Maple 2018.2 Integration Test Results
on the problems in "5 Inverse trig functions/5.3 Inverse tangent"

Test results for the 48 problems in "5.3.2 (d x)^m (a+b arctan(c x^n))^p.txt"

Problem 3: Result more than twice size of optimal antiderivative.

$$\int \frac{a + b \arctan(c x)}{x} \, dx$$

Optimal(type 4, 27 leaves, 3 steps):

$$a \ln(x) + \frac{I b \operatorname{polylog}(2, -I c x)}{2} - \frac{I b \operatorname{polylog}(2, I c x)}{2}$$

Result(type 4, 73 leaves):

$$a \ln(c x) + b \ln(c x) \arctan(c x) + \frac{I b \ln(c x) \ln(1 + I c x)}{2} - \frac{I b \ln(c x) \ln(1 - I c x)}{2} + \frac{I b \operatorname{dilog}(1 + I c x)}{2} - \frac{I b \operatorname{dilog}(1 - I c x)}{2}$$

Problem 6: Result more than twice size of optimal antiderivative.

$$\int x^2 (a + b \arctan(c x))^2 \, dx$$

Optimal(type 4, 120 leaves, 9 steps):

$$\frac{b^2 x}{3 c^2} - \frac{b^2 \arctan(c x)}{3 c^3} - \frac{b x^2 (a + b \arctan(c x))}{3 c} - \frac{I (a + b \arctan(c x))^2}{3 c^3} + \frac{x^3 (a + b \arctan(c x))^2}{3} - \frac{2 b (a + b \arctan(c x)) \ln\left(\frac{2}{1 + I c x}\right)}{3 c^3} - \frac{I b^2 \operatorname{polylog}\left(2, 1 - \frac{2}{1 + I c x}\right)}{3 c^3}$$

Result(type 4, 297 leaves):

$$\frac{x^3 a^2}{3} + \frac{x^3 b^2 \arctan(c x)^2}{3} - \frac{b^2 \arctan(c x) x^2}{3 c} + \frac{b^2 \arctan(c x) \ln(c^2 x^2 + 1)}{3 c^3} + \frac{b^2 x}{3 c^2} - \frac{b^2 \arctan(c x)}{3 c^3} + \frac{I b^2 \operatorname{dilog}\left(\frac{I}{2} (c x - I)\right)}{6 c^3} - \frac{I b^2 \ln(c x - I)^2}{12 c^3} - \frac{I b^2 \operatorname{dilog}\left(-\frac{I}{2} (c x + I)\right)}{6 c^3} + \frac{I b^2 \ln(c^2 x^2 + 1) \ln(c x - I)}{6 c^3} + \frac{I b^2 \ln(c x + I) \ln\left(\frac{I}{2} (c x - I)\right)}{6 c^3} - \frac{I b^2 \ln(c x - I) \ln\left(-\frac{I}{2} (c x + I)\right)}{6 c^3} + \frac{I b^2 \ln(c x + I)^2}{12 c^3} - \frac{I b^2 \ln(c^2 x^2 + 1) \ln(c x + I)}{6 c^3} + \frac{2 x^3 a b \arctan(c x)}{3} - \frac{x^2 a b}{3 c} + \frac{a b \ln(c^2 x^2 + 1)}{3 c^3}$$

Problem 9: Result more than twice size of optimal antiderivative.

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

```
Optimal(type 4, 121 leaves, 6 steps):
```

$$-2\left(a+b\arctan(cx)\right)^2\operatorname{arctanh}\left(-1+\frac{2}{1+Icx}\right)-Ib\left(a+b\arctan(cx)\right)\operatorname{polylog}\left(2,1-\frac{2}{1+Icx}\right)+Ib\left(a+b\arctan(cx)\right)\operatorname{polylog}\left(2,-1+\frac{2}{1+Icx}\right)-\frac{b^2\operatorname{polylog}\left(3,1-\frac{2}{1+Icx}\right)}{2}+\frac{b^2\operatorname{polylog}\left(3,-1+\frac{2}{1+Icx}\right)}{2}$$

```
Result(type 4, 1127 leaves):
```

$$-Iab\operatorname{dilog}(1-Icx)+Ib^2\arctan(cx)\operatorname{polylog}\left(2,-\frac{(1+Icx)^2}{c^2x^2+1}\right)-2Ib^2\arctan(cx)\operatorname{polylog}\left(2,\frac{1+Icx}{\sqrt{c^2x^2+1}}\right)+\frac{Ib^2\pi\arctan(cx)^2}{2}-2Ib^2\arctan(cx)\operatorname{polylog}\left(2,-\frac{1+Icx}{\sqrt{c^2x^2+1}}\right)+2ab\ln(cx)\arctan(cx)+Iab\operatorname{dilog}(1+Icx)+b^2\arctan(cx)^2\ln\left(1-\frac{1+Icx}{\sqrt{c^2x^2+1}}\right)+b^2\ln(cx)\arctan(cx)^2-b^2\arctan(cx)^2\ln\left(\frac{(1+Icx)^2}{c^2x^2+1}-1\right)+b^2\arctan(cx)^2\ln\left(1+\frac{1+Icx}{\sqrt{c^2x^2+1}}\right)+Iab\ln(cx)\ln(1+Icx)-Iab\ln(cx)\ln(1-Icx)-\frac{Ib^2\pi\operatorname{csgn}\left(\frac{\frac{(1+Icx)^2}{c^2x^2+1}-1}{1+\frac{(1+Icx)^2}{c^2x^2+1}}\right)^2\arctan(cx)^2}{2}+\frac{Ib^2\pi\operatorname{csgn}\left(\frac{\frac{(1+Icx)^2}{c^2x^2+1}-1}{1+\frac{(1+Icx)^2}{c^2x^2+1}}\right)^3\arctan(cx)^2}{2}+\frac{Ib^2\pi\operatorname{csgn}\left(\frac{I\left(\frac{(1+Icx)^2}{c^2x^2+1}-1\right)}{1+\frac{(1+Icx)^2}{c^2x^2+1}}\right)^3\arctan(cx)^2}{2}-\frac{Ib^2\pi\operatorname{csgn}\left(\frac{I}{1+\frac{(1+Icx)^2}{c^2x^2+1}}\right)\operatorname{csgn}\left(\frac{I\left(\frac{(1+Icx)^2}{c^2x^2+1}-1\right)}{1+\frac{(1+Icx)^2}{c^2x^2+1}}\right)^2\arctan(cx)^2}{2}+\frac{Ib^2\pi\operatorname{csgn}\left(\frac{\frac{(1+Icx)^2}{c^2x^2+1}-1}{1+\frac{(1+Icx)^2}{c^2x^2+1}}\right)\operatorname{csgn}\left(\frac{I\left(\frac{(1+Icx)^2}{c^2x^2+1}-1\right)}{1+\frac{(1+Icx)^2}{c^2x^2+1}}\right)\arctan(cx)^2}{2}-\frac{Ib^2\pi\operatorname{csgn}\left(I\left(\frac{(1+Icx)^2}{c^2x^2+1}-1\right)\right)\operatorname{csgn}\left(\frac{I\left(\frac{(1+Icx)^2}{c^2x^2+1}-1\right)}{1+\frac{(1+Icx)^2}{c^2x^2+1}}\right)^2\arctan(cx)^2}{2}$$

$$-\frac{I b^2 \pi \operatorname{csgn}\left(\frac{\frac{(1+I c x)^2}{c^2 x^2+1}-1}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^2 \operatorname{csgn}\left(\frac{I\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right) \arctan(c x)^2}{2}-\frac{b^2 \operatorname{polylog}\left(3,-\frac{(1+I c x)^2}{c^2 x^2+1}\right)}{2}+2 b^2 \operatorname{polylog}\left(3,-\frac{1+I c x}{\sqrt{c^2 x^2+1}}\right)$$

$$+2 b^2 \operatorname{polylog}\left(3,\frac{1+I c x}{\sqrt{c^2 x^2+1}}\right)+a^2 \ln(c x)+\frac{I b^2 \pi \operatorname{csgn}\left(I\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)\right) \operatorname{csgn}\left(\frac{I}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right) \arctan(c x)^2}{2}$$

Problem 11: Result more than twice size of optimal antiderivative.

$$\int (a+b\arctan(c x))^3 \, dx$$

Optimal(type 4, 112 leaves, 5 steps):

$$\frac{I(a+b\arctan(c x))^3}{c}+x(a+b\arctan(c x))^3+\frac{3 b(a+b\arctan(c x))^2 \ln\left(\frac{2}{1+I c x}\right)}{c}+\frac{3 I b^2(a+b\arctan(c x)) \operatorname{polylog}\left(2,1-\frac{2}{1+I c x}\right)}{c}$$

$$+\frac{3 b^3 \operatorname{polylog}\left(3,1-\frac{2}{1+I c x}\right)}{2 c}$$

Result(type 4, 269 leaves):

$$a^3 x-\frac{I b^3 \arctan(c x)^3}{c}+b^3 \arctan(c x)^3 x+\frac{3 b^3 \arctan(c x)^2 \ln\left(1+\frac{(1+I c x)^2}{c^2 x^2+1}\right)}{c}-\frac{3 I b^3 \arctan(c x) \operatorname{polylog}\left(2,-\frac{(1+I c x)^2}{c^2 x^2+1}\right)}{c}$$

$$+\frac{3 b^3 \operatorname{polylog}\left(3,-\frac{(1+I c x)^2}{c^2 x^2+1}\right)}{2 c}-\frac{3 I \arctan(c x)^2 a b^2}{c}+3 \arctan(c x)^2 x a b^2+\frac{6 \arctan(c x) \ln\left(1+\frac{(1+I c x)^2}{c^2 x^2+1}\right) a b^2}{c}$$

$$-\frac{3 I \operatorname{polylog}\left(2,-\frac{(1+I c x)^2}{c^2 x^2+1}\right) a b^2}{c}+3 a^2 b \arctan(c x) x-\frac{3 a^2 b \ln(c^2 x^2+1)}{2 c}$$

Problem 18: Unable to integrate problem.

$$\int (d x)^m (a+b\arctan(c x)) \, dx$$

Optimal(type 5, 71 leaves, 2 steps):

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

Result(type 8, 16 leaves):

$$\int (dx)^m(a+b\arctan(cx))\,dx$$

Problem 20: Result is not expressed in closed-form.

$$\int \frac{a+b\arctan(cx^2)}{x}\,dx$$

Optimal(type 4, 31 leaves, 4 steps):

$$a\ln(x)+\frac{I\,b\,\mathrm{polylog}(2,-I\,c\,x^2)}{4}-\frac{I\,b\,\mathrm{polylog}(2,I\,c\,x^2)}{4}$$

Result(type 7, 62 leaves):

$$a\ln(x)+b\ln(x)\arctan(cx^2)-\frac{b\left(\sum_{\_R1=RootOf(c^2\_Z^4+1)}\frac{\ln(x)\ln\left(\frac{\_R1-x}{\_R1}\right)+\mathrm{dilog}\left(\frac{\_R1-x}{\_R1}\right)}{\_R1^2}\right)}{2c}$$

Problem 25: Unable to integrate problem.

$$\int x^2(a+b\arctan(cx^2))^2\,dx$$

Optimal(type 4, 1030 leaves, 86 steps):

$$\frac{2Iabx^3}{9}+\frac{x^3(2a+Ib\ln(1-Icx^2))^2}{12}-\frac{b^2x^3\ln(1-Icx^2)}{9}-\frac{b^2x^3\ln(1+Icx^2)^2}{12}-\frac{(-1)^{1/4}b\arctan\left((-1)^{3/4}x\sqrt{c}\right)(2a+Ib\ln(1-Icx^2))}{3c^{3/2}}$$
$$+\frac{(-1)^{3/4}b^2\arctan\left((-1)^{3/4}x\sqrt{c}\right)\ln(1+Icx^2)}{3c^{3/2}}+\frac{(-1)^{3/4}b^2\mathrm{arctanh}\left((-1)^{3/4}x\sqrt{c}\right)\ln(1+Icx^2)}{3c^{3/2}}$$
$$-\frac{2(-1)^{3/4}b^2\arctan\left((-1)^{3/4}x\sqrt{c}\right)\ln\left(\frac{2}{1-(-1)^{1/4}x\sqrt{c}}\right)}{3c^{3/2}}+\frac{2(-1)^{3/4}b^2\arctan\left((-1)^{3/4}x\sqrt{c}\right)\ln\left(\frac{2}{1+(-1)^{1/4}x\sqrt{c}}\right)}{3c^{3/2}}$$
$$-\frac{(-1)^{3/4}b^2\arctan\left((-1)^{3/4}x\sqrt{c}\right)\ln\left(\frac{\sqrt{2}\left((-1)^{1/4}+x\sqrt{c}\right)}{1+(-1)^{1/4}x\sqrt{c}}\right)}{3c^{3/2}}+\frac{2(-1)^{3/4}b^2\mathrm{arctanh}\left((-1)^{3/4}x\sqrt{c}\right)\ln\left(\frac{2}{1-(-1)^{3/4}x\sqrt{c}}\right)}{3c^{3/2}}$$
$$-\frac{2(-1)^{3/4}b^2\mathrm{arctanh}\left((-1)^{3/4}x\sqrt{c}\right)\ln\left(\frac{2}{1+(-1)^{3/4}x\sqrt{c}}\right)}{3c^{3/2}}+\frac{(-1)^{3/4}b^2\mathrm{arctanh}\left((-1)^{3/4}x\sqrt{c}\right)\ln\left(-\frac{\sqrt{2}\left((-1)^{3/4}+x\sqrt{c}\right)}{1+(-1)^{3/4}x\sqrt{c}}\right)}{3c^{3/2}}$$

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

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

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

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

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

$$-\frac{I b x^3 \left(2 a + I b \ln(1-I c x^2)\right)}{9} + \frac{4 (-1)^{3/4} b^2 \arctan\left((-1)^{3/4} x\sqrt{c}\right)}{3 c^{3/2}} + \frac{(-1)^{1/4} b^2 \arctan\left((-1)^{3/4} x\sqrt{c}\right)^2}{3 c^{3/2}}$$

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

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

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

Result(type 8, 18 leaves):

$$\int x^2 \left(a + b \arctan(c x^2)\right)^2 dx$$

Problem 26: Unable to integrate problem.

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

Optimal(type 1, 1 leaves, 69 steps):

$$0$$

Result(type 8, 14 leaves):

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

Problem 27: Unable to integrate problem.

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

Optimal(type 1, 1 leaves, 47 steps):

$$0$$

Result(type 8, 18 leaves):

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

Problem 32: Unable to integrate problem.

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

Optimal(type 4, 136 leaves, 10 steps):

$$\frac{b^{2} x^{3}}{9 c^{2}}-\frac{b^{2} \arctan\left(c x^{3}\right)}{9 c^{3}}-\frac{b x^{6} \left(a+b\arctan\left(c x^{3}\right)\right)}{9 c}-\frac{I \left(a+b\arctan\left(c x^{3}\right)\right)^{2}}{9 c^{3}}+\frac{x^{9} \left(a+b\arctan\left(c x^{3}\right)\right)^{2}}{9}-\frac{2 b \left(a+b\arctan\left(c x^{3}\right)\right) \ln\left(\frac{2}{1+I c x^{3}}\right)}{9 c^{3}} - \frac{I b^{2} \operatorname{polylog}\left(2, 1-\frac{2}{1+I c x^{3}}\right)}{9 c^{3}}$$

Result(type 8, 18 leaves):

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

Problem 35: Unable to integrate problem.

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

Optimal(type 4, 137 leaves, 7 steps):

$$-\frac{2 \left(a+b\arctan\left(c x^{3}\right)\right)^{2} \operatorname{arctanh}\left(-1+\frac{2}{1+I c x^{3}}\right)}{3}-\frac{I b \left(a+b\arctan\left(c x^{3}\right)\right) \operatorname{polylog}\left(2, 1-\frac{2}{1+I c x^{3}}\right)}{3} + \frac{I b \left(a+b\arctan\left(c x^{3}\right)\right) \operatorname{polylog}\left(2, -1+\frac{2}{1+I c x^{3}}\right)}{3}-\frac{b^{2} \operatorname{polylog}\left(3, 1-\frac{2}{1+I c x^{3}}\right)}{6}+\frac{b^{2} \operatorname{polylog}\left(3, -1+\frac{2}{1+I c x^{3}}\right)}{6}$$

Result(type 8, 18 leaves):

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

Problem 37: Unable to integrate problem.

$$\int (a+b\arctan(c x^3))^2\, dx$$

Optimal(type 1, 1 leaves, 69 steps):

$$0$$

Result(type 8, 14 leaves):

$$\int (a+b\arctan(c x^3))^2\, dx$$

Problem 38: Unable to integrate problem.

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

Optimal(type 1, 1 leaves, 77 steps):

$$0$$

Result(type 8, 18 leaves):

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

Problem 39: Result more than twice size of optimal antiderivative.

$$\int x^2 (a+b\arctan(c x^3))^3\, dx$$

Optimal(type 4, 128 leaves, 6 steps):

$$\frac{I (a+b\arctan(c x^3))^3}{3 c}+\frac{x^3 (a+b\arctan(c x^3))^3}{3}+\frac{b (a+b\arctan(c x^3))^2 \ln\left(\frac{2}{1+I c x^3}\right)}{c}+\frac{I b^2 (a+b\arctan(c x^3)) \operatorname{polylog}\left(2, 1-\frac{2}{1+I c x^3}\right)}{c}+\frac{b^3 \operatorname{polylog}\left(3, 1-\frac{2}{1+I c x^3}\right)}{2 c}$$

Result(type 4, 302 leaves):

$$\frac{a^3 x^3}{3}-\frac{I b^3 \arctan(c x^3)^3}{3 c}+\frac{b^3 \arctan(c x^3)^3 x^3}{3}+\frac{b^3 \arctan(c x^3)^2 \ln\left(1+\frac{(1+I c x^3)^2}{c^2 x^6+1}\right)}{c}-\frac{I b^3 \arctan(c x^3) \operatorname{polylog}\left(2, -\frac{(1+I c x^3)^2}{c^2 x^6+1}\right)}{c}$$

$$+\frac{b^3 \operatorname{polylog}\left(3, -\frac{(1+I c x^3)^2}{c^2 x^6+1}\right)}{2 c} - \frac{I \arctan(c x^3)^2 a b^2}{c} + \arctan(c x^3)^2 x^3 a b^2 + \frac{2 \arctan(c x^3) \ln\left(1+\frac{(1+I c x^3)^2}{c^2 x^6+1}\right) a b^2}{c}$$
$$-\frac{I \operatorname{polylog}\left(2, -\frac{(1+I c x^3)^2}{c^2 x^6+1}\right) a b^2}{c} + a^2 b \arctan(c x^3) x^3 - \frac{a^2 b \ln(c^2 x^6+1)}{2 c}$$

Problem 40: Unable to integrate problem.

$$\int \frac{(a+b \arctan(c x^3))^3}{x^4}\, dx$$

Optimal(type 4, 122 leaves, 6 steps):

$$-\frac{I c (a+b \arctan(c x^3))^3}{3} - \frac{(a+b \arctan(c x^3))^3}{3 x^3} + b c (a+b \arctan(c x^3))^2 \ln\left(2-\frac{2}{1-I c x^3}\right) - I b^2 c (a+b \arctan(c x^3)) \operatorname{polylog}\left(2, -1+\frac{2}{1-I c x^3}\right)$$
$$+\frac{b^3 c \operatorname{polylog}\left(3, -1+\frac{2}{1-I c x^3}\right)}{2}$$

Result(type 8, 18 leaves):

$$\int \frac{(a+b \arctan(c x^3))^3}{x^4}\, dx$$

Problem 41: Unable to integrate problem.

$$\int (d x)^m (a+b \arctan(c x^3))\, dx$$

Optimal(type 5, 73 leaves, 2 steps):

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

Result(type 8, 18 leaves):

$$\int (d x)^m (a+b \arctan(c x^3))\, dx$$

Problem 46: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 79 leaves, 6 steps):

$$I c \left(a + b \operatorname{arccot}\left(\frac{x}{c}\right)\right)^2 + x \left(a + b \operatorname{arccot}\left(\frac{x}{c}\right)\right)^2 - 2 b c \left(a + b \operatorname{arccot}\left(\frac{x}{c}\right)\right) \ln\left(\frac{2 c}{c + I x}\right) + I b^2 c \operatorname{polylog}\left(2, 1 - \frac{2 c}{c + I x}\right)$$

Result(type 4, 356 leaves):

$$x a^2 + b^2 x \arctan\left(\frac{c}{x}\right)^2 + c b^2 \arctan\left(\frac{c}{x}\right) \ln\left(1 + \frac{c^2}{x^2}\right) - 2 c b^2 \arctan\left(\frac{c}{x}\right) \ln\left(\frac{c}{x}\right) + \frac{I c b^2 \ln\left(1 + \frac{c^2}{x^2}\right) \ln\left(\frac{c}{x} - I\right)}{2} - I c b^2 \operatorname{dilog}\left(1 + \frac{I c}{x}\right)$$
$$+ \frac{I c b^2 \ln\left(\frac{c}{x} + I\right) \ln\left(\frac{I}{2}\left(\frac{c}{x} - I\right)\right)}{2} - \frac{I c b^2 \operatorname{dilog}\left(-\frac{I}{2}\left(\frac{c}{x} + I\right)\right)}{2} - \frac{I c b^2 \ln\left(\frac{c}{x} - I\right) \ln\left(-\frac{I}{2}\left(\frac{c}{x} + I\right)\right)}{2} - I c b^2 \ln\left(\frac{c}{x}\right) \ln\left(1 + \frac{I c}{x}\right)$$
$$+ I c b^2 \ln\left(\frac{c}{x}\right) \ln\left(1 - \frac{I c}{x}\right) - \frac{I c b^2 \ln\left(1 + \frac{c^2}{x^2}\right) \ln\left(\frac{c}{x} + I\right)}{2} - \frac{I c b^2 \ln\left(\frac{c}{x} - I\right)^2}{4} + \frac{I c b^2 \operatorname{dilog}\left(\frac{I}{2}\left(\frac{c}{x} - I\right)\right)}{2} + \frac{I c b^2 \ln\left(\frac{c}{x} + I\right)^2}{4} + I c b^2 \operatorname{dilog}\left(1\right.$$
$$\left.- \frac{I c}{x}\right) + 2 a b x \arctan\left(\frac{c}{x}\right) + c a b \ln\left(1 + \frac{c^2}{x^2}\right) - 2 c a b \ln\left(\frac{c}{x}\right)$$

Problem 47: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 129 leaves, 6 steps):

$$-\frac{I \left(a + b \operatorname{arccot}\left(\frac{x}{c}\right)\right)^3}{c} - \frac{\left(a + b \operatorname{arccot}\left(\frac{x}{c}\right)\right)^3}{x} - \frac{3 b \left(a + b \operatorname{arccot}\left(\frac{x}{c}\right)\right)^2 \ln\left(\frac{2}{1 + \frac{I c}{x}}\right)}{c} - \frac{3 I b^2 \left(a + b \operatorname{arccot}\left(\frac{x}{c}\right)\right) \operatorname{polylog}\left(2, 1 - \frac{2}{1 + \frac{I c}{x}}\right)}{c}$$
$$- \frac{3 b^3 \operatorname{polylog}\left(3, 1 - \frac{2}{1 + \frac{I c}{x}}\right)}{2 c}$$

Result(type 4, 305 leaves):

$$-\frac{a^3}{x} + \frac{I b^3 \arctan\left(\frac{c}{x}\right)^3}{c} - \frac{b^3 \arctan\left(\frac{c}{x}\right)^3}{x} - \frac{3 b^3 \arctan\left(\frac{c}{x}\right)^2 \ln\left(1 + \frac{\left(1 + \frac{I c}{x}\right)^2}{1 + \frac{c^2}{x^2}}\right)}{c} + \frac{3 I b^3 \arctan\left(\frac{c}{x}\right) \operatorname{polylog}\left(2, -\frac{\left(1 + \frac{I c}{x}\right)^2}{1 + \frac{c^2}{x^2}}\right)}{c}$$

$$-\frac{3 b^3 \operatorname{polylog}\left(3, -\frac{\left(1+\frac{I c}{x}\right)^2}{1+\frac{c^2}{x^2}}\right)}{2 c} + \frac{3 I \arctan\left(\frac{c}{x}\right)^2 a b^2}{c} - \frac{3 \arctan\left(\frac{c}{x}\right)^2 a b^2}{x} - \frac{6 \arctan\left(\frac{c}{x}\right) \ln\left(1+\frac{\left(1+\frac{I c}{x}\right)^2}{1+\frac{c^2}{x^2}}\right) a b^2}{c}$$
$$+ \frac{3 I \operatorname{polylog}\left(2, -\frac{\left(1+\frac{I c}{x}\right)^2}{1+\frac{c^2}{x^2}}\right) a b^2}{c} - \frac{3 a^2 b \arctan\left(\frac{c}{x}\right)}{x} + \frac{3 a^2 b \ln\left(1+\frac{c^2}{x^2}\right)}{2 c}$$

Test results for the 11 problems in "5.3.3 (d+e x)^m (a+b arctan(c x^n))^p.txt"

Problem 4: Result more than twice size of optimal antiderivative.

$$\int (e x+d)^2 (a+b \arctan(c x))^2 \, dx$$

Optimal(type 4, 250 leaves, 15 steps):

$$-\frac{2 a b d e x}{c} + \frac{b^2 e^2 x}{3 c^2} - \frac{b^2 e^2 \arctan(c x)}{3 c^3} - \frac{2 b^2 d e x \arctan(c x)}{c} - \frac{b e^2 x^2 (a+b \arctan(c x))}{3 c} + \frac{I (3 c^2 d^2 - e^2) (a+b \arctan(c x))^2}{3 c^3}$$
$$- \frac{d \left(d^2 - \frac{3 e^2}{c^2}\right) (a+b \arctan(c x))^2}{3 e} + \frac{(e x+d)^3 (a+b \arctan(c x))^2}{3 e} + \frac{2 b (3 c^2 d^2 - e^2) (a+b \arctan(c x)) \ln\left(\frac{2}{1+I c x}\right)}{3 c^3}$$
$$+ \frac{b^2 d e \ln(c^2 x^2+1)}{c^2} + \frac{I b^2 (3 c^2 d^2 - e^2) \operatorname{polylog}\left(2, 1-\frac{2}{1+I c x}\right)}{3 c^3}$$

Result(type 4, 749 leaves):

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

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

Problem 5: Result more than twice size of optimal antiderivative.

$$\int (ex+d)^3\,(a+b\arctan(cx))^3\,dx$$

Optimal(type 4, 605 leaves, 29 steps):

$$\frac{3ab^2de^2x}{c^2}-\frac{b^3e^3x}{4c^3}+\frac{b^3e^3\arctan(cx)}{4c^4}+\frac{3b^3de^2x\arctan(cx)}{c^2}+\frac{b^2e^3x^2(a+b\arctan(cx))}{4c^2}-\frac{3bde^2(a+b\arctan(cx))^2}{2c^3}$$
$$+\frac{Ibe^3(a+b\arctan(cx))^2}{4c^4}+\frac{Ib^3e^3\,\mathrm{polylog}\left(2,1-\frac{2}{1+Icx}\right)}{4c^4}-\frac{3be(6c^2d^2-e^2)x(a+b\arctan(cx))^2}{4c^3}-\frac{3bde^2x^2(a+b\arctan(cx))^2}{2c}$$
$$-\frac{be^3x^3(a+b\arctan(cx))^2}{4c}+\frac{Id(cd-e)(cd+e)(a+b\arctan(cx))^3}{c^3}-\frac{(c^4d^4-6c^2d^2e^2+e^4)(a+b\arctan(cx))^3}{4c^4e}$$
$$+\frac{(ex+d)^4(a+b\arctan(cx))^3}{4e}+\frac{b^2e^3(a+b\arctan(cx))\ln\left(\frac{2}{1+Icx}\right)}{2c^4}-\frac{3b^2e(6c^2d^2-e^2)(a+b\arctan(cx))\ln\left(\frac{2}{1+Icx}\right)}{2c^4}$$
$$+\frac{3bd(cd-e)(cd+e)(a+b\arctan(cx))^2\ln\left(\frac{2}{1+Icx}\right)}{c^3}-\frac{3b^3de^2\ln(c^2x^2+1)}{2c^3}-\frac{3Ibe(6c^2d^2-e^2)(a+b\arctan(cx))^2}{4c^4}$$
$$+\frac{3Ib^2d(cd-e)(cd+e)(a+b\arctan(cx))\,\mathrm{polylog}\left(2,1-\frac{2}{1+Icx}\right)}{c^3}-\frac{3Ib^3e(6c^2d^2-e^2)\,\mathrm{polylog}\left(2,1-\frac{2}{1+Icx}\right)}{4c^4}$$
$$+\frac{3b^3d(cd-e)(cd+e)\,\mathrm{polylog}\left(3,1-\frac{2}{1+Icx}\right)}{2c^3}$$

Result(type ?, 3576 leaves): Display of huge result suppressed!

Problem 6: Result more than twice size of optimal antiderivative.

$$\int (ex+d)^2\,(a+b\arctan(cx))^3\,dx$$

Optimal(type 4, 388 leaves, 20 steps):

$$\frac{a b^2 e^2 x}{c^2}+\frac{b^3 e^2 x \arctan(c x)}{c^2}-\frac{3 I b d e (a+b \arctan(c x))^2}{c^2}-\frac{b e^2 (a+b \arctan(c x))^2}{2 c^3}-\frac{3 b d e x (a+b \arctan(c x))^2}{c}-\frac{b e^2 x^2 (a+b \arctan(c x))^2}{2 c}$$
$$+\frac{I (3 c^2 d^2-e^2) (a+b \arctan(c x))^3}{3 c^3}-\frac{d \left(d^2-\frac{3 e^2}{c^2}\right) (a+b \arctan(c x))^3}{3 e}+\frac{(e x+d)^3 (a+b \arctan(c x))^3}{3 e}$$
$$-\frac{6 b^2 d e (a+b \arctan(c x)) \ln\left(\frac{2}{1+I c x}\right)}{c^2}+\frac{b (3 c^2 d^2-e^2) (a+b \arctan(c x))^2 \ln\left(\frac{2}{1+I c x}\right)}{c^3}-\frac{b^3 e^2 \ln(c^2 x^2+1)}{2 c^3}$$
$$-\frac{3 I b^3 d e \operatorname{polylog}\left(2, 1-\frac{2}{1+I c x}\right)}{c^2}+\frac{I b^2 (3 c^2 d^2-e^2) (a+b \arctan(c x)) \operatorname{polylog}\left(2, 1-\frac{2}{1+I c x}\right)}{c^3}$$
$$+\frac{b^3 (3 c^2 d^2-e^2) \operatorname{polylog}\left(3, 1-\frac{2}{1+I c x}\right)}{2 c^3}$$

Result(type ?, 3021 leaves): Display of huge result suppressed!

Problem 7: Result more than twice size of optimal antiderivative.

$$\int (e x+d) (a+b \arctan(c x))^3 \, dx$$

Optimal(type 4, 243 leaves, 14 steps):

$$-\frac{3 I b e (a+b \arctan(c x))^2}{2 c^2}-\frac{3 b e x (a+b \arctan(c x))^2}{2 c}+\frac{I d (a+b \arctan(c x))^3}{c}-\frac{\left(d^2-\frac{e^2}{c^2}\right) (a+b \arctan(c x))^3}{2 e}$$
$$+\frac{(e x+d)^2 (a+b \arctan(c x))^3}{2 e}-\frac{3 b^2 e (a+b \arctan(c x)) \ln\left(\frac{2}{1+I c x}\right)}{c^2}+\frac{3 b d (a+b \arctan(c x))^2 \ln\left(\frac{2}{1+I c x}\right)}{c}$$
$$-\frac{3 I b^3 e \operatorname{polylog}\left(2, 1-\frac{2}{1+I c x}\right)}{2 c^2}+\frac{3 I b^2 d (a+b \arctan(c x)) \operatorname{polylog}\left(2, 1-\frac{2}{1+I c x}\right)}{c}+\frac{3 b^3 d \operatorname{polylog}\left(3, 1-\frac{2}{1+I c x}\right)}{2 c}$$

Result(type ?, 7461 leaves): Display of huge result suppressed!

Problem 8: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 292 leaves, 1 step):

$$-\frac{(a+b \arctan(c x))^3 \ln\left(\frac{2}{1-I c x}\right)}{e}+\frac{(a+b \arctan(c x))^3 \ln\left(\frac{2 c (e x+d)}{(c d+I e) (1-I c x)}\right)}{e}+\frac{3 I b (a+b \arctan(c x))^2 \operatorname{polylog}\left(2, 1-\frac{2}{1-I c x}\right)}{2 e}$$

$$-\frac{3 I b (a+b\arctan(cx))^2 \operatorname{polylog}\left(2, 1-\frac{2c(ex+d)}{(cd+Ie)(1-Icx)}\right)}{2e}-\frac{3b^2(a+b\arctan(cx))\operatorname{polylog}\left(3,1-\frac{2}{1-Icx}\right)}{2e}$$
$$+\frac{3b^2(a+b\arctan(cx))\operatorname{polylog}\left(3,1-\frac{2c(ex+d)}{(cd+Ie)(1-Icx)}\right)}{2e}-\frac{3Ib^3\operatorname{polylog}\left(4,1-\frac{2}{1-Icx}\right)}{4e}+\frac{3Ib^3\operatorname{polylog}\left(4,1-\frac{2c(ex+d)}{(cd+Ie)(1-Icx)}\right)}{4e}$$

Result(type ?, 2615 leaves): Display of huge result suppressed!

Problem 9: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 477 leaves, 10 steps):

$$\frac{Ic(a+b\arctan(cx))^3}{c^2d^2+e^2}+\frac{c^2d(a+b\arctan(cx))^3}{e(c^2d^2+e^2)}-\frac{(a+b\arctan(cx))^3}{e(ex+d)}-\frac{3bc(a+b\arctan(cx))^2\ln\left(\frac{2}{1-Icx}\right)}{c^2d^2+e^2}$$
$$+\frac{3bc(a+b\arctan(cx))^2\ln\left(\frac{2}{1+Icx}\right)}{c^2d^2+e^2}+\frac{3bc(a+b\arctan(cx))^2\ln\left(\frac{2c(ex+d)}{(cd+Ie)(1-Icx)}\right)}{c^2d^2+e^2}$$
$$+\frac{3Ib^2c(a+b\arctan(cx))\operatorname{polylog}\left(2,1-\frac{2}{1-Icx}\right)}{c^2d^2+e^2}+\frac{3Ib^2c(a+b\arctan(cx))\operatorname{polylog}\left(2,1-\frac{2}{1+Icx}\right)}{c^2d^2+e^2}$$
$$-\frac{3Ib^2c(a+b\arctan(cx))\operatorname{polylog}\left(2,1-\frac{2c(ex+d)}{(cd+Ie)(1-Icx)}\right)}{c^2d^2+e^2}-\frac{3b^3c\operatorname{polylog}\left(3,1-\frac{2}{1-Icx}\right)}{2(c^2d^2+e^2)}+\frac{3b^3c\operatorname{polylog}\left(3,1-\frac{2}{1+Icx}\right)}{2(c^2d^2+e^2)}$$
$$+\frac{3b^3c\operatorname{polylog}\left(3,1-\frac{2c(ex+d)}{(cd+Ie)(1-Icx)}\right)}{2(c^2d^2+e^2)}$$

Result(type ?, 2959 leaves): Display of huge result suppressed!

Problem 10: Result is not expressed in closed-form.

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

Optimal(type 4, 421 leaves, 19 steps):

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

$$-\frac{b c \ln(e x+d) \ln\left(\frac{e\left(1-x\sqrt{-\sqrt{-c^2}}\right)}{e+d\sqrt{-\sqrt{-c^2}}}\right)}{2 e\sqrt{-c^2}}-\frac{b c \ln(e x+d) \ln\left(-\frac{e\left(1+x\sqrt{-\sqrt{-c^2}}\right)}{-e+d\sqrt{-\sqrt{-c^2}}}\right)}{2 e\sqrt{-c^2}}+\frac{b c \operatorname{polylog}\left(2, \frac{(-c^2)^{1/4}(e x+d)}{(-c^2)^{1/4} d-e}\right)}{2 e\sqrt{-c^2}}$$

$$+\frac{b c \operatorname{polylog}\left(2, \frac{(-c^2)^{1/4}(e x+d)}{(-c^2)^{1/4} d+e}\right)}{2 e\sqrt{-c^2}}-\frac{b c \operatorname{polylog}\left(2, \frac{(e x+d)\sqrt{-\sqrt{-c^2}}}{-e+d\sqrt{-\sqrt{-c^2}}}\right)}{2 e\sqrt{-c^2}}-\frac{b c \operatorname{polylog}\left(2, \frac{(e x+d)\sqrt{-\sqrt{-c^2}}}{e+d\sqrt{-\sqrt{-c^2}}}\right)}{2 e\sqrt{-c^2}}$$

Result(type 7, 137 leaves):

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

$$-\frac{b e\left(\sum_{\_R1=RootOf(c^2\_Z^4-4 c^2 d\_Z^3+6 c^2 d^2\_Z^2-4 c^2 d^3\_Z+c^2 d^4+e^4)} \frac{\ln(e x+d) \ln\left(\frac{-e x+\_R1-d}{\_R1}\right)+\operatorname{dilog}\left(\frac{-e x+\_R1-d}{\_R1}\right)}{\_R1^2-2\_R1 d+d^2}\right)}{2 c}$$

Test results for the 337 problems in "5.3.4 u (a+b arctan(c x))^p.txt"

Problem 15: Result more than twice size of optimal antiderivative.

$$\int \frac{x (a+b \arctan(c x))}{d+I c d x} dx$$

Optimal(type 4, 100 leaves, 7 steps):

$$-\frac{I a x}{c d}-\frac{I b x \arctan(c x)}{c d}-\frac{(a+b \arctan(c x)) \ln\left(\frac{2}{1+I c x}\right)}{c^2 d}+\frac{I b \ln(c^2 x^2+1)}{2 c^2 d}-\frac{I b \operatorname{polylog}\left(2, 1-\frac{2}{1+I c x}\right)}{2 c^2 d}$$

Result(type 4, 260 leaves):

$$-\frac{I a x}{c d}+\frac{a \ln(c^2 x^2+1)}{2 c^2 d}+\frac{I a \arctan(c x)}{c^2 d}-\frac{I b x \arctan(c x)}{c d}+\frac{b \ln(c x-I) \arctan(c x)}{c^2 d}+\frac{I b \ln(c^4 x^4+10 c^2 x^2+9)}{8 c^2 d}+\frac{b \arctan\left(\frac{1}{6} c^3 x^3+\frac{7}{6} c x\right)}{4 c^2 d}$$

$$-\frac{b \arctan\left(\frac{c x}{2}\right)}{4 c^2 d}+\frac{b \arctan\left(\frac{c x}{2}-\frac{I}{2}\right)}{2 c^2 d}+\frac{I b \ln(c^2 x^2+1)}{4 c^2 d}-\frac{b \arctan(c x)}{2 c^2 d}-\frac{I b \ln(c x-I) \ln\left(-\frac{I}{2}(c x+I)\right)}{2 c^2 d}-\frac{I b \operatorname{dilog}\left(-\frac{I}{2}(c x+I)\right)}{2 c^2 d}$$

$$+\frac{I b \ln(c x-I)^2}{4 c^2 d}$$

Problem 16: Result more than twice size of optimal antiderivative.

$$\int \frac{a+b\arctan(cx)}{x(d+Icdx)}\,dx$$

Optimal(type 4, 49 leaves, 2 steps):

$$\frac{(a+b\arctan(cx))\ln\left(2-\frac{2}{1+Icx}\right)}{d}+\frac{Ib\,\mathrm{polylog}\left(2,-1+\frac{2}{1+Icx}\right)}{2d}$$

Result(type 4, 192 leaves):

$$-\frac{a\ln(c^2x^2+1)}{2d}-\frac{Ia\arctan(cx)}{d}+\frac{a\ln(cx)}{d}-\frac{b\ln(cx-I)\arctan(cx)}{d}+\frac{b\arctan(cx)\ln(cx)}{d}+\frac{Ib\ln(cx)\ln(1+Icx)}{2d}-\frac{Ib\ln(cx)\ln(1-Icx)}{2d}+\frac{Ib\,\mathrm{dilog}(1+Icx)}{2d}-\frac{Ib\,\mathrm{dilog}(1-Icx)}{2d}+\frac{Ib\ln(cx-I)\ln\left(-\frac{I}{2}(cx+I)\right)}{2d}+\frac{Ib\,\mathrm{dilog}\left(-\frac{I}{2}(cx+I)\right)}{2d}-\frac{Ib\ln(cx-I)^2}{4d}$$

Problem 17: Result more than twice size of optimal antiderivative.

$$\int \frac{a+b\arctan(cx)}{x^3(d+Icdx)}\,dx$$

Optimal(type 4, 148 leaves, 12 steps):

$$-\frac{bc}{2dx}-\frac{bc^2\arctan(cx)}{2d}+\frac{-a-b\arctan(cx)}{2dx^2}+\frac{Ic(a+b\arctan(cx))}{dx}-\frac{Ibc^2\ln(x)}{d}+\frac{Ibc^2\ln(c^2x^2+1)}{2d}-\frac{c^2(a+b\arctan(cx))\ln\left(2-\frac{2}{1+Icx}\right)}{d}-\frac{Ibc^2\,\mathrm{polylog}\left(2,-1+\frac{2}{1+Icx}\right)}{2d}$$

Result(type 4, 334 leaves):

$$\frac{c^2a\ln(c^2x^2+1)}{2d}+\frac{Ibc^2\ln(c^2x^2+1)}{2d}-\frac{a}{2dx^2}-\frac{Ic^2b\ln(cx)\ln(1+Icx)}{2d}-\frac{c^2a\ln(cx)}{d}+\frac{c^2b\ln(cx-I)\arctan(cx)}{d}-\frac{b\arctan(cx)}{2dx^2}-\frac{Ic^2b\ln(cx)}{d}-\frac{c^2b\arctan(cx)\ln(cx)}{d}+\frac{Icb\arctan(cx)}{dx}-\frac{Ic^2b\,\mathrm{dilog}\left(-\frac{I}{2}(cx+I)\right)}{2d}-\frac{bc^2\arctan(cx)}{2d}-\frac{bc}{2dx}-\frac{Ic^2b\ln(cx-I)\ln\left(-\frac{I}{2}(cx+I)\right)}{2d}+\frac{Ic^2b\ln(cx-I)^2}{4d}+\frac{Ic^2b\,\mathrm{dilog}(1-Icx)}{2d}-\frac{Ic^2b\,\mathrm{dilog}(1+Icx)}{2d}+\frac{Ic^2b\ln(cx)\ln(1-Icx)}{2d}+\frac{Ic^2a\arctan(cx)}{d}+\frac{Ica}{dx}$$

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

$$\int x(d+Icdx)(a+b\arctan(cx))^2\,dx$$

Optimal(type 4, 186 leaves, 17 steps):

$$-\frac{abdx}{c}+\frac{Ib^2dx}{3c}-\frac{Ib^2d\arctan(cx)}{3c^2}-\frac{b^2dx\arctan(cx)}{c}-\frac{Ibdx^2(a+b\arctan(cx))}{3}+\frac{5d(a+b\arctan(cx))^2}{6c^2}+\frac{dx^2(a+b\arctan(cx))^2}{2}$$

$$+\frac{I c d x^3 (a+b\arctan(c x))^2}{3}-\frac{2 I b d (a+b\arctan(c x)) \ln\left(\frac{2}{1+I c x}\right)}{3 c^2}+\frac{b^2 d \ln(c^2 x^2+1)}{2 c^2}+\frac{b^2 d \operatorname{polylog}\left(2, 1-\frac{2}{1+I c x}\right)}{3 c^2}$$

Result(type 4, 415 leaves):

$$\frac{d a b\arctan(c x)}{c^2}+\frac{d b^2 \ln(c x-I) \ln\left(-\frac{I}{2}(c x+I)\right)}{6 c^2}-\frac{d b^2 \ln(c x-I) \ln(c^2 x^2+1)}{6 c^2}+\frac{d b^2 \ln(c x+I) \ln(c^2 x^2+1)}{6 c^2}-\frac{d b^2 \ln(c x+I) \ln\left(\frac{I}{2}(c x-I)\right)}{6 c^2}$$
$$+d a b\arctan(c x) x^2+\frac{I c d a^2 x^3}{3}-\frac{I d a b x^2}{3}-\frac{I d b^2\arctan(c x) x^2}{3}+\frac{d a^2 x^2}{2}+\frac{d b^2 \ln(c x-I)^2}{12 c^2}+\frac{d b^2 \operatorname{dilog}\left(-\frac{I}{2}(c x+I)\right)}{6 c^2}-\frac{d b^2 \ln(c x+I)^2}{12 c^2}$$
$$-\frac{d b^2 \operatorname{dilog}\left(\frac{I}{2}(c x-I)\right)}{6 c^2}+\frac{d b^2\arctan(c x)^2}{2 c^2}+\frac{d b^2\arctan(c x)^2 x^2}{2}+\frac{b^2 d \ln(c^2 x^2+1)}{2 c^2}+\frac{I c d b^2\arctan(c x)^2 x^3}{3}+\frac{I d b^2\arctan(c x) \ln(c^2 x^2+1)}{3 c^2}$$
$$+\frac{I d a b \ln(c^2 x^2+1)}{3 c^2}+\frac{2 I c d a b\arctan(c x) x^3}{3}+\frac{I b^2 d x}{3 c}-\frac{a b d x}{c}-\frac{b^2 d x\arctan(c x)}{c}-\frac{I b^2 d\arctan(c x)}{3 c^2}$$

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

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

Optimal(type 4, 279 leaves, 19 steps):

$$a b c d^2 x+b^2 c d^2 x\arctan(c x)-\frac{5 d^2 (a+b\arctan(c x))^2}{2}+2 I c d^2 x (a+b\arctan(c x))^2-\frac{c^2 d^2 x^2 (a+b\arctan(c x))^2}{2}-2 d^2 (a$$
$$+b\arctan(c x))^2 \operatorname{arctanh}\left(-1+\frac{2}{1+I c x}\right)+4 I b d^2 (a+b\arctan(c x)) \ln\left(\frac{2}{1+I c x}\right)-\frac{b^2 d^2 \ln(c^2 x^2+1)}{2}-2 b^2 d^2 \operatorname{polylog}\left(2, 1-\frac{2}{1+I c x}\right)$$
$$-I b d^2 (a+b\arctan(c x)) \operatorname{polylog}\left(2, 1-\frac{2}{1+I c x}\right)+I b d^2 (a+b\arctan(c x)) \operatorname{polylog}\left(2, -1+\frac{2}{1+I c x}\right)-\frac{b^2 d^2 \operatorname{polylog}\left(3, 1-\frac{2}{1+I c x}\right)}{2}$$
$$+\frac{b^2 d^2 \operatorname{polylog}\left(3, -1+\frac{2}{1+I c x}\right)}{2}$$

Result(type 4, 1541 leaves):

$$-I d^2 b^2\arctan(c x)-\frac{d^2 a^2 c^2 x^2}{2}-d^2 a b\arctan(c x)+d^2 b^2\arctan(c x)^2 \ln\left(1-\frac{1+I c x}{\sqrt{c^2 x^2+1}}\right)+d^2 b^2\arctan(c x)^2 \ln(c x)-d^2 b^2\arctan(c x)^2 \ln\left(\frac{(1+I c x)^2}{c^2 x^2+1}\right.$$
$$\left.-1\right)+d^2 b^2\arctan(c x)^2 \ln\left(1+\frac{1+I c x}{\sqrt{c^2 x^2+1}}\right)-\frac{d^2 b^2\arctan(c x)^2 c^2 x^2}{2}$$

$$+\frac{I d^2 b^2 \pi \operatorname{csgn}\left(\frac{\frac{(1+I c x)^2}{c^2 x^2+1}-1}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right) \arctan(c x)^2}{2}$$

$$-\frac{I d^2 b^2 \pi \operatorname{csgn}\left(\frac{I}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^2 \arctan(c x)^2}{2}$$

$$-\frac{I d^2 b^2 \pi \operatorname{csgn}\left(\frac{\frac{(1+I c x)^2}{c^2 x^2+1}-1}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^2 \operatorname{csgn}\left(\frac{I\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right) \arctan(c x)^2}{2}$$

$$-\frac{I d^2 b^2 \pi \operatorname{csgn}\left(I\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^2 \arctan(c x)^2}{2} + 4 I d^2 a b \arctan(c x)\, c x + 2 d^2 a b \arctan(c x) \ln(c x)$$

$$+ I d^2 a b \operatorname{dilog}(1+I c x) - 2 I d^2 a b \ln\left(c^2 x^2+1\right) - I d^2 a b \operatorname{dilog}(1-I c x) + I d^2 b^2 \arctan(c x) \operatorname{polylog}\left(2, -\frac{(1+I c x)^2}{c^2 x^2+1}\right)$$

$$- 2 I d^2 b^2 \arctan(c x) \operatorname{polylog}\left(2, -\frac{1+I c x}{\sqrt{c^2 x^2+1}}\right) - 2 I d^2 b^2 \arctan(c x) \operatorname{polylog}\left(2, \frac{1+I c x}{\sqrt{c^2 x^2+1}}\right) + 4 I d^2 b^2 \arctan(c x) \ln\left(1+\frac{I(1+I c x)}{\sqrt{c^2 x^2+1}}\right)$$

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

$$+\frac{I d^2 b^2 \pi \operatorname{csgn}\left(\frac{\frac{(1+I c x)^2}{c^2 x^2+1}-1}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^3 \arctan(c x)^2}{2} - \frac{I d^2 b^2 \pi \operatorname{csgn}\left(\frac{\frac{(1+I c x)^2}{c^2 x^2+1}-1}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^2 \arctan(c x)^2}{2}$$

$$+\frac{I d^2 b^2 \pi \operatorname{csgn}\left(\frac{I\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^3 \arctan(c x)^2}{2} + I d^2 a b \ln(c x) \ln(1+I c x) - I d^2 a b \ln(c x) \ln(1-I c x) - d^2 a b \arctan(c x)\, c^2 x^2$$

$$+2 I d^2 b^2 \arctan(cx)^2 cx + \frac{I d^2 b^2 \pi \,\mathrm{csgn}\left(I\left(\frac{(1+Icx)^2}{c^2x^2+1}-1\right)\right)\mathrm{csgn}\left(\frac{I}{1+\frac{(1+Icx)^2}{c^2x^2+1}}\right)\mathrm{csgn}\left(\frac{I\left(\frac{(1+Icx)^2}{c^2x^2+1}-1\right)}{1+\frac{(1+Icx)^2}{c^2x^2+1}}\right)\arctan(cx)^2}{2}$$

$$-\frac{d^2 b^2 \,\mathrm{polylog}\left(3, -\frac{(1+Icx)^2}{c^2x^2+1}\right)}{2} + \frac{3 d^2 b^2 \arctan(cx)^2}{2} + 2 d^2 b^2 \,\mathrm{polylog}\left(3, -\frac{1+Icx}{\sqrt{c^2x^2+1}}\right) + 2 d^2 b^2 \,\mathrm{polylog}\left(3, \frac{1+Icx}{\sqrt{c^2x^2+1}}\right) + d^2 b^2 \ln\left(1 + \frac{(1+Icx)^2}{c^2x^2+1}\right) + 4 d^2 b^2 \,\mathrm{dilog}\left(1+\frac{I(1+Icx)}{\sqrt{c^2x^2+1}}\right) + 4 d^2 b^2 \,\mathrm{dilog}\left(1-\frac{I(1+Icx)}{\sqrt{c^2x^2+1}}\right) + d^2 a^2 \ln(cx)$$

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

$$\int \frac{(d+Icdx)^2 (a+b\arctan(cx))^2}{x^2}\, dx$$

Optimal(type 4, 302 leaves, 17 steps):

$$-2 I c d^2 (a+b\arctan(cx))^2 - \frac{d^2 (a+b\arctan(cx))^2}{x} - c^2 d^2 x (a+b\arctan(cx))^2 - 4 I c d^2 (a+b\arctan(cx))^2 \,\mathrm{arctanh}\left(-1+\frac{2}{1+Icx}\right) - 2 b c d^2 (a + b\arctan(cx)) \ln\left(\frac{2}{1+Icx}\right) + 2 b c d^2 (a+b\arctan(cx)) \ln\left(2-\frac{2}{1-Icx}\right) - I b^2 c d^2 \,\mathrm{polylog}\left(2, -1+\frac{2}{1-Icx}\right) - I b^2 c d^2 \,\mathrm{polylog}\left(2, 1 - \frac{2}{1+Icx}\right) + 2 b c d^2 (a+b\arctan(cx)) \,\mathrm{polylog}\left(2, 1-\frac{2}{1+Icx}\right) - 2 b c d^2 (a+b\arctan(cx)) \,\mathrm{polylog}\left(2, -1+\frac{2}{1+Icx}\right) - I b^2 c d^2 \,\mathrm{polylog}\left(3, 1 - \frac{2}{1+Icx}\right) + I b^2 c d^2 \,\mathrm{polylog}\left(3, -1+\frac{2}{1+Icx}\right)$$

Result(type ?, 11958 leaves): Display of huge result suppressed!

