Maple 2018.2 Integration Test Results
on the problems in "1 Algebraic functions/1.2 Trinomial products/1.2.3 General"

Test results for the 179 problems in "1.2.3.2 (d x)^m (a+b x^n+c x^(2 n))^p.txt"

Problem 36: Unable to integrate problem.

$$\int \frac{(d x)^m}{\left(b^2 x^6 + 2 a b x^3 + a^2\right)^{3/2}}\, dx$$

Optimal(type 5, 60 leaves, 2 steps):

$$\frac{(d x)^{1+m} \left(b x^3 + a\right) \operatorname{hypergeom}\left(\left[3, \frac{1}{3} + \frac{m}{3}\right], \left[\frac{4}{3} + \frac{m}{3}\right], -\frac{b x^3}{a}\right)}{a^3 d (1+m) \sqrt{\left(b x^3 + a\right)^2}}$$

Result(type 8, 28 leaves):

$$\int \frac{(d x)^m}{\left(b^2 x^6 + 2 a b x^3 + a^2\right)^{3/2}}\, dx$$

Problem 37: Unable to integrate problem.

$$\int (d x)^m \left(b^2 x^6 + 2 a b x^3 + a^2\right)^p\, dx$$

Optimal(type 5, 77 leaves, 2 steps):

$$\frac{(d x)^{1+m} \left(b^2 x^6 + 2 a b x^3 + a^2\right)^p \operatorname{hypergeom}\left(\left[-2 p, \frac{1}{3} + \frac{m}{3}\right], \left[\frac{4}{3} + \frac{m}{3}\right], -\frac{b x^3}{a}\right)}{d (1+m) \left(1 + \frac{b x^3}{a}\right)^{2 p}}$$

Result(type 8, 28 leaves):

$$\int (d x)^m \left(b^2 x^6 + 2 a b x^3 + a^2\right)^p\, dx$$

Problem 39: Unable to integrate problem.

$$\int x \left(b^2 x^6 + 2 a b x^3 + a^2\right)^p\, dx$$

Optimal(type 5, 54 leaves, 2 steps):

$$\frac{x^2 \left(b x^3 + a\right) \left(b^2 x^6 + 2 a b x^3 + a^2\right)^p \operatorname{hypergeom}\left(\left[1, \frac{5}{3} + 2 p\right], \left[\frac{5}{3}\right], -\frac{b x^3}{a}\right)}{2 a}$$

Result(type 8, 24 leaves):

$$\int x\left(b^{2} x^{6}+2 a b x^{3}+a^{2}\right)^{p} dx$$

Problem 40: Unable to integrate problem.

$$\int \frac{\left(b^{2} x^{6}+2 a b x^{3}+a^{2}\right)^{p}}{x} dx$$

Optimal(type 5, 63 leaves, 3 steps):

$$-\frac{\left(b x^{3}+a\right)\left(b^{2} x^{6}+2 a b x^{3}+a^{2}\right)^{p} \operatorname{hypergeom}\left([1,1+2 p],[2+2 p], 1+\frac{b x^{3}}{a}\right)}{3 a(1+2 p)}$$

Result(type 8, 26 leaves):

$$\int \frac{\left(b^{2} x^{6}+2 a b x^{3}+a^{2}\right)^{p}}{x} dx$$

Problem 42: Result is not expressed in closed-form.

$$\int \frac{x}{c x^{6}+b x^{3}+a} dx$$

Optimal(type 3, 421 leaves, 13 steps):

$$-\frac{2^{1/3} c^{1/3} \ln\left(2^{1/3} c^{1/3} x+\left(b-\sqrt{-4 a c+b^{2}}\right)^{1/3}\right)}{3\left(b-\sqrt{-4 a c+b^{2}}\right)^{1/3} \sqrt{-4 a c+b^{2}}}+\frac{c^{1/3} \ln\left(2^{2/3} c^{2/3} x^{2}-2^{1/3} c^{1/3} x\left(b-\sqrt{-4 a c+b^{2}}\right)^{1/3}+\left(b-\sqrt{-4 a c+b^{2}}\right)^{2/3}\right) 2^{1/3}}{6\left(b-\sqrt{-4 a c+b^{2}}\right)^{1/3} \sqrt{-4 a c+b^{2}}}$$

$$-\frac{2^{1/3} c^{1/3} \arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} c^{1/3} x}{\left(b-\sqrt{-4 a c+b^{2}}\right)^{1/3}}\right) \sqrt{3}}{3}\right) \sqrt{3}}{3\left(b-\sqrt{-4 a c+b^{2}}\right)^{1/3} \sqrt{-4 a c+b^{2}}}+\frac{2^{1/3} c^{1/3} \ln\left(2^{1/3} c^{1/3} x+\left(b+\sqrt{-4 a c+b^{2}}\right)^{1/3}\right)}{3 \sqrt{-4 a c+b^{2}}\left(b+\sqrt{-4 a c+b^{2}}\right)^{1/3}}$$

$$-\frac{c^{1/3} \ln\left(2^{2/3} c^{2/3} x^{2}-2^{1/3} c^{1/3} x\left(b+\sqrt{-4 a c+b^{2}}\right)^{1/3}+\left(b+\sqrt{-4 a c+b^{2}}\right)^{2/3}\right) 2^{1/3}}{6 \sqrt{-4 a c+b^{2}}\left(b+\sqrt{-4 a c+b^{2}}\right)^{1/3}}$$

$$+\frac{2^{1/3} c^{1/3} \arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} c^{1/3} x}{\left(b+\sqrt{-4 a c+b^{2}}\right)^{1/3}}\right) \sqrt{3}}{3}\right) \sqrt{3}}{3 \sqrt{-4 a c+b^{2}}\left(b+\sqrt{-4 a c+b^{2}}\right)^{1/3}}$$

Result(type 7, 40 leaves):

$$\frac{\left(\sum_{\_R=RootOf(c\_Z^6+b\_Z^3+a)} \frac{\_R\ln(x-\_R)}{2\_R^5 c+\_R^2 b}\right)}{3}$$

Problem 43: Result is not expressed in closed-form.

$$\int \frac{1}{c x^6+b x^3+a}\, dx$$

Optimal(type 3, 421 leaves, 13 steps):

$$\frac{2^{2/3} c^{2/3} \ln\left(2^{1/3} c^{1/3} x+\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}\right)}{3\left(b-\sqrt{-4 a c+b^2}\right)^{2/3} \sqrt{-4 a c+b^2}}-\frac{c^{2/3} \ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}+\left(b-\sqrt{-4 a c+b^2}\right)^{2/3}\right) 2^{2/3}}{6\left(b-\sqrt{-4 a c+b^2}\right)^{2/3} \sqrt{-4 a c+b^2}}$$

$$-\frac{2^{2/3} c^{2/3} \arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} c^{1/3} x}{\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\sqrt{3}}{3\left(b-\sqrt{-4 a c+b^2}\right)^{2/3} \sqrt{-4 a c+b^2}}-\frac{2^{2/3} c^{2/3} \ln\left(2^{1/3} c^{1/3} x+\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}\right)}{3\sqrt{-4 a c+b^2}\left(b+\sqrt{-4 a c+b^2}\right)^{2/3}}$$

$$+\frac{c^{2/3} \ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}+\left(b+\sqrt{-4 a c+b^2}\right)^{2/3}\right) 2^{2/3}}{6\sqrt{-4 a c+b^2}\left(b+\sqrt{-4 a c+b^2}\right)^{2/3}}$$

$$+\frac{2^{2/3} c^{2/3} \arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} c^{1/3} x}{\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\sqrt{3}}{3\sqrt{-4 a c+b^2}\left(b+\sqrt{-4 a c+b^2}\right)^{2/3}}$$

Result(type 7, 39 leaves):

$$\frac{\left(\sum_{\_R=RootOf(c\_Z^6+b\_Z^3+a)} \frac{\ln(x-\_R)}{2\_R^5 c+\_R^2 b}\right)}{3}$$

Problem 49: Unable to integrate problem.

$$\int x^5 \sqrt{c x^6+b x^3+a}\, dx$$

Optimal(type 3, 90 leaves, 5 steps):

$$\frac{\left(c x^6+b x^3+a\right)^{3/2}}{9 c}+\frac{b\left(-4 a c+b^2\right) \operatorname{arctanh}\left(\frac{2 c x^3+b}{2\sqrt{c}\sqrt{c x^6+b x^3+a}}\right)}{48 c^{5/2}}-\frac{b\left(2 c x^3+b\right)\sqrt{c x^6+b x^3+a}}{24 c^2}$$

Result(type 8, 80 leaves):

$$\frac{\left(8 c^2 x^6 + 2 b c x^3 + 8 a c - 3 b^2\right) \sqrt{c x^6 + b x^3 + a}}{72 c^2} + \int -\frac{b \left(4 a c - b^2\right) x^2}{16 c^2 \sqrt{c x^6 + b x^3 + a}}\, dx$$

Problem 50: Unable to integrate problem.

$$\int \frac{\sqrt{c x^6 + b x^3 + a}}{x}\, dx$$

Optimal(type 3, 85 leaves, 7 steps):

$$-\frac{\operatorname{arctanh}\left(\frac{b x^3 + 2 a}{2 \sqrt{a}\, \sqrt{c x^6 + b x^3 + a}}\right) \sqrt{a}}{3} + \frac{b \operatorname{arctanh}\left(\frac{2 c x^3 + b}{2 \sqrt{c}\, \sqrt{c x^6 + b x^3 + a}}\right)}{6 \sqrt{c}} + \frac{\sqrt{c x^6 + b x^3 + a}}{3}$$

Result(type 8, 20 leaves):

$$\int \frac{\sqrt{c x^6 + b x^3 + a}}{x}\, dx$$

Problem 51: Unable to integrate problem.

$$\int x \sqrt{c x^6 + b x^3 + a}\, dx$$

Optimal(type 6, 116 leaves, 2 steps):

$$\frac{x^2 \mathit{AppellF1}\left(\frac{2}{3}, -\frac{1}{2}, -\frac{1}{2}, \frac{5}{3}, -\frac{2 c x^3}{b - \sqrt{-4 a c + b^2}}, -\frac{2 c x^3}{b + \sqrt{-4 a c + b^2}}\right) \sqrt{c x^6 + b x^3 + a}}{2 \sqrt{1 + \frac{2 c x^3}{b - \sqrt{-4 a c + b^2}}}\, \sqrt{1 + \frac{2 c x^3}{b + \sqrt{-4 a c + b^2}}}}$$

Result(type 8, 48 leaves):

$$\frac{x^2 \sqrt{c x^6 + b x^3 + a}}{5} + \int \frac{3 x \left(b x^3 + 2 a\right)}{10 \sqrt{c x^6 + b x^3 + a}}\, dx$$

Problem 52: Unable to integrate problem.

$$\int \frac{\sqrt{c x^6 + b x^3 + a}}{x^3}\, dx$$

Optimal(type 6, 116 leaves, 2 steps):

$$-\frac{\operatorname{AppellF1}\left(-\frac{2}{3}, -\frac{1}{2}, -\frac{1}{2}, \frac{1}{3}, -\frac{2 c x^3}{b-\sqrt{-4 a c+b^2}}, -\frac{2 c x^3}{b+\sqrt{-4 a c+b^2}}\right) \sqrt{c x^6+b x^3+a}}{2 x^2 \sqrt{1+\frac{2 c x^3}{b-\sqrt{-4 a c+b^2}}} \sqrt{1+\frac{2 c x^3}{b+\sqrt{-4 a c+b^2}}}}$$

```
Result(type 8, 47 leaves):
```

$$-\frac{\sqrt{c x^6+b x^3+a}}{2 x^2}+\int \frac{\frac{3 c x^3}{2}+\frac{3 b}{4}}{\sqrt{c x^6+b x^3+a}} \, dx$$

```
Problem 53: Unable to integrate problem.
```

$$\int x^2 \left(c x^6+b x^3+a\right)^{3/2} dx$$

```
Optimal(type 3, 106 leaves, 5 steps):
```

$$\frac{\left(2 c x^3+b\right) \left(c x^6+b x^3+a\right)^{3/2}}{24 c}+\frac{\left(-4 a c+b^2\right)^2 \operatorname{arctanh}\left(\frac{2 c x^3+b}{2 \sqrt{c} \sqrt{c x^6+b x^3+a}}\right)}{128 c^{5/2}}-\frac{\left(-4 a c+b^2\right) \left(2 c x^3+b\right) \sqrt{c x^6+b x^3+a}}{64 c^2}$$

```
Result(type 8, 109 leaves):
```

$$\frac{\left(16 x^9 c^3+24 b x^6 c^2+40 a c^2 x^3+2 b^2 c x^3+20 a b c-3 b^3\right) \sqrt{c x^6+b x^3+a}}{192 c^2}+\int \frac{3 \left(16 a^2 c^2-8 a b^2 c+b^4\right) x^2}{128 c^2 \sqrt{c x^6+b x^3+a}} \, dx$$

```
Problem 54: Unable to integrate problem.
```

$$\int \frac{\left(c x^6+b x^3+a\right)^{3/2}}{x^4} \, dx$$

```
Optimal(type 3, 122 leaves, 8 steps):
```

$$-\frac{\left(c x^6+b x^3+a\right)^{3/2}}{3 x^3}-\frac{b \operatorname{arctanh}\left(\frac{b x^3+2 a}{2 \sqrt{a} \sqrt{c x^6+b x^3+a}}\right) \sqrt{a}}{2}+\frac{\left(4 a c+b^2\right) \operatorname{arctanh}\left(\frac{2 c x^3+b}{2 \sqrt{c} \sqrt{c x^6+b x^3+a}}\right)}{8 \sqrt{c}}+\frac{\left(2 c x^3+3 b\right) \sqrt{c x^6+b x^3+a}}{4}$$

```
Result(type 8, 77 leaves):
```

$$-\frac{a \sqrt{c x^6+b x^3+a}}{3 x^3}+\int \frac{2 c^2 x^9+4 b c x^6+4 a c x^3+2 b^2 x^3+3 a b}{2 x \sqrt{c x^6+b x^3+a}} \, dx$$

```
Problem 55: Unable to integrate problem.
```

$$\int \frac{(c x^6 + b x^3 + a)^{3/2}}{x^7}\, dx$$

Optimal(type 3, 123 leaves, 8 steps):

$$-\frac{(c x^6 + b x^3 + a)^{3/2}}{6 x^6} - \frac{(4 a c + b^2) \operatorname{arctanh}\left(\frac{b x^3 + 2 a}{2 \sqrt{a} \sqrt{c x^6 + b x^3 + a}}\right)}{8 \sqrt{a}} + \frac{b \operatorname{arctanh}\left(\frac{2 c x^3 + b}{2 \sqrt{c} \sqrt{c x^6 + b x^3 + a}}\right) \sqrt{c}}{2} - \frac{(-2 c x^3 + b) \sqrt{c x^6 + b x^3 + a}}{4 x^3}$$

Result(type 8, 76 leaves):

$$-\frac{\sqrt{c x^6 + b x^3 + a}\, (5 b x^3 + 2 a)}{12 x^6} + \int \frac{8 c^2 x^6 + 16 b c x^3 + 12 a c + 3 b^2}{8 x \sqrt{c x^6 + b x^3 + a}}\, dx$$

Problem 56: Unable to integrate problem.

$$\int \frac{(c x^6 + b x^3 + a)^{3/2}}{x^2}\, dx$$

Optimal(type 6, 117 leaves, 2 steps):

$$-\frac{a \operatorname{AppellF1}\left(-\frac{1}{3}, -\frac{3}{2}, -\frac{3}{2}, \frac{2}{3}, -\frac{2 c x^3}{b - \sqrt{-4 a c + b^2}}, -\frac{2 c x^3}{b + \sqrt{-4 a c + b^2}}\right) \sqrt{c x^6 + b x^3 + a}}{x \sqrt{1 + \frac{2 c x^3}{b - \sqrt{-4 a c + b^2}}} \sqrt{1 + \frac{2 c x^3}{b + \sqrt{-4 a c + b^2}}}}$$

Result(type 8, 74 leaves):

$$-\frac{\sqrt{c x^6 + b x^3 + a}\, (-10 c x^6 - 19 b x^3 + 80 a)}{80 x} + \int \frac{27 x (20 a c x^3 + b^2 x^3 + 12 a b)}{160 \sqrt{c x^6 + b x^3 + a}}\, dx$$

Problem 57: Unable to integrate problem.

$$\int \frac{x^{11}}{\sqrt{c x^6 + b x^3 + a}}\, dx$$

Optimal(type 3, 103 leaves, 5 steps):

$$-\frac{b (-12 a c + 5 b^2) \operatorname{arctanh}\left(\frac{2 c x^3 + b}{2 \sqrt{c} \sqrt{c x^6 + b x^3 + a}}\right)}{48 c^{7/2}} + \frac{x^6 \sqrt{c x^6 + b x^3 + a}}{9 c} + \frac{(-10 b c x^3 - 16 a c + 15 b^2) \sqrt{c x^6 + b x^3 + a}}{72 c^3}$$

Result(type 8, 80 leaves):

$$-\frac{\left(-8 c^2 x^6+10 b c x^3+16 a c-15 b^2\right) \sqrt{c x^6+b x^3+a}}{72 c^3}+\int \frac{b \left(12 a c-5 b^2\right) x^2}{16 c^3 \sqrt{c x^6+b x^3+a}}\, dx$$

Problem 58: Unable to integrate problem.

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

Optimal(type 3, 86 leaves, 5 steps):

$$\frac{\left(-4 a c+3 b^2\right) \operatorname{arctanh}\left(\frac{2 c x^3+b}{2 \sqrt{c}\, \sqrt{c x^6+b x^3+a}}\right)}{24 c^{5/2}}-\frac{b \sqrt{c x^6+b x^3+a}}{4 c^2}+\frac{x^3 \sqrt{c x^6+b x^3+a}}{6 c}$$

Result(type 8, 64 leaves):

$$-\frac{\left(-2 c x^3+3 b\right) \sqrt{c x^6+b x^3+a}}{12 c^2}+\int -\frac{x^2 \left(4 a c-3 b^2\right)}{8 c^2 \sqrt{c x^6+b x^3+a}}\, dx$$

Problem 59: Unable to integrate problem.

$$\int \frac{1}{x^4 \sqrt{c x^6+b x^3+a}}\, dx$$

Optimal(type 3, 58 leaves, 4 steps):

$$\frac{b \operatorname{arctanh}\left(\frac{b x^3+2 a}{2 \sqrt{a}\, \sqrt{c x^6+b x^3+a}}\right)}{6 a^{3/2}}-\frac{\sqrt{c x^6+b x^3+a}}{3 a x^3}$$

Result(type 8, 48 leaves):

$$-\frac{\sqrt{c x^6+b x^3+a}}{3 a x^3}+\int -\frac{b}{2 a x \sqrt{c x^6+b x^3+a}}\, dx$$

Problem 60: Unable to integrate problem.

$$\int \frac{1}{x^{13} \sqrt{c x^6+b x^3+a}}\, dx$$

Optimal(type 3, 166 leaves, 7 steps):

$$-\frac{\left(48 a^2 c^2-120 a b^2 c+35 b^4\right) \operatorname{arctanh}\left(\frac{b x^3+2 a}{2 \sqrt{a} \sqrt{c x^6+b x^3+a}}\right)}{384 a^{9/2}}-\frac{\sqrt{c x^6+b x^3+a}}{12 a x^{12}}+\frac{7 b \sqrt{c x^6+b x^3+a}}{72 a^2 x^9}-\frac{\left(-36 a c+35 b^2\right) \sqrt{c x^6+b x^3+a}}{288 a^3 x^6}$$
$$+\frac{5 b\left(-44 a c+21 b^2\right) \sqrt{c x^6+b x^3+a}}{576 a^4 x^3}$$

Result(type 8, 117 leaves):

$$-\frac{\sqrt{c x^6+b x^3+a}\left(220 a b c x^9-105 b^3 x^9-72 a^2 c x^6+70 a b^2 x^6-56 a^2 b x^3+48 a^3\right)}{576 a^4 x^{12}}+\int \frac{48 a^2 c^2-120 a b^2 c+35 b^4}{128 a^4 x \sqrt{c x^6+b x^3+a}} \, dx$$

Problem 61: Unable to integrate problem.

$$\int \frac{x}{\sqrt{c x^6+b x^3+a}} \, dx$$

Optimal(type 6, 116 leaves, 2 steps):

$$\frac{x^2 \operatorname{AppellF1}\left(\frac{2}{3}, \frac{1}{2}, \frac{1}{2}, \frac{5}{3},-\frac{2 c x^3}{b-\sqrt{-4 a c+b^2}},-\frac{2 c x^3}{b+\sqrt{-4 a c+b^2}}\right) \sqrt{1+\frac{2 c x^3}{b-\sqrt{-4 a c+b^2}}} \sqrt{1+\frac{2 c x^3}{b+\sqrt{-4 a c+b^2}}}}{2 \sqrt{c x^6+b x^3+a}}$$

Result(type 8, 18 leaves):

$$\int \frac{x}{\sqrt{c x^6+b x^3+a}} \, dx$$

Problem 62: Unable to integrate problem.

$$\int \frac{1}{\sqrt{c x^6+b x^3+a}} \, dx$$

Optimal(type 6, 113 leaves, 2 steps):

$$\frac{x \operatorname{AppellF1}\left(\frac{1}{3}, \frac{1}{2}, \frac{1}{2}, \frac{4}{3},-\frac{2 c x^3}{b-\sqrt{-4 a c+b^2}},-\frac{2 c x^3}{b+\sqrt{-4 a c+b^2}}\right) \sqrt{1+\frac{2 c x^3}{b-\sqrt{-4 a c+b^2}}} \sqrt{1+\frac{2 c x^3}{b+\sqrt{-4 a c+b^2}}}}{\sqrt{c x^6+b x^3+a}}$$

Result(type 8, 16 leaves):

$$\int \frac{1}{\sqrt{c x^6+b x^3+a}} \, dx$$

Problem 63: Unable to integrate problem.

$$\int \frac{1}{x^3 \sqrt{c x^6 + b x^3 + a}}\, dx$$

Optimal(type 6, 116 leaves, 2 steps):

$$-\frac{\mathit{AppellF1}\left(-\frac{2}{3}, \frac{1}{2}, \frac{1}{2}, \frac{1}{3}, -\frac{2 c x^3}{b - \sqrt{-4 a c + b^2}}, -\frac{2 c x^3}{b + \sqrt{-4 a c + b^2}}\right) \sqrt{1 + \frac{2 c x^3}{b - \sqrt{-4 a c + b^2}}}\ \sqrt{1 + \frac{2 c x^3}{b + \sqrt{-4 a c + b^2}}}}{2 x^2 \sqrt{c x^6 + b x^3 + a}}$$

Result(type 8, 52 leaves):

$$-\frac{\sqrt{c x^6 + b x^3 + a}}{2 a x^2} + \int -\frac{-2 c x^3 + b}{4 a \sqrt{c x^6 + b x^3 + a}}\, dx$$

Problem 65: Unable to integrate problem.

$$\int \frac{1}{x \left(c x^6 + b x^3 + a\right)^{3/2}}\, dx$$

Optimal(type 3, 78 leaves, 5 steps):

$$-\frac{\operatorname{arctanh}\left(\frac{b x^3 + 2 a}{2 \sqrt{a}\ \sqrt{c x^6 + b x^3 + a}}\right)}{3 a^{3/2}} + \frac{2 \left(b c x^3 - 2 a c + b^2\right)}{3 a \left(-4 a c + b^2\right) \sqrt{c x^6 + b x^3 + a}}$$

Result(type 8, 20 leaves):

$$\int \frac{1}{x \left(c x^6 + b x^3 + a\right)^{3/2}}\, dx$$

Problem 66: Unable to integrate problem.

$$\int \frac{1}{x^{10} \left(c x^6 + b x^3 + a\right)^{3/2}}\, dx$$

Optimal(type 3, 230 leaves, 7 steps):

$$\frac{5 b \left(-12 a c + 7 b^2\right) \operatorname{arctanh}\left(\frac{b x^3 + 2 a}{2 \sqrt{a}\ \sqrt{c x^6 + b x^3 + a}}\right)}{48 a^{9/2}} + \frac{2 \left(b c x^3 - 2 a c + b^2\right)}{3 a \left(-4 a c + b^2\right) x^9 \sqrt{c x^6 + b x^3 + a}} - \frac{\left(-16 a c + 7 b^2\right) \sqrt{c x^6 + b x^3 + a}}{9 a^2 \left(-4 a c + b^2\right) x^9}$$
$$+ \frac{b \left(-116 a c + 35 b^2\right) \sqrt{c x^6 + b x^3 + a}}{36 a^3 \left(-4 a c + b^2\right) x^6} - \frac{\left(256 a^2 c^2 - 460 a b^2 c + 105 b^4\right) \sqrt{c x^6 + b x^3 + a}}{72 a^4 \left(-4 a c + b^2\right) x^3}$$

Result(type 8, 159 leaves):

$$-\frac{\sqrt{c x^6+b x^3+a}\,\left(-40 a c x^6+57 b^2 x^6-22 a b x^3+8 a^2\right)}{72 a^4 x^9}+\int\frac{28 a b c^2 x^6-19 b^3 c x^6+16 a^2 c^2 x^3+12 a b^2 c x^3-19 b^4 x^3+60 a^2 b c-35 a b^3}{16 a^4 x c\left(x^6+\frac{b x^3}{c}+\frac{a}{c}\right)\sqrt{c x^6+b x^3+a}}\,dx$$

Problem 67: Unable to integrate problem.

$$\int\frac{x^3}{\left(c x^6+b x^3+a\right)^{3/2}}\,dx$$

Optimal(type 6, 119 leaves, 2 steps):

$$\frac{x^4\,AppellF1\left(\frac{4}{3},\frac{3}{2},\frac{3}{2},\frac{7}{3},-\frac{2 c x^3}{b-\sqrt{-4 a c+b^2}},-\frac{2 c x^3}{b+\sqrt{-4 a c+b^2}}\right)\sqrt{1+\frac{2 c x^3}{b-\sqrt{-4 a c+b^2}}}\,\sqrt{1+\frac{2 c x^3}{b+\sqrt{-4 a c+b^2}}}}{4 a\sqrt{c x^6+b x^3+a}}$$

Result(type 8, 20 leaves):

$$\int\frac{x^3}{\left(c x^6+b x^3+a\right)^{3/2}}\,dx$$

Problem 68: Unable to integrate problem.

$$\int\frac{1}{x^3\left(c x^6+b x^3+a\right)^{3/2}}\,dx$$

Optimal(type 6, 119 leaves, 2 steps):

$$-\frac{AppellF1\left(-\frac{2}{3},\frac{3}{2},\frac{3}{2},\frac{1}{3},-\frac{2 c x^3}{b-\sqrt{-4 a c+b^2}},-\frac{2 c x^3}{b+\sqrt{-4 a c+b^2}}\right)\sqrt{1+\frac{2 c x^3}{b-\sqrt{-4 a c+b^2}}}\,\sqrt{1+\frac{2 c x^3}{b+\sqrt{-4 a c+b^2}}}}{2 a x^2\sqrt{c x^6+b x^3+a}}$$

Result(type 8, 100 leaves):

$$-\frac{\sqrt{c x^6+b x^3+a}}{2 a^2 x^2}+\int-\frac{-2 c^2 x^9-b c x^6+2 a c x^3+b^2 x^3+5 a b}{4 a^2 c\left(x^6+\frac{b x^3}{c}+\frac{a}{c}\right)\sqrt{c x^6+b x^3+a}}\,dx$$

Problem 69: Unable to integrate problem.

$$\int\frac{(d x)^m}{c x^6+b x^3+a}\,dx$$

Optimal(type 5, 157 leaves, 3 steps):

$$\frac{2 c (d x)^{1+m} \mathrm{hypergeom}\left(\left[1, \frac{1}{3}+\frac{m}{3}\right], \left[\frac{4}{3}+\frac{m}{3}\right], -\frac{2 c x^3}{b-\sqrt{-4 a c+b^2}}\right)}{d (1+m) \left(b-\sqrt{-4 a c+b^2}\right) \sqrt{-4 a c+b^2}} - \frac{2 c (d x)^{1+m} \mathrm{hypergeom}\left(\left[1, \frac{1}{3}+\frac{m}{3}\right], \left[\frac{4}{3}+\frac{m}{3}\right], -\frac{2 c x^3}{b+\sqrt{-4 a c+b^2}}\right)}{d (1+m) \sqrt{-4 a c+b^2} \left(b+\sqrt{-4 a c+b^2}\right)}$$

Result(type 8, 22 leaves):

$$\int \frac{(d x)^m}{c x^6+b x^3+a}\, dx$$

Problem 70: Unable to integrate problem.

$$\int x^5 \left(c x^6+b x^3+a\right)^p dx$$

Optimal(type 5, 146 leaves, 3 steps):

$$\frac{\left(c x^6+b x^3+a\right)^{1+p}}{6 c (1+p)} + \frac{2^p b \left(c x^6+b x^3+a\right)^{1+p} \mathrm{hypergeom}\left([-p, 1+p], [2+p], \frac{2 c x^3+\sqrt{-4 a c+b^2}+b}{2 \sqrt{-4 a c+b^2}}\right) \left(\frac{-2 c x^3+\sqrt{-4 a c+b^2}-b}{\sqrt{-4 a c+b^2}}\right)^{-1-p}}{3 c (1+p) \sqrt{-4 a c+b^2}}$$

Result(type 8, 20 leaves):

$$\int x^5 \left(c x^6+b x^3+a\right)^p dx$$

Problem 71: Unable to integrate problem.

$$\int x^2 \left(c x^6+b x^3+a\right)^p dx$$

Optimal(type 5, 117 leaves, 2 steps):

$$-\frac{2^{1+p} \left(c x^6+b x^3+a\right)^{1+p} \mathrm{hypergeom}\left([-p, 1+p], [2+p], \frac{2 c x^3+\sqrt{-4 a c+b^2}+b}{2 \sqrt{-4 a c+b^2}}\right) \left(\frac{-2 c x^3+\sqrt{-4 a c+b^2}-b}{\sqrt{-4 a c+b^2}}\right)^{-1-p}}{3 (1+p) \sqrt{-4 a c+b^2}}$$

Result(type 8, 20 leaves):

$$\int x^2 \left(c x^6+b x^3+a\right)^p dx$$

Problem 72: Unable to integrate problem.

$$\int \frac{\left(c x^6+b x^3+a\right)^p}{x}\, dx$$

Optimal(type 6, 147 leaves, 3 steps):

$$\frac{2^{-1+2p}\left(c x^6+b x^3+a\right)^p \operatorname{AppellF1}\left(-2p, -p, -p, 1-2p, \frac{-b-\sqrt{-4ac+b^2}}{2cx^3}, \frac{-b+\sqrt{-4ac+b^2}}{2cx^3}\right)}{3p\left(\frac{2cx^3-\sqrt{-4ac+b^2}+b}{cx^3}\right)^p\left(\frac{2cx^3+\sqrt{-4ac+b^2}+b}{cx^3}\right)^p}$$

Result(type 8, 20 leaves):

$$\int \frac{\left(c x^6+b x^3+a\right)^p}{x}\, dx$$

Problem 73: Unable to integrate problem.

$$\int \frac{\left(c x^6+b x^3+a\right)^p}{x^4}\, dx$$

Optimal(type 6, 152 leaves, 3 steps):

$$-\frac{4^p\left(c x^6+b x^3+a\right)^p \operatorname{AppellF1}\left(1-2p, -p, -p, 2-2p, \frac{-b-\sqrt{-4ac+b^2}}{2cx^3}, \frac{-b+\sqrt{-4ac+b^2}}{2cx^3}\right)}{3(1-2p)x^3\left(\frac{2cx^3-\sqrt{-4ac+b^2}+b}{cx^3}\right)^p\left(\frac{2cx^3+\sqrt{-4ac+b^2}+b}{cx^3}\right)^p}$$

Result(type 8, 20 leaves):

$$\int \frac{\left(c x^6+b x^3+a\right)^p}{x^4}\, dx$$

Problem 82: Unable to integrate problem.

$$\int \frac{x^m}{c x^8+b x^4+a}\, dx$$

Optimal(type 5, 147 leaves, 3 steps):

$$\frac{2 c x^{1+m} \operatorname{hypergeom}\left(\left[1, \frac{1}{4}+\frac{m}{4}\right], \left[\frac{5}{4}+\frac{m}{4}\right], -\frac{2cx^4}{b-\sqrt{-4ac+b^2}}\right)}{(1+m)\left(b-\sqrt{-4ac+b^2}\right)\sqrt{-4ac+b^2}} - \frac{2 c x^{1+m} \operatorname{hypergeom}\left(\left[1, \frac{1}{4}+\frac{m}{4}\right], \left[\frac{5}{4}+\frac{m}{4}\right], -\frac{2cx^4}{b+\sqrt{-4ac+b^2}}\right)}{(1+m)\sqrt{-4ac+b^2}\left(b+\sqrt{-4ac+b^2}\right)}$$

Result(type 8, 20 leaves):

$$\int \frac{x^m}{c x^8+b x^4+a}\, dx$$

Problem 85: Unable to integrate problem.

$$\int \frac{x^m}{x^8+x^4+1}\, dx$$

Optimal(type 5, 107 leaves, 3 steps):

$$-\frac{2\,x^{1+m}\,\mathrm{hypergeom}\left(\left[1, \frac{1}{4}+\frac{m}{4}\right], \left[\frac{5}{4}+\frac{m}{4}\right], -\frac{2\,x^4}{1+\mathrm{I}\sqrt{3}}\right)\sqrt{3}}{3\,(1+m)\,\left(\mathrm{I}-\sqrt{3}\right)}+\frac{2\,x^{1+m}\,\mathrm{hypergeom}\left(\left[1, \frac{1}{4}+\frac{m}{4}\right], \left[\frac{5}{4}+\frac{m}{4}\right], -\frac{2\,x^4}{1-\mathrm{I}\sqrt{3}}\right)\sqrt{3}}{3\,(1+m)\,\left(\mathrm{I}+\sqrt{3}\right)}$$

Result(type 8, 16 leaves):

$$\int \frac{x^m}{x^8+x^4+1}\, dx$$

Problem 94: Unable to integrate problem.

$$\int \frac{x^m}{x^8-x^4+1}\, dx$$

Optimal(type 5, 107 leaves, 3 steps):

$$-\frac{2\,x^{1+m}\,\mathrm{hypergeom}\left(\left[1, \frac{1}{4}+\frac{m}{4}\right], \left[\frac{5}{4}+\frac{m}{4}\right], \frac{2\,x^4}{1+\mathrm{I}\sqrt{3}}\right)\sqrt{3}}{3\,(1+m)\,\left(\mathrm{I}-\sqrt{3}\right)}+\frac{2\,x^{1+m}\,\mathrm{hypergeom}\left(\left[1, \frac{1}{4}+\frac{m}{4}\right], \left[\frac{5}{4}+\frac{m}{4}\right], \frac{2\,x^4}{1-\mathrm{I}\sqrt{3}}\right)\sqrt{3}}{3\,(1+m)\,\left(\mathrm{I}+\sqrt{3}\right)}$$

Result(type 8, 18 leaves):

$$\int \frac{x^m}{x^8-x^4+1}\, dx$$

Problem 98: Result is not expressed in closed-form.

