1) - 1/36*\log(x - 1) + 1/144*\log(x - 2)$

mupad [B] time = 0.05, size = 42, normalized size = 0.75

$$\frac{\ln(x-2)}{144} - \frac{7 \ln(x+1)}{36} - \frac{\ln(x-1)}{36} + \frac{31 \ln(x+2)}{144} - \frac{\frac{x}{4} + \frac{5}{12}}{x^2 + 3x + 2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^2 - 3*x + 2)/(x^4 - 5*x^2 + 4)^2,x)

[Out] $\log(x-2)/144 - (7*\log(x+1))/36 - \log(x-1)/36 + (31*\log(x+2))/144 - (x/4 + 5/12)/(3*x + x^2 + 2)$

sympy [A] time = 0.29, size = 46, normalized size = 0.82

$$\frac{-3x-5}{12x^2+36x+24} + \frac{\log(x-2)}{144} - \frac{\log(x-1)}{36} - \frac{7 \log(x+1)}{36} + \frac{31 \log(x+2)}{144}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**2-3*x+2)/(x**4-5*x**2+4)**2,x)
```

```
[Out] (-3*x - 5)/(12*x**2 + 36*x + 24) + log(x - 2)/144 - log(x - 1)/36 - 7*log(x  
+ 1)/36 + 31*log(x + 2)/144
```

$$3.92 \quad \int \frac{(d+ex)(2-3x+x^2)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=89

$$-\frac{x(3d-4e)+5d-6e}{12(x^2+3x+2)} - \frac{1}{36}(d+e)\log(1-x) + \frac{1}{144}(d+2e)\log(2-x) - \frac{1}{36}(7d-13e)\log(x+1) + \frac{1}{144}(31d-50e)\log(x+2)$$

[Out] 1/12*(-5*d+6*e-(3*d-4*e)*x)/(x^2+3*x+2)-1/36*(d+e)*ln(1-x)+1/144*(d+2*e)*ln(2-x)-1/36*(7*d-13*e)*ln(1+x)+1/144*(31*d-50*e)*ln(2+x)

Rubi [A] time = 0.26, antiderivative size = 89, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 5, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.192$, Rules used = {1586, 1016, 1072, 632, 31}

$$-\frac{x(3d-4e)+5d-6e}{12(x^2+3x+2)} - \frac{1}{36}(d+e)\log(1-x) + \frac{1}{144}(d+2e)\log(2-x) - \frac{1}{36}(7d-13e)\log(x+1) + \frac{1}{144}(31d-50e)\log(x+2)$$

Antiderivative was successfully verified.

[In] Int[((d + e*x)*(2 - 3*x + x^2))/(4 - 5*x^2 + x^4)^2, x]

[Out] -(5*d - 6*e + (3*d - 4*e)*x)/(12*(2 + 3*x + x^2)) - ((d + e)*Log[1 - x])/36 + ((d + 2*e)*Log[2 - x])/144 - ((7*d - 13*e)*Log[1 + x])/36 + ((31*d - 50*e)*Log[2 + x])/144

Rule 31

Int[((a_) + (b_)*(x_))^(n_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 632

Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && NiceSqrtQ[b^2 - 4*a*c]

Rule 1016

Int[((g_) + (h_)*(x_))*((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_)*((d_) + (e_)*(x_) + (f_)*(x_)^2)^(q_), x_Symbol] := Simp[((a + b*x + c*x^2)^(p+1) * (d + e*x + f*x^2)^(q+1) * (g*c*(2*a*c*e - b*(c*d + a*f)) + (g*b - a*h)*(2*c^2*d + b^2*f - c*(b*e + 2*a*f)) + c*(g*(2*c^2*d + b^2*f - c*(b*e + 2*a*f)))

```

- h*(b*c*d - 2*a*c*e + a*b*f))*x))/((b^2 - 4*a*c)*((c*d - a*f)^2 - (b*d -
a*e)*(c*e - b*f))*(p + 1)), x] + Dist[1/((b^2 - 4*a*c)*((c*d - a*f)^2 - (b*
d - a*e)*(c*e - b*f))*(p + 1)), Int[(a + b*x + c*x^2)^(p + 1)*(d + e*x + f*
x^2)^q*Simp[(b*h - 2*g*c)*((c*d - a*f)^2 - (b*d - a*e)*(c*e - b*f))*(p + 1)
+ (b^2*(g*f) - b*(h*c*d + g*c*e + a*h*f) + 2*(g*c*(c*d - a*f) - a*(-(h*c*e
))))*(a*f*(p + 1) - c*d*(p + 2)) - e*((g*c)*(2*a*c*e - b*(c*d + a*f)) + (g*
b - a*h)*(2*c^2*d + b^2*f - c*(b*e + 2*a*f)))*(p + q + 2) - (2*f*((g*c)*(2*
a*c*e - b*(c*d + a*f)) + (g*b - a*h)*(2*c^2*d + b^2*f - c*(b*e + 2*a*f)))*
(p + q + 2) - (b^2*g*f - b*(h*c*d + g*c*e + a*h*f) + 2*(g*c*(c*d - a*f) - a*
(-(h*c*e))))*(b*f*(p + 1) - c*e*(2*p + q + 4)))*x - c*f*(b^2*(g*f) - b*(h*c
*d + g*c*e + a*h*f) + 2*(g*c*(c*d - a*f) + a*h*c*e))*(2*p + 2*q + 5)*x^2, x
], x], x] /; FreeQ[{a, b, c, d, e, f, g, h, q}, x] && NeQ[b^2 - 4*a*c, 0] &
& NeQ[e^2 - 4*d*f, 0] && LtQ[p, -1] && NeQ[(c*d - a*f)^2 - (b*d - a*e)*(c*e
- b*f), 0] && !( !IntegerQ[p] && ILtQ[q, -1])

```

Rule 1072

```

Int[((A_.) + (B_.)*(x_) + (C_.)*(x_)^2)/(((a_) + (b_.)*(x_) + (c_.)*(x_)^2)
*((d_) + (e_.)*(x_) + (f_.)*(x_)^2)), x_Symbol] := With[{q = c^2*d^2 - b*c*
d*e + a*c*e^2 + b^2*d*f - 2*a*c*d*f - a*b*e*f + a^2*f^2}, Dist[1/q, Int[(A*
c^2*d - a*c*C*d - A*b*c*e + a*B*c*e + A*b^2*f - a*b*B*f - a*A*c*f + a^2*C*f
+ c*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B*f)*x]/(a + b*x + c*x^2),
x], x] + Dist[1/q, Int[(c*C*d^2 - B*c*d*e + A*c*e^2 + b*B*d*f - A*c*d*f - a
*C*d*f - A*b*e*f + a*A*f^2 - f*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B
*f)*x]/(d + e*x + f*x^2), x], x] /; NeQ[q, 0] /; FreeQ[{a, b, c, d, e, f,
A, B, C}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[e^2 - 4*d*f, 0]

```

Rule 1586

```

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

```

Rubi steps

$$\begin{aligned}
\int \frac{(d+ex)(2-3x+x^2)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex}{(2-3x+x^2)(2+3x+x^2)^2} dx \\
&= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{1}{72} \int \frac{6(3d-10e)-24(2d-3e)x+6(3d-4e)x^2}{(2-3x+x^2)(2+3x+x^2)} dx \\
&= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{\int \frac{108(3d-10e)-288(2d-3e)+(-36(3d-10e)+72(3d-4e))x}{2-3x+x^2} dx}{5184} - \int \frac{108(3d-10e)-288(2d-3e)+(-36(3d-10e)+72(3d-4e))x}{5184} dx \\
&= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{1}{36}(7d-13e) \int \frac{1}{1+x} dx - \frac{1}{144}(-d-2e) \int \frac{1}{-2+x} dx \\
&= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{1}{36}(d+e) \log(1-x) + \frac{1}{144}(d+2e) \log(2-x) - \frac{1}{36}(7d-13e) \log(x+1)
\end{aligned}$$

Mathematica [A] time = 0.05, size = 80, normalized size = 0.90

$$\frac{1}{144} \left(\frac{12(-3dx - 5d + 4ex + 6e)}{x^2 + 3x + 2} - 4(d+e) \log(1-x) + (d+2e) \log(2-x) + 4(13e-7d) \log(x+1) + (31d-50e) \log(x+2) \right)$$

Antiderivative was successfully verified.

[In] Integrate[((d + e*x)*(2 - 3*x + x^2))/(4 - 5*x^2 + x^4)^2,x]

[Out] ((12*(-5*d + 6*e - 3*d*x + 4*e*x))/(2 + 3*x + x^2) - 4*(d + e)*Log[1 - x] + (d + 2*e)*Log[2 - x] + 4*(-7*d + 13*e)*Log[1 + x] + (31*d - 50*e)*Log[2 + x])/144

fricas [A] time = 0.72, size = 153, normalized size = 1.72

$$\frac{12(3d-4e)x - ((31d-50e)x^2 + 3(31d-50e)x + 62d-100e) \log(x+2) + 4((7d-13e)x^2 + 3(7d-13e)x + 14d-26e) \log(x+1) + 4((d+e)x^2 + 3(d+e)x + 2d+2e) \log(x-1) - ((d+2e)x^2 + 3(d+2e)x + 2d+4e) \log(x-2) + 60d-72e}{(x^2+3x+2)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/144*(12*(3*d - 4*e)*x - ((31*d - 50*e)*x^2 + 3*(31*d - 50*e)*x + 62*d - 100*e)*log(x + 2) + 4*((7*d - 13*e)*x^2 + 3*(7*d - 13*e)*x + 14*d - 26*e)*log(x + 1) + 4*((d + e)*x^2 + 3*(d + e)*x + 2*d + 2*e)*log(x - 1) - ((d + 2*e)*x^2 + 3*(d + 2*e)*x + 2*d + 4*e)*log(x - 2) + 60*d - 72*e)/(x^2 + 3*x + 2)

giac [A] time = 0.38, size = 85, normalized size = 0.96

$$\frac{1}{144} (31d - 50e) \log(|x + 2|) - \frac{1}{36} (7d - 13e) \log(|x + 1|) - \frac{1}{36} (d + e) \log(|x - 1|) + \frac{1}{144} (d + 2e) \log(|x - 2|) - \frac{(3d - 4e)x + 5d - 6e}{(x + 2)(x + 1)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] 1/144*(31*d - 50*e)*log(abs(x + 2)) - 1/36*(7*d - 13*e)*log(abs(x + 1)) - 1/36*(d + e)*log(abs(x - 1)) + 1/144*(d + 2*e)*log(abs(x - 2)) - 1/12*((3*d - 4*e)*x + 5*d - 6*e)/((x + 2)*(x + 1))

maple [A] time = 0.01, size = 90, normalized size = 1.01

$$\frac{31d \ln(x + 2)}{144} + \frac{d \ln(x - 2)}{144} - \frac{d \ln(x - 1)}{36} - \frac{7d \ln(x + 1)}{36} - \frac{25e \ln(x + 2)}{72} + \frac{e \ln(x - 2)}{72} - \frac{e \ln(x - 1)}{36} + \frac{13e \ln(x + 1)}{36} - \frac{(3d - 4e)x + 5d - 6e}{(x + 2)(x + 1)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4)^2,x)

[Out] 1/144*d*ln(x-2)+1/72*e*ln(x-2)-7/36*d*ln(x+1)+13/36*e*ln(x+1)-1/6/(x+1)*d+1/6/(x+1)*e-1/36*d*ln(x-1)-1/36*e*ln(x-1)-1/12/(x+2)*d+1/6/(x+2)*e+31/144*d*ln(x+2)-25/72*e*ln(x+2)

maxima [A] time = 0.45, size = 75, normalized size = 0.84

$$\frac{1}{144} (31d - 50e) \log(x + 2) - \frac{1}{36} (7d - 13e) \log(x + 1) - \frac{1}{36} (d + e) \log(x - 1) + \frac{1}{144} (d + 2e) \log(x - 2) - \frac{(3d - 4e)x + 5d - 6e}{12(x^2 + 3x + 2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)*(x^2-3*x+2)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] 1/144*(31*d - 50*e)*log(x + 2) - 1/36*(7*d - 13*e)*log(x + 1) - 1/36*(d + e)*log(x - 1) + 1/144*(d + 2*e)*log(x - 2) - 1/12*((3*d - 4*e)*x + 5*d - 6*e)/(x^2 + 3*x + 2)

mupad [B] time = 0.10, size = 79, normalized size = 0.89

$$\ln(x - 2) \left(\frac{d}{144} + \frac{e}{72} \right) - \ln(x - 1) \left(\frac{d}{36} + \frac{e}{36} \right) - \ln(x + 1) \left(\frac{7d}{36} - \frac{13e}{36} \right) - \frac{\frac{5d}{12} - \frac{e}{2} + x \left(\frac{d}{4} - \frac{e}{3} \right)}{x^2 + 3x + 2} + \ln(x + 2) \left(\frac{31d}{144} - \frac{25e}{72} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int(((d + e*x)*(x^2 - 3*x + 2))/(x^4 - 5*x^2 + 4)^2,x)`

[Out] `log(x - 2)*(d/144 + e/72) - log(x - 1)*(d/36 + e/36) - log(x + 1)*((7*d)/36 - (13*e)/36) - ((5*d)/12 - e/2 + x*(d/4 - e/3))/(3*x + x^2 + 2) + log(x + 2)*((31*d)/144 - (25*e)/72)`

sympy [B] time = 10.51, size = 1255, normalized size = 14.10

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((e*x+d)*(x**2-3*x+2)/(x**4-5*x**2+4)**2,x)`

[Out] `-(d + e)*log(x + (-24383100*d**6 + 187408066*d**5*e + 10439775*d**5*(d + e) - 511591980*d**4*e**2 - 94132290*d**4*e*(d + e) + 667200*d**4*(d + e)**2 + 469491120*d**3*e**3 + 333672552*d**3*e**2*(d + e) - 2703328*d**3*e*(d + e)**2 - 198000*d**3*(d + e)**3 + 322778400*d**2*e**4 - 582497712*d**2*e**3*(d + e) + 1752768*d**2*e**2*(d + e)**2 + 1107552*d**2*e*(d + e)**3 - 863493856*d*e**5 + 500776560*d*e**4*(d + e) + 4226944*d*e**3*(d + e)**2 - 1880640*d*e**2*(d + e)**3 + 429000000*e**6 - 169242912*e**5*(d + e) - 4538112*e**4*(d + e)**2 + 964224*e**3*(d + e)**3)/(13474125*d**6 - 102860175*d**5*e + 274190390*d**4*e**2 - 224142072*d**3*e**3 - 245084096*d**2*e**4 + 535797456*d*e**5 - 256183200*e**6))/36 + (d + 2*e)*log(x + (-24383100*d**6 + 187408066*d**5*e - 10439775*d**5*(d + 2*e)/4 - 511591980*d**4*e**2 + 47066145*d**4*e*(d + 2*e)/2 + 41700*d**4*(d + 2*e)**2 + 469491120*d**3*e**3 - 83418138*d**3*e**2*(d + 2*e) - 168958*d**3*e*(d + 2*e)**2 + 12375*d**3*(d + 2*e)**3/4 + 322778400*d**2*e**4 + 145624428*d**2*e**3*(d + 2*e) + 109548*d**2*e**2*(d + 2*e)**2 - 34611*d**2*e*(d + 2*e)**3/2 - 863493856*d*e**5 - 125194140*d*e**4*(d + 2*e) + 264184*d*e**3*(d + 2*e)**2 + 29385*d*e**2*(d + 2*e)**3 + 429000000*e**6 + 42310728*e**5*(d + 2*e) - 283632*e**4*(d + 2*e)**2 - 15066*e**3*(d + 2*e)**3)/(13474125*d**6 - 102860175*d**5*e + 274190390*d**4*e**2 - 224142072*d**3*e**3 - 245084096*d**2*e**4 + 535797456*d*e**5 - 256183200*e**6))/144 - (7*d - 13*e)*log(x + (-24383100*d**6 + 187408066*d**5*e + 10439775*d**5*(7*d - 13*e) - 511591980*d**4*e**2 - 94132290*d**4*e*(7*d - 13*e) + 667200*d**4*(7*d - 13*e)**2 + 469491120*d**3*e**3 + 333672552*d**3*e**2*(7*d - 13*e) - 2703328*d**3*e*(7*d - 13*e)**2 - 198000*d**3*(7*d - 13*e)**3 + 322778400*d**2*e**4 - 582497712*d**2*e**3*(7*d - 13*e) + 1752768*d**2*e**2*(7*d - 13*e)**2 + 1107552*d**2*e*(7*d - 13*e)**3 - 863493856*d*e**5 + 500776560*d*e**4*(7*d - 13*e) + 4226944*d*e**3*(7*d - 13*e)**2 - 1880640*d*e**2*(7*d - 13*e)**3 + 429000000*e**6 - 169242912*e**5*(7*d - 13*e) - 4538112*e**4*(7*d - 13*e)**2 + 964224*e**3*(7*d - 13*e)**3)/(13474125*d**6 - 102860175*d**5*e + 274190390*d**4*e**2 - 224142072*d**3*e**3 - 245084096*d**2*e**4 + 535797456*d*e**5 - 256183200*e**6))/36 + (31*d - 50*e)*log(x + (-24383100*d**6 + 187408066*d**5*e - 10439775*d**5*(31*d - 50*e)/4 - 511591980*d**4*e**2 + 47066145*d**4*e*(31*d - 50*e)/2 + 41700*d**4*(31*d - 50*e)**2 + 46949`

$$\begin{aligned}
& 1120*d^{**3}*e^{**3} - 83418138*d^{**3}*e^{**2}*(31*d - 50*e) - 168958*d^{**3}*e*(31*d - 50*e)^{**2} + 12375*d^{**3}*(31*d - 50*e)^{**3}/4 + 322778400*d^{**2}*e^{**4} + 145624428*d^{**2}*e^{**3}*(31*d - 50*e) + 109548*d^{**2}*e^{**2}*(31*d - 50*e)^{**2} - 34611*d^{**2}*e*(31*d - 50*e)^{**3}/2 - 863493856*d*e^{**5} - 125194140*d*e^{**4}*(31*d - 50*e) + 264184*d*e^{**3}*(31*d - 50*e)^{**2} + 29385*d*e^{**2}*(31*d - 50*e)^{**3} + 429000000*e^{**6} + 42310728*e^{**5}*(31*d - 50*e) - 283632*e^{**4}*(31*d - 50*e)^{**2} - 15066*e^{**3}*(31*d - 50*e)^{**3})/(13474125*d^{**6} - 102860175*d^{**5}*e + 274190390*d^{**4}*e^{**2} - 224142072*d^{**3}*e^{**3} - 245084096*d^{**2}*e^{**4} + 535797456*d*e^{**5} - 256183200*e^{**6}))/144 + (-5*d + 6*e + x*(-3*d + 4*e))/(12*x^{**2} + 36*x + 24)
\end{aligned}$$

$$3.93 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=105

$$-\frac{x(3d-4e+6f)+5d-6e+8f}{12(x^2+3x+2)} - \frac{1}{36} \log(1-x)(d+e+f) + \frac{1}{144} \log(2-x)(d+2e+4f) - \frac{1}{36} \log(x+1)(7d-13e+19f)$$

[Out] 1/12*(-5*d+6*e-8*f-(3*d-4*e+6*f)*x)/(x^2+3*x+2)-1/36*(d+e+f)*ln(1-x)+1/144*(d+2*e+4*f)*ln(2-x)-1/36*(7*d-13*e+19*f)*ln(1+x)+1/144*(31*d-50*e+76*f)*ln(2+x)

Rubi [A] time = 0.32, antiderivative size = 105, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 5, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.161$, Rules used = {1586, 1060, 1072, 632, 31}

$$-\frac{x(3d-4e+6f)+5d-6e+8f}{12(x^2+3x+2)} - \frac{1}{36} \log(1-x)(d+e+f) + \frac{1}{144} \log(2-x)(d+2e+4f) - \frac{1}{36} \log(x+1)(7d-13e+19f)$$

Antiderivative was successfully verified.

[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4)^2, x]

[Out] -(5*d - 6*e + 8*f + (3*d - 4*e + 6*f)*x)/(12*(2 + 3*x + x^2)) - ((d + e + f)*Log[1 - x])/36 + ((d + 2*e + 4*f)*Log[2 - x])/144 - ((7*d - 13*e + 19*f)*Log[1 + x])/36 + ((31*d - 50*e + 76*f)*Log[2 + x])/144

Rule 31

Int[((a_) + (b_)*(x_))^(p_), x_Symbol] := Simp[Log[RemoveContent[a + b*x, x]]/b, x] /; FreeQ[{a, b}, x]

Rule 632

Int[((d_) + (e_)*(x_))/((a_) + (b_)*(x_) + (c_)*(x_)^2), x_Symbol] := With[{q = Rt[b^2 - 4*a*c, 2]}, Dist[(c*d - e*(b/2 - q/2))/q, Int[1/(b/2 - q/2 + c*x), x], x] - Dist[(c*d - e*(b/2 + q/2))/q, Int[1/(b/2 + q/2 + c*x), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0] && NiceSqrtQ[b^2 - 4*a*c]

Rule 1060

Int[((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_)*((A_) + (B_)*(x_) + (C_)*(x_)^2)*((d_) + (e_)*(x_) + (f_)*(x_)^2)^(q_), x_Symbol] := Simp[((a + b*x + c*x^2)^(p + 1)*(d + e*x + f*x^2)^(q + 1)*((A*c - a*C)*(2*a*c*e - b*(c*d +

```

a*f)) + (A*b - a*B)*(2*c^2*d + b^2*f - c*(b*e + 2*a*f)) + c*(A*(2*c^2*d + b
^2*f - c*(b*e + 2*a*f)) - B*(b*c*d - 2*a*c*e + a*b*f) + C*(b^2*d - a*b*e -
2*a*(c*d - a*f))*x)/((b^2 - 4*a*c)*((c*d - a*f)^2 - (b*d - a*e)*(c*e - b*
f))*(p + 1)), x] + Dist[1/((b^2 - 4*a*c)*((c*d - a*f)^2 - (b*d - a*e)*(c*e
- b*f))*(p + 1)), Int[(a + b*x + c*x^2)^(p + 1)*(d + e*x + f*x^2)^q*Simp[(b
*B - 2*A*c - 2*a*C)*((c*d - a*f)^2 - (b*d - a*e)*(c*e - b*f))*(p + 1) + (b^
2*(C*d + A*f) - b*(B*c*d + A*c*e + a*C*e + a*B*f) + 2*(A*c*(c*d - a*f) - a
*(c*C*d - B*c*e - a*C*f)))*(a*f*(p + 1) - c*d*(p + 2)) - e*((A*c - a*C)*(2*a
*c*e - b*(c*d + a*f)) + (A*b - a*B)*(2*c^2*d + b^2*f - c*(b*e + 2*a*f)))*(p
+ q + 2) - (2*f*((A*c - a*C)*(2*a*c*e - b*(c*d + a*f)) + (A*b - a*B)*(2*c^
2*d + b^2*f - c*(b*e + 2*a*f)))*(p + q + 2) - (b^2*(C*d + A*f) - b*(B*c*d +
A*c*e + a*C*e + a*B*f) + 2*(A*c*(c*d - a*f) - a*(c*C*d - B*c*e - a*C*f)))*
(b*f*(p + 1) - c*e*(2*p + q + 4))*x - c*f*(b^2*(C*d + A*f) - b*(B*c*d + A
c*e + a*C*e + a*B*f) + 2*(A*c*(c*d - a*f) - a*(c*C*d - B*c*e - a*C*f)))*(2*
p + 2*q + 5)*x^2, x], x] /; FreeQ[{a, b, c, d, e, f, A, B, C, q}, x] &&
NeQ[b^2 - 4*a*c, 0] && NeQ[e^2 - 4*d*f, 0] && LtQ[p, -1] && NeQ[(c*d - a*f
)^2 - (b*d - a*e)*(c*e - b*f), 0] && !(IntegerQ[p] && ILtQ[q, -1]) && !
IGtQ[q, 0]

```

Rule 1072

```

Int[((A_.) + (B_.)*(x_) + (C_.)*(x_)^2)/(((a_) + (b_.)*(x_) + (c_.)*(x_)^2)
*((d_) + (e_.)*(x_) + (f_.)*(x_)^2)), x_Symbol] := With[{q = c^2*d^2 - b*c*
d*e + a*c*e^2 + b^2*d*f - 2*a*c*d*f - a*b*e*f + a^2*f^2}, Dist[1/q, Int[(A*
c^2*d - a*c*C*d - A*b*c*e + a*B*c*e + A*b^2*f - a*b*B*f - a*A*c*f + a^2*C*f
+ c*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B*f)*x]/(a + b*x + c*x^2),
x], x] + Dist[1/q, Int[(c*C*d^2 - B*c*d*e + A*c*e^2 + b*B*d*f - A*c*d*f - a
*C*d*f - A*b*e*f + a*A*f^2 - f*(B*c*d - b*C*d - A*c*e + a*C*e + A*b*f - a*B
*f)*x]/(d + e*x + f*x^2), x], x] /; NeQ[q, 0] /; FreeQ[{a, b, c, d, e, f,
A, B, C}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[e^2 - 4*d*f, 0]

```

Rule 1586

```

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px
, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] &&
EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

```

Rubi steps

$$\begin{aligned}
\int \frac{(2-3x+x^2)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2}{(2-3x+x^2)(2+3x+x^2)^2} dx \\
&= -\frac{5d-6e+8f+(3d-4e+6f)x}{12(2+3x+x^2)} - \frac{1}{72} \int \frac{6(3d-10e+12f)-24(2d-3e+2f)}{(2-3x+x^2)(2+3x+x^2)} dx \\
&= -\frac{5d-6e+8f+(3d-4e+6f)x}{12(2+3x+x^2)} - \frac{\int \frac{-288(2d-3e+5f)+108(3d-10e+12f)+(72(3d-10e+12f)-24(2d-3e+2f))}{2-3x+x^2} dx}{5184} \\
&= -\frac{5d-6e+8f+(3d-4e+6f)x}{12(2+3x+x^2)} - \frac{1}{144}(-31d+50e-76f) \int \frac{1}{2+x} dx - \frac{1}{36}(d+e+f) \log(1-x) + \frac{1}{144}(d+2e+4f) \log(x+1)
\end{aligned}$$

Mathematica [A] time = 0.07, size = 97, normalized size = 0.92

$$\frac{1}{144} \left(-\frac{12(d(3x+5)-4ex-6e+6fx+8f)}{x^2+3x+2} - 4 \log(1-x)(d+e+f) + \log(2-x)(d+2e+4f) - 4 \log(x+1)(d+2e+4f) \right)$$

Antiderivative was successfully verified.

[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4)^2,x]

[Out] ((-12*(-6*e + 8*f - 4*e*x + 6*f*x + d*(5 + 3*x)))/(2 + 3*x + x^2) - 4*(d + e + f)*Log[1 - x] + (d + 2*e + 4*f)*Log[2 - x] - 4*(7*d - 13*e + 19*f)*Log[1 + x] + (31*d - 50*e + 76*f)*Log[2 + x])/144

fricas [B] time = 0.88, size = 191, normalized size = 1.82

$$\frac{12(3d-4e+6f)x - ((31d-50e+76f)x^2 + 3(31d-50e+76f)x + 62d-100e+152f) \log(x+2) + 4(7d-13e+19f)x^2 + 3(7d-13e+19f)x + 14d-26e+38f}{(x^2+3x+2)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/144*(12*(3*d - 4*e + 6*f)*x - ((31*d - 50*e + 76*f)*x^2 + 3*(31*d - 50*e + 76*f)*x + 62*d - 100*e + 152*f)*log(x + 2) + 4*((7*d - 13*e + 19*f)*x^2 + 3*(7*d - 13*e + 19*f)*x + 14*d - 26*e + 38*f)*log(x + 1) + 4*((d + e + f)*x^2 + 3*(d + e + f)*x + 2*d + 2*e + 2*f)*log(x - 1) - ((d + 2*e + 4*f)*x^2 + 3*(d + 2*e + 4*f)*x + 2*d + 4*e + 8*f)*log(x - 2) + 60*d - 72*e + 96*f)/(x^2 + 3*x + 2)

giac [A] time = 0.32, size = 101, normalized size = 0.96

$$\frac{1}{144} (31d + 76f - 50e) \log(|x + 2|) - \frac{1}{36} (7d + 19f - 13e) \log(|x + 1|) - \frac{1}{36} (d + f + e) \log(|x - 1|) + \frac{1}{144} (d + 4f + 2e) \log(|x - 2|) - \frac{1}{12} \left(\frac{(3d + 6f - 4e)x + 5d + 8f - 6e}{(x + 2)(x + 1)} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] 1/144*(31*d + 76*f - 50*e)*log(abs(x + 2)) - 1/36*(7*d + 19*f - 13*e)*log(abs(x + 1)) - 1/36*(d + f + e)*log(abs(x - 1)) + 1/144*(d + 4*f + 2*e)*log(abs(x - 2)) - 1/12*((3*d + 6*f - 4*e)*x + 5*d + 8*f - 6*e)/((x + 2)*(x + 1))

maple [A] time = 0.01, size = 134, normalized size = 1.28

$$\frac{31d \ln(x + 2)}{144} + \frac{d \ln(x - 2)}{144} - \frac{d \ln(x - 1)}{36} - \frac{7d \ln(x + 1)}{36} - \frac{25e \ln(x + 2)}{72} + \frac{e \ln(x - 2)}{72} - \frac{e \ln(x - 1)}{36} + \frac{13e \ln(x + 1)}{36} + \frac{4f \ln(x + 2)}{144} + \frac{2e \ln(x - 2)}{144} - \frac{2e \ln(x - 1)}{36} + \frac{4f \ln(x + 1)}{144} - \frac{2f \ln(x - 1)}{36} - \frac{1}{12} \left(\frac{(3d + 6f - 4e)x + 5d + 8f - 6e}{(x + 2)(x + 1)} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)

[Out] 1/144*d*ln(x-2)+1/72*e*ln(x-2)+1/36*f*ln(x-2)-7/36*d*ln(x+1)+13/36*e*ln(x+1)-19/36*f*ln(x+1)-1/6/(x+1)*d+1/6/(x+1)*e-1/6/(x+1)*f-1/36*d*ln(x-1)-1/36*e*ln(x-1)-1/36*f*ln(x-1)-1/12/(x+2)*d+1/6/(x+2)*e-1/3/(x+2)*f+31/144*d*ln(x+2)-25/72*e*ln(x+2)+19/36*f*ln(x+2)

maxima [A] time = 0.44, size = 91, normalized size = 0.87

$$\frac{1}{144} (31d - 50e + 76f) \log(x + 2) - \frac{1}{36} (7d - 13e + 19f) \log(x + 1) - \frac{1}{36} (d + e + f) \log(x - 1) + \frac{1}{144} (d + 2e + 4f) \log(x - 2) - \frac{1}{12} \left(\frac{(3d - 4e + 6f)x + 5d - 6e + 8f}{x^2 + 3x + 2} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] 1/144*(31*d - 50*e + 76*f)*log(x + 2) - 1/36*(7*d - 13*e + 19*f)*log(x + 1) - 1/36*(d + e + f)*log(x - 1) + 1/144*(d + 2*e + 4*f)*log(x - 2) - 1/12*((3*d - 4*e + 6*f)*x + 5*d - 6*e + 8*f)/(x^2 + 3*x + 2)

mupad [B] time = 0.83, size = 97, normalized size = 0.92

$$\ln(x - 2) \left(\frac{d}{144} + \frac{e}{72} + \frac{f}{36} \right) - \ln(x + 1) \left(\frac{7d}{36} - \frac{13e}{36} + \frac{19f}{36} \right) - \ln(x - 1) \left(\frac{d}{36} + \frac{e}{36} + \frac{f}{36} \right) + \ln(x + 2) \left(\frac{31d}{144} - \frac{25e}{72} + \frac{19f}{36} \right) - \frac{1}{12} \left(\frac{(3d - 4e + 6f)x + 5d - 6e + 8f}{x^2 + 3x + 2} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2))/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x - 2)*(d/144 + e/72 + f/36) - log(x + 1)*((7*d)/36 - (13*e)/36 + (19*f)/36) - log(x - 1)*(d/36 + e/36 + f/36) + log(x + 2)*((31*d)/144 - (25*e)/72 + (19*f)/36) - ((5*d)/12 - e/2 + (2*f)/3 + x*(d/4 - e/3 + f/2))/(3*x + x^2 + 2)
```

```
sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00
```

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((x**2-3*x+2)*(f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```

$$3.94 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=117

$$-\frac{d-2e+4f-8g}{12(x+2)} - \frac{d-e+f-g}{6(x+1)} - \frac{1}{36} \log(1-x)(d+e+f+g) + \frac{1}{144} \log(2-x)(d+2e+4f+8g) - \frac{1}{36} \log(x+1)(7d-13e+44*(d+2*e+4*f+8*g)*\ln(2-x)-1/36*(7*d-13*e+19*f-25*g)*\ln(1+x)+1/144*(31*d-50*e+76*f-104*g)*\ln(2+x)$$

[Out] 1/6*(-d+e-f+g)/(1+x)+1/12*(-d+2*e-4*f+8*g)/(2+x)-1/36*(d+e+f+g)*ln(1-x)+1/144*(d+2*e+4*f+8*g)*ln(2-x)-1/36*(7*d-13*e+19*f-25*g)*ln(1+x)+1/144*(31*d-50*e+76*f-104*g)*ln(2+x)

Rubi [A] time = 0.25, antiderivative size = 117, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {1586, 6728}

$$-\frac{d-2e+4f-8g}{12(x+2)} - \frac{d-e+f-g}{6(x+1)} - \frac{1}{36} \log(1-x)(d+e+f+g) + \frac{1}{144} \log(2-x)(d+2e+4f+8g) - \frac{1}{36} \log(x+1)(7d-13e+44*(d+2*e+4*f+8*g)*\ln(2-x)-1/36*(7*d-13*e+19*f-25*g)*\ln(1+x)+1/144*(31*d-50*e+76*f-104*g)*\ln(2+x)$$

Antiderivative was successfully verified.