Problem 26: Result more than twice size of optimal antiderivative.

$$\int \frac{(d+Icdx)^3 (a+b\arctan(cx))^2}{x^4}\, dx$$

Optimal(type 4, 391 leaves, 28 steps):

$$-\frac{b^2c^2d^3}{3x} - \frac{b^2c^3d^3\arctan(cx)}{3} - \frac{bcd^3(a+b\arctan(cx))}{3x^2} + 2 I c^3 d^3 (a+b\arctan(cx))^2 \,\mathrm{arctanh}\left(-1+\frac{2}{1+Icx}\right) + \frac{I b^2 c^3 d^3 \,\mathrm{polylog}\left(3, 1-\frac{2}{1+Icx}\right)}{2} - \frac{d^3 (a+b\arctan(cx))^2}{3x^3} - \frac{3 I b^2 c^3 d^3 \ln(c^2x^2+1)}{2} + \frac{3 c^2 d^3 (a+b\arctan(cx))^2}{x} - \frac{3 I b c^2 d^3 (a+b\arctan(cx))}{x} + \frac{11 I c^3 d^3 (a+b\arctan(cx))^2}{6} + 3 I b^2 c^3 d^3 \ln(x) - \frac{20 b c^3 d^3 (a+b\arctan(cx)) \ln\left(2-\frac{2}{1-Icx}\right)}{3} - \frac{I b^2 c^3 d^3 \,\mathrm{polylog}\left(3, -1+\frac{2}{1+Icx}\right)}{2} - b c^3 d^3 (a+b\arctan(cx)) \,\mathrm{polylog}\left(2, 1\right.$$

$$- \frac{2}{1 + I c x}\right) + b c^3 d^3 (a + b \arctan(c x)) \operatorname{polylog}\left(2, -1 + \frac{2}{1 + I c x}\right) + \frac{10 I b^2 c^3 d^3 \operatorname{polylog}\left(2, -1 + \frac{2}{1 - I c x}\right)}{3} - \frac{3 I c d^3 (a + b \arctan(c x))^2}{2 x^2}$$

Result(type 4, 1813 leaves):

$$c^3 d^3 a b \operatorname{dilog}(1 + I c x) - \frac{c^3 d^3 b^2 \pi \operatorname{csgn}\left(I\left(\frac{(1 + I c x)^2}{c^2 x^2 + 1} - 1\right)\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1 + I c x)^2}{c^2 x^2 + 1} - 1\right)}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right)^2 \arctan(c x)^2}{2}$$

$$- \frac{c^3 d^3 b^2 \pi \operatorname{csgn}\left(\frac{I}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1 + I c x)^2}{c^2 x^2 + 1} - 1\right)}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right)^2 \arctan(c x)^2}{2}$$

$$- \frac{c^3 d^3 b^2 \pi \operatorname{csgn}\left(\frac{\frac{(1 + I c x)^2}{c^2 x^2 + 1} - 1}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right)^2 \operatorname{csgn}\left(\frac{I\left(\frac{(1 + I c x)^2}{c^2 x^2 + 1} - 1\right)}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right) \arctan(c x)^2}{2}$$

$$+ \frac{c^3 d^3 b^2 \pi \operatorname{csgn}\left(\frac{\frac{(1 + I c x)^2}{c^2 x^2 + 1} - 1}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1 + I c x)^2}{c^2 x^2 + 1} - 1\right)}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right) \arctan(c x)^2}{2} - \frac{3 I c d^3 a b \arctan(c x)}{x^2} - 2 I c^3 d^3 a b \arctan(c x) \ln(c x)$$

$$- \frac{c d^3 b^2 \arctan(c x)}{3 x^2} + \frac{3 c^2 d^3 b^2 \arctan(c x)^2}{x} - \frac{2 d^3 a b \arctan(c x)}{3 x^3} - \frac{3 I c d^3 a^2}{2 x^2} + 3 I c^3 d^3 b^2 \ln\left(1 + \frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}\right) + \frac{11 I c^3 d^3 b^2 \arctan(c x)^2}{6}$$

$$+ 3 I c^3 d^3 b^2 \ln\left(\frac{1 + I c x}{\sqrt{c^2 x^2 + 1}} - 1\right) + \frac{I c^3 d^3 b^2 \operatorname{polylog}\left(3, -\frac{(1 + I c x)^2}{c^2 x^2 + 1}\right)}{2} - 2 I c^3 d^3 b^2 \operatorname{polylog}\left(3, \frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}\right) - 2 I c^3 d^3 b^2 \operatorname{polylog}\left(3, -\frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}\right)$$

$$- \frac{20 I c^3 d^3 b^2 \operatorname{dilog}\left(\frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}\right)}{3} + \frac{20 I c^3 d^3 b^2 \operatorname{dilog}\left(1 + \frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}\right)}{3} - I c^3 d^3 a^2 \ln(c x) - \frac{c d^3 a b}{3 x^2} - \frac{20 c^3 d^3 b^2 \arctan(c x) \ln\left(1 + \frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}\right)}{3}$$

$$- 2 c^3 d^3 b^2 \arctan(c x) \operatorname{polylog}\left(2, -\frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}\right) - 2 c^3 d^3 b^2 \arctan(c x) \operatorname{polylog}\left(2, \frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}\right) + c^3 d^3 b^2 \arctan(c x) \operatorname{polylog}\left(2, -\frac{(1 + I c x)^2}{c^2 x^2 + 1}\right)$$

$$-c^3 d^3 a b \operatorname{dilog}(1-I c x)+\frac{10 c^3 d^3 a b \ln(c^2 x^2+1)}{3}-\frac{20 c^3 d^3 a b \ln(c x)}{3}+\frac{c^3 d^3 b^2 \pi \arctan(c x)^2}{2}-\frac{d^3 a^2}{3 x^3}+\frac{3 c^2 d^3 a^2}{x}-\frac{d^3 b^2 \arctan(c x)^2}{3 x^3}$$

$$+\frac{8 b^2 c^3 d^3 \arctan(c x)}{3}+\frac{c^3 d^3 b^2 \pi \operatorname{csgn}\left(I\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)\right) \operatorname{csgn}\left(\frac{I}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right) \arctan(c x)^2}{2}$$

$$+\frac{6 c^2 d^3 a b \arctan(c x)}{x}+\frac{c^3 d^3 b^2 \pi \operatorname{csgn}\left(\frac{\frac{(1+I c x)^2}{c^2 x^2+1}-1}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^3 \arctan(c x)^2}{2}+\frac{c^3 d^3 b^2 \pi \operatorname{csgn}\left(\frac{I\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^3 \arctan(c x)^2}{2}$$

$$-\frac{c^3 d^3 b^2 \pi \operatorname{csgn}\left(\frac{\frac{(1+I c x)^2}{c^2 x^2+1}-1}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^2 \arctan(c x)^2}{2}+I c^3 d^3 b^2 \arctan(c x)^2 \ln\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)+c^3 d^3 a b \ln(c x) \ln(1+I c x)-c^3 d^3 a b \ln(c x) \ln(1$$

$$-I c x)-I c^3 d^3 b^2 \arctan(c x)^2 \ln\left(1-\frac{1+I c x}{\sqrt{c^2 x^2+1}}\right)-I c^3 d^3 b^2 \arctan(c x)^2 \ln(c x)-\frac{I c^3 d^3 b^2 \sqrt{c^2 x^2+1}}{3\left(I c x-\sqrt{c^2 x^2+1}+1\right)}+\frac{I c^3 d^3 b^2 \sqrt{c^2 x^2+1}}{3\left(1+I c x+\sqrt{c^2 x^2+1}\right)}$$

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

Problem 27: Result more than twice size of optimal antiderivative.

$$\int \frac{(d+I c d x)^3 (a+b \arctan(c x))^2}{x^5}\, dx$$

Optimal(type 4, 271 leaves, 20 steps):

$$-\frac{b^2 c^2 d^3}{12 x^2}-\frac{I b^2 c^3 d^3}{x}-I b^2 c^4 d^3 \arctan(c x)-\frac{b c d^3 (a+b \arctan(c x))}{6 x^3}-\frac{I b c^2 d^3 (a+b \arctan(c x))}{x^2}+\frac{7 b c^3 d^3 (a+b \arctan(c x))}{2 x}$$

$$-\frac{d^3 (1+I c x)^4 (a+b \arctan(c x))^2}{4 x^4}-4 I a b c^4 d^3 \ln(x)-\frac{11 b^2 c^4 d^3 \ln(x)}{3}-4 I b c^4 d^3 (a+b \arctan(c x)) \ln\left(\frac{2}{1-I c x}\right)+\frac{11 b^2 c^4 d^3 \ln(c^2 x^2+1)}{6}$$

$$+2 b^2 c^4 d^3 \operatorname{polylog}(2,-I c x)-2 b^2 c^4 d^3 \operatorname{polylog}(2, I c x)-2 b^2 c^4 d^3 \operatorname{polylog}\left(2, 1-\frac{2}{1-I c x}\right)$$

Result(type 4, 756 leaves):

$$-\frac{d^3 a^2}{4 x^4}+\frac{7 c^3 d^3 a b}{2 x}-\frac{c d^3 a b}{6 x^3}+\frac{3 c^2 d^3 b^2 \arctan(c x)^2}{2 x^2}+\frac{11 b^2 c^4 d^3 \ln(c^2 x^2+1)}{6}+\frac{7 c^4 d^3 a b \arctan(c x)}{2}+2 c^4 d^3 b^2 \ln(c x) \ln(1+I c x)$$

$$- 2 c^4 d^3 b^2 \ln(c x) \ln(1 - I c x) + c^4 d^3 b^2 \ln(c x - I) \ln\left(-\frac{I}{2} (c x + I)\right) - c^4 d^3 b^2 \ln(c x - I) \ln(c^2 x^2 + 1) - c^4 d^3 b^2 \ln(c x + I) \ln\left(\frac{I}{2} (c x - I)\right)$$
$$+ c^4 d^3 b^2 \ln(c x + I) \ln(c^2 x^2 + 1) + \frac{7 c^3 d^3 b^2 \arctan(c x)}{2 x} - \frac{c d^3 b^2 \arctan(c x)}{6 x^3} - \frac{d^3 a b \arctan(c x)}{2 x^4} - \frac{I c d^3 a^2}{x^3} + \frac{I c^3 d^3 a^2}{x} - \frac{2 I c d^3 a b \arctan(c x)}{x^3}$$
$$+ \frac{2 I c^3 d^3 a b \arctan(c x)}{x} - \frac{b^2 c^2 d^3}{12 x^2} + \frac{3 c^2 d^3 a^2}{2 x^2} - \frac{d^3 b^2 \arctan(c x)^2}{4 x^4} + \frac{7 c^4 d^3 b^2 \arctan(c x)^2}{4} - c^4 d^3 b^2 \operatorname{dilog}\left(\frac{I}{2} (c x - I)\right) + c^4 d^3 b^2 \operatorname{dilog}\left(-\frac{I}{2} (c x + I)\right) - \frac{11 c^4 d^3 b^2 \ln(c x)}{3} + \frac{c^4 d^3 b^2 \ln(c x - I)^2}{2} - \frac{c^4 d^3 b^2 \ln(c x + I)^2}{2} + 2 c^4 d^3 b^2 \operatorname{dilog}(1 + I c x) - 2 c^4 d^3 b^2 \operatorname{dilog}(1 - I c x) + \frac{3 c^2 d^3 a b \arctan(c x)}{x^2}$$
$$+ \frac{I c^3 d^3 b^2 \arctan(c x)^2}{x} + 2 I c^4 d^3 a b \ln(c^2 x^2 + 1) - 4 I c^4 d^3 a b \ln(c x) + 2 I c^4 d^3 b^2 \arctan(c x) \ln(c^2 x^2 + 1) - 4 I c^4 d^3 b^2 \arctan(c x) \ln(c x) - \frac{I c^2 d^3 a b}{x^2}$$
$$- \frac{I c d^3 b^2 \arctan(c x)^2}{x^3} - \frac{I c^2 d^3 b^2 \arctan(c x)}{x^2} - \frac{I b^2 c^3 d^3}{x} - I b^2 c^4 d^3 \arctan(c x)$$

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

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

Optimal(type 4, 175 leaves, 8 steps):

$$-\frac{I c (a + b \arctan(c x))^2}{d} - \frac{(a + b \arctan(c x))^2}{d x} + \frac{2 b c (a + b \arctan(c x)) \ln\left(2 - \frac{2}{1 - I c x}\right)}{d} - \frac{I c (a + b \arctan(c x))^2 \ln\left(2 - \frac{2}{1 + I c x}\right)}{d}$$
$$- \frac{I b^2 c \operatorname{polylog}\left(2, -1 + \frac{2}{1 - I c x}\right)}{d} + \frac{b c (a + b \arctan(c x)) \operatorname{polylog}\left(2, -1 + \frac{2}{1 + I c x}\right)}{d} - \frac{I b^2 c \operatorname{polylog}\left(3, -1 + \frac{2}{1 + I c x}\right)}{2 d}$$

Result(type ?, 9234 leaves): Display of huge result suppressed!

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

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

Optimal(type 4, 257 leaves, 17 steps):

$$-\frac{b c (a + b \arctan(c x))}{d x} - \frac{3 c^2 (a + b \arctan(c x))^2}{2 d} - \frac{(a + b \arctan(c x))^2}{2 d x^2} + \frac{I c (a + b \arctan(c x))^2}{d x} + \frac{b^2 c^2 \ln(x)}{d} - \frac{b^2 c^2 \ln(c^2 x^2 + 1)}{2 d}$$
$$- \frac{2 I b c^2 (a + b \arctan(c x)) \ln\left(2 - \frac{2}{1 - I c x}\right)}{d} - \frac{c^2 (a + b \arctan(c x))^2 \ln\left(2 - \frac{2}{1 + I c x}\right)}{d} - \frac{b^2 c^2 \operatorname{polylog}\left(2, -1 + \frac{2}{1 - I c x}\right)}{d}$$
$$- \frac{I b c^2 (a + b \arctan(c x)) \operatorname{polylog}\left(2, -1 + \frac{2}{1 + I c x}\right)}{d} - \frac{b^2 c^2 \operatorname{polylog}\left(3, -1 + \frac{2}{1 + I c x}\right)}{2 d}$$

Result(type ?, 2220 leaves): Display of huge result suppressed!

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

$$\int \frac{(a+b\arctan(cx))^2}{x^4\,(d+\mathrm{I}\,c\,d\,x)}\,dx$$

Optimal(type 4, 332 leaves, 26 steps):

$$-\frac{b^2c^2}{3dx}-\frac{b^2c^3\arctan(cx)}{3d}-\frac{bc\,(a+b\arctan(cx))}{3dx^2}+\frac{\mathrm{I}\,b\,c^2\,(a+b\arctan(cx))}{dx}+\frac{11\,\mathrm{I}\,c^3\,(a+b\arctan(cx))^2}{6d}-\frac{(a+b\arctan(cx))^2}{3dx^3}$$
$$+\frac{\mathrm{I}\,c\,(a+b\arctan(cx))^2}{2dx^2}+\frac{c^2\,(a+b\arctan(cx))^2}{dx}-\frac{\mathrm{I}\,b^2c^3\ln(x)}{d}+\frac{\mathrm{I}\,b^2c^3\ln(c^2x^2+1)}{2d}-\frac{8\,b\,c^3\,(a+b\arctan(cx))\ln\left(2-\frac{2}{1-\mathrm{I}\,c\,x}\right)}{3d}$$
$$+\frac{\mathrm{I}\,c^3\,(a+b\arctan(cx))^2\ln\left(2-\frac{2}{1+\mathrm{I}\,c\,x}\right)}{d}+\frac{4\,\mathrm{I}\,b^2c^3\,\mathrm{polylog}\left(2,-1+\frac{2}{1-\mathrm{I}\,c\,x}\right)}{3d}-\frac{b\,c^3\,(a+b\arctan(cx))\,\mathrm{polylog}\left(2,-1+\frac{2}{1+\mathrm{I}\,c\,x}\right)}{d}$$
$$+\frac{\mathrm{I}\,b^2c^3\,\mathrm{polylog}\left(3,-1+\frac{2}{1+\mathrm{I}\,c\,x}\right)}{2d}$$

Result(type ?, 2379 leaves): Display of huge result suppressed!

Problem 31: Result more than twice size of optimal antiderivative.

$$\int \frac{x^2\,(a+b\arctan(cx))^2}{(d+\mathrm{I}\,c\,d\,x)^3}\,dx$$

Optimal(type 4, 273 leaves, 26 steps):

$$-\frac{\mathrm{I}\,b^2}{16c^3d^3(-cx+\mathrm{I})^2}+\frac{13\,b^2}{16c^3d^3(-cx+\mathrm{I})}-\frac{13\,b^2\arctan(cx)}{16c^3d^3}+\frac{b\,(a+b\arctan(cx))}{4c^3d^3(-cx+\mathrm{I})^2}+\frac{7\,\mathrm{I}\,b\,(a+b\arctan(cx))}{4c^3d^3(-cx+\mathrm{I})}-\frac{7\,\mathrm{I}\,(a+b\arctan(cx))^2}{8c^3d^3}$$
$$+\frac{\mathrm{I}\,(a+b\arctan(cx))^2}{2c^3d^3(-cx+\mathrm{I})^2}-\frac{2\,(a+b\arctan(cx))^2}{c^3d^3(-cx+\mathrm{I})}-\frac{\mathrm{I}\,(a+b\arctan(cx))^2\ln\left(\frac{2}{1+\mathrm{I}\,c\,x}\right)}{c^3d^3}+\frac{b\,(a+b\arctan(cx))\,\mathrm{polylog}\left(2,1-\frac{2}{1+\mathrm{I}\,c\,x}\right)}{c^3d^3}$$
$$-\frac{\mathrm{I}\,b^2\,\mathrm{polylog}\left(3,1-\frac{2}{1+\mathrm{I}\,c\,x}\right)}{2c^3d^3}$$

Result(type 4, 1275 leaves):

$$-\frac{b^2\pi\,\mathrm{csgn}\left(\frac{(1+\mathrm{I}\,c\,x)^2}{c^2x^2+1}\right)\mathrm{csgn}\left(\frac{(1+\mathrm{I}\,c\,x)^2}{(c^2x^2+1)\left(1+\frac{(1+\mathrm{I}\,c\,x)^2}{c^2x^2+1}\right)}\right)\mathrm{csgn}\left(\frac{\mathrm{I}}{1+\frac{(1+\mathrm{I}\,c\,x)^2}{c^2x^2+1}}\right)\arctan(cx)^2}{2c^3d^3}-\frac{a^2\arctan(cx)}{c^3d^3}+\frac{2\,a^2}{c^3d^3(cx-\mathrm{I})}$$
$$-\frac{3\,b^2}{c^3d^3(8cx-8\,\mathrm{I})}-\frac{2\,b^2\arctan(cx)^3}{3c^3d^3}+\frac{4\,a\,b\arctan(cx)}{c^3d^3(cx-\mathrm{I})}-\frac{b^2\arctan(cx)\,x^2}{16\,c\,d^3(cx-\mathrm{I})^2}-\frac{3\,b^2\arctan(cx)\,x}{4c^2d^3(cx-\mathrm{I})}+\frac{a\,b\ln(cx-\mathrm{I})\ln\left(-\frac{\mathrm{I}}{2}\,(cx+\mathrm{I})\right)}{c^3d^3}$$

$$+\frac{I b^2 \arctan(cx)^2 \ln(cx-I)}{c^3 d^3}-\frac{I b^2}{64 c^3 d^3 (cx-I)^2}-\frac{7 I b^2 \arctan(cx)^2}{8 c^3 d^3}+\frac{b^2 \arctan(cx)}{16 c^3 d^3 (cx-I)^2}-\frac{b^2 \arctan(cx) \operatorname{polylog}\left(2,-\frac{(1+I cx)^2}{c^2 x^2+1}\right)}{c^3 d^3}$$

$$+\frac{a b \operatorname{dilog}\left(-\frac{I}{2}(cx+I)\right)}{c^3 d^3}-\frac{b^2 x}{32 c^2 d^3 (cx-I)^2}-\frac{a b \ln(cx-I)^2}{2 c^3 d^3}+\frac{7 a b \ln(c^4 x^4+10 c^2 x^2+9)}{32 c^3 d^3}+\frac{a b}{4 c^3 d^3 (cx-I)^2}-\frac{7 a b \ln(c^2 x^2+1)}{16 c^3 d^3}$$

$$+\frac{b^2 \pi \arctan(cx)^2}{c^3 d^3}+\frac{I a^2 \ln(c^2 x^2+1)}{2 c^3 d^3}+\frac{I a^2}{2 c^3 d^3 (cx-I)^2}-\frac{I b^2 \operatorname{polylog}\left(3,-\frac{(1+I cx)^2}{c^2 x^2+1}\right)}{2 c^3 d^3}+\frac{2 b^2 \arctan(cx)^2}{c^3 d^3 (cx-I)}$$

$$-\frac{b^2 \pi \operatorname{csgn}\left(\frac{(1+I cx)^2}{(c^2 x^2+1)\left(1+\frac{(1+I cx)^2}{c^2 x^2+1}\right)}\right)^3 \arctan(cx)^2}{2 c^3 d^3}-\frac{b^2 \pi \operatorname{csgn}\left(\frac{(1+I cx)^2}{(c^2 x^2+1)\left(1+\frac{(1+I cx)^2}{c^2 x^2+1}\right)}\right)^2 \arctan(cx)^2}{c^3 d^3}+\frac{3 I b^2 x}{c^2 d^3 (8 cx-8 I)}$$

$$+\frac{I b^2 x^2}{64 c d^3 (cx-I)^2}+\frac{I b^2 \arctan(cx)^2}{2 c^3 d^3 (cx-I)^2}-\frac{3 I b^2 \arctan(cx)}{4 c^3 d^3 (cx-I)}-\frac{I b^2 \arctan(cx)^2 \ln\left(\frac{2 I (1+I cx)^2}{c^2 x^2+1}\right)}{c^3 d^3}-\frac{7 I a b \arctan\left(\frac{1}{6} c^3 x^3+\frac{7}{6} cx\right)}{16 c^3 d^3}$$

$$+\frac{7 I a b \arctan\left(\frac{cx}{2}\right)}{16 c^3 d^3}-\frac{7 I a b \arctan\left(\frac{cx}{2}-\frac{I}{2}\right)}{8 c^3 d^3}-\frac{7 I a b \arctan(cx)}{8 c^3 d^3}-\frac{7 I a b}{4 c^3 d^3 (cx-I)}+\frac{I a b \arctan(cx)}{c^3 d^3 (cx-I)^2}$$

$$+\frac{b^2 \pi \operatorname{csgn}\left(\frac{(1+I cx)^2}{(c^2 x^2+1)\left(1+\frac{(1+I cx)^2}{c^2 x^2+1}\right)}\right)^2 \operatorname{csgn}\left(\frac{I}{1+\frac{(1+I cx)^2}{c^2 x^2+1}}\right) \arctan(cx)^2}{2 c^3 d^3}$$

$$-\frac{b^2 \pi \operatorname{csgn}\left(\frac{(1+I cx)^2}{c^2 x^2+1}\right) \operatorname{csgn}\left(\frac{(1+I cx)^2}{(c^2 x^2+1)\left(1+\frac{(1+I cx)^2}{c^2 x^2+1}\right)}\right)^2 \arctan(cx)^2}{2 c^3 d^3}+\frac{2 I a b \arctan(cx) \ln(cx-I)}{c^3 d^3}-\frac{I b^2 \arctan(cx)\, x}{8 c^2 d^3 (cx-I)^2}$$

```
Problem 32: Result more than twice size of optimal antiderivative.
```

$$\int \frac{(a+b \arctan(cx))^2}{x^2 (d+I c d x)^3}\, dx$$

```
Optimal(type 4, 355 leaves, 36 steps):
```

$$-\frac{I b^2 c}{16 d^3 (-cx+I)^2}-\frac{19 b^2 c}{16 d^3 (-cx+I)}+\frac{19 b^2 c \arctan(cx)}{16 d^3}+\frac{b c (a+b \arctan(cx))}{4 d^3 (-cx+I)^2}-\frac{9 I b c (a+b \arctan(cx))}{4 d^3 (-cx+I)}+\frac{I c (a+b \arctan(cx))^2}{8 d^3}$$

$$-\frac{(a+b\arctan(cx))^2}{d^3 x}+\frac{I c (a+b\arctan(cx))^2}{2 d^3 (-cx+I)^2}+\frac{2 c (a+b\arctan(cx))^2}{d^3 (-cx+I)}+\frac{6 I c (a+b\arctan(cx))^2 \operatorname{arctanh}\left(-1+\frac{2}{1+I cx}\right)}{d^3}$$
$$-\frac{3 I c (a+b\arctan(cx))^2 \ln\left(\frac{2}{1+I cx}\right)}{d^3}+\frac{2 b c (a+b\arctan(cx)) \ln\left(2-\frac{2}{1-I cx}\right)}{d^3}-\frac{I b^2 c \operatorname{polylog}\left(2,-1+\frac{2}{1-I cx}\right)}{d^3}$$
$$+\frac{3 b c (a+b\arctan(cx)) \operatorname{polylog}\left(2,-1+\frac{2}{1+I cx}\right)}{d^3}-\frac{3 I b^2 c \operatorname{polylog}\left(3,-1+\frac{2}{1+I cx}\right)}{2 d^3}$$

Result(type ?, 9658 leaves): Display of huge result suppressed!

Problem 33: Result more than twice size of optimal antiderivative.

$$\int \frac{(a+b\arctan(cx))^2}{(1+I cx)^4}\, dx$$

Optimal(type 3, 177 leaves, 18 steps):

$$-\frac{b^2}{54 c (-cx+I)^3}+\frac{5 I b^2}{144 c (-cx+I)^2}+\frac{11 b^2}{144 c (-cx+I)}-\frac{11 b^2 \arctan(cx)}{144 c}-\frac{I b (a+b\arctan(cx))}{9 c (-cx+I)^3}-\frac{b (a+b\arctan(cx))}{12 c (-cx+I)^2}+\frac{I b (a+b\arctan(cx))}{12 c (-cx+I)}$$
$$-\frac{I (a+b\arctan(cx))^2}{24 c}+\frac{I (a+b\arctan(cx))^2}{3 c (1+I cx)^3}$$

Result(type 3, 403 leaves):

$$\frac{I b^2 \arctan(cx)^2}{3 c (1+I cx)^3}-\frac{I a b \arctan(cx)}{12 c}-\frac{11 b^2}{144 c (cx-I)}-\frac{I b^2 \ln(cx-I)^2}{96 c}-\frac{I b^2 \ln(cx+I)^2}{96 c}-\frac{b^2 \ln(cx-I) \arctan(cx)}{24 c}+\frac{b^2 \arctan(cx) \ln(cx+I)}{24 c}$$
$$+\frac{5 I b^2}{144 c (cx-I)^2}+\frac{I a^2}{3 c (1+I cx)^3}+\frac{I a b}{9 c (cx-I)^3}-\frac{I a b}{12 c (cx-I)}+\frac{I b^2 \ln(cx-I) \ln\left(-\frac{I}{2} (cx+I)\right)}{48 c}+\frac{I b^2 \arctan(cx)}{9 c (cx-I)^3}+\frac{b^2}{54 c (cx-I)^3}$$
$$-\frac{11 b^2 \arctan(cx)}{144 c}-\frac{b^2 \arctan(cx)}{12 c (cx-I)^2}+\frac{I b^2 \ln\left(-\frac{I}{2} (-cx+I)\right) \ln(cx+I)}{48 c}-\frac{I b^2 \ln\left(-\frac{I}{2} (cx+I)\right) \ln\left(-\frac{I}{2} (-cx+I)\right)}{48 c}-\frac{a b}{12 c (cx-I)^2}$$
$$+\frac{2 I a b \arctan(cx)}{3 c (1+I cx)^3}-\frac{I b^2 \arctan(cx)}{12 c (cx-I)}$$

Problem 34: Result more than twice size of optimal antiderivative.

$$\int \frac{\arctan(ax)^2}{cx-I a cx^2}\, dx$$

Optimal(type 4, 70 leaves, 4 steps):

$$\frac{\arctan(ax)^2 \ln\left(2-\frac{2}{1-I ax}\right)}{c}-\frac{I \arctan(ax) \operatorname{polylog}\left(2,-1+\frac{2}{1-I ax}\right)}{c}+\frac{\operatorname{polylog}\left(3,-1+\frac{2}{1-I ax}\right)}{2 c}$$

Result(type 4, 182 leaves):

$$\frac{\arctan(a x)^2 \ln\left(1+\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)}{c}-\frac{2 I \arctan(a x) \operatorname{polylog}\left(2,-\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)}{c}+\frac{2 \operatorname{polylog}\left(3,-\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)}{c}+\frac{\arctan(a x)^2 \ln\left(1-\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)}{c}-\frac{2 I \arctan(a x) \operatorname{polylog}\left(2,\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)}{c}+\frac{2 \operatorname{polylog}\left(3,\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)}{c}$$

Problem 35: Result more than twice size of optimal antiderivative.

$$\int (d+I c d x)^3 (a+b \arctan(c x))^3 \, dx$$

Optimal(type 4, 350 leaves, 26 steps):

$$-3 a b^2 d^3 x-\frac{11 I b^2 d^3 (a+b \arctan(c x)) \ln\left(\frac{2}{1+I c x}\right)}{c}-\frac{6 I b^2 d^3 (a+b \arctan(c x)) \operatorname{polylog}\left(2,1-\frac{2}{1-I c x}\right)}{c}-3 b^3 d^3 x \arctan(c x)+\frac{I b c^2 d^3 x^3 (a+b \arctan(c x))^2}{4}+\frac{7 b d^3 (a+b \arctan(c x))^2}{c}-\frac{I b^3 d^3 \arctan(c x)}{4 c}+\frac{3 b c d^3 x^2 (a+b \arctan(c x))^2}{2}-\frac{I b^2 c d^3 x^2 (a+b \arctan(c x))}{4}-\frac{I d^3 (1+I c x)^4 (a+b \arctan(c x))^3}{4 c}+\frac{6 b d^3 (a+b \arctan(c x))^2 \ln\left(\frac{2}{1-I c x}\right)}{c}+\frac{I b^3 d^3 x}{4}+\frac{3 b^3 d^3 \ln(c^2 x^2+1)}{2 c}-\frac{21 I b d^3 x (a+b \arctan(c x))^2}{4}+\frac{11 b^3 d^3 \operatorname{polylog}\left(2,1-\frac{2}{1+I c x}\right)}{2 c}+\frac{3 b^3 d^3 \operatorname{polylog}\left(3,1-\frac{2}{1-I c x}\right)}{c}$$

Result(type ?, 2003 leaves): Display of huge result suppressed!

Problem 36: Result more than twice size of optimal antiderivative.

$$\int (d+I c d x) (a+b \arctan(c x))^3 \, dx$$

Optimal(type 4, 200 leaves, 11 steps):

$$\frac{3 b d (a+b \arctan(c x))^2}{2 c}-\frac{3 I b d x (a+b \arctan(c x))^2}{2}-\frac{I d (1+I c x)^2 (a+b \arctan(c x))^3}{2 c}+\frac{3 b d (a+b \arctan(c x))^2 \ln\left(\frac{2}{1-I c x}\right)}{c}-\frac{3 I b^2 d (a+b \arctan(c x)) \ln\left(\frac{2}{1+I c x}\right)}{c}-\frac{3 I b^2 d (a+b \arctan(c x)) \operatorname{polylog}\left(2,1-\frac{2}{1-I c x}\right)}{c}+\frac{3 b^3 d \operatorname{polylog}\left(2,1-\frac{2}{1+I c x}\right)}{2 c}+\frac{3 b^3 d \operatorname{polylog}\left(3,1-\frac{2}{1-I c x}\right)}{2 c}$$

Result(type ?, 7450 leaves): Display of huge result suppressed!

Problem 37: Result more than twice size of optimal antiderivative.

$$\int \frac{(a+b\arctan(cx))^3}{(d+Icdx)^2}\,dx$$

Optimal(type 3, 161 leaves, 11 steps):

$$-\frac{3Ib^3}{4cd^2(-cx+I)}+\frac{3Ib^3\arctan(cx)}{4cd^2}+\frac{3b^2(a+b\arctan(cx))}{2cd^2(-cx+I)}-\frac{3b(a+b\arctan(cx))^2}{4cd^2}+\frac{3Ib(a+b\arctan(cx))^2}{2cd^2(-cx+I)}-\frac{I(a+b\arctan(cx))^3}{2cd^2}+\frac{I(a+b\arctan(cx))^3}{cd^2(1+Icx)}$$

Result(type 3, 550 leaves):

$$\frac{3Ib^3\arctan(cx)x}{4d^2(cx-I)}-\frac{3Iab^2\ln(cx-I)^2}{8cd^2}-\frac{b^3\arctan(cx)^3}{2cd^2(cx-I)}-\frac{3b^3x\arctan(cx)^2}{4d^2(cx-I)}+\frac{3Ia^2b\arctan(cx)}{cd^2(1+Icx)}-\frac{3b^3\arctan(cx)}{4cd^2(cx-I)}-\frac{Ib^3\arctan(cx)^3x}{2d^2(cx-I)}+\frac{Ia^3}{cd^2(1+Icx)}-\frac{3Ia^2b\arctan(cx)}{2cd^2}-\frac{3Iab^2\arctan(cx)}{cd^2(cx-I)}-\frac{3ab^2\ln(cx-I)\arctan(cx)}{2cd^2}+\frac{Ib^3\arctan(cx)^3}{cd^2(1+Icx)}+\frac{3ab^2\arctan(cx)\ln(cx+I)}{2cd^2}+\frac{3Iab^2\arctan(cx)^2}{cd^2(1+Icx)}-\frac{3Ib^3\arctan(cx)^2}{4cd^2(cx-I)}-\frac{3ab^2}{2cd^2(cx-I)}-\frac{3ab^2\arctan(cx)}{2cd^2}-\frac{3Iab^2\ln(cx+I)^2}{8cd^2}-\frac{3Ia^2b}{2cd^2(cx-I)}+\frac{3Iab^2\ln\left(-\frac{I}{2}(-cx+I)\right)\ln(cx+I)}{4cd^2}-\frac{3Iab^2\ln\left(-\frac{I}{2}(-cx+I)\right)\ln\left(-\frac{I}{2}(cx+I)\right)}{4cd^2}+\frac{3Ib^3}{4cd^2(cx-I)}+\frac{3Iab^2\ln(cx-I)\ln\left(-\frac{I}{2}(cx+I)\right)}{4cd^2}$$

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

$$\int \frac{(a+b\arctan(cx))^3}{(d+Icdx)^4}\,dx$$

Optimal(type 3, 316 leaves, 42 steps):

$$\frac{Ib^3}{108cd^4(-cx+I)^3}+\frac{19b^3}{576cd^4(-cx+I)^2}-\frac{85Ib^3}{576cd^4(-cx+I)}+\frac{85Ib^3\arctan(cx)}{576cd^4}-\frac{b^2(a+b\arctan(cx))}{18cd^4(-cx+I)^3}+\frac{5Ib^2(a+b\arctan(cx))}{48cd^4(-cx+I)^2}+\frac{11b^2(a+b\arctan(cx))}{48cd^4(-cx+I)}-\frac{11b(a+b\arctan(cx))^2}{96cd^4}-\frac{Ib(a+b\arctan(cx))^2}{6cd^4(-cx+I)^3}-\frac{b(a+b\arctan(cx))^2}{8cd^4(-cx+I)^2}+\frac{Ib(a+b\arctan(cx))^2}{8cd^4(-cx+I)}-\frac{I(a+b\arctan(cx))^3}{24cd^4}+\frac{I(a+b\arctan(cx))^3}{3cd^4(1+Icx)^3}$$

Result(type 3, 880 leaves):

$$-\frac{Ic^2b^3\arctan(cx)^3x^3}{24d^4(cx-I)^3}+\frac{7Icb^3x^2\arctan(cx)^2}{32d^4(cx-I)^3}+\frac{85Ic^2b^3\arctan(cx)x^3}{576d^4(cx-I)^3}-\frac{Iab^2\arctan(cx)}{4cd^4(cx-I)}-\frac{Iab^2\ln\left(-\frac{I}{2}(-cx+I)\right)\ln\left(-\frac{I}{2}(cx+I)\right)}{16cd^4}+\frac{Iab^2\ln\left(-\frac{I}{2}(-cx+I)\right)\ln(cx+I)}{16cd^4}+\frac{Iab^2\arctan(cx)}{3cd^4(cx-I)^3}+\frac{Iab^2\ln(cx-I)\ln\left(-\frac{I}{2}(cx+I)\right)}{16cd^4}+\frac{Iab^2\arctan(cx)^2}{cd^4(1+Icx)^3}+\frac{Ia^2b\arctan(cx)}{cd^4(1+Icx)^3}$$

$$- \frac{a^2 b}{8 c d^4 (cx - I)^2} - \frac{11 a b^2}{48 c d^4 (cx - I)} + \frac{a b^2}{18 c d^4 (cx - I)^3} - \frac{11 a b^2 \arctan(cx)}{48 c d^4} + \frac{b^3 \arctan(cx)^3}{24 c d^4 (cx - I)^3} + \frac{139 b^3 \arctan(cx)}{576 c d^4 (cx - I)^3} - \frac{b^3 x \arctan(cx)^2}{32 d^4 (cx - I)^3}$$
$$+ \frac{I a^3}{3 c d^4 (1 + I c x)^3} - \frac{41 I b^3}{216 c d^4 (cx - I)^3} + \frac{29 I b^3 \arctan(cx)^2}{96 c d^4 (cx - I)^3} + \frac{I b^3 \arctan(cx)^3}{3 c d^4 (1 + I c x)^3} + \frac{85 I c b^3 x^2}{576 d^4 (cx - I)^3} - \frac{c b^3 \arctan(cx)^3 x^2}{8 d^4 (cx - I)^3}$$
$$- \frac{11 c^2 b^3 x^3 \arctan(cx)^2}{96 d^4 (cx - I)^3} + \frac{41 c b^3 \arctan(cx) x^2}{192 d^4 (cx - I)^3} - \frac{a b^2 \ln(cx - I) \arctan(cx)}{8 c d^4} + \frac{a b^2 \arctan(cx) \ln(cx + I)}{8 c d^4} - \frac{a b^2 \arctan(cx)}{4 c d^4 (cx - I)^2} + \frac{I b^3 \arctan(cx)^3 x}{8 d^4 (cx - I)^3}$$
$$+ \frac{23 I b^3 \arctan(cx) x}{192 d^4 (cx - I)^3} - \frac{I a^2 b \arctan(cx)}{8 c d^4} + \frac{I a^2 b}{6 c d^4 (cx - I)^3} - \frac{I a^2 b}{8 c d^4 (cx - I)} - \frac{I a b^2 \ln(cx + I)^2}{32 c d^4} + \frac{5 I a b^2}{48 c d^4 (cx - I)^2} - \frac{I a b^2 \ln(cx - I)^2}{32 c d^4}$$
$$+ \frac{21 b^3 x}{64 d^4 (cx - I)^3}$$

Problem 39: Result more than twice size of optimal antiderivative.

$$\int \frac{(a + b \arctan(cx))^3}{x^2 (d + I c d x)} dx$$

Optimal(type 4, 244 leaves, 10 steps):

$$- \frac{I c (a + b \arctan(cx))^3}{d} - \frac{(a + b \arctan(cx))^3}{d x} + \frac{3 b c (a + b \arctan(cx))^2 \ln\left(2 - \frac{2}{1 - I c x}\right)}{d} - \frac{I c (a + b \arctan(cx))^3 \ln\left(2 - \frac{2}{1 + I c x}\right)}{d}$$
$$- \frac{3 I b^2 c (a + b \arctan(cx)) \operatorname{polylog}\left(2, -1 + \frac{2}{1 - I c x}\right)}{d} + \frac{3 b c (a + b \arctan(cx))^2 \operatorname{polylog}\left(2, -1 + \frac{2}{1 + I c x}\right)}{2 d} + \frac{3 b^3 c \operatorname{polylog}\left(3, -1 + \frac{2}{1 - I c x}\right)}{2 d}$$
$$- \frac{3 I b^2 c (a + b \arctan(cx)) \operatorname{polylog}\left(3, -1 + \frac{2}{1 + I c x}\right)}{2 d} - \frac{3 b^3 c \operatorname{polylog}\left(4, -1 + \frac{2}{1 + I c x}\right)}{4 d}$$

Result(type ?, 11232 leaves): Display of huge result suppressed!