$$\int \frac{1}{x^2\,(x^8-x^4+1)}\, dx$$

Optimal(type 3, 312 leaves, 22 steps):

$$-\frac{1}{x}+\frac{\ln\left(1+x^2-x\left(\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2}-\frac{\sqrt{6}}{6}\right)}{8}-\frac{\ln\left(1+x^2+x\left(\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2}-\frac{\sqrt{6}}{6}\right)}{8}+\frac{\arctan\left(\frac{-2\,x+\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}}{\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}}\right)}{4\left(\frac{3\sqrt{2}}{2}-\frac{\sqrt{6}}{2}\right)}$$

$$-\frac{\arctan\left(\frac{2x+\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}}{\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}}\right)}{4\left(\frac{3\sqrt{2}}{2}-\frac{\sqrt{6}}{2}\right)}-\frac{\ln\left(1+x^2-x\left(\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2}+\frac{\sqrt{6}}{6}\right)}{8}+\frac{\ln\left(1+x^2+x\left(\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2}+\frac{\sqrt{6}}{6}\right)}{8}$$

$$-\frac{\arctan\left(\frac{-2x+\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}}{\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}}\right)}{4\left(\frac{3\sqrt{2}}{2}+\frac{\sqrt{6}}{2}\right)}+\frac{\arctan\left(\frac{2x+\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}}{\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}}\right)}{4\left(\frac{3\sqrt{2}}{2}+\frac{\sqrt{6}}{2}\right)}$$

Result(type 7, 51 leaves):

$$-\frac{\left(\sum_{\_R=RootOf(\_Z^8-\_Z^4+1)}\frac{(\_R^6-\_R^2)\ln(x-\_R)}{2\_R^7-\_R^3}\right)}{4}-\frac{1}{x}$$

Problem 99: Result is not expressed in closed-form.

$$\int\frac{1}{x^4(x^8-x^4+1)}\,dx$$

Optimal(type 3, 304 leaves, 20 steps):

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

$$+\frac{\ln\left(1+x^2-x\left(\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2}-\frac{\sqrt{6}}{6}\right)}{8}-\frac{\ln\left(1+x^2+x\left(\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2}-\frac{\sqrt{6}}{6}\right)}{8}$$

$$-\frac{\arctan\left(\frac{-2x+\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}}{\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}}\right)\left(\frac{\sqrt{2}}{2}+\frac{\sqrt{6}}{6}\right)}{4}+\frac{\arctan\left(\frac{2x+\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}}{\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}}\right)\left(\frac{\sqrt{2}}{2}+\frac{\sqrt{6}}{6}\right)}{4}$$

$$-\frac{\ln\left(1+x^2-x\left(\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2}+\frac{\sqrt{6}}{6}\right)}{8}+\frac{\ln\left(1+x^2+x\left(\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2}+\frac{\sqrt{6}}{6}\right)}{8}$$

Result(type 7, 49 leaves):

$$-\frac{1}{3x^3}+\frac{\left(\sum_{\_R=RootOf(\_Z^8-\_Z^4+1)}\frac{(-\_R^4+1)\ln(x-\_R)}{2\_R^7-\_R^3}\right)}{4}$$

Problem 100: Result more than twice size of optimal antiderivative.

$$\int\frac{x^9}{x^8+3x^4+1}\,dx$$

Optimal(type 3, 51 leaves, 5 steps):

$$\frac{x^2}{2}+\frac{\arctan\left(x^2\left(\frac{\sqrt{5}}{2}+\frac{1}{2}\right)\right)\left(1-\frac{2\sqrt{5}}{5}\right)}{2}-\frac{\arctan\left(\frac{x^2\sqrt{2}}{\sqrt{3+\sqrt{5}}}\right)\left(1+\frac{2\sqrt{5}}{5}\right)}{2}$$

Result(type 3, 116 leaves):

$$\frac{x^2}{2}-\frac{7\sqrt{5}\arctan\left(\frac{4x^2}{2\sqrt{5}+2}\right)}{5\left(2\sqrt{5}+2\right)}-\frac{3\arctan\left(\frac{4x^2}{2\sqrt{5}+2}\right)}{2\sqrt{5}+2}+\frac{7\sqrt{5}\arctan\left(\frac{4x^2}{2\sqrt{5}-2}\right)}{5\left(2\sqrt{5}-2\right)}-\frac{3\arctan\left(\frac{4x^2}{2\sqrt{5}-2}\right)}{2\sqrt{5}-2}$$

Problem 101: Result more than twice size of optimal antiderivative.

$$\int\frac{1}{x^3\left(x^8+3x^4+1\right)}\,dx$$

Optimal(type 3, 54 leaves, 5 steps):

$$-\frac{1}{2x^2}-\frac{\arctan\left(x^2\left(\frac{\sqrt{5}}{2}+\frac{1}{2}\right)\right)\left(3+\sqrt{5}\right)^{3/2}\sqrt{10}}{40}+\frac{\arctan\left(\frac{x^2\sqrt{2}}{\sqrt{3+\sqrt{5}}}\right)\left(1-\frac{2\sqrt{5}}{5}\right)}{2}$$

Result(type 3, 116 leaves):

$$-\frac{1}{2x^2}+\frac{3\sqrt{5}\arctan\left(\frac{4x^2}{2\sqrt{5}+2}\right)}{5\left(2\sqrt{5}+2\right)}-\frac{\arctan\left(\frac{4x^2}{2\sqrt{5}+2}\right)}{2\sqrt{5}+2}-\frac{\arctan\left(\frac{4x^2}{2\sqrt{5}-2}\right)}{2\sqrt{5}-2}-\frac{3\sqrt{5}\arctan\left(\frac{4x^2}{2\sqrt{5}-2}\right)}{5\left(2\sqrt{5}-2\right)}$$

Problem 102: Result is not expressed in closed-form.

$$\int \frac{x^4}{x^8+3x^4+1}\,dx$$

Optimal(type 3, 293 leaves, 19 steps):

$$-\frac{\arctan\left(-1+\frac{2^{3/4}x}{\left(3-\sqrt{5}\right)^{1/4}}\right)\left(3-\sqrt{5}\right)^{1/4}2^{1/4}\sqrt{5}}{20}-\frac{\arctan\left(1+\frac{2^{3/4}x}{\left(3-\sqrt{5}\right)^{1/4}}\right)\left(3-\sqrt{5}\right)^{1/4}2^{1/4}\sqrt{5}}{20}$$
$$+\frac{\ln\left(2x^2-2\,2^{1/4}x\left(3-\sqrt{5}\right)^{1/4}+\sqrt{5}-1\right)\left(3-\sqrt{5}\right)^{1/4}2^{1/4}\sqrt{5}}{40}-\frac{\ln\left(2x^2+2\,2^{1/4}x\left(3-\sqrt{5}\right)^{1/4}+\sqrt{5}-1\right)\left(3-\sqrt{5}\right)^{1/4}2^{1/4}\sqrt{5}}{40}$$
$$+\frac{\arctan\left(-1+\frac{2^{3/4}x}{\left(3+\sqrt{5}\right)^{1/4}}\right)\left(3+\sqrt{5}\right)^{1/4}2^{1/4}\sqrt{5}}{20}+\frac{\arctan\left(1+\frac{2^{3/4}x}{\left(3+\sqrt{5}\right)^{1/4}}\right)\left(3+\sqrt{5}\right)^{1/4}2^{1/4}\sqrt{5}}{20}$$
$$-\frac{\ln\left(2x^2-2\,2^{1/4}x\left(3+\sqrt{5}\right)^{1/4}+\sqrt{5}+1\right)\left(3+\sqrt{5}\right)^{1/4}2^{1/4}\sqrt{5}}{40}+\frac{\ln\left(2x^2+2\,2^{1/4}x\left(3+\sqrt{5}\right)^{1/4}+\sqrt{5}+1\right)\left(3+\sqrt{5}\right)^{1/4}2^{1/4}\sqrt{5}}{40}$$

Result(type 7, 39 leaves):

$$\frac{\left(\sum_{\_R=RootOf\left(\_Z^8+3\_Z^4+1\right)}\frac{\_R^4\ln(x-\_R)}{2\_R^7+3\_R^3}\right)}{4}$$

Problem 103: Result is not expressed in closed-form.

$$\int \frac{1}{x^8+3x^4+1}\,dx$$

Optimal(type 3, 221 leaves, 19 steps):

$$-\frac{\arctan\left(x\sqrt{\sqrt{5}-1}-1\right)\sqrt{-20+10\sqrt{5}}}{20}-\frac{\arctan\left(1+x\sqrt{\sqrt{5}-1}\right)\sqrt{-20+10\sqrt{5}}}{20}+\frac{\ln\left(1+2x^2+\sqrt{5}-2x\sqrt{\sqrt{5}+1}\right)\sqrt{-20+10\sqrt{5}}}{40}$$
$$-\frac{\ln\left(1+2x^2+\sqrt{5}+2x\sqrt{\sqrt{5}+1}\right)\sqrt{-20+10\sqrt{5}}}{40}+\frac{\arctan\left(x\sqrt{\sqrt{5}+1}-1\right)\sqrt{20+10\sqrt{5}}}{20}+\frac{\arctan\left(1+x\sqrt{\sqrt{5}+1}\right)\sqrt{20+10\sqrt{5}}}{20}$$
$$-\frac{\ln\left(-1+2x^2+\sqrt{5}-2x\sqrt{\sqrt{5}-1}\right)\sqrt{20+10\sqrt{5}}}{40}+\frac{\ln\left(-1+2x^2+\sqrt{5}+2x\sqrt{\sqrt{5}-1}\right)\sqrt{20+10\sqrt{5}}}{40}$$

Result(type 7, 36 leaves):

$$\frac{\left(\sum_{\_R=RootOf\left(\_Z^8+3\_Z^4+1\right)}\frac{\ln(x-\_R)}{2\_R^7+3\_R^3}\right)}{4}$$

Problem 104: Result is not expressed in closed-form.

$$\int \frac{1}{x^2 (x^8 + 3 x^4 + 1)} \, dx$$

Optimal(type 3, 270 leaves, 20 steps):

$$-\frac{1}{x} + \frac{\arctan\left(-1 + \frac{2^{3/4} x}{(3+\sqrt{5})^{1/4}}\right) (6150 - 2750\sqrt{5})^{1/4}}{20} + \frac{\arctan\left(1 + \frac{2^{3/4} x}{(3+\sqrt{5})^{1/4}}\right) (6150 - 2750\sqrt{5})^{1/4}}{20}$$
$$+ \frac{\ln\left(2 x^2 - 2\, 2^{1/4} x (3+\sqrt{5})^{1/4} + \sqrt{5} + 1\right) (6150 - 2750\sqrt{5})^{1/4}}{40} - \frac{\ln\left(2 x^2 + 2\, 2^{1/4} x (3+\sqrt{5})^{1/4} + \sqrt{5} + 1\right) (6150 - 2750\sqrt{5})^{1/4}}{40}$$
$$- \frac{\arctan\left(-1 + \frac{2^{3/4} x}{(3-\sqrt{5})^{1/4}}\right) (246 + 110\sqrt{5})^{1/4} \sqrt{5}}{20} - \frac{\arctan\left(1 + \frac{2^{3/4} x}{(3-\sqrt{5})^{1/4}}\right) (246 + 110\sqrt{5})^{1/4} \sqrt{5}}{20}$$
$$- \frac{\ln\left(2 x^2 - 2\, 2^{1/4} x (3-\sqrt{5})^{1/4} + \sqrt{5} - 1\right) (246 + 110\sqrt{5})^{1/4} \sqrt{5}}{40} + \frac{\ln\left(2 x^2 + 2\, 2^{1/4} x (3-\sqrt{5})^{1/4} + \sqrt{5} - 1\right) (246 + 110\sqrt{5})^{1/4} \sqrt{5}}{40}$$

Result(type 7, 51 leaves):

$$-\frac{\left(\sum_{\_R = RootOf(\_Z^8 + 3\,\_Z^4 + 1)} \frac{(\_R^6 + 3\,\_R^2) \ln(x - \_R)}{2\,\_R^7 + 3\,\_R^3}\right)}{4} - \frac{1}{x}$$

Problem 112: Result more than twice size of optimal antiderivative.

$$\int \frac{x}{\left(c + \frac{a}{x^2} + \frac{b}{x}\right)^2} \, dx$$

Optimal(type 3, 188 leaves, 8 steps):

$$-\frac{b(-11 a c + 3 b^2) x}{c^3 (-4 a c + b^2)} + \frac{(-8 a c + 3 b^2) x^2}{2 c^2 (-4 a c + b^2)} - \frac{b x^3}{c (-4 a c + b^2)} + \frac{x^4 (b x + 2 a)}{(-4 a c + b^2)(c x^2 + b x + a)} + \frac{b (30 a^2 c^2 - 20 a b^2 c + 3 b^4) \operatorname{arctanh}\left(\frac{2 c x + b}{\sqrt{-4 a c + b^2}}\right)}{c^4 (-4 a c + b^2)^{3/2}}$$
$$+ \frac{(-2 a c + 3 b^2) \ln(c x^2 + b x + a)}{2 c^4}$$

Result(type 3, 661 leaves):

$$\frac{x^2}{2 c^2} - \frac{2 b x}{c^3} - \frac{5 b x a^2}{c^2 (c x^2 + b x + a)(4 a c - b^2)} + \frac{5 b^3 x a}{c^3 (c x^2 + b x + a)(4 a c - b^2)} - \frac{b^5 x}{c^4 (c x^2 + b x + a)(4 a c - b^2)} - \frac{2 a^3}{c^2 (c x^2 + b x + a)(4 a c - b^2)}$$
$$+ \frac{4 a^2 b^2}{c^3 (c x^2 + b x + a)(4 a c - b^2)} - \frac{a b^4}{c^4 (c x^2 + b x + a)(4 a c - b^2)} - \frac{4 \ln((4 a c - b^2)(c x^2 + b x + a)) a^2}{c^2 (4 a c - b^2)}$$

$$+\frac{7\ln\left(\left(4ac-b^2\right)\left(cx^2+bx+a\right)\right)ab^2}{c^3\left(4ac-b^2\right)}-\frac{3\ln\left(\left(4ac-b^2\right)\left(cx^2+bx+a\right)\right)b^4}{2c^4\left(4ac-b^2\right)}+\frac{30\arctan\left(\frac{2c\left(4ac-b^2\right)x+b\left(4ac-b^2\right)}{\sqrt{64a^3c^3-48a^2b^2c^2+12ab^4c-b^6}}\right)a^2b}{c^2\sqrt{64a^3c^3-48a^2b^2c^2+12ab^4c-b^6}}$$

$$-\frac{20\arctan\left(\frac{2c\left(4ac-b^2\right)x+b\left(4ac-b^2\right)}{\sqrt{64a^3c^3-48a^2b^2c^2+12ab^4c-b^6}}\right)ab^3}{c^3\sqrt{64a^3c^3-48a^2b^2c^2+12ab^4c-b^6}}+\frac{3\arctan\left(\frac{2c\left(4ac-b^2\right)x+b\left(4ac-b^2\right)}{\sqrt{64a^3c^3-48a^2b^2c^2+12ab^4c-b^6}}\right)b^5}{c^4\sqrt{64a^3c^3-48a^2b^2c^2+12ab^4c-b^6}}$$

Problem 114: Result more than twice size of optimal antiderivative.

$$\int\frac{1}{\left(c+\frac{a}{x^2}+\frac{b}{x}\right)^2x^7}\,dx$$

Optimal(type 3, 194 leaves, 8 steps):

$$\frac{8ac-3b^2}{2a^2\left(-4ac+b^2\right)x^2}+\frac{b\left(-11ac+3b^2\right)}{a^3\left(-4ac+b^2\right)x}+\frac{bcx-2ac+b^2}{a\left(-4ac+b^2\right)x^2\left(cx^2+bx+a\right)}+\frac{b\left(30a^2c^2-20ab^2c+3b^4\right)\operatorname{arctanh}\left(\frac{2cx+b}{\sqrt{-4ac+b^2}}\right)}{a^4\left(-4ac+b^2\right)^{3/2}}$$

$$+\frac{\left(-2ac+3b^2\right)\ln(x)}{a^4}-\frac{\left(-2ac+3b^2\right)\ln\left(cx^2+bx+a\right)}{2a^4}$$

Result(type 3, 645 leaves):

$$-\frac{1}{2a^2x^2}-\frac{2\ln(x)c}{a^3}+\frac{3\ln(x)b^2}{a^4}+\frac{2b}{a^3x}+\frac{3c^2bx}{a^2\left(cx^2+bx+a\right)\left(4ac-b^2\right)}-\frac{cb^3x}{a^3\left(cx^2+bx+a\right)\left(4ac-b^2\right)}-\frac{2c^2}{a\left(cx^2+bx+a\right)\left(4ac-b^2\right)}$$

$$+\frac{4b^2c}{a^2\left(cx^2+bx+a\right)\left(4ac-b^2\right)}-\frac{b^4}{a^3\left(cx^2+bx+a\right)\left(4ac-b^2\right)}+\frac{4c^2\ln\left(\left(4ac-b^2\right)\left(cx^2+bx+a\right)\right)}{a^2\left(4ac-b^2\right)}$$

$$-\frac{7c\ln\left(\left(4ac-b^2\right)\left(cx^2+bx+a\right)\right)b^2}{a^3\left(4ac-b^2\right)}+\frac{3\ln\left(\left(4ac-b^2\right)\left(cx^2+bx+a\right)\right)b^4}{2a^4\left(4ac-b^2\right)}+\frac{30\arctan\left(\frac{2c\left(4ac-b^2\right)x+b\left(4ac-b^2\right)}{\sqrt{64a^3c^3-48a^2b^2c^2+12ab^4c-b^6}}\right)c^2b}{a^2\sqrt{64a^3c^3-48a^2b^2c^2+12ab^4c-b^6}}$$

$$-\frac{20\arctan\left(\frac{2c\left(4ac-b^2\right)x+b\left(4ac-b^2\right)}{\sqrt{64a^3c^3-48a^2b^2c^2+12ab^4c-b^6}}\right)cb^3}{a^3\sqrt{64a^3c^3-48a^2b^2c^2+12ab^4c-b^6}}+\frac{3\arctan\left(\frac{2c\left(4ac-b^2\right)x+b\left(4ac-b^2\right)}{\sqrt{64a^3c^3-48a^2b^2c^2+12ab^4c-b^6}}\right)b^5}{a^4\sqrt{64a^3c^3-48a^2b^2c^2+12ab^4c-b^6}}$$

Problem 115: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{\left(c+\frac{a}{x^2}+\frac{b}{x}\right)^3 x}\, dx$$

Optimal(type 3, 180 leaves, 8 steps):

$$-\frac{b\left(-7ac+b^2\right)x}{c^2\left(-4ac+b^2\right)^2}+\frac{x^4\left(bx+2a\right)}{2\left(-4ac+b^2\right)\left(cx^2+bx+a\right)^2}+\frac{x^2\left(a\left(-16ac+b^2\right)+b\left(-10ac+b^2\right)x\right)}{2c\left(-4ac+b^2\right)^2\left(cx^2+bx+a\right)}$$
$$+\frac{b\left(30a^2c^2-10ab^2c+b^4\right)\operatorname{arctanh}\left(\frac{2cx+b}{\sqrt{-4ac+b^2}}\right)}{c^3\left(-4ac+b^2\right)^{5/2}}+\frac{\ln\left(cx^2+bx+a\right)}{2c^3}$$

Result(type 3, 805 leaves):

$$\frac{\frac{b\left(25a^2c^2-15ab^2c+2b^4\right)x^3}{c^2\left(16a^2c^2-8ab^2c+b^4\right)}+\frac{\left(32a^3c^3+11a^2b^2c^2-19ab^4c+3b^6\right)x^2}{2c^3\left(16a^2c^2-8ab^2c+b^4\right)}+\frac{ab\left(31a^2c^2-22ab^2c+3b^4\right)x}{\left(16a^2c^2-8ab^2c+b^4\right)c^3}+\frac{3a^2\left(8a^2c^2-7ab^2c+b^4\right)}{2c^3\left(16a^2c^2-8ab^2c+b^4\right)}}{\left(cx^2+bx+a\right)^2}$$
$$+\frac{\ln\left(c^2\left(16a^2c^2-8ab^2c+b^4\right)\left(cx^2+bx+a\right)\right)}{2c^3}-\frac{30\arctan\left(\frac{2c^3\left(16a^2c^2-8ab^2c+b^4\right)x+c^2\left(16a^2c^2-8ab^2c+b^4\right)b}{\sqrt{1024a^5c^9-1280a^4b^2c^8+640a^3b^4c^7-160a^2b^6c^6+20ab^8c^5-b^{10}c^4}}\right)a^2bc}{\sqrt{1024a^5c^9-1280a^4b^2c^8+640a^3b^4c^7-160a^2b^6c^6+20ab^8c^5-b^{10}c^4}}$$
$$+\frac{10\arctan\left(\frac{2c^3\left(16a^2c^2-8ab^2c+b^4\right)x+c^2\left(16a^2c^2-8ab^2c+b^4\right)b}{\sqrt{1024a^5c^9-1280a^4b^2c^8+640a^3b^4c^7-160a^2b^6c^6+20ab^8c^5-b^{10}c^4}}\right)ab^3}{\sqrt{1024a^5c^9-1280a^4b^2c^8+640a^3b^4c^7-160a^2b^6c^6+20ab^8c^5-b^{10}c^4}}$$
$$-\frac{\arctan\left(\frac{2c^3\left(16a^2c^2-8ab^2c+b^4\right)x+c^2\left(16a^2c^2-8ab^2c+b^4\right)b}{\sqrt{1024a^5c^9-1280a^4b^2c^8+640a^3b^4c^7-160a^2b^6c^6+20ab^8c^5-b^{10}c^4}}\right)b^5}{\sqrt{1024a^5c^9-1280a^4b^2c^8+640a^3b^4c^7-160a^2b^6c^6+20ab^8c^5-b^{10}c^4}\,c}$$

Problem 116: Result more than twice size of optimal antiderivative.

$$\int \frac{1}{\left(c+\frac{a}{x^2}+\frac{b}{x}\right)^3 x^3}\, dx$$

Optimal(type 3, 99 leaves, 5 steps):

$$-\frac{x^3\left(2cx+b\right)}{2\left(-4ac+b^2\right)\left(cx^2+bx+a\right)^2}+\frac{3bx\left(bx+2a\right)}{2\left(-4ac+b^2\right)^2\left(cx^2+bx+a\right)}+\frac{6ab\operatorname{arctanh}\left(\frac{2cx+b}{\sqrt{-4ac+b^2}}\right)}{\left(-4ac+b^2\right)^{5/2}}$$

Result(type 3, 222 leaves):

$$-\frac{-\frac{3 a b c x^3}{16 a^2 c^2-8 a b^2 c+b^4}-\frac{(16 a^2 c^2+a b^2 c+b^4) x^2}{2 c (16 a^2 c^2-8 a b^2 c+b^4)}-\frac{(5 a c+b^2) a b x}{c (16 a^2 c^2-8 a b^2 c+b^4)}-\frac{a^2 (8 a c+b^2)}{2 c (16 a^2 c^2-8 a b^2 c+b^4)}}{(c x^2+b x+a)^2}$$

$$-\frac{6 a b \arctan\left(\frac{2 c x+b}{\sqrt{4 a c-b^2}}\right)}{(16 a^2 c^2-8 a b^2 c+b^4) \sqrt{4 a c-b^2}}$$

```
Problem 119: Result more than twice size of optimal antiderivative.
```

$$\int \frac{1}{\left(c+\frac{a}{x^2}+\frac{b}{x}\right)^3 x^8}\, dx$$

```
Optimal(type 3, 229 leaves, 9 steps):
```

$$-\frac{3 (-5 a c+b^2) (-2 a c+b^2)}{a^3 (-4 a c+b^2)^2 x}+\frac{b c x-2 a c+b^2}{2 a (-4 a c+b^2) x (c x^2+b x+a)^2}+\frac{3 b^4-20 a b^2 c+20 a^2 c^2+3 b c (-6 a c+b^2) x}{2 a^2 (-4 a c+b^2)^2 x (c x^2+b x+a)}$$
$$-\frac{3 (-20 a^3 c^3+30 a^2 b^2 c^2-10 a b^4 c+b^6) \operatorname{arctanh}\left(\frac{2 c x+b}{\sqrt{-4 a c+b^2}}\right)}{a^4 (-4 a c+b^2)^{5/2}}-\frac{3 b \ln(x)}{a^4}+\frac{3 b \ln(c x^2+b x+a)}{2 a^4}$$

```
Result(type 3, 1437 leaves):
```

$$-\frac{1}{a^3 x}-\frac{3 b \ln(x)}{a^4}-\frac{14 c^4 x^3}{a (c x^2+b x+a)^2 (16 a^2 c^2-8 a b^2 c+b^4)}+\frac{13 c^3 x^3 b^2}{a^2 (c x^2+b x+a)^2 (16 a^2 c^2-8 a b^2 c+b^4)}$$
$$-\frac{2 c^2 x^3 b^4}{a^3 (c x^2+b x+a)^2 (16 a^2 c^2-8 a b^2 c+b^4)}-\frac{37 c^3 b x^2}{a (c x^2+b x+a)^2 (16 a^2 c^2-8 a b^2 c+b^4)}+\frac{55 c^2 b^3 x^2}{2 a^2 (c x^2+b x+a)^2 (16 a^2 c^2-8 a b^2 c+b^4)}$$
$$-\frac{4 c b^5 x^2}{a^3 (c x^2+b x+a)^2 (16 a^2 c^2-8 a b^2 c+b^4)}-\frac{18 x c^3}{(c x^2+b x+a)^2 (16 a^2 c^2-8 a b^2 c+b^4)}-\frac{7 x b^2 c^2}{a (c x^2+b x+a)^2 (16 a^2 c^2-8 a b^2 c+b^4)}$$
$$+\frac{12 x b^4 c}{a^2 (c x^2+b x+a)^2 (16 a^2 c^2-8 a b^2 c+b^4)}-\frac{2 x b^6}{a^3 (c x^2+b x+a)^2 (16 a^2 c^2-8 a b^2 c+b^4)}-\frac{29 b c^2}{(c x^2+b x+a)^2 (16 a^2 c^2-8 a b^2 c+b^4)}$$
$$+\frac{18 b^3 c}{a (c x^2+b x+a)^2 (16 a^2 c^2-8 a b^2 c+b^4)}-\frac{5 b^5}{2 a^2 (c x^2+b x+a)^2 (16 a^2 c^2-8 a b^2 c+b^4)}$$
$$+\frac{24 c^2 \ln((16 a^2 c^2-8 a b^2 c+b^4) (c x^2+b x+a)) b}{a^2 (16 a^2 c^2-8 a b^2 c+b^4)}-\frac{12 c \ln((16 a^2 c^2-8 a b^2 c+b^4) (c x^2+b x+a)) b^3}{a^3 (16 a^2 c^2-8 a b^2 c+b^4)}$$
$$+\frac{3 \ln((16 a^2 c^2-8 a b^2 c+b^4) (c x^2+b x+a)) b^5}{2 a^4 (16 a^2 c^2-8 a b^2 c+b^4)}-\frac{60 \arctan\left(\frac{2 c (16 a^2 c^2-8 a b^2 c+b^4) x+b (16 a^2 c^2-8 a b^2 c+b^4)}{\sqrt{1024 c^5 a^5-1280 c^4 b^2 a^4+640 c^3 b^4 a^3-160 c^2 b^6 a^2+20 c b^8 a-b^{10}}}\right) c^3}{a \sqrt{1024 c^5 a^5-1280 c^4 b^2 a^4+640 c^3 b^4 a^3-160 c^2 b^6 a^2+20 c b^8 a-b^{10}}}$$

$$+\frac{90\arctan\left(\frac{2c(16a^2c^2-8ab^2c+b^4)x+b(16a^2c^2-8ab^2c+b^4)}{\sqrt{1024c^5a^5-1280c^4b^2a^4+640c^3b^4a^3-160c^2b^6a^2+20cb^8a-b^{10}}}\right)b^2c^2}{a^2\sqrt{1024c^5a^5-1280c^4b^2a^4+640c^3b^4a^3-160c^2b^6a^2+20cb^8a-b^{10}}}$$

$$-\frac{30\arctan\left(\frac{2c(16a^2c^2-8ab^2c+b^4)x+b(16a^2c^2-8ab^2c+b^4)}{\sqrt{1024c^5a^5-1280c^4b^2a^4+640c^3b^4a^3-160c^2b^6a^2+20cb^8a-b^{10}}}\right)b^4c}{a^3\sqrt{1024c^5a^5-1280c^4b^2a^4+640c^3b^4a^3-160c^2b^6a^2+20cb^8a-b^{10}}}$$

$$+\frac{3\arctan\left(\frac{2c(16a^2c^2-8ab^2c+b^4)x+b(16a^2c^2-8ab^2c+b^4)}{\sqrt{1024c^5a^5-1280c^4b^2a^4+640c^3b^4a^3-160c^2b^6a^2+20cb^8a-b^{10}}}\right)b^6}{a^4\sqrt{1024c^5a^5-1280c^4b^2a^4+640c^3b^4a^3-160c^2b^6a^2+20cb^8a-b^{10}}}$$

```
Problem 130: Unable to integrate problem.
```

$$\int (a^2+2abx^{1/3}+b^2x^{2/3})^p (dx)^m \, dx$$

```
Optimal(type 5, 73 leaves, 4 steps):
```

$$\frac{(a^2+2abx^{1/3}+b^2x^{2/3})^p x (dx)^m \mathrm{hypergeom}\left([-2p, 3+3m], [4+3m], -\frac{bx^{1/3}}{a}\right)}{(1+m)\left(1+\frac{bx^{1/3}}{a}\right)^{2p}}$$

```
Result(type 8, 28 leaves):
```

$$\int (a^2+2abx^{1/3}+b^2x^{2/3})^p (dx)^m \, dx$$

```
Problem 131: Unable to integrate problem.
```

$$\int (a^2+2abx^{1/3}+b^2x^{2/3})^p x \, dx$$

```
Optimal(type 3, 275 leaves, 4 steps):
```

$$-\frac{3a^6\left(1+\frac{bx^{1/3}}{a}\right)(a^2+2abx^{1/3}+b^2x^{2/3})^p}{b^6(1+2p)}+\frac{15a^6\left(1+\frac{bx^{1/3}}{a}\right)^2(a^2+2abx^{1/3}+b^2x^{2/3})^p}{2b^6(1+p)}$$

$$-\frac{30a^6\left(1+\frac{bx^{1/3}}{a}\right)^3(a^2+2abx^{1/3}+b^2x^{2/3})^p}{b^6(3+2p)}+\frac{15a^6\left(1+\frac{bx^{1/3}}{a}\right)^4(a^2+2abx^{1/3}+b^2x^{2/3})^p}{b^6(2+p)}$$

$$-\frac{15a^6\left(1+\frac{bx^{1/3}}{a}\right)^5(a^2+2abx^{1/3}+b^2x^{2/3})^p}{b^6(5+2p)}+\frac{3a^6\left(1+\frac{bx^{1/3}}{a}\right)^6(a^2+2abx^{1/3}+b^2x^{2/3})^p}{2b^6(3+p)}$$

Result(type 8, 24 leaves):

$$\int \left(a^2+2abx^{1/3}+b^2x^{2/3}\right)^p x\,dx$$

Problem 132: Unable to integrate problem.

$$\int \frac{\left(a^2+2abx^{1/3}+b^2x^{2/3}\right)^p}{x}\,dx$$

Optimal(type 5, 63 leaves, 3 steps):

$$-\frac{3\left(1+\frac{bx^{1/3}}{a}\right)\left(a^2+2abx^{1/3}+b^2x^{2/3}\right)^p \text{hypergeom}\left([1,1+2p],[2+2p],1+\frac{bx^{1/3}}{a}\right)}{1+2p}$$

Result(type 8, 26 leaves):

$$\int \frac{\left(a^2+2abx^{1/3}+b^2x^{2/3}\right)^p}{x}\,dx$$

Problem 137: Result is not expressed in closed-form.

$$\int \frac{x^{-1-\frac{n}{4}}}{bx^n+cx^{2n}}\,dx$$

Optimal(type 3, 195 leaves, 14 steps):

$$-\frac{4}{5bnx^{\frac{5n}{4}}}+\frac{4c}{b^2nx^{\frac{n}{4}}}+\frac{c^{5/4}\ln\left(-\frac{b^{1/4}c^{1/4}\sqrt{2}}{x^{\frac{n}{4}}}+\frac{\sqrt{b}}{x^{\frac{n}{2}}}+\sqrt{c}\right)\sqrt{2}}{2b^{9/4}n}-\frac{c^{5/4}\ln\left(\frac{b^{1/4}c^{1/4}\sqrt{2}}{x^{\frac{n}{4}}}+\frac{\sqrt{b}}{x^{\frac{n}{2}}}+\sqrt{c}\right)\sqrt{2}}{2b^{9/4}n}$$
$$+\frac{c^{5/4}\arctan\left(1-\frac{b^{1/4}\sqrt{2}}{c^{1/4}x^{\frac{n}{4}}}\right)\sqrt{2}}{b^{9/4}n}-\frac{c^{5/4}\arctan\left(1+\frac{b^{1/4}\sqrt{2}}{c^{1/4}x^{\frac{n}{4}}}\right)\sqrt{2}}{b^{9/4}n}$$

Result(type 7, 72 leaves):

$$\frac{4c}{b^2nx^{\frac{n}{4}}}-\frac{4}{5bn\left(x^{\frac{n}{4}}\right)^5}+\left(\sum_{\_R=RootOf(b^9n^4\_Z^4+c^5)}\_R\ln\left(x^{\frac{n}{4}}+\frac{b^7n^3\_R^3}{c^4}\right)\right)$$

Problem 142: Unable to integrate problem.

$$\int \frac{x^2}{\sqrt{a^2 + 2 a b x^n + b^2 x^{2n}}} \, dx$$

Optimal(type 5, 62 leaves, 2 steps):

$$\frac{x^3 (a + b x^n) \operatorname{hypergeom}\left(\left[1, \frac{3}{n}\right], \left[\frac{3+n}{n}\right], -\frac{b x^n}{a} \right)}{3 a \sqrt{a^2 + 2 a b x^n + b^2 x^{2n}}}$$

Result(type 8, 28 leaves):

$$\int \frac{x^2}{\sqrt{a^2 + 2 a b x^n + b^2 x^{2n}}} \, dx$$

Problem 143: Unable to integrate problem.

$$\int \frac{(d x)^m}{(a^2 + 2 a b x^n + b^2 x^{2n})^{3/2}} \, dx$$

Optimal(type 5, 76 leaves, 2 steps):

$$\frac{(d x)^{1+m} (a + b x^n) \operatorname{hypergeom}\left(\left[3, \frac{1+m}{n}\right], \left[\frac{1+m+n}{n}\right], -\frac{b x^n}{a} \right)}{a^3 d (1+m) \sqrt{a^2 + 2 a b x^n + b^2 x^{2n}}}$$

Result(type 8, 30 leaves):

$$\int \frac{(d x)^m}{(a^2 + 2 a b x^n + b^2 x^{2n})^{3/2}} \, dx$$

Problem 145: Unable to integrate problem.