[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4)^2, x]

[Out] -(d - e + f - g)/(6*(1 + x)) - (d - 2*e + 4*f - 8*g)/(12*(2 + x)) - ((d + e + f + g)*Log[1 - x])/36 + ((d + 2*e + 4*f + 8*g)*Log[2 - x])/144 - ((7*d - 13*e + 19*f - 25*g)*Log[1 + x])/36 + ((31*d - 50*e + 76*f - 104*g)*Log[2 + x])/144

Rule 1586

Int[(u_)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p+q, 0]

Rule 6728

Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(2*n_.)), x_Symbol] := With[{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; SumQ[v]] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]

Rubi steps

$$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx = \int \frac{d+ex+fx^2+gx^3}{(2-3x+x^2)(2+3x+x^2)^2} dx$$

$$= \int \left(\frac{d+2e+4f+8g}{144(-2+x)} + \frac{-d-e-f-g}{36(-1+x)} + \frac{d-e+f-g}{6(1+x)^2} + \frac{-7d+13e-19f+25g}{36(1+x)} \right) dx$$

$$= -\frac{d-e+f-g}{6(1+x)} - \frac{d-2e+4f-8g}{12(2+x)} - \frac{1}{36}(d+e+f+g)\log(1-x) + \frac{1}{144}\log(2-x)(d+2e+4f+8g)$$

Mathematica [A] time = 0.06, size = 114, normalized size = 0.97

$$\frac{1}{144} \left(\frac{12(-3dx - 5d + 4ex + 6e - 6fx - 8f + 10gx + 12g)}{x^2 + 3x + 2} - 4 \log(1-x)(d+e+f+g) + \log(2-x)(d+2e+4f+8g) + (-7d+13e-19f+25g)\log(1+x) + (31d-50e+76f-104g)\log(2+x) \right) / 144$$

Antiderivative was successfully verified.

[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4)^2,x]

[Out] ((12*(-5*d + 6*e - 8*f + 12*g - 3*d*x + 4*e*x - 6*f*x + 10*g*x))/(2 + 3*x + x^2) - 4*(d + e + f + g)*Log[1 - x] + (d + 2*e + 4*f + 8*g)*Log[2 - x] + 4*(-7*d + 13*e - 19*f + 25*g)*Log[1 + x] + (31*d - 50*e + 76*f - 104*g)*Log[2 + x])/144

fricas [B] time = 2.55, size = 229, normalized size = 1.96

$$\frac{12(3d-4e+6f-10g)x - ((31d-50e+76f-104g)x^2 + 3(31d-50e+76f-104g)x + 62d-100e+152f-208g)\log(x+2) + 4((7d-13e+19f-25g)x^2 + 3(7d-13e+19f-25g)x + 14d-26e+38f-50g)\log(x+1) + 4((d+e+f+g)x^2 + 3(d+e+f+g)x + 2d+2e+2f+2g)\log(x-1) - ((d+2e+4f+8g)x^2 + 3(d+2e+4f+8g)x + 2d+4e+8f+16g)\log(x-2) + 60d-72e+96f-144g}{(x^2+3x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/144*(12*(3*d - 4*e + 6*f - 10*g)*x - ((31*d - 50*e + 76*f - 104*g)*x^2 + 3*(31*d - 50*e + 76*f - 104*g)*x + 62*d - 100*e + 152*f - 208*g)*log(x + 2) + 4*((7*d - 13*e + 19*f - 25*g)*x^2 + 3*(7*d - 13*e + 19*f - 25*g)*x + 14*d - 26*e + 38*f - 50*g)*log(x + 1) + 4*((d + e + f + g)*x^2 + 3*(d + e + f + g)*x + 2*d + 2*e + 2*f + 2*g)*log(x - 1) - ((d + 2*e + 4*f + 8*g)*x^2 + 3*(d + 2*e + 4*f + 8*g)*x + 2*d + 4*e + 8*f + 16*g)*log(x - 2) + 60*d - 72*e + 96*f - 144*g)/(x^2 + 3*x + 2)

giac [A] time = 0.38, size = 117, normalized size = 1.00

$$\frac{1}{144} (31d + 76f - 104g - 50e) \log(|x + 2|) - \frac{1}{36} (7d + 19f - 25g - 13e) \log(|x + 1|) - \frac{1}{36} (d + f + g + e) \log(|x - 1|) + \frac{1}{144} (d + 4f + 8g + 2e) \log(|x - 2|) - \frac{1}{12} ((3d + 6f - 10g - 4e)x + 5d + 8f - 12g - 6e) / ((x + 2)(x + 1))$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] 1/144*(31*d + 76*f - 104*g - 50*e)*log(abs(x + 2)) - 1/36*(7*d + 19*f - 25*g - 13*e)*log(abs(x + 1)) - 1/36*(d + f + g + e)*log(abs(x - 1)) + 1/144*(d + 4*f + 8*g + 2*e)*log(abs(x - 2)) - 1/12*((3*d + 6*f - 10*g - 4*e)*x + 5*d + 8*f - 12*g - 6*e)/((x + 2)*(x + 1))

maple [A] time = 0.02, size = 178, normalized size = 1.52

$$\frac{31d \ln(x + 2)}{144} + \frac{d \ln(x - 2)}{144} - \frac{d \ln(x - 1)}{36} - \frac{7d \ln(x + 1)}{36} - \frac{25e \ln(x + 2)}{72} + \frac{e \ln(x - 2)}{72} - \frac{e \ln(x - 1)}{36} + \frac{13e \ln(x + 1)}{36} + \frac{1}{144} (d + 4f + 8g + 2e) \log(|x - 2|) - \frac{1}{12} ((3d + 6f - 10g - 4e)x + 5d + 8f - 12g - 6e) / ((x + 2)(x + 1))$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)

[Out] 1/144*d*ln(x-2)+1/72*e*ln(x-2)+1/36*f*ln(x-2)+1/18*g*ln(x-2)-7/36*d*ln(x+1)+13/36*e*ln(x+1)-19/36*f*ln(x+1)+25/36*g*ln(x+1)-1/6/(x+1)*d+1/6/(x+1)*e-1/6/(x+1)*f+1/6/(x+1)*g-1/36*d*ln(x-1)-1/36*e*ln(x-1)-1/36*f*ln(x-1)-1/36*g*ln(x-1)-1/12/(x+2)*d+1/6/(x+2)*e-1/3/(x+2)*f+2/3/(x+2)*g+31/144*d*ln(x+2)-25/72*e*ln(x+2)+19/36*f*ln(x+2)-13/18*g*ln(x+2)

maxima [A] time = 0.44, size = 107, normalized size = 0.91

$$\frac{1}{144} (31d - 50e + 76f - 104g) \log(x + 2) - \frac{1}{36} (7d - 13e + 19f - 25g) \log(x + 1) - \frac{1}{36} (d + e + f + g) \log(x - 1) + \frac{1}{144} (d + 2e + 4f + 8g) \log(x - 2) - \frac{1}{12} ((3d - 4e + 6f - 10g)x + 5d - 6e + 8f - 12g) / (x^2 + 3x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] 1/144*(31*d - 50*e + 76*f - 104*g)*log(x + 2) - 1/36*(7*d - 13*e + 19*f - 25*g)*log(x + 1) - 1/36*(d + e + f + g)*log(x - 1) + 1/144*(d + 2*e + 4*f + 8*g)*log(x - 2) - 1/12*((3*d - 4*e + 6*f - 10*g)*x + 5*d - 6*e + 8*f - 12*g)/(x^2 + 3*x + 2)

mupad [B] time = 0.91, size = 115, normalized size = 0.98

$$\ln(x-2) \left(\frac{d}{144} + \frac{e}{72} + \frac{f}{36} + \frac{g}{18} \right) - \ln(x+1) \left(\frac{7d}{36} - \frac{13e}{36} + \frac{19f}{36} - \frac{25g}{36} \right) - \ln(x-1) \left(\frac{d}{36} + \frac{e}{36} + \frac{f}{36} + \frac{g}{36} \right) + \ln(x+2) \left(\frac{31d}{144} - \frac{25e}{72} + \frac{19f}{36} - \frac{13g}{18} \right) - \left(\frac{5d}{12} - \frac{e}{2} + \frac{2f}{3} - g + x \left(\frac{d}{4} - \frac{e}{3} + \frac{f}{2} - \frac{5g}{6} \right) \right) / (3x^2 + x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2 + g*x^3))/(x^4 - 5*x^2 + 4)^2,x)

[Out] log(x - 2)*(d/144 + e/72 + f/36 + g/18) - log(x + 1)*((7*d)/36 - (13*e)/36 + (19*f)/36 - (25*g)/36) - log(x - 1)*(d/36 + e/36 + f/36 + g/36) + log(x + 2)*((31*d)/144 - (25*e)/72 + (19*f)/36 - (13*g)/18) - ((5*d)/12 - e/2 + (2*f)/3 - g + x*(d/4 - e/3 + f/2 - (5*g)/6))/(3*x + x^2 + 2)

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x**2-3*x+2)*(g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)

[Out] Timed out

$$3.95 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=131

$$-\frac{d-e+f-g+h}{6(x+1)} - \frac{d-2e+4f-8g+16h}{12(x+2)} - \frac{1}{36} \log(1-x)(d+e+f+g+h) + \frac{1}{144} \log(2-x)(d+2e+4f+8g+16h) - \frac{1}{36}$$

[Out] 1/6*(-d+e-f+g-h)/(1+x)+1/12*(-d+2*e-4*f+8*g-16*h)/(2+x)-1/36*(d+e+f+g+h)*ln(1-x)+1/144*(d+2*e+4*f+8*g+16*h)*ln(2-x)-1/36*(7*d-13*e+19*f-25*g+31*h)*ln(1+x)+1/144*(31*d-50*e+76*f-104*g+112*h)*ln(2+x)

Rubi [A] time = 0.28, antiderivative size = 131, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 41, $\frac{\text{number of rules}}{\text{integrand size}} = 0.049$, Rules used = {1586, 6728}

$$-\frac{d-e+f-g+h}{6(x+1)} - \frac{d-2e+4f-8g+16h}{12(x+2)} - \frac{1}{36} \log(1-x)(d+e+f+g+h) + \frac{1}{144} \log(2-x)(d+2e+4f+8g+16h) - \frac{1}{36}$$

Antiderivative was successfully verified.

[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + x^4)^2, x]

[Out] -(d - e + f - g + h)/(6*(1 + x)) - (d - 2*e + 4*f - 8*g + 16*h)/(12*(2 + x)) - ((d + e + f + g + h)*Log[1 - x])/36 + ((d + 2*e + 4*f + 8*g + 16*h)*Log[2 - x])/144 - ((7*d - 13*e + 19*f - 25*g + 31*h)*Log[1 + x])/36 + ((31*d - 50*e + 76*f - 104*g + 112*h)*Log[2 + x])/144

Rule 1586

Int[(u_)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 6728

Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(n2_.)), x_Symbol] := With[{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n)), x]}, Int[v, x] /; SumQ[v] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]

Rubi steps

$$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx = \int \frac{d+ex+fx^2+gx^3+hx^4}{(2-3x+x^2)(2+3x+x^2)^2} dx$$

$$= \int \left(\frac{d+2e+4f+8g+16h}{144(-2+x)} + \frac{-d-e-f-g-h}{36(-1+x)} + \frac{d-e+f}{6(1+x)} \right) dx$$

$$= -\frac{d-e+f-g+h}{6(1+x)} - \frac{d-2e+4f-8g+16h}{12(2+x)} - \frac{1}{36}(d+e+f)$$

Mathematica [A] time = 0.06, size = 136, normalized size = 1.04

$$\frac{1}{144} \left(-\frac{12(d(3x+5)+2(-e(2x+3)+3fx+4f-5gx-6g+9hx+10h))}{x^2+3x+2} - 4 \log(1-x)(d+e+f+g+h) + \dots \right)$$

Antiderivative was successfully verified.

[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + x^4)^2, x]

[Out] ((-12*(d*(5 + 3*x) + 2*(4*f - 6*g + 10*h + 3*f*x - 5*g*x + 9*h*x - e*(3 + 2*x))))/(2 + 3*x + x^2) - 4*(d + e + f + g + h)*Log[1 - x] + (d + 2*(e + 2*f + 4*g + 8*h))*Log[2 - x] - 4*(7*d - 13*e + 19*f - 25*g + 31*h)*Log[1 + x] + (31*d - 50*e + 76*f - 104*g + 112*h)*Log[2 + x])/144

fricas [B] time = 11.82, size = 267, normalized size = 2.04

$$\frac{12(3d-4e+6f-10g+18h)x - ((31d-50e+76f-104g+112h)x^2 + 3(31d-50e+76f-104g+112h))}{(x^2+3x+2)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2, x, algorithm="fricas")

[Out] -1/144*(12*(3*d - 4*e + 6*f - 10*g + 18*h)*x - ((31*d - 50*e + 76*f - 104*g + 112*h)*x^2 + 3*(31*d - 50*e + 76*f - 104*g + 112*h))*Log(x + 2) + 4*((7*d - 13*e + 19*f - 25*g + 31*h)*x^2 + 3*(7*d - 13*e + 19*f - 25*g + 31*h))*Log(x + 1) + 4*((d + e + f + g + h)*x^2 + 3*(d + e + f + g + h))*Log(x - 1) - ((d + 2*e + 4*f + 8*g + 16*h)*x^2 + 3*(d + 2*e + 4*f + 8*g + 16*h))*Log(x - 2) + 60*d - 72*e + 96*f - 144*g + 240*h)/(x^2 + 3*x + 2)

giac [A] time = 0.33, size = 133, normalized size = 1.02

$$\frac{1}{144} (31d + 76f - 104g + 112h - 50e) \log(|x + 2|) - \frac{1}{36} (7d + 19f - 25g + 31h - 13e) \log(|x + 1|) - \frac{1}{36} (d + f$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] 1/144*(31*d + 76*f - 104*g + 112*h - 50*e)*log(abs(x + 2)) - 1/36*(7*d + 19*f - 25*g + 31*h - 13*e)*log(abs(x + 1)) - 1/36*(d + f + g + h + e)*log(abs(x - 1)) + 1/144*(d + 4*f + 8*g + 16*h + 2*e)*log(abs(x - 2)) - 1/12*((3*d + 6*f - 10*g + 18*h - 4*e)*x + 5*d + 8*f - 12*g + 20*h - 6*e)/((x + 2)*(x + 1))

maple [A] time = 0.01, size = 222, normalized size = 1.69

$$\frac{7h \ln(x+2)}{9} - \frac{h \ln(x-1)}{36} - \frac{31h \ln(x+1)}{36} + \frac{h \ln(x-2)}{9} - \frac{g \ln(x-1)}{36} - \frac{13g \ln(x+2)}{18} + \frac{g \ln(x-2)}{18} + \frac{25g \ln(x+1)}{36} +$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)

[Out] 7/9*h*ln(x+2)-1/36*h*ln(x-1)-31/36*h*ln(x+1)+1/9*h*ln(x-2)-1/36*g*ln(x-1)-1/36*g*ln(x+2)+1/18*g*ln(x-2)+25/36*g*ln(x+1)+31/144*d*ln(x+2)-25/72*e*ln(x+2)-1/36*e*ln(x-1)-1/36*d*ln(x-1)+13/36*e*ln(x+1)-7/36*d*ln(x+1)+1/144*d*ln(x-2)+1/72*e*ln(x-2)+1/36*f*ln(x-2)-19/36*f*ln(x+1)-1/36*f*ln(x-1)+19/36*f*ln(x+2)-4/3/(x+2)*h-1/6/(x+1)*h+2/3/(x+2)*g+1/6/(x+1)*g-1/12/(x+2)*d+1/6/(x+2)*e-1/6/(x+1)*d+1/6/(x+1)*e-1/3/(x+2)*f-1/6/(x+1)*f

maxima [A] time = 0.45, size = 123, normalized size = 0.94

$$\frac{1}{144} (31d - 50e + 76f - 104g + 112h) \log(x + 2) - \frac{1}{36} (7d - 13e + 19f - 25g + 31h) \log(x + 1) - \frac{1}{36} (d + e +$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] 1/144*(31*d - 50*e + 76*f - 104*g + 112*h)*log(x + 2) - 1/36*(7*d - 13*e + 19*f - 25*g + 31*h)*log(x + 1) - 1/36*(d + e + f + g + h)*log(x - 1) + 1/144*(d + 2*e + 4*f + 8*g + 16*h)*log(x - 2) - 1/12*((3*d - 4*e + 6*f - 10*g + 18*h)*x + 5*d - 6*e + 8*f - 12*g + 20*h)/(x^2 + 3*x + 2)

mupad [B] time = 1.33, size = 133, normalized size = 1.02

$$\ln(x-2) \left(\frac{d}{144} + \frac{e}{72} + \frac{f}{36} + \frac{g}{18} + \frac{h}{9} \right) - \ln(x-1) \left(\frac{d}{36} + \frac{e}{36} + \frac{f}{36} + \frac{g}{36} + \frac{h}{36} \right) - \ln(x+1) \left(\frac{7d}{36} - \frac{13e}{36} + \frac{19f}{36} - \frac{25g}{36} + \frac{31h}{36} \right) - \left(\frac{5d}{12} - \frac{e}{2} + \frac{2f}{3} - g + \frac{5h}{3} + x \left(\frac{d}{4} - \frac{e}{3} + \frac{f}{2} - \frac{5g}{6} + \frac{3h}{2} \right) \right) / (3x + x^2 + 2) + \ln(x+2) \left(\frac{31d}{144} - \frac{25e}{72} + \frac{19f}{36} - \frac{13g}{18} + \frac{7h}{9} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(x^4 - 5*x^2 + 4)^2, x)

[Out] log(x - 2)*(d/144 + e/72 + f/36 + g/18 + h/9) - log(x - 1)*(d/36 + e/36 + f/36 + g/36 + h/36) - log(x + 1)*((7*d)/36 - (13*e)/36 + (19*f)/36 - (25*g)/36 + (31*h)/36) - ((5*d)/12 - e/2 + (2*f)/3 - g + (5*h)/3 + x*(d/4 - e/3 + f/2 - (5*g)/6 + (3*h)/2))/(3*x + x^2 + 2) + log(x + 2)*((31*d)/144 - (25*e)/72 + (19*f)/36 - (13*g)/18 + (7*h)/9)

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x**2-3*x+2)*(h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)

[Out] Timed out

$$3.96 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=147

$$-\frac{d-2e+4f-8g+16h-32i}{12(x+2)} - \frac{d-e+f-g+h-i}{6(x+1)} - \frac{1}{36} \log(1-x)(d+e+f+g+h+i) + \frac{1}{144} \log(2-x)(d+2e+4f+8g+16h+32i)$$

[Out] 1/6*(-d+e-f+g-h+i)/(1+x)+1/12*(-d+2*e-4*f+8*g-16*h+32*i)/(2+x)-1/36*(d+e+f+g+h+i)*ln(1-x)+1/144*(d+2*e+4*f+8*g+16*h+32*i)*ln(2-x)-1/36*(7*d-13*e+19*f-25*g+31*h-37*i)*ln(1+x)+1/144*(31*d-50*e+76*f-104*g+112*h-32*i)*ln(2+x)

Rubi [A] time = 0.33, antiderivative size = 147, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 46, $\frac{\text{number of rules}}{\text{integrand size}} = 0.043$, Rules used = {1586, 6728}

$$-\frac{d-2e+4f-8g+16h-32i}{12(x+2)} - \frac{d-e+f-g+h-i}{6(x+1)} - \frac{1}{36} \log(1-x)(d+e+f+g+h+i) + \frac{1}{144} \log(2-x)(d+2e+4f+8g+16h+32i)$$

Antiderivative was successfully verified.

[In] Int[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2 + x^4)^2,x]

[Out] -(d - e + f - g + h - i)/(6*(1 + x)) - (d - 2*e + 4*f - 8*g + 16*h - 32*i)/(12*(2 + x)) - ((d + e + f + g + h + i)*Log[1 - x])/36 + ((d + 2*e + 4*f + 8*g + 16*h + 32*i)*Log[2 - x])/144 - ((7*d - 13*e + 19*f - 25*g + 31*h - 37*i)*Log[1 + x])/36 + ((31*d - 50*e + 76*f - 104*g + 112*h - 32*i)*Log[2 + x])/144

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 6728

Int[(u_)/((a_.) + (b_.)*(x_)^(n_.) + (c_.)*(x_)^(2*n_.)), x_Symbol] := With[{v = RationalFunctionExpand[u/(a + b*x^n + c*x^(2*n))], x}], Int[v, x] /; SumQ[v] /; FreeQ[{a, b, c}, x] && EqQ[n2, 2*n] && IGtQ[n, 0]

Rubi steps

$$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+96x^5)}{(4-5x^2+x^4)^2} dx = \int \frac{d+ex+fx^2+gx^3+hx^4+96x^5}{(2-3x+x^2)(2+3x+x^2)^2} dx$$

$$= \int \left(\frac{3072+d+2e+4f+8g+16h}{144(-2+x)} + \frac{-96-d-e-j}{36(-1+x)} \right) dx$$

$$= \frac{96-d+e-f+g-h}{6(1+x)} + \frac{3072-d+2e-4f+8g-16h}{12(2+x)}$$

Mathematica [A] time = 0.08, size = 153, normalized size = 1.04

$$\frac{1}{144} \left(\frac{12(2(e(2x+3) - 3fx - 4f + 5gx + 6g - 9hx - 10h + 17ix + 18i) - d(3x+5))}{x^2 + 3x + 2} - 4 \log(1-x)(d+e+f+g+h+i) \right)$$

Antiderivative was successfully verified.

[In] Integrate[((2 - 3*x + x^2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2 + x^4)^2,x]

[Out] ((12*(-(d*(5 + 3*x)) + 2*(-4*f + 6*g - 10*h + 18*i - 3*f*x + 5*g*x - 9*h*x + 17*i*x + e*(3 + 2*x))))/(2 + 3*x + x^2) - 4*(d + e + f + g + h + i)*Log[1 - x] + (d + 2*e + 4*(f + 2*g + 4*h + 8*i))*Log[2 - x] + 4*(-7*d + 13*e - 19*f + 25*g - 31*h + 37*i)*Log[1 + x] + (31*d - 50*e + 76*f - 104*g + 112*h - 32*i)*Log[2 + x])/144

fricas [B] time = 70.06, size = 305, normalized size = 2.07

$$\frac{12(3d - 4e + 6f - 10g + 18h - 34i)x - ((31d - 50e + 76f - 104g + 112h - 32i)x^2 + 3(31d - 50e + 76f - 104g + 112h - 32i))}{(4 - 5x^2 + x^4)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/144*(12*(3*d - 4*e + 6*f - 10*g + 18*h - 34*i)*x - ((31*d - 50*e + 76*f - 104*g + 112*h - 32*i)*x^2 + 3*(31*d - 50*e + 76*f - 104*g + 112*h - 32*i))*x + 62*d - 100*e + 152*f - 208*g + 224*h - 64*i)*log(x + 2) + 4*((7*d - 13*e + 19*f - 25*g + 31*h - 37*i)*x^2 + 3*(7*d - 13*e + 19*f - 25*g + 31*h - 37*i)*x + 14*d - 26*e + 38*f - 50*g + 62*h - 74*i)*log(x + 1) + 4*((d + e + f + g + h + i)*x^2 + 3*(d + e + f + g + h + i)*x + 2*d + 2*e + 2*f + 2*g + 2*h + 2*i)*log(x - 1) - ((d + 2*e + 4*f + 8*g + 16*h + 32*i)*x^2 + 3*(d +

$2*e + 4*f + 8*g + 16*h + 32*i)*x + 2*d + 4*e + 8*f + 16*g + 32*h + 64*i)*\log(x - 2) + 60*d - 72*e + 96*f - 144*g + 240*h - 432*i)/(x^2 + 3*x + 2)$

giac [A] time = 0.39, size = 149, normalized size = 1.01

$$\frac{1}{144} (31d + 76f - 104g + 112h - 32i - 50e) \log(|x + 2|) - \frac{1}{36} (7d + 19f - 25g + 31h - 37i - 13e) \log(|x + 1|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] 1/144*(31*d + 76*f - 104*g + 112*h - 32*i - 50*e)*log(abs(x + 2)) - 1/36*(7*d + 19*f - 25*g + 31*h - 37*i - 13*e)*log(abs(x + 1)) - 1/36*(d + f + g + h + i + e)*log(abs(x - 1)) + 1/144*(d + 4*f + 8*g + 16*h + 32*i + 2*e)*log(abs(x - 2)) - 1/12*((3*d + 6*f - 10*g + 18*h - 34*i - 4*e)*x + 5*d + 8*f - 12*g + 20*h - 36*i - 6*e)/((x + 2)*(x + 1))

maple [A] time = 0.01, size = 266, normalized size = 1.81

$$-\frac{2i \ln(x+2)}{9} - \frac{i \ln(x-1)}{36} + \frac{37i \ln(x+1)}{36} + \frac{2i \ln(x-2)}{9} + \frac{7h \ln(x+2)}{9} - \frac{h \ln(x-1)}{36} - \frac{31h \ln(x+1)}{36} + \frac{h \ln(x-2)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)

[Out] -2/9*i*ln(x+2)-1/36*i*ln(x-1)+37/36*i*ln(x+1)+2/9*i*ln(x-2)+7/9*h*ln(x+2)-1/36*h*ln(x-1)-31/36*h*ln(x+1)+1/9*h*ln(x-2)-1/36*g*ln(x-1)-13/18*g*ln(x+2)+1/18*g*ln(x-2)+25/36*g*ln(x+1)+31/144*d*ln(x+2)-25/72*e*ln(x+2)-1/36*e*ln(x-1)-1/36*d*ln(x-1)+13/36*e*ln(x+1)-7/36*d*ln(x+1)+1/144*d*ln(x-2)+1/72*e*ln(x-2)+1/36*f*ln(x-2)-19/36*f*ln(x+1)-1/36*f*ln(x-1)+19/36*f*ln(x+2)+8/3/(x+2)*i+1/6/(x+1)*i-4/3/(x+2)*h-1/6/(x+1)*h+2/3/(x+2)*g+1/6/(x+1)*g-1/12/(x+2)*d+1/6/(x+2)*e-1/6/(x+1)*d+1/6/(x+1)*e-1/3/(x+2)*f-1/6/(x+1)*f

maxima [A] time = 0.45, size = 139, normalized size = 0.95

$$\frac{1}{144} (31d - 50e + 76f - 104g + 112h - 32i) \log(x + 2) - \frac{1}{36} (7d - 13e + 19f - 25g + 31h - 37i) \log(x + 1) -$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((x^2-3*x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] $\frac{1}{144}(31d - 50e + 76f - 104g + 112h - 32i)\log(x + 2) - \frac{1}{36}(7d - 13e + 19f - 25g + 31h - 37i)\log(x + 1) - \frac{1}{36}(d + e + f + g + h + i)\log(x - 1) + \frac{1}{144}(d + 2e + 4f + 8g + 16h + 32i)\log(x - 2) - \frac{1}{12}((3d - 4e + 6f - 10g + 18h - 34i)x + 5d - 6e + 8f - 12g + 20h - 36i)/(x^2 + 3x + 2)$

mupad [B] time = 1.68, size = 151, normalized size = 1.03

$$\ln(x-2) \left(\frac{d}{144} + \frac{e}{72} + \frac{f}{36} + \frac{g}{18} + \frac{h}{9} + \frac{2i}{9} \right) - \ln(x-1) \left(\frac{d}{36} + \frac{e}{36} + \frac{f}{36} + \frac{g}{36} + \frac{h}{36} + \frac{i}{36} \right) - \ln(x+1) \left(\frac{7d}{36} - \frac{13e}{36} + \frac{19f}{36} - \frac{25g}{36} + \frac{31h}{36} - \frac{37i}{36} \right) + \frac{1}{144}(d + 2e + 4f + 8g + 16h + 32i)\log(x - 2) - \frac{1}{12}((3d - 4e + 6f - 10g + 18h - 34i)x + 5d - 6e + 8f - 12g + 20h - 36i)/(x^2 + 3x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int(((x^2 - 3*x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(x^4 - 5*x^2 + 4)^2,x)`

[Out] $\log(x - 2)(d/144 + e/72 + f/36 + g/18 + h/9 + (2i)/9) - \log(x - 1)(d/36 + e/36 + f/36 + g/36 + h/36 + i/36) - \log(x + 1)((7d)/36 - (13e)/36 + (19f)/36 - (25g)/36 + (31h)/36 - (37i)/36) + \log(x + 2)((31d)/144 - (25e)/72 + (19f)/36 - (13g)/18 + (7h)/9 - (2i)/9) - ((5d)/12 - e/2 + (2f)/3 - g + (5h)/3 - 3i + x(d/4 - e/3 + f/2 - (5g)/6 + (3h)/2 - (17i)/6))/(3x + x^2 + 2)$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((x**2-3*x+2)*(i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)`

[Out] Timed out

$$3.97 \quad \int \frac{2+x}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=68

$$\frac{1}{12(1-x)} + \frac{1}{36(2-x)} - \frac{1}{36(x+1)} + \frac{1}{18} \log(1-x) - \frac{35}{432} \log(2-x) + \frac{1}{54} \log(x+1) + \frac{1}{144} \log(x+2)$$

[Out] 1/12/(1-x)+1/36/(2-x)-1/36/(1+x)+1/18*ln(1-x)-35/432*ln(2-x)+1/54*ln(1+x)+1/144*ln(2+x)

Rubi [A] time = 0.06, antiderivative size = 68, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 16, $\frac{\text{number of rules}}{\text{integrand size}} = 0.125$, Rules used = {1586, 2074}

$$\frac{1}{12(1-x)} + \frac{1}{36(2-x)} - \frac{1}{36(x+1)} + \frac{1}{18} \log(1-x) - \frac{35}{432} \log(2-x) + \frac{1}{54} \log(x+1) + \frac{1}{144} \log(x+2)$$

Antiderivative was successfully verified.

[In] Int[(2 + x)/(4 - 5*x^2 + x^4)^2, x]

[Out] 1/(12*(1 - x)) + 1/(36*(2 - x)) - 1/(36*(1 + x)) + Log[1 - x]/18 - (35*Log[2 - x])/432 + Log[1 + x]/54 + Log[2 + x]/144

Rule 1586

Int[(u_)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 2074

Int[(P_)^(p_)*(Q_)^(q_), x_Symbol] := With[{PP = Factor[P]}, Int[ExpandIntegrand[PP^p*Q^q, x], x] /; !SumQ[NonfreeFactors[PP, x]] /; FreeQ[q, x] && PolyQ[P, x] && PolyQ[Q, x] && IntegerQ[p] && NeQ[P, x]

Rubi steps

$$\begin{aligned} \int \frac{2+x}{(4-5x^2+x^4)^2} dx &= \int \frac{1}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left(\frac{1}{36(-2+x)^2} - \frac{35}{432(-2+x)} + \frac{1}{12(-1+x)^2} + \frac{1}{18(-1+x)} + \frac{1}{36(1+x)^2} + \frac{1}{54(1+x)} \right) dx \\ &= \frac{1}{12(1-x)} + \frac{1}{36(2-x)} - \frac{1}{36(1+x)} + \frac{1}{18} \log(1-x) - \frac{35}{432} \log(2-x) + \frac{1}{54} \log(1+x) + \end{aligned}$$

Mathematica [A] time = 0.03, size = 60, normalized size = 0.88

$$\frac{1}{432} \left(\frac{12(-5x^2+6x+5)}{x^3-2x^2-x+2} + 24 \log(1-x) - 35 \log(2-x) + 8 \log(x+1) + 3 \log(x+2) \right)$$

Antiderivative was successfully verified.