Problem 41: Result more than twice size of optimal antiderivative.

$$\int \frac{x^2 (a + b \arctan(cx))^2}{e x + d} dx$$

Optimal(type 4, 405 leaves, 14 steps):

$$- \frac{a b x}{c e} - \frac{b^2 x \arctan(cx)}{c e} - \frac{I d (a + b \arctan(cx))^2}{c e^2} + \frac{(a + b \arctan(cx))^2}{2 c^2 e} - \frac{d x (a + b \arctan(cx))^2}{e^2} + \frac{x^2 (a + b \arctan(cx))^2}{2 e}$$
$$- \frac{d^2 (a + b \arctan(cx))^2 \ln\left(\frac{2}{1 - I c x}\right)}{e^3} - \frac{2 b d (a + b \arctan(cx)) \ln\left(\frac{2}{1 + I c x}\right)}{c e^2} + \frac{d^2 (a + b \arctan(cx))^2 \ln\left(\frac{2 c (e x + d)}{(c d + I e) (1 - I c x)}\right)}{e^3}$$
$$+ \frac{b^2 \ln(c^2 x^2 + 1)}{2 c^2 e} + \frac{I b d^2 (a + b \arctan(cx)) \operatorname{polylog}\left(2, 1 - \frac{2}{1 - I c x}\right)}{e^3} - \frac{I b^2 d \operatorname{polylog}\left(2, 1 - \frac{2}{1 + I c x}\right)}{c e^2}$$

$$- \frac{I b d^2 (a + b \arctan(c x)) \operatorname{polylog}\left(2, 1 - \frac{2 c (e x + d)}{(c d + I e) (1 - I c x)}\right)}{e^3} - \frac{b^2 d^2 \operatorname{polylog}\left(3, 1 - \frac{2}{1 - I c x}\right)}{2 e^3}$$

$$+ \frac{b^2 d^2 \operatorname{polylog}\left(3, 1 - \frac{2 c (e x + d)}{(c d + I e) (1 - I c x)}\right)}{2 e^3}$$

Result(type 4, 1783 leaves):

$$- \frac{b^2 \arctan(c x)^2 d x}{e^2} + \frac{a b \arctan(c x) x^2}{e} + \frac{I b^2 \arctan(c x)}{c^2 e} + \frac{a b \arctan(c x)}{c^2 e} + \frac{b^2 \arctan(c x)^2 d^2 \ln(c x e + c d)}{e^3}$$

$$- \frac{b^2 d^2 \arctan(c x)^2 \ln\left(- \frac{I e (1 + I c x)^2}{c^2 x^2 + 1} + \frac{(1 + I c x)^2 c d}{c^2 x^2 + 1} + I e + c d\right)}{e^3} - \frac{a b d}{c e^2} - \frac{a b x}{c e} - \frac{b^2 x \arctan(c x)}{c e} - \frac{a^2 d x}{e^2} - \frac{b^2 \ln\left(1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}\right)}{c^2 e}$$

$$+ \frac{b^2 \arctan(c x)^2}{2 c^2 e} + \frac{b^2 \arctan(c x)^2 x^2}{2 e} - \frac{b^2 d^2 \operatorname{polylog}\left(3, - \frac{(1 + I c x)^2}{c^2 x^2 + 1}\right)}{2 e^3} + \frac{a^2 d^2 \ln(c x e + c d)}{e^3} + \frac{a^2 x^2}{2 e}$$

$$+ \frac{c b^2 d^3 \arctan(c x)^2 \ln\left(1 - \frac{(I e - c d) (1 + I c x)^2}{(c d + I e) \left(c^2 x^2 + 1\right)}\right)}{e^3 (- I e + c d)} + \frac{I a b d^2 \ln(c x e + c d) \ln\left(\frac{I e - c x e}{c d + I e}\right)}{e^3} - \frac{I a b d^2 \ln(c x e + c d) \ln\left(\frac{I e + c x e}{I e - c d}\right)}{e^3}$$

$$- \frac{I b^2 d^2 \arctan(c x)^2 \ln\left(1 - \frac{(I e - c d) (1 + I c x)^2}{(c d + I e) \left(c^2 x^2 + 1\right)}\right)}{e^2 (- I e + c d)} + \frac{I b^2 d^2 \pi \operatorname{csgn}\left(\frac{I \left(- \frac{I e (1 + I c x)^2}{c^2 x^2 + 1} + \frac{(1 + I c x)^2 c d}{c^2 x^2 + 1} + I e + c d\right)}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right)^3 \arctan(c x)^2}{2 e^3}$$

$$- \frac{I c b^2 d^3 \arctan(c x) \operatorname{polylog}\left(2, \frac{(I e - c d) (1 + I c x)^2}{(c d + I e) \left(c^2 x^2 + 1\right)}\right)}{e^3 (- I e + c d)}$$

$$- \frac{I b^2 d^2 \pi \operatorname{csgn}\left(I \left(- \frac{I e (1 + I c x)^2}{c^2 x^2 + 1} + \frac{(1 + I c x)^2 c d}{c^2 x^2 + 1} + I e + c d\right)\right) \operatorname{csgn}\left(\frac{I \left(- \frac{I e (1 + I c x)^2}{c^2 x^2 + 1} + \frac{(1 + I c x)^2 c d}{c^2 x^2 + 1} + I e + c d\right)}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right)^2 \arctan(c x)^2}{2 e^3}$$

$$-\frac{I b^2 d^2 \pi \operatorname{csgn}\left(\frac{I\left(-\frac{I e (1+I c x)^2}{c^2 x^2+1}+\frac{(1+I c x)^2 c d}{c^2 x^2+1}+I e+c d\right)}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^2 \operatorname{csgn}\left(\frac{I}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right) \arctan(c x)^2}{2 e^3}+\frac{1}{2 e^3}\left(I b^2 d^2 \pi \operatorname{csgn}\left(I\left(-\frac{I e (1+I c x)^2}{c^2 x^2+1}+\frac{(1+I c x)^2 c d}{c^2 x^2+1}+I e+c d\right)\right) \operatorname{csgn}\left(\frac{I\left(-\frac{I e (1+I c x)^2}{c^2 x^2+1}+\frac{(1+I c x)^2 c d}{c^2 x^2+1}+I e+c d\right)}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right) \operatorname{csgn}\left(\frac{I}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right) \arctan(c x)^2\right)$$

$$-\frac{I a b d^2 \operatorname{dilog}\left(\frac{I e+c x e}{I e-c d}\right)}{e^3}+\frac{2 I b^2 d \operatorname{dilog}\left(1+\frac{I(1+I c x)}{\sqrt{c^2 x^2+1}}\right)}{c e^2}+\frac{2 I b^2 d \operatorname{dilog}\left(1-\frac{I(1+I c x)}{\sqrt{c^2 x^2+1}}\right)}{c e^2}+\frac{2 a b \arctan(c x) d^2 \ln(c x e+c d)}{e^3}$$

$$-\frac{b^2 d^2 \arctan(c x) \operatorname{polylog}\left(2, \frac{(I e-c d)(1+I c x)^2}{(c d+I e)(c^2 x^2+1)}\right)}{e^2(-I e+c d)}+\frac{I b^2 d^2 \arctan(c x) \operatorname{polylog}\left(2,-\frac{(1+I c x)^2}{c^2 x^2+1}\right)}{e^3}-\frac{2 a b \arctan(c x) d x}{e^2}$$

$$+\frac{I a b d^2 \operatorname{dilog}\left(\frac{I e-c x e}{c d+I e}\right)}{e^3}-\frac{2 b^2 d \arctan(c x) \ln\left(1+\frac{I(1+I c x)}{\sqrt{c^2 x^2+1}}\right)}{c e^2}-\frac{2 b^2 d \arctan(c x) \ln\left(1-\frac{I(1+I c x)}{\sqrt{c^2 x^2+1}}\right)}{c e^2}+\frac{I b^2 d \arctan(c x)^2}{c e^2}$$

$$+\frac{c b^2 d^3 \operatorname{polylog}\left(3, \frac{(I e-c d)(1+I c x)^2}{(c d+I e)(c^2 x^2+1)}\right)}{2 e^3(-I e+c d)}+\frac{a b d \ln\left(c^2 d^2-2 c d(c x e+c d)+(c x e+c d)^2+e^2\right)}{c e^2}-\frac{I b^2 d^2 \operatorname{polylog}\left(3, \frac{(I e-c d)(1+I c x)^2}{(c d+I e)(c^2 x^2+1)}\right)}{2 e^2(-I e+c d)}$$

Problem 42: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 555 leaves, 21 steps):

$$-\frac{b c(a+b \arctan(c x))}{d x}-\frac{c^2(a+b \arctan(c x))^2}{2 d}-\frac{I b e^2(a+b \arctan(c x)) \operatorname{polylog}\left(2,1-\frac{2}{1+I c x}\right)}{d^3}-\frac{(a+b \arctan(c x))^2}{2 d x^2}+\frac{e(a+b \arctan(c x))^2}{d^2 x}$$

$$-\frac{2 e^2(a+b \arctan(c x))^2 \operatorname{arctanh}\left(-1+\frac{2}{1+I c x}\right)}{d^3}+\frac{b^2 c^2 \ln(x)}{d}+\frac{e^2(a+b \arctan(c x))^2 \ln\left(\frac{2}{1-I c x}\right)}{d^3}$$

$$-\frac{e^2(a+b \arctan(c x))^2 \ln\left(\frac{2 c(e x+d)}{(c d+I e)(1-I c x)}\right)}{d^3}-\frac{b^2 c^2 \ln(c^2 x^2+1)}{2 d}-\frac{2 b c e(a+b \arctan(c x)) \ln\left(2-\frac{2}{1-I c x}\right)}{d^2}$$

$$+\frac{I b e^2 (a+b\arctan(cx)) \operatorname{polylog}\left(2, 1-\frac{2c(ex+d)}{(cd+Ie)(1-Icx)}\right)}{d^3}+\frac{I b e^2 (a+b\arctan(cx)) \operatorname{polylog}\left(2, -1+\frac{2}{1+Icx}\right)}{d^3}$$

$$+\frac{I c e (a+b\arctan(cx))^2}{d^2}+\frac{I b^2 c e \operatorname{polylog}\left(2, -1+\frac{2}{1-Icx}\right)}{d^2}-\frac{I b e^2 (a+b\arctan(cx)) \operatorname{polylog}\left(2, 1-\frac{2}{1-Icx}\right)}{d^3}$$

$$+\frac{b^2 e^2 \operatorname{polylog}\left(3, 1-\frac{2}{1-Icx}\right)}{2d^3}-\frac{b^2 e^2 \operatorname{polylog}\left(3, 1-\frac{2}{1+Icx}\right)}{2d^3}+\frac{b^2 e^2 \operatorname{polylog}\left(3, -1+\frac{2}{1+Icx}\right)}{2d^3}$$

$$-\frac{b^2 e^2 \operatorname{polylog}\left(3, 1-\frac{2c(ex+d)}{(cd+Ie)(1-Icx)}\right)}{2d^3}$$

Result(type ?, 2860 leaves): Display of huge result suppressed!

Problem 50: Result more than twice size of optimal antiderivative.

$$\int \frac{\arctan(ax)}{x^3 (a^2 c x^2+c)^2}\, dx$$

Optimal(type 4, 142 leaves, 15 steps):

$$-\frac{a}{2c^2 x}+\frac{a^3 x}{4c^2 (x^2 a^2+1)}-\frac{a^2\arctan(ax)}{4c^2}-\frac{\arctan(ax)}{2c^2x^2}-\frac{a^2\arctan(ax)}{2c^2(x^2a^2+1)}+\frac{I a^2\arctan(ax)^2}{c^2}-\frac{2a^2\arctan(ax)\ln\left(2-\frac{2}{1-Iax}\right)}{c^2}$$

$$+\frac{I a^2 \operatorname{polylog}\left(2, -1+\frac{2}{1-Iax}\right)}{c^2}$$

Result(type 4, 340 leaves):

$$\frac{I a^2}{2c^2}+\frac{I a^2\arctan(ax)}{8c^2(ax-I)}+\frac{a^3\arctan(ax)x}{8c^2(ax+I)}+\frac{a^2}{16c^2(ax+I)}+\frac{I a^3 x}{16c^2(ax+I)}+\frac{2 I a^2\operatorname{polylog}\left(2, -\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c^2}+\frac{a^3\arctan(ax)x}{8c^2(ax-I)}+\frac{a^2}{16c^2(ax-I)}$$

$$+\frac{I a^2\arctan(ax)^2}{c^2}-\frac{I a^3 x}{16c^2(ax-I)}-\frac{a^2\arctan(ax)}{2c^2}-\frac{a}{2c^2x}-\frac{\arctan(ax)}{2c^2x^2}-\frac{2a^2\arctan(ax)\ln\left(1+\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c^2}$$

$$+\frac{2 I a^2\operatorname{polylog}\left(2, \frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c^2}-\frac{2a^2\arctan(ax)\ln\left(1-\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c^2}-\frac{I a^2\arctan(ax)}{8c^2(ax+I)}$$

Problem 54: Result more than twice size of optimal antiderivative.

$$\int \frac{\arctan(a x)\sqrt{a^2 c x^2 + c}}{x^4}\, dx$$

Optimal(type 3, 68 leaves, 5 steps):

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

Result(type 3, 152 leaves):

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

Problem 66: Result more than twice size of optimal antiderivative.

$$\int \frac{x^3 \arctan(a x)}{(a^2 c x^2 + c)^{5/2}}\, dx$$

Optimal(type 3, 96 leaves, 3 steps):

$$\frac{x^3}{9 a c (a^2 c x^2 + c)^{3/2}} - \frac{x^2 \arctan(a x)}{3 a^2 c (a^2 c x^2 + c)^{3/2}} + \frac{2 x}{3 a^3 c^2 \sqrt{a^2 c x^2 + c}} - \frac{2 \arctan(a x)}{3 a^4 c^2 \sqrt{a^2 c x^2 + c}}$$

Result(type 3, 243 leaves):

$$-\frac{(3 \arctan(a x) + I)\,\left(I x^3 a^3 + 3 x^2 a^2 - 3 I a x - 1\right)\sqrt{c\,(a x - I)\,(a x + I)}}{72\,(x^2 a^2 + 1)^2 c^3 a^4} - \frac{3\,(\arctan(a x) + I)\,(1 + I a x)\sqrt{c\,(a x - I)\,(a x + I)}}{8 a^4 c^3 (x^2 a^2 + 1)}$$
$$+\frac{3\sqrt{c\,(a x - I)\,(a x + I)}\,(-1 + I a x)\,(\arctan(a x) - I)}{8 a^4 c^3 (x^2 a^2 + 1)} + \frac{\sqrt{c\,(a x - I)\,(a x + I)}\,\left(I x^3 a^3 - 3 x^2 a^2 - 3 I a x + 1\right)(-I + 3 \arctan(a x))}{72 a^4 c^3 (x^4 a^4 + 2 x^2 a^2 + 1)}$$

Problem 67: Result more than twice size of optimal antiderivative.

$$\int \frac{x^2 \arctan(a x)}{(a^2 c x^2 + c)^{5/2}}\, dx$$

Optimal(type 3, 65 leaves, 4 steps):

$$-\frac{1}{9 a^3 c (a^2 c x^2 + c)^{3/2}} + \frac{x^3 \arctan(a x)}{3 c (a^2 c x^2 + c)^{3/2}} + \frac{1}{3 a^3 c^2 \sqrt{a^2 c x^2 + c}}$$

Result(type 3, 239 leaves):

$$\frac{(3\arctan(a x)+I)\left(a^3 x^3-3 I x^2 a^2-3 a x+I\right)\sqrt{c(a x-I)(a x+I)}}{72\left(x^2 a^2+1\right)^2 c^3 a^3}+\frac{(\arctan(a x)+I)(a x-I)\sqrt{c(a x-I)(a x+I)}}{8 a^3 c^3\left(x^2 a^2+1\right)}$$
$$+\frac{\sqrt{c(a x-I)(a x+I)}\,(a x+I)(\arctan(a x)-I)}{8 a^3 c^3\left(x^2 a^2+1\right)}+\frac{(-I+3\arctan(a x))\sqrt{c(a x-I)(a x+I)}\left(a^3 x^3+3 I x^2 a^2-3 a x-I\right)}{72\left(x^4 a^4+2 x^2 a^2+1\right) c^3 a^3}$$

Problem 68: Result more than twice size of optimal antiderivative.

$$\int \frac{\arctan(a x)}{x^2\left(a^2 c x^2+c\right)^{5/2}}\,dx$$

Optimal(type 3, 134 leaves, 9 steps):

$$-\frac{a}{9 c\left(a^2 c x^2+c\right)^{3/2}}-\frac{a^2 x\arctan(a x)}{3 c\left(a^2 c x^2+c\right)^{3/2}}-\frac{a\,\mathrm{arctanh}\left(\frac{\sqrt{a^2 c x^2+c}}{\sqrt{c}}\right)}{c^{5/2}}-\frac{5 a}{3 c^2\sqrt{a^2 c x^2+c}}-\frac{5 a^2 x\arctan(a x)}{3 c^2\sqrt{a^2 c x^2+c}}-\frac{\arctan(a x)\sqrt{a^2 c x^2+c}}{c^3 x}$$

Result(type 3, 368 leaves):

$$\frac{a(3\arctan(a x)+I)\left(a^3 x^3-3 I x^2 a^2-3 a x+I\right)\sqrt{c(a x-I)(a x+I)}}{72 c^3\left(x^2 a^2+1\right)^2}-\frac{7 a(\arctan(a x)+I)(a x-I)\sqrt{c(a x-I)(a x+I)}}{8 c^3\left(x^2 a^2+1\right)}$$
$$-\frac{7\sqrt{c(a x-I)(a x+I)}\,(a x+I)(\arctan(a x)-I)\,a}{8 c^3\left(x^2 a^2+1\right)}+\frac{\sqrt{c(a x-I)(a x+I)}\left(a^3 x^3+3 I x^2 a^2-3 a x-I\right)(-I+3\arctan(a x))\,a}{72 c^3\left(x^4 a^4+2 x^2 a^2+1\right)}$$
$$-\frac{\arctan(a x)\sqrt{c(a x-I)(a x+I)}}{x c^3}-\frac{a\ln\left(1+\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)\sqrt{c(a x-I)(a x+I)}}{\sqrt{x^2 a^2+1}\,c^3}+\frac{a\ln\left(\frac{1+I a x}{\sqrt{x^2 a^2+1}}-1\right)\sqrt{c(a x-I)(a x+I)}}{\sqrt{x^2 a^2+1}\,c^3}$$

Problem 72: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 179 leaves, 15 steps):

$$-\frac{a c\arctan(a x)}{x}-\frac{a^2 c\arctan(a x)^2}{2}-\frac{c\arctan(a x)^2}{2 x^2}-2 a^2 c\arctan(a x)^2\,\mathrm{arctanh}\left(-1+\frac{2}{1+I a x}\right)+a^2 c\ln(x)-\frac{a^2 c\ln\left(x^2 a^2+1\right)}{2}$$
$$-I a^2 c\arctan(a x)\,\mathrm{polylog}\left(2,1-\frac{2}{1+I a x}\right)+I a^2 c\arctan(a x)\,\mathrm{polylog}\left(2,-1+\frac{2}{1+I a x}\right)-\frac{a^2 c\,\mathrm{polylog}\left(3,1-\frac{2}{1+I a x}\right)}{2}$$
$$+\frac{a^2 c\,\mathrm{polylog}\left(3,-1+\frac{2}{1+I a x}\right)}{2}$$

Result(type 4, 1166 leaves):

$$\frac{I a^2 c \pi \operatorname{csgn}\left(I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)\right) \operatorname{csgn}\left(\frac{I}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right) \arctan(a x)^2}{2}$$

$$-\frac{I a^2 c \pi \operatorname{csgn}\left(\frac{\frac{(1+I a x)^2}{x^2 a^2+1}-1}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right)^2 \operatorname{csgn}\left(\frac{I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right) \arctan(a x)^2}{2}$$

$$-\frac{I a^2 c \pi \operatorname{csgn}\left(I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right)^2 \arctan(a x)^2}{2}$$

$$+\frac{I a^2 c \pi \operatorname{csgn}\left(\frac{\frac{(1+I a x)^2}{x^2 a^2+1}-1}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right) \arctan(a x)^2}{2}$$

$$-\frac{I a^2 c \pi \operatorname{csgn}\left(\frac{I}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right)^2 \arctan(a x)^2}{2} + 2 a^2 c \operatorname{polylog}\left(3, \frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) - \frac{a^2 c \operatorname{polylog}\left(3, -\frac{(1+I a x)^2}{x^2 a^2+1}\right)}{2}$$

$$+ 2 a^2 c \operatorname{polylog}\left(3, -\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) + a^2 c \ln\left(\frac{1+I a x}{\sqrt{x^2 a^2+1}}-1\right) + a^2 c \ln\left(1+\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) - \frac{a c \arctan(a x)}{x} - a^2 c \arctan(a x)^2 \ln\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)$$

$$+ a^2 c \arctan(a x)^2 \ln\left(1-\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) + a^2 c \arctan(a x)^2 \ln\left(1+\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) + a^2 c \arctan(a x)^2 \ln(a x) - I a^2 c \arctan(a x) - \frac{a^2 c \arctan(a x)^2}{2}$$

$$- \frac{c \arctan(a x)^2}{2 x^2} + I a^2 c \arctan(a x) \operatorname{polylog}\left(2, -\frac{(1+I a x)^2}{x^2 a^2+1}\right) + \frac{I a^2 c \pi \operatorname{csgn}\left(\frac{I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right)^3 \arctan(a x)^2}{2}$$

$$+\frac{I a^2 c \pi \operatorname{csgn}\left(\frac{\frac{(1+I a x)^2}{x^2 a^2+1}-1}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right)^3 \arctan(a x)^2}{2}-\frac{I a^2 c \pi \operatorname{csgn}\left(\frac{\frac{(1+I a x)^2}{x^2 a^2+1}-1}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right)^2 \arctan(a x)^2}{2}-2 I a^2 c \arctan(a x) \operatorname{polylog}\left(2,-\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)$$
$$-2 I a^2 c \arctan(a x) \operatorname{polylog}\left(2, \frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)+\frac{I a^2 c \pi \arctan(a x)^2}{2}$$

```
Problem 74: Result more than twice size of optimal antiderivative.
```

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

```
Optimal(type 4, 256 leaves, 38 steps):
```

$$\frac{29 a^2 c^3 x^2}{180}+\frac{a^4 c^3 x^4}{60}-\frac{11 a c^3 x \arctan(a x)}{6}-\frac{7 a^3 c^3 x^3 \arctan(a x)}{18}-\frac{a^5 c^3 x^5 \arctan(a x)}{15}+\frac{11 c^3 \arctan(a x)^2}{12}+\frac{3 a^2 c^3 x^2 \arctan(a x)^2}{2}$$
$$+\frac{3 a^4 c^3 x^4 \arctan(a x)^2}{4}+\frac{a^6 c^3 x^6 \arctan(a x)^2}{6}-2 c^3 \arctan(a x)^2 \operatorname{arctanh}\left(-1+\frac{2}{1+I a x}\right)+\frac{34 c^3 \ln(x^2 a^2+1)}{45}-I c^3 \arctan(a x) \operatorname{polylog}\left(2, 1\right.$$
$$\left.-\frac{2}{1+I a x}\right)+I c^3 \arctan(a x) \operatorname{polylog}\left(2,-1+\frac{2}{1+I a x}\right)-\frac{c^3 \operatorname{polylog}\left(3, 1-\frac{2}{1+I a x}\right)}{2}+\frac{c^3 \operatorname{polylog}\left(3,-1+\frac{2}{1+I a x}\right)}{2}$$

```
Result(type 4, 1216 leaves):
```

$$\frac{13 c^3}{90}+I c^3 \arctan(a x) \operatorname{polylog}\left(2,-\frac{(1+I a x)^2}{x^2 a^2+1}\right)+\frac{11 c^3 \arctan(a x)^2}{12}+c^3 \arctan(a x)^2 \ln(a x)-\frac{11 a c^3 x \arctan(a x)}{6}-\frac{7 a^3 c^3 x^3 \arctan(a x)}{18}$$
$$-\frac{a^5 c^3 x^5 \arctan(a x)}{15}+\frac{3 a^2 c^3 x^2 \arctan(a x)^2}{2}+\frac{3 a^4 c^3 x^4 \arctan(a x)^2}{4}+\frac{a^6 c^3 x^6 \arctan(a x)^2}{6}+\frac{29 a^2 c^3 x^2}{180}+\frac{a^4 c^3 x^4}{60}+2 c^3 \operatorname{polylog}\left(3, \frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)$$
$$-\frac{68 c^3 \ln\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)}{45}-\frac{c^3 \operatorname{polylog}\left(3,-\frac{(1+I a x)^2}{x^2 a^2+1}\right)}{2}+2 c^3 \operatorname{polylog}\left(3,-\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)-2 I c^3 \arctan(a x) \operatorname{polylog}\left(2,-\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)$$
$$-2 I c^3 \arctan(a x) \operatorname{polylog}\left(2, \frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)+\frac{I c^3 \pi \arctan(a x)^2}{2}-c^3 \arctan(a x)^2 \ln\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)+c^3 \arctan(a x)^2 \ln\left(1+\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)$$
$$+c^3 \arctan(a x)^2 \ln\left(1-\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)+\frac{68 I c^3 \arctan(a x)}{45}-\frac{I c^3 \pi \operatorname{csgn}\left(I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right)^2 \arctan(a x)^2}{2}$$

$$- \frac{I c^{3} \pi \operatorname{csgn}\left(\frac{\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}-1}{1+\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}}\right)^{2} \operatorname{csgn}\left(\frac{I\left(\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}-1\right)}{1+\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}}\right) \arctan(a x)^{2}}{2}$$

$$- \frac{I c^{3} \pi \operatorname{csgn}\left(\frac{I}{1+\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}}\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}-1\right)}{1+\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}}\right)^{2} \arctan(a x)^{2}}{2}$$

$$+ \frac{I c^{3} \pi \operatorname{csgn}\left(\frac{\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}-1}{1+\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}}\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}-1\right)}{1+\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}}\right) \arctan(a x)^{2}}{2} + \frac{I c^{3} \pi \operatorname{csgn}\left(\frac{\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}-1}{1+\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}}\right)^{3} \arctan(a x)^{2}}{2}$$

$$+ \frac{I c^{3} \pi \operatorname{csgn}\left(\frac{I\left(\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}-1\right)}{1+\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}}\right)^{3} \arctan(a x)^{2}}{2} - \frac{I c^{3} \pi \operatorname{csgn}\left(\frac{\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}-1}{1+\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}}\right)^{2} \arctan(a x)^{2}}{2}$$

$$+ \frac{I c^{3} \pi \operatorname{csgn}\left(I\left(\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}-1\right)\right) \operatorname{csgn}\left(\frac{I}{1+\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}}\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}-1\right)}{1+\frac{(1+I a x)^{2}}{x^{2} a^{2}+1}}\right) \arctan(a x)^{2}}{2}$$

Problem 77: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 92 leaves, 7 steps):

$$\frac{I \arctan(a x)^{2}}{a^{3} c}+\frac{x \arctan(a x)^{2}}{a^{2} c}-\frac{\arctan(a x)^{3}}{3 a^{3} c}+\frac{2 \arctan(a x) \ln\left(\frac{2}{1+I a x}\right)}{a^{3} c}+\frac{I \operatorname{polylog}\left(2, 1-\frac{2}{1+I a x}\right)}{a^{3} c}$$

Result(type 4, 229 leaves):

$$\frac{x\arctan(ax)^2}{a^2 c}-\frac{\arctan(ax)^3}{3a^3 c}-\frac{\arctan(ax)\ln(x^2a^2+1)}{a^3 c}+\frac{I\ln(ax-I)^2}{4a^3 c}+\frac{I\ln(ax-I)\ln\left(-\frac{I}{2}(ax+I)\right)}{2a^3 c}-\frac{I\ln(ax-I)\ln(x^2a^2+1)}{2a^3 c}$$
$$+\frac{I\,\mathrm{dilog}\left(-\frac{I}{2}(ax+I)\right)}{2a^3 c}-\frac{I\ln(ax+I)^2}{4a^3 c}-\frac{I\ln(ax+I)\ln\left(\frac{I}{2}(ax-I)\right)}{2a^3 c}+\frac{I\ln(ax+I)\ln(x^2a^2+1)}{2a^3 c}-\frac{I\,\mathrm{dilog}\left(\frac{I}{2}(ax-I)\right)}{2a^3 c}$$

Problem 78: Result more than twice size of optimal antiderivative.

$$\int\frac{\arctan(ax)^2}{x^3(a^2cx^2+c)}\,dx$$

Optimal(type 4, 163 leaves, 13 steps):

$$-\frac{a\arctan(ax)}{cx}-\frac{a^2\arctan(ax)^2}{2c}-\frac{\arctan(ax)^2}{2cx^2}+\frac{Ia^2\arctan(ax)^3}{3c}+\frac{a^2\ln(x)}{c}-\frac{a^2\ln(x^2a^2+1)}{2c}-\frac{a^2\arctan(ax)^2\ln\left(2-\frac{2}{1-Iax}\right)}{c}$$
$$+\frac{Ia^2\arctan(ax)\,\mathrm{polylog}\left(2,-1+\frac{2}{1-Iax}\right)}{c}-\frac{a^2\,\mathrm{polylog}\left(3,-1+\frac{2}{1-Iax}\right)}{2c}$$

Result(type ?, 5490 leaves): Display of huge result suppressed!

Problem 79: Result more than twice size of optimal antiderivative.

$$\int\frac{\arctan(ax)^2}{x(a^2cx^2+c)^2}\,dx$$

Optimal(type 4, 153 leaves, 8 steps):

$$-\frac{1}{4c^2(x^2a^2+1)}-\frac{ax\arctan(ax)}{2c^2(x^2a^2+1)}-\frac{\arctan(ax)^2}{4c^2}+\frac{\arctan(ax)^2}{2c^2(x^2a^2+1)}-\frac{I\arctan(ax)^3}{3c^2}+\frac{\arctan(ax)^2\ln\left(2-\frac{2}{1-Iax}\right)}{c^2}$$
$$-\frac{I\arctan(ax)\,\mathrm{polylog}\left(2,-1+\frac{2}{1-Iax}\right)}{c^2}+\frac{\mathrm{polylog}\left(3,-1+\frac{2}{1-Iax}\right)}{2c^2}$$

Result(type 4, 1935 leaves):

$$\frac{I\arctan(ax)^2\pi\,\mathrm{csgn}\left(\frac{I\left(\frac{(1+Iax)^2}{x^2a^2+1}-1\right)}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)^3}{2c^2}+\frac{ax}{16c^2(ax-I)}+\frac{ax}{16c^2(ax+I)}+\frac{I\arctan(ax)^2\pi}{2c^2}-\frac{2I\arctan(ax)\,\mathrm{polylog}\left(2,-\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c^2}$$

$$
-\frac{2 I \arctan(a x)\, \mathrm{polylog}\left(2, \frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)}{c^2}-\frac{I \arctan(a x)^2 \pi\, \mathrm{csgn}\left(I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)\right) \mathrm{csgn}\left(\frac{I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right)^2}{2 c^2}
$$

$$
+\frac{I \arctan(a x)^2 \pi\, \mathrm{csgn}\left(\frac{I}{\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2}\right) \mathrm{csgn}\left(\frac{I (1+I a x)^2}{(x^2 a^2+1)\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2}\right)^2}{4 c^2}
$$

$$
+\frac{I \arctan(a x)^2 \pi\, \mathrm{csgn}\left(\frac{I (1+I a x)^2}{(x^2 a^2+1)\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2}\right)^2 \mathrm{csgn}\left(\frac{I (1+I a x)^2}{x^2 a^2+1}\right)}{4 c^2}+\frac{I \arctan(a x)^2 \pi\, \mathrm{csgn}\left(\frac{I (1+I a x)}{\sqrt{x^2 a^2+1}}\right) \mathrm{csgn}\left(\frac{I (1+I a x)^2}{x^2 a^2+1}\right)^2}{2 c^2}
$$

$$
-\frac{I \arctan(a x)^2 \pi\, \mathrm{csgn}\left(\frac{I (1+I a x)}{\sqrt{x^2 a^2+1}}\right)^2 \mathrm{csgn}\left(\frac{I (1+I a x)^2}{x^2 a^2+1}\right)}{4 c^2}-\frac{I \arctan(a x)^2 \pi\, \mathrm{csgn}\left(I\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2\right)^2 \mathrm{csgn}\left(I\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)\right)}{2 c^2}
$$

$$
+\frac{I \arctan(a x)^2 \pi\, \mathrm{csgn}\left(I\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2\right) \mathrm{csgn}\left(I\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)\right)^2}{4 c^2}
$$

$$
+\frac{I \arctan(a x)^2 \pi\, \mathrm{csgn}\left(\frac{\frac{(1+I a x)^2}{x^2 a^2+1}-1}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right) \mathrm{csgn}\left(\frac{I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right)}{2 c^2}-\frac{I \arctan(a x)\, a x}{c^2 (8 a x+8 I)}+\frac{I \arctan(a x)\, a x}{c^2 (8 a x-8 I)}
$$

$$
-\frac{I \arctan(a x)^2 \pi\, \mathrm{csgn}\left(\frac{\frac{(1+I a x)^2}{x^2 a^2+1}-1}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right)^2 \mathrm{csgn}\left(\frac{I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right)}{2 c^2}
$$

$$
-\frac{I \arctan(a x)^2 \pi\, \mathrm{csgn}\left(\frac{I}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right) \mathrm{csgn}\left(\frac{I\left(\frac{(1+I a x)^2}{x^2 a^2+1}-1\right)}{1+\frac{(1+I a x)^2}{x^2 a^2+1}}\right)^2}{2 c^2}-\frac{\arctan(a x)^2 \ln(x^2 a^2+1)}{2 c^2}+\frac{\arctan(a x)^2 \ln(a x)}{c^2}+\frac{\arctan(a x)^2}{2 c^2 (x^2 a^2+1)}
$$

$$-\frac{I\arctan(ax)^3}{3c^2}-\frac{\arctan(ax)^2}{4c^2}+\frac{I\arctan(ax)^2\pi\,\mathrm{csgn}\left(I\left(\frac{(1+Iax)^2}{x^2a^2+1}-1\right)\right)\mathrm{csgn}\left(\frac{I}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)\mathrm{csgn}\left(\frac{I\left(\frac{(1+Iax)^2}{x^2a^2+1}-1\right)}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)}{2c^2}$$

$$-\frac{I\arctan(ax)^2\pi\,\mathrm{csgn}\left(\frac{I}{\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)\mathrm{csgn}\left(\frac{I(1+Iax)^2}{(x^2a^2+1)\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)\mathrm{csgn}\left(\frac{I(1+Iax)^2}{x^2a^2+1}\right)}{4c^2}+\frac{2\,\mathrm{polylog}\left(3,\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c^2}$$

$$+\frac{2\,\mathrm{polylog}\left(3,-\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c^2}+\frac{\arctan(ax)^2\ln\left(\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c^2}+\frac{\arctan(ax)^2\ln\left(1+\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c^2}-\frac{\arctan(ax)^2\ln\left(\frac{(1+Iax)^2}{x^2a^2+1}-1\right)}{c^2}$$

$$+\frac{\arctan(ax)^2\ln\left(1-\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c^2}+\frac{\arctan(ax)^2\ln(2)}{c^2}-\frac{\arctan(ax)}{c^2(8ax+8I)}-\frac{\arctan(ax)}{c^2(8ax-8I)}-\frac{I}{16c^2(ax+I)}+\frac{I}{16c^2(ax-I)}$$

$$-\frac{I\arctan(ax)^2\pi\,\mathrm{csgn}\left(\frac{I(1+Iax)^2}{x^2a^2+1}\right)^3}{4c^2}+\frac{I\arctan(ax)^2\pi\,\mathrm{csgn}\left(I\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2\right)^3}{4c^2}-\frac{I\arctan(ax)^2\pi\,\mathrm{csgn}\left(\frac{\frac{(1+Iax)^2}{x^2a^2+1}-1}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)^2}{2c^2}$$

$$+\frac{I\arctan(ax)^2\pi\,\mathrm{csgn}\left(\frac{\frac{(1+Iax)^2}{x^2a^2+1}-1}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)^3}{2c^2}-\frac{I\arctan(ax)^2\pi\,\mathrm{csgn}\left(\frac{I(1+Iax)^2}{(x^2a^2+1)\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)^3}{4c^2}$$

```
Problem 95: Unable to integrate problem.
```

$$\int\frac{x^4\arctan(ax)^2}{(a^2cx^2+c)^{5/2}}\,dx$$

```
Optimal(type 4, 436 leaves, 17 steps):
```

$$\frac{2x^3}{27a^2c(a^2cx^2+c)^{3/2}}-\frac{2x^2\arctan(ax)}{9a^3c(a^2cx^2+c)^{3/2}}-\frac{x^3\arctan(ax)^2}{3a^2c(a^2cx^2+c)^{3/2}}+\frac{22x}{9a^4c^2\sqrt{a^2cx^2+c}}-\frac{22\arctan(ax)}{9a^5c^2\sqrt{a^2cx^2+c}}-\frac{x\arctan(ax)^2}{a^4c^2\sqrt{a^2cx^2+c}}$$

$$- \frac{2 \mathrm{I} \arctan\left(\frac{1 + \mathrm{I} a x}{\sqrt{x^2 a^2 + 1}}\right) \arctan(a x)^2 \sqrt{x^2 a^2 + 1}}{a^5 c^2 \sqrt{a^2 c x^2 + c}} + \frac{2 \mathrm{I} \arctan(a x) \operatorname{polylog}\left(2, \frac{-\mathrm{I} (1 + \mathrm{I} a x)}{\sqrt{x^2 a^2 + 1}}\right) \sqrt{x^2 a^2 + 1}}{a^5 c^2 \sqrt{a^2 c x^2 + c}}$$

$$- \frac{2 \mathrm{I} \arctan(a x) \operatorname{polylog}\left(2, \frac{\mathrm{I} (1 + \mathrm{I} a x)}{\sqrt{x^2 a^2 + 1}}\right) \sqrt{x^2 a^2 + 1}}{a^5 c^2 \sqrt{a^2 c x^2 + c}} - \frac{2 \operatorname{polylog}\left(3, \frac{-\mathrm{I} (1 + \mathrm{I} a x)}{\sqrt{x^2 a^2 + 1}}\right) \sqrt{x^2 a^2 + 1}}{a^5 c^2 \sqrt{a^2 c x^2 + c}} + \frac{2 \operatorname{polylog}\left(3, \frac{\mathrm{I} (1 + \mathrm{I} a x)}{\sqrt{x^2 a^2 + 1}}\right) \sqrt{x^2 a^2 + 1}}{a^5 c^2 \sqrt{a^2 c x^2 + c}}$$

Result(type 8, 24 leaves):

$$\int \frac{x^4 \arctan(a x)^2}{(a^2 c x^2 + c)^{5/2}} \, dx$$

Problem 99: Result more than twice size of optimal antiderivative.

$$\int x^2 (a^2 c x^2 + c) \arctan(a x)^3 \, dx$$

Optimal(type 4, 182 leaves, 34 steps):

$$-\frac{c x^2}{20 a} + \frac{c x \arctan(a x)}{10 a^2} + \frac{c x^3 \arctan(a x)}{10} - \frac{c \arctan(a x)^2}{20 a^3} - \frac{c x^2 \arctan(a x)^2}{5 a} - \frac{3 a c x^4 \arctan(a x)^2}{20} - \frac{2 \mathrm{I} c \arctan(a x)^3}{15 a^3} + \frac{c x^3 \arctan(a x)^3}{3}$$

$$+ \frac{a^2 c x^5 \arctan(a x)^3}{5} - \frac{2 c \arctan(a x)^2 \ln\left(\frac{2}{1 + \mathrm{I} a x}\right)}{5 a^3} - \frac{2 \mathrm{I} c \arctan(a x) \operatorname{polylog}\left(2, 1 - \frac{2}{1 + \mathrm{I} a x}\right)}{5 a^3} - \frac{c \operatorname{polylog}\left(3, 1 - \frac{2}{1 + \mathrm{I} a x}\right)}{5 a^3}$$

Result(type ?, 2554 leaves): Display of huge result suppressed!

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

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

Optimal(type 4, 273 leaves, 16 steps):

$$-\frac{3 \mathrm{I} a^2 c \arctan(a x)^2}{2} - \frac{3 a c \arctan(a x)^2}{2 x} - \frac{a^2 c \arctan(a x)^3}{2} - \frac{c \arctan(a x)^3}{2 x^2} - 2 a^2 c \arctan(a x)^3 \operatorname{arctanh}\left(-1 + \frac{2}{1 + \mathrm{I} a x}\right) + 3 a^2 c \arctan(a x) \ln\left(2\right.$$

$$\left. - \frac{2}{1 - \mathrm{I} a x}\right) - \frac{3 \mathrm{I} a^2 c \operatorname{polylog}\left(2, -1 + \frac{2}{1 - \mathrm{I} a x}\right)}{2} - \frac{3 \mathrm{I} a^2 c \arctan(a x)^2 \operatorname{polylog}\left(2, 1 - \frac{2}{1 + \mathrm{I} a x}\right)}{2} + \frac{3 \mathrm{I} a^2 c \arctan(a x)^2 \operatorname{polylog}\left(2, -1 + \frac{2}{1 + \mathrm{I} a x}\right)}{2}$$

$$- \frac{3 a^2 c \arctan(a x) \operatorname{polylog}\left(3, 1 - \frac{2}{1 + \mathrm{I} a x}\right)}{2} + \frac{3 a^2 c \arctan(a x) \operatorname{polylog}\left(3, -1 + \frac{2}{1 + \mathrm{I} a x}\right)}{2} + \frac{3 \mathrm{I} a^2 c \operatorname{polylog}\left(4, 1 - \frac{2}{1 + \mathrm{I} a x}\right)}{4}$$

$$- \frac{3 \mathrm{I} a^2 c \operatorname{polylog}\left(4, -1 + \frac{2}{1 + \mathrm{I} a x}\right)}{4}$$

Result(type 4, 567 leaves):

$$-3 I a^2 c \arctan(a x)^2 \operatorname{polylog}\left(2, -\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) - \frac{a^2 c \arctan(a x)^3}{2} - \frac{3 a c \arctan(a x)^2}{2 x} - \frac{c \arctan(a x)^3}{2 x^2} - 3 I a^2 c \arctan(a x)^2 \operatorname{polylog}\left(2, \frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)$$

$$+ 3 a^2 c \arctan(a x) \ln\left(1+\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) - \frac{3 I a^2 c \operatorname{polylog}\left(4, -\frac{(1+I a x)^2}{x^2 a^2+1}\right)}{4} - a^2 c \arctan(a x)^3 \ln\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right) - 3 I a^2 c \operatorname{polylog}\left(2,\right.$$

$$\left.-\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) - \frac{3 a^2 c \arctan(a x) \operatorname{polylog}\left(3, -\frac{(1+I a x)^2}{x^2 a^2+1}\right)}{2} + 6 I a^2 c \operatorname{polylog}\left(4, \frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) + a^2 c \arctan(a x)^3 \ln\left(1+\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)$$

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

$$+ a^2 c \arctan(a x)^3 \ln\left(1-\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) - 3 I a^2 c \operatorname{polylog}\left(2, \frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) + 3 a^2 c \arctan(a x) \ln\left(1-\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) - \frac{3 I a^2 c \arctan(a x)^2}{2}$$

$$+ 6 a^2 c \arctan(a x) \operatorname{polylog}\left(3, -\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)$$

Problem 102: Result more than twice size of optimal antiderivative.

$$\int x^2 \left(a^2 c x^2 + c\right)^3 \arctan(a x)^3 \, dx$$

Optimal(type 4, 342 leaves, 132 steps):

$$-\frac{107 c^3 x^2}{7560 a} - \frac{11 a c^3 x^4}{1260} - \frac{a^3 c^3 x^6}{504} - \frac{47 c^3 x \arctan(a x)}{1260 a^2} + \frac{239 c^3 x^3 \arctan(a x)}{3780} + \frac{59 a^2 c^3 x^5 \arctan(a x)}{1260} + \frac{a^4 c^3 x^7 \arctan(a x)}{84} + \frac{47 c^3 \arctan(a x)^2}{2520 a^3}$$

$$- \frac{8 c^3 x^2 \arctan(a x)^2}{105 a} - \frac{89 a c^3 x^4 \arctan(a x)^2}{420} - \frac{10 a^3 c^3 x^6 \arctan(a x)^2}{63} - \frac{a^5 c^3 x^8 \arctan(a x)^2}{24} - \frac{16 I c^3 \arctan(a x)^3}{315 a^3} + \frac{c^3 x^3 \arctan(a x)^3}{3}$$

$$+ \frac{3 a^2 c^3 x^5 \arctan(a x)^3}{5} + \frac{3 a^4 c^3 x^7 \arctan(a x)^3}{7} + \frac{a^6 c^3 x^9 \arctan(a x)^3}{9} - \frac{16 c^3 \arctan(a x)^2 \ln\left(\frac{2}{1+I a x}\right)}{105 a^3} + \frac{31 c^3 \ln(x^2 a^2+1)}{945 a^3}$$

$$- \frac{16 I c^3 \arctan(a x) \operatorname{polylog}\left(2, 1-\frac{2}{1+I a x}\right)}{105 a^3} - \frac{8 c^3 \operatorname{polylog}\left(3, 1-\frac{2}{1+I a x}\right)}{105 a^3}$$

Result(type 4, 1180 leaves):

$$\frac{4 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(\frac{I}{\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2}\right) \operatorname{csgn}\left(\frac{I (1+I a x)^2}{x^2 a^2+1}\right) \operatorname{csgn}\left(\frac{I (1+I a x)^2}{(x^2 a^2+1)\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2}\right)}{105 a^3}$$

$$- \frac{4 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(I \left(1 + \frac{(1 + I a x)^2}{x^2 a^2 + 1}\right)^2\right)^3}{105 a^3} + \frac{4 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(\frac{I (1 + I a x)^2}{x^2 a^2 + 1}\right)^3}{105 a^3}$$

$$+ \frac{4 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(\frac{I (1 + I a x)^2}{(x^2 a^2 + 1)\left(1 + \frac{(1 + I a x)^2}{x^2 a^2 + 1}\right)^2}\right)^3}{105 a^3} + \frac{4 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(\frac{I (1 + I a x)}{\sqrt{x^2 a^2 + 1}}\right)^2 \operatorname{csgn}\left(\frac{I (1 + I a x)^2}{x^2 a^2 + 1}\right)}{105 a^3}$$

$$- \frac{8 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(\frac{I (1 + I a x)}{\sqrt{x^2 a^2 + 1}}\right) \operatorname{csgn}\left(\frac{I (1 + I a x)^2}{x^2 a^2 + 1}\right)^2}{105 a^3}$$

$$- \frac{4 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(\frac{I (1 + I a x)^2}{x^2 a^2 + 1}\right) \operatorname{csgn}\left(\frac{I (1 + I a x)^2}{(x^2 a^2 + 1)\left(1 + \frac{(1 + I a x)^2}{x^2 a^2 + 1}\right)^2}\right)^2}{105 a^3}$$

$$- \frac{4 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(\frac{I}{\left(1 + \frac{(1 + I a x)^2}{x^2 a^2 + 1}\right)^2}\right) \operatorname{csgn}\left(\frac{I (1 + I a x)^2}{(x^2 a^2 + 1)\left(1 + \frac{(1 + I a x)^2}{x^2 a^2 + 1}\right)^2}\right)^2}{105 a^3}$$

$$- \frac{4 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(I \left(1 + \frac{(1 + I a x)^2}{x^2 a^2 + 1}\right)\right)^2 \operatorname{csgn}\left(I \left(1 + \frac{(1 + I a x)^2}{x^2 a^2 + 1}\right)^2\right)}{105 a^3} + \frac{16 I c^3 \arctan(a x) \operatorname{polylog}\left(2, -\frac{(1 + I a x)^2}{x^2 a^2 + 1}\right)}{105 a^3}$$

$$- \frac{47 c^3 x \arctan(a x)}{1260 a^2} + \frac{59 a^2 c^3 x^5 \arctan(a x)}{1260} + \frac{a^4 c^3 x^7 \arctan(a x)}{84} - \frac{8 c^3 x^2 \arctan(a x)^2}{105 a} - \frac{89 a c^3 x^4 \arctan(a x)^2}{420} - \frac{10 a^3 c^3 x^6 \arctan(a x)^2}{63}$$

$$- \frac{a^5 c^3 x^8 \arctan(a x)^2}{24} + \frac{3 a^2 c^3 x^5 \arctan(a x)^3}{5} + \frac{3 a^4 c^3 x^7 \arctan(a x)^3}{7} + \frac{a^6 c^3 x^9 \arctan(a x)^3}{9} - \frac{16 c^3 \ln(2) \arctan(a x)^2}{105 a^3}$$

$$- \frac{16 c^3 \arctan(a x)^2 \ln\left(\frac{1 + I a x}{\sqrt{x^2 a^2 + 1}}\right)}{105 a^3} + \frac{8 c^3 \arctan(a x)^2 \ln(x^2 a^2 + 1)}{105 a^3} + \frac{62 I c^3 \arctan(a x)}{945 a^3} + \frac{16 I c^3 \arctan(a x)^3}{315 a^3} - \frac{107 c^3 x^2}{7560 a} - \frac{11 a c^3 x^4}{1260}$$

$$- \frac{a^3 c^3 x^6}{504} + \frac{239 c^3 x^3 \arctan(a x)}{3780} + \frac{47 c^3 \arctan(a x)^2}{2520 a^3} + \frac{c^3 x^3 \arctan(a x)^3}{3} - \frac{62 c^3 \ln\left(1 + \frac{(1 + I a x)^2}{x^2 a^2 + 1}\right)}{945 a^3} - \frac{8 c^3 \operatorname{polylog}\left(3, -\frac{(1 + I a x)^2}{x^2 a^2 + 1}\right)}{105 a^3}$$

$$- \frac{c^3}{135 a^3} + \frac{8 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(I \left(1 + \frac{(1 + I a x)^2}{x^2 a^2 + 1}\right)\right) \operatorname{csgn}\left(I \left(1 + \frac{(1 + I a x)^2}{x^2 a^2 + 1}\right)^2\right)^2}{105 a^3}$$

Problem 103: Result more than twice size of optimal antiderivative.

$$\int \left(a^2 c x^2 + c\right)^3 \arctan(a x)^3 \, dx$$

Optimal(type 4, 349 leaves, 17 steps):

$$-\frac{13 c^3 \left(x^2 a^2+1\right)}{210 a}-\frac{c^3 \left(x^2 a^2+1\right)^2}{140 a}+\frac{14 c^3 x \arctan(a x)}{15}+\frac{13 c^3 x \left(x^2 a^2+1\right) \arctan(a x)}{105}+\frac{c^3 x \left(x^2 a^2+1\right)^2 \arctan(a x)}{35}$$
$$-\frac{12 c^3 \left(x^2 a^2+1\right) \arctan(a x)^2}{35 a}-\frac{9 c^3 \left(x^2 a^2+1\right)^2 \arctan(a x)^2}{70 a}-\frac{c^3 \left(x^2 a^2+1\right)^3 \arctan(a x)^2}{14 a}+\frac{16 I c^3 \arctan(a x)^3}{35 a}+\frac{16 c^3 x \arctan(a x)^3}{35}$$
$$+\frac{8 c^3 x \left(x^2 a^2+1\right) \arctan(a x)^3}{35}+\frac{6 c^3 x \left(x^2 a^2+1\right)^2 \arctan(a x)^3}{35}+\frac{c^3 x \left(x^2 a^2+1\right)^3 \arctan(a x)^3}{7}+\frac{48 c^3 \arctan(a x)^2 \ln\left(\frac{2}{1+I a x}\right)}{35 a}$$
$$-\frac{7 c^3 \ln\left(x^2 a^2+1\right)}{15 a}+\frac{48 I c^3 \arctan(a x) \operatorname{polylog}\left(2, 1-\frac{2}{1+I a x}\right)}{35 a}+\frac{24 c^3 \operatorname{polylog}\left(3, 1-\frac{2}{1+I a x}\right)}{35 a}$$