$$\int \frac{1}{x^2 (a^2 + 2 a b x^n + b^2 x^{2n})^{3/2}} \, dx$$

Optimal(type 5, 62 leaves, 2 steps):

$$-\frac{(a + b x^n) \operatorname{hypergeom}\left(\left[3, -\frac{1}{n}\right], \left[\frac{-1+n}{n}\right], -\frac{b x^n}{a} \right)}{a^3 x \sqrt{a^2 + 2 a b x^n + b^2 x^{2n}}}$$

Result(type 8, 117 leaves):

$$\frac{\left(2 b n e^{n \ln(x)} + 3 a n + b e^{n \ln(x)} + a\right) \sqrt{\left(b e^{n \ln(x)} + a\right)^2}}{2 a^2 n^2 x \left(b e^{n \ln(x)} + a\right)^3} + \frac{\left(\int \frac{2 n^2 + 3 n + 1}{2 a^2 n^2 x^2 \left(b e^{n \ln(x)} + a\right)} \, dx\right) \sqrt{\left(b e^{n \ln(x)} + a\right)^2}}{b e^{n \ln(x)} + a}$$

Problem 146: Unable to integrate problem.

$$\int (d x)^{-1-2 n (1+p)} \left(a^2+2 a b x^n+b^2 x^{2 n}\right)^p \, dx$$

Optimal(type 3, 119 leaves, 3 steps):

$$-\frac{\left(a+b x^n\right) \left(a^2+2 a b x^n+b^2 x^{2 n}\right)^p}{a d n (1+2 p) (d x)^{2 n (1+p)}}+\frac{\left(a^2+2 a b x^n+b^2 x^{2 n}\right)^{1+p}}{2 a^2 d n (1+p) (1+2 p) (d x)^{2 n (1+p)}}$$

Result(type 8, 37 leaves):

$$\int (d x)^{-1-2 n (1+p)} \left(a^2+2 a b x^n+b^2 x^{2 n}\right)^p \, dx$$

Problem 147: Result more than twice size of optimal antiderivative.

$$\int \frac{x^{-1-n}}{a+b x^n+c x^{2 n}} \, dx$$

Optimal(type 3, 92 leaves, 8 steps):

$$-\frac{1}{a n x^n}-\frac{b \ln(x)}{a^2}+\frac{b \ln\left(a+b x^n+c x^{2 n}\right)}{2 a^2 n}-\frac{\left(-2 a c+b^2\right) \operatorname{arctanh}\left(\frac{b+2 c x^n}{\sqrt{-4 a c+b^2}}\right)}{a^2 n \sqrt{-4 a c+b^2}}$$

Result(type 3, 657 leaves):

$$-\frac{1}{a n x^n}-\frac{4 n^2 \ln(x) a b c}{4 a^3 c n^2-a^2 b^2 n^2}+\frac{n^2 \ln(x) b^3}{4 a^3 c n^2-a^2 b^2 n^2}+\frac{2 \ln\left(x^n-\frac{-2 a b c+b^3+\sqrt{-16 a^3 c^3+20 a^2 b^2 c^2-8 a b^4 c+b^6}}{2 c \left(2 a c-b^2\right)}\right) b c}{a \left(4 a c-b^2\right) n}$$
$$-\frac{\ln\left(x^n-\frac{-2 a b c+b^3+\sqrt{-16 a^3 c^3+20 a^2 b^2 c^2-8 a b^4 c+b^6}}{2 c \left(2 a c-b^2\right)}\right) b^3}{2 a^2 \left(4 a c-b^2\right) n}$$
$$+\frac{\ln\left(x^n-\frac{-2 a b c+b^3+\sqrt{-16 a^3 c^3+20 a^2 b^2 c^2-8 a b^4 c+b^6}}{2 c \left(2 a c-b^2\right)}\right) \sqrt{-16 a^3 c^3+20 a^2 b^2 c^2-8 a b^4 c+b^6}}{2 a^2 \left(4 a c-b^2\right) n}$$
$$+\frac{2 \ln\left(x^n+\frac{2 a b c-b^3+\sqrt{-16 a^3 c^3+20 a^2 b^2 c^2-8 a b^4 c+b^6}}{2 c \left(2 a c-b^2\right)}\right) b c}{a \left(4 a c-b^2\right) n}-\frac{\ln\left(x^n+\frac{2 a b c-b^3+\sqrt{-16 a^3 c^3+20 a^2 b^2 c^2-8 a b^4 c+b^6}}{2 c \left(2 a c-b^2\right)}\right) b^3}{2 a^2 \left(4 a c-b^2\right) n}$$
$$-\frac{\ln\left(x^n+\frac{2 a b c-b^3+\sqrt{-16 a^3 c^3+20 a^2 b^2 c^2-8 a b^4 c+b^6}}{2 c \left(2 a c-b^2\right)}\right) \sqrt{-16 a^3 c^3+20 a^2 b^2 c^2-8 a b^4 c+b^6}}{2 a^2 \left(4 a c-b^2\right) n}$$

Problem 148: Result is not expressed in closed-form.

$$\int \frac{x^{-1+\frac{n}{4}}}{a+b\,x^{n}+c\,x^{2\,n}}\,dx$$

Optimal(type 3, 273 leaves, 8 steps):

$$\frac{2\,2^{3/4}\,c^{3/4}\arctan\left(\frac{2^{1/4}\,c^{1/4}\,x^{\frac{n}{4}}}{\left(-b-\sqrt{-4\,a\,c+b^{2}}\right)^{1/4}}\right)}{n\left(-b-\sqrt{-4\,a\,c+b^{2}}\right)^{3/4}\sqrt{-4\,a\,c+b^{2}}}+\frac{2\,2^{3/4}\,c^{3/4}\operatorname{arctanh}\left(\frac{2^{1/4}\,c^{1/4}\,x^{\frac{n}{4}}}{\left(-b-\sqrt{-4\,a\,c+b^{2}}\right)^{1/4}}\right)}{n\left(-b-\sqrt{-4\,a\,c+b^{2}}\right)^{3/4}\sqrt{-4\,a\,c+b^{2}}}-\frac{2\,2^{3/4}\,c^{3/4}\arctan\left(\frac{2^{1/4}\,c^{1/4}\,x^{\frac{n}{4}}}{\left(-b+\sqrt{-4\,a\,c+b^{2}}\right)^{1/4}}\right)}{n\sqrt{-4\,a\,c+b^{2}}\left(-b+\sqrt{-4\,a\,c+b^{2}}\right)^{3/4}}$$
$$-\frac{2\,2^{3/4}\,c^{3/4}\operatorname{arctanh}\left(\frac{2^{1/4}\,c^{1/4}\,x^{\frac{n}{4}}}{\left(-b+\sqrt{-4\,a\,c+b^{2}}\right)^{1/4}}\right)}{n\sqrt{-4\,a\,c+b^{2}}\left(-b+\sqrt{-4\,a\,c+b^{2}}\right)^{3/4}}$$

Result(type 7, 279 leaves):

$$\sum_{\_R=RootOf\left(\left(256\,a^{7}\,c^{4}\,n^{8}-256\,a^{6}\,b^{2}\,c^{3}\,n^{8}+96\,a^{5}\,b^{4}\,c^{2}\,n^{8}-16\,a^{4}\,b^{6}\,c\,n^{8}+a^{3}\,b^{8}\,n^{8}\right)\_Z^{8}+\left(-48\,a^{3}\,b\,c^{3}\,n^{4}+40\,a^{2}\,b^{3}\,c^{2}\,n^{4}-11\,a\,b^{5}\,c\,n^{4}+b^{7}\,n^{4}\right)\_Z^{4}+c^{3}\right)}\_R\ln\left(x^{\frac{n}{4}}+\left(\frac{16\,n^{5}\,b\,a^{5}\,c^{2}}{a\,c^{2}-b^{2}\,c}\right.\right.$$
$$\left.\left.-\frac{8\,n^{5}\,b^{3}\,a^{4}\,c}{a\,c^{2}-b^{2}\,c}+\frac{n^{5}\,b^{5}\,a^{3}}{a\,c^{2}-b^{2}\,c}\right)\_R^{5}+\left(\frac{2\,n\,a^{2}\,c^{2}}{a\,c^{2}-b^{2}\,c}-\frac{4\,n\,a\,b^{2}\,c}{a\,c^{2}-b^{2}\,c}+\frac{n\,b^{4}}{a\,c^{2}-b^{2}\,c}\right)\_R\right)$$

Problem 149: Result is not expressed in closed-form.

$$\int \frac{x^{-1+\frac{n}{3}}}{a+b\,x^{n}+c\,x^{2\,n}}\,dx$$

Optimal(type 3, 465 leaves, 14 steps):

$$\frac{2^{2/3}\,c^{2/3}\ln\left(2^{1/3}\,c^{1/3}\,x^{\frac{n}{3}}+\left(b-\sqrt{-4\,a\,c+b^{2}}\right)^{1/3}\right)}{n\left(b-\sqrt{-4\,a\,c+b^{2}}\right)^{2/3}\sqrt{-4\,a\,c+b^{2}}}$$
$$-\frac{c^{2/3}\ln\left(2^{2/3}\,c^{2/3}\,x^{\frac{2\,n}{3}}-2^{1/3}\,c^{1/3}\,x^{\frac{n}{3}}\left(b-\sqrt{-4\,a\,c+b^{2}}\right)^{1/3}+\left(b-\sqrt{-4\,a\,c+b^{2}}\right)^{2/3}\right)2^{2/3}}{2\,n\left(b-\sqrt{-4\,a\,c+b^{2}}\right)^{2/3}\sqrt{-4\,a\,c+b^{2}}}$$

$$-\frac{2^{2/3} c^{2/3} \arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} c^{1/3} x^{\frac{n}{3}}}{\left(b-\sqrt{-4ac+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\sqrt{3}}{n\left(b-\sqrt{-4ac+b^2}\right)^{2/3}\sqrt{-4ac+b^2}} - \frac{2^{2/3} c^{2/3} \ln\left(2^{1/3} c^{1/3} x^{\frac{n}{3}} + \left(b+\sqrt{-4ac+b^2}\right)^{1/3}\right)}{n\sqrt{-4ac+b^2}\left(b+\sqrt{-4ac+b^2}\right)^{2/3}}$$

$$+\frac{c^{2/3} \ln\left(2^{2/3} c^{2/3} x^{\frac{2n}{3}} - 2^{1/3} c^{1/3} x^{\frac{n}{3}} \left(b+\sqrt{-4ac+b^2}\right)^{1/3} + \left(b+\sqrt{-4ac+b^2}\right)^{2/3}\right) 2^{2/3}}{2n\sqrt{-4ac+b^2}\left(b+\sqrt{-4ac+b^2}\right)^{2/3}}$$

$$+\frac{2^{2/3} c^{2/3} \arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} c^{1/3} x^{\frac{n}{3}}}{\left(b+\sqrt{-4ac+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\sqrt{3}}{n\sqrt{-4ac+b^2}\left(b+\sqrt{-4ac+b^2}\right)^{2/3}}$$

Result(type 7, 259 leaves):

$$\sum_{\_R=RootOf((64 a^5 c^3 n^6 - 48 a^4 b^2 c^2 n^6 + 12 a^3 b^4 c n^6 - a^2 b^6 n^6)\ \_Z^6 + (16 a^2 b c^2 n^3 - 8 a b^3 c n^3 + b^5 n^3)\ \_Z^3 + c^2)} \_R \ln\left(x^{\frac{n}{3}} + \left(-\frac{16 n^4 b a^4 c^2}{2ac^2 - b^2 c} + \frac{8 n^4 b^3 a^3 c}{2ac^2 - b^2 c} - \frac{n^4 b^5 a^2}{2ac^2 - b^2 c}\right)\_R^4 + \left(\frac{4 n a^2 c^2}{2ac^2 - b^2 c} - \frac{5 n a b^2 c}{2ac^2 - b^2 c} + \frac{n b^4}{2ac^2 - b^2 c}\right)\_R\right)$$

Problem 150: Result is not expressed in closed-form.

$$\int \frac{x^{-1+\frac{n}{2}}}{a + b x^n + c x^{2n}}\, dx$$

Optimal(type 3, 129 leaves, 4 steps):

$$\frac{2 \arctan\left(\frac{x^{\frac{n}{2}}\sqrt{2}\sqrt{c}}{\sqrt{b-\sqrt{-4ac+b^2}}}\right)\sqrt{2}\sqrt{c}}{n\sqrt{-4ac+b^2}\sqrt{b-\sqrt{-4ac+b^2}}} - \frac{2 \arctan\left(\frac{x^{\frac{n}{2}}\sqrt{2}\sqrt{c}}{\sqrt{b+\sqrt{-4ac+b^2}}}\right)\sqrt{2}\sqrt{c}}{n\sqrt{-4ac+b^2}\sqrt{b+\sqrt{-4ac+b^2}}}$$

Result(type 7, 113 leaves):

$$\sum_{\_R=RootOf((16 a^3 c^2 n^4 - 8 a^2 b^2 c n^4 + a b^4 n^4)\ \_Z^4 + (-4 a b c n^2 + b^3 n^2)\ \_Z^2 + c)} \_R \ln\left(x^{\frac{n}{2}} + \left(4 a^2 b n^3 - \frac{n^3 b^3 a}{c}\right)\_R^3 + \left(2 a n - \frac{n b^2}{c}\right)\_R\right)$$

Problem 151: Result is not expressed in closed-form.

$$\int \frac{x^{-1-\frac{n}{3}}}{a+b x^{n}+c x^{2 n}}\, dx$$

Optimal(type 3, 570 leaves, 16 steps):

$$-\frac{3}{a n x^{\frac{n}{3}}}+\frac{\ln\left(\frac{2^{1/3} a^{1/3}}{x^{\frac{n}{3}}}+\left(b-\sqrt{-4 a c+b^{2}}\right)^{1/3}\right)\left(b+\frac{2 a c-b^{2}}{\sqrt{-4 a c+b^{2}}}\right) 2^{2/3}}{2 a^{4/3} n \left(b-\sqrt{-4 a c+b^{2}}\right)^{2/3}}$$
$$-\frac{\ln\left(\frac{2^{2/3} a^{2/3}}{x^{\frac{2 n}{3}}}-\frac{2^{1/3} a^{1/3}\left(b-\sqrt{-4 a c+b^{2}}\right)^{1/3}}{x^{\frac{n}{3}}}+\left(b-\sqrt{-4 a c+b^{2}}\right)^{2/3}\right)\left(b+\frac{2 a c-b^{2}}{\sqrt{-4 a c+b^{2}}}\right) 2^{2/3}}{4 a^{4/3} n \left(b-\sqrt{-4 a c+b^{2}}\right)^{2/3}}$$
$$-\frac{\arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} a^{1/3}}{x^{\frac{n}{3}}\left(b-\sqrt{-4 a c+b^{2}}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\sqrt{3}\left(b+\frac{2 a c-b^{2}}{\sqrt{-4 a c+b^{2}}}\right) 2^{2/3}}{2 a^{4/3} n \left(b-\sqrt{-4 a c+b^{2}}\right)^{2/3}}$$
$$+\frac{\ln\left(\frac{2^{1/3} a^{1/3}}{x^{\frac{n}{3}}}+\left(b+\sqrt{-4 a c+b^{2}}\right)^{1/3}\right)\left(b+\frac{-2 a c+b^{2}}{\sqrt{-4 a c+b^{2}}}\right) 2^{2/3}}{2 a^{4/3} n \left(b+\sqrt{-4 a c+b^{2}}\right)^{2/3}}$$
$$-\frac{\ln\left(\frac{2^{2/3} a^{2/3}}{x^{\frac{2 n}{3}}}-\frac{2^{1/3} a^{1/3}\left(b+\sqrt{-4 a c+b^{2}}\right)^{1/3}}{x^{\frac{n}{3}}}+\left(b+\sqrt{-4 a c+b^{2}}\right)^{2/3}\right)\left(b+\frac{-2 a c+b^{2}}{\sqrt{-4 a c+b^{2}}}\right) 2^{2/3}}{4 a^{4/3} n \left(b+\sqrt{-4 a c+b^{2}}\right)^{2/3}}$$
$$-\frac{\arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} a^{1/3}}{x^{\frac{n}{3}}\left(b+\sqrt{-4 a c+b^{2}}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\sqrt{3}\left(b+\frac{-2 a c+b^{2}}{\sqrt{-4 a c+b^{2}}}\right) 2^{2/3}}{2 a^{4/3} n \left(b+\sqrt{-4 a c+b^{2}}\right)^{2/3}}$$

Result(type 7, 533 leaves):

$$-\frac{3}{a\,n\,x^{\frac{n}{3}}}+\left(\sum_{\_R=RootOf\left(\left(64\,a^7\,c^3\,n^6-48\,a^6\,b^2\,c^2\,n^6+12\,a^5\,b^4\,c\,n^6-a^4\,b^6\,n^6\right)\,\_Z^6+\left(-32\,a^3\,b\,c^3\,n^3+32\,a^2\,b^3\,c^2\,n^3-10\,a\,b^5\,c\,n^3+b^7\,n^3\right)\,\_Z^3+c^4\right)}\_R\ln\left(x^{\frac{n}{3}}+\left(-\frac{64\,n^5\,a^8\,c^4}{2\,a^2\,c^5-4\,b^2\,a\,c^4+b^4\,c^3}+\frac{112\,n^5\,b^2\,a^7\,c^3}{2\,a^2\,c^5-4\,b^2\,a\,c^4+b^4\,c^3}-\frac{60\,n^5\,b^4\,a^6\,c^2}{2\,a^2\,c^5-4\,b^2\,a\,c^4+b^4\,c^3}+\frac{13\,n^5\,b^6\,a^5\,c}{2\,a^2\,c^5-4\,b^2\,a\,c^4+b^4\,c^3}-\frac{n^5\,b^8\,a^4}{2\,a^2\,c^5-4\,b^2\,a\,c^4+b^4\,c^3}\right)\_R^5+\left(\frac{28\,c^4\,a^4\,b\,n^2}{2\,a^2\,c^5-4\,b^2\,a\,c^4+b^4\,c^3}-\frac{63\,c^3\,a^3\,b^3\,n^2}{2\,a^2\,c^5-4\,b^2\,a\,c^4+b^4\,c^3}+\frac{42\,c^2\,a^2\,b^5\,n^2}{2\,a^2\,c^5-4\,b^2\,a\,c^4+b^4\,c^3}-\frac{11\,c\,a\,b^7\,n^2}{2\,a^2\,c^5-4\,b^2\,a\,c^4+b^4\,c^3}+\frac{n^2\,b^9}{2\,a^2\,c^5-4\,b^2\,a\,c^4+b^4\,c^3}\right)\_R^2\right)\right)$$

Problem 152: Result is not expressed in closed-form.

$$\int\frac{x^{-1-\frac{n}{4}}}{a+b\,x^n+c\,x^{2\,n}}\,dx$$

Optimal(type 3, 344 leaves, 10 steps):

$$-\frac{4}{a\,n\,x^{\frac{n}{4}}}-\frac{2^{3/4}\arctan\left(\frac{2^{1/4}\,a^{1/4}}{x^{\frac{n}{4}}\left(-b-\sqrt{-4\,a\,c+b^2}\right)^{1/4}}\right)\left(b+\frac{-2\,a\,c+b^2}{\sqrt{-4\,a\,c+b^2}}\right)}{a^{5/4}\,n\left(-b-\sqrt{-4\,a\,c+b^2}\right)^{3/4}}-\frac{2^{3/4}\operatorname{arctanh}\left(\frac{2^{1/4}\,a^{1/4}}{x^{\frac{n}{4}}\left(-b-\sqrt{-4\,a\,c+b^2}\right)^{1/4}}\right)\left(b+\frac{-2\,a\,c+b^2}{\sqrt{-4\,a\,c+b^2}}\right)}{a^{5/4}\,n\left(-b-\sqrt{-4\,a\,c+b^2}\right)^{3/4}}-\frac{2^{3/4}\arctan\left(\frac{2^{1/4}\,a^{1/4}}{x^{\frac{n}{4}}\left(-b+\sqrt{-4\,a\,c+b^2}\right)^{1/4}}\right)\left(b+\frac{2\,a\,c-b^2}{\sqrt{-4\,a\,c+b^2}}\right)}{a^{5/4}\,n\left(-b+\sqrt{-4\,a\,c+b^2}\right)^{3/4}}-\frac{2^{3/4}\operatorname{arctanh}\left(\frac{2^{1/4}\,a^{1/4}}{x^{\frac{n}{4}}\left(-b+\sqrt{-4\,a\,c+b^2}\right)^{1/4}}\right)\left(b+\frac{2\,a\,c-b^2}{\sqrt{-4\,a\,c+b^2}}\right)}{a^{5/4}\,n\left(-b+\sqrt{-4\,a\,c+b^2}\right)^{3/4}}$$

Result(type 7, 629 leaves):

$$-\frac{4}{a\,n\,x^{\frac{n}{4}}}+\left(\sum_{\_R=RootOf\left(\left(256\,a^9\,c^4\,n^8-256\,a^8\,b^2\,c^3\,n^8+96\,a^7\,b^4\,c^2\,n^8-16\,a^6\,b^6\,c\,n^8+a^5\,b^8\,n^8\right)\,\_Z^8+\left(80\,a^4\,b\,c^4\,n^4-120\,a^3\,b^3\,c^3\,n^4+61\,a^2\,b^5\,c^2\,n^4-13\,a\,b^7\,c\,n^4+b^9\,n^4\right)\,\_Z^4+c^5\right)}\_R\ln\left(x^{\frac{n}{4}}+\left(-\frac{128\,n^7\,a^{10}\,c^5}{a^2\,c^6-3\,a\,b^2\,c^5+b^4\,c^4}+\frac{352\,n^7\,b^2\,a^9\,c^4}{a^2\,c^6-3\,a\,b^2\,c^5+b^4\,c^4}-\frac{280\,n^7\,b^4\,a^8\,c^3}{a^2\,c^6-3\,a\,b^2\,c^5+b^4\,c^4}+\frac{98\,n^7\,b^6\,a^7\,c^2}{a^2\,c^6-3\,a\,b^2\,c^5+b^4\,c^4}-\frac{16\,n^7\,b^8\,a^6\,c}{a^2\,c^6-3\,a\,b^2\,c^5+b^4\,c^4}+\frac{n^7\,b^{10}\,a^5}{a^2\,c^6-3\,a\,b^2\,c^5+b^4\,c^4}\right)\_R^7+\left(-\frac{36\,n^3\,b\,a^5\,c^5}{a^2\,c^6-3\,a\,b^2\,c^5+b^4\,c^4}+\frac{129\,n^3\,b^3\,a^4\,c^4}{a^2\,c^6-3\,a\,b^2\,c^5+b^4\,c^4}-\frac{138\,n^3\,b^5\,a^3\,c^3}{a^2\,c^6-3\,a\,b^2\,c^5+b^4\,c^4}+\frac{63\,n^3\,b^7\,a^2\,c^2}{a^2\,c^6-3\,a\,b^2\,c^5+b^4\,c^4}-\frac{13\,n^3\,b^9\,a\,c}{a^2\,c^6-3\,a\,b^2\,c^5+b^4\,c^4}+\frac{n^3\,b^{11}}{a^2\,c^6-3\,a\,b^2\,c^5+b^4\,c^4}\right)\_R^3\right)\right)$$

Problem 153: Unable to integrate problem.

$$\int \frac{1}{x^3 \left(a + b x^n + c x^{2n}\right)}\, dx$$

Optimal(type 5, 130 leaves, 3 steps):

$$\frac{c\,\mathrm{hypergeom}\left(\left[1, -\frac{2}{n}\right], \left[\frac{-2+n}{n}\right], -\frac{2 c x^n}{b - \sqrt{-4 a c + b^2}}\right)}{x^2 \left(b^2 - 4 a c - b\sqrt{-4 a c + b^2}\right)} + \frac{c\,\mathrm{hypergeom}\left(\left[1, -\frac{2}{n}\right], \left[\frac{-2+n}{n}\right], -\frac{2 c x^n}{b + \sqrt{-4 a c + b^2}}\right)}{x^2 \left(b^2 - 4 a c + b\sqrt{-4 a c + b^2}\right)}$$

Result(type 8, 22 leaves):

$$\int \frac{1}{x^3 \left(a + b x^n + c x^{2n}\right)}\, dx$$

Problem 156: Unable to integrate problem.

$$\int \frac{x^2}{\left(a + b x^n + c x^{2n}\right)^{3/2}}\, dx$$

Optimal(type 6, 131 leaves, 2 steps):

$$\frac{x^3\, \mathit{AppellF1}\left(\frac{3}{n}, \frac{3}{2}, \frac{3}{2}, \frac{3+n}{n}, -\frac{2 c x^n}{b - \sqrt{-4 a c + b^2}}, -\frac{2 c x^n}{b + \sqrt{-4 a c + b^2}}\right) \sqrt{1 + \frac{2 c x^n}{b - \sqrt{-4 a c + b^2}}}\, \sqrt{1 + \frac{2 c x^n}{b + \sqrt{-4 a c + b^2}}}}{3 a \sqrt{a + b x^n + c x^{2n}}}$$

Result(type 8, 22 leaves):

$$\int \frac{x^2}{\left(a + b x^n + c x^{2n}\right)^{3/2}}\, dx$$

Problem 157: Unable to integrate problem.

$$\int \frac{1}{x \left(a + b x^n + c x^{2n}\right)^{3/2}}\, dx$$

Optimal(type 3, 88 leaves, 5 steps):

$$-\frac{\mathrm{arctanh}\left(\frac{2 a + b x^n}{2 \sqrt{a}\, \sqrt{a + b x^n + c x^{2n}}}\right)}{a^{3/2}\, n} + \frac{2 \left(b^2 - 2 a c + b c x^n\right)}{a \left(-4 a c + b^2\right) n \sqrt{a + b x^n + c x^{2n}}}$$

Result(type 8, 22 leaves):

$$\int \frac{1}{x \left(a + b x^n + c x^{2n}\right)^{3/2}}\, dx$$

Problem 158: Result more than twice size of optimal antiderivative.

$$\int (d\,x)^m \left(a + b\,x^n + c\,x^{2\,n}\right)\,dx$$

Optimal(type 3, 58 leaves, 6 steps):

$$\frac{b\,x^{1+n}\,(d\,x)^m}{1+m+n} + \frac{c\,x^{1+2\,n}\,(d\,x)^m}{1+m+2\,n} + \frac{a\,(d\,x)^{1+m}}{d\,(1+m)}$$

Result(type 3, 204 leaves):

$$\frac{1}{(1+m)\,(1+m+n)\,(1+m+2\,n)}\Bigg(x\left(c\,m^2\,(x^n)^2 + c\,m\,n\,(x^n)^2 + b\,m^2\,x^n + 2\,b\,m\,n\,x^n + 2\,m\,c\,(x^n)^2 + c\,(x^n)^2\,n + a\,m^2 + 3\,a\,m\,n + 2\,a\,n^2 + 2\,x^n\,b\,m\right.$$
$$\left. + 2\,b\,x^n\,n + c\,(x^n)^2 + 2\,a\,m + 3\,a\,n + b\,x^n + a\right)\,e^{-\frac{m\,(\mathrm{I}\,\pi\,\mathrm{csgn}(\mathrm{I}\,d\,x)^3 - \mathrm{I}\,\pi\,\mathrm{csgn}(\mathrm{I}\,d\,x)^2\,\mathrm{csgn}(\mathrm{I}\,d) - \mathrm{I}\,\pi\,\mathrm{csgn}(\mathrm{I}\,d\,x)^2\,\mathrm{csgn}(\mathrm{I}\,x) + \mathrm{I}\,\pi\,\mathrm{csgn}(\mathrm{I}\,d\,x)\,\mathrm{csgn}(\mathrm{I}\,d)\,\mathrm{csgn}(\mathrm{I}\,x) - 2\,\ln(x) - 2\,\ln(d))}{2}}\Bigg)$$

Problem 159: Unable to integrate problem.

$$\int \frac{(d\,x)^m}{\left(a + b\,x^n + c\,x^{2\,n}\right)^3}\,dx$$

Optimal(type 5, 595 leaves, 6 steps):

$$\frac{(d\,x)^{1+m}\,\left(b^2 - 2\,a\,c + b\,c\,x^n\right)}{2\,a\,\left(-4\,a\,c + b^2\right)\,d\,n\,\left(a + b\,x^n + c\,x^{2\,n}\right)^2}$$
$$- \frac{(d\,x)^{1+m}\,\left(4\,a^2\,c^2\,(1+m-4\,n) - 5\,a\,b^2\,c\,(1+m-3\,n) + b^4\,(1+m-2\,n) - b\,c\,\left(2\,a\,c\,(2+2\,m-7\,n) - b^2\,(1+m-2\,n)\right)\,x^n\right)}{2\,a^2\,\left(-4\,a\,c + b^2\right)^2\,d\,n^2\,\left(a + b\,x^n + c\,x^{2\,n}\right)}$$
$$- \frac{1}{2\,a^2\,\left(-4\,a\,c + b^2\right)^{5/2}\,d\,(1+m)\,n^2\,\left(b - \sqrt{-4\,a\,c + b^2}\right)}\Bigg(c\,(d\,x)^{1+m}\,\mathrm{hypergeom}\left(\left[1, \frac{1+m}{n}\right], \left[\frac{1+m+n}{n}\right], -\frac{2\,c\,x^n}{b - \sqrt{-4\,a\,c + b^2}}\right)\,\Big(-b^4\,(1 + m^2$$
$$+ m\,(2 - 3\,n) - 3\,n + 2\,n^2) + 6\,a\,b^2\,c\,\left(1 + m^2 + m\,(2 - 4\,n) - 4\,n + 3\,n^2\right) - 8\,a^2\,c^2\,\left(1 + m^2 + m\,(2 - 6\,n) - 6\,n + 8\,n^2\right) + b\,\big(2\,a\,c\,(2 + 2\,m - 7\,n)$$
$$- b^2\,(1 + m - 2\,n)\big)\,(1 + m - n)\,\sqrt{-4\,a\,c + b^2}\Big)\Bigg) - \frac{1}{2\,a^2\,\left(-4\,a\,c + b^2\right)^{5/2}\,d\,(1+m)\,n^2\,\left(b + \sqrt{-4\,a\,c + b^2}\right)}\Bigg(c\,(d\,x)^{1+m}\,\mathrm{hypergeom}\Bigg(\Bigg[1,$$
$$\frac{1+m}{n}\Bigg], \left[\frac{1+m+n}{n}\right], -\frac{2\,c\,x^n}{b + \sqrt{-4\,a\,c + b^2}}\Bigg)\,\Big(b^4\,\left(1 + m^2 + m\,(2 - 3\,n) - 3\,n + 2\,n^2\right) - 6\,a\,b^2\,c\,\left(1 + m^2 + m\,(2 - 4\,n) - 4\,n + 3\,n^2\right) + 8\,a^2\,c^2\,(1 + m^2$$
$$+ m\,(2 - 6\,n) - 6\,n + 8\,n^2) + b\,\left(2\,a\,c\,(2 + 2\,m - 7\,n) - b^2\,(1 + m - 2\,n)\right)\,(1 + m - n)\,\sqrt{-4\,a\,c + b^2}\Big)\Bigg)$$

Result(type 8, 24 leaves):

$$\int \frac{(d\,x)^m}{\left(a + b\,x^n + c\,x^{2\,n}\right)^3}\,dx$$

Problem 160: Unable to integrate problem.

$$\int \frac{(d x)^m}{\sqrt{a + b x^n + c x^{2n}}} \, dx$$

Optimal(type 6, 142 leaves, 2 steps):

$$\frac{(d x)^{1+m} \text{AppellF1}\left(\frac{1+m}{n}, \frac{1}{2}, \frac{1}{2}, \frac{1+m+n}{n}, -\frac{2 c x^n}{b - \sqrt{-4 a c + b^2}}, -\frac{2 c x^n}{b + \sqrt{-4 a c + b^2}}\right) \sqrt{1 + \frac{2 c x^n}{b - \sqrt{-4 a c + b^2}}} \sqrt{1 + \frac{2 c x^n}{b + \sqrt{-4 a c + b^2}}}}{d (1+m) \sqrt{a + b x^n + c x^{2n}}}$$

Result(type 8, 24 leaves):

$$\int \frac{(d x)^m}{\sqrt{a + b x^n + c x^{2n}}} \, dx$$

Problem 161: Unable to integrate problem.

$$\int \frac{(d x)^m}{(a + b x^n + c x^{2n})^{3/2}} \, dx$$

Optimal(type 6, 145 leaves, 2 steps):

$$\frac{(d x)^{1+m} \text{AppellF1}\left(\frac{1+m}{n}, \frac{3}{2}, \frac{3}{2}, \frac{1+m+n}{n}, -\frac{2 c x^n}{b - \sqrt{-4 a c + b^2}}, -\frac{2 c x^n}{b + \sqrt{-4 a c + b^2}}\right) \sqrt{1 + \frac{2 c x^n}{b - \sqrt{-4 a c + b^2}}} \sqrt{1 + \frac{2 c x^n}{b + \sqrt{-4 a c + b^2}}}}{a d (1+m) \sqrt{a + b x^n + c x^{2n}}}$$

Result(type 8, 24 leaves):

$$\int \frac{(d x)^m}{(a + b x^n + c x^{2n})^{3/2}} \, dx$$

Problem 162: Result more than twice size of optimal antiderivative.

$$\int (e x + d)^3 \left(a + b (e x + d)^2 + c (e x + d)^4\right)^2 dx$$

Optimal(type 1, 79 leaves, 4 steps):

$$\frac{a^2 (e x + d)^4}{4 e} + \frac{a b (e x + d)^6}{3 e} + \frac{(2 a c + b^2) (e x + d)^8}{8 e} + \frac{b c (e x + d)^{10}}{5 e} + \frac{c^2 (e x + d)^{12}}{12 e}$$

Result(type 1, 1313 leaves):

$$\frac{e^{11} c^2 x^{12}}{12} + d e^{10} c^2 x^{11} + \frac{\left(27 d^2 e^9 c^2 + e^3 \left(2 \left(6 c d^2 e^2 + b e^2\right) c e^4 + 16 c^2 d^2 e^6\right)\right) x^{10}}{10}$$

$$+ \frac{\left(25 d^3 c^2 e^8 + 3 d e^2 \left(2 \left(6 c d^2 e^2 + b e^2\right) c e^4 + 16 c^2 d^2 e^6\right) + e^3 \left(2 \left(4 c d^3 e + 2 b d e\right) c e^4 + 8 \left(6 c d^2 e^2 + b e^2\right) c d e^3\right)\right) x^9}{9} + \frac{1}{8} \left(\left(8 d^4 c^2 e^7 \right.\right.$$

$$+ 3 d^2 e (2 (6 c d^2 e^2 + b e^2) c e^4 + 16 c^2 d^2 e^6) + 3 d e^2 (2 (4 c d^3 e + 2 b d e) c e^4 + 8 (6 c d^2 e^2 + b e^2) c d e^3) + e^3 (2 (c d^4 + b d^2 + a) c e^4 + 8 (4 c d^3 e$$

$$+ 2 b d e) c d e^3 + (6 c d^2 e^2 + b e^2)^2)) x^8) + \frac{1}{7} ((d^3 (2 (6 c d^2 e^2 + b e^2) c e^4 + 16 c^2 d^2 e^6) + 3 d^2 e (2 (4 c d^3 e + 2 b d e) c e^4 + 8 (6 c d^2 e^2$$

$$+ b e^2) c d e^3) + 3 d e^2 (2 (c d^4 + b d^2 + a) c e^4 + 8 (4 c d^3 e + 2 b d e) c d e^3 + (6 c d^2 e^2 + b e^2)^2) + e^3 (8 (c d^4 + b d^2 + a) c d e^3 + 2 (4 c d^3 e$$

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

$$+ 2 b d e) c d e^3 + (6 c d^2 e^2 + b e^2)^2) + 3 d e^2 (8 (c d^4 + b d^2 + a) c d e^3 + 2 (4 c d^3 e + 2 b d e) (6 c d^2 e^2 + b e^2)) + e^3 (2 (c d^4 + b d^2 + a) (6 c d^2 e^2$$

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

$$+ a) c d e^3 + 2 (4 c d^3 e + 2 b d e) (6 c d^2 e^2 + b e^2)) + 3 d e^2 (2 (c d^4 + b d^2 + a) (6 c d^2 e^2 + b e^2) + (4 c d^3 e + 2 b d e)^2) + 2 e^3 (c d^4 + b d^2$$

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

$$+ b e^2) + (4 c d^3 e + 2 b d e)^2) + 6 d e^2 (c d^4 + b d^2 + a) (4 c d^3 e + 2 b d e) + e^3 (c d^4 + b d^2 + a)^2) x^4)$$

$$+ \frac{(d^3 (2 (c d^4 + b d^2 + a) (6 c d^2 e^2 + b e^2) + (4 c d^3 e + 2 b d e)^2) + 6 d^2 e (c d^4 + b d^2 + a) (4 c d^3 e + 2 b d e) + 3 d e^2 (c d^4 + b d^2 + a)^2) x^3}{3}$$

$$+ \frac{(2 d^3 (c d^4 + b d^2 + a) (4 c d^3 e + 2 b d e) + 3 d^2 e (c d^4 + b d^2 + a)^2) x^2}{2} + d^3 (c d^4 + b d^2 + a)^2 x$$

Problem 163: Result more than twice size of optimal antiderivative.

$$\int (ex+d)^3 (a + b (ex+d)^2 + c (ex+d)^4)^3 \, dx$$

Optimal(type 1, 124 leaves, 4 steps):

$$\frac{a^3 (ex+d)^4}{4 e} + \frac{a^2 b (ex+d)^6}{2 e} + \frac{3 a (a c + b^2) (ex+d)^8}{8 e} + \frac{b (6 a c + b^2) (ex+d)^{10}}{10 e} + \frac{c (a c + b^2) (ex+d)^{12}}{4 e} + \frac{3 b c^2 (ex+d)^{14}}{14 e} + \frac{c^3 (ex+d)^{16}}{16 e}$$

Result(type ?, 7549 leaves): Display of huge result suppressed!

