

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-^p

Nasser M. Abbasi

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Contents

1	Introduction	3
1.1	Listing of CAS systems tested	3
1.2	Results	3
1.3	Performance	7
1.4	list of integrals that has no closed form antiderivative	8
1.5	list of integrals solved by CAS but has no known antiderivative	8
1.6	list of integrals solved by CAS but failed verification	8
1.7	Timing	9
1.8	Verification	9
1.9	Important notes about some of the results	9
1.9.1	Important note about Maxima results	9
1.9.2	Important note about FriCAS and Giac/XCAS results	10
1.9.3	Important note about finding leaf size of antiderivative	10
1.9.4	Important note about Mupad results	11
1.10	Design of the test system	11
2	detailed summary tables of results	13
2.1	List of integrals sorted by grade for each CAS	13
2.1.1	Rubi	13
2.1.2	Mathematica	13
2.1.3	Maple	13
2.1.4	Maxima	13
2.1.5	FriCAS	14
2.1.6	Sympy	14
2.1.7	Giac	14
2.1.8	Mupad	14
2.2	Detailed conclusion table per each integral for all CAS systems	15
2.3	Detailed conclusion table specific for Rubi results	33
3	Listing of integrals	39
3.1	$\int (d + ex)(a + bx^2 + cx^4) dx$	39
3.2	$\int (d + ex + fx^2)(a + bx^2 + cx^4) dx$	41
3.3	$\int (d + ex + fx^2 + gx^3)(a + bx^2 + cx^4) dx$	43
3.4	$\int (a + bx^2 + cx^4)(d + ex + fx^2 + gx^3 + hx^4) dx$	45
3.5	$\int (a + bx^2 + cx^4)(d + ex + fx^2 + gx^3 + hx^4 + ix^5) dx$	47

3.6	$\int (d + ex)(a + bx^2 + cx^4)^2 dx$	50
3.7	$\int (d + ex + fx^2)(a + bx^2 + cx^4)^2 dx$	53
3.8	$\int (d + ex + fx^2 + gx^3)(a + bx^2 + cx^4)^2 dx$	56
3.9	$\int (a + bx^2 + cx^4)^2 (d + ex + fx^2 + gx^3 + hx^4) dx$	59
3.10	$\int \frac{d+ex}{4-5x^2+x^4} dx$	62
3.11	$\int \frac{d+ex+fx^2}{4-5x^2+x^4} dx$	65
3.12	$\int \frac{d+ex+fx^2+gx^3}{4-5x^2+x^4} dx$	69
3.13	$\int \frac{d+ex+fx^2+gx^3+hx^4}{4-5x^2+x^4} dx$	72
3.14	$\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{4-5x^2+x^4} dx$	75
3.15	$\int \frac{d+ex}{1+x^2+x^4} dx$	78
3.16	$\int \frac{d+ex+fx^2}{1+x^2+x^4} dx$	82
3.17	$\int \frac{d+ex+fx^2+gx^3}{1+x^2+x^4} dx$	87
3.18	$\int \frac{d+ex+fx^2+gx^3+hx^4}{1+x^2+x^4} dx$	91
3.19	$\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{1+x^2+x^4} dx$	95
3.20	$\int \frac{d+ex}{a+bx^2+cx^4} dx$	100
3.21	$\int \frac{d+ex+fx^2}{a+bx^2+cx^4} dx$	104
3.22	$\int \frac{d+ex+fx^2+gx^3}{a+bx^2+cx^4} dx$	110
3.23	$\int \frac{d+ex+fx^2+gx^3+hx^4}{a+bx^2+cx^4} dx$	121
3.24	$\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{a+bx^2+cx^4} dx$	129
3.25	$\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{a+bx^2+cx^4} dx$	140
3.26	$\int \frac{d+ex}{(4-5x^2+x^4)^2} dx$	168
3.27	$\int \frac{d+ex+fx^2}{(4-5x^2+x^4)^2} dx$	172
3.28	$\int \frac{d+ex+fx^2+gx^3}{(4-5x^2+x^4)^2} dx$	177
3.29	$\int \frac{d+ex+fx^2+gx^3+hx^4}{(4-5x^2+x^4)^2} dx$	181
3.30	$\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(4-5x^2+x^4)^2} dx$	185
3.31	$\int \frac{d+ex}{(1+x^2+x^4)^2} dx$	190
3.32	$\int \frac{d+ex+fx^2}{(1+x^2+x^4)^2} dx$	195
3.33	$\int \frac{d+ex+fx^2+gx^3}{(1+x^2+x^4)^2} dx$	201
3.34	$\int \frac{d+ex+fx^2+gx^3+hx^4}{(1+x^2+x^4)^2} dx$	205
3.35	$\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(1+x^2+x^4)^2} dx$	210
3.36	$\int \frac{d+ex}{(a+bx^2+cx^4)^2} dx$	216
3.37	$\int \frac{d+ex+fx^2}{(a+bx^2+cx^4)^2} dx$	223
3.38	$\int \frac{d+ex+fx^2+gx^3}{(a+bx^2+cx^4)^2} dx$	232
3.39	$\int \frac{d+ex+fx^2+gx^3+hx^4}{(a+bx^2+cx^4)^2} dx$	242

- 3.40 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(a+bx^2+cx^4)^2} dx \dots\dots\dots 255$
- 3.41 $\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{(a+bx^2+cx^4)^2} dx \dots\dots\dots 267$
- 3.42 $\int \frac{d+ex}{(4-5x^2+x^4)^3} dx \dots\dots\dots 305$
- 3.43 $\int \frac{d+ex+fx^2}{(4-5x^2+x^4)^3} dx \dots\dots\dots 310$
- 3.44 $\int \frac{d+ex+fx^2+gx^3}{(4-5x^2+x^4)^3} dx \dots\dots\dots 317$
- 3.45 $\int \frac{d+ex+fx^2+gx^3+hx^4}{(4-5x^2+x^4)^3} dx \dots\dots\dots 322$
- 3.46 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(4-5x^2+x^4)^3} dx \dots\dots\dots 327$
- 3.47 $\int \frac{d+ex}{(1+x^2+x^4)^3} dx \dots\dots\dots 332$
- 3.48 $\int \frac{d+ex+fx^2}{(1+x^2+x^4)^3} dx \dots\dots\dots 337$
- 3.49 $\int \frac{d+ex+fx^2+gx^3}{(1+x^2+x^4)^3} dx \dots\dots\dots 344$
- 3.50 $\int \frac{d+ex+fx^2+gx^3+hx^4}{(1+x^2+x^4)^3} dx \dots\dots\dots 349$
- 3.51 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(1+x^2+x^4)^3} dx \dots\dots\dots 355$
- 3.52 $\int \frac{d+ex}{(a+bx^2+cx^4)^3} dx \dots\dots\dots 361$
- 3.53 $\int \frac{d+ex+fx^2}{(a+bx^2+cx^4)^3} dx \dots\dots\dots 370$
- 3.54 $\int \frac{d+ex+fx^2+gx^3}{(a+bx^2+cx^4)^3} dx \dots\dots\dots 380$
- 3.55 $\int \frac{d+ex+fx^2+gx^3+hx^4}{(a+bx^2+cx^4)^3} dx \dots\dots\dots 392$
- 3.56 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5}{(a+bx^2+cx^4)^3} dx \dots\dots\dots 411$
- 3.57 $\int \frac{d+ex+fx^2+gx^3+hx^4+jx^5+kx^6+lx^7+mx^8}{(a+bx^2+cx^4)^3} dx \dots\dots\dots 433$
- 3.58 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5+jx^6+kx^7}{(a+bx^2+cx^4)^2} dx \dots\dots\dots 487$
- 3.59 $\int \frac{d+ex+fx^2+gx^3+hx^4+ix^5+jx^8+kx^{11}}{(a+bx^2+cx^4)^3} dx \dots\dots\dots 513$
- 3.60 $\int (a+bx^2+cx^4)^3 (ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6) dx 562$
- 3.61 $\int (a+bx^2+cx^4)^2 (ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6) dx 566$
- 3.62 $\int (a+bx^2+cx^4) (ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6) dx 569$
- 3.63 $\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{a+bx^2+cx^4} dx \dots\dots\dots 572$
- 3.64 $\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^2} dx \dots\dots\dots 574$
- 3.65 $\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^3} dx \dots\dots\dots 580$
- 3.66 $\int \frac{ad+aex+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^4} dx \dots\dots\dots 589$
- 3.67 $\int \frac{2-x-2x^2+x^3}{4-5x^2+x^4} dx \dots\dots\dots 599$
- 3.68 $\int \frac{(d+ex)(2-x-2x^2+x^3)}{4-5x^2+x^4} dx \dots\dots\dots 601$
- 3.69 $\int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{4-5x^2+x^4} dx \dots\dots\dots 603$

3.70	$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx$	605
3.71	$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx$	608
3.72	$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx$	611
3.73	$\int \frac{2-3x+x^2}{4-5x^2+x^4} dx$	614
3.74	$\int \frac{(d+ex)(2-3x+x^2)}{4-5x^2+x^4} dx$	616
3.75	$\int \frac{(2-3x+x^2)(d+ex+fx^2)}{4-5x^2+x^4} dx$	618
3.76	$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx$	621
3.77	$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx$	624
3.78	$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx$	627
3.79	$\int \frac{2+x}{4-5x^2+x^4} dx$	630
3.80	$\int \frac{(2+x)(d+ex)}{4-5x^2+x^4} dx$	632
3.81	$\int \frac{(2+x)(d+ex+fx^2)}{4-5x^2+x^4} dx$	635
3.82	$\int \frac{(2+x)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx$	638
3.83	$\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx$	641
3.84	$\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx$	644
3.85	$\int \frac{2-x-2x^2+x^3}{(4-5x^2+x^4)^2} dx$	647
3.86	$\int \frac{(d+ex)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx$	649
3.87	$\int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx$	652
3.88	$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$	655
3.89	$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$	658
3.90	$\int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$	661
3.91	$\int \frac{2-3x+x^2}{(4-5x^2+x^4)^2} dx$	664
3.92	$\int \frac{(d+ex)(2-3x+x^2)}{(4-5x^2+x^4)^2} dx$	667
3.93	$\int \frac{(2-3x+x^2)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx$	671
3.94	$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$	675
3.95	$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$	678
3.96	$\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$	681
3.97	$\int \frac{2+x}{(4-5x^2+x^4)^2} dx$	684
3.98	$\int \frac{(2+x)(d+ex)}{(4-5x^2+x^4)^2} dx$	687
3.99	$\int \frac{(2+x)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx$	690

3.100	$\int \frac{(2+x)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx$	693
3.101	$\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx$	696
3.102	$\int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+ix^5)}{(4-5x^2+x^4)^2} dx$	699
3.103	$\int (d+ex+fx^2+gx^3)(a+bx^2+cx^4)^{3/2} dx$	702
3.104	$\int (d+ex+fx^2+gx^3)\sqrt{a+bx^2+cx^4} dx$	707
3.105	$\int \frac{d+ex+fx^2+gx^3}{\sqrt{a+bx^2+cx^4}} dx$	712
3.106	$\int \frac{d+ex+fx^2+gx^3}{(a+bx^2+cx^4)^{3/2}} dx$	716
3.107	$\int \frac{d+ex+fx^2+gx^3}{(a+bx^2+cx^4)^{5/2}} dx$	720
3.108	$\int \frac{ag-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$	725
3.109	$\int \frac{ag+ex-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$	727
3.110	$\int \frac{ag+fx^3-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$	730
3.111	$\int \frac{ag+ex+fx^3-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$	733
4	Listing of Grading functions	737
4.0.1	Mathematica and Rubi grading function	737
4.0.2	Maple grading function	739
4.0.3	Sympy grading function	742
4.0.4	SageMath grading function	744

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 Hypergeometric $2F1$ 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.

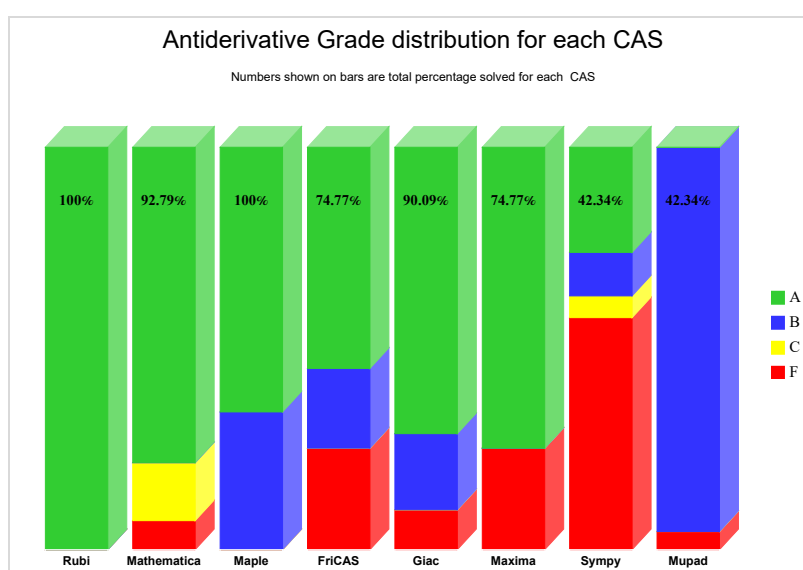
Table 1.2: Description of grading applied to integration result

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

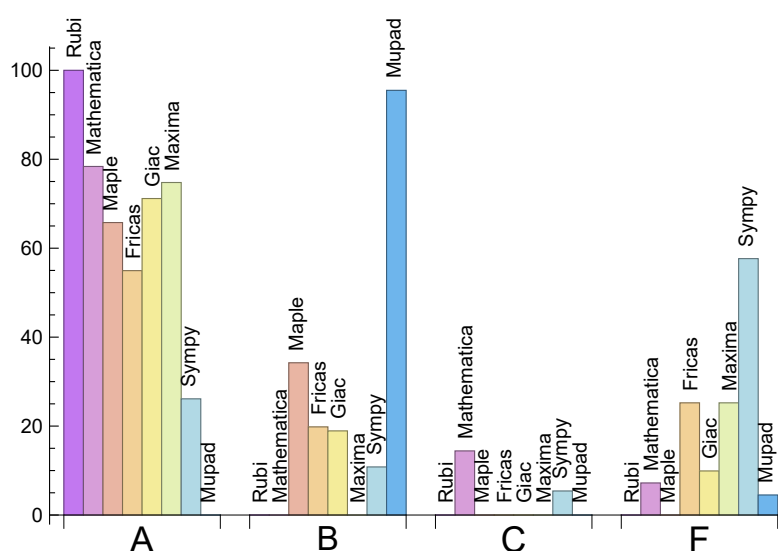
System	% A grade	% B grade	% C grade	% F grade
Rubi	100.00	0.00	0.00	0.00
Mathematica	78.38	0.00	14.41	7.21
Maple	65.77	34.23	0.00	0.00
Maxima	74.77	0.00	0.00	25.23
Fricas	54.95	19.82	0.00	25.23
Sympy	26.13	10.81	5.41	57.66
Giac	71.17	18.92	0.00	9.91
Mupad	0.00	95.50	0.00	4.50

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

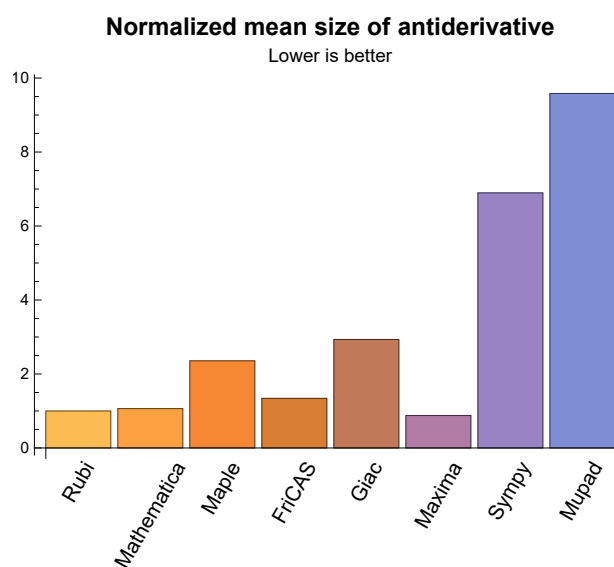
1.3 Performance

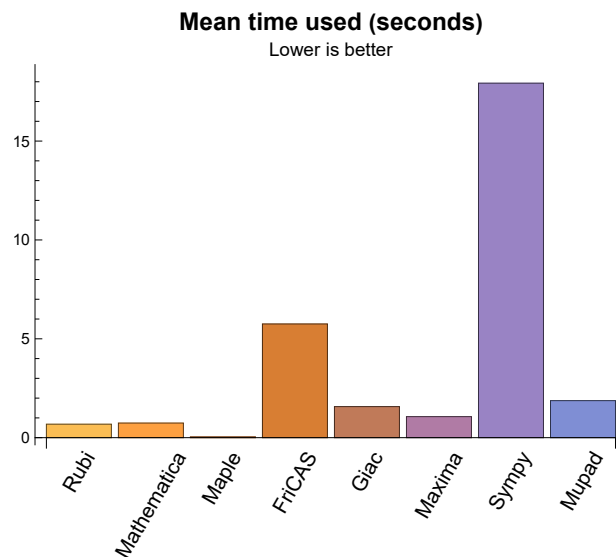
The table below summarizes the performance of each CAS system in terms of CPU time and leaf size of results.

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

{}

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 identified 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.

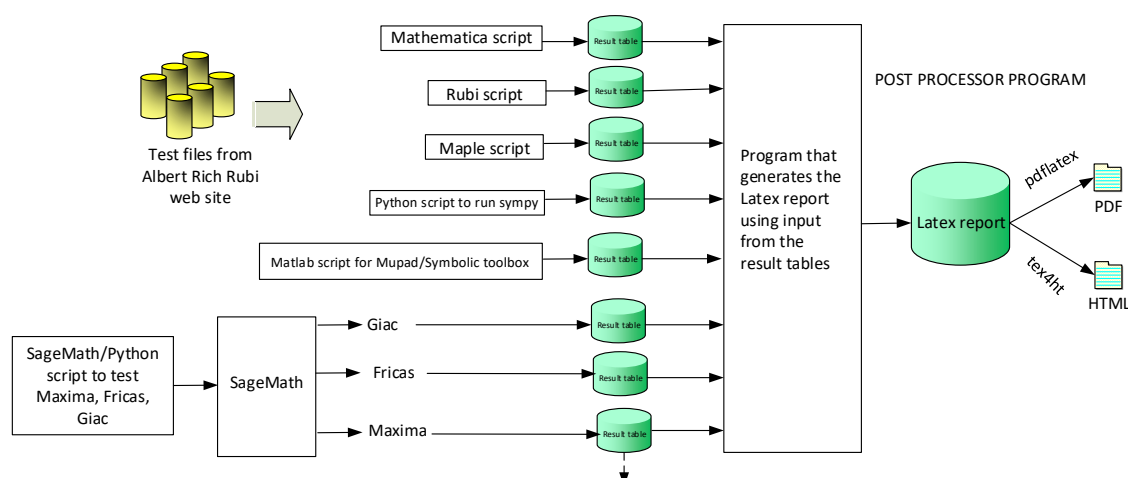
The following is an example of using Matlab's symbolic toolbox (Mupad) to solve an integral

```
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
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

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
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
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

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
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
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
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

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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	$\frac{\text{number of rules}}{\text{integrand leaf size}}$
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] 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

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

$$\begin{aligned} \int (d + ex) (a + bx^2 + cx^4) dx &= \int (ad + aex + bdx^2 + bex^3 + cdx^4 + cex^5) dx \\ &= adx + \frac{1}{2}aex^2 + \frac{1}{3}bdx^3 + \frac{1}{4}bex^4 + \frac{1}{5}cdx^5 + \frac{1}{6}cex^6 \end{aligned}$$

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

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

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

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

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

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),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

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

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((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

$$\begin{aligned} \int (a + bx^2 + cx^4)(d + ex + fx^2 + gx^3 + hx^4) dx &= \int (ad + aex + (bd + af)x^2 + (be + ag)x^3 + (cd + bf + ah)x^4 + (ce + bg)x^5 + (cf + bh)x^6 + cgx^7 + chx^8) dx \\ &= adx + \frac{1}{2}aex^2 + \frac{1}{3}(bd + af)x^3 + \frac{1}{4}(be + ag)x^4 + \frac{1}{5}(cd + bf + ah)x^5 + \frac{1}{6}(ce + bg)x^6 + \frac{1}{7}(cf + bh)x^7 + \frac{1}{8}cgx^8 + \frac{1}{9}chx^9 \end{aligned}$$

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

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

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

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

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

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

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] $\frac{1}{10}cix^{10} + \frac{1}{9}chx^9 + \frac{1}{8}cgx^8 + \frac{1}{8}bix^8 + \frac{1}{7}cfx^7 + \frac{1}{7}bhx^7 + \frac{1}{6}bgx^6 + \frac{1}{6}aix^6 + \frac{1}{6}cx^6e + \frac{1}{5}cdx^5 + \frac{1}{5}bfx^5 + \frac{1}{5}ahx^5 + \frac{1}{4}agx^4 + \frac{1}{4}adx^4 + \frac{1}{2}x^2e + xda$

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

$$\frac{1}{10}cix^{10} + \frac{1}{9}chx^9 + \frac{1}{8}cgx^8 + \frac{1}{8}bix^8 + \frac{1}{7}cfx^7 + \frac{1}{7}bhx^7 + \frac{1}{6}bgx^6 + \frac{1}{6}aix^6 + \frac{1}{6}cx^6e + \frac{1}{5}cdx^5 + \frac{1}{5}bfx^5 + \frac{1}{5}ahx^5 + \frac{1}{4}agx^4 + \frac{1}{4}adx^4 + \frac{1}{2}x^2e + xda$$

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] $\frac{1}{10}cix^{10} + \frac{1}{9}chx^9 + \frac{1}{8}cgx^8 + \frac{1}{8}bix^8 + \frac{1}{7}cfx^7 + \frac{1}{7}bhx^7 + \frac{1}{6}bgx^6 + \frac{1}{6}aix^6 + \frac{1}{6}cx^6e + \frac{1}{5}cdx^5 + \frac{1}{5}bfx^5 + \frac{1}{5}ahx^5 + \frac{1}{4}agx^4 + \frac{1}{4}adx^4 + \frac{1}{2}x^2e + xda$

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

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

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

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

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

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

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

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

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

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

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

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)

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

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

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

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

$$\frac{630a^2x(2d + ex) + 42a(5bx^3(4d + 3ex) + 2cx^5(6d + 5ex)) + 42b^2x^5(6d + 5ex) + 45bcx^7(8d + 7ex) + 14c^2x^9(10d + 9ex) + 42a(5b^2x^3(4d + 3ex) + 2c^2x^5(6d + 5ex))}{1260}$$

Antiderivative was successfully verified.

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

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

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

$$\frac{1}{10} x^{10} e c^2 + \frac{1}{9} x^9 d c^2 + \frac{1}{4} x^8 e c b + \frac{2}{7} x^7 d c b + \frac{1}{6} x^6 e b^2 + \frac{1}{3} x^6 e c a + \frac{1}{5} x^5 d b^2 + \frac{2}{5} x^5 d c a + \frac{1}{2} x^4 e b a + \frac{2}{3} x^3 d b a + \frac{1}{2} x^2 e a^2 + x d a^2$$

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

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] $\frac{1}{10}c^2x^{10}e + \frac{1}{9}c^2d*x^9 + \frac{1}{4}b*c*x^8*e + \frac{2}{7}b*c*d*x^7 + \frac{1}{6}b^2*x^6*e + \frac{1}{3}a*c*x^6*e + \frac{1}{5}b^2*d*x^5 + \frac{2}{5}a*c*d*x^5 + \frac{1}{2}a*b*x^4*e + \frac{2}{3}a*b*d*x^3 + \frac{1}{2}a^2*x^2*e + a^2*d*x$

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

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

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

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

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

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

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

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

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

[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}

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

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

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

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

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

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

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

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] $\frac{1}{11}x^{11}f*c^2 + \frac{1}{10}x^{10}e*c^2 + \frac{1}{9}x^9*d*c^2 + \frac{2}{9}x^9*f*c*b + \frac{1}{4}x^8*e*c*b + \frac{2}{7}x^7*d*c*b + \frac{1}{7}x^7*f*b^2 + \frac{2}{7}x^7*f*c*a + \frac{1}{6}x^6*e*b^2 + \frac{1}{3}x^6*e*c*a + \frac{1}{5}x^5*d*b^2 + \frac{2}{5}x^5*d*c*a + \frac{2}{5}x^5*f*b*a + \frac{1}{2}x^4*e*b*a + \frac{2}{3}x^3*d*b*a + \frac{1}{3}x^3*f*a^2 + \frac{1}{2}x^2*e*a^2 + x*d*a^2$

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

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

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] $\frac{1}{11}c^2f*x^{11} + \frac{1}{10}c^2*x^{10}e + \frac{1}{9}c^2*d*x^9 + \frac{2}{9}b*c*f*x^9 + \frac{1}{4}b*c*x^8*e + \frac{2}{7}b*c*d*x^7 + \frac{1}{7}b^2*f*x^7 + \frac{2}{7}a*c*f*x^7 + \frac{1}{6}b^2*x^6*e + \frac{1}{3}a*c*x^6*e + \frac{1}{5}b^2*d*x^5 + \frac{2}{5}a*c*d*x^5 + \frac{2}{5}a*b*f*x^5 + \frac{1}{2}a*b*x^4*e + \frac{2}{3}a*b*d*x^3 + \frac{1}{3}a^2*f*x^3 + \frac{1}{2}a^2*x^2*e + a^2*d*x$

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

$$\frac{c^2fx^{11}}{11} + \frac{c^2ex^{10}}{10} + \frac{bcex^8}{4} + \frac{(2fbc + c^2d)x^9}{9} + \frac{abex^4}{2} + \frac{(2ac + b^2)ex^6}{6} + \frac{(2bcd + (2ac + b^2)f)x^7}{7} + \frac{a^2ex^2}{2} + \frac{(2abf + (2ac + b^2)d)x^3}{3}$$

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)^2,x)

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

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

$$\frac{1}{11}c^2fx^{11} + \frac{1}{10}c^2ex^{10} + \frac{1}{4}bcex^8 + \frac{1}{9}(c^2d + 2bcf)x^9 + \frac{1}{6}(b^2 + 2ac)ex^6 + \frac{1}{7}(2bcd + (b^2 + 2ac)f)x^7 + \frac{1}{2}abex^4 + \frac{1}{5}(2abf + (2ac + b^2)d)x^3$$

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

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

$$x^5 \left(\frac{db^2}{5} + \frac{2afb}{5} + \frac{2acd}{5} \right) + x^7 \left(\frac{fb^2}{7} + \frac{2cdb}{7} + \frac{2acf}{7} \right) + x^3 \left(\frac{fa^2}{3} + \frac{2bda}{3} \right) + x^9 \left(\frac{dc^2}{9} + \frac{2bfc}{9} \right) + \frac{a^2ex^2}{2} + \frac{c^2ex^{10}}{10}$$

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

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

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

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

$$\begin{aligned} \int (d + ex + fx^2 + gx^3) (a + bx^2 + cx^4)^2 dx &= \int (a^2 d + a^2 ex + a(2bd + af)x^2 + a(2be + ag)x^3 + (b^2 d + 2acd + 2abf)x^4 + (b^2 e + 2ace + 2abg)x^5 + (2bcd + b^2 f + 2acf)x^6 + (2bce + b^2 g + 2acg)x^7 + (c^2 f)x^8 + (c^2 g)x^9) dx \\ &= a^2 dx + \frac{1}{2} a^2 ex^2 + \frac{1}{3} a(2bd + af)x^3 + \frac{1}{4} a(2be + ag)x^4 + \frac{1}{5} (b^2 d + 2acd + 2abf)x^5 + \frac{1}{6} (b^2 e + 2ace + 2abg)x^6 + \frac{1}{7} (2bcd + b^2 f + 2acf)x^7 + \frac{1}{8} (2bce + b^2 g + 2acg)x^8 + \frac{1}{9} c^2 f x^9 + \frac{1}{10} c^2 g x^{10} \end{aligned}$$

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

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

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] $\frac{1}{12}x^{12}g^2c^2 + \frac{1}{11}x^{11}f^2c^2 + \frac{1}{10}x^{10}e^2c^2 + \frac{1}{5}x^{10}g^2cb + \frac{1}{9}x^9d^2c^2 + \frac{2}{9}x^9f^2cb + \frac{1}{4}x^8e^2cb + \frac{1}{8}x^8g^2b^2 + \frac{1}{4}x^8g^2ca + \frac{2}{7}x^7d^2cb + \frac{1}{7}x^7f^2b^2 + \frac{2}{7}x^7f^2ca + \frac{1}{6}x^6e^2b^2 + \frac{1}{3}x^6e^2ca + \frac{1}{3}x^6g^2b^2 + \frac{1}{5}x^5d^2b^2 + \frac{2}{5}x^5d^2ca + \frac{2}{5}x^5f^2b^2 + \frac{1}{2}x^4e^2b^2 + \frac{1}{4}x^4g^2a^2 + \frac{2}{3}x^3d^2b^2 + \frac{1}{3}x^3f^2a^2 + \frac{1}{2}x^2e^2a^2 + xda^2$

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

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

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

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

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

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

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

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

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

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

$$x^5 \left(\frac{db^2}{5} + \frac{2afb}{5} + \frac{2acd}{5} \right) + x^6 \left(\frac{eb^2}{6} + \frac{agb}{3} + \frac{ace}{3} \right) + x^7 \left(\frac{fb^2}{7} + \frac{2cdb}{7} + \frac{2acf}{7} \right) + x^8 \left(\frac{gb^2}{8} + \frac{ceb}{4} + \frac{acg}{4} \right)$$

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

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

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

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)**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

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

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

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}

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

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

$$\int (a + bx^2 + cx^4)^2 (d + ex + fx^2 + gx^3 + hx^4) dx = \int (a^2 d + a^2 ex + a(2bd + af)x^2 + a(2be + ag)x^3 + (b^2 d + 2abf + a(2cd + ah))x^4 + (b^2 e + 2ace + 2abg)x^5 + (b^2 f + 2acf + 2b(cd + ah))x^6 + (2bce + b^2g + 2acg)x^7 + (c^2 d + b^2 h + 2c(bf + ah))x^8 + (c(c e + 2bg)x^9 + (c(c f + 2bh))x^{10} + (c^2 g)x^{11} + (c^2 h)x^{12})x^{13} / 13$$

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

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

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

+ 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

$$x^6 \left(\frac{eb^2}{6} + \frac{agb}{3} + \frac{ace}{3} \right) + x^8 \left(\frac{gb^2}{8} + \frac{ceb}{4} + \frac{acg}{4} \right) + x^3 \left(\frac{fa^2}{3} + \frac{2bda}{3} \right) + x^4 \left(\frac{ga^2}{4} + \frac{bea}{2} \right) + x^{10} \left(\frac{ec^2}{10} + \frac{bgc}{5} \right)$$

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 + (a^2*h)/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 + (2*a*b*h)/7) + x^9*((c^2*d)/9 + (b^2*h)/9 + (2*b*c*f)/9 + (2*a*c*h)/9) + (a^2*e*x^2)/2 + (c^2*g*x^12)/12 + (c^2*h*x^13)/13 + a^2*d*x

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

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

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*arctanh(1/2*x)+1/3*d*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] Int[(d + e*x)/(4 - 5*x^2 + x^4),x]

[Out] -(d*ArcTanh[x/2])/6 + (d*ArcTanh[x])/3 - (e*Log[1 - x^2])/6 + (e*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 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)*Log[1 - x] + (d + 2*e)*Log[2 - x] + 2*(d - e)*Log[1 + x] - (d - 2*e)*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(abs(x + 2)) + 1/6*(d - e)*log(abs(x + 1)) - 1/6*(d + e)*log(abs(x - 1)) + 1/12*(d + 2*e)*log(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] $-(d-2e)*\log(x + (-35*d**4*e + 51*d**4*(d-2e)/2 - 180*d**2*e**3 - 90*d**2*e**2*(d-2e) + 41*d**2*e*(d-2e)**2 - 15*d**2*(d-2e)**3/2 + 320*e**5 - 96*e**4*(d-2e) - 80*e**3*(d-2e)**2 + 24*e**2*(d-2e)**3)/(9*d**5 - 160*d**3*e**2 + 256*d*e**4))/12 + (d-e)*\log(x + (-35*d**4*e - 51*d**4*(d-e) - 180*d**2*e**3 + 180*d**2*e**2*(d-e) + 164*d**2*e*(d-e)**2 + 60*d**2*(d-e)**3 + 320*e**5 + 192*e**4*(d-e) - 320*e**3*(d-e)**2 - 192*e**2*(d-e)**3)/(9*d**5 - 160*d**3*e**2 + 256*d*e**4))/6 - (d+e)*\log(x + (-35*d**4*e + 51*d**4*(d+e) - 180*d**2*e**3 - 180*d**2*e**2*(d+e) + 164*d**2*e*(d+e)**2 - 60*d**2*(d+e)**3 + 320*e**5 - 192*e**4*(d+e) - 320*e**3*(d+e)**2 + 192*e**2*(d+e)**3)/(9*d**5 - 160*d**3*e**2 + 256*d*e**4))/6 + (d+2e)*\log(x + (-35*d**4*e - 51*d**4*(d+2e)/2 - 180*d**2*e**3 + 90*d**2*e**2*(d+2e) + 41*d**2*e*(d+2e)**2 + 15*d**2*(d+2e)**3/2 + 320*e**5 + 96*e**4*(d+2e) - 80*e**3*(d+2e)**2 - 24*e**2*(d+2e)**3)/(9*d**5 - 160*d**3*e**2 + 256*d*e**4))/12$

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

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

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

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

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

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

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

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

$$\begin{aligned}
& **5*f - 512*e**3*f*(d - e + f)**2 + 1152*e**2*f**3*(d - e + f) - 1472*e*f** \\
& 5 + 1280*e*f**3*(d - e + f)**2 + 960*f**5*(d - e + f) - 384*f**3*(d - e + 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 + 12 \\
& 80*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))/6 - (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 - 3 \\
& 20*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*(d + e + f)**2 - 1152*d*f**4*(d + \\
& e + f) + 240*d*f**2*(d + e + f)**3 + 512*e**5*f - 512*e**3*f*(d + e + f)**2 \\
& - 1152*e**2*f**3*(d + e + f) - 1472*e*f**5 + 1280*e*f**3*(d + e + f)**2 - \\
& 960*f**5*(d + e + f) + 384*f**3*(d + e + 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))/6 + (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) + 1 \\
& 5*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) + 1 \\
& 2*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) - 14 \\
& 72*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
\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)*arctanh(1/2*x)+1/3*(d+f)*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] Int[(d + e*x + f*x^2 + g*x^3)/(4 - 5*x^2 + x^4), x]

[Out] -((d + 4*f)*ArcTanh[x/2])/6 + ((d + f)*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] && 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

$*x^2 + c*x^4)^p, x] + \text{Int}[x*\text{Sum}[\text{Coeff}[\text{Pq}, x, 2*k + 1]*x^{(2*k)}, \{k, 0, (q - 1)/2\}](a + b*x^2 + c*x^4)^p, x]] /; \text{FreeQ}[\{a, b, c, p\}, x] \&\& \text{PolyQ}[\text{Pq}, x] \&\& !\text{PolyQ}[\text{Pq}, x^2]$

Rubi steps

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

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

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

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] && 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

$*x^2 + c*x^4)^p, x] + \text{Int}[x*\text{Sum}[\text{Coeff}[\text{Pq}, x, 2*k + 1]*x^{(2*k)}, \{k, 0, (q - 1)/2\}](a + b*x^2 + c*x^4)^p, x]] /; \text{FreeQ}[\{a, b, c, p\}, x] \&\& \text{PolyQ}[\text{Pq}, x] \&\& !\text{PolyQ}[\text{Pq}, x^2]$

Rule 1676

$\text{Int}[(\text{Pq}_)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] \rightarrow \text{Int}[\text{ExpandInte grand}[\text{Pq}/(a + b*x^2 + c*x^4), x], x] /; \text{FreeQ}[\{a, b, c\}, x] \&\& \text{PolyQ}[\text{Pq}, x^2] \&\& \text{Expon}[\text{Pq}, x^2] > 1$

Rubi steps

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

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

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

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] $h*x - 1/12*(d + 4*f - 8*g + 16*h - 2*e)*\log(\text{abs}(x + 2)) + 1/6*(d + f - g + h - e)*\log(\text{abs}(x + 1)) - 1/6*(d + f + g + h + e)*\log(\text{abs}(x - 1)) + 1/12*(d + 4*f + 8*g + 16*h + 2*e)*\log(\text{abs}(x - 2))$

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

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

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

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 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] && NeQ[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]

$p, x], x, x^2], x] /; \text{FreeQ}[\{a, b, c, p\}, x] \ \&\& \ \text{PolyQ}[\text{Pq}, x^2] \ \&\& \ \text{IntegerQ}[(m - 1)/2]$

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 1676

$\text{Int}[(\text{Pq}_-)/((a_-) + (b_-)(x_-)^2 + (c_-)(x_-)^4), x_Symbol] \ :> \ \text{Int}[\text{ExpandIntegrand}[\text{Pq}/(a + b*x^2 + c*x^4), x], x] /; \text{FreeQ}[\{a, b, c\}, x] \ \&\& \ \text{PolyQ}[\text{Pq}, x^2] \ \&\& \ \text{Expon}[\text{Pq}, x^2] > 1$

Rubi steps

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

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

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

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

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

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

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

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

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

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="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

$$hx+\frac{ix^2}{2}-\ln(x-1)\left(\frac{d}{6}+\frac{e}{6}+\frac{f}{6}+\frac{g}{6}+\frac{h}{6}+\frac{i}{6}\right)+\ln(x+1)\left(\frac{d}{6}-\frac{e}{6}+\frac{f}{6}-\frac{g}{6}+\frac{h}{6}-\frac{i}{6}\right)+\ln(x-2)\left(\frac{d}{12}+\frac{e}{6}+\frac{f}{3}+\frac{g}{3}+\frac{4h}{3}+\frac{8i}{3}\right)-\ln(x+2)\left(\frac{d}{12}-\frac{e}{6}+\frac{f}{3}-\frac{2g}{3}+\frac{4h}{3}-\frac{8i}{3}\right)$$

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

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] := 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 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

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

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

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

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

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

Verification of antiderivative is not currently implemented for this CAS.

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

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

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

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

$$-\ln\left(x - \frac{1}{2} - \frac{\sqrt{3}1i}{2}\right)\left(\frac{d}{4} + \frac{\sqrt{3}d1i}{12} + \frac{\sqrt{3}e1i}{6}\right) + \ln\left(x + \frac{1}{2} - \frac{\sqrt{3}1i}{2}\right)\left(\frac{d}{4} - \frac{\sqrt{3}d1i}{12} + \frac{\sqrt{3}e1i}{6}\right) + \ln\left(x - \frac{1}{2} + \frac{\sqrt{3}1i}{2}\right)\left(\frac{d}{4} - \frac{\sqrt{3}d1i}{12} - \frac{\sqrt{3}e1i}{6}\right) + \ln\left(x + \frac{1}{2} + \frac{\sqrt{3}1i}{2}\right)\left(\frac{d}{4} + \frac{\sqrt{3}d1i}{12} - \frac{\sqrt{3}e1i}{6}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] $\log\left(x - \frac{(3^{1/2}1i)}{2} + \frac{1}{2}\right)\left(\frac{d}{4} - \frac{(3^{1/2}d1i)}{12} + \frac{(3^{1/2}e1i)}{6}\right) - \log\left(x - \frac{(3^{1/2}1i)}{2} - \frac{1}{2}\right)\left(\frac{d}{4} + \frac{(3^{1/2}d1i)}{12} + \frac{(3^{1/2}e1i)}{6}\right) + \log\left(x + \frac{(3^{1/2}1i)}{2} - \frac{1}{2}\right)\left(\frac{d}{4} - \frac{(3^{1/2}d1i)}{12} - \frac{(3^{1/2}e1i)}{6}\right) + \log\left(x + \frac{(3^{1/2}1i)}{2} + \frac{1}{2}\right)\left(\frac{d}{4} + \frac{(3^{1/2}d1i)}{12} - \frac{(3^{1/2}e1i)}{6}\right)$

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

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

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

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

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

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

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

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} \cdot I \cdot (d + 2e + f)/12) \cdot \log(x + (-7d^{5/2}e + 6d^{5/2}(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12) + 25d^4ef + 18d^4f(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12) - 15d^3e^3 - 18d^3e^2(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12) - 25d^3ef^2 + 60d^3e(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^2 - 42d^3f^2(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12) + 72d^3(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^3 + 108d^2e^2f(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12) + 20d^2ef^3 - 144d^2ef(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^2 - 12d^2f^3(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12) - 144d^2f(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^3 + 4de^5 + 24de^4(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12) + 15de^3f^2 + 48de^3(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^2 - 54de^2f^2(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12) + 288de^2(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^3 - 20def^4 + 180def^2(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^2 + 36df^4(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12) - 72df^2(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^3 - 8e^5f - 96e^3f(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^2 + 36e^2f^3(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12) + 11ef^5 - 48ef^3(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^2 - 6f^5(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (d + 2e + f)/12) + 144f^3(-d/4 + f/4 - \sqrt{3} \cdot I \cdot (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^2ef^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} \cdot I \cdot (d + 2e + f)/12) \cdot \log(x + (-7d^{5/2}e + 6d^{5/2}(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12) + 25d^4ef + 18d^4f(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12) - 15d^3e^3 - 18d^3e^2(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12) - 25d^3ef^2 + 60d^3e(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^2 - 42d^3f^2(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12) + 72d^3(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^3 + 108d^2e^2f(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12) + 20d^2ef^3 - 144d^2ef(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^2 - 12d^2f^3(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12) - 144d^2f(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^3 + 4de^5 + 24de^4(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12) + 15de^3f^2 + 48de^3(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^2 - 54de^2f^2(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12) + 288de^2(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^3 - 20def^4 + 180def^2(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^2 + 36df^4(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12) - 72df^2(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^3 - 8e^5f - 96e^3f(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^2 + 36e^2f^3(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12) + 11ef^5 - 48ef^3(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12)^2 - 6f^5(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (d + 2e + f)/12) + 144f^3(-d/4 + f/4 + \sqrt{3} \cdot I \cdot (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^2ef^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} \cdot I \cdot (d - 2e + f)/12) \cdot \log(x + (-7d^{5/2}e + 6d^{5/2}(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12) + 25d^4ef + 18d^4f(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12) - 15d^3e^3 - 18d^3e^2(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12) - 25d^3ef^2 + 60d^3e(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12)^2 - 42d^3f^2(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12) + 72d^3(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12)^3 + 108d^2e^2f(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12) + 20d^2ef^3 - 144d^2ef(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12)^2 - 12d^2f^3(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12) + 144d^2f(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12)^3 + 4de^5 + 24de^4(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12) + 15de^3f^2 + 48de^3(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12)^2 - 54de^2f^2(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12) + 288de^2(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12)^3 - 20def^4 + 180def^2(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12)^2 + 36df^4(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12) - 72df^2(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12)^3 - 8e^5f - 96e^3f(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12)^2 + 36e^2f^3(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12) + 11ef^5 - 48ef^3(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12)^2 - 6f^5(d/4 - f/4 - \sqrt{3} \cdot I \cdot (d - 2e + f)/12) + 144f^3(d/4 - f/4 - \sqrt{3} \cdot I \cdot (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^2ef^2 - 3d^2f^4 + 16de^4f + 40de^2f^3 - 3df^5 - 16e^4f^2 - 8e^2f^4 + 3f^6))$

$$\begin{aligned}
& + 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} \\
& (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 + s \\
& \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 \\
&))
\end{aligned}$$

$$3.17 \quad \int \frac{d+ex+fx^2+gx^3}{1+x^2+x^4} dx$$

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, 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

$[b^2 - 4ac, 0] \ \&\& \ \text{NeQ}[c*d^2 - b*d*e + a*e^2, 0] \ \&\& \ \text{NegQ}[b^2 - 4ac]$

Rule 1247

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

Rule 1673

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

Rubi steps

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

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] $(2*\text{Sqrt}[2 - (2*I)*\text{Sqrt}[3]]*((2*I)*d + (-I + \text{Sqrt}[3])*f)*\text{ArcTan}[\frac{(-I + \text{Sqrt}[3])*x}{2}] + 2*(\text{Sqrt}[2 + (2*I)*\text{Sqrt}[3]]*((-2*I)*d + (I + \text{Sqrt}[3])*f)*\text{ArcTan}[\frac{(I + \text{Sqrt}[3])*x}{2}] + (-4*e + 2*g)*\text{ArcTan}[\frac{\text{Sqrt}[3]}{1 + 2*x^2}] + \text{Sqrt}[3]*g*\text{Log}[1 + x^2 + x^4]))/(8*\text{Sqrt}[3])$

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] $1/6*\text{sqrt}(3)*(d - 2*e + f + g)*\arctan(1/3*\text{sqrt}(3)*(2*x + 1)) + 1/6*\text{sqrt}(3)*(d + 2*e + f - g)*\arctan(1/3*\text{sqrt}(3)*(2*x - 1)) + 1/4*(d - f + g)*\log(x^2 + x + 1) - 1/4*(d - f - g)*\log(x^2 - x + 1)$

giac [A] time = 0.29, size = 85, normalized size = 0.67

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

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

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

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

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

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

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

[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}

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

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, 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

$[b^2 - 4ac, 0] \ \&\& \ \text{NeQ}[c*d^2 - b*d*e + a*e^2, 0] \ \&\& \ \text{NegQ}[b^2 - 4ac]$

Rule 1247

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

Rule 1673

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

Rule 1676

$\text{Int}[(Pq_*)/((a_*) + (b_*)*(x_*)^2 + (c_*)*(x_*)^4), x_Symbol] \ :> \ \text{Int}[\text{ExpandIntegrand}[Pq/(a + b*x^2 + c*x^4), x], x] \ /; \ \text{FreeQ}\{a, b, c\}, x] \ \&\& \ \text{PolyQ}[Pq, x^2] \ \&\& \ \text{Expon}[Pq, x^2] > 1$

Rubi steps

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

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

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

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

giac [A] time = 0.30, size = 94, normalized size = 0.69

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

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

maple [B] time = 0.01, size = 241, normalized size = 1.77

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

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] 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)+1/6*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)*arctan(1/3*(2*x+1)*3^(1/2))*h+1/4*f*ln(x^2-x+1)-1/4*d*ln(x^2-x+1)+1/4*g*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)*arctan(1/3*(2*x-1)*3^(1/2))*h

maxima [A] time = 2.62, size = 92, normalized size = 0.68

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

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

$(d - e*x)/(q + r*x + x^2), x], x]] /; \text{FreeQ}[\{a, b, c, d, e\}, x] \ \&\& \ \text{NeQ}[b^2 - 4*a*c, 0] \ \&\& \ \text{NeQ}[c*d^2 - b*d*e + a*e^2, 0] \ \&\& \ \text{NegQ}[b^2 - 4*a*c]$

Rule 1657

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

Rule 1663

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

Rule 1673

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

Rule 1676

$\text{Int}[(Pq_)/((a_) + (b_)*(x_)^2 + (c_)*(x_)^4), x_Symbol] :> \text{Int}[\text{ExpandIntegrand}[Pq/(a + b*x^2 + c*x^4), x], x] /; \text{FreeQ}[\{a, b, c\}, x] \ \&\& \ \text{PolyQ}[Pq, x^2] \ \&\& \ \text{Expon}[Pq, x^2] > 1$

Rubi steps

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3 + hx^4 + 19x^5}{1 + x^2 + x^4} dx &= \int \frac{x(e + gx^2 + 19x^4)}{1 + x^2 + x^4} dx + \int \frac{d + fx^2 + hx^4}{1 + x^2 + x^4} dx \\ &= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx + 19x^2}{1 + x + x^2} dx, x, x^2 \right) + \int \left(h + \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} \right) dx \\ &= hx + \frac{1}{2} \text{Subst} \left(\int \left(19 - \frac{19 - e + (19 - g)x}{1 + x + x^2} \right) dx, x, x^2 \right) + \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx \\ &= hx + \frac{19x^2}{2} + \frac{1}{2} \int \frac{d - h - (d - f)x}{1 - x + x^2} dx + \frac{1}{2} \int \frac{d - h + (d - f)x}{1 + x + x^2} dx - \frac{1}{2} \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx \\ &= hx + \frac{19x^2}{2} + \frac{1}{4}(d - f) \int \frac{1 + 2x}{1 + x + x^2} dx + \frac{1}{4}(-d + f) \int \frac{-1 + 2x}{1 - x + x^2} dx - \frac{1}{4} \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx \\ &= hx + \frac{19x^2}{2} - \frac{1}{4}(d - f) \log(1 - x + x^2) + \frac{1}{4}(d - f) \log(1 + x + x^2) - \frac{1}{4} \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx \\ &= hx + \frac{19x^2}{2} - \frac{(d + f - 2h) \tan^{-1} \left(\frac{1-2x}{\sqrt{3}} \right)}{2\sqrt{3}} + \frac{(d + f - 2h) \tan^{-1} \left(\frac{1+2x}{\sqrt{3}} \right)}{2\sqrt{3}} - \frac{1}{4} \int \frac{d - h + (f - h)x^2}{1 + x^2 + x^4} dx \end{aligned}$$

Mathematica [C] time = 0.58, size = 187, normalized size = 1.24

$$\frac{1}{12} \left((1 + i\sqrt{3}) \tan^{-1} \left(\frac{1}{2} (\sqrt{3} - i)x \right) (2\sqrt{3}d - (\sqrt{3} + 3i)f - (\sqrt{3} - 3i)h) + (\sqrt{3} + i) \tan^{-1} \left(\frac{1}{2} (\sqrt{3} + i)x \right) (-2i\sqrt{3}d + (\sqrt{3} - 3i)f + (\sqrt{3} + 3i)h) \right)$$

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

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

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

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

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="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

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

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

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

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="maxima")

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

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] $hx - \log(dgx^3i - dfx^9i - dex^6i + dhx^3i + dix^3i + ehx^6i - fhx^3i - ghx^3i - hix^3i - 3\sqrt{3}d^2 - d^2x^6i - f^2x^3i + d^2x^3i + f^2x^6i - 2\sqrt{3}d^2e + 3\sqrt{3}d^2f + 3\sqrt{3}d^2g + 4\sqrt{3}e^2f + 3\sqrt{3}d^2h + 3\sqrt{3}d^2i - 2\sqrt{3}e^2h - 2\sqrt{3}f^2g - 3\sqrt{3}f^2h - 2\sqrt{3}f^2i + 3\sqrt{3}g^2h + 3\sqrt{3}h^2i + d^2fx^9i + e^2fx^6i + d^2hx^3i - ehx^6i - f^2gx^3i - fhx^3i - f^2ix^3i + ghx^3i + hix^3i - 3\sqrt{3}f^2x + 3\sqrt{3}d^2fx - 2\sqrt{3}d^2gx - 2\sqrt{3}e^2fx - 3\sqrt{3}d^2hx - 2\sqrt{3}d^2ix - 2\sqrt{3}e^2hx + 3\sqrt{3}f^2gx + 3\sqrt{3}f^2hx + 3\sqrt{3}f^2ix + 3\sqrt{3}g^2hx + 3\sqrt{3}h^2ix + 4\sqrt{3}d^2e^2x)(d/4 - f/4 - g/4 + i/4 + (3\sqrt{3}d^2i)/12 + (3\sqrt{3}e^2i)/6 + (3\sqrt{3}f^2i)/12 - (3\sqrt{3}g^2i)/12 - (3\sqrt{3}h^2i)/6 - (3\sqrt{3}i^2i)/12) - \log(dex^6i + d^2fx^9i - d^2gx^3i - d^2hx^3i - dix^3i - ehx^6i + fhx^3i + ghx^3i + hix^3i - 3\sqrt{3}d^2 + d^2x^6i + f^2x^3i - d^2x^3i - f^2x^6i - 2\sqrt{3}d^2e + 3\sqrt{3}d^2f + 3\sqrt{3}d^2g + 4\sqrt{3}e^2f + 3\sqrt{3}d^2h + 3\sqrt{3}d^2i - 2\sqrt{3}e^2h - 2\sqrt{3}f^2g - 3\sqrt{3}f^2h - 2\sqrt{3}f^2i + 3\sqrt{3}g^2h + 3\sqrt{3}h^2i - d^2fx^9i - e^2fx^6i - d^2hx^3i + ehx^6i + f^2gx^3i + fhx^3i + f^2ix^3i - ghx^3i - hix^3i - 3\sqrt{3}f^2x + 3\sqrt{3}d^2fx - 2\sqrt{3}d^2gx - 2\sqrt{3}e^2fx - 3\sqrt{3}d^2hx - 2\sqrt{3}d^2ix - 2\sqrt{3}e^2hx + 3\sqrt{3}f^2gx + 3\sqrt{3}f^2hx + 3\sqrt{3}f^2ix + 3\sqrt{3}g^2hx + 3\sqrt{3}h^2ix + 4\sqrt{3}d^2e^2x)(d/4 - f/4 - g/4 + i/4 - (3\sqrt{3}d^2i)/12 - (3\sqrt{3}e^2i)/6 - (3\sqrt{3}f^2i)/12 + (3\sqrt{3}g^2i)/12 + (3\sqrt{3}h^2i)/6 + (3\sqrt{3}i^2i)/12) - \log(d^2fx^9i - dex^6i + d^2gx^3i - d^2hx^3i + dix^3i + ehx^6i + fhx^3i - ghx^3i - hix^3i - 3\sqrt{3}d^2 - d^2x^6i - f^2x^3i - d^2x^3i - f^2x^6i + 2\sqrt{3}d^2e + 3\sqrt{3}d^2f - 3\sqrt{3}d^2g - 4\sqrt{3}e^2f + 3\sqrt{3}d^2h - 3\sqrt{3}d^2i + 2\sqrt{3}e^2h + 2\sqrt{3}f^2g - 3\sqrt{3}f^2h + 2\sqrt{3}f^2i - 3\sqrt{3}g^2h - 3\sqrt{3}h^2i + d^2fx^9i - e^2fx^6i + d^2hx^3i + ehx^6i + f^2gx^3i - fhx^3i + f^2ix^3i - ghx^3i - hix^3i + 3\sqrt{3}f^2x - 3\sqrt{3}d^2fx - 2\sqrt{3}d^2gx - 2\sqrt{3}e^2fx + 3\sqrt{3}d^2hx - 2\sqrt{3}d^2ix - 2\sqrt{3}e^2hx + 3\sqrt{3}f^2gx - 3\sqrt{3}f^2hx + 3\sqrt{3}f^2ix + 3\sqrt{3}g^2hx + 3\sqrt{3}h^2ix + 4\sqrt{3}d^2e^2x)(f/4 - d/4 - g/4 + i/4 + (3\sqrt{3}d^2i)/12 - (3\sqrt{3}e^2i)/6 + (3\sqrt{3}f^2i)/12 + (3\sqrt{3}g^2i)/12 - (3\sqrt{3}h^2i)/6 + (3\sqrt{3}i^2i)/12) + \log(d^2fx^9i - dex^6i + d^2gx^3i - d^2hx^3i + dix^3i + ehx^6i + fhx^3i - ghx^3i - hix^3i + 3\sqrt{3}d^2 - d^2x^6i - f^2x^3i - d^2x^3i - f^2x^6i - 2\sqrt{3}d^2e - 3\sqrt{3}d^2f + 3\sqrt{3}d^2g + 4\sqrt{3}e^2f - 3\sqrt{3}d^2h + 3\sqrt{3}d^2i - 2\sqrt{3}e^2h - 2\sqrt{3}f^2g + 3\sqrt{3}f^2h - 2\sqrt{3}f^2i + 3\sqrt{3}g^2h + 3\sqrt{3}h^2i + d^2fx^9i - e^2fx^6i + d^2hx^3i + ehx^6i + f^2gx^3i - fhx^3i + f^2ix^3i - ghx^3i - hix^3i - 3\sqrt{3}f^2x + 3\sqrt{3}d^2fx + 2\sqrt{3}d^2gx + 2\sqrt{3}e^2fx - 3\sqrt{3}d^2hx + 2\sqrt{3}d^2ix + 2\sqrt{3}e^2hx - 3\sqrt{3}f^2gx + 3\sqrt{3}f^2hx - 3\sqrt{3}f^2ix - 3\sqrt{3}g^2hx - 3\sqrt{3}h^2ix - 4\sqrt{3}d^2e^2x)(d/4 - f/4 + g/4 - i/4 + (3\sqrt{3}d^2i)/12 - (3\sqrt{3}e^2i)/6 + (3\sqrt{3}f^2i)/12 + (3\sqrt{3}g^2i)/12 - (3\sqrt{3}h^2i)/6 + (3\sqrt{3}i^2i)/12) + (ix^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((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] $(\operatorname{Sqrt}[2] * \operatorname{Sqrt}[c] * d * \operatorname{ArcTan}[(\operatorname{Sqrt}[2] * \operatorname{Sqrt}[c] * x) / \operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4 * a * c]]]) / (\operatorname{Sqrt}[b^2 - 4 * a * c] * \operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4 * a * c]]) - (\operatorname{Sqrt}[2] * \operatorname{Sqrt}[c] * d * \operatorname{ArcTan}[(\operatorname{Sqrt}[2] * \operatorname{Sqrt}[c] * x) / \operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4 * a * c]]]) / (\operatorname{Sqrt}[b^2 - 4 * a * c] * \operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4 * a * c]]) - (e * \operatorname{ArcTanh}[(b + 2 * c * x^2) / \operatorname{Sqrt}[b^2 - 4 * a * c]]) / \operatorname{Sqrt}[b^2 - 4 * a * c]$

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] && (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 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

$[1/(b/2 + q/2 + c*x^2), x], x]] /; \text{FreeQ}\{a, b, c\}, x] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{PosQ}[b^2 - 4*a*c]$

Rule 1107

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

Rule 1673

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

Rubi steps

$$\begin{aligned} \int \frac{d + ex}{a + bx^2 + cx^4} dx &= \int \frac{d}{a + bx^2 + cx^4} dx + \int \frac{ex}{a + bx^2 + cx^4} dx \\ &= d \int \frac{1}{a + bx^2 + cx^4} dx + e \int \frac{x}{a + bx^2 + cx^4} dx \\ &= \frac{(cd) \int \frac{1}{\frac{b}{2} - \frac{1}{2} \sqrt{b^2 - 4ac} + cx^2} dx}{\sqrt{b^2 - 4ac}} - \frac{(cd) \int \frac{1}{\frac{b}{2} + \frac{1}{2} \sqrt{b^2 - 4ac} + cx^2} dx}{\sqrt{b^2 - 4ac}} + \frac{1}{2} e \text{Subst} \left(\int \frac{1}{a + bx + cx^2} dx, x \right) \\ &= \frac{\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{b^2 - 4ac} \sqrt{b - \sqrt{b^2 - 4ac}}} - \frac{\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{b^2 - 4ac} \sqrt{b + \sqrt{b^2 - 4ac}}} - e \text{Subst} \left(\int \frac{1}{b^2 - 4ac - x} dx, x \right) \\ &= \frac{\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{b^2 - 4ac} \sqrt{b - \sqrt{b^2 - 4ac}}} - \frac{\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{b^2 - 4ac} \sqrt{b + \sqrt{b^2 - 4ac}}} - \frac{e \tanh^{-1} \left(\frac{b + 2cx^2}{\sqrt{b^2 - 4ac}} \right)}{\sqrt{b^2 - 4ac}} \end{aligned}$$

Mathematica [A] time = 0.25, size = 194, normalized size = 1.03

$$\frac{2\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{b - \sqrt{b^2 - 4ac}}} - \frac{2\sqrt{2} \sqrt{c} d \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{\sqrt{b^2 - 4ac} + b}} \right)}{\sqrt{\sqrt{b^2 - 4ac} + b}} + e \left(\log \left(\sqrt{b^2 - 4ac} - b - 2cx^2 \right) - \log \left(\sqrt{b^2 - 4ac} + b + 2cx^2 \right) \right) / (2\sqrt{b^2 - 4ac})$$

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^2 - 4ac} \sqrt{b^2 - 4ac} b^4 - 8\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^3 c - 2\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c^2 + 16\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c^2 + 8\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c^2 + 16ab^2 c^2 + 2b^3 c^2 - 4\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c^2 + 32a^2 c^3 - 8ab^2 c^3 - \sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^3 + 4\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^3 + 2\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c - \sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c + 2(b^2 - 4ac) b^2 c - 8(b^2 - 4ac) a c^2 - 2(b^2 - 4ac) b^2 c^2) d \arctan(2\sqrt{1/2} x / \sqrt{(b + \sqrt{b^2 - 4ac})/c}) / ((a b^4 - 8a^2 b^2 c - 2a b^3 c + 16a^3 c^2 + 8a^2 b^2 c^2 + a b^2 c^2 - 4a^2 c^3) a b^2 c) + \frac{1}{4}(\sqrt{2})\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^4 - 8\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^3 c + 2\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c^2 + 16\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c^2 + 8\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c^2 + \sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c^2 - 16ab^2 c^2 - 2b^3 c^2 - 4\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c^2 + 32a^2 c^3 + 8ab^2 c^3 + \sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^3 - 4\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^3 - 2\sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c + \sqrt{2}\sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} \sqrt{b^2 - 4ac} b^2 c - 2(b^2 - 4ac) b^2 c + 8(b^2 - 4ac) a c^2 + 2(b^2 - 4ac) b^2 c^2) d \arctan(2\sqrt{1/2} x / \sqrt{(b - \sqrt{b^2 - 4ac})/c}) / ((a b^4 - 8a^2 b^2 c - 2a b^3 c + 16a^3 c^2 + 8a^2 b^2 c^2 + a b^2 c^2 - 4a^2 c^3) a b^2 c) - \frac{1}{2}(b^2 c^2 - 4a^2 c^3 - 2b^2 c^3 + c^4) \sqrt{b^2 - 4ac} e \log(x^2 + 1/2(b + \sqrt{b^2 - 4ac})/c) / ((b^4 - 8a b^2 c - 2b^3 c + 16a^2 c^2 + 8a b^2 c^2 + b^2 c^2 - 4a^2 c^3) c^2) + \frac{1}{2}(b^2 c^2 - 4a^2 c^3 - 2b^2 c^3 + c^4) \sqrt{b^2 - 4ac} e \log(x^2 + 1/2(b - \sqrt{b^2 - 4ac})/c) / ((b^4 - 8a b^2 c - 2b^3 c + 16a^2 c^2 + 8a b^2 c^2 + b^2 c^2 - 4a^2 c^3) c^2)$

maple [A] time = 0.03, size = 231, normalized size = 1.22

$$\frac{2\sqrt{-4ac + b^2} \sqrt{2} cd \operatorname{arctanh}\left(\frac{\sqrt{2} cx}{\sqrt{(-b + \sqrt{-4ac + b^2})c}}\right)}{(8ac - 2b^2) \sqrt{(-b + \sqrt{-4ac + b^2})c}} + \frac{2\sqrt{-4ac + b^2} \sqrt{2} cd \operatorname{arctan}\left(\frac{\sqrt{2} cx}{\sqrt{(b + \sqrt{-4ac + b^2})c}}\right)}{(8ac - 2b^2) \sqrt{(b + \sqrt{-4ac + b^2})c}} \sqrt{-4ac + b^2} e \ln\left(\frac{(-4ac + b^2)^{1/2} / (8ac - 2b^2) * e \ln(-2cx^2 + (-4ac + b^2)^{1/2} - b) + 2c * (-4ac + b^2)^{1/2} / (8ac - 2b^2) * d * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) + (-4ac + b^2)^{1/2} / (8ac - 2b^2) * e \ln(2cx^2 + (-4ac + b^2)^{1/2} + b) + 2c * (-4ac + b^2)^{1/2} / (8ac - 2b^2) * d * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx)}{(-4ac + b^2)^{1/2} / (8ac - 2b^2) * e \ln(-2cx^2 + (-4ac + b^2)^{1/2} - b) + 2c * (-4ac + b^2)^{1/2} / (8ac - 2b^2) * d * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) + (-4ac + b^2)^{1/2} / (8ac - 2b^2) * e \ln(2cx^2 + (-4ac + b^2)^{1/2} + b) + 2c * (-4ac + b^2)^{1/2} / (8ac - 2b^2) * d * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx)}$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] $-\frac{(-4ac + b^2)^{1/2} / (8ac - 2b^2) * e \ln(-2cx^2 + (-4ac + b^2)^{1/2} - b) + 2c * (-4ac + b^2)^{1/2} / (8ac - 2b^2) * d * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) + (-4ac + b^2)^{1/2} / (8ac - 2b^2) * e \ln(2cx^2 + (-4ac + b^2)^{1/2} + b) + 2c * (-4ac + b^2)^{1/2} / (8ac - 2b^2) * d * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx)}{(-4ac + b^2)^{1/2} / (8ac - 2b^2) * e \ln(-2cx^2 + (-4ac + b^2)^{1/2} - b) + 2c * (-4ac + b^2)^{1/2} / (8ac - 2b^2) * d * 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx) + (-4ac + b^2)^{1/2} / (8ac - 2b^2) * e \ln(2cx^2 + (-4ac + b^2)^{1/2} + b) + 2c * (-4ac + b^2)^{1/2} / (8ac - 2b^2) * d * 2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * \operatorname{arctan}(2^{1/2} / ((b + (-4ac + b^2)^{1/2}) * c)^{1/2} * cx)}$

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

$$\sum_{k=1}^4 \ln \left(c^2 \left(d e^2 + e^3 x + \text{root} \left(128 a^2 b^2 c z^4 - 256 a^3 c^2 z^4 - 16 a b^4 z^4 + 16 a b c d^2 z^2 - 32 a^2 c e^2 z^2 + 8 a b^2 e^2 z^2 \right) \right) \right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] symsum(log(c^2*(d*e^2 + e^3*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*d - 8*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*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

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right) + \left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right) - e \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}} + \sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b} - \sqrt{b^2-4ac}}$$

[Out] $-e \operatorname{arctanh}\left(\frac{2cx^2+b}{(-4ac+b^2)^{1/2}}\right) / (-4ac+b^2)^{1/2} + 1/2 \operatorname{arctan}\left(x \sqrt{2} \sqrt{c} / (b - (-4ac+b^2)^{1/2})\right) / (b - (-4ac+b^2)^{1/2}) + (f - (2cd-bf)/\sqrt{b^2-4ac}) \operatorname{arctan}\left(x \sqrt{2} \sqrt{c} / (\sqrt{b^2-4ac} + b)\right) / (\sqrt{b^2-4ac} + b) + (f + (2cd-bf)/\sqrt{b^2-4ac}) \operatorname{arctan}\left(x \sqrt{2} \sqrt{c} / (b - \sqrt{b^2-4ac})\right) / (b - \sqrt{b^2-4ac}) - e \operatorname{arctanh}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right) / \sqrt{b^2-4ac}$

Rubi [A] time = 0.24, 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}

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right) + \left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right) - e \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}} + \sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b} - \sqrt{b^2-4ac}}$$

Antiderivative was successfully verified.

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

[Out] $((f + (2cd-bf)/\sqrt{b^2-4ac}) \operatorname{ArcTan}[(\sqrt{2}\sqrt{c}x)/\sqrt{b-\sqrt{b^2-4ac}}]) / (\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}}) + ((f - (2cd-bf)/\sqrt{b^2-4ac}) \operatorname{ArcTan}[(\sqrt{2}\sqrt{c}x)/\sqrt{b+\sqrt{b^2-4ac}}]) / (\sqrt{2}\sqrt{c}\sqrt{b+\sqrt{b^2-4ac}}) - (e \operatorname{ArcTanh}[(b+2cx^2)/\sqrt{b^2-4ac}]) / \sqrt{b^2-4ac}$

Rule 12

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

Rule 205

$\text{Int}[(a_*) + (b_*)(x_)^2)^{-1}, x_Symbol] := \text{Simp}[(\text{Rt}[a/b, 2] \operatorname{ArcTan}[x/\text{Rt}[a/b, 2]])/a, x] /;$ FreeQ[{a, b}, x] && PosQ[a/b]

Rule 206

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

Rule 618

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

$$\begin{aligned} \int \frac{d + ex + fx^2}{a + bx^2 + cx^4} dx &= \int \frac{ex}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2}{a + bx^2 + cx^4} dx \\ &= e \int \frac{x}{a + bx^2 + cx^4} dx + \frac{1}{2} \left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \int \frac{1}{\frac{b}{2} + \frac{1}{2}\sqrt{b^2 - 4ac} + cx^2} dx + \frac{1}{2} \left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \int \frac{1}{\frac{b}{2} - \frac{1}{2}\sqrt{b^2 - 4ac} + cx^2} dx \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b + \sqrt{b^2 - 4ac}}} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{\frac{b}{2} + \frac{1}{2}\sqrt{b^2 - 4ac} + cx^2} dx \right) \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b + \sqrt{b^2 - 4ac}}} - e \operatorname{Subst} \left(\int \frac{1}{\frac{b}{2} + \frac{1}{2}\sqrt{b^2 - 4ac} + cx^2} dx \right) \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2}\sqrt{c}\sqrt{b + \sqrt{b^2 - 4ac}}} - \frac{e \tanh^{-1} \left(\frac{b}{\sqrt{b^2 - 4ac}} \right)}{\sqrt{b^2 - 4ac}} \end{aligned}$$

Mathematica [A] time = 0.22, size = 234, normalized size = 1.11

$$\frac{\sqrt{2} \left(f \left(\sqrt{b^2 - 4ac} - b \right) + 2cd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{c}\sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\sqrt{2} \left(f \left(\sqrt{b^2 - 4ac} + b \right) - 2cd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{\sqrt{b^2 - 4ac} + b}} \right)}{\sqrt{c}\sqrt{\sqrt{b^2 - 4ac} + b}} + e \log \left(\sqrt{b^2 - 4ac} - b - 2cx^2 \right) - \frac{e \log \left(\sqrt{b^2 - 4ac} + b + 2cx^2 \right)}{2\sqrt{b^2 - 4ac}}$$

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]]

```
rt[b^2 - 4*a*c] - 2*c*x^2] - e*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2)]/(2*Sqr
t[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))*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 + sq
rt(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)*
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))*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)*sq
rt(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)*s
qrt(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))
```

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] $-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*e*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})-2*c/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)})*c*x)*f*a+1/2/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)})*c*x)*f*b^2-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)})*c*x)*b*f+c*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)})*c*x)*d+1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*e*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})+2*c/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)})*c*x)*f*a-1/2/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)})*c*x)*f*b^2-1/2*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)})*c*x)*b*f+c*(-4*a*c+b^2)^{(1/2)}/(4*a*c-b^2)*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)})*c*x)*d$

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] $\operatorname{symsum}(\log(c^2*d*e^2 - c^2*d^2*f + c^2*e^3*x - a*c*f^3 - 8*\operatorname{root}(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^3*b^3*c^2*x + b*c*d*f^2 - 16*\operatorname{root}(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*a*c^3*d - 4*\operatorname{root}($


```

^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
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((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

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right) + \left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right) - \frac{(2ce-bg) \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right) + g \log(a + \dots)}{2c\sqrt{b^2-4ac}}}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}} + \sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}}$$

[Out] $\frac{1}{4}g*\ln(c*x^4+b*x^2+a)/c-1/2*(-b*g+2*c*e)*\operatorname{arctanh}((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/c/(-4*a*c+b^2)^{(1/2)}+1/2*\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)})*(f+(-b*f+2*c*d)/(-4*a*c+b^2)^{(1/2)})*2^{(1/2)}/c^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)}+1/2*\operatorname{arctan}(x^2^{(1/2)}*c^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)})*(f+(b*f-2*c*d)/(-4*a*c+b^2)^{(1/2)})*2^{(1/2)}/c^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)}$

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}

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right) + \left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right) - \frac{(2ce-bg) \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right) + g \log(a + \dots)}{2c\sqrt{b^2-4ac}}}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}} + \sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b}}$$

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] && (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] := 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 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]

Rubi steps

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3}{a + bx^2 + cx^4} dx &= \int \frac{d + fx^2}{a + bx^2 + cx^4} dx + \int \frac{x(e + gx^2)}{a + bx^2 + cx^4} dx \\ &= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{a + bx + cx^2} dx, x, x^2 \right) + \frac{1}{2} \left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \int \frac{1}{\frac{b}{2} + \frac{1}{2}\sqrt{b^2 - 4ac} + cx} dx \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} + \frac{g \text{Subst} \left(\int \frac{1}{a + bx + cx^2} dx, x, x^2 \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} + \frac{g \log \left(\frac{b + \sqrt{b^2 - 4ac} + 2cx}{b - \sqrt{b^2 - 4ac} + 2cx} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} - \frac{(2ce - g) \log \left(\frac{b + \sqrt{b^2 - 4ac} + 2cx}{b - \sqrt{b^2 - 4ac} + 2cx} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} \end{aligned}$$

Mathematica [A] time = 0.29, size = 280, normalized size = 1.14

$$\frac{2\sqrt{2} \sqrt{c} \left(f \left(\sqrt{b^2 - 4ac} - b \right) + 2cd \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{2\sqrt{2} \sqrt{c} \left(f \left(\sqrt{b^2 - 4ac} + b \right) - 2cd \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b^2 - 4ac} + b} \right)}{\sqrt{b^2 - 4ac} + b} + \frac{\left(g \left(\sqrt{b^2 - 4ac} - b \right) + 2ce - g \right) \log \left(\frac{b + \sqrt{b^2 - 4ac} + 2cx}{b - \sqrt{b^2 - 4ac} + 2cx} \right)}{4c\sqrt{b^2 - 4ac}}$$

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)*
```

$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) - 1/16*((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 + \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*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 - \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*abs(c))$

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] 1/(4*a*c-b^2)*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*g*a-1/4/(4*a*c-b^2)/c*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*g*b^2+1/4*(-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))*b*g-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)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*f*a+1/

$$\frac{2\sqrt{4ac-b^2} \cdot 2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot cx) \cdot f \cdot b^{-1/2} \cdot (-4ac+b^2)^{1/2} / (4ac-b^2)^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot cx) \cdot b \cdot f + c \cdot (-4ac+b^2)^{1/2} / (4ac-b^2)^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \operatorname{arctanh}(2^{1/2} / ((-b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot cx) \cdot d + 1 / (4ac-b^2) \cdot \ln(2cx^2+b+(-4ac+b^2)^{1/2}) \cdot g \cdot a^{-1/4} / (4ac-b^2) / c \cdot \ln(2cx^2+b+(-4ac+b^2)^{1/2}) \cdot g \cdot b^{-1/4} \cdot (-4ac+b^2)^{1/2} / (4ac-b^2) / c \cdot \ln(2cx^2+b+(-4ac+b^2)^{1/2}) \cdot b \cdot g + 1/2 \cdot (-4ac+b^2)^{1/2} / (4ac-b^2) \cdot e \cdot \ln(2cx^2+b+(-4ac+b^2)^{1/2}) + 2 / (4ac-b^2) \cdot 2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot a \cdot c \cdot f \cdot \arctan(2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot cx) - 1/2 / (4ac-b^2) \cdot 2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot b^2 \cdot f \cdot \arctan(2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot cx) - 1/2 \cdot (-4ac+b^2)^{1/2} / (4ac-b^2) \cdot 2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot b \cdot f \cdot \arctan(2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot cx) + (-4ac+b^2)^{1/2} / (4ac-b^2) \cdot 2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot c \cdot d \cdot \arctan(2^{1/2} / ((b+(-4ac+b^2)^{1/2})c)^{1/2} \cdot cx)$$

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)

mupad [B] time = 2.54, size = 15179, normalized size = 61.96

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)/(a + b*x^2 + c*x^4),x)

[Out] symsum(log(c^2*d*e^2 + b^2*d*g^2 - c^2*d^2*f + c^2*e^3*x - a*c*f^3 - 8*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)^3*b^3*c^2*x - a*c*d*g^2 + b*c*d*f^2 - a*b*f*g^2 - a*b*g^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 - 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

$$\begin{aligned}
&^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 \\
&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 \\
&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*d - 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 \\
&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 \\
&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)*c^3*d^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 \\
&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*\text{root}(128*a^2*b^2*c^3*z^4 - 16*a*b^4 \\
&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 \\
&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*\text{ro} \\
&\text{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 \\
&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 \\
&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* \\
&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
\end{aligned}$$

$$\begin{aligned}
& *e^{2f} + 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^{2f^2} - \\
& 2*a^2*c*e^{2g^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*\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 - 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^{2f^2} - 2*a^2*c*e^{2g^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*\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 + 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^{2f^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*\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^{2f^2} - 2*a^2*c*e^{2g^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^{2f^2} - 2*a^2*c*e^{2g^2} - 2*a*c^2
\end{aligned}$$

$$\begin{aligned}
& *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 \\
& 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 \\
& *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 + 1 \\
& 6*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
\end{aligned}$$

$$\begin{aligned}
& - 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 \operatorname{root}(128 a^2 b^2 c^3 z^4 - 16 a^4 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^4 b^4 c g z^3 + 256 a^3 c^3 g z^3 + 32 a^2 b^2 c^2 e g z^2 \\
& + 16 a^2 b^2 c^2 d f z^2 - 8 a^3 b^3 c e g z^2 + 40 a^2 b^2 c^2 g^2 z^2 + 16 a^2 \\
& b^2 c^2 f^2 z^2 + 8 a^2 b^2 c^2 e^2 z^2 - 64 a^2 c^3 d f z^2 - 4 a^2 b^3 c f^2 z^2 \\
& + 16 a^2 b^3 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^2 b^4 g^2 z^2 - 8 a^2 b^2 c d f g z + 32 a^2 c^2 d f g z - 16 \\
& a^2 b^2 c e g^2 z - 4 a^2 b^2 c e^2 g z - 16 a^2 b^2 c^2 d^2 g z + 4 a^2 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^2 d \\
& d^2 g z + 4 a^2 b^3 e g^2 z + 16 a^2 c^3 d^2 e z + 16 a^3 c^2 g^3 z - 4 a^2 b^2 g^3 \\
& z - 4 a^2 b^2 c d e f g + 2 a^2 b^2 c e^3 g + 2 a^2 b^2 c d f^3 + 4 a^2 c^2 e f^2 g - \\
& 4 a^2 c^2 d f g^2 + 2 b^2 c^2 d^2 e g - 4 a^2 c^2 d^2 e g + 2 a^2 b^2 d f g^2 + 4 a^2 \\
& c^2 d e^2 f + 3 a^2 b^2 c d^2 g^2 + 2 a^2 b^2 e g^3 + 2 b^2 c^2 d^3 f - a^2 b^2 c e^2 f^2 \\
& - 2 a^2 c^2 e^2 g^2 - 2 a^2 c^2 d^2 f^2 - a^2 b^2 f^2 g^2 - b^2 c^2 d^2 f^2 - a^2 \\
& b^2 e^2 g^2 - b^2 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 e f - 4 \operatorname{root}(128 a^2 b^2 c^3 z^4 - 16 a^4 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^4 b^4 c g z^3 + 256 a^3 c^3 \\
& g z^3 + 32 a^2 b^2 c^2 e g z^2 + 16 a^2 b^2 c^2 d f z^2 - 8 a^3 b^3 c e g z^2 + \\
& 40 a^2 b^2 c^2 g^2 z^2 + 16 a^2 b^2 c^2 f^2 z^2 + 8 a^2 b^2 c^2 e^2 z^2 - 64 a^2 \\
& c^3 d f z^2 - 4 a^2 b^3 c f^2 z^2 + 16 a^2 b^3 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^2 b^4 g^2 z^2 - 8 a^2 b^2 c d f g \\
& z + 32 a^2 c^2 d f g z - 16 a^2 b^2 c e g^2 z - 4 a^2 b^2 c e^2 g z - 16 a^2 b^2 \\
& c^2 d^2 g z + 4 a^2 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^2 d^2 g z + 4 a^2 b^3 e g^2 z + 16 a^2 c^3 d^2 e z + \\
& 16 a^3 c^2 g^3 z - 4 a^2 b^2 g^3 z - 4 a^2 b^2 c d e f g + 2 a^2 b^2 c e^3 g + 2 a^2 b^2 \\
& c d f^3 + 4 a^2 c^2 e f^2 g - 4 a^2 c^2 d f g^2 + 2 b^2 c^2 d^2 e g - 4 a^2 c^2 d^2 \\
& e g + 2 a^2 b^2 d f g^2 + 4 a^2 c^2 d e^2 f + 3 a^2 b^2 c d^2 g^2 + 2 a^2 b^2 e g^3 \\
& + 2 b^2 c^2 d^3 f - a^2 b^2 c e^2 f^2 - 2 a^2 c^2 e^2 g^2 - 2 a^2 c^2 d^2 f^2 - a^2 \\
& b^2 f^2 g^2 - b^2 c^2 d^2 f^2 - a^2 b^2 e^2 g^2 - b^2 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 d g + a c^2 e g^2 x + b^2 \\
& c e f^2 x - a c^2 f^2 g x - 2 b^2 c e^2 g x - 2 c^2 d e f x + 10 \operatorname{root}(128 a^2 \\
& b^2 c^3 z^4 - 16 a^4 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^4 b^4 c g z^3 + 256 a^3 c^3 g z^3 + 32 a^2 b^2 c^2 e g z^2 + 16 a^2 b^2 c^2 \\
& d f z^2 - 8 a^3 b^3 c e g z^2 + 40 a^2 b^2 c^2 g^2 z^2 + 16 a^2 b^2 c^2 f^2 z^2 + \\
& 8 a^2 b^2 c^2 e^2 z^2 - 64 a^2 c^3 d f z^2 - 4 a^2 b^3 c f^2 z^2 + 16 a^2 b^3 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^2 \\
& b^4 g^2 z^2 - 8 a^2 b^2 c d f g z + 32 a^2 c^2 d f g z - 16 a^2 b^2 c e g^2 z \\
& - 4 a^2 b^2 c e^2 g z - 16 a^2 b^2 c^2 d^2 g z + 4 a^2 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^2 d^2 g z + 4 a^2 b^3 \\
& e g^2 z + 16 a^2 c^3 d^2 e z + 16 a^3 c^2 g^3 z - 4 a^2 b^2 g^3 z - 4 a^2 b^2 c d \\
& e f g + 2 a^2 b^2 c e^3 g + 2 a^2 b^2 c d f^3 + 4 a^2 c^2 e f^2 g - 4 a^2 c^2 d f g^2 + \\
& 2 b^2 c^2 d^2 e g - 4 a^2 c^2 d^2 e g + 2 a^2 b^2 d f g^2 + 4 a^2 c^2 d e^2 f + 3 \\
& a^2 b^2 c d^2 g^2 + 2 a^2 b^2 e g^3 + 2 b^2 c^2 d^3 f - a^2 b^2 c e^2 f^2 - 2 a^2 c^2 e^2 \\
& g^2 - 2 a^2 c^2 d^2 f^2 - a^2 b^2 f^2 g^2 - b^2 c^2 d^2 f^2 - a^2 b^2 e^2 g^2 - b^2 \\
& 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^2 b^2 c g^2 x + 4 \operatorname{root}(128 a^2 b^2 c^3 z^4 - 16 a^4 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^4 b^4 c g z^3 + 256 a^3 c^3 g z^3 + 32 a^2 \\
& b^2 c^2 e g z^2 + 16 a^2 b^2 c^2 d f z^2 - 8 a^3 b^3 c e g z^2 + 40 a^2 b^2 c^2 g^2 \\
& z^2 + 16 a^2 b^2 c^2 f^2 z^2 + 8 a^2 b^2 c^2 e^2 z^2 - 64 a^2 c^3 d f z^2 - \\
& 4 a^2 b^3 c f^2 z^2 + 16 a^2 b^3 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^2 b^4 g^2 z^2 - 8 a^2 b^2 c d f g z + 32 a^2 c^2 \\
& d f g z - 16 a^2 b^2 c e g^2 z - 4 a^2 b^2 c e^2 g z - 16 a^2 b^2 c^2 d^2 g z + 4 \\
& a^2 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^2 d^2 g z + 4 a^2 b^3 e g^2 z + 16 a^2 c^3 d^2 e z + 16 a^3 c^2 g^3 z \\
& - 4 a^2 b^2 g^3 z - 4 a^2 b^2 c d e f g + 2 a^2 b^2 c e^3 g + 2 a^2 b^2 c d f^3 + 4 a^2 \\
& c^2 e f^2 g - 4 a^2 c^2 d f g^2 + 2 b^2 c^2 d^2 e g - 4 a^2 c^2 d^2 e g + 2 a^2 b^2 \\
& d f g^2 + 4 a^2 c^2 d e^2 f + 3 a^2 b^2 c d^2 g^2 + 2 a^2 b^2 e g^3 + 2 b^2 c^2 d^3 \\
& f - a^2 b^2 c e^2 f^2 - 2 a^2 c^2 e^2 g^2 - 2 a^2 c^2 d^2 f^2 - a^2 b^2 f^2 g^2 - b^2 \\
& c^2 d^2 f^2 - a^2 b^2 e^2 g^2 - b^2 c^2 d^2 e^2 - b^3 d^2 g^2 - a^2 c f^4 - a c^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^4b^2c^2z^4 - 256a^3c^4z^4 - 128a^2b^2c^2g^3z^3 + 16a^4b^2c^2g^3z^3 + 256a^3c^3g^3z^3 + 32a^2b^2c^2e^2g^2z^2 + 16a^4b^2c^2d^2f^2z^2 - 8a^4b^3c^2e^2g^2z^2 + 40a^2b^2c^2g^2z^2 + 16a^2b^2c^2f^2z^2 + 8a^4b^2c^2e^2z^2 - 64a^2c^3d^2f^2z^2 - 4a^4b^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^4b^2g^2z^2 - 8a^4b^2c^2d^2f^2z^2 - 8a^4b^2c^2d^2f^2g^2z^2 + 32a^2c^2d^2f^2g^2z^2 - 16a^2b^2c^2e^2g^2z^2 - 4a^4b^2c^2e^2g^2z^2 - 16a^2b^2c^2d^2g^2z^2 + 4a^4b^2c^2e^2f^2z^2 + 16a^2c^2e^2g^2z^2 - 16a^2c^2e^2f^2z^2 - 4b^2c^2d^2e^2z^2 + 4b^3c^2d^2g^2z^2 + 4a^4b^3e^2g^2z^2 + 16a^2c^3d^2e^2z^2 + 16a^3c^2g^3z^2 - 4a^2b^2g^3z^2 - 4a^2b^2c^2d^2e^2f^2g^2z^2 + 2a^4b^2c^2d^2e^2f^2g^2z^2 + 2a^4b^2c^2d^2e^2f^2g^2z^2 - 4a^2b^2c^2d^2e^2f^2g^2z^2 - 2a^2c^2e^2g^2z^2 - 2a^2c^2d^2f^2z^2 - a^2b^2f^2g^2z^2 - b^2c^2d^2f^2z^2 - a^2b^2e^2g^2z^2 - b^2c^2d^2e^2z^2 - b^3d^2g^2z^2 - a^2c^2f^4z^2 - a^2c^2e^4z^2 - a^3g^4z^2 - c^3d^4z^2, z, k) * a^2e^2g^2x - 32\text{root}(128a^2b^2c^3z^4 - 16a^4b^2c^2z^4 - 256a^3c^4z^4 - 128a^2b^2c^2g^3z^3 + 16a^4b^2c^2g^3z^3 + 256a^3c^3g^3z^3 + 32a^2b^2c^2e^2g^2z^2 + 16a^4b^2c^2d^2f^2z^2 - 8a^4b^3c^2e^2g^2z^2 + 40a^2b^2c^2g^2z^2 + 16a^2b^2c^2f^2z^2 + 8a^4b^2c^2e^2z^2 - 64a^2c^3d^2f^2z^2 - 4a^4b^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^4b^2g^2z^2 - 8a^4b^2c^2d^2f^2g^2z^2 - 8a^4b^2c^2d^2f^2g^2z^2 + 32a^2c^2d^2f^2g^2z^2 - 16a^2b^2c^2e^2g^2z^2 - 4a^4b^2c^2e^2g^2z^2 - 16a^2b^2c^2d^2g^2z^2 + 4a^4b^2c^2e^2f^2z^2 + 16a^2c^2e^2g^2z^2 - 16a^2c^2e^2f^2z^2 - 4b^2c^2d^2e^2z^2 + 4b^3c^2d^2g^2z^2 + 4a^4b^3e^2g^2z^2 + 16a^2c^3d^2e^2z^2 + 16a^3c^2g^3z^2 - 4a^2b^2g^3z^2 - 4a^2b^2c^2d^2e^2f^2g^2z^2 + 2a^4b^2c^2d^2e^2f^2g^2z^2 - 4a^2c^2d^2e^2f^2g^2z^2 + 2a^4b^2c^2d^2e^2f^2g^2z^2 + 4a^2c^2d^2e^2f^2g^2z^2 + 3a^4b^2c^2d^2e^2f^2g^2z^2 + 2a^2b^2c^2d^3f^2z^2 - a^2b^2c^2e^2f^2z^2 - 2a^2c^2e^2g^2z^2 - 2a^2c^2d^2f^2z^2 - a^2b^2f^2g^2z^2 - b^2c^2d^2f^2z^2 - a^2b^2e^2g^2z^2 - b^2c^2d^2e^2z^2 - b^3d^2g^2z^2 - a^2c^2f^4z^2 - a^2c^2e^4z^2 - a^3g^4z^2 - c^3d^4z^2, z, k) * a^2e^2g^2x + 4\text{root}(128a^2b^2c^3z^4 - 16a^4b^2c^2z^4 - 256a^3c^4z^4 - 128a^2b^2c^2g^3z^3 + 16a^4b^2c^2g^3z^3 + 256a^3c^3g^3z^3 + 32a^2b^2c^2e^2g^2z^2 + 16a^4b^2c^2d^2f^2z^2 - 8a^4b^3c^2e^2g^2z^2 + 40a^2b^2c^2g^2z^2 + 16a^2b^2c^2f^2z^2 + 8a^4b^2c^2e^2z^2 - 64a^2c^3d^2f^2z^2 - 4a^4b^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^4b^2g^2z^2 - 8a^4b^2c^2d^2f^2g^2z^2 - 8a^4b^2c^2d^2f^2g^2z^2 + 32a^2c^2d^2f^2g^2z^2 - 16a^2b^2c^2e^2g^2z^2 - 4a^4b^2c^2e^2g^2z^2 - 16a^2b^2c^2d^2g^2z^2 + 4a^4b^2c^2e^2f^2z^2 + 16a^2c^2e^2g^2z^2 - 16a^2c^2e^2f^2z^2 - 4b^2c^2d^2e^2z^2 + 4b^3c^2d^2g^2z^2 + 4a^4b^3e^2g^2z^2 + 16a^2c^3d^2e^2z^2 + 16a^3c^2g^3z^2 - 4a^2b^2g^3z^2 - 4a^2b^2c^2d^2e^2f^2g^2z^2 + 2a^4b^2c^2d^2e^2f^2g^2z^2 - 4a^2c^2d^2e^2f^2g^2z^2 + 2a^4b^2c^2d^2e^2f^2g^2z^2 + 4a^2c^2d^2e^2f^2g^2z^2 + 3a^4b^2c^2d^2e^2f^2g^2z^2 + 2a^2b^2c^2d^3f^2z^2 - a^2b^2c^2e^2f^2z^2 - 2a^2c^2e^2g^2z^2 - 2a^2c^2d^2f^2z^2 - a^2b^2f^2g^2z^2 - b^2c^2d^2f^2z^2 - a^2b^2e^2g^2z^2 - b^2c^2d^2e^2z^2 - b^3d^2g^2z^2 - a^2c^2f^4z^2 - a^2c^2e^4z^2 - a^3g^4z^2 - c^3d^4z^2, 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] 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

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] :> 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 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 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{a + bx^2 + cx^4} dx &= \int \frac{x(e + gx^2)}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2 + hx^4}{a + bx^2 + cx^4} dx \\
&= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{a + bx + cx^2} dx, x, x^2 \right) + \int \left(\frac{h}{c} + \frac{cd - ah + (cf - bh)x^2}{c(a + bx^2 + cx^4)} \right) dx \\
&= \frac{hx}{c} + \frac{\int \frac{cd - ah + (cf - bh)x^2}{a + bx^2 + cx^4} dx}{c} + \frac{g \text{Subst} \left(\int \frac{b + 2cx}{a + bx + cx^2} dx, x, x^2 \right)}{4c} + \frac{(2ce - bg) \text{Subst} \left(\int \frac{1}{b^2 - 4ac - x^2} dx, x, b + 2cx^2 \right)}{2c} \\
&= \frac{hx}{c} + \frac{g \log(a + bx^2 + cx^4)}{4c} - \frac{(2ce - bg) \text{Subst} \left(\int \frac{1}{b^2 - 4ac - x^2} dx, x, b + 2cx^2 \right)}{2c} + \frac{\left(cf - bh + \frac{2c^2d + b^2h - c(bf + 2ah)}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(cf - bh - \frac{2c^2d - bcf + c^2e}{\sqrt{b^2 - 4ac}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}}
\end{aligned}$$

Mathematica [A] time = 0.50, size = 383, normalized size = 1.32

$$\frac{2\sqrt{2} \tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(c\left(f\sqrt{b^2-4ac}-2ah-bf\right)+bh\left(b-\sqrt{b^2-4ac}\right)+2c^2d\right)}{\sqrt{b^2-4ac}\sqrt{b-\sqrt{b^2-4ac}}}-\frac{2\sqrt{2} \tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{\sqrt{b^2-4ac}+b}}\right)\left(-c\left(f\sqrt{b^2-4ac}+2ah+bf\right)+bh\left(\sqrt{b^2-4ac}\right)\right)}{\sqrt{b^2-4ac}\sqrt{\sqrt{b^2-4ac}+b}}$$

$4c^{3/2}$

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])*g)*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/Sqrt[b^2 - 4*a*c] + (Sqrt[c]*(-2*c*e + (b + Sqrt[b^2 - 4*a*c])*g)*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/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] h*x/c + 1/4*g*log(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 - 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*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^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 +

$$\begin{aligned}
& 8*(b^2 - 4*a*c)*a*c^5*d*abs(c) - 2*(sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))* \\
& c)*a*b^4*c^2 - 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a^2*b^2*c^3 - 2*sq \\
& rt(2)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b^3*c^3 + 2*a*b^4*c^3 + 16*sqrt(2)* \\
& sqrt(b*c - sqrt(b^2 - 4*a*c))*a^3*c^4 + 8*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4 \\
& *a*c))*a^2*b*c^4 + sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*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))*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*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))*a \\
& *b*c^5 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^2*c^ \\
& 5 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*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))*b^4*c^3 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(\\
& b*c - sqrt(b^2 - 4*a*c))*a*b^2*c^4 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c \\
& - sqrt(b^2 - 4*a*c))*b^3*c^4 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt \\
& (b^2 - 4*a*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))*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))*b \\
& ^4*c^3 - 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a^2*b* \\
& c^4 - 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*a*b^2*c^4 \\
& - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*c))*b^3*c^4 + 2*sq \\
& rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c - sqrt(b^2 - 4*a*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))*b^4*c + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4 \\
& *a*c))*a*b^2*c^2 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a* \\
& 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))*a*b \\
& *c^3 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^2*c^3 + \\
& 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + 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 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))* \\
& b^5 + 8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b^3*c \\
& + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^4*c - 16*sq \\
& rt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*b*c^2 - 8*sqrt(\\
& 2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b^2*c^2 - sqrt(2)*sq \\
& rt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^3*c^2 + 4*sqrt(2)*sqrt(b^ \\
& 2 - 4*a*c)*sqrt(b*c + 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*(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))*a*b^2*c^4 - 2*sqrt \\
& (2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^3*c^4 - 2*b^4*c^4 + 16*sqrt(2)*sqrt(b \\
& *c + sqrt(b^2 - 4*a*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))*b^2*c^5 + 16*a*b^2*c^5 \\
& - 4*sqrt(2)*sqrt(b*c + 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*abs(c) + 2*(sqrt(2)*sqrt(b*c + sq \\
& rt(b^2 - 4*a*c))*a*b^4*c^2 - 8*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^ \\
& 2*b^2*c^3 - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b^3*c^3 - 2*a*b^4*c \\
& ^3 + 16*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^3*c^4 + 8*sqrt(2)*sqrt(b* \\
& c + sqrt(b^2 - 4*a*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))*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 \\
& *abs(c) + 2*(2*b^3*c^6 - 8*a*b*c^7 - sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + s \\
& qrt(b^2 - 4*a*c))*b^3*c^4 + 4*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b \\
& ^2 - 4*a*c))*a*b*c^5 + 2*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - \\
& 4*a*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)*sq
\end{aligned}$$

$$\begin{aligned} & \text{rt}(b^2 - 4ac) \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^4 c^3 + 4 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot a b^2 c^4 + 2 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^3 c^4 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^2 c^5 - 2(b^2 - 4ac) b^2 c^5 \cdot f + (2b^5 c^4 - 12ab^3 c^5 + 16a^2 b c^6 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^5 c^2 + 6 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot a b^3 c^3 + 2 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^4 c^3 - 8 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot a^2 b c^4 - 4 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot a b^2 c^4 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^3 c^4 + 2 \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot a b^4 c^5 - 2(b^2 - 4ac) b^3 c^4 + 4(b^2 - 4ac) a b^3 c^5) \cdot h \cdot \arctan\left(\frac{2 \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \sqrt{bc + \sqrt{b^2 - 4ac}}}{x \sqrt{(b^2 c^3 - \sqrt{b^2 c^6 - 4ac^7})/c^4}}\right) / ((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) \cdot c^2) \\ & - 1/16 \cdot ((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 - 4ac}) \cdot g \cdot \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 - 4ac}) \cdot \text{abs}(c) \cdot 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 - 4ac}) \cdot g - 2(b^5 c^2 - 8 a b^3 c^3 - 2 b^4 c^3 + 16 a^2 b^2 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 - 4ac}) \cdot e) \cdot \log(x^2 + 1/2 \cdot (b^2 c^3 + \sqrt{b^2 c^6 - 4ac^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) \cdot c^2 \cdot \text{abs}(c)) - 1/16 \cdot ((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 - 4ac}) \cdot g \cdot \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 - 4ac}) \cdot \text{abs}(c) \cdot 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 - 4ac}) \cdot g - 2(b^5 c^2 - 8 a b^3 c^3 - 2 b^4 c^3 + 16 a^2 b^2 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 - 4ac}) \cdot e) \cdot \log(x^2 + 1/2 \cdot (b^2 c^3 - \sqrt{b^2 c^6 - 4ac^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) \cdot c^2 \cdot \text{abs}(c)) \end{aligned}$$

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]
$$\begin{aligned} & h*x/c - 1/4 \cdot (-4ac + b^2) / (4ac - b^2) / c \cdot \ln(-2cx^2 - b + (-4ac + b^2)^{1/2}) \cdot g + 1/4 \cdot (-4ac + b^2)^{1/2} / (4ac - b^2) \cdot b/c \cdot g \cdot \ln(-2cx^2 - b + (-4ac + b^2)^{1/2}) - 1/2 \cdot (-4ac + b^2)^{1/2} / (4ac - b^2) \cdot e \cdot \ln(-2cx^2 - b + (-4ac + b^2)^{1/2}) - 1/2 \cdot (-4ac + b^2) / (4ac - b^2) / c \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) \cdot c)^{1/2} \cdot \text{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) \cdot c)^{1/2} \cdot c \cdot x) \cdot b \cdot h + 1/2 \cdot (-4ac + b^2) / (4ac - b^2) \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) \cdot c)^{1/2} \cdot \text{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) \cdot c)^{1/2} \cdot c \cdot x) \cdot f - (-4ac + b^2)^{1/2} / (4ac - b^2) \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) \cdot c)^{1/2} \cdot \text{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) \cdot c)^{1/2} \cdot c \cdot x) \cdot a \cdot h + 1/2 \cdot (-4ac + b^2) / (4ac - b^2) / c \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) \cdot c)^{1/2} \cdot \text{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) \cdot c)^{1/2} \cdot c \cdot x) \cdot b^2 \cdot h - 1/2 \cdot (-4ac + b^2)^{1/2} / (4ac - b^2) \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) \cdot c)^{1/2} \cdot \text{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) \cdot c)^{1/2} \cdot c \cdot x) \cdot b \cdot f + c \cdot (-4ac + b^2)^{1/2} / (4ac - b^2) \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) \cdot c)^{1/2} \cdot \text{arctanh}(2^{1/2} / ((-b + (-4ac + b^2)^{1/2}) \cdot c)^{1/2} \cdot c \cdot x) \cdot d - 1/4 \cdot (-4ac + b^2) / (4ac - b^2) / c \end{aligned}$$

$$\ln(2cx^2+b+(-4ac+b^2)^{1/2})g-1/4(-4ac+b^2)^{1/2}/(4ac-b^2)b/cg$$

$$*\ln(2cx^2+b+(-4ac+b^2)^{1/2})+1/2(-4ac+b^2)^{1/2}/(4ac-b^2)*e*\ln(2$$

$$*cx^2+b+(-4ac+b^2)^{1/2})+1/2(-4ac+b^2)/(4ac-b^2)/c*2^{1/2}/((b+(-4$$

$$*ac+b^2)^{1/2})*c)^{1/2}*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*c$$

$$*x)*b*h-1/2(-4ac+b^2)/(4ac-b^2)*2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}$$

$$*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*c*x)*f-(-4ac+b^2)^{1/2}$$

$$)/(4ac-b^2)*2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*\arctan(2^{1/2}/((b+(-4$$

$$*ac+b^2)^{1/2})*c)^{1/2}*c*x)*a*h+1/2(-4ac+b^2)^{1/2}/(4ac-b^2)/c*2$$

$$^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2}$$

$$)*c)^{1/2}*c*x)*b^2*h-1/2(-4ac+b^2)^{1/2}/(4ac-b^2)*2^{1/2}/((b+(-4$$

$$*ac+b^2)^{1/2})*c)^{1/2}*b*f*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}$$

$$)*c*x)+(-4ac+b^2)^{1/2}/(4ac-b^2)*2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}$$

$$*c*d*\arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*c*x)$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

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 -

$$\begin{aligned}
& 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) * (\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^2c^3egz^2 + 32a^2b^2c^3d^2hz^2 - 8a^2b^3c^2egz^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^2c^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^2gz^2 \\
& + 8a^2b^2c^2d^2egz^2 - 8a^2b^3c^2efgz^2 - 20a^2b^2c^2e^2gz^2 - 16a^2b^2c^2e^2fz^2 - 32a^3c^2f^2gz^2 + 32a^2c^3d^2f^2gz^2 - 32a^2c^3d^2egz^2 \\
& + 16a^3b^2c^2g^2hz^2 + 4a^2b^3c^2eg^2z^2 - 16a^2b^3c^2d^2gz^2 - 4a^2b^3c^2g^2hz^2 + 16a^3c^2e^2hz^2 + 16a^2c^3e^2gz^2 + 4b^3c^2d^2gz^2 \\
& - 16a^2c^3e^2fz^2 - 4b^2c^3d^2ez^2 - 4a^2b^2c^2g^3z^2 + 4a^2b^4e^2hz^2 + 16a^2c^4d^2ez^2 + 16a^3c^2g^3z^2 - 4a^2b^2c^2efgz^2 \\
& - 4a^2b^2c^2d^2egz^2 + 2a^2b^2c^2e^2f^2gz^2 - 2a^2b^2c^2d^2efgz^2 - 2a^2b^2c^2d^2e^2f^2gz^2 - 4a^2c^2e^2f^2gz^2 + 2a^2b^2c^2d^2e^2f^2gz^2 \\
& + 4a^2c^2d^2efgz^2 + 2b^2c^2d^2egz^2 + 3a^2b^2c^2e^2h^2 + 4a^2b^2c^2d^2h^2 + 3a^2b^2c^2d^2g^2 + 4a^3c^2f^2gz^2h^2 - 4a^3c^2eg^2hz^2 \\
& + 2b^3c^2d^2f^2gz^2 + 2a^2b^3d^2f^2gz^2 - 4a^2c^3d^2egz^2 + 2a^2b^2c^2f^3gz^2 + 4a^2c^3d^2e^2fz^2 + 2a^2b^2c^2eg^3z^2 \\
& + 2a^2b^2c^2e^3gz^2 + 2a^2b^2c^2d^2f^3z^2 + 2a^3b^2f^2h^3z^2 + 4a^3c^2d^2h^3z^2 + 4a^2c^3d^3h^3z^2 + 2b^2c^3d^3fz^2 - a^2b^2c^2f^2gz^2 \\
& - a^2b^2c^2e^2gz^2 - a^2b^2c^2e^2f^2gz^2 - 6a^2c^2d^2h^2 - 2a^2c^2e^2gz^2 - 2a^3c^2f^2h^2 - 2b^2c^2d^3h^2 - 2a^2b^2d^3h^2 - 2a^2c^3d^2f^2gz^2 \\
& - a^2b^2c^2d^2f^2gz^2 - a^3b^2g^2h^2 - b^3c^2d^2g^2 - a^2b^3e^2h^2 - b^2c^3d^2e^2gz^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^2c^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^2c^3egz^2 + 32a^2b^2c^3d^2hz^2 - 8a^2b^3c^2egz^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^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^2c^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^2gz^2 + 8a^2b^2c^2d^2egz^2 - 8a^2b^3c^2efgz^2 - 20a^2b^2c^2e^2gz^2 - 16a^2b^2c^2e^2fz^2 - 32a^3c^2f^2gz^2 + 32a^2c^3d^2f^2gz^2 - 32a^2c^3d^2egz^2 + 16a^3b^2c^2g^2hz^2 + 4a^2b^3c^2eg^2z^2 - 16a^2b^3c^2d^2gz^2 - 4a^2b^3c^2g^2hz^2 + 16a^3c^2e^2hz^2 + 16a^2c^3e^2gz^2 + 4b^3c^2d^2gz^2 - 16a^2c^3e^2fz^2 - 4b^2c^3d^2ez^2 - 4a^2b^2c^2g^3z^2 + 4a^2b^4e^2hz^2 + 16a^2c^4d^2ez^2 + 16a^3c^2g^3z^2 - 4a^2b^2c^2efgz^2 - 4a^2b^2c^2d^2egz^2 + 2a^2b^2c^2e^2f^2gz^2 - 2a^2b^2c^2d^2efgz^2 - 2a^2b^2c^2d^2e^2f^2gz^2 - 4a^2c^2e^2f^2gz^2 + 2a^2b^2c^2d^2e^2f^2gz^2 + 4a^2c^2d^2efgz^2 + 2b^2c^2d^2egz^2 + 3a^2b^2c^2e^2h^2 + 4a^2b^2c^2d^2h^2 + 3a^2b^2c^2d^2g^2 + 4a^3c^2f^2gz^2h^2 - 4a^3c^2eg^2hz^2 + 2b^3c^2d^2f^2gz^2 + 2a^2b^3d^2f^2gz^2 - 4a^2c^3d^2egz^2 + 2a^2b^2c^2f^3gz^2 + 4a^2c^3d^2e^2fz^2 + 2a^2b^2c^2eg^3z^2 + 2a^2b^2c^2d^2f^3z^2 + 2a^3b^2f^2h^3z^2 + 4a^3c^2d^2h^3z^2 + 4a^2c^3d^3h^3z^2 + 2b^2c^3d^3fz^2 - a^2b^2c^2f^2gz^2 - a^2b^2c^2e^2gz^2 - a^2b^2c^2e^2f^2gz^2 - 6a^2c^2d^2h^2 - 2a^2c^2e^2gz^2 - 2a^3c^2f^2h^2 - 2b^2c^2d^3h^2 - 2a^2b^2d^3h^2 - 2a^2c^3d^2f^2gz^2 - a^2b^2c^2d^2f^2gz^2 - a^3b^2g^2h^2 - b^3c^2d^2g^2 - a^2b^3e^2h^2 - b^2c^3d^2e^2gz^2 - b^4d^2h^2 - a^2c^2f^4 - a^3c^2g^4 -
\end{aligned}$$

$$\begin{aligned}
& a^3e^4 - a^4h^4 - c^4d^4, z, k) \cdot x \cdot (8b^3c^3 - 32abc^4) / c - (4b^3d^3e + 8a^3d^3g - 8a^3e^3f - 4b^2c^2d^3g - 8a^2c^2g^3h + 4a^2b^2c^2efh + 4a^2b^2c^2f^3g) / c + (x(4c^4d^2 + 2b^4h^2 - 4a^3c^3f^2 - 2b^3c^3e^2 + 2b^3c^3g^2 + 2b^2c^2f^2 + 4a^2c^2h^2 - 4b^2c^3d^3f - 8a^2c^3d^3h + 8a^2c^3e^3g - 4b^3c^3f^3h - 10a^2b^2c^2g^2 - 8a^2b^2c^2h^2 + 4b^2c^2d^3h + 12a^2b^2c^2f^3h)) / c - (a^2c^2f^3 - a^2b^2h^3 - c^3d^3e^2 + c^3d^2f - b^3d^3h^2 + a^2c^2d^3g^2 - b^2c^2d^3f^2 - b^2c^2d^3g^2 + a^2b^2f^3h^2 + a^2c^2e^2h - b^2c^2d^2h + a^2c^2f^3h^2 - a^2c^2g^2h + 2a^2b^2c^2d^3h^2 + a^2b^2c^2f^3g^2 - 2a^2b^2c^2f^2h + 2b^2c^2d^3eg - 2a^2c^2d^3fh - 2a^2c^2e^3fg + 2b^2c^2d^3fh) / c) \cdot \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^2c^3egz^2 + 32a^2b^2c^3d^3hz^2 - 8a^2b^3c^2egz^2 - 8a^2b^3c^2d^3hz^2 + 16a^2b^2c^3d^3f^2z^2 + 8a^2b^4c^3f^2hz^2 - 48a^2b^2c^2f^3hz^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^3f^2z^2 - 4a^2b^4c^3g^2z^2 + 16a^2b^2c^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^3ghz + 32a^2b^2c^2e^3fhz - 8a^2b^2c^2d^3fgz + 8a^2b^2c^2d^3ehz - 8a^2b^3c^2e^3fhz - 20a^2b^2c^2e^3hz - 16a^2b^2c^2e^3gz - 4a^2b^2c^2e^2gz + 4a^2b^2c^2e^3f^2z - 32a^3c^2f^3ghz + 32a^2c^3d^3fgz - 32a^2c^3d^3ehz + 16a^3b^2c^2g^2h^2z + 4a^2b^3c^2e^3gz - 16a^2b^2c^3d^2gz - 4a^2b^3g^2h^2z + 16a^3c^2e^3hz + 16a^2c^3e^2gz + 4b^3c^2d^2gz - 16a^2c^3e^3f^2z - 4b^2c^3d^2e^3z - 4a^2b^2c^3g^3z + 4a^2b^4e^3hz + 16a^2c^4d^2e^3z + 16a^3c^2g^3z - 4a^2b^2c^2e^3f^3g^2h - 4a^2b^2c^2d^3e^3fg + 8a^2c^2d^3e^3gh - 2a^2b^2c^2d^3g^2h + 2a^2b^2c^2e^3f^3h - 4a^2b^2c^2d^3f^2h - 2a^2b^2c^2d^3f^2h^2 - 2a^2b^2c^2d^2f^3h + 2a^2b^2c^2d^3fg^2 - 2a^2b^2c^2d^3e^2h - 4a^2c^2e^2f^3h + 2a^2b^2e^3gh^2 + 4a^2c^2e^3f^2g + 4a^2c^2d^3f^2h - 4a^2c^2d^3fg^2 + 2b^2c^2d^2e^3g + 3a^2b^2c^2e^3h^2 + 4a^2b^2c^2d^2h^2 + 3a^2b^2c^2d^2g^2 + 4a^3c^2f^3g^2h - 4a^3c^2e^3gh^2 + 2b^3c^2d^2f^3h + 2a^2b^3d^2f^3h^2 - 4a^2c^3d^2e^3g + 2a^2b^2c^2f^3h + 4a^2c^3d^2e^3f + 2a^2b^2c^2e^3g^3 + 2a^2b^2c^2e^3g + 2a^2b^2c^2d^3f^3 + 2a^3b^2f^3h^3 + 4a^3c^2d^3h^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), k, 1, 4) + (hx)/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((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

$$\frac{\tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)(-2aci + b^2i - bcg + 2c^2e)}{2c^2\sqrt{b^2-4ac}} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{b+\sqrt{b^2-4ac}}}$$

[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, number of rules / integrand size = 0.250, Rules used = {1673, 1676, 1166, 205, 1663, 1657, 634, 618, 206, 628}

$$\frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b^2-4ac+b}}\right)\left(\frac{-2ach+b^2h-bcf+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)}{\sqrt{2}c^{3/2}\sqrt{\sqrt{b^2-4ac}+b}} \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)\left(\frac{-c(2ah+bf)+b^2h+2c^2d}{\sqrt{b^2-4ac}} - bh + cf\right)$$

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), 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

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] :> 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 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 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 24x^5}{a + bx^2 + cx^4} dx &= \int \frac{x(e + gx^2 + 24x^4)}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2 + hx^4}{a + bx^2 + cx^4} dx \\
&= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx + 24x^2}{a + bx + cx^2} dx, x, x^2 \right) + \int \left(\frac{h}{c} + \frac{cd - ah + (cf - bh)}{c(a + bx^2 + cx^4)} \right) dx \\
&= \frac{hx}{c} + \frac{1}{2} \text{Subst} \left(\int \left(\frac{24}{c} - \frac{24a - ce + (24b - cg)x}{c(a + bx + cx^2)} \right) dx, x, x^2 \right) + \frac{\int \frac{cd - ah + (cf - bh)}{c(a + bx^2 + cx^4)} dx}{c} \\
&= \frac{hx}{c} + \frac{12x^2}{c} - \frac{\text{Subst} \left(\int \frac{24a - ce + (24b - cg)x}{a + bx + cx^2} dx, x, x^2 \right)}{2c} + \frac{(cf - bh - \frac{2c^2d - b^2h - c^2a}{\sqrt{b^2 - 4ac}}) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{c^2 d - b^2 h - c^2 a}{\sqrt{b^2 - 4ac}} \\
&= \frac{hx}{c} + \frac{12x^2}{c} + \frac{(cf - bh + \frac{2c^2d + b^2h - c(bf + 2ah)}{\sqrt{b^2 - 4ac}}) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{c^2 d - b^2 h - c^2 a}{\sqrt{b^2 - 4ac}} \\
&= \frac{hx}{c} + \frac{12x^2}{c} + \frac{(cf - bh + \frac{2c^2d + b^2h - c(bf + 2ah)}{\sqrt{b^2 - 4ac}}) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{c^2 d - b^2 h - c^2 a}{\sqrt{b^2 - 4ac}} \\
&= \frac{hx}{c} + \frac{12x^2}{c} + \frac{(cf - bh + \frac{2c^2d + b^2h - c(bf + 2ah)}{\sqrt{b^2 - 4ac}}) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} c^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{c^2 d - b^2 h - c^2 a}{\sqrt{b^2 - 4ac}}
\end{aligned}$$

Mathematica [A] time = 0.65, size = 441, normalized size = 1.37

$$\frac{2\sqrt{2}\sqrt{c}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}}\right)\left(c\left(f\sqrt{b^2-4ac}-2ah-bf\right)+bh\left(b-\sqrt{b^2-4ac}\right)+2c^2d\right)}{\sqrt{b^2-4ac}\sqrt{b-\sqrt{b^2-4ac}}}-\frac{2\sqrt{2}\sqrt{c}\tan^{-1}\left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b^2-4ac+b}}\right)\left(-c\left(f\sqrt{b^2-4ac}+2ah+bf\right)+bh\left(b+\sqrt{b^2-4ac}\right)+2c^2d\right)}{\sqrt{b^2-4ac}\sqrt{b^2-4ac+b}}$$

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")

$$\begin{aligned}
& b^2 - 4ac) \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot ab^2c^2 + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^3c^2 - 16\sqrt{2} \sqrt{b^2 - 4ac} \\
& \cdot \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot a^2c^3 - 8\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot ab^2c^3 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \\
& \cdot c \cdot b^2c^3 + 4\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot a^2c^4 - 2(b^2 - 4ac) \cdot b^2c^3 + 8(b^2 - 4ac) \cdot a^2c^4 \\
& \cdot c^2 \cdot f - (2b^5c^2 - 16ab^3c^3 + 32a^2b^2c^4 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^5 + 8\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \\
& \cdot c \cdot ab^3c^3 + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^4c^3 - 16\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot a^2b^2c^2 - 8\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \\
& \cdot c \cdot ab^2c^2 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^3c^2 + 4\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot ab^2c^3 - 2(b^2 - 4ac) \cdot b^3c^2 + 8(b^2 - 4ac) \cdot ab^2c^3 \\
& \cdot c^2 \cdot h - 2(\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^4c^3 - 8\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot ab^2c^4 - 2\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^3 \\
& \cdot c^4 - 2b^4c^4 + 16\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot a^2c^5 + 8\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot ab^2c^5 + \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^2c^5 + 16ab^2c^5 - 4\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \\
& \cdot c \cdot a^2c^6 - 32a^2c^6 + 2(b^2 - 4ac) \cdot b^2c^4 - 8(b^2 - 4ac) \cdot a^2c^5) \cdot d \cdot \text{abs}(c) + 2(\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot ab^4c^2 - 8\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot a^2b^2c^3 - 2\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \\
& \cdot c \cdot ab^3c^3 - 2ab^4c^3 + 16\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot a^3c^4 + 8\sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot a^2b^2c^4 + \sqrt{2} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot ab^2c^4 + 16a^2b^2c^4 - 4\sqrt{2} \\
& \cdot c \cdot \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot a^2c^5 - 32a^3c^5 + 2(b^2 - 4ac) \cdot ab^2c^3 - 8(b^2 - 4ac) \cdot a^2c^4) \cdot h \cdot \text{abs}(c) + 2(2b^3c^6 - 8ab^2c^7 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^3c^4 + 4\sqrt{2} \\
& \cdot c \cdot \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot ab^2c^5 + 2\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^2c^5 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^2c^5 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^2c^5 \\
& \cdot c \cdot b^2c^5 - 2(b^2 - 4ac) \cdot b^2c^5) \cdot f + (2b^5c^4 - 12ab^3c^5 + 16a^2b^2c^6 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^5c^2 + 6\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot ab^3c^3 + 2\sqrt{2} \sqrt{b^2 - 4ac} \\
& \cdot c \cdot \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot b^4c^3 - 8\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot a^2b^2c^4 - 4\sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \cdot c \cdot ab^2c^4 - \sqrt{2} \sqrt{b^2 - 4ac} \sqrt{bc + \sqrt{b^2 - 4ac}} \\
& \cdot c \cdot a^2c^5 - 32a^3c^5 + 2(b^2 - 4ac) \cdot ab^2c^3 - 8(b^2 - 4ac) \cdot a^2c^4) \cdot h \cdot \arctan(2\sqrt{1/2} \cdot x / \sqrt{(b^2c^5 - \sqrt{b^2c^{10} - 4ac^{11}}) / c^6}) / ((ab^4c^3 - 8a^2b^2c^4 - 2ab^3c^4 + 16a^3c^5 + 8a^2 \\
& \cdot b^2c^5 + ab^2c^5 - 4a^2c^6) \cdot c^2) + 1/16(b^7c - 10ab^5c^2 - 2b^6 \\
& \cdot c^2 + 32a^2b^3c^3 + 12ab^4c^3 + b^5c^3 - 32a^3b^2c^4 - 16a^2b^2 \\
& \cdot c^4 - 6ab^3c^4 + 8a^2b^2c^5 + (b^7 - 10ab^5c - 2b^6c + 32a^2b^3 \\
& \cdot c^2 + 12ab^4c^2 + b^5c^2 - 32a^3b^2c^3 - 16a^2b^2c^3 - 6ab^3c^3 \\
& + 8a^2b^2c^4 - (b^6 - 10ab^4c - 2b^5c + 32a^2b^2c^2 + 12ab^3c^2 \\
& + b^4c^2 - 32a^3c^3 - 16a^2b^2c^3 - 6ab^2c^3 + 8a^2c^4) \sqrt{b^2 - 4ac}) \cdot \text{abs}(c) - (b^6c - 6ab^4c^2 - 2b^5c^2 + 8a^2b^2c^3 + 4ab^3 \\
& \cdot c^3 + b^4c^3 - 2ab^2c^4) \sqrt{b^2 - 4ac}) \cdot i \cdot \log(x^2 + 1/2(b^2c^5 + \sqrt{b^2c^{10} - 4ac^{11}}) / c^6) / ((ab^4c - 8a^2b^2c^2 - 2ab^3c^2 + 16a^3c^3 + 8a^2b^2c^3 + ab^2c^3 - 4a^2c^4) \cdot c^2 \cdot \text{abs}(c)) + 1/16(b^7c \\
& - 10ab^5c^2 - 2b^6c^2 + 32a^2b^3c^3 + 12ab^4c^3 + b^5c^3 - 32a^3 \\
& \cdot b^2c^4 - 16a^2b^2c^4 - 6ab^3c^4 + 8a^2b^2c^5 + (b^7 - 10ab^5c \\
& - 2b^6c + 32a^2b^3c^2 + 12ab^4c^2 + b^5c^2 - 32a^3b^2c^3 - 16a^2 \\
& \cdot b^2c^3 - 6ab^3c^3 + 8a^2b^2c^4 + (b^6 - 10ab^4c - 2b^5c + 32a^2
\end{aligned}$$

```

*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)*sqr
t(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))

```

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] 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] -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
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)/(4*a*c-b^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^2*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)*b/c*h*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^2/c*h*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)*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)*
arctanh(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)*b*f*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*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1
/2))*c)^(1/2)*c*x)+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)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*f-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)*f*arctan
(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^

```

$$2)^{(1/2)}) * c)^{(1/2)} * c * x) - (-4 * a * c + b^2)^{(1/2)} / (4 * a * c - b^2) * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x + b^2)^{(1/2)}) * c)^{(1/2)} * \operatorname{arctanh}(2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * a * h - 1/4 * (-4 * a * c + b^2) / (4 * a * c - b^2) / c * g * \ln(-2 * c * x^2 - b + (-4 * a * c + b^2)^{(1/2)}) - 1/4 * (-4 * a * c + b^2) / (4 * a * c - b^2) / c * g * \ln(2 * c * x^2 + b + (-4 * a * c + b^2)^{(1/2)}) + 1/2 * i * x^2 / c + 1/4 * (-4 * a * c + b^2) / (4 * a * c - b^2) / c^2 * \ln(-2 * c * x^2 - b + (-4 * a * c + b^2)^{(1/2)}) * b * i + 1/2 * (-4 * a * c + b^2)^{(1/2)} / (4 * a * c - b^2) / c * \ln(-2 * c * x^2 - b + (-4 * a * c + b^2)^{(1/2)}) * a * i - 1/4 * (-4 * a * c + b^2)^{(1/2)} / (4 * a * c - b^2) / c^2 * \ln(-2 * c * x^2 - b + (-4 * a * c + b^2)^{(1/2)}) * b^2 * i + 1/4 * (-4 * a * c + b^2) / (4 * a * c - b^2) / c^2 * \ln(2 * c * x^2 + b + (-4 * a * c + b^2)^{(1/2)}) * b * i - 1/2 * (-4 * a * c + b^2)^{(1/2)} / (4 * a * c - b^2) / c * \ln(2 * c * x^2 + b + (-4 * a * c + b^2)^{(1/2)}) * a * i + 1/4 * (-4 * a * c + b^2)^{(1/2)} / (4 * a * c - b^2) / c^2 * \ln(2 * c * x^2 + b + (-4 * a * c + b^2)^{(1/2)}) * b^2 * i$$

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] 1/2*(i*x^2 + 2*h*x)/c - 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] 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 - 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^

$$\begin{aligned}
& 2*eg*iz + 8*a^2*b^2*c^2*f*gh*z - 8*a^2*b^2*c^2*d*hi*z + 4*a^3*b^2*c*h^2 \\
& *iz - 32*a^3*b*c^2*g^2*iz + 12*a^3*b^2*c*gi^2*z + 8*a^2*b^3*c*g^2*iz + \\
& 16*a^3*b*c^2*gh^2*z - 4*a^2*b^3*c*gh^2*z + 32*a^3*b*c^2*ei^2*z - 24*a^2*b \\
& b^3*c*ei^2*z - 16*a^2*b*c^3*e^2*iz + 4*a*b^3*c^2*e^2*iz + 20*a*b^2*c^3*d \\
& ^2*iz - 16*a^2*b*c^3*eg^2*z + 4*a*b^3*c^2*eg^2*z - 4*a*b^2*c^3*e^2*g*z + \\
& 4*a*b^2*c^3*ef^2*z - 32*a^3*c^3*f*gh*z - 32*a^3*c^3*eg*iz + 32*a^3*c^3 \\
& *d*hi*z + 32*a^2*c^4*d*f*g*z - 32*a^2*c^4*d*eh*z + 4*a*b^4*c*eh^2*z - 16 \\
& *a*b*c^4*d^2*g*z - 4*a^2*b^2*c^2*f^2*iz - 20*a^2*b^2*c^2*eh^2*z - 4*a^2*b \\
& ^2*c^2*g^3*z - 16*a^4*c^2*h^2*iz + 16*a^4*c^2*gi^2*z + 16*a^3*c^3*f^2*iz \\
& - 4*a^2*b^4*gi^2*z - 4*b^4*c^2*d^2*iz + 16*a^3*c^3*eh^2*z - 16*a^2*c^4*d \\
& ^2*iz + 16*a^2*c^4*e^2*g*z + 4*b^3*c^3*d^2*g*z - 16*a^2*c^4*ef^2*z - 4*b \\
& ^2*c^4*d^2*e*z + 4*a*b^5*ei^2*z - 16*a^4*b*c*ci^3*z + 16*a*c^5*d^2*e*z + 4* \\
& a^3*b^3*ii^3*z + 16*a^3*c^3*g^3*z + 4*a^2*b^2*c*d*gh*iz + 12*a^2*b*c^2*d*f*g \\
& *i - 4*a^2*b*c^2*ef*gh - 4*a^2*b*c^2*d*eh*iz + 4*a*b^2*c^2*d*ef*iz - 4*a^ \\
& 3*b*c*f*gh*iz - 4*a*b^3*c*d*f*gi - 4*a*b*c^3*d*ef*g + 2*a^2*b^2*c*f^2*gi \\
& - 4*a^2*b^2*c*eg^2*iz - 2*a^2*b*c^2*e^2*gi - 8*a*b^2*c^2*d^2*gi + 2*a^2*b \\
& b^2*c*egh^2 - 2*a^2*b*c^2*ef^2*iz - 8*a^2*b^2*c*d*fi^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*ef*h*iz - 8*a^3*c^2*d*gh*iz + 8*a^2*c^3*d*eg \\
& *h - 8*a^2*c^3*d*ef*iz - 2*a^3*b*c*eh^2*iz + 6*a^3*b*c*d*hi^2 - 2*a^3*b*c* \\
& eg*iz^2 + 2*a*b^3*c*e^2*gi + 6*a*b*c^3*d^2*ei + 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*ii^2 - 5*a^2*b*c^2*d^2*ii^ \\
& 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*gi + 2*a^3*b \\
& ^2*f*hi^2 + 4*a^3*c^2*f*g^2*h + 4*a^3*c^2*eg^2*iz - 4*a^3*c^2*egh^2 + 4* \\
& a^2*c^3*d^2*gi + 2*a^2*b^3*eg*iz^2 - 2*a^2*b^3*d*hi^2 + 4*a^3*c^2*d*fi^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*ei + 4*a^2*c^3*ef \\
& ^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*ii^2 + 2*b^2*c \\
& ^3*d^2*eg + 2*a^2*b*c^2*f^3*h - 2*a*b^2*c^2*e^3*iz + 5*a*b^3*c*d^2*ii^2 - 2* \\
& a^2*b^2*c*d*hi^3 + 2*a^2*b*c^2*eg^3 + 3*a*b*c^3*d^2*g^2 + 4*a^4*c*g*h^2*iz - \\
& 4*a^4*c*f*hi^2 + 2*b^4*c*d^2*gi + 2*a^3*b*c*g^3*iz + 2*a*b^4*d*fi^2 - 4* \\
& a*c^4*d^2*eg + 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*gi^3 + 4*a^4*c*ei^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*ii^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*ii^2 + 4*a^2*c^3*ei \\
& ^3*iz - 2*b^2*c^3*d^3*h - 2*a^3*b^2*ei^3 + 4*a^3*c^2*d*hi^3 - 2*a*c^4*d^2*f^ \\
& 2 - a^3*b^2*g^2*ii^2 - a^2*b^3*f^2*ii^2 - b^3*c^2*d^2*g^2 - b^2*c^3*d^2*f^2 - \\
& a^4*b*hi^2*ii^2 - b^4*c*d^2*h^2 - a*b^4*ei^2*ii^2 - b*c^4*d^2*e^2 - b^5*d^2*ii^ \\
& 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*ii^4 - c^5*d^4, \\
& z, l)*(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*iz^3 - 128*a^2*b^2*c^4*g*z^3 - 256*a^3*b*c^4*iz^3 - 16*a*b^5*c \\
& ^2*iz^3 + 16*a*b^4*c^3*g*z^3 + 256*a^3*c^5*g*z^3 + 160*a^3*b*c^3*gi*iz^2 \\
& + 8*a*b^4*c^2*f*hi*iz^2 + 8*a*b^4*c^2*ei*iz^2 + 32*a^2*b*c^4*eg*z^2 + 32*a^2 \\
& *b*c^4*d*hi*iz^2 - 8*a*b^3*c^3*eg*z^2 - 8*a*b^3*c^3*d*hi*iz^2 + 16*a*b^2*c^4*d \\
& *f*iz^2 + 8*a*b^5*c*gi*iz^2 - 72*a^2*b^3*c^2*gi*iz^2 - 48*a^2*b^2*c^3*f*hi*iz^ \\
& 2 - 48*a^2*b^2*c^3*ei*iz^2 + 32*a^2*b^4*c*ii^2*iz^2 - 48*a^3*b*c^3*h^2*iz^2 - \\
& 4*a*b^4*c^2*g^2*iz^2 + 16*a^2*b*c^4*f^2*iz^2 - 4*a*b^3*c^3*f^2*iz^2 + 8*a*b^2* \\
& c^4*e^2*iz^2 + 64*a^3*c^4*f*hi*iz^2 + 64*a^3*c^4*ei*iz^2 - 64*a^2*c^5*d*f*iz^2 \\
& - 4*a*b^5*c*h^2*iz^2 + 16*a*b*c^5*d^2*iz^2 - 56*a^3*b^2*c^2*ii^2*iz^2 + 28*a^2*b \\
& b^3*c^2*h^2*iz^2 + 40*a^2*b^2*c^3*g^2*iz^2 - 32*a^4*c^3*ii^2*iz^2 - 96*a^3*c^4*g \\
& ^2*iz^2 - 32*a^2*c^5*e^2*iz^2 - 4*b^3*c^4*d^2*iz^2 - 4*a*b^6*ii^2*iz^2 + 32*a^2 \\
& *b*c^3*ef*hi*iz - 32*a^2*b*c^3*d*fi*iz - 8*a*b^3*c^2*ef*hi*iz + 8*a*b^3*c^2*d \\
& *f*iz - 8*a*b^2*c^3*d*f*g*iz + 8*a*b^2*c^3*d*eh*iz - 8*a*b^4*c*eg*iz + 40 \\
& *a^2*b^2*c^2*eg*iz + 8*a^2*b^2*c^2*f*gh*iz - 8*a^2*b^2*c^2*d*hi*iz + 4*a^ \\
& 3*b^2*c*h^2*iz - 32*a^3*b*c^2*g^2*iz + 12*a^3*b^2*c*gi^2*z + 8*a^2*b^3*c \\
& *g^2*iz + 16*a^3*b*c^2*gh^2*z - 4*a^2*b^3*c*gh^2*z + 32*a^3*b*c^2*ei^2* \\
& z - 24*a^2*b^3*c*ei^2*z - 16*a^2*b*c^3*e^2*iz + 4*a*b^3*c^2*e^2*iz + 20* \\
& a*b^2*c^3*d^2*iz - 16*a^2*b*c^3*eg^2*z + 4*a*b^3*c^2*eg^2*z - 4*a*b^2*c^ \\
& 3*e^2*g*iz + 4*a*b^2*c^3*ef^2*z - 32*a^3*c^3*f*gh*iz - 32*a^3*c^3*eg*iz +
\end{aligned}$$

$$\begin{aligned}
& 32a^3c^3d^2h^2i^2z + 32a^2c^4d^2f^2g^2z - 32a^2c^4d^2e^2h^2z + 4a^4b^4c^2e^2h^2z - 16a^4b^4c^2d^2g^2z - 4a^2b^2c^2f^2i^2z - 20a^2b^2c^2e^2h^2z - 4a^2b^2c^2g^3z - 16a^4c^2h^2i^2z + 16a^4c^2g^2i^2z + 16a^3c^3f^2i^2z - 4a^2b^4g^2i^2z - 4b^4c^2d^2i^2z + 16a^3c^3e^2h^2z - 16a^2c^4d^2i^2z + 16a^2c^4e^2g^2z + 4b^3c^3d^2g^2z - 16a^2c^4e^2f^2z - 4b^2c^4d^2e^2z + 4a^4b^5e^2i^2z - 16a^4b^3c^3i^2z + 16a^4c^5d^2e^2z + 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^4b^2c^2d^2e^2f^2i - 4a^3b^2c^2f^2g^2h^2i - 4a^3b^2c^2d^2e^2f^2g^2i - 4a^2b^2c^2d^2e^2f^2g^2h^2i + 2a^2b^2c^2e^2g^2h^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 - 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 - 2a^3b^2c^2e^2g^2i + 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 + 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 - 2a^2b^3d^2h^2i + 4a^3c^2d^2f^2i - 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^3c^2d^2g^2 + 4a^4c^2g^2h^2i - 4a^4c^2f^2h^2i + 2b^4c^2d^2g^2i + 2a^3b^2c^2g^3i + 2a^2b^4d^2f^2i - 4a^2c^4d^2e^2g + 2a^3b^2c^2f^2h^3 + 4a^2c^4d^2e^2f + 2a^2b^3c^2e^3g + 2a^2b^3c^2d^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^2c^4d^3h + 2b^2c^4d^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^3e^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^2c^4d^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^2c^4d^2e^2 - b^5d^2i^2 - a^3c^2g^4 - a^2c^3f^4 - a^4c^2h^4 - a^2c^4e^4 - a^5i^4 - c^5d^4, z, 1) * ((x*(4b^2c^4e - 8b^3c^3g + 16a^2c^4i + 8b^4c^2i - 16a^2c^5e + 32a^2b^4g - 36a^2b^2c^3i)) / c^2 - (4b^2c^4d + 16a^2c^4h - 16a^2c^5d - 4a^2b^2c^3h) / c^2 + (root(128a^2b^2c^5z^4 - 16a^2b^4c^4z^4 - 256a^3c^6z^4 + 128a^2b^3c^3i^2z^3 - 128a^2b^2c^4g^2z^3 - 256a^3b^2c^4i^2z^3 - 16a^2b^5c^2i^2z^3 + 16a^2b^4c^3g^2z^3 + 256a^3c^5g^2z^3 + 160a^3b^2c^3g^2i^2z^2 + 8a^2b^4c^2f^2h^2z^2 + 8a^2b^4c^2e^2i^2z^2 + 32a^2b^2c^4e^2g^2z^2 + 32a^2b^2c^4d^2h^2z^2 - 8a^2b^3c^3e^2g^2z^2 - 8a^2b^3c^3d^2h^2z^2 + 16a^2b^2c^4d^2f^2z^2 + 8a^2b^5c^2g^2i^2z^2 - 72a^2b^3c^2g^2i^2z^2 - 48a^2b^2c^3f^2h^2z^2 - 48a^2b^2c^3e^2i^2z^2 + 32a^2b^4c^2i^2z^2 - 48a^3b^2c^3h^2z^2 - 4a^2b^4c^2g^2z^2 + 16a^2b^2c^4f^2z^2 - 4a^2b^3c^3f^2z^2 + 8a^2b^2c^4e^2z^2 + 64a^3c^4f^2h^2z^2 + 64a^3c^4e^2i^2z^2 - 64a^2c^5d^2f^2z^2 - 4a^2b^5c^2h^2z^2 + 16a^2b^2c^5d^2z^2 - 56a^3b^2c^2i^2z^2 + 28a^2b^3c^2h^2z^2 + 40a^2b^2c^3g^2z^2 - 32a^4c^3i^2z^2 - 96a^3c^4g^2z^2 - 32a^2c^5e^2z^2 - 4b^3c^4d^2z^2 - 4a^2b^6i^2z^2 + 32a^2b^2c^3e^2f^2h^2z - 32a^2b^2c^3d^2f^2i^2z - 8a^2b^3c^2e^2f^2h^2z + 8a^2b^3c^2d^2f^2i^2z - 8a^2b^2c^3d^2f^2g^2z + 8a^2b^2c^3d^2e^2h^2z - 8a^2b^4c^2e^2g^2i^2z + 40a^2b^2c^2e^2g^2i^2z + 8a^2b^2c^2f^2g^2h^2z - 8a^2b^2c^2d^2h^2i^2z + 4a^3b^2c^2h^2i^2z - 32a^3b^2c^2g^2i^2z + 12a^3b^2c^2g^2i^2z + 8a^2b^3c^2g^2i^2z + 16a^3b^2c^2g^2h^2z - 4a^2b^3c^2g^2h^2z + 32a^3b^2c^2e^2i^2z - 24a^2b^3c^2e^2i^2z - 16a^2b^2c^3e^2i^2z + 4a^2b^3c^2e^2i^2z + 20a^2b^2c^3d^2i^2z - 16a^2b^2c^3e^2g^2z + 4a^2b^3c^2e^2g^2z - 4a^2b^2c^3e^2g^2z + 4a^2b^2c^3e^2f^2z - 32a^3c^3f^2g^2h^2z - 32a^3c^3e^2g^2i^2z + 32a^3c^3d^2h^2i^2z + 32a^2c^4d^2f^2g^2z - 32a^2c^4d^2e^2h^2z + 4a^2b^4c^2e^2h^2z - 16a^2b^2c^4d^2g^2z - 4a^2b^2c^2f^2i^2z - 20a^2b^2c^2e^2h^2z - 4a^2b^2c^2g^3z - 16a^4c^2h^2i^2z + 16a^4c^2g^2i^2z + 16a^3c^3f^2i^2z - 4a^2b^4g^2i^2z - 4b
\end{aligned}$$

$$\begin{aligned}
&^4c^2d^2i^*z + 16a^3c^3e^h^2z - 16a^2c^4d^2i^*z + 16a^2c^4e^2g^*z + 4b^3c^3d^2g^*z - 16a^2c^4e^f^2z - 4b^2c^4d^2e^*z + 4a^5b^5e^*i^2z - 16a^4b^3c^i^3z + 16a^3c^5d^2e^*z + 4a^3b^3i^3z + 16a^3c^3g^3z + 4a^2b^2c^d^*g^*h^i + 12a^2b^2c^2d^*f^*g^*i - 4a^2b^2c^2e^*f^*g^*h - 4a^2b^2c^2d^*e^*h^i + 4a^2b^2c^2d^*e^*f^*i - 4a^3b^2c^*f^*g^*h^i - 4a^2b^3c^*d^*f^*g^*i - 4a^2b^2c^3d^*e^*f^*g + 2a^2b^2c^2f^2g^*i - 4a^2b^2c^2e^*g^2i - 2a^2b^2c^2e^2g^*i - 8a^2b^2c^2d^2g^*i + 2a^2b^2c^2e^*g^*h^2 - 2a^2b^2c^2e^*f^2i - 8a^2b^2c^2d^*f^*i^2 - 2a^2b^2c^2d^*g^2h + 2a^2b^2c^2e^2f^*h - 4a^2b^2c^2d^*f^2h - 2a^2b^2c^2d^*f^*h^2 + 2a^2b^2c^2d^*f^*g^2 + 8a^3c^2e^*f^*h^i - 8a^3c^2d^*g^*h^i + 8a^2c^3d^*e^*g^*h - 8a^2c^3d^*e^*f^*i - 2a^3b^2c^*e^*h^2i + 6a^3b^2c^*d^*h^i^2 - 2a^3b^2c^*e^*g^*i^2 + 2a^2b^3c^*e^2g^*i + 6a^2b^3c^3d^2e^*i + 2a^2b^3c^2d^*f^*h^2 - 2a^2b^3c^3d^2f^*h - 2a^2b^3c^3d^*e^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^*i + 2a^3b^2f^*h^i^2 + 4a^3c^2f^*g^2h + 4a^3c^2e^*g^2i - 4a^3c^2e^*g^*h^2 + 4a^2c^3d^2g^*i + 2a^2b^3e^*g^*i^2 - 2a^2b^3d^*h^i^2 + 4a^3c^2d^*f^*i^2 - 4a^2c^3e^2f^*h + 2b^3c^2d^2f^*h - 2b^3c^2d^2e^*i + 4a^2c^3e^*f^2g + 4a^2c^3d^*f^2h - 4a^2c^3d^*f^*g^2 + 3a^3b^2c^*f^2i^2 + 2b^2c^3d^2e^*g + 2a^2b^2c^2f^3h - 2a^2b^2c^2e^3i + 5a^2b^3c^*d^2i^2 - 2a^2b^2c^2d^*h^3 + 2a^2b^2c^2e^*g^3 + 3a^2b^3c^3d^2g^2 + 4a^4c^*g^*h^2i - 4a^4c^*f^*h^i^2 + 2b^4c^*d^2g^*i + 2a^3b^2c^*g^3i + 2a^2b^4d^*f^*i^2 - 4a^2c^4d^2e^*g + 2a^3b^2c^*f^*h^3 + 4a^2c^4d^2e^2f + 2a^2b^2c^3e^3g + 2a^2b^2c^3d^*f^3 - a^2b^2c^2f^2h^2 - a^2b^2c^2f^2g^2 - a^2b^2c^2e^2g^2 + 2a^4b^2g^*i^3 + 4a^4c^*e^*i^3 + 4a^2c^4d^3h + 2b^2c^4d^3f - a^3b^2c^*g^2h^2 - a^2b^3c^*e^2h^2 - 6a^3c^2e^2i^2 - 2a^3c^2f^2h^2 - a^2b^3c^3e^2f^2 - 6a^2c^3d^2h^2 - 2a^2c^3e^2g^2 - 2a^4c^*g^2i^2 + 4a^2c^3e^3i - 2b^2c^3d^3h - 2a^3b^2e^*i^3 + 4a^3c^2d^*h^3 - 2a^2c^4d^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^*d^2h^2 - a^2b^4e^2i^2 - b^2c^4d^2e^2 - b^5d^2i^2 - a^3c^2g^4 - a^2c^3f^4 - a^4c^*h^4 - a^2c^4e^4 - a^5i^4 - c^5d^4, z, 1)*x*(8b^3c^4 - 32a^2b^3c^5)/c^2 - (4b^2c^4d^*e + 8a^2c^4d^*g - 8a^2c^4e^*f - 4b^2c^3d^*g + 4b^3c^2d^*i + 8a^2c^3f^*i - 8a^2c^3g^*h - 4a^2b^2c^2f^*i + 4a^2b^2c^2h^*i - 12a^2b^2c^3d^*i + 4a^2b^2c^3e^*h + 4a^2b^2c^3f^*g)/c^2 + (x*(4c^5d^2 + 2b^5i^2 - 4a^2c^4f^2 - 2b^2c^4e^2 + 2b^4c^*h^2 + 2b^2c^3f^2 + 4a^2c^3h^2 + 2b^3c^2g^2 - 8a^2b^2c^2h^2 + 6a^2b^2c^2i^2 - 4b^2c^4d^*f - 8a^2c^4d^*h + 8a^2c^4e^*g - 4b^4c^*g^*i - 10a^2b^2c^3g^2 - 10a^2b^3c^*i^2 + 4b^2c^3d^*h - 4b^3c^2f^*h - 8a^2c^3g^*i + 20a^2b^2c^2g^*i - 4a^2b^2c^3e^*i + 12a^2b^2c^3f^*h))/c^2))*root(128a^2b^2c^5z^4 - 16a^2b^4c^4z^4 - 256a^3c^6z^4 + 128a^2b^3c^3i^*z^3 - 128a^2b^2c^4g^*z^3 - 256a^3b^2c^4i^*z^3 - 16a^2b^5c^2i^*z^3 + 16a^2b^4c^3g^*z^3 + 256a^3c^5g^*z^3 + 160a^3b^2c^3g^*i^*z^2 + 8a^2b^4c^2f^*h^*z^2 + 8a^2b^4c^2e^*i^*z^2 + 32a^2b^2c^4e^*g^*z^2 + 32a^2b^2c^4d^*h^*z^2 - 8a^2b^3c^3e^*g^*z^2 - 8a^2b^3c^3d^*h^*z^2 + 16a^2b^2c^4d^*f^*z^2 + 8a^2b^5c^*g^*i^*z^2 - 72a^2b^3c^2g^*i^*z^2 - 48a^2b^2c^3f^*h^*z^2 - 48a^2b^2c^3e^*i^*z^2 + 32a^2b^4c^*i^2z^2 - 48a^3b^2c^3h^2z^2 - 4a^2b^4c^2g^2z^2 + 16a^2b^2c^4f^2z^2 - 4a^2b^3c^3f^2z^2 + 8a^2b^2c^4e^2z^2 + 64a^3c^4f^*h^*z^2 + 64a^3c^4e^*i^*z^2 - 64a^2c^5d^*f^*z^2 - 4a^2b^5c^*h^2z^2 + 16a^2b^2c^5d^2z^2 - 56a^3b^2c^2i^2z^2 + 28a^2b^3c^2h^2z^2 + 40a^2b^2c^3g^2z^2 - 32a^4c^3i^2z^2 - 96a^3c^4g^2z^2 - 32a^2c^5e^2z^2 - 4b^3c^4d^2z^2 - 4a^2b^6i^2z^2 + 32a^2b^2c^3e^*f^*h^*z - 32a^2b^2c^3d^*f^*i^*z - 8a^2b^3c^2e^*f^*h^*z + 8a^2b^3c^2d^*f^*i^*z - 8a^2b^2c^3d^*f^*g^*z + 8a^2b^2c^3d^*e^*h^*z - 8a^2b^4c^*e^*g^*i^*z + 40a^2b^2c^2e^*g^*i^*z + 8a^2b^2c^2f^*g^*h^*z - 8a^2b^2c^2d^*h^*i^*z + 4a^3b^2c^*h^2i^*z - 32a^3b^2c^2g^2i^*z + 12a^3b^2c^*g^*i^2z + 8a^2b^3c^*g^2i^*z + 16a^3b^2c^2g^*h^2z - 4a^2b^3c^*g^*h^2z + 32a^3b^2c^2e^*i^2z - 24a^2b^3c^*e^*i^2z - 16a^2b^2c^3e^2i^*z + 4a^2b^3c^2e^2i^*z + 20a^2b^2c^3d^2i^*z - 16a^2b^2c^3e^*g^2z + 4a^2b^3c^2e^*g^2z - 4a^2b^2c^3e^2g^*z + 4a^2b^2c^3e^*f^2z - 32a^3c^3f^*g^*h^*z - 32a^3c^3e^*g^*i^*z + 32a^3c^3d^*h^*i^*z + 32a^2c^4d^*f^*g^*z - 32a^2c^4d^*e^*h^*z + 4a^2b^4c^*e^*h^2z - 16a^2b^2c^4d^2g^*z - 4a^2b^2c^2f^
\end{aligned}$$

$$\begin{aligned}
& ^2i*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), 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] $((c^2h + b^2m - c*(b*k + a*m))*x)/c^3 + ((c*j - b*1)*x^2)/(2*c^2) + ((c*k - b*m)*x^3)/(3*c^2) + (1*x^4)/(4*c) + (m*x^5)/(5*c) + ((c^3f - c^2*(b*h + a*k) - b^3*m + b*c*(b*k + 2*a*m) + (2*c^4d - c^3*(b*f + 2*a*h) + b^4*m - b^2*c*(b*k + 4*a*m) + c^2*(b^2*h + 3*a*b*k + 2*a^2*m))/\operatorname{Sqrt}[b^2 - 4*a*c])* \operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]])/(\operatorname{Sqrt}[2]*c^{(7/2)}*\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]) + ((c^3f - c^2*(b*h + a*k) - b^3*m + b*c*(b*k + 2*a*m) - (2*c^4d - c^3*(b*f + 2*a*h) + b^4*m - b^2*c*(b*k + 4*a*m) + c^2*(b^2*h + 3*a*b*k + 2*a^2*m))/\operatorname{Sqrt}[b^2 - 4*a*c])* \operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]])/(\operatorname{Sqrt}[2]*c^{(7/2)}*\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]) - ((2*c^3e - c^2*(b*g + 2*a*j) - b^3*1 + b*c*(b*j + 3*a*1))*\operatorname{ArcTanh}[(b + 2*c*x^2)/\operatorname{Sqrt}[b^2 - 4*a*c]])/(2*c^3*\operatorname{Sqrt}[b^2 - 4*a*c]) + ((c^2g + b^2*1 - c*(b*j + a*1))*\operatorname{Log}[a + b*x^2 + c*x^4])/(4*c^3)$

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] := 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 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 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + jx^5 + kx^6 + lx^7 + mx^8}{a + bx^2 + cx^4} dx &= \int \frac{x(e + gx^2 + jx^4 + lx^6)}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2 + hx^4 + kx^6}{a + bx^2 + cx^4} dx \\
&= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx + jx^2 + lx^3}{a + bx + cx^2} dx, x, x^2 \right) + \int \left(\frac{c^2h + b^2m - c(bk + am)}{c^3} x + \frac{(ck - bm)x^3}{3c^2} + \frac{mx^5}{5c} + \dots \right) dx \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(ck - bm)x^3}{3c^2} + \frac{mx^5}{5c} + \dots \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(cj - bl)x^2}{2c^2} + \frac{(ck - bm)}{3c^2} \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(cj - bl)x^2}{2c^2} + \frac{(ck - bm)}{3c^2} \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(cj - bl)x^2}{2c^2} + \frac{(ck - bm)}{3c^2} \\
&= \frac{(c^2h + b^2m - c(bk + am))x}{c^3} + \frac{(cj - bl)x^2}{2c^2} + \frac{(ck - bm)}{3c^2}
\end{aligned}$$

Mathematica [A] time = 1.29, size = 816, normalized size = 1.50

$$\frac{mx^5}{5c} + \frac{lx^4}{4c} + \frac{(ck - bm)x^3}{3c^2} + \frac{(cj - bl)x^2}{2c^2} + \frac{(mb^2 + c^2h - c(bk + am))x}{c^3} + \frac{(2dc^4 + (-bf + \sqrt{b^2 - 4ac}f - 2ah)c^3 + (2mb^2 - b^2m - c(bk + am)))}{c^3}$$

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^2*h - b*Sqrt[b^2 - 4*a*c]*h + 3*a*b*k - a*Sqrt[b^2 - 4*a*c]*k + 2*a^2*m) + b*c*(-(b^2*k) + b*Sqrt[b^2 - 4*a*c]*k - 4*a*b*m + 2*a*Sqrt[b^2 - 4*a*c]*m))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]])/(Sqrt[2]*c^(7/2)*Sqrt[b^2 - 4*a*c]*Sqrt[b - Sqrt[b^2 - 4*a*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^2*h + b*Sqrt[b^2 - 4*a*c]*h + 3*a*b*k + a*Sqrt[b^2 - 4*a*c]*k + 2*a^2*m) - b*c*(b^2*k + b*Sqrt[b^2 - 4*a*c]*k + 4*a*b*m + 2*a*Sqrt[b^2 - 4*a*c]*m))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]])/(Sqrt[2]*c^(7/2)*Sqrt[b^2 - 4*a*c]*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((2*c^3*e + c^2*(-(b*g) + Sqrt[b^2 - 4*a*c]*g - 2*a*j) + b^2*(-b + Sqrt[b^2 - 4*a*c])*l + c*(b^2*j - b*Sqrt[b^2 - 4*a*c]*j + 3*a*b*l - a*Sqrt[b^2 - 4*a*c]*l))*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(4*c^3*Sqrt[b^2 - 4*a*c]) + ((-2*c^3*e + c^2*(b*g + Sqrt[b^2 - 4*a*c]*g + 2*a*j) + b^2*(b + Sqrt[b^2 - 4*a*c])*l - c*(b^2*j + b*Sqrt[b^2 - 4*a*c]*j + 3*a*b*l + a*Sqrt[b^2 - 4*a*c]*l))*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])/(4*c^3*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((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]
$$-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*\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 - 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*\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}*\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$$

$$\begin{aligned}
& 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*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)*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}}*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)*
\end{aligned}$$

$$\begin{aligned}
& ^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) - 1/8*((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*\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 - 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*\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}*\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 + 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^2*b^3*c^4 - 2*\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^2*b^3*c^4
\end{aligned}$$

$$\begin{aligned}
& 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 * \text{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 * \text{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 - \\
& 1 * 2 * 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) * 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}} * 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})) * 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) * \text{abs}(c)
\end{aligned}$$

$$\begin{aligned}
& c^3 - 32a^3c^4 - 16a^2b^2c^4 - 6ab^2c^4 + 8a^2c^5) \sqrt{b^2 - 4ac} \\
&) * j * \text{abs}(c) + (b^8 - 11ab^6c - 2b^7c + 40a^2b^4c^2 + 14ab^5c^2 + \\
& b^6c^2 - 48a^3b^2c^3 - 24a^2b^3c^3 - 7ab^4c^3 + 12a^2b^2c^4 - \\
& (b^7 - 11ab^5c - 2b^6c + 40a^2b^3c^2 + 14ab^4c^2 + b^5c^2 - 48 \\
& a^3b^2c^3 - 24a^2b^2c^3 - 7ab^3c^3 + 12a^2b^2c^4) \sqrt{b^2 - 4ac} \\
&) * 1 * \text{abs}(c) - 2 * (b^5c^3 - 8ab^3c^4 - 2b^4c^4 + 16a^2b^2c^5 + 8ab^2c^5 \\
& + b^3c^5 - 4ab^2c^6 - (b^4c^3 - 8ab^2c^4 - 2b^3c^4 + 16a^2c^5 \\
& + 8ab^2c^5 + b^2c^6) \sqrt{b^2 - 4ac}) * \text{abs}(c) * e + (b^6c^3 - \\
& 8ab^4c^4 - 2b^5c^4 + 16a^2b^2c^5 + 8ab^3c^5 + b^4c^5 - 4ab^2c^6 \\
& c^6 - (b^5c^3 - 4ab^3c^4 - 2b^4c^4 + b^3c^5) \sqrt{b^2 - 4ac}) * g - \\
& (b^7c^2 - 10ab^5c^3 - 2b^6c^3 + 32a^2b^3c^4 + 12ab^4c^4 + b^5c^4 \\
& - 32a^3b^2c^5 - 16a^2b^2c^5 - 6ab^3c^5 + 8a^2b^2c^6 - (b^6c^2 - \\
& 6ab^4c^3 - 2b^5c^3 + 8a^2b^2c^4 + 4ab^3c^4 + b^4c^4 - 2ab^2c^5) \\
& \sqrt{b^2 - 4ac}) * j + (b^8c - 11ab^6c^2 - 2b^7c^2 + 40a^2b^4c^3 + 14ab^5c^3 \\
& + b^6c^3 - 48a^3b^2c^4 - 24a^2b^3c^4 - 7ab^4c^4 + 12a^2b^2c^5 - (b^7c - 7ab^5c^2 \\
& - 2b^6c^2 + 12a^2b^3c^3 + 6ab^4c^3 + b^5c^3 - 3ab^3c^4) \sqrt{b^2 - 4ac}) * 1 - 2 * (b^5c^4 - 8ab^3c^5 \\
& - 2b^4c^5 + 16a^2b^2c^6 + 8ab^2c^6 + b^3c^6 - 4ab^2c^7 - (b^4c^4 - 4ab^2c^5 \\
& - 2b^3c^5 + b^2c^6) \sqrt{b^2 - 4ac}) * e) * \log(x^2 + 1/2 * (b^2c^22 - 4ac^23)) / c^12) / ((ab^4c^2 - 8a^2b^2c^3 \\
& - 2ab^3c^3 + 16a^3c^4 + 8a^2b^2c^4 + ab^2c^4 - 4a^2c^5) * c^2 * \text{abs}(c)) \\
& - 1/16 * ((b^6c^2 - 8ab^4c^3 - 2b^5c^3 + 16a^2b^2c^4 + 8ab^3c^4 + b^4c^4 - 4ab^2c^5 \\
& + (b^5c^2 - 8ab^3c^3 - 2b^4c^3 + 16a^2b^2c^4 + 8ab^2c^4 + b^3c^4 - 4ab^2c^5) \\
& \sqrt{b^2 - 4ac}) * g * \text{abs}(c) - (b^7c - 10ab^5c^2 - 2b^6c^2 + 32a^2b^3c^3 \\
& + 12ab^4c^3 + b^5c^3 - 32a^3b^2c^4 - 16a^2b^2c^4 - 6ab^3c^4 + 8a^2b^2c^5 + (b^6c \\
& - 10ab^4c^2 - 2b^5c^2 + 32a^2b^2c^3 + 12ab^3c^3 + b^4c^3 - 32a^3c^4 - 16a^2b^2c^4 \\
& - 6ab^2c^4 + 8a^2c^5) \sqrt{b^2 - 4ac}) * j * \text{abs}(c) + (b^8 - 11ab^6c - 2b^7c \\
& + 40a^2b^4c^2 + 14ab^5c^2 + b^6c^2 - 48a^3b^2c^3 - 24a^2b^3c^3 - 7ab^4c^3 + 12a^2b^2c^4 \\
& + (b^7 - 11ab^5c - 2b^6c + 40a^2b^3c^2 + 14ab^4c^2 + b^5c^2 - 48a^3b^2c^3 - 24a^2 \\
& b^2c^3 - 7ab^3c^3 + 12a^2b^2c^4) \sqrt{b^2 - 4ac}) * 1 * \text{abs}(c) - 2 * (b^5c^3 - 8ab^3c^4 \\
& - 2b^4c^4 + 16a^2b^2c^5 + 8ab^2c^5 + b^3c^5 - 4ab^2c^6 + (b^4c^3 - 8ab^2c^4 \\
& - 2b^3c^4 + 16a^2c^5 + 8ab^2c^5 + b^2c^6) \sqrt{b^2 - 4ac}) * \text{abs}(c) * e + (b^6c^3 - 8ab^4c^4 \\
& - 2b^5c^4 + 16a^2b^2c^5 + 8ab^3c^5 + b^4c^5 - 4ab^2c^6 + (b^5c^3 - 4ab^3c^4 \\
& - 2b^4c^4 + b^3c^5) \sqrt{b^2 - 4ac}) * g - (b^7c^2 - 10ab^5c^3 - 2b^6c^3 + 32a^2b^3c^4 \\
& + 12ab^4c^4 + b^5c^4 - 32a^3b^2c^5 - 16a^2b^2c^5 - 6ab^3c^5 + 8a^2b^2c^6 + (b^6c^2 - 6ab^4c^3 \\
& - 2b^5c^3 + 8a^2b^2c^4 + 4ab^3c^4 + b^4c^4 - 2ab^2c^5) \sqrt{b^2 - 4ac}) * j + (b^8c - 11ab^6c^2 \\
& - 2b^7c^2 + 40a^2b^4c^3 + 14ab^5c^3 + b^6c^3 - 48a^3b^2c^4 - 24a^2b^3c^4 - 7ab^4c^4 + 12a^2b^2c^5 \\
& + (b^7c - 7ab^5c^2 - 2b^6c^2 + 12a^2b^3c^3 + 6ab^4c^3 + b^5c^3 - 3ab^3c^4) \sqrt{b^2 - 4ac}) * 1 - 2 * (b^5c^4 - 8ab^3c^5 \\
& - 2b^4c^5 + 16a^2b^2c^6 + 8ab^2c^6 + b^3c^6 - 4ab^2c^7 + (b^4c^4 - 4ab^2c^5 - 2b^3c^5 \\
& + b^2c^6) \sqrt{b^2 - 4ac}) * e) * \log(x^2 + 1/2 * (b^2c^22 - 4ac^23)) / c^12) / ((ab^4c^2 - 8a^2b^2c^3 \\
& - 2ab^3c^3 + 16a^3c^4 + 8a^2b^2c^4 + ab^2c^4 - 4a^2c^5) * c^2 * \text{abs}(c)) + 1/60 * (12c^4 * \\
& m * x^5 + 15c^4 * 1 * x^4 + 20c^4 * k * x^3 - 20b * c^3 * m * x^3 + 30c^4 * j * x^2 - 30b * \\
& c^3 * 1 * x^2 + 60c^4 * h * x - 60b * c^3 * k * x + 60b^2 * c^2 * m * x - 60a * c^3 * m * x) / c^5
\end{aligned}$$

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] 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),x)

[Out] 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)*arctanh(2^(1/2)/((-b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^2*h+1/2*(-4*a*

$$\begin{aligned}
& 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*a \\
& rctan(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)}*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)^{(1/2)}/(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) \\
& *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)}*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*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*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*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)}*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*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)}*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)}*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)}*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)}*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)}*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)}*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)}*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)}*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)}*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)}*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)}*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)}*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*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)}*arctanh(2^{(1/2)}/((\\
& -b+(-4*a*c+b^2)^{(1/2}))*c)^{(1/2)}*c*x)*a*h+5/2/c/(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^2*k*a-5/2/c/(4*a*c-b^2)*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2}))*c)^{(1/2)}*arct \\
& anh(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2}))*c)^{(1/2)}*c*x)*b^2*k*a+4/c/(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)*a^2*b*m+1/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)}*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2}))*c)^{(1/2) \\
& }*c*x)*a^2*m-1/2/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)}*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2}))*c)^{(1/2)}*c*x)*b^3*k \\
& +1/4*1*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/(4*a*c-b^2)*ln(-2* \\
& c*x^2-b+(-4*a*c+b^2)^{(1/2}))*b^3*j+1/4/c^2/(4*a*c-b^2)*ln(2*c*x^2+b+(-4*a*c+
\end{aligned}$$

$b^2)^{(1/2)} * b^{3*j-1} / c / (4*a*c-b^2) * \ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)}) * a^{2*1-1} / c / (4*a*c-b^2) * \ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)}) * a^{2*1-1/4} / c^3 / (4*a*c-b^2) * \ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)}) * b^{4*1-1/4} / c^3 / (4*a*c-b^2) * \ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)}) * b^{4*1+1/2} / c^3 * (-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^{4*m+1} / 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^{2*m-1/2} / 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{arctanh}(2^{(1/2)} / ((-b+(-4*a*c+b^2)^{(1/2)}) * c)^{(1/2)} * c * x) * b^{3*k+1/2} / c^3 * (-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^{4*m-3} / 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) * a * b^{3*m+3} / 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^{3*m} * a^{-4} / 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) * a^{2*b*m+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^{2*k-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^{2*k+5/4} / c^2 / (4*a*c-b^2) * \ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)}) * a^{1*b^2+5/4} / c^2 / (4*a*c-b^2) * \ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)}) * a^{1*b^2-1} / c / (4*a*c-b^2) * \ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)}) * b^j * a^{-1} / c / (4*a*c-b^2) * \ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)}) * b^j * a^{1/2} / c * (-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^j + 1/4 / c^3 * (-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)}) * b^{3*1-1/4} / 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)}) * b^{2*j-1/2} / c * (-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^j - 1/4 / c^3 * (-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)}) * b^{3*1+1/4} / 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)}) * b^{2*j}$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\frac{12c^2mx^5 + 15c^2lx^4 + 20(c^2k - bcm)x^3 + 30(c^2j - bcl)x^2 + 60(c^2h - bck + (b^2 - ac)m)x - \int \frac{c^3d - ac^2h + abck + (c^3e - ac^2j + a*b*c*1)*x}{c^3} dx}{60c^3}$$

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*1)*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)*1)*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*1)*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*1)/(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*1^2 - 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*1^2 - a

$$\begin{aligned}
& ^3b^4k^2m^2 + a^4c^3j^2m + a^5c^2k^2m^2 - a^5c^2l^2m - a^3b^2c^2k^3 - a^6d^2g^2 + b^6c^6d^2f^2 - a^6e^2h + b^6d^2h + a^6d^2k - \\
& 2a^5b^3c^3m^3 + b^6c^6d^2l^2 - a^6b^6f^2m^2 - 2a^5b^3c^5d^2h^2 - a^6b^3c^5f^2g^2 + 2a^5b^3c^5f^2h + a^6b^3c^5e^2k - 2a^5b^3c^5d^2m - 6a^5b^5c^6d^2m^2 - 2 \\
& b^2c^5d^2f^2h - a^6b^5c^6f^2l^2 + 2b^2c^5d^2e^2j - 2b^3c^4d^2e^2l + 2b^3c^4d^2f^2k - 2b^3c^4d^2g^2j - 2a^2c^5d^2f^2m + 2a^2c^5d^2g^2l - 2a^2c^5 \\
& d^2h^2k - 2a^2c^5e^2f^2l - 2a^2c^5e^2g^2k + 2a^2c^5e^2h^2j - 2a^2c^5f^2g^2j - 2b^4c^3d^2f^2m + 2b^4c^3d^2g^2l - 2b^4c^3d^2h^2k + 2b^5c^2d^2h^2m \\
& + 2a^3c^4f^2h^2m - 2a^3c^4g^2h^2l - 2b^5c^2d^2j^2l + 2a^3c^4d^2k^2m - 2a^3c^4e^2j^2m + 2a^3c^4e^2k^2l + 2a^3c^4f^2j^2l + 2a^3c^4g^2j^2k + 2a \\
& ^4c^3g^2l^2m - 2a^4c^3h^2k^2m - 2a^4c^3j^2k^2l - 3a^2b^2c^4d^2j^2 - a^6b^2c^4f^2h^2 - 4a^2b^3c^3d^2k^2 + 3a^2b^3c^4d^2k^2 - a^6b^3c^3f^2j^2 - 5a \\
& b^4c^2d^2l^2 + 2a^2b^3c^4f^2j^2 - 2a^2b^2c^4f^2k^2 - a^6b^4c^2f^2k^2 - 4a^3b^3c^3d^2m^2 - a^6b^2c^4e^2m - 3a^3b^3c^3f^2l^2 + 2a^2b^3c^3f^2m \\
& - 5a^2b^3c^4f^2m + 5a^2b^4c^3f^2m^2 + a^2b^4c^3h^2l^2 - 4a^3b^3c^3h^2m - a^3b^3c^3j^2k^2 - 4a^3b^3c^3h^2m^2 + 5a^4b^2c^2h^2m^2 - a^3b^3c^3k \\
& ^2l^2 + 2a^4b^2c^2k^2l^2 + 2a^3b^3c^3k^2m - 3a^4b^2c^2k^2m + a^4b^2c^2k^2m^2 + a^4b^2c^2l^2m - 2b^6c^6d^2e^2g + 2a^6c^6d^2f^2h + 2a^6c^6e^2f^2g - \\
& 2a^6c^6d^2e^2j - 2b^6c^6d^2k^2m + 6a^2b^2c^3d^2l^2 + 3a^2b^2c^3f^2k^2 + 10a^2b^3c^2d^2m^2 + a^2b^2c^3h^2j^2 + 4a^2b^3c^2f^2l^2 - 2a^2b^2c^3h^2k^2 + 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^2d^2e^2l - 4a^2b^3c^2d^2f^2k + 4a^2b^3c^2d^2g^2j - 2a^2b^3c^2e^2f^2j + 2a^2b^5c^3f^2k^2m + 6a^2b^2c^4d^2f^2m - 6a^2b^2c^4d^2g^2 \\
& l + 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^3c^4d^2h^2m + 2a^2 \\
& b^3c^4e^2g^2m - 2a^2b^3c^4e^2h^2l + 4a^2b^3c^4f^2g^2l - 2a^2b^3c^4f^2h^2k - 2a^2b^3c^4g^2h^2j + 8a^2b^3c^3d^2j^2l - 6a^2b^3c^4d^2j^2l - 2a^2b^4c^2f^2h \\
& ^2m + 10a^2b^4c^2d^2k^2m + 2a^2b^4c^2f^2j^2l + 8a^3b^3c^3f^2k^2m - 2a^3b^3c^3g^2k^2l + 4a^3b^3c^3h^2j^2l - 2a^2b^4c^3h^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 - 2 \\
& 56a^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^3c^7j^2z^3 - 16a^2b^5c^5j^2z^3 + 16a^2b^4c^6g^2z^3 - 256a^4c^7l^2z^3 + 256a^3 \\
& c^8g^2z^3 - 96a^4b^2c^5j^2l^2z^2 + 8a^2b^7c^2j^2l^2z^2 + 160a^4b^2c^5h^2m \\
& z^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^
\end{aligned}$$

$$\begin{aligned}
& 5c^5l^2z^2 - 32a^4c^6j^2z^2 - 96a^3c^7g^2z^2 - 32a^2c^8e^2z^2 \\
& - 4b^3c^7d^2z^2 - 4ab^9m^2z^2 + 32a^5b^3c^3h^1m^2z + 8a^2b^6c^3g^2k^1m^2z + 96a^4b^3c^4e^2k^1m^2z + 32a^4b^3c^4h^1j^1k^1z + 32a^4b^3c^4g^2j^1l^1z + 32a^4b^3c^4f^1j^1m^2z - 64a^4b^3c^4g^2h^1m^2z - 8ab^6c^2e^2j^1l^1z + 8ab^6c^2e^2h^1m^2z - 64a^3b^3c^5e^2h^1k^1z + 64a^3b^3c^5e^2g^1l^1z - 64a^3b^3c^5e^2f^1m^2z + 32a^3b^3c^5f^2g^2k^1z - 32a^3b^3c^5d^2h^1l^1z + 32a^3b^3c^5d^2g^2m^2z - 8ab^5c^3e^2h^1k^1z + 8ab^5c^3e^2g^1l^1z - 8ab^5c^3e^2f^1m^2z - 8ab^4c^4e^2g^2j^1z + 8ab^4c^4e^2f^2k^1z - 8ab^4c^4d^2f^1l^1z + 8ab^4c^4d^2e^2m^2z - 32a^2b^3c^6d^2f^1j^1z + 32a^2b^3c^6d^2e^2k^1z + 8ab^3c^5d^2f^1j^1z - 8ab^3c^5d^2e^2k^1z + 32a^2b^3c^6e^2f^1h^1z - 8ab^3c^5e^2f^1h^1z - 8ab^2c^6d^2f^1g^2z + 8ab^2c^6d^2e^2h^1z - 8ab^7c^2e^2k^1m^2z - 40a^5b^2c^2k^1l^1m^2z + 48a^4b^3c^2j^1k^1m^2z - 8a^4b^3c^2h^1l^1m^2z + 104a^4b^2c^3g^2k^1m^2z - 56a^3b^4c^2g^2k^1m^2z - 40a^4b^2c^3h^1j^1m^2z + 8a^4b^2c^3h^1k^1l^1z + 8a^4b^2c^3f^1l^1m^2z + 8a^3b^4c^2h^1j^1m^2z - 152a^3b^3c^3e^2k^1m^2z + 64a^2b^5c^2e^2k^1m^2z - 40a^3b^3c^3g^2j^1l^1z - 8a^3b^3c^3h^1j^1k^1z - 8a^3b^3c^3f^1j^1m^2z + 8a^2b^5c^2g^2j^1l^1z + 48a^3b^3c^3g^2h^1m^2z - 8a^2b^5c^2g^2h^1m^2z - 104a^3b^2c^4e^2j^1l^1z + 56a^2b^4c^3e^2j^1l^1z + 8a^3b^2c^4f^1j^1k^1z - 8a^3b^2c^4d^2k^1l^1z + 8a^3b^2c^4d^2j^1m^2z + 104a^3b^2c^4e^2h^1m^2z - 56a^2b^4c^3e^2h^1m^2z - 40a^3b^2c^4g^2h^1k^1z - 40a^3b^2c^4f^1g^2m^2z - 8a^3b^2c^4f^1h^1l^1z + 8a^2b^4c^3g^2h^1k^1z + 8a^2b^4c^3f^1g^2m^2z + 48a^2b^3c^4e^2h^1k^1z - 48a^2b^3c^4e^2g^1l^1z + 48a^2b^3c^4e^2f^1m^2z - 8a^2b^3c^4f^1g^2k^1z + 8a^2b^3c^4d^2h^1l^1z - 8a^2b^3c^4d^2g^2m^2z + 40a^2b^2c^5e^2g^2j^1z - 40a^2b^2c^5e^2f^2k^1z + 40a^2b^2c^5d^2f^1l^1z - 40a^2b^2c^5d^2e^2m^2z - 8a^2b^2c^5d^2h^1j^1z + 8a^2b^2c^5d^2g^2k^1z + 8a^2b^2c^5f^2g^2h^1z + 8a^4b^4c^2k^1l^1m^2z - 64a^5b^3c^3j^1k^1m^2z - 8a^3b^5c^2j^1k^1m^2z - 32a^6b^3c^2l^1m^2z + 24a^5b^3c^3l^1m^2z - 28a^4b^4c^2j^1m^2z + 16a^5b^3c^3k^2l^1z + 4a^3b^5c^2j^1l^2z + 48a^5b^3c^3g^2m^2z + 32a^3b^5c^2g^2m^2z - 4a^2b^6c^2g^1l^2z - 36a^2b^6c^2e^2m^2z - 32a^4b^3c^4g^2k^2z - 16a^3b^3c^5f^2l^1z - 48a^4b^3c^4e^2l^2z - 32a^3b^3c^5g^2j^1z - 4ab^4c^4e^2l^1z + 32a^2b^3c^6d^2l^1z - 24ab^3c^5d^2l^1z + 4ab^6c^2e^2k^2z + 32a^3b^3c^5e^2j^2z + 16a^3b^3c^5g^2h^2z - 16a^2b^3c^6e^2j^1z + 4ab^5c^3e^2j^2z + 4ab^3c^5e^2j^1z + 20ab^2c^6d^2j^1z + 4ab^4c^4e^2h^2z - 16a^2b^3c^6e^2g^2z + 4ab^3c^5e^2g^2z - 4ab^2c^6e^2g^2z + 4ab^2c^6e^2f^2z + 32a^6c^3k^1l^1m^2z - 32a^5c^4h^1k^1l^1z + 32a^5c^4h^1j^1m^2z - 32a^5c^4g^2k^1m^2z - 32a^5c^4f^1l^1m^2z - 32a^4c^5f^1j^1k^1z + 32a^4c^5e^2j^1l^1z + 32a^4c^5d^2k^1l^1z - 32a^4c^5d^2j^1m^2z + 32a^4c^5g^2h^1k^1z + 32a^4c^5f^1h^1l^1z + 32a^4c^5f^1g^2m^2z - 32a^4c^5e^2h^1m^2z - 32a^3c^6e^2g^2j^1z + 32a^3c^6e^2f^2k^1z + 32a^3c^6d^2h^1j^1z - 32a^3c^6d^2g^2k^1z - 32a^3c^6d^2f^1l^1z + 32a^3c^6d^2e^2m^2z - 32a^3c^6f^1g^2h^1z + 4ab^7c^2e^2l^2z + 32a^2c^7d^2f^1g^2z - 32a^2c^7d^2e^2h^1z - 16ab^7c^2d^2g^2z + 52a^5b^2c^2j^1m^2z - 4a^4b^3c^2k^2l^1z + 36a^4b^2c^3j^2l^1z - 16a^4b^3c^2j^1l^2z - 8a^3b^4c^2j^2l^1z - 20a^4b^2c^3j^1k^2z + 4a^3b^4c^2j^1k^2z - 76a^4b^3c^2g^2m^2z - 60a^4b^2c^3g^1l^2z + 44a^3b^2c^4g^2l^1z + 28a^3b^4c^2g^1l^2z - 8a^2b^4c^3g^2l^1z + 104a^3b^4c^2e^2m^2z - 100a^4b^2c^3e^2m^2z + 24a^3b^3c^3g^2k^2z + 4a^3b^2c^4h^2j^1z - 4a^2b^5c^2g^2k^2z + 4a^2b^3c^4f^2l^1z + 76a^3b^3c^3e^2l^2z - 32a^2b^5c^2e^2l^2z + 20a^2b^2c^5e^2l^1z + 12a^3b^2c^4g^2j^2z + 8a^2b^3c^4g^2j^1z - 4a^2b^4c^3g^2j^2z + 52a^3b^2c^4e^2k^2z - 28a^2b^4c^3e^2k^2z - 4a^2b^2c^5f^2j^1z - 24a^2b^3c^4e^2j^2z - 4a^2b^3c^4g^2h^2z - 20a^2b^2c^5e^2h^2z + 20a^5b^2c^2l^3z + 4a^3b^3c^3j^3z - 4a^2b^2c^5g^3z - 4a^4b^5l^1m^2z - 16a^6c^3j^1m^2z - 16a^5c^4j^2l^1z + 4a^3b^6j^1m^2z + 16a^5c^4j^1k^2z + 48a^5c^4g^1l^2z - 48a^4c^5g^2l^1z - 4a^2b^7g^2m^2z + 16a^5c^4e^2m^2z - 16a^4c^5h^2j^1z + 16a^4c^5g^2j^2z - 16a^3c^6e^2l^1z + 4b^5c^4d^2l^1z - 16a^4c^5e^2k^2z + 16a^3c^6f^2j^1z - 4b^4c^5d^2j^1z - 16a^2c^7d^2j^1z - 4a^4b^4c^1l^3z + 16a^3c^6e^2h^2z - 16a^4b^3c^4j^3z + 16a^2c^7e^2g^2z + 4b^3c^6d^2g^2z - 16a^2c^7e^2f^2z - 4b^2c^7d^2e^2z + 4ab^8e^2m^2z + 16a^6c^8d^2e^2z - 16a^6c^3l^3z + 16a^3c^6g^3z
\end{aligned}$$

$$\begin{aligned}
& z + 4a^5b^2c^2g^2k^2m + 12a^5b^2c^2g^2j^2k^2m + 12a^5b^2c^2e^2k^2m - 4a^5b^2c^2h^2j^2k^2m - 4a^5b^2c^2f^2j^2k^2m - 4a^4b^3c^2g^2j^2k^2m - 4a^4b^3c^2e^2k^2m - 4a^4b^3c^2g^2h^2k^2m + 4a^4b^3c^2f^2h^2k^2m + 12a^4b^3c^3d^2j^2k^2m - 20a^4b^3c^3e^2g^2k^2m + 12a^4b^3c^3f^2h^2j^2m + 12a^4b^3c^3e^2h^2j^2m + 12a^4b^3c^3d^2h^2k^2m - 4a^4b^3c^3g^2h^2j^2k - 4a^4b^3c^3f^2g^2k^2m - 4a^4b^3c^3f^2g^2j^2m - 4a^4b^3c^3e^2h^2k^2m - 4a^4b^3c^3e^2f^2l^2m - 4a^4b^3c^3d^2g^2l^2m - 4a^2b^5c^2e^2g^2k^2m + 4a^2b^5c^2d^2h^2k^2m - 20a^3b^4c^2d^2f^2j^2m - 4a^3b^4c^4e^2f^2j^2k - 4a^3b^4c^4d^2g^2j^2k - 4a^3b^4c^4d^2e^2k^2m - 4a^3b^4c^4d^2e^2j^2m - 4a^2b^5c^2d^2f^2j^2m + 12a^3b^4c^4e^2g^2h^2k + 12a^3b^4c^4e^2f^2g^2m + 12a^3b^4c^4d^2g^2h^2l + 12a^3b^4c^4d^2f^2h^2m - 4a^3b^4c^4f^2g^2h^2j - 4a^3b^4c^4e^2f^2h^2l + 4a^2b^5c^2d^2f^2h^2m - 4a^2b^4c^3d^2f^2h^2k + 4a^2b^4c^3d^2f^2g^2l + 12a^2b^4c^5d^2f^2g^2j + 12a^2b^4c^5d^2e^2f^2l - 4a^2b^4c^5d^2e^2h^2j - 4a^2b^4c^5d^2e^2g^2k - 4a^2b^3c^4d^2f^2g^2j - 4a^2b^3c^4d^2e^2f^2l - 4a^2b^4c^5e^2f^2g^2h + 4a^2b^2c^5d^2e^2f^2j - 4a^6b^2c^2j^2k^2m - 4a^2b^6c^2d^2f^2k^2m - 4a^2b^6c^2d^2e^2f^2g - 16a^4b^2c^2e^2j^2k^2m + 4a^4b^2c^2f^2j^2k^2m + 4a^4b^2c^2d^2j^2l^2m + 12a^4b^2c^2f^2h^2k^2m + 4a^4b^2c^2g^2h^2j^2m + 4a^4b^2c^2e^2h^2l^2m - 4a^3b^3c^2d^2j^2k^2m + 20a^3b^3c^2e^2g^2k^2m - 16a^3b^3c^2d^2h^2k^2m - 4a^3b^3c^2f^2h^2j^2l - 4a^3b^3c^2e^2h^2j^2m - 40a^3b^2c^3d^2f^2k^2m + 24a^2b^4c^2d^2f^2k^2m - 16a^3b^2c^3d^2h^2j^2l + 12a^3b^2c^3e^2g^2j^2l + 4a^3b^2c^3e^2h^2j^2k + 4a^3b^2c^3e^2f^2j^2m + 4a^3b^2c^3d^2g^2k^2m - 4a^2b^4c^2e^2g^2j^2l + 4a^2b^4c^2d^2h^2j^2l - 16a^3b^2c^3e^2g^2h^2m + 4a^3b^2c^3f^2g^2h^2l + 4a^2b^4c^2e^2g^2h^2m + 20a^2b^3c^3d^2f^2j^2l - 16a^2b^3c^3d^2f^2h^2m - 4a^2b^3c^3e^2g^2h^2k - 4a^2b^3c^3e^2f^2g^2m - 4a^2b^3c^3d^2g^2h^2l - 16a^2b^2c^4d^2f^2g^2l + 12a^2b^2c^4d^2f^2h^2k + 4a^2b^2c^4e^2f^2g^2k + 4a^2b^2c^4d^2g^2h^2j + 4a^2b^2c^4d^2e^2h^2l + 4a^2b^2c^4d^2e^2g^2m + 2a^5b^2c^2j^2k^2m - 4a^5b^2c^2e^2h^2k^2m - 2a^5b^2c^2h^2k^2m + 2a^4b^3c^2h^2k^2m + 2a^5b^2c^2h^2k^2l^2 + 2a^5b^2c^2f^2l^2m - 2a^5b^2c^2h^2j^2m + 2a^3b^4c^2g^2k^2m + 14a^4b^2c^3f^2k^2m - 10a^5b^2c^2f^2k^2m - 8a^5b^2c^2g^2j^2m^2 - 8a^5b^2c^2e^2l^2m^2 + 4a^5b^2c^2f^2k^2m^2 + 4a^4b^3c^2f^2k^2m - 2a^5b^2c^2g^2k^2l + 2a^2b^5c^2f^2k^2m + 6a^5b^2c^2f^2k^2l^2 + 6a^5b^2c^2d^2l^2m - 2a^5b^2c^2g^2j^2l^2 + 2a^4b^3c^2g^2j^2l^2 - 2a^4b^3c^2f^2k^2l^2 - 2a^4b^3c^2d^2l^2m - 2a^4b^3c^2g^2j^2l - 14a^2b^5c^2d^2k^2m - 10a^5b^2c^2e^2j^2m^2 + 10a^4b^3c^2e^2j^2m^2 - 10a^3b^4c^4d^2k^2m - 6a^4b^3c^2d^2k^2m^2 + 6a^4b^3c^2g^2h^2m - 4a^3b^4c^2d^2k^2m - 2a^5b^2c^2d^2k^2m^2 + 14a^5b^2c^2f^2h^2m^2 + 14a^3b^4c^4e^2j^2l - 10a^4b^3c^2f^2h^2m^2 - 10a^4b^3c^2f^2h^2m - 10a^4b^3c^2e^2j^2l - 2a^4b^3c^2g^2h^2l - 2a^4b^3c^2f^2j^2k - 2a^4b^3c^2d^2j^2m - 2a^3b^4c^2e^2j^2l^2 + 2a^3b^4c^2d^2k^2l^2 + 2a^2b^5c^2e^2j^2l - 12a^2b^4c^3d^2j^2l - 10a^3b^4c^4e^2h^2m + 6a^4b^3c^3e^2j^2k^2 + 2a^3b^4c^2f^2h^2l^2 - 2a^2b^5c^2e^2h^2m - 12a^3b^4c^2e^2g^2m^2 + 12a^3b^4c^2c^2d^2h^2m^2 + 12a^2b^4c^3d^2h^2m + 6a^3b^4c^4f^2g^2l - 2a^4b^3c^3f^2h^2k^2 - 2a^3b^4c^4f^2h^2k + 14a^4b^3c^3e^2g^2l^2 - 10a^4b^3c^3d^2h^2l^2 - 10a^3b^4c^4e^2g^2l - 2a^3b^4c^4f^2g^2k - 2a^3b^4c^4d^2g^2m + 2a^2b^5c^2e^2g^2l^2 - 2a^2b^5c^2d^2h^2l^2 + 2a^2b^4c^3e^2h^2k - 2a^2b^4c^3e^2g^2l + 2a^2b^4c^3e^2f^2m - 14a^2b^5c^2d^2f^2m^2 + 14a^2b^5c^2d^2h^2k - 10a^4b^3c^3d^2f^2m^2 - 10a^3b^4c^4d^2h^2k - 10a^2b^5c^2d^2g^2l - 10a^2b^3c^4d^2h^2k + 10a^2b^3c^4d^2g^2l - 6a^2b^3c^4d^2f^2m - 4a^2b^4c^3d^2f^2m - 2a^3b^4c^4e^2h^2j - 2a^2b^5c^2d^2f^2m + 6a^3b^4c^4d^2h^2j^2 + 6a^2b^5c^2e^2f^2k + 6a^2b^5c^2d^2e^2m - 2a^3b^4c^4e^2g^2j^2 - 2a^2b^5c^2e^2g^2j + 2a^2b^3c^4e^2g^2j - 2a^2b^3c^4e^2f^2k - 2a^2b^3c^4d^2e^2m + 14a^3b^4c^4d^2f^2k^2 - 10a^2b^5c^2d^2f^2k - 8a^2b^2c^5d^2g^2j - 8a^2b^2c^5d^2e^2l + 4a^2b^3c^4d^2f^2k + 4a^2b^2c^5d^2f^2k - 2a^2b^5c^2e^2f^2j + 2a^2b^5c^2d^2f^2k^2 + 2a^2b^4c^3d^2f^2j^2 + 2a^2b^2c^5d^2e^2k - 2a^2b^2c^5d^2g^2h + 2a^2b^2c^5e^2f^2h - 4a^2b^2c^5d^2f^2h - 2a^2b^2c^5d^2f^2h^2 + 2a^2b^3c^4d^2f^2h^2 + 2a^2b^2c^5d^2f^2g^2 + 8a^6c^2h^2j^2l^2m - 8a^6c^2g^2k^2l^2m - 8a^5c^3f^2j^2k^2l + 8a^5c^3e^2j^2k^2m - 8a^5c^3d^2j^2l^2m + 8a^5c^3g^2h^2k^2l - 8a^5c^3g^2h^2j^2m - 8a^5c^3f^2h^2k^2m + 8a^5c^3f^2g^2l^2m - 8a^5c^3e^2h^2l^2m - 2a^6b^2c^2h^2l^2m + 8a^4c^4f^2g^2j^2k - 8a^4c^4e^2h^2j^2k - 8a^4c^4e^2g^2j^2l + 8a^4c^4e^2f^2k^2l - 8a^4c^4e^2f^2j^2m + 8
\end{aligned}$$

$$\begin{aligned}
& a^4c^4d^4h^4j^4 - 8a^4c^4d^4g^4k^4 + 8a^4c^4d^4g^4j^4m + 8a^4c^4d^4f^4k^4m \\
& + 8a^4c^4d^4e^4l^4m + 6a^6b^6c^6g^6l^6m^2 - 2a^6b^6c^6h^6k^6m^2 - 8a^4c^4f^6 \\
& g^6h^6l^6 + 8a^4c^4e^6g^6h^6m + 2a^6b^6c^6e^2k^6m + 8a^3c^5d^6e^6j^6k + 8a^3c^5 \\
& e^6f^6h^6j - 8a^3c^5e^6f^6g^6k - 8a^3c^5d^6g^6h^6j - 8a^3c^5d^6f^6h^6k + 8a^3 \\
& c^5d^6f^6g^6l - 8a^3c^5d^6e^6h^6l - 8a^3c^5d^6e^6g^6m - 8a^2c^6d^6e^6f^6j \\
& + 8a^2c^6d^6e^6g^6h + 2a^6b^6c^6d^6f^6l^2 + 6a^6b^6c^6d^6e^6j - 2a^6b^6c^6d^6 \\
& e^6f^6h - 2a^6b^6c^6d^6e^6h - 8a^4b^2c^2g^2k^6m - 10a^3b^3c^2f^2k^6m \\
& + 2a^4b^2c^2h^2j^6l + 18a^3b^2c^3e^2k^6m - 12a^2b^4c^2e^2k^6m - 4a^4b^2c^2 \\
& g^2j^2l + 2a^3b^3c^2g^2j^6l + 28a^2b^3c^3d^2k^6m + 14a^4b^2c^2d^2k^6m - 8a^3b^2c^3 \\
& f^2j^6l + 2a^4b^2c^2g^2j^6k^2 + 2a^4b^2c^2e^6k^2l - 2a^3b^3c^2g^2h^6m + 2a^2b^4c^2f^2j^6l \\
& - 10a^2b^3c^3e^2j^6l - 8a^4b^2c^2d^2k^6l^2 + 4a^4b^2c^2e^6j^6l^2 + 4a^3b^3c^2 \\
& f^6h^2m + 4a^3b^3c^2e^6j^2l + 4a^3b^2c^3f^2h^6m - 2a^2b^4c^2f^2h^6m + 18a^2b^2c^4 \\
& d^2j^6l + 10a^2b^3c^3e^2h^6m - 8a^4b^2c^2f^6h^6l^2 - 2a^3b^3c^2e^6j^6k^2 + 2a^3b^2c^3 \\
& g^2h^6k + 2a^3b^2c^3f^6g^2m - 22a^4b^2c^2d^2h^6m^2 - 22a^2b^2c^4d^2h^6m + 18a^4b^2c^2e^6 \\
& g^6m^2 + 16a^3b^2c^3d^2h^6m - 4a^3b^2c^3f^6h^2k - 4a^2b^4c^2d^2h^6m^2 + 2a^3b^3c^2 \\
& f^6h^6k^2 + 2a^3b^2c^3d^2j^6k + 2a^2b^3c^3f^2h^6k - 2a^2b^3c^3f^2g^6l - 10a^3b^3c^2 \\
& e^6g^6l^2 + 10a^3b^3c^2d^2h^6l^2 - 8a^2b^2c^4e^2h^6k - 8a^2b^2c^4e^2f^6m + 4a^2b^3c^3e^6g^2l \\
& + 4a^2b^2c^4e^2g^6l + 2a^3b^2c^3f^6h^6j^2 + 28a^3b^3c^2d^2f^6m^2 + 14a^2b^2c^4d^2f^6m \\
& - 8a^3b^2c^3e^6g^6k^2 + 4a^3b^2c^3d^2h^6k^2 + 4a^2b^3c^3d^2h^6k + 2a^2b^4c^2e^6g^6k^2 \\
& - 2a^2b^4c^2d^2h^6k^2 + 2a^2b^2c^4f^2g^6j + 2a^2b^2c^4e^6f^2l + 18a^3b^2c^3d^2f^6l^2 - 12a^2b^4 \\
& c^2d^2f^6l^2 - 4a^2b^2c^4e^6g^2j + 2a^2b^3c^3e^6g^6j^2 - 2a^2b^3c^3d^2h^6j^2 - 10a^2b^3c^3 \\
& d^2f^6k^2 - 8a^2b^2c^4d^2f^6j^2 + 2a^2b^2c^4e^6g^6h^2 + 4a^5b^2c^3h^2m^2 - 2a^4b^2c^2h^3m \\
& - 5a^5b^6c^2g^2m^2 + 5a^4b^3c^6g^2m^2 + 3a^5b^6c^2h^2l^2 + 6a^3b^4c^6f^2m^2 - 2a^3b^2c^3 \\
& g^3l + 2a^2b^3c^3f^3m + 7a^4b^6c^3e^2m^2 + 7a^2b^5c^6e^2m^2 - 5a^4b^6c^3f^2l^2 + 3a^4b^6c^3 \\
& g^2k^2 - 2a^4b^2c^2f^6k^3 - 2a^2b^2c^4f^3k + 7a^3b^6c^4d^2l^2 + 7a^6b^5c^2d^2l^2 - 5a^3b^6c^4e^2 \\
& k^2 + 3a^3b^6c^4f^2j^2 + 6a^6b^4c^3d^2k^2 + 2a^3b^3c^2d^2k^3 - 2a^3b^2c^3e^6j^3 - 5a^2b^6c^5 \\
& d^2j^2 + 5a^6b^3c^4d^2j^2 + 3a^2b^6c^5e^2h^2 + 4a^6b^2c^5d^2h^2 - 2a^2b^2c^4d^2h^3 - 4a^6c^2j^2k^6m \\
& + 2a^6b^2j^6l^2 + 4a^6c^2j^6k^2l + 4a^6c^2h^6k^2m - 4a^6c^2h^6k^6l^2 - 4a^6c^2f^6l^2m + 4a^5c^3 \\
& g^2k^6m + 2a^5b^3h^6k^6m^2 - 2a^5b^3g^6l^2m^2 + 4a^6c^2g^6j^6m^2 + 4a^6c^2f^6k^6m^2 + 4a^6c^2e^6l^6m^2 \\
& - 4a^5c^3h^2j^6l + 4a^5c^3h^6j^2k + 4a^5c^3g^6j^2l + 4a^5c^3f^6j^2m - 4a^4c^4e^2k^6m + 2a^4b^4 \\
& g^6j^6m^2 - 2a^4b^4f^6k^6m^2 + 2a^4b^4e^6l^6m^2 - 4a^5c^3g^6j^6k^2 - 4a^5c^3e^6k^2l - 4a^5c^3d^6k^2m \\
& + 4a^4c^4f^2j^6l + 4a^5c^3e^6j^6l^2 + 4a^5c^3d^6k^6l^2 + 4a^4c^4f^2h^6m + 2b^6c^2d^2j^6l \\
& - 2a^3b^5e^6j^6m^2 + 2a^3b^5d^6k^6m^2 + 4a^5c^3f^6h^6l^2 - 4a^4c^4g^2h^6k - 4a^4c^4f^6g^2m - 4a^3c^5 \\
& d^2j^6l - 2b^6c^2d^2h^6m + 2a^3b^5f^6h^6m^2 + 12a^5c^3d^2h^6m^2 - 12a^4c^4d^2h^6m + 12a^3c^5d^2h^6m \\
& - 4a^5c^3e^6g^6m^2 + 4a^4c^4g^6h^2j + 4a^4c^4f^6h^2k + 4a^4c^4e^6h^2l - 4a^4c^4d^6j^2k + 3a^6b^6c^6j^2m^2 \\
& - 4a^4c^4f^6h^6j^2 + 4a^3c^5e^2h^6k + 4a^3c^5e^2g^6l + 4a^3c^5e^2f^6m + 2b^5c^3d^2h^6k - 2b^5c^3d^2g^6l \\
& + 2b^5c^3d^2f^6m + 2a^5b^6c^2j^3l + 2a^2b^6e^6g^6m^2 - 2a^2b^6d^2h^6m^2 + 4a^4c^4e^6g^6k^2 + 4a^4c^4d^2h^6k^2 \\
& - 4a^3c^5f^2g^6j - 4a^3c^5e^6f^2l - 4a^3c^5d^6f^2m - 4a^4c^4d^6f^6l^2 + 4a^3c^5e^6g^2j + 4a^3c^5d^6g^2k \\
& + 2b^4c^4d^2g^6j - 2b^4c^4d^2f^6k + 2b^4c^4d^2e^6l - 6a^3b^6c^4f^3m + 4a^3c^5f^6g^2h + 4a^2c^6d^2g^6j \\
& + 4a^2c^6d^2f^6k + 4a^2c^6d^2e^6l - 2a^5b^2c^6g^6l^3 + 2a^5b^6c^2h^6k^3 + 2a^4b^6c^3h^3k - 4a^3c^5e^6g^6h^2 \\
& + 4a^3c^5d^6f^6j^2 - 4a^2c^6d^6e^2k - 2b^3c^5d^2e^6j + 8a^5b^2c^6d^6m^3 + 8a^6b^6c^6d^2m^2 + 8a^6b^2c^5d^3m \\
& - 6a^5b^6c^2e^6l^3 - 6a^2b^6c^5e^6l^3 - 4a^2c^6e^2f^6h + 2b^3c^5d^2f^6h + 2a^4b^3c^6e^6l^3 + 2a^4b^6c^3g^6j^3 \\
& + 2a^3b^6c^4g^6j + 2a^6b^3c^4e^6l^3 + 4a^2c^6e^6f^2g + 4a^2c^6d^6f^2h - 6a^4b^6c^3d^6k^3 - 4a^2c^6d^6f^6g^2 \\
& + 2b^2c^6d^2e^6g - 2a^6b^2c^6
\end{aligned}$$