Result(type 4, 1133 leaves):

$$-\frac{12 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(\frac{I}{\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2}\right) \operatorname{csgn}\left(\frac{I (1+I a x)^2}{x^2 a^2+1}\right) \operatorname{csgn}\left(\frac{I (1+I a x)^2}{\left(x^2 a^2+1\right) \left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2}\right)}{35 a}-\frac{12 a^3 c^3 \arctan(a x)^2 x^4}{35}$$
$$-\frac{a^5 c^3 \arctan(a x)^2 x^6}{14}-\frac{57 a c^3 \arctan(a x)^2 x^2}{70}+\frac{19 a^2 c^3 \arctan(a x) x^3}{105}+\frac{a^4 c^3 \arctan(a x) x^5}{35}+\frac{a^6 c^3 \arctan(a x)^3 x^7}{7}+\frac{3 a^4 c^3 \arctan(a x)^3 x^5}{5}$$
$$+a^2 c^3 \arctan(a x)^3 x^3+\frac{48 c^3 \ln(2) \arctan(a x)^2}{35 a}+\frac{48 c^3 \arctan(a x)^2 \ln\left(\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)}{35 a}-\frac{24 c^3 \arctan(a x)^2 \ln\left(x^2 a^2+1\right)}{35 a}-\frac{14 I c^3 \arctan(a x)}{15 a}$$
$$-\frac{16 I c^3 \arctan(a x)^3}{35 a}-\frac{29 c^3}{420 a}-\frac{48 I c^3 \arctan(a x) \operatorname{polylog}\left(2, -\frac{(1+I a x)^2}{x^2 a^2+1}\right)}{35 a}-\frac{8 a c^3 x^2}{105}-\frac{a^3 x^4 c^3}{140}+\frac{14 c^3 \ln\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)}{15 a}$$
$$+\frac{24 c^3 \operatorname{polylog}\left(3, -\frac{(1+I a x)^2}{x^2 a^2+1}\right)}{35 a}-\frac{19 c^3 \arctan(a x)^2}{35 a}+\frac{38 c^3 x \arctan(a x)}{35}+c^3 x \arctan(a x)^3$$
$$+\frac{12 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(\frac{I}{\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2}\right) \operatorname{csgn}\left(\frac{I (1+I a x)^2}{\left(x^2 a^2+1\right) \left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2}\right)^2}{35 a}$$
$$+\frac{12 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(I \left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)\right)^2 \operatorname{csgn}\left(I \left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2\right)}{35 a}$$

$$-\frac{24 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(I\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)\right) \operatorname{csgn}\left(I\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2\right)^2}{35 a}$$

$$-\frac{12 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(\frac{I(1+I a x)}{\sqrt{x^2 a^2+1}}\right)^2 \operatorname{csgn}\left(\frac{I(1+I a x)^2}{x^2 a^2+1}\right)}{35 a}+\frac{24 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(\frac{I(1+I a x)}{\sqrt{x^2 a^2+1}}\right) \operatorname{csgn}\left(\frac{I(1+I a x)^2}{x^2 a^2+1}\right)^2}{35 a}$$

$$+\frac{12 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(\frac{I(1+I a x)^2}{x^2 a^2+1}\right) \operatorname{csgn}\left(\frac{I(1+I a x)^2}{(x^2 a^2+1)\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2}\right)^2}{35 a}+\frac{12 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(I\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2\right)^3}{35 a}$$

$$-\frac{12 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(\frac{I(1+I a x)^2}{x^2 a^2+1}\right)^3}{35 a}-\frac{12 I c^3 \arctan(a x)^2 \pi \operatorname{csgn}\left(\frac{I(1+I a x)^2}{(x^2 a^2+1)\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2}\right)^3}{35 a}$$

Problem 106: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 123 leaves, 5 steps):

$$-\frac{I \arctan(a x)^4}{4 a^2 c}-\frac{\arctan(a x)^3 \ln\left(\frac{2}{1+I a x}\right)}{a^2 c}-\frac{3 I \arctan(a x)^2 \operatorname{polylog}\left(2, 1-\frac{2}{1+I a x}\right)}{2 a^2 c}-\frac{3 \arctan(a x) \operatorname{polylog}\left(3, 1-\frac{2}{1+I a x}\right)}{2 a^2 c}$$

$$+\frac{3 I \operatorname{polylog}\left(4, 1-\frac{2}{1+I a x}\right)}{4 a^2 c}$$

Result(type 4, 935 leaves):

$$\frac{\arctan(a x)^3 \ln(x^2 a^2+1)}{2 a^2 c}-\frac{\arctan(a x)^3 \ln\left(\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)}{a^2 c}+\frac{I \arctan(a x)^4}{4 a^2 c}+\frac{I \operatorname{csgn}\left(\frac{I(1+I a x)^2}{x^2 a^2+1}\right)^3 \arctan(a x)^3 \pi}{4 a^2 c}$$

$$-\frac{3 \arctan(a x) \operatorname{polylog}\left(3, -\frac{(1+I a x)^2}{x^2 a^2+1}\right)}{2 a^2 c}+\frac{3 I \arctan(a x)^2 \operatorname{polylog}\left(2, -\frac{(1+I a x)^2}{x^2 a^2+1}\right)}{2 a^2 c}$$

$$-\frac{I \operatorname{csgn}\left(I\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)\right)^2 \operatorname{csgn}\left(I\left(1+\frac{(1+I a x)^2}{x^2 a^2+1}\right)^2\right) \arctan(a x)^3 \pi}{4 a^2 c}$$

$$-\frac{I\,\mathrm{csgn}\left(\frac{I(1+Iax)^2}{x^2a^2+1}\right)\mathrm{csgn}\left(\frac{I(1+Iax)^2}{(x^2a^2+1)\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)^2\arctan(ax)^3\pi}{4a^2c}$$

$$+\frac{I\,\mathrm{csgn}\left(\frac{I}{\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)\mathrm{csgn}\left(\frac{I(1+Iax)^2}{x^2a^2+1}\right)\mathrm{csgn}\left(\frac{I(1+Iax)^2}{(x^2a^2+1)\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)\arctan(ax)^3\pi}{4a^2c}$$

$$-\frac{I\,\mathrm{csgn}\left(\frac{I(1+Iax)^2}{x^2a^2+1}\right)^2\mathrm{csgn}\left(\frac{I(1+Iax)}{\sqrt{x^2a^2+1}}\right)\arctan(ax)^3\pi}{2a^2c}-\frac{3\,I\,\mathrm{polylog}\left(4,-\frac{(1+Iax)^2}{x^2a^2+1}\right)}{4a^2c}$$

$$-\frac{I\,\mathrm{csgn}\left(\frac{I}{\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)\mathrm{csgn}\left(\frac{I(1+Iax)^2}{(x^2a^2+1)\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)^2\arctan(ax)^3\pi}{4a^2c}$$

$$+\frac{I\,\mathrm{csgn}\left(\frac{I(1+Iax)^2}{(x^2a^2+1)\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)^3\arctan(ax)^3\pi}{4a^2c}-\frac{I\,\mathrm{csgn}\left(I\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2\right)^3\arctan(ax)^3\pi}{4a^2c}$$

$$+\frac{I\,\mathrm{csgn}\left(I\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)\right)\mathrm{csgn}\left(I\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2\right)^2\arctan(ax)^3\pi}{2a^2c}+\frac{I\,\mathrm{csgn}\left(\frac{I(1+Iax)^2}{x^2a^2+1}\right)\mathrm{csgn}\left(\frac{I(1+Iax)}{\sqrt{x^2a^2+1}}\right)^2\arctan(ax)^3\pi}{4a^2c}$$

$$-\frac{\arctan(ax)^3\ln(2)}{a^2c}$$

```
Problem 107: Result more than twice size of optimal antiderivative.
```

$$\int\frac{\arctan(ax)^3}{x\,(a^2cx^2+c)}\,dx$$

```
Optimal(type 4, 109 leaves, 5 steps):
```

$$-\frac{I\arctan(ax)^4}{4c}+\frac{\arctan(ax)^3\ln\left(2-\frac{2}{1-Iax}\right)}{c}-\frac{3\,I\arctan(ax)^2\,\mathrm{polylog}\left(2,-1+\frac{2}{1-Iax}\right)}{2c}+\frac{3\arctan(ax)\,\mathrm{polylog}\left(3,-1+\frac{2}{1-Iax}\right)}{2c}$$

$$+\frac{3\,I\,\mathrm{polylog}\left(4,-1+\frac{2}{1-Iax}\right)}{4c}$$

Result(type 4, 1833 leaves):

$$
-\frac{I\arctan(ax)^3\pi\,\mathrm{csgn}\left(\frac{\frac{(1+Iax)^2}{x^2a^2+1}-1}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)^2}{2c}+\frac{I\arctan(ax)^3\pi\,\mathrm{csgn}\left(\frac{I\left(\frac{(1+Iax)^2}{x^2a^2+1}-1\right)}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)^3}{2c}-\frac{I\,\mathrm{csgn}\left(\frac{I(1+Iax)^2}{x^2a^2+1}\right)^3\arctan(ax)^3\pi}{4c}
$$

$$
-\frac{I\,\mathrm{csgn}\left(\frac{I(1+Iax)^2}{(x^2a^2+1)\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)^3\arctan(ax)^3\pi}{4c}+\frac{I\,\mathrm{csgn}\left(I\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2\right)^3\arctan(ax)^3\pi}{4c}
$$

$$
+\frac{I\pi\arctan(ax)^3\,\mathrm{csgn}\left(\frac{\frac{(1+Iax)^2}{x^2a^2+1}-1}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)^3}{2c}+\frac{\arctan(ax)^3\ln(2)}{c}
$$

$$
-\frac{I\,\mathrm{csgn}\left(\frac{I}{\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)\mathrm{csgn}\left(\frac{I(1+Iax)^2}{x^2a^2+1}\right)\mathrm{csgn}\left(\frac{I(1+Iax)^2}{(x^2a^2+1)\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)\arctan(ax)^3\pi}{4c}
$$

$$
+\frac{I\arctan(ax)^3\pi\,\mathrm{csgn}\left(I\left(\frac{(1+Iax)^2}{x^2a^2+1}-1\right)\right)\mathrm{csgn}\left(\frac{I}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)\mathrm{csgn}\left(\frac{I\left(\frac{(1+Iax)^2}{x^2a^2+1}-1\right)}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)}{2c}-\frac{I\arctan(ax)^4}{4c}+\frac{I\arctan(ax)^3\pi}{2c}
$$

$$
-\frac{3I\arctan(ax)^2\,\mathrm{polylog}\left(2,-\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c}-\frac{3I\arctan(ax)^2\,\mathrm{polylog}\left(2,\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c}
$$

$$
+\frac{I\arctan(ax)^3\pi\,\mathrm{csgn}\left(\frac{\frac{(1+Iax)^2}{x^2a^2+1}-1}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)\mathrm{csgn}\left(\frac{I\left(\frac{(1+Iax)^2}{x^2a^2+1}-1\right)}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)}{2c}
$$

$$-\frac{I\arctan(a x)^3\pi\,\mathrm{csgn}\left(\frac{\frac{(1+Iax)^2}{x^2a^2+1}-1}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)^2\mathrm{csgn}\left(\frac{I\left(\frac{(1+Iax)^2}{x^2a^2+1}-1\right)}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)}{2c}$$

$$-\frac{I\arctan(a x)^3\pi\,\mathrm{csgn}\left(\frac{I}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)\mathrm{csgn}\left(\frac{I\left(\frac{(1+Iax)^2}{x^2a^2+1}-1\right)}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)^2}{2c}$$

$$-\frac{I\arctan(a x)^3\pi\,\mathrm{csgn}\left(I\left(\frac{(1+Iax)^2}{x^2a^2+1}-1\right)\right)\mathrm{csgn}\left(\frac{I\left(\frac{(1+Iax)^2}{x^2a^2+1}-1\right)}{1+\frac{(1+Iax)^2}{x^2a^2+1}}\right)^2}{2c}$$

$$+\frac{I\,\mathrm{csgn}\left(\frac{I}{\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)\mathrm{csgn}\left(\frac{I(1+Iax)^2}{(x^2a^2+1)\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)^2\arctan(a x)^3\pi}{4c}$$

$$+\frac{I\,\mathrm{csgn}\left(\frac{I(1+Iax)^2}{x^2a^2+1}\right)^2\mathrm{csgn}\left(\frac{I(1+Iax)}{\sqrt{x^2a^2+1}}\right)\arctan(a x)^3\pi}{2c}+\frac{I\,\mathrm{csgn}\left(\frac{I(1+Iax)^2}{x^2a^2+1}\right)\mathrm{csgn}\left(\frac{I(1+Iax)^2}{(x^2a^2+1)\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2}\right)^2\arctan(a x)^3\pi}{4c}$$

$$-\frac{I\,\mathrm{csgn}\left(\frac{I(1+Iax)^2}{x^2a^2+1}\right)\mathrm{csgn}\left(\frac{I(1+Iax)}{\sqrt{x^2a^2+1}}\right)^2\arctan(a x)^3\pi}{4c}+\frac{I\,\mathrm{csgn}\left(I\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)\right)^2\mathrm{csgn}\left(I\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2\right)\arctan(a x)^3\pi}{4c}$$

$$-\frac{I\,\mathrm{csgn}\left(I\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)\right)\mathrm{csgn}\left(I\left(1+\frac{(1+Iax)^2}{x^2a^2+1}\right)^2\right)^2\arctan(a x)^3\pi}{2c}+\frac{\arctan(a x)^3\ln\left(1-\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c}$$

$$+\frac{6\arctan(a x)\,\mathrm{polylog}\left(3,-\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c}+\frac{\arctan(a x)^3\ln\left(1+\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c}+\frac{6\arctan(a x)\,\mathrm{polylog}\left(3,\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c}$$

$$-\frac{\arctan(a x)^3\ln\left(\frac{(1+Iax)^2}{x^2a^2+1}-1\right)}{c}+\frac{6I\,\mathrm{polylog}\left(4,-\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c}+\frac{6I\,\mathrm{polylog}\left(4,\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)}{c}+\frac{\arctan(a x)^3\ln(a x)}{c}$$

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

Problem 108: Result more than twice size of optimal antiderivative.

$$\int \frac{\arctan(a x)^3}{x^4 (a^2 c x^2+c)^2}\, dx$$

Optimal(type 4, 305 leaves, 35 steps):

$$-\frac{3 a^3}{8 c^2 (x^2 a^2+1)}-\frac{a^2 \arctan(a x)}{c^2 x}-\frac{3 a^4 x \arctan(a x)}{4 c^2 (x^2 a^2+1)}-\frac{7 a^3 \arctan(a x)^2}{8 c^2}-\frac{a \arctan(a x)^2}{2 c^2 x^2}+\frac{3 a^3 \arctan(a x)^2}{4 c^2 (x^2 a^2+1)}$$
$$+\frac{7 I a^3 \arctan(a x) \operatorname{polylog}\left(2, -1+\frac{2}{1-I a x}\right)}{c^2}-\frac{\arctan(a x)^3}{3 c^2 x^3}+\frac{2 a^2 \arctan(a x)^3}{c^2 x}+\frac{a^4 x \arctan(a x)^3}{2 c^2 (x^2 a^2+1)}+\frac{5 a^3 \arctan(a x)^4}{8 c^2}+\frac{a^3 \ln(x)}{c^2}$$
$$-\frac{a^3 \ln(x^2 a^2+1)}{2 c^2}-\frac{7 a^3 \arctan(a x)^2 \ln\left(2-\frac{2}{1-I a x}\right)}{c^2}+\frac{7 I a^3 \arctan(a x)^3}{3 c^2}-\frac{7 a^3 \operatorname{polylog}\left(3, -1+\frac{2}{1-I a x}\right)}{2 c^2}$$

Result(type ?, 5189 leaves): Display of huge result suppressed!

Problem 111: Unable to integrate problem.

$$\int \frac{\arctan(a x)^3 \sqrt{a^2 c x^2+c}}{x^2}\, dx$$

Optimal(type 4, 659 leaves, 22 steps):

$$-\frac{2 I a c \arctan\left(\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) \arctan(a x)^3 \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}-\frac{6 a c \arctan(a x)^2 \operatorname{arctanh}\left(\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}$$
$$+\frac{6 I a c \arctan(a x) \operatorname{polylog}\left(2, -\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}+\frac{3 I a c \arctan(a x)^2 \operatorname{polylog}\left(2, \frac{-I (1+I a x)}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}$$
$$-\frac{3 I a c \arctan(a x)^2 \operatorname{polylog}\left(2, \frac{I (1+I a x)}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}-\frac{6 I a c \arctan(a x) \operatorname{polylog}\left(2, \frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}$$
$$-\frac{6 a c \operatorname{polylog}\left(3, -\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}-\frac{6 a c \arctan(a x) \operatorname{polylog}\left(3, \frac{-I (1+I a x)}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}$$

$$+\frac{6 a c \arctan(a x)\, \mathrm{polylog}\left(3, \frac{I(1+I a x)}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}+\frac{6 a c\, \mathrm{polylog}\left(3, \frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}$$

$$-\frac{6 I a c\, \mathrm{polylog}\left(4, \frac{-I(1+I a x)}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}+\frac{6 I a c\, \mathrm{polylog}\left(4, \frac{I(1+I a x)}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}-\frac{\arctan(a x)^3 \sqrt{a^2 c x^2+c}}{x}$$

Result(type 8, 24 leaves):

$$\int \frac{\arctan(a x)^3 \sqrt{a^2 c x^2+c}}{x^2}\, dx$$

Problem 113: Unable to integrate problem.

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

Optimal(type 4, 891 leaves, 37 steps):

$$-\frac{9 I a c^2\, \mathrm{polylog}\left(4, \frac{-I(1+I a x)}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}-\frac{6 I a c^2 \arctan(a x)\, \mathrm{polylog}\left(2, \frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}$$

$$-\frac{6 a c^2 \arctan(a x)^2\, \mathrm{arctanh}\left(\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}-\frac{6 I a c^2 \arctan(a x) \arctan\left(\frac{\sqrt{1+I a x}}{\sqrt{1-I a x}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}$$

$$+\frac{3 I a c^2\, \mathrm{polylog}\left(2, \frac{-I\sqrt{1+I a x}}{\sqrt{1-I a x}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}+\frac{9 I a c^2 \arctan(a x)^2\, \mathrm{polylog}\left(2, \frac{-I(1+I a x)}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{2\sqrt{a^2 c x^2+c}}$$

$$-\frac{3 I a c^2\, \mathrm{polylog}\left(2, \frac{I\sqrt{1+I a x}}{\sqrt{1-I a x}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}+\frac{6 I a c^2 \arctan(a x)\, \mathrm{polylog}\left(2, -\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}$$

$$-\frac{3 I a c^2 \arctan\left(\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) \arctan(a x)^3 \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}-\frac{6 a c^2\, \mathrm{polylog}\left(3, -\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right) \sqrt{x^2 a^2+1}}{\sqrt{a^2 c x^2+c}}$$

$$- \frac{9 a c^2 \arctan(a x) \operatorname{polylog}\left(3, \frac{-I(1 + I a x)}{\sqrt{x^2 a^2 + 1}}\right) \sqrt{x^2 a^2 + 1}}{\sqrt{a^2 c x^2 + c}} + \frac{9 a c^2 \arctan(a x) \operatorname{polylog}\left(3, \frac{I(1 + I a x)}{\sqrt{x^2 a^2 + 1}}\right) \sqrt{x^2 a^2 + 1}}{\sqrt{a^2 c x^2 + c}}$$

$$+ \frac{6 a c^2 \operatorname{polylog}\left(3, \frac{1 + I a x}{\sqrt{x^2 a^2 + 1}}\right) \sqrt{x^2 a^2 + 1}}{\sqrt{a^2 c x^2 + c}} - \frac{9 I a c^2 \arctan(a x)^2 \operatorname{polylog}\left(2, \frac{I(1 + I a x)}{\sqrt{x^2 a^2 + 1}}\right) \sqrt{x^2 a^2 + 1}}{2 \sqrt{a^2 c x^2 + c}}$$

$$+ \frac{9 I a c^2 \operatorname{polylog}\left(4, \frac{I(1 + I a x)}{\sqrt{x^2 a^2 + 1}}\right) \sqrt{x^2 a^2 + 1}}{\sqrt{a^2 c x^2 + c}} - \frac{3 a c \arctan(a x)^2 \sqrt{a^2 c x^2 + c}}{2} - \frac{c \arctan(a x)^3 \sqrt{a^2 c x^2 + c}}{x} + \frac{a^2 c x \arctan(a x)^3 \sqrt{a^2 c x^2 + c}}{2}$$

Result(type 8, 24 leaves):

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

Problem 119: Unable to integrate problem.

$$\int \frac{\arctan(a x)^3}{\sqrt{a^2 c x^2 + c}} \, dx$$

Optimal(type 4, 386 leaves, 11 steps):

$$- \frac{2 I \arctan\left(\frac{1 + I a x}{\sqrt{x^2 a^2 + 1}}\right) \arctan(a x)^3 \sqrt{x^2 a^2 + 1}}{a \sqrt{a^2 c x^2 + c}} + \frac{3 I \arctan(a x)^2 \operatorname{polylog}\left(2, \frac{-I(1 + I a x)}{\sqrt{x^2 a^2 + 1}}\right) \sqrt{x^2 a^2 + 1}}{a \sqrt{a^2 c x^2 + c}}$$

$$- \frac{3 I \arctan(a x)^2 \operatorname{polylog}\left(2, \frac{I(1 + I a x)}{\sqrt{x^2 a^2 + 1}}\right) \sqrt{x^2 a^2 + 1}}{a \sqrt{a^2 c x^2 + c}} - \frac{6 \arctan(a x) \operatorname{polylog}\left(3, \frac{-I(1 + I a x)}{\sqrt{x^2 a^2 + 1}}\right) \sqrt{x^2 a^2 + 1}}{a \sqrt{a^2 c x^2 + c}}$$

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

Result(type 8, 21 leaves):

$$\int \frac{\arctan(a x)^3}{\sqrt{a^2 c x^2 + c}} \, dx$$

Problem 120: Unable to integrate problem.

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

Optimal(type 4, 407 leaves, 14 steps):

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

Result(type 8, 24 leaves):

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

Problem 156: Result more than twice size of optimal antiderivative.

$$\int \frac{x^2}{(a^2 c x^2 + c)^{5/2} \arctan(a x)^2}\, dx$$

Optimal(type 4, 126 leaves, 12 steps):

$$\frac{1}{a^3 c (a^2 c x^2 + c)^{3/2} \arctan(a x)} - \frac{1}{a^3 c^2 \arctan(a x) \sqrt{a^2 c x^2 + c}} - \frac{\operatorname{Si}(\arctan(a x)) \sqrt{x^2 a^2 + 1}}{4 a^3 c^2 \sqrt{a^2 c x^2 + c}} + \frac{3 \operatorname{Si}(3 \arctan(a x)) \sqrt{x^2 a^2 + 1}}{4 a^3 c^2 \sqrt{a^2 c x^2 + c}}$$

Result(type 4, 585 leaves):

$$-\frac{1}{8 \sqrt{x^2 a^2 + 1}\, (x^4 a^4 + 2 x^2 a^2 + 1) \arctan(a x)\, c^3 a^3} \Big(I \Big(3 \arctan(a x) \operatorname{Ei}_1(3 I \arctan(a x)) x^4 a^4 - \sqrt{x^2 a^2 + 1}\, x^3 a^3 + 6 \arctan(a x) \operatorname{Ei}_1(3 I \arctan(a x)) x^2 a^2$$
$$- 3 I \sqrt{x^2 a^2 + 1}\, x^2 a^2 + 3 \sqrt{x^2 a^2 + 1}\, x a + 3 \operatorname{Ei}_1(3 I \arctan(a x)) \arctan(a x) + I \sqrt{x^2 a^2 + 1}\Big) \sqrt{c (a x - I) (a x + I)}\Big)$$
$$+ \frac{1}{8 \sqrt{x^2 a^2 + 1}\, (x^4 a^4 + 2 x^2 a^2 + 1) \arctan(a x)\, c^3 a^3} \Big(I \Big(3 \arctan(a x) \operatorname{Ei}_1(-3 I \arctan(a x)) x^4 a^4 - \sqrt{x^2 a^2 + 1}\, x^3 a^3 + 6 \arctan(a x) \operatorname{Ei}_1($$
$$-3 I \arctan(a x)) x^2 a^2 + 3 I \sqrt{x^2 a^2 + 1}\, x^2 a^2 + 3 \sqrt{x^2 a^2 + 1}\, x a - I \sqrt{x^2 a^2 + 1} + 3 \operatorname{Ei}_1(-3 I \arctan(a x)) \arctan(a x)\Big) \sqrt{c (a x - I) (a x + I)}\Big)$$
$$+ \frac{I \left(\arctan(a x) \operatorname{Ei}_1(I \arctan(a x)) x^2 a^2 + \operatorname{Ei}_1(I \arctan(a x)) \arctan(a x) + \sqrt{x^2 a^2 + 1}\, x a + I \sqrt{x^2 a^2 + 1}\right) \sqrt{c (a x - I) (a x + I)}}{8 (x^2 a^2 + 1)^{3/2} \arctan(a x)\, c^3 a^3}$$

$$-\frac{I\left(\arctan(ax)\,\mathrm{Ei}_1(-I\arctan(ax))\,x^2a^2+\mathrm{Ei}_1(-I\arctan(ax))\arctan(ax)+\sqrt{x^2a^2+1}\;xa-I\sqrt{x^2a^2+1}\right)\sqrt{c\,(ax-I)\,(ax+I)}}{8\,(x^2a^2+1)^{3/2}\arctan(ax)\,c^3a^3}$$

Problem 173: Unable to integrate problem.

$$\int\left(\frac{x^3}{(x^2a^2+1)\arctan(ax)^3}-\frac{3x^2}{2a\arctan(ax)^2}\right)dx$$

Optimal(type 3, 14 leaves, 2 steps):

$$-\frac{x^3}{2a\arctan(ax)^2}$$

Result(type 8, 38 leaves):

$$\int\left(\frac{x^3}{(x^2a^2+1)\arctan(ax)^3}-\frac{3x^2}{2a\arctan(ax)^2}\right)dx$$

Problem 180: Result more than twice size of optimal antiderivative.

$$\int\frac{x^3}{(a^2cx^2+c)^{5/2}\arctan(ax)^3}\,dx$$

Optimal(type 4, 156 leaves, 13 steps):

$$-\frac{x^3}{2ac\,(a^2cx^2+c)^{3/2}\arctan(ax)^2}+\frac{3}{2a^4c\,(a^2cx^2+c)^{3/2}\arctan(ax)}-\frac{3}{2a^4c^2\arctan(ax)\sqrt{a^2cx^2+c}}-\frac{3\,\mathrm{Si}(\arctan(ax))\sqrt{x^2a^2+1}}{8a^4c^2\sqrt{a^2cx^2+c}}$$
$$+\frac{9\,\mathrm{Si}(3\arctan(ax))\sqrt{x^2a^2+1}}{8a^4c^2\sqrt{a^2cx^2+c}}$$

Result(type 4, 847 leaves):

$$\frac{1}{16\sqrt{x^2a^2+1}\,(x^4a^4+2x^2a^2+1)\arctan(ax)^2c^3a^4}\Big(I\Big(9\arctan(ax)^2\,\mathrm{Ei}_1(-3I\arctan(ax))\,x^4a^4-3\arctan(ax)\sqrt{x^2a^2+1}\;x^3a^3+18\arctan(ax)^2\,\mathrm{Ei}_1($$
$$-3I\arctan(ax))\,x^2a^2+I\sqrt{x^2a^2+1}\;x^3a^3+9I\arctan(ax)\sqrt{x^2a^2+1}\;x^2a^2+3\sqrt{x^2a^2+1}\;x^2a^2+9\arctan(ax)\sqrt{x^2a^2+1}\;xa-3I\sqrt{x^2a^2+1}\;xa$$
$$+9\,\mathrm{Ei}_1(-3I\arctan(ax))\arctan(ax)^2-3I\arctan(ax)\sqrt{x^2a^2+1}-\sqrt{x^2a^2+1}\Big)\sqrt{c\,(ax-I)\,(ax+I)}\Big)$$
$$-\frac{1}{16\sqrt{x^2a^2+1}\,(x^4a^4+2x^2a^2+1)\arctan(ax)^2c^3a^4}\Big(I\Big(9\arctan(ax)^2\,\mathrm{Ei}_1(3I\arctan(ax))\,x^4a^4-3\arctan(ax)\sqrt{x^2a^2+1}\;x^3a^3$$
$$+18\arctan(ax)^2\,\mathrm{Ei}_1(3I\arctan(ax))\,x^2a^2-I\sqrt{x^2a^2+1}\;x^3a^3-9I\arctan(ax)\sqrt{x^2a^2+1}\;x^2a^2+3\sqrt{x^2a^2+1}\;x^2a^2+9\arctan(ax)\sqrt{x^2a^2+1}\;xa$$
$$+9\,\mathrm{Ei}_1(3I\arctan(ax))\arctan(ax)^2+3I\sqrt{x^2a^2+1}\;xa+3I\arctan(ax)\sqrt{x^2a^2+1}-\sqrt{x^2a^2+1}\Big)\sqrt{c\,(ax-I)\,(ax+I)}\Big)$$

$$+\frac{1}{16\,(x^2a^2+1)^{3/2}\arctan(ax)^2c^3a^4}\Big(3\,I\Big(\arctan(ax)^2\,\mathrm{Ei}_1(I\arctan(ax))\,x^2a^2+\arctan(ax)\sqrt{x^2a^2+1}\,xa+I\sqrt{x^2a^2+1}\,xa$$
$$+\mathrm{Ei}_1(I\arctan(ax))\arctan(ax)^2+I\arctan(ax)\sqrt{x^2a^2+1}-\sqrt{x^2a^2+1}\Big)\sqrt{c\,(ax-I)\,(ax+I)}\Big)$$
$$-\frac{1}{16\,(x^2a^2+1)^{3/2}\arctan(ax)^2c^3a^4}\Big(3\,I\Big(\arctan(ax)^2\,\mathrm{Ei}_1(-I\arctan(ax))\,x^2a^2+\arctan(ax)\sqrt{x^2a^2+1}\,xa+\mathrm{Ei}_1(-I\arctan(ax))\arctan(ax)^2$$
$$-I\sqrt{x^2a^2+1}\,xa-I\arctan(ax)\sqrt{x^2a^2+1}-\sqrt{x^2a^2+1}\Big)\sqrt{c\,(ax-I)\,(ax+I)}\Big)$$

```
Problem 181: Result more than twice size of optimal antiderivative.
```

$$\int\frac{x}{(a^2cx^2+c)^{5/2}\arctan(ax)^3}\,dx$$

```
Optimal(type 4, 153 leaves, 20 steps):
```

$$-\frac{x}{2ac\,(a^2cx^2+c)^{3/2}\arctan(ax)^2}-\frac{3}{2a^2c\,(a^2cx^2+c)^{3/2}\arctan(ax)}+\frac{1}{a^2c^2\arctan(ax)\sqrt{a^2cx^2+c}}-\frac{\mathrm{Si}(\arctan(ax))\sqrt{x^2a^2+1}}{8a^2c^2\sqrt{a^2cx^2+c}}$$
$$-\frac{9\,\mathrm{Si}(3\arctan(ax))\sqrt{x^2a^2+1}}{8a^2c^2\sqrt{a^2cx^2+c}}$$

```
Result(type 4, 847 leaves):
```

$$-\frac{1}{16\sqrt{x^2a^2+1}\,(x^4a^4+2x^2a^2+1)\arctan(ax)^2c^3a^2}\Big(I\Big(9\arctan(ax)^2\,\mathrm{Ei}_1(-3\,I\arctan(ax))\,x^4a^4-3\arctan(ax)\sqrt{x^2a^2+1}\,x^3a^3+18\arctan(ax)^2\,\mathrm{Ei}_1($$
$$-3\,I\arctan(ax))\,x^2a^2+I\sqrt{x^2a^2+1}\,x^3a^3+9\,I\arctan(ax)\sqrt{x^2a^2+1}\,x^2a^2+3\sqrt{x^2a^2+1}\,x^2a^2+9\arctan(ax)\sqrt{x^2a^2+1}\,xa-3\,I\sqrt{x^2a^2+1}\,xa$$
$$+9\,\mathrm{Ei}_1(-3\,I\arctan(ax))\arctan(ax)^2-3\,I\arctan(ax)\sqrt{x^2a^2+1}-\sqrt{x^2a^2+1}\Big)\sqrt{c\,(ax-I)\,(ax+I)}\Big)$$
$$-\frac{1}{16\,(x^2a^2+1)^{3/2}a^2c^3\arctan(ax)^2}\Big(I\Big(\arctan(ax)^2\,\mathrm{Ei}_1(-I\arctan(ax))\,x^2a^2+\arctan(ax)\sqrt{x^2a^2+1}\,xa+\mathrm{Ei}_1(-I\arctan(ax))\arctan(ax)^2$$
$$-I\sqrt{x^2a^2+1}\,xa-I\arctan(ax)\sqrt{x^2a^2+1}-\sqrt{x^2a^2+1}\Big)\sqrt{c\,(ax-I)\,(ax+I)}\Big)$$
$$+\frac{1}{16\sqrt{x^2a^2+1}\,(x^4a^4+2x^2a^2+1)\arctan(ax)^2c^3a^2}\Big(I\Big(9\arctan(ax)^2\,\mathrm{Ei}_1(3\,I\arctan(ax))\,x^4a^4-3\arctan(ax)\sqrt{x^2a^2+1}\,x^3a^3$$
$$+18\arctan(ax)^2\,\mathrm{Ei}_1(3\,I\arctan(ax))\,x^2a^2-I\sqrt{x^2a^2+1}\,x^3a^3-9\,I\arctan(ax)\sqrt{x^2a^2+1}\,x^2a^2+3\sqrt{x^2a^2+1}\,x^2a^2+9\arctan(ax)\sqrt{x^2a^2+1}\,xa$$
$$+9\,\mathrm{Ei}_1(3\,I\arctan(ax))\arctan(ax)^2+3\,I\sqrt{x^2a^2+1}\,xa+3\,I\arctan(ax)\sqrt{x^2a^2+1}-\sqrt{x^2a^2+1}\Big)\sqrt{c\,(ax-I)\,(ax+I)}\Big)$$
$$+\frac{1}{16\,(x^2a^2+1)^{3/2}a^2c^3\arctan(ax)^2}\Big(I\Big(\arctan(ax)^2\,\mathrm{Ei}_1(I\arctan(ax))\,x^2a^2+\arctan(ax)\sqrt{x^2a^2+1}\,xa+I\sqrt{x^2a^2+1}\,xa$$

$$+\operatorname{Ei}_1(I\arctan(ax))\arctan(ax)^2+I\arctan(ax)\sqrt{x^2a^2+1}-\sqrt{x^2a^2+1}\Big)\sqrt{c\,(ax-I)\,(ax+I)}\Big)$$

Problem 182: Result more than twice size of optimal antiderivative.

$$\int\frac{1}{(a^2cx^2+c)^{5/2}\arctan(ax)^3}\,dx$$

Optimal(type 4, 125 leaves, 14 steps):

$$-\frac{1}{2ac\,(a^2cx^2+c)^{3/2}\arctan(ax)^2}+\frac{3x}{2c\,(a^2cx^2+c)^{3/2}\arctan(ax)}-\frac{3\operatorname{Ci}(\arctan(ax))\sqrt{x^2a^2+1}}{8ac^2\sqrt{a^2cx^2+c}}-\frac{9\operatorname{Ci}(3\arctan(ax))\sqrt{x^2a^2+1}}{8ac^2\sqrt{a^2cx^2+c}}$$

Result(type 4, 843 leaves):

$$\frac{1}{16\sqrt{x^2a^2+1}\,(x^4a^4+2x^2a^2+1)\arctan(ax)^2ac^3}\Big(\Big(9\arctan(ax)^2\operatorname{Ei}_1(3I\arctan(ax))x^4a^4-3\arctan(ax)\sqrt{x^2a^2+1}\,x^3a^3$$

$$+18\arctan(ax)^2\operatorname{Ei}_1(3I\arctan(ax))x^2a^2-I\sqrt{x^2a^2+1}\,x^3a^3-9I\arctan(ax)\sqrt{x^2a^2+1}\,x^2a^2+3\sqrt{x^2a^2+1}\,x^2a^2+9\arctan(ax)\sqrt{x^2a^2+1}\,xa$$

$$+9\operatorname{Ei}_1(3I\arctan(ax))\arctan(ax)^2+3I\sqrt{x^2a^2+1}\,xa+3I\arctan(ax)\sqrt{x^2a^2+1}-\sqrt{x^2a^2+1}\Big)\sqrt{c\,(ax-I)\,(ax+I)}\Big)$$

$$+\frac{1}{16\sqrt{x^2a^2+1}\,(x^4a^4+2x^2a^2+1)\arctan(ax)^2ac^3}\Big(\Big(9\arctan(ax)^2\operatorname{Ei}_1(-3I\arctan(ax))x^4a^4-3\arctan(ax)\sqrt{x^2a^2+1}\,x^3a^3+18\arctan(ax)^2\operatorname{Ei}_1($$

$$-3I\arctan(ax))x^2a^2+I\sqrt{x^2a^2+1}\,x^3a^3+9I\arctan(ax)\sqrt{x^2a^2+1}\,x^2a^2+3\sqrt{x^2a^2+1}\,x^2a^2+9\arctan(ax)\sqrt{x^2a^2+1}\,xa-3I\sqrt{x^2a^2+1}\,xa$$

$$+9\operatorname{Ei}_1(-3I\arctan(ax))\arctan(ax)^2-3I\arctan(ax)\sqrt{x^2a^2+1}-\sqrt{x^2a^2+1}\Big)\sqrt{c\,(ax-I)\,(ax+I)}\Big)$$

$$+\frac{1}{16\,(x^2a^2+1)^{3/2}\arctan(ax)^2ac^3}\Big(3\Big(\arctan(ax)^2\operatorname{Ei}_1(I\arctan(ax))x^2a^2+\arctan(ax)\sqrt{x^2a^2+1}\,xa+I\sqrt{x^2a^2+1}\,xa$$

$$+\operatorname{Ei}_1(I\arctan(ax))\arctan(ax)^2+I\arctan(ax)\sqrt{x^2a^2+1}-\sqrt{x^2a^2+1}\Big)\sqrt{c\,(ax-I)\,(ax+I)}\Big)$$

$$+\frac{1}{16\,(x^2a^2+1)^{3/2}\arctan(ax)^2ac^3}\Big(3\Big(\arctan(ax)^2\operatorname{Ei}_1(-I\arctan(ax))x^2a^2+\arctan(ax)\sqrt{x^2a^2+1}\,xa+\operatorname{Ei}_1(-I\arctan(ax))\arctan(ax)^2$$

$$-I\sqrt{x^2a^2+1}\,xa-I\arctan(ax)\sqrt{x^2a^2+1}-\sqrt{x^2a^2+1}\Big)\sqrt{c\,(ax-I)\,(ax+I)}\Big)$$

Problem 222: Unable to integrate problem.

$$\int\frac{x\arctan(ax)^{3/2}}{(a^2cx^2+c)^{3/2}}\,dx$$

Optimal(type 4, 105 leaves, 6 steps):

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

Result(type 8, 22 leaves):

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

Problem 225: Unable to integrate problem.

$$\int \frac{x \arctan(a x)^{3/2}}{(a^2 c x^2+c)^{5/2}}\, dx$$

Optimal(type 4, 200 leaves, 11 steps):

$$-\frac{\arctan(a x)^{3/2}}{3 a^2 c (a^2 c x^2+c)^{3/2}}-\frac{\mathrm{FresnelS}\left(\frac{\sqrt{6}\,\sqrt{\arctan(a x)}}{\sqrt{\pi}}\right)\sqrt{6}\,\sqrt{\pi}\,\sqrt{x^2 a^2+1}}{144 a^2 c^2 \sqrt{a^2 c x^2+c}}-\frac{3\,\mathrm{FresnelS}\left(\frac{\sqrt{2}\,\sqrt{\arctan(a x)}}{\sqrt{\pi}}\right)\sqrt{2}\,\sqrt{\pi}\,\sqrt{x^2 a^2+1}}{16 a^2 c^2 \sqrt{a^2 c x^2+c}}$$
$$+\frac{3 x \sqrt{\arctan(a x)}}{8 a c^2 \sqrt{a^2 c x^2+c}}+\frac{\sin(3 \arctan(a x))\sqrt{x^2 a^2+1}\,\sqrt{\arctan(a x)}}{24 a^2 c^2 \sqrt{a^2 c x^2+c}}$$

Result(type 8, 22 leaves):

$$\int \frac{x \arctan(a x)^{3/2}}{(a^2 c x^2+c)^{5/2}}\, dx$$

Problem 226: Unable to integrate problem.

$$\int \frac{\arctan(a x)^{3/2}}{(a^2 c x^2+c)^{5/2}}\, dx$$

Optimal(type 4, 202 leaves, 14 steps):

$$\frac{x \arctan(a x)^{3/2}}{3 c (a^2 c x^2+c)^{3/2}}+\frac{2 x \arctan(a x)^{3/2}}{3 c^2 \sqrt{a^2 c x^2+c}}-\frac{\mathrm{FresnelC}\left(\frac{\sqrt{6}\,\sqrt{\arctan(a x)}}{\sqrt{\pi}}\right)\sqrt{6}\,\sqrt{\pi}\,\sqrt{x^2 a^2+1}}{144 a c^2 \sqrt{a^2 c x^2+c}}-\frac{9\,\mathrm{FresnelC}\left(\frac{\sqrt{2}\,\sqrt{\arctan(a x)}}{\sqrt{\pi}}\right)\sqrt{2}\,\sqrt{\pi}\,\sqrt{x^2 a^2+1}}{16 a c^2 \sqrt{a^2 c x^2+c}}$$
$$+\frac{\sqrt{\arctan(a x)}}{6 a c (a^2 c x^2+c)^{3/2}}+\frac{\sqrt{\arctan(a x)}}{a c^2 \sqrt{a^2 c x^2+c}}$$

Result(type 8, 21 leaves):

$$\int \frac{\arctan(a x)^{3/2}}{(a^2 c x^2 + c)^{5/2}}\, dx$$

Problem 251: Unable to integrate problem.

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

Optimal(type 4, 50 leaves, 4 steps):

$$\frac{\operatorname{FresnelS}\left(\frac{\sqrt{2}\,\sqrt{\arctan(a x)}}{\sqrt{\pi}}\right)\sqrt{2}\,\sqrt{\pi}\,\sqrt{x^2 a^2 + 1}}{a^2 c \sqrt{a^2 c x^2 + c}}$$

Result(type 8, 22 leaves):

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

Problem 267: Unable to integrate problem.

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

Optimal(type 4, 78 leaves, 5 steps):

$$-\frac{2\operatorname{FresnelS}\left(\frac{\sqrt{2}\,\sqrt{\arctan(a x)}}{\sqrt{\pi}}\right)\sqrt{2}\,\sqrt{\pi}\,\sqrt{x^2 a^2 + 1}}{a c \sqrt{a^2 c x^2 + c}} - \frac{2}{a c \sqrt{a^2 c x^2 + c}\,\sqrt{\arctan(a x)}}$$

Result(type 8, 21 leaves):

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

Problem 269: Unable to integrate problem.

$$\int \frac{1}{(a^2 c x^2 + c)^{5/2} \arctan(a x)^{3/2}}\, dx$$

Optimal(type 4, 129 leaves, 9 steps):

$$-\frac{3\operatorname{FresnelS}\left(\frac{\sqrt{2}\,\sqrt{\arctan(a x)}}{\sqrt{\pi}}\right)\sqrt{2}\,\sqrt{\pi}\,\sqrt{x^2 a^2 + 1}}{2 a c^2 \sqrt{a^2 c x^2 + c}} - \frac{\operatorname{FresnelS}\left(\frac{\sqrt{6}\,\sqrt{\arctan(a x)}}{\sqrt{\pi}}\right)\sqrt{6}\,\sqrt{\pi}\,\sqrt{x^2 a^2 + 1}}{2 a c^2 \sqrt{a^2 c x^2 + c}} - \frac{2}{a c (a^2 c x^2 + c)^{3/2} \sqrt{\arctan(a x)}}$$

Result(type 8, 21 leaves):

$$\int \frac{1}{\left(a^2 c x^2 + c\right)^{5/2} \arctan(a x)^{3/2}}\, dx$$

Problem 290: Unable to integrate problem.

$$\int \frac{x^2}{\left(a^2 c x^2 + c\right)^{5/2} \arctan(a x)^{5/2}}\, dx$$

Optimal(type 4, 184 leaves, 27 steps):

$$-\frac{2 x^2}{3 a c \left(a^2 c x^2 + c\right)^{3/2} \arctan(a x)^{3/2}} - \frac{\operatorname{FresnelC}\left(\frac{\sqrt{2}\,\sqrt{\arctan(a x)}}{\sqrt{\pi}}\right) \sqrt{2}\,\sqrt{\pi}\,\sqrt{x^2 a^2 + 1}}{3 a^3 c^2 \sqrt{a^2 c x^2 + c}} + \frac{\operatorname{FresnelC}\left(\frac{\sqrt{6}\,\sqrt{\arctan(a x)}}{\sqrt{\pi}}\right) \sqrt{6}\,\sqrt{\pi}\,\sqrt{x^2 a^2 + 1}}{a^3 c^2 \sqrt{a^2 c x^2 + c}}$$
$$- \frac{8 x}{3 a^2 c \left(a^2 c x^2 + c\right)^{3/2} \sqrt{\arctan(a x)}} + \frac{4 x^3}{3 c \left(a^2 c x^2 + c\right)^{3/2} \sqrt{\arctan(a x)}}$$

Result(type 8, 24 leaves):

$$\int \frac{x^2}{\left(a^2 c x^2 + c\right)^{5/2} \arctan(a x)^{5/2}}\, dx$$

Problem 302: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 334 leaves, 16 steps):

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

Result(type 4, 759 leaves):

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

$$- \frac{I b \ln(c x - I) \ln\left(\frac{RootOf(e\_Z^2 + 2 I\_Z e + c^2 d - e, index = 2) - c x + I}{RootOf(e\_Z^2 + 2 I\_Z e + c^2 d - e, index = 2)}\right)}{4 e^2} + \frac{I b \ln(c x - I) \ln(c^2 e x^2 + c^2 d)}{4 e^2}$$

$$+ \frac{I b \ln(c x + I) \ln\left(\frac{RootOf(e\_Z^2 - 2 I\_Z e + c^2 d - e, index = 2) - c x - I}{RootOf(e\_Z^2 - 2 I\_Z e + c^2 d - e, index = 2)}\right)}{4 e^2} + \frac{I b \operatorname{dilog}\left(\frac{RootOf(e\_Z^2 - 2 I\_Z e + c^2 d - e, index = 1) - c x - I}{RootOf(e\_Z^2 - 2 I\_Z e + c^2 d - e, index = 1)}\right)}{4 e^2}$$

$$+ \frac{I b \ln(c x + I) \ln\left(\frac{RootOf(e\_Z^2 - 2 I\_Z e + c^2 d - e, index = 1) - c x - I}{RootOf(e\_Z^2 - 2 I\_Z e + c^2 d - e, index = 1)}\right)}{4 e^2}$$

$$- \frac{I b \ln(c x - I) \ln\left(\frac{RootOf(e\_Z^2 + 2 I\_Z e + c^2 d - e, index = 1) - c x + I}{RootOf(e\_Z^2 + 2 I\_Z e + c^2 d - e, index = 1)}\right)}{4 e^2} - \frac{I b \operatorname{dilog}\left(\frac{RootOf(e\_Z^2 + 2 I\_Z e + c^2 d - e, index = 1) - c x + I}{RootOf(e\_Z^2 + 2 I\_Z e + c^2 d - e, index = 1)}\right)}{4 e^2}$$

$$+ \frac{I b \operatorname{dilog}\left(\frac{RootOf(e\_Z^2 - 2 I\_Z e + c^2 d - e, index = 2) - c x - I}{RootOf(e\_Z^2 - 2 I\_Z e + c^2 d - e, index = 2)}\right)}{4 e^2} - \frac{I b \operatorname{dilog}\left(\frac{RootOf(e\_Z^2 + 2 I\_Z e + c^2 d - e, index = 2) - c x + I}{RootOf(e\_Z^2 + 2 I\_Z e + c^2 d - e, index = 2)}\right)}{4 e^2}$$

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

Problem 304: Result is not expressed in closed-form.