Problem 164: Result is not expressed in closed-form.

$$\int \frac{(ex+d)^3}{a + b (ex+d)^2 + c (ex+d)^4} \, dx$$

Optimal(type 3, 73 leaves, 6 steps):

$$\frac{\ln(a + b (ex+d)^2 + c (ex+d)^4)}{4 c e} + \frac{b \operatorname{arctanh}\left(\frac{b + 2 c (ex+d)^2}{\sqrt{-4 a c + b^2}}\right)}{2 c e \sqrt{-4 a c + b^2}}$$

Result(type 7, 150 leaves):

$$\frac{\sum_{\_R=RootOf(c e^4 \_Z^4+4 c d e^3 \_Z^3+(6 c d^2 e^2+b e^2) \_Z^2+(4 c d^3 e+2 b d e) \_Z+c d^4+b d^2+a)} \frac{(\_R^3 e^3+3 \_R^2 d e^2+3 \_R d^2 e+d^3) \ln(x-\_R)}{2 c e^3 \_R^3+6 c d e^2 \_R^2+6 c d^2 e \_R+2 c d^3+b e \_R+b d}}{2 e}$$

Problem 165: Result is not expressed in closed-form.

$$\int \frac{1}{(ex+d)\left(a+b(ex+d)^2+c(ex+d)^4\right)}\, dx$$

Optimal(type 3, 86 leaves, 8 steps):

$$\frac{\ln(ex+d)}{a e}-\frac{\ln\left(a+b(ex+d)^2+c(ex+d)^4\right)}{4 a e}+\frac{b \operatorname{arctanh}\left(\frac{b+2 c(ex+d)^2}{\sqrt{-4 a c+b^2}}\right)}{2 a e \sqrt{-4 a c+b^2}}$$

Result(type 7, 183 leaves):

$$\frac{\sum_{\_R=RootOf(c e^4 \_Z^4+4 c d e^3 \_Z^3+(6 c d^2 e^2+b e^2) \_Z^2+(4 c d^3 e+2 b d e) \_Z+c d^4+b d^2+a)} \frac{(-c e^3 \_R^3-3 c d e^2 \_R^2+e(-3 c d^2-b) \_R-c d^3-b d) \ln(x-\_R)}{2 c e^3 \_R^3+6 c d e^2 \_R^2+6 c d^2 e \_R+2 c d^3+b e \_R+b d}}{2 a e}+\frac{\ln(ex+d)}{a e}$$

Problem 166: Result is not expressed in closed-form.

$$\int \frac{1}{(ex+d)^2\left(a+b(ex+d)^2+c(ex+d)^4\right)}\, dx$$

Optimal(type 3, 159 leaves, 5 steps):

$$-\frac{1}{a e(ex+d)}-\frac{\arctan\left(\frac{(ex+d)\sqrt{2}\sqrt{c}}{\sqrt{b-\sqrt{-4 a c+b^2}}}\right)\sqrt{c}\left(1+\frac{b}{\sqrt{-4 a c+b^2}}\right)\sqrt{2}}{2 a e \sqrt{b-\sqrt{-4 a c+b^2}}}-\frac{\arctan\left(\frac{(ex+d)\sqrt{2}\sqrt{c}}{\sqrt{b+\sqrt{-4 a c+b^2}}}\right)\sqrt{c}\left(1-\frac{b}{\sqrt{-4 a c+b^2}}\right)\sqrt{2}}{2 a e \sqrt{b+\sqrt{-4 a c+b^2}}}$$

Result(type 7, 167 leaves):

$$\frac{\sum_{\_R=RootOf(c e^4 \_Z^4+4 c d e^3 \_Z^3+(6 c d^2 e^2+b e^2) \_Z^2+(4 c d^3 e+2 b d e) \_Z+c d^4+b d^2+a)} \frac{(-\_R^2 c e^2-2 \_R c d e-c d^2-b) \ln(x-\_R)}{2 c e^3 \_R^3+6 c d e^2 \_R^2+6 c d^2 e \_R+2 c d^3+b e \_R+b d}}{2 a e}-\frac{1}{a e(ex+d)}$$

Problem 167: Result is not expressed in closed-form.

$$\int \frac{(ex+d)^4}{\left(a+b(ex+d)^2+c(ex+d)^4\right)^2}\, dx$$

Optimal(type 3, 227 leaves, 5 steps):

$$\frac{(ex+d)\left(2a+b(ex+d)^2\right)}{2\left(-4ac+b^2\right)e\left(a+b(ex+d)^2+c(ex+d)^4\right)}+\frac{\arctan\left(\frac{(ex+d)\sqrt{2}\sqrt{c}}{\sqrt{b-\sqrt{-4ac+b^2}}}\right)\left(b+\frac{-4ac-b^2}{\sqrt{-4ac+b^2}}\right)\sqrt{2}}{4\left(-4ac+b^2\right)e\sqrt{c}\sqrt{b-\sqrt{-4ac+b^2}}}$$
$$+\frac{\arctan\left(\frac{(ex+d)\sqrt{2}\sqrt{c}}{\sqrt{b+\sqrt{-4ac+b^2}}}\right)\left(b^2+4ac+b\sqrt{-4ac+b^2}\right)\sqrt{2}}{4\left(-4ac+b^2\right)^{3/2}e\sqrt{c}\sqrt{b+\sqrt{-4ac+b^2}}}$$

Result(type 7, 322 leaves):

$$\frac{-\frac{b e^2 x^3}{2(4ac-b^2)}-\frac{3dbex^2}{2(4ac-b^2)}-\frac{(3bd^2+2a)x}{2(4ac-b^2)}-\frac{d(bd^2+2a)}{2e(4ac-b^2)}}{ce^4x^4+4cde^3x^3+6cd^2e^2x^2+4cd^3ex+be^2x^2+cd^4+2bdex+bd^2+a}+\frac{1}{4e}\Bigg($$
$$\sum_{\_R=RootOf(ce^4\_Z^4+4cde^3\_Z^3+(6cd^2e^2+be^2)\_Z^2+(4cd^3e+2bde)\_Z+cd^4+bd^2+a)}\frac{(-\_R^2be^2-2\_Rbde-bd^2+2a)\ln(x-\_R)}{(4ac-b^2)(2ce^3\_R^3+6cde^2\_R^2+6cd^2e\_R+2cd^3+be\_R+bd)}\Bigg)$$

Problem 168: Result is not expressed in closed-form.

$$\int\frac{(ex+d)^3}{\left(a+b(ex+d)^2+c(ex+d)^4\right)^2}\,dx$$

Optimal(type 3, 91 leaves, 5 steps):

$$\frac{2a+b(ex+d)^2}{2\left(-4ac+b^2\right)e\left(a+b(ex+d)^2+c(ex+d)^4\right)}-\frac{b\,\operatorname{arctanh}\left(\frac{b+2c(ex+d)^2}{\sqrt{-4ac+b^2}}\right)}{\left(-4ac+b^2\right)^{3/2}e}$$

Result(type 7, 275 leaves):

$$\frac{-\frac{bex^2}{2(4ac-b^2)}-\frac{bdx}{4ac-b^2}-\frac{bd^2+2a}{2e(4ac-b^2)}}{ce^4x^4+4cde^3x^3+6cd^2e^2x^2+4cd^3ex+be^2x^2+cd^4+2bdex+bd^2+a}+\frac{1}{2e}\Bigg(b\Bigg($$
$$\sum_{\_R=RootOf(ce^4\_Z^4+4cde^3\_Z^3+(6cd^2e^2+be^2)\_Z^2+(4cd^3e+2bde)\_Z+cd^4+bd^2+a)}$$

$$\frac{(-e\_R-d)\ln(x-\_R)}{(4ac-b^2)\left(2ce^3\_R^3+6cde^2\_R^2+6cd^2e\_R+2cd^3+be\_R+bd\right)}\Bigg)\Bigg)$$

Problem 169: Result is not expressed in closed-form.

$$\int \frac{(ex+d)^2}{\left(a+b(ex+d)^2+c(ex+d)^4\right)^2}\,dx$$

Optimal(type 3, 213 leaves, 5 steps):

$$-\frac{(ex+d)\left(b+2c(ex+d)^2\right)}{2\left(-4ac+b^2\right)e\left(a+b(ex+d)^2+c(ex+d)^4\right)}+\frac{\arctan\left(\frac{(ex+d)\sqrt{2}\sqrt{c}}{\sqrt{b-\sqrt{-4ac+b^2}}}\right)\sqrt{c}\left(2b-\sqrt{-4ac+b^2}\right)\sqrt{2}}{2\left(-4ac+b^2\right)^{3/2}e\sqrt{b-\sqrt{-4ac+b^2}}}$$
$$-\frac{\arctan\left(\frac{(ex+d)\sqrt{2}\sqrt{c}}{\sqrt{b+\sqrt{-4ac+b^2}}}\right)\sqrt{c}\left(2b+\sqrt{-4ac+b^2}\right)\sqrt{2}}{2\left(-4ac+b^2\right)^{3/2}e\sqrt{b+\sqrt{-4ac+b^2}}}$$

Result(type 7, 318 leaves):

$$\frac{\frac{ce^2x^3}{4ac-b^2}+\frac{3dcex^2}{4ac-b^2}+\frac{(6cd^2+b)x}{2(4ac-b^2)}+\frac{d(2cd^2+b)}{2e(4ac-b^2)}}{ce^4x^4+4cde^3x^3+6cd^2e^2x^2+4cd^3ex+be^2x^2+cd^4+2bdex+bd^2+a}$$
$$+\frac{1}{4e}\Bigg(\sum_{\_R=RootOf(ce^4\_Z^4+4cde^3\_Z^3+(6cd^2e^2+be^2)\_Z^2+(4cd^3e+2bde)\_Z+cd^4+bd^2+a)}\frac{(2\_R^2ce^2+4\_Rcde+2cd^2-b)\ln(x-\_R)}{(4ac-b^2)\left(2ce^3\_R^3+6cde^2\_R^2+6cd^2e\_R+2cd^3+be\_R+bd\right)}\Bigg)$$

Problem 170: Result is not expressed in closed-form.

$$\int \frac{ex+d}{\left(a+b(ex+d)^2+c(ex+d)^4\right)^2}\,dx$$

Optimal(type 3, 92 leaves, 5 steps):

$$\frac{-b-2c(ex+d)^2}{2\left(-4ac+b^2\right)e\left(a+b(ex+d)^2+c(ex+d)^4\right)}+\frac{2c\,\mathrm{arctanh}\left(\frac{b+2c(ex+d)^2}{\sqrt{-4ac+b^2}}\right)}{\left(-4ac+b^2\right)^{3/2}e}$$

Result(type 7, 269 leaves):

$$\frac{\frac{c e x^2}{4 a c-b^2}+\frac{2 c d x}{4 a c-b^2}+\frac{2 c d^2+b}{2 e\left(4 a c-b^2\right)}}{c e^4 x^4+4 c d e^3 x^3+6 c d^2 e^2 x^2+4 c d^3 e x+b e^2 x^2+c d^4+2 b d e x+b d^2+a}+\frac{1}{e}\left(c\left(\sum_{\_R=RootOf\left(c e^4 \_Z^4+4 c d e^3 \_Z^3+\left(6 c d^2 e^2+b e^2\right) \_Z^2+\left(4 c d^3 e+2 b d e\right) \_Z+c d^4+b d^2+a\right)} \frac{\left(e \_R+d\right) \ln\left(x-\_R\right)}{\left(4 a c-b^2\right)\left(2 c e^3 \_R^3+6 c d e^2 \_R^2+6 c d^2 e \_R+2 c d^3+b e \_R+b d\right)}\right)\right)$$

Problem 171: Result is not expressed in closed-form.

$$\int \frac{(e x+d)^2}{\left(a+b(e x+d)^2+c(e x+d)^4\right)^3} \, dx$$

Optimal(type 3, 319 leaves, 6 steps):

$$-\frac{(e x+d)\left(b+2 c(e x+d)^2\right)}{4\left(-4 a c+b^2\right) e\left(a+b(e x+d)^2+c(e x+d)^4\right)^2}+\frac{(e x+d)\left(b\left(8 a c+b^2\right)+c\left(20 a c+b^2\right)(e x+d)^2\right)}{8 a\left(-4 a c+b^2\right)^2 e\left(a+b(e x+d)^2+c(e x+d)^4\right)}$$
$$+\frac{\arctan\left(\frac{(e x+d)\sqrt{2}\sqrt{c}}{\sqrt{b-\sqrt{-4 a c+b^2}}}\right)\sqrt{c}\left(b^2+20 a c+\frac{b\left(-52 a c+b^2\right)}{\sqrt{-4 a c+b^2}}\right)\sqrt{2}}{16 a\left(-4 a c+b^2\right)^2 e\sqrt{b-\sqrt{-4 a c+b^2}}}$$
$$+\frac{\arctan\left(\frac{(e x+d)\sqrt{2}\sqrt{c}}{\sqrt{b+\sqrt{-4 a c+b^2}}}\right)\sqrt{c}\left(b^2+20 a c-\frac{b\left(-52 a c+b^2\right)}{\sqrt{-4 a c+b^2}}\right)\sqrt{2}}{16 a\left(-4 a c+b^2\right)^2 e\sqrt{b+\sqrt{-4 a c+b^2}}}$$

Result(type 7, 884 leaves):

$$\left(\frac{c^2 e^6\left(20 a c+b^2\right) x^7}{8\left(16 a^2 c^2-8 a b^2 c+b^4\right) a}+\frac{7 c^2 d e^5\left(20 a c+b^2\right) x^6}{8\left(16 a^2 c^2-8 a b^2 c+b^4\right) a}+\frac{\left(420 a c^2 d^2+21 b^2 c d^2+28 a b c+2 b^3\right) c e^4 x^5}{8\left(16 a^2 c^2-8 a b^2 c+b^4\right) a}\right.$$
$$+\frac{5 c d e^3\left(140 a c^2 d^2+7 b^2 c d^2+28 a b c+2 b^3\right) x^4}{8\left(16 a^2 c^2-8 a b^2 c+b^4\right) a}+\frac{e^2\left(700 a c^3 d^4+35 b^2 c^2 d^4+280 a b c^2 d^2+20 b^3 c d^2+36 a^2 c^2+5 a b^2 c+b^4\right) x^3}{8\left(16 a^2 c^2-8 a b^2 c+b^4\right) a}$$
$$+\frac{d e\left(420 a c^3 d^4+21 b^2 c^2 d^4+280 a b c^2 d^2+20 b^3 c d^2+108 a^2 c^2+15 a b^2 c+3 b^4\right) x^2}{8\left(16 a^2 c^2-8 a b^2 c+b^4\right) a}$$
$$+\frac{\left(140 a c^3 d^6+7 b^2 c^2 d^6+140 a b c^2 d^4+10 b^3 c d^4+108 a^2 c^2 d^2+15 a b^2 c d^2+3 b^4 d^2+16 a^2 b c-a b^3\right) x}{8\left(16 a^2 c^2-8 a b^2 c+b^4\right) a}$$
$$\left.+\frac{d\left(20 a c^3 d^6+b^2 c^2 d^6+28 a b c^2 d^4+2 b^3 c d^4+36 a^2 c^2 d^2+5 a b^2 c d^2+b^4 d^2+16 a^2 b c-a b^3\right)}{8 e\left(16 a^2 c^2-8 a b^2 c+b^4\right) a}\right) \Big/ \left(c e^4 x^4+4 c d e^3 x^3+6 c d^2 e^2 x^2\right.$$

$$+4 c d^3 e x+b e^2 x^2+c d^4+2 b d e x+b d^2+a)^2+\frac{1}{16 a e}\left(\sum_{\_R=RootOf(c e^4 \_Z^4+4 c d e^3 \_Z^3+(6 c d^2 e^2+b e^2) \_Z^2+(4 c d^3 e+2 b d e) \_Z+c d^4+b d^2+a)} \frac{(c e^2(20 a c+b^2) \_R^2+2 c d e(20 a c+b^2) \_R+20 a c^2 d^2+b^2 c d^2-16 a b c+b^3) \ln(x-\_R)}{(16 a^2 c^2-8 a b^2 c+b^4)(2 c e^3 \_R^3+6 c d e^2 \_R^2+6 c d^2 e \_R+2 c d^3+b e \_R+b d)}\right)$$

Problem 172: Result is not expressed in closed-form.

$$\int \frac{(e f x+d f)^3}{a+b(e x+d)^2+c(e x+d)^4}\, dx$$

Optimal(type 3, 79 leaves, 6 steps):

$$\frac{f^3 \ln(a+b(e x+d)^2+c(e x+d)^4)}{4 c e}+\frac{b f^3 \operatorname{arctanh}\left(\frac{b+2 c(e x+d)^2}{\sqrt{-4 a c+b^2}}\right)}{2 c e \sqrt{-4 a c+b^2}}$$

Result(type 7, 153 leaves):

$$\frac{f^3\left(\sum_{\_R=RootOf(c e^4 \_Z^4+4 c d e^3 \_Z^3+(6 c d^2 e^2+b e^2) \_Z^2+(4 c d^3 e+2 b d e) \_Z+c d^4+b d^2+a)} \frac{(\_R^3 e^3+3 \_R^2 d e^2+3 \_R d^2 e+d^3) \ln(x-\_R)}{2 c e^3 \_R^3+6 c d e^2 \_R^2+6 c d^2 e \_R+2 c d^3+b e \_R+b d}\right)}{2 e}$$

Problem 173: Result is not expressed in closed-form.

$$\int \frac{1}{(e f x+d f)^2(a+b(e x+d)^2+c(e x+d)^4)}\, dx$$

Optimal(type 3, 168 leaves, 5 steps):

$$-\frac{1}{a e f^2(e x+d)}-\frac{\arctan\left(\frac{(e x+d)\sqrt{2}\sqrt{c}}{\sqrt{b-\sqrt{-4 a c+b^2}}}\right)\sqrt{c}\left(1+\frac{b}{\sqrt{-4 a c+b^2}}\right)\sqrt{2}}{2 a e f^2\sqrt{b-\sqrt{-4 a c+b^2}}}-\frac{\arctan\left(\frac{(e x+d)\sqrt{2}\sqrt{c}}{\sqrt{b+\sqrt{-4 a c+b^2}}}\right)\sqrt{c}\left(1-\frac{b}{\sqrt{-4 a c+b^2}}\right)\sqrt{2}}{2 a e f^2\sqrt{b+\sqrt{-4 a c+b^2}}}$$

Result(type 7, 173 leaves):

$$\frac{\sum_{\_R=RootOf(c e^4 \_Z^4+4 c d e^3 \_Z^3+(6 c d^2 e^2+b e^2) \_Z^2+(4 c d^3 e+2 b d e) \_Z+c d^4+b d^2+a)} \frac{(-\_R^2 c e^2-2 \_R c d e-c d^2-b) \ln(x-\_R)}{2 c e^3 \_R^3+6 c d e^2 \_R^2+6 c d^2 e \_R+2 c d^3+b e \_R+b d}}{2 f^2 a e}$$

$$-\frac{1}{a e f^2(e x+d)}$$

Problem 174: Result is not expressed in closed-form.

$$\int \frac{1}{(efx+df)^2\left(a+b\,(ex+d)^2+c\,(ex+d)^4\right)^2}\,dx$$

Optimal(type 3, 312 leaves, 6 steps):

$$\frac{10\,a\,c-3\,b^2}{2\,a^2\left(-4\,a\,c+b^2\right)ef^2\,(ex+d)}+\frac{b^2-2\,a\,c+b\,c\,(ex+d)^2}{2\,a\left(-4\,a\,c+b^2\right)ef^2\,(ex+d)\left(a+b\,(ex+d)^2+c\,(ex+d)^4\right)}$$
$$-\frac{\arctan\left(\frac{(ex+d)\sqrt{2}\,\sqrt{c}}{\sqrt{b-\sqrt{-4\,a\,c+b^2}}}\right)\sqrt{c}\left(3\,b^3-16\,a\,b\,c+\left(-10\,a\,c+3\,b^2\right)\sqrt{-4\,a\,c+b^2}\right)\sqrt{2}}{4\,a^2\left(-4\,a\,c+b^2\right)^{3/2}ef^2\sqrt{b-\sqrt{-4\,a\,c+b^2}}}$$
$$+\frac{\arctan\left(\frac{(ex+d)\sqrt{2}\,\sqrt{c}}{\sqrt{b+\sqrt{-4\,a\,c+b^2}}}\right)\sqrt{c}\left(3\,b^3-16\,a\,b\,c-\left(-10\,a\,c+3\,b^2\right)\sqrt{-4\,a\,c+b^2}\right)\sqrt{2}}{4\,a^2\left(-4\,a\,c+b^2\right)^{3/2}ef^2\sqrt{b+\sqrt{-4\,a\,c+b^2}}}$$

Result(type 7, 1345 leaves):

$$-\frac{c^2e^2x^3}{f^2a\left(ce^4x^4+4cde^3x^3+6cd^2e^2x^2+4cd^3ex+be^2x^2+cd^4+2bdex+bd^2+a\right)\left(4ac-b^2\right)}$$
$$+\frac{ce^2x^3b^2}{2f^2a^2\left(ce^4x^4+4cde^3x^3+6cd^2e^2x^2+4cd^3ex+be^2x^2+cd^4+2bdex+bd^2+a\right)\left(4ac-b^2\right)}$$
$$-\frac{3dc^2ex^2}{f^2a\left(ce^4x^4+4cde^3x^3+6cd^2e^2x^2+4cd^3ex+be^2x^2+cd^4+2bdex+bd^2+a\right)\left(4ac-b^2\right)}$$
$$+\frac{3dcex^2b^2}{2f^2a^2\left(ce^4x^4+4cde^3x^3+6cd^2e^2x^2+4cd^3ex+be^2x^2+cd^4+2bdex+bd^2+a\right)\left(4ac-b^2\right)}$$
$$-\frac{3xc^2d^2}{f^2a\left(ce^4x^4+4cde^3x^3+6cd^2e^2x^2+4cd^3ex+be^2x^2+cd^4+2bdex+bd^2+a\right)\left(4ac-b^2\right)}$$
$$+\frac{3xb^2cd^2}{2f^2a^2\left(ce^4x^4+4cde^3x^3+6cd^2e^2x^2+4cd^3ex+be^2x^2+cd^4+2bdex+bd^2+a\right)\left(4ac-b^2\right)}$$
$$-\frac{3xbc}{2f^2a\left(ce^4x^4+4cde^3x^3+6cd^2e^2x^2+4cd^3ex+be^2x^2+cd^4+2bdex+bd^2+a\right)\left(4ac-b^2\right)}$$
$$+\frac{xb^3}{2f^2a^2\left(ce^4x^4+4cde^3x^3+6cd^2e^2x^2+4cd^3ex+be^2x^2+cd^4+2bdex+bd^2+a\right)\left(4ac-b^2\right)}$$
$$-\frac{d^3c^2}{f^2a\left(ce^4x^4+4cde^3x^3+6cd^2e^2x^2+4cd^3ex+be^2x^2+cd^4+2bdex+bd^2+a\right)e\left(4ac-b^2\right)}$$
$$+\frac{d^3b^2c}{2f^2a^2\left(ce^4x^4+4cde^3x^3+6cd^2e^2x^2+4cd^3ex+be^2x^2+cd^4+2bdex+bd^2+a\right)e\left(4ac-b^2\right)}$$

$$-\frac{3 d b c}{2 f^2 a \left(c e^4 x^4+4 c d e^3 x^3+6 c d^2 e^2 x^2+4 c d^3 e x+b e^2 x^2+c d^4+2 b d e x+b d^2+a\right) e \left(4 a c-b^2\right)}$$
$$+\frac{d b^3}{2 f^2 a^2 \left(c e^4 x^4+4 c d e^3 x^3+6 c d^2 e^2 x^2+4 c d^3 e x+b e^2 x^2+c d^4+2 b d e x+b d^2+a\right) e \left(4 a c-b^2\right)}-\frac{1}{4 f^2 a^2 e}\Bigg($$
$$\sum_{\_R=RootOf\left(c e^4\,\_Z^4+4 c d e^3\,\_Z^3+\left(6 c d^2 e^2+b e^2\right)\_Z^2+\left(4 c d^3 e+2 b d e\right)\_Z+c d^4+b d^2+a\right)} \frac{\left(c e^2 \left(10 a c-3 b^2\right)\_R^2+2 c d e \left(10 a c-3 b^2\right)\_R+10 a c^2 d^2-3 b^2 c d^2+13 a b c-3 b^3\right)\ln(x-\_R)}{\left(4 a c-b^2\right)\left(2 c e^3\,\_R^3+6 c d e^2\,\_R^2+6 c d^2 e\,\_R+2 c d^3+b e\,\_R+b d\right)}\Bigg)-\frac{1}{f^2 a^2 e (e x+d)}$$

Problem 175: Result is not expressed in closed-form.

$$\int \frac{(e f x+d f)^2}{\left(a+b (e x+d)^2+c (e x+d)^4\right)^3}\, dx$$

Optimal(type 3, 331 leaves, 6 steps):

$$-\frac{f^2 (e x+d)\left(b+2 c (e x+d)^2\right)}{4\left(-4 a c+b^2\right) e\left(a+b (e x+d)^2+c (e x+d)^4\right)^2}+\frac{f^2 (e x+d)\left(b\left(8 a c+b^2\right)+c\left(20 a c+b^2\right)(e x+d)^2\right)}{8 a\left(-4 a c+b^2\right)^2 e\left(a+b (e x+d)^2+c (e x+d)^4\right)}$$
$$+\frac{f^2 \arctan\left(\frac{(e x+d)\sqrt{2}\sqrt{c}}{\sqrt{b-\sqrt{-4 a c+b^2}}}\right)\sqrt{c}\left(b^2+20 a c+\frac{b\left(-52 a c+b^2\right)}{\sqrt{-4 a c+b^2}}\right)\sqrt{2}}{16 a\left(-4 a c+b^2\right)^2 e\sqrt{b-\sqrt{-4 a c+b^2}}}$$
$$+\frac{f^2 \arctan\left(\frac{(e x+d)\sqrt{2}\sqrt{c}}{\sqrt{b+\sqrt{-4 a c+b^2}}}\right)\sqrt{c}\left(b^2+20 a c-\frac{b\left(-52 a c+b^2\right)}{\sqrt{-4 a c+b^2}}\right)\sqrt{2}}{16 a\left(-4 a c+b^2\right)^2 e\sqrt{b+\sqrt{-4 a c+b^2}}}$$

Result(type ?, 4750 leaves): Display of huge result suppressed!

Problem 176: Result is not expressed in closed-form.

$$\int \frac{e f x+d f}{\left(a+b (e x+d)^2+c (e x+d)^4\right)^3}\, dx$$

Optimal(type 3, 145 leaves, 6 steps):

$$-\frac{f\left(b+2 c (e x+d)^2\right)}{4\left(-4 a c+b^2\right) e\left(a+b (e x+d)^2+c (e x+d)^4\right)^2}+\frac{3 c f\left(b+2 c (e x+d)^2\right)}{2\left(-4 a c+b^2\right)^2 e\left(a+b (e x+d)^2+c (e x+d)^4\right)}-\frac{6 c^2 f \operatorname{arctanh}\left(\frac{b+2 c (e x+d)^2}{\sqrt{-4 a c+b^2}}\right)}{\left(-4 a c+b^2\right)^{5/2} e}$$

Result(type ?, 2131 leaves): Display of huge result suppressed!