$$\begin{aligned}
&^5e^3j + 2a^3b^4c^4f^3h^3 + 2a^2b^5c^5f^3h + 2a^2b^5c^5e^3g^3 + 3a^6b^6d^2g^2 - 9a^4b^2c^2f^2m^2 + 4a^4b^2c^2g^2l^2 - 14a^3b^3c^2e^2m^2 + 5a^3b^3c^2f^2l^2 - 20a^2b^4c^2d^2m^2 + 16a^3b^2c^3d^2m^2 - 9a^3b^2c^3e^2l^2 + 6a^2b^4c^2e^2l^2 + 4a^3b^2c^3f^2k^2 - 14a^2b^3c^3d^2l^2 + 5a^2b^3c^3e^2k^2 - 9a^2b^2c^4d^2k^2 + 4a^2b^2c^4e^2j^2 + 4a^7c^2k^2m - 4a^7c^2j^2m^2 + 2b^7c^2d^2k^2m + 2a^6b^3c^3k^3m + 2a^6b^3c^3j^3l^3 + 2a^6b^7d^2f^2m^2 - 6a^6b^3c^3f^2m^3 - 6a^6b^3c^3d^3k - 4a^6c^7d^2e^2g + 4a^6c^7d^2e^2f + 2a^6b^3c^3e^2g + 2a^6b^3c^3d^2f^3 - a^5b^2c^2j^2l^2 - a^5b^3c^2j^2k^2 - a^4b^3c^3h^2l^2 - a^3b^4c^3g^2l^2 - a^4b^3c^3h^2j^2 - a^2b^5c^3f^2l^2 - a^2b^5c^3e^2k^2 - a^3b^4c^3g^2h^2 - a^2b^4c^3e^2j^2 - a^2b^5c^3f^2g^2 - a^2b^3c^4e^2h^2 - a^2b^2c^5e^2g^2 + 2a^7b^3k^3m^3 + 4a^7c^3h^3m^3 + 4a^6c^7d^3h + 2b^7c^7d^3f - a^6b^3c^3k^2l^2 - 2a^6c^2j^2l^2 - 6a^6c^2h^2m^2 - a^6b^3c^3e^2l^2 - 6a^5c^3g^2l^2 - 2a^5c^3h^2k^2 - 2a^5c^3f^2m^2 - 6a^4c^4f^2k^2 - 6a^4c^4d^2m^2 - 2a^4c^4g^2j^2 - 2a^4c^4e^2l^2 - 6a^3c^5e^2j^2 - 2a^3c^5d^2k^2 - 2a^3c^5f^2h^2 - a^2b^3c^6e^2f^2 - 6a^2c^6d^2h^2 - 2a^2c^6e^2g^2 - a^4b^2c^2h^2k^2 - a^3b^3c^2g^2k^2 - a^3b^2c^3g^2j^2 - a^2b^4c^2f^2k^2 - a^2b^3c^3f^2j^2 - a^2b^2c^4f^2h^2 - 2a^7c^2k^2m^2 + 4a^5c^3h^3m - 2a^6b^2h^3m^3 + 4a^6c^2g^3l^3 + 4a^4c^4g^3l - 2b^4c^4d^3m + 2a^5b^3f^3m^3 - 4a^6c^2d^3m^3 + 4a^5c^3f^3k^3 + 4a^3c^5f^3k - 4a^2c^6d^3m + 2b^3c^5d^3k - 2a^4b^4d^3m^3 + 4a^4c^4e^3j^3 + 4a^2c^6e^3j - 2b^2c^6d^3h + 4a^3c^5d^3h - 2a^6c^7d^2f^2 - a^6b^2k^2m^2 - a^5b^3j^2m^2 - a^4b^4h^2m^2 - a^3b^5g^2m^2 - a^2b^6f^2m^2 - b^6c^2d^2k^2 - b^5c^3d^2j^2 - b^4c^4d^2h^2 - b^3c^5d^2g^2 - b^2c^6d^2f^2 - a^7b^3l^2m^2 - b^7c^2d^2l^2 - a^6b^7e^2m^2 - b^7c^2d^2e^2 - b^8d^2m^2 - a^6c^2k^4 - a^5c^3j^4 - a^4c^4h^4 - a^3c^5g^4 - a^2c^6f^4 - a^7c^2l^4 - a^6c^7e^4 - a^8m^4 - c^8d^4, z, k1)*(root(128a^2b^2c^8z^4 - 16a^4b^4c^7z^4 - 256a^3c^9z^4 + 384a^3b^2c^6l^1z^3 - 144a^2b^4c^5l^1z^3 + 128a^2b^3c^6j^1z^3 - 128a^2b^2c^7g^1z^3 + 16a^4b^6c^4l^1z^3 - 256a^3b^3c^7j^1z^3 - 16a^4b^5c^5j^1z^3 + 16a^4b^4c^6g^1z^3 - 256a^4c^7l^1z^3 + 256a^3c^8g^1z^3 - 96a^4b^3c^5j^1l^1z^2 + 8a^6b^7c^2j^1l^1z^2 + 160a^4b^3c^5h^1m^1z^2 - 8a^6b^7c^2h^1m^1z^2 + 8a^6b^6c^3h^1k^1z^2 - 8a^6b^6c^3g^1l^1z^2 + 8a^6b^6c^3f^1m^1z^2 + 160a^3b^3c^6g^1j^1z^2 - 96a^3b^3c^6f^1k^1z^2 - 96a^3b^3c^6e^1l^1z^2 - 96a^3b^3c^6d^1m^1z^2 + 8a^6b^5c^4g^1j^1z^2 - 8a^6b^5c^4f^1k^1z^2 - 8a^6b^5c^4e^1l^1z^2 - 8a^6b^5c^4d^1m^1z^2 + 8a^6b^4c^5e^1j^1z^2 + 8a^6b^4c^5d^1k^1z^2 + 8a^6b^4c^5f^1h^1z^2 + 32a^2b^3c^7e^1g^1z^2 + 32a^2b^3c^7d^1h^1z^2 - 8a^6b^3c^6e^1g^1z^2 - 8a^6b^3c^6d^1h^1z^2 + 16a^6b^2c^7d^1f^1z^2 + 8a^6b^8c^1k^1m^1z^2 - 304a^4b^2c^4k^1m^1z^2 + 264a^3b^4c^3k^1m^1z^2 - 80a^2b^6c^2k^1m^1z^2 + 184a^3b^3c^4j^1l^1z^2 - 72a^2b^5c^3j^1l^1z^2 - 200a^3b^3c^4h^1m^1z^2 + 72a^2b^5c^3h^1m^1z^2 - 240a^3b^2c^5g^1l^1z^2 + 144a^3b^2c^5h^1k^1z^2 + 144a^3b^2c^5f^1m^1z^2 + 80a^2b^4c^4g^1l^1z^2 - 64a^2b^4c^4h^1k^1z^2 - 64a^2b^4c^4f^1m^1z^2 - 72a^2b^3c^5g^1j^1z^2 + 56a^2b^3c^5f^1k^1z^2 + 56a^2b^3c^5e^1l^1z^2 + 56a^2b^3c^5d^1m^1z^2 - 48a^2b^2c^6e^1j^1z^2 - 48a^2b^2c^6d^1k^1z^2 - 48a^2b^2c^6f^1h^1z^2 - 112a^5b^3c^4m^2z^2 + 44a^2b^7c^2m^2z^2 + 80a^4b^3c^5k^2z^2 - 4a^6b^7c^2k^2z^2 - 4a^6b^6c^3j^2z^2 - 48a^3b^3c^6h^2z^2 - 4a^6b^5c^4h^2z^2 - 4a^6b^4c^5g^2z^2 + 16a^2b^3c^7f^2z^2 - 4a^6b^3c^6f^2z^2 + 8a^6b^2c^7e^2z^2 + 64a^5c^5k^2m^2z^2 + 192a^4c^6g^1l^1z^2 - 64a^4c^6h^1k^1z^2 - 64a^4c^6f^1m^1z^2 + 64a^3c^7e^1j^1z^2 + 64a^3c^7d^1k^1z^2 + 64a^3c^7f^1h^1z^2 - 4a^6b^8c^1l^2z^2 - 64a^2c^8d^2f^2z^2 + 16a^6b^3c^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^6b^9m^2z^2 + 32a^5b^3c^3h^1l^1m^1z + 8a^2b^6c^3g^1k^1m^1z + 96a^4b^3c^4e^1k^1m^1z + 32a^4b^3c^4h^1j^1k^1z + 32a^4b^3c^4g^1j^1l^1z + 32a^4b^3c^4f^1j^1m^1z - 64*
\end{aligned}$$

$$\begin{aligned}
& a^4 b^3 c^4 g^2 h^2 m^2 z - 8 a^4 b^3 c^4 g^2 h^2 m^2 z + 8 a^4 b^3 c^4 g^2 h^2 m^2 z - 64 a^3 b^3 c^4 \\
& 5 e^2 h^2 k^2 z + 64 a^3 b^3 c^4 5 e^2 g^2 l^2 z - 64 a^3 b^3 c^4 5 e^2 f^2 m^2 z + 32 a^3 b^3 c^4 5 f^2 g^2 \\
& k^2 z - 32 a^3 b^3 c^4 5 d^2 h^2 l^2 z + 32 a^3 b^3 c^4 5 d^2 g^2 m^2 z - 8 a^4 b^3 c^4 5 e^2 h^2 k^2 z + 8 \\
& a^4 b^3 c^4 5 e^2 g^2 l^2 z - 8 a^4 b^3 c^4 5 e^2 f^2 m^2 z - 8 a^4 b^3 c^4 5 e^2 g^2 j^2 z + 8 a^4 b^3 c^4 \\
& 4 e^2 f^2 k^2 z - 8 a^4 b^3 c^4 4 d^2 f^2 l^2 z + 8 a^4 b^3 c^4 4 d^2 e^2 m^2 z - 32 a^2 b^3 c^6 d^2 f^2 j^2 \\
& z + 32 a^2 b^3 c^6 d^2 e^2 k^2 z + 8 a^4 b^3 c^5 d^2 f^2 j^2 z - 8 a^4 b^3 c^5 d^2 e^2 k^2 z + 32 a^2 \\
& b^3 c^6 e^2 f^2 h^2 z - 8 a^4 b^3 c^5 e^2 f^2 h^2 z - 8 a^4 b^2 c^6 d^2 f^2 g^2 z + 8 a^4 b^2 c^6 d^2 e^2 h^2 z \\
& - 8 a^4 b^7 c^2 e^2 k^2 m^2 z - 40 a^5 b^2 c^2 k^2 l^2 m^2 z + 48 a^4 b^3 c^2 j^2 k^2 m^2 z - 8 a^4 b^3 c^2 h^2 l^2 m^2 z \\
& + 104 a^4 b^2 c^3 g^2 k^2 m^2 z - 56 a^3 b^4 c^2 g^2 k^2 m^2 z - 40 a^4 b^2 c^3 h^2 j^2 m^2 z + 8 a^4 b^2 c^3 h^2 k^2 l^2 z \\
& + 8 a^4 b^2 c^3 f^2 l^2 m^2 z + 8 a^3 b^4 c^2 h^2 j^2 m^2 z - 152 a^3 b^3 c^3 e^2 k^2 m^2 z + 64 a^2 b^5 c^2 e^2 k^2 m^2 z \\
& - 40 a^3 b^3 c^3 g^2 j^2 l^2 z - 8 a^3 b^3 c^3 h^2 j^2 k^2 z - 8 a^3 b^3 c^3 f^2 j^2 m^2 z + 8 a^2 b^5 c^2 g^2 j^2 l^2 z \\
& + 48 a^3 b^3 c^3 g^2 h^2 m^2 z - 8 a^2 b^5 c^2 g^2 h^2 m^2 z - 104 a^3 b^2 c^4 e^2 j^2 l^2 z + 56 a^2 b^4 c^3 e^2 j^2 l^2 z \\
& + 8 a^3 b^2 c^4 f^2 j^2 k^2 z - 8 a^3 b^2 c^4 d^2 k^2 l^2 z + 8 a^3 b^2 c^4 d^2 j^2 m^2 z + 104 a^3 b^2 c^4 e^2 h^2 m^2 z - 56 \\
& a^2 b^4 c^3 e^2 h^2 m^2 z - 40 a^3 b^2 c^4 g^2 h^2 k^2 z - 40 a^3 b^2 c^4 f^2 g^2 m^2 z - 8 a^3 b^2 c^4 f^2 h^2 l^2 z \\
& + 8 a^2 b^4 c^3 g^2 h^2 k^2 z + 8 a^2 b^4 c^3 f^2 g^2 m^2 z + 48 a^2 b^3 c^4 e^2 h^2 k^2 z - 48 a^2 b^3 c^4 e^2 g^2 l^2 z \\
& + 48 a^2 b^3 c^4 e^2 f^2 m^2 z - 8 a^2 b^3 c^4 f^2 g^2 k^2 z + 8 a^2 b^3 c^4 d^2 h^2 l^2 z - 8 a^2 b^3 c^4 d^2 g^2 m^2 z \\
& + 40 a^2 b^2 c^5 e^2 g^2 j^2 z - 40 a^2 b^2 c^5 e^2 f^2 k^2 z + 40 a^2 b^2 c^5 d^2 f^2 l^2 z - 40 a^2 b^2 c^5 d^2 e^2 m^2 z \\
& - 8 a^2 b^2 c^5 d^2 h^2 j^2 z + 8 a^2 b^2 c^5 d^2 g^2 k^2 z + 8 a^2 b^2 c^5 f^2 g^2 h^2 z + 8 a^4 b^4 c^2 k^2 l^2 m^2 z \\
& - 64 a^5 b^3 c^3 j^2 k^2 m^2 z - 8 a^3 b^5 c^2 j^2 k^2 m^2 z - 32 a^6 b^3 c^2 l^2 m^2 z + 24 a^5 b^3 c^2 l^2 m^2 z \\
& - 28 a^4 b^4 c^2 j^2 m^2 z + 16 a^5 b^3 c^3 k^2 l^2 z + 4 a^3 b^5 c^2 j^2 l^2 z + 48 a^5 b^3 c^3 g^2 m^2 z + 32 a^3 b^5 \\
& c^2 g^2 m^2 z - 4 a^2 b^6 c^2 g^2 l^2 z - 36 a^2 b^6 c^2 e^2 m^2 z - 32 a^4 b^3 c^4 g^2 k^2 z - 16 a^3 b^3 c^5 f^2 l^2 z \\
& - 48 a^4 b^3 c^4 e^2 l^2 z - 32 a^3 b^3 c^5 g^2 j^2 z - 4 a^2 b^4 c^4 e^2 l^2 z + 32 a^2 b^3 c^6 d^2 l^2 z - 24 a^2 b^3 c^5 d^2 l^2 z \\
& + 4 a^2 b^6 c^2 e^2 k^2 z + 32 a^3 b^3 c^5 e^2 j^2 z + 16 a^3 b^3 c^5 g^2 h^2 z - 16 a^2 b^3 c^6 e^2 j^2 z + 4 a^2 b^5 c^3 e^2 j^2 z \\
& + 4 a^2 b^3 c^5 e^2 j^2 z + 20 a^2 b^2 c^6 d^2 j^2 z + 4 a^2 b^4 c^4 e^2 h^2 z - 16 a^2 b^3 c^6 e^2 g^2 z + 4 a^2 b^3 c^5 e^2 g^2 z \\
& - 4 a^2 b^2 c^6 e^2 g^2 z + 4 a^2 b^2 c^6 e^2 f^2 z + 32 a^6 c^3 k^2 l^2 m^2 z - 32 a^5 c^4 h^2 k^2 l^2 z + 32 a^5 c^4 h^2 j^2 m^2 z \\
& - 32 a^5 c^4 g^2 k^2 m^2 z - 32 a^5 c^4 f^2 l^2 m^2 z - 32 a^4 c^5 f^2 j^2 k^2 z + 32 a^4 c^5 e^2 j^2 l^2 z + 32 a^4 c^5 d^2 k^2 l^2 z \\
& - 32 a^4 c^5 d^2 j^2 m^2 z + 32 a^4 c^5 g^2 h^2 k^2 z + 32 a^4 c^5 f^2 h^2 l^2 z + 32 a^4 c^5 f^2 g^2 m^2 z - 32 a^4 c^5 e^2 h^2 m^2 z \\
& - 32 a^3 c^6 e^2 g^2 j^2 z + 32 a^3 c^6 e^2 f^2 k^2 z + 32 a^3 c^6 d^2 h^2 j^2 z - 32 a^3 c^6 d^2 g^2 k^2 z - 32 a^3 c^6 d^2 f^2 l^2 z \\
& + 32 a^3 c^6 d^2 e^2 m^2 z - 32 a^3 c^6 f^2 g^2 h^2 z + 4 a^2 b^7 c^2 e^2 l^2 z + 32 a^2 c^7 d^2 f^2 g^2 z - 32 a^2 c^7 d^2 e^2 h^2 z - 16 \\
& a^2 b^3 c^7 d^2 g^2 z + 52 a^5 b^2 c^2 j^2 m^2 z - 4 a^4 b^3 c^2 k^2 l^2 z + 36 a^4 b^2 c^3 j^2 l^2 z - 16 a^4 b^3 c^2 j^2 l^2 z \\
& - 8 a^3 b^4 c^2 j^2 l^2 z - 20 a^4 b^2 c^3 j^2 k^2 z + 4 a^3 b^4 c^2 j^2 k^2 z - 76 a^4 b^3 c^2 g^2 m^2 z - 60 a^4 b^2 c^3 g^2 l^2 z \\
& + 44 a^3 b^2 c^4 g^2 l^2 z + 28 a^3 b^4 c^2 g^2 l^2 z - 8 a^2 b^4 c^3 g^2 l^2 z + 104 a^3 b^4 c^2 e^2 m^2 z - 100 a^4 b^2 c^3 e^2 m^2 z \\
& + 24 a^3 b^3 c^3 g^2 k^2 z + 4 a^3 b^2 c^4 h^2 j^2 z - 4 a^2 b^5 c^2 g^2 k^2 z + 4 a^2 b^3 c^4 f^2 l^2 z + 76 a^3 b^3 c^3 e^2 l^2 z \\
& - 32 a^2 b^5 c^2 e^2 l^2 z + 20 a^2 b^2 c^5 e^2 l^2 z + 12 a^3 b^2 c^4 g^2 j^2 z + 8 a^2 b^3 c^4 g^2 j^2 z - 4 a^2 b^4 c^3 g^2 j^2 z \\
& + 52 a^3 b^2 c^4 e^2 k^2 z - 28 a^2 b^4 c^3 e^2 k^2 z - 4 a^2 b^2 c^5 f^2 j^2 z - 24 a^2 b^3 c^4 e^2 j^2 z - 4 a^2 b^3 c^4 g^2 h^2 z \\
& - 20 a^2 b^2 c^5 e^2 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^2 m^2 z - 16 a^6 c^3 j^2 m^2 z \\
& - 16 a^5 c^4 j^2 l^2 z + 4 a^3 b^6 j^2 m^2 z + 16 a^5 c^4 j^2 k^2 z + 48 a^5 c^4 g^2 l^2 z - 48 a^4 c^5 g^2 l^2 z - 4 a^2 b^7 g^2 m^2 z \\
& + 16 a^5 c^4 e^2 m^2 z - 16 a^4 c^5 h^2 j^2 z + 16 a^4 c^5 g^2 j^2 z - 16 a^3 c^6 e^2 l^2 z + 4 b^5 c^4 d^2 l^2 z - 16 a^4 c^5 e^2 k^2 z \\
& + 16 a^3 c^6 f^2 j^2 z - 4 b^4 c^5 d^2 j^2 z - 16 a^2 c^7 d^2 j^2 z - 4 a^4 b^4 c^2 l^3 z + 16 a^3 c^6 e^2 h^2 z - 16 a^4 b^3 c^4 j^3 z \\
& + 16 a^2 c^7 e^2 g^2 z + 4 b^3 c^6 d^2 g^2 z - 16 a^2 c^7 e^2 f^2 z - 4 b^2 c^7 d^2 e^2 z + 4 a^2 b^8 e^2 m^2 z + 16 a^2 c^8 d^2 e^2 z \\
& - 16 a^6 c^3 l^3 z + 16 a^3 c^6 g^3 z + 4 a^5 b^2 c^2 g^2 k^2 l^2 m^2 z + 12 a^5 b^2 c^2 g^2 j^2 k^2 m^2 z + 12 a^5 b^2 c^2 e^2 k^2 l^2 m^2 z \\
& - 4 a^5 b^2 c^2 h^2 j^2 k^2 l^2 m^2 z - 4 a^5 b^2 c^2 f^2 j^2 k^2 l^2 m^2 z - 4 a^4 b^3 c^2 e^2 k^2 l^2 m^2 z - 4 a^5 b^2 c^2 g^2 h^2 l^2 m^2 z \\
& + 4 a^3 b^4 c^2 e^2 j^2 k^2 m^2 z - 4 a^3 b^4 c^2 f^2 h^2 k^2 m^2 z + 12 a^4 b^3 c^2 d^2 j^2 k^2 l^2 m^2 z - 20 a^4 b^3 c^2 d^2 j^2 k^2 l^2 m^2 z
\end{aligned}$$

$$\begin{aligned}
& *c^3*eg*kk*m + 12*a^4*b*c^3*f*h*j*1 + 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*1 - 4*a^4*b*c^3*f*g*j*m - \\
& 4*a^4*b*c^3*e*h*k*1 - 4*a^4*b*c^3*e*f*1*m - 4*a^4*b*c^3*d*g*1*m - 4*a^2*b^5* \\
& *c*eg*kk*m + 4*a^2*b^5*c*d*h*k*m - 20*a^3*b*c^4*d*f*j*1 - 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*1 - 4*a^3*b*c^4*d*e*j*m - 4*a* \\
& b^5*c^2*d*f*j*1 + 12*a^3*b*c^4*eg*h*k + 12*a^3*b*c^4*ef*g*m + 12*a^3*b*c^4* \\
& d*g*h*1 + 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*ef*h* \\
& 1 + 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*1 + 12*a^ \\
& 2*b*c^5*d*f*g*j + 12*a^2*b*c^5*d*ef*1 - 4*a^2*b*c^5*d*ef*h*j - 4*a^2*b*c^5* \\
& d*eg*k - 4*a*b^3*c^4*d*f*g*j - 4*a*b^3*c^4*d*ef*1 - 4*a^2*b*c^5*ef*g*h + \\
& 4*a*b^2*c^5*d*ef*j - 4*a^6*b*c*j*k*1*m - 4*a*b^6*c*d*f*k*m - 4*a*b*c^6*d* \\
& ef*g - 16*a^4*b^2*c^2*ej*kk*m + 4*a^4*b^2*c^2*f*j*k*1 + 4*a^4*b^2*c^2*d*j* \\
& 1*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*eh*1* \\
& m - 4*a^3*b^3*c^2*d*j*k*1 + 20*a^3*b^3*c^2*eg*kk*m - 16*a^3*b^3*c^2*d*h*kk*m \\
& - 4*a^3*b^3*c^2*f*h*j*1 - 4*a^3*b^3*c^2*eh*j*m - 40*a^3*b^2*c^3*d*f*kk*m + \\
& 24*a^2*b^4*c^2*d*f*k*m - 16*a^3*b^2*c^3*d*h*j*1 + 12*a^3*b^2*c^3*eg*j*1 + \\
& 4*a^3*b^2*c^3*eh*j*k + 4*a^3*b^2*c^3*ef*j*m + 4*a^3*b^2*c^3*d*g*k*1 - 4* \\
& a^2*b^4*c^2*eg*j*1 + 4*a^2*b^4*c^2*d*h*j*1 - 16*a^3*b^2*c^3*eg*h*m + 4*a^ \\
& 3*b^2*c^3*f*g*h*1 + 4*a^2*b^4*c^2*eg*h*m + 20*a^2*b^3*c^3*d*f*j*1 - 16*a^2* \\
& b^3*c^3*d*f*h*m - 4*a^2*b^3*c^3*eg*h*k - 4*a^2*b^3*c^3*ef*g*m - 4*a^2*b^ \\
& 3*c^3*d*g*h*1 - 16*a^2*b^2*c^4*d*f*g*1 + 12*a^2*b^2*c^4*d*f*h*k + 4*a^2*b^2* \\
& c^4*ef*g*k + 4*a^2*b^2*c^4*d*g*h*j + 4*a^2*b^2*c^4*d*eh*1 + 4*a^2*b^2*c^ \\
& 4*d*eg*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*1^2 + 2*a^5*b^2*c*f*1^2*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*el*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*1 + 2*a^2*b^5*c*f^2*k*m + 6*a^5*b*c^ \\
& ^2*f*k*1^2 + 6*a^5*b*c^2*d*1^2*m - 2*a^5*b*c^2*g*j*1^2 + 2*a^4*b^3*c*g*j*1^ \\
& 2 - 2*a^4*b^3*c*f*k*1^2 - 2*a^4*b^3*c*d*1^2*m - 2*a^4*b*c^3*g^2*j*1 - 14*a* \\
& b^5*c^2*d^2*k*m - 10*a^5*b*c^2*ej*m^2 + 10*a^4*b^3*c*ej*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*1 - 10*a^ \\
& 4*b^3*c*f*h*m^2 - 10*a^4*b*c^3*f*h^2*m - 10*a^4*b*c^3*ej^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*ej*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*ej*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*eg*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*eg*1^2 - 10*a^4*b*c^3*d*h*1^2 - 10*a^3*b*c^4*eg^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*eg*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*eh^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*eg*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*el + 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*ef^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*ej*kk*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*eh*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*eh*j*k - 8*a^4*c^4*eg*j*1 + \\
& 8*a^4*c^4*ef*k*1 - 8*a^4*c^4*ef*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*el*m + 6*a^6*b*c \\
& *g*1*m^2 - 2*a^6*b*c*h*kk*m^2 - 8*a^4*c^4*f*g*h*1 + 8*a^4*c^4*eg*h*m + 2*a* \\
& b^6*c*e^2*k*m + 8*a^3*c^5*d*ej*k + 8*a^3*c^5*ef*h*j - 8*a^3*c^5*ef*g*k -
\end{aligned}$$

$$\begin{aligned}
& 8a^3c^5d^5g^5h^5j - 8a^3c^5d^5f^5h^5k + 8a^3c^5d^5f^5g^5l - 8a^3c^5d^5e^5h^5l - 8a^3c^5d^5e^5g^5m - 8a^2c^6d^5e^5f^5j + 8a^2c^6d^5e^5g^5h + 2a^2b^6c^5d^5f^5l^2 + 6a^2b^6c^6d^5e^5j - 2a^2b^6c^6d^5f^5h - 2a^2b^6c^6d^5e^5h - 8a^4b^2c^2g^2k^2m - 10a^4b^2c^2f^2k^2m + 2a^4b^2c^2h^2j^2m + 18a^3b^2c^3e^2k^2m - 12a^2b^4c^2e^2k^2m - 4a^4b^2c^2g^2j^2m + 2a^3b^3c^2g^2j^2m + 28a^2b^3c^3d^2k^2m + 14a^4b^2c^2d^2k^2m - 8a^3b^2c^3f^2j^2m + 2a^4b^2c^2g^2j^2k^2 + 2a^4b^2c^2e^2k^2l - 2a^3b^3c^2g^2h^2m + 2a^2b^4c^2f^2j^2m - 10a^2b^3c^3e^2j^2m - 8a^4b^2c^2d^2k^2l^2 + 4a^4b^2c^2e^2j^2l^2 + 4a^3b^3c^2f^2h^2m + 4a^3b^3c^2e^2j^2m + 4a^3b^2c^3f^2h^2m - 2a^2b^4c^2f^2h^2m + 18a^2b^2c^4d^2j^2m + 10a^2b^3c^3e^2h^2m - 8a^4b^2c^2f^2h^2l^2 - 2a^3b^3c^2e^2j^2k^2 + 2a^3b^2c^3g^2h^2k + 2a^3b^2c^3f^2g^2m - 22a^4b^2c^2d^2h^2m^2 - 22a^2b^2c^4d^2h^2m + 18a^4b^2c^2e^2g^2m^2 + 16a^3b^2c^3d^2h^2m - 4a^3b^2c^3f^2h^2k - 4a^2b^4c^2d^2h^2m + 2a^3b^3c^2f^2h^2k^2 + 2a^3b^2c^3d^2j^2k + 2a^2b^3c^3f^2h^2k - 2a^2b^3c^3f^2g^2l - 10a^3b^3c^2e^2g^2l^2 + 10a^3b^3c^2d^2h^2l^2 - 8a^2b^2c^4e^2h^2k - 8a^2b^2c^4e^2f^2m + 4a^2b^3c^3e^2g^2l + 4a^2b^2c^4e^2g^2l + 2a^3b^2c^3f^2h^2j^2 + 28a^3b^3c^2d^2f^2m^2 + 14a^2b^2c^4d^2f^2m - 8a^3b^2c^3e^2g^2k^2 + 4a^3b^2c^3d^2h^2k^2 + 4a^2b^3c^3d^2h^2k + 2a^2b^4c^2e^2g^2k^2 - 2a^2b^4c^2d^2h^2k^2 + 2a^2b^2c^4f^2g^2j + 2a^2b^2c^4e^2f^2l + 18a^3b^2c^3d^2f^2l^2 - 12a^2b^4c^2d^2f^2l^2 - 4a^2b^2c^4e^2g^2j + 2a^2b^3c^3e^2g^2j^2 - 2a^2b^3c^3d^2h^2j^2 - 10a^2b^3c^3d^2f^2k^2 - 8a^2b^2c^4d^2f^2j^2 + 2a^2b^2c^4e^2g^2h^2 + 4a^5b^2c^4h^2m^2 - 2a^4b^2c^2h^3m - 5a^5b^2c^2g^2m^2 + 5a^4b^3c^2g^2m^2 + 3a^5b^2c^2h^2l^2 + 6a^3b^4c^2f^2m^2 - 2a^3b^2c^3g^3l + 2a^2b^3c^3f^3m + 7a^4b^2c^3e^2m^2 + 7a^2b^5c^2e^2m^2 - 5a^4b^2c^3f^2l^2 + 3a^4b^2c^3g^2k^2 - 2a^4b^2c^2f^2k^3 - 2a^2b^2c^4f^3k + 7a^3b^2c^4d^2l^2 + 7a^2b^5c^2d^2l^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^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^2l^2m + 4a^6c^2j^2k^2l + 4a^6c^2h^2k^2m - 4a^6c^2h^2k^2l - 4a^6c^2f^2l^2m + 4a^5c^3g^2k^2m + 2a^5b^3h^2k^2m^2 - 2a^5b^3g^2l^2m^2 + 4a^6c^2g^2j^2m^2 + 4a^6c^2f^2k^2m^2 + 4a^6c^2e^2l^2m^2 - 4a^5c^3h^2j^2l + 4a^5c^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^2j^2k^2 - 4a^5c^3e^2k^2l - 4a^5c^3d^2k^2m + 4a^4c^4f^2j^2l + 4a^5c^3e^2j^2l^2 + 4a^5c^3d^2k^2l^2 + 4a^4c^4f^2h^2m + 2b^6c^2d^2j^2l - 2a^3b^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^2h^2m^2 + 12a^5c^3d^2h^2m^2 - 12a^4c^4d^2h^2m + 12a^3c^5d^2h^2m - 4a^5c^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^2k + 4a^3c^5e^2g^2l + 4a^3c^5e^2f^2m + 2b^5c^3d^2h^2k - 2b^5c^3d^2g^2l + 2b^5c^3d^2f^2m + 2a^5b^2c^2j^3l + 2a^2b^6e^2g^2m^2 - 2a^2b^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^2j + 4a^3c^5d^2g^2k + 2b^4c^4d^2g^2j - 2b^4c^4d^2f^2k + 2b^4c^4d^2e^2l - 6a^3b^2c^4f^3m + 4a^3c^5f^2g^2h + 4a^2c^6d^2g^2j + 4a^2c^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^2k - 2b^3c^5d^2e^2j + 8a^5b^2c^2d^2m^3 + 8a^2b^6c^2d^2m^2 + 8a^2b^2c^5d^3m - 6a^5b^2c^2e^2l^3 - 6a^2b^2c^5e^3l - 4a^2c^6e^2f^2h + 2b^3c^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^2k^3 - 4a^2c^6d^2f^2g^2 + 2b^2c^6d^2e^2g - 2a^2b^2c^5e^3j + 2a^3b^2c^4f^2h^3 + 2a^2b^2c^5f^3h + 2a^2b^2c^5e^2g^3 + 3a^2b^2c^6d^2g^2 - 9a^4b^2c^2f^2m^2 + 4a^4b^2c^2g^2l^2 - 14a^3b^3c^2e^2m^2 + 5a^3b^3c^2f^2l^2 - 20a^2b^4c^2d^2m^2 + 16a^3b^2c^3d^2m^2 - 9a^3b^2c^3e^2l
\end{aligned}$$

$$\begin{aligned}
&^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^1^2*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*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^1^2* \\
&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^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*l - 16*a*c^8*e + 32*a*b*c^7*g - 36*a*b^2*c^ \\
&6*j + 44*a*b^3*c^5*l - 48*a^2*b*c^6*l))/c^5 + (root(128*a^2*b^2*c^8*z^4 - 1 \\
&6*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^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*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*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 \\
&0*a^3*b^2*c^5*g^1*z^2 + 144*a^3*b^2*c^5*h*k*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*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*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*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*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*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*l^2*z^2 - 132*a^3*b^4*c^3*l^2*z^2 + 40*a^2*b^6*c \\
&^2*l^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*l^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 \\
&*l*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
\end{aligned}$$

$$\begin{aligned}
& + 32a^4b^3c^4g^*j^*l^*z + 32a^4b^3c^4f^*j^*m^*z - 64a^4b^3c^4g^*h^*m^*z - 8a^4b^3c^4e^*j^*l^*z + 8a^4b^3c^4e^*h^*m^*z - 64a^3b^3c^5e^*h^*k^*z + 64a^3b^3c^5e^*g^*l^*z - 64a^3b^3c^5e^*f^*m^*z + 32a^3b^3c^5f^*g^*k^*z - 32a^3b^3c^5d^*h^*l^*z + 32a^3b^3c^5d^*g^*m^*z - 8a^3b^5c^3e^*h^*k^*z + 8a^3b^5c^3e^*g^*l^*z - 8a^3b^5c^3e^*f^*m^*z - 8a^3b^4c^4e^*g^*j^*z + 8a^3b^4c^4e^*f^*k^*z - 8a^3b^4c^4d^*f^*l^*z + 8a^3b^4c^4d^*e^*m^*z - 32a^2b^3c^6d^*f^*j^*z + 32a^2b^3c^6d^*e^*k^*z + 8a^3b^3c^5d^*f^*j^*z - 8a^3b^3c^5d^*e^*k^*z + 32a^2b^3c^6e^*f^*h^*z - 8a^3b^3c^5e^*f^*h^*z - 8a^3b^2c^6d^*f^*g^*z + 8a^3b^2c^6d^*e^*h^*z - 8a^3b^7c^*e^*k^*m^*z - 40a^5b^2c^2k^*l^*m^*z + 48a^4b^3c^2j^*k^*m^*z - 8a^4b^3c^2h^*l^*m^*z + 104a^4b^2c^3g^*k^*m^*z - 56a^3b^4c^2g^*k^*m^*z - 40a^4b^2c^3h^*j^*m^*z + 8a^4b^2c^3h^*k^*l^*z + 8a^4b^2c^3f^*l^*m^*z + 8a^3b^4c^2h^*j^*m^*z - 152a^3b^3c^3e^*k^*m^*z + 64a^2b^5c^2e^*k^*m^*z - 40a^3b^3c^3g^*j^*l^*z - 8a^3b^3c^3h^*j^*k^*z - 8a^3b^3c^3f^*j^*m^*z + 8a^2b^5c^2g^*j^*l^*z + 48a^3b^3c^3g^*h^*m^*z - 8a^2b^5c^2g^*h^*m^*z - 104a^3b^2c^4e^*j^*l^*z + 56a^2b^4c^3e^*j^*l^*z + 8a^3b^2c^4f^*j^*k^*z - 8a^3b^2c^4d^*k^*l^*z + 8a^3b^2c^4d^*j^*m^*z + 104a^3b^2c^4e^*h^*m^*z - 56a^2b^4c^3e^*h^*m^*z - 40a^3b^2c^4g^*h^*k^*z - 40a^3b^2c^4f^*g^*m^*z - 8a^3b^2c^4f^*h^*l^*z + 8a^2b^4c^3g^*h^*k^*z + 8a^2b^4c^3f^*g^*m^*z + 48a^2b^3c^4e^*h^*k^*z - 48a^2b^3c^4e^*g^*l^*z + 48a^2b^3c^4e^*f^*m^*z - 8a^2b^3c^4f^*g^*k^*z + 8a^2b^3c^4d^*h^*l^*z - 8a^2b^3c^4d^*g^*m^*z + 40a^2b^2c^5e^*g^*j^*z - 40a^2b^2c^5e^*f^*k^*z + 40a^2b^2c^5d^*f^*l^*z - 40a^2b^2c^5d^*e^*m^*z - 8a^2b^2c^5d^*h^*j^*z + 8a^2b^2c^5d^*g^*k^*z + 8a^2b^2c^5f^*g^*h^*z + 8a^4b^4c^*k^*l^*m^*z - 64a^5b^3c^3j^*k^*m^*z - 8a^3b^5c^3j^*k^*m^*z - 32a^6b^3c^2l^*m^2z + 24a^5b^3c^3l^*m^2z - 28a^4b^4c^3j^*m^2z + 16a^5b^3c^3k^2l^*z + 4a^3b^5c^3j^*l^2z + 48a^5b^3c^3g^*m^2z + 32a^3b^5c^3g^*m^2z - 4a^2b^6c^3g^*l^2z - 36a^2b^6c^3e^*m^2z - 32a^4b^3c^4g^*k^2z - 16a^3b^3c^5f^2l^*z - 48a^4b^3c^4e^*l^2z - 32a^3b^3c^5g^2j^*z - 4a^3b^4c^4e^2l^*z + 32a^2b^3c^6d^2l^*z - 24a^3b^3c^5d^2l^*z + 4a^3b^6c^2e^*k^2z + 32a^3b^3c^5e^*j^2z + 16a^3b^3c^5g^*h^2z - 16a^2b^3c^6e^2j^*z + 4a^3b^5c^3e^*j^2z + 4a^3b^3c^5e^2j^*z + 20a^3b^2c^6d^2j^*z + 4a^3b^4c^4e^*h^2z - 16a^2b^3c^6e^*g^2z + 4a^3b^3c^5e^*g^2z - 4a^3b^2c^6e^2g^*z + 4a^3b^2c^6e^*f^2z + 32a^6c^3k^*l^*m^*z - 32a^5c^4h^*k^*l^*z + 32a^5c^4h^*j^*m^*z - 32a^5c^4g^*k^*m^*z - 32a^5c^4f^*l^*m^*z - 32a^4c^5f^*j^*k^*z + 32a^4c^5e^*j^*l^*z + 32a^4c^5d^*k^*l^*z - 32a^4c^5d^*j^*m^*z + 32a^4c^5g^*h^*k^*z + 32a^4c^5f^*h^*l^*z + 32a^4c^5f^*g^*m^*z - 32a^4c^5e^*h^*m^*z - 32a^3c^6e^*g^*j^*z + 32a^3c^6e^*f^*k^*z + 32a^3c^6d^*h^*j^*z - 32a^3c^6d^*g^*k^*z - 32a^3c^6d^*f^*l^*z + 32a^3c^6d^*e^*m^*z - 32a^3c^6f^*g^*h^*z + 4a^3b^7c^*e^*l^2z + 32a^2c^7d^*f^*g^*z - 32a^2c^7d^*e^*h^*z - 16a^3b^7c^*d^2g^*z + 52a^5b^2c^2j^*m^2z - 4a^4b^3c^2k^2l^*z + 36a^4b^2c^3j^2l^*z - 16a^4b^3c^2j^*l^2z - 8a^3b^4c^2j^2l^*z - 20a^4b^2c^3j^*k^2z + 4a^3b^4c^2j^*k^2z - 76a^4b^3c^2g^*m^2z - 60a^4b^2c^3g^*l^2z + 44a^3b^2c^4g^2l^*z + 28a^3b^4c^2g^*l^2z - 8a^2b^4c^3g^2l^*z + 104a^3b^4c^2e^*m^2z - 100a^4b^2c^3e^*m^2z + 24a^3b^3c^3g^*k^2z + 4a^3b^2c^4h^2j^*z - 4a^2b^5c^2g^*k^2z + 4a^2b^3c^4f^2l^*z + 76a^3b^3c^3e^*l^2z - 32a^2b^5c^2e^*l^2z + 20a^2b^2c^5e^2l^*z + 12a^3b^2c^4g^*j^2z + 8a^2b^3c^4g^2j^*z - 4a^2b^4c^3g^*j^2z + 52a^3b^2c^4e^*k^2z - 28a^2b^4c^3e^*k^2z - 4a^2b^2c^5f^2j^*z - 24a^2b^3c^4e^*j^2z - 4a^2b^3c^4g^*h^2z - 20a^2b^2c^5e^*h^2z + 20a^5b^2c^2l^3z + 4a^3b^3c^3j^3z - 4a^2b^2c^5g^3z - 4a^4b^5l^*m^2z - 16a^6c^3j^*m^2z - 16a^5c^4j^2l^*z + 4a^3b^6j^*m^2z + 16a^5c^4j^*k^2z + 48a^5c^4g^*l^2z - 48a^4c^5g^2l^*z - 4a^2b^7g^*m^2z + 16a^5c^4e^*m^2z - 16a^4c^5h^2j^*z + 16a^4c^5g^*j^2z - 16a^3c^6e^2l^*z + 4b^5c^4d^2l^*z - 16a^4c^5e^*k^2z + 16a^3c^6f^2j^*z - 4b^4c^5d^2j^*z - 16a^2c^7d^2j^*z - 4a^4b^4c^1^3z + 16a^3c^6e^*h^2z - 16a^4b^3c^4j^3z + 16a^2c^7e^2g^*z + 4b^3c^6d^2g^*z - 16a^2c^7e^*f^2z - 4b^2c^7d^2e^*z + 4a^3b^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^3c^2g^*j^*k^*m + 12a^5b^3c^2e^*k^*l^*m - 4a^5b^3c^2h^*j^*k^*l - 4a^5b^3c^2f^*j^*l^*m - 4a^4b^3c^*g^*j^*k^*m - 4a^4b^3c^*e^*k^*l^*m - 4a^5b^3c^2g^*h^*l^*m + 4a^3b^4c^*e^*j^*k^*m - 4
\end{aligned}$$

$$\begin{aligned}
& a^3b^4c^3f^2h^2k^2m + 12a^4b^3c^3d^2j^2k^2l - 20a^4b^3c^3e^2g^2k^2m + 12a^4b^3c^3f^2h^2j^2k^2l + 12a^4b^3c^3e^2h^2j^2m + 12a^4b^3c^3d^2h^2k^2m - 4a^4b^3c^3g^2h^2j^2k^2 - 4a^4b^3c^3f^2g^2k^2l - 4a^4b^3c^3f^2g^2j^2m - 4a^4b^3c^3e^2h^2k^2l - 4a^4b^3c^3e^2f^2l^2m - 4a^4b^3c^3d^2g^2l^2m - 4a^2b^5c^3e^2g^2k^2m + 4a^2b^5c^3d^2h^2k^2m - 20a^3b^3c^4d^2f^2j^2l - 4a^3b^3c^4e^2f^2j^2k^2 - 4a^3b^3c^4d^2g^2j^2k^2 - 4a^3b^3c^4d^2e^2k^2l - 4a^3b^3c^4d^2e^2j^2m - 4a^2b^5c^2d^2f^2j^2l + 12a^3b^3c^4e^2g^2h^2k^2 + 12a^3b^3c^4e^2f^2g^2m + 12a^3b^3c^4d^2g^2h^2l + 12a^3b^3c^4d^2f^2h^2m - 4a^3b^3c^4f^2g^2h^2j - 4a^3b^3c^4e^2f^2h^2l + 4a^2b^5c^2d^2f^2h^2m - 4a^2b^4c^3d^2f^2h^2k^2 + 4a^2b^4c^3d^2f^2g^2l + 12a^2b^3c^5d^2f^2g^2j + 12a^2b^3c^5d^2e^2f^2l - 4a^2b^3c^5d^2e^2h^2j - 4a^2b^3c^5d^2e^2g^2k - 4a^2b^3c^4d^2f^2g^2j - 4a^2b^3c^4d^2e^2f^2l - 4a^2b^3c^5e^2f^2g^2h + 4a^2b^2c^5d^2e^2f^2j - 4a^6b^2c^2j^2k^2l^2m - 4a^2b^6c^2d^2f^2k^2m - 4a^2b^2c^6d^2e^2f^2g - 16a^4b^2c^2e^2j^2k^2m + 4a^4b^2c^2d^2f^2j^2k^2l + 4a^4b^2c^2d^2j^2l^2m + 12a^4b^2c^2d^2f^2h^2k^2m + 4a^4b^2c^2d^2g^2h^2j^2m + 4a^4b^2c^2e^2h^2l^2m - 4a^3b^3c^2d^2j^2k^2l + 20a^3b^3c^2e^2g^2k^2m - 16a^3b^3c^2d^2h^2k^2m - 4a^3b^3c^2d^2f^2h^2j^2l - 4a^3b^3c^2e^2h^2j^2m - 40a^3b^2c^3d^2f^2k^2m + 24a^2b^4c^2d^2f^2k^2m - 16a^3b^2c^3d^2h^2j^2l + 12a^3b^2c^3e^2g^2j^2l + 4a^3b^2c^3e^2h^2j^2k + 4a^3b^2c^3e^2f^2j^2m + 4a^3b^2c^3d^2g^2k^2l - 4a^2b^4c^2e^2g^2j^2l + 4a^2b^4c^2d^2h^2j^2l - 16a^3b^2c^3e^2g^2h^2m + 4a^3b^2c^3f^2g^2h^2l + 4a^2b^4c^2e^2g^2h^2m + 20a^2b^3c^3d^2f^2j^2l - 16a^2b^3c^3d^2f^2h^2m - 4a^2b^3c^3e^2g^2h^2k - 4a^2b^3c^3e^2f^2g^2m - 4a^2b^3c^3d^2g^2h^2l - 16a^2b^2c^4d^2f^2g^2l + 12a^2b^2c^4d^2f^2h^2k + 4a^2b^2c^4e^2f^2g^2k + 4a^2b^2c^4d^2d^2g^2h^2j + 4a^2b^2c^4d^2e^2h^2l + 4a^2b^2c^4d^2e^2g^2m + 2a^5b^2c^2j^2k^2m - 4a^5b^2c^2h^2k^2l^2m - 2a^5b^2c^2h^2j^2k^2m + 2a^4b^3c^2h^2k^2m + 2a^5b^2c^2h^2k^2l^2 + 2a^5b^2c^2f^2l^2m - 2a^5b^2c^2h^2j^2l^2m + 2a^3b^4c^2g^2k^2m + 14a^4b^3c^3f^2k^2m - 10a^5b^2c^2f^2k^2l^2m - 8a^5b^2c^2g^2j^2m^2 - 8a^5b^2c^2e^2l^2m^2 + 4a^5b^2c^2f^2k^2m^2 + 4a^4b^3c^2f^2k^2l^2m - 2a^5b^2c^2g^2k^2l^2 + 2a^2b^5c^2f^2k^2m + 6a^5b^2c^2f^2k^2l^2 + 6a^5b^2c^2d^2l^2m - 2a^5b^2c^2g^2j^2l^2 + 2a^4b^3c^2g^2j^2l^2 - 2a^4b^3c^2f^2k^2l^2 - 2a^4b^3c^2d^2l^2m - 2a^4b^3c^2g^2j^2l - 14a^2b^5c^2d^2k^2m - 10a^5b^2c^2e^2j^2m^2 + 10a^4b^3c^2e^2j^2m^2 - 10a^3b^3c^4d^2k^2m - 6a^4b^3c^2d^2k^2m^2 + 6a^4b^3c^3g^2h^2m - 4a^3b^4c^2d^2k^2m - 2a^5b^2c^2d^2k^2m^2 + 14a^5b^2c^2f^2h^2m^2 + 14a^3b^3c^4e^2j^2l - 10a^4b^3c^2f^2h^2m^2 - 10a^4b^3c^3f^2h^2m - 10a^4b^3c^3e^2j^2l - 2a^4b^3c^3g^2h^2l - 2a^4b^3c^3f^2j^2k - 2a^4b^3c^3d^2j^2m - 2a^3b^4c^2e^2j^2l^2 + 2a^3b^4c^2d^2k^2l^2 + 2a^2b^5c^2e^2j^2l - 12a^2b^4c^3d^2j^2l - 10a^3b^3c^4e^2h^2m + 6a^4b^3c^3e^2j^2k^2 + 2a^3b^4c^2f^2h^2l^2 - 2a^2b^5c^2e^2h^2m - 12a^3b^4c^2e^2g^2m^2 + 12a^3b^4c^2d^2h^2m^2 + 12a^2b^4c^3d^2h^2m + 6a^3b^3c^4f^2g^2l - 2a^4b^3c^3f^2h^2k^2 - 2a^3b^3c^4f^2h^2k + 14a^4b^3c^3e^2g^2l^2 - 10a^4b^3c^3d^2h^2l^2 - 10a^3b^3c^4e^2g^2l - 2a^3b^3c^4f^2g^2k - 2a^3b^3c^4d^2g^2m + 2a^2b^5c^2e^2g^2l^2 - 2a^2b^5c^2d^2h^2l^2 + 2a^2b^4c^3e^2h^2k - 2a^2b^4c^3e^2g^2l + 2a^2b^4c^3e^2f^2m - 14a^2b^5c^2d^2f^2m^2 + 14a^2b^3c^5d^2h^2k - 10a^4b^3c^3d^2f^2m^2 - 10a^3b^3c^4d^2h^2k - 10a^2b^3c^5d^2g^2l - 10a^2b^3c^4d^2h^2k + 10a^2b^3c^4d^2g^2l - 6a^2b^3c^4d^2f^2m - 4a^2b^4c^3d^2f^2m - 2a^3b^3c^4e^2h^2j - 2a^2b^3c^5d^2f^2m + 6a^3b^3c^4d^2h^2j^2 + 6a^2b^3c^5e^2f^2k + 6a^2b^3c^5d^2e^2m - 2a^3b^3c^4e^2g^2j^2 - 2a^2b^3c^5e^2g^2j + 2a^2b^3c^4e^2g^2j - 2a^2b^3c^4e^2f^2k - 2a^2b^3c^4d^2e^2m + 14a^3b^3c^4d^2f^2k^2 - 10a^2b^3c^5d^2f^2k - 8a^2b^2c^5d^2g^2j - 8a^2b^2c^5d^2e^2l + 4a^2b^3c^4d^2f^2k + 4a^2b^2c^5d^2f^2k - 2a^2b^3c^5e^2f^2j + 2a^2b^5c^2d^2f^2k^2 + 2a^2b^4c^3d^2f^2j^2 + 2a^2b^2c^5d^2e^2k - 2a^2b^3c^5d^2g^2h + 2a^2b^2c^5e^2f^2h - 4a^2b^2c^5d^2f^2h - 2a^2b^2c^5d^2f^2h^2 + 2a^2b^3c^4d^2f^2h^2 + 2a^2b^2c^5d^2f^2g^2 + 8a^6c^2h^2j^2l^2m - 8a^6c^2g^2k^2l^2m - 8a^5c^3f^2j^2k^2l + 8a^5c^3e^2j^2k^2m - 8a^5c^3d^2j^2l^2m + 8a^5c^3g^2h^2k^2l - 8a^5c^3g^2h^2j^2m - 8a^5c^3f^2h^2k^2m + 8a^5c^3f^2g^2l^2m - 8a^5c^3e^2h^2l^2m - 2a^6b^2c^2h^2l^2m + 8a^4c^4f^2g^2j^2k - 8a^4c^4e^2h^2j^2k - 8a^4c^4e^2g^2j^2l + 8a^4c^4e^2f^2k^2l - 8a^4c^4e^2f^2j^2m + 8a^4c^4d^2h^2j^2l - 8a^4c^4d^2g^2k^2l + 8a^4c^4d^2g^2j^2m + 8a^4c^4d^2f^2k^2m + 8a^4c^4d^2e^2l^2m + 6a^6b^2c^2g^2l^2m^2 - 2a^6b^2c^2h^2k^2m^2 - 8a^4c^4f^2g^2h^2l + 8a^4c^4e^2g^2h^2m + 2a^2b^6c^2e^2k^2m + 8a^3c^4
\end{aligned}$$

$$\begin{aligned}
& 5d^*e^*j^*k + 8a^3c^5e^*f^*h^*j - 8a^3c^5e^*f^*g^*k - 8a^3c^5d^*g^*h^*j - 8a^3c^5d^*f^*h^*k + 8a^3c^5d^*f^*g^*l - 8a^3c^5d^*e^*h^*l - 8a^3c^5d^*e^*g^*m \\
& - 8a^2c^6d^*e^*f^*j + 8a^2c^6d^*e^*g^*h + 2a^*b^6c^d^*f^*l^2 + 6a^*b^*c^6d^2e^*j - 2a^*b^*c^6d^2f^*h - 2a^*b^*c^6d^2e^2h - 8a^4b^2c^2g^2k^*m - 10a^3b^3c^2f^2k^*m + 2a^4b^2c^2h^2j^*l + 18a^3b^2c^3e^2k^*m - 12a^2b^4c^2e^2k^*m - 4a^4b^2c^2g^2j^2l + 2a^3b^3c^2g^2j^*l + 28a^2b^3c^3d^2k^*m + 14a^4b^2c^2d^2k^2m - 8a^3b^2c^3f^2j^*l + 2a^4b^2c^2g^2j^*k^2 + 2a^4b^2c^2e^2k^2l - 2a^3b^3c^2g^2h^*m + 2a^2b^4c^2f^2j^*l - 10a^2b^3c^3e^2j^*l - 8a^4b^2c^2d^2k^*l^2 + 4a^4b^2c^2e^*j^*l^2 + 4a^3b^3c^2f^*h^2m + 4a^3b^3c^2e^*j^2l + 4a^3b^2c^3f^2h^*m - 2a^2b^4c^2f^2h^*m + 18a^2b^2c^4d^2j^*l + 10a^2b^3c^3e^2h^*m - 8a^4b^2c^2f^*h^*l^2 - 2a^3b^3c^2e^*j^*k^2 + 2a^3b^2c^3g^2h^*k + 2a^3b^2c^3f^*g^2m - 22a^4b^2c^2d^*h^*m^2 - 22a^2b^2c^4d^2h^*m + 18a^4b^2c^2e^*g^*m^2 + 16a^3b^2c^3d^*h^2m - 4a^3b^2c^3f^*h^2k - 4a^2b^4c^2d^*h^2m + 2a^3b^3c^2f^*h^*k^2 + 2a^3b^2c^3d^*j^2k + 2a^2b^3c^3f^2h^*k - 2a^2b^3c^3f^2g^*l - 10a^3b^3c^2e^*g^*l^2 + 10a^3b^3c^2d^*h^*l^2 - 8a^2b^2c^4e^2h^*k - 8a^2b^2c^4e^2f^*m + 4a^2b^3c^3e^*g^2l + 4a^2b^2c^4e^2g^*l + 2a^3b^2c^3f^*h^*j^2 + 28a^3b^3c^2d^*f^*m^2 + 14a^2b^2c^4d^*f^2m - 8a^3b^2c^3e^*g^*k^2 + 4a^3b^2c^3d^*h^*k^2 + 4a^2b^3c^3d^*h^2k + 2a^2b^4c^2e^*g^*k^2 - 2a^2b^4c^2d^*h^*k^2 + 2a^2b^2c^4f^2g^*j + 2a^2b^2c^4e^*f^2l + 18a^3b^2c^3d^*f^*l^2 - 12a^2b^4c^2d^*f^*l^2 - 4a^2b^2c^4e^*g^2j + 2a^2b^3c^3e^*g^*j^2 - 2a^2b^3c^3d^*h^*j^2 - 10a^2b^3c^3d^*f^*k^2 - 8a^2b^2c^4d^*f^*j^2 + 2a^2b^2c^4e^*g^*h^2 + 4a^5b^2c^*h^2m^2 - 2a^4b^2c^2h^3m - 5a^5b^*c^2g^2m^2 + 5a^4b^3c^*g^2m^2 + 3a^5b^*c^2h^2l^2 + 6a^3b^4c^*f^2m^2 - 2a^3b^2c^3g^3l + 2a^2b^3c^3f^3m + 7a^4b^*c^3e^2m^2 + 7a^2b^5c^*e^2m^2 - 5a^4b^*c^3f^2l^2 + 3a^4b^*c^3g^2k^2 - 2a^4b^2c^2f^*k^3 - 2a^2b^2c^4f^3k + 7a^3b^*c^4d^2l^2 + 7a^*b^5c^2d^2l^2 - 5a^3b^*c^4e^2k^2 + 3a^3b^*c^4f^2j^2 + 6a^*b^4c^3d^2k^2 + 2a^3b^3c^2d^*k^3 - 2a^3b^2c^3e^*j^3 - 5a^2b^*c^5d^2j^2 + 5a^*b^3c^4d^2j^2 + 3a^2b^*c^5e^2h^2 + 4a^*b^2c^5d^2h^2 - 2a^2b^2c^4d^*h^3 - 4a^6c^2j^2k^*m + 2a^6b^2j^*l^*m^2 + 4a^6c^2j^*k^2l + 4a^6c^2h^*k^2m - 4a^6c^2h^*k^*l^2 - 4a^6c^2f^*l^2m + 4a^5c^3g^2k^*m + 2a^5b^3h^*k^*m^2 - 2a^5b^3g^*l^*m^2 + 4a^6c^2g^*j^*m^2 + 4a^6c^2f^*k^*m^2 + 4a^6c^2e^*l^*m^2 - 4a^5c^3h^2j^*l + 4a^5c^3h^*j^2k + 4a^5c^3g^*j^2l + 4a^5c^3f^*j^2m - 4a^4c^4e^2k^*m + 2a^4b^4g^*j^*m^2 - 2a^4b^4f^*k^*m^2 + 2a^4b^4e^*l^*m^2 - 4a^5c^3g^*j^*k^2 - 4a^5c^3e^*k^2l - 4a^5c^3d^*k^2m + 4a^4c^4f^2j^*l + 4a^5c^3e^*j^*l^2 + 4a^5c^3d^*k^*l^2 + 4a^4c^4f^2h^*m + 2b^6c^2d^2j^*l - 2a^3b^5e^*j^*m^2 + 2a^3b^5d^*k^*m^2 + 4a^5c^3f^*h^*l^2 - 4a^4c^4g^2h^*k - 4a^4c^4f^*g^2m - 4a^3c^5d^2j^*l - 2b^6c^2d^2h^*m + 2a^3b^5f^*h^*m^2 + 12a^5c^3d^*h^*m^2 - 12a^4c^4d^*h^2m + 12a^3c^5d^2h^*m - 4a^5c^3e^*g^*m^2 + 4a^4c^4g^*h^2j + 4a^4c^4f^*h^2k + 4a^4c^4e^*h^2l - 4a^4c^4d^*j^2k + 3a^6b^*c^j^2m^2 - 4a^4c^4f^*h^*j^2 + 4a^3c^5e^2h^*k + 4a^3c^5e^2g^*l + 4a^3c^5e^2f^*m + 2b^5c^3d^2h^*k - 2b^5c^3d^2g^*l + 2b^5c^3d^2f^*m + 2a^5b^*c^2j^3l + 2a^2b^6e^*g^*m^2 - 2a^2b^6d^*h^*m^2 + 4a^4c^4e^*g^*k^2 + 4a^4c^4d^*h^*k^2 - 4a^3c^5f^2g^*j - 4a^3c^5e^*f^2l - 4a^3c^5d^*f^2m - 4a^4c^4d^*f^*l^2 + 4a^3c^5e^*g^2j + 4a^3c^5d^*g^2k + 2b^4c^4d^2g^*j - 2b^4c^4d^2f^*k + 2b^4c^4d^2e^*l - 6a^3b^*c^4f^3m + 4a^3c^5f^*g^2h + 4a^2c^6d^2g^*j + 4a^2c^6d^2f^*k + 4a^2c^6d^2e^*l - 2a^5b^2c^*g^*l^3 + 2a^5b^*c^2h^*k^3 + 2a^4b^*c^3h^3k - 4a^3c^5e^*g^*h^2 + 4a^3c^5d^*f^*j^2 - 4a^2c^6d^2e^2k - 2b^3c^5d^2e^*j + 8a^5b^2c^*d^*m^3 + 8a^*b^6c^*d^2m^2 + 8a^*b^2c^5d^3m - 6a^5b^*c^2e^*l^3 - 6a^2b^*c^5e^3l - 4a^2c^6e^2f^*h + 2b^3c^5d^2f^*h + 2a^4b^3c^*e^*l^3 + 2a^4b^*c^3g^*j^3 + 2a^3b^*c^4g^3j + 2a^*b^3c^4e^3l + 4a^2c^6e^*f^2g + 4a^2c^6d^*f^2h - 6a^4b^*c^3d^*k^3 - 4a^2c^6d^*f^*g^2 + 2b^2c^6d^2e^*g - 2a^*b^2c^5e^3j + 2a^3b^*c^4f^*h^3 + 2a^2b^*c^5f^3h + 2a^2b^*c^5e^*g^3 + 3a^*b^*c^6d^2g^2 - 9a^4b^2c^2f^2m^2 + 4a^4b^2c^2g^2l^2 - 14a^3b^3c^2e^2m^2 + 5a^3b^3c^2f^2l^2 - 20a^2b^4c^2d^2
\end{aligned}$$

$$\begin{aligned}
& *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)*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*1 + 8*a^2*c^6*e*k + 8*a^2*c^6*f*j - 4*b^4*c^4*d*1 + 8*a^3*c^5*g*m + 8*a^3 \\
& *c^5*h*1 - 8*a^3*c^5*j*k - 8*a^4*c^4*1*m + 16*a*b^2*c^5*d*1 - 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*1 - 12*a^2*b*c^5*e*m \\
& - 12*a^2*b*c^5*f*1 + 4*a^2*b*c^5*g*k + 4*a^2*b*c^5*h*j + 4*a^3*b*c^4*j*m + 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^
\end{aligned}$$

$$\begin{aligned}
& 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* \\
& e*h*m - 4*a^2*b*c^4*f*g*m - 4*a^2*b*c^4*g*h*k + 8*a*b^3*c^3*e*j*1 + 2*a^2*b \\
& *c^4*d*j*m - 8*a^2*b*c^4*e*j*1 + 2*a^2*b*c^4*f*j*k - 2*a*b^4*c^2*g*h*m + 10 \\
& *a*b^4*c^2*e*k*m + 2*a*b^4*c^2*g*j*1 + 2*a^3*b*c^3*f*1*m + 6*a^3*b*c^3*g*k* \\
& m - 4*a^3*b*c^3*h*j*m + 2*a^3*b*c^3*h*k*1 - 2*a^2*b^4*c*j*k*m + 2*a^3*b^3*c \\
& *k*1*m - 4*a^4*b*c^2*k*1*m + 6*a^2*b^2*c^3*g*h*m - 12*a^2*b^2*c^3*e*k*m - 2 \\
& *a^2*b^2*c^3*f*j*m - 4*a^2*b^2*c^3*g*j*1 - 2*a^2*b^2*c^3*h*j*k - 8*a^2*b^3* \\
& c^2*g*k*m + 2*a^2*b^3*c^2*h*j*m - 2*a^3*b^2*c^2*h*1*m + 6*a^3*b^2*c^2*j*k*m \\
&))/c^5)*\text{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 - 240*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 - 6 \\
& 4*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 - 13 \\
& 2*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
\end{aligned}$$

$$\begin{aligned}
& + 8*a*b^4*c^4*e*f*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*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*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*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*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*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*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
\end{aligned}$$

$$\begin{aligned}
& *b^4*ef*j*k - 4*a^3*b*c^4*d*g*j*k - 4*a^3*b*c^4*d*e*k*1 - 4*a^3*b*c^4*d* \\
& e*j*m - 4*a*b^5*c^2*d*f*j*1 + 12*a^3*b*c^4*e*g*h*k + 12*a^3*b*c^4*ef*g*m + \\
& 12*a^3*b*c^4*d*g*h*1 + 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*ef*h*1 + 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*1 + 12*a^2*b*c^5*d*f*g*j + 12*a^2*b*c^5*d*ef*1 - 4*a^2*b*c^5*d*eh*j - \\
& 4*a^2*b*c^5*d*eg*k - 4*a*b^3*c^4*d*f*g*j - 4*a*b^3*c^4*d*ef*1 - 4*a^2*b*c \\
& ^5*ef*g*h + 4*a*b^2*c^5*d*ef*j - 4*a^6*b*c*j*k*1*m - 4*a*b^6*c*d*f*k*m - \\
& 4*a*b*c^6*d*ef*g - 16*a^4*b^2*c^2*ej*k*m + 4*a^4*b^2*c^2*f*j*k*1 + 4*a^4*b \\
& ^2*c^2*d*j*1*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*eh*1*m - 4*a^3*b^3*c^2*d*j*k*1 + 20*a^3*b^3*c^2*eg*k*m - 16*a^3*b^3 \\
& *c^2*d*h*k*m - 4*a^3*b^3*c^2*f*h*j*1 - 4*a^3*b^3*c^2*eh*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*1 + 12*a^3*b^2*c \\
& ^3*eg*j*1 + 4*a^3*b^2*c^3*eh*j*k + 4*a^3*b^2*c^3*ef*j*m + 4*a^3*b^2*c^3* \\
& d*g*k*1 - 4*a^2*b^4*c^2*eg*j*1 + 4*a^2*b^4*c^2*d*h*j*1 - 16*a^3*b^2*c^3*ef \\
& *g*h*m + 4*a^3*b^2*c^3*f*g*h*1 + 4*a^2*b^4*c^2*eg*h*m + 20*a^2*b^3*c^3*d*f* \\
& j*1 - 16*a^2*b^3*c^3*d*f*h*m - 4*a^2*b^3*c^3*eg*h*k - 4*a^2*b^3*c^3*ef*g* \\
& m - 4*a^2*b^3*c^3*d*g*h*1 - 16*a^2*b^2*c^4*d*f*g*1 + 12*a^2*b^2*c^4*d*f*h*k \\
& + 4*a^2*b^2*c^4*ef*g*k + 4*a^2*b^2*c^4*d*g*h*j + 4*a^2*b^2*c^4*d*eh*1 + \\
& 4*a^2*b^2*c^4*d*eg*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*1^2 + 2*a^5*b^2*c*f*1^ \\
& 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*1*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*1 + 2*a^2*b^5*c*f^2*k*m \\
& + 6*a^5*b*c^2*f*k*1^2 + 6*a^5*b*c^2*d*1^2*m - 2*a^5*b*c^2*g*j*1^2 + 2*a^4* \\
& b^3*c*g*j*1^2 - 2*a^4*b^3*c*f*k*1^2 - 2*a^4*b^3*c*d*1^2*m - 2*a^4*b*c^3*g^2 \\
& *j*1 - 14*a*b^5*c^2*d^2*k*m - 10*a^5*b*c^2*ej*m^2 + 10*a^4*b^3*c*ej*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*ef \\
& ^2*j*1 - 10*a^4*b^3*c*f*h*m^2 - 10*a^4*b*c^3*f*h^2*m - 10*a^4*b*c^3*ej^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*ej*1^2 + 2*a^3*b^4*c*d*k*1^2 + 2*a*b^5*c^2*ef^2*j*1 - 12*a*b^4*c^3*d^2 \\
& *j*1 - 10*a^3*b*c^4*ef^2*h*m + 6*a^4*b*c^3*ej*k^2 + 2*a^3*b^4*c*f*h*1^2 - 2 \\
& *a*b^5*c^2*ef^2*h*m - 12*a^3*b^4*c*eg*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*eg*1^2 - 10*a^4*b*c^3*d*h*1^2 - 10*a^3*b*c^4*eg^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*eg*1^2 - 2*a^2*b^5 \\
& *c*d*h*1^2 + 2*a*b^4*c^3*ef^2*h*k - 2*a*b^4*c^3*ef^2*g*1 + 2*a*b^4*c^3*ef^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*eh^ \\
& 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*ef^2*f*k + 6*a \\
& ^2*b*c^5*d*ef^2*m - 2*a^3*b*c^4*eg*j^2 - 2*a^2*b*c^5*ef^2*g*j + 2*a*b^3*c^4* \\
& ef^2*g*j - 2*a*b^3*c^4*ef^2*f*k - 2*a*b^3*c^4*d*ef^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*ef^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*ef^2*k - 2*a^2*b*c^5*d*g^2*h + 2* \\
& a*b^2*c^5*ef^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*ej*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*ef \\
& 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*eh*j*k - 8*a^4*c \\
& ^4*eg*j*1 + 8*a^4*c^4*ef*k*1 - 8*a^4*c^4*ef*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*ef*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*ef \\
& *g*h*m + 2*a*b^6*c*ef^2*k*m + 8*a^3*c^5*d*ej*k + 8*a^3*c^5*ef*h*j - 8*a^3*c \\
& ^5*ef*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*ef*1 - 8*a^3*c^5*d*eg*m - 8*a^2*c^6*d*ef*j + 8*a^2*c^6*d*eg*h \\
& + 2*a*b^6*c*d*f*1^2 + 6*a*b*c^6*d^2*ef*j - 2*a*b*c^6*d^2*f*h - 2*a*b*c^6*d* \\
& ef^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*
\end{aligned}$$

$$\begin{aligned}
& 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*g*j^2 \\
& *1 + 2*a^3*b^3*c^2*g^2*j*1 + 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*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^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*1 + 18*a^3*b^2*c^3*d*f*1^2 - 12*a^2*b^4*c^2*d*f*1^2 - 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*1^2 + 6*a^3*b^4*c*f^2*m^2 - 2*a^3*b^2*c^3*g^3*1 + 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*1^2 + 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*1^2 + 7*a*b^5*c^2*d^2*1^2 - 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*1 + 4*a^6*c^2*h*k^2*m - 4*a^6*c^2*h*k*1^2 - 4*a^6*c^2*f* \\
& 1^2*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*1 + 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*1 - 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*1^2 + 4*a^5*c^3*d*k*1^2 + 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*1^2 - 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*1 - \\
& 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*1 + 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*1 - 4*a^3*c^5*d*f^2*m - 4*a^4*c^4*d*f*1^2 + 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*1^3 + 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*1^3 - 6*a^2*b*c^5*e^3*1 - 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*1^3 + 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*1 + 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*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^
\end{aligned}$$

$$\begin{aligned}
& 3*k - 4*a*c^7*d^2*e*g + 4*a*c^7*d*e^2*f + 2*a*b*c^6*e^3*g + 2*a*b*c^6*d*f^3 \\
& - a^5*b^2*c*j^2*l^2 - a^5*b*c^2*j^2*k^2 - a^4*b^3*c*h^2*l^2 - a^3*b^4*c*g^2 \\
& 2*l^2 - a^4*b*c^3*h^2*j^2 - a^2*b^5*c*f^2*l^2 - a*b^5*c^2*e^2*k^2 - a^3*b*c^4 \\
& g^2*h^2 - a*b^4*c^3*e^2*j^2 - a^2*b*c^5*f^2*g^2 - a*b^3*c^4*e^2*h^2 - a*b^2 \\
& c^5*e^2*g^2 + 2*a^7*b*k*m^3 + 4*a^7*c*h*m^3 + 4*a*c^7*d^3*h + 2*b*c^7*d^3 \\
& f - a^6*b*c*k^2*l^2 - 2*a^6*c^2*j^2*l^2 - 6*a^6*c^2*h^2*m^2 - a*b^6*c*e^2 \\
& l^2 - 6*a^5*c^3*g^2*l^2 - 2*a^5*c^3*h^2*k^2 - 2*a^5*c^3*f^2*m^2 - 6*a^4*c^4 \\
& f^2*k^2 - 6*a^4*c^4*d^2*m^2 - 2*a^4*c^4*g^2*j^2 - 2*a^4*c^4*e^2*l^2 - 6*a^3 \\
& c^5*e^2*j^2 - 2*a^3*c^5*d^2*k^2 - 2*a^3*c^5*f^2*h^2 - a*b*c^6*e^2*f^2 - 6 \\
& a^2*c^6*d^2*h^2 - 2*a^2*c^6*e^2*g^2 - a^4*b^2*c^2*h^2*k^2 - a^3*b^3*c^2*g^2 \\
& k^2 - a^3*b^2*c^3*g^2*j^2 - a^2*b^4*c^2*f^2*k^2 - a^2*b^3*c^3*f^2*j^2 - a^2 \\
& b^2*c^4*f^2*h^2 - 2*a^7*c*k^2*m^2 + 4*a^5*c^3*h^3*m - 2*a^6*b^2*h*m^3 + 4*a^6 \\
& c^2*g*l^3 + 4*a^4*c^4*g^3*l - 2*b^4*c^4*d^3*m + 2*a^5*b^3*f*m^3 - 4*a^6*c^2 \\
& d*m^3 + 4*a^5*c^3*f*k^3 + 4*a^3*c^5*f^3*k - 4*a^2*c^6*d^3*m + 2*b^3*c^5 \\
& d^3*k - 2*a^4*b^4*d*m^3 + 4*a^4*c^4*e*j^3 + 4*a^2*c^6*e^3*j - 2*b^2*c^6 \\
& d^3*h + 4*a^3*c^5*d*h^3 - 2*a*c^7*d^2*f^2 - a^6*b^2*k^2*m^2 - a^5*b^3*j^2 \\
& m^2 - a^4*b^4*h^2*m^2 - a^3*b^5*g^2*m^2 - a^2*b^6*f^2*m^2 - b^6*c^2*d^2*k^2 \\
& - b^5*c^3*d^2*j^2 - b^4*c^4*d^2*h^2 - b^3*c^5*d^2*g^2 - b^2*c^6*d^2*f^2 - a^7 \\
& b*l^2*m^2 - b^7*c*d^2*l^2 - a*b^7*e^2*m^2 - b*c^7*d^2*e^2 - b^8*d^2*m^2 - a^6 \\
& c^2*k^4 - a^5*c^3*j^4 - a^4*c^4*h^4 - a^3*c^5*g^4 - a^2*c^6*f^4 - a^7*c*l^4 - a \\
& c^7*e^4 - a^8*m^4 - c^8*d^4, z, k1), k1, 1, 4) + (1*x^4)/(4*c) + (m*x^5)/(5*c)
\end{aligned}$$

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+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),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] /; 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 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] && 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

$$\begin{aligned}
 \int \frac{d + ex}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{d}{(4 - 5x^2 + x^4)^2} dx + \int \frac{ex}{(4 - 5x^2 + x^4)^2} dx \\
 &= d \int \frac{1}{(4 - 5x^2 + x^4)^2} dx + e \int \frac{x}{(4 - 5x^2 + x^4)^2} dx \\
 &= \frac{dx(17 - 5x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72}d \int \frac{-1 + 5x^2}{4 - 5x^2 + x^4} dx + \frac{1}{2}e \operatorname{Subst} \left(\int \frac{1}{(4 - 5x + x^2)^2} dx, x, x^2 \right) \\
 &= \frac{dx(17 - 5x^2)}{72(4 - 5x^2 + x^4)} + \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{1}{54}d \int \frac{1}{-1 + x^2} dx - \frac{1}{216}(19d) \int \frac{1}{-4 + x^2} dx \\
 &= \frac{dx(17 - 5x^2)}{72(4 - 5x^2 + x^4)} + \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{19}{432}d \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54}d \tanh^{-1}(x) - \frac{1}{27}e \operatorname{Subst} \left(\int \frac{1}{-4 + x^2} dx, x, x^2 \right) \\
 &= \frac{dx(17 - 5x^2)}{72(4 - 5x^2 + x^4)} + \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{19}{432}d \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54}d \tanh^{-1}(x) + \frac{1}{27}e \operatorname{Subst} \left(\int \frac{1}{-4 + x^2} dx, x, x^2 \right)
 \end{aligned}$$

Mathematica [A] time = 0.05, size = 90, normalized size = 0.96

$$\frac{1}{864} \left(\frac{12(dx(17 - 5x^2) + e(20 - 8x^2))}{x^4 - 5x^2 + 4} + 8(d + 4e) \log(1 - x) - (19d + 32e) \log(2 - x) - 8(d - 4e) \log(x + 1) - \frac{1}{27}e \operatorname{Subst} \left(\int \frac{1}{-4 + x^2} dx, x, x^2 \right) \right)$$

Antiderivative was successfully verified.

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

[Out] $((12*(e*(20 - 8*x^2) + d*x*(17 - 5*x^2)))/(4 - 5*x^2 + x^4) + 8*(d + 4*e)*\text{Log}[1 - x] - (19*d + 32*e)*\text{Log}[2 - x] - 8*(d - 4*e)*\text{Log}[1 + x] + (19*d - 32*e)*\text{Log}[2 + x])/864$

fricas [B] time = 1.32, size = 169, normalized size = 1.80

$$\frac{60 dx^3 + 96 ex^2 - 204 dx - ((19d - 32e)x^4 - 5(19d - 32e)x^2 + 76d - 128e) \log(x + 2) + 8((d - 4e)x^4 - 5(d - 4e)x^2 + 4d - 16e) \log(x + 1) - 8((d + 4e)x^4 - 5(d + 4e)x^2 + 4d + 16e) \log(x - 1) + ((19d + 32e)x^4 - 5(19d + 32e)x^2 + 76d + 128e) \log(x - 2) - 240e}{(x^4 - 5x^2 + 4)^2}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((e*x+d)/(x^4-5*x^2+4)^2,x, algorithm="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] $1/864*(19*d - 32*e)*\log(\text{abs}(x + 2)) - 1/108*(d - 4*e)*\log(\text{abs}(x + 1)) + 1/108*(d + 4*e)*\log(\text{abs}(x - 1)) - 1/864*(19*d + 32*e)*\log(\text{abs}(x - 2)) - 1/72*(5*d*x^3 + 8*x^2*e - 17*d*x - 20*e)/(x^4 - 5*x^2 + 4)$

maple [A] time = 0.02, size = 122, normalized size = 1.30

$$\frac{19d \ln(x + 2)}{864} - \frac{19d \ln(x - 2)}{864} + \frac{d \ln(x - 1)}{108} - \frac{d \ln(x + 1)}{108} - \frac{e \ln(x + 2)}{27} - \frac{e \ln(x - 2)}{27} + \frac{e \ln(x - 1)}{27} + \frac{e \ln(x + 1)}{27} - \frac{5dx^3 + 8ex^2 - 17dx - 20e}{144(x^4 - 5x^2 + 4)}$$

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

$$\frac{1}{864} (19d - 32e) \log(x + 2) - \frac{1}{108} (d - 4e) \log(x + 1) + \frac{1}{108} (d + 4e) \log(x - 1) - \frac{1}{864} (19d + 32e) \log(x - 2) - \frac{5dx^3 + 8ex^2 - 17dx - 20e}{144(x^4 - 5x^2 + 4)}$$

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

$$\ln(x - 1) \left(\frac{d}{108} + \frac{e}{27} \right) - \ln(x + 1) \left(\frac{d}{108} - \frac{e}{27} \right) - \ln(x - 2) \left(\frac{19d}{864} + \frac{e}{27} \right) + \ln(x + 2) \left(\frac{19d}{864} - \frac{e}{27} \right) + \frac{-\frac{5dx^3}{72} - \frac{ex^2}{9} + \frac{17dx}{144} - 20e}{x^4 - 5x^2 + 4}$$

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

$$(d - 4e) \log\left(x + \frac{-6006260d^4e + 2341251d^4(d-4e) - 18247680d^2e^3 + 24099840d^2e^2(d-4e) + 7387904d^2e(d-4e)^2 - 665280d^2(d-4e)^3 + 587202560d^2e^2}{1675971d^5 - 66150400d^3e^2 + 318767104de^4}\right)$$

108

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] /; 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

$$\begin{aligned} \int \frac{d + ex + fx^2}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{ex}{(4 - 5x^2 + x^4)^2} dx + \int \frac{d + fx^2}{(4 - 5x^2 + x^4)^2} dx \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72} \int \frac{-d + 20f + (5d + 8f)x^2}{4 - 5x^2 + x^4} dx + e \int \frac{x}{(4 - 5x^2 + x^4)^2} dx \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{(4 - 5x + x^2)^2} dx, x, x^2 \right) - \frac{1}{54} (-d - 7f) \\ &= \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432} (19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54} (-d - 7f) \\ &= \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432} (19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54} (-d - 7f) \\ &= \frac{e(5 - 2x^2)}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432} (19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right) - \frac{1}{54} (-d - 7f) \end{aligned}$$

Mathematica [A] time = 0.08, size = 112, normalized size = 0.97

$$\frac{1}{864} \left(\frac{12(-5dx^3 + 17dx + e(20 - 8x^2) - 8fx^3 + 20fx)}{x^4 - 5x^2 + 4} + 8 \log(1 - x)(d + 4e + 7f) - \log(2 - x)(19d + 32e + 52f) \right)$$

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

$$\frac{12(5d + 8f)x^3 + 96ex^2 - 12(17d + 20f)x - ((19d - 32e + 52f)x^4 - 5(19d - 32e + 52f)x^2 + 76d - 128e)}{(4 - 5x^2 + x^4)^2}$$

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="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(abs(x + 2)) - 1/108*(d + 7*f - 4*e)*log(abs(x + 1)) + 1/108*(d + 7*f + 4*e)*log(abs(x - 1)) - 1/864*(19*d + 52*f + 32*e)*log(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

$$\frac{19d \ln(x + 2)}{864} - \frac{19d \ln(x - 2)}{864} + \frac{d \ln(x - 1)}{108} - \frac{d \ln(x + 1)}{108} - \frac{e \ln(x + 2)}{27} - \frac{e \ln(x - 2)}{27} + \frac{e \ln(x - 1)}{27} + \frac{e \ln(x + 1)}{27} + \frac{13f}{864} \ln(x + 2) - \frac{13f}{864} \ln(x - 2)$$

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

$$\ln(x-1) \left(\frac{d}{108} + \frac{e}{27} + \frac{7f}{108} \right) - \ln(x+1) \left(\frac{d}{108} - \frac{e}{27} + \frac{7f}{108} \right) - \ln(x-2) \left(\frac{19d}{864} + \frac{e}{27} + \frac{13f}{216} \right) + \ln(x+2) \left(\frac{19d}{864} - \frac{e}{27} + \frac{13f}{216} \right) + \left(\frac{5e}{18} - x^3 \left(\frac{5d}{72} + \frac{f}{9} \right) - \frac{e x^2}{9} + x \left(\frac{17d}{72} + \frac{5f}{18} \right) \right) / (x^4 - 5x^2 + 4)$$

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 - 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 - 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 + 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 - 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 - 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

$$\begin{aligned}
& 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}* \\
& 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

$$\frac{x(-x^2(5d+8f)+17d+20f)}{72(x^4-5x^2+4)} + \frac{1}{432}(19d+52f)\tanh^{-1}\left(\frac{x}{2}\right) - \frac{1}{54}(d+7f)\tanh^{-1}(x) + \frac{1}{54}(2e+5g)\log(1-x^2) -$$

[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_))^(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 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] - 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] && 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

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{d + fx^2}{(4 - 5x^2 + x^4)^2} dx + \int \frac{x(e + gx^2)}{(4 - 5x^2 + x^4)^2} dx \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72} \int \frac{-d + 20f + (5d + 8f)x^2}{4 - 5x^2 + x^4} dx + \frac{1}{2} \text{Subst} \left(\int \frac{1}{4 - 5x^2 + x^4} dx, x, x^2 \right) \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} - \frac{1}{54}(-d - 7f) \int \frac{1}{-1 + x^2} dx \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{1}{432}(19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right) \\ &= \frac{x(17d + 20f - (5d + 8f)x^2)}{72(4 - 5x^2 + x^4)} + \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{1}{432}(19d + 52f) \tanh^{-1} \left(\frac{x}{2} \right) \end{aligned}$$

Mathematica [A] time = 0.05, size = 134, normalized size = 0.97

$$\frac{1}{864} \left(\frac{12(-5dx^3 + 17dx + e(20 - 8x^2) - 8fx^3 + 20fx - 4g(5x^2 - 8))}{x^4 - 5x^2 + 4} + 8 \log(1 - x)(d + 4e + 7f + 10g) - \log(2) \right)$$

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

$$\frac{12(5d + 8f)x^3 + 48(2e + 5g)x^2 - 12(17d + 20f)x - ((19d - 32e + 52f - 80g)x^4 - 5(19d - 32e + 52f - 80g)x^2 + 76d - 128e + 208f - 320g)\log(x + 2) + 8((d - 4e + 7f - 10g)x^4 - 5(d - 4e + 7f - 10g)x^2 + 4d - 16e + 28f - 40g)\log(x + 1) - 8((d + 4e + 7f + 10g)x^4 - 5(d + 4e + 7f + 10g)x^2 + 4d + 16e + 28f + 40g)\log(x - 1) + ((19d + 32e + 52f + 80g)x^4 - 5(19d + 32e + 52f + 80g)x^2 + 76d + 128e + 208f + 320g)\log(x - 2) - 240e - 384g}{(x^4 - 5x^2 + 4)^2}$$

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)^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

$$\frac{1}{864} (19d + 52f - 80g - 32e) \log(|x + 2|) - \frac{1}{108} (d + 7f - 10g - 4e) \log(|x + 1|) + \frac{1}{108} (d + 7f + 10g + 4e) \log(|x - 1|)$$

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] 1/864*(19*d + 52*f - 80*g - 32*e)*log(abs(x + 2)) - 1/108*(d + 7*f - 10*g - 4*e)*log(abs(x + 1)) + 1/108*(d + 7*f + 10*g + 4*e)*log(abs(x - 1)) - 1/864*(19*d + 52*f + 80*g + 32*e)*log(abs(x - 2)) - 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

$$\frac{5g \ln(x - 1)}{54} - \frac{5g \ln(x + 2)}{54} - \frac{5g \ln(x - 2)}{54} + \frac{5g \ln(x + 1)}{54} + \frac{19d \ln(x + 2)}{864} - \frac{e \ln(x + 2)}{27} + \frac{e \ln(x - 1)}{27} + \frac{d \ln(x - 1)}{108}$$

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] 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)+1/18/(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 = 0.97, size = 127, normalized size = 0.92

$$\frac{1}{864} (19d - 32e + 52f - 80g) \log(x + 2) - \frac{1}{108} (d - 4e + 7f - 10g) \log(x + 1) + \frac{1}{108} (d + 4e + 7f + 10g) \log(x - 1)$$

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] $\frac{1}{864}(19d - 32e + 52f - 80g)\log(x + 2) - \frac{1}{108}(d - 4e + 7f - 10g)\log(x + 1) + \frac{1}{108}(d + 4e + 7f + 10g)\log(x - 1) - \frac{1}{864}(19d + 32e + 52f + 80g)\log(x - 2) - \frac{1}{72}((5d + 8f)x^3 + 4(2e + 5g)x^2 - (17d + 20f)x - 20e - 32g)/(x^4 - 5x^2 + 4)$

mupad [B] time = 0.14, size = 128, normalized size = 0.93

$$\ln(x-1) \left(\frac{d}{108} + \frac{e}{27} + \frac{7f}{108} + \frac{5g}{54} \right) - \ln(x+1) \left(\frac{d}{108} - \frac{e}{27} + \frac{7f}{108} - \frac{5g}{54} \right) - \ln(x-2) \left(\frac{19d}{864} + \frac{e}{27} + \frac{13f}{216} + \frac{5g}{54} \right) + \ln(x+2) \left(\frac{19d}{864} - \frac{e}{27} + \frac{13f}{216} - \frac{5g}{54} \right) + \frac{(5d + 8f)x^3 + 4(2e + 5g)x^2 - (17d + 20f)x - 20e - 32g}{72(x^4 - 5x^2 + 4)}$$

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] $\log(x - 1)(d/108 + e/27 + (7f)/108 + (5g)/54) - \log(x + 1)(d/108 - e/27 + (7f)/108 - (5g)/54) - \log(x - 2)((19d)/864 + e/27 + (13f)/216 + (5g)/54) + \log(x + 2)((19d)/864 - e/27 + (13f)/216 - (5g)/54) + ((5e)/18 + (4g)/9 - x^3((5d)/72 + f/9) - x^2(e/9 + (5g)/18) + x((17d)/72 + (5f)/18))/(x^4 - 5x^2 + 4)$

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

$$\frac{x \left(- \left(x^2(5d + 8f + 20h) \right) + 17d + 20f + 32h \right)}{72(x^4 - 5x^2 + 4)} + \frac{1}{432} \tanh^{-1} \left(\frac{x}{2} \right) (19d + 52f + 112h) - \frac{1}{54} \tanh^{-1}(x)(d + 7f + 13h) +$$

[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}

$$\frac{x \left(x^2(-5d + 8f + 20h) + 17d + 20f + 32h \right)}{72(x^4 - 5x^2 + 4)} + \frac{1}{432} \tanh^{-1} \left(\frac{x}{2} \right) (19d + 52f + 112h) - \frac{1}{54} \tanh^{-1}(x)(d + 7f + 13h) +$$

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_))^(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 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] - 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] && 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], 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

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3 + hx^4}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{x(e + gx^2)}{(4 - 5x^2 + x^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^2} dx \\ &= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72} \int \frac{-d + 20f + 32h + (5d + 8f + 20h)x^2}{4 - 5x^2 + x^4} dx \\ &= \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{18}(-2e - 5g) \\ &= \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432}(19d - 10e - 15g) \\ &= \frac{5e + 8g - (2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} + \frac{1}{432}(19d - 10e - 15g) \end{aligned}$$

Mathematica [A] time = 0.07, size = 159, normalized size = 1.06

$$\frac{1}{864} \left(\frac{12(x(d(5x^2 - 17) + 4f(2x^2 - 5) + 4h(5x^2 - 8)) + 4e(2x^2 - 5) + 4g(5x^2 - 8))}{x^4 - 5x^2 + 4} + 8 \log(1 - x)(d + 4e + 4g) \right)$$

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] $((-12*(4*e*(-5 + 2*x^2) + 4*g*(-8 + 5*x^2) + x*(4*f*(-5 + 2*x^2) + d*(-17 + 5*x^2) + 4*h*(-8 + 5*x^2))))/(4 - 5*x^2 + x^4) + 8*(d + 4*e + 7*f + 10*g + 13*h)*\text{Log}[1 - x] - (19*d + 32*e + 52*f + 80*g + 112*h)*\text{Log}[2 - x] - 8*(d - 4*e + 7*f - 10*g + 13*h)*\text{Log}[1 + x] + (19*d - 32*e + 52*f - 80*g + 112*h)*\text{Log}[2 + x])/864$

fricas [B] time = 5.40, size = 304, normalized size = 2.03

$$\frac{12(5d + 8f + 20h)x^3 + 48(2e + 5g)x^2 - 12(17d + 20f + 32h)x - ((19d - 32e + 52f - 80g + 112h)x^4)}{864}$$

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

$$\frac{1}{864}(19d + 52f - 80g + 112h - 32e)\log(|x + 2|) - \frac{1}{108}(d + 7f - 10g + 13h - 4e)\log(|x + 1|) + \frac{1}{108}(d + 7f - 10g + 13h - 4e)\log(|x - 1|)$$

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

$$\frac{1}{864}(19d - 32e + 52f - 80g + 112h)\log(x + 2) - \frac{1}{108}(d - 4e + 7f - 10g + 13h)\log(x + 1) + \frac{1}{108}(d + 4e - 7f + 10g - 13h)\log(x - 1)$$

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

$$\frac{x \left(- \left(x^2(5d + 8f + 20h) \right) + 17d + 20f + 32h \right)}{72(x^4 - 5x^2 + 4)} + \frac{1}{432} \tanh^{-1} \left(\frac{x}{2} \right) (19d + 52f + 112h) - \frac{1}{54} \tanh^{-1}(x)(d + 7f + 13h) +$$

[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}

$$\frac{x \left(x^2 \left(- (5d + 8f + 20h) \right) + 17d + 20f + 32h \right)}{72(x^4 - 5x^2 + 4)} + \frac{1}{432} \tanh^{-1} \left(\frac{x}{2} \right) (19d + 52f + 112h) - \frac{1}{54} \tanh^{-1}(x)(d + 7f + 13h) +$$

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], 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

$Q[c*d^2 - a*e^2, 0] \ \&\& \ \text{PosQ}[b^2 - 4*a*c]$

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], 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 30x^5}{(4 - 5x^2 + x^4)^2} dx &= \int \frac{x(e + gx^2 + 30x^4)}{(4 - 5x^2 + x^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^2} dx \\
&= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} - \frac{1}{72} \int \frac{-d + 20f + 32h}{4 - 5x^2 + x^4} dx \\
&= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} \\
&= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} \\
&= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)} \\
&= \frac{600 + 5e + 8g - (510 + 2e + 5g)x^2}{18(4 - 5x^2 + x^4)} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{72(4 - 5x^2 + x^4)}
\end{aligned}$$

Mathematica [A] time = 0.09, size = 185, normalized size = 1.14

$$\frac{-5dx^3 + 17dx - 8ex^2 + 20e - 8fx^3 + 20fx - 20gx^2 + 32g - 20hx^3 + 32hx - 68ix^2 + 80i}{72(x^4 - 5x^2 + 4)} + \frac{1}{108} \log(1-x)(d+4e)$$

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 + 10*g + 13*h + 16*i)*Log[1 - x])/108 + ((-19*d - 32*e - 52*f - 80*g - 112*h - 128*i)*Log[2 - x])/864 + ((-d + 4*e - 7*f + 10*g - 13*h + 16*i)*Log[1 + x])/108 + ((19*d - 32*e + 52*f - 80*g + 112*h - 128*i)*Log[2 + x])/864

fricas [B] time = 25.37, size = 346, normalized size = 2.14

$$\frac{12(5d + 8f + 20h)x^3 + 48(2e + 5g + 17i)x^2 - 12(17d + 20f + 32h)x - ((19d - 32e + 52f - 80g + 112h - 128i)x^4 - 5(19d - 32e + 52f - 80g + 112h - 128i)x^2 + 76d - 128e + 208f - 320g + 448h - 512i) \log(x + 2) + 8((d - 4e + 7f - 10g + 13h - 16i)x^4 - 5(d - 4e + 7f - 10g + 13h - 16i)x^2 + 4d - 16e + 28f - 40g + 52h - 64i) \log(x + 1) - 8((d + 4e + 7f + 10g + 13h + 16i)x^4 - 5(d + 4e + 7f + 10g + 13h + 16i)x^2 + 4d + 16e + 28f + 40g + 52h + 64i) \log(x - 1) + ((19d + 32e + 52f + 80g + 112h + 128i)x^4 - 5(19d + 32e + 52f + 80g + 112h + 128i)x^2 + 76d + 128e + 208f + 320g + 448h + 512i) \log(x - 2) - 240e - 384g - 960i}{(x^4 - 5x^2 + 4)}$$

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="fricas")

[Out] -1/864*(12*(5*d + 8*f + 20*h)*x^3 + 48*(2*e + 5*g + 17*i)*x^2 - 12*(17*d + 20*f + 32*h)*x - ((19*d - 32*e + 52*f - 80*g + 112*h - 128*i)*x^4 - 5*(19*d - 32*e + 52*f - 80*g + 112*h - 128*i)*x^2 + 76*d - 128*e + 208*f - 320*g + 448*h - 512*i)*log(x + 2) + 8*((d - 4*e + 7*f - 10*g + 13*h - 16*i)*x^4 - 5*(d - 4*e + 7*f - 10*g + 13*h - 16*i)*x^2 + 4*d - 16*e + 28*f - 40*g + 52*h - 64*i)*log(x + 1) - 8*((d + 4*e + 7*f + 10*g + 13*h + 16*i)*x^4 - 5*(d + 4*e + 7*f + 10*g + 13*h + 16*i)*x^2 + 4*d + 16*e + 28*f + 40*g + 52*h + 64*i)*log(x - 1) + ((19*d + 32*e + 52*f + 80*g + 112*h + 128*i)*x^4 - 5*(19*d + 32*e + 52*f + 80*g + 112*h + 128*i)*x^2 + 76*d + 128*e + 208*f + 320*g + 448*h + 512*i)*log(x - 2) - 240*e - 384*g - 960*i)/(x^4 - 5*x^2 + 4)

giac [A] time = 0.32, size = 179, normalized size = 1.10

$$\frac{1}{864} (19d + 52f - 80g + 112h - 128i - 32e) \log(|x + 2|) - \frac{1}{108} (d + 7f - 10g + 13h - 16i - 4e) \log(|x + 1|)$$

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*(19*d + 52*f - 80*g + 112*h - 128*i - 32*e)*log(abs(x + 2)) - 1/108*(d + 7*f - 10*g + 13*h - 16*i - 4*e)*log(abs(x + 1)) + 1/108*(d + 7*f + 10*g + 13*h + 16*i + 4*e)*log(abs(x - 1)) - 1/864*(19*d + 52*f + 80*g + 112*h + 128*i + 32*e)*log(abs(x - 2)) - 1/72*(5*d*x^3 + 8*f*x^3 + 20*h*x^3 + 20*g*x^2 + 68*i*x^2 + 8*x^2*e - 17*d*x - 20*f*x - 32*h*x - 32*g - 80*i - 20*e)/(x^4 - 5*x^2 + 4)

maple [B] time = 0.02, size = 362, normalized size = 2.23

$$-\frac{4i \ln(x+2)}{27} + \frac{4i \ln(x-1)}{27} + \frac{4i \ln(x+1)}{27} - \frac{4i \ln(x-2)}{27} + \frac{7h \ln(x+2)}{54} + \frac{13h \ln(x-1)}{108} - \frac{13h \ln(x+1)}{108} - \frac{7h \ln(x-2)}{54}$$

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

$$\frac{1}{864} (19d - 32e + 52f - 80g + 112h - 128i) \log(x + 2) - \frac{1}{108} (d - 4e + 7f - 10g + 13h - 16i) \log(x + 1) + \frac{1}{108} (d + 7f - 10g + 13h - 16i) \log(x - 1) - \frac{1}{864} (19d + 52f + 80g + 112h + 128i) \log(x - 2) - \frac{1}{72} (5d + 8f + 20h) x^3 + 4(2e + 5g + 17i) x^2 - (17d + 20f + 32h) x - 20e - 32g - 80i / (x^4 - 5x^2 + 4)$$

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

$$\frac{\left(-\frac{5d}{72} - \frac{f}{9} - \frac{5h}{18}\right) x^3 + \left(-\frac{e}{9} - \frac{5g}{18} - \frac{17i}{18}\right) x^2 + \left(\frac{17d}{72} + \frac{5f}{18} + \frac{4h}{9}\right) x + \frac{5e}{18} + \frac{4g}{9} + \frac{10i}{9}}{x^4 - 5x^2 + 4} + \ln(x - 1) \left(\frac{d}{108} + \frac{e}{27} + \frac{7f}{108} + \frac{5g}{54} + \frac{13h}{108} + \frac{4i}{27}\right) - \ln(x + 1) \left(\frac{d}{108} - \frac{e}{27} + \frac{7f}{108} - \frac{5g}{54} + \frac{13h}{108} - \frac{4i}{27}\right)$$

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)

) / 27) - log(x - 2) * ((19*d) / 864 + e / 27 + (13*f) / 216 + (5*g) / 54 + (7*h) / 54 + (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

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

[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

$$\begin{aligned}
\int \frac{d+ex}{(1+x^2+x^4)^2} dx &= \int \frac{d}{(1+x^2+x^4)^2} dx + \int \frac{ex}{(1+x^2+x^4)^2} dx \\
&= d \int \frac{1}{(1+x^2+x^4)^2} dx + e \int \frac{x}{(1+x^2+x^4)^2} dx \\
&= \frac{dx(1-x^2)}{6(1+x^2+x^4)} + \frac{1}{6} d \int \frac{5-x^2}{1+x^2+x^4} dx + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{(1+x+x^2)^2} dx, x, x^2 \right) \\
&= \frac{dx(1-x^2)}{6(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{1}{12} d \int \frac{5-6x}{1-x+x^2} dx + \frac{1}{12} d \int \frac{5+6x}{1+x+x^2} dx + \frac{1}{3} e \operatorname{Subst} \left(\int \frac{1}{1-x+x^2} dx, x, x^2 \right) \\
&= \frac{dx(1-x^2)}{6(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{1}{6} d \int \frac{1}{1-x+x^2} dx + \frac{1}{6} d \int \frac{1}{1+x+x^2} dx - \frac{1}{4} d \int \frac{1}{1-x+x^2} dx \\
&= \frac{dx(1-x^2)}{6(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{2e \tan^{-1} \left(\frac{1+2x^2}{\sqrt{3}} \right)}{3\sqrt{3}} - \frac{1}{4} d \log(1-x+x^2) + \frac{1}{4} d \log(1+x+x^2) \\
&= \frac{dx(1-x^2)}{6(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} - \frac{d \tan^{-1} \left(\frac{1-2x}{\sqrt{3}} \right)}{3\sqrt{3}} + \frac{d \tan^{-1} \left(\frac{1+2x}{\sqrt{3}} \right)}{3\sqrt{3}} + \frac{2e \tan^{-1} \left(\frac{1+2x^2}{\sqrt{3}} \right)}{3\sqrt{3}}
\end{aligned}$$

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 + 2*e*x^2 + d*(x - x^3))/(6*(1 + x^2 + x^4)) - ((-11*I + Sqrt[3])*d*ArcTan[(-I + Sqrt[3])*x/2])/(6*Sqrt[6 + (6*I)*Sqrt[3]]) - ((11*I + Sqrt[3])*d*ArcTan[(I + Sqrt[3])*x/2])/(6*Sqrt[6 - (6*I)*Sqrt[3]]) - (2*e*ArcTan[Sqrt[3]/(1 + 2*x^2)])/(3*Sqrt[3])

fricas [A] time = 1.09, size = 154, normalized size = 1.10

$$\frac{6dx^3 - 12ex^2 - 4\sqrt{3}((d-2e)x^4 + (d-2e)x^2 + d-2e) \arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) - 4\sqrt{3}((d+2e)x^4 + (d+2e)x^2 + d+2e) \arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) - 6dx - 9(d*x^4 + d*x^2 + d) \log(x^2 + x + 1) + 9(d*x^4 + d*x^2 + d) \log(x^2 - x + 1) - 6e}{(1+x^2+x^4)^2}$$

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*(6*d*x^3 - 12*e*x^2 - 4*sqrt(3)*((d - 2*e)*x^4 + (d - 2*e)*x^2 + d - 2*e)*arctan(1/3*sqrt(3)*(2*x + 1)) - 4*sqrt(3)*((d + 2*e)*x^4 + (d + 2*e)*x^2 + d + 2*e)*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)

giac [A] time = 0.24, size = 100, normalized size = 0.71

$$\frac{1}{9} \sqrt{3} (d-2e) \arctan\left(\frac{1}{3} \sqrt{3} (2x+1)\right) + \frac{1}{9} \sqrt{3} (d+2e) \arctan\left(\frac{1}{3} \sqrt{3} (2x-1)\right) + \frac{1}{4} d \log(x^2+x+1) - \frac{1}{4} d \log(x^2-x+1) - \frac{6d}{x^4+x^2+1} - \frac{6e}{x^4+x^2+1}$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] $\frac{1}{9}\sqrt{3}(d-2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{9}\sqrt{3}(d+2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{4}d\log(x^2+x+1) - \frac{1}{4}d\log(x^2-x+1) - \frac{1}{6}(d*x^3 - 2*x^2*e - d*x - e)/(x^4 + x^2 + 1)$

maple [A] time = 0.01, size = 146, normalized size = 1.04

$$\frac{\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9} + \frac{\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{9} - \frac{d \ln(x^2 - x + 1)}{4} + \frac{d \ln(x^2 + x + 1)}{4} - \frac{2\sqrt{3} e \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{9}$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] $\frac{1}{4}\left(\frac{-1}{3}d - \frac{1}{3}e\right)x - \frac{2}{3}d + \frac{1}{3}e / (x^2+x+1) + \frac{1}{4}d \ln(x^2+x+1) + \frac{1}{9}3^{(1/2)}d \arctan\left(\frac{1}{3}(2x+1)3^{(1/2)}\right) - \frac{2}{9}3^{(1/2)}e \arctan\left(\frac{1}{3}(2x+1)3^{(1/2)}\right) - \frac{1}{4}\left(\frac{1}{3}d - \frac{1}{3}e\right)x - \frac{2}{3}d - \frac{1}{3}e / (x^2-x+1) - \frac{1}{4}d \ln(x^2-x+1) + \frac{1}{9}3^{(1/2)}d \arctan\left(\frac{1}{3}(2x-1)3^{(1/2)}\right) + \frac{2}{9}3^{(1/2)}e \arctan\left(\frac{1}{3}(2x-1)3^{(1/2)}\right)$

maxima [A] time = 2.42, size = 96, normalized size = 0.69

$$\frac{1}{9}\sqrt{3}(d-2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{9}\sqrt{3}(d+2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{4}d\log(x^2+x+1) - \frac{1}{4}d\log(x^2-x+1)$$

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] $\frac{1}{9}\sqrt{3}(d-2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right) + \frac{1}{9}\sqrt{3}(d+2e)\arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{4}d\log(x^2+x+1) - \frac{1}{4}d\log(x^2-x+1) - \frac{1}{6}(d*x^3 - 2*e*x^2 - d*x - e)/(x^4 + x^2 + 1)$

mupad [B] time = 0.25, size = 149, normalized size = 1.06

$$\frac{-\frac{dx^3}{6} + \frac{ex^2}{3} + \frac{dx}{6} + \frac{e}{6}}{x^4 + x^2 + 1} - \ln\left(x - \frac{1}{2} - \frac{\sqrt{3}1i}{2}\right)\left(\frac{d}{4} + \frac{\sqrt{3}d1i}{18} + \frac{\sqrt{3}e1i}{9}\right) + \ln\left(x + \frac{1}{2} - \frac{\sqrt{3}1i}{2}\right)\left(\frac{d}{4} - \frac{\sqrt{3}d1i}{18} + \frac{\sqrt{3}e1i}{9}\right)$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] $\frac{(e/6 + (d*x)/6 - (d*x^3)/6 + (e*x^2)/3)/(x^2 + x^4 + 1) - \log(x - (3^{(1/2)}*1i)/2 - 1/2)*(d/4 + (3^{(1/2)}*d*1i)/18 + (3^{(1/2)}*e*1i)/9) + \log(x - (3^{(1/2)}*1i)/2 + 1/2)*(d/4 - (3^{(1/2)}*d*1i)/18 + (3^{(1/2)}*e*1i)/9) + \log(x + (3^{(1/2)}*1i)/2 - 1/2)*((3^{(1/2)}*d*1i)/18 - d/4 + (3^{(1/2)}*e*1i)/9) + \log(x + (3^{(1/2)}*1i)/2 + 1/2)*(d/4 + (3^{(1/2)}*d*1i)/18 - (3^{(1/2)}*e*1i)/9)$

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] $(-d/4 - \sqrt{3}*I*(d + 2*e)/18)*\log(x + (-10309*d**4*e + 1026*d**4*(-d/4 - \sqrt{3}*I*(d + 2*e)/18) - 7200*d**2*e**3 - 31536*d**2*e**2*(-d/4 - \sqrt{3}*I*(d + 2*e)/18) + 108432*d**2*e*(-d/4 - \sqrt{3}*I*(d + 2*e)/18)**2 + 163296$

$$\begin{aligned}
& *d^{**2}*(-d/4 - \sqrt{3}*I*(d + 2*e)/18)**3 + 1792*e^{**5} + 11520*e^{**4}*(-d/4 - \sqrt{3}*I*(d + 2*e)/18) \\
& + 48384*e^{**3}*(-d/4 - \sqrt{3}*I*(d + 2*e)/18)**2 + 311040*e^{**2}*(-d/4 - \sqrt{3}*I*(d + 2*e)/18)**3)/(3348*d^{**5} - 11408*d^{**3}*e^{**2} \\
& - 7936*d*e^{**4}) + (-d/4 + \sqrt{3}*I*(d + 2*e)/18)*\log(x + (-10309*d^{**4}*e + 1026*d^{**4}*(-d/4 + \sqrt{3}*I*(d + 2*e)/18) \\
& - 7200*d^{**2}*e^{**3} - 31536*d^{**2}*e^{**2}*(-d/4 + \sqrt{3}*I*(d + 2*e)/18) + 108432*d^{**2}*e*(-d/4 + \sqrt{3}*I*(d + 2*e)/18)**2 \\
& + 163296*d^{**2}*(-d/4 + \sqrt{3}*I*(d + 2*e)/18)**3 + 1792*e^{**5} + 11520*e^{**4}*(-d/4 + \sqrt{3}*I*(d + 2*e)/18) \\
& + 48384*e^{**3}*(-d/4 + \sqrt{3}*I*(d + 2*e)/18)**2 + 311040*e^{**2}*(-d/4 + \sqrt{3}*I*(d + 2*e)/18)**3)/(3348*d^{**5} \\
& - 11408*d^{**3}*e^{**2} - 7936*d*e^{**4}) + (d/4 - \sqrt{3}*I*(d - 2*e)/18)*\log(x + (-10309*d^{**4}*e + 1026*d^{**4}*(d/4 - \sqrt{3}*I*(d - 2*e)/18) \\
& - 7200*d^{**2}*e^{**3} - 31536*d^{**2}*e^{**2}*(d/4 - \sqrt{3}*I*(d - 2*e)/18) + 108432*d^{**2}*e*(d/4 - \sqrt{3}*I*(d - 2*e)/18)**2 \\
& + 163296*d^{**2}*(d/4 - \sqrt{3}*I*(d - 2*e)/18)**3 + 1792*e^{**5} + 11520*e^{**4}*(d/4 - \sqrt{3}*I*(d - 2*e)/18) \\
& + 48384*e^{**3}*(d/4 - \sqrt{3}*I*(d - 2*e)/18)**2 + 311040*e^{**2}*(d/4 - \sqrt{3}*I*(d - 2*e)/18)**3)/(3348*d^{**5} - 11408*d^{**3}*e^{**2} \\
& - 7936*d*e^{**4}) + (d/4 + \sqrt{3}*I*(d - 2*e)/18)*\log(x + (-10309*d^{**4}*e + 1026*d^{**4}*(d/4 + \sqrt{3}*I*(d - 2*e)/18) \\
& - 7200*d^{**2}*e^{**3} - 31536*d^{**2}*e^{**2}*(d/4 + \sqrt{3}*I*(d - 2*e)/18) + 108432*d^{**2}*e*(d/4 + \sqrt{3}*I*(d - 2*e)/18)**2 \\
& + 163296*d^{**2}*(d/4 + \sqrt{3}*I*(d - 2*e)/18)**3 + 1792*e^{**5} + 11520*e^{**4}*(d/4 + \sqrt{3}*I*(d - 2*e)/18) \\
& + 48384*e^{**3}*(d/4 + \sqrt{3}*I*(d - 2*e)/18)**2 + 311040*e^{**2}*(d/4 + \sqrt{3}*I*(d - 2*e)/18)**3)/(3348*d^{**5} - 11408*d^{**3}*e^{**2} \\
& - 7936*d*e^{**4}) + (-d*x^{**3} + d*x + 2*e*x^{**2} + e)/(6*x^{**4} + 6*x^{**2} + 6)
\end{aligned}$$

$$3.32 \quad \int \frac{d+ex+fx^2}{(1+x^2+x^4)^2} dx$$

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}, 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 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] $((6*(e + 2*e*x^2 + x*(d + f - d*x^2 + 2*f*x^2)))/(1 + x^2 + x^4) - (((-11*I + \operatorname{Sqrt}[3])*d - 2*(-2*I + \operatorname{Sqrt}[3])*f)*\operatorname{ArcTan}[((-I + \operatorname{Sqrt}[3])*x)/2])/ \operatorname{Sqrt}[(1 + I*\operatorname{Sqrt}[3])/6] - (((11*I + \operatorname{Sqrt}[3])*d - 2*(2*I + \operatorname{Sqrt}[3])*f)*\operatorname{ArcTan}[((I + \operatorname{Sqrt}[3])*x)/2])/ \operatorname{Sqrt}[(1 - I*\operatorname{Sqrt}[3])/6] - 8*\operatorname{Sqrt}[3]*e*\operatorname{ArcTan}[\operatorname{Sqrt}[3]/(1 + 2*x^2)])/36$

fricas [A] time = 0.93, size = 212, normalized size = 1.28

$$\frac{12(d-2f)x^3 - 24ex^2 - 2\sqrt{3}((4d-8e+f)x^4 + (4d-8e+f)x^2 + 4d-8e+f) \arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right)}{x^4+x^2+1}$$

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="fricas")

[Out] $-1/72*(12*(d-2*f)*x^3 - 24*e*x^2 - 2*\operatorname{sqrt}(3)*((4*d-8*e+f)*x^4 + (4*d-8*e+f)*x^2 + 4*d-8*e+f)*\operatorname{arctan}(1/3*\operatorname{sqrt}(3)*(2*x+1)) - 2*\operatorname{sqrt}(3)*((4*d+8*e+f)*x^4 + (4*d+8*e+f)*x^2 + 4*d+8*e+f)*\operatorname{arctan}(1/3*\operatorname{sqrt}(3)*(2*x-1)) - 12*(d+f)*x - 9*((2*d-f)*x^4 + (2*d-f)*x^2 + 2*d-f)*\log(x^2+x+1) + 9*((2*d-f)*x^4 + (2*d-f)*x^2 + 2*d-f)*\log(x^2-x+1) - 12*e)/(x^4+x^2+1)$

giac [A] time = 0.23, size = 128, normalized size = 0.78

$$\frac{1}{36} \sqrt{3} (4d+f-8e) \arctan\left(\frac{1}{3} \sqrt{3} (2x+1)\right) + \frac{1}{36} \sqrt{3} (4d+f+8e) \arctan\left(\frac{1}{3} \sqrt{3} (2x-1)\right) + \frac{1}{8} (2d-f) \log(1-x+x^2)$$

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="giac")

[Out] $\frac{1}{36}\sqrt{3}(4d + f - 8e)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{36}\sqrt{3}(4d + f + 8e)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{1}{8}(2d - f)\log(x^2 + x + 1) - \frac{1}{8}(2d - f)\log(x^2 - x + 1) - \frac{1}{6}(d*x^3 - 2*f*x^3 - 2*x^2*e - d*x - f*x - e)/(x^4 + x^2 + 1)$

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] $\frac{1}{4}\left(\frac{-1/3d-1/3e+2/3f}{x^2+x+1} + \frac{1/4d\ln(x^2+x+1) - 1/8f\ln(x^2+x+1) + 1/9\sqrt{3}d\arctan(1/3(2x+1)\sqrt{3}) - 2/9\sqrt{3}e\arctan(1/3(2x+1)\sqrt{3}) + 1/36\sqrt{3}f\arctan(1/3(2x+1)\sqrt{3}) - 1/4\left(\frac{1/3d-1/3e-2/3f}{x^2-x+1} - \frac{1/4d\ln(x^2-x+1) + 1/8f\ln(x^2-x+1) + 1/9\sqrt{3}d\arctan(1/3(2x-1)\sqrt{3}) + 2/9\sqrt{3}e\arctan(1/3(2x-1)\sqrt{3}) + 1/36\sqrt{3}f\arctan(1/3(2x-1)\sqrt{3})\right)}{x^2-x+1}\right)$

maxima [A] time = 2.39, size = 120, normalized size = 0.73

$$\frac{1}{36}\sqrt{3}(4d - 8e + f)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{36}\sqrt{3}(4d + 8e + f)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{1}{8}(2d - f)\log(x^2)$$

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] $\frac{1}{36}\sqrt{3}(4d - 8e + f)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{36}\sqrt{3}(4d + 8e + f)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{1}{8}(2d - f)\log(x^2 + x + 1) - \frac{1}{8}(2d - f)\log(x^2 - x + 1) - \frac{1}{6}\left(\frac{(d - 2f)x^3 - 2ex^2 - (d + f)x - e}{x^4 + x^2 + 1}\right)$

mupad [B] time = 0.32, size = 201, normalized size = 1.22

$$\frac{\left(\frac{f}{3} - \frac{d}{6}\right)x^3 + \frac{ex^2}{3} + \left(\frac{d}{6} + \frac{f}{6}\right)x + \frac{e}{6}}{x^4 + x^2 + 1} - \ln\left(x - \frac{1}{2} - \frac{\sqrt{3}i}{2}\right)\left(\frac{d}{4} - \frac{f}{8} + \frac{\sqrt{3}d1i}{18} + \frac{\sqrt{3}e1i}{9} + \frac{\sqrt{3}f1i}{72}\right) - \ln\left(x + \frac{1}{2} - \frac{\sqrt{3}i}{2}\right)$$

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] $\frac{(e/6 - x^3(d/6 - f/3) + (e*x^2)/3 + x*(d/6 + f/6))/(x^2 + x^4 + 1) - \log(x - (3^{(1/2)}*1i)/2 - 1/2)*(d/4 - f/8 + (3^{(1/2)}*d*1i)/18 + (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/72) - \log(x - (3^{(1/2)}*1i)/2 + 1/2)*(f/8 - d/4 + (3^{(1/2)}*d*1i)/18 - (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/72) + \log(x + (3^{(1/2)}*1i)/2 - 1/2)*(f/8 - d/4 + (3^{(1/2)}*d*1i)/18 + (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/72) + \log(x + (3^{(1/2)}*1i)/2 + 1/2)*(d/4 - f/8 + (3^{(1/2)}*d*1i)/18 - (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/72)$

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} \cdot I \cdot (4d + 8e + f)/72) \cdot \log(x + (-164944d^{5/2}e + 16416d^{5/2}(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) + 336520d^{4/2}ef + 200664d^{4/2}f(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) - 115200d^{3/2}e^3 - 504576d^{3/2}e^2(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) - 272380d^{3/2}ef^2 + 1734912d^{3/2}e(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^2 - 229500d^{3/2}f^2(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) + 2612736d^{3/2}(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^3 + 51840d^{2/2}e^3f + 881280d^{2/2}e^2f(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) + 119420d^{2/2}ef^3 - 2477952d^{2/2}ef(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^2 + 50436d^{2/2}f^3(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) - 2519424d^{2/2}f(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^3 + 28672d^{1/2}e^5 + 184320d^{1/2}e^4(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) + 8640d^{1/2}e^3f^2 + 774144d^{1/2}e^3(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^2 - 409536d^{1/2}e^2f^2(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) + 4976640d^{1/2}e^2(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^3 - 31040d^{1/2}ef^4 + 1270080d^{1/2}ef^2(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^2 + 14040d^{1/2}f^4(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) + 139968d^{1/2}f^2(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^3 - 20480e^{5/2}f - 36864e^{4/2}f(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) - 2880e^{3/2}f^3 - 552960e^{3/2}f(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^2 + 70848e^{2/2}f^3(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) - 995328e^{2/2}f(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^3 + 3956ef^5 - 209088ef^3(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^2 - 3996f^5(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) + 233280f^3(-d/4 + f/8 - \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^3)/(53568d^{6/2} - 69984d^{5/2}f - 182528d^{4/2}e^2 + 23652d^{4/2}f^2 + 377344d^{3/2}e^2f + 5400d^{3/2}f^3 - 126976d^{2/2}e^4 - 278400d^{2/2}e^2f^2 - 4131d^{2/2}f^4 + 102400d^{1/2}e^4f + 93568d^{1/2}e^2f^3 + 81d^{1/2}f^5 - 28672e^{4/2}f^2 - 11648e^{2/2}f^4 + 189f^6)) + (-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) \cdot \log(x + (-164944d^{5/2}e + 16416d^{5/2}(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) + 336520d^{4/2}ef + 200664d^{4/2}f(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) - 115200d^{3/2}e^3 - 504576d^{3/2}e^2(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) - 272380d^{3/2}ef^2 + 1734912d^{3/2}e(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^2 - 229500d^{3/2}f^2(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) + 2612736d^{3/2}(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^3 + 51840d^{2/2}e^3f + 881280d^{2/2}e^2f(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) + 119420d^{2/2}ef^3 - 2477952d^{2/2}ef(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^2 + 50436d^{2/2}f^3(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) - 2519424d^{2/2}f(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^3 + 28672d^{1/2}e^5 + 184320d^{1/2}e^4(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) + 8640d^{1/2}e^3f^2 + 774144d^{1/2}e^3(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^2 - 409536d^{1/2}e^2f^2(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) + 4976640d^{1/2}e^2(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^3 - 31040d^{1/2}ef^4 + 1270080d^{1/2}ef^2(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^2 + 14040d^{1/2}f^4(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) + 139968d^{1/2}f^2(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^3 - 20480e^{5/2}f - 36864e^{4/2}f(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) - 2880e^{3/2}f^3 - 552960e^{3/2}f(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^2 + 70848e^{2/2}f^3(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) - 995328e^{2/2}f(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^3 + 3956ef^5 - 209088ef^3(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^2 - 3996f^5(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72) + 233280f^3(-d/4 + f/8 + \sqrt{3} \cdot I \cdot (4d + 8e + f)/72)^3)/(53568d^{6/2} - 69984d^{5/2}f - 182528d^{4/2}e^2 + 23652d^{4/2}f^2 + 377344d^{3/2}e^2f + 5400d^{3/2}f^3 - 126976d^{2/2}e^4 - 278400d^{2/2}e^2f^2 - 4131d^{2/2}f^4 + 102400d^{1/2}e^4f + 93568d^{1/2}e^2f^3 + 81d^{1/2}f^5 - 28672e^{4/2}f^2 - 11648e^{2/2}f^4 + 189f^6)) + (d/4 - f/8 - \sqrt{3} \cdot I \cdot (4d - 8e + f)/72) \cdot \log(x + (-164944d^{5/2}e + 16416d^{5/2}(d/4 - f/8 - \sqrt{3} \cdot I \cdot (4d - 8e + f)/72) + 336520d^{4/2}ef + 200664d^{4/2}f(d/4 - f/8 - \sqrt{3} \cdot I \cdot (4d - 8e + f)/72) - 115200d^{3/2}e^3 - 504576d^{3/2}e^2(d/4 - f/8 - \sqrt{3} \cdot I \cdot (4d - 8e + f)/72) - 272380d^{3/2}ef^2 + 1734$

$$\begin{aligned}
& 912*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 - 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 - \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)) + (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 - 504576*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 - 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 + \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] := 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 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) * (a + b*x + c*x^2)^(p + 1)), x]

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_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

$$\begin{aligned}
 \int \frac{d + ex + fx^2 + gx^3}{(1 + x^2 + x^4)^2} dx &= \int \frac{d + fx^2}{(1 + x^2 + x^4)^2} dx + \int \frac{x(e + gx^2)}{(1 + x^2 + x^4)^2} dx \\
 &= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + (-d + 2f)x^2}{1 + x^2 + x^4} dx + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(1 + x + x^2)^2} dx \right) \\
 &= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{1}{12} \int \frac{5d - f - (6d - 3f)x}{1 - x + x^2} dx + \frac{1}{12} \int \frac{e + gx}{(1 + x + x^2)^2} dx \\
 &= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{1}{8}(2d - f) \int \frac{1 + 2x}{1 + x + x^2} dx + \frac{1}{8}(-2d - f) \int \frac{1 - 2x}{1 + x + x^2} dx \\
 &= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{(2e - g) \tan^{-1} \left(\frac{1 + 2x}{\sqrt{3}} \right)}{3\sqrt{3}} - \frac{1}{8}(2d - f) \log \left| \frac{1 + 2x}{1 + x + x^2} \right| \\
 &= \frac{x(d + f - (d - 2f)x^2)}{6(1 + x^2 + x^4)} + \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} - \frac{(4d + f) \tan^{-1} \left(\frac{1 - 2x}{\sqrt{3}} \right)}{12\sqrt{3}} + \frac{(4d + f) \tan^{-1} \left(\frac{1 + 2x}{\sqrt{3}} \right)}{12\sqrt{3}}
 \end{aligned}$$

Mathematica [C] time = 0.43, 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

$$\frac{12(d - 2f)x^3 - 12(2e - g)x^2 - 2\sqrt{3}((4d - 8e + f + 4g)x^4 + (4d - 8e + f + 4g)x^2 + 4d - 8e + f + 4g)}{(x^4 + x^2 + 1)^2}$$

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

$$\frac{1}{36} \sqrt{3} (4d + f + 4g - 8e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{36} \sqrt{3} (4d + f - 4g + 8e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{8} (2d - f) \log(x^2 + x + 1) - \frac{1}{8} (2d - f) \log(x^2 - x + 1) - \frac{1}{6} (d^2 x^3 - 2f x^3 + g x^2 - 2x^2 e - d x - f x + 2g - e) / (x^4 + x^2 + 1)$$

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*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))

$$\begin{aligned} & (1/2)) + 1/9 \cdot 3^{1/2} \cdot g \cdot \arctan(1/3 \cdot (2x+1) \cdot 3^{1/2}) - 1/4 \cdot ((1/3 \cdot d - 1/3 \cdot e - 1/3 \cdot g - 2/3 \cdot f) \cdot x - 2/3 \cdot d - 1/3 \cdot e + 2/3 \cdot g + 1/3 \cdot f) / (x^2 - x + 1) - 1/4 \cdot d \cdot \ln(x^2 - x + 1) + 1/8 \cdot f \cdot \ln(x^2 - x + 1) \\ & + 1/9 \cdot 3^{1/2} \cdot d \cdot \arctan(1/3 \cdot (2x-1) \cdot 3^{1/2}) + 2/9 \cdot 3^{1/2} \cdot e \cdot \arctan(1/3 \cdot (2x-1) \cdot 3^{1/2}) + 1/36 \cdot 3^{1/2} \cdot f \cdot \arctan(1/3 \cdot (2x-1) \cdot 3^{1/2}) - 1/9 \cdot 3^{1/2} \cdot g \cdot \arctan(1/3 \cdot (2x-1) \cdot 3^{1/2}) \end{aligned}$$

maxima [A] time = 2.58, size = 135, normalized size = 0.75

$$\frac{1}{36} \sqrt{3} (4d - 8e + f + 4g) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{36} \sqrt{3} (4d + 8e + f - 4g) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{8} (2d - f) \log(x^2 - x + 1) - \frac{1}{6} ((d - 2f)x^3 - (2e - g)x^2 - (d + f)x - e + 2g) / (x^4 + x^2 + 1)$$

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

$$\frac{\left(\frac{f}{3} - \frac{d}{6}\right)x^3 + \left(\frac{e}{3} - \frac{g}{6}\right)x^2 + \left(\frac{d}{6} + \frac{f}{6}\right)x + \frac{e}{6} - \frac{g}{3}}{x^4 + x^2 + 1} - \ln\left(x - \frac{1}{2} - \frac{\sqrt{3} \operatorname{Im}}{2}\right) \left(\frac{d}{4} - \frac{f}{8} + \frac{\sqrt{3} d \operatorname{Im}}{18} + \frac{\sqrt{3} e \operatorname{Im}}{9} + \frac{\sqrt{3} f \operatorname{Im}}{72} - \frac{\sqrt{3}}{18}\right)$$

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

$$-\frac{1}{8} \log(x^2 - x + 1)(2d - f + h) + \frac{1}{8} \log(x^2 + x + 1)(2d - f + h) + \frac{x(-x^2(d - 2f + h) + d + f - 2h)}{6(x^4 + x^2 + 1)} - \frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12}$$

[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}

$$\frac{x(x^2(-d-2f+h)+d+f-2h)}{6(x^4+x^2+1)} - \frac{1}{8} \log(x^2 - x + 1)(2d - f + h) + \frac{1}{8} \log(x^2 + x + 1)(2d - f + h) - \frac{\tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{12}$$

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] := 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 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[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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(1 + x^2 + x^4)^2} dx &= \int \frac{x(e + gx^2)}{(1 + x^2 + x^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^2} dx \\
&= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx + \dots \\
&= \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{12} \int \frac{5d - f + 2h}{1 + x^2 + x^4} dx + \dots \\
&= \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{3}(-2e + g) \operatorname{Subst} \left(\frac{1}{\sqrt{1 + x^2 + x^4}}, x \right) \\
&= \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{(2e - g) \tan^{-1} \left(\frac{1 + 2x}{\sqrt{1 + x^2 + x^4}} \right)}{3\sqrt{3}} \\
&= \frac{e - 2g + (2e - g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} - \frac{(4d + f + h) \tan^{-1} \left(\frac{1 + 2x}{\sqrt{1 + x^2 + x^4}} \right)}{12\sqrt{3}}
\end{aligned}$$

Mathematica [C] time = 0.61, size = 234, normalized size = 1.25

$$\frac{1}{36} \left(\frac{6(x(d(x^2 - 1) - f(2x^2 + 1) + h(x^2 + 2)) - e(2x^2 + 1) + g(x^2 + 2))}{x^4 + x^2 + 1} - \frac{\tan^{-1} \left(\frac{1}{2}(\sqrt{3} - i)x \right) ((\sqrt{3} - 1) \sqrt{1 + x^2 + x^4})}{\sqrt{6} \sqrt{1 + x^2 + x^4}} \right)$$

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] $((-6*(g*(2 + x^2) - e*(1 + 2*x^2) + x*(d*(-1 + x^2) + h*(2 + x^2) - f*(1 + 2*x^2))))/(1 + x^2 + x^4) - (((-11*I + \operatorname{Sqrt}[3])*d - 2*(-2*I + \operatorname{Sqrt}[3])*f + (-5*I + \operatorname{Sqrt}[3])*h)*\operatorname{ArcTan}[((-I + \operatorname{Sqrt}[3])*x)/2])/ \operatorname{Sqrt}[(1 + I*\operatorname{Sqrt}[3])/6] - (((11*I + \operatorname{Sqrt}[3])*d - 2*(2*I + \operatorname{Sqrt}[3])*f + (5*I + \operatorname{Sqrt}[3])*h)*\operatorname{ArcTan}[((I + \operatorname{Sqrt}[3])*x)/2])/ \operatorname{Sqrt}[(1 - I*\operatorname{Sqrt}[3])/6] - 4*\operatorname{Sqrt}[3]*(2*e - g)*\operatorname{ArcTan}[\operatorname{Sqrt}[3]/(1 + 2*x^2)])/36$

fricas [A] time = 4.34, size = 255, normalized size = 1.36

$$\frac{12(d - 2f + h)x^3 - 12(2e - g)x^2 - 2\sqrt{3}((4d - 8e + f + 4g + h)x^4 + (4d - 8e + f + 4g + h)x^2 + 4d - 8e + f + 4g + h)}{12(d - 2f + h)x^3 - 12(2e - g)x^2 - 2\sqrt{3}((4d - 8e + f + 4g + h)x^4 + (4d - 8e + f + 4g + h)x^2 + 4d - 8e + f + 4g + h)}$$

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] $-1/72*(12*(d - 2*f + h)*x^3 - 12*(2*e - g)*x^2 - 2*\operatorname{sqrt}(3)*((4*d - 8*e + f + 4*g + h)*x^4 + (4*d - 8*e + f + 4*g + h)*x^2 + 4*d - 8*e + f + 4*g + h)*\operatorname{arctan}(1/3*\operatorname{sqrt}(3)*(2*x + 1)) - 2*\operatorname{sqrt}(3)*((4*d + 8*e + f - 4*g + h)*x^4 + (4*d + 8*e + f - 4*g + h)*x^2 + 4*d + 8*e + f - 4*g + h)*\operatorname{arctan}(1/3*\operatorname{sqrt}(3)*(2*x - 1)) - 12*(d + f - 2*h)*x - 9*((2*d - f + h)*x^4 + (2*d - f + h)*x^2 + 2*d - f + h)*\log(x^2 + x + 1) + 9*((2*d - f + h)*x^4 + (2*d - f + h)*x^2 + 2*d - f + h)*\log(x^2 - x + 1) - 12*e + 24*g)/(x^4 + x^2 + 1)$

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] $\frac{1}{36}\sqrt{3}(4d + f + 4g + h - 8e)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{36}\sqrt{3}(4d + f - 4g + h + 8e)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{1}{8}(2d - f + h)\log(x^2 + x + 1) - \frac{1}{8}(2d - f + h)\log(x^2 - x + 1) - \frac{1}{6}(dx^3 - 2fx^2 + hx + g - 2x^2e - dx - fx + 2hx + 2g - e)/(x^4 + x^2 + 1)$

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] $\frac{1}{4}\left(-\frac{1}{3}d + \frac{2}{3}f - \frac{1}{3}g - \frac{1}{3}e - \frac{1}{3}h\right)x - \frac{2}{3}d + \frac{1}{3}f - \frac{2}{3}g + \frac{1}{3}e + \frac{1}{3}h \over (x^2 + x + 1) + \frac{1}{4}d \ln(x^2 + x + 1) - \frac{1}{8}f \ln(x^2 + x + 1) + \frac{1}{8} \ln(x^2 + x + 1) * h + \frac{1}{9}3^{(1/2)} * d * \arctan\left(\frac{1}{3}(2x+1)*3^{(1/2)}\right) - \frac{2}{9}3^{(1/2)} * e * \arctan\left(\frac{1}{3}(2x+1)*3^{(1/2)}\right) + \frac{1}{36}3^{(1/2)} * f * \arctan\left(\frac{1}{3}(2x+1)*3^{(1/2)}\right) + \frac{1}{9}3^{(1/2)} * g * \arctan\left(\frac{1}{3}(2x+1)*3^{(1/2)}\right) + \frac{1}{36}3^{(1/2)} * h * \arctan\left(\frac{1}{3}(2x+1)*3^{(1/2)}\right) - \frac{1}{4}\left(\frac{1}{3}d - \frac{2}{3}f - \frac{1}{3}g - \frac{1}{3}e + \frac{1}{3}h\right)x - \frac{2}{3}d + \frac{1}{3}f + \frac{2}{3}g - \frac{1}{3}e + \frac{1}{3}h \over (x^2 - x + 1) - \frac{1}{4}d \ln(x^2 - x + 1) + \frac{1}{8}f \ln(x^2 - x + 1) - \frac{1}{8} \ln(x^2 - x + 1) * h + \frac{1}{9}3^{(1/2)} * d * \arctan\left(\frac{1}{3}(2x-1)*3^{(1/2)}\right) + \frac{2}{9}3^{(1/2)} * e * \arctan\left(\frac{1}{3}(2x-1)*3^{(1/2)}\right) + \frac{1}{36}3^{(1/2)} * f * \arctan\left(\frac{1}{3}(2x-1)*3^{(1/2)}\right) - \frac{1}{9}3^{(1/2)} * g * \arctan\left(\frac{1}{3}(2x-1)*3^{(1/2)}\right) + \frac{1}{36}3^{(1/2)} * h * \arctan\left(\frac{1}{3}(2x-1)*3^{(1/2)}\right)$

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] $\frac{1}{36}\sqrt{3}(4d - 8e + f + 4g + h)\arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right) + \frac{1}{36}\sqrt{3}(4d + 8e + f - 4g + h)\arctan\left(\frac{1}{3}\sqrt{3}(2x - 1)\right) + \frac{1}{8}(2d - f + h)\log(x^2 + x + 1) - \frac{1}{8}(2d - f + h)\log(x^2 - x + 1) - \frac{1}{6}((d - 2f + h)x^3 - (2e - g)x^2 - (d + f - 2h)x - e + 2g)/(x^4 + x^2 + 1)$

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] $\frac{(e/6 - g/3 + x^2(e/3 - g/6) + x(d/6 + f/6 - h/3) - x^3(d/6 - f/3 + h/6))}{(x^2 + x^4 + 1)} - \log(60*d*g - 153*d*f - 120*d*e + 24*e*f + 135*d*h - 48*e*h - 12*f*g - 81*f*h + 24*g*h + 3^{(1/2)}*d^2*90i + 3^{(1/2)}*f^2*9i + 3^{(1/2)}*h^2*18i - 198*d^2*x - 36*f^2*x - 45*h^2*x + 126*d^2 + 45*f^2 + 36*h^2 + 3^{(1/2)}*d*e*56i - 3^{(1/2)}*d*f*63i - 3^{(1/2)}*d*g*28i - 3^{(1/2)}*e*f*40i + 3^{(1/2)}*d*h*81i + 3^{(1/2)}*e*h*32i + 3^{(1/2)}*f*g*20i - 3^{(1/2)}*f*h*27i - 3^{(1/2)}*g*h*16i - 24*d*e*x + 171*d*f*x + 12*d*g*x + 48*e*f*x - 189*d*h*x - 24*e*h*x - 24*f*g*x + 81*f*h*x + 12*g*h*x + 3^{(1/2)}*d^2*x*18i + 3^{(1/2)}*f^2*x*18i + 3^{(1/2)}*h^2*x*9i - 3^{(1/2)}*d*f*x*45i + 3^{(1/2)}*d*g*x*44i + 3^{(1/2)}*e*f*x*32$

$$\begin{aligned}
& i + 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)
\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)**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

$[2*c*d - b*e, 0] \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{!NiceSqrtQ}[b^2 - 4*a*c]$

Rule 1169

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

Rule 1660

$\text{Int}[(Pq_)*((a_ + (b_)*(x_) + (c_)*(x_)^2)^{p_}), x_Symbol] := \text{With}[\{Q =$
 $\text{PolynomialQuotient}[Pq, a + b*x + c*x^2, x], f = \text{Coeff}[\text{PolynomialRemainder}[P$
 $q, a + b*x + c*x^2, x], x, 0], g = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b*x +$
 $c*x^2, x], x, 1]\}, \text{Simp}[(b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^{$
 $(p + 1))/((p + 1)*(b^2 - 4*a*c)), x] + \text{Dist}[1/((p + 1)*(b^2 - 4*a*c)), \text{Int}[$
 $(a + b*x + c*x^2)^{(p + 1)*\text{ExpandToSum}[(p + 1)*(b^2 - 4*a*c)*Q - (2*p + 3)*($
 $2*c*f - b*g), x], x], x]] /; \text{FreeQ}[\{a, b, c\}, x] \&\& \text{PolyQ}[Pq, x] \&\& \text{NeQ}[b^2$
 $- 4*a*c, 0] \&\& \text{LtQ}[p, -1]$

Rule 1663

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

Rule 1673

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

Rule 1678

$\text{Int}[(Pq_)*((a_ + (b_)*(x_)^2 + (c_)*(x_)^4)^{p_}), x_Symbol] := \text{With}[\{d =$
 $\text{Coeff}[\text{PolynomialRemainder}[Pq, a + b*x^2 + c*x^4, x], x, 0], e = \text{Coeff}[\text{Poly$
 $nomialRemainder}[Pq, a + b*x^2 + c*x^4, x], x, 2]\}, \text{Simp}[(x*(a + b*x^2 + c*x$
 $^4)^{(p + 1)*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*($
 $b^2 - 4*a*c)), x] + \text{Dist}[1/(2*a*(p + 1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x^2 + c*$
 $x^4)^{(p + 1)*\text{ExpandToSum}[2*a*(p + 1)*(b^2 - 4*a*c)*\text{PolynomialQuotient}[Pq, a$
 $+ b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p$
 $+ 7)*(b*d - 2*a*e)*x^2, x], x], x]] /; \text{FreeQ}[\{a, b, c\}, x] \&\& \text{PolyQ}[Pq, x^$
 $2] \&\& \text{Expon}[Pq, x^2] > 1 \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1]$

Rubi steps

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 35x^5}{(1 + x^2 + x^4)^2} dx &= \int \frac{x(e + gx^2 + 35x^4)}{(1 + x^2 + x^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^2} dx \\
&= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx \\
&= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{12} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx \\
&= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} + \frac{1}{6} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx \\
&= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} - \frac{1}{8} \int \frac{5d - f + 2h + (-d + 2f - h)x^2}{1 + x^2 + x^4} dx \\
&= \frac{35 + e - 2g - (35 - 2e + g)x^2}{6(1 + x^2 + x^4)} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{6(1 + x^2 + x^4)} - \frac{(4d - 8e + f + 4g + h - 8i)x^4 + (4d - 8e + f + 4g + h - 8i)x^2}{\sqrt{\frac{1}{6}(1 + x^2 + x^4)}}
\end{aligned}$$

Mathematica [C] time = 0.66, size = 243, normalized size = 1.25

$$\frac{1}{36} \left(\frac{6(-dx^3 + dx + 2ex^2 + e + 2fx^3 + fx - g(x^2 + 2) - hx^3 - 2hx - ix^2 + i)}{x^4 + x^2 + 1} - \frac{\tan^{-1}\left(\frac{1}{2}(\sqrt{3} - i)x\right) \left((\sqrt{3} - 11i)\sqrt{\frac{1}{6}(1 + x^2 + x^4)}\right)}{\sqrt{\frac{1}{6}(1 + x^2 + x^4)}} \right)$$

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

$$\frac{12(d - 2f + h)x^3 - 12(2e - g - i)x^2 - 2\sqrt{3}((4d - 8e + f + 4g + h - 8i)x^4 + (4d - 8e + f + 4g + h - 8i)x^2)}{\sqrt{\frac{1}{6}(1 + x^2 + x^4)}}$$

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+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*(2*e + 24*g - 12*i)/(x^4 + x^2 + 1)

giac [A] time = 0.31, size = 169, normalized size = 0.87

$$\frac{1}{36} \sqrt{3} (4d + f + 4g + h - 8i - 8e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{36} \sqrt{3} (4d + f - 4g + h + 8i + 8e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right)$$

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] 1/36*sqrt(3)*(4*d + f + 4*g + h - 8*i - 8*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/36*sqrt(3)*(4*d + f - 4*g + h + 8*i + 8*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/8*(2*d - f + h)*log(x^2 + x + 1) - 1/8*(2*d - f + h)*log(x^2 - x + 1) - 1/6*(d*x^3 - 2*f*x^3 + h*x^3 + g*x^2 + i*x^2 - 2*x^2*e - d*x - f*x + 2*h*x + 2*g - 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] 1/4*((-1/3*d-1/3*e-1/3*g-1/3*h+2/3*f+2/3*i)*x-2/3*d+1/3*e-2/3*g+1/3*h+1/3*f+1/3*i)/(x^2+x+1)+1/4*d*ln(x^2+x+1)-1/8*f*ln(x^2+x+1)+1/8*h*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))+1/36*3^(1/2)*h*arctan(1/3*(2*x+1)*3^(1/2))-2/9*3^(1/2)*i*arctan(1/3*(2*x+1)*3^(1/2))-1/4*((1/3*d-1/3*e-1/3*g+1/3*h-2/3*f+2/3*i)*x-2/3*d-1/3*e+2/3*g+1/3*h+1/3*f-1/3*i)/(x^2-x+1)-1/4*d*ln(x^2-x+1)+1/8*f*ln(x^2-x+1)-1/8*h*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))+1/36*3^(1/2)*h*arctan(1/3*(2*x-1)*3^(1/2))+2/9*3^(1/2)*i*arctan(1/3*(2*x-1)*3^(1/2))

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] 1/36*sqrt(3)*(4*d - 8*e + f + 4*g + h - 8*i)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/36*sqrt(3)*(4*d + 8*e + f - 4*g + h + 8*i)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/8*(2*d - f + h)*log(x^2 + x + 1) - 1/8*(2*d - f + h)*log(x^2 - x + 1) - 1/6*((d - 2*f + h)*x^3 - (2*e - g - i)*x^2 - (d + f - 2*h)*x - e + 2*g - i)/(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] 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 + 13
5*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 - 18
9*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) - lo
g(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 - 2
4*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*56
i - 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 + 1
2*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*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)
```

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

$$\frac{dx(-2ac + b^2 + bcx^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}d(b\sqrt{b^2 - 4ac} - 12ac + b^2) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right)}{2\sqrt{2}a(b^2 - 4ac)^{3/2}\sqrt{b - \sqrt{b^2 - 4ac}}} - \frac{\sqrt{c}d(-b\sqrt{b^2 - 4ac} - 12ac + b^2) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b + \sqrt{b^2 - 4ac}}}\right)}{2\sqrt{2}a(b^2 - 4ac)^{3/2}\sqrt{b + \sqrt{b^2 - 4ac}}}$$

[Out] $-1/2*e*(2*c*x^2+b)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*d*x*(b*c*x^2-2*a*c+b^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+2*c*e*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/(-4*a*c+b^2)^{(3/2)}+1/4*d*arctan(x*2^{(1/2)}*c^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)}))^{(1/2)}*c^{(1/2)}*(b^2-12*a*c+b*(-4*a*c+b^2)^{(1/2)})/a/(-4*a*c+b^2)^{(3/2)}*2^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)}-1/4*d*arctan(x*2^{(1/2)}*c^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)}))^{(1/2)}*c^{(1/2)}*(b^2-12*a*c-b*(-4*a*c+b^2)^{(1/2)})/a/(-4*a*c+b^2)^{(3/2)}*2^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)}$

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}

$$\frac{dx(-2ac + b^2 + bcx^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}d(b\sqrt{b^2 - 4ac} - 12ac + b^2) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right)}{2\sqrt{2}a(b^2 - 4ac)^{3/2}\sqrt{b - \sqrt{b^2 - 4ac}}} - \frac{\sqrt{c}d(-b\sqrt{b^2 - 4ac} - 12ac + b^2) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b + \sqrt{b^2 - 4ac}}}\right)}{2\sqrt{2}a(b^2 - 4ac)^{3/2}\sqrt{b + \sqrt{b^2 - 4ac}}}$$

Antiderivative was successfully verified.

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

[Out] $-(e*(b + 2*c*x^2))/(2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (d*x*(b^2 - 2*a*c + b*c*x^2))/(2*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (\text{Sqrt}[c]*(b^2 - 12*a*c + b*\text{Sqrt}[b^2 - 4*a*c])*d*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]])]/(2*\text{Sqrt}[2]*a*(b^2 - 4*a*c)^{(3/2)}*\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) - (\text{Sqrt}[c]*(b^2 - 12*a*c - b*\text{Sqrt}[b^2 - 4*a*c])*d*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]])]/(2*\text{Sqrt}[2]*a*(b^2 - 4*a*c)^{(3/2)}*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) + (2*c*e*\text{ArcTanh}[(b + 2*c*x^2)/\text{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c)^{(3/2)}$

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 + 1)*(a + b*x + c*x^2)^(p + 1))/((p + 1)*(b^2 - 4*a*c)), x]

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] && 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

$$\begin{aligned}
\int \frac{d+ex}{(a+bx^2+cx^4)^2} dx &= \int \frac{d}{(a+bx^2+cx^4)^2} dx + \int \frac{ex}{(a+bx^2+cx^4)^2} dx \\
&= d \int \frac{1}{(a+bx^2+cx^4)^2} dx + e \int \frac{x}{(a+bx^2+cx^4)^2} dx \\
&= \frac{dx(b^2-2ac+bcx^2)}{2a(b^2-4ac)(a+bx^2+cx^4)} - \frac{d \int \frac{b^2-2ac-2(b^2-4ac)-bcx^2}{a+bx^2+cx^4} dx}{2a(b^2-4ac)} + \frac{1}{2} e \text{Subst} \left(\int \frac{1}{(a+bx+cx^2)} \right. \\
&= -\frac{e(b+2cx^2)}{2(b^2-4ac)(a+bx^2+cx^4)} + \frac{dx(b^2-2ac+bcx^2)}{2a(b^2-4ac)(a+bx^2+cx^4)} - \frac{c(b^2-12ac-b\sqrt{b^2-4ac})}{4a(b^2-4ac)} \\
&= -\frac{e(b+2cx^2)}{2(b^2-4ac)(a+bx^2+cx^4)} + \frac{dx(b^2-2ac+bcx^2)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c}(b^2-12ac+b\sqrt{b^2-4ac})}{2\sqrt{2}a(b^2-4ac)} \\
&= -\frac{e(b+2cx^2)}{2(b^2-4ac)(a+bx^2+cx^4)} + \frac{dx(b^2-2ac+bcx^2)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c}(b^2-12ac+b\sqrt{b^2-4ac})}{2\sqrt{2}a(b^2-4ac)}
\end{aligned}$$

Mathematica [A] time = 0.76, size = 341, normalized size = 1.03

$$\frac{1}{4} \left(\frac{2abe + 4acx(d+ex) - 2bdx(b+cx^2)}{a(4ac-b^2)(a+bx^2+cx^4)} + \frac{\sqrt{2}\sqrt{c}d(b\sqrt{b^2-4ac}-12ac+b^2)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{a(b^2-4ac)^{3/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{2}\sqrt{c}d(b\sqrt{b^2-4ac}+12ac-b^2)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b+\sqrt{b^2-4ac}}}\right)}{a(b^2-4ac)^{3/2}\sqrt{b+\sqrt{b^2-4ac}}} \right)$$

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*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]]) - (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] $\frac{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)) + \frac{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}*\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*c^2)*(a*b^2 - 4*a^2*c)^2*d + 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}}*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{b*c + \sqrt{b^2 - 4*a*c}}*a^2*b^3*c^2 + \sqrt{2}*\sqrt{b*c + \sqrt{b^2 - 4*a*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}}*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*\text{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)*\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)*\text{abs}(a*b^2 - 4*a^2*c)*\text{abs}(c)) - \frac{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}*\sqrt{b^2 - 4*a*c})*\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^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*(\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}}*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{b*c - \sqrt{b^2 - 4*a*c}}*a^2*b^3*c^2 + \sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*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}}*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*\text{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)*\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)*\text{abs}(a*b^2 - 4*a^2*c)*\text{abs}(c))$

$$b^2 - 4ac) * c) * a^4 * b * c^4 - 2 * (b^2 - 4ac) * a^2 * b^5 * c^2 + 32 * (b^2 - 4ac) * a^3 * b^3 * c^3 - 96 * (b^2 - 4ac) * a^4 * b * c^4) * d) * \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) * \text{abs}(a * b^2 - 4 * a^2 * c) * \text{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}) * \text{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 * \text{abs}(a * b^2 - 4 * a^2 * 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}) * \text{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 * \text{abs}(a * b^2 - 4 * a^2 * c))$$

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

[Out] $c/(4ac-b^2)^2/(x^2+1/2b/c+1/2*(-4ac+b^2)^{1/2}/c)*d*x*(-4ac+b^2)^{1/2}-1/4/(4ac-b^2)^2/(x^2+1/2b/c+1/2*(-4ac+b^2)^{1/2}/c)/a*d*x*b^2*(-4ac+b^2)^{1/2}-c/(4ac-b^2)^2/(x^2+1/2b/c+1/2*(-4ac+b^2)^{1/2}/c)*d*x*b+1/4/(4ac-b^2)^2/(x^2+1/2b/c+1/2*(-4ac+b^2)^{1/2}/c)/a*d*x*b^3+2*c/(4ac-b^2)^2/(x^2+1/2b/c+1/2*(-4ac+b^2)^{1/2}/c)*e*a-1/2/(4ac-b^2)^2/(x^2+1/2b/c+1/2*(-4ac+b^2)^{1/2}/c)*e*b^2+c/(4ac-b^2)^2*e*(-4ac+b^2)^{1/2}*ln(2*c*x^2+b+(-4ac+b^2)^{1/2})+3*c^2/(4ac-b^2)^2*2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*c*x)*(-4ac+b^2)^{1/2}*d-1/4*c/(4ac-b^2)^2/a*2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*c*x)*(-4ac+b^2)^{1/2}*b^2*d-c^2/(4ac-b^2)^2*2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*c*x)*b*d+1/4*c/(4ac-b^2)^2/a*2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*arctan(2^{1/2}/((b+(-4ac+b^2)^{1/2})*c)^{1/2}*c*x)*b^3*d-c/(4ac-b^2)^2/(x^2+1/2b/c-1/2*(-4ac+b^2)^{1/2}/c)*d*x*(-4ac+b^2)^{1/2}+1/4/(4ac-b^2)^2/(x^2+1/2b/c-1/2*(-4ac+b^2)^{1/2}/c)/a*d*x*b^2*(-4ac+b^2)^{1/2}-c/(4ac-b^2)^2/(x^2+1/2b/c-1/2*(-4ac+b^2)^{1/2}/c)*d*x*b+1/4/(4ac-b^2)^2/(x^2+1/2b/c-1/2*(-4ac+b^2)^{1/2}/c)/a*d*x*b^3+2*c/(4ac-b^2)^2/(x^2+1/2b/c-1/2*(-4ac+b^2)^{1/2}/c)*e*a-1/2/(4ac-b^2)^2/(x^2+1/2b/c-1/2*(-4ac+b^2)^{1/2}/c)*e*b^2-c/(4ac-b^2)^2*e*(-4ac+b^2)^{1/2}*ln(-2*c*x^2-b+(-4ac+b^2)^{1/2})+3*c^2/(4ac-b^2)^2*2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*arctanh(2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*c*x)*(-4ac+b^2)^{1/2}*d-1/4*c/(4ac-b^2)^2/a*2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*arctanh(2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*c*x)*(-4ac+b^2)^{1/2}*b^2*d+c^2/(4ac-b^2)^2*2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*arctanh(2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*c*x)*b*d-1/4*c/(4ac-b^2)^2/a*2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*arctanh(2^{1/2}/((-b+(-4ac+b^2)^{1/2})*c)^{1/2}*c*x)*b^3*d$

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] $\frac{1}{2}(b*c*d*x^3 - 2*a*c*e*x^2 - a*b*e + (b^2 - 2*a*c)*d*x)/((a*b^2*c - 4*a^2*c^2)*x^4 + a^2*b^2 - 4*a^3*c + (a*b^3 - 4*a^2*b*c)*x^2) + \frac{1}{2}\text{integrate}((b*c*d*x^2 - 4*a*c*e*x + (b^2 - 6*a*c)*d)/(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c)$

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*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 - 104
8576*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 - 46
08*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 + 1843
2*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)

```

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

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c} \left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} - 2af + bd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c} \left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}}$$

[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}

$$\frac{x(cx^2(bd-2af)-abf-2acd+b^2d)}{2a(b^2-4ac)(a+bx^2+cx^4)} + \frac{\sqrt{c} \left(\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} - 2af + bd \right) \tan^{-1} \left(\frac{\sqrt{2}\sqrt{cx}}{\sqrt{b-\sqrt{b^2-4ac}}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}} + \frac{\sqrt{c} \left(-\frac{4abf-12acd+b^2d}{\sqrt{b^2-4ac}} \right)}{2\sqrt{2}a(b^2-4ac)\sqrt{b-\sqrt{b^2-4ac}}}$$

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

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] /; 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

$$\begin{aligned}
\int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^2} dx &= \int \frac{ex}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2}{(a + bx^2 + cx^4)^2} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \int \frac{-b^2d + 6acd - abf - c(bd - 2af)x^2}{a + bx^2 + cx^4} dx + e \int \frac{1}{(a + bx^2 + cx^4)^2} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{(a + bx + cx^2)^2} dx, x, x^2 \right) + \frac{1}{2} e \int \frac{1}{(a + bx^2 + cx^4)^2} dx \\
&= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2af)}{2a(b^2 - 4ac)} \\
&= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2af)}{2a(b^2 - 4ac)} \\
&= -\frac{e(b + 2cx^2)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2af)}{2a(b^2 - 4ac)}
\end{aligned}$$

Mathematica [A] time = 1.17, size = 398, normalized size = 1.08

$$\frac{1}{4} \left(\frac{2ab(e + fx) + 4acx(d + x(e + fx)) - 2bdx(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)} + \frac{\sqrt{2}\sqrt{c} \left(b(d\sqrt{b^2 - 4ac} + 4af) - 2a(f\sqrt{b^2 - 4ac} + \dots) \right)}{a(b^2 - 4ac)^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}} \right)$$

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]
$$\frac{1}{2} \frac{(b^2 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)} + \frac{1}{16} \frac{((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^2 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^2 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 \operatorname{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 \operatorname{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) \operatorname{abs}(a b^2 - 4 a^2 c) \operatorname{abs}(c)) - \frac{1}{16} \frac{((2 b^3 c^2 - 8 a b c^3 -$$

$$\begin{aligned}
& \text{sqrt}(2) * \text{sqrt}(b^2 - 4*a*c) * \text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c) * b^3 + 4 * \text{sqrt}(2) * \\
& \text{sqrt}(b^2 - 4*a*c) * \text{sqrt}(b*c - \text{sqrt}(b^2 - 4*a*c)*c) * a * b * 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^2 * c - \text{sqrt}(2) * \text{sqrt}(b^2 - 4*a*c) \\
& * \text{sqrt}(b*c - \text{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 - \text{sqrt}(2) * \text{sqrt}(b^2 - 4*a*c) * \text{sqrt}(b * \\
& c - \text{sqrt}(b^2 - 4*a*c)*c) * a * b^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^2 * 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 * c - \text{sqrt}(2) * \text{sqrt}(b^2 - 4*a*c) * \text{sqrt}(b * c - \text{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 * (\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 * \text{sqrt}(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{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 - \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 + 96 * \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 + 16 * \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 - 48 * \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 * \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 + 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) * \text{abs}(a * b^2 - 4 * a^2 * c) * \text{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) * \text{sqrt}(b^2 - 4 * a * c)) * \text{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) * \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)) - 1/4 * ((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) * \text{sqrt} \\
& (b^2 - 4 * a * c)) * \text{abs}(a * b^2 - 4 * a^2 * c) * e - (a * b^5 * c^2 - 8 * a^2 * b^3 * c^3 - 2 * a * b
\end{aligned}$$

$$\begin{aligned} & ^4c^3 + 16a^3b^2c^4 + 8a^2b^2c^4 + ab^3c^4 - 4a^2b^2c^5 - (ab^4c^2 \\ & - 4a^2b^2c^3 - 2ab^3c^3 + ab^2c^4)\sqrt{b^2 - 4ac})e) \log(x^2 \\ & + 1/2(ab^3 - 4a^2b^2c - \sqrt{(ab^3 - 4a^2b^2c)^2 - 4(a^2b^2 - 4a^3c)} \\ & c)(ab^2c - 4a^2c^2)) / (ab^2c - 4a^2c^2) / ((ab^4 - 8a^2b^2c - 2 \\ & ab^3c + 16a^3c^2 + 8a^2b^2c^2 + ab^2c^2 - 4a^2c^3)c^2 \operatorname{abs}(ab^2 \\ & - 4a^2c)) \end{aligned}$$

maple [B] time = 0.18, size = 1813, normalized size = 4.93

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

[Out]
$$\begin{aligned} & -1/4/(4ac-b^2)^{2*2^{(1/2)}}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}*(-4ac+b^2)^{(1/2)} \\ & /ab^2c^2d \arctan(2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}c*x) - 1/4c/(4 \\ & ac-b^2)^2/a^{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^2d - 1/2/(4ac-b^2 \\ &)^2/(x^2+1/2b/c+1/2*(-4ac+b^2)^{(1/2)}/c)b^2e - 1/2/(4ac-b^2)^2/(x^2+1/2 \\ & *b/c-1/2*(-4ac+b^2)^{(1/2)}/c)b^2e - c/(4ac-b^2)^{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^2f - c/(4ac-b^2)^{2*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)}c*x) * (-4ac+b^2)^{(1/2)} \\ &)b^2f - 2c^2/(4ac-b^2)^2a^{2^{(1/2)}}/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)} \operatorname{arctan} \\ & \operatorname{h}(2^{(1/2)}/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}c*x) * f + 1/2c/(4ac-b^2)^{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^2f + 2c^2/(4ac-b^2)^2a^{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)}c*x) * f - 1/2c/(\\ & 4ac-b^2)^{2*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)}c*x) * b^2f + 2c/(4ac-b^2)^2/(x^2+1/2b/c+1/2*(- \\ & 4ac+b^2)^{(1/2)}/c) * x * a * f + 2c/(4ac-b^2)^2/(x^2+1/2b/c-1/2*(-4ac+b^2)^{(1/2)}/ \\ & c) * x * a * f - 1/4c/(4ac-b^2)^2/a^{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^3d - 1/2/(4ac-b^2 \\ &)^2/(x^2+1/2b/c-1/2*(-4ac+b^2)^{(1/2)}/c) * x * b^2f + 1/(4ac-b^2)^2 * (-4ac \\ & +b^2)^{(1/2)}c * e * \ln(2c*x^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(-2c*x^2-b+(-4ac+b^2)^{(1/2)}) - 1/4/(4ac-b^2)^2/(x^2+1/2b/c+1/2*(-4ac \\ & +b^2)^{(1/2)}/c) * (-4ac+b^2)^{(1/2)}/ab^2d * x + 3/(4ac-b^2)^{2*2^{(1/2)}}/((b+(- \\ & 4ac+b^2)^{(1/2)})c)^{(1/2)} * (-4ac+b^2)^{(1/2)}c^2d \arctan(2^{(1/2)}/((b+(-4 \\ & ac+b^2)^{(1/2)})c)^{(1/2)}c*x) - 1/(4ac-b^2)^{2*2^{(1/2)}}/((b+(-4ac+b^2)^{(1/2)}) \\ &)c)^{(1/2)} * b^2c^2d \arctan(2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}c*x) + 1 \\ & /4/(4ac-b^2)^2/(x^2+1/2b/c-1/2*(-4ac+b^2)^{(1/2)}/c) * (-4ac+b^2)^{(1/2)}/ \\ & ab^2d * x + 3c^2/(4ac-b^2)^{2*2^{(1/2)}}/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)} \operatorname{arc} \\ & \operatorname{tanh}(2^{(1/2)}/((-b+(-4ac+b^2)^{(1/2)})c)^{(1/2)}c*x) * (-4ac+b^2)^{(1/2)}d + c^2 \\ & /2/(4ac-b^2)^{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^2d + 1/4/(4ac-b^2)^{2*2^{(1/2)}}/((b+(-4 \\ & ac+b^2)^{(1/2)})c)^{(1/2)}/ab^3c^2d \arctan(2^{(1/2)}/((b+(-4ac+b^2)^{(1/2)}) \\ &)c)^{(1/2)}c*x) + 2/(4ac-b^2)^2/(x^2+1/2b/c+1/2*(-4ac+b^2)^{(1/2)}/c) * a * c * e - \\ & 1/2/(4ac-b^2)^2/(x^2+1/2b/c+1/2*(-4ac+b^2)^{(1/2)}/c) * x * b^2f + 1/(4ac-b^2 \\ &)^2/(x^2+1/2b/c+1/2*(-4ac+b^2)^{(1/2)}/c) * (-4ac+b^2)^{(1/2)}c * d * x - 1/(4ac-b^2 \\ &)^2/(x^2+1/2b/c+1/2*(-4ac+b^2)^{(1/2)}/c) * a * b^3d * 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 \\ & +1/2b/c-1/2*(-4ac+b^2)^{(1/2)}/c) * b^2c^2d * x + 1/4/(4ac-b^2)^2/(x^2+1/2b/c-1 \\ & /2*(-4ac+b^2)^{(1/2)}/c) / ab^3d * 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]
$$-1/2*(2*a*c*e*x^2 - (b*c*d - 2*a*c*f)*x^3 + a*b*e + (a*b*f - (b^2 - 2*a*c)*d)*x)/((a*b^2*c - 4*a^2*c^2)*x^4 + a^2*b^2 - 4*a^3*c + (a*b^3 - 4*a^2*b*c)*x^2) - 1/2*integrate((4*a*c*e*x - a*b*f - (b*c*d - 2*a*c*f)*x^2 - (b^2 - 6*a*c)*d)/(c*x^4 + b*x^2 + a), x)/(a*b^2 - 4*a^2*c)$$

mupad [B] time = 1.71, 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]
$$\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 - 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)*((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)) + \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 - 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$$

$$\begin{aligned}
& 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*(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^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)) + (\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 - 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)) * \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 - 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), 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)
\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)**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

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 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^2} dx &= \int \frac{d + fx^2}{(a + bx^2 + cx^4)^2} dx + \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^2} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(a + bx + cx^2)^2} dx, x, x^2 \right) - \frac{f}{2} \int \frac{1}{(a + bx + cx^2)^2} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{c(bd - 2af)}{2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2af)}{2\sqrt{2}a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} - \frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\sqrt{c}(bd - 2af)}{2\sqrt{2}a(b^2 - 4ac)(a + bx^2 + cx^4)}
\end{aligned}$$

Mathematica [A] time = 1.30, size = 421, normalized size = 1.09

$$\frac{1}{4} \left(\frac{-4a^2g + 2ab(e + x(f - gx)) + 4acx(d + x(e + fx)) - 2bdx(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)} + \frac{\sqrt{2}\sqrt{c}(b(d\sqrt{b^2 - 4ac} + 4af) - 2a(f - gx))}{a(b^2 - 4ac)^{3/2}} \right)$$

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] ((-4*a^2*g - 2*b*d*x*(b + c*x^2) + 4*a*c*x*(d + x*(e + f*x)) + 2*a*b*(e + x*(f - g*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]]) + (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((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} \frac{(b^2 c d x^3 - 2 a^2 c f x^3 + a b g x^2 - 2 a^2 c x^2 e + b^2 d x - 2 a^2 c d x - a b f x + 2 a^2 g - a b e)}{(c x^4 + b x^2 + a)(a b^2 - 4 a^2 c)} + \frac{1}{16} \frac{\left((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}} \right) 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}} 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 + \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 (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}} 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{b c + \sqrt{b^2 - 4 a c}} a^2 b^3 c^2 + \sqrt{2} \sqrt{b c + \sqrt{b^2 - 4 a 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}} 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 \operatorname{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 \operatorname{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\left(\frac{2 \sqrt{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)})}}\right) / ((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) \operatorname{abs}(a b^2 - 4 a^2 c) \operatorname{abs}(c)) - \frac{1}{16} \frac{\left((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}} \right) 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 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 - \sqrt{b^2 - 4 a c}}$$

$$\begin{aligned}
& 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*\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 - 8*\sqrt{2}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c}*a^3*b^3*c - 2*s \\
& \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*ab \\
& 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 - \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 + 9 \\
& 6*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c}*a^4*b^2*c^3 + 1 \\
& 6*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\sqrt{b*c - \sqrt{b^2 - 4*a*c}*c}*a^3*b^3*c^3 - 4 \\
& 8*\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 + 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 \\
& \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)*\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)*\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)*\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*\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 - 4*a*b*c^2 - 2*b^2*c^2 + b*c^3)*\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)*\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
\end{aligned}$$

$$c^2 - 2*a*b^5*c^2 + 16*a^3*b^2*c^3 + 8*a^2*b^3*c^3 + a*b^4*c^3 - 4*a^2*b^2*c^4 - (a*b^5*c - 4*a^2*b^3*c^2 - 2*a*b^4*c^2 + a*b^3*c^3)*\text{sqrt}(b^2 - 4*a*c) *g + 2*(a*b^5*c^2 - 8*a^2*b^3*c^3 - 2*a*b^4*c^3 + 16*a^3*b*c^4 + 8*a^2*b^2*c^4 + a*b^3*c^4 - 4*a^2*b*c^5 - (a*b^4*c^2 - 4*a^2*b^2*c^3 - 2*a*b^3*c^3 + a*b^2*c^4)*\text{sqrt}(b^2 - 4*a*c))*e*\log(x^2 + 1/2*(a*b^3 - 4*a^2*b*c - \text{sqrt}((a*b^3 - 4*a^2*b*c)^2 - 4*(a^2*b^2 - 4*a^3*c)*(a*b^2*c - 4*a^2*c^2))))/(a*b^2*c - 4*a^2*c^2)/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*c^2*\text{abs}(a*b^2 - 4*a^2*c))$$

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] `int((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)}/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+1/2/(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*g+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{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*\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/c/(4*a*c-b^2)^{2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)*b^3*g+1/4/c/(4*a*c-b^2)^{2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*b^3*g-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)}*a*g-1/(4*a*c-b^2)^{2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*a*b*g-1/2/(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*g+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)}*a*g-1/(4*a*c-b^2)^{2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*a*b*g+1/4/c/(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)}*b^2*g-1/4/c/(4*a*c-b^2)^{2/(x^2+1/2*b/c-1/2*(-4*a$$

$$\frac{*(c+b^2)^{(1/2)}/c)*(-4*a*c+b^2)^{(1/2)}*b^2*g+1/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)*(-4*a*c+b^2)^{(1/2)}*c*d*x-1/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)*b*c*d*x+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c+1/2*(-4*a*c+b^2)^{(1/2)}/c)/a*b^3*d*x-1/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*(-4*a*c+b^2)^{(1/2)}*c*d*x-1/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)*b*c*d*x+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)/a*b^3*d*x$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\frac{(bcd - 2acf)x^3 - abe + 2a^2g - (2ace - abg)x^2 - (abf - (b^2 - 2ac)d)x}{2((ab^2c - 4a^2c^2)x^4 + a^2b^2 - 4a^3c + (ab^3 - 4a^2bc)x^2)} - \int \frac{abf + (bcd - 2acf)x^2 + (b^2 - 6ac)d - 2(2ace - abg)}{cx^4 + bx^2 + a} dx$$

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)^2,x, algorithm="maxima")

[Out] $\frac{1}{2} * ((b*c*d - 2*a*c*f)*x^3 - a*b*e + 2*a^2*g - (2*a*c*e - a*b*g)*x^2 - (a*b*f - (b^2 - 2*a*c)*d)*x) / ((a*b^2*c - 4*a^2*c^2)*x^4 + a^2*b^2 - 4*a^3*c + (a*b^3 - 4*a^2*b*c)*x^2) - \frac{1}{2} * \text{integrate}(- (a*b*f + (b*c*d - 2*a*c*f)*x^2 + (b^2 - 6*a*c)*d - 2*(2*a*c*e - a*b*g)*x) / (c*x^4 + b*x^2 + a), x) / (a*b^2 - 4*a^2*c)$

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] 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 - 6140*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$

$$\begin{aligned}
& 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) * (\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 + 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)) + (\text{root}(1572864*a^8*b^2*c^5*z^4 - 9 \\
& 83040*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 + 61 \\
& 44*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 + 122 \\
& 88*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 + 43 \\
& 2*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 - 8 \\
& 192*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^
\end{aligned}$$

$$\begin{aligned}
& 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 - 3 \\
& 84*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*(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 - 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)/(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 - 36*a*b^4*c^4*d^2 + 128*a^3*b*c^5*e^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*b^5*c^3*d*f + 320*a^3*b*c^5*d*f - 96*a^2*b^3*c^4*d*f + 32*a^2*b^4*c^3*e*g - 128*a^3*b^2*c^4*e*g))/(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 - 2*b^3*c^4*d^2*e + b^4*c^3*d^2*g - 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 - 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 + 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 + 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 + 6140*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*
\end{aligned}$$

$$\begin{aligned}
& d^2 e z - 16 b^9 d^2 g z - 768 a^3 b c^3 d e f g + 32 a b^5 c d e f g - 192 \\
& a^2 b^3 c^2 d e f g + 16 a^2 b^4 c e f^2 g + 48 a^2 b^4 c d f g^2 - 240 a \\
& b^4 c^2 d^2 e g - 32 a b^4 c^2 d e^2 f + 192 a^3 b^2 c^2 e f^2 g + 192 a^3 \\
& b^2 c^2 d f g^2 + 960 a^2 b^2 c^3 d^2 e g + 192 a^2 b^2 c^3 d e^2 f - 48 a^3 \\
& b^3 c f^2 g^2 - 192 a^3 b c^3 e^2 f^2 + 198 a b^4 c^2 d^2 f^2 + 144 a^2 b \\
& ^3 c^2 d f^3 - 960 a^2 b c^4 d^2 e^2 + 240 a b^3 c^3 d^2 e^2 + 768 a^3 c^4 \\
& d e^2 f + 512 a^3 b c^3 e^3 g + 128 a^3 b^3 c e g^3 + 60 a b^5 c d^2 g^2 + \\
& 2016 a^2 b c^4 d^3 f - 496 a b^3 c^3 d^3 f + 224 a^3 b c^3 d f^3 - 384 a^3 \\
& b^2 c^2 e^2 g^2 - 240 a^2 b^3 c^2 d^2 g^2 - 16 a^2 b^3 c^2 e^2 f^2 - 960 a^2 \\
& b^2 c^3 d^2 f^2 + 16 b^6 c d^2 e g - 8 a b^6 d f g^2 - 18 a b^5 c d f^3 - \\
& 4 a^2 b^5 f^2 g^2 - 288 a^3 c^4 d^2 f^2 - 16 b^5 c^2 d^2 e^2 - 24 a^3 b^2 \\
& c^2 f^4 + 30 b^5 c^2 d^3 f - 9 b^6 c d^2 f^2 - 9 a^2 b^4 c f^4 + 360 a b^2 \\
& c^4 d^4 - 4 b^7 d^2 g^2 - 16 a^4 c^3 f^4 - 16 a^3 b^4 g^4 - 256 a^3 c^4 e^4 \\
& - 25 b^4 c^3 d^4 - 1296 a^2 c^5 d^4, z, k), k, 1, 4) + ((b e - 2 a g)/(2(\\
& 4 a c - b^2)) + (x^2(2 c e - b g))/(2(4 a c - b^2)) + (x(2 a c d - b^2 d \\
& + a b f))/(2 a(4 a c - b^2)) - (c x^3(b d - 2 a f))/(2 a(4 a c - b^2))) \\
& / (a + b x^2 + c x^4)
\end{aligned}$$

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

$$\frac{x(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right) \left(\frac{b^2(cd - ah) + 4abcf - 4ac(ah + 3cd)}{\sqrt{b^2 - 4ac}} + abh - 2acf\right)}{2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b - \sqrt{b^2 - 4ac}}}$$

[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}

$$\frac{x(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right) \left(\frac{b^2(cd - ah) + 4abcf - 4ac(ah + 3cd)}{\sqrt{b^2 - 4ac}} + abh - 2acf\right)}{2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b - \sqrt{b^2 - 4ac}}}$$

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

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[$b^2 - 4ac$, 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 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], 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(a + bx^2 + cx^4)^2} dx &= \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^2} dx \\
&= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx^2}{(a + bx^2 + cx^4)} dx \right) \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{be - 2ag + (2ce - bg)x^2}{2(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)}
\end{aligned}$$

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] $\frac{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)) + \frac{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 - 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*(\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*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 - 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$

$$\begin{aligned}
& ^5b^2c^3 - 8\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^4 \\
& 4b^3c^3 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^3b \\
& ^4c^3 + 4\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}}c)a^4b^2 \\
& ^2c^4 - 2(b^2 - 4ac)a^3b^4c^3 + 8(b^2 - 4ac)a^4b^2c^4)f - (2a \\
& ^3b^7c^2 - 8a^4b^5c^3 - 32a^5b^3c^4 + 128a^6b^1c^5 - \sqrt{2}\sqrt{(b^2 - 4ac)} \\
& \sqrt{bc + \sqrt{b^2 - 4ac}}c)a^3b^7 + 4\sqrt{2}\sqrt{b^2 - 4ac} \\
& \sqrt{bc + \sqrt{b^2 - 4ac}}c)a^4b^5c + 2\sqrt{2}\sqrt{b^2 - 4ac} \\
& \sqrt{bc + \sqrt{b^2 - 4ac}}c)a^3b^6c + 16\sqrt{2}\sqrt{b^2 - 4ac} \\
& \sqrt{bc + \sqrt{b^2 - 4ac}}c)a^5b^3c^2 - \sqrt{2}\sqrt{b^2 - 4ac} \\
& \sqrt{bc + \sqrt{b^2 - 4ac}}c)a^3b^5c^2 - 64\sqrt{2}\sqrt{b^2 - 4ac} \\
& \sqrt{bc + \sqrt{b^2 - 4ac}}c)a^6b^1c^3 - 32\sqrt{2}\sqrt{b^2 - 4ac} \\
& \sqrt{bc + \sqrt{b^2 - 4ac}}c)a^5b^2c^3 + 16\sqrt{2}\sqrt{b^2 - 4ac} \\
& \sqrt{bc + \sqrt{b^2 - 4ac}}c)a^5b^1c^4 - 2(b^2 - 4ac)a^3b^5c^2 + 32 \\
& (b^2 - 4ac)a^5b^1c^4)h) \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^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^1c^4 - 8a^4b^2c^4 + 16a^5c^5) \\
& \text{abs}(ab^2 - 4a^2c)\text{abs}(c)) - 1/16((2b^3c^3 - 8ab^1c^4 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c)b^3c \\
& + 4\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c)ab^1c^2 + 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^1c^3 - 2(b^2 - 4ac)b^1c^3)(ab^2 - 4a^2c)^2d - 2(2ab^2c^3 - 8a^2c^4 - \sqrt{2}\sqrt{b^2 - 4ac} \\
& \sqrt{bc - \sqrt{b^2 - 4ac}}c)ab^2c + 4\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2c^2 + 2\sqrt{2}\sqrt{b^2 - 4ac} \\
& \sqrt{bc - \sqrt{b^2 - 4ac}}c)ab^1c^2 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c)ac^3 - 2(b^2 - 4ac)ac^3)(ab^2 - 4a^2c)^2 \\
& f + (2ab^3c^2 - 8a^2b^1c^3 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c)ab^3 + 4\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) \\
& a^2b^1c + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c)ac)ab^2c - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c)ab^1c^2 - 2(b^2 - 4ac)ab^1c^2)(ab^2 - 4a^2c)^2 \\
& h - 2(\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)ab^6c - 14\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^4c^2 - 2\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)ab^5c^2 + 2a \\
& ^1b^6c^2 + 64\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3b^2c^3 + 20\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^3c^3 + \sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) \\
& a^2b^4c^3 - 28a^2b^4c^3 - 96\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^4c^4 - 48\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3b^1c^4 - 10\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) \\
& a^2b^2c^4 + 128a^3b^2c^4 + 24\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3c^5 - 192a^4c^5 - 2(b^2 - 4ac)ab^4c^2 + 20(b^2 - 4ac)a^2b^2c^3 - 48(b^2 - 4ac)a^3c^4) \\
& d\text{abs}(ab^2 - 4a^2c) - 2(\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^5c - 8\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3b^3c^2 - 2\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) \\
& a^2b^4c^2 + 2a^2b^5c^2 + 16\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^4b^1c^3 + 8\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3b^2c^3 + \sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) \\
& a^2b^3c^3 - 16a^3b^3c^3 - 4\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3b^1c^4 + 32a^4b^1c^4 - 2(b^2 - 4ac)a^2b^3c^2 + 8(b^2 - 4ac)a^3b^1c^3)f\text{abs} \\
& (ab^2 - 4a^2c) + 4(\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3b^4c - 8\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^4b^2c^2 - 2\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) \\
& a^3b^3c^2 + 2a^3b^4c^2 + 16\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^5c^3 + 8\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^4b^1c^3 + \sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c) \\
& a^3b^2c^3 - 16a^4b^2c^3 - 4\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^4c^4 + 32a^5c^4 - 2(b^2 - 4ac)a^3b^2c^2 + 8(b^2 - 4ac)a^4c^3)h\text{abs}(ab^2 - 4a^2c) + \\
& (2a^2b^7c^3 - 40a^3b^5c^4 + 224a^4b^3c^5 - 384a^5b^1c^6 - \sqrt{2} \\
& \sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^2b^7c + 20\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c)a^3b^5c^2 + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c) \\
& a^2b^6c^2 - 112\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}c)
\end{aligned}$$

$$\begin{aligned} & \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^4 b^3 c^3 - 32 \sqrt{2} * \\ & \sqrt{b^2 - 4ac} \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^3 b^4 c^3 - \sqrt{2} * \sqrt{ \\ & (b^2 - 4ac) \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^2 b^5 c^3 + 192 \sqrt{2} * \sqrt{ \\ & (b^2 - 4ac) \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^5 b^4 c^4 + 96 \sqrt{2} * \sqrt{ \\ & (b^2 - 4ac) \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^4 b^2 c^4 + 16 \sqrt{2} * \sqrt{ \\ & (b^2 - 4ac) \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^3 b^3 c^4 - 48 \sqrt{2} * \sqrt{ \\ & (b^2 - 4ac) \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^4 b^5 c^5 - 2 * (b^2 - 4ac) a^ \\ & ^2 b^5 c^3 + 32 * (b^2 - 4ac) a^3 b^3 c^4 - 96 * (b^2 - 4ac) a^4 b^5 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 - 4a \\ & ac} * \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^3 b^6 c^3 + 8 \sqrt{2} * \sqrt{b^2 - 4ac} \\ &) * \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^4 b^4 c^2 + 2 \sqrt{2} * \sqrt{b^2 - 4ac} \\ &) * \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^3 b^5 c^2 - 16 \sqrt{2} * \sqrt{b^2 - 4ac} \\ &) * \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^5 b^2 c^3 - 8 \sqrt{2} * \sqrt{b^2 - 4ac} * \\ & \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^4 b^3 c^3 - \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{ \\ & (bc - \sqrt{b^2 - 4ac}) c) a^3 b^4 c^3 + 4 \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{ \\ & (bc - \sqrt{b^2 - 4ac}) c) a^4 b^2 c^4 - 2 * (b^2 - 4ac) a^3 b^4 c^3 + 8 * (\\ & b^2 - 4ac) 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^4 c^5 - \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{bc - \sqrt{b^2 - 4ac} \\ & c) a^3 b^7 c^2 + 4 \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^ \\ & ^4 b^5 c^2 + 2 \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^3 * \\ & b^6 c^2 + 16 \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^5 b^ \\ & ^3 c^2 - \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^3 b^5 c^ \\ & ^2 - 64 \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^6 b^4 c^3 \\ & - 32 \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^5 b^2 c^3 \\ & + 16 \sqrt{2} * \sqrt{b^2 - 4ac} * \sqrt{bc - \sqrt{b^2 - 4ac}} c) a^5 b^4 c^4 - \\ & 2 * (b^2 - 4ac) a^3 b^5 c^2 + 32 * (b^2 - 4ac) a^5 b^4 c^4) h) * \arctan(2 \sqrt{2} \\ & (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^4 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)) + 1/8 * ((b^4 c - 4 a b^2 c^2 - 2 b^3 c^2 + b^2 c^3 + (b^3 c - 4 \\ & a b^2 c^2 - 2 b^2 c^2 + b c^3) * \sqrt{b^2 - 4 a c}) * g * \text{abs}(a b^2 - 4 a^2 c) - 2 \\ & * (b^3 c^2 - 4 a b^2 c^3 - 2 b^2 c^3 + b c^4 + (b^2 c^2 - 4 a c^3 - 2 b^2 c^3 + \\ & c^4) * \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) * \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^4 c^4 + 8 a^2 b^2 c^4 \\ & + a b^3 c^4 - 4 a^2 b^4 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^2 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 - 4 a b^2 c^2 - 2 b^2 c^2 + b c^3) * \sqrt{b^2 \\ & - 4 a c}) * g * \text{abs}(a b^2 - 4 a^2 c) - 2 * (b^3 c^2 - 4 a b^2 c^3 - 2 b^2 c^3 + b c \\ & ^4 - (b^2 c^2 - 4 a c^3 - 2 b^2 c^3 + c^4) * \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) * \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^4 c^4 + 8 a^2 b^2 c^4 + a b^3 c^4 - 4 a^2 b^4 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^2 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 = 0.07, size = 1801, normalized size = 4.10

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

```
[In] int((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)*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+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*(a*b*h-2*a*c*f+b*c*d)/(4*a*c-b^2)*x^3-1/2*(b*g-2*c*e)/(4*a*c-b^2)*x^2-1/2*(2*a^2*h-a*b*f-2*a*c*d+b^2*d)/a/(4*a*c-b^2)*x-1/2*(2*a*g-b*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)^(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)/((-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)*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/(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*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)*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))+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))*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)*arctan(2^(1/2)/((b+(-4*a*c+b^2)^(1/2))*c)^(1/2)*c*x)*b^3*h
```

```
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] $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^2, x)$

[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) + \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 + 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)) - \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 + 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 - 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*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 + 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$

$$\begin{aligned}
& *f^2h^2 + 192a^3b^2c^3ef^2g + 144a^2b^3c^3d^2f^2h + 16a^2b^4c^2 \\
& *ef^2g - 12a^2b^4c^2d^2f^2h + 192a^3b^2c^3d^2f^2g^2 + 96a^2b^3c^3 \\
& *d^2e^2h + 48a^2b^4c^2d^2f^2g^2 + 960a^2b^2c^4d^2e^2g + 192a^2b^2c^4 \\
& *d^2e^2f - 48a^4b^3c^3g^2h^2 + 80a^3b^3c^2f^3h - 42a^3b^4c^2f^2 \\
& *h^2 - 192a^4b^2c^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^2c^4e^2f^2 + \\
& 60a^2b^5c^2d^2g^2 + 198a^2b^4c^3d^2f^2 + 144a^2b^3c^3d^2f^3 - 960a^2 \\
& *b^2c^5d^2e^2 + 240a^2b^3c^4d^2e^2 + 256a^4c^4e^2f^2h - 192a^4c^4 \\
& *d^2f^2h + 16b^6c^2d^2e^2g + 96a^5b^2c^2f^2h^3 + 96a^4b^2c^3f^3h + \\
& 80a^4b^3c^2f^2h^3 + 6a^2b^5c^2f^3h + 768a^3c^5d^2e^2f + 512a^3b^2c^4 \\
& *e^3g + 132a^2b^4c^3d^3h - 28a^3b^4c^2d^2h^3 + 12a^2b^6c^2d^2h^2 + \\
& 2016a^2b^2c^5d^3f - 496a^2b^3c^4d^3f + 224a^3b^2c^4d^2f^3 - 18a^2b^5 \\
& *c^2d^2f^3 - 192a^4b^2c^2f^2h^2 - 48a^3b^3c^2f^2g^2 - 16a^3b^3c^2 \\
& *e^2h^2 - 464a^3b^2c^3d^2h^2 - 384a^3b^2c^3e^2g^2 + 42a^2b^4 \\
& *c^2d^2h^2 - 240a^2b^3c^3d^2g^2 - 16a^2b^3c^3e^2f^2 - 960a^2b^2 \\
& *c^4d^2f^2 + 6b^7c^2d^2f^2h - 2a^2b^7d^2f^2h^2 - 32a^5c^3f^2h^2 - \\
& 4a^3b^5g^2h^2 - 864a^4c^4d^2h^2 - 9b^6c^2d^2f^2 - 288a^3c^5d^2 \\
& *f^2 - 16b^5c^3d^2e^2 - 24a^3b^2c^3f^4 - 9a^2b^4c^2f^4 - 10b^6 \\
& *c^2d^3h + 6a^3b^5f^2h^3 - 1728a^3c^5d^3h - 192a^5c^3d^2h^3 - 4 \\
& *b^7c^2d^2g^2 + 30b^5c^3d^3f + 6a^2b^6d^2h^3 - 24a^5b^2c^2h^4 - 16 \\
& *a^3b^4c^2g^4 + 360a^2b^2c^5d^4 - 16a^6c^2h^4 - 9a^4b^4h^4 - 16a^4 \\
& *c^4f^4 - 256a^3c^5e^4 - 25b^4c^4d^4 - 1296a^2c^6d^4 - a^2b^6f^2 \\
& *h^2 - b^8d^2h^2, z, k) * (\text{root}(1572864a^8b^2c^6z^4 - 983040a^7b^4c^5 \\
& *z^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^2 \\
& *h^2z^2 + 6144a^4b^5c^3e^2g^2z^2 - 2048a^3b^7c^2d^2h^2z^2 - 512a^3b^7 \\
& *c^2e^2g^2z^2 + 24576a^5b^2c^5d^2f^2z^2 - 3072a^3b^6c^3d^2f^2z^2 + 2048a^4 \\
& *b^4c^4d^2f^2z^2 + 576a^2b^8c^2d^2f^2z^2 + 12288a^7b^2c^4h^2z^2 + 1 \\
& 28a^3b^8c^2g^2z^2 + 12288a^6b^2c^5f^2z^2 - 16a^2b^9c^2f^2z^2 + 614 \\
& 40a^5b^2c^6d^2z^2 + 432a^2b^9c^2d^2z^2 - 16384a^7c^5f^2h^2z^2 - 4915 \\
& 2a^6c^6d^2f^2z^2 - 8192a^6b^3c^3h^2z^2 + 1536a^5b^5c^2h^2z^2 - 8 \\
& 192a^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^5 \\
& *e^2z^2 - 6144a^4b^4c^4e^2z^2 + 512a^3b^6c^3e^2z^2 - 61440a^4b^3 \\
& *c^5d^2z^2 + 24064a^3b^5c^4d^2z^2 - 4608a^2b^7c^3d^2z^2 - 16 \\
& *a^3b^9h^2z^2 - 32768a^6c^6e^2z^2 - 16b^11c^2d^2z^2 - 6144a^5b^2c^4 \\
& *d^2g^2h^2z + 96a^2b^7c^2d^2g^2h^2z - 4096a^4b^2c^5d^2e^2f^2z + 64a^2b^7 \\
& *c^2d^2 \\
& *e^2f^2z - 32a^2b^8c^2d^2f^2g^2z + 4608a^4b^3c^3d^2g^2h^2z - 1152a^3b^5 \\
& *c^2d^2 \\
& *g^2h^2z - 9216a^4b^2c^4d^2e^2h^2z + 2304a^3b^4c^3d^2e^2h^2z + 2048a^4 \\
& *b^2 \\
& *c^4d^2f^2g^2z - 1536a^3b^4c^3d^2f^2g^2z + 384a^2b^6c^2d^2f^2g^2z - 192a^2 \\
& *b^6 \\
& *c^2d^2e^2h^2z + 3072a^3b^3c^4d^2e^2f^2z - 768a^2b^5c^3d^2e^2f^2z - 102 \\
& 4a^6 \\
& *b^2c^3g^2h^2z - 192a^4b^5c^2g^2h^2z + 1024a^5b^2c^4f^2g^2z - 32a^3 \\
& *b^6 \\
& *c^2e^2h^2z - 16a^2b^7c^2f^2g^2z - 9216a^4b^2c^5d^2g^2z + 336a^2b^7 \\
& *c^2 \\
& *d^2g^2z - 672a^2b^6c^3d^2e^2z + 12288a^5c^5d^2e^2h^2z + 768a^5b^3 \\
& *c^2 \\
& *g^2h^2z - 1536a^5b^2c^3e^2h^2z - 768a^4b^3c^3f^2g^2z + 384a^4 \\
& *b^4 \\
& *c^2e^2h^2z + 192a^3b^5c^2f^2g^2z + 7936a^3b^3c^4d^2g^2z - 249 \\
& 6a^2 \\
& *b^5c^3d^2g^2z + 1536a^4b^2c^4e^2f^2z - 384a^3b^4c^3e^2f^2z + 32a^2 \\
& *b^6 \\
& *c^2e^2f^2z - 15872a^3b^2c^5d^2e^2z + 4992a^2b^4c^4d^2 \\
& *e^2z + 16a^3b^7g^2h^2z + 2048a^6c^4e^2h^2z - 2048a^5c^5e^2f^2z + 3 \\
& 2b^8 \\
& *c^2d^2e^2z + 18432a^4c^6d^2e^2z - 16b^9c^2d^2g^2z - 256a^4b^2c^3 \\
& *e^2 \\
& *f^2g^2h - 768a^3b^2c^4d^2e^2f^2g + 32a^2b^5c^2d^2e^2f^2g - 192a^3b^3c^2 \\
& *e^2 \\
& *f^2g^2h + 896a^3b^2c^3d^2e^2g^2h - 96a^2b^4c^2d^2e^2g^2h - 192a^2b^3c^3 \\
& *d^2 \\
& *e^2f^2g + 48a^3b^4c^2f^2g^2h + 16a^3b^4c^2e^2g^2h^2 + 24a^2b^5c^2d^2g^2 \\
& *h^2 + 2208a^3b^2c^4d^2f^2h + 800a^4b^2c^3d^2f^2h^2 - 102a^2b^5c^2d^2f^2 \\
& *h - 30a^2 \\
& *b^5c^2d^2f^2h^2 - 896a^3b^2c^4d^2e^2h - 240a^2b^4c^3d^2e^2g - 32a^2 \\
& *b^4 \\
& *c^3d^2e^2f + 12a^2b^6c^2d^2f^2h - 8a^2b^6c^2d^2f^2g^2 + 64a^4b^2*
\end{aligned}$$

$$\begin{aligned}
& 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*(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 + 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 - 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 - 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*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^
\end{aligned}$$

$$\begin{aligned}
& 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 + 2 \\
& 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 + 24 \\
& 0*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 - 86 \\
& 4*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 \\
& ^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 - 384*a^4*c^5*d*h + 4*a*b^5*c^3*d*f + 32 \\
& 0*a^3*b*c^5*d*f + 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 - 128*a^3*b^2*c^4*e*g - 12*a^2*b \\
& ^5*c^2*f*h + 32*a^3*b^3*c^3*f*h))/(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 - 2*b^3*c^4*d^2*e + b^4*c^3*d^2*g - \\
& 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 - 16*a^3*c^4*e*f*h \\
& - 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 + 8*a^3*b*c \\
& ^3*e*h^2 - a^2*b^4*c*g*h^2 + 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 - 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 + 8*a^3*b*c^3*f*g*h - 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))/(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 + 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^
\end{aligned}$$

$$\begin{aligned}
& 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 - 153 \\
& 6*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 - \\
& 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*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 + 4 \\
& 992*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 + 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)
\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)**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

$$\frac{-\left(x^2(-2aci + b^2i - bcg + 2c^2e)\right) - b(ai + ce) + 2acg}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x\left(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d\right)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} +$$

```
[Out] 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)+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)*arctanh((2*c*x^2+b)/(-4
*a*c+b^2)^(1/2))/(-4*a*c+b^2)^(3/2)+1/4*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*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}

$$\frac{x^2\left(-\left(-2aci + b^2i - bcg + 2c^2e\right)\right) - b(ai + ce) + 2acg}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x\left(x^2(abh - 2acf + bcd) - abf - 2a(cd - ah) + b^2d\right)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} +$$

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)^2,x]
```

```
[Out] (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)
)/Sqrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]
]/(2*Sqrt[2]*a*Sqrt[c]*(b^2 - 4*a*c)*Sqrt[b - 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))/S
qrt[b^2 - 4*a*c])*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]]/
(2*Sqrt[2]*a*Sqrt[c]*(b^2 - 4*a*c)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((2*c*e -
b*g + 2*a*i)*ArcTanh[(b + 2*c*x^2)/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] && !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 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, 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 40x^5}{(a + bx^2 + cx^4)^2} dx &= \int \frac{x(e + gx^2 + 40x^4)}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^2} dx \\
&= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{1}{2} \text{Subst} \left(\int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^2} dx \right) \\
&= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{40ab + bce - 2acg + (40b^2 - 2c(40a - ce) - bcg)x^2}{2c(b^2 - 4ac)(a + bx^2 + cx^4)} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{2a(b^2 - 4ac)(a + bx^2 + cx^4)}
\end{aligned}$$

Mathematica [A] time = 2.11, size = 524, normalized size = 1.12

$$\frac{1}{4} \left(\frac{2(a^2(bi - 2c(g + x(h + ix))) + a(b^2ix^2 + bc(e + x(f - x(g + hx))) + 2c^2x(d + x(e + fx))) - bcdx(b + cx^2))}{ac(4ac - b^2)(a + bx^2 + cx^4)} \right)$$

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*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 - 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="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)^2,x, algorithm="giac")

[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]
$$\frac{1}{4} \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{(-4ac+b^2)^{1/2}} \frac{1}{2} b^2 h \arctan\left(\frac{2^{1/2}}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right) + \frac{1}{4} \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right)} \frac{1}{(-4ac+b^2)^{1/2}} b^2 h + \left(-\frac{1}{2} \frac{1}{(4ac-b^2)} \frac{1}{a} x^3 - \frac{1}{2} \frac{1}{(4ac-b^2)} \frac{1}{a} x^2 - \frac{1}{2} \frac{1}{(4ac-b^2)} \frac{1}{a} x + \frac{1}{2} \frac{1}{c} \frac{1}{(ab^2-2ac^2+bc^2e)} \frac{1}{(4ac-b^2)} \frac{1}{(c^4+bx^2+a)} - \frac{1}{4} \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{(-4ac+b^2)^{1/2}} \frac{1}{ab^2} \frac{1}{c} \frac{1}{d} \arctan\left(\frac{2^{1/2}}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right) - \frac{1}{4} \frac{1}{(4ac-b^2)^2} \frac{1}{a} \frac{1}{2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right)} \frac{1}{(-4ac+b^2)^{1/2}} b^2 d - \frac{c}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right)} \frac{1}{(-4ac+b^2)^{1/2}} b^2 f - \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{(-4ac+b^2)^{1/2}} \frac{1}{2} b^2 c f \arctan\left(\frac{2^{1/2}}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right) - \frac{2c^2}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right)} \frac{1}{(-4ac+b^2)^{1/2}} b^2 f + \frac{2}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{a} \frac{1}{c^2} \frac{1}{f} \arctan\left(\frac{2^{1/2}}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right) - \frac{1}{2} \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{b^2} \frac{1}{c} \frac{1}{f} \arctan\left(\frac{2^{1/2}}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right) - \frac{1}{4} \frac{1}{(4ac-b^2)^2} \frac{1}{a} \frac{1}{2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right)} \frac{1}{(-4ac+b^2)^{1/2}} b^3 d + \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right)} \frac{1}{(-4ac+b^2)^{1/2}} b^2 h + \frac{1}{2} \frac{1}{(4ac-b^2)^2} \frac{1}{(-4ac+b^2)^{1/2}} b^2 g \ln(-2cx^2 - b + (-4ac+b^2)^{1/2}) + \frac{1}{(4ac-b^2)^2} \frac{1}{(-4ac+b^2)^{1/2}} c e \ln(2cx^2 + b + (-4ac+b^2)^{1/2}) - \frac{1}{(4ac-b^2)^2} \frac{1}{(-4ac+b^2)^{1/2}} c e \ln(-2cx^2 - b + (-4ac+b^2)^{1/2}) + \frac{3}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{(-4ac+b^2)^{1/2}} c^2 d \arctan\left(\frac{2^{1/2}}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right) - \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{b} \frac{1}{c^2} \frac{1}{d} \arctan\left(\frac{2^{1/2}}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right) + \frac{3c^2}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right)} \frac{1}{(-4ac+b^2)^{1/2}} d + \frac{c^2}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right)} \frac{1}{(-4ac+b^2)^{1/2}} b^2 d + \frac{1}{4} \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{ab^3} \frac{1}{c} \frac{1}{d} \arctan\left(\frac{2^{1/2}}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right) - \frac{1}{4} \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{\operatorname{arctanh}\left(\frac{2^{1/2}}{((-b+(-4ac+b^2)^{1/2})c)^{1/2}} c x\right)} \frac{1}{(-4ac+b^2)^{1/2}} b^3 h - \frac{1}{2} \frac{1}{(4ac-b^2)^2} \frac{1}{(-4ac+b^2)^{1/2}} b^2 g \ln(2cx^2 + b + (-4ac+b^2)^{1/2}) + \frac{1}{(4ac-b^2)^2} \frac{1}{2} \frac{1}{((b+(-4ac+b^2)^{1/2})c)^{1/2}} \frac{1}{(-4ac+b^2)^{1/2}} b^2 h$$

$$\begin{aligned} &)^{(1/2)} * c)^{(1/2)} * (-4 * a * c + b^2)^{(1/2)} * a * c * h * \arctan(2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)} * c)^{(1/2)} * c * x) - 1 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)} * c)^{(1/2)} * c * x) + a / (4 * a * c - b^2)^2 * c * 2^{(1/2)} / ((-b + (-4 * a * c + b^2)^{(1/2)} * c)^{(1/2)} * c * x) * (-4 * a * c + b^2)^{(1/2)} * h + 1 / 4 / (4 * a * c - b^2)^2 * 2^{(1/2)} / ((b + (-4 * a * c + b^2)^{(1/2)} * c)^{(1/2)} * c * x) - a / (4 * a * c - b^2)^2 * \ln(-2 * c * x^2 - b + (-4 * a * c + b^2)^{(1/2)} * (-4 * a * c + b^2)^{(1/2)} * i + a / (4 * a * c - b^2)^2 * \ln(2 * c * x^2 + b + (-4 * a * c + b^2)^{(1/2)} * (-4 * a * c + b^2)^{(1/2)} * i \end{aligned}$$