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

Optimal(type 4, 366 leaves, 19 steps):

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

$$- \frac{(a + b \arctan(c x)) \ln\left(\frac{2 c (\sqrt{-d} + x \sqrt{e})}{(1 - I c x) (c \sqrt{-d} + I \sqrt{e})}\right)}{2 d^2} + \frac{I b \operatorname{polylog}(2, -I c x)}{2 d^2} - \frac{I b \operatorname{polylog}(2, I c x)}{2 d^2} - \frac{I b \operatorname{polylog}\left(2, 1 - \frac{2}{1 - I c x}\right)}{2 d^2}$$

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

Result(type 7, 1763 leaves):

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

$$+ \frac{I b c^3 \sqrt{e d}\, \operatorname{arctanh}\left(\frac{\frac{\left(2 c^2 d - 2 e\right) (1 + I c x)^2}{c^2 x^2 + 1} + 2 c^2 d + 2 e}{4 c \sqrt{e d}}\right)}{8 d \left(c^2 d - e\right)^2}$$

$$- \frac{I b e \ln\left(\frac{c^2 d (1 + I c x)^4}{\left(c^2 x^2 + 1\right)^2} + \frac{2 c^2 d (1 + I c x)^2}{c^2 x^2 + 1} - \frac{e (1 + I c x)^4}{\left(c^2 x^2 + 1\right)^2} + c^2 d + \frac{2 e (1 + I c x)^2}{c^2 x^2 + 1} - e\right)}{8 d^2 \left(c^2 d - e\right)} + \frac{I b e \operatorname{dilog}\left(1 + \frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}\right)}{d^2 \left(c^2 d - e\right)}$$

$$- \frac{I b \sqrt{e d}\, e^2 \operatorname{arctanh}\left(\frac{\frac{\left(2 c^2 d - 2 e\right) (1 + I c x)^2}{c^2 x^2 + 1} + 2 c^2 d + 2 e}{4 c \sqrt{e d}}\right)}{8 c d^3 \left(c^2 d - e\right)^2} - \frac{I b c^2 \operatorname{dilog}\left(1 + \frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}\right)}{d \left(c^2 d - e\right)} + \frac{1}{4 d \left(c^2 d - e\right)} \Bigg(I b c^2 \Bigg($$

$$\sum_{\_R1 = RootOf\left(\left(c^2 d - e\right) \_Z^4 + \left(2 c^2 d + 2 e\right) \_Z^2 + c^2 d - e\right)}$$

$$\frac{\left(\_R1^2 c^2 d - \_R1^2 e + 3 c^2 d + e\right) \left(I \arctan(c x) \ln\left(\frac{\_R1 - \frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}}{\_R1}\right) + \operatorname{dilog}\left(\frac{\_R1 - \frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}}{\_R1}\right)\right)}{\_R1^2 c^2 d - \_R1^2 e + c^2 d + e} \Bigg) \Bigg)$$

$$- \frac{I b \sqrt{e d}\, e \operatorname{arctanh}\left(\frac{\frac{\left(2 c^2 d - 2 e\right) (1 + I c x)^2}{c^2 x^2 + 1} + 2 c^2 d + 2 e}{4 c \sqrt{e d}}\right)}{8 c d^3 \left(c^2 d - e\right)} + \frac{3 I b c \sqrt{e d}\, \operatorname{arctanh}\left(\frac{\frac{\left(2 c^2 d - 2 e\right) (1 + I c x)^2}{c^2 x^2 + 1} + 2 c^2 d + 2 e}{4 c \sqrt{e d}}\right)}{8 d^2 \left(c^2 d - e\right)}$$

$$- \frac{b e \arctan(c x) \ln\left(1 + \frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}\right)}{d^2 \left(c^2 d - e\right)} - \frac{I b e^2 \ln\left(\frac{c^2 d (1 + I c x)^4}{\left(c^2 x^2 + 1\right)^2} + \frac{2 c^2 d (1 + I c x)^2}{c^2 x^2 + 1} - \frac{e (1 + I c x)^4}{\left(c^2 x^2 + 1\right)^2} + c^2 d + \frac{2 e (1 + I c x)^2}{c^2 x^2 + 1} - e\right)}{8 d^2 \left(c^2 d - e\right)^2}$$

$$- \frac{1}{4 d^2 \left(c^2 d - e\right)} \Bigg(I b e \Bigg($$

$$\sum_{\_R1 = RootOf((c^2 d - e)\_Z^4 + (2c^2 d + 2e)\_Z^2 + c^2 d - e)} \frac{(\_R1^2 c^2 d - \_R1^2 e + 3c^2 d + e)\left(I\arctan(cx)\ln\left(\frac{\_R1 - \frac{1 + Icx}{\sqrt{c^2 x^2 + 1}}}{\_R1}\right) + \operatorname{dilog}\left(\frac{\_R1 - \frac{1 + Icx}{\sqrt{c^2 x^2 + 1}}}{\_R1}\right)\right)}{\_R1^2 c^2 d - \_R1^2 e + c^2 d + e}\Bigg)\Bigg) + \frac{1}{4d(c^2 d - e)}\Bigg(I b c^2\Bigg($$

$$\sum_{\_R1 = RootOf((c^2 d - e)\_Z^4 + (2c^2 d + 2e)\_Z^2 + c^2 d - e)} \frac{(\_R1^2 c^2 d - \_R1^2 e - c^2 d + e)\left(I\arctan(cx)\ln\left(\frac{\_R1 - \frac{1 + Icx}{\sqrt{c^2 x^2 + 1}}}{\_R1}\right) + \operatorname{dilog}\left(\frac{\_R1 - \frac{1 + Icx}{\sqrt{c^2 x^2 + 1}}}{\_R1}\right)\right)}{\_R1^2 c^2 d - \_R1^2 e + c^2 d + e}\Bigg)\Bigg) - \frac{1}{4d^2(c^2 d - e)}\Bigg(I b e\Bigg($$

$$\sum_{\_R1 = RootOf((c^2 d - e)\_Z^4 + (2c^2 d + 2e)\_Z^2 + c^2 d - e)} \frac{(\_R1^2 c^2 d - \_R1^2 e - c^2 d + e)\left(I\arctan(cx)\ln\left(\frac{\_R1 - \frac{1 + Icx}{\sqrt{c^2 x^2 + 1}}}{\_R1}\right) + \operatorname{dilog}\left(\frac{\_R1 - \frac{1 + Icx}{\sqrt{c^2 x^2 + 1}}}{\_R1}\right)\right)}{\_R1^2 c^2 d - \_R1^2 e + c^2 d + e}\Bigg)\Bigg) + \frac{b c^2 \arctan(cx)\ln\left(1 + \frac{1 + Icx}{\sqrt{c^2 x^2 + 1}}\right)}{d(c^2 d - e)}$$

$$+ \frac{I b c^2 \operatorname{dilog}\left(\frac{1 + Icx}{\sqrt{c^2 x^2 + 1}}\right)}{d(c^2 d - e)} - \frac{I b e \operatorname{dilog}\left(\frac{1 + Icx}{\sqrt{c^2 x^2 + 1}}\right)}{d^2(c^2 d - e)}$$

$$+ \frac{I b c^2 e \ln\left(\frac{c^2 d(1 + Icx)^4}{(c^2 x^2 + 1)^2} + \frac{2c^2 d(1 + Icx)^2}{c^2 x^2 + 1} - \frac{e(1 + Icx)^4}{(c^2 x^2 + 1)^2} + c^2 d + \frac{2e(1 + Icx)^2}{c^2 x^2 + 1} - e\right)}{8d(c^2 d - e)^2}$$

Problem 305: Result is not expressed in closed-form.

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

Optimal(type 4, 419 leaves, 22 steps):

$$-\frac{b c}{2 d^2 x}-\frac{b c^2 \arctan(c x)}{2 d^2}+\frac{b c^2 e \arctan(c x)}{2 d^2 (c^2 d-e)}+\frac{-a-b \arctan(c x)}{2 d^2 x^2}-\frac{e (a+b \arctan(c x))}{2 d^2 (x^2 e+d)}-\frac{b c e^{3/2} \arctan\left(\frac{x \sqrt{e}}{\sqrt{d}}\right)}{2 d^{5/2} (c^2 d-e)}-\frac{2 a e \ln(x)}{d^3}$$
$$-\frac{2 e (a+b \arctan(c x)) \ln\left(\frac{2}{1-I c x}\right)}{d^3}+\frac{e (a+b \arctan(c x)) \ln\left(\frac{2 c (\sqrt{-d}-x \sqrt{e})}{(1-I c x) (c \sqrt{-d}-I \sqrt{e})}\right)}{d^3}$$
$$+\frac{e (a+b \arctan(c x)) \ln\left(\frac{2 c (\sqrt{-d}+x \sqrt{e})}{(1-I c x) (c \sqrt{-d}+I \sqrt{e})}\right)}{d^3}-\frac{I b e \operatorname{polylog}(2,-I c x)}{d^3}+\frac{I b e \operatorname{polylog}(2,I c x)}{d^3}+\frac{I b e \operatorname{polylog}\left(2,1-\frac{2}{1-I c x}\right)}{d^3}$$
$$-\frac{I b e \operatorname{polylog}\left(2,1-\frac{2 c (\sqrt{-d}-x \sqrt{e})}{(1-I c x) (c \sqrt{-d}-I \sqrt{e})}\right)}{2 d^3}-\frac{I b e \operatorname{polylog}\left(2,1-\frac{2 c (\sqrt{-d}+x \sqrt{e})}{(1-I c x) (c \sqrt{-d}+I \sqrt{e})}\right)}{2 d^3}$$

Result(type ?, 2276 leaves): Display of huge result suppressed!

Problem 306: Result is not expressed in closed-form.

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

Optimal(type 4, 611 leaves, 24 steps):

$$\frac{x (a+b \arctan(c x))}{2 d (x^2 e+d)}-\frac{b c \ln(c^2 x^2+1)}{4 d (c^2 d-e)}+\frac{b c \ln(x^2 e+d)}{4 d (c^2 d-e)}+\frac{(a+b \arctan(c x)) \arctan\left(\frac{x \sqrt{e}}{\sqrt{d}}\right)}{2 d^{3/2} \sqrt{e}}-\frac{I b c \ln\left(-\frac{(1+x \sqrt{-c^2}) \sqrt{e}}{I \sqrt{-c^2} \sqrt{d}-\sqrt{e}}\right) \ln\left(1-\frac{I x \sqrt{e}}{\sqrt{d}}\right)}{8 d^{3/2} \sqrt{-c^2} \sqrt{e}}$$
$$+\frac{I b c \ln\left(\frac{(1-x \sqrt{-c^2}) \sqrt{e}}{I \sqrt{-c^2} \sqrt{d}+\sqrt{e}}\right) \ln\left(1-\frac{I x \sqrt{e}}{\sqrt{d}}\right)}{8 d^{3/2} \sqrt{-c^2} \sqrt{e}}-\frac{I b c \ln\left(-\frac{(1-x \sqrt{-c^2}) \sqrt{e}}{I \sqrt{-c^2} \sqrt{d}-\sqrt{e}}\right) \ln\left(1+\frac{I x \sqrt{e}}{\sqrt{d}}\right)}{8 d^{3/2} \sqrt{-c^2} \sqrt{e}}$$
$$+\frac{I b c \ln\left(\frac{(1+x \sqrt{-c^2}) \sqrt{e}}{I \sqrt{-c^2} \sqrt{d}+\sqrt{e}}\right) \ln\left(1+\frac{I x \sqrt{e}}{\sqrt{d}}\right)}{8 d^{3/2} \sqrt{-c^2} \sqrt{e}}+\frac{I b c \operatorname{polylog}\left(2,\frac{\sqrt{-c^2} (\sqrt{d}-I x \sqrt{e})}{\sqrt{-c^2} \sqrt{d}-I \sqrt{e}}\right)}{8 d^{3/2} \sqrt{-c^2} \sqrt{e}}-\frac{I b c \operatorname{polylog}\left(2,\frac{\sqrt{-c^2} (\sqrt{d}-I x \sqrt{e})}{\sqrt{-c^2} \sqrt{d}+I \sqrt{e}}\right)}{8 d^{3/2} \sqrt{-c^2} \sqrt{e}}$$
$$+\frac{I b c \operatorname{polylog}\left(2,\frac{\sqrt{-c^2} (\sqrt{d}+I x \sqrt{e})}{\sqrt{-c^2} \sqrt{d}-I \sqrt{e}}\right)}{8 d^{3/2} \sqrt{-c^2} \sqrt{e}}-\frac{I b c \operatorname{polylog}\left(2,\frac{\sqrt{-c^2} (\sqrt{d}+I x \sqrt{e})}{\sqrt{-c^2} \sqrt{d}+I \sqrt{e}}\right)}{8 d^{3/2} \sqrt{-c^2} \sqrt{e}}$$

Result(type 7, 1129 leaves):

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

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

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

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

$$- \frac{c b e \ln\left(\frac{c^2 d (1 + I c x)^4}{\left(c^2 x^2 + 1\right)^2} + \frac{2 c^2 d (1 + I c x)^2}{c^2 x^2 + 1} - \frac{e (1 + I c x)^4}{\left(c^2 x^2 + 1\right)^2} + c^2 d + \frac{2 e (1 + I c x)^2}{c^2 x^2 + 1} - e\right)}{4 d \left(c^2 d - e\right)^2}$$

$$+ \frac{b \sqrt{e d}\, e \operatorname{arctanh}\left(\frac{\frac{\left(2 c^2 d - 2 e\right) (1 + I c x)^2}{c^2 x^2 + 1} + 2 c^2 d + 2 e}{4 c \sqrt{e d}}\right)}{4 d^2 \left(c^2 d - e\right)^2} + \frac{c b e \ln\left(\frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}\right)}{d \left(c^2 d - e\right)^2}$$

$$+ \frac{c b e \left(\sum_{\_R1 = RootOf\left(\left(c^2 d - e\right) \_Z^4 + \left(2 c^2 d + 2 e\right) \_Z^2 + c^2 d - e\right)} \frac{I \arctan(c x) \ln\left(\frac{\_R1 - \frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}}{\_R1}\right) + \operatorname{dilog}\left(\frac{\_R1 - \frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}}{\_R1}\right)}{\_R1^2 c^2 d - \_R1^2 e + c^2 d + e}\right)}{2 d \left(c^2 d - e\right)}$$

$$- \frac{c^3 b \left(\sum_{\_R1 = RootOf\left(\left(c^2 d - e\right) \_Z^4 + \left(2 c^2 d + 2 e\right) \_Z^2 + c^2 d - e\right)} \frac{I \arctan(c x) \ln\left(\frac{\_R1 - \frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}}{\_R1}\right) + \operatorname{dilog}\left(\frac{\_R1 - \frac{1 + I c x}{\sqrt{c^2 x^2 + 1}}}{\_R1}\right)}{\_R1^2 c^2 d - \_R1^2 e + c^2 d + e}\right)}{2 \left(c^2 d - e\right)}$$

Problem 307: Unable to integrate problem.

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

```
Optimal(type 3, 191 leaves, 9 steps):
```

$$-\frac{b x (x^2 e + d)^{3/2}}{20 c e} - \frac{d (x^2 e + d)^{3/2} (a + b \arctan(c x))}{3 e^2} + \frac{(x^2 e + d)^{5/2} (a + b \arctan(c x))}{5 e^2} + \frac{b (c^2 d - e)^{3/2} (2 c^2 d + 3 e) \arctan\left(\frac{x \sqrt{c^2 d - e}}{\sqrt{x^2 e + d}}\right)}{15 c^5 e^2}$$

$$+ \frac{b (15 c^4 d^2 + 20 c^2 d e - 24 e^2) \operatorname{arctanh}\left(\frac{x \sqrt{e}}{\sqrt{x^2 e + d}}\right)}{120 c^5 e^{3/2}} - \frac{b (c^2 d - 12 e) x \sqrt{x^2 e + d}}{120 c^3 e}$$

```
Result(type 8, 23 leaves):
```

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

```
Problem 310: Unable to integrate problem.
```

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

```
Optimal(type 3, 192 leaves, 10 steps):
```

$$-\frac{b c (x^2 e + d)^{3/2}}{20 d x^4} - \frac{(x^2 e + d)^{3/2} (a + b \arctan(c x))}{5 d x^5} + \frac{2 e (x^2 e + d)^{3/2} (a + b \arctan(c x))}{15 d^2 x^3} - \frac{b c (24 c^4 d^2 - 20 c^2 d e - 15 e^2) \operatorname{arctanh}\left(\frac{\sqrt{x^2 e + d}}{\sqrt{d}}\right)}{120 d^{3/2}}$$

$$+ \frac{b (c^2 d - e)^{3/2} (3 c^2 d + 2 e) \operatorname{arctanh}\left(\frac{c \sqrt{x^2 e + d}}{\sqrt{c^2 d - e}}\right)}{15 d^2} + \frac{b c (12 c^2 d - e) \sqrt{x^2 e + d}}{120 d x^2}$$

```
Result(type 8, 23 leaves):
```

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

```
Problem 315: Unable to integrate problem.
```

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

```
Optimal(type 3, 89 leaves, 6 steps):
```

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

Result(type 8, 21 leaves):

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

Problem 318: Unable to integrate problem.

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

Optimal(type 3, 65 leaves, 3 steps):

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

Result(type 8, 21 leaves):

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

Problem 320: Unable to integrate problem.

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

Optimal(type 3, 93 leaves, 5 steps):

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

Result(type 8, 23 leaves):

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

Problem 321: Unable to integrate problem.

$$\int \frac{a+b\arctan(cx)}{(x^2 e+d)^{5/2}}\,dx$$

Optimal(type 3, 124 leaves, 7 steps):

$$\frac{x\,(a+b\arctan(cx))}{3d\,(x^2e+d)^{3/2}}+\frac{b\,(3c^2d-2e)\,\operatorname{arctanh}\left(\frac{c\sqrt{x^2e+d}}{\sqrt{c^2d-e}}\right)}{3d^2\,(c^2d-e)^{3/2}}-\frac{bc}{3d\,(c^2d-e)\sqrt{x^2e+d}}+\frac{2x\,(a+b\arctan(cx))}{3d^2\sqrt{x^2e+d}}$$

Result(type 8, 20 leaves):

$$\int \frac{a+b\arctan(cx)}{(x^2 e+d)^{5/2}}\,dx$$

Problem 323: Unable to integrate problem.

$$\int x^m\,(x^2e+d)^3\,(a+b\arctan(cx))\,dx$$

Optimal(type 5, 376 leaves, 4 steps):

$$-\frac{b\,e\,(e^2\,(m^2+8m+15)-3c^2de\,(m^2+10m+21)+3c^4d^2\,(m^2+12m+35))\,x^{2+m}}{c^5\,(2+m)\,(3+m)\,(5+m)\,(7+m)}+\frac{b\,e^2\,(e\,(5+m)-3c^2d\,(7+m))\,x^{4+m}}{c^3\,(4+m)\,(5+m)\,(7+m)}-\frac{b\,e^3x^{6+m}}{c\,(6+m)\,(7+m)}$$
$$+\frac{d^3x^{1+m}\,(a+b\arctan(cx))}{1+m}+\frac{3d^2ex^{3+m}\,(a+b\arctan(cx))}{3+m}+\frac{3de^2x^{5+m}\,(a+b\arctan(cx))}{5+m}+\frac{e^3x^{7+m}\,(a+b\arctan(cx))}{7+m}$$
$$+\frac{1}{c^5\,(1+m)\,(2+m)\,(3+m)\,(5+m)\,(7+m)}\Big(b\,(e^3\,(m^3+9m^2+23m+15)-3c^2de^2\,(m^3+11m^2+31m+21)+3c^4d^2e\,(m^3+13m^2+47m$$
$$+35)-c^6d^3\,(m^3+15m^2+71m+105))\,x^{2+m}\,\mathrm{hypergeom}\left(\left[1,1+\frac{m}{2}\right],\left[2+\frac{m}{2}\right],-c^2x^2\right)\Big)$$

Result(type 8, 23 leaves):

$$\int x^m\,(x^2e+d)^3\,(a+b\arctan(cx))\,dx$$

Problem 324: Unable to integrate problem.

$$\int x^m\,(x^2e+d)\,(a+b\arctan(cx))\,dx$$

Optimal(type 5, 120 leaves, 3 steps):

$$-\frac{b\,e\,x^{2+m}}{c\,(m^2+5m+6)}+\frac{d\,x^{1+m}\,(a+b\arctan(cx))}{1+m}+\frac{e\,x^{3+m}\,(a+b\arctan(cx))}{3+m}-\frac{b\left(\frac{c^2d}{1+m}-\frac{e}{3+m}\right)x^{2+m}\,\mathrm{hypergeom}\left(\left[1,1+\frac{m}{2}\right],\left[2+\frac{m}{2}\right],-c^2x^2\right)}{c\,(2+m)}$$

Result(type 8, 21 leaves):

$$\int x^m\,(x^2e+d)\,(a+b\arctan(cx))\,dx$$

Problem 328: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 200 leaves, 14 steps):

$$-\frac{a b e x}{c}-\frac{b^{2} e x \arctan \left(c x\right)}{c}+\frac{e \left(a+b \arctan \left(c x\right)\right)^{2}}{2 c^{2}}+\frac{e x^{2} \left(a+b \arctan \left(c x\right)\right)^{2}}{2}-2 d \left(a+b \arctan \left(c x\right)\right)^{2} \operatorname{arctanh}\left(-1+\frac{2}{1+I c x}\right)+\frac{b^{2} e \ln\left(c^{2} x^{2}+1\right)}{2 c^{2}}$$
$$-I b d \left(a+b \arctan \left(c x\right)\right) \operatorname{polylog}\left(2, 1-\frac{2}{1+I c x}\right)+I b d \left(a+b \arctan \left(c x\right)\right) \operatorname{polylog}\left(2, -1+\frac{2}{1+I c x}\right)-\frac{b^{2} d \operatorname{polylog}\left(3, 1-\frac{2}{1+I c x}\right)}{2}$$
$$+\frac{b^{2} d \operatorname{polylog}\left(3, -1+\frac{2}{1+I c x}\right)}{2}$$

Result(type 4, 1283 leaves):

$$2 a b \arctan \left(c x\right) d \ln\left(c x\right)+I a b d \ln\left(c x\right) \ln\left(1+I c x\right)-\frac{I b^{2} d \pi \operatorname{csgn}\left(\frac{\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}-1}{1+\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}}\right)^{2} \operatorname{csgn}\left(\frac{I \left(\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}-1\right)}{1+\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}}\right) \arctan \left(c x\right)^{2}}{2}$$
$$-\frac{I b^{2} d \pi \operatorname{csgn}\left(I \left(\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}-1\right)\right) \operatorname{csgn}\left(\frac{I \left(\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}-1\right)}{1+\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}}\right)^{2} \arctan \left(c x\right)^{2}}{2}$$
$$+\frac{I b^{2} d \pi \operatorname{csgn}\left(\frac{\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}-1}{1+\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}}\right) \operatorname{csgn}\left(\frac{I \left(\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}-1\right)}{1+\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}}\right) \arctan \left(c x\right)^{2}}{2}$$
$$+\frac{I b^{2} d \pi \operatorname{csgn}\left(I \left(\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}-1\right)\right) \operatorname{csgn}\left(\frac{I}{1+\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}}\right) \operatorname{csgn}\left(\frac{I \left(\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}-1\right)}{1+\frac{\left(1+I c x\right)^{2}}{c^{2} x^{2}+1}}\right) \arctan \left(c x\right)^{2}}{2}$$

$$-\frac{I b^2 d \pi \operatorname{csgn}\left(\frac{I}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^2 \arctan(c x)^2}{2} - \frac{a b e x}{c} - \frac{b^2 e x \arctan(c x)}{c} + \frac{b^2 \arctan(c x)^2 x^2 e}{2}$$

$$+ b^2 \arctan(c x)^2 d \ln(c x) + \frac{b^2 e \arctan(c x)^2}{2 c^2} - \frac{b^2 e \ln\left(1+\frac{(1+I c x)^2}{c^2 x^2+1}\right)}{c^2} - b^2 d \arctan(c x)^2 \ln\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right) + b^2 d \arctan(c x)^2 \ln\left(1\right.$$

$$\left.+\frac{1+I c x}{\sqrt{c^2 x^2+1}}\right) + b^2 d \arctan(c x)^2 \ln\left(1-\frac{1+I c x}{\sqrt{c^2 x^2+1}}\right) + \frac{a^2 x^2 e}{2} + 2 b^2 d \operatorname{polylog}\left(3, -\frac{1+I c x}{\sqrt{c^2 x^2+1}}\right) + 2 b^2 d \operatorname{polylog}\left(3, \frac{1+I c x}{\sqrt{c^2 x^2+1}}\right)$$

$$-\frac{b^2 d \operatorname{polylog}\left(3, -\frac{(1+I c x)^2}{c^2 x^2+1}\right)}{2} + a^2 d \ln(c x) - I a b d \ln(c x) \ln(1-I c x) + \frac{I b^2 d \pi \operatorname{csgn}\left(\frac{I\left(\frac{(1+I c x)^2}{c^2 x^2+1}-1\right)}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^3 \arctan(c x)^2}{2}$$

$$-\frac{I b^2 d \pi \operatorname{csgn}\left(\frac{\frac{(1+I c x)^2}{c^2 x^2+1}-1}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^2 \arctan(c x)^2}{2} + \frac{I b^2 d \pi \operatorname{csgn}\left(\frac{\frac{(1+I c x)^2}{c^2 x^2+1}-1}{1+\frac{(1+I c x)^2}{c^2 x^2+1}}\right)^3 \arctan(c x)^2}{2} + \frac{a b \arctan(c x) e}{c^2} + I a b d \operatorname{dilog}(1+I c x)$$

$$+ a b \arctan(c x) x^2 e - I a b d \operatorname{dilog}(1-I c x) + I b^2 d \arctan(c x) \operatorname{polylog}\left(2, -\frac{(1+I c x)^2}{c^2 x^2+1}\right) + \frac{I b^2 \arctan(c x) e}{c^2} - 2 I b^2 d \arctan(c x) \operatorname{polylog}\left(2,\right.$$

$$\left.-\frac{1+I c x}{\sqrt{c^2 x^2+1}}\right) + \frac{I b^2 d \pi \arctan(c x)^2}{2} - 2 I b^2 d \arctan(c x) \operatorname{polylog}\left(2, \frac{1+I c x}{\sqrt{c^2 x^2+1}}\right)$$

Problem 329: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 398 leaves, 30 steps):

$$\frac{2 b^2 d e x}{3 c^2} - \frac{3 b^2 e^2 x}{10 c^4} + \frac{b^2 e^2 x^3}{30 c^2} - \frac{2 b^2 d e \arctan(c x)}{3 c^3} + \frac{3 b^2 e^2 \arctan(c x)}{10 c^5} - \frac{2 b d e x^2 (a + b \arctan(c x))}{3 c} + \frac{b e^2 x^2 (a + b \arctan(c x))}{5 c^3}$$

$$- \frac{b e^2 x^4 (a + b \arctan(c x))}{10 c} + \frac{I d^2 (a + b \arctan(c x))^2}{c} + \frac{I b^2 e^2 \operatorname{polylog}\left(2, 1 - \frac{2}{1 + I c x}\right)}{5 c^5} + \frac{I b^2 d^2 \operatorname{polylog}\left(2, 1 - \frac{2}{1 + I c x}\right)}{c} + d^2 x (a$$

$$+b\arctan(cx))^2+\frac{2dex^3(a+b\arctan(cx))^2}{3}+\frac{e^2x^5(a+b\arctan(cx))^2}{5}+\frac{2bd^2(a+b\arctan(cx))\ln\left(\frac{2}{1+Icx}\right)}{c}$$

$$-\frac{4bde(a+b\arctan(cx))\ln\left(\frac{2}{1+Icx}\right)}{3c^3}+\frac{2be^2(a+b\arctan(cx))\ln\left(\frac{2}{1+Icx}\right)}{5c^5}-\frac{2Ide(a+b\arctan(cx))^2}{3c^3}+\frac{Ie^2(a+b\arctan(cx))^2}{5c^5}$$

$$-\frac{2Ib^2de\operatorname{polylog}\left(2,1-\frac{2}{1+Icx}\right)}{3c^3}$$

Result(type 4, 1004 leaves):

$$-\frac{b^2\arctan(cx)\ln(c^2x^2+1)d^2}{c}-\frac{ab\ln(c^2x^2+1)d^2}{c}+2ab\arctan(cx)xd^2+\frac{Ib^2\ln(cx-I)^2d^2}{4c}+\frac{Ib^2\operatorname{dilog}\left(-\frac{I}{2}(cx+I)\right)d^2}{2c}-\frac{Ib^2\ln(cx+I)^2d^2}{4c}$$

$$-\frac{Ib^2\operatorname{dilog}\left(\frac{I}{2}(cx-I)\right)d^2}{2c}+\frac{Ib^2\ln(cx+I)\ln(c^2x^2+1)d^2}{2c}+\frac{Ib^2\ln\left(-\frac{I}{2}(cx+I)\right)\ln(cx-I)d^2}{2c}-\frac{Ib^2\ln(cx-I)\ln(c^2x^2+1)d^2}{2c}+a^2xd^2$$

$$+\frac{2b^2dex}{3c^2}-\frac{2b^2de\arctan(cx)}{3c^3}-\frac{3b^2e^2x}{10c^4}+\frac{b^2e^2x^3}{30c^2}+\frac{3b^2e^2\arctan(cx)}{10c^5}-\frac{ab\ln(c^2x^2+1)e^2}{5c^5}-\frac{2abdex^2}{3c}-\frac{2b^2\arctan(cx)dex^2}{3c}$$

$$+\frac{2b^2\arctan(cx)\ln(c^2x^2+1)de}{3c^3}+\frac{2ab\ln(c^2x^2+1)de}{3c^3}+\frac{4ab\arctan(cx)dex^3}{3}+\frac{Ib^2de\ln(cx+I)^2}{6c^3}-\frac{Ib^2e^2\ln(cx+I)\ln\left(\frac{I}{2}(cx-I)\right)}{10c^5}$$

$$+\frac{Ib^2e^2\ln(cx+I)\ln(c^2x^2+1)}{10c^5}+\frac{Ib^2e^2\ln(cx-I)\ln\left(-\frac{I}{2}(cx+I)\right)}{10c^5}-\frac{Ib^2e^2\ln(cx-I)\ln(c^2x^2+1)}{10c^5}+\frac{Ib^2de\operatorname{dilog}\left(\frac{I}{2}(cx-I)\right)}{3c^3}$$

$$-\frac{Ib^2de\ln(cx-I)^2}{6c^3}-\frac{Ib^2de\operatorname{dilog}\left(-\frac{I}{2}(cx+I)\right)}{3c^3}-\frac{Ib^2de\ln(cx+I)\ln(c^2x^2+1)}{3c^3}-\frac{Ib^2de\ln(cx-I)\ln\left(-\frac{I}{2}(cx+I)\right)}{3c^3}$$

$$+\frac{Ib^2de\ln(cx-I)\ln(c^2x^2+1)}{3c^3}+\frac{Ib^2de\ln(cx+I)\ln\left(\frac{I}{2}(cx-I)\right)}{3c^3}-\frac{b^2\arctan(cx)e^2x^4}{10c}+\frac{Ib^2e^2\ln(cx-I)^2}{20c^5}+\frac{Ib^2e^2\operatorname{dilog}\left(-\frac{I}{2}(cx+I)\right)}{10c^5}$$

$$-\frac{Ib^2e^2\ln(cx+I)^2}{20c^5}-\frac{Ib^2e^2\operatorname{dilog}\left(\frac{I}{2}(cx-I)\right)}{10c^5}+\frac{abe^2x^2}{5c^3}-\frac{abe^2x^4}{10c}+\frac{2ab\arctan(cx)e^2x^5}{5}+\frac{2b^2\arctan(cx)^2dex^3}{3}+\frac{b^2\arctan(cx)x^2e^2}{5c^3}$$

$$+b^2\arctan(cx)^2xd^2-\frac{Ib^2\ln\left(\frac{I}{2}(cx-I)\right)\ln(cx+I)d^2}{2c}+\frac{2a^2dex^3}{3}+\frac{b^2\arctan(cx)^2e^2x^5}{5}-\frac{b^2\arctan(cx)\ln(c^2x^2+1)e^2}{5c^5}+\frac{a^2e^2x^5}{5}$$

Problem 330: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 330 leaves, 25 steps):

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

Result(type 4, 1548 leaves):

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

$$+ \frac{I d^2 b^2 \pi \operatorname{csgn}\left(\frac{\frac{(1 + I c x)^2}{c^2 x^2 + 1} - 1}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right) \operatorname{csgn}\left(\frac{I \left(\frac{(1 + I c x)^2}{c^2 x^2 + 1} - 1\right)}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right) \arctan(c x)^2}{2}$$

$$- \frac{I d^2 b^2 \pi \operatorname{csgn}\left(\frac{I}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right) \operatorname{csgn}\left(\frac{I \left(\frac{(1 + I c x)^2}{c^2 x^2 + 1} - 1\right)}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right)^2 \arctan(c x)^2}{2}$$

$$- \frac{I d^2 b^2 \pi \operatorname{csgn}\left(\frac{\frac{(1 + I c x)^2}{c^2 x^2 + 1} - 1}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right)^2 \operatorname{csgn}\left(\frac{I \left(\frac{(1 + I c x)^2}{c^2 x^2 + 1} - 1\right)}{1 + \frac{(1 + I c x)^2}{c^2 x^2 + 1}}\right) \arctan(c x)^2}{2}$$

$$-\frac{I d^2 b^2 \pi \operatorname{csgn}\left(I\left(\frac{(1+I c x)^2}{c^2x^2+1}-1\right)\right)\operatorname{csgn}\left(\frac{I\left(\frac{(1+I c x)^2}{c^2x^2+1}-1\right)}{1+\frac{(1+I c x)^2}{c^2x^2+1}}\right)^2 \arctan(c x)^2}{2}+2 d^2 a b \arctan(c x)\ln(c x)+I d^2 a b \operatorname{dilog}(1+I c x)$$

$$-I d^2 a b \operatorname{dilog}(1-I c x)+I d^2 b^2 \arctan(c x)\operatorname{polylog}\left(2,-\frac{(1+I c x)^2}{c^2x^2+1}\right)-2 I d^2 b^2 \arctan(c x)\operatorname{polylog}\left(2,-\frac{1+I c x}{\sqrt{c^2x^2+1}}\right)$$

$$-2 I d^2 b^2 \arctan(c x)\operatorname{polylog}\left(2,\frac{1+I c x}{\sqrt{c^2x^2+1}}\right)+\frac{I d^2 b^2 \pi \arctan(c x)^2}{2}+a^2 e x^2 d-\frac{b^2 \arctan(c x) x^3 e^2}{6 c}-\frac{a b e^2 x^3}{6 c}-\frac{2 b^2 d e \ln\left(1+\frac{(1+I c x)^2}{c^2x^2+1}\right)}{c^2}$$

$$-\frac{2 I b^2 \arctan(c x) e^2}{3 c^4}-\frac{a b e^2 \arctan(c x)}{2 c^4}+\frac{a b \arctan(c x) e^2 x^4}{2}+\frac{I d^2 b^2 \pi \operatorname{csgn}\left(\frac{\frac{(1+I c x)^2}{c^2x^2+1}-1}{1+\frac{(1+I c x)^2}{c^2x^2+1}}\right)^3 \arctan(c x)^2}{2}$$

$$-\frac{I d^2 b^2 \pi \operatorname{csgn}\left(\frac{\frac{(1+I c x)^2}{c^2x^2+1}-1}{1+\frac{(1+I c x)^2}{c^2x^2+1}}\right)^2 \arctan(c x)^2}{2}+\frac{I d^2 b^2 \pi \operatorname{csgn}\left(\frac{I\left(\frac{(1+I c x)^2}{c^2x^2+1}-1\right)}{1+\frac{(1+I c x)^2}{c^2x^2+1}}\right)^3 \arctan(c x)^2}{2}+I d^2 a b \ln(c x)\ln(1+I c x)$$

$$-I d^2 a b \ln(c x)\ln(1-I c x)+\frac{I d^2 b^2 \pi \operatorname{csgn}\left(I\left(\frac{(1+I c x)^2}{c^2x^2+1}-1\right)\right)\operatorname{csgn}\left(\frac{I}{1+\frac{(1+I c x)^2}{c^2x^2+1}}\right)\operatorname{csgn}\left(\frac{I\left(\frac{(1+I c x)^2}{c^2x^2+1}-1\right)}{1+\frac{(1+I c x)^2}{c^2x^2+1}}\right)\arctan(c x)^2}{2}$$

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

```
Problem 331: Result more than twice size of optimal antiderivative.
```

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

```
Optimal(type 4, 317 leaves, 20 steps):
```

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

$$- \frac{d^2 (a + b\arctan(cx))^2}{x} + 2dex(a + b\arctan(cx))^2 + \frac{e^2 x^3 (a + b\arctan(cx))^2}{3} + \frac{4bde(a + b\arctan(cx))\ln\left(\frac{2}{1 + I cx}\right)}{c}$$

$$- \frac{2be^2(a + b\arctan(cx))\ln\left(\frac{2}{1 + I cx}\right)}{3c^3} + 2bcd^2(a + b\arctan(cx))\ln\left(2 - \frac{2}{1 - I cx}\right) - I b^2 c d^2 \operatorname{polylog}\left(2, -1 + \frac{2}{1 - I cx}\right)$$

$$+ \frac{2 I b^2 de \operatorname{polylog}\left(2, 1 - \frac{2}{1 + I cx}\right)}{c} - \frac{I b^2 e^2 \operatorname{polylog}\left(2, 1 - \frac{2}{1 + I cx}\right)}{3c^3}$$

Result(type 4, 996 leaves):

$$- \frac{b^2 e^2 \arctan(cx) x^2}{3c} + \frac{2abe^2 \arctan(cx) x^3}{3} + \frac{I b^2 \ln(cx + I)^2 e^2}{12c^3} + \frac{I b^2 \operatorname{dilog}\left(\frac{I}{2}(cx - I)\right) e^2}{6c^3} - \frac{I b^2 \ln(cx - I)^2 e^2}{12c^3} - \frac{I b^2 \operatorname{dilog}\left(-\frac{I}{2}(cx + I)\right) e^2}{6c^3}$$

$$- \frac{abe^2 x^2}{3c} + \frac{b^2 e^2 \arctan(cx)\ln(c^2x^2 + 1)}{3c^3} + \frac{abe^2 \ln(c^2x^2 + 1)}{3c^3} - \frac{2d^2 ab\arctan(cx)}{x} + 2cd^2 ab\ln(cx) - \frac{d^2 a^2}{x} + \frac{a^2 e^2 x^3}{3} + I c b^2 d^2 \ln(cx)\ln(1$$

$$+ I cx) - \frac{2b^2 \arctan(cx)\ln(c^2x^2 + 1) de}{c} - \frac{2ab\ln(c^2x^2 + 1) de}{c} + \frac{I b^2 de \operatorname{dilog}\left(-\frac{I}{2}(cx + I)\right)}{c} + 4abde\arctan(cx) x$$

$$- \frac{I b^2 de \operatorname{dilog}\left(\frac{I}{2}(cx - I)\right)}{c} + \frac{I b^2 de\ln(cx - I)^2}{2c} - \frac{I b^2 de\ln(cx + I)^2}{2c} - I c b^2 d^2 \ln(cx)\ln(1 - I cx) + \frac{I c b^2 \ln\left(-\frac{I}{2}(cx + I)\right)\ln(cx - I) d^2}{2}$$

$$- \frac{I c b^2 \ln(cx - I)\ln(c^2x^2 + 1) d^2}{2} - \frac{I c b^2 \ln\left(\frac{I}{2}(cx - I)\right)\ln(cx + I) d^2}{2} + \frac{I c b^2 \ln(cx + I)\ln(c^2x^2 + 1) d^2}{2} + 2b^2 \arctan(cx)^2 x de + I c b^2 d^2 \operatorname{dilog}(1$$

$$+ I cx) - cab\ln(c^2x^2 + 1) d^2 - cb^2 \arctan(cx)\ln(c^2x^2 + 1) d^2 + 2cb^2 \arctan(cx) d^2 \ln(cx) - I c b^2 d^2 \operatorname{dilog}(1 - I cx) + \frac{I c b^2 \ln(cx - I)^2 d^2}{4}$$

$$+ \frac{I c b^2 \operatorname{dilog}\left(-\frac{I}{2}(cx + I)\right) d^2}{2} - \frac{I c b^2 \ln(cx + I)^2 d^2}{4} - \frac{I c b^2 \operatorname{dilog}\left(\frac{I}{2}(cx - I)\right) d^2}{2} + \frac{b^2 e^2 \arctan(cx)^2 x^3}{3} - \frac{d^2 b^2 \arctan(cx)^2}{x} + \frac{b^2 e^2 x}{3c^2}$$

$$- \frac{b^2 e^2 \arctan(cx)}{3c^3} - \frac{I b^2 \ln\left(-\frac{I}{2}(cx + I)\right)\ln(cx - I) e^2}{6c^3} + \frac{I b^2 \ln(cx - I)\ln(c^2x^2 + 1) e^2}{6c^3} + \frac{I b^2 \ln\left(\frac{I}{2}(cx - I)\right)\ln(cx + I) e^2}{6c^3}$$

$$- \frac{I b^2 \ln(cx + I)\ln(c^2x^2 + 1) e^2}{6c^3} + \frac{I b^2 de\ln(cx + I)\ln(c^2x^2 + 1)}{c} + \frac{I b^2 de\ln(cx - I)\ln\left(-\frac{I}{2}(cx + I)\right)}{c} - \frac{I b^2 de\ln(cx - I)\ln(c^2x^2 + 1)}{c}$$

$$- \frac{I b^2 de\ln(cx + I)\ln\left(\frac{I}{2}(cx - I)\right)}{c} + 2a^2 xde$$

Problem 332: Unable to integrate problem.

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

Optimal(type 4, 546 leaves, 12 steps):

$$-\frac{2(a+b\arctan(cx))^2\operatorname{arctanh}\left(-1+\frac{2}{1+Icx}\right)}{d}+\frac{(a+b\arctan(cx))^2\ln\left(\frac{2}{1-Icx}\right)}{d}-\frac{(a+b\arctan(cx))^2\ln\left(\frac{2c\left(\sqrt{-d}-x\sqrt{e}\right)}{(1-Icx)\left(c\sqrt{-d}-I\sqrt{e}\right)}\right)}{2d}$$
$$-\frac{(a+b\arctan(cx))^2\ln\left(\frac{2c\left(\sqrt{-d}+x\sqrt{e}\right)}{(1-Icx)\left(c\sqrt{-d}+I\sqrt{e}\right)}\right)}{2d}-\frac{Ib(a+b\arctan(cx))\operatorname{polylog}\left(2,1-\frac{2}{1-Icx}\right)}{d}$$
$$-\frac{Ib(a+b\arctan(cx))\operatorname{polylog}\left(2,1-\frac{2}{1+Icx}\right)}{d}+\frac{Ib(a+b\arctan(cx))\operatorname{polylog}\left(2,-1+\frac{2}{1+Icx}\right)}{d}$$
$$+\frac{Ib(a+b\arctan(cx))\operatorname{polylog}\left(2,1-\frac{2c\left(\sqrt{-d}-x\sqrt{e}\right)}{(1-Icx)\left(c\sqrt{-d}-I\sqrt{e}\right)}\right)}{2d}+\frac{Ib(a+b\arctan(cx))\operatorname{polylog}\left(2,1-\frac{2c\left(\sqrt{-d}+x\sqrt{e}\right)}{(1-Icx)\left(c\sqrt{-d}+I\sqrt{e}\right)}\right)}{2d}$$
$$+\frac{b^2\operatorname{polylog}\left(3,1-\frac{2}{1-Icx}\right)}{2d}-\frac{b^2\operatorname{polylog}\left(3,1-\frac{2}{1+Icx}\right)}{2d}+\frac{b^2\operatorname{polylog}\left(3,-1+\frac{2}{1+Icx}\right)}{2d}$$
$$-\frac{b^2\operatorname{polylog}\left(3,1-\frac{2c\left(\sqrt{-d}-x\sqrt{e}\right)}{(1-Icx)\left(c\sqrt{-d}-I\sqrt{e}\right)}\right)}{4d}-\frac{b^2\operatorname{polylog}\left(3,1-\frac{2c\left(\sqrt{-d}+x\sqrt{e}\right)}{(1-Icx)\left(c\sqrt{-d}+I\sqrt{e}\right)}\right)}{4d}$$

Result(type 8, 25 leaves):

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

Problem 333: Unable to integrate problem.

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

Optimal(type 4, 451 leaves, 9 steps):

$$-\frac{Ic(a+b\arctan(cx))^2}{d}-\frac{(a+b\arctan(cx))^2}{dx}+\frac{2bc(a+b\arctan(cx))\ln\left(2-\frac{2}{1-Icx}\right)}{d}-\frac{Ib^2c\operatorname{polylog}\left(2,-1+\frac{2}{1-Icx}\right)}{d}$$
$$+\frac{(a+b\arctan(cx))^2\ln\left(\frac{2c\left(\sqrt{-d}-x\sqrt{e}\right)}{(1-Icx)\left(c\sqrt{-d}-I\sqrt{e}\right)}\right)\sqrt{e}}{2(-d)^{3/2}}-\frac{(a+b\arctan(cx))^2\ln\left(\frac{2c\left(\sqrt{-d}+x\sqrt{e}\right)}{(1-Icx)\left(c\sqrt{-d}+I\sqrt{e}\right)}\right)\sqrt{e}}{2(-d)^{3/2}}$$

$$-\frac{I b (a+b\arctan(c x))\operatorname{polylog}\left(2, 1-\frac{2 c\left(\sqrt{-d}-x\sqrt{e}\right)}{(1-I c x)\left(c\sqrt{-d}-I\sqrt{e}\right)}\right)\sqrt{e}}{2(-d)^{3/2}}$$

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

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

Result(type 8, 25 leaves):

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

Problem 334: Result more than twice size of optimal antiderivative.

$$\int\arctan(x)\ln\left(x^2+1\right)dx$$

Optimal(type 3, 36 leaves, 8 steps):

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

Result(type 3, 1912 leaves):

$$2 I\arctan(x)+\frac{\operatorname{csgn}\left(\frac{I(1+Ix)^2}{\left(x^2+1\right)\left(1+\frac{(1+Ix)^2}{x^2+1}\right)^2}\right)^2\operatorname{csgn}\left(\frac{I}{\left(1+\frac{(1+Ix)^2}{x^2+1}\right)^2}\right)\arctan(x)\,\pi}{2}$$

$$-\frac{I\ln\left(1+\frac{(1+Ix)^2}{x^2+1}\right)\pi\operatorname{csgn}\left(\frac{I(1+Ix)^2}{\left(x^2+1\right)\left(1+\frac{(1+Ix)^2}{x^2+1}\right)^2}\right)^3}{2}+\frac{I\ln\left(1+\frac{(1+Ix)^2}{x^2+1}\right)\pi\operatorname{csgn}\left(I\left(1+\frac{(1+Ix)^2}{x^2+1}\right)^2\right)^3}{2}$$

$$-\frac{I\ln\left(1+\frac{(1+Ix)^2}{x^2+1}\right)\pi\operatorname{csgn}\left(\frac{I(1+Ix)^2}{x^2+1}\right)^3}{2}-\pi\arctan(x)\operatorname{csgn}\left(I\left(1+\frac{(1+Ix)^2}{x^2+1}\right)^2\right)^2\operatorname{csgn}\left(I\left(1+\frac{(1+Ix)^2}{x^2+1}\right)\right)-2x\arctan(x)$$

$$-\frac{\operatorname{csgn}\left(\frac{I(1+Ix)^2}{x^2+1}\right)^3\arctan(x)\,\pi}{2}-\frac{\operatorname{csgn}\left(\frac{I(1+Ix)^2}{\left(x^2+1\right)\left(1+\frac{(1+Ix)^2}{x^2+1}\right)^2}\right)^3\arctan(x)\,\pi}{2}-2\arctan(x)\ln\left(1+\frac{(1+Ix)^2}{x^2+1}\right)x-2I\ln(2)\arctan(x)$$

$$
-\ln\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)^2+\frac{\pi\arctan(x)\,\mathrm{csgn}\left(\mathrm{I}\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)^2\right)^3}{2}+2\ln(2)\arctan(x)\,x+\mathrm{I}\ln\left(1\right.
$$

$$
\left.+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)\pi\,\mathrm{csgn}\left(\frac{\mathrm{I}(1+\mathrm{I}x)}{\sqrt{x^2+1}}\right)\mathrm{csgn}\left(\frac{\mathrm{I}(1+\mathrm{I}x)^2}{x^2+1}\right)^2
$$

$$
-\frac{\mathrm{csgn}\left(\frac{\mathrm{I}(1+\mathrm{I}x)^2}{(x^2+1)\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)^2}\right)\mathrm{csgn}\left(\frac{\mathrm{I}(1+\mathrm{I}x)^2}{x^2+1}\right)\mathrm{csgn}\left(\frac{\mathrm{I}}{\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)^2}\right)\arctan(x)\,\pi}{2}
$$

$$
+\mathrm{I}\pi\arctan(x)\,\mathrm{csgn}\left(\frac{\mathrm{I}(1+\mathrm{I}x)}{\sqrt{x^2+1}}\right)\mathrm{csgn}\left(\frac{\mathrm{I}(1+\mathrm{I}x)^2}{x^2+1}\right)^2x-\frac{\mathrm{I}\pi\arctan(x)\,\mathrm{csgn}\left(\frac{\mathrm{I}(1+\mathrm{I}x)}{\sqrt{x^2+1}}\right)^2\mathrm{csgn}\left(\frac{\mathrm{I}(1+\mathrm{I}x)^2}{x^2+1}\right)x}{2}
$$

$$
+\frac{\mathrm{I}\pi\arctan(x)\,\mathrm{csgn}\left(\mathrm{I}\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)\right)^2\mathrm{csgn}\left(\mathrm{I}\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)^2\right)x}{2}-\mathrm{I}\pi\arctan(x)\,\mathrm{csgn}\left(\mathrm{I}\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)\right)\mathrm{csgn}\left(\mathrm{I}\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)^2\right)^2x
$$

$$
+\frac{\mathrm{I}\pi\arctan(x)\,\mathrm{csgn}\left(\frac{\mathrm{I}(1+\mathrm{I}x)^2}{x^2+1}\right)\mathrm{csgn}\left(\frac{\mathrm{I}(1+\mathrm{I}x)^2}{(x^2+1)\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)^2}\right)^2x}{2}
$$

$$
+\frac{\mathrm{I}\pi\arctan(x)\,\mathrm{csgn}\left(\frac{\mathrm{I}(1+\mathrm{I}x)^2}{(x^2+1)\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)^2}\right)^2\mathrm{csgn}\left(\frac{\mathrm{I}}{\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)^2}\right)x}{2}
$$

$$
-\frac{\mathrm{I}\ln\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)\pi\,\mathrm{csgn}\left(\frac{\mathrm{I}}{\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)^2}\right)\mathrm{csgn}\left(\frac{\mathrm{I}(1+\mathrm{I}x)^2}{x^2+1}\right)\mathrm{csgn}\left(\frac{\mathrm{I}(1+\mathrm{I}x)^2}{(x^2+1)\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)^2}\right)}{2}
$$

$$
+\frac{\pi\arctan(x)\,\mathrm{csgn}\left(\mathrm{I}\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)^2\right)\mathrm{csgn}\left(\mathrm{I}\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)\right)^2}{2}+2\left(-\mathrm{I}\arctan(x)+x\arctan(x)+\ln\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)\right)\ln\left(\frac{1+\mathrm{I}x}{\sqrt{x^2+1}}\right)
$$

$$
-\frac{\mathrm{I}\pi\arctan(x)\,\mathrm{csgn}\left(\frac{\mathrm{I}(1+\mathrm{I}x)^2}{(x^2+1)\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)^2}\right)^3x}{2}+\frac{\mathrm{I}\pi\arctan(x)\,\mathrm{csgn}\left(\mathrm{I}\left(1+\frac{(1+\mathrm{I}x)^2}{x^2+1}\right)^2\right)^3x}{2}
$$

$$-\frac{\operatorname{csgn}\left(\frac{I(1+Ix)^2}{x^2+1}\right)\operatorname{csgn}\left(\frac{I(1+Ix)}{\sqrt{x^2+1}}\right)^2\arctan(x)\,\pi}{2}+\operatorname{csgn}\left(\frac{I(1+Ix)^2}{x^2+1}\right)^2\operatorname{csgn}\left(\frac{I(1+Ix)}{\sqrt{x^2+1}}\right)\arctan(x)\,\pi$$

$$+\frac{\operatorname{csgn}\left(\frac{I(1+Ix)^2}{(x^2+1)\left(1+\frac{(1+Ix)^2}{x^2+1}\right)^2}\right)^2\operatorname{csgn}\left(\frac{I(1+Ix)^2}{x^2+1}\right)\arctan(x)\,\pi}{2}-2\ln\left(1+\frac{(1+Ix)^2}{x^2+1}\right)+2\ln\left(1+\frac{(1+Ix)^2}{x^2+1}\right)\ln(2)$$

$$-\frac{I\pi\arctan(x)\operatorname{csgn}\left(\frac{I(1+Ix)^2}{x^2+1}\right)\operatorname{csgn}\left(\frac{I(1+Ix)^2}{(x^2+1)\left(1+\frac{(1+Ix)^2}{x^2+1}\right)^2}\right)\operatorname{csgn}\left(\frac{I}{\left(1+\frac{(1+Ix)^2}{x^2+1}\right)^2}\right)x}{2}-\frac{I\pi\arctan(x)\operatorname{csgn}\left(\frac{I(1+Ix)^2}{x^2+1}\right)^3x}{2}$$

$$+\frac{I\ln\left(1+\frac{(1+Ix)^2}{x^2+1}\right)\pi\operatorname{csgn}\left(I\left(1+\frac{(1+Ix)^2}{x^2+1}\right)\right)^2\operatorname{csgn}\left(I\left(1+\frac{(1+Ix)^2}{x^2+1}\right)^2\right)}{2}$$

$$+\frac{I\ln\left(1+\frac{(1+Ix)^2}{x^2+1}\right)\pi\operatorname{csgn}\left(\frac{I(1+Ix)^2}{x^2+1}\right)\operatorname{csgn}\left(\frac{I(1+Ix)^2}{(x^2+1)\left(1+\frac{(1+Ix)^2}{x^2+1}\right)^2}\right)^2}{2}-I\ln\left(1+\frac{(1+Ix)^2}{x^2+1}\right)\pi\operatorname{csgn}\left(I\left(1\right.\right.$$

$$\left.\left.+\frac{(1+Ix)^2}{x^2+1}\right)\right)\operatorname{csgn}\left(I\left(1+\frac{(1+Ix)^2}{x^2+1}\right)^2\right)^2-\frac{I\ln\left(1+\frac{(1+Ix)^2}{x^2+1}\right)\pi\operatorname{csgn}\left(\frac{I(1+Ix)}{\sqrt{x^2+1}}\right)^2\operatorname{csgn}\left(\frac{I(1+Ix)^2}{x^2+1}\right)}{2}$$

$$+\frac{I\ln\left(1+\frac{(1+Ix)^2}{x^2+1}\right)\pi\operatorname{csgn}\left(\frac{I}{\left(1+\frac{(1+Ix)^2}{x^2+1}\right)^2}\right)\operatorname{csgn}\left(\frac{I(1+Ix)^2}{(x^2+1)\left(1+\frac{(1+Ix)^2}{x^2+1}\right)^2}\right)^2}{2}$$

Problem 335: Result more than twice size of optimal antiderivative.

$$\int\frac{\arctan(x)\ln(x^2+1)}{x}\,dx$$

Optimal(type 4, 157 leaves, 12 steps):

$$-\frac{I\ln(1+Ix)^2\ln(-Ix)}{2}+\frac{I\ln(1-Ix)^2\ln(Ix)}{2}+I\ln(1-Ix)\operatorname{polylog}(2,1-Ix)-I\ln(1+Ix)\operatorname{polylog}(2,1+Ix)$$

$$-\frac{I\left(\ln(1-Ix)+\ln(1+Ix)-\ln(x^2+1)\right)\operatorname{polylog}(2,-Ix)}{2}+\frac{I\left(\ln(1-Ix)+\ln(1+Ix)-\ln(x^2+1)\right)\operatorname{polylog}(2,Ix)}{2}-I\operatorname{polylog}(3,1-Ix)$$

$+ \mathrm{I}\,\mathrm{polylog}(3, 1 + \mathrm{I}x)$

Result(type ?, 5236 leaves): Display of huge result suppressed!