Problem 177: Unable to integrate problem.

$$\int \frac{x^2}{\sqrt{a+b\,(e x+d)^3+c\,(e x+d)^6}}\,\mathrm{d}x$$

```
Optimal(type 6, 344 leaves, 10 steps):
```

$$\frac{\operatorname{arctanh}\left(\frac{b+2\,c\,(e x+d)^3}{2\sqrt{c}\,\sqrt{a+b\,(e x+d)^3+c\,(e x+d)^6}}\right)}{3\,e^3\sqrt{c}}$$

$$+\frac{d^2\,(e x+d)\,\mathit{AppellF1}\left(\frac{1}{3},\frac{1}{2},\frac{1}{2},\frac{4}{3},-\frac{2\,c\,(e x+d)^3}{b-\sqrt{-4\,a\,c+b^2}},-\frac{2\,c\,(e x+d)^3}{b+\sqrt{-4\,a\,c+b^2}}\right)\sqrt{1+\frac{2\,c\,(e x+d)^3}{b-\sqrt{-4\,a\,c+b^2}}}\,\sqrt{1+\frac{2\,c\,(e x+d)^3}{b+\sqrt{-4\,a\,c+b^2}}}}{e^3\sqrt{a+b\,(e x+d)^3+c\,(e x+d)^6}}$$

$$-\frac{d\,(e x+d)^2\,\mathit{AppellF1}\left(\frac{2}{3},\frac{1}{2},\frac{1}{2},\frac{5}{3},-\frac{2\,c\,(e x+d)^3}{b-\sqrt{-4\,a\,c+b^2}},-\frac{2\,c\,(e x+d)^3}{b+\sqrt{-4\,a\,c+b^2}}\right)\sqrt{1+\frac{2\,c\,(e x+d)^3}{b-\sqrt{-4\,a\,c+b^2}}}\,\sqrt{1+\frac{2\,c\,(e x+d)^3}{b+\sqrt{-4\,a\,c+b^2}}}}{e^3\sqrt{a+b\,(e x+d)^3+c\,(e x+d)^6}}$$

```
Result(type 8, 28 leaves):
```

$$\int \frac{x^2}{\sqrt{a+b\,(e x+d)^3+c\,(e x+d)^6}}\,\mathrm{d}x$$

```
Problem 178: Result more than twice size of optimal antiderivative.
```

$$\int (2+3\,x)^6\left(1+(2+3\,x)^7+(2+3\,x)^{14}\right)\mathrm{d}x$$

```
Optimal(type 1, 28 leaves, 3 steps):
```

$$\frac{(2+3\,x)^7}{21}+\frac{(2+3\,x)^{14}}{42}+\frac{(2+3\,x)^{21}}{63}$$

```
Result(type 1, 104 leaves):
```

$$\frac{1162261467}{7}\,x^{21}+2324522934\,x^{20}+15496819560\,x^{19}+65431015920\,x^{18}+196293047760\,x^{17}+444930908256\,x^{16}+790988281344\,x^{15}+\frac{15819767221203}{14}\,x^{14}$$
$$+1318314865122\,x^{13}+1269491970942\,x^{12}+1015602174288\,x^{11}+677082445416\,x^{10}+376174427616\,x^9+173635132896\,x^8+66158154783\,x^7$$
$$+20588764518\,x^6+5149786572\,x^5+1010576952\,x^4+149902032\,x^3+15808800\,x^2+1056832\,x$$

```
Problem 179: Result more than twice size of optimal antiderivative.
```

$$\int (2+3\,x)^6\left(1+(2+3\,x)^7+(2+3\,x)^{14}\right)^2\mathrm{d}x$$

```
Optimal(type 1, 46 leaves, 4 steps):
```

$$\frac{(2+3\,x)^7}{21}+\frac{(2+3\,x)^{14}}{21}+\frac{(2+3\,x)^{21}}{21}+\frac{(2+3\,x)^{28}}{42}+\frac{(2+3\,x)^{35}}{105}$$

Result(type 1, 174 leaves):

$$17451466816\,x + 7299544818384\,x^3 + 6077684727888102\,x^6 + 197897276851452864\,x^8 + \frac{4057390785756924}{5}\,x^5 + 443569828128\,x^2 + 87406679578680\,x^4 + 37727143432895007\,x^7 + 889942562270387136\,x^9 + 872775774067455498528\,x^{16} + \frac{17344958593049772048}{5}\,x^{10} + 465517091041681015296\,x^{15} + 221699757548270194389\,x^{14} + 94069263918929616324\,x^{13} + 3534290697929473864098\,x^{20} + 2945285062308448290360\,x^{19} + 2194577166014752240080\,x^{18} + 1463104032160519033200\,x^{17} + \frac{26506949038858918036881}{7}\,x^{21} + 11821487501620716192\,x^{11} + 35454069480572048124\,x^{12} + 11118121133111046\,x^{34} + 126005372841925188\,x^{33} + 924039400840784712\,x^{32} + 4928210137817518464\,x^{31} + \frac{101849676181562048256}{5}\,x^{30} + 67899784121041365504\,x^{29} + \frac{2625458326972530284475}{14}\,x^{28} + 437576396725285446564\,x^{27} + 875152864622814086340\,x^{26} + \frac{7584660010542711771792}{5}\,x^{25} + 2298383223254096766840\,x^{24} + 3064515076512846852480\,x^{23} + 3614565944605222108800\,x^{22} + \frac{16677181699666569}{35}\,x^{35}$$

Test results for the 27 problems in "1.2.3.3 (d+e x^n)^q (a+b x^n+c x^(2 n))^p.txt"

Problem 2: Result is not expressed in closed-form.

$$\int \frac{e x^4 + d}{c x^8 + a}\, dx$$

Optimal(type 3, 518 leaves, 19 steps):

$$-\frac{\arctan\left(\frac{-2 c^{1/8} x + a^{1/8}\sqrt{2-\sqrt{2}}}{a^{1/8}\sqrt{2+\sqrt{2}}}\right)\left(-e\sqrt{a} + d\left(1+\sqrt{2}\right)\sqrt{c}\right)\sqrt{2-\sqrt{2}}}{8 a^{7/8} c^{5/8}} + \frac{\arctan\left(\frac{2 c^{1/8} x + a^{1/8}\sqrt{2-\sqrt{2}}}{a^{1/8}\sqrt{2+\sqrt{2}}}\right)\left(-e\sqrt{a} + d\left(1+\sqrt{2}\right)\sqrt{c}\right)\sqrt{2-\sqrt{2}}}{8 a^{7/8} c^{5/8}} + \frac{\ln\left(a^{1/4} + c^{1/4} x^2 - c^{1/8} a^{1/8}\sqrt{2-\sqrt{2}}\, x\right)\left(-e\sqrt{a} + d\left(1-\sqrt{2}\right)\sqrt{c}\right)}{8 a^{7/8} c^{5/8}\sqrt{4-2\sqrt{2}}} - \frac{\ln\left(a^{1/4} + c^{1/4} x^2 + c^{1/8} a^{1/8}\sqrt{2-\sqrt{2}}\, x\right)\left(-e\sqrt{a} + d\left(1-\sqrt{2}\right)\sqrt{c}\right)}{8 a^{7/8} c^{5/8}\sqrt{4-2\sqrt{2}}}$$

$$+\frac{\arctan\left(\frac{-2 c^{1/8} x+a^{1/8}\sqrt{2+\sqrt{2}}}{a^{1/8}\sqrt{2-\sqrt{2}}}\right)\left(-e\sqrt{a}+d\left(1-\sqrt{2}\right)\sqrt{c}\right)\sqrt{2+\sqrt{2}}}{8 a^{7/8} c^{5/8}}$$

$$-\frac{\arctan\left(\frac{2 c^{1/8} x+a^{1/8}\sqrt{2+\sqrt{2}}}{a^{1/8}\sqrt{2-\sqrt{2}}}\right)\left(-e\sqrt{a}+d\left(1-\sqrt{2}\right)\sqrt{c}\right)\sqrt{2+\sqrt{2}}}{8 a^{7/8} c^{5/8}}$$

$$+\frac{\ln\left(a^{1/4}+c^{1/4}x^2+c^{1/8}a^{1/8}\sqrt{2+\sqrt{2}}\,x\right)\left(d+d\sqrt{2}-\frac{e\sqrt{a}}{\sqrt{c}}\right)}{8 a^{7/8} c^{1/8}\sqrt{4+2\sqrt{2}}}-\frac{\ln\left(a^{1/4}+c^{1/4}x^2-c^{1/8}a^{1/8}\sqrt{2+\sqrt{2}}\,x\right)\left(-e\sqrt{a}+d\left(1+\sqrt{2}\right)\sqrt{c}\right)}{8 a^{7/8} c^{5/8}\sqrt{4+2\sqrt{2}}}$$

Result(type 7, 33 leaves):

$$\frac{\sum_{\_R=RootOf(c\,\_Z^8+a)}\frac{\left(\_R^4 e+d\right)\ln(x-\_R)}{\_R^7}}{8 c}$$

Problem 3: Result is not expressed in closed-form.

$$\int\frac{e x^4+d}{e^2 x^8-x^4 b+d^2}\,dx$$

Optimal(type 3, 261 leaves, 7 steps):

$$-\frac{\arctan\left(\frac{x\sqrt{2}\sqrt{e}}{\sqrt{\sqrt{-2 d e+b}-\sqrt{2 d e+b}}}\right)\sqrt{e}\sqrt{2}}{2\sqrt{-2 d e+b}\sqrt{\sqrt{-2 d e+b}-\sqrt{2 d e+b}}}-\frac{\operatorname{arctanh}\left(\frac{x\sqrt{2}\sqrt{e}}{\sqrt{\sqrt{-2 d e+b}-\sqrt{2 d e+b}}}\right)\sqrt{e}\sqrt{2}}{2\sqrt{-2 d e+b}\sqrt{\sqrt{-2 d e+b}-\sqrt{2 d e+b}}}-\frac{\arctan\left(\frac{x\sqrt{2}\sqrt{e}}{\sqrt{\sqrt{-2 d e+b}+\sqrt{2 d e+b}}}\right)\sqrt{e}\sqrt{2}}{2\sqrt{-2 d e+b}\sqrt{\sqrt{-2 d e+b}+\sqrt{2 d e+b}}}$$

$$-\frac{\operatorname{arctanh}\left(\frac{x\sqrt{2}\sqrt{e}}{\sqrt{\sqrt{-2 d e+b}+\sqrt{2 d e+b}}}\right)\sqrt{e}\sqrt{2}}{2\sqrt{-2 d e+b}\sqrt{\sqrt{-2 d e+b}+\sqrt{2 d e+b}}}$$

Result(type 7, 54 leaves):

$$\frac{\left(\sum_{\_R=RootOf(e^2\,\_Z^8-b\,\_Z^4+d^2)}\frac{\left(\_R^4 e+d\right)\ln(x-\_R)}{2\,\_R^7 e^2-\_R^3 b}\right)}{4}$$

Problem 4: Result is not expressed in closed-form.

$$\int \frac{x^4+1}{x^8+3x^4+1}\,dx$$

Optimal(type 3, 293 leaves, 19 steps):

$$\frac{\arctan\left(-1+\frac{2^{3/4}x}{(3+\sqrt{5})^{1/4}}\right)(3-\sqrt{5})^{1/4}2^{1/4}\sqrt{5}}{20}+\frac{\arctan\left(1+\frac{2^{3/4}x}{(3+\sqrt{5})^{1/4}}\right)(3-\sqrt{5})^{1/4}2^{1/4}\sqrt{5}}{20}$$
$$-\frac{\ln\left(2x^2-2\,2^{1/4}x(3+\sqrt{5})^{1/4}+\sqrt{5}+1\right)(3-\sqrt{5})^{1/4}2^{1/4}\sqrt{5}}{40}+\frac{\ln\left(2x^2+2\,2^{1/4}x(3+\sqrt{5})^{1/4}+\sqrt{5}+1\right)(3-\sqrt{5})^{1/4}2^{1/4}\sqrt{5}}{40}$$
$$+\frac{\arctan\left(-1+\frac{2^{3/4}x}{(3-\sqrt{5})^{1/4}}\right)(3+\sqrt{5})^{1/4}2^{1/4}\sqrt{5}}{20}+\frac{\arctan\left(1+\frac{2^{3/4}x}{(3-\sqrt{5})^{1/4}}\right)(3+\sqrt{5})^{1/4}2^{1/4}\sqrt{5}}{20}$$
$$-\frac{\ln\left(2x^2-2\,2^{1/4}x(3-\sqrt{5})^{1/4}+\sqrt{5}-1\right)(3+\sqrt{5})^{1/4}2^{1/4}\sqrt{5}}{40}+\frac{\ln\left(2x^2+2\,2^{1/4}x(3-\sqrt{5})^{1/4}+\sqrt{5}-1\right)(3+\sqrt{5})^{1/4}2^{1/4}\sqrt{5}}{40}$$

Result(type 7, 41 leaves):

$$\frac{\left(\sum_{\_R=RootOf(\_Z^8+3\_Z^4+1)}\frac{(\_R^4+1)\ln(x-\_R)}{2\_R^7+3\_R^3}\right)}{4}$$

Problem 7: Result is not expressed in closed-form.

$$\int \frac{x^4+1}{x^8-4x^4+1}\,dx$$

Optimal(type 3, 101 leaves, 7 steps):

$$\frac{\arctan\left(\frac{2^{1/4}x}{\sqrt{\sqrt{3}-1}}\right)2^{3/4}}{4\sqrt{\sqrt{3}-1}}+\frac{\operatorname{arctanh}\left(\frac{2^{1/4}x}{\sqrt{\sqrt{3}-1}}\right)2^{3/4}}{4\sqrt{\sqrt{3}-1}}-\frac{\arctan\left(\frac{2^{1/4}x}{\sqrt{1+\sqrt{3}}}\right)2^{3/4}}{4\sqrt{1+\sqrt{3}}}-\frac{\operatorname{arctanh}\left(\frac{2^{1/4}x}{\sqrt{1+\sqrt{3}}}\right)2^{3/4}}{4\sqrt{1+\sqrt{3}}}$$

Result(type 7, 39 leaves):

$$\frac{\left(\sum_{\_R=RootOf(\_Z^8-4\_Z^4+1)}\frac{(\_R^4+1)\ln(x-\_R)}{\_R^7-2\_R^3}\right)}{8}$$

Problem 8: Result is not expressed in closed-form.

$$\int \frac{x^4+1}{x^8-5x^4+1}\,dx$$

Optimal(type 3, 123 leaves, 7 steps):

$$\frac{\arctan\left(\frac{x\sqrt{2}}{\sqrt{-\sqrt{3}+\sqrt{7}}}\right)}{\sqrt{-6\sqrt{3}+6\sqrt{7}}}+\frac{\operatorname{arctanh}\left(\frac{x\sqrt{2}}{\sqrt{-\sqrt{3}+\sqrt{7}}}\right)}{\sqrt{-6\sqrt{3}+6\sqrt{7}}}-\frac{\arctan\left(\frac{x\sqrt{2}}{\sqrt{\sqrt{3}+\sqrt{7}}}\right)}{\sqrt{6\sqrt{3}+6\sqrt{7}}}-\frac{\operatorname{arctanh}\left(\frac{x\sqrt{2}}{\sqrt{\sqrt{3}+\sqrt{7}}}\right)}{\sqrt{6\sqrt{3}+6\sqrt{7}}}$$

Result(type 7, 41 leaves):

$$\frac{\left(\sum_{\_R=RootOf(\_Z^8-5\_Z^4+1)}\frac{(\_R^4+1)\ln(x-\_R)}{2\_R^7-5\_R^3}\right)}{4}$$

Problem 11: Result is not expressed in closed-form.

$$\int\frac{-x^4+1}{x^8-5x^4+1}\,dx$$

Optimal(type 3, 121 leaves, 7 steps):

$$\frac{\arctan\left(\frac{x\sqrt{2}}{\sqrt{-\sqrt{3}+\sqrt{7}}}\right)}{\sqrt{-14\sqrt{3}+14\sqrt{7}}}+\frac{\operatorname{arctanh}\left(\frac{x\sqrt{2}}{\sqrt{-\sqrt{3}+\sqrt{7}}}\right)}{\sqrt{-14\sqrt{3}+14\sqrt{7}}}+\frac{\arctan\left(\frac{x\sqrt{2}}{\sqrt{\sqrt{3}+\sqrt{7}}}\right)}{\sqrt{14\sqrt{3}+14\sqrt{7}}}+\frac{\operatorname{arctanh}\left(\frac{x\sqrt{2}}{\sqrt{\sqrt{3}+\sqrt{7}}}\right)}{\sqrt{14\sqrt{3}+14\sqrt{7}}}$$

Result(type 7, 43 leaves):

$$\frac{\left(\sum_{\_R=RootOf(\_Z^8-5\_Z^4+1)}\frac{(-\_R^4+1)\ln(x-\_R)}{2\_R^7-5\_R^3}\right)}{4}$$

Problem 13: Result is not expressed in closed-form.

$$\int\frac{d+\frac{e}{x^3}}{c+\frac{a}{x^6}+\frac{b}{x^3}}\,dx$$

Optimal(type 3, 577 leaves, 15 steps):

$$\frac{dx}{c}-\frac{\ln\left(2^{1/3}c^{1/3}x+\left(b-\sqrt{-4ac+b^2}\right)^{1/3}\right)\left(bd-ce+\frac{2dca-b^2d+bce}{\sqrt{-4ac+b^2}}\right)2^{2/3}}{6c^{4/3}\left(b-\sqrt{-4ac+b^2}\right)^{2/3}}$$
$$+\frac{\ln\left(2^{2/3}c^{2/3}x^2-2^{1/3}c^{1/3}x\left(b-\sqrt{-4ac+b^2}\right)^{1/3}+\left(b-\sqrt{-4ac+b^2}\right)^{2/3}\right)\left(bd-ce+\frac{2dca-b^2d+bce}{\sqrt{-4ac+b^2}}\right)2^{2/3}}{12c^{4/3}\left(b-\sqrt{-4ac+b^2}\right)^{2/3}}$$

$$+\frac{\arctan\left(\frac{\left(1-\frac{2\,2^{1/3} c^{1/3} x}{\left(b-\sqrt{-4ac+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\left(bd-ce+\frac{2dca-b^2 d+bce}{\sqrt{-4ac+b^2}}\right)2^{2/3}\sqrt{3}}{6c^{4/3}\left(b-\sqrt{-4ac+b^2}\right)^{2/3}}$$

$$-\frac{\ln\left(2^{1/3} c^{1/3} x+\left(b+\sqrt{-4ac+b^2}\right)^{1/3}\right)\left(bd-ce+\frac{-2dca+b^2 d-bce}{\sqrt{-4ac+b^2}}\right)2^{2/3}}{6c^{4/3}\left(b+\sqrt{-4ac+b^2}\right)^{2/3}}$$

$$+\frac{\ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x\left(b+\sqrt{-4ac+b^2}\right)^{1/3}+\left(b+\sqrt{-4ac+b^2}\right)^{2/3}\right)\left(bd-ce+\frac{-2dca+b^2 d-bce}{\sqrt{-4ac+b^2}}\right)2^{2/3}}{12c^{4/3}\left(b+\sqrt{-4ac+b^2}\right)^{2/3}}$$

$$+\frac{\arctan\left(\frac{\left(1-\frac{2\,2^{1/3} c^{1/3} x}{\left(b+\sqrt{-4ac+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\left(bd-ce+\frac{-2dca+b^2 d-bce}{\sqrt{-4ac+b^2}}\right)2^{2/3}\sqrt{3}}{6c^{4/3}\left(b+\sqrt{-4ac+b^2}\right)^{2/3}}$$

Result(type 7, 66 leaves):

$$\frac{dx}{c}+\frac{\sum_{\_R=RootOf(\_Z^6 c+\_Z^3 b+a)}\frac{\left((-bd+ce)\_R^3-ad\right)\ln(x-\_R)}{2\_R^5 c+\_R^2 b}}{3c}$$

Problem 14: Result is not expressed in closed-form.

$$\int\frac{d+\frac{e}{x^4}}{c+\frac{a}{x^8}+\frac{b}{x^4}}\,dx$$

Optimal(type 3, 351 leaves, 9 steps):

$$\frac{dx}{c}+\frac{\arctan\left(\frac{2^{1/4} c^{1/4} x}{\left(-b-\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(bd-ce+\frac{-2dca+b^2 d-bce}{\sqrt{-4ac+b^2}}\right)2^{3/4}}{4c^{5/4}\left(-b-\sqrt{-4ac+b^2}\right)^{3/4}}$$

$$+\frac{\operatorname{arctanh}\left(\frac{2^{1/4} c^{1/4} x}{\left(-b-\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(bd-ce+\frac{-2dca+b^2 d-bce}{\sqrt{-4ac+b^2}}\right)2^{3/4}}{4c^{5/4}\left(-b-\sqrt{-4ac+b^2}\right)^{3/4}}$$

$$+\frac{\arctan\left(\frac{2^{1/4}c^{1/4}x}{\left(-b+\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(bd-ce+\frac{2dca-b^2d+bce}{\sqrt{-4ac+b^2}}\right)2^{3/4}}{4c^{5/4}\left(-b+\sqrt{-4ac+b^2}\right)^{3/4}}$$

$$+\frac{\operatorname{arctanh}\left(\frac{2^{1/4}c^{1/4}x}{\left(-b+\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(bd-ce+\frac{2dca-b^2d+bce}{\sqrt{-4ac+b^2}}\right)2^{3/4}}{4c^{5/4}\left(-b+\sqrt{-4ac+b^2}\right)^{3/4}}$$

Result(type 7, 66 leaves):

$$\frac{dx}{c}+\frac{\sum_{\_R=RootOf(c\_Z^8+b\_Z^4+a)}\frac{((-bd+ce)\_R^4-ad)\ln(x-\_R)}{2\_R^7c+\_R^3b}}{4c}$$

Problem 15: Unable to integrate problem.

$$\int\frac{1}{(d+ex^n)(a+cx^{2n})}\,dx$$

Optimal(type 5, 150 leaves, 6 steps):

$$\frac{cdx\,\mathrm{hypergeom}\left(\left[1,\frac{1}{2n}\right],\left[1+\frac{1}{2n}\right],-\frac{cx^{2n}}{a}\right)}{a(ae^2+cd^2)}+\frac{e^2x\,\mathrm{hypergeom}\left(\left[1,\frac{1}{n}\right],\left[1+\frac{1}{n}\right],-\frac{ex^n}{d}\right)}{d(ae^2+cd^2)}-\frac{cex^{1+n}\,\mathrm{hypergeom}\left(\left[1,\frac{1+n}{2n}\right],\left[\frac{3}{2}+\frac{1}{2n}\right],-\frac{cx^{2n}}{a}\right)}{a(ae^2+cd^2)(1+n)}$$

Result(type 8, 23 leaves):

$$\int\frac{1}{(d+ex^n)(a+cx^{2n})}\,dx$$

Problem 16: Unable to integrate problem.

$$\int\frac{d+ex^n}{a-cx^{2n}}\,dx$$

Optimal(type 5, 77 leaves, 3 steps):

$$\frac{dx\,\mathrm{hypergeom}\left(\left[1,\frac{1}{2n}\right],\left[1+\frac{1}{2n}\right],\frac{cx^{2n}}{a}\right)}{a}+\frac{ex^{1+n}\,\mathrm{hypergeom}\left(\left[1,\frac{1+n}{2n}\right],\left[\frac{3}{2}+\frac{1}{2n}\right],\frac{cx^{2n}}{a}\right)}{a(1+n)}$$

Result(type 8, 22 leaves):

$$\int\frac{d+ex^n}{a-cx^{2n}}\,dx$$

Problem 17: Unable to integrate problem.

$$\int \frac{(d+e x^n)^2}{(a+c x^{2n})^2}\, dx$$

Optimal(type 5, 193 leaves, 7 steps):

$$\frac{x\left(c d^2-a e^2+2 c d e x^n\right)}{2 a c n\left(a+c x^{2n}\right)}+\frac{e^2 x \operatorname{hypergeom}\left(\left[1, \frac{1}{2n}\right],\left[1+\frac{1}{2n}\right],-\frac{c x^{2n}}{a}\right)}{a c}-\frac{\left(-a e^2+c d^2\right)(1-2n)\, x \operatorname{hypergeom}\left(\left[1, \frac{1}{2n}\right],\left[1+\frac{1}{2n}\right],-\frac{c x^{2n}}{a}\right)}{2 a^2 c n}$$
$$-\frac{d e(1-n)\, x^{1+n} \operatorname{hypergeom}\left(\left[1, \frac{1+n}{2n}\right],\left[\frac{3}{2}+\frac{1}{2n}\right],-\frac{c x^{2n}}{a}\right)}{a^2 n(1+n)}$$

Result(type 8, 114 leaves):

$$-\frac{x\left(-2 d e \mathrm{e}^{n \ln(x)} c+a e^2-c d^2\right)}{2 a c n\left(a+c\left(\mathrm{e}^{n \ln(x)}\right)^2\right)}+\int \frac{2 d e \mathrm{e}^{n \ln(x)} c n+2 c d^2 n-2 d e \mathrm{e}^{n \ln(x)} c+a e^2-c d^2}{2 a c n\left(a+c\left(\mathrm{e}^{n \ln(x)}\right)^2\right)}\, dx$$

Problem 18: Unable to integrate problem.

$$\int \frac{1}{(d+e x^n)(a+c x^{2n})^3}\, dx$$

Optimal(type 5, 558 leaves, 15 steps):

$$\frac{c x\left(d-e x^n\right)}{4 a\left(a e^2+c d^2\right) n\left(a+c x^{2n}\right)^2}+\frac{c e^2 x\left(d-e x^n\right)}{2 a\left(a e^2+c d^2\right)^2 n\left(a+c x^{2n}\right)}-\frac{c x\left(d(1-4n)-e(1-3n) x^n\right)}{8 a^2\left(a e^2+c d^2\right) n^2\left(a+c x^{2n}\right)}$$
$$+\frac{c d e^4 x \operatorname{hypergeom}\left(\left[1, \frac{1}{2n}\right],\left[1+\frac{1}{2n}\right],-\frac{c x^{2n}}{a}\right)}{a\left(a e^2+c d^2\right)^3}+\frac{c d(1-4n)(1-2n)\, x \operatorname{hypergeom}\left(\left[1, \frac{1}{2n}\right],\left[1+\frac{1}{2n}\right],-\frac{c x^{2n}}{a}\right)}{8 a^3\left(a e^2+c d^2\right) n^2}$$
$$-\frac{c d e^2(1-2n)\, x \operatorname{hypergeom}\left(\left[1, \frac{1}{2n}\right],\left[1+\frac{1}{2n}\right],-\frac{c x^{2n}}{a}\right)}{2 a^2\left(a e^2+c d^2\right)^2 n}+\frac{e^6 x \operatorname{hypergeom}\left(\left[1, \frac{1}{n}\right],\left[1+\frac{1}{n}\right],-\frac{e x^n}{d}\right)}{d\left(a e^2+c d^2\right)^3}$$
$$-\frac{c e^5 x^{1+n} \operatorname{hypergeom}\left(\left[1, \frac{1+n}{2n}\right],\left[\frac{3}{2}+\frac{1}{2n}\right],-\frac{c x^{2n}}{a}\right)}{a\left(a e^2+c d^2\right)^3(1+n)}-\frac{c e(1-3n)(1-n)\, x^{1+n} \operatorname{hypergeom}\left(\left[1, \frac{1+n}{2n}\right],\left[\frac{3}{2}+\frac{1}{2n}\right],-\frac{c x^{2n}}{a}\right)}{8 a^3\left(a e^2+c d^2\right) n^2(1+n)}$$
$$+\frac{c e^3(1-n)\, x^{1+n} \operatorname{hypergeom}\left(\left[1, \frac{1+n}{2n}\right],\left[\frac{3}{2}+\frac{1}{2n}\right],-\frac{c x^{2n}}{a}\right)}{2 a^2\left(a e^2+c d^2\right)^2 n(1+n)}$$

Result(type 8, 531 leaves):

$$\frac{1}{8 a^2 n^2\left(a e^2+c d^2\right)^2\left(a+c\left(\mathrm{e}^{n \ln(x)}\right)^2\right)^2}\Big(c x\Big(-7 a c e^3 n\left(\mathrm{e}^{n \ln(x)}\right)^3-3 c^2 d^2 e n\left(\mathrm{e}^{n \ln(x)}\right)^3+8 a c d e^2 n\left(\mathrm{e}^{n \ln(x)}\right)^2+a c e^3\left(\mathrm{e}^{n \ln(x)}\right)^3+4 c^2 d^3 n\left(\mathrm{e}^{n \ln(x)}\right)^2$$
$$+c^2 d^2 e\left(\mathrm{e}^{n \ln(x)}\right)^3-9 a^2 e^3 n \mathrm{e}^{n \ln(x)}-5 a c d^2 e n \mathrm{e}^{n \ln(x)}-a c d e^2\left(\mathrm{e}^{n \ln(x)}\right)^2-c^2\left(\mathrm{e}^{n \ln(x)}\right)^2 d^3+10 a^2 d e^2 n+a^2 e^3 \mathrm{e}^{n \ln(x)}+6 a c d^3 n+a c d^2 e \mathrm{e}^{n \ln(x)}$$

$$-a^2 d e^2 - a c d^3)\Big)\Big) + \int \frac{1}{8 n^2 a^2 \left(d + e\, e^{n \ln(x)}\right) \left(a e^2 + c d^2\right)^2 \left(a + c \left(e^{n \ln(x)}\right)^2\right)} \Big(-7 a c e^4 n^2 \left(e^{n \ln(x)}\right)^2 - 3 c^2 d^2 e^2 n^2 \left(e^{n \ln(x)}\right)^2 + 9 a c d e^3 n^2 e^{n \ln(x)} + 8 a c e^4 n \left(e^{n \ln(x)}\right)^2 + 5 c^2 d^3 e n^2 e^{n \ln(x)} + 4 c^2 d^2 e^2 n \left(e^{n \ln(x)}\right)^2 + 8 a^2 e^4 n^2 + 16 a c d^2 e^2 n^2 - 2 a c d e^3 n e^{n \ln(x)} - a c e^4 \left(e^{n \ln(x)}\right)^2 + 8 c^2 d^4 n^2 - 2 c^2 d^3 e n e^{n \ln(x)} - c^2 d^2 e^2 \left(e^{n \ln(x)}\right)^2 - 10 a c d^2 e^2 n - 6 c^2 d^4 n + a c d^2 e^2 + c^2 d^4 \Big) \, dx$$

Problem 20: Unable to integrate problem.

$$\int \frac{\left(a + c x^{2n}\right)^p}{\left(d + e x^n\right)^2} \, dx$$

Optimal(type 6, 249 leaves, 8 steps):

$$\frac{e^2 x^{1+2n} \left(a + c x^{2n}\right)^p AppellF1\left(1 + \frac{1}{2n}, 2, -p, 2 + \frac{1}{2n}, \frac{e^2 x^{2n}}{d^2}, -\frac{c x^{2n}}{a}\right)}{d^4 (1 + 2n) \left(1 + \frac{c x^{2n}}{a}\right)^p} + \frac{x \left(a + c x^{2n}\right)^p AppellF1\left(\frac{1}{2n}, 2, -p, 1 + \frac{1}{2n}, \frac{e^2 x^{2n}}{d^2}, -\frac{c x^{2n}}{a}\right)}{d^2 \left(1 + \frac{c x^{2n}}{a}\right)^p} - \frac{2 e x^{1+n} \left(a + c x^{2n}\right)^p AppellF1\left(\frac{1+n}{2n}, 2, -p, \frac{3}{2} + \frac{1}{2n}, \frac{e^2 x^{2n}}{d^2}, -\frac{c x^{2n}}{a}\right)}{d^3 (1 + n) \left(1 + \frac{c x^{2n}}{a}\right)^p}$$

Result(type 8, 23 leaves):

$$\int \frac{\left(a + c x^{2n}\right)^p}{\left(d + e x^n\right)^2} \, dx$$

Problem 21: Unable to integrate problem.

$$\int \frac{\left(a + c x^{2n}\right)^p}{\left(d + e x^n\right)^3} \, dx$$

Optimal(type 6, 341 leaves, 10 steps):

$$\frac{3 e^2 x^{1+2n} \left(a + c x^{2n}\right)^p AppellF1\left(1 + \frac{1}{2n}, 3, -p, 2 + \frac{1}{2n}, \frac{e^2 x^{2n}}{d^2}, -\frac{c x^{2n}}{a}\right)}{d^5 (1 + 2n) \left(1 + \frac{c x^{2n}}{a}\right)^p} - \frac{e^3 x^{1+3n} \left(a + c x^{2n}\right)^p AppellF1\left(\frac{3}{2} + \frac{1}{2n}, 3, -p, \frac{5}{2} + \frac{1}{2n}, \frac{e^2 x^{2n}}{d^2}, -\frac{c x^{2n}}{a}\right)}{d^6 (1 + 3n) \left(1 + \frac{c x^{2n}}{a}\right)^p} + \frac{x \left(a + c x^{2n}\right)^p AppellF1\left(\frac{1}{2n}, 3, -p, 1 + \frac{1}{2n}, \frac{e^2 x^{2n}}{d^2}, -\frac{c x^{2n}}{a}\right)}{d^3 \left(1 + \frac{c x^{2n}}{a}\right)^p}$$

$$-\frac{3\, e x^{1+n} (a+c x^{2n})^p \, AppellF1\left(\frac{1+n}{2n}, 3, -p, \frac{3}{2}+\frac{1}{2n}, \frac{e^2 x^{2n}}{d^2}, -\frac{c x^{2n}}{a}\right)}{d^4 (1+n) \left(1+\frac{c x^{2n}}{a}\right)^p}$$

Result(type 8, 23 leaves):

$$\int \frac{(a+c x^{2n})^p}{(d+e x^n)^3}\, dx$$

Problem 23: Unable to integrate problem.

$$\int \frac{(d+e x^n)^2}{a+b x^n+c x^{2n}}\, dx$$

Optimal(type 5, 216 leaves, 5 steps):

$$\frac{e^2 x}{c} + \frac{x\, \mathrm{hypergeom}\left(\left[1, \frac{1}{n}\right], \left[1+\frac{1}{n}\right], -\frac{2 c x^n}{b-\sqrt{-4ac+b^2}}\right) \left(2cde - b e^2 + \frac{2c^2 d^2 + b^2 e^2 - 2ce(ae+bd)}{\sqrt{-4ac+b^2}}\right)}{c\left(b-\sqrt{-4ac+b^2}\right)}$$
$$+ \frac{x\, \mathrm{hypergeom}\left(\left[1, \frac{1}{n}\right], \left[1+\frac{1}{n}\right], -\frac{2 c x^n}{b+\sqrt{-4ac+b^2}}\right) \left(2cde - b e^2 + \frac{-2c^2 d^2 - b^2 e^2 + 2ce(ae+bd)}{\sqrt{-4ac+b^2}}\right)}{c\left(b+\sqrt{-4ac+b^2}\right)}$$

Result(type 8, 68 leaves):

$$\frac{e^2 x}{c} + \int -\frac{b e^2 e^{n \ln(x)} - 2 d e e^{n \ln(x)} c + a e^2 - c d^2}{c\left(a + b e^{n \ln(x)} + c \left(e^{n \ln(x)}\right)^2\right)}\, dx$$

Problem 24: Unable to integrate problem.