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]
$$-1/2 * (a * b * c * e - 2 * a^2 * c * g + a^2 * b * i - (b * c^2 * d - 2 * a * c^2 * f + a * b * c * h) * x^3 + (2 * a * c^2 * e - a * b * c * g + (a * b^2 - 2 * a^2 * c) * i) * x^2 + (a * b * c * f - 2 * a^2 * c * h - (b^2 * c - 2 * a * c^2) * d) * x) / (a^2 * b^2 * c - 4 * a^3 * c^2 + (a * b^2 * c^2 - 4 * a^2 * c^3) * x^4 + (a * b^3 * c - 4 * a^2 * b * c^2) * x^2) + 1/2 * \int ((a * b * f - 2 * a^2 * h + (b * c * d - 2 * a * c * f + a * b * h) * x^2 + (b^2 - 6 * a * c) * d - 2 * (2 * a * c * e - a * b * g + 2 * a^2 * i) * x) / (c * x^4 + b * x^2 + a), x) / (a * b^2 - 4 * a^2 * c)$$

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 \end{aligned}$$

$$\begin{aligned}
& \wedge 8c^2d^2f^2z^2 + 512a^5b^6c^i^2z^2 + 12288a^7b^c^4h^2z^2 + 128a^3b^8c^g^2z^2 + 12288a^6b^c^5f^2z^2 - 16a^2b^9c^f^2z^2 + 61440a^5b^c^6d^2z^2 + 432a^b^9c^2d^2z^2 - 65536a^7c^5e^i^2z^2 - 16384a^7c^5f^h^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^d^2z^2 - 192a^3b^6c^d^h^i^z - 6144a^5b^c^4d^g^h^z - 4096a^5b^c^4d^f^i^z + 96a^2b^7c^d^g^h^z + 64a^2b^7c^d^f^i^z - 4096a^4b^c^5d^e^f^z + 64a^b^7c^2d^e^f^z - 32a^b^8c^d^f^g^z - 9216a^5b^2c^3d^h^i^z + 2304a^4b^4c^2d^h^i^z + 4608a^4b^3c^3d^g^h^z + 3072a^4b^3c^3d^f^i^z - 1152a^3b^5c^2d^g^h^z - 768a^3b^5c^2d^f^i^z - 9216a^4b^2c^4d^e^h^z + 2304a^3b^4c^3d^e^h^z + 2048a^4b^2c^4d^f^g^z - 1536a^3b^4c^3d^f^g^z + 384a^2b^6c^2d^f^g^z - 192a^2b^6c^2d^e^h^z + 3072a^3b^3c^4d^e^f^z - 768a^2b^5c^3d^e^f^z + 384a^5b^4c^h^2i^z - 1024a^6b^c^3g^h^2z - 192a^4b^5c^g^h^2z + 32a^3b^6c^f^2i^z + 1024a^5b^c^4f^2g^z - 32a^3b^6c^e^h^2z - 16a^2b^7c^f^2g^z - 9216a^4b^c^5d^2g^z + 336a^b^7c^2d^2g^z - 672a^b^6c^3d^2e^z + 12288a^6c^4d^h^i^z + 12288a^5c^5d^e^h^z + 32a^b^8c^d^2i^z - 1536a^6b^2c^2h^2i^z + 1536a^5b^2c^3f^2i^z + 768a^5b^3c^2g^h^2z - 384a^4b^4c^2f^2i^z - 15872a^4b^2c^4d^2i^z + 4992a^3b^4c^3d^2i^z - 1536a^5b^2c^3e^h^2z - 768a^4b^3c^3f^2g^z - 672a^2b^6c^2d^2i^z + 384a^4b^4c^2e^h^2z + 192a^3b^5c^2f^2g^z + 7936a^3b^3c^4d^2g^z - 2496a^2b^5c^3d^2g^z + 1536a^4b^2c^4e^f^2z - 384a^3b^4c^3e^f^2z + 32a^2b^6c^2e^f^2z - 15872a^3b^2c^5d^2e^z + 4992a^2b^4c^4d^2e^z + 2048a^7c^3h^2i^z - 32a^4b^6h^2i^z - 2048a^6c^4f^2i^z + 16a^3b^7g^h^2z + 18432a^5c^5d^2i^z + 2048a^6c^4e^h^2z - 2048a^5c^5e^f^2z + 32b^8c^2d^2e^z + 18432a^4c^6d^2e^z - 16b^9c^d^2g^z - 256a^5b^c^2f^g^h^i - 192a^4b^3c^f^g^h^i - 96a^3b^4c^d^g^h^i - 1792a^4b^c^3d^e^h^i - 768a^4b^c^3d^f^g^i - 256a^4b^c^3e^f^g^h + 32a^2b^5c^d^f^g^i - 768a^3b^c^4d^e^f^g + 32a^b^5c^2d^e^f^g + 896a^4b^2c^2d^g^h^i + 384a^4b^2c^2e^f^h^i - 192a^3b^3c^2e^f^g^h - 192a^3b^3c^2d^f^g^i + 192a^3b^3c^2d^e^h^i + 896a^3b^2c^3d^e^g^h + 384a^3b^2c^3d^e^f^i - 96a^2b^4c^2d^e^g^h - 64a^2b^4c^2d^e^f^i - 192a^2b^3c^3d^e^f^g + 192a^5b^2c^g^h^2i + 192a^5b^2c^f^h^i^2 - 384a^5b^c^2e^h^2i - 32a^4b^3c^e^h^2i + 16a^3b^4c^f^2g^i + 1536a^5b^c^2e^g^i^2 + 1536a^4b^c^3e^2g^i - 896a^5b^c^2d^h^i^2 + 96a^4b^3c^d^h^i^2 + 48a^3b^4c^f^g^2h - 384a^4b^c^3e^f^2i + 16a^3b^4c^e^g^h^2 - 32a^3b^4c^d^f^i^2 + 24a^2b^5c^d^g^2h + 2208a^3b^c^4d^2f^h - 1920a^3b^c^4d^2e^i + 800a^4b^c^3d^f^h^2 - 102a^b^5c^2d^2f^h - 32a^b^5c^2d^2e^i - 30a^2b^5c^d^f^h^2 - 896a^3b^c^4d^e^2h - 240a^b^4c^3d^2e^g - 32a^b^4c^3d^e^2f + 512a^5c^3e^f^h^i + 1536a^4c^4d^e^f^i + 16a^b^6c^d^2g^i + 12a^b^6c^d^f^2h - 8a^b^6c^d^f^g^2 + 192a^4b^2c^2f^2g^i - 768a^4b^2c^2e^g^2i + 64a^4b^2c^2f^g^2h + 960a^3b^2c^3d^2g^i - 240a^2b^4c^2d^2g^i + 192a^4b^2c^2e^g^h^2 - 32a^3b^3c^2e^f^2i - 224a^3b^3c^2d^g^2h + 192a^4b^2c^2d^f^i^2 + 192a^3b^2c^3e^2f^h - 864a^3b^2c^3d^f^2h + 480a^2b^3c^3d^2e^i + 336a^3b^3c^2d^f^h^2 + 192a^3b^2c^3e^f^2g + 144a^2b^3c^3d^2f^h + 16a^2b^4c^2e^f^2g - 12a^2b^4c^2d^f^2h + 192a^3b^2c^3d^f^g^2 + 96a^2b^3c^3d^e^2h + 48a^2b^4c^2d^f^g^2 + 960a^2b^2c^4d^2e^g + 192a^2b^2c^4d^e^2f - 384a^5b^2c^g^2i^2 - 192a^5b^c^2f^2i^2 - 48a^4b^3c^g^2h^2 - 16a^4b^3c^f^2i^2 + 80a^3b^3c^2f^3h - 42a^3b^4c^f^2h^2 - 960a^4b^c^3d^2i^2 - 192a^4b^c^3e^2h^2 - 16a^2b^5c^d^2i^2 - 4a^2b^5c^f^2g^2 - 192a^4b^2c^2d^h^3 - 192a^2b^2c^4d^3h + 128a^3b^3c^2e^g^3 - 192a^3b^c^4e^2f^2 + 60a^b^5c^2d^2g^2 + 198a^b^4c^3d^2f^2 + 144a^2b^3c^3d^f^3 - 96
\end{aligned}$$

$$\begin{aligned}
& 0*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, l)*((32*a*b^5*c^3*d*e - 512*a^5*c^4*f*i - 512*a^4*c^5*e*f + 1024*a^3*b*c^5*d*e - 16*a*b^6*c^2*d*g + 1024*a^4*b*c^4*d*i + 512*a^4*b*c^4*e*h + 256*a^4*b*c^4*f*g + 512*a^5*b*c^3*h*i - 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 + 32*a^2*b^5*c^2*d*i - 16*a^2*b^5*c^2*f*g - 384*a^3*b^3*c^3*d*i - 128*a^3*b^3*c^3*e*h + 32*a^3*b^4*c^2*f*i + 64*a^3*b^4*c^2*g*h - 256*a^4*b^2*c^3*g*h - 128*a^4*b^3*c^2*h*i)/(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 + 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*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
\end{aligned}$$

$$\begin{aligned}
& *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 - 2 \\
& 496*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 - 19 \\
& 2*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 + 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 + 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, 1)*(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
\end{aligned}$$

$$\begin{aligned}
& + 2048a^6c^5h - 288a^2b^6c^3d + 1920a^3b^4c^4d - 5632a^4b^2c^5d + 16a^2b^7c^2f - 192a^3b^5c^3f + 768a^4b^3c^4f - 32a^3b^6c^2h + 384a^4b^4c^3h - 1536a^5b^2c^4h + 16ab^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^6z^4 - 983040a^7b^4c^5z^4 + 327680a^6b^6c^4z^4 - 61440a^5b^8c^3z^4 + 6144a^4b^{10}c^2z^4 - 256a^3b^{12}cz^4 - 1048576a^9c^7z^4 + 32768a^7b^4c^4g^2z^2 - 512a^4b^7c^4g^2z^2 + 192a^3b^8c^4f^2z^2 + 57344a^6b^2c^5d^2h^2z^2 + 32768a^6b^2c^5e^2g^2z^2 + 96a^2b^9c^4d^2h^2z^2 - 32ab^{10}c^4d^2f^2z^2 - 24576a^6b^3c^3g^2z^2 + 6144a^5b^5c^2g^2z^2 + 49152a^6b^2c^4e^2z^2 - 12288a^5b^4c^3e^2z^2 + 6144a^5b^4c^3f^2h^2z^2 - 2048a^4b^6c^2f^2h^2z^2 + 1024a^4b^6c^2e^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 + 512a^5b^6c^4i^2z^2 + 12288a^7b^4c^4h^2z^2 + 128a^3b^8c^4g^2z^2 + 12288a^6b^2c^5f^2z^2 - 16a^2b^9c^4f^2z^2 + 61440a^5b^2c^6d^2z^2 + 432ab^9c^2d^2z^2 - 65536a^7c^5e^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^{11}cd^2z^2 - 192a^3b^6cd^2h^2z^2 - 6144a^5b^2c^4d^2g^2h^2z^2 - 4096a^5b^2c^4d^2f^2i^2z^2 + 96a^2b^7cd^2g^2h^2z^2 + 64a^2b^7cd^2f^2i^2z^2 - 4096a^4b^2c^5d^2e^2f^2z^2 + 64ab^7c^2d^2e^2f^2z^2 - 32ab^8cd^2f^2g^2z^2 - 9216a^5b^2c^3d^2h^2i^2z^2 + 2304a^4b^4c^2d^2h^2i^2z^2 + 4608a^4b^3c^3d^2g^2h^2z^2 + 3072a^4b^3c^3d^2f^2i^2z^2 - 1152a^3b^5c^2d^2g^2h^2z^2 - 768a^3b^5c^2d^2f^2i^2z^2 - 9216a^4b^2c^4d^2e^2h^2z^2 + 2304a^3b^4c^3d^2e^2h^2z^2 + 2048a^4b^2c^4d^2f^2g^2z^2 - 1536a^3b^4c^3d^2f^2g^2z^2 + 384a^2b^6c^2d^2f^2g^2z^2 - 192a^2b^6c^2d^2e^2h^2z^2 + 3072a^3b^3c^4d^2e^2f^2z^2 - 768a^2b^5c^3d^2e^2f^2z^2 + 384a^5b^4c^3h^2i^2z^2 - 1024a^6b^2c^3g^2h^2z^2 - 192a^4b^5c^3g^2h^2z^2 + 32a^3b^6c^3f^2i^2z^2 + 1024a^5b^2c^4f^2g^2z^2 - 32a^3b^6c^3e^2h^2z^2 - 16a^2b^7c^3f^2g^2z^2 - 9216a^4b^2c^5d^2g^2z^2 + 336ab^7c^2d^2g^2z^2 - 672ab^6c^3d^2e^2z^2 + 12288a^6c^4d^2h^2i^2z^2 + 12288a^5c^5d^2e^2h^2z^2 + 32ab^8cd^2i^2z^2 - 1536a^6b^2c^2h^2i^2z^2 + 1536a^5b^2c^3f^2i^2z^2 + 768a^5b^3c^2g^2h^2z^2 - 384a^4b^4c^2f^2i^2z^2 - 15872a^4b^2c^4d^2i^2z^2 + 4992a^3b^4c^3d^2i^2z^2 - 1536a^5b^2c^3e^2h^2z^2 - 768a^4b^3c^3f^2g^2z^2 - 672a^2b^6c^2d^2i^2z^2 + 384a^4b^4c^2e^2h^2z^2 + 192a^3b^5c^2f^2g^2z^2 + 7936a^3b^3c^4d^2g^2z^2 - 2496a^2b^5c^3d^2g^2z^2 + 1536a^4b^2c^4e^2f^2z^2 - 384a^3b^4c^3e^2f^2z^2 + 32a^2b^6c^2e^2f^2z^2 - 15872a^3b^2c^5d^2e^2z^2 + 4992a^2b^4c^4d^2e^2z^2 + 2048a^7c^3h^2i^2z^2 - 32a^4b^6h^2i^2z^2 - 2048a^6c^4f^2i^2z^2 + 16a^3b^7g^2h^2z^2 + 18432a^5c^5d^2i^2z^2 + 2048a^6c^4e^2h^2z^2 - 2048a^5c^5e^2f^2z^2 + 32b^8c^2d^2e^2z^2 + 18432a^4c^6d^2e^2z^2 - 16b^9cd^2g^2z^2 - 256a^5b^2c^2f^2g^2h^2i^2 - 192a^4b^3c^3f^2g^2h^2i^2 - 96a^3b^4c^3d^2e^2h^2i^2 - 1792a^4b^2c^3d^2e^2h^2i^2 - 768a^4b^2c^3d^2f^2g^2i^2 - 256a^4b^2c^3e^2f^2g^2h^2i^2 + 32a^2b^5c^2d^2f^2g^2i^2 - 768a^3b^2c^4d^2e^2f^2g^2 + 32ab^5c^2d^2e^2f^2g^2 + 896a^4b^2c^2d^2g^2h^2i^2 + 384a^4b^2c^2e^2f^2h^2i^2 - 192a^3b^3c^2e^2f^2g^2h^2i^2 - 192a^3b^3c^2d^2f^2g^2i^2 + 192a^3b^3c^2d^2e^2h^2i^2 + 896a^3b^2c^3d^2e^2g^2h^2 + 384a^3b^2c^3d^2e^2f^2i^2 - 96a^2b^4c^2d^2e^2g^2h^2 - 64a^2b^4c^2d^2e^2f^2i^2 - 192a^2b^3c^3d^2e^2f^2g^2 + 192a^5b^2c^3g^2h^2i^2 + 192a^5b^2c^3f^2h^2i^2 - 384a^5b^2c^2e^2h^2i^2 - 32a^4b^3c^3e^2h^2i^2 + 16a^3b^4c^3f^2g^2i^2 + 1536a^5b^2c^2e^2g^2i^2 + 1536a^4b^3c^3e^2g^2i^2 - 896a^5b^2c^2d^2h^2i^2 + 96a^4b^3c^3d^2h^2i^2 + 48a^3b^4c^3f^2g^2h^2 - 384a^4b^2c^3e^2f^2i^2 + 16a^3b^4c^3e^2g^2h^2 - 32a^3b^4c^3d^2f^2i^2 + 24a^2b^5c^3d^2g^2h^2 + 2208a^3b^2c^4d^2f^2h^2 - 1920a^3b^2c^4d^2e^2i^2 + 800a^4b^2c^3d^2f^2h^2 - 102ab^5c^2d^2f^2h^2 - 32ab^5c^2d^2e^2i^2 - 30a^2b^5c^2d^2f^2h^2 - 896a^3b^2c^4d^2e^2h^2 - 240ab^4c^3d^2e^2g^2 - 32ab^4c^3
\end{aligned}$$

$$\begin{aligned}
& 3*d^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^ \\
& 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 + 327 \\
& 680*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
\end{aligned}$$

$$\begin{aligned}
& *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^3*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*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*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 + 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 +
\end{aligned}$$

$$\begin{aligned}
& 16a^2b^4c^2ef^2g - 12a^2b^4c^2d^2f^2h + 192a^3b^2c^3d^2f^2g^2 \\
& + 96a^2b^3c^3d^2e^2h + 48a^2b^4c^2d^2f^2g^2 + 960a^2b^2c^4d^2e^2g \\
& + 192a^2b^2c^4d^2e^2f - 384a^5b^2c^2g^2i^2 - 192a^5b^2c^2f^2i^2 \\
& - 48a^4b^3c^2g^2h^2 - 16a^4b^3c^2f^2i^2 + 80a^3b^3c^2f^3h - 42a^3b^4c^2f^2h^2 \\
& - 960a^4b^3c^3d^2i^2 - 192a^4b^3c^3e^2h^2 - 16a^2b^5c^2d^2i^2 - 4a^2b^5c^2f^2g^2 \\
& - 192a^4b^2c^2d^2h^3 - 192a^2b^2c^4d^3h + 128a^3b^3c^2e^2g^3 - 192a^3b^3c^4e^2f^2 \\
& + 60ab^5c^2d^2g^2 + 198ab^4c^3d^2f^2 + 144a^2b^3c^3d^2f^3 - 960a^2b^3c^5d^2e^2 \\
& + 240ab^3c^4d^2e^2 + 256a^6c^2f^2h^2i^2 + 16a^4b^4g^2h^2i + 768a^5c^3d^2f^2i^2 \\
& + 256a^4c^4e^2f^2h - 192a^6b^3c^2h^2i^2 - 192a^4c^4d^2f^2h + 128a^4b^3c^2g^3i \\
& + 16b^6c^2d^2e^2g + 96a^5b^3c^2f^2h^3 + 96a^4b^3c^3f^3h + 80a^4b^3c^2f^2h^3 \\
& + 6a^2b^5c^2f^3h + 768a^3c^5d^2e^2f + 512a^3b^3c^4e^3g + 132ab^4c^3d^3h - 28a^3b^4c^2d^3h^3 \\
& + 12ab^6c^2d^2h^2 + 2016a^2b^3c^5d^3f - 496ab^3c^4d^3f + 224a^3b^3c^4d^2f^3 \\
& - 18ab^5c^2d^2f^3 - 192a^4b^2c^2f^2h^2 + 240a^3b^3c^2d^2i^2 - 48a^3b^3c^2f^2g^2 \\
& - 16a^3b^3c^2e^2h^2 - 464a^3b^2c^3d^2h^2 - 384a^3b^2c^3e^2g^2 + 42a^2b^4c^2d^2h^2 \\
& - 240a^2b^3c^3d^2g^2 - 16a^2b^3c^3e^2f^2 - 960a^2b^2c^4d^2f^2 + 6b^7c^2d^2f^2h \\
& + 512a^6b^3c^2g^2i^3 - 2ab^7d^2f^2h^2 - 16a^5b^3h^2i^2 - 1536a^5c^3e^2i^2 \\
& - 32a^5c^3f^2h^2 - 4a^3b^5g^2h^2 - 864a^4c^4d^2h^2 - 9b^6c^2d^2f^2 - 288a^3c^5d^2f^2 \\
& - 16b^5c^3d^2e^2 - 24a^3b^2c^3f^4 - 9a^2b^4c^2f^4 - 1024a^6c^2e^2i^3 - 1024a^4c^4e^3i \\
& - 10b^6c^2d^3h + 6a^3b^5f^2h^3 - 1728a^3c^5d^3h - 192a^5c^3d^2h^3 - 4b^7c^2d^2g^2 \\
& + 30b^5c^3d^3f + 6a^2b^6d^2h^3 - 24a^5b^2c^2h^4 - 16a^3b^4c^2g^4 + 360ab^2c^5d^4 \\
& - 16a^6c^2h^4 - 9a^4b^4h^4 - 16a^4c^4f^4 - 256a^3c^5e^4 - 25b^4c^4d^4 - 1296a^2c^6d^4 \\
& - a^2b^6f^2h^2 - 256a^7c^2i^4 - b^8d^2h^2, z, 1), 1, 1, 4)
\end{aligned}$$

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

$$\frac{x(-b^2(a^2m+c^2d)) + x^2(-bc(-3a^2m+ach+c^2d) - ab^3m + ab^2ck + 2ac^2(cf - ak)) + 2ac(a^2m - ach + c^2d)}{2ac^2(b^2 - 4ac)(a + bx^2 + cx^4)}$$

[Out] $m*x/c^2 + 1/2*(-b*c*(a*j+c*e) + a*b^2*1 + 2*a*c*(-a*1+c*g) - (2*c^3*e - c^2*(2*a*j+b*g) - b^3*1 + b*c*(3*a*1+b*j)) * x^2) / c^2 / (-4*a*c+b^2) / (c*x^4+b*x^2+a) - 1/2*x*(a*b*c*(a*k+c*f) - b^2*(a^2*m+c^2*d) + 2*a*c*(a^2*m-a*c*h+c^2*d) + (a*b^2*c*k + 2*a*c^2*(-a*k+c*f) - a*b^3*m - b*c*(c^2*d + a*c*h - 3*a^2*m)) * x^2) / a/c^2 / (-4*a*c+b^2) / (c*x^4+b*x^2+a) + 1/2*(4*c^3*e - c^2*(-4*a*j+2*b*g) + b^3*1 - 6*a*b*c*1) * arctanh((2*c*x^2+b) / (-4*a*c+b^2)^(1/2)) / c^2 / (-4*a*c+b^2)^(3/2) + 1/4*1*ln(c*x^4+b*x^2+a) / c^2 + 1/4*arctan(x*2^(1/2)*c^(1/2) / (b - (-4*a*c+b^2)^(1/2))^(1/2)) * (a*b^2*c*k - 2*a*c^2*(3*a*k+c*f) - 3*a*b^3*m + b*c*(13*a^2*m+a*c*h+c^2*d) + (-a*b^3*c*k + 4*a*b*c^2*(2*a*k+c*f) + 3*a*b^4*m + b^2*c*(-19*a^2*m-a*c*h+c^2*d) - 4*a*c^2*(-5*a^2*m+a*c*h+3*c^2*d)) / (-4*a*c+b^2)^(1/2)) / a/c^(5/2) / (-4*a*c+b^2)*2^(1/2) / (b - (-4*a*c+b^2)^(1/2))^(1/2) + 1/4*arctan(x*2^(1/2)*c^(1/2) / (b + (-4*a*c+b^2)^(1/2))^(1/2)) * (a*b^2*c*k - 2*a*c^2*(3*a*k+c*f) - 3*a*b^3*m + b*c*(13*a^2*m+a*c*h+c^2*d) + (a*b^3*c*k - 4*a*b*c^2*(2*a*k+c*f) - 3*a*b^4*m - b^2*c*(-19*a^2*m-a*c*h+c^2*d) + 4*a*c^2*(-5*a^2*m+a*c*h+3*c^2*d)) / (-4*a*c+b^2)^(1/2)) / a/c^(5/2) / (-4*a*c+b^2)*2^(1/2) / (b + (-4*a*c+b^2)^(1/2))^(1/2)$

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}

$$\frac{x(x^2(-bc(-3a^2m+ach+c^2d) + ab^2ck - ab^3m + 2ac^2(cf - ak)) + b^2(-a^2m+c^2d)) + 2ac(a^2m - ach + c^2d)}{2ac^2(b^2 - 4ac)(a + bx^2 + cx^4)}$$

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)^2, x]

[Out] $(m*x)/c^2 - (b*c*(c*e + a*j) - a*b^2*1 - 2*a*c*(c*g - a*1) + (2*c^3*e - c^2*(b*g + 2*a*j) - b^3*1 + b*c*(b*j + 3*a*1)) * x^2) / (2*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) - (x*(a*b*c*(c*f + a*k) - b^2*(c^2*d + a^2*m) + 2*a*c*(c^2*d - a*c*h + a^2*m) + (a*b^2*c*k + 2*a*c^2*(c*f - a*k) - a*b^3*m - b*c*(c^2*d + a*c*h - 3*a^2*m)) * x^2) / (2*a*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + ((a*b^2*c*k - 2*a*c^2*(c*f + 3*a*k) - 3*a*b^3*m + b*c*(c^2*d + a*c*h + 13*a^2*m) - (a*b^3*c*k - 4*a*b*c^2*(c*f + 2*a*k) - 3*a*b^4*m - b^2*c*(c^2*d - a*c*h - 19*a^2*m) + 4*a*c^2*(3*c^2*d + a*c*h - 5*a^2*m)) / Sqrt[b^2 - 4*a*c]) * ArcTan[(Sqrt[2]*Sqrt[c]*x) / Sqrt[b - Sqrt[b^2 - 4*a*c]]) / (2*Sqrt[2]*a*c^(5/2)*(b^2 - 4*a*c)*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + ((a*b^2*c*k - 2*a*c^2*(c*f + 3*a*k) - 3*a*b^3*m + b*c*(c^2*d + a*c*h + 13*a^2*m) + (a*b^3*c*k - 4*a*b*c^2*(c*f + 2*a*k) - 3*a*b^4*m - b^2*c*(c^2*d - a*c*h - 19*a^2*m) + 4*a*c^2*(3*c^2*d + a*c*h - 5*a^2*m)) / Sqrt[b^2 - 4*a*c]) * ArcTan[(Sqrt[2]*Sqrt[c]*x) / Sqrt[b + Sqrt[b^2 - 4*a*c]]) / (2*Sqrt[2]*a*c^(5/2)*(b^2 - 4*a*c)*Sqrt[b + Sqrt[b^2 - 4*a*c]]) + ((4*c^3*e - c^2*(2*b*g - 4*a*j) + b^3*1 - 6*a*b*c*1) * ArcTanh[(b + 2*c*x^2) / Sqrt[b^2 - 4*a*c]]) / (2*c^2*(b^2 - 4*a*c)^(3/2)) + (1*Log[a + b*x^2 + c*x^4]) / (4*c^2)$

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] := 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 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

$*x^2 + c*x^4)^p, x] + \text{Int}[x*\text{Sum}[\text{Coeff}[\text{Pq}, x, 2*k + 1]*x^{(2*k)}, \{k, 0, (q - 1)/2\}](a + b*x^2 + c*x^4)^p, x]] /; \text{FreeQ}[\{a, b, c, p\}, x] \&\& \text{PolyQ}[\text{Pq}, x] \&\& !\text{PolyQ}[\text{Pq}, x^2]$

Rule 1676

$\text{Int}[(\text{Pq}_)/((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] \rightarrow \text{Int}[\text{ExpandIntegrand}[\text{Pq}/(a + b*x^2 + c*x^4), x], x] /; \text{FreeQ}[\{a, b, c\}, x] \&\& \text{PolyQ}[\text{Pq}, x^2] \&\& \text{Expon}[\text{Pq}, x^2] > 1$

Rule 1678

$\text{Int}[(\text{Pq}_)*((a_) + (b_.)*(x_)^2 + (c_.)*(x_)^4)^{(p_)}, x_Symbol] \rightarrow \text{With}[\{d = \text{Coeff}[\text{PolynomialRemainder}[\text{Pq}, a + b*x^2 + c*x^4, x], x, 0], e = \text{Coeff}[\text{PolynomialRemainder}[\text{Pq}, a + b*x^2 + c*x^4, x], x, 2]\}, \text{Simp}[(x*(a + b*x^2 + c*x^4)^{(p + 1)}*(a*b*e - d*(b^2 - 2*a*c) - c*(b*d - 2*a*e)*x^2))/(2*a*(p + 1)*(b^2 - 4*a*c)), x] + \text{Dist}[1/(2*a*(p + 1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x^2 + c*x^4)^{(p + 1)}*\text{ExpandToSum}[2*a*(p + 1)*(b^2 - 4*a*c)*\text{PolynomialQuotient}[\text{Pq}, a + b*x^2 + c*x^4, x] + b^2*d*(2*p + 3) - 2*a*c*d*(4*p + 5) - a*b*e + c*(4*p + 7)*(b*d - 2*a*e)*x^2, x], x]] /; \text{FreeQ}[\{a, b, c\}, x] \&\& \text{PolyQ}[\text{Pq}, x^2] \&\& \text{Expon}[\text{Pq}, x^2] > 1 \&\& \text{NeQ}[b^2 - 4*a*c, 0] \&\& \text{LtQ}[p, -1]$

Rubi steps

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3 + hx^4 + jx^5 + kx^6 + lx^7 + mx^8}{(a + bx^2 + cx^4)^2} dx &= \int \frac{x(e + gx^2 + jx^4 + lx^6)}{(a + bx^2 + cx^4)^2} dx + \int \frac{d + fx^2 + hx^4 + kx^6 + lx^8}{(a + bx^2 + cx^4)^2} dx \\ &= -\frac{x(abc(cf + ak) - b^2(c^2d + a^2m) + 2ac(c^2d - acf))}{2ac^2} \\ &= -\frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg - al))}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\ &= \frac{mx}{c^2} - \frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg - al))}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\ &= \frac{mx}{c^2} - \frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg - al))}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\ &= \frac{mx}{c^2} - \frac{bc(ce + aj) - ab^2l - 2ac(CG - al) + (2c^3e - c^2(bg - al))}{2c^2(b^2 - 4ac)(a + bx^2 + cx^4)} \end{aligned}$$

Mathematica [A] time = 5.70, size = 935, normalized size = 1.21

$$4\sqrt{c}mx + \frac{2\sqrt{c}(2c(l+mx)a^3 - ((l+mx)b^2 - c(j+x(k+3x(l+mx))))b + 2c^2(g+x(h+x(j+kx))))a^2 + (-x^2(l+mx)b^3 + cx^2(j+kx)b^2 + c^2(e+x(f-x(g+lx))))b + 2c^2d)}{a(4ac-b^2)(cx^4+bx^2+a)}$$

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] (4*Sqrt[c]*m*x + (2*Sqrt[c]*(2*a^3*c*(1 + m*x) - b*c^2*d*x*(b + c*x^2) + a*
(b^2*c*x^2*(j + k*x) - b^3*x^2*(1 + m*x) + 2*c^3*x*(d + x*(e + f*x)) + b*c^
2*(e + x*(f - x*(g + h*x)))) - a^2*(b^2*(1 + m*x) + 2*c^2*(g + x*(h + x*(j
+ k*x))) - b*c*(j + x*(k + 3*x*(1 + m*x)))))))/(a*(-b^2 + 4*a*c)*(a + b*x^2
+ c*x^4)) - (Sqrt[2]*(-3*a*b^4*m + 2*a*c^2*(6*c^2*d + c*Sqrt[b^2 - 4*a*c]*f
+ 2*a*c*h + 3*a*Sqrt[b^2 - 4*a*c]*k - 10*a^2*m) + a*b^3*(c*k + 3*Sqrt[b^2
- 4*a*c]*m) - b*c*(c^2*(Sqrt[b^2 - 4*a*c]*d + 4*a*f) + a*c*(Sqrt[b^2 - 4*a*
c]*h + 8*a*k) + 13*a^2*Sqrt[b^2 - 4*a*c]*m) + b^2*c*(-(c^2*d) + a*c*h + a*(
-(Sqrt[b^2 - 4*a*c]*k) + 19*a*m)))*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]]) - (Sqr
t[2]*(3*a*b^4*m + 2*a*c^2*(-6*c^2*d + c*Sqrt[b^2 - 4*a*c]*f - 2*a*c*h + 3*a
*Sqrt[b^2 - 4*a*c]*k + 10*a^2*m) + a*b^3*(-(c*k) + 3*Sqrt[b^2 - 4*a*c]*m) -
b*c*(c^2*(Sqrt[b^2 - 4*a*c]*d - 4*a*f) + a*c*(Sqrt[b^2 - 4*a*c]*h - 8*a*k)
+ 13*a^2*Sqrt[b^2 - 4*a*c]*m) + b^2*c*(c^2*d - a*c*h - a*(Sqrt[b^2 - 4*a*c
]*k + 19*a*m)))*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[c]*(-4*c^3*e + 2*
c^2*(b*g - 2*a*j) + b^2*(-b + Sqrt[b^2 - 4*a*c])*1 + a*c*(6*b*1 - 4*Sqrt[b^
2 - 4*a*c]*1))*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(3/2) +
(Sqrt[c]*(4*c^3*e + c^2*(-2*b*g + 4*a*j) + b^2*(b + Sqrt[b^2 - 4*a*c])*1 -
2*a*c*(3*b + 2*Sqrt[b^2 - 4*a*c])*1)*Log[b + Sqrt[b^2 - 4*a*c] + 2*c*x^2])
/(b^2 - 4*a*c)^(3/2))/(4*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)
^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] 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)^2,x)
```

```
[Out] -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)*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
```

$$\begin{aligned}
&) * 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) \\
&) * 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} \\
& ^{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 + \\
& -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 * a \\
& rctan(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} \\
& ^{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} \\
& ^{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) + 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 * \arctan(2^{1/2} / ((b + (-4 * a * c + b^2)^{1/2}) * c)^{1/2} * c * x) + 3 / 2 / c / (c * x^4 \\
& + b * x^2 + a) * a / (4 * a * c - b^2) * x^3 * b * m - 1 / 2 * c / (c * x^4 + b * x^2 + a) / a / (4 * a * c - b^2) * x^3 * b * \\
& d + 3 / 2 / c / (c * x^4 + b * x^2 + a) / (4 * a * c - b^2) * x^2 * a * b * 1 + 1 / 2 / c / (c * x^4 + b * x^2 + a) * a / (4 * a * \\
& c - b^2) * x * b * k - 1 / 2 / c^2 / (c * x^4 + b * x^2 + a) * a / (4 * a * c - b^2) * x * b^2 * m - 5 * a^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} * m + 13 * a^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 * m + 5 / 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) * b^2 * k - 13 * a^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 * m - 5 / 2 * a / (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^2 * k - 5 * a^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) * (-4 * a * c + b^2)^{1/2} * m + 3 / 2 / c * 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} * b * 1 - 6 * c * a \\
& ^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) * k - 3 / 2 / c * 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} * b * 1 + 6 * c * a^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) * k + 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) * b^5 * 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
\end{aligned}$$

$$\begin{aligned} & *c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x) *b^{4*k+1/4}/c/(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 \\ & ^{4*k-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)})+19/4/c*a/(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*m+19/4}/c*a/(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) *(-4*a*c+b^2)^{(1/2)} *b^{2*m+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*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*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)} *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+c/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x^2*e+c/(c*x^4+b*x^2+a)/(4*a*c-b^2)*x^3*f+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}*arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) *c)^{(1/2)} *c*x) -25/4/c*a/(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*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)} *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)} *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)} *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)} *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)} *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)} *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^k+1/4/c/ \\ & (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) *(-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

$$\frac{abc^2e - 2a^2c^2g + a^2bcj - (bc^3d - 2ac^3f + abc^2h - (ab^2c - 2a^2c^2)k + (ab^3 - 3a^2bc)m)x^3 + (2ac^3e - abc^2g + a^2bc^3)}{2(a^2b^2c^2 - 4a^3c^3 + ab^2c^3)}$$

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] -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)*1)*x^2 - (a^2*b^2 - 2*a^3*c)*1 + (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)*1*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

$*c^2*g + 2*a^2*c^2*j - a^2*b*c*1)*x)/(c*x^4 + b*x^2 + a), x)/(a*b^2*c^2 - 4*a^2*c^3)$

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*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 + 1048576*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 + 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*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 + 30720*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 - 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*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 + 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 - 288768*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 - 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^$

$$\begin{aligned}
& 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 - 3712*a^5*b^7*c^2*j*k*m*z - 1 \\
& 3824*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 - 10752*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 + 960*a^4*b^6*c^4*d*j*m*z - 5 \\
& 12*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 - 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*l*z \\
& + 32*a^3*b^8*c^3*g*h*k*z + 41472*a^5*b^3*c^6*d*h*l*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*l*z + 12288*a^5*b \\
& ^3*c^6*e*g*l*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*l*z \\
& + 1888*a^3*b^7*c^4*d*h*l*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*l*z - 96*a^3*b^7*c^4*f*g*k*z - 96*a^2*b^9*c^3*d*h*l*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*l*z - 614 \\
& 4*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 - 153 \\
& 6*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^1*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^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*l*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*l*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*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*
\end{aligned}$$

$$\begin{aligned}
& z - 9216a^4b^9c^9d^2g^2z + 336a^7b^7c^6d^2g^2z - 672a^6b^6c^7d^2e^2z \\
& - 122880a^9c^5k^1m^2z - 40960a^8c^6f^1m^2z + 24576a^8c^6h^1k^1z - \\
& 20480a^8c^6h^1j^1m^2z + 73728a^7c^7d^2k^1z - 61440a^7c^7d^2j^1m^2z + 327 \\
& 68a^7c^7e^1j^1z - 12288a^7c^7f^1j^1k^1z - 20480a^7c^7e^1h^1m^2z + 8192a \\
& ^7c^7f^1h^1z - 61440a^6c^8d^2e^1m^2z + 24576a^6c^8d^2f^1z - 12288a^6c \\
& ^8e^1f^1k^1z + 12288a^6c^8d^2h^1j^1z + 12288a^5c^9d^2e^1h^1z - 131328a^8b^ \\
& ^3c^3l^1m^2z + 46656a^7b^5c^2l^1m^2z - 142848a^8b^2c^4j^1m^2z + 10 \\
& 6368a^7b^4c^3j^1m^2z - 34208a^6b^6c^2j^1m^2z + 2304a^7b^3c^4k^2 \\
& ^1z - 576a^6b^5c^3k^2l^1z + 48a^5b^7c^2k^2l^1z + 45056a^7b^3c^4 \\
& ^1j^1l^2z - 15360a^6b^5c^3j^1l^2z - 12288a^7b^2c^5j^2l^1z + 3072a^6 \\
& ^b^4c^4j^2l^1z + 2304a^5b^7c^2j^1l^2z - 256a^5b^6c^3j^2l^1z + 158 \\
& 72a^7b^2c^5j^1k^2z - 4992a^6b^4c^4j^1k^2z + 672a^5b^6c^3j^1k^2z \\
& - 32a^4b^8c^2j^1k^2z + 71424a^7b^3c^4g^1m^2z - 53184a^6b^5c^3g \\
& ^1m^2z + 17104a^5b^7c^2g^1m^2z + 6912a^6b^3c^5h^2l^1z - 1728a^5b^ \\
& ^5c^4h^2l^1z + 144a^4b^7c^3h^2l^1z + 24576a^7b^2c^5g^1l^2z - 22528 \\
& ^a^6b^4c^4g^1l^2z + 7680a^5b^6c^3g^1l^2z + 4096a^6b^2c^6g^2l^1z \\
& - 3072a^5b^4c^5g^2l^1z - 1152a^4b^8c^2g^1l^2z + 768a^4b^6c^4g^2 \\
& ^1z - 64a^3b^8c^3g^2l^1z - 142848a^7b^2c^5e^1m^2z + 106368a^6b^4 \\
& ^c^4e^1m^2z - 34208a^5b^6c^3e^1m^2z - 7936a^6b^3c^5g^1k^2z + 5088a \\
& ^4b^8c^2e^1m^2z + 2496a^5b^5c^4g^1k^2z - 1536a^6b^2c^6h^2j^1z + \\
& 1280a^5b^3c^6f^2l^1z + 384a^5b^4c^5h^2j^1z - 336a^4b^7c^3g^1k^2 \\
& ^1z + 192a^4b^5c^5f^2l^1z - 144a^3b^7c^4f^2l^1z - 32a^4b^6c^4h^2 \\
& ^1j^1z + 16a^3b^9c^2g^1k^2z + 16a^2b^9c^3f^2l^1z + 45056a^6b^3c^5 \\
& ^1e^1l^2z - 15360a^5b^5c^4e^1l^2z - 12288a^5b^2c^7e^2l^1z + 3072a^4 \\
& ^b^4c^6e^2l^1z + 2304a^4b^7c^3e^1l^2z - 256a^3b^6c^5e^2l^1z - 128a \\
& ^3b^9c^2e^1l^2z + 59136a^4b^3c^7d^2l^1z - 23488a^3b^5c^6d^2l^1z \\
& + 15872a^6b^2c^6e^1k^2z - 4992a^5b^4c^5e^1k^2z + 4560a^2b^7c^5 \\
& ^1d^2l^1z + 1536a^5b^2c^7f^2j^1z + 672a^4b^6c^4e^1k^2z - 384a^4b^4 \\
& ^c^6f^2j^1z - 32a^3b^8c^3e^1k^2z + 32a^3b^6c^5f^2j^1z + 768a^5b^3 \\
& ^c^6g^1h^2z - 192a^4b^5c^5g^1h^2z + 16a^3b^7c^4g^1h^2z - 15872a^4 \\
& ^b^2c^8d^2j^1z + 4992a^3b^4c^7d^2j^1z - 672a^2b^6c^6d^2j^1z - 153 \\
& 6a^5b^2c^7e^1h^2z - 768a^4b^3c^7f^2g^1z + 384a^4b^4c^6e^1h^2z + \\
& 192a^3b^5c^6f^2g^1z - 32a^3b^6c^5e^1h^2z - 16a^2b^7c^5f^2g^1z \\
& + 7936a^3b^3c^8d^2g^1z - 2496a^2b^5c^7d^2g^1z + 1536a^4b^2c^8e^1 \\
& ^1f^2z - 384a^3b^4c^7e^1f^2z + 32a^2b^6c^6e^1f^2z - 15872a^3b^2c^ \\
& ^9d^2e^1z + 4992a^2b^4c^8d^2e^1z - 61440a^8b^2c^4l^1z + 21504a^7 \\
& ^b^4c^3l^1z - 3328a^6b^6c^2l^1z + 432a^5b^9l^1m^2z + 51200a^9c^ \\
& ^5j^1m^2z + 16384a^8c^6j^2l^1z - 288a^4b^10j^1m^2z - 18432a^8c^6j^1 \\
& ^1k^2z + 144a^3b^11g^1m^2z + 51200a^8c^6e^1m^2z + 2048a^7c^7h^2j^1z \\
& + 16384a^6c^8e^2l^1z + 16b^11c^3d^2l^1z - 18432a^7c^7e^1k^2z - 20 \\
& 48a^6c^8f^2j^1z + 18432a^5c^9d^2j^1z + 192a^5b^8c^1l^3z + 2048a^6 \\
& ^c^8e^1h^2z - 16b^9c^5d^2g^1z - 2048a^5c^9e^1f^2z + 32b^8c^6d^2e \\
& ^1z + 18432a^4c^10d^2e^1z + 65536a^9c^5l^1z - 11008a^8b^3c^3j^1k^1m \\
& - 288a^6b^5c^1j^1k^1m + 144a^5b^6c^1g^1k^1m - 11008a^7b^3c^4e^1k^1m \\
& - 5376a^7b^3c^4f^1j^1m + 3840a^7b^3c^4g^1j^1k^1m - 3328a^7b^3c^4h^1j^1k^1 \\
& - 96a^4b^7c^1g^1j^1k^1m - 2560a^7b^3c^4g^1h^1m - 36a^3b^8c^1f^1h^1k^1m - 69 \\
& 12a^6b^3c^5d^1j^1k^1 - 7872a^6b^3c^5d^1h^1k^1m - 7680a^6b^3c^5d^1g^1l^1m - 53 \\
& 76a^6b^3c^5e^1f^1l^1m + 3840a^6b^3c^5e^1g^1k^1m - 3328a^6b^3c^5e^1h^1k^1 - 15 \\
& 36a^6b^3c^5f^1g^1k^1 + 1280a^6b^3c^5f^1g^1j^1m - 768a^6b^3c^5g^1h^1j^1k^1 - 768 \\
& ^a^6b^3c^5f^1h^1j^1 - 768a^6b^3c^5e^1h^1j^1m - 36a^2b^9c^1d^1h^1k^1m - 6912a^ \\
& ^5b^3c^6d^1e^1k^1 - 4864a^5b^3c^6d^1e^1j^1m - 2304a^5b^3c^6d^1g^1j^1k^1 - 1792a^ \\
& ^5b^3c^6e^1f^1j^1k^1 - 1280a^5b^3c^6d^1f^1j^1 - 4544a^5b^3c^6d^1f^1h^1m + 1536a^ \\
& ^5b^3c^6d^1g^1h^1 + 1280a^5b^3c^6e^1f^1g^1m - 768a^5b^3c^6e^1g^1h^1k^1 - 768a^5 \\
& ^b^3c^6e^1f^1h^1 - 256a^5b^3c^6f^1g^1h^1j^1 + 12a^2b^9c^2d^1f^1h^1m + 16a^2b^8c^3 \\
& ^1d^1f^1g^1 - 4a^2b^8c^3d^1f^1h^1k^1 - 2304a^4b^3c^7d^1e^1g^1k^1 - 1792a^4b^3c^7d^1 \\
& ^1e^1h^1j^1 - 1280a^4b^3c^7d^1e^1f^1 - 768a^4b^3c^7d^1f^1g^1j^1 - 32a^2b^7c^4d^1e^1f \\
& ^1 - 256a^4b^3c^7e^1f^1g^1h^1 - 768a^3b^3c^8d^1e^1f^1g^1 + 32a^2b^5c^6d^1e^1f^1g^1 \\
& + 12a^2b^10c^1d^1f^1k^1m + 3648a^7b^3c^2j^1k^1l^1m + 5504a^7b^2c^3g^1k^1l^1m \\
& - 1824a^6b^4c^2g^1k^1l^1m + 384a^7b^2c^3h^1j^1l^1m - 288a^6b^4c^2h^1j^1
\end{aligned}$$

$$\begin{aligned}
& 1*m - 4800*a^6*b^3*c^3*g*j*k*m + 3648*a^6*b^3*c^3*e*k*1*m + 1280*a^5*b^5*c^2*g*j*k*m + 1088*a^6*b^3*c^3*f*j*1*m + 576*a^6*b^3*c^3*h*j*k*1 - 288*a^5*b^5*c^2*e*k*1*m - 192*a^6*b^3*c^3*g*h*1*m + 144*a^5*b^5*c^2*g*h*1*m + 9600*a^6*b^2*c^4*e*j*k*m - 4224*a^6*b^2*c^4*d*j*1*m - 2560*a^5*b^4*c^3*e*j*k*m + 384*a^6*b^2*c^4*f*j*k*1 + 224*a^5*b^4*c^3*d*j*1*m + 192*a^4*b^6*c^2*e*j*k*m - 160*a^5*b^4*c^3*f*j*k*1 - 4608*a^6*b^2*c^4*f*h*k*m + 2688*a^6*b^2*c^4*f*g*1*m + 1664*a^6*b^2*c^4*g*h*k*1 - 744*a^5*b^4*c^3*f*h*k*m - 544*a^5*b^4*c^3*f*g*1*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*1*m - 288*a^5*b^4*c^3*g*h*k*1 - 288*a^5*b^4*c^3*e*h*1*m - 96*a^4*b^6*c^2*g*h*j*m + 2112*a^5*b^3*c^4*d*j*k*1 - 160*a^4*b^5*c^3*d*j*k*1 + 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*1*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*1*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*1 - 448*a^5*b^3*c^4*f*h*j*1 + 288*a^4*b^5*c^3*f*g*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 + 2432*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 + 960*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 - 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^
\end{aligned}$$

$$\begin{aligned}
& 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 - 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 + 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 + 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 + 76 \\
& 32*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 - \\
& 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 + 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 \\
& + 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*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 \\
& + 1386*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 + 1
\end{aligned}$$

$$\begin{aligned}
& 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^ \\
& 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 - 4 \\
& 96*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
\end{aligned}$$

$$\begin{aligned}
&^3k + 132a^5b^4c^3f^*k^3 + 128a^4b^3c^5g^3j - 28a^3b^4c^5f^3k \\
&- 10a^4b^6c^2f^*k^3 + 6a^2b^6c^4f^3k + 10752a^5b^*c^6d^2l^2 - 9 \\
&60a^5b^*c^6e^2k^2 - 192a^5b^*c^6f^2j^2 + 108a^*b^9c^2d^2l^2 - 1680 \\
&a^5b^3c^4d^*k^3 - 1680a^2b^3c^7d^3k + 222a^4b^5c^3d^*k^3 + 30a^* \\
&b^8c^3d^2k^2 - 10a^3b^7c^2d^*k^3 - 960a^4b^*c^7d^2j^2 + 80a^4b^3 \\
&c^5f^*h^3 + 80a^3b^3c^6f^3h + 6a^3b^5c^4f^*h^3 + 6a^2b^5c^5f^3 \\
&*h - 192a^4b^*c^7e^2h^2 - 192a^4b^2c^6d^*h^3 - 192a^2b^2c^8d^3h \\
&+ 128a^3b^3c^6e^*g^3 - 28a^3b^4c^5d^*h^3 + 12a^*b^6c^5d^2h^2 + 6a^ \\
&^2b^6c^4d^*h^3 - 192a^3b^*c^8e^2f^2 + 60a^*b^5c^6d^2g^2 + 198a^*b^4 \\
&c^7d^2f^2 + 144a^2b^3c^7d^*f^3 - 960a^2b^*c^9d^2e^2 + 240a^*b^3c^ \\
&8d^2e^2 + 15360a^9c^3k^*l^2m - 12800a^9c^3j^*l^2m^2 - 3840a^8c^4j^ \\
&^2k^*m + 432a^6b^6j^*l^2m^2 + 4608a^8c^4j^*k^2l + 2880a^8c^4h^*k^2m + \\
&5120a^8c^4f^*l^2m - 3072a^8c^4h^*k^2l + 270a^5b^7h^*k^2m^2 - 216a^ \\
&5b^7g^*l^2m^2 - 12800a^8c^4e^*l^2m^2 - 4800a^8c^4f^*k^2m^2 - 512a^7c^5 \\
&h^2j^*l - 3840a^6c^6e^2k^*m - 1280a^7c^5f^*j^2m + 768a^7c^5h^*j^2k \\
&+ 144a^4b^8g^*j^2m^2 - 90a^4b^8f^*k^2m^2 + 8640a^7c^5d^*k^2m + 4608a^ \\
&^7c^5e^*k^2l + 512a^6c^6f^2j^*l - 9216a^7c^5d^*k^2l - 4096a^7c^5 \\
&e^*j^2l + 320a^6c^6f^2h^*m - 90a^3b^9d^*k^2m^2 + 15200a^9b^*c^2k^2m^3 \\
&- 6192a^8b^3c^*k^2m^3 + 5472a^8b^*c^3k^3m - 4608a^5c^7d^2j^*l - 1024 \\
&a^7c^5f^*h^2l + 150a^6b^5c^*k^3m + 54a^3b^9f^*h^2m^2 + 6b^10c^2d^ \\
&^2h^*m - 14400a^7c^5d^*h^2m^2 + 8640a^5c^7d^2h^*m + 2880a^6c^6d^*h^2m \\
&+ 2304a^6c^6d^*j^2k - 512a^6c^6e^*h^2l - 192a^6c^6f^*h^2k + 6144a^ \\
&^8b^*c^3j^2l^3 + 1536a^7b^*c^4j^3l - 1280a^5c^7e^2f^*m + 768a^5c^7 \\
&e^2h^*k + 256a^6c^6f^*h^2j^2 + 192a^6b^5c^*j^2l^3 + 54a^2b^10d^*h^2m^2 \\
&- 18b^9c^3d^2f^*m + 8b^9c^3d^2g^*l - 2b^9c^3d^2h^*k + 4068a^7b^4 \\
&c^*h^2m^3 - 1728a^6c^6d^*h^2k^2 + 960a^5c^7d^*f^2m + 512a^5c^7e^*f^2l \\
&- 3072a^6c^6d^*f^2l^2 - 16b^8c^4d^2e^*l + 6b^8c^4d^2f^*k - 4608a^4 \\
&c^8d^2e^*l + 2400a^8b^*c^3f^2m^3 + 2016a^7b^*c^4h^*k^3 - 1728a^4c^8d^ \\
&^2f^*k - 1146a^6b^5c^*f^2m^3 + 224a^6b^*c^5h^3k - 96a^5b^6c^*g^2l^3 + \\
&96a^5b^*c^6f^3m + 2304a^4c^8d^*e^2k + 768a^5c^7d^*f^2j^2 + 6144a^7 \\
&b^*c^4e^2l^3 - 2280a^5b^6c^*d^2m^3 + 1536a^4b^*c^7e^3l - 616a^*b^6c^5d^ \\
&^3m + 512a^6b^*c^5g^2j^3 + 256a^4c^8e^2f^*h + 240a^*b^10c^*d^2m^2 + 6 \\
&b^7c^5d^2f^*h - 192a^4c^8d^*f^2h + 4320a^6b^*c^5d^*k^3 + 4320a^3b^* \\
&c^8d^3k + 222a^*b^5c^6d^3k + 16b^6c^6d^2e^*g + 96a^5b^*c^6f^*h^3 + \\
&96a^4b^*c^7f^3h + 768a^3c^9d^*e^2f + 512a^3b^*c^8e^3g + 132a^*b^4 \\
&c^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 \\
&^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^3 \\
&c^3j^2k^2 - 16a^5b^5c^2j^2k^2 + 1680a^6b^3c^3g^2m^2 - 1648a^6 \\
&b^3c^3h^2l^2 - 1540a^5b^5c^2g^2m^2 + 444a^5b^5c^2h^2l^2 - 960 \\
&a^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^4 \\
&c^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 - 3 \\
&84a^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^ \\
&^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^2 \\
&c^7e^2g^2 + 42a^2b^4c^6d^2h^2 - 240a^2b^3c^7d^2g^2 - 16a^2b^
\end{aligned}$$

$$\begin{aligned}
& 3c^7e^2f^2 - 960a^2b^2c^8d^2f^2 + 6b^{11}cd^2km - 18ab^{11}dfm^2 - 7200a^9c^3k^2m^2 - 324a^7b^5l^2m^2 - 225a^6b^6k^2m^2 - 20 \\
& 48a^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^2 \\
& c^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 + 240 \\
& 00a^8c^4d^3m^3 + 8640a^4c^8d^3m - 1728a^7c^5f^3k^3 - 192a^5c^7f^3k - 4b^{11}cd^2l^2 + 126a^4b^8d^3m^3 - 10b^7c^5d^3k + 4200a^9b^2 \\
& c^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 + \\
& 360ab^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^1 - 512a^4c^8e^* \\
& f - 1536a^5c^7e^*k - 512a^5c^7f^*j + 1024a^6c^6h^*l - 1536a^6c^6j^*k - 5120a^7c^5l^*m + 32ab^5c^6d^*e + 1024a^3b^c^8d^*e - 16ab^6c^5 \\
& *d^*g + 512a^4b^c^7e^*h + 256a^4b^c^7f^*g + 1024a^4b^c^7d^*j + 16ab^8c^3d^*l + 2048a^5b^c^6e^*m + 256a^5b^c^6f^*l + 768a^5b^c^6g^*k + 51 \\
& 2a^5b^c^6h^*j + 2048a^6b^c^5j^*m + 1792a^6b^c^5k^*l - 384a^2b^3c^7 \\
& *d^*e + 192a^2b^4c^6d^*g + 32a^2b^4c^6e^*f - 512a^3b^2c^7d^*g - 16a^2b^5c^5f^*g - 128a^3b^3c^6e^*h + 32a^2b^5c^5d^*j - 384a^3b^3c^6 \\
& *d^*j + 64a^3b^4c^5g^*h - 256a^4b^2c^6g^*h - 288a^2b^6c^4d^*l + 17 \\
& 92a^3b^4c^5d^*l - 32a^3b^4c^5e^*k + 32a^3b^4c^5f^*j - 4352a^4b^2 \\
& *c^6d^*l + 512a^4b^2c^6e^*k + 16a^2b^7c^3f^*l + 96a^3b^5c^4e^*m - \\
& 144a^3b^5c^4f^*l + 16a^3b^5c^4g^*k - 896a^4b^3c^5e^*m + 256a^4b^3 \\
& c^5f^*l - 256a^4b^3c^5g^*k - 128a^4b^3c^5h^*j - 48a^3b^6c^3g^*m \\
& - 48a^3b^6c^3h^*l + 448a^4b^4c^4g^*m + 512a^4b^4c^4h^*l - 1024a^5 \\
& *b^2c^5g^*m - 1536a^5b^2c^5h^*l - 32a^4b^4c^4j^*k + 512a^5b^2c^5j^*k \\
& + 96a^4b^5c^3j^*m + 80a^4b^5c^3k^*l - 896a^5b^3c^4j^*m - 768a^5 \\
& b^3c^4k^*l - 256a^5b^4c^3l^*m + 2304a^6b^2c^4l^*m) / (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^7z^4 + 6144a^4b^{10}c^6z^4 - 256a^3b^{12}c^5z^4 - 1048576a^9c^{11}z^4 \\
& - 1572864a^8b^2c^8l^1z^3 + 983040a^7b^4c^7l^1z^3 - 327680a^6b^6c^6l^1z^3 + 61440a^5b^8c^5l^1z^3 - 6144a^4b^{10}c^4l^1z^3 + 256a^3b^{12} \\
& c^3l^1z^3 + 1048576a^9c^9l^1z^3 + 96a^3b^{12}c^3k^*m^*z^2 + 98304a^8b^c^7 \\
& *j^*l^1z^2 + 24576a^8b^c^7h^*m^*z^2 + 155648a^7b^c^8d^*m^*z^2 + 98304a^7b^c^8e^*l^1z^2 + 57344a^7b^c^8f^*k^*z^2 + 32768a^7b^c^8g^*j^*z^2 + 57344a^6 \\
& b^c^9d^*h^*z^2 + 32768a^6b^c^9e^*g^*z^2 - 32ab^{10}c^5d^*f^*z^2 - 491520 \\
& a^8b^2c^6k^*m^*z^2 + 358400a^7b^4c^5k^*m^*z^2 - 129024a^6b^6c^4k^*m^* \\
& z^2 + 24768a^5b^8c^3k^*m^*z^2 - 2432a^4b^{10}c^2k^*m^*z^2 - 90112a^7b^3 \\
& c^6j^*l^1z^2 + 30720a^6b^5c^5j^*l^1z^2 - 4608a^5b^7c^4j^*l^1z^2 + 256a^4 \\
& b^9c^3j^*l^1z^2 - 21504a^6b^5c^5h^*m^*z^2 + 9216a^5b^7c^4h^*m^*z^2 + \\
& 8192a^7b^3c^6h^*m^*z^2 - 1568a^4b^9c^3h^*m^*z^2 + 96a^3b^{11}c^2h^*m^* \\
& z^2 - 172032a^7b^2c^7f^*m^*z^2 + 116736a^6b^4c^6f^*m^*z^2 - 49152a^7b^2 \\
& c^7g^*l^1z^2 + 45056a^6b^4c^6g^*l^1z^2 - 35840a^5b^6c^5f^*m^*z^2 + 24 \\
& 576a^7b^2c^7h^*k^*z^2 - 15360a^5b^6c^5g^*l^1z^2 + 5184a^4b^8c^4f^*m^* \\
& z^2 - 3072a^5b^6c^5h^*k^*z^2 + 2304a^4b^8c^4g^*l^1z^2 + 2048a^6b^4c^6 \\
& h^*k^*z^2 + 576a^4b^8c^4h^*k^*z^2 - 288a^3b^{10}c^3f^*m^*z^2 - 128a^3b^{10} \\
& c^3g^*l^1z^2 - 32a^3b^{10}c^3h^*k^*z^2 - 147456a^6b^3c^7d^*m^*z^2 - 901 \\
& 12a^6b^3c^7e^*l^1z^2 + 52224a^5b^5c^6d^*m^*z^2 - 49152a^6b^3c^7f^*k^* \\
& z^2 + 30720a^5b^5c^6e^*l^1z^2 - 24576a^6b^3c^7g^*j^*z^2 + 15360a^5b^5 \\
& c^6f^*k^*z^2 - 8192a^4b^7c^5d^*m^*z^2 + 6144a^5b^5c^6g^*j^*z^2 - 4608a
\end{aligned}$$

$$\begin{aligned}
& ^4b^7c^5e^1z^2 - 2048a^4b^7c^5f^kz^2 - 512a^4b^7c^5g^jz^2 + 480a^3b^9c^4d^mz^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^7d^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^z^2 - 2048a^4b^6c^6f^h^z^2 + 192a^3b^8c^5f^h^z^2 - 49152a^5b^3c^8d^h^z^2 - 24576a^5b^3c^8e^g^z^2 + 15360a^4b^5c^7d^h^z^2 + 6144a^4b^5c^7e^g^z^2 - 2048a^3b^7c^6d^h^z^2 - 512a^3b^7c^6e^g^z^2 + 96a^2b^9c^5d^h^z^2 + 24576a^5b^2c^9d^f^z^2 - 3072a^3b^6c^7d^f^z^2 + 2048a^4b^4c^8d^f^z^2 + 576a^2b^8c^6d^f^z^2 - 430080a^9b^3c^6m^2z^2 + 3408a^4b^11c^m^2z^2 - 64a^3b^12c^1^2z^2 + 61440a^8b^3c^7k^2z^2 + 12288a^7b^3c^8h^2z^2 + 12288a^6b^3c^9f^2z^2 + 61440a^5b^3c^10d^2z^2 + 432a^2b^9c^6d^2z^2 + 245760a^9c^7k^mz^2 + 81920a^8c^8f^mz^2 - 49152a^8c^8h^kz^2 - 147456a^7c^9d^kz^2 - 65536a^7c^9e^jz^2 - 16384a^7c^9f^h^z^2 - 49152a^6c^10d^f^z^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^10c^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^11c^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^13m^2z^2 - 32768a^8c^8j^2z^2 - 32768a^6c^10e^2z^2 - 16b^11c^5d^2z^2 + 18432a^8b^3c^5h^1m^z - 96a^3b^10c^g^k^m^z + 90112a^7b^3c^6e^k^m^z + 36864a^7b^3c^6f^j^m^z - 16384a^7b^3c^6g^j^l^z + 14336a^7b^3c^6d^l^m^z - 10240a^7b^3c^6f^k^l^z + 4096a^7b^3c^6h^j^k^z + 10240a^7b^3c^6g^h^m^z - 47104a^6b^3c^7d^h^l^z + 36864a^6b^3c^7e^f^m^z + 30720a^6b^3c^7d^g^m^z - 16384a^6b^3c^7e^g^l^z + 6144a^6b^3c^7f^g^k^z + 4096a^6b^3c^7e^h^k^z + 32a^2b^10c^3d^f^l^z - 4096a^5b^3c^8d^f^j^z - 6144a^5b^3c^8d^g^h^z - 32a^2b^8c^5d^f^g^z - 4096a^4b^3c^9d^e^f^z + 64a^2b^7c^6d^e^f^z + 110592a^8b^2c^4k^1m^z - 36864a^7b^4c^3k^1m^z + 5376a^6b^6c^2k^1m^z - 79872a^7b^3c^4j^k^m^z + 26112a^6b^5c^3j^k^m^z - 3712a^5b^7c^2j^k^m^z - 13824a^7b^3c^4h^1m^z + 3456a^6b^5c^3h^1m^z - 288a^5b^7c^2h^1m^z - 45056a^7b^2c^5g^k^m^z + 39936a^6b^4c^4g^k^m^z + 30720a^7b^2c^5f^l^m^z - 18432a^7b^2c^5h^k^1z - 13056a^5b^6c^3g^k^m^z - 7680a^6b^4c^4f^l^m^z + 5376a^6b^4c^4h^j^m^z + 4608a^6b^4c^4h^k^1z + 3072a^7b^2c^5h^j^m^z - 1984a^5b^6c^3h^j^m^z + 1856a^4b^8c^2g^k^m^z + 640a^5b^6c^3f^l^m^z - 384a^5b^6c^3h^k^1z + 192a^4b^8c^2h^j^m^z - 79872a^6b^3c^5e^k^m^z - 27648a^6b^3c^5f^j^m^z + 26112a^5b^5c^4e^k^m^z + 12288a^6b^3c^5g^j^l^z - 10752a^6b^3c^5d^l^m^z + 7680a^6b^3c^5f^k^l^z + 6912a^5b^5c^4f^j^m^z - 3712a^4b^7c^3e^k^m^z - 3072a^6b^3c^5h^j^k^z - 3072a^5b^5c^4g^j^l^z + 2688a^5b^5c^4d^l^m^z - 1920a^5b^5c^4f^k^l^z + 768a^5b^5c^4h^j^k^z - 576a^4b^7c^3f^j^m^z + 256a^4b^7c^3g^j^l^z - 224a^4b^7c^3d^l^m^z + 192a^3b^9c^2e^k^m^z + 160a^4b^7c^3f^k^l^z - 64a^4b^7c^3h^j^k^z - 2688a^5b^5c^4g^h^m^z - 1536a^6b^3c^5g^h^m^z + 992a^4b^7c^3g^h^m^z - 96a^3b^9c^2g^h^m^z - 65536a^6b^2c^6d^k^l^z + 46080a^6b^2c^6d^j^m^z - 24576a^6b^2c^6e^j^l^z + 21504a^5b^4c^5d^k^l^z - 11520a^5b^4c^5d^j^m^z + 9216a^6b^2c^6f^j^k^z + 6144a^5b^4c^5e^j^l^z - 3072a^4b^6c^4d^k^l^z - 2304a^5b^4c^5f^j^k^z + 960a^4b^6c^4d^j^m^z - 512a^4b^6c^4e^j^l^z + 192a^4b^6c^4f^j^k^z + 160a^3b^8c^3d^k^l^z - 18432a^6b^2c^6f^g^m^z + 13824a^5b^4c^5f^g^m^z + 5376a^5b^4c^5e^h^m^z - 3456a^4b^6c^4f^g^m^z + 3072a^6b^2c^6e^h^m^z - 3072a^5b^4c^5f^h^l^z - 2048a^6b^2c^6
\end{aligned}$$

$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 - 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^*l^*z + 32*a^3*b^8*c^3*g^*h^*k^*z + 41472*a^5*b^3*c^6*d^*h^*l^*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^*l^*z + 12288*a^5*b^3*c^6*e^*g^*l^*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^*l^*z + 1888*a^3*b^7*c^4*d^*h^*l^*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^*l^*z - 96*a^3*b^7*c^4*f^*g^*k^*z - 96*a^2*b^9*c^3*d^*h^*l^*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^*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 - 1288*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*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$

$$\begin{aligned}
& *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^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 + 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 \\
& *j*m - 192*a^5*b^3*c^4*g*h*j*k - 192*a^5*b^3*c^4*f*g*k*l + 192*a^4*b^5*c^3* \\
& e*h*j*m - 112*a^4*b^5*c^3*d*g*l*m + 96*a^4*b^5*c^3*f*h*j*l - 96*a^3*b^7*c^2 \\
& *e*g*k*m + 80*a^4*b^5*c^3*f*g*k*l + 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*l - 4608*a^5*b^2*c^5*e*g*j*l - 4224*a^ \\
& 5*b^2*c^5*d*e*l*m + 3456*a^5*b^2*c^5*e*f*j*m + 3456*a^5*b^2*c^5*d*g*k*l + 2 \\
& 432*a^5*b^2*c^5*d*g*j*m - 1312*a^4*b^4*c^4*d*h*j*l + 1272*a^3*b^6*c^3*d*f*k \\
& *m - 1056*a^4*b^4*c^4*d*g*k*l + 896*a^5*b^2*c^5*f*g*j*k + 768*a^4*b^4*c^4*e \\
& *g*j*l - 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*l - 232*a^2*b^8*c^2*d*f*k*m + 224*a^4*b^4 \\
& *c^4*d*e*l*m - 160*a^4*b^4*c^4*e*f*k*l - 96*a^4*b^4*c^4*f*g*j*k + 96*a^3*b^ \\
& 6*c^3*d*h*j*l + 80*a^3*b^6*c^3*d*g*k*l - 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*l + 384*a^5 \\
& *b^2*c^5*e*g*h*m + 224*a^4*b^4*c^4*f*g*h*l - 96*a^3*b^6*c^3*e*g*h*m - 48*a^ \\
& 3*b^6*c^3*f*g*h*l + 2112*a^4*b^3*c^5*d*e*k*l - 960*a^4*b^3*c^5*d*f*j*l + 96 \\
& 0*a^4*b^3*c^5*d*e*j*m + 384*a^3*b^5*c^4*d*f*j*l + 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*l - 32*a^2*b^7*c^3*d*f*j*l \\
& + 7392*a^4*b^3*c^5*d*f*h*m - 2496*a^4*b^3*c^5*d*g*h*l - 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*l - 448*a^4*b^3*c
\end{aligned}$$

$$\begin{aligned}
& ^5e*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*c^7*d*e^2*f + 5120*a^8*c^4*h*j*1*m + 15360*a^7*c^5*d*j*1*m - 7680*a^7*c^5*e*j*k*m + 3072*a^7*c^5*f*j*k*1 + 5120*a^7*c^5*e*h*1*m + 1920*a^7*c^5*f*h*k*m + 15360*a^6*c^6*d*e*1*m + 5760*a^6*c^6*d*f*k*m + 3072*a^6*c^6*e*f*k*1 - 3072*a^6*c^6*d*h*j*1 - 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*1 - 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*1^2 - 5568*a^8*b^2*c^2*k*1^2*m + 15552*a^8*b^2*c^2*j*1*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*1^2*m - 1088*a^7*b^2*c^3*j*k^2*1 + 48*a^6*b^4*c^2*j*k^2*1 - 8544*a^7*b^2*c^3*h*k^2*m - 7776*a^7*b^3*c^2*g*1*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*1^2 - 1424*a^6*b^4*c^2*h*k*1^2 + 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*1^2*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*1^2*m + 96*a^5*b^5*c^2*h*j^2*m + 15552*a^7*b^2*c^3*e*1*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*1*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 +
\end{aligned}$$

$$\begin{aligned}
& 960a^6b^2c^4h^2j^*l - 678a^5b^5c^2f^*k^2m + 544a^6b^3c^3g^*k^2l \\
& - 144a^5b^4c^3h^2j^*l - 102a^4b^5c^3f^2k^*m - 62a^3b^7c^2f^2k^* \\
& *m - 24a^5b^5c^2g^*k^2l + 6432a^6b^3c^3d^*l^2m + 4800a^5b^2c^5e^ \\
& ^2k^*m - 2304a^6b^2c^4g^*j^2l + 1920a^6b^3c^3g^*j^*l^2 + 1728a^6b^2 \\
& *c^4f^*j^2m - 1280a^4b^4c^4e^2k^*m + 1152a^5b^3c^4g^2j^*l - 1032a^ \\
& ^5b^5c^2d^*l^2m - 864a^6b^3c^3f^*k^*l^2 - 768a^5b^5c^2g^*j^*l^2 + 40 \\
& 8a^5b^5c^2f^*k^*l^2 + 384a^5b^4c^3g^*j^2l - 288a^5b^4c^3f^*j^2m + \\
& 192a^6b^2c^4h^*j^2k - 192a^4b^5c^3g^2j^*l + 96a^3b^6c^3e^2k^*m \\
& - 32a^5b^4c^3h^*j^2k - 21120a^6b^2c^4d^*k^2m + 20880a^6b^3c^3d^ \\
& *k^*m^2 + 19760a^4b^3c^5d^2k^*m - 12320a^6b^3c^3e^*j^*m^2 - 9750a^5b^ \\
& ^5c^2d^*k^*m^2 - 9390a^3b^5c^4d^2k^*m + 8460a^5b^4c^3d^*k^2m + 3360 \\
& *a^5b^5c^2e^*j^*m^2 + 1860a^2b^7c^3d^2k^*m - 1218a^4b^6c^2d^*k^2m \\
& - 1088a^6b^2c^4e^*k^2l + 960a^6b^2c^4g^*j^*k^2 - 240a^5b^4c^3g^*j^* \\
& k^2 + 192a^5b^2c^5f^2j^*l - 104a^4b^5c^3g^2h^*m - 96a^5b^3c^4g^ \\
& ^2h^*m + 48a^5b^4c^3e^*k^2l + 48a^4b^4c^4f^2j^*l + 24a^3b^7c^2g^ \\
& ^2h^*m + 16a^4b^6c^2g^*j^*k^2 - 16a^3b^6c^3f^2j^*l + 13376a^6b^2c^4 \\
& *d^*k^*l^2 - 5136a^5b^4c^3d^*k^*l^2 - 3840a^6b^2c^4e^*j^*l^2 + 1536a^5b^ \\
& ^4c^3e^*j^*l^2 + 1392a^5b^3c^4f^*h^2m + 1386a^5b^5c^2f^*h^*m^2 - 768* \\
& a^5b^3c^4e^*j^2l + 768a^4b^6c^2d^*k^*l^2 - 768a^4b^3c^5e^2j^*l - 5 \\
& 88a^4b^4c^4f^2h^*m - 480a^5b^3c^4g^*h^2l + 480a^5b^3c^4d^*j^2m \\
& - 480a^5b^2c^5f^2h^*m - 128a^4b^6c^2e^*j^*l^2 + 100a^3b^6c^3f^2h^* \\
& *m + 96a^5b^3c^4f^*j^2k + 72a^4b^5c^3g^*h^2l - 54a^4b^5c^3f^*h^2 \\
& *m - 48a^6b^3c^3f^*h^*m^2 - 36a^3b^7c^2f^*h^2m + 6a^2b^8c^2f^2h^* \\
& m + 6848a^4b^2c^6d^2j^*l - 2448a^3b^4c^5d^2j^*l + 624a^5b^4c^3f^ \\
& *h^*l^2 + 576a^6b^2c^4f^*h^*l^2 + 480a^5b^3c^4e^*j^*k^2 + 432a^4b^4c^ \\
& ^4f^*g^2m - 416a^4b^3c^5e^2h^*m + 336a^2b^6c^4d^2j^*l - 320a^5b^2 \\
& *c^5f^*g^2m - 256a^4b^6c^2f^*h^*l^2 + 192a^5b^2c^5g^2h^*k + 96a^3b^ \\
& ^5c^4e^2h^*m - 72a^3b^6c^3f^*g^2m + 48a^4b^4c^4g^2h^*k - 32a^4b^ \\
& ^5c^3e^*j^*k^2 - 8a^3b^6c^3g^2h^*k + 24768a^6b^2c^4d^*h^*m^2 - 21108* \\
& a^5b^4c^3d^*h^*m^2 - 10048a^4b^2c^6d^2h^*m + 7218a^4b^6c^2d^*h^*m^2 \\
& - 6720a^6b^2c^4e^*g^*m^2 + 6160a^5b^4c^3e^*g^*m^2 - 2592a^5b^2c^5d^* \\
& h^2m - 1680a^4b^6c^2e^*g^*m^2 + 1068a^3b^4c^5d^2h^*m + 960a^5b^2c^ \\
& ^5e^*h^2l - 876a^4b^4c^4d^*h^2m - 864a^5b^2c^5f^*h^2k + 546a^2b^ \\
& ^6c^4d^2h^*m + 432a^3b^6c^3d^*h^2m + 336a^4b^3c^5f^2h^*k - 320a^5 \\
& *b^2c^5d^*j^2k + 192a^5b^2c^5g^*h^2j + 144a^5b^3c^4f^*h^*k^2 - 144* \\
& a^4b^4c^4e^*h^2l - 102a^4b^5c^3f^*h^*k^2 - 96a^4b^3c^5f^2g^*l - 36 \\
& *a^2b^8c^2d^*h^2m - 30a^3b^5c^4f^2h^*k - 24a^3b^5c^4f^2g^*l + 16 \\
& *a^4b^4c^4g^*h^2j - 12a^4b^4c^4f^*h^2k + 12a^3b^6c^3f^*h^2k + 8* \\
& a^2b^7c^3f^2g^*l + 6a^3b^7c^2f^*h^*k^2 - 2a^2b^7c^3f^2h^*k - 9312* \\
& a^5b^3c^4d^*h^*l^2 + 3288a^4b^5c^3d^*h^*l^2 - 2304a^4b^2c^6e^2g^*l + \\
& 1920a^5b^3c^4e^*g^*l^2 + 1728a^4b^2c^6e^2f^*m + 1152a^4b^3c^5e^*g^ \\
& ^2l - 768a^4b^5c^3e^*g^*l^2 - 608a^4b^3c^5d^*g^2m - 472a^3b^7c^2* \\
& d^*h^*l^2 + 384a^3b^4c^5e^2g^*l - 288a^3b^4c^5e^2f^*m - 224a^4b^3c^ \\
& ^5f^*g^2k + 192a^5b^2c^5f^*h^*j^2 + 192a^4b^2c^6e^2h^*k - 192a^3b^ \\
& ^5c^4e^*g^2l + 120a^3b^5c^4d^*g^2m + 64a^3b^7c^2e^*g^*l^2 - 32a^3b^ \\
& ^4c^5e^2h^*k + 24a^3b^5c^4f^*g^2k + 9936a^3b^3c^6d^2f^*m + 3786a^ \\
& ^4b^5c^3d^*f^*m^2 - 3552a^5b^2c^5d^*h^*k^2 - 3486a^2b^5c^5d^2f^*m - \\
& 3424a^3b^3c^6d^2g^*l - 1868a^3b^7c^2d^*f^*m^2 + 1332a^4b^4c^4d^*h^* \\
& k^2 - 1296a^5b^3c^4d^*f^*m^2 - 1236a^3b^4c^5d^*f^2m + 1224a^2b^5c^ \\
& ^5d^2g^*l - 1152a^4b^2c^6d^*f^2m + 960a^5b^2c^5e^*g^*k^2 - 496a^3b^ \\
& ^3c^6d^2h^*k + 462a^2b^6c^4d^*f^2m + 432a^4b^3c^5d^*h^2k - 240a^4 \\
& *b^4c^4e^*g^*k^2 - 222a^2b^5c^5d^2h^*k + 192a^4b^2c^6f^2g^*j + 192* \\
& a^4b^2c^6e^*f^2l - 174a^3b^5c^4d^*h^2k - 156a^3b^6c^3d^*h^*k^2 + 4 \\
& 8a^3b^4c^5e^*f^2l - 32a^4b^3c^5e^*h^2j + 16a^3b^6c^3e^*g^*k^2 + 1 \\
& 6a^3b^4c^5f^2g^*j - 16a^2b^6c^4e^*f^2l + 12a^2b^7c^3d^*h^2k + 6 \\
& *a^2b^8c^2d^*h^*k^2 + 1728a^5b^2c^5d^*f^*l^2 + 1392a^4b^4c^4d^*f^*l^2 \\
& - 840a^3b^6c^3d^*f^*l^2 - 768a^4b^2c^6e^*g^2j + 576a^4b^2c^6d^*g^2 \\
& *k + 480a^3b^3c^6d^*e^2m + 144a^2b^8c^2d^*f^*l^2 + 96a^4b^3c^5d^*h^ \\
& *j^2 + 96a^3b^3c^6e^2f^*k - 80a^3b^4c^5d^*g^2k + 6848a^3b^2c^7d
\end{aligned}$$

$$\begin{aligned}
& ^2e^1 - 3552a^3b^2c^7d^2f^*k - 2448a^2b^4c^6d^2e^1 + 1332a^2b^4 \\
& *c^6d^2f^*k + 960a^3b^2c^7d^2g^*j - 496a^4b^3c^5d^2f^*k^2 + 432a^3* \\
& b^3c^6d^2f^2k - 240a^2b^4c^6d^2g^*j - 222a^3b^5c^4d^2f^*k^2 - 174a \\
& ^2b^5c^5d^2f^2k + 64a^4b^2c^6f^*g^2h + 48a^3b^4c^5f^*g^2h + 42a \\
& ^2b^7c^3d^2f^*k^2 - 32a^3b^3c^6e^*f^2j - 320a^3b^2c^7d^2e^2k + 192 \\
& *a^4b^2c^6e^*g^2h^2 + 192a^4b^2c^6d^2f^*j^2 - 32a^3b^4c^5d^2f^*j^2 + 1 \\
& 6a^3b^4c^5e^*g^2h^2 + 480a^2b^3c^7d^2e^*j - 224a^3b^3c^6d^2g^2h + \\
& 192a^3b^2c^7e^2f^*h + 24a^2b^5c^5d^2g^2h - 864a^3b^2c^7d^2f^2h \\
& + 336a^3b^3c^6d^2f^*h^2 + 192a^3b^2c^7e^*f^2g + 144a^2b^3c^7d^2* \\
& f^*h - 30a^2b^5c^5d^2f^*h^2 + 16a^2b^4c^6e^*f^2g - 12a^2b^4c^6d^2f^ \\
& ^2h + 192a^3b^2c^7d^2f^*g^2 + 96a^2b^3c^7d^2e^2h + 48a^2b^4c^6d^2f \\
& *g^2 + 960a^2b^2c^8d^2e^*g + 192a^2b^2c^8d^2e^2f - 7680a^9b^*c^2*1 \\
& ^2m^2 + 3152a^8b^3c^1^2m^2 + 2070a^7b^4c^*k^2m^2 - 1840a^7b^3c^2 \\
& *k^3m + 6720a^8b^*c^3j^2m^2 - 3072a^8b^*c^3k^2*1^2 + 1680a^6b^5c^*j \\
& ^2m^2 - 100a^6b^5c^*k^2*1^2 - 2176a^7b^3c^2*j*1^3 - 256a^6b^3c^3*j \\
& ^3*1 - 64a^5b^6c^*j^2*1^2 - 12480a^8b^2c^2*h^*m^3 + 972a^5b^6c^*h^2*m \\
& ^2 - 960a^7b^*c^4j^2*k^2 - 252a^5b^4c^3*h^3*m - 192a^6b^2c^4*h^3*m \\
& + 54a^4b^6c^2*h^3*m + 1536a^7b^*c^4h^2*1^2 + 420a^4b^7c^*g^2m^2 - 3 \\
& 6a^4b^7c^*h^2*1^2 - 3072a^7b^2c^3*g^1^3 + 2096a^7b^3c^2*f^*m^3 + 108 \\
& 8a^6b^4c^2*g^1^3 - 496a^6b^3c^3*h^*k^3 - 192a^4b^4c^4*g^3*1 + 176a \\
& ^4b^3c^5f^3*m + 144a^5b^3c^4h^3*k + 78a^3b^8c^*f^2m^2 + 54a^3b^ \\
& 5c^4f^3*m + 32a^3b^6c^3*g^3*1 + 30a^5b^5c^2*h^*k^3 - 18a^4b^5c^3* \\
& h^3*k - 18a^2b^7c^3*f^3*m - 16a^3b^8c^*g^2*1^2 + 6720a^6b^*c^5e^2m^ \\
& 2 - 192a^6b^*c^5h^2*j^2 - 4a^2b^9c^*f^2*1^2 - 35040a^7b^2c^3d^*m^3 + \\
& 14300a^6b^4c^2d^*m^3 - 12000a^3b^2c^7d^3*m + 4380a^2b^4c^6d^3*m \\
& - 2176a^6b^3c^3e^1^3 - 256a^3b^3c^6e^3*1 - 192a^6b^2c^4f^*k^3 + \\
& 192a^5b^5c^2e^1^3 - 192a^4b^2c^6f^3*k + 132a^5b^4c^3f^*k^3 + 12 \\
& 8a^4b^3c^5g^3*j - 28a^3b^4c^5f^3*k - 10a^4b^6c^2f^*k^3 + 6a^2b^ \\
& ^6c^4f^3*k + 10752a^5b^*c^6d^2*1^2 - 960a^5b^*c^6e^2*k^2 - 192a^5b^* \\
& c^6f^2*j^2 + 108a^*b^9c^2d^2*1^2 - 1680a^5b^3c^4d^*k^3 - 1680a^2b^3 \\
& *c^7d^3*k + 222a^4b^5c^3d^*k^3 + 30a^*b^8c^3d^2*k^2 - 10a^3b^7c^2* \\
& d^*k^3 - 960a^4b^*c^7d^2*j^2 + 80a^4b^3c^5f^*h^3 + 80a^3b^3c^6f^3*h \\
& + 6a^3b^5c^4f^*h^3 + 6a^2b^5c^5f^3*h - 192a^4b^*c^7e^2*h^2 - 192* \\
& a^4b^2c^6d^*h^3 - 192a^2b^2c^8d^3*h + 128a^3b^3c^6e^*g^3 - 28a^3* \\
& b^4c^5d^*h^3 + 12a^*b^6c^5d^2*h^2 + 6a^2b^6c^4d^*h^3 - 192a^3b^*c^8* \\
& e^2f^2 + 60a^*b^5c^6d^2*g^2 + 198a^*b^4c^7d^2f^2 + 144a^2b^3c^7d^* \\
& f^3 - 960a^2b^*c^9d^2e^2 + 240a^*b^3c^8d^2e^2 + 15360a^9c^3k^1^2m \\
& - 12800a^9c^3j^*1m^2 - 3840a^8c^4j^2*k^*m + 432a^6b^6j^*1m^2 + 460 \\
& 8a^8c^4j^*k^2*1 + 2880a^8c^4h^*k^2m + 5120a^8c^4f^*1^2m - 3072a^8* \\
& c^4h^*k^1^2 + 270a^5b^7h^*k^*m^2 - 216a^5b^7g^*1m^2 - 12800a^8c^4e^1 \\
& *m^2 - 4800a^8c^4f^*k^*m^2 - 512a^7c^5h^2*j^*1 - 3840a^6c^6e^2*k^*m - \\
& 1280a^7c^5f^*j^2m + 768a^7c^5h^*j^2k + 144a^4b^8g^*j^*m^2 - 90a^4b^ \\
& ^8f^*k^*m^2 + 8640a^7c^5d^*k^2m + 4608a^7c^5e^*k^2*1 + 512a^6c^6f^2* \\
& j^*1 - 9216a^7c^5d^*k^1^2 - 4096a^7c^5e^*j^*1^2 + 320a^6c^6f^2*h^*m - 9 \\
& 0a^3b^9d^*k^*m^2 + 15200a^9b^*c^2k^*m^3 - 6192a^8b^3c^*k^*m^3 + 5472a^8 \\
& *b^*c^3k^3m - 4608a^5c^7d^2*j^*1 - 1024a^7c^5f^*h^1^2 + 150a^6b^5c^* \\
& k^3m + 54a^3b^9f^*h^*m^2 + 6b^10c^2d^2*h^*m - 14400a^7c^5d^*h^*m^2 + 8 \\
& 640a^5c^7d^2*h^*m + 2880a^6c^6d^*h^2m + 2304a^6c^6d^*j^2k - 512a^6 \\
& *c^6e^*h^2*1 - 192a^6c^6f^*h^2k + 6144a^8b^*c^3j^*1^3 + 1536a^7b^*c^4* \\
& j^3*1 - 1280a^5c^7e^2f^*m + 768a^5c^7e^2h^*k + 256a^6c^6f^*h^*j^2 + \\
& 192a^6b^5c^*j^*1^3 + 54a^2b^10d^*h^*m^2 - 18b^9c^3d^2f^*m + 8b^9c^3* \\
& d^2g^*1 - 2b^9c^3d^2h^*k + 4068a^7b^4c^*h^*m^3 - 1728a^6c^6d^*h^*k^2 + \\
& 960a^5c^7d^2f^2m + 512a^5c^7e^*f^2*1 - 3072a^6c^6d^2f^*1^2 - 16b^8* \\
& c^4d^2e^1 + 6b^8c^4d^2f^*k - 4608a^4c^8d^2e^1 + 2400a^8b^*c^3f^*m \\
& ^3 + 2016a^7b^*c^4h^*k^3 - 1728a^4c^8d^2f^*k - 1146a^6b^5c^*f^*m^3 + 2 \\
& 24a^6b^*c^5h^3k - 96a^5b^6c^*g^1^3 + 96a^5b^*c^6f^3m + 2304a^4c^8 \\
& *d^2e^2k + 768a^5c^7d^2f^*j^2 + 6144a^7b^*c^4e^1^3 - 2280a^5b^6c^*d^*m^ \\
& 3 + 1536a^4b^*c^7e^3*1 - 616a^*b^6c^5d^3m + 512a^6b^*c^5g^*j^3 + 256* \\
& a^4c^8e^2f^*h + 240a^*b^10c^d^2m^2 + 6b^7c^5d^2f^*h - 192a^4c^8d^*
\end{aligned}$$

$$\begin{aligned}
& f^2h + 4320a^6b^6c^5dk^3 + 4320a^3b^6c^8d^3k + 222a^5b^5c^6d^3k + \\
& 16b^6c^6d^2e^2g + 96a^5b^6c^6f^2h^3 + 96a^4b^6c^7f^3h + 768a^3c^9 \\
& *d^2e^2f + 512a^3b^6c^8e^3g + 132a^4b^4c^7d^3h + 2016a^2b^6c^9d^3f \\
& - 496a^5b^3c^8d^3f + 224a^3b^6c^8d^3f^3 - 18a^5b^5c^6d^3f^3 - 3264a^8 \\
& *b^2c^2k^2m^2 - 6160a^7b^3c^2j^2m^2 + 1104a^7b^3c^2k^2l^2 - 1 \\
& 920a^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^2 \\
& *k^2 + 1680a^6b^3c^3g^2m^2 - 1648a^6b^3c^3h^2l^2 - 1540a^5b^5c^2 \\
& *g^2m^2 + 444a^5b^5c^2h^2l^2 - 960a^6b^2c^4h^2k^2 - 576a^6b^2 \\
& *c^4f^2m^2 - 512a^6b^2c^4g^2l^2 - 480a^5b^4c^3g^2l^2 + 198a^5 \\
& *b^4c^3h^2k^2 + 192a^4b^6c^2g^2l^2 - 186a^5b^4c^3f^2m^2 - 97a^4 \\
& *b^6c^2f^2m^2 - 9a^4b^6c^2h^2k^2 - 6160a^5b^3c^4e^2m^2 + 168 \\
& 0a^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 \\
& *d^2m^2 - 2500a^2b^8c^2d^2m^2 - 1920a^5b^2c^5e^2l^2 + 768a^4b^4 \\
& *c^4e^2l^2 - 464a^5b^2c^5f^2k^2 - 384a^5b^2c^5g^2j^2 - 64a^3b^6 \\
& *c^3e^2l^2 + 42a^4b^4c^4f^2k^2 + 12a^3b^6c^3f^2k^2 - 13104a^4 \\
& *b^3c^5d^2l^2 + 5628a^3b^5c^4d^2l^2 - 1128a^2b^7c^3d^2l^2 + 2 \\
& 40a^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 \\
& ^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 \\
& j^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^2 \\
& *h^2 - 240a^2b^3c^7d^2g^2 - 16a^2b^3c^7e^2f^2 - 960a^2b^2c^8d \\
& ^2*f^2 + 6b^11c^d^2k^2m - 18a^5b^11d^2f^2m^2 - 7200a^9c^3k^2m^2 - 324 \\
& a^7b^5l^2m^2 - 225a^6b^6k^2m^2 - 2048a^8c^4j^2l^2 - 144a^5b^7j \\
& j^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^10f^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 + 3 \\
& 60a^7b^2c^3k^4 - 25a^6b^4c^2k^4 - 864a^4c^8d^2h^2 - 4b^7c^5d \\
& ^2*g^2 - 9b^6c^6d^2f^2 - 288a^3c^9d^2f^2 - 24a^5b^2c^5h^4 - 16 \\
& b^5c^7d^2e^2 - 9a^4b^4c^4h^4 - 16a^3b^4c^5g^4 - 24a^3b^2c^7f^4 \\
& ^4 - 9a^2b^4c^6f^4 - a^2b^8c^2f^2k^2 - a^2b^6c^4f^2h^2 + 630a^7 \\
& *b^5k^2m^3 + 8000a^9c^3h^2m^3 + 320a^7c^5h^3m - 378a^6b^6h^2m^3 + \\
& 126a^5b^7f^2m^3 + 30b^8c^4d^3m + 24000a^8c^4d^2m^3 + 8640a^4c^8d \\
& ^3m - 1728a^7c^5f^2k^3 - 192a^5c^7f^3k - 4b^11c^d^2l^2 + 126a^4b^8 \\
& *d^2m^3 - 10b^7c^5d^3k + 4200a^9b^2c^2m^4 - 1024a^6c^6e^2j^3 - 10 \\
& 24a^4c^8e^3j - 144a^7b^4c^2l^4 - 10b^6c^6d^3h - 1728a^3c^9d^3h \\
& h - 192a^5c^7d^3h^3 + 30b^5c^7d^3f + 360a^5b^2c^9d^4 - 9b^12d^2m \\
& ^2 - 10000a^10c^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^10d^4 - b^10c^2d^2k^2 - b^8c^4d^2h^2, \\
& z, k1) * ((6144a^5c^9d + 2048a^6c^8h - 10240a^7c^7m - 288a^2b^6c^6 \\
& *d + 1920a^3b^4c^7d - 5632a^4b^2c^8d + 16a^2b^7c^5f - 192a^3b^5 \\
& *c^6f + 768a^4b^3c^7f - 32a^3b^6c^5h + 384a^4b^4c^6h - 1536 \\
& *a^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^6 \\
& *m + 16a^5b^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^5 \\
& *j - 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 + 9216 \\
& *a^6b^6c^7l)) / (4 * (64a^5c^6 - a^2b^6c^3 + 12a^3b^4c^4 - 48a^4b^2c^5)) - \\
& (\text{root}(1572864a^8b^2c^10z^4 - 983040a^7b^4c^9z^4 + 327680a^6
\end{aligned}$$

$$\begin{aligned}
& *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 + 1048576*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 + 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*1*z^2 + 57344*a^7*b*c^8*f*k*z^2 + 327 \\
& 68*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 + 30720*a^6*b^5*c^5*j*1*z^2 - 46 \\
& 08*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 - 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
\end{aligned}$$

$$\begin{aligned}
& 4a^7b^3c^4h^1m^*z + 3456a^6b^5c^3h^1m^*z - 288a^5b^7c^2h^1m^*z \\
& - 45056a^7b^2c^5g^*k^*m^*z + 39936a^6b^4c^4g^*k^*m^*z + 30720a^7b^2c^5 \\
& *f^1m^*z - 18432a^7b^2c^5h^*k^*l^*z - 13056a^5b^6c^3g^*k^*m^*z - 7680a^6 \\
& *b^4c^4f^1m^*z + 5376a^6b^4c^4h^*j^*m^*z + 4608a^6b^4c^4h^*k^*l^*z + 30 \\
& 72a^7b^2c^5h^*j^*m^*z - 1984a^5b^6c^3h^*j^*m^*z + 1856a^4b^8c^2g^*k^*m^* \\
& z + 640a^5b^6c^3f^1m^*z - 384a^5b^6c^3h^*k^*l^*z + 192a^4b^8c^2h^*j \\
& *m^*z - 79872a^6b^3c^5e^*k^*m^*z - 27648a^6b^3c^5f^*j^*m^*z + 26112a^5b^ \\
& 5c^4e^*k^*m^*z + 12288a^6b^3c^5g^*j^*l^*z - 10752a^6b^3c^5d^*l^*m^*z + 768 \\
& 0a^6b^3c^5f^*k^*l^*z + 6912a^5b^5c^4f^*j^*m^*z - 3712a^4b^7c^3e^*k^*m^*z \\
& - 3072a^6b^3c^5h^*j^*k^*z - 3072a^5b^5c^4g^*j^*l^*z + 2688a^5b^5c^4d \\
& *l^*m^*z - 1920a^5b^5c^4f^*k^*l^*z + 768a^5b^5c^4h^*j^*k^*z - 576a^4b^7c \\
& ^3f^*j^*m^*z + 256a^4b^7c^3g^*j^*l^*z - 224a^4b^7c^3d^*l^*m^*z + 192a^3b^ \\
& 9c^2e^*k^*m^*z + 160a^4b^7c^3f^*k^*l^*z - 64a^4b^7c^3h^*j^*k^*z - 2688a^5 \\
& *b^5c^4g^*h^*m^*z - 1536a^6b^3c^5g^*h^*m^*z + 992a^4b^7c^3g^*h^*m^*z - 96* \\
& a^3b^9c^2g^*h^*m^*z - 65536a^6b^2c^6d^*k^*l^*z + 46080a^6b^2c^6d^*j^*m^*z \\
& - 24576a^6b^2c^6e^*j^*l^*z + 21504a^5b^4c^5d^*k^*l^*z - 11520a^5b^4c^ \\
& 5d^*j^*m^*z + 9216a^6b^2c^6f^*j^*k^*z + 6144a^5b^4c^5e^*j^*l^*z - 3072a^4* \\
& b^6c^4d^*k^*l^*z - 2304a^5b^4c^5f^*j^*k^*z + 960a^4b^6c^4d^*j^*m^*z - 512* \\
& a^4b^6c^4e^*j^*l^*z + 192a^4b^6c^4f^*j^*k^*z + 160a^3b^8c^3d^*k^*l^*z - 1 \\
& 8432a^6b^2c^6f^*g^*m^*z + 13824a^5b^4c^5f^*g^*m^*z + 5376a^5b^4c^5e^*h \\
& *m^*z - 3456a^4b^6c^4f^*g^*m^*z + 3072a^6b^2c^6e^*h^*m^*z - 3072a^5b^4c \\
& ^5f^*h^1z - 2048a^6b^2c^6g^*h^*k^*z - 1984a^4b^6c^4e^*h^*m^*z + 1536a^5 \\
& *b^4c^5g^*h^*k^*z + 1024a^4b^6c^4f^*h^1z - 384a^4b^6c^4g^*h^*k^*z + 288 \\
& *a^3b^8c^3f^*g^*m^*z + 192a^3b^8c^3e^*h^*m^*z - 96a^3b^8c^3f^*h^1z + 3 \\
& 2a^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^3* \\
& c^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 + 1 \\
& 888a^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 \\
& *l^*z - 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^2 \\
& *c^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^1* \\
& z + 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^7 \\
& *d^*g^*h^*z - 1152a^3b^5c^6d^*g^*h^*z + 96a^2b^7c^5d^*g^*h^*z - 9216a^4b^2 \\
& *c^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 + 30 \\
& 72a^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^2z \\
& - 7344a^6b^7c^*l^*m^2z + 5088a^5b^8c^*j^*m^2z - 3072a^8b^*c^5k^2l^*z \\
& - 49152a^8b^*c^5j^*l^2z - 128a^4b^9c^*j^*l^2z - 25600a^8b^*c^5g^*m^2z \\
& - 9216a^7b^*c^6h^2l^*z - 2544a^4b^9c^*g^*m^2z + 64a^3b^10c^*g^1l^2z \\
& + 9216a^7b^*c^6g^*k^2z - 3072a^6b^*c^7f^2l^*z - 288a^3b^10c^*e^*m^2z \\
& - 49152a^7b^*c^6e^*l^2z - 58368a^5b^*c^8d^2l^*z - 432a^*b^9c^4d^2l^*z \\
& - 1024a^6b^*c^7g^*h^2z + 32a^*b^8c^5d^2j^*z + 1024a^5b^*c^8f^2g^*z - \\
& 9216a^4b^*c^9d^2g^*z + 336a^*b^7c^6d^2g^*z - 672a^*b^6c^7d^2e^*z - 1 \\
& 22880a^9c^5k^*l^*m^*z - 40960a^8c^6f^1m^*z + 24576a^8c^6h^*k^*l^*z - 204 \\
& 80a^8c^6h^*j^*m^*z + 73728a^7c^7d^*k^*l^*z - 61440a^7c^7d^*j^*m^*z + 32768* \\
& a^7c^7e^*j^*l^*z - 12288a^7c^7f^*j^*k^*z - 20480a^7c^7e^*h^*m^*z + 8192a^7* \\
& c^7f^*h^1z - 61440a^6c^8d^*e^*m^*z + 24576a^6c^8d^*f^1z - 12288a^6c^8 \\
& *e^*f^*k^*z + 12288a^6c^8d^*h^*j^*z + 12288a^5c^9d^*e^*h^*z - 131328a^8b^3c \\
& ^3l^*m^2z + 46656a^7b^5c^2l^*m^2z - 142848a^8b^2c^4j^*m^2z + 10636 \\
& 8a^7b^4c^3j^*m^2z - 34208a^6b^6c^2j^*m^2z + 2304a^7b^3c^4k^2l^* \\
& z - 576a^6b^5c^3k^2l^*z + 48a^5b^7c^2k^2l^*z + 45056a^7b^3c^4j^* \\
& l^2z - 15360a^6b^5c^3j^*l^2z - 12288a^7b^2c^5j^2l^*z + 3072a^6b^ \\
& 4c^4j^2l^*z + 2304a^5b^7c^2j^*l^2z - 256a^5b^6c^3j^2l^*z + 15872*
\end{aligned}$$

$a^7b^2c^5jk^2z - 4992a^6b^4c^4jk^2z + 672a^5b^6c^3jk^2z - 32a^4b^8c^2jk^2z + 71424a^7b^3c^4g^2m^2z - 53184a^6b^5c^3g^2m^2z + 17104a^5b^7c^2g^2m^2z + 6912a^6b^3c^5h^2l^2z - 1728a^5b^5c^4h^2l^2z + 144a^4b^7c^3h^2l^2z + 24576a^7b^2c^5g^2l^2z - 22528a^6b^4c^4g^2l^2z + 7680a^5b^6c^3g^2l^2z + 4096a^6b^2c^6g^2l^2z - 3072a^5b^4c^5g^2l^2z - 1152a^4b^8c^2g^2l^2z + 768a^4b^6c^4g^2l^2z - 64a^3b^8c^3g^2l^2z - 142848a^7b^2c^5e^2m^2z + 106368a^6b^4c^4e^2m^2z - 34208a^5b^6c^3e^2m^2z - 7936a^6b^3c^5g^2k^2z + 5088a^4b^8c^2e^2m^2z + 2496a^5b^5c^4g^2k^2z - 1536a^6b^2c^6h^2j^2z + 1280a^5b^3c^6f^2l^2z + 384a^5b^4c^5h^2j^2z - 336a^4b^7c^3g^2k^2z + 192a^4b^5c^5f^2l^2z - 144a^3b^7c^4f^2l^2z - 32a^4b^6c^4h^2j^2z + 16a^3b^9c^2g^2k^2z + 16a^2b^9c^3f^2l^2z + 45056a^6b^3c^5e^2l^2z - 15360a^5b^5c^4e^2l^2z - 12288a^5b^2c^7e^2l^2z + 3072a^4b^4c^6e^2l^2z + 2304a^4b^7c^3e^2l^2z - 256a^3b^6c^5e^2l^2z - 128a^3b^9c^2e^2l^2z + 59136a^4b^3c^7d^2l^2z - 23488a^3b^5c^6d^2l^2z + 15872a^6b^2c^6e^2k^2z - 4992a^5b^4c^5e^2k^2z + 4560a^2b^7c^5d^2l^2z + 1536a^5b^2c^7f^2j^2z + 672a^4b^6c^4e^2k^2z - 384a^4b^4c^6f^2j^2z - 32a^3b^8c^3e^2k^2z + 32a^3b^6c^5f^2j^2z + 768a^5b^3c^6g^2h^2z - 192a^4b^5c^5g^2h^2z + 16a^3b^7c^4g^2h^2z - 15872a^4b^2c^8d^2j^2z + 4992a^3b^4c^7d^2j^2z - 672a^2b^6c^6d^2j^2z - 1536a^5b^2c^7e^2h^2z - 768a^4b^3c^7f^2g^2z + 384a^4b^4c^6e^2h^2z + 192a^3b^5c^6f^2g^2z - 32a^3b^6c^5e^2h^2z - 16a^2b^7c^5f^2g^2z + 7936a^3b^3c^8d^2g^2z - 2496a^2b^5c^7d^2g^2z + 1536a^4b^2c^8e^2f^2z - 384a^3b^4c^7e^2f^2z + 32a^2b^6c^6e^2f^2z - 15872a^3b^2c^9d^2e^2z + 4992a^2b^4c^8d^2e^2z - 61440a^8b^2c^4l^3z + 21504a^7b^4c^3l^3z - 3328a^6b^6c^2l^3z + 432a^5b^9l^3m^2z + 51200a^9c^5j^2m^2z + 16384a^8c^6j^2l^2z - 288a^4b^10j^2m^2z - 18432a^8c^6j^2k^2z + 144a^3b^11g^2m^2z + 51200a^8c^6e^2m^2z + 2048a^7c^7h^2j^2z + 16384a^6c^8e^2l^2z + 16b^11c^3d^2l^2z - 18432a^7c^7e^2k^2z - 2048a^6c^8f^2j^2z + 18432a^5c^9d^2j^2z + 192a^5b^8c^1l^3z + 2048a^6c^8e^2h^2z - 16b^9c^5d^2g^2z - 2048a^5c^9e^2f^2z + 32b^8c^6d^2e^2z + 18432a^4c^10d^2e^2z + 65536a^9c^5l^3z - 11008a^8b^3c^3j^2k^2l^2m - 288a^6b^5c^3j^2k^2l^2m + 144a^5b^6c^3g^2k^2l^2m - 11008a^7b^3c^4e^2k^2l^2m - 5376a^7b^3c^4f^2j^2l^2m + 3840a^7b^3c^4g^2j^2k^2m - 3328a^7b^3c^4h^2j^2k^2l^2m - 96a^4b^7c^3g^2j^2k^2m - 2560a^7b^3c^4g^2h^2l^2m - 36a^3b^8c^3f^2h^2k^2m - 6912a^6b^3c^5d^2j^2k^2l^2m - 7872a^6b^3c^5d^2h^2k^2m - 7680a^6b^3c^5d^2g^2l^2m - 5376a^6b^3c^5e^2f^2l^2m + 3840a^6b^3c^5e^2g^2k^2m - 3328a^6b^3c^5e^2h^2k^2l^2m - 1536a^6b^3c^5f^2g^2k^2l^2m + 1280a^6b^3c^5f^2g^2j^2m - 768a^6b^3c^5g^2h^2j^2k^2 - 768a^6b^3c^5f^2h^2j^2l^2 - 768a^6b^3c^5e^2h^2j^2m - 36a^2b^9c^3d^2h^2k^2m - 6912a^5b^3c^6d^2e^2k^2l^2m - 4864a^5b^3c^6d^2e^2j^2m - 2304a^5b^3c^6d^2g^2j^2k^2 - 1792a^5b^3c^6e^2f^2j^2k^2 - 1280a^5b^3c^6d^2f^2j^2l^2 - 4544a^5b^3c^6d^2f^2h^2m + 1536a^5b^3c^6d^2g^2h^2l^2 + 1280a^5b^3c^6e^2f^2g^2m - 768a^5b^3c^6e^2g^2h^2k^2 - 768a^5b^3c^6e^2f^2h^2l^2 - 256a^5b^3c^6f^2g^2h^2j^2 + 12a^2b^9c^2d^2f^2h^2m + 16a^2b^8c^3d^2f^2g^2l^2 - 4a^2b^8c^3d^2f^2h^2k^2 - 2304a^4b^3c^7d^2e^2g^2k^2 - 1792a^4b^3c^7d^2e^2h^2j^2 - 1280a^4b^3c^7d^2e^2f^2l^2 - 768a^4b^3c^7d^2f^2g^2j^2 - 32a^2b^7c^4d^2e^2f^2l^2 - 256a^4b^3c^7e^2f^2g^2h^2 - 768a^3b^3c^8d^2e^2f^2g^2 + 32a^2b^5c^6d^2e^2f^2g^2 + 12a^2b^10c^2d^2f^2k^2m + 3648a^7b^3c^2j^2k^2l^2m + 5504a^7b^2c^3g^2k^2l^2m - 1824a^6b^4c^2g^2k^2l^2m + 384a^7b^2c^3h^2j^2l^2m - 288a^6b^4c^2h^2j^2l^2m - 4800a^6b^3c^3g^2j^2k^2m + 3648a^6b^3c^3e^2k^2l^2m + 1280a^5b^5c^2g^2j^2k^2m + 1088a^6b^3c^3f^2j^2l^2m + 576a^6b^3c^3h^2j^2k^2l^2 - 288a^5b^5c^2e^2k^2l^2m - 192a^6b^3c^3g^2h^2l^2m + 144a^5b^5c^2g^2h^2l^2m + 9600a^6b^2c^4e^2j^2k^2m - 4224a^6b^2c^4d^2j^2l^2m - 2560a^5b^4c^3e^2j^2k^2m + 384a^6b^2c^4f^2j^2k^2l^2 + 224a^5b^4c^3d^2j^2l^2m + 192a^4b^6c^2e^2j^2k^2m - 160a^5b^4c^3f^2j^2k^2l^2 - 4608a^6b^2c^4f^2h^2k^2m + 2688a^6b^2c^4f^2g^2l^2m + 1664a^6b^2c^4g^2h^2k^2l^2 - 744a^5b^4c^3f^2h^2k^2m - 544a^5b^4c^3f^2g^2l^2m + 492a^4b^6c^2f^2h^2k^2m + 416a^5b^4c^3g^2h^2j^2m + 384a^6b^2c^4g^2h^2j^2m + 384a^6b^2c^4e^2h^2l^2m - 288a^5b^4c^3g^2h^2k^2l^2 - 288a^5b^4c^3e^2h^2l^2m - 96a^4b^6c^2g^2h^2j^2m + 2112a^5b^3c^4d^2j^2k^2l^2 - 160a^4b^5c^3d^2j^2k^2l^2 + 16992a^5b^3c^4d^2h^2k^2m - 6252a^4b^5c^3d^2h^2k^2m - 480$

$$\begin{aligned}
& 0*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*j*m - 192*a^5*b^3*c^4*g*h*j*k - 192*a^5*b^3* \\
& c^4*f*g*k*l + 192*a^4*b^5*c^3*e*h*j*m - 112*a^4*b^5*c^3*d*g*l*m + 96*a^4*b^ \\
& 5*c^3*f*h*j*l - 96*a^3*b^7*c^2*e*g*k*m + 80*a^4*b^5*c^3*f*g*k*l + 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*l - 4608 \\
& *a^5*b^2*c^5*e*g*j*l - 4224*a^5*b^2*c^5*d*e*l*m + 3456*a^5*b^2*c^5*e*f*j*m \\
& + 3456*a^5*b^2*c^5*d*g*k*l + 2432*a^5*b^2*c^5*d*g*j*m - 1312*a^4*b^4*c^4*d* \\
& h*j*l + 1272*a^3*b^6*c^3*d*f*k*m - 1056*a^4*b^4*c^4*d*g*k*l + 896*a^5*b^2*c \\
& ^5*f*g*j*k + 768*a^4*b^4*c^4*e*g*j*l - 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*l - 232*a^2 \\
& *b^8*c^2*d*f*k*m + 224*a^4*b^4*c^4*d*e*l*m - 160*a^4*b^4*c^4*e*f*k*l - 96*a \\
& ^4*b^4*c^4*f*g*j*k + 96*a^3*b^6*c^3*d*h*j*l + 80*a^3*b^6*c^3*d*g*k*l - 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*l + 384*a^5*b^2*c^5*e*g*h*m + 224*a^4*b^4*c^4*f*g*h*l - \\
& 96*a^3*b^6*c^3*e*g*h*m - 48*a^3*b^6*c^3*f*g*h*l + 2112*a^4*b^3*c^5*d*e*k*l \\
& - 960*a^4*b^3*c^5*d*f*j*l + 960*a^4*b^3*c^5*d*e*j*m + 384*a^3*b^5*c^4*d*f*j \\
& *l + 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*l - 32*a^2*b^7*c^3*d*f*j*l + 7392*a^4*b^3*c^5*d*f*h*m - 2496*a^4*b^3*c^ \\
& 5*d*g*h*l - 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*l - 448*a^4*b^3*c^5*e*f*h*l + 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*l - 48*a \\
& ^2*b^7*c^3*d*g*h*l + 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*l - 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*l + 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*l + 600*a^3*b^4*c^5*d \\
& *f*h*k + 480*a^3*b^4*c^5*d*f*g*l - 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*l - 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*l + 12*a^2*b^6*c^4*d*f*h*k - 960*a^3*b^3* \\
& c^6*d*e*f*l + 384*a^2*b^5*c^5*d*e*f*l + 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*l^2*m - 4752*a^7*b^4*c*j*l*m^2 + 96*a^5*b^6*c*j^2*k*m - 6144*a \\
& ^8*b*c^3*h*l^2*m - 168*a^6*b^5*c*h*l^2*m + 6400*a^8*b*c^3*g*l*m^2 - 2862*a^ \\
& 6*b^5*c*h*k*m^2 + 2376*a^6*b^5*c*g*l*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*l^2 + 56*a^5*b^6*c*f*l^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*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 - 892 \\
& 8*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*l + 4608*a^5*b*c^6*e^2*j*l - 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*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 - 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
\end{aligned}$$

$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 + 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 - 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 + 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 + 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 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 + 1386 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 + 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 l - 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 l - 102 a^4 b^5 c^3 f h k^2 - 96 a^4 b^3 c^5 f^2 g l - 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 l + 16 a^4 b^4 c^4 g h^2 j - 12 a^4 b^4 c^4 f h^2 k$

$$\begin{aligned}
& + 12a^3b^6c^3f^2h^2k + 8a^2b^7c^3f^2g^1 + 6a^3b^7c^2f^2h^2k^2 - \\
& 2a^2b^7c^3f^2h^2k - 9312a^5b^3c^4d^2h^1^2 + 3288a^4b^5c^3d^2h^1^2 - \\
& 2304a^4b^2c^6e^2g^1 + 1920a^5b^3c^4e^2g^1^2 + 1728a^4b^2c^6e^2f^2m + 1152a^4b^3c^5e^2g^2^1 - \\
& 768a^4b^5c^3e^2g^1^2 - 608a^4b^3c^5d^2g^2^m - 472a^3b^7c^2d^2h^1^2 + 384a^3b^4c^5e^2g^1 - 288a^3b^4c^5e^2f^2m - \\
& 224a^4b^3c^5f^2g^2^k + 192a^5b^2c^5f^2h^2j^2 + 192a^4b^2c^6e^2h^2k - 192a^3b^5c^4e^2g^2^1 + 120a^3b^5c^4d^2g^2^m + 64a^3b^7c^2e^2g^1^2 - \\
& 32a^3b^4c^5e^2h^2k + 24a^3b^5c^4f^2g^2^k + 9936a^3b^3c^6d^2f^2m + 3786a^4b^5c^3d^2f^2m^2 - 3552a^5b^2c^5d^2h^2k^2 - 3486a^2b^5c^5d^2f^2m - \\
& 3424a^3b^3c^6d^2g^1 - 1868a^3b^7c^2d^2f^2m^2 + 1332a^4b^4c^4d^2h^2k^2 - 1296a^5b^3c^4d^2f^2m^2 - 1236a^3b^4c^5d^2f^2m + 1224a^2b^5c^5d^2g^1 - \\
& 1152a^4b^2c^6d^2f^2m + 960a^5b^2c^5e^2g^2^k - 496a^3b^3c^6d^2h^2k + 462a^2b^6c^4d^2f^2m + 432a^4b^3c^5d^2h^2k - 240a^4b^4c^4e^2g^2^k - \\
& 222a^2b^5c^5d^2h^2k + 192a^4b^2c^6f^2g^2^j + 192a^4b^2c^6e^2f^2^1 - 174a^3b^5c^4d^2h^2k - 156a^3b^6c^3d^2h^2k^2 + 48a^3b^4c^5e^2f^2^1 - \\
& 32a^4b^3c^5e^2h^2j + 16a^3b^6c^3e^2g^2^k + 16a^3b^4c^5f^2g^2^j - 16a^2b^6c^4e^2f^2^1 + 12a^2b^7c^3d^2h^2k + 6a^2b^8c^2d^2h^2k^2 + 1728a^5b^2c^5d^2f^1^2 + \\
& 1392a^4b^4c^4d^2f^1^2 - 840a^3b^6c^3d^2f^1^2 - 768a^4b^2c^6e^2g^2^j + 576a^4b^2c^6d^2g^2^k + 480a^3b^3c^6d^2e^2^m + 144a^2b^8c^2d^2f^1^2 + 96a^4b^3c^5d^2h^2j^2 + \\
& 96a^3b^3c^6e^2f^2^k - 80a^3b^4c^5d^2g^2^k + 6848a^3b^2c^7d^2e^1 - 3552a^3b^2c^7d^2f^2^k - 2448a^2b^4c^6d^2e^1 + 1332a^2b^4c^6d^2f^2^k + 960a^3b^2c^7d^2g^2^j - \\
& 496a^4b^3c^5d^2f^2^k + 432a^3b^3c^6d^2f^2^k - 240a^2b^4c^6d^2g^2^j - 222a^3b^5c^4d^2f^2^k - 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 - 32a^3b^3c^6e^2f^2^j - 320a^3b^2c^7d^2e^2^k + 192a^4b^2c^6e^2g^2^h + 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^7e^2f^2^g + 144a^2b^3c^7d^2f^2^h - \\
& 30a^2b^5c^5d^2f^2^h^2 + 16a^2b^4c^6e^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^2^g + 192a^2b^2c^8d^2e^2^f - \\
& 7680a^9b^3c^2^1^2m^2 + 3152a^8b^3c^1^2m^2 + 2070a^7b^4c^2k^2m^2 - 1840a^7b^3c^2k^3m + 6720a^8b^3c^3j^2m^2 - 3072a^8b^3c^3k^2^1^2 + 1680a^6b^5c^3j^2m^2 - 100a^6b^5c^3k^2^1^2 - 2176a^7b^3c^2j^1^3 - \\
& 256a^6b^3c^3j^3^1 - 64a^5b^6c^3j^2^1^2 - 12480a^8b^2c^2h^3m^3 + 972a^5b^6c^3h^2m^2 - 960a^7b^3c^4j^2k^2 - 252a^5b^4c^3h^3m - 192a^6b^2c^4h^3m + 54a^4b^6c^2h^3m + 1536a^7b^3c^4h^2^1^2 + \\
& 420a^4b^7c^2g^2^m^2 - 36a^4b^7c^2h^2^1^2 - 3072a^7b^2c^3g^1^3 + 2096a^7b^3c^2f^2m^3 + 1088a^6b^4c^2g^1^3 - 496a^6b^3c^3h^2k^3 - 192a^4b^4c^4g^3^1 + 176a^4b^3c^5f^3^m + 144a^5b^3c^4h^3k + 78a^3b^8c^2f^2m^2 + 54a^3b^5c^4f^3^m + 32a^3b^6c^3g^3^1 + 30a^5b^5c^2h^2k^3 - 18a^4b^5c^3h^3k - 18a^2b^7c^3f^3^m - 16a^3b^8c^2g^2^1^2 + 6720a^6b^3c^5e^2m^2 - 192a^6b^3c^5h^2j^2 - 4a^2b^9c^2f^2^1^2 - 35040a^7b^2c^3d^2m^3 + 14300a^6b^4c^2d^2m^3 - 12000a^3b^2c^7d^3m + 4380a^2b^4c^6d^3m - 2176a^6b^3c^3e^1^3 - 256a^3b^3c^6e^3^1 - 192a^6b^2c^4f^2k^3 + 192a^5b^5c^2e^1^3 - 192a^4b^2c^6f^3^k + 132a^5b^4c^3f^2k^3 + 128a^4b^3c^5g^3^j - 28a^3b^4c^5f^3^k - 10a^4b^6c^2f^2k^3 + 6a^2b^6c^4f^3^k + 10752a^5b^3c^6d^2^1^2 - 960a^5b^3c^6e^2k^2 - 192a^5b^3c^6f^2j^2 + 108a^4b^9c^2d^2^1^2 - 1680a^5b^3c^4d^2k^3 - 1680a^2b^3c^7d^3k + 222a^4b^5c^3d^2k^3 + 30a^4b^8c^3d^2k^2 - 10a^3b^7c^2d^2k^3 - 960a^4b^3c^7d^2j^2 + 80a^4b^3c^5f^2h^3 + 80a^3b^3c^6f^3^h + 6a^3b^5c^4f^2h^3 + 6a^2b^5c^5f^3^h - 192a^4b^3c^7e^2h^2 - 192a^4b^2c^6d^2h^3 - 192a^2b^2c^8d^3h + 128a^3b^3c^6e^2g^3 - 28a^3b^4c^5d^2h^3 + 12a^2b^6c^5d^2h^2 + 6a^2b^6c^4d^2h^3 - 192a^3b^3c^8e^2f^2 + 60a^2b^5c^6d^2g^2 + 198a^2b^4c^7d^2f^2 + 144a^2b^3c^7d^2f^3 - 960a^2b^3c^9d^2e^2 + 240a^2b^3c^8d^2e^2 + 15360a^9c^3k^1^2m - 12800a^9c^3j^1m^2 - 3840a^8c^4j^2k
\end{aligned}$$

$$\begin{aligned}
& *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 + 51 \\
& 20*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 - 6 \\
& 192*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 - 1 \\
& 8*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*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 - 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 - 2048*a^6*c^6*e^2*1^2 - 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*1^4 - 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 + 8000*a^9*c^3*h*m^3 + 320*a^7*c^
\end{aligned}$$

$$\begin{aligned}
& 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^1l^4 - 10b^6 \\
& c^6d^3h - 1728a^3c^9d^3h - 192a^5c^7d^3h^3 + 30b^5c^7d^3f + 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^2 \\
& d^2k^2 - b^8c^4d^2h^2, z, k1) * x * (8192a^6b^3c^9 + 32a^2b^9c^5 - 512a^3b^7c^6 + 3072a^4b^5c^7 - 8192a^5b^3c^8) / (4 * (64a^5c^6 - a^2 \\
& b^6c^3 + 12a^3b^4c^4 - 48a^4b^2c^5)) + (x * (2b^6c^6d^2 - 576a^3c^9d^2 + 64a^4c^8f^2 - 64a^5c^7h^2 + 576a^6c^6k^2 + 18a^2b^{10} \\
& m^2 - 1600a^7c^5m^2 - 36a^2b^4c^7d^2 + 128a^3b^3c^8e^2 + 128a^5b^3c^6j^2 + 8a^2b^9c^1l^2 + 3072a^6b^3c^5l^2 - 300a^3b^8c^3m^2 + 256a^2 \\
& b^2c^8d^2 - 32a^2b^3c^7e^2 + 20a^2b^4c^6f^2 - 96a^3b^2c^7f^2 - 8a^2b^5c^5g^2 + 32a^3b^3c^6g^2 + 2a^2b^6c^4h^2 - 4a^3b^4c^5 \\
& h^2 - 32a^4b^3c^5j^2 + 2a^2b^8c^2k^2 - 40a^3b^6c^3k^2 + 276a^4b^4c^4k^2 - 736a^5b^2c^5k^2 - 136a^3b^7c^2l^2 + 888a^4b^5c^3 \\
& l^2 - 2656a^5b^3c^4l^2 + 1874a^4b^6c^2m^2 - 5284a^5b^4c^3m^2 + 6144a^6b^2c^4m^2 - 384a^4c^8d^3h + 1920a^5c^7d^3m - 1024a^5c^7 \\
& e^3l + 384a^5c^7f^3k + 640a^6c^6h^3m - 1024a^6c^6j^3l + 4a^2b^5c^6d^3f + 320a^3b^3c^8d^3f + 64a^4b^3c^7f^3h + 576a^4b^3c^7d^3k + 256a^4b^3c^7 \\
& e^3j - 1472a^5b^3c^6f^3m + 512a^5b^3c^6g^3l + 64a^5b^3c^6h^3k - 12a^2b^9c^3k^3m - 3776a^6b^3c^5k^3m - 96a^2b^3c^7d^3f + 8a^2b^4c^6d^3h + \\
& 32a^2b^4c^6e^3g + 64a^3b^2c^7d^3h - 128a^3b^2c^7e^3g - 12a^2b^5c^5f^3h + 32a^3b^3c^6f^3h + 20a^2b^5c^5d^3k - 224a^3b^3c^6d^3k - 6 \\
& 4a^3b^3c^6e^3j - 60a^2b^6c^4d^3m - 12a^2b^6c^4f^3k + 632a^3b^4c^5d^3m - 32a^3b^4c^5e^3l + 152a^3b^4c^5f^3k + 32a^3b^4c^5g^3j - 20 \\
& 48a^4b^2c^6d^3m + 384a^4b^2c^6e^3l - 512a^4b^2c^6f^3k - 128a^4b^2c^6g^3j + 36a^2b^7c^3f^3m + 4a^2b^7c^3h^3k - 396a^3b^5c^4f^3m + \\
& 16a^3b^5c^4g^3l - 44a^3b^5c^4h^3k + 1376a^4b^3c^5f^3m - 192a^4b^3c^5g^3l + 96a^4b^3c^5h^3k - 12a^2b^8c^2h^3m + 112a^3b^6c^3h^3m - \\
& 248a^4b^4c^4h^3m - 192a^5b^2c^5h^3m - 32a^4b^4c^4j^3l + 384a^5b^2c^5j^3l + 220a^3b^7c^2k^3m - 1436a^4b^5c^3k^3m + 3936a^5b^3c^4k^3 \\
& k^3m) / (4 * (64a^5c^6 - a^2b^6c^3 + 12a^3b^4c^4 - 48a^4b^2c^5)) - (\\
& 5b^3c^7d^3 + 8a^3c^7f^3 + 216a^6c^4k^3 - 63a^5b^5m^3 - 96a^2c^8d^3e^2 + 72a^2c^8d^2f - 4a^4b^3c^5h^3 - 3b^4c^6d^2f - 32a^3c^7 \\
& e^2h + b^5c^5d^2h - 96a^4c^6d^3j^2 + 8a^4c^6f^3h^2 + 216a^3c^7d^2k + 573a^6b^3c^3m^3 - 1300a^7b^3c^2m^3 + 384a^5c^5d^3l^2 + b^6c^4 \\
& d^2k + 72a^4c^6f^2k + 216a^5c^5f^3k^2 + 9a^2b^8f^3m^2 + 160a^4c^6e^2m - 32a^5c^5h^3j^2 - 3b^7c^3d^2m + 24a^5c^5h^2k + 200a^6 \\
& c^4f^3m^2 - 27a^3b^7h^3m^2 + 128a^6c^4h^3l^2 + 45a^4b^6k^3m^2 + 160a^6c^4j^2m + 600a^7c^3k^3m^2 - 640a^7c^3l^2m + 6a^2b^2c^6f^3 - \\
& 3a^3b^3c^4h^3 + 5a^4b^4c^2k^3 - 66a^5b^2c^3k^3 - 36a^2b^8d^3 + 9a^2b^9d^3m^2 + 4a^2b^8c^3d^3l^2 + 48a^3c^7d^3f^3h - 192a^3c^7d^3e^3j \\
& - 240a^4c^6d^3f^3m + 144a^4c^6d^3h^3k - 128a^4c^6e^3f^3l - 64a^4c^6e^3h^3j - 80a^5c^5f^3h^3m - 720a^5c^5d^3k^3m + 320a^5c^5e^3j^3m - 384a^5c^5 \\
& e^3k^3l - 128a^5c^5f^3j^3l - 240a^6c^4h^3k^3m - 384a^6c^4j^3k^3l + 16a^2b^2c^7d^3e^2 + 18a^2b^2c^7d^2f + 3a^2b^3c^6d^3f^2 - 60a^2b^3c^7d^3f^2 \\
& + 4a^2b^4c^5d^3g^2 + 16a^2b^3c^7e^2f - a^2b^3c^6d^2h + a^2b^5c^4d^3h^2 - 60a^2b^3c^7d^2h - 28a^3b^3c^6d^3h^2 - 28a^3b^3c^6f^2h - 10a^2b^4 \\
& c^5d^2k + a^2b^7c^2d^3k^2 - 396a^4b^3c^5d^3k^2 + 16a^3b^3c^6e^2k + 16a^4b^3c^5f^3j^2 + 25a^2b^5c^4d^2m - 159a^2b^7c^3d^3m^2 - 348a^3b^3c^6 \\
& d^2m + 1460a^5b^3c^4d^3m^2 + 4a^2b^7c^3f^3l^2 + 128a^5b^3c^4f^3l^2 - 78a^3b^6c^3f^3m^2 - 76a^4b^3c^5f^2m - 204a^5b^3c^4h^3k^2 - 12a^3b^6 \\
& c^3h^3l^2 + 279a^4b^5c^3h^3m^2 - 12a^5b^3c^4h^2m + 16a^5b^3c^4j^2k + 420a^6b^3c^3h^3m^2 + 20a^4b^5c^3k^3l^2 + 512a^6b^3c^3k^3l^2 - 30a^4b^5 \\
& c^3k^2m - 402a^5b^4c^3k^3m^2 - 924a^6b^3c^3k^2m - 28a^5b^4c^3l^2m - 24a^2b^2c^6d^3g^2 - 9a^2b^3c^5d^3h^2 + 4a^2b^3c^5f^3g^2 - 5a^2b^3
\end{aligned}$$

$$\begin{aligned}
& ^3c^5f^2h + a^2b^4c^4fh^2 + 16a^3b^2c^5d^2j^2 + 18a^3b^2c^5fh^2 - 6a^2b^2c^6d^2k - 21a^2b^5c^3dk^2 - 8a^3b^2c^5g^2h + 15 \\
& 5a^3b^3c^4dk^2 - 72a^2b^6c^2d^2l^2 + 436a^3b^4c^3d^2l^2 - 952a^4b^2c^4d^2l^2 + 23a^2b^3c^5d^2m - 5a^2b^4c^4f^2k + a^2b^6c^2f \\
& f^2k + 26a^3b^2c^5f^2k - 12a^3b^4c^3f^2k + 970a^3b^5c^2d^2m^2 + 2a^4b^2c^4f^2k^2 - 2289a^4b^3c^3d^2m^2 - 48a^3b^2c^5e^2m + 4 \\
& a^3b^3c^4g^2k - 36a^3b^5c^2f^2l^2 + 52a^4b^3c^3f^2l^2 + 15a^2b^5c^3f^2m - 53a^3b^3c^4f^2m - 6a^3b^4c^3h^2k - 3a^3b^5c^2hk^2 + 42a^4b^2c^4h^2k \\
& + 51a^4b^3c^3hk^2 + 133a^4b^4c^2f^2m^2 + 114a^5b^2c^3f^2m^2 - 12a^3b^4c^3g^2m + 40a^4b^2c^4g^2m + 128a^4b^4c^2h^2l^2 - 360a^5b^2c^3h^2l^2 \\
& + 18a^3b^5c^2h^2m - 81a^4b^3c^3h^2m - 801a^5b^3c^2h^2m - 48a^5b^2c^3j^2m - 204a^5b^3c^2k^2l^2 + 339a^5b^3c^2k^2m + 762a^6b^2c^2k^2m^2 + 264a^6b^2c^2 \\
& l^2m - 6a^4b^8c^2dk^2m - 16a^4b^3c^6d^2eg + 96a^2b^7c^2d^2eg - 4a^4b^4c^5d^2fh + 32a^3b^6c^6e^2gh + 16a^4b^5c^4d^2fh + 544a^3b^6c^6d^2fh \\
& + 32a^3b^6c^6d^2fh + 96a^3b^6c^6d^2gh + 32a^3b^6c^6d^2gj + 32a^3b^6c^6e^2fh + 12a^4b^6c^3d^2fh - 8a^4b^6c^3d^2gh + 2a^4b^6c^3d^2hk - 6a \\
& b^7c^2d^2hm - 152a^4b^6c^5d^2hm - 160a^4b^6c^5e^2gm + 224a^4b^6c^5e^2hm + 64a^4b^6c^5f^2gm - 152a^4b^6c^5f^2hk + 32a^4b^6c^5g^2hm + 544 \\
& a^4b^6c^5d^2j^2 + 32a^4b^6c^5e^2jk - 6a^2b^7c^2fh^2m + 32a^5b^6c^4e^2l^2m - 536a^5b^6c^4fh^2m - 160a^5b^6c^4g^2jm + 192a^5b^6c^4g^2k^2l^2 + 224 \\
& a^5b^6c^4h^2j^2 + 18a^3b^6c^4hk^2m + 32a^6b^6c^3j^2l^2 + 52a^2b^2c^6d^2fh - 16a^2b^2c^6e^2fg + 32a^2b^2c^6d^2ej - 192a^2b^3c^5d^2e \\
& l + 70a^2b^3c^5d^2fk - 16a^2b^3c^5d^2gj - 190a^2b^4c^4d^2fm + 96a^2b^4c^4d^2g^2l - 30a^2b^4c^4d^2hk + 16a^2b^4c^4e^2fl + 676a^3 \\
& b^2c^5d^2fm - 272a^3b^2c^5d^2g^2l + 100a^3b^2c^5d^2hk - 48a^3b^2c^5e^2fl - 16a^3b^2c^5e^2gk - 16a^3b^2c^5f^2gj + 80a^2b^5c^3d^2hm - 8a^2b^5c^3f^2g^2l \\
& + 2a^2b^5c^3f^2hk - 210a^3b^3c^4d^2hm + 48a^3b^3c^4e^2gm - 48a^3b^3c^4e^2hl + 24a^3b^3c^4f^2g^2l + 6a^3b^3c^4f^2hk + 16a^2b^5c^3d^2j^2l - 192a^3b^3c^4d^2j^2l \\
& - 6a^2b^6c^2f^2hm - 28a^3b^4c^3f^2hm + 24a^3b^4c^3g^2hl + 276a^4b^2c^4f^2hm - 112a^4b^2c^4g^2hl + 116a^2b^6c^2d^2k^2m - 780a^3b^4c^3d^2k^2m \\
& + 16a^3b^4c^3f^2j^2l + 1876a^4b^2c^4d^2k^2m - 96a^4b^2c^4e^2jm + 80a^4b^2c^4e^2k^2l - 48a^4b^2c^4f^2j^2l - 16a^4b^2c^4g^2jk + 62a^3b^5c^2f^2k^2m \\
& - 42a^4b^3c^3f^2k^2m + 48a^4b^3c^3g^2jm - 40a^4b^3c^3g^2k^2l - 48a^4b^3c^3h^2j^2l - 246a^4b^4c^2h^2k^2m - 16a^5b^2c^3g^2l^2m + 804a^5b^2c^3h^2k^2m \\
& + 80a^5b^2c^3j^2k^2l)/(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^2l^3 - 320a^6b^3c^3l^3 \\
& + 96a^3c^7e^2j + 96a^4c^6e^2j^2 + 144a^3c^7d^2l + 128a^5c^5e^2l^2 - b^6c^4d^2l - 16a^4c^6f^2l - 9a^2b^8g^2m^2 + 16a^5c^5h^2l + 18a^3b^7j^2m^2 \\
& + 128a^6c^4j^2l^2 - 144a^6c^4k^2l - 27a^4b^6l^2m^2 + 400a^7c^3l^2m^2 - 4a^2b^3c^5g^3 + 124a^5b^3c^2l^3 + 24a^4b^3c^8d^2e - 48a^2c^8d^2ef - 16a^3c^7e^2fh \\
& - 144a^3c^7d^2ek - 48a^3c^7d^2fj + 96a^4c^6d^2hl + 80a^4c^6e^2fm - 48a^4c^6e^2hk - 16a^4c^6f^2hj - 144a^4c^6d^2jk - 480a^5c^5d^2lm + 240a^5c^5e^2km \\
& + 80a^5c^5f^2jm - 96a^5c^5f^2k^2l - 48a^5c^5h^2jk - 160a^6c^4h^2lm + 240a^6c^4j^2km - 12a^4b^2c^7d^2g + 16a^2b^7c^7e^2f - 48a^2b^7c^7e^2g \\
& + 8a^3b^6c^6e^2h - 2a^4b^3c^6d^2j + 24a^2b^7c^7d^2j + 18a^4b^4c^5d^2l + 16a^3b^6c^6f^2j + 96a^4b^6c^5e^2k^2 - 176a^3b^6c^6e^2l - 48a^4b^6c^5g^2j^2 \\
& + 18a^2b^7c^7e^2m^2 + 8a^4b^6c^5h^2j - 520a^5b^6c^4e^2m^2 - 4a^2b^7c^7g^2l^2 - 64a^5b^6c^4g^2l^2 + 96a^3b^6c^6g^2m^2 + 96a^5b^6c^4j^2k^2 + 8a^3b^6c^6j^2l^2 \\
& - 176a^5b^6c^4j^2l - 192a^4b^5c^6j^2m^2 - 520a^6b^6c^3j^2m^2 + 270a^5b^4c^2l^2m^2 + 24a^2b^2c^6e^2g^2 - 8a^2b^2c^6f^2g + 2a^2b^3c^5e^2h - a^2b^4c^4g^2h^2 \\
& - 4a^3b^2c^5g^2h^2 - 100a^2b^2c^6d^2l + 2a^2b^5c^3e^2k^2 - 28a^3b^3c^4e^2k^2 + 32a^2b^3c^5e^2l + 8a^2b^6c^2e^2l^2 + 24a^3b^2c^5g^2j - 88a^3b^4c^3e^2l^2 \\
& + 216a^4b^2c^4e^2l^2 - a^2b^4c^4f^2l - a^2b^6c^2g^2k^2 + 2a^3b^3c^4h^2j + 14a^3b^4c^3g^2k^2 - 192a^3b^5c^2*
\end{aligned}$$

$$\begin{aligned}
& 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^1^2 - 108a^4b^3c^3g^1^2 - 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^1^2 + 216a^5b^2c^3j^1^2 - 3a^4b^4c^2k^2*1 + 40a^5b^2c^3k^2*1 \\
& + 614a^5b^3c^2j^m^2 - 756a^6b^2c^2*1^m^2 - 4a*b^2c^7*d*e*f + 2*a* \\
& b^3c^6*d*f*g + 32a^2b*c^7*d*e*h + 24a^2b*c^7*d*f*g + 8a^3b*c^6*f*g*h \\
& - 2a*b^5c^4*d*f*1 + 272a^3b*c^6*d*e*m - 8a^3b*c^6*d*f*1 + 72a^3b*c \\
& ^6*d*g*k + 32a^3b*c^6*d*h*j + 80a^3b*c^6*e*f*k - 96a^3b*c^6*e*g*j + 6 \\
& 4a^4b*c^5*e*h*m - 40a^4b*c^5*f*g*m + 8a^4b*c^5*f*h*1 + 24a^4b*c^5*g \\
& *h*k + 272a^4b*c^5*d*j*m + 72a^4b*c^5*d*k*1 - 352a^4b*c^5*e*j*1 + 80* \\
& a^4b*c^5*f*j*k + 6a^2b^7*c*g^k*m + 248a^5b*c^4*f*1^m - 120a^5b*c^4*g \\
& *k^m + 64a^5b*c^4*h*j^m + 56a^5b*c^4*h*k*1 - 12a^3b^6*c*j^k^m + 18a^ \\
& 4b^5c*k^1^m + 584a^6b*c^3*k^1^m - 16a^2b^2c^6*d*g*h - 12a^2b^2c^6 \\
& *e*f*h + 20a^2b^2c^6*d*e*k - 4a^2b^2c^6*d*f*j + 6a^2b^3c^5*f*g*h - \\
& 60a^2b^3c^5*d*e*m + 18a^2b^3c^5*d*f*1 - 10a^2b^3c^5*d*g*k - 12a^ \\
& 2b^3c^5*e*f*k + 30a^2b^4c^4*d*g^m + 6a^2b^4c^4*d*h*1 + 36a^2b^4c \\
& ^4*e*f^m - 32a^2b^4c^4*e*g*1 + 4a^2b^4c^4*e*h*k + 6a^2b^4c^4*f*g*k \\
& - 136a^3b^2c^5*d*g^m - 64a^3b^2c^5*d*h*1 - 180a^3b^2c^5*e*f^m + 1 \\
& 76a^3b^2c^5*e*g*1 - 20a^3b^2c^5*e*h*k - 40a^3b^2c^5*f*g*k - 12a^3 \\
& *b^2c^5*f*h*j + 20a^3b^2c^5*d*j^k - 12a^2b^5c^3*e*h^m - 18a^2b^5c \\
& ^3*f*g^m - 2a^2b^5c^3*g^h*k + 40a^3b^3c^4*e*h^m + 90a^3b^3c^4*f*g^ \\
& m + 6a^3b^3c^4*f*h*1 + 10a^3b^3c^4*g^h*k - 60a^3b^3c^4*d*j^m - 10* \\
& a^3b^3c^4*d*k*1 + 64a^3b^3c^4*e*j*1 - 12a^3b^3c^4*f*j^k + 6a^2b^6 \\
& *c^2*g^h^m - 20a^3b^4c^3*g^h^m - 32a^4b^2c^4*g^h^m - 12a^2b^6c^2*e \\
& *k^m + 148a^3b^4c^3*e*k^m + 36a^3b^4c^3*f*j^m - 32a^3b^4c^3*g*j*1 \\
& + 4a^3b^4c^3*h*j^k + 104a^4b^2c^4*d*1^m - 476a^4b^2c^4*e*k^m - 180 \\
& *a^4b^2c^4*f*j^m + 8a^4b^2c^4*f*k*1 + 176a^4b^2c^4*g*j*1 - 20a^4b \\
& ^2c^4*h*j^k - 74a^3b^5c^2*g^k^m - 12a^3b^5c^2*h*j^m - 54a^4b^3c^3 \\
& *f*1^m + 238a^4b^3c^3*g^k^m + 40a^4b^3c^3*h*j^m - 6a^4b^3c^3*h*k*1 \\
& + 18a^4b^4c^2*h*1^m - 48a^5b^2c^3*h*1^m + 148a^4b^4c^2*j^k^m - 47 \\
& 6a^5b^2c^3*j^k^m - 210a^5b^3c^2*k^1^m)/(4*(64a^5c^6 - a^2b^6c^3 \\
& + 12a^3b^4c^4 - 48a^4b^2c^5)))*\text{root}(1572864a^8b^2c^10z^4 - 983040 \\
& *a^7b^4c^9z^4 + 327680a^6b^6c^8z^4 - 61440a^5b^8c^7z^4 + 6144a^ \\
& 4b^10c^6z^4 - 256a^3b^12c^5z^4 - 1048576a^9c^11z^4 - 1572864a^8* \\
& b^2c^8*1z^3 + 983040a^7b^4c^7*1z^3 - 327680a^6b^6c^6*1z^3 + 61440 \\
& *a^5b^8c^5*1z^3 - 6144a^4b^10c^4*1z^3 + 256a^3b^12c^3*1z^3 + 104 \\
& 8576a^9c^9*1z^3 + 96a^3b^12c^k^mz^2 + 98304a^8b^6c^7*j^1z^2 + 2457 \\
& 6a^8b^6c^7*h^mz^2 + 155648a^7b^6c^8*d^mz^2 + 98304a^7b^6c^8*e^1z^2 + \\
& 57344a^7b^6c^8*f^kz^2 + 32768a^7b^6c^8*g^jz^2 + 57344a^6b^6c^9*d^h^z^2 \\
& + 32768a^6b^6c^9*e^gz^2 - 32a*b^10c^5*d*f^z^2 - 491520a^8b^2c^6*k^m \\
& *z^2 + 358400a^7b^4c^5*k^mz^2 - 129024a^6b^6c^4*k^mz^2 + 24768a^5* \\
& b^8c^3*k^mz^2 - 2432a^4b^10c^2*k^mz^2 - 90112a^7b^3c^6*j^1z^2 + 3 \\
& 0720a^6b^5c^5*j^1z^2 - 4608a^5b^7c^4*j^1z^2 + 256a^4b^9c^3*j^1z \\
& ^2 - 21504a^6b^5c^5*h^mz^2 + 9216a^5b^7c^4*h^mz^2 + 8192a^7b^3c^ \\
& 6*h^mz^2 - 1568a^4b^9c^3*h^mz^2 + 96a^3b^11c^2*h^mz^2 - 172032a^7 \\
& *b^2c^7*f^mz^2 + 116736a^6b^4c^6*f^mz^2 - 49152a^7b^2c^7*g^1z^2 + \\
& 45056a^6b^4c^6*g^1z^2 - 35840a^5b^6c^5*f^mz^2 + 24576a^7b^2c^7* \\
& h^kz^2 - 15360a^5b^6c^5*g^1z^2 + 5184a^4b^8c^4*f^mz^2 - 3072a^5b \\
& ^6c^5*h^kz^2 + 2304a^4b^8c^4*g^1z^2 + 2048a^6b^4c^6*h^kz^2 + 576* \\
& a^4b^8c^4*h^kz^2 - 288a^3b^10c^3*f^mz^2 - 128a^3b^10c^3*g^1z^2 - \\
& 32a^3b^10c^3*h^kz^2 - 147456a^6b^3c^7*d^mz^2 - 90112a^6b^3c^7*e \\
& *1z^2 + 52224a^5b^5c^6*d^mz^2 - 49152a^6b^3c^7*f^kz^2 + 30720a^5* \\
& b^5c^6*e^1z^2 - 24576a^6b^3c^7*g^jz^2 + 15360a^5b^5c^6*f^kz^2 - 8 \\
& 192a^4b^7c^5*d^mz^2 + 6144a^5b^5c^6*g^jz^2 - 4608a^4b^7c^5*e^1z \\
& ^2 - 2048a^4b^7c^5*f^kz^2 - 512a^4b^7c^5*g^jz^2 + 480a^3b^9c^4*d \\
& *mz^2 + 256a^3b^9c^4*e^1z^2 + 96a^3b^9c^4*f^kz^2 + 131072a^6b^2* \\
& c^8*d^kz^2 + 49152a^6b^2c^8*e^jz^2 - 43008a^5b^4c^7*d^kz^2 - 12288 \\
& *a^5b^4c^7*e^jz^2 + 6144a^4b^6c^6*d^kz^2 + 1024a^4b^6c^6*e^jz^2
\end{aligned}$$

$$\begin{aligned}
& - 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 \\
& *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 - \\
& 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*l*z + 32*a^3*b^8*c^3*g*h*k*z + 41472*a^5*b^3*c^6*d*h* \\
& l*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
\end{aligned}$$

$$\begin{aligned}
& *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 + 1888*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 + 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*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*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*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 - 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*1*m*z - 40960*a^8*c^6*f*1*m*z \\
& + 24576*a^8*c^6*h*k*1*z - 20480*a^8*c^6*h*j*m*z + 73728*a^7*c^7*d*k*1*z - 6 \\
& 1440*a^7*c^7*d*j*m*z + 32768*a^7*c^7*e*j*1*z - 12288*a^7*c^7*f*j*k*z - 2048 \\
& 0*a^7*c^7*e*h*m*z + 8192*a^7*c^7*f*h*1*z - 61440*a^6*c^8*d*e*m*z + 24576*a^ \\
& 6*c^8*d*f*1*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*1*m^2*z + 46656*a^7*b^5*c^2*1*m^2*z - 14284 \\
& 8*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*1*z - 576*a^6*b^5*c^3*k^2*1*z + 48*a^5*b^7*c^2*k \\
& ^2*1*z + 45056*a^7*b^3*c^4*j*1^2*z - 15360*a^6*b^5*c^3*j*1^2*z - 12288*a^7* \\
& b^2*c^5*j^2*1*z + 3072*a^6*b^4*c^4*j^2*1*z + 2304*a^5*b^7*c^2*j*1^2*z - 256 \\
& *a^5*b^6*c^3*j^2*1*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*1*z - 1728*a^5*b^5*c^4*h^2*1*z + 144*a^4*b^7*c^3*h^2*1*z + 24576*a \\
& ^7*b^2*c^5*g*1^2*z - 22528*a^6*b^4*c^4*g*1^2*z + 7680*a^5*b^6*c^3*g*1^2*z + \\
& 4096*a^6*b^2*c^6*g^2*1*z - 3072*a^5*b^4*c^5*g^2*1*z - 1152*a^4*b^8*c^2*g*1 \\
& ^2*z + 768*a^4*b^6*c^4*g^2*1*z - 64*a^3*b^8*c^3*g^2*1*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*1*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*1*z - 144*a^3*b^7*c^4*f^ \\
& 2*1*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*1*z + 45056*a^6*b^3*c^5*e*1^2*z - 15360*a^5*b^5*c^4*e*1^2*z - 12288*a^5*b \\
& ^2*c^7*e^2*1*z + 3072*a^4*b^4*c^6*e^2*1*z + 2304*a^4*b^7*c^3*e*1^2*z - 256* \\
& a^3*b^6*c^5*e^2*1*z - 128*a^3*b^9*c^2*e*1^2*z + 59136*a^4*b^3*c^7*d^2*1*z - \\
& 23488*a^3*b^5*c^6*d^2*1*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*1*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*1^3*z + 21504*a^7*b^4*c^3*1^3*z - 3328*a^6*b^6*c^2*1^3*z + 432*a^5*
\end{aligned}$$

$$\begin{aligned}
& b^9 l^m 2^z + 51200 a^9 c^5 j^m 2^z + 16384 a^8 c^6 j^2 l^m - 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 - 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^m - 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^m - 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 - 3328 a^6 b^c^5 e^h k^m - 1536 a^6 b^c^5 f^g k^m + 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^m - 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 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 j^m - 192 a^5 b^3 c^4 g^h j^k - 192 a^5 b^3 c^4 f^g k^l + 192 a^4 b^5 c^3 e^h j^m - 112 a^4 b^5 c^3 d^g l^m \\
& + 96 a^4 b^5 c^3 f^h j^l - 96 a^3 b^7 c^2 e^g k^m + 80 a^4 b^5 c^3 f^g k^l + 32 a^4 b^5 c^3 g^h j^k - 11456 a^5 b^2 c^5 d^f k^m + 49 \\
& 92 a^5 b^2 c^5 d^h j^l - 4608 a^5 b^2 c^5 e^g j^l - 4224 a^5 b^2 c^5 d^e l^m + 3456 a^5 b^2 c^5 e^f j^m + 3456 a^5 b^2 c^5 d^g k^l + 2432 a^5 b^2 c^5 d^g j^m \\
& - 1312 a^4 b^4 c^4 d^h j^l + 1272 a^3 b^6 c^3 d^f k^m - 1056 a^4 b^4 c^4 d^g k^l + 896 a^5 b^2 c^5 f^g j^k + 768 a^4 b^4 c^4 e^g j^l - 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^l - 232 a^2 b^8 c^2 d^f k^m + 224 a^4 b^4 c^4 d^e l^m - 1 \\
& 60 a^4 b^4 c^4 e^f k^l - 96 a^4 b^4 c^4 f^g j^k + 96 a^3 b^6 c^3 d^h j^l + 80 a^3 b^6 c^3 d^g k^l - 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^l + 384 a^5 b^2 c^5 e^g h^m + 224 a^4 b^4 c^4 f^g h^l - 96 a^3 b^6 c^3 e^g h^m - 48 a^3 b^6 c^3 f^g h^l \\
& + 2112 a^4 b^3 c^5 d^e k^l - 960 a^4 b^3 c^5 d^f j^l + 960 a^4 b^3 c^5 d^e j^m + 384 a^3 b^5 c^4 d^f j^l + 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^l - 32 a^2 b^7 c^3 d^f j^l + 7392 a^4 b^3 c^5 d^f h^m - 2496 a^4 b^3 c^5 d^g h^l - 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^l - 448 a^4 b^3 c^5 e^f h^l + 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^l \\
& - 48 a^2 b^7 c^3 d^g h^l + 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^l - 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^
\end{aligned}$$

$$\begin{aligned}
& *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*d*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 + 640*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*c^7*d*e^2*f + 5120*a^8*c^4*h*j*1*m + 15360*a^7*c^5*d*j*1*m - 7680*a^7*c^5*e*j*k*m + 3072*a^7*c^5*f*j*k*1 + 5120*a^7*c^5*e*h*1*m + 1920*a^7*c^5*f*h*k*m + 15360*a^6*c^6*d*e*1*m + 5760*a^6*c^6*d*f*k*m + 3072*a^6*c^6*e*f*k*1 - 3072*a^6*c^6*d*h*j*1 - 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*1 - 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*1^2 - 5568*a^8*b^2*c^2*k*1^2*m + 15552*a^8*b^2*c^2*j*1*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*1^2*m - 1088*a^7*b^2*c^3*j*k^2*1 + 48*a^6*b^4*c^2*j*k^2*1 - 8544*a^7*b^2*c^3*h*k^2*m - 7776*a^7*b^3*c^2*g*1*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*1^2 - 1424*a^6*b^4*c^2*h*k*1^2 + 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*1^2*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*1^2*m + 96*a^5*b^5*c^2*h*j^2*m + 15552*a^7*b^2*c^3*e*1*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*1*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*1 - 678*a^5*b^5*c^2*f*k^2*m + 544*a^6*b^3*c^3*g*k^2*1 - 144*a^5*b^4*c^3*h^2*j*1 - 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*1 + 6432*a^6*b^3*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 - 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 \\
& *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 + 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
\end{aligned}$$

$$\begin{aligned}
&^2 - 32a^3b^3c^6e^2f^2j - 320a^3b^2c^7d^2e^2k + 192a^4b^2c^6e^2g \\
& * h^2 + 192a^4b^2c^6d^2f^2j^2 - 32a^3b^4c^5d^2f^2j^2 + 16a^3b^4c^5e^2g \\
& * h^2 + 480a^2b^3c^7d^2e^2j - 224a^3b^3c^6d^2g^2h + 192a^3b^2c^7 \\
& * e^2f^2h + 24a^2b^5c^5d^2g^2h - 864a^3b^2c^7d^2f^2h + 336a^3b^3c^6 \\
& * d^2f^2h^2 + 192a^3b^2c^7e^2f^2g + 144a^2b^3c^7d^2f^2h - 30a^2b^5 \\
& * c^5d^2f^2h^2 + 16a^2b^4c^6e^2f^2g - 12a^2b^4c^6d^2f^2h + 192a^3b^2 \\
& * c^7d^2f^2g^2 + 96a^2b^3c^7d^2e^2h + 48a^2b^4c^6d^2f^2g^2 + 960a^2b^2 \\
& * c^8d^2e^2g + 192a^2b^2c^8d^2e^2f - 7680a^9b^3c^2l^2m^2 + 3152a^8 \\
& * b^3c^1l^2m^2 + 2070a^7b^4c^2k^2m^2 - 1840a^7b^3c^2k^3m + 6720a^8 \\
& * b^3c^3j^2m^2 - 3072a^8b^3c^3k^2l^2 + 1680a^6b^5c^3j^2m^2 - 100a^6 \\
& * b^5c^3k^2l^2 - 2176a^7b^3c^2j^3l^3 - 256a^6b^3c^3j^3l - 64a^5b^6 \\
& * c^3j^2l^2 - 12480a^8b^2c^2h^3m^3 + 972a^5b^6c^3h^2m^2 - 960a^7b^3c^4 \\
& * j^2k^2 - 252a^5b^4c^3h^3m - 192a^6b^2c^4h^3m + 54a^4b^6c^2 \\
& * h^3m + 1536a^7b^3c^4h^2l^2 + 420a^4b^7c^2g^2m^2 - 36a^4b^7c^2h^2l^2 \\
& - 3072a^7b^2c^3g^2l^3 + 2096a^7b^3c^2f^2m^3 + 1088a^6b^4c^2g^2l^3 \\
& - 496a^6b^3c^3h^2k^3 - 192a^4b^4c^4g^3l + 176a^4b^3c^5f^3m \\
& + 144a^5b^3c^4h^3k + 78a^3b^8c^2f^2m^2 + 54a^3b^5c^4f^3m + 32 \\
& * a^3b^6c^3g^3l + 30a^5b^5c^2h^2k^3 - 18a^4b^5c^3h^3k - 18a^2b^7 \\
& * c^3f^3m - 16a^3b^8c^2g^2l^2 + 6720a^6b^3c^5e^2m^2 - 192a^6b^3c^5 \\
& * h^2j^2 - 4a^2b^9c^2f^2l^2 - 35040a^7b^2c^3d^2m^3 + 14300a^6b^4c^2 \\
& * d^2m^3 - 12000a^3b^2c^7d^3m + 4380a^2b^4c^6d^3m - 2176a^6b^3c^3 \\
& * e^2l^3 - 256a^3b^3c^6e^3l - 192a^6b^2c^4f^2k^3 + 192a^5b^5c^2 \\
& * e^2l^3 - 192a^4b^2c^6f^3k + 132a^5b^4c^3f^2k^3 + 128a^4b^3c^5g^3 \\
& * j - 28a^3b^4c^5f^3k - 10a^4b^6c^2f^2k^3 + 6a^2b^6c^4f^3k + 1 \\
& 0752a^5b^3c^6d^2l^2 - 960a^5b^3c^6e^2k^2 - 192a^5b^3c^6f^2j^2 + 10 \\
& 8a^4b^9c^2d^2l^2 - 1680a^5b^3c^4d^2k^3 - 1680a^2b^3c^7d^3k + 222 \\
& * a^4b^5c^3d^2k^3 + 30a^4b^8c^3d^2k^2 - 10a^3b^7c^2d^2k^3 - 960a^4b^3 \\
& * c^7d^2j^2 + 80a^4b^3c^5f^2h^3 + 80a^3b^3c^6f^3h + 6a^3b^5c^4 \\
& * f^2h^3 + 6a^2b^5c^5f^3h - 192a^4b^3c^7e^2h^2 - 192a^4b^2c^6d^2h^3 \\
& - 192a^2b^2c^8d^3h + 128a^3b^3c^6e^2g^3 - 28a^3b^4c^5d^2h^3 + \\
& 12a^4b^6c^5d^2h^2 + 6a^2b^6c^4d^2h^3 - 192a^3b^3c^8e^2f^2 + 60a^4b^5 \\
& * c^6d^2g^2 + 198a^4b^4c^7d^2f^2 + 144a^2b^3c^7d^2f^3 - 960a^2b^3c^9 \\
& * d^2e^2 + 240a^4b^3c^8d^2e^2 + 15360a^9c^3k^2l^2m - 12800a^9c^3 \\
& * j^2l^2m^2 - 3840a^8c^4j^2k^2m + 432a^6b^6j^2l^2m^2 + 4608a^8c^4j^2k^2 \\
& * l + 2880a^8c^4h^2k^2m + 5120a^8c^4f^2l^2m - 3072a^8c^4h^2k^2l^2 + 27 \\
& 0a^5b^7h^2k^2m^2 - 216a^5b^7g^2l^2m^2 - 12800a^8c^4e^2l^2m^2 - 4800a^8c^4 \\
& * f^2k^2m^2 - 512a^7c^5h^2j^2l - 3840a^6c^6e^2k^2m - 1280a^7c^5f^2j^2 \\
& * m + 768a^7c^5h^2j^2k + 144a^4b^8g^2j^2m^2 - 90a^4b^8f^2k^2m^2 + 864 \\
& 0a^7c^5d^2k^2m + 4608a^7c^5e^2k^2l + 512a^6c^6f^2j^2l - 9216a^7c^5 \\
& * d^2k^2l^2 - 4096a^7c^5e^2j^2l^2 + 320a^6c^6f^2h^2m - 90a^3b^9d^2k^2m^2 \\
& + 15200a^9b^3c^2k^2m^3 - 6192a^8b^3c^2k^2m^3 + 5472a^8b^3c^3k^3m - 4 \\
& 608a^5c^7d^2j^2l - 1024a^7c^5f^2h^2l^2 + 150a^6b^5c^2k^3m + 54a^3b^9 \\
& * f^2h^2m^2 + 6b^10c^2d^2h^2m - 14400a^7c^5d^2h^2m^2 + 8640a^5c^7d^2 \\
& * h^2m + 2880a^6c^6d^2h^2m + 2304a^6c^6d^2j^2k - 512a^6c^6e^2h^2l - 1 \\
& 92a^6c^6f^2h^2k + 6144a^8b^3c^3j^2l^3 + 1536a^7b^3c^4j^3l - 1280a^5 \\
& * c^7e^2f^2m + 768a^5c^7e^2h^2k + 256a^6c^6f^2h^2j^2 + 192a^6b^5c^2j^2 \\
& * l^3 + 54a^2b^10d^2h^2m^2 - 18b^9c^3d^2f^2m + 8b^9c^3d^2g^2l - 2b^9c^3 \\
& * d^2h^2k + 4068a^7b^4c^2h^2m^3 - 1728a^6c^6d^2h^2k^2 + 960a^5c^7d^2f^2 \\
& * m + 512a^5c^7e^2f^2l - 3072a^6c^6d^2f^2l^2 - 16b^8c^4d^2e^2l + 6b^8 \\
& * c^4d^2f^2k - 4608a^4c^8d^2e^2l + 2400a^8b^3c^3f^2m^3 + 2016a^7b^3c^4 \\
& * h^2k^3 - 1728a^4c^8d^2f^2k - 1146a^6b^5c^2f^2m^3 + 224a^6b^3c^5h^3 \\
& * k - 96a^5b^6c^2g^2l^3 + 96a^5b^3c^6f^3m + 2304a^4c^8d^2e^2k + 768a^5 \\
& * c^7d^2f^2j^2 + 6144a^7b^3c^4e^2l^3 - 2280a^5b^6c^2d^2m^3 + 1536a^4b^3c^7 \\
& * e^3l - 616a^4b^6c^5d^3m + 512a^6b^3c^5g^2j^3 + 256a^4c^8e^2f^2h \\
& + 240a^4b^10c^2d^2m^2 + 6b^7c^5d^2f^2h - 192a^4c^8d^2f^2h + 4320a^6 \\
& * b^3c^5d^2k^3 + 4320a^3b^3c^8d^3k + 222a^4b^5c^6d^3k + 16b^6c^6d^2e^2 \\
& * g + 96a^5b^3c^6f^2h^3 + 96a^4b^3c^7f^3h + 768a^3c^9d^2e^2f + 512a^3 \\
& * b^3c^8e^3g + 132a^4b^4c^7d^3h + 2016a^2b^3c^9d^3f - 496a^4b^3c^8 \\
& * d^3f + 224a^3b^3c^8d^2f^3 - 18a^4b^5c^6d^2f^3 - 3264a^8b^2c^2k^2m^2
\end{aligned}$$

```

2 - 6160*a^7*b^3*c^2*j^2*m^2 + 1104*a^7*b^3*c^2*k^2*l^2 - 1920*a^7*b^2*c^3*
j^2*l^2 + 768*a^6*b^4*c^2*j^2*l^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*l^2 - 1540*a^5*b^5*c^2*g^2*m^2 + 444
*a^5*b^5*c^2*h^2*l^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*l^2 - 480*a^5*b^4*c^3*g^2*l^2 + 198*a^5*b^4*c^3*h^2*k^2
+ 192*a^4*b^6*c^2*g^2*l^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*l^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*l^2 + 36*a^3*b^7*c^2
*f^2*l^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*l^2 + 768*a^4*b^4*c^4*e^2*l^2 - 4
64*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*l^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*l^
2 + 5628*a^3*b^5*c^4*d^2*l^2 - 1128*a^2*b^7*c^3*d^2*l^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
*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+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] 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}

$$-\frac{dx(59-35x^2)}{3456(x^4-5x^2+4)} + \frac{dx(17-5x^2)}{144(x^4-5x^2+4)^2} - \frac{313d \tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{13}{648}d \tanh^{-1}(x) - \frac{e(5-2x^2)}{54(x^4-5x^2+4)} + \frac{e(5-x^2)}{36(x^4-5x^2+4)}$$

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] /; 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 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] && 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

$$\begin{aligned}
\int \frac{d+ex}{(4-5x^2+x^4)^3} dx &= \int \frac{d}{(4-5x^2+x^4)^3} dx + \int \frac{ex}{(4-5x^2+x^4)^3} dx \\
&= d \int \frac{1}{(4-5x^2+x^4)^3} dx + e \int \frac{x}{(4-5x^2+x^4)^3} dx \\
&= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} - \frac{1}{144} d \int \frac{-19+25x^2}{(4-5x^2+x^4)^2} dx + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{(4-5x+x^2)^3} dx, \right. \\
&= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} + \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} - \frac{dx(59-35x^2)}{3456(4-5x^2+x^4)} + \frac{d \int \frac{519+105x^2}{4-5x^2+x^4} dx}{10368} \\
&= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} + \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} - \frac{dx(59-35x^2)}{3456(4-5x^2+x^4)} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)} \\
&= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} + \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} - \frac{dx(59-35x^2)}{3456(4-5x^2+x^4)} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)} \\
&= \frac{dx(17-5x^2)}{144(4-5x^2+x^4)^2} + \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} - \frac{dx(59-35x^2)}{3456(4-5x^2+x^4)} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)}
\end{aligned}$$

Mathematica [A] time = 0.10, size = 128, normalized size = 0.90

$$\frac{288(dx(17-5x^2)+e(20-8x^2))}{(x^4-5x^2+4)^2} + \frac{12(dx(35x^2-59)+64e(2x^2-5))}{x^4-5x^2+4} - 32(13d+16e)\log(1-x) + (313d+512e)\log(2-x) + 32(13d-16e)\log(1+x) - (313d+512e)\log(2+x)$$

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

$$420 dx^7 + 1536 ex^6 - 2808 dx^5 - 11520 ex^4 + 3780 dx^3 + 23040 ex^2 + 2064 dx - ((313d - 512e)x^8 - 10(313d + 512e)x^6 + 33(313d - 512e)x^4 - 40(313d - 512e)x^2 + 5008d - 8192e)\log(x + 2) + 32((13d - 16e)x^8 - 10(13d - 16e)x^6 + 33(13d - 16e)x^4 - 40(13d - 16e)x^2 + 208d - 256e)\log(x + 1) - 32((13d + 16e)x^8 - 10(13d + 16e)x^6 + 33(13d + 16e)x^4 - 40(13d + 16e)x^2 + 208d + 256e)\log(x - 1) + ((313d + 512e)x^8 - 10(313d + 512e)x^6 + 33(313d + 512e)x^4 - 40(313d + 512e)x^2 + 5008d + 8192e)\log(x - 2) - 960(0e)/(x^8 - 10x^6 + 33x^4 - 40x^2 + 16)$$

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) - 960(0e)/(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

$$\ln(x + 1) \left(\frac{13d}{1296} - \frac{e}{81} \right) - \ln(x - 1) \left(\frac{13d}{1296} + \frac{e}{81} \right) + \ln(x - 2) \left(\frac{313d}{41472} + \frac{e}{81} \right) - \ln(x + 2) \left(\frac{313d}{41472} - \frac{e}{81} \right) + \frac{35dx^7}{3456} + \frac{ex^7}{27}$$

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

$$(13d - 16e) \log\left(x + \frac{-1106258459719280d^4e - 13113710954343d^4(13d - 16e) - 817263343042560d^2e^3 + 153628968222720d^2e^2(13d - 16e) + 9530192294125624e^4}{2294125624e^4}\right)$$

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) \cdot \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) - 19670950215680*e^{**3}*(13*d - 16*e)^{**2} - 557272006656*e^{**2}*(13*d - 16*e)^{**3}) / (22941256248261*d^{**5} - 2312740746035200*d^{**3}*e^{**2} + 4473912813420544*d*e^{**4}) / 1296 - (13*d + 16*e) \cdot \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) - 19670950215680*e^{**3}*(13*d + 16*e)^{**2} + 557272006656*e^{**2}*(13*d + 16*e)^{**3}) / (22941256248261*d^{**5} - 2312740746035200*d^{**3}*e^{**2} + 4473912813420544*d*e^{**4}) / 1296 - (313*d - 512*e) \cdot \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}*(313*d - 512*e)^{**3} / 32 + 5035763255214080*e^{**5} - 4458176053248*e^{**4}*(313*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} + 4473912813420544*d*e^{**4}) / 41472 + (313*d + 512*e) \cdot \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}*(313*d + 512*e)^{**3} / 32 + 5035763255214080*e^{**5} + 4458176053248*e^{**4}*(313*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} + 4473912813420544*d*e^{**4}) / 41472 + (35*d*x^{**7} - 234*d*x^{**5} + 315*d*x^{**3} + 172*d*x + 128*e*x^{**6} - 960*e*x^{**4} + 1920*e*x^{**2} - 800*e) / (3456*x^{**8} - 34560*x^{**6} + 114048*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] /; 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

$$\begin{aligned}
\int \frac{d+ex+fx^2}{(4-5x^2+x^4)^3} dx &= \int \frac{ex}{(4-5x^2+x^4)^3} dx + \int \frac{d+fx^2}{(4-5x^2+x^4)^3} dx \\
&= \frac{x(17d+20f-(5d+8f)x^2)}{144(4-5x^2+x^4)^2} - \frac{1}{144} \int \frac{-19d+20f+5(5d+8f)x^2}{(4-5x^2+x^4)^2} dx + e \int \frac{x}{(4-5x^2+x^4)} dx \\
&= \frac{x(17d+20f-(5d+8f)x^2)}{144(4-5x^2+x^4)^2} - \frac{x(59d+380f-35(d+4f)x^2)}{3456(4-5x^2+x^4)} + \frac{\int \frac{3(173d+260f)+105(d+4f)}{4-5x^2+x^4}}{10368} \\
&= \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} + \frac{x(17d+20f-(5d+8f)x^2)}{144(4-5x^2+x^4)^2} - \frac{x(59d+380f-35(d+4f)x^2)}{3456(4-5x^2+x^4)} - \frac{1}{10368} \\
&= \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} + \frac{x(17d+20f-(5d+8f)x^2)}{144(4-5x^2+x^4)^2} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)} - \frac{x(59d+380f-35(d+4f)x^2)}{3456(4-5x^2+x^4)} \\
&= \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} + \frac{x(17d+20f-(5d+8f)x^2)}{144(4-5x^2+x^4)^2} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)} - \frac{x(59d+380f-35(d+4f)x^2)}{3456(4-5x^2+x^4)} \\
&= \frac{e(5-2x^2)}{36(4-5x^2+x^4)^2} + \frac{x(17d+20f-(5d+8f)x^2)}{144(4-5x^2+x^4)^2} - \frac{e(5-2x^2)}{54(4-5x^2+x^4)} - \frac{x(59d+380f-35(d+4f)x^2)}{3456(4-5x^2+x^4)}
\end{aligned}$$

Mathematica [A] time = 0.13, size = 161, normalized size = 0.92

$$\frac{12(dx(35x^2-59)+64e(2x^2-5)+20fx(7x^2-19))}{x^4-5x^2+4} + \frac{288(-5dx^3+17dx+e(20-8x^2)-8fx^3+20fx)}{(x^4-5x^2+4)^2} - 32 \log(1-x)(13d+16e+25f) + \log(2)$$

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)*Log[2 - x] + 32*(13*d - 16*e + 25*f)*Log[1 + x] + (-313*d + 512*e - 820*f)*Log[2 + x])/41472

fricas [B] time = 1.92, size = 389, normalized size = 2.22

$$420(d+4f)x^7 + 1536ex^6 - 216(13d+60f)x^5 - 11520ex^4 + 756(5d+36f)x^3 + 23040ex^2 + 48(43d-260f)x - ((313d-512e+820f)x^8 - 10(313d-512e+820f)x^6 + 33(313d-512e+820f)x^4 - 40(313d-512e+820f)x^2 + 5008d - 8192e + 13120f) \log(x+2) + 32((13d-16e+25f)x^8 - 10(13d-16e+25f)x^6 + 33(13d-16e+25f)x^4 - 40(13d-16e+25f)x^2 + 208d - 256e + 400f) \log(x+1) - 32((13d+16e+25f)x^8 - 10(13d+16e+25f)x^6 + 33(13d+16e+25f)x^4 - 40(13d+16e+25f)x^2 + 208d + 256e + 400f) \log(x-1) + ((313d+512e+820f)x^8 - 10(313d+512e+820f)x^6 + 33(313d+512e+820f)x^4 - 40(313d+512e+820f)x^2 + 5008d + 8192e - 13120f) \log(x-2)$$

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="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)

$$20*f)*x^6 + 33*(313*d + 512*e + 820*f)*x^4 - 40*(313*d + 512*e + 820*f)*x^2 + 5008*d + 8192*e + 13120*f)*\log(x - 2) - 9600*e)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)$$

giac [A] time = 0.35, size = 157, normalized size = 0.90

$$-\frac{1}{41472} (313d + 820f - 512e) \log(|x + 2|) + \frac{1}{1296} (13d + 25f - 16e) \log(|x + 1|) - \frac{1}{1296} (13d + 25f + 16e)$$

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) - 13490528680832000*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 - 66895452108800000*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) - 13490528680832000*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 - 66895452108800000*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)
```

$$\begin{aligned}
& 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 - 151082645593600000*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 \\
& + 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 \\
& 82645593600000*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**
\end{aligned}$$

$$\frac{2 - 800e + x^{7}(35d + 140f) + x^{5}(-234d - 1080f) + x^{3}(315d + 2268f) + x(172d - 1040f)}{(3456x^{8} - 34560x^{6} + 114048x^{4} - 138240x^{2} + 55296)}$$

$$3.44 \quad \int \frac{d+ex+fx^2+gx^3}{(4-5x^2+x^4)^3} dx$$

Optimal. Leaf size=204

$$\frac{x(-35x^2(d+4f)+59d+380f)}{3456(x^4-5x^2+4)} + \frac{x(-(x^2(5d+8f))+17d+20f)}{144(x^4-5x^2+4)^2} - \frac{(313d+820f)\tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{1}{648}(13d+20f)$$

[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}

$$\frac{x(-35x^2(d+4f)+59d+380f)}{3456(x^4-5x^2+4)} + \frac{x(x^2(-(5d+8f))+17d+20f)}{144(x^4-5x^2+4)^2} - \frac{(313d+820f)\tanh^{-1}\left(\frac{x}{2}\right)}{20736} + \frac{1}{648}(13d+20f)$$

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))/(10*8*(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_))^(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] /; 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)^(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 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{d + fx^2}{(4 - 5x^2 + x^4)^3} dx + \int \frac{x(e + gx^2)}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 5(5d + 8f)x^2}{(4 - 5x^2 + x^4)^2} dx + \frac{1}{2} \text{Subst} \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{x(59d + 380f - 35(d + 4g)x^2)}{3456(4 - 5x^2 + x^4)} \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)(5 - 2x^2)}{108(4 - 5x^2 + x^4)} - \frac{x(13d + 60f)}{3456(4 - 5x^2 + x^4)} \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)(5 - 2x^2)}{108(4 - 5x^2 + x^4)} - \frac{x(13d + 60f)}{3456(4 - 5x^2 + x^4)} \\
&= \frac{x(17d + 20f - (5d + 8f)x^2)}{144(4 - 5x^2 + x^4)^2} + \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)(5 - 2x^2)}{108(4 - 5x^2 + x^4)} - \frac{x(13d + 60f)}{3456(4 - 5x^2 + x^4)}
\end{aligned}$$

Mathematica [A] time = 0.08, size = 193, normalized size = 0.95

$$\frac{12(dx(35x^2-59)+64e(2x^2-5)+20fx(7x^2-19)+160g(2x^2-5))}{x^4-5x^2+4} + \frac{288(-5dx^3+17dx+e(20-8x^2)-8fx^3+20fx-4g(5x^2-8))}{(x^4-5x^2+4)^2} - 32 \log(1-x)(13d+60f)$$

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) + 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 + 40*g)*Log[1 - x] + (313*d + 512*e + 820*f + 1280*g)*Log[2 - x] + 32*(13*d - 16*e + 25*f - 40*g)*Log[1 + x] + (-313*d + 512*e - 820*f + 1280*g)*Log[2 + x])/41472

fricas [B] time = 2.86, size = 470, normalized size = 2.30

$$\frac{420(d + 4f)x^7 + 768(2e + 5g)x^6 - 216(13d + 60f)x^5 - 5760(2e + 5g)x^4 + 756(5d + 36f)x^3 + 11520(2e + 5g)x^2 + 48(43d - 260f)x - ((313d - 512e + 820f - 1280g)x^8 - 10(313d - 512e + 820f - 1280g)x^6 + 33(313d - 512e + 820f - 1280g)x^4 - 40(313d - 512e + 820f - 1280g)x^2 + 5008d - 8192e + 13120f - 20480g)\log(x + 2) + 32((13d - 16e + 25f - 40g)x^8 - 10(13d - 16e + 25f - 40g)x^6 + 33(13d - 16e + 25f - 40g)x^4 - 40(13d - 16e + 25f - 40g)x^2 + 208d - 256e + 400f - 640g)\log(x + 1) - 32((13d + 16e + 25f + 40g)x^8 - 10(13d + 16e + 25f + 40g)x^6 + 33(13d + 16e + 25f + 40g)x^4 - 40(13d + 16e + 25f + 40g)x^2 + 208d + 256e + 400f + 640g)\log(x - 1) + ((313d + 512e + 820f + 1280g)x^8 - 10(313d + 512e + 820f + 1280g)x^6 + 33(313d + 512e + 820f + 1280g)x^4 - 40(313d + 512e + 820f + 1280g)x^2 + 5008d - 8192e + 13120f - 20480g)\log(x - 1)}{(x^4 - 5x^2 + 4)^3}$$

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] 1/41472*(420*(d + 4*f)*x^7 + 768*(2*e + 5*g)*x^6 - 216*(13*d + 60*f)*x^5 - 5760*(2*e + 5*g)*x^4 + 756*(5*d + 36*f)*x^3 + 11520*(2*e + 5*g)*x^2 + 48*(43*d - 260*f)*x - ((313*d - 512*e + 820*f - 1280*g)*x^8 - 10*(313*d - 512*e + 820*f - 1280*g)*x^6 + 33*(313*d - 512*e + 820*f - 1280*g)*x^4 - 40*(313*d - 512*e + 820*f - 1280*g)*x^2 + 5008*d - 8192*e + 13120*f - 20480*g)*log(x + 2) + 32*((13*d - 16*e + 25*f - 40*g)*x^8 - 10*(13*d - 16*e + 25*f - 40*g)*x^6 + 33*(13*d - 16*e + 25*f - 40*g)*x^4 - 40*(13*d - 16*e + 25*f - 40*g)*x^2 + 208*d - 256*e + 400*f - 640*g)*log(x + 1) - 32*((13*d + 16*e + 25*f + 40*g)*x^8 - 10*(13*d + 16*e + 25*f + 40*g)*x^6 + 33*(13*d + 16*e + 25*f + 40*g)*x^4 - 40*(13*d + 16*e + 25*f + 40*g)*x^2 + 208*d + 256*e + 400*f + 640*g)*log(x - 1) + ((313*d + 512*e + 820*f + 1280*g)*x^8 - 10*(313*d + 512*e + 820*f + 1280*g)*x^6 + 33*(313*d + 512*e + 820*f + 1280*g)*x^4 - 40*(313*d + 512*e + 820*f + 1280*g)*x^2 + 5008*d - 8192*e + 13120*f - 20480*g)*log(x - 1)

$e + 820*f + 1280*g)*x^6 + 33*(313*d + 512*e + 820*f + 1280*g)*x^4 - 40*(313*d + 512*e + 820*f + 1280*g)*x^2 + 5008*d + 8192*e + 13120*f + 20480*g)*\log(x - 2) - 9600*e - 29184*g)/(x^8 - 10*x^6 + 33*x^4 - 40*x^2 + 16)$

giac [A] time = 0.39, size = 190, normalized size = 0.93

$$-\frac{1}{41472} (313d + 820f - 1280g - 512e) \log(|x + 2|) + \frac{1}{1296} (13d + 25f - 40g - 16e) \log(|x + 1|) - \frac{1}{1296} (13d + 25f - 40g - 16e) \log(|x - 1|)$$

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] $-\frac{1}{41472} (313d + 820f - 1280g - 512e) \log(\text{abs}(x + 2)) + \frac{1}{1296} (13d + 25f - 40g - 16e) \log(\text{abs}(x + 1)) - \frac{1}{1296} (13d + 25f + 40g + 16e) \log(\text{abs}(x - 1)) + \frac{1}{41472} (313d + 820f + 1280g + 512e) \log(\text{abs}(x - 2)) + \frac{1}{3456} (35d*x^7 + 140*f*x^7 + 320*g*x^6 + 128*x^6*e - 234*d*x^5 - 1080*f*x^5 - 2400*g*x^4 - 960*x^4*e + 315*d*x^3 + 2268*f*x^3 + 4800*g*x^2 + 1920*x^2*e + 172*d*x - 1040*f*x - 2432*g - 800*e)/(x^4 - 5*x^2 + 4)^2$

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] $-\frac{5}{162} g \ln(x-1) + \frac{5}{162} g \ln(x+2) + \frac{5}{162} g \ln(x-2) - \frac{5}{162} g \ln(x+1) - \frac{313}{41472} d \ln(x+2) + \frac{1}{81} e \ln(x+2) - \frac{1}{81} e \ln(x-1) - \frac{13}{1296} d \ln(x-1) - \frac{1}{81} e \ln(x+1) + \frac{13}{1296} d \ln(x+1) + \frac{313}{41472} d \ln(x-2) + \frac{1}{81} e \ln(x-2) + \frac{205}{10368} f \ln(x-2) + \frac{25}{1296} f \ln(x+1) - \frac{25}{1296} f \ln(x-1) - \frac{205}{10368} f \ln(x+2) - \frac{1}{432} (x+2)^2 g + \frac{1}{432} (x-1)^2 g + \frac{1}{432} (x+1)^2 g - \frac{1}{432} (x-2)^2 g - \frac{1}{432} (x+1)^2 d + \frac{1}{432} (x+1)^2 e + \frac{1}{432} (x-1)^2 d + \frac{1}{432} (x-1)^2 e + \frac{1}{3456} (x+2)^2 d - \frac{1}{1728} (x+2)^2 e + \frac{1}{864} (x+2)^2 f + \frac{1}{432} (x-1)^2 f - \frac{1}{432} (x+1)^2 f - \frac{1}{864} (x-2)^2 f - \frac{1}{3456} (x-2)^2 d - \frac{1}{1728} (x-2)^2 e - \frac{13}{864} (x+2) g - \frac{7}{432} (x+1) g + \frac{7}{432} (x-1) g + \frac{13}{864} (x-2) g + \frac{19}{6912} (x+2) d - \frac{17}{3456} (x+2) e + \frac{19}{6912} (x-2) d + \frac{17}{3456} (x-2) e + \frac{1}{432} (x+1) d - \frac{1}{144} (x+1) e + \frac{1}{432} (x-1) d + \frac{1}{144} (x-1) e + \frac{5}{432} (x-1) f + \frac{5}{576} (x+2) f + \frac{5}{576} (x-2) f + \frac{5}{432} (x+1) f$

maxima [A] time = 1.08, size = 188, normalized size = 0.92

$$-\frac{1}{41472} (313d - 512e + 820f - 1280g) \log(x + 2) + \frac{1}{1296} (13d - 16e + 25f - 40g) \log(x + 1) - \frac{1}{1296} (13d + 25f - 40g - 16e) \log(x - 1)$$

Verification of antiderivative is not currently implemented for this CAS.

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

[Out] $-\frac{1}{41472} (313d - 512e + 820f - 1280g) \log(x + 2) + \frac{1}{1296} (13d - 16e + 25f - 40g) \log(x + 1) - \frac{1}{1296} (13d + 16e + 25f + 40g) \log(x - 1) + \frac{1}{41472} (313d + 512e + 820f + 1280g) \log(x - 2) + \frac{1}{3456} (35(d + 4f) x^7 + 64(2e + 5g) x^6 - 18(13d + 60f) x^5 - 480(2e + 5g) x^4 + 63(5d + 36f) x^3 + 960(2e + 5g) x^2 + 4(43d - 260f) x - 800e - 2432g)/(x^8 - 10x^6 + 33x^4 - 40x^2 + 16)$

mupad [B] time = 0.85, size = 182, normalized size = 0.89

$$\frac{\left(\frac{35d}{3456} + \frac{35f}{864}\right) x^7 + \left(\frac{e}{27} + \frac{5g}{54}\right) x^6 + \left(-\frac{13d}{192} - \frac{5f}{16}\right) x^5 + \left(-\frac{5e}{18} - \frac{25g}{36}\right) x^4 + \left(\frac{35d}{384} + \frac{21f}{32}\right) x^3 + \left(\frac{5e}{9} + \frac{25g}{18}\right) x^2 + \left(\frac{43d}{864} - \frac{260f}{864}\right) x - 800e - 2432g}{x^8 - 10x^6 + 33x^4 - 40x^2 + 16}$$

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] $(x^3*((35*d)/384 + (21*f)/32) - (19*g)/27 - x^5*((13*d)/192 + (5*f)/16) - (25*e)/108 + x^7*((35*d)/3456 + (35*f)/864) + x^2*((5*e)/9 + (25*g)/18) - x^4*((5*e)/18 + (25*g)/36) + x^6*(e/27 + (5*g)/54) + x*((43*d)/864 - (65*f)/216))/(33*x^4 - 40*x^2 - 10*x^6 + x^8 + 16) - \log(x - 1)*((13*d)/1296 + e/81 + (25*f)/1296 + (5*g)/162) + \log(x + 1)*((13*d)/1296 - e/81 + (25*f)/1296 - (5*g)/162) + \log(x - 2)*((313*d)/41472 + e/81 + (205*f)/10368 + (5*g)/162) - \log(x + 2)*((313*d)/41472 - e/81 + (205*f)/10368 - (5*g)/162)$

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

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(-(x^2(5d+8f+20h))+17d+20f+32h)}{144(x^4-5x^2+4)^2} - \frac{\tanh^{-1}\left(\frac{x}{2}\right)}{3}$$

[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}

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(x^2(-(5d+8f+20h))+17d+20f+32h)}{144(x^4-5x^2+4)^2} - \frac{\tanh^{-1}\left(\frac{x}{2}\right)}{3}$$

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] /; 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)^(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 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]
```

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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2)}{(4 - 5x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 32h + 5(5d + 8f + 20h)x^2}{(4 - 5x^2 + x^4)^3} dx \\
&= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{x(59d + 80f + 112h - (13d + 16e + 25f - 40g + 61h)x^2)}{108(4 - 5x^2 + x^4)^3} \\
&= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)x^3}{108(4 - 5x^2 + x^4)^3} \\
&= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)x^3}{108(4 - 5x^2 + x^4)^3} \\
&= \frac{5e + 8g - (2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{(2e + 5g)x^3}{108(4 - 5x^2 + x^4)^3}
\end{aligned}$$

Mathematica [A] time = 0.12, size = 231, normalized size = 1.03

$$\frac{-5dx^3 + 17dx - 8ex^2 + 20e - 8fx^3 + 20fx - 20gx^2 + 32g - 20hx^3 + 32hx}{144(x^4 - 5x^2 + 4)^2} + \frac{35dx^3 - 59dx + 128ex^2 - 320e + 144e}{3456(x^4 - 5x^2 + 4)^3}$$

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

$$\frac{60(7d + 28f + 64h)x^7 + 768(2e + 5g)x^6 - 216(13d + 60f + 136h)x^5 - 5760(2e + 5g)x^4 + 756(5d + 36f + 80h)x^3 + 11520(2e + 5g)x^2 + 48(43d - 260f - 656h)x - ((313d - 512e + 820f - 1280g + 1936h)x^8 - 10(313d - 512e + 820f - 1280g + 1936h)x^6 + 33(313d - 512e + 820f - 1280g + 1936h)x^4 - 40(313d - 512e + 820f - 1280g + 1936h)x^2 + 5008d - 8192e + 13120f - 20480g + 30976h) \log(x + 2) + 32((13d - 16e + 25f - 40g + 61h)x^8 - 10(13d - 16e + 25f - 40g + 61h)x^6 + 33(13d - 16e + 25f - 40g + 61h)x^4 - 40(13d - 16e + 25f - 40g + 61h)x^2 + 208d - 256e + 400f - 640g + 976h) \log(x + 1) - 32((13d + 16e + 25f + 40g + 61h)x^8 - 10(13d + 16e + 25f + 40g + 61h)x^6 + 33(13d + 16e + 25f + 40g + 61h)x^4 - 40(13d + 16e + 25f + 40g + 61h)x^2 + 5008d + 8192e + 13120f - 20480g + 30976h) \log(x - 2) + 32((13d + 16e + 25f + 40g + 61h)x^8 - 10(13d + 16e + 25f + 40g + 61h)x^6 + 33(13d + 16e + 25f + 40g + 61h)x^4 - 40(13d + 16e + 25f + 40g + 61h)x^2 + 5008d + 8192e + 13120f - 20480g + 30976h) \log(x - 1)}{3456(x^4 - 5x^2 + 4)^3}$$

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="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 + 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 + 5008*d + 8192*e + 13120*f - 20480*g + 30976*h)*log(x - 1)

$(d + 60f + 136h)x^5 - 480(2e + 5g)x^4 + 63(5d + 36f + 80h)x^3 + 960(2e + 5g)x^2 + 4(43d - 260f - 656h)x - 800e - 2432g)/(x^8 - 10x^6 + 33x^4 - 40x^2 + 16)$

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] $\log(x+1) \left(\frac{13d}{1296} - \frac{e}{81} + \frac{25f}{1296} - \frac{5g}{162} + \frac{61h}{1296} \right) - \log(x-1) \left(\frac{13d}{1296} + \frac{e}{81} + \frac{25f}{1296} + \frac{5g}{162} + \frac{61h}{1296} \right) - \left(\frac{25e}{108} + \frac{19g}{27} - x^2 \left(\frac{5e}{9} + \frac{25g}{18} \right) + x^4 \left(\frac{5e}{18} + \frac{25g}{36} \right) - x^6 \left(\frac{e}{27} + \frac{5g}{54} \right) + x \left(\frac{65f}{216} - \frac{43d}{864} + \frac{41h}{54} \right) + x^5 \left(\frac{13d}{192} + \frac{5f}{16} + \frac{17h}{24} \right) - x^3 \left(\frac{35d}{384} + \frac{21f}{32} + \frac{35h}{24} \right) - x^7 \left(\frac{35d}{3456} + \frac{35f}{864} + \frac{5h}{54} \right) \right) / (33x^4 - 40x^2 - 10x^6 + x^8 + 16) + \log(x-2) \left(\frac{313d}{41472} + \frac{e}{81} + \frac{205f}{10368} + \frac{5g}{162} + \frac{121h}{2592} \right) - \log(x+2) \left(\frac{313d}{41472} - \frac{e}{81} + \frac{205f}{10368} - \frac{5g}{162} + \frac{121h}{2592} \right)$

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((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

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(-(x^2(5d+8f+20h))+17d+20f+32h)}{144(x^4-5x^2+4)^2} - \frac{\tanh^{-1}\left(\frac{x}{2}\right)}{1}$$

[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}

$$\frac{x(-5x^2(7d+28f+64h)+59d+380f+848h)}{3456(x^4-5x^2+4)} + \frac{x(x^2(-5d+8f+20h))+17d+20f+32h}{144(x^4-5x^2+4)^2} - \frac{\tanh^{-1}\left(\frac{x}{2}\right)}{1}$$

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] - 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 + 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

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3 + hx^4 + 46x^5}{(4 - 5x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2 + 46x^4)}{(4 - 5x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(4 - 5x^2 + x^4)^3} dx \\ &= \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} - \frac{1}{144} \int \frac{-19d + 20f + 32h - (5d + 8f + 20h)x^2}{(4 - 5x^2 + x^4)^3} dx \\ &= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} \\ &= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} \\ &= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} \\ &= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} \\ &= \frac{920 + 5e + 8g - (782 + 2e + 5g)x^2}{36(4 - 5x^2 + x^4)^2} + \frac{x(17d + 20f + 32h - (5d + 8f + 20h)x^2)}{144(4 - 5x^2 + x^4)^2} \end{aligned}$$

Mathematica [A] time = 0.13, size = 261, normalized size = 1.09

$$\frac{-5dx^3 + 17dx - 8ex^2 + 20e - 8fx^3 + 20fx - 20gx^2 + 32g - 20hx^3 + 32hx - 68ix^2 + 80i}{144(x^4 - 5x^2 + 4)^2} + \frac{35dx^3 - 59dx + 12e}{144(x^4 - 5x^2 + 4)^2}$$

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

$$\frac{60(7d + 28f + 64h)x^7 + 768(2e + 5g + 11i)x^6 - 216(13d + 60f + 136h)x^5 - 5760(2e + 5g + 11i)x^4 + \dots}{144(x^4 - 5x^2 + 4)^2}$$

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)^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

$$-\frac{1}{41472} (313d + 820f - 1280g + 1936h - 2816i - 512e) \log(|x + 2|) + \frac{1}{1296} (13d + 25f - 40g + 61h - 88i - 16e) \log(|x + 1|) - \frac{1}{1296} (13d + 25f + 40g + 61h + 88i + 16e) \log(|x - 1|) + \frac{1}{3456} (35d^7 + 140f^7 + 320h^7 + 320g^6 + 704i^6 + 128x^6e - 234d^5x^5 - 1080fx^5 - 2448hx^5 - 2400gx^4 - 5280ix^4 - 960x^4e + 315d^3x^3 + 2268fx^3 + 5040hx^3 + 4800gx^2 + 9984ix^2 + 1920x^2e + 172d^2x - 1040fx - 2624hx - 2432g - 5120i - 800e)/(x^4 - 5x^2 + 4)^2$$

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)^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*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

$$\frac{11i \ln(x + 2)}{162} - \frac{11i \ln(x - 1)}{162} - \frac{11i \ln(x + 1)}{162} + \frac{11i \ln(x - 2)}{162} - \frac{121h \ln(x + 2)}{2592} - \frac{61h \ln(x - 1)}{1296} + \frac{61h \ln(x + 1)}{1296} + \frac{121h \ln(x - 2)}{2592}$$