[In] Integrate[(2+x)/(4-5*x^2+x^4)^2,x]

[Out] ((12*(5+6*x-5*x^2))/(2-x-2*x^2+x^3)+24*Log[1-x]-35*Log[2-x]+8*Log[1+x]+3*Log[2+x])/432

fricas [B] time = 0.66, size = 103, normalized size = 1.51

$$\frac{60x^2 - 3(x^3 - 2x^2 - x + 2) \log(x+2) - 8(x^3 - 2x^2 - x + 2) \log(x+1) - 24(x^3 - 2x^2 - x + 2) \log(x-1) - 72x - 60}{432(x^3 - 2x^2 - x + 2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/432*(60*x^2-3*(x^3-2*x^2-x+2)*log(x+2)-8*(x^3-2*x^2-x+2)*log(x+1)-24*(x^3-2*x^2-x+2)*log(x-1)+35*(x^3-2*x^2-x+2)*log(x-2)-72*x-60)/(x^3-2*x^2-x+2)

giac [A] time = 0.40, size = 56, normalized size = 0.82

$$-\frac{5x^2-6x-5}{36(x+1)(x-1)(x-2)} + \frac{1}{144} \log(|x+2|) + \frac{1}{54} \log(|x+1|) + \frac{1}{18} \log(|x-1|) - \frac{35}{432} \log(|x-2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] $-1/36*(5*x^2 - 6*x - 5)/((x + 1)*(x - 1)*(x - 2)) + 1/144*\log(\text{abs}(x + 2)) + 1/54*\log(\text{abs}(x + 1)) + 1/18*\log(\text{abs}(x - 1)) - 35/432*\log(\text{abs}(x - 2))$

maple [A] time = 0.01, size = 47, normalized size = 0.69

$$\frac{\ln(x+2)}{144} - \frac{35 \ln(x-2)}{432} + \frac{\ln(x-1)}{18} + \frac{\ln(x+1)}{54} - \frac{1}{36(x-2)} - \frac{1}{36(x+1)} - \frac{1}{12(x-1)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((x+2)/(x^4-5*x^2+4)^2,x)`

[Out] $-1/36/(x-2)-35/432*\ln(x-2)-1/36/(x+1)+1/54*\ln(x+1)-1/12/(x-1)+1/18*\ln(x-1)+1/144*\ln(x+2)$

maxima [A] time = 0.44, size = 52, normalized size = 0.76

$$-\frac{5x^2 - 6x - 5}{36(x^3 - 2x^2 - x + 2)} + \frac{1}{144} \log(x + 2) + \frac{1}{54} \log(x + 1) + \frac{1}{18} \log(x - 1) - \frac{35}{432} \log(x - 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((2+x)/(x^4-5*x^2+4)^2,x, algorithm="maxima")`

[Out] $-1/36*(5*x^2 - 6*x - 5)/(x^3 - 2*x^2 - x + 2) + 1/144*\log(x + 2) + 1/54*\log(x + 1) + 1/18*\log(x - 1) - 35/432*\log(x - 2)$

mupad [B] time = 0.05, size = 52, normalized size = 0.76

$$\frac{\ln(x-1)}{18} + \frac{\ln(x+1)}{54} - \frac{35 \ln(x-2)}{432} + \frac{\ln(x+2)}{144} - \frac{-\frac{5x^2}{36} + \frac{x}{6} + \frac{5}{36}}{-x^3 + 2x^2 + x - 2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((x + 2)/(x^4 - 5*x^2 + 4)^2,x)`

[Out] $\log(x - 1)/18 + \log(x + 1)/54 - (35*\log(x - 2))/432 + \log(x + 2)/144 - (x/6 - (5*x^2)/36 + 5/36)/(x + 2*x^2 - x^3 - 2)$

sympy [A] time = 0.31, size = 53, normalized size = 0.78

$$\frac{-5x^2 + 6x + 5}{36x^3 - 72x^2 - 36x + 72} - \frac{35 \log(x - 2)}{432} + \frac{\log(x - 1)}{18} + \frac{\log(x + 1)}{54} + \frac{\log(x + 2)}{144}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((2+x)/(x**4-5*x**2+4)**2,x)`

[Out] $(-5*x**2 + 6*x + 5)/(36*x**3 - 72*x**2 - 36*x + 72) - 35*\log(x - 2)/432 + 1*\log(x - 1)/18 + \log(x + 1)/54 + \log(x + 2)/144$

$$3.98 \quad \int \frac{(2+x)(d+ex)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=105

$$-\frac{d-e}{36(x+1)} + \frac{d+e}{12(1-x)} + \frac{d+2e}{36(2-x)} + \frac{1}{36}(2d+5e)\log(1-x) - \frac{1}{432}(35d+58e)\log(2-x) + \frac{1}{108}(2d+e)\log(x+1) + \frac{1}{144}(d-2e)\log(2+x)$$

[Out] 1/12*(d+e)/(1-x)+1/36*(d+2*e)/(2-x)+1/36*(-d+e)/(1+x)+1/36*(2*d+5*e)*ln(1-x)-1/432*(35*d+58*e)*ln(2-x)+1/108*(2*d+e)*ln(1+x)+1/144*(d-2*e)*ln(2+x)

Rubi [A] time = 0.20, antiderivative size = 105, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 21, $\frac{\text{number of rules}}{\text{integrand size}} = 0.095$, Rules used = {1586, 6742}

$$-\frac{d-e}{36(x+1)} + \frac{d+e}{12(1-x)} + \frac{d+2e}{36(2-x)} + \frac{1}{36}(2d+5e)\log(1-x) - \frac{1}{432}(35d+58e)\log(2-x) + \frac{1}{108}(2d+e)\log(x+1) + \frac{1}{144}(d-2e)\log(2+x)$$

Antiderivative was successfully verified.

[In] Int[((2 + x)*(d + e*x))/(4 - 5*x^2 + x^4)^2, x]

[Out] (d + e)/(12*(1 - x)) + (d + 2*e)/(36*(2 - x)) - (d - e)/(36*(1 + x)) + ((2*d + 5*e)*Log[1 - x])/36 - ((35*d + 58*e)*Log[2 - x])/432 + ((2*d + e)*Log[1 + x])/108 + ((d - 2*e)*Log[2 + x])/144

Rule 1586

Int[(u_)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p + q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 6742

Int[u_, x_Symbol] := With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]]

Rubi steps

$$\begin{aligned} \int \frac{(2+x)(d+ex)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left(\frac{d+2e}{36(-2+x)^2} + \frac{-35d-58e}{432(-2+x)} + \frac{d+e}{12(-1+x)^2} + \frac{2d+5e}{36(-1+x)} + \frac{d-e}{36(1+x)^2} + \frac{2d+e}{108(1+x)} \right) dx \\ &= \frac{d+e}{12(1-x)} + \frac{d+2e}{36(2-x)} - \frac{d-e}{36(1+x)} + \frac{1}{36}(2d+5e)\log(1-x) - \frac{1}{432}(35d+58e)\log(2-x) \end{aligned}$$

Mathematica [A] time = 0.09, size = 97, normalized size = 0.92

$$\frac{1}{432} \left(\frac{12(d(-5x^2+6x+5)+2e(5-2x^2))}{x^3-2x^2-x+2} + 12(2d+5e)\log(1-x) - (35d+58e)\log(2-x) + 4(2d+e)\log(x+2) + 3(d-2e)\log(2+x) \right) / 432$$

Antiderivative was successfully verified.

[In] Integrate[((2+x)*(d+e*x))/(4-5*x^2+x^4)^2,x]

[Out] ((12*(d*(5+6*x-5*x^2)+2*e*(5-2*x^2)))/(2-x-2*x^2+x^3)+12*(2*d+5*e)*Log[1-x]-(35*d+58*e)*Log[2-x]+4*(2*d+e)*Log[1+x]+3*(d-2*e)*Log[2+x])/432

fricas [B] time = 0.94, size = 211, normalized size = 2.01

$$\frac{12(5d+4e)x^2-72dx-3((d-2e)x^3-2(d-2e)x^2-(d-2e)x+2d-4e)\log(x+2)-4((2d+e)x^3-2(2d+e)x^2-(d-2e)x+2d-4e)\log(x+1)-12((2d+5e)x^3-2(2d+5e)x^2-(2d+5e)x+4d+10e)\log(x-1)+((35d+58e)x^3-2(35d+58e)x^2-(35d+58e)x+70d+116e)\log(x-2)-60d-120e}{(x^3-2x^2-x+2)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/432*(12*(5*d+4*e)*x^2-72*d*x-3*((d-2*e)*x^3-2*(d-2*e)*x^2-(d-2*e)*x+2*d-4*e)*log(x+2)-4*((2*d+e)*x^3-2*(2*d+e)*x^2-(2*d+e)*x+4*d+2*e)*log(x+1)-12*((2*d+5*e)*x^3-2*(2*d+5*e)*x^2-(2*d+5*e)*x+4*d+10*e)*log(x-1)+((35*d+58*e)*x^3-2*(35*d+58*e)*x^2-(35*d+58*e)*x+70*d+116*e)*log(x-2)-60*d-120*e)/(x^3-2*x^2-x+2)

giac [A] time = 0.31, size = 98, normalized size = 0.93

$$\frac{1}{144}(d-2e)\log(|x+2|)+\frac{1}{108}(2d+e)\log(|x+1|)+\frac{1}{36}(2d+5e)\log(|x-1|)-\frac{1}{432}(35d+58e)\log(|x-2|)-\frac{1}{432}(35d+58e)\log(|x-2|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] $\frac{1}{144}(d - 2e)\log(\text{abs}(x + 2)) + \frac{1}{108}(2d + e)\log(\text{abs}(x + 1)) + \frac{1}{36}(2d + 5e)\log(\text{abs}(x - 1)) - \frac{1}{432}(35d + 58e)\log(\text{abs}(x - 2)) - \frac{1}{36}((5d + 4e)x^2 - 6dx - 5d - 10e)/((x + 1)(x - 1)(x - 2))$

maple [A] time = 0.01, size = 106, normalized size = 1.01

$$\frac{d \ln(x+2)}{144} - \frac{35d \ln(x-2)}{432} + \frac{d \ln(x-1)}{18} + \frac{d \ln(x+1)}{54} - \frac{e \ln(x+2)}{72} - \frac{29e \ln(x-2)}{216} + \frac{5e \ln(x-1)}{36} + \frac{e \ln(x+1)}{108} - \frac{(5d + 4e)x^2 - 6dx - 5d - 10e}{36(x+1)(x-1)(x-2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x+2)*(e*x+d)/(x^4-5*x^2+4)^2,x)

[Out] $-35/432*d*\ln(x-2) - 29/216*e*\ln(x-2) - 1/36/(x-2)*d - 1/18/(x-2)*e - 1/36/(x+1)*d + 1/36/(x+1)*e + 1/54*d*\ln(x+1) + 1/108*e*\ln(x+1) - 1/12/(x-1)*d - 1/12/(x-1)*e + 1/18*d*\ln(x-1) + 5/36*e*\ln(x-1) + 1/144*d*\ln(x+2) - 1/72*e*\ln(x+2)$

maxima [A] time = 0.44, size = 88, normalized size = 0.84

$$\frac{1}{144}(d - 2e)\log(x + 2) + \frac{1}{108}(2d + e)\log(x + 1) + \frac{1}{36}(2d + 5e)\log(x - 1) - \frac{1}{432}(35d + 58e)\log(x - 2) - \frac{(5d + 4e)x^2 - 6dx - 5d - 10e}{36(x+1)(x-1)(x-2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] $\frac{1}{144}(d - 2e)\log(x + 2) + \frac{1}{108}(2d + e)\log(x + 1) + \frac{1}{36}(2d + 5e)\log(x - 1) - \frac{1}{432}(35d + 58e)\log(x - 2) - \frac{1}{36}((5d + 4e)x^2 - 6dx - 5d - 10e)/(x^3 - 2x^2 - x + 2)$

mupad [B] time = 0.09, size = 90, normalized size = 0.86

$$\ln(x-1) \left(\frac{d}{18} + \frac{5e}{36} \right) - \frac{\left(-\frac{5d}{36} - \frac{e}{9} \right) x^2 + \frac{dx}{6} + \frac{5d}{36} + \frac{5e}{18}}{-x^3 + 2x^2 + x - 2} + \ln(x+1) \left(\frac{d}{54} + \frac{e}{108} \right) + \ln(x+2) \left(\frac{d}{144} - \frac{e}{72} \right) - \ln(x-2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(((x + 2)*(d + e*x))/(x^4 - 5*x^2 + 4)^2,x)

[Out] $\log(x - 1)*(d/18 + (5*e)/36) - ((5*d)/36 + (5*e)/18 - x^2*((5*d)/36 + e/9) + (d*x)/6)/(x + 2*x^2 - x^3 - 2) + \log(x + 1)*(d/54 + e/108) + \log(x + 2)*(d/144 - e/72) - \log(x - 2)*((35*d)/432 + (29*e)/216)$

sympy [B] time = 8.79, size = 1034, normalized size = 9.85

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(e*x+d)/(x**4-5*x**2+4)**2,x)

[Out] $(d - 2e) \log(x + (8710660d^5 + 91884504d^4e - 7579779d^4(d - 2e) / 4 + 364910432d^3e^2 - 18128055d^3e(d - 2e) - 83772d^3(d - 2e)^2 + 686697536d^2e^3 - 60296868d^2e^2(d - 2e) - 597816d^2e(d - 2e)^2 + 65907d^2(d - 2e)^3 / 4 + 614357568de^4 - 85949220de^3(d - 2e) - 1500048de^2(d - 2e)^2 + 105840de(d - 2e)^3 + 20847040e^5 - 45136356e^4(d - 2e) - 1196064e^3(d - 2e)^2 + 128277e^2(d - 2e)^3) / (3374210d^5 + 38645295d^4e + 170558380d^3e^2 + 362061760d^2e^3 + 370298160de^4 + 146466320e^5) / 144 + (2d + e) \log(x + (8710660d^5 + 91884504d^4e - 2526593d^4(2d + e) + 364910432d^3e^2 - 24170740d^3e(2d + e) - 148928d^3(2d + e)^2 + 686697536d^2e^3 - 80395824d^2e^2(2d + e) - 1062784d^2e(2d + e)^2 + 39056d^2(2d + e)^3 + 614357568de^4 - 114598960de^3(2d + e) - 2666752de^2(2d + e)^2 + 250880de(2d + e)^3 + 208470400e^5 - 60181808e^4(2d + e) - 2126336e^3(2d + e)^2 + 304064e^2(2d + e)^3) / (3374210d^5 + 38645295d^4e + 170558380d^3e^2 + 362061760d^2e^3 + 370298160de^4 + 146466320e^5) / 108 + (2d + 5e) \log(x + (8710660d^5 + 91884504d^4e - 7579779d^4(2d + 5e) + 364910432d^3e^2 - 72512220d^3e(2d + 5e) - 1340352d^3(2d + 5e)^2 + 686697536d^2e^3 - 241187472d^2e^2(2d + 5e) - 9565056d^2e(2d + 5e)^2 + 1054512d^2(2d + 5e)^3 + 614357568de^4 - 343796880de^3(2d + 5e) - 24000768de^2(2d + 5e)^2 + 6773760de(2d + 5e)^3 + 208470400e^5 - 180545424e^4(2d + 5e) - 19137024e^3(2d + 5e)^2 + 8209728e^2(2d + 5e)^3) / (3374210d^5 + 38645295d^4e + 170558380d^3e^2 + 362061760d^2e^3 + 370298160de^4 + 146466320e^5) / 36 - (35d + 58e) \log(x + (8710660d^5 + 91884504d^4e + 2526593d^4(35d + 58e) / 4 + 364910432d^3e^2 + 6042685d^3e(35d + 58e) - 9308d^3(35d + 58e)^2 + 686697536d^2e^3 + 20098956d^2e^2(35d + 58e) - 66424d^2e(35d + 58e)^2 - 2441d^2(35d + 58e)^3 / 4 + 614357568de^4 + 28649740de^3(35d + 58e) - 166672de^2(35d + 58e)^2 - 3920de(35d + 58e)^3 + 208470400e^5 + 15045452e^4(35d + 58e) - 132896e^3(35d + 58e)^2 - 4751e^2(35d + 58e)^3) / (3374210d^5 + 38645295d^4e + 170558380d^3e^2 + 362061760d^2e^3 + 370298160de^4 + 146466320e^5) / 432 + (6dx + 5d + 10e + x^2(-5d - 4e)) / (36x^3 - 72x^2 - 36x + 72)$

$$3.99 \quad \int \frac{(2+x)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=122

$$-\frac{d-e+f}{36(x+1)} + \frac{d+e+f}{12(1-x)} + \frac{d+2e+4f}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f) - \frac{1}{432} \log(2-x)(35d+58e+92f) + \frac{1}{108} \log(x+1)(2d+5e+8f) + \frac{1}{144} \log(2+x)(d-2e+4f)$$

[Out] 1/12*(d+e+f)/(1-x)+1/36*(d+2*e+4*f)/(2-x)+1/36*(-d+e-f)/(1+x)+1/36*(2*d+5*e+8*f)*ln(1-x)-1/432*(35*d+58*e+92*f)*ln(2-x)+1/108*(2*d+e-4*f)*ln(1+x)+1/144*(d-2*e+4*f)*ln(2+x)

Rubi [A] time = 0.22, antiderivative size = 122, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 26, $\frac{\text{number of rules}}{\text{integrand size}} = 0.077$, Rules used = {1586, 6742}

$$-\frac{d-e+f}{36(x+1)} + \frac{d+e+f}{12(1-x)} + \frac{d+2e+4f}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f) - \frac{1}{432} \log(2-x)(35d+58e+92f) + \frac{1}{108} \log(x+1)(2d+5e+8f) + \frac{1}{144} \log(2+x)(d-2e+4f)$$

Antiderivative was successfully verified.

[In] Int[((2 + x)*(d + e*x + f*x^2))/(4 - 5*x^2 + x^4)^2, x]

[Out] (d + e + f)/(12*(1 - x)) + (d + 2*e + 4*f)/(36*(2 - x)) - (d - e + f)/(36*(1 + x)) + ((2*d + 5*e + 8*f)*Log[1 - x])/36 - ((35*d + 58*e + 92*f)*Log[2 - x])/432 + ((2*d + e - 4*f)*Log[1 + x])/108 + ((d - 2*e + 4*f)*Log[2 + x])/144

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] :> Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 6742

Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]]

Rubi steps

$$\int \frac{(2+x)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx = \int \frac{d+ex+fx^2}{(2+x)(2-x-2x^2+x^3)^2} dx$$

$$= \int \left(\frac{d+2e+4f}{36(-2+x)^2} + \frac{-35d-58e-92f}{432(-2+x)} + \frac{d+e+f}{12(-1+x)^2} + \frac{2d+5e+8f}{36(-1+x)} + \frac{d-e+f}{36(1+x)^2} \right) dx$$

$$= \frac{d+e+f}{12(1-x)} + \frac{d+2e+4f}{36(2-x)} - \frac{d-e+f}{36(1+x)} + \frac{1}{36}(2d+5e+8f)\log(1-x) - \frac{1}{432}(35d+92f+58e)$$

Mathematica [A] time = 0.05, size = 121, normalized size = 0.99

$$\frac{1}{432} \left(\frac{12(d(-5x^2+6x+5) + e(10-4x^2) + 2f(-4x^2+3x+4))}{x^3-2x^2-x+2} + 12\log(1-x)(2d+5e+8f) - \log(2-x)(35d+92f+58e) \right)$$

Antiderivative was successfully verified.

[In] Integrate[((2+x)*(d+e*x+f*x^2))/(4-5*x^2+x^4)^2,x]

[Out] ((12*(d*(5+6*x-5*x^2)+e*(10-4*x^2)+2*f*(4+3*x-4*x^2)))/(2-x-2*x^2+x^3)+12*(2*d+5*e+8*f)*Log[1-x]- (35*d+58*e+92*f)*Log[2-x]+4*(2*d+e-4*f)*Log[1+x]+3*(d-2*e+4*f)*Log[2+x])/432

fricas [B] time = 1.24, size = 267, normalized size = 2.19

$$\frac{12(5d+4e+8f)x^2 - 72(d+f)x - 3((d-2e+4f)x^3 - 2(d-2e+4f)x^2 - (d-2e+4f)x + 2d - 4e + 8f)}{x^3 - 2x^2 - x + 2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/432*(12*(5*d+4*e+8*f)*x^2-72*(d+f)*x-3*((d-2*e+4*f)*x^3-2*(d-2*e+4*f)*x^2-(d-2*e+4*f)*x+2*d-4*e+8*f)*log(x+2)-4*((2*d+e-4*f)*x^3-2*(2*d+e-4*f)*x^2-(2*d+e-4*f)*x+4*d+2*e-8*f)*log(x+1)-12*((2*d+5*e+8*f)*x^3-2*(2*d+5*e+8*f)*x^2-(2*d+5*e+8*f)*x+4*d+10*e+16*f)*log(x-1)+((35*d+58*e+92*f)*x^3-2*(35*d+58*e+92*f)*x^2-(35*d+58*e+92*f)*x+70*d+116*e+184*f)*log(x-2)-60*d-120*e-96*f)/(x^3-2*x^2-x+2)

giac [A] time = 0.33, size = 118, normalized size = 0.97

$$\frac{1}{144}(d+4f-2e)\log(|x+2|) + \frac{1}{108}(2d-4f+e)\log(|x+1|) + \frac{1}{36}(2d+8f+5e)\log(|x-1|) - \frac{1}{432}(35d+92f+58e)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] $\frac{1}{144}(d + 4f - 2e) \log(\text{abs}(x + 2)) + \frac{1}{108}(2d - 4f + e) \log(\text{abs}(x + 1)) + \frac{1}{36}(2d + 8f + 5e) \log(\text{abs}(x - 1)) - \frac{1}{432}(35d + 92f + 58e) \log(\text{abs}(x - 2)) - \frac{1}{36}((5d + 8f + 4e)x^2 - 6(d + f)x - 5d - 8f - 10e) / ((x + 1)(x - 1)(x - 2))$

maple [A] time = 0.02, size = 158, normalized size = 1.30

$$\frac{d \ln(x+2)}{144} - \frac{35d \ln(x-2)}{432} + \frac{d \ln(x-1)}{18} + \frac{d \ln(x+1)}{54} - \frac{e \ln(x+2)}{72} - \frac{29e \ln(x-2)}{216} + \frac{5e \ln(x-1)}{36} + \frac{e \ln(x+1)}{108} + \frac{f \ln(x+2)}{54} - \frac{f \ln(x-2)}{54} + \frac{f \ln(x-1)}{18} + \frac{f \ln(x+1)}{54} - \frac{e \ln(x+2)}{72} - \frac{29e \ln(x-2)}{216} + \frac{5e \ln(x-1)}{36} + \frac{e \ln(x+1)}{108}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x+2)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)

[Out] $-35/432*d*\ln(x-2)-29/216*e*\ln(x-2)-23/108*f*\ln(x-2)-1/36/(x-2)*d-1/18/(x-2)*e-1/9/(x-2)*f-1/36/(x+1)*d+1/36/(x+1)*e-1/36/(x+1)*f+1/54*d*\ln(x+1)+1/108*e*\ln(x+1)-1/27*f*\ln(x+1)-1/12/(x-1)*d-1/12/(x-1)*e-1/12/(x-1)*f+1/18*d*\ln(x-1)+5/36*e*\ln(x-1)+2/9*f*\ln(x-1)+1/144*d*\ln(x+2)-1/72*e*\ln(x+2)+1/36*f*\ln(x+2)$

maxima [A] time = 0.44, size = 108, normalized size = 0.89

$$\frac{1}{144} (d - 2e + 4f) \log(x + 2) + \frac{1}{108} (2d + e - 4f) \log(x + 1) + \frac{1}{36} (2d + 5e + 8f) \log(x - 1) - \frac{1}{432} (35d + 58e + 92f) \log(x - 2) - \frac{1}{36} ((5d + 4e + 8f)x^2 - 6(d + f)x - 5d - 10e - 8f) / (x^3 - 2x^2 - x + 2)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] $\frac{1}{144}(d - 2e + 4f) \log(x + 2) + \frac{1}{108}(2d + e - 4f) \log(x + 1) + \frac{1}{36}(2d + 5e + 8f) \log(x - 1) - \frac{1}{432}(35d + 58e + 92f) \log(x - 2) - \frac{1}{36}((5d + 4e + 8f)x^2 - 6(d + f)x - 5d - 10e - 8f) / (x^3 - 2x^2 - x + 2)$

mupad [B] time = 0.13, size = 113, normalized size = 0.93

$$\ln(x-1) \left(\frac{d}{18} + \frac{5e}{36} + \frac{2f}{9} \right) + \ln(x+1) \left(\frac{d}{54} + \frac{e}{108} - \frac{f}{27} \right) + \ln(x+2) \left(\frac{d}{144} - \frac{e}{72} + \frac{f}{36} \right) - \ln(x-2) \left(\frac{35d}{432} + \frac{29e}{216} + \frac{f}{54} \right) - \frac{((5d + 4e + 8f)x^2 - 6(d + f)x - 5d - 10e - 8f)}{36(x^3 - 2x^2 - x + 2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(((x + 2)*(d + e*x + f*x^2))/(x^4 - 5*x^2 + 4)^2,x)

```
[Out] log(x - 1)*(d/18 + (5*e)/36 + (2*f)/9) + log(x + 1)*(d/54 + e/108 - f/27) +
log(x + 2)*(d/144 - e/72 + f/36) - log(x - 2)*((35*d)/432 + (29*e)/216 + (
23*f)/108) - ((5*d)/36 + (5*e)/18 + (2*f)/9 + x*(d/6 + f/6) - x^2*((5*d)/36
+ e/9 + (2*f)/9))/(x + 2*x^2 - x^3 - 2)
```

```
sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00
```

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```

$$3.100 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=141

$$-\frac{d-e+f-g}{36(x+1)} + \frac{d+e+f+g}{12(1-x)} + \frac{d+2e+4f+8g}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g) - \frac{1}{432} \log(2-x)(35d+58e+92f+136g) + \frac{1}{108} \log(1+x)(2d+5e+8f+11g) - \frac{1}{144} \log(2+x)(d-2e+4f-8g)$$

[Out] 1/12*(d+e+f+g)/(1-x)+1/36*(d+2*e+4*f+8*g)/(2-x)+1/36*(-d+e-f+g)/(1+x)+1/36*(2*d+5*e+8*f+11*g)*ln(1-x)-1/432*(35*d+58*e+92*f+136*g)*ln(2-x)+1/108*(2*d+5*e+8*f+11*g)*ln(1+x)+1/144*(d-2*e+4*f-8*g)*ln(2+x)

Rubi [A] time = 0.25, antiderivative size = 141, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.065$, Rules used = {1586, 6742}

$$-\frac{d-e+f-g}{36(x+1)} + \frac{d+e+f+g}{12(1-x)} + \frac{d+2e+4f+8g}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g) - \frac{1}{432} \log(2-x)(35d+58e+92f+136g) + \frac{1}{108} \log(1+x)(2d+5e+8f+11g) - \frac{1}{144} \log(2+x)(d-2e+4f-8g)$$

Antiderivative was successfully verified.

[In] Int[((2 + x)*(d + e*x + f*x^2 + g*x^3))/(4 - 5*x^2 + x^4)^2, x]

[Out] (d + e + f + g)/(12*(1 - x)) + (d + 2*e + 4*f + 8*g)/(36*(2 - x)) - (d - e + f - g)/(36*(1 + x)) + ((2*d + 5*e + 8*f + 11*g)*Log[1 - x])/36 - ((35*d + 58*e + 92*f + 136*g)*Log[2 - x])/432 + ((2*d + e - 4*f + 7*g)*Log[1 + x])/108 + ((d - 2*e + 4*f - 8*g)*Log[2 + x])/144

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 6742

Int[u_, x_Symbol] := With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]]

Rubi steps

$$\int \frac{(2+x)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx = \int \frac{d+ex+fx^2+gx^3}{(2+x)(2-x-2x^2+x^3)^2} dx$$

$$= \int \left(\frac{d+2e+4f+8g}{36(-2+x)^2} + \frac{-35d-58e-92f-136g}{432(-2+x)} + \frac{d+e+f+g}{12(-1+x)^2} + \frac{2d+5e+8f+11g}{36} \right) dx$$

$$= \frac{d+e+f+g}{12(1-x)} + \frac{d+2e+4f+8g}{36(2-x)} - \frac{d-e+f-g}{36(1+x)} + \frac{1}{36}(2d+5e+8f+11g)x$$

Mathematica [A] time = 0.07, size = 144, normalized size = 1.02

$$\frac{1}{432} \left(\frac{12(d(-5x^2+6x+5)) + 2(e(5-2x^2) + f(-4x^2+3x+4) + g(8-5x^2))}{x^3-2x^2-x+2} + 12 \log(1-x)(2d+5e+8f+11g) \right)$$

Antiderivative was successfully verified.

[In] Integrate[((2+x)*(d+e*x+f*x^2+g*x^3))/(4-5*x^2+x^4)^2,x]

[Out] ((12*(d*(5+6*x-5*x^2)+2*(g*(8-5*x^2)+f*(4+3*x-4*x^2)+e*(5-2*x^2))))/(2-x-2*x^2+x^3)+12*(2*d+5*e+8*f+11*g)*Log[1-x]- (35*d+58*e+92*f+136*g)*Log[2-x]+4*(2*d+e-4*f+7*g)*Log[1+x]+3*(d-2*e+4*f-8*g)*Log[2+x])/432

fricas [B] time = 2.53, size = 321, normalized size = 2.28

$$\frac{12(5d+4e+8f+10g)x^2-72(d+f)x-3((d-2e+4f-8g)x^3-2(d-2e+4f-8g)x^2-(d-2e+4f-8g)x+2d-4e+8f-16g)\log(x+2)-4((2d+e-4f+7g)x^3-2(2d+e-4f+7g)x^2-(2d+e-4f+7g)x+4d+2e-8f+14g)\log(x+1)-12((2d+5e+8f+11g)x^3-2(2d+5e+8f+11g)x^2-(2d+5e+8f+11g)x+4d+10e+16f+22g)\log(x-1)+((35d+58e+92f+136g)x^3-2(35d+58e+92f+136g)x^2-(35d+58e+92f+136g)x+70d+116e+184f+272g)\log(x-2)-60d-120e-96f-192g)/(x^3-2x^2-x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/432*(12*(5*d+4*e+8*f+10*g)*x^2-72*(d+f)*x-3*((d-2*e+4*f-8*g)*x^3-2*(d-2*e+4*f-8*g)*x+2*d-4*e+8*f-16*g)*log(x+2)-4*((2*d+e-4*f+7*g)*x^3-2*(2*d+e-4*f+7*g)*x^2-(2*d+e-4*f+7*g)*x+4*d+2*e-8*f+14*g)*log(x+1)-12*((2*d+5*e+8*f+11*g)*x^3-2*(2*d+5*e+8*f+11*g)*x^2-(2*d+5*e+8*f+11*g)*x+4*d+10*e+16*f+22*g)*log(x-1)+((35*d+58*e+92*f+136*g)*x^3-2*(35*d+58*e+92*f+136*g)*x^2-(35*d+58*e+92*f+136*g)*x+70*d+116*e+184*f+272*g)*log(x-2)-60*d-120*e-96*f-192*g)/(x^3-2*x^2-x+2)

giac [A] time = 0.32, size = 136, normalized size = 0.96

$$\frac{1}{144} (d + 4f - 8g - 2e) \log(|x + 2|) + \frac{1}{108} (2d - 4f + 7g + e) \log(|x + 1|) + \frac{1}{36} (2d + 8f + 11g + 5e) \log(|x - 1|)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="giac")

[Out] 1/144*(d + 4*f - 8*g - 2*e)*log(abs(x + 2)) + 1/108*(2*d - 4*f + 7*g + e)*log(abs(x + 1)) + 1/36*(2*d + 8*f + 11*g + 5*e)*log(abs(x - 1)) - 1/432*(35*d + 92*f + 136*g + 58*e)*log(abs(x - 2)) - 1/36*((5*d + 8*f + 10*g + 4*e)*x^2 - 6*(d + f)*x - 5*d - 8*f - 16*g - 10*e)/((x + 1)*(x - 1)*(x - 2))

maple [A] time = 0.02, size = 210, normalized size = 1.49

$$\frac{11g \ln(x-1)}{36} - \frac{g \ln(x+2)}{18} - \frac{17g \ln(x-2)}{54} + \frac{7g \ln(x+1)}{108} + \frac{d \ln(x+2)}{144} - \frac{e \ln(x+2)}{72} + \frac{5e \ln(x-1)}{36} + \frac{d \ln(x-1)}{18} + \dots$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x+2)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)

[Out] 11/36*g*ln(x-1)-1/18*g*ln(x+2)-17/54*g*ln(x-2)+7/108*g*ln(x+1)+1/144*d*ln(x+2)-1/72*e*ln(x+2)+5/36*e*ln(x-1)+1/18*d*ln(x-1)+1/108*e*ln(x+1)+1/54*d*ln(x+1)-35/432*d*ln(x-2)-29/216*e*ln(x-2)-23/108*f*ln(x-2)-1/27*f*ln(x+1)+2/9*f*ln(x-1)+1/36*f*ln(x+2)+1/36/(x+1)*g-1/12/(x-1)*g-2/9/(x-2)*g-1/36/(x-2)*d-1/18/(x-2)*e-1/36/(x+1)*d+1/36/(x+1)*e-1/12/(x-1)*d-1/12/(x-1)*e-1/12/(x-1)*f-1/9/(x-2)*f-1/36/(x+1)*f

maxima [A] time = 0.45, size = 126, normalized size = 0.89

$$\frac{1}{144} (d - 2e + 4f - 8g) \log(x + 2) + \frac{1}{108} (2d + e - 4f + 7g) \log(x + 1) + \frac{1}{36} (2d + 5e + 8f + 11g) \log(x - 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] 1/144*(d - 2*e + 4*f - 8*g)*log(x + 2) + 1/108*(2*d + e - 4*f + 7*g)*log(x + 1) + 1/36*(2*d + 5*e + 8*f + 11*g)*log(x - 1) - 1/432*(35*d + 58*e + 92*f + 136*g)*log(x - 2) - 1/36*((5*d + 4*e + 8*f + 10*g)*x^2 - 6*(d + f)*x - 5*d - 10*e - 8*f - 16*g)/(x^3 - 2*x^2 - x + 2)

mupad [B] time = 0.88, size = 131, normalized size = 0.93

$$\ln(x-1) \left(\frac{d}{18} + \frac{5e}{36} + \frac{2f}{9} + \frac{11g}{36} \right) + \ln(x+2) \left(\frac{d}{144} - \frac{e}{72} + \frac{f}{36} - \frac{g}{18} \right) + \ln(x+1) \left(\frac{d}{54} + \frac{e}{108} - \frac{f}{27} + \frac{7g}{108} \right) - \ln(x-2) \left(\frac{35d}{432} + \frac{58e}{432} + \frac{92f}{432} + \frac{136g}{432} \right) - \frac{1}{36} \frac{(5d + 4e + 8f + 10g)x^2 - 6(d + f)x - 5d - 10e - 8f - 16g}{(x-2)(x-1)(x+1)}$$

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int(((x + 2)*(d + e*x + f*x^2 + g*x^3))/(x^4 - 5*x^2 + 4)^2,x)
```

```
[Out] log(x - 1)*(d/18 + (5*e)/36 + (2*f)/9 + (11*g)/36) + log(x + 2)*(d/144 - e/
72 + f/36 - g/18) + log(x + 1)*(d/54 + e/108 - f/27 + (7*g)/108) - log(x -
2)*((35*d)/432 + (29*e)/216 + (23*f)/108 + (17*g)/54) - ((5*d)/36 + (5*e)/1
8 + (2*f)/9 + (4*g)/9 - x^2*((5*d)/36 + e/9 + (2*f)/9 + (5*g)/18) + x*(d/6
+ f/6))/(x + 2*x^2 - x^3 - 2)
```

```
sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00
```

Timed out

Verification of antiderivative is not currently implemented for this CAS.