Problem 336: Unable to integrate problem.

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

Optimal(type 4, 138 leaves, 10 steps):

$$b c^2 e\arctan(cx) + a c^2 e\ln(x) - \frac{a c^2 e\ln(c^2x^2+1)}{2} - \frac{b c\,(d + e\ln(c^2x^2+1))}{2x} - \frac{b c^2\arctan(cx)\,(d + e\ln(c^2x^2+1))}{2} - \frac{(a + b\arctan(cx))\,(d + e\ln(c^2x^2+1))}{2x^2} + \frac{\mathrm{I}\,b c^2 e\,\mathrm{polylog}(2, -\mathrm{I}cx)}{2} - \frac{\mathrm{I}\,b c^2 e\,\mathrm{polylog}(2, \mathrm{I}cx)}{2}$$

Result(type 8, 28 leaves):

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

Problem 337: Unable to integrate problem.

$$\int \frac{(a + b\arctan(cx))\,(d + e\ln(gx^2 + f))}{x^2}\,dx$$

Optimal(type 4, 528 leaves, 28 steps):

$$-\frac{(a + b\arctan(cx))\,(d + e\ln(gx^2+f))}{x} + \frac{b c\ln\left(-\frac{gx^2}{f}\right)(d + e\ln(gx^2+f))}{2} - \frac{b c\ln\left(-\frac{g(c^2x^2+1)}{fc^2-g}\right)(d + e\ln(gx^2+f))}{2} - \frac{b c e\,\mathrm{polylog}\left(2, \frac{c^2(gx^2+f)}{fc^2-g}\right)}{2} + \frac{b c e\,\mathrm{polylog}\left(2, 1 + \frac{gx^2}{f}\right)}{2} - \frac{\mathrm{I}\,b e\ln(1+\mathrm{I}cx)\ln\left(\frac{c(\sqrt{-f} - x\sqrt{g})}{c\sqrt{-f} - \mathrm{I}\sqrt{g}}\right)\sqrt{g}}{2\sqrt{-f}} + \frac{\mathrm{I}\,b e\ln(1-\mathrm{I}cx)\ln\left(\frac{c(\sqrt{-f} - x\sqrt{g})}{c\sqrt{-f} + \mathrm{I}\sqrt{g}}\right)\sqrt{g}}{2\sqrt{-f}} - \frac{\mathrm{I}\,b e\ln(1-\mathrm{I}cx)\ln\left(\frac{c(\sqrt{-f} + x\sqrt{g})}{c\sqrt{-f} - \mathrm{I}\sqrt{g}}\right)\sqrt{g}}{2\sqrt{-f}} + \frac{\mathrm{I}\,b e\ln(1+\mathrm{I}cx)\ln\left(\frac{c(\sqrt{-f} + x\sqrt{g})}{c\sqrt{-f} + \mathrm{I}\sqrt{g}}\right)\sqrt{g}}{2\sqrt{-f}} + \frac{\mathrm{I}\,b e\,\mathrm{polylog}\left(2, \frac{(-cx+\mathrm{I})\sqrt{g}}{c\sqrt{-f} + \mathrm{I}\sqrt{g}}\right)\sqrt{g}}{2\sqrt{-f}} + \frac{\mathrm{I}\,b e\,\mathrm{polylog}\left(2, \frac{(cx+\mathrm{I})\sqrt{g}}{c\sqrt{-f} + \mathrm{I}\sqrt{g}}\right)\sqrt{g}}{2\sqrt{-f}} - \frac{\mathrm{I}\,b e\,\mathrm{polylog}\left(2, \frac{(1-\mathrm{I}cx)\sqrt{g}}{\mathrm{I}c\sqrt{-f} + \sqrt{g}}\right)\sqrt{g}}{2\sqrt{-f}} - \frac{\mathrm{I}\,b e\,\mathrm{polylog}\left(2, \frac{(1+\mathrm{I}cx)\sqrt{g}}{\mathrm{I}c\sqrt{-f} + \sqrt{g}}\right)\sqrt{g}}{2\sqrt{-f}} + \frac{2 a e\arctan\left(\frac{x\sqrt{g}}{\sqrt{f}}\right)\sqrt{g}}{\sqrt{f}}$$

Result(type 8, 26 leaves):

$$\int \frac{(a + b\arctan(cx))\left(d + e\ln\left(gx^2 + f\right)\right)}{x^2}\, dx$$

```
Test results for the 23 problems in "5.3.5 u (a+b arctan(c+d x))^p.txt"
```

Problem 1: Result more than twice size of optimal antiderivative.

$$\int (dex + ce)^3 (a + b\arctan(dx + c))\, dx$$

Optimal(type 3, 64 leaves, 6 steps):

$$\frac{b e^3 x}{4} - \frac{b e^3 (dx + c)^3}{12 d} - \frac{b e^3 \arctan(dx + c)}{4 d} + \frac{e^3 (dx + c)^4 (a + b\arctan(dx + c))}{4 d}$$

Result(type 3, 224 leaves):

$$\frac{d^3 x^4 a e^3}{4} + d^2 x^3 a c e^3 + \frac{3 d x^2 a c^2 e^3}{2} + x a c^3 e^3 + \frac{a c^4 e^3}{4 d} + \frac{d^3 \arctan(dx + c)\, x^4 b e^3}{4} + d^2 \arctan(dx + c)\, x^3 b c e^3 + \frac{3 d \arctan(dx + c)\, x^2 b c^2 e^3}{2}$$
$$+ \arctan(dx + c)\, x b c^3 e^3 + \frac{\arctan(dx + c)\, b c^4 e^3}{4 d} - \frac{d^2 x^3 b e^3}{12} - \frac{d x^2 b c e^3}{4} - \frac{x b c^2 e^3}{4} - \frac{b c^3 e^3}{12 d} + \frac{b e^3 x}{4} + \frac{b c e^3}{4 d} - \frac{b e^3 \arctan(dx + c)}{4 d}$$

Problem 2: Result more than twice size of optimal antiderivative.

$$\int (dex + ce) (a + b\arctan(dx + c))\, dx$$

Optimal(type 3, 42 leaves, 5 steps):

$$-\frac{b e x}{2} + \frac{b e \arctan(dx + c)}{2 d} + \frac{e (dx + c)^2 (a + b\arctan(dx + c))}{2 d}$$

Result(type 3, 91 leaves):

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

Problem 3: Result more than twice size of optimal antiderivative.

$$\int (dex + ce)^3 (a + b\arctan(dx + c))^2\, dx$$

Optimal(type 3, 143 leaves, 13 steps):

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

Result(type 3, 542 leaves):

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

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

```
Problem 4: Result more than twice size of optimal antiderivative.
```

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

```
Optimal(type 4, 172 leaves, 8 steps):
```

$$-\frac{2 (a+b \arctan(d x+c))^2 \operatorname{arctanh}\left(-1+\frac{2}{1+I(d x+c)}\right)}{e d}-\frac{I b (a+b \arctan(d x+c)) \operatorname{polylog}\left(2, 1-\frac{2}{1+I(d x+c)}\right)}{e d}$$
$$+\frac{I b (a+b \arctan(d x+c)) \operatorname{polylog}\left(2,-1+\frac{2}{1+I(d x+c)}\right)}{e d}-\frac{b^2 \operatorname{polylog}\left(3, 1-\frac{2}{1+I(d x+c)}\right)}{2 e d}+\frac{b^2 \operatorname{polylog}\left(3,-1+\frac{2}{1+I(d x+c)}\right)}{2 e d}$$

```
Result(type 4, 1432 leaves):
```

$$\frac{2 a b \ln(d x+c) \arctan(d x+c)}{d e}+\frac{I a b \operatorname{dilog}(1+I(d x+c))}{d e}-\frac{2 I b^2 \arctan(d x+c) \operatorname{polylog}\left(2, \frac{1+I(d x+c)}{\sqrt{1+(d x+c)^2}}\right)}{d e}$$
$$-\frac{2 I b^2 \arctan(d x+c) \operatorname{polylog}\left(2,-\frac{1+I(d x+c)}{\sqrt{1+(d x+c)^2}}\right)}{d e}-\frac{I a b \operatorname{dilog}(1-I(d x+c))}{d e}+\frac{I b^2 \pi \arctan(d x+c)^2}{2 d e}+\frac{a^2 \ln(d x+c)}{d e}$$
$$-\frac{b^2 \operatorname{polylog}\left(3,-\frac{(1+I(d x+c))^2}{1+(d x+c)^2}\right)}{2 d e}+\frac{2 b^2 \operatorname{polylog}\left(3,-\frac{1+I(d x+c)}{\sqrt{1+(d x+c)^2}}\right)}{d e}+\frac{2 b^2 \operatorname{polylog}\left(3, \frac{1+I(d x+c)}{\sqrt{1+(d x+c)^2}}\right)}{d e}$$
$$+\frac{I b^2 \pi \operatorname{csgn}\left(\frac{\frac{(1+I(d x+c))^2}{1+(d x+c)^2}-1}{1+\frac{(1+I(d x+c))^2}{1+(d x+c)^2}}\right) \operatorname{csgn}\left(\frac{I\left(\frac{(1+I(d x+c))^2}{1+(d x+c)^2}-1\right)}{1+\frac{(1+I(d x+c))^2}{1+(d x+c)^2}}\right) \arctan(d x+c)^2}{2 d e}$$

$$
- \frac{\mathrm{I}\, b^{2} \pi \operatorname{csgn}\left(\mathrm{I}\left(\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}-1\right)\right) \operatorname{csgn}\left(\frac{\mathrm{I}\left(\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}-1\right)}{1+\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}}\right)^{2} \arctan(d x+c)^{2}}{2 d e}
$$

$$
- \frac{\mathrm{I}\, b^{2} \pi \operatorname{csgn}\left(\frac{\mathrm{I}}{1+\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}}\right) \operatorname{csgn}\left(\frac{\mathrm{I}\left(\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}-1\right)}{1+\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}}\right)^{2} \arctan(d x+c)^{2}}{2 d e}
$$

$$
- \frac{\mathrm{I}\, b^{2} \pi \operatorname{csgn}\left(\frac{\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}-1}{1+\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}}\right)^{2} \operatorname{csgn}\left(\frac{\mathrm{I}\left(\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}-1\right)}{1+\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}}\right) \arctan(d x+c)^{2}}{2 d e} - \frac{b^{2} \arctan(d x+c)^{2} \ln\left(\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}-1\right)}{d e}
$$

$$
+ \frac{b^{2} \arctan(d x+c)^{2} \ln\left(1+\frac{1+\mathrm{I}\,(d x+c)}{\sqrt{1+(d x+c)^{2}}}\right)}{d e} + \frac{b^{2} \arctan(d x+c)^{2} \ln\left(1-\frac{1+\mathrm{I}\,(d x+c)}{\sqrt{1+(d x+c)^{2}}}\right)}{d e}
$$

$$
+ \frac{\mathrm{I}\, b^{2} \arctan(d x+c) \operatorname{polylog}\left(2, -\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}\right)}{d e} + \frac{\mathrm{I}\, a b \ln(d x+c) \ln(1+\mathrm{I}\,(d x+c))}{d e}
$$

$$
- \frac{\mathrm{I}\, b^{2} \pi \operatorname{csgn}\left(\frac{\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}-1}{1+\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}}\right)^{2} \arctan(d x+c)^{2}}{2 d e} - \frac{\mathrm{I}\, a b \ln(d x+c) \ln(1-\mathrm{I}\,(d x+c))}{d e}
$$

$$
+ \frac{\mathrm{I}\, b^{2} \pi \operatorname{csgn}\left(\frac{\mathrm{I}\left(\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}-1\right)}{1+\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}}\right)^{3} \arctan(d x+c)^{2}}{2 d e} + \frac{\mathrm{I}\, b^{2} \pi \operatorname{csgn}\left(\frac{\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}-1}{1+\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}}\right)^{3} \arctan(d x+c)^{2}}{2 d e}
$$

$$
+ \frac{\mathrm{I}\, b^{2} \pi \operatorname{csgn}\left(\mathrm{I}\left(\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}-1\right)\right) \operatorname{csgn}\left(\frac{\mathrm{I}}{1+\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}}\right) \operatorname{csgn}\left(\frac{\mathrm{I}\left(\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}-1\right)}{1+\frac{(1+\mathrm{I}\,(d x+c))^{2}}{1+(d x+c)^{2}}}\right) \arctan(d x+c)^{2}}{2 d e}
$$

$$+\frac{b^2\ln(dx+c)\arctan(dx+c)^2}{de}$$

Problem 5: Result more than twice size of optimal antiderivative.

$$\int (dex+ce)^2\,(a+b\arctan(dx+c))^3\,dx$$

Optimal(type 4, 254 leaves, 14 steps):

$$ab^2e^2x+\frac{b^3e^2(dx+c)\arctan(dx+c)}{d}-\frac{be^2(a+b\arctan(dx+c))^2}{2d}-\frac{be^2(dx+c)^2(a+b\arctan(dx+c))^2}{2d}-\frac{Ie^2(a+b\arctan(dx+c))^3}{3d}$$
$$+\frac{e^2(dx+c)^3(a+b\arctan(dx+c))^3}{3d}-\frac{be^2(a+b\arctan(dx+c))^2\ln\left(\frac{2}{1+I(dx+c)}\right)}{d}-\frac{b^3e^2\ln\left(1+(dx+c)^2\right)}{2d}$$
$$-\frac{Ib^2e^2(a+b\arctan(dx+c))\operatorname{polylog}\left(2,1-\frac{2}{1+I(dx+c)}\right)}{d}-\frac{b^3e^2\operatorname{polylog}\left(3,1-\frac{2}{1+I(dx+c)}\right)}{2d}$$

Result(type ?, 3241 leaves): Display of huge result suppressed!

Problem 6: Result more than twice size of optimal antiderivative.

$$\int (dex+ce)\,(a+b\arctan(dx+c))^3\,dx$$

Optimal(type 4, 150 leaves, 10 steps):

$$-\frac{3Ibe(a+b\arctan(dx+c))^2}{2d}-\frac{3be(dx+c)(a+b\arctan(dx+c))^2}{2d}+\frac{e(a+b\arctan(dx+c))^3}{2d}+\frac{e(dx+c)^2(a+b\arctan(dx+c))^3}{2d}$$
$$-\frac{3b^2e(a+b\arctan(dx+c))\ln\left(\frac{2}{1+I(dx+c)}\right)}{d}-\frac{3Ib^3e\operatorname{polylog}\left(2,1-\frac{2}{1+I(dx+c)}\right)}{2d}$$

Result(type 4, 566 leaves):

$$\frac{3d\arctan(dx+c)^2x^2ab^2e}{2}+\frac{3d\arctan(dx+c)x^2a^2be}{2}+\frac{3\arctan(dx+c)^2ab^2c^2e}{2d}-\frac{3\arctan(dx+c)ab^2ce}{d}+\frac{3\arctan(dx+c)a^2bc^2e}{2d}$$
$$+3\arctan(dx+c)^2xab^2ce+3\arctan(dx+c)xa^2bce+\frac{3Ieb^3\ln(dx+c+I)\ln\left(\frac{I}{2}(dx+c-I)\right)}{4d}-\frac{3Ieb^3\ln\left(1+(dx+c)^2\right)\ln(dx+c+I)}{4d}$$
$$+\frac{3Ieb^3\ln\left(1+(dx+c)^2\right)\ln(dx+c-I)}{4d}-\frac{3Ieb^3\ln(dx+c-I)\ln\left(-\frac{I}{2}(dx+c+I)\right)}{4d}-\frac{3a^2bce}{2d}-3\arctan(dx+c)xab^2e$$
$$+\frac{d\arctan(dx+c)^3x^2b^3e}{2}+\frac{3eab^2\arctan(dx+c)^2}{2d}+\frac{3eab^2\ln\left(1+(dx+c)^2\right)}{2d}+\frac{3a^2be\arctan(dx+c)}{2d}$$
$$+\frac{3eb^3\arctan(dx+c)\ln\left(1+(dx+c)^2\right)}{2d}+\frac{\arctan(dx+c)^3b^3c^2e}{2d}-\frac{3\arctan(dx+c)^2b^3ce}{2d}+\frac{3Ieb^3\ln(dx+c+I)^2}{8d}$$

$$-\frac{3 I e b^3 \operatorname{dilog}\left(-\frac{I}{2}\,(d x+c+I)\right)}{4 d}+\frac{3 I e b^3 \operatorname{dilog}\left(\frac{I}{2}\,(d x+c-I)\right)}{4 d}-\frac{3 I e b^3 \ln(d x+c-I)^2}{8 d}+\arctan(d x+c)^3 x b^3 c e+x a^3 c e-\frac{3 a^2 b x e}{2}$$
$$+\frac{d x^2 a^3 e}{2}-\frac{3 \arctan(d x+c)^2 x b^3 e}{2}+\frac{e b^3 \arctan(d x+c)^3}{2 d}+\frac{a^3 c^2 e}{2 d}$$

Problem 7: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 256 leaves, 10 steps):

$$-\frac{2\,(a+b \arctan(d x+c))^3 \operatorname{arctanh}\left(-1+\frac{2}{1+I\,(d x+c)}\right)}{e d}-\frac{3 I b\,(a+b \arctan(d x+c))^2 \operatorname{polylog}\left(2, 1-\frac{2}{1+I\,(d x+c)}\right)}{2 e d}$$
$$+\frac{3 I b\,(a+b \arctan(d x+c))^2 \operatorname{polylog}\left(2, -1+\frac{2}{1+I\,(d x+c)}\right)}{2 e d}-\frac{3 b^2\,(a+b \arctan(d x+c)) \operatorname{polylog}\left(3, 1-\frac{2}{1+I\,(d x+c)}\right)}{2 e d}$$
$$+\frac{3 b^2\,(a+b \arctan(d x+c)) \operatorname{polylog}\left(3, -1+\frac{2}{1+I\,(d x+c)}\right)}{2 e d}+\frac{3 I b^3 \operatorname{polylog}\left(4, 1-\frac{2}{1+I\,(d x+c)}\right)}{4 e d}-\frac{3 I b^3 \operatorname{polylog}\left(4, -1+\frac{2}{1+I\,(d x+c)}\right)}{4 e d}$$

Result(type ?, 2893 leaves): Display of huge result suppressed!

Problem 8: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 156 leaves, 7 steps):

$$-\frac{I\,(a+b \arctan(d x+c))^3}{d e^2}-\frac{(a+b \arctan(d x+c))^3}{d e^2\,(d x+c)}+\frac{3 b\,(a+b \arctan(d x+c))^2 \ln\left(2-\frac{2}{1-I\,(d x+c)}\right)}{d e^2}$$
$$-\frac{3 I b^2\,(a+b \arctan(d x+c)) \operatorname{polylog}\left(2, -1+\frac{2}{1-I\,(d x+c)}\right)}{d e^2}+\frac{3 b^3 \operatorname{polylog}\left(3, -1+\frac{2}{1-I\,(d x+c)}\right)}{2 d e^2}$$

Result(type ?, 2695 leaves): Display of huge result suppressed!

Problem 9: Result more than twice size of optimal antiderivative.

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

Optimal(type 4, 166 leaves, 9 steps):

$$-\frac{3 I b\,(a+b \arctan(d x+c))^2}{2 d e^3}-\frac{3 b\,(a+b \arctan(d x+c))^2}{2 d e^3\,(d x+c)}-\frac{(a+b \arctan(d x+c))^3}{2 d e^3}-\frac{(a+b \arctan(d x+c))^3}{2 d e^3\,(d x+c)^2}$$

$$+\frac{3 b^2 (a+b\arctan(dx+c)) \ln\left(2-\frac{2}{1-I(dx+c)}\right)}{d e^3}-\frac{3 I b^3 \operatorname{polylog}\left(2,-1+\frac{2}{1-I(dx+c)}\right)}{2 d e^3}$$

Result(type 4, 630 leaves):

$$-\frac{a^3}{2 d e^3 (dx+c)^2}-\frac{b^3 \arctan(dx+c)^3}{2 d e^3}-\frac{3 a b^2 \ln\left(1+(dx+c)^2\right)}{2 d e^3}+\frac{3 a b^2 \ln(dx+c)}{d e^3}-\frac{3 a^2 b \arctan(dx+c)}{2 d e^3}-\frac{b^3 \arctan(dx+c)^3}{2 d e^3 (dx+c)^2}$$
$$-\frac{3 b^3 \arctan(dx+c)^2}{2 d e^3 (dx+c)}-\frac{3 b^3 \arctan(dx+c) \ln\left(1+(dx+c)^2\right)}{2 d e^3}+\frac{3 b^3 \ln(dx+c) \arctan(dx+c)}{d e^3}-\frac{3 a b^2 \arctan(dx+c)^2}{2 d e^3}-\frac{3 I b^3 \ln(dx+c+I)^2}{8 d e^3}$$
$$-\frac{3 I b^3 \operatorname{dilog}\left(\frac{I}{2}(dx+c-I)\right)}{4 d e^3}-\frac{3 I b^3 \operatorname{dilog}(1-I(dx+c))}{2 d e^3}+\frac{3 I b^3 \operatorname{dilog}\left(-\frac{I}{2}(dx+c+I)\right)}{4 d e^3}+\frac{3 I b^3 \operatorname{dilog}(1+I(dx+c))}{2 d e^3}$$
$$+\frac{3 I b^3 \ln(dx+c-I)^2}{8 d e^3}-\frac{3 a^2 b}{2 d e^3 (dx+c)}-\frac{3 a^2 b \arctan(dx+c)}{2 d e^3 (dx+c)^2}-\frac{3 a b^2 \arctan(dx+c)^2}{2 d e^3 (dx+c)^2}-\frac{3 a b^2 \arctan(dx+c)}{d e^3 (dx+c)}$$
$$+\frac{3 I b^3 \ln(dx+c-I) \ln\left(-\frac{I}{2}(dx+c+I)\right)}{4 d e^3}-\frac{3 I b^3 \ln(dx+c) \ln(1-I(dx+c))}{2 d e^3}-\frac{3 I b^3 \ln(dx+c+I) \ln\left(\frac{I}{2}(dx+c-I)\right)}{4 d e^3}$$
$$+\frac{3 I b^3 \ln\left(1+(dx+c)^2\right) \ln(dx+c+I)}{4 d e^3}+\frac{3 I b^3 \ln(dx+c) \ln(1+I(dx+c))}{2 d e^3}-\frac{3 I b^3 \ln\left(1+(dx+c)^2\right) \ln(dx+c-I)}{4 d e^3}$$

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

$$\int \frac{(a+b\arctan(dx+c))^3}{fx+e}\, dx$$

Optimal(type 4, 344 leaves, 2 steps):

$$-\frac{(a+b\arctan(dx+c))^3 \ln\left(\frac{2}{1-I(dx+c)}\right)}{f}+\frac{(a+b\arctan(dx+c))^3 \ln\left(\frac{2d(fx+e)}{(ed+If-cf)(1-I(dx+c))}\right)}{f}$$
$$+\frac{3 I b (a+b\arctan(dx+c))^2 \operatorname{polylog}\left(2,1-\frac{2}{1-I(dx+c)}\right)}{2f}-\frac{3 I b (a+b\arctan(dx+c))^2 \operatorname{polylog}\left(2,1-\frac{2d(fx+e)}{(ed+If-cf)(1-I(dx+c))}\right)}{2f}$$
$$-\frac{3 b^2 (a+b\arctan(dx+c)) \operatorname{polylog}\left(3,1-\frac{2}{1-I(dx+c)}\right)}{2f}+\frac{3 b^2 (a+b\arctan(dx+c)) \operatorname{polylog}\left(3,1-\frac{2d(fx+e)}{(ed+If-cf)(1-I(dx+c))}\right)}{2f}$$
$$-\frac{3 I b^3 \operatorname{polylog}\left(4,1-\frac{2}{1-I(dx+c)}\right)}{4f}+\frac{3 I b^3 \operatorname{polylog}\left(4,1-\frac{2d(fx+e)}{(ed+If-cf)(1-I(dx+c))}\right)}{4f}$$

Result(type ?, 4388 leaves): Display of huge result suppressed!

Problem 14: Unable to integrate problem.

$$\int (fx+e)^m (a+b\arctan(dx+c))\,dx$$

Optimal(type 5, 171 leaves, 6 steps):

$$\frac{(fx+e)^{1+m}(a+b\arctan(dx+c))}{f(1+m)} - \frac{I b d (fx+e)^{2+m}\operatorname{hypergeom}\left([1,2+m],[3+m],\frac{d(fx+e)}{ed+If-cf}\right)}{2f(ed+(I-c)f)(1+m)(2+m)}$$
$$+ \frac{I b d (fx+e)^{2+m}\operatorname{hypergeom}\left([1,2+m],[3+m],\frac{d(fx+e)}{ed-(I+c)f}\right)}{2f(ed-(I+c)f)(1+m)(2+m)}$$

Result(type 8, 20 leaves):

$$\int (fx+e)^m (a+b\arctan(dx+c))\,dx$$

Problem 18: Humongous result has more than 20000 leaves.

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

Optimal(type 4, 510 leaves, 25 steps):

$$-\frac{(1+Ia+Ibx)\ln(1+Ia+Ibx)}{2cb} - \frac{(1-Ia-Ibx)\ln(-I(I+a+bx))}{2cb} + \frac{I\ln(1+Ia+Ibx)\ln\left(-\frac{b(-x\sqrt{-c}+\sqrt{d})}{I\sqrt{-c}-a\sqrt{-c}-b\sqrt{d}}\right)\sqrt{d}}{4(-c)^{3/2}}$$
$$+\frac{I\ln(1-Ia-Ibx)\ln\left(-\frac{b(x\sqrt{-c}+\sqrt{d})}{(I+a)\sqrt{-c}-b\sqrt{d}}\right)\sqrt{d}}{4(-c)^{3/2}} - \frac{I\ln(1+Ia+Ibx)\ln\left(\frac{b(x\sqrt{-c}+\sqrt{d})}{I\sqrt{-c}-a\sqrt{-c}+b\sqrt{d}}\right)\sqrt{d}}{4(-c)^{3/2}}$$
$$-\frac{I\ln(1-Ia-Ibx)\ln\left(\frac{b(-x\sqrt{-c}+\sqrt{d})}{I\sqrt{-c}+a\sqrt{-c}+b\sqrt{d}}\right)\sqrt{d}}{4(-c)^{3/2}} + \frac{I\operatorname{polylog}\left(2,\frac{(I-a-bx)\sqrt{-c}}{I\sqrt{-c}-a\sqrt{-c}-b\sqrt{d}}\right)\sqrt{d}}{4(-c)^{3/2}}$$
$$+\frac{I\operatorname{polylog}\left(2,\frac{(I+a+bx)\sqrt{-c}}{I\sqrt{-c}+a\sqrt{-c}-b\sqrt{d}}\right)\sqrt{d}}{4(-c)^{3/2}} - \frac{I\operatorname{polylog}\left(2,\frac{(1+Ia+Ibx)\sqrt{-c}}{(1+Ia)\sqrt{-c}-Ib\sqrt{d}}\right)\sqrt{d}}{4(-c)^{3/2}} - \frac{I\operatorname{polylog}\left(2,\frac{(I+a+bx)\sqrt{-c}}{I\sqrt{-c}+a\sqrt{-c}+b\sqrt{d}}\right)\sqrt{d}}{4(-c)^{3/2}}$$

Result(type ?, 27376 leaves): Display of huge result suppressed!

Problem 19: Result is not expressed in closed-form.

$$\int \frac{\arctan(bx+a)}{c+\frac{d}{\sqrt{x}}}\,dx$$

Optimal(type 4, 612 leaves, 37 steps):

$$-\frac{(1+Ia+Ibx)\ln(1+Ia+Ibx)}{2cb}-\frac{(1-Ia-Ibx)\ln(-I(I+a+bx))}{2cb}+\frac{Id\ln(1+Ia+Ibx)\sqrt{x}}{c^2}$$

$$-\frac{Id^2\ln\left(d+c\sqrt{x}\right)\ln\left(\frac{c\left(\sqrt{-I-a}-\sqrt{b}\sqrt{x}\right)}{c\sqrt{-I-a}+d\sqrt{b}}\right)}{c^3}-\frac{Id^2\ln(1+Ia+Ibx)\ln\left(d+c\sqrt{x}\right)}{c^3}-\frac{Id^2\ln\left(d+c\sqrt{x}\right)\ln\left(\frac{c\left(\sqrt{-I-a}+\sqrt{b}\sqrt{x}\right)}{c\sqrt{-I-a}-d\sqrt{b}}\right)}{c^3}$$

$$+\frac{Id^2\operatorname{polylog}\left(2,-\frac{\sqrt{b}\left(d+c\sqrt{x}\right)}{c\sqrt{I-a}-d\sqrt{b}}\right)}{c^3}-\frac{Id\ln(1-Ia-Ibx)\sqrt{x}}{c^2}-\frac{Id^2\operatorname{polylog}\left(2,-\frac{\sqrt{b}\left(d+c\sqrt{x}\right)}{c\sqrt{-I-a}-d\sqrt{b}}\right)}{c^3}$$

$$+\frac{Id^2\ln\left(d+c\sqrt{x}\right)\ln\left(\frac{c\left(\sqrt{I-a}+\sqrt{b}\sqrt{x}\right)}{c\sqrt{I-a}-d\sqrt{b}}\right)}{c^3}-\frac{Id^2\operatorname{polylog}\left(2,\frac{\sqrt{b}\left(d+c\sqrt{x}\right)}{c\sqrt{-I-a}+d\sqrt{b}}\right)}{c^3}+\frac{2Id\operatorname{arctanh}\left(\frac{\sqrt{b}\sqrt{x}}{\sqrt{I-a}}\right)\sqrt{I-a}}{c^2\sqrt{b}}$$

$$-\frac{2Id\arctan\left(\frac{\sqrt{b}\sqrt{x}}{\sqrt{I+a}}\right)\sqrt{I+a}}{c^2\sqrt{b}}+\frac{Id^2\ln\left(d+c\sqrt{x}\right)\ln\left(\frac{c\left(\sqrt{I-a}-\sqrt{b}\sqrt{x}\right)}{c\sqrt{I-a}+d\sqrt{b}}\right)}{c^3}+\frac{Id^2\ln(1-Ia-Ibx)\ln\left(d+c\sqrt{x}\right)}{c^3}$$

$$+\frac{Id^2\operatorname{polylog}\left(2,\frac{\sqrt{b}\left(d+c\sqrt{x}\right)}{c\sqrt{I-a}+d\sqrt{b}}\right)}{c^3}$$

Result(type 7, 1001 leaves):

$$\frac{\arctan(bx+a)x}{c}-\frac{2\arctan(bx+a)d\sqrt{x}}{c^2}+\frac{2\arctan(bx+a)d^2\ln\left(d+c\sqrt{x}\right)}{c^3}-\frac{1}{c}\Bigg(d^2\Bigg($$

$$\sum_{\_R1=RootOf(b^2\_Z^4-4db^2\_Z^3+(2c^2ab+6d^2b^2)\_Z^2+(-4abc^2d-4b^2d^3)\_Z+a^2c^4+2abc^2d^2+b^2d^4+c^4)}$$

$$\frac{\_R1\left(\ln\left(d+c\sqrt{x}\right)\ln\left(\frac{-c\sqrt{x}+\_R1-d}{\_R1}\right)+\operatorname{dilog}\left(\frac{-c\sqrt{x}+\_R1-d}{\_R1}\right)\right)}{\_R1^3b-3\_R1^2bd+\_R1ac^2+3\_R1bd^2-ac^2d-bd^3}\Bigg)\Bigg)$$

$$-\frac{\sum_{\_R=RootOf(b^2\_Z^4-4db^2\_Z^3+(2c^2ab+6d^2b^2)\_Z^2+(-4abc^2d-4b^2d^3)\_Z+a^2c^4+2abc^2d^2+b^2d^4+c^4)}\frac{\_R^3\ln\left(c\sqrt{x}-\_R+d\right)}{b\_R^3-3bd\_R^2+c^2a\_R+3bd^2\_R-ac^2d-bd^3}}{2c}$$

$$+\frac{1}{2c}\Bigg(3d^3\Bigg($$

$$\sum_{\_R=RootOf(b^2\_Z^4-4db^2\_Z^3+(2c^2ab+6d^2b^2)\_Z^2+(-4abc^2d-4b^2d^3)\_Z+a^2c^4+2abc^2d^2+b^2d^4+c^4)} \frac{\ln(c\sqrt{x}-\_R+d)}{b\_R^3-3bd\_R^2+c^2a\_R+3bd^2\_R-ac^2d-bd^3}\Bigg)\Bigg)$$

$$+\frac{1}{2c}\Bigg(5d\Bigg(\sum_{\_R=RootOf(b^2\_Z^4-4db^2\_Z^3+(2c^2ab+6d^2b^2)\_Z^2+(-4abc^2d-4b^2d^3)\_Z+a^2c^4+2abc^2d^2+b^2d^4+c^4)} \frac{\_R^2\ln(c\sqrt{x}-\_R+d)}{b\_R^3-3bd\_R^2+c^2a\_R+3bd^2\_R-ac^2d-bd^3}\Bigg)\Bigg)$$

$$-\frac{1}{2c}\Bigg(7d^2\Bigg(\sum_{\_R=RootOf(b^2\_Z^4-4db^2\_Z^3+(2c^2ab+6d^2b^2)\_Z^2+(-4abc^2d-4b^2d^3)\_Z+a^2c^4+2abc^2d^2+b^2d^4+c^4)} \frac{\_R\ln(c\sqrt{x}-\_R+d)}{b\_R^3-3bd\_R^2+c^2a\_R+3bd^2\_R-ac^2d-bd^3}\Bigg)\Bigg)$$

$$+\frac{1}{c}\Bigg(d^3\Bigg(\sum_{\_R1=RootOf(b^2\_Z^4-4db^2\_Z^3+(2c^2ab+6d^2b^2)\_Z^2+(-4abc^2d-4b^2d^3)\_Z+a^2c^4+2abc^2d^2+b^2d^4+c^4)} \frac{\ln(d+c\sqrt{x})\ln\left(\frac{-c\sqrt{x}+\_R1-d}{\_R1}\right)+\operatorname{dilog}\left(\frac{-c\sqrt{x}+\_R1-d}{\_R1}\right)}{\_R1^3b-3\_R1^2bd+\_R1ac^2+3\_R1bd^2-ac^2d-bd^3}\Bigg)\Bigg)$$

Test results for the 109 problems in "5.3.6 Exponentials of inverse tangent.txt"

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

$$\int \frac{x^3\sqrt{x^2a^2+1}}{1+Iax}\,dx$$

Optimal(type 3, 73 leaves, 5 steps):

$$-\frac{3\,I\operatorname{arcsinh}(ax)}{8a^4}+\frac{x^2\sqrt{x^2a^2+1}}{3a^2}-\frac{Ix^3\sqrt{x^2a^2+1}}{4a}-\frac{(16-9Iax)\sqrt{x^2a^2+1}}{24a^4}$$

Result(type 3, 186 leaves):

$$\frac{5Ix\sqrt{x^2a^2+1}}{8a^3}+\frac{5I\ln\left(\frac{xa^2}{\sqrt{a^2}}+\sqrt{x^2a^2+1}\right)}{8a^3\sqrt{a^2}}+\frac{(x^2a^2+1)^{3/2}}{3a^4}-\frac{Ix(x^2a^2+1)^{3/2}}{4a^3}-\frac{\sqrt{\left(x-\frac{I}{a}\right)^2a^2+2Ia\left(x-\frac{I}{a}\right)}}{a^4}$$

$$-\frac{I\ln\left(\frac{Ia+\left(x-\frac{I}{a}\right)a^2}{\sqrt{a^2}}+\sqrt{\left(x-\frac{I}{a}\right)^2a^2+2Ia\left(x-\frac{I}{a}\right)}\right)}{a^3\sqrt{a^2}}$$

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

$$\int\frac{\sqrt{x^2a^2+1}}{(1+Iax)\,x}\,dx$$

Optimal(type 3, 22 leaves, 6 steps):

$$-I\operatorname{arcsinh}(ax)-\operatorname{arctanh}\left(\sqrt{x^2a^2+1}\right)$$

Result(type 3, 120 leaves):

$$\sqrt{x^2a^2+1}-\operatorname{arctanh}\left(\frac{1}{\sqrt{x^2a^2+1}}\right)-\sqrt{\left(x-\frac{I}{a}\right)^2a^2+2Ia\left(x-\frac{I}{a}\right)}-\frac{Ia\ln\left(\frac{Ia+\left(x-\frac{I}{a}\right)a^2}{\sqrt{a^2}}+\sqrt{\left(x-\frac{I}{a}\right)^2a^2+2Ia\left(x-\frac{I}{a}\right)}\right)}{\sqrt{a^2}}$$

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

$$\int\frac{\sqrt{x^2a^2+1}}{(1+Iax)\,x^3}\,dx$$

Optimal(type 3, 52 leaves, 6 steps):

$$\frac{a^2\operatorname{arctanh}\left(\sqrt{x^2a^2+1}\right)}{2}-\frac{\sqrt{x^2a^2+1}}{2x^2}+\frac{Ia\sqrt{x^2a^2+1}}{x}$$

Result(type 3, 218 leaves):

$$-\frac{(x^2a^2+1)^{3/2}}{2x^2}-\frac{a^2\sqrt{x^2a^2+1}}{2}+\frac{a^2\operatorname{arctanh}\left(\frac{1}{\sqrt{x^2a^2+1}}\right)}{2}+a^2\sqrt{\left(x-\frac{I}{a}\right)^2a^2+2Ia\left(x-\frac{I}{a}\right)}$$
$$+\frac{Ia^3\ln\left(\frac{Ia+\left(x-\frac{I}{a}\right)a^2}{\sqrt{a^2}}+\sqrt{\left(x-\frac{I}{a}\right)^2a^2+2Ia\left(x-\frac{I}{a}\right)}\right)}{\sqrt{a^2}}+\frac{Ia(x^2a^2+1)^{3/2}}{x}-Ia^3x\sqrt{x^2a^2+1}-\frac{Ia^3\ln\left(\frac{xa^2}{\sqrt{a^2}}+\sqrt{x^2a^2+1}\right)}{\sqrt{a^2}}$$

Problem 18: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 45 leaves, 8 steps):

$$I \operatorname{arcsinh}(a x) - \operatorname{arctanh}\left(\sqrt{x^2 a^2+1}\right) + \frac{4 I \sqrt{x^2 a^2+1}}{-a x+I}$$

Result(type 3, 256 leaves):

$$\frac{(x^2 a^2+1)^{3/2}}{3} + \sqrt{x^2 a^2+1} - \operatorname{arctanh}\left(\frac{1}{\sqrt{x^2 a^2+1}}\right) + \frac{I\left(\left(x-\frac{I}{a}\right)^2 a^2+2 I a\left(x-\frac{I}{a}\right)\right)^{5/2}}{a^3\left(x-\frac{I}{a}\right)^3} - \frac{\left(\left(x-\frac{I}{a}\right)^2 a^2+2 I a\left(x-\frac{I}{a}\right)\right)^{5/2}}{a^2\left(x-\frac{I}{a}\right)^2}$$
$$+ \frac{2\left(\left(x-\frac{I}{a}\right)^2 a^2+2 I a\left(x-\frac{I}{a}\right)\right)^{3/2}}{3} + I a \sqrt{\left(x-\frac{I}{a}\right)^2 a^2+2 I a\left(x-\frac{I}{a}\right)}\, x$$
$$+ \frac{I a \ln\left(\frac{I a+\left(x-\frac{I}{a}\right) a^2}{\sqrt{a^2}} + \sqrt{\left(x-\frac{I}{a}\right)^2 a^2+2 I a\left(x-\frac{I}{a}\right)}\right)}{\sqrt{a^2}}$$

Problem 19: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 97 leaves, 14 steps):

$$-\frac{11 I a^3 \operatorname{arctanh}\left(\sqrt{x^2 a^2+1}\right)}{2} - \frac{\sqrt{x^2 a^2+1}}{3 x^3} + \frac{3 I a \sqrt{x^2 a^2+1}}{2 x^2} + \frac{14 a^2 \sqrt{x^2 a^2+1}}{3 x} - \frac{4 a^3 \sqrt{x^2 a^2+1}}{-a x+I}$$

Result(type 3, 391 leaves):

$$-\frac{(x^2 a^2+1)^{5/2}}{3 x^3} + \frac{16 a^2 (x^2 a^2+1)^{5/2}}{3 x} - \frac{16 a^4 (x^2 a^2+1)^{3/2} x}{3} - 8 a^4 x \sqrt{x^2 a^2+1} - \frac{8 a^4 \ln\left(\frac{x a^2}{\sqrt{a^2}} + \sqrt{x^2 a^2+1}\right)}{\sqrt{a^2}} + \frac{11 I a^3 (x^2 a^2+1)^{3/2}}{6}$$
$$+ 8 a^4 \sqrt{\left(x-\frac{I}{a}\right)^2 a^2+2 I a\left(x-\frac{I}{a}\right)}\, x + \frac{8 a^4 \ln\left(\frac{I a+\left(x-\frac{I}{a}\right) a^2}{\sqrt{a^2}} + \sqrt{\left(x-\frac{I}{a}\right)^2 a^2+2 I a\left(x-\frac{I}{a}\right)}\right)}{\sqrt{a^2}} + \frac{3 I a (x^2 a^2+1)^{5/2}}{2 x^2}$$

$$+\frac{11\,I\,a^3\sqrt{x^2a^2+1}}{2}-\frac{11\,I\,a^3\,\mathrm{arctanh}\left(\frac{1}{\sqrt{x^2a^2+1}}\right)}{2}-\frac{\left(\left(x-\frac{I}{a}\right)^2a^2+2\,I\,a\left(x-\frac{I}{a}\right)\right)^{5/2}}{\left(x-\frac{I}{a}\right)^3}+\frac{2\,I\,a\left(\left(x-\frac{I}{a}\right)^2a^2+2\,I\,a\left(x-\frac{I}{a}\right)\right)^{5/2}}{\left(x-\frac{I}{a}\right)^2}$$

$$-\frac{16\,I\,a^3\left(\left(x-\frac{I}{a}\right)^2a^2+2\,I\,a\left(x-\frac{I}{a}\right)\right)^{3/2}}{3}$$

```
Problem 20: Unable to integrate problem.
```

$$\int\frac{\sqrt{\frac{1+I\,a\,x}{\sqrt{x^2a^2+1}}}}{x}\,dx$$

```
Optimal(type 3, 204 leaves, 17 steps):
```

$$-2\arctan\left(\frac{(1+I\,a\,x)^{1/4}}{(1-I\,a\,x)^{1/4}}\right)-2\,\mathrm{arctanh}\left(\frac{(1+I\,a\,x)^{1/4}}{(1-I\,a\,x)^{1/4}}\right)-\frac{\ln\left(1-\frac{(1-I\,a\,x)^{1/4}\sqrt{2}}{(1+I\,a\,x)^{1/4}}+\frac{\sqrt{1-I\,a\,x}}{\sqrt{1+I\,a\,x}}\right)\sqrt{2}}{2}$$

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

```
Result(type 8, 27 leaves):
```

$$\int\frac{\sqrt{\frac{1+I\,a\,x}{\sqrt{x^2a^2+1}}}}{x}\,dx$$

```
Problem 21: Unable to integrate problem.
```

$$\int\frac{\sqrt{\frac{1+I\,a\,x}{\sqrt{x^2a^2+1}}}}{x^2}\,dx$$

```
Optimal(type 3, 72 leaves, 6 steps):
```

$$-\frac{(1-I\,a\,x)^{3/4}(1+I\,a\,x)^{1/4}}{x}-I\,a\arctan\left(\frac{(1+I\,a\,x)^{1/4}}{(1-I\,a\,x)^{1/4}}\right)-I\,a\,\mathrm{arctanh}\left(\frac{(1+I\,a\,x)^{1/4}}{(1-I\,a\,x)^{1/4}}\right)$$

Result(type 8, 27 leaves):

$$\int \frac{\sqrt{\frac{1 + I a x}{\sqrt{x^2 a^2 + 1}}}}{x^2}\, dx$$

Problem 22: Unable to integrate problem.

$$\int \frac{\sqrt{\frac{1 + I a x}{\sqrt{x^2 a^2 + 1}}}}{x^3}\, dx$$

Optimal(type 3, 99 leaves, 7 steps):

$$-\frac{I a (1 - I a x)^{3/4} (1 + I a x)^{1/4}}{4 x} - \frac{(1 - I a x)^{3/4} (1 + I a x)^{5/4}}{2 x^2} + \frac{a^2 \arctan\left(\frac{(1 + I a x)^{1/4}}{(1 - I a x)^{1/4}}\right)}{4} + \frac{a^2 \operatorname{arctanh}\left(\frac{(1 + I a x)^{1/4}}{(1 - I a x)^{1/4}}\right)}{4}$$

Result(type 8, 27 leaves):

$$\int \frac{\sqrt{\frac{1 + I a x}{\sqrt{x^2 a^2 + 1}}}}{x^3}\, dx$$

Problem 23: Unable to integrate problem.