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
```

$$\frac{1}{(x+1)^i + \frac{11}{432} \frac{1}{(x-1)^i + \frac{1}{24} \frac{1}{(x-2)^i + \frac{11}{432} \frac{1}{(x+2)^h + \frac{1}{48} \frac{1}{(x+1)^h + \frac{1}{48} \frac{1}{(x-1)^h + \frac{11}{432} \frac{1}{(x-2)^h - \frac{13}{864} \frac{1}{(x+2)^g - \frac{7}{432} \frac{1}{(x+1)^g + \frac{7}{432} \frac{1}{(x-1)^g + \frac{13}{864} \frac{1}{(x-2)^g + \frac{19}{6912} \frac{1}{(x+2)^d - \frac{17}{3456} \frac{1}{(x+2)^e + \frac{19}{6912} \frac{1}{(x-2)^d + \frac{17}{3456} \frac{1}{(x-2)^e + \frac{1}{432} \frac{1}{(x+1)^d - \frac{1}{144} \frac{1}{(x+1)^e + \frac{1}{432} \frac{1}{(x-1)^d + \frac{1}{144} \frac{1}{(x-1)^e + \frac{5}{432} \frac{1}{(x-1)^f + \frac{5}{576} \frac{1}{(x+2)^f + \frac{5}{576} \frac{1}{(x-2)^f + \frac{5}{432} \frac{1}{(x+1)^f}}$$

maxima [A] time = 1.12, size = 238, normalized size = 1.00

$$-\frac{1}{41472} (313d - 512e + 820f - 1280g + 1936h - 2816i) \log(x+2) + \frac{1}{1296} (13d - 16e + 25f - 40g + 61h$$

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] $-\frac{1}{41472} (313d - 512e + 820f - 1280g + 1936h - 2816i) \log(x+2) + \frac{1}{1296} (13d - 16e + 25f - 40g + 61h - 88i) \log(x+1) - \frac{1}{1296} (13d + 16e + 25f + 40g + 61h + 88i) \log(x-1) + \frac{1}{41472} (313d + 512e + 820f + 1280g + 1936h + 2816i) \log(x-2) + \frac{1}{3456} (5(7d + 28f + 64h) x^7 + 64(2e + 5g + 11i) x^6 - 18(13d + 60f + 136h) x^5 - 480(2e + 5g + 11i) x^4 + 63(5d + 36f + 80h) x^3 + 192(10e + 25g + 52i) x^2 + 4(43d - 260f - 656h) x - 800e - 2432g - 5120i) / (x^8 - 10x^6 + 33x^4 - 40x^2 + 16)$

mupad [B] time = 0.62, size = 233, normalized size = 0.97

$$\ln(x+1) \left(\frac{13d}{1296} - \frac{e}{81} + \frac{25f}{1296} - \frac{5g}{162} + \frac{61h}{1296} - \frac{11i}{162} \right) - \ln(x-1) \left(\frac{13d}{1296} + \frac{e}{81} + \frac{25f}{1296} + \frac{5g}{162} + \frac{61h}{1296} + \frac{11i}{162} \right) -$$

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] $\log(x+1) * ((13d)/1296 - e/81 + (25f)/1296 - (5g)/162 + (61h)/1296 - (11i)/162) - \log(x-1) * ((13d)/1296 + e/81 + (25f)/1296 + (5g)/162 + (61h)/1296 + (11i)/162) - ((25e)/108 + (19g)/27 + (40i)/27 + x * ((65f)/216 - (43d)/864 + (41h)/54) + x^5 * ((13d)/192 + (5f)/16 + (17h)/24) - x^3 * ((35d)/384 + (21f)/32 + (35h)/24) - x^7 * ((35d)/3456 + (35f)/864 + (5h)/54) - x^2 * ((5e)/9 + (25g)/18 + (26i)/9) - x^6 * (e/27 + (5g)/54 + (11i)/54) + x^4 * ((5e)/18 + (25g)/36 + (55i)/36) / (33x^4 - 40x^2 - 10x^6 + x^8 + 16) + \log(x-2) * ((313d)/41472 + e/81 + (205f)/10368 + (5g)/162 + (121h)/2592 + (11i)/162) - \log(x+2) * ((313d)/41472 - e/81 + (205f)/10368 - (5g)/162 + (121h)/2592 - (11i)/162)$

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

$$-\frac{9}{32}d \log(x^2 - x + 1) + \frac{9}{32}d \log(x^2 + x + 1) + \frac{dx(2 - 7x^2)}{24(x^4 + x^2 + 1)} + \frac{dx(1 - x^2)}{12(x^4 + x^2 + 1)^2} - \frac{13d \tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{48\sqrt{3}} + \frac{13d \tan^{-1}\left(\frac{2x}{\sqrt{3}}\right)}{48\sqrt{3}}$$

[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}

$$\frac{dx(2 - 7x^2)}{24(x^4 + x^2 + 1)} + \frac{dx(1 - x^2)}{12(x^4 + x^2 + 1)^2} - \frac{9}{32}d \log(x^2 - x + 1) + \frac{9}{32}d \log(x^2 + x + 1) - \frac{13d \tan^{-1}\left(\frac{1-2x}{\sqrt{3}}\right)}{48\sqrt{3}} + \frac{13d \tan^{-1}\left(\frac{2x}{\sqrt{3}}\right)}{48\sqrt{3}}$$

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] := 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 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 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

$$\begin{aligned}
\int \frac{d+ex}{(1+x^2+x^4)^3} dx &= \int \frac{d}{(1+x^2+x^4)^3} dx + \int \frac{ex}{(1+x^2+x^4)^3} dx \\
&= d \int \frac{1}{(1+x^2+x^4)^3} dx + e \int \frac{x}{(1+x^2+x^4)^3} dx \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{1}{12}d \int \frac{11-5x^2}{(1+x^2+x^4)^2} dx + \frac{1}{2}e \operatorname{Subst} \left(\int \frac{1}{(1+x+x^2)^3} dx, x, x^2 \right) \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{1}{72}d \int \frac{60-21x^2}{1+x^2+x^4} dx + \frac{1}{2}e \operatorname{Subst} \left(\int \frac{1}{(1+x+x^2)^3} dx, x, x^2 \right) \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{1}{144}d \int \frac{60-21x^2}{1+x^2+x^4} dx \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{1}{96}(13d) \int \frac{60-21x^2}{1+x^2+x^4} dx \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{2e \tan^{-1} \left(\frac{1-x^2}{\sqrt{3}} \right)}{3\sqrt{3}} \\
&= \frac{dx(1-x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{dx(2-7x^2)}{24(1+x^2+x^4)} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} - \frac{13d \tan^{-1} \left(\frac{1-x^2}{\sqrt{3}} \right)}{48\sqrt{3}}
\end{aligned}$$

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

$$\frac{84dx^7 - 96ex^6 + 60dx^5 - 144ex^4 + 84dx^3 - 192ex^2 - 2\sqrt{3}((13d - 32e)x^8 + 2(13d - 32e)x^6 + 3(13d - 32e)x^4 + 2(13d - 32e)x^2 + 13d - 32e)\arctan(1/3\sqrt{3}(2x + 1)) - 2\sqrt{3}((13d + 32e)x^8 + 2(13d + 32e)x^6 + 3(13d + 32e)x^4 + 2(13d + 32e)x^2 + 13d + 32e)\arctan(1/3\sqrt{3}(2x - 1)) - 48dx - 81(d - e)}{48\sqrt{3}}$$

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 - e)

$$x^8 + 2dx^6 + 3d^2x^4 + 2d^3x^2 + d) \log(x^2 + x + 1) + 81(d^4x^8 + 2d^5x^6 + 3d^6x^4 + 2d^7x^2 + d^8) \log(x^2 - x + 1) - 72e / (x^8 + 2x^6 + 3x^4 + 2x^2 + 1)$$

giac [A] time = 0.36, size = 131, normalized size = 0.71

$$\frac{1}{144} \sqrt{3} (13d - 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{9}{32} d \log(x^2 + x + 1)$$

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

$$\frac{13\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144} + \frac{13\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144} - \frac{9d \ln(x^2 - x + 1)}{32} + \frac{9d \ln(x^2 + x + 1)}{32} - \frac{2\sqrt{3} e \arctan\left(\frac{1}{3}\sqrt{3}(2x+1)\right)}{9}$$

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

$$\frac{-\frac{7dx^7}{24} + \frac{ex^6}{3} - \frac{5dx^5}{24} + \frac{ex^4}{2} - \frac{7dx^3}{24} + \frac{2ex^2}{3} + \frac{dx}{6} + \frac{e}{4}}{x^8 + 2x^6 + 3x^4 + 2x^2 + 1} - \ln\left(x - \frac{1}{2} - \frac{\sqrt{3} 1i}{2}\right) \left(\frac{9d}{32} + \frac{\sqrt{3} d 13i}{288} + \frac{\sqrt{3} e 1i}{9}\right) + \ln\left(x + \frac{1}{2} + \frac{\sqrt{3} 1i}{2}\right) \left(\frac{9d}{32} + \frac{\sqrt{3} d 13i}{288} + \frac{\sqrt{3} e 1i}{9}\right)$$

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)

$$+ \log(x + (3^{1/2} * i) / 2 - 1/2) * ((3^{1/2} * d * 13i) / 288 - (9 * d) / 32 + (3^{1/2} * e * 1i) / 9) + \log(x + (3^{1/2} * i) / 2 + 1/2) * ((9 * d) / 32 + (3^{1/2} * d * 13i) / 288 - (3^{1/2} * e * 1i) / 9)$$

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**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 * (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 * (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 * (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) + (-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)$

$$3.48 \quad \int \frac{d+ex+fx^2}{(1+x^2+x^4)^3} dx$$

Optimal. Leaf size=223

$$-\frac{1}{32}(9d-4f)\log(x^2-x+1)+\frac{1}{32}(9d-4f)\log(x^2+x+1)+\frac{x(-7x^2(d-f)+2d+3f)}{24(x^4+x^2+1)}+\frac{x(-(x^2(d-2f))+d+f)}{12(x^4+x^2+1)}$$

[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] := 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 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

$$\begin{aligned}
\int \frac{d+ex+fx^2}{(1+x^2+x^4)^3} dx &= \int \frac{ex}{(1+x^2+x^4)^3} dx + \int \frac{d+fx^2}{(1+x^2+x^4)^3} dx \\
&= \frac{x(d+f-(d-2f)x^2)}{12(1+x^2+x^4)^2} + \frac{1}{12} \int \frac{11d-f-5(d-2f)x^2}{(1+x^2+x^4)^2} dx + e \int \frac{x}{(1+x^2+x^4)^3} dx \\
&= \frac{x(d+f-(d-2f)x^2)}{12(1+x^2+x^4)^2} + \frac{x(2d+3f-7(d-f)x^2)}{24(1+x^2+x^4)} + \frac{1}{72} \int \frac{15(4d-f)-21(d-f)x^2}{1+x^2+x^4} dx \\
&= \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{x(d+f-(d-2f)x^2)}{12(1+x^2+x^4)^2} + \frac{x(2d+3f-7(d-f)x^2)}{24(1+x^2+x^4)} + \frac{1}{144} \int \frac{15(4d-f)-21(d-f)x^2}{1+x^2+x^4} dx \\
&= \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{x(d+f-(d-2f)x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{x(2d+3f-7(d-f)x^2)}{24(1+x^2+x^4)} \\
&= \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{x(d+f-(d-2f)x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{x(2d+3f-7(d-f)x^2)}{24(1+x^2+x^4)} \\
&= \frac{e(1+2x^2)}{12(1+x^2+x^4)^2} + \frac{x(d+f-(d-2f)x^2)}{12(1+x^2+x^4)^2} + \frac{e(1+2x^2)}{6(1+x^2+x^4)} + \frac{x(2d+3f-7(d-f)x^2)}{24(1+x^2+x^4)}
\end{aligned}$$

Mathematica [C] time = 0.59, size = 235, normalized size = 1.05

$$\frac{1}{144} \left(\frac{12(x(-dx^2+d+2fx^2+f)+2ex^2+e)}{(x^4+x^2+1)^2} + \frac{6(-7dx^3+2dx+e(8x^2+4)+7fx^3+3fx)}{x^4+x^2+1} - \frac{((7\sqrt{3}-47i)dx^3+...)}{...} \right)$$

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

$$\frac{84(d-f)x^7 - 96ex^6 + 60(d-2f)x^5 - 144ex^4 + 84(d-2f)x^3 - 192ex^2 - 2\sqrt{3}((13d-32e+2f)x^8 + 2(13d-32e+2f)x^6 + 3(13d-32e+2f)x^4 + 2(13d-32e+2f)x^2 + 13d-32e+2f)\arctan(1/3\sqrt{3}(2x+1)) - 2\sqrt{3}((13d+32e+2f)x^8 + 2(13d+32e+2f)x^6 + 3(13d+32e+2f)x^4 + 2(13d+32e+2f)x^2 + 13d+32e+2f)\arctan(1/3\sqrt{3}(2x-1)) - 12(4d+5f)x - 9((9d-4f)x^8 + 2(9d-4f)x^6 + 3(9d-4f)x^4 + 2(9d-4f)x^2 + 9d-4f)}{144}$$

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)

$9*d - 4*f)*x^2 + 9*d - 4*f)*\log(x^2 + x + 1) + 9*((9*d - 4*f)*x^8 + 2*(9*d - 4*f)*x^6 + 3*(9*d - 4*f)*x^4 + 2*(9*d - 4*f)*x^2 + 9*d - 4*f)*\log(x^2 - x + 1) - 72*e)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)$

giac [A] time = 0.37, size = 171, normalized size = 0.77

$$\frac{1}{144} \sqrt{3} (13d + 2f - 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 2f + 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{32} (9d - 4f) \log(x^2 + x + 1) - \frac{1}{32} (9d - 4f) \log(x^2 - x + 1) - \frac{1}{24} (7d*x^7 - 7*f*x^7 - 8*x^6*e + 5*d*x^5 - 10*f*x^5 - 12*x^4*e + 7*d*x^3 - 14*f*x^3 - 16*x^2*e - 4*d*x - 5*f*x - 6*e)/(x^4 + x^2 + 1)^2$$

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] 1/144*sqrt(3)*(13*d + 2*f - 32*e)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/144*sqrt(3)*(13*d + 2*f + 32*e)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/32*(9*d - 4*f)*log(x^2 + x + 1) - 1/32*(9*d - 4*f)*log(x^2 - x + 1) - 1/24*(7*d*x^7 - 7*f*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] 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

$$\frac{1}{144} \sqrt{3} (13d - 32e + 2f) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 32e + 2f) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{32} (9d - 4f) \log(x^2 + x + 1) - \frac{1}{32} (9d - 4f) \log(x^2 - x + 1) - \frac{1}{24} (7*(d - f)*x^7 - 8*e*x^6 + 5*(d - 2*f)*x^5 - 12*e*x^4 + 7*(d - 2*f)*x^3 - 16*e*x^2 - (4*d + 5*f)*x - 6*e)/(x^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((f*x^2+e*x+d)/(x^4+x^2+1)^3,x, algorithm="maxima")

[Out] 1/144*sqrt(3)*(13*d - 32*e + 2*f)*arctan(1/3*sqrt(3)*(2*x + 1)) + 1/144*sqrt(3)*(13*d + 32*e + 2*f)*arctan(1/3*sqrt(3)*(2*x - 1)) + 1/32*(9*d - 4*f)*log(x^2 + x + 1) - 1/32*(9*d - 4*f)*log(x^2 - x + 1) - 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^8 + 2*x^6 + 3*x^4 + 2*x^2 + 1)

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*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 - 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 - 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

$$\begin{aligned}
& + 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 + \\
& 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}
\end{aligned}$$

$$\begin{aligned}
&) * 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 \\
& 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] /; 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 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_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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(1 + x^2 + x^4)^3} dx &= \int \frac{d + fx^2}{(1 + x^2 + x^4)^3} dx + \int \frac{x(e + gx^2)}{(1 + x^2 + x^4)^3} dx \\
&= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12} \int \frac{11d - f - 5(d - 2f)x^2}{(1 + x^2 + x^4)^2} dx + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(1 + x + x^2)} \right. \\
&= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} + \frac{1}{72} \int \frac{15}{1 + x + x^2} \\
&= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\
&= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\
&= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)} \\
&= \frac{x(d + f - (d - 2f)x^2)}{12(1 + x^2 + x^4)^2} + \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} + \frac{x(2d + 3f - 7(d - f)x^2)}{24(1 + x^2 + x^4)}
\end{aligned}$$

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

$$\frac{84(d - f)x^7 - 48(2e - g)x^6 + 60(d - 2f)x^5 - 72(2e - g)x^4 + 84(d - 2f)x^3 - 96(2e - g)x^2 - 2\sqrt{3}((13d - 32e + 2f + 16g)x^8 + 2(13d - 32e + 2f + 16g)x^6 + 3(13d - 32e + 2f + 16g)x^4 + 2(13d - 32e + 2f + 16g)x^2 + 13d - 32e + 2f + 16g)\arctan(1/3\sqrt{3}(2x + 1)) - 2\sqrt{3}((13d + 32e + 2f - 16g)x^8 + 2(13d + 32e + 2f - 16g)x^6 + 3(13d + 32e + 2f - 16g)x^4 + 2(13d + 32e + 2f - 16g)x^2 + 13d + 32e + 2f - 16g)\arctan(1/3\sqrt{3}(2x - 1))}{(x^4 + x^2 + 1)^3}$$

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*(2e - g)*x^6 + 60*(d - 2*f)*x^5 - 72*(2e - g)*x^4 + 84*(d - 2*f)*x^3 - 96*(2e - 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))

$32e + 2f - 16g)x^2 + 13d + 32e + 2f - 16g) \arctan(1/3\sqrt{3})(2x - 1) - 12(4d + 5f)x - 9((9d - 4f)x^8 + 2(9d - 4f)x^6 + 3(9d - 4f)x^4 + 2(9d - 4f)x^2 + 9d - 4f) \log(x^2 + x + 1) + 9((9d - 4f)x^8 + 2(9d - 4f)x^6 + 3(9d - 4f)x^4 + 2(9d - 4f)x^2 + 9d - 4f) \log(x^2 - x + 1) - 72e + 72g)/(x^8 + 2x^6 + 3x^4 + 2x^2 + 1)$

giac [A] time = 0.38, size = 198, normalized size = 0.81

$$\frac{1}{144} \sqrt{3} (13d + 2f + 16g - 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 2f - 16g + 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{32} (9d - 4f) \log(x^2 + x + 1) - \frac{1}{32} (9d - 4f) \log(x^2 - x + 1) - \frac{1}{24} (7d^2x^7 - 7fx^7 + 4gx^6 - 8x^6e + 5dx^5 - 10fx^5 + 6gx^4 - 12x^4e + 7dx^3 - 14fx^3 + 8gx^2 - 16x^2e - 4dx - 5fx + 6g - 6e)/(x^4 + x^2 + 1)^2$$

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] $\frac{1}{144}\sqrt{3}(13d + 2f + 16g - 32e) \arctan(1/3\sqrt{3})(2x + 1) + \frac{1}{144}\sqrt{3}(13d + 2f - 16g + 32e) \arctan(1/3\sqrt{3})(2x - 1) + \frac{1}{32}(9d - 4f) \log(x^2 + x + 1) - \frac{1}{32}(9d - 4f) \log(x^2 - x + 1) - \frac{1}{24}(7d^2x^7 - 7fx^7 + 4gx^6 - 8x^6e + 5dx^5 - 10fx^5 + 6gx^4 - 12x^4e + 7dx^3 - 14fx^3 + 8gx^2 - 16x^2e - 4dx - 5fx + 6g - 6e)/(x^4 + x^2 + 1)^2$

maple [A] time = 0.02, size = 322, normalized size = 1.33

$$\frac{13\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144} + \frac{13\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144} - \frac{9d \ln(x^2 - x + 1)}{32} + \frac{9d \ln(x^2 + x + 1)}{32} - \frac{2\sqrt{3} e \arctan\left(\frac{1}{3}\sqrt{3}(2x + 1)\right)}{9}$$

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] $\frac{1}{16}((-\frac{7}{3}d + \frac{7}{3}f - \frac{4}{3}e - \frac{1}{3}g)x^3 + (-6d + 4f - 2g)x^2 + (-\frac{20}{3}d + \frac{13}{3}f + \frac{1}{3}e - \frac{8}{3}g)x - 4d + \frac{4}{3}f + 2e - 2g)/(x^2 + x + 1)^2 + \frac{9}{32}d \ln(x^2 + x + 1) - \frac{1}{8}f \ln(x^2 + x + 1) + \frac{13}{144}3^{1/2}d \arctan(1/3(2x + 1)3^{1/2}) - \frac{2}{9}3^{1/2}e \arctan(1/3(2x + 1)3^{1/2}) + \frac{1}{72}3^{1/2}f \arctan(1/3(2x + 1)3^{1/2}) + \frac{1}{9}3^{1/2}g \arctan(1/3(2x + 1)3^{1/2}) - \frac{1}{16}((\frac{7}{3}d - \frac{7}{3}f - \frac{4}{3}e - \frac{1}{3}g)x^3 + (-6d + 4f + 2g)x^2 + (\frac{20}{3}d - \frac{13}{3}f + \frac{1}{3}e - \frac{8}{3}g)x - 4d + \frac{4}{3}f - 2e + 2g)/(x^2 - x + 1)^2 - \frac{9}{32}d \ln(x^2 - x + 1) + \frac{1}{8}f \ln(x^2 - x + 1) + \frac{13}{144}3^{1/2}d \arctan(1/3(2x - 1)3^{1/2}) + \frac{2}{9}3^{1/2}e \arctan(1/3(2x - 1)3^{1/2}) + \frac{1}{72}3^{1/2}f \arctan(1/3(2x - 1)3^{1/2}) - \frac{1}{9}3^{1/2}g \arctan(1/3(2x - 1)3^{1/2})$

maxima [A] time = 2.61, size = 200, normalized size = 0.82

$$\frac{1}{144} \sqrt{3} (13d - 32e + 2f + 16g) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 32e + 2f - 16g) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{32} (9d - 4f) \log(x^2 + x + 1) - \frac{1}{32} (9d - 4f) \log(x^2 - x + 1) - \frac{1}{24} (7d^2x^7 - 4(2e - g)x^6 + 5(d - 2f)x^5 - 6(2e - g)x^4 + 7(d - 2f)x^3 - 8(2e - g)x^2 - (4d + 5f)x - 6e + 6g)/(x^8 + 2x^6 + 3x^4 + 2x^2 + 1)$$

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] $\frac{1}{144}\sqrt{3}(13d - 32e + 2f + 16g) \arctan(1/3\sqrt{3})(2x + 1) + \frac{1}{144}\sqrt{3}(13d + 32e + 2f - 16g) \arctan(1/3\sqrt{3})(2x - 1) + \frac{1}{32}(9d - 4f) \log(x^2 + x + 1) - \frac{1}{32}(9d - 4f) \log(x^2 - x + 1) - \frac{1}{24}(7d^2x^7 - 4(2e - g)x^6 + 5(d - 2f)x^5 - 6(2e - g)x^4 + 7(d - 2f)x^3 - 8(2e - g)x^2 - (4d + 5f)x - 6e + 6g)/(x^8 + 2x^6 + 3x^4 + 2x^2 + 1)$

mapad [B] time = 1.17, size = 295, normalized size = 1.21

$$\frac{\left(\frac{7f}{24} - \frac{7d}{24}\right) x^7 + \left(\frac{e}{3} - \frac{g}{6}\right) x^6 + \left(\frac{5f}{12} - \frac{5d}{24}\right) x^5 + \left(\frac{e}{2} - \frac{g}{4}\right) x^4 + \left(\frac{7f}{12} - \frac{7d}{24}\right) x^3 + \left(\frac{2e}{3} - \frac{g}{3}\right) x^2 + \left(\frac{d}{6} + \frac{5f}{24}\right) x + \frac{e}{4} - \frac{g}{4}}{x^8 + 2x^6 + 3x^4 + 2x^2 + 1}$$

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] /; 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] := 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]] /; 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

$$\begin{aligned}
 \int \frac{d + ex + fx^2 + gx^3 + hx^4}{(1 + x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2)}{(1 + x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^3} dx \\
 &= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12} \int \frac{11d - f + 2h - 5(d - 2f + h)x^2}{(1 + x^2 + x^4)^2} dx \\
 &= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{x(2d + 3f - h - (d - 2f + h)x^2)}{24(1 + x^2 + x^4)} \\
 &= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} \\
 &= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} \\
 &= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} \\
 &= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)} \\
 &= \frac{e - 2g + (2e - g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{(2e - g)(1 + 2x^2)}{12(1 + x^2 + x^4)}
 \end{aligned}$$

Mathematica [C] time = 0.90, size = 303, normalized size = 1.15

$$\frac{1}{144} \left(\frac{6(x(7dx^2 - 2d - 7fx^2 - 3f + 4hx^2 + h) - 4e(2x^2 + 1) + g(4x^2 + 2))}{x^4 + x^2 + 1} + \frac{12(x(-dx^2 + d + 2fx^2 + f - (x^4 + x^2 + 1)))}{(x^4 + x^2 + 1)^2} \right)$$

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

$$\frac{12(7d - 7f + 4h)x^7 - 48(2e - g)x^6 + 60(d - 2f + h)x^5 - 72(2e - g)x^4 + 84(d - 2f + h)x^3 - 96(2e - g)x^2 + 48(d - 2f + h)x - 48e}{(x^4 + x^2 + 1)^3}$$

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+x^2+1)^3,x, algorithm="fricas")

```
[Out] -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)
```

giac [A] time = 0.39, size = 228, normalized size = 0.87

$$\frac{1}{144} \sqrt{3} (13d + 2f + 16g + h - 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 2f - 16g + h + 32e) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) - \frac{9}{32} \ln(x^2 - x + 1) + \frac{9}{32} \ln(x^2 + x + 1) - \frac{2\sqrt{3}}{9} e \arctan\left(\frac{2x-1}{3}\right)$$

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] 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
```

maple [A] time = 0.02, size = 396, normalized size = 1.51

$$\frac{13\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144} + \frac{13\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144} - \frac{9d \ln(x^2 - x + 1)}{32} + \frac{9d \ln(x^2 + x + 1)}{32} - \frac{2\sqrt{3} e \arctan\left(\frac{2x-1}{3}\right)}{9}$$

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)^3,x)
```

```
[Out] 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

$$\frac{1}{144} \sqrt{3} (13d - 32e + 2f + 16g + h) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 32e + 2f - 16g + h) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) - \frac{9}{32} \ln(x^2 - x + 1) + \frac{9}{32} \ln(x^2 + x + 1) - \frac{2\sqrt{3}}{9} e \arctan\left(\frac{2x-1}{3}\right)$$

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="maxima")
```

```
[Out] 1/144*sqrt(3)*(13*d - 32*e + 2*f + 16*g + h)*arctan(1/3*sqrt(3)*(2*x + 1))
+ 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] 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
+ 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) + lo
g(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 +
```

$$3^{(1/2)}*f^2*x*252i + 3^{(1/2)}*h^2*x*108i - 3^{(1/2)}*d*f*x*819i + 3^{(1/2)}*d*g*x*752i + 3^{(1/2)}*e*f*x*544i + 3^{(1/2)}*d*h*x*513i - 3^{(1/2)}*e*h*x*448i - 3^{(1/2)}*f*g*x*272i - 3^{(1/2)}*f*h*x*333i + 3^{(1/2)}*g*h*x*224i - 3^{(1/2)}*d*e*x*1504i*(f/8 - (9*d)/32 - (3*h)/32 + (3^{(1/2)}*d*13i)/288 + (3^{(1/2)}*e*1i)/9 + (3^{(1/2)}*f*1i)/144 - (3^{(1/2)}*g*1i)/18 + (3^{(1/2)}*h*1i)/288)$$

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},

$x] \&\& \text{NeQ}[b^2 - 4*a*c, 0]$

Rule 628

$\text{Int}[(d + (e \cdot x)/(a + (b \cdot x) + (c \cdot x)^2)), x_Symbol] \rightarrow \text{Simp}[(d \cdot \text{Log}[\text{RemoveContent}[a + b \cdot x + c \cdot x^2, x]])/b, x] /; \text{FreeQ}\{a, b, c, d, e\}, x] \&\& \text{EqQ}[2 \cdot c \cdot d - b \cdot e, 0]$

Rule 634

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

Rule 1169

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

Rule 1178

$\text{Int}[(d + (e \cdot x^2) \cdot (a + (b \cdot x)^2 + (c \cdot x)^4)^{p_1}), x_Symbol] \rightarrow \text{Simp}[(x \cdot (a \cdot b \cdot e - d \cdot (b^2 - 2 \cdot a \cdot c) - c \cdot (b \cdot d - 2 \cdot a \cdot e) \cdot x^2) \cdot (a + b \cdot x^2 + c \cdot x^4)^{p_1 + 1})/(2 \cdot a \cdot (p_1 + 1) \cdot (b^2 - 4 \cdot a \cdot c)), x] + \text{Dist}[1/(2 \cdot a \cdot (p_1 + 1) \cdot (b^2 - 4 \cdot a \cdot c)), \text{Int}[\text{Simp}[(2 \cdot p_1 + 3) \cdot d \cdot b^2 - a \cdot b \cdot e - 2 \cdot a \cdot c \cdot d \cdot (4 \cdot p_1 + 5) + (4 \cdot p_1 + 7) \cdot (d \cdot b - 2 \cdot a \cdot e) \cdot c \cdot x^2, x] \cdot (a + b \cdot x^2 + c \cdot x^4)^{p_1 + 1}, x], x] /; \text{FreeQ}\{a, b, c, d, e\}, x] \&\& \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0] \&\& \text{NeQ}[c \cdot d^2 - b \cdot d \cdot e + a \cdot e^2, 0] \&\& \text{LtQ}[p_1, -1] \&\& \text{IntegerQ}[2 \cdot p_1]$

Rule 1660

$\text{Int}[(Pq) \cdot (a + (b \cdot x) + (c \cdot x)^2)^{p_1}, x_Symbol] \rightarrow \text{With}\{Q = \text{PolynomialQuotient}[Pq, a + b \cdot x + c \cdot x^2, x], f = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b \cdot x + c \cdot x^2, x], x, 0], g = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b \cdot x + c \cdot x^2, x], x, 1]\}, \text{Simp}[(b \cdot f - 2 \cdot a \cdot g + (2 \cdot c \cdot f - b \cdot g) \cdot x) \cdot (a + b \cdot x + c \cdot x^2)^{p_1 + 1})/((p_1 + 1) \cdot (b^2 - 4 \cdot a \cdot c)), x] + \text{Dist}[1/((p_1 + 1) \cdot (b^2 - 4 \cdot a \cdot c)), \text{Int}[(a + b \cdot x + c \cdot x^2)^{p_1 + 1} \cdot \text{ExpandToSum}[(p_1 + 1) \cdot (b^2 - 4 \cdot a \cdot c) \cdot Q - (2 \cdot p_1 + 3) \cdot (2 \cdot c \cdot f - b \cdot g), x], x], x]] /; \text{FreeQ}\{a, b, c\}, x] \&\& \text{PolyQ}[Pq, x] \&\& \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0] \&\& \text{LtQ}[p_1, -1]$

Rule 1663

$\text{Int}[(Pq) \cdot (x)^{m_1} \cdot (a + (b \cdot x)^2 + (c \cdot x)^4)^{p_1}, x_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[x^{(m_1 - 1)/2} \cdot \text{SubstFor}[x^2, Pq, x] \cdot (a + b \cdot x + c \cdot x^2)^{p_1}, x], x, x^2], x] /; \text{FreeQ}\{a, b, c, p\}, x] \&\& \text{PolyQ}[Pq, x^2] \&\& \text{IntegerQ}[(m_1 - 1)/2]$

Rule 1673

$\text{Int}[(Pq) \cdot (a + (b \cdot x)^2 + (c \cdot x)^4)^{p_1}, x_Symbol] \rightarrow \text{Module}\{q = \text{Expon}[Pq, x], k\}, \text{Int}[\text{Sum}[\text{Coeff}[Pq, x, 2 \cdot k] \cdot x^{(2 \cdot k)}, \{k, 0, q/2\}] \cdot (a + b \cdot x^2 + c \cdot x^4)^p, x] + \text{Int}[x \cdot \text{Sum}[\text{Coeff}[Pq, x, 2 \cdot k + 1] \cdot x^{(2 \cdot k)}, \{k, 0, (q - 1)/2\}] \cdot (a + b \cdot x^2 + c \cdot x^4)^p, x]] /; \text{FreeQ}\{a, b, c, p\}, x] \&\& \text{PolyQ}[Pq, x] \&\& \text{!PolyQ}[Pq, x^2]$

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

$$\begin{aligned} \int \frac{d + ex + fx^2 + gx^3 + hx^4 + 51x^5}{(1 + x^2 + x^4)^3} dx &= \int \frac{x(e + gx^2 + 51x^4)}{(1 + x^2 + x^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(1 + x^2 + x^4)^3} dx \\ &= \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \frac{1}{12} \int \frac{11d - f + 2h - 5(d - 2f + h)x^2}{(1 + x^2 + x^4)^2} dx \\ &= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \dots \\ &= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \dots \\ &= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \dots \\ &= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \dots \\ &= \frac{51 + e - 2g - (51 - 2e + g)x^2}{12(1 + x^2 + x^4)^2} + \frac{x(d + f - 2h - (d - 2f + h)x^2)}{12(1 + x^2 + x^4)^2} + \dots \end{aligned}$$

Mathematica [C] time = 0.98, size = 325, normalized size = 1.21

$$\frac{1}{144} \left(\frac{12(-dx^3 + dx + 2ex^2 + e + 2fx^3 + fx - g(x^2 + 2) - hx^3 - 2hx - ix^2 + i)}{(x^4 + x^2 + 1)^2} + \frac{6(-7dx^3 + 2dx + e(8x^2 + 4))}{(x^4 + x^2 + 1)^2} \right)$$

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

$$12(7d - 7f + 4h)x^7 - 48(2e - g + i)x^6 + 60(d - 2f + h)x^5 - 72(2e - g + i)x^4 + 84(d - 2f + h)x^3 - 48(4e - 2g + i)x^2 - 2\sqrt{3}((13d - 32e + 2f + 16g + h - 16i)x^8 + 2(13d - 32e + 2f + 16g + h - 16i)x^6 + 3(13d - 32e + 2f + 16g + h - 16i)x^4 + 2(13d - 32e + 2f + 16g + h - 16i)x^2 + 13d - 32e + 2f + 16g + h - 16i)\arctan(1/3\sqrt{3}(2x + 1)) - 2\sqrt{3}((13d + 32e + 2f - 16g + h + 16i)x^8 + 2(13d + 32e + 2f - 16g + h + 16i)x^6 + 3(13d + 32e + 2f - 16g + h + 16i)x^4 + 2(13d + 32e + 2f - 16g + h + 16i)x^2 + 13d + 32e + 2f - 16g + h + 16i)\arctan(1/3\sqrt{3}(2x - 1)) - 12(4d + 5f - 5h)x - 9((9d - 4f + 3h)x^8 + 2(9d - 4f + 3h)x^6 + 3(9d - 4f + 3h)x^4 + 2(9d - 4f + 3h)x^2 + 9d - 4f + 3h)\log(x^2 + x + 1) + 9((9d - 4f + 3h)x^8 + 2(9d - 4f + 3h)x^6 + 3(9d - 4f + 3h)x^4 + 2(9d - 4f + 3h)x^2 + 9d - 4f + 3h)\log(x^2 - x + 1) - 72e + 72g - 48i)/(x^8 + 2x^6 + 3x^4 + 2x^2 + 1)$$

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)^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

$$\frac{13\sqrt{3} d \arctan\left(\frac{(2x+1)\sqrt{3}}{3}\right)}{144} + \frac{13\sqrt{3} d \arctan\left(\frac{(2x-1)\sqrt{3}}{3}\right)}{144} - \frac{9d \ln(x^2 - x + 1)}{32} + \frac{9d \ln(x^2 + x + 1)}{32} - \frac{2\sqrt{3} e \arctan\left(\frac{2x}{9}\right)}{9}$$

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))

$$\frac{1}{3}(2x+1)\sqrt{3} - \frac{1}{16} \left(\frac{7}{3}d - \frac{7}{3}f + \frac{4}{3}h - \frac{4}{3}e - \frac{1}{3}g + \frac{1}{3}i \right) x^3 + (-6d + 4f - 2h + 2g - 2i) x^2 + \left(\frac{20}{3}d - \frac{13}{3}f + \frac{5}{3}h + \frac{1}{3}e - \frac{8}{3}g + \frac{7}{3}i \right) x - \frac{4}{3}d + \frac{4}{3}f - 2e + 2g - \frac{4}{3}i$$

$$\frac{1}{(x^2 - x + 1)^2} - \frac{9}{32} d \ln(x^2 - x + 1) + \frac{1}{8} f \ln(x^2 - x + 1) - \frac{3}{32} h \ln(x^2 - x + 1) + \frac{13}{144} \sqrt{3} \arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{2}{9} \sqrt{3} \arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{72} \sqrt{3} \arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) - \frac{1}{9} \sqrt{3} \arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{144} \sqrt{3} \arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right) + \frac{1}{9} \sqrt{3} \arctan\left(\frac{1}{3}\sqrt{3}(2x-1)\right)$$

maxima [A] time = 2.12, size = 229, normalized size = 0.85

$$\frac{1}{144} \sqrt{3} (13d - 32e + 2f + 16g + h - 16i) \arctan\left(\frac{1}{3} \sqrt{3} (2x + 1)\right) + \frac{1}{144} \sqrt{3} (13d + 32e + 2f - 16g + h + 16i) \arctan\left(\frac{1}{3} \sqrt{3} (2x - 1)\right) + \frac{1}{32} (9d - 4f + 3h) \log(x^2 + x + 1) - \frac{1}{32} (9d - 4f + 3h) \log(x^2 - x + 1) - \frac{1}{24} ((7d - 7f + 4h)x^7 - 4(2e - g + i)x^6 + 5(d - 2f + h)x^5 - 6(2e - g + i)x^4 + 7(d - 2f + h)x^3 - 4(4e - 2g + i)x^2 - (4d + 5f - 5h)x - 6e + 6g - 4i) / (x^8 + 2x^6 + 3x^4 + 2x^2 + 1)$$

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)^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] 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)

$$\begin{aligned}
& /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*75 \\
& 2i - 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(192 \\
& 0*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*54 \\
& 4i + 3^{(1/2)}*e*f*608i + 3^{(1/2)}*d*h*945i - 3^{(1/2)}*d*i*544i - 3^{(1/2)}*e*h*4 \\
& 16i - 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 \\
& 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

$$\frac{dx(3bcx^2(b^2-8ac) + (b^2-7ac)(3b^2-4ac))}{8a^2(b^2-4ac)^2(a+bx^2+cx^4)} + \frac{3\sqrt{c}d(56a^2c^2-10ab^2c+b(b^2-8ac)\sqrt{b^2-4ac}+b^4)\tan^{-1}}{8\sqrt{2}a^2(b^2-4ac)^{5/2}\sqrt{b-\sqrt{b^2-4ac}}}$$

[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}

$$\frac{3\sqrt{c}d(56a^2c^2-10ab^2c+b(b^2-8ac)\sqrt{b^2-4ac}+b^4)\tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right)}{8\sqrt{2}a^2(b^2-4ac)^{5/2}\sqrt{b-\sqrt{b^2-4ac}}} + \frac{3\sqrt{c}d\left(-\frac{56a^2c^2-10ab^2c+b^4}{\sqrt{b^2-4ac}}-8abc\right)}{8\sqrt{2}a^2(b^2-4ac)^2\sqrt{b-\sqrt{b^2-4ac}}}$$

Antiderivative was successfully verified.

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

[Out] $-(e*(b+2*c*x^2))/(4*(b^2-4*a*c)*(a+b*x^2+c*x^4)^2)+(d*x*(b^2-2*a*c+b*c*x^2))/(4*a*(b^2-4*a*c)*(a+b*x^2+c*x^4)^2)+(3*c*e*(b+2*c*x^2))/(2*(b^2-4*a*c)^2*(a+b*x^2+c*x^4))+(d*x*((b^2-7*a*c)*(3*b^2-4*a*c)+3*b*c*(b^2-8*a*c)*x^2))/(8*a^2*(b^2-4*a*c)^2*(a+b*x^2+c*x^4))+(3*sqrt[c]*(b^4-10*a*b^2*c+56*a^2*c^2+b*(b^2-8*a*c)*sqrt[b^2-4*a*c])*d*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b-sqrt[b^2-4*a*c]]]/(8*sqrt[2]*a^2*(b^2-4*a*c)^(5/2)*sqrt[b-sqrt[b^2-4*a*c]])+(3*sqrt[c]*(b^3-8*a*b*c-(b^4-10*a*b^2*c+56*a^2*c^2)/sqrt[b^2-4*a*c])*d*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b+sqrt[b^2-4*a*c]]]/(8*sqrt[2]*a^2*(b^2-4*a*c)^2*sqrt[b+sqrt[b^2-4*a*c]])-(6*c^2*e*ArcTanh[(b+2*c*x^2)/sqrt[b^2-4*a*c]])/(b^2-4*a*c)^(5/2)$

Rule 12

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

$Q[a, 0] \parallel \text{LtQ}[b, 0]$

Rule 614

$\text{Int}[(a_.) + (b_.)(x_) + (c_.)(x_)^2]^{(p_.)}, x_Symbol] \rightarrow \text{Simp}[(b + 2cx)(a + bx + cx^2)^{(p+1)} / ((p+1)(b^2 - 4ac)), x] - \text{Dist}[(2c(2p+3)) / ((p+1)(b^2 - 4ac)), \text{Int}[(a + bx + cx^2)^{(p+1)}, x], x] /;$ FreeQ[{a, b, c}, x] && NeQ[b^2 - 4ac, 0] && LtQ[p, -1] && NeQ[p, -3/2] && IntegerQ[4p]

Rule 618

$\text{Int}[(a_.) + (b_.)(x_) + (c_.)(x_)^2]^{(-1)}, x_Symbol] \rightarrow \text{Dist}[-2, \text{Subst}[\text{Int}[1/\text{Simp}[b^2 - 4ac - x^2, x], x], x, b + 2cx], x] /;$ FreeQ[{a, b, c}, x] && NeQ[b^2 - 4ac, 0]

Rule 1092

$\text{Int}[(a_) + (b_.)(x_)^2 + (c_.)(x_)^4]^{(p_.)}, x_Symbol] \rightarrow -\text{Simp}[(x(b^2 - 2ac + bcx^2)(a + bx^2 + cx^4)^{(p+1)}) / (2a(p+1)(b^2 - 4ac)), x] + \text{Dist}[1 / (2a(p+1)(b^2 - 4ac)), \text{Int}[(b^2 - 2ac + 2(p+1)(b^2 - 4ac) + bc(4p+7)x^2)(a + bx^2 + cx^4)^{(p+1)}, x], x] /;$ FreeQ[{a, b, c}, x] && NeQ[b^2 - 4ac, 0] && LtQ[p, -1] && IntegerQ[2p]

Rule 1107

$\text{Int}[(x_)((a_) + (b_.)(x_)^2 + (c_.)(x_)^4]^{(p_.)}, x_Symbol] \rightarrow \text{Dist}[1/2, \text{Subst}[\text{Int}[(a + bx + cx^2)^p, x], x, x^2], x] /;$ FreeQ[{a, b, c, p}, x]

Rule 1166

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

Rule 1178

$\text{Int}[(d_) + (e_.)(x_)^2] * ((a_) + (b_.)(x_)^2 + (c_.)(x_)^4)^{(p_.)}, x_Symbol] \rightarrow \text{Simp}[(x(a*b*e - d(b^2 - 2ac) - c(b*d - 2a*e)*x^2)(a + bx^2 + cx^4)^{(p+1)}) / (2a(p+1)(b^2 - 4ac)), x] + \text{Dist}[1 / (2a(p+1)(b^2 - 4ac)), \text{Int}[\text{Simp}[(2p+3)*d*b^2 - a*b*e - 2a*c*d*(4p+5) + (4p+7)*(d*b - 2a*e)*c*x^2, x] * (a + bx^2 + cx^4)^{(p+1)}, x], x] /;$ FreeQ[{a, b, c, d, e}, x] && NeQ[b^2 - 4ac, 0] && NeQ[c*d^2 - b*d*e + a*e^2, 0] && LtQ[p, -1] && IntegerQ[2p]

Rule 1673

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

Rubi steps

$$\begin{aligned}
\int \frac{d+ex}{(a+bx^2+cx^4)^3} dx &= \int \frac{d}{(a+bx^2+cx^4)^3} dx + \int \frac{ex}{(a+bx^2+cx^4)^3} dx \\
&= d \int \frac{1}{(a+bx^2+cx^4)^3} dx + e \int \frac{x}{(a+bx^2+cx^4)^3} dx \\
&= \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} - \frac{d \int \frac{b^2-2ac-4(b^2-4ac)-5bcx^2}{(a+bx^2+cx^4)^2} dx}{4a(b^2-4ac)} + \frac{1}{2} e \operatorname{Subst} \left(\int \frac{1}{(a+bx^2+cx^4)^2} dx \right) \\
&= -\frac{e(b+2cx^2)}{4(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx((b^2-7ac)(3b+2cx^2))}{8a^2(b^2-4ac)(a+bx^2+cx^4)^2} \\
&= -\frac{e(b+2cx^2)}{4(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{3ce(b+2cx^2)}{2(b^2-4ac)^2(a+bx^2+cx^4)} \\
&= -\frac{e(b+2cx^2)}{4(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{3ce(b+2cx^2)}{2(b^2-4ac)^2(a+bx^2+cx^4)} \\
&= -\frac{e(b+2cx^2)}{4(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{dx(b^2-2ac+bcx^2)}{4a(b^2-4ac)(a+bx^2+cx^4)^2} + \frac{3ce(b+2cx^2)}{2(b^2-4ac)^2(a+bx^2+cx^4)}
\end{aligned}$$

Mathematica [A] time = 1.91, size = 488, normalized size = 1.03

$$\frac{1}{16} \left(\frac{8a^2c(3be+cx(7d+6ex)) - 2abcdx(25b+24cx^2) + 6b^3dx(b+cx^2)}{a^2(b^2-4ac)^2(a+bx^2+cx^4)} + \frac{3\sqrt{2}\sqrt{c}d(56a^2c^2-10ab^2c-8abc)}{a^2(b^2-4ac)} \right)$$

Antiderivative was successfully verified.

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

[Out]
$$\begin{aligned}
&((4*a*b*e + 8*a*c*x*(d + e*x) - 4*b*d*x*(b + c*x^2))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)^2) + (6*b^3*d*x*(b + c*x^2) - 2*a*b*c*d*x*(25*b + 24*c*x^2) + 8*a^2*c*(3*b*e + c*x*(7*d + 6*e*x)))/(a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (3*sqrt[2]*sqrt[c]*(b^4 - 10*a*b^2*c + 56*a^2*c^2 + b^3*sqrt[b^2 - 4*a*c] - 8*a*b*c*sqrt[b^2 - 4*a*c])*d*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b - sqrt[b^2 - 4*a*c]]])/(a^2*(b^2 - 4*a*c)^(5/2)*sqrt[b - sqrt[b^2 - 4*a*c]]) - (3*sqrt[2]*sqrt[c]*(b^4 - 10*a*b^2*c + 56*a^2*c^2 - b^3*sqrt[b^2 - 4*a*c] + 8*a*b*c*sqrt[b^2 - 4*a*c])*d*ArcTan[(sqrt[2]*sqrt[c]*x)/sqrt[b + sqrt[b^2 - 4*a*c]]])/(a^2*(b^2 - 4*a*c)^(5/2)*sqrt[b + sqrt[b^2 - 4*a*c]]) + (48*c^2*e*Log[-b + sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(5/2) - (48*c^2*e*Log[b + sqrt[b^2 - 4*a*c] + 2*c*x^2])/(b^2 - 4*a*c)^(5/2))/16
\end{aligned}$$

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] 3/32*(sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*b^8 - 17*sqrt(2)*sqrt(b*c + s
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 + sqr
t(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 - 8
8*sqrt(2)*sqrt(b^2 - 4*a*c)*sqrt(b*c + sqrt(b^2 - 4*a*c))*c)*a^2*b^3*c^2 - 2
2*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)*sq
rt(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*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)*abs(c)) + 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*s
qrt(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*arctan(2*s
qrt(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)*abs(c)) - 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 + 4
8*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
+ 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
+ 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 +
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 - 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 = 0.36, size = 3725, normalized size = 7.86

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

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

```

[Out] 3/16*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a^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^4*d-15/8*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a^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)*b^2*d+3/16*c/(16*a^2*c^2-8*a*b^2*c+b^4)/
(4*a*c-b^2)/a^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)*b^4*d-15/8*c^2/(16*a^
2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^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+3/16*c/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)/a^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^5*d-15/8*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*(-4*a*c+b^2)^(1/2)*b^2+9/4*c^2/(16*a^2*c^2-8*
a*b^2*c+b^4)/(4*a*c-b^2)/a^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^3*d-3/16*c/(16*a^2*c^2-8*a*
b^2*c+b^4)/(4*a*c-b^2)/a^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*d+15/8*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*(-4
*a*c+b^2)^(1/2)*b^2-9/4*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^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-3*c^2/(16*a^2*c^2-8*a*b^2*c+b^4)/(4*a*c-b^2)*(-4*a*c+
b^2)^(1/2)*e*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))+3*c^2/(16*a^2*c^2-8*a*b^2*c+
b^4)/(4*a*c-b^2)*(-4*a*c+b^2)^(1/2)*e*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))-1/(1
6*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)

```

$$\begin{aligned} & \frac{2e^x(-4ac+b^2)^{1/2}b^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)^2e^x(-4ac+b^2)^{1/2}b^{-3/4}/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2e^xb^3-3/4/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2e^xb^3-3/16/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2/a^2d*x^3b^5-5/16/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2d/ax*b^4-3/16/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2/a^2d*x^3b^5-5/16/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2d/ax*b^4+9/2c^2/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2d*x^3*(-4ac+b^2)^{1/2}-6c^2/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2d*x^3b+6c^2/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2e^x^2a-3/2c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2e^x^2b^2-11c^2/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2d*ax+4c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2d*x^b^2+4c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2e^x(-4ac+b^2)^{1/2}a+3c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2e^xab-9/2c^2/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2d*x^3*(-4ac+b^2)^{1/2}-6c^2/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2d*x^3b+6c^2/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2e^x^2a-3/2c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2e^x^2b^2-11c^2/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2d*ax+4c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2d*x^b^2-4c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2e^x(-4ac+b^2)^{1/2}a+3c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2e^xab+9/4c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2/a*d*x^3b^3+5/4c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2d*x*b*(-4ac+b^2)^{1/2}+9/4c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2/a*d*x^3b^3-5/4c/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2d*x*b*(-4ac+b^2)^{1/2}+21/2c^3/(16a^2c^2-8ab^2c+b^4)/(4ac-b^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-6c^3/(16a^2c^2-8ab^2c+b^4)/(4ac-b^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+21/2c^3/(16a^2c^2-8ab^2c+b^4)/(4ac-b^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}*c*x)*(-4ac+b^2)^{1/2}d+3/16/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2/a^2d*x^3*(-4ac+b^2)^{1/2}b^4+5/16/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c+1/2(-4ac+b^2)^{1/2}/c)^2d/ax*b^3*(-4ac+b^2)^{1/2}-3/16/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2/a^2d*x^3*(-4ac+b^2)^{1/2}b^4-5/16/(16a^2c^2-8ab^2c+b^4)/(4ac-b^2)/(x^2+1/2b/c-1/2(-4ac+b^2)^{1/2}/c)^2d/ax*b^3*(-4ac+b^2)^{1/2}+6c^3/(16a^2c^2-8ab^2c+b^4)/(4ac-b^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})*c*x)*b*d \end{aligned}$$

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\frac{24a^2c^3ex^6 + 36a^2bc^2ex^4 + 3(b^3c^2 - 8abc^3)dx^7 + (6b^4c - 49ab^2c^2 + 28a^2c^3)dx^5 + (3b^5 - 20ab^3c - 4a^2bc^2)dx^3 + 8((a^2b^4c^2 - 8a^3b^2c^3 + 16a^4c^4)x^8 + a^4b^4 - 8a^5b^2c + 16a^6c^2 + 2(a^2b^5c - 8a^3b^3c^2 + 16a^4bc^3)x^6 + \dots}{8((a^2b^4c^2 - 8a^3b^2c^3 + 16a^4c^4)x^8 + a^4b^4 - 8a^5b^2c + 16a^6c^2 + 2(a^2b^5c - 8a^3b^3c^2 + 16a^4bc^3)x^6 + \dots)}$$

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] 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*x^7
+ (6*b^4*c - 49*a*b^2*c^2 + 28*a^2*c^3)*d*x^5 + (3*b^5 - 20*a*b^3*c - 4*a^2
*b*c^2)*d*x^3 + 8*(a^2*b^2*c + 5*a^3*c^2)*e*x^2 + (5*a*b^4 - 37*a^2*b^2*c +
44*a^3*c^2)*d*x - 2*(a^2*b^3 - 10*a^3*b*c)*e)/((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) - 3/8*integrate(-(16*a^2*c
^2*e*x + (b^3*c - 8*a*b*c^2)*d*x^2 + (b^4 - 9*a*b^2*c + 28*a^2*c^2)*d)/(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 = 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] symsum(log(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 + 246487
4496*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 + 7
54974720*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 + 177
1776*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 - 1
7418240*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 + 4718
5920*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 + 754974
720*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 - 42
8544*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 - 174182
40*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 - 2
949120*a^6*b^6*c^6*d + 7798784*a^7*b^4*c^7*d - 11534336*a^8*b^2*c^8*d))/(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^
```

$$\begin{aligned}
& 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 - 17179869 \\
& 1840*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 + 6 \\
& 936330240*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 - 730054 \\
& 656*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^1 \\
& 1*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 + 120795955 \\
& 2*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 + 102275 \\
& 4816*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 + 6 \\
& 446304*a^2*b^4*c^7*d^4 - 734832*a*b^6*c^6*d^4 + 49787136*a^4*c^9*d^4 + 5308 \\
& 416*a^5*c^8*e^4 + 35721*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 - 22 \\
& 93760*a^8*b^7*c^6 + 5505024*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 - 6144*a^9*b^2*c^5)) + (3*(1081344*a^6*b*c^8*d*e + 1536*a \\
& ^2*b^9*c^4*d*e - 29184*a^3*b^7*c^5*d*e + 227328*a^4*b^5*c^6*d*e - 811008*a^5 \\
& *b^3*c^7*d*e))/(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*(2257 \\
& 92*a^6*c^9*d^2 + 9*b^{12}*c^3*d^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 - 21 \\
& 1968*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))/(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*(3456*a*b^5*c^6*d^3 - 189*b^7 \\
& *c^5*d^3 + 56448*a^3*b*c^8*d^3 + 64512*a^4*c^8*d*e^2 - 22608*a^2*b^3*c^7 \\
& *d^3 + 2304*a^2*b^4*c^6*d*e^2 - 20736*a^3*b^2*c^7*d*e^2))/(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*(6912*a^4*c^8*e^3 - 27*b^7*c^5*d^2*e + \\
& 486*a*b^5*c^6*d^2*e + 12096*a^3*b*c^8*d^2*e - 3672*a^2*b^3*c^7*d^2*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 - 503316480*a^8*b^{14}*c^3*z^4 + 47185920*a^7*b^{16}*c^2*z^4 - 17179869184 \\
& 0*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 - 262 \\
& 1440*a^6*b^{18}*c*z^4 + 68719476736*a^{15}*c^{10}*z^4 + 65536*a^5*b^{20}*z^4 + 6936 \\
& 330240*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 + 102275481 \\
& 6*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 + 6446 \\
& 304*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), k, 1, 4) + ((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)) + (3*c^3*e*x^6)/(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)) - (d*x^3*(4*a^2*b*c^2 - 3*b^5
\end{aligned}$$

$$+ 20*a*b^3*c)/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (d*x*(5*b^4 + 44*a^2*c^2 - 37*a*b^2*c))/(8*a*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (d*x^5*(6*b^4*c + 28*a^2*c^3 - 49*a*b^2*c^2))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)) + (3*c*d*x^7*(b^3*c - 8*a*b*c^2))/(8*a^2*(b^4 + 16*a^2*c^2 - 8*a*b^2*c)))/(x^4*(2*a*c + b^2) + a^2 + c^2*x^8 + 2*a*b*x^2 + 2*b*c*x^6)$$

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((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

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d \right) \sqrt{c} \left(\frac{-52a^2bcf + 168a^2c^2d + \sqrt{b^2 - 4ac}}{\sqrt{b^2 - 4ac}} \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)}$$

[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}

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d - 25ab^2cd + ab^3f + 3b^4d \right) \sqrt{c} \left(\frac{-52a^2bcf + 168a^2c^2d - \sqrt{b^2 - 4ac}}{\sqrt{b^2 - 4ac}} \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)}$$

Antiderivative was successfully verified.

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

[Out] $-(e * (b + 2 * c * x^2)) / (4 * (b^2 - 4 * a * c) * (a + b * x^2 + c * x^4)^2) + (x * (b^2 * d - 2 * a * c * d - a * b * f + c * (b * d - 2 * a * f) * x^2)) / (4 * a * (b^2 - 4 * a * c) * (a + b * x^2 + c * x^4)^2) + (3 * c * e * (b + 2 * c * x^2)) / (2 * (b^2 - 4 * a * c)^2 * (a + b * x^2 + c * x^4)) + (x * (3 * b^4 * d - 25 * a * b^2 * c * d + 28 * a^2 * c^2 * d + a * b^3 * f + 8 * a^2 * b * c * f + c * (3 * b^3 * d - 24 * a * b * c * d + a * b^2 * f + 20 * a^2 * c * f) * x^2)) / (8 * a^2 * (b^2 - 4 * a * c)^2 * (a + b * x^2 + c * x^4)) + (\operatorname{Sqrt}[c] * (3 * b^4 * d + b^3 * (3 * \operatorname{Sqrt}[b^2 - 4 * a * c] * d + a * f) - 4 * a * b * c * (6 * \operatorname{Sqrt}[b^2 - 4 * a * c] * d + 13 * a * f) - a * b^2 * (30 * c * d - \operatorname{Sqrt}[b^2 - 4 * a * c] * f) + 4 * a^2 * c * (42 * c * d + 5 * \operatorname{Sqrt}[b^2 - 4 * a * c] * f)) * \operatorname{ArcTan}[(\operatorname{Sqrt}[2] * \operatorname{Sqrt}[c] * x) / \operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4 * a * c]])] / (8 * \operatorname{Sqrt}[2] * a^2 * (b^2 - 4 * a * c)^{(5/2)} * \operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4 * a * c]]) + (\operatorname{Sqrt}[c] * (3 * b^3 * d - 24 * a * b * c * d + a * b^2 * f + 20 * a^2 * c * f - (3 * b^4 * d - 30 * a * b^2 * c * d + 168 * a^2 * c^2 * d + a * b^3 * f - 52 * a^2 * b * c * f) / \operatorname{Sqrt}[b^2 - 4 * a * c]) * \operatorname{ArcTan}[(\operatorname{Sqrt}[2] * \operatorname{Sqrt}[c] * x) / \operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4 * a * c]])] / (8 * \operatorname{Sqrt}[2] * a^2 * (b^2 - 4 * a * c)^2 * \operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4 * a * c]]) - (6 * c^2 * e * \operatorname{ArcTanh}[(b + 2 * c * x^2) / \operatorname{Sqrt}[b^2 - 4 * a * c]]) / (b^2 - 4 * a * c)^{(5/2)}$

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

$\text{Int}[(a + (b \cdot x)^2)^{-1}, x_Symbol] \rightarrow \text{Simp}[(\text{Rt}[a/b, 2] \cdot \text{ArcTan}[x/\text{Rt}[a/b, 2]])/a, x] /; \text{FreeQ}\{a, b, x\} \ \&\& \ \text{PosQ}[a/b]$

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

$\text{Int}[(a + (b \cdot x) + (c \cdot x)^2)^{p}, x_Symbol] \rightarrow \text{Simp}[(b + 2 \cdot c \cdot x) \cdot (a + b \cdot x + c \cdot x^2)^{p+1} / ((p+1) \cdot (b^2 - 4 \cdot a \cdot c)), x] - \text{Dist}[(2 \cdot c \cdot (2 \cdot p + 3)) / ((p+1) \cdot (b^2 - 4 \cdot a \cdot c)), \text{Int}[(a + b \cdot x + c \cdot x^2)^{p+1}, x], x] /; \text{FreeQ}\{a, b, c, x\} \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{NeQ}[p, -3/2] \ \&\& \ \text{IntegerQ}[4 \cdot p]$

Rule 618

$\text{Int}[(a + (b \cdot x) + (c \cdot x)^2)^{-1}, x_Symbol] \rightarrow \text{Dist}[-2, \text{Subst}[\text{Int}[1/\text{Simp}[b^2 - 4 \cdot a \cdot c - x^2, x], x], x, b + 2 \cdot c \cdot x], x] /; \text{FreeQ}\{a, b, c, x\} \ \&\& \ \text{NeQ}[b^2 - 4 \cdot a \cdot c, 0]$

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

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

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 1673

$\text{Int}[(Pq) \cdot (a + (b \cdot x)^2 + (c \cdot x)^4)^{p}, x_Symbol] \rightarrow \text{Module}\{q = \text{Expon}[Pq, x], k\}, \text{Int}[\text{Sum}[\text{Coeff}[Pq, x, 2 \cdot k] \cdot x^{2 \cdot k}, \{k, 0, q/2\}] \cdot (a + b \cdot x^2 + c \cdot x^4)^p, x] + \text{Int}[x \cdot \text{Sum}[\text{Coeff}[Pq, x, 2 \cdot k + 1] \cdot x^{2 \cdot k}, \{k, 0, (q-1)/2\}] \cdot (a + b \cdot x^2 + c \cdot x^4)^p, x] /; \text{FreeQ}\{a, b, c, p, x\} \ \&\& \ \text{PolyQ}[Pq, x] \ \&\& \ !\text{PolyQ}[Pq, x^2]$

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

$$c) * c) * a^4 * c^3 + 80 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c) * a^3 * b * c^3 - 18 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c) * a^2 * b^2 * c^3 - 40 * \sqrt{2} * \sqrt{b^2 - 4 * a * c} * \sqrt{b * c - \sqrt{b^2 - 4 * a * c}} * c) * a^3 * c^4 - 2 * (b^2 - 4 * a * c) * a * b^5 * c + 40 * (b^2 - 4 * a * c) * a^2 * b^3 * c^2 + 2 * (b^2 - 4 * a * c) * a * b^4 * c^2 - 128 * (b^2 - 4 * a * c) * a^3 * b * c^3 - 36 * (b^2 - 4 * a * c) * a^2 * b^2 * c^3 - 80 * (b^2 - 4 * a * c) * a^3 * c^4) * f) * \arctan(2 * \sqrt{1/2} * x / \sqrt{(a^2 * b^5 - 8 * a^3 * b^3 * c + 16 * a^4 * b * c^2 - \sqrt{(a^2 * b^5 - 8 * a^3 * b^3 * c + 16 * a^4 * b * c^2)^2 - 4 * (a^3 * b^4 - 8 * a^4 * b^2 * c + 16 * a^5 * c^2) * (a^2 * b^4 * c - 8 * a^3 * b^2 * c^2 + 16 * a^4 * c^3))}) / ((a^2 * b^4 * c - 8 * a^3 * b^2 * c^2 + 16 * a^4 * c^3))) / ((a^3 * b^8 - 16 * a^4 * b^6 * c - 2 * a^3 * b^7 * c + 96 * a^5 * b^4 * c^2 + 24 * a^4 * b^5 * c^2 + a^3 * b^6 * c^2 - 256 * a^6 * b^2 * c^3 - 96 * a^5 * b^3 * c^3 - 12 * a^4 * b^4 * c^3 + 256 * a^7 * c^4 + 128 * a^6 * b * c^4 + 48 * a^5 * b^2 * c^4 - 64 * a^6 * c^5) * \text{abs}(c)) + 1/8 * (3 * b^3 * c^2 * d * x^7 - 24 * a * b * c^3 * d * x^7 + a * b^2 * c^2 * f * x^7 + 20 * a^2 * c^3 * f * x^7 + 24 * a^2 * c^3 * x^6 * e + 6 * b^4 * c * d * x^5 - 49 * a * b^2 * c^2 * d * x^5 + 28 * a^2 * c^3 * d * x^5 + 2 * a * b^3 * c * f * x^5 + 28 * a^2 * b * c^2 * f * x^5 + 36 * a^2 * b * c^2 * x^4 * e + 3 * b^5 * d * x^3 - 20 * a * b^3 * c * d * x^3 - 4 * a^2 * b * c^2 * d * x^3 + a * b^4 * f * x^3 + 5 * a^2 * b^2 * c * f * x^3 + 36 * a^3 * c^2 * f * x^3 + 8 * a^2 * b^2 * c * x^2 * e + 40 * a^3 * c^2 * x^2 * e + 5 * a * b^4 * d * x - 37 * a^2 * b^2 * c * d * x + 44 * a^3 * c^2 * d * x - a^2 * b^3 * f * x + 16 * a^3 * b * c * f * x - 2 * a^2 * b^3 * e + 20 * a^3 * b * c * e) / ((a^2 * b^4 - 8 * a^3 * b^2 * c + 16 * a^4 * c^2) * (c * x^4 + b * x^2 + a)^2)$$

maple [B] time = 0.62, size = 7858, normalized size = 12.65

output too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((f * x^2 + e * x + d) / (c * x^4 + b * x^2 + a)^3, x)$

[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] $\text{integrate}((f * x^2 + e * x + d) / (c * x^4 + b * x^2 + a)^3, x, \text{algorithm} = \text{"maxima"})$

[Out] $1/8 * (24 * a^2 * c^3 * e * x^6 + 36 * a^2 * b * c^2 * e * x^4 + (3 * (b^3 * c^2 - 8 * a * b * c^3) * d + (a * b^2 * c^2 + 20 * a^2 * c^3) * f) * x^7 + ((6 * b^4 * c - 49 * a * b^2 * c^2 + 28 * a^2 * c^3) * d + 2 * (a * b^3 * c + 14 * a^2 * b * c^2) * f) * x^5 + 8 * (a^2 * b^2 * c + 5 * a^3 * c^2) * e * x^2 + ((3 * b^5 - 20 * a * b^3 * c - 4 * a^2 * b * c^2) * d + (a * b^4 + 5 * a^2 * b^2 * c + 36 * a^3 * c^2) * f) * x^3 - 2 * (a^2 * b^3 - 10 * a^3 * b * c) * e + ((5 * a * b^4 - 37 * a^2 * b^2 * c + 44 * a^3 * c^2) * d - (a^2 * b^3 - 16 * a^3 * b * c) * f) * x) / ((a^2 * b^4 * c^2 - 8 * a^3 * b^2 * c^3 + 16 * a^4 * c^4) * x^8 + a^4 * b^4 - 8 * a^5 * b^2 * c + 16 * a^6 * c^2 + 2 * (a^2 * b^5 * c - 8 * a^3 * b^3 * c^2 + 16 * a^4 * b * c^3) * x^6 + (a^2 * b^6 - 6 * a^3 * b^4 * c + 32 * a^5 * c^3) * x^4 + 2 * (a^3 * b^5 - 8 * a^4 * b^3 * c + 16 * a^5 * b * c^2) * x^2) + 1/8 * \text{integrate}((48 * a^2 * c^2 * e * x + (3 * (b^3 * c - 8 * a * b * c^2) * d + (a * b^2 * c + 20 * a^2 * c^2) * f) * x^2 + 3 * (b^4 - 9 * a * b^2 * c + 28 * a^2 * c^2) * d + (a * b^3 - 16 * a^2 * b * c) * f) / (c * x^4 + b * x^2 + a), x) / (a^2 * b^4 - 8 * a^3 * b^2 * c + 16 * a^4 * c^2)$

mupad [B] time = 3.26, size = 8689, normalized size = 13.99

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((d + e * x + f * x^2) / (a + b * x^2 + c * x^4)^3, x)$

[Out] $((x^2 * (5 * a * c^2 * e + b^2 * c * e)) / (b^4 + 16 * a^2 * c^2 - 8 * a * b^2 * c) - (b^3 * e - 10 * a * b * c * e) / (4 * (b^4 + 16 * a^2 * c^2 - 8 * a * b^2 * c))) + (x^5 * (28 * a^2 * c^3 * d + 6 * b^4 * c * d + 2 * a * b^3 * c * f - 49 * a * b^2 * c^2 * d + 28 * a^2 * b * c^2 * f)) / (8 * a^2 * (b^4 + 16 * a^2 * c^2 - 8 * a * b^2 * c))$

$$\begin{aligned}
& - 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 + 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 - 35208*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^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 - 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 + 160000*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*(\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
\end{aligned}$$

$$\begin{aligned}
& - 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 \\
& ^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)) + (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 \\
& ^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 - 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 \\
& ^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 +
\end{aligned}$$

$$\begin{aligned}
& 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} + 16 \\
& 9869312*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 + 4 \\
& 792320*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^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 \\
& *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)))*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}* \\
& ^5*z^4 + 3523215360*a^9*b^{12}*c^4*z^4 - 2621440*a^6*b^{18}*c*z^4 + 68719476736
\end{aligned}$$

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*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^
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

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d \right) \sqrt{c} \left(-\frac{-52a^2bcf + 168a^2c^2d + \sqrt{b^2 - 4ac}}{\sqrt{b^2 - 4ac}} \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)}$$

[Out] $\frac{1}{4}xx(b^2d-2a*c*d-a*b*f+c*(-2*a*f+b*d))*x^2/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+1/4*(-b*e+2*a*g-(-b*g+2*c*e))*x^2/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+3/4*(-b*g+2*c*e)*(2*c*x^2+b)/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)+1/8*xx(3*b^4d-25*a*b^2*c*d+28*a^2*c^2*d+a*b^3*f+8*a^2*b*c*f+c*(20*a^2*c*f+a*b^2*f-24*a*b*c*d+3*b^3*d))*x^2/a^2/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)-3*c*(-b*g+2*c*e)*\operatorname{arctanh}((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/(-4*a*c+b^2)^{(5/2)}+1/16*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)})/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)})*c^{(1/2)}*(3*b^4d+b^3*(a*f+3*d*(-4*a*c+b^2)^{(1/2)}))-4*a*b*c*(13*a*f+6*d*(-4*a*c+b^2)^{(1/2)})-a*b^2*(30*c*d-f*(-4*a*c+b^2)^{(1/2)})+4*a^2*c*(42*c*d+5*f*(-4*a*c+b^2)^{(1/2)}))/a^2/(-4*a*c+b^2)^{(5/2)}*2^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)}+1/16*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)})/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)})*c^{(1/2)}*(3*b^3d-24*a*b*c*d+a*b^2*f+20*a^2*c*f+(52*a^2*b*c*f-168*a^2*c^2*d-a*b^3*f+30*a*b^2*c*d-3*b^4d)/(-4*a*c+b^2)^{(1/2)}))/a^2/(-4*a*c+b^2)^2*2^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)}$

Rubi [A] time = 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}

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d - 25ab^2cd + ab^3f + 3b^4d \right) \sqrt{c} \left(-\frac{-52a^2bcf + 168a^2c^2d + \sqrt{b^2 - 4ac}}{\sqrt{b^2 - 4ac}} \right)}{8a^2 (b^2 - 4ac)^2 (a + bx^2 + cx^4)}$$

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] $\frac{x*(b^2*d - 2*a*c*d - a*b*f + c*(b*d - 2*a*f))*x^2}{(4*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) - (b*e - 2*a*g + (2*c*e - b*g))*x^2}/(4*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (3*(2*c*e - b*g)*(b + 2*c*x^2))/(4*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (x*(3*b^4*d - 25*a*b^2*c*d + 28*a^2*c^2*d + a*b^3*f + 8*a^2*b*c*f + c*(3*b^3*d - 24*a*b*c*d + a*b^2*f + 20*a^2*c*f))*x^2)/(8*a^2*c*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (\operatorname{Sqrt}[c]*(3*b^4*d + b^3*(3*\operatorname{Sqrt}[b^2 - 4*a*c]*d + a*f) - 4*a*b*c*(6*\operatorname{Sqrt}[b^2 - 4*a*c]*d + 13*a*f) - a*b^2*(30*c*d - \operatorname{Sqrt}[b^2 - 4*a*c]*f) + 4*a^2*c*(42*c*d + 5*\operatorname{Sqrt}[b^2 - 4*a*c]*f))*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]])]/(8*\operatorname{Sqrt}[2]*a^2*(b^2 - 4*a*c)^{(5/2)}*\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]) + (\operatorname{Sqrt}[c]*(3*b^3*d - 24*a*b*c*d + a*b^2*f + 20*a^2*c*f - (3*b^4*d - 30*a*b^2*c*d + 168*a^2*c^2*d + a*b^3*f - 52*a^2*b*c*f)/\operatorname{Sqrt}[b^2 - 4*a*c]))*\operatorname{ArcTan}[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]])]/(8*\operatorname{Sqrt}[2]*a^2*(b^2 - 4*a*c)^2*\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]) - (3*c*(2*c*e - b*g)*\operatorname{ArcTanh}[(b + 2*c*x^2)/\operatorname{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c)^{(5/2)}$

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 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^3} dx &= \int \frac{d + fx^2}{(a + bx^2 + cx^4)^3} dx + \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(a + bx + cx^2)^3} dx, x, x^2 \right) - \frac{\int \frac{e + gx}{(a + bx + cx^2)^3} dx}{2} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(3b^4d - 2b^3e - 2b^2c^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3(2ce - b^2g)}{4(b^2 - 4ac)} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3(2ce - b^2g)}{4(b^2 - 4ac)} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{3(2ce - b^2g)}{4(b^2 - 4ac)}
\end{aligned}$$

Mathematica [A] time = 4.29, size = 661, normalized size = 1.02

$$\frac{1}{16} \left(\frac{-8a^2g + 4ab(e + x(f - gx)) + 8acx(d + x(e + fx)) - 4bdx(b + cx^2)}{a(4ac - b^2)(a + bx^2 + cx^4)^2} + \frac{2(a^2(-6b^2g + 4bc(3e + 2fx - 3gx^2))}{a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)} \right)$$

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*c^2*x*(7*d + 6*e*x + 5*f*x^2) + 4*b*c*(3*e + 2*f*x - 3*g*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]]) - (24*c*(-2*c*e + b*g)*Log[-b + Sqrt[b^2 - 4*a*c] - 2*c*x^2])/(b^2 - 4*a*c)^(5/2) + (24*c*(-2*c*e + b*g)*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((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] 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))*a*b^6*c - 2*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*b^7*c - 2*b^8*c + 116*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*b^4*c^2 + 26*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a*b^5*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*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))*a^3*b^2*c^3 - 128*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^2*b^3*c^3 - 13*sqrt(2)*sqrt(b*c + 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*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^4*c^4 + 224*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*c))*a^3*b*c^4 + 64*sqrt(2)*sqrt(b*c + 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*sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*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))*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))*b^6*c - 88*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(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))
```

$$\begin{aligned}
&) / (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{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 * 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{sqrt}(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{sqrt}(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{sqrt}(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{sqrt}(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 - 4 a c) * c) * a^3 b^2 c^2 + 36 * \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 + \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 + 160 * \text{sqrt}(2) * \text{sqrt}(b^2 - 4 a c) * \text{sqrt}(b c - \text{sqrt}(b^2 - 4 a c) * c) * a^4 c^3 + 80 * \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 - 18 * \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^2 c^3 - 40 * \text{sqrt}(2) * \text{sqrt}(b^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)) + 3/2 * ((b^3 c^3 - 4 a * b c^4 - 2 b^2 c^4 + b c^5) * \text{sqrt}(b^2 - 4 a c) * g - 2 * (b^2 c^4 - 4 a c^5 - 2 b c^5 + c^6) * \text{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 + \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)) / ((b^8 - 16 a * b^6 c - 2 b^7 c + 96
\end{aligned}$$

$$a^2b^4c^2 + 24ab^5c^2 + b^6c^2 - 256a^3b^2c^3 - 96a^2b^3c^3 - 12ab^4c^3 + 256a^4c^4 + 128a^3b^4c^4 + 48a^2b^2c^4 - 64a^3c^5)c^2 - 3/2*((b^3c^3 - 4ab^4c^4 - 2b^2c^4 + b^5c^5)*\sqrt{b^2 - 4ac})g - 2*(b^2c^4 - 4ac^5 - 2b^2c^5 + c^6)*\sqrt{b^2 - 4ac}*e*\log(x^2 + 1/2*(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2 - \sqrt{(a^2b^5 - 8a^3b^3c + 16a^4b^2c^2)^2 - 4*(a^3b^4 - 8a^4b^2c + 16a^5c^2)*(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3)})))/(a^2b^4c - 8a^3b^2c^2 + 16a^4c^3))/((b^8 - 16ab^6c - 2b^7c + 96a^2b^4c^2 + 24ab^5c^2 + b^6c^2 - 256a^3b^2c^3 - 96a^2b^3c^3 - 12ab^4c^3 + 256a^4c^4 + 128a^3b^4c^4 + 48a^2b^2c^4 - 64a^3c^5)c^2) + 1/8*(3b^3c^2d*x^7 - 24ab^3c^3d*x^7 + a*b^2c^2*f*x^7 + 20a^2c^3f*x^7 - 12a^2b^2c^2g*x^6 + 24a^2c^3*x^6e + 6b^4c*d*x^5 - 49ab^2c^2d*x^5 + 28a^2c^3d*x^5 + 2ab^3c*f*x^5 + 28a^2b^2c^2f*x^5 - 18a^2b^2c^2g*x^4 + 36a^2b^2c^2*x^4e + 3b^5d*x^3 - 20ab^3c*d*x^3 - 4a^2b^2c^2d*x^3 + a*b^4f*x^3 + 5a^2b^2c^2f*x^3 + 36a^3c^2*f*x^3 - 4a^2b^3g*x^2 - 20a^3b^2c^2g*x^2 + 8a^2b^2c^2*x^2e + 40a^3c^2*x^2e + 5ab^4d*x - 37a^2b^2c^2d*x + 44a^3c^2d*x - a^2b^3f*x + 16a^3b^2c^2f*x - 2a^3b^2g - 16a^4c^2g - 2a^2b^3e + 20a^3b^2c^2e)/(a^2b^4 - 8a^3b^2c + 16a^4c^2)*(c*x^4 + b*x^2 + a)^2)$$

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^3c^2 - 8ab^4c^3)*d + (a*b^2c^2 + 20a^2c^3)*f)*x^7 + 12*(2a^2c^3e - a^2b^2c^2g)*x^6 + ((6*b^4c - 49ab^2c^2 + 28a^2c^3)*d + 2*(a*b^3c + 14a^2b^2c^2)*f)*x^5 + 18*(2a^2b^2c^2e - a^2b^2c^2g)*x^4 + ((3*b^5 - 20ab^3c - 4a^2b^2c^2)*d + (a*b^4 + 5a^2b^2c + 36a^3c^2)*f)*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 + ((5ab^4 - 37a^2b^2c + 44a^3c^2)*d - (a^2b^3 - 16a^3b^2c)*f)*x)/((a^2b^4c^2 - 8a^3b^2c^2 + 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*integrate(((3*(b^3c - 8ab^4c^2)*d + (a*b^2c + 20a^2c^2)*f)*x^2 + 3*(b^4 - 9ab^2c + 28a^2c^2)*d + (a*b^3 - 16a^2b^2c)*f + 24*(2a^2c^2e - a^2b^2c^2g)*x)/(c*x^4 + b*x^2 + a), x)/(a^2b^4 - 8a^3b^2c + 16a^4c^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] int((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^3,x)

[Out] symsum(log((x*(13824a^4c^8e^3 - 54b^7c^5d^2e + 27b^8c^4d^2g - 1728a^4b^3c^5g^3 - 20160a^4c^8d^2e*f + 972ab^5c^6d^2e + 24192a^3b^2c^8d^2e - 486ab^6c^5d^2g + 6240a^4b^2c^7e*f^2 - 20736a^4b^2c^7g

$$\begin{aligned}
& e^2g - 7344a^2b^3c^7d^2e + 3672a^2b^4c^6d^2g - 6a^2b^5c^5e^2f^2 - 12096a^3b^2c^7d^2g + 192a^3b^3c^6e^2f^2 + 10368a^4b^2c^6e^2g^2 + 3a^2b^6c^4f^2g - 96a^3b^4c^5f^2g - 3120a^4b^2c^6f^2g - 36a^2b^6c^5d^2e^2f + 18a^2b^7c^4d^2e^2f + 10080a^4b^2c^7d^2e^2f + 900a^2b^4c^6d^2e^2f - 4896a^3b^2c^7d^2e^2f - 450a^2b^5c^5d^2e^2f + 2448a^3b^3c^6d^2e^2f) / (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^12c^4z^4 - 2621440a^6b^18c^2z^4 + 68719476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 - 73728a^2b^{16}c^4d^2e^2fz^2 + 1509949440a^9b^3c^7e^2g^2z^2 - 1321205760a^9b^2c^8d^2e^2fz^2 - 754974720a^8b^5c^6e^2g^2z^2 + 732168192a^7b^6c^6d^2e^2fz^2 - 366280704a^6b^8c^5d^2e^2fz^2 - 330301440a^8b^4c^7d^2e^2fz^2 + 188743680a^7b^7c^5e^2g^2z^2 + 96583680a^5b^{10}c^4d^2e^2fz^2 - 23592960a^6b^9c^4e^2g^2z^2 + 1179648a^5b^{11}c^3e^2g^2z^2 - 15175680a^4b^{12}c^3d^2e^2fz^2 + 1428480a^3b^{14}c^2d^2e^2fz^2 - 1207959552a^{10}b^2c^8e^2g^2z^2 - 440401920a^{10}b^2c^8f^2z^2 + 1761607680a^{10}c^9d^2e^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 - 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 + 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^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^2b^{18}d^2e^2fz^2 + 1207959552a^{10}c^9e^2z^2 + 256a^2b^17f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^2c^8d^2e^2fz + 9216a^2b^{13}c^2d^2e^2fz - 4608a^2b^{14}c^2d^2e^2fgz - 221773824a^6b^3c^7d^2e^2fz + 110886912a^6b^4c^6d^2e^2fgz - 84934656a^7b^2c^7d^2e^2fgz + 117964800a^5b^5c^6d^2e^2fz - 58982400a^5b^6c^5d^2e^2fgz + 16220160a^4b^8c^4d^2e^2fgz - 2396160a^3b^{10}c^3d^2e^2fgz + 175104a^2b^{12}c^2d^2e^2fgz - 32440320a^4b^7c^5d^2e^2fz + 4792320a^3b^9c^4d^2e^2fz - 350208a^2b^{11}c^3d^2e^2fz + 346816512a^7b^2c^8d^2e^2gz - 19660800a^8b^2c^7f^2gz - 768a^2b^{13}c^2f^2gz + 214272a^2b^{13}c^2d^2gz - 428544a^2b^{12}c^3d^2ez + 1022754816a^6b^2c^8d^2ez - 642318336a^5b^4c^7d^2ez - 511377408a^6b^3c^7d^2gz + 321159168a^5b^5c^6d^2gz + 223395840a^4b^6c^6d^2ez - 111697920a^4b^7c^5d^2gz + 25362432a^7b^3c^6f^2gz - 50724864a^7b^2c^7e^2gz - 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^2gz + 23362560a^3b^9c^4d^2gz - 46725120a^3b^8c^5d^2ez - 7127040a^5b^6c^5e^2gz - 2965248a^2b^{11}c^3d^2gz + 1013760a^4b^8c^4e^2gz - 69120a^3b^{10}c^3e^2gz + 1536a^2b^{12}c^2e^2f^2gz + 5930496a^2b^{10}c^4d^2ez - 693633024a^7c^9d^2ez + 39321600a^8c^8e^2gz + 13824b^{14}c^2d^2ez - 6912b^{15}c^2d^2gz + 15482880a^5b^2c^7d^2e^2fg - 13824a^2b^9c^3d^2e^2fg + 7741440a^4b^3c^6d^2e^2fg - 2903040a^3b^5c^5d^2e^2fg + 387072a^2b^7c^4d^2e^2fg + 3456a^2b^{10}c^2d^2e^2fg^2 + 435456a^2b^8c^4d^2e^2fg + 13824a^2b^8c^4d^2e^2f - 3870720a^5b^2c^6e^2fg - 34836480a^4b^2c^7d^2e^2fg - 645120a^4b^4c^5e^2fg + 80640a^3b^6c^4e^2fg - 2304a^2b^8c^3e^2fg - 3870720a^5b^2c^6d^2e^2fg^2 - 1935360a^4b^4c^5d^2e^2fg^2 + 725760a^3b^6c^4d^2e^2fg^2 + 17418240a^3b^4c^6d^2e^2fg - 96768a^2b^8c^3d^2e^2fg^2 - 3919104a^2b^6c^5d^2e^2fg - 7741440a^4b^2c^7d^2e^2f + 2903040a^3b^4c^6d^2e^2f - 387072a^2b^6c^5d^2e^2f + 37310976a^3b^3c^7d^3f - 2654208a^5b^3c^5e^2g^3 + 3870720a^5b^2c^7e^2f^2 + 34836480a^4b^2c^8d^2e^2 - 108864a^2b^9c^3d^2g^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^2f^3 + 17
\end{aligned}$$

$$\begin{aligned}
& 37792a^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^2e^2g - 75188736a^4b^8c^8d^3f - 15482880a^5c^8d^2e^2f - 10616832a^5b^7c^7e^3g - 4262400a^5b^7c^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) \cdot ((983040a^7c^8e^2f - 3244032a^6b^8c^8d^2e - 491520a^7b^8c^7f^2g - 4608a^2b^9c^4d^2e + 87552a^3b^7c^5d^2e - 681984a^4b^5c^6d^2e + 2433024a^5b^3c^7d^2e + 2304a^2b^10c^3d^2g - 43776a^3b^8c^4d^2g - 1536a^3b^8c^4e^2f + 340992a^4b^6c^5d^2g + 39936a^4b^6c^5e^2f - 1216512a^5b^4c^6d^2g - 184320a^5b^4c^6e^2f + 1622016a^6b^2c^7d^2g - 49152a^6b^2c^7e^2f + 768a^3b^9c^3f^2g - 19968a^4b^7c^4f^2g + 92160a^5b^5c^5f^2g + 24576a^6b^3c^6f^2g) / (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) - \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}c^4d^2fz^2 + 1509949440a^9b^3c^7e^2gz^2 - 1321205760a^9b^2c^8d^2fz^2 - 754974720a^8b^5c^6e^2gz^2 + 732168192a^7b^6c^6d^2fz^2 - 366280704a^6b^8c^5d^2fz^2 - 330301440a^8b^4c^7d^2fz^2 + 188743680a^7b^7c^5e^2gz^2 + 96583680a^5b^{10}c^4d^2fz^2 - 23592960a^6b^9c^4e^2gz^2 + 1179648a^5b^{11}c^3e^2gz^2 - 15175680a^4b^{12}c^3d^2fz^2 + 1428480a^3b^{14}c^2d^2fz^2 - 1207959552a^{10}b^8c^8e^2gz^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^8c^9d^2z^2 - 1509949440a^9b^2c^8e^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 + 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^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^2b^{18}d^2fz^2 + 1207959552a^{10}c^9e^2z^2 + 256a^2b^{17}f^2z^2 + 2304b^{19}d^2z^2 + 169869312a^7b^8c^8d^2e^2fz + 9216a^2b^{13}c^2d^2e^2fz - 4608a^2b^{14}c^2d^2fz - 221773824a^6b^3c^7d^2e^2fz + 110886912a^6b^4c^6d^2fz - 84934656a^7b^2c^7d^2fz + 117964800a^5b^5c^6d^2e^2fz - 58982400a^5b^6c^5d^2fz + 16220160a^4b^8c^4d^2fz - 2396160a^3b^{10}c^3d^2fz + 175104a^2b^{12}c^2d^2fz - 32440320a^4b^7c^5d^2e^2fz + 4792320a^3b^9c^4d^2e^2fz - 350208a^2b^{11}c^3d^2e^2fz + 346816512a^7b^8c^8d^2g^2 - 19660800a^8b^8c^7f^2g^2 - 768a^2b^{13}c^3f^2g^2 + 214272a^2b^{13}c^2d^2g^2 - 428544a^2b^{12}c^3d^2e^2z + 1022754816a^6b^2c^8d^2e^2z - 642318336a^5b^4c^7d^2e^2z - 511377408a^6b^3c^7d^2g^2 + 321159168a^5b^5c^6d^2g^2 + 223395840a^4b^6c^6d^2e^2z - 111697920a^4b^7c^5d^2g^2 + 25362432a^7b^3c^6f^2g^2 - 50724864a^7b^2c^7e^2f^2z - 13271040a^6b^5c^5f^2g^2 + 3563520a^5b^7c^4f^2g^2 - 506880a
\end{aligned}$$

$$\begin{aligned}
& ^4b^9c^3f^2g^2z + 34560a^3b^{11}c^2f^2g^2z + 26542080a^6b^4c^6e^f^2z + 23362560a^3b^9c^4d^2g^2z - 46725120a^3b^8c^5d^2e^z - 7127040 \\
& *a^5b^6c^5e^f^2z - 2965248a^2b^{11}c^3d^2g^2z + 1013760a^4b^8c^4e^f^2z - 69120a^3b^{10}c^3e^f^2z + 1536a^2b^{12}c^2e^f^2z + 5930496a \\
& ^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^2d^2g^2z + 15482880a^5b^7c^7d^2e^f^2g \\
& - 13824a^5b^9c^3d^2e^f^2g + 7741440a^4b^3c^6d^2e^f^2g - 2903040a^3b^5c^5d^2e^f^2g + 387072a^2b^7c^4d^2e^f^2g + 3456a^2b^{10}c^2d^2f^2g^2 + 435456 \\
& *a^2b^8c^4d^2e^f^2g + 13824a^2b^8c^4d^2e^2f - 3870720a^5b^2c^6e^f^2g - 34836480a^4b^2c^7d^2e^f^2g - 645120a^4b^4c^5e^f^2g + 80640a^3b^6 \\
& *c^4e^f^2g - 2304a^2b^8c^3e^f^2g - 3870720a^5b^2c^6d^2f^2g^2 - 1935360a^4b^4c^5d^2f^2g^2 + 725760a^3b^6c^4d^2f^2g^2 + 17418240a^3b^4c^6 \\
& d^2e^f^2g - 96768a^2b^8c^3d^2f^2g^2 - 3919104a^2b^6c^5d^2e^f^2g - 7741440a^4b^2c^7d^2e^2f + 2903040a^3b^4c^6d^2e^2f - 387072a^2b^6c^5d \\
& *e^2f + 37310976a^3b^3c^7d^3f - 2654208a^5b^3c^5e^f^2g^3 + 3870720a^5b^3c^7e^2f^2 + 34836480a^4b^3c^8d^2e^2 - 108864a^5b^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^7 \\
& *c^5d^2e^2 - 20736b^{10}c^3d^2e^f^2g - 75188736a^4b^3c^8d^3f - 15482880a^5c^8d^2e^2f - 10616832a^5b^3c^7e^3f^2g - 4262400a^5b^3c^7d^2f^3 + 852 \\
& 768a^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^2 \\
& *g^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^2 \\
& *g^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^4 \\
& d^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^2 \\
& *c^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 + 35 \\
& 721b^8c^5d^4, z, k) * ((768a^2b^{14}c^2d - 22020096a^9c^9d - 22272a^3 \\
& b^{12}c^3d + 282624a^4b^{10}c^4d - 2027520a^5b^8c^5d + 8847360a^6b^6c^6d - 23396352a^7b^4c^7d + 34603008a^8b^2c^8d + 256a^3b^{13} \\
& c^2f - 9216a^4b^{11}c^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^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (x * (1572864a^9c^9e - 1536a^4 \\
& b^{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 - 491520a^7b^5c^6g + 983040a^8b^3c^7g - 786432a^9b^1c^8g)) / (64 * (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)) + (root(56 \\
& 371445760a^{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^9 \\
& b^{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^5d^2f^2z^2 + 1509949440a^9b^3c^7e^f^2g^2z^2 \\
& - 1321205760a^9b^2c^8d^2f^2z^2 - 754974720a^8b^5c^6e^f^2g^2z^2 + 732168192a^7b^6c^6d^2f^2z^2 - 366280704a^6b^8c^5d^2f^2z^2 - 330301440a^8b^4c^7 \\
& d^2f^2z^2 + 188743680a^7b^7c^5e^f^2g^2z^2 + 96583680a^5b^{10}c^4d^2f^2z^2 - 23592960a^6b^9c^4e^f^2g^2z^2 + 1179648a^5b^{11}c^3e^f^2g^2z^2 - 15175680a^4 \\
& b^{12}c^3d^2f^2z^2 + 1428480a^3b^{14}c^2d^2f^2z^2 - 1207959552a^{10}b^1c^8e^f^2g^2z^2 - 440401920a^{10}b^1c^8f^2z^2 + 1761607680a^{10}c^9d^2f^2z^2 - 1408 \\
& 0a^3b^{15}c^1f^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 - 94464a^2b^{17}c^d^2z^2 + 754974720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3c^7f^2z^2
\end{aligned}$$

$$\begin{aligned}
& *z^2 - 377487360*a^9*b^4*c^6*g^2*z^2 + 301989888*a^{10}*b^2*c^7*g^2*z^2 + 188 \\
& 743680*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 + 1120665 \\
& 6*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 - 1986 \\
& 0480*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^1 \\
& 3*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 + 110 \\
& 886912*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 - 58982400*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 + 214272*a*b^{13}*c^2*d^2*g*z - 428544*a*b^{12}*c^3*d^2*e*z + 1022 \\
& 754816*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 + 25362432*a^7*b^3*c^6*f^2*g*z - 50724 \\
& 864*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 + 26542 \\
& 080*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 + 1 \\
& 013760*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 + 39321 \\
& 600*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 + 154828 \\
& 80*a^5*b*c^7*d*e*f*g - 13824*a*b^9*c^3*d*e*f*g + 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*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 - 3870720* \\
& a^5*b^2*c^6*e*f^2*g - 34836480*a^4*b^2*c^7*d^2*e*g - 645120*a^4*b^4*c^5*e*f \\
& ^2*g + 80640*a^3*b^6*c^4*e*f^2*g - 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 + 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 - 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 - 2654208*a^5*b^3*c \\
& ^5*e*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
\end{aligned}$$

$$\begin{aligned}
& 23936a^5b^2c^8d^2 - 4608a^4b^5c^6e^2 + 36864a^5b^3c^7e^2 + 2a^8 \\
& 2b^{10}c^3f^2 - 84a^3b^8c^4f^2 + 3520a^4b^6c^5f^2 - 26240a^5b^4c^6f^2 + 59904a^6b^2c^7f^2 - 1152a^4b^7c^4g^2 + 9216a^5b^5c^5g^2 \\
& - 18432a^6b^3c^6g^2 + 12a^8b^{11}c^3d^2f - 218112a^6b^8c^8d^2f - 420 \\
& a^2b^9c^4d^2f + 4992a^3b^7c^5d^2f - 36480a^4b^5c^6d^2f + 144384a^5b^3c^7d^2f + 4608a^4b^6c^5e^2g - 36864a^5b^4c^6e^2g + 73728a^6b^2 \\
& c^7e^2g) / (64(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^6b^5c^6d^3 - 169344a^3b^8c^8d^3 - 1935 \\
& 36a^4c^8d^2e^2 + 141120a^4c^8d^2f - 315b^8c^4d^2f + 67824a^2b^3 \\
& c^7d^3 - 35a^2b^6c^4f^3 - 84a^3b^4c^5f^3 + 12720a^4b^2c^6f^3 \\
& + 6237a^5b^6c^5d^2f - 210a^6b^7c^4d^2f - 116160a^4b^8c^7d^2f + 368 \\
& 64a^4b^8c^7e^2f - 6912a^2b^4c^6d^2e^2 + 62208a^3b^2c^7d^2e^2 - 423 \\
& 72a^2b^4c^6d^2f + 1764a^2b^5c^5d^2f + 96048a^3b^2c^7d^2f + 4 \\
& 608a^3b^3c^6d^2f - 1728a^2b^6c^4d^2g^2 - 2304a^3b^3c^6e^2f + 1 \\
& 5552a^3b^4c^5d^2g^2 - 48384a^4b^2c^6d^2g^2 - 576a^3b^5c^4f^2g^2 + \\
& 9216a^4b^3c^5f^2g^2 + 193536a^4b^8c^7d^2e^2g + 6912a^2b^5c^5d^2e^2g - \\
& 62208a^3b^3c^6d^2e^2g + 2304a^3b^4c^5e^2f^2g - 36864a^4b^2c^6e^2f^2g) \\
& / (512(a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7 \\
& b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) * \text{root}(56371445760a^{11}b^8 \\
& c^6z^4 - 503316480a^8b^{14}c^3z^4 + 47185920a^7b^{16}c^2z^4 - 171798 \\
& 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^2fz^2 + 1509949440a^9b^3c^7e^2gz^2 - 1321205760a^9 \\
& b^2c^8d^2fz^2 - 754974720a^8b^5c^6e^2gz^2 + 732168192a^7b^6c^6d^2f \\
& fz^2 - 366280704a^6b^8c^5d^2fz^2 - 330301440a^8b^4c^7d^2fz^2 + 188 \\
& 743680a^7b^7c^5e^2gz^2 + 96583680a^5b^{10}c^4d^2fz^2 - 23592960a^6b^9 \\
& c^4e^2gz^2 + 1179648a^5b^{11}c^3e^2gz^2 - 15175680a^4b^{12}c^3d^2fz^2 \\
& + 1428480a^3b^{14}c^2d^2fz^2 - 1207959552a^{10}b^8c^8e^2gz^2 - 4404019 \\
& 20a^{10}b^8c^8f^2z^2 + 1761607680a^{10}c^9d^2fz^2 - 14080a^3b^{15}c^3f^2z^2 \\
& + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 396 \\
& 3617280a^9b^8c^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^5 \\
& g^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^2 \\
& z^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^8b^{18}d^2fz^2 + 1207959552a^{10}c^9e^2z^2 + 256a^2b^{17}f^2z^2 + 23 \\
& 04b^{19}d^2z^2 + 169869312a^7b^8c^8d^2e^2fz + 9216a^8b^{13}c^2d^2e^2fz - 4 \\
& 608a^8b^{14}c^2d^2fgz - 221773824a^6b^3c^7d^2e^2fz + 110886912a^6b^4c^6 \\
& d^2fgz - 84934656a^7b^2c^7d^2fgz + 117964800a^5b^5c^6d^2e^2fgz - \\
& 58982400a^5b^6c^5d^2fgz + 16220160a^4b^8c^4d^2fgz - 2396160a^3b^8 \\
& c^3d^2fgz + 175104a^2b^{12}c^2d^2fgz - 32440320a^4b^7c^5d^2e^2fz \\
& z + 4792320a^3b^9c^4d^2e^2fz - 350208a^2b^{11}c^3d^2e^2fz + 346816512a^7 \\
& b^8c^8d^2gz - 19660800a^8b^8c^7f^2gz - 768a^2b^{13}c^3f^2gz + 21 \\
& 4272a^8b^{13}c^2d^2gz - 428544a^8b^{12}c^3d^2e^2gz + 1022754816a^6b^2c^8 \\
& d^2e^2gz - 642318336a^5b^4c^7d^2e^2gz - 511377408a^6b^3c^7d^2gz + \\
& 321159168a^5b^5c^6d^2gz + 223395840a^4b^6c^6d^2e^2gz - 111697920a^4 \\
& b^7c^5d^2gz + 25362432a^7b^3c^6f^2gz - 50724864a^7b^2c^7e^2 \\
& f^2gz - 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^2gz + 23362560a^3b^9c^4d^2gz - 46725120a^3b^8c^5d^2e^2gz - 7127 \\
& 040a^5b^6c^5e^2f^2gz - 2965248a^2b^{11}c^3d^2gz + 1013760a^4b^8c^4 \\
& e^2f^2gz - 69120a^3b^{10}c^3e^2f^2gz + 1536a^2b^{12}c^2e^2f^2gz + 593049
\end{aligned}$$

$$\begin{aligned}
& 6a^2b^{10}c^4d^2e^z - 693633024a^7c^9d^2e^z + 39321600a^8c^8e^f^2 \\
& *z + 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^{10}c^2d*f*g^2 + 435 \\
& 456a*b^8c^4d^2e*g + 13824a*b^8c^4d*e^2f - 3870720a^5b^2c^6e*f^2 \\
& *g - 34836480a^4b^2c^7d^2e*g - 645120a^4b^4c^5e*f^2*g + 80640a^3* \\
& b^6c^4e*f^2*g - 2304a^2b^8c^3e*f^2*g - 3870720a^5b^2c^6d*f*g^2 - \\
& 1935360a^4b^4c^5d*f*g^2 + 725760a^3b^6c^4d*f*g^2 + 17418240a^3b^4 \\
& *c^6d^2e*g - 96768a^2b^8c^3d*f*g^2 - 3919104a^2b^6c^5d^2e*g - 77 \\
& 41440a^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 + 387072 \\
& 0a^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^5* \\
& c^5d*f^3 - 260190a*b^8c^4d^2f^2 - 211680a^2b^7c^4d*f^3 - 435456a* \\
& b^7c^5d^2e^2 - 20736b^{10}c^3d^2e*g - 75188736a^4b*c^8d^3f - 15482 \\
& 880a^5c^8d*e^2f - 10616832a^5b*c^7e^3g - 4262400a^5b*c^7d*f^3 + \\
& 852768a*b^7c^5d^3f + 7350a*b^9c^3d*f^3 + 967680a^5b^3c^5f^2g^2 \\
& + 161280a^4b^5c^4f^2g^2 - 20160a^3b^7c^3f^2g^2 + 576a^2b^9c^2* \\
& f^2g^2 + 7962624a^5b^2c^6e^2g^2 + 35525376a^4b^2c^7d^2f^2 + 8709 \\
& 120a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 979776a^2b^7c^4* \\
& d^2g^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2 \\
& *b^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^9 \\
& *c^4d^2e^2 + 331776a^5b^4c^4g^4 + 492800a^5b^2c^6f^4 + 351456a^4 \\
& *b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3* \\
& b^2c^8d^4 + 6446304a^2b^4c^7d^4 - 39690b^9c^4d^3f - 734832a*b^6* \\
& c^6d^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + \\
& 35721b^8c^5d^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)
\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)**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] $\frac{1}{4}(-b*e+2*a*g-(-b*g+2*c*e)*x^2)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+1/4*x*(b^2*d-a*b*f-2*a*(-a*h+c*d)+(a*b*h-2*a*c*f+b*c*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+3/4*(-b*g+2*c*e)*(2*c*x^2+b)/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)+1/8*x*(3*b^4*d+a*b^3*f+8*a^2*b*c*f+4*a^2*c*(a*h+7*c*d)-a*b^2*(7*a*h+25*c*d)+c*(3*b^3*d+a*b^2*f+20*a^2*c*f-12*a*b*(a*h+2*c*d))*x^2)/a^2/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)-3*c*(-b*g+2*c*e)*\operatorname{arctanh}((2*c*x^2+b)/(-4*a*c+b^2)^{(1/2)})/(-4*a*c+b^2)^{(5/2)}+1/16*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)})*c^{(1/2)}*(3*b^3*d+a*b^2*f+20*a^2*c*f-12*a*b*(a*h+2*c*d)+(3*b^4*d+a*b^3*f-52*a^2*b*c*f-6*a*b^2*(-3*a*h+5*c*d)+24*a^2*c*(a*h+7*c*d))/(-4*a*c+b^2)^{(1/2)})/a^2/(-4*a*c+b^2)^2*2^{(1/2)}/(b-(-4*a*c+b^2)^{(1/2)})^{(1/2)}+1/16*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)})*c^{(1/2)}*(3*b^3*d+a*b^2*f+20*a^2*c*f-12*a*b*(a*h+2*c*d)+(-3*b^4*d-a*b^3*f+52*a^2*b*c*f+6*a*b^2*(-3*a*h+5*c*d)-24*a^2*c*(a*h+7*c*d))/(-4*a*c+b^2)^{(1/2)})/a^2/(-4*a*c+b^2)^2*2^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})^{(1/2)}$

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] $-(b*e - 2*a*g + (2*c*e - b*g)*x^2)/(4*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (x*(b^2*d - a*b*f - 2*a*(c*d - a*h) + (b*c*d - 2*a*c*f + a*b*h)*x^2))/(4*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (3*(2*c*e - b*g)*(b + 2*c*x^2))/(4*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (x*(3*b^4*d + a*b^3*f + 8*a^2*b*c*f + 4*a^2*c*(7*c*d + a*h) - a*b^2*(25*c*d + 7*a*h) + c*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(2*c*d + a*h))*x^2))/(8*a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (\operatorname{Sqrt}[c]*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(2*c*d + a*h) + (3*b^4*d + a*b^3*f - 52*a^2*b*c*f - 6*a*b^2*(5*c*d - 3*a*h) + 24*a^2*c*(7*c*d + a*h))/\operatorname{Sqrt}[b^2 - 4*a*c])*ArcTan[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]])]/(8*\operatorname{Sqrt}[2]*a^2*(b^2 - 4*a*c)^2*\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]) + (\operatorname{Sqrt}[c]*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(2*c*d + a*h) - (3*b^4*d + a*b^3*f - 52*a^2*b*c*f - 6*a*b^2*(5*c*d - 3*a*h) + 24*a^2*c*(7*c*d + a*h))/\operatorname{Sqrt}[b^2 - 4*a*c])*ArcTan[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]])]/(8*\operatorname{Sqrt}[2]*a^2*(b^2 - 4*a*c)^2*\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]) - (3*c*(2*c*e - b*g)*ArcTanh[(b + 2*c*x^2)/\operatorname{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c)^{(5/2)}$

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 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]

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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4}{(a + bx^2 + cx^4)^3} dx = \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^3} dx$$

$$= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx^2}{(a + bx + cx^2)^3} dx, x, a + bx^2 + cx^4 \right)$$

$$= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2}$$

$$= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2}$$

$$= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2}$$

$$= -\frac{be - 2ag + (2ce - bg)x^2}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2}$$

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*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
```

$$+ 4*a*c)^2*(a + b*x^2 + c*x^4)) + (\text{Sqrt}[c]*(3*b^4*d - 30*a*b^2*c*d + 168*a^2*c^2*d + 3*b^3*\text{Sqrt}[b^2 - 4*a*c]*d - 24*a*b*c*\text{Sqrt}[b^2 - 4*a*c]*d + a*b^3*f - 52*a^2*b*c*f + a*b^2*\text{Sqrt}[b^2 - 4*a*c]*f + 20*a^2*c*\text{Sqrt}[b^2 - 4*a*c]*f + 18*a^2*b^2*h + 24*a^3*c*h - 12*a^2*b*\text{Sqrt}[b^2 - 4*a*c]*h)*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]])]/(8*\text{Sqrt}[2]*a^2*(b^2 - 4*a*c)^(5/2)*\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) + (\text{Sqrt}[c]*(-3*b^4*d + 30*a*b^2*c*d - 168*a^2*c^2*d + 3*b^3*\text{Sqrt}[b^2 - 4*a*c]*d - 24*a*b*c*\text{Sqrt}[b^2 - 4*a*c]*d - a*b^3*f + 52*a^2*b*c*f + a*b^2*\text{Sqrt}[b^2 - 4*a*c]*f + 20*a^2*c*\text{Sqrt}[b^2 - 4*a*c]*f - 18*a^2*b^2*h - 24*a^3*c*h - 12*a^2*b*\text{Sqrt}[b^2 - 4*a*c]*h)*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]])]/(8*\text{Sqrt}[2]*a^2*(b^2 - 4*a*c)^(5/2)*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) + (3*c*(2*c*e - b*g)*\text{Log}[-b + \text{Sqrt}[b^2 - 4*a*c] - 2*c*x^2])/(2*(b^2 - 4*a*c)^(5/2)) - (3*c*(2*c*e - b*g)*\text{Log}[b + \text{Sqrt}[b^2 - 4*a*c] + 2*c*x^2])/(2*(b^2 - 4*a*c)^(5/2))$$

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] $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))*a*b^6*c - 2*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*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))*a^3*b*c^3 + 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^2*c^3 + 11*\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^3 - 44*\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^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))*a*b^7 - 24*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^2*b^5*c - 2*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*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))*a^3*b^3*c^2 + 40*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^2*b^4*c^2 + \text{sqrt}(2)*\text{sqrt}(b*c + \text{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*\text{sqrt}(2)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*a^$

$$\begin{aligned}
& 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 + 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{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 + \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{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^3*b^3*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\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{b*c + \sqrt{b^2 - 4*a*c}}*c)*a^4*b*c^2 + 24*\sqrt{2}*\sqrt{b^2 - 4*a*c}*\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{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^3*b*c^3 + 2*(b^2 - 4*a*c)*a^2*b^4*c - 2*(b^2 - 4*a*c)*a^2*b^3*c^2 - 32*(b^2 - 4*a*c)*a^4*c^3 - 24*(b^2 - 4*a*c)*a^3*b*c^3)*h)*\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*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*
\end{aligned}$$

$$\begin{aligned}
& a^2c^3 - 22(b^2 - 4ac)ab^3c^3 + 224(b^2 - 4ac)a^3c^4 + \\
& 88(b^2 - 4ac)a^2b^4c^4)d + (\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}})a^2b^7 - 24\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^5c - 2\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^6c + 2ab^7c + 144\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^3b^3c^2 + 40\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^4c^2 + \sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^5c^2 - 48a^2b^5c^2 - 2ab^6c^2 - 256\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^4b^3c^3 - 128\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^3b^2c^3 - 20\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^3c^3 + 288a^3b^3c^3 + 44a^2b^4c^3 + 64\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^3b^4c^4 - 512a^4b^4c^4 - 64a^3b^2c^4 - 320a^4c^5 + \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^6 - 22\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^4c - 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^5c + 32\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^3b^2c^2 + 36\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^3c^2 + \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}ab^4c^2 + 160\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^4c^3 + 80\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^3b^3c^3 - 18\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^2c^3 - 40\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^3c^4 - 2(b^2 - 4ac)ab^5c + 40(b^2 - 4ac)a^2b^3c^2 + 2(b^2 - 4ac)ab^4c^2 - 128(b^2 - 4ac)a^3b^3c^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}})a^2b^6 - 4\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^3b^4c - 2\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^5c + 2a^2b^6c - 16\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^4b^2c^2 + \sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^4c^2 - 8a^3b^4c^2 - 2a^2b^5c^2 + 64\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^5c^3 + 32\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^4b^3c^3 - 32a^4b^2c^3 - 16a^3b^3c^3 - 16\sqrt{2}\sqrt{bc - \sqrt{b^2 - 4ac}}a^4c^4 + 128a^5c^4 + 96a^4b^4c^4 + \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^5 + 8\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^3b^3c - 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^4c - 48\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^4b^3c^2 - 24\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^3b^2c^2 + \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^2b^3c^2 + 12\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc - \sqrt{b^2 - 4ac}}a^3b^3c^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^3c^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^4c^4 + 48a^5b^2c^4 - 64a^6c^5) \operatorname{abs}(c)) + 3/2((b^3c^3 - 4ab^4c - 2b^2c^4 + bc^5)\sqrt{b^2 - 4ac})g - 2(b^2c^4 - 4ac^5 - 2bc^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^4c^4 + 48a^2b^2c^4 - 64a^3c^5)c^2) - 3/2((b^3c^3 - 4ab^4c - 2b^2c^4 + bc^5)\sqrt{b^2 - 4ac})g - 2(b^2c^4 - 4ac^5 - 2bc^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^4c^4 + 48a^2b^2c^4 - 64a^3c^5)c^2) + 1/8(3b^3c^2d^7 - 24ab^3c^3d^7 + ab^2c^4 - 64a^3c^5)c^2) + 1/8(3b^3c^2d^7 - 24ab^3c^3d^7 + ab^2c^4 - 64a^3c^5)c^2)
\end{aligned}$$

$$\begin{aligned} &^2*f*x^7 + 20*a^2*c^3*f*x^7 - 12*a^2*b*c^2*h*x^7 - 12*a^2*b*c^2*g*x^6 + 24* \\ &a^2*c^3*x^6*e + 6*b^4*c*d*x^5 - 49*a*b^2*c^2*d*x^5 + 28*a^2*c^3*d*x^5 + 2*a \\ &*b^3*c*f*x^5 + 28*a^2*b*c^2*f*x^5 - 19*a^2*b^2*c*h*x^5 + 4*a^3*c^2*h*x^5 - \\ &18*a^2*b^2*c*g*x^4 + 36*a^2*b*c^2*x^4*e + 3*b^5*d*x^3 - 20*a*b^3*c*d*x^3 - \\ &4*a^2*b*c^2*d*x^3 + a*b^4*f*x^3 + 5*a^2*b^2*c*f*x^3 + 36*a^3*c^2*f*x^3 - 5* \\ &a^2*b^3*h*x^3 - 16*a^3*b*c*h*x^3 - 4*a^2*b^3*g*x^2 - 20*a^3*b*c*g*x^2 + 8*a \\ &^2*b^2*c*x^2*e + 40*a^3*c^2*x^2*e + 5*a*b^4*d*x - 37*a^2*b^2*c*d*x + 44*a^3 \\ &*c^2*d*x - a^2*b^3*f*x + 16*a^3*b*c*f*x - 3*a^3*b^2*h*x - 12*a^4*c*h*x - 2* \\ &a^3*b^2*g - 16*a^4*c*g - 2*a^2*b^3*e + 20*a^3*b*c*e)/((a^2*b^4 - 8*a^3*b^2* \\ &c + 16*a^4*c^2)*(c*x^4 + b*x^2 + a)^2) \end{aligned}$$

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] $\text{int}((h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3, x)$

[Out]
$$\begin{aligned} &-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)}*\text{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)}*\text{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2) \\ &^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)}*\text{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)}) \\ &^2)*c)^{(1/2)}*\text{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)}*\text{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c) \\ &^2)^{(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)}*\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)}*b^2*d+(-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^7-3/2*c^2*(b*g-2*c*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)/(1 \\ &6*a^2*c^2-8*a*b^2*c+b^4)*x^5-9/4*b*c*(b*g-2*c*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*(5*a* \\ &c+b^2)*(b*g-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*(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^4+b*x^2+a)^2-4/(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)}*\text{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) \\ &^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)}*\text{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)}) \\ &^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*d+4/(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)}*\text{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) \\ &^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)}*\text{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)}) \\ &^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)}*\text{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c) \\ &^2)^{(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)}*\text{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c) \\ &^2)^{(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)}*\text{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c) \\ &^2)^{(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)}*\text{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)} \\ &^2)^{(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)}*\text{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)} \\ &^2)^{(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 \end{aligned}$$

$$\begin{aligned} & *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 / (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)} * \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)} * \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)} * \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)} * \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)} * \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)} * \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{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)} * \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 \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)^3,x, algorithm="maxima")

[Out]
$$\begin{aligned} & -1/8 * ((12*a^2*b*c^2*h - 3*(b^3*c^2 - 8*a*b*c^3)*d - (a*b^2*c^2 + 20*a^2*c^3) * f) * x^7 - 12*(2*a^2*c^3*e - a^2*b*c^2*g) * x^6 - ((6*b^4*c - 49*a*b^2*c^2 + 28*a^2*c^3) * d + 2*(a*b^3*c + 14*a^2*b*c^2) * f - (19*a^2*b^2*c - 4*a^3*c^2) * h) * x^5 - 18*(2*a^2*b*c^2*e - a^2*b^2*c*g) * x^4 - ((3*b^5 - 20*a*b^3*c - 4*a^2 * b*c^2) * d + (a*b^4 + 5*a^2*b^2*c + 36*a^3*c^2) * f - (5*a^2*b^3 + 16*a^3*b*c) * h) * x^3 - 4*(2*(a^2*b^2*c + 5*a^3*c^2) * e - (a^2*b^3 + 5*a^3*b*c) * g) * x^2 + 2 * (a^2*b^3 - 10*a^3*b*c) * e + 2*(a^3*b^2 + 8*a^4*c) * g - ((5*a*b^4 - 37*a^2*b^2 * c + 44*a^3*c^2) * d - (a^2*b^3 - 16*a^3*b*c) * f - 3*(a^3*b^2 + 4*a^4*c) * h) * x) / ((a^2*b^4*c^2 - 8*a^3*b^2*c^3 + 16*a^4*c^4) * x^8 + a^4*b^4 - 8*a^5*b^2*c + 16*a^6*c^2 + 2*(a^2*b^5*c - 8*a^3*b^3*c^2 + 16*a^4*b*c^3) * x^6 + (a^2*b^6 - 6*a^3*b^4*c + 32*a^5*c^3) * x^4 + 2*(a^3*b^5 - 8*a^4*b^3*c + 16*a^5*b*c^2) * x^2) - 1/8 * integrate(((12*a^2*b*c^2*h - 3*(b^3*c - 8*a*b*c^2)*d - (a*b^2*c + 20*a^2*c^2) * f) * x^2 - 3*(b^4 - 9*a*b^2*c + 28*a^2*c^2) * d - (a*b^3 - 16*a^2*b * \end{aligned}$$

$c)*f - 3*(a^2*b^2 + 4*a^3*c)*h - 24*(2*a^2*c^2*e - a^2*b*c*g)*x)/(c*x^4 + b*x^2 + a), x)/(a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2)$

mupad [B] time = 5.35, size = 23811, normalized size = 35.07

result too large to display

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((d + e*x + f*x^2 + g*x^3 + h*x^4)/(a + b*x^2 + c*x^4)^3, x)$

[Out] $((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 + 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^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)) + (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 + 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 + 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 + 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 - 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 - 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 + 614000*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*b^$

$$\begin{aligned}
& 14c^2d^2f^2z^2 - 1207959552a^{10}b^8c^8e^8g^2z^2 - 440401920a^{10}b^8c^8f^2z^2 \\
& - 188743680a^{11}b^8c^7h^2z^2 + 1761607680a^{10}c^9d^2f^2z^2 + 46080a^5 \\
& *b^{13}c^8h^2z^2 - 14080a^3b^{15}c^8f^2z^2 + 6936330240a^8b^3c^8d^2z^2 \\
& + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^8c^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^8b^{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^2 \\
& z^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^4 \\
& *e^2z^2 + 1771776a^2b^{15}c^2d^2z^2 + 1536a^8b^{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^{19} \\
& d^2z^2 + 169869312a^7b^8c^8d^2e^2f^2z^2 + 99090432a^8b^8c^7d^2g^2h^2z^2 - 460 \\
& 8a^3b^{12}c^2f^2g^2h^2z^2 - 9437184a^8b^8c^7e^2f^2h^2z^2 - 13824a^2b^{13}c^8d^2g^2h^2z^2 \\
& + 9216a^8b^{13}c^2d^2e^2f^2z^2 - 4608a^8b^{14}c^8d^2e^2f^2g^2z^2 + 219414528a^7b^2c^7 \\
& d^2e^2h^2z^2 - 221773824a^6b^3c^7d^2e^2f^2z^2 - 109707264a^7b^3c^6d^2g^2h^2z^2 + 1 \\
& 10886912a^6b^4c^6d^2f^2g^2z^2 - 88473600a^6b^4c^6d^2e^2h^2z^2 - 84934656a^7 \\
& b^2c^7d^2f^2g^2z^2 + 117964800a^5b^5c^6d^2e^2f^2z^2 + 44236800a^6b^5c^5d^2g^2 \\
& h^2z^2 - 5898240a^7b^4c^5f^2g^2h^2z^2 + 4718592a^8b^2c^6f^2g^2h^2z^2 + 2949120a^ \\
& 6b^6c^4f^2g^2h^2z^2 - 737280a^5b^8c^3f^2g^2h^2z^2 + 92160a^4b^{10}c^2f^2g^2h^2z^2 \\
& z - 58982400a^5b^6c^5d^2f^2g^2z^2 + 11796480a^7b^3c^6e^2f^2h^2z^2 - 6635520a^ \\
& 5b^7c^4d^2g^2h^2z^2 - 5898240a^6b^5c^5e^2f^2h^2z^2 + 1474560a^5b^7c^4e^2f^2 \\
& h^2z^2 - 276480a^4b^9c^3d^2g^2h^2z^2 - 184320a^4b^9c^3e^2f^2h^2z^2 + 179712a^3 \\
& b^{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^4 \\
& *b^8c^4d^2e^2h^2z^2 - 359424a^3b^{10}c^3d^2e^2h^2z^2 + 175104a^2b^{12}c^2d^2f^2g^2z^2 \\
& z + 27648a^2b^{12}c^2d^2e^2h^2z^2 - 32440320a^4b^7c^5d^2e^2f^2z^2 + 4792320a^3 \\
& *b^9c^4d^2e^2f^2z^2 - 350208a^2b^{11}c^3d^2e^2f^2z^2 + 346816512a^7b^8c^8d^2g^2z^2 \\
& z + 7077888a^9b^8c^6g^2h^2z^2 - 6912a^4b^{11}c^8g^2h^2z^2 - 19660800a^8b^8c^7 \\
& f^2g^2z^2 - 768a^2b^{13}c^8f^2g^2z^2 + 214272a^8b^{13}c^2d^2g^2z^2 - 428544a^8b^ \\
& ^{12}c^3d^2e^2z^2 - 198180864a^8c^8d^2e^2h^2z^2 + 1022754816a^6b^2c^8d^2e^2z^2 \\
& z - 642318336a^5b^4c^7d^2e^2z^2 - 511377408a^6b^3c^7d^2g^2z^2 + 3211591 \\
& 68a^5b^5c^6d^2g^2z^2 + 223395840a^4b^6c^6d^2e^2z^2 - 111697920a^4b^7c^5 \\
& d^2g^2z^2 - 8847360a^8b^3c^5g^2h^2z^2 + 4423680a^7b^5c^4g^2h^2z^2 - 1 \\
& 105920a^6b^7c^3g^2h^2z^2 + 138240a^5b^9c^2g^2h^2z^2 + 25362432a^7b^3c^6 \\
& f^2g^2z^2 + 17694720a^8b^2c^6e^2h^2z^2 - 50724864a^7b^2c^7e^2f^2z^2 - \\
& 13271040a^6b^5c^5f^2g^2z^2 - 8847360a^7b^4c^5e^2h^2z^2 + 3563520a^5b^ \\
& ^7c^4f^2g^2z^2 + 2211840a^6b^6c^4e^2h^2z^2 - 506880a^4b^9c^3f^2g^2z^2 - \\
& 276480a^5b^8c^3e^2h^2z^2 + 34560a^3b^{11}c^2f^2g^2z^2 + 13824a^4b^{10}c^2 \\
& *e^2h^2z^2 + 26542080a^6b^4c^6e^2f^2z^2 + 23362560a^3b^9c^4d^2g^2z^2 - \\
& 46725120a^3b^8c^5d^2e^2z^2 - 7127040a^5b^6c^5e^2f^2z^2 - 2965248a^2b^ \\
& 11c^3d^2g^2z^2 + 1013760a^4b^8c^4e^2f^2z^2 - 69120a^3b^{10}c^3e^2f^2z^2 + \\
& 1536a^2b^{12}c^2e^2f^2z^2 + 5930496a^2b^{10}c^4d^2e^2z^2 - 693633024a^7c^9 \\
& d^2e^2z^2 - 14155776a^9c^7e^2h^2z^2 + 39321600a^8c^8e^2f^2z^2 + 13824b^ \\
& 14c^2d^2e^2z^2 - 6912b^{15}c^8d^2g^2z^2 + 2211840a^6b^8c^6e^2f^2g^2h^2z^2 + 15482880 \\
& a^5b^8c^7d^2e^2f^2g^2z^2 - 13824a^8b^9c^3d^2e^2f^2g^2z^2 + 4423680a^5b^3c^5e^2f^2g^2h^2z^2 \\
& + 138240a^4b^5c^4e^2f^2g^2h^2z^2 - 13824a^3b^7c^3e^2f^2g^2h^2z^2 - 16588800a^5b^2 \\
& c^6d^2e^2g^2h^2z^2 + 1658880a^4b^4c^5d^2e^2g^2h^2z^2 + 124416a^3b^6c^4d^2e^2g^2h^2z^2 - 4 \\
& 1472a^2b^8c^3d^2e^2g^2h^2z^2 + 7741440a^4b^3c^6d^2e^2f^2g^2z^2 - 2903040a^3b^5c^5 \\
& d^2e^2f^2g^2z^2 + 387072a^2b^7c^4d^2e^2f^2g^2z^2 - 37062144a^5b^8c^7d^2f^2h^2z^2 - 59857 \\
& 92a^6b^8c^6d^2f^2h^2z^2 + 206010a^8b^9c^3d^2f^2h^2z^2 - 6300a^8b^{10}c^2d^2f^2h^2z^2 + \\
& 16588800a^5b^8c^7d^2e^2h^2z^2 + 3456a^8b^{10}c^2d^2f^2g^2z^2 + 435456a^8b^8c^4d^2 \\
& e^2g^2z^2 + 13824a^8b^8c^4d^2e^2f^2z^2 + 1350a^8b^{11}c^8d^2f^2h^2z^2 - 1105920a^5b^4c^
\end{aligned}$$

$$\begin{aligned}
&^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 + 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 + 15630336*a^5*b^2*c^6*d*f^2*h - 14459904*a^4*b^3*c^6*d^2*f*h + 96 \\
&30144*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 - 14 \\
&14080*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 + 1468 \\
&80*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 - 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 - 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 - 216 \\
&00*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 + 16 \\
&58880*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 + 173779 \\
&2*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^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 + 1264 \\
&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 + 4 \\
&61376*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 + 6451 \\
&20*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 + 5806 \\
&08*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 + 5 \\
&308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, k)*((983040*a^7*c^8*e*f - 324403 \\
&2*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 +
\end{aligned}$$

$$\begin{aligned}
& 24576a^6b^3c^6f^*g + 2304a^4b^8c^3g^*h + 9216a^5b^6c^4g^*h - 18432 \\
& 0a^6b^4c^5g^*h + 442368a^7b^2c^6g^*h)/(512(a^4b^{12} + 4096a^{10}c^6 \\
& - 24a^5b^{10}c + 240a^6b^8c^2 - 1280a^7b^6c^3 + 3840a^8b^4c^4 - 6 \\
& 144a^9b^2c^5)) - \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 + 19327 \\
& 3528320a^{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^*z^4 + 6871 \\
& 9476736a^{15}c^{10}z^4 + 65536a^5b^{20}z^4 - 46080a^4b^{14}c^*f^*h^*z^2 - 105 \\
& 984a^3b^{15}c^*d^*h^*z^2 - 73728a^2b^{16}c^*d^*f^*z^2 + 2548039680a^9b^3c^7 \\
& d^*h^*z^2 + 1509949440a^9b^3c^7e^*g^*z^2 - 1401421824a^8b^5c^6d^*h^*z^2 - \\
& 1321205760a^9b^2c^8d^*f^*z^2 - 754974720a^8b^5c^6e^*g^*z^2 + 732168192 \\
& a^7b^6c^6d^*f^*z^2 - 456130560a^9b^4c^6f^*h^*z^2 + 390463488a^7b^7c^5 \\
& 5d^*h^*z^2 - 366280704a^6b^8c^5d^*f^*z^2 - 330301440a^8b^4c^7d^*f^*z^2 + \\
& 254017536a^8b^6c^5f^*h^*z^2 - 1887436800a^{10}b^*c^8d^*h^*z^2 + 188743680 \\
& a^{10}b^2c^7f^*h^*z^2 + 188743680a^7b^7c^5e^*g^*z^2 - 61931520a^7b^8c^4 \\
& f^*h^*z^2 + 96583680a^5b^{10}c^4d^*f^*z^2 - 51609600a^6b^9c^4d^*h^*z^2 + 6 \\
& 144000a^6b^{10}c^3f^*h^*z^2 + 61440a^5b^{12}c^2f^*h^*z^2 - 23592960a^6b^9 \\
& c^4e^*g^*z^2 + 1179648a^5b^{11}c^3e^*g^*z^2 + 829440a^4b^{13}c^2d^*h^*z^2 + \\
& 368640a^5b^{11}c^3d^*h^*z^2 - 15175680a^4b^{12}c^3d^*f^*z^2 + 1428480a^3b \\
& b^{14}c^2d^*f^*z^2 - 1207959552a^{10}b^*c^8e^*g^*z^2 - 440401920a^{10}b^*c^8f^2 \\
& z^2 - 188743680a^{11}b^*c^7h^2z^2 + 1761607680a^{10}c^9d^*f^*z^2 + 46080a \\
& ^5b^{13}c^*h^2z^2 - 14080a^3b^{15}c^*f^2z^2 + 6936330240a^8b^3c^8d^2z \\
& ^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^*c^9d^2z^2 - 150994 \\
& 9440a^9b^2c^8e^2z^2 + 251658240a^{11}c^8f^*h^*z^2 + 1536a^3b^{16}f^*h^*z \\
& ^2 + 4608a^2b^{17}d^*h^*z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^*b^{17} \\
& c^*d^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 \\
& ^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 - 26542080 \\
& a^8b^7c^4h^2z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5h^2 \\
& z^2 - 1290240a^6b^{11}c^2h^2z^2 + 5898240a^6b^{10}c^3g^2z^2 - 294912 \\
& a^5b^{12}c^2g^2z^2 + 11206656a^7b^7c^5f^2z^2 + 8929280a^6b^9c^4 \\
& f^2z^2 + 23592960a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 291 \\
& 840a^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 + 1207959 \\
& 552a^{10}c^9e^2z^2 + 2304a^4b^{15}h^2z^2 + 256a^2b^{17}f^2z^2 + 2304 \\
& b^{19}d^2z^2 + 169869312a^7b^*c^8d^*e^*f^*z + 99090432a^8b^*c^7d^*g^*h^*z - 4 \\
& 608a^3b^{12}c^*f^*g^*h^*z - 9437184a^8b^*c^7e^*f^*h^*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 - 88473600a^6b^4c^6d^*e^*h^*z - 84934656a^ \\
& 7b^2c^7d^*f^*g^*z + 117964800a^5b^5c^6d^*e^*f^*z + 44236800a^6b^5c^5d^* \\
& g^*h^*z - 5898240a^7b^4c^5f^*g^*h^*z + 4718592a^8b^2c^6f^*g^*h^*z + 2949120 \\
& a^6b^6c^4f^*g^*h^*z - 737280a^5b^8c^3f^*g^*h^*z + 92160a^4b^{10}c^2f^*g^* \\
& h^*z - 58982400a^5b^6c^5d^*f^*g^*z + 11796480a^7b^3c^6e^*f^*h^*z - 6635520 \\
& a^5b^7c^4d^*g^*h^*z - 5898240a^6b^5c^5e^*f^*h^*z + 1474560a^5b^7c^4e^* \\
& f^*h^*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^2 \\
& g^*z + 7077888a^9b^*c^6g^*h^2z - 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 + 1022754816a^6b^2c^8d^2 \\
& e^*z - 642318336a^5b^4c^7d^2e^*z - 511377408a^6b^3c^7d^2g^*z + 32115 \\
& 9168a^5b^5c^6d^2g^*z + 223395840a^4b^6c^6d^2e^*z - 111697920a^4b^ \\
& 7c^5d^2g^*z - 8847360a^8b^3c^5g^*h^2z + 4423680a^7b^5c^4g^*h^2z -
\end{aligned}$$

$$\begin{aligned}
& 1105920a^6b^7c^3g^2h^2z + 138240a^5b^9c^2g^2h^2z + 25362432a^7b^8c^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^{11}c^3d^2g^2z + 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^2e^2z - 693633024a^7c^9d^2e^2z - 14155776a^9c^7e^2h^2z + 39321600a^8c^8e^2f^2z + 13824b^{14}c^2d^2e^2z \\
& - 6912b^{15}c^2d^2g^2z + 2211840a^6b^6c^6e^2f^2g^2h + 15482880a^5b^6c^7d^2e^2f^2g - 13824a^8b^9c^3d^2e^2f^2g + 4423680a^5b^3c^5e^2f^2g^2h + 13824a^4b^5c^4e^2f^2g^2h \\
& - 13824a^3b^7c^3e^2f^2g^2h - 16588800a^5b^2c^6d^2e^2g^2h + 1658880a^4b^4c^5d^2e^2g^2h + 124416a^3b^6c^4d^2e^2g^2h - 41472a^2b^8c^3d^2e^2g^2h \\
& + 7741440a^4b^3c^6d^2e^2f^2g - 2903040a^3b^5c^5d^2e^2f^2g + 387072a^2b^7c^4d^2e^2f^2g - 37062144a^5b^6c^7d^2f^2h - 5985792a^6b^6c^6d^2f^2h^2 \\
& + 206010a^8b^9c^3d^2f^2h - 6300a^8b^{10}c^2d^2f^2h + 16588800a^5b^6c^7d^2e^2h + 3456a^8b^{10}c^2d^2f^2g^2 + 435456a^8b^8c^4d^2e^2g \\
& + 13824a^8b^8c^4d^2e^2f + 1350a^8b^{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^5e^2g^2h^2 - 829440a^5b^4c^4e^2g^2h^2 - 20736a^4b^6c^3e^2g^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^6e^2f^2g \\
& + 2867328a^4b^4c^5d^2f^2h - 2095200a^2b^7c^4d^2f^2h - 1414080a^3b^6c^4d^2f^2h - 34836480a^4b^2c^7d^2e^2g - 645120a^4b^4c^5e^2f^2g \\
& + 306720a^3b^7c^3d^2f^2h^2 + 197820a^2b^8c^3d^2f^2h + 146880a^4b^5c^4d^2f^2h^2 + 80640a^3b^6c^4e^2f^2g - 55350a^2b^9c^2d^2f^2h^2 \\
& - 2304a^2b^8c^3e^2f^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^2e^2g - 124416a^3b^5c^5d^2e^2h - 96768a^2b^8c^3d^2f^2g^2 + 41472a^2b^7c^4d^2e^2h - 3919104a^2b^6c^5d^2e^2g \\
& - 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^2h^3 - 354240a^5b^5c^3f^2h^3 \\
& - 354240a^4b^5c^4f^3h + 43680a^3b^7c^3f^3h - 21600a^4b^7c^2f^2h^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^5e^2g^3 \\
& + 1949184a^6b^2c^5d^2h^3 + 1296000a^5b^4c^4d^2h^3 - 155520a^4b^6c^3d^2h^3 - 40500a^8b^{10}c^2d^2h^2 - 8100a^3b^8c^2d^2h^3 \\
& + 3870720a^5b^6c^7e^2f^2 + 34836480a^4b^6c^8d^2e^2 - 108864a^8b^9c^3d^2g^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^2f^3 + 1737792a^3b^5c^5d^2f^3 \\
& - 260190a^8b^8c^4d^2f^2 - 211680a^2b^7c^4d^2f^3 - 435456a^8b^7c^5d^2e^2 - 2211840a^6c^7e^2f^2h - 9450b^{11}c^2d^2f^2h \\
& + 1612800a^6c^7d^2f^2h - 20736b^{10}c^3d^2e^2g - 75188736a^4b^6c^8d^3f - 883200a^6b^6c^6f^3h - 317952a^7b^6c^5f^2h^3 + 1350a^3b^9c^2f^2h^3 \\
& - 15482880a^5c^8d^2e^2f - 10616832a^5b^6c^7e^3g - 345060a^8b^8c^4d^3h + 4050a^2b^{10}c^2d^2h^3 - 4262400a^5b^6c^7d^2f^3 + 852768a^8b^7c^5d^3f \\
& + 7350a^8b^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 + 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 + 64
\end{aligned}$$

$$\begin{aligned}
& 5120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2b^7c^4e^2 \\
& f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f^2 - 1741824 \\
& 0a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e^2 + 115200a^7c^6f^2h^2 \\
& + 6096384a^6c^7d^2h^2 + 5184b^{11}c^2d^2g^2 + 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^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 \\
& + 28449792a^5c^8d^3h + 17010b^{10}c^3d^3h + 2025b^{12}c^2d^2h^2 + 58 \\
& 0608a^7c^6d^3h^3 - 39690b^9c^4d^3f + 2025a^4b^8c^3h^4 - 734832a^6b^6 \\
& c^6d^4 + 20736a^8c^5h^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + \\
& 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, k) * ((768a^2b^{14}c^2d - 3145 \\
& 728a^{10}c^8h - 22020096a^9c^9d - 22272a^3b^{12}c^3d + 282624a^4b^1 \\
& 0c^4d - 2027520a^5b^8c^5d + 8847360a^6b^6c^6d - 23396352a^7b^4c^7 \\
& d + 34603008a^8b^2c^8d + 256a^3b^{13}c^2f - 9216a^4b^{11}c^3f + \\
& 122880a^5b^9c^4f - 819200a^6b^7c^5f + 2949120a^7b^5c^6f - 5505 \\
& 024a^8b^3c^7f + 768a^4b^{12}c^2h - 12288a^5b^{10}c^3h + 61440a^6b^8 \\
& c^4h - 983040a^8b^4c^6h + 3145728a^9b^2c^7h + 4194304a^9b^3c^8 \\
& f) / (512(a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 240a^6b^8c^2 - 1280 \\
& a^7b^6c^3 + 3840a^8b^4c^4 - 6144a^9b^2c^5)) + (x * (1572864a^9c^9e \\
& e - 1536a^4b^{10}c^4e + 30720a^5b^8c^5e - 245760a^6b^6c^6e + 9830 \\
& 40a^7b^4c^7e - 1966080a^8b^2c^8e + 768a^4b^{11}c^3g - 15360a^5b^9 \\
& c^4g + 122880a^6b^7c^5g - 491520a^7b^5c^6g + 983040a^8b^3c^7 \\
& g - 786432a^9b^3c^8g)) / (64(a^4b^{12} + 4096a^{10}c^6 - 24a^5b^{10}c + 2 \\
& 40a^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^{14}c^3z^4 + 47185920 \\
& a^7b^{16}c^2z^4 - 171798691840a^{14}b^2c^9z^4 + 193273528320a^{13}b^4c^8 \\
& z^4 - 128849018880a^{12}b^6c^7z^4 - 16911433728a^{10}b^{10}c^5z^4 + 35 \\
& 23215360a^9b^{12}c^4z^4 - 2621440a^6b^{18}c^2z^4 + 68719476736a^{15}c^{10} \\
& z^4 + 65536a^5b^{20}z^4 - 46080a^4b^{14}c^2f^2h^2 - 105984a^3b^{15}c^2d^2h \\
& z^2 - 73728a^2b^{16}c^2d^2f^2z^2 + 2548039680a^9b^3c^7d^2h^2z^2 + 15099494 \\
& 40a^9b^3c^7e^2g^2z^2 - 1401421824a^8b^5c^6d^2h^2z^2 - 1321205760a^9b^2 \\
& c^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 - 366280 \\
& 704a^6b^8c^5d^2f^2z^2 - 330301440a^8b^4c^7d^2f^2z^2 + 254017536a^8b^6 \\
& c^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 + 9658368 \\
& 0a^5b^{10}c^4d^2f^2z^2 - 51609600a^6b^9c^4d^2h^2z^2 + 6144000a^6b^{10}c^3 \\
& f^2h^2z^2 + 61440a^5b^{12}c^2f^2h^2z^2 - 23592960a^6b^9c^4e^2g^2z^2 + 117 \\
& 9648a^5b^{11}c^3e^2g^2z^2 + 829440a^4b^{13}c^2d^2h^2z^2 + 368640a^5b^{11}c^3 \\
& d^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^2h^2z^2 \\
& - 14080a^3b^{15}c^2f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6 \\
& b^7c^6d^2z^2 - 3963617280a^9b^3c^9d^2z^2 - 1509949440a^9b^2c^8e^2 \\
& z^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 + 754974 \\
& 720a^8b^4c^7e^2z^2 - 730054656a^5b^9c^5d^2z^2 + 477102080a^9b^3 \\
& c^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 - 17432 \\
& 5760a^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^6 \\
& b^{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 + 23592960 \\
& a^6b^8c^5e^2z^2 - 2600960a^5b^{11}c^3f^2z^2 + 291840a^4b^{13}c^2f^2 \\
& z^2 - 19860480a^3b^{13}c^3d^2z^2 - 1179648a^5b^{10}c^4e^2z^2 + 177 \\
& 1776a^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 + 169
\end{aligned}$$

$$\begin{aligned}
& 869312a^7b^3c^8d^2ef^2z + 99090432a^8b^3c^7d^2g^2h^2z - 4608a^3b^12c^2f^2g^2h^2z - 9437184a^8b^3c^7e^2f^2h^2z - 13824a^2b^13c^2d^2g^2h^2z + 9216a^2b^13c^2d^2e^2f^2z - 4608a^2b^14c^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^10c^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^11c^2d^2g^2h^2z + 9216a^3b^11c^2e^2f^2h^2z + 16220160a^4b^8c^4d^2f^2g^2z + 13271040a^5b^6c^5d^2e^2h^2z - 2396160a^3b^10c^3d^2f^2g^2z + 552960a^4b^8c^4d^2e^2h^2z - 359424a^3b^10c^3d^2e^2h^2z + 175104a^2b^12c^2d^2f^2g^2z + 27648a^2b^12c^2d^2e^2h^2z - 32440320a^4b^7c^5d^2e^2f^2z + 4792320a^3b^9c^4d^2e^2f^2z - 350208a^2b^11c^3d^2e^2f^2z + 346816512a^7b^3c^8d^2g^2z + 7077888a^9b^3c^6g^2h^2z - 6912a^4b^11c^2g^2h^2z - 19660800a^8b^3c^7f^2g^2z - 768a^2b^13c^2f^2g^2z + 214272a^2b^13c^2d^2g^2z - 428544a^2b^12c^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^11c^2f^2g^2z + 13824a^4b^10c^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^11c^3d^2g^2z + 1013760a^4b^8c^4e^2f^2z - 69120a^3b^10c^3e^2f^2z + 1536a^2b^12c^2e^2f^2z + 5930496a^2b^10c^4d^2e^2z - 693633024a^7c^9d^2e^2z - 14155776a^9c^7e^2h^2z + 39321600a^8c^8e^2f^2z + 13824b^14c^2d^2e^2z - 6912b^15c^2d^2g^2z + 2211840a^6b^3c^6e^2f^2g^2h + 15482880a^5b^3c^7d^2e^2f^2g - 13824a^2b^9c^3d^2e^2f^2g + 4423680a^5b^3c^5e^2f^2g^2h + 138240a^4b^5c^4e^2f^2g^2h - 13824a^3b^7c^3e^2f^2g^2h - 16588800a^5b^2c^6d^2e^2g^2h + 1658880a^4b^4c^5d^2e^2g^2h + 124416a^3b^6c^4d^2e^2g^2h - 41472a^2b^8c^3d^2e^2g^2h + 7741440a^4b^3c^6d^2e^2f^2g - 2903040a^3b^5c^5d^2e^2f^2g + 387072a^2b^7c^4d^2e^2f^2g - 37062144a^5b^3c^7d^2f^2h - 5985792a^6b^3c^6d^2f^2h^2 + 206010a^2b^9c^3d^2f^2h - 6300a^2b^10c^2d^2f^2h + 16588800a^5b^3c^7d^2e^2h + 3456a^2b^10c^2d^2f^2g^2 + 435456a^2b^8c^4d^2e^2g + 13824a^2b^8c^4d^2e^2f + 1350a^2b^11c^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^5e^2g^2h^2 - 829440a^5b^4c^4e^2g^2h^2 - 20736a^4b^6c^3e^2g^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^6e^2f^2g + 2867328a^4b^4c^5d^2f^2h - 2095200a^2b^7c^4d^2f^2h - 1414080a^3b^6c^4d^2f^2h - 34836480a^4b^2c^7d^2e^2g - 645120a^4b^4c^5e^2f^2g + 306720a^3b^7c^3d^2f^2h + 197820a^2b^8c^3d^2f^2h + 146880a^4b^5c^4d^2f^2h^2 + 80640a^3b^6c^4e^2f^2g - 55350a^2b^9c^2d^2f^2h^2 - 2304a^2b^8c^3e^2f^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^2e^2g - 124416a^3b^5c^5d^2e^2h - 96768a^2b^8c^3d^2f^2g^2 + 41472a^2b^7c^4d^2e^2h - 3919104a^2b^6c^5d^2e^2g - 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
\end{aligned}$$

$$\begin{aligned}
& *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^ \\
& 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 + 51 \\
& 84*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 + 355 \\
& 25376*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 - 4354 \\
& 560*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 + 14 \\
& 336*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} + 40 \\
& 96*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 - 115 \\
& 20*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 \\
& 28*a^4*b^3*c^5*g^3 - 20160*a^4*c^8*d*e*f - 2880*a^5*c^7*e*f*h + 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 + 1728*a^5*b*c^6*e*h^2 - 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 + 1296*a^4*b^3*c^5*e*h^2 - 648*a
\end{aligned}$$

$$\begin{aligned}
& ^4b^4c^4g^2h^2 - 864a^5b^2c^5g^2h^2 - 36a^6b^6c^5d^2e^2f + 18a^7b^7c^4d^2f^2g + 15552a^4b^2c^7d^2e^2h + 10080a^4b^2c^7d^2f^2g + 1440a^5b^2c^6f^2g^2h + 900a^2b^4c^6d^2e^2f - 4896a^3b^2c^7d^2e^2f - 108a^2b^5c^5d^2e^2h - 450a^2b^5c^5d^2f^2g + 2448a^3b^3c^6d^2f^2g + 54a^2b^6c^4d^2g^2h - 36a^3b^4c^5e^2f^2h - 7776a^4b^2c^6d^2g^2h - 6048a^4b^2c^6e^2f^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^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^3z^4 + 68719476736a^15c^10z^4 + 65536a^5b^20z^4 - 46080a^4b^14c^2f^2h^2z^2 - 105984a^3b^15c^2d^2h^2z^2 - 73728a^2b^16c^2d^2f^2z^2 + 2548039680a^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^10b^2c^8d^2h^2z^2 + 188743680a^7b^7c^5e^2g^2z^2 - 61931520a^7b^8c^4f^2h^2z^2 + 96583680a^5b^10c^4d^2f^2z^2 - 51609600a^6b^9c^4d^2h^2z^2 + 6144000a^6b^10c^3f^2h^2z^2 + 61440a^5b^12c^2f^2h^2z^2 - 23592960a^6b^9c^4e^2g^2z^2 + 1179648a^5b^11c^3e^2g^2z^2 + 829440a^4b^13c^2d^2h^2z^2 + 368640a^5b^11c^3d^2h^2z^2 - 15175680a^4b^12c^3d^2f^2z^2 + 1428480a^3b^14c^2d^2f^2z^2 - 1207959552a^10b^2c^8e^2g^2z^2 - 440401920a^10b^2c^8f^2z^2 - 188743680a^11b^2c^7h^2z^2 + 1761607680a^10c^9d^2f^2z^2 + 46080a^5b^13c^2h^2z^2 - 14080a^3b^15c^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 + 251658240a^11c^8f^2h^2z^2 + 1536a^3b^16f^2h^2z^2 + 4608a^2b^17d^2h^2z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^2b^17c^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^10b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 + 141557760a^10b^3c^6h^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 - 26542080a^8b^7c^4h^2z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5h^2z^2 - 1290240a^6b^11c^2h^2z^2 + 5898240a^6b^10c^3g^2z^2 - 294912a^5b^12c^2g^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 + 1536a^2b^18d^2f^2z^2 + 1207959552a^10c^9e^2z^2 + 2304a^4b^15h^2z^2 + 256a^2b^17f^2z^2 + 2304b^19d^2z^2 + 169869312a^7b^2c^8d^2e^2f^2z + 99090432a^8b^2c^7d^2g^2h^2z - 4608a^3b^12c^2f^2g^2h^2z - 9437184a^8b^2c^7e^2f^2h^2z - 13824a^2b^13c^2d^2g^2h^2z + 9216a^2b^13c^2d^2e^2f^2z - 4608a^2b^14c^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^10c^2f^2g^2h^2z - 5898240a^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^11c^2d^2g^2h^2z + 9216a^3b^11c^2e^2f^2h^2z + 16220160a^4b^8c^4d^2f^2g^2z + 13271040a^5b^6c^5d^2e^2h^2z - 2396160a^3b^10c^3d^2f^2g^2z + 552960a^4b^8c^4d^2e^2h^2z - 359424a^3b^10c^3d^2e^2h^2z + 175104a^2b^12c^2d^2f^2g^2z + 27648a^2b^12c^2d^2e^2h^2z - 32440320a^4b^7c^5d^2e^2f^2z + 4792320a^3b^9c^4d^2e^2f^2z - 350208a^2b^11c^3d^2e^2f^2z + 346816512a^7b^2c^8d^2z * g^2z + 7077888a^9b^2c^6g^2h^2z - 6912a^4b^11c^2g^2h^2z - 19660800a^8b^2c^7f^2g^2z - 768a^2b^13c^2f^2g^2z + 214272a^2b^13c^2d^2g^2z - 428544a^
\end{aligned}$$

$$\begin{aligned}
& a^5b^5c^6d^2g^2 + 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 \\
& z - 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 \\
& z - 276480a^5b^8c^3e^2h^2z + 34560a^3b^11c^2f^2g^2z + 13824a^4b^10c^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^11c^3d^2g^2z + 1013760a^4b^8c^4e^2f^2z - 69120a^3b^10c^3e^2f^2z \\
& z + 1536a^2b^12c^2e^2f^2z + 5930496a^2b^10c^4d^2e^2z - 693633024a^7c^9d^2e^2z - 14155776a^9c^7e^2h^2z + 39321600a^8c^8e^2f^2z + 13824 \\
& *b^14c^2d^2e^2z - 6912*b^15c^d^2g^2z + 2211840a^6b^c^6e^2f^2g^2h + 15482880a^5b^c^7d^2e^2f^2g^2h - 13824a^a^b^9c^3d^2e^2f^2g^2h + 4423680a^5b^3c^5e^2f^2g^2h \\
& *h + 138240a^4b^5c^4e^2f^2g^2h - 13824a^3b^7c^3e^2f^2g^2h - 16588800a^5b^2c^6d^2e^2g^2h + 1658880a^4b^4c^5d^2e^2g^2h + 124416a^3b^6c^4d^2e^2g^2h \\
& - 41472a^2b^8c^3d^2e^2g^2h + 7741440a^4b^3c^6d^2e^2f^2g^2h - 2903040a^3b^5c^5d^2e^2f^2g^2h + 387072a^2b^7c^4d^2e^2f^2g^2h - 37062144a^5b^c^7d^2f^2h - 59 \\
& 85792a^6b^c^6d^2f^2h^2 + 206010a^a^b^9c^3d^2f^2h - 6300a^a^b^10c^2d^2f^2h + 16588800a^5b^c^7d^2e^2h + 3456a^a^b^10c^2d^2f^2g^2h + 435456a^a^b^8c^4 \\
& *d^2e^2g^2h + 13824a^a^b^8c^4d^2e^2f^2h + 1350a^a^b^11c^d^2f^2h^2 - 1105920a^5b^4c^4f^2g^2h - 552960a^6b^2c^5f^2g^2h - 34560a^4b^6c^3f^2g^2h + 34 \\
& 56a^3b^8c^2f^2g^2h - 1658880a^6b^2c^5e^2g^2h^2 - 829440a^5b^4c^4e^2g^2h^2 - 20736a^4b^6c^3e^2g^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^6e^2f^2g^2h + 2867328a^4b^4c^5d^2f^2h - 2095200a^2b^7c^4d^2f^2h - 1414080a^3b^6c^4d^2f^2h \\
& - 34836480a^4b^2c^7d^2e^2g^2h - 645120a^4b^4c^5e^2f^2g^2h + 306720a^3b^7c^3d^2f^2h^2 + 197820a^2b^8c^3d^2f^2h + 146880a^4b^5c^4d^2f^2h^2 + 80640a^3b^6c^4e^2f^2g^2h - 55350a^2b^9c^2d^2f^2h^2 \\
& - 2304a^2b^8c^3e^2f^2g^2h - 3870720a^5b^2c^6d^2f^2g^2h - 1935360a^4b^4c^5d^2f^2g^2h - 1658880a^4b^3c^6d^2e^2h + 725760a^3b^6c^4d^2f^2g^2h^2 + 17418240a^3b^4c^6d^2e^2g^2h - 124416a^3b^5c^5d^2e^2h - 96768a^2b^8c^3d^2f^2g^2h + 41472a^2b^7c^4d^2e^2h - 3919104a^2b^6c^5d^2e^2g^2h - 7741440a^4b^2c^7d^2e^2f^2h + 2903040a^3b^4c^6d^2e^2f^2h - 387072a^2b^6c^5d^2e^2f^2h - 1648128a^5b^3c^5f^2h^3 - 898560a^6b^3c^4f^2h^3 - 354240a^5b^5c^3f^2h^3 - 354240a^4b^5c^4f^2h^3 + 43680a^3b^7c^3f^2h^3 - 21600a^4b^7c^2f^2h^3 - 1050a^2b^9c^2f^2h^3 + 225a^2b^10c^2f^2h^2 + 1658880a^6b^c^6e^2h^2 + 16547328a^4b^2c^7d^2h^3 - 12306816a^3b^4c^6d^2h^3 + 37310976a^3b^3c^7d^2h^3 + 3037824a^2b^6c^5d^2h^3 - 2654208a^5b^3c^5e^2g^2h^3 + 1949184a^6b^2c^5d^2h^3 + 1296000a^5b^4c^4d^2h^3 - 155520a^4b^6c^3d^2h^3 - 40500a^a^b^10c^2d^2h^2 - 8100a^3b^8c^2d^2h^3 + 3870720a^5b^c^7e^2f^2h^2 + 34836480a^4b^c^8d^2e^2h^2 - 108864a^a^b^9c^3d^2g^2h^2 - 8068032a^2b^5c^6d^2h^3 + 5623296a^4b^3c^6d^2f^2h^3 + 1737792a^3b^5c^5d^2f^2h^3 - 260190a^a^b^8c^4d^2f^2h^2 - 211680a^2b^7c^4d^2f^2h^3 - 435456a^a^b^7c^5d^2e^2h^2 - 2211840a^6c^7e^2f^2h - 9450b^11c^2d^2f^2h + 1612800a^6c^7d^2f^2h - 20736b^10c^3d^2e^2g^2h - 75188736a^4b^c^8d^2h^3 + 883200a^6b^c^6f^2h^3 - 317952a^7b^c^5f^2h^3 + 1350a^3b^9c^2f^2h^3 - 15482880a^5c^8d^2e^2f^2h - 10616832a^5b^c^7e^2h^3 + 345060a^a^b^8c^4d^2h^3 + 4050a^2b^10c^2d^2h^3 - 4262400a^5b^c^7d^2f^2h^3 + 852768a^a^b^7c^5d^2h^3 + 7350a^a^b^9c^3d^2f^2h^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^2h^2 + 829440a^5b^3c^5e^2h^2 + 161280a^4b^5c^4f^2g^2h^2 + 20736a^4b^5c^4e^2h^2 - 20160a^3b^7c^3f^2g^2h^2
\end{aligned}$$

$$\begin{aligned}
& 2 + 576a^2b^9c^2f^2g^2 + 11487744a^5b^2c^6d^2h^2 + 7962624a^5b^2c^6e^2g^2 + 35525376a^4b^2c^7d^2f^2 - 1412640a^3b^6c^4d^2h^2 \\
& + 461376a^4b^4c^5d^2h^2 + 375030a^2b^8c^3d^2h^2 + 8709120a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 979776a^2b^7c^4d^2g^2 + 6 \\
& 45120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5e^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784a^2b^6c^5d^2f^2 - 174182 \\
& 40a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^2e^2 + 115200a^7c^6f^2h^2 + 6096384a^6c^7d^2h^2 + 5184b^11c^2d^2g^2 + 11025b^10c^3d^2f^2 \\
& + 5644800a^5c^8d^2f^2 + 142560a^6b^4c^3h^4 + 103680a^7b^2c^4h^4 + 32400a^5b^6c^2h^4 + 20736b^9c^4d^2e^2 + 331776a^5b^4c^4g^4 \\
& + 492800a^5b^2c^6f^4 + 351456a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 \\
& + 28449792a^5c^8d^3h + 17010b^10c^3d^3h + 2025b^12c^d^2h^2 + 580608a^7c^6d^3h - 39690b^9c^4d^3f + 2025a^4b^8c^h^4 - 734832a^6c^6d^4 \\
& + 20736a^8c^5h^4 + 49787136a^4c^9d^4 + 160000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, k), k, 1, 4)
\end{aligned}$$

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] $\frac{1}{4}x(b^2d - a*b*f - 2*a*(c*d - a*h) + (b*c*d - 2*a*c*f + a*b*h)*x^2)/a/(-4*a*c + b^2)/((c*x^4 + b*x^2 + a)^2 + 1/4*(2*a*c*g - b*(a*i + c*e) - (-2*a*c*i + b^2*i - b*c*g + 2*c^2*e)*x^2)/c/(-4*a*c + b^2)/((c*x^4 + b*x^2 + a)^2 + 1/4*(6*c*e - 3*b*g + 2*a*i + b^2*i/c)*(2*c*x^2 + b)/(-4*a*c + b^2)^2/(c*x^4 + b*x^2 + a) + 1/8*x*(3*b^4*d + a*b^3*f + 8*a^2*b*c*f + 4*a^2*c*(a*h + 7*c*d) - a*b^2*(7*a*h + 25*c*d) + c*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(a*h + 2*c*d))*x^2)/a^2/(-4*a*c + b^2)^2/(c*x^4 + b*x^2 + a) - (2*a*c*i + b^2*i - 3*b*c*g + 6*c^2*e)*\operatorname{arctanh}((2*c*x^2 + b)/(-4*a*c + b^2)^{(1/2)})/(-4*a*c + b^2)^{(5/2)} + 1/16*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b - (-4*a*c + b^2)^{(1/2)})^{(1/2)})*c^{(1/2)}*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(a*h + 2*c*d) + (3*b^4*d + a*b^3*f - 52*a^2*b*c*f - 6*a*b^2*(-3*a*h + 5*c*d) + 24*a^2*c*(a*h + 7*c*d))/(-4*a*c + b^2)^{(1/2)})/a^2/(-4*a*c + b^2)^2*2^{(1/2)}/(b - (-4*a*c + b^2)^{(1/2)})^{(1/2)} + 1/16*\operatorname{arctan}(x*2^{(1/2)}*c^{(1/2)}/(b + (-4*a*c + b^2)^{(1/2)})^{(1/2)})*c^{(1/2)}*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(a*h + 2*c*d) + (-3*b^4*d - a*b^3*f + 52*a^2*b*c*f + 6*a*b^2*(-3*a*h + 5*c*d) - 24*a^2*c*(a*h + 7*c*d))/(-4*a*c + b^2)^{(1/2)})/a^2/(-4*a*c + b^2)^2*2^{(1/2)}/(b + (-4*a*c + b^2)^{(1/2)})^{(1/2)}$

Rubi [A] time = 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] $(x*(b^2*d - a*b*f - 2*a*(c*d - a*h) + (b*c*d - 2*a*c*f + a*b*h)*x^2))/(4*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (2*a*c*g - b*(c*e + a*i) - (2*c^2*e - b*c*g + b^2*i - 2*a*c*i)*x^2)/(4*c*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + ((6*c*e - 3*b*g + 2*a*i + (b^2*i)/c)*(b + 2*c*x^2))/(4*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (x*(3*b^4*d + a*b^3*f + 8*a^2*b*c*f + 4*a^2*c*(7*c*d + a*h) - a*b^2*(25*c*d + 7*a*h) + c*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(2*c*d + a*h))*x^2)/(8*a^2*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (\operatorname{Sqrt}[c]*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(2*c*d + a*h) + (3*b^4*d + a*b^3*f - 52*a^2*b*c*f - 6*a*b^2*(5*c*d - 3*a*h) + 24*a^2*c*(7*c*d + a*h))/\operatorname{Sqrt}[b^2 - 4*a*c])*ArcTan[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]])]/(8*\operatorname{Sqrt}[2]*a^2*(b^2 - 4*a*c)^2*\operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4*a*c]]) + (\operatorname{Sqrt}[c]*(3*b^3*d + a*b^2*f + 20*a^2*c*f - 12*a*b*(2*c*d + a*h) - (3*b^4*d + a*b^3*f - 52*a^2*b*c*f - 6*a*b^2*(5*c*d - 3*a*h) + 24*a^2*c*(7*c*d + a*h))/\operatorname{Sqrt}[b^2 - 4*a*c])*ArcTan[(\operatorname{Sqrt}[2]*\operatorname{Sqrt}[c]*x)/\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]])]/(8*\operatorname{Sqrt}[2]*a^2*(b^2 - 4*a*c)^2*\operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4*a*c]]) - ((6*c^2*e - 3*b*c*g + b^2*i + 2*a*c*i)*ArcTanh[(b + 2*c*x^2)/\operatorname{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c)^{(5/2)}$

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 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 + 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 56x^5}{(a + bx^2 + cx^4)^3} dx &= \int \frac{x(e + gx^2 + 56x^4)}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^3} dx \\
&= \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{1}{2} \text{Subst} \left(\int \frac{d + fx^2 + hx^4}{(a + bx^2 + cx^4)^3} dx \right) \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
&= -\frac{56ab + bce - 2acg + (56b^2 - 2c(56a - ce) - bcg)x^2}{4c(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - abf - 2a(cd - ah) + (bcd - 2acf + abh)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2}
\end{aligned}$$

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] $\text{int}((i*x^5+h*x^4+g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^3,x)$

[Out]
$$\begin{aligned} & -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)}*\text{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)}*\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)}*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)}*\text{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)}*\text{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)}*\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)}*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)}*\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)}*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^4+b*x^2+a)^2-4/(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)}*\text{arctan}(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)}*\text{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*b*d+4/(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)}*\text{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)}*\text{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)}*\text{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)}*\text{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)}*\text{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)}*\text{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)}*\text{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)}*\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)}*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)}*\text{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)}*\text{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)}*\text{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)}*\text{arctan}(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c)^{(1/2)}*c*x) \end{aligned}$$

$$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{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]
$$\begin{aligned} & -1/8*((12*a^2*b*c^2*h - 3*(b^3*c^2 - 8*a*b*c^3)*d - (a*b^2*c^2 + 20*a^2*c^3)*f)*x^7 - 4*(6*a^2*c^3*e - 3*a^2*b*c^2*g + (a^2*b^2*c + 2*a^3*c^2)*i)*x^6 \\ & - 12*a^4*b*i - ((6*b^4*c - 49*a*b^2*c^2 + 28*a^2*c^3)*d + 2*(a*b^3*c + 14*a^2*b*c^2)*f - (19*a^2*b^2*c - 4*a^3*c^2)*h)*x^5 - 6*(6*a^2*b*c^2*e - 3*a^2*b^2*c*g + (a^2*b^3 + 2*a^3*b*c)*i)*x^4 - ((3*b^5 - 20*a*b^3*c - 4*a^2*b*c^2)*d + (a*b^4 + 5*a^2*b^2*c + 36*a^3*c^2)*f - (5*a^2*b^3 + 16*a^3*b*c)*h)*x^3 \\ & - 4*(2*(a^2*b^2*c + 5*a^3*c^2)*e - (a^2*b^3 + 5*a^3*b*c)*g + (5*a^3*b^2 - 2*a^4*c)*i)*x^2 + 2*(a^2*b^3 - 10*a^3*b*c)*e + 2*(a^3*b^2 + 8*a^4*c)*g - (5*a*b^4 - 37*a^2*b^2*c + 44*a^3*c^2)*d - (a^2*b^3 - 16*a^3*b*c)*f - 3*(a^3*b^2 + 4*a^4*c)*h)*x)/((a^2*b^4*c^2 - 8*a^3*b^2*c^3 + 16*a^4*c^4)*x^8 + a^4*b^4 - 8*a^5*b^2*c + 16*a^6*c^2 + 2*(a^2*b^5*c - 8*a^3*b^3*c^2 + 16*a^4*b*c^3)*x^6 + (a^2*b^6 - 6*a^3*b^4*c + 32*a^5*c^3)*x^4 + 2*(a^3*b^5 - 8*a^4*b^3*c + 16*a^5*b*c^2)*x^2) - 1/8*integrate(((12*a^2*b*c*h - 3*(b^3*c - 8*a*b*c^2)*d - (a*b^2*c + 20*a^2*c^2)*f)*x^2 - 3*(b^4 - 9*a*b^2*c + 28*a^2*c^2)*d - (a*b^3 - 16*a^2*b*c)*f - 3*(a^2*b^2 + 4*a^3*c)*h - 8*(6*a^2*c^2*e - 3*a^2*b*c*g + (a^2*b^2 + 2*a^3*c)*i)*x)/(c*x^4 + b*x^2 + a), x)/(a^2*b^4 - 8*a^3*b^2*c + 16*a^4*c^2) \end{aligned}$$

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*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 - 6912*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)) + 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 + 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 + 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 + 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 + 254017536*a^8*b^6*c^5*f*h*z^2 - 1887436800*a^10*b*c^8*d*h*z^2 + 188743680*a^10

```

$$\begin{aligned}
& *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* \\
& 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 + \\
& 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*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 - 4608*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 - 109707264*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 - 45613 \\
& 056*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 + 47 \\
& 18592*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 - 2764 \\
& 8*a^4*b^10*c^2*d*h*i*z - 58982400*a^5*b^6*c^5*d*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 - 589 \\
& 8240*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 - 276 \\
& 480*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 + 132710 \\
& 40*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 - 66060288*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 - 6 \\
& 42318336*a^5*b^4*c^7*d^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 321159168*a^
\end{aligned}$$

$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 + 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^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^2*i + 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^2*i + 1152*a^3*b^9*c*d*h^2*i - 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^2*i - 5985792*a^6*b*c^6*d*f^2*h + 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^2*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^2*h^2 - 10321920*a^6*c^7*d*e*f^2*i + 1350*a*b^11*c*d*f^2*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^2*h^2 - 568320*a^6*b^4*c^3*f^2*h^2 - 136704*a^5*b^6*c^2*f^2*h^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^2*i + 2654208*a^5*b^4*c^4*e*g^2*i + 1658880*a^6*b^3*c^4*d*h^2*i - 1105920*a^5*b^4*c^4*f^2*g^2*h - 884736*a^5*b^5*c^3*e*g^2*i - 552960*a^6*b^2*c^5*f^2*g^2*h + 262656*a^5*b^5*c^3*d*h^2*i - 552960*a^4*b^7*c^2*d*h^2*i - 34560*a^4*b^6*c^3*f^2*g^2*h + 3456*a^3*b^8*c^2*f^2*g^2*h - 11612160*a^5*b^2*c^6*d^2*g^2*i + 1720320*a^5*b^3*c^5*e*f^2*i - 1658880*a^6*b^2*c^5*e*g^2*h + 1596672*a^3*b^6*c^4*d^2*g^2*i - 829440*a^5*b^4*c^4*e*g^2*h - 508032*a^2*b^8*c^3*d^2*g^2*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^2*h + 768*a^2*b^9*c^2*e*f^2*i - 4423680$

$$\begin{aligned}
& a^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^4 \\
& *b^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 + 9630 \\
& 144a^3b^5c^5d^2f^*h - 8764416a^5b^3c^5d^*f^*h^2 - 3870720a^5b^2c^6 \\
& *e^*f^2g - 3193344a^3b^5c^5d^2e^*i + 2867328a^4b^4c^5d^*f^2h - 2095 \\
& 200a^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 + 3067 \\
& 20a^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 + 41 \\
& 472a^2b^7c^4d^*e^2h - 3919104a^2b^6c^5d^2e^*g - 7741440a^4b^2c^7 \\
& *d^*e^2f + 2903040a^3b^4c^6d^*e^2f - 387072a^2b^6c^5d^*e^2f + 18432 \\
& 0a^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 - 35 \\
& 4240a^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^2 \\
& *c^7d^3h - 12306816a^3b^4c^6d^3h + 37310976a^3b^3c^7d^3f + 3037 \\
& 824a^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 - 5 \\
& 623296a^4b^3c^6d^*f^3 + 1737792a^3b^5c^5d^*f^3 - 260190a^*b^8c^4d^2 \\
& *f^2 - 211680a^2b^7c^4d^*f^3 - 435456a^*b^7c^5d^2e^2 - 245760a^8c^5 \\
& *f^*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^8 \\
& *d^*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^ \\
& ^4g^2h^2 + 207360a^5b^5c^3g^2h^2 + 170240a^5b^5c^3f^2i^2 + 9216 \\
& a^4b^7c^2f^2i^2 + 5184a^4b^7c^2g^2h^2 + 3538944a^6b^2c^5e^2i^ \\
& ^2 + 1684224a^6b^2c^5f^2h^2 + 1264320a^5b^4c^4f^2h^2 + 884736a^5 \\
& b^4c^4e^2i^2 + 126720a^4b^6c^3f^2h^2 - 13950a^3b^8c^2f^2h^2 + \\
& 1935360a^5b^3c^5d^2i^2 + 967680a^5b^3c^5f^2g^2 + 829440a^5b^3c^ \\
& ^5e^2h^2 - 532224a^4b^5c^4d^2i^2 + 161280a^4b^5c^4f^2g^2 - 9676 \\
& 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^2 \\
& *c^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^8 \\
& c^3d^2h^2 + 8709120a^4b^3c^6d^2g^2 - 4354560a^3b^5c^5d^2g^2 + 9 \\
& 79776a^2b^7c^4d^2g^2 + 645120a^4b^3c^6e^2f^2 - 80640a^3b^5c^5 \\
& e^2f^2 + 2304a^2b^7c^4e^2f^2 - 15269184a^3b^4c^6d^2f^2 + 2870784 \\
& *a^2b^6c^5d^2f^2 - 17418240a^3b^3c^7d^2e^2 + 3919104a^2b^5c^6d^ \\
& ^2e^2 - 3456b^12c^d^2g^*i + 384a^*b^12d^*f^*i^2 + 576a^4b^9h^2i^2 + 3 \\
& 538944a^7c^6e^2i^2 + 115200a^7c^6f^2h^2 + 64a^2b^11f^2i^2 + 609 \\
& 6384a^6c^7d^2h^2 + 5184b^11c^2d^2g^2 + 131072a^8b^2c^3i^4 + 983 \\
& 04a^7b^4c^2i^4 + 11025b^10c^3d^2f^2 + 5644800a^5c^8d^2f^2 + 142
\end{aligned}$$

$$\begin{aligned}
& 560a^6b^4c^3h^4 + 103680a^7b^2c^4h^4 + 32400a^5b^6c^2h^4 + 2073 \\
& 6b^9c^4d^2e^2 + 331776a^5b^4c^4g^4 + 492800a^5b^2c^6f^4 + 35145 \\
& 6a^4b^4c^5f^4 - 43120a^3b^6c^4f^4 + 1225a^2b^8c^3f^4 - 27433728 \\
& a^3b^2c^8d^4 + 6446304a^2b^4c^7d^4 + 7077888a^6c^7e^3i + 786432 \\
& a^8c^5e^i^3 + 28449792a^5c^8d^3h + 17010b^10c^3d^3h + 2025b^12c \\
& d^2h^2 + 580608a^7c^6d^3h^3 - 39690b^9c^4d^3f + 32768a^6b^6c^i^4 \\
& + 2025a^4b^8c^h^4 - 734832a^b^6c^6d^4 + 576b^13d^2i^2 + 65536a^9 \\
& c^4i^4 + 20736a^8c^5h^4 + 4096a^5b^8i^4 + 49787136a^4c^9d^4 + 1 \\
& 60000a^6c^7f^4 + 5308416a^5c^8e^4 + 35721b^8c^5d^4, z, 1) * (\text{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 \\
& a^9b^12c^4z^4 - 2621440a^6b^18c^z^4 + 68719476736a^15c^10z^4 + 655 \\
& 36a^5b^20z^4 + 196608a^5b^13c^g^i^z^2 - 46080a^4b^14c^f^h^z^2 - 10 \\
& 5984a^3b^15c^d^h^z^2 - 73728a^2b^16c^d^f^z^2 + 2548039680a^9b^3c^7 \\
& d^h^z^2 + 1509949440a^9b^3c^7e^g^z^2 - 1401421824a^8b^5c^6d^h^z^2 \\
& - 1321205760a^9b^2c^8d^f^z^2 - 754974720a^8b^5c^6e^g^z^2 + 73216819 \\
& 2a^7b^6c^6d^f^z^2 - 603979776a^10b^2c^7e^i^z^2 - 456130560a^9b^4c \\
& c^6f^h^z^2 + 390463488a^7b^7c^5d^h^z^2 + 301989888a^10b^3c^6g^i^z^2 \\
& - 366280704a^6b^8c^5d^f^z^2 - 330301440a^8b^4c^7d^f^z^2 + 2540175 \\
& 36a^8b^6c^5f^h^z^2 - 1887436800a^10b^c^8d^h^z^2 + 188743680a^10b^2 \\
& c^7f^h^z^2 + 188743680a^7b^7c^5e^g^z^2 + 125829120a^8b^6c^5e^i^z^2 \\
& - 62914560a^8b^7c^4g^i^z^2 - 61931520a^7b^8c^4f^h^z^2 + 23592960a \\
& a^7b^9c^3g^i^z^2 - 47185920a^7b^8c^4e^i^z^2 - 3538944a^6b^11c^2g \\
& i^z^2 + 96583680a^5b^10c^4d^f^z^2 - 51609600a^6b^9c^4d^h^z^2 + 707 \\
& 7888a^6b^10c^3e^i^z^2 + 6144000a^6b^10c^3f^h^z^2 - 393216a^5b^12c \\
& c^2e^i^z^2 + 61440a^5b^12c^2f^h^z^2 - 23592960a^6b^9c^4e^g^z^2 + 1 \\
& 179648a^5b^11c^3e^g^z^2 + 829440a^4b^13c^2d^h^z^2 + 368640a^5b^11 \\
& c^3d^h^z^2 - 15175680a^4b^12c^3d^f^z^2 + 1428480a^3b^14c^2d^f^z^2 \\
& - 1207959552a^10b^c^8e^g^z^2 - 402653184a^11b^c^7g^i^z^2 - 440401920 \\
& a^10b^c^8f^2z^2 - 188743680a^11b^c^7h^2z^2 + 1761607680a^10c^9d^f \\
& f^z^2 + 524288a^6b^12c^i^2z^2 + 46080a^5b^13c^h^2z^2 - 14080a^3b^15 \\
& c^f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z \\
& z^2 - 3963617280a^9b^c^9d^2z^2 + 805306368a^11c^8e^i^z^2 - 150994944 \\
& 0a^9b^2c^8e^2z^2 + 251658240a^11c^8f^h^z^2 + 1536a^3b^16f^h^z^2 \\
& + 4608a^2b^17d^h^z^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^a^b^17c^d \\
& ^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^1 \\
& 0b^2c^7g^2z^2 + 188743680a^8b^6c^5g^2z^2 + 141557760a^10b^3c^6h \\
& h^2z^2 - 174325760a^8b^5c^6f^2z^2 - 188743680a^7b^6c^6e^2z^2 + 1 \\
& 46165760a^4b^11c^4d^2z^2 - 50331648a^10b^4c^5i^2z^2 - 33554432a^ \\
& 11b^2c^6i^2z^2 + 20971520a^9b^6c^4i^2z^2 - 47185920a^7b^8c^4g^ \\
& 2z^2 - 26542080a^8b^7c^4h^2z^2 - 2752512a^7b^10c^2i^2z^2 + 26214 \\
& 40a^8b^8c^3i^2z^2 + 9584640a^7b^9c^3h^2z^2 - 2359296a^9b^5c^5h \\
& h^2z^2 - 1290240a^6b^11c^2h^2z^2 + 5898240a^6b^10c^3g^2z^2 - 294 \\
& 912a^5b^12c^2g^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 + 1536a^a^b^18d^f^z^2 + 1207 \\
& 959552a^10c^9e^2z^2 + 134217728a^12c^7i^2z^2 - 32768a^5b^14i^2z \\
& ^2 + 2304a^4b^15h^2z^2 + 256a^2b^17f^2z^2 + 2304b^19d^2z^2 + 169 \\
& 869312a^7b^c^8d^e^f^z + 99090432a^8b^c^7d^g^h^z - 3145728a^9b^c^6f \\
& h^i^z - 27648a^4b^11c^f^h^i^z + 56623104a^8b^c^7d^f^i^z - 50688a^3b \\
& ^12c^d^h^i^z - 4608a^3b^12c^f^g^h^z - 9437184a^8b^c^7e^f^h^z - 5529 \\
& 6a^2b^13c^d^f^i^z - 13824a^2b^13c^d^g^h^z + 9216a^a^b^13c^2d^e^f^z - \\
& 4608a^a^b^14c^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 \\
& b^7c^3f^h^i^z + 184320a^5b^9c^2f^h^i^z - 88473600a^6b^4c^6d^e^h^z
\end{aligned}$$

$- 84934656a^7b^2c^7d^2fgz + 117964800a^5b^5c^6d^2efz - 45613056a^7b^3c^6d^2fi^2z + 44236800a^6b^5c^5d^2g^2hz - 10321920a^6b^6c^4d^2h^2iz + 7077888a^7b^4c^5d^2h^2iz - 5898240a^7b^4c^5f^2g^2hz + 4718592a^8b^2c^6f^2g^2hz + 2949120a^6b^6c^4f^2g^2hz + 2396160a^5b^8c^3d^2h^2iz - 737280a^5b^8c^3f^2g^2hz + 92160a^4b^10c^2f^2g^2hz - 27648a^4b^10c^2d^2h^2iz - 5898240a^5b^6c^5d^2fgz + 11796480a^7b^3c^6ef^2hz + 8847360a^5b^7c^4d^2fi^2z - 6635520a^5b^7c^4d^2g^2hz - 5898240a^6b^5c^5ef^2hz - 3809280a^4b^9c^3d^2fi^2z + 2359296a^6b^5c^5d^2fi^2z + 1474560a^5b^7c^4ef^2hz + 681984a^3b^11c^2d^2fi^2z - 276480a^4b^9c^3d^2g^2hz - 184320a^4b^9c^3ef^2hz + 179712a^3b^11c^2d^2g^2hz + 9216a^3b^11c^2ef^2hz + 16220160a^4b^8c^4d^2fgz + 13271040a^5b^6c^5d^2efz - 2396160a^3b^10c^3d^2fgz + 552960a^4b^8c^4d^2efz - 359424a^3b^10c^3d^2efz + 175104a^2b^12c^2d^2fgz + 27648a^2b^12c^2d^2efz - 32440320a^4b^7c^5d^2efz + 4792320a^3b^9c^4d^2efz - 350208a^2b^11c^3d^2efz + 346816512a^7b^8c^8d^2g^2z - 41472a^5b^10c^2h^2iz + 7077888a^9b^6c^6g^2h^2z - 11008a^3b^12c^2f^2iz - 6912a^4b^11c^2g^2h^2z - 19660800a^8b^6c^7f^2g^2z - 768a^2b^13c^2f^2g^2z + 214272a^2b^13c^2d^2g^2z - 428544a^2b^12c^3d^2ez - 198180864a^8c^8d^2efz - 66060288a^9c^7d^2h^2iz + 1536a^3b^13f^2h^2iz + 4608a^2b^14d^2h^2iz - 66816a^2b^14c^2d^2iz + 1022754816a^6b^2c^8d^2ez - 642318336a^5b^4c^7d^2ez - 511377408a^6b^3c^7d^2g^2z + 321159168a^5b^5c^6d^2g^2z + 225312768a^7b^2c^7d^2iz + 223395840a^4b^6c^6d^2ez - 111697920a^4b^7c^5d^2g^2z + 3538944a^9b^2c^5h^2iz - 737280a^7b^6c^3h^2iz + 276480a^6b^8c^2h^2iz - 10354688a^8b^2c^6f^2iz - 43646976a^6b^4c^6d^2iz - 8847360a^8b^3c^5g^2h^2z + 4423680a^7b^5c^4g^2h^2z + 2048000a^6b^6c^4f^2iz - 1105920a^6b^7c^3g^2h^2z - 849920a^5b^8c^3f^2iz + 393216a^7b^4c^5f^2iz + 145920a^4b^10c^2f^2iz + 138240a^5b^9c^2g^2h^2z - 32587776a^5b^6c^5d^2iz + 25362432a^7b^3c^6f^2g^2z + 21657600a^4b^8c^4d^2iz + 17694720a^8b^2c^6ef^2z - 50724864a^7b^2c^7ef^2z - 13271040a^6b^5c^5f^2g^2z - 8847360a^7b^4c^5ef^2z - 5810688a^3b^10c^3d^2iz + 3563520a^5b^7c^4f^2g^2z + 2211840a^6b^6c^4ef^2z + 845568a^2b^12c^2d^2iz - 506880a^4b^9c^3f^2g^2z - 276480a^5b^8c^3ef^2z + 34560a^3b^11c^2f^2g^2z + 13824a^4b^10c^2ef^2z + 26542080a^6b^4c^6ef^2z + 23362560a^3b^9c^4d^2g^2z - 46725120a^3b^8c^5d^2ez - 7127040a^5b^6c^5ef^2z - 2965248a^2b^11c^3d^2g^2z + 1013760a^4b^8c^4ef^2z - 69120a^3b^10c^3ef^2z + 1536a^2b^12c^2ef^2z + 5930496a^2b^10c^4d^2ez + 1536a^2b^15d^2fi^2z - 693633024a^7c^9d^2ez - 231211008a^8c^8d^2iz - 4718592a^10c^6h^2iz + 2304a^4b^12h^2iz + 13107200a^9c^7f^2iz + 256a^2b^14f^2iz - 14155776a^9c^7ef^2z + 39321600a^8c^8ef^2z + 13824b^14c^2d^2ez - 6912b^15c^2d^2g^2z + 2304b^16d^2iz + 737280a^7b^6c^5f^2g^2h^2i - 2304a^3b^9c^2f^2g^2h^2i - 6912a^2b^10c^2d^2g^2h^2i + 11059200a^6b^6c^6d^2ef^2g^2i + 2211840a^6b^6c^6ef^2g^2h^2i + 4608a^2b^10c^2d^2ef^2g^2i + 15482880a^5b^6c^7d^2ef^2g^2i - 13824a^2b^9c^3d^2ef^2g^2i - 2304a^2b^11c^2d^2ef^2g^2i + 1843200a^6b^3c^4f^2g^2h^2i + 783360a^5b^5c^3f^2g^2h^2i + 18432a^4b^7c^2f^2g^2h^2i - 5529600a^6b^2c^5d^2g^2h^2i - 3686400a^6b^2c^5ef^2h^2i - 2211840a^5b^4c^4d^2g^2h^2i - 1566720a^5b^4c^4ef^2h^2i + 317952a^4b^6c^3d^2g^2h^2i - 36864a^4b^6c^3ef^2h^2i + 6912a^3b^8c^2d^2g^2h^2i + 4608a^3b^8c^2ef^2h^2i + 5160960a^5b^3c^5d^2fg^2i + 4423680a^5b^3c^5ef^2g^2h^2i + 4423680a^5b^3c^5d^2ef^2h^2i - 635904a^4b^5c^4d^2ef^2h^2i - 354816a^3b^7c^3d^2fg^2i + 322560a^4b^5c^4d^2fg^2i + 138240a^4b^5c^4ef^2g^2h^2i + 59904a^2b^9c^2d^2fg^2i - 13824a^3b^7c^3ef^2g^2h^2i - 13824a^3b^7c^3d^2ef^2h^2i + 13824a^2b^9c^2d^2ef^2h^2i - 16588800a^5b^2c^6d^2ef^2g^2h^2i - 10321920a^5b^2c^6d^2ef^2g^2h^2i + 1658880a^4b^4c^5d^2ef^2g^2h^2i + 709632a^3b^6c^4d^2ef^2g^2h^2i - 645120a^4b^4c^5d^2ef^2g^2h^2i + 124416a^3b^6c^4d^2ef^2g^2h^2i - 119808a^2b^8c^3d^2ef^2g^2h^2i - 41472a^2b^8c^3d^2ef^2g^2h^2i + 7741440a^4b^3c^6d^2ef^2g^2h^2i - 2903040a^3b^5c^5d^2ef^2g^2h^2i + 387072a^2b^7c^4d^2ef^2g^2h^2i - 3456a^4b^8c^2g^2h^2i - 2304a^4b^8c^2f^2h^2i + 1105920a^7b^6c^5ef^2h^2i - 384a^2b^10c^2f^2h^2i$

$$\begin{aligned}
& g^i - 10616832a^6b^6c^6e^2g^i - 3538944a^7b^6c^5e^2g^i + 1843200a^7b^6c^5d^2h^i + 1152a^3b^9c^2d^2h^i - 37062144a^5b^6c^7d^2f^i + 2580480a^6b^6c^6e^2f^i + 65664a^6b^10c^2d^2g^i + 23224320a^5b^6c^7d^2e^i \\
& i - 9216a^2b^10c^2d^2f^i - 5985792a^6b^6c^6d^2f^i + 206010a^6b^9c^3d^2f^i - 131328a^6b^9c^3d^2e^i - 6300a^6b^10c^2d^2f^2h + 16588800a^5b^6c^7d^2e^2h + 3456a^6b^10c^2d^2f^2g + 435456a^6b^8c^4d^2e^2g + 13824a^6b^8c^4d^2e^2f - 1474560a^7c^6e^2f^2h^i - 10321920a^6c^7d^2e^2f^i + 1350a^6b^11c^2d^2f^2h^2 - 552960a^7b^2c^4g^2h^2i - 552960a^6b^4c^3g^2h^2i - 145152a^5b^6c^2g^2h^2i - 737280a^7b^2c^4f^2h^2i - 568320a^6b^4c^3f^2h^2i - 136704a^5b^6c^2f^2h^2i - 1290240a^6b^2c^5f^2g^i + 1105920a^6b^3c^4e^2h^2i - 860160a^5b^4c^4f^2g^i + 290304a^5b^5c^3e^2h^2i - 80640a^4b^6c^3f^2g^i + 12672a^3b^8c^2f^2g^i + 6912a^4b^7c^2e^2h^2i + 5308416a^6b^2c^5e^2g^2i - 5308416a^5b^3c^5e^2g^i - 3538944a^6b^3c^4e^2g^i + 2654208a^5b^4c^4e^2g^2i + 1658880a^6b^3c^4d^2h^i - 1105920a^5b^4c^4f^2g^2h - 884736a^5b^5c^3e^2g^i - 552960a^6b^2c^5f^2g^2h + 262656a^5b^5c^3d^2h^i - 55296a^4b^7c^2d^2h^i - 34560a^4b^6c^3f^2g^2h + 3456a^3b^8c^2f^2g^2h - 11612160a^5b^2c^6d^2g^i + 1720320a^5b^3c^5e^2f^2i - 1658880a^6b^2c^5e^2g^2h + 1596672a^3b^6c^4d^2g^i - 829440a^5b^4c^4e^2g^2h - 508032a^2b^8c^3d^2g^i + 161280a^4b^5c^4e^2f^2i - 25344a^3b^7c^3e^2f^2i - 20736a^4b^6c^3e^2g^2h + 768a^2b^9c^2e^2f^2i - 4423680a^5b^2c^6e^2f^2h + 4147200a^5b^3c^5d^2g^2h - 2580480a^6b^2c^5d^2f^i - 967680a^5b^4c^4d^2f^i - 414720a^4b^5c^4d^2g^2h - 138240a^4b^4c^5e^2f^2h + 64512a^4b^6c^3d^2f^i + 39168a^3b^8c^2d^2f^i - 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 - 3870720a^5b^2c^6e^2f^2g - 3193344a^3b^5c^5d^2e^i + 2867328a^4b^4c^5d^2f^2h - 2095200a^2b^7c^4d^2f^2h - 1414080a^3b^6c^4d^2f^2h - 34836480a^4b^2c^7d^2e^2g + 1016064a^2b^7c^4d^2e^i - 645120a^4b^4c^5e^2f^2g + 306720a^3b^7c^3d^2f^2h + 197820a^2b^8c^3d^2f^2h + 146880a^4b^5c^4d^2f^2h + 80640a^3b^6c^4e^2f^2g - 55350a^2b^9c^2d^2f^2h - 2304a^2b^8c^3e^2f^2g - 3870720a^5b^2c^6d^2f^2g - 1935360a^4b^4c^5d^2f^2g - 1658880a^4b^3c^6d^2e^2h + 725760a^3b^6c^4d^2f^2g + 17418240a^3b^4c^6d^2e^2g - 124416a^3b^5c^5d^2e^2h - 96768a^2b^8c^3d^2f^2g + 41472a^2b^7c^4d^2e^2h - 3919104a^2b^6c^5d^2e^2g - 7741440a^4b^2c^7d^2e^2f + 2903040a^3b^4c^6d^2e^2f - 387072a^2b^6c^5d^2e^2f + 184320a^8b^6c^4h^2i + 25344a^5b^7c^4h^2i - 884736a^6b^3c^4g^3i - 589824a^7b^3c^3g^3i - 442368a^5b^5c^3g^3i - 294912a^6b^5c^2g^3i + 430080a^7b^6c^5f^2i - 1984a^3b^9c^2f^2i + 3538944a^5b^2c^6e^3i - 1648128a^5b^3c^5f^3h + 1179648a^7b^2c^4e^3i - 898560a^6b^3c^4f^3h + 589824a^6b^4c^3e^3i - 354240a^5b^5c^3f^3h - 354240a^4b^5c^4f^3h + 98304a^5b^6c^2e^3i + 43680a^3b^7c^3f^3h - 21600a^4b^7c^2f^3h - 1050a^2b^9c^2f^3h + 225a^2b^10c^2f^2h^2 + 3870720a^6b^6c^6d^2i + 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^5e^2g^3 + 1949184a^6b^2c^5d^3h + 1296000a^5b^4c^4d^3h - 155520a^4b^6c^3d^3h - 40500a^6b^10c^2d^2h^2 - 8100a^3b^8c^2d^3h + 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 - 245760a^8c^5f^2h^i + 384a^3b^10f^2h^i + 1152a^2b^11d^2h^i - 2211840a^6c^7e^2f^2h - 1720320a^7c^6d^2f^2h - 9450b^11c^2d^2f^2h + 6912b^11c^2d^2e^2i + 1612800a^6c^7d^2f^2h - 393216a^8b^6c^4g^3i - 49152a^5b^7c^2g^3i - 20736b^10c^3d^2e^2g - 75188736a^4b^6c^8d^3f - 883200a^6b^6c^6f^3h - 317952a^7b^6c^5f^3h + 1350a^3b^9c^2f^3h - 15482880a^5c^8d^2e^2f - 9792a^6b^11c^2d^2i - 10616832a^5b^6c^7e^3g - 345060a^6b^8c^4d^3h + 4050a^2b^10c^2d^3h - 4262400a^5b^6c^7d^2f^3 + 852768a^6b^7c^5d^3h
\end{aligned}$$

$$\begin{aligned}
&^3f + 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 + 2211 \\
&84*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 + 1935 \\
&360*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*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 - 141 \\
&2640*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 + 97977 \\
&6*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 + 35389 \\
&44*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 + 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 + 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 + 16000 \\
&0*a^6*c^7*f^4 + 5308416*a^5*c^8*e^4 + 35721*b^8*c^5*d^4, z, 1)*((768*a^2*b^ \\
&14*c^2*d - 3145728*a^10*c^8*h - 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 - 23 \\
&396352*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 + 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 + 41 \\
&94304*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*(1 \\
&572864*a^9*c^9*e + 524288*a^10*c^8*i - 1536*a^4*b^10*c^4*e + 30720*a^5*b^8* \\
&c^5*e - 245760*a^6*b^6*c^6*e + 983040*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 - 256*a^4*b^12*c^2*i + 4608*a^5*b^10* \\
&c^3*i - 30720*a^6*b^8*c^4*i + 81920*a^7*b^6*c^5*i - 393216*a^9*b^2*c^7*i - \\
&786432*a^9*b*c^8*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)) + (roo \\
&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* \\
&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
\end{aligned}$$

$$\begin{aligned}
& 960a^7b^9c^3giz^2 - 47185920a^7b^8c^4eiz^2 - 3538944a^6b^{11}c^2giz^2 + 96583680a^5b^{10}c^4dfiz^2 - 51609600a^6b^9c^4dhez^2 + \\
& 7077888a^6b^{10}c^3eiz^2 + 6144000a^6b^{10}c^3fhez^2 - 393216a^5b^{12}c^2eiz^2 + 61440a^5b^{12}c^2fhez^2 - 23592960a^6b^9c^4eegz^2 \\
& + 1179648a^5b^{11}c^3eegz^2 + 829440a^4b^{13}c^2dhez^2 + 368640a^5b^{11}c^3dhez^2 - 15175680a^4b^{12}c^3dfiz^2 + 1428480a^3b^{14}c^2df \\
& iz^2 - 1207959552a^{10}b^8c^8eegz^2 - 402653184a^{11}b^7c^7giz^2 - 440401920a^{10}b^8c^8f^2z^2 - 188743680a^{11}b^7c^7h^2z^2 + 1761607680a^{10}c^9dfiz^2 + 524288a^6b^{12}c^3i^2z^2 + 46080a^5b^{13}c^3h^2z^2 - 14080a^3b^{15}c^3f^2z^2 + 6936330240a^8b^3c^8d^2z^2 + 2464874496a^6b^7c^6d^2z^2 - 3963617280a^9b^3c^9d^2z^2 + 805306368a^{11}c^8eiz^2 - 1509949440a^9b^2c^8e^2z^2 + 251658240a^{11}c^8fhez^2 + 1536a^3b^{16}fhez^2 + 4608a^2b^{17}dhez^2 - 5400428544a^7b^5c^7d^2z^2 - 94464a^2b^{17}c^3d^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 - 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 + 2621440a^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 - 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^2b^{18}dfiz^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^8c^8d^2e^2fz + 99090432a^8b^7c^7d^2g^2hz - 3145728a^9b^6c^6f^2hez - 27648a^4b^{11}c^3f^2hez + 56623104a^8b^6c^7d^2f^2hez - 50688a^3b^{12}c^3d^2hez - 4608a^3b^{12}c^3f^2g^2hez - 9437184a^8b^7c^7e^2f^2hez - 55296a^2b^{13}c^3d^2f^2hez - 13824a^2b^{13}c^3d^2g^2hez + 9216a^2b^{13}c^3d^2e^2fz - 4608a^2b^{14}c^3d^2f^2g^2z + 219414528a^7b^2c^7d^2e^2hez - 221773824a^6b^3c^7d^2e^2fz - 109707264a^7b^3c^6d^2g^2hez + 110886912a^6b^4c^6d^2f^2g^2z + 40108032a^8b^2c^6d^2hez + 2359296a^8b^3c^5f^2hez - 491520a^6b^7c^3f^2hez + 184320a^5b^9c^2f^2hez - 88473600a^6b^4c^6d^2e^2hez - 84934656a^7b^2c^7d^2f^2g^2z + 117964800a^5b^5c^6d^2e^2fz - 45613056a^7b^3c^6d^2f^2hez + 44236800a^6b^5c^5d^2g^2hez - 10321920a^6b^6c^4d^2hez + 7077888a^7b^4c^5d^2hez - 5898240a^7b^4c^5f^2g^2hez + 4718592a^8b^2c^6f^2g^2hez + 2949120a^6b^6c^4f^2g^2hez + 2396160a^5b^8c^3d^2hez - 737280a^5b^8c^3f^2g^2hez + 92160a^4b^{10}c^2f^2g^2hez - 27648a^4b^{10}c^2d^2hez - 58982400a^5b^6c^5d^2f^2g^2z + 11796480a^7b^3c^6e^2f^2hez + 8847360a^5b^7c^4d^2f^2hez - 6635520a^5b^7c^4d^2g^2hez - 5898240a^6b^5c^5e^2f^2hez - 3809280a^4b^9c^3d^2f^2hez + 2359296a^6b^5c^5d^2f^2hez + 1474560a^5b^7c^4e^2f^2hez + 681984a^3b^{11}c^2d^2f^2hez - 276480a^4b^9c^3d^2g^2hez - 184320a^4b^9c^3e^2f^2hez + 179712a^3b^{11}c^2d^2g^2hez + 9216a^3b^{11}c^2e^2f^2hez + 16220160a^4b^8c^4d^2f^2g^2z + 13271040a^5b^6c^5d^2e^2hez - 2396160a^3b^{10}c^3d^2f^2g^2z + 552960a^4b^8c^4d^2e^2hez - 359424a^3b^{10}c^3d^2e^2hez + 175104a^2b^{12}c^2d^2f^2g^2z + 27648a^2b^{12}c^2d^2e^2hez - 32440320a^4b^7c^5d^2e^2fz + 4792320a^3b^9c^4d^2e^2fz - 350208a^2b^{11}c^3d^2e^2fz + 346816512a^7b^8c^8d^2g^2z - 41472a^5b^{10}c^3h^2i^2z + 7077888a^9b^7c^6g^2h^2z - 11008a^3b^{12}c^3f^2i^2z - 6912a^4b^{11}c^3g^2h^2z - 19660800a^8b^7c^7f^2g^2z - 768a^2b^{13}c^3f^2g^2z + 214272a^2b^{13}c^3d^2g^2z - 428544a^2b^{12}c^3d^2e^2z - 198180864a^8c^8d^2e^2hez - 66060288a^9c^7d^2hez + 1536a^3b^{13}f^2hez + 4608a^2b^{14}d^2hez - 66816a^2b^{14}c^3d^2i^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 + 225312768a^7b^2c^7d^2i^2z + 223395840a^4b^6c^6d^2e^2z - 111697920a^4b^7c^5d^2g^2z + 3538944a^9b^2c^5h^2i^2z - 7372
\end{aligned}$$

$80a^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^2h^2z + 4423680a^7b^5c^4g^2h^2z + 2048000a^6b^6c^4f^2i^z - 1105920a^6b^7c^3g^2h^2z - 849920a^5b^8c^3f^2i^z + 393216a^7b^4c^5f^2i^z + 145920a^4b^10c^2f^2i^z + 138240a^5b^9c^2g^2h^2z - 32587776a^5b^6c^5d^2i^z + 25362432a^7b^3c^6f^2g^2z + 21657600a^4b^8c^4d^2i^z + 17694720a^8b^2c^6e^2h^2z - 50724864a^7b^2c^7e^2f^2z - 13271040a^6b^5c^5f^2g^2z - 8847360a^7b^4c^5e^2h^2z - 5810688a^3b^10c^3d^2i^z + 3563520a^5b^7c^4f^2g^2z + 2211840a^6b^6c^4e^2h^2z + 845568a^2b^12c^2d^2i^z - 506880a^4b^9c^3f^2g^2z - 276480a^5b^8c^3e^2h^2z + 34560a^3b^11c^2f^2g^2z + 13824a^4b^10c^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^11c^3d^2g^2z + 1013760a^4b^8c^4e^2f^2z - 69120a^3b^10c^3e^2f^2z + 1536a^2b^12c^2e^2f^2z + 5930496a^2b^10c^4d^2e^2z + 1536a^3b^15d^2f^2i^z - 693633024a^7c^9d^2e^2z - 231211008a^8c^8d^2i^z - 4718592a^10c^6h^2i^z + 2304a^4b^12h^2i^z + 13107200a^9c^7f^2i^z + 256a^2b^14f^2i^z - 14155776a^9c^7e^2h^2z + 39321600a^8c^8e^2f^2z + 13824b^14c^2d^2e^2z - 6912b^15c^2d^2g^2z + 2304b^16d^2i^z + 737280a^7b^3c^5f^2g^2h^2i - 2304a^3b^9c^5f^2g^2h^2i - 6912a^2b^10c^4d^2g^2h^2i + 11059200a^6b^3c^6d^2e^2h^2i + 5160960a^6b^3c^6d^2f^2g^2i + 2211840a^6b^3c^6e^2f^2g^2h + 4608a^3b^10c^2d^2e^2f^2i + 15482880a^5b^3c^7d^2e^2f^2g - 13824a^3b^9c^3d^2e^2f^2g - 2304a^3b^11c^2d^2f^2g^2i + 1843200a^6b^3c^4f^2g^2h^2i + 783360a^5b^5c^3f^2g^2h^2i + 18432a^4b^7c^2f^2g^2h^2i - 5529600a^6b^2c^5d^2g^2h^2i - 3686400a^6b^2c^5e^2f^2h^2i - 2211840a^5b^4c^4d^2g^2h^2i - 1566720a^5b^4c^4e^2f^2h^2i + 317952a^4b^6c^3d^2g^2h^2i - 36864a^4b^6c^3e^2f^2h^2i + 6912a^3b^8c^2d^2g^2h^2i + 4608a^3b^8c^2e^2f^2h^2i + 5160960a^5b^3c^5d^2f^2g^2i + 4423680a^5b^3c^5e^2f^2g^2h + 4423680a^5b^3c^5d^2e^2h^2i - 635904a^4b^5c^4d^2e^2h^2i - 354816a^3b^7c^3d^2f^2g^2i + 322560a^4b^5c^4d^2f^2g^2i + 138240a^4b^5c^4e^2f^2g^2h + 59904a^2b^9c^2d^2f^2g^2i - 13824a^3b^7c^3e^2f^2g^2h - 13824a^3b^7c^3d^2e^2h^2i + 13824a^2b^9c^2d^2e^2h^2i - 16588800a^5b^2c^6d^2e^2g^2h - 10321920a^5b^2c^6d^2e^2f^2i + 1658880a^4b^4c^5d^2e^2g^2h + 709632a^3b^6c^4d^2e^2f^2i - 645120a^4b^4c^5d^2e^2f^2i + 124416a^3b^6c^4d^2e^2g^2h - 119808a^2b^8c^3d^2e^2f^2i - 41472a^2b^8c^3d^2e^2g^2h + 7741440a^4b^3c^6d^2e^2f^2g - 2903040a^3b^5c^5d^2e^2f^2g + 387072a^2b^7c^4d^2e^2f^2g - 3456a^4b^8c^2g^2h^2i - 2304a^4b^8c^2f^2h^2i^2 + 1105920a^7b^3c^5e^2h^2i - 384a^2b^10c^2f^2g^2i - 10616832a^6b^3c^6e^2g^2i - 3538944a^7b^3c^5e^2g^2i^2 + 1843200a^7b^3c^5d^2h^2i^2 + 1152a^3b^9c^3d^2h^2i^2 - 37062144a^5b^3c^7d^2f^2h + 2580480a^6b^3c^6e^2f^2i + 65664a^3b^10c^2d^2g^2i + 23224320a^5b^3c^7d^2e^2i - 9216a^2b^10c^2d^2f^2i^2 - 5985792a^6b^3c^6d^2f^2h^2 + 206010a^3b^9c^3d^2f^2h - 131328a^3b^9c^3d^2e^2i - 6300a^3b^10c^2d^2f^2h + 16588800a^5b^3c^7d^2e^2h + 3456a^3b^10c^2d^2f^2g^2 + 435456a^3b^8c^4d^2e^2g + 13824a^3b^8c^4d^2e^2f - 1474560a^7c^6e^2f^2h^2i - 10321920a^6c^7d^2e^2f^2i + 1350a^3b^11c^2d^2f^2h^2 - 552960a^7b^2c^4g^2h^2i - 552960a^6b^4c^3g^2h^2i - 145152a^5b^6c^2g^2h^2i - 737280a^7b^2c^4f^2h^2i^2 - 568320a^6b^4c^3f^2h^2i^2 - 136704a^5b^6c^2f^2h^2i^2 - 1290240a^6b^2c^5f^2g^2i + 1105920a^6b^3c^4e^2h^2i - 860160a^5b^4c^4f^2g^2i + 290304a^5b^5c^3e^2h^2i - 80640a^4b^6c^3f^2g^2i + 12672a^3b^8c^2f^2g^2i + 6912a^4b^7c^2e^2h^2i + 5308416a^6b^2c^5e^2g^2i - 5308416a^5b^3c^5e^2g^2i - 3538944a^6b^3c^4e^2g^2i^2 + 2654208a^5b^4c^4e^2g^2i + 1658880a^6b^3c^4d^2h^2i^2 - 1105920a^5b^4c^4f^2g^2h - 884736a^5b^5c^3e^2g^2i^2 - 552960a^6b^2c^5f^2g^2h + 262656a^5b^5c^3d^2h^2i^2 - 55296a^4b^7c^2d^2h^2i^2 - 34560a^4b^6c^3f^2g^2h + 3456a^3b^8c^2f^2g^2h - 11612160a^5b^2c^6d^2g^2i + 1720320a^5b^3c^5e^2f^2i - 1658880a^6b^2c^5e^2g^2h^2 + 1596672a^3b^6c^4d^2g^2i - 829440a^5b^4c^4e^2g^2h^2 - 508032a^2b^8c^3d^2g^2i + 161280a^4b^5c^4e^2f^2i - 25344a^3b^7c^3e^2f^2i - 20736a^4b^6c^3e^2g^2h^2 + 768a^2b^9c^2e^2f^2i - 4423680a^5b^2c^6e^2f^2h + 4147200a^5b^3c^5d^2g^2h - 2580480a^6b^2c^5d^2f^2i^2 - 967680a^5b^4c^4d^2f^2i^2 - 414720a^4b^5c^4d^2g^2h - 138240a^4$

$$\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 \\
& 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
\end{aligned}$$

$$\begin{aligned}
& 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 \\
& *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
\end{aligned}$$

$$\begin{aligned}
& *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)) \\
& /((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 + 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 + 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 + 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 + 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 + 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 + 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 - 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 + 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 - 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 - 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 - 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 + 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 + 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*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 - 4608*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
\end{aligned}$$

$*g*z + 219414528*a^7*b^2*c^7*d*e*h*z - 221773824*a^6*b^3*c^7*d*e*f*z - 1097$
 $07264*a^7*b^3*c^6*d*g*h*z + 110886912*a^6*b^4*c^6*d*f*g*z + 40108032*a^8*b^$
 $2*c^6*d*h*i*z + 2359296*a^8*b^3*c^5*f*h*i*z - 491520*a^6*b^7*c^3*f*h*i*z +$
 $184320*a^5*b^9*c^2*f*h*i*z - 88473600*a^6*b^4*c^6*d*e*h*z - 84934656*a^7*b^$
 $2*c^7*d*f*g*z + 117964800*a^5*b^5*c^6*d*e*f*z - 45613056*a^7*b^3*c^6*d*f*i*$
 $z + 44236800*a^6*b^5*c^5*d*g*h*z - 10321920*a^6*b^6*c^4*d*h*i*z + 7077888*a$
 $^7*b^4*c^5*d*h*i*z - 5898240*a^7*b^4*c^5*f*g*h*z + 4718592*a^8*b^2*c^6*f*g*$
 $h*z + 2949120*a^6*b^6*c^4*f*g*h*z + 2396160*a^5*b^8*c^3*d*h*i*z - 737280*a^$
 $5*b^8*c^3*f*g*h*z + 92160*a^4*b^10*c^2*f*g*h*z - 27648*a^4*b^10*c^2*d*h*i*z$
 $- 58982400*a^5*b^6*c^5*d*f*g*z + 11796480*a^7*b^3*c^6*e*f*h*z + 8847360*a^$
 $5*b^7*c^4*d*f*i*z - 6635520*a^5*b^7*c^4*d*g*h*z - 5898240*a^6*b^5*c^5*e*f*h$
 $*z - 3809280*a^4*b^9*c^3*d*f*i*z + 2359296*a^6*b^5*c^5*d*f*i*z + 1474560*a^$
 $5*b^7*c^4*e*f*h*z + 681984*a^3*b^11*c^2*d*f*i*z - 276480*a^4*b^9*c^3*d*g*h*$
 $z - 184320*a^4*b^9*c^3*e*f*h*z + 179712*a^3*b^11*c^2*d*g*h*z + 9216*a^3*b^1$
 $1*c^2*e*f*h*z + 16220160*a^4*b^8*c^4*d*f*g*z + 13271040*a^5*b^6*c^5*d*e*h*z$
 $- 2396160*a^3*b^10*c^3*d*f*g*z + 552960*a^4*b^8*c^4*d*e*h*z - 359424*a^3*b$
 $^10*c^3*d*e*h*z + 175104*a^2*b^12*c^2*d*f*g*z + 27648*a^2*b^12*c^2*d*e*h*z$
 $- 32440320*a^4*b^7*c^5*d*e*f*z + 4792320*a^3*b^9*c^4*d*e*f*z - 350208*a^2*b$
 $^11*c^3*d*e*f*z + 346816512*a^7*b*c^8*d^2*g*z - 41472*a^5*b^10*c^h^2*i*z +$
 $7077888*a^9*b*c^6*g^h^2*z - 11008*a^3*b^12*c^f^2*i*z - 6912*a^4*b^11*c^g^h^$
 $2*z - 19660800*a^8*b*c^7*f^2*g*z - 768*a^2*b^13*c^f^2*g*z + 214272*a*b^13*c$
 $^2*d^2*g*z - 428544*a*b^12*c^3*d^2*e*z - 198180864*a^8*c^8*d*e*h*z - 660602$
 $88*a^9*c^7*d*h*i*z + 1536*a^3*b^13*f*h*i*z + 4608*a^2*b^14*d*h*i*z - 66816*$
 $a*b^14*c^d^2*i*z + 1022754816*a^6*b^2*c^8*d^2*e*z - 642318336*a^5*b^4*c^7*d$
 $^2*e*z - 511377408*a^6*b^3*c^7*d^2*g*z + 321159168*a^5*b^5*c^6*d^2*g*z + 22$
 $5312768*a^7*b^2*c^7*d^2*i*z + 223395840*a^4*b^6*c^6*d^2*e*z - 111697920*a^4$
 $*b^7*c^5*d^2*g*z + 3538944*a^9*b^2*c^5*h^2*i*z - 737280*a^7*b^6*c^3*h^2*i*z$
 $+ 276480*a^6*b^8*c^2*h^2*i*z - 10354688*a^8*b^2*c^6*f^2*i*z - 43646976*a^6$
 $*b^4*c^6*d^2*i*z - 8847360*a^8*b^3*c^5*g^h^2*z + 4423680*a^7*b^5*c^4*g^h^2*$
 $z + 2048000*a^6*b^6*c^4*f^2*i*z - 1105920*a^6*b^7*c^3*g^h^2*z - 849920*a^5*$
 $b^8*c^3*f^2*i*z + 393216*a^7*b^4*c^5*f^2*i*z + 145920*a^4*b^10*c^2*f^2*i*z$
 $+ 138240*a^5*b^9*c^2*g^h^2*z - 32587776*a^5*b^6*c^5*d^2*i*z + 25362432*a^7*$
 $b^3*c^6*f^2*g*z + 21657600*a^4*b^8*c^4*d^2*i*z + 17694720*a^8*b^2*c^6*e^h^2$
 $*z - 50724864*a^7*b^2*c^7*e^f^2*z - 13271040*a^6*b^5*c^5*f^2*g*z - 8847360*$
 $a^7*b^4*c^5*e^h^2*z - 5810688*a^3*b^10*c^3*d^2*i*z + 3563520*a^5*b^7*c^4*f^$
 $2*g*z + 2211840*a^6*b^6*c^4*e^h^2*z + 845568*a^2*b^12*c^2*d^2*i*z - 506880*$
 $a^4*b^9*c^3*f^2*g*z - 276480*a^5*b^8*c^3*e^h^2*z + 34560*a^3*b^11*c^2*f^2*g$
 $*z + 13824*a^4*b^10*c^2*e^h^2*z + 26542080*a^6*b^4*c^6*e^f^2*z + 23362560*a$
 $^3*b^9*c^4*d^2*g*z - 46725120*a^3*b^8*c^5*d^2*e*z - 7127040*a^5*b^6*c^5*e^f$
 $^2*z - 2965248*a^2*b^11*c^3*d^2*g*z + 1013760*a^4*b^8*c^4*e^f^2*z - 69120*a$
 $^3*b^10*c^3*e^f^2*z + 1536*a^2*b^12*c^2*e^f^2*z + 5930496*a^2*b^10*c^4*d^2*$
 $e*z + 1536*a*b^15*d*f*i*z - 693633024*a^7*c^9*d^2*e*z - 231211008*a^8*c^8*d$
 $^2*i*z - 4718592*a^10*c^6*h^2*i*z + 2304*a^4*b^12*h^2*i*z + 13107200*a^9*c^$
 $7*f^2*i*z + 256*a^2*b^14*f^2*i*z - 14155776*a^9*c^7*e^h^2*z + 39321600*a^8*$
 $c^8*e^f^2*z + 13824*b^14*c^2*d^2*e*z - 6912*b^15*c^d^2*g*z + 2304*b^16*d^2*$
 $i*z + 737280*a^7*b*c^5*f*g*h*i - 2304*a^3*b^9*c^f*g^h*i - 6912*a^2*b^10*c^d$
 $*g^h*i + 11059200*a^6*b*c^6*d*e^h*i + 5160960*a^6*b*c^6*d*f*g*i + 2211840*a$
 $^6*b*c^6*e^f*g^h + 4608*a*b^10*c^2*d*e^f*i + 15482880*a^5*b*c^7*d*e^f*g - 1$
 $3824*a*b^9*c^3*d*e^f*g - 2304*a*b^11*c^d*f*g*i + 1843200*a^6*b^3*c^4*f*g^h*$
 $i + 783360*a^5*b^5*c^3*f*g^h*i + 18432*a^4*b^7*c^2*f*g^h*i - 5529600*a^6*b^$
 $2*c^5*d*g^h*i - 3686400*a^6*b^2*c^5*e^f*h*i - 2211840*a^5*b^4*c^4*d*g^h*i -$
 $1566720*a^5*b^4*c^4*e^f*h*i + 317952*a^4*b^6*c^3*d*g^h*i - 36864*a^4*b^6*c$
 $^3*e^f*h*i + 6912*a^3*b^8*c^2*d*g^h*i + 4608*a^3*b^8*c^2*e^f*h*i + 5160960*$
 $a^5*b^3*c^5*d*f*g*i + 4423680*a^5*b^3*c^5*e^f*g^h + 4423680*a^5*b^3*c^5*d*e$
 $*h*i - 635904*a^4*b^5*c^4*d*e^h*i - 354816*a^3*b^7*c^3*d*f*g*i + 322560*a^4$
 $*b^5*c^4*d*f*g*i + 138240*a^4*b^5*c^4*e^f*g^h + 59904*a^2*b^9*c^2*d*f*g*i -$
 $13824*a^3*b^7*c^3*e^f*g^h - 13824*a^3*b^7*c^3*d*e^h*i + 13824*a^2*b^9*c^2*$
 $d*e^h*i - 16588800*a^5*b^2*c^6*d*e^g^h - 10321920*a^5*b^2*c^6*d*e^f*i + 165$
 $8880*a^4*b^4*c^5*d*e^g^h + 709632*a^3*b^6*c^4*d*e^f*i - 645120*a^4*b^4*c^5*$

$$\begin{aligned}
& 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 + 11 \\
& 52 * 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 + 3 \\
& 456 * 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 - 806 \\
& 40 * 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 + 1596 \\
& 672 * 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 + 645 \\
& 12 * 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 + 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
\end{aligned}$$