```
[In] integrate((2+x)*(g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)
```

```
[Out] Timed out
```


$$3.101 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=158

$$-\frac{d-e+f-g+h}{36(x+1)} + \frac{d+e+f+g+h}{12(1-x)} + \frac{d+2e+4f+8g+16h}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+14h) - \frac{1}{432} \log($$

[Out] 1/12*(d+e+f+g+h)/(1-x)+1/36*(d+2*e+4*f+8*g+16*h)/(2-x)+1/36*(-d+e-f+g-h)/(1+x)+1/36*(2*d+5*e+8*f+11*g+14*h)*ln(1-x)-1/432*(35*d+58*e+92*f+136*g+176*h)*ln(2-x)+1/108*(2*d+e-4*f+7*g-10*h)*ln(1+x)+1/144*(d-2*e+4*f-8*g+16*h)*ln(2+x)

Rubi [A] time = 0.29, antiderivative size = 158, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.056$, Rules used = {1586, 6742}

$$-\frac{d-e+f-g+h}{36(x+1)} + \frac{d+e+f+g+h}{12(1-x)} + \frac{d+2e+4f+8g+16h}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+14h) - \frac{1}{432} \log($$

Antiderivative was successfully verified.

[In] Int[((2 + x)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(4 - 5*x^2 + x^4)^2, x]

[Out] (d + e + f + g + h)/(12*(1 - x)) + (d + 2*e + 4*f + 8*g + 16*h)/(36*(2 - x)) - (d - e + f - g + h)/(36*(1 + x)) + ((2*d + 5*e + 8*f + 11*g + 14*h)*Log[1 - x])/36 - ((35*d + 58*e + 92*f + 136*g + 176*h)*Log[2 - x])/432 + ((2*d + e - 4*f + 7*g - 10*h)*Log[1 + x])/108 + ((d - 2*e + 4*f - 8*g + 16*h)*Log[2 + x])/144

Rule 1586

Int[(u_.)*(Px_)^(p_.)*(Qx_)^(q_.), x_Symbol] := Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 6742

Int[u_, x_Symbol] := With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]]

Rubi steps

$$\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx = \int \frac{d+ex+fx^2+gx^3+hx^4}{(2+x)(2-x-2x^2+x^3)^2} dx$$

$$= \int \left(\frac{d+2e+4f+8g+16h}{36(-2+x)^2} + \frac{-35d-58e-92f-136g-176h}{432(-2+x)} + \frac{d}{432} \right) dx$$

$$= \frac{d+e+f+g+h}{12(1-x)} + \frac{d+2e+4f+8g+16h}{36(2-x)} - \frac{d-e+f-g+h}{36(1+x)} + \frac{1}{3} \log\left(\frac{2+x}{2-x}\right)$$

Mathematica [A] time = 0.09, size = 169, normalized size = 1.07

$$\frac{1}{432} \left(\frac{12(d(-5x^2+6x+5) + 2(e(5-2x^2) + f(-4x^2+3x+4) - 5gx^2+8g-10hx^2+3hx+10h))}{x^3-2x^2-x+2} + 12 \log\left(\frac{2+x}{2-x}\right) \right)$$

Antiderivative was successfully verified.

[In] Integrate[((2+x)*(d+e*x+f*x^2+g*x^3+h*x^4))/(4-5*x^2+x^4)^2,x]

[Out] ((12*(d*(5+6*x-5*x^2)+2*(8*g+10*h+3*h*x-5*g*x^2-10*h*x^2+f*(4+3*x-4*x^2)+e*(5-2*x^2)))/(2-x-2*x^2+x^3)+12*(2*d+5*e+8*f+11*g+14*h)*Log[1-x]- (35*d+58*e+92*f+136*g+176*h)*Log[2-x]+4*(2*d+e-4*f+7*g-10*h)*Log[1+x]+3*(d-2*e+4*f-8*g+16*h)*Log[2+x])/432

fricas [B] time = 12.11, size = 376, normalized size = 2.38

$$\frac{12(5d+4e+8f+10g+20h)x^2 - 72(d+f+h)x - 3((d-2e+4f-8g+16h)x^3 - 2(d-2e+4f-8g+16h)x^2 - (d-2e+4f-8g+16h)x + 2d-4e+8f-16g+32h)\log(x+2) - 4((2d+e-4f+7g-10h)x^3 - 2(2d+e-4f+7g-10h)x^2 - (2d+e-4f+7g-10h)x + 4d+2e-8f+14g-20h)\log(x+1) - 12((2d+5e+8f+11g+14h)x^3 - 2(2d+5e+8f+11g+14h)x^2 - (2d+5e+8f+11g+14h)x + 4d+10e+16f+22g+28h)\log(x-2)}{432}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/432*(12*(5*d+4*e+8*f+10*g+20*h)*x^2-72*(d+f+h)*x-3*((d-2*e+4*f-8*g+16*h)*x^3-2*(d-2*e+4*f-8*g+16*h)*x^2-(d-2*e+4*f-8*g+16*h)*x+2*d-4*e+8*f-16*g+32*h)*log(x+2)-4*((2*d+e-4*f+7*g-10*h)*x^3-2*(2*d+e-4*f+7*g-10*h)*x^2-(2*d+e-4*f+7*g-10*h)*x+4*d+2*e-8*f+14*g-20*h)*log(x+1)-12*((2*d+5*e+8*f+11*g+14*h)*x^3-2*(2*d+5*e+8*f+11*g+14*h)*x^2-(2*d+5*e+8*f+11*g+14*h)*x+4*d+10*e+16*f+22*g+28*h)*log(x-2)

[Out] $\frac{1}{144}(d - 2e + 4f - 8g + 16h)\log(x + 2) + \frac{1}{108}(2d + e - 4f + 7g - 10h)\log(x + 1) + \frac{1}{36}(2d + 5e + 8f + 11g + 14h)\log(x - 1) - \frac{1}{43}2(35d + 58e + 92f + 136g + 176h)\log(x - 2) - \frac{1}{36}((5d + 4e + 8f + 10g + 20h)x^2 - 6(d + f + h)x - 5d - 10e - 8f - 16g - 20h)/(x^3 - 2x^2 - x + 2)$

mupad [B] time = 1.39, size = 152, normalized size = 0.96

$$\ln(x-1) \left(\frac{d}{18} + \frac{5e}{36} + \frac{2f}{9} + \frac{11g}{36} + \frac{7h}{18} \right) - \frac{\left(-\frac{5d}{36} - \frac{e}{9} - \frac{2f}{9} - \frac{5g}{18} - \frac{5h}{9} \right) x^2 + \left(\frac{d}{6} + \frac{f}{6} + \frac{h}{6} \right) x + \frac{5d}{36} + \frac{5e}{18} + \frac{2f}{9} + \frac{4g}{9} + \frac{7h}{18}}{-x^3 + 2x^2 + x - 2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int(((x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4))/(x^4 - 5*x^2 + 4)^2,x)`

[Out] $\log(x - 1)\left(\frac{d}{18} + \frac{5e}{36} + \frac{2f}{9} + \frac{11g}{36} + \frac{7h}{18}\right) - \left(\frac{5d}{36} + \frac{5e}{18} + \frac{2f}{9} + \frac{4g}{9} + \frac{5h}{9} - x^2\left(\frac{5d}{36} + \frac{e}{9} + \frac{2f}{9} + \frac{5g}{18} + \frac{5h}{9}\right) + x\left(\frac{d}{6} + \frac{f}{6} + \frac{h}{6}\right)\right)/(x + 2x^2 - x^3 - 2) + \log(x + 2)\left(\frac{d}{144} - \frac{e}{72} + \frac{f}{36} - \frac{g}{18} + \frac{h}{9}\right) + \log(x + 1)\left(\frac{d}{54} + \frac{e}{108} - \frac{f}{27} + \frac{7g}{108} - \frac{5h}{54}\right) - \log(x - 2)\left(\frac{35d}{432} + \frac{29e}{216} + \frac{23f}{108} + \frac{17g}{54} + \frac{11h}{27}\right)$

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((2+x)*(h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)`

[Out] Timed out

$$3.102 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=177

$$-\frac{d-e+f-g+h-i}{36(x+1)} + \frac{d+e+f+g+h+i}{12(1-x)} + \frac{d+2e+4f+8g+16h+32i}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+14$$

[Out] 1/12*(d+e+f+g+h+i)/(1-x)+1/36*(d+2*e+4*f+8*g+16*h+32*i)/(2-x)+1/36*(-d+e-f+g-h+i)/(1+x)+1/36*(2*d+5*e+8*f+11*g+14*h+17*i)*ln(1-x)-1/432*(35*d+58*e+92*f+136*g+176*h+160*i)*ln(2-x)+1/108*(2*d+e-4*f+7*g-10*h+13*i)*ln(1+x)+1/144*(d-2*e+4*f-8*g+16*h-32*i)*ln(2+x)

Rubi [A] time = 0.34, antiderivative size = 177, normalized size of antiderivative = 1.00, number of steps used = 3, number of rules used = 2, integrand size = 41, $\frac{\text{number of rules}}{\text{integrand size}} = 0.049$, Rules used = {1586, 6742}

$$-\frac{d-e+f-g+h-i}{36(x+1)} + \frac{d+e+f+g+h+i}{12(1-x)} + \frac{d+2e+4f+8g+16h+32i}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+14$$

Antiderivative was successfully verified.

[In] Int[((2 + x)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2 + x^4)^2, x]

[Out] (d + e + f + g + h + i)/(12*(1 - x)) + (d + 2*e + 4*f + 8*g + 16*h + 32*i)/(36*(2 - x)) - (d - e + f - g + h - i)/(36*(1 + x)) + ((2*d + 5*e + 8*f + 11*g + 14*h + 17*i)*Log[1 - x])/36 - ((35*d + 58*e + 92*f + 136*g + 176*h + 160*i)*Log[2 - x])/432 + ((2*d + e - 4*f + 7*g - 10*h + 13*i)*Log[1 + x])/108 + ((d - 2*e + 4*f - 8*g + 16*h - 32*i)*Log[2 + x])/144

Rule 1586

Int[(u_)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] :> Int[u*PolynomialQuotient[Px, Qx, x]^p*Qx^(p+q), x] /; FreeQ[q, x] && PolyQ[Px, x] && PolyQ[Qx, x] && EqQ[PolynomialRemainder[Px, Qx, x], 0] && IntegerQ[p] && LtQ[p*q, 0]

Rule 6742

Int[u_, x_Symbol] :> With[{v = ExpandIntegrand[u, x]}, Int[v, x] /; SumQ[v]]

Rubi steps

$$\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+102x^5)}{(4-5x^2+x^4)^2} dx = \int \frac{d+ex+fx^2+gx^3+hx^4+102x^5}{(2+x)(2-x-2x^2+x^3)^2} dx$$

$$= \int \left(\frac{3264+d+2e+4f+8g+16h}{36(-2+x)^2} + \frac{-16320-35d-58e-92f-136g-176h-160i}{432(-2+x)} \right) dx$$

$$= \frac{102+d+e+f+g+h}{12(1-x)} + \frac{3264+d+2e+4f+8g+16h}{36(2-x)} + \frac{-16320-35d-58e-92f-136g-176h-160i}{432} \log\left(\frac{2+x}{2-x}\right)$$

Mathematica [A] time = 0.11, size = 195, normalized size = 1.10

$$\frac{-5dx^2 + 6dx + 5d - 4ex^2 + 10e - 8fx^2 + 6fx + 8f - 10gx^2 + 16g - 20hx^2 + 6hx + 20h - 34ix^2 + 40i}{36(x^3 - 2x^2 - x + 2)} + \frac{1}{36} \log\left(\frac{2+x}{2-x}\right)$$

Antiderivative was successfully verified.

[In] Integrate[((2 + x)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(4 - 5*x^2 + x^4)^2,x]

[Out] (5*d + 10*e + 8*f + 16*g + 20*h + 40*i + 6*d*x + 6*f*x + 6*h*x - 5*d*x^2 - 4*e*x^2 - 8*f*x^2 - 10*g*x^2 - 20*h*x^2 - 34*i*x^2)/(36*(2 - x - 2*x^2 + x^3)) + ((2*d + 5*e + 8*f + 11*g + 14*h + 17*i)*Log[1 - x])/36 + ((-35*d - 58*e - 92*f - 136*g - 176*h - 160*i)*Log[2 - x])/432 + ((2*d + e - 4*f + 7*g - 10*h + 13*i)*Log[1 + x])/108 + ((d - 2*e + 4*f - 8*g + 16*h - 32*i)*Log[2 + x])/144

fricas [B] time = 70.99, size = 430, normalized size = 2.43

$$\frac{12(5d+4e+8f+10g+20h+34i)x^2 - 72(d+f+h)x - 3((d-2e+4f-8g+16h-32i)x^3 - 2(d-2e+4f-8g+16h-32i)x^2 - (d-2e+4f-8g+16h-32i)x + 2d-4e+8f-16g+32h-64i)\log(x+2) - 4((2d+e-4f+7g-10h+13i)x^3 - 2(2d+e-4f+7g-10h+13i)x^2 - (2d+e-4f+7g-10h+13i)x + 4d+2e-8f+14g-20h+26i)\log(x+1) - 12((2d+5e-10g+20h+40i)x - 5d-4e-8f-16g-20h-34i)}{36(x^3-2x^2-x+2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="fricas")

[Out] -1/432*(12*(5*d + 4*e + 8*f + 10*g + 20*h + 34*i)*x^2 - 72*(d + f + h)*x - 3*((d - 2*e + 4*f - 8*g + 16*h - 32*i)*x^3 - 2*(d - 2*e + 4*f - 8*g + 16*h - 32*i)*x^2 - (d - 2*e + 4*f - 8*g + 16*h - 32*i)*x + 2*d - 4*e + 8*f - 16*g + 32*h - 64*i)*log(x + 2) - 4*((2*d + e - 4*f + 7*g - 10*h + 13*i)*x^3 - 2*(2*d + e - 4*f + 7*g - 10*h + 13*i)*x^2 - (2*d + e - 4*f + 7*g - 10*h + 13*i)*x + 4*d + 2*e - 8*f + 14*g - 20*h + 26*i)*log(x + 1) - 12*((2*d + 5*e - 10*g + 20*h + 40*i)*x - 5*d - 4*e - 8*f - 16*g - 20*h - 34*i)

+ 8*f + 11*g + 14*h + 17*i)*x^3 - 2*(2*d + 5*e + 8*f + 11*g + 14*h + 17*i)*x^2 - (2*d + 5*e + 8*f + 11*g + 14*h + 17*i)*x + 4*d + 10*e + 16*f + 22*g + 28*h + 34*i)*log(x - 1) + ((35*d + 58*e + 92*f + 136*g + 176*h + 160*i)*x^3 - 2*(35*d + 58*e + 92*f + 136*g + 176*h + 160*i)*x^2 - (35*d + 58*e + 92*f + 136*g + 176*h + 160*i)*x + 70*d + 116*e + 184*f + 272*g + 352*h + 320*i)*log(x - 2) - 60*d - 120*e - 96*f - 192*g - 240*h - 480*i)/(x^3 - 2*x^2 - x + 2)

giac [A] time = 0.43, size = 173, normalized size = 0.98

$$\frac{1}{144} (d + 4f - 8g + 16h - 32i - 2e) \log(|x + 2|) + \frac{1}{108} (2d - 4f + 7g - 10h + 13i + e) \log(|x + 1|) + \frac{1}{36} (2d + 5e + 8f + 11g + 14h + 17i) \log(|x - 1|) - \frac{1}{432} (35d + 58e + 92f + 136g + 176h + 160i) \log(|x - 2|) - \frac{1}{36} ((5d + 8f + 10g + 20h + 34i + 4e)x^2 - 6(d + f + h)x - 5d - 8f - 16g - 20h - 40i - 10e) / ((x + 1)(x - 1)(x - 2))$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm m="giac")

[Out] 1/144*(d + 4*f - 8*g + 16*h - 32*i - 2*e)*log(abs(x + 2)) + 1/108*(2*d - 4*f + 7*g - 10*h + 13*i + e)*log(abs(x + 1)) + 1/36*(2*d + 8*f + 11*g + 14*h + 17*i + 5*e)*log(abs(x - 1)) - 1/432*(35*d + 92*f + 136*g + 176*h + 160*i + 58*e)*log(abs(x - 2)) - 1/36*((5*d + 8*f + 10*g + 20*h + 34*i + 4*e)*x^2 - 6*(d + f + h)*x - 5*d - 8*f - 16*g - 20*h - 40*i - 10*e)/((x + 1)*(x - 1)*(x - 2))

maple [A] time = 0.02, size = 314, normalized size = 1.77

$$-\frac{2i \ln(x + 2)}{9} + \frac{17i \ln(x - 1)}{36} + \frac{13i \ln(x + 1)}{108} - \frac{10i \ln(x - 2)}{27} + \frac{h \ln(x + 2)}{9} + \frac{7h \ln(x - 1)}{18} - \frac{5h \ln(x + 1)}{54} - \frac{11h \ln(x - 2)}{27}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((x+2)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x)

[Out] -2/9*i*ln(x+2)+17/36*i*ln(x-1)+13/108*i*ln(x+1)-10/27*i*ln(x-2)+1/9*h*ln(x+2)+7/18*h*ln(x-1)-5/54*h*ln(x+1)-11/27*h*ln(x-2)+11/36*g*ln(x-1)-1/18*g*ln(x+2)-17/54*g*ln(x-2)+7/108*g*ln(x+1)+1/144*d*ln(x+2)-1/72*e*ln(x+2)+5/36*e*ln(x-1)+1/18*d*ln(x-1)+1/108*e*ln(x+1)+1/54*d*ln(x+1)-35/432*d*ln(x-2)-29/216*e*ln(x-2)-23/108*f*ln(x-2)-1/27*f*ln(x+1)+2/9*f*ln(x-1)+1/36*f*ln(x+2)+1/36/(x+1)*i-1/12/(x-1)*i-8/9/(x-2)*i-1/36/(x+1)*h-1/12/(x-1)*h-4/9/(x-2)*h+1/36/(x+1)*g-1/12/(x-1)*g-2/9/(x-2)*g-1/36/(x-2)*d-1/18/(x-2)*e-1/36/(x+1)*d+1/36/(x+1)*e-1/12/(x-1)*d-1/12/(x-1)*e-1/12/(x-1)*f-1/9/(x-2)*f-1/36/(x+1)*f

maxima [A] time = 0.46, size = 163, normalized size = 0.92

$$\frac{1}{144} (d - 2e + 4f - 8g + 16h - 32i) \log(x + 2) + \frac{1}{108} (2d + e - 4f + 7g - 10h + 13i) \log(x + 1) + \frac{1}{36} (2d + 5e + 8f + 11g + 14h + 17i) \log(x - 1) - \frac{1}{432} (35d + 58e + 92f + 136g + 176h + 160i) \log(x - 2) - \frac{1}{36} ((5d + 8f + 10g + 20h + 34i + 4e)x^2 - 6(d + f + h)x - 5d - 8f - 16g - 20h - 40i - 10e) / ((x + 1)(x - 1)(x - 2))$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="maxima")

[Out] 1/144*(d - 2*e + 4*f - 8*g + 16*h - 32*i)*log(x + 2) + 1/108*(2*d + e - 4*f + 7*g - 10*h + 13*i)*log(x + 1) + 1/36*(2*d + 5*e + 8*f + 11*g + 14*h + 17*i)*log(x - 1) - 1/432*(35*d + 58*e + 92*f + 136*g + 176*h + 160*i)*log(x - 2) - 1/36*((5*d + 4*e + 8*f + 10*g + 20*h + 34*i)*x^2 - 6*(d + f + h)*x - 5*d - 10*e - 8*f - 16*g - 20*h - 40*i)/(x^3 - 2*x^2 - x + 2)

mupad [B] time = 1.75, size = 170, normalized size = 0.96

$$\ln(x-1) \left(\frac{d}{18} + \frac{5e}{36} + \frac{2f}{9} + \frac{11g}{36} + \frac{7h}{18} + \frac{17i}{36} \right) + \ln(x+2) \left(\frac{d}{144} - \frac{e}{72} + \frac{f}{36} - \frac{g}{18} + \frac{h}{9} - \frac{2i}{9} \right) + \ln(x+1) \left(\frac{d}{54} + \frac{e}{108} - \frac{f}{27} + \frac{7g}{108} - \frac{5h}{54} + \frac{13i}{108} \right) - \log(x-2) \left(\frac{35d}{432} + \frac{58e}{432} + \frac{92f}{432} + \frac{136g}{432} + \frac{176h}{432} + \frac{160i}{432} \right) - \frac{(5d + 4e + 8f + 10g + 20h + 34i)x^2 - 6(d + f + h)x - 5d - 10e - 8f - 16g - 20h - 40i}{36(x^3 - 2x^2 - x + 2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(((x + 2)*(d + e*x + f*x^2 + g*x^3 + h*x^4 + i*x^5))/(x^4 - 5*x^2 + 4)^2, x)

[Out] log(x - 1)*(d/18 + (5*e)/36 + (2*f)/9 + (11*g)/36 + (7*h)/18 + (17*i)/36) + log(x + 2)*(d/144 - e/72 + f/36 - g/18 + h/9 - (2*i)/9) + log(x + 1)*(d/54 + e/108 - f/27 + (7*g)/108 - (5*h)/54 + (13*i)/108) - log(x - 2)*((35*d)/432 + (29*e)/216 + (23*f)/108 + (17*g)/54 + (11*h)/27 + (10*i)/27) - ((5*d)/36 + (5*e)/18 + (2*f)/9 + (4*g)/9 + (5*h)/9 + (10*i)/9 - x^2*((5*d)/36 + e/9 + (2*f)/9 + (5*g)/18 + (5*h)/9 + (17*i)/18) + x*(d/6 + f/6 + h/6))/(x + 2*x^2 - x^3 - 2)

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((2+x)*(i*x**5+h*x**4+g*x**3+f*x**2+e*x+d)/(x**4-5*x**2+4)**2,x)

[Out] Timed out

3.103 $\int (d + ex + fx^2 + gx^3) (a + bx^2 + cx^4)^{3/2} dx$

Optimal. Leaf size=717

$$\frac{x\sqrt{a+bx^2+cx^4}(-84a^2c^2f+57ab^2cf-144abc^2d-8b^4f+18b^3cd)\sqrt[4]{a}(\sqrt{a}+\sqrt{cx^2})\sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{cx^2})^2}}(-84a)}{315c^{5/2}(\sqrt{a}+\sqrt{cx^2})}$$

[Out] $1/32*(-b*g+2*c*e)*(2*c*x^2+b)*(c*x^4+b*x^2+a)^{(3/2)}/c^2+1/63*x*(7*c*f*x^2+3*b*f+9*c*d)*(c*x^4+b*x^2+a)^{(3/2)}/c+1/10*g*(c*x^4+b*x^2+a)^{(5/2)}/c+3/512*(-4*a*c+b^2)^2*(-b*g+2*c*e)*\operatorname{arctanh}(1/2*(2*c*x^2+b)/c^{(1/2)})/(c*x^4+b*x^2+a)^{(1/2)}/c^{(7/2)}-3/256*(-4*a*c+b^2)*(-b*g+2*c*e)*(2*c*x^2+b)*(c*x^4+b*x^2+a)^{(1/2)}/c^3+1/315*x*(9*b^2*c*d+90*a*c^2*d-4*b^3*f+9*a*b*c*f+3*c*(14*a*c*f-4*b^2*f+9*b*c*d)*x^2)*(c*x^4+b*x^2+a)^{(1/2)}/c^2-1/315*(-84*a^2*c^2*f+57*a*b^2*c*f-144*a*b*c^2*d-8*b^4*f+18*b^3*c*d)*x*(c*x^4+b*x^2+a)^{(1/2)}/c^{(5/2)}/(a^{(1/2)}+x^2*c^{(1/2)})+1/315*a^{(1/4)}*(-84*a^2*c^2*f+57*a*b^2*c*f-144*a*b*c^2*d-8*b^4*f+18*b^3*c*d)*(\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))^2)^{(1/2)}/\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))*\operatorname{EllipticE}(\sin(2*\arctan(c^{(1/4)}*x/a^{(1/4)})),1/2*(2-b/a^{(1/2)}/c^{(1/2)})^{(1/2)}*(a^{(1/2)}+x^2*c^{(1/2)}))*((c*x^4+b*x^2+a)/(a^{(1/2)}+x^2*c^{(1/2)}))^2)^{(1/2)}/c^{(11/4)}/(c*x^4+b*x^2+a)^{(1/2)}-1/630*a^{(1/4)}*(\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))^2)^{(1/2)}/\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))*\operatorname{EllipticF}(\sin(2*\arctan(c^{(1/4)}*x/a^{(1/4)})),1/2*(2-b/a^{(1/2)}/c^{(1/2)})^{(1/2)}*(a^{(1/2)}+x^2*c^{(1/2)}))*((c*x^4+b*x^2+a)/(a^{(1/2)}+x^2*c^{(1/2)}))^2)^{(1/2)}/c^{(11/4)}/(c*x^4+b*x^2+a)^{(1/2)}$

Rubi [A] time = 0.60, antiderivative size = 717, normalized size of antiderivative = 1.00, number of steps used = 12, number of rules used = 10, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.312$, Rules used = {1673, 1176, 1197, 1103, 1195, 1247, 640, 612, 621, 206}

$$\frac{x\sqrt{a+bx^2+cx^4}(-84a^2c^2f+57ab^2cf-144abc^2d+18b^3cd-8b^4f)\sqrt[4]{a}(\sqrt{a}+\sqrt{cx^2})\sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{cx^2})^2}}(-84a)}{315c^{5/2}(\sqrt{a}+\sqrt{cx^2})}$$

Antiderivative was successfully verified.

[In] $\operatorname{Int}[(d + e*x + f*x^2 + g*x^3)*(a + b*x^2 + c*x^4)^{(3/2)}, x]$

[Out] $-((18*b^3*c*d - 144*a*b*c^2*d - 8*b^4*f + 57*a*b^2*c*f - 84*a^2*c^2*f)*x*\operatorname{Sqrt}[a + b*x^2 + c*x^4])/(315*c^{(5/2)}*(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)) - (3*(b^2 - 4*a*c)*(2*c*e - b*g)*(b + 2*c*x^2)*\operatorname{Sqrt}[a + b*x^2 + c*x^4])/(256*c^3) + (x*(9*b^2*c*d + 90*a*c^2*d - 4*b^3*f + 9*a*b*c*f + 3*c*(9*b*c*d - 4*b^2*f + 14*a$

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*c*f)*x^2)*Sqrt[a + b*x^2 + c*x^4]/(315*c^2) + ((2*c*e - b*g)*(b + 2*c*x^2)
)*(a + b*x^2 + c*x^4)^(3/2))/(32*c^2) + (x*(3*(3*c*d + b*f) + 7*c*f*x^2)*(a
+ b*x^2 + c*x^4)^(3/2))/(63*c) + (g*(a + b*x^2 + c*x^4)^(5/2))/(10*c) + (3
*(b^2 - 4*a*c)^2*(2*c*e - b*g)*ArcTanh[(b + 2*c*x^2)/(2*Sqrt[c]*Sqrt[a + b*
x^2 + c*x^4)]])/(512*c^(7/2)) + (a^(1/4)*(18*b^3*c*d - 144*a*b*c^2*d - 8*b^
4*f + 57*a*b^2*c*f - 84*a^2*c^2*f)*(Sqrt[a] + Sqrt[c]*x^2)*Sqrt[(a + b*x^2
+ c*x^4)/(Sqrt[a] + Sqrt[c]*x^2)^2]*EllipticE[2*ArcTan[(c^(1/4)*x)/a^(1/4)]
, (2 - b/(Sqrt[a]*Sqrt[c]))/4])/(315*c^(11/4)*Sqrt[a + b*x^2 + c*x^4]) - (a
^(1/4)*(18*b^3*c*d - 144*a*b*c^2*d - 8*b^4*f + 57*a*b^2*c*f - 84*a^2*c^2*f
+ Sqrt[a]*Sqrt[c]*(9*b^2*c*d - 180*a*c^2*d - 4*b^3*f + 24*a*b*c*f))*(Sqrt[a
] + Sqrt[c]*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(Sqrt[a] + Sqrt[c]*x^2)^2]*Ellipt
icF[2*ArcTan[(c^(1/4)*x)/a^(1/4)], (2 - b/(Sqrt[a]*Sqrt[c]))/4])/(630*c^(11
/4)*Sqrt[a + b*x^2 + c*x^4])

```

Rule 206

```

Int[((a_) + (b_.)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/
Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (Gt
Q[a, 0] || LtQ[b, 0])

```

Rule 612

```

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol] := Simp[((b + 2*c*x
)*(a + b*x + c*x^2)^p)/(2*c*(2*p + 1)), x] - Dist[(p*(b^2 - 4*a*c))/(2*c*(2
*p + 1)), Int[(a + b*x + c*x^2)^(p - 1), x], x] /; FreeQ[{a, b, c}, x] && N
eQ[b^2 - 4*a*c, 0] && GtQ[p, 0] && IntegerQ[4*p]

```

Rule 621

```

Int[1/Sqrt[(a_) + (b_.)*(x_) + (c_.)*(x_)^2], x_Symbol] := Dist[2, Subst[Int
[1/(4*c - x^2), x], x, (b + 2*c*x)/Sqrt[a + b*x + c*x^2]], x] /; FreeQ[{a,
b, c}, x] && NeQ[b^2 - 4*a*c, 0]