$$\int \frac{(d+e x^n)^3}{(a+b x^n+c x^{2n})^3}\, dx$$

Optimal(type 5, 1674 leaves, 11 steps):

$$\frac{x\left(b^2 c d^3 - 2acd(-3ae^2+cd^2) - abe(ae^2+3cd^2) - \left(ab^2 e^3 + 2ace(-ae^2+3cd^2) - bcd(3ae^2+cd^2)\right) x^n\right)}{2ac(-4ac+b^2)\, n\, (a+bx^n+cx^{2n})^2}$$
$$+ \frac{e^2 x\left(3b^2 cd - 6ac^2 d - b^3 e + abce + c(-2ace - b^2 e + 3bcd) x^n\right)}{ac^2(-4ac+b^2)\, n\, (a+bx^n+cx^{2n})} - \frac{1}{2a^2c^2(-4ac+b^2)^2 n^2 (a+bx^n+cx^{2n})} \left(x \left(ab^2c^2 d \left(3ae^2 (1\right.\right.\right.$$
$$- 9n) - 5cd^2(1-3n)) + 4a^2c^3 d(-3ae^2+cd^2)(1-4n) - 2ab^5 e^3 n + 2a^2 bc^2 e\left(3cd^2(2-3n) - 5ae^2 n\right) - 3ab^3 ce\left(-3ae^2 n + cd^2\right)$$
$$+ b^4 cd\left(cd^2(1-2n) + 6ae^2 n\right) + c\left(4a^2c^2 e(-ae^2+3cd^2)(1-3n) - 2ab^4 e^3 n - 2abc^2 d\left(cd^2(2-7n) + 3ae^2 n\right) + b^3 cd\left(cd^2(1-2n)\right.\right.$$

$$+6ae^2n)-ab^2ce(3cd^2-ae^2(1+2n)))x^n))+\frac{1}{2a^2c(-4ac+b^2)^2n^2(b-\sqrt{-4ac+b^2})}\Big(x\,\mathrm{hypergeom}\Big(\Big[1,\frac{1}{n}\Big],\Big[1+\frac{1}{n}\Big],$$

$$-\frac{2cx^n}{b-\sqrt{-4ac+b^2}}\Big)\Big((1-n)(4a^2c^2e(-ae^2+3cd^2)(1-3n)-2ab^4e^3n-2abc^2d(cd^2(2-7n)+3ae^2n)+b^3cd(cd^2(1-2n)+6ae^2n)$$

$$-ab^2ce(3cd^2-ae^2(1+2n)))+\frac{1}{\sqrt{-4ac+b^2}}(-2ab^5e^3(1-n)n+b^4cd(1-n)(cd^2(1-2n)+6ae^2n)+8a^2c^3d(-3ae^2$$

$$+cd^2)(8n^2-6n+1)-6ab^2c^2d(cd^2(3n^2-4n+1)-ae^2(15n^2-10n+1))+4a^2bc^2e(3cd^2(-3n^2-n+1)+ae^2(19n^2-11n+1))$$

$$-ab^3ce(3cd^2(1-n)+ae^2(30n^2-19n+1)))))+\frac{1}{2a^2c(-4ac+b^2)^2n^2(b+\sqrt{-4ac+b^2})}\Big(x\,\mathrm{hypergeom}\Big(\Big[1,\frac{1}{n}\Big],\Big[1+\frac{1}{n}\Big],$$

$$-\frac{2cx^n}{b+\sqrt{-4ac+b^2}}\Big)\Big((1-n)(4a^2c^2e(-ae^2+3cd^2)(1-3n)-2ab^4e^3n-2abc^2d(cd^2(2-7n)+3ae^2n)+b^3cd(cd^2(1-2n)+6ae^2n)$$

$$-ab^2ce(3cd^2-ae^2(1+2n)))+\frac{1}{\sqrt{-4ac+b^2}}(2ab^5e^3(1-n)n-b^4cd(1-n)(cd^2(1-2n)+6ae^2n)-8a^2c^3d(-3ae^2$$

$$+cd^2)(8n^2-6n+1)+6ab^2c^2d(cd^2(3n^2-4n+1)-ae^2(15n^2-10n+1))-4a^2bc^2e(3cd^2(-3n^2-n+1)+ae^2(19n^2-11n+1))$$

$$+ab^3ce(3cd^2(1-n)+ae^2(30n^2-19n+1)))))+\frac{1}{ac(-4ac+b^2)n(b^2-4ac+b\sqrt{-4ac+b^2})}\Big(e^2x\,\mathrm{hypergeom}\Big(\Big[1,\frac{1}{n}\Big],\Big[1+\frac{1}{n}\Big],$$

$$-\frac{2cx^n}{b+\sqrt{-4ac+b^2}}\Big)\Big(-b^3e(1-n)+b^2(1-n)\Big(3cd+e\sqrt{-4ac+b^2}\Big)+bc\Big(2ae(2-5n)-3d(1-n)\sqrt{-4ac+b^2}\Big)-2ac\Big(6cd(1-2n)$$

$$-e(1-n)\sqrt{-4ac+b^2}\Big)\Big)\Big)+\frac{1}{ac(-4ac+b^2)n(b^2-4ac-b\sqrt{-4ac+b^2})}\Big(e^2x\,\mathrm{hypergeom}\Big(\Big[1,\frac{1}{n}\Big],\Big[1+\frac{1}{n}\Big],-\frac{2cx^n}{b-\sqrt{-4ac+b^2}}\Big)\Big($$

$$-b^3e(1-n)+b^2(1-n)\Big(3cd-e\sqrt{-4ac+b^2}\Big)+bc\Big(2ae(2-5n)+3d(1-n)\sqrt{-4ac+b^2}\Big)-2ac\Big(6cd(1-2n)+e(1$$

$$-n)\sqrt{-4ac+b^2}\Big)\Big)\Big)$$

```
Result(type 8, 1579 leaves):
```

$$\frac{1}{2(4ac-b^2)^2a^2n^2\left(a+b\,e^{n\ln(x)}+c\left(e^{n\ln(x)}\right)^2\right)^2}\Big(x\Big(-b^5d^3e^{n\ln(x)}-4a^3c^2d^3-3a^3b^2de^2n+30a^3bcd^2en-3a^2b^3d^2en+4a^3c^2e^3\left(e^{n\ln(x)}\right)^3$$

$$-b^3c^2d^3\left(e^{n\ln(x)}\right)^3-a^2b^3e^3\left(e^{n\ln(x)}\right)^2-4a^2c^3d^3\left(e^{n\ln(x)}\right)^2+2b^5d^3n\,e^{n\ln(x)}-2b^4cd^3\left(e^{n\ln(x)}\right)^2+4a^4ce^3e^{n\ln(x)}-a^3b^2e^3e^{n\ln(x)}+24a^3c^2d^3n$$

$$+12a^4cde^2+5a^2b^2cd^3-ab^4d^3-12a^2c^3d^2e\left(e^{n\ln(x)}\right)^3+4abc^3d^3\left(e^{n\ln(x)}\right)^3+4b^4cd^3n\left(e^{n\ln(x)}\right)^2-4a^4ce^3n\,e^{n\ln(x)}+10a^3b^2e^3n\,e^{n\ln(x)}$$

$$+4a^3bce^3\left(e^{n\ln(x)}\right)^2+12a^3c^2de^2\left(e^{n\ln(x)}\right)^2+9ab^2c^2d^3\left(e^{n\ln(x)}\right)^2-12a^3c^2d^2e\,e^{n\ln(x)}-3a^2b^3de^2e^{n\ln(x)}+3ab^4d^2e\,e^{n\ln(x)}+4ab^3cd^3e^{n\ln(x)}$$

$$-18a^2bc^2de^2n\left(e^{n\ln(x)}\right)^3-27a^2b^2cde^2n\left(e^{n\ln(x)}\right)^2+54a^2bc^2d^2en\left(e^{n\ln(x)}\right)^2-30a^3bcde^2n\,e^{n\ln(x)}+12a^2b^2cd^2en\,e^{n\ln(x)}+2a^2b^2ce^3n\left(e^{n\ln(x)}\right)^3$$

$$+36a^2c^3d^2en\left(e^{n\ln(x)}\right)^3-14abc^3d^3n\left(e^{n\ln(x)}\right)^3+6a^3bce^3n\left(e^{n\ln(x)}\right)^2-29ab^2c^2d^3n\left(e^{n\ln(x)}\right)^2+3ab^2c^2d^2e\left(e^{n\ln(x)}\right)^3+60a^3c^2d^2en\,e^{n\ln(x)}$$

$$-6a^2b^3de^2n\,e^{n\ln(x)}-3a^2b^2cde^2\left(e^{n\ln(x)}\right)^2-2a^2bc^2d^3n\,e^{n\ln(x)}-24a^2bc^2d^2e\left(e^{n\ln(x)}\right)^2-12ab^3cd^3n\,e^{n\ln(x)}+6ab^3cd^2e\left(e^{n\ln(x)}\right)^2$$

$$+ 12 a^3 b c d e^2 e^{n \ln(x)} - 9 a^2 b^2 c d^2 e e^{n \ln(x)} + 4 a^3 c^2 e^3 n \left(e^{n \ln(x)}\right)^3 + 2 b^3 c^2 d^3 n \left(e^{n \ln(x)}\right)^3 + 3 a^2 b^3 e^3 n \left(e^{n \ln(x)}\right)^2 - a^2 b^2 c e^3 \left(e^{n \ln(x)}\right)^3$$
$$+ 16 a^2 c^3 d^3 n \left(e^{n \ln(x)}\right)^2 - 21 a^2 b^2 c d^3 n + 3 a b^4 d^3 n - 3 a^3 b^2 d e^2 - 12 a^3 b c d^2 e + 3 a^2 b^3 d^2 e + 6 a^4 b e^3 n - 24 a^4 c d e^2 n \Big) \Big) + \int$$
$$- \frac{1}{2 \left(4 a c - b^2\right)^2 a^2 n^2 \left(a + b e^{n \ln(x)} + c \left(e^{n \ln(x)}\right)^2\right)} \Big(-36 a^2 c^2 d^2 e n^2 e^{n \ln(x)} + 14 a b c^2 d^3 n^2 e^{n \ln(x)} + 48 a^2 c^2 d^2 e n e^{n \ln(x)} - 18 a b c^2 d^3 n e^{n \ln(x)}$$
$$+ 3 a b^2 c d^2 e e^{n \ln(x)} - 4 a^2 c^2 d^3 - b^4 d^3 + 4 a^3 c e^3 e^{n \ln(x)} - a^2 b^2 e^3 e^{n \ln(x)} - b^3 c d^3 e^{n \ln(x)} - 3 a b^3 d^2 e n - 3 a^2 b^2 d e^2 n + 30 a^2 b c d^2 e n$$
$$+ 18 a^2 b c d e^2 n^2 e^{n \ln(x)} - 18 a^2 b c d e^2 n e^{n \ln(x)} - 3 a b^2 c d^2 e n e^{n \ln(x)} - 32 a^2 c^2 d^3 n^2 - 2 b^4 d^3 n^2 + 5 a b^2 c d^3 + 24 a^2 c^2 d^3 n + 3 b^4 d^3 n + 12 a^3 c d e^2$$
$$- 4 a^3 c e^3 n^2 e^{n \ln(x)} - 2 a^2 b^2 e^3 n^2 e^{n \ln(x)} - 2 b^3 c d^3 n^2 e^{n \ln(x)} + 3 a^2 b^2 e^3 n e^{n \ln(x)} + 3 b^3 c d^3 n e^{n \ln(x)} - 12 a^2 c^2 d^2 e e^{n \ln(x)} + 4 a b c^2 d^3 e^{n \ln(x)} + 16 a b^2 c d^3 n^2$$
$$+ 6 a^3 b e^3 n - 21 a b^2 c d^3 n - 3 a^2 b^2 d e^2 - 12 a^2 b c d^2 e - 24 a^3 c d e^2 n + 3 a b^3 d^2 e \Big) \, dx$$

Problem 25: Unable to integrate problem.

$$\int \frac{(d + e x^n)^2}{\left(a + b x^n + c x^{2 n}\right)^3} \, dx$$

Optimal(type 5, 1165 leaves, 11 steps):

$$\frac{x \left(b^2 d^2 - 2 a b d e - 2 a \left(-a e^2 + c d^2\right) + \left(a b e^2 - 4 d c a e + b c d^2\right) x^n\right)}{2 a \left(-4 a c + b^2\right) n \left(a + b x^n + c x^{2 n}\right)^2} + \frac{e^2 x \left(b^2 - 2 a c + b c x^n\right)}{a c \left(-4 a c + b^2\right) n \left(a + b x^n + c x^{2 n}\right)}$$
$$+ \frac{1}{2 a^2 c \left(-4 a c + b^2\right)^2 n^2 \left(a + b x^n + c x^{2 n}\right)} \Big(x \left(2 a b^3 c d e - a b^2 c \left(a e^2 (1 - 9 n) - 5 c d^2 (1 - 3 n)\right) - 4 a^2 c^2 \left(-a e^2 + c d^2\right) (1 - 4 n) - 4 a^2 b c^2 d e (2\right.$$
$$\left. - 3 n) - b^4 \left(c d^2 (1 - 2 n) + 2 a e^2 n\right) + c \left(2 a b^2 c d e - 8 a^2 c^2 d e (1 - 3 n) + 2 a b c \left(c d^2 (2 - 7 n) + a e^2 n\right) - b^3 \left(c d^2 (1 - 2 n) + 2 a e^2 n\right)\right) x^n\right)$$
$$\Big) - \frac{1}{2 a^2 \left(-4 a c + b^2\right)^2 n^2 \left(b - \sqrt{-4 a c + b^2}\right)} \left(x \,\mathrm{hypergeom}\left(\left[1, \frac{1}{n}\right], \left[1 + \frac{1}{n}\right], -\frac{2 c x^n}{b - \sqrt{-4 a c + b^2}}\right) \left((1 - n) \left(2 a b^2 c d e - 8 a^2 c^2 d e (1 - 3 n)\right.\right.\right.$$
$$\left. + 2 a b c \left(c d^2 (2 - 7 n) + a e^2 n\right) - b^3 \left(c d^2 (1 - 2 n) + 2 a e^2 n\right)\right) + \frac{1}{\sqrt{-4 a c + b^2}} \Big(2 a b^3 c d e (1 - n) - b^4 (1 - n) \left(c d^2 (1 - 2 n) + 2 a e^2 n\right)$$
$$\left.\left. - 8 a^2 b c^2 d e \left(-3 n^2 - n + 1\right) - 8 a^2 c^2 \left(-a e^2 + c d^2\right) \left(8 n^2 - 6 n + 1\right) + 2 a b^2 c \left(3 c d^2 \left(3 n^2 - 4 n + 1\right) - a e^2 \left(15 n^2 - 10 n + 1\right)\right)\Big)\right)\right)$$
$$- \frac{1}{2 a^2 \left(-4 a c + b^2\right)^2 n^2 \left(b + \sqrt{-4 a c + b^2}\right)} \left(x \,\mathrm{hypergeom}\left(\left[1, \frac{1}{n}\right], \left[1 + \frac{1}{n}\right], -\frac{2 c x^n}{b + \sqrt{-4 a c + b^2}}\right) \left((1 - n) \left(2 a b^2 c d e - 8 a^2 c^2 d e (1 - 3 n)\right.\right.\right.$$
$$\left. + 2 a b c \left(c d^2 (2 - 7 n) + a e^2 n\right) - b^3 \left(c d^2 (1 - 2 n) + 2 a e^2 n\right)\right) + \frac{1}{\sqrt{-4 a c + b^2}} \Big(-2 a b^3 c d e (1 - n) + b^4 (1 - n) \left(c d^2 (1 - 2 n) + 2 a e^2 n\right)$$
$$\left.\left. + 8 a^2 b c^2 d e \left(-3 n^2 - n + 1\right) + 8 a^2 c^2 \left(-a e^2 + c d^2\right) \left(8 n^2 - 6 n + 1\right) - 2 a b^2 c \left(3 c d^2 \left(3 n^2 - 4 n + 1\right) - a e^2 \left(15 n^2 - 10 n + 1\right)\right)\Big)\right)\right)$$

$$-\frac{e^2 x \,\mathrm{hypergeom}\left(\left[1, \frac{1}{n}\right], \left[1+\frac{1}{n}\right], -\frac{2 c x^n}{b-\sqrt{-4 a c+b^2}}\right) \left(4 a c (1-2 n) - b^2 (1-n) - b (1-n) \sqrt{-4 a c+b^2}\right)}{a (-4 a c+b^2) n \left(b^2-4 a c-b \sqrt{-4 a c+b^2}\right)}$$

$$-\frac{e^2 x \,\mathrm{hypergeom}\left(\left[1, \frac{1}{n}\right], \left[1+\frac{1}{n}\right], -\frac{2 c x^n}{b+\sqrt{-4 a c+b^2}}\right) \left(4 a c (1-2 n) - b^2 (1-n) + b (1-n) \sqrt{-4 a c+b^2}\right)}{a (-4 a c+b^2) n \left(b^2-4 a c+b \sqrt{-4 a c+b^2}\right)}$$

Result(type 8, 1189 leaves):

$$-\frac{1}{2 (4 a c-b^2)^2 a^2 n^2 \left(a+b e^{n \ln(x)}+c (e^{n \ln(x)})^2\right)^2} \Big(x \big(-4 a^4 c e^2 + 4 d^2 c^2 a^3 + b^5 d^2 e^{n \ln(x)} - 36 a^2 b c^2 d e n (e^{n \ln(x)})^2 - 8 a^2 b^2 c d e n e^{n \ln(x)} - 20 a^3 b c d e n$$
$$+ 2 a^2 b^3 d e n + 6 a^2 b c^2 e^2 n (e^{n \ln(x)})^3 - 24 a^2 c^3 d e n (e^{n \ln(x)})^3 + 14 a b c^3 d^2 n (e^{n \ln(x)})^3 + 9 a^2 b^2 c e^2 n (e^{n \ln(x)})^2 + 29 a b^2 c^2 d^2 n (e^{n \ln(x)})^2$$
$$- 2 a b^2 c^2 d e (e^{n \ln(x)})^3 + 10 a^3 b c e^2 n e^{n \ln(x)} - 40 a^3 c^2 d e n e^{n \ln(x)} + 2 a^2 b c^2 d^2 n e^{n \ln(x)} + 16 a^2 b c^2 d e (e^{n \ln(x)})^2 + 12 a b^3 c d^2 n e^{n \ln(x)}$$
$$- 4 a b^3 c d e (e^{n \ln(x)})^2 + 6 a^2 b^2 c d e e^{n \ln(x)} - 2 b^3 c^2 d^2 n (e^{n \ln(x)})^3 - 16 a^2 c^3 d^2 n (e^{n \ln(x)})^2 + 8 a^2 c^3 d e (e^{n \ln(x)})^3 - 4 a b c^3 d^2 (e^{n \ln(x)})^3$$
$$- 4 b^4 c d^2 n (e^{n \ln(x)})^2 + 2 a^2 b^3 e^2 n e^{n \ln(x)} + a^2 b^2 c e^2 (e^{n \ln(x)})^2 - 9 a b^2 c^2 d^2 (e^{n \ln(x)})^2 - 4 a^3 b c e^2 e^{n \ln(x)} + 8 a^3 c^2 d e e^{n \ln(x)} - 2 a b^4 d e e^{n \ln(x)}$$
$$- 4 a b^3 c d^2 e^{n \ln(x)} + a^3 b^2 e^2 n + 21 a^2 b^2 c d^2 n - 3 a b^4 d^2 n + 8 a^3 b c d e - 2 a^2 b^3 d e + b^3 c^2 d^2 (e^{n \ln(x)})^3 - 4 a^3 c^2 e^2 (e^{n \ln(x)})^2 + 4 a^2 c^3 d^2 (e^{n \ln(x)})^2$$
$$- 2 b^5 d^2 n e^{n \ln(x)} + 2 b^4 c d^2 (e^{n \ln(x)})^2 + a^2 b^3 e^2 e^{n \ln(x)} + 8 a^4 c e^2 n - 24 a^3 c^2 d^2 n + a^3 b^2 e^2 - 5 a^2 b^2 c d^2 + a b^4 d^2\big)\Big) +$$
$$\int \frac{1}{2 (4 a c-b^2)^2 a^2 n^2 \left(a+b e^{n \ln(x)}+c (e^{n \ln(x)})^2\right)} \big(-4 a^3 c e^2 + b^4 d^2 + 4 d^2 c^2 a^2 - 5 a b^2 c d^2 + 2 a b^2 c d e n e^{n \ln(x)} - 20 a^2 b c d e n + 2 a b^3 d e n$$
$$- 6 a^2 b c e^2 n^2 e^{n \ln(x)} + 24 a^2 c^2 d e n^2 e^{n \ln(x)} - 14 a b c^2 d^2 n^2 e^{n \ln(x)} + 6 a^2 b c e^2 n e^{n \ln(x)} - 32 a^2 c^2 d e n e^{n \ln(x)} + 18 a b c^2 d^2 n e^{n \ln(x)} - 2 a b^2 c d e e^{n \ln(x)}$$
$$+ 2 b^3 c d^2 n^2 e^{n \ln(x)} - 3 b^3 c d^2 n e^{n \ln(x)} + 8 a^2 c^2 d e e^{n \ln(x)} - 4 a b c^2 d^2 e^{n \ln(x)} - 2 a b^3 d e + a^2 b^2 e^2 n + 21 a b^2 c d^2 n + 8 a^2 b c d e - 16 a b^2 c d^2 n^2$$
$$+ b^3 c d^2 e^{n \ln(x)} + 32 a^2 c^2 d^2 n^2 + 2 b^4 d^2 n^2 + a^2 b^2 e^2 + 8 a^3 c e^2 n - 24 a^2 c^2 d^2 n - 3 b^4 d^2 n\big) \, dx$$

Problem 26: Unable to integrate problem.

$$\int (d+e x^n)^3 (a+b x^n+c x^{2 n})^p \, dx$$

Optimal(type 6, 574 leaves, 10 steps):

$$\frac{3 d^2 e x^{1+n} (a+b x^n+c x^{2 n})^p \mathit{AppellF1}\left(1+\frac{1}{n}, -p, -p, 2+\frac{1}{n}, -\frac{2 c x^n}{b-\sqrt{-4 a c+b^2}}, -\frac{2 c x^n}{b+\sqrt{-4 a c+b^2}}\right)}{(1+n) \left(1+\frac{2 c x^n}{b-\sqrt{-4 a c+b^2}}\right)^p \left(1+\frac{2 c x^n}{b+\sqrt{-4 a c+b^2}}\right)^p}$$

$$+\frac{3\,d\,e^2\,x^{1+2n}\,(a+b\,x^n+c\,x^{2n})^p\,AppellF1\left(2+\frac{1}{n},-p,-p,3+\frac{1}{n},-\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}},-\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)}{(1+2\,n)\left(1+\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}}\right)^p\left(1+\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)^p}$$

$$+\frac{e^3\,x^{1+3n}\,(a+b\,x^n+c\,x^{2n})^p\,AppellF1\left(3+\frac{1}{n},-p,-p,4+\frac{1}{n},-\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}},-\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)}{(1+3\,n)\left(1+\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}}\right)^p\left(1+\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)^p}$$

$$+\frac{d^3\,x\,(a+b\,x^n+c\,x^{2n})^p\,AppellF1\left(\frac{1}{n},-p,-p,1+\frac{1}{n},-\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}},-\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)}{\left(1+\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}}\right)^p\left(1+\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)^p}$$

Result(type 8, 28 leaves):

$$\int (d+e\,x^n)^3\,(a+b\,x^n+c\,x^{2n})^p\,dx$$

Problem 27: Unable to integrate problem.

$$\int (d+e\,x^n)^2\,(a+b\,x^n+c\,x^{2n})^p\,dx$$

Optimal(type 6, 423 leaves, 8 steps):

$$\frac{2\,d\,e\,x^{1+n}\,(a+b\,x^n+c\,x^{2n})^p\,AppellF1\left(1+\frac{1}{n},-p,-p,2+\frac{1}{n},-\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}},-\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)}{(1+n)\left(1+\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}}\right)^p\left(1+\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)^p}$$

$$+\frac{e^2\,x^{1+2n}\,(a+b\,x^n+c\,x^{2n})^p\,AppellF1\left(2+\frac{1}{n},-p,-p,3+\frac{1}{n},-\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}},-\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)}{(1+2\,n)\left(1+\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}}\right)^p\left(1+\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)^p}$$

$$+\frac{d^2\,x\,(a+b\,x^n+c\,x^{2n})^p\,AppellF1\left(\frac{1}{n},-p,-p,1+\frac{1}{n},-\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}},-\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)}{\left(1+\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}}\right)^p\left(1+\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)^p}$$

Result(type 8, 28 leaves):

$$\int (d+e x^n)^2 \left(a+b x^n+c x^{2n}\right)^p \, dx$$

Test results for the 46 problems in "1.2.3.4 (f x)^m (d+e x^n)^q (a+b x^n+c x^(2 n))^p.txt"

Problem 5: Result is not expressed in closed-form.

$$\int \frac{x^3 \left(e x^3+d\right)}{c x^6+b x^3+a} \, dx$$

Optimal(type 3, 577 leaves, 14 steps):

$$\frac{e x}{c}+\frac{\ln\left(2^{1/3} c^{1/3} x+\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}\right)\left(c d-b e+\frac{-2 a c e+b^2 e-b c d}{\sqrt{-4 a c+b^2}}\right) 2^{2/3}}{6 c^{4/3}\left(b-\sqrt{-4 a c+b^2}\right)^{2/3}}$$
$$-\frac{\ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}+\left(b-\sqrt{-4 a c+b^2}\right)^{2/3}\right)\left(c d-b e+\frac{-2 a c e+b^2 e-b c d}{\sqrt{-4 a c+b^2}}\right) 2^{2/3}}{12 c^{4/3}\left(b-\sqrt{-4 a c+b^2}\right)^{2/3}}$$
$$-\frac{\arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} c^{1/3} x}{\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\left(c d-b e+\frac{-2 a c e+b^2 e-b c d}{\sqrt{-4 a c+b^2}}\right) 2^{2/3}\sqrt{3}}{6 c^{4/3}\left(b-\sqrt{-4 a c+b^2}\right)^{2/3}}$$
$$+\frac{\ln\left(2^{1/3} c^{1/3} x+\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}\right)\left(c d-b e+\frac{2 a c e-b^2 e+b c d}{\sqrt{-4 a c+b^2}}\right) 2^{2/3}}{6 c^{4/3}\left(b+\sqrt{-4 a c+b^2}\right)^{2/3}}$$
$$-\frac{\ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}+\left(b+\sqrt{-4 a c+b^2}\right)^{2/3}\right)\left(c d-b e+\frac{2 a c e-b^2 e+b c d}{\sqrt{-4 a c+b^2}}\right) 2^{2/3}}{12 c^{4/3}\left(b+\sqrt{-4 a c+b^2}\right)^{2/3}}$$
$$-\frac{\arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} c^{1/3} x}{\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\left(c d-b e+\frac{2 a c e-b^2 e+b c d}{\sqrt{-4 a c+b^2}}\right) 2^{2/3}\sqrt{3}}{6 c^{4/3}\left(b+\sqrt{-4 a c+b^2}\right)^{2/3}}$$

Result(type 7, 66 leaves):

$$\frac{e x}{c}+\frac{\sum_{\_R=RootOf(\_Z^6 c+\_Z^3 b+a)} \frac{((-b e+c d)\_R^3-a e)\ln(x-\_R)}{2\_R^5 c+\_R^2 b}}{3 c}$$

Problem 6: Result is not expressed in closed-form.

$$\int \frac{x\left(e x^3+d\right)}{c x^6+b x^3+a}\, dx$$

Optimal(type 3, 490 leaves, 13 steps):

$$-\frac{\ln\left(2^{1/3} c^{1/3} x+\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}\right)\left(e+\frac{-b e+2 c d}{\sqrt{-4 a c+b^2}}\right) 2^{1/3}}{6 c^{2/3}\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}$$
$$+\frac{\ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}+\left(b-\sqrt{-4 a c+b^2}\right)^{2/3}\right)\left(e+\frac{-b e+2 c d}{\sqrt{-4 a c+b^2}}\right) 2^{1/3}}{12 c^{2/3}\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}$$
$$-\frac{\arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} c^{1/3} x}{\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\left(e+\frac{-b e+2 c d}{\sqrt{-4 a c+b^2}}\right) 2^{1/3}\sqrt{3}}{6 c^{2/3}\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}$$
$$-\frac{\ln\left(2^{1/3} c^{1/3} x+\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}\right)\left(e+\frac{b e-2 c d}{\sqrt{-4 a c+b^2}}\right) 2^{1/3}}{6 c^{2/3}\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}}$$
$$+\frac{\ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}+\left(b+\sqrt{-4 a c+b^2}\right)^{2/3}\right)\left(e+\frac{b e-2 c d}{\sqrt{-4 a c+b^2}}\right) 2^{1/3}}{12 c^{2/3}\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}}$$
$$-\frac{\arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} c^{1/3} x}{\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\left(e+\frac{b e-2 c d}{\sqrt{-4 a c+b^2}}\right) 2^{1/3}\sqrt{3}}{6 c^{2/3}\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}}$$

Result(type 7, 48 leaves):

$$\frac{\left(\sum_{\_R=RootOf(\_Z^6 c+\_Z^3 b+a)} \frac{(\_R^4 e+\_R d)\ln(x-\_R)}{2\_R^5 c+\_R^2 b}\right)}{3}$$

Problem 7: Result is not expressed in closed-form.

$$\int \frac{e x^3+d}{c x^6+b x^3+a}\, dx$$

Optimal(type 3, 490 leaves, 13 steps):

$$\frac{\ln\left(2^{1/3} c^{1/3} x+\left(b-\sqrt{-4ac+b^2}\right)^{1/3}\right)\left(e+\frac{-be+2cd}{\sqrt{-4ac+b^2}}\right)2^{2/3}}{6c^{1/3}\left(b-\sqrt{-4ac+b^2}\right)^{2/3}}$$
$$-\frac{\ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x\left(b-\sqrt{-4ac+b^2}\right)^{1/3}+\left(b-\sqrt{-4ac+b^2}\right)^{2/3}\right)\left(e+\frac{-be+2cd}{\sqrt{-4ac+b^2}}\right)2^{2/3}}{12c^{1/3}\left(b-\sqrt{-4ac+b^2}\right)^{2/3}}$$
$$-\frac{\arctan\left(\frac{\left(1-\frac{2\,2^{1/3} c^{1/3} x}{\left(b-\sqrt{-4ac+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\left(e+\frac{-be+2cd}{\sqrt{-4ac+b^2}}\right)2^{2/3}\sqrt{3}}{6c^{1/3}\left(b-\sqrt{-4ac+b^2}\right)^{2/3}}$$
$$+\frac{\ln\left(2^{1/3} c^{1/3} x+\left(b+\sqrt{-4ac+b^2}\right)^{1/3}\right)\left(e+\frac{be-2cd}{\sqrt{-4ac+b^2}}\right)2^{2/3}}{6c^{1/3}\left(b+\sqrt{-4ac+b^2}\right)^{2/3}}$$
$$-\frac{\ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x\left(b+\sqrt{-4ac+b^2}\right)^{1/3}+\left(b+\sqrt{-4ac+b^2}\right)^{2/3}\right)\left(e+\frac{be-2cd}{\sqrt{-4ac+b^2}}\right)2^{2/3}}{12c^{1/3}\left(b+\sqrt{-4ac+b^2}\right)^{2/3}}$$
$$-\frac{\arctan\left(\frac{\left(1-\frac{2\,2^{1/3} c^{1/3} x}{\left(b+\sqrt{-4ac+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\left(e+\frac{be-2cd}{\sqrt{-4ac+b^2}}\right)2^{2/3}\sqrt{3}}{6c^{1/3}\left(b+\sqrt{-4ac+b^2}\right)^{2/3}}$$

Result(type 7, 46 leaves):

$$\frac{\left(\sum_{\_R=RootOf(\_Z^6 c+\_Z^3 b+a)} \frac{(\_R^3 e+d)\ln(x-\_R)}{2\_R^5 c+\_R^2 b}\right)}{3}$$

Problem 8: Result is not expressed in closed-form.

$$\int \frac{e x^3+d}{x^2\left(c x^6+b x^3+a\right)}\, dx$$

Optimal(type 3, 517 leaves, 14 steps):

$$-\frac{d}{x a}+\frac{c^{1/3}\ln\left(2^{1/3} c^{1/3} x+\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}\right)\left(d+\frac{-2 a e+b d}{\sqrt{-4 a c+b^2}}\right) 2^{1/3}}{6 a\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}$$
$$-\frac{c^{1/3}\ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}+\left(b-\sqrt{-4 a c+b^2}\right)^{2/3}\right)\left(d+\frac{-2 a e+b d}{\sqrt{-4 a c+b^2}}\right) 2^{1/3}}{12 a\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}$$
$$+\frac{c^{1/3}\arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} c^{1/3} x}{\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\left(d+\frac{-2 a e+b d}{\sqrt{-4 a c+b^2}}\right) 2^{1/3}\sqrt{3}}{6 a\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}$$
$$+\frac{c^{1/3}\ln\left(2^{1/3} c^{1/3} x+\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}\right)\left(d+\frac{2 a e-b d}{\sqrt{-4 a c+b^2}}\right) 2^{1/3}}{6 a\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}}$$
$$-\frac{c^{1/3}\ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}+\left(b+\sqrt{-4 a c+b^2}\right)^{2/3}\right)\left(d+\frac{2 a e-b d}{\sqrt{-4 a c+b^2}}\right) 2^{1/3}}{12 a\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}}$$
$$+\frac{c^{1/3}\arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} c^{1/3} x}{\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\left(d+\frac{2 a e-b d}{\sqrt{-4 a c+b^2}}\right) 2^{1/3}\sqrt{3}}{6 a\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}}$$

Result(type 7, 69 leaves):

$$-\frac{\sum_{\_R=RootOf(\_Z^6 c+\_Z^3 b+a)} \frac{\left(c d \_R^4+(-a e+b d) \_R\right) \ln(x-\_R)}{2 \_R^5 c+\_R^2 b}}{3 a}-\frac{d}{x a}$$

Problem 9: Result is not expressed in closed-form.

$$\int \frac{e x^3+d}{x^3 \left(c x^6+b x^3+a\right)} \, dx$$

Optimal(type 3, 517 leaves, 14 steps):

$$-\frac{d}{2 a x^2}-\frac{c^{2/3} \ln\left(2^{1/3} c^{1/3} x+\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}\right) \left(d+\frac{-2 a e+b d}{\sqrt{-4 a c+b^2}}\right) 2^{2/3}}{6 a \left(b-\sqrt{-4 a c+b^2}\right)^{2/3}}$$
$$+\frac{c^{2/3} \ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x \left(b-\sqrt{-4 a c+b^2}\right)^{1/3}+\left(b-\sqrt{-4 a c+b^2}\right)^{2/3}\right) \left(d+\frac{-2 a e+b d}{\sqrt{-4 a c+b^2}}\right) 2^{2/3}}{12 a \left(b-\sqrt{-4 a c+b^2}\right)^{2/3}}$$
$$+\frac{c^{2/3} \arctan\left(\frac{\left(1-\frac{2 2^{1/3} c^{1/3} x}{\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}\right) \sqrt{3}}{3}\right) \left(d+\frac{-2 a e+b d}{\sqrt{-4 a c+b^2}}\right) 2^{2/3} \sqrt{3}}{6 a \left(b-\sqrt{-4 a c+b^2}\right)^{2/3}}$$
$$-\frac{c^{2/3} \ln\left(2^{1/3} c^{1/3} x+\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}\right) \left(d+\frac{2 a e-b d}{\sqrt{-4 a c+b^2}}\right) 2^{2/3}}{6 a \left(b+\sqrt{-4 a c+b^2}\right)^{2/3}}$$
$$+\frac{c^{2/3} \ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x \left(b+\sqrt{-4 a c+b^2}\right)^{1/3}+\left(b+\sqrt{-4 a c+b^2}\right)^{2/3}\right) \left(d+\frac{2 a e-b d}{\sqrt{-4 a c+b^2}}\right) 2^{2/3}}{12 a \left(b+\sqrt{-4 a c+b^2}\right)^{2/3}}$$
$$+\frac{c^{2/3} \arctan\left(\frac{\left(1-\frac{2 2^{1/3} c^{1/3} x}{\left(b+\sqrt{-4 a c+b^2}\right)^{1/3}}\right) \sqrt{3}}{3}\right) \left(d+\frac{2 a e-b d}{\sqrt{-4 a c+b^2}}\right) 2^{2/3} \sqrt{3}}{6 a \left(b+\sqrt{-4 a c+b^2}\right)^{2/3}}$$

Result(type 7, 67 leaves):

$$-\frac{d}{2 a x^2}+\frac{\sum_{\_R=RootOf(\_Z^6 c+\_Z^3 b+a)} \frac{(-\_R^3 c d+a e-b d) \ln(x-\_R)}{2 \_R^5 c+\_R^2 b}}{3 a}$$

Problem 11: Result is not expressed in closed-form.

$$\int \frac{-x^3+1}{x^6-x^3+1}\, dx$$

Optimal(type 3, 289 leaves, 13 steps):

$$-\frac{\arctan\left(\frac{\left(1+\frac{2\, 2^{1/3} x}{(1-I\sqrt{3})^{1/3}}\right)\sqrt{3}}{3}\right)(I-\sqrt{3})\, 2^{2/3}}{6\,(1-I\sqrt{3})^{2/3}}-\frac{\ln\left(-2^{1/3} x+(1-I\sqrt{3})^{1/3}\right)(3-I\sqrt{3})\, 2^{2/3}}{18\,(1-I\sqrt{3})^{2/3}}$$
$$+\frac{\ln\left(2^{2/3} x^2+2^{1/3}(1-I\sqrt{3})^{1/3} x+(1-I\sqrt{3})^{2/3}\right)(3-I\sqrt{3})\, 2^{2/3}}{36\,(1-I\sqrt{3})^{2/3}}-\frac{\ln\left(-2^{1/3} x+(1+I\sqrt{3})^{1/3}\right)(3+I\sqrt{3})\, 2^{2/3}}{18\,(1+I\sqrt{3})^{2/3}}$$
$$+\frac{\ln\left(2^{2/3} x^2+2^{1/3} x(1+I\sqrt{3})^{1/3}+(1+I\sqrt{3})^{2/3}\right)(3+I\sqrt{3})\, 2^{2/3}}{36\,(1+I\sqrt{3})^{2/3}}+\frac{\arctan\left(\frac{\left(1+\frac{2\, 2^{1/3} x}{(1+I\sqrt{3})^{1/3}}\right)\sqrt{3}}{3}\right)(I+\sqrt{3})\, 2^{2/3}}{6\,(1+I\sqrt{3})^{2/3}}$$

Result(type 7, 43 leaves):

$$\frac{\left(\sum_{\_R=RootOf(\_Z^6-\_Z^3+1)} \frac{(-\_R^3+1) \ln(x-\_R)}{2 \_R^5-\_R^2}\right)}{3}$$

Problem 12: Result more than twice size of optimal antiderivative.