```

*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
*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

$$\frac{-\frac{lb^4}{c^2} + \frac{jb^3}{c} - \left(3g - \frac{5al}{c}\right)b^2 + 2(3ce + aj)b + 2(jb^2 - 3cgb - 3alb + 6c^2e + 2acj)x^2 - 16a^2l \left(\left(\frac{ma^2}{c} + 3cd\right)b^3 + a\right)}{4(b^2 - 4ac)^2(cx^4 + bx^2 + a)} +$$

[Out] $\frac{1}{4}(-b*c*(a*j+c*e)+a*b^2*1+2*a*c*(-a*1+c*g)-(2*c^3*e-c^2*(2*a*j+b*g)-b^3*1+b*c*(3*a*1+b*j))*x^2)/c^2/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2-1/4*x*(a*b*c*(a*k+c*f)-b^2*(a^2*m+c^2*d)+2*a*c*(a^2*m-a*c*h+c^2*d)+(a*b^2*c*k+2*a*c^2*(-a*k+c*f)-a*b^3*m-b*c*(-3*a^2*m+a*c*h+c^2*d))*x^2)/a/c^2/(-4*a*c+b^2)/(c*x^4+b*x^2+a)^2+1/4*(b^3*j/c+2*b*(a*j+3*c*e)-16*a^2*1-b^4*1/c^2-b^2*(3*g-5*a*1/c)+2*(-3*a*b*1+2*a*c*j+b^2*j-3*b*c*g+6*c^2*e)*x^2)/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)+1/8*x*(4*a^2*b*c^2*(a*k+2*c*f)+a*b^3*c*(2*a*k+c*f)-a*b^2*c*(-11*a^2*m+7*a*c*h+25*c^2*d)+4*a^2*c^2*(-9*a^2*m+a*c*h+7*c^2*d)+b^4*(-2*a^2*m+3*c^2*d)+c*(a*b^2*c*(3*a*k+c*f)+4*a^2*c^2*(3*a*k+5*c*f)+b^3*(a^2*m+3*c^2*d)-4*a*b*c*(4*a^2*m+3*a*c*h+6*c^2*d))*x^2)/a^2/c^2/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)-(-3*a*b*1+2*a*c*j+b^2*j-3*b*c*g+6*c^2*e)*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/(-4*a*c+b^2)^(5/2)+1/16*arctan(x^2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2)))^(1/2))*(a*b^2*c*(3*a*k+c*f)+4*a^2*c^2*(3*a*k+5*c*f)+b^3*(a^2*m+3*c^2*d)-4*a*b*c*(4*a^2*m+3*a*c*h+6*c^2*d)+(a*b^3*c*(-3*a*k+c*f)-4*a^2*b*c^2*(9*a*k+13*c*f)-6*a*b^2*c*(-3*a^2*m-3*a*c*h+5*c^2*d)+b^4*(-a^2*m+3*c^2*d)+8*a^2*c^2*(5*a^2*m+3*a*c*h+21*c^2*d))/(-4*a*c+b^2)^(1/2))/a^2/c^(3/2)/(-4*a*c+b^2)^2^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/16*arctan(x^2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2)))^(1/2))*(a*b^2*c*(3*a*k+c*f)+4*a^2*c^2*(3*a*k+5*c*f)+b^3*(a^2*m+3*c^2*d)-4*a*b*c*(4*a^2*m+3*a*c*h+6*c^2*d)+(-a*b^3*c*(-3*a*k+c*f)+4*a^2*b*c^2*(9*a*k+13*c*f)+6*a*b^2*c*(-3*a^2*m-3*a*c*h+5*c^2*d)-b^4*(-a^2*m+3*c^2*d)-8*a^2*c^2*(5*a^2*m+3*a*c*h+21*c^2*d))/(-4*a*c+b^2)^(1/2))/a^2/c^(3/2)/(-4*a*c+b^2)^2^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)$

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}

$$\frac{-\frac{lb^4}{c^2} + \frac{jb^3}{c} - \left(3g - \frac{5al}{c}\right)b^2 + 2(3ce + aj)b + 2(jb^2 - 3cgb - 3alb + 6c^2e + 2acj)x^2 - 16a^2l \left(\left(\frac{ma^2}{c} + 3cd\right)b^3 + a\right)}{4(b^2 - 4ac)^2(cx^4 + bx^2 + a)} +$$

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] $-(b*c*(c*e + a*j) - a*b^2*1 - 2*a*c*(c*g - a*1) + (2*c^3*e - c^2*(b*g + 2*a*j) - b^3*1 + b*c*(b*j + 3*a*1))*x^2)/(4*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) - (x*(a*b*c*(c*f + a*k) - b^2*(c^2*d + a^2*m) + 2*a*c*(c^2*d - a*c*h + a^2*m) + (a*b^2*c*k + 2*a*c^2*(c*f - a*k) - a*b^3*m - b*c*(c^2*d + a*c*h - 3*a^2*m))*x^2))/(4*a*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + ((b^3*j)/c + 2*b*(3*c*e + a*j) - 16*a^2*1 - (b^4*1)/c^2 - b^2*(3*g - (5*a*1)/c) + 2*(6*c^2*e - 3*b*c*g + b^2*j + 2*a*c*j - 3*a*b*1)*x^2)/(4*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (x*(4*a^2*b*c*(2*c*f + a*k) + a*b^3*(c*f + 2*a*k) - a*b^2*(25*c^2*d + 7*a*c*h - 11*a^2*m) + 4*a^2*c*(7*c^2*d + a*c*h - 9*a^2*m) + b^4*(3*c*d - (2*a^2*m)/c) + (a*b^2*c*(c*f + 3*a*k) + 4*a^2*c^2*(5*c*f + 3*a*k) + b^3*(3*c^2*d + a^2*m) - 4*a*b*c*(6*c^2*d + 3*a*c*h + 4*a^2*m))*x^2)$

$$\begin{aligned} &/ (8*a^2*c*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + ((a*b^2*(c*f + 3*a*k) + 4*a^2*c*(5*c*f + 3*a*k) - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*m) + b^3*(3*c*d + (a^2*m)/c) + (a*b^3*c*(c*f - 3*a*k) - 4*a^2*b*c^2*(13*c*f + 9*a*k) - 6*a*b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*m) + b^4*(3*c^2*d - a^2*m) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2*m)))/(c*Sqrt[b^2 - 4*a*c]))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*Sqrt[c]*(b^2 - 4*a*c)^2*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + ((a*b^2*(c*f + 3*a*k) + 4*a^2*c*(5*c*f + 3*a*k) - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*m) + b^3*(3*c*d + (a^2*m)/c) - (a*b^3*c*(c*f - 3*a*k) - 4*a^2*b*c^2*(13*c*f + 9*a*k) - 6*a*b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*m) + b^4*(3*c^2*d - a^2*m) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2*m)))/(c*Sqrt[b^2 - 4*a*c]))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]]])/(8*Sqrt[2]*a^2*Sqrt[c]*(b^2 - 4*a*c)^2*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - ((6*c^2*e - 3*b*c*g + b^2*j + 2*a*c*j - 3*a*b*l)*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(5/2) \end{aligned}$$
Rule 205

$$\text{Int}[(a_.) + (b_.)*(x_)^2)^{-1}, x_Symbol] \text{ :> } \text{Simp}[(\text{Rt}[a/b, 2]*\text{ArcTan}[x/\text{Rt}[a/b, 2]])/a, x] \text{ /; } \text{FreeQ}\{a, b, x\} \ \&\& \ \text{PosQ}[a/b]$$
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 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

$$\text{Int}[(d_.) + (e_.)*(x_))*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^{(p_)}, x_Symbol] \text{ :> } \text{Simp}[(b*d - 2*a*e + (2*c*d - b*e)*x)*(a + b*x + c*x^2)^{(p+1)}/((p+1)*(b^2 - 4*a*c)), x] - \text{Dist}[(2*p + 3)*(2*c*d - b*e)/((p+1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x + c*x^2)^{(p+1)}, x], x] \text{ /; } \text{FreeQ}\{a, b, c, d, e, x\} \ \&\& \ \text{NeQ}[2*c*d - b*e, 0] \ \&\& \ \text{NeQ}[b^2 - 4*a*c, 0] \ \&\& \ \text{LtQ}[p, -1] \ \&\& \ \text{NeQ}[p, -3/2]$$
Rule 1166

$$\text{Int}[(d_.) + (e_.)*(x_)^2)/((a_.) + (b_.)*(x_)^2 + (c_.)*(x_)^4), x_Symbol] \text{ :> } \text{With}\{q = \text{Rt}[b^2 - 4*a*c, 2]\}, \text{Dist}[e/2 + (2*c*d - b*e)/(2*q), \text{Int}[1/(b/2 - q/2 + c*x^2), x], x] + \text{Dist}[e/2 - (2*c*d - b*e)/(2*q), \text{Int}[1/(b/2 + q/2 + c*x^2), x], x]] \text{ /; } \text{FreeQ}\{a, b, c, d, e, x\} \ \&\& \ \text{NeQ}[b^2 - 4*a*c, 0] \ \&\& \ \text{NeQ}[c*d^2 - a*e^2, 0] \ \&\& \ \text{PosQ}[b^2 - 4*a*c]$$
Rule 1660

$$\text{Int}[(Pq_)*((a_.) + (b_.)*(x_) + (c_.)*(x_)^2)^{(p_)}, x_Symbol] \text{ :> } \text{With}\{Q = \text{PolynomialQuotient}[Pq, a + b*x + c*x^2, x], f = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b*x + c*x^2, x], x, 0], g = \text{Coeff}[\text{PolynomialRemainder}[Pq, a + b*x + c*x^2, x], x, 1]\}, \text{Simp}[(b*f - 2*a*g + (2*c*f - b*g)*x)*(a + b*x + c*x^2)^{(p+1)}/((p+1)*(b^2 - 4*a*c)), x] + \text{Dist}[1/((p+1)*(b^2 - 4*a*c)), \text{Int}[(a + b*x + c*x^2)^{(p+1)}*\text{ExpandToSum}[(p+1)*(b^2 - 4*a*c)*Q - (2*p + 3)*(2*c*f - b*g), x], x], x]] \text{ /; } \text{FreeQ}\{a, b, c, x\} \ \&\& \ \text{PolyQ}[Pq, x] \ \&\& \ \text{NeQ}[b^2 - 4*a*c, 0] \ \&\& \ \text{LtQ}[p, -1]$$
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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + jx^5 + kx^6 + lx^7 + mx^8}{(a + bx^2 + cx^4)^3} dx = \int \frac{x(e + gx^2 + jx^4 + lx^6)}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2 + hx^4 + jx^6 + kx^8}{(a + bx^2 + cx^4)^3} dx$$

$$= -\frac{x(abc(cf + ak) - b^2(c^2d + a^2m) + 2ac(c^2d - acf))}{4ac^2}$$

$$= -\frac{bc(ce + aj) - ab^2l - 2ac(cg - al) + (2c^3e - c^2(bg - aj))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= -\frac{bc(ce + aj) - ab^2l - 2ac(cg - al) + (2c^3e - c^2(bg - aj))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= -\frac{bc(ce + aj) - ab^2l - 2ac(cg - al) + (2c^3e - c^2(bg - aj))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= -\frac{bc(ce + aj) - ab^2l - 2ac(cg - al) + (2c^3e - c^2(bg - aj))}{4c^2(b^2 - 4ac)(a + bx^2 + cx^4)}$$

Mathematica [A] time = 7.48, size = 1590, normalized size = 1.38

$$\frac{2cla^3 + 2cmxa^3 - 2c^2kx^3a^2 + 3bcmx^3a^2 - 2c^2jx^2a^2 + 3bclx^2a^2 - 2c^2ga^2 + bcja^2 - b^2la^2 - 2c^2hxa^2 + bckxa^2 - b^2r}{4ac^2}$$

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*l)*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((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*l + (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^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 + 16*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*integrate((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)
```

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] 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] symsum(log(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 - 128
```

$849018880a^{12}b^6c^{10}z^4 - 16911433728a^{10}b^{10}c^8z^4 + 3523215360a^9b^{12}c^7z^4 + 68719476736a^{15}c^{13}z^4 + 1536a^5b^{16}c^k m^z^2 + 1536$
 $a^*b^{18}c^3d^fz^2 - 2571632640a^9b^5c^8d^mz^2 + 2548039680a^9b^3c^{10}d^h z^2 + 1509949440a^{10}b^3c^9e^l z^2 + 1509949440a^9b^3c^{10}e^g$
 $z^2 - 1401421824a^8b^5c^9d^h z^2 - 1321205760a^9b^2c^{11}d^f z^2 - 2$
 $793406464a^{11}b^c^{10}d^m z^2 + 890634240a^8b^7c^7d^m z^2 - 754974720a^{10}b^4c^8g^l z^2 - 754974720a^9b^5c^8e^l z^2 + 719585280a^8b^6c^8$
 $d^k z^2 - 707788800a^9b^4c^9d^k z^2 - 754974720a^8b^5c^9e^g z^2 +$
 $603979776a^{11}b^2c^9g^l z^2 - 581959680a^{10}b^4c^8f^m z^2 + 732168192$
 $a^7b^6c^9d^f z^2 + 534773760a^{11}b^3c^8h^m z^2 - 456130560a^{11}b^4c^7k^m z^2 - 603979776a^{10}b^2c^{10}e^j z^2 + 534773760a^{10}b^3c^9f^k$
 $z^2 + 384040960a^9b^6c^7f^m z^2 + 377487360a^9b^6c^7g^l z^2 - 45613$
 $0560a^9b^4c^9f^h z^2 + 301989888a^{11}b^3c^8j^l z^2 - 415236096a^{10}b^2c^{10}d^k z^2 + 254017536a^{10}b^6c^6k^m z^2 - 330301440a^{10}b^4c^8$
 $h^k z^2 + 390463488a^7b^7c^8d^h z^2 + 188743680a^{12}b^2c^8k^m z^2 +$
 $301989888a^{10}b^3c^9g^j z^2 - 297861120a^7b^8c^7d^k z^2 - 366280704a^6b^8c^8d^f z^2 + 188743680a^{11}b^2c^9h^k z^2 - 330301440a^8b^4c^$
 $10d^f z^2 + 254017536a^8b^6c^8f^h z^2 - 1887436800a^{10}b^c^{11}d^h z^2$
 $+ 188743680a^8b^7c^7e^l z^2 + 153354240a^9b^6c^7h^k z^2 - 18530304$
 $0a^7b^9c^6d^m z^2 - 117964800a^{10}b^5c^7h^m z^2 - 61931520a^9b^8c^5k^m z^2 + 121634816a^{11}b^2c^9f^m z^2 - 115671040a^8b^8c^6f^m z^2$
 $- 62914560a^9b^7c^6j^l z^2 + 188743680a^{10}b^2c^{10}f^h z^2 - 9437184$
 $0a^8b^8c^6g^l z^2 + 6144000a^8b^{10}c^4k^m z^2 - 117964800a^9b^5c^8f^k z^2 + 61440a^7b^{12}c^3k^m z^2 - 46080a^6b^{14}c^2k^m z^2 + 23592$
 $960a^8b^9c^5j^l z^2 + 188743680a^7b^7c^8e^g z^2 - 37355520a^9b^7c^6h^m z^2 + 125829120a^8b^6c^8e^j z^2 + 23101440a^8b^9c^5h^m z^2$
 $- 3538944a^7b^{11}c^4j^l z^2 + 196608a^6b^{13}c^3j^l z^2 - 4349952a^7b^{11}c^4h^m z^2 + 337920a^6b^{13}c^3h^m z^2 - 7680a^5b^{15}c^2h^m z^2$
 $- 62914560a^8b^7c^7g^j z^2 - 26542080a^8b^8c^6h^k z^2 + 17940480a^7b^{10}c^5f^m z^2 + 11796480a^7b^{10}c^5g^l z^2 - 37355520a^8b^7c^7f$
 $k z^2 - 1347584a^6b^{12}c^4f^m z^2 + 68272128a^6b^{10}c^6d^k z^2 - 589$
 $824a^6b^{12}c^4g^l z^2 + 552960a^6b^{12}c^4h^k z^2 - 147456a^7b^{10}c^5h^k z^2 - 46080a^5b^{14}c^3h^k z^2 + 35840a^5b^{14}c^3f^m z^2 + 23592$
 $960a^7b^9c^6g^j z^2 - 23592960a^7b^9c^6e^l z^2 + 23371776a^6b^{11}c^5d^m z^2 + 23101440a^7b^9c^6f^k z^2 - 47185920a^7b^8c^7e^j z^2 -$
 $61931520a^7b^8c^7f^h z^2 - 4349952a^6b^{11}c^5f^k z^2 - 3538944a^6b^{11}c^5g^j z^2 - 1677312a^5b^{13}c^4d^m z^2 + 1179648a^6b^{11}c^5e^l z^2 + 337920a^5b^{13}c^4f^k z^2 + 196608a^5b^{13}c^4g^j z^2 + 53760a^4$
 $b^{15}c^3d^m z^2 - 7680a^4b^{15}c^3f^k z^2 + 96583680a^5b^{10}c^7d^f z^2 - 9179136a^5b^{12}c^5d^k z^2 + 7077888a^6b^{10}c^6e^j z^2 - 51609600$
 $a^6b^9c^7d^h z^2 + 691200a^4b^{14}c^4d^k z^2 - 393216a^5b^{12}c^5e^j z^2 - 23040a^3b^{16}c^3d^k z^2 + 6144000a^6b^{10}c^6f^h z^2 + 61440a^5b^{12}c^5f^h z^2 - 46080a^4b^{14}c^4f^h z^2 + 1536a^3b^{16}c^3f^h z^2 - 23592960a^6b^9c^7e^g z^2 + 1179648a^5b^{11}c^6e^g z^2 + 829440a^4b^{13}c^5d^h z^2 + 368640a^5b^{11}c^6d^h z^2 - 105984a^3b^{15}c^4d^h z^2 + 4608a^2b^{17}c^3d^h z^2 - 15175680a^4b^{12}c^6d^f z^2 + 1428480a^3b^{14}c^5d^f z^2 - 73728a^2b^{16}c^4d^f z^2 + 4108320768a^{10}b^3c^9d^m z^2 - 1207959552a^{11}b^c^{10}e^l z^2 - 1207959552a^{10}b^c^{11}e^g z^2 - 578813952a^{12}b^c^9h^m z^2 - 578813952a^{11}b^c^{10}f^k z^2 - 402653184a^{12}b^c^9j^l z^2 - 402653184a^{11}b^c^{10}g^j z^2 - 440401920a^{10}b^c^{11}f^2 z^2 - 188743680a^{12}b^c^9k^2 z^2 - 188743680a^{11}b^c^{10}h^2 z^2 + 1761607680a^{10}c^{12}d^f z^2 - 14080a^6b^{15}c^m^2 z^2 - 94464a^*b^{17}c^4d^2 z^2 + 6936330240a^8b^3c^{11}d^2 z^2 + 2464874496a^6b^7c^9d^2 z^2 - 3963617280a^9b^c^{12}d^2 z^2 + 1056964608a^{11}c^{11}d^k z^2 + 805306368a^{11}c^{11}e^j z^2 + 419430400a^{12}c^{10}f^m z^2 + 251658240a^{13}c^9k^m z^2 - 1509949440a^9b^2c^{11}e^2 z^2 + 251658240a^{11}c^{11}f^h z^2 + 150994944a^{12}c^{10}h^k z^2 - 5400428544a^7b^5c^{10}d^2 z^2 + 754974720a^8b^4c^{10}e^2 z^2 - 730054656a^5b^9c^8d^2 z^2 + 477102080a^{12}b^3c^7m^2 z^2 - 377487360a^{11}b^4c^7l^2 z^2 + 477102080a^9b^3c^{10}f^2 z^2 + 3019898$

$$\begin{aligned}
& 88a^{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^3c^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 - 14745600a^8b^5c^6f^2k^2l^2z^2 - 29491200a^9b^3c^7g^2h^2m^2z^2 - 11796480a^9b^3c^7e^2k^2m^2z^2 - 44236800a^7b^6c^6d^2k^2l^2z^2 + 58982400a^9b^2c^8e^2h^2m^2z^2 + 5898240a^8b^5c^6e^2k^2m^2z^2 + 3686400a^7b^7c^5f^2k^2l^2z^2 + 3225600a^6b^9c^4d^2l^2m^2z^2 - 1474560a^7b^7c^5e^2k^2m^2z^2 - 460800a^6b^9c^4f^2k^2l^2z^2 + 184320a^6b^9c^4e^2k^2m^2z^2 - 161280a^5b^{11}c^3d^2l^2m^2z^2 + 23040a^5b^{11}c^3f^2k^2l^2z^2 - 9216a^5b^{11}c^3e^2k^2m^2z^2 + 14745600a^8b^5c^6g^2h^2m^2z^2 + 110886912a^7b^4c^8d^2f^2l^2z^2 - 3686400a^7b^7c^5g^2h^2m^2z^2 - 221773824a^6b^3c^{10}d^2e^2f^2z^2 + 460800a^6b^9c^4g^2h^2m^2z^2 - 17203200a^7b^6c^6d^2j^2m^2z^2 - 23040a^5b^{11}c^3g^2h^2m^2z^2 - 29491200a^8b^4c^7e^2h^2m^2z^2 - 11796480a^9b^2c^8f^2j^2k^2z^2 + 11059200a^6b^8c^5d^2k^2l^2z^2 + 6451200a^6b^8c^5d^2j^2m^2z^2 + 88473600a^7b^4c^8d^2g^2k^2z^2 + 2457600a^7b^6c^6f^2j^2k^2z^2 - 35389440a^8b^3c^8d^2j^2k^2z^2 - 1382400a^5b^{10}c^4d^2k^2l^2z^2 - 84934656a^8b^2c^9d^2f^2l^2z^2 - 967680a^5b^{10}c^4d^2j^2m^2z^2 - 921600a^6b^8c^5f^2j^2k^2z^2 + 138240a^5b^{10}c^4f^2j^2k^2z^2 + 69120a^4b^{12}c^3d^2k^2l^2z^2 + 53760a^4b^{12}c^3d^2j^2m^2z^2 - 7680a^4b^{12}c^3f^2j^2k^2z^2 + 44236800a^7b^5c^7d^2h^2l^2z^2 + 7372800a
\end{aligned}$$

$$\begin{aligned}
& ^7b^6c^6e^h m^*z - 5898240a^8b^4c^7f^h l^*z + 4718592a^9b^2c^8f^h l^*z - 70778880a^8b^2c^9d^g k^*z + 2949120a^7b^6c^6f^h l^*z - 921600a^6b^8c^5e^h m^*z - 737280a^6b^8c^5f^h l^*z + 92160a^5b^10c^4f^h l^*z + 46080a^5b^10c^4e^h m^*z - 4608a^4b^12c^3f^h l^*z + 29491200a^8b^3c^8f^g k^*z - 109707264a^7b^3c^9d^g h^*z - 25804800a^6b^7c^6d^g m^*z - 58982400a^8b^2c^9e^f k^*z - 58982400a^6b^6c^7d^f l^*z + 7372800a^6b^7c^6d^j k^*z + 88473600a^6b^5c^8d^e k^*z - 2764800a^5b^9c^5d^j k^*z + 51609600a^6b^6c^7d^e m^*z + 414720a^4b^11c^4d^j k^*z - 23040a^3b^13c^3d^j k^*z - 14745600a^7b^5c^7f^g k^*z - 44236800a^6b^6c^7d^g k^*z - 6635520a^6b^7c^6d^h l^*z + 40108032a^8b^2c^9d^h j^*z + 3686400a^6b^7c^6f^g k^*z + 3225600a^5b^9c^5d^g m^*z + 2359296a^8b^3c^8f^h j^*z - 491520a^6b^7c^6f^h j^*z - 460800a^5b^9c^5f^g k^*z - 276480a^5b^9c^5d^h l^*z + 184320a^5b^9c^5f^h j^*z + 179712a^4b^11c^4d^h l^*z - 161280a^4b^11c^4d^g m^*z - 27648a^4b^11c^4f^h j^*z + 23040a^4b^11c^4f^g k^*z - 13824a^3b^13c^3d^h l^*z + 1536a^3b^13c^3f^h j^*z + 29491200a^7b^4c^8e^f k^*z + 110886912a^6b^4c^9d^f g^*z + 16220160a^5b^8c^6d^f l^*z - 45613056a^7b^3c^9d^f j^*z + 11059200a^5b^8c^6d^g k^*z - 10321920a^6b^6c^7d^h j^*z - 7372800a^6b^6c^7e^f k^*z + 7077888a^7b^4c^8d^h j^*z - 6451200a^5b^8c^6d^e m^*z - 88473600a^6b^4c^9d^e h^*z + 2396160a^5b^8c^6d^h j^*z - 2396160a^4b^10c^5d^f l^*z - 1382400a^4b^10c^5d^g k^*z - 84934656a^7b^2c^10d^f g^*z + 921600a^5b^8c^6e^f k^*z + 117964800a^5b^5c^9d^e f^*z + 322560a^4b^10c^5d^e m^*z + 175104a^3b^12c^4d^f l^*z + 69120a^3b^12c^4d^g k^*z - 50688a^3b^12c^4d^h j^*z - 46080a^4b^10c^5e^f k^*z - 27648a^4b^10c^5d^h j^*z + 4608a^2b^14c^3d^h j^*z - 4608a^2b^14c^3d^f l^*z + 44236800a^6b^5c^8d^g h^*z - 5898240a^7b^4c^8f^g h^*z - 22118400a^5b^7c^7d^e k^*z + 4718592a^8b^2c^9f^g h^*z + 2949120a^6b^6c^7f^g h^*z - 737280a^5b^8c^6f^g h^*z + 92160a^4b^10c^5f^g h^*z - 4608a^3b^12c^4f^g h^*z + 8847360a^5b^7c^7d^f j^*z - 58982400a^5b^6c^8d^f g^*z - 3809280a^4b^9c^6d^f j^*z + 2764800a^4b^9c^6d^e k^*z + 2359296a^6b^5c^8d^f j^*z + 681984a^3b^11c^5d^f j^*z - 138240a^3b^11c^5d^e k^*z - 55296a^2b^13c^4d^f j^*z + 11796480a^7b^3c^9e^f h^*z - 6635520a^5b^7c^7d^g h^*z - 5898240a^6b^5c^8e^f h^*z + 1474560a^5b^7c^7e^f h^*z - 276480a^4b^9c^6d^g h^*z - 184320a^4b^9c^6e^f h^*z + 179712a^3b^11c^5d^g h^*z - 13824a^2b^13c^4d^g h^*z + 9216a^3b^11c^5e^f h^*z + 16220160a^4b^8c^7d^f g^*z + 13271040a^5b^6c^8d^e h^*z - 2396160a^3b^10c^6d^f g^*z + 552960a^4b^8c^7d^e h^*z - 359424a^3b^10c^6d^e h^*z + 175104a^2b^12c^5d^f g^*z + 27648a^2b^12c^5d^e h^*z - 32440320a^4b^7c^8d^e f^*z + 4792320a^3b^9c^7d^e f^*z - 350208a^2b^11c^6d^e f^*z + 165150720a^10b^c^8d^l m^*z + 4608a^6b^12c^k^l m^*z + 23592960a^11b^c^7h^l m^*z + 3145728a^11b^c^7j^k m^*z - 1536a^5b^13c^j^k m^*z + 165150720a^9b^c^9d^g m^*z + 346816512a^7b^c^11d^2g^*z + 19660800a^12b^c^6l^m^2z - 34560a^7b^11c^l^m^2z - 7077888a^11b^c^7k^2l^*z + 11008a^6b^12c^j^m^2z + 19660800a^11b^c^7g^m^2z + 7077888a^10b^c^8h^2l^*z + 768a^5b^13c^g^m^2z - 19660800a^9b^c^9f^2l^*z - 7077888a^10b^c^8g^k^2z - 6912a^b^15c^3d^2l^*z + 7077888a^9b^c^9g^h^2z - 19660800a^8b^c^10f^2g^*z - 66816a^b^14c^4d^2j^*z + 214272a^b^13c^5d^2g^*z - 428544a^b^12c^6d^2e^*z - 330301440a^9c^10d^e m^*z - 110100480a^10c^9d^j m^*z - 15728640a^11c^8h^j m^*z - 47185920a^10c^9e^h m^*z - 198180864a^8c^11d^e h^*z + 15728640a^10c^9f^j k^*z - 66060288a^9c^10d^h j^*z + 47185920a^9c^10e^f k^*z + 1022754816a^6b^2c^11d^2e^*z - 642318336a^5b^4c^10d^2e^*z - 511377408a^7b^3c^9d^2l^*z - 511377408a^6b^3c^10d^2g^*z + 321159168a^6b^5c^8d^2l^*z + 321159168a^5b^5c^9d^2g^*z + 225312768a^7b^2c^10d^2j^*z - 25362432a^11b^3c^5l^m^2z + 13271040a^10b^5c^4l^m^2z - 3563520a^9b^7c^3l^m^2z + 506880a^8b^9c^2l^m^2z + 10354688a^11b^2c^6j^m^2z + 8847360a^10b^3c^6k^2l^*z - 4423680a^9b^5c^5k^2l^*z - 204800a^9b^6c^4j^m^2z + 1105920a^8b^7c^4k^2l^*z + 849920a^8b^8c^3j^m^2z - 393216a^10b^4c^5j^m^2z - 145920a^7b^10c^2j^m^2z - 138240a^7b^9c^3k^2l^*z + 6912a^6b^11c^2k^2l^*z - 111697920a^5b^7c^7d^
\end{aligned}$$

$2*1*z + 223395840*a^4*b^6*c^9*d^2*e*z - 25362432*a^10*b^3*c^6*g*m^2*z - 353$
 $8944*a^10*b^2*c^7*j*k^2*z + 737280*a^8*b^6*c^5*j*k^2*z + 50724864*a^10*b^2*$
 $c^7*e*m^2*z - 276480*a^7*b^8*c^4*j*k^2*z + 41472*a^6*b^10*c^3*j*k^2*z - 230$
 $4*a^5*b^12*c^2*j*k^2*z + 13271040*a^9*b^5*c^5*g*m^2*z - 8847360*a^9*b^3*c^7$
 $*h^2*1*z + 4423680*a^8*b^5*c^6*h^2*1*z - 3563520*a^8*b^7*c^4*g*m^2*z - 1105$
 $920*a^7*b^7*c^5*h^2*1*z + 506880*a^7*b^9*c^3*g*m^2*z + 138240*a^6*b^9*c^4*h$
 $^2*1*z - 34560*a^6*b^11*c^2*g*m^2*z - 6912*a^5*b^11*c^3*h^2*1*z - 26542080*$
 $a^9*b^4*c^6*e*m^2*z + 25362432*a^8*b^3*c^8*f^2*1*z - 13271040*a^7*b^5*c^7*f$
 $^2*1*z + 8847360*a^9*b^3*c^7*g*k^2*z + 7127040*a^8*b^6*c^5*e*m^2*z - 442368$
 $0*a^8*b^5*c^6*g*k^2*z + 3563520*a^6*b^7*c^6*f^2*1*z + 3538944*a^9*b^2*c^8*h$
 $^2*j*z + 1105920*a^7*b^7*c^5*g*k^2*z - 1013760*a^7*b^8*c^4*e*m^2*z - 737280$
 $*a^7*b^6*c^6*h^2*j*z - 506880*a^5*b^9*c^5*f^2*1*z + 276480*a^6*b^8*c^5*h^2*$
 $j*z - 138240*a^6*b^9*c^4*g*k^2*z + 69120*a^6*b^10*c^3*e*m^2*z - 41472*a^5*b$
 $^10*c^4*h^2*j*z + 34560*a^4*b^11*c^4*f^2*1*z + 6912*a^5*b^11*c^3*g*k^2*z +$
 $2304*a^4*b^12*c^3*h^2*j*z - 1536*a^5*b^12*c^2*e*m^2*z - 768*a^3*b^13*c^3*f^$
 $2*1*z - 111697920*a^4*b^7*c^8*d^2*g*z + 23362560*a^4*b^9*c^6*d^2*1*z - 1769$
 $4720*a^9*b^2*c^8*e*k^2*z - 10354688*a^8*b^2*c^9*f^2*j*z - 43646976*a^6*b^4*$
 $c^9*d^2*j*z + 8847360*a^8*b^4*c^7*e*k^2*z - 2965248*a^3*b^11*c^5*d^2*1*z -$
 $2211840*a^7*b^6*c^6*e*k^2*z + 2048000*a^6*b^6*c^7*f^2*j*z - 849920*a^5*b^8*$
 $c^6*f^2*j*z + 393216*a^7*b^4*c^8*f^2*j*z + 276480*a^6*b^8*c^5*e*k^2*z + 214$
 $272*a^2*b^13*c^4*d^2*1*z + 145920*a^4*b^10*c^5*f^2*j*z - 13824*a^5*b^10*c^4$
 $*e*k^2*z - 11008*a^3*b^12*c^4*f^2*j*z + 256*a^2*b^14*c^3*f^2*j*z - 32587776$
 $*a^5*b^6*c^8*d^2*j*z - 8847360*a^8*b^3*c^8*g*h^2*z + 21657600*a^4*b^8*c^7*d$
 $^2*j*z + 4423680*a^7*b^5*c^7*g*h^2*z - 1105920*a^6*b^7*c^6*g*h^2*z + 138240$
 $*a^5*b^9*c^5*g*h^2*z - 6912*a^4*b^11*c^4*g*h^2*z + 25362432*a^7*b^3*c^9*f^2$
 $*g*z - 5810688*a^3*b^10*c^6*d^2*j*z + 17694720*a^8*b^2*c^9*e*h^2*z + 845568$
 $*a^2*b^12*c^5*d^2*j*z - 50724864*a^7*b^2*c^10*e*f^2*z - 13271040*a^6*b^5*c^$
 $8*f^2*g*z - 8847360*a^7*b^4*c^8*e*h^2*z + 3563520*a^5*b^7*c^7*f^2*g*z + 221$
 $1840*a^6*b^6*c^7*e*h^2*z - 506880*a^4*b^9*c^6*f^2*g*z - 276480*a^5*b^8*c^6*$
 $e*h^2*z + 34560*a^3*b^11*c^5*f^2*g*z + 13824*a^4*b^10*c^5*e*h^2*z - 768*a^2$
 $*b^13*c^4*f^2*g*z + 26542080*a^6*b^4*c^9*e*f^2*z + 23362560*a^3*b^9*c^7*d^2$
 $*g*z - 46725120*a^3*b^8*c^8*d^2*e*z - 7127040*a^5*b^6*c^8*e*f^2*z - 2965248$
 $*a^2*b^11*c^6*d^2*g*z + 1013760*a^4*b^8*c^7*e*f^2*z - 69120*a^3*b^10*c^6*e*$
 $f^2*z + 1536*a^2*b^12*c^5*e*f^2*z + 5930496*a^2*b^10*c^7*d^2*e*z + 34681651$
 $2*a^8*b*c^10*d^2*1*z - 693633024*a^7*c^12*d^2*e*z - 231211008*a^8*c^11*d^2*$
 $j*z + 768*a^6*b^13*l*m^2*z - 13107200*a^12*c^7*j*m^2*z - 256*a^5*b^14*j*m^2$
 $*z + 4718592*a^11*c^8*j*k^2*z - 39321600*a^11*c^8*e*m^2*z - 4718592*a^10*c^$
 $9*h^2*j*z + 14155776*a^10*c^9*e*k^2*z + 13107200*a^9*c^10*f^2*j*z + 2304*b^$
 $16*c^3*d^2*j*z - 14155776*a^9*c^10*e*h^2*z + 39321600*a^8*c^11*e*f^2*z - 69$
 $12*b^15*c^4*d^2*g*z + 13824*b^14*c^5*d^2*e*z + 737280*a^10*b*c^5*j*k*1*m -$
 $2304*a^6*b^9*c*j*k*1*m + 2211840*a^9*b*c^6*e*k*1*m + 1228800*a^9*b*c^6*f*j*$
 $1*m + 737280*a^9*b*c^6*g*j*k*m + 442368*a^9*b*c^6*h*j*k*1 + 36*a^3*b^12*c*f$
 $*h*k*m + 3096576*a^8*b*c^7*d*j*k*1 - 12745728*a^8*b*c^7*d*h*k*m + 3686400*a$
 $^8*b*c^7*e*f*1*m + 3391488*a^8*b*c^7*e*h*j*m + 2211840*a^8*b*c^7*e*g*k*m +$
 $1327104*a^8*b*c^7*e*h*k*1 + 1228800*a^8*b*c^7*f*g*j*m + 737280*a^8*b*c^7*f*$
 $h*j*1 + 442368*a^8*b*c^7*g*h*j*k + 108*a^2*b^13*c*d*h*k*m + 16367616*a^7*b*$
 $c^8*d*e*j*m + 9289728*a^7*b*c^8*d*e*k*1 + 5160960*a^7*b*c^8*d*f*j*1 + 33914$
 $88*a^7*b*c^8*e*f*j*k + 3096576*a^7*b*c^8*d*g*j*k - 19307520*a^7*b*c^8*d*f*h$
 $*m + 3686400*a^7*b*c^8*e*f*g*m + 2211840*a^7*b*c^8*e*f*h*1 + 1327104*a^7*b*$
 $c^8*e*g*h*k + 737280*a^7*b*c^8*f*g*h*j - 180*a*b^13*c^2*d*f*h*m - 540*a*b^1$
 $2*c^3*d*f*h*k + 15482880*a^6*b*c^9*d*e*f*1 + 11059200*a^6*b*c^9*d*e*h*j + 9$
 $289728*a^6*b*c^9*d*e*g*k + 5160960*a^6*b*c^9*d*f*g*j - 2304*a*b^11*c^4*d*f*$
 $g*j + 2211840*a^6*b*c^9*e*f*g*h + 4608*a*b^10*c^5*d*e*f*j + 15482880*a^5*b*$
 $c^10*d*e*f*g - 13824*a*b^9*c^6*d*e*f*g + 36*a*b^14*c*d*f*k*m + 1843200*a^9*$
 $b^3*c^4*j*k*1*m + 783360*a^8*b^5*c^3*j*k*1*m + 18432*a^7*b^7*c^2*j*k*1*m -$
 $2211840*a^8*b^4*c^4*g*k*1*m - 1695744*a^9*b^2*c^5*h*j*1*m - 1400832*a^8*b^4$
 $*c^4*h*j*1*m - 1105920*a^9*b^2*c^5*g*k*1*m - 253440*a^7*b^6*c^3*h*j*1*m - 6$
 $9120*a^7*b^6*c^3*g*k*1*m + 11520*a^6*b^8*c^2*h*j*1*m + 6912*a^6*b^8*c^2*g*k$
 $*1*m + 4423680*a^8*b^3*c^5*e*k*1*m + 2506752*a^8*b^3*c^5*f*j*1*m + 1843200*$

$a^8b^3c^5g^jkm + 1327104a^8b^3c^5h^jkm + 838656a^7b^5c^4f^jkm + 783360a^7b^5c^4g^jkm + 691200a^7b^5c^4h^jkm + 138240a^7b^5c^4e^kkm + 69120a^6b^7c^3h^jkm - 53760a^6b^7c^3f^jkm + 18432a^6b^7c^3g^jkm - 13824a^6b^7c^3e^kkm - 2304a^5b^9c^2g^jkm + 2543616a^8b^3c^5g^hlm + 829440a^7b^5c^4g^hlm - 34560a^6b^7c^3g^hlm - 8183808a^8b^2c^6d^jkm - 3686400a^8b^2c^6e^jkm - 2285568a^7b^4c^5d^jkm - 1695744a^8b^2c^6f^jkm - 1566720a^7b^4c^5e^jkm - 1400832a^7b^4c^5f^jkm + 741888a^6b^6c^4d^jkm - 253440a^6b^6c^4f^jkm - 80640a^5b^8c^3d^jkm - 36864a^6b^6c^4e^jkm + 11520a^5b^8c^3f^jkm + 4608a^5b^8c^3e^jkm + 6700032a^8b^2c^6f^hkm + 5103360a^7b^4c^5f^hkm - 5087232a^8b^2c^6e^hlm - 2838528a^7b^4c^5f^gkm - 1843200a^8b^2c^6f^gkm - 1695744a^8b^2c^6g^hjm - 1658880a^7b^4c^5g^hkm - 1658880a^7b^4c^5e^hlm - 1400832a^7b^4c^5g^hjm - 663552a^8b^2c^6g^hkm + 483840a^6b^6c^4f^hkm - 253440a^6b^6c^4g^hjm - 207360a^6b^6c^4g^hkm + 161280a^6b^6c^4f^gkm + 69120a^6b^6c^4e^hlm - 50040a^5b^8c^3f^hkm + 11520a^5b^8c^3g^hjm + 180a^4b^10c^2f^hkm + 4202496a^7b^3c^6d^jkm + 635904a^6b^5c^5d^jkm - 276480a^5b^7c^4d^jkm + 34560a^4b^9c^3d^jkm - 16671744a^7b^3c^6d^hkm + 12275712a^7b^3c^6d^gkm + 5677056a^7b^3c^6e^fkm + 4423680a^7b^3c^6e^gkm + 3317760a^7b^3c^6e^hkm + 2801664a^7b^3c^6e^hjm - 2709504a^6b^5c^5d^gkm + 2543616a^7b^3c^6f^gkm + 2506752a^7b^3c^6f^gjm + 1843200a^7b^3c^6f^hjm + 1327104a^7b^3c^6g^hjm + 838656a^6b^5c^5f^gjm + 829440a^6b^5c^5f^gkm + 783360a^6b^5c^5f^hjm + 691200a^6b^5c^5g^hjm + 665280a^5b^7c^4d^hkm + 506880a^6b^5c^5e^hjm + 414720a^6b^5c^5e^hkm - 322560a^6b^5c^5e^fkm + 241920a^5b^7c^4d^gkm + 138240a^6b^5c^5e^gkm - 108540a^4b^9c^3d^hkm + 69120a^5b^7c^4g^hjm - 53760a^5b^7c^4f^gjm - 51840a^6b^5c^5d^hkm - 34560a^5b^7c^4f^gkm - 23040a^5b^7c^4e^hjm + 18432a^5b^7c^4f^hjm - 13824a^5b^7c^4e^gkm - 2304a^4b^9c^3f^hjm + 1296a^3b^11c^2d^hkm + 31924224a^7b^2c^7d^fkm - 24551424a^7b^2c^7d^ekm + 10616832a^7b^2c^7e^gkm - 8183808a^7b^2c^7d^gkm - 5529600a^7b^2c^7d^hjm + 5419008a^6b^4c^6d^ekm + 5308416a^6b^4c^6e^gkm - 5087232a^7b^2c^7e^fkm - 5013504a^7b^2c^7e^fjm + 4868352a^6b^4c^6d^fkm - 4644864a^7b^2c^7d^gkm - 3981312a^6b^4c^6d^gkm - 2654208a^7b^2c^7e^hjm - 2367360a^5b^6c^5d^fkm - 2285568a^6b^4c^6d^gkm - 2211840a^6b^4c^6d^hjm - 1695744a^7b^2c^7f^gjm - 1677312a^6b^4c^6e^fjm - 1658880a^6b^4c^6e^fkm - 1400832a^6b^4c^6f^gjm - 1382400a^6b^4c^6e^hjm + 1036800a^5b^6c^5d^gkm + 741888a^5b^6c^5d^gjm - 483840a^5b^6c^5d^ekm + 317952a^5b^6c^5d^hjm + 268920a^4b^8c^4d^fkm - 253440a^5b^6c^5f^gjm - 138240a^5b^6c^5e^hjm + 107520a^5b^6c^5e^fjm - 103680a^4b^8c^4d^gkm - 80640a^4b^8c^4d^gjm + 69120a^5b^6c^5e^fkm + 11520a^4b^8c^4f^gjm + 6912a^4b^8c^4d^hjm - 6912a^3b^10c^3d^hjm + 6120a^3b^10c^3d^fkm - 1368a^2b^12c^2d^fkm - 5087232a^7b^2c^7e^ghm - 2211840a^6b^4c^6f^ghm - 1658880a^6b^4c^6e^ghm - 1105920a^7b^2c^7f^ghm - 69120a^5b^6c^5f^ghm + 69120a^5b^6c^5e^ghm + 6912a^4b^8c^4f^ghm + 7962624a^6b^3c^7d^ekm - 22164480a^6b^3c^7d^fhm + 5160960a^6b^3c^7d^fjm + 4571136a^6b^3c^7d^ekm + 4202496a^6b^3c^7d^gjm + 2801664a^6b^3c^7e^fjm - 2073600a^5b^5c^6d^ekm - 1483776a^5b^5c^6d^ekm + 635904a^5b^5c^6d^gjm + 506880a^5b^5c^6e^fjm - 354816a^4b^7c^5d^fjm + 322560a^5b^5c^6d^fjm - 276480a^4b^7c^5d^gjm + 207360a^4b^7c^5d^ekm + 161280a^4b^7c^5d^ekm + 59904a^3b^9c^4d^fjm + 34560a^3b^9c^4d^gjm - 23040a^4b^7c^5e^fjm - 2304a^2b^11c^3d^fjm + 829440a^6b^3c^7d^ghm + 5677056a^6b^3c^7e^fgm + 4423680a^6b^3c^7e^fhm + 3317760a^6b^3c^7e^ghm + 2805120a^5b^5c^6d^fhm + 1843200a^6b^3c^7f^ghm - 829440a^5b^5c^6d^ghm + 783360a^5b^5c^6f^ghm + 437184a^4b^7c^5d^fhm + 414720a^5b^5c^6e^g$

$h^k - 322560a^5b^5c^6efg^m - 146268a^3b^9c^4dfh^m + 138240a^5$
 $b^5c^6efh^l - 62208a^4b^7c^5dgh^l + 20736a^3b^9c^4dgh^l +$
 $18432a^4b^7c^5fgh^j - 13824a^4b^7c^5efh^l + 9360a^2b^{11}c^3d$
 $f^h^m - 2304a^3b^9c^4fgh^j - 8404992a^6b^2c^8d^e^j^k - 24551424a$
 $a^6b^2c^8d^e^g^m + 21150720a^6b^2c^8d^f^h^k - 1271808a^5b^4c^7d^e$
 $e^j^k + 552960a^4b^6c^6d^e^j^k - 69120a^3b^8c^5d^e^j^k - 16588800a$
 $^6b^2c^8d^e^h^l - 7741440a^6b^2c^8d^f^g^l + 6946560a^5b^4c^7d^f^h$
 $h^k - 5529600a^6b^2c^8d^g^h^j + 5419008a^5b^4c^7d^e^g^m - 5087232a$
 $^6b^2c^8e^f^g^k - 3870720a^5b^4c^7d^f^g^l - 3686400a^6b^2c^8e^f^h$
 $h^j - 2211840a^5b^4c^7d^g^h^j - 1755648a^4b^6c^6d^f^h^k - 1658880a$
 $^5b^4c^7e^f^g^k + 1658880a^5b^4c^7d^e^h^l - 1566720a^5b^4c^7e^f^h$
 $h^j + 1451520a^4b^6c^6d^f^g^l - 483840a^4b^6c^6d^e^g^m + 317952a^4$
 $b^6c^6d^g^h^j - 193536a^3b^8c^5d^f^g^l + 124416a^4b^6c^6d^e^h^l$
 $+ 114696a^3b^8c^5d^f^h^k + 69120a^4b^6c^6e^f^g^k - 41472a^3b^8c^5$
 $d^e^h^l - 36864a^4b^6c^6e^f^h^j + 14580a^2b^{10}c^4d^f^h^k + 6912a^3$
 $b^8c^5d^g^h^j - 6912a^2b^{10}c^4d^g^h^j + 6912a^2b^{10}c^4d^f^g^l$
 $+ 4608a^3b^8c^5e^f^h^j + 7962624a^5b^3c^8d^e^g^k + 7741440a^5b^3c$
 $c^8d^e^f^l + 5160960a^5b^3c^8d^f^g^j + 4423680a^5b^3c^8d^e^h^j - 2$
 $903040a^4b^5c^7d^e^f^l - 2073600a^4b^5c^7d^e^g^k - 635904a^4b^5c$
 $^7d^e^h^j + 387072a^3b^7c^6d^e^f^l - 354816a^3b^7c^6d^f^g^j + 3225$
 $60a^4b^5c^7d^f^g^j + 207360a^3b^7c^6d^e^g^k + 59904a^2b^9c^5d^f$
 $g^j - 13824a^3b^7c^6d^e^h^j + 13824a^2b^9c^5d^e^h^j - 13824a^2b^9$
 $c^5d^e^f^l + 4423680a^5b^3c^8e^f^g^h + 138240a^4b^5c^7e^f^g^h -$
 $13824a^3b^7c^6e^f^g^h - 10321920a^5b^2c^9d^e^f^j + 709632a^3b^6c^7$
 $d^e^f^j - 645120a^4b^4c^8d^e^f^j - 119808a^2b^8c^6d^e^f^j - 1658$
 $8800a^5b^2c^9d^e^g^h + 1658880a^4b^4c^8d^e^g^h + 124416a^3b^6c^7$
 $d^e^g^h - 41472a^2b^8c^6d^e^g^h + 7741440a^4b^3c^9d^e^f^g - 290304$
 $0a^3b^5c^8d^e^f^g + 387072a^2b^7c^7d^e^f^g + 3456a^7b^8c^k^l^2m$
 $+ 12672a^7b^8c^j^l^m^2 + 384a^5b^{10}c^j^2k^m - 1635840a^{10}b^c^5h^k$
 $k^m^2 - 1009152a^9b^c^6h^2k^m + 3690a^6b^9c^h^k^m^2 + 1152a^6b^9c$
 $g^l^m^2 - 540a^5b^{10}c^h^k^2m + 54a^4b^{11}c^h^2k^m + 565248a^9b^c^6$
 $h^j^2m - 39771648a^7b^c^8d^2k^m - 2496000a^8b^c^7f^2k^m - 154368$
 $0a^9b^c^6f^k^2m + 1980a^5b^{10}c^f^k^m^2 - 384a^5b^{10}c^g^j^m^2 - 18$
 $0a^4b^{11}c^f^k^2m + 6a^2b^{13}c^f^2k^m - 10298880a^9b^c^6d^k^m^2 +$
 $2580480a^9b^c^6e^j^m^2 + 5310a^4b^{11}c^d^k^m^2 - 1674a^ab^{13}c^2d^2k$
 $^m - 540a^3b^{12}c^d^k^2m - 10616832a^7b^c^8e^2j^l - 3538944a^8b^c^7$
 $e^j^2l + 2727936a^8b^c^7d^j^2m - 2496000a^9b^c^6f^h^m^2 - 1543680$
 $a^8b^c^7f^h^2m + 565248a^8b^c^7f^j^2k - 270a^4b^{11}c^f^h^m^2 - 59$
 $512320a^6b^c^9d^2f^m + 5087232a^7b^c^8e^2h^m + 1105920a^8b^c^7e^e$
 $j^k^2 - 3456a^ab^{12}c^3d^2j^l - 1635840a^7b^c^8f^2h^k - 1009152a^8b$
 $c^7f^h^k^2 + 10260a^ab^{12}c^3d^2h^m - 684a^3b^{12}c^d^h^m^2 - 24675840$
 $a^6b^c^9d^2h^k - 15552000a^8b^c^7d^f^m^2 + 24551424a^6b^c^9d^e^2m$
 $m - 3939840a^7b^c^8d^h^2k + 1105920a^7b^c^8e^h^2j - 25074a^ab^{11}c^4$
 $d^2f^m + 10530a^ab^{11}c^4d^2h^k + 10368a^ab^{11}c^4d^2g^l + 420a^ab^{11}$
 $2c^3d^f^2m - 378a^2b^{13}c^d^f^m^2 - 10616832a^6b^c^9e^2g^j + 50872$
 $32a^6b^c^9e^2f^k - 3538944a^7b^c^8e^g^j^2 + 1843200a^7b^c^8d^h^j^2$
 $- 7994880a^6b^c^9d^f^2k - 4990464a^7b^c^8d^f^k^2 + 2580480a^6b^c^9$
 $e^f^2j + 65664a^ab^{10}c^5d^2g^j - 27972a^ab^{10}c^5d^2f^k - 20736a^a$
 $b^{10}c^5d^2e^l + 1260a^ab^{11}c^4d^f^2k + 54a^ab^{13}c^2d^f^k^2 + 232243$
 $20a^5b^c^{10}d^2e^j - 37062144a^5b^c^{10}d^2f^h + 384a^ab^{12}c^3d^f^j^2$
 $- 131328a^ab^9c^6d^2e^j - 5985792a^6b^c^9d^f^h^2 + 206010a^ab^9c^6$
 $d^2f^h - 6300a^ab^{10}c^5d^f^2h + 1350a^ab^{11}c^4d^f^h^2 + 16588800a^5$
 $b^c^{10}d^e^2h + 3456a^ab^{10}c^5d^f^g^2 + 435456a^ab^8c^7d^2e^g + 1382$
 $4a^ab^8c^7d^e^2f - 1474560a^9c^7e^j^k^m + 460800a^9c^7f^h^k^m + 32$
 $25600a^8c^8d^f^k^m - 2457600a^8c^8e^f^j^m - 884736a^8c^8e^h^j^k -$
 $6193152a^7c^9d^e^j^k + 1935360a^7c^9d^f^h^k - 1474560a^7c^9e^f^h^j$
 $- 10321920a^6c^{10}d^e^f^j - 1105920a^9b^4c^3k^l^2m - 552960a^{10}b^2$
 $c^4k^l^2m - 34560a^8b^6c^2k^l^2m - 1290240a^{10}b^2c^4j^l^m^2 -$
 $860160a^9b^4c^3j^l^m^2 - 80640a^8b^6c^2j^l^m^2 - 737280a^9b^2c^5$

$$\begin{aligned}
& *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 + 414720*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 - 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*l*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*l*m^2 - 56160*a^6*b^7*c^3*h^2*k*m - 40320*a \\
& ^7*b^7*c^2*g*l*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*l^2*m - 1105920*a^7*b^4*c \\
& ^5*g^2*k*m - 921600*a^9*b^2*c^5*f*l^2*m - 829440*a^8*b^4*c^4*h*k*l^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*l^2 + 317952*a^7*b^5*c^4*h*j^2*m - 103680*a^7*b^6*c^3*h*k*l^2 + 80640*a^7 \\
& *b^6*c^3*f*l^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*l*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*l - 645120*a^8*b^4*c^4*e*l*m \\
& ^2 - 552960*a^8*b^2*c^6*h^2*j*l - 552960*a^7*b^4*c^5*h^2*j*l + 414720*a^7*b \\
& ^5*c^4*g*k^2*l - 145152*a^6*b^6*c^4*h^2*j*l + 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*l*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*l + 5490*a^5*b^9*c^2*f*k^2*m - 34 \\
& 56*a^5*b^8*c^3*h^2*j*l - 2304*a^6*b^8*c^2*e*l*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*l^2*m - 4423680*a^7*b^2 \\
& *c^7*e^2*k*m - 2654208*a^8*b^3*c^5*g*j*l^2 - 2654208*a^7*b^3*c^6*g^2*j*l + \\
& 1769472*a^8*b^2*c^6*g*j^2*l + 1769472*a^7*b^4*c^5*g*j^2*l - 1354752*a^7*b^5 \\
& *c^4*d*l^2*m - 1327104*a^7*b^5*c^4*g*j*l^2 - 1327104*a^6*b^5*c^5*g^2*j*l + \\
& 1271808*a^8*b^3*c^5*f*k*l^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*l + 414720*a^7*b^5*c^4*f*k*l^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*l^2*m - 17280*a^6*b^7*c^3*f*k*l^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*l - 1290240*a^7*b^2*c^7*f^2*j*l + \\
& 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*l - 829440*a^7*b^4*c^5*e*k^2*l - 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*l - 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*l - 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*l - 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*l + 5308416*a^8*b^2*c^6*e*j*l^2 - 5308416* \\
& a^6*b^3*c^7*e^2*j*l - 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*l + 3000960* \\
& a^6*b^4*c^6*f^2*h*m + 2654208*a^7*b^4*c^5*e*j*l^2 - 2322432*a^8*b^2*c^6*d*k \\
& *l^2 + 2125824*a^7*b^3*c^6*d*j^2*m - 1990656*a^7*b^4*c^5*d*k*l^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 \\
& *l + 829440*a^7*b^3*c^6*g*h^2*l + 749568*a^7*b^3*c^6*f*j^2*k + 518400*a^6*b \\
& ^6*c^4*d*k*l^2 + 414720*a^6*b^5*c^5*g*h^2*l + 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*l^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*l + 5490*a^4*b^9*c^3*f
\end{aligned}$$

$$\begin{aligned}
& *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 \\
& 0*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 - 11059 \\
& 20*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 \\
& *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 \\
& *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
\end{aligned}$$

$$\begin{aligned}
& ^4c^7e^*g^2*j - 2322432*a^6b^2*c^8*d^*g^2*k - 1990656*a^5b^4*c^7*d^*g^2*k \\
& - 1935360*a^6b^4*c^6*d^*f^1^2 + 1658880*a^6b^3*c^7*d^*h*j^2 + 1658880*a^5b^3 \\
& ^3*c^8*e^2*f^*k - 884736*a^5b^5*c^6*e^*g*j^2 + 725760*a^5b^6*c^5*d^*f^1^2 + \\
& 17418240*a^4b^4*c^8*d^2*e^1 + 518400*a^4b^6*c^6*d^*g^2*k + 483840*a^4b^5* \\
& c^7*d^*e^2*m + 262656*a^5b^5*c^6*d^*h*j^2 - 96768*a^4b^8*c^4*d^*f^1^2 - 6912 \\
& 0*a^4b^5*c^7*e^2*f^*k - 55296*a^4b^7*c^5*d^*h*j^2 - 51840*a^3b^8*c^5*d^*g^2 \\
& *k + 3456*a^3b^10*c^3*d^*f^1^2 + 1152*a^3b^9*c^4*d^*h*j^2 + 1152*a^2b^11*c^3 \\
& ^3*d^*h*j^2 - 15431040*a^4b^4*c^8*d^2*f^*k - 13248000*a^5b^3*c^8*d^*f^2*k - \\
& 11612160*a^5b^2*c^9*d^2*g*j - 10063872*a^6b^3*c^7*d^*f^*k^2 - 3919104*a^3b^8 \\
& ^6*c^7*d^2*e^1 + 2554560*a^4b^5*c^7*d^*f^2*k + 1720320*a^5b^3*c^8*e^*f^2*j \\
& + 1596672*a^3b^6*c^7*d^2*g*j + 1518912*a^3b^6*c^7*d^2*f^*k - 1105920*a^5b^4 \\
& ^4*c^7*f^*g^2*h + 838080*a^5b^5*c^6*d^*f^*k^2 - 552960*a^6b^2*c^8*f^*g^2*h - \\
& 508032*a^2b^8*c^6*d^2*g*j + 435456*a^2b^8*c^6*d^2*e^1 + 161280*a^4b^5*c^7 \\
& ^7*e^*f^2*j + 116640*a^4b^7*c^5*d^*f^*k^2 + 106812*a^2b^8*c^6*d^2*f^*k - 98208 \\
& *a^3b^7*c^6*d^*f^2*k - 34560*a^4b^6*c^6*f^*g^2*h - 27270*a^3b^9*c^4*d^*f^*k^2 \\
& - 26334*a^2b^9*c^5*d^*f^2*k - 25344*a^3b^7*c^6*e^*f^2*j + 3456*a^3b^8*c^5 \\
& ^5*f^*g^2*h + 768*a^2b^9*c^5*e^*f^2*j - 702*a^2b^11*c^3*d^*f^*k^2 - 7962624*a^5 \\
& ^5b^2*c^9*d^*e^2*k - 2580480*a^6b^2*c^8*d^*f^*j^2 + 2073600*a^4b^4*c^8*d^*e^2 \\
& *k - 1658880*a^6b^2*c^8*e^*g^*h^2 - 967680*a^5b^4*c^7*d^*f^*j^2 - 829440*a^5b^4 \\
& ^4*c^7*e^*g^*h^2 - 207360*a^3b^6*c^7*d^*e^2*k + 64512*a^4b^6*c^6*d^*f^*j^2 + \\
& 39168*a^3b^8*c^5*d^*f^*j^2 - 20736*a^4b^6*c^6*e^*g^*h^2 - 9216*a^2b^10*c^4*d^ \\
& ^4*f^*j^2 - 4423680*a^5b^2*c^9*e^2*f^*h + 4147200*a^5b^3*c^8*d^*g^2*h - 319334 \\
& 4*a^3b^5*c^8*d^2*e^*j + 1016064*a^2b^7*c^7*d^2*e^*j - 414720*a^4b^5*c^7*d^* \\
& g^2*h - 138240*a^4b^4*c^8*e^2*f^*h - 31104*a^3b^7*c^6*d^*g^2*h + 13824*a^3b^6 \\
& ^6*c^7*e^2*f^*h + 10368*a^2b^9*c^5*d^*g^2*h + 15630336*a^5b^2*c^9*d^*f^2*h \\
& - 14459904*a^4b^3*c^9*d^2*f^*h + 9630144*a^3b^5*c^8*d^2*f^*h - 8764416*a^5b^3 \\
& ^3*c^8*d^*f^*h^2 - 3870720*a^5b^2*c^9*e^*f^2*g + 2867328*a^4b^4*c^8*d^*f^2*h \\
& - 2095200*a^2b^7*c^7*d^2*f^*h - 1414080*a^3b^6*c^7*d^*f^2*h - 34836480*a^4 \\
& ^4b^2*c^10*d^2*e^*g - 645120*a^4b^4*c^8*e^*f^2*g + 306720*a^3b^7*c^6*d^*f^*h^2 \\
& + 197820*a^2b^8*c^6*d^*f^2*h + 146880*a^4b^5*c^7*d^*f^*h^2 + 80640*a^3b^6*c^7 \\
& ^7*e^*f^2*g - 55350*a^2b^9*c^5*d^*f^*h^2 - 2304*a^2b^8*c^6*e^*f^2*g - 387072 \\
& 0*a^5b^2*c^9*d^*f^*g^2 - 1935360*a^4b^4*c^8*d^*f^*g^2 - 1658880*a^4b^3*c^9*d^ \\
& ^2*e^2*h + 725760*a^3b^6*c^7*d^*f^*g^2 + 17418240*a^3b^4*c^9*d^2*e^*g - 124416 \\
& *a^3b^5*c^8*d^*e^2*h - 96768*a^2b^8*c^6*d^*f^*g^2 + 41472*a^2b^7*c^7*d^*e^2* \\
& h - 3919104*a^2b^6*c^8*d^2*e^*g - 7741440*a^4b^2*c^10*d^*e^2*f + 2903040*a^3 \\
& ^3b^4*c^9*d^*e^2*f - 387072*a^2b^6*c^8*d^*e^2*f - 20160*a^8b^7*c^1^2*m^2 - \\
& 1648128*a^10b^3*c^3*k^*m^3 - 898560*a^9b^3*c^4*k^3*m - 354240*a^9b^5*c^2*k^* \\
& ^2*m^3 - 354240*a^8b^5*c^3*k^3*m - 21600*a^7b^7*c^2*k^3*m - 13950*a^7b^8*c^2 \\
& ^2*m^2 + 430080*a^10b^*c^5*j^2*m^2 - 1984*a^6b^9*c^*j^2*m^2 - 884736*a^9b^3 \\
& ^3*c^4*j^1^3 - 589824*a^8b^3*c^5*j^3*1 - 442368*a^8b^5*c^3*j^1^3 - 2949 \\
& 12*a^7b^5*c^4*j^3*1 - 49152*a^6b^7*c^3*j^3*1 + 1359360*a^10b^2*c^4*h^*m^3 \\
& + 1173120*a^9b^4*c^3*h^*m^3 + 743040*a^7b^4*c^5*h^3*m + 622080*a^8b^2*c^6 \\
& ^6*h^3*m + 184320*a^9b^*c^6*j^2*k^2 + 107136*a^6b^6*c^4*h^3*m - 32640*a^8b^6 \\
& ^6*c^2*h^*m^3 + 540*a^5b^8*c^3*h^3*m - 270*a^4b^10*c^2*h^3*m - 180*a^5b^10 \\
& ^10*c^*h^2*m^2 - 2293760*a^9b^3*c^4*f^*m^3 - 2293760*a^6b^3*c^7*f^3*m + 13271 \\
& 04*a^8b^4*c^4*g^1^3 + 1327104*a^6b^4*c^6*g^3*1 - 622080*a^8b^3*c^5*h^*k^3 \\
& - 622080*a^7b^3*c^6*h^3*k - 326592*a^7b^5*c^4*h^*k^3 - 326592*a^6b^5*c^5 \\
& ^5*h^3*k - 199360*a^8b^5*c^3*f^*m^3 - 199360*a^5b^5*c^6*f^3*m + 61920*a^7b^7 \\
& ^7*c^2*f^*m^3 + 61920*a^4b^7*c^5*f^3*m - 38880*a^6b^7*c^3*h^*k^3 - 38880*a^5 \\
& ^5b^7*c^4*h^3*k - 3682*a^3b^9*c^4*f^3*m - 810*a^5b^9*c^2*h^*k^3 - 810*a^4b^9 \\
& ^9*c^3*h^3*k - 70*a^3b^12*c^*f^2*m^2 + 70*a^2b^11*c^3*f^3*m + 3870720*a^8b^* \\
& ^8b^*c^7*e^2*m^2 + 184320*a^8b^*c^7*h^2*j^2 - 14152320*a^4b^4*c^8*d^3*m + 106 \\
& 44480*a^5b^2*c^9*d^3*m + 5483520*a^9b^2*c^5*d^*m^3 + 4269888*a^3b^6*c^7*d^3 \\
& ^3*m - 2654208*a^8b^3*c^5*e^1^3 + 1359360*a^6b^2*c^8*f^3*k + 1330560*a^8b^4 \\
& ^4*c^4*d^*m^3 + 1173120*a^5b^4*c^7*f^3*k - 884736*a^6b^3*c^7*g^3*j - 8265 \\
& 60*a^7b^6*c^3*d^*m^3 + 743040*a^7b^4*c^5*f^*k^3 + 622080*a^8b^2*c^6*f^*k^3 \\
& - 607068*a^2b^8*c^6*d^3*m - 589824*a^7b^3*c^6*g^*j^3 - 442368*a^5b^5*c^6*g^3 \\
& ^3*j - 294912*a^6b^5*c^5*g^*j^3 + 145188*a^6b^8*c^2*d^*m^3 + 107136*a^6b^6 \\
& ^6*c^4*f^*k^3 - 49152*a^5b^7*c^4*g^*j^3 - 32640*a^4b^6*c^6*f^3*k - 5796*a^3b^
\end{aligned}$$

$$\begin{aligned}
& b^8c^5f^3k + 540a^5b^8c^3f^3k^3 - 270a^4b^{10}c^2f^3k^3 + 210a^2b^{10}c^4f^3k + 19077120a^4b^3c^9d^3k + 1658880a^7b^8c^8e^2k^2 + 430080a^7b^8c^8f^2j^2 + 3538944a^5b^2c^9e^3j - 2488320a^7b^3c^6d^3k^3 - 2379456a^3b^5c^8d^3k + 1179648a^7b^2c^7e^3j^3 + 589824a^6b^4c^6e^3j^3 + 98304a^5b^6c^5e^3j^3 - 95904a^2b^7c^7d^3k - 57024a^6b^5c^5d^3k^3 + 49248a^5b^7c^4d^3k^3 - 4050a^4b^9c^3d^3k^3 - 810a^3b^{11}c^2d^3k^3 - 486a^3b^{12}c^3d^2k^2 + 3870720a^6b^8c^9d^2j^2 - 1648128a^5b^3c^8f^3h - 898560a^6b^3c^7f^3h^3 - 354240a^5b^5c^6f^3h^3 - 354240a^4b^5c^7f^3h + 43680a^3b^7c^6f^3h - 21600a^4b^7c^5f^3h^3 - 9792a^3b^{11}c^4d^2j^2 + 1350a^3b^9c^4f^3h^3 - 1050a^2b^9c^5f^3h + 1658880a^6b^8c^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^{10}c^5d^2h^2 - 8100a^3b^8c^5d^3h + 4050a^2b^{10}c^4d^3h + 3870720a^5b^8c^10e^2f^2 + 34836480a^4b^8c^{11}d^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^{10}c^6j^2k^3m - 384a^6b^{10}j^3k^3m^2 + 138240a^{10}c^6h^3k^2m - 90a^5b^{11}h^3k^3m^2 + 384000a^{10}c^6f^3k^3m^2 - 2211840a^8c^8e^2k^3m - 409600a^9c^7f^3j^2m - 147456a^9c^7h^3j^2k - 30a^4b^{12}f^3k^3m^2 + 967680a^9c^7d^3k^2m + 384000a^8c^8f^2h^3m - 90a^3b^{13}d^3k^3m^2 + 20321280a^7c^9d^2h^3m - 883200a^{11}b^3c^4k^3m^3 - 317952a^{10}b^3c^5k^3m + 43680a^8b^7c^3k^3m^3 + 1350a^6b^9c^3k^3m - 270b^{14}c^2d^2h^3m + 6a^3b^{13}f^3h^3m^2 + 4838400a^9c^7d^3h^3m^2 + 2903040a^8c^8d^3h^2m - 1032192a^8c^8d^3j^2k + 138240a^8c^8f^3h^2k - 3686400a^7c^9e^2f^3m - 1327104a^7c^9e^2h^3k - 393216a^9b^3c^6j^3l - 245760a^8c^8f^3h^3j^2 - 810b^{13}c^3d^2h^3k + 630b^{13}c^3d^2f^3m + 18a^2b^{14}d^3h^3m^2 + 2688000a^7c^9d^3f^2m + 580608a^8c^8d^3h^3k^2 - 5796a^7b^8c^8h^3m^3 - 3456b^{12}c^4d^2g^3j + 1890b^{12}c^4d^2f^3k + 6773760a^6c^10d^2f^3k - 1344000a^{10}b^3c^5f^3m^3 - 1344000a^7b^3c^8f^3m - 207360a^9b^3c^6h^3k^3 - 207360a^8b^3c^7h^3k - 3682a^6b^9c^3f^3m^3 - 9289728a^6c^10d^2e^2k - 1720320a^7c^9d^3f^3j^2 - 50803200a^5b^3c^10d^3k + 6912b^{11}c^5d^2e^3j - 10616832a^6b^3c^9e^3l - 2211840a^6c^10e^2f^3h - 393216a^8b^3c^7g^3j^3 + 43416a^3b^{10}c^5d^3m - 9576a^5b^{10}c^3d^3m^3 - 9450b^{11}c^5d^2f^3h - 504a^3b^{14}c^3d^2m^2 + 1612800a^6c^10d^3f^2h - 1036800a^8b^3c^7d^3k^3 + 45198a^3b^9c^6d^3k - 20736b^{10}c^6d^2e^3g - 75188736a^4b^3c^{11}d^3f - 883200a^6b^3c^9f^3h - 317952a^7b^3c^8f^3h^3 - 15482880a^5c^{11}d^2e^2f - 10616832a^5b^3c^{10}e^3g - 345060a^3b^8c^7d^3h - 4262400a^5b^3c^{10}d^3f^3 + 852768a^3b^7c^8d^3f + 7350a^3b^9c^6d^3f^3 + 967680a^{10}b^3c^3l^2m^2 + 161280a^9b^5c^2l^2m^2 + 1684224a^{10}b^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^2 + 207360a^8b^5c^3k^2l^2 + 170240a^8b^5c^3j^2m^2 + 9216a^7b^7c^2j^2m^2 + 5184a^7b^7c^2k^2l^2 + 884736a^9b^2c^5j^2l^2 + 884736a^8b^4c^4j^2l^2 + 221184a^7b^6c^3j^2l^2 + 1419840a^8b^4c^4h^2m^2 + 1387008a^9b^2c^5h^2m^2 + 276480a^8b^3c^5j^2k^2 + 140544a^7b^5c^4j^2k^2 + 84960a^7b^6c^3h^2m^2 + 25344a^6b^7c^3j^2k^2 - 8010a^6b^8c^2h^2m^2 + 576a^5b^9c^2j^2k^2 + 967680a^8b^3c^5g^2m^2 + 414720a^8b^3c^5h^2l^2 + 207360a^7b^5c^4h^2l^2 + 161280a^7b^5c^4g^2m^2 - 20160a^6b^7c^3g^2m^2 + 5184a^6b^7c^3h^2l^2 + 576a^5b^9c^2g^2m^2 + 3808000a^8b^2c^6f^2m^2 + 1990656a^7b^4c^5g^2l^2 + 1643712a^7b^4c^5f^2m^2 + 803520a^7b^4c^5h^2k^2 + 725760a^8b^2c^6h^2k^2 + 207360a^6b^6c^4h^2k^2 - 125440a^6b^6c^4f^2m^2 - 13790a^5b^8c^3f^2m^2 + 10530a^5b^8c^3h^2k^2 + 1785a^4b^{10}c^2f^2m^2 + 81a^4b^{10}c^2h^2k^2 + 18427392a^7b^2c^7d^2m^2 + 967680a^7b^3c^6f^2l^2 + 645120a^7b^3c^6e^2m^2 + 414720a^7b^3c^6g^2k^2 + 276480a^7b^3c^6h^2j^2 + 207360a^6b^5c^5g^2k^2 + 161280a^6b^5c^5f^2l^2 + 140544a^6b^5c^5h^2j^2 - 80640a^6b^5c^5e^2m^2 + 25344a^5b^7c^4h^2j^2 - 20160a^5b^7c^4f^
\end{aligned}$$

$$\begin{aligned}
& 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* \\
& 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 + 16128 \\
& 0*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^1 \\
& 2*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^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* \\
& *1*z^2 + 1509949440*a^9*b^3*c^10*e*g*z^2 - 1401421824*a^8*b^5*c^9*d*h*z^2 -
\end{aligned}$$

$$\begin{aligned}
& 1321205760a^9b^2c^{11}d^fz^2 - 2793406464a^{11}b^c^{10}d^mz^2 + 8906342 \\
& 40a^8b^7c^7d^mz^2 - 754974720a^{10}b^4c^8g^1z^2 - 754974720a^9b^5 \\
& c^8e^1z^2 + 719585280a^8b^6c^8d^kz^2 - 707788800a^9b^4c^9d^kz^2 \\
& - 754974720a^8b^5c^9e^g^1z^2 + 603979776a^{11}b^2c^9g^1z^2 - 581959 \\
& 680a^{10}b^4c^8f^mz^2 + 732168192a^7b^6c^9d^fz^2 + 534773760a^{11}b \\
& ^3c^8h^mz^2 - 456130560a^{11}b^4c^7k^mz^2 - 603979776a^{10}b^2c^{10}e \\
& ^jz^2 + 534773760a^{10}b^3c^9f^kz^2 + 384040960a^9b^6c^7f^mz^2 + 3 \\
& 77487360a^9b^6c^7g^1z^2 - 456130560a^9b^4c^9f^h^1z^2 + 301989888a^ \\
& 11b^3c^8j^1z^2 - 415236096a^{10}b^2c^{10}d^kz^2 + 254017536a^{10}b^6c \\
& ^6k^mz^2 - 330301440a^{10}b^4c^8h^kz^2 + 390463488a^7b^7c^8d^h^1z^2 \\
& + 188743680a^{12}b^2c^8k^mz^2 + 301989888a^{10}b^3c^9g^jz^2 - 297861 \\
& 120a^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^1 \\
& z^2 - 1887436800a^{10}b^c^{11}d^h^1z^2 + 188743680a^8b^7c^7e^1z^2 + 1533 \\
& 54240a^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^m \\
& z^2 - 115671040a^8b^8c^6f^mz^2 - 62914560a^9b^7c^6j^1z^2 + 18874 \\
& 3680a^{10}b^2c^{10}f^h^1z^2 - 94371840a^8b^8c^6g^1z^2 + 6144000a^8b^1 \\
& 0c^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^1z^2 + 188743680a^7 \\
& b^7c^8e^g^1z^2 - 37355520a^9b^7c^6h^mz^2 + 125829120a^8b^6c^8e^j \\
& z^2 + 23101440a^8b^9c^5h^mz^2 - 3538944a^7b^{11}c^4j^1z^2 + 196608 \\
& a^6b^{13}c^3j^1z^2 - 4349952a^7b^{11}c^4h^mz^2 + 337920a^6b^{13}c^3 \\
& h^mz^2 - 7680a^5b^{15}c^2h^mz^2 - 62914560a^8b^7c^7g^jz^2 - 265420 \\
& 80a^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^7 \\
& b^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^h^1z^2 - 4349952 \\
& a^6b^{11}c^5f^kz^2 - 3538944a^6b^{11}c^5g^jz^2 - 1677312a^5b^{13}c^4 \\
& d^mz^2 + 1179648a^6b^{11}c^5e^1z^2 + 337920a^5b^{13}c^4f^kz^2 + 196 \\
& 608a^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 + 707 \\
& 7888a^6b^{10}c^6e^jz^2 - 51609600a^6b^9c^7d^h^1z^2 + 691200a^4b^{14} \\
& c^4d^kz^2 - 393216a^5b^{12}c^5e^jz^2 - 23040a^3b^{16}c^3d^kz^2 + 61 \\
& 44000a^6b^{10}c^6f^h^1z^2 + 61440a^5b^{12}c^5f^h^1z^2 - 46080a^4b^{14}c^ \\
& 4f^h^1z^2 + 1536a^3b^{16}c^3f^h^1z^2 - 23592960a^6b^9c^7e^g^1z^2 + 1179 \\
& 648a^5b^{11}c^6e^g^1z^2 + 829440a^4b^{13}c^5d^h^1z^2 + 368640a^5b^{11}c^ \\
& 6d^h^1z^2 - 105984a^3b^{15}c^4d^h^1z^2 + 4608a^2b^{17}c^3d^h^1z^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^1z^ \\
& 2 - 1207959552a^{10}b^c^{11}e^g^1z^2 - 578813952a^{12}b^c^9h^mz^2 - 5788139 \\
& 52a^{11}b^c^{10}f^kz^2 - 402653184a^{12}b^c^9j^1z^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^a^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^ \\
& m^2z^2 + 251658240a^{13}c^9k^mz^2 - 1509949440a^9b^2c^{11}e^2z^2 + 2516 \\
& 58240a^{11}c^{11}f^h^1z^2 + 150994944a^{12}c^{10}h^kz^2 - 5400428544a^7b^5 \\
& c^{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^
\end{aligned}$$

$$\begin{aligned}
& 5*1^2*z^2 + 11206656*a^{10}*b^7*c^5*m^2*z^2 + 8929280*a^9*b^9*c^4*m^2*z^2 - 2 \\
& 600960*a^8*b^{11}*c^3*m^2*z^2 + 291840*a^7*b^{13}*c^2*m^2*z^2 - 50331648*a^{10}*b \\
& ^4*c^8*j^2*z^2 + 146165760*a^4*b^{11}*c^7*d^2*z^2 - 26542080*a^9*b^7*c^6*k^2* \\
& z^2 + 5898240*a^8*b^{10}*c^4*l^2*z^2 - 294912*a^7*b^{12}*c^3*l^2*z^2 - 33554432 \\
& *a^{11}*b^2*c^9*j^2*z^2 + 9584640*a^8*b^9*c^5*k^2*z^2 + 20971520*a^9*b^6*c^7* \\
& j^2*z^2 - 2359296*a^{10}*b^5*c^7*k^2*z^2 - 1290240*a^7*b^{11}*c^4*k^2*z^2 + 460 \\
& 80*a^6*b^{13}*c^3*k^2*z^2 + 2304*a^5*b^{15}*c^2*k^2*z^2 - 2752512*a^7*b^{10}*c^5* \\
& j^2*z^2 + 2621440*a^8*b^8*c^6*j^2*z^2 + 524288*a^6*b^{12}*c^4*j^2*z^2 - 32768 \\
& *a^5*b^{14}*c^3*j^2*z^2 - 47185920*a^7*b^8*c^7*g^2*z^2 - 26542080*a^8*b^7*c^7 \\
& *h^2*z^2 + 9584640*a^7*b^9*c^6*h^2*z^2 - 2359296*a^9*b^5*c^8*h^2*z^2 - 1290 \\
& 240*a^6*b^{11}*c^5*h^2*z^2 + 46080*a^5*b^{13}*c^4*h^2*z^2 + 2304*a^4*b^{15}*c^3*h \\
& ^2*z^2 + 5898240*a^6*b^{10}*c^6*g^2*z^2 - 294912*a^5*b^{12}*c^5*g^2*z^2 + 11206 \\
& 656*a^7*b^7*c^8*f^2*z^2 + 8929280*a^6*b^9*c^7*f^2*z^2 + 23592960*a^6*b^8*c^ \\
& 8*e^2*z^2 - 2600960*a^5*b^{11}*c^6*f^2*z^2 + 291840*a^4*b^{13}*c^5*f^2*z^2 - 14 \\
& 080*a^3*b^{15}*c^4*f^2*z^2 + 256*a^2*b^{17}*c^3*f^2*z^2 - 19860480*a^3*b^{13}*c^6 \\
& *d^2*z^2 - 1179648*a^5*b^{10}*c^7*e^2*z^2 + 1771776*a^2*b^{15}*c^5*d^2*z^2 - 44 \\
& 0401920*a^{13}*b*c^8*m^2*z^2 + 1207959552*a^{10}*c^{12}*e^2*z^2 + 134217728*a^{12}* \\
& c^{10}*j^2*z^2 + 256*a^5*b^{17}*m^2*z^2 + 2304*b^{19}*c^3*d^2*z^2 - 23592960*a^{10} \\
& *b*c^8*f*k*l*z + 99090432*a^9*b*c^9*d*h*l*z + 9437184*a^{10}*b*c^8*e*k*m*z + \\
& 23592960*a^{10}*b*c^8*g*h*m*z + 141557760*a^8*b*c^{10}*d*e*k*z + 47185920*a^9*b \\
& *c^9*d*j*k*z - 23592960*a^9*b*c^9*f*g*k*z + 169869312*a^7*b*c^{11}*d*e*f*z + \\
& 99090432*a^8*b*c^{10}*d*g*h*z - 3145728*a^9*b*c^9*f*h*j*z + 56623104*a^8*b*c^ \\
& ^{10}*d*f*j*z + 1536*a*b^{15}*c^3*d*f*j*z - 9437184*a^8*b*c^{10}*e*f*h*z - 4608*a \\
& b^{14}*c^4*d*f*g*z + 9216*a*b^{13}*c^5*d*e*f*z + 412876800*a^8*b^2*c^9*d*e*m*z \\
& - 206438400*a^9*b^3*c^7*d*l*m*z + 5898240*a^{10}*b^4*c^5*k*l*m*z - 206438400* \\
& a^8*b^3*c^8*d*g*m*z - 4718592*a^{11}*b^2*c^6*k*l*m*z - 2949120*a^9*b^6*c^4*k* \\
& l*m*z + 737280*a^8*b^8*c^3*k*l*m*z - 92160*a^7*b^{10}*c^2*k*l*m*z + 103219200 \\
& *a^8*b^5*c^6*d*l*m*z - 29491200*a^{10}*b^3*c^6*h*l*m*z - 206438400*a^7*b^4*c^ \\
& 8*d*e*m*z - 2359296*a^{10}*b^3*c^6*j*k*m*z + 491520*a^8*b^7*c^4*j*k*m*z - 184 \\
& 320*a^7*b^9*c^3*j*k*m*z + 27648*a^6*b^{11}*c^2*j*k*m*z + 14745600*a^9*b^5*c^5 \\
& *h*l*m*z - 3686400*a^8*b^7*c^4*h*l*m*z + 460800*a^7*b^9*c^3*h*l*m*z - 23040 \\
& *a^6*b^{11}*c^2*h*l*m*z + 88473600*a^8*b^4*c^7*d*k*l*z + 82575360*a^9*b^2*c^8 \\
& *d*j*m*z + 11796480*a^{10}*b^2*c^7*h*j*m*z + 5898240*a^9*b^4*c^6*g*k*m*z - 47 \\
& 18592*a^{10}*b^2*c^7*g*k*m*z - 70778880*a^9*b^2*c^8*d*k*l*z - 2949120*a^8*b^6 \\
& *c^5*g*k*m*z - 2457600*a^8*b^6*c^5*h*j*m*z + 921600*a^7*b^8*c^4*h*j*m*z + 7 \\
& 37280*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 + 2949120 \\
& 0*a^9*b^3*c^7*f*k*l*z - 176947200*a^7*b^3*c^9*d*e*k*z - 109707264*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 + 368640 \\
& 0*a^7*b^7*c^5*f*k*l*z + 3225600*a^6*b^9*c^4*d*l*m*z - 14745600*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^{11}*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 - 294912 \\
& 00*a^8*b^4*c^7*e*h*m*z - 11796480*a^9*b^2*c^8*f*j*k*z + 11059200*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 + 24 \\
& 57600*a^7*b^6*c^6*f*j*k*z - 35389440*a^8*b^3*c^8*d*j*k*z - 1382400*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 + 69120*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 + 4423 \\
& 6800*a^7*b^5*c^7*d*h*l*z + 7372800*a^7*b^6*c^6*e*h*m*z - 5898240*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 + 29 \\
& 49120*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*
\end{aligned}$$

$d*g*h*z - 25804800*a^6*b^7*c^6*d*g*m*z - 58982400*a^8*b^2*c^9*e*f*k*z - 589$
 $82400*a^6*b^6*c^7*d*f*l*z + 7372800*a^6*b^7*c^6*d*j*k*z + 88473600*a^6*b^5*$
 $c^8*d*e*k*z - 2764800*a^5*b^9*c^5*d*j*k*z + 51609600*a^6*b^6*c^7*d*e*m*z +$
 $414720*a^4*b^11*c^4*d*j*k*z - 23040*a^3*b^13*c^3*d*j*k*z - 14745600*a^7*b^5$
 $*c^7*f*g*k*z - 44236800*a^6*b^6*c^7*d*g*k*z - 6635520*a^6*b^7*c^6*d*h*l*z +$
 $40108032*a^8*b^2*c^9*d*h*j*z + 3686400*a^6*b^7*c^6*f*g*k*z + 3225600*a^5*b$
 $^9*c^5*d*g*m*z + 2359296*a^8*b^3*c^8*f*h*j*z - 491520*a^6*b^7*c^6*f*h*j*z -$
 $460800*a^5*b^9*c^5*f*g*k*z - 276480*a^5*b^9*c^5*d*h*l*z + 184320*a^5*b^9*c$
 $^5*f*h*j*z + 179712*a^4*b^11*c^4*d*h*l*z - 161280*a^4*b^11*c^4*d*g*m*z - 27$
 $648*a^4*b^11*c^4*f*h*j*z + 23040*a^4*b^11*c^4*f*g*k*z - 13824*a^3*b^13*c^3*$
 $d*h*l*z + 1536*a^3*b^13*c^3*f*h*j*z + 29491200*a^7*b^4*c^8*e*f*k*z + 110886$
 $912*a^6*b^4*c^9*d*f*g*z + 16220160*a^5*b^8*c^6*d*f*l*z - 45613056*a^7*b^3*c$
 $^9*d*f*j*z + 11059200*a^5*b^8*c^6*d*g*k*z - 10321920*a^6*b^6*c^7*d*h*j*z -$
 $7372800*a^6*b^6*c^7*e*f*k*z + 7077888*a^7*b^4*c^8*d*h*j*z - 6451200*a^5*b^8$
 $*c^6*d*e*m*z - 88473600*a^6*b^4*c^9*d*e*h*z + 2396160*a^5*b^8*c^6*d*h*j*z -$
 $2396160*a^4*b^10*c^5*d*f*l*z - 1382400*a^4*b^10*c^5*d*g*k*z - 84934656*a^7$
 $*b^2*c^10*d*f*g*z + 921600*a^5*b^8*c^6*e*f*k*z + 117964800*a^5*b^5*c^9*d*e*$
 $f*z + 322560*a^4*b^10*c^5*d*e*m*z + 175104*a^3*b^12*c^4*d*f*l*z + 69120*a^3$
 $*b^12*c^4*d*g*k*z - 50688*a^3*b^12*c^4*d*h*j*z - 46080*a^4*b^10*c^5*e*f*k*z$
 $- 27648*a^4*b^10*c^5*d*h*j*z + 4608*a^2*b^14*c^3*d*h*j*z - 4608*a^2*b^14*c$
 $^3*d*f*l*z + 44236800*a^6*b^5*c^8*d*g*h*z - 5898240*a^7*b^4*c^8*f*g*h*z - 2$
 $2118400*a^5*b^7*c^7*d*e*k*z + 4718592*a^8*b^2*c^9*f*g*h*z + 2949120*a^6*b^6$
 $*c^7*f*g*h*z - 737280*a^5*b^8*c^6*f*g*h*z + 92160*a^4*b^10*c^5*f*g*h*z - 46$
 $08*a^3*b^12*c^4*f*g*h*z + 8847360*a^5*b^7*c^7*d*f*j*z - 58982400*a^5*b^6*c^8$
 $*d*f*g*z - 3809280*a^4*b^9*c^6*d*f*j*z + 2764800*a^4*b^9*c^6*d*e*k*z + 235$
 $9296*a^6*b^5*c^8*d*f*j*z + 681984*a^3*b^11*c^5*d*f*j*z - 138240*a^3*b^11*c^5$
 $*d*e*k*z - 55296*a^2*b^13*c^4*d*f*j*z + 11796480*a^7*b^3*c^9*e*f*h*z - 663$
 $5520*a^5*b^7*c^7*d*g*h*z - 5898240*a^6*b^5*c^8*e*f*h*z + 1474560*a^5*b^7*c^7$
 $*e*f*h*z - 276480*a^4*b^9*c^6*d*g*h*z - 184320*a^4*b^9*c^6*e*f*h*z + 17971$
 $2*a^3*b^11*c^5*d*g*h*z - 13824*a^2*b^13*c^4*d*g*h*z + 9216*a^3*b^11*c^5*e*f$
 $*h*z + 16220160*a^4*b^8*c^7*d*f*g*z + 13271040*a^5*b^6*c^8*d*e*h*z - 239616$
 $0*a^3*b^10*c^6*d*f*g*z + 552960*a^4*b^8*c^7*d*e*h*z - 359424*a^3*b^10*c^6*d$
 $*e*h*z + 175104*a^2*b^12*c^5*d*f*g*z + 27648*a^2*b^12*c^5*d*e*h*z - 3244032$
 $0*a^4*b^7*c^8*d*e*f*z + 4792320*a^3*b^9*c^7*d*e*f*z - 350208*a^2*b^11*c^6*d$
 $*e*f*z + 165150720*a^10*b*c^8*d*l*m*z + 4608*a^6*b^12*c*k*l*m*z + 23592960*$
 $a^11*b*c^7*h*l*m*z + 3145728*a^11*b*c^7*j*k*m*z - 1536*a^5*b^13*c*j*k*m*z +$
 $165150720*a^9*b*c^9*d*g*m*z + 346816512*a^7*b*c^11*d^2*g*z + 19660800*a^12$
 $*b*c^6*l*m^2*z - 34560*a^7*b^11*c*l*m^2*z - 7077888*a^11*b*c^7*k^2*l*z + 11$
 $008*a^6*b^12*c*j*m^2*z + 19660800*a^11*b*c^7*g*m^2*z + 7077888*a^10*b*c^8*h$
 $^2*l*z + 768*a^5*b^13*c*g*m^2*z - 19660800*a^9*b*c^9*f^2*l*z - 7077888*a^10$
 $*b*c^8*g*k^2*z - 6912*a*b^15*c^3*d^2*l*z + 7077888*a^9*b*c^9*g*h^2*z - 1966$
 $0800*a^8*b*c^10*f^2*g*z - 66816*a*b^14*c^4*d^2*j*z + 214272*a*b^13*c^5*d^2*$
 $g*z - 428544*a*b^12*c^6*d^2*e*z - 330301440*a^9*c^10*d*e*m*z - 110100480*a^10$
 $*c^9*d*j*m*z - 15728640*a^11*c^8*h*j*m*z - 47185920*a^10*c^9*e*h*m*z - 19$
 $8180864*a^8*c^11*d*e*h*z + 15728640*a^10*c^9*f*j*k*z - 66060288*a^9*c^10*d*$
 $h*j*z + 47185920*a^9*c^10*e*f*k*z + 1022754816*a^6*b^2*c^11*d^2*e*z - 64231$
 $8336*a^5*b^4*c^10*d^2*e*z - 511377408*a^7*b^3*c^9*d^2*l*z - 511377408*a^6*b$
 $^3*c^10*d^2*g*z + 321159168*a^6*b^5*c^8*d^2*l*z + 321159168*a^5*b^5*c^9*d^2$
 $*g*z + 225312768*a^7*b^2*c^10*d^2*j*z - 25362432*a^11*b^3*c^5*l*m^2*z + 132$
 $71040*a^10*b^5*c^4*l*m^2*z - 3563520*a^9*b^7*c^3*l*m^2*z + 506880*a^8*b^9*c$
 $^2*l*m^2*z + 10354688*a^11*b^2*c^6*j*m^2*z + 8847360*a^10*b^3*c^6*k^2*l*z -$
 $4423680*a^9*b^5*c^5*k^2*l*z - 2048000*a^9*b^6*c^4*j*m^2*z + 1105920*a^8*b^7$
 $*c^4*k^2*l*z + 849920*a^8*b^8*c^3*j*m^2*z - 393216*a^10*b^4*c^5*j*m^2*z -$
 $145920*a^7*b^10*c^2*j*m^2*z - 138240*a^7*b^9*c^3*k^2*l*z + 6912*a^6*b^11*c^2$
 $*k^2*l*z - 111697920*a^5*b^7*c^7*d^2*l*z + 223395840*a^4*b^6*c^9*d^2*e*z -$
 $25362432*a^10*b^3*c^6*g*m^2*z - 3538944*a^10*b^2*c^7*j*k^2*z + 737280*a^8*$
 $b^6*c^5*j*k^2*z + 50724864*a^10*b^2*c^7*e*m^2*z - 276480*a^7*b^8*c^4*j*k^2*$
 $z + 41472*a^6*b^10*c^3*j*k^2*z - 2304*a^5*b^12*c^2*j*k^2*z + 13271040*a^9*b$
 $^5*c^5*g*m^2*z - 8847360*a^9*b^3*c^7*h^2*l*z + 4423680*a^8*b^5*c^6*h^2*l*z$

$$\begin{aligned}
& - 3563520a^8b^7c^4g^2m^2z - 1105920a^7b^7c^5h^2l^2z + 506880a^7b^8c^3g^2m^2z + 138240a^6b^9c^4h^2l^2z - 34560a^6b^11c^2g^2m^2z - 6912a^5b^11c^3h^2l^2z - 26542080a^9b^4c^6e^2m^2z + 25362432a^8b^3c^8f^2l^2z - 13271040a^7b^5c^7f^2l^2z + 8847360a^9b^3c^7g^2k^2z + 7127040a^8b^6c^5e^2m^2z - 4423680a^8b^5c^6g^2k^2z + 3563520a^6b^7c^6f^2l^2z + 3538944a^9b^2c^8h^2j^2z + 1105920a^7b^7c^5g^2k^2z - 1013760a^7b^8c^4e^2m^2z - 737280a^7b^6c^6h^2j^2z - 506880a^5b^9c^5f^2l^2z + 276480a^6b^8c^5h^2j^2z - 138240a^6b^9c^4g^2k^2z + 69120a^6b^10c^3e^2m^2z - 41472a^5b^10c^4h^2j^2z + 34560a^4b^11c^4f^2l^2z + 6912a^5b^11c^3g^2k^2z + 2304a^4b^12c^3h^2j^2z - 1536a^5b^12c^2e^2m^2z - 768a^3b^13c^3f^2l^2z - 111697920a^4b^7c^8d^2g^2z + 23362560a^4b^9c^6d^2l^2z - 17694720a^9b^2c^8e^2k^2z - 10354688a^8b^2c^9f^2j^2z - 43646976a^6b^4c^9d^2j^2z + 8847360a^8b^4c^7e^2k^2z - 2965248a^3b^11c^5d^2l^2z - 2211840a^7b^6c^6e^2k^2z + 2048000a^6b^6c^7f^2j^2z - 849920a^5b^8c^6f^2j^2z + 393216a^7b^4c^8f^2j^2z + 276480a^6b^8c^5e^2k^2z + 214272a^2b^13c^4d^2l^2z + 145920a^4b^10c^5f^2j^2z - 13824a^5b^10c^4e^2k^2z - 11008a^3b^12c^4f^2j^2z + 256a^2b^14c^3f^2j^2z - 32587776a^5b^6c^8d^2j^2z - 8847360a^8b^3c^8g^2h^2z + 21657600a^4b^8c^7d^2j^2z + 4423680a^7b^5c^7g^2h^2z - 1105920a^6b^7c^6g^2h^2z + 138240a^5b^9c^5g^2h^2z - 6912a^4b^11c^4g^2h^2z + 25362432a^7b^3c^9f^2g^2z - 5810688a^3b^10c^6d^2j^2z + 17694720a^8b^2c^9e^2h^2z + 845568a^2b^12c^5d^2j^2z - 50724864a^7b^2c^10e^2f^2z - 13271040a^6b^5c^8f^2g^2z - 8847360a^7b^4c^8e^2h^2z + 3563520a^5b^7c^7f^2g^2z + 2211840a^6b^6c^7e^2h^2z - 506880a^4b^9c^6f^2g^2z - 276480a^5b^8c^6e^2h^2z + 34560a^3b^11c^5f^2g^2z + 13824a^4b^10c^5e^2h^2z - 768a^2b^13c^4f^2g^2z + 26542080a^6b^4c^9e^2f^2z + 23362560a^3b^9c^7d^2g^2z - 46725120a^3b^8c^8d^2e^2z - 7127040a^5b^6c^8e^2f^2z - 2965248a^2b^11c^6d^2g^2z + 1013760a^4b^8c^7e^2f^2z - 69120a^3b^10c^6e^2f^2z + 1536a^2b^12c^5e^2f^2z + 5930496a^2b^10c^7d^2e^2z + 346816512a^8b^c^10d^2l^2z - 693633024a^7c^12d^2e^2z - 231211008a^8c^11d^2j^2z + 768a^6b^13l^2m^2z - 13107200a^12c^7j^2m^2z - 256a^5b^14j^2m^2z + 4718592a^11c^8j^2k^2z - 3932160a^11c^8e^2m^2z - 4718592a^10c^9h^2j^2z + 14155776a^10c^9e^2k^2z + 13107200a^9c^10f^2j^2z + 2304b^16c^3d^2j^2z - 14155776a^9c^10e^2h^2z + 39321600a^8c^11e^2f^2z - 6912b^15c^4d^2g^2z + 13824b^14c^5d^2e^2z + 737280a^10b^c^5j^2k^2l^2m - 2304a^6b^9c^5j^2k^2l^2m + 2211840a^9b^c^6e^2k^2l^2m + 1228800a^9b^c^6f^2j^2l^2m + 737280a^9b^c^6g^2j^2k^2m + 442368a^9b^c^6h^2j^2k^2l + 36a^3b^12c^2f^2h^2k^2m + 3096576a^8b^c^7d^2j^2k^2l - 12745728a^8b^c^7d^2h^2k^2m + 3686400a^8b^c^7e^2f^2l^2m + 3391488a^8b^c^7e^2h^2j^2m + 2211840a^8b^c^7e^2g^2k^2m + 1327104a^8b^c^7e^2h^2k^2l + 1228800a^8b^c^7f^2g^2j^2m + 737280a^8b^c^7f^2h^2j^2l + 442368a^8b^c^7g^2h^2j^2k + 108a^2b^13c^2d^2h^2k^2m + 16367616a^7b^c^8d^2e^2j^2m + 9289728a^7b^c^8d^2e^2k^2l + 5160960a^7b^c^8d^2f^2j^2l + 3391488a^7b^c^8e^2f^2j^2k + 3096576a^7b^c^8d^2g^2j^2k - 19307520a^7b^c^8d^2f^2h^2m + 3686400a^7b^c^8e^2f^2g^2m + 2211840a^7b^c^8e^2f^2h^2l + 1327104a^7b^c^8e^2g^2h^2k + 737280a^7b^c^8f^2g^2h^2j - 180a^2b^13c^2d^2f^2h^2m - 540a^2b^12c^3d^2f^2h^2k + 15482880a^6b^c^9d^2e^2f^2l + 11059200a^6b^c^9d^2e^2h^2j + 9289728a^6b^c^9d^2e^2g^2k + 5160960a^6b^c^9d^2f^2g^2j - 2304a^2b^11c^4d^2f^2g^2j + 2211840a^6b^c^9e^2f^2g^2h + 4608a^2b^10c^5d^2e^2f^2j + 15482880a^5b^c^10d^2e^2f^2g - 13824a^2b^9c^6d^2e^2f^2g + 36a^2b^14c^2d^2f^2k^2m + 1843200a^9b^3c^4j^2k^2l^2m + 783360a^8b^5c^3j^2k^2l^2m + 18432a^7b^7c^2j^2k^2l^2m - 2211840a^8b^4c^4g^2k^2l^2m - 1695744a^9b^2c^5h^2j^2l^2m - 1400832a^8b^4c^4h^2j^2l^2m - 1105920a^9b^2c^5g^2k^2l^2m - 253440a^7b^6c^3h^2j^2l^2m - 69120a^7b^6c^3g^2k^2l^2m + 11520a^6b^8c^2h^2j^2l^2m + 6912a^6b^8c^2g^2k^2l^2m + 4423680a^8b^3c^5e^2k^2l^2m + 2506752a^8b^3c^5f^2j^2l^2m + 1843200a^8b^3c^5g^2j^2k^2m + 1327104a^8b^3c^5h^2j^2k^2l + 838656a^7b^5c^4f^2j^2l^2m + 783360a^7b^5c^4g^2j^2k^2m + 691200a^7b^5c^4h^2j^2k^2l + 138240a^7b^5c^4e^2k^2l^2m + 69120a^6b^7c^3h^2j^2k^2l - 53760a^6b^7c^3f^2j^2l^2m + 18432a^6b^7c^3g^2j^2k^2m - 13824a^6b^7c^3e^2k^2l^2m - 2304a^5b^9c^2g^2j^2k^2m + 2543616a^8b^3c^5g^2h^2l^2m + 82
\end{aligned}$$

$9440a^7b^5c^4g^h1m - 34560a^6b^7c^3g^h1m - 8183808a^8b^2c^6d^j1m - 3686400a^8b^2c^6e^j*k1m - 2285568a^7b^4c^5d^j1m - 1695744a^8b^2c^6f^j*k1 - 1566720a^7b^4c^5e^j*k1 - 1400832a^7b^4c^5f^j*k1 + 741888a^6b^6c^4d^j1m - 253440a^6b^6c^4f^j*k1 - 80640a^5b^8c^3d^j1m - 36864a^6b^6c^4e^j*k1 + 11520a^5b^8c^3f^j*k1 + 4608a^5b^8c^3e^j*k1 + 6700032a^8b^2c^6f^h*k1 + 5103360a^7b^4c^5f^h*k1 - 5087232a^8b^2c^6e^h1m - 2838528a^7b^4c^5f^g1m - 1843200a^8b^2c^6f^g1m - 1695744a^8b^2c^6g^h*j1m - 1658880a^7b^4c^5g^h*k1 - 1658880a^7b^4c^5e^h1m - 1400832a^7b^4c^5g^h*j1m - 663552a^8b^2c^6g^h*k1 + 483840a^6b^6c^4f^h*k1 - 253440a^6b^6c^4g^h*j1m - 207360a^6b^6c^4g^h*k1 + 161280a^6b^6c^4f^g1m + 69120a^6b^6c^4e^h1m - 50040a^5b^8c^3f^h*k1 + 11520a^5b^8c^3g^h*j1m + 180a^4b^10c^2f^h*k1 + 4202496a^7b^3c^6d^j*k1 + 635904a^6b^5c^5d^j*k1 - 276480a^5b^7c^4d^j*k1 + 34560a^4b^9c^3d^j*k1 - 16671744a^7b^3c^6d^h*k1 + 12275712a^7b^3c^6d^g1m + 5677056a^7b^3c^6e^f1m + 4423680a^7b^3c^6e^g*k1 + 3317760a^7b^3c^6e^h*k1 + 2801664a^7b^3c^6e^h*j1m - 2709504a^6b^5c^5d^g1m + 2543616a^7b^3c^6f^g*k1 + 2506752a^7b^3c^6f^g*j1m + 1843200a^7b^3c^6f^h*j1 + 1327104a^7b^3c^6g^h*j1 + 838656a^6b^5c^5f^g*j1 + 829440a^6b^5c^5f^g*k1 + 783360a^6b^5c^5f^h*j1 + 691200a^6b^5c^5g^h*j1 + 665280a^5b^7c^4d^h*k1 + 506880a^6b^5c^5e^h*j1 + 414720a^6b^5c^5e^h*k1 - 322560a^6b^5c^5e^f1m + 241920a^5b^7c^4d^g1m + 138240a^6b^5c^5e^g*k1 - 108540a^4b^9c^3d^h*k1 + 69120a^5b^7c^4g^h*j1 - 53760a^5b^7c^4f^g*j1 - 51840a^6b^5c^5d^h*k1 - 34560a^5b^7c^4f^g*k1 - 23040a^5b^7c^4e^h*j1 + 18432a^5b^7c^4f^h*j1 - 13824a^5b^7c^4e^g*k1 - 2304a^4b^9c^3f^h*j1 + 1296a^3b^11c^2d^h*k1 + 31924224a^7b^2c^7d^f*k1 - 24551424a^7b^2c^7d^e1m + 10616832a^7b^2c^7e^g*j1 - 8183808a^7b^2c^7d^g*j1 - 5529600a^7b^2c^7d^h*j1 + 5419008a^6b^4c^6d^e1m + 5308416a^6b^4c^6e^g*j1 - 5087232a^7b^2c^7e^f*k1 - 5013504a^7b^2c^7e^f*j1 + 4868352a^6b^4c^6d^f*k1 - 4644864a^7b^2c^7d^g*k1 - 3981312a^6b^4c^6d^g*k1 - 2654208a^7b^2c^7e^h*j1 - 2367360a^5b^6c^5d^f*k1 - 2285568a^6b^4c^6d^g*j1 - 2211840a^6b^4c^6d^h*j1 - 1695744a^7b^2c^7f^g*j1 - 1677312a^6b^4c^6e^f*j1 - 1658880a^6b^4c^6e^f*k1 - 1400832a^6b^4c^6f^g*j1 - 1382400a^6b^4c^6e^h*j1 + 1036800a^5b^6c^5d^g*k1 + 741888a^5b^6c^5d^g*j1 - 483840a^5b^6c^5d^e1m + 317952a^5b^6c^5d^h*j1 + 268920a^4b^8c^4d^f*k1 - 253440a^5b^6c^5f^g*j1 - 138240a^5b^6c^5e^h*j1 + 107520a^5b^6c^5e^f*j1 - 103680a^4b^8c^4d^g*k1 - 80640a^4b^8c^4d^g*j1 + 69120a^5b^6c^5e^f*k1 + 11520a^4b^8c^4f^g*j1 + 6912a^4b^8c^4d^h*j1 - 6912a^3b^10c^3d^h*j1 + 6120a^3b^10c^3d^f*k1 - 1368a^2b^12c^2d^f*k1 - 5087232a^7b^2c^7e^g^h1m - 2211840a^6b^4c^6f^g^h1 - 1658880a^6b^4c^6e^g^h1m - 1105920a^7b^2c^7f^g^h1 - 69120a^5b^6c^5f^g^h1 + 69120a^5b^6c^5e^g^h1m + 6912a^4b^8c^4f^g^h1 + 7962624a^6b^3c^7d^e*k1 - 22164480a^6b^3c^7d^f^h1m + 5160960a^6b^3c^7d^f*j1 + 4571136a^6b^3c^7d^e*j1 + 4202496a^6b^3c^7d^g*j1 + 2801664a^6b^3c^7e^f*j1 - 2073600a^5b^5c^6d^e*k1 - 1483776a^5b^5c^6d^e*j1 + 635904a^5b^5c^6d^g*j1 + 506880a^5b^5c^6e^f*j1 - 354816a^4b^7c^5d^f*j1 + 322560a^5b^5c^6d^f*j1 - 276480a^4b^7c^5d^g*j1 + 207360a^4b^7c^5d^e*k1 + 161280a^4b^7c^5d^e*j1 + 59904a^3b^9c^4d^f*j1 + 34560a^3b^9c^4d^g*j1 - 23040a^4b^7c^5e^f*j1 - 2304a^2b^11c^3d^f*j1 + 8294400a^6b^3c^7d^g^h1 + 5677056a^6b^3c^7e^f^g1m + 4423680a^6b^3c^7e^f^h1 + 3317760a^6b^3c^7e^g^h1 + 2805120a^5b^5c^6d^f^h1 + 1843200a^6b^3c^7f^g^h1 - 829440a^5b^5c^6d^g^h1 + 783360a^5b^5c^6f^g^h1 + 437184a^4b^7c^5d^f^h1 + 414720a^5b^5c^6e^g^h1 - 322560a^5b^5c^6e^f^g1m - 146268a^3b^9c^4d^f^h1 + 138240a^5b^5c^6e^f^h1 - 62208a^4b^7c^5d^g^h1 + 20736a^3b^9c^4d^g^h1 + 18432a^4b^7c^5f^g^h1 - 13824a^4b^7c^5e^f^h1 + 9360a^2b^11c^3d^f^h1 - 2304a^3b^9c^4f^g^h1 - 8404992a^6b^2c^8d^e*j1 - 24551424a^6b^2c^8d^e^g1m + 21150720a^6b^2c^8d^e^h1m$

$c^8*d*f*h*k - 1271808*a^5*b^4*c^7*d*e*j*k + 552960*a^4*b^6*c^6*d*e*j*k - 69$
 $120*a^3*b^8*c^5*d*e*j*k - 16588800*a^6*b^2*c^8*d*e*h*1 - 7741440*a^6*b^2*c^$
 $8*d*f*g*1 + 6946560*a^5*b^4*c^7*d*f*h*k - 5529600*a^6*b^2*c^8*d*g*h*j + 541$
 $9008*a^5*b^4*c^7*d*e*g*m - 5087232*a^6*b^2*c^8*e*f*g*k - 3870720*a^5*b^4*c^$
 $7*d*f*g*1 - 3686400*a^6*b^2*c^8*e*f*h*j - 2211840*a^5*b^4*c^7*d*g*h*j - 175$
 $5648*a^4*b^6*c^6*d*f*h*k - 1658880*a^5*b^4*c^7*e*f*g*k + 1658880*a^5*b^4*c^$
 $7*d*e*h*1 - 1566720*a^5*b^4*c^7*e*f*h*j + 1451520*a^4*b^6*c^6*d*f*g*1 - 483$
 $840*a^4*b^6*c^6*d*e*g*m + 317952*a^4*b^6*c^6*d*g*h*j - 193536*a^3*b^8*c^5*d$
 $*f*g*1 + 124416*a^4*b^6*c^6*d*e*h*1 + 114696*a^3*b^8*c^5*d*f*h*k + 69120*a^$
 $4*b^6*c^6*e*f*g*k - 41472*a^3*b^8*c^5*d*e*h*1 - 36864*a^4*b^6*c^6*e*f*h*j +$
 $14580*a^2*b^10*c^4*d*f*h*k + 6912*a^3*b^8*c^5*d*g*h*j - 6912*a^2*b^10*c^4*$
 $d*g*h*j + 6912*a^2*b^10*c^4*d*f*g*1 + 4608*a^3*b^8*c^5*e*f*h*j + 7962624*a^$
 $5*b^3*c^8*d*e*g*k + 7741440*a^5*b^3*c^8*d*e*f*1 + 5160960*a^5*b^3*c^8*d*f*g$
 $*j + 4423680*a^5*b^3*c^8*d*e*h*j - 2903040*a^4*b^5*c^7*d*e*f*1 - 2073600*a^$
 $4*b^5*c^7*d*e*g*k - 635904*a^4*b^5*c^7*d*e*h*j + 387072*a^3*b^7*c^6*d*e*f*1$
 $- 354816*a^3*b^7*c^6*d*f*g*j + 322560*a^4*b^5*c^7*d*f*g*j + 207360*a^3*b^7$
 $*c^6*d*e*g*k + 59904*a^2*b^9*c^5*d*f*g*j - 13824*a^3*b^7*c^6*d*e*h*j + 1382$
 $4*a^2*b^9*c^5*d*e*h*j - 13824*a^2*b^9*c^5*d*e*f*1 + 4423680*a^5*b^3*c^8*e*f$
 $*g*h + 138240*a^4*b^5*c^7*e*f*g*h - 13824*a^3*b^7*c^6*e*f*g*h - 10321920*a^$
 $5*b^2*c^9*d*e*f*j + 709632*a^3*b^6*c^7*d*e*f*j - 645120*a^4*b^4*c^8*d*e*f*j$
 $- 119808*a^2*b^8*c^6*d*e*f*j - 16588800*a^5*b^2*c^9*d*e*g*h + 1658880*a^4*$
 $b^4*c^8*d*e*g*h + 124416*a^3*b^6*c^7*d*e*g*h - 41472*a^2*b^8*c^6*d*e*g*h +$
 $7741440*a^4*b^3*c^9*d*e*f*g - 2903040*a^3*b^5*c^8*d*e*f*g + 387072*a^2*b^7*$
 $c^7*d*e*f*g + 3456*a^7*b^8*c*k*1^2*m + 12672*a^7*b^8*c*j*1*m^2 + 384*a^5*b^$
 $10*c*j^2*k*m - 1635840*a^10*b*c^5*h*k*m^2 - 1009152*a^9*b*c^6*h^2*k*m + 369$
 $0*a^6*b^9*c*h*k*m^2 + 1152*a^6*b^9*c*g*1*m^2 - 540*a^5*b^10*c*h*k^2*m + 54*$
 $a^4*b^11*c*h^2*k*m + 565248*a^9*b*c^6*h*j^2*m - 39771648*a^7*b*c^8*d^2*k*m$
 $- 2496000*a^8*b*c^7*f^2*k*m - 1543680*a^9*b*c^6*f*k^2*m + 1980*a^5*b^10*c*f$
 $*k*m^2 - 384*a^5*b^10*c*g*j*m^2 - 180*a^4*b^11*c*f*k^2*m + 6*a^2*b^13*c*f^2$
 $*k*m - 10298880*a^9*b*c^6*d*k*m^2 + 2580480*a^9*b*c^6*e*j*m^2 + 5310*a^4*b^$
 $11*c*d*k*m^2 - 1674*a*b^13*c^2*d^2*k*m - 540*a^3*b^12*c*d*k^2*m - 10616832*$
 $a^7*b*c^8*e^2*j*1 - 3538944*a^8*b*c^7*e*j^2*1 + 2727936*a^8*b*c^7*d*j^2*m -$
 $2496000*a^9*b*c^6*f*h*m^2 - 1543680*a^8*b*c^7*f*h^2*m + 565248*a^8*b*c^7*f$
 $*j^2*k - 270*a^4*b^11*c*f*h*m^2 - 59512320*a^6*b*c^9*d^2*f*m + 5087232*a^7*$
 $b*c^8*e^2*h*m + 1105920*a^8*b*c^7*e*j*k^2 - 3456*a*b^12*c^3*d^2*j*1 - 16358$
 $40*a^7*b*c^8*f^2*h*k - 1009152*a^8*b*c^7*f*h*k^2 + 10260*a*b^12*c^3*d^2*h*m$
 $- 684*a^3*b^12*c*d*h*m^2 - 24675840*a^6*b*c^9*d^2*h*k - 15552000*a^8*b*c^7$
 $*d*f*m^2 + 24551424*a^6*b*c^9*d*e^2*m - 3939840*a^7*b*c^8*d*h^2*k + 1105920$
 $*a^7*b*c^8*e*h^2*j - 25074*a*b^11*c^4*d^2*f*m + 10530*a*b^11*c^4*d^2*h*k +$
 $10368*a*b^11*c^4*d^2*g*1 + 420*a*b^12*c^3*d*f^2*m - 378*a^2*b^13*c*d*f*m^2$
 $- 10616832*a^6*b*c^9*e^2*g*j + 5087232*a^6*b*c^9*e^2*f*k - 3538944*a^7*b*c^$
 $8*e*g*j^2 + 1843200*a^7*b*c^8*d*h*j^2 - 7994880*a^6*b*c^9*d*f^2*k - 4990464$
 $*a^7*b*c^8*d*f*k^2 + 2580480*a^6*b*c^9*e*f^2*j + 65664*a*b^10*c^5*d^2*g*j -$
 $27972*a*b^10*c^5*d^2*f*k - 20736*a*b^10*c^5*d^2*e*1 + 1260*a*b^11*c^4*d*f^$
 $2*k + 54*a*b^13*c^2*d*f*k^2 + 23224320*a^5*b*c^10*d^2*e*j - 37062144*a^5*b*$
 $c^10*d^2*f*h + 384*a*b^12*c^3*d*f*j^2 - 131328*a*b^9*c^6*d^2*e*j - 5985792*$
 $a^6*b*c^9*d*f*h^2 + 206010*a*b^9*c^6*d^2*f*h - 6300*a*b^10*c^5*d*f^2*h + 13$
 $50*a*b^11*c^4*d*f*h^2 + 16588800*a^5*b*c^10*d*e^2*h + 3456*a*b^10*c^5*d*f*g$
 $^2 + 435456*a*b^8*c^7*d^2*e*g + 13824*a*b^8*c^7*d*e^2*f - 1474560*a^9*c^7*e$
 $*j*k*m + 460800*a^9*c^7*f*h*k*m + 3225600*a^8*c^8*d*f*k*m - 2457600*a^8*c^8$
 $*e*f*j*m - 884736*a^8*c^8*e*h*j*k - 6193152*a^7*c^9*d*e*j*k + 1935360*a^7*c$
 $^9*d*f*h*k - 1474560*a^7*c^9*e*f*h*j - 10321920*a^6*c^10*d*e*f*j - 1105920*$
 $a^9*b^4*c^3*k*1^2*m - 552960*a^10*b^2*c^4*k*1^2*m - 34560*a^8*b^6*c^2*k*1^2$
 $*m - 1290240*a^10*b^2*c^4*j*1*m^2 - 860160*a^9*b^4*c^3*j*1*m^2 - 80640*a^8*$
 $b^6*c^2*j*1*m^2 - 737280*a^9*b^2*c^5*j^2*k*m - 568320*a^8*b^4*c^4*j^2*k*m -$
 $136704*a^7*b^6*c^3*j^2*k*m - 2304*a^6*b^8*c^2*j^2*k*m + 1271808*a^9*b^3*c^$
 $4*h*1^2*m - 552960*a^9*b^2*c^5*j*k^2*1 - 552960*a^8*b^4*c^4*j*k^2*1 + 41472$
 $0*a^8*b^5*c^3*h*1^2*m - 145152*a^7*b^6*c^3*j*k^2*1 - 17280*a^7*b^7*c^2*h*1^$
 $2*m - 3456*a^6*b^8*c^2*j*k^2*1 - 3640320*a^9*b^3*c^4*h*k*m^2 - 2626560*a^8*$

$$\begin{aligned}
& b^3c^5h^2k^m + 2211840a^9b^2c^5hk^2m + 2056320a^8b^4c^4hk^2m \\
& + 1935360a^9b^3c^4g^1m^2 - 1143360a^8b^5c^3hk^2m - 1097280a^7b^5c^4h^2k^m + 364608a^7b^6c^3hk^2m + 322560a^8b^5c^3g^1m^2 - \\
& 56160a^6b^7c^3h^2k^m - 40320a^7b^7c^2g^1m^2 + 27936a^7b^7c^2hk^2m - 3780a^6b^8c^2hk^2m + 2970a^5b^9c^2h^2k^m - 1419264a^8 \\
& *b^4c^4f^1^2m - 1105920a^7b^4c^5g^2k^m - 921600a^9b^2c^5f^1^2m \\
& - 829440a^8b^4c^4hk^1^2 + 749568a^8b^3c^5h^2j^2m - 552960a^8b^2 \\
& *c^6g^2k^m - 331776a^9b^2c^5hk^1^2 + 317952a^7b^5c^4h^2j^2m - 10 \\
& 3680a^7b^6c^3hk^1^2 + 80640a^7b^6c^3f^1^2m + 38400a^6b^7c^3h^2j^2m - 34560a^6b^6c^4g^2k^m + 3456a^5b^8c^3g^2k^m - 1920a^5b^9 \\
& *c^2h^2j^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 + 3000960a^8b^4 \\
& *c^4f^2k^m - 1290240a^9b^2c^5g^2j^2m - 1085760a^7b^5c^4f^2k^m - \\
& 959040a^6b^5c^5f^2k^m - 860160a^8b^4c^4g^2j^2m + 829440a^8b^3c^4 \\
& 5g^2k^1 - 645120a^8b^4c^4e^1m^2 - 552960a^8b^2c^6h^2j^1 - 55296 \\
& 0a^7b^4c^5h^2j^1 + 414720a^7b^5c^4g^2k^1 - 145152a^6b^6c^4h^2 \\
& *j^1 + 103200a^5b^7c^4f^2k^m - 80640a^7b^6c^3g^2j^2m + 80640a^7b \\
& ^6c^3e^1m^2 + 41280a^7b^6c^3f^2k^m - 37188a^6b^8c^2f^2k^m + 13 \\
& 536a^6b^7c^3f^2k^m + 12672a^6b^8c^2g^2j^2m + 10368a^6b^7c^3g^2k \\
& ^2*1 + 5490a^5b^9c^2f^2k^m - 3456a^5b^8c^3h^2j^1 - 2304a^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 \\
& 1^2 - 2654208a^7b^3c^6g^2j^1 + 1769472a^8b^2c^6g^2j^2*1 + 1769472a \\
& ^7b^4c^5g^2j^2*1 - 1354752a^7b^5c^4d^1^2m - 1327104a^7b^5c^4g^2j \\
& 1^2 - 1327104a^6b^5c^5g^2j^1 + 1271808a^8b^3c^5f^2k^1^2 - 1040384a \\
& ^8b^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^2*1 + 414720a^7b^5 \\
& c^4f^2k^1^2 - 138240a^6b^6c^4h^2j^2k - 138240a^6b^4c^6e^2k^m - 1 \\
& 21856a^6b^6c^4f^2j^2m + 120960a^6b^7c^3d^1^2m - 17280a^6b^7c^3f \\
& f^2k^1^2 + 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^2m - 1658880a^8b^2c^6e^2k^ \\
& 2*1 - 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^2*1 - 705024a^6b^6c^4d^2k^2m - 552960a^8b^ \\
& 2c^6g^2j^2k^2 - 552960a^7b^4c^5g^2j^2k^2 + 414720a^6b^5c^5g^2h^m + 3 \\
& 19392a^6b^7c^3d^2k^m + 161280a^7b^5c^4e^2j^2m - 145152a^6b^6c^4 \\
& *g^2j^2k^2 - 85734a^5b^9c^2d^2k^m - 80640a^5b^6c^5f^2j^1 - 25344a^6 \\
& b^7c^3e^2j^2m + 23490a^3b^9c^4d^2k^m - 20736a^6b^6c^4e^2k^2*1 - \\
& 17280a^5b^7c^4g^2h^m + 14148a^5b^8c^3d^2k^2m + 13716a^2b^11c^3 \\
& *d^2k^m + 12690a^4b^10c^2d^2k^2m + 12672a^4b^8c^4f^2j^1 - 3456a^5 \\
& b^8c^3g^2j^2k^2 + 768a^5b^9c^2e^2j^2m - 384a^3b^10c^3f^2j^1 + 53 \\
& 08416a^8b^2c^6e^2j^1^2 - 5308416a^6b^3c^7e^2j^1 - 5142528a^8b^3c \\
& ^5f^2h^m + 5068800a^7b^2c^7f^2h^m - 3755520a^7b^3c^6f^2h^2m - 35 \\
& 38944a^7b^3c^6e^2j^2*1 + 3000960a^6b^4c^6f^2h^m + 2654208a^7b^4c \\
& ^5e^2j^1^2 - 2322432a^8b^2c^6d^2k^1^2 + 2125824a^7b^3c^6d^2j^2m - 19 \\
& 90656a^7b^4c^5d^2k^1^2 - 1085760a^6b^5c^5f^2h^2m - 959040a^7b^5c^ \\
& 4f^2h^m - 884736a^6b^5c^5e^2j^2*1 + 829440a^7b^3c^6g^2h^2*1 + 74956 \\
& 8a^7b^3c^6f^2j^2k + 518400a^6b^6c^4d^2k^1^2 + 414720a^6b^5c^5g^2h \\
& ^2*1 + 317952a^6b^5c^5f^2j^2k + 133632a^6b^5c^5d^2j^2m + 103200a^6 \\
& b^7c^3f^2h^m - 96768a^5b^7c^4d^2j^2m - 51840a^5b^8c^3d^2k^1^2 + \\
& 41280a^5b^6c^5f^2h^m + 38400a^5b^7c^4f^2j^2k - 37188a^4b^8c^4f \\
& ^2h^m + 13536a^5b^7c^4f^2h^2m + 13440a^4b^9c^3d^2j^2m + 10368a^5b \\
& ^7c^4g^2h^2*1 + 5490a^4b^9c^3f^2h^2m + 1980a^3b^10c^3f^2h^m - 19 \\
& 20a^4b^9c^3f^2j^2k + 810a^5b^9c^2f^2h^m - 180a^3b^11c^2f^2h^2m \\
& - 30a^2b^12c^2f^2h^m + 30067200a^6b^2c^8d^2h^m - 11612160a^6b^ \\
& 2c^8d^2j^1 + 1658880a^6b^3c^7e^2h^m + 1596672a^4b^6c^6d^2j^1 - \\
& 1419264a^6b^4c^6f^2g^2m - 1105920a^7b^4c^5f^2h^1^2 + 1105920a^7b^
\end{aligned}$$

$3c^6e^j k^2 - 921600a^7b^2c^7f^g^2m - 829440a^6b^4c^6g^2h^k - 5$
 $52960a^8b^2c^6f^h^1l^2 - 508032a^3b^8c^5d^2j^1 - 331776a^7b^2c^7$
 $g^2h^k + 290304a^6b^5c^5e^j k^2 - 103680a^5b^6c^5g^2h^k + 80640a$
 $a^5b^6c^5f^g^2m - 69120a^5b^5c^6e^2h^m + 65664a^2b^{10}c^4d^2j^1$
 $l - 34560a^6b^6c^4f^h^1l^2 + 6912a^5b^7c^4e^j k^2 + 3456a^5b^8c^3$
 $f^h^1l^2 + 11930112a^8b^2c^6d^h^m^2 + 8432640a^7b^2c^7d^h^2m + 445$
 $0176a^7b^4c^5d^h^m^2 + 4337280a^6b^4c^6d^h^2m - 3870720a^8b^2c^6$
 $e^g^m^2 - 3640320a^6b^3c^7f^2h^k - 2885760a^5b^4c^7d^2h^m - 284$
 $4288a^4b^6c^6d^2h^m - 2626560a^7b^3c^6f^h^k^2 + 2211840a^7b^2c^7$
 $f^h^2k + 2056320a^6b^4c^6f^h^2k + 1935360a^6b^3c^7f^2g^1 - 191$
 $6928a^7b^2c^7d^j^2k - 1687680a^6b^6c^4d^h^m^2 - 1658880a^7b^2c^7$
 $e^h^2l - 1143360a^5b^5c^6f^2h^k - 1097280a^6b^5c^5f^h^k^2 + 101$
 $9412a^3b^8c^5d^2h^m - 1007424a^5b^6c^5d^h^2m - 912384a^6b^4c^6$
 $d^j^2k - 829440a^6b^4c^6e^h^2l - 645120a^7b^4c^5e^g^m^2 - 552960$
 $a^7b^2c^7g^h^2j - 552960a^6b^4c^6g^h^2j + 364608a^5b^6c^5f^h^2$
 $2k + 322560a^5b^5c^6f^2g^1 + 197460a^5b^8c^3d^h^m^2 - 145152a^5b$
 $b^6c^5g^h^2j - 143802a^2b^{10}c^4d^2h^m + 80640a^6b^6c^4e^g^m^2 -$
 $56160a^5b^7c^4f^h^k^2 + 51948a^4b^8c^4d^h^2m - 40320a^4b^7c^5f$
 $f^2g^1 + 34560a^4b^8c^4d^j^2k + 27936a^4b^7c^5f^2h^k - 20736a^5$
 $b^6c^5e^h^2l - 13824a^5b^6c^5d^j^2k + 10800a^3b^{10}c^3d^h^2m -$
 $5760a^3b^{10}c^3d^j^2k - 3780a^4b^8c^4f^h^2k + 3690a^3b^9c^4f^2$
 $h^k - 3456a^4b^8c^4g^h^2j + 2970a^4b^9c^3f^h^k^2 - 2304a^5b^8c^3$
 $e^g^m^2 + 1152a^3b^9c^4f^2g^1 - 540a^3b^{10}c^3f^h^2k - 540a^2$
 $b^{12}c^2d^h^2m - 90a^4b^{10}c^2d^h^m^2 - 90a^2b^{11}c^3f^2h^k + 54a$
 $a^3b^{11}c^2f^h^k^2 + 15925248a^6b^2c^8e^2g^1 - 7962624a^7b^3c^6e$
 $g^1l^2 - 7962624a^6b^3c^7e^g^2l + 23385600a^6b^2c^8d^f^2m + 61378$
 $56a^6b^3c^7d^g^2m - 5677056a^6b^2c^8e^2f^m + 4147200a^7b^3c^6d$
 $d^h^1l^2 - 3317760a^6b^2c^8e^2h^k - 1354752a^5b^5c^6d^g^2m + 12718$
 $08a^6b^3c^7f^g^2k - 737280a^7b^2c^7f^h^j^2 + 17418240a^5b^3c^8d$
 $d^2g^1 - 568320a^6b^4c^6f^h^j^2 - 414720a^6b^5c^5d^h^1l^2 + 414720a$
 $a^5b^5c^6f^g^2k - 414720a^5b^4c^7e^2h^k + 322560a^5b^4c^7e^2f$
 $m - 136704a^5b^6c^5f^h^j^2 + 120960a^4b^7c^5d^g^2m - 31104a^5b^7$
 $c^4d^h^1l^2 - 17280a^4b^7c^5f^g^2k + 10368a^4b^9c^3d^h^1l^2 - 230$
 $4a^4b^8c^4f^h^j^2 + 384a^3b^{10}c^3f^h^j^2 + 50042880a^5b^2c^9d^2$
 $f^k - 13271040a^5b^3c^8d^2h^k - 13149696a^7b^3c^6d^f^m^2 + 109065$
 $60a^4b^5c^7d^2f^m - 8709120a^4b^5c^7d^2g^1 - 7418880a^5b^3c^8d$
 $d^2f^m + 7133184a^7b^2c^7d^h^k^2 - 6428160a^6b^3c^7d^h^2k + 55935$
 $36a^4b^5c^7d^2h^k - 3870720a^6b^2c^8e^f^2l + 3369600a^6b^4c^6d$
 $d^h^k^2 + 3148992a^6b^5c^5d^f^m^2 - 2985696a^3b^7c^6d^2f^m + 19595$
 $52a^3b^7c^6d^2g^1 - 1658880a^7b^2c^7e^g^k^2 - 1505280a^4b^6c^6d$
 $d^f^2m - 1290240a^6b^2c^8f^2g^j - 34836480a^5b^2c^9d^2e^1 + 1105$
 $920a^6b^3c^7e^h^2j - 860160a^5b^4c^7f^2g^j - 829440a^6b^4c^6e$
 $g^k^2 - 692064a^3b^7c^6d^2h^k - 689472a^5b^5c^6d^h^2k - 645120a$
 $a^5b^4c^7e^f^2l - 388800a^5b^6c^5d^h^k^2 + 378954a^2b^9c^5d^2f^m$
 $m + 362880a^5b^4c^7d^f^2m + 296964a^3b^8c^5d^f^2m + 290304a^5b^5$
 $c^6e^h^2j + 277344a^4b^7c^5d^h^2k - 217728a^2b^9c^5d^2g^1 - 8$
 $0640a^4b^6c^6f^2g^j + 80640a^4b^6c^6e^f^2l - 77070a^4b^9c^3d^f$
 $f^m^2 - 30240a^5b^7c^4d^f^m^2 - 28350a^3b^9c^4d^h^2k - 26406a^2b^9$
 $c^5d^2h^k - 21060a^4b^8c^4d^h^k^2 - 20736a^5b^6c^5e^g^k^2 - 19$
 $278a^2b^{10}c^4d^f^2m + 12672a^3b^8c^5f^2g^j + 10044a^3b^{10}c^3d$
 $h^k^2 + 8820a^3b^{11}c^2d^f^m^2 + 6912a^4b^7c^5e^h^2j - 2304a^3b^8$
 $c^5e^f^2l - 1620a^2b^{11}c^3d^h^2k - 384a^2b^{10}c^4f^2g^j + 162a$
 $a^2b^{12}c^2d^h^k^2 - 5419008a^5b^3c^8d^e^2m + 5308416a^6b^2c^8e^g$
 $g^2j - 5308416a^5b^3c^8e^2g^j - 3870720a^7b^2c^7d^f^1l^2 - 3538944$
 $a^6b^3c^7e^g^j^2 + 2654208a^5b^4c^7e^g^2j - 2322432a^6b^2c^8d^g$
 $g^2k - 1990656a^5b^4c^7d^g^2k - 1935360a^6b^4c^6d^f^1l^2 + 1658880$
 $a^6b^3c^7d^h^j^2 + 1658880a^5b^3c^8e^2f^k - 884736a^5b^5c^6e^g$
 $g^j^2 + 725760a^5b^6c^5d^f^1l^2 + 17418240a^4b^4c^8d^2e^1 + 518400a$
 $a^4b^6c^6d^g^2k + 483840a^4b^5c^7d^e^2m + 262656a^5b^5c^6d^h^j^2$

$$\begin{aligned}
& 2 - 96768a^4b^8c^4d^2f^2 - 69120a^4b^5c^7e^2fk - 55296a^4b^7c^5d^2h^2j^2 - 51840a^3b^8c^5d^2g^2k + 3456a^3b^10c^3d^2f^2 + 1152a^3b^9c^4d^2h^2j^2 + 1152a^2b^11c^3d^2h^2j^2 - 15431040a^4b^4c^8d^2fk^2 - 13248000a^5b^3c^8d^2fk^2 - 11612160a^5b^2c^9d^2g^2j - 10063872a^6b^3c^7d^2fk^2 - 3919104a^3b^6c^7d^2e^2 + 2554560a^4b^5c^7d^2fk^2 + 1720320a^5b^3c^8e^2f^2j + 1596672a^3b^6c^7d^2g^2j + 1518912a^3b^6c^7d^2fk^2 - 1105920a^5b^4c^7f^2g^2h + 838080a^5b^5c^6d^2fk^2 - 552960a^6b^2c^8f^2g^2h - 508032a^2b^8c^6d^2g^2j + 435456a^2b^8c^6d^2e^2 + 161280a^4b^5c^7e^2f^2j + 116640a^4b^7c^5d^2fk^2 + 106812a^2b^8c^6d^2fk^2 - 98208a^3b^7c^6d^2fk^2 - 34560a^4b^6c^6f^2g^2h - 27270a^3b^9c^4d^2fk^2 - 26334a^2b^9c^5d^2fk^2 - 25344a^3b^7c^6e^2f^2j + 3456a^3b^8c^5f^2g^2h + 768a^2b^9c^5e^2f^2j - 702a^2b^11c^3d^2fk^2 - 7962624a^5b^2c^9d^2e^2k - 2580480a^6b^2c^8d^2fk^2 + 2073600a^4b^4c^8d^2e^2k - 1658880a^6b^2c^8e^2g^2h - 967680a^5b^4c^7d^2fk^2 - 829440a^5b^4c^7e^2g^2h - 207360a^3b^6c^7d^2e^2k + 64512a^4b^6c^6d^2fk^2 + 39168a^3b^8c^5d^2fk^2 - 20736a^4b^6c^6e^2g^2h - 9216a^2b^10c^4d^2fk^2 - 4423680a^5b^2c^9e^2f^2h + 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^2fk^2 - 14459904a^4b^3c^9d^2fk^2 + 9630144a^3b^5c^8d^2fk^2 - 8764416a^5b^3c^8d^2fk^2 - 3870720a^5b^2c^9e^2f^2g + 2867328a^4b^4c^8d^2fk^2 - 2095200a^2b^7c^7d^2fk^2 - 1414080a^3b^6c^7d^2fk^2 - 34836480a^4b^2c^10d^2e^2g - 645120a^4b^4c^8e^2f^2g + 306720a^3b^7c^6d^2fk^2 + 197820a^2b^8c^6d^2fk^2 + 146880a^4b^5c^7d^2fk^2 + 80640a^3b^6c^7e^2f^2g - 55350a^2b^9c^5d^2fk^2 - 2304a^2b^8c^6e^2f^2g - 3870720a^5b^2c^9d^2fk^2 - 1935360a^4b^4c^8d^2fk^2 - 1658880a^4b^3c^9d^2e^2h + 725760a^3b^6c^7d^2fk^2 + 17418240a^3b^4c^9d^2e^2g - 124416a^3b^5c^8d^2e^2h - 96768a^2b^8c^6d^2fk^2 + 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^1^2m^2 - 1648128a^10b^3c^3k^3m^3 - 898560a^9b^3c^4k^3m^3 - 354240a^9b^5c^2k^3m^3 - 354240a^8b^5c^3k^3m^3 - 21600a^7b^7c^2k^3m^3 - 13950a^7b^8c^2k^3m^2 + 430080a^10b^3c^5j^2m^2 - 1984a^6b^9c^2j^2m^2 - 884736a^9b^3c^4j^3l^3 - 589824a^8b^3c^5j^3l^3 - 442368a^8b^5c^3j^3l^3 - 294912a^7b^5c^4j^3l^3 - 49152a^6b^7c^3j^3l^3 + 1359360a^10b^2c^4h^3m^3 + 1173120a^9b^4c^3h^3m^3 + 743040a^7b^4c^5h^3m^3 + 622080a^8b^2c^6h^3m^3 + 184320a^9b^3c^6j^2k^2 + 107136a^6b^6c^4h^3m^3 - 32640a^8b^6c^2h^3m^3 + 540a^5b^8c^3h^3m^3 - 270a^4b^10c^2h^3m^3 - 180a^5b^10c^2h^3m^2 - 2293760a^9b^3c^4f^3m^3 - 2293760a^6b^3c^7f^3m^3 + 1327104a^8b^4c^4g^3l^3 + 1327104a^6b^4c^6g^3l^3 - 622080a^8b^3c^5h^3k^3 - 622080a^7b^3c^6h^3k^3 - 326592a^7b^5c^4h^3k^3 - 326592a^6b^5c^5h^3k^3 - 199360a^8b^5c^3f^3m^3 - 199360a^5b^5c^6f^3m^3 + 61920a^7b^7c^2f^3m^3 + 61920a^4b^7c^5f^3m^3 - 38880a^6b^7c^3h^3k^3 - 38880a^5b^7c^4h^3k^3 - 3682a^3b^9c^4f^3m^3 - 810a^5b^9c^2h^3k^3 - 810a^4b^9c^3h^3k^3 - 70a^3b^12c^2f^2m^2 + 70a^2b^11c^3f^3m^3 + 3870720a^8b^3c^7e^2m^2 + 184320a^8b^3c^7h^2j^2 - 14152320a^4b^4c^8d^3m^3 + 10644480a^5b^2c^9d^3m^3 + 5483520a^9b^2c^5d^3m^3 + 4269888a^3b^6c^7d^3m^3 - 2654208a^8b^3c^5e^2l^3 + 1359360a^6b^2c^8f^3k^3 + 1330560a^8b^4c^4d^3m^3 + 1173120a^5b^4c^7f^3k^3 - 884736a^6b^3c^7g^3j^3 - 826560a^7b^6c^3d^3m^3 + 743040a^7b^4c^5f^3k^3 + 622080a^8b^2c^6f^3k^3 - 607068a^2b^8c^6d^3m^3 - 589824a^7b^3c^6g^3j^3 - 442368a^5b^5c^6g^3j^3 - 294912a^6b^5c^5g^3j^3 + 145188a^6b^8c^2d^3m^3 + 107136a^6b^6c^4f^3k^3 - 49152a^5b^7c^4g^3j^3 - 32640a^4b^6c^6f^3k^3 - 5796a^3b^8c^5f^3k^3 + 540a^5b^8c^3f^3k^3 - 270a^4b^10c^2f^3k^3 + 210a^2b^10c^4f^3k^3 + 19077120a^4b^3c^9d^3k^3 + 1658880a^7b^3c^8e^2k^2 + 430080a^7b^3c^8f^2j^2 + 3538944a^5b^2c^9e^3j^3 - 2488320a^7b^3c^6d^3k^3 - 2379456a^3b^5c^8d^3k^3 + 1179648a^7b^2c^7e^2j^3 + 589824a^6b^4c^6e^2j^3 + 98304a^5b^6c^5e^2j^3 -
\end{aligned}$$

$$\begin{aligned}
& 95904a^2b^7c^7d^3k - 57024a^6b^5c^5d^2k^3 + 49248a^5b^7c^4d^2k^3 \\
& - 4050a^4b^9c^3d^2k^3 - 810a^3b^{11}c^2d^2k^3 - 486ab^{12}c^3d^2k^2 \\
& + 3870720a^6b^9c^3d^2j^2 - 1648128a^5b^3c^8f^3h - 898560a^6b^3c^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 - 9792ab^{11}c^4d^2j^2 + 1350a^3b^9c^4f^3h^3 - 1050a^2b^9c^5f^3h^3 + 1658880a^6b^9c^5e^2h^2 + 16547328a^4b^2c^{10}d^3h - 12306816a^3b^4c^9d^3h + 37310976a^3b^3c^{10}d^3f + 3037824a^2b^6c^8d^3h - 2654208a^5b^3c^8e^2g^3 + 1949184a^6b^2c^8d^3h^3 + 1296000a^5b^4c^7d^3h^3 - 155520a^4b^6c^6d^3h^3 - 40500ab^{10}c^5d^2h^2 - 8100a^3b^8c^5d^2h^3 + 4050a^2b^{10}c^4d^2h^3 + 3870720a^5b^9c^{10}e^2f^2 + 34836480a^4b^9c^{11}d^2e^2 - 108864ab^9c^6d^2g^2 - 8068032a^2b^5c^9d^3f - 5623296a^4b^3c^9d^3f^3 + 1737792a^3b^5c^8d^3f^3 - 260190ab^8c^7d^2f^2 - 211680a^2b^7c^7d^3f^3 - 435456ab^7c^8d^2e^2 - 245760a^{10}c^6j^2k^2m - 384a^6b^{10}j^2k^2m^2 + 138240a^{10}c^6h^2k^2m - 90a^5b^{11}h^2k^2m^2 + 384000a^{10}c^6f^2k^2m^2 - 2211840a^8c^8e^2k^2m - 409600a^9c^7f^2j^2m - 147456a^9c^7h^2j^2k - 30a^4b^{12}f^2k^2m^2 + 967680a^9c^7d^2k^2m + 384000a^8c^8f^2h^2m - 90a^3b^{13}d^2k^2m^2 + 20321280a^7c^9d^2h^2m - 883200a^{11}b^4c^4k^2m^3 - 317952a^{10}b^3c^5k^3m + 43680a^8b^7c^4k^3m^3 + 1350a^6b^9c^4k^3m - 270b^{14}c^2d^2h^2m + 6a^3b^{13}f^2h^2m^2 + 4838400a^9c^7d^2h^2m^2 + 2903040a^8c^8d^2h^2m - 1032192a^8c^8d^2j^2k + 138240a^8c^8f^2h^2k - 3686400a^7c^9e^2f^2m - 1327104a^7c^9e^2h^2k - 393216a^9b^3c^6j^3l - 245760a^8c^8f^2h^2j^2 - 810b^{13}c^3d^2h^2k + 630b^{13}c^3d^2f^2m + 18a^2b^{14}d^2h^2m^2 + 2688000a^7c^9d^2f^2m + 580608a^8c^8d^2h^2k^2 - 5796a^7b^8c^8h^2m^3 - 3456b^{12}c^4d^2g^2j + 1890b^{12}c^4d^2f^2k + 6773760a^6c^{10}d^2f^2k - 1344000a^{10}b^3c^5f^2m^3 - 1344000a^7b^3c^8f^3m - 207360a^9b^3c^6h^2k^3 - 207360a^8b^3c^7h^3k - 3682a^6b^9c^4f^2m^3 - 9289728a^6c^{10}d^2e^2k - 1720320a^7c^9d^2f^2j^2 - 50803200a^5b^3c^{10}d^3k + 6912b^{11}c^5d^2e^2j - 10616832a^6b^3c^9e^3l - 2211840a^6c^{10}e^2f^2h - 393216a^8b^3c^7g^2j^3 + 43416a^6b^{10}c^5d^3m - 9576a^5b^{10}c^4d^3m^3 - 9450b^{11}c^5d^2f^2h - 504a^6b^{14}c^4d^2m^2 + 1612800a^6c^{10}d^2f^2h - 1036800a^8b^3c^7d^2k^3 + 45198a^6b^9c^6d^3k - 20736b^{10}c^6d^2e^2g - 75188736a^4b^3c^{11}d^3f - 883200a^6b^3c^9f^3h - 317952a^7b^3c^8f^3h^3 - 15482880a^5c^{11}d^2e^2f - 10616832a^5b^3c^{10}e^3g - 345060a^6b^8c^7d^3h - 4262400a^5b^3c^{10}d^2f^3 + 852768a^6b^7c^8d^3f + 7350a^6b^9c^6d^2f^3 + 967680a^{10}b^3c^3l^2m^2 + 161280a^9b^5c^2l^2m^2 + 1684224a^{10}b^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^2 + 207360a^8b^5c^3k^2l^2 + 170240a^8b^5c^3j^2m^2 + 9216a^7b^7c^2j^2m^2 + 5184a^7b^7c^2k^2l^2 + 884736a^9b^2c^5j^2l^2 + 884736a^8b^4c^4j^2l^2 + 221184a^7b^6c^3j^2l^2 + 1419840a^8b^4c^4h^2m^2 + 1387008a^9b^2c^5h^2m^2 + 276480a^8b^3c^5j^2k^2 + 140544a^7b^5c^4j^2k^2 + 84960a^7b^6c^3h^2m^2 + 25344a^6b^7c^3j^2k^2 - 8010a^6b^8c^2h^2m^2 + 576a^5b^9c^2j^2k^2 + 967680a^8b^3c^5g^2m^2 + 414720a^8b^3c^5h^2l^2 + 207360a^7b^5c^4h^2l^2 + 161280a^7b^5c^4g^2m^2 - 20160a^6b^7c^3g^2m^2 + 5184a^6b^7c^3h^2l^2 + 576a^5b^9c^2g^2m^2 + 3808000a^8b^2c^6f^2m^2 + 1990656a^7b^4c^5g^2l^2 + 1643712a^7b^4c^5f^2m^2 + 803520a^7b^4c^5h^2k^2 + 725760a^8b^2c^6h^2k^2 + 207360a^6b^6c^4h^2k^2 - 125440a^6b^6c^4f^2m^2 - 13790a^5b^8c^3f^2m^2 + 10530a^5b^8c^3h^2k^2 + 1785a^4b^{10}c^2f^2m^2 + 81a^4b^{10}c^2h^2k^2 + 18427392a^7b^2c^7d^2m^2 + 967680a^7b^3c^6f^2l^2 + 645120a^7b^3c^6e^2m^2 + 414720a^7b^3c^6g^2k^2 + 276480a^7b^3c^6h^2j^2 + 207360a^6b^5c^5g^2k^2 + 161280a^6b^5c^5f^2l^2 + 140544a^6b^5c^5h^2j^2 - 80640a^6b^5c^5e^2m^2 + 25344a^5b^7c^4h^2j^2 - 20160a^5b^7c^4f^2l^2 + 5184a^5b^7c^4g^2k^2 + 2304a^5b^7c^4e^2m^2 + 576a^4b^9c^3h^2j^2 + 576a^4b^9c^3f^2l^2 + 7962624a^7b^2c^7e^2l^2 - 4148928a^6b^4c^6d^2m^2 + 1419840a^6b^4c^6f^2k^2 + 1387008a^7b^2c^7f^2k^2 - 1183392a^5b^6c^5d^2m^2 + 884736a^7b^2c^7g^2j^2 + 884736a^6b^4c^6g^2j^2 + 645750a^4b^8c^
\end{aligned}$$

$$\begin{aligned}
& 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* \\
& 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 + 26 \\
& 88000*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 - 220 \\
& 20096*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 - 29491 \\
& 20*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*(157
\end{aligned}$$

$$\begin{aligned}
& 2864*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*1 \\
& - 15360*a^6*b^9*c^4*1 + 122880*a^7*b^7*c^5*1 - 491520*a^8*b^5*c^6*1 + 983040*a^9*b^3*c^7*1 - 786432*a^9*b*c^9*g - 786432*a^{10}*b*c^8*1) / (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 + 6871947673 \\
& 6*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 - 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*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 + 384040960*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 + 188743680*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 - 62914560*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 + 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*1*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*1*z^2 + 196608*a^6*b^{13}*c^3*j*1*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 - 26542080*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*1*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*1*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*1*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*1*z^2 + 337920*a^5*b^{13}*c^4*f*k*z^2 + 196608*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 + 7077888*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 + 6144000*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 + 1179648*a^5*b^{11}*c^6*e*g*z^2 + 829440*a^4*b^{13}*c^5*d*h*z^2 + 368640*a^5*b^{11}*c^6*d*h*z^2 - 105984*a^3*b^{15}*c^4*d*h*z^2 + 4608*a^2*b^{17}*c^3*d*h*z^2 - 15175680*a^4*b^{12}*c^6*d*f*z^2 + 1428480*a^3*b^{14}*c^5*d*f*z^2 - 73728*a^2*b^{16}*c^4*d*f*z^2 + 4108320768*a^{10}*b^3*c^9*d*m*z^2 - 1207959552*a^{11}*b
\end{aligned}$$

$c^{10}e^{1z^2} - 1207959552a^{10}b^2c^{11}e^2g^2z^2 - 578813952a^{12}b^2c^9h^2m^2z^2 - 578813952a^{11}b^2c^{10}f^2k^2z^2 - 402653184a^{12}b^2c^9j^2l^2z^2 - 402653184a^{11}b^2c^{10}g^2j^2z^2 - 440401920a^{10}b^2c^{11}f^2z^2 - 188743680a^{12}b^2c^9k^2z^2 - 188743680a^{11}b^2c^{10}h^2z^2 + 1761607680a^{10}c^{12}d^2f^2z^2 - 14080a^6b^{15}c^2m^2z^2 - 94464a^2b^{17}c^4d^2z^2 + 6936330240a^8b^3c^{11}d^2z^2 + 2464874496a^6b^7c^9d^2z^2 - 3963617280a^9b^2c^{12}d^2z^2 + 1056964608a^{11}c^{11}d^2k^2z^2 + 805306368a^{11}c^{11}e^2j^2z^2 + 419430400a^{12}c^{10}f^2m^2z^2 + 251658240a^{13}c^9k^2m^2z^2 - 1509949440a^9b^2c^{11}e^2z^2 + 251658240a^{11}c^{11}f^2h^2z^2 + 150994944a^{12}c^{10}h^2k^2z^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^2c^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^2c^8f^2k^2z^2 + 99090432a^9b^2c^9d^2h^2z^2 + 9437184a^{10}b^2c^8e^2k^2z^2 + 23592960a^{10}b^2c^8g^2h^2z^2 + 141557760a^8b^2c^{10}d^2e^2k^2z^2 + 47185920a^9b^2c^9d^2j^2k^2z^2 - 23592960a^9b^2c^9f^2g^2k^2z^2 + 169869312a^7b^2c^{11}d^2e^2f^2z^2 + 99090432a^8b^2c^{10}d^2g^2h^2z^2 - 3145728a^9b^2c^9f^2h^2j^2z^2 + 56623104a^8b^2c^{10}d^2f^2j^2z^2 + 1536a^2b^{15}c^3d^2f^2j^2z^2 - 9437184a^8b^2c^{10}e^2f^2h^2z^2 - 4608a^2b^{14}c^4d^2f^2g^2z^2 + 9216a^2b^{13}c^5d^2e^2f^2z^2 + 412876800a^8b^2c^9d^2e^2m^2z^2 - 206438400a^9b^3c^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 - 14745600a^8b^5c^6f^2k^2l^2z^2 - 29491200a^9b^3c^7g^2h^2m^2z^2 - 11796480a^9b^3c^7e^2k^2m^2z^2 - 44236800a^7b^6c^6d^2k^2l^2z^2 + 58982400a^9b^2c^8e^2h^2m^2z^2 + 5898240a^8b^5c^6e^2k^2m^2z^2 + 3686400a^7b^7c^5f^2k^2l^2z^2 + 3225600a^6b^9c^4d^2l^2m^2z^2 - 1474560a$

$$\begin{aligned}
& ^7b^7c^5ekk^mz - 460800a^6b^9c^4fkk^l^mz + 184320a^6b^9c^4ekk^mz \\
& z - 161280a^5b^{11}c^3d^l^mz + 23040a^5b^{11}c^3fkk^l^mz - 9216a^5b^{11} \\
& c^3ekk^mz + 14745600a^8b^5c^6g^h^mz + 110886912a^7b^4c^8d^f^l^mz \\
& z - 3686400a^7b^7c^5g^h^mz - 221773824a^6b^3c^{10}d^e^f^mz + 460800a \\
& ^6b^9c^4g^h^mz - 17203200a^7b^6c^6d^j^mz - 23040a^5b^{11}c^3g^h^m \\
& mz - 29491200a^8b^4c^7e^h^mz - 11796480a^9b^2c^8f^j^kz + 1105920 \\
& 0a^6b^8c^5d^k^l^mz + 6451200a^6b^8c^5d^j^mz + 88473600a^7b^4c^8d \\
& dg^k^kz + 2457600a^7b^6c^6f^j^kz - 35389440a^8b^3c^8d^j^kz - 1382 \\
& 400a^5b^{10}c^4d^k^l^mz - 84934656a^8b^2c^9d^f^l^mz - 967680a^5b^{10}c \\
& ^4d^j^mz - 921600a^6b^8c^5f^j^kz + 138240a^5b^{10}c^4f^j^kz + 691 \\
& 20a^4b^{12}c^3d^k^l^mz + 53760a^4b^{12}c^3d^j^mz - 7680a^4b^{12}c^3f^j \\
& j^kz + 44236800a^7b^5c^7d^h^l^mz + 7372800a^7b^6c^6e^h^mz - 589824 \\
& 0a^8b^4c^7f^h^l^mz + 4718592a^9b^2c^8f^h^l^mz - 70778880a^8b^2c^9d \\
& dg^k^kz + 2949120a^7b^6c^6f^h^l^mz - 921600a^6b^8c^5e^h^mz - 737280 \\
& a^6b^8c^5f^h^l^mz + 92160a^5b^{10}c^4f^h^l^mz + 46080a^5b^{10}c^4e^h^m \\
& mz - 4608a^4b^{12}c^3f^h^l^mz + 29491200a^8b^3c^8f^g^k^kz - 109707264a \\
& ^7b^3c^9d^g^h^mz - 25804800a^6b^7c^6d^g^mz - 58982400a^8b^2c^9e \\
& f^k^kz - 58982400a^6b^6c^7d^f^l^mz + 7372800a^6b^7c^6d^j^kz + 88473 \\
& 600a^6b^5c^8d^e^k^kz - 2764800a^5b^9c^5d^j^kz + 51609600a^6b^6c^ \\
& 7d^e^mz + 414720a^4b^{11}c^4d^j^kz - 23040a^3b^{13}c^3d^j^kz - 1474 \\
& 5600a^7b^5c^7f^g^k^kz - 44236800a^6b^6c^7d^g^k^kz - 6635520a^6b^7c \\
& ^6d^h^l^mz + 40108032a^8b^2c^9d^h^j^mz + 3686400a^6b^7c^6f^g^k^kz + 3 \\
& 225600a^5b^9c^5d^g^mz + 2359296a^8b^3c^8f^h^j^mz - 491520a^6b^7c \\
& ^6f^h^j^mz - 460800a^5b^9c^5f^g^k^kz - 276480a^5b^9c^5d^h^l^mz + 1843 \\
& 20a^5b^9c^5f^h^j^mz + 179712a^4b^{11}c^4d^h^l^mz - 161280a^4b^{11}c^4d \\
& dg^mz - 27648a^4b^{11}c^4f^h^j^mz + 23040a^4b^{11}c^4f^g^k^kz - 13824a \\
& ^3b^{13}c^3d^h^l^mz + 1536a^3b^{13}c^3f^h^j^mz + 29491200a^7b^4c^8e^f^k \\
& kz + 110886912a^6b^4c^9d^f^g^mz + 16220160a^5b^8c^6d^f^l^mz - 456130 \\
& 56a^7b^3c^9d^f^j^mz + 11059200a^5b^8c^6d^g^k^kz - 10321920a^6b^6c^ \\
& 7d^h^j^mz - 7372800a^6b^6c^7e^f^k^kz + 7077888a^7b^4c^8d^h^j^mz - 645 \\
& 1200a^5b^8c^6d^e^mz - 88473600a^6b^4c^9d^e^h^mz + 2396160a^5b^8c \\
& ^6d^h^j^mz - 2396160a^4b^{10}c^5d^f^l^mz - 1382400a^4b^{10}c^5d^g^k^kz - \\
& 84934656a^7b^2c^{10}d^f^g^mz + 921600a^5b^8c^6e^f^k^kz + 117964800a^5b \\
& ^5c^9d^e^f^mz + 322560a^4b^{10}c^5d^e^mz + 175104a^3b^{12}c^4d^f^l^mz \\
& + 69120a^3b^{12}c^4d^g^k^kz - 50688a^3b^{12}c^4d^h^j^mz - 46080a^4b^{10} \\
& c^5e^f^k^kz - 27648a^4b^{10}c^5d^h^j^mz + 4608a^2b^{14}c^3d^h^j^mz - 460 \\
& 8a^2b^{14}c^3d^f^l^mz + 44236800a^6b^5c^8d^g^h^mz - 5898240a^7b^4c^8 \\
& f^g^h^mz - 22118400a^5b^7c^7d^e^k^kz + 4718592a^8b^2c^9f^g^h^mz + 294 \\
& 9120a^6b^6c^7f^g^h^mz - 737280a^5b^8c^6f^g^h^mz + 92160a^4b^{10}c^5f \\
& f^g^h^mz - 4608a^3b^{12}c^4f^g^h^mz + 8847360a^5b^7c^7d^f^j^mz - 5898240 \\
& 0a^5b^6c^8d^f^g^mz - 3809280a^4b^9c^6d^f^j^mz + 2764800a^4b^9c^6d \\
& e^k^kz + 2359296a^6b^5c^8d^f^j^mz + 681984a^3b^{11}c^5d^f^j^mz - 138240 \\
& a^3b^{11}c^5d^e^k^kz - 55296a^2b^{13}c^4d^f^j^mz + 11796480a^7b^3c^9e \\
& f^h^mz - 6635520a^5b^7c^7d^g^h^mz - 5898240a^6b^5c^8e^f^h^mz + 147456 \\
& 0a^5b^7c^7e^f^h^mz - 276480a^4b^9c^6d^g^h^mz - 184320a^4b^9c^6e^f \\
& h^mz + 179712a^3b^{11}c^5d^g^h^mz - 13824a^2b^{13}c^4d^g^h^mz + 9216a^3b \\
& ^{11}c^5e^f^h^mz + 16220160a^4b^8c^7d^f^g^mz + 13271040a^5b^6c^8d^e^h \\
& h^mz - 2396160a^3b^{10}c^6d^f^g^mz + 552960a^4b^8c^7d^e^h^mz - 359424a^ \\
& 3b^{10}c^6d^e^h^mz + 175104a^2b^{12}c^5d^f^g^mz + 27648a^2b^{12}c^5d^e^h \\
& h^mz - 32440320a^4b^7c^8d^e^f^mz + 4792320a^3b^9c^7d^e^f^mz - 350208a^ \\
& 2b^{11}c^6d^e^f^mz + 165150720a^{10}b^c^8d^l^mz + 4608a^6b^{12}c^k^l^mz \\
& + 23592960a^{11}b^c^7h^l^mz + 3145728a^{11}b^c^7j^k^mz - 1536a^5b^{13} \\
& c^j^k^mz + 165150720a^9b^c^9d^g^mz + 346816512a^7b^c^{11}d^2g^mz + 1 \\
& 9660800a^{12}b^c^6l^m^2z - 34560a^7b^{11}c^l^m^2z - 7077888a^{11}b^c^7k \\
& ^2l^mz + 11008a^6b^{12}c^j^m^2z + 19660800a^{11}b^c^7g^m^2z + 7077888a \\
& ^{10}b^c^8h^2l^mz + 768a^5b^{13}c^g^m^2z - 19660800a^9b^c^9f^2l^mz - \\
& 7077888a^{10}b^c^8g^k^2z - 6912a^b^{15}c^3d^2l^mz + 7077888a^9b^c^9g^h \\
& ^2z - 19660800a^8b^c^{10}f^2g^mz - 66816a^b^{14}c^4d^2j^mz + 214272a^b \\
& ^{13}c^5d^2g^mz - 428544a^b^{12}c^6d^2e^mz - 330301440a^9c^{10}d^e^mz -
\end{aligned}$$

$110100480a^{10}c^9d^*j^*m^*z - 15728640a^{11}c^8h^*j^*m^*z - 47185920a^{10}c^9e^*h^*m^*z - 198180864a^8c^{11}d^*e^*h^*z + 15728640a^{10}c^9f^*j^*k^*z - 66060288a^9c^{10}d^*h^*j^*z + 47185920a^9c^{10}e^*f^*k^*z + 1022754816a^6b^2c^{11}d^2e^*z - 642318336a^5b^4c^{10}d^2e^*z - 511377408a^7b^3c^9d^2l^*z - 511377408a^6b^3c^{10}d^2g^*z + 321159168a^6b^5c^8d^2l^*z + 321159168a^5b^5c^9d^2g^*z + 225312768a^7b^2c^{10}d^2j^*z - 25362432a^{11}b^3c^5l^*m^2z + 13271040a^{10}b^5c^4l^*m^2z - 3563520a^9b^7c^3l^*m^2z + 506880a^8b^9c^2l^*m^2z + 10354688a^{11}b^2c^6j^*m^2z + 8847360a^{10}b^3c^6k^2l^*z - 4423680a^9b^5c^5k^2l^*z - 2048000a^9b^6c^4j^*m^2z + 1105920a^8b^7c^4k^2l^*z + 849920a^8b^8c^3j^*m^2z - 393216a^{10}b^4c^5j^*m^2z - 145920a^7b^10c^2j^*m^2z - 138240a^7b^9c^3k^2l^*z + 6912a^6b^{11}c^2k^2l^*z - 111697920a^5b^7c^7d^2l^*z + 223395840a^4b^6c^9d^2e^*z - 25362432a^{10}b^3c^6g^*m^2z - 3538944a^{10}b^2c^7j^*k^2z + 737280a^8b^6c^5j^*k^2z + 50724864a^{10}b^2c^7e^*m^2z - 276480a^7b^8c^4j^*k^2z + 41472a^6b^{10}c^3j^*k^2z - 2304a^5b^{12}c^2j^*k^2z + 13271040a^9b^5c^5g^*m^2z - 8847360a^9b^3c^7h^2l^*z + 4423680a^8b^5c^6h^2l^*z - 3563520a^8b^7c^4g^*m^2z - 1105920a^7b^7c^5h^2l^*z + 506880a^7b^9c^3g^*m^2z + 138240a^6b^9c^4h^2l^*z - 34560a^6b^{11}c^2g^*m^2z - 6912a^5b^{11}c^3h^2l^*z - 26542080a^9b^4c^6e^*m^2z + 25362432a^8b^3c^8f^2l^*z - 13271040a^7b^5c^7f^2l^*z + 8847360a^9b^3c^7g^*k^2z + 7127040a^8b^6c^5e^*m^2z - 4423680a^8b^5c^6g^*k^2z + 3563520a^6b^7c^6f^2l^*z + 3538944a^9b^2c^8h^2j^*z + 1105920a^7b^7c^5g^*k^2z - 1013760a^7b^8c^4e^*m^2z - 737280a^7b^6c^6h^2j^*z - 506880a^5b^9c^5f^2l^*z + 276480a^6b^8c^5h^2j^*z - 138240a^6b^9c^4g^*k^2z + 69120a^6b^{10}c^3e^*m^2z - 41472a^5b^{10}c^4h^2j^*z + 34560a^4b^{11}c^4f^2l^*z + 6912a^5b^{11}c^3g^*k^2z + 2304a^4b^{12}c^3h^2j^*z - 1536a^5b^{12}c^2e^*m^2z - 768a^3b^{13}c^3f^2l^*z - 111697920a^4b^7c^8d^2g^*z + 23362560a^4b^9c^6d^2l^*z - 17694720a^9b^2c^8e^*k^2z - 10354688a^8b^2c^9f^2j^*z - 43646976a^6b^4c^9d^2j^*z + 8847360a^8b^4c^7e^*k^2z - 2965248a^3b^{11}c^5d^2l^*z - 2211840a^7b^6c^6e^*k^2z + 2048000a^6b^6c^7f^2j^*z - 849920a^5b^8c^6f^2j^*z + 393216a^7b^4c^8f^2j^*z + 276480a^6b^8c^5e^*k^2z + 214272a^2b^{13}c^4d^2l^*z + 145920a^4b^{10}c^5f^2j^*z - 13824a^5b^{10}c^4e^*k^2z - 11008a^3b^{12}c^4f^2j^*z + 256a^2b^{14}c^3f^2j^*z - 32587776a^5b^6c^8d^2j^*z - 8847360a^8b^3c^8g^*h^2z + 21657600a^4b^8c^7d^2j^*z + 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^*z + 17694720a^8b^2c^9e^*h^2z + 845568a^2b^{12}c^5d^2j^*z - 50724864a^7b^2c^{10}e^*f^2z - 13271040a^6b^5c^8f^2g^*z - 8847360a^7b^4c^8e^*h^2z + 3563520a^5b^7c^7f^2g^*z + 2211840a^6b^6c^7e^*h^2z - 506880a^4b^9c^6f^2g^*z - 276480a^5b^8c^6e^*h^2z + 34560a^3b^{11}c^5f^2g^*z + 13824a^4b^{10}c^5e^*h^2z - 768a^2b^{13}c^4f^2g^*z + 26542080a^6b^4c^9e^*f^2z + 23362560a^3b^9c^7d^2g^*z - 46725120a^3b^8c^8d^2e^*z - 7127040a^5b^6c^8e^*f^2z - 2965248a^2b^{11}c^6d^2g^*z + 1013760a^4b^8c^7e^*f^2z - 69120a^3b^{10}c^6e^*f^2z + 1536a^2b^{12}c^5e^*f^2z + 5930496a^2b^{10}c^7d^2e^*z + 346816512a^8b^c^{10}d^2l^*z - 693633024a^7c^{12}d^2e^*z - 231211008a^8c^{11}d^2j^*z + 768a^6b^{13}l^*m^2z - 13107200a^{12}c^7j^*m^2z - 256a^5b^{14}j^*m^2z + 4718592a^{11}c^8j^*k^2z - 39321600a^{11}c^8e^*m^2z - 4718592a^{10}c^9h^2j^*z + 14155776a^{10}c^9e^*k^2z + 13107200a^9c^{10}f^2j^*z + 2304b^{16}c^3d^2j^*z - 14155776a^9c^{10}e^*h^2z + 39321600a^8c^{11}e^*f^2z - 6912b^{15}c^4d^2g^*z + 13824b^{14}c^5d^2e^*z + 737280a^{10}b^c^5j^*k^1m - 2304a^6b^9c^j^*k^1m + 2211840a^9b^c^6e^*k^1m + 1228800a^9b^c^6f^*j^1m + 737280a^9b^c^6g^*j^k^1m + 442368a^9b^c^6h^*j^k^1m + 36a^3b^{12}c^f^*h^*k^1m + 3096576a^8b^c^7d^*j^k^1m - 12745728a^8b^c^7d^*h^*k^1m + 3686400a^8b^c^7e^*f^1m + 3391488a^8b^c^7e^*h^*j^1m + 2211840a^8b^c^7e^*g^*k^1m + 1327104a^8b^c^7e^*h^*k^1m + 1228800a^8b^c^7f^*g^*j^1m + 737280a^8b^c^7f^*h^*j^1m + 442368a^8b^c^7g^*h^*j^k^1m + 108a^2b^{13}c^d^*h^*k^1m + 16367616a^7b^c^8d^*e^*j^1m + 9289728a^7b^c^8d^*e^*k^1m + 5160960a^7b^c^8d^*f^*j^1m + 3391488a^7b^c^8e^*f^*j^k^1m + 3096$

$576a^7b^8c^8d^8g^8j^8k - 19307520a^7b^8c^8d^8f^8h^8m + 3686400a^7b^8c^8e^8f^8g^8m + 2211840a^7b^8c^8e^8f^8h^8l + 1327104a^7b^8c^8e^8g^8h^8k + 737280a^7b^8c^8f^8g^8h^8j - 180a^8b^{13}c^2d^8f^8h^8m - 540a^8b^{12}c^3d^8f^8h^8k + 15482880a^6b^8c^9d^8e^8f^8l + 11059200a^6b^8c^9d^8e^8h^8j + 9289728a^6b^8c^9d^8e^8g^8k + 5160960a^6b^8c^9d^8f^8g^8j - 2304a^8b^{11}c^4d^8f^8g^8j + 2211840a^6b^8c^9e^8f^8g^8h + 4608a^8b^{10}c^5d^8e^8f^8j + 15482880a^5b^8c^{10}d^8e^8f^8g - 13824a^8b^9c^6d^8e^8f^8g + 36a^8b^{14}c^8d^8f^8k^8m + 1843200a^9b^3c^4j^8k^8l^8m + 783360a^8b^5c^3j^8k^8l^8m + 18432a^7b^7c^2j^8k^8l^8m - 2211840a^8b^4c^4g^8k^8l^8m - 1695744a^9b^2c^5h^8j^8l^8m - 1400832a^8b^4c^4h^8j^8l^8m - 1105920a^9b^2c^5g^8k^8l^8m - 253440a^7b^6c^3h^8j^8l^8m - 69120a^7b^6c^3g^8k^8l^8m + 11520a^6b^8c^2h^8j^8l^8m + 6912a^6b^8c^2g^8k^8l^8m + 4423680a^8b^3c^5e^8k^8l^8m + 2506752a^8b^3c^5f^8j^8l^8m + 1843200a^8b^3c^5g^8j^8k^8m + 1327104a^8b^3c^5h^8j^8k^8l + 838656a^7b^5c^4f^8j^8l^8m + 783360a^7b^5c^4g^8j^8k^8m + 691200a^7b^5c^4h^8j^8k^8l + 138240a^7b^5c^4e^8k^8l^8m + 69120a^6b^7c^3h^8j^8k^8l - 53760a^6b^7c^3f^8j^8l^8m + 18432a^6b^7c^3g^8j^8k^8m - 13824a^6b^7c^3e^8k^8l^8m - 2304a^5b^9c^2g^8j^8k^8m + 2543616a^8b^3c^5g^8h^8l^8m + 829440a^7b^5c^4g^8h^8l^8m - 34560a^6b^7c^3g^8h^8l^8m - 8183808a^8b^2c^6d^8j^8l^8m - 3686400a^8b^2c^6e^8j^8k^8m - 2285568a^7b^4c^5d^8j^8l^8m - 1695744a^8b^2c^6f^8j^8k^8l - 1566720a^7b^4c^5e^8j^8k^8m - 1400832a^7b^4c^5f^8j^8k^8l + 741888a^6b^6c^4d^8j^8l^8m - 253440a^6b^6c^4f^8j^8k^8l - 80640a^5b^8c^3d^8j^8l^8m - 36864a^6b^6c^4e^8j^8k^8m + 11520a^5b^8c^3f^8j^8k^8l + 4608a^5b^8c^3e^8j^8k^8m + 670032a^8b^2c^6f^8h^8k^8m + 5103360a^7b^4c^5f^8h^8k^8m - 5087232a^8b^2c^6e^8h^8l^8m - 2838528a^7b^4c^5f^8g^8l^8m - 1843200a^8b^2c^6f^8g^8l^8m - 1695744a^8b^2c^6g^8h^8j^8m - 1658880a^7b^4c^5g^8h^8k^8l - 1658880a^7b^4c^5e^8h^8l^8m - 1400832a^7b^4c^5g^8h^8j^8m - 663552a^8b^2c^6g^8h^8k^8l + 483840a^6b^6c^4f^8h^8k^8m - 253440a^6b^6c^4g^8h^8j^8m - 207360a^6b^6c^4g^8h^8k^8l + 161280a^6b^6c^4f^8g^8l^8m + 69120a^6b^6c^4e^8h^8l^8m - 50040a^5b^8c^3f^8h^8k^8m + 11520a^5b^8c^3g^8h^8j^8m + 180a^4b^{10}c^2f^8h^8k^8m + 4202496a^7b^3c^6d^8j^8k^8l + 635904a^6b^5c^5d^8j^8k^8l - 276480a^5b^7c^4d^8j^8k^8l + 34560a^4b^9c^3d^8j^8k^8l - 16671744a^7b^3c^6d^8h^8k^8m + 12275712a^7b^3c^6d^8g^8l^8m + 5677056a^7b^3c^6e^8f^8l^8m + 4423680a^7b^3c^6e^8g^8k^8m + 3317760a^7b^3c^6e^8h^8k^8l + 2801664a^7b^3c^6e^8h^8j^8m - 2709504a^6b^5c^5d^8g^8l^8m + 2543616a^7b^3c^6f^8g^8k^8l + 2506752a^7b^3c^6f^8g^8j^8m + 1843200a^7b^3c^6f^8h^8j^8l + 1327104a^7b^3c^6g^8h^8j^8k + 838656a^6b^5c^5f^8g^8j^8m + 829440a^6b^5c^5f^8g^8k^8l + 783360a^6b^5c^5f^8h^8j^8l + 691200a^6b^5c^5g^8h^8j^8k + 665280a^5b^7c^4d^8h^8k^8m + 506880a^6b^5c^5e^8h^8j^8m + 414720a^6b^5c^5e^8h^8k^8l - 322560a^6b^5c^5e^8f^8l^8m + 241920a^5b^7c^4d^8g^8l^8m + 138240a^6b^5c^5e^8g^8k^8m - 108540a^4b^9c^3d^8h^8k^8m + 69120a^5b^7c^4g^8h^8j^8k - 53760a^5b^7c^4f^8g^8j^8m - 51840a^6b^5c^5d^8h^8k^8m - 34560a^5b^7c^4f^8g^8k^8l - 23040a^5b^7c^4e^8h^8j^8m + 18432a^5b^7c^4f^8h^8j^8l - 13824a^5b^7c^4e^8g^8k^8m - 2304a^4b^9c^3f^8h^8j^8l + 1296a^3b^{11}c^2d^8h^8k^8m + 31924224a^7b^2c^7d^8f^8k^8m - 24551424a^7b^2c^7d^8e^8l^8m + 10616832a^7b^2c^7e^8g^8j^8l - 8183808a^7b^2c^7d^8g^8j^8m - 5529600a^7b^2c^7d^8h^8j^8l + 5419008a^6b^4c^6d^8e^8l^8m + 5308416a^6b^4c^6e^8g^8j^8l - 5087232a^7b^2c^7e^8f^8k^8l - 5013504a^7b^2c^7e^8f^8j^8m + 4868352a^6b^4c^6d^8f^8k^8m - 4644864a^7b^2c^7d^8g^8k^8l - 3981312a^6b^4c^6d^8g^8k^8l - 2654208a^7b^2c^7e^8h^8j^8k - 2367360a^5b^6c^5d^8f^8k^8m - 2285568a^6b^4c^6d^8g^8j^8m - 2211840a^6b^4c^6d^8h^8j^8l - 1695744a^7b^2c^7f^8g^8j^8k - 1677312a^6b^4c^6e^8f^8j^8m - 1658880a^6b^4c^6e^8f^8k^8l - 1400832a^6b^4c^6f^8g^8j^8k - 1382400a^6b^4c^6e^8h^8j^8k + 1036800a^5b^6c^5d^8g^8k^8l + 741888a^5b^6c^5d^8g^8j^8m - 483840a^5b^6c^5d^8e^8l^8m + 317952a^5b^6c^5d^8h^8j^8l + 268920a^4b^8c^4d^8f^8k^8m - 253440a^5b^6c^5f^8g^8j^8k - 138240a^5b^6c^5e^8h^8j^8k + 107520a^5b^6c^5e^8f^8j^8m - 103680a^4b^8c^4d^8g^8k^8l - 80640a^4b^8c^4d^8g^8j^8m + 69120a^5b^6c^5e^8f^8k^8l + 11520a^4b^8c^4f^8g^8j^8k + 6912a^4b^8c^4d^8h^8j^8l - 6912a^3b^{10}c^3d^8h^8j^8l + 6120a^3b^{10}c^3d^8f^8k^8m - 1368a^2b^{12}c^2d^8f^8k^8m - 5087232a^7b^2c^7e^8g^8h^8m - 2211840a^6b^4c^6f^8g^8h^8l - 1658880a^6b^4c^6e^8g^8h^8m - 1105920a^7b^2c^7f^8g^8h^8l - 69120a^5b^6c^5f^8g^8h^8l + 69120a^5b^6c^5e^8g^8h^8m +$

$$\begin{aligned}
& 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 + 4 \\
& 202496a^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 + 50 \\
& 6880a^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 + 161280* \\
& a^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 + 3 \\
& 317760a^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 + 437 \\
& 184a^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 + 21150 \\
& 720a^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 - 774144 \\
& 0a^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 - 387072 \\
& 0a^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 + 165888 \\
& 0a^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^4b^5c^7d*e*g*k - 635904a^4b^5c^7d*e*h*j + 387072a^3b^7c^6d*e*f*1 - 354816a^3b^7c^6d*f*g*j + 322560a^4b^5c^7d*f*g*j + 207360a^3b^7c^6d*e*g*k + 59904a^2b^9c^5d*f*g*j - 13824a^3b^7c^6d*e*h*j + 13824a^2b^9c^5d*e*h*j - 13824a^2b^9c^5d*e*f*1 + 4423680a^5b^3c^8e*f*g*h + 138240a^4b^5c^7e*f*g*h - 13824a^3b^7c^6e*f*g*h - 10321920a^5b^2c^9d*e*f*j + 709632a^3b^6c^7d*e*f*j - 645120a^4b^4c^8d*e*f*j - 119808a^2b^8c^6d*e*f*j - 16588800a^5b^2c^9d*e*g*h + 1658880a^4b^4c^8d*e*g*h + 124416a^3b^6c^7d*e*g*h - 41472a^2b^8c^6d*e*g*h + 7741440a^4b^3c^9d*e*f*g - 2903040a^3b^5c^8d*e*f*g + 387072a^2b^7c^7d*e*f*g + 3456a^7b^8c*k*1^2*m + 12672a^7b^8c*j*1*m^2 + 384a^5b^10c*j^2*k*m - 1635840a^10b*c^5h*k*m^2 - 1009152a^9b*c^6h^2*k*m + 3690a^6b^9c*h*k*m^2 + 1152a^6b^9c*g*1*m^2 - 540a^5b^10c*h*k^2*m + 54a^4b^11c*h^2*k*m + 565248a^9b*c^6h*j^2*m - 39771648a^7b*c^8d^2*k*m - 2496000a^8b*c^7f^2*k*m - 1543680a^9b*c^6f*k^2*m + 1980a^5b^10c*f*k*m^2 - 384a^5b^10c*g*j*m^2 - 180a^4b^11c*f*k^2*m + 6a^2b^13c*f^2*k*m - 10298880a^9b*c^6d*k*m^2 + 2580480a^9b*c^6e*j*m^2 + 5310a^4b^11c*d*k*m^2 - 1674a*b^13c^2d^2*k*m - 540a^3b^12c*d*k^2*m - 10616832a^7b*c^8e^2*j*1 - 3538944a^8b*c^7e*j^2*1 + 2727936a^8b*c^7d*j^2*m - 2496000a^9b*c^6f*h*m^2 - 1543680a^8b*c^7f*h^2*m + 565248a^8b*c^7f*j^2*k - 270a^4b^11c*f*h*m^2 - 59512320a^6b*c^9d^2*f*m + 5087232a^7b*c^8e^2*h*m + 1105920a^8b*c^7e*j*k^2 - 3456a*b^12c^3d^2*j*1 - 1635840a^7b*c^8f^2*h*k - 1009152a^8b*c^7f*h*k^2 + 10260a*b^12c^3d^2*h*m - 684a^3b^12c*d*h*m^2 - 24675840a^6b*c^9d^2*h*k - 15552000a^8b*c^7d*f*m^2 + 24551424a^6b*c^9d*e^2*m - 3939840a^7b*c^8d*h^2*k + 1105920a^7b*c^8e*h^2*j - 25074a*b^11c^4d^2*f*m + 10530a*b^11c^4d^2*h*k + 10368a*b^11c^4d^2*g*1 + 420a*b^12c^3d*f^2*m - 378a^2b^13c*d*f*m^2 - 10616832a^6b*c^9e^2*g*j + 5087232a^6b*c^9e^2*f*k - 3538944a^7b*c^8e*g*j^2 + 1843200a^7b*c^8d*h*j^2 - 7994880a^6b*c^9d*f^2*k - 4990464a^7b*c^8d*f*k^2 + 2580480a^6b*c^9e*f^2*j + 65664a*b^10c
\end{aligned}$$

$$\begin{aligned}
& ^5d^2g^*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 - 370 \\
& 62144*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 + 13824*a*b^8*c^7*d*e^2*f - 14745 \\
& 60*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 - 245 \\
& 7600*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 + 1 \\
& 935360*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 + 127180 \\
& 8*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 + 414720*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*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*l*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*l*m^2 - 56160*a^6*b^7*c^3*h^2*k*m - 40320*a^7*b^7*c^2*g*l*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*l^2*m - 1105920*a^7*b^4*c^5*g^2*k*m - 921600*a^9*b^2 \\
& *c^5*f*l^2*m - 829440*a^8*b^4*c^4*h*k*l^2 + 749568*a^8*b^3*c^5*h*j^2*m - 55 \\
& 2960*a^8*b^2*c^6*g^2*k*m - 331776*a^9*b^2*c^5*h*k*l^2 + 317952*a^7*b^5*c^4* \\
& h*j^2*m - 103680*a^7*b^6*c^3*h*k*l^2 + 80640*a^7*b^6*c^3*f*l^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*l*m^2 - 3755520*a^8*b^3*c^5*f*k^2*m + 300 \\
& 0960*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 + 82944 \\
& 0*a^8*b^3*c^5*g*k^2*l - 645120*a^8*b^4*c^4*e*l*m^2 - 552960*a^8*b^2*c^6*h^2 \\
& *j*l - 552960*a^7*b^4*c^5*h^2*j*l + 414720*a^7*b^5*c^4*g*k^2*l - 145152*a^6 \\
& *b^6*c^4*h^2*j*l + 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*l*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*l + 5490*a^5*b^9*c^2*f*k^2*m - 3456*a^5*b^8*c^3*h^2*j*l - 23 \\
& 04*a^6*b^8*c^2*e*l*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*l^2*m - 4423680*a^7*b^2*c^7*e^2*k*m - 2654208*a^8* \\
& b^3*c^5*g*j*l^2 - 2654208*a^7*b^3*c^6*g^2*j*l + 1769472*a^8*b^2*c^6*g*j^2*l \\
& + 1769472*a^7*b^4*c^5*g*j^2*l - 1354752*a^7*b^5*c^4*d*l^2*m - 1327104*a^7* \\
& b^5*c^4*g*j*l^2 - 1327104*a^6*b^5*c^5*g^2*j*l + 1271808*a^8*b^3*c^5*f*k*l^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 + 442368*a^6*b^6*c^4*g*j^2*l + 4 \\
& 14720*a^7*b^5*c^4*f*k*l^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*l^2*m - 17280* \\
& a^6*b^7*c^3*f*k*l^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*l - 1290240*a^7*b^2*c^7*f^2*j*l + 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*l - 829440*a^7*b^4*c^5*e*k^2*l - 705024*a^6*b^6*c^4*d*k^2*m - 5 \\
& 52960*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* \\
& l - 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*l - 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 \\
& *l - 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*
\end{aligned}$$