```

Rule 640

```

Int[((d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(p_), x_Symbol
] := Simp[(e*(a + b*x + c*x^2)^(p + 1))/(2*c*(p + 1)), x] + Dist[(2*c*d - b
*e)/(2*c), Int[(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e, p}, x]
&& NeQ[2*c*d - b*e, 0] && NeQ[p, -1]

```

Rule 1103

```

Int[1/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbol] := With[{q = Rt[c
/a, 4]}, Simp[((1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^2)^2)]*
EllipticF[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(2*q*Sqrt[a + b*x^2 + c*x^4])

```

), x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]

Rule 1176

Int[((d_) + (e_)*(x_)^2)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Simp[(x*(2*b*e*p + c*d*(4*p + 3) + c*e*(4*p + 1)*x^2)*(a + b*x^2 + c*x^4)^p)/(c*(4*p + 1)*(4*p + 3)), x] + Dist[(2*p)/(c*(4*p + 1)*(4*p + 3)), Int[Simp[2*a*c*d*(4*p + 3) - a*b*e + (2*a*c*e*(4*p + 1) + b*c*d*(4*p + 3) - b^2*e*(2*p + 1))*x^2, x]*(a + b*x^2 + c*x^4)^(p - 1), x], x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && GtQ[p, 0] && FractionQ[p] && IntegerQ[2*p]

Rule 1195

Int[((d_) + (e_)*(x_)^2)/Sqrt[(a_) + (b_)*(x_)^2 + (c_)*(x_)^4], x_Symbol] := With[{q = Rt[c/a, 4]}, -Simp[(d*x*Sqrt[a + b*x^2 + c*x^4])/(a*(1 + q^2*x^2)), x] + Simp[(d*(1 + q^2*x^2)*Sqrt[a + b*x^2 + c*x^4])/(a*(1 + q^2*x^2)^2)*EllipticE[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)]/(q*Sqrt[a + b*x^2 + c*x^4]), x] /; EqQ[e + d*q^2, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]

Rule 1197

Int[((d_) + (e_)*(x_)^2)/Sqrt[(a_) + (b_)*(x_)^2 + (c_)*(x_)^4], x_Symbol] := With[{q = Rt[c/a, 2]}, Dist[(e + d*q)/q, Int[1/Sqrt[a + b*x^2 + c*x^4], x], x] - Dist[e/q, Int[(1 - q*x^2)/Sqrt[a + b*x^2 + c*x^4], x], x] /; NeQ[e + d*q, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]

Rule 1247

Int[(x_)*((d_) + (e_)*(x_)^2)^(q_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]

Rule 1673

Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]

Rubi steps

$$\begin{aligned}
\int (d + ex + fx^2 + gx^3)(a + bx^2 + cx^4)^{3/2} dx &= \int (d + fx^2)(a + bx^2 + cx^4)^{3/2} dx + \int x(e + gx^2)(a + bx^2 + cx^4)^{3/2} dx \\
&= \frac{x(3(3cd + bf) + 7cfx^2)(a + bx^2 + cx^4)^{3/2}}{63c} + \frac{1}{2} \text{Subst}\left(\int (e + gx^2)(a + bx^2 + cx^4)^{3/2} dx, x, \sqrt{a + bx^2 + cx^4}\right) \\
&= \frac{x(9b^2cd + 90ac^2d - 4b^3f + 9abcf + 3c(9bcd - 4b^2f + 14acf))}{315c^2} \\
&= \frac{x(9b^2cd + 90ac^2d - 4b^3f + 9abcf + 3c(9bcd - 4b^2f + 14acf))}{315c^2} \\
&= -\frac{(18b^3cd - 144abc^2d - 8b^4f + 57ab^2cf - 84a^2c^2f)x\sqrt{a + bx^2 + cx^4}}{315c^{5/2}(\sqrt{a} + \sqrt{c}x^2)} \\
&= -\frac{(18b^3cd - 144abc^2d - 8b^4f + 57ab^2cf - 84a^2c^2f)x\sqrt{a + bx^2 + cx^4}}{315c^{5/2}(\sqrt{a} + \sqrt{c}x^2)} \\
&= -\frac{(18b^3cd - 144abc^2d - 8b^4f + 57ab^2cf - 84a^2c^2f)x\sqrt{a + bx^2 + cx^4}}{315c^{5/2}(\sqrt{a} + \sqrt{c}x^2)}
\end{aligned}$$

Mathematica [F] time = 0.00, size = 0, normalized size = 0.00

\$Aborted

Verification is Not applicable to the result.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)*(a + b*x^2 + c*x^4)^(3/2), x]

[Out] \$Aborted

fricas [F] time = 1.55, size = 0, normalized size = 0.00

integral((cgx^7 + cfx^6 + (ce + bg)x^5 + (cd + bf)x^4 + (be + ag)x^3 + aex + (bd + af)x^2 + ad)\sqrt{cx^4 + bx^2 + a}, x)

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^(3/2), x, algorithm="fricas")

[Out] integral((c*g*x^7 + c*f*x^6 + (c*e + b*g)*x^5 + (c*d + b*f)*x^4 + (b*e + a*g)*x^3 + a*e*x + (b*d + a*f)*x^2 + a*d)*sqrt(c*x^4 + b*x^2 + a), x)

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (cx^4 + bx^2 + a)^{\frac{3}{2}} (gx^3 + fx^2 + ex + d) dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^(3/2),x, algorithm="giac")

[Out] integrate((c*x^4 + b*x^2 + a)^(3/2)*(g*x^3 + f*x^2 + e*x + d), x)

maple [B] time = 0.02, size = 3038, normalized size = 4.24

output 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)*(c*x^4+b*x^2+a)^(3/2),x)

[Out]
$$\frac{1}{7}d*2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) / a)^{(1/2)} * (-2*(-b + (-4*a*c + b^2)^{(1/2)}) / a*x^2 + 4)^{(1/2)} * (2*(b + (-4*a*c + b^2)^{(1/2)}) / a*x^2 + 4)^{(1/2)} / (c*x^4 + b*x^2 + a)^{(1/2)} * \text{EllipticF}(1/2*2^{(1/2)} * ((-b + (-4*a*c + b^2)^{(1/2)}) / a)^{(1/2)} * x, 1/2 * (2*(b + (-4*a*c + b^2)^{(1/2)}) / a*b/c - 4)^{(1/2)}) * a^2 + 2/15*f*a^3*2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) / a)^{(1/2)} * (-2*(-b + (-4*a*c + b^2)^{(1/2)}) / a*x^2 + 4)^{(1/2)} * (2*(b + (-4*a*c + b^2)^{(1/2)}) / a*x^2 + 4)^{(1/2)} / (c*x^4 + b*x^2 + a)^{(1/2)} / (b + (-4*a*c + b^2)^{(1/2)}) * \text{EllipticE}(1/2*2^{(1/2)} * ((-b + (-4*a*c + b^2)^{(1/2)}) / a)^{(1/2)} * x, 1/2 * (2*(b + (-4*a*c + b^2)^{(1/2)}) / a*b/c - 4)^{(1/2)}) - 2/15*f*a^3*2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) / a)^{(1/2)} * (-2*(-b + (-4*a*c + b^2)^{(1/2)}) / a*x^2 + 4)^{(1/2)} * (2*(b + (-4*a*c + b^2)^{(1/2)}) / a*x^2 + 4)^{(1/2)} / (c*x^4 + b*x^2 + a)^{(1/2)} / (b + (-4*a*c + b^2)^{(1/2)}) * \text{EllipticF}(1/2*2^{(1/2)} * ((-b + (-4*a*c + b^2)^{(1/2)}) / a)^{(1/2)} * x, 1/2 * (2*(b + (-4*a*c + b^2)^{(1/2)}) / a*b/c - 4)^{(1/2)}) + 19/210*f*a^2*2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) / a)^{(1/2)} * (-2*(-b + (-4*a*c + b^2)^{(1/2)}) / a*x^2 + 4)^{(1/2)} * (2*(b + (-4*a*c + b^2)^{(1/2)}) / a*x^2 + 4)^{(1/2)} / (c*x^4 + b*x^2 + a)^{(1/2)} / (b + (-4*a*c + b^2)^{(1/2)}) / c*b^2 * \text{EllipticF}(1/2*2^{(1/2)} * ((-b + (-4*a*c + b^2)^{(1/2)}) / a)^{(1/2)} * x, 1/2 * (2*(b + (-4*a*c + b^2)^{(1/2)}) / a*b/c - 4)^{(1/2)}) - 4/315*f*a^2*2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) / a)^{(1/2)} * (-2*(-b + (-4*a*c + b^2)^{(1/2)}) / a*x^2 + 4)^{(1/2)} * (2*(b + (-4*a*c + b^2)^{(1/2)}) / a*x^2 + 4)^{(1/2)} / (c*x^4 + b*x^2 + a)^{(1/2)} / (b + (-4*a*c + b^2)^{(1/2)}) * b^4/c^2 * \text{EllipticF}(1/2*2^{(1/2)} * ((-b + (-4*a*c + b^2)^{(1/2)}) / a)^{(1/2)} * x, 1/2 * (2*(b + (-4*a*c + b^2)^{(1/2)}) / a*b/c - 4)^{(1/2)}) + 4/315*f*a^2*2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) / a)^{(1/2)} * (-2*(-b + (-4*a*c + b^2)^{(1/2)}) / a*x^2 + 4)^{(1/2)} * (2*(b + (-4*a*c + b^2)^{(1/2)}) / a*x^2 + 4)^{(1/2)} / (c*x^4 + b*x^2 + a)^{(1/2)} / (b + (-4*a*c + b^2)^{(1/2)}) * b^4/c^2 * \text{EllipticE}(1/2*2^{(1/2)} * ((-b + (-4*a*c + b^2)^{(1/2)}) / a)^{(1/2)} * x, 1/2 * (2*(b + (-4*a*c + b^2)^{(1/2)}) / a*b/c - 4)^{(1/2)}) + 1/35*d*a^2*2^{(1/2)} / ((-b + (-4*a*c + b^2)^{(1/2)}) / a)^{(1/2)} * (-2*(-b + (-4*a*c + b^2)^{(1/2)}) / a*x^2 + 4)^{(1/2)}$$

$$\begin{aligned}
&)^{1/2} * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} / (c * x^4 + b * x^2 + a)^{1/2} / (b + (-4 * a * c + b^2)^{1/2}) * b^3 / c * \text{EllipticF}(1/2 * 2^{1/2} * ((-b + (-4 * a * c + b^2)^{1/2})) / a)^{1/2} * x, 1/2 * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * b / c - 4)^{1/2} - 1/35 * d * a^2^{1/2} / ((-b + (-4 * a * c + b^2)^{1/2}) / a)^{1/2} * (-2 * (-b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} / (c * x^4 + b * x^2 + a)^{1/2} / (b + (-4 * a * c + b^2)^{1/2}) * b^3 / c * \text{EllipticE}(1/2 * 2^{1/2} * ((-b + (-4 * a * c + b^2)^{1/2})) / a)^{1/2} * x, 1/2 * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * b / c - 4)^{1/2} - 19/210 * f * a^2 * 2^{1/2} / ((-b + (-4 * a * c + b^2)^{1/2}) / a)^{1/2} * (-2 * (-b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} / (c * x^4 + b * x^2 + a)^{1/2} / (b + (-4 * a * c + b^2)^{1/2}) / c * b^2 * \text{EllipticE}(1/2 * 2^{1/2} * ((-b + (-4 * a * c + b^2)^{1/2})) / a)^{1/2} * x, 1/2 * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * b / c - 4)^{1/2} + 1/315 * f / c^2 * a^2^{1/2} / ((-b + (-4 * a * c + b^2)^{1/2}) / a)^{1/2} * (-2 * (-b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} / (c * x^4 + b * x^2 + a)^{1/2} * \text{EllipticF}(1/2 * 2^{1/2} * ((-b + (-4 * a * c + b^2)^{1/2})) / a)^{1/2} * x, 1/2 * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * b / c - 4)^{1/2} * b^3 - 1/140 * d * 2^{1/2} / ((-b + (-4 * a * c + b^2)^{1/2}) / a)^{1/2} * (-2 * (-b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} / (c * x^4 + b * x^2 + a)^{1/2} * \text{EllipticF}(1/2 * 2^{1/2} * ((-b + (-4 * a * c + b^2)^{1/2})) / a)^{1/2} * x, 1/2 * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * b / c - 4)^{1/2} * a / c * b^2 - 8/35 * d * a^2 * 2^{1/2} / ((-b + (-4 * a * c + b^2)^{1/2}) / a)^{1/2} * (-2 * (-b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} / (c * x^4 + b * x^2 + a)^{1/2} / (b + (-4 * a * c + b^2)^{1/2}) * b * \text{EllipticF}(1/2 * 2^{1/2} * ((-b + (-4 * a * c + b^2)^{1/2})) / a)^{1/2} * x, 1/2 * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * b / c - 4)^{1/2} + 8/35 * d * a^2 * 2^{1/2} / ((-b + (-4 * a * c + b^2)^{1/2}) / a)^{1/2} * (-2 * (-b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} / (c * x^4 + b * x^2 + a)^{1/2} / (b + (-4 * a * c + b^2)^{1/2}) * b * \text{EllipticE}(1/2 * 2^{1/2} * ((-b + (-4 * a * c + b^2)^{1/2})) / a)^{1/2} * x, 1/2 * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * b / c - 4)^{1/2} - 2/105 * f / c * a^2 * 2^{1/2} / ((-b + (-4 * a * c + b^2)^{1/2}) / a)^{1/2} * (-2 * (-b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * x^2 + 4)^{1/2} / (c * x^4 + b * x^2 + a)^{1/2} * \text{EllipticF}(1/2 * 2^{1/2} * ((-b + (-4 * a * c + b^2)^{1/2})) / a)^{1/2} * x, 1/2 * (2 * (b + (-4 * a * c + b^2)^{1/2})) / a * b / c - 4)^{1/2} * b + 3/64 * g * a * b^3 / c^{5/2} * \ln((c * x^2 + 1/2 * b) / c^{1/2} + (c * x^4 + b * x^2 + a)^{1/2}) - 5/64 * g * a * b^2 / c^2 * (c * x^4 + b * x^2 + a)^{1/2} + 8/105 * f / c * x * (c * x^4 + b * x^2 + a)^{1/2} * a * b + 7/160 * g * a * b * x^2 / c * (c * x^4 + b * x^2 + a)^{1/2} + 5/16 * e * a * x^2 * (c * x^4 + b * x^2 + a)^{1/2} - 3/128 * e * b^3 / c^2 * (c * x^4 + b * x^2 + a)^{1/2} + 3/256 * e * b^4 / c^{5/2} * \ln((c * x^2 + 1/2 * b) / c^{1/2} + (c * x^4 + b * x^2 + a)^{1/2}) - 3/512 * g * b^5 / c^{7/2} * \ln((c * x^2 + 1/2 * b) / c^{1/2} + (c * x^4 + b * x^2 + a)^{1/2}) + 1/10 * g * a^2 / c * (c * x^4 + b * x^2 + a)^{1/2} + 1/9 * f * c * x^7 * (c * x^4 + b * x^2 + a)^{1/2} + 10/63 * f * b * x^5 * (c * x^4 + b * x^2 + a)^{1/2} + 11/45 * f * x^3 * (c * x^4 + b * x^2 + a)^{1/2} * a + 3/16 * e * b * x^4 * (c * x^4 + b * x^2 + a)^{1/2} + 1/8 * e * c * x^6 * (c * x^4 + b * x^2 + a)^{1/2} + 3/16 * e * a^2 * \ln((c * x^2 + 1/2 * b) / c^{1/2} + (c * x^4 + b * x^2 + a)^{1/2}) / c^{1/2} + 1/7 * d * c * x^5 * (c * x^4 + b * x^2 + a)^{1/2} + 8/35 * d * b * x^3 * (c * x^4 + b * x^2 + a)^{1/2} + 3/7 * d * x * (c * x^4 + b * x^2 + a)^{1/2} * a + 1/5 * g * a * x^4 * (c * x^4 + b * x^2 + a)^{1/2} + 3/256 * g * b^4 / c^3 * (c * x^4 + b * x^2 + a)^{1/2} + 1/10 * g * c * x^8 * (c * x^4 + b * x^2 + a)^{1/2} + 11/80 * g * b * x^6 * (c * x^4 + b * x^2 + a)^{1/2} + 1/160 * g * b^2 * x^4 / c * (c * x^4 + b * x^2 + a)^{1/2} - 1/128 * g * b^3 / c^2 * x^2 * (c * x^4 + b * x^2 + a)^{1/2} - 3/32 * g * a^2 * b / c^{3/2} * \ln((c * x^2 + 1/2 * b) / c^{1/2} + (c * x^4 + b * x^2 + a)^{1/2}) - 3/32 * e * a * b^2 / c^{3/2} * \ln((c * x^2 + 1/2 * b) / c^{1/2} + (c * x^4 + b * x^2 + a)^{1/2}) + 1/35 * d / c * x * (c * x^4 + b * x^2 + a)^{1/2} * b^2 + 1/105 * f / c * x^3 * (c * x^4 + b * x^2 + a)^{1/2}
\end{aligned}$$

$/2)*b^2-4/315*f/c^2*x*(c*x^4+b*x^2+a)^{(1/2)}*b^3+1/64*e*b^2*x^2/c*(c*x^4+b*x^2+a)^{(1/2)}+5/32*e*a*b/c*(c*x^4+b*x^2+a)^{(1/2)}$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (cx^4 + bx^2 + a)^{\frac{3}{2}} (gx^3 + fx^2 + ex + d) dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^(3/2),x, algorithm="maxima")

[Out] integrate((c*x^4 + b*x^2 + a)^(3/2)*(g*x^3 + f*x^2 + e*x + d), x)

mupad [F] time = 0.00, size = -1, normalized size = -0.00

$$\int (cx^4 + bx^2 + a)^{3/2} (gx^3 + fx^2 + ex + d) dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a + b*x^2 + c*x^4)^(3/2)*(d + e*x + f*x^2 + g*x^3),x)

[Out] int((a + b*x^2 + c*x^4)^(3/2)*(d + e*x + f*x^2 + g*x^3), x)

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int (a + bx^2 + cx^4)^{\frac{3}{2}} (d + ex + fx^2 + gx^3) dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x**3+f*x**2+e*x+d)*(c*x**4+b*x**2+a)**(3/2),x)

[Out] Integral((a + b*x**2 + c*x**4)**(3/2)*(d + e*x + f*x**2 + g*x**3), x)

3.104 $\int (d + ex + fx^2 + gx^3) \sqrt{a + bx^2 + cx^4} dx$

Optimal. Leaf size=505

$$\frac{x\sqrt{a + bx^2 + cx^4} (6acf - 2b^2f + 5bcd) \sqrt[4]{a} (\sqrt{a} + \sqrt{c}x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{c}x^2)^2}} (6acf - 2b^2f + 5bcd) E\left(2 \tan^{-1}\left(\frac{\sqrt[4]{c}x}{\sqrt[4]{a}}\right)\right)}{15c^{3/2} (\sqrt{a} + \sqrt{c}x^2) 15c^{7/4} \sqrt{a + bx^2 + cx^4}}$$

[Out] $\frac{1}{6} g (c x^4 + b x^2 + a)^{3/2} / c - 1/32 (-4 a c + b^2) (-b g + 2 c e) \operatorname{arctanh}\left(\frac{1}{2} (2 c x^2 + b) / c^{1/2} / (c x^4 + b x^2 + a)^{1/2} / c^{5/2} + 1/16 (-b g + 2 c e) (2 c x^2 + b) (c x^4 + b x^2 + a)^{1/2} / c^2 + 1/15 x (3 c f x^2 + b f + 5 c d) (c x^4 + b x^2 + a)^{1/2} / c + 1/15 (6 a c f - 2 b^2 f + 5 b c d) x (c x^4 + b x^2 + a)^{1/2} / c^{3/2} / (a^{1/2} + x^2 c^{1/2}) - 1/15 a^{1/4} (6 a c f - 2 b^2 f + 5 b c d) (\cos(2 \arctan(c^{1/4} x / a^{1/4}))^2)^{1/2} / \cos(2 \arctan(c^{1/4} x / a^{1/4})) \operatorname{EllipticE}(\sin(2 \arctan(c^{1/4} x / a^{1/4})), 1/2 (2 - b/a^{1/2} / c^{1/2}))^{1/2} (a^{1/2} + x^2 c^{1/2})^{1/2} ((c x^4 + b x^2 + a) / (a^{1/2} + x^2 c^{1/2}))^{1/2} / c^{7/4} / (c x^4 + b x^2 + a)^{1/2} + 1/30 a^{1/4} (\cos(2 \arctan(c^{1/4} x / a^{1/4}))^2)^{1/2} / \cos(2 \arctan(c^{1/4} x / a^{1/4})) \operatorname{EllipticF}(\sin(2 \arctan(c^{1/4} x / a^{1/4})), 1/2 (2 - b/a^{1/2} / c^{1/2}))^{1/2} (a^{1/2} + x^2 c^{1/2}) (b + 2 a^{1/2} c^{1/2}) (5 c d - 2 b f + 3 f a^{1/2} c^{1/2}) ((c x^4 + b x^2 + a) / (a^{1/2} + x^2 c^{1/2}))^{1/2} / c^{7/4} / (c x^4 + b x^2 + a)^{1/2}\right)$

Rubi [A] time = 0.28, antiderivative size = 505, normalized size of antiderivative = 1.00, number of steps used = 10, number of rules used = 10, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.312$, Rules used = {1673, 1176, 1197, 1103, 1195, 1247, 640, 612, 621, 206}

$$\frac{x\sqrt{a + bx^2 + cx^4} (6acf - 2b^2f + 5bcd) \sqrt[4]{a} (\sqrt{a} + \sqrt{c}x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{c}x^2)^2}} (6acf - 2b^2f + 5bcd) E\left(2 \tan^{-1}\left(\frac{\sqrt[4]{c}x}{\sqrt[4]{a}}\right)\right)}{15c^{3/2} (\sqrt{a} + \sqrt{c}x^2) 15c^{7/4} \sqrt{a + bx^2 + cx^4}}$$

Antiderivative was successfully verified.

[In] $\text{Int}[(d + e*x + f*x^2 + g*x^3)*\text{Sqrt}[a + b*x^2 + c*x^4], x]$

[Out] $((5 b c d - 2 b^2 f + 6 a c f) x \sqrt{a + b x^2 + c x^4}) / (15 c^{3/2} (\sqrt{a} + \sqrt{c} x^2)) + ((2 c e - b g) (b + 2 c x^2) \sqrt{a + b x^2 + c x^4}) / (16 c^2) + (x (5 c d + b f + 3 c f x^2) \sqrt{a + b x^2 + c x^4}) / (15 c) + (g (a + b x^2 + c x^4)^{3/2}) / (6 c) - ((b^2 - 4 a c) (2 c e - b g) \operatorname{ArcTanh}\left(\frac{b + 2 c x^2}{2 \sqrt{c} \sqrt{a + b x^2 + c x^4}}\right)) / (32 c^{5/2}) - (a^{1/4} (5 b c d - 2 b^2 f + 6 a c f) (\sqrt{a} + \sqrt{c} x^2) \sqrt{(a + b x^2 + c x^4) / (\sqrt{a} + \sqrt{c} x^2)^2}) \operatorname{EllipticE}\left[2 \operatorname{ArcTan}\left[\frac{c^{1/4} x}{a^{1/4}}\right], \left(2 - \frac{b}{\sqrt{a} \sqrt{c}}\right) / 4\right] / (15 c^{7/4} \sqrt{a + b x^2 + c x^4}) + (a^{1/4} (6 a c f - 2 b^2 f + 5 b c d) x (c x^4 + b x^2 + a)^{1/2} / c^{3/2} / (a^{1/2} + x^2 c^{1/2}) - 1/15 a^{1/4} (6 a c f - 2 b^2 f + 5 b c d) (\cos(2 \arctan(c^{1/4} x / a^{1/4}))^2)^{1/2} / \cos(2 \arctan(c^{1/4} x / a^{1/4})) \operatorname{EllipticE}(\sin(2 \arctan(c^{1/4} x / a^{1/4})), 1/2 (2 - b/a^{1/2} / c^{1/2}))^{1/2} (a^{1/2} + x^2 c^{1/2})^{1/2} ((c x^4 + b x^2 + a) / (a^{1/2} + x^2 c^{1/2}))^{1/2} / c^{7/4} / (c x^4 + b x^2 + a)^{1/2} + 1/30 a^{1/4} (\cos(2 \arctan(c^{1/4} x / a^{1/4}))^2)^{1/2} / \cos(2 \arctan(c^{1/4} x / a^{1/4})) \operatorname{EllipticF}(\sin(2 \arctan(c^{1/4} x / a^{1/4})), 1/2 (2 - b/a^{1/2} / c^{1/2}))^{1/2} (a^{1/2} + x^2 c^{1/2}) (b + 2 a^{1/2} c^{1/2}) (5 c d - 2 b f + 3 f a^{1/2} c^{1/2}) ((c x^4 + b x^2 + a) / (a^{1/2} + x^2 c^{1/2}))^{1/2} / c^{7/4} / (c x^4 + b x^2 + a)^{1/2})$

$(b + 2\sqrt{a}\sqrt{c})(5cd - 2bf + 3\sqrt{a}\sqrt{c}f)(\sqrt{a} + \sqrt{c}x^2)\sqrt{a + bx^2 + cx^4}/(\sqrt{a} + \sqrt{c}x^2)^2 \text{EllipticF}[2 \text{ArcTan}[(c^{1/4}x)/a^{1/4}], (2 - b/(\sqrt{a}\sqrt{c}))/4]/(30c^{7/4}\sqrt{a + bx^2 + cx^4})$

Rule 206

$\text{Int}[(a_) + (b_)(x_)^2]^{-1}, x_Symbol] \rightarrow \text{Simp}[(1 \text{ArcTanh}[\text{Rt}[-b, 2]x]/\text{Rt}[a, 2])]/(\text{Rt}[a, 2]\text{Rt}[-b, 2]), x] /; \text{FreeQ}\{a, b\}, x \ \&\& \ \text{NegQ}[a/b] \ \&\& \ (\text{GtQ}[a, 0] \ || \ \text{LtQ}[b, 0])$

Rule 612

$\text{Int}[(a_) + (b_)(x_) + (c_)(x_)^2]^{(p_)}, x_Symbol] \rightarrow \text{Simp}[(b + 2cx)(a + bx + cx^2)^p/(2c(2p + 1)), x] - \text{Dist}[(p(b^2 - 4ac))/(2c(2p + 1)), \text{Int}[(a + bx + cx^2)^{p-1}, x], x] /; \text{FreeQ}\{a, b, c\}, x \ \&\& \ \text{NeQ}[b^2 - 4ac, 0] \ \&\& \ \text{GtQ}[p, 0] \ \&\& \ \text{IntegerQ}[4p]$

Rule 621

$\text{Int}[1/\sqrt{(a_) + (b_)(x_) + (c_)(x_)^2}], x_Symbol] \rightarrow \text{Dist}[2, \text{Subst}[\text{Int}[1/(4c - x^2), x], x, (b + 2cx)/\sqrt{a + bx + cx^2}], x] /; \text{FreeQ}\{a, b, c\}, x \ \&\& \ \text{NeQ}[b^2 - 4ac, 0]$

Rule 640

$\text{Int}[(d_) + (e_)(x_)]((a_) + (b_)(x_) + (c_)(x_)^2)^{(p_)}, x_Symbol] \rightarrow \text{Simp}[(e(a + bx + cx^2)^{p+1})/(2c(p + 1)), x] + \text{Dist}[(2cd - be)/(2c), \text{Int}[(a + bx + cx^2)^p, x], x] /; \text{FreeQ}\{a, b, c, d, e, p\}, x \ \&\& \ \text{NeQ}[2cd - be, 0] \ \&\& \ \text{NeQ}[p, -1]$

Rule 1103

$\text{Int}[1/\sqrt{(a_) + (b_)(x_)^2 + (c_)(x_)^4}], x_Symbol] \rightarrow \text{With}\{q = \text{Rt}[c/a, 4]\}, \text{Simp}[(1 + q^2x^2)\sqrt{a + bx^2 + cx^4}/(a(1 + q^2x^2)^2) \text{EllipticF}[2 \text{ArcTan}[qx], 1/2 - (bq^2)/(4c)]/(2q\sqrt{a + bx^2 + cx^4}), x] /; \text{FreeQ}\{a, b, c\}, x \ \&\& \ \text{NeQ}[b^2 - 4ac, 0] \ \&\& \ \text{PosQ}[c/a]$

Rule 1176

$\text{Int}[(d_) + (e_)(x_)^2]((a_) + (b_)(x_)^2 + (c_)(x_)^4)^{(p_)}, x_Symbol] \rightarrow \text{Simp}[(x(2be^p + cd(4p + 3) + ce(4p + 1)x^2)(a + bx^2 + cx^4)^p)/(c(4p + 1)(4p + 3)), x] + \text{Dist}[(2p)/(c(4p + 1)(4p + 3)), \text{Int}[\text{Simp}[2acd(4p + 3) - abe + (2ace(4p + 1) + bcd(4p + 3) - b^2e(2p + 1))x^2, x](a + bx^2 + cx^4)^{p-1}, x], x] /; \text{FreeQ}\{a, b, c, d, e\}, x \ \&\& \ \text{NeQ}[b^2 - 4ac, 0] \ \&\& \ \text{NeQ}[cd^2 - bde + ae^2, 0] \ \&\&$

GtQ[p, 0] && FractionQ[p] && IntegerQ[2*p]

Rule 1195

Int[((d_) + (e_)*(x_)^2)/Sqrt[(a_) + (b_)*(x_)^2 + (c_)*(x_)^4], x_Symbol] := With[{q = Rt[c/a, 4]}, -Simp[(d*x*Sqrt[a + b*x^2 + c*x^4])/(a*(1 + q^2*x^2)), x] + Simp[(d*(1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^2)^2)]*EllipticE[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(q*Sqrt[a + b*x^2 + c*x^4]), x] /; EqQ[e + d*q^2, 0] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]

Rule 1197

Int[((d_) + (e_)*(x_)^2)/Sqrt[(a_) + (b_)*(x_)^2 + (c_)*(x_)^4], x_Symbol] := With[{q = Rt[c/a, 2]}, Dist[(e + d*q)/q, Int[1/Sqrt[a + b*x^2 + c*x^4], x], x] - Dist[e/q, Int[(1 - q*x^2)/Sqrt[a + b*x^2 + c*x^4], x], x] /; NeQ[e + d*q, 0] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]

Rule 1247

Int[(x_)*((d_) + (e_)*(x_)^2)^(q_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]

Rule 1673

Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]

Rubi steps

$$\begin{aligned}
\int (d + ex + fx^2 + gx^3) \sqrt{a + bx^2 + cx^4} dx &= \int (d + fx^2) \sqrt{a + bx^2 + cx^4} dx + \int x(e + gx^2) \sqrt{a + bx^2 + cx^4} dx \\
&= \frac{x(5cd + bf + 3cfx^2) \sqrt{a + bx^2 + cx^4}}{15c} + \frac{1}{2} \text{Subst} \left(\int (e + gx) \sqrt{a + bx^2 + cx^4} dx, x, \sqrt{a + bx^2 + cx^4} \right) \\
&= \frac{x(5cd + bf + 3cfx^2) \sqrt{a + bx^2 + cx^4}}{15c} + \frac{g(a + bx^2 + cx^4)^{3/2}}{6c} + \frac{(2ce - bg)(b + 2cx^2) \sqrt{a + bx^2 + cx^4}}{16c^2} \\
&= \frac{(5bcd - 2b^2f + 6acf) x \sqrt{a + bx^2 + cx^4}}{15c^{3/2} (\sqrt{a} + \sqrt{c}x^2)} + \frac{(2ce - bg)(b + 2cx^2) \sqrt{a + bx^2 + cx^4}}{16c^2} \\
&= \frac{(5bcd - 2b^2f + 6acf) x \sqrt{a + bx^2 + cx^4}}{15c^{3/2} (\sqrt{a} + \sqrt{c}x^2)} + \frac{(2ce - bg)(b + 2cx^2) \sqrt{a + bx^2 + cx^4}}{16c^2} \\
&= \frac{(5bcd - 2b^2f + 6acf) x \sqrt{a + bx^2 + cx^4}}{15c^{3/2} (\sqrt{a} + \sqrt{c}x^2)} + \frac{(2ce - bg)(b + 2cx^2) \sqrt{a + bx^2 + cx^4}}{16c^2}
\end{aligned}$$

Mathematica [F] time = 0.00, size = 0, normalized size = 0.00

\$Aborted

Verification is Not applicable to the result.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)*Sqrt[a + b*x^2 + c*x^4], x]