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

Optimal(type 3, 252 leaves, 15 steps):

$$-\frac{41 (1 - I a x)^{1/4} (1 + I a x)^{3/4}}{64 a^4} + \frac{x^2 (1 - I a x)^{1/4} (1 + I a x)^{7/4}}{4 a^2} - \frac{(1 - I a x)^{1/4} (1 + I a x)^{7/4} (11 + 4 I a x)}{32 a^4}$$
$$+ \frac{123 \arctan\left(1 - \frac{(1 - I a x)^{1/4} \sqrt{2}}{(1 + I a x)^{1/4}}\right) \sqrt{2}}{128 a^4} - \frac{123 \arctan\left(1 + \frac{(1 - I a x)^{1/4} \sqrt{2}}{(1 + I a x)^{1/4}}\right) \sqrt{2}}{128 a^4} + \frac{123 \ln\left(1 - \frac{(1 - I a x)^{1/4} \sqrt{2}}{(1 + I a x)^{1/4}} + \frac{\sqrt{1 - I a x}}{\sqrt{1 + I a x}}\right) \sqrt{2}}{256 a^4}$$
$$- \frac{123 \ln\left(1 + \frac{(1 - I a x)^{1/4} \sqrt{2}}{(1 + I a x)^{1/4}} + \frac{\sqrt{1 - I a x}}{\sqrt{1 + I a x}}\right) \sqrt{2}}{256 a^4}$$

Result(type 8, 27 leaves):

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

Problem 24: Unable to integrate problem.

$$\int \left(\frac{1 + I a x}{\sqrt{x^2 a^2 + 1}} \right)^{5/2} x^2 \, dx$$

Optimal(type 3, 273 leaves, 16 steps):

$$\frac{55 I (1 - I a x)^{3/4} (1 + I a x)^{1/4}}{8 a^3} + \frac{11 I (1 - I a x)^{3/4} (1 + I a x)^{5/4}}{4 a^3} + \frac{2 I (1 + I a x)^{9/4}}{a^3 (1 - I a x)^{1/4}} + \frac{I (1 - I a x)^{3/4} (1 + I a x)^{9/4}}{3 a^3} - \frac{55 I \arctan\left(1 - \frac{(1 - I a x)^{1/4} \sqrt{2}}{(1 + I a x)^{1/4}}\right) \sqrt{2}}{16 a^3} + \frac{55 I \arctan\left(1 + \frac{(1 - I a x)^{1/4} \sqrt{2}}{(1 + I a x)^{1/4}}\right) \sqrt{2}}{16 a^3} + \frac{55 I \ln\left(1 - \frac{(1 - I a x)^{1/4} \sqrt{2}}{(1 + I a x)^{1/4}} + \frac{\sqrt{1 - I a x}}{\sqrt{1 + I a x}}\right) \sqrt{2}}{32 a^3} - \frac{55 I \ln\left(1 + \frac{(1 - I a x)^{1/4} \sqrt{2}}{(1 + I a x)^{1/4}} + \frac{\sqrt{1 - I a x}}{\sqrt{1 + I a x}}\right) \sqrt{2}}{32 a^3}$$

Result(type 8, 27 leaves):

$$\int \left(\frac{1 + I a x}{\sqrt{x^2 a^2 + 1}} \right)^{5/2} x^2 \, dx$$

Problem 25: Unable to integrate problem.

$$\int \left(\frac{1 + I a x}{\sqrt{x^2 a^2 + 1}} \right)^{5/2} x \, dx$$

Optimal(type 3, 242 leaves, 15 steps):

$$-\frac{25 (1 - I a x)^{3/4} (1 + I a x)^{1/4}}{4 a^2} - \frac{5 (1 - I a x)^{3/4} (1 + I a x)^{5/4}}{2 a^2} - \frac{2 (1 + I a x)^{9/4}}{a^2 (1 - I a x)^{1/4}} + \frac{25 \arctan\left(1 - \frac{(1 - I a x)^{1/4} \sqrt{2}}{(1 + I a x)^{1/4}}\right) \sqrt{2}}{8 a^2} - \frac{25 \arctan\left(1 + \frac{(1 - I a x)^{1/4} \sqrt{2}}{(1 + I a x)^{1/4}}\right) \sqrt{2}}{8 a^2} - \frac{25 \ln\left(1 - \frac{(1 - I a x)^{1/4} \sqrt{2}}{(1 + I a x)^{1/4}} + \frac{\sqrt{1 - I a x}}{\sqrt{1 + I a x}}\right) \sqrt{2}}{16 a^2} + \frac{25 \ln\left(1 + \frac{(1 - I a x)^{1/4} \sqrt{2}}{(1 + I a x)^{1/4}} + \frac{\sqrt{1 - I a x}}{\sqrt{1 + I a x}}\right) \sqrt{2}}{16 a^2}$$

Result(type 8, 25 leaves):

$$\int \left(\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)^{5/2} x \, dx$$

Problem 26: Unable to integrate problem.

$$\int \frac{1}{\sqrt{\frac{1+I a x}{\sqrt{x^2 a^2+1}}}} \, dx$$

Optimal(type 3, 201 leaves, 13 steps):

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

Result(type 8, 23 leaves):

$$\int \frac{1}{\sqrt{\frac{1+I a x}{\sqrt{x^2 a^2+1}}}} \, dx$$

Problem 27: Unable to integrate problem.

$$\int \frac{1}{\sqrt{\frac{1+I a x}{\sqrt{x^2 a^2+1}}}\, x} \, dx$$

Optimal(type 3, 204 leaves, 17 steps):

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

Result(type 8, 27 leaves):

$$\int \frac{1}{\sqrt{\frac{1+I a x}{\sqrt{x^2 a^2+1}}}\, x} \, dx$$

Problem 28: Unable to integrate problem.

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

Optimal(type 3, 201 leaves, 13 steps):

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

Result(type 8, 23 leaves):

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

Problem 29: Unable to integrate problem.

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

Optimal(type 3, 204 leaves, 17 steps):

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

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

Result(type 8, 27 leaves):

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

Problem 30: Unable to integrate problem.

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

Optimal(type 3, 72 leaves, 6 steps):

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

Result(type 8, 27 leaves):

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

Problem 31: Unable to integrate problem.

$$\int\frac{1}{\left(\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)^{5/2} x^4}\, dx$$

Optimal(type 3, 151 leaves, 10 steps):

$$\frac{287 I a^3 (1-I a x)^{1/4}}{24 (1+I a x)^{1/4}}-\frac{(1-I a x)^{1/4}}{3 x^3 (1+I a x)^{1/4}}+\frac{13 I a (1-I a x)^{1/4}}{12 x^2 (1+I a x)^{1/4}}+\frac{61 a^2 (1-I a x)^{1/4}}{24 x (1+I a x)^{1/4}}+\frac{55 I a^3 \arctan\left(\frac{(1+I a x)^{1/4}}{(1-I a x)^{1/4}}\right)}{8}$$
$$-\frac{55 I a^3 \operatorname{arctanh}\left(\frac{(1+I a x)^{1/4}}{(1-I a x)^{1/4}}\right)}{8}$$

Result(type 8, 27 leaves):

$$\int \frac{1}{\left(\frac{1+\mathrm{I}\,a\,x}{\sqrt{x^2a^2+1}}\right)^{5/2} x^4}\,dx$$

Problem 32: Unable to integrate problem.

$$\int \left(\frac{1+\mathrm{I}\,x}{\sqrt{x^2+1}}\right)^{1/3} dx$$

Optimal(type 3, 188 leaves, 14 steps):

$$\mathrm{I}\,(1-\mathrm{I}\,x)^{5/6}\,(1+\mathrm{I}\,x)^{1/6} + \frac{2\,\mathrm{I}\arctan\left(\frac{(1-\mathrm{I}\,x)^{1/6}}{(1+\mathrm{I}\,x)^{1/6}}\right)}{3} + \frac{\mathrm{I}\arctan\left(\frac{2\,(1-\mathrm{I}\,x)^{1/6}}{(1+\mathrm{I}\,x)^{1/6}}-\sqrt{3}\right)}{3} + \frac{\mathrm{I}\arctan\left(\frac{2\,(1-\mathrm{I}\,x)^{1/6}}{(1+\mathrm{I}\,x)^{1/6}}+\sqrt{3}\right)}{3}$$
$$+ \frac{\mathrm{I}\ln\left(1+\frac{(1-\mathrm{I}\,x)^{1/3}}{(1+\mathrm{I}\,x)^{1/3}}-\frac{(1-\mathrm{I}\,x)^{1/6}\sqrt{3}}{(1+\mathrm{I}\,x)^{1/6}}\right)\sqrt{3}}{6} - \frac{\mathrm{I}\ln\left(1+\frac{(1-\mathrm{I}\,x)^{1/3}}{(1+\mathrm{I}\,x)^{1/3}}+\frac{(1-\mathrm{I}\,x)^{1/6}\sqrt{3}}{(1+\mathrm{I}\,x)^{1/6}}\right)\sqrt{3}}{6}$$

Result(type 8, 18 leaves):

$$\int \left(\frac{1+\mathrm{I}\,x}{\sqrt{x^2+1}}\right)^{1/3} dx$$

Problem 33: Unable to integrate problem.

$$\int \frac{\left(\frac{1+\mathrm{I}\,x}{\sqrt{x^2+1}}\right)^{1/3}}{x}\,dx$$

Optimal(type 3, 324 leaves, 25 steps):

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

Result(type 8, 22 leaves):

$$\int \frac{\left(\frac{1+\mathrm{I}x}{\sqrt{x^2+1}}\right)^{1/3}}{x}\,dx$$

Problem 34: Unable to integrate problem.

$$\int \frac{\left(\frac{1+\mathrm{I}x}{\sqrt{x^2+1}}\right)^{1/3}}{x^2}\,dx$$

Optimal(type 3, 188 leaves, 13 steps):

$$-\frac{(1-\mathrm{I}x)^{5/6}(1+\mathrm{I}x)^{1/6}}{x}-\frac{2\,\mathrm{I}\,\operatorname{arctanh}\left(\frac{(1+\mathrm{I}x)^{1/6}}{(1-\mathrm{I}x)^{1/6}}\right)}{3}+\frac{\mathrm{I}\ln\left(1-\frac{(1+\mathrm{I}x)^{1/6}}{(1-\mathrm{I}x)^{1/6}}+\frac{(1+\mathrm{I}x)^{1/3}}{(1-\mathrm{I}x)^{1/3}}\right)}{6}-\frac{\mathrm{I}\ln\left(1+\frac{(1+\mathrm{I}x)^{1/6}}{(1-\mathrm{I}x)^{1/6}}+\frac{(1+\mathrm{I}x)^{1/3}}{(1-\mathrm{I}x)^{1/3}}\right)}{6}$$
$$+\frac{\mathrm{I}\arctan\left(\frac{\left(1-\frac{2(1+\mathrm{I}x)^{1/6}}{(1-\mathrm{I}x)^{1/6}}\right)\sqrt{3}}{3}\right)\sqrt{3}}{3}-\frac{\mathrm{I}\arctan\left(\frac{\left(1+\frac{2(1+\mathrm{I}x)^{1/6}}{(1-\mathrm{I}x)^{1/6}}\right)\sqrt{3}}{3}\right)\sqrt{3}}{3}$$

Result(type 8, 22 leaves):

$$\int \frac{\left(\frac{1+\mathrm{I}x}{\sqrt{x^2+1}}\right)^{1/3}}{x^2}\,dx$$

Problem 35: Unable to integrate problem.

$$\int \frac{\left(\frac{1+\mathrm{I}x}{\sqrt{x^2+1}}\right)^{1/3}}{x^3}\,dx$$

Optimal(type 3, 205 leaves, 14 steps):

$$-\frac{(1-\mathrm{I}x)^{5/6}(1+\mathrm{I}x)^{7/6}}{2x^2}-\frac{\mathrm{I}(1-\mathrm{I}x)^{5/6}(1+\mathrm{I}x)^{1/6}}{6x}+\frac{\operatorname{arctanh}\left(\frac{(1+\mathrm{I}x)^{1/6}}{(1-\mathrm{I}x)^{1/6}}\right)}{9}-\frac{\ln\left(1-\frac{(1+\mathrm{I}x)^{1/6}}{(1-\mathrm{I}x)^{1/6}}+\frac{(1+\mathrm{I}x)^{1/3}}{(1-\mathrm{I}x)^{1/3}}\right)}{36}$$

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

Result(type 8, 22 leaves):

$$\int\frac{\left(\frac{1+Ix}{\sqrt{x^2+1}}\right)^{1/3}}{x^3}\,dx$$

Problem 36: Unable to integrate problem.

$$\int\left(\frac{1+Ix}{\sqrt{x^2+1}}\right)^{2/3}x^2\,dx$$

Optimal(type 3, 125 leaves, 5 steps):

$$-\frac{11I(1-Ix)^{2/3}(1+Ix)^{1/3}}{27}-\frac{I(1-Ix)^{2/3}(1+Ix)^{4/3}}{9}+\frac{(1-Ix)^{2/3}(1+Ix)^{4/3}x}{3}+\frac{11I\ln\left(1+\frac{(1-Ix)^{1/3}}{(1+Ix)^{1/3}}\right)}{27}+\frac{11I\ln(1+Ix)}{81}$$
$$+\frac{22I\arctan\left(\frac{\sqrt{3}}{3}-\frac{2(1-Ix)^{1/3}\sqrt{3}}{3(1+Ix)^{1/3}}\right)\sqrt{3}}{81}$$

Result(type 8, 22 leaves):

$$\int\left(\frac{1+Ix}{\sqrt{x^2+1}}\right)^{2/3}x^2\,dx$$

Problem 37: Unable to integrate problem.

$$\int\left(\frac{1+Ix}{\sqrt{x^2+1}}\right)^{2/3}dx$$

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

$$I(1-Ix)^{2/3}(1+Ix)^{1/3}-I\ln\left(1+\frac{(1-Ix)^{1/3}}{(1+Ix)^{1/3}}\right)-\frac{I\ln(1+Ix)}{3}-\frac{2I\arctan\left(\frac{\sqrt{3}}{3}-\frac{2(1-Ix)^{1/3}\sqrt{3}}{3(1+Ix)^{1/3}}\right)\sqrt{3}}{3}$$

Result(type 8, 18 leaves):

$$\int\left(\frac{1+Ix}{\sqrt{x^2+1}}\right)^{2/3}dx$$

Problem 38: Unable to integrate problem.

$$\int \frac{\left(\frac{1+Ix}{\sqrt{x^2+1}}\right)^{2/3}}{x^2}\,dx$$

Optimal(type 3, 84 leaves, 3 steps):

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

Result(type 8, 22 leaves):

$$\int \frac{\left(\frac{1+Ix}{\sqrt{x^2+1}}\right)^{2/3}}{x^2}\,dx$$

Problem 39: Unable to integrate problem.

$$\int \frac{\left(\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)^{1/4}}{x}\,dx$$

Optimal(type 3, 636 leaves, 39 steps):

$$-2\arctan\left(\frac{(1+Iax)^{1/8}}{(1-Iax)^{1/8}}\right)-2\,\mathrm{arctanh}\left(\frac{(1+Iax)^{1/8}}{(1-Iax)^{1/8}}\right)+\frac{\ln\left(1+\frac{(1+Iax)^{1/4}}{(1-Iax)^{1/4}}-\frac{(1+Iax)^{1/8}\sqrt{2}}{(1-Iax)^{1/8}}\right)\sqrt{2}}{2}$$
$$-\frac{\ln\left(1+\frac{(1+Iax)^{1/4}}{(1-Iax)^{1/4}}+\frac{(1+Iax)^{1/8}\sqrt{2}}{(1-Iax)^{1/8}}\right)\sqrt{2}}{2}+\arctan\left(1-\frac{(1+Iax)^{1/8}\sqrt{2}}{(1-Iax)^{1/8}}\right)\sqrt{2}-\arctan\left(1+\frac{(1+Iax)^{1/8}\sqrt{2}}{(1-Iax)^{1/8}}\right)\sqrt{2}$$
$$+\arctan\left(\frac{-\frac{2(1-Iax)^{1/8}}{(1+Iax)^{1/8}}+\sqrt{2+\sqrt{2}}}{\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}-\arctan\left(\frac{\frac{2(1-Iax)^{1/8}}{(1+Iax)^{1/8}}+\sqrt{2+\sqrt{2}}}{\sqrt{2-\sqrt{2}}}\right)\sqrt{2-\sqrt{2}}$$
$$-\frac{\ln\left(1+\frac{(1-Iax)^{1/4}}{(1+Iax)^{1/4}}-\frac{(1-Iax)^{1/8}\sqrt{2-\sqrt{2}}}{(1+Iax)^{1/8}}\right)\sqrt{2-\sqrt{2}}}{2}+\frac{\ln\left(1+\frac{(1-Iax)^{1/4}}{(1+Iax)^{1/4}}+\frac{(1-Iax)^{1/8}\sqrt{2-\sqrt{2}}}{(1+Iax)^{1/8}}\right)\sqrt{2-\sqrt{2}}}{2}$$

$$+\arctan\left(\frac{-\frac{2(1-Iax)^{1/8}}{(1+Iax)^{1/8}}+\sqrt{2-\sqrt{2}}}{\sqrt{2+\sqrt{2}}}\right)\sqrt{2+\sqrt{2}}-\arctan\left(\frac{\frac{2(1-Iax)^{1/8}}{(1+Iax)^{1/8}}+\sqrt{2-\sqrt{2}}}{\sqrt{2+\sqrt{2}}}\right)\sqrt{2+\sqrt{2}}$$

$$-\frac{\ln\left(1+\frac{(1-Iax)^{1/4}}{(1+Iax)^{1/4}}-\frac{(1-Iax)^{1/8}\sqrt{2+\sqrt{2}}}{(1+Iax)^{1/8}}\right)\sqrt{2+\sqrt{2}}}{2}+\frac{\ln\left(1+\frac{(1-Iax)^{1/4}}{(1+Iax)^{1/4}}+\frac{(1-Iax)^{1/8}\sqrt{2+\sqrt{2}}}{(1+Iax)^{1/8}}\right)\sqrt{2+\sqrt{2}}}{2}$$

Result(type 8, 27 leaves):

$$\int\frac{\left(\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)^{1/4}}{x}\,dx$$

Problem 40: Unable to integrate problem.

$$\int\frac{\left(\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)^{1/4}}{x^3}\,dx$$

Optimal(type 3, 271 leaves, 17 steps):

$$-\frac{Ia(1-Iax)^{7/8}(1+Iax)^{1/8}}{8x}-\frac{(1-Iax)^{7/8}(1+Iax)^{9/8}}{2x^2}+\frac{a^2\arctan\left(\frac{(1+Iax)^{1/8}}{(1-Iax)^{1/8}}\right)}{16}+\frac{a^2\operatorname{arctanh}\left(\frac{(1+Iax)^{1/8}}{(1-Iax)^{1/8}}\right)}{16}$$

$$-\frac{a^2\arctan\left(1-\frac{(1+Iax)^{1/8}\sqrt{2}}{(1-Iax)^{1/8}}\right)\sqrt{2}}{32}+\frac{a^2\arctan\left(1+\frac{(1+Iax)^{1/8}\sqrt{2}}{(1-Iax)^{1/8}}\right)\sqrt{2}}{32}-\frac{a^2\ln\left(1+\frac{(1+Iax)^{1/4}}{(1-Iax)^{1/4}}-\frac{(1+Iax)^{1/8}\sqrt{2}}{(1-Iax)^{1/8}}\right)\sqrt{2}}{64}$$

$$+\frac{a^2\ln\left(1+\frac{(1+Iax)^{1/4}}{(1-Iax)^{1/4}}+\frac{(1+Iax)^{1/8}\sqrt{2}}{(1-Iax)^{1/8}}\right)\sqrt{2}}{64}$$

Result(type 8, 27 leaves):

$$\int\frac{\left(\frac{1+Iax}{\sqrt{x^2a^2+1}}\right)^{1/4}}{x^3}\,dx$$

Problem 41: Unable to integrate problem.

$$\int \frac{x^m \sqrt{x^2 a^2 + 1}}{1 + \mathrm{I}\, a\, x}\, dx$$

Optimal(type 5, 70 leaves, 4 steps):

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

Result(type 8, 26 leaves):

$$\int \frac{x^m \sqrt{x^2 a^2 + 1}}{1 + \mathrm{I}\, a\, x}\, dx$$

Problem 42: Unable to integrate problem.

$$\int \frac{x^m}{\sqrt{\frac{1 + \mathrm{I}\, a\, x}{\sqrt{x^2 a^2 + 1}}}}\, dx$$

Optimal(type 6, 30 leaves, 2 steps):

$$\frac{x^{1+m} \mathit{AppellF1}\left(1+m, \frac{1}{4}, -\frac{1}{4}, 2+m, -\mathrm{I}\, a\, x, \mathrm{I}\, a\, x\right)}{1+m}$$

Result(type 8, 27 leaves):

$$\int \frac{x^m}{\sqrt{\frac{1 + \mathrm{I}\, a\, x}{\sqrt{x^2 a^2 + 1}}}}\, dx$$

Problem 43: Unable to integrate problem.

$$\int \frac{x^m}{\left(\frac{1 + \mathrm{I}\, a\, x}{\sqrt{x^2 a^2 + 1}}\right)^{3/2}}\, dx$$

Optimal(type 6, 30 leaves, 2 steps):

$$\frac{x^{1+m} \mathit{AppellF1}\left(1+m, \frac{3}{4}, -\frac{3}{4}, 2+m, -\mathrm{I}\, a\, x, \mathrm{I}\, a\, x\right)}{1+m}$$

Result(type 8, 27 leaves):

$$\int \frac{x^m}{\left(\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)^{3/2}}\, dx$$

Problem 44: Unable to integrate problem.

$$\int \left(\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)^{1/4} x^m\, dx$$

Optimal(type 6, 30 leaves, 2 steps):

$$\frac{x^{1+m} AppellF1\left(1+m, -\frac{1}{8}, \frac{1}{8}, 2+m, -I a x, I a x\right)}{1+m}$$

Result(type 8, 27 leaves):

$$\int \left(\frac{1+I a x}{\sqrt{x^2 a^2+1}}\right)^{1/4} x^m\, dx$$

Problem 45: Unable to integrate problem.

$$\int e^{I n \arctan(a x)} x^2\, dx$$

Optimal(type 5, 125 leaves, 4 steps):

$$-\frac{I n (1-I a x)^{1-\frac{n}{2}} (1+I a x)^{1+\frac{n}{2}}}{6 a^3} + \frac{x (1-I a x)^{1-\frac{n}{2}} (1+I a x)^{1+\frac{n}{2}}}{3 a^2}$$

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

Result(type 8, 15 leaves):

$$\int e^{I n \arctan(a x)} x^2\, dx$$

Problem 46: Unable to integrate problem.

$$\int e^{I n \arctan(a x)} x\, dx$$

Optimal(type 5, 85 leaves, 3 steps):

$$\frac{(1-Iax)^{1-\frac{n}{2}}(1+Iax)^{1+\frac{n}{2}}}{2a^2}+\frac{2^{\frac{n}{2}}n(1-Iax)^{1-\frac{n}{2}}\,\mathrm{hypergeom}\left(\left[-\frac{n}{2},1-\frac{n}{2}\right],\left[2-\frac{n}{2}\right],\frac{1}{2}-\frac{Iax}{2}\right)}{a^2(2-n)}$$

Result(type 8, 13 leaves):

$$\int e^{In\arctan(ax)}x\,dx$$

Problem 48: Result more than twice size of optimal antiderivative.

$$\int \frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}\,x}\,dx$$

Optimal(type 3, 68 leaves, 8 steps):

$$I\operatorname{arcsinh}(bx+a)-\frac{2\operatorname{arctanh}\left(\frac{\sqrt{I+a}\sqrt{1+Ia+Ibx}}{\sqrt{I-a}\sqrt{1-Ia-Ibx}}\right)\sqrt{I-a}}{\sqrt{I+a}}$$

Result(type 3, 156 leaves):

$$\frac{Ib\ln\left(\frac{b^2x+ab}{\sqrt{b^2}}+\sqrt{x^2b^2+2abx+a^2+1}\right)}{\sqrt{b^2}}-\frac{I\ln\left(\frac{2a^2+2+2abx+2\sqrt{a^2+1}\sqrt{x^2b^2+2abx+a^2+1}}{x}\right)a}{\sqrt{a^2+1}}$$
$$-\frac{\ln\left(\frac{2a^2+2+2abx+2\sqrt{a^2+1}\sqrt{x^2b^2+2abx+a^2+1}}{x}\right)}{\sqrt{a^2+1}}$$

Problem 49: Result more than twice size of optimal antiderivative.

$$\int \frac{(1+I(bx+a))^3}{(1+(bx+a)^2)^{3/2}x^4}\,dx$$

Optimal(type 3, 266 leaves, 8 steps):

$$-\frac{(11I-18a-6Ia^2)b^3\operatorname{arctanh}\left(\frac{\sqrt{I+a}\sqrt{1+Ia+Ibx}}{\sqrt{I-a}\sqrt{1-Ia-Ibx}}\right)}{(I-a)^{3/2}(I+a)^{9/2}}+\frac{(52+51Ia-2a^2)b^3\sqrt{1+Ia+Ibx}}{6(I-a)(I+a)^4\sqrt{1-Ia-Ibx}}-\frac{(I-a)\sqrt{1+Ia+Ibx}}{3(I+a)x^3\sqrt{1-Ia-Ibx}}$$
$$+\frac{7Ib\sqrt{1+Ia+Ibx}}{6(I+a)^2x^2\sqrt{1-Ia-Ibx}}+\frac{(19+16Ia)b^2\sqrt{1+Ia+Ibx}}{6(I-a)(I+a)^3x\sqrt{1-Ia-Ibx}}$$

Result(type ?, 2623 leaves): Display of huge result suppressed!

Problem 50: Result more than twice size of optimal antiderivative.

$$\int \frac{x^3\sqrt{1+(bx+a)^2}}{1+I(bx+a)}\,dx$$

Optimal(type 3, 163 leaves, 7 steps):

$$-\frac{(3I-12a-12Ia^2+8a^3)\operatorname{arcsinh}(bx+a)}{8b^4}+\frac{x^2(1-Ia-Ibx)^{3/2}\sqrt{1+Ia+Ibx}}{4b^2}-\frac{(1-Ia-Ibx)^{3/2}(7+10Ia-18a^2-2(I-6a)bx)\sqrt{1+Ia+Ibx}}{24b^4}-\frac{(3+12Ia-12a^2-8Ia^3)\sqrt{1-Ia-Ibx}\sqrt{1+Ia+Ibx}}{8b^4}$$

Result(type 3, 893 leaves):

$$-\frac{3\sqrt{x^2b^2+2abx+a^2+1}\,xa}{2b^3}-\frac{3\ln\left(\frac{b^2x+ab}{\sqrt{b^2}}+\sqrt{x^2b^2+2abx+a^2+1}\right)a}{2b^3\sqrt{b^2}}-\frac{3\sqrt{x^2b^2+2abx+a^2+1}\,a^2}{2b^4}$$
$$-\frac{3I\sqrt{b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)}\,a}{b^4}+\frac{3\sqrt{b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)}\,a^2}{b^4}-\frac{3Ia^3\sqrt{x^2b^2+2abx+a^2+1}}{2b^4}$$
$$+\frac{5I\sqrt{x^2b^2+2abx+a^2+1}\,a}{8b^4}+\frac{5I\ln\left(\frac{b^2x+ab}{\sqrt{b^2}}+\sqrt{x^2b^2+2abx+a^2+1}\right)}{8b^3\sqrt{b^2}}+\frac{I\sqrt{b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)}\,a^3}{b^4}$$
$$-\frac{\ln\left(\frac{Ib+b^2\left(x-\frac{I-a}{b}\right)}{\sqrt{b^2}}+\sqrt{b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)}\right)a^3}{b^3\sqrt{b^2}}$$
$$+\frac{3\ln\left(\frac{Ib+b^2\left(x-\frac{I-a}{b}\right)}{\sqrt{b^2}}+\sqrt{b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)}\right)a}{b^3\sqrt{b^2}}$$
$$-\frac{I\ln\left(\frac{Ib+b^2\left(x-\frac{I-a}{b}\right)}{\sqrt{b^2}}+\sqrt{b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)}\right)}{b^3\sqrt{b^2}}-\frac{Ix(x^2b^2+2abx+a^2+1)^{3/2}}{4b^3}+\frac{(x^2b^2+2abx+a^2+1)^{3/2}}{3b^4}$$
$$+\frac{3Ia(x^2b^2+2abx+a^2+1)^{3/2}}{4b^4}+\frac{5I\sqrt{x^2b^2+2abx+a^2+1}\,x}{8b^3}-\frac{3Ia^2\sqrt{x^2b^2+2abx+a^2+1}\,x}{2b^3}$$

$$+\frac{3\,\mathrm{I}\ln\left(\frac{\mathrm{I}\,b+b^2\left(x-\frac{\mathrm{I}-a}{b}\right)}{\sqrt{b^2}}+\sqrt{b^2\left(x-\frac{\mathrm{I}-a}{b}\right)^2+2\,\mathrm{I}\,b\left(x-\frac{\mathrm{I}-a}{b}\right)}\right)a^2}{b^3\sqrt{b^2}}-\frac{3\,\mathrm{I}\,a^2\ln\left(\frac{b^2x+a\,b}{\sqrt{b^2}}+\sqrt{x^2b^2+2\,a\,b\,x+a^2+1}\right)}{2\,b^3\sqrt{b^2}}$$

$$-\frac{\sqrt{b^2\left(x-\frac{\mathrm{I}-a}{b}\right)^2+2\,\mathrm{I}\,b\left(x-\frac{\mathrm{I}-a}{b}\right)}}{b^4}$$

```
Problem 51: Result more than twice size of optimal antiderivative.
```

$$\int\frac{\sqrt{1+(b\,x+a)^2}}{(1+\mathrm{I}\,(b\,x+a))\,x^4}\,dx$$

```
Optimal(type 3, 226 leaves, 7 steps):
```

$$\frac{(2\,a+\mathrm{I}\,(-2\,a^2+1))\,b^3\,\mathrm{arctanh}\left(\frac{\sqrt{\mathrm{I}+a}\,\sqrt{1+\mathrm{I}\,a+\mathrm{I}\,b\,x}}{\sqrt{\mathrm{I}-a}\,\sqrt{1-\mathrm{I}\,a-\mathrm{I}\,b\,x}}\right)}{(\mathrm{I}-a)^{7/2}\,(\mathrm{I}+a)^{5/2}}-\frac{\sqrt{1-\mathrm{I}\,a-\mathrm{I}\,b\,x}\,\sqrt{1+\mathrm{I}\,a+\mathrm{I}\,b\,x}}{3\,(1+\mathrm{I}\,a)\,x^3}+\frac{(3-2\,\mathrm{I}\,a)\,b\sqrt{1-\mathrm{I}\,a-\mathrm{I}\,b\,x}\,\sqrt{1+\mathrm{I}\,a+\mathrm{I}\,b\,x}}{6\,(\mathrm{I}-a)^2\,(\mathrm{I}+a)\,x^2}$$

$$+\frac{(4-9\,\mathrm{I}\,a-2\,a^2)\,b^2\sqrt{1-\mathrm{I}\,a-\mathrm{I}\,b\,x}\,\sqrt{1+\mathrm{I}\,a+\mathrm{I}\,b\,x}}{6\,(1+\mathrm{I}\,a)\,(a^2+1)^2\,x}$$

```
Result(type 3, 1737 leaves):
```

$$\frac{b^4\ln\left(\frac{\mathrm{I}\,b+b^2\left(x-\frac{\mathrm{I}-a}{b}\right)}{\sqrt{b^2}}+\sqrt{b^2\left(x-\frac{\mathrm{I}-a}{b}\right)^2+2\,\mathrm{I}\,b\left(x-\frac{\mathrm{I}-a}{b}\right)}\right)}{(\mathrm{I}-a)^4\sqrt{b^2}}-\frac{\mathrm{I}\,b^3\sqrt{b^2\left(x-\frac{\mathrm{I}-a}{b}\right)^2+2\,\mathrm{I}\,b\left(x-\frac{\mathrm{I}-a}{b}\right)}}{(\mathrm{I}-a)^4}$$

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

$$+\frac{\mathrm{I}\,b^3\sqrt{x^2b^2+2\,a\,b\,x+a^2+1}}{2\,(\mathrm{I}-a)^2\,(a^2+1)}-\frac{\mathrm{I}\,b^3\ln\left(\frac{2\,a^2+2+2\,a\,b\,x+2\sqrt{a^2+1}\,\sqrt{x^2b^2+2\,a\,b\,x+a^2+1}}{x}\right)}{2\,(\mathrm{I}-a)^2\sqrt{a^2+1}}+\frac{\mathrm{I}\,a^3\,b^3\sqrt{x^2b^2+2\,a\,b\,x+a^2+1}}{(\mathrm{I}-a)\,(a^2+1)^3}$$

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

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

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

$$+\frac{I b^4 a \ln\left(\frac{b^2 x+a b}{\sqrt{b^2}}+\sqrt{x^2 b^2+2 a b x+a^2+1}\right)}{(I-a)^4 \sqrt{b^2}}-\frac{I a^3 b^3 \ln\left(\frac{2 a^2+2+2 a b x+2 \sqrt{a^2+1} \sqrt{x^2 b^2+2 a b x+a^2+1}}{x}\right)}{2 (I-a) (a^2+1)^{5/2}}$$

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

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

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

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

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

Problem 52: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 52 leaves, 3 steps):

$$\frac{2 (1+I a) x}{b^2}-\frac{I x^2}{b}-\frac{x^3}{3}-\frac{2 I (I-a)^2 \ln(I-a-b x)}{b^3}$$

Result(type 3, 142 leaves):

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

Problem 53: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 74 leaves, 3 steps):

$$\frac{-I-a}{2(I-a) x^2}-\frac{2 I b}{(I-a)^2 x}-\frac{2 b^2 \ln(x)}{(1+I a)^3}+\frac{2 b^2 \ln(I-a-b x)}{(1+I a)^3}$$

Result(type 3, 245 leaves):

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

Problem 54: Result more than twice size of optimal antiderivative.

$$\int \frac{x^4 \left(1+(b x+a)^2\right)^{3/2}}{(1+I(b x+a))^3}\, dx$$

Optimal(type 3, 262 leaves, 9 steps):

$$-\frac{3\left(19+68 I a-88 a^2-48 I a^3+8 a^4\right) \operatorname{arcsinh}(b x+a)}{8 b^5}+\frac{2 I x^4 (1-I a-I b x)^{3/2}}{b \sqrt{1+I a+I b x}}-\frac{3(17 I-16 a) x^2 (1-I a-I b x)^{3/2} \sqrt{1+I a+I b x}}{20 b^3}$$
$$-\frac{11 x^3 (1-I a-I b x)^{3/2} \sqrt{1+I a+I b x}}{5 b^2}+\frac{I (1-I a-I b x)^{3/2}\left(163+458 I a-422 a^2-112 I a^3-2\left(61 I-118 a-52 I a^2\right) b x\right) \sqrt{1+I a+I b x}}{40 b^5}$$
$$+\frac{3\left(19 I-68 a-88 I a^2+48 a^3+8 I a^4\right) \sqrt{1-I a-I b x}\, \sqrt{1+I a+I b x}}{8 b^5}$$

Result(type ?, 2057 leaves): Display of huge result suppressed!

Problem 55: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 200 leaves, 8 steps):

$$\frac{3\left(17 I-44 a-36 I a^{2}+8 a^{3}\right) \operatorname{arcsinh}(b x+a)}{8 b^{4}}+\frac{2 I x^{3}(1-I a-I b x)^{3/2}}{b \sqrt{1+I a+I b x}}-\frac{9 x^{2}(1-I a-I b x)^{3/2} \sqrt{1+I a+I b x}}{4 b^{2}}$$
$$-\frac{I(1-I a-I b x)^{3/2}\left(29 I-54 a-22 I a^{2}+2(11+10 I a) b x\right) \sqrt{1+I a+I b x}}{8 b^{4}}+\frac{3\left(17+44 I a-36 a^{2}-8 I a^{3}\right) \sqrt{1-I a-I b x} \sqrt{1+I a+I b x}}{8 b^{4}}$$

```
Result(type 3, 1528 leaves):
```

$$\frac{6 I \sqrt{b^{2}\left(x-\frac{I-a}{b}\right)^{2}+2 I b\left(x-\frac{I-a}{b}\right)}\, x}{b^{3}}-\frac{27 I \sqrt{b^{2}\left(x-\frac{I-a}{b}\right)^{2}+2 I b\left(x-\frac{I-a}{b}\right)}\, a^{3}}{2 b^{4}}+\frac{I x\left(x^{2} b^{2}+2 a b x+a^{2}+1\right)^{3/2}}{4 b^{3}}$$
$$+\frac{I a\left(x^{2} b^{2}+2 a b x+a^{2}+1\right)^{3/2}}{4 b^{4}}+\frac{3 I x \sqrt{x^{2} b^{2}+2 a b x+a^{2}+1}}{8 b^{3}}+\frac{3 I a \sqrt{x^{2} b^{2}+2 a b x+a^{2}+1}}{8 b^{4}}$$
$$+\frac{3 I \ln\left(\frac{b^{2} x+a b}{\sqrt{b^{2}}}+\sqrt{x^{2} b^{2}+2 a b x+a^{2}+1}\right)}{8 b^{3} \sqrt{b^{2}}}+\frac{\left(b^{2}\left(x-\frac{I-a}{b}\right)^{2}+2 I b\left(x-\frac{I-a}{b}\right)\right)^{5/2} a^{3}}{b^{7}\left(x-\frac{I}{b}+\frac{a}{b}\right)^{3}}$$
$$-\frac{3\left(b^{2}\left(x-\frac{I-a}{b}\right)^{2}+2 I b\left(x-\frac{I-a}{b}\right)\right)^{5/2} a}{b^{7}\left(x-\frac{I}{b}+\frac{a}{b}\right)^{3}}+\frac{I\left(b^{2}\left(x-\frac{I-a}{b}\right)^{2}+2 I b\left(x-\frac{I-a}{b}\right)\right)^{5/2}}{b^{7}\left(x-\frac{I}{b}+\frac{a}{b}\right)^{3}}$$
$$+\frac{3 \sqrt{b^{2}\left(x-\frac{I-a}{b}\right)^{2}+2 I b\left(x-\frac{I-a}{b}\right)}\, x a^{3}}{b^{3}}-\frac{2 I\left(b^{2}\left(x-\frac{I-a}{b}\right)^{2}+2 I b\left(x-\frac{I-a}{b}\right)\right)^{3/2} a^{3}}{b^{4}}$$
$$+\frac{11 I\left(b^{2}\left(x-\frac{I-a}{b}\right)^{2}+2 I b\left(x-\frac{I-a}{b}\right)\right)^{3/2} a}{b^{4}}+\frac{6 I \sqrt{b^{2}\left(x-\frac{I-a}{b}\right)^{2}+2 I b\left(x-\frac{I-a}{b}\right)}\, a}{b^{4}}$$
$$+\frac{6 I \ln\left(\frac{I b+b^{2}\left(x-\frac{I-a}{b}\right)}{\sqrt{b^{2}}}+\sqrt{b^{2}\left(x-\frac{I-a}{b}\right)^{2}+2 I b\left(x-\frac{I-a}{b}\right)}\right)}{b^{3} \sqrt{b^{2}}}-\frac{33 \sqrt{b^{2}\left(x-\frac{I-a}{b}\right)^{2}+2 I b\left(x-\frac{I-a}{b}\right)}\, x a}{2 b^{3}}$$
$$+\frac{9\left(b^{2}\left(x-\frac{I-a}{b}\right)^{2}+2 I b\left(x-\frac{I-a}{b}\right)\right)^{5/2} a^{2}}{b^{6}\left(x-\frac{I}{b}+\frac{a}{b}\right)^{2}}+\frac{4\left(b^{2}\left(x-\frac{I-a}{b}\right)^{2}+2 I b\left(x-\frac{I-a}{b}\right)\right)^{3/2}}{b^{4}}$$

$$+\frac{3\sqrt{b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)}\,a^4}{b^4}-\frac{5\left(b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)\right)^{5/2}}{b^6\left(x-\frac{I}{b}+\frac{a}{b}\right)^2}$$

$$-\frac{9\left(b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)\right)^{3/2}a^2}{b^4}-\frac{27I\sqrt{b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)}\,x\,a^2}{2b^3}$$

$$-\frac{3I\left(b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)\right)^{5/2}a^2}{b^7\left(x-\frac{I}{b}+\frac{a}{b}\right)^3}+\frac{2I\left(b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)\right)^{5/2}a^3}{b^6\left(x-\frac{I}{b}+\frac{a}{b}\right)^2}$$

$$-\frac{12I\left(b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)\right)^{5/2}a}{b^6\left(x-\frac{I}{b}+\frac{a}{b}\right)^2}-\frac{27I\ln\left(\frac{Ib+b^2\left(x-\frac{I-a}{b}\right)}{\sqrt{b^2}}+\sqrt{b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)}\right)a^2}{2b^3\sqrt{b^2}}$$

$$-\frac{33\sqrt{b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)}\,a^2}{2b^4}+\frac{3\ln\left(\frac{Ib+b^2\left(x-\frac{I-a}{b}\right)}{\sqrt{b^2}}+\sqrt{b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)}\right)a^3}{b^3\sqrt{b^2}}$$

$$-\frac{33\ln\left(\frac{Ib+b^2\left(x-\frac{I-a}{b}\right)}{\sqrt{b^2}}+\sqrt{b^2\left(x-\frac{I-a}{b}\right)^2+2Ib\left(x-\frac{I-a}{b}\right)}\right)a}{2b^3\sqrt{b^2}}$$

```
Problem 56: Unable to integrate problem.
```

$$\int\sqrt{\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}}\,x\,dx$$

```
Optimal(type 3, 313 leaves, 14 steps):
```

$$\frac{(1-4Ia)(1-Ia-Ibx)^{3/4}(1+Ia+Ibx)^{1/4}}{4b^2}+\frac{(1-Ia-Ibx)^{3/4}(1+Ia+Ibx)^{5/4}}{2b^2}-\frac{(1-4Ia)\arctan\left(1-\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}\right)\sqrt{2}}{8b^2}$$

$$+\frac{(1-4Ia)\arctan\left(1+\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}\right)\sqrt{2}}{8b^2}+\frac{(1-4Ia)\ln\left(1-\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}+\frac{\sqrt{1-Ia-Ibx}}{\sqrt{1+Ia+Ibx}}\right)\sqrt{2}}{16b^2}$$

$$-\frac{(1-4Ia)\ln\left(1+\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}+\frac{\sqrt{1-Ia-Ibx}}{\sqrt{1+Ia+Ibx}}\right)\sqrt{2}}{16b^2}$$

Result(type 8, 28 leaves):

$$\int\sqrt{\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}}\,x\,dx$$

Problem 57: Unable to integrate problem.

$$\int\frac{\sqrt{\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}}}{x^2}\,dx$$

Optimal(type 3, 159 leaves, 6 steps):

$$-\frac{(I+a+bx)\,(1+I(bx+a))^{1/4}}{(I+a)\,x\,(1-I(bx+a))^{1/4}}+\frac{Ib\arctan\left(\frac{(I+a)^{1/4}(1+I(bx+a))^{1/4}}{(I-a)^{1/4}(1-I(bx+a))^{1/4}}\right)}{(I-a)^{3/4}(I+a)^{5/4}}+\frac{Ib\,\mathrm{arctanh}\left(\frac{(I+a)^{1/4}(1+I(bx+a))^{1/4}}{(I-a)^{1/4}(1-I(bx+a))^{1/4}}\right)}{(I-a)^{3/4}(I+a)^{5/4}}$$

Result(type 8, 30 leaves):

$$\int\frac{\sqrt{\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}}}{x^2}\,dx$$

Problem 58: Unable to integrate problem.

$$\int\left(\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}\right)^{3/2}x^2\,dx$$

Optimal(type 3, 381 leaves, 15 steps):

$$-\frac{\left(17I+36a-24Ia^2\right)(1-Ia-Ibx)^{1/4}(1+Ia+Ibx)^{3/4}}{24b^3}-\frac{(3I+8a)\,(1-Ia-Ibx)^{1/4}(1+Ia+Ibx)^{7/4}}{12b^3}$$

$$+\frac{x(1-Ia-Ibx)^{1/4}(1+Ia+Ibx)^{7/4}}{3b^2}+\frac{(17I+36a-24Ia^2)\arctan\left(1-\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}\right)\sqrt{2}}{16b^3}$$

$$-\frac{(17I+36a-24Ia^2)\arctan\left(1+\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}\right)\sqrt{2}}{16b^3}$$

$$+\frac{(17I+36a-24Ia^2)\ln\left(1-\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}+\frac{\sqrt{1-Ia-Ibx}}{\sqrt{1+Ia+Ibx}}\right)\sqrt{2}}{32b^3}$$

$$-\frac{(17I+36a-24Ia^2)\ln\left(1+\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}+\frac{\sqrt{1-Ia-Ibx}}{\sqrt{1+Ia+Ibx}}\right)\sqrt{2}}{32b^3}$$

Result(type 8, 30 leaves):

$$\int\left(\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}\right)^{3/2}x^2\,dx$$

Problem 59: Unable to integrate problem.

$$\int\frac{\left(\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}\right)^{3/2}}{x^2}\,dx$$

Optimal(type 3, 160 leaves, 6 steps):

$$-\frac{(1-Ia-Ibx)^{1/4}(1+Ia+Ibx)^{3/4}}{(1-Ia)x}-\frac{3Ib\arctan\left(\frac{(I+a)^{1/4}(1+Ia+Ibx)^{1/4}}{(I-a)^{1/4}(1-Ia-Ibx)^{1/4}}\right)}{(I-a)^{1/4}(I+a)^{7/4}}+\frac{3Ib\,\mathrm{arctanh}\left(\frac{(I+a)^{1/4}(1+Ia+Ibx)^{1/4}}{(I-a)^{1/4}(1-Ia-Ibx)^{1/4}}\right)}{(I-a)^{1/4}(I+a)^{7/4}}$$

Result(type 8, 30 leaves):

$$\int\frac{\left(\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}\right)^{3/2}}{x^2}\,dx$$

Problem 60: Unable to integrate problem.

$$\int \frac{1}{\sqrt{\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}}}\,dx$$

Optimal(type 3, 257 leaves, 13 steps):

$$-\frac{I(1-Ia-Ibx)^{1/4}(1+Ia+Ibx)^{3/4}}{b}-\frac{I\arctan\left(1-\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}\right)\sqrt{2}}{2b}+\frac{I\arctan\left(1+\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}\right)\sqrt{2}}{2b}$$
$$-\frac{I\ln\left(1-\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}+\frac{\sqrt{1-Ia-Ibx}}{\sqrt{1+Ia+Ibx}}\right)\sqrt{2}}{4b}+\frac{I\ln\left(1+\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}+\frac{\sqrt{1-Ia-Ibx}}{\sqrt{1+Ia+Ibx}}\right)\sqrt{2}}{4b}$$

Result(type 8, 26 leaves):

$$\int \frac{1}{\sqrt{\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}}}\,dx$$

Problem 61: Unable to integrate problem.

$$\int \frac{1}{\sqrt{\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}}\,x^2}\,dx$$

Optimal(type 3, 164 leaves, 5 steps):

$$-\frac{(I-a-bx)\,(1-I(bx+a))^{1/4}}{(I-a)\,x\,(1+I(bx+a))^{1/4}}-\frac{I\,b\arctan\left(\frac{(I-a)^{1/4}(1-I(bx+a))^{1/4}}{(I+a)^{1/4}(1+I(bx+a))^{1/4}}\right)}{(I-a)^{5/4}(I+a)^{3/4}}-\frac{I\,b\,\mathrm{arctanh}\left(\frac{(I-a)^{1/4}(1-I(bx+a))^{1/4}}{(I+a)^{1/4}(1+I(bx+a))^{1/4}}\right)}{(I-a)^{5/4}(I+a)^{3/4}}$$

Result(type 8, 30 leaves):

$$\int \frac{1}{\sqrt{\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}}\,x^2}\,dx$$

Problem 62: Unable to integrate problem.

$$\int \frac{x^2}{\left(\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}\right)^{3/2}}\,dx$$

Optimal(type 3, 381 leaves, 15 steps):

$$\frac{(17I-36a-24Ia^2)(1-Ia-Ibx)^{3/4}(1+Ia+Ibx)^{1/4}}{24b^3}+\frac{(3I-8a)(1-Ia-Ibx)^{7/4}(1+Ia+Ibx)^{1/4}}{12b^3}$$
$$+\frac{x(1-Ia-Ibx)^{7/4}(1+Ia+Ibx)^{1/4}}{3b^2}+\frac{(17I-36a-24Ia^2)\arctan\left(1-\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}\right)\sqrt{2}}{16b^3}$$
$$-\frac{(17I-36a-24Ia^2)\arctan\left(1+\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}\right)\sqrt{2}}{16b^3}$$
$$-\frac{(17I-36a-24Ia^2)\ln\left(1-\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}+\frac{\sqrt{1-Ia-Ibx}}{\sqrt{1+Ia+Ibx}}\right)\sqrt{2}}{32b^3}$$
$$+\frac{(17I-36a-24Ia^2)\ln\left(1+\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}+\frac{\sqrt{1-Ia-Ibx}}{\sqrt{1+Ia+Ibx}}\right)\sqrt{2}}{32b^3}$$

Result(type 8, 30 leaves):

$$\int \frac{x^2}{\left(\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}\right)^{3/2}}\,dx$$

Problem 63: Unable to integrate problem.

$$\int \frac{1}{\left(\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}\right)^{3/2}}\,dx$$

Optimal(type 3, 257 leaves, 13 steps):

$$-\frac{I(1-Ia-Ibx)^{3/4}(1+Ia+Ibx)^{1/4}}{b}-\frac{3I\arctan\left(1-\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}\right)\sqrt{2}}{2b}+\frac{3I\arctan\left(1+\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}\right)\sqrt{2}}{2b}$$

$$+\frac{3\,I\ln\left(1-\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}+\frac{\sqrt{1-Ia-Ibx}}{\sqrt{1+Ia+Ibx}}\right)\sqrt{2}}{4b}-\frac{3\,I\ln\left(1+\frac{(1-Ia-Ibx)^{1/4}\sqrt{2}}{(1+Ia+Ibx)^{1/4}}+\frac{\sqrt{1-Ia-Ibx}}{\sqrt{1+Ia+Ibx}}\right)\sqrt{2}}{4b}$$

Result(type 8, 26 leaves):

$$\int\frac{1}{\left(\frac{1+I(bx+a)}{\sqrt{1+(bx+a)^2}}\right)^{3/2}}\,dx$$

Problem 64: Unable to integrate problem.

$$\int e^{n\arctan(bx+a)}x^2\,dx$$

Optimal(type 5, 174 leaves, 4 steps):

$$-\frac{(4a+n)\,(1-Ia-Ibx)^{1+\frac{In}{2}}\,(1+Ia+Ibx)^{1-\frac{In}{2}}}{6b^3}+\frac{x\,(1-Ia-Ibx)^{1+\frac{In}{2}}\,(1+Ia+Ibx)^{1-\frac{In}{2}}}{3b^2}$$

$$+\frac{\left(-6a^2-6an-n^2+2\right)(1-Ia-Ibx)^{1+\frac{In}{2}}\,\mathrm{hypergeom}\left(\left[\frac{I}{2}n,1+\frac{In}{2}\right],\left[2+\frac{In}{2}\right],\frac{1}{2}-\frac{Ia}{2}-\frac{Ibx}{2}\right)}{3\,2^{\frac{I}{2}n}\,b^3\,(2I-n)}$$

Result(type 8, 15 leaves):

$$\int e^{n\arctan(bx+a)}x^2\,dx$$

Problem 65: Unable to integrate problem.

$$\int e^{n\arctan(bx+a)}x\,dx$$

Optimal(type 5, 115 leaves, 3 steps):

$$\frac{(1-Ia-Ibx)^{1+\frac{In}{2}}\,(1+Ia+Ibx)^{1-\frac{In}{2}}}{2b^2}+\frac{(2a+n)\,(1-Ia-Ibx)^{1+\frac{In}{2}}\,\mathrm{hypergeom}\left(\left[\frac{I}{2}n,1+\frac{In}{2}\right],\left[2+\frac{In}{2}\right],\frac{1}{2}-\frac{Ia}{2}-\frac{Ibx}{2}\right)}{2^{\frac{I}{2}n}\,b^2\,(2I-n)}$$

Result(type 8, 13 leaves):

$$\int e^{n\arctan(bx+a)}x\,dx$$

Problem 66: Unable to integrate problem.