$f^2*j*1 + 5308416*a^8*b^2*c^6*e*j*1^2 - 5308416*a^6*b^3*c^7*e^2*j*1 - 51425$
 $28*a^8*b^3*c^5*f*h*m^2 + 5068800*a^7*b^2*c^7*f^2*h*m - 3755520*a^7*b^3*c^6*$
 $f*h^2*m - 3538944*a^7*b^3*c^6*e*j^2*1 + 3000960*a^6*b^4*c^6*f^2*h*m + 26542$
 $08*a^7*b^4*c^5*e*j*1^2 - 2322432*a^8*b^2*c^6*d*k*1^2 + 2125824*a^7*b^3*c^6*$
 $d*j^2*m - 1990656*a^7*b^4*c^5*d*k*1^2 - 1085760*a^6*b^5*c^5*f*h^2*m - 95904$
 $0*a^7*b^5*c^4*f*h*m^2 - 884736*a^6*b^5*c^5*e*j^2*1 + 829440*a^7*b^3*c^6*g*h$
 $^2*1 + 749568*a^7*b^3*c^6*f*j^2*k + 518400*a^6*b^6*c^4*d*k*1^2 + 414720*a^6$
 $*b^5*c^5*g*h^2*1 + 317952*a^6*b^5*c^5*f*j^2*k + 133632*a^6*b^5*c^5*d*j^2*m$
 $+ 103200*a^6*b^7*c^3*f*h*m^2 - 96768*a^5*b^7*c^4*d*j^2*m - 51840*a^5*b^8*c^$
 $3*d*k*1^2 + 41280*a^5*b^6*c^5*f^2*h*m + 38400*a^5*b^7*c^4*f*j^2*k - 37188*a$
 $^4*b^8*c^4*f^2*h*m + 13536*a^5*b^7*c^4*f*h^2*m + 13440*a^4*b^9*c^3*d*j^2*m$
 $+ 10368*a^5*b^7*c^4*g*h^2*1 + 5490*a^4*b^9*c^3*f*h^2*m + 1980*a^3*b^10*c^3*$
 $f^2*h*m - 1920*a^4*b^9*c^3*f*j^2*k + 810*a^5*b^9*c^2*f*h*m^2 - 180*a^3*b^11$
 $*c^2*f*h^2*m - 30*a^2*b^12*c^2*f^2*h*m + 30067200*a^6*b^2*c^8*d^2*h*m - 116$
 $12160*a^6*b^2*c^8*d^2*j*1 + 1658880*a^6*b^3*c^7*e^2*h*m + 1596672*a^4*b^6*c$
 $^6*d^2*j*1 - 1419264*a^6*b^4*c^6*f*g^2*m - 1105920*a^7*b^4*c^5*f*h*1^2 + 11$
 $05920*a^7*b^3*c^6*e*j*k^2 - 921600*a^7*b^2*c^7*f*g^2*m - 829440*a^6*b^4*c^6$
 $*g^2*h*k - 552960*a^8*b^2*c^6*f*h*1^2 - 508032*a^3*b^8*c^5*d^2*j*1 - 331776$
 $*a^7*b^2*c^7*g^2*h*k + 290304*a^6*b^5*c^5*e*j*k^2 - 103680*a^5*b^6*c^5*g^2*$
 $h*k + 80640*a^5*b^6*c^5*f*g^2*m - 69120*a^5*b^5*c^6*e^2*h*m + 65664*a^2*b^1$
 $0*c^4*d^2*j*1 - 34560*a^6*b^6*c^4*f*h*1^2 + 6912*a^5*b^7*c^4*e*j*k^2 + 3456$
 $*a^5*b^8*c^3*f*h*1^2 + 11930112*a^8*b^2*c^6*d*h*m^2 + 8432640*a^7*b^2*c^7*d$
 $*h^2*m + 4450176*a^7*b^4*c^5*d*h*m^2 + 4337280*a^6*b^4*c^6*d*h^2*m - 387072$
 $0*a^8*b^2*c^6*e*g*m^2 - 3640320*a^6*b^3*c^7*f^2*h*k - 2885760*a^5*b^4*c^7*d$
 $^2*h*m - 2844288*a^4*b^6*c^6*d^2*h*m - 2626560*a^7*b^3*c^6*f*h*k^2 + 221184$
 $0*a^7*b^2*c^7*f*h^2*k + 2056320*a^6*b^4*c^6*f*h^2*k + 1935360*a^6*b^3*c^7*f$
 $^2*g*1 - 1916928*a^7*b^2*c^7*d*j^2*k - 1687680*a^6*b^6*c^4*d*h*m^2 - 165888$
 $0*a^7*b^2*c^7*e*h^2*1 - 1143360*a^5*b^5*c^6*f^2*h*k - 1097280*a^6*b^5*c^5*f$
 $*h*k^2 + 1019412*a^3*b^8*c^5*d^2*h*m - 1007424*a^5*b^6*c^5*d*h^2*m - 912384$
 $*a^6*b^4*c^6*d*j^2*k - 829440*a^6*b^4*c^6*e*h^2*1 - 645120*a^7*b^4*c^5*e*g*$
 $m^2 - 552960*a^7*b^2*c^7*g*h^2*j - 552960*a^6*b^4*c^6*g*h^2*j + 364608*a^5*$
 $b^6*c^5*f*h^2*k + 322560*a^5*b^5*c^6*f^2*g*1 + 197460*a^5*b^8*c^3*d*h*m^2 -$
 $145152*a^5*b^6*c^5*g*h^2*j - 143802*a^2*b^10*c^4*d^2*h*m + 80640*a^6*b^6*c$
 $^4*e*g*m^2 - 56160*a^5*b^7*c^4*f*h*k^2 + 51948*a^4*b^8*c^4*d*h^2*m - 40320*$
 $a^4*b^7*c^5*f^2*g*1 + 34560*a^4*b^8*c^4*d*j^2*k + 27936*a^4*b^7*c^5*f^2*h*k$
 $- 20736*a^5*b^6*c^5*e*h^2*1 - 13824*a^5*b^6*c^5*d*j^2*k + 10800*a^3*b^10*c$
 $^3*d*h^2*m - 5760*a^3*b^10*c^3*d*j^2*k - 3780*a^4*b^8*c^4*f*h^2*k + 3690*a^$
 $3*b^9*c^4*f^2*h*k - 3456*a^4*b^8*c^4*g*h^2*j + 2970*a^4*b^9*c^3*f*h*k^2 - 2$
 $304*a^5*b^8*c^3*e*g*m^2 + 1152*a^3*b^9*c^4*f^2*g*1 - 540*a^3*b^10*c^3*f*h^2$
 $*k - 540*a^2*b^12*c^2*d*h^2*m - 90*a^4*b^10*c^2*d*h*m^2 - 90*a^2*b^11*c^3*f$
 $^2*h*k + 54*a^3*b^11*c^2*f*h*k^2 + 15925248*a^6*b^2*c^8*e^2*g*1 - 7962624*a$
 $^7*b^3*c^6*e*g*1^2 - 7962624*a^6*b^3*c^7*e*g^2*1 + 23385600*a^6*b^2*c^8*d*f$
 $^2*m + 6137856*a^6*b^3*c^7*d*g^2*m - 5677056*a^6*b^2*c^8*e^2*f*m + 4147200*$
 $a^7*b^3*c^6*d*h*1^2 - 3317760*a^6*b^2*c^8*e^2*h*k - 1354752*a^5*b^5*c^6*d*g$
 $^2*m + 1271808*a^6*b^3*c^7*f*g^2*k - 737280*a^7*b^2*c^7*f*h*j^2 + 17418240*$
 $a^5*b^3*c^8*d^2*g*1 - 568320*a^6*b^4*c^6*f*h*j^2 - 414720*a^6*b^5*c^5*d*h*1$
 $^2 + 414720*a^5*b^5*c^6*f*g^2*k - 414720*a^5*b^4*c^7*e^2*h*k + 322560*a^5*b$
 $^4*c^7*e^2*f*m - 136704*a^5*b^6*c^5*f*h*j^2 + 120960*a^4*b^7*c^5*d*g^2*m -$
 $31104*a^5*b^7*c^4*d*h*1^2 - 17280*a^4*b^7*c^5*f*g^2*k + 10368*a^4*b^9*c^3*d$
 $*h*1^2 - 2304*a^4*b^8*c^4*f*h*j^2 + 384*a^3*b^10*c^3*f*h*j^2 + 50042880*a^5$
 $*b^2*c^9*d^2*f*k - 13271040*a^5*b^3*c^8*d^2*h*k - 13149696*a^7*b^3*c^6*d*f*$
 $m^2 + 10906560*a^4*b^5*c^7*d^2*f*m - 8709120*a^4*b^5*c^7*d^2*g*1 - 7418880*$
 $a^5*b^3*c^8*d^2*f*m + 7133184*a^7*b^2*c^7*d*h*k^2 - 6428160*a^6*b^3*c^7*d*h$
 $^2*k + 5593536*a^4*b^5*c^7*d^2*h*k - 3870720*a^6*b^2*c^8*e*f^2*1 + 3369600*$
 $a^6*b^4*c^6*d*h*k^2 + 3148992*a^6*b^5*c^5*d*f*m^2 - 2985696*a^3*b^7*c^6*d^2$
 $*f*m + 1959552*a^3*b^7*c^6*d^2*g*1 - 1658880*a^7*b^2*c^7*e*g*k^2 - 1505280*$
 $a^4*b^6*c^6*d*f^2*m - 1290240*a^6*b^2*c^8*f^2*g*j - 34836480*a^5*b^2*c^9*d^$
 $2*e*1 + 1105920*a^6*b^3*c^7*e*h^2*j - 860160*a^5*b^4*c^7*f^2*g*j - 829440*a$
 $^6*b^4*c^6*e*g*k^2 - 692064*a^3*b^7*c^6*d^2*h*k - 689472*a^5*b^5*c^6*d*h^2*$

$$\begin{aligned}
& k - 645120a^5b^4c^7ef^2l - 388800a^5b^6c^5d*h*k^2 + 378954a^2b^9c^5d^2*f*m + 362880a^5b^4c^7d*f^2*m + 296964a^3b^8c^5d*f^2*m + 2 \\
& 90304a^5b^5c^6e*h^2*j + 277344a^4b^7c^5d*h^2*k - 217728a^2b^9c^5d^2*g*1 - 80640a^4b^6c^6f^2*g*j + 80640a^4b^6c^6e*f^2*1 - 77070a^4 \\
& 4b^9c^3d*f*m^2 - 30240a^5b^7c^4d*f*m^2 - 28350a^3b^9c^4d*h^2*k - 26406a^2b^9c^5d^2*h*k - 21060a^4b^8c^4d*h*k^2 - 20736a^5b^6c^5 \\
& e*g*k^2 - 19278a^2b^10c^4d*f^2*m + 12672a^3b^8c^5f^2*g*j + 10044a^3b^10c^3d*h*k^2 + 8820a^3b^11c^2d*f*m^2 + 6912a^4b^7c^5e*h^2*j - \\
& 2304a^3b^8c^5e*f^2*1 - 1620a^2b^11c^3d*h^2*k - 384a^2b^10c^4f^2 \\
& 2*g*j + 162a^2b^12c^2d*h*k^2 - 5419008a^5b^3c^8d*e^2*m + 5308416a^6b^2c^8e*g^2*j - 5308416a^5b^3c^8e^2*g*j - 3870720a^7b^2c^7d*f*1 \\
& ^2 - 3538944a^6b^3c^7e*g*j^2 + 2654208a^5b^4c^7e*g^2*j - 2322432a^6b^2c^8d*g^2*k - 1990656a^5b^4c^7d*g^2*k - 1935360a^6b^4c^6d*f*1 \\
& ^2 + 1658880a^6b^3c^7d*h*j^2 + 1658880a^5b^3c^8e^2*f*k - 884736a^5b^5c^6e*g*j^2 + 725760a^5b^6c^5d*f*1^2 + 17418240a^4b^4c^8d^2*e* \\
& 1 + 518400a^4b^6c^6d*g^2*k + 483840a^4b^5c^7d*e^2*m + 262656a^5b^5c^6d*h*j^2 - 96768a^4b^8c^4d*f*1^2 - 69120a^4b^5c^7e^2*f*k - 552 \\
& 96a^4b^7c^5d*h*j^2 - 51840a^3b^8c^5d*g^2*k + 3456a^3b^10c^3d*f*1^2 + 1152a^3b^9c^4d*h*j^2 + 1152a^2b^11c^3d*h*j^2 - 15431040a^4b^4 \\
& c^8d^2*f*k - 13248000a^5b^3c^8d*f^2*k - 11612160a^5b^2c^9d^2*g* \\
& j - 10063872a^6b^3c^7d*f*k^2 - 3919104a^3b^6c^7d^2*e*1 + 2554560a^4b^5c^7d*f^2*k + 1720320a^5b^3c^8e*f^2*j + 1596672a^3b^6c^7d^2*g \\
& *j + 1518912a^3b^6c^7d^2*f*k - 1105920a^5b^4c^7f*g^2*h + 838080a^5b^5c^6d*f*k^2 - 552960a^6b^2c^8f*g^2*h - 508032a^2b^8c^6d^2*g*j \\
& + 435456a^2b^8c^6d^2*e*1 + 161280a^4b^5c^7e*f^2*j + 116640a^4b^7c^5d*f*k^2 + 106812a^2b^8c^6d^2*f*k - 98208a^3b^7c^6d*f^2*k - 3456 \\
& 0a^4b^6c^6f*g^2*h - 27270a^3b^9c^4d*f*k^2 - 26334a^2b^9c^5d*f^2 \\
& *k - 25344a^3b^7c^6e*f^2*j + 3456a^3b^8c^5f*g^2*h + 768a^2b^9c^5e*f^2*j - 702a^2b^11c^3d*f*k^2 - 7962624a^5b^2c^9d*e^2*k - 2580480 \\
& *a^6b^2c^8d*f*j^2 + 2073600a^4b^4c^8d*e^2*k - 1658880a^6b^2c^8e* \\
& g*h^2 - 967680a^5b^4c^7d*f*j^2 - 829440a^5b^4c^7e*g*h^2 - 207360a^3b^6c^7d*e^2*k + 64512a^4b^6c^6d*f*j^2 + 39168a^3b^8c^5d*f*j^2 - \\
& 20736a^4b^6c^6e*g*h^2 - 9216a^2b^10c^4d*f*j^2 - 4423680a^5b^2c^9e^2*f*h + 4147200a^5b^3c^8d*g^2*h - 3193344a^3b^5c^8d^2*e*j + 101 \\
& 6064a^2b^7c^7d^2*e*j - 414720a^4b^5c^7d*g^2*h - 138240a^4b^4c^8e^2*f*h - 31104a^3b^7c^6d*g^2*h + 13824a^3b^6c^7e^2*f*h + 10368a^2 \\
& b^9c^5d*g^2*h + 15630336a^5b^2c^9d*f^2*h - 14459904a^4b^3c^9d^2* \\
& f*h + 9630144a^3b^5c^8d^2*f*h - 8764416a^5b^3c^8d*f*h^2 - 3870720a^5b^2c^9e*f^2*g + 2867328a^4b^4c^8d*f^2*h - 2095200a^2b^7c^7d^2* \\
& f*h - 1414080a^3b^6c^7d*f^2*h - 34836480a^4b^2c^10d^2*e*g - 645120* \\
& a^4b^4c^8e*f^2*g + 306720a^3b^7c^6d*f*h^2 + 197820a^2b^8c^6d*f^2 \\
& *h + 146880a^4b^5c^7d*f*h^2 + 80640a^3b^6c^7e*f^2*g - 55350a^2b^9c^5d*f*h^2 - 2304a^2b^8c^6e*f^2*g - 3870720a^5b^2c^9d*f*g^2 - 193 \\
& 5360a^4b^4c^8d*f*g^2 - 1658880a^4b^3c^9d*e^2*h + 725760a^3b^6c^7d*f*g^2 + 17418240a^3b^4c^9d^2*e*g - 124416a^3b^5c^8d*e^2*h - 9676 \\
& 8a^2b^8c^6d*f*g^2 + 41472a^2b^7c^7d*e^2*h - 3919104a^2b^6c^8d^2 \\
& *e*g - 7741440a^4b^2c^10d*e^2*f + 2903040a^3b^4c^9d*e^2*f - 387072* \\
& a^2b^6c^8d*e^2*f - 20160a^8b^7c*1^2*m^2 - 1648128a^10b^3c^3k*m^3 \\
& - 898560a^9b^3c^4k^3*m - 354240a^9b^5c^2k*m^3 - 354240a^8b^5c^3k \\
& k^3*m - 21600a^7b^7c^2k^3*m - 13950a^7b^8c*k^2*m^2 + 430080a^10b*c^5j^2*m^2 - 1984a^6b^9c*j^2*m^2 - 884736a^9b^3c^4j*1^3 - 589824a^8 \\
& b^3c^5j^3*1 - 442368a^8b^5c^3j*1^3 - 294912a^7b^5c^4j^3*1 - 4915 \\
& 2a^6b^7c^3j^3*1 + 1359360a^10b^2c^4h*m^3 + 1173120a^9b^4c^3h*m^3 \\
& + 743040a^7b^4c^5h^3*m + 622080a^8b^2c^6h^3*m + 184320a^9b*c^6j^2k^2 + 107136a^6b^6c^4h^3*m - 32640a^8b^6c^2h*m^3 + 540a^5b^8c^3h^3*m - 270a^4b^10c^2h^3*m - 180a^5b^10c*h^2*m^2 - 2293760a^9b^3c^4f*m^3 - 2293760a^6b^3c^7f^3*m + 1327104a^8b^4c^4g*1^3 + 1327104a^6b^4c^6g^3*1 - 622080a^8b^3c^5h*k^3 - 622080a^7b^3c^6h^3*k - 326592a^7b^5c^4h*k^3 - 326592a^6b^5c^5h^3*k - 199360a^8b^5c^3
\end{aligned}$$

$$\begin{aligned}
& *f^3m^3 - 199360a^5b^5c^6f^3m + 61920a^7b^7c^2f^3m^3 + 61920a^4b^7 \\
& *c^5f^3m^3 - 38880a^6b^7c^3h^3k^3 - 38880a^5b^7c^4h^3k - 3682a^3b \\
& ^9c^4f^3m^3 - 810a^5b^9c^2h^3k^3 - 810a^4b^9c^3h^3k - 70a^3b^12 \\
& c^f^2m^2 + 70a^2b^11c^3f^3m^3 + 3870720a^8b^7c^7e^2m^2 + 184320a^8 \\
& b^7c^7h^2j^2 - 14152320a^4b^4c^8d^3m^3 + 10644480a^5b^2c^9d^3m^3 + 5 \\
& 483520a^9b^2c^5d^3m^3 + 4269888a^3b^6c^7d^3m^3 - 2654208a^8b^3c^5 \\
& e^1^3 + 1359360a^6b^2c^8f^3k + 1330560a^8b^4c^4d^3m^3 + 1173120a^5 \\
& b^4c^7f^3k - 884736a^6b^3c^7g^3j - 826560a^7b^6c^3d^3m^3 + 7430 \\
& 40a^7b^4c^5f^3k^3 + 622080a^8b^2c^6f^3k^3 - 607068a^2b^8c^6d^3m^3 \\
& - 589824a^7b^3c^6g^3j^3 - 442368a^5b^5c^6g^3j - 294912a^6b^5c^5 \\
& g^3j^3 + 145188a^6b^8c^2d^3m^3 + 107136a^6b^6c^4f^3k^3 - 49152a^5b^7 \\
& c^4g^3j^3 - 32640a^4b^6c^6f^3k - 5796a^3b^8c^5f^3k + 540a^5b^8 \\
& c^3f^3k^3 - 270a^4b^10c^2f^3k^3 + 210a^2b^10c^4f^3k + 19077120a^4 \\
& b^3c^9d^3k + 1658880a^7b^3c^8e^2k^2 + 430080a^7b^3c^8f^2j^2 + 353 \\
& 8944a^5b^2c^9e^3j - 2488320a^7b^3c^6d^3k^3 - 2379456a^3b^5c^8d^ \\
& 3k + 1179648a^7b^2c^7e^3j^3 + 589824a^6b^4c^6e^3j^3 + 98304a^5b^6 \\
& c^5e^3j^3 - 95904a^2b^7c^7d^3k - 57024a^6b^5c^5d^3k^3 + 49248a^5b \\
& ^7c^4d^3k^3 - 4050a^4b^9c^3d^3k^3 - 810a^3b^11c^2d^3k^3 - 486a^3b^12 \\
& c^3d^2k^2 + 3870720a^6b^3c^9d^2j^2 - 1648128a^5b^3c^8f^3h - 8985 \\
& 60a^6b^3c^7f^3h^3 - 354240a^5b^5c^6f^3h^3 - 354240a^4b^5c^7f^3h \\
& + 43680a^3b^7c^6f^3h - 21600a^4b^7c^5f^3h^3 - 9792a^3b^11c^4d^2j \\
& ^2 + 1350a^3b^9c^4f^3h^3 - 1050a^2b^9c^5f^3h + 1658880a^6b^3c^9e^ \\
& 2h^2 + 16547328a^4b^2c^10d^3h - 12306816a^3b^4c^9d^3h + 37310976 \\
& a^3b^3c^10d^3f + 3037824a^2b^6c^8d^3h - 2654208a^5b^3c^8e^3g^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^1 \\
& 0c^4d^3h^3 + 3870720a^5b^3c^10e^2f^2 + 34836480a^4b^3c^11d^2e^2 - 10 \\
& 8864a^3b^9c^6d^2g^2 - 8068032a^2b^5c^9d^3f - 5623296a^4b^3c^9d^ \\
& f^3 + 1737792a^3b^5c^8d^3f^3 - 260190a^3b^8c^7d^2f^2 - 211680a^2b^7 \\
& c^7d^3f^3 - 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^9 \\
& c^7h^3j^2k - 30a^4b^12f^3k^2m + 967680a^9c^7d^3k^2m + 384000a^8c^8 \\
& f^2h^3m - 90a^3b^13d^3k^2m + 20321280a^7c^9d^2h^3m - 883200a^11b^3c \\
& ^4k^3m^3 - 317952a^10b^3c^5k^3m + 43680a^8b^7c^3k^3m + 1350a^6b^9c \\
& ^3k^3m - 270b^14c^2d^2h^3m + 6a^3b^13f^3h^3m^2 + 4838400a^9c^7d^3h^3m^ \\
& 2 + 2903040a^8c^8d^3h^2m - 1032192a^8c^8d^3j^2k + 138240a^8c^8f^3h^ \\
& 2k - 3686400a^7c^9e^2f^3m - 1327104a^7c^9e^2h^3k - 393216a^9b^3c^6 \\
& j^3m - 245760a^8c^8f^3h^3j^2 - 810b^13c^3d^2h^3k + 630b^13c^3d^2f^3 \\
& m + 18a^2b^14d^3h^3m^2 + 2688000a^7c^9d^3f^2m + 580608a^8c^8d^3h^3k^2 \\
& - 5796a^7b^8c^3h^3m^3 - 3456b^12c^4d^2g^3j + 1890b^12c^4d^2f^3k + 67 \\
& 73760a^6c^10d^2f^3k - 1344000a^10b^3c^5f^3m^3 - 1344000a^7b^3c^8f^3m^3 \\
& - 207360a^9b^3c^6h^3k^3 - 207360a^8b^3c^7h^3k - 3682a^6b^9c^3f^3m^3 - \\
& 9289728a^6c^10d^2e^2k - 1720320a^7c^9d^3f^3j^2 - 50803200a^5b^3c^10d \\
& ^3k + 6912b^11c^5d^2e^3j - 10616832a^6b^3c^9e^3m - 2211840a^6c^10 \\
& e^2f^3h - 393216a^8b^3c^7g^3j^3 + 43416a^3b^10c^5d^3m - 9576a^5b^10c \\
& ^d^3m^3 - 9450b^11c^5d^2f^3h - 504a^3b^14c^d^2m^2 + 1612800a^6c^10d^ \\
& f^2h - 1036800a^8b^3c^7d^3k^3 + 45198a^3b^9c^6d^3k - 20736b^10c^6d^ \\
& 2e^3g - 75188736a^4b^3c^11d^3f - 883200a^6b^3c^9f^3h - 317952a^7b^3c \\
& ^8f^3h^3 - 15482880a^5c^11d^2e^2f - 10616832a^5b^3c^10e^3g - 345060a \\
& ^b^8c^7d^3h - 4262400a^5b^3c^10d^3f^3 + 852768a^3b^7c^8d^3f + 7350a \\
& ^b^9c^6d^3f^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^2 + 2 \\
& 07360a^8b^5c^3k^2l^2 + 170240a^8b^5c^3j^2m^2 + 9216a^7b^7c^2j \\
& ^2m^2 + 5184a^7b^7c^2k^2l^2 + 884736a^9b^2c^5j^2l^2 + 884736a^8 \\
& b^4c^4j^2l^2 + 221184a^7b^6c^3j^2l^2 + 1419840a^8b^4c^4h^2m^2 \\
& + 1387008a^9b^2c^5h^2m^2 + 276480a^8b^3c^5j^2k^2 + 140544a^7b^ \\
& 5c^4j^2k^2 + 84960a^7b^6c^3h^2m^2 + 25344a^6b^7c^3j^2k^2 - 801
\end{aligned}$$

$$\begin{aligned}
& 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*l^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 + 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*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
\end{aligned}$$

$$\begin{aligned}
& *b^{10}c^6d^3h + 580608a^7c^9d^3h^3 - 39690b^9c^7d^3f - 734832a^6b^6 \\
& *c^9d^4 + 9b^{16}d^2m^2 + 160000a^{12}c^4m^4 + 1225a^8b^8m^4 + 20736a^{10}c^6k^4 \\
& + 65536a^9c^7j^4 + 20736a^8c^8h^4 + 49787136a^4c^{12}d^4 + 160000a^6c^{10}f^4 \\
& + 5308416a^5c^{11}e^4 + 35721b^8c^8d^4 + a^2b^{14}f^2m^2, z, k1) *x * (8388608a^{11}b^c^{10} - 512a^4b^{15}c^3 + 14336a^5b^{13}c^4 \\
& - 172032a^6b^{11}c^5 + 1146880a^7b^9c^6 - 4587520a^8b^7c^7 + 11010048a^9b^5c^8 \\
& - 14680064a^{10}b^3c^9) / (64 * (4096a^{10}c^7 + a^4b^{12}c - 24a^5b^{10}c^2 + 240a^6b^8c^3 \\
& - 1280a^7b^6c^4 + 3840a^8b^4c^5 - 6144a^9b^2c^6)) - (983040a^7c^9e^f + 589824a^8c^8e^k \\
& + 327680a^8c^8f^j + 196608a^9c^7j^k - 3244032a^6b^c^9d^e - 884736a^7b^c^8e^h \\
& - 491520a^7b^c^8f^g - 1081344a^7b^c^8d^j - 1277952a^8b^c^7e^m - 491520a^8b^c^7f^l \\
& - 294912a^8b^c^7g^k - 294912a^8b^c^7h^j - 425984a^9b^c^6j^m - 294912a^9b^c^6k^l \\
& - 4608a^2b^9c^5d^e + 87552a^3b^7c^6d^e - 681984a^4b^5c^7d^e + 2433024a^5b^3c^8d^e + 2304a^2b^{10}c^4d^g \\
& - 43776a^3b^8c^5d^g - 1536a^3b^8c^5e^f + 340992a^4b^6c^6d^g + 39936a^4b^6c^6e^f \\
& - 1216512a^5b^4c^7d^g - 184320a^5b^4c^7e^f + 1622016a^6b^2c^8d^g - 49152a^6b^2c^8e^f \\
& + 768a^3b^9c^4f^g - 4608a^4b^7c^5e^h - 19968a^4b^7c^5f^g - 18432a^5b^5c^6e^h \\
& + 92160a^5b^5c^6f^g + 368640a^6b^3c^7e^h + 24576a^6b^3c^7f^g - 768a^2b^{11}c^3d^j \\
& + 13056a^3b^9c^4d^j - 84480a^4b^7c^5d^j + 178176a^5b^5c^6d^j + 270336a^6b^3c^7d^j \\
& + 2304a^4b^8c^4g^h + 9216a^5b^6c^5g^h - 184320a^6b^4c^6g^h + 442368a^7b^2c^7g^h + 2304a^3b^{10}c^3d^l \\
& - 256a^3b^{10}c^3f^j - 43776a^4b^8c^4d^l + 6144a^4b^8c^4f^j + 340992a^5b^6c^5d^l \\
& + 27648a^5b^6c^5e^k - 17408a^5b^6c^5f^j - 1216512a^6b^4c^6d^l - 184320a^6b^4c^6e^k \\
& - 69632a^6b^4c^6f^j + 1622016a^7b^2c^7d^l + 147456a^7b^2c^7e^k + 147456a^7b^2c^7f^j \\
& + 768a^4b^9c^3f^l - 768a^4b^9c^3h^j + 1536a^5b^7c^4e^m - 19968a^5b^7c^4f^l \\
& - 13824a^5b^7c^4g^k - 4608a^5b^7c^4h^j - 92160a^6b^5c^5e^m + 92160a^6b^5c^5f^l \\
& + 92160a^6b^5c^5g^k + 55296a^6b^5c^5h^j + 663552a^7b^3c^6e^m + 24576a^7b^3c^6f^l - 73728a^7b^3c^6g^k \\
& - 24576a^7b^3c^6h^j - 768a^5b^8c^3g^m + 2304a^5b^8c^3h^l + 46080a^6b^6c^4g^m \\
& + 9216a^6b^6c^4h^l - 331776a^7b^4c^5g^m - 184320a^7b^4c^5h^l + 638976a^8b^2c^6g^m \\
& + 442368a^8b^2c^6h^l + 4608a^5b^8c^3j^k - 21504a^6b^6c^4j^k - 36864a^7b^4c^5j^k \\
& + 147456a^8b^2c^6j^k + 256a^5b^9c^2j^m - 14848a^6b^7c^3j^m - 13824a^6b^7c^3k^l \\
& + 79872a^7b^5c^4j^m + 92160a^7b^5c^4k^l + 8192a^8b^3c^5j^m - 73728a^8b^3c^5k^l \\
& - 768a^6b^8c^2l^m + 46080a^7b^6c^3l^m - 331776a^8b^4c^4l^m + 638976a^9b^2c^5l^m) / (512 * (4096a^{10}c^7 \\
& + a^4b^{12}c - 24a^5b^{10}c^2 + 240a^6b^8c^3 - 1280a^7b^6c^4 + 3840a^8b^4c^5 - 6144a^9b^2c^6)) \\
& + (x * (25600a^7c^9f^2 - 18b^{12}c^4d^2 - 451584a^6c^{10}d^2 - 9216a^8c^8h^2 + 9216a^9c^7k^2 - 2a^4b^{12}m^2 \\
& - 25600a^{10}c^6m^2 + 504a^b^{10}c^5d^2 + 73728a^6b^c^9e^2 + 8192a^8b^c^7j^2 + 88a^5b^{10}c^m^2 \\
& - 6228a^2b^8c^6d^2 + 42624a^3b^6c^7d^2 - 176256a^4b^4c^8d^2 + 423936a^5b^2c^9d^2 + 4608a^4b^5c^7e^2 \\
& - 36864a^5b^3c^8e^2 - 2a^2b^{10}c^4f^2 + 84a^3b^8c^5f^2 - 3520a^4b^6c^6f^2 + 26240a^5b^4c^7f^2 \\
& - 59904a^6b^2c^8f^2 + 1152a^4b^7c^5g^2 - 9216a^5b^5c^6g^2 + 18432a^6b^3c^7g^2 - 468a^4b^8c^4h^2 \\
& + 3456a^5b^6c^5h^2 - 5760a^6b^4c^6h^2 + 128a^4b^9c^3j^2 - 512a^5b^7c^4j^2 - 1536a^6b^5c^5j^2 \\
& + 4096a^7b^3c^6j^2 - 18a^4b^{10}c^2k^2 - 108a^5b^8c^3k^2 + 576a^6b^6c^4k^2 + 5760a^7b^4c^5k^2 \\
& - 23040a^8b^2c^6k^2 + 1152a^6b^7c^3l^2 - 9216a^7b^5c^4l^2 + 18432a^8b^3c^5l^2 - 1236a^6b^8c^2m^2 \\
& + 5760a^7b^6c^3m^2 - 8320a^8b^4c^4m^2 + 6144a^9b^2c^5m^2 - 129024a^7c^9d^h - 215040a^8c^8d^m \\
& + 30720a^8c^8f^k - 30720a^9c^7h^m - 12a^b^{11}c^4d^f + 218112a^6b^c^9d^f + 9216a^7b^c^8f^h \\
& + 156672a^7b^c^8d^k + 49152a^7b^c^8e^j + 25600a^8b^c^7f^m + 9216a^8b^c^7h^k - 12a^4b^{11}c^k^m \\
& + 21504a^9b^c^6k^m + 420a^2b^9c^5d^f - 4992a^3b^7c^6d^f + 36480a^4b^5c^7d^f \\
& - 144384a^5b^3c^8d^f - 36a^2b^{10}c^4d^h + 360a^3b^8c^5d^h - 3456a^4b^6c^6d^h \\
& - 4608a^4b^6c^6e^g + 11520a
\end{aligned}$$

$$\begin{aligned}
& ^5b^4c^7d^*h + 36864a^5b^4c^7e^*g + 27648a^6b^2c^8d^*h - 73728a^6b^2c^8e^*g - 12a^3b^9c^4f^*h + 2304a^4b^7c^5f^*h - 17280a^5b^5c^6f^*h + 30720a^6b^3c^7f^*h + 180a^3b^9c^4d^*k - 2304a^4b^7c^5d^*k + 1536a^4b^7c^5e^*j + 19584a^5b^5c^6d^*k - 9216a^5b^5c^6e^*j - 92160a^6b^3c^7d^*k - 168a^4b^8c^4d^*m - 360a^4b^8c^4f^*k - 768a^4b^8c^4g^*j + 768a^5b^6c^5d^*m - 4608a^5b^6c^5e^*l - 768a^5b^6c^5f^*k + 4608a^5b^6c^5g^*j - 11520a^6b^4c^6d^*m + 36864a^6b^4c^6e^*l + 25344a^6b^4c^6f^*k + 98304a^7b^2c^7d^*m - 73728a^7b^2c^7e^*l - 73728a^7b^2c^7f^*k - 24576a^7b^2c^7g^*j - 140a^4b^9c^3f^*m + 180a^4b^9c^3h^*k + 3584a^5b^7c^4f^*m + 2304a^5b^7c^4g^*l - 20352a^6b^5c^5f^*m - 18432a^6b^5c^5g^*l - 8064a^6b^5c^5h^*k + 26624a^7b^3c^6f^*m + 36864a^7b^3c^6g^*l + 18432a^7b^3c^6h^*k + 60a^4b^10c^2h^*m - 1560a^5b^8c^3h^*m + 8832a^6b^6c^4h^*m - 13056a^7b^4c^5h^*m + 3072a^8b^2c^6h^*m - 768a^5b^8c^3j^*l + 4608a^6b^6c^4j^*l - 24576a^8b^2c^6j^*l + 228a^5b^9c^2k^*m + 384a^6b^7c^3k^*m - 9600a^7b^5c^4k^*m + 15360a^8b^3c^5k^*m)/(64*(4096a^10c^7 + a^4b^12c - 24a^5b^10c^2 + 240a^6b^8c^3 - 1280a^7b^6c^4 + 3840a^8b^4c^5 - 6144a^9b^2c^6)) + (35a^6b^7m^3 - 8000a^5c^8f^3 - 1728a^8c^5k^3 - 567b^7c^6d^3 + 10368a^b^5c^7d^3 + 169344a^3b^c^9d^3 + 193536a^4c^9d^e^2 - 141120a^4c^9d^2f + 1728a^6b^c^6h^3 + 315b^8c^5d^2f + 27648a^5c^8e^2h - 135b^9c^4d^2h + 21504a^6c^7d^j^2 - 2880a^6c^7f^*h^2 - 84672a^5c^8d^2k - 1176a^7b^5c^m^3 + 6400a^9b^c^3m^3 + 3a^2b^11d^m^2 + 27b^10c^3d^2k - 14400a^6c^7f^2k - 8640a^7c^6f^*k^2 + a^3b^10f^*m^2 + 46080a^6c^7e^2m + 3072a^7c^6h^*j^2 + 9b^11c^2d^2m - 1728a^7c^6h^2k - 8000a^8c^5f^*m^2 + 3a^4b^9h^*m^2 - 15a^5b^8k^*m^2 + 5120a^8c^5j^2m - 4800a^9c^4k^*m^2 - 67824a^2b^3c^8d^3 + 35a^2b^6c^5f^3 + 84a^3b^4c^6f^3 - 12720a^4b^2c^7f^3 + 540a^4b^5c^4h^3 + 4320a^5b^3c^5h^3 - 135a^5b^6c^2k^3 - 1620a^6b^4c^3k^3 - 4752a^7b^2c^4k^3 + 9456a^8b^3c^2m^3 - 40320a^5c^8d^*f^*h + 129024a^5c^8d^*e^*j - 67200a^6c^7d^*f^*m - 24192a^6c^7d^*h^*k + 18432a^6c^7e^*h^*j - 9600a^7c^6f^*h^*m - 40320a^7c^6d^*k^*m + 30720a^7c^6e^*j^*m - 5760a^8c^5h^*k^*m - 6237a^b^6c^6d^2f + 210a^b^7c^5d^2f^2 + 116160a^4b^c^8d^2f^2 - 36864a^4b^c^8e^2f + 2430a^b^7c^5d^2h + 133056a^4b^c^8d^2h + 27648a^5b^c^7d^*h^2 + 26880a^5b^c^7f^2h - 297a^b^8c^4d^2k + 46656a^6b^c^6d^*k^2 - 27648a^5b^c^7e^2k - 4096a^6b^c^6f^*j^2 - 324a^b^9c^3d^2m - 132a^3b^9c^d^*m^2 + 193536a^5b^c^7d^2m + 63360a^7b^c^5d^*m^2 - 51a^4b^8c^*f^*m^2 + 40000a^6b^c^6f^2m + 10368a^7b^c^5h^*k^2 - 78a^5b^7c^*h^*m^2 + 8064a^7b^c^5h^2m - 3072a^7b^c^5j^2k + 12480a^8b^c^4h^*m^2 - 90a^5b^7c^*k^2m + 705a^6b^6c^*k^*m^2 + 15552a^8b^c^4k^2m + 6912a^2b^4c^7d^*e^2 - 62208a^3b^2c^8d^*e^2 + 42372a^2b^4c^7d^2f - 1764a^2b^5c^6d^*f^2 - 96048a^3b^2c^8d^2f - 4608a^3b^3c^7d^*f^2 + 1728a^2b^6c^5d^*g^2 + 2304a^3b^3c^7e^2f - 15552a^3b^4c^6d^*g^2 + 48384a^4b^2c^7d^*g^2 - 13716a^2b^5c^6d^2h + 405a^2b^7c^4d^*h^2 + 12096a^3b^3c^7d^2h - 5400a^3b^5c^5d^*h^2 + 28944a^4b^3c^6d^*h^2 + 576a^3b^5c^5f^*g^2 + 6912a^4b^2c^7e^2h - 9216a^4b^3c^6f^*g^2 - 15a^2b^7c^4f^2h + 192a^2b^8c^3d^*j^2 - 360a^3b^5c^5f^2h - 960a^3b^6c^4d^*j^2 + 135a^3b^6c^4f^*h^2 + 15696a^4b^3c^6f^2h - 768a^4b^4c^5d^*j^2 - 5580a^4b^4c^5f^*h^2 + 14592a^5b^2c^6d^*j^2 - 20592a^5b^2c^6f^*h^2 - 999a^2b^6c^5d^2k + 27a^2b^9c^2d^*k^2 + 23004a^3b^4c^6d^2k - 108a^3b^7c^3d^*k^2 - 84240a^4b^2c^7d^2k + 1728a^4b^4c^5g^2h - 1404a^4b^5c^4d^*k^2 + 6912a^5b^2c^6g^2h + 14688a^5b^3c^5d^*k^2 + 64a^3b^7c^3f^*j^2 - 768a^4b^5c^4f^*j^2 + 1728a^4b^6c^3d^*l^2 - 3840a^5b^3c^5f^*j^2 - 15552a^5b^4c^4d^*l^2 + 48384a^6b^2c^5d^*l^2 + 3717a^2b^7c^4d^2m + 3a^2b^8c^3f^2k - 15192a^3b^5c^5d^2m + 135a^3b^6c^4f^2k + 9a^3b^8c^2f^*k^2 - 7920a^4b^3c^6d^2m - 2988a^4b^4c^5f^2k - 99a^4b^6c^3f^*k^2 + 2079a^4b^7c^2d^*m^2 - 28272a^5b^2c^6f^2k - 4500a^5b^4c^4f^*k^2 - 14448a^5b^5c^3d^*m^2 - 20304a^6b^2c^5f^*k^2 + 37104a^6b^3c^4d^*m^2 + 192a^4b^6c^3h^*j^2 + 2304a^5b^2c^6e^2m - 6912a^5b
\end{aligned}$$

$$\begin{aligned}
& ^3c^5g^2k + 1536a^5b^4c^4h^2j^2 + 576a^5b^5c^3f^2l^2 + 3840a^6b^2c^5h^2j^2 - 9216a^6b^3c^4f^2l^2 + a^2b^9c^2f^2m + 20a^3b^7c^3f^2m - 1596a^4b^5c^4f^2m - 243a^4b^6c^3h^2k + 27a^4b^7c^2h^2k^2 + 16736a^5b^3c^5f^2m - 5940a^5b^4c^4h^2k + 1728a^5b^5c^3h^2k^2 + 875a^5b^6c^2f^2m - 13392a^6b^2c^5h^2k + 10800a^6b^3c^4h^2k^2 - 2716a^6b^4c^3f^2m - 39600a^7b^2c^4f^2m + 576a^5b^4c^4g^2m + 11520a^6b^2c^5g^2m + 1728a^6b^4c^3h^2l^2 + 6912a^7b^2c^4h^2l^2 - 81a^4b^7c^2h^2m + 720a^5b^5c^3h^2m - 768a^5b^5c^3j^2k + 17136a^6b^3c^4h^2m - 3072a^6b^3c^4j^2k - 900a^6b^5c^2h^2m^2 + 22272a^7b^3c^3h^2m^2 + 64a^5b^6c^2j^2m + 1536a^6b^4c^3j^2m + 5376a^7b^2c^4j^2m - 6912a^7b^3c^3k^2l^2 + 1260a^6b^5c^2k^2m + 13248a^7b^3c^3k^2m - 6084a^7b^4c^2k^2m - 26256a^8b^2c^3k^2m^2 + 576a^7b^4c^2l^2m + 11520a^8b^2c^3l^2m - 193536a^4b^8d^2e^2g - 90a^8b^8c^4d^2f^2h - 27648a^5b^8c^7e^2g^2h + 18a^8b^9c^3d^2f^2k - 193536a^5b^8c^7d^2e^2l + 147456a^5b^8c^7d^2f^2k - 64512a^5b^8c^7d^2g^2j - 24576a^5b^8c^7e^2f^2j + 6a^8b^10c^2d^2f^2m + 84096a^6b^8c^6d^2h^2m - 46080a^6b^8c^6e^2g^2m - 27648a^6b^8c^6e^2h^2l + 33408a^6b^8c^6f^2h^2k - 9216a^6b^8c^6g^2h^2j - 64512a^6b^8c^6d^2j^2l - 18432a^6b^8c^6e^2j^2k + 18a^2b^10c^2d^2k^2m + 6a^3b^9c^2f^2k^2m - 46080a^7b^8c^5e^2l^2m + 49920a^7b^8c^5f^2k^2m - 15360a^7b^8c^5g^2j^2m - 9216a^7b^8c^5h^2j^2l + 18a^4b^8c^2h^2k^2m - 15360a^8b^8c^4j^2l^2m - 6912a^2b^5c^6d^2e^2g + 62208a^3b^3c^7d^2e^2g - 270a^2b^6c^5d^2f^2h + 16056a^3b^4c^6d^2f^2h - 2304a^3b^4c^6e^2f^2g - 127008a^4b^2c^7d^2f^2h + 36864a^4b^2c^7e^2f^2g + 2304a^2b^6c^5d^2e^2j - 16128a^3b^4c^6d^2e^2j + 23040a^4b^2c^7d^2e^2j - 6912a^4b^3c^6e^2g^2h + 306a^2b^7c^4d^2f^2k - 1152a^2b^7c^4d^2g^2j - 6912a^3b^5c^5d^2e^2l - 5328a^3b^5c^5d^2f^2k + 8064a^3b^5c^5d^2g^2j + 768a^3b^5c^5e^2f^2j + 62208a^4b^3c^6d^2e^2l + 19872a^4b^3c^6d^2f^2k - 11520a^4b^3c^6d^2g^2j - 10752a^4b^3c^6e^2f^2j - 48a^2b^8c^3d^2f^2m - 216a^2b^8c^3d^2h^2k - 2226a^3b^6c^4d^2f^2m + 3456a^3b^6c^4d^2g^2l + 1998a^3b^6c^4d^2h^2k - 384a^3b^6c^4f^2g^2j + 33384a^4b^4c^5d^2f^2m - 31104a^4b^4c^5d^2g^2l - 1944a^4b^4c^5d^2h^2k - 2304a^4b^4c^5e^2f^2l + 2304a^4b^4c^5e^2h^2j + 5376a^4b^4c^5f^2g^2j - 162528a^5b^2c^6d^2f^2m + 96768a^5b^2c^6d^2g^2l - 87264a^5b^2c^6d^2h^2k + 36864a^5b^2c^6e^2f^2l + 27648a^5b^2c^6e^2g^2k + 13824a^5b^2c^6e^2h^2j + 12288a^5b^2c^6f^2g^2j - 72a^2b^9c^2d^2h^2m + 2016a^3b^7c^3d^2h^2m - 72a^3b^7c^3f^2h^2k - 18648a^4b^5c^4d^2h^2m + 1152a^4b^5c^4f^2g^2l + 1800a^4b^5c^4f^2h^2k - 1152a^4b^5c^4g^2h^2j + 67392a^5b^3c^5d^2h^2m - 2304a^5b^3c^5e^2g^2m - 6912a^5b^3c^5e^2h^2l - 18432a^5b^3c^5f^2g^2l + 27072a^5b^3c^5f^2h^2k - 6912a^5b^3c^5g^2h^2j - 1152a^3b^7c^3d^2j^2l + 8064a^4b^5c^4d^2j^2l - 11520a^5b^3c^5d^2j^2l - 9216a^5b^3c^5e^2j^2k - 24a^3b^8c^2f^2h^2m + 1050a^4b^6c^3f^2h^2m - 9576a^5b^4c^4f^2h^2m + 3456a^5b^4c^4g^2h^2l - 57504a^6b^2c^5f^2h^2m + 13824a^6b^2c^5g^2h^2l - 432a^3b^8c^2d^2k^2m + 2394a^4b^6c^3d^2k^2m - 384a^4b^6c^3f^2j^2l + 6552a^5b^4c^4d^2k^2m + 768a^5b^4c^4e^2j^2m + 5376a^5b^4c^4f^2j^2l + 4608a^5b^4c^4g^2j^2k - 114336a^6b^2c^5d^2k^2m + 16896a^6b^2c^5e^2j^2m + 27648a^6b^2c^5e^2k^2l + 12288a^6b^2c^5f^2j^2l + 9216a^6b^2c^5g^2j^2k - 186a^4b^7c^2f^2k^2m - 384a^5b^5c^3g^2j^2m - 1152a^5b^5c^3h^2j^2l - 2304a^6b^3c^4e^2l^2m + 31584a^6b^3c^4f^2k^2m - 8448a^6b^3c^4g^2j^2m - 13824a^6b^3c^4g^2k^2l - 6912a^6b^3c^4h^2j^2l + 342a^5b^6c^2h^2k^2m + 1152a^6b^4c^3g^2l^2m - 12600a^6b^4c^3h^2k^2m + 23040a^7b^2c^4g^2l^2m - 37728a^7b^2c^4h^2k^2m + 4608a^6b^4c^3j^2k^2l + 9216a^7b^2c^4j^2k^2l - 384a^6b^5c^2j^2l^2m - 8448a^7b^3c^3j^2l^2m)/(512(4096a^10c^7 + a^4b^12c - 24a^5b^10c^2 + 240a^6b^8c^3 - 1280a^7b^6c^4 + 3840a^8b^4c^5 - 6144a^9b^2c^6)) + (x*(13824a^4c^9e^3 + 512a^7c^6j^3 - 54b^7c^6d^2e + 27b^8c^5d^2g + 13824a^5c^8e^2j + 4608a^6c^7e^2j^2 - 9b^9c^4d^2j + a^4b^9j^2m^2 - 3a^5b^8l^2m^2 - 1728a^4b^3c^6g^3 + 64a^4b^6c^3j^3 + 384a^5b^4c^4j^3 + 768a^6b^2c^5j^3 - 1728a^7b^3c^3l^3 - 20160a^4c^9d^2e^2f - 2880a^5c^8e^2f^2h - 12096a^5c^8d^2e^2k - 6720a^5c^8d^2f^2j - 4800a^6c^7e^2f^2m - 1728a^6c^7e^2h^2k - 960a^6c^7f^2h^2j - 4032a^6c^7d^2j^2k - 2880a^7c
\end{aligned}$$

$^6e*k*m - 1600*a^7*c^6*f*j*m - 576*a^7*c^6*h*j*k - 960*a^8*c^5*j*k*m + 972$
 $*a*b^5*c^7*d^2*e + 24192*a^3*b*c^9*d^2*e - 486*a*b^6*c^6*d^2*g + 6240*a^4*b$
 $*c^8*e*f^2 - 20736*a^4*b*c^8*e^2*g + 1728*a^5*b*c^7*e*h^2 + 144*a*b^7*c^5*d$
 $^2*j + 8064*a^4*b*c^8*d^2*j + 27*a*b^8*c^4*d^2*1 + 2080*a^5*b*c^7*f^2*j + 2$
 $592*a^6*b*c^6*e*k^2 - 20736*a^5*b*c^7*e^2*1 - 2304*a^6*b*c^6*g*j^2 + 576*a^$
 $6*b*c^6*h^2*j + 3840*a^7*b*c^5*e*m^2 - 3*a^4*b^8*c*g*m^2 + 864*a^7*b*c^5*j*$
 $k^2 - 2304*a^7*b*c^5*j^2*1 - 32*a^5*b^7*c*j*m^2 + 1280*a^8*b*c^4*j*m^2 + 10$
 $2*a^6*b^6*c*1*m^2 - 7344*a^2*b^3*c^8*d^2*e + 3672*a^2*b^4*c^7*d^2*g - 6*a^2$
 $*b^5*c^6*e*f^2 - 12096*a^3*b^2*c^8*d^2*g + 192*a^3*b^3*c^7*e*f^2 + 10368*a^$
 $4*b^2*c^7*e*g^2 + 3*a^2*b^6*c^5*f^2*g - 96*a^3*b^4*c^6*f^2*g - 3120*a^4*b^2$
 $*c^7*f^2*g + 1296*a^4*b^3*c^6*e*h^2 - 900*a^2*b^5*c^6*d^2*j + 1584*a^3*b^3*$
 $c^7*d^2*j + 6912*a^4*b^2*c^7*e^2*j + 1152*a^4*b^4*c^5*e*j^2 - 648*a^4*b^4*c$
 $^5*g*h^2 + 4608*a^5*b^2*c^6*e*j^2 - 864*a^5*b^2*c^6*g*h^2 - 486*a^2*b^6*c^5$
 $*d^2*1 - a^2*b^7*c^4*f^2*j + 3672*a^3*b^4*c^6*d^2*1 + 30*a^3*b^5*c^5*f^2*j$
 $- 12096*a^4*b^2*c^7*d^2*1 + 1104*a^4*b^3*c^6*f^2*j + 54*a^4*b^5*c^4*e*k^2 +$
 $864*a^5*b^3*c^5*e*k^2 + 1728*a^4*b^4*c^5*g^2*j - 576*a^4*b^5*c^4*g*j^2 + 3$
 $456*a^5*b^2*c^6*g^2*j - 2304*a^5*b^3*c^5*g*j^2 + 10368*a^6*b^2*c^5*e*1^2 +$
 $3*a^3*b^6*c^4*f^2*1 - 96*a^4*b^4*c^5*f^2*1 + 216*a^4*b^5*c^4*h^2*j - 27*a^4$
 $*b^6*c^3*g*k^2 + 6*a^4*b^7*c^2*e*m^2 - 3120*a^5*b^2*c^6*f^2*1 + 720*a^5*b^3$
 $*c^5*h^2*j - 432*a^5*b^4*c^4*g*k^2 - 204*a^5*b^5*c^3*e*m^2 - 1296*a^6*b^2*c$
 $^5*g*k^2 + 1488*a^6*b^3*c^4*e*m^2 - 5184*a^5*b^3*c^5*g^2*1 - 5184*a^6*b^3*c$
 $^4*g*1^2 - 648*a^5*b^4*c^4*h^2*1 + 102*a^5*b^6*c^2*g*m^2 - 864*a^6*b^2*c^5*$
 $h^2*1 - 744*a^6*b^4*c^3*g*m^2 - 1920*a^7*b^2*c^4*g*m^2 + 9*a^4*b^7*c^2*j*k^$
 $2 + 162*a^5*b^5*c^3*j*k^2 + 720*a^6*b^3*c^4*j*k^2 - 576*a^5*b^5*c^3*j^2*1 -$
 $2304*a^6*b^3*c^4*j^2*1 + 1728*a^6*b^4*c^3*j*1^2 + 3456*a^7*b^2*c^4*j*1^2 -$
 $27*a^5*b^6*c^2*k^2*1 - 432*a^6*b^4*c^3*k^2*1 + 180*a^6*b^5*c^2*j*m^2 - 129$
 $6*a^7*b^2*c^4*k^2*1 + 1136*a^7*b^3*c^3*j*m^2 - 744*a^7*b^4*c^2*1*m^2 - 1920$
 $*a^8*b^2*c^3*1*m^2 - 36*a*b^6*c^6*d*e*f + 18*a*b^7*c^5*d*f*g + 15552*a^4*b*$
 $c^8*d*e*h + 10080*a^4*b*c^8*d*f*g - 6*a*b^8*c^4*d*f*j + 1440*a^5*b*c^7*f*g*$
 $h + 21888*a^5*b*c^7*d*e*m + 10080*a^5*b*c^7*d*f*1 + 6048*a^5*b*c^7*d*g*k +$
 $5184*a^5*b*c^7*d*h*j + 8064*a^5*b*c^7*e*f*k - 13824*a^5*b*c^7*e*g*j + 5184*$
 $a^6*b*c^6*e*h*m + 2400*a^6*b*c^6*f*g*m + 1440*a^6*b*c^6*f*h*1 + 864*a^6*b*c$
 $^6*g*h*k + 7296*a^6*b*c^6*d*j*m + 6048*a^6*b*c^6*d*k*1 - 13824*a^6*b*c^6*e*$
 $j*1 + 2688*a^6*b*c^6*f*j*k + 2400*a^7*b*c^5*f*1*m + 1440*a^7*b*c^5*g*k*m +$
 $1728*a^7*b*c^5*h*j*m + 864*a^7*b*c^5*h*k*1 + 6*a^4*b^8*c*j*k*m - 18*a^5*b^7$
 $*c*k*1*m + 1440*a^8*b*c^4*k*1*m + 900*a^2*b^4*c^7*d*e*f - 4896*a^3*b^2*c^8*$
 $d*e*f - 108*a^2*b^5*c^6*d*e*h - 450*a^2*b^5*c^6*d*f*g + 2448*a^3*b^3*c^7*d*$
 $f*g + 54*a^2*b^6*c^5*d*g*h - 36*a^3*b^4*c^6*e*f*h - 7776*a^4*b^2*c^7*d*g*h$
 $- 6048*a^4*b^2*c^7*e*f*h + 138*a^2*b^6*c^5*d*f*j + 540*a^3*b^4*c^6*d*e*k -$
 $516*a^3*b^4*c^6*d*f*j - 6048*a^4*b^2*c^7*d*e*k - 4992*a^4*b^2*c^7*d*f*j + 1$
 $8*a^3*b^5*c^5*f*g*h + 3024*a^4*b^3*c^6*f*g*h + 18*a^2*b^7*c^4*d*f*1 - 18*a^$
 $2*b^7*c^4*d*h*j - 450*a^3*b^5*c^5*d*f*1 - 270*a^3*b^5*c^5*d*g*k - 36*a^3*b^$
 $5*c^5*d*h*j - 2016*a^4*b^3*c^6*d*e*m + 2448*a^4*b^3*c^6*d*f*1 + 3024*a^4*b^$
 $3*c^6*d*g*k + 2592*a^4*b^3*c^6*d*h*j + 1440*a^4*b^3*c^6*e*f*k - 6912*a^4*b^$
 $3*c^6*e*g*j + 54*a^3*b^6*c^4*d*h*1 - 6*a^3*b^6*c^4*f*h*j + 1008*a^4*b^4*c^5$
 $*d*g*m + 420*a^4*b^4*c^5*e*f*m - 540*a^4*b^4*c^5*e*h*k - 720*a^4*b^4*c^5*f*$
 $g*k - 1020*a^4*b^4*c^5*f*h*j - 10944*a^5*b^2*c^6*d*g*m - 7776*a^5*b^2*c^6*d$
 $*h*1 - 7392*a^5*b^2*c^6*e*f*m + 20736*a^5*b^2*c^6*e*g*1 - 4320*a^5*b^2*c^6*$
 $e*h*k - 4032*a^5*b^2*c^6*f*g*k - 2496*a^5*b^2*c^6*f*h*j + 90*a^3*b^6*c^4*d*$
 $j*k - 828*a^4*b^4*c^5*d*j*k - 4032*a^5*b^2*c^6*d*j*k - 180*a^4*b^5*c^4*e*h*$
 $m - 210*a^4*b^5*c^4*f*g*m + 18*a^4*b^5*c^4*f*h*1 + 270*a^4*b^5*c^4*g*h*k +$
 $2880*a^5*b^3*c^5*e*h*m + 3696*a^5*b^3*c^5*f*g*m + 3024*a^5*b^3*c^5*f*h*1 +$
 $2160*a^5*b^3*c^5*g*h*k - 336*a^4*b^5*c^4*d*j*m - 270*a^4*b^5*c^4*d*k*1 + 24$
 $0*a^4*b^5*c^4*f*j*k + 2976*a^5*b^3*c^5*d*j*m + 3024*a^5*b^3*c^5*d*k*1 - 691$
 $2*a^5*b^3*c^5*e*j*1 + 1824*a^5*b^3*c^5*f*j*k + 90*a^4*b^6*c^3*g*h*m - 1440*$
 $a^5*b^4*c^4*g*h*m - 2592*a^6*b^2*c^5*g*h*m + 36*a^4*b^6*c^3*e*k*m + 70*a^4*$
 $b^6*c^3*f*j*m - 90*a^4*b^6*c^3*h*j*k + 1008*a^5*b^4*c^4*d*1*m - 324*a^5*b^4$
 $*c^4*e*k*m - 1092*a^5*b^4*c^4*f*j*m - 720*a^5*b^4*c^4*f*k*1 + 3456*a^5*b^4*$
 $c^4*g*j*1 - 900*a^5*b^4*c^4*h*j*k - 10944*a^6*b^2*c^5*d*1*m - 5472*a^6*b^2*$

$$\begin{aligned}
& c^5 * e * k * m - 3264 * a^6 * b^2 * c^5 * f * j * m - 4032 * a^6 * b^2 * c^5 * f * k * l + 6912 * a^6 * b^2 * \\
& c^5 * g * j * l - 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 * l * 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 * l + 3696 * a^6 * b^3 * c^4 * f * l * 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 * l + 90 * a^5 * b^6 * c^2 * h * l * m \\
& - 1440 * a^6 * b^4 * c^3 * h * l * m - 2592 * a^7 * b^2 * c^4 * h * l * 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 * l * m + 2 \\
& 736 * a^7 * b^3 * c^3 * k * l * 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 * l * 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 * 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 + 384 \\
& 040960 * 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} * 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 * l * 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 * l * z^2 + 188743680 * 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^{10} * 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 - 6291456 \\
& 0 * a^8 * b^7 * c^7 * g * j * z^2 - 26542080 * 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 + 337 \\
& 920 * a^5 * b^{13} * c^4 * f * k * z^2 + 196608 * 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 - 9179 \\
& 136 * a^5 * b^{12} * c^5 * d * k * z^2 + 7077888 * 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 - 2 \\
& 3040 * a^3 * b^{16} * c^3 * d * k * z^2 + 6144000 * 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 - 23592 \\
& 960 * a^6 * b^9 * c^7 * e * g * z^2 + 1179648 * a^5 * b^{11} * c^6 * e * g * z^2 + 829440 * a^4 * b^{13} * c^5 \\
& * d * h * z^2 + 368640 * a^5 * b^{11} * c^6 * d * h * z^2 - 105984 * a^3 * b^{15} * c^4 * d * h * z^2 + 460 \\
& 8 * a^2 * b^{17} * c^3 * d * h * z^2 - 15175680 * a^4 * b^{12} * c^6 * d * f * z^2 + 1428480 * a^3 * b^{14} * c^5 \\
& * d * f * z^2 - 73728 * a^2 * b^{16} * c^4 * d * f * z^2 + 4108320768 * a^{10} * b^3 * c^9 * d * m * z^2 -
\end{aligned}$$

$1207959552a^{11}b^9c^{10}e^1z^2 - 1207959552a^{10}b^9c^{11}e^1gz^2 - 578813952a^{12}b^9c^9h^1m^1z^2 - 578813952a^{11}b^9c^{10}f^1k^1z^2 - 402653184a^{12}b^9c^9j^1l^1z^2 - 402653184a^{11}b^9c^{10}g^1j^1z^2 - 440401920a^{10}b^9c^{11}f^2z^2 - 188743680a^{12}b^9c^9k^2z^2 - 188743680a^{11}b^9c^{10}h^2z^2 + 1761607680a^{10}c^{12}d^1f^1z^2 - 14080a^6b^{15}c^2m^2z^2 - 94464a^8b^{17}c^4d^2z^2 + 6936330240a^8b^3c^{11}d^2z^2 + 2464874496a^6b^7c^9d^2z^2 - 3963617280a^9b^9c^{12}d^2z^2 + 1056964608a^{11}c^{11}d^1k^1z^2 + 805306368a^{11}c^{11}e^1j^1z^2 + 419430400a^{12}c^{10}f^1m^1z^2 + 251658240a^{13}c^9k^1m^1z^2 - 150994940a^9b^2c^{11}e^2z^2 + 251658240a^{11}c^{11}f^1h^1z^2 + 150994944a^{12}c^{10}h^1k^1z^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^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^9c^8f^1k^1z + 99090432a^9b^9c^9d^1h^1z + 9437184a^{10}b^9c^8e^1k^1m^1z + 23592960a^{10}b^9c^8g^1h^1m^1z + 141557760a^8b^9c^{10}d^1e^1k^1z + 47185920a^9b^9c^9d^1j^1k^1z - 23592960a^9b^9c^9f^1g^1k^1z + 169869312a^7b^9c^{11}d^1e^1f^1z + 99090432a^8b^9c^{10}d^1g^1h^1z - 3145728a^9b^9c^9f^1h^1j^1z + 56623104a^8b^9c^{10}d^1f^1j^1z + 1536a^8b^{15}c^3d^1f^1j^1z - 9437184a^8b^9c^{10}e^1f^1h^1z - 4608a^8b^{14}c^4d^1f^1g^1z + 9216a^8b^{13}c^5d^1e^1f^1z + 412876800a^8b^2c^9d^1e^1m^1z - 206438400a^9b^3c^7d^1l^1m^1z + 5898240a^{10}b^4c^5k^1l^1m^1z - 206438400a^8b^3c^8d^1g^1m^1z - 4718592a^{11}b^2c^6k^1l^1m^1z - 2949120a^9b^6c^4k^1l^1m^1z + 737280a^8b^8c^3k^1l^1m^1z - 92160a^7b^{10}c^2k^1l^1m^1z + 103219200a^8b^5c^6d^1l^1m^1z - 29491200a^{10}b^3c^6h^1l^1m^1z - 206438400a^7b^4c^8d^1e^1m^1z - 2359296a^{10}b^3c^6j^1k^1m^1z + 491520a^8b^7c^4j^1k^1m^1z - 184320a^7b^9c^3j^1k^1m^1z + 27648a^6b^{11}c^2j^1k^1m^1z + 14745600a^9b^5c^5h^1l^1m^1z - 3686400a^8b^7c^4h^1l^1m^1z + 460800a^7b^9c^3h^1l^1m^1z - 23040a^6b^{11}c^2h^1l^1m^1z + 88473600a^8b^4c^7d^1k^1l^1z + 82575360a^9b^2c^8d^1j^1m^1z + 11796480a^{10}b^2c^7h^1j^1m^1z + 5898240a^9b^4c^6g^1k^1m^1z - 4718592a^{10}b^2c^7g^1k^1m^1z - 70778880a^9b^2c^8d^1k^1l^1z - 2949120a^8b^6c^5g^1k^1m^1z - 2457600a^8b^6c^5h^1j^1m^1z + 921600a^7b^8c^4h^1j^1m^1z + 737280a^7b^8c^4g^1k^1m^1z - 138240a^6b^{10}c^3h^1j^1m^1z - 92160a^6b^{10}c^3g^1k^1m^1z + 7680a^5b^{12}c^2h^1j^1m^1z + 4608a^5b^{12}c^2g^1k^1m^1z + 29491200a^9b^3c^7f^1k^1l^1z - 176947200a^7b^3c^9d^1e^1k^1z - 109707264a^8b^3c^8d^1h^1l^1z - 25804800a^7b^7c^5d^1l^1m^1z + 103219200a^7b^5c^7d^1g^1m^1z + 219414528a^7b^2c^{10}d^1e^1h^1z - 14745600a^8b^5c^6f^1k^1l^1z - 29491200a^9b^3c^7g^1h^1m^1z - 11796480a^9b^3c^7e^1k^1m^1z - 44236800a^7b^6c^6d^1k^1l^1z + 58982400a^9b^2c^8e^1h^1m^1z + 5898240a^8b^5c^6e^1k^1m^1z + 3686400a^7b^7c^5f^1k^1l^1z + 3225600a^6b^9c^4d^1$

$1 * 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^{11} * 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 + 11059200 * 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 - 1382400 * 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 + 69120 * 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 - 5898240 * 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 + 88473600 * 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 - 14745600 * 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 + 3225600 * 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 + 184320 * 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 - 45613056 * 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 - 6451200 * 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 - 4608 * 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 * 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 + 2949120 * 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 - 58982400 * 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 + 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 + 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 - 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$

$^9c^{10}d^*e^*m^*z - 110100480a^{10}c^9d^*j^*m^*z - 15728640a^{11}c^8h^*j^*m^*z -$
 $47185920a^{10}c^9e^*h^*m^*z - 198180864a^8c^{11}d^*e^*h^*z + 15728640a^{10}c^9*$
 $f^*j^*k^*z - 66060288a^9c^{10}d^*h^*j^*z + 47185920a^9c^{10}e^*f^*k^*z + 102275481$
 $6a^6b^2c^{11}d^2e^*z - 642318336a^5b^4c^{10}d^2e^*z - 511377408a^7b^3$
 $c^9d^2l^*z - 511377408a^6b^3c^{10}d^2g^*z + 321159168a^6b^5c^8d^2l^*$
 $z + 321159168a^5b^5c^9d^2g^*z + 225312768a^7b^2c^{10}d^2j^*z - 25362$
 $432a^{11}b^3c^5l^*m^2z + 13271040a^{10}b^5c^4l^*m^2z - 3563520a^9b^7*$
 $c^3l^*m^2z + 506880a^8b^9c^2l^*m^2z + 10354688a^{11}b^2c^6j^*m^2z +$
 $8847360a^{10}b^3c^6k^2l^*z - 4423680a^9b^5c^5k^2l^*z - 2048000a^9b^6$
 $c^4j^*m^2z + 1105920a^8b^7c^4k^2l^*z + 849920a^8b^8c^3j^*m^2z -$
 $393216a^{10}b^4c^5j^*m^2z - 145920a^7b^10c^2j^*m^2z - 138240a^7b^9*$
 $c^3k^2l^*z + 6912a^6b^11c^2k^2l^*z - 111697920a^5b^7c^7d^2l^*z + 2$
 $23395840a^4b^6c^9d^2e^*z - 25362432a^{10}b^3c^6g^*m^2z - 3538944a^{10}$
 $b^2c^7j^*k^2z + 737280a^8b^6c^5j^*k^2z + 50724864a^{10}b^2c^7e^*m^2$
 $z - 276480a^7b^8c^4j^*k^2z + 41472a^6b^10c^3j^*k^2z - 2304a^5b^1$
 $2c^2j^*k^2z + 13271040a^9b^5c^5g^*m^2z - 8847360a^9b^3c^7h^2l^*z$
 $+ 4423680a^8b^5c^6h^2l^*z - 3563520a^8b^7c^4g^*m^2z - 1105920a^7b$
 $^7c^5h^2l^*z + 506880a^7b^9c^3g^*m^2z + 138240a^6b^9c^4h^2l^*z -$
 $34560a^6b^11c^2g^*m^2z - 6912a^5b^11c^3h^2l^*z - 26542080a^9b^4c$
 $^6e^*m^2z + 25362432a^8b^3c^8f^2l^*z - 13271040a^7b^5c^7f^2l^*z +$
 $8847360a^9b^3c^7g^*k^2z + 7127040a^8b^6c^5e^*m^2z - 4423680a^8b^5$
 $c^6g^*k^2z + 3563520a^6b^7c^6f^2l^*z + 3538944a^9b^2c^8h^2j^*z +$
 $1105920a^7b^7c^5g^*k^2z - 1013760a^7b^8c^4e^*m^2z - 737280a^7b^6*$
 $c^6h^2j^*z - 506880a^5b^9c^5f^2l^*z + 276480a^6b^8c^5h^2j^*z - 138$
 $240a^6b^9c^4g^*k^2z + 69120a^6b^10c^3e^*m^2z - 41472a^5b^10c^4h$
 $^2j^*z + 34560a^4b^11c^4f^2l^*z + 6912a^5b^11c^3g^*k^2z + 2304a^4*$
 $b^12c^3h^2j^*z - 1536a^5b^12c^2e^*m^2z - 768a^3b^13c^3f^2l^*z - 1$
 $11697920a^4b^7c^8d^2g^*z + 23362560a^4b^9c^6d^2l^*z - 17694720a^9*$
 $b^2c^8e^*k^2z - 10354688a^8b^2c^9f^2j^*z - 43646976a^6b^4c^9d^2j$
 $^*z + 8847360a^8b^4c^7e^*k^2z - 2965248a^3b^11c^5d^2l^*z - 2211840a$
 $^7b^6c^6e^*k^2z + 2048000a^6b^6c^7f^2j^*z - 849920a^5b^8c^6f^2j$
 $^*z + 393216a^7b^4c^8f^2j^*z + 276480a^6b^8c^5e^*k^2z + 214272a^2b$
 $^13c^4d^2l^*z + 145920a^4b^10c^5f^2j^*z - 13824a^5b^10c^4e^*k^2z$
 $- 11008a^3b^12c^4f^2j^*z + 256a^2b^14c^3f^2j^*z - 32587776a^5b^6*$
 $c^8d^2j^*z - 8847360a^8b^3c^8g^*h^2z + 21657600a^4b^8c^7d^2j^*z +$
 $4423680a^7b^5c^7g^*h^2z - 1105920a^6b^7c^6g^*h^2z + 138240a^5b^9*$
 $c^5g^*h^2z - 6912a^4b^11c^4g^*h^2z + 25362432a^7b^3c^9f^2g^*z - 58$
 $10688a^3b^10c^6d^2j^*z + 17694720a^8b^2c^9e^*h^2z + 845568a^2b^12$
 $c^5d^2j^*z - 50724864a^7b^2c^10e^*f^2z - 13271040a^6b^5c^8f^2g^*z$
 $- 8847360a^7b^4c^8e^*h^2z + 3563520a^5b^7c^7f^2g^*z + 2211840a^6*$
 $b^6c^7e^*h^2z - 506880a^4b^9c^6f^2g^*z - 276480a^5b^8c^6e^*h^2z +$
 $34560a^3b^11c^5f^2g^*z + 13824a^4b^10c^5e^*h^2z - 768a^2b^13c^4$
 $f^2g^*z + 26542080a^6b^4c^9e^*f^2z + 23362560a^3b^9c^7d^2g^*z - 46$
 $725120a^3b^8c^8d^2e^*z - 7127040a^5b^6c^8e^*f^2z - 2965248a^2b^11$
 $c^6d^2g^*z + 1013760a^4b^8c^7e^*f^2z - 69120a^3b^10c^6e^*f^2z + 1$
 $536a^2b^12c^5e^*f^2z + 5930496a^2b^10c^7d^2e^*z + 346816512a^8b^*c$
 $^10d^2l^*z - 693633024a^7c^12d^2e^*z - 231211008a^8c^11d^2j^*z + 768$
 $a^6b^13l^*m^2z - 13107200a^12c^7j^*m^2z - 256a^5b^14j^*m^2z + 4718$
 $592a^{11}c^8j^*k^2z - 39321600a^{11}c^8e^*m^2z - 4718592a^{10}c^9h^2j^*z$
 $+ 14155776a^{10}c^9e^*k^2z + 13107200a^9c^{10}f^2j^*z + 2304b^{16}c^3d^$
 $2j^*z - 14155776a^9c^{10}e^*h^2z + 39321600a^8c^{11}e^*f^2z - 6912b^{15}c$
 $^4d^2g^*z + 13824b^{14}c^5d^2e^*z + 737280a^{10}b^*c^5j^*k^1m - 2304a^6*$
 $b^9c^*j^*k^1m + 2211840a^9b^*c^6e^*k^1m + 1228800a^9b^*c^6f^*j^1m + 737$
 $280a^9b^*c^6g^*j^*k^1m + 442368a^9b^*c^6h^*j^*k^1 + 36a^3b^{12}c^*f^*h^*k^1m +$
 $3096576a^8b^*c^7d^*j^*k^1 - 12745728a^8b^*c^7d^*h^*k^1m + 3686400a^8b^*c^7*$
 $e^*f^1m + 3391488a^8b^*c^7e^*h^*j^1m + 2211840a^8b^*c^7e^*g^*k^1m + 1327104a$
 $^8b^*c^7e^*h^*k^1 + 1228800a^8b^*c^7f^*g^*j^1m + 737280a^8b^*c^7f^*h^*j^1 + 4$
 $42368a^8b^*c^7g^*h^*j^1k + 108a^2b^{13}c^*d^*h^*k^1m + 16367616a^7b^*c^8d^*e^*j$
 $^1m + 9289728a^7b^*c^8d^*e^*k^1 + 5160960a^7b^*c^8d^*f^*j^1 + 3391488a^7b^*$

$c^8 * e * f * j * k + 3096576 * a^7 * b * c^8 * d * g * j * k - 19307520 * a^7 * b * c^8 * d * f * h * m + 3686$
 $400 * a^7 * b * c^8 * e * f * g * m + 2211840 * a^7 * b * c^8 * e * f * h * l + 1327104 * a^7 * b * c^8 * e * g * h$
 $* k + 737280 * a^7 * b * c^8 * f * g * h * j - 180 * a * b^{13} * c^2 * d * f * h * m - 540 * a * b^{12} * c^3 * d * f$
 $* h * k + 15482880 * a^6 * b * c^9 * d * e * f * l + 11059200 * a^6 * b * c^9 * d * e * h * j + 9289728 * a^6$
 $* b * c^9 * d * e * g * k + 5160960 * a^6 * b * c^9 * d * f * g * j - 2304 * a * b^{11} * c^4 * d * f * g * j + 221$
 $1840 * a^6 * b * c^9 * e * f * g * h + 4608 * a * b^{10} * c^5 * d * e * f * j + 15482880 * a^5 * b * c^{10} * d * e * f$
 $* g - 13824 * a * b^9 * c^6 * d * e * f * g + 36 * a * b^{14} * c * d * f * k * m + 1843200 * a^9 * b^3 * c^4 * j$
 $* k * l * m + 783360 * a^8 * b^5 * c^3 * j * k * l * m + 18432 * a^7 * b^7 * c^2 * j * k * l * m - 2211840 * a^8$
 $* b^4 * c^4 * g * k * l * m - 1695744 * a^9 * b^2 * c^5 * h * j * l * m - 1400832 * a^8 * b^4 * c^4 * h * j * l$
 $* m - 1105920 * a^9 * b^2 * c^5 * g * k * l * m - 253440 * a^7 * b^6 * c^3 * h * j * l * m - 69120 * a^7 * b^6$
 $* c^3 * g * k * l * m + 11520 * a^6 * b^8 * c^2 * h * j * l * m + 6912 * a^6 * b^8 * c^2 * g * k * l * m + 44$
 $23680 * a^8 * b^3 * c^5 * e * k * l * m + 2506752 * a^8 * b^3 * c^5 * f * j * l * m + 1843200 * a^8 * b^3 * c^5$
 $* g * j * k * m + 1327104 * a^8 * b^3 * c^5 * h * j * k * l + 838656 * a^7 * b^5 * c^4 * f * j * l * m + 783$
 $360 * a^7 * b^5 * c^4 * g * j * k * m + 691200 * a^7 * b^5 * c^4 * h * j * k * l + 138240 * a^7 * b^5 * c^4 * e$
 $* k * l * m + 69120 * a^6 * b^7 * c^3 * h * j * k * l - 53760 * a^6 * b^7 * c^3 * f * j * l * m + 18432 * a^6 * b^7$
 $* c^3 * g * j * k * m - 13824 * a^6 * b^7 * c^3 * e * k * l * m - 2304 * a^5 * b^9 * c^2 * g * j * k * m + 25$
 $43616 * a^8 * b^3 * c^5 * g * h * l * m + 829440 * a^7 * b^5 * c^4 * g * h * l * m - 34560 * a^6 * b^7 * c^3 * g$
 $* h * l * m - 8183808 * a^8 * b^2 * c^6 * d * j * l * m - 3686400 * a^8 * b^2 * c^6 * e * j * k * m - 22855$
 $68 * a^7 * b^4 * c^5 * d * j * l * m - 1695744 * a^8 * b^2 * c^6 * f * j * k * l - 1566720 * a^7 * b^4 * c^5 * e$
 $* j * k * m - 1400832 * a^7 * b^4 * c^5 * f * j * k * l + 741888 * a^6 * b^6 * c^4 * d * j * l * m - 253440$
 $* a^6 * b^6 * c^4 * f * j * k * l - 80640 * a^5 * b^8 * c^3 * d * j * l * m - 36864 * a^6 * b^6 * c^4 * e * j * k * m$
 $+ 11520 * a^5 * b^8 * c^3 * f * j * k * l + 4608 * a^5 * b^8 * c^3 * e * j * k * m + 6700032 * a^8 * b^2 * c^6$
 $* f * h * k * m + 5103360 * a^7 * b^4 * c^5 * f * h * k * m - 5087232 * a^8 * b^2 * c^6 * e * h * l * m - 2$
 $838528 * a^7 * b^4 * c^5 * f * g * l * m - 1843200 * a^8 * b^2 * c^6 * f * g * l * m - 1695744 * a^8 * b^2 * c^6$
 $* g * h * j * m - 1658880 * a^7 * b^4 * c^5 * g * h * k * l - 1658880 * a^7 * b^4 * c^5 * e * h * l * m - 1$
 $400832 * a^7 * b^4 * c^5 * g * h * j * m - 663552 * a^8 * b^2 * c^6 * g * h * k * l + 483840 * a^6 * b^6 * c^4$
 $* f * h * k * m - 253440 * a^6 * b^6 * c^4 * g * h * j * m - 207360 * a^6 * b^6 * c^4 * g * h * k * l + 16128$
 $0 * a^6 * b^6 * c^4 * f * g * l * m + 69120 * a^6 * b^6 * c^4 * e * h * l * m - 50040 * a^5 * b^8 * c^3 * f * h * k$
 $* m + 11520 * a^5 * b^8 * c^3 * g * h * j * m + 180 * a^4 * b^{10} * c^2 * f * h * k * m + 4202496 * a^7 * b^3 * c^6$
 $* d * j * k * l + 635904 * a^6 * b^5 * c^5 * d * j * k * l - 276480 * a^5 * b^7 * c^4 * d * j * k * l + 34$
 $560 * a^4 * b^9 * c^3 * d * j * k * l - 16671744 * a^7 * b^3 * c^6 * d * h * k * m + 12275712 * a^7 * b^3 * c^6$
 $* d * g * l * m + 5677056 * a^7 * b^3 * c^6 * e * f * l * m + 4423680 * a^7 * b^3 * c^6 * e * g * k * m + 33$
 $17760 * a^7 * b^3 * c^6 * e * h * k * l + 2801664 * a^7 * b^3 * c^6 * e * h * j * m - 2709504 * a^6 * b^5 * c^5$
 $* d * g * l * m + 2543616 * a^7 * b^3 * c^6 * f * g * k * l + 2506752 * a^7 * b^3 * c^6 * f * g * j * m + 18$
 $43200 * a^7 * b^3 * c^6 * f * h * j * l + 1327104 * a^7 * b^3 * c^6 * g * h * j * k + 838656 * a^6 * b^5 * c^5$
 $* f * g * j * m + 829440 * a^6 * b^5 * c^5 * f * g * k * l + 783360 * a^6 * b^5 * c^5 * f * h * j * l + 69120$
 $0 * a^6 * b^5 * c^5 * g * h * j * k + 665280 * a^5 * b^7 * c^4 * d * h * k * m + 506880 * a^6 * b^5 * c^5 * e * h$
 $* j * m + 414720 * a^6 * b^5 * c^5 * e * h * k * l - 322560 * a^6 * b^5 * c^5 * e * f * l * m + 241920 * a^5$
 $* b^7 * c^4 * d * g * l * m + 138240 * a^6 * b^5 * c^5 * e * g * k * m - 108540 * a^4 * b^9 * c^3 * d * h * k * m$
 $+ 69120 * a^5 * b^7 * c^4 * g * h * j * k - 53760 * a^5 * b^7 * c^4 * f * g * j * m - 51840 * a^6 * b^5 * c^5$
 $* d * h * k * m - 34560 * a^5 * b^7 * c^4 * f * g * k * l - 23040 * a^5 * b^7 * c^4 * e * h * j * m + 18432 * a^5$
 $* b^7 * c^4 * f * h * j * l - 13824 * a^5 * b^7 * c^4 * e * g * k * m - 2304 * a^4 * b^9 * c^3 * f * h * j * l +$
 $1296 * a^3 * b^{11} * c^2 * d * h * k * m + 31924224 * a^7 * b^2 * c^7 * d * f * k * m - 24551424 * a^7 * b^2$
 $* c^7 * d * e * l * m + 10616832 * a^7 * b^2 * c^7 * e * g * j * l - 8183808 * a^7 * b^2 * c^7 * d * g * j * m -$
 $5529600 * a^7 * b^2 * c^7 * d * h * j * l + 5419008 * a^6 * b^4 * c^6 * d * e * l * m + 5308416 * a^6 * b^4$
 $* c^6 * e * g * j * l - 5087232 * a^7 * b^2 * c^7 * e * f * k * l - 5013504 * a^7 * b^2 * c^7 * e * f * j * m +$
 $4868352 * a^6 * b^4 * c^6 * d * f * k * m - 4644864 * a^7 * b^2 * c^7 * d * g * k * l - 3981312 * a^6 * b^4$
 $* c^6 * d * g * k * l - 2654208 * a^7 * b^2 * c^7 * e * h * j * k - 2367360 * a^5 * b^6 * c^5 * d * f * k * m -$
 $2285568 * a^6 * b^4 * c^6 * d * g * j * m - 2211840 * a^6 * b^4 * c^6 * d * h * j * l - 1695744 * a^7 * b^2$
 $* c^7 * f * g * j * k - 1677312 * a^6 * b^4 * c^6 * e * f * j * m - 1658880 * a^6 * b^4 * c^6 * e * f * k * l -$
 $1400832 * a^6 * b^4 * c^6 * f * g * j * k - 1382400 * a^6 * b^4 * c^6 * e * h * j * k + 1036800 * a^5 * b^6$
 $* c^5 * d * g * k * l + 741888 * a^5 * b^6 * c^5 * d * g * j * m - 483840 * a^5 * b^6 * c^5 * d * e * l * m + 3$
 $17952 * a^5 * b^6 * c^5 * d * h * j * l + 268920 * a^4 * b^8 * c^4 * d * f * k * m - 253440 * a^5 * b^6 * c^5$
 $* f * g * j * k - 138240 * a^5 * b^6 * c^5 * e * h * j * k + 107520 * a^5 * b^6 * c^5 * e * f * j * m - 103680$
 $* a^4 * b^8 * c^4 * d * g * k * l - 80640 * a^4 * b^8 * c^4 * d * g * j * m + 69120 * a^5 * b^6 * c^5 * e * f * k * l$
 $+ 11520 * a^4 * b^8 * c^4 * f * g * j * k + 6912 * a^4 * b^8 * c^4 * d * h * j * l - 6912 * a^3 * b^{10} * c^3$
 $* d * h * j * l + 6120 * a^3 * b^{10} * c^3 * d * f * k * m - 1368 * a^2 * b^{12} * c^2 * d * f * k * m - 5087232$
 $* a^7 * b^2 * c^7 * e * g * h * m - 2211840 * a^6 * b^4 * c^6 * f * g * h * l - 1658880 * a^6 * b^4 * c^6 * e * g$
 $* h * m - 1105920 * a^7 * b^2 * c^7 * f * g * h * l - 69120 * a^5 * b^6 * c^5 * f * g * h * l + 69120 * a^5$

$$\begin{aligned}
& *b^6c^5*eg*hm + 6912a^4b^8c^4*f*g*hl + 7962624a^6b^3c^7*d*ek*l - \\
& 22164480a^6b^3c^7*d*f*hm + 5160960a^6b^3c^7*d*f*j*l + 4571136a^6b \\
& ^3c^7*d*ej*lm + 4202496a^6b^3c^7*d*g*j*k + 2801664a^6b^3c^7*e*f*j*k \\
& - 2073600a^5b^5c^6*d*ek*l - 1483776a^5b^5c^6*d*ej*lm + 635904a^5b^ \\
& 5c^6*d*g*j*k + 506880a^5b^5c^6*e*f*j*k - 354816a^4b^7c^5*d*f*j*l + 3 \\
& 22560a^5b^5c^6*d*f*j*l - 276480a^4b^7c^5*d*g*j*k + 207360a^4b^7c^5 \\
& *d*ek*l + 161280a^4b^7c^5*d*ej*lm + 59904a^3b^9c^4*d*f*j*l + 34560a \\
& ^3b^9c^4*d*g*j*k - 23040a^4b^7c^5*e*f*j*k - 2304a^2b^11c^3*d*f*j*l \\
& + 8294400a^6b^3c^7*d*g*hl + 5677056a^6b^3c^7*e*f*g*lm + 4423680a^6b \\
& ^3c^7*e*f*hl + 3317760a^6b^3c^7*e*g*hk + 2805120a^5b^5c^6*d*f*hm \\
& + 1843200a^6b^3c^7*f*g*hj - 829440a^5b^5c^6*d*g*hl + 783360a^5b^5 \\
& *c^6*f*g*hj + 437184a^4b^7c^5*d*f*hm + 414720a^5b^5c^6*e*g*hk - 32 \\
& 2560a^5b^5c^6*e*f*g*lm - 146268a^3b^9c^4*d*f*hm + 138240a^5b^5c^6* \\
& e*f*hl - 62208a^4b^7c^5*d*g*hl + 20736a^3b^9c^4*d*g*hl + 18432a^4 \\
& *b^7c^5*f*g*hj - 13824a^4b^7c^5*e*f*hl + 9360a^2b^11c^3*d*f*hm - \\
& 2304a^3b^9c^4*f*g*hj - 840492a^6b^2c^8*d*ej*k - 24551424a^6b^2c^ \\
& ^8*d*eg*lm + 21150720a^6b^2c^8*d*f*hk - 1271808a^5b^4c^7*d*ej*k + 5 \\
& 52960a^4b^6c^6*d*ej*k - 69120a^3b^8c^5*d*ej*k - 16588800a^6b^2c^ \\
& 8*d*eh*l - 7741440a^6b^2c^8*d*f*g*l + 6946560a^5b^4c^7*d*f*hk - 552 \\
& 9600a^6b^2c^8*d*g*hj + 5419008a^5b^4c^7*d*eg*lm - 5087232a^6b^2c^ \\
& 8*e*f*g*k - 3870720a^5b^4c^7*d*f*g*l - 3686400a^6b^2c^8*e*f*hl - 221 \\
& 1840a^5b^4c^7*d*g*hj - 1755648a^4b^6c^6*d*f*hk - 1658880a^5b^4c^ \\
& 7*e*f*g*k + 1658880a^5b^4c^7*d*eh*l - 1566720a^5b^4c^7*e*f*hl + 145 \\
& 1520a^4b^6c^6*d*f*g*l - 483840a^4b^6c^6*d*eg*lm + 317952a^4b^6c^6* \\
& d*g*hj - 193536a^3b^8c^5*d*f*g*l + 124416a^4b^6c^6*d*eh*l + 114696* \\
& a^3b^8c^5*d*f*hk + 69120a^4b^6c^6*e*f*g*k - 41472a^3b^8c^5*d*eh*l \\
& - 36864a^4b^6c^6*e*f*hl + 14580a^2b^10c^4*d*f*hk + 6912a^3b^8c^ \\
& 5*d*g*hj - 6912a^2b^10c^4*d*g*hj + 6912a^2b^10c^4*d*f*g*l + 4608a^ \\
& 3b^8c^5*e*f*hl + 7962624a^5b^3c^8*d*eg*k + 7741440a^5b^3c^8*d*ef \\
& *l + 5160960a^5b^3c^8*d*f*g*j + 4423680a^5b^3c^8*d*eh*lj - 2903040a^ \\
& 4b^5c^7*d*ef*l - 2073600a^4b^5c^7*d*eg*k - 635904a^4b^5c^7*d*eh* \\
& j + 387072a^3b^7c^6*d*ef*l - 354816a^3b^7c^6*d*f*g*j + 322560a^4b^ \\
& 5c^7*d*f*g*j + 207360a^3b^7c^6*d*eg*k + 59904a^2b^9c^5*d*f*g*j - 13 \\
& 824a^3b^7c^6*d*eh*lj + 13824a^2b^9c^5*d*eh*lj - 13824a^2b^9c^5*d* \\
& e*f*l + 4423680a^5b^3c^8*e*f*g*hl + 138240a^4b^5c^7*e*f*g*hl - 13824a^3 \\
& *b^7c^6*e*f*g*hl - 10321920a^5b^2c^9*d*ef*fj + 709632a^3b^6c^7*d*ef* \\
& j - 645120a^4b^4c^8*d*ef*fj - 119808a^2b^8c^6*d*ef*fj - 16588800a^5* \\
& b^2c^9*d*eg*hl + 1658880a^4b^4c^8*d*eg*hl + 124416a^3b^6c^7*d*eg*hl \\
& - 41472a^2b^8c^6*d*eg*hl + 7741440a^4b^3c^9*d*ef*fg - 2903040a^3b^5 \\
& *c^8*d*ef*fg + 387072a^2b^7c^7*d*ef*fg + 3456a^7b^8c*k*l^2*m + 12672* \\
& a^7b^8c*j*l*m^2 + 384a^5b^10c*j^2*k*m - 1635840a^10b*c^5*h*k*m^2 - 1 \\
& 009152a^9b*c^6*h^2*k*m + 3690a^6b^9c*h*k*m^2 + 1152a^6b^9c*g*l*m^2 \\
& - 540a^5b^10c*h*k^2*m + 54a^4b^11c*h^2*k*m + 565248a^9b*c^6*h*j^2*m \\
& - 39771648a^7b*c^8*d^2*k*m - 2496000a^8b*c^7*f^2*k*m - 1543680a^9b*c^ \\
& ^6*f*k^2*m + 1980a^5b^10c*f*k*m^2 - 384a^5b^10c*g*j*m^2 - 180a^4b^1 \\
& 1c*f*k^2*m + 6a^2b^13c*f^2*k*m - 10298880a^9b*c^6*d*k*m^2 + 2580480a^ \\
& ^9b*c^6*ej*m^2 + 5310a^4b^11c*d*k*m^2 - 1674a*b^13c^2*d^2*k*m - 540* \\
& a^3b^12c*d*k^2*m - 10616832a^7b*c^8*e^2*j*l - 3538944a^8b*c^7*ej^2*l \\
& + 2727936a^8b*c^7*d*j^2*m - 2496000a^9b*c^6*f*hl^2 - 1543680a^8b*c^ \\
& 7*f*hl^2*m + 565248a^8b*c^7*f*j^2*k - 270a^4b^11c*f*hl^2 - 59512320a^ \\
& 6b*c^9*d^2*f*m + 5087232a^7b*c^8*e^2*hl^2 + 1105920a^8b*c^7*ej*k^2 - 3 \\
& 456a*b^12c^3*d^2*j*l - 1635840a^7b*c^8*f^2*hk - 1009152a^8b*c^7*f*h* \\
& k^2 + 10260a*b^12c^3*d^2*hl^2 - 684a^3b^12c*d*hl^2 - 24675840a^6b*c^ \\
& 9*d^2*hl^2 - 15552000a^8b*c^7*d*f*m^2 + 24551424a^6b*c^9*d*e^2*m - 39398 \\
& 40a^7b*c^8*d*hl^2*k + 1105920a^7b*c^8*eh^2*j - 25074a*b^11c^4*d^2*f*m \\
& + 10530a*b^11c^4*d^2*hl^2 + 10368a*b^11c^4*d^2*g*l + 420a*b^12c^3*d*f \\
& ^2*m - 378a^2b^13c*d*f*m^2 - 10616832a^6b*c^9*e^2*g*j + 5087232a^6b* \\
& c^9*e^2*f*k - 3538944a^7b*c^8*eg*j^2 + 1843200a^7b*c^8*d*hl^2*j - 79948 \\
& 80a^6b*c^9*d*f^2*k - 4990464a^7b*c^8*d*f*k^2 + 2580480a^6b*c^9*ef^2*
\end{aligned}$$

$$\begin{aligned}
& 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 + 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 - 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 + 414720*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*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*l*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*l*m^2 - 56160*a^6*b^7*c^3*h^2*k*m - 40320*a^7*b^7*c^2*g*l*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*l^2*m - 1105920*a^7*b^4*c^5*g^2*k*m - 921600*a^9*b^2*c^5*f*l^2*m - 829440*a^8*b^4*c^4*h*k*l^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*l^2 + 317952*a^7*b^5*c^4*h*j^2*m - 103680*a^7*b^6*c^3*h*k*l^2 + 80640*a^7*b^6*c^3*f*l^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*l*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*l - 645120*a^8*b^4*c^4*e*l*m^2 - 552960*a^8*b^2*c^6*h^2*j*l - 552960*a^7*b^4*c^5*h^2*j*l + 414720*a^7*b^5*c^4*g*k^2*l - 145152*a^6*b^6*c^4*h^2*j*l + 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*l*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*l + 5490*a^5*b^9*c^2*f*k^2*m - 3456*a^5*b^8*c^3*h^2*j*l - 2304*a^6*b^8*c^2*e*l*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*l^2*m - 4423680*a^7*b^2*c^7*e^2*k*m - 2654208*a^8*b^3*c^5*g*j*l^2 - 2654208*a^7*b^3*c^6*g^2*j*l + 1769472*a^8*b^2*c^6*g*j^2*l + 1769472*a^7*b^4*c^5*g*j^2*l - 1354752*a^7*b^5*c^4*d*l^2*m - 1327104*a^7*b^5*c^4*g*j*l^2 - 1327104*a^6*b^5*c^5*g^2*j*l + 1271808*a^8*b^3*c^5*f*k*l^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 + 442368*a^6*b^6*c^4*g*j^2*l + 414720*a^7*b^5*c^4*f*k*l^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*l^2*m - 17280*a^6*b^7*c^3*f*k*l^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*l - 1290240*a^7*b^2*c^7*f^2*j*l + 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*l - 829440*a^7*b^4*c^5*e*k^2*l - 705024*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*l - 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*l - 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*l - 3456*a^5*b^8*c^3*g*j*k^2 + 768*a^5*b^9*c^2*e*j*m^2 -
\end{aligned}$$

$384a^3b^{10}c^3f^2j^1 + 5308416a^8b^2c^6e^j^1^2 - 5308416a^6b^3c^7e^2j^1 - 5142528a^8b^3c^5f^2h^2m + 5068800a^7b^2c^7f^2h^2m - 3755520a^7b^3c^6f^2h^2m - 3538944a^7b^3c^6e^j^2^1 + 3000960a^6b^4c^6f^2h^2m + 2654208a^7b^4c^5e^j^1^2 - 2322432a^8b^2c^6d^2k^1^2 + 2125824a^7b^3c^6d^2j^2^m - 1990656a^7b^4c^5d^2k^1^2 - 1085760a^6b^5c^5f^2h^2m - 959040a^7b^5c^4f^2h^2m - 884736a^6b^5c^5e^j^2^1 + 829440a^7b^3c^6g^2h^2^1 + 749568a^7b^3c^6f^2j^2^k + 518400a^6b^6c^4d^2k^1^2 + 414720a^6b^5c^5g^2h^2^1 + 317952a^6b^5c^5f^2j^2^k + 133632a^6b^5c^5d^2j^2^m + 103200a^6b^7c^3f^2h^2m - 96768a^5b^7c^4d^2j^2^m - 51840a^5b^8c^3d^2k^1^2 + 41280a^5b^6c^5f^2h^2m + 38400a^5b^7c^4f^2j^2^k - 37188a^4b^8c^4f^2h^2m + 13536a^5b^7c^4f^2h^2m + 13440a^4b^9c^3d^2j^2^m + 10368a^5b^7c^4g^2h^2^1 + 5490a^4b^9c^3f^2h^2m + 1980a^3b^10c^3f^2h^2m - 1920a^4b^9c^3f^2j^2^k + 810a^5b^9c^2f^2h^2m^2 - 180a^3b^11c^2f^2h^2m - 30a^2b^12c^2f^2h^2m + 30067200a^6b^2c^8d^2h^2m - 11612160a^6b^2c^8d^2j^1 + 1658880a^6b^3c^7e^2h^2m + 1596672a^4b^6c^6d^2j^1 - 1419264a^6b^4c^6f^2g^2^m - 1105920a^7b^4c^5f^2h^1^2 + 1105920a^7b^3c^6e^j^2^k - 921600a^7b^2c^7f^2g^2^m - 829440a^6b^4c^6g^2h^2^k - 552960a^8b^2c^6f^2h^1^2 - 508032a^3b^8c^5d^2j^1 - 331776a^7b^2c^7g^2h^2^k + 290304a^6b^5c^5e^j^2^k - 103680a^5b^6c^5g^2h^2^k + 80640a^5b^6c^5f^2g^2^m - 69120a^5b^5c^6e^2h^2m + 65664a^2b^10c^4d^2j^1 - 34560a^6b^6c^4f^2h^1^2 + 6912a^5b^7c^4e^j^2^k + 3456a^5b^8c^3f^2h^1^2 + 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^1 - 1916928a^7b^2c^7d^2j^2^k - 1687680a^6b^6c^4d^2h^2m - 1658880a^7b^2c^7e^2h^2^1 - 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^2^k - 829440a^6b^4c^6e^2h^2^1 - 645120a^7b^4c^5e^2g^2m - 552960a^7b^2c^7g^2h^2^j - 552960a^6b^4c^6g^2h^2^j + 364608a^5b^6c^5f^2h^2k + 322560a^5b^5c^6f^2g^1 + 197460a^5b^8c^3d^2h^2m - 145152a^5b^6c^5g^2h^2^j - 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^1 + 34560a^4b^8c^4d^2j^2^k + 27936a^4b^7c^5f^2h^2k - 20736a^5b^6c^5e^2h^2^1 - 13824a^5b^6c^5d^2j^2^k + 10800a^3b^10c^3d^2h^2m - 5760a^3b^10c^3d^2j^2^k - 3780a^4b^8c^4f^2h^2k + 3690a^3b^9c^4f^2h^2k - 3456a^4b^8c^4g^2h^2^j + 2970a^4b^9c^3f^2h^2k - 2304a^5b^8c^3e^2g^2m + 1152a^3b^9c^4f^2g^1 - 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^1 - 7962624a^7b^3c^6e^2g^1^2 - 7962624a^6b^3c^7e^2g^2^1 + 23385600a^6b^2c^8d^2f^2m + 6137856a^6b^3c^7d^2g^2m - 5677056a^6b^2c^8e^2f^2m + 4147200a^7b^3c^6d^2h^1^2 - 3317760a^6b^2c^8e^2h^2k - 1354752a^5b^5c^6d^2g^2m + 1271808a^6b^3c^7f^2g^2^k - 737280a^7b^2c^7f^2h^2j^2 + 17418240a^5b^3c^8d^2g^1 - 568320a^6b^4c^6f^2h^2j^2 - 414720a^6b^5c^5d^2h^1^2 + 414720a^5b^5c^6f^2g^2^k - 414720a^5b^4c^7e^2h^2k + 322560a^5b^4c^7e^2f^2m - 136704a^5b^6c^5f^2h^2j^2 + 120960a^4b^7c^5d^2g^2m - 31104a^5b^7c^4d^2h^1^2 - 17280a^4b^7c^5f^2g^2^k + 10368a^4b^9c^3d^2h^1^2 - 2304a^4b^8c^4f^2h^2j^2 + 384a^3b^10c^3f^2h^2j^2 + 50042880a^5b^2c^9d^2f^2k - 13271040a^5b^3c^8d^2h^2k - 13149696a^7b^3c^6d^2f^2m + 10906560a^4b^5c^7d^2f^2m - 8709120a^4b^5c^7d^2g^1 - 7418880a^5b^3c^8d^2f^2m + 7133184a^7b^2c^7d^2h^2k - 6428160a^6b^3c^7d^2h^2k + 5593536a^4b^5c^7d^2h^2k - 3870720a^6b^2c^8e^2f^2^1 + 3369600a^6b^4c^6d^2h^2k + 3148992a^6b^5c^5d^2f^2m - 2985696a^3b^7c^6d^2f^2m + 1959552a^3b^7c^6d^2g^1 - 1658880a^7b^2c^7e^2g^2^k - 1505280a^4b^6c^6d^2f^2m - 1290240a^6b^2c^8f^2g^2^j - 34836480a^5b^2c^9d^2e^1 + 1105920a^6b^3c^7e^2h^2^j - 860160a^5b^4c^7f^2g^2^j - 829440a^6b^4c^6e^2g^2^k - 692064a^3b^7c^6d^2h^2k - 689472*$

$$\begin{aligned}
& a^5 b^5 c^6 d h^2 k - 645120 a^5 b^4 c^7 e f^2 m - 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 - 80640 a^4 b^6 c^6 f^2 g^j + 80640 a^4 b^6 c^6 e \\
& f^2 m - 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 m - 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 m^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 m^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 m^2 + 17418240 a^4 \\
& b^4 c^8 d^2 e m + 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 m^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 m^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 m + 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 m + 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 - 1658 \\
& 880 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 - 1 \\
& 38240 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 - 1445990 \\
& 4 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 - 209520 \\
& 0 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 - 39191 \\
& 04 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 - 3 \\
& 54240 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^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 m^1 - 442368 a^8 b^5 c^3 j^1^3 - 294912 a^7 b^ \\
& ^5 c^4 j^3 m^1 - 49152 a^6 b^7 c^3 j^3 m^1 + 1359360 a^{10} b^2 c^4 h m^3 + 117312 \\
& 0 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 + 1327104 a^6 b^4 c^6 g^3 m^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 -
\end{aligned}$$

$$\begin{aligned}
& 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^3f^2m^2 + 70a^2b^11c^3f^3m + 3870720a^8b^6c^7e^2m^2 + 184320a^8b^6c^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^1 + 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^6c^8e^2k^2 + 430080a^7b^6c^8f^2j^2 + 3538944a^5b^2c^9e^3j - 2488320a^7b^3c^6d^3k - 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^6b^12c^3d^2k^2 + 3870720a^6b^6c^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^6b^11c^4d^2j^2 + 1350a^3b^9c^4f^3h - 1050a^2b^9c^5f^3h + 1658880a^6b^6c^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^6b^10c^5d^2h^2 - 8100a^3b^8c^5d^3h + 4050a^2b^10c^4d^3h + 3870720a^5b^6c^10e^2f^2 + 34836480a^4b^6c^11d^2e^2 - 108864a^6b^9c^6d^2g^2 - 8068032a^2b^5c^9d^3f - 5623296a^4b^3c^9d^3f + 1737792a^3b^5c^8d^3f - 260190a^6b^8c^7d^2f^2 - 211680a^2b^7c^7d^3f - 435456a^6b^7c^8d^2e^2 - 245760a^10c^6j^2k^2m - 384a^6b^10j^2k^2m + 138240a^10c^6h^2k^2m - 90a^5b^11h^2k^2m + 384000a^10c^6f^2k^2m - 2211840a^8c^8e^2k^2m - 409600a^9c^7f^2j^2m - 147456a^9c^7h^2j^2k - 30a^4b^12f^2k^2m + 967680a^9c^7d^2k^2m + 384000a^8c^8f^2h^2m - 90a^3b^13d^2k^2m + 20321280a^7c^9d^2h^2m - 883200a^11b^6c^4k^2m - 317952a^10b^6c^5k^3m + 43680a^8b^7c^3k^2m + 1350a^6b^9c^3k^3m - 270b^14c^2d^2h^2m + 6a^3b^13f^2h^2m + 4838400a^9c^7d^2h^2m + 2903040a^8c^8d^2h^2m - 1032192a^8c^8d^2j^2k + 138240a^8c^8f^2h^2k - 3686400a^7c^9e^2f^2m - 1327104a^7c^9e^2h^2k - 393216a^9b^6c^6j^3k - 245760a^8c^8f^2h^2j^2 - 810b^13c^3d^2h^2k + 630b^13c^3d^2f^2m + 18a^2b^14d^2h^2m + 2688000a^7c^9d^2f^2m + 580608a^8c^8d^2h^2k - 5796a^7b^8c^8h^2m - 3456b^12c^4d^2g^2j + 1890b^12c^4d^2f^2k + 6773760a^6c^10d^2f^2k - 1344000a^10b^6c^5f^2m - 1344000a^7b^6c^8f^3m - 207360a^9b^6c^6h^2k^3 - 207360a^8b^6c^7h^3k - 3682a^6b^9c^3f^2m - 9289728a^6c^10d^2e^2k - 1720320a^7c^9d^2f^2j^2 - 50803200a^5b^6c^10d^3k + 6912b^11c^5d^2e^2j - 10616832a^6b^6c^9e^3k - 2211840a^6c^10e^2f^2h - 393216a^8b^6c^7g^2j^3 + 43416a^6b^10c^5d^3m - 9576a^5b^10c^3d^3m - 9450b^11c^5d^2f^2h - 504a^6b^14c^3d^2m^2 + 1612800a^6c^10d^2f^2h - 1036800a^8b^6c^7d^2k^3 + 45198a^6b^9c^6d^3k - 20736b^10c^6d^2e^2g - 75188736a^4b^6c^11d^3f - 883200a^6b^6c^9f^3h - 317952a^7b^6c^8f^3h - 15482880a^5c^11d^2e^2f - 10616832a^5b^6c^10e^3g - 345060a^6b^8c^7d^3h - 4262400a^5b^6c^10d^2f^3 + 852768a^6b^7c^8d^3f + 7350a^6b^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^2 + 207360a^8b^5c^3k^2l^2 + 170240a^8b^5c^3j^2m^2 + 9216a^7b^7c^2j^2m^2 + 5184a^7b^7c^2k^2l^2 + 884736a^9b^2c^5j^2l^2 + 884736a^8b^4c^4j^2l^2 + 221184a^7b^6c^3j^2l^2 + 1419840a^8b^4c^4h^2m^2 + 1387008a^9b^2c^5h^2m^2 + 276480a^8b^3c^5j^2k^2 + 140544a^7b^5c^4j^2k^2 + 84960a^7b^6c^3h^2m^2 + 25344a^6b^7
\end{aligned}$$

$$\begin{aligned}
& *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 + 19906 \\
& 56*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 + 41472 \\
& 0*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 + 5 \\
& 184*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 - 1159 \\
& 20*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 + 979 \\
& 776*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 + 1 \\
& 684224*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 + 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*
\end{aligned}$$

$$\begin{aligned}
& c^{11}d^3h + 17010b^{10}c^6d^3h + 580608a^7c^9d^3h^3 - 39690b^9c^7d^3 \\
& 3f - 734832a^6c^9d^4 + 9b^{16}d^2m^2 + 160000a^{12}c^4m^4 + 1225a^8 \\
& 8b^8m^4 + 20736a^{10}c^6k^4 + 65536a^9c^7j^4 + 20736a^8c^8h^4 + 49 \\
& 787136a^4c^{12}d^4 + 160000a^6c^{10}f^4 + 5308416a^5c^{11}e^4 + 35721b^8 \\
& 8c^8d^4 + a^2b^{14}f^2m^2, z, k1), k1, 1, 4) - ((8a^2c^2g + a^2b^2l \\
& + b^3c^2e + 8a^3c^2l - 10ab^2c^2e + ab^2c^2g - 6a^2b^2c^2j)/(4c^2(b^4 \\
& + 16a^2c^2 - 8ab^2c)) + (x^4(b^4l + 9b^2c^2g + 16a^2c^2l - 18 \\
& b^2c^3e - 3b^3c^2j - 6ab^2c^2j + ab^2c^2l))/(4c^2(b^4 + 16a^2c^2 - 8 \\
& ab^2c)) - (x^7(3b^3c^2d + 20a^2c^3f + 12a^3c^2k + a^2b^3m - 2 \\
& 4ab^2c^3d - 16a^3b^2c^2m + ab^2c^2f - 12a^2b^2c^2h + 3a^2b^2c^2k)) \\
& /((8a^2(b^4 + 16a^2c^2 - 8ab^2c)) + (x^2(2a^2c^2j - 2b^2c^2e - \\
& 10a^2c^3e + b^3c^2g + ab^3l + 5ab^2c^2g - 5ab^2c^2j + 5a^2b^2c^2l)) \\
& /((2c^2(b^4 + 16a^2c^2 - 8ab^2c)) - (cx^6(6c^2e + b^2j - 3b^2c^2g + \\
& 2a^2c^2j - 3ab^2l))/(2(b^4 + 16a^2c^2 - 8ab^2c)) + (x^3(4a^4c^2k \\
& - 36a^3c^3f + 2a^3b^3m - 3b^5c^2d - 5a^2b^2c^2f - ab^4c^2f + 2 \\
& 8a^4b^2c^2m + 20ab^3c^2d + 4a^2b^2c^3d + 5a^2b^3c^2h + 16a^3b^2c^2 \\
& h - 19a^3b^2c^2k))/(8a^2c^2(b^4 + 16a^2c^2 - 8ab^2c)) + (x(12a^3 \\
& c^2h - 44a^2c^3d + a^3b^2m - 5b^4c^2d + 20a^4c^2m + ab^3c^2f - 12 \\
& a^3b^2c^2k + 37ab^2c^2d - 16a^2b^2c^2f + 3a^2b^2c^2h))/(8a^2c^2(b^4 \\
& + 16a^2c^2 - 8ab^2c)) - (x^5(28a^2c^4d + 6b^4c^2d + 4a^3c^3h \\
& - a^2b^4m - 36a^4c^2m - 19a^2b^2c^2h - 49ab^2c^3d + 2a^2b^3c^2 \\
& f + 28a^2b^2c^3f + 5a^2b^3c^2k + 16a^3b^2c^2k - 5a^3b^2c^2m))/(8 \\
& a^2c^2(b^4 + 16a^2c^2 - 8ab^2c)))/(x^4(2a^2c + b^2) + a^2 + c^2x^8 \\
& + 2ab^2x^2 + 2b^2c^2x^6)
\end{aligned}$$

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

$$\frac{x \left(x^2 (-ab^2j + bc(ah + cd) - 2ac(cf - aj)) + c \left(-\frac{ab(aj+cf)}{c} - 2a(cd - ah) + b^2d \right) \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right) \left(\frac{ab^2j}{c} + \dots \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)} + \dots$$

[Out] $\frac{1}{2}x(c(b^2d - 2a(-ah + cd) - ab(a + j + cf)/c) + (b(c(a + h + cd) - ab^2j - 2ac(-aj + cf))x^2)/a/c/(-4ac + b^2)/(cx^4 + bx^2 + a) + 1/2(-b(c(a + i + ce) + ab^2k + 2ac(-ak + cg) - (2c^3e - c^2(2ai + bg) - b^3k + b(c(3ak + bi)))x^2)/c^2/(-4ac + b^2)/(cx^4 + bx^2 + a) + 1/2(4c^3e - c^2(-4ai + 2bg) + b^3k - 6abck) \operatorname{arctanh}((2cx^2 + b)/(-4ac + b^2)^{1/2})/c^2/(-4ac + b^2)^{3/2} + 1/4k \ln(cx^4 + bx^2 + a)/c^2 + 1/4 \operatorname{arctan}(x^2^{1/2}c^{1/2}/(b - (-4ac + b^2)^{1/2}))^{1/2} * (b(a + h + cd) + ab^2j/c - 2a(3aj + cf) + (b^2c(-ah + cd) - 4ac^2(a + h + 3cd) - ab^3j + 4ab(c(a + j + cf)))/c/(-4ac + b^2)^{1/2})/a/(-4ac + b^2)^{2^{1/2}}/c^{1/2}/(b - (-4ac + b^2)^{1/2})^{1/2} + 1/4 \operatorname{arctan}(x^2^{1/2}c^{1/2}/(b + (-4ac + b^2)^{1/2}))^{1/2} * (b(a + h + cd) + ab^2j/c - 2a(3aj + cf) + (-b^2c(-ah + cd) + 4ac^2(a + h + 3cd) + ab^3j - 4ab(c(a + j + cf)))/c/(-4ac + b^2)^{1/2})/a/(-4ac + b^2)^{2^{1/2}}/c^{1/2}/(b + (-4ac + b^2)^{1/2})^{1/2}$

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}

$$\frac{\tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right) \left(\frac{b^2c(cd - ah) - ab^3j + 4abc(2aj + cf) - 4ac^2(ah + 3cd)}{c\sqrt{b^2 - 4ac}} + \frac{ab^2j}{c} + b(ah + cd) - 2a(3aj + cf) \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{cx}}{\sqrt{b^2 - 4ac}} \right)}{2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b - \sqrt{b^2 - 4ac}}} + \dots$$

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] $(x(c(b^2d - 2a(c*d - a*h) - (ab(c*f + a*j))/c) + (b(c(c*d + a*h) - ab^2j - 2ac(c*f - a*j))x^2)/(2ac(b^2 - 4ac)(a + bx^2 + cx^4)) - (b(c(c*e + a*i) - ab^2k - 2ac(c*g - a*k) + (2c^3e - c^2(b*g + 2ai) - b^3k + b(c(b*i + 3ak)))x^2)/(2c^2(b^2 - 4ac)(a + bx^2 + cx^4)) + ((b(c*d + a*h) + (ab^2j)/c - 2a(c*f + 3aj) + (b^2c(c*d - a*h) - 4ac^2(3cd + a*h) - ab^3j + 4ab(c(a + j + cf)))/c\sqrt{b^2 - 4ac})) \operatorname{ArcTan}[(\sqrt{2}\sqrt{cx})/\sqrt{b - \sqrt{b^2 - 4ac}}])/(2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b - \sqrt{b^2 - 4ac}}) + ((b(c*d + a*h) + (ab^2j)/c - 2a(c*f + 3aj) - (b^2c(c*d - a*h) - 4ac^2(3cd + a*h) - ab^3j + 4ab(c(a + j + cf)))/c\sqrt{b^2 - 4ac})) \operatorname{ArcTan}[(\sqrt{2}\sqrt{cx})/\sqrt{b + \sqrt{b^2 - 4ac}}])/(2\sqrt{2}a\sqrt{c}(b^2 - 4ac)\sqrt{b + \sqrt{b^2 - 4ac}}) + ((4c^3e - c^2(2bg - 4ai) + b^3k - 6abck) \operatorname{ArcTanh}((b + 2cx^2)/\sqrt{b^2 - 4ac}))/((2c^2(b^2 - 4ac)^{3/2}) + (k \operatorname{Log}[a + bx^2 + cx^4])/(4c^2)$

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 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]] /; 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

$$\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 58x^5 + jx^6 + kx^7}{(a + bx^2 + cx^4)^2} dx = \int \frac{d + fx^2 + hx^4 + jx^6}{(a + bx^2 + cx^4)^2} dx + \int \frac{x(e + gx^2 + 58x^4 + kx^6)}{(a + bx^2 + cx^4)^2} dx$$

$$= \frac{x \left(c \left(b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= \frac{x \left(c \left(b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= \frac{x \left(c \left(b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= \frac{x \left(c \left(b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)}$$

$$= \frac{x \left(c \left(b^2 d - 2a(cd - ah) - \frac{ab(cf + aj)}{c} \right) + (bc(cd + ah) - ab^2) \right)}{2ac(b^2 - 4ac)(a + bx^2 + cx^4)}$$

Mathematica [A] time = 4.40, size = 775, normalized size = 1.20

$$\frac{\sqrt{2} \sqrt{c} \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right) \left(-bc(8a^2 j + cd\sqrt{b^2 - 4ac} + ah\sqrt{b^2 - 4ac} + 4acf) + ab^3 j + 2ac(c f \sqrt{b^2 - 4ac} + 3aj\sqrt{b^2 - 4ac} + 2ach + 6c^2 d) - b^2(a j \sqrt{b^2 - 4ac} - ach) \right)}{a(b^2 - 4ac)^{3/2} \sqrt{b - \sqrt{b^2 - 4ac}}}$$

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*(-(b^2*k) + b*c*(i + x*(j + 3*k*x)) - 2*c^2*(g + x*(h + x*(i + j*x)))))/(a*(-b^2 + 4*a*c)*(a + b*x^2 + c*x^4)) - (Sqrt[2]*Sqrt[c]*(a*b^3*j - b*c*(c*Sqrt[b^2 - 4*a*c]*d + 4*a*c*f + a*Sqrt[b^2 - 4*a*c]*h + 8*a^2*j) - b^2*(c^2*d
```

$$\begin{aligned}
& - a*c*h + a*\sqrt{b^2 - 4*a*c}*j) + 2*a*c*(6*c^2*d + c*\sqrt{b^2 - 4*a*c}*f + \\
& 2*a*c*h + 3*a*\sqrt{b^2 - 4*a*c}*j))*\text{ArcTan}[(\sqrt{2}*\sqrt{c}*x)/\sqrt{b - \sqrt{b^2 - 4*a*c}}] + (\sqrt{2}*\sqrt{c}*(a*b^3*j + b*c*(c*\sqrt{b^2 - 4*a*c}*d - 4*a*c*f + a*\sqrt{b^2 - 4*a*c}*h - 8*a^2*j) + 2*a*c*(6*c^2*d - c*\sqrt{b^2 - 4*a*c}*f + 2*a*c*h - 3*a*\sqrt{b^2 - 4*a*c}*j) + b^2*(-(c^2*d) + a*c*h + a*\sqrt{b^2 - 4*a*c}*j)))*\text{ArcTan}[(\sqrt{2}*\sqrt{c}*x)/\sqrt{b + \sqrt{b^2 - 4*a*c}}] + ((-4*c^3*e + 2*c^2*(b*g - 2*a*i) + b^2*(-b + \sqrt{b^2 - 4*a*c}))*k + a*c*(6*b*k - 4*\sqrt{b^2 - 4*a*c}*k))*\text{Log}[-b + \sqrt{b^2 - 4*a*c} - 2*c*x^2]/(b^2 - 4*a*c)^{(3/2)} + ((4*c^3*e + c^2*(-2*b*g + 4*a*i) + b^2*(b + \sqrt{b^2 - 4*a*c}))*k - 2*a*c*(3*b + 2*\sqrt{b^2 - 4*a*c}))*k)*\text{Log}[b + \sqrt{b^2 - 4*a*c} + 2*c*x^2]/(b^2 - 4*a*c)^{(3/2)})/(4*c^2)
\end{aligned}$$

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((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)

$$\begin{aligned}
& 1/4/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)}*b^2*h*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)+1/4/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*h+(-1/2/a*(2*a^2*c*j-a*b^2*j+a*b*c*h-2*a*c^2*f+b*c^2*d)/(4*a*c-b^2)/c*x^3+1/2*(3*a*b*c*k-2*a*c^2*i-b^3*k+b^2*c*i-b*c^2*g+2*c^3*e)/(4*a*c-b^2)/c^2*x^2+1/2*(a^2*b*j-2*a^2*c*h+a*b*c*f+2*a*c^2*d-b^2*c*d)/a/c/(4*a*c-b^2)*x+1/2*(2*a^2*c*k-a*b^2*k+a*b*c*i-2*a*c^2*g+b*c^2*e)/(4*a*c-b^2)/c^2)/(c*x^4+b*x^2+a)-1/4/(4*a*c-b^2)^2*2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*(-4*a*c+b^2)^{(1/2)}/a*b^2*c*d*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-1/4*c/(4*a*c-b^2)^2/a*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b^2*d+4*a^2/(4*a*c-b^2)^2*\ln(-2*c*x^2-b+(-4*a*c+b^2)^{(1/2)})*k+4*a^2/(4*a*c-b^2)^2*\ln(2*c*x^2+b+(-4*a*c+b^2)^{(1/2)})*k-c/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*(-4*a*c+b^2)^{(1/2)}*b*c*f*\arctan(2^{(1/2)}/((b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)-2*c^2/(4*a*c-b^2)^2*a*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*\operatorname{arctanh}(2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}*c*x)*f+1/2*c/(4*a*c-b^2)^2*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})*c)^{(1/2)}
\end{aligned}$$

```

*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)*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/(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))-1/4/(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^4*j-3/2*a/(4*a*c-
b^2)^2/c*ln(2*c*x^2+b+(-4*a*c+b^2)^(1/2))*(-4*a*c+b^2)^(1/2)*b*k+6*a^2/(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)*j+1/4/(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^4
*j+5/2*a/(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^2*j-6*a^2/(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)*j-5/2*a/(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^2*j+3/2*a/(4
*a*c-b^2)^2/c*ln(-2*c*x^2-b+(-4*a*c+b^2)^(1/2))*(-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)*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*j+1/4/(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)*b^3*j+1/4/(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)*(-4*a*c+b^2)^(1/2)*b^3*j-2*a/(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*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*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)*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/
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)*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*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*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)*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*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*1
n(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

```

maxima [F] time = 0.00, size = 0, normalized size = 0.00

$$\frac{abc^2e - 2a^2c^2g + a^2bci - (bc^3d - 2ac^3f + abc^2h - (ab^2c - 2a^2c^2)j)x^3 + (2ac^3e - abc^2g + (ab^2c - 2a^2c^2)i - 2(a^2b^2c^2 - 4a^3c^3 + (ab^2c^3 - 4a^2c^4)x^4 + (a$$

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]
$$-1/2*(a*b*c^2*e - 2*a^2*c^2*g + a^2*b*c*i - (b*c^3*d - 2*a*c^3*f + a*b*c^2*h - (a*b^2*c - 2*a^2*c^2)*j)*x^3 + (2*a*c^3*e - a*b*c^2*g + (a*b^2*c - 2*a^2*c^2)*i - (a*b^3 - 3*a^2*b*c)*k)*x^2 - (a^2*b^2 - 2*a^3*c)*k + (a*b*c^2*f - 2*a^2*c^2*h + a^2*b*c*j - (b^2*c^2 - 2*a*c^3)*d)*x)/(a^2*b^2*c^2 - 4*a^3*c^3 + (a*b^2*c^3 - 4*a^2*c^4)*x^4 + (a*b^3*c^2 - 4*a^2*b*c^3)*x^2) - 1/2*integrate(-(2*(a*b^2 - 4*a^2*c)*k*x^3 + a*b*c*f - 2*a^2*c*h + a^2*b*j + (b*c^2*d - 2*a*c^2*f + a*b*c*h + (a*b^2 - 6*a^2*c)*j)*x^2 + (b^2*c - 6*a*c^2)*d - 2*(2*a*c^2*e - a*b*c*g + 2*a^2*c*i - a^2*b*k)*x)/(c*x^4 + b*x^2 + a), x)/(a*b^2*c - 4*a^2*c^2)$$

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] 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]
$$\begin{aligned} & ((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}(1 \\ & 572864*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*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 \end{aligned}$$

$$\begin{aligned}
& *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 + \\
& 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 + 2457 \\
& 6*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*
\end{aligned}$$

$$\begin{aligned}
& a^5b^2c^6f^2i^*z + 768a^5b^3c^5g^*h^2z + 672a^4b^6c^3e^*j^2z - 3 \\
& 84a^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^3 \\
& *b^4c^6e^*f^2z + 32a^2b^6c^5e^*f^2z - 15872a^3b^2c^8d^2e^*z + 499 \\
& 2a^2b^4c^7d^2e^*z - 61440a^8b^2c^3k^3z + 21504a^7b^4c^2k^3z + \\
& 16384a^8c^5i^2k^z - 18432a^8c^5i^*j^2z - 128a^4b^9i^*k^2z + 2048 \\
& *a^7c^6h^2i^*z + 64a^3b^10g^*k^2z + 16384a^6c^7e^2k^z + 16b^11c^ \\
& 2d^2k^z - 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^4* \\
& d^*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^*e^*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 - 2 \\
& 56a^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^ \\
& a^6b^2c^3f^*i^*j^*k - 288a^5b^4c^2g^*h^*j^*k - 160a^5b^4c^2f^*i^*j^*k + 2 \\
& 112a^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^ \\
& 4d^*g^*j^*k - 1312a^4b^4c^3d^*h^*i^*k - 1056a^4b^4c^3d^*g^*j^*k + 896a^5b \\
& ^2c^4f^*g^*i^*j + 768a^4b^4c^3e^*g^*i^*k + 384a^5b^2c^4f^*g^*h^*k + 384a^ \\
& 5b^2c^4e^*h^*i^*j + 384a^5b^2c^4e^*f^*j^*k + 224a^4b^4c^3f^*g^*h^*k - 160 \\
& *a^4b^4c^3e^*f^*j^*k - 96a^4b^4c^3f^*g^*i^*j + 96a^3b^6c^2d^*h^*i^*k + 80 \\
& *a^3b^6c^2d^*g^*j^*k - 64a^4b^4c^3e^*h^*i^*j - 48a^3b^6c^2f^*g^*h^*k - 24 \\
& 96a^4b^3c^4d^*g^*h^*k + 2112a^4b^3c^4d^*e^*j^*k - 960a^4b^3c^4d^*f^*i^*k \\
& + 656a^3b^5c^3d^*g^*h^*k - 448a^4b^3c^4e^*f^*h^*k + 384a^3b^5c^3d^*f^* \\
& i^*k + 320a^4b^3c^4d^*g^*i^*j - 192a^4b^3c^4f^*g^*h^*i - 192a^4b^3c^4e \\
& *g^*h^*j + 192a^4b^3c^4e^*f^*i^*j - 160a^3b^5c^3d^*e^*j^*k + 96a^3b^5c^3 \\
& *e^*f^*h^*k - 48a^2b^7c^2d^*g^*h^*k + 32a^3b^5c^3e^*g^*h^*j - 32a^2b^7c^2 \\
& *d^*f^*i^*k + 4992a^4b^2c^5d^*e^*h^*k - 3584a^4b^2c^5d^*f^*h^*j - 1312a^3b \\
& ^4c^4d^*e^*h^*k + 896a^4b^2c^5e^*f^*g^*j + 896a^4b^2c^5d^*g^*h^*i + 640a^ \\
& 4b^2c^5d^*f^*g^*k - 640a^4b^2c^5d^*e^*i^*j + 600a^3b^4c^4d^*f^*h^*j + 480 \\
& *a^3b^4c^4d^*f^*g^*k + 384a^4b^2c^5e^*f^*h^*i - 192a^2b^6c^3d^*f^*g^*k - \\
& 96a^3b^4c^4e^*f^*g^*j - 96a^3b^4c^4d^*g^*h^*i + 96a^2b^6c^3d^*e^*h^*k + \\
& 12a^2b^6c^3d^*f^*h^*j - 960a^3b^3c^5d^*e^*f^*k + 384a^2b^5c^4d^*e^*f^*k \\
& + 320a^3b^3c^5d^*e^*g^*j - 192a^3b^3c^5e^*e^*f^*g^*h - 192a^3b^3c^5d^*f^*g \\
& *i + 192a^3b^3c^5d^*e^*h^*i + 32a^2b^5c^4d^*f^*g^*i + 896a^3b^2c^6d^*e \\
& *g^*h + 384a^3b^2c^6d^*e^*f^*i - 96a^2b^4c^5d^*e^*g^*h - 64a^2b^4c^5d^* \\
& e^*f^*i - 192a^2b^3c^6d^*e^*f^*g + 48a^6b^4c^*i^*j^2k - 1424a^6b^4c^*h^*j \\
& *k^2 - 2304a^7b^*c^3g^*j^2k - 24a^5b^5c^*g^*j^2k + 2048a^7b^*c^3g^*i^*k \\
& ^2 - 1024a^7b^*c^3f^*j^2k - 768a^5b^5c^*g^*i^*k^2 + 408a^5b^5c^*f^*j^2k^2 \\
& + 256a^6b^*c^4g^*h^2k + 16a^4b^6c^*g^*i^*j^2 + 4608a^6b^*c^4e^*i^2k + \\
& 4608a^5b^*c^5e^2i^*k - 896a^6b^*c^4f^*i^2j + 768a^4b^6c^*d^*j^2k^2 - 25 \\
& 6a^4b^6c^*f^*h^k^2 - 128a^4b^6c^*e^*i^k^2 + 2208a^6b^*c^4f^*h^*j^2 - 1920 \\
& *a^6b^*c^4e^*i^*j^2 + 800a^5b^*c^5f^2h^*j - 256a^5b^*c^5f^2g^*k - 16a^*b \\
& ^8c^2d^2i^*k + 6a^3b^7c^*f^*h^*j^2 + 8192a^6b^*c^4d^*h^*k^2 + 2048a^6b^* \\
& c^4e^*g^*k^2 - 472a^3b^7c^*d^*h^*k^2 + 64a^3b^7c^*e^*g^*k^2 + 4896a^4b^*c^6 \\
& *d^2h^*j + 2304a^4b^*c^6d^2g^*k + 1824a^5b^*c^5d^*h^2j - 384a^5b^*c^5* \\
& e^*h^2i - 168a^*b^7c^3d^2g^*k + 42a^*b^7c^3d^2h^*j + 6a^2b^8c^*d^*h^*j^ \\
& 2 + 1536a^5b^*c^5e^*g^*i^2 + 1536a^4b^*c^6e^2g^*i - 896a^5b^*c^5d^*h^*i^2
\end{aligned}$$

$$\begin{aligned}
& - 896a^4b^6c^6e^2f^*j + 144a^2b^8c^d^*f^*k^2 + 4896a^5b^6c^5d^*f^*j^2 + \\
& 1824a^4b^6c^6d^*f^2*j - 384a^4b^6c^6e^*f^2*i + 336a^*b^6c^4d^2e^*k - 1 \\
& 56a^*b^6c^4d^2f^*j + 16a^*b^6c^4d^2g^*i + 12a^*b^7c^3d^*f^2*j + 2208a^ \\
& ^3b^6c^7d^2f^*h - 1920a^3b^6c^7d^2e^*i + 800a^4b^6c^6d^*f^*h^2 - 102a^*b \\
& ^5c^5d^2f^*h - 32a^*b^5c^5d^2e^*i + 12a^*b^6c^4d^*f^2*h - 2a^*b^7c^3* \\
& d^*f^*h^2 - 896a^3b^6c^7d^*e^2*h - 8a^*b^6c^4d^*f^*g^2 - 240a^*b^4c^6d^2e^ \\
& *g - 32a^*b^4c^6d^*e^2*f + 3072a^7c^4f^*i^*j^*k + 3072a^6c^5e^*f^*j^*k - 3 \\
& 072a^6c^5d^*h^*i^*k + 1536a^6c^5e^*h^*i^*j + 4608a^5c^6d^*e^*i^*j - 3072a^ \\
& ^5c^6d^*e^*h^*k - 1152a^5c^6d^*f^*h^*j + 512a^5c^6e^*f^*h^*i + 1536a^4c^7d^ \\
& *e^*f^*i - 2a^*b^9c^d^*f^*j^2 - 1088a^7b^2c^2i^*j^2*k + 4800a^7b^2c^2h^* \\
& j^*k^2 + 960a^6b^2c^3h^2i^*k + 544a^6b^3c^2g^*j^2*k - 144a^5b^4c^2 \\
& *h^2i^*k - 2304a^6b^2c^3g^*i^2*k + 1920a^6b^3c^2g^*i^*k^2 + 1152a^5b^ \\
& ^3c^3g^2i^*k - 864a^6b^3c^2f^*j^*k^2 + 384a^5b^4c^2g^*i^2*k + 192a^ \\
& ^6b^2c^3h^*i^2*j - 192a^4b^5c^2g^2i^*k - 32a^5b^4c^2h^*i^2*j - 1088 \\
& *a^6b^2c^3e^*j^2*k + 960a^6b^2c^3g^*i^*j^2 - 480a^5b^3c^3g^*h^2*k - \\
& 240a^5b^4c^2g^*i^*j^2 + 192a^5b^2c^4f^2i^*k + 72a^4b^5c^2g^*h^2*k \\
& + 48a^5b^4c^2e^*j^2*k + 48a^4b^4c^3f^2i^*k - 16a^3b^6c^2f^2i^*k \\
& + 13376a^6b^2c^3d^*j^*k^2 - 5136a^5b^4c^2d^*j^*k^2 - 3840a^6b^2c^3e^ \\
& *i^*k^2 + 1536a^5b^4c^2e^*i^*k^2 - 768a^5b^3c^3e^*i^2*k - 768a^4b^3c^ \\
& ^4e^2i^*k + 624a^5b^4c^2f^*h^*k^2 + 576a^6b^2c^3f^*h^*k^2 + 192a^5b^ \\
& ^2c^4g^2h^*j + 96a^5b^3c^3f^*i^2*j + 48a^4b^4c^3g^2h^*j - 8a^3b^6 \\
& *c^2g^2h^*j + 6848a^4b^2c^5d^2i^*k - 2448a^3b^4c^4d^2i^*k + 960a^ \\
& ^5b^2c^4e^*h^2*k - 864a^5b^2c^4f^*h^2*j + 480a^5b^3c^3e^*i^*j^2 + 336 \\
& *a^4b^3c^4f^2h^*j + 336a^2b^6c^3d^2i^*k + 192a^5b^2c^4g^*h^2*i + \\
& 144a^5b^3c^3f^*h^*j^2 - 144a^4b^4c^3e^*h^2*k - 102a^4b^5c^2f^*h^*j^2 \\
& - 96a^4b^3c^4f^2g^*k - 32a^4b^5c^2e^*i^*j^2 - 30a^3b^5c^3f^2h^*j \\
& - 24a^3b^5c^3f^2g^*k + 16a^4b^4c^3g^*h^2*i - 12a^4b^4c^3f^*h^2*j \\
& + 12a^3b^6c^2f^*h^2*j + 8a^2b^7c^2f^2g^*k - 2a^2b^7c^2f^2h^*j - \\
& 9312a^5b^3c^3d^*h^*k^2 + 3288a^4b^5c^2d^*h^*k^2 - 2304a^4b^2c^5e^2 \\
& *g^*k + 1920a^5b^3c^3e^*g^*k^2 + 1152a^4b^3c^4e^*g^2*k - 768a^4b^5c^ \\
& ^2e^*g^*k^2 + 384a^3b^4c^4e^2g^*k - 320a^5b^2c^4d^*i^2*j - 224a^4b^3 \\
& *c^4f^*g^2*j + 192a^5b^2c^4f^*h^*i^2 + 192a^4b^2c^5e^2h^*j - 192a^3b^ \\
& ^5c^3e^*g^2*k - 32a^3b^4c^4e^2h^*j + 24a^3b^5c^3f^*g^2*j - 3552a^ \\
& ^5b^2c^4d^*h^*j^2 - 3424a^3b^3c^5d^2g^*k + 1332a^4b^4c^3d^*h^*j^2 + 1 \\
& 224a^2b^5c^4d^2g^*k + 960a^5b^2c^4e^*g^*j^2 - 496a^3b^3c^5d^2h^*j \\
& + 432a^4b^3c^4d^*h^2*j - 240a^4b^4c^3e^*g^*j^2 - 222a^2b^5c^4d^2* \\
& h^*j + 192a^4b^2c^5f^2g^*i + 192a^4b^2c^5e^*f^2*k - 174a^3b^5c^3d^ \\
& *h^2*j - 156a^3b^6c^2d^*h^*j^2 + 48a^3b^4c^4e^*f^2*k - 32a^4b^3c^4* \\
& e^*h^2*i + 16a^3b^6c^2e^*g^*j^2 + 16a^3b^4c^4f^2g^*i - 16a^2b^6c^3* \\
& e^*f^2*k + 12a^2b^7c^2d^*h^2*j + 1728a^5b^2c^4d^*f^*k^2 + 1392a^4b^4* \\
& c^3d^*f^*k^2 - 840a^3b^6c^2d^*f^*k^2 - 768a^4b^2c^5e^*g^2*i + 576a^4b^ \\
& ^2c^5d^*g^2*j + 96a^4b^3c^4d^*h^*i^2 + 96a^3b^3c^5e^2f^*j - 80a^3b^ \\
& ^4c^4d^*g^2*j + 64a^4b^2c^5f^*g^2*h + 48a^3b^4c^4f^*g^2*h + 6848a^3 \\
& *b^2c^6d^2e^*k - 3552a^3b^2c^6d^2f^*j - 2448a^2b^4c^5d^2e^*k + 13 \\
& 32a^2b^4c^5d^2f^*j + 960a^3b^2c^6d^2g^*i - 496a^4b^3c^4d^*f^*j^2 \\
& + 432a^3b^3c^5d^*f^2*j - 240a^2b^4c^5d^2g^*i - 222a^3b^5c^3d^*f^*j \\
& ^2 + 192a^4b^2c^5e^*g^*h^2 - 174a^2b^5c^4d^*f^2*j + 42a^2b^7c^2d^*f^ \\
& *j^2 - 32a^3b^3c^5e^*f^2*i + 16a^3b^4c^4e^*g^*h^2 - 320a^3b^2c^6d^* \\
& e^2*j - 224a^3b^3c^5d^*g^2*h + 192a^4b^2c^5d^*f^*i^2 + 192a^3b^2c^6 \\
& *e^2f^*h - 32a^3b^4c^4d^*f^*i^2 + 24a^2b^5c^4d^*g^2*h - 864a^3b^2c^ \\
& ^6d^*f^2*h + 480a^2b^3c^6d^2e^*i + 336a^3b^3c^5d^*f^*h^2 + 192a^3b^2 \\
& *c^6e^*f^2*g + 144a^2b^3c^6d^2f^*h - 30a^2b^5c^4d^*f^*h^2 + 16a^2b^ \\
& ^4c^5e^*f^2*g - 12a^2b^4c^5d^*f^2*h + 192a^3b^2c^6d^*f^*g^2 + 96a^2b^ \\
& ^3c^6d^*e^2*h + 48a^2b^4c^5d^*f^*g^2 + 960a^2b^2c^7d^2e^*g + 192a^2 \\
& *b^2c^7d^*e^2*f - 3072a^8b^c^2j^2*k^2 + 1104a^7b^3c^j^2*k^2 + 768a^ \\
& ^6b^4c^i^2*k^2 - 256a^6b^3c^2i^3*k + 1536a^7b^c^3h^2*k^2 - 960a^7* \\
& b^c^3i^2*j^2 + 444a^5b^5c^*h^2*k^2 - 16a^5b^5c^*i^2*j^2 - 3072a^7b^2 \\
& *c^2g^*k^3 - 496a^6b^3c^2h^*j^3 + 192a^4b^6c^*g^2*k^2 - 192a^4b^4c^ \\
& ^3g^3*k + 144a^5b^3c^3h^3*j + 32a^3b^6c^2g^3*k - 18a^4b^5c^2h^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* \\
& 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 -
\end{aligned}$$

$$\begin{aligned}
& 512a^4c^7e^f - 1536a^5c^6e^j - 512a^5c^6f^i + 1024a^6c^5h^k - 1 \\
& 536a^6c^5i^j + 32a^ab^5c^5d^e + 1024a^3b^c^7d^e - 16a^ab^6c^4d^g \\
& + 1024a^4b^c^6d^i + 512a^4b^c^6e^h + 256a^4b^c^6f^g + 16a^ab^8c^2 \\
& *d^k + 256a^5b^c^5f^k + 768a^5b^c^5g^j + 512a^5b^c^5h^i + 1792a^6 \\
& *b^c^4j^k - 384a^2b^3c^6d^e + 192a^2b^4c^5d^g + 32a^2b^4c^5e^f \\
& - 512a^3b^2c^6d^g + 32a^2b^5c^4d^i - 16a^2b^5c^4f^g - 384a^3* \\
& b^3c^5d^i - 128a^3b^3c^5e^h - 288a^2b^6c^3d^k + 1792a^3b^4c^4* \\
& d^k - 32a^3b^4c^4e^j + 32a^3b^4c^4f^i + 64a^3b^4c^4g^h - 4352a \\
& ^4b^2c^5d^k + 512a^4b^2c^5e^j - 256a^4b^2c^5g^h + 16a^2b^7c^2 \\
& *f^k - 144a^3b^5c^3f^k + 16a^3b^5c^3g^j + 256a^4b^3c^4f^k - 256 \\
& *a^4b^3c^4g^j - 128a^4b^3c^4h^i - 48a^3b^6c^2h^k + 512a^4b^4c \\
& ^3h^k - 32a^4b^4c^3i^j - 1536a^5b^2c^4h^k + 512a^5b^2c^4i^j + \\
& 80a^4b^5c^2j^k - 768a^5b^3c^3j^k)/(8(64a^5c^5 - a^2b^6c^2 + 12 \\
& *a^3b^4c^3 - 48a^4b^2c^4)) - \text{root}(1572864a^8b^2c^9z^4 - 983040a^7 \\
& *b^4c^8z^4 + 327680a^6b^6c^7z^4 - 61440a^5b^8c^6z^4 + 6144a^4b^ \\
& 10c^5z^4 - 256a^3b^12c^4z^4 - 1048576a^9c^10z^4 - 1572864a^8b^2* \\
& c^7kz^3 + 983040a^7b^4c^6kz^3 - 327680a^6b^6c^5kz^3 + 61440a^5 \\
& *b^8c^4kz^3 - 6144a^4b^10c^3kz^3 + 256a^3b^12c^2kz^3 + 1048576 \\
& *a^9c^8kz^3 + 98304a^8b^c^6i^kz^2 + 98304a^7b^c^7e^kz^2 + 57344* \\
& a^7b^c^7f^jz^2 + 32768a^7b^c^7g^i^z^2 + 57344a^6b^c^8d^h^z^2 + 327 \\
& 68a^6b^c^8e^g^z^2 - 32a^ab^10c^4d^f^z^2 - 90112a^7b^3c^5i^kz^2 + \\
& 30720a^6b^5c^4i^kz^2 - 4608a^5b^7c^3i^kz^2 + 256a^4b^9c^2i^kz^ \\
& 2 - 49152a^7b^2c^6g^kz^2 + 45056a^6b^4c^5g^kz^2 + 24576a^7b^2 \\
& *c^6h^jz^2 - 15360a^5b^6c^4g^kz^2 - 3072a^5b^6c^4h^jz^2 + 2304* \\
& a^4b^8c^3g^kz^2 + 2048a^6b^4c^5h^jz^2 + 576a^4b^8c^3h^jz^2 - \\
& 128a^3b^10c^2g^kz^2 - 32a^3b^10c^2h^jz^2 - 90112a^6b^3c^6e^kz^ \\
& 2 - 49152a^6b^3c^6f^jz^2 + 30720a^5b^5c^5e^kz^2 - 24576a^6b^3 \\
& *c^6g^i^z^2 + 15360a^5b^5c^5f^jz^2 + 6144a^5b^5c^5g^i^z^2 - 4608* \\
& a^4b^7c^4e^kz^2 - 2048a^4b^7c^4f^jz^2 - 512a^4b^7c^4g^i^z^2 + \\
& 256a^3b^9c^3e^kz^2 + 96a^3b^9c^3f^jz^2 + 131072a^6b^2c^7d^jz^ \\
& ^2 + 49152a^6b^2c^7e^i^z^2 - 43008a^5b^4c^6d^jz^2 - 12288a^5b^4* \\
& c^6e^i^z^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^i^z^2 - 320a^3b^8c^4d^jz^2 + 19 \\
& 2a^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 - 16 \\
& *a^3b^11c^j^2z^2 + 12288a^7b^c^7h^2z^2 + 12288a^6b^c^8f^2z^2 + 6 \\
& 1440a^5b^c^9d^2z^2 + 432a^ab^9c^5d^2z^2 - 49152a^8c^7h^jz^2 - 14 \\
& 7456a^7c^8d^jz^2 - 65536a^7c^8e^i^z^2 - 16384a^7c^8f^h^z^2 - 4915 \\
& 2a^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^4* \\
& b^9c^2j^2z^2 + 24576a^7b^2c^6i^2z^2 - 6144a^6b^4c^5i^2z^2 + 51 \\
& 2a^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^2 \\
& *z^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 - 61440 \\
& *a^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 - 3 \\
& 2768a^6c^9e^2z^2 - 16b^11c^4d^2z^2 - 16384a^7b^c^5g^i^kz - 1024 \\
& 0a^7b^c^5f^j^kz + 4096a^7b^c^5h^i^jz - 47104a^6b^c^6d^h^kz - 16 \\
& 384a^6b^c^6e^g^kz + 6144a^6b^c^6f^g^jz + 4096a^6b^c^6e^h^jz + 3 \\
& 2a^ab^10c^2d^f^kz - 6144a^5b^c^7d^g^h^z - 4096a^5b^c^7d^f^i^z - 32 \\
& *a^b^8c^4d^f^g^z - 4096a^4b^c^8d^e^f^z + 64a^ab^7c^5d^e^f^z - 18432* \\
& a^7b^2c^4h^j^kz + 4608a^6b^4c^3h^j^kz - 384a^5b^6c^2h^j^kz + \\
& 12288a^6b^3c^4g^i^kz + 7680a^6b^3c^4f^j^kz - 3072a^6b^3c^4h^i
\end{aligned}$$

$$\begin{aligned}
& *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 + 1 \\
& 2288*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 \\
& *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 - 4 \\
& 9152*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 - 30 \\
& 72*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
\end{aligned}$$

$$\begin{aligned}
& ^2*ez + 18432*a^4*c^9*d^2*ez + 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* \\
& 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 + 4 \\
& 2*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 + 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
\end{aligned}$$

$$\begin{aligned}
& *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*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 + 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*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 + 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*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*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 + 1332*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
\end{aligned}$$

$$\begin{aligned}
& + 512a^6c^5f^2i^k + 64a^4b^7g^i k^2 - 40a^4b^7f^j k^2 - 9216a^7 \\
& *c^4d^j k^2 - 4096a^7c^4e^i k^2 - 1024a^7c^4f^h k^2 - 4608a^5c^6d \\
& ^2i^k - 512a^6c^5e^h^2k - 192a^6c^5f^h^2j - 40a^3b^8d^j k^2 + 2 \\
& 4a^3b^8f^h k^2 + 2304a^6c^5d^i^2j + 768a^5c^6e^2h^j + 256a^6c^ \\
& 5f^h i^2 + 8b^9c^2d^2g^k - 2b^9c^2d^2h^j + 6144a^8b^c^2i^k^3 - \\
& 2176a^7b^3c^i k^3 - 1728a^6c^5d^h^j^2 + 1536a^7b^c^3i^3k + 512a^ \\
& 5c^6e^f^2k + 24a^2b^9d^h k^2 - 3072a^6c^5d^f k^2 - 16b^8c^3d^2 \\
& e^k + 6b^8c^3d^2f^j - 4608a^4c^7d^2e^k + 2016a^7b^c^3h^j^3 - 172 \\
& 8a^4c^7d^2f^j + 1088a^6b^4c^g k^3 + 224a^6b^c^4h^3j + 30a^5b^5 \\
& *c^h j^3 + 2304a^4c^7d^e^2j + 768a^5c^6d^f i^2 + 256a^4c^7e^2f^h \\
& + 6b^7c^4d^2f^h + 6144a^7b^c^3e^k^3 + 1536a^4b^c^6e^3k + 512a^ \\
& 6b^c^4g^i^3 + 192a^5b^5c^e k^3 - 192a^4c^7d^f^2h - 10a^4b^6c^f^ \\
& j^3 + 108a^b^9c^d^2k^2 + 16b^6c^5d^2e^g + 4320a^6b^c^4d^j^3 + 432 \\
& 0a^3b^c^7d^3j + 222a^b^5c^5d^3j + 96a^5b^c^5f^h^3 + 96a^4b^c^6 \\
& *f^3h - 10a^3b^7c^d^j^3 + 768a^3c^8d^e^2f + 512a^3b^c^7e^3g + 1 \\
& 32a^b^4c^6d^3h + 2016a^2b^c^8d^3f - 496a^b^3c^7d^3f + 224a^3b \\
& *c^7d^f^3 - 18a^b^5c^5d^f^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^5 \\
& *b^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 + 768 \\
& *a^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^2 \\
& *k^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^3 \\
& *c^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^4 \\
& *c^5d^2h^2 - 240a^2b^3c^6d^2g^2 - 16a^2b^3c^6e^2f^2 - 960a^2b \\
& ^2c^7d^2f^2 - 8a^b^10d^f k^2 - a^2b^8c^f^2j^2 - 2048a^8c^3i^2k^ \\
& ^2 - 100a^6b^5j^2k^2 - 64a^5b^6i^2k^2 - 288a^7c^4h^2j^2 - 36a^4 \\
& *b^7h^2k^2 - 16a^3b^8g^2k^2 - 2048a^6c^5e^2k^2 - 864a^6c^5f^2 \\
& j^2 - 4a^2b^9f^2k^2 - 2592a^5c^6d^2j^2 - 1536a^5c^6e^2i^2 - 32 \\
& a^5c^6f^2h^2 - 864a^4c^7d^2h^2 + 360a^7b^2c^2j^4 - 4b^7c^4d^2 \\
& *g^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^k^3 - 96a^5b^6 \\
& *g^k^3 - 1728a^7c^4f^j^3 - 192a^5c^6f^3j - 10b^7c^4d^3j - 1024a \\
& ^6c^5e^i^3 - 1024a^4c^7e^3i + 1536a^8b^2c^k^4 - 10b^6c^5d^3h - \\
& 1728a^3c^8d^3h - 192a^5c^6d^h^3 - 25a^6b^4c^j^4 + 30b^5c^6d^3 \\
& *f + 360a^b^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^1 \\
& 0c^d^2j^2, z, n) * ((6144a^5c^8d + 2048a^6c^7h - 288a^2b^6c^5d + \\
& 1920a^3b^4c^6d - 5632a^4b^2c^7d + 16a^2b^7c^4f - 192a^3b^5c^ \\
& 5f + 768a^4b^3c^6f - 32a^3b^6c^4h + 384a^4b^4c^5h - 1536a^5b \\
& ^2c^6h + 16a^3b^7c^3j - 192a^4b^5c^4j + 768a^5b^3c^5j + 16a^ \\
& b^8c^4d - 1024a^5b^c^7f - 1024a^6b^c^6j) / (8 * (64a^5c^5 - a^2b^6c \\
& ^2 + 12a^3b^4c^3 - 48a^4b^2c^4)) + (x * (32a^2b^6c^5e - 2048a^6c^ \\
& 7i - 2048a^5c^8e - 384a^3b^4c^6e + 1536a^4b^2c^7e - 16a^2b^7 \\
& *c^4g + 192a^3b^5c^5g - 768a^4b^3c^6g + 32a^3b^6c^4i - 384a^4 \\
& b^4c^5i + 1536a^5b^2c^6i + 32a^2b^9c^2k - 528a^3b^7c^3k + 326 \\
& 4a^4b^5c^4k - 8960a^5b^3c^5k + 1024a^5b^c^7g + 9216a^6b^c^6k) \\
&) / (4 * (64a^5c^5 - a^2b^6c^2 + 12a^3b^4c^3 - 48a^4b^2c^4)) - (\text{root}(\\
& 1572864a^8b^2c^9z^4 - 983040a^7b^4c^8z^4 + 327680a^6b^6c^7z^4 - \\
& 61440a^5b^8c^6z^4 + 6144a^4b^10c^5z^4 - 256a^3b^12c^4z^4 - 104 \\
& 8576a^9c^10z^4 - 1572864a^8b^2c^7kz^3 + 983040a^7b^4c^6kz^3 -
\end{aligned}$$

$327680a^6b^6c^5kz^3 + 61440a^5b^8c^4kz^3 - 6144a^4b^{10}c^3kz^3 + 256a^3b^{12}c^2kz^3 + 1048576a^9c^8kz^3 + 98304a^8b^6c^6ikz^2 + 98304a^7b^6c^7ekz^2 + 57344a^7b^6c^7fjz^2 + 32768a^7b^6c^7giz^2 + 57344a^6b^6c^8dhz^2 + 32768a^6b^6c^8egz^2 - 32a^6b^{10}c^4dfz^2 - 90112a^7b^3c^5ikz^2 + 30720a^6b^5c^4ikz^2 - 4608a^5b^7c^3ikkz^2 + 256a^4b^9c^2ikkz^2 - 49152a^7b^2c^6gkz^2 + 45056a^6b^4c^5gkz^2 + 24576a^7b^2c^6hjkz^2 - 15360a^5b^6c^4gkz^2 - 3072a^5b^6c^4hjkz^2 + 2304a^4b^8c^3gkz^2 + 2048a^6b^4c^5hjkz^2 + 576a^4b^8c^3hjkz^2 - 128a^3b^{10}c^2gkz^2 - 32a^3b^{10}c^2hjkz^2 - 90112a^6b^3c^6ekz^2 - 49152a^6b^3c^6fjz^2 + 30720a^5b^5c^5ekz^2 - 24576a^6b^3c^6giz^2 + 15360a^5b^5c^5fjz^2 + 6144a^5b^5c^5giz^2 - 4608a^4b^7c^4ekz^2 - 2048a^4b^7c^4fjz^2 - 512a^4b^7c^4giz^2 + 256a^3b^9c^3ekz^2 + 96a^3b^9c^3fjz^2 + 131072a^6b^2c^7djkz^2 + 49152a^6b^2c^7eiz^2 - 43008a^5b^4c^6djkz^2 - 12288a^5b^4c^6eiz^2 + 6144a^5b^4c^6fhz^2 + 6144a^4b^6c^5djkz^2 - 2048a^4b^6c^5fhz^2 + 1024a^4b^6c^5eiz^2 - 320a^3b^8c^4djkz^2 + 192a^3b^8c^4fhz^2 - 49152a^5b^3c^7dhhz^2 - 24576a^5b^3c^7egz^2 + 15360a^4b^5c^6dhhz^2 + 6144a^4b^5c^6egz^2 - 2048a^3b^7c^5dhhz^2 - 512a^3b^7c^5egz^2 + 96a^2b^9c^4dhhz^2 + 24576a^5b^2c^8dfffz^2 - 3072a^3b^6c^6dfffz^2 + 2048a^4b^4c^7dfffz^2 + 576a^2b^8c^5dfffz^2 + 1536a^4b^{10}c^k^2z^2 + 61440a^8b^6c^6j^2z^2 - 16a^3b^{11}c^j^2z^2 + 12288a^7b^6c^7h^2z^2 + 12288a^6b^6c^8f^2z^2 + 61440a^5b^6c^9d^2z^2 + 432a^6b^9c^5d^2z^2 - 49152a^8c^7hjkz^2 - 147456a^7c^8djkz^2 - 65536a^7c^8eiz^2 - 16384a^7c^8fhz^2 - 49152a^6c^9dfffz^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^6c^5gikz - 10240a^7b^6c^5fjkz + 4096a^7b^6c^5hikz - 47104a^6b^6c^6dhhkz - 16384a^6b^6c^6egkz + 6144a^6b^6c^6fghjkz + 4096a^6b^6c^6ehjkz + 32a^6b^{10}c^2dfffkz - 6144a^5b^6c^7dghhjkz - 4096a^5b^6c^7dfffiz - 32a^6b^8c^4dfffghz - 4096a^4b^6c^8dfeffz + 64a^6b^7c^5dfeffz - 18432a^7b^2c^4hjkz + 4608a^6b^4c^3hjkz - 384a^5b^6c^2hjkz + 12288a^6b^3c^4gikz + 7680a^6b^3c^4fjkz - 3072a^6b^3c^4hijkz - 3072a^5b^5c^3gikz - 1920a^5b^5c^3fjkz + 768a^5b^5c^3hijkz + 256a^4b^7c^2gikz + 160a^4b^7c^2fjkz - 64a^4b^7c^2hijkz - 65536a^6b^2c^5djkz - 24576a^6b^2c^5eikz + 21504a^5b^4c^4djkz + 9216a^6b^2c^5fijkz + 6144a^5b^4c^4eikz - 3072a^5b^4c^4fhkz - 3072a^4b^6c^3djkz - 2304a^5b^4c^4fijkz - 2048a^6b^2c^5ghjkz + 1536a^5b^4c^4ghjkz + 1024a^4b^6c^3fhkz - 512a^4b^6c^3eikz - 384a^4b^6c^3ghjkz + 192a^4b^6c^3fijkz + 160a^3b^8c^2djkz - 96a^3b^8c^2fhkz + 32a^3b^8c^2ghjkz + 41472a^5b^3c^5dhhkz - 13440a^4b^5c^4dhhkz + 12288a^5b^3c^5egkz - 4608a^5b^3c^5fghjkz - 3072a^5b^3c^5ehjkz - 3072a^4b^5c^4egkz + 1888a^3b^7c^3dhhkz + 1152a^4b^5c^4fghjkz + 768a^4b^5c^4ehjkz + 256a^3b^7c^3egkz - 96a^3b^7c^3fghjkz - 96a^2b^9c^2dhhkz - 64a^3b^7c^3ehjkz + 9216a^5b^2c^6effjkz - 9216a^5b^2c^6dhhikz - 6656a^4b^4c^5dfffkz - 6144a^5b^2c^6dfffkz + 3456a^3b^6c^4dfffkz - 2304a^4b^4c^5effjkz + 2304a^4b^4c^5dhhikz - 576a^2b^8c^3dfffkz + 192a^3b^6c^4dhhikz + 4608a^4$

$$\begin{aligned}
& *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 \\
& 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
\end{aligned}$$

$$\begin{aligned}
& ^5b^2c^4*eh*ij + 384a^5b^2c^4*ef*jk + 224a^4b^4c^3*f*gh*k - 16 \\
& 0a^4b^4c^3*ef*jk - 96a^4b^4c^3*f*gi*ij + 96a^3b^6c^2*d*h*ik + 8 \\
& 0a^3b^6c^2*d*gj*jk - 64a^4b^4c^3*eh*ij - 48a^3b^6c^2*f*gh*k - 2 \\
& 496a^4b^3c^4*d*gh*k + 2112a^4b^3c^4*d*ej*jk - 960a^4b^3c^4*d*fi* \\
& k + 656a^3b^5c^3*d*gh*k - 448a^4b^3c^4*ef*h*k + 384a^3b^5c^3*d*f \\
& *i*k + 320a^4b^3c^4*d*gi*ij - 192a^4b^3c^4*f*gh*ij - 192a^4b^3c^4* \\
& e*gh*ij + 192a^4b^3c^4*ef*ij - 160a^3b^5c^3*d*ej*jk + 96a^3b^5c^ \\
& 3*ef*h*k - 48a^2b^7c^2*d*gh*k + 32a^3b^5c^3*e*gh*ij - 32a^2b^7c^ \\
& 2*d*fi*k + 4992a^4b^2c^5*d*eh*k - 3584a^4b^2c^5*d*fh*ij - 1312a^3* \\
& b^4c^4*d*eh*k + 896a^4b^2c^5*ef*gj + 896a^4b^2c^5*d*gh*ij + 640a \\
& ^4b^2c^5*d*fg*k - 640a^4b^2c^5*d*ei*ij + 600a^3b^4c^4*d*fh*ij + 48 \\
& 0a^3b^4c^4*d*fg*k + 384a^4b^2c^5*ef*h*ij - 192a^2b^6c^3*d*fg*k - \\
& 96a^3b^4c^4*ef*gj - 96a^3b^4c^4*d*gh*ij + 96a^2b^6c^3*d*eh*k + \\
& 12a^2b^6c^3*d*fh*ij - 960a^3b^3c^5*d*ef*k + 384a^2b^5c^4*d*ef*k \\
& + 320a^3b^3c^5*d*eg*ij - 192a^3b^3c^5*ef*gh - 192a^3b^3c^5*d*f* \\
& gi + 192a^3b^3c^5*d*eh*ij + 32a^2b^5c^4*d*fg*ij + 896a^3b^2c^6*d* \\
& e*gh + 384a^3b^2c^6*d*ef*ij - 96a^2b^4c^5*d*eg*ih - 64a^2b^4c^5*d \\
& *ef*ij - 192a^2b^3c^6*d*ef*gi + 48a^6b^4c^3*ij^2*k - 1424a^6b^4c^3*h \\
& j*k^2 - 2304a^7b^3c^3*gj^2*k - 24a^5b^5c^3*gj^2*k + 2048a^7b^3c^3*gi* \\
& k^2 - 1024a^7b^3c^3*f*jk^2 - 768a^5b^5c^3*gi*k^2 + 408a^5b^5c^3*f*jk^ \\
& 2 + 256a^6b^3c^4*gh^2*k + 16a^4b^6c^3*gi*ij^2 + 4608a^6b^3c^4*ei^2*k + \\
& 4608a^5b^3c^5*e^2*ik - 896a^6b^3c^4*fi^2*ij + 768a^4b^6c^3*d*jk^2 - 2 \\
& 56a^4b^6c^3*f*hk^2 - 128a^4b^6c^3*ei*k^2 + 2208a^6b^3c^4*f*hj^2 - 192 \\
& 0a^6b^3c^4*ei*ij^2 + 800a^5b^3c^5*f^2*h*ij - 256a^5b^3c^5*f^2*g*k - 16a* \\
& b^8c^2*d^2*ik + 6a^3b^7c^3*f*hj^2 + 8192a^6b^3c^4*d*hk^2 + 2048a^6b \\
& ^3c^4*e*g*k^2 - 472a^3b^7c^3*d*hk^2 + 64a^3b^7c^3*e*g*k^2 + 4896a^4b^3c^ \\
& 6*d^2*h*ij + 2304a^4b^3c^6*d^2*g*k + 1824a^5b^3c^5*d*h^2*ij - 384a^5b^3c^5 \\
& *eh^2*ij - 168a^3b^7c^3*d^2*g*k + 42a^3b^7c^3*d^2*h*ij + 6a^2b^8c^3*d*h*ij \\
& ^2 + 1536a^5b^3c^5*e*gi^2 + 1536a^4b^3c^6*e^2*gi - 896a^5b^3c^5*d*h*ij^ \\
& 2 - 896a^4b^3c^6*e^2*f*ij + 144a^2b^8c^3*d*fk^2 + 4896a^5b^3c^5*d*f*ij^2 \\
& + 1824a^4b^3c^6*d*f^2*ij - 384a^4b^3c^6*ef^2*ij + 336a^3b^6c^4*d^2*e*k - \\
& 156a^3b^6c^4*d^2*f*ij + 16a^3b^6c^4*d^2*g*ij + 12a^3b^7c^3*d*f^2*ij + 2208* \\
& a^3b^6c^7*d^2*f*h - 1920a^3b^6c^7*d^2*ei + 800a^4b^3c^6*d*fh^2 - 102a* \\
& b^5c^5*d^2*f*h - 32a^3b^5c^5*d^2*ei + 12a^3b^6c^4*d*f^2*h - 2a^3b^7c^3 \\
& *d*f*h^2 - 896a^3b^3c^7*d*e^2*h - 8a^3b^6c^4*d*f*g^2 - 240a^3b^4c^6*d^2* \\
& e*g - 32a^3b^4c^6*d*e^2*f + 3072a^7c^4*f*ij*jk + 3072a^6c^5*ef*ij*jk - \\
& 3072a^6c^5*d*hi*k + 1536a^6c^5*eh*ij + 4608a^5c^6*d*ei*ij - 3072a \\
& ^5c^6*d*eh*k - 1152a^5c^6*d*fh*ij + 512a^5c^6*ef*hi + 1536a^4c^7* \\
& d*ef*ij - 2a^3b^9c^3*d*f*ij^2 - 1088a^7b^2c^2*ij^2*k + 4800a^7b^2c^2*h \\
& *jk^2 + 960a^6b^2c^3*h^2*ik + 544a^6b^3c^2*gj^2*k - 144a^5b^4c^ \\
& 2*h^2*ik - 2304a^6b^2c^3*gi^2*k + 1920a^6b^3c^2*gi*k^2 + 1152a^5* \\
& b^3c^3*g^2*ik - 864a^6b^3c^2*f*jk^2 + 384a^5b^4c^2*gi^2*k + 192a \\
& ^6b^2c^3*h*ij^2 - 192a^4b^5c^2*g^2*ik - 32a^5b^4c^2*h*ij^2 - 108 \\
& 8a^6b^2c^3*ej^2*k + 960a^6b^2c^3*gi*ij^2 - 480a^5b^3c^3*gh^2*k - \\
& 240a^5b^4c^2*gi*ij^2 + 192a^5b^2c^4*f^2*ik + 72a^4b^5c^2*g*h^2*k \\
& + 48a^5b^4c^2*ej^2*k + 48a^4b^4c^3*f^2*ik - 16a^3b^6c^2*f^2*ik \\
& + 13376a^6b^2c^3*d*jk^2 - 5136a^5b^4c^2*d*jk^2 - 3840a^6b^2c^3* \\
& e*ik^2 + 1536a^5b^4c^2*ei*k^2 - 768a^5b^3c^3*ei^2*k - 768a^4b^3* \\
& c^4*e^2*ik + 624a^5b^4c^2*f*hk^2 + 576a^6b^2c^3*f*hk^2 + 192a^5b \\
& ^2c^4*g^2*h*ij + 96a^5b^3c^3*f*ij^2 + 48a^4b^4c^3*g^2*h*ij - 8a^3b^ \\
& 6c^2*g^2*h*ij + 6848a^4b^2c^5*d^2*ik - 2448a^3b^4c^4*d^2*ik + 960a \\
& ^5b^2c^4*eh^2*k - 864a^5b^2c^4*f*h^2*ij + 480a^5b^3c^3*ei*ij^2 + 33 \\
& 6a^4b^3c^4*f^2*h*ij + 336a^2b^6c^3*d^2*ik + 192a^5b^2c^4*g*h^2*ij + \\
& 144a^5b^3c^3*f*h*ij^2 - 144a^4b^4c^3*eh^2*k - 102a^4b^5c^2*f*h*ij^ \\
& 2 - 96a^4b^3c^4*f^2*g*k - 32a^4b^5c^2*ei*ij^2 - 30a^3b^5c^3*f^2*h* \\
& j - 24a^3b^5c^3*f^2*g*k + 16a^4b^4c^3*g*h^2*ij - 12a^4b^4c^3*f*h^2* \\
& j + 12a^3b^6c^2*f*h^2*ij + 8a^2b^7c^2*f^2*g*k - 2a^2b^7c^2*f^2*h*ij \\
& - 9312a^5b^3c^3*d*hk^2 + 3288a^4b^5c^2*d*hk^2 - 2304a^4b^2c^5*e^ \\
& 2*g*k + 1920a^5b^3c^3*e*g*k^2 + 1152a^4b^3c^4*e*g^2*k - 768a^4b^5*
\end{aligned}$$

$$\begin{aligned}
&^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 * 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 + 1332 * 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 - 1024 * 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 - 3072 * 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 - 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 *
\end{aligned}$$

$$\begin{aligned}
& 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 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) * x * (8192 a^6 b c^8 + 32 a^2 b^9 c^4 - 512 a^3 b^7 c^5 + 3072 a^4 b^5 c^6 - 8192 a^5 b^3 c^7) / (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)) + (x * (2 b^6 c^5 d^2 - 576 a^3 c^8 d^2 + 64 a^4 c^7 f^2 - 64 a^5 c^6 h^2 + 8 a^2 b^9 k^2 + 576 a^6 c^5 j^2 - 36 a b^4 c^6 d^2 + 128 a^3 b c^7 e^2 + 128 a^5 b c^5 i^2 + 2 a^2 b^8 c j^2 - 136 a^3 b^7 c k^2 + 3072 a^6 b c^4 k^2 + 256 a^2 b^2 c^7 d^2 - 32 a^2 b^3 c^6 e^2 + 20 a^2 b^4 c^5 f^2 - 96 a^3 b^2 c^6 f^2 - 8 a^2 b^5 c^4 g^2 + 32 a^3 b^3 c^5 g^2 + 2 a^2 b^6 c^3 h^2 - 4 a^3 b^4 c^4 h^2 - 32 a^4 b^3 c^4 i^2 - 40 a^3 b^6 c^2 j^2 + 276 a^4 b^4 c^3 j^2 - 736 a^5 b^2 c^4 j^2 + 888 a^4 b^5 c^2 k^2 - 2656 a^5 b^3 c^3 k^2 - 384 a^4 c^7 d h - 1024 a^5 c^6 e k + 384 a^5 c^6 f j - 1024 a^6 c^5 i k + 4 a b^5 c^5 d f + 320 a^3 b c^7 d f + 576 a^4 b c^6 d j + 256 a^4 b c^6 e i + 64 a^4 b c^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^
\end{aligned}$$

$$\begin{aligned}
& 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 - 1 \\
& 92*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 \\
& *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^4
\end{aligned}$$

$$\begin{aligned}
& 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 + 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 + 983040*a^8*b*c^6*i*k*z^2 + 983040*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*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*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 + 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 + 1
\end{aligned}$$

$$\begin{aligned}
& 2288a^5b^3c^5e*g*k*z - 4608a^5b^3c^5f*g*j*z - 3072a^5b^3c^5e*h*j*z - 3072a^4b^5c^4e*g*k*z + 1888a^3b^7c^3d*h*k*z + 1152a^4b^5c^4f*g*j*z + 768a^4b^5c^4e*h*j*z + 256a^3b^7c^3e*g*k*z - 96a^3b^7c^3f*g*j*z - 96a^2b^9c^2d*h*k*z - 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*k*z - 6144a^5b^2c^6d*f*k*z + 3456a^3b^6c^4d*f*k*z - 2304a^4b^4c^5e*f*j*z + 2304a^4b^4c^5d*h*i*z - 576a^2b^8c^3d*f*k*z + 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^2k*z + 48a^5b^7c*j^2k*z - 49152a^8b^c^4i*k^2*z + 2304a^5b^7c*i*k^2*z - 9216a^7b^c^5h^2k*z - 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^2k*z + 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^2k*z - 1024a^6b^c^6g*h^2*z - 432a*b^9c^3d^2k*z + 1024a^5b^c^7f^2g*z + 32a*b^8c^4d^2i*z - 9216a^4b^c^8d^2g*z + 336a*b^7c^5d^2g*z - 672a*b^6c^6d^2e*z + 24576a^8c^5h*j*k*z + 73728a^7c^6d*j*k*z + 32768a^7c^6e*i*k*z - 12288a^7c^6f*i*j*z + 8192a^7c^6f*h*k*z + 24576a^6c^7d*f*k*z - 12288a^6c^7e*f*j*z + 12288a^6c^7d*h*i*z + 12288a^5c^8d*e*h*z + 2304a^7b^3c^3j^2k*z - 576a^6b^5c^2j^2k*z + 45056a^7b^3c^3i*k^2*z - 15360a^6b^5c^2i*k^2*z - 12288a^7b^2c^4i^2k*z + 3072a^6b^4c^3i^2k*z - 256a^5b^6c^2i^2k*z + 15872a^7b^2c^4i*j^2*z + 6912a^6b^3c^4h^2k*z - 4992a^6b^4c^3i*j^2*z - 1728a^5b^5c^3h^2k*z + 672a^5b^6c^2i*j^2*z + 144a^4b^7c^2h^2k*z + 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^2k*z - 3072a^5b^4c^4g^2k*z + 768a^4b^6c^3g^2k*z - 64a^3b^8c^2g^2k*z - 7936a^6b^3c^4g*j^2*z + 2496a^5b^5c^3g*j^2*z - 1536a^6b^2c^5h^2i*z + 1280a^5b^3c^5f^2k*z + 384a^5b^4c^4h^2i*z - 336a^4b^7c^2g*j^2*z + 192a^4b^5c^4f^2k*z - 144a^3b^7c^3f^2k*z - 32a^4b^6c^3h^2i*z + 16a^2b^9c^2f^2k*z + 45056a^6b^3c^4e*k^2*z - 15360a^5b^5c^3e*k^2*z - 12288a^5b^2c^6e^2k*z + 3072a^4b^4c^5e^2k*z + 2304a^4b^7c^2e*k^2*z - 256a^3b^6c^4e^2k*z + 59136a^4b^3c^6d^2k*z - 23488a^3b^5c^5d^2k*z + 15872a^6b^2c^5e*j^2*z - 4992a^5b^4c^4e*j^2*z + 4560a^2b^7c^4d^2k*z + 1536a^5b^2c^6f^2i*z + 768a^5b^3c^5g*h^2*z + 672a^4b^6c^3e*j^2*z - 384a^4b^4c^5f^2i*z - 192a^4b^5c^4g*h^2*z - 32a^3b^8c^2e*j^2*z + 32a^3b^6c^4f^2i*z + 16a^3b^7c^3g*h^2*z - 15872a^4b^2c^7d^2i*z + 4992a^3b^4c^6d^2i*z - 1536a^5b^2c^6e*h^2*z - 768a^4b^3c^6f^2g*z - 672a^2b^6c^5d^2i*z + 384a^4b^4c^5e*h^2*z + 192a^3b^5c^5f^2g*z - 32a^3b^6c^4e*h^2*z - 16a^2b^7c^4f^2g*z + 7936a^3b^3c^7d^2g*z - 2496a^2b^5c^6d^2g*z + 1536a^4b^2c^7e*f^2*z - 384a^3b^4c^6e*f^2*z + 32a^2b^6c^5e*f^2*z - 15872a^3b^2c^8d^2e*z + 4992a^2b^4c^7d^2e*z - 61440a^8b^2c^3k^3*z + 21504a^7b^4c^2k^3*z + 16384a^8c^5i^2k*z - 18432a^8c^5i*j^2*z - 128a^4b^9i*k^2*z + 2048a^7c^6h^2i*z + 64a^3b^10g*k^2*z + 16384a^6c^7e^2k*z + 16b^11c^2d^2k*z - 18432a^7c^6e*j^2*z - 2048a^6c^7f^2i*z + 18432a^5c^8d^2i*z - 3328a^6b^6c*k^3*z + 2048a^6c^7e*h^2*z - 16b^9c^4d^2g*z - 2048a^5c^8e*f^2*z + 32b^8c^5d^2e*z + 18432a^4c^9d^2e*z + 65536a^9c^4k^3*z + 192a^5b^8k^3*z - 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
\end{aligned}$$

$$\begin{aligned}
& *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 - 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 + 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*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 - 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*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
\end{aligned}$$

$$\begin{aligned}
& *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*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 + 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*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*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 + 1332*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 - 1024*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 - 3072*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
\end{aligned}$$

```

*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 - 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 + 432
0*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 + 1
32*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*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), 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**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

$$\frac{x \left(\left(- \left(\left(\frac{ja^2}{c^2} + d \right) b^2 \right) + afb + 2a \left(\frac{ja^2}{c} - ha + cd \right) \right) c^2 + (-ajb^3 - c(-3ja^2 + cha + c^2d)b + 2ac^3f)x^2 \right) \left(\left(\frac{ja^2}{c} + 3c \right) \right)}{4ac^2 (b^2 - 4ac) (cx^4 + bx^2 + a)^2} +$$

[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}

$$\frac{x \left(\left(- \left(\left(\frac{ja^2}{c^2} + d \right) b^2 \right) + afb + 2a \left(\frac{ja^2}{c} - ha + cd \right) \right) c^2 + (-ajb^3 - c(-3ja^2 + cha + c^2d)b + 2ac^3f)x^2 \right) \left(\left(\frac{ja^2}{c} + 3c \right) \right)}{4ac^2 (b^2 - 4ac) (cx^4 + bx^2 + a)^2} +$$

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] $-(x*(c^2*(a*b*f - b^2*(d + (a^2*j)/c^2) + 2*a*(c*d - a*h + (a^2*j)/c)) + (2*a*c^3*f - a*b^3*j - b*c*(c^2*d + a*c*h - 3*a^2*j))*x^2)/(4*a*c^2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) - (b*c^3*(c*e + a*i) - a*b^4*k + 4*a^2*b^2*c*k - 2*a*c^2*(c^2*g + a^2*k) + (2*c^5*e + b^2*c^3*i - c^4*(b*g + 2*a*i) - b^5*k + 5*a*b^3*c*k - 5*a^2*b*c^2*k)*x^2)/(4*c^4*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)^2) + (x*(c*(a*b^3*f + 8*a^2*b*c*f + 4*a^2*(7*c^2*d + a*c*h - 9*a^2*j) + b^4*(3*d - (2*a^2*j)/c^2) - a*b^2*(25*c*d + 7*a*h - (11*a^2*j)/c)) + (a*b^2*c^2*f + 20*a^2*c^3*f + b^3*(3*c^2*d + a^2*j) - 4*a*b*c*(6*c^2*d + 3*a*c*h + 4*a^2*j))*x^2)/(8*a^2*c*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + (b^3*c^2*i + 2*b*c^3*(3*c*e + a*i) + 11*a*b^4*k - (b^6*k)/c + 32*a^3*c^2*k - 3*b^2*(c^3*g + 13*a^2*c*k) + 2*(6*c^5*e + b^2*c^3*i - c^4*(3*b*g - 2*a*i) + 2*b^5*k - 15*a*b^3*c*k + 25*a^2*b*c^2*k)*x^2)/c^3/(-4*a*c+b^2)^2/(c*x^4+b*x^2+a)^2$

$$5*k - 15*a*b^3*c*k + 25*a^2*b*c^2*k)*x^2)/(4*c^3*(b^2 - 4*a*c)^2*(a + b*x^2 + c*x^4)) + ((a*b^2*c*f + 20*a^2*c^2*f - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*j) + b^3*(3*c*d + (a^2*j)/c) + (a*b^3*c^2*f - 52*a^2*b*c^3*f - 6*a*b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*j) + b^4*(3*c^2*d - a^2*j) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2*j))/(c*Sqrt[b^2 - 4*a*c]))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b - Sqrt[b^2 - 4*a*c]])/(8*Sqrt[2]*a^2*Sqrt[c]*(b^2 - 4*a*c)^2*Sqrt[b - Sqrt[b^2 - 4*a*c]]) + ((a*b^2*c*f + 20*a^2*c^2*f - 4*a*b*(6*c^2*d + 3*a*c*h + 4*a^2*j) + b^3*(3*c*d + (a^2*j)/c) - (a*b^3*c^2*f - 52*a^2*b*c^3*f - 6*a*b^2*c*(5*c^2*d - 3*a*c*h - 3*a^2*j) + b^4*(3*c^2*d - a^2*j) + 8*a^2*c^2*(21*c^2*d + 3*a*c*h + 5*a^2*j))/(c*Sqrt[b^2 - 4*a*c]))*ArcTan[(Sqrt[2]*Sqrt[c]*x)/Sqrt[b + Sqrt[b^2 - 4*a*c]])/(8*Sqrt[2]*a^2*Sqrt[c]*(b^2 - 4*a*c)^2*Sqrt[b + Sqrt[b^2 - 4*a*c]]) - ((12*c^5*e + 2*b^2*c^3*i - c^4*(6*b*g - 4*a*i) - b^5*k + 10*a*b^3*c*k - 30*a^2*b*c^2*k)*ArcTanh[(b + 2*c*x^2)/Sqrt[b^2 - 4*a*c]])/(2*c^3*(b^2 - 4*a*c)^(5/2)) + (k*Log[a + b*x^2 + c*x^4])/(4*c^3)$$
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] := 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 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[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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3 + hx^4 + 59x^5 + jx^8 + kx^{11}}{(a + bx^2 + cx^4)^3} dx &= \int \frac{d + fx^2 + hx^4 + jx^8}{(a + bx^2 + cx^4)^3} dx + \int \frac{x(e + gx^2 + 59x^4 + kx^{10})}{(a + bx^2 + cx^4)^3} dx \\
&= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3f)}{4ac^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3f)}{4ac^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3f)}{4ac^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3f)}{4ac^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3f)}{4ac^2(b^2 - 4ac)(a + bx^2 + cx^4)} \\
&= -\frac{x \left(c^2 \left(abf - b^2 \left(d + \frac{a^2j}{c^2} \right) + 2a \left(cd - ah + \frac{a^2j}{c} \right) \right) + (2ac^3f)}{4ac^2(b^2 - 4ac)(a + bx^2 + cx^4)}
\end{aligned}$$

Mathematica [A] time = 7.35, size = 1649, normalized size = 1.40

$$\frac{-akx^2b^5 - a^2kb^4 - ac^2jx^3b^3 + 5a^2ckx^2b^3 + ac^3ix^2b^2 + 4a^3ckb^2 - c^4dx^2b^2 - a^2c^2jxb^2 - c^5dx^3b - ac^4hx^3b + 3a^2c^3jx^2b}{4ac^4(b^2 - 4ac)(a + bx^2 + cx^4)^3}$$

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 + 28*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

$$\begin{aligned}
& *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 * \text{Sqrt}[b^2 - 4 * a * c] * d - 24 * a * b * c^3 * \text{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 * \text{Sqrt}[b^2 - 4 * a * c] * f + 20 * a^2 * c^3 * \text{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 * \text{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 * \text{Sqrt}[b^2 - 4 * a * c] * j \\
& - 16 * a^3 * b * c * \text{Sqrt}[b^2 - 4 * a * c] * j) * \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 * c^{(3/2)} * (b^2 - 4 * a * c)^{(5/2)} * \text{Sqrt}[b - \text{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 * \text{Sqrt}[b^2 - 4 * a * c] * d - 24 * a * b * c^3 * \text{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 * \text{Sqrt}[b^2 - 4 * a * c] * f + 20 * a^2 * c^3 * \text{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 * \text{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 * \text{Sqrt}[b^2 - 4 * a * c] * j - 16 * a^3 * b * c * \text{Sqrt}[b^2 - 4 * a * c] * j) * \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 * c^{(3/2)} * (b^2 - 4 * a * c)^{(5/2)} * \text{Sqrt}[b + \text{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 * \text{Sqrt}[b^2 - 4 * a * c] * k - 8 * a * b^2 * c * \text{Sqrt}[b^2 - 4 * a * c] * k + 16 * a^2 * c^2 * \text{Sqrt}[b^2 - 4 * a * c] * k) * \text{Log}[-b + \text{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 * \text{Sqrt}[b^2 - 4 * a * c] * k - 8 * a * b^2 * c * \text{Sqrt}[b^2 - 4 * a * c] * k + 16 * a^2 * c^2 * \text{Sqrt}[b^2 - 4 * a * c] * k) * \text{Log}[b + \text{Sqrt}[b^2 - 4 * a * c] + 2 * c * x^2]) / (4 * c^3 * (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((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]
$$\frac{1}{8} \cdot (12a^4bc^3i - (12a^2b^2c^5h - 3(b^3c^5 - 8ab^2c^6)d - (ab^2c^5 + 20a^2c^6)f - (a^2b^3c^3 - 16a^3b^2c^4)j) \cdot x^7 + 4(6a^2c^6e - 3a^2b^2c^5g + (a^2b^2c^4 + 2a^3c^5)i + (2a^2b^5c - 15a^3b^3c^2 + 25a^4b^2c^3)k) \cdot x^6 + ((6b^4c^4 - 49a^2b^2c^5 + 28a^2c^6)d + 2(a^2b^3c^4 + 14a^2b^2c^5)f - (19a^2b^2c^4 - 4a^3c^5)h - (a^2b^4c^2 + 5a^3b^2c^3 + 36a^4c^4)j) \cdot x^5 + 2(18a^2b^2c^5e - 9a^2b^2c^4g + 3(a^2b^3c^3 + 2a^3b^2c^4)i + (3a^2b^6 - 19a^3b^4c + 11a^4b^2c^2 + 32a^5c^3)k) \cdot x^4 + ((3b^5c^3 - 20a^2b^3c^4 - 4a^2b^2c^5)d + (ab^4c^3 + 5a^2b^2c^4 + 36a^3c^5)f - (5a^2b^3c^3 + 16a^3b^2c^4)h - 2(a^3b^3c^2 + 14a^4b^2c^3)j) \cdot x^3 + 4(2(a^2b^2c^4 + 5a^3c^5)e - (a^2b^3c^3 + 5a^3b^2c^4)g + (5a^3b^2c^3 - 2a^4c^4)i + (3a^3b^5 - 22a^4b^3c + 31a^5b^2c^2)k) \cdot x^2 - 2(a^2b^3c^3 - 10a^3b^2c^4)e - 2(a^3b^2c^3 + 8a^4c^4)g + 6(a^4b^4 - 7a^5b^2c + 8a^6c^2)k + ((5a^2b^4c^3 - 37a^2b^2c^4 + 44a^3c^5)d - (a^2b^3c^3 - 16a^3b^2c^4)f - 3(a^3b^2c^3 + 4a^4c^4)h - (a^4b^2c^2 + 20a^5c^3)j) \cdot x) / (a^4b^4c^3 - 8a^5b^2c^4 + 16a^6c^5 + (a^2b^4c^5 - 8a^3b^2c^6 + 16a^4c^7) \cdot x^8 + 2(a^2b^5c^4 - 8a^3b^3c^5 + 16a^4b^2c^6) \cdot x^6 + (a^2b^6c^3 - 6a^3b^4c^4 + 32a^5c^6) \cdot x^4 + 2(a^3b^5c^3 - 8a^4b^3c^4 + 16a^5b^2c^5) \cdot x^2) + \frac{1}{8} \cdot \text{integrate}((8(a^2b^4 - 8a^3b^2c + 16a^4c^2) \cdot k \cdot x^3 - (12a^2b^2c^3h - 3(b^3c^3 - 8a^2b^2c^4)d - (ab^2c^3 + 20a^2c^4)f - (a^2b^3c - 16a^3b^2c^2)j) \cdot x^2 + 3(b^4c^2 - 9a^2b^2c^3 + 28a^2c^4)d + (ab^3c^2 - 16a^2b^2c^3)f + 3(a^2b^2c^2 + 4a^3c^3)h + (a^3b^2c + 20a^4c^2)j + 8(6a^2c^4e - 3a^2b^2c^3g + (a^2b^2c^2 + 2a^3c^3)i + (a^3b^3 - 7a^4b^2c)k) \cdot x) / (c \cdot x^4 + b \cdot x^2 + a), x) / (a^2b^4c^2 - 8a^3b^2c^3 + 16a^4c^4)$$

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] 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]
$$\begin{aligned} & ((x^7 \cdot (3b^3c^2d + 20a^2c^3f + a^2b^3j - 24ab^2c^3d - 16a^3b^2c^2j + ab^2c^2f - 12a^2b^2c^2h)) / (8a^2(b^4 + 16a^2c^2 - 8ab^2c)) - \\ & (b^3c^3e + 8a^2c^4g - 3a^2b^4k - 24a^4c^2k - 10ab^2c^4e + ab^2c^3g - 6a^2b^2c^3i + 21a^3b^2c^2k) / (4c^3(b^4 + 16a^2c^2 - 8ab^2c)) + \\ & (x^4 \cdot (3b^6k - 9b^2c^4g + 3b^3c^3i + 32a^3c^3k + 18b^2c^5e + 11a^2b^2c^2k + 6ab^2c^4i - 19a^2b^4c^2k)) / (4c^3(b^4 + 16a^2c^2 - 8ab^2c)) + \\ & (x^2 \cdot (2b^2c^4e - b^3c^3g - 2a^2c^4i + 10a^2c^5e + 3ab^5k - 5ab^2c^4g + 5ab^2c^3i - 22a^2b^3c^2k + 31a^3b^2c^2k)) / (2c^3(b^4 + 16a^2c^2 - 8ab^2c)) + \\ & (x^6 \cdot (6c^5e + 2b^5k + b^2c^3i - 3b^2c^4g + 2a^2c^4i - 15ab^3c^2k + 25a^2b^2c^2k)) / (2c^2(b^4 + 16a^2c^2 - 8ab^2c)) - \\ & (x^3 \cdot (2a^3b^3j - 36a^3c^3f - 3b^5c^2d - 5a^2b^2c^2f - ab^4c^2f + 28a^4b^2c^2j + 20ab^3c^2d + 4a^2b^2c^3d + 5a^2b^3c^2h + 16a^3b^2c^2h)) / (8a^2c(b^4 + 16a^2c^2 - 8ab^2c)) + \\ & (x^5 \cdot (28a^2c^4d + 6b^4c^2d + 4a^3c^3h - a^2b^4j - 36a^4c^2j - 19a^2b^2c^2h - 49ab^2c^3d + 2ab^3c^2f + 28a^2b^2c^3f - 5a^3b^2c^2j)) / (8a^2c(b^4 + 16a^2c^2 - 8ab^2c)) - \\ & (x \cdot (12a^3c^2h - 44a^2c^3d + a^3b^2j - 5b^4c^2d + 20a^4c^2j + ab^3c^2f + 37ab^2c^2d - 16a^2b^2c^2f + 3a^2b^2c^2h)) / (8a^2c(b^4 + 16a^2c^2 - 8ab^2c))) / (x^4 \cdot (2ac + b^2) + a^2 + c^2x^8 + 2abx^2 + 2b^2cx^6) + \text{symsum}(\log((10368ab^5c^{10}d^3 - 8000a^5c^{11}f^3 - 567b^7c^9d^3 + 169344a^3b^2c^{12}d^3 + 193536a^4c^{12}d^2e^2 - 141120a^4c^{12}d^2f + 1728a^6b^2c^9h^3 + 315b^8c^8d^2f + 6400a^9b^2c^6j^3 + 27648a^5c^{11}e^2h + 21504a^6c^{10}d^2i^2 - 135b^9c^7d^2h + 192a^2b^{14}d^2k^2 - 2880a^6c^8 \end{aligned}$$

$$\begin{aligned}
& 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 \\
& 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 \\
& - 549888*a^8*b*c^7*e*j*k - 119808*a^8*b*c^7*h*i*k - 183296*a^9*b*c^6*i*j*k \\
& - 6912*a^2*b^5*c^9*d*e*g + 62208*a^3*b^3*c^10*d*e*g + 2304*a^2*b^6*c^8*d*e* \\
& i - 270*a^2*b^6*c^8*d*f*h - 16128*a^3*b^4*c^9*d*e*i + 16056*a^3*b^4*c^9*d*f \\
& *h - 2304*a^3*b^4*c^9*e*f*g + 23040*a^4*b^2*c^10*d*e*i - 127008*a^4*b^2*c^1 \\
& 0*d*f*h + 36864*a^4*b^2*c^10*e*f*g - 1152*a^2*b^7*c^7*d*g*i - 48*a^2*b^8*c^ \\
& 6*d*f*j - 2304*a^2*b^9*c^5*d*e*k + 8064*a^3*b^5*c^8*d*g*i + 768*a^3*b^5*c^8 \\
& *e*f*i - 2226*a^3*b^6*c^7*d*f*j + 43776*a^3*b^7*c^6*d*e*k - 11520*a^4*b^3*c \\
& ^9*d*g*i - 10752*a^4*b^3*c^9*e*f*i - 6912*a^4*b^3*c^9*e*g*h + 33384*a^4*b^4 \\
& *c^8*d*f*j - 340992*a^4*b^5*c^7*d*e*k - 162528*a^5*b^2*c^9*d*f*j + 1241856* \\
& a^5*b^3*c^8*d*e*k - 72*a^2*b^9*c^5*d*h*j + 1152*a^2*b^10*c^4*d*g*k - 384*a^ \\
& 3*b^6*c^7*f*g*i + 2016*a^3*b^7*c^6*d*h*j - 21888*a^3*b^8*c^5*d*g*k - 768*a^ \\
& 3*b^8*c^5*e*f*k + 2304*a^4*b^4*c^8*e*h*i + 5376*a^4*b^4*c^8*f*g*i - 18648*a
\end{aligned}$$

$$\begin{aligned}
& ^4b^5c^7d^h*j + 170496a^4b^6c^6d^g*k + 19968a^4b^6c^6e^f*k + 138 \\
& 24a^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^3* \\
& d^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^8* \\
& e^i*j - 57504a^6b^2c^8f^h*j + 117504a^6b^3c^7d^i*k + 103680a^6b^3 \\
& *c^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 - 384 \\
& *a^4b^9c^3h^i*k - 384a^5b^7c^4h^i*k + 18048a^6b^5c^5h^i*k + 1344 \\
& 0a^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^ \\
& 10c^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^6 \\
& *z^4 - 171798691840a^{14}b^2c^{15}z^4 + 193273528320a^{13}b^4c^{14}z^4 - 12 \\
& 8849018880a^{12}b^6c^{13}z^4 - 16911433728a^{10}b^{10}c^{11}z^4 + 3523215360* \\
& a^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^1 \\
& 4b^2c^{12}kz^3 - 193273528320a^{13}b^4c^{11}kz^3 + 128849018880a^{12}b^6 \\
& *c^{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 - 687194 \\
& 76736a^{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 + 1509 \\
& 949440a^9b^3c^{13}e^gz^2 - 1401421824a^8b^5c^{12}d^h*z^2 - 1226833920* \\
& a^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^j \\
& *z^2 - 754974720a^8b^5c^{12}e^gz^2 - 570425344a^{11}b^5c^9i^kz^2 + 73 \\
& 2168192a^7b^6c^{12}d^fz^2 - 581959680a^{10}b^4c^{11}f^jz^2 - 603979776* \\
& a^{10}b^2c^{13}e^i*z^2 + 534773760a^{11}b^3c^{11}h^jz^2 - 558366720a^8b^9 \\
& *c^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 - 2 \\
& 64241152a^{10}b^7c^8i^kz^2 + 390463488a^7b^7c^{11}d^h*z^2 + 279183360* \\
& a^8b^{10}c^7g^kz^2 + 301989888a^{10}b^3c^{12}g^i*z^2 + 222822400a^9b^9* \\
& c^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 + 1887 \\
& 43680a^{10}b^2c^{13}f^h*z^2 - 185303040a^7b^9c^9d^jz^2 - 117964800a^1 \\
& 0b^5c^{10}h^jz^2 - 6039797760a^{12}b^c^{12}e^kz^2 - 67502080a^8b^{11}c^6 \\
& *i^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^i*z^2 + 1081344 \\
& 0a^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^i*z^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^1 \\
& 5c^5h^jz^2 - 61931520a^7b^8c^{10}f^h*z^2 + 23592960a^7b^9c^9g^i*z^ \\
& 2 + 17940480a^7b^{10}c^8f^jz^2 - 47185920a^7b^8c^{10}e^i*z^2 - 5898240 \\
& *a^6b^{13}c^6e^kz^2 - 3538944a^6b^{11}c^8g^i*z^2 - 1347584a^6b^{12}c^7 \\
& *f^jz^2 + 196608a^5b^{15}c^5e^kz^2 + 196608a^5b^{13}c^7g^i*z^2 + 3584 \\
& 0a^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^i*z^2
\end{aligned}$$

$$\begin{aligned}
& + 6144000a^6b^{10}c^9f^*h^*z^2 - 1677312a^5b^{13}c^7d^*j^*z^2 - 393216a^5 \\
& *b^{12}c^8e^*i^*z^2 + 61440a^5b^{12}c^8f^*h^*z^2 + 53760a^4b^{15}c^6d^*j^*z^2 \\
& - 46080a^4b^{14}c^7f^*h^*z^2 + 1536a^3b^{16}c^6f^*h^*z^2 - 23592960a^6b^9 \\
& c^{10}e^*g^*z^2 + 1179648a^5b^{11}c^9e^*g^*z^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^*f^*z^2 + 1428480a^3b^{14}c^8d^*f^*z^2 \\
& - 73728a^2b^{16}c^7d^*f^*z^2 + 4108320768a^{10}b^3c^{12}d^*j^*z^2 - 1207959 \\
& 552a^{10}b^c^{14}e^*g^*z^2 - 578813952a^{12}b^c^{12}h^*j^*z^2 + 3246391296a^{10}b^6 \\
& c^9g^*k^*z^2 - 402653184a^{11}b^c^{13}g^*i^*z^2 + 3019898880a^{12}b^2c^{11}g^* \\
& k^*z^2 - 440401920a^{10}b^c^{14}f^2z^2 - 188743680a^{11}b^c^{13}h^2z^2 + 17 \\
& 61607680a^{10}c^{15}d^*f^*z^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 + 58007224320a^{13}b^4c^8k^2z^2 + 149684 \\
& 22400a^{11}b^8c^6k^2z^2 + 805306368a^{11}c^{14}e^*i^*z^2 - 35966156800a^{12} \\
& b^6c^7k^2z^2 + 419430400a^{12}c^{13}f^*j^*z^2 - 1509949440a^9b^2c^{14}e^ \\
& ^2z^2 + 251658240a^{11}c^{14}f^*h^*z^2 - 56874762240a^{14}b^2c^9k^2z^2 - 54 \\
& 00428544a^7b^5c^{13}d^2z^2 + 890470400a^9b^{12}c^4k^2z^2 + 754974720a^8 \\
& b^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^8 \\
& b^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^9 \\
& b^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^6 \\
& b^{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 + 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^c^{11}j^2z^2 + 1207959552a^{10}c^{15}e^2z^2 + 134217728 \\
& a^{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^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^*b^{18}c^3d^*f^*k^*z - 9437184a^8b^c^{13}e^*f^*h^*z \\
& + 1536a^*b^{15}c^6d^*f^*i^*z - 4608a^*b^{14}c^7d^*f^*g^*z + 9216a^*b^{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 - 859963392a^7 \\
& b^6c^9d^*f^*k^*z - 780779520a^8b^7c^7d^*j^*k^*z - 754974720a^9b^3c^{10}e^*g^*k^*z \\
& + 2222456832a^{11}b^c^{10}d^*j^*k^*z - 454164480a^{11}b^3c^8h^*j^*k^*z + 377487360 \\
& a^8b^5c^9e^*g^*k^*z + 290979840a^{10}b^4c^8f^*j^*k^*z + 381026304a^6b^8c^8d^*f^*k^*z \\
& + 412876800a^8b^2c^{12}d^*e^*j^*z + 301989888a^{10}b^2c^{10}e^*i^*k^*z - 320421888 \\
& a^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 + 168990720 \\
& a^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^6 \\
& h^*j^*k^*z - 60817408a^{11}b^2c^9f^*j^*k^*z + 57835520a^8b^8c^6f^*j^*k^*z + 219414528 \\
& a^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
\end{aligned}$$