$$\int (e x^3+d)^{5/2} (c x^6+b x^3+a)\, dx$$

Optimal(type 4, 321 leaves, 6 steps):

$$\frac{30 d\,(667 a e^2-58 b d e+16 c d^2)\, x\,(e x^3+d)^{3/2}}{124729 e^2}+\frac{2\,(667 a e^2-58 b d e+16 c d^2)\, x\,(e x^3+d)^{5/2}}{11339 e^2}-\frac{2\,(-29 b e+8 c d)\, x\,(e x^3+d)^{7/2}}{667 e^2}$$
$$+\frac{2 c x^4 (e x^3+d)^{7/2}}{29 e}+\frac{54 d^2\,(667 a e^2-58 b d e+16 c d^2)\, x\sqrt{e x^3+d}}{124729 e^2}$$

$$+\frac{1}{124729\, e^{7/3}\sqrt{e x^3+d}\sqrt{\frac{d^{1/3}\left(d^{1/3}+e^{1/3}x\right)}{\left(e^{1/3}x+d^{1/3}\left(1+\sqrt{3}\right)\right)^2}}}\Bigg(54\, 3^{3/4} d^3 \left(667 a e^2-58 b d e+16 c d^2\right)\left(d^{1/3}\right.$$

$$\left.+e^{1/3}x\right)\operatorname{EllipticF}\left(\frac{e^{1/3}x+d^{1/3}\left(1-\sqrt{3}\right)}{e^{1/3}x+d^{1/3}\left(1+\sqrt{3}\right)}, I\sqrt{3}+2I\right)\left(\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}\right)\sqrt{\frac{d^{2/3}-d^{1/3}e^{1/3}x+e^{2/3}x^2}{\left(e^{1/3}x+d^{1/3}\left(1+\sqrt{3}\right)\right)^2}}\Bigg)$$

```
Result(type 4, 1069 leaves):
```

$$a\left(\frac{2 e^2 x^7\sqrt{e x^3+d}}{17}+\frac{74 d e x^4\sqrt{e x^3+d}}{187}+\frac{106 d^2 x\sqrt{e x^3+d}}{187}-\frac{1}{187\, e\sqrt{e x^3+d}}\Bigg(54 I d^3\sqrt{3}\left(-d e^2\right)^{1/}\right.$$

$$3\sqrt{\frac{I\left(x+\frac{\left(-d e^2\right)^{1/3}}{2e}-\frac{I\sqrt{3}\left(-d e^2\right)^{1/3}}{2e}\right)\sqrt{3}\, e}{\left(-d e^2\right)^{1/3}}}\sqrt{\frac{x-\frac{\left(-d e^2\right)^{1/3}}{e}}{-\frac{3\left(-d e^2\right)^{1/3}}{2e}+\frac{I\sqrt{3}\left(-d e^2\right)^{1/3}}{2e}}}$$

$$\sqrt{\frac{-I\left(x+\frac{\left(-d e^2\right)^{1/3}}{2e}+\frac{I\sqrt{3}\left(-d e^2\right)^{1/3}}{2e}\right)\sqrt{3}\, e}{\left(-d e^2\right)^{1/3}}}\operatorname{EllipticF}\left(\frac{\sqrt{3}\sqrt{\frac{I\left(x+\frac{\left(-d e^2\right)^{1/3}}{2e}-\frac{I\sqrt{3}\left(-d e^2\right)^{1/3}}{2e}\right)\sqrt{3}\, e}{\left(-d e^2\right)^{1/3}}}}{3},\right.$$

$$\left.\left.\sqrt{\frac{I\sqrt{3}\left(-d e^2\right)^{1/3}}{e\left(-\frac{3\left(-d e^2\right)^{1/3}}{2e}+\frac{I\sqrt{3}\left(-d e^2\right)^{1/3}}{2e}\right)}}\right)\Bigg)\right)+b\left(\frac{2 e^2 x^{10}\sqrt{e x^3+d}}{23}+\frac{98 d e x^7\sqrt{e x^3+d}}{391}+\frac{974 d^2 x^4\sqrt{e x^3+d}}{4301}+\frac{162 d^3 x\sqrt{e x^3+d}}{4301\, e}\right.$$

$$+\frac{1}{4301\, e^2\sqrt{e x^3+d}}\Bigg(108 I d^4\sqrt{3}\left(-d e^2\right)^{1/}$$

$$\sqrt[3]{\frac{I\left(x+\frac{(-d e^2)^{1/3}}{2e}-\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}\;\sqrt{\frac{x-\frac{(-d e^2)^{1/3}}{e}}{-\frac{3(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}}}$$

$$\sqrt{\frac{-I\left(x+\frac{(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}\;\mathrm{EllipticF}\left(\frac{\sqrt{3}\sqrt{\frac{I\left(x+\frac{(-d e^2)^{1/3}}{2e}-\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}}{3},\right.$$

$$\left.\left.\left.\sqrt{\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{e\left(-\frac{3(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)}}\right)\right)\right)+c\left(\frac{2e^2x^{13}\sqrt{e x^3+d}}{29}+\frac{122\,d\,e\,x^{10}\sqrt{e x^3+d}}{667}+\frac{1562\,d^2x^7\sqrt{e x^3+d}}{11339}+\frac{810\,d^3x^4\sqrt{e x^3+d}}{124729\,e}\right.$$

$$-\frac{1296\,d^4x\sqrt{e x^3+d}}{124729\,e^2}-\frac{1}{124729\,e^3\sqrt{e x^3+d}}\Bigg(864\,I\,d^5\sqrt{3}\,(-d e^2)^{1/}$$

$$\sqrt[3]{\frac{I\left(x+\frac{(-d e^2)^{1/3}}{2e}-\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}\;\sqrt{\frac{x-\frac{(-d e^2)^{1/3}}{e}}{-\frac{3(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}}}$$

$$\sqrt{\frac{-I\left(x+\frac{(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}\;\mathrm{EllipticF}\left(\frac{\sqrt{3}\sqrt{\frac{I\left(x+\frac{(-d e^2)^{1/3}}{2e}-\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}}{3},\right.$$

$$\sqrt{\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{e\left(-\frac{3(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)}}\;\Bigg)\Bigg)\Bigg)$$

Problem 13: Result more than twice size of optimal antiderivative.

$$\int \frac{c x^6 + b x^3 + a}{(e x^3 + d)^{3/2}}\, dx$$

Optimal(type 4, 226 leaves, 3 steps):

$$\frac{2\,(a e^2 - b d e + c d^2)\,x}{3 d e^2 \sqrt{e x^3 + d}} + \frac{2 c x \sqrt{e x^3 + d}}{5 e^2}$$
$$- \frac{1}{45 d e^{7/3} \sqrt{e x^3 + d} \sqrt{\frac{d^{1/3}(d^{1/3} + e^{1/3} x)}{(e^{1/3} x + d^{1/3}(1+\sqrt{3}))^2}}} \Bigg(2\,(16 c d^2 - 5 e (a e + 2 b d))\,(d^{1/3} + e^{1/3} x)\,\mathrm{EllipticF}\left(\frac{e^{1/3} x + d^{1/3}(1-\sqrt{3})}{e^{1/3} x + d^{1/3}(1+\sqrt{3})},\right.$$
$$\left. I\sqrt{3} + 2 I\right)\left(\frac{\sqrt{6}}{2} + \frac{\sqrt{2}}{2}\right)\sqrt{\frac{d^{2/3} - d^{1/3} e^{1/3} x + e^{2/3} x^2}{(e^{1/3} x + d^{1/3}(1+\sqrt{3}))^2}}\; 3^{3/4}\Bigg)$$

Result(type 4, 933 leaves):

$$a\left(\frac{2x}{3 d \sqrt{\left(x^3 + \frac{d}{e}\right) e}} - \frac{1}{9 d e \sqrt{e x^3 + d}}\Bigg(2 I \sqrt{3}\,(-d e^2)^{1/}\right.$$

$$3 \sqrt{\frac{I\left(x + \frac{(-d e^2)^{1/3}}{2e} - \frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\, e}{(-d e^2)^{1/3}}}\;\sqrt{\frac{x - \frac{(-d e^2)^{1/3}}{e}}{-\frac{3(-d e^2)^{1/3}}{2e} + \frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}}}$$

$$\sqrt{\frac{-I\left(x+\frac{(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}\ \text{EllipticF}\left(\frac{\sqrt{3}\sqrt{\frac{I\left(x+\frac{(-d e^2)^{1/3}}{2e}-\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}}{3},\right.$$

$$\left.\sqrt{\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{e\left(-\frac{3(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)}}\right)\Bigg)\Bigg)+b\left(-\frac{2x}{3e\sqrt{\left(x^3+\frac{d}{e}\right)e}}-\frac{1}{9e^2\sqrt{e x^3+d}}\left(4I\sqrt{3}\,(-d e^2)^{1/}\right.\right.$$

$$3\sqrt{\frac{I\left(x+\frac{(-d e^2)^{1/3}}{2e}-\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}\sqrt{\frac{x-\frac{(-d e^2)^{1/3}}{e}}{-\frac{3(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}}}$$

$$\sqrt{\frac{-I\left(x+\frac{(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}\ \text{EllipticF}\left(\frac{\sqrt{3}\sqrt{\frac{I\left(x+\frac{(-d e^2)^{1/3}}{2e}-\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}}{3},\right.$$

$$\left.\sqrt{\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{e\left(-\frac{3(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)}}\right)\Bigg)\Bigg)+c\left(\frac{2dx}{3e^2\sqrt{\left(x^3+\frac{d}{e}\right)e}}+\frac{2x\sqrt{e x^3+d}}{5e^2}+\frac{1}{45e^3\sqrt{e x^3+d}}\left(32Id\sqrt{3}\,(-d e^2)^{1/}\right.\right.$$

$$3\sqrt{\frac{I\left(x+\frac{(-d e^2)^{1/3}}{2e}-\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}\sqrt{\frac{x-\frac{(-d e^2)^{1/3}}{e}}{-\frac{3(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}}}$$

$$\sqrt{\frac{-I\left(x+\frac{(-d e^2)^{1/3}}{2 e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2 e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}\ \text{EllipticF}\left(\frac{\sqrt{3}\sqrt{\frac{I\left(x+\frac{(-d e^2)^{1/3}}{2 e}-\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2 e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}}{3},\right.$$

$$\left.\left.\left.\sqrt{\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{e\left(-\frac{3(-d e^2)^{1/3}}{2 e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2 e}\right)}}\right)\right)\right)$$

Problem 14: Result more than twice size of optimal antiderivative.

$$\int \frac{c x^6+b x^3+a}{(e x^3+d)^{7/2}}\,dx$$

Optimal(type 4, 282 leaves, 4 steps):

$$\frac{2(a e^2-b d e+c d^2)x}{15 d e^2 (e x^3+d)^{5/2}}-\frac{2(-13 a e^2-2 b d e+17 c d^2)x}{135 d^2 e^2 (e x^3+d)^{3/2}}+\frac{2(91 a e^2+14 b d e+16 c d^2)x}{405 d^3 e^2\sqrt{e x^3+d}}$$

$$+\frac{1}{1215 d^3 e^{7/3}\sqrt{e x^3+d}\sqrt{\frac{d^{1/3}(d^{1/3}+e^{1/3}x)}{(e^{1/3}x+d^{1/3}(1+\sqrt{3}))^2}}}\Bigg(2(91 a e^2+14 b d e+16 c d^2)(d^{1/3}$$

$$+e^{1/3}x)\,\text{EllipticF}\left(\frac{e^{1/3}x+d^{1/3}(1-\sqrt{3})}{e^{1/3}x+d^{1/3}(1+\sqrt{3})},I\sqrt{3}+2I\right)\left(\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}\right)\sqrt{\frac{d^{2/3}-d^{1/3}e^{1/3}x+e^{2/3}x^2}{(e^{1/3}x+d^{1/3}(1+\sqrt{3}))^2}}\,3^{3/4}\Bigg)$$

Result(type 4, 1094 leaves):

$$a\left(\frac{2x\sqrt{e x^3+d}}{15 d e^3\left(x^3+\frac{d}{e}\right)^3}+\frac{26 x\sqrt{e x^3+d}}{135 d^2 e^2\left(x^3+\frac{d}{e}\right)^2}+\frac{182 x}{405 d^3\sqrt{\left(x^3+\frac{d}{e}\right)e}}-\frac{1}{1215 d^3 e\sqrt{e x^3+d}}\Bigg(182 I\sqrt{3}\,(-d e^2)^{1/}\right.$$

$$\sqrt[3]{\frac{I\left(x+\frac{(-d e^{2})^{1/3}}{2e}-\frac{I\sqrt{3}\,(-d e^{2})^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^{2})^{1/3}}}\;\sqrt{\frac{x-\frac{(-d e^{2})^{1/3}}{e}}{-\frac{3\,(-d e^{2})^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^{2})^{1/3}}{2e}}}$$

$$\sqrt{\frac{-I\left(x+\frac{(-d e^{2})^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^{2})^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^{2})^{1/3}}}\;\mathrm{EllipticF}\left(\frac{\sqrt{3}\sqrt{\frac{I\left(x+\frac{(-d e^{2})^{1/3}}{2e}-\frac{I\sqrt{3}\,(-d e^{2})^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^{2})^{1/3}}}}{3},\right.$$

$$\left.\sqrt{\frac{I\sqrt{3}\,(-d e^{2})^{1/3}}{e\left(-\frac{3\,(-d e^{2})^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^{2})^{1/3}}{2e}\right)}}\right)\Bigg)\Bigg)+b\left(-\frac{2x\sqrt{e x^{3}+d}}{15\,e^{4}\left(x^{3}+\frac{d}{e}\right)^{3}}+\frac{4x\sqrt{e x^{3}+d}}{135\,d\,e^{3}\left(x^{3}+\frac{d}{e}\right)^{2}}+\frac{28x}{405\,e\,d^{2}\sqrt{\left(x^{3}+\frac{d}{e}\right)e}}\right.$$

$$-\frac{1}{1215\,e^{2}d^{2}\sqrt{e x^{3}+d}}\Bigg(28\,I\sqrt{3}\,(-d e^{2})^{1/}$$

$$\sqrt[3]{\frac{I\left(x+\frac{(-d e^{2})^{1/3}}{2e}-\frac{I\sqrt{3}\,(-d e^{2})^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^{2})^{1/3}}}\;\sqrt{\frac{x-\frac{(-d e^{2})^{1/3}}{e}}{-\frac{3\,(-d e^{2})^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^{2})^{1/3}}{2e}}}$$

$$\sqrt{\frac{-I\left(x+\frac{(-d e^{2})^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^{2})^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^{2})^{1/3}}}\;\mathrm{EllipticF}\left(\frac{\sqrt{3}\sqrt{\frac{I\left(x+\frac{(-d e^{2})^{1/3}}{2e}-\frac{I\sqrt{3}\,(-d e^{2})^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^{2})^{1/3}}}}{3},\right.$$

$$\sqrt{\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{e\left(-\frac{3(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)}}\Bigg)\Bigg)\Bigg) + c\left(\frac{2 d x\sqrt{e x^3+d}}{15 e^5\left(x^3+\frac{d}{e}\right)^3} - \frac{34 x\sqrt{e x^3+d}}{135 e^4\left(x^3+\frac{d}{e}\right)^2} + \frac{32 x}{405 e^2 d\sqrt{\left(x^3+\frac{d}{e}\right)e}}\right.$$

$$-\frac{1}{1215 e^3 d\sqrt{e x^3+d}}\left(32 I\sqrt{3}\,(-d e^2)^{1/}\right.$$

$$3\sqrt{\frac{I\left(x+\frac{(-d e^2)^{1/3}}{2e}-\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}\sqrt{\frac{x-\frac{(-d e^2)^{1/3}}{e}}{-\frac{3(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}}}$$

$$\sqrt{\frac{-I\left(x+\frac{(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}\ \mathrm{EllipticF}\left(\frac{\sqrt{3}\sqrt{\frac{I\left(x+\frac{(-d e^2)^{1/3}}{2e}-\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)\sqrt{3}\,e}{(-d e^2)^{1/3}}}}{3},\right.$$

$$\sqrt{\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{e\left(-\frac{3(-d e^2)^{1/3}}{2e}+\frac{I\sqrt{3}\,(-d e^2)^{1/3}}{2e}\right)}}\Bigg)\Bigg)\Bigg)$$

```
Problem 15: Result is not expressed in closed-form.
```

$$\int \frac{x^2\left(e x^4+d\right)}{c x^8+b x^4+a}\,dx$$

```
Optimal(type 3, 291 leaves, 7 steps):
```

$$\frac{\arctan\left(\frac{2^{1/4} c^{1/4} x}{\left(-b-\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(e+\frac{b e-2 c d}{\sqrt{-4ac+b^2}}\right)2^{1/4}}{4 c^{3/4}\left(-b-\sqrt{-4ac+b^2}\right)^{1/4}} - \frac{\operatorname{arctanh}\left(\frac{2^{1/4} c^{1/4} x}{\left(-b-\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(e+\frac{b e-2 c d}{\sqrt{-4ac+b^2}}\right)2^{1/4}}{4 c^{3/4}\left(-b-\sqrt{-4ac+b^2}\right)^{1/4}}$$

$$+\frac{\arctan\left(\frac{2^{1/4}c^{1/4}x}{\left(-b+\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(e+\frac{-be+2cd}{\sqrt{-4ac+b^2}}\right)2^{1/4}}{4c^{3/4}\left(-b+\sqrt{-4ac+b^2}\right)^{1/4}}-\frac{\operatorname{arctanh}\left(\frac{2^{1/4}c^{1/4}x}{\left(-b+\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(e+\frac{-be+2cd}{\sqrt{-4ac+b^2}}\right)2^{1/4}}{4c^{3/4}\left(-b+\sqrt{-4ac+b^2}\right)^{1/4}}$$

Result(type 7, 50 leaves):

$$\frac{\left(\sum_{\_R=RootOf(\_Z^8c+\_Z^4b+a)}\frac{(\_R^6e+\_R^2d)\ln(x-\_R)}{2\_R^7c+\_R^3b}\right)}{4}$$

Problem 16: Result is not expressed in closed-form.

$$\int\frac{ex^4+d}{cx^8+bx^4+a}\,dx$$

Optimal(type 3, 291 leaves, 7 steps):

$$-\frac{\arctan\left(\frac{2^{1/4}c^{1/4}x}{\left(-b-\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(e+\frac{be-2cd}{\sqrt{-4ac+b^2}}\right)2^{3/4}}{4c^{1/4}\left(-b-\sqrt{-4ac+b^2}\right)^{3/4}}-\frac{\operatorname{arctanh}\left(\frac{2^{1/4}c^{1/4}x}{\left(-b-\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(e+\frac{be-2cd}{\sqrt{-4ac+b^2}}\right)2^{3/4}}{4c^{1/4}\left(-b-\sqrt{-4ac+b^2}\right)^{3/4}}$$

$$-\frac{\arctan\left(\frac{2^{1/4}c^{1/4}x}{\left(-b+\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(e+\frac{-be+2cd}{\sqrt{-4ac+b^2}}\right)2^{3/4}}{4c^{1/4}\left(-b+\sqrt{-4ac+b^2}\right)^{3/4}}-\frac{\operatorname{arctanh}\left(\frac{2^{1/4}c^{1/4}x}{\left(-b+\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(e+\frac{-be+2cd}{\sqrt{-4ac+b^2}}\right)2^{3/4}}{4c^{1/4}\left(-b+\sqrt{-4ac+b^2}\right)^{3/4}}$$

Result(type 7, 46 leaves):

$$\frac{\left(\sum_{\_R=RootOf(\_Z^8c+\_Z^4b+a)}\frac{(\_R^4e+d)\ln(x-\_R)}{2\_R^7c+\_R^3b}\right)}{4}$$

Problem 17: Result is not expressed in closed-form.

$$\int\frac{ex^4+d}{x^2\left(cx^8+bx^4+a\right)}\,dx$$

Optimal(type 3, 312 leaves, 8 steps):

$$-\frac{d}{xa}-\frac{c^{1/4}\arctan\left(\frac{2^{1/4}c^{1/4}x}{\left(-b-\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(d+\frac{2ae-bd}{\sqrt{-4ac+b^2}}\right)2^{1/4}}{4a\left(-b-\sqrt{-4ac+b^2}\right)^{1/4}}+\frac{c^{1/4}\operatorname{arctanh}\left(\frac{2^{1/4}c^{1/4}x}{\left(-b-\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(d+\frac{2ae-bd}{\sqrt{-4ac+b^2}}\right)2^{1/4}}{4a\left(-b-\sqrt{-4ac+b^2}\right)^{1/4}}$$

$$-\frac{c^{1/4}\arctan\left(\frac{2^{1/4}c^{1/4}x}{\left(-b+\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(d+\frac{-2ae+bd}{\sqrt{-4ac+b^2}}\right)2^{1/4}}{4a\left(-b+\sqrt{-4ac+b^2}\right)^{1/4}}+\frac{c^{1/4}\operatorname{arctanh}\left(\frac{2^{1/4}c^{1/4}x}{\left(-b+\sqrt{-4ac+b^2}\right)^{1/4}}\right)\left(d+\frac{-2ae+bd}{\sqrt{-4ac+b^2}}\right)2^{1/4}}{4a\left(-b+\sqrt{-4ac+b^2}\right)^{1/4}}$$

Result(type 7, 71 leaves):

$$-\frac{\sum_{\_R=RootOf(\_Z^8c+\_Z^4b+a)}\frac{\left(cd\_R^6+(-ae+bd)\_R^2\right)\ln(x-\_R)}{2\_R^7c+\_R^3b}}{4a}-\frac{d}{xa}$$

Problem 18: Result is not expressed in closed-form.

$$\int\frac{-x^4+1}{x^8-x^4+1}\,dx$$

Optimal(type 3, 307 leaves, 19 steps):

$$\frac{\ln\left(1+x^2-x\left(\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2}-\frac{\sqrt{6}}{6}\right)}{8}-\frac{\ln\left(1+x^2+x\left(\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2}-\frac{\sqrt{6}}{6}\right)}{8}-\frac{\arctan\left(\frac{-2x+\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}}{\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}}\right)}{4\left(\frac{3\sqrt{2}}{2}-\frac{\sqrt{6}}{2}\right)}$$

$$+\frac{\arctan\left(\frac{2x+\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}}{\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}}\right)}{4\left(\frac{3\sqrt{2}}{2}-\frac{\sqrt{6}}{2}\right)}-\frac{\ln\left(1+x^2-x\left(\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2}+\frac{\sqrt{6}}{6}\right)}{8}+\frac{\ln\left(1+x^2+x\left(\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}\right)\right)\left(\frac{\sqrt{2}}{2}+\frac{\sqrt{6}}{6}\right)}{8}$$

$$+\frac{\arctan\left(\frac{-2x+\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}}{\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}}\right)}{4\left(\frac{3\sqrt{2}}{2}+\frac{\sqrt{6}}{2}\right)}-\frac{\arctan\left(\frac{2x+\frac{\sqrt{6}}{2}+\frac{\sqrt{2}}{2}}{\frac{\sqrt{6}}{2}-\frac{\sqrt{2}}{2}}\right)}{4\left(\frac{3\sqrt{2}}{2}+\frac{\sqrt{6}}{2}\right)}$$

Result(type 7, 43 leaves):

$$\frac{\left(\sum_{\_R=RootOf(\_Z^8-\_Z^4+1)}\frac{\left(-\_R^4+1\right)\ln(x-\_R)}{2\_R^7-\_R^3}\right)}{4}$$

Problem 23: Result more than twice size of optimal antiderivative.

$$\int \frac{x^3}{\left(a+\frac{c}{x^2}+\frac{b}{x}\right)(e x+d)^2}\,dx$$

Optimal(type 3, 335 leaves, 7 steps):

$$-\frac{(2 a d+b e) x}{a^2 e^3}+\frac{x^2}{2 a e^2}+\frac{d^5}{e^4\left(a d^2-e(b d-c e)\right)(e x+d)}+\frac{d^4\left(3 a d^2-e(4 b d-5 c e)\right)\ln(e x+d)}{e^4\left(a d^2-e(b d-c e)\right)^2}$$
$$+\frac{\left(b^4 d^2-2 b^3 c d e+4 a b c^2 d e+a c^2\left(a d^2-c e^2\right)-b^2 c\left(3 a d^2-c e^2\right)\right)\ln\left(a x^2+b x+c\right)}{2 a^3\left(a d^2-e(b d-c e)\right)^2}$$
$$+\frac{\left(b^5 d^2-2 b^4 c d e+8 a b^2 c^2 d e-4 a^2 c^3 d e+a b c^2\left(5 a d^2-3 c e^2\right)-b^3 c\left(5 a d^2-c e^2\right)\right)\operatorname{arctanh}\left(\frac{2 x a+b}{\sqrt{-4 a c+b^2}}\right)}{a^3\left(a d^2-e(b d-c e)\right)^2\sqrt{-4 a c+b^2}}$$

Result(type 3, 942 leaves):

$$\frac{x^2}{2 a e^2}-\frac{2 d x}{a e^3}-\frac{b x}{a^2 e^2}+\frac{\ln\left(a x^2+b x+c\right) d^2 c^2}{2\left(a d^2-b d e+c e^2\right)^2 a}-\frac{3\ln\left(a x^2+b x+c\right) b^2 c d^2}{2\left(a d^2-b d e+c e^2\right)^2 a^2}+\frac{2\ln\left(a x^2+b x+c\right) b c^2 d e}{\left(a d^2-b d e+c e^2\right)^2 a^2}-\frac{\ln\left(a x^2+b x+c\right) c^3 e^2}{2\left(a d^2-b d e+c e^2\right)^2 a^2}$$
$$+\frac{\ln\left(a x^2+b x+c\right) b^4 d^2}{2\left(a d^2-b d e+c e^2\right)^2 a^3}-\frac{\ln\left(a x^2+b x+c\right) b^3 c d e}{\left(a d^2-b d e+c e^2\right)^2 a^3}+\frac{\ln\left(a x^2+b x+c\right) b^2 c^2 e^2}{2\left(a d^2-b d e+c e^2\right)^2 a^3}-\frac{5\arctan\left(\frac{2 x a+b}{\sqrt{4 a c-b^2}}\right) b c^2 d^2}{\left(a d^2-b d e+c e^2\right)^2 a\sqrt{4 a c-b^2}}$$
$$+\frac{4\arctan\left(\frac{2 x a+b}{\sqrt{4 a c-b^2}}\right) c^3 d e}{\left(a d^2-b d e+c e^2\right)^2 a\sqrt{4 a c-b^2}}+\frac{5\arctan\left(\frac{2 x a+b}{\sqrt{4 a c-b^2}}\right) b^3 c d^2}{\left(a d^2-b d e+c e^2\right)^2 a^2\sqrt{4 a c-b^2}}-\frac{8\arctan\left(\frac{2 x a+b}{\sqrt{4 a c-b^2}}\right) b^2 c^2 d e}{\left(a d^2-b d e+c e^2\right)^2 a^2\sqrt{4 a c-b^2}}$$
$$+\frac{3\arctan\left(\frac{2 x a+b}{\sqrt{4 a c-b^2}}\right) b c^3 e^2}{\left(a d^2-b d e+c e^2\right)^2 a^2\sqrt{4 a c-b^2}}-\frac{\arctan\left(\frac{2 x a+b}{\sqrt{4 a c-b^2}}\right) b^5 d^2}{\left(a d^2-b d e+c e^2\right)^2 a^3\sqrt{4 a c-b^2}}+\frac{2\arctan\left(\frac{2 x a+b}{\sqrt{4 a c-b^2}}\right) b^4 c d e}{\left(a d^2-b d e+c e^2\right)^2 a^3\sqrt{4 a c-b^2}}$$
$$-\frac{\arctan\left(\frac{2 x a+b}{\sqrt{4 a c-b^2}}\right) b^3 c^2 e^2}{\left(a d^2-b d e+c e^2\right)^2 a^3\sqrt{4 a c-b^2}}+\frac{3 d^6\ln(e x+d) a}{e^4\left(a d^2-b d e+c e^2\right)^2}-\frac{4 d^5\ln(e x+d) b}{e^3\left(a d^2-b d e+c e^2\right)^2}+\frac{5 d^4\ln(e x+d) c}{e^2\left(a d^2-b d e+c e^2\right)^2}$$
$$+\frac{d^5}{e^4\left(a d^2-b d e+c e^2\right)(e x+d)}$$

Problem 24: Result more than twice size of optimal antiderivative.

$$\int x^3\sqrt{a+\frac{c}{x^2}+\frac{b}{x}}\,\sqrt{e x+d}\,dx$$

Optimal(type 4, 702 leaves, 10 steps):

$$-\frac{4\left(8a^2d^2+3b^2e^2+ae(4bd-7ce)\right)x(ex+d)^{3/2}\sqrt{a+\frac{c}{x^2}+\frac{b}{x}}}{315a^2e^3}+\frac{2(ad+be)x(ex+d)^{5/2}\sqrt{a+\frac{c}{x^2}+\frac{b}{x}}}{63ae^3}$$

$$+\frac{2\left(19a^3d^3-6a^2cde^2+8b^3e^3+3abe^2(bd-9ce)\right)x\sqrt{a+\frac{c}{x^2}+\frac{b}{x}}\sqrt{ex+d}}{315a^3e^3}+\frac{2x^4\sqrt{a+\frac{c}{x^2}+\frac{b}{x}}\sqrt{ex+d}}{9}$$

$$-\frac{1}{315a^4e^4(ax^2+bx+c)\sqrt{\frac{a(ex+d)}{2ad-e\left(b+\sqrt{-4ac+b^2}\right)}}}\left(2\left(8a^4d^4+8b^4e^4-a^3d^2e(4bd-9ce)-4ab^2e^3(bd+9ce)-3a^2e^2\left(b^2d^2-5bcde-7c^2e^2\right)\right)x\,\mathrm{EllipticE}\left(\frac{\sqrt{\frac{b+2xa+\sqrt{-4ac+b^2}}{\sqrt{-4ac+b^2}}}\sqrt{2}}{2},\sqrt{-\frac{2e\sqrt{-4ac+b^2}}{2ad-e\left(b+\sqrt{-4ac+b^2}\right)}}\right)\sqrt{2}\sqrt{-4ac+b^2}\sqrt{a+\frac{c}{x^2}+\frac{b}{x}}\sqrt{ex+d}\sqrt{-\frac{a(ax^2+bx+c)}{-4ac+b^2}}\right)$$

$$+\frac{1}{315a^4e^4(ax^2+bx+c)\sqrt{ex+d}}\left(2\left(16a^3d^3+6a^2cde^2-8b^3e^3-3abe^2(bd-9ce)\right)\left(ad^2-e(bd-ce)\right)x\,\mathrm{EllipticF}\left(\frac{\sqrt{\frac{b+2xa+\sqrt{-4ac+b^2}}{\sqrt{-4ac+b^2}}}\sqrt{2}}{2},\sqrt{-\frac{2e\sqrt{-4ac+b^2}}{2ad-e\left(b+\sqrt{-4ac+b^2}\right)}}\right)\sqrt{2}\sqrt{-4ac+b^2}\sqrt{a+\frac{c}{x^2}+\frac{b}{x}}\sqrt{-\frac{a(ax^2+bx+c)}{-4ac+b^2}}\sqrt{\frac{a(ex+d)}{2ad-e\left(b+\sqrt{-4ac+b^2}\right)}}\right)$$

Result(type ?, 9181 leaves): Display of huge result suppressed!

Problem 25: Result more than twice size of optimal antiderivative.

$$\int x^2 \sqrt{a+\frac{c}{x^2}+\frac{b}{x}}\,\sqrt{ex+d}\,dx$$

Optimal(type 4, 572 leaves, 8 steps):

$$-\frac{2x\left(4a^2d^2+4b^2e^2-ae(2bd-5ce)-3ae(ad-4be)x\right)\sqrt{a+\frac{c}{x^2}+\frac{b}{x}}\,\sqrt{ex+d}}{105a^2e^2}+\frac{2x\left(ax^2+bx+c\right)\sqrt{a+\frac{c}{x^2}+\frac{b}{x}}\,\sqrt{ex+d}}{7a}$$

$$+\frac{1}{105a^3e^3\left(ax^2+bx+c\right)\sqrt{\frac{a(ex+d)}{2ad-e\left(b+\sqrt{-4ac+b^2}\right)}}}\Bigg(\left(8a^3d^3+8b^3e^3-a^2de(5bd-16ce)-abe^2(5bd+29ce)\right)x\,\text{EllipticE}\left(\frac{\sqrt{\frac{b+2xa+\sqrt{-4ac+b^2}}{\sqrt{-4ac+b^2}}}\,\sqrt{2}}{2},\sqrt{-\frac{2e\sqrt{-4ac+b^2}}{2ad-e\left(b+\sqrt{-4ac+b^2}\right)}}\right)\sqrt{2}\,\sqrt{-4ac+b^2}\,\sqrt{a+\frac{c}{x^2}+\frac{b}{x}}\,\sqrt{ex+d}\,\sqrt{-\frac{a\left(ax^2+bx+c\right)}{-4ac+b^2}}\Bigg)$$

$$-\frac{1}{105a^3e^3\left(ax^2+bx+c\right)\sqrt{ex+d}}\Bigg(2\left(8a^2d^2-4b^2e^2-ae(bd-10ce)\right)\left(ad^2-e(bd-ce)\right)x\,\text{EllipticF}\left(\frac{\sqrt{\frac{b+2xa+\sqrt{-4ac+b^2}}{\sqrt{-4ac+b^2}}}\,\sqrt{2}}{2},\sqrt{-\frac{2e\sqrt{-4ac+b^2}}{2ad-e\left(b+\sqrt{-4ac+b^2}\right)}}\right)\sqrt{2}\,\sqrt{-4ac+b^2}\,\sqrt{a+\frac{c}{x^2}+\frac{b}{x}}\,\sqrt{-\frac{a\left(ax^2+bx+c\right)}{-4ac+b^2}}\,\sqrt{\frac{a(ex+d)}{2ad-e\left(b+\sqrt{-4ac+b^2}\right)}}\Bigg)$$

Result(type ?, 6301 leaves): Display of huge result suppressed!