[Out] \$Aborted

fricas [F] time = 1.51, size = 0, normalized size = 0.00

$$\text{integral} \left(\sqrt{cx^4 + bx^2 + a} (gx^3 + fx^2 + ex + d), x \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^(1/2), x, algorithm="fricas")

[Out] integral(sqrt(c*x^4 + b*x^2 + a)*(g*x^3 + f*x^2 + e*x + d), x)

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{cx^4 + bx^2 + a} (gx^3 + fx^2 + ex + d) dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^(1/2),x, algorithm="giac")

[Out] integrate(sqrt(c*x^4 + b*x^2 + a)*(g*x^3 + f*x^2 + e*x + d), x)

maple [B] time = 0.01, size = 1585, normalized size = 3.14

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)*(c*x^4+b*x^2+a)^(1/2),x)

[Out] $\frac{1}{6}g(c^2x^4+b^2x^2+a)^{3/2}/c - \frac{1}{8}g^2b/c^2x^2(c^2x^4+b^2x^2+a)^{1/2} - \frac{1}{16}g^2b^2/c^2(c^2x^4+b^2x^2+a)^{1/2} - \frac{1}{8}g^2b/c^3 \ln\left(\frac{c^2x^2+1/2b}{c}\right) + (c^2x^4+b^2x^2+a)^{1/2} \left[\frac{a+1/32g^2b^3/c^5}{c^5} \ln\left(\frac{c^2x^2+1/2b}{c}\right) + \frac{1}{15}f^2x^3(c^2x^4+b^2x^2+a)^{1/2} + \frac{1}{15}f^2b/c^2x(c^2x^4+b^2x^2+a)^{1/2} - \frac{1}{60}f^2b/c^2a^2(c^2x^4+b^2x^2+a)^{1/2} \right] / \left[(-b+(-4ac+b^2)^{1/2})/a \right]^{1/2} \left[-2(-b+(-4ac+b^2)^{1/2})/a^2x^2+4 \right]^{1/2} \left[2(b+(-4ac+b^2)^{1/2})/a^2x^2+4 \right]^{1/2} / (c^2x^4+b^2x^2+a)^{1/2} \left[\text{EllipticF}\left(\frac{1}{2}x^2, \frac{(-b+(-4ac+b^2)^{1/2})/a}{c^2x^4+b^2x^2+a}\right) \right]^{1/2} x, \frac{1}{2} \left[2(b+(-4ac+b^2)^{1/2})/ab/c-4 \right]^{1/2} - \frac{1}{5}f^2a^2(c^2x^4+b^2x^2+a)^{1/2} / \left[(-b+(-4ac+b^2)^{1/2})/a \right]^{1/2} \left[-2(-b+(-4ac+b^2)^{1/2})/a^2x^2+4 \right]^{1/2} \left[2(b+(-4ac+b^2)^{1/2})/a^2x^2+4 \right]^{1/2} / (c^2x^4+b^2x^2+a)^{1/2} / (b+(-4ac+b^2)^{1/2}) \right] \left[\text{EllipticF}\left(\frac{1}{2}x^2, \frac{(-b+(-4ac+b^2)^{1/2})/a}{c^2x^4+b^2x^2+a}\right) \right]^{1/2} x, \frac{1}{2} \left[2(b+(-4ac+b^2)^{1/2})/ab/c-4 \right]^{1/2} + \frac{1}{5}f^2a^2(c^2x^4+b^2x^2+a)^{1/2} / \left[(-b+(-4ac+b^2)^{1/2})/a \right]^{1/2} \left[-2(-b+(-4ac+b^2)^{1/2})/a^2x^2+4 \right]^{1/2} \left[2(b+(-4ac+b^2)^{1/2})/a^2x^2+4 \right]^{1/2} / (c^2x^4+b^2x^2+a)^{1/2} / (b+(-4ac+b^2)^{1/2}) \right] \left[\text{EllipticE}\left(\frac{1}{2}x^2, \frac{(-b+(-4ac+b^2)^{1/2})/a}{c^2x^4+b^2x^2+a}\right) \right]^{1/2} x, \frac{1}{2} \left[2(b+(-4ac+b^2)^{1/2})/ab/c-4 \right]^{1/2} + \frac{1}{4}e^2(c^2x^4+b^2x^2+a)^{1/2} + \frac{1}{8}e/c^2(c^2x^4+b^2x^2+a)^{1/2} \left[b + \frac{1}{4}e/c \right] \ln\left(\frac{c^2x^2+1/2b}{c}\right) + (c^2x^4+b^2x^2+a)^{1/2} \left[\frac{a-1/16e/c^3}{c^3} \ln\left(\frac{c^2x^2+1/2b}{c}\right) + \frac{b^2+1/3d^2x^2}{c^2} (c^2x^4+b^2x^2+a)^{1/2} + \frac{1}{6}d^2a^2 \right] / \left[(-b+(-4ac+b^2)^{1/2})/a \right]^{1/2} \left[-2(-b+(-4ac+b^2)^{1/2})/a^2x^2+4 \right]^{1/2} \left[2(b+(-4ac+b^2)^{1/2})/a^2x^2+4 \right]^{1/2} / (c^2x^4+b^2x^2+a)^{1/2} / (b+(-4ac+b^2)^{1/2}) \right] \left[\text{EllipticE}\left(\frac{1}{2}x^2, \frac{(-b+(-4ac+b^2)^{1/2})/a}{c^2x^4+b^2x^2+a}\right) \right]^{1/2} x, \frac{1}{2} \left[2(b+(-4ac+b^2)^{1/2})/ab/c-4 \right]^{1/2} + \frac{1}{4}e^2(c^2x^4+b^2x^2+a)^{1/2} + \frac{1}{8}e/c^2(c^2x^4+b^2x^2+a)^{1/2} \left[b + \frac{1}{4}e/c \right] \ln\left(\frac{c^2x^2+1/2b}{c}\right) + (c^2x^4+b^2x^2+a)^{1/2} \left[\frac{a-1/16e/c^3}{c^3} \ln\left(\frac{c^2x^2+1/2b}{c}\right) + \frac{b^2+1/3d^2x^2}{c^2} (c^2x^4+b^2x^2+a)^{1/2} + \frac{1}{6}d^2a^2 \right] / \left[(-b+(-4ac+b^2)^{1/2})/a \right]^{1/2} \left[-2(-b+(-4ac+b^2)^{1/2})/a^2x^2+4 \right]^{1/2} \left[2(b+(-4ac+b^2)^{1/2})/a^2x^2+4 \right]^{1/2} / (c^2x^4+b^2x^2+a)^{1/2} / (b+(-4ac+b^2)^{1/2}) \right]$

$$2+4)^{(1/2)} * (2 * (b + (-4 * a * c + b^2)^{(1/2)}) / a * x^2 + 4)^{(1/2)} / (c * x^4 + b * x^2 + a)^{(1/2)} * \text{EllipticF}(1/2 * 2^{(1/2)} * ((-b + (-4 * a * c + b^2)^{(1/2)}) / a)^{(1/2)} * x, 1/2 * (2 * (b + (-4 * a * c + b^2)^{(1/2)}) / a * b / c - 4)^{(1/2)}) - 1/6 * d * b * a * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) / a)^{(1/2)} * (-2 * (-b + (-4 * a * c + b^2)^{(1/2)}) / a * x^2 + 4)^{(1/2)} * (2 * (b + (-4 * a * c + b^2)^{(1/2)}) / a * x^2 + 4)^{(1/2)} / (c * x^4 + b * x^2 + a)^{(1/2)} / (b + (-4 * a * c + b^2)^{(1/2)}) * \text{EllipticF}(1/2 * 2^{(1/2)} * ((-b + (-4 * a * c + b^2)^{(1/2)}) / a)^{(1/2)} * x, 1/2 * (2 * (b + (-4 * a * c + b^2)^{(1/2)}) / a * b / c - 4)^{(1/2)}) + 1/6 * d * b * a * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) / a)^{(1/2)} * (-2 * (-b + (-4 * a * c + b^2)^{(1/2)}) / a * x^2 + 4)^{(1/2)} * (2 * (b + (-4 * a * c + b^2)^{(1/2)}) / a * x^2 + 4)^{(1/2)} / (c * x^4 + b * x^2 + a)^{(1/2)} / (b + (-4 * a * c + b^2)^{(1/2)}) * \text{EllipticE}(1/2 * 2^{(1/2)} * ((-b + (-4 * a * c + b^2)^{(1/2)}) / a)^{(1/2)} * x, 1/2 * (2 * (b + (-4 * a * c + b^2)^{(1/2)}) / a * b / c - 4)^{(1/2)})$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{cx^4 + bx^2 + a} (gx^3 + fx^2 + ex + d) dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^(1/2),x, algorithm="maxima")

[Out] integrate(sqrt(c*x^4 + b*x^2 + a)*(g*x^3 + f*x^2 + e*x + d), x)

mupad [F] time = 0.00, size = -1, normalized size = -0.00

$$\int \sqrt{cx^4 + bx^2 + a} (gx^3 + fx^2 + ex + d) dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((a + b*x^2 + c*x^4)^(1/2)*(d + e*x + f*x^2 + g*x^3),x)

[Out] int((a + b*x^2 + c*x^4)^(1/2)*(d + e*x + f*x^2 + g*x^3), x)

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \sqrt{a + bx^2 + cx^4} (d + ex + fx^2 + gx^3) dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x**3+f*x**2+e*x+d)*(c*x**4+b*x**2+a)**(1/2),x)

[Out] Integral(sqrt(a + b*x**2 + c*x**4)*(d + e*x + f*x**2 + g*x**3), x)

$$3.105 \quad \int \frac{d+ex+fx^2+gx^3}{\sqrt{a+bx^2+cx^4}} dx$$

Optimal. Leaf size=359

$$\frac{\sqrt[4]{a} (\sqrt{a} + \sqrt{c} x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{c}x^2)^2}} \left(\frac{\sqrt{c}d}{\sqrt{a}} + f \right) F\left(2 \tan^{-1}\left(\frac{\sqrt[4]{c}x}{\sqrt[4]{a}}\right) \middle| \frac{1}{4}\left(2 - \frac{b}{\sqrt{a}\sqrt{c}}\right)\right)}{2c^{3/4}\sqrt{a+bx^2+cx^4}} + \frac{(2ce - bg) \tanh^{-1}\left(\frac{b+2cx^2}{2\sqrt{c}\sqrt{a+bx^2+cx^4}}\right)}{4c^{3/2}}$$

[Out] 1/4*(-b*g+2*c*e)*arctanh(1/2*(2*c*x^2+b)/c^(1/2)/(c*x^4+b*x^2+a)^(1/2))/c^(3/2)+1/2*g*(c*x^4+b*x^2+a)^(1/2)/c+f*x*(c*x^4+b*x^2+a)^(1/2)/c^(1/2)/(a^(1/2)+x^2*c^(1/2))-a^(1/4)*f*(cos(2*arctan(c^(1/4)*x/a^(1/4)))^2)^(1/2)/cos(2*arctan(c^(1/4)*x/a^(1/4)))*EllipticE(sin(2*arctan(c^(1/4)*x/a^(1/4))),1/2*(2-b/a^(1/2)/c^(1/2))^1/2)*(a^(1/2)+x^2*c^(1/2))*((c*x^4+b*x^2+a)/(a^(1/2)+x^2*c^(1/2))^2)^(1/2)/c^(3/4)/(c*x^4+b*x^2+a)^(1/2)+1/2*a^(1/4)*(cos(2*arctan(c^(1/4)*x/a^(1/4)))^2)^(1/2)/cos(2*arctan(c^(1/4)*x/a^(1/4)))*EllipticF(sin(2*arctan(c^(1/4)*x/a^(1/4))),1/2*(2-b/a^(1/2)/c^(1/2))^1/2)*(a^(1/2)+x^2*c^(1/2))*((c*x^4+b*x^2+a)/(a^(1/2)+x^2*c^(1/2))^2)^(1/2)/c^(3/4)/(c*x^4+b*x^2+a)^(1/2)

Rubi [A] time = 0.16, antiderivative size = 359, normalized size of antiderivative = 1.00, number of steps used = 8, number of rules used = 8, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {1673, 1197, 1103, 1195, 1247, 640, 621, 206}

$$\frac{\sqrt[4]{a} (\sqrt{a} + \sqrt{c} x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{c}x^2)^2}} \left(\frac{\sqrt{c}d}{\sqrt{a}} + f \right) F\left(2 \tan^{-1}\left(\frac{\sqrt[4]{c}x}{\sqrt[4]{a}}\right) \middle| \frac{1}{4}\left(2 - \frac{b}{\sqrt{a}\sqrt{c}}\right)\right)}{2c^{3/4}\sqrt{a+bx^2+cx^4}} + \frac{(2ce - bg) \tanh^{-1}\left(\frac{b+2cx^2}{2\sqrt{c}\sqrt{a+bx^2+cx^4}}\right)}{4c^{3/2}}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3)/Sqrt[a + b*x^2 + c*x^4],x]

[Out] (g*Sqrt[a + b*x^2 + c*x^4])/(2*c) + (f*x*Sqrt[a + b*x^2 + c*x^4])/(Sqrt[c]*(Sqrt[a] + Sqrt[c]*x^2)) + ((2*c*e - b*g)*ArcTanh[(b + 2*c*x^2)/(2*Sqrt[c]*Sqrt[a + b*x^2 + c*x^4])])/(4*c^(3/2)) - (a^(1/4)*f*(Sqrt[a] + Sqrt[c]*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(Sqrt[a] + Sqrt[c]*x^2)^2]*EllipticE[2*ArcTan[(c^(1/4)*x)/a^(1/4)], (2 - b/(Sqrt[a]*Sqrt[c]))/4])/(c^(3/4)*Sqrt[a + b*x^2 + c*x^4]) + (a^(1/4)*((Sqrt[c]*d)/Sqrt[a] + f)*(Sqrt[a] + Sqrt[c]*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(Sqrt[a] + Sqrt[c]*x^2)^2]*EllipticF[2*ArcTan[(c^(1/4)*x)/a^(1/4)], (2 - b/(Sqrt[a]*Sqrt[c]))/4])/(2*c^(3/4)*Sqrt[a + b*x^2 + c*x^4])

Rule 206

Int[((a_) + (b_)*(x_)^2)^(-1), x_Symbol] := Simp[(1*ArcTanh[(Rt[-b, 2]*x)/Rt[a, 2]])/(Rt[a, 2]*Rt[-b, 2]), x] /; FreeQ[{a, b}, x] && NegQ[a/b] && (GtQ[a, 0] || LtQ[b, 0])

Rule 621

Int[1/Sqrt[(a_) + (b_)*(x_) + (c_)*(x_)^2], x_Symbol] := Dist[2, Subst[Int[1/(4*c - x^2), x], x, (b + 2*c*x)/Sqrt[a + b*x + c*x^2]], x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 640

Int[((d_) + (e_)*(x_))*((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol] := Simp[(e*(a + b*x + c*x^2)^(p + 1))/(2*c*(p + 1)), x] + Dist[(2*c*d - b*e)/(2*c), Int[(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c, d, e, p}, x] && NeQ[2*c*d - b*e, 0] && NeQ[p, -1]

Rule 1103

Int[1/Sqrt[(a_) + (b_)*(x_)^2 + (c_)*(x_)^4], x_Symbol] := With[{q = Rt[c/a, 4]}, Simp[((1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^2)^2)]*EllipticF[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(2*q*Sqrt[a + b*x^2 + c*x^4]), x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]

Rule 1195

Int[((d_) + (e_)*(x_)^2)/Sqrt[(a_) + (b_)*(x_)^2 + (c_)*(x_)^4], x_Symbol] := With[{q = Rt[c/a, 4]}, -Simp[(d*x*Sqrt[a + b*x^2 + c*x^4])/(a*(1 + q^2*x^2)), x] + Simp[(d*(1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^2)^2)]*EllipticE[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(q*Sqrt[a + b*x^2 + c*x^4]), x] /; EqQ[e + d*q^2, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]

Rule 1197

Int[((d_) + (e_)*(x_)^2)/Sqrt[(a_) + (b_)*(x_)^2 + (c_)*(x_)^4], x_Symbol] := With[{q = Rt[c/a, 2]}, Dist[(e + d*q)/q, Int[1/Sqrt[a + b*x^2 + c*x^4], x], x] - Dist[e/q, Int[(1 - q*x^2)/Sqrt[a + b*x^2 + c*x^4], x], x] /; NeQ[e + d*q, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]

Rule 1247

Int[(x_)*((d_) + (e_)*(x_)^2)^(q_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],

$x, x^2], x] /; \text{FreeQ}\{a, b, c, d, e, p, q\}, x]$

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3}{\sqrt{a + bx^2 + cx^4}} dx &= \int \frac{d + fx^2}{\sqrt{a + bx^2 + cx^4}} dx + \int \frac{x(e + gx^2)}{\sqrt{a + bx^2 + cx^4}} dx \\ &= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{\sqrt{a + bx + cx^2}} dx, x, x^2 \right) - \frac{(\sqrt{a} f) \int \frac{1 - \frac{\sqrt{c}x^2}{\sqrt{a}}}{\sqrt{a + bx^2 + cx^4}} dx}{\sqrt{c}} + \left(d + \frac{\sqrt{a} f}{\sqrt{c}} \right) \int \frac{1}{\sqrt{a + bx^2 + cx^4}} dx \\ &= \frac{g\sqrt{a + bx^2 + cx^4}}{2c} + \frac{fx\sqrt{a + bx^2 + cx^4}}{\sqrt{c}(\sqrt{a} + \sqrt{c}x^2)} - \frac{\sqrt[4]{a} f (\sqrt{a} + \sqrt{c}x^2) \sqrt{\frac{a + bx^2 + cx^4}{(\sqrt{a} + \sqrt{c}x^2)^2}} E \left(2 \tan^{-1} \left(\frac{\sqrt{a + bx^2 + cx^4}}{\sqrt{a} + \sqrt{c}x^2} \right) \right)}{c^{3/4} \sqrt{a + bx^2 + cx^4}} \\ &= \frac{g\sqrt{a + bx^2 + cx^4}}{2c} + \frac{fx\sqrt{a + bx^2 + cx^4}}{\sqrt{c}(\sqrt{a} + \sqrt{c}x^2)} - \frac{\sqrt[4]{a} f (\sqrt{a} + \sqrt{c}x^2) \sqrt{\frac{a + bx^2 + cx^4}{(\sqrt{a} + \sqrt{c}x^2)^2}} E \left(2 \tan^{-1} \left(\frac{\sqrt{a + bx^2 + cx^4}}{\sqrt{a} + \sqrt{c}x^2} \right) \right)}{c^{3/4} \sqrt{a + bx^2 + cx^4}} \\ &= \frac{g\sqrt{a + bx^2 + cx^4}}{2c} + \frac{fx\sqrt{a + bx^2 + cx^4}}{\sqrt{c}(\sqrt{a} + \sqrt{c}x^2)} + \frac{(2ce - bg) \tanh^{-1} \left(\frac{b + 2cx^2}{2\sqrt{c} \sqrt{a + bx^2 + cx^4}} \right)}{4c^{3/2}} - \frac{\sqrt[4]{a} f}{c^{3/4} \sqrt{a + bx^2 + cx^4}} \end{aligned}$$

Mathematica [C] time = 1.38, size = 526, normalized size = 1.47

$$\frac{-i\sqrt{2}\sqrt{c}\sqrt{\frac{-\sqrt{b^2-4ac}+b+2cx^2}{b-\sqrt{b^2-4ac}}}\sqrt{\frac{\sqrt{b^2-4ac}+b+2cx^2}{\sqrt{b^2-4ac}+b}}\left(f\left(\sqrt{b^2-4ac}-b\right)+2cd\right)F\left(i\sinh^{-1}\left(\sqrt{2}\sqrt{\frac{c}{b+\sqrt{b^2-4ac}}}\right)x\right)}{b-\sqrt{b^2-4ac}}$$

Antiderivative was successfully verified.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)/Sqrt[a + b*x^2 + c*x^4], x]

[Out] (I*Sqrt[2]*Sqrt[c]*(-b + Sqrt[b^2 - 4*a*c])*f*Sqrt[(b - Sqrt[b^2 - 4*a*c] + 2*c*x^2)/(b - Sqrt[b^2 - 4*a*c]))*Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x^2)/(b + Sqrt[b^2 - 4*a*c])]*EllipticE[I*ArcSinh[Sqrt[2]*Sqrt[c]/(b + Sqrt[b^2 - 4*a*c])]*x], (b + Sqrt[b^2 - 4*a*c])/(b - Sqrt[b^2 - 4*a*c]) - I*Sqrt[2]*Sqrt[c]*(2*c*d + (-b + Sqrt[b^2 - 4*a*c])*f)*Sqrt[(b - Sqrt[b^2 - 4*a*c] + 2*c*x^2)/(b - Sqrt[b^2 - 4*a*c])]*Sqrt[(b + Sqrt[b^2 - 4*a*c] + 2*c*x^2)/(b + Sqrt[b^2 - 4*a*c])]*EllipticF[I*ArcSinh[Sqrt[2]*Sqrt[c]/(b + Sqrt[b^2 - 4*a*c])]*x], (b + Sqrt[b^2 - 4*a*c])/(b - Sqrt[b^2 - 4*a*c]) + Sqrt[c]/(b + Sqrt[b^2 - 4*a*c])*(2*Sqrt[c]*g*(a + b*x^2 + c*x^4) + (2*c*e - b*g)*Sqrt[a + b*x^2 + c*x^4]*Log[b + 2*c*x^2 + 2*Sqrt[c]*Sqrt[a + b*x^2 + c*x^4]]))/(4*c^(3/2)*Sqrt[c]/(b + Sqrt[b^2 - 4*a*c]))*Sqrt[a + b*x^2 + c*x^4]

fricas [F] time = 0.98, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{gx^3 + fx^2 + ex + d}{\sqrt{cx^4 + bx^2 + a}}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(1/2), x, algorithm="fricas")

[Out] integral((g*x^3 + f*x^2 + e*x + d)/sqrt(c*x^4 + b*x^2 + a), x)

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{gx^3 + fx^2 + ex + d}{\sqrt{cx^4 + bx^2 + a}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(1/2), x, algorithm="giac")

[Out] integrate((g*x^3 + f*x^2 + e*x + d)/sqrt(c*x^4 + b*x^2 + a), x)

maple [A] time = 0.01, size = 453, normalized size = 1.26

$$\frac{\sqrt{2} \sqrt{-\frac{2(-b + \sqrt{-4ac + b^2})x^2}{a} + 4} \sqrt{\frac{2(b + \sqrt{-4ac + b^2})x^2}{a} + 4} \left(-\text{EllipticE}\left(\frac{\sqrt{2} \sqrt{\frac{-b + \sqrt{-4ac + b^2}}{a}}}{2} x, \sqrt{\frac{2(b + \sqrt{-4ac + b^2})b}{ac} - 4}\right) + \text{EllipticE}\left(\frac{\sqrt{2} \sqrt{\frac{-b + \sqrt{-4ac + b^2}}{a}}}{2} x, \sqrt{\frac{2(b + \sqrt{-4ac + b^2})b}{ac} - 4}\right) \right)}{2 \sqrt{\frac{-b + \sqrt{-4ac + b^2}}{a}} \sqrt{cx^4 + bx^2 + a} (b + \sqrt{-4ac + b^2})}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(1/2),x)`

[Out] $\frac{1}{2}g(c^2x^4+bx^2+a)^{1/2}/c - \frac{1}{4}g^2b/c^{3/2} \ln\left(\frac{c^2x^2+1/2b}{c}\right)^{1/2} + (c^2x^4+bx^2+a)^{1/2} - \frac{1}{2}fa^2^{1/2}/\left(\frac{-b+(-4ac+b^2)^{1/2}}{a}\right)^{1/2} \cdot (-2(-b+(-4ac+b^2)^{1/2})/ax^2+4)^{1/2} \cdot (2(b+(-4ac+b^2)^{1/2})/ax^2+4)^{1/2} / (c^2x^4+bx^2+a)^{1/2} / (b+(-4ac+b^2)^{1/2}) \cdot (\text{EllipticF}(1/2, 2^{1/2}) \cdot ((-b+(-4ac+b^2)^{1/2})/a)^{1/2} \cdot x, 1/2 \cdot (2(b+(-4ac+b^2)^{1/2})/ab/c-4)^{1/2}) - \text{EllipticE}(1/2, 2^{1/2}) \cdot ((-b+(-4ac+b^2)^{1/2})/a)^{1/2} \cdot x, 1/2 \cdot (2(b+(-4ac+b^2)^{1/2})/ab/c-4)^{1/2}) + 1/2e \ln\left(\frac{c^2x^2+1/2b}{c}\right)^{1/2} + (c^2x^4+bx^2+a)^{1/2} / c^{1/2} + 1/4d \cdot 2^{1/2} / \left(\frac{-b+(-4ac+b^2)^{1/2}}{a}\right)^{1/2} \cdot (-2(-b+(-4ac+b^2)^{1/2})/ax^2+4)^{1/2} \cdot (2(b+(-4ac+b^2)^{1/2})/ax^2+4)^{1/2} / (c^2x^4+bx^2+a)^{1/2} \cdot \text{EllipticF}(1/2, 2^{1/2}) \cdot ((-b+(-4ac+b^2)^{1/2})/a)^{1/2} \cdot x, 1/2 \cdot (2(b+(-4ac+b^2)^{1/2})/ab/c-4)^{1/2})$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{gx^3 + fx^2 + ex + d}{\sqrt{cx^4 + bx^2 + a}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(1/2),x, algorithm="maxima")`

[Out] `integrate((g*x^3 + f*x^2 + e*x + d)/sqrt(c*x^4 + b*x^2 + a), x)`

mupad [F] time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{gx^3 + fx^2 + ex + d}{\sqrt{cx^4 + bx^2 + a}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(1/2),x)`

[Out] `int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(1/2), x)`

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{d + ex + fx^2 + gx^3}{\sqrt{a + bx^2 + cx^4}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**(1/2),x)`

[Out] `Integral((d + e*x + f*x**2 + g*x**3)/sqrt(a + b*x**2 + c*x**4), x)`

$$3.106 \quad \int \frac{d+ex+fx^2+gx^3}{(a+bx^2+cx^4)^{3/2}} dx$$

Optimal. Leaf size=447

$$\frac{\sqrt[4]{c} (\sqrt{a} + \sqrt{c} x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{c}x^2)^2}} (bd - 2af) E\left(2 \tan^{-1}\left(\frac{\sqrt[4]{c}x}{\sqrt{a}}\right) \middle| \frac{1}{4}\left(2 - \frac{b}{\sqrt{a}\sqrt{c}}\right)\right) (\sqrt{a} + \sqrt{c} x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{c}x^2)^2}} (\sqrt{c} d)}{a^{3/4} (b^2 - 4ac) \sqrt{a + bx^2 + cx^4} \quad 2a^{3/4} \sqrt[4]{c} (b - 2\sqrt{c})}$$

[Out] $x*(b^2*d-2*a*c*d-a*b*f+c*(-2*a*f+b*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^(1/2)+(-b*e+2*a*g-(-b*g+2*c*e)*x^2)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^(1/2)-(-2*a*f+b*d)*x*c^(1/2)*(c*x^4+b*x^2+a)^(1/2)/a/(-4*a*c+b^2)/(a^(1/2)+x^2*c^(1/2))+c^(1/4)*(-2*a*f+b*d)*(cos(2*arctan(c^(1/4)*x/a^(1/4)))^2)^(1/2)/cos(2*arctan(c^(1/4)*x/a^(1/4)))*EllipticE(sin(2*arctan(c^(1/4)*x/a^(1/4))),1/2*(2-b/a^(1/2)/c^(1/2))^(1/2))*(a^(1/2)+x^2*c^(1/2))*((c*x^4+b*x^2+a)/(a^(1/2)+x^2*c^(1/2)))^(1/2)/a^(3/4)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^(1/2)-1/2*(cos(2*arctan(c^(1/4)*x/a^(1/4)))^2)^(1/2)/cos(2*arctan(c^(1/4)*x/a^(1/4)))*EllipticF(sin(2*arctan(c^(1/4)*x/a^(1/4))),1/2*(2-b/a^(1/2)/c^(1/2))^(1/2))*(-f*a^(1/2)+d*c^(1/2))*(a^(1/2)+x^2*c^(1/2))*((c*x^4+b*x^2+a)/(a^(1/2)+x^2*c^(1/2)))^(1/2)/a^(3/4)/c^(1/4)/(-2*a^(1/2)*c^(1/2)+b)/(c*x^4+b*x^2+a)^(1/2)$

Rubi [A] time = 0.27, antiderivative size = 447, normalized size of antiderivative = 1.00, number of steps used = 7, number of rules used = 7, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.219$, Rules used = {1673, 1178, 1197, 1103, 1195, 1247, 636}

$$\frac{\sqrt[4]{c} (\sqrt{a} + \sqrt{c} x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{c}x^2)^2}} (bd - 2af) E\left(2 \tan^{-1}\left(\frac{\sqrt[4]{c}x}{\sqrt{a}}\right) \middle| \frac{1}{4}\left(2 - \frac{b}{\sqrt{a}\sqrt{c}}\right)\right) (\sqrt{a} + \sqrt{c} x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{c}x^2)^2}} (\sqrt{c} d)}{a^{3/4} (b^2 - 4ac) \sqrt{a + bx^2 + cx^4} \quad 2a^{3/4} \sqrt[4]{c} (b - 2\sqrt{c})}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(3/2), x]

[Out] $(x*(b^2*d - 2*a*c*d - a*b*f + c*(b*d - 2*a*f)*x^2))/(a*(b^2 - 4*a*c)*\text{Sqrt}[a + b*x^2 + c*x^4]) - (b*e - 2*a*g + (2*c*e - b*g)*x^2)/((b^2 - 4*a*c)*\text{Sqrt}[a + b*x^2 + c*x^4]) - (\text{Sqrt}[c]*(b*d - 2*a*f)*x*\text{Sqrt}[a + b*x^2 + c*x^4])/(a*(b^2 - 4*a*c)*(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)) + (c^(1/4)*(b*d - 2*a*f)*(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)*\text{Sqrt}[(a + b*x^2 + c*x^4)/(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)]^2*\text{EllipticE}[2*\text{ArcTan}[(c^(1/4)*x)/a^(1/4)], (2 - b/(\text{Sqrt}[a]*\text{Sqrt}[c]))/4])/(a^(3/4)*(b^2 - 4*a*c)*\text{Sqrt}[a + b*x^2 + c*x^4]) - ((\text{Sqrt}[c]*d - \text{Sqrt}[a]*f)*(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)*\text{Sqrt}[(a + b*x^2 + c*x^4)/(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)]^2*\text{EllipticF}[2*\text{ArcTan}[(c^(1/4)*x)/a^(1/4)], (2 - b/(\text{Sqrt}[a]*\text{Sqrt}[c]))/4])/(2*a^(3/4)*(b - 2*\text{Sqrt}[a]*\text{Sqrt}[c])*c^(1/4)*\text{Sqrt}[a + b*x^2 + c*x^4])$

Rule 636

```
Int[((d_.) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(3/2), x_Symbol]
:= Simp[(-2*(b*d - 2*a*e + (2*c*d - b*e)*x))/((b^2 - 4*a*c)*Sqrt[a + b*x
+ c*x^2]), x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b
^2 - 4*a*c, 0]
```

Rule 1103

```
Int[1/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbol] := With[{q = Rt[c
/a, 4]}, Simp[((1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^2)^2)]*
EllipticF[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(2*q*Sqrt[a + b*x^2 + c*x^4]
), x]] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]
```

Rule 1178

```
Int[((d_) + (e_.)*(x_)^2)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol]
:= Simp[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 +
c*x^4)^(p + 1))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + Dist[1/(2*a*(p + 1)*(b^2
- 4*a*c)), Int[Simp[(2*p + 3)*d*b^2 - a*b*e - 2*a*c*d*(4*p + 5) + (4*p + 7
)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^(p + 1), x], x] /; FreeQ[{a,
b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] &&
LtQ[p, -1] && IntegerQ[2*p]
```

Rule 1195

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbol]
:= With[{q = Rt[c/a, 4]}, -Simp[(d*x*Sqrt[a + b*x^2 + c*x^4])/((a*(1 + q^
2*x^2)), x] + Simp[(d*(1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^
2)^2)]*EllipticE[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)]/(q*Sqrt[a + b*x^2 + c
*x^4]), x] /; EqQ[e + d*q^2, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 -
4*a*c, 0] && PosQ[c/a]
```

Rule 1197

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbol]
:= With[{q = Rt[c/a, 2]}, Dist[(e + d*q)/q, Int[1/Sqrt[a + b*x^2 + c*x^4]
], x], x] - Dist[e/q, Int[(1 - q*x^2)/Sqrt[a + b*x^2 + c*x^4], x], x] /; Ne
Q[e + d*q, 0]] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[
c/a]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(
p_.), x_Symbol] := Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x],
```