$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^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^3c^{11}d^{h}k^z - 3361603584a^{10}b^3c^9d^{j}k^z + 603979776a^{10}b^3c^{11}e^{g}k^z + 407371776a^{12}b^3c^9h^{j}k^z + 201326592a^{11}b^3c^{10}g^{i}k^z + 346816512a^7b^3c^{14}d^2g^z + 129761280a^{11}b^3c^{10}h^2k^z + 121896960a^{10}b^3c^{11}f^2k^z + 458752a^6b^{15}c^i k^2z + 19660800a^{11}b^3c^{10}g^j^2z + 49152a^5b^{16}c^g k^2z + 7077888a^9b^3c^{12}g^h^2z + 94464a^a b^{17}c^4d^2k^z - 19660800a^8b^3c^{13}f^2g^z - 66816a^a b^{14}c^7d^2i^z + 214272a^a b^{13}c^8d^2g^z - 428544a^a 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^3c^{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^3c^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^kz - 4781506560a^{11}b^3c^8e^kz - 398131200a^{12}b^3c^7j^2kz - 511377408a^6b^3c^{13}d^2gz - 377487360a^8b^4c^{10}e^2kz + 285212672a^{11}b^5c^6ik^2z + 199065600a^{11}b^5c^6j^2kz + 279183360a^8b^9c^5e^kz + 321159168a^5b^5c^{12}d^2gz + 188743680a^9b^4c^9g^2kz + 132120576a^{10}b^7c^5ik^2z - 150994944a^{10}b^2c^{10}g^2kz - 111411200a^9b^9c^4ik^2z - 126812160a^{10}b^3c^9h^2kz + 225312768a^7b^2c^{13}d^2iz - 139591680a^8b^{10}c^4g^kz - 49766400a^{10}b^7c^5j^2kz - 145463040a^4b^{11}c^7d^2kz - 94371840a^8b^6c^8g^2kz + 223395840a^4b^6c^{12}d^2ez + 33751040a^8b^{11}c^3ik^2z - 78970880a^9b^3c^{10}f^2kz + 94371840a^7b^6c^9e^2kz + 25165824a^{10}b^4c^8i^2kz + 6220800a^9b^9c^4j^2kz + 39223296a^9b^5c^8h^2kz - 311040a^8b^{11}c^3j^2kz + 16777216a^{11}b^2c^9i^2kz - 10485760a^9b^6c^7i^2kz - 5406720a^7b^{13}c^2ik^2z + 1376256a^7b^{10}c^5i^2kz - 1310720a^8b^8c^6i^2kz - 262144a^6b^{12}c^4i^2kz + 16384a^5b^{14}c^3i^2kz + 10354688a^{11}b^2c^9ij^2z + 23592960a^7b^8c^7g^2kz + 38559744a^7b^7c^8f^2kz + 19169280a^7b^{12}c^3g^kz - 2048000a^9b^6c^7ij^2z - 1520640a^7b^9c^6h^2kz - 1105920a^8b^7c^7h^2kz + 849920a^8b^8c^6ij^2z - 393216a^{10}b^4c^8ij^2z + 195840a^6b^{11}c^5h^2kz - 145920a^7b^{10}c^5ij^2z + 11520a^5b^{13}c^4h^2kz + 11008a^6b^{12}c^4ij^2z - 2304a^4b^{15}c^3h^2kz - 256a^5b^{14}c^3ij^2z - 25362432a^{10}b^3c^9gj^2z - 24739840a^8b^5c^9f^2kz - 38338560a^7b^{11}c^4ek^2z - 2949120a^6b^{10}c^6g^2kz - 1474560a^6b^{14}c^2g^kz + 50724864a^{10}b^2c^{10}ej^2z + 147456a^5b^{12}c^5g^2kz - 15150080a^6b^9c^7f^2kz + 13271040a^9b^5c^8gj^2z - 111697920a^4b^7c^{11}d^2gz - 3563520a^8b^7c^7gkj^2z + 3538944a^9b^2c^{11}h^2iz + 2912000a^5b^{11}c^6f^2kz - 737280a^7b^6c^9h^2iz + 506880a^7b^9c^6gj^2z - 291840a^4b^{13}c^5f^2kz + 276480a^6b^8c^8h^2iz - 41472a^5b^{10}c^7h^2iz - 34560a^6b^{11}c^5gj^2z + 14080a^3b^{15}c^4f^2kz + 2304a^4b^{12}c^6h^2iz + 768a^5b^{13}c^4gj^2z - 256a^2b^{17}c^3f^2kz - 11796480a^6b^8c^8e^2kz - 26542080a^9b^4c^9ej^2z + 19837440a^3b^{13}c^6d^2kz + 2949120a^6b^{13}c^3ek^2z + 589824a^5b^{10}c^7e^2kz - 98304a^5b^{15}c^2ek^2z - 10354688a^8b^2c^{12}f^2iz - 43646976a^6b^4c^{12}d^2iz - 8847360a^8b^3c^{11}gh^2z + 7127040a^8b^6c^8ej^2z + 4423680a^7b^5c^{10}gh^2z + 2048000a^6b^6c^{10}f^2iz - 1771776a^2b^{15}c^5d^2kz - 1105920a^6b^7c^9gh^2z - 1013760a^7b^8c^7ej^2z - 849920a^5b^8c^9f^2iz + 393216a^7b^4c^{11}f^2iz + 145920a^4b^{10}c^8f^2iz + 138240a^5b^9c^8gh^2z + 69120a^6b^{10}c^6ej^2z - 11008a^3b^{12}c^7f^2iz - 6912a^4b^{11}c^7gh^2z - 1536a^5b^{12}c^5ej^2z + 256a^2b^{14}c^6f^2iz - 32587776a^5b^6c^{11}d^2iz + 25362432a^7b^3c^{12}f^2gz + 21657600a^4b^8c^{10}d^2iz + 17694720a^8b^2c^{12}eh^2z - 50724864a^7b^2c^{13}ef^2z - 13271040a^6b^5c^{11}f^2gz - 8847360a^7b^4c^{11}eh^2z - 5810688a^3b^{10}c^9d^2iz + 3563520a^5b^7c^{10}f^2gz + 2211840a^6b^6c^{10}eh^2z + 845568a^2b^{12}c^8d^2iz - 506880a^4b^9c^9f^2gz - 276480a^5b^8c^9eh^2z + 34560a^3b^{11}c^8f^2gz + 13824a^4b^{10}c^8eh^2z - 768a^2b^{13}c^7f^2gz + 26542080a^6b^4c^{12}ef^2z + 23362560a^3b^9c^{10}d^2gz - 46725120a^3b^8c^{11}d^2ez - 7127040a^5b^6c^{11}ef^2z - 2965248a^2b^{11}c^9d^2gz + 1013760a^4b^8c^{10}ef^2z - 69120a^3b^{10}c^9ef^2z + 1536a^2b^{12}c^8ef^2z + 5930496a^2b^{10}c^{10}d^2ez + 1006632960a^{13}b^c^8ik^2z + 3246391296a^{10}b^5c^7ek^2z + 318504960a^{13}b^c^8j^2kz + 61538304a^{10}b^{10}c^2k^3z - 603979776a^{10}c^{12}e^2kz - 693633024a^7c^{15}d^2ez - 231211008a^8c^{14}d^2iz - 67108864a^{12}c^{10}i^2kz - 13107200a^{12}c^{10}ij^2z - 16384a^5b^{17}ik^2z - 39321600a^{11}c^{11}ej^2z - 4718592a^{10}c^{12}h^2iz - 2304b^{19}c^3d^2kz + 13107200a^9c^{13}f^2iz + 2304b^{16}c^6d^2iz - 14155776a^9c^{13}eh^2z + 39321600a^8c^{14}ef^2z - 4833280a^9b^{12}ck^3z - 6912b^{15}c^7d^2gz + 6962544640a^{14}b^2c^6k^3z + 13824b^{14}c^8d^2ez + 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^8c^8f^i j^k - 5898240a^{10}b^8c^8g^h j^k - 41287680a^9b^8c^9d^g j^k + 4472832a^9b^8c^9f^h i^k + 18432000a^9b^8c^9e^f j^k + 3391488a^8b^8c^{10}e^h i^j + 1228800a^8b^8c^{10}f^g i^j - 24772608a^8b^8c^{10}d^g h^k + 13418496a^8b^8c^{10}e^f h^k + 1649024a^8b^8c^{10}d^f i^k + 737280a^7b^8c^{11}f^g h^i - 768a^7b^{15}c^3d^f i^k - 19307520a^7b^8c^{11}d^f h^j + 16367616a^7b^8c^{11}d^e i^j + 3686400a^7b^8c^{11}e^f g^j + 34947072a^7b^8c^{11}d^e f^k + 2304a^7b^{14}c^4d^f g^k - 180a^7b^{13}c^5d^f h^j + 11059200a^6b^8c^{12}d^e h^i + 5160960a^6b^8c^{12}d^f g^i + 2211840a^6b^8c^{12}e^f g^h - 4608a^6b^{13}c^5d^e f^k - 2304a^6b^{11}c^7d^f g^i + 4608a^6b^{10}c^8d^e f^i + 15482880a^5b^8c^{13}d^e f^g - 13824a^6b^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 + 1045552a^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 - 3633408a^6b^8c^5d^i j^k + 2211840a^8b^4c^7d^i j^k + 68898816a^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^{10}c^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^{10}c^4f^g j^k - 26880a^4b^{12}c^3d^i j^k + 13824a^4b^{11}c^4f^h i^k + 11520a^5b^8c^6g^h i^j - 768a^3b^{13}c^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^{11}c^4d^g j^k - 53760a^5b^9c^5e^f j^k - 53760a^5b^7c^7f^g i^j - 46080a^4b^{10}c^5f^g h^k - 34560a^5b^8c^6f^g h^k + 25344a^3b^{12}c^4d^h i^k - 23040a^5b^7c^7e^h i^j + 13824a^4b^{10}c^5d^h i^k + 2304a^3b^{12}c^4f^g h^k - 2304a^2b^{14}c^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^{10}d^g i^j - 6718464a^6b^5c^8d^f i^k - 5087232a^7b^2c^{10}e^g h^j - 5013504a^7b^2c^{10}e^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^{10}f^g h^i - 1677312a^6b^4c^9e^f i^j - 1658880a^6b^4c^9e^g h^j + 68345856a^6b^3c^{10}d^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^{11}c^5d^f i^k - 161280a^4b^{10}c^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^{11}c^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^{13}c^4d^f i^k + 18432a^4b^7c^8f^g h^i + 6912a^2b^{13}c^4d^g h^k - 4608a^3b^{11}c^5e^f h^k - 2304a^3b^9c^7f^g h^i + 27164160a^5b^6c^8d^f g^k - 22164480a^6b^3c^{10}d^f h^j - 54328320a^5b^5c^9d^e f^k - 17473536a^7b^2c^{10}d^f g^k - 8225280a^5b^6c^8d^e h^k - 8087040a^4b^8c^7d^f g^k + 5677056a^6b^3c^{10}e^f g^j - 5529600a^6b^2c^{11}d^g h^i + 4571136a^6b^3c^{10}d^e i^j - 3686400a^6b^2c^{11}e^f h^i + 2805120a^5b^5c^9d^f h^j - 2211840a^5b$

$$\begin{aligned}
& ^4c^{10}d^*g^*h^*i - 1566720*a^5b^4c^{10}e^*f^*h^*i - 1483776*a^5b^5c^9d^*e^*i^* \\
& j + 1198080*a^3b^{10}c^6d^*f^*g^*k + 437184*a^4b^7c^8d^*f^*h^*j - 322560*a^5b^5c^9e^*f^*g^*j + 317952*a^4b^6c^9d^*g^*h^*i - 276480*a^4b^8c^7d^*e^*h^*k + \\
& 179712*a^3b^{10}c^6d^*e^*h^*k + 161280*a^4b^7c^8d^*e^*i^*j - 146268*a^3b^9c^7d^*f^*h^*j - 87552*a^2b^{12}c^5d^*f^*g^*k - 36864*a^4b^6c^9e^*f^*h^*i - 1382 \\
& 4*a^2b^{12}c^5d^*e^*h^*k + 9360*a^2b^{11}c^6d^*f^*h^*j + 6912*a^3b^8c^8d^*g^*h^* \\
& *i - 6912*a^2b^{10}c^7d^*g^*h^*i + 4608*a^3b^8c^8e^*f^*h^*i - 24551424*a^6b^2c^{11}d^*e^*g^*j + 16174080*a^4b^7c^8d^*e^*f^*k + 5419008*a^5b^4c^{10}d^*e^*g^* \\
& j + 5160960*a^5b^3c^{11}d^*f^*g^*i + 4423680*a^5b^3c^{11}e^*f^*g^*h + 4423680*a^5b^3c^{11}d^*e^*h^*i - 2396160*a^3b^9c^7d^*e^*f^*k - 635904*a^4b^5c^{10}d^*e^* \\
& *h^*i - 483840*a^4b^6c^9d^*e^*g^*j - 354816*a^3b^7c^9d^*f^*g^*i + 322560*a^4b^5c^{10}d^*f^*g^*i + 175104*a^2b^{11}c^6d^*e^*f^*k + 138240*a^4b^5c^{10}e^*f^*g^* \\
& *h + 59904*a^2b^9c^8d^*f^*g^*i - 13824*a^3b^7c^9e^*f^*g^*h - 13824*a^3b^7c^9d^*e^*h^*i + 13824*a^2b^9c^8d^*e^*h^*i - 16588800*a^5b^2c^{12}d^*e^*g^*h - 1 \\
& 0321920*a^5b^2c^{12}d^*e^*f^*i + 1658880*a^4b^4c^{11}d^*e^*g^*h + 709632*a^3b^6c^{10}d^*e^*f^*i - 645120*a^4b^4c^{11}d^*e^*f^*i + 124416*a^3b^6c^{10}d^*e^*g^*h \\
& - 119808*a^2b^8c^9d^*e^*f^*i - 41472*a^2b^8c^9d^*e^*g^*h + 7741440*a^4b^3c^{12}d^*e^*f^*g - 2903040*a^3b^5c^{11}d^*e^*f^*g + 387072*a^2b^7c^{10}d^*e^*f^*g - \\
& 381026304*a^{11}b^*c^7d^*j^*k^2 - 241827840*a^{10}b^*c^8d^*h^*k^2 - 65667072*a^{12}b^*c^6h^*j^*k^2 - 169344*a^7b^{11}c^*h^*j^*k^2 - 25165824*a^{11}b^*c^7g^*i^*k^2 - \\
& 4915200*a^{11}b^*c^7g^*j^2*k - 53084160*a^8b^*c^{10}e^2*i^*k - 75497472*a^{10}b^*c^8e^*g^*k^2 - 86704128*a^7b^*c^{11}d^2*g^*k + 565248*a^9b^*c^9h^*i^2*j - 168 \\
& 448*a^6b^{12}c^*f^*j^*k^2 - 24576*a^5b^{13}c^*g^*i^*k^2 - 1769472*a^9b^*c^9g^*h^2*k - 17694720*a^9b^*c^9e^*i^2*k - 411264*a^5b^{13}c^*d^*j^*k^2 - 11520*a^4b^{14}c^*f^*h^*k^2 + 4915200*a^8b^*c^{10}f^2*g^*k + 2580480*a^9b^*c^9e^*i^*j^2 - 2496 \\
& 000*a^9b^*c^9f^*h^*j^2 - 1543680*a^8b^*c^{10}f^*h^2*j + 33408*a^*b^{14}c^4d^2*i^*k - 59512320*a^6b^*c^{12}d^2*f^*j + 5087232*a^7b^*c^{11}e^2*h^*j + 2727936*a^8b^*c^{10}d^*i^2*j - 26496*a^3b^{15}c^*d^*h^*k^2 + 1105920*a^7b^*c^{11}e^*h^2*i - 1 \\
& 07136*a^*b^{13}c^5d^2*g^*k + 10260*a^*b^{12}c^6d^2*h^*j - 10616832*a^6b^*c^{12}e^2*g^*i - 3538944*a^7b^*c^{11}e^*g^*i^2 + 1843200*a^7b^*c^{11}d^*h^*i^2 - 18432*a^2b^{16}c^*d^*f^*k^2 - 15552000*a^8b^*c^{10}d^*f^*j^2 + 24551424*a^6b^*c^{12}d^*e^2*j \\
& j - 37062144*a^5b^*c^{13}d^2*f^*h + 2580480*a^6b^*c^{12}e^*f^2*i + 214272*a^*b^{12}c^6d^2*e^*k + 65664*a^*b^{10}c^8d^2*g^*i - 25074*a^*b^{11}c^7d^2*f^*j + 420*a^*b^{12}c^6d^*f^2*j + 6*a^*b^{15}c^3d^*f^*j^2 + 23224320*a^5b^*c^{13}d^2*e^*i + 38 \\
& 4*a^*b^{12}c^6d^*f^*i^2 - 5985792*a^6b^*c^{12}d^*f^*h^2 + 206010*a^*b^9c^9d^2*f^*h - 131328*a^*b^9c^9d^2*e^*i - 6300*a^*b^{10}c^8d^*f^2*h + 1350*a^*b^{11}c^7d^*f^*h^2 + 16588800*a^5b^*c^{13}d^*e^2*h + 3456*a^*b^{10}c^8d^*f^*g^2 + 435456*a^*b^8c^{10}d^2*e^*g + 13824*a^*b^8c^{10}d^*e^2*f + 3932160*a^{11}c^8h^*i^*j^*k + 2752 \\
& 5120*a^{10}c^9d^*i^*j^*k + 82575360*a^9c^{10}d^*e^*j^*k + 11796480*a^{10}c^9e^*h^*j^*k + 16515072*a^9c^{10}d^*h^*i^*k + 49545216*a^8c^{11}d^*e^*h^*k - 2457600*a^8c^{11}e^*f^*i^*j - 1474560*a^7c^{12}e^*f^*h^*i - 10321920*a^6c^{13}d^*e^*f^*i + 7370772 \\
& 48*a^{10}b^3c^6d^*j^*k^2 - 518814720*a^9b^5c^5d^*j^*k^2 + 441354240*a^9b^3c^7d^*h^*k^2 - 429871104*a^6b^2c^{11}d^2*e^*k - 272212992*a^8b^5c^6d^*h^*k^2 + 305731584*a^5b^4c^{10}d^2*e^*k + 192412800*a^8b^7c^4d^*j^*k^2 + 11191 \\
& 2960*a^{11}b^3c^5h^*j^*k^2 + 214935552*a^6b^3c^{10}d^2*g^*k + 202427136*a^7b^6c^6d^*f^*k^2 - 49904640*a^{10}b^5c^4h^*j^*k^2 - 178513920*a^8b^4c^7d^*f^*k^2 - 152865792*a^5b^5c^9d^2*g^*k - 114388992*a^7b^2c^{10}d^2*i^*k + 949 \\
& 61664*a^{10}b^2c^7e^*i^*k^2 - 9039872*a^{11}b^2c^6i^*j^2*k - 56494080*a^{10}b^4c^5f^*j^*k^2 - 2052096*a^{10}b^4c^5i^*j^2*k + 1327360*a^9b^6c^4i^*j^2*k - 158080*a^8b^8c^3i^*j^2*k - 47480832*a^{10}b^3c^6g^*i^*k^2 + 45576960*a^9b^6c^4f^*j^*k^2 + 7954560*a^9b^7c^3h^*j^*k^2 - 104693760*a^9b^3c^7e^*g^*k^2 + 142080*a^8b^9c^2h^*j^*k^2 + 16017408*a^{10}b^3c^6g^*j^2*k - 4930560*a^9b^5c^5g^*j^2*k - 3649536*a^9b^2c^8h^2*i^*k - 1843200*a^8b^4c^7h^2*i^*k + 85524480*a^8b^5c^6e^*g^*k^2 + 474240*a^8b^7c^4g^*j^2*k + 288000*a^7b^6c^6h^2*i^*k + 63360*a^6b^8c^5h^2*i^*k - 8064*a^5b^{10}c^4h^2*i^*k - 1152*a^4b^{12}c^3h^2*i^*k - 15437824*a^{11}b^2c^6f^*j^*k^2 - 32034816*a^{10}b^2c^7e^*j^2*k - 14369280*a^8b^8c^3f^*j^*k^2 - 13271040*a^8b^3c^8g^2*i^*k + 80267904*a^7b^7c^5d^*h^*k^2 + 79626240*a^7b^2c^{10}e^2*g^*k + 11059200*a^9b^5c^5g^*i^*k^2 + 8847360*a^9b^2c^8g^*i^2*k - 42113280*a^7b^9c^
\end{aligned}$$

$3*d*j*k^2 + 6389760*a^8*b^7*c^4*g*i*k^2 + 5898240*a^8*b^4*c^7*g*i^2*k - 376$
 $01280*a^9*b^4*c^6*f*h*k^2 - 2949120*a^7*b^9*c^3*g*i*k^2 + 2242560*a^7*b^10*$
 $c^2*f*j*k^2 - 2211840*a^7*b^5*c^7*g^2*i*k + 1769472*a^6*b^7*c^6*g^2*i*k + 7$
 $49568*a^8*b^3*c^8*h*i^2*j - 442368*a^7*b^6*c^6*g*i^2*k + 442368*a^6*b^11*c^$
 $2*g*i*k^2 - 442368*a^6*b^8*c^5*g*i^2*k + 317952*a^7*b^5*c^7*h*i^2*j - 22118$
 $4*a^5*b^9*c^5*g^2*i*k + 73728*a^5*b^10*c^4*g*i^2*k + 38400*a^6*b^7*c^6*h*i^$
 $2*j - 1920*a^5*b^9*c^5*h*i^2*j + 9861120*a^9*b^4*c^6*e*j^2*k - 110280960*a^$
 $4*b^6*c^9*d^2*e*k - 93330432*a^6*b^8*c^5*d*f*k^2 + 24645888*a^8*b^6*c^5*f*h$
 $*k^2 + 6359040*a^8*b^3*c^8*g*h^2*k - 22118400*a^9*b^4*c^6*e*i*k^2 - 3862528$
 $*a^8*b^2*c^9*f^2*i*k - 2248704*a^7*b^4*c^8*f^2*i*k - 1290240*a^9*b^2*c^8*g*$
 $i*j^2 - 948480*a^8*b^6*c^5*e*j^2*k - 860160*a^8*b^4*c^7*g*i*j^2 - 414720*a^$
 $7*b^5*c^7*g*h^2*k + 303360*a^6*b^6*c^7*f^2*i*k + 266880*a^5*b^8*c^6*f^2*i*k$
 $- 224640*a^6*b^7*c^6*g*h^2*k - 80640*a^7*b^6*c^6*g*i*j^2 - 72960*a^4*b^10*$
 $c^5*f^2*i*k + 17280*a^5*b^9*c^5*g*h^2*k + 12672*a^6*b^8*c^5*g*i*j^2 + 5504*$
 $a^3*b^12*c^4*f^2*i*k + 3456*a^4*b^11*c^4*g*h^2*k - 384*a^5*b^10*c^4*g*i*j^2$
 $- 128*a^2*b^14*c^3*f^2*i*k + 30265344*a^6*b^4*c^9*d^2*i*k - 12779520*a^8*b$
 $^6*c^5*e*i*k^2 - 11796480*a^8*b^3*c^8*e*i^2*k - 8847360*a^7*b^3*c^9*e^2*i*k$
 $- 7925760*a^10*b^2*c^7*f*h*k^2 + 7077888*a^6*b^5*c^8*e^2*i*k - 39813120*a^$
 $7*b^3*c^9*e*g^2*k - 73175040*a^9*b^2*c^8*d*f*k^2 + 5898240*a^7*b^8*c^4*e*i*$
 $k^2 + 5542272*a^6*b^11*c^2*d*j*k^2 - 5420160*a^7*b^8*c^4*f*h*k^2 + 55140480$
 $*a^4*b^7*c^8*d^2*g*k + 1271808*a^7*b^3*c^9*g^2*h*j - 1040384*a^8*b^2*c^9*f*$
 $i^2*j + 884736*a^7*b^5*c^7*e*i^2*k - 884736*a^6*b^10*c^3*e*i*k^2 + 884736*a$
 $^6*b^7*c^6*e*i^2*k - 884736*a^5*b^7*c^7*e^2*i*k - 697344*a^7*b^4*c^8*f*i^2*$
 $j + 414720*a^6*b^5*c^8*g^2*h*j + 226560*a^6*b^10*c^3*f*h*k^2 - 147456*a^5*b$
 $^9*c^5*e*i^2*k - 121856*a^6*b^6*c^7*f*i^2*j + 82560*a^5*b^12*c^2*f*h*k^2 +$
 $49152*a^5*b^12*c^2*e*i*k^2 - 17280*a^5*b^7*c^7*g^2*h*j + 8960*a^5*b^8*c^6*f$
 $*i^2*j + 14194944*a^5*b^6*c^8*d^2*i*k - 12718080*a^8*b^2*c^9*e*h^2*k - 1061$
 $5680*a^4*b^8*c^7*d^2*i*k - 26542080*a^6*b^4*c^9*e^2*g*k - 23592960*a^7*b^7*$
 $c^5*e*g*k^2 - 5142528*a^8*b^3*c^8*f*h*j^2 + 5068800*a^7*b^2*c^10*f^2*h*j -$
 $3755520*a^7*b^3*c^9*f*h^2*j + 3336192*a^7*b^3*c^9*f^2*g*k + 3000960*a^6*b^4$
 $*c^9*f^2*h*j + 2893824*a^3*b^10*c^6*d^2*i*k + 1720320*a^8*b^3*c^8*e*i*j^2 +$
 $1704960*a^6*b^5*c^8*f^2*g*k - 1307520*a^5*b^7*c^7*f^2*g*k - 1085760*a^6*b^$
 $5*c^8*f*h^2*j - 959040*a^7*b^5*c^7*f*h*j^2 + 829440*a^7*b^4*c^8*e*h^2*k - 5$
 $52960*a^7*b^2*c^10*g*h^2*i - 552960*a^6*b^4*c^9*g*h^2*i + 449280*a^6*b^6*c^$
 $7*e*h^2*k - 422784*a^2*b^12*c^5*d^2*i*k + 253440*a^4*b^9*c^6*f^2*g*k + 1612$
 $80*a^7*b^5*c^7*e*i*j^2 - 145152*a^5*b^6*c^8*g*h^2*i + 103200*a^6*b^7*c^6*f*$
 $h*j^2 + 41280*a^5*b^6*c^8*f^2*h*j - 37188*a^4*b^8*c^7*f^2*h*j - 34560*a^5*b$
 $^8*c^6*e*h^2*k - 25344*a^6*b^7*c^6*e*i*j^2 - 17280*a^3*b^11*c^5*f^2*g*k + 1$
 $3536*a^5*b^7*c^7*f*h^2*j - 6912*a^4*b^10*c^5*e*h^2*k + 5490*a^4*b^9*c^6*f*h$
 $^2*j - 3456*a^4*b^8*c^7*g*h^2*i + 1980*a^3*b^10*c^6*f^2*h*j + 810*a^5*b^9*c$
 $^5*f*h*j^2 + 768*a^5*b^9*c^5*e*i*j^2 + 384*a^2*b^13*c^4*f^2*g*k - 270*a^4*b$
 $^11*c^4*f*h*j^2 - 180*a^3*b^11*c^5*f*h^2*j - 30*a^2*b^12*c^5*f^2*h*j + 6*a^$
 $3*b^13*c^3*f*h*j^2 + 30067200*a^6*b^2*c^11*d^2*h*j + 13271040*a^6*b^5*c^8*e$
 $*g^2*k - 10857600*a^6*b^9*c^4*d*h*k^2 + 2949120*a^6*b^9*c^4*e*g*k^2 + 26542$
 $08*a^5*b^6*c^8*e^2*g*k + 2125824*a^7*b^3*c^9*d*i^2*j + 1658880*a^6*b^3*c^10$
 $*e^2*h*j - 1419264*a^6*b^4*c^9*f*g^2*j - 1327104*a^5*b^7*c^7*e*g^2*k - 9216$
 $00*a^7*b^2*c^10*f*g^2*j - 737280*a^7*b^2*c^10*f*h*i^2 - 568320*a^6*b^4*c^9*$
 $f*h*i^2 + 207360*a^4*b^13*c^2*d*h*k^2 - 147456*a^5*b^11*c^3*e*g*k^2 - 13670$
 $4*a^5*b^6*c^8*f*h*i^2 + 133632*a^6*b^5*c^8*d*i^2*j - 96768*a^5*b^7*c^7*d*i^$
 $2*j + 80640*a^5*b^6*c^8*f*g^2*j - 69120*a^5*b^5*c^9*e^2*h*j + 13440*a^4*b^9$
 $*c^6*d*i^2*j - 5760*a^5*b^11*c^3*d*h*k^2 - 2304*a^4*b^8*c^7*f*h*i^2 + 384*a$
 $^3*b^10*c^6*f*h*i^2 + 11930112*a^8*b^2*c^9*d*h*j^2 - 11646720*a^3*b^9*c^7*d$
 $^2*g*k + 8432640*a^7*b^2*c^10*d*h^2*j + 24140160*a^5*b^10*c^4*d*f*k^2 - 667$
 $2384*a^7*b^2*c^10*e*f^2*k + 4450176*a^7*b^4*c^8*d*h*j^2 + 4337280*a^6*b^4*c$
 $^9*d*h^2*j - 3870720*a^8*b^2*c^9*e*g*j^2 - 3409920*a^6*b^4*c^9*e*f^2*k - 28$
 $85760*a^5*b^4*c^10*d^2*h*j - 2844288*a^4*b^6*c^9*d^2*h*j + 2615040*a^5*b^6*$
 $c^8*e*f^2*k - 1687680*a^6*b^6*c^7*d*h*j^2 + 1482624*a^2*b^11*c^6*d^2*g*k -$
 $1290240*a^6*b^2*c^11*f^2*g*i + 1105920*a^6*b^3*c^10*e*h^2*i + 1019412*a^3*b$
 $^8*c^8*d^2*h*j - 1007424*a^5*b^6*c^8*d*h^2*j - 860160*a^5*b^4*c^10*f^2*g*i$

$$\begin{aligned}
& - 645120a^7b^4c^8e*g*j^2 - 506880a^4b^8c^7e*f^2*k + 290304a^5b^5c^9e*h^2*i + 197460a^5b^8c^6d*h*j^2 - 143802a^2b^10c^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^10c^6e*f^2*k + 12672a^3b^8c^8f^2*g*i + 10800a^3b^10c^6d*h^2*j + 6912a^4b^7c^8e*h^2*i - 2304a^5b^8c^6e*g*j^2 - 768a^2b^12c^5e*f^2*k - 684a^3b^12c^4d*h*j^2 - 540a^2b^12c^5d*h^2*j - 384a^2b^10c^7f^2*g*i - 90a^4b^10c^5d*h*j^2 + 18a^2b^14c^3d*h*j^2 + 23385600a^6b^2c^11d*f^2*j + 23293440a^3b^8c^8d^2*e*k + 6137856a^6b^3c^10d*g^2*j - 5677056a^6b^2c^11e^2*f*j + 5308416a^6b^2c^11e*g^2*i - 5308416a^5b^3c^11e^2*g*i - 3786240a^4b^12c^3d*f*k^2 - 3538944a^6b^3c^10e*g*i^2 + 2654208a^5b^4c^10e*g^2*i + 1658880a^6b^3c^10d*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^11f*g^2*h + 357120a^3b^14c^2d*f*k^2 + 322560a^5b^4c^10e^2*f*j + 262656a^5b^5c^9d*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^11c^6d*h*i^2 - 13149696a^7b^3c^9d*f*j^2 - 11612160a^5b^2c^12d^2*g*i + 10906560a^4b^5c^10d^2*f*j - 7418880a^5b^3c^11d^2*f*j + 3148992a^6b^5c^8d*f*j^2 - 2985696a^3b^7c^9d^2*f*j - 2965248a^2b^10c^7d^2*e*k + 1720320a^5b^3c^11e*f^2*i - 1658880a^6b^2c^11e*g*h^2 + 1596672a^3b^6c^10d^2*g*i - 1505280a^4b^6c^9d*f^2*j - 829440a^5b^4c^10e*g*h^2 - 508032a^2b^8c^9d^2*g*i + 378954a^2b^9c^8d^2*f*j + 362880a^5b^4c^10d*f^2*j + 296964a^3b^8c^8d*f^2*j + 161280a^4b^5c^10e*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^10c^7d*f^2*j + 8820a^3b^11c^5d*f*j^2 + 768a^2b^9c^8e*f^2*i - 378a^2b^13c^4d*f*j^2 - 5419008a^5b^3c^11d*e^2*j - 4423680a^5b^2c^12e^2*f*h + 4147200a^5b^3c^11d*g^2*h - 2580480a^6b^2c^11d*f*i^2 - 967680a^5b^4c^10d*f*i^2 + 483840a^4b^5c^10d*e^2*j - 414720a^4b^5c^10d*g^2*h - 138240a^4b^4c^11e^2*f*h + 64512a^4b^6c^9d*f*i^2 + 39168a^3b^8c^8d*f*i^2 - 31104a^3b^7c^9d*g^2*h + 13824a^3b^6c^10e^2*f*h + 10368a^2b^9c^8d*g^2*h - 9216a^2b^10c^7d*f*i^2 + 15630336a^5b^2c^12d*f^2*h - 14459904a^4b^3c^12d^2*f*h + 9630144a^3b^5c^11d^2*f*h - 8764416a^5b^3c^11d*f*h^2 - 3870720a^5b^2c^12e*f^2*g - 3193344a^3b^5c^11d^2*e*i + 2867328a^4b^4c^11d*f^2*h - 2095200a^2b^7c^10d^2*f*h - 1414080a^3b^6c^10d*f^2*h - 34836480a^4b^2c^13d^2*e*g + 1016064a^2b^7c^10d^2*e*i - 645120a^4b^4c^11e*f^2*g + 306720a^3b^7c^9d*f*h^2 + 197820a^2b^8c^9d*f^2*h + 146880a^4b^5c^10d*f*h^2 + 80640a^3b^6c^10e*f^2*g - 55350a^2b^9c^8d*f*h^2 - 2304a^2b^8c^9e*f^2*g - 3870720a^5b^2c^12d*f*g^2 - 1935360a^4b^4c^11d*f*g^2 - 1658880a^4b^3c^12d*e^2*h + 725760a^3b^6c^10d*f*g^2 + 17418240a^3b^4c^12d^2*e*g - 124416a^3b^5c^11d*e^2*h - 96768a^2b^8c^9d*f*g^2 + 41472a^2b^7c^10d*e^2*h - 3919104a^2b^6c^11d^2*e*g - 7741440a^4b^2c^13d*e^2*f + 2903040a^3b^4c^12d*e^2*f - 387072a^2b^6c^11d*e^2*f - 681246720a^9b*c^9d^2*k^2 + 265912320a^11b^3c^5e*k^3 + 188743680a^12b^2c^5g*k^3 - 132956160a^11b^4c^4g*k^3 - 52101120a^13b*c^5j^2*k^2 + 25722880a^12b^3c^4i*k^3 + 19644416a^11b^5c^3i*k^3 - 1583680a^9b^9c*j^2*k^2 - 9142272a^10b^7c^2i*k^3 - 74022912a^10b^5c^4e*k^3 - 20643840a^11b*c^7h^2*k^2 + 37011456a^10b^6c^3g*k^3 - 2293760a^9b^3c^7i^3*k - 557056a^8b^5c^6i^3*k + 147456a^7b^7c^5i^3*k - 65536a^6b^12c*i^2*k^2 + 32768a^6b^9c^4i^3*k - 8192a^5b^11c^3i^3*k + 430080a^10b*c^8i^2*j^2 - 2880a^5b^13c*h^2*k^2 + 6635520a^7b^4c^8g^3*k - 4792320a^9b^8c^2g*k^3 - 2211840a^6b^6c^7g^3*k + 1359360a^10b^2c^7h*j^3 + 1173120a^9b^4c^6h*j^3 + 743040a^7b^4c^8h^3*j + 622080a^8b^2c^9h^3*j + 221184a^5b^8c^6g^3*k + 107136a^6b^6c^7h^3*j - 32640a^8b^6c^5h*j^3 - 5796a^7b^8c^4h*j^3 + 540a^5b^8c^6h^3*j - 270a^4b^10c^5h^3*j + 210a^6b^10c^3h*j^3 - 2949120a^10b*c^8f^2*k^2 + 17694720a^6b^3c^10e^3*k + 184320a^8b*c^10h^2*i^2 - 3520a^3b^15c*f^2*k^2 + 9584640a^9b^7c^3e*k^3 - 2293760a^9b^3c^7f*j^3 - 2293760a^6b^3c^10f^3*
\end{aligned}$$

$j - 1769472a^5b^5c^9e^3k - 884736a^6b^3c^{10}g^3i - 589824a^7b^3c^9g^3i^3 - 491520a^8b^9c^2e^k^3 - 442368a^5b^5c^9g^3i - 294912a^6b^5c^8g^3i^3 - 199360a^8b^5c^6f^j^3 - 199360a^5b^5c^9f^3j + 61920a^7b^7c^5f^j^3 + 61920a^4b^7c^8f^3j - 49152a^5b^7c^7g^3i^3 - 3682a^6b^9c^4f^j^3 - 3682a^3b^9c^7f^3j + 70a^5b^{11}c^3f^j^3 + 70a^2b^{11}c^6f^3j + 3870720a^8b^c^{10}e^2j^2 + 430080a^7b^c^{11}f^2i^2 - 14152320a^4b^4c^{11}d^3j + 10644480a^5b^2c^{12}d^3j + 5483520a^9b^2c^8d^j^3 + 4269888a^3b^6c^{10}d^3j + 3538944a^5b^2c^{12}e^3i - 1648128a^5b^3c^{11}f^3h + 1330560a^8b^4c^7d^j^3 + 1179648a^7b^2c^{10}e^i^3 - 898560a^6b^3c^{10}f^h^3 - 826560a^7b^6c^6d^j^3 - 607068a^2b^8c^9d^3j + 589824a^6b^4c^9e^i^3 - 354240a^5b^5c^9f^h^3 - 354240a^4b^5c^{10}f^3h + 145188a^6b^8c^5d^j^3 + 98304a^5b^6c^8e^i^3 + 43680a^3b^7c^9f^3h - 21600a^4b^7c^8f^h^3 - 9576a^5b^{10}c^4d^j^3 + 1350a^3b^9c^7f^h^3 - 1050a^2b^9c^8f^3h - 504a^b^{14}c^4d^2j^2 + 210a^4b^{12}c^3d^j^3 + 3870720a^6b^c^{12}d^2i^2 + 1658880a^6b^c^{12}e^2h^2 - 9792a^b^{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^h^3 + 1296000a^5b^4c^{10}d^h^3 - 155520a^4b^6c^9d^h^3 - 40500a^b^{10}c^8d^2h^2 - 8100a^3b^8c^8d^h^3 + 4050a^2b^{10}c^7d^h^3 + 3870720a^5b^c^{13}e^2f^2 + 34836480a^4b^c^{14}d^2e^2 - 108864a^b^9c^9d^2g^2 - 8068032a^2b^5c^{12}d^3f - 5623296a^4b^3c^{12}d^f^3 + 1737792a^3b^5c^{11}d^f^3 - 260190a^b^8c^{10}d^2f^2 - 211680a^2b^7c^{10}d^f^3 - 435456a^b^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^f^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^h^j^2 + 2903040a^8c^{11}d^h^2j - 1966080a^{10}b^c^8i^3k + 1433600a^9b^9c^i^k^3 + 1152a^2b^{17}d^h^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^f^2j + 245760a^8b^{10}c^g^k^3 - 2211840a^6c^{13}e^2f^h - 1720320a^7c^{12}d^f^i^2 - 9450b^{11}c^8d^2f^h + 6912b^{11}c^8d^2e^i + 1612800a^6c^{13}d^f^2h - 1344000a^{10}b^c^8f^j^3 - 1344000a^7b^c^{11}f^3j - 393216a^8b^c^{10}g^3i^3 - 23616a^b^{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^h^3 + 43416a^b^{10}c^8d^3j - 15482880a^5c^{14}d^e^2f - 10616832a^5b^c^{13}e^3g - 345060a^b^8c^{10}d^3h - 4262400a^5b^c^{13}d^f^3 + 852768a^b^7c^{11}d^3f + 7350a^b^9c^9d^f^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 + 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$

$$\begin{aligned}
&^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 + 57 \\
&6a^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^7 \\
&b^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^8 \\
&c^6f^2j^2 + 1785a^4b^{10}c^5f^2j^2 - 70a^3b^{12}c^4f^2j^2 - 495360 \\
&0a^3b^{13}c^3d^2k^2 + 18427392a^7b^2c^{10}d^2j^2 + 645120a^7b^3c^9 \\
&e^2j^2 + 501760a^6b^3c^{10}f^2i^2 + 442944a^2b^{15}c^2d^2k^2 + 4147 \\
&20a^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^7 \\
&c^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^2 \\
&i^2 + 1684224a^6b^2c^{11}f^2h^2 + 1264320a^5b^4c^{10}f^2h^2 - 118339 \\
&2a^5b^6c^8d^2j^2 + 884736a^5b^4c^{10}e^2i^2 + 645750a^4b^8c^7d^2 \\
&j^2 + 126720a^4b^6c^9f^2h^2 - 115920a^3b^{10}c^6d^2j^2 - 13950a^3 \\
&b^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^3 \\
&c^{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^5 \\
&b^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 + 375 \\
&030a^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 - 80 \\
&640a^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^3 \\
&k^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^2 \\
&>k^2 + 57937920a^{13}b^4c^2k^4 + 320000a^9c^{10}f^2j^2 + 64a^2b^{17}f^2 \\
&>k^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^2 \\
&h^2 + 6096384a^6c^{13}d^2h^2 + 492800a^{11}b^2c^6j^4 + 351456a^{10}b^4 \\
&c^5j^4 - 43120a^9b^6c^4j^4 + 5184b^{11}c^8d^2g^2 + 1225a^8b^8c^3 \\
&j^4 + 131072a^8b^2c^9i^4 + 98304a^7b^4c^8i^4 + 32768a^6b^6c^7 \\
&i^4 + 11025b^{10}c^9d^2f^2 + 4096a^5b^8c^6i^4 + 5644800a^5c^{14}d^2 \\
&f^2 + 142560a^6b^4c^9h^4 + 103680a^7b^2c^{10}h^4 + 32400a^5b^6c^8 \\
&h^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^{10} \\
&f^4 + 1225a^2b^8c^9f^4 - 27433728a^3b^2c^{14}d^4 + 6446304a^2b^4c^{13} \\
&d^4 + a^2b^{14}c^3f^2j^2 - 81920a^8b^{11}i^3k^3 + 384000a^{11}c^8h^3 \\
&j^3 + 138240a^9c^{10}h^3j + 47416320a^6c^{13}d^3j - 1134b^{12}c^7d^3j \\
&+ 7077888a^6c^{13}e^3i + 2688000a^{10}c^9d^3j^3 + 786432a^8c^{11}e^3i^3 \\
&+ 28449792a^5c^{14}d^3h - 7782400a^{12}b^6c^3k^4 + 17010b^{10}c^9d^3h + \\
&580608a^7c^{12}d^3h^3 - 39690b^9c^{10}d^3f - 734832a^6b^6c^{12}d^4 + 268 \\
&435456a^{15}c^4k^4 + 576b^{19}d^2k^2 + 409600a^{11}b^8k^4 + 160000a^{12}c^7 \\
&j^4 + 65536a^9c^{10}i^4 + 20736a^8c^{11}h^4 + 49787136a^4c^{15}d^4 + \\
&160000a^6c^{13}f^4 + 5308416a^5c^{14}e^4 + 35721b^8c^{11}d^4, z, n) * ((1 \\
&1010048a^9c^{10}d^2k - 327680a^8c^{11}f^2i - 983040a^7c^{12}e^2f + 1572864a^{10} \\
&c^9h^2k + 2621440a^{11}c^8j^2k + 3244032a^6b^6c^{12}d^2e + 1081344a^7b^6 \\
&c^{11}d^2i + 884736a^7b^6c^{11}e^2h + 491520a^7b^6c^{11}f^2g + 1277952a^8b^6 \\
&c^{10}e^2j + 294912a^8b^6c^{10}h^2i + 360448a^9b^6c^9f^2k + 425984a^9b^6c^9 \\
&i^2j + 4608a^2b^9c^8d^2e - 87552a^3b^7c^9d^2e + 681984a^4b^5c^{10}d^2 \\
&e - 2433024a^5b^3c^{11}d^2e - 2304a^2b^{10}c^7d^2g + 43776a^3b^8c^8d^2 \\
&g + 1536a^3b^8c^8e^2f - 340992a^4b^6c^9d^2g - 39936a^4b^6c^9e^2f + \\
&1216512a^5b^4c^{10}d^2g + 184320a^5b^4c^{10}e^2f - 1622016a^6b^2c^{11}
\end{aligned}$$

$$\begin{aligned}
& 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 \\
& ^{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 - 3523215360 * 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 - 2571632640 * a^9 * b^5 * c^{11} * d * j * z^2 + 2548039680 * a^9 * b^3 * c^{13} * \\
& d * h * z^2 + 2453667840 * a^9 * b^7 * c^9 * e * k * z^2 + 2181038080 * a^{12} * b^3 * c^{10} * i * k * z^2 \\
& - 6492782592 * a^{10} * b^5 * c^{10} * e * k * z^2 + 1509949440 * a^9 * b^3 * c^{13} * e * g * z^2 - 140 \\
& 1421824 * 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 + 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 + 732168192 * a^7 * b^6 * c^{12} * d * f * z^2 - 58 \\
& 1959680 * 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 + 3 \\
& 90463488 * 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 + 188743680 * a^{10} * b^2 * c^{13} * f * h * z^2 - 185 \\
& 303040 * 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^1 \\
& ^2 * 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 + 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 - 917504 * a^6 * b^{15} * c^4 * i * k * z^2 + 32768 * a^5 * b^{17} * c^3 * i * k * z^2 - 6291 \\
& 4560 * 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^{15} * 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 + 35840 * a^5 * b^{14} * c^6 * f * j * z^2 + 96583680
\end{aligned}$$

$$\begin{aligned}
& 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^{11} 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 + 1 \\
& 536 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^{17} 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 - 1207959552 a^{10} b^3 c^{14} e^g z^2 - 5788139 \\
& 52 a^{12} b^3 c^{12} h^j z^2 + 3246391296 a^{10} b^6 c^9 g^k z^2 - 402653184 a^{11} b^6 c^{13} g^i z^2 + 3019898880 a^{12} b^2 c^{11} g^k z^2 - 440401920 a^{10} b^3 c^{14} f^2 z^2 - \\
& 188743680 a^{11} b^3 c^{13} h^2 z^2 + 1761607680 a^{10} c^{15} d^f z^2 - 6553 \\
& 60 a^6 b^{18} c^k z^2 - 94464 a^6 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^3 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 + 8053 \\
& 06368 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 - 5400428544 a^7 b^5 c^{13} d^2 z^2 + 8 \\
& 90470400 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 z^2 + 301989888 a^{10} b^2 c^{13} g^2 z^2 - 174325760 a^{11} b^5 c^9 j^2 z^2 - 126156800 a^8 b^{14} c^3 k^2 z^2 + 18 \\
& 8743680 a^8 b^6 c^{11} g^2 z^2 + 141557760 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^{11} 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 + 8929280 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 + 256 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^3 c^{11} j^2 z^2 + 1207959552 a^{10} c^{15} e^2 z^2 + 134217728 a^{12} c^{13} i^2 z^2 + 25769803776 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^3 c^{12} d^g j z + 23592960 a^{10} b^3 c^{11} g^h j z + 169869312 a^7 b^3 c^{14} d^e f z + 99090432 a^8 b^3 c^{13} d^g h z - 3145728 a^9 b^3 c^{12} f^h i z + 56623104 a^8 b^3 c^{13} d^f i z - 1536 a^6 b^{18} c^3 d^f k z - 9437184 a^8 b^3 c^{13} e^f h z + 1536 a^6 b^{15} c^6 d^f i z - 4608 a^6 b^{14} c^7 d^f g z + 9216 a^6 b^{13} 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 - 859963392 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^3 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 + 41287680 a^8 b^2 c^{12} d^e j z + 301989888 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 + 235929600 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 + 219414528 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^{11} 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 + 31457280 a^8 b^7 c^7 g^i k z - 62914560 a^8
\end{aligned}$$

$$\begin{aligned}
& *b^6c^8e*ikz - 94371840a^7b^7c^8e*ggkz - 221773824a^6b^3c^{13}d \\
& e*fkz + 82575360a^9b^2c^{11}d*ijz + 11796480a^{10}b^2c^{10}h*ijz - 11 \\
& 796480a^7b^9c^6g*ikz - 8970240a^7b^{10}c^5f*j*kz + 103219200a^7b \\
& ^5c^{10}d*g*jz - 2457600a^8b^6c^8h*ijz + 1769472a^6b^{11}c^5g*ikz \\
& z + 921600a^7b^8c^7h*ijz + 673792a^6b^{12}c^4f*j*kz - 138240a^6b \\
& ^{10}c^6h*ijz - 98304a^5b^{13}c^4g*ikz - 17920a^5b^{14}c^3f*j*kz + \\
& 7680a^5b^{12}c^5h*ijz - 97136640a^5b^{10}c^7d*f*kz - 29491200a^9b \\
& ^3c^{10}g*h*jz + 58982400a^9b^2c^{11}e*h*jz + 23592960a^7b^8c^7e*ikz \\
& kz - 22169088a^6b^{11}c^5d*j*kz + 21381120a^7b^8c^7f*h*kz + 147456 \\
& 00a^8b^5c^9g*h*jz + 42854400a^6b^9c^7d*h*kz - 109707264a^7b^3c \\
& ^{12}d*g*hz - 3686400a^7b^7c^8g*h*jz - 3538944a^6b^{10}c^6e*ikz + \\
& 1645056a^5b^{13}c^4d*j*kz - 890880a^6b^{10}c^6f*h*kz + 460800a^6b^9 \\
& *c^7g*h*jz - 330240a^5b^{12}c^5f*h*kz + 196608a^5b^{12}c^5e*ikz - \\
& 53760a^4b^{15}c^3d*j*kz + 46080a^4b^{14}c^4f*h*kz - 23040a^5b^{11}c^ \\
& 6g*h*jz - 1536a^3b^{16}c^3f*h*kz - 29491200a^8b^4c^{10}e*h*jz - 172 \\
& 03200a^7b^6c^9d*ijz + 11796480a^6b^9c^7e*ggkz + 110886912a^6b^ \\
& 4c^{12}d*f*gz + 7372800a^7b^6c^9e*h*jz + 40108032a^8b^2c^{12}d*h*iz \\
& z + 6451200a^6b^8c^8d*ijz + 2359296a^8b^3c^{11}f*h*iz - 967680a^5 \\
& *b^{10}c^7d*ijz - 921600a^6b^8c^8e*h*jz - 829440a^4b^{13}c^5d*h*kz \\
& z - 589824a^5b^{11}c^6e*ggkz - 491520a^6b^7c^9f*h*iz + 184320a^5b \\
& ^9c^8f*h*iz + 105984a^3b^{15}c^4d*h*kz + 69120a^5b^{11}c^6d*h*kz + \\
& 53760a^4b^{12}c^6d*ijz + 46080a^5b^{10}c^7e*h*jz - 27648a^4b^{11}c^ \\
& ^7f*h*iz - 4608a^2b^{17}c^3d*h*kz + 1536a^3b^{13}c^6f*h*iz - 258048 \\
& 00a^6b^7c^9d*g*jz - 88473600a^6b^4c^{12}d*e*hz + 51609600a^6b^6c \\
& ^{10}d*e*jz - 84934656a^7b^2c^{13}d*f*gz + 117964800a^5b^5c^{12}d*e*fz \\
& z + 15160320a^4b^{12}c^6d*f*kz - 45613056a^7b^3c^{12}d*f*iz + 4423680 \\
& 0a^6b^5c^{11}d*g*hz - 10321920a^6b^6c^{10}d*h*iz + 7077888a^7b^4c^ \\
& ^{11}d*h*iz - 5898240a^7b^4c^{11}f*g*hz + 4718592a^8b^2c^{12}f*g*hz + \\
& 3225600a^5b^9c^8d*g*jz + 2949120a^6b^6c^{10}f*g*hz + 2396160a^5b^ \\
& 8c^9d*h*iz - 1428480a^3b^{14}c^5d*f*kz - 737280a^5b^8c^9f*g*hz - \\
& 161280a^4b^{11}c^7d*g*jz + 92160a^4b^{10}c^8f*g*hz + 73728a^2b^{16}c \\
& ^4d*f*kz - 50688a^3b^{12}c^7d*h*iz - 27648a^4b^{10}c^8d*h*iz - 460 \\
& 8a^3b^{12}c^7f*g*hz + 4608a^2b^{14}c^6d*h*iz - 58982400a^5b^6c^{11} \\
& d*f*gz + 11796480a^7b^3c^{12}e*f*hz + 8847360a^5b^7c^{10}d*f*iz - 66 \\
& 35520a^5b^7c^{10}d*g*hz - 6451200a^5b^8c^9d*e*jz - 5898240a^6b^5c \\
& ^{11}e*f*hz - 3809280a^4b^9c^9d*f*iz + 2359296a^6b^5c^{11}d*f*iz + \\
& 1474560a^5b^7c^{10}e*f*hz + 681984a^3b^{11}c^8d*f*iz + 322560a^4b^ \\
& ^{10}c^8d*e*jz - 276480a^4b^9c^9d*g*hz - 184320a^4b^9c^9e*f*hz + \\
& 179712a^3b^{11}c^8d*g*hz - 55296a^2b^{13}c^7d*f*iz - 13824a^2b^{13}c \\
& ^7d*g*hz + 9216a^3b^{11}c^8e*f*hz + 16220160a^4b^8c^{10}d*f*gz + 13 \\
& 271040a^5b^6c^{11}d*e*hz - 2396160a^3b^{10}c^9d*f*gz + 552960a^4b^8 \\
& *c^{10}d*e*hz - 359424a^3b^{10}c^9d*e*hz + 175104a^2b^{12}c^8d*f*gz + \\
& 27648a^2b^{12}c^8d*e*hz - 32440320a^4b^7c^{11}d*e*fz + 4792320a^3b \\
& ^9c^{10}d*e*fz - 350208a^2b^{11}c^9d*e*fz + 1439170560a^{10}b*c^{11}d*h* \\
& kz - 3361603584a^{10}b^3c^9d*j*kz + 603979776a^{10}b*c^{11}e*ggkz + 407 \\
& 371776a^{12}b*c^9h*j*kz + 201326592a^{11}b*c^{10}g*ikz + 346816512a^7b \\
& *c^{14}d^2g*z + 129761280a^{11}b*c^{10}h^2kz + 121896960a^{10}b*c^{11}f^2k \\
& *z + 458752a^6b^{15}c*ik^2z + 19660800a^{11}b*c^{10}g*j^2z + 49152a^5b \\
& ^{16}c*gk^2z + 7077888a^9b*c^{12}g*h^2z + 94464a*b^{17}c^4d^2kz - 196 \\
& 60800a^8b*c^{13}f^2gz - 66816a*b^{14}c^7d^2*iz + 214272a*b^{13}c^8d^2 \\
& *gz - 428544a*b^{12}c^9d^2*ez + 2390753280a^{11}b^4c^7g*k^2z - 241142 \\
& 1696a^6b^7c^9d^2kz - 6603079680a^8b^3c^{11}d^2kz + 3715891200a^9 \\
& *b*c^{12}d^2kz - 880803840a^{10}c^{12}d*f*kz - 1623195648a^{10}b^6c^6g*k \\
& ^2z - 402653184a^{11}c^{11}e*ikz - 1509949440a^{12}b^2c^8g*k^2z - 2097 \\
& 15200a^{12}c^{10}f*j*kz - 330301440a^9c^{13}d*e*jz + 3019898880a^{12}b*c^ \\
& 9e*k^2z - 125829120a^{11}c^{11}f*h*kz - 110100480a^{10}c^{12}d*ijz - 198 \\
& 180864a^8c^{14}d*e*hz - 15728640a^{11}c^{11}h*ijz - 1226833920a^9b^7c \\
& ^6e*k^2z - 47185920a^{10}c^{12}e*h*jz - 66060288a^9c^{13}d*h*iz - 10905 \\
& 19040a^{12}b^3c^7*ik^2z + 1022754816a^6b^2c^{14}d^2*ez + 5216108544a
\end{aligned}$$

$$\begin{aligned}
& ^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^10c^4g^*k^2z - 49766400a^{10}b^7c^5j^2k^*z - 145463040a^4b^11c^7d^2k^*z \\
& - 94371840a^8b^6c^8g^2k^*z + 223395840a^4b^6c^{12}d^2e^*z + 33751040a^8b^11c^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^13c^2i^*k^2z + 1376256a^7b^10c^5i^2k^*z - 1310720a^8b^8c^6i^2k^*z \\
& - 262144a^6b^12c^4i^2k^*z + 16384a^5b^14c^3i^2k^*z + 10354688a^{11}b^2c^9i^*j^2z + 23592960a^7b^8c^7g^2k^*z + 38559744a^7b^7c^8f^2k^*z \\
& + 19169280a^7b^12c^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^11c^5h^2k^*z - 145920a^7b^10c^5i^*j^2z + 11520a^5b^13c^4h^2k^*z + 11008a^6b^12c^4i^*j^2z \\
& - 2304a^4b^15c^3h^2k^*z - 256a^5b^14c^3i^*j^2z - 25362432a^{10}b^3c^9g^*j^2z - 24739840a^8b^5c^9f^2k^*z - 38338560a^7b^11c^4e^*k^2z \\
& - 2949120a^6b^10c^6g^2k^*z - 1474560a^6b^14c^2g^*k^2z + 50724864a^{10}b^2c^{10}e^*j^2z + 147456a^5b^12c^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^11c^6f^2k^*z \\
& - 737280a^7b^6c^9h^2i^*z + 506880a^7b^9c^6g^*j^2z - 291840a^4b^13c^5f^2k^*z + 276480a^6b^8c^8h^2i^*z - 41472a^5b^10c^7h^2i^*z \\
& - 34560a^6b^11c^5g^*j^2z + 14080a^3b^15c^4f^2k^*z + 2304a^4b^12c^6h^2i^*z + 768a^5b^13c^4g^*j^2z - 256a^2b^17c^3f^2k^*z \\
& - 11796480a^6b^8c^8e^2k^*z - 26542080a^9b^4c^9e^*j^2z + 19837440a^3b^13c^6d^2k^*z + 2949120a^6b^13c^3e^*k^2z + 589824a^5b^10c^7e^2k^*z \\
& - 98304a^5b^15c^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^15c^5d^2k^*z - 1105920a^6b^7c^9g^*h^2z - 1013760a^7b^8c^9f^2i^*z \\
& + 393216a^7b^4c^{11}f^2i^*z + 145920a^4b^10c^8f^2i^*z + 138240a^5b^9c^8g^*h^2z + 69120a^6b^10c^6e^*j^2z - 11008a^3b^12c^7f^2i^*z \\
& - 6912a^4b^11c^7g^*h^2z - 1536a^5b^12c^5e^*j^2z + 256a^2b^14c^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^10c^9d^2i^*z + 3563520a^5b^7c^{10}f^2g^*z + 2211840a^6b^6c^{10}e^*h^2z + 845568a^2b^12c^8d^2i^*z \\
& - 506880a^4b^9c^9f^2g^*z - 276480a^5b^8c^9e^*h^2z + 34560a^3b^11c^8f^2g^*z + 13824a^4b^10c^8e^*h^2z - 768a^2b^13c^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^11c^9d^2g^*z + 1013760a^4b^8c^{10}e^*f^2z - 69120a^3b^10c^9e^*f^2z + 1536a^2b^12c^8e^*f^2z \\
& + 5930496a^2b^10c^{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^10c^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^17i^*k^2z - 39321600a^{11}c^{11}e^*j^2z - 4718592a^{10}c^{12}h^2i^*z - 2304b^19c^3d^2k^*z \\
& + 13107200a^9c^{13}f^2i^*z + 2304b^16c^6d^2i^*z - 14155776a^9c^{13}e^*h^2z + 39321600a^8c^{14}e^*f^2z - 4833280a^9b^12c^*k^3z - 6912b^15c^7d^2g^*z \\
& + 6962544640a^{14}b^2c^6k^3z + 13824b^14c^8d^2
\end{aligned}$$

$$\begin{aligned}
& *e*z + 1876951040*a^{12}*b^6*c^4*k^3*z - 4844421120*a^{13}*b^4*c^5*k^3*z - 4377 \\
& 80480*a^{11}*b^8*c^3*k^3*z - 4294967296*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 + 33 \\
& 91488*a^8*b*c^{10}*e*h*i*j + 1228800*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 + 7372 \\
& 80*a^7*b*c^{11}*f*g*h*i - 768*a*b^{15}*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 + 110592 \\
& 00*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 - 268 \\
& 80*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 + 10 \\
& 485760*a^9*b^3*c^7*f*i*j*k - 40181760*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 + 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
\end{aligned}$$

$$\begin{aligned}
& 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 \\
& + 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* \\
& 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
\end{aligned}$$

$$\begin{aligned}
&^2 + 79626240a^7b^2c^{10}e^2g^k + 11059200a^9b^5c^5g^i k^2 + 8847360 \\
&a^9b^2c^8g^i k^2 - 42113280a^7b^9c^3d^j k^2 + 6389760a^8b^7c^4g \\
&i k^2 + 5898240a^8b^4c^7g^i k^2 - 37601280a^9b^4c^6f^h k^2 - 29491 \\
&20a^7b^9c^3g^i k^2 + 2242560a^7b^{10}c^2f^j k^2 - 2211840a^7b^5c^7 \\
&g^2 i k + 1769472a^6b^7c^6g^2 i k + 749568a^8b^3c^8h^i k^2 - 44236 \\
&8a^7b^6c^6g^i k^2 + 442368a^6b^{11}c^2g^i k^2 - 442368a^6b^8c^5g^i \\
&i k^2 + 317952a^7b^5c^7h^i k^2 - 221184a^5b^9c^5g^2 i k + 73728a^5 \\
&b^{10}c^4g^i k^2 + 38400a^6b^7c^6h^i k^2 - 1920a^5b^9c^5h^i k^2 + \\
&9861120a^9b^4c^6e^j k^2 - 110280960a^4b^6c^9d^2 e k - 93330432a^6b \\
&b^8c^5d^f k^2 + 24645888a^8b^6c^5f^h k^2 + 6359040a^8b^3c^8g^h k^2 \\
&k - 22118400a^9b^4c^6e^i k^2 - 3862528a^8b^2c^9f^2 i k - 2248704a^7 \\
&b^4c^8f^2 i k - 1290240a^9b^2c^8g^i j^2 - 948480a^8b^6c^5e^j k^2 \\
&k - 860160a^8b^4c^7g^i j^2 - 414720a^7b^5c^7g^h k^2 + 303360a^6b^6 \\
&c^7f^2 i k + 266880a^5b^8c^6f^2 i k - 224640a^6b^7c^6g^h k^2 - 8 \\
&0640a^7b^6c^6g^i j^2 - 72960a^4b^{10}c^5f^2 i k + 17280a^5b^9c^5g \\
&h^2 k + 12672a^6b^8c^5g^i j^2 + 5504a^3b^{12}c^4f^2 i k + 3456a^4b \\
&^{11}c^4g^h k^2 - 384a^5b^{10}c^4g^i j^2 - 128a^2b^{14}c^3f^2 i k + 302 \\
&65344a^6b^4c^9d^2 i k - 12779520a^8b^6c^5e^i k^2 - 11796480a^8b^3 \\
&c^8e^i k^2 - 8847360a^7b^3c^9e^2 i k - 7925760a^{10}b^2c^7f^h k^2 + \\
&7077888a^6b^5c^8e^2 i k - 39813120a^7b^3c^9e^g k^2 - 73175040a^9b \\
&b^2c^8d^f k^2 + 5898240a^7b^8c^4e^i k^2 + 5542272a^6b^{11}c^2d^j k^2 \\
&- 5420160a^7b^8c^4f^h k^2 + 55140480a^4b^7c^8d^2 g k + 1271808a^7 \\
&b^3c^9g^2 h^j - 1040384a^8b^2c^9f^i k^2 + 884736a^7b^5c^7e^i k^2 \\
&k - 884736a^6b^{10}c^3e^i k^2 + 884736a^6b^7c^6e^i k^2 - 884736a^5b^7 \\
&c^7e^2 i k - 697344a^7b^4c^8f^i k^2 + 414720a^6b^5c^8g^2 h^j + \\
&226560a^6b^{10}c^3f^h k^2 - 147456a^5b^9c^5e^i k^2 - 121856a^6b^6c^7 \\
&>f^i k^2 + 82560a^5b^{12}c^2f^h k^2 + 49152a^5b^{12}c^2e^i k^2 - 1728 \\
&0a^5b^7c^7g^2 h^j + 8960a^5b^8c^6f^i k^2 + 14194944a^5b^6c^8d^2 \\
&>i k - 12718080a^8b^2c^9e^h k^2 - 10615680a^4b^8c^7d^2 i k - 265420 \\
&80a^6b^4c^9e^2 g k - 23592960a^7b^7c^5e^g k^2 - 5142528a^8b^3c^8 \\
&>f^h j^2 + 5068800a^7b^2c^{10}f^2 h^j - 3755520a^7b^3c^9f^h k^2 + 333 \\
&6192a^7b^3c^9f^2 g k + 3000960a^6b^4c^9f^2 h^j + 2893824a^3b^{10}c^6 \\
&>d^2 i k + 1720320a^8b^3c^8e^i j^2 + 1704960a^6b^5c^8f^2 g k - 13 \\
&07520a^5b^7c^7f^2 g k - 1085760a^6b^5c^8f^h k^2 - 959040a^7b^5c^7 \\
&>f^h j^2 + 829440a^7b^4c^8e^h k^2 - 552960a^7b^2c^{10}g^h k^2 - 5529 \\
&60a^6b^4c^9g^h k^2 + 449280a^6b^6c^7e^h k^2 - 422784a^2b^{12}c^5d^2 \\
&>i k + 253440a^4b^9c^6f^2 g k + 161280a^7b^5c^7e^i j^2 - 145152a^5 \\
&>b^6c^8g^h k^2 + 103200a^6b^7c^6f^h j^2 + 41280a^5b^6c^8f^2 h^j \\
&- 37188a^4b^8c^7f^2 h^j - 34560a^5b^8c^6e^h k^2 - 25344a^6b^7c^6 \\
&>e^i j^2 - 17280a^3b^{11}c^5f^2 g k + 13536a^5b^7c^7f^h k^2 - 6912a^4 \\
&>b^{10}c^5e^h k^2 + 5490a^4b^9c^6f^h k^2 - 3456a^4b^8c^7g^h k^2 + \\
&1980a^3b^{10}c^6f^2 h^j + 810a^5b^9c^5f^h j^2 + 768a^5b^9c^5e^i k^2 \\
&j^2 + 384a^2b^{13}c^4f^2 g k - 270a^4b^{11}c^4f^h j^2 - 180a^3b^{11}c^5 \\
&>f^h k^2 - 30a^2b^{12}c^5f^2 h^j + 6a^3b^{13}c^3f^h j^2 + 30067200a^6 \\
&>b^2c^{11}d^2 h^j + 13271040a^6b^5c^8e^g k^2 - 10857600a^6b^9c^4d^h \\
&>k^2 + 2949120a^6b^9c^4e^g k^2 + 2654208a^5b^6c^8e^2 g k + 2125824a^7 \\
&>b^3c^9d^i k^2 + 1658880a^6b^3c^{10}e^2 h^j - 1419264a^6b^4c^9f^g \\
&>k^2 - 1327104a^5b^7c^7e^g k^2 - 921600a^7b^2c^{10}f^g k^2 - 737280a^7 \\
&>b^2c^{10}f^h k^2 - 568320a^6b^4c^9f^h k^2 + 207360a^4b^{13}c^2d^h \\
&>k^2 - 147456a^5b^{11}c^3e^g k^2 - 136704a^5b^6c^8f^h k^2 + 133632a^6 \\
&>b^5c^8d^i k^2 - 96768a^5b^7c^7d^i k^2 + 80640a^5b^6c^8f^g k^2 - \\
&69120a^5b^5c^9e^2 h^j + 13440a^4b^9c^6d^i k^2 - 5760a^5b^{11}c^3d^h \\
&>k^2 - 2304a^4b^8c^7f^h k^2 + 384a^3b^{10}c^6f^h k^2 + 11930112a^8 \\
&>b^2c^9d^h k^2 - 11646720a^3b^9c^7d^2 g k + 8432640a^7b^2c^{10}d^h \\
&>k^2 + 24140160a^5b^{10}c^4d^f k^2 - 6672384a^7b^2c^{10}e^f k^2 + 44501 \\
&76a^7b^4c^8d^h k^2 + 4337280a^6b^4c^9d^h k^2 - 3870720a^8b^2c^9e^g \\
&>k^2 - 3409920a^6b^4c^9e^f k^2 - 2885760a^5b^4c^{10}d^2 h^j - 2844 \\
&288a^4b^6c^9d^2 h^j + 2615040a^5b^6c^8e^f k^2 - 1687680a^6b^6c^7 \\
&>d^h k^2 + 1482624a^2b^{11}c^6d^2 g k - 1290240a^6b^2c^{11}f^2 g^i + 11
\end{aligned}$$

$05920a^6b^3c^{10}e^h2i + 1019412a^3b^8c^8d^2h^j - 1007424a^5b^6c^8d^h2j - 860160a^5b^4c^{10}f^2g^i - 645120a^7b^4c^8e^g^j^2 - 506880a^4b^8c^7e^f^2k + 290304a^5b^5c^9e^h2i + 197460a^5b^8c^6d^h^j^2 - 143802a^2b^{10}c^7d^2h^j + 80640a^6b^6c^7e^g^j^2 - 80640a^4b^6c^9f^2g^i + 51948a^4b^8c^7d^h2j + 34560a^3b^{10}c^6e^f^2k + 12672a^3b^8c^8f^2g^i + 10800a^3b^{10}c^6d^h2j + 6912a^4b^7c^8e^h2i - 2304a^5b^8c^6e^g^j^2 - 768a^2b^{12}c^5e^f^2k - 684a^3b^{12}c^4d^h^j^2 - 540a^2b^{12}c^5d^h2j - 384a^2b^{10}c^7f^2g^i - 90a^4b^{10}c^5d^h^j^2 + 18a^2b^{14}c^3d^h^j^2 + 23385600a^6b^2c^{11}d^f^2j + 23293440a^3b^8c^8d^2e^k + 6137856a^6b^3c^{10}d^g^2j - 5677056a^6b^2c^{11}e^2f^j + 5308416a^6b^2c^{11}e^g^2i - 5308416a^5b^3c^{11}e^2g^i - 3786240a^4b^{12}c^3d^f^k^2 - 3538944a^6b^3c^{10}e^g^i^2 + 2654208a^5b^4c^{10}e^g^2i + 1658880a^6b^3c^{10}d^h^i^2 - 1354752a^5b^5c^9d^g^2j - 1105920a^5b^4c^{10}f^g^2h - 884736a^5b^5c^9e^g^i^2 - 552960a^6b^2c^{11}f^g^2h + 357120a^3b^{14}c^2d^f^k^2 + 322560a^5b^4c^{10}e^2f^j + 262656a^5b^5c^9d^h^i^2 + 120960a^4b^7c^8d^g^2j - 55296a^4b^7c^8d^h^i^2 - 34560a^4b^6c^9f^g^2h + 3456a^3b^8c^8f^g^2h + 1152a^3b^9c^7d^h^i^2 + 1152a^2b^{11}c^6d^h^i^2 - 13149696a^7b^3c^9d^f^j^2 - 11612160a^5b^2c^{12}d^2g^i + 10906560a^4b^5c^{10}d^2f^j - 7418880a^5b^3c^{11}d^2f^j + 3148992a^6b^5c^8d^f^j^2 - 2985696a^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 - 1505280a^4b^6c^9d^f^2j - 829440a^5b^4c^{10}e^g^h^2 - 508032a^2b^8c^9d^2g^i + 378954a^2b^9c^8d^2f^j + 362880a^5b^4c^{10}d^f^2j + 296964a^3b^8c^8d^f^2j + 161280a^4b^5c^{10}e^f^2i - 77070a^4b^9c^6d^f^j^2 - 30240a^5b^7c^7d^f^j^2 - 25344a^3b^7c^9e^f^2i - 20736a^4b^6c^9e^g^h^2 - 19278a^2b^{10}c^7d^f^2j + 8820a^3b^{11}c^5d^f^j^2 + 768a^2b^9c^8e^f^2i - 378a^2b^{13}c^4d^f^j^2 - 5419008a^5b^3c^{11}d^e^2j - 4423680a^5b^2c^{12}e^2f^h + 4147200a^5b^3c^{11}d^g^2h - 2580480a^6b^2c^{11}d^f^i^2 - 967680a^5b^4c^{10}d^f^i^2 + 483840a^4b^5c^{10}d^e^2j - 414720a^4b^5c^{10}d^g^2h - 138240a^4b^4c^{11}e^2f^h + 64512a^4b^6c^9d^f^i^2 + 39168a^3b^8c^8d^f^i^2 - 31104a^3b^7c^9d^g^2h + 13824a^3b^6c^{10}e^2f^h + 10368a^2b^9c^8d^g^2h - 9216a^2b^{10}c^7d^f^i^2 + 15630336a^5b^2c^{12}d^f^2h - 14459904a^4b^3c^{12}d^2f^h + 9630144a^3b^5c^{11}d^2f^h - 8764416a^5b^3c^{11}d^f^h^2 - 3870720a^5b^2c^{12}e^f^2g - 3193344a^3b^5c^{11}d^2e^i + 2867328a^4b^4c^{11}d^f^2h - 2095200a^2b^7c^{10}d^2f^h - 1414080a^3b^6c^{10}d^f^2h - 34836480a^4b^2c^{13}d^2e^g + 1016064a^2b^7c^{10}d^2e^i - 645120a^4b^4c^11e^f^2g + 306720a^3b^7c^9d^f^h^2 + 197820a^2b^8c^9d^f^2h + 146880a^4b^5c^{10}d^f^h^2 + 80640a^3b^6c^{10}e^f^2g - 55350a^2b^9c^8d^f^h^2 - 2304a^2b^8c^9e^f^2g - 3870720a^5b^2c^{12}d^f^g^2 - 1935360a^4b^4c^{11}d^f^g^2 - 1658880a^4b^3c^{12}d^e^2h + 725760a^3b^6c^{10}d^f^g^2 + 17418240a^3b^4c^{12}d^2e^g - 124416a^3b^5c^{11}d^e^2h - 96768a^2b^8c^9d^f^g^2 + 41472a^2b^7c^{10}d^e^2h - 3919104a^2b^6c^{11}d^2e^g - 7741440a^4b^2c^{13}d^e^2f + 2903040a^3b^4c^{12}d^e^2f - 387072a^2b^6c^{11}d^e^2f - 681246720a^9b^c^9d^2k^2 + 265912320a^{11}b^3c^5e^k^3 + 188743680a^{12}b^2c^5g^k^3 - 132956160a^{11}b^4c^4g^k^3 - 52101120a^{13}b^c^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 - 74022912a^{10}b^5c^4e^k^3 - 20643840a^{11}b^c^7h^2k^2 + 37011456a^{10}b^6c^3g^k^3 - 2293760a^9b^3c^7i^3k - 557056a^8b^5c^6i^3k + 147456a^7b^7c^5i^3k - 65536a^6b^{12}c^i^2k^2 + 32768a^6b^9c^4i^3k - 8192a^5b^{11}c^3i^3k + 430080a^{10}b^c^8i^2j^2 - 2880a^5b^{13}c^h^2k^2 + 6635520a^7b^4c^8g^3k - 4792320a^9b^8c^2g^k^3 - 2211840a^6b^6c^7g^3k + 1359360a^{10}b^2c^7h^j^3 + 1173120a^9b^4c^6h^j^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^j^3 - 5796a^7b^8c^4h^j^3 + 540a^5b^8c^6h^3j - 270a^4b^{10}c^5h^3j + 210a^6b^{10}c^3h^j^3 - 2949120a^{10}b^c^8f^2k^2 + 17694720a^6b^3c^{10}e^3k + 184320a^8b^c^{10}$

$$\begin{aligned}
& h^2 i^2 - 3520 a^3 b^{15} c^2 f^2 k^2 + 9584640 a^9 b^7 c^3 e^2 k^3 - 2293760 a^9 \\
& b^3 c^7 f^2 j^3 - 2293760 a^6 b^3 c^{10} f^3 j - 1769472 a^5 b^5 c^9 e^3 k - 8 \\
& 84736 a^6 b^3 c^{10} g^3 i - 589824 a^7 b^3 c^9 g^3 i^3 - 491520 a^8 b^9 c^2 e^2 k^3 - 442368 a^5 b^5 c^9 g^3 i - 294912 a^6 b^5 c^8 g^3 i^3 - 199360 a^8 b^5 c^6 f^2 j^3 - 199360 a^5 b^5 c^9 f^3 j + 61920 a^7 b^7 c^5 f^2 j^3 + 61920 a^4 b^7 c^8 f^3 j - 49152 a^5 b^7 c^7 g^3 i^3 - 3682 a^6 b^9 c^4 f^2 j^3 - 3682 a^3 b^9 c^7 f^3 j + 70 a^5 b^{11} c^3 f^2 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^2 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^2 j^3 + 1179648 a^7 b^2 c^{10} e^2 i^3 - 898560 a^6 b^3 c^{10} f^2 h^3 - 826560 a^7 b^6 c^6 d^2 j^3 - 607068 a^2 b^8 c^9 d^3 j + 589824 a^6 b^4 c^9 e^2 i^3 - 354240 a^5 b^5 c^9 f^2 h^3 - 354240 a^4 b^5 c^{10} f^3 h + 145188 a^6 b^8 c^5 d^2 j^3 + 98304 a^5 b^6 c^8 e^2 i^3 + 43680 a^3 b^7 c^9 f^3 h - 21600 a^4 b^7 c^8 f^2 h^3 - 9576 a^5 b^{10} c^4 d^2 j^3 + 1350 a^3 b^9 c^7 f^2 h^3 - 1050 a^2 b^9 c^8 f^3 h - 504 a^4 b^{14} c^4 d^2 j^2 + 210 a^4 b^{12} c^3 d^2 j^3 + 3870720 a^6 b^3 c^{12} d^2 i^2 + 1658880 a^6 b^3 c^{12} e^2 h^2 - 9792 a^6 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^2 g^3 + 1949184 a^6 b^2 c^{11} d^2 h^3 + 1296000 a^5 b^4 c^{10} d^2 h^3 - 155520 a^4 b^6 c^9 d^2 h^3 - 40500 a^6 b^{10} c^8 d^2 h^2 - 8100 a^3 b^8 c^8 d^2 h^3 + 4050 a^2 b^{10} c^7 d^2 h^3 + 3870720 a^5 b^3 c^{13} e^2 f^2 + 34836480 a^4 b^3 c^{14} d^2 e^2 - 108864 a^6 b^9 c^9 d^2 g^2 - 8068032 a^2 b^5 c^{12} d^3 f - 5623296 a^4 b^3 c^{12} d^2 f^3 + 1737792 a^3 b^5 c^{11} d^2 f^3 - 260190 a^6 b^8 c^{10} d^2 f^2 - 211680 a^2 b^7 c^{10} d^2 f^3 - 435456 a^6 b^7 c^{11} d^2 e^2 - 377487360 a^{12} b^3 c^6 e^2 k^3 + 1434977280 a^8 b^3 c^8 d^2 k^2 + 173408256 a^7 c^{12} d^2 e^2 k + 3276800 a^{12} c^7 i^2 j^2 k - 125829120 a^{13} b^3 c^5 i^2 k^3 + 26214400 a^{12} c^7 f^2 j^2 k^2 + 1179648 a^{10} c^9 h^2 i^2 k + 13440 a^6 b^{13} h^2 j^2 k^2 + 50331648 a^{11} c^8 e^2 i^2 k^2 + 110100480 a^{10} c^9 d^2 f^2 k^2 + 57802752 a^8 c^{11} d^2 i^2 k + 9830400 a^{11} c^8 e^2 j^2 k - 3276800 a^9 c^{10} f^2 i^2 k + 4480 a^5 b^{14} f^2 j^2 k^2 + 15728640 a^{11} c^8 f^2 h^2 k^2 - 409600 a^9 c^{10} f^2 i^2 j - 1152 b^{16} c^3 d^2 i^2 k - 1220516352 a^7 b^5 c^7 d^2 k^2 + 3538944 a^9 c^{10} e^2 h^2 k + 384000 a^8 c^{11} f^2 h^2 j + 13440 a^4 b^{15} d^2 j^2 k^2 + 384 a^3 b^{16} f^2 h^2 k^2 + 20321280 a^7 c^{12} d^2 h^2 j - 245760 a^8 c^{11} f^2 h^2 i^2 + 3456 b^{15} c^4 d^2 g^2 k - 270 b^{14} c^5 d^2 h^2 j - 9830400 a^8 c^{11} e^2 f^2 k + 4838400 a^9 c^{10} d^2 h^2 j^2 + 2903040 a^8 c^{11} d^2 h^2 j - 1966080 a^{10} b^3 c^8 i^3 k + 1433600 a^9 b^9 c^2 i^2 k^3 + 1152 a^2 b^{17} d^2 h^2 k^2 - 3686400 a^7 c^{12} e^2 f^2 j - 53084160 a^7 b^3 c^{11} e^3 k - 6912 b^{14} c^5 d^2 e^2 k - 3456 b^{12} c^7 d^2 g^2 i + 630 b^{13} c^6 d^2 f^2 j + 2688000 a^7 c^{12} d^2 f^2 j + 245760 a^8 b^{10} c^2 g^2 k^3 - 2211840 a^6 c^{13} e^2 f^2 h - 1720320 a^7 c^{12} d^2 f^2 i^2 - 9450 b^{11} c^8 d^2 f^2 h + 6912 b^{11} c^8 d^2 e^2 i + 1612800 a^6 c^{13} d^2 f^2 h - 1344000 a^{10} b^3 c^8 f^2 j^3 - 1344000 a^7 b^3 c^{11} f^3 j - 393216 a^8 b^3 c^{10} g^2 i^3 - 23616 a^6 b^{17} c^2 d^2 k^2 - 20736 b^{10} c^9 d^2 e^2 g - 75188736 a^4 b^3 c^{14} d^3 f - 883200 a^6 b^3 c^{12} f^3 h - 317952 a^7 b^3 c^{11} f^2 h^3 + 43416 a^6 b^{10} c^8 d^3 j - 15482880 a^5 c^{14} d^2 e^2 f - 10616832 a^5 b^3 c^{13} e^3 g - 345060 a^6 b^8 c^{10} d^3 h - 4262400 a^5 b^3 c^{13} d^2 f^3 + 852768 a^6 b^7 c^{11} d^3 f + 7350 a^6 b^9 c^9 d^2 f^3 + 584578368 a^6 b^7 c^6 d^2 k^2 + 93905920 a^{12} b^3 c^4 j^2 k^2 - 177997248 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 + 1387008 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^{10} c^4 h^2 j^2 + 9 a^4 b^{12} c^3 h^2 j^2 +
\end{aligned}$$

$$\begin{aligned}
& 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^4b^{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^{10}f^4 + 1225a^2b^8c^9f^4 - 27433728a^3b^2c^{14}d^4 + 6446304a^2b^4c^{13}d^4 + a^2b^{14}c^3f^2j^2 - 81920a^8b^{11}i^2k^3 + 384000a^{11}c^8h^2j^3 + 138240a^9c^{10}h^3j + 47416320a^6c^{13}d^3j - 1134b^{12}c^7d^3j + 7077888a^6c^{13}e^3i + 2688000a^{10}c^9d^2j^3 + 786432a^8c^{11}e^3i + 28449792a^5c^{14}d^3h - 7782400a^{12}b^6c^2k^4 + 17010b^{10}c^9d^3h + 580608a^7c^{12}d^3h - 39690b^9c^{10}d^3f - 734832a^6b^6c^{12}d^4 + 268435456a^{15}c^4k^4 + 576b^{19}d^2k^2 + 409600a^{11}b^8k^4 + 160000a^{12}c^7j^4 + 65536a^9c^{10}i^4 + 20736a^8c^{11}h^4 + 49787136a^4c^{15}d^4 + 160000a^6c^{13}f^4 + 5308416a^5c^{14}e^4 + 35721b^8c^{11}d^4, z, n) * ((768a^2b^{14}c^6d - 3145728a^{10}c^{12}h - 5242880a^{11}c^{11}j - 22020096a^9c^{13}d - 22272a^3b^{12}c^7d + 282624a^4b^{10}c^8d - 2027520a^5b^8c^9d + 8847360a^6b^6c^{10}d - 23396352a^7b^4c^{11}d + 34603008a^8b^2c^{12}d + 256a^3b^{13}c^6f - 9216a^4b^{11}c^7f + 122880a^5b^9c^8f - 819200a^6b^7c^9f + 2949120a^7b^5c^{10}f - 5505024a^8b^3c^{11}f + 768a^4b^{12}c^6h - 12288a^5b^{10}c^7h + 61440a^6b^8c^8h - 983040a^8b^4c^{10}h + 3145728a^9b^2c^{11}
\end{aligned}$$

$$\begin{aligned}
& *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 - \\
& 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
\end{aligned}$$

$$\begin{aligned}
& ^3c^{12}d^jz^2 - 1207959552a^{10}b^c^{14}e^gkz^2 - 578813952a^{12}b^c^{12}h^jz^2 + 3246391296a^{10}b^6c^9g^kz^2 - 402653184a^{11}b^c^{13}g^iiz^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^ab^{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 + 58007224320a^{13}b^4c^8k^2z^2 + 14968422400a^{11}b^8c^6k^2z^2 + 805306368a^{11}c^{14}e^iiz^2 - 35966156800a^{12}b^6c^7k^2z^2 + 419430400a^{12}c^{13}f^jz^2 - 1509949440a^9b^2c^{14}e^2z^2 + 251658240a^{11}c^{14}f^hiz^2 - 56874762240a^{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^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 + 165150720a^9b^c^{12}d^g^jz + 23592960a^{10}b^c^{11}g^h^jz + 169869312a^7b^c^{14}d^e^fz + 99090432a^8b^c^{13}d^g^h^jz - 3145728a^9b^c^{12}f^h^i^jz + 56623104a^8b^c^{13}d^f^i^jz - 1536a^ab^{18}c^3d^f^k^z - 9437184a^8b^c^{13}e^f^h^jz + 1536a^ab^{15}c^6d^f^i^jz - 4608a^ab^{14}c^7d^f^g^z + 9216a^ab^{13}c^8d^e^f^jz + 2173501440a^9b^5c^8d^j^k^z - 1987706880a^9b^3c^{10}d^h^k^z + 1121255424a^8b^5c^9d^h^k^z + 861143040a^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^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 + 381026304a^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 - 150994944a^{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 - 60817408a^{11}b^2c^9f^j^k^z + 57835520a^8b^8c^6f^j^k^z + 219414528a^7b^2c^{13}d^e^h^jz - 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 + 11796480a^{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^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^
\end{aligned}$$

$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 - 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 - 17203200*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 - 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 + 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 - 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 - 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 + 13271040*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 + 407371776*a^{12}*b*c^9*h*j*k*z + 201326592*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^{12}*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 - 6603079680*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 - 1623195648*a^{10}*b^6*c^6*g*k^2*z - 402653184*a^{11}*c^{11}*e*i*k*z - 1509949440*a^{12}*b^2*c^8*g*k^2*z - 209715200*a^{12}*c^{10}*f*j*k*z - 330301440*a^9*c^{13}*d*e*j*z + 3019898880*a^{12}*b*c^9*e*k^2*z - 125829120*a^{11}*c^{11}*f*h*k*z - 110100480*a^{10}*c^{12}*d*i*j*z - 198180864*a^8*c^{14}*d*e*h*z - 15728640*a^{11}*c^{11}*h*i*j*z - 1226833920*a^9*b^7*c^6*e*k^2*z - 47185920*a^{10}*c^{12}*e*h*j*z - 66060288*a^9*c^{13}*d*h*i*z - 1090519040*a^{12}*b^3*c^7*i*k^2*z + 1022754816*a^6*b^2*c^{14}*d^2*e*z + 5216108544*a^7*b^5*c^{10}*d^2*k*z + 754974720*a^9*b^2*c^{11}*e^2*k*z + 721529856*a^5*b^9*c^8*d^2*k*z + 613416960*a^9*b^8*c^5*g*k^2*z - 642318336*a^5*b^4*c^{13}*d^2*e*z - 4781506560*a^{11}*b^3*c^8*e*k^2*z - 398131200*a^{12}*b^3*c^7*j^2*k*z - 511377408*a^6*b^3*c^{13}*d^2*g*z - 377487360*a^8*b^4*c^{10}*e^2*k*z + 285212672*a^{11}*b^5*c^6*i*k^2*z + 199065600*a^{11}*b^5*c^6*j^2*k*z + 279183360*a^8*b^9*c^5*e*k^2*z + 321159168*a^5*b^5*c^{12}*d^2*g*z + 188743680*a^9*b^4*c^9*g^2*k*z + 132120576*a^{10}*b^7*c^5*i*k^2*z - 150994944*a^{10}*b^2*c^{10}*g^2*k*z - 111411200*a^9*b^9*c^4*i*k^2*z - 126812160*a^{10}*b^3*c^9*h^2*k*z + 225312768*a^7*b^2*c^{13}*d^2*i*z - 1395$

$91680a^8b^{10}c^4gk^2z - 49766400a^{10}b^7c^5j^2kz - 145463040a^4b^{11}c^7d^2kz - 94371840a^8b^6c^8g^2kz + 223395840a^4b^6c^{12}d^2ez + 33751040a^8b^{11}c^3ik^2z - 78970880a^9b^3c^{10}f^2kz + 94371840a^7b^6c^9e^2kz + 25165824a^{10}b^4c^8i^2kz + 6220800a^9b^9c^4j^2kz + 39223296a^9b^5c^8h^2kz - 311040a^8b^{11}c^3j^2kz + 16777216a^{11}b^2c^9i^2kz - 10485760a^9b^6c^7i^2kz - 5406720a^7b^{13}c^2ik^2z + 1376256a^7b^{10}c^5i^2kz - 1310720a^8b^8c^6i^2kz - 262144a^6b^{12}c^4i^2kz + 16384a^5b^{14}c^3i^2kz + 10354688a^{11}b^2c^9ij^2z + 23592960a^7b^8c^7g^2kz + 38559744a^7b^7c^8f^2kz + 19169280a^7b^{12}c^3gk^2z - 2048000a^9b^6c^7ij^2z - 1520640a^7b^9c^6h^2kz - 1105920a^8b^7c^7h^2kz + 849920a^8b^8c^6ijk^2z - 393216a^{10}b^4c^8ij^2z + 195840a^6b^{11}c^5h^2kz - 145920a^7b^{10}c^5ij^2z + 11520a^5b^{13}c^4h^2kz + 11008a^6b^{12}c^4ijk^2z - 2304a^4b^{15}c^3h^2kz - 256a^5b^{14}c^3ijk^2z - 25362432a^{10}b^3c^9gkj^2z - 24739840a^8b^5c^9f^2kz - 38338560a^7b^{11}c^4ekk^2z - 2949120a^6b^{10}c^6g^2kz - 1474560a^6b^{14}c^2gk^2z + 50724864a^{10}b^2c^{10}ej^2z + 147456a^5b^{12}c^5g^2kz - 15150080a^6b^9c^7f^2kz + 13271040a^9b^5c^8gkj^2z - 111697920a^4b^7c^{11}d^2gz - 3563520a^8b^7c^7gkj^2z + 3538944a^9b^2c^{11}h^2iz + 2912000a^5b^{11}c^6f^2kz - 737280a^7b^6c^9h^2iz + 506880a^7b^9c^6gkj^2z - 291840a^4b^{13}c^5f^2kz + 276480a^6b^8c^8h^2iz - 41472a^5b^{10}c^7h^2iz - 34560a^6b^{11}c^5gkj^2z + 14080a^3b^{15}c^4f^2kz + 2304a^4b^{12}c^6h^2iz + 768a^5b^{13}c^4gkj^2z - 256a^2b^{17}c^3f^2kz - 11796480a^6b^8c^8e^2kz - 26542080a^9b^4c^9ej^2z + 19837440a^3b^{13}c^6d^2kz + 2949120a^6b^{13}c^3ekk^2z + 589824a^5b^{10}c^7e^2kz - 98304a^5b^{15}c^2ekk^2z - 10354688a^8b^2c^{12}f^2iz - 43646976a^6b^4c^{12}d^2iz - 8847360a^8b^3c^{11}g^2h^2z + 7127040a^8b^6c^8ej^2z + 4423680a^7b^5c^{10}g^2h^2z + 2048000a^6b^6c^{10}f^2iz - 1771776a^2b^{15}c^5d^2kz - 1105920a^6b^7c^9g^2h^2z - 1013760a^7b^8c^7ej^2z - 849920a^5b^8c^9f^2iz + 393216a^7b^4c^{11}f^2iz + 145920a^4b^{10}c^8f^2iz + 138240a^5b^9c^8g^2h^2z + 69120a^6b^{10}c^6ej^2z - 11008a^3b^{12}c^7f^2iz - 6912a^4b^{11}c^7g^2h^2z - 1536a^5b^{12}c^5ej^2z + 256a^2b^{14}c^6f^2iz - 32587776a^5b^6c^{11}d^2iz + 25362432a^7b^3c^{12}f^2gz + 21657600a^4b^8c^{10}d^2iz + 17694720a^8b^2c^{12}eh^2z - 50724864a^7b^2c^{13}ef^2z - 13271040a^6b^5c^{11}f^2gz - 8847360a^7b^4c^{11}eh^2z - 5810688a^3b^{10}c^9d^2iz + 3563520a^5b^7c^{10}f^2gz + 2211840a^6b^6c^{10}eh^2z + 845568a^2b^{12}c^8d^2iz - 506880a^4b^9c^9f^2gz - 276480a^5b^8c^9eh^2z + 34560a^3b^{11}c^8f^2gz + 13824a^4b^{10}c^8eh^2z - 768a^2b^{13}c^7f^2gz + 26542080a^6b^4c^{12}ef^2z + 23362560a^3b^9c^{10}d^2gz - 46725120a^3b^8c^{11}d^2ez - 7127040a^5b^6c^{11}ef^2z - 2965248a^2b^{11}c^9d^2gz + 1013760a^4b^8c^{10}ef^2z - 69120a^3b^{10}c^9ef^2z + 1536a^2b^{12}c^8ef^2z + 5930496a^2b^{10}c^{10}d^2ez + 1006632960a^{13}b^3c^8ik^2z + 3246391296a^{10}b^5c^7ekk^2z + 318504960a^{13}b^3c^8j^2kz + 61538304a^{10}b^{10}c^2k^3z - 603979776a^{10}c^{12}e^2kz - 693633024a^7c^{15}d^2ez - 231211008a^8c^{14}d^2iz - 67108864a^{12}c^{10}i^2kz - 13107200a^{12}c^{10}ij^2z - 16384a^5b^{17}ik^2z - 3932160a^{11}c^{11}ej^2z - 4718592a^{10}c^{12}h^2iz - 2304b^{19}c^3d^2kz + 13107200a^9c^{13}f^2iz + 2304b^{16}c^6d^2iz - 14155776a^9c^{13}eh^2z + 39321600a^8c^{14}ef^2z - 4833280a^9b^{12}ck^3z - 6912b^{15}c^7d^2gz + 6962544640a^{14}b^2c^6k^3z + 13824b^{14}c^8d^2ez + 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^3c^8fijk - 5898240a^{10}b^3c^8g^2h^2jk - 41287680a^9b^3c^9d^2g^2jk + 4472832a^9b^3c^9f^2h^2ik + 18432000a^9b^3c^9ef^2jk + 3391488a^8b^3c^{10}eh^2ijk + 1228800a^8b^3c^{10}f^2g^2ijk - 24772608a^8b^3c^{10}d^2g^2hk + 13418496a^8b^3c^{10}ef^2hk + 11649024a^8b^3c^{10}d^2f^2ik + 737280a^7b^3c^{11}f^2gh^2i - 768a^6b^{15}c^3d^2f^2ik - 19307520a^7b^3c^{11}d^2f^2hj + 16367616a^7b^3c^{11}d^2ef^2jk + 3686400a^7b^3c^{11}ef^2g^2jk + 34947072a^7b^3c^{11}d^2ef^2k +$

$2304a^4b^{14}c^4d^4efg^4k - 180a^4b^{13}c^5d^4efgh^4j + 11059200a^6b^6c^{12}d^4e^4h^4i + 5160960a^6b^6c^{12}d^4efg^4i + 2211840a^6b^6c^{12}e^4f^4g^4h - 4608a^4b^{13}c^5d^4e^4f^4k - 2304a^4b^{11}c^7d^4efg^4i + 4608a^4b^{10}c^8d^4efg^4i + 15482880a^5b^6c^{13}d^4efg^4g - 13824a^4b^9c^9d^4efg^4g - 225976320a^8b^2c^9d^4efg^4j^4k + 112988160a^8b^3c^8d^4efg^4j^4k - 11427840a^{10}b^2c^7h^4i^4j^4k - 4177920a^9b^4c^6h^4i^4j^4k + 1399296a^8b^6c^5h^4i^4j^4k - 26880a^6b^{10}c^3h^4i^4j^4k + 16128a^7b^8c^4h^4i^4j^4k - 61562880a^9b^2c^8d^4i^4j^4k + 20090880a^9b^3c^7g^4h^4j^4k + 119623680a^7b^4c^8d^4efg^4j^4k + 10485760a^9b^3c^7f^4i^4j^4k - 40181760a^9b^2c^8e^4h^4j^4k - 3778560a^8b^5c^6g^4h^4j^4k - 137797632a^7b^2c^{10}d^4efg^4h^4k - 1248768a^7b^7c^5f^4i^4j^4k + 229376a^6b^9c^4f^4i^4j^4k + 220160a^8b^5c^6f^4i^4j^4k - 209664a^7b^7c^5g^4h^4j^4k + 80640a^6b^9c^4g^4h^4j^4k - 8960a^5b^{11}c^3f^4i^4j^4k - 59811840a^7b^5c^7d^4g^4j^4k + 53084160a^8b^2c^9efg^4i^4k - 11120640a^8b^4c^7f^4g^4j^4k + 10455552a^7b^6c^6d^4i^4j^4k - 9216000a^9b^2c^8efg^4j^4k + 7557120a^8b^4c^7e^4h^4j^4k + 7397376a^8b^3c^8f^4h^4i^4k + 5230080a^7b^6c^6f^4g^4j^4k - 37675008a^8b^2c^9d^4h^4i^4k - 3633408a^6b^8c^5d^4i^4j^4k + 2211840a^8b^4c^7d^4i^4j^4k + 68898816a^7b^3c^9d^4g^4h^4k - 1695744a^8b^2c^9g^4h^4i^4j - 1400832a^7b^4c^8g^4h^4i^4j + 967680a^7b^5c^7f^4h^4i^4k - 783360a^6b^7c^6f^4h^4i^4k - 741888a^6b^8c^5f^4g^4j^4k + 499968a^5b^{10}c^4d^4i^4j^4k + 419328a^7b^6c^6e^4h^4j^4k - 253440a^6b^6c^7g^4h^4i^4j - 161280a^6b^8c^5e^4h^4j^4k + 42240a^5b^9c^5f^4h^4i^4k + 26880a^5b^{10}c^4f^4g^4j^4k - 26880a^4b^{12}c^3d^4i^4j^4k + 13824a^4b^{11}c^4f^4h^4i^4k + 11520a^5b^8c^6g^4h^4i^4j - 768a^3b^{13}c^3f^4h^4i^4k + 22241280a^8b^3c^8efg^4j^4k + 14222592a^6b^7c^6d^4g^4j^4k - 10460160a^7b^5c^7efg^4j^4k + 8847360a^7b^4c^8efg^4i^4k - 7741440a^7b^4c^8efg^4h^4k - 7077888a^6b^6c^7efg^4i^4k + 6935040a^6b^6c^7d^4h^4i^4k - 6709248a^8b^2c^9efg^4h^4k - 3612672a^7b^4c^8d^4h^4i^4k + 2801664a^7b^3c^9efg^4i^4j + 2506752a^7b^3c^9efg^4i^4j + 2419200a^6b^6c^7f^4g^4h^4k - 1661184a^5b^9c^5d^4g^4j^4k + 1483776a^6b^7c^6efg^4j^4k - 1463040a^5b^8c^6d^4h^4i^4k + 884736a^5b^8c^6efg^4i^4k + 838656a^6b^5c^8efg^4i^4j + 506880a^6b^5c^8efg^4h^4i^4j + 80640a^4b^{11}c^4d^4g^4j^4k - 53760a^5b^9c^5efg^4j^4k - 53760a^5b^7c^7efg^4i^4j - 46080a^4b^{10}c^5efg^4h^4k - 34560a^5b^8c^6efg^4h^4k + 25344a^3b^{12}c^4d^4h^4i^4k - 23040a^5b^7c^7efg^4h^4i^4j + 13824a^4b^{10}c^5d^4h^4i^4k + 2304a^3b^{12}c^4f^4g^4h^4k - 2304a^2b^{14}c^3d^4h^4i^4k - 29030400a^6b^5c^8d^4g^4h^4k + 28606464a^7b^3c^9d^4efg^4i^4k - 28445184a^6b^6c^7d^4efg^4j^4k + 58060800a^6b^4c^9d^4efg^4h^4k + 15482880a^7b^3c^9efg^4h^4k - 8183808a^7b^2c^{10}d^4g^4i^4j - 6718464a^6b^5c^8d^4efg^4i^4k - 5087232a^7b^2c^{10}efg^4h^4j - 5013504a^7b^2c^{10}efg^4i^4j - 4838400a^6b^5c^8efg^4h^4k + 4112640a^5b^7c^7d^4g^4h^4k - 3663360a^5b^7c^7d^4efg^4i^4k + 3322368a^5b^8c^6d^4efg^4j^4k - 2285568a^6b^4c^9d^4g^4i^4j + 1896960a^4b^9c^6d^4efg^4i^4k + 1843200a^6b^3c^{10}efg^4h^4i - 1677312a^6b^4c^9efg^4i^4j - 1658880a^6b^4c^9efg^4h^4j + 68345856a^6b^3c^{10}d^4efg^4k + 783360a^5b^5c^9efg^4h^4i + 741888a^5b^6c^8d^4g^4i^4j - 34172928a^6b^4c^9d^4efg^4k - 340992a^3b^{11}c^5d^4efg^4i^4k - 161280a^4b^{10}c^5d^4efg^4j^4k + 138240a^4b^9c^6d^4g^4h^4k + 107520a^5b^6c^8efg^4i^4j + 92160a^4b^9c^6efg^4h^4k - 89856a^3b^{11}c^5d^4g^4h^4k - 80640a^4b^8c^7d^4g^4i^4j + 69120a^5b^7c^7efg^4h^4k + 69120a^5b^6c^8efg^4h^4j + 27648a^2b^{13}c^4d^4efg^4i^4k + 18432a^4b^7c^8efg^4h^4i + 6912a^2b^{13}c^4d^4g^4h^4k - 4608a^3b^{11}c^5efg^4h^4k - 2304a^3b^9c^7f^4g^4h^4i + 27164160a^5b^6c^8d^4efg^4k - 22164480a^6b^3c^{10}d^4efg^4h^4j - 54328320a^5b^5c^9d^4efg^4k - 17473536a^7b^2c^{10}d^4efg^4k - 8225280a^5b^6c^8d^4efg^4h^4k - 8087040a^4b^8c^7d^4efg^4k + 5677056a^6b^3c^{10}efg^4g^4j - 5529600a^6b^2c^{11}d^4g^4h^4i + 4571136a^6b^3c^{10}d^4efg^4i^4j - 3686400a^6b^2c^{11}efg^4h^4i + 2805120a^5b^5c^9d^4efg^4h^4j - 2211840a^5b^4c^{10}d^4g^4h^4i - 1566720a^5b^4c^{10}efg^4h^4i - 1483776a^5b^5c^9d^4efg^4i^4j + 1198080a^3b^{10}c^6d^4efg^4k + 437184a^4b^7c^8d^4efg^4h^4j - 322560a^5b^5c^9efg^4g^4j + 317952a^4b^6c^9d^4g^4h^4i - 276480a^4b^8c^7d^4efg^4h^4k + 179712a^3b^{10}c^6d^4efg^4h^4k + 161280a^4b^7c^8d^4efg^4i^4j - 146268a^3b^9c^7d^4efg^4h^4j - 87552a^2b^{12}c^5d^4efg^4k - 36864a^4b^6c^9efg^4h^4i - 13824a^2b^{12}c^5d^4efg^4h^4k + 9360a^2b^{11}c^6d^4efg^4h^4j + 6912a^3b^8c^8d^4g^4h^4i - 6912a^2b^{10}c^7d^4g^4h^4i + 4608a^3b^8c^8d^4g^4h^4i$

$e*f*h*i - 24551424*a^6*b^2*c^{11}*d*e*g*j + 16174080*a^4*b^7*c^8*d*e*f*k + 54$
 $19008*a^5*b^4*c^{10}*d*e*g*j + 5160960*a^5*b^3*c^{11}*d*f*g*i + 4423680*a^5*b^3$
 $*c^{11}*e*f*g*h + 4423680*a^5*b^3*c^{11}*d*e*h*i - 2396160*a^3*b^9*c^7*d*e*f*k$
 $- 635904*a^4*b^5*c^{10}*d*e*h*i - 483840*a^4*b^6*c^9*d*e*g*j - 354816*a^3*b^7$
 $*c^9*d*f*g*i + 322560*a^4*b^5*c^{10}*d*f*g*i + 175104*a^2*b^{11}*c^6*d*e*f*k +$
 $138240*a^4*b^5*c^{10}*e*f*g*h + 59904*a^2*b^9*c^8*d*f*g*i - 13824*a^3*b^7*c^9$
 $*e*f*g*h - 13824*a^3*b^7*c^9*d*e*h*i + 13824*a^2*b^9*c^8*d*e*h*i - 16588800$
 $*a^5*b^2*c^{12}*d*e*g*h - 10321920*a^5*b^2*c^{12}*d*e*f*i + 1658880*a^4*b^4*c^{11}$
 $*d*e*g*h + 709632*a^3*b^6*c^{10}*d*e*f*i - 645120*a^4*b^4*c^{11}*d*e*f*i + 124$
 $416*a^3*b^6*c^{10}*d*e*g*h - 119808*a^2*b^8*c^9*d*e*f*i - 41472*a^2*b^8*c^9*d$
 $*e*g*h + 7741440*a^4*b^3*c^{12}*d*e*f*g - 2903040*a^3*b^5*c^{11}*d*e*f*g + 3870$
 $72*a^2*b^7*c^{10}*d*e*f*g - 381026304*a^{11}*b*c^7*d*j*k^2 - 241827840*a^{10}*b*c$
 $^8*d*h*k^2 - 65667072*a^{12}*b*c^6*h*j*k^2 - 169344*a^7*b^{11}*c*h*j*k^2 - 2516$
 $5824*a^{11}*b*c^7*g*i*k^2 - 4915200*a^{11}*b*c^7*g*j^2*k - 53084160*a^8*b*c^{10}$
 $e^2*i*k - 75497472*a^{10}*b*c^8*e*g*k^2 - 86704128*a^7*b*c^{11}*d^2*g*k + 56524$
 $8*a^9*b*c^9*h*i^2*j - 168448*a^6*b^{12}*c*f*j*k^2 - 24576*a^5*b^{13}*c*g*i*k^2$
 $- 1769472*a^9*b*c^9*g*h^2*k - 17694720*a^9*b*c^9*e*i^2*k - 411264*a^5*b^{13}$
 $*c*d*j*k^2 - 11520*a^4*b^{14}*c*f*h*k^2 + 4915200*a^8*b*c^{10}*f^2*g*k + 2580480$
 $*a^9*b*c^9*e*i*j^2 - 2496000*a^9*b*c^9*f*h*j^2 - 1543680*a^8*b*c^{10}*f*h^2*j$
 $+ 33408*a*b^{14}*c^4*d^2*i*k - 59512320*a^6*b*c^{12}*d^2*f*j + 5087232*a^7*b*c$
 $^{11}*e^2*h*j + 2727936*a^8*b*c^{10}*d*i^2*j - 26496*a^3*b^{15}*c*d*h*k^2 + 11059$
 $20*a^7*b*c^{11}*e*h^2*i - 107136*a*b^{13}*c^5*d^2*g*k + 10260*a*b^{12}*c^6*d^2*h*$
 $j - 10616832*a^6*b*c^{12}*e^2*g*i - 3538944*a^7*b*c^{11}*e*g*i^2 + 1843200*a^7*$
 $b*c^{11}*d*h*i^2 - 18432*a^2*b^{16}*c*d*f*k^2 - 15552000*a^8*b*c^{10}*d*f*j^2 + 2$
 $4551424*a^6*b*c^{12}*d*e^2*j - 37062144*a^5*b*c^{13}*d^2*f*h + 2580480*a^6*b*c^{12}$
 $*e*f^2*i + 214272*a*b^{12}*c^6*d^2*e*k + 65664*a*b^{10}*c^8*d^2*g*i - 25074*a$
 $*b^{11}*c^7*d^2*f*j + 420*a*b^{12}*c^6*d*f^2*j + 6*a*b^{15}*c^3*d*f*j^2 + 2322432$
 $0*a^5*b*c^{13}*d^2*e*i + 384*a*b^{12}*c^6*d*f*i^2 - 5985792*a^6*b*c^{12}*d*f*h^2$
 $+ 206010*a*b^9*c^9*d^2*f*h - 131328*a*b^9*c^9*d^2*e*i - 6300*a*b^{10}*c^8*d*f$
 $^2*h + 1350*a*b^{11}*c^7*d*f*h^2 + 16588800*a^5*b*c^{13}*d*e^2*h + 3456*a*b^{10}$
 $*c^8*d*f*g^2 + 435456*a*b^8*c^{10}*d^2*e*g + 13824*a*b^8*c^{10}*d*e^2*f + 393216$
 $0*a^{11}*c^8*h*i*j*k + 27525120*a^{10}*c^9*d*i*j*k + 82575360*a^9*c^{10}*d*e*j*k$
 $+ 11796480*a^{10}*c^9*e*h*j*k + 16515072*a^9*c^{10}*d*h*i*k + 49545216*a^8*c^{11}$
 $*d*e*h*k - 2457600*a^8*c^{11}*e*f*i*j - 1474560*a^7*c^{12}*e*f*h*i - 10321920*a$
 $^6*c^{13}*d*e*f*i + 737077248*a^{10}*b^3*c^6*d*j*k^2 - 518814720*a^9*b^5*c^5*d*$
 $j*k^2 + 441354240*a^9*b^3*c^7*d*h*k^2 - 429871104*a^6*b^2*c^{11}*d^2*e*k - 27$
 $2212992*a^8*b^5*c^6*d*h*k^2 + 305731584*a^5*b^4*c^{10}*d^2*e*k + 192412800*a^8$
 $*b^7*c^4*d*j*k^2 + 111912960*a^{11}*b^3*c^5*h*j*k^2 + 214935552*a^6*b^3*c^{10}$
 $*d^2*g*k + 202427136*a^7*b^6*c^6*d*f*k^2 - 49904640*a^{10}*b^5*c^4*h*j*k^2 -$
 $178513920*a^8*b^4*c^7*d*f*k^2 - 152865792*a^5*b^5*c^9*d^2*g*k - 114388992*a$
 $^7*b^2*c^{10}*d^2*i*k + 94961664*a^{10}*b^2*c^7*e*i*k^2 - 9039872*a^{11}*b^2*c^6*$
 $i*j^2*k - 56494080*a^{10}*b^4*c^5*f*j*k^2 - 2052096*a^{10}*b^4*c^5*i*j^2*k + 13$
 $27360*a^9*b^6*c^4*i*j^2*k - 158080*a^8*b^8*c^3*i*j^2*k - 47480832*a^{10}*b^3*$
 $c^6*g*i*k^2 + 45576960*a^9*b^6*c^4*f*j*k^2 + 7954560*a^9*b^7*c^3*h*j*k^2 -$
 $104693760*a^9*b^3*c^7*e*g*k^2 + 142080*a^8*b^9*c^2*h*j*k^2 + 16017408*a^{10}$
 $b^3*c^6*g*j^2*k - 4930560*a^9*b^5*c^5*g*j^2*k - 3649536*a^9*b^2*c^8*h^2*i*k$
 $- 1843200*a^8*b^4*c^7*h^2*i*k + 85524480*a^8*b^5*c^6*e*g*k^2 + 474240*a^8*$
 $b^7*c^4*g*j^2*k + 288000*a^7*b^6*c^6*h^2*i*k + 63360*a^6*b^8*c^5*h^2*i*k -$
 $8064*a^5*b^{10}*c^4*h^2*i*k - 1152*a^4*b^{12}*c^3*h^2*i*k - 15437824*a^{11}*b^2*c$
 $^6*f*j*k^2 - 32034816*a^{10}*b^2*c^7*e*j^2*k - 14369280*a^8*b^8*c^3*f*j*k^2 -$
 $13271040*a^8*b^3*c^8*g^2*i*k + 80267904*a^7*b^7*c^5*d*h*k^2 + 79626240*a^7$
 $*b^2*c^{10}*e^2*g*k + 11059200*a^9*b^5*c^5*g*i*k^2 + 8847360*a^9*b^2*c^8*g*i^$
 $2*k - 42113280*a^7*b^9*c^3*d*j*k^2 + 6389760*a^8*b^7*c^4*g*i*k^2 + 5898240*$
 $a^8*b^4*c^7*g*i^2*k - 37601280*a^9*b^4*c^6*f*h*k^2 - 2949120*a^7*b^9*c^3*g*$
 $i*k^2 + 2242560*a^7*b^{10}*c^2*f*j*k^2 - 2211840*a^7*b^5*c^7*g^2*i*k + 176947$
 $2*a^6*b^7*c^6*g^2*i*k + 749568*a^8*b^3*c^8*h*i^2*j - 442368*a^7*b^6*c^6*g*i$
 $^2*k + 442368*a^6*b^{11}*c^2*g*i*k^2 - 442368*a^6*b^8*c^5*g*i^2*k + 317952*a^7$
 $*b^5*c^7*h*i^2*j - 221184*a^5*b^9*c^5*g^2*i*k + 73728*a^5*b^{10}*c^4*g*i^2*k$
 $+ 38400*a^6*b^7*c^6*h*i^2*j - 1920*a^5*b^9*c^5*h*i^2*j + 9861120*a^9*b^4*c$

$$\begin{aligned}
& ^6e*j^2k - 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 + 2 \\
& 66880*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 - 88 \\
& 47360*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 + 8256 \\
& 0*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 + 506880 \\
& 0*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 + 1720 \\
& 320*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 + 82944 \\
& 0*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 - 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^1 \\
& 3*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 + 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 - 2885760*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 + 148262 \\
& 4*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^1 \\
& 0*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 - 860 \\
& 160*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 + 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
\end{aligned}$$

$$\begin{aligned}
& j^2 + 18a^2b^{14}c^3d^*h^*j^2 + 23385600a^6b^2c^{11}d^*f^2*j + 23293440a^3b^8c^8d^2e^*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 - 378624 \\
& 0a^4b^{12}c^3d^*f^*k^2 - 3538944a^6b^3c^{10}e^*g^*i^2 + 2654208a^5b^4c^1 \\
& 0e^*g^2*i + 1658880a^6b^3c^{10}d^*h^*i^2 - 1354752a^5b^5c^9d^*g^2*j - 11 \\
& 05920a^5b^4c^{10}f^*g^2*h - 884736a^5b^5c^9e^*g^*i^2 - 552960a^6b^2c^ \\
& 11f^*g^2*h + 357120a^3b^{14}c^2d^*f^*k^2 + 322560a^5b^4c^{10}e^2*f*j + 26 \\
& 2656a^5b^5c^9d^*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^2c^{12}d^2*g^*i + 10906560a^4b^5c^{10}d^2*f^*j - 7418880a^5 \\
& *b^3c^{11}d^2*f^*j + 3148992a^6b^5c^8d^*f^*j^2 - 2985696a^3b^7c^9d^2*f^ \\
& *j - 2965248a^2b^{10}c^7d^2e^*k + 1720320a^5b^3c^{11}e^*f^2*i - 1658880* \\
& a^6b^2c^{11}e^*g^*h^2 + 1596672a^3b^6c^{10}d^2*g^*i - 1505280a^4b^6c^9d^ \\
& *f^2*j - 829440a^5b^4c^{10}e^*g^*h^2 - 508032a^2b^8c^9d^2*g^*i + 378954* \\
& a^2b^9c^8d^2*f^*j + 362880a^5b^4c^{10}d^*f^2*j + 296964a^3b^8c^8d^*f^ \\
& 2*j + 161280a^4b^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 - 19 \\
& 278a^2b^{10}c^7d^*f^2*j + 8820a^3b^{11}c^5d^*f^*j^2 + 768a^2b^9c^8e^*f^ \\
& 2*i - 378a^2b^{13}c^4d^*f^*j^2 - 5419008a^5b^3c^{11}d^*e^2*j - 4423680a^5 \\
& *b^2c^{12}e^2*f^*h + 4147200a^5b^3c^{11}d^*g^2*h - 2580480a^6b^2c^{11}d^*f^ \\
& *i^2 - 967680a^5b^4c^{10}d^*f^*i^2 + 483840a^4b^5c^{10}d^*e^2*j - 414720a^ \\
& ^4b^5c^{10}d^*g^2*h - 138240a^4b^4c^{11}e^2*f^*h + 64512a^4b^6c^9d^*f^*i^ \\
& ^2 + 39168a^3b^8c^8d^*f^*i^2 - 31104a^3b^7c^9d^*g^2*h + 13824a^3b^6c^ \\
& ^{10}e^2*f^*h + 10368a^2b^9c^8d^*g^2*h - 9216a^2b^{10}c^7d^*f^*i^2 + 1563 \\
& 0336a^5b^2c^{12}d^*f^2*h - 14459904a^4b^3c^{12}d^2*f^*h + 9630144a^3b^5 \\
& *c^{11}d^2*f^*h - 8764416a^5b^3c^{11}d^*f^*h^2 - 3870720a^5b^2c^{12}e^*f^2*g \\
& - 3193344a^3b^5c^{11}d^2*e^*i + 2867328a^4b^4c^{11}d^*f^2*h - 2095200a^ \\
& 2b^7c^{10}d^2*f^*h - 1414080a^3b^6c^{10}d^*f^2*h - 34836480a^4b^2c^{13}d^ \\
& ^2e^*g + 1016064a^2b^7c^{10}d^2*e^*i - 645120a^4b^4c^{11}e^*f^2*g + 30672 \\
& 0a^3b^7c^9d^*f^*h^2 + 197820a^2b^8c^9d^*f^2*h + 146880a^4b^5c^{10}d^* \\
& f^*h^2 + 80640a^3b^6c^{10}e^*f^2*g - 55350a^2b^9c^8d^*f^*h^2 - 2304a^2b^ \\
& ^8c^9e^*f^2*g - 3870720a^5b^2c^{12}d^*f^*g^2 - 1935360a^4b^4c^{11}d^*f^*g^ \\
& 2 - 1658880a^4b^3c^{12}d^*e^2*h + 725760a^3b^6c^{10}d^*f^*g^2 + 17418240a^ \\
& ^3b^4c^{12}d^2*e^*g - 124416a^3b^5c^{11}d^*e^2*h - 96768a^2b^8c^9d^*f^*g^ \\
& ^2 + 41472a^2b^7c^{10}d^*e^2*h - 3919104a^2b^6c^{11}d^2*e^*g - 7741440a^ \\
& 4b^2c^{13}d^*e^2*f + 2903040a^3b^4c^{12}d^*e^2*f - 387072a^2b^6c^{11}d^*e^ \\
& ^2*f - 681246720a^9b^*c^9d^2*k^2 + 265912320a^{11}b^3c^5e^*k^3 + 1887436 \\
& 80a^{12}b^2c^5g^*k^3 - 132956160a^{11}b^4c^4g^*k^3 - 52101120a^{13}b^*c^5* \\
& j^2*k^2 + 25722880a^{12}b^3c^4i^*k^3 + 19644416a^{11}b^5c^3i^*k^3 - 15836 \\
& 80a^9b^9c^*j^2*k^2 - 9142272a^{10}b^7c^2i^*k^3 - 74022912a^{10}b^5c^4e^ \\
& *k^3 - 20643840a^{11}b^*c^7h^2*k^2 + 37011456a^{10}b^6c^3g^*k^3 - 2293760* \\
& a^9b^3c^7i^3*k - 557056a^8b^5c^6i^3*k + 147456a^7b^7c^5i^3*k - 6 \\
& 5536a^6b^{12}c^*i^2*k^2 + 32768a^6b^9c^4i^3*k - 8192a^5b^{11}c^3i^3*k \\
& + 430080a^{10}b^*c^8i^2*j^2 - 2880a^5b^{13}c^*h^2*k^2 + 6635520a^7b^4c^ \\
& 8g^3*k - 4792320a^9b^8c^2g^*k^3 - 2211840a^6b^6c^7g^3*k + 1359360a^ \\
& ^{10}b^2c^7h^*j^3 + 1173120a^9b^4c^6h^*j^3 + 743040a^7b^4c^8h^3*j + \\
& 622080a^8b^2c^9h^3*j + 221184a^5b^8c^6g^3*k + 107136a^6b^6c^7h^ \\
& 3*j - 32640a^8b^6c^5h^*j^3 - 5796a^7b^8c^4h^*j^3 + 540a^5b^8c^6h^ \\
& 3*j - 270a^4b^{10}c^5h^3*j + 210a^6b^{10}c^3h^*j^3 - 2949120a^{10}b^*c^8* \\
& f^2*k^2 + 17694720a^6b^3c^{10}e^3*k + 184320a^8b^*c^{10}h^2*i^2 - 3520a^ \\
& 3b^{15}c^*f^2*k^2 + 9584640a^9b^7c^3e^*k^3 - 2293760a^9b^3c^7f^*j^3 - \\
& 2293760a^6b^3c^{10}f^3*j - 1769472a^5b^5c^9e^3*k - 884736a^6b^3c^1 \\
& 0g^3*i - 589824a^7b^3c^9g^*i^3 - 491520a^8b^9c^2e^*k^3 - 442368a^5* \\
& b^5c^9g^3*i - 294912a^6b^5c^8g^*i^3 - 199360a^8b^5c^6f^*j^3 - 19936 \\
& 0a^5b^5c^9f^3*j + 61920a^7b^7c^5f^*j^3 + 61920a^4b^7c^8f^3*j - 4 \\
& 9152a^5b^7c^7g^*i^3 - 3682a^6b^9c^4f^*j^3 - 3682a^3b^9c^7f^3*j + \\
& 70a^5b^{11}c^3f^*j^3 + 70a^2b^{11}c^6f^3*j + 3870720a^8b^*c^{10}e^2*j^2 \\
& + 430080a^7b^*c^{11}f^2*i^2 - 14152320a^4b^4c^{11}d^3*j + 10644480a^5b^
\end{aligned}$$

$$\begin{aligned}
& 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 \\
& 8944*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 - 3542 \\
& 40*a^5*b^5*c^9*f*h^3 - 354240*a^4*b^5*c^{10}*f^3*h + 145188*a^6*b^8*c^5*d*j^3 \\
& + 98304*a^5*b^6*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^{14}*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 + 1658880*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 - 4 \\
& 0500*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 - 8068032*a^2*b^5*c^{12}*d^3*f - 5623296*a^4*b^3*c^{12}*d*f^3 + 1737 \\
& 792*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 - 32 \\
& 76800*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^{10}*f*i^2*j - 1152*b^{16}*c^3*d^2*i*k - 1220516352*a^7*b^5*c^7* \\
& d^2*k^2 + 3538944*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 + 3456*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 + 4838400*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 - 36864 \\
& 00*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 - 3 \\
& 456*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 + 24 \\
& 5760*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 - 883200*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 - 15482880*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 + 73 \\
& 50*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 - 177997248*a^5*b^9*c^5*d^2*k^2 - 50967040*a^{11}*b^5*c^3*j^2*k^2 + 1 \\
& 04693760*a^9*b^2*c^8*e^2*k^2 + 12849984*a^{10}*b^7*c^2*j^2*k^2 + 20021248*a^1 \\
& 1*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 + 18874 \\
& 368*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 + 1387008*a^9*b^2*c^8*h^2*j^2 - 737280*a^6*b^{10}*c^3*g^2*k^2 + 849 \\
& 60*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^{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 - 9231552*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 + 72960*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 + 884736*a^7*b^2*c^{10}*g^2*i^2 + 884736*a^6*b^4*c^9*g^2*i^2 + 2
\end{aligned}$$

$$\begin{aligned}
& 21184*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 - 13790*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 + 5184*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 + 829440*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 + 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 + 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*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 + 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)*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^10 + 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 - 42624*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 - 4608*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^
\end{aligned}$$

$$\begin{aligned}
& 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^ \\
& 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 + 38 \\
& 40*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 + 3 \\
& 2768*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 + 62 \\
& 40*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 - 1 \\
& 2096*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 + 6 \\
& 912*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 + 1 \\
& 80*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 - 12
\end{aligned}$$

$$\begin{aligned}
& 8a^4b^9c^3i^2k + 704a^5b^7c^4i^2k + 960a^6b^5c^5i^2k + 6720a^6b^8c^2i^2k^2 - 8704a^7b^3c^6i^2k - 13056a^7b^6c^3i^2k^2 - 24640a^8b^4c^4i^2k^2 + 92544a^9b^2c^5i^2k^2 - 10a^7b^6c^3j^2k + 1560a^8b^4c^4j^2k - 11136a^9b^2c^5j^2k - 36a^6b^6c^9d^2e^2f + 18a^6b^7c^8d^2f^2g + 15552a^4b^6c^11d^2e^2h + 10080a^4b^6c^11d^2f^2g - 6a^6b^8c^7d^2f^2i + 21888a^5b^6c^10d^2e^2j + 6a^6b^11c^4d^2f^2k + 5184a^5b^6c^10d^2h^2i - 13824a^5b^6c^10e^2g^2i + 1440a^5b^6c^10f^2g^2h - 4128a^6b^6c^9d^2f^2k + 7296a^6b^6c^9d^2i^2j + 5184a^6b^6c^9e^2h^2j + 2400a^6b^6c^9f^2g^2j - 81408a^7b^6c^8e^2i^2k + 4896a^7b^6c^8f^2h^2k + 1728a^7b^6c^8h^2i^2j + 5600a^8b^6c^7f^2j^2k + 900a^2b^4c^10d^2e^2f - 4896a^3b^2c^11d^2e^2f - 108a^2b^5c^9d^2e^2h - 450a^2b^5c^9d^2f^2g + 2448a^3b^3c^10d^2f^2g + 138a^2b^6c^8d^2f^2i + 54a^2b^6c^8d^2g^2h - 516a^3b^4c^9d^2f^2i - 36a^3b^4c^9e^2f^2h - 4992a^4b^2c^10d^2f^2i - 7776a^4b^2c^10d^2g^2h - 6048a^4b^2c^10e^2f^2h - 2016a^4b^3c^9d^2e^2j - 18a^2b^7c^7d^2h^2i - 210a^2b^9c^5d^2f^2k - 36a^3b^5c^8d^2h^2i + 18a^3b^5c^8f^2g^2h + 2496a^3b^7c^6d^2f^2k + 2592a^4b^3c^9d^2h^2i - 6912a^4b^3c^9e^2g^2i + 3024a^4b^3c^9f^2g^2h + 1008a^4b^4c^8d^2g^2j + 420a^4b^4c^8e^2f^2j - 13770a^4b^5c^7d^2f^2k - 10944a^5b^2c^9d^2g^2j - 7392a^5b^2c^9e^2f^2j + 31536a^5b^3c^8d^2f^2k + 18a^2b^10c^4d^2h^2k - 6a^3b^6c^7f^2h^2i - 180a^3b^8c^5d^2h^2k - 1020a^4b^4c^8f^2h^2i - 336a^4b^5c^7d^2i^2j - 180a^4b^5c^7e^2h^2j - 210a^4b^5c^7f^2g^2j - 162a^4b^6c^6d^2h^2k + 4608a^4b^6c^6e^2g^2k - 2496a^5b^2c^9f^2h^2i + 2976a^5b^3c^8d^2i^2j + 2880a^5b^3c^8e^2h^2j + 3696a^5b^3c^8f^2g^2j + 10080a^5b^4c^7d^2h^2k - 43776a^5b^4c^7e^2g^2k - 45792a^6b^2c^8d^2h^2k + 122112a^6b^2c^8e^2g^2k + 6a^3b^9c^4f^2h^2k + 70a^4b^6c^6f^2i^2j + 90a^4b^6c^6g^2h^2j - 1536a^4b^7c^5e^2i^2k - 102a^4b^7c^5f^2h^2k + 210a^4b^8c^4d^2j^2k - 1092a^5b^4c^7f^2i^2j - 1440a^5b^4c^7g^2h^2j + 11520a^5b^5c^6e^2i^2k - 390a^5b^5c^6f^2h^2k - 3696a^5b^6c^5d^2j^2k - 3264a^6b^2c^8f^2i^2j - 2592a^6b^2c^8g^2h^2j - 11520a^6b^3c^7e^2i^2k + 5040a^6b^3c^7f^2h^2k + 26160a^6b^4c^6d^2j^2k - 79296a^7b^2c^7d^2j^2k - 30a^4b^7c^5h^2i^2j + 768a^4b^8c^4g^2i^2k + 420a^5b^5c^6h^2i^2j - 5760a^5b^6c^5g^2i^2k + 70a^5b^7c^4f^2j^2k + 1824a^6b^3c^7h^2i^2j + 5760a^6b^4c^6g^2i^2k - 1722a^6b^5c^5f^2j^2k + 40704a^7b^2c^7g^2i^2k + 7824a^7b^3c^6f^2j^2k + 210a^6b^6c^4h^2j^2k + 384a^7b^4c^5h^2j^2k - 13728a^8b^2c^6h^2j^2k)/(64(4096a^10c^10 + a^4b^12c^4 - 24a^5b^10c^5 + 240a^6b^8c^6 - 1280a^7b^6c^7 + 3840a^8b^4c^8 - 6144a^9b^2c^9))\sqrt{(56371445760a^11b^8c^12z^4 - 503316480a^8b^14c^9z^4 + 47185920a^7b^16c^8z^4 - 2621440a^6b^18c^7z^4 + 65536a^5b^20c^6z^4 - 171798691840a^14b^2c^15z^4 + 193273528320a^13b^4c^14z^4 - 128849018880a^12b^6c^13z^4 - 16911433728a^10b^10c^11z^4 + 3523215360a^9b^12c^10z^4 + 68719476736a^15c^16z^4 - 47185920a^7b^16c^5kz^3 + 2621440a^6b^18c^4kz^3 - 65536a^5b^20c^3kz^3 + 171798691840a^14b^2c^12kz^3 - 193273528320a^13b^4c^11kz^3 + 128849018880a^12b^6c^10kz^3 + 16911433728a^10b^10c^8kz^3 - 3523215360a^9b^12c^7kz^3 - 56371445760a^11b^8c^9kz^3 + 503316480a^8b^14c^6kz^3 - 68719476736a^15c^13kz^3 + 1536a^6b^18c^6d^2f^2z^2 - 2571632640a^9b^5c^11d^2j^2z^2 + 2548039680a^9b^3c^13d^2h^2z^2 + 2453667840a^9b^7c^9e^2k^2z^2 + 2181038080a^12b^3c^10i^2k^2z^2 - 6492782592a^10b^5c^10e^2k^2z^2 + 1509949440a^9b^3c^13e^2g^2z^2 - 1401421824a^8b^5c^12d^2h^2z^2 - 1226833920a^9b^8c^8g^2k^2z^2 - 1321205760a^9b^2c^14d^2f^2z^2 - 2793406464a^11b^6c^13d^2j^2z^2 + 9563013120a^11b^3c^11e^2k^2z^2 + 890634240a^8b^7c^10d^2j^2z^2 - 754974720a^8b^5c^12e^2g^2z^2 - 570425344a^11b^5c^9i^2k^2z^2 + 732168192a^7b^6c^12d^2f^2z^2 - 581959680a^10b^4c^11f^2j^2z^2 - 603979776a^10b^2c^13e^2i^2z^2 + 534773760a^11b^3c^11h^2j^2z^2 - 558366720a^8b^9c^8e^2k^2z^2 - 4781506560a^11b^4c^10g^2k^2z^2 - 2013265920a^13b^6c^11i^2k^2z^2 - 456130560a^9b^4c^12f^2h^2z^2 + 384040960a^9b^6c^10f^2j^2z^2 - 264241152a^10b^7c^8i^2k^2z^2 + 390463488a^7b^7c^11d^2h^2z^2 + 279183360a^8b^10c^7g^2k^2z^2 + 301989888a^10b^3c^12g^2i^2z^2 + 222822400a^9b^9c^7i^2k^2z^2 - 366280704a^6b^8c^11d^2f^2z^2 - 330301440a^8b^4c^13d^2f^2z^2 + 254017536a^8b^6c^11f^2h^2z^2 - 1887436800a^10b^6c^14d^2h^2z^2}
\end{aligned}$$

$$\begin{aligned}
&^2 + 188743680a^{10}b^2c^{13}f^*h^*z^2 - 185303040a^7b^9c^9d^*j^*z^2 - 1179 \\
&64800a^{10}b^5c^{10}h^*j^*z^2 - 6039797760a^{12}b^*c^{12}e^*k^*z^2 - 67502080a^8 \\
&*b^{11}c^6i^*k^*z^2 + 121634816a^{11}b^2c^{12}f^*j^*z^2 + 188743680a^7b^7c^{11} \\
&1e^*g^*z^2 - 115671040a^8b^8c^9f^*j^*z^2 + 125829120a^8b^6c^{11}e^*i^*z^2 \\
&+ 10813440a^7b^{13}c^5i^*k^*z^2 + 76677120a^7b^{11}c^7e^*k^*z^2 - 38338560* \\
&a^7b^{12}c^6g^*k^*z^2 - 37355520a^9b^7c^9h^*j^*z^2 - 917504a^6b^{15}c^4i^* \\
&*k^*z^2 + 32768a^5b^{17}c^3i^*k^*z^2 - 62914560a^8b^7c^{10}g^*i^*z^2 + 23101 \\
&440a^8b^9c^8h^*j^*z^2 - 4349952a^7b^{11}c^7h^*j^*z^2 + 2949120a^6b^{14}c^5 \\
&g^*k^*z^2 + 337920a^6b^{13}c^6h^*j^*z^2 - 98304a^5b^{16}c^4g^*k^*z^2 - 768 \\
&0a^5b^{15}c^5h^*j^*z^2 - 61931520a^7b^8c^{10}f^*h^*z^2 + 23592960a^7b^9c^9 \\
&g^*i^*z^2 + 17940480a^7b^{10}c^8f^*j^*z^2 - 47185920a^7b^8c^{10}e^*i^*z^2 \\
&- 5898240a^6b^{13}c^6e^*k^*z^2 - 3538944a^6b^{11}c^8g^*i^*z^2 - 1347584a^6 \\
&*b^{12}c^7f^*j^*z^2 + 196608a^5b^{15}c^5e^*k^*z^2 + 196608a^5b^{13}c^7g^*i^*z^2 \\
&+ 35840a^5b^{14}c^6f^*j^*z^2 + 96583680a^5b^{10}c^{10}d^*f^*z^2 + 23371776 \\
&*a^6b^{11}c^8d^*j^*z^2 - 51609600a^6b^9c^{10}d^*h^*z^2 + 7077888a^6b^{10}c^9 \\
&e^*i^*z^2 + 6144000a^6b^{10}c^9f^*h^*z^2 - 1677312a^5b^{13}c^7d^*j^*z^2 - 3 \\
&93216a^5b^{12}c^8e^*i^*z^2 + 61440a^5b^{12}c^8f^*h^*z^2 + 53760a^4b^{15}c^6 \\
&d^*j^*z^2 - 46080a^4b^{14}c^7f^*h^*z^2 + 1536a^3b^{16}c^6f^*h^*z^2 - 235929 \\
&60a^6b^9c^{10}e^*g^*z^2 + 1179648a^5b^{11}c^9e^*g^*z^2 + 829440a^4b^{13}c^8 \\
&d^*h^*z^2 + 368640a^5b^{11}c^9d^*h^*z^2 - 105984a^3b^{15}c^7d^*h^*z^2 + 460 \\
&8a^2b^{17}c^6d^*h^*z^2 - 15175680a^4b^{12}c^9d^*f^*z^2 + 1428480a^3b^{14}c^8 \\
&d^*f^*z^2 - 73728a^2b^{16}c^7d^*f^*z^2 + 4108320768a^{10}b^3c^{12}d^*j^*z^2 \\
&- 1207959552a^{10}b^*c^{14}e^*g^*z^2 - 578813952a^{12}b^*c^{12}h^*j^*z^2 + 32463912 \\
&96a^{10}b^6c^9g^*k^*z^2 - 402653184a^{11}b^*c^{13}g^*i^*z^2 + 3019898880a^{12}b^2 \\
&c^{11}g^*k^*z^2 - 440401920a^{10}b^*c^{14}f^2z^2 - 188743680a^{11}b^*c^{13}h^2 \\
&*z^2 + 1761607680a^{10}c^{15}d^*f^*z^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 + 58007224320a^{13}b^4c^8k^2z^2 \\
&+ 14968422400a^{11}b^8c^6k^2z^2 + 805306368a^{11}c^{14}e^*i^*z^2 - 3596615 \\
&6800a^{12}b^6c^7k^2z^2 + 419430400a^{12}c^{13}f^*j^*z^2 - 1509949440a^9b^2 \\
&c^{14}e^2z^2 + 251658240a^{11}c^{14}f^*h^*z^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 + 477102080* \\
&a^{12}b^3c^{10}j^2z^2 + 477102080a^9b^3c^{13}f^2z^2 - 377487360a^9b^4* \\
&c^{12}g^2z^2 + 301989888a^{10}b^2c^{13}g^2z^2 - 174325760a^{11}b^5c^9j^2 \\
&*z^2 - 126156800a^8b^{14}c^3k^2z^2 + 188743680a^8b^6c^{11}g^2z^2 + 14 \\
&1557760a^{10}b^3c^{12}h^2z^2 - 174325760a^8b^5c^{12}f^2z^2 - 188743680* \\
&a^7b^6c^{12}e^2z^2 - 4350935040a^{10}b^{10}c^5k^2z^2 + 146165760a^4b^1 \\
&1c^{10}d^2z^2 - 50331648a^{10}b^4c^{11}i^2z^2 + 11796480a^7b^{16}c^2k^2 \\
&*z^2 - 33554432a^{11}b^2c^{12}i^2z^2 + 11206656a^{10}b^7c^8j^2z^2 + 892 \\
&9280a^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 + 2 \\
&56a^5b^{17}c^3j^2z^2 - 47185920a^7b^8c^{10}g^2z^2 - 26542080a^8b^7* \\
&c^{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^9 \\
&*c^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^5 \\
&b^{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^5 \\
&*b^{10}c^{10}e^2z^2 + 1771776a^2b^{15}c^8d^2z^2 - 440401920a^{13}b^*c^{11}j^2 \\
&^2z^2 + 1207959552a^{10}c^{15}e^2z^2 + 134217728a^{12}c^{13}i^2z^2 + 25769 \\
&803776a^{15}c^{10}k^2z^2 + 16384a^5b^{20}k^2z^2 + 2304b^{19}c^6d^2z^2 + \\
&165150720a^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 \\
&+ 56623104a^8b^*c^{13}d^*f^*i^*z - 1536a^*b^{18}c^3d^*f^*k^*z - 9437184a^8b^*c^ \\
&13e^*f^*h^*z + 1536a^*b^{15}c^6d^*f^*i^*z - 4608a^*b^{14}c^7d^*f^*g^*z + 9216a^*b^1 \\
&3c^8d^*e^*f^*z + 2173501440a^9b^5c^8d^*j^*k^*z - 1987706880a^9b^3c^{10}d^*
\end{aligned}$$

$h*k*z + 1121255424*a^8*b^5*c^9*d*h*k*z + 861143040*a^8*b^4*c^10*d*f*k*z - 8$
 $59963392*a^7*b^6*c^9*d*f*k*z - 780779520*a^8*b^7*c^7*d*j*k*z - 754974720*a^$
 $9*b^3*c^10*e*g*k*z + 2222456832*a^11*b*c^10*d*j*k*z - 454164480*a^11*b^3*c^$
 $8*h*j*k*z + 377487360*a^8*b^5*c^9*e*g*k*z + 290979840*a^10*b^4*c^8*f*j*k*z$
 $+ 381026304*a^6*b^8*c^8*d*f*k*z + 412876800*a^8*b^2*c^12*d*e*j*z + 30198988$
 $8*a^10*b^2*c^10*e*i*k*z - 320421888*a^7*b^7*c^8*d*h*k*z + 185794560*a^10*b^$
 $5*c^7*h*j*k*z - 192020480*a^9*b^6*c^7*f*j*k*z + 190709760*a^9*b^4*c^9*f*h*k$
 $*z - 150994944*a^10*b^3*c^9*g*i*k*z + 168990720*a^7*b^9*c^6*d*j*k*z + 23592$
 $9600*a^9*b^2*c^11*d*f*k*z - 206438400*a^8*b^3*c^11*d*g*j*z - 206438400*a^7*$
 $b^4*c^11*d*e*j*z - 101646336*a^8*b^6*c^8*f*h*k*z - 29245440*a^9*b^7*c^6*h*j$
 $*k*z - 60817408*a^11*b^2*c^9*f*j*k*z + 57835520*a^8*b^8*c^6*f*j*k*z + 21941$
 $4528*a^7*b^2*c^13*d*e*h*z - 70778880*a^10*b^2*c^10*f*h*k*z + 677376*a^7*b^1$
 $1*c^4*h*j*k*z - 645120*a^8*b^9*c^5*h*j*k*z - 53760*a^6*b^13*c^3*h*j*k*z + 3$
 $1457280*a^8*b^7*c^7*g*i*k*z - 62914560*a^8*b^6*c^8*e*i*k*z - 94371840*a^7*b$
 $^7*c^8*e*g*k*z - 221773824*a^6*b^3*c^13*d*e*f*z + 82575360*a^9*b^2*c^11*d*i$
 $*j*z + 11796480*a^10*b^2*c^10*h*i*j*z - 11796480*a^7*b^9*c^6*g*i*k*z - 8970$
 $240*a^7*b^10*c^5*f*j*k*z + 103219200*a^7*b^5*c^10*d*g*j*z - 2457600*a^8*b^6$
 $*c^8*h*i*j*z + 1769472*a^6*b^11*c^5*g*i*k*z + 921600*a^7*b^8*c^7*h*i*j*z +$
 $673792*a^6*b^12*c^4*f*j*k*z - 138240*a^6*b^10*c^6*h*i*j*z - 98304*a^5*b^13*$
 $c^4*g*i*k*z - 17920*a^5*b^14*c^3*f*j*k*z + 7680*a^5*b^12*c^5*h*i*j*z - 9713$
 $6640*a^5*b^10*c^7*d*f*k*z - 29491200*a^9*b^3*c^10*g*h*j*z + 58982400*a^9*b^$
 $2*c^11*e*h*j*z + 23592960*a^7*b^8*c^7*e*i*k*z - 22169088*a^6*b^11*c^5*d*j*k$
 $*z + 21381120*a^7*b^8*c^7*f*h*k*z + 14745600*a^8*b^5*c^9*g*h*j*z + 42854400$
 $*a^6*b^9*c^7*d*h*k*z - 109707264*a^7*b^3*c^12*d*g*h*z - 3686400*a^7*b^7*c^8$
 $*g*h*j*z - 3538944*a^6*b^10*c^6*e*i*k*z + 1645056*a^5*b^13*c^4*d*j*k*z - 89$
 $0880*a^6*b^10*c^6*f*h*k*z + 460800*a^6*b^9*c^7*g*h*j*z - 330240*a^5*b^12*c^$
 $5*f*h*k*z + 196608*a^5*b^12*c^5*e*i*k*z - 53760*a^4*b^15*c^3*d*j*k*z + 4608$
 $0*a^4*b^14*c^4*f*h*k*z - 23040*a^5*b^11*c^6*g*h*j*z - 1536*a^3*b^16*c^3*f*h$
 $*k*z - 29491200*a^8*b^4*c^10*e*h*j*z - 17203200*a^7*b^6*c^9*d*i*j*z + 11796$
 $480*a^6*b^9*c^7*e*g*k*z + 110886912*a^6*b^4*c^12*d*f*g*z + 7372800*a^7*b^6*$
 $c^9*e*h*j*z + 40108032*a^8*b^2*c^12*d*h*i*z + 6451200*a^6*b^8*c^8*d*i*j*z +$
 $2359296*a^8*b^3*c^11*f*h*i*z - 967680*a^5*b^10*c^7*d*i*j*z - 921600*a^6*b^$
 $8*c^8*e*h*j*z - 829440*a^4*b^13*c^5*d*h*k*z - 589824*a^5*b^11*c^6*e*g*k*z -$
 $491520*a^6*b^7*c^9*f*h*i*z + 184320*a^5*b^9*c^8*f*h*i*z + 105984*a^3*b^15*$
 $c^4*d*h*k*z + 69120*a^5*b^11*c^6*d*h*k*z + 53760*a^4*b^12*c^6*d*i*j*z + 460$
 $80*a^5*b^10*c^7*e*h*j*z - 27648*a^4*b^11*c^7*f*h*i*z - 4608*a^2*b^17*c^3*d*$
 $h*k*z + 1536*a^3*b^13*c^6*f*h*i*z - 25804800*a^6*b^7*c^9*d*g*j*z - 88473600$
 $*a^6*b^4*c^12*d*e*h*z + 51609600*a^6*b^6*c^10*d*e*j*z - 84934656*a^7*b^2*c^$
 $13*d*f*g*z + 117964800*a^5*b^5*c^12*d*e*f*z + 15160320*a^4*b^12*c^6*d*f*k*z$
 $- 45613056*a^7*b^3*c^12*d*f*i*z + 44236800*a^6*b^5*c^11*d*g*h*z - 10321920$
 $*a^6*b^6*c^10*d*h*i*z + 7077888*a^7*b^4*c^11*d*h*i*z - 5898240*a^7*b^4*c^11$
 $*f*g*h*z + 4718592*a^8*b^2*c^12*f*g*h*z + 3225600*a^5*b^9*c^8*d*g*j*z + 294$
 $9120*a^6*b^6*c^10*f*g*h*z + 2396160*a^5*b^8*c^9*d*h*i*z - 1428480*a^3*b^14*$
 $c^5*d*f*k*z - 737280*a^5*b^8*c^9*f*g*h*z - 161280*a^4*b^11*c^7*d*g*j*z + 92$
 $160*a^4*b^10*c^8*f*g*h*z + 73728*a^2*b^16*c^4*d*f*k*z - 50688*a^3*b^12*c^7*$
 $d*h*i*z - 27648*a^4*b^10*c^8*d*h*i*z - 4608*a^3*b^12*c^7*f*g*h*z + 4608*a^2$
 $*b^14*c^6*d*h*i*z - 58982400*a^5*b^6*c^11*d*f*g*z + 11796480*a^7*b^3*c^12*e$
 $*f*h*z + 8847360*a^5*b^7*c^10*d*f*i*z - 6635520*a^5*b^7*c^10*d*g*h*z - 6451$
 $200*a^5*b^8*c^9*d*e*j*z - 5898240*a^6*b^5*c^11*e*f*h*z - 3809280*a^4*b^9*c^$
 $9*d*f*i*z + 2359296*a^6*b^5*c^11*d*f*i*z + 1474560*a^5*b^7*c^10*e*f*h*z + 6$
 $81984*a^3*b^11*c^8*d*f*i*z + 322560*a^4*b^10*c^8*d*e*j*z - 276480*a^4*b^9*c^$
 $9*d*g*h*z - 184320*a^4*b^9*c^9*e*f*h*z + 179712*a^3*b^11*c^8*d*g*h*z - 552$
 $96*a^2*b^13*c^7*d*f*i*z - 13824*a^2*b^13*c^7*d*g*h*z + 9216*a^3*b^11*c^8*e*$
 $f*h*z + 16220160*a^4*b^8*c^10*d*f*g*z + 13271040*a^5*b^6*c^11*d*e*h*z - 239$
 $6160*a^3*b^10*c^9*d*f*g*z + 552960*a^4*b^8*c^10*d*e*h*z - 359424*a^3*b^10*c^$
 $^9*d*e*h*z + 175104*a^2*b^12*c^8*d*f*g*z + 27648*a^2*b^12*c^8*d*e*h*z - 324$
 $40320*a^4*b^7*c^11*d*e*f*z + 4792320*a^3*b^9*c^10*d*e*f*z - 350208*a^2*b^11$
 $*c^9*d*e*f*z + 1439170560*a^10*b*c^11*d*h*k*z - 3361603584*a^10*b^3*c^9*d*j$
 $*k*z + 603979776*a^10*b*c^11*e*g*k*z + 407371776*a^12*b*c^9*h*j*k*z + 20132$

$6592a^{11}b^3c^{10}g^2ik^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^2ik^2z + 19660800a^{11}b^3c^{10}g^2j^2z + 49152a^5b^{16}c^2g^2k^2z + 7077888a^9b^3c^{12}g^2h^2z + 94464a^7b^{17}c^4d^2k^2z - 19660800a^8b^3c^{13}f^2g^2z - 66816a^7b^{14}c^7d^2i^2z + 214272a^7b^{13}c^8d^2g^2z - 428544a^7b^{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^3c^{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^2ej^2z + 3019898880a^{12}b^3c^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^2hj^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^10e^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^{15}c^4f^2k^2z + 2304a^4b^{12}c^6h^2i^2z + 768a^5b^{13}c^4g^2j^2z - 256a^2b^{17}c^3f^2k^2z - 11796480a^6b^8c^8e^2k^2z - 26542080a^9b^4c^9e^2j^2z + 19837440a^3b^{13}c^6d^2k^2z + 2949120a^6b^{13}c^3e^2k^2z + 589824a^5b^{10}c^7e^2k^2z - 98304a^5b^{15}c^2e^2k^2z - 10354688a^8b^2c^{12}f^2i^2z - 43646976a^6b^4c^{12}d^2i^2z - 8847360a^8b^3c^{11}g^2h^2z + 7127040a^8b^6c^8e^2j^2z + 4423680a^7b^5c^{10}g^2h^2z + 2048000a^6b^6c^{10}f^2i^2z - 1771776a^2b^{15}c^5d^2k^2z - 1105920a^6b^7c^9g^2h^2z - 1013760a^7b^8c^7e^2j^2z - 849920a^5b^8c^9f^2i^2z + 393216a^7b^4c^{11}f^2i^2z + 145920a^4b^{10}c^8f^2i^2z + 138240a^5b^9c^8g^2h^2z + 69120a^6b^{10}c^6e^2j^2z - 11008a^3b^{12}c^7f^2i^2z - 6912a^4b^{11}c^7g^2h^2z - 1536a^5b^{12}c^5e^2j^2z + 256a^2b^{14}c^6f^2i^2z - 32587776a^5b^6c^{11}d^2i^2z + 25362432a^7b^3c^{12}f^2g^2z + 21657600a^4b^8c^{10}d^2i^2z + 17694720a^8b^2c^{12}e^2h^2z - 50724864a^7b^2c^{13}e^2f^2z - 13271040a^6b^5c^{11}f^2g^2z - 8847360a^7b^4c^{11}e^2h^2z - 5810688a^3b^{10}c^9d^2i^2z + 3563520a^5b^7c^{10}f^2g^2z + 2211840a^6b^6c^{10}e^2h^2z + 845568a^2b^{12}c^8d^2z$

$$\begin{aligned}
& *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 \\
& 898816*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 - 741 \\
& 888*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 - 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 + 5 \\
& 06880*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 - 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 - 2 \\
& 8445184*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^
\end{aligned}$$

$6*b^5*c^8*e*f*h*k + 4112640*a^5*b^7*c^7*d*g*h*k - 3663360*a^5*b^7*c^7*d*f*i$
 $*k + 3322368*a^5*b^8*c^6*d*e*j*k - 2285568*a^6*b^4*c^9*d*g*i*j + 1896960*a^$
 $4*b^9*c^6*d*f*i*k + 1843200*a^6*b^3*c^10*f*g*h*i - 1677312*a^6*b^4*c^9*e*f*$
 $i*j - 1658880*a^6*b^4*c^9*e*g*h*j + 68345856*a^6*b^3*c^10*d*e*f*k + 783360*$
 $a^5*b^5*c^9*f*g*h*i + 741888*a^5*b^6*c^8*d*g*i*j - 34172928*a^6*b^4*c^9*d*f$
 $*g*k - 340992*a^3*b^11*c^5*d*f*i*k - 161280*a^4*b^10*c^5*d*e*j*k + 138240*a$
 $^4*b^9*c^6*d*g*h*k + 107520*a^5*b^6*c^8*e*f*i*j + 92160*a^4*b^9*c^6*e*f*h*k$
 $- 89856*a^3*b^11*c^5*d*g*h*k - 80640*a^4*b^8*c^7*d*g*i*j + 69120*a^5*b^7*c$
 $^7*e*f*h*k + 69120*a^5*b^6*c^8*e*g*h*j + 27648*a^2*b^13*c^4*d*f*i*k + 18432$
 $*a^4*b^7*c^8*f*g*h*i + 6912*a^2*b^13*c^4*d*g*h*k - 4608*a^3*b^11*c^5*e*f*h*$
 $k - 2304*a^3*b^9*c^7*f*g*h*i + 27164160*a^5*b^6*c^8*d*f*g*k - 22164480*a^6*$
 $b^3*c^10*d*f*h*j - 54328320*a^5*b^5*c^9*d*e*f*k - 17473536*a^7*b^2*c^10*d*f$
 $*g*k - 8225280*a^5*b^6*c^8*d*e*h*k - 8087040*a^4*b^8*c^7*d*f*g*k + 5677056*$
 $a^6*b^3*c^10*e*f*g*j - 5529600*a^6*b^2*c^11*d*g*h*i + 4571136*a^6*b^3*c^10*$
 $d*e*i*j - 3686400*a^6*b^2*c^11*e*f*h*i + 2805120*a^5*b^5*c^9*d*f*h*j - 2211$
 $840*a^5*b^4*c^10*d*g*h*i - 1566720*a^5*b^4*c^10*e*f*h*i - 1483776*a^5*b^5*c$
 $^9*d*e*i*j + 1198080*a^3*b^10*c^6*d*f*g*k + 437184*a^4*b^7*c^8*d*f*h*j - 32$
 $2560*a^5*b^5*c^9*e*f*g*j + 317952*a^4*b^6*c^9*d*g*h*i - 276480*a^4*b^8*c^7*$
 $d*e*h*k + 179712*a^3*b^10*c^6*d*e*h*k + 161280*a^4*b^7*c^8*d*e*i*j - 146268$
 $*a^3*b^9*c^7*d*f*h*j - 87552*a^2*b^12*c^5*d*f*g*k - 36864*a^4*b^6*c^9*e*f*h$
 $*i - 13824*a^2*b^12*c^5*d*e*h*k + 9360*a^2*b^11*c^6*d*f*h*j + 6912*a^3*b^8*$
 $c^8*d*g*h*i - 6912*a^2*b^10*c^7*d*g*h*i + 4608*a^3*b^8*c^8*e*f*h*i - 245514$
 $24*a^6*b^2*c^11*d*e*g*j + 16174080*a^4*b^7*c^8*d*e*f*k + 5419008*a^5*b^4*c^$
 $10*d*e*g*j + 5160960*a^5*b^3*c^11*d*f*g*i + 4423680*a^5*b^3*c^11*e*f*g*h +$
 $4423680*a^5*b^3*c^11*d*e*h*i - 2396160*a^3*b^9*c^7*d*e*f*k - 635904*a^4*b^5$
 $*c^10*d*e*h*i - 483840*a^4*b^6*c^9*d*e*g*j - 354816*a^3*b^7*c^9*d*f*g*i + 3$
 $22560*a^4*b^5*c^10*d*f*g*i + 175104*a^2*b^11*c^6*d*e*f*k + 138240*a^4*b^5*c$
 $^10*e*f*g*h + 59904*a^2*b^9*c^8*d*f*g*i - 13824*a^3*b^7*c^9*e*f*g*h - 13824$
 $*a^3*b^7*c^9*d*e*h*i + 13824*a^2*b^9*c^8*d*e*h*i - 16588800*a^5*b^2*c^12*d*$
 $e*g*h - 10321920*a^5*b^2*c^12*d*e*f*i + 1658880*a^4*b^4*c^11*d*e*g*h + 7096$
 $32*a^3*b^6*c^10*d*e*f*i - 645120*a^4*b^4*c^11*d*e*f*i + 124416*a^3*b^6*c^10$
 $*d*e*g*h - 119808*a^2*b^8*c^9*d*e*f*i - 41472*a^2*b^8*c^9*d*e*g*h + 7741440$
 $*a^4*b^3*c^12*d*e*f*g - 2903040*a^3*b^5*c^11*d*e*f*g + 387072*a^2*b^7*c^10*$
 $d*e*f*g - 381026304*a^11*b*c^7*d*j*k^2 - 241827840*a^10*b*c^8*d*h*k^2 - 656$
 $67072*a^12*b*c^6*h*j*k^2 - 169344*a^7*b^11*c*h*j*k^2 - 25165824*a^11*b*c^7*$
 $g*i*k^2 - 4915200*a^11*b*c^7*g*j^2*k - 53084160*a^8*b*c^10*e^2*i*k - 754974$
 $72*a^10*b*c^8*e*g*k^2 - 86704128*a^7*b*c^11*d^2*g*k + 565248*a^9*b*c^9*h*i^$
 $2*j - 168448*a^6*b^12*c*f*j*k^2 - 24576*a^5*b^13*c*g*i*k^2 - 1769472*a^9*b*$
 $c^9*g*h^2*k - 17694720*a^9*b*c^9*e*i^2*k - 411264*a^5*b^13*c*d*j*k^2 - 1152$
 $0*a^4*b^14*c*f*h*k^2 + 4915200*a^8*b*c^10*f^2*g*k + 2580480*a^9*b*c^9*e*i*j$
 $^2 - 2496000*a^9*b*c^9*f*h*j^2 - 1543680*a^8*b*c^10*f*h^2*j + 33408*a*b^14*$
 $c^4*d^2*i*k - 59512320*a^6*b*c^12*d^2*f*j + 5087232*a^7*b*c^11*e^2*h*j + 27$
 $27936*a^8*b*c^10*d*i^2*j - 26496*a^3*b^15*c*d*h*k^2 + 1105920*a^7*b*c^11*e*$
 $h^2*i - 107136*a*b^13*c^5*d^2*g*k + 10260*a*b^12*c^6*d^2*h*j - 10616832*a^6$
 $*b*c^12*e^2*g*i - 3538944*a^7*b*c^11*e*g*i^2 + 1843200*a^7*b*c^11*d*h*i^2 -$
 $18432*a^2*b^16*c*d*f*k^2 - 15552000*a^8*b*c^10*d*f*j^2 + 24551424*a^6*b*c^$
 $12*d*e^2*j - 37062144*a^5*b*c^13*d^2*f*h + 2580480*a^6*b*c^12*e*f^2*i + 214$
 $272*a*b^12*c^6*d^2*e*k + 65664*a*b^10*c^8*d^2*g*i - 25074*a*b^11*c^7*d^2*f*$
 $j + 420*a*b^12*c^6*d*f^2*j + 6*a*b^15*c^3*d*f*j^2 + 23224320*a^5*b*c^13*d^2$
 $*e*i + 384*a*b^12*c^6*d*f*i^2 - 5985792*a^6*b*c^12*d*f*h^2 + 206010*a*b^9*c$
 $^9*d^2*f*h - 131328*a*b^9*c^9*d^2*e*i - 6300*a*b^10*c^8*d*f^2*h + 1350*a*b^$
 $11*c^7*d*f*h^2 + 16588800*a^5*b*c^13*d*e^2*h + 3456*a*b^10*c^8*d*f*g^2 + 43$
 $5456*a*b^8*c^10*d^2*e*g + 13824*a*b^8*c^10*d*e^2*f + 3932160*a^11*c^8*h*i*j$
 $*k + 27525120*a^10*c^9*d*i*j*k + 82575360*a^9*c^10*d*e*j*k + 11796480*a^10*$
 $c^9*e*h*j*k + 16515072*a^9*c^10*d*h*i*k + 49545216*a^8*c^11*d*e*h*k - 24576$
 $00*a^8*c^11*e*f*i*j - 1474560*a^7*c^12*e*f*h*i - 10321920*a^6*c^13*d*e*f*i$
 $+ 737077248*a^10*b^3*c^6*d*j*k^2 - 518814720*a^9*b^5*c^5*d*j*k^2 + 44135424$
 $0*a^9*b^3*c^7*d*h*k^2 - 429871104*a^6*b^2*c^11*d^2*e*k - 272212992*a^8*b^5*$
 $c^6*d*h*k^2 + 305731584*a^5*b^4*c^10*d^2*e*k + 192412800*a^8*b^7*c^4*d*j*k^$

$$\begin{aligned}
& 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^4 \\
& c^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^4 \\
& i^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^3 \\
& c^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^4 \\
& c^7h^2i^k + 85524480a^8b^5c^6e^g k^2 + 474240a^8b^7c^4g^j^2k \\
& + 288000a^7b^6c^6h^2i^k + 63360a^6b^8c^5h^2i^k - 8064a^5b^{10}c^4 \\
& h^2i^k - 1152a^4b^{12}c^3h^2i^k - 15437824a^{11}b^2c^6f^j k^2 - 320 \\
& 34816a^{10}b^2c^7e^j^2k - 14369280a^8b^8c^3f^j k^2 - 13271040a^8b^3 \\
& c^8g^2i^k + 80267904a^7b^7c^5d^h k^2 + 79626240a^7b^2c^{10}e^2g^k \\
& k + 11059200a^9b^5c^5g^i k^2 + 8847360a^9b^2c^8g^i^2k - 42113280a^7 \\
& b^9c^3d^j k^2 + 6389760a^8b^7c^4g^i k^2 + 5898240a^8b^4c^7g^i^2 \\
& k - 37601280a^9b^4c^6f^h k^2 - 2949120a^7b^9c^3g^i k^2 + 2242560a^7 \\
& b^{10}c^2f^j k^2 - 2211840a^7b^5c^7g^2i^k + 1769472a^6b^7c^6g^2 \\
& i^k + 749568a^8b^3c^8h^i^2j - 442368a^7b^6c^6g^i^2k + 442368a^6 \\
& b^{11}c^2g^i k^2 - 442368a^6b^8c^5g^i^2k + 317952a^7b^5c^7h^i^2j \\
& j - 221184a^5b^9c^5g^2i^k + 73728a^5b^{10}c^4g^i^2k + 38400a^6b^7 \\
& c^6h^i^2j - 1920a^5b^9c^5h^i^2j + 9861120a^9b^4c^6e^j^2k - 110 \\
& 280960a^4b^6c^9d^2e^k - 93330432a^6b^8c^5d^f k^2 + 24645888a^8b^6 \\
& c^5f^h k^2 + 6359040a^8b^3c^8g^h^2k - 22118400a^9b^4c^6e^i k^2 \\
& - 3862528a^8b^2c^9f^2i^k - 2248704a^7b^4c^8f^2i^k - 1290240a^9b^2 \\
& c^8g^i j^2 - 948480a^8b^6c^5e^j^2k - 860160a^8b^4c^7g^i j^2 - \\
& 414720a^7b^5c^7g^h^2k + 303360a^6b^6c^7f^2i^k + 266880a^5b^8c^6 \\
& f^2i^k - 224640a^6b^7c^6g^h^2k - 80640a^7b^6c^6g^i j^2 - 72960a^4 \\
& b^{10}c^5f^2i^k + 17280a^5b^9c^5g^h^2k + 12672a^6b^8c^5g^i j^2 \\
& 2 + 5504a^3b^{12}c^4f^2i^k + 3456a^4b^{11}c^4g^h^2k - 384a^5b^{10}c^4 \\
& g^i j^2 - 128a^2b^{14}c^3f^2i^k + 30265344a^6b^4c^9d^2i^k - 12779 \\
& 520a^8b^6c^5e^i k^2 - 11796480a^8b^3c^8e^i^2k - 8847360a^7b^3c^9 \\
& e^2i^k - 7925760a^{10}b^2c^7f^h k^2 + 7077888a^6b^5c^8e^2i^k - 39 \\
& 813120a^7b^3c^9e^g^2k - 73175040a^9b^2c^8d^f k^2 + 5898240a^7b^8 \\
& c^4e^i k^2 + 5542272a^6b^{11}c^2d^j k^2 - 5420160a^7b^8c^4f^h k^2 + \\
& 55140480a^4b^7c^8d^2g^k + 1271808a^7b^3c^9g^2h^j - 1040384a^8b^2 \\
& c^9f^i^2j + 884736a^7b^5c^7e^i^2k - 884736a^6b^{10}c^3e^i k^2 + \\
& 884736a^6b^7c^6e^i^2k - 884736a^5b^7c^7e^2i^k - 697344a^7b^4c^8 \\
& f^i^2j + 414720a^6b^5c^8g^2h^j + 226560a^6b^{10}c^3f^h k^2 - 147 \\
& 456a^5b^9c^5e^i^2k - 121856a^6b^6c^7f^i^2j + 82560a^5b^{12}c^2f^h \\
& k^2 + 49152a^5b^{12}c^2e^i k^2 - 17280a^5b^7c^7g^2h^j + 8960a^5b^8 \\
& c^6f^i^2j + 14194944a^5b^6c^8d^2i^k - 12718080a^8b^2c^9e^h^2 \\
& k - 10615680a^4b^8c^7d^2i^k - 26542080a^6b^4c^9e^2g^k - 23592960 \\
& a^7b^7c^5e^g k^2 - 5142528a^8b^3c^8f^h j^2 + 5068800a^7b^2c^{10}f^2 \\
& h^j - 3755520a^7b^3c^9f^h^2j + 3336192a^7b^3c^9f^2g^k + 300096 \\
& 0a^6b^4c^9f^2h^j + 2893824a^3b^{10}c^6d^2i^k + 1720320a^8b^3c^8e^i \\
& j^2 + 1704960a^6b^5c^8f^2g^k - 1307520a^5b^7c^7f^2g^k - 10857 \\
& 60a^6b^5c^8f^h^2j - 959040a^7b^5c^7f^h j^2 + 829440a^7b^4c^8e^h^2 \\
& k - 552960a^7b^2c^{10}g^h^2i - 552960a^6b^4c^9g^h^2i + 449280a^6 \\
& b^6c^7e^h^2k - 422784a^2b^{12}c^5d^2i^k + 253440a^4b^9c^6f^2g^k \\
& + 161280a^7b^5c^7e^i j^2 - 145152a^5b^6c^8g^h^2i + 103200a^6b^7 \\
& c^6f^h j^2 + 41280a^5b^6c^8f^2h^j - 37188a^4b^8c^7f^2h^j - 34 \\
& 560a^5b^8c^6e^h^2k - 25344a^6b^7c^6e^i j^2 - 17280a^3b^{11}c^5f^2 \\
& g^k + 13536a^5b^7c^7f^h^2j - 6912a^4b^{10}c^5e^h^2k + 5490a^4b^9 \\
& c^6f^h^2j - 3456a^4b^8c^7g^h^2i + 1980a^3b^{10}c^6f^2h^j + 810a^5 \\
& b^9c^5f^h j^2 + 768a^5b^9c^5e^i j^2 + 384a^2b^{13}c^4f^2g^k - 270a^4 \\
& b^{11}c^4f^h j^2 - 180a^3b^{11}c^5f^h^2j - 30a^2b^{12}c^5f^2h^j \\
& *j + 6a^3b^{13}c^3f^h j^2 + 30067200a^6b^2c^{11}d^2h^j + 13271040a^6 \\
& b^5c^8e^g^2k - 10857600a^6b^9c^4d^h k^2 + 2949120a^6b^9c^4e^g k^2
\end{aligned}$$

$$\begin{aligned}
& 2 + 2654208a^5b^6c^8e^2g^*k + 2125824a^7b^3c^9d^*i^2j + 1658880a^6 \\
& *b^3c^{10}e^2h^*j - 1419264a^6b^4c^9f^*g^2j - 1327104a^5b^7c^7e^*g^2 \\
& *k - 921600a^7b^2c^{10}f^*g^2j - 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^2j - 96768a^5b^7 \\
& *c^7d^*i^2j + 80640a^5b^6c^8f^*g^2j - 69120a^5b^5c^9e^2h^*j + 1344 \\
& 0a^4b^9c^6d^*i^2j - 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^3b^9 \\
& c^7d^2g^*k + 8432640a^7b^2c^{10}d^*h^2j + 24140160a^5b^{10}c^4d^*f^* \\
& k^2 - 6672384a^7b^2c^{10}e^*f^2k + 4450176a^7b^4c^8d^*h^*j^2 + 4337280a^6 \\
& b^4c^9d^*h^2j - 3870720a^8b^2c^9e^*g^*j^2 - 3409920a^6b^4c^9e^*f^2 \\
& *k - 2885760a^5b^4c^{10}d^2h^*j - 2844288a^4b^6c^9d^2h^*j + 2615040 \\
& *a^5b^6c^8e^*f^2k - 1687680a^6b^6c^7d^*h^*j^2 + 1482624a^2b^{11}c^6d^2 \\
& *g^*k - 1290240a^6b^2c^{11}f^2g^*i + 1105920a^6b^3c^{10}e^*h^2i + 1019 \\
& 412a^3b^8c^8d^2h^*j - 1007424a^5b^6c^8d^*h^2j - 860160a^5b^4c^{10} \\
& *f^2g^*i - 645120a^7b^4c^8e^*g^*j^2 - 506880a^4b^8c^7e^*f^2k + 290304 \\
& *a^5b^5c^9e^*h^2i + 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^2g^*i + 51948a^4b^8 \\
& c^7d^*h^2j + 34560a^3b^{10}c^6e^*f^2k + 12672a^3b^8c^8f^2g^*i + 10 \\
& 800a^3b^{10}c^6d^*h^2j + 6912a^4b^7c^8e^*h^2i - 2304a^5b^8c^6e^*g^* \\
& j^2 - 768a^2b^{12}c^5e^*f^2k - 684a^3b^{12}c^4d^*h^*j^2 - 540a^2b^{12}c^5 \\
& d^*h^2j - 384a^2b^{10}c^7f^2g^*i - 90a^4b^{10}c^5d^*h^*j^2 + 18a^2b^{14} \\
& c^3d^*h^*j^2 + 23385600a^6b^2c^{11}d^*f^2j + 23293440a^3b^8c^8d^2e^* \\
& k + 6137856a^6b^3c^{10}d^*g^2j - 5677056a^6b^2c^{11}e^2f^*j + 5308416a^6 \\
& b^2c^{11}e^*g^2i - 5308416a^5b^3c^{11}e^2g^*i - 3786240a^4b^{12}c^3d^* \\
& *f^*k^2 - 3538944a^6b^3c^{10}e^*g^*i^2 + 2654208a^5b^4c^{10}e^*g^2i + 1658 \\
& 880a^6b^3c^{10}d^*h^*i^2 - 1354752a^5b^5c^9d^*g^2j - 1105920a^5b^4c^{10} \\
& f^*g^2h - 884736a^5b^5c^9e^*g^*i^2 - 552960a^6b^2c^{11}f^*g^2h + 357 \\
& 120a^3b^{14}c^2d^*f^*k^2 + 322560a^5b^4c^{10}e^2f^*j + 262656a^5b^5c^9 \\
& d^*h^*i^2 + 120960a^4b^7c^8d^*g^2j - 55296a^4b^7c^8d^*h^*i^2 - 34560a^4 \\
& b^6c^9f^*g^2h + 3456a^3b^8c^8f^*g^2h + 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^2g^*i + 10906560a^4b^5c^{10}d^2f^*j - 7418880a^5b^3c^{11}d^2f^* \\
& j + 3148992a^6b^5c^8d^*f^*j^2 - 2985696a^3b^7c^9d^2f^*j - 2965248a^2 \\
& b^{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 - 1505280a^4b^6c^9d^*f^2j - 829440a^5 \\
& b^4c^{10}e^*g^*h^2 - 508032a^2b^8c^9d^2g^*i + 378954a^2b^9c^8d^2f^* \\
& j + 362880a^5b^4c^{10}d^*f^2j + 296964a^3b^8c^8d^*f^2j + 161280a^4 \\
& b^5c^{10}e^*f^2i - 77070a^4b^9c^6d^*f^*j^2 - 30240a^5b^7c^7d^*f^*j^2 - \\
& 25344a^3b^7c^9e^*f^2i - 20736a^4b^6c^9e^*g^*h^2 - 19278a^2b^{10}c^7 \\
& d^*f^2j + 8820a^3b^{11}c^5d^*f^*j^2 + 768a^2b^9c^8e^*f^2i - 378a^2b^{13} \\
& c^4d^*f^*j^2 - 5419008a^5b^3c^{11}d^*e^2j - 4423680a^5b^2c^{12}e^2f^* \\
& h + 4147200a^5b^3c^{11}d^*g^2h - 2580480a^6b^2c^{11}d^*f^*i^2 - 967680a^5 \\
& b^4c^{10}d^*f^*i^2 + 483840a^4b^5c^{10}d^*e^2j - 414720a^4b^5c^{10}d^*g^2 \\
& h - 138240a^4b^4c^{11}e^2f^*h + 64512a^4b^6c^9d^*f^*i^2 + 39168a^3b^8 \\
& c^8d^*f^*i^2 - 31104a^3b^7c^9d^*g^2h + 13824a^3b^6c^{10}e^2f^*h + 1 \\
& 0368a^2b^9c^8d^*g^2h - 9216a^2b^{10}c^7d^*f^*i^2 + 15630336a^5b^2c^{12} \\
& d^*f^2h - 14459904a^4b^3c^{12}d^2f^*h + 9630144a^3b^5c^{11}d^2f^*h - \\
& 8764416a^5b^3c^{11}d^*f^*h^2 - 3870720a^5b^2c^{12}e^*f^2g - 3193344a^3b^5 \\
& c^{11}d^2e^*i + 2867328a^4b^4c^{11}d^*f^2h - 2095200a^2b^7c^{10}d^2f^* \\
& h - 1414080a^3b^6c^{10}d^*f^2h - 34836480a^4b^2c^{13}d^2e^*g + 1016064 \\
& a^2b^7c^{10}d^2e^*i - 645120a^4b^4c^{11}e^*f^2g + 306720a^3b^7c^9d^* \\
& f^*h^2 + 197820a^2b^8c^9d^*f^2h + 146880a^4b^5c^{10}d^*f^*h^2 + 80640a^3 \\
& b^6c^{10}e^*f^2g - 55350a^2b^9c^8d^*f^*h^2 - 2304a^2b^8c^9e^*f^2g - \\
& 3870720a^5b^2c^{12}d^*f^*g^2 - 1935360a^4b^4c^{11}d^*f^*g^2 - 1658880a^4b^3 \\
& c^{12}d^*e^2h + 725760a^3b^6c^{10}d^*f^*g^2 + 17418240a^3b^4c^{12}d^2e^* \\
& g - 124416a^3b^5c^{11}d^*e^2h - 96768a^2b^8c^9d^*f^*g^2 + 41472a^2b^7 \\
& c^{10}d^*e^2h - 3919104a^2b^6c^{11}d^2e^*g - 7741440a^4b^2c^{13}d^*e^2 \\
& *f + 2903040a^3b^4c^{12}d^*e^2f - 387072a^2b^6c^{11}d^*e^2f - 681246720
\end{aligned}$$

$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^2 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^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 + 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^* 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 + 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^* 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 - 354240 a^4 b^5 c^10 f^3 h + 145188 a^6 b^8 c^5 d^* j^3 + 98304 a^5 b^6 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^14 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 + 1658880 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 - 8068032 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^10 f^* i^2 j - 1152 b^16 c^3 d^2 i^* k - 1220516352 a^7 b^5 c^7 d^2 k^2 + 3538944 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 + 3456 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 + 4838400 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 - 883200 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 - 15482880 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$

$$\begin{aligned}
&^3 + 584578368a^6b^7c^6d^2k^2 + 93905920a^{12}b^3c^4j^2k^2 - 177997 \\
&248a^5b^9c^5d^2k^2 - 50967040a^{11}b^5c^3j^2k^2 + 104693760a^9b^2 \\
&c^8e^2k^2 + 12849984a^{10}b^7c^2j^2k^2 + 20021248a^{11}b^2c^6i^2k^2 \\
&2 - 85524480a^8b^4c^7e^2k^2 + 33223680a^{10}b^3c^6h^2k^2 + 4227072* \\
&a^{10}b^4c^5i^2k^2 - 3973120a^9b^6c^4i^2k^2 + 344064a^7b^{10}c^2i^2 \\
&2k^2 - 81920a^8b^8c^3i^2k^2 - 11386368a^9b^5c^5h^2k^2 + 26173440 \\
&a^9b^4c^6g^2k^2 - 21381120a^8b^6c^5g^2k^2 + 18874368a^{10}b^2c^7 \\
&g^2k^2 + 501760a^9b^3c^7i^2j^2 + 452160a^8b^7c^4h^2k^2 + 385920 \\
&a^7b^9c^3h^2k^2 + 170240a^8b^5c^6i^2j^2 - 48960a^6b^{11}c^2h^2* \\
&k^2 + 9216a^7b^7c^5i^2j^2 - 1984a^6b^9c^4i^2j^2 + 64a^5b^{11}c^3 \\
&i^2j^2 + 5898240a^7b^8c^4g^2k^2 + 1419840a^8b^4c^7h^2j^2 + 1387 \\
&008a^9b^2c^8h^2j^2 - 737280a^6b^{10}c^3g^2k^2 + 84960a^7b^6c^6h^2 \\
&>j^2 + 36864a^5b^{12}c^2g^2k^2 - 8010a^6b^8c^5h^2j^2 - 180a^5b^ \\
&10c^4h^2j^2 + 9a^4b^{12}c^3h^2j^2 + 14115840a^9b^3c^7f^2k^2 - 92 \\
&31552a^7b^7c^5f^2k^2 + 23592960a^7b^6c^6e^2k^2 + 4984320a^8b^5* \\
&c^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^3* \\
&c^9h^2i^2 + 161280a^7b^5c^7g^2j^2 + 140544a^6b^5c^8h^2i^2 + 729 \\
&60a^4b^{13}c^2f^2k^2 + 25344a^5b^7c^7h^2i^2 - 20160a^6b^7c^6g^2 \\
&j^2 + 576a^5b^9c^5g^2j^2 + 576a^4b^9c^6h^2i^2 + 3808000a^8b^2* \\
&c^9f^2j^2 - 2949120a^6b^8c^5e^2k^2 + 1643712a^7b^4c^8f^2j^2 + 8 \\
&84736a^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 - 1379 \\
&0a^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^5* \\
&b^5c^9f^2i^2 - 80640a^6b^5c^8e^2j^2 + 9216a^4b^7c^8f^2i^2 + 51 \\
&84a^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^2 \\
&c^{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^7* \\
&f^2h^2 + 1935360a^5b^3c^{11}d^2i^2 + 967680a^5b^3c^{11}f^2g^2 + 8294 \\
&40a^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^4 \\
&b^2c^{13}d^2f^2 - 1412640a^3b^6c^{10}d^2h^2 + 461376a^4b^4c^{11}d^2* \\
&h^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^2 \\
&f^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 + 78400 \\
&a^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 + 64* \\
&a^2b^{17}f^2k^2 + 16934400a^8c^{11}d^2j^2 + 9b^{16}c^3d^2j^2 + 3538944 \\
&a^7c^{12}e^2i^2 + 115200a^7c^{12}f^2h^2 + 576b^{13}c^6d^2i^2 + 2025b^ \\
&^12c^7d^2h^2 + 6096384a^6c^{13}d^2h^2 + 492800a^{11}b^2c^6j^4 + 3514 \\
&56a^{10}b^4c^5j^4 - 43120a^9b^6c^4j^4 + 5184b^{11}c^8d^2g^2 + 1225* \\
&a^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^5 \\
&c^{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^5* \\
&b^4c^{10}g^4 + 492800a^5b^2c^{12}f^4 + 351456a^4b^4c^{11}f^4 - 43120a^ \\
&3b^6c^{10}f^4 + 1225a^2b^8c^9f^4 - 27433728a^3b^2c^{14}d^4 + 6446304 \\
&a^2b^4c^{13}d^4 + a^2b^{14}c^3f^2j^2 - 81920a^8b^{11}i^2k^3 + 384000a^
\end{aligned}$$

```

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

$$3.60 \quad \int (a + bx^2 + cx^4)^3 (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cf x^6) dx$$

Optimal. Leaf size=416

$$a^4 dx + \frac{1}{2} a^4 ex^2 + \frac{1}{3} a^3 x^3 (af + 4bd) + a^3 bex^4 + \frac{2}{5} a^2 x^5 (2abf + 2acd + 3b^2 d) + \frac{1}{3} a^2 ex^6 (2ac + 3b^2) + \frac{1}{10} ex^{10} (6a^2 c^2 + 12ab^2 c)$$

[Out] a^4*d*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}

$$\frac{1}{11} x^{11} (6a^2 c^2 f + 12ab^2 c f + 12abc^2 d + 4b^3 c d + b^4 f) + \frac{1}{9} x^9 (12a^2 b c f + 6a^2 c^2 d + 12ab^2 c d + 4ab^3 f + b^4 d) + \frac{1}{10} ex^{10} (6a^2 c^2 + 12ab^2 c)$$

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

$$\int (a + bx^2 + cx^4)^3 (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cf x^6) dx = \int (a^4 d + a^4 ex + a^3 (4bd + b^2 e) x^2 + a^3 b e x^3 + a^2 (3b^2 d + 2ac d + 2ab f) x^4 + a^2 c^2 (b^2 + 3ac) x^5 + a (2b^3 d + 6abc d + 3ab^2 f + 2a^2 c f) x^6 + ab (b^2 + 3ac) e x^7 + (b^4 d + 12ab^2 c d + 6a^2 c^2 d + 4ab^3 f + 12a^2 b c f) x^8 + (b^4 + 12ab^2 c + 6a^2 c^2) e x^9 + (4b^3 c d + 12ab c^2 d + b^4 f + 12ab^2 c f + 6a^2 c^2 f) x^{10} + b c (b^2 + 3ac) e x^{11} + 2c (3b^2 c d + 2ac^2 d + 2b^3 f + 6ab c f) x^{12} + c^2 (3b^2 + 2ac) e x^{13} + 2c^2 (2b c d + 3b^2 f + 2a c f) x^{14} + b c^3 e x^{15} + c^3 (c d + 4b f) x^{16} + c^4 e x^{17} + c^4 f x^{18}) dx = a^4 dx + \frac{1}{2} a^4 ex^2 + \frac{1}{3} a^3 (4bd + b^2 e) x^3 + \frac{1}{5} a^2 (3b^2 d + 2ac d + 2ab f) x^4 + \frac{1}{3} a^2 c^2 (b^2 + 3ac) x^5 + \frac{1}{7} a (2b^3 d + 6abc d + 3ab^2 f + 2a^2 c f) x^6 + \frac{1}{2} ab (b^2 + 3ac) e x^7 + \frac{1}{9} (b^4 d + 12ab^2 c d + 6a^2 c^2 d + 4ab^3 f + 12a^2 b c f) x^8 + \frac{1}{10} (b^4 + 12ab^2 c + 6a^2 c^2) e x^9 + \frac{1}{11} (4b^3 c d + 12ab c^2 d + b^4 f + 12ab^2 c f + 6a^2 c^2 f) x^{10} + \frac{1}{3} b c (b^2 + 3ac) e x^{11} + \frac{1}{13} 2c (3b^2 c d + 2ac^2 d + 2b^3 f + 6ab c f) x^{12} + \frac{1}{7} c^2 (3b^2 + 2ac) e x^{13} + \frac{1}{15} 2c^2 (2b c d + 3b^2 f + 2a c f) x^{14} + \frac{1}{4} b c^3 e x^{15} + \frac{1}{17} c^3 (c d + 4b f) x^{16} + \frac{1}{18} c^4 e x^{17} + \frac{1}{19} c^4 f x^{18}$$

Mathematica [A] time = 0.12, size = 416, normalized size = 1.00

$$a^4 dx + \frac{1}{2} a^4 ex^2 + \frac{1}{3} a^3 x^3 (af + 4bd) + a^3 bex^4 + \frac{2}{5} a^2 x^5 (2abf + 2acd + 3b^2 d) + \frac{1}{3} a^2 ex^6 (2ac + 3b^2) + \frac{1}{10} ex^{10} (6a^2 c^2 + 12ab^2 c)$$

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

$$\frac{1}{19}x^{19}fc^4 + \frac{1}{18}x^{18}ec^4 + \frac{1}{17}x^{17}dc^4 + \frac{4}{17}x^{17}fc^3b + \frac{1}{4}x^{16}ec^3b + \frac{4}{15}x^{15}dc^3b + \frac{2}{5}x^{15}fc^2b^2 + \frac{4}{15}x^{15}fc^3a + \frac{3}{7}x^{14}ec^2b^2 + \frac{2}{7}x^{14}ec^3a$$

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*e*c*b*a^2 + 4/7*x^7*d*b^3*a + 12/7*x^7*d*c*b*a^2 + 6/7*x^7*f*b^2*a^2 + 4/7*x^7*f*c*a^3 + x^6*e*b^2*a^2 + 2/3*x^6*e*c*a^3 + 6/5*x^5*d*b^2*a^2 + 4/5*x^5*d*c*a^3 + 4/5*x^5*f*b*a^3 + x^4*e*b*a^3 + 4/3*x^3*d*b*a^3 + 1/3*x^3*f*a^4 + 1/2*x^2*e*a^4 + x*d*a^4

giac [A] time = 0.43, size = 478, normalized size = 1.15

$$\frac{1}{19}c^4fx^{19} + \frac{1}{18}c^4x^{18}e + \frac{1}{17}c^4dx^{17} + \frac{4}{17}bc^3fx^{17} + \frac{1}{4}bc^3x^{16}e + \frac{4}{15}bc^3dx^{15} + \frac{2}{5}b^2c^2fx^{15} + \frac{4}{15}ac^3fx^{15} + \frac{3}{7}b^2c^2x^{14}e + \frac{2}{7}ac^3x^{14}e$$

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="giac")

[Out] 1/19*c^4*f*x^19 + 1/18*c^4*x^18*e + 1/17*c^4*d*x^17 + 4/17*b*c^3*f*x^17 + 1/4*b*c^3*x^16*e + 4/15*b*c^3*d*x^15 + 2/5*b^2*c^2*f*x^15 + 4/15*a*c^3*f*x^15 + 3/7*b^2*c^2*x^14*e + 2/7*a*c^3*x^14*e + 6/13*b^2*c^2*d*x^13 + 4/13*a*c^3*d*x^13 + 4/13*b^3*c*f*x^13 + 12/13*a*b*c^2*f*x^13 + 1/3*b^3*c*x^12*e + a*b*c^2*x^12*e + 4/11*b^3*c*d*x^11 + 12/11*a*b*c^2*d*x^11 + 1/11*b^4*f*x^11 + 12/11*a*b^2*c*f*x^11 + 6/11*a^2*c^2*f*x^11 + 1/10*b^4*x^10*e + 6/5*a*b^2*c*x^10*e + 3/5*a^2*c^2*x^10*e + 1/9*b^4*d*x^9 + 4/3*a*b^2*c*d*x^9 + 2/3*a^2*c^2*d*x^9 + 4/9*a*b^3*f*x^9 + 4/3*a^2*b*c*f*x^9 + 1/2*a*b^3*x^8*e + 3/2*a^2*b*c*x^8*e + 4/7*a*b^3*d*x^7 + 12/7*a^2*b*c*d*x^7 + 6/7*a^2*b^2*f*x^7 + 4/7*a^3*c*f*x^7 + a^2*b^2*x^6*e + 2/3*a^3*c*x^6*e + 6/5*a^2*b^2*d*x^5 + 4/5*a^3*c*d*x^5 + 4/5*a^3*b*f*x^5 + a^3*b*x^4*e + 4/3*a^3*b*d*x^3 + 1/3*a^4*f*x^3 + 1/2*a^4*x^2*e + a^4*d*x

maple [B] time = 0.00, size = 829, normalized size = 1.99

$$\frac{c^4fx^{19}}{19} + \frac{c^4ex^{18}}{18} + \frac{bc^3ex^{16}}{4} + \frac{(3bc^3f + (bf + cd)c^3)x^{17}}{17} + \frac{(3(bf + cd)bc^2 + (af + bd)c^3 + (a^2c^2 + 2b^2c + (2a^3c^2d + 4a^3b^2f)x^5 + a^3b^2*x^4e + 4/3a^3b*d*x^3 + 1/3a^4*f*x^3 + 1/2a^4*x^2e + a^4*d*x$$

Verification of antiderivative is not currently implemented for this CAS.

[In] `int((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] $\frac{1}{19}c^4fx^{19} + \frac{1}{18}c^4ex^{18} + \frac{1}{17}(3b^3c^3f + c^3(bf + cd))x^{17} + \frac{1}{4}b^3c^3ex^{16} + \frac{1}{15}((a^2c^2 + 2b^2c + (2ac + b^2)c)cf + 3b^2c^2(bf + cd) + c^3(a^2f + b^2d))x^{15} + \frac{1}{14}((a^2c^2 + 2b^2c + (2ac + b^2)c)ce + 3b^2c^2e + a^2c^3e)x^{14} + \frac{1}{13}((4ab^3c + (2ac + b^2)b)cf + (a^2c^2 + 2b^2c + (2ac + b^2)c)(bf + cd) + 3b^2c^2(a^2f + b^2d) + a^2c^3d)x^{13} + \frac{1}{12}((4ab^3c + (2ac + b^2)b)ce + (a^2c^2 + 2b^2c + (2ac + b^2)c)be + 3a^2b^3c^2e)x^{12} + \frac{1}{11}((a^2c^2 + 2a^2b^2 + (2ac + b^2)a)cf + (4ab^3c + (2ac + b^2)b)(bf + cd) + (a^2c^2 + 2b^2c + (2ac + b^2)c)(a^2f + b^2d) + 3dab^3c^2)x^{11} + \frac{1}{10}((a^2c^2 + 2a^2b^2 + (2ac + b^2)a)ce + (4ab^3c + (2ac + b^2)b)be + (a^2c^2 + 2b^2c + (2ac + b^2)c)ae)x^{10} + \frac{1}{9}(3a^2b^3c^3f + (a^2c^2 + 2a^2b^2 + (2ac + b^2)a)(bf + cd) + (4ab^3c + (2ac + b^2)b)(a^2f + b^2d) + (a^2c^2 + 2b^2c + (2ac + b^2)c)ad)x^9 + \frac{1}{8}(3a^2b^3c^3e + (a^2c^2 + 2a^2b^2 + (2ac + b^2)a)be + (4ab^3c + (2ac + b^2)b)ae)x^8 + \frac{1}{7}(a^3c^3f + 3a^2b^3(bf + cd) + (a^2c^2 + 2a^2b^2 + (2ac + b^2)a)(a^2f + b^2d) + (4ab^3c + (2ac + b^2)b)ad)x^7 + \frac{1}{6}(a^3c^3e + 3a^2b^3e + (a^2c^2 + 2a^2b^2 + (2ac + b^2)a)ae)x^6 + \frac{1}{5}(a^3(bf + cd) + 3a^2b^3(a^2f + b^2d) + (a^2c^2 + 2a^2b^2 + (2ac + b^2)a)ad)x^5 + a^3b^3ex^4 + \frac{1}{3}(a^3(a^2f + b^2d) + 3a^3b^3d)x^3 + \frac{1}{2}a^4ex^2 + a^4d*x$

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] $\frac{1}{19}c^4fx^{19} + \frac{1}{18}c^4ex^{18} + \frac{1}{4}b^3c^3ex^{16} + \frac{1}{17}(c^4d + 4b^3c^3f)x^{17} + \frac{1}{7}(3b^2c^2 + 2ac^3)ex^{14} + \frac{2}{15}(2b^2c^3d + (3b^2c^2 + 2ac^3)f)x^{15} + \frac{1}{3}(b^3c + 3a^2b^3c^2)ex^{12} + \frac{2}{13}((3b^2c^2 + 2ac^3)d + 2(b^3c + 3a^2b^3c^2)f)x^{13} + \frac{1}{10}(b^4 + 12a^2b^2c + 6a^2c^2)ex^{10} + \frac{1}{11}(4(b^3c + 3a^2b^3c^2)d + (b^4 + 12a^2b^2c + 6a^2c^2)f)x^{11} + \frac{1}{2}(a^2b^3 + 3a^2b^3c)ex^8 + \frac{1}{9}((b^4 + 12a^2b^2c + 6a^2c^2)d + 4(a^2b^3 + 3a^2b^3c)f)x^9 + a^3b^3ex^4 + \frac{1}{3}(3a^2b^2 + 2a^3c)ex^6 + \frac{2}{7}(2(a^2b^3 + 3a^2b^3c)d + (3a^2b^2 + 2a^3c)f)x^7 + \frac{1}{2}a^4ex^2 + a^4d*x + \frac{2}{5}(2a^3b^3f + (3a^2b^2 + 2a^3c)d)x^5 + \frac{1}{3}(4a^3b^3d + a^4f)x^3$

mupad [B] time = 0.38, size = 398, normalized size = 0.96

$$x^3 \left(\frac{fa^4}{3} + \frac{4bda^3}{3} \right) + x^{17} \left(\frac{dc^4}{17} + \frac{4bfc^3}{17} \right) + x^5 \left(\frac{4fa^3b}{5} + \frac{4cda^3}{5} + \frac{6da^2b^2}{5} \right) + x^{15} \left(\frac{2fb^2c^2}{5} + \frac{4dbc^3}{15} + \frac{4af}{15} \right)$$

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] $x^3((a^4f)/3 + (4a^3b^3d)/3) + x^{17}((c^4d)/17 + (4b^3c^3f)/17) + x^{15}((6a^2b^2d)/5 + (4a^3c^3d)/5 + (4a^3b^3f)/5) + x^{15}((2b^2c^2f)/5 + (4b^3c^3d)/15 + (4a^3c^3f)/15) + x^9((b^4d)/9 + (2a^2c^2d)/3 + (4a^2b^3f)/9 + (4a^2b^2c^2d)/3 + (4a^2b^3c^2f)/3) + x^{11}((b^4f)/11 + (6a^2c^2f)/11 + (4b^3c^3d)/11 + (12a^2b^3c^2d)/11 + (12a^2b^2c^2f)/11) + x^7((6a^2b^2f)/7 + (4a^2b^3d)/7 + (4a^3c^3f)/7 + (12a^2b^3c^2d)/7) + x^{13}((6b^2c^2d)/13 + (4a^3c^3d)/13 + (4b^3c^3f)/13 + (12a^2b^3c^2f)/13) + (a^4e*x^2)/2 + (c^4e*x^18)/18 + (c^4f*x^19)/19 + (e*x^10*(b^4 + 6a^2c^2 + 12a^2b^2c))/10 + a^4d*x + (a^2e*x^6*(2ac + 3b^2))/3 + (c^2e*x^14$

$$\frac{(2ac + 3b^2)}{7} + a^3 b e^{x^4} + \frac{(bc^3 e^{x^{16}})}{4} + \frac{(a b e^{x^8} (3ac + b^2))}{2} + \frac{(bc e^{x^{12}} (3ac + b^2))}{3}$$

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{bc^3 e^{x^{16}}}{4} + \frac{c^4 e^{x^{18}}}{18} + \frac{c^4 f x^{19}}{19} + x^{17} \left(\frac{4bc^3 f}{17} + \frac{c^4 d}{17} \right) + x^{15} \left(\frac{4ac^3 f}{15} + \frac{2b^2 c^2 f}{5} + \frac{4bc^3 d}{15} \right) + x^{14} \left(\frac{2a^4 d}{7} + \frac{2a^3 b e^{x^2}}{7} + \frac{2a^2 c^3 e^{x^{16}}}{7} + \frac{2a^2 c^4 e^{x^{18}}}{7} + \frac{2a^2 c^4 f x^{19}}{7} + \frac{2a^2 c^4 d x^{17}}{7} + \frac{2a^2 c^3 f x^{15}}{7} + \frac{2a^2 c^3 d x^{13}}{7} + \frac{2a^2 c^2 f x^{11}}{7} + \frac{2a^2 c^2 d x^9}{7} + \frac{2a^2 c f x^7}{7} + \frac{2a^2 c d x^5}{7} + \frac{2a^2 b e^{x^4}}{7} + \frac{2a^2 b e^{x^8}}{7} + \frac{2a^2 b e^{x^{12}}}{7} + \frac{2a^2 b e^{x^{16}}}{7} + \frac{2a^2 b e^{x^{20}}}{7} + \frac{2a^2 b e^{x^{24}}}{7} + \frac{2a^2 b e^{x^{28}}}{7} + \frac{2a^2 b e^{x^{32}}}{7} + \frac{2a^2 b e^{x^{36}}}{7} + \frac{2a^2 b e^{x^{40}}}{7} + \frac{2a^2 b e^{x^{44}}}{7} + \frac{2a^2 b e^{x^{48}}}{7} + \frac{2a^2 b e^{x^{52}}}{7} + \frac{2a^2 b e^{x^{56}}}{7} + \frac{2a^2 b e^{x^{60}}}{7} + \frac{2a^2 b e^{x^{64}}}{7} + \frac{2a^2 b e^{x^{68}}}{7} + \frac{2a^2 b e^{x^{72}}}{7} + \frac{2a^2 b e^{x^{76}}}{7} + \frac{2a^2 b e^{x^{80}}}{7} + \frac{2a^2 b e^{x^{84}}}{7} + \frac{2a^2 b e^{x^{88}}}{7} + \frac{2a^2 b e^{x^{92}}}{7} + \frac{2a^2 b e^{x^{96}}}{7} + \frac{2a^2 b e^{x^{100}}}{7} + \frac{2a^2 b e^{x^{104}}}{7} + \frac{2a^2 b e^{x^{108}}}{7} + \frac{2a^2 b e^{x^{112}}}{7} + \frac{2a^2 b e^{x^{116}}}{7} + \frac{2a^2 b e^{x^{120}}}{7} + \frac{2a^2 b e^{x^{124}}}{7} + \frac{2a^2 b e^{x^{128}}}{7} + \frac{2a^2 b e^{x^{132}}}{7} + \frac{2a^2 b e^{x^{136}}}{7} + \frac{2a^2 b e^{x^{140}}}{7} + \frac{2a^2 b e^{x^{144}}}{7} + \frac{2a^2 b e^{x^{148}}}{7} + \frac{2a^2 b e^{x^{152}}}{7} + \frac{2a^2 b e^{x^{156}}}{7} + \frac{2a^2 b e^{x^{160}}}{7} + \frac{2a^2 b e^{x^{164}}}{7} + \frac{2a^2 b e^{x^{168}}}{7} + \frac{2a^2 b e^{x^{172}}}{7} + \frac{2a^2 b e^{x^{176}}}{7} + \frac{2a^2 b e^{x^{180}}}{7} + \frac{2a^2 b e^{x^{184}}}{7} + \frac{2a^2 b e^{x^{188}}}{7} + \frac{2a^2 b e^{x^{192}}}{7} + \frac{2a^2 b e^{x^{196}}}{7} + \frac{2a^2 b e^{x^{200}}}{7} + \frac{2a^2 b e^{x^{204}}}{7} + \frac{2a^2 b e^{x^{208}}}{7} + \frac{2a^2 b e^{x^{212}}}{7} + \frac{2a^2 b e^{x^{216}}}{7} + \frac{2a^2 b e^{x^{220}}}{7} + \frac{2a^2 b e^{x^{224}}}{7} + \frac{2a^2 b e^{x^{228}}}{7} + \frac{2a^2 b e^{x^{232}}}{7} + \frac{2a^2 b e^{x^{236}}}{7} + \frac{2a^2 b e^{x^{240}}}{7} + \frac{2a^2 b e^{x^{244}}}{7} + \frac{2a^2 b e^{x^{248}}}{7} + \frac{2a^2 b e^{x^{252}}}{7} + \frac{2a^2 b e^{x^{256}}}{7} + \frac{2a^2 b e^{x^{260}}}{7} + \frac{2a^2 b e^{x^{264}}}{7} + \frac{2a^2 b e^{x^{268}}}{7} + \frac{2a^2 b e^{x^{272}}}{7} + \frac{2a^2 b e^{x^{276}}}{7} + \frac{2a^2 b e^{x^{280}}}{7} + \frac{2a^2 b e^{x^{284}}}{7} + \frac{2a^2 b e^{x^{288}}}{7} + \frac{2a^2 b e^{x^{292}}}{7} + \frac{2a^2 b e^{x^{296}}}{7} + \frac{2a^2 b e^{x^{300}}}{7} + \frac{2a^2 b e^{x^{304}}}{7} + \frac{2a^2 b e^{x^{308}}}{7} + \frac{2a^2 b e^{x^{312}}}{7} + \frac{2a^2 b e^{x^{316}}}{7} + \frac{2a^2 b e^{x^{320}}}{7} + \frac{2a^2 b e^{x^{324}}}{7} + \frac{2a^2 b e^{x^{328}}}{7} + \frac{2a^2 b e^{x^{332}}}{7} + \frac{2a^2 b e^{x^{336}}}{7} + \frac{2a^2 b e^{x^{340}}}{7} + \frac{2a^2 b e^{x^{344}}}{7} + \frac{2a^2 b e^{x^{348}}}{7} + \frac{2a^2 b e^{x^{352}}}{7} + \frac{2a^2 b e^{x^{356}}}{7} + \frac{2a^2 b e^{x^{360}}}{7} + \frac{2a^2 b e^{x^{364}}}{7} + \frac{2a^2 b e^{x^{368}}}{7} + \frac{2a^2 b e^{x^{372}}}{7} + \frac{2a^2 b e^{x^{376}}}{7} + \frac{2a^2 b e^{x^{380}}}{7} + \frac{2a^2 b e^{x^{384}}}{7} + \frac{2a^2 b e^{x^{388}}}{7} + \frac{2a^2 b e^{x^{392}}}{7} + \frac{2a^2 b e^{x^{396}}}{7} + \frac{2a^2 b e^{x^{400}}}{7} + \frac{2a^2 b e^{x^{404}}}{7} + \frac{2a^2 b e^{x^{408}}}{7} + \frac{2a^2 b e^{x^{412}}}{7} + \frac{2a^2 b e^{x^{416}}}{7} + \frac{2a^2 b e^{x^{420}}}{7} + \frac{2a^2 b e^{x^{424}}}{7} + \frac{2a^2 b e^{x^{428}}}{7} + \frac{2a^2 b e^{x^{432}}}{7} + \frac{2a^2 b e^{x^{436}}}{7} + \frac{2a^2 b e^{x^{440}}}{7} + \frac{2a^2 b e^{x^{444}}}{7} + \frac{2a^2 b e^{x^{448}}}{7} + \frac{2a^2 b e^{x^{452}}}{7} + \frac{2a^2 b e^{x^{456}}}{7} + \frac{2a^2 b e^{x^{460}}}{7} + \frac{2a^2 b e^{x^{464}}}{7} + \frac{2a^2 b e^{x^{468}}}{7} + \frac{2a^2 b e^{x^{472}}}{7} + \frac{2a^2 b e^{x^{476}}}{7} + \frac{2a^2 b e^{x^{480}}}{7} + \frac{2a^2 b e^{x^{484}}}{7} + \frac{2a^2 b e^{x^{488}}}{7} + \frac{2a^2 b e^{x^{492}}}{7} + \frac{2a^2 b e^{x^{496}}}{7} + \frac{2a^2 b e^{x^{500}}}{7} + \frac{2a^2 b e^{x^{504}}}{7} + \frac{2a^2 b e^{x^{508}}}{7} + \frac{2a^2 b e^{x^{512}}}{7} + \frac{2a^2 b e^{x^{516}}}{7} + \frac{2a^2 b e^{x^{520}}}{7} + \frac{2a^2 b e^{x^{524}}}{7} + \frac{2a^2 b e^{x^{528}}}{7} + \frac{2a^2 b e^{x^{532}}}{7} + \frac{2a^2 b e^{x^{536}}}{7} + \frac{2a^2 b e^{x^{540}}}{7} + \frac{2a^2 b e^{x^{544}}}{7} + \frac{2a^2 b e^{x^{548}}}{7} + \frac{2a^2 b e^{x^{552}}}{7} + \frac{2a^2 b e^{x^{556}}}{7} + \frac{2a^2 b e^{x^{560}}}{7} + \frac{2a^2 b e^{x^{564}}}{7} + \frac{2a^2 b e^{x^{568}}}{7} + \frac{2a^2 b e^{x^{572}}}{7} + \frac{2a^2 b e^{x^{576}}}{7} + \frac{2a^2 b e^{x^{580}}}{7} + \frac{2a^2 b e^{x^{584}}}{7} + \frac{2a^2 b e^{x^{588}}}{7} + \frac{2a^2 b e^{x^{592}}}{7} + \frac{2a^2 b e^{x^{596}}}{7} + \frac{2a^2 b e^{x^{600}}}{7} + \frac{2a^2 b e^{x^{604}}}{7} + \frac{2a^2 b e^{x^{608}}}{7} + \frac{2a^2 b e^{x^{612}}}{7} + \frac{2a^2 b e^{x^{616}}}{7} + \frac{2a^2 b e^{x^{620}}}{7} + \frac{2a^2 b e^{x^{624}}}{7} + \frac{2a^2 b e^{x^{628}}}{7} + \frac{2a^2 b e^{x^{632}}}{7} + \frac{2a^2 b e^{x^{636}}}{7} + \frac{2a^2 b e^{x^{640}}}{7} + \frac{2a^2 b e^{x^{644}}}{7} + \frac{2a^2 b e^{x^{648}}}{7} + \frac{2a^2 b e^{x^{652}}}{7} + \frac{2a^2 b e^{x^{656}}}{7} + \frac{2a^2 b e^{x^{660}}}{7} + \frac{2a^2 b e^{x^{664}}}{7} + \frac{2a^2 b e^{x^{668}}}{7} + \frac{2a^2 b e^{x^{672}}}{7} + \frac{2a^2 b e^{x^{676}}}{7} + \frac{2a^2 b e^{x^{680}}}{7} + \frac{2a^2 b e^{x^{684}}}{7} + \frac{2a^2 b e^{x^{688}}}{7} + \frac{2a^2 b e^{x^{692}}}{7} + \frac{2a^2 b e^{x^{696}}}{7} + \frac{2a^2 b e^{x^{700}}}{7} + \frac{2a^2 b e^{x^{704}}}{7} + \frac{2a^2 b e^{x^{708}}}{7} + \frac{2a^2 b e^{x^{712}}}{7} + \frac{2a^2 b e^{x^{716}}}{7} + \frac{2a^2 b e^{x^{720}}}{7} + \frac{2a^2 b e^{x^{724}}}{7} + \frac{2a^2 b e^{x^{728}}}{7} + \frac{2a^2 b e^{x^{732}}}{7} + \frac{2a^2 b e^{x^{736}}}{7} + \frac{2a^2 b e^{x^{740}}}{7} + \frac{2a^2 b e^{x^{744}}}{7} + \frac{2a^2 b e^{x^{748}}}{7} + \frac{2a^2 b e^{x^{752}}}{7} + \frac{2a^2 b e^{x^{756}}}{7} + \frac{2a^2 b e^{x^{760}}}{7} + \frac{2a^2 b e^{x^{764}}}{7} + \frac{2a^2 b e^{x^{768}}}{7} + \frac{2a^2 b e^{x^{772}}}{7} + \frac{2a^2 b e^{x^{776}}}{7} + \frac{2a^2 b e^{x^{780}}}{7} + \frac{2a^2 b e^{x^{784}}}{7} + \frac{2a^2 b e^{x^{788}}}{7} + \frac{2a^2 b e^{x^{792}}}{7} + \frac{2a^2 b e^{x^{796}}}{7} + \frac{2a^2 b e^{x^{800}}}{7} + \frac{2a^2 b e^{x^{804}}}{7} + \frac{2a^2 b e^{x^{808}}}{7} + \frac{2a^2 b e^{x^{812}}}{7} + \frac{2a^2 b e^{x^{816}}}{7} + \frac{2a^2 b e^{x^{820}}}{7} + \frac{2a^2 b e^{x^{824}}}{7} + \frac{2a^2 b e^{x^{828}}}{7} + \frac{2a^2 b e^{x^{832}}}{7} + \frac{2a^2 b e^{x^{836}}}{7} + \frac{2a^2 b e^{x^{840}}}{7} + \frac{2a^2 b e^{x^{844}}}{7} + \frac{2a^2 b e^{x^{848}}}{7} + \frac{2a^2 b e^{x^{852}}}{7} + \frac{2a^2 b e^{x^{856}}}{7} + \frac{2a^2 b e^{x^{860}}}{7} + \frac{2a^2 b e^{x^{864}}}{7} + \frac{2a^2 b e^{x^{868}}}{7} + \frac{2a^2 b e^{x^{872}}}{7} + \frac{2a^2 b e^{x^{876}}}{7} + \frac{2a^2 b e^{x^{880}}}{7} + \frac{2a^2 b e^{x^{884}}}{7} + \frac{2a^2 b e^{x^{888}}}{7} + \frac{2a^2 b e^{x^{892}}}{7} + \frac{2a^2 b e^{x^{896}}}{7} + \frac{2a^2 b e^{x^{900}}}{7} + \frac{2a^2 b e^{x^{904}}}{7} + \frac{2a^2 b e^{x^{908}}}{7} + \frac{2a^2 b e^{x^{912}}}{7} + \frac{2a^2 b e^{x^{916}}}{7} + \frac{2a^2 b e^{x^{920}}}{7} + \frac{2a^2 b e^{x^{924}}}{7} + \frac{2a^2 b e^{x^{928}}}{7} + \frac{2a^2 b e^{x^{932}}}{7} + \frac{2a^2 b e^{x^{936}}}{7} + \frac{2a^2 b e^{x^{940}}}{7} + \frac{2a^2 b e^{x^{944}}}{7} + \frac{2a^2 b e^{x^{948}}}{7} + \frac{2a^2 b e^{x^{952}}}{7} + \frac{2a^2 b e^{x^{956}}}{7} + \frac{2a^2 b e^{x^{960}}}{7} + \frac{2a^2 b e^{x^{964}}}{7} + \frac{2a^2 b e^{x^{968}}}{7} + \frac{2a^2 b e^{x^{972}}}{7} + \frac{2a^2 b e^{x^{976}}}{7} + \frac{2a^2 b e^{x^{980}}}{7} + \frac{2a^2 b e^{x^{984}}}{7} + \frac{2a^2 b e^{x^{988}}}{7} + \frac{2a^2 b e^{x^{992}}}{7} + \frac{2a^2 b e^{x^{996}}}{7} + \frac{2a^2 b e^{x^{1000}}}{7}$$

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}

$$\frac{1}{7} x^7 (3a^2 cf + 3ab^2 f + 6abcd + b^3 d) + \frac{1}{3} a^2 x^3 (af + 3bd) + \frac{3}{4} a^2 bex^4 + a^3 dx + \frac{1}{2} a^3 ex^2 + \frac{1}{9} x^9 (6abcf + 3ac^2 d + 3b^2 cd + b^3 d)$$

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

$$\int (a + bx^2 + cx^4)^2 (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx = \int (a^3 d + a^3 ex + a^2(3bd + b^2 d) + a^2(b^2 + ac)e + a(b^3 d + 6abcf + 3ac^2 d + 3b^2 cd + b^3 d)x^7 + (b(b^2 + 6ac)e + (3b^2 c d + 3ac^2 d + b^3 f + 6abcf)x^9 + (3c(b^2 + ac)e + (3c(bcd + b^2 f + acf)x^{11} + b c^2 e x^{12})/4 + (c^2(c d + 3 b f) x^{13})/13 + (c^3 e x^{14})/14 + (c^3 f x^{15})/15)$$

Mathematica [A] time = 0.05, size = 259, normalized size = 1.00

$$a^3 dx + \frac{1}{2} a^3 ex^2 + \frac{1}{7} x^7 (3a^2 cf + 3ab^2 f + 6abcd + b^3 d) + \frac{1}{3} a^2 x^3 (af + 3bd) + \frac{3}{4} a^2 bex^4 + \frac{3}{11} cx^{11} (acf + b^2 f + bcd) + \frac{3}{5} ax^5$$

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] $a^3 d x + (a^3 e x^2)/2 + (a^2 (3 b d + a f) x^3)/3 + (3 a^2 b e x^4)/4 + (3 a (b^2 d + a c d + a b f) x^5)/5 + (a (b^2 + a c) e x^6)/2 + ((b^3 d + 6 a b c d + 3 a b^2 f + 3 a^2 c f) x^7)/7 + (b (b^2 + 6 a c) e x^8)/8 + ((3 b^2 c d + 3 a c^2 d + b^3 f + 6 a b c f) x^9)/9 + (3 c (b^2 + a c) e x^{10})/10 + (3 c (b c d + b^2 f + a c f) x^{11})/11 + (b c^2 e x^{12})/4 + (c^2 (c d + 3 b f) x^{13})/13 + (c^3 e x^{14})/14 + (c^3 f x^{15})/15$

$0 + (3*c*(b*c*d + b^2*f + a*c*f)*x^{11})/11 + (b*c^2*e*x^{12})/4 + (c^2*(c*d + 3*b*f)*x^{13})/13 + (c^3*e*x^{14})/14 + (c^3*f*x^{15})/15$

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] $1/15*c^3*f*x^{15} + 1/14*c^3*x^{14}*e + 1/13*c^3*d*x^{13} + 3/13*b*c^2*f*x^{13} + 1/4*b*c^2*x^{12}*e + 3/11*b*c^2*d*x^{11} + 3/11*b^2*c*f*x^{11} + 3/11*a*c^2*f*x^{11} + 3/10*b^2*c*x^{10}*e + 3/10*a*c^2*x^{10}*e + 1/3*b^2*c*d*x^9 + 1/3*a*c^2*d*x^9 + 1/9*b^3*f*x^9 + 2/3*a*b*c*f*x^9 + 1/8*b^3*x^8*e + 3/4*a*b*c*x^8*e + 1/7*b^3*d*x^7 + 6/7*a*b*c*d*x^7 + 3/7*a*b^2*f*x^7 + 3/7*a^2*c*f*x^7 + 1/2*a*b^2*x^6*e + 1/2*a^2*c*x^6*e + 3/5*a*b^2*d*x^5 + 3/5*a^2*c*d*x^5 + 3/5*a^2*b*f*x^5 + 3/4*a^2*b*x^4*e + a^2*b*d*x^3 + 1/3*a^3*f*x^3 + 1/2*a^3*x^2*e + a^3*d*x$

maple [A] time = 0.00, size = 354, normalized size = 1.37

$$\frac{c^3fx^{15}}{15} + \frac{c^3ex^{14}}{14} + \frac{bc^2ex^{12}}{4} + \frac{(2bc^2f + (bf + cd)c^2)x^{13}}{13} + \frac{(2(bf + cd)bc + (af + bd)c^2 + (2ac + b^2)cf)x^{11}}{11} + \dots$$

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] $1/15*c^3*f*x^{15} + 1/14*c^3*e*x^{14} + 1/13*(2*b*c^2*f + c^2*(b*f + c*d))*x^{13} + 1/4*b*c^2*e*x^{12} + 1/11*((2*a*c + b^2)*c*f + 2*b*c*(b*f + c*d) + c^2*(a*f + b*d))*x^{11} + 1/10*((2*a*c + b^2)*c*e + 2*b^2*c*e + a*c^2*e)*x^{10} + 1/9*(2*a*b*c*f + (2*a*c + b^2)*(b*f + c*d) + 2*b*c*(a*f + b*d) + a*c^2*d)*x^9 + 1/8*(4*a*b*c*e + (2*a*c + b^2)*b*e)*x^8 + 1/7*(a^2*c*f + 2*a*b*(b*f + c*d) + (2*a*c + b^2)*(a*f + b*d) + 2*a*b*c*d)*x^7 + 1/6*(a^2*c*e + 2*a*b^2*e + (2*a*c + b^2)*a*e)*x^6 + 1/5*(a^2*(b*f + c*d) + 2*a*b*(a*f + b*d) + (2*a*c + b^2)*a*d)*x^5 + 3/4*a^2*b*e*x^4 + 1/3*(a^2*(a*f + b*d) + 2*a^2*b*d)*x^3 + 1/2*a^3*e*x^2 + a^3*d*x$

maxima [A] time = 0.70, size = 251, normalized size = 0.97

$$\frac{1}{15}c^3fx^{15} + \frac{1}{14}c^3ex^{14} + \frac{1}{4}bc^2ex^{12} + \frac{1}{13}(c^3d + 3bc^2f)x^{13} + \frac{3}{10}(b^2c + ac^2)ex^{10} + \frac{3}{11}(bc^2d + (b^2c + ac^2)f)x^{11} + \frac{1}{8}(b^2c + ac^2)ex^{10}$$

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="maxima")

[Out] 1/15*c^3*f*x^15 + 1/14*c^3*e*x^14 + 1/4*b*c^2*e*x^12 + 1/13*(c^3*d + 3*b*c^2*f)*x^13 + 3/10*(b^2*c + a*c^2)*e*x^10 + 3/11*(b*c^2*d + (b^2*c + a*c^2)*f)*x^11 + 1/8*(b^3 + 6*a*b*c)*e*x^8 + 1/9*(3*(b^2*c + a*c^2)*d + (b^3 + 6*a*b*c)*f)*x^9 + 3/4*a^2*b*e*x^4 + 1/2*(a*b^2 + a^2*c)*e*x^6 + 1/7*((b^3 + 6*a*b*c)*d + 3*(a*b^2 + a^2*c)*f)*x^7 + 1/2*a^3*e*x^2 + 3/5*(a^2*b*f + (a*b^2 + a^2*c)*d)*x^5 + a^3*d*x + 1/3*(3*a^2*b*d + a^3*f)*x^3

mupad [B] time = 0.95, size = 246, normalized size = 0.95

$$x^3 \left(\frac{f a^3}{3} + b d a^2 \right) + x^{13} \left(\frac{d c^3}{13} + \frac{3 b f c^2}{13} \right) + x^5 \left(\frac{3 f a^2 b}{5} + \frac{3 c d a^2}{5} + \frac{3 d a b^2}{5} \right) + x^{11} \left(\frac{3 f b^2 c}{11} + \frac{3 d b c^2}{11} + \frac{3 a f c^2}{11} \right) +$$

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

$$a^3 dx + \frac{a^3 e x^2}{2} + \frac{3 a^2 b e x^4}{4} + \frac{b c^2 e x^{12}}{4} + \frac{c^3 e x^{14}}{14} + \frac{c^3 f x^{15}}{15} + x^{13} \left(\frac{3 b c^2 f}{13} + \frac{c^3 d}{13} \right) + x^{11} \left(\frac{3 a c^2 f}{11} + \frac{3 b^2 c f}{11} + \frac{3 b c^2 d}{11} \right) + x^{10} \left(\frac{3 a c^2 e}{10} \right) +$$

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)

$$3.62 \quad \int (a + bx^2 + cx^4) (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx$$

Optimal. Leaf size=154

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

[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 = 0.15, 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}

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

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

$$\int (a + bx^2 + cx^4) (ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6) dx = \int (a^2 d + a^2 ex + a(2bd + 2ac)d + a^2 ex^2 + \frac{1}{3} a(2bdf + 2acd + b^2 d) + \frac{1}{6} ex^6 (2ac + b^2) + \frac{1}{3} ax^3 (af + 2bd) + \frac{1}{2} abex^4) dx$$

Mathematica [A] time = 0.03, size = 154, normalized size = 1.00

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

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

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

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="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

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

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

$$\frac{c^2 f x^{11}}{11} + \frac{c^2 e x^{10}}{10} + \frac{b c e x^8}{4} + \frac{(b c f + (b f + c d) c) x^9}{9} + \frac{a b e x^4}{2} + \frac{(a c f + (b f + c d) b + (a f + b d) c) x^7}{7} + \frac{(2 a c e + b^2 e) x^6}{6}$$

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

maxima [A] time = 0.59, size = 138, normalized size = 0.90

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

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] 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 = 0.09, size = 138, normalized size = 0.90

$$x^5 \left(\frac{d b^2}{5} + \frac{2 a f b}{5} + \frac{2 a c d}{5} \right) + x^7 \left(\frac{f b^2}{7} + \frac{2 c d b}{7} + \frac{2 a c f}{7} \right) + x^3 \left(\frac{f a^2}{3} + \frac{2 b d a}{3} \right) + x^9 \left(\frac{d c^2}{9} + \frac{2 b f c}{9} \right) + \frac{a^2 e x^2}{2} + \frac{c^2 e x^5}{1}$$

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^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 = 0.10, size = 165, normalized size = 1.07

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

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)
```

$$3.63 \quad \int \frac{ad+aux+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{a+bx^2+cx^4} dx$$

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

$$\int \frac{ad + aux + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{a + bx^2 + cx^4} dx = \int (d + ex + fx^2) dx = dx + \frac{ex^2}{2} + \frac{fx^3}{3}$$

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

$$3.64 \quad \int \frac{ad+aux+(bd+af)x^2+bex^3+(cd+bf)x^4+cex^5+cfx^6}{(a+bx^2+cx^4)^2} dx$$

Optimal. Leaf size=211

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right) + \left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right) - \frac{e \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}} + \sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b} - \sqrt{b^2-4ac}}$$

[Out] $-e \operatorname{arctanh}\left(\frac{2cx^2+b}{(-4ac+b^2)^{1/2}}\right) / (-4ac+b^2)^{1/2} + 1/2 \operatorname{arctan}\left(x \sqrt{2} \sqrt{c} / (b - (-4ac+b^2)^{1/2})\right) \sqrt{b - (-4ac+b^2)^{1/2}} / c + 1/2 \operatorname{arctan}\left(x \sqrt{2} \sqrt{c} / (b + (-4ac+b^2)^{1/2})\right) \sqrt{b + (-4ac+b^2)^{1/2}} / c - e \operatorname{tanh}^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right) / \sqrt{b^2-4ac}$

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, number of rules / integrand size = 0.127, Rules used = {1586, 1673, 1166, 205, 12, 1107, 618, 206}

$$\frac{\left(\frac{2cd-bf}{\sqrt{b^2-4ac}} + f\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b-\sqrt{b^2-4ac}}}\right) + \left(f - \frac{2cd-bf}{\sqrt{b^2-4ac}}\right) \tan^{-1}\left(\frac{\sqrt{2}\sqrt{c}x}{\sqrt{\sqrt{b^2-4ac}+b}}\right) - \frac{e \tanh^{-1}\left(\frac{b+2cx^2}{\sqrt{b^2-4ac}}\right)}{\sqrt{b^2-4ac}}}{\sqrt{2}\sqrt{c}\sqrt{b-\sqrt{b^2-4ac}} + \sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2-4ac}+b} - \sqrt{b^2-4ac}}$$

Antiderivative was successfully verified.