Problem 26: Unable to integrate problem.

$$\int \frac{(fx)^m\left(a+cx^{2n}\right)^p}{\left(d+ex^n\right)^2}\,dx$$

Optimal(type 6, 290 leaves, 8 steps):

$$\frac{x\,(fx)^m\,(a+c x^{2n})^p\,\mathit{AppellF1}\left(\frac{1+m}{2n},2,-p,1+\frac{1+m}{2n},\frac{e^2x^{2n}}{d^2},-\frac{cx^{2n}}{a}\right)}{d^2\,(1+m)\left(1+\frac{cx^{2n}}{a}\right)^p}$$
$$-\frac{2\,e x^{1+n}\,(fx)^m\,(a+cx^{2n})^p\,\mathit{AppellF1}\left(\frac{1+m+n}{2n},2,-p,\frac{1+m+3n}{2n},\frac{e^2x^{2n}}{d^2},-\frac{cx^{2n}}{a}\right)}{d^3\,(1+m+n)\left(1+\frac{cx^{2n}}{a}\right)^p}$$
$$+\frac{e^2 x^{1+2n}\,(fx)^m\,(a+cx^{2n})^p\,\mathit{AppellF1}\left(\frac{1+m+2n}{2n},2,-p,\frac{1+m+4n}{2n},\frac{e^2x^{2n}}{d^2},-\frac{cx^{2n}}{a}\right)}{d^4\,(1+m+2n)\left(1+\frac{cx^{2n}}{a}\right)^p}$$

Result(type 8, 28 leaves):

$$\int \frac{(fx)^m\,(a+cx^{2n})^p}{(d+ex^n)^2}\,dx$$

Problem 27: Unable to integrate problem.

$$\int \frac{(fx)^m\,(a+cx^{2n})^p}{(d+ex^n)^3}\,dx$$

Optimal(type 6, 396 leaves, 10 steps):

$$\frac{x\,(fx)^m\,(a+c x^{2n})^p\,\mathit{AppellF1}\left(\frac{1+m}{2n},3,-p,1+\frac{1+m}{2n},\frac{e^2x^{2n}}{d^2},-\frac{cx^{2n}}{a}\right)}{d^3\,(1+m)\left(1+\frac{cx^{2n}}{a}\right)^p}$$
$$-\frac{3\,e x^{1+n}\,(fx)^m\,(a+cx^{2n})^p\,\mathit{AppellF1}\left(\frac{1+m+n}{2n},3,-p,\frac{1+m+3n}{2n},\frac{e^2x^{2n}}{d^2},-\frac{cx^{2n}}{a}\right)}{d^4\,(1+m+n)\left(1+\frac{cx^{2n}}{a}\right)^p}$$
$$+\frac{3\,e^2 x^{1+2n}\,(fx)^m\,(a+cx^{2n})^p\,\mathit{AppellF1}\left(\frac{1+m+2n}{2n},3,-p,\frac{1+m+4n}{2n},\frac{e^2x^{2n}}{d^2},-\frac{cx^{2n}}{a}\right)}{d^5\,(1+m+2n)\left(1+\frac{cx^{2n}}{a}\right)^p}$$

$$-\frac{e^3 x^{1+3n} (fx)^m (a+cx^{2n})^p \, AppellF1\left(\frac{1+m+3n}{2n}, 3, -p, \frac{1+m+5n}{2n}, \frac{e^2 x^{2n}}{d^2}, -\frac{cx^{2n}}{a}\right)}{d^6 (1+m+3n) \left(1+\frac{cx^{2n}}{a}\right)^p}$$

Result(type 8, 28 leaves):

$$\int \frac{(fx)^m (a+cx^{2n})^p}{(d+ex^n)^3} \, dx$$

Problem 28: Result more than twice size of optimal antiderivative.

$$\int x^{-1+n} (b+2cx^n) (-a+bx^n+cx^{2n})^{13} \, dx$$

Optimal(type 3, 23 leaves, 2 steps):

$$\frac{(a-bx^n-cx^{2n})^{14}}{14n}$$

Result(type ?, 2045 leaves): Display of huge result suppressed!

Problem 29: Result more than twice size of optimal antiderivative.

$$\int (2cx+b) (cx^2+bx)^{13} \, dx$$

Optimal(type 1, 13 leaves, 1 step):

$$\frac{(cx^2+bx)^{14}}{14}$$

Result(type 1, 154 leaves):

$$\frac{1}{14} c^{14} x^{28} + b c^{13} x^{27} + \frac{13}{2} b^2 c^{12} x^{26} + 26 b^3 c^{11} x^{25} + \frac{143}{2} b^4 c^{10} x^{24} + 143 b^5 c^9 x^{23} + \frac{429}{2} b^6 c^8 x^{22} + \frac{1716}{7} b^7 c^7 x^{21} + \frac{429}{2} b^8 c^6 x^{20} + 143 b^9 c^5 x^{19} + \frac{143}{2} b^{10} c^4 x^{18} + 26 b^{11} c^3 x^{17} + \frac{13}{2} b^{12} c^2 x^{16} + b^{13} c x^{15} + \frac{1}{14} b^{14} x^{14}$$

Problem 30: Result more than twice size of optimal antiderivative.

$$\int x (2cx^2+b) (cx^4+bx^2)^{13} \, dx$$

Optimal(type 1, 14 leaves, 3 steps):

$$\frac{x^{28} (cx^2+b)^{14}}{28}$$

Result(type 1, 156 leaves):

$$\frac{1}{28} c^{14} x^{56} + \frac{1}{2} b c^{13} x^{54} + \frac{13}{4} b^2 c^{12} x^{52} + 13 b^3 c^{11} x^{50} + \frac{143}{4} b^4 c^{10} x^{48} + \frac{143}{2} b^5 c^9 x^{46} + \frac{429}{4} b^6 c^8 x^{44} + \frac{858}{7} b^7 c^7 x^{42} + \frac{429}{4} b^8 c^6 x^{40} + \frac{143}{2} b^9 c^5 x^{38}$$

$$+\frac{143}{4} b^{10} c^4 x^{36}+13 b^{11} c^3 x^{34}+\frac{13}{4} b^{12} c^2 x^{32}+\frac{1}{2} b^{13} c x^{30}+\frac{1}{28} b^{14} x^{28}$$

Problem 38: Result more than twice size of optimal antiderivative.

$$\int \frac{x\left(2 c x^2+b\right)}{\left(c x^4+b x^2\right)^8} \, dx$$

Optimal(type 1, 14 leaves, 3 steps):

$$-\frac{1}{14 x^{14}\left(c x^2+b\right)^7}$$

Result(type 1, 196 leaves):

$$-\frac{c^8\left(-\frac{b^6}{7 c\left(c x^2+b\right)^7}-\frac{66 b}{c\left(c x^2+b\right)^2}-\frac{30 b^2}{c\left(c x^2+b\right)^3}-\frac{132}{c\left(c x^2+b\right)}-\frac{12 b^3}{c\left(c x^2+b\right)^4}-\frac{4 b^4}{c\left(c x^2+b\right)^5}-\frac{b^5}{c\left(c x^2+b\right)^6}\right)}{2 b^{13}}-\frac{1}{14 b^7 x^{14}}-\frac{66 c^6}{b^{13} x^2}$$
$$+\frac{33 c^5}{b^{12} x^4}-\frac{15 c^4}{b^{11} x^6}+\frac{6 c^3}{b^{10} x^8}-\frac{2 c^2}{b^9 x^{10}}+\frac{c}{2 b^8 x^{12}}$$

Problem 41: Unable to integrate problem.

$$\int \frac{(f x)^m\left(d+e x^n\right)}{\left(a+b x^n+c x^{2 n}\right)^2} \, dx$$

Optimal(type 5, 364 leaves, 5 steps):

$$\frac{(f x)^{1+m}\left(b^2 d-2 d c a-b e a+c(-2 a e+b d) x^n\right)}{a\left(-4 a c+b^2\right) f n\left(a+b x^n+c x^{2 n}\right)}-\frac{1}{a\left(-4 a c+b^2\right) f(1+m) n\left(b-\sqrt{-4 a c+b^2}\right)}\left(c (f x)^{1+m} \operatorname{hypergeom}\left(\left[1, \frac{1+m}{n}\right],\right.\right.$$
$$\left.\left.\left[\frac{1+m+n}{n}\right], -\frac{2 c x^n}{b-\sqrt{-4 a c+b^2}}\right)\left((-2 a e+b d)(1+m-n)+\frac{-4 a c d(1+m-2 n)+b^2 d(1+m-n)-2 a b e n}{\sqrt{-4 a c+b^2}}\right)\right)$$
$$-\frac{1}{a\left(-4 a c+b^2\right) f(1+m) n\left(b+\sqrt{-4 a c+b^2}\right)}\left(c (f x)^{1+m} \operatorname{hypergeom}\left(\left[1, \frac{1+m}{n}\right],\left[\frac{1+m+n}{n}\right], -\frac{2 c x^n}{b+\sqrt{-4 a c+b^2}}\right)\left((-2 a e+b d)(1+m\right.\right.$$
$$\left.\left.-n)+\frac{4 a c d(1+m-2 n)-b^2 d(1+m-n)+2 a b e n}{\sqrt{-4 a c+b^2}}\right)\right)$$

Result(type 8, 31 leaves):

$$\int \frac{(f x)^m\left(d+e x^n\right)}{\left(a+b x^n+c x^{2 n}\right)^2} \, dx$$

Problem 42: Unable to integrate problem.

$$\int \frac{x\left(d+e x^n\right)^q}{a+b x^n+c x^{2 n}}\, dx$$

Optimal(type 6, 198 leaves, 5 steps):

$$-\frac{c x^2 \left(d+e x^n\right)^q AppellF1\left(\frac{2}{n}, 1, -q, \frac{n+2}{n}, -\frac{2 c x^n}{b-\sqrt{-4 a c+b^2}}, -\frac{e x^n}{d}\right)}{\left(1+\frac{e x^n}{d}\right)^q \left(b^2-4 a c-b \sqrt{-4 a c+b^2}\right)} - \frac{c x^2 \left(d+e x^n\right)^q AppellF1\left(\frac{2}{n}, 1, -q, \frac{n+2}{n}, -\frac{2 c x^n}{b+\sqrt{-4 a c+b^2}}, -\frac{e x^n}{d}\right)}{\left(1+\frac{e x^n}{d}\right)^q \left(b^2-4 a c+b \sqrt{-4 a c+b^2}\right)}$$

Result(type 8, 29 leaves):

$$\int \frac{x\left(d+e x^n\right)^q}{a+b x^n+c x^{2 n}}\, dx$$

Problem 43: Unable to integrate problem.

$$\int \frac{\left(d+e x^n\right)^q}{a+b x^n+c x^{2 n}}\, dx$$

Optimal(type 6, 186 leaves, 5 steps):

$$-\frac{2 c x \left(d+e x^n\right)^q AppellF1\left(\frac{1}{n}, 1, -q, 1+\frac{1}{n}, -\frac{2 c x^n}{b-\sqrt{-4 a c+b^2}}, -\frac{e x^n}{d}\right)}{\left(1+\frac{e x^n}{d}\right)^q \left(b^2-4 a c-b \sqrt{-4 a c+b^2}\right)} - \frac{2 c x \left(d+e x^n\right)^q AppellF1\left(\frac{1}{n}, 1, -q, 1+\frac{1}{n}, -\frac{2 c x^n}{b+\sqrt{-4 a c+b^2}}, -\frac{e x^n}{d}\right)}{\left(1+\frac{e x^n}{d}\right)^q \left(b^2-4 a c+b \sqrt{-4 a c+b^2}\right)}$$

Result(type 8, 28 leaves):

$$\int \frac{\left(d+e x^n\right)^q}{a+b x^n+c x^{2 n}}\, dx$$

Problem 44: Unable to integrate problem.

$$\int \frac{x^2\left(d+e x^n\right)^q}{\left(a+b x^n+c x^{2 n}\right)^2}\, dx$$

Optimal(type 1, 1 leaves, 0 steps):

$$0$$

Result(type 8, 31 leaves):

$$\int \frac{x^2\left(d+e x^n\right)^q}{\left(a+b x^n+c x^{2 n}\right)^2}\, dx$$

Problem 45: Unable to integrate problem.

$$\int \frac{(d+e x^n)^q}{x (a+b x^n+c x^{2n})^2}\, dx$$

Optimal(type 5, 757 leaves, 0 steps):

$$\frac{(ex+d)^{q+1} \left(b^2 c d-2 a c^2 d-b^3 e+3 a b c e+c \left(2 a c e-b^2 e+b c d\right) x\right)}{a \left(-4 a c+b^2\right) \left(a e^2-b d e+c d^2\right) \left(c x^2+b x+a\right)}-\frac{(ex+d)^{q+1} \operatorname{hypergeom}\left([1,q+1],[2+q],\frac{ex+d}{d}\right)}{a^2 d (q+1)}$$

$$-\frac{c (ex+d)^{q+1} \operatorname{hypergeom}\left([1,1],[1-q],\frac{-2 c d+e\left(b-\sqrt{-4 a c+b^2}\right)}{e\left(b+2 c x-\sqrt{-4 a c+b^2}\right)}\right)\left(1+\frac{b}{\sqrt{-4 a c+b^2}}\right)}{a^2 e q\left(b+2 c x-\sqrt{-4 a c+b^2}\right)}$$

$$-\frac{1}{a\left(-4 a c+b^2\right) e\left(a e^2-b d e+c d^2\right) q\left(b+2 c x-\sqrt{-4 a c+b^2}\right)}\Bigg(c (ex+d)^{q+1} \operatorname{hypergeom}\Bigg([1,1],[1-q],$$

$$\frac{-2 c d+e\left(b-\sqrt{-4 a c+b^2}\right)}{e\left(b+2 c x-\sqrt{-4 a c+b^2}\right)}\Bigg)\left(e\left(2 a c e-b^2 e+b c d\right) q+\frac{-2 b c\left(c d^2+a e^2(1-2 q)\right)-4 a c^2 d e q-b^3 e^2 q+b^2 c d e(2+q)}{\sqrt{-4 a c+b^2}}\right)\Bigg)$$

$$-\frac{c (ex+d)^{q+1} \operatorname{hypergeom}\left([1,1],[1-q],\frac{-2 c d+e\left(b+\sqrt{-4 a c+b^2}\right)}{e\left(b+2 c x+\sqrt{-4 a c+b^2}\right)}\right)\left(1-\frac{b}{\sqrt{-4 a c+b^2}}\right)}{a^2 e q\left(b+2 c x+\sqrt{-4 a c+b^2}\right)}$$

$$-\frac{1}{a\left(-4 a c+b^2\right) e\left(a e^2-b d e+c d^2\right) q\left(b+2 c x+\sqrt{-4 a c+b^2}\right)}\Bigg(c (ex+d)^{q+1} \operatorname{hypergeom}\Bigg([1,1],[1-q],$$

$$\frac{-2 c d+e\left(b+\sqrt{-4 a c+b^2}\right)}{e\left(b+2 c x+\sqrt{-4 a c+b^2}\right)}\Bigg)\left(e\left(2 a c e-b^2 e+b c d\right) q+\frac{2 b c\left(c d^2+a e^2(1-2 q)\right)+4 a c^2 d e q+b^3 e^2 q-b^2 c d e(2+q)}{\sqrt{-4 a c+b^2}}\right)\Bigg)$$

Result(type 8, 31 leaves):

$$\int \frac{(d+e x^n)^q}{x (a+b x^n+c x^{2n})^2}\, dx$$

Problem 46: Unable to integrate problem.

$$\int \frac{(d+e x^n)^q}{x^2 (a+b x^n+c x^{2n})^2}\, dx$$

Optimal(type 1, 1 leaves, 0 steps):

$$0$$

Result(type 8, 31 leaves):

$$\int \frac{(d+e x^n)^q}{x^2 \left(a+b x^n+c x^{2 n}\right)^2}\, dx$$

Test results for the 7 problems in "1.2.3.5 P(x) (d x)^m (a+b x^n+c x^(2 n))^p.txt"

Problem 1: Result is not expressed in closed-form.

$$\int \frac{m x^8+l x^7+k x^6+j x^5+h x^4+g x^3+x^2 f+e x+d}{c x^6+b x^3+a}\, dx$$

Optimal(type 3, 1374 leaves, 37 steps):

$$\frac{k x}{c}+\frac{l x^2}{2 c}+\frac{m x^3}{3 c}+\frac{(-b m+c j)\ln(c x^6+b x^3+a)}{6 c^2}+\frac{\ln\left(2^{1/3} c^{1/3} x+\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}\right)\left(g-\frac{b k}{c}+\frac{2 c^2 d+b^2 k-c(2 a k+b g)}{c\sqrt{-4 a c+b^2}}\right) 2^{2/3}}{6 c^{1/3}\left(b-\sqrt{-4 a c+b^2}\right)^{2/3}}$$
$$-\frac{\ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}+\left(b-\sqrt{-4 a c+b^2}\right)^{2/3}\right)\left(g-\frac{b k}{c}+\frac{2 c^2 d+b^2 k-c(2 a k+b g)}{c\sqrt{-4 a c+b^2}}\right) 2^{2/3}}{12 c^{1/3}\left(b-\sqrt{-4 a c+b^2}\right)^{2/3}}$$
$$-\frac{\arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} c^{1/3} x}{\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\left(g-\frac{b k}{c}+\frac{2 c^2 d+b^2 k-c(2 a k+b g)}{c\sqrt{-4 a c+b^2}}\right) 2^{2/3}\sqrt{3}}{6 c^{1/3}\left(b-\sqrt{-4 a c+b^2}\right)^{2/3}}$$
$$-\frac{\ln\left(2^{1/3} c^{1/3} x+\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}\right)\left(h-\frac{b l}{c}+\frac{2 c^2 e+b^2 l-c(2 a l+b h)}{c\sqrt{-4 a c+b^2}}\right) 2^{1/3}}{6 c^{2/3}\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}$$
$$+\frac{\ln\left(2^{2/3} c^{2/3} x^2-2^{1/3} c^{1/3} x\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}+\left(b-\sqrt{-4 a c+b^2}\right)^{2/3}\right)\left(h-\frac{b l}{c}+\frac{2 c^2 e+b^2 l-c(2 a l+b h)}{c\sqrt{-4 a c+b^2}}\right) 2^{1/3}}{12 c^{2/3}\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}$$
$$-\frac{\arctan\left(\frac{\left(1-\frac{2\, 2^{1/3} c^{1/3} x}{\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\left(h-\frac{b l}{c}+\frac{2 c^2 e+b^2 l-c(2 a l+b h)}{c\sqrt{-4 a c+b^2}}\right) 2^{1/3}\sqrt{3}}{6 c^{2/3}\left(b-\sqrt{-4 a c+b^2}\right)^{1/3}}$$

$$-\frac{\left(-2acm+b^2m-bcj+2c^2f\right)\operatorname{arctanh}\left(\frac{2cx^3+b}{\sqrt{-4ac+b^2}}\right)}{3c^2\sqrt{-4ac+b^2}}$$

$$+\frac{\ln\left(2^{1/3}c^{1/3}x+\left(b+\sqrt{-4ac+b^2}\right)^{1/3}\right)\left(g-\frac{bk}{c}+\frac{2ack-b^2k+bcg-2c^2d}{c\sqrt{-4ac+b^2}}\right)2^{2/3}}{6c^{1/3}\left(b+\sqrt{-4ac+b^2}\right)^{2/3}}$$

$$-\frac{\ln\left(2^{2/3}c^{2/3}x^2-2^{1/3}c^{1/3}x\left(b+\sqrt{-4ac+b^2}\right)^{1/3}+\left(b+\sqrt{-4ac+b^2}\right)^{2/3}\right)\left(g-\frac{bk}{c}+\frac{2ack-b^2k+bcg-2c^2d}{c\sqrt{-4ac+b^2}}\right)2^{2/3}}{12c^{1/3}\left(b+\sqrt{-4ac+b^2}\right)^{2/3}}$$

$$-\frac{\arctan\left(\frac{\left(1-\frac{2\,2^{1/3}c^{1/3}x}{\left(b+\sqrt{-4ac+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\left(g-\frac{bk}{c}+\frac{2ack-b^2k+bcg-2c^2d}{c\sqrt{-4ac+b^2}}\right)2^{2/3}\sqrt{3}}{6c^{1/3}\left(b+\sqrt{-4ac+b^2}\right)^{2/3}}$$

$$-\frac{\ln\left(2^{1/3}c^{1/3}x+\left(b+\sqrt{-4ac+b^2}\right)^{1/3}\right)\left(h-\frac{bl}{c}+\frac{2acl-b^2l+bch-2c^2e}{c\sqrt{-4ac+b^2}}\right)2^{1/3}}{6c^{2/3}\left(b+\sqrt{-4ac+b^2}\right)^{1/3}}$$

$$+\frac{\ln\left(2^{2/3}c^{2/3}x^2-2^{1/3}c^{1/3}x\left(b+\sqrt{-4ac+b^2}\right)^{1/3}+\left(b+\sqrt{-4ac+b^2}\right)^{2/3}\right)\left(h-\frac{bl}{c}+\frac{2acl-b^2l+bch-2c^2e}{c\sqrt{-4ac+b^2}}\right)2^{1/3}}{12c^{2/3}\left(b+\sqrt{-4ac+b^2}\right)^{1/3}}$$

$$-\frac{\arctan\left(\frac{\left(1-\frac{2\,2^{1/3}c^{1/3}x}{\left(b+\sqrt{-4ac+b^2}\right)^{1/3}}\right)\sqrt{3}}{3}\right)\left(h-\frac{bl}{c}+\frac{2acl-b^2l+bch-2c^2e}{c\sqrt{-4ac+b^2}}\right)2^{1/3}\sqrt{3}}{6c^{2/3}\left(b+\sqrt{-4ac+b^2}\right)^{1/3}}$$

Result(type 7, 133 leaves):

$$\frac{mx^3}{3c}+\frac{lx^2}{2c}+\frac{kx}{c}+\frac{\displaystyle\sum_{\_R=RootOf(\_Z^6c+\_Z^3b+a)}\frac{\left((-bm+cj)\_R^5+(-bl+ch)\_R^4+(-bk+cg)\_R^3+(-am+cf)\_R^2+(-al+ce)\_R-ak+cd\right)\ln(x-\_R)}{2\_R^5c+\_R^2b}}{3c}$$

Problem 2: Unable to integrate problem.

$$\int \frac{ex+d}{a+b\,x^n+c\,x^{2n}}\,dx$$

Optimal(type 5, 255 leaves, 9 steps):

$$-\frac{2\,c\,d\,x\,\text{hypergeom}\left(\left[1,\frac{1}{n}\right],\left[1+\frac{1}{n}\right],-\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}}\right)}{b^2-4\,a\,c-b\sqrt{-4\,a\,c+b^2}}-\frac{c\,e\,x^2\,\text{hypergeom}\left(\left[1,\frac{2}{n}\right],\left[\frac{n+2}{n}\right],-\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}}\right)}{b^2-4\,a\,c-b\sqrt{-4\,a\,c+b^2}}$$
$$-\frac{2\,c\,d\,x\,\text{hypergeom}\left(\left[1,\frac{1}{n}\right],\left[1+\frac{1}{n}\right],-\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)}{b^2-4\,a\,c+b\sqrt{-4\,a\,c+b^2}}-\frac{c\,e\,x^2\,\text{hypergeom}\left(\left[1,\frac{2}{n}\right],\left[\frac{n+2}{n}\right],-\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)}{b^2-4\,a\,c+b\sqrt{-4\,a\,c+b^2}}$$

Result(type 8, 24 leaves):

$$\int \frac{ex+d}{a+b\,x^n+c\,x^{2n}}\,dx$$

Problem 3: Unable to integrate problem.

$$\int \frac{ex+d}{\left(a+b\,x^n+c\,x^{2n}\right)^2}\,dx$$

Optimal(type 5, 718 leaves, 15 steps):

$$\frac{d\,x\,(b^2-2\,a\,c+b\,c\,x^n)}{a\,(-4\,a\,c+b^2)\,n\,(a+b\,x^n+c\,x^{2n})}+\frac{e\,x^2\,(b^2-2\,a\,c+b\,c\,x^n)}{a\,(-4\,a\,c+b^2)\,n\,(a+b\,x^n+c\,x^{2n})}$$
$$-\frac{2\,b\,c^2\,e\,(-n+2)\,x^{n+2}\,\text{hypergeom}\left(\left[1,\frac{n+2}{n}\right],\left[2+\frac{2}{n}\right],-\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}}\right)}{a\,(-4\,a\,c+b^2)^{3/2}\,n\,(n+2)\,\left(b-\sqrt{-4\,a\,c+b^2}\right)}$$
$$+\frac{2\,b\,c^2\,e\,(-n+2)\,x^{n+2}\,\text{hypergeom}\left(\left[1,\frac{n+2}{n}\right],\left[2+\frac{2}{n}\right],-\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)}{a\,(-4\,a\,c+b^2)^{3/2}\,n\,(n+2)\,\left(b+\sqrt{-4\,a\,c+b^2}\right)}$$
$$-\frac{c\,e\,\left(4\,a\,c\,(1-n)-b^2\,(-n+2)\right)\,x^2\,\text{hypergeom}\left(\left[1,\frac{2}{n}\right],\left[\frac{n+2}{n}\right],-\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}}\right)}{a\,(-4\,a\,c+b^2)\,n\,\left(b^2-4\,a\,c-b\sqrt{-4\,a\,c+b^2}\right)}$$
$$-\frac{c\,e\,\left(4\,a\,c\,(1-n)-b^2\,(-n+2)\right)\,x^2\,\text{hypergeom}\left(\left[1,\frac{2}{n}\right],\left[\frac{n+2}{n}\right],-\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)}{a\,(-4\,a\,c+b^2)\,n\,\left(b^2-4\,a\,c+b\sqrt{-4\,a\,c+b^2}\right)}$$

$$-\frac{c\,d\,x\,\mathrm{hypergeom}\left(\left[1,\frac{1}{n}\right],\left[1+\frac{1}{n}\right],-\frac{2\,c\,x^n}{b-\sqrt{-4\,a\,c+b^2}}\right)\left(4\,a\,c\,(1-2\,n)-b^2\,(1-n)-b\,(1-n)\sqrt{-4\,a\,c+b^2}\right)}{a\,(-4\,a\,c+b^2)\,n\left(b^2-4\,a\,c-b\sqrt{-4\,a\,c+b^2}\right)}$$

$$-\frac{c\,d\,x\,\mathrm{hypergeom}\left(\left[1,\frac{1}{n}\right],\left[1+\frac{1}{n}\right],-\frac{2\,c\,x^n}{b+\sqrt{-4\,a\,c+b^2}}\right)\left(4\,a\,c\,(1-2\,n)-b^2\,(1-n)+b\,(1-n)\sqrt{-4\,a\,c+b^2}\right)}{a\,(-4\,a\,c+b^2)\,n\left(b^2-4\,a\,c+b\sqrt{-4\,a\,c+b^2}\right)}$$

Result(type 8, 201 leaves):

$$\frac{x\,(e\,x+d)\,\left(-b\,c\,e^{n\ln(x)}+2\,a\,c-b^2\right)}{(4\,a\,c-b^2)\,a\,n\left(a+b\,e^{n\ln(x)}+c\,(e^{n\ln(x)})^2\right)}+$$
$$\int\frac{-b\,c\,e\,n\,x\,e^{n\ln(x)}+4\,a\,c\,e\,n\,x-b^2\,e\,n\,x-b\,c\,d\,n\,e^{n\ln(x)}+2\,b\,c\,x\,e\,e^{n\ln(x)}+4\,a\,c\,d\,n-4\,a\,c\,e\,x-b^2\,d\,n+2\,b^2\,e\,x+b\,c\,d\,e^{n\ln(x)}-2\,d\,c\,a+b^2\,d}{(4\,a\,c-b^2)\,a\,n\left(a+b\,e^{n\ln(x)}+c\,(e^{n\ln(x)})^2\right)}\,dx$$

Problem 4: Unable to integrate problem.

$$\int\frac{-a\,h\,x^{-1+\frac{n}{2}}+c\,f\,x^{-1+n}+c\,g\,x^{-1+2\,n}+c\,h\,x^{-1+\frac{5\,n}{2}}}{\left(a+b\,x^n+c\,x^{2\,n}\right)^{3/2}}\,dx$$

Optimal(type 3, 71 leaves, 2 steps):

$$-\frac{2\left(c\,(-2\,a\,g+b\,f)+(-4\,a\,c+b^2)\,h\,x^{\frac{n}{2}}+c\,(-b\,g+2\,c\,f)\,x^n\right)}{(-4\,a\,c+b^2)\,n\sqrt{a+b\,x^n+c\,x^{2\,n}}}$$

Result(type 8, 59 leaves):

$$\int\frac{-a\,h\,x^{-1+\frac{n}{2}}+c\,f\,x^{-1+n}+c\,g\,x^{-1+2\,n}+c\,h\,x^{-1+\frac{5\,n}{2}}}{\left(a+b\,x^n+c\,x^{2\,n}\right)^{3/2}}\,dx$$

Problem 5: Unable to integrate problem.

$$\int\frac{(d\,x)^{-1+\frac{n}{2}}\left(-a\,h+c\,f\,x^{\frac{n}{2}}+c\,g\,x^{\frac{3\,n}{2}}+c\,h\,x^{2\,n}\right)}{\left(a+b\,x^n+c\,x^{2\,n}\right)^{3/2}}\,dx$$

Optimal(type 3, 87 leaves, 2 steps):

$$-\frac{2\,x^{1-\frac{n}{2}}\,(d\,x)^{-1+\frac{n}{2}}\left(c\,(-2\,a\,g+b\,f)+(-4\,a\,c+b^2)\,h\,x^{\frac{n}{2}}+c\,(-b\,g+2\,c\,f)\,x^n\right)}{(-4\,a\,c+b^2)\,n\sqrt{a+b\,x^n+c\,x^{2\,n}}}$$

Result(type 8, 57 leaves):

$$\int \frac{(dx)^{-1+\frac{n}{2}} \left(-ah + cfx^{\frac{n}{2}} + cgx^{\frac{3n}{2}} + chx^{2n}\right)}{\left(a+bx^n+cx^{2n}\right)^{3/2}}\, dx$$

Problem 6: Unable to integrate problem.

$$\int (gx)^m \left(a+bx^n+cx^{2n}\right)^p \left(a(1+m)+b(np+m+n+1)x^n + c(1+m+2n(1+p))x^{2n}\right) dx$$

Optimal(type 3, 29 leaves, 1 step):

$$\frac{(gx)^{1+m}\left(a+bx^n+cx^{2n}\right)^{1+p}}{g}$$

Result(type 8, 58 leaves):

$$\int (gx)^m \left(a+bx^n+cx^{2n}\right)^p \left(a(1+m)+b(np+m+n+1)x^n + c(1+m+2n(1+p))x^{2n}\right) dx$$

Problem 7: Unable to integrate problem.

$$\int \frac{A+Bx^n+Cx^{2n}+\mathrm{D}x^{3n}}{\left(a+bx^n+cx^{2n}\right)^2}\, dx$$

Optimal(type 5, 485 leaves, 4 steps):

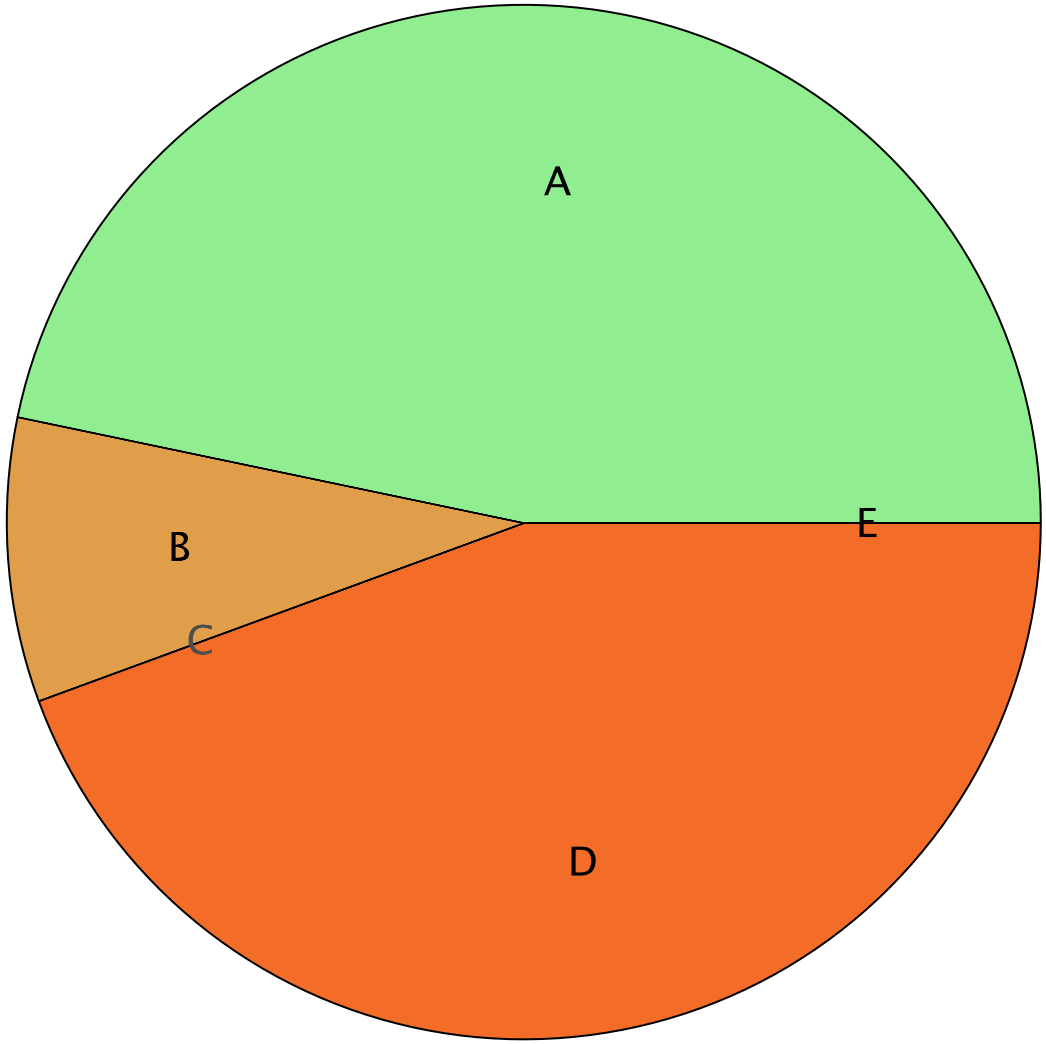
$$\frac{x\left(Ac\left(-2ac+b^2\right)-a(bBc-2acC+ab\mathrm{D})+\left(bc(Ac+aC)-ab^2\mathrm{D}-2ac(Bc-a\mathrm{D})\right)x^n\right)}{ac\left(-4ac+b^2\right)n\left(a+bx^n+cx^{2n}\right)}$$
$$+ \frac{1}{ac\left(-4ac+b^2\right)n\left(b-\sqrt{-4ac+b^2}\right)}\left(x\,\mathrm{hypergeom}\left(\left[1,\frac{1}{n}\right],\left[1+\frac{1}{n}\right],-\frac{2cx^n}{b-\sqrt{-4ac+b^2}}\right)\left(ab^2\mathrm{D}-bc(Ac+aC)(1-n)+2ac(Bc(1-n)-a\mathrm{D}(1+n))+\frac{Ac^2\left(4ac(1-2n)-b^2(1-n)\right)-a\left(4ac^2C+b^3\mathrm{D}-b^2cC(1-n)-2bc(Bcn+a\mathrm{D}(n+2))\right)}{\sqrt{-4ac+b^2}}\right)\right)$$
$$+ \frac{1}{ac\left(-4ac+b^2\right)n\left(b+\sqrt{-4ac+b^2}\right)}\left(x\,\mathrm{hypergeom}\left(\left[1,\frac{1}{n}\right],\left[1+\frac{1}{n}\right],-\frac{2cx^n}{b+\sqrt{-4ac+b^2}}\right)\left(ab^2\mathrm{D}-bc(Ac+aC)(1-n)+2ac(Bc(1-n)-a\mathrm{D}(1+n))+\frac{-Ac^2\left(4ac(1-2n)-b^2(1-n)\right)+a\left(4ac^2C+b^3\mathrm{D}-b^2cC(1-n)-2bc(Bcn+a\mathrm{D}(n+2))\right)}{\sqrt{-4ac+b^2}}\right)\right)$$

Result(type 8, 40 leaves):

$$\int \frac{A+Bx^n+Cx^{2n}+\mathrm{D}x^{3n}}{\left(a+bx^n+cx^{2n}\right)^2}\, dx$$

Summary of Integration Test Results

259 integration problems



A - 121 optimal antiderivatives
B - 23 more than twice size of optimal antiderivatives
C - 0 unnecessarily complex antiderivatives
D - 115 unable to integrate problems
E - 0 integration timeouts