$x, x^2], x] /; \text{FreeQ}[\{a, b, c, d, e, p, q\}, x]$

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^{3/2}} dx &= \int \frac{d + fx^2}{(a + bx^2 + cx^4)^{3/2}} dx + \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^{3/2}} dx \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{a(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} + \frac{1}{2} \text{Subst}\left(\int \frac{e + gx}{(a + bx + cx^2)^{3/2}} dx, x, x^2\right) - \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{a(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} - \frac{be - 2ag + (2ce - bg)x^2}{(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} + \frac{(\sqrt{c}(bd - 2af))}{\sqrt{a}} \\ &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{a(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} - \frac{be - 2ag + (2ce - bg)x^2}{(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} - \frac{\sqrt{c}(bd - 2af)}{a(b^2 - 4ac)} \end{aligned}$$

Mathematica [F] time = 0.00, size = 0, normalized size = 0.00

\$Aborted

Verification is Not applicable to the result.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(3/2), x]

[Out] \$Aborted

fricas [F] time = 0.61, size = 0, normalized size = 0.00

$$\text{integral}\left(\frac{\sqrt{cx^4 + bx^2 + a}(gx^3 + fx^2 + ex + d)}{c^2x^8 + 2bcx^6 + (b^2 + 2ac)x^4 + 2abx^2 + a^2}, x\right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="fricas")

[Out] integral(sqrt(c*x^4 + b*x^2 + a)*(g*x^3 + f*x^2 + e*x + d)/(c^2*x^8 + 2*b*c*x^6 + (b^2 + 2*a*c)*x^4 + 2*a*b*x^2 + a^2), x)

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{gx^3 + fx^2 + ex + d}{(cx^4 + bx^2 + a)^{\frac{3}{2}}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="giac")

[Out] integrate((g*x^3 + f*x^2 + e*x + d)/(c*x^4 + b*x^2 + a)^(3/2), x)

maple [B] time = 0.03, size = 1005, normalized size = 2.25

$$\frac{\left(\sqrt{2} \sqrt{-\frac{2(-b+\sqrt{-4ac+b^2})x^2}{a}} + 4 \sqrt{\frac{2(b+\sqrt{-4ac+b^2})x^2}{a}} + 4 \left(-\text{EllipticE} \left(\frac{\sqrt{2} \sqrt{-\frac{-b+\sqrt{-4ac+b^2}}{a}} x}{2}, \sqrt{\frac{2(b+\sqrt{-4ac+b^2})b}{ac}-4}}{2} \right) + \text{EllipticE} \left(\frac{\sqrt{2} \sqrt{\frac{-b+\sqrt{-4ac+b^2}}{a}} x}{2}, \sqrt{\frac{2(b+\sqrt{-4ac+b^2})b}{ac}-4}}{2} \right) \right)}{2(4ac-b^2) \sqrt{\frac{-b+\sqrt{-4ac+b^2}}{a}} \sqrt{cx^4+bx^2+a} (b+\sqrt{-4ac+b^2})}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(3/2),x)

[Out] -g/(c*x^4+b*x^2+a)^(1/2)*(b*x^2+2*a)/(4*a*c-b^2)+f*(-2*c*(-1/(4*a*c-b^2))*x^3-1/2/(4*a*c-b^2)*b/c*x)/((x^4+b/c*x^2+a/c)*c)^(1/2)-1/4/(4*a*c-b^2)*b*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)*EllipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))+c/(4*a*c-b^2)*a*2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*(-2*(-b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)*(2*(b+(-4*a*c+b^2)^(1/2))/a*x^2+4)^(1/2)/(c*x^4+b*x^2+a)^(1/2)/(b+(-4*a*c+b^2)^(1/2))*(EllipticF(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))-EllipticE(1/2*2^(1/2)*((-b+(-4*a*c+b^2)^(1/2))/a)^(1/2)*x,1/2*(2*(b+(-4*a*c+b^2)^(1/2))/a*b/c-4)^(1/2))))+e*(2*c*x^2+b)/(4*a*c-b^2)/(c*x^4+b*x^2+a)^(1/2)+d*(-2*c*(1/2/a*b/(4*a*c-b^2))*x^3-1/2*(2*a*c-b^2)/a/(4*a*c-b^2)/c*x)/((x^4+b/c*x^2+a/c)*c)^(1/2)+1/4*(1/a-(2*a*c-b^2)/a/(4*a*c-b^2))

$*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*(-2*(-b+(-4*a*c+b^2)^{(1/2)})/a*x^{2+4})^{(1/2)}*(2*(b+(-4*a*c+b^2)^{(1/2)})/a*x^{2+4})^{(1/2)}/(c*x^4+b*x^2+a)^{(1/2)}*EllipticF(1/2*2^{(1/2)}*(-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*x,1/2*(2*(b+(-4*a*c+b^2)^{(1/2)})/a*b/c-4)^{(1/2)})-1/2*b/(4*a*c-b^2)*c*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*(-2*(-b+(-4*a*c+b^2)^{(1/2)})/a*x^{2+4})^{(1/2)}*(2*(b+(-4*a*c+b^2)^{(1/2)})/a*x^{2+4})^{(1/2)}/(c*x^4+b*x^2+a)^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})*(EllipticF(1/2*2^{(1/2)}*(-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*x,1/2*(2*(b+(-4*a*c+b^2)^{(1/2)})/a*b/c-4)^{(1/2)})-EllipticE(1/2*2^{(1/2)}*(-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*x,1/2*(2*(b+(-4*a*c+b^2)^{(1/2)})/a*b/c-4)^{(1/2))}$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{gx^3 + fx^2 + ex + d}{(cx^4 + bx^2 + a)^{\frac{3}{2}}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="maxima")

[Out] integrate((g*x^3 + f*x^2 + e*x + d)/(c*x^4 + b*x^2 + a)^(3/2), x)

mupad [F] time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{gx^3 + fx^2 + ex + d}{(cx^4 + bx^2 + a)^{3/2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(3/2),x)

[Out] int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(3/2), x)

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^{\frac{3}{2}}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**(3/2),x)

[Out] Integral((d + e*x + f*x**2 + g*x**3)/(a + b*x**2 + c*x**4)**(3/2), x)

$$3.107 \quad \int \frac{d+ex+fx^2+gx^3}{(a+bx^2+cx^4)^{5/2}} dx$$

Optimal. Leaf size=680

$$\frac{\sqrt[4]{c} (\sqrt{a} + \sqrt{c}x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{c}x^2)^2}} (6a^{3/2}\sqrt{c}f - 3\sqrt{a}b\sqrt{c}d + abf - 10acd + 2b^2d) F\left(2 \tan^{-1}\left(\frac{\sqrt[4]{c}x}{\sqrt[4]{a}}\right)\right) \frac{1}{4} \left(2 - \frac{b}{\sqrt{a}\sqrt{c}}\right)}{6a^{7/4} (b - 2\sqrt{a}\sqrt{c}) (b^2 - 4ac) \sqrt{a + bx^2 + cx^4}}$$

[Out] $\frac{1}{3}x(b^2d - 2ac d - abf + c(bd - 2af)x^2)/a/(-4ac + b^2)/(cx^4 + bx^2 + a)^{3/2} + \frac{1}{3}(-be + 2ag - (bg + 2ce)x^2)/(-4ac + b^2)/(cx^4 + bx^2 + a)^{3/2} + \frac{4}{3}(-bg + 2ce)(2cx^2 + b)/(-4ac + b^2)^2/(cx^4 + bx^2 + a)^{1/2} + \frac{1}{3}x(2b^4d - 17ab^2cd + 20a^2c^2d + ab^3f + 4a^2b^2cf + c(12a^2cf + ab^2f - 16abc d + 2b^3d)x^2)/a^2/(-4ac + b^2)^2/(cx^4 + bx^2 + a)^{1/2} - \frac{1}{3}(12a^2cf + ab^2f - 16abc d + 2b^3d)xc^{1/2}(cx^4 + bx^2 + a)^{1/2}/a^2/(-4ac + b^2)^2/(a^{1/2} + x^2c^{1/2}) + \frac{1}{3}c^{1/4}(12a^2cf + ab^2f - 16abc d + 2b^3d)(\cos(2\arctan(c^{1/4}x/a^{1/4}))^2)^{1/2}/\cos(2\arctan(c^{1/4}x/a^{1/4})) * \text{EllipticE}(\sin(2\arctan(c^{1/4}x/a^{1/4})), 1/2(2 - b/a^{1/2})/c^{1/2})^{1/2})(a^{1/2} + x^2c^{1/2})((cx^4 + bx^2 + a)/(a^{1/2} + x^2c^{1/2}))^{1/2}/a^{7/4}/(-4ac + b^2)^2/(cx^4 + bx^2 + a)^{1/2} - \frac{1}{6}c^{1/4}(\cos(2\arctan(c^{1/4}x/a^{1/4}))^2)^{1/2}/\cos(2\arctan(c^{1/4}x/a^{1/4})) * \text{EllipticF}(\sin(2\arctan(c^{1/4}x/a^{1/4})), 1/2(2 - b/a^{1/2})/c^{1/2})^{1/2})(a^{1/2} + x^2c^{1/2})(2b^2d - 10ac d + abf + 6a^{3/2}fc^{1/2} - 3bd a^{1/2}c^{1/2})((cx^4 + bx^2 + a)/(a^{1/2} + x^2c^{1/2}))^{1/2}/a^{7/4}/(-4ac + b^2)/(-2a^{1/2}c^{1/2} + b)/(cx^4 + bx^2 + a)^{1/2}$

Rubi [A] time = 0.51, antiderivative size = 680, normalized size of antiderivative = 1.00, number of steps used = 9, number of rules used = 8, integrand size = 32, $\frac{\text{number of rules}}{\text{integrand size}} = 0.250$, Rules used = {1673, 1178, 1197, 1103, 1195, 1247, 638, 613}

$$\frac{x(cx^2(12a^2cf + ab^2f - 16abcd + 2b^3d) + 4a^2bcf + 20a^2c^2d - 17ab^2cd + ab^3f + 2b^4d) \sqrt{cx\sqrt{a + bx^2 + cx^4}}}{3a^2(b^2 - 4ac)^2 \sqrt{a + bx^2 + cx^4}} \quad \frac{\sqrt{cx\sqrt{a + bx^2 + cx^4}}}{3a^2(b^2 - 4ac)}$$

Antiderivative was successfully verified.

[In] Int[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(5/2), x]

[Out] $(x(b^2d - 2ac d - abf + c(bd - 2af)x^2))/(3a(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}) - (be - 2ag + (2ce - bg)x^2)/(3(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}) + (4(2ce - bg)(b + 2cx^2))/(3(b^2 - 4ac)^2 \text{Sqrt}[a + bx^2 + cx^4]) + (x(2b^4d - 17ab^2cd + 20a^2c^2d$

$$+ a*b^3*f + 4*a^2*b*c*f + c*(2*b^3*d - 16*a*b*c*d + a*b^2*f + 12*a^2*c*f)*x^2)/(3*a^2*(b^2 - 4*a*c)^2*\text{Sqrt}[a + b*x^2 + c*x^4]) - (\text{Sqrt}[c]*(2*b^3*d - 16*a*b*c*d + a*b^2*f + 12*a^2*c*f)*x*\text{Sqrt}[a + b*x^2 + c*x^4])/(3*a^2*(b^2 - 4*a*c)^2*(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)) + (c^{1/4}*(2*b^3*d - 16*a*b*c*d + a*b^2*f + 12*a^2*c*f)*(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)*\text{Sqrt}[(a + b*x^2 + c*x^4)/(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)]^2*\text{EllipticE}[2*\text{ArcTan}[(c^{1/4})*x]/a^{1/4}], (2 - b/(\text{Sqrt}[a]*\text{Sqrt}[c]))/4)/(3*a^{7/4}*(b^2 - 4*a*c)^2*\text{Sqrt}[a + b*x^2 + c*x^4]) - (c^{1/4}*(2*b^2*d - 3*\text{Sqrt}[a]*b*\text{Sqrt}[c]*d - 10*a*c*d + a*b*f + 6*a^{3/2}*\text{Sqrt}[c]*f)*(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)*\text{Sqrt}[(a + b*x^2 + c*x^4)/(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)]^2*\text{EllipticF}[2*\text{ArcTan}[(c^{1/4})*x]/a^{1/4}], (2 - b/(\text{Sqrt}[a]*\text{Sqrt}[c]))/4)/(6*a^{7/4}*(b - 2*\text{Sqrt}[a]*\text{Sqrt}[c])*(b^2 - 4*a*c)*\text{Sqrt}[a + b*x^2 + c*x^4])$$

Rule 613

$$\text{Int}[(a_.) + (b_.)*(x_) + (c_.)*(x_)^2]^{-3/2}, x_Symbol] \rightarrow \text{Simp}[(-2*(b + 2*c*x))/((b^2 - 4*a*c)*\text{Sqrt}[a + b*x + c*x^2]), x] /; \text{FreeQ}\{a, b, c\}, x] \&\& \text{NeQ}[b^2 - 4*a*c, 0]$$

Rule 638

$$\text{Int}[(d_.) + (e_.)*(x_)]*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^{p_}, x_Symbol] \rightarrow \text{Simp}[(b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^{p+1})/((p+1)*(b^2 - 4*a*c)), x] - \text{Dist}[(2*p+3)*(2*c*d - b*e)/((p+1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x + c*x^2)^{p+1}, x], x] /; \text{FreeQ}\{a, b, c, d, e\}, x] \&\& \text{NeQ}[2*c*d - b*e, 0] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1] \&\& \text{NeQ}[p, -3/2]$$

Rule 1103

$$\text{Int}[1/\text{Sqrt}[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbol] \rightarrow \text{With}\{q = \text{Rt}[c/a, 4]\}, \text{Simp}[(1 + q^2*x^2)*\text{Sqrt}[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^2)^2)]*\text{EllipticF}[2*\text{ArcTan}[q*x], 1/2 - (b*q^2)/(4*c)]/(2*q*\text{Sqrt}[a + b*x^2 + c*x^4]), x] /; \text{FreeQ}\{a, b, c\}, x] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{PosQ}[c/a]$$

Rule 1178

$$\text{Int}[(d_) + (e_.)*(x_)^2]*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^{p_}, x_Symbol] \rightarrow \text{Simp}[(x*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2)*(a + b*x^2 + c*x^4)^{p+1})/(2*a*(p+1)*(b^2 - 4*a*c)), x] + \text{Dist}[1/(2*a*(p+1)*(b^2 - 4*a*c)), \text{Int}[\text{Simp}[(2*p+3)*d*b^2 - a*b*e - 2*a*c*d*(4*p+5) + (4*p+7)*(d*b - 2*a*e)*c*x^2, x]*(a + b*x^2 + c*x^4)^{p+1}, x], x] /; \text{FreeQ}\{a, b, c, d, e\}, x] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{NeQ}[c*d^2 - b*d*e + a*e^2, 0] \&\& \text{LtQ}[p, -1] \&\& \text{IntegerQ}[2*p]$$

Rule 1195

$$\text{Int}[(d_) + (e_.)*(x_)^2]/\text{Sqrt}[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbol]$$

```
1] :=> With[{q = Rt[c/a, 4]}, -Simp[(d*x*Sqrt[a + b*x^2 + c*x^4])/(a*(1 + q^2*x^2)), x] + Simp[(d*(1 + q^2*x^2)*Sqrt[(a + b*x^2 + c*x^4)/(a*(1 + q^2*x^2)^2)]*EllipticE[2*ArcTan[q*x], 1/2 - (b*q^2)/(4*c)])/(q*Sqrt[a + b*x^2 + c*x^4]), x] /; EqQ[e + d*q^2, 0] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]
```

Rule 1197

```
Int[((d_) + (e_.)*(x_)^2)/Sqrt[(a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4], x_Symbol] :=> With[{q = Rt[c/a, 2]}, Dist[(e + d*q)/q, Int[1/Sqrt[a + b*x^2 + c*x^4], x], x] - Dist[e/q, Int[(1 - q*x^2)/Sqrt[a + b*x^2 + c*x^4], x], x] /; NeQ[e + d*q, 0] /; FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4*a*c, 0] && PosQ[c/a]
```

Rule 1247

```
Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] :=> Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :=> Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q - 1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x] && !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^{5/2}} dx &= \int \frac{d + fx^2}{(a + bx^2 + cx^4)^{5/2}} dx + \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^{5/2}} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{3a(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(a + bx + cx^2)^{5/2}} dx, x, x^2 \right) - \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{3a(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} - \frac{be - 2ag + (2ce - bg)x^2}{3(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} + \frac{x(2b^4d - 4b^2c^2d - 2ac^2d - ab^2f + c^2(bd - 2af)x^2)}{3(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{3a(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} - \frac{be - 2ag + (2ce - bg)x^2}{3(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} + \frac{4(2ce - bg)x^2}{3(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{3a(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} - \frac{be - 2ag + (2ce - bg)x^2}{3(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} + \frac{4(2ce - bg)x^2}{3(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}}
\end{aligned}$$

Mathematica [F] time = 0.00, size = 0, normalized size = 0.00

\$Aborted

Verification is Not applicable to the result.

[In] Integrate[(d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(5/2), x]

[Out] \$Aborted

fricas [F] time = 0.96, size = 0, normalized size = 0.00

$$\text{integral} \left(\frac{\sqrt{cx^4 + bx^2 + a}(gx^3 + fx^2 + ex + d)}{c^3x^{12} + 3bc^2x^{10} + 3(b^2c + ac^2)x^8 + (b^3 + 6abc)x^6 + 3a^2bx^2 + 3(ab^2 + a^2c)x^4 + a^3}, x \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(5/2), x, algorithm="fricas")

[Out] integral(sqrt(c*x^4 + b*x^2 + a)*(g*x^3 + f*x^2 + e*x + d)/(c^3*x^12 + 3*b*c^2*x^10 + 3*(b^2*c + a*c^2)*x^8 + (b^3 + 6*a*b*c)*x^6 + 3*a^2*b*x^2 + 3*(a*b^2 + a^2*c)*x^4 + a^3), x)

giac [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{gx^3 + fx^2 + ex + d}{(cx^4 + bx^2 + a)^{\frac{5}{2}}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(5/2),x, algorithm="giac")

[Out] integrate((g*x^3 + f*x^2 + e*x + d)/(c*x^4 + b*x^2 + a)^(5/2), x)

maple [B] time = 0.06, size = 1395, normalized size = 2.05

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)/(c*x^4+b*x^2+a)^(5/2),x)

[Out]
$$\begin{aligned} & -1/3*g*(8*b*c^2*x^6+12*b^2*c*x^4+12*a*b*c*x^2+3*b^3*x^2+8*a^2*c+2*a*b^2)/(c \\ & *x^4+b*x^2+a)^{(3/2)}/(16*a^2*c^2-8*a*b^2*c+b^4)+f*((2/3/c/(4*a*c-b^2)*x^3+1/ \\ & 3*b/(4*a*c-b^2)/c^2*x)*(c*x^4+b*x^2+a)^{(1/2)}/(x^4+b/c*x^2+a/c)^2-2*c*(-1/6* \\ & (12*a*c+b^2)/a/(4*a*c-b^2)^2*x^3-1/6*(4*a*c+b^2)*b/a/(4*a*c-b^2)^2/c*x)/((x \\ & ^4+b/c*x^2+a/c)*c)^{(1/2)}+1/4*(-1/3*a*b/(4*a*c-b^2)-1/3*(4*a*c+b^2)*b/a/(4*a \\ & *c-b^2)^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*(-2*(-b+(-4*a*c+b^2)^{(1/2)}) \\ & /a*x^2+4)^{(1/2)}*(2*(b+(-4*a*c+b^2)^{(1/2)})/a*x^2+4)^{(1/2)}/(c*x^4+b*x^2+a \\ &)^{(1/2)}*EllipticF(1/2*2^{(1/2)}*((-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*x,1/2*(2*(\\ & b+(-4*a*c+b^2)^{(1/2)})/a*b/c-4)^{(1/2)})+1/6*c*(12*a*c+b^2)/(4*a*c-b^2)^2*2^{(1/2)}/ \\ & ((-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*(-2*(-b+(-4*a*c+b^2)^{(1/2)})/a*x^2+4)^{(1/2)} \\ & *(2*(b+(-4*a*c+b^2)^{(1/2)})/a*x^2+4)^{(1/2)}/(c*x^4+b*x^2+a)^{(1/2)}/(b+(-4 \\ & *a*c+b^2)^{(1/2)})*(EllipticF(1/2*2^{(1/2)}*((-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*x \\ & ,1/2*(2*(b+(-4*a*c+b^2)^{(1/2)})/a*b/c-4)^{(1/2)})-EllipticE(1/2*2^{(1/2)}*((-b+ \\ & -4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*x,1/2*(2*(b+(-4*a*c+b^2)^{(1/2)})/a*b/c-4)^{(1/2)}) \\ &))+1/3*e*(16*c^3*x^6+24*b*c^2*x^4+24*a*c^2*x^2+6*b^2*c*x^2+12*a*b*c-b^3)/(c \\ & *x^4+b*x^2+a)^{(3/2)}/(16*a^2*c^2-8*a*b^2*c+b^4)+d*((-1/3/a*b/(4*a*c-b^2)/c*x \\ & ^3+1/3*(2*a*c-b^2)/(4*a*c-b^2)/a/c^2*x)*(c*x^4+b*x^2+a)^{(1/2)}/(x^4+b/c*x^2+a \\ & /c)^2-2*c*(1/3*b*(8*a*c-b^2)/(4*a*c-b^2)^2/a^2*x^3-1/6*(20*a^2*c^2-17*a*b^2 \\ & *c+2*b^4)/a^2/(4*a*c-b^2)^2/c*x)/((x^4+b/c*x^2+a/c)*c)^{(1/2)}+1/4*(2/3*(5*a \\ & *c-b^2)/a^2/(4*a*c-b^2)-1/3*(20*a^2*c^2-17*a*b^2*c+2*b^4)/a^2/(4*a*c-b^2)^2 \\ &)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*(-2*(-b+(-4*a*c+b^2)^{(1/2)})/a*x \\ & ^2+4)^{(1/2)}*(2*(b+(-4*a*c+b^2)^{(1/2)})/a*x^2+4)^{(1/2)}/(c*x^4+b*x^2+a)^{(1/2)}* \\ & EllipticF(1/2*2^{(1/2)}*((-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*x,1/2*(2*(b+(-4*a*c \\ & +b^2)^{(1/2)})/a*b/c-4)^{(1/2)})-1/3*b*c*(8*a*c-b^2)/(4*a*c-b^2)^2/a*2^{(1/2)}/((\\ & -b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*(-2*(-b+(-4*a*c+b^2)^{(1/2)})/a*x^2+4)^{(1/2)}* \\ & (2*(b+(-4*a*c+b^2)^{(1/2)})/a*x^2+4)^{(1/2)}/(c*x^4+b*x^2+a)^{(1/2)}/(b+(-4*a*c+b \end{aligned}$$

$\sqrt{2})^{1/2}) * (\text{EllipticF}(1/2 * 2^{1/2} * ((-b + (-4 * a * c + b^2)^{1/2}) / a)^{1/2} * x, 1/2 * (2 * (b + (-4 * a * c + b^2)^{1/2}) / a * b / c - 4)^{1/2}) - \text{EllipticE}(1/2 * 2^{1/2} * ((-b + (-4 * a * c + b^2)^{1/2}) / a)^{1/2} * x, 1/2 * (2 * (b + (-4 * a * c + b^2)^{1/2}) / a * b / c - 4)^{1/2})))$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\int \frac{gx^3 + fx^2 + ex + d}{(cx^4 + bx^2 + a)^{\frac{5}{2}}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^(5/2),x, algorithm="maxima")

[Out] integrate((g*x^3 + f*x^2 + e*x + d)/(c*x^4 + b*x^2 + a)^(5/2), x)

mupad [F] time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{gx^3 + fx^2 + ex + d}{(cx^4 + bx^2 + a)^{5/2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(5/2), x)

[Out] int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^(5/2), x)

sympy [F(-1)] time = 0.00, size = 0, normalized size = 0.00

Timed out

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((g*x**3+f*x**2+e*x+d)/(c*x**4+b*x**2+a)**(5/2), x)

[Out] Timed out

$$3.108 \quad \int \frac{ag - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx$$

Optimal. Leaf size=19

$$\frac{gx}{\sqrt{a + bx^2 + cx^4}}$$

[Out] $g*x/(c*x^4+b*x^2+a)^{(1/2)}$

Rubi [A] time = 0.02, antiderivative size = 19, normalized size of antiderivative = 1.00, number of steps used = 1, number of rules used = 1, integrand size = 28, $\frac{\text{number of rules}}{\text{integrand size}} = 0.036$, Rules used = {1588}

$$\frac{gx}{\sqrt{a + bx^2 + cx^4}}$$

Antiderivative was successfully verified.

[In] $\text{Int}[(a*g - c*g*x^4)/(a + b*x^2 + c*x^4)^{(3/2)}, x]$

[Out] $(g*x)/\text{Sqrt}[a + b*x^2 + c*x^4]$

Rule 1588

$\text{Int}[(Pp_)*(Qq_)^{(m_.)}, x_Symbol] \rightarrow \text{With}[\{p = \text{Expon}[Pp, x], q = \text{Expon}[Qq, x]\}, \text{Simp}[(\text{Coeff}[Pp, x, p]*x^{(p - q + 1)}*Qq^{(m + 1)})/((p + m*q + 1)*\text{Coeff}[Qq, x, q]), x] /; \text{NeQ}[p + m*q + 1, 0] \&\& \text{EqQ}[(p + m*q + 1)*\text{Coeff}[Qq, x, q]*Pp, \text{Coeff}[Pp, x, p]*x^{(p - q)}*((p - q + 1)*Qq + (m + 1)*x*D[Qq, x])]] /; \text{FreeQ}[m, x] \&\& \text{PolyQ}[Pp, x] \&\& \text{PolyQ}[Qq, x] \&\& \text{NeQ}[m, -1]$

Rubi steps

$$\int \frac{ag - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx = \frac{gx}{\sqrt{a + bx^2 + cx^4}}$$

Mathematica [F] time = 0.00, size = 0, normalized size = 0.00

\$Aborted

Verification is Not applicable to the result.

[In] $\text{Integrate}[(a*g - c*g*x^4)/(a + b*x^2 + c*x^4)^{(3/2)}, x]$

[Out] \$Aborted

fricas [A] time = 0.71, size = 17, normalized size = 0.89

$$\frac{gx}{\sqrt{cx^4 + bx^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((-c*g*x^4+a*g)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="fricas")

[Out] g*x/sqrt(c*x^4 + b*x^2 + a)

giac [B] time = 1.91, size = 60, normalized size = 3.16

$$\frac{(b^4g - 8ab^2cg + 16a^2c^2g)x}{\sqrt{cx^4 + bx^2 + a}(b^4 - 8ab^2c + 16a^2c^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((-c*g*x^4+a*g)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="giac")

[Out] (b^4*g - 8*a*b^2*c*g + 16*a^2*c^2*g)*x/(sqrt(c*x^4 + b*x^2 + a)*(b^4 - 8*a*b^2*c + 16*a^2*c^2))

maple [A] time = 0.00, size = 18, normalized size = 0.95

$$\frac{gx}{\sqrt{cx^4 + bx^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((-c*g*x^4+a*g)/(c*x^4+b*x^2+a)^(3/2),x)

[Out] g*x/(c*x^4+b*x^2+a)^(1/2)

maxima [A] time = 0.63, size = 17, normalized size = 0.89

$$\frac{gx}{\sqrt{cx^4 + bx^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((-c*g*x^4+a*g)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="maxima")

[Out] g*x/sqrt(c*x^4 + b*x^2 + a)

mupad [B] time = 0.99, size = 17, normalized size = 0.89

$$\frac{gx}{\sqrt{cx^4 + bx^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((a*g - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2), x)`

[Out] `(g*x)/(a + b*x^2 + c*x^4)^(1/2)`

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$-g \left(\int \left(-\frac{a}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} \right) dx + \int \frac{cx^4}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4}} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((-c*g*x**4+a*g)/(c*x**4+b*x**2+a)**(3/2), x)`

[Out] `-g*(Integral(-a/(a*sqrt(a + b*x**2 + c*x**4) + b*x**2*sqrt(a + b*x**2 + c*x**4) + c*x**4*sqrt(a + b*x**2 + c*x**4)), x) + Integral(c*x**4/(a*sqrt(a + b*x**2 + c*x**4) + b*x**2*sqrt(a + b*x**2 + c*x**4) + c*x**4*sqrt(a + b*x**2 + c*x**4)), x))`

$$3.109 \quad \int \frac{ag+ex-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$$

Optimal. Leaf size=57

$$\frac{gx}{\sqrt{a+bx^2+cx^4}} - \frac{e(b+2cx^2)}{(b^2-4ac)\sqrt{a+bx^2+cx^4}}$$

[Out] $g*x/(c*x^4+b*x^2+a)^{(1/2)}-e*(2*c*x^2+b)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^{(1/2)}$

Rubi [A] time = 0.07, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 31, $\frac{\text{number of rules}}{\text{integrand size}} = 0.161$, Rules used = {1673, 1588, 12, 1107, 613}

$$\frac{gx}{\sqrt{a+bx^2+cx^4}} - \frac{e(b+2cx^2)}{(b^2-4ac)\sqrt{a+bx^2+cx^4}}$$

Antiderivative was successfully verified.

[In] Int[(a*g + e*x - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2), x]

[Out] (g*x)/Sqrt[a + b*x^2 + c*x^4] - (e*(b + 2*c*x^2))/((b^2 - 4*a*c)*Sqrt[a + b*x^2 + c*x^4])

Rule 12

Int[(a_)*(u_), x_Symbol] := Dist[a, Int[u, x], x] /; FreeQ[a, x] && !MatchQ[u, (b_)*(v_)] /; FreeQ[b, x]

Rule 613

Int[((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(-3/2), x_Symbol] := Simp[(-2*(b + 2*c*x))/((b^2 - 4*a*c)*Sqrt[a + b*x + c*x^2]), x] /; FreeQ[{a, b, c}, x] && NeQ[b^2 - 4*a*c, 0]

Rule 1107

Int[(x_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2, Subst[Int[(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, p}, x]

Rule 1588

Int[(Pp_)*(Qq_)^(m_.), x_Symbol] := With[{p = Expon[Pp, x], q = Expon[Qq, x]}, Simp[(Coeff[Pp, x, p]*x^(p - q + 1)*Qq^(m + 1))/((p + m*q + 1)*Coeff[Qq

```
, x, q]), x] /; NeQ[p + m*q + 1, 0] && EqQ[(p + m*q + 1)*Coeff[Qq, x, q]*Pp
, Coeff[Pp, x, p]*x^(p - q)*((p - q + 1)*Qq + (m + 1)*x*D[Qq, x])]] /; Free
Q[m, x] && PolyQ[Pp, x] && PolyQ[Qq, x] && NeQ[m, -1]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned} \int \frac{ag + ex - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx &= \int \frac{ex}{(a + bx^2 + cx^4)^{3/2}} dx + \int \frac{ag - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + e \int \frac{x}{(a + bx^2 + cx^4)^{3/2}} dx \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{(a + bx + cx^2)^{3/2}} dx, x, x^2 \right) \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} - \frac{e(b + 2cx^2)}{(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} \end{aligned}$$

Mathematica [F] time = 0.00, size = 0, normalized size = 0.00

\$Aborted

Verification is Not applicable to the result.