[In] $\operatorname{Int}[(a*d + a*e*x + (b*d + a*f))*x^2 + b*e*x^3 + (c*d + b*f)*x^4 + c*e*x^5 + c*f*x^6]/(a + b*x^2 + c*x^4)^2, x]$

[Out] $\left(\frac{f + (2cd - bf)/\sqrt{b^2 - 4ac}}{\sqrt{2}\sqrt{c}\sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{f - (2cd - bf)/\sqrt{b^2 - 4ac}}{\sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2 - 4ac} + b}} - \frac{e \operatorname{ArcTanh}\left(\frac{b + 2cx^2}{\sqrt{b^2 - 4ac}}\right)}{\sqrt{b^2 - 4ac}}\right) \operatorname{ArcTan}\left[\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b - \sqrt{b^2 - 4ac}}}\right] + \left(\frac{f - (2cd - bf)/\sqrt{b^2 - 4ac}}{\sqrt{2}\sqrt{c}\sqrt{\sqrt{b^2 - 4ac} + b}} - \frac{e \operatorname{ArcTanh}\left(\frac{b + 2cx^2}{\sqrt{b^2 - 4ac}}\right)}{\sqrt{b^2 - 4ac}}\right) \operatorname{ArcTan}\left[\frac{\sqrt{2}\sqrt{c}x}{\sqrt{b + \sqrt{b^2 - 4ac}}}\right]$

Rule 12

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

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

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

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 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 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

$$\begin{aligned} \int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{(a + bx^2 + cx^4)^2} dx &= \int \frac{d + ex + fx^2}{a + bx^2 + cx^4} dx \\ &= \int \frac{ex}{a + bx^2 + cx^4} dx + \int \frac{d + fx^2}{a + bx^2 + cx^4} dx \\ &= e \int \frac{x}{a + bx^2 + cx^4} dx + \frac{1}{2} \left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \int \frac{1}{\sqrt{b - \sqrt{b^2 - 4ac}}} dx \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} \\ &= \frac{\left(f + \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\left(f - \frac{2cd - bf}{\sqrt{b^2 - 4ac}} \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}}} \right)}{\sqrt{2} \sqrt{c} \sqrt{b + \sqrt{b^2 - 4ac}}} \end{aligned}$$

Mathematica [A] time = 0.06, size = 234, normalized size = 1.11

$$\frac{\sqrt{2} \left(f \left(\sqrt{b^2 - 4ac} - b \right) + 2cd \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b - \sqrt{b^2 - 4ac}}} \right)}{\sqrt{c} \sqrt{b - \sqrt{b^2 - 4ac}}} + \frac{\sqrt{2} \left(f \left(\sqrt{b^2 - 4ac} + b \right) - 2cd \right) \tan^{-1} \left(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b^2 - 4ac} + b} \right)}{\sqrt{c} \sqrt{b^2 - 4ac} + b} + e \log \left(\sqrt{b^2 - 4ac} - b - 2cx^2 \right) - \frac{\quad}{2\sqrt{b^2 - 4ac}}$$

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))*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*sqrt(2)*sqrt(b*c - sqrt(b^2 - 4*a*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))
```

$t(b*c - \sqrt{b^2 - 4*a*c})*c)*b*c^2 - 2*(b^2 - 4*a*c)*b^2*c + 8*(b^2 - 4*a*c)*a*c^2 + 2*(b^2 - 4*a*c)*b*c^2)*d + 2*(2*a*b^2*c^2 - 8*a^2*c^3 - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c})*c)*a*b^2 + 4*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c})*c)*a^2*c + 2*\sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c})*c)*a*b*c - \sqrt{2}*\sqrt{b^2 - 4*a*c})*\sqrt{b*c - \sqrt{b^2 - 4*a*c})*c)*a*c^2 - 2*(b^2 - 4*a*c)*a*c^2)*f)*\arctan(2*\sqrt{1/2}*x/\sqrt{(b - \sqrt{b^2 - 4*a*c})/c})/((a*b^4 - 8*a^2*b^2*c - 2*a*b^3*c + 16*a^3*c^2 + 8*a^2*b*c^2 + a*b^2*c^2 - 4*a^2*c^3)*\text{abs}(c))$

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*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)^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(1
6*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*
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*
```

$$\begin{aligned}
& e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 \\
& + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)^2*b^2*c^2*e*x + 4*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 \\
& + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z \\
& + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 \\
& + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*b*c^2*d*e - 8*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 \\
& + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z \\
& + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k)*a*c^2*e*f + b*c*e*f^2 \\
& *x - 2*c^2*d*e*f*x + 4*root(16*a*b^4*c*z^4 - 128*a^2*b^2*c^2*z^4 + 256*a^3*c^3*z^4 - 16*a*b^2*c*d*f*z^2 + 64*a^2*c^2*d*f*z^2 - 16*a^2*b*c*f^2*z^2 - 8*a*b^2*c*e^2*z^2 - 16*a*b*c^2*d^2*z^2 + 32*a^2*c^2*e^2*z^2 + 4*b^3*c*d^2*z^2 + 4*a*b^3*f^2*z^2 + 16*a^2*c*e*f^2*z \\
& + 4*b^2*c*d^2*e*z - 4*a*b^2*e*f^2*z - 16*a*c^2*d^2*e*z - 4*a*c*d*e^2*f + 2*a*c*d^2*f^2 - 2*b*c*d^3*f - 2*a*b*d*f^3 + b*c*d^2*e^2 + a*b*e^2*f^2 + a*c*e^4 + b^2*d^2*f^2 + c^2*d^4 + a^2*f^4, z, k), k, 1, 4)
\end{aligned}$$

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)**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] $-1/2*e*(2*c*x^2+b)/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+1/2*x*(b^2*d-2*a*c*d-a*b*f+c*(-2*a*f+b*d)*x^2)/a/(-4*a*c+b^2)/(c*x^4+b*x^2+a)+2*c*e*arctanh((2*c*x^2+b)/(-4*a*c+b^2)^(1/2))/(-4*a*c+b^2)^(3/2)+1/4*arctan(x*2^(1/2)*c^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(b*d-2*a*f+(4*a*b*f-12*a*c*d+b^2*d)/(-4*a*c+b^2)^(1/2))/a/(-4*a*c+b^2)*2^(1/2)/(b-(-4*a*c+b^2)^(1/2))^(1/2)+1/4*arctan(x*2^(1/2)*c^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2))*c^(1/2)*(b*d-2*a*f+(-4*a*b*f+12*a*c*d-b^2*d)/(-4*a*c+b^2)^(1/2))/a/(-4*a*c+b^2)*2^(1/2)/(b+(-4*a*c+b^2)^(1/2))^(1/2)$

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] 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] $-(e*(b + 2*c*x^2))/(2*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (x*(b^2*d - 2*a*c*d - a*b*f + c*(b*d - 2*a*f)*x^2))/(2*a*(b^2 - 4*a*c)*(a + b*x^2 + c*x^4)) + (\text{Sqrt}[c]*(b*d - 2*a*f + (b^2*d - 12*a*c*d + 4*a*b*f)/\text{Sqrt}[b^2 - 4*a*c]))*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]]/(2*\text{Sqrt}[2]*a*(b^2 - 4*a*c)*\text{Sqrt}[b - \text{Sqrt}[b^2 - 4*a*c]]) + (\text{Sqrt}[c]*(b*d - 2*a*f - (b^2*d - 12*a*c*d + 4*a*b*f)/\text{Sqrt}[b^2 - 4*a*c]))*\text{ArcTan}[(\text{Sqrt}[2]*\text{Sqrt}[c]*x)/\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]]/(2*\text{Sqrt}[2]*a*(b^2 - 4*a*c)*\text{Sqrt}[b + \text{Sqrt}[b^2 - 4*a*c]]) + (2*c*e*\text{ArcTanh}[(b + 2*c*x^2)/\text{Sqrt}[b^2 - 4*a*c]])/(b^2 - 4*a*c)^(3/2)$

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] /; 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 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

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

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 - 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((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] 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))*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*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 + 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)*(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))*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(b*c + sqrt(b^2 - 4*a*c))*a^2*b^3*c^2 + sqrt(2)*sqrt(b*c + sqrt(b^2 - 4*a*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))*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
```

$$\begin{aligned}
& *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)*\text{abs}(a*b^2 - 4*a^2*c)*\text{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*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*\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 - 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*\text{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)*\text{abs}(a*b^2 - 4*a^2*c)*\text{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}))*\text{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 +
\end{aligned}$$

$$\frac{\sqrt{(a^3b^3 - 4a^2b^2c)^2 - 4(a^2b^2 - 4a^3c)(ab^2c - 4a^2c^2)}}{(ab^2c - 4a^2c^2)} \cdot \frac{1}{(a^4b^4 - 8a^2b^2c - 2a^3b^3c + 16a^3c^2 + 8a^2b^2c^2 + ab^2c^2 - 4a^2c^3)c^2 \operatorname{abs}(ab^2 - 4a^2c)} - \frac{1}{4} \cdot \frac{(b^3c^2 - 4ab^2c^3 - 2b^2c^3 + bc^4 - (b^2c^2 - 4ac^3 - 2b^2c^3 + c^4) \sqrt{b^2 - 4ac}) \operatorname{abs}(ab^2 - 4a^2c) e - (ab^5c^2 - 8a^2b^3c^3 - 2a^3b^4c^3 + 16a^3b^2c^4 + 8a^2b^2c^4 + ab^3c^4 - 4a^2b^2c^5 - (ab^4c^2 - 4a^2b^2c^3 - 2a^3b^3c^3 + ab^2c^4) \sqrt{b^2 - 4ac}) e}{\log(x^2 + 1/2(ab^3 - 4a^2b^2c - \sqrt{(a^3b^3 - 4a^2b^2c)^2 - 4(a^2b^2 - 4a^3c)(ab^2c - 4a^2c^2)}))} \cdot \frac{1}{(ab^2c - 4a^2c^2)} \cdot \frac{1}{(a^4b^4 - 8a^2b^2c - 2a^3b^3c + 16a^3c^2 + 8a^2b^2c^2 + ab^2c^2 - 4a^2c^3)c^2 \operatorname{abs}(ab^2 - 4a^2c)}$$

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] $\operatorname{int}((a*d+a*e*x+(a*f+b*d))*x^2+b*e*x^3+(b*f+c*d)*x^4+c*e*x^5+c*f*x^6)/(c*x^4+b*x^2+a)^3, x$

[Out]
$$\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{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)}/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{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*\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)*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$$

$$\sqrt{2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c}*b*c*d*x+1/4/(4*a*c-b^2)^2/(x^2+1/2*b/c-1/2*(-4*a*c+b^2)^{(1/2)}/c)/a*b^3*d*x$$

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]
$$\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 - 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)*((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)) + \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 - 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$$

$$\begin{aligned}
& *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 \\
& 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 \\
& 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*(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^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 - 983040*a^7*b^4*c^4*z^4 + 32768 \\
& 0*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 - 6144 \\
& 0*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^1 \\
& 1*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 + 20 \\
& 16*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 - 28 \\
& 8*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 - 307 \\
& 2*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 - 8 \\
& 192*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^1 \\
& 0*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 - 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^
\end{aligned}$$

```

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((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

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d + ab^3f - 25ab^2cd + 3b^4d \right) + \sqrt{c} \left(\frac{-52a^2bcf + 168a^2c^2d}{8a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)} \right)}{8a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)}$$

[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}

$$\frac{x \left(cx^2 (20a^2cf + ab^2f - 24abcd + 3b^3d) + 8a^2bcf + 28a^2c^2d - 25ab^2cd + ab^3f + 3b^4d \right) + \sqrt{c} \left(\frac{-52a^2bcf + 168a^2c^2d}{8a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)} \right)}{8a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)}$$

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] $-(e * (b + 2 * c * x^2)) / (4 * (b^2 - 4 * a * c) * (a + b * x^2 + c * x^4)^2) + (x * (b^2 * d - 2 * a * c * d - a * b * f + c * (b * d - 2 * a * f) * x^2)) / (4 * a * (b^2 - 4 * a * c) * (a + b * x^2 + c * x^4)^2) + (3 * c * e * (b + 2 * c * x^2)) / (2 * (b^2 - 4 * a * c)^2 * (a + b * x^2 + c * x^4)) + (x * (3 * b^4 * d - 25 * a * b^2 * c * d + 28 * a^2 * c^2 * d + a * b^3 * f + 8 * a^2 * b * c * f + c * (3 * b^3 * d - 24 * a * b * c * d + a * b^2 * f + 20 * a^2 * c * f) * x^2)) / (8 * a^2 * (b^2 - 4 * a * c)^2 * (a + b * x^2 + c * x^4)) + (\operatorname{Sqrt}[c] * (3 * b^4 * d + b^3 * (3 * \operatorname{Sqrt}[b^2 - 4 * a * c] * d + a * f) - 4 * a * b * c * (6 * \operatorname{Sqrt}[b^2 - 4 * a * c] * d + 13 * a * f) - a * b^2 * (30 * c * d - \operatorname{Sqrt}[b^2 - 4 * a * c] * f) + 4 * a^2 * c * (42 * c * d + 5 * \operatorname{Sqrt}[b^2 - 4 * a * c] * f)) * \operatorname{ArcTan}[(\operatorname{Sqrt}[2] * \operatorname{Sqrt}[c] * x) / \operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4 * a * c]])] / (8 * \operatorname{Sqrt}[2] * a^2 * (b^2 - 4 * a * c)^{(5/2)} * \operatorname{Sqrt}[b - \operatorname{Sqrt}[b^2 - 4 * a * c]]) + (\operatorname{Sqrt}[c] * (3 * b^3 * d - 24 * a * b * c * d + a * b^2 * f + 20 * a^2 * c * f - (3 * b^4 * d - 30 * a * b^2 * c * d + 168 * a^2 * c^2 * d + a * b^3 * f - 52 * a^2 * b * c * f) / \operatorname{Sqrt}[b^2 - 4 * a * c]) * \operatorname{ArcTan}[(\operatorname{Sqrt}[2] * \operatorname{Sqrt}[c] * x) / \operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4 * a * c]])] / (8 * \operatorname{Sqrt}[2] * a^2 * (b^2 - 4 * a * c)^2 * \operatorname{Sqrt}[b + \operatorname{Sqrt}[b^2 - 4 * a * c]]) - (6 * c^2 * e * \operatorname{ArcTanh}[(b + 2 * c * x^2) / \operatorname{Sqrt}[b^2 - 4 * a * c]]) / (b^2 - 4 * a * c)^{(5/2)}$

Rule 12

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

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

$$\begin{aligned}
 \int \frac{ad + aex + (bd + af)x^2 + bex^3 + (cd + bf)x^4 + cex^5 + cfx^6}{(a + bx^2 + cx^4)^4} dx &= \int \frac{d + ex + fx^2}{(a + bx^2 + cx^4)^3} dx \\
 &= \int \frac{ex}{(a + bx^2 + cx^4)^3} dx + \int \frac{d + fx^2}{(a + bx^2 + cx^4)^3} dx \\
 &= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} - \frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} \\
 &= -\frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{e(b + 2cx^2)}{4(b^2 - 4ac)(a + bx^2 + cx^4)^2} + \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{4a(b^2 - 4ac)(a + bx^2 + cx^4)^2}
 \end{aligned}$$

Mathematica [A] time = 3.58, size = 625, normalized size = 1.01

$$\frac{1}{16} \left(\frac{8a^2c(b(3e + 2fx) + cx(7d + 6ex + 5fx^2)) + 2abx(b^2f - 25bcd + bcfx^2 - 24c^2dx^2) + 6b^3dx(b + cx^2)}{a^2(b^2 - 4ac)^2(a + bx^2 + cx^4)} + \dots \right)$$

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[

$$\frac{b^2 - 4ac}{(a^2(b^2 - 4ac)^{5/2} \sqrt{b - \sqrt{b^2 - 4ac}}) + (\sqrt{2} \sqrt{c} (-3b^4d + b^3(3\sqrt{b^2 - 4ac}d - af) + 4ab^2c(-6\sqrt{b^2 - 4ac}d + 13af) + ab^2(30cd + \sqrt{b^2 - 4ac}f) + 4a^2c(-42cd + 5\sqrt{b^2 - 4ac}f)) \operatorname{ArcTan}(\frac{\sqrt{2} \sqrt{c} x}{\sqrt{b + \sqrt{b^2 - 4ac}})}) / (a^2(b^2 - 4ac)^{5/2} \sqrt{b + \sqrt{b^2 - 4ac}}) + (48c^2 \operatorname{Log}[-b + \sqrt{b^2 - 4ac} - 2cx^2]) / (b^2 - 4ac)^{5/2} - (48c^2 \operatorname{Log}[b + \sqrt{b^2 - 4ac} + 2cx^2]) / (b^2 - 4ac)^{5/2}}{16}$$

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]
$$\frac{-3(b^2c^4 - 4ac^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) + 3(b^2c^4 - 4ac^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) + 1/32(3(\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})b^8 - 17\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})ab^6c - 2\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})b^7c - 2b^8c + 116\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})a^2b^4c^2 + 26\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})ab^5c^2 + \sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})b^6c^2 + 34ab^6c^2 + 2b^7c^2 - 368\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})a^3b^2c^3 - 128\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})a^2b^3c^3 - 13\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})ab^4c^3 - 232a^2b^4c^3 - 30ab^5c^3 + 448\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})a^4c^4 + 224\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})a^3b^2c^4 + 64\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})a^2b^2c^4 + 736a^3b^2c^4 + 176a^2b^3c^4 - 112\sqrt{2}\sqrt{bc + \sqrt{b^2 - 4ac}})a^3c^5 - 896a^4c^5 - 352a^3b^2c^5 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}})b^7 + 15\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}})ab^5c + 2\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}})b^6c - 88\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}})a^2b^3c^2 - 22\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}})ab^4c^2 - \sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}})b^5c^2 + 176\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}})a^3b^2c^3 + 88\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}})a^2b^2c^3 + 11\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}})ab^3c^3 - 44\sqrt{2}\sqrt{b^2 - 4ac}\sqrt{bc + \sqrt{b^2 - 4ac}})a^2b^2c^4 + 2(b^2 - 4ac)b^6c - 26(b^2 - 4ac)$$

$$\begin{aligned}
& *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{sqrt}(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{sqrt}(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 - 4*a*c))*c)*a^3*b^2*c^2 - 36*\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 - \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 - 160*\text{sqrt}(2)* \\
& \text{sqrt}(b^2 - 4*a*c)*\text{sqrt}(b*c + \text{sqrt}(b^2 - 4*a*c))*c)*a^4*c^3 - 80*\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 + 18*\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^2*c^3 + 40*\text{sqrt}(2)*\text{sqrt}(b \\
& ^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} \\
& \text{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} \\
& \text{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} \\
& \text{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} \\
& \text{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*s
\end{aligned}$$

```

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)*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)*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)

```

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] 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] 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="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
^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 - 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)

```

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] $\int ((a*d + x^2*(b*d + a*f) + x^4*(c*d + b*f) + a*e*x + b*e*x^3 + c*e*x^5 + c*f*x^6)/(a + b*x^2 + c*x^4)^4, x)$

[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 + 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 - 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 - 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$

$$\begin{aligned}
& 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 \\
& ^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)) + (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 \\
& ^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
\end{aligned}$$

$$\begin{aligned}
& 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^8 c^8 f^2 z^2 + 1761607680 a^{10} c^9 d f z^2 - 14080 a^3 b^{15} c^5 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^3 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^5 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 + 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^8 c^5 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 - 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^3 c^7 e^2 f^2 + 34836480 a^4 b^3 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^3 c^8 d^3 f - 15482880 a^5 c^8 d e^2 f - 4262400 a^5 b^3 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 + 35721 b^8 c^5 d^4, z, k) * x * (4194304 a^{11} b^9 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 + 5505024 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 - 6144 a^9 b^2 c^5)) + (3244032 a^6 b^8 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^3 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 + 1760 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^3 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^3 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 - 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^3 c^7 d f^2 + 36864 a^4 b^3 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
\end{aligned}$$

$$\frac{b^3c^6e^2f}{(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(6912a^4c^8e^3 - 27b^7c^5d^2e - 10080a^4c^8d^2ef + 486ab^5c^6d^2e + 12096a^3b^2c^8d^2e + 3120a^4b^2c^7d^2ef - 3672a^2b^3c^7d^2e - 3a^2b^5c^5ef^2 + 96a^3b^3c^6ef^2 - 18ab^6c^5d^2ef + 450a^2b^4c^6d^2ef - 2448a^3b^2c^7d^2ef)) / (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))} \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 - 73728a^2b^{16}c^2d^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^2c^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 + 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 + 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^8d^2efz + 9216ab^{13}c^2d^2efz - 221773824a^6b^3c^7d^2efz + 117964800a^5b^5c^6d^2efz - 32440320a^4b^7c^5d^2efz + 4792320a^3b^9c^4d^2efz - 350208a^2b^{11}c^3d^2efz - 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 - 69120a^3b^{10}c^3e^2fz + 1536a^2b^{12}c^2e^2fz + 5930496a^2b^{10}c^4d^2ez - 693633024a^7c^9d^2ez + 39321600a^8c^8e^2fz + 13824b^{14}c^2d^2ez + 13824ab^8c^4d^2ef - 7741440a^4b^2c^7d^2ef + 2903040a^3b^4c^6d^2ef - 387072a^2b^6c^5d^2ef + 37310976a^3b^3c^7d^3f + 3870720a^5b^2c^7e^2f^2 + 34836480a^4b^2c^8d^2e^2 - 8068032a^2b^5c^6d^3f - 5623296a^4b^3c^6d^2f^3 + 1737792a^3b^5c^5d^2f^3 - 260190ab^8c^4d^2f^2 - 211680a^2b^7c^4d^2f^3 - 435456ab^7c^5d^2e^2 - 75188736a^4b^2c^8d^3f - 15482880a^5c^8d^2e^2f - 4262400a^5b^2c^7d^2f^3 + 852768ab^7c^5d^3f + 7350ab^9c^3d^2f^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^{10}c^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), 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)**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], 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] $x*e + (d - 2*e)*\log(\text{abs}(x + 2))$

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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3}{2+x} dx \\ &= \int \left(e-4f+12g + \frac{d-2e+4f-8g}{2+x} + (f-6g)(2+x) + g(2+x)^2 \right) dx \\ &= (e-4f+12g)x + \frac{1}{2}(f-6g)(2+x)^2 + \frac{1}{3}g(2+x)^3 + (d-2e- \end{aligned}$$

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] 1/3*g*x^3+1/2*f*x^2-g*x^2+e*x-2*f*x+4*g*x+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 = 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] 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)

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 - 2*f + 4*g) + (g*x^3)/3 + log(x + 2)*(d - 2*e + 4*f - 8*g)

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] g*x**3/3 + x**2*(f/2 - g) + x*(e - 2*f + 4*g) + (d - 2*e + 4*f - 8*g)*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] $(e - 2f + 4g - 8h)x + ((f - 2g + 4h)x^2)/2 + ((g - 2h)x^3)/3 + (hx^4)/4 + (d - 2e + 4f - 8g + 16h)\text{Log}[2 + x]$

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] $1/4*h*x^4 + 1/3*g*x^3 - 2/3*h*x^3 + 1/2*f*x^2 - g*x^2 + 2*h*x^2 - 2*f*x + 4*g*x - 8*h*x + x*e + (d + 4*f - 8*g + 16*h - 2*e)*\log(\text{abs}(x + 2))$

maple [A] time = 0.00, size = 87, normalized size = 1.28

$$\frac{hx^4}{4} + \frac{gx^3}{3} - \frac{2hx^3}{3} + \frac{fx^2}{2} - gx^2 + 2hx^2 + d \ln(x + 2) + ex - 2e \ln(x + 2) - 2fx + 4f \ln(x + 2) + 4gx - 8g \ln(x + 2) - 8h$$

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),x)`

[Out] $1/4*h*x^4 + 1/3*g*x^3 - 2/3*h*x^3 + 1/2*f*x^2 - g*x^2 + 2*h*x^2 + e*x - 2*f*x + 4*g*x - 8*h*x + d*\ln(x+2) - 2*e*\ln(x+2) + 4*f*\ln(x+2) - 8*g*\ln(x+2) + 16*h*\ln(x+2)$

maxima [A] time = 0.44, size = 62, normalized size = 0.91

$$\frac{1}{4}hx^4 + \frac{1}{3}(g - 2h)x^3 + \frac{1}{2}(f - 2g + 4h)x^2 + (e - 2f + 4g - 8h)x + (d - 2e + 4f - 8g + 16h)\log(x + 2)$$

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="maxima")`

[Out] $1/4*h*x^4 + 1/3*(g - 2*h)*x^3 + 1/2*(f - 2*g + 4*h)*x^2 + (e - 2*f + 4*g - 8*h)*x + (d - 2*e + 4*f - 8*g + 16*h)*\log(x + 2)$

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] `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),x)`

[Out] $x^3*(g/3 - (2*h)/3) + \log(x + 2)*(d - 2*e + 4*f - 8*g + 16*h) + (h*x^4)/4 + x^2*(f/2 - g + 2*h) + x*(e - 2*f + 4*g - 8*h)$

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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+72x^5)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+72x^5}{2+x} dx \\ &= \int \left(1152 \left(1 + \frac{e-2f+4g-8h}{1152} \right) + (-576+f) \right. \\ &= (1152+e-2f+4g-8h)x - \frac{1}{2}(576-f+2g) \end{aligned}$$

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] $(e - 2f + 4g - 8h + 16i)x + ((f - 2g + 4h - 8i)x^2)/2 + ((g - 2h + 4i)x^3)/3 + ((h - 2i)x^4)/4 + (ix^5)/5 + (d - 2e + 4f - 8g + 16h - 32i)\text{Log}[2 + x]$

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] $1/5*i*x^5 + 1/4*h*x^4 - 1/2*i*x^4 + 1/3*g*x^3 - 2/3*h*x^3 + 4/3*i*x^3 + 1/2*f*x^2 - g*x^2 + 2*h*x^2 - 4*i*x^2 - 2*f*x + 4*g*x - 8*h*x + 16*i*x + x*e + (d + 4*f - 8*g + 16*h - 32*i - 2*e)*\log(\text{abs}(x + 2))$

maple [A] time = 0.00, size = 122, normalized size = 1.33

$$\frac{ix^5}{5} + \frac{hx^4}{4} - \frac{ix^4}{2} + \frac{gx^3}{3} - \frac{2hx^3}{3} + \frac{4ix^3}{3} + \frac{fx^2}{2} - gx^2 + 2hx^2 - 4ix^2 + d \ln(x + 2) + ex - 2e \ln(x + 2) - 2fx + 4f \ln(x + 2) + 4gx - 8hx + 16ix + xe + (d + 4f - 8g + 16h - 32i)\log(x + 2)$$

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),x)`

[Out] $1/5*i*x^5 + 1/4*h*x^4 - 1/2*i*x^4 + 1/3*g*x^3 - 2/3*h*x^3 + 4/3*i*x^3 + 1/2*f*x^2 - g*x^2 + 2*h*x^2 - 4*i*x^2 + e*x - 2*f*x + 4*g*x - 8*h*x + 16*i*x + d*\ln(x+2) - 2*e*\ln(x+2) + 4*f*\ln(x+2) - 8*g*\ln(x+2) + 16*h*\ln(x+2) - 32*i*\ln(x+2)$

maxima [A] time = 0.46, size = 84, normalized size = 0.91

$$\frac{1}{5}ix^5 + \frac{1}{4}(h - 2i)x^4 + \frac{1}{3}(g - 2h + 4i)x^3 + \frac{1}{2}(f - 2g + 4h - 8i)x^2 + (e - 2f + 4g - 8h + 16i)x + (d - 2e + 4f - 8g + 16h - 32i)\log(x + 2)$$

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="maxima")`

[Out] $1/5*i*x^5 + 1/4*(h - 2*i)*x^4 + 1/3*(g - 2*h + 4*i)*x^3 + 1/2*(f - 2*g + 4*h - 8*i)*x^2 + (e - 2*f + 4*g - 8*h + 16*i)*x + (d - 2*e + 4*f - 8*g + 16*h - 32*i)*\log(x + 2)$

mupad [B] time = 0.04, size = 87, normalized size = 0.95

$$x^4 \left(\frac{h}{4} - \frac{i}{2} \right) + \ln(x + 2) (d - 2e + 4f - 8g + 16h - 32i) + \frac{ix^5}{5} + x^2 \left(\frac{f}{2} - g + 2h - 4i \right) + x (e - 2f + 4g - 8h + 16i) + (d - 2e + 4f - 8g + 16h - 32i)\log(x + 2)$$

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),x)
```

```
[Out] x^4*(h/4 - i/2) + log(x + 2)*(d - 2*e + 4*f - 8*g + 16*h - 32*i) + (i*x^5)/5 + x^2*(f/2 - g + 2*h - 4*i) + x*(e - 2*f + 4*g - 8*h + 16*i) + x^3*(g/3 - (2*h)/3 + (4*i)/3)
```

sympy [A] time = 0.25, size = 88, normalized size = 0.96

$$\frac{ix^5}{5} + x^4 \left(\frac{h}{4} - \frac{i}{2} \right) + x^3 \left(\frac{g}{3} - \frac{2h}{3} + \frac{4i}{3} \right) + x^2 \left(\frac{f}{2} - g + 2h - 4i \right) + x(e - 2f + 4g - 8h + 16i) + (d - 2e + 4f - 8g + 16h - 32i) \log(x + 2)$$

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)
```

```
[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*ln(x+1)-e*ln(x+1)-d*ln(x+2)+2*e*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 - 2*e)*log(x + 2) + (d - e)*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)*(d - e) - log(x + 2)*(d - 2*e)

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 + 2*e)*log(x + (4*d - 6*e)/(2*d - 3*e)) + (d - e)*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_.)*(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[ExpandIntegrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, -2]

Rubi steps

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

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[ExpandIntegrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, -2]

Rubi steps

$$\begin{aligned}
\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3}{2+3x+x^2} dx \\
&= \int \left(f-3g+gx + \frac{d-2f+6g+(e-3f+7g)x}{2+3x+x^2} \right) dx \\
&= (f-3g)x + \frac{gx^2}{2} + \int \frac{d-2f+6g+(e-3f+7g)x}{2+3x+x^2} dx \\
&= (f-3g)x + \frac{gx^2}{2} - (d-2e+4f-8g) \int \frac{1}{2+x} dx + (d-e+f-g) \int \frac{1}{1+x} dx \\
&= (f-3g)x + \frac{gx^2}{2} + (d-e+f-g) \log(1+x) - (d-2e+4f-8g) \log(2+x)
\end{aligned}$$

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

$$\frac{gx^2}{2} - d \ln(x+2) + d \ln(x+1) + 2e \ln(x+2) - e \ln(x+1) + fx - 4f \ln(x+2) + f \ln(x+1) - 3gx + 8g \ln(x+2) - g \ln(x+1)$$

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

$$\frac{1}{2}gx^2 + (f - 3g)x - (d - 2e + 4f - 8g)\log(x + 2) + (d - e + f - g)\log(x + 1)$$

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="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

$$\ln(x + 1)(d - e + f - g) + x(f - 3g) + \frac{gx^2}{2} - \ln(x + 2)(d - 2e + 4f - 8g)$$

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

$$\frac{gx^2}{2} + x(f - 3g) + (-d + 2e - 4f + 8g)\log\left(x + \frac{4d - 6e + 10f - 18g}{2d - 3e + 5f - 9g}\right) + (d - e + f - g)\log(x + 1)$$

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

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

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

$$\frac{hx^3}{3} + \frac{gx^2}{2} - \frac{3hx^2}{2} - d \ln(x+2) + d \ln(x+1) + 2e \ln(x+2) - e \ln(x+1) + fx - 4f \ln(x+2) + f \ln(x+1) - 3gx + 8g$$

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] $\frac{1}{3}hx^3 + \frac{1}{2}gx^2 - \frac{3}{2}hx + f - 3g + 7h + d \ln(x+1) - e \ln(x+1) + f \ln(x+1) - g \ln(x+1) + h \ln(x+1) - d \ln(x+2) + 2e \ln(x+2) - 4f \ln(x+2) + 8g \ln(x+2) - 16h \ln(x+2)$

maxima [A] time = 0.44, size = 62, normalized size = 0.94

$$\frac{1}{3}hx^3 + \frac{1}{2}(g - 3h)x^2 + (f - 3g + 7h)x - (d - 2e + 4f - 8g + 16h) \log(x + 2) + (d - e + f - g + h) \log(x + 1)$$

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] $\frac{1}{3}hx^3 + \frac{1}{2}(g - 3h)x^2 + (f - 3g + 7h)x - (d - 2e + 4f - 8g + 16h) \log(x + 2) + (d - e + f - g + h) \log(x + 1)$

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] $x^2(g/2 - (3h)/2) + x(f - 3g + 7h) - \log(x + 2)(d - 2e + 4f - 8g + 16h) + (hx^3)/3 + \log(x + 1)(d - e + f - g + h)$

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] $hx^3/3 + x^2(g/2 - 3h/2) + x(f - 3g + 7h) + (-d + 2e - 4f + 8g - 16h) \log(x + (4d - 6e + 10f - 18g + 34h)/(2d - 3e + 5f - 9g + 17h)) + (d - e + f - g + h) \log(x + 1)$

$$3.78 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+ix^5)}{4-5x^2+x^4} dx$$

Optimal. Leaf size=90

$$\log(x+1)(d-e+f-g+h-i)-\log(x+2)(d-2e+4f-8g+16h-32i)+x(f-3g+7h-15i)+\frac{1}{2}x^2(g-3h+7i)+\frac{1}{3}x^3(h-3i)+$$

[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}

$$\log(x+1)(d-e+f-g+h-i)-\log(x+2)(d-2e+4f-8g+16h-32i)+x(f-3g+7h-15i)+\frac{1}{2}x^2(g-3h+7i)+\frac{1}{3}x^3(h-3i)+$$

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[ExpandIntegrand[Pq*(a + b*x + c*x^2)^p, x], x] /; FreeQ[{a, b, c}, x] && PolyQ[Pq, x] && IGtQ[p, -2]

Rubi steps

$$\begin{aligned}
\int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+78x^5)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+78x^5}{2+3x+x^2} dx \\
&= \int \left(-1170 + f - 3g + 7h + (546 + g - 3h)x - (234 - h)x^2 \right) dx \\
&= -(1170 - f + 3g - 7h)x + \frac{1}{2}(546 + g - 3h)x^2 - \frac{1}{3}(234 - h)x^3 \\
&= -(1170 - f + 3g - 7h)x + \frac{1}{2}(546 + g - 3h)x^2 - \frac{1}{3}(234 - h)x^3 \\
&= -(1170 - f + 3g - 7h)x + \frac{1}{2}(546 + g - 3h)x^2 - \frac{1}{3}(234 - h)x^3
\end{aligned}$$

Mathematica [A] time = 0.04, size = 91, normalized size = 1.01

$$\log(x+1)(d-e+f-g+h-i)+\log(x+2)(-d+2e-4f+8g-16h+32i)+x(f-3g+7h-15i)+\frac{1}{2}x^2(g-3h+7i)+\frac{1}{3}x^3(h-3i)+\frac{1}{4}x^4(i-h)$$

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

$$\frac{1}{4}ix^4 + \frac{1}{3}(h-3i)x^3 + \frac{1}{2}(g-3h+7i)x^2 + (f-3g+7h-15i)x - (d-2e+4f-8g+16h-32i)\log(x+2) + (d-e+f-g+h-i)\log(x+1)$$

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, algorithm="fricas")

[Out] 1/4*i*x^4 + 1/3*(h - 3*i)*x^3 + 1/2*(g - 3*h + 7*i)*x^2 + (f - 3*g + 7*h - 15*i)*x - (d - 2*e + 4*f - 8*g + 16*h - 32*i)*log(x + 2) + (d - e + f - g + h - i)*log(x + 1)

giac [A] time = 0.39, size = 97, normalized size = 1.08

$$\frac{1}{4}ix^4 + \frac{1}{3}hx^3 - ix^3 + \frac{1}{2}gx^2 - \frac{3}{2}hx^2 + \frac{7}{2}ix^2 + fx - 3gx + 7hx - 15ix - (d + 4f - 8g + 16h - 32i - 2e)\log(|x+2|) + (d + f - g + h - i - e)\log(|x+1|)$$

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, algorithm="giac")

[Out] 1/4*i*x^4 + 1/3*h*x^3 - i*x^3 + 1/2*g*x^2 - 3/2*h*x^2 + 7/2*i*x^2 + f*x - 3*g*x + 7*h*x - 15*i*x - (d + 4*f - 8*g + 16*h - 32*i - 2*e)*log(abs(x + 2)) + (d + f - g + h - i - e)*log(abs(x + 1))

maple [A] time = 0.01, size = 134, normalized size = 1.49

$$\frac{ix^4}{4} + \frac{hx^3}{3} - ix^3 + \frac{gx^2}{2} - \frac{3hx^2}{2} + \frac{7ix^2}{2} - d\ln(x+2) + d\ln(x+1) + 2e\ln(x+2) - e\ln(x+1) + fx - 4f\ln(x+2) + f\ln(x+1) - 3gx + 7hx - 15ix - (d + 4f - 8g + 16h - 32i - 2e)\ln|x+2| + (d + f - g + h - i - e)\ln|x+1|$$

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] 1/4*i*x^4+1/3*h*x^3-i*x^3+1/2*g*x^2-3/2*h*x^2+7/2*i*x^2+f*x-3*g*x+7*h*x-15*i*x+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)+2*e*ln(x+2)-4*f*ln(x+2)+8*g*ln(x+2)-16*h*ln(x+2)+32*i*ln(x+2)

maxima [A] time = 0.44, size = 84, normalized size = 0.93

$$\frac{1}{4}ix^4 + \frac{1}{3}(h-3i)x^3 + \frac{1}{2}(g-3h+7i)x^2 + (f-3g+7h-15i)x - (d-2e+4f-8g+16h-32i)\log(x+2) +$$

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, algorith="maxima")

[Out] 1/4*i*x^4 + 1/3*(h - 3*i)*x^3 + 1/2*(g - 3*h + 7*i)*x^2 + (f - 3*g + 7*h - 15*i)*x - (d - 2*e + 4*f - 8*g + 16*h - 32*i)*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

$$\frac{ix^4}{4} + x^3 \left(\frac{h}{3} - i \right) + x^2 \left(\frac{g}{2} - \frac{3h}{2} + \frac{7i}{2} \right) + x(f - 3g + 7h - 15i) + (-d + 2e - 4f + 8g - 16h + 32i) \log \left(x + \frac{4d - 6e + 10f - 15i}{2d - 3e} \right) +$$

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 - 15*i)/(2*d - 3*e)) + (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] Int[(2 + x)/(4 - 5*x^2 + x^4), x]

[Out] -Log[1 - x]/2 + Log[2 - x]/3 + 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 2058

Int[(P_)^(p_), x_Symbol] := With[{u = Factor[P]}, Int[ExpandIntegrand[u^p, x], x] /; !SumQ[NonfreeFactors[u, x]]] /; PolyQ[P, x] && 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] Int[((2 + x)*(d + e*x))/(4 - 5*x^2 + x^4), x]

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

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

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

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] $(-3*(d + e)*\text{Log}[1 - x] + 2*(d + 2*e)*\text{Log}[2 - x] + (d - e)*\text{Log}[1 + x])/6$

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

$$\frac{(d - e) \log\left(x + \frac{26d^3 + 66d^2e - 9d^2(d - e) + 78de^2 - 12de(d - e) - 7d(d - e)^2 + 46e^3 + 3e^2(d - e) - 8e(d - e)^2}{10d^3 + 69d^2e + 102de^2 + 35e^3}\right)}{6} - \frac{(d + e) \log\left(x + \frac{26d^3 + 66d^2e + 27d^2(d - e) + 78de^2 - 12de(d - e) - 7d(d - e)^2 + 46e^3 + 3e^2(d - e) - 8e(d - e)^2}{10d^3 + 69d^2e + 102de^2 + 35e^3}\right)}{6}$$

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

$$\begin{aligned}
& \left(10d^3 + 69d^2e + 102de^2 + 35e^3 \right) / 6 - (d + e) \log(x + (26d^3 + 66d^2e + 27d^2(d + e) + 78de^2 + 36d^2e(d + e) - 63d(d + e)^2 + 46e^3 - 9e^2(d + e) - 72e(d + e)^2) / (10d^3 + 69d^2e + 102de^2 + 35e^3)) / 2 \\
& + (d + 2e) \log(x + (26d^3 + 66d^2e - 18d^2(d + 2e) + 78de^2 - 24d^2e(d + 2e) - 28d(d + 2e)^2 + 46e^3 + 6e^2(d + 2e) - 32e(d + 2e)^2) / (10d^3 + 69d^2e + 102de^2 + 35e^3)) / 3
\end{aligned}$$

$$3.81 \quad \int \frac{(2+x)(d+ex+fx^2)}{4-5x^2+x^4} dx$$

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

[Out] -((d + e + f)*Log[1 - x])/2 + ((d + 2*e + 4*f)*Log[2 - x])/3 + ((d - e + f)*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

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

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

$$(d - e + f) \log \left(x + \frac{26d^3 + 66d^2e + 132d^2f - 9d^2(d - e + f) + 78de^2 + 276def - 12de(d - e + f) + 222df^2 + 6df(d - e + f) - 7d(d - e + f)^2 + 46e^3 + 204e^2f + 3e^2(2e + f)}{10d^3 + 69d^2e + 102d^2f + 102de^2 + 318def + 246df^2 + 35e^3 + 174ef} \right)$$

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 +
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
```

$$3.82 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3)}{4-5x^2+x^4} dx$$

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

$\text{Int}[(u_*)*(Px_)^(p_)*(Qx_)^(q_), x_Symbol] \rightarrow \text{Int}[u*\text{PolynomialQuotient}[Px, Qx, x]^{p*Qx^{p+q}}, x] /; \text{FreeQ}[q, x] \ \&\& \ \text{PolyQ}[Px, x] \ \&\& \ \text{PolyQ}[Qx, x] \ \&\& \ \text{EqQ}[\text{PolynomialRemainder}[Px, Qx, x], 0] \ \&\& \ \text{IntegerQ}[p] \ \&\& \ \text{LtQ}[p*q, 0]$

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

[Out] $(6*g*x - 3*(d+e+f+g)*\text{Log}[1-x] + 2*(d+2*e+4*f+8*g)*\text{Log}[2-x] + (d-e+f-g)*\text{Log}[1+x])/6$

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
) - 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
```

$$3.83 \quad \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx$$

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_.)*(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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{2-x-2x^2+x^3} dx \\ &= \int \left(g \left(1 + \frac{2h}{g} \right) + \frac{d+2e+4f+8g+16h}{3(-2+x)} + \frac{-d-e-f-g-h}{2(-1+x)} \right) dx \\ &= (g+2h)x + \frac{hx^2}{2} - \frac{1}{2}(d+e+f+g+h) \log(1-x) + \frac{1}{3}(d+2e+4f+8g+16h) \log(2-x) + \frac{1}{6}(d-e+f-g+h) \log(1+x) \end{aligned}$$

Mathematica [A] time = 0.03, size = 71, normalized size = 0.96

$$\frac{1}{6} \left(-3 \log(1-x)(d+e+f+g+h) + 2 \log(2-x)(d+2(e+2f+4g+8h)) + \log(x+1)(d-e+f-g+h) + \dots \right)$$

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

$$\frac{1}{2}hx^2+(g+2h)x+\frac{1}{6}(d-e+f-g+h)\log(x+1)-\frac{1}{2}(d+e+f+g+h)\log(x-1)+\frac{1}{3}(d+2e+4f+8g+16h)\log(x-2)$$

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="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

$$\frac{1}{2}hx^2+gx+2hx+\frac{1}{6}(d+f-g+h-e)\log(|x+1|)-\frac{1}{2}(d+f+g+h+e)\log(|x-1|)+\frac{1}{3}(d+4f+8g+16h+2e)\log(|x-2|)$$

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="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

$$\frac{hx^2}{2} + \frac{d \ln(x-2)}{3} - \frac{d \ln(x-1)}{2} + \frac{d \ln(x+1)}{6} + \frac{2e \ln(x-2)}{3} - \frac{e \ln(x-1)}{2} - \frac{e \ln(x+1)}{6} + \frac{4f \ln(x-2)}{3} - \frac{f \ln(x-1)}{2} + \frac{16h \ln(x-2)}{3} - \frac{16h \ln(x-1)}{2} + \frac{16h \ln(x+1)}{6}$$

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] 1/2*h*x^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] 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)

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 + 2*h) + (h*x^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 + (2*e)/3 + (4*f)/3 + (8*g)/3 + (16*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((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_.)*(P_x_)^(p_.)*(Q_x_)^(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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+84x^5)}{4-5x^2+x^4} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+84x^5}{2-x-2x^2+x^3} dx \\ &= \int \left(420 \left(1 + \frac{1}{420}(g+2h) \right) + \frac{2688+d+2e+4f+8g+16h}{3(-2+x)} \right) dx \\ &= (420+g+2h)x + \frac{1}{2}(168+h)x^2 + 28x^3 - \frac{1}{2}(84+d+e+f+g+h+i) \log(1-x) \\ &\quad + \frac{1}{3}(d+2e+4f+8g+16h+32i) \log(2-x) + \frac{1}{6}(d-e+f-g+h-i) \log(1+x) + x(g+2h+5i) \end{aligned}$$

Mathematica [A] time = 0.05, size = 91, normalized size = 0.95

$$\frac{1}{6} \left(-3 \log(1-x)(d+e+f+g+h+i) + 2 \log(2-x)(d+2e+4(f+2g+4h+8i)) + \log(x+1)(d-e+f-g+h-i) + x(g+2h+5i) \right) +$$

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] $(6*(g + 2*h + 5*i)*x + 3*(h + 2*i)*x^2 + 2*i*x^3 - 3*(d + e + f + g + h + i) * \text{Log}[1 - x] + 2*(d + 2*e + 4*(f + 2*g + 4*h + 8*i)) * \text{Log}[2 - x] + (d - e + f - g + h - i) * \text{Log}[1 + x]) / 6$

fricas [A] time = 1.30, size = 82, normalized size = 0.85

$$\frac{1}{3}ix^3 + \frac{1}{2}(h + 2i)x^2 + (g + 2h + 5i)x + \frac{1}{6}(d - e + f - g + h - i)\log(x + 1) - \frac{1}{2}(d + e + f + g + h + i)\log(x - 1)$$

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

$$\frac{1}{3}ix^3 + \frac{1}{2}hx^2 + ix^2 + gx + 2hx + 5ix + \frac{1}{6}(d + f - g + h - i - e)\log(|x + 1|) - \frac{1}{2}(d + f + g + h + i + e)\log(|x - 1|)$$

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] $1/3*i*x^3 + 1/2*h*x^2 + i*x^2 + g*x + 2*h*x + 5*i*x + 1/6*(d + f - g + h - i - e)*\log(\text{abs}(x + 1)) - 1/2*(d + f + g + h + i + e)*\log(\text{abs}(x - 1)) + 1/3*(d + 4*f + 8*g + 16*h + 32*i + 2*e)*\log(\text{abs}(x - 2))$

maple [A] time = 0.01, size = 156, normalized size = 1.62

$$\frac{ix^3}{3} + \frac{hx^2}{2} + ix^2 + \frac{d \ln(x-2)}{3} - \frac{d \ln(x-1)}{2} + \frac{d \ln(x+1)}{6} + \frac{2e \ln(x-2)}{3} - \frac{e \ln(x-1)}{2} - \frac{e \ln(x+1)}{6} + \frac{4f \ln(x-2)}{3}$$

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] $1/3*d*\ln(x-2) + 2/3*e*\ln(x-2) + 4/3*f*\ln(x-2) + 8/3*g*\ln(x-2) + 16/3*h*\ln(x-2) + 32/3*i*\ln(x-2) + 1/3*i*x^3 + 1/2*h*x^2 + i*x^2 + g*x + 2*h*x + 5*i*x + 1/6*d*\ln(x+1) - 1/6*e*\ln(x+1) + 1/6*f*\ln(x+1) - 1/6*g*\ln(x+1) + 1/6*h*\ln(x+1) - 1/6*i*\ln(x+1) - 1/2*d*\ln(x-1) - 1/2*e*\ln(x-1) - 1/2*f*\ln(x-1) - 1/2*g*\ln(x-1) - 1/2*h*\ln(x-1) - 1/2*i*\ln(x-1)$

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] $1/3*i*x^3 + 1/2*(h + 2*i)*x^2 + (g + 2*h + 5*i)*x + 1/6*(d - e + f - g + h - i)*\log(x + 1) - 1/2*(d + e + f + g + h + i)*\log(x - 1) + 1/3*(d + 2*e + 4*f + 8*g + 16*h + 32*i)*\log(x - 2)$

mupad [B] time = 0.88, size = 99, normalized size = 1.03

$$x(g + 2h + 5i) + \frac{ix^3}{3} - \ln(x - 1) \left(\frac{d}{2} + \frac{e}{2} + \frac{f}{2} + \frac{g}{2} + \frac{h}{2} + \frac{i}{2} \right) + \ln(x + 1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} - \frac{i}{6} \right) + \ln(x - 2)$$

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

$$\begin{aligned} \int \frac{(d+ex)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left(\frac{d+2e}{48(-2+x)} + \frac{-d-e}{18(-1+x)} + \frac{d-e}{6(1+x)} + \frac{-d+2e}{12(2+x)^2} + \frac{-19d+26e}{144(2+x)} \right) dx \\ &= \frac{d-2e}{12(2+x)} - \frac{1}{18}(d+e)\log(1-x) + \frac{1}{48}(d+2e)\log(2-x) + \frac{1}{6}(d-e)\log(1+x) - \frac{1}{144}(19d-26e)\log(2+x) \end{aligned}$$

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(abs(x + 2)) + 1/6*(d - e)*log(abs(x + 1)) - 1/18*(d + e)*log(abs(x - 1)) + 1/48*(d + 2*e)*log(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 - 2e)/(12x + 24) + (d - e) \log(x + (-1534775d^{**6} + 8032360d^{**5}e - 984027d^{**5}(d - e) - 12991180d^{**4}e^{**2} + 11797266d^{**4}e(d - e) + 3567168d^{**4}(d - e)^{**2} + 1075200d^{**3}e^{**3} - 32721528d^{**3}e^{**2}(d - e) - 8725248d^{**3}e(d - e)^{**2} - 247104d^{**3}(d - e)^{**3} + 16959280d^{**2}e^{**4} + 38977296d^{**2}e^{**3}(d - e) - 2820096d^{**2}e^{**2}(d - e)^{**2} - 10357632d^{**2}e(d - e)^{**3} - 15836800d^{**2}e^{**5} - 21294960d^{**2}e^{**4}(d - e) + 15436800d^{**2}e^{**3}(d - e)^{**2} + 16277760d^{**2}e^{**2}(d - e)^{**3} + 4283840e^{**6} + 3876000e^{**5}(d - e) - 6865920e^{**4}(d - e)^{**2} - 4078080e^{**3}(d - e)^{**3})/(801262d^{**6} - 4662251d^{**5}e + 7296938d^{**4}e^{**2} + 1388616d^{**3}e^{**3} - 12447440d^{**2}e^{**4} + 9990800d^{**2}e^{**5} - 2380000e^{**6}))/6 - (d + e) \log(x + (-1534775d^{**6} + 8032360d^{**5}e + 328009d^{**5}(d + e) - 12991180d^{**4}e^{**2} - 3932422d^{**4}e(d + e) + 396352d^{**4}(d + e)^{**2} + 1075200d^{**3}e^{**3} + 10907176d^{**3}e^{**2}(d + e) - 969472d^{**3}e(d + e)^{**2} + 9152d^{**3}(d + e)^{**3} + 16959280d^{**2}e^{**4} - 12992432d^{**2}e^{**3}(d + e) - 313344d^{**2}e^{**2}(d + e)^{**2} + 383616d^{**2}e(d + e)^{**3} - 15836800d^{**2}e^{**5} + 7098320d^{**2}e^{**4}(d + e) + 1715200d^{**2}e^{**3}(d + e)^{**2} - 602880d^{**2}e^{**2}(d + e)^{**3} + 4283840e^{**6} - 1292000e^{**5}(d + e) - 762880e^{**4}(d + e)^{**2} + 151040e^{**3}(d + e)^{**3})/(801262d^{**6} - 4662251d^{**5}e + 7296938d^{**4}e^{**2} + 1388616d^{**3}e^{**3} - 12447440d^{**2}e^{**4} + 9990800d^{**2}e^{**5} - 2380000e^{**6}))/18 + (d + 2e) \log(x + (-1534775d^{**6} + 8032360d^{**5}e - 984027d^{**5}(d + 2e)/8 - 12991180d^{**4}e^{**2} + 5898633d^{**4}e(d + 2e)/4 + 55737d^{**4}(d + 2e)^{**2} + 1075200d^{**3}e^{**3} - 4090191d^{**3}e^{**2}(d + 2e) - 136332d^{**3}e(d + 2e)^{**2} - 3861d^{**3}(d + 2e)^{**3}/8 + 16959280d^{**2}e^{**4} + 4872162d^{**2}e^{**3}(d + 2e) - 44064d^{**2}e^{**2}(d + 2e)^{**2} - 80919d^{**2}e(d + 2e)^{**3}/4 - 15836800d^{**2}e^{**5} - 2661870d^{**2}e^{**4}(d + 2e) + 241200d^{**2}e^{**3}(d + 2e)^{**2} + 63585d^{**2}e^{**2}(d + 2e)^{**3}/2 + 4283840e^{**6} + 484500e^{**5}(d + 2e) - 107280e^{**4}(d + 2e)^{**2} - 7965e^{**3}(d + 2e)^{**3})/(801262d^{**6} - 4662251d^{**5}e + 7296938d^{**4}e^{**2} + 1388616d^{**3}e^{**3} - 12447440d^{**2}e^{**4} + 9990800d^{**2}e^{**5} - 2380000e^{**6}))/48 - (19d - 26e) \log(x + (-1534775d^{**6} + 8032360d^{**5}e + 328009d^{**5}(19d - 26e)/8 - 12991180d^{**4}e^{**2} - 1966211d^{**4}e(19d - 26e)/4 + 6193d^{**4}(19d - 26e)^{**2} + 1075200d^{**3}e^{**3} + 1363397d^{**3}e^{**2}(19d - 26e) - 15148d^{**3}e(19d - 26e)^{**2} + 143d^{**3}(19d - 26e)^{**3}/8 + 16959280d^{**2}e^{**4} - 1624054d^{**2}e^{**3}(19d - 26e) - 4896d^{**2}e^{**2}(19d - 26e)^{**2} + 2997d^{**2}e(19d - 26e)^{**3}/4 - 15836800d^{**2}e^{**5} + 887290d^{**2}e^{**4}(19d - 26e) + 26800d^{**2}e^{**3}(19d - 26e)^{**2} - 2355d^{**2}e^{**2}(19d - 26e)^{**3}/2 + 4283840e^{**6} - 161500e^{**5}(19d - 26e) - 1920e^{**4}(19d - 26e)^{**2} + 295e^{**3}(19d - 26e)^{**3})/(801262d^{**6} - 4662251d^{**5}e + 7296938d^{**4}e^{**2} + 1388616d^{**3}e^{**3} - 12447440d^{**2}e^{**4} + 9990800d^{**2}e^{**5} - 2380000e^{**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

$$\begin{aligned} \int \frac{(d+ex+fx^2)(2-x-2x^2+x^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left(\frac{d+2e+4f}{48(-2+x)} + \frac{-d-e-f}{18(-1+x)} + \frac{d-e+f}{6(1+x)} + \frac{-d+2e-4f}{12(2+x)^2} + \frac{-19d+26e-28f}{144(2+x)} \right) dx \\ &= \frac{d-2e+4f}{12(2+x)} - \frac{1}{18}(d+e+f)\log(1-x) + \frac{1}{48}(d+2e+4f)\log(2-x) + \frac{1}{6}(d-e+f)\log(1+x) - \frac{1}{144}\log(x+2)(19d-26e+28f) \end{aligned}$$

Mathematica [A] time = 0.06, size = 77, normalized size = 0.94

$$\frac{1}{144} \left(\frac{12(d-2e+4f)}{x+2} + 24 \log(-x-1)(d-e+f) - 8 \log(1-x)(d+e+f) + 3 \log(2-x)(d+2e+4f) + \log(x+2)(19d-26e+28f) \right)$$

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] $((12*(d - 2*e + 4*f))/(2 + x) + 24*(d - e + f)*\text{Log}[-1 - x] - 8*(d + e + f)*\text{Log}[1 - x] + 3*(d + 2*e + 4*f)*\text{Log}[2 - x] + (-19*d + 26*e - 28*f)*\text{Log}[2 + x])/144$

fricas [A] time = 1.10, size = 116, normalized size = 1.41

$$\frac{\left(\left(19d - 26e + 28f\right)x + 38d - 52e + 56f\right)\log(x + 2) - 24\left(\left(d - e + f\right)x + 2d - 2e + 2f\right)\log(x + 1) + 8\left(\left(d + e + f\right)x + 2d + 2e + 2f\right)\log(x - 1) - 3\left(\left(d + 2e + 4f\right)x + 2d + 4e + 8f\right)\log(x - 2) - 12d + 24e - 48f\right)}{144(x + 2)}$$

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] $-1/144*\left(\left(19*d - 26*e + 28*f\right)*x + 38*d - 52*e + 56*f\right)*\log(x + 2) - 24*\left(\left(d - e + f\right)*x + 2*d - 2*e + 2*f\right)*\log(x + 1) + 8*\left(\left(d + e + f\right)*x + 2*d + 2*e + 2*f\right)*\log(x - 1) - 3*\left(\left(d + 2*e + 4*f\right)*x + 2*d + 4*e + 8*f\right)*\log(x - 2) - 12*d + 24*e - 48*f\right)/(x + 2)$

giac [A] time = 0.25, size = 77, normalized size = 0.94

$$-\frac{1}{144}(19d + 28f - 26e)\log(|x + 2|) + \frac{1}{6}(d + f - e)\log(|x + 1|) - \frac{1}{18}(d + f + e)\log(|x - 1|) + \frac{1}{48}(d + 4f + 2e)\log(|x - 2|) + \frac{1}{12}(d + 4f - 2e)/(x + 2)$$

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="giac")

[Out] $-1/144*(19*d + 28*f - 26*e)*\log(\text{abs}(x + 2)) + 1/6*(d + f - e)*\log(\text{abs}(x + 1)) - 1/18*(d + f + e)*\log(\text{abs}(x - 1)) + 1/48*(d + 4*f + 2*e)*\log(\text{abs}(x - 2)) + 1/12*(d + 4*f - 2*e)/(x + 2)$

maple [A] time = 0.01, size = 110, normalized size = 1.34

$$-\frac{19d \ln(x + 2)}{144} + \frac{d \ln(x - 2)}{48} - \frac{d \ln(x - 1)}{18} + \frac{d \ln(x + 1)}{6} + \frac{13e \ln(x + 2)}{72} + \frac{e \ln(x - 2)}{24} - \frac{e \ln(x - 1)}{18} - \frac{e \ln(x + 1)}{6}$$

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

$$-\frac{1}{144}(19d - 26e + 28f)\log(x + 2) + \frac{1}{6}(d - e + f)\log(x + 1) - \frac{1}{18}(d + e + f)\log(x - 1) + \frac{1}{48}(d + 2e + 4f)\log(x - 2) + \frac{1}{12}(d - 2e + 4f)/(x + 2)$$

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

$$\frac{\frac{d}{12} - \frac{e}{6} + \frac{f}{3}}{x + 2} + \ln(x + 1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} \right) - \ln(x - 1) \left(\frac{d}{18} + \frac{e}{18} + \frac{f}{18} \right) + \ln(x - 2) \left(\frac{d}{48} + \frac{e}{24} + \frac{f}{12} \right) - \ln(x + 2) \left(\frac{19d}{144} + \frac{e}{24} + \frac{f}{12} \right)$$

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

$$\frac{d-2e+4f-8g}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g) + \frac{1}{48} \log(2-x)(d+2e+4f+8g) + \frac{1}{6} \log(x+1)(d-e+f-g) - \frac{1}{144} \log(x+2)$$

[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}

$$\frac{d-2e+4f-8g}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g) + \frac{1}{48} \log(2-x)(d+2e+4f+8g) + \frac{1}{6} \log(x+1)(d-e+f-g) - \frac{1}{144} \log(x+2)$$

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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left(\frac{d+2e+4f+8g}{48(-2+x)} + \frac{-d-e-f-g}{18(-1+x)} + \frac{d-e+f-g}{6(1+x)} + \frac{-d}{48(2+x)} \right) dx \\ &= \frac{d-2e+4f-8g}{12(2+x)} - \frac{1}{18}(d+e+f+g)\log(1-x) + \frac{1}{48}(d+2e+4f+8g)\log(2-x) + \frac{1}{6}(d-e+f-g)\log(1+x) - \frac{1}{144}\log(x+2) \end{aligned}$$

Mathematica [A] time = 0.05, size = 90, normalized size = 0.95

$$\frac{1}{144} \left(\frac{12(d-2e+4f-8g)}{x+2} + 24 \log(-x-1)(d-e+f-g) - 8 \log(1-x)(d+e+f+g) + 3 \log(2-x)(d+2e+4f+8g) + \log(x+1)(d-e+f-g) \right)$$

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] $((12*(d - 2*e + 4*f - 8*g))/(2 + x) + 24*(d - e + f - g)*\text{Log}[-1 - x] - 8*(d + e + f + g)*\text{Log}[1 - x] + 3*(d + 2*e + 4*f + 8*g)*\text{Log}[2 - x] + (-19*d + 26*e - 28*f + 8*g)*\text{Log}[2 + x])/144$

fricas [A] time = 2.42, size = 141, normalized size = 1.48

$$\frac{((19d - 26e + 28f - 8g)x + 38d - 52e + 56f - 16g) \log(x + 2) - 24((d - e + f - g)x + 2d - 2e + 2f - 2g) \log(x + 1) + 8((d + e + f + g)x + 2d + 2e + 2f + 2g) \log(x - 1) - 3((d + 2e + 4f + 8g)x + 2d + 4e + 8f + 16g) \log(x - 2) - 12d + 24e - 48f + 96g}{(x + 2)}$$

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

$$-\frac{1}{144}(19d + 28f - 8g - 26e) \log(|x + 2|) + \frac{1}{6}(d + f - g - e) \log(|x + 1|) - \frac{1}{18}(d + f + g + e) \log(|x - 1|) + \frac{1}{48}(d + 4f + 8g + 2e) \log(|x - 2|) + \frac{1}{12}(d + 4f - 8g - 2e)/(x + 2)$$

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)^2,x, algorithm="giac")`

[Out] $-1/144*(19*d + 28*f - 8*g - 26*e)*\log(\text{abs}(x + 2)) + 1/6*(d + f - g - e)*\log(\text{abs}(x + 1)) - 1/18*(d + f + g + e)*\log(\text{abs}(x - 1)) + 1/48*(d + 4*f + 8*g + 2*e)*\log(\text{abs}(x - 2)) + 1/12*(d + 4*f - 8*g - 2*e)/(x + 2)$

maple [A] time = 0.01, size = 146, normalized size = 1.54

$$-\frac{19d \ln(x + 2)}{144} + \frac{d \ln(x - 2)}{48} - \frac{d \ln(x - 1)}{18} + \frac{d \ln(x + 1)}{6} + \frac{13e \ln(x + 2)}{72} + \frac{e \ln(x - 2)}{24} - \frac{e \ln(x - 1)}{18} - \frac{e \ln(x + 1)}{6} - \frac{f \ln(x + 2)}{72} + \frac{f \ln(x - 2)}{24} - \frac{f \ln(x - 1)}{18} - \frac{f \ln(x + 1)}{6} - \frac{g \ln(x + 2)}{72} + \frac{g \ln(x - 2)}{24} - \frac{g \ln(x - 1)}{18} - \frac{g \ln(x + 1)}{6} - \frac{1}{12} \frac{d + 4f - 8g - 2e}{x + 2}$$

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

$$-\frac{1}{144}(19d - 26e + 28f - 8g) \log(x + 2) + \frac{1}{6}(d - e + f - g) \log(x + 1) - \frac{1}{18}(d + e + f + g) \log(x - 1) + \frac{1}{48}(d + 4f + 8g + 2e) \log(x - 2) + \frac{1}{12}(d + 4f - 8g - 2e)/(x + 2)$$

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)^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

$$\frac{\frac{d}{12} - \frac{e}{6} + \frac{f}{3} - \frac{2g}{3}}{x + 2} + \ln(x + 1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} \right) - \ln(x - 1) \left(\frac{d}{18} + \frac{e}{18} + \frac{f}{18} + \frac{g}{18} \right) + \ln(x - 2) \left(\frac{d}{48} + \frac{e}{24} + \frac{f}{12} + \frac{g}{6} \right) + \frac{1}{12} \frac{d + 4f - 8g - 2e}{x + 2}$$

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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left(\frac{d+2e+4f+8g+16h}{48(-2+x)} + \frac{-d-e-f-g-h}{18(-1+x)} + \frac{d-e}{6} \right) dx \\ &= \frac{d-2e+4f-8g+16h}{12(2+x)} - \frac{1}{18}(d+e+f+g+h) \log(1-x) \end{aligned}$$

Mathematica [A] time = 0.06, size = 102, normalized size = 0.96

$$\frac{1}{144} \left(\frac{12(d-2e+4f-8g+16h)}{x+2} + 24 \log(-x-1)(d-e+f-g+h) - 8 \log(1-x)(d+e+f+g+h) + 3 \log(2) \right)$$

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

$$-\frac{1}{144} (19d + 28f - 8g - 80h - 26e) \log(|x + 2|) + \frac{1}{6} (d + f - g + h - e) \log(|x + 1|) - \frac{1}{18} (d + f + g + h + e) \log(|x - 1|) + \frac{1}{12} (d + 4f - 8g + 16h - 2e) \log(|x - 2|) + \frac{1}{12} (d + 4f - 8g + 16h - 2e) / (x + 2)$$

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="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

$$\frac{5h \ln(x + 2)}{9} - \frac{h \ln(x - 1)}{18} + \frac{h \ln(x + 1)}{6} + \frac{h \ln(x - 2)}{3} - \frac{g \ln(x - 1)}{18} + \frac{g \ln(x + 2)}{18} + \frac{g \ln(x - 2)}{6} - \frac{g \ln(x + 1)}{6} - \frac{19d - 26e + 28f - 8g - 80h}{144} \ln(x + 2) + \frac{d - e + f - g + h}{6} \ln(x + 1) - \frac{d + e + f + g + h}{18} \ln(x - 1) + \frac{d + 4f - 8g + 16h - 2e}{12} \ln(x - 2) + \frac{d + 4f - 8g + 16h - 2e}{12(x + 2)}$$

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

$$-\frac{1}{144} (19d - 26e + 28f - 8g - 80h) \log(x + 2) + \frac{1}{6} (d - e + f - g + h) \log(x + 1) - \frac{1}{18} (d + e + f + g + h) \log(x - 1) + \frac{d + 4f - 8g + 16h - 2e}{12} \log(x - 2) + \frac{d + 4f - 8g + 16h - 2e}{12(x + 2)}$$

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

$$\frac{\frac{d}{12} - \frac{e}{6} + \frac{f}{3} - \frac{2g}{3} + \frac{4h}{3}}{x + 2} + \ln(x + 1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} \right) - \ln(x - 1) \left(\frac{d}{18} + \frac{e}{18} + \frac{f}{18} + \frac{g}{18} + \frac{h}{18} \right) + \ln(x - 2) \left(\frac{d}{48} + \frac{e}{24} + \frac{f}{12} + \frac{g}{6} + \frac{h}{3} \right)$$

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

$$\frac{d-2e+4f-8g+16h-32i}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g+h+i) + \frac{1}{48} \log(2-x)(d+2e+4f+8g+16h+32i) + \frac{1}{6} \log(x+2)(d+2e+4f+8g+16h+32i)$$

[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}

$$\frac{d-2e+4f-8g+16h-32i}{12(x+2)} - \frac{1}{18} \log(1-x)(d+e+f+g+h+i) + \frac{1}{48} \log(2-x)(d+2e+4f+8g+16h+32i) + \frac{1}{6} \log(x+2)(d+2e+4f+8g+16h+32i)$$

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] $i*x + (d - 2*e + 4*f - 8*g + 16*h - 32*i)/(12*(2 + x)) - ((d + e + f + g + h + i)*\text{Log}[1 - x])/18 + ((d + 2*e + 4*f + 8*g + 16*h + 32*i)*\text{Log}[2 - x])/48 + ((d - e + f - g + h - i)*\text{Log}[1 + x])/6 - ((19*d - 26*e + 28*f - 8*g - 80*h + 352*i)*\text{Log}[2 + x])/144$

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

$$\begin{aligned} \int \frac{(2-x-2x^2+x^3)(d+ex+fx^2+gx^3+hx^4+90x^5)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+90x^5}{(2+x)^2(2-x-2x^2+x^3)} dx \\ &= \int \left(90 + \frac{2880+d+2e+4f+8g+16h}{48(-2+x)} + \frac{-90}{(2+x)^2} \right) dx \\ &= 90x - \frac{2880-d+2e-4f+8g-16h}{12(2+x)} - \frac{1}{18} (90x^2 - 2880x + 2880) \end{aligned}$$

Mathematica [A] time = 0.06, size = 118, normalized size = 0.97

$$\frac{1}{144} \left(\frac{12(d-2(e-2f+4g-8h+16i))}{x+2} - 8 \log(1-x)(d+e+f+g+h+i) + 3 \log(2-x)(d+2e+4(f+2g+2h+2i)) \right)$$

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 + 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

$$\frac{144ix^2 + 288ix - ((19d - 26e + 28f - 8g - 80h + 352i)x + 38d - 52e + 56f - 16g - 160h + 704i) \log(x + 2)}{(4 - 5x^2 + x^4)^2}$$

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="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

$$ix - \frac{1}{144} (19d + 28f - 8g - 80h + 352i - 26e) \log(|x + 2|) + \frac{1}{6} (d + f - g + h - i - e) \log(|x + 1|) - \frac{1}{18} (d + f + g + h + i + e) \log(|x - 1|) + \frac{1}{48} (d + 4f + 8g + 16h + 32i + 2e) \log(|x - 2|) + \frac{1}{12} (d + 4f - 8g + 16h - 32i - 2e) / (x + 2)$$

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="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

$$-\frac{22i \ln(x + 2)}{9} - \frac{i \ln(x - 1)}{18} - \frac{i \ln(x + 1)}{6} + \frac{2i \ln(x - 2)}{3} + \frac{5h \ln(x + 2)}{9} - \frac{h \ln(x - 1)}{18} + \frac{h \ln(x + 1)}{6} + \frac{h \ln(x - 2)}{3} - \frac{g \ln(x + 2)}{9} - \frac{g \ln(x - 1)}{18} - \frac{g \ln(x + 1)}{6} + \frac{g \ln(x - 2)}{3} - \frac{f \ln(x + 2)}{9} - \frac{f \ln(x - 1)}{18} - \frac{f \ln(x + 1)}{6} + \frac{f \ln(x - 2)}{3} - \frac{e \ln(x + 2)}{9} - \frac{e \ln(x - 1)}{18} - \frac{e \ln(x + 1)}{6} + \frac{e \ln(x - 2)}{3} - \frac{d \ln(x + 2)}{9} - \frac{d \ln(x - 1)}{18} - \frac{d \ln(x + 1)}{6} + \frac{d \ln(x - 2)}{3} - \frac{1}{144} (19d + 28f - 8g - 80h + 352i - 26e) \log(x + 2) + \frac{1}{6} (d + f - g + h - i - e) \log(x + 1) - \frac{1}{18} (d + f + g + h + i + e) \log(x - 1) + \frac{1}{48} (d + 4f + 8g + 16h + 32i + 2e) \log(x - 2) + \frac{1}{12} (d + 4f - 8g + 16h - 32i - 2e) / (x + 2)$$

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*e*ln(x+1)-1/6*d*ln(x-1)-1/6*d*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

$$ix - \frac{1}{144} (19d - 26e + 28f - 8g - 80h + 352i) \log(x + 2) + \frac{1}{6} (d - e + f - g + h - i) \log(x + 1) - \frac{1}{18} (d + e + f + g + h + i) \log(x - 1) + \frac{1}{48} (d + 4f + 8g + 16h + 32i + 2e) \log(x - 2) + \frac{1}{12} (d + 4f - 8g + 16h - 32i - 2e) / (x + 2)$$

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

$$ix + \frac{\frac{d}{12} - \frac{e}{6} + \frac{f}{3} - \frac{2g}{3} + \frac{4h}{3} - \frac{8i}{3}}{x+2} + \ln(x+1) \left(\frac{d}{6} - \frac{e}{6} + \frac{f}{6} - \frac{g}{6} + \frac{h}{6} - \frac{i}{6} \right) + \ln(x-2) \left(\frac{d}{48} + \frac{e}{24} + \frac{f}{12} + \frac{g}{6} + \frac{h}{3} + \frac{2i}{3} \right)$$

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))*(p+1)), Int[(a + b*x + c*x^2)^(p+1)*(d + e*x + f*x^2)^q*Simp[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(abs(x + 2)) - 7/36*log(abs(x + 1)) - 1/36*log(abs(x - 1)) + 1/144*log(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] /; 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

$$\begin{aligned} \int \frac{(d+ex)(2-3x+x^2)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex}{(2-3x+x^2)(2+3x+x^2)^2} dx \\ &= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{1}{72} \int \frac{6(3d-10e)-24(2d-3e)x+6(3d-4e)x^2}{(2-3x+x^2)(2+3x+x^2)} dx \\ &= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{\int \frac{108(3d-10e)-288(2d-3e)+(-36(3d-10e)+72(3d-4e))x}{2-3x+x^2} dx}{5184} - \int \frac{108(3d-10e)-288(2d-3e)}{5184} dx \\ &= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{1}{36}(7d-13e) \int \frac{1}{1+x} dx - \frac{1}{144}(-d-2e) \int \frac{1}{-2+x} dx - \frac{1}{5184}(108(3d-10e)-288(2d-3e))x \\ &= -\frac{5d-6e+(3d-4e)x}{12(2+3x+x^2)} - \frac{1}{36}(d+e) \log(1-x) + \frac{1}{144}(d+2e) \log(2-x) - \frac{1}{36}(7d-13e)x \end{aligned}$$

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

$$\frac{12(3d-4e)x - ((31d-50e)x^2 + 3(31d-50e)x + 62d-100e) \log(x+2) + 4((7d-13e)x^2 + 3(7d-13e)x)}{144}$$

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

$$\frac{1}{144} (31d - 50e) \log(|x + 2|) - \frac{1}{36} (7d - 13e) \log(|x + 1|) - \frac{1}{36} (d + e) \log(|x - 1|) + \frac{1}{144} (d + 2e) \log(|x - 2|) - \frac{60d - 72e}{x^2 + 3x + 2}$$

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="giac")`

[Out] $1/144*(31*d - 50*e)*\log(\text{abs}(x + 2)) - 1/36*(7*d - 13*e)*\log(\text{abs}(x + 1)) - 1/36*(d + e)*\log(\text{abs}(x - 1)) + 1/144*(d + 2*e)*\log(\text{abs}(x - 2)) - 1/12*((3*d - 4*e)*x + 5*d - 6*e)/((x + 2)*(x + 1))$

maple [A] time = 0.01, size = 90, normalized size = 1.01

$$\frac{31d \ln(x + 2)}{144} + \frac{d \ln(x - 2)}{144} - \frac{d \ln(x - 1)}{36} - \frac{7d \ln(x + 1)}{36} - \frac{25e \ln(x + 2)}{72} + \frac{e \ln(x - 2)}{72} - \frac{e \ln(x - 1)}{36} + \frac{13e \ln(x + 1)}{36} - \frac{60d - 72e}{x^2 + 3x + 2}$$

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

$$\frac{1}{144} (31d - 50e) \log(x + 2) - \frac{1}{36} (7d - 13e) \log(x + 1) - \frac{1}{36} (d + e) \log(x - 1) + \frac{1}{144} (d + 2e) \log(x - 2) - \frac{3d - 4e}{12} \frac{1}{x^2 + 3x + 2}$$

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 + (-24383100d^6 + 187408066d^5e + 10439775d^5(d + e) - 511591980d^4e^2 - 94132290d^4e(d + e) + 667200d^4(d + e)^2 + 469491120d^3e^3 + 333672552d^3e^2(d + e) - 2703328d^3e(d + e)^2 - 198000d^3(d + e)^3 + 322778400d^2e^4 - 582497712d^2e^3(d + e) + 1752768d^2e^2(d + e)^2 + 1107552d^2e(d + e)^3 - 863493856d^2e^5 + 500776560d^2e^4(d + e) + 4226944d^2e^3(d + e)^2 - 1880640d^2e^2(d + e)^3 + 429000000e^6 - 169242912e^5(d + e) - 4538112e^4(d + e)^2 + 964224e^3(d + e)^3) / (13474125d^6 - 102860175d^5e + 274190390d^4e^2 - 224142072d^3e^3 - 245084096d^2e^4 + 535797456d^2e^5 - 256183200e^6) / 36 + (d + 2e) \log(x + (-24383100d^6 + 187408066d^5e - 10439775d^5(d + 2e) / 4 - 511591980d^4e^2 + 47066145d^4e(d + 2e) / 2 + 41700d^4(d + 2e)^2 + 469491120d^3e^3 - 83418138d^3e^2(d + 2e) - 168958d^3e(d + 2e)^2 + 12375d^3(d + 2e)^3 / 4 + 322778400d^2e^4 + 145624428d^2e^3(d + 2e) + 109548d^2e^2(d + 2e)^2 - 34611d^2e(d + 2e)^3 / 2 - 863493856d^2e^5 - 125194140d^2e^4(d + 2e) + 264184d^2e^3(d + 2e)^2 + 29385d^2e^2(d + 2e)^3 + 429000000e^6 + 42310728e^5(d + 2e) - 283632e^4(d + 2e)^2 - 15066e^3(d + 2e)^3) / (13474125d^6 - 102860175d^5e + 274190390d^4e^2 - 224142072d^3e^3 - 245084096d^2e^4 + 535797456d^2e^5 - 256183200e^6) / 144 - (7d - 13e) \log(x + (-24383100d^6 + 187408066d^5e + 10439775d^5(7d - 13e) - 511591980d^4e^2 - 94132290d^4e(7d - 13e) + 667200d^4(7d - 13e)^2 + 469491120d^3e^3 + 333672552d^3e^2(7d - 13e) - 2703328d^3e(7d - 13e)^2 - 198000d^3(7d - 13e)^3 + 322778400d^2e^4 - 582497712d^2e^3(7d - 13e) + 1752768d^2e^2(7d - 13e)^2 + 1107552d^2e(7d - 13e)^3 - 863493856d^2e^5 + 500776560d^2e^4(7d - 13e) + 4226944d^2e^3(7d - 13e)^2 - 1880640d^2e^2(7d - 13e)^3 + 429000000e^6 - 169242912e^5(7d - 13e) - 4538112e^4(7d - 13e)^2 + 964224e^3(7d - 13e)^3) / (13474125d^6 - 102860175d^5e + 274190390d^4e^2 - 224142072d^3e^3 - 245084096d^2e^4 + 535797456d^2e^5 - 256183200e^6) / 36 + (31d - 50e) \log(x + (-24383100d^6 + 187408066d^5e - 10439775d^5(31d - 50e) / 4 - 511591980d^4e^2 + 47066145d^4e(31d - 50e) / 2 + 41700d^4(31d - 50e)^2 + 469491120d^3e^3 - 83418138d^3e^2(31d - 50e) - 168958d^3e(31d - 50e)^2 + 12375d^3(31d - 50e)^3 / 4 + 322778400d^2e^4 + 145624428d^2e^3(31d - 50e) + 109548d^2e^2(31d - 50e)^2 - 34611d^2e(31d - 50e)^3 / 2 - 863493856d^2e^5 - 125194140d^2e^4(31d - 50e) + 264184d^2e^3(31d - 50e)^2 + 29385d^2e^2(31d - 50e)^3 + 429000000e^6 + 42310728e^5(31d - 50e) - 283632e^4(31d - 50e)^2 - 15066e^3(31d - 50e)^3) / (13474125d^6 - 102860175d^5e + 274190390d^4e^2 - 224142072d^3e^3 - 245084096d^2e^4 + 535797456d^2e^5 - 256183200e^6) / 144 + (-5d + 6e + x(-3d + 4e)) / (12x^2 + 36x + 24)$

$$3.93 \quad \int \frac{(2-3x+x^2)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx$$

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] && !LtQ[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

$$\int \frac{(2 - 3x + x^2)(d + ex + fx^2)}{(4 - 5x^2 + x^4)^2} dx = \int \frac{d + ex + fx^2}{(2 - 3x + x^2)(2 + 3x + x^2)^2} dx$$

$$= -\frac{5d - 6e + 8f + (3d - 4e + 6f)x}{12(2 + 3x + x^2)} - \frac{1}{72} \int \frac{6(3d - 10e + 12f) - 24(2d - 3e - 12f)}{(2 - 3x + x^2)(2 + 3x + x^2)^2} dx$$

$$= -\frac{5d - 6e + 8f + (3d - 4e + 6f)x}{12(2 + 3x + x^2)} - \frac{\int \frac{-288(2d - 3e + 5f) + 108(3d - 10e + 12f) + (72(3d - 4e + 6f)x^2)}{2 - 3x + x^2} dx}{5184}$$

$$= -\frac{5d - 6e + 8f + (3d - 4e + 6f)x}{12(2 + 3x + x^2)} - \frac{1}{144}(-31d + 50e - 76f) \int \frac{1}{2 + x} dx - \frac{1}{144} \int \frac{1}{1 + x} dx$$

$$= -\frac{5d - 6e + 8f + (3d - 4e + 6f)x}{12(2 + 3x + x^2)} - \frac{1}{36}(d + e + f) \log(1 - x) + \frac{1}{144}(d + 2e + f) \log(x + 2) + \frac{1}{144}(d + 2e + f) \log(x + 1)$$

Mathematica [A] time = 0.07, size = 97, normalized size = 0.92

$$\frac{1}{144} \left(-\frac{12(d(3x + 5) - 4ex - 6e + 6fx + 8f)}{x^2 + 3x + 2} - 4 \log(1 - x)(d + e + f) + \log(2 - x)(d + 2e + 4f) - 4 \log(x + 1)(7d + 10e + 12f) \right)$$

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

$$\frac{12(3d - 4e + 6f)x - ((31d - 50e + 76f)x^2 + 3(31d - 50e + 76f)x + 62d - 100e + 152f) \log(x + 2) + 4((31d - 50e + 76f)x + 62d - 100e + 152f) \log(x + 1)}{144(x^2 + 3x + 2)}$$

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]
$$\frac{-1}{144} \cdot (12 \cdot (3d - 4e + 6f) \cdot x - ((31d - 50e + 76f) \cdot x^2 + 3 \cdot (31d - 50e + 76f) \cdot x + 62d - 100e + 152f) \cdot \log(x + 2) + 4 \cdot ((7d - 13e + 19f) \cdot x^2 + 3 \cdot (7d - 13e + 19f) \cdot x + 14d - 26e + 38f) \cdot \log(x + 1) + 4 \cdot ((d + e + f) \cdot x^2 + 3 \cdot (d + e + f) \cdot x + 2d + 2e + 2f) \cdot \log(x - 1) - ((d + 2e + 4f) \cdot x^2 + 3 \cdot (d + 2e + 4f) \cdot x + 2d + 4e + 8f) \cdot \log(x - 2) + 60d - 72e + 96f) / (x^2 + 3x + 2)$$

giac [A] time = 0.32, size = 101, normalized size = 0.96

$$\frac{1}{144} (31d + 76f - 50e) \log(|x + 2|) - \frac{1}{36} (7d + 19f - 13e) \log(|x + 1|) - \frac{1}{36} (d + f + e) \log(|x - 1|) + \frac{1}{144} (d + 2e + 4f) \log(|x - 2|)$$

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="giac")

[Out]
$$\frac{1}{144} \cdot (31d + 76f - 50e) \cdot \log(\text{abs}(x + 2)) - \frac{1}{36} \cdot (7d + 19f - 13e) \cdot \log(\text{abs}(x + 1)) - \frac{1}{36} \cdot (d + f + e) \cdot \log(\text{abs}(x - 1)) + \frac{1}{144} \cdot (d + 4f + 2e) \cdot \log(\text{abs}(x - 2)) - \frac{1}{12} \cdot ((3d + 6f - 4e) \cdot x + 5d + 8f - 6e) / ((x + 2) \cdot (x + 1))$$

maple [A] time = 0.01, size = 134, normalized size = 1.28

$$\frac{31d \ln(x + 2)}{144} + \frac{d \ln(x - 2)}{144} - \frac{d \ln(x - 1)}{36} - \frac{7d \ln(x + 1)}{36} - \frac{25e \ln(x + 2)}{72} + \frac{e \ln(x - 2)}{72} - \frac{e \ln(x - 1)}{36} + \frac{13e \ln(x + 1)}{36}$$

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]
$$\frac{1}{144} \cdot d \cdot \ln(x - 2) + \frac{1}{72} \cdot e \cdot \ln(x - 2) + \frac{1}{36} \cdot f \cdot \ln(x - 2) - \frac{7}{36} \cdot d \cdot \ln(x + 1) + \frac{13}{36} \cdot e \cdot \ln(x + 1) - \frac{19}{36} \cdot f \cdot \ln(x + 1) - \frac{1}{6} \cdot \frac{d}{x + 1} + \frac{1}{6} \cdot \frac{e}{x + 1} - \frac{1}{6} \cdot \frac{f}{x + 1} - \frac{1}{36} \cdot d \cdot \ln(x - 1) - \frac{1}{36} \cdot e \cdot \ln(x - 1) - \frac{1}{36} \cdot f \cdot \ln(x - 1) - \frac{1}{12} \cdot \frac{d}{x + 2} + \frac{1}{6} \cdot \frac{e}{x + 2} - \frac{1}{3} \cdot \frac{f}{x + 2} + \frac{31}{144} \cdot d \cdot \ln(x + 2) - \frac{25}{72} \cdot e \cdot \ln(x + 2) + \frac{19}{36} \cdot f \cdot \ln(x + 2)$$

maxima [A] time = 0.44, size = 91, normalized size = 0.87

$$\frac{1}{144} (31d - 50e + 76f) \log(x + 2) - \frac{1}{36} (7d - 13e + 19f) \log(x + 1) - \frac{1}{36} (d + e + f) \log(x - 1) + \frac{1}{144} (d + 2e + 4f) \log(x - 2)$$

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]
$$\frac{1}{144} \cdot (31d - 50e + 76f) \cdot \log(x + 2) - \frac{1}{36} \cdot (7d - 13e + 19f) \cdot \log(x + 1) - \frac{1}{36} \cdot (d + e + f) \cdot \log(x - 1) + \frac{1}{144} \cdot (d + 2e + 4f) \cdot \log(x - 2) - \frac{1}{12} \cdot ((3d - 4e + 6f) \cdot x + 5d - 6e + 8f) / (x^2 + 3x + 2)$$

mupad [B] time = 0.83, size = 97, normalized size = 0.92

$$\ln(x - 2) \left(\frac{d}{144} + \frac{e}{72} + \frac{f}{36} \right) - \ln(x + 1) \left(\frac{7d}{36} - \frac{13e}{36} + \frac{19f}{36} \right) - \ln(x - 1) \left(\frac{d}{36} + \frac{e}{36} + \frac{f}{36} \right) + \ln(x + 2) \left(\frac{31d}{144} - \frac{25e}{72} + \frac{19f}{36} \right)$$

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]
$$\log(x - 2) \cdot (d/144 + e/72 + f/36) - \log(x + 1) \cdot ((7d)/36 - (13e)/36 + (19f)/36) - \log(x - 1) \cdot (d/36 + e/36 + f/36) + \log(x + 2) \cdot ((31d)/144 - (25e)/72 + (19f)/36)$$

$2 + (19*f)/36) - ((5*d)/12 - e/2 + (2*f)/3 + x*(d/4 - e/3 + f/2))/(3*x + x^2 + 2)$

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

$$-\frac{d-2e+4f-8g}{12(x+2)} - \frac{d-e+f-g}{6(x+1)} - \frac{1}{36} \log(1-x)(d+e+f+g) + \frac{1}{144} \log(2-x)(d+2e+4f+8g) - \frac{1}{36} \log(x+1)(7d-1$$

[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}

$$-\frac{d-2e+4f-8g}{12(x+2)} - \frac{d-e+f-g}{6(x+1)} - \frac{1}{36} \log(1-x)(d+e+f+g) + \frac{1}{144} \log(2-x)(d+2e+4f+8g) - \frac{1}{36} \log(x+1)(7d-1$$

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_)^(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

$$\begin{aligned} \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3}{(2-3x+x^2)(2+3x+x^2)^2} dx \\ &= \int \left(\frac{d+2e+4f+8g}{144(-2+x)} + \frac{-d-e-f-g}{36(-1+x)} + \frac{d-e+f-g}{6(1+x)^2} + \frac{-7d+1}{3} \right) dx \\ &= -\frac{d-e+f-g}{6(1+x)} - \frac{d-2e+4f-8g}{12(2+x)} - \frac{1}{36}(d+e+f+g)\log(1-x) \end{aligned}$$

Mathematica [A] time = 0.06, size = 114, normalized size = 0.97

$$\frac{1}{144} \left(\frac{12(-3dx - 5d + 4ex + 6e - 6fx - 8f + 10gx + 12g)}{x^2 + 3x + 2} - 4 \log(1-x)(d+e+f+g) + \log(2-x)(d+2e+4f+8g) - \log(x+1)(7d-13e+19f-25g) \right)$$

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

$$\frac{31d \ln(x + 2)}{144} + \frac{d \ln(x - 2)}{144} - \frac{d \ln(x - 1)}{36} - \frac{7d \ln(x + 1)}{36} - \frac{25e \ln(x + 2)}{72} + \frac{e \ln(x - 2)}{72} - \frac{e \ln(x - 1)}{36} + \frac{13e \ln(x + 1)}{36} + \frac{1}{144} (d + 4f + 8g + 2e) \ln|x - 2| - \frac{1}{12} ((3d + 6f - 10g - 4e)x + 5d + 8f - 12g - 6e) / ((x + 2)(x + 1))$$

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

$$\frac{1}{144} (31d - 50e + 76f - 104g) \log(x + 2) - \frac{1}{36} (7d - 13e + 19f - 25g) \log(x + 1) - \frac{1}{36} (d + e + f + g) \log(x - 1) + \frac{1}{144} (d + 4f + 8g + 2e) \log|x - 2| - \frac{1}{12} ((3d + 6f - 10g - 4e)x + 5d + 8f - 12g - 6e) / ((x + 2)(x + 1))$$

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="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

$$\ln(x-2) \left(\frac{d}{144} + \frac{e}{72} + \frac{f}{36} + \frac{g}{18} \right) - \ln(x+1) \left(\frac{7d}{36} - \frac{13e}{36} + \frac{19f}{36} - \frac{25g}{36} \right) - \ln(x-1) \left(\frac{d}{36} + \frac{e}{36} + \frac{f}{36} + \frac{g}{36} \right) + \ln \left(\frac{(3d-4e+6f-10g)x + 5d - 6e + 8f - 12g}{x^2 + 3x + 2} \right)$$

Verification of antiderivative is not currently implemented for this CAS.

[In] int(((x^2 - 3*x + 2)*(d + e*x + f*x^2 + 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

$$\begin{aligned} \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{(2-3x+x^2)(2+3x+x^2)^2} dx \\ &= \int \left(\frac{d+2e+4f+8g+16h}{144(-2+x)} + \frac{-d-e-f-g-h}{36(-1+x)} + \frac{d-e+f-g+h}{6(1+x)} \right) dx \\ &= -\frac{d-e+f-g+h}{6(1+x)} - \frac{d-2e+4f-8g+16h}{12(2+x)} - \frac{1}{36}(d+e+f+g+h) \log(1-x) + \frac{1}{144}(d+2e+4f+8g+16h) \log(2-x) \end{aligned}$$

Mathematica [A] time = 0.06, size = 136, normalized size = 1.04

$$\frac{1}{144} \left(-\frac{12(d(3x+5)+2(-e(2x+3)+3fx+4f-5gx-6g+9hx+10h))}{x^2+3x+2} - 4 \log(1-x)(d+e+f+g+h) + \log(2-x)(d+2e+4f+8g+16h) \right)$$

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

$$\frac{12(3d - 4e + 6f - 10g + 18h)x - ((31d - 50e + 76f - 104g + 112h)x^2 + 3(31d - 50e + 76f - 104g +$$

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)*x + 62*d - 100*e + 152*f - 208*g + 224*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)*x + 14*d - 26*e + 38*f - 50*g + 62*h)*log(x + 1) + 4*((d + e + f + g + h)*x^2 + 3*(d + e + f + g + h)*x + 2*d + 2*e + 2*f + 2*g + 2*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)*x + 2*d + 4*e + 8*f + 16*g + 32*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

$$\frac{1}{144} (31d + 76f - 104g + 112h - 50e) \log(|x + 2|) - \frac{1}{36} (7d + 19f - 25g + 31h - 13e) \log(|x + 1|) - \frac{1}{36} (d +$$

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)-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)-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

$$\ln(x-2) \left(\frac{d}{144} + \frac{e}{72} + \frac{f}{36} + \frac{g}{18} + \frac{h}{9} \right) - \ln(x-1) \left(\frac{d}{36} + \frac{e}{36} + \frac{f}{36} + \frac{g}{36} + \frac{h}{36} \right) - \ln(x+1) \left(\frac{7d}{36} - \frac{13e}{36} + \frac{19f}{36} - \frac{25g}{36} + \frac{31h}{36} \right) - \frac{(5d-6e+8f-12g+20h)x + 5d-6e+8f-12g+20h}{x^2+3x+2}$$

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))/(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_)^(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

$$\begin{aligned} \int \frac{(2-3x+x^2)(d+ex+fx^2+gx^3+hx^4+96x^5)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+96x^5}{(2-3x+x^2)(2+3x+x^2)^2} dx \\ &= \int \left(\frac{3072+d+2e+4f+8g+16h}{144(-2+x)} + \frac{-96-d-e}{36(-1-x)} \right. \\ &= \frac{96-d+e-f+g-h}{6(1+x)} + \frac{3072-d+2e-4f+8g-96}{12(2+x)} \end{aligned}$$

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

$$\frac{12(3d - 4e + 6f - 10g + 18h - 34i)x - ((31d - 50e + 76f - 104g + 112h - 32i)x^2 + 3(31d - 50e + 76f - 104g + 112h - 32i)x + 62d - 100e + 152f - 208g + 224h - 64i)\log(x + 2) + 4((7d - 13e + 19f - 25g + 31h - 37i)x^2 + 3(7d - 13e + 19f - 25g + 31h - 37i)x + 14d - 26e + 38f - 50g + 62h - 74i)\log(x + 1) + 4((d + e + f + g + h + i)x^2 + 3(d + e + f + g + h + i)x + 2d + 2e + 2f + 2g + 2h + 2i)\log(x - 1) - ((d + 2e + 4f + 8g + 16h + 32i)x^2 + 3(d + 2e + 4f + 8g + 16h + 32i)x + 2d + 4e + 8f + 16g + 32h + 64i)\log(x - 2) + 60d - 72e + 96f - 144g + 240h - 432i}{(x^2 + 3x + 2)^2}$$

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

$$\frac{1}{144}(31d + 76f - 104g + 112h - 32i - 50e)\log(|x + 2|) - \frac{1}{36}(7d + 19f - 25g + 31h - 37i - 13e)\log(|x + 1|) + \frac{1}{144}(d + 4f + 8g + 16h + 32i + 2e)\log(|x - 1|) - \frac{1}{12}((3d + 6f - 10g + 18h - 34i - 4e)x + 5d + 8f - 12g + 20h - 36i - 6e)/((x + 2)(x + 1))$$

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)

$2) * i + 1/6/(x+1) * i - 4/3/(x+2) * h - 1/6/(x+1) * h + 2/3/(x+2) * g + 1/6/(x+1) * g - 1/12/(x+2) * d + 1/6/(x+2) * e - 1/6/(x+1) * d + 1/6/(x+1) * e - 1/3/(x+2) * f - 1/6/(x+1) * f$

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] 1/144*(31*d - 50*e + 76*f - 104*g + 112*h - 32*i)*log(x + 2) - 1/36*(7*d - 13*e + 19*f - 25*g + 31*h - 37*i)*log(x + 1) - 1/36*(d + e + f + g + h + i)*log(x - 1) + 1/144*(d + 2*e + 4*f + 8*g + 16*h + 32*i)*log(x - 2) - 1/12*((3*d - 4*e + 6*f - 10*g + 18*h - 34*i)*x + 5*d - 6*e + 8*f - 12*g + 20*h - 36*i)/(x^2 + 3*x + 2)

mupad [B] time = 1.68, size = 151, normalized size = 1.03

$$\ln(x-2) \left(\frac{d}{144} + \frac{e}{72} + \frac{f}{36} + \frac{g}{18} + \frac{h}{9} + \frac{2i}{9} \right) - \ln(x-1) \left(\frac{d}{36} + \frac{e}{36} + \frac{f}{36} + \frac{g}{36} + \frac{h}{36} + \frac{i}{36} \right) - \ln(x+1) \left(\frac{7d}{36} - \frac{13e}{36} + \frac{19f}{36} - \frac{25g}{36} + \frac{31h}{36} - \frac{37i}{36} \right)$$

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 + (2*i)/9) - log(x - 1)*(d/36 + e/36 + f/36 + g/36 + h/36 + i/36) - log(x + 1)*((7*d)/36 - (13*e)/36 + (19*f)/36 - (25*g)/36 + (31*h)/36 - (37*i)/36) + log(x + 2)*((31*d)/144 - (25*e)/72 + (19*f)/36 - (13*g)/18 + (7*h)/9 - (2*i)/9) - ((5*d)/12 - e/2 + (2*f)/3 - g + (5*h)/3 - 3*i + x*(d/4 - e/3 + f/2 - (5*g)/6 + (3*h)/2 - (17*i)/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)*(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

$$\begin{aligned} \int \frac{2+x}{(4-5x^2+x^4)^2} dx &= \int \frac{1}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left(\frac{1}{36(-2+x)^2} - \frac{35}{432(-2+x)} + \frac{1}{12(-1+x)^2} + \frac{1}{18(-1+x)} + \frac{1}{36(1+x)^2} + \frac{1}{54(1+x)} \right) dx \\ &= \frac{1}{12(1-x)} + \frac{1}{36(2-x)} - \frac{1}{36(1+x)} + \frac{1}{18} \log(1-x) - \frac{35}{432} \log(2-x) + \frac{1}{54} \log(1+x) + \frac{1}{144} \log(2+x) \end{aligned}$$

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

$$\frac{60x^2 - 3(x^3 - 2x^2 - x + 2)\log(x + 2) - 8(x^3 - 2x^2 - x + 2)\log(x + 1) - 24(x^3 - 2x^2 - x + 2)\log(x - 1)}{432(x^3 - 2x^2 - x + 2)}$$

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(abs(x + 2)) + 1/54*log(abs(x + 1)) + 1/18*log(abs(x - 1)) - 35/432*log(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
og(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

$$\begin{aligned} \int \frac{(2+x)(d+ex)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left(\frac{d+2e}{36(-2+x)^2} + \frac{-35d-58e}{432(-2+x)} + \frac{d+e}{12(-1+x)^2} + \frac{2d+5e}{36(-1+x)} + \frac{d-e}{36(1+x)^2} + \frac{2d+e}{108(1+x)} \right) dx \\ &= \frac{d+e}{12(1-x)} + \frac{d+2e}{36(2-x)} - \frac{d-e}{36(1+x)} + \frac{1}{36}(2d+5e)\log(1-x) - \frac{1}{432}(35d+58e)\log(2-x) + \frac{1}{108}(2d+e)\log(x+1) + \frac{1}{144}(d-2e)\log(2+x) \end{aligned}$$

Mathematica [A] time = 0.09, size = 97, normalized size = 0.92

$$\frac{1}{432} \left(\frac{12(d(-5x^2+6x+5)+2e(5-2x^2))}{x^3-2x^2-x+2} + 12(2d+5e)\log(1-x) - (35d+58e)\log(2-x) + 4(2d+e)\log(x+1) + (d-2e)\log(2+x) \right)$$

Antiderivative was successfully verified.

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

[Out] $((12*(d*(5 + 6*x - 5*x^2) + 2*e*(5 - 2*x^2)))/(2 - x - 2*x^2 + x^3) + 12*(2*d + 5*e)*\text{Log}[1 - x] - (35*d + 58*e)*\text{Log}[2 - x] + 4*(2*d + e)*\text{Log}[1 + x] + 3*(d - 2*e)*\text{Log}[2 + x])/432$

fricas [B] time = 0.94, size = 211, normalized size = 2.01

$$\frac{12(5d + 4e)x^2 - 72dx - 3((d - 2e)x^3 - 2(d - 2e)x^2 - (d - 2e)x + 2d - 4e)\log(x + 2) - 4((2d + e)x^3 - 2(2d + e)x^2 - (2d + e)x + 4d + 2e)\log(x + 1) - 12((2d + 5e)x^3 - 2(2d + 5e)x^2 - (2d + 5e)x + 4d + 10e)\log(x - 1) + ((35d + 58e)x^3 - 2(35d + 58e)x^2 - (35d + 58e)x + 70d + 116e)\log(x - 2) - 60d - 120e}{(x^3 - 2x^2 - x + 2)}$$

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

$$\frac{1}{144}(d - 2e)\log(|x + 2|) + \frac{1}{108}(2d + e)\log(|x + 1|) + \frac{1}{36}(2d + 5e)\log(|x - 1|) - \frac{1}{432}(35d + 58e)\log(|x - 2|) - \frac{5d + 4e}{36}x^2 - 6dx - 5d - 10e / ((x + 1)(x - 1)(x - 2))$$

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="giac")`

[Out] $1/144*(d - 2*e)*\log(\text{abs}(x + 2)) + 1/108*(2*d + e)*\log(\text{abs}(x + 1)) + 1/36*(2*d + 5*e)*\log(\text{abs}(x - 1)) - 1/432*(35*d + 58*e)*\log(\text{abs}(x - 2)) - 1/36*((5*d + 4*e)*x^2 - 6*d*x - 5*d - 10*e)/((x + 1)*(x - 1)*(x - 2))$

maple [A] time = 0.01, size = 106, normalized size = 1.01

$$\frac{d \ln(x + 2)}{144} - \frac{35d \ln(x - 2)}{432} + \frac{d \ln(x - 1)}{18} + \frac{d \ln(x + 1)}{54} - \frac{e \ln(x + 2)}{72} - \frac{29e \ln(x - 2)}{216} + \frac{5e \ln(x - 1)}{36} + \frac{e \ln(x + 1)}{108} - \frac{5d + 4e}{36}x^2 - 6dx - 5d - 10e / ((x + 1)(x - 1)(x - 2))$$

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

$$\frac{1}{144}(d - 2e)\log(x + 2) + \frac{1}{108}(2d + e)\log(x + 1) + \frac{1}{36}(2d + 5e)\log(x - 1) - \frac{1}{432}(35d + 58e)\log(x - 2) - \frac{5d + 4e}{36}x^2 - 6dx - 5d - 10e / ((x^3 - 2x^2 - x + 2))$$

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] $1/144*(d - 2*e)*\log(x + 2) + 1/108*(2*d + e)*\log(x + 1) + 1/36*(2*d + 5*e)*\log(x - 1) - 1/432*(35*d + 58*e)*\log(x - 2) - 1/36*((5*d + 4*e)*x^2 - 6*d*x - 5*d - 10*e)/(x^3 - 2*x^2 - x + 2)$

mupad [B] time = 0.09, size = 90, normalized size = 0.86

$$\ln(x - 1) \left(\frac{d}{18} + \frac{5e}{36} \right) - \frac{\left(-\frac{5d}{36} - \frac{e}{9} \right) x^2 + \frac{dx}{6} + \frac{5d}{36} + \frac{5e}{18}}{-x^3 + 2x^2 + x - 2} + \ln(x + 1) \left(\frac{d}{54} + \frac{e}{108} \right) + \ln(x + 2) \left(\frac{d}{144} - \frac{e}{72} \right) - \ln(x - 2) \left(\frac{35d}{432} + \frac{29e}{216} \right) + \frac{5d + 4e}{36}x^2 + 6dx + 5d + 10e / ((x + 1)(x - 1)(x - 2))$$

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 - 2*e)*log(x + (8710660*d**5 + 91884504*d**4*e - 7579779*d**4*(d - 2*e)/
4 + 364910432*d**3*e**2 - 18128055*d**3*e*(d - 2*e) - 83772*d**3*(d - 2*e)*
*2 + 686697536*d**2*e**3 - 60296868*d**2*e**2*(d - 2*e) - 597816*d**2*e*(d
- 2*e)**2 + 65907*d**2*(d - 2*e)**3/4 + 614357568*d*e**4 - 85949220*d*e**3*
(d - 2*e) - 1500048*d*e**2*(d - 2*e)**2 + 105840*d*e*(d - 2*e)**3 + 2084704
00*e**5 - 45136356*e**4*(d - 2*e) - 1196064*e**3*(d - 2*e)**2 + 128277*e**2
*(d - 2*e)**3)/(3374210*d**5 + 38645295*d**4*e + 170558380*d**3*e**2 + 3620
61760*d**2*e**3 + 370298160*d*e**4 + 146466320*e**5))/144 + (2*d + e)*log(x
+ (8710660*d**5 + 91884504*d**4*e - 2526593*d**4*(2*d + e) + 364910432*d**
3*e**2 - 24170740*d**3*e*(2*d + e) - 148928*d**3*(2*d + e)**2 + 686697536*d
**2*e**3 - 80395824*d**2*e**2*(2*d + e) - 1062784*d**2*e*(2*d + e)**2 + 390
56*d**2*(2*d + e)**3 + 614357568*d*e**4 - 114598960*d*e**3*(2*d + e) - 2666
752*d*e**2*(2*d + e)**2 + 250880*d*e*(2*d + e)**3 + 208470400*e**5 - 601818
08*e**4*(2*d + e) - 2126336*e**3*(2*d + e)**2 + 304064*e**2*(2*d + e)**3)/(
3374210*d**5 + 38645295*d**4*e + 170558380*d**3*e**2 + 362061760*d**2*e**3
+ 370298160*d*e**4 + 146466320*e**5))/108 + (2*d + 5*e)*log(x + (8710660*d*
*5 + 91884504*d**4*e - 7579779*d**4*(2*d + 5*e) + 364910432*d**3*e**2 - 725
12220*d**3*e*(2*d + 5*e) - 1340352*d**3*(2*d + 5*e)**2 + 686697536*d**2*e**
3 - 241187472*d**2*e**2*(2*d + 5*e) - 9565056*d**2*e*(2*d + 5*e)**2 + 10545
12*d**2*(2*d + 5*e)**3 + 614357568*d*e**4 - 343796880*d*e**3*(2*d + 5*e) -
24000768*d*e**2*(2*d + 5*e)**2 + 6773760*d*e*(2*d + 5*e)**3 + 208470400*e**
5 - 180545424*e**4*(2*d + 5*e) - 19137024*e**3*(2*d + 5*e)**2 + 8209728*e**
2*(2*d + 5*e)**3)/(3374210*d**5 + 38645295*d**4*e + 170558380*d**3*e**2 + 3
62061760*d**2*e**3 + 370298160*d*e**4 + 146466320*e**5))/36 - (35*d + 58*e)
*log(x + (8710660*d**5 + 91884504*d**4*e + 2526593*d**4*(35*d + 58*e)/4 + 3
64910432*d**3*e**2 + 6042685*d**3*e*(35*d + 58*e) - 9308*d**3*(35*d + 58*e)
**2 + 686697536*d**2*e**3 + 20098956*d**2*e**2*(35*d + 58*e) - 66424*d**2*e
*(35*d + 58*e)**2 - 2441*d**2*(35*d + 58*e)**3/4 + 614357568*d*e**4 + 28649
740*d*e**3*(35*d + 58*e) - 166672*d*e**2*(35*d + 58*e)**2 - 3920*d*e*(35*d
+ 58*e)**3 + 208470400*e**5 + 15045452*e**4*(35*d + 58*e) - 132896*e**3*(35
*d + 58*e)**2 - 4751*e**2*(35*d + 58*e)**3)/(3374210*d**5 + 38645295*d**4*e
+ 170558380*d**3*e**2 + 362061760*d**2*e**3 + 370298160*d*e**4 + 146466320
*e**5))/432 + (6*d*x + 5*d + 10*e + x**2*(-5*d - 4*e))/(36*x**3 - 72*x**2 -
36*x + 72)
```

$$3.99 \quad \int \frac{(2+x)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx$$

Optimal. Leaf size=122

$$-\frac{d-e+f}{36(x+1)} + \frac{d+e+f}{12(1-x)} + \frac{d+2e+4f}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f) - \frac{1}{432} \log(2-x)(35d+58e+92f) + \frac{1}{108} \log(x+1)(2d+5e+8f)$$

[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}

$$-\frac{d-e+f}{36(x+1)} + \frac{d+e+f}{12(1-x)} + \frac{d+2e+4f}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f) - \frac{1}{432} \log(2-x)(35d+58e+92f) + \frac{1}{108} \log(x+1)(2d+5e+8f)$$

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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left(\frac{d+2e+4f}{36(-2+x)^2} + \frac{-35d-58e-92f}{432(-2+x)} + \frac{d+e+f}{12(-1+x)^2} + \frac{2d+5e+8f}{36(-1+x)} + \frac{d-e+f}{36(1+x)^2} \right) dx \\ &= \frac{d+e+f}{12(1-x)} + \frac{d+2e+4f}{36(2-x)} - \frac{d-e+f}{36(1+x)} + \frac{1}{36}(2d+5e+8f)\log(1-x) - \frac{1}{432}(35d+58e+92f)\log(2-x) + \frac{1}{108}(2d+e-4f)\log(1+x) + \frac{1}{144}(d-2e+4f)\log(2+x) \end{aligned}$$

Mathematica [A] time = 0.05, size = 121, normalized size = 0.99

$$\frac{1}{432} \left(\frac{12(d(-5x^2+6x+5) + e(10-4x^2) + 2f(-4x^2+3x+4))}{x^3-2x^2-x+2} + 12\log(1-x)(2d+5e+8f) - \log(2-x)(35d+58e+92f) \right)$$

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

$$\frac{12(5d + 4e + 8f)x^2 - 72(d + f)x - 3((d - 2e + 4f)x^3 - 2(d - 2e + 4f)x^2 - (d - 2e + 4f)x + 2d - 4e + 8f)}{432}$$

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

$$\frac{1}{144}(d + 4f - 2e)\log(|x + 2|) + \frac{1}{108}(2d - 4f + e)\log(|x + 1|) + \frac{1}{36}(2d + 8f + 5e)\log(|x - 1|) - \frac{1}{432}(35d + 58e + 92f)\log(|x - 2|) - 60d - 120e - 96f$$

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] 1/144*(d + 4*f - 2*e)*log(abs(x + 2)) + 1/108*(2*d - 4*f + e)*log(abs(x + 1)) + 1/36*(2*d + 8*f + 5*e)*log(abs(x - 1)) - 1/432*(35*d + 92*f + 58*e)*log(abs(x - 2)) - 1/36*((5*d + 8*f + 4*e)*x^2 - 6*(d + f)*x - 5*d - 8*f - 10*e)/((x + 1)*(x - 1)*(x - 2))

maple [A] time = 0.02, size = 158, normalized size = 1.30

$$\frac{d \ln(x + 2)}{144} - \frac{35d \ln(x - 2)}{432} + \frac{d \ln(x - 1)}{18} + \frac{d \ln(x + 1)}{54} - \frac{e \ln(x + 2)}{72} - \frac{29e \ln(x - 2)}{216} + \frac{5e \ln(x - 1)}{36} + \frac{e \ln(x + 1)}{108} + \dots$$

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

$$\frac{1}{144}(d - 2e + 4f)\log(x + 2) + \frac{1}{108}(2d + e - 4f)\log(x + 1) + \frac{1}{36}(2d + 5e + 8f)\log(x - 1) - \frac{1}{432}(35d + 58e + 92f)\log(x - 2) - 1/36$$

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] 1/144*(d - 2*e + 4*f)*log(x + 2) + 1/108*(2*d + e - 4*f)*log(x + 1) + 1/36*(2*d + 5*e + 8*f)*log(x - 1) - 1/432*(35*d + 58*e + 92*f)*log(x - 2) - 1/36

$((5*d + 4*e + 8*f)*x^2 - 6*(d + f)*x - 5*d - 10*e - 8*f)/(x^3 - 2*x^2 - x + 2)$

mupad [B] time = 0.13, size = 113, normalized size = 0.93

$$\ln(x-1) \left(\frac{d}{18} + \frac{5e}{36} + \frac{2f}{9} \right) + \ln(x+1) \left(\frac{d}{54} + \frac{e}{108} - \frac{f}{27} \right) + \ln(x+2) \left(\frac{d}{144} - \frac{e}{72} + \frac{f}{36} \right) - \ln(x-2) \left(\frac{35d}{432} + \frac{29e}{216} + \frac{23f}{108} \right) - \left(\frac{5d}{36} + \frac{5e}{18} + \frac{2f}{9} + x \left(\frac{d}{6} + \frac{f}{6} \right) - x^2 \left(\frac{5d}{36} + \frac{e}{9} + \frac{2f}{9} \right) \right) / (x + 2x^2 - x^3 - 2)$$

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

$$-\frac{d-e+f-g}{36(x+1)} + \frac{d+e+f+g}{12(1-x)} + \frac{d+2e+4f+8g}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g) - \frac{1}{432} \log(2-x)(35d+58e+92f+136g) + \frac{1}{108} \log(1+x)(2d+e-4f+7g) + \frac{1}{144} \log(2+x)(d-2e+4f-8g)$$

[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+e-4*f+7*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, number of rules / integrand size = 0.065, Rules used = {1586, 6742}

$$-\frac{d-e+f-g}{36(x+1)} + \frac{d+e+f+g}{12(1-x)} + \frac{d+2e+4f+8g}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g) - \frac{1}{432} \log(2-x)(35d+58e+92f+136g) + \frac{1}{108} \log(1+x)(2d+e-4f+7g) + \frac{1}{144} \log(2+x)(d-2e+4f-8g)$$

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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left(\frac{d+2e+4f+8g}{36(-2+x)^2} + \frac{-35d-58e-92f-136g}{432(-2+x)} + \frac{d+e+f+g}{12(-1+x)^2} + \frac{2d+e-4f+7g}{108} \right) dx \\ &= \frac{d+e+f+g}{12(1-x)} + \frac{d+2e+4f+8g}{36(2-x)} - \frac{d-e+f-g}{36(1+x)} + \frac{1}{36} (2d+5e+8f+11g) \log(1-x) \\ &\quad - \frac{1}{432} (35d+58e+92f+136g) \log(2-x) + \frac{1}{108} (2d+e-4f+7g) \log(1+x) + \frac{1}{144} (d-2e+4f-8g) \log(2+x) \end{aligned}$$

Mathematica [A] time = 0.07, size = 144, normalized size = 1.02

$$\frac{1}{432} \left(\frac{12(d(-5x^2+6x+5)) + 2(e(5-2x^2) + f(-4x^2+3x+4) + g(8-5x^2))}{x^3-2x^2-x+2} + 12 \log(1-x)(2d+5e+8f+11g) - \log(2-x)(35d+58e+92f+136g) + \log(1+x)(2d+e-4f+7g) + \log(2+x)(d-2e+4f-8g) \right)$$

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 - 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

$$\frac{1}{144}(d + 4f - 8g - 2e)\log(|x + 2|) + \frac{1}{108}(2d - 4f + 7g + e)\log(|x + 1|) + \frac{1}{36}(2d + 8f + 11g + 5e)\log(|x - 1|) - \frac{1}{432}(35d + 58e + 92f + 136g)\log(|x - 2|) - \frac{1}{36}((5d + 8f + 10g + 4e)x^2 - 6(d + f)x - 5d - 8f - 16g - 10e)/((x + 1)(x - 1)(x - 2))$$

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="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

$$\frac{11g \ln(x - 1)}{36} - \frac{g \ln(x + 2)}{18} - \frac{17g \ln(x - 2)}{54} + \frac{7g \ln(x + 1)}{108} + \frac{d \ln(x + 2)}{144} - \frac{e \ln(x + 2)}{72} + \frac{5e \ln(x - 1)}{36} + \frac{d \ln(x - 1)}{18} + \frac{e \ln(x - 1)}{18} - \frac{1}{36}((5d + 8f + 10g + 4e)x^2 - 6(d + f)x - 5d - 8f - 16g - 10e)/((x + 1)(x - 1)(x - 2))$$

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

$$\frac{1}{144}(d - 2e + 4f - 8g)\log(x + 2) + \frac{1}{108}(2d + e - 4f + 7g)\log(x + 1) + \frac{1}{36}(2d + 5e + 8f + 11g)\log(x - 1) - \frac{1}{432}(35d + 58e + 92f + 136g)\log(x - 2) - \frac{1}{36}((5d + 8f + 10g + 4e)x^2 - 6(d + f)x - 5d - 8f - 16g - 10e)/((x + 1)(x - 1)(x - 2))$$

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="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

$$\ln(x-1) \left(\frac{d}{18} + \frac{5e}{36} + \frac{2f}{9} + \frac{11g}{36} \right) + \ln(x+2) \left(\frac{d}{144} - \frac{e}{72} + \frac{f}{36} - \frac{g}{18} \right) + \ln(x+1) \left(\frac{d}{54} + \frac{e}{108} - \frac{f}{27} + \frac{7g}{108} \right) - \ln$$

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)/18 + (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

$$-\frac{d-e+f-g+h}{36(x+1)} + \frac{d+e+f+g+h}{12(1-x)} + \frac{d+2e+4f+8g+16h}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+14h) - \frac{1}{432} \log(2$$

[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}

$$-\frac{d-e+f-g+h}{36(x+1)} + \frac{d+e+f+g+h}{12(1-x)} + \frac{d+2e+4f+8g+16h}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+14h) - \frac{1}{432} \log(2$$

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)^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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left(\frac{d+2e+4f+8g+16h}{36(-2+x)^2} + \frac{-35d-58e-92f-136g-176h}{432(-2+x)} + \frac{d}{432} \right) dx \\ &= \frac{d+e+f+g+h}{12(1-x)} + \frac{d+2e+4f+8g+16h}{36(2-x)} - \frac{d-e+f-g+h}{36(1+x)} + \frac{1}{432} \log(1-x)(2d+5e+8f+11g+14h) - \frac{1}{432} \log(2+x)(d-2e+4f-8g+16h) \end{aligned}$$

Mathematica [A] time = 0.09, size = 169, normalized size = 1.07

$$\frac{1}{432} \left(\frac{12(d(-5x^2+6x+5)+2(e(5-2x^2)+f(-4x^2+3x+4))-5gx^2+8g-10hx^2+3hx+10h)}{x^3-2x^2-x+2} + 12 \log(1-x) \right)$$

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

$$\frac{12(5d + 4e + 8f + 10g + 20h)x^2 - 72(d + f + h)x - 3((d - 2e + 4f - 8g + 16h)x^3 - 2(d - 2e + 4f - 8g + 16h)x^2 - (d - 2e + 4f - 8g + 16h)x + 2d - 4e + 8f - 16g + 32h)\log(x + 2) - 4((2d + e - 4f + 7g - 10h)x^3 - 2(2d + e - 4f + 7g - 10h)x^2 - (2d + e - 4f + 7g - 10h)x + 4d + 2e - 8f + 14g - 20h)\log(x + 1) - 12((2d + 5e + 8f + 11g + 14h)x^3 - 2(2d + 5e + 8f + 11g + 14h)x^2 - (2d + 5e + 8f + 11g + 14h)x + 4d + 10e + 16f + 22g + 28h)\log(x - 1) + ((35d + 58e + 92f + 136g + 176h)x^3 - 2(35d + 58e + 92f + 136g + 176h)x^2 - (35d + 58e + 92f + 136g + 176h)x + 70d + 116e + 184f + 272g + 352h)\log(x - 2) - 60d - 120e - 96f - 192g - 240h}{(x^3 - 2x^2 - x + 2)}$$

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)^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 - 1) + ((35*d + 58*e + 92*f + 136*g + 176*h)*x^3 - 2*(35*d + 58*e + 92*f + 136*g + 176*h)*x^2 - (35*d + 58*e + 92*f + 136*g + 176*h)*x + 70*d + 116*e + 184*f + 272*g + 352*h)*log(x - 2) - 60*d - 120*e - 96*f - 192*g - 240*h)/(x^3 - 2*x^2 - x + 2)

giac [A] time = 0.37, size = 155, normalized size = 0.98

$$\frac{1}{144} (d + 4f - 8g + 16h - 2e) \log(|x + 2|) + \frac{1}{108} (2d - 4f + 7g - 10h + e) \log(|x + 1|) + \frac{1}{36} (2d + 8f + 11g + 14h + 5e) \log(|x - 1|) - \frac{1}{432} (35d + 92f + 136g + 176h + 58e) \log(|x - 2|) - \frac{1}{36} ((5d + 8f + 10g + 20h + 4e)x^2 - 6(d + f + h)x - 5d - 8f - 16g - 20h - 10e) / ((x + 1)(x - 1)(x - 2))$$

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)^2,x, algorithm="giac")

[Out] 1/144*(d + 4*f - 8*g + 16*h - 2*e)*log(abs(x + 2)) + 1/108*(2*d - 4*f + 7*g - 10*h + e)*log(abs(x + 1)) + 1/36*(2*d + 8*f + 11*g + 14*h + 5*e)*log(abs(x - 1)) - 1/432*(35*d + 92*f + 136*g + 176*h + 58*e)*log(abs(x - 2)) - 1/36*((5*d + 8*f + 10*g + 20*h + 4*e)*x^2 - 6*(d + f + h)*x - 5*d - 8*f - 16*g - 20*h - 10*e)/((x + 1)*(x - 1)*(x - 2))

maple [A] time = 0.02, size = 262, normalized size = 1.66

$$\frac{h \ln(x + 2)}{9} + \frac{7h \ln(x - 1)}{18} - \frac{5h \ln(x + 1)}{54} - \frac{11h \ln(x - 2)}{27} + \frac{11g \ln(x - 1)}{36} - \frac{g \ln(x + 2)}{18} - \frac{17g \ln(x - 2)}{54} + \frac{7g \ln(x - 1)}{108} - \frac{1}{432} (35d + 92f + 136g + 176h + 58e) \log(|x - 2|) - \frac{1}{36} ((5d + 8f + 10g + 20h + 4e)x^2 - 6(d + f + h)x - 5d - 8f - 16g - 20h - 10e) / ((x + 1)(x - 1)(x - 2))$$

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)^2,x)

[Out] 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*

$f \cdot \ln(x+2) - 1/36/(x+1) \cdot h - 1/12/(x-1) \cdot h - 4/9/(x-2) \cdot h + 1/36/(x+1) \cdot g - 1/12/(x-1) \cdot g - 2/9/(x-2) \cdot g - 1/36/(x-2) \cdot d - 1/18/(x-2) \cdot e - 1/36/(x+1) \cdot d + 1/36/(x+1) \cdot e - 1/12/(x-1) \cdot d - 1/12/(x-1) \cdot e - 1/12/(x-1) \cdot f - 1/9/(x-2) \cdot f - 1/36/(x+1) \cdot f$

maxima [A] time = 0.45, size = 145, normalized size = 0.92

$$\frac{1}{144} (d - 2e + 4f - 8g + 16h) \log(x + 2) + \frac{1}{108} (2d + e - 4f + 7g - 10h) \log(x + 1) + \frac{1}{36} (2d + 5e + 8f + 11g - 10h) \log(x - 1) - \frac{1}{43} (2(35d + 58e + 92f + 136g + 176h) \log(x - 2) - 1/36((5d + 4e + 8f + 10g + 20h)x^2 - 6(d + f + h)x - 5d - 10e - 8f - 16g - 20h)/(x^3 - 2x^2 - x + 2))$$

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="maxima")

[Out] 1/144*(d - 2*e + 4*f - 8*g + 16*h)*log(x + 2) + 1/108*(2*d + e - 4*f + 7*g - 10*h)*log(x + 1) + 1/36*(2*d + 5*e + 8*f + 11*g + 14*h)*log(x - 1) - 1/43*2*(35*d + 58*e + 92*f + 136*g + 176*h)*log(x - 2) - 1/36*((5*d + 4*e + 8*f + 10*g + 20*h)*x^2 - 6*(d + f + h)*x - 5*d - 10*e - 8*f - 16*g - 20*h)/(x^3 - 2*x^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)*(d/18 + (5*e)/36 + (2*f)/9 + (11*g)/36 + (7*h)/18) - ((5*d)/36 + (5*e)/18 + (2*f)/9 + (4*g)/9 + (5*h)/9 - x^2*((5*d)/36 + e/9 + (2*f)/9 + (5*g)/18 + (5*h)/9) + x*(d/6 + f/6 + h/6))/(x + 2*x^2 - x^3 - 2) + log(x + 2)*(d/144 - e/72 + f/36 - g/18 + h/9) + log(x + 1)*(d/54 + e/108 - f/27 + (7*g)/108 - (5*h)/54) - log(x - 2)*((35*d)/432 + (29*e)/216 + (23*f)/108 + (17*g)/54 + (11*h)/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((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

$$-\frac{d-e+f-g+h-i}{36(x+1)} + \frac{d+e+f+g+h+i}{12(1-x)} + \frac{d+2e+4f+8g+16h+32i}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+11h+14i)$$

[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}

$$-\frac{d-e+f-g+h-i}{36(x+1)} + \frac{d+e+f+g+h+i}{12(1-x)} + \frac{d+2e+4f+8g+16h+32i}{36(2-x)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+11h+14i)$$

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

$$\begin{aligned} \int \frac{(2+x)(d+ex+fx^2+gx^3+hx^4+102x^5)}{(4-5x^2+x^4)^2} dx &= \int \frac{d+ex+fx^2+gx^3+hx^4+102x^5}{(2+x)(2-x-2x^2+x^3)^2} dx \\ &= \int \left(\frac{3264+d+2e+4f+8g+16h}{36(-2+x)^2} + \frac{-16320-35d-58e-92f-136g-176h-160i}{432} \right) dx \\ &= \frac{102+d+e+f+g+h}{12(1-x)} + \frac{3264+d+2e+4f+8g+16h}{36(2-x)} \end{aligned}$$

Mathematica [A] time = 0.11, size = 195, normalized size = 1.10

$$\frac{-5dx^2 + 6dx + 5d - 4ex^2 + 10e - 8fx^2 + 6fx + 8f - 10gx^2 + 16g - 20hx^2 + 6hx + 20h - 34ix^2 + 40i}{36(x^3 - 2x^2 - x + 2)} + \frac{1}{36} \log(1-x)(2d+5e+8f+11g+11h+14i)$$

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

$$\frac{12(5d + 4e + 8f + 10g + 20h + 34i)x^2 - 72(d + f + h)x - 3((d - 2e + 4f - 8g + 16h - 32i)x^3 - 2(d - 2e + 4f - 8g + 16h - 32i)x^2 - (d - 2e + 4f - 8g + 16h - 32i)x + 2d - 4e + 8f - 16g + 32h - 64i)\log(x + 2) - 4((2d + e - 4f + 7g - 10h + 13i)x^3 - 2(2d + e - 4f + 7g - 10h + 13i)x^2 - (2d + e - 4f + 7g - 10h + 13i)x + 4d + 2e - 8f + 14g - 20h + 26i)\log(x + 1) - 12((2d + 5e + 8f + 11g + 14h + 17i)x^3 - 2(2d + 5e + 8f + 11g + 14h + 17i)x^2 - (2d + 5e + 8f + 11g + 14h + 17i)x + 4d + 10e + 16f + 22g + 28h + 34i)\log(x - 1) + ((35d + 58e + 92f + 136g + 176h + 160i)x^3 - 2(35d + 58e + 92f + 136g + 176h + 160i)x^2 - (35d + 58e + 92f + 136g + 176h + 160i)x + 70d + 116e + 184f + 272g + 352h + 320i)\log(x - 2) - 60d - 120e - 96f - 192g - 240h - 480i}{(x^3 - 2x^2 - x + 2)}$$

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 + 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

$$\frac{1}{144}(d + 4f - 8g + 16h - 32i - 2e)\log(|x + 2|) + \frac{1}{108}(2d - 4f + 7g - 10h + 13i + e)\log(|x + 1|) + \frac{1}{36}(2d + 5e + 8f + 11g + 14h + 17i)\log(|x - 1|) - \frac{1}{432}(35d + 92f + 136g + 176h + 160i + 58e)\log(|x - 2|) - \frac{1}{36}((5d + 8f + 10g + 20h + 34i + 4e)x^2 - 6(d + f + h)x - 5d - 8f - 16g - 20h - 40i - 10e)/((x + 1)(x - 1)(x - 2))$$

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="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)-29/2
16*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

$$\frac{1}{144} (d - 2e + 4f - 8g + 16h - 32i) \log(x + 2) + \frac{1}{108} (2d + e - 4f + 7g - 10h + 13i) \log(x + 1) + \frac{1}{36} (2d +$$

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="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

$$\ln(x - 1) \left(\frac{d}{18} + \frac{5e}{36} + \frac{2f}{9} + \frac{11g}{36} + \frac{7h}{18} + \frac{17i}{36} \right) + \ln(x + 2) \left(\frac{d}{144} - \frac{e}{72} + \frac{f}{36} - \frac{g}{18} + \frac{h}{9} - \frac{2i}{9} \right) + \ln(x + 1) \left(\frac{d}{54} -$$

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)/4
32 + (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

$$\frac{x\sqrt{a+bx^2+cx^4}(-84a^2c^2f+57ab^2cf-144abc^2d-8b^4f+18b^3cd)}{315c^{5/2}(\sqrt{a}+\sqrt{cx^2})} \frac{\sqrt[4]{a}(\sqrt{a}+\sqrt{cx^2})\sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{cx^2})^2}}(-84a^2c^2f+57ab^2cf-144abc^2d-8b^4f+18b^3cd)}{315c^{5/2}(\sqrt{a}+\sqrt{cx^2})}$$

[Out] $\frac{1}{32}(-b*g+2*c*e)*(2*c*x^2+b)*(c*x^4+b*x^2+a)^{(3/2)}/c^2+1/63*x*(7*c*f*x^2+3*b*f+9*c*d)*(c*x^4+b*x^2+a)^{(3/2)}/c+1/10*g*(c*x^4+b*x^2+a)^{(5/2)}/c+3/512*(-4*a*c+b^2)^2*(-b*g+2*c*e)*\operatorname{arctanh}(1/2*(2*c*x^2+b)/c^{(1/2)})/(c*x^4+b*x^2+a)^{(1/2)}/c^{(7/2)}-3/256*(-4*a*c+b^2)*(-b*g+2*c*e)*(2*c*x^2+b)*(c*x^4+b*x^2+a)^{(1/2)}/c^3+1/315*x*(9*b^2*c*d+90*a*c^2*d-4*b^3*f+9*a*b*c*f+3*c*(14*a*c*f-4*b^2*f+9*b*c*d)*x^2)*(c*x^4+b*x^2+a)^{(1/2)}/c^2-1/315*(-84*a^2*c^2*f+57*a*b^2*c*f-144*a*b*c^2*d-8*b^4*f+18*b^3*c*d)*x*(c*x^4+b*x^2+a)^{(1/2)}/c^{(5/2)}/(a^{(1/2)}+x^2*c^{(1/2)})+1/315*a^{(1/4)}*(-84*a^2*c^2*f+57*a*b^2*c*f-144*a*b*c^2*d-8*b^4*f+18*b^3*c*d)*(\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))^2)^{(1/2)}/\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))*\operatorname{EllipticE}(\sin(2*\arctan(c^{(1/4)}*x/a^{(1/4)})),1/2*(2-b/a^{(1/2)}/c^{(1/2)})^{(1/2)}*(a^{(1/2)}+x^2*c^{(1/2)}))*((c*x^4+b*x^2+a)/(a^{(1/2)}+x^2*c^{(1/2)}))^2)^{(1/2)}/c^{(11/4)}/(c*x^4+b*x^2+a)^{(1/2)}-1/630*a^{(1/4)}*(\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))^2)^{(1/2)}/\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))*\operatorname{EllipticF}(\sin(2*\arctan(c^{(1/4)}*x/a^{(1/4)})),1/2*(2-b/a^{(1/2)}/c^{(1/2)})^{(1/2)}*(a^{(1/2)}+x^2*c^{(1/2)}))*((c*x^4+b*x^2+a)/(a^{(1/2)}+x^2*c^{(1/2)}))^2)^{(1/2)}/c^{(11/4)}/(c*x^4+b*x^2+a)^{(1/2)}$

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}

$$\frac{x\sqrt{a+bx^2+cx^4}(-84a^2c^2f+57ab^2cf-144abc^2d+18b^3cd-8b^4f)}{315c^{5/2}(\sqrt{a}+\sqrt{cx^2})} \frac{\sqrt[4]{a}(\sqrt{a}+\sqrt{cx^2})\sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{cx^2})^2}}(-84a^2c^2f+57ab^2cf-144abc^2d+18b^3cd-8b^4f)}{315c^{5/2}(\sqrt{a}+\sqrt{cx^2})}$$

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] $-\frac{((18*b^3*c*d - 144*a*b*c^2*d - 8*b^4*f + 57*a*b^2*c*f - 84*a^2*c^2*f)*x*\operatorname{Sqrt}[a + b*x^2 + c*x^4])}{(315*c^{(5/2)}*(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2))} - \frac{(3*(b^2 - 4*a*c)*(2*c*e - b*g)*(b + 2*c*x^2)*\operatorname{Sqrt}[a + b*x^2 + c*x^4])}{(256*c^3)} + \frac{(x*(9*b^2*c*d + 90*a*c^2*d - 4*b^3*f + 9*a*b*c*f + 3*c*(9*b*c*d - 4*b^2*f + 14*a*c*f)*x^2)*\operatorname{Sqrt}[a + b*x^2 + c*x^4])}{(315*c^2)} + \frac{((2*c*e - b*g)*(b + 2*c*x^2)*(a + b*x^2 + c*x^4)^{(3/2)})}{(32*c^2)} + \frac{(x*(3*(3*c*d + b*f) + 7*c*f*x^2)*(a + b*x^2 + c*x^4)^{(3/2)})}{(63*c)} + \frac{(g*(a + b*x^2 + c*x^4)^{(5/2)})}{(10*c)} + \frac{(3*(b^2 - 4*a*c)^2*(2*c*e - b*g)*\operatorname{ArcTanh}[(b + 2*c*x^2)/(2*\operatorname{Sqrt}[c]*\operatorname{Sqrt}[a + b*x^2 + c*x^4])])}{(512*c^{(7/2)})} + \frac{(a^{(1/4)}*(18*b^3*c*d - 144*a*b*c^2*d - 8*b^4*f + 57*a*b^2*c*f - 84*a^2*c^2*f)*(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)*\operatorname{Sqrt}[(a + b*x^2 + c*x^4)/(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)^2]*\operatorname{EllipticE}[2*\operatorname{ArcTan}[(c^{(1/4)}*x)/a^{(1/4)}], (2 - b/(\operatorname{Sqrt}[a]*\operatorname{Sqrt}[c]))/4])}{(315*c^{(11/4)}*\operatorname{Sqrt}[a + b*x^2 + c*x^4])} - \frac{(a^{(1/4)}*(18*b^3*c*d - 144*a*b*c^2*d - 8*b^4*f + 57*a*b^2*c*f - 84*a^2*c^2*f + \operatorname{Sqrt}[a]*\operatorname{Sqrt}[c]*(9*b^2*c*d - 180*a*c^2*d - 4*b^3*f + 24*a*b*c*f))*(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)*\operatorname{Sqrt}[(a + b*x^2 + c*x^4)/(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)^2]*\operatorname{EllipticF}[2*\operatorname{ArcTan}[(c^{(1/4)}*x)/a^{(1/4)}], (2 - b/(\operatorname{Sqrt}[a]*\operatorname{Sqrt}[c]))/4])}{(630*c^{(11/4)}*\operatorname{Sqrt}[a + b*x^2 + c*x^4])}$

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 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] && NeQ[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

$$\begin{aligned}
\int (d + ex + fx^2 + gx^3)(a + bx^2 + cx^4)^{3/2} dx &= \int (d + fx^2)(a + bx^2 + cx^4)^{3/2} dx + \int x(e + gx^2)(a + bx^2 + cx^4)^{3/2} dx \\
&= \frac{x(3(3cd + bf) + 7cfx^2)(a + bx^2 + cx^4)^{3/2}}{63c} + \frac{1}{2} \text{Subst}\left(\int (e + gx^2)(a + bx^2 + cx^4)^{3/2} dx, x, x^2\right) \\
&= \frac{x(9b^2cd + 90ac^2d - 4b^3f + 9abcf + 3c(9bcd - 4b^2f + 14acf))x}{315c^2} \\
&= \frac{x(9b^2cd + 90ac^2d - 4b^3f + 9abcf + 3c(9bcd - 4b^2f + 14acf))x}{315c^2} \\
&= -\frac{(18b^3cd - 144abc^2d - 8b^4f + 57ab^2cf - 84a^2c^2f)x\sqrt{a + bx^2 + cx^4}}{315c^{5/2}(\sqrt{a} + \sqrt{cx^4})} \\
&= -\frac{(18b^3cd - 144abc^2d - 8b^4f + 57ab^2cf - 84a^2c^2f)x\sqrt{a + bx^2 + cx^4}}{315c^{5/2}(\sqrt{a} + \sqrt{cx^4})} \\
&= -\frac{(18b^3cd - 144abc^2d - 8b^4f + 57ab^2cf - 84a^2c^2f)x\sqrt{a + bx^2 + cx^4}}{315c^{5/2}(\sqrt{a} + \sqrt{cx^4})}
\end{aligned}$$

Mathematica [F] time = 0.00, size = 0, normalized size = 0.00

\$Aborted

Verification is Not applicable to the result.

[In] Integrate[(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 \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})/a)^{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} / (cx^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}) \cdot a^2 + 2/15 \cdot f \cdot a^3 \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})/a)^{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} / (cx^4 + bx^2 + a)^{1/2} / (b + (-4ac + b^2)^{1/2}) \cdot \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}) - 2/15 \cdot f \cdot a^3 \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})/a)^{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} / (cx^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}) + 19/210 \cdot f \cdot a^2 \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})/a)^{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} / (cx^4 + bx^2 + a)^{1/2} / (b + (-4ac + b^2)^{1/2}) / cb^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}) - 4/315 \cdot f \cdot a^2 \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})/a)^{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} / (cx^4 + bx^2 + a)^{1/2} / (b + (-4ac + b^2)^{1/2}) \cdot b^4/c^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}) + 4/315 \cdot f \cdot a^2 \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})/a)^{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} / (cx^4 + bx^2 + a)^{1/2} / (b + (-4ac + b^2)^{1/2}) \cdot b^4/c^2 \cdot \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}) + 1/35 \cdot d \cdot a^2 \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})/a)^{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} / (cx^4 + bx^2 + a)^{1/2} \cdot (2(b + (-4ac + b^2)^{1/2})/ax^2 + 4)^{1/2} / (cx^4 + bx^2 + a)^{1/2} / (b + (-4ac + b^2)^{1/2}) \cdot b^3/c \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}) - 1/35 \cdot d \cdot a^2 \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})/a)^{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} / (cx^4 + bx^2 + a)^{1/2} / (b + (-4ac + b^2)^{1/2}) \cdot b^3/c \cdot \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}) - 19/210 \cdot f \cdot a^2 \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})/a)^{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} / (cx^4 + bx^2 + a)^{1/2} / (b + (-4ac + b^2)^{1/2}) / cb^2 \cdot \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}) + 1/315 \cdot f/c^2 \cdot a^2 \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})/a)^{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} / (cx^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}) \cdot b^3 - 1/140 \cdot d \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})/a)^{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} / (cx^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}) \cdot b^3 - 1/140 \cdot d \cdot 2^{1/2} / ((-b + (-4ac + b^2)^{1/2})/a)^{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} / (cx^4 + bx^2 + a)^{1/2} \cdot \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})$

$$\begin{aligned} & \wedge 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)})*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*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*El \\ & lipticE(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)}*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)}*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)} \end{aligned}$$

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

$$\frac{x\sqrt{a + bx^2 + cx^4} (6acf - 2b^2f + 5bcd)}{15c^{3/2}(\sqrt{a} + \sqrt{c}x^2)} - \frac{\sqrt[4]{a}(\sqrt{a} + \sqrt{c}x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a} + \sqrt{c}x^2)^2}} (6acf - 2b^2f + 5bcd) E\left(2 \tan^{-1}\left(\frac{\sqrt[4]{a} + \sqrt{c}x^2}{\sqrt{a + bx^2 + cx^4}}\right)\right)}{15c^{7/4}\sqrt{a + bx^2 + cx^4}}$$

[Out] $\frac{1}{6}g*(c*x^4+b*x^2+a)^{(3/2)}/c-1/32*(-4*a*c+b^2)*(-b*g+2*c*e)*\operatorname{arctanh}(1/2*(2*c*x^2+b)/c^{(1/2)})/(c*x^4+b*x^2+a)^{(1/2)}/c^{(5/2)}+1/16*(-b*g+2*c*e)*(2*c*x^2+b)*(c*x^4+b*x^2+a)^{(1/2)}/c^2+1/15*x*(3*c*f*x^2+b*f+5*c*d)*(c*x^4+b*x^2+a)^{(1/2)}/c+1/15*(6*a*c*f-2*b^2*f+5*b*c*d)*x*(c*x^4+b*x^2+a)^{(1/2)}/c^{(3/2)}/(a^{(1/2)}+x^2*c^{(1/2)})-1/15*a^{(1/4)}*(6*a*c*f-2*b^2*f+5*b*c*d)*(\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))^2)^{(1/2)}/\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))*\operatorname{EllipticE}(\sin(2*\arctan(c^{(1/4)}*x/a^{(1/4)})), 1/2*(2-b/a^{(1/2)}/c^{(1/2)})^{(1/2)}*(a^{(1/2)}+x^2*c^{(1/2)})^{(1/2)}*((c*x^4+b*x^2+a)/(a^{(1/2)}+x^2*c^{(1/2)})^2)^{(1/2)}/c^{(7/4)}/(c*x^4+b*x^2+a)^{(1/2)}+1/30*a^{(1/4)}*(\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))^2)^{(1/2)}/\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))*\operatorname{EllipticF}(\sin(2*\arctan(c^{(1/4)}*x/a^{(1/4)})), 1/2*(2-b/a^{(1/2)}/c^{(1/2)})^{(1/2)}*(a^{(1/2)}+x^2*c^{(1/2)})*(b+2*a^{(1/2)}*c^{(1/2)})*(5*c*d-2*b*f+3*f*a^{(1/2)}*c^{(1/2)})*((c*x^4+b*x^2+a)/(a^{(1/2)}+x^2*c^{(1/2)})^2)^{(1/2)}/c^{(7/4)}/(c*x^4+b*x^2+a)^{(1/2)}$

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}

$$\frac{x\sqrt{a + bx^2 + cx^4} (6acf - 2b^2f + 5bcd)}{15c^{3/2}(\sqrt{a} + \sqrt{c}x^2)} - \frac{\sqrt[4]{a}(\sqrt{a} + \sqrt{c}x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a} + \sqrt{c}x^2)^2}} (6acf - 2b^2f + 5bcd) E\left(2 \tan^{-1}\left(\frac{\sqrt[4]{a} + \sqrt{c}x^2}{\sqrt{a + bx^2 + cx^4}}\right)\right)}{15c^{7/4}\sqrt{a + bx^2 + cx^4}}$$

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] $((5*b*c*d - 2*b^2*f + 6*a*c*f)*x*\operatorname{Sqrt}[a + b*x^2 + c*x^4])/(15*c^{(3/2)}*(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)) + ((2*c*e - b*g)*(b + 2*c*x^2)*\operatorname{Sqrt}[a + b*x^2 + c*x^4])/(16*c^2) + (x*(5*c*d + b*f + 3*c*f*x^2)*\operatorname{Sqrt}[a + b*x^2 + c*x^4])/(15*c) + (g*(a + b*x^2 + c*x^4)^{(3/2)})/(6*c) - ((b^2 - 4*a*c)*(2*c*e - b*g)*\operatorname{ArcTanh}[(b + 2*c*x^2)/(2*\operatorname{Sqrt}[c]*\operatorname{Sqrt}[a + b*x^2 + c*x^4])])/(32*c^{(5/2)}) - (a^{(1/4)}*(5*b*c*d - 2*b^2*f + 6*a*c*f)*(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)*\operatorname{Sqrt}[(a + b*x^2 + c*x^4)/(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)^2]*\operatorname{EllipticE}[2*\operatorname{ArcTan}[(c^{(1/4)}*x)/a^{(1/4)}], (2 - b/(\operatorname{Sqrt}[a]*\operatorname{Sqrt}[c]))/4])/(15*c^{(7/4)}*\operatorname{Sqrt}[a + b*x^2 + c*x^4]) + (a^{(1/4)}*(b + 2*\operatorname{Sqrt}[a]*\operatorname{Sqrt}[c]))*(5*c*d - 2*b*f + 3*\operatorname{Sqrt}[a]*\operatorname{Sqrt}[c]*f)*(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)*\operatorname{Sqrt}[(a + b*x^2 + c*x^4)/(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)^2]*\operatorname{EllipticF}[2*\operatorname{ArcTan}[(c^{(1/4)}*x)/a^{(1/4)}], (2 - b/(\operatorname{Sqrt}[a]*\operatorname{Sqrt}[c]))/4])/(30*c^{(7/4)}*\operatorname{Sqrt}[a + b*x^2 + c*x^4])$

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 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

$eQ[b^2 - 4ac, 0] \&\& GtQ[p, 0] \&\& IntegerQ[4p]$

Rule 621

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

Rule 640

$Int[((d_) + (e_)*(x_))*((a_) + (b_)*(x_) + (c_)*(x_)^2)^(p_), x_Symbol] := Simp[(e*(a + bx + cx^2)^(p + 1))/(2c*(p + 1)), x] + Dist[(2cd - b*e)/(2c), Int[(a + bx + cx^2)^p, x], x] /; FreeQ[{a, b, c, d, e, p}, x] \&\& NeQ[2cd - b*e, 0] \&\& NeQ[p, -1]$

Rule 1103

$Int[1/Sqrt[(a_) + (b_)*(x_)^2 + (c_)*(x_)^4], x_Symbol] := With[{q = Rt[c/a, 4]}, Simp[((1 + q^2*x^2)*Sqrt[(a + bx^2 + cx^4)/(a*(1 + q^2*x^2)^2])*EllipticF[2*ArcTan[q*x], 1/2 - (bq^2)/(4c)])/(2q*Sqrt[a + bx^2 + cx^4]), x]] /; FreeQ[{a, b, c}, x] \&\& NeQ[b^2 - 4ac, 0] \&\& PosQ[c/a]$

Rule 1176

$Int[((d_) + (e_)*(x_)^2)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Simp[(x*(2b*ep + c*d*(4p + 3) + c*e*(4p + 1)*x^2)*(a + bx^2 + cx^4)^p)/(c*(4p + 1)*(4p + 3)), x] + Dist[(2p)/(c*(4p + 1)*(4p + 3)), Int[Simp[2a*c*d*(4p + 3) - a*b*e + (2a*c*e*(4p + 1) + b*c*d*(4p + 3) - b^2*e*(2p + 1))*x^2, x]*(a + bx^2 + cx^4)^(p - 1), x], x] /; FreeQ[{a, b, c, d, e}, x] \&\& NeQ[b^2 - 4ac, 0] \&\& NeQ[c*d^2 - b*d*e + a*e^2, 0] \&\& GtQ[p, 0] \&\& FractionQ[p] \&\& IntegerQ[2p]$

Rule 1195

$Int[((d_) + (e_)*(x_)^2)/Sqrt[(a_) + (b_)*(x_)^2 + (c_)*(x_)^4], x_Symbol] := With[{q = Rt[c/a, 4]}, -Simp[(d*x*Sqrt[a + bx^2 + cx^4])/(a*(1 + q^2*x^2)), x] + Simp[(d*(1 + q^2*x^2)*Sqrt[(a + bx^2 + cx^4)/(a*(1 + q^2*x^2)^2])*EllipticE[2*ArcTan[q*x], 1/2 - (bq^2)/(4c)])/(q*Sqrt[a + bx^2 + cx^4]), x] /; EqQ[e + d*q^2, 0]] /; FreeQ[{a, b, c, d, e}, x] \&\& NeQ[b^2 - 4ac, 0] \&\& PosQ[c/a]$

Rule 1197

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

Rule 1247

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

Rule 1673

$Int[(Pq)*((a_) + (b_)*(x_)^2 + (c_)*(x_)^4)^(p_), x_Symbol] := Module[{q = Expon[Pq, x], k}, Int[Sum[Coeff[Pq, x, 2*k]*x^(2*k), {k, 0, q/2}]]*(a + b$

$(x^2 + cx^4)^p, x] + \text{Int}[x \cdot \text{Sum}[\text{Coeff}[\text{Pq}, x, 2k + 1] \cdot x^{(2k)}, \{k, 0, (q - 1)/2\}] \cdot (a + bx^2 + cx^4)^p, x]] /; \text{FreeQ}[\{a, b, c, p\}, x] \ \&\& \ \text{PolyQ}[\text{Pq}, x] \ \&\& \ \text{!PolyQ}[\text{Pq}, x^2]$

Rubi steps

$$\begin{aligned} \int (d + ex + fx^2 + gx^3) \sqrt{a + bx^2 + cx^4} dx &= \int (d + fx^2) \sqrt{a + bx^2 + cx^4} dx + \int x(e + gx^2) \sqrt{a + bx^2 + cx^4} dx \\ &= \frac{x(5cd + bf + 3cfx^2) \sqrt{a + bx^2 + cx^4}}{15c} + \frac{1}{2} \text{Subst}\left(\int (e + gx) \sqrt{a + bx^2 + cx^4} dx, x, \sqrt{a + bx^2 + cx^4}\right) \\ &= \frac{x(5cd + bf + 3cfx^2) \sqrt{a + bx^2 + cx^4}}{15c} + \frac{g(a + bx^2 + cx^4)^{3/2}}{6c} + \frac{(5bcd - 2b^2f + 6acf)x \sqrt{a + bx^2 + cx^4}}{15c^{3/2}(\sqrt{a} + \sqrt{c}x^2)} + \frac{(2ce - bg)(b + 2cx^2)}{16c^2} \\ &= \frac{(5bcd - 2b^2f + 6acf)x \sqrt{a + bx^2 + cx^4}}{15c^{3/2}(\sqrt{a} + \sqrt{c}x^2)} + \frac{(2ce - bg)(b + 2cx^2)}{16c^2} \\ &= \frac{(5bcd - 2b^2f + 6acf)x \sqrt{a + bx^2 + cx^4}}{15c^{3/2}(\sqrt{a} + \sqrt{c}x^2)} + \frac{(2ce - bg)(b + 2cx^2)}{16c^2} \end{aligned}$$

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] $\text{int}((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^{(1/2)}, x)$

[Out] $\frac{1}{6}g*(c*x^4+b*x^2+a)^{(3/2)}/c-1/8*g*b/c*x^2*(c*x^4+b*x^2+a)^{(1/2)}-1/16*g*b^2/c^2*(c*x^4+b*x^2+a)^{(1/2)}-1/8*g*b/c^{(3/2)}*\ln((c*x^2+1/2*b)/c^{(1/2)}+(c*x^4+b*x^2+a)^{(1/2)})+1/32*g*b^3/c^{(5/2)}*\ln((c*x^2+1/2*b)/c^{(1/2)}+(c*x^4+b*x^2+a)^{(1/2)})+1/5*f*x^3*(c*x^4+b*x^2+a)^{(1/2)}+1/15*f*b/c*x*(c*x^4+b*x^2+a)^{(1/2)}-1/60*f*b/c*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)}*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)})-1/5*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)})*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)})+1/5*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)})*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)})+1/15*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^2/c*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)})-1/15*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^2/c*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)})+1/4*e*x^2*(c*x^4+b*x^2+a)^{(1/2)}+1/8*e/c*(c*x^4+b*x^2+a)^{(1/2)}*b+1/4*e/c^{(1/2)}*\ln((c*x^2+1/2*b)/c^{(1/2)}+(c*x^4+b*x^2+a)^{(1/2)})*b^2+1/3*d*x*(c*x^4+b*x^2+a)^{(1/2)}+1/6*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)}*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*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)})+1/6*d*b*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)})*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] $\text{integrate}((g*x^3+f*x^2+e*x+d)*(c*x^4+b*x^2+a)^{(1/2)}, x, \text{algorithm}="maxima")$

[Out] $\text{integrate}(\text{sqrt}(c*x^4 + b*x^2 + a)*(g*x^3 + f*x^2 + e*x + d), x)$

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] $\frac{1}{4}*(-b*g+2*c*e)*\operatorname{arctanh}\left(\frac{1}{2}*(2*c*x^2+b)/c^{(1/2)}/(c*x^4+b*x^2+a)^{(1/2)}\right)/c^{(3/2)}+1/2*g*(c*x^4+b*x^2+a)^{(1/2)}/c+f*x*(c*x^4+b*x^2+a)^{(1/2)}/c^{(1/2)}/(a^{(1/2)}+x^2*c^{(1/2)})-a^{(1/4)}*f*(\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))^2)^{(1/2)}/\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))*\operatorname{EllipticE}(\sin(2*\arctan(c^{(1/4)}*x/a^{(1/4)})),1/2*(2-b/a^{(1/2)}/c^{(1/2)})^{(1/2)}*(a^{(1/2)}+x^2*c^{(1/2)}))*((c*x^4+b*x^2+a)/(a^{(1/2)}+x^2*c^{(1/2)})^2)^{(1/2)}/c^{(3/4)}/(c*x^4+b*x^2+a)^{(1/2)}+1/2*a^{(1/4)}*(\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))^2)^{(1/2)}/\cos(2*\arctan(c^{(1/4)}*x/a^{(1/4)}))*\operatorname{EllipticF}(\sin(2*\arctan(c^{(1/4)}*x/a^{(1/4)})),1/2*(2-b/a^{(1/2)}/c^{(1/2)})^{(1/2)}*(a^{(1/2)}+x^2*c^{(1/2)}))*((f+d*c^{(1/2)}/a^{(1/2)}))*((c*x^4+b*x^2+a)/(a^{(1/2)}+x^2*c^{(1/2)})^2)^{(1/2)}/c^{(3/4)}/(c*x^4+b*x^2+a)^{(1/2)}$

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] $(g*\operatorname{Sqrt}[a + b*x^2 + c*x^4])/(2*c) + (f*x*\operatorname{Sqrt}[a + b*x^2 + c*x^4])/(\operatorname{Sqrt}[c]*(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)) + ((2*c*e - b*g)*\operatorname{ArcTanh}[(b + 2*c*x^2)/(2*\operatorname{Sqrt}[c]*\operatorname{Sqrt}[a + b*x^2 + c*x^4])])/(4*c^{(3/2)}) - (a^{(1/4)}*f*(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)*\operatorname{Sqrt}[(a + b*x^2 + c*x^4)/(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)^2]*\operatorname{EllipticE}[2*\operatorname{ArcTan}[(c^{(1/4)}*x)/a^{(1/4)}], (2 - b/(\operatorname{Sqrt}[a]*\operatorname{Sqrt}[c]))/4])/(c^{(3/4)}*\operatorname{Sqrt}[a + b*x^2 + c*x^4]) + (a^{(1/4)}*((\operatorname{Sqrt}[c]*d)/\operatorname{Sqrt}[a] + f)*(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)*\operatorname{Sqrt}[(a + b*x^2 + c*x^4)/(\operatorname{Sqrt}[a] + \operatorname{Sqrt}[c]*x^2)^2]*\operatorname{EllipticF}[2*\operatorname{ArcTan}[(c^{(1/4)}*x)/a^{(1/4)}], (2 - b/(\operatorname{Sqrt}[a]*\operatorname{Sqrt}[c]))/4])/(2*c^{(3/4)}*\operatorname{Sqrt}[a + b*x^2 + c*x^4])$

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] /; 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{\sqrt{a + bx^2 + cx^4}} dx &= \int \frac{d + fx^2}{\sqrt{a + bx^2 + cx^4}} dx + \int \frac{x(e + gx^2)}{\sqrt{a + bx^2 + cx^4}} dx \\
&= \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{\sqrt{a + bx + cx^2}} dx, x, x^2 \right) - \frac{(\sqrt{a} f) \int \frac{1 - \frac{\sqrt{c} x^2}{\sqrt{a}}}{\sqrt{a + bx^2 + cx^4}} dx}{\sqrt{c}} + \left(d + \frac{\sqrt{a} f}{\sqrt{c}} \right) \int \frac{1}{\sqrt{a + bx^2 + cx^4}} dx \\
&= \frac{g\sqrt{a + bx^2 + cx^4}}{2c} + \frac{fx\sqrt{a + bx^2 + cx^4}}{\sqrt{c}(\sqrt{a} + \sqrt{c}x^2)} - \frac{\sqrt[4]{a} f (\sqrt{a} + \sqrt{c}x^2) \sqrt{\frac{a + bx^2 + cx^4}{(\sqrt{a} + \sqrt{c}x^2)^2}} E \left(2 \tan^{-1} \left(\frac{\sqrt{a + bx^2 + cx^4}}{\sqrt{a} + \sqrt{c}x^2} \right) \right)}{c^{3/4} \sqrt{a + bx^2 + cx^4}} \\
&= \frac{g\sqrt{a + bx^2 + cx^4}}{2c} + \frac{fx\sqrt{a + bx^2 + cx^4}}{\sqrt{c}(\sqrt{a} + \sqrt{c}x^2)} - \frac{\sqrt[4]{a} f (\sqrt{a} + \sqrt{c}x^2) \sqrt{\frac{a + bx^2 + cx^4}{(\sqrt{a} + \sqrt{c}x^2)^2}} E \left(2 \tan^{-1} \left(\frac{\sqrt{a + bx^2 + cx^4}}{\sqrt{a} + \sqrt{c}x^2} \right) \right)}{c^{3/4} \sqrt{a + bx^2 + cx^4}} \\
&= \frac{g\sqrt{a + bx^2 + cx^4}}{2c} + \frac{fx\sqrt{a + bx^2 + cx^4}}{\sqrt{c}(\sqrt{a} + \sqrt{c}x^2)} + \frac{(2ce - bg) \tanh^{-1} \left(\frac{b + 2cx^2}{2\sqrt{c} \sqrt{a + bx^2 + cx^4}} \right)}{4c^{3/2}} - \frac{\sqrt[4]{a} f}{c^{3/4}}
\end{aligned}$$

Mathematica [C] time = 1.38, size = 526, normalized size = 1.47

$$-i\sqrt{2} \sqrt{c} \sqrt{\frac{-\sqrt{b^2 - 4ac} + b + 2cx^2}{b - \sqrt{b^2 - 4ac}}} \sqrt{\frac{\sqrt{b^2 - 4ac} + b + 2cx^2}{\sqrt{b^2 - 4ac} + b}} \left(f \left(\sqrt{b^2 - 4ac} - b \right) + 2cd \right) F \left(i \sinh^{-1} \left(\sqrt{2} \sqrt{\frac{c}{b + \sqrt{b^2 - 4ac}}} x \right) \right) \Big|_{\frac{b + \sqrt{b^2 - 4ac}}{b - \sqrt{b^2 - 4ac}}}$$

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

$$\frac{\sqrt{2} \sqrt{\frac{2(-b+\sqrt{-4ac+b^2})x^2}{a}} + 4 \sqrt{\frac{2(b+\sqrt{-4ac+b^2})x^2}{a}} + 4 \left(-\text{EllipticE} \left(\frac{\sqrt{2} \sqrt{\frac{-b+\sqrt{-4ac+b^2}}{a}} x}{2}, \frac{\sqrt{\frac{2(b+\sqrt{-4ac+b^2})b}{ac}} - 4}{2}} \right) + \text{Ellip} \right)}{2 \sqrt{\frac{-b+\sqrt{-4ac+b^2}}{a}} \sqrt{cx^4 + bx^2 + a} (b + \sqrt{-4ac + b^2})}$$

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] $\frac{1}{2}g(c*x^4+b*x^2+a)^{(1/2)}/c - 1/4*g*b/c^{(3/2)}*\ln((c*x^2+1/2*b)/c^{(1/2)}+(c*x^4+b*x^2+a)^{(1/2)}) - 1/2*f*a^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*(-2*(-b+(-4*a*c+b^2)^{(1/2)})/a*x^2+4)^{(1/2)}*(2*(b+(-4*a*c+b^2)^{(1/2)})/a*x^2+4)^{(1/2)}/(c*x^4+b*x^2+a)^{(1/2)}/(b+(-4*a*c+b^2)^{(1/2)})*(\text{EllipticF}(1/2*2^{(1/2)}*((-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*x, 1/2*(2*(b+(-4*a*c+b^2)^{(1/2)})/a*b/c-4)^{(1/2)})) - \text{EllipticE}(1/2*2^{(1/2)}*((-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*x, 1/2*(2*(b+(-4*a*c+b^2)^{(1/2)})/a*b/c-4)^{(1/2)})) + 1/2*e*\ln((c*x^2+1/2*b)/c^{(1/2)}+(c*x^4+b*x^2+a)^{(1/2)})/c^{(1/2)} + 1/4*d*2^{(1/2)}/((-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*(-2*(-b+(-4*a*c+b^2)^{(1/2)})/a*x^2+4)^{(1/2)}*(2*(b+(-4*a*c+b^2)^{(1/2)})/a*x^2+4)^{(1/2)}/(c*x^4+b*x^2+a)^{(1/2)}*\text{EllipticF}(1/2*2^{(1/2)}*((-b+(-4*a*c+b^2)^{(1/2)})/a)^{(1/2)}*x, 1/2*(2*(b+(-4*a*c+b^2)^{(1/2)})/a*b/c-4)^{(1/2)}))$

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

$$\frac{\sqrt[4]{c} (\sqrt{a} + \sqrt{c} x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{c}x^2)^2}} (bd - 2af) E\left(2 \tan^{-1}\left(\frac{\sqrt[4]{c}x}{\sqrt{a}}\right) \middle| \frac{1}{4}\left(2 - \frac{b}{\sqrt{a}\sqrt{c}}\right)\right) (\sqrt{a} + \sqrt{c} x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{c}x^2)^2}} (\sqrt{c} d - 2\sqrt{a})}{a^{3/4} (b^2 - 4ac) \sqrt{a + bx^2 + cx^4} \quad 2a^{3/4} \sqrt[4]{c} (b - 2\sqrt{a})}$$

[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}

$$\frac{\sqrt[4]{c} (\sqrt{a} + \sqrt{c} x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{c}x^2)^2}} (bd - 2af) E\left(2 \tan^{-1}\left(\frac{\sqrt[4]{c}x}{\sqrt{a}}\right) \middle| \frac{1}{4}\left(2 - \frac{b}{\sqrt{a}\sqrt{c}}\right)\right) (\sqrt{a} + \sqrt{c} x^2) \sqrt{\frac{a+bx^2+cx^4}{(\sqrt{a}+\sqrt{c}x^2)^2}} (\sqrt{c} d - 2\sqrt{a})}{a^{3/4} (b^2 - 4ac) \sqrt{a + bx^2 + cx^4} \quad 2a^{3/4} \sqrt[4]{c} (b - 2\sqrt{a})}$$

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] /; 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^{3/2}} dx &= \int \frac{d + fx^2}{(a + bx^2 + cx^4)^{3/2}} dx + \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^{3/2}} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{a(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(a + bx + cx^2)^{3/2}} dx, x, x^2 \right) - \frac{1}{2} \int \frac{e + gx}{(a + bx + cx^2)^{3/2}} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{a(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} - \frac{be - 2ag + (2ce - bg)x^2}{(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} + \frac{(\sqrt{c}(bd - 2af))}{\sqrt{a}} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{a(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} - \frac{be - 2ag + (2ce - bg)x^2}{(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} - \frac{\sqrt{c}(bd - 2af)}{a(b^2 - 4ac)}
\end{aligned}$$

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

$$\int \frac{gx^3 + fx^2 + ex + d}{(cx^4 + bx^2 + a)^{3/2}} dx$$

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

$$\left(\frac{\sqrt{2} \sqrt{-\frac{2(-b + \sqrt{-4ac + b^2})x^2}{a}} + 4 \sqrt{\frac{2(b + \sqrt{-4ac + b^2})x^2}{a}} + 4 \left(-\text{EllipticE} \left(\frac{\sqrt{2} \sqrt{\frac{-b + \sqrt{-4ac + b^2}}{a}} x}{2}, \sqrt{\frac{2(b + \sqrt{-4ac + b^2})b}{ac}} \right) \right)}{2(4ac - b^2) \sqrt{\frac{-b + \sqrt{-4ac + b^2}}{a}} \sqrt{cx^4 + bx^2 + a} (b + \sqrt{-4ac + b^2})} \right) + \text{Elliptic}$$

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

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

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] $\frac{1}{3}xx(b^2d-2*ac*d-ab*fc+(-2*af+bd)*x^2)/a/(-4*ac+b^2)/(cx^4+bx^2+a)^{(3/2)}+1/3*(-b*e+2*ag-(-bg+2*ce)*x^2)/(-4*ac+b^2)/(cx^4+bx^2+a)^{(3/2)}+4/3*(-bg+2*ce)*(2*cx^2+b)/(-4*ac+b^2)^2/(cx^4+bx^2+a)^{(1/2)}+1/3*x*(2*b^4*d-17*a*b^2*c*d+20*a^2*c^2*d+a*b^3*f+4*a^2*b*c*f+c*(12*a^2*c*f+a*b^2*f-16*a*b*c*d+2*b^3*d)*x^2)/a^2/(-4*ac+b^2)^2/(cx^4+bx^2+a)^{(1/2)}-1/3*(12*a^2*c*f+a*b^2*f-16*a*b*c*d+2*b^3*d)*x*c^{(1/2)}*(cx^4+bx^2+a)^{(1/2)}/a^2/(-4*ac+b^2)^2/(a^{(1/2)}+x^2*c^{(1/2)})+1/3*c^{(1/4)}*(12*a^2*c*f+a*b^2*f-16*a*b*c*d+2*b^3*d)*(cos(2*arctan(c^{(1/4)}*x/a^{(1/4)})))^2)^{(1/2)}/cos(2*arctan(c^{(1/4)}*x/a^{(1/4)}))*EllipticE(sin(2*arctan(c^{(1/4)}*x/a^{(1/4)})),1/2*(2-b/a^{(1/2)}/c^{(1/2)}))^{(1/2)}*(a^{(1/2)}+x^2*c^{(1/2)})*((cx^4+bx^2+a)/(a^{(1/2)}+x^2*c^{(1/2)}))^2)^{(1/2)}/a^{(7/4)}/(-4*ac+b^2)^2/(cx^4+bx^2+a)^{(1/2)}-1/6*c^{(1/4)}*(cos(2*arctan(c^{(1/4)}*x/a^{(1/4)})))^2)^{(1/2)}/cos(2*arctan(c^{(1/4)}*x/a^{(1/4)}))*EllipticF(sin(2*arctan(c^{(1/4)}*x/a^{(1/4)})),1/2*(2-b/a^{(1/2)}/c^{(1/2)}))^{(1/2)}*(a^{(1/2)}+x^2*c^{(1/2)})*(2*b^2*d-10*ac*d+ab*fc+6*a^{(3/2)}*f*c^{(1/2)}-3*b*d*a^{(1/2)}*c^{(1/2)})*((cx^4+bx^2+a)/(a^{(1/2)}+x^2*c^{(1/2)}))^2)^{(1/2)}/a^{(7/4)}/(-4*ac+b^2)/(-2*a^{(1/2)}*c^{(1/2)}+b)/(cx^4+bx^2+a)^{(1/2)}$

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}

$$\frac{x(cx^2(12a^2cf + ab^2f - 16abcd + 2b^3d) + 4a^2bcf + 20a^2c^2d - 17ab^2cd + ab^3f + 2b^4d) \sqrt{cx} \sqrt{a + bx^2 + cx^4} (12)}{3a^2(b^2 - 4ac)^2 \sqrt{a + bx^2 + cx^4} \quad 3a^2(b^2 - 4ac)}$$

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] $(x*(b^2*d - 2*ac*d - a*b*fc + c*(b*d - 2*af)*x^2))/(3*a*(b^2 - 4*ac)*(a + b*x^2 + c*x^4)^{(3/2)}) - (b*e - 2*ag + (2*ce - b*g)*x^2)/(3*(b^2 - 4*ac)*(a + b*x^2 + c*x^4)^{(3/2)}) + (4*(2*ce - b*g)*(b + 2*cx^2))/(3*(b^2 - 4*ac)^2*\text{Sqrt}[a + b*x^2 + c*x^4]) + (x*(2*b^4*d - 17*a*b^2*c*d + 20*a^2*c^2*d + a*b^3*f + 4*a^2*b*c*f + c*(2*b^3*d - 16*a*b*c*d + a*b^2*f + 12*a^2*c*f)*x^2))/(3*a^2*(b^2 - 4*ac)^2*\text{Sqrt}[a + b*x^2 + c*x^4]) - (\text{Sqrt}[c]*(2*b^3*d - 16*a*b*c*d + a*b^2*f + 12*a^2*c*f)*x*\text{Sqrt}[a + b*x^2 + c*x^4])/(3*a^2*(b^2 - 4*ac)^2*(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)) + (c^{(1/4)}*(2*b^3*d - 16*a*b*c*d + a*b^2*f + 12*a^2*c*f)*(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)*\text{Sqrt}[(a + b*x^2 + c*x^4)/(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)]*EllipticE[2*ArcTan[(c^{(1/4)}*x)/a^{(1/4)}], (2 - b/(\text{Sqrt}[a]*\text{Sqrt}[c]))/4])/(3*a^{(7/4)}*(b^2 - 4*ac)^2*\text{Sqrt}[a + b*x^2 + c*x^4]) - (c^{(1/4)}*(2*b^2*d - 3*\text{Sqrt}[a]*b*\text{Sqrt}[c]*d - 10*ac*d + a*b*fc + 6*a^{(3/2)}*\text{Sqrt}[c]*f)*(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)*\text{Sqrt}[(a + b*x^2 + c*x^4)/(\text{Sqrt}[a] + \text{Sqrt}[c]*x^2)]*EllipticF[2*ArcTan[(c^{(1/4)}*x)/a^{(1/4)}], (2 - b/(\text{Sqrt}[a]*\text{Sqrt}[c]))/4])/(6*a^{(7/4)}*(b - 2*\text{Sqrt}[a]*\text{Sqrt}[c])*(b^2 - 4*ac)*\text{Sqrt}[a + b*x^2 + c*x^4])$

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 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 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] /; 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

$$\begin{aligned}
\int \frac{d + ex + fx^2 + gx^3}{(a + bx^2 + cx^4)^{5/2}} dx &= \int \frac{d + fx^2}{(a + bx^2 + cx^4)^{5/2}} dx + \int \frac{x(e + gx^2)}{(a + bx^2 + cx^4)^{5/2}} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{3a(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} + \frac{1}{2} \text{Subst} \left(\int \frac{e + gx}{(a + bx + cx^2)^{5/2}} dx, x, x^2 \right) - \int \frac{x^2}{(a + bx + cx^2)^{5/2}} dx \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{3a(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} - \frac{be - 2ag + (2ce - bg)x^2}{3(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} + \frac{x(2b^4d - 12b^2cd - 12bd^2 - 12c^2d)}{3(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{3a(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} - \frac{be - 2ag + (2ce - bg)x^2}{3(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} + \frac{4(2ce - bg)}{3(b^2 - 4ac)} \\
&= \frac{x(b^2d - 2acd - abf + c(bd - 2af)x^2)}{3a(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} - \frac{be - 2ag + (2ce - bg)x^2}{3(b^2 - 4ac)(a + bx^2 + cx^4)^{3/2}} + \frac{4(2ce - bg)}{3(b^2 - 4ac)}
\end{aligned}$$

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)^(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

$$\int \frac{gx^3 + fx^2 + ex + d}{(cx^4 + bx^2 + a)^{5/2}} dx$$

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] $\text{int}((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^{(5/2)}, x)$

[Out]
$$-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*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

$$\int \frac{g x^3 + f x^2 + e x + d}{(c x^4 + b x^2 + a)^{\frac{5}{2}}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{integrate}((g*x^3+f*x^2+e*x+d)/(c*x^4+b*x^2+a)^{(5/2)}, x, \text{algorithm}="maxima")$

[Out] $\text{integrate}((g*x^3 + f*x^2 + e*x + d)/(c*x^4 + b*x^2 + a)^{(5/2)}, x)$

mupad [F] time = 0.00, size = -1, normalized size = -0.00

$$\int \frac{g x^3 + f x^2 + e x + d}{(c x^4 + b x^2 + a)^{5/2}} dx$$

Verification of antiderivative is not currently implemented for this CAS.

[In] $\text{int}((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^{(5/2)}, x)$

[Out] $\text{int}((d + e*x + f*x^2 + g*x^3)/(a + b*x^2 + c*x^4)^{(5/2)}, x)$

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] Int[(a*g - 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]

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])]] /; FreeQ[m, x] && PolyQ[Pp, x] && PolyQ[Qq, x] && 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] 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])] /; FreeQ[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

$$\frac{4acgx - b^2gx + 2ce x^2 + be}{\sqrt{cx^4 + bx^2 + a} (4ac - b^2)}$$

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] $(4acgx - b^2gx + 2ce^2 + be) / (cx^4 + bx^2 + a)^{1/2} / (4ac - b^2)$

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] $-(2ce^2 + be - (b^2g - 4acg)x) / (\sqrt{cx^4 + bx^2 + a}(b^2 - 4ac))$

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] $(be + 2ce^2 - b^2gx + 4acgx) / ((4ac - b^2)(a + bx^2 + cx^4)^{1/2})$

sympy [F] time = 0.00, size = 0, normalized size = 0.00

$$-\int \left(-\frac{ag}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} \right) dx - \int \left(-\frac{e}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} \right) dx$$

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] $-\text{Integral}(-ag/(a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}), x) - \text{Integral}(-e/(a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}), x) - \text{Integral}(c*g*x^4/(a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}), x)$

$$3.110 \quad \int \frac{ag + fx^3 - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx$$

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

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

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

$\text{Int}[(Pp_*)(Qq_)^{(m_*)}, x_Symbol] \rightarrow \text{With}\{p = \text{Expon}[Pp, x], q = \text{Expon}[Qq, x]\}, \text{Simp}[(\text{Coeff}[Pp, x, p]*x^{(p-q+1)}*Qq^{(m+1)})/((p+m*q+1)*\text{Coeff}[Qq, x, q]), x] /; \text{NeQ}[p+m*q+1, 0] \ \&\& \ \text{EqQ}[(p+m*q+1)*\text{Coeff}[Qq, x, q]*Pp, \text{Coeff}[Pp, x, p]*x^{(p-q)}*((p-q+1)*Qq + (m+1)*x*D[Qq, x])] /; \text{FreeQ}[m, x] \ \&\& \ \text{PolyQ}[Pp, x] \ \&\& \ \text{PolyQ}[Qq, x] \ \&\& \ \text{NeQ}[m, -1]$

Rule 1673

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

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*a*f + 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] `-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(-f*x**3/(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)`

$$3.111 \quad \int \frac{ag+ex+fx^3-cgx^4}{(a+bx^2+cx^4)^{3/2}} dx$$

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)/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)*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])] /; FreeQ[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

$$\begin{aligned} \int \frac{ag + ex + fx^3 - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx &= \int \frac{x(e + fx^2)}{(a + bx^2 + cx^4)^{3/2}} dx + \int \frac{ag - cgx^4}{(a + bx^2 + cx^4)^{3/2}} dx \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} + \frac{1}{2} \text{Subst} \left(\int \frac{e + fx}{(a + bx + cx^2)^{3/2}} dx, x, x^2 \right) \\ &= \frac{gx}{\sqrt{a + bx^2 + cx^4}} - \frac{be - 2af + (2ce - bf)x^2}{(b^2 - 4ac)\sqrt{a + bx^2 + cx^4}} \end{aligned}$$

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

$$\frac{\left(\frac{(b^3f - 4abcf - 2b^2ce + 8ac^2e)x}{b^4 - 8ab^2c + 16a^2c^2} + \frac{b^4g - 8ab^2cg + 16a^2c^2g}{b^4 - 8ab^2c + 16a^2c^2} \right) x + \frac{2ab^2f - 8a^2cf - b^3e + 4abce}{b^4 - 8ab^2c + 16a^2c^2}}{\sqrt{cx^4 + bx^2 + a}}$$

Verification of antiderivative is not currently implemented for this CAS.

[In] integrate((-c*g*x^4+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] $(4acgx - b^2gx - bfx^2 + 2cex^2 - 2af + be) / (cx^4 + bx^2 + a)^{1/2} / (4ac - b^2)$

maxima [A] time = 0.68, size = 94, normalized size = 1.36

$$\frac{\sqrt{cx^4 + bx^2 + a} \left((2ce - bf)x^2 + be - 2af - (b^2g - 4acg)x \right)}{(b^2c - 4ac^2)x^4 + ab^2 - 4a^2c + (b^3 - 4abc)x^2}$$

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="maxima")

[Out] $-\text{sqrt}(cx^4 + bx^2 + a) * ((2*c*e - b*f)*x^2 + b*e - 2*a*f - (b^2*g - 4*a*c*g)*x) / ((b^2*c - 4*a*c^2)*x^4 + a*b^2 - 4*a^2*c + (b^3 - 4*a*b*c)*x^2)$

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

$$-\int \left(-\frac{ag}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} \right) dx - \int \left(-\frac{e}{a\sqrt{a+bx^2+cx^4} + bx^2\sqrt{a+bx^2+cx^4} + cx^4\sqrt{a+bx^2+cx^4}} \right) dx$$

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;
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)])))
  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)))
    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 Fricas, 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"

```