[In] Integrate[(a*g + e*x - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2), x]

[Out] \$Aborted

fricas [A] time = 0.83, size = 82, normalized size = 1.44

$$\frac{\sqrt{cx^4 + bx^2 + a} (2cex^2 - (b^2 - 4ac)gx + be)}{(b^2c - 4ac^2)x^4 + ab^2 - 4a^2c + (b^3 - 4abc)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((-c*g*x^4+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="fricas")

[Out] -sqrt(c*x^4 + b*x^2 + a)*(2*c*e*x^2 - (b^2 - 4*a*c)*g*x + b*e)/((b^2*c - 4*a*c^2)*x^4 + a*b^2 - 4*a^2*c + (b^3 - 4*a*b*c)*x^2)

giac [B] time = 2.01, size = 142, normalized size = 2.49

$$\frac{\left(\frac{2(b^2ce-4ac^2e)x}{b^4-8ab^2c+16a^2c^2} - \frac{b^4g-8ab^2cg+16a^2c^2g}{b^4-8ab^2c+16a^2c^2}\right)x + \frac{b^3e-4abce}{b^4-8ab^2c+16a^2c^2}}{\sqrt{cx^4 + bx^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((-c*g*x^4+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="giac")

[Out] -((2*(b^2*c*e - 4*a*c^2*e)*x/(b^4 - 8*a*b^2*c + 16*a^2*c^2) - (b^4*g - 8*a*b^2*c*g + 16*a^2*c^2*g)/(b^4 - 8*a*b^2*c + 16*a^2*c^2))*x + (b^3*e - 4*a*b*c*e)/(b^4 - 8*a*b^2*c + 16*a^2*c^2))/sqrt(c*x^4 + b*x^2 + a)

maple [A] time = 0.00, size = 52, normalized size = 0.91

$$\frac{4acgx - b^2gx + 2cex^2 + be}{\sqrt{cx^4 + bx^2 + a} (4ac - b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((-c*g*x^4+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x)

[Out] (4*a*c*g*x-b^2*g*x+2*c*e*x^2+b*e)/(c*x^4+b*x^2+a)^(1/2)/(4*a*c-b^2)

maxima [A] time = 0.64, size = 51, normalized size = 0.89

$$\frac{2cex^2 + be - (b^2g - 4acg)x}{\sqrt{cx^4 + bx^2 + a} (b^2 - 4ac)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((-c*g*x^4+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="maxima")

[Out] -(2*c*e*x^2 + b*e - (b^2*g - 4*a*c*g)*x)/(sqrt(c*x^4 + b*x^2 + a)*(b^2 - 4*a*c))

mupad [B] time = 0.93, size = 51, normalized size = 0.89

$$\frac{-gb^2x + eb + 2cex^2 + 4acgx}{(4ac - b^2) \sqrt{cx^4 + bx^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((a*g + e*x - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x)`

[Out] `(b*e + 2*c*e*x^2 - b^2*g*x + 4*a*c*g*x)/((4*a*c - b^2)*(a + b*x^2 + c*x^4)^(1/2))`

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$-\int \left(-\frac{ag}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} \right) dx - \int \left(-\frac{ex}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4}} \right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((-c*g*x**4+a*g+e*x)/(c*x**4+b*x**2+a)**(3/2),x)`

[Out] `-Integral(-a*g/(a*sqrt(a + b*x**2 + c*x**4) + b*x**2*sqrt(a + b*x**2 + c*x**4) + c*x**4*sqrt(a + b*x**2 + c*x**4)), x) - Integral(-e*x/(a*sqrt(a + b*x**2 + c*x**4) + b*x**2*sqrt(a + b*x**2 + c*x**4) + c*x**4*sqrt(a + b*x**2 + c*x**4)), x) - Integral(c*g*x**4/(a*sqrt(a + b*x**2 + c*x**4) + b*x**2*sqrt(a + b*x**2 + c*x**4) + c*x**4*sqrt(a + b*x**2 + c*x**4)), x)`

$$3.110 \quad \int \frac{ag + fx^3 - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx$$

Optimal. Leaf size=57

$$\frac{f(2a + bx^2)}{(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} + \frac{gx}{\sqrt{a + bx^2 + cx^4}}$$

[Out] $g*x/(c*x^4+b*x^2+a)^{(1/2)}+f*(b*x^2+2*a)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^{(1/2)}$

Rubi [A] time = 0.08, antiderivative size = 57, normalized size of antiderivative = 1.00, number of steps used = 5, number of rules used = 5, integrand size = 33, $\frac{\text{number of rules}}{\text{integrand size}} = 0.152$, Rules used = {1673, 1588, 12, 1114, 636}

$$\frac{f(2a + bx^2)}{(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} + \frac{gx}{\sqrt{a + bx^2 + cx^4}}$$

Antiderivative was successfully verified.

[In] $\text{Int}[(a*g + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^{(3/2)}, x]$

[Out] $(g*x)/\text{Sqrt}[a + b*x^2 + c*x^4] + (f*(2*a + b*x^2))/((b^2 - 4*a*c)*\text{Sqrt}[a + b*x^2 + c*x^4])$

Rule 12

$\text{Int}[(a_)*(u_), x_Symbol] \rightarrow \text{Dist}[a, \text{Int}[u, x], x] /; \text{FreeQ}[a, x] \ \&\& \ !\text{Match}[\text{Q}[u, (b_)*(v_)] /; \text{FreeQ}[b, x]]$

Rule 636

$\text{Int}[((d_.) + (e_)*(x_))/((a_.) + (b_)*(x_) + (c_)*(x_)^2)^{(3/2)}, x_Symbol] \rightarrow \text{Simp}[(-2*(b*d - 2*a*e + (2*c*d - b*e)*x))/((b^2 - 4*a*c)*\text{Sqrt}[a + b*x + c*x^2]), x] /; \text{FreeQ}[\{a, b, c, d, e\}, x] \ \&\& \ \text{NeQ}[2*c*d - b*e, 0] \ \&\& \ \text{NeQ}[b^2 - 4*a*c, 0]$

Rule 1114

$\text{Int}[(x_)^{(m_)}*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^{(p_)}, x_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[x^{(m-1)/2}*(a + b*x + c*x^2)^p, x], x, x^2], x] /; \text{FreeQ}[\{a, b, c, p\}, x] \ \&\& \ \text{IntegerQ}[(m-1)/2]$

Rule 1588

```
Int[(Pp_)*(Qq_)^(m_), x_Symbol] := With[{p = Expon[Pp, x], q = Expon[Qq, x]
}], Simp[(Coeff[Pp, x, p]*x^(p - q + 1)*Qq^(m + 1))/((p + m*q + 1)*Coeff[Qq
, x, q]), x] /; NeQ[p + m*q + 1, 0] && EqQ[(p + m*q + 1)*Coeff[Qq, x, q]*Pp
, Coeff[Pp, x, p]*x^(p - q)*((p - q + 1)*Qq + (m + 1)*x*D[Qq, x])] /; Free
Q[m, x] && PolyQ[Pp, x] && PolyQ[Qq, x] && NeQ[m, -1]
```

Rule 1673

```
Int[(Pq_)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned} \int \frac{ag + fx^3 - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx &= \int \frac{fx^3}{(a + bx^2 + cx^4)^{3/2}} dx + \int \frac{ag - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + f \int \frac{x^3}{(a + bx^2 + cx^4)^{3/2}} dx \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + \frac{1}{2} f \operatorname{Subst} \left(\int \frac{x}{(a + bx + cx^2)^{3/2}} dx, x, x^2 \right) \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + \frac{f(2a + bx^2)}{(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} \end{aligned}$$

Mathematica [F] time = 0.00, size = 0, normalized size = 0.00

\$Aborted

Verification is Not applicable to the result.

[In] Integrate[(a*g + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2), x]

[Out] \$Aborted

fricas [A] time = 0.61, size = 80, normalized size = 1.40

$$\frac{\sqrt{cx^4 + bx^2 + a}(bfx^2 + (b^2 - 4ac)gx + 2af)}{(b^2c - 4ac^2)x^4 + ab^2 - 4a^2c + (b^3 - 4abc)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((-c*g*x^4+f*x^3+a*g)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="fricas")

[Out] sqrt(c*x^4 + b*x^2 + a)*(b*f*x^2 + (b^2 - 4*a*c)*g*x + 2*a*f)/((b^2*c - 4*a*c^2)*x^4 + a*b^2 - 4*a^2*c + (b^3 - 4*a*b*c)*x^2)

giac [B] time = 1.95, size = 136, normalized size = 2.39

$$\frac{\left(\frac{(b^3f-4abcf)x}{b^4-8ab^2c+16a^2c^2} + \frac{b^4g-8ab^2cg+16a^2c^2g}{b^4-8ab^2c+16a^2c^2}\right)x + \frac{2(ab^2f-4a^2cf)}{b^4-8ab^2c+16a^2c^2}}{\sqrt{cx^4 + bx^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((-c*g*x^4+f*x^3+a*g)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="giac")

[Out] (((b^3*f - 4*a*b*c*f)*x/(b^4 - 8*a*b^2*c + 16*a^2*c^2) + (b^4*g - 8*a*b^2*c*g + 16*a^2*c^2*g)/(b^4 - 8*a*b^2*c + 16*a^2*c^2))*x + 2*(a*b^2*f - 4*a^2*c*f)/(b^4 - 8*a*b^2*c + 16*a^2*c^2))/sqrt(c*x^4 + b*x^2 + a)

maple [A] time = 0.00, size = 53, normalized size = 0.93

$$\frac{4acgx - b^2gx - bfx^2 - 2af}{\sqrt{cx^4 + bx^2 + a} (4ac - b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int((-c*g*x^4+f*x^3+a*g)/(c*x^4+b*x^2+a)^(3/2),x)

[Out] (4*a*c*g*x-b^2*g*x-b*f*x^2-2*a*f)/(c*x^4+b*x^2+a)^(1/2)/(4*a*c-b^2)

maxima [A] time = 0.63, size = 49, normalized size = 0.86

$$\frac{bfx^2 + 2af + (b^2g - 4acg)x}{\sqrt{cx^4 + bx^2 + a}(b^2 - 4ac)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((-c*g*x^4+f*x^3+a*g)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="maxima")

[Out] (b*f*x^2 + 2*a*f + (b^2*g - 4*a*c*g)*x)/(sqrt(c*x^4 + b*x^2 + a)*(b^2 - 4*a*c))

mupad [B] time = 0.96, size = 51, normalized size = 0.89

$$\frac{gb^2x + fbx^2 - 4acgx + 2af}{(4ac - b^2)\sqrt{cx^4 + bx^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((a*g + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x)`

[Out] $-(2*af + b*f*x^2 + b^2*g*x - 4*a*c*g*x)/((4*a*c - b^2)*(a + b*x^2 + c*x^4)^{(1/2)})$

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$-\int \left(-\frac{ag}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} \right) dx - \int \left(-\frac{fx^3}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4}} \right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((-c*g*x**4+f*x**3+a*g)/(c*x**4+b*x**2+a)**(3/2),x)`

[Out] $-\text{Integral}(-a*g/(a*\text{sqrt}(a + b*x**2 + c*x**4) + b*x**2*\text{sqrt}(a + b*x**2 + c*x**4) + c*x**4*\text{sqrt}(a + b*x**2 + c*x**4)), x) - \text{Integral}(-f*x**3/(a*\text{sqrt}(a + b*x**2 + c*x**4) + b*x**2*\text{sqrt}(a + b*x**2 + c*x**4) + c*x**4*\text{sqrt}(a + b*x**2 + c*x**4))), x) - \text{Integral}(c*g*x**4/(a*\text{sqrt}(a + b*x**2 + c*x**4) + b*x**2*\text{sqrt}(a + b*x**2 + c*x**4) + c*x**4*\text{sqrt}(a + b*x**2 + c*x**4))), x)$

$$3.111 \quad \int \frac{ag+ex+fx^3-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$$

Optimal. Leaf size=69

$$\frac{gx}{\sqrt{a+bx^2+cx^4}} - \frac{-2af+x^2(2ce-bf)+be}{(b^2-4ac)\sqrt{a+bx^2+cx^4}}$$

[Out] $g*x/(c*x^4+b*x^2+a)^{(1/2)}+(-b*e+2*a*f-(-b*f+2*c*e)*x^2)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^{(1/2)}$

Rubi [A] time = 0.09, antiderivative size = 69, normalized size of antiderivative = 1.00, number of steps used = 4, number of rules used = 4, integrand size = 36, $\frac{\text{number of rules}}{\text{integrand size}} = 0.111$, Rules used = {1673, 1588, 1247, 636}

$$\frac{gx}{\sqrt{a+bx^2+cx^4}} - \frac{-2af+x^2(2ce-bf)+be}{(b^2-4ac)\sqrt{a+bx^2+cx^4}}$$

Antiderivative was successfully verified.

[In] Int[(a*g + e*x + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2), x]

[Out] $(g*x)/\text{Sqrt}[a + b*x^2 + c*x^4] - (b*e - 2*a*f + (2*c*e - b*f)*x^2)/((b^2 - 4*a*c)*\text{Sqrt}[a + b*x^2 + c*x^4])$

Rule 636

Int[((d_.) + (e_.)*(x_))/((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^(3/2), x_Symbol] := Simp[(-2*(b*d - 2*a*e + (2*c*d - b*e)*x))/((b^2 - 4*a*c)*Sqrt[a + b*x + c*x^2]), x] /; FreeQ[{a, b, c, d, e}, x] && NeQ[2*c*d - b*e, 0] && NeQ[b^2 - 4*a*c, 0]

Rule 1247

Int[(x_)*((d_) + (e_.)*(x_)^2)^(q_.)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_.), x_Symbol] := Dist[1/2, Subst[Int[(d + e*x)^q*(a + b*x + c*x^2)^p, x], x, x^2], x] /; FreeQ[{a, b, c, d, e, p, q}, x]

Rule 1588

Int[(Pp_)*(Qq_)^(m_.), x_Symbol] := With[{p = Expon[Pp, x], q = Expon[Qq, x]}, Simp[(Coeff[Pp, x, p]*x^(p - q + 1)*Qq^(m + 1))/((p + m*q + 1)*Coeff[Qq, x, q]), x] /; NeQ[p + m*q + 1, 0] && EqQ[(p + m*q + 1)*Coeff[Qq, x, q]*Pp, Coeff[Pp, x, p]*x^(p - q)*((p - q + 1)*Qq + (m + 1)*x*D[Qq, x])] /; Free

$Q[m, x] \ \&\& \ \text{PolyQ}[Pp, x] \ \&\& \ \text{PolyQ}[Qq, x] \ \&\& \ \text{NeQ}[m, -1]$

Rule 1673

```
Int[(Pq_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^(p_), x_Symbol] :> Module[{q
= Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]*(a + b
*x^2 + c*x^4)^p, x] + Int[x*Sum[Coeff[Pq, x, 2*k + 1]*x^(2*k), {k, 0, (q -
1)/2}]*(a + b*x^2 + c*x^4)^p, x]] /; FreeQ[{a, b, c, p}, x] && PolyQ[Pq, x]
&& !PolyQ[Pq, x^2]
```

Rubi steps

$$\begin{aligned} \int \frac{ag + ex + fx^3 - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx &= \int \frac{x(e + fx^2)}{(a + bx^2 + cx^4)^{3/2}} dx + \int \frac{ag - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + \frac{1}{2} \text{Subst} \left(\int \frac{e + fx}{(a + bx + cx^2)^{3/2}} dx, x, x^2 \right) \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} - \frac{be - 2af + (2ce - bf)x^2}{(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} \end{aligned}$$

Mathematica [F] time = 0.00, size = 0, normalized size = 0.00

\$Aborted

Verification is Not applicable to the result.

[In] Integrate[(a*g + e*x + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2), x]

[Out] \$Aborted

fricas [A] time = 0.75, size = 92, normalized size = 1.33

$$\frac{\sqrt{cx^4 + bx^2 + a} \left((b^2 - 4ac)gx - (2ce - bf)x^2 - be + 2af \right)}{(b^2c - 4ac^2)x^4 + ab^2 - 4a^2c + (b^3 - 4abc)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((-c*g*x^4+f*x^3+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2), x, algorithm="fricas")

[Out] $\sqrt{c*x^4 + b*x^2 + a} * ((b^2 - 4*a*c)*g*x - (2*c*e - b*f)*x^2 - b*e + 2*a*f) / ((b^2*c - 4*a*c^2)*x^4 + a*b^2 - 4*a^2*c + (b^3 - 4*a*b*c)*x^2)$

giac [B] time = 2.10, size = 166, normalized size = 2.41

$$\frac{\left(\frac{(b^3 f - 4 a b c f - 2 b^2 c e + 8 a c^2 e) x}{b^4 - 8 a b^2 c + 16 a^2 c^2} + \frac{b^4 g - 8 a b^2 c g + 16 a^2 c^2 g}{b^4 - 8 a b^2 c + 16 a^2 c^2}\right) x + \frac{2 a b^2 f - 8 a^2 c f - b^3 e + 4 a b c e}{b^4 - 8 a b^2 c + 16 a^2 c^2}}{\sqrt{c x^4 + b x^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((-c*g*x^4+f*x^3+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="giac")`

[Out] $((b^3*f - 4*a*b*c*f - 2*b^2*c*e + 8*a*c^2*e)*x/(b^4 - 8*a*b^2*c + 16*a^2*c^2) + (b^4*g - 8*a*b^2*c*g + 16*a^2*c^2*g)/(b^4 - 8*a*b^2*c + 16*a^2*c^2))*x + (2*a*b^2*f - 8*a^2*c*f - b^3*e + 4*a*b*c*e)/(b^4 - 8*a*b^2*c + 16*a^2*c^2)/\sqrt{c*x^4 + b*x^2 + a}$

maple [A] time = 0.00, size = 63, normalized size = 0.91

$$\frac{4acgx - b^2gx - bfx^2 + 2cex^2 - 2af + be}{\sqrt{cx^4 + bx^2 + a} (4ac - b^2)}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((-c*g*x^4+f*x^3+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x)`

[Out] $(4*a*c*g*x - b^2*g*x - b*f*x^2 + 2*c*e*x^2 - 2*a*f + b*e)/(c*x^4 + b*x^2 + a)^{(1/2)}/(4*a*c - b^2)$

maxima [A] time = 0.68, size = 94, normalized size = 1.36

$$\frac{\sqrt{cx^4 + bx^2 + a}((2ce - bf)x^2 + be - 2af - (b^2g - 4acg)x)}{(b^2c - 4ac^2)x^4 + ab^2 - 4a^2c + (b^3 - 4abc)x^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((-c*g*x^4+f*x^3+a*g+e*x)/(c*x^4+b*x^2+a)^(3/2),x, algorithm="maxima")`

[Out] $-\sqrt{c*x^4 + b*x^2 + a} * ((2*c*e - b*f)*x^2 + b*e - 2*a*f - (b^2*g - 4*a*c*g)*x) / ((b^2*c - 4*a*c^2)*x^4 + a*b^2 - 4*a^2*c + (b^3 - 4*a*b*c)*x^2)$

mupad [B] time = 0.98, size = 62, normalized size = 0.90

$$\frac{g b^2 x + f b x^2 - e b - 2 c e x^2 - 4 a c g x + 2 a f}{(4 a c - b^2) \sqrt{c x^4 + b x^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((a*g + e*x + f*x^3 - c*g*x^4)/(a + b*x^2 + c*x^4)^(3/2),x)`

[Out] $-(2*a*f - b*e + b*f*x^2 - 2*c*e*x^2 + b^2*g*x - 4*a*c*g*x)/((4*a*c - b^2)*(a + b*x^2 + c*x^4)^{(1/2)})$

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$-\int \left(-\frac{ag}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} \right) dx - \int \left(-\frac{ex}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4}} \right) dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `integrate((-c*g*x**4+f*x**3+a*g+e*x)/(c*x**4+b*x**2+a)**(3/2),x)`

[Out] $-\text{Integral}(-a*g/(a*\text{sqrt}(a + b*x**2 + c*x**4) + b*x**2*\text{sqrt}(a + b*x**2 + c*x**4) + c*x**4*\text{sqrt}(a + b*x**2 + c*x**4)), x) - \text{Integral}(-e*x/(a*\text{sqrt}(a + b*x**2 + c*x**4) + b*x**2*\text{sqrt}(a + b*x**2 + c*x**4) + c*x**4*\text{sqrt}(a + b*x**2 + c*x**4))), x) - \text{Integral}(-f*x**3/(a*\text{sqrt}(a + b*x**2 + c*x**4) + b*x**2*\text{sqrt}(a + b*x**2 + c*x**4) + c*x**4*\text{sqrt}(a + b*x**2 + c*x**4))), x) - \text{Integral}(c*g*x**4/(a*\text{sqrt}(a + b*x**2 + c*x**4) + b*x**2*\text{sqrt}(a + b*x**2 + c*x**4) + c*x**4*\text{sqrt}(a + b*x**2 + c*x**4))), x)$

Chapter 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 Maple and for Mathematica/Rubi. There is a version for grading Sympy and version for use with Sagemath.

The following are links to the current source code.

The following are the listings of source code of the grading functions.

4.0.1 Mathematica and Rubi grading function

```
(* 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]

```

4.0.2 Maple grading function

```

# 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

```

```

#Nasser 12/22/2019 Added debug flag, added 'dilog' to special functions
# see problem 156, file Apostol_Problems

GradeAntiderivative := proc(result,optimal)
local leaf_count_result, leaf_count_optimal,ExpnType_result,ExpnType_optimal,
  debug:=false;

  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);

  if debug then
    print("ExpnType_result",ExpnType_result," ExpnType_optimal=",
  ExpnType_optimal);
  fi;

# 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

#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. But no harm of keeping it here.
#just in case.

if not type(result,freeof('int')) then
  return "F";
end if;

if ExpnType_result<=ExpnType_optimal then
  if debug then
    print("ExpnType_result<=ExpnType_optimal");
  fi;

```



```

if is_contains_complex(result) then
  if is_contains_complex(optimal) then
    if debug then
      print("both result and optimal complex");
    fi;
    #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
    if debug then
      print("result contains complex but optimal is not");
    fi;
    return "C";
  end if
else # result do not contain complex
  # this assumes optimal do not as well
  if debug then
    print("result do not contain complex, this assumes optimal do not
as well");
  fi;
  if leaf_count_result<=2*leaf_count_optimal then
    if debug then
      print("leaf_count_result<=2*leaf_count_optimal");
    fi;
    return "A";
  else
    if debug then
      print("leaf_count_result>2*leaf_count_optimal");
    fi;
    return "B";
  end if
end if
else #ExpnType(result) > ExpnType(optimal)
  if debug then
    print("ExpnType(result) > ExpnType(optimal)");
  fi;
  return "C";
end if

end proc:

#
# is_contains_complex(result)
# takes expressions and returns true if it contains "I" else false

```

```

#
#Nasser 032417
is_contains_complex:= proc(expression)
  return (has(expression,I));
end proc:

# 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 := 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)])))
  end if
end proc:

```

```

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' 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,dilog,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:
```

4.0.3 Sympy grading function

```
#Dec 24, 2019. Nasser M. Abbasi:
#           Port of original Maple grading function by
#           Albert Rich to use with Sympy/Python
#Dec 27, 2019 Nasser. Added `RootSum`. See problem 177, Timofeev file
#           added 'exp_polar'
from sympy import *

def leaf_count(expr):
    #sympy do not have leaf count function. This is approximation
    return round(1.7*count_ops(expr))

def is_sqrt(expr):
    if isinstance(expr,Pow):
        if expr.args[1] == Rational(1,2):
            return True
        else:
            return False
    else:
        return False

def is_elementary_function(func):
    return func in [exp,log,ln,sin,cos,tan,cot,sec,csc,
        asin,acos,atan,acot,asec,acsc,sinh,cosh,tanh,coth,sech,csch,
        asinh,acosh,atanh,acoth,asech,acsch
        ]

def is_special_function(func):
    return func in [ erf,erfc,erfi,
        fresnels,fresnelc,Ei,Ei,Li,Si,Ci,Shi,Chi,
        gamma,loggamma,digamma,zeta,polylog,LambertW,
        elliptic_f,elliptic_e,elliptic_pi,exp_polar
        ]

def is_hypergeometric_function(func):
    return func in [hyper]

def is_appell_function(func):
    return func in [appellf1]
```

```

def is_atom(expn):
    try:
        if expn.isAtom or isinstance(expn,int) or isinstance(expn,float):
            return True
        else:
            return False

    except AttributeError as error:
        return False

def expnType(expn):
    debug=False
    if debug:
        print("expn=",expn,"type(expn)=",type(expn))

    if is_atom(expn):
        return 1
    elif isinstance(expn,list):
        return max(map(expnType, expn)) #apply(max,map(ExpnType,expn))
    elif is_sqrt(expn):
        if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
            return 1
        else:
            return max(2,expnType(expn.args[0])) #max(2,ExpnType(op(1,expn)))
    elif isinstance(expn,Pow): #type(expn,'`^`')
        if isinstance(expn.args[1],Integer): #type(op(2,expn),'integer')
            return expnType(expn.args[0]) #ExpnType(op(1,expn))
        elif isinstance(expn.args[1],Rational): #type(op(2,expn),'rational')
            if isinstance(expn.args[0],Rational): #type(op(1,expn),'rational')
                return 1
            else:
                return max(2,expnType(expn.args[0])) #max(2,ExpnType(op(1,expn)
))
        else:
            return max(3,expnType(expn.args[0]),expnType(expn.args[1])) #max(3,
ExpnType(op(1,expn)),ExpnType(op(2,expn)))
    elif isinstance(expn,Add) or isinstance(expn,Mul): #type(expn,'`+`') or type
(expn,'`*`')
        m1 = expnType(expn.args[0])
        m2 = expnType(list(expn.args[1:]))
        return max(m1,m2) #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
    elif is_elementary_function(expn.func): #ElementaryFunctionQ(op(0,expn))
        return max(3,expnType(expn.args[0])) #max(3,ExpnType(op(1,expn)))
    elif is_special_function(expn.func): #SpecialFunctionQ(op(0,expn))
        m1 = max(map(expnType, list(expn.args)))
        return max(4,m1) #max(4,apply(max,map(ExpnType,[op(expn)])))

```

```

elif is_hypergeometric_function(expn.func): #HypergeometricFunctionQ(op(0,
expn))
    m1 = max(map(expnType, list(expn.args)))
    return max(5,m1) #max(5,apply(max,map(ExpnType,[op(expn)])))
elif is_appell_function(expn.func):
    m1 = max(map(expnType, list(expn.args)))
    return max(6,m1) #max(5,apply(max,map(ExpnType,[op(expn)])))
elif isinstance(expn,RootSum):
    m1 = max(map(expnType, list(expn.args))) #Apply[Max,Append[Map[ExpnType,
Apply[List,expn]],7]],
    return max(7,m1)
elif str(expn).find("Integral") != -1:
    m1 = max(map(expnType, list(expn.args)))
    return max(8,m1) #max(5,apply(max,map(ExpnType,[op(expn)])))
else:
    return 9

#main function
def grade_antiderivative(result,optimal):

    leaf_count_result = leaf_count(result)
    leaf_count_optimal = leaf_count(optimal)

    expnType_result = expnType(result)
    expnType_optimal = expnType(optimal)

    if str(result).find("Integral") != -1:
        return "F"

    if expnType_result <= expnType_optimal:
        if result.has(I):
            if optimal.has(I): #both result and optimal complex
                if leaf_count_result <= 2*leaf_count_optimal:
                    return "A"
                else:
                    return "B"
            else: #result contains complex but optimal is not
                return "C"
        else: # result do not contain complex, this assumes optimal do not as
well
            if leaf_count_result <= 2*leaf_count_optimal:
                return "A"
            else:
                return "B"
    else:
        return "C"

```

4.0.4 SageMath grading function

```

#Dec 24, 2019. Nasser: Ported original Maple grading function by
#       Albert Rich to use with Sagemath. This is used to
#       grade Fracas, Giac and Maxima results.
#Dec 24, 2019. Nasser: Added 'exp_integral_e' and 'sng', 'sin_integral'
#       'arctan2','floor','abs','log_integral'

from sage.all import *
from sage.symbolic.operators import add_vararg, mul_vararg

debug=False;

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

def is_sqrt(expr):
    if expr.operator() == operator.pow: #isinstance(expr,Pow):
        if expr.operands()[1]==1/2: #expr.args[1] == Rational(1,2):
            if debug: print ("expr is sqrt")
            return True
        else:
            return False
    else:
        return False

def is_elementary_function(func):
    debug=False
    m = func.name() in ['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','sgn',
        'arctan2','floor','abs'
    ]
    if debug:
        if m:

```

```

        print ("func ", func , " is elementary_function")
    else:
        print ("func ", func , " is NOT elementary_function")

    return m

def is_special_function(func):
    debug=False
    if debug: print ("type(func)=", type(func))

    m= func.name() in ['erf','erfc','erfi','fresnel_sin','fresnel_cos','Ei',
        'Ei','Li','Si','sin_integral','Ci','cos_integral','Shi','
sinh_integral'
        'Chi','cosh_integral','gamma','log_gamma','psi,zeta',
        'polylog','lambert_w','elliptic_f','elliptic_e',
        'elliptic_pi','exp_integral_e','log_integral']

    if debug:
        print ("m=",m)
        if m:
            print ("func ", func ," is special_function")
        else:
            print ("func ", func ," is NOT special_function")

    return m

def is_hypergeometric_function(func):
    return func.name() in ['hypergeometric','hypergeometric_M','hypergeometric_U
']

def is_appell_function(func):
    return func.name() in ['hypergeometric']    #[appellf1] can't find this in
sagemath

def is_atom(expn):

    debug=False
    if debug: print ("Enter is_atom")

    #thanks to answer at https://ask.sagemath.org/question/49179/what-is-sagemath-equivalent-to-atomic-type-in-maple/
    try:
        if expn.parent() is SR:

```



```

        return expn.operator() is None
    if expn.parent() in (ZZ, QQ, AA, QQbar):
        return expn in expn.parent() # Should always return True
    if hasattr(expn.parent(), "base_ring") and hasattr(expn.parent(), "gens"):
        return expn in expn.parent().base_ring() or expn in expn.parent().
gens()
    return False

except AttributeError as error:
    return False

def expnType(expn):

    if debug:
        print (">>>>Enter expnType, expn=", expn)
        print (">>>>is_atom(expn)=", is_atom(expn))

    if is_atom(expn):
        return 1
    elif type(expn)==list: #instance(expn,list):
        return max(map(expnType, expn)) #apply(max,map(ExpnType,expn))
    elif is_sqrt(expn):
        if type(expn.operands()[0])==Rational: #type(instance(expn.args[0],
Rational):
            return 1
        else:
            return max(2,expnType(expn.operands()[0])) #max(2,expnType(expn.
args[0]))
    elif expn.operator() == operator.pow: #instance(expn,Pow)
        if type(expn.operands()[1])==Integer: #instance(expn.args[1],Integer)
            return expnType(expn.operands()[0]) #expnType(expn.args[0])
        elif type(expn.operands()[1])==Rational: #instance(expn.args[1],
Rational)
            if type(expn.operands()[0])==Rational: #instance(expn.args[0],
Rational)
                return 1
            else:
                return max(2,expnType(expn.operands()[0])) #max(2,expnType(expn.
args[0]))
        else:
            return max(3,expnType(expn.operands()[0]),expnType(expn.operands()
[1])) #max(3,expnType(expn.operands()[0]),expnType(expn.operands()[1]))
    elif expn.operator() == add_vararg or expn.operator() == mul_vararg: #
instance(expn,Add) or instance(expn,Mul)
        m1 = expnType(expn.operands()[0]) #expnType(expn.args[0])
        m2 = expnType(expn.operands()[1:]) #expnType(list(expn.args[1:]))

```

```

    return max(m1,m2) #max(ExpnType(op(1,expn)),max(ExpnType(rest(expn))))
elif is_elementary_function(expn.operator()): #is_elementary_function(expn.
func)
    return max(3,expnType(expn.operands()[0]))
elif is_special_function(expn.operator()): #is_special_function(expn.func)
    m1 = max(map(expnType, expn.operands())) #max(map(expnType, list(
expn.args)))
    return max(4,m1) #max(4,m1)
elif is_hypergeometric_function(expn.operator()): #
is_hypergeometric_function(expn.func)
    m1 = max(map(expnType, expn.operands())) #max(map(expnType, list(
expn.args)))
    return max(5,m1) #max(5,m1)
elif is_appell_function(expn.operator()):
    m1 = max(map(expnType, expn.operands())) #max(map(expnType, list(
expn.args)))
    return max(6,m1) #max(6,m1)
elif str(expn).find("Integral") != -1: #this will never happen, since it
#is checked before calling the grading function that is passed.
#but kept it here.
    m1 = max(map(expnType, expn.operands())) #max(map(expnType, list(
expn.args)))
    return max(8,m1) #max(5,apply(max,map(ExpnType,[op(expn)])))
else:
    return 9

```

```
#main function
```

```
def grade_antiderivative(result,optimal):
```

```

    if debug: print ("Enter grade_antiderivative for sagemath")

    leaf_count_result = tree_size(result) #leaf_count(result)
    leaf_count_optimal = tree_size(optimal) #leaf_count(optimal)

    if debug: print ("leaf_count_result=", leaf_count_result, "
leaf_count_optimal=",leaf_count_optimal)

    expnType_result = expnType(result)
    expnType_optimal = expnType(optimal)

    if debug: print ("expnType_result=", expnType_result, "expnType_optimal=",
expnType_optimal)

    if expnType_result <= expnType_optimal:
        if result.has(I):
            if optimal.has(I): #both result and optimal complex

```

```
        if leaf_count_result <= 2*leaf_count_optimal:
            return "A"
        else:
            return "B"
    else: #result contains complex but optimal is not
        return "C"
else: # result do not contain complex, this assumes optimal do not as
well
    if leaf_count_result <= 2*leaf_count_optimal:
        return "A"
    else:
        return "B"
else:
    return "C"
```