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

Optimal(type 5, 106 leaves, 2 steps):

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

Result(type 8, 15 leaves):

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

Problem 67: Unable to integrate problem.

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

Optimal(type 5, 172 leaves, 3 steps):

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

Result(type 8, 15 leaves):

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

Problem 68: Unable to integrate problem.

$$\int e^{\arctan(a x)}\, dx$$

Optimal(type 5, 41 leaves, 2 steps):

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

Result(type 8, 7 leaves):

$$\int e^{\arctan(a x)}\, dx$$

Problem 71: Unable to integrate problem.

$$\int e^{2\arctan(a x)} \left(a^2 c x^2 + c\right)^p dx$$

Optimal(type 5, 83 leaves, 3 steps):

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

Result(type 8, 22 leaves):

$$\int e^{2\arctan(a x)} \left(a^2 c x^2 + c\right)^p dx$$

Problem 73: Unable to integrate problem.

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

Optimal(type 5, 66 leaves, 3 steps):

$$\frac{\left(\frac{2}{29} + \frac{5 I}{29}\right) 2^{\frac{5}{2} - I} c \left(1 - I a x\right)^{\frac{5}{2} + I} \operatorname{hypergeom}\left(\left[\frac{5}{2} + I, -\frac{3}{2} + I\right], \left[\frac{7}{2} + I\right], \frac{1}{2} - \frac{I a x}{2}\right) \sqrt{a^2 c x^2 + c}}{a \sqrt{x^2 a^2 + 1}}$$

Result(type 8, 22 leaves):

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

Problem 75: Unable to integrate problem.

$$\int \frac{\left(a^2 c x^2 + c\right)^{3/2}}{e^{\arctan(a x)}} dx$$

Optimal(type 5, 66 leaves, 3 steps):

$$\frac{\left(-\frac{1}{13} + \frac{5 I}{13}\right) 2^{\frac{3}{2} + \frac{I}{2}} c \left(1 - I a x\right)^{\frac{5}{2} - \frac{I}{2}} \operatorname{hypergeom}\left(\left[\frac{5}{2} - \frac{I}{2}, -\frac{3}{2} - \frac{I}{2}\right], \left[\frac{7}{2} - \frac{I}{2}\right], \frac{1}{2} - \frac{I a x}{2}\right) \sqrt{a^2 c x^2 + c}}{a \sqrt{x^2 a^2 + 1}}$$

Result(type 8, 22 leaves):

$$\int \frac{\left(a^2 c x^2 + c\right)^{3/2}}{e^{\arctan(a x)}} dx$$

Problem 76: Unable to integrate problem.

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

Optimal(type 5, 65 leaves, 3 steps):

$$\frac{\left(-\frac{1}{5}+\frac{3 I}{5}\right) 2^{\frac{1}{2}+\frac{I}{2}} (1 - I a x)^{\frac{3}{2}-\frac{I}{2}} \operatorname{hypergeom}\left(\left[\frac{3}{2}-\frac{I}{2}, -\frac{1}{2}-\frac{I}{2}\right], \left[\frac{5}{2}-\frac{I}{2}\right], \frac{1}{2}-\frac{I a x}{2}\right) \sqrt{a^2 c x^2 + c}}{a \sqrt{x^2 a^2 + 1}}$$

Result(type 8, 22 leaves):

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

Problem 78: Unable to integrate problem.

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

Optimal(type 5, 43 leaves, 2 steps):

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

Result(type 8, 22 leaves):

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

Problem 79: Unable to integrate problem.

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

Optimal(type 5, 66 leaves, 3 steps):

$$\frac{\left(-\frac{2}{29}+\frac{5 I}{29}\right) 2^{\frac{5}{2}+I} c (1 - I a x)^{\frac{5}{2}-I} \operatorname{hypergeom}\left(\left[\frac{5}{2}-I, -\frac{3}{2}-I\right], \left[\frac{7}{2}-I\right], \frac{1}{2}-\frac{I a x}{2}\right) \sqrt{a^2 c x^2 + c}}{a \sqrt{x^2 a^2 + 1}}$$

Result(type 8, 24 leaves):

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

Problem 82: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(x^2 a^2+1\right)^{3/2}}{(1+I a x)^4}\, dx$$

Optimal(type 3, 57 leaves, 5 steps):

$$\frac{2 I (1-I a x)^{3/2}}{3 a (1+I a x)^{3/2}}+\frac{\operatorname{arcsinh}(a x)}{a}-\frac{2 I \sqrt{1-I a x}}{a \sqrt{1+I a x}}$$

Result(type 3, 261 leaves):

$$\frac{I \left(\left(x-\frac{I}{a}\right)^2 a^2+2 I a \left(x-\frac{I}{a}\right)\right)^{5/2}}{3 a^5 \left(x-\frac{I}{a}\right)^4}+\frac{\left(\left(x-\frac{I}{a}\right)^2 a^2+2 I a \left(x-\frac{I}{a}\right)\right)^{5/2}}{3 a^4 \left(x-\frac{I}{a}\right)^3}+\frac{2 I \left(\left(x-\frac{I}{a}\right)^2 a^2+2 I a \left(x-\frac{I}{a}\right)\right)^{5/2}}{3 a^3 \left(x-\frac{I}{a}\right)^2}$$
$$-\frac{2 I \left(\left(x-\frac{I}{a}\right)^2 a^2+2 I a \left(x-\frac{I}{a}\right)\right)^{3/2}}{3 a}+\sqrt{\left(x-\frac{I}{a}\right)^2 a^2+2 I a \left(x-\frac{I}{a}\right)}\, x+\frac{\ln\left(\frac{I a+\left(x-\frac{I}{a}\right) a^2}{\sqrt{a^2}}+\sqrt{\left(x-\frac{I}{a}\right)^2 a^2+2 I a \left(x-\frac{I}{a}\right)}\right)}{\sqrt{a^2}}$$

Problem 90: Unable to integrate problem.

$$\int e^{n \arctan(a x)} \left(a^2 c x^2+c\right)^2 dx$$

Optimal(type 5, 66 leaves, 2 steps):

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

Result(type 8, 22 leaves):

$$\int e^{n \arctan(a x)} \left(a^2 c x^2+c\right)^2 dx$$

Problem 91: Unable to integrate problem.

$$\int e^{n \arctan(a x)}\, dx$$

Optimal(type 5, 61 leaves, 2 steps):

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

Result(type 8, 9 leaves):

$$\int e^{n \arctan(a x)}\, dx$$

Problem 93: Unable to integrate problem.

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

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

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

Result(type 8, 25 leaves):

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

Problem 94: Unable to integrate problem.

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

Optimal(type 5, 329 leaves, 10 steps):

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

Result(type 8, 25 leaves):

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

Problem 98: Unable to integrate problem.

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

Optimal(type 5, 247 leaves, 5 steps):

$$\frac{x^2 (1-Iax)^{\frac{1}{2}+\frac{In}{2}} (1+Iax)^{\frac{1}{2}-\frac{In}{2}} \sqrt{x^2 a^2+1}}{3 a^2 \sqrt{a^2 c x^2+c}} - \frac{(1-Iax)^{\frac{1}{2}+\frac{In}{2}} (1+Iax)^{\frac{1}{2}-\frac{In}{2}} \left(4-In-n^2+a(1+In) n x\right) \sqrt{x^2 a^2+1}}{6 a^4 (1+In) \sqrt{a^2 c x^2+c}}$$

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

Result(type 8, 25 leaves):

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

Problem 99: Unable to integrate problem.

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

Optimal(type 5, 219 leaves, 5 steps):

$$-\frac{(1+In) (1-Iax)^{\frac{1}{2}+\frac{In}{2}} (1+Iax)^{\frac{1}{2}-\frac{In}{2}} \sqrt{x^2 a^2+1}}{2 a^3 (I+n) \sqrt{a^2 c x^2+c}} + \frac{x (1-Iax)^{\frac{1}{2}+\frac{In}{2}} (1+Iax)^{\frac{1}{2}-\frac{In}{2}} \sqrt{x^2 a^2+1}}{2 a^2 \sqrt{a^2 c x^2+c}}$$

$$- \frac{I 2^{\frac{1}{2}-\frac{In}{2}} \left(-n^2+1\right) (1-Iax)^{\frac{1}{2}+\frac{In}{2}} \mathrm{hypergeom}\left(\left[\frac{1}{2}+\frac{In}{2}, -\frac{1}{2}+\frac{In}{2}\right], \left[\frac{3}{2}+\frac{In}{2}\right], \frac{1}{2}-\frac{Iax}{2}\right) \sqrt{x^2 a^2+1}}{a^3 \left(n^2+1\right) \sqrt{a^2 c x^2+c}}$$

Result(type 8, 25 leaves):

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

Problem 100: Unable to integrate problem.

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

Optimal(type 5, 218 leaves, 6 steps):

$$-\frac{(1-Iax)^{\frac{1}{2}+\frac{In}{2}} (1+Iax)^{\frac{1}{2}-\frac{In}{2}} \sqrt{x^2 a^2+1}}{2 x^2 \sqrt{a^2 c x^2+c}} - \frac{a n (1-Iax)^{\frac{1}{2}+\frac{In}{2}} (1+Iax)^{\frac{1}{2}-\frac{In}{2}} \sqrt{x^2 a^2+1}}{2 x \sqrt{a^2 c x^2+c}}$$

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

Result(type 8, 25 leaves):

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

Problem 103: Unable to integrate problem.

$$\int \mathrm{e}^{n \arctan(a x)} \left(a^2 c x^2+c\right)^{1/3} \mathrm{d}x$$

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

$$-\frac{3\, 2^{\frac{4}{3}-\frac{\mathrm{I} n}{2}} (1-\mathrm{I} a x)^{\frac{4}{3}+\frac{\mathrm{I} n}{2}} \left(a^2 c x^2+c\right)^{1/3} \operatorname{hypergeom}\left(\left[\frac{4}{3}+\frac{\mathrm{I} n}{2}, -\frac{1}{3}+\frac{\mathrm{I} n}{2}\right], \left[\frac{7}{3}+\frac{\mathrm{I} n}{2}\right], \frac{1}{2}-\frac{\mathrm{I} a x}{2}\right)}{a (8 \mathrm{I}-3 n) \left(x^2 a^2+1\right)^{1/3}}$$

Result(type 8, 22 leaves):

$$\int \mathrm{e}^{n \arctan(a x)} \left(a^2 c x^2+c\right)^{1/3} \mathrm{d}x$$

Problem 104: Unable to integrate problem.

$$\int \frac{\mathrm{e}^{n \arctan(a x)}}{\left(a^2 c x^2+c\right)^{1/3}}\, \mathrm{d}x$$

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

$$-\frac{3\, 2^{\frac{2}{3}-\frac{\mathrm{I} n}{2}} (1-\mathrm{I} a x)^{\frac{2}{3}+\frac{\mathrm{I} n}{2}} \left(x^2 a^2+1\right)^{1/3} \operatorname{hypergeom}\left(\left[\frac{2}{3}+\frac{\mathrm{I} n}{2}, \frac{1}{3}+\frac{\mathrm{I} n}{2}\right], \left[\frac{5}{3}+\frac{\mathrm{I} n}{2}\right], \frac{1}{2}-\frac{\mathrm{I} a x}{2}\right)}{a (4 \mathrm{I}-3 n) \left(a^2 c x^2+c\right)^{1/3}}$$

Result(type 8, 22 leaves):

$$\int \frac{\mathrm{e}^{n \arctan(a x)}}{\left(a^2 c x^2+c\right)^{1/3}}\, \mathrm{d}x$$

Problem 105: Unable to integrate problem.

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

Optimal(type 6, 43 leaves, 2 steps):

$$\frac{x^{1+m}\,\mathit{AppellF1}\left(1+m,2+\frac{\mathrm{I}\,n}{2},2-\frac{\mathrm{I}\,n}{2},2+m,-\mathrm{I}\,a\,x,\mathrm{I}\,a\,x\right)}{c^2\,(1+m)}$$

Result(type 8, 25 leaves):

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

Problem 106: Unable to integrate problem.

$$\int\frac{\mathrm{e}^{n\arctan(a\,x)}\,x^m}{\sqrt{a^2\,c\,x^2+c}}\,\mathrm{d}x$$

Optimal(type 6, 63 leaves, 3 steps):

$$\frac{x^{1+m}\,\mathit{AppellF1}\left(1+m,\frac{1}{2}+\frac{\mathrm{I}\,n}{2},\frac{1}{2}-\frac{\mathrm{I}\,n}{2},2+m,-\mathrm{I}\,a\,x,\mathrm{I}\,a\,x\right)\sqrt{x^2\,a^2+1}}{(1+m)\,\sqrt{a^2\,c\,x^2+c}}$$

Result(type 8, 25 leaves):

$$\int\frac{\mathrm{e}^{n\arctan(a\,x)}\,x^m}{\sqrt{a^2\,c\,x^2+c}}\,\mathrm{d}x$$

Problem 107: Unable to integrate problem.

$$\int\frac{\mathrm{e}^{n\arctan(a\,x)}\,x^m}{\left(a^2\,c\,x^2+c\right)^{5/2}}\,\mathrm{d}x$$

Optimal(type 6, 66 leaves, 3 steps):

$$\frac{x^{1+m}\,\mathit{AppellF1}\left(1+m,\frac{5}{2}+\frac{\mathrm{I}\,n}{2},\frac{5}{2}-\frac{\mathrm{I}\,n}{2},2+m,-\mathrm{I}\,a\,x,\mathrm{I}\,a\,x\right)\sqrt{x^2\,a^2+1}}{c^2\,(1+m)\,\sqrt{a^2\,c\,x^2+c}}$$

Result(type 8, 25 leaves):

$$\int\frac{\mathrm{e}^{n\arctan(a\,x)}\,x^m}{\left(a^2\,c\,x^2+c\right)^{5/2}}\,\mathrm{d}x$$

Test results for the 44 problems in "5.3.7 Inverse tangent functions.txt"

Problem 8: Unable to integrate problem.

$$\int x^{9/2}\arctan\left(\frac{x\sqrt{-e}}{\sqrt{x^2 e+d}}\right)\mathrm{d}x$$

Optimal(type 4, 190 leaves, 6 steps):

$$\frac{2\,x^{11/2}\arctan\left(\frac{x\sqrt{-e}}{\sqrt{x^2 e+d}}\right)}{11}+\frac{36\,d\,x^{5/2}\sqrt{x^2 e+d}}{847\,(-e)^{3/2}}+\frac{4\,x^{9/2}\sqrt{x^2 e+d}}{121\sqrt{-e}}+\frac{60\,d^2\sqrt{x}\,\sqrt{x^2 e+d}}{847\,(-e)^{5/2}}$$
$$+\frac{30\,d^{11/4}\sqrt{\cos\left(2\arctan\left(\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right)\right)^2}\,\mathrm{EllipticF}\left(\sin\left(2\arctan\left(\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right)\right),\frac{\sqrt{2}}{2}\right)\sqrt{-e}\,\left(\sqrt{d}+x\sqrt{e}\right)\sqrt{\frac{x^2 e+d}{\left(\sqrt{d}+x\sqrt{e}\right)^2}}}{847\cos\left(2\arctan\left(\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right)\right)e^{13/4}\sqrt{x^2 e+d}}$$

Result(type 8, 23 leaves):

$$\int x^{9/2}\arctan\left(\frac{x\sqrt{-e}}{\sqrt{x^2 e+d}}\right)\mathrm{d}x$$

Problem 9: Unable to integrate problem.

$$\int x^{5/2}\arctan\left(\frac{x\sqrt{-e}}{\sqrt{x^2 e+d}}\right)\mathrm{d}x$$

Optimal(type 4, 168 leaves, 5 steps):

$$\frac{2\,x^{7/2}\arctan\left(\frac{x\sqrt{-e}}{\sqrt{x^2 e+d}}\right)}{7}+\frac{4\,x^{5/2}\sqrt{x^2 e+d}}{49\sqrt{-e}}+\frac{20\,d\sqrt{x}\,\sqrt{x^2 e+d}}{147\,(-e)^{3/2}}$$
$$-\frac{10\,d^{7/4}\sqrt{\cos\left(2\arctan\left(\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right)\right)^2}\,\mathrm{EllipticF}\left(\sin\left(2\arctan\left(\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right)\right),\frac{\sqrt{2}}{2}\right)\sqrt{-e}\,\left(\sqrt{d}+x\sqrt{e}\right)\sqrt{\frac{x^2 e+d}{\left(\sqrt{d}+x\sqrt{e}\right)^2}}}{147\cos\left(2\arctan\left(\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right)\right)e^{9/4}\sqrt{x^2 e+d}}$$

Result(type 8, 23 leaves):

$$\int x^{5/2}\arctan\left(\frac{x\sqrt{-e}}{\sqrt{x^2 e+d}}\right)\mathrm{d}x$$

Problem 10: Unable to integrate problem.

$$\int \frac{\arctan\left(\frac{x\sqrt{-e}}{\sqrt{x^2 e+d}}\right)}{x^{11/2}}\, dx$$

Optimal(type 4, 173 leaves, 5 steps):

$$-\frac{2\arctan\left(\frac{x\sqrt{-e}}{\sqrt{x^2 e+d}}\right)}{9 x^{9/2}} - \frac{20 (-e)^{3/2}\sqrt{x^2 e+d}}{189 d^2 x^{3/2}} - \frac{4\sqrt{-e}\sqrt{x^2 e+d}}{63 d x^{7/2}}$$
$$+ \frac{10 e^{7/4}\sqrt{\cos\left(2\arctan\left(\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right)\right)^2}\, \mathrm{EllipticF}\left(\sin\left(2\arctan\left(\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right)\right), \frac{\sqrt{2}}{2}\right)\sqrt{-e}\,\left(\sqrt{d}+x\sqrt{e}\right)\sqrt{\frac{x^2 e+d}{\left(\sqrt{d}+x\sqrt{e}\right)^2}}}{189\cos\left(2\arctan\left(\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right)\right) d^{9/4}\sqrt{x^2 e+d}}$$

Result(type 8, 23 leaves):

$$\int \frac{\arctan\left(\frac{x\sqrt{-e}}{\sqrt{x^2 e+d}}\right)}{x^{11/2}}\, dx$$

Problem 11: Unable to integrate problem.

$$\int \frac{\arctan\left(\frac{x\sqrt{-e}}{\sqrt{x^2 e+d}}\right)}{x^{9/2}}\, dx$$

Optimal(type 4, 315 leaves, 7 steps):

$$-\frac{2\arctan\left(\frac{x\sqrt{-e}}{\sqrt{x^2 e+d}}\right)}{7 x^{7/2}} - \frac{4\sqrt{-e}\sqrt{x^2 e+d}}{35 d x^{5/2}} - \frac{12 (-e)^{3/2}\sqrt{x^2 e+d}}{35 d^2\sqrt{x}} - \frac{12 e^{3/2}\sqrt{-e}\sqrt{x}\sqrt{x^2 e+d}}{35 d^2\left(\sqrt{d}+x\sqrt{e}\right)}$$
$$+ \frac{12 e^{5/4}\sqrt{\cos\left(2\arctan\left(\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right)\right)^2}\, \mathrm{EllipticE}\left(\sin\left(2\arctan\left(\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right)\right), \frac{\sqrt{2}}{2}\right)\sqrt{-e}\,\left(\sqrt{d}+x\sqrt{e}\right)\sqrt{\frac{x^2 e+d}{\left(\sqrt{d}+x\sqrt{e}\right)^2}}}{35\cos\left(2\arctan\left(\frac{e^{1/4}\sqrt{x}}{d^{1/4}}\right)\right) d^{7/4}\sqrt{x^2 e+d}}$$

$$-\frac{6 e^{5/4} \sqrt{\cos\left(2 \arctan\left(\frac{e^{1/4} \sqrt{x}}{d^{1/4}}\right)\right)^{2}}\ \mathrm{EllipticF}\left(\sin\left(2 \arctan\left(\frac{e^{1/4} \sqrt{x}}{d^{1/4}}\right)\right), \frac{\sqrt{2}}{2}\right) \sqrt{-e}\ \left(\sqrt{d} + x \sqrt{e}\right) \sqrt{\frac{x^{2} e + d}{\left(\sqrt{d} + x \sqrt{e}\right)^{2}}}}{35 \cos\left(2 \arctan\left(\frac{e^{1/4} \sqrt{x}}{d^{1/4}}\right)\right) d^{7/4} \sqrt{x^{2} e + d}}$$

Result(type 8, 23 leaves):

$$\int \frac{\arctan\left(\frac{x \sqrt{-e}}{\sqrt{x^{2} e + d}}\right)}{x^{9/2}}\, \mathrm{d}x$$

Problem 15: Result more than twice size of optimal antiderivative.

$$\int \left(\frac{\pi}{2} - \mathrm{arccot}(\cot(b x + a))\right) \mathrm{d}x$$

Optimal(type 3, 20 leaves, 2 steps):

$$-\frac{\left(\frac{\pi}{2} - \mathrm{arccot}(\cot(b x + a))\right)^{2}}{2 b}$$

Result(type 3, 50 leaves):

$$\frac{\pi x}{2} - \frac{-\left(\frac{\pi}{2} - \mathrm{arccot}(\cot(b x + a))\right) \mathrm{arccot}(\cot(b x + a)) - \frac{\left(\frac{\pi}{2} - \mathrm{arccot}(\cot(b x + a))\right)^{2}}{2}}{b}$$

Problem 17: Result more than twice size of optimal antiderivative.

$$\int x \arctan(c + d \tan(b x + a))\, \mathrm{d}x$$

Optimal(type 4, 257 leaves, 9 steps):

$$\frac{x^{2} \arctan(c + d \tan(b x + a))}{2} + \frac{I x^{2} \ln\left(1 + \frac{(1 + I c + d)\, e^{2 I a + 2 I b x}}{1 + I c - d}\right)}{4} - \frac{I x^{2} \ln\left(1 + \frac{(c + I (1 - d))\, e^{2 I a + 2 I b x}}{c + I (1 + d)}\right)}{4}$$
$$+ \frac{x\, \mathrm{polylog}\left(2, -\frac{(1 + I c + d)\, e^{2 I a + 2 I b x}}{1 + I c - d}\right)}{4 b} - \frac{x\, \mathrm{polylog}\left(2, -\frac{(c + I (1 - d))\, e^{2 I a + 2 I b x}}{c + I (1 + d)}\right)}{4 b} + \frac{I\, \mathrm{polylog}\left(3, -\frac{(1 + I c + d)\, e^{2 I a + 2 I b x}}{1 + I c - d}\right)}{8 b^{2}}$$
$$- \frac{I\, \mathrm{polylog}\left(3, -\frac{(c + I (1 - d))\, e^{2 I a + 2 I b x}}{c + I (1 + d)}\right)}{8 b^{2}}$$

Result(type ?, 7719 leaves): Display of huge result suppressed!

Problem 18: Result more than twice size of optimal antiderivative.

$$\int x^2 \arctan(c + (-1 + I c) \tan(b x + a))\, dx$$

Optimal(type 4, 124 leaves, 7 steps):

$$\frac{b x^4}{12} + \frac{x^3 \arctan(c - (1 - I c) \tan(b x + a))}{3} + \frac{I x^3 \ln(1 + I c\, e^{2 I a + 2 I b x})}{6} + \frac{x^2 \operatorname{polylog}(2, -I c\, e^{2 I a + 2 I b x})}{4 b} + \frac{I x \operatorname{polylog}(3, -I c\, e^{2 I a + 2 I b x})}{4 b^2} - \frac{\operatorname{polylog}(4, -I c\, e^{2 I a + 2 I b x})}{8 b^3}$$

Result(type 4, 1532 leaves):

$$-\frac{x^3 \pi \operatorname{csgn}\left(\frac{I (e^{2 I (b x + a)} c - I)}{e^{2 I (b x + a)} + 1}\right) \operatorname{csgn}\left(\frac{e^{2 I (b x + a)} c - I}{e^{2 I (b x + a)} + 1}\right)}{12} - \frac{x^3 \pi \operatorname{csgn}(I e^{I (b x + a)}) \operatorname{csgn}(I e^{2 I (b x + a)})^2}{6} + \frac{I x^3 \ln(e^{I (b x + a)})}{3} + \frac{I \ln(I + c) x^3}{6}$$
$$+ \frac{x^3 \pi \operatorname{csgn}\left(\frac{e^{2 I (b x + a)} c - I}{e^{2 I (b x + a)} + 1}\right)^3}{12} + \frac{a^2 \operatorname{dilog}(1 - I e^{I (b x + a)} \sqrt{I c})}{2 b^3} - \frac{\operatorname{polylog}(2, -I e^{2 I (b x + a)} c) a^2}{4 b^3} + \frac{a^2 \operatorname{dilog}(1 + I e^{I (b x + a)} \sqrt{I c})}{2 b^3}$$
$$+ \frac{x^3 \pi \operatorname{csgn}\left(\frac{I (I + c)}{e^{2 I (b x + a)} + 1}\right)^3}{12} + \frac{x^3 \pi \operatorname{csgn}(I e^{2 I (b x + a)})^3}{12} + \frac{x^3 \pi \operatorname{csgn}\left(\frac{I e^{2 I (b x + a)} (I + c)}{e^{2 I (b x + a)} + 1}\right)^3}{12} - \frac{x^3 \pi \operatorname{csgn}\left(\frac{I (e^{2 I (b x + a)} c - I)}{e^{2 I (b x + a)} + 1}\right)^3}{12}$$
$$+ \frac{x^2 \operatorname{polylog}(2, -I e^{2 I (b x + a)} c)}{4 b} + \frac{I x^3 \ln(1 + I e^{2 I (b x + a)} c)}{6} - \frac{x^3 \pi \operatorname{csgn}\left(\frac{e^{2 I (b x + a)} (I + c)}{e^{2 I (b x + a)} + 1}\right)^2}{12} + \frac{x^3 \pi \operatorname{csgn}\left(\frac{e^{2 I (b x + a)} (I + c)}{e^{2 I (b x + a)} + 1}\right)^3}{12}$$
$$- \frac{x^3 \pi \operatorname{csgn}\left(\frac{e^{2 I (b x + a)} c - I}{e^{2 I (b x + a)} + 1}\right)^2}{12} + \frac{x^3 \pi \operatorname{csgn}\left(\frac{I e^{2 I (b x + a)} (I + c)}{e^{2 I (b x + a)} + 1}\right) \operatorname{csgn}\left(\frac{e^{2 I (b x + a)} (I + c)}{e^{2 I (b x + a)} + 1}\right)}{12} + \frac{I x \operatorname{polylog}(3, -I e^{2 I (b x + a)} c)}{4 b^2}$$
$$+ \frac{x^3 \pi \operatorname{csgn}(I (e^{2 I (b x + a)} c - I)) \operatorname{csgn}\left(\frac{I (e^{2 I (b x + a)} c - I)}{e^{2 I (b x + a)} + 1}\right)^2}{12} - \frac{x^3 \pi \operatorname{csgn}\left(\frac{I}{e^{2 I (b x + a)} + 1}\right) \operatorname{csgn}\left(\frac{I (I + c)}{e^{2 I (b x + a)} + 1}\right)^2}{12}$$
$$- \frac{x^3 \pi \operatorname{csgn}(I (I + c)) \operatorname{csgn}\left(\frac{I (I + c)}{e^{2 I (b x + a)} + 1}\right)^2}{12} + \frac{x^3 \pi \operatorname{csgn}\left(\frac{I (e^{2 I (b x + a)} c - I)}{e^{2 I (b x + a)} + 1}\right) \operatorname{csgn}\left(\frac{e^{2 I (b x + a)} c - I}{e^{2 I (b x + a)} + 1}\right)^2}{12} + \frac{x^3 \pi}{6}$$
$$- \frac{x^3 \pi \operatorname{csgn}\left(\frac{I}{e^{2 I (b x + a)} + 1}\right) \operatorname{csgn}(I (e^{2 I (b x + a)} c - I)) \operatorname{csgn}\left(\frac{I (e^{2 I (b x + a)} c - I)}{e^{2 I (b x + a)} + 1}\right)}{12} - \frac{I \ln(1 + I e^{2 I (b x + a)} c) x a^2}{2 b^2} + \frac{I a^2 \ln(1 + I e^{I (b x + a)} \sqrt{I c}) x}{2 b^2}$$

$$+\frac{I a^2 \ln\left(1 - I e^{I(bx+a)} \sqrt{I c}\right) x}{2 b^2} - \frac{\text{polylog}(4, -I e^{2I(bx+a)} c)}{8 b^3} - \frac{x^3 \pi \,\text{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}+1}\right) \text{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}+1}\right)^2}{12} + \frac{b x^4}{12}$$

$$+\frac{x^3 \pi \,\text{csgn}\left(\frac{I}{e^{2I(bx+a)}+1}\right) \text{csgn}(I(I+c))\, \text{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}+1}\right)}{12} + \frac{x^3 \pi \,\text{csgn}(I e^{2I(bx+a)})\, \text{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}+1}\right) \text{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}+1}\right)}{12}$$

$$-\frac{x^3 \pi \,\text{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}+1}\right) \text{csgn}\left(\frac{e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}+1}\right)^2}{12} - \frac{x^3 \pi \,\text{csgn}(I e^{2I(bx+a)})\, \text{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}+1}\right)^2}{12}$$

$$+\frac{x^3 \pi \,\text{csgn}(I e^{I(bx+a)})^2 \,\text{csgn}(I e^{2I(bx+a)})}{12} - \frac{I \ln(1 + I e^{2I(bx+a)} c)\, a^3}{3 b^3} - \frac{I a^3 \ln(-e^{2I(bx+a)} c + I)}{6 b^3} + \frac{I a^3 \ln\left(1 + I e^{I(bx+a)} \sqrt{I c}\right)}{2 b^3}$$

$$+\frac{I a^3 \ln\left(1 - I e^{I(bx+a)} \sqrt{I c}\right)}{2 b^3} + \frac{x^3 \pi \,\text{csgn}\left(\frac{I}{e^{2I(bx+a)}+1}\right) \text{csgn}\left(\frac{I(e^{2I(bx+a)} c - I)}{e^{2I(bx+a)}+1}\right)^2}{12} - \frac{I x^3 \ln(e^{2I(bx+a)} c - I)}{6}$$

Problem 21: Result more than twice size of optimal antiderivative.

$$\int -x^2 \arctan(-c - (1 - I c)\cot(bx+a))\, dx$$

Optimal(type 4, 126 leaves, 7 steps):

$$\frac{b x^4}{12} - \frac{x^3 \arctan(-c - (1 - I c)\cot(bx+a))}{3} + \frac{I x^3 \ln(1 - I c e^{2Ia + 2Ibx})}{6} + \frac{x^2 \text{polylog}(2, I c e^{2Ia+2Ibx})}{4 b} + \frac{I x \,\text{polylog}(3, I c e^{2Ia+2Ibx})}{4 b^2}$$

$$-\frac{\text{polylog}(4, I c e^{2Ia+2Ibx})}{8 b^3}$$

Result(type 4, 1531 leaves):

$$-\frac{x^3 \pi \,\text{csgn}(I e^{I(bx+a)})\, \text{csgn}(I e^{2I(bx+a)})^2}{6} - \frac{x^3 \pi \,\text{csgn}\left(\frac{I(e^{2I(bx+a)} c + I)}{e^{2I(bx+a)} - 1}\right)^3}{12} + \frac{I x^3 \ln(e^{I(bx+a)})}{3} + \frac{I \ln(I + c)\, x^3}{6}$$

$$-\frac{x^3 \pi \,\text{csgn}\left(\frac{I}{e^{2I(bx+a)}-1}\right) \text{csgn}(I(e^{2I(bx+a)} c + I))\, \text{csgn}\left(\frac{I(e^{2I(bx+a)} c + I)}{e^{2I(bx+a)} - 1}\right)}{12} - \frac{\text{polylog}(2, I e^{2I(bx+a)} c)\, a^2}{4 b^3} + \frac{a^2 \,\text{dilog}\left(1 - I e^{I(bx+a)} \sqrt{-I c}\right)}{2 b^3}$$

$$+\frac{x^2 \text{polylog}(2, I e^{2I(bx+a)} c)}{4 b} - \frac{x^3 \pi \,\text{csgn}\left(\frac{e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)^2}{12} + \frac{x^3 \pi \,\text{csgn}\left(\frac{e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)^3}{12}$$

$$-\frac{x^3 \pi \,\text{csgn}\left(\frac{I(e^{2I(bx+a)} c + I)}{e^{2I(bx+a)}-1}\right) \text{csgn}\left(\frac{e^{2I(bx+a)} c + I}{e^{2I(bx+a)}-1}\right)}{12} + \frac{I x \,\text{polylog}(3, I e^{2I(bx+a)} c)}{4 b^2} - \frac{I \ln(1 - I e^{2I(bx+a)} c)\, a^3}{3 b^3} - \frac{I a^3 \ln(e^{2I(bx+a)} c + I)}{6 b^3}$$

$$+\frac{I a^3 \ln\left(1 - I e^{I(bx+a)}\sqrt{-Ic}\right)}{2 b^3} + \frac{I a^3 \ln\left(1 + I e^{I(bx+a)}\sqrt{-Ic}\right)}{2 b^3} - \frac{x^3 \pi \operatorname{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)^2}{12}$$

$$+\frac{x^3 \pi \operatorname{csgn}\left(\frac{I}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{I\left(e^{2I(bx+a)}c+I\right)}{e^{2I(bx+a)}-1}\right)^2}{12} + \frac{x^3 \pi \operatorname{csgn}\left(I\left(e^{2I(bx+a)}c+I\right)\right) \operatorname{csgn}\left(\frac{I\left(e^{2I(bx+a)}c+I\right)}{e^{2I(bx+a)}-1}\right)^2}{12}$$

$$-\frac{x^3 \pi \operatorname{csgn}\left(I e^{2I(bx+a)}\right) \operatorname{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)^2}{12} - \frac{x^3 \pi \operatorname{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)^2}{12}$$

$$-\frac{x^3 \pi \operatorname{csgn}(I(I+c)) \operatorname{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}-1}\right)^2}{12} - \frac{x^3 \pi \operatorname{csgn}\left(\frac{I}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}-1}\right)^2}{12} + \frac{x^3 \pi \operatorname{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)^3}{12}$$

$$+\frac{x^3 \pi \operatorname{csgn}\left(I e^{2I(bx+a)}\right)^3}{12} + \frac{x^3 \pi \operatorname{csgn}\left(\frac{I\left(e^{2I(bx+a)}c+I\right)}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{e^{2I(bx+a)}c+I}{e^{2I(bx+a)}-1}\right)^2}{12} - \frac{\operatorname{polylog}\left(4, I e^{2I(bx+a)}c\right)}{8 b^3}$$

$$+\frac{x^3 \pi \operatorname{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)}{12} + \frac{x^3 \pi}{6} + \frac{I a^2 \ln\left(1 - I e^{I(bx+a)}\sqrt{-Ic}\right) x}{2 b^2} + \frac{I a^2 \ln\left(1 + I e^{I(bx+a)}\sqrt{-Ic}\right) x}{2 b^2} + \frac{b x^4}{12}$$

$$+\frac{a^2 \operatorname{dilog}\left(1 + I e^{I(bx+a)}\sqrt{-Ic}\right)}{2 b^3} - \frac{I x^3 \ln\left(e^{2I(bx+a)}c+I\right)}{6} + \frac{x^3 \pi \operatorname{csgn}\left(\frac{e^{2I(bx+a)}c+I}{e^{2I(bx+a)}-1}\right)^3}{12} - \frac{x^3 \pi \operatorname{csgn}\left(\frac{e^{2I(bx+a)}c+I}{e^{2I(bx+a)}-1}\right)^2}{12}$$

$$+\frac{x^3 \pi \operatorname{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}-1}\right)^3}{12} + \frac{x^3 \pi \operatorname{csgn}\left(I e^{I(bx+a)}\right)^2 \operatorname{csgn}\left(I e^{2I(bx+a)}\right)}{12} + \frac{x^3 \pi \operatorname{csgn}(I(I+c)) \operatorname{csgn}\left(\frac{I}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}-1}\right)}{12}$$

$$+\frac{x^3 \pi \operatorname{csgn}\left(I e^{2I(bx+a)}\right) \operatorname{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)}{12} - \frac{I \ln\left(1 - I e^{2I(bx+a)}c\right) x a^2}{2 b^2} + \frac{I x^3 \ln\left(1 - I e^{2I(bx+a)}c\right)}{6}$$

Problem 22: Result more than twice size of optimal antiderivative.

$$\int -x \arctan(-c - (1 - Ic)\cot(bx+a))\, dx$$

Optimal(type 4, 101 leaves, 6 steps):

$$\frac{b x^3}{6} - \frac{x^2 \arctan(-c - (1 - Ic)\cot(bx+a))}{2} + \frac{I x^2 \ln\left(1 - I c e^{2Ia + 2Ibx}\right)}{4} + \frac{x \operatorname{polylog}\left(2, I c e^{2Ia+2Ibx}\right)}{4b} + \frac{I \operatorname{polylog}\left(3, I c e^{2Ia+2Ibx}\right)}{8 b^2}$$

Result(type 4, 1496 leaves):

$$\frac{\pi x^2 \operatorname{csgn}(I(I+c)) \operatorname{csgn}\left(\frac{I}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}-1}\right)}{8} + \frac{\pi x^2 \operatorname{csgn}\left(I e^{2I(bx+a)}\right) \operatorname{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)}{8}$$

$$- \frac{\pi x^2 \operatorname{csgn}\left(\frac{I}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(I\left(e^{2I(bx+a)}c+I\right)\right) \operatorname{csgn}\left(\frac{I\left(e^{2I(bx+a)}c+I\right)}{e^{2I(bx+a)}-1}\right)}{8} + \frac{\pi x^2}{4} - \frac{I x^2 \ln\left(e^{2I(bx+a)}c+I\right)}{4}$$

$$- \frac{\pi x^2 \operatorname{csgn}(I(I+c)) \operatorname{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}-1}\right)^2}{8} - \frac{\pi x^2 \operatorname{csgn}\left(I e^{2I(bx+a)}\right) \operatorname{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)^2}{8} - \frac{I a \ln\left(1 - I e^{I(bx+a)}\sqrt{-Ic}\right) x}{2b}$$

$$- \frac{I a \ln\left(1 + I e^{I(bx+a)}\sqrt{-Ic}\right) x}{2b} + \frac{I \ln\left(1 - I e^{2I(bx+a)}c\right) x a}{2b} - \frac{\pi x^2 \operatorname{csgn}\left(\frac{e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)^2}{8} - \frac{\pi x^2 \operatorname{csgn}\left(\frac{e^{2I(bx+a)}c+I}{e^{2I(bx+a)}-1}\right)^2}{8}$$

$$+ \frac{\pi x^2 \operatorname{csgn}\left(\frac{e^{2I(bx+a)}c+I}{e^{2I(bx+a)}-1}\right)^3}{8} + \frac{\pi x^2 \operatorname{csgn}\left(\frac{e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)^3}{8} + \frac{I x^2 \ln\left(e^{I(bx+a)}\right)}{2} + \frac{I \ln(I+c) x^2}{4}$$

$$- \frac{\pi x^2 \operatorname{csgn}\left(\frac{I}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}-1}\right)^2}{8} + \frac{\pi x^2 \operatorname{csgn}\left(\frac{I}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{I\left(e^{2I(bx+a)}c+I\right)}{e^{2I(bx+a)}-1}\right)^2}{8}$$

$$+ \frac{\pi x^2 \operatorname{csgn}\left(I\left(e^{2I(bx+a)}c+I\right)\right) \operatorname{csgn}\left(\frac{I\left(e^{2I(bx+a)}c+I\right)}{e^{2I(bx+a)}-1}\right)^2}{8} - \frac{\pi x^2 \operatorname{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)^2}{8} + \frac{b x^3}{6}$$

$$+ \frac{I \operatorname{polylog}\left(3, I e^{2I(bx+a)}c\right)}{8b^2} + \frac{x \operatorname{polylog}\left(2, I e^{2I(bx+a)}c\right)}{4b} + \frac{a \operatorname{polylog}\left(2, I e^{2I(bx+a)}c\right)}{4b^2} - \frac{a \operatorname{dilog}\left(1 - I e^{I(bx+a)}\sqrt{-Ic}\right)}{2b^2}$$

$$- \frac{a \operatorname{dilog}\left(1 + I e^{I(bx+a)}\sqrt{-Ic}\right)}{2b^2} + \frac{\pi x^2 \operatorname{csgn}\left(\frac{I(I+c)}{e^{2I(bx+a)}-1}\right)^3}{8} - \frac{\pi x^2 \operatorname{csgn}\left(\frac{I\left(e^{2I(bx+a)}c+I\right)}{e^{2I(bx+a)}-1}\right)^3}{8} + \frac{\pi x^2 \operatorname{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)^3}{8}$$

$$+ \frac{\pi x^2 \operatorname{csgn}\left(\frac{I\left(e^{2I(bx+a)}c+I\right)}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{e^{2I(bx+a)}c+I}{e^{2I(bx+a)}-1}\right)^2}{8} + \frac{I \ln\left(1 - I e^{2I(bx+a)}c\right) a^2}{4b^2} + \frac{I a^2 \ln\left(e^{2I(bx+a)}c+I\right)}{4b^2} - \frac{I a^2 \ln\left(1 - I e^{I(bx+a)}\sqrt{-Ic}\right)}{2b^2}$$

$$- \frac{I a^2 \ln\left(1 + I e^{I(bx+a)}\sqrt{-Ic}\right)}{2b^2} - \frac{\pi x^2 \operatorname{csgn}\left(\frac{I\left(e^{2I(bx+a)}c+I\right)}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{e^{2I(bx+a)}c+I}{e^{2I(bx+a)}-1}\right)}{8}$$

$$+ \frac{\pi x^2 \operatorname{csgn}\left(\frac{I e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{e^{2I(bx+a)}(I+c)}{e^{2I(bx+a)}-1}\right)}{8} + \frac{\pi x^2 \operatorname{csgn}\left(I e^{2I(bx+a)}\right)^3}{8} + \frac{I x^2 \ln\left(1 - I e^{2I(bx+a)}c\right)}{4}$$

$$-\frac{\pi x^2 \operatorname{csgn}\left(\frac{I e^{2 I (b x+a)} (I+c)}{e^{2 I (b x+a)}-1}\right) \operatorname{csgn}\left(\frac{e^{2 I (b x+a)} (I+c)}{e^{2 I (b x+a)}-1}\right)^2}{8}+\frac{\pi x^2 \operatorname{csgn}\left(I e^{I (b x+a)}\right)^2 \operatorname{csgn}\left(I e^{2 I (b x+a)}\right)}{8}-\frac{\pi x^2 \operatorname{csgn}\left(I e^{I (b x+a)}\right) \operatorname{csgn}\left(I e^{2 I (b x+a)}\right)^2}{4}$$

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

$$\int -x \arctan(-c-(-1-I c) \cot(b x+a))\, dx$$

Optimal(type 4, 100 leaves, 6 steps):

$$-\frac{b x^3}{6}-\frac{x^2 \arctan(-c+(1+I c) \cot(b x+a))}{2}-\frac{I x^2 \ln\left(1+I c e^{2 I a+2 I b x}\right)}{4}-\frac{x \operatorname{polylog}\left(2,-I c e^{2 I a+2 I b x}\right)}{4 b}-\frac{I \operatorname{polylog}\left(3,-I c e^{2 I a+2 I b x}\right)}{8 b^2}$$

Result(type 4, 1497 leaves):

$$\frac{\pi x^2}{4}-\frac{x^2 \pi \operatorname{csgn}\left(\frac{e^{2 I (b x+a)} c-I}{e^{2 I (b x+a)}-1}\right)^2}{8}+\frac{x^2 \pi \operatorname{csgn}\left(\frac{e^{2 I (b x+a)} c-I}{e^{2 I (b x+a)}-1}\right)^3}{8}+\frac{I x^2 \ln\left(e^{2 I (b x+a)} c-I\right)}{4}$$
$$-\frac{x^2 \pi \operatorname{csgn}\left(\frac{I}{e^{2 I (b x+a)}-1}\right) \operatorname{csgn}\left(\frac{I\left(e^{2 I (b x+a)} c-I\right)}{e^{2 I (b x+a)}-1}\right)^2}{8}+\frac{x^2 \pi \operatorname{csgn}\left(\frac{I e^{2 I (b x+a)} (c-I)}{e^{2 I (b x+a)}-1}\right) \operatorname{csgn}\left(\frac{e^{2 I (b x+a)} (c-I)}{e^{2 I (b x+a)}-1}\right)^2}{8}-\frac{I \ln(c-I) x^2}{4}$$
$$+\frac{x^2 \pi \operatorname{csgn}\left(I\left(e^{2 I (b x+a)} c-I\right)\right) \operatorname{csgn}\left(\frac{I}{e^{2 I (b x+a)}-1}\right) \operatorname{csgn}\left(\frac{I\left(e^{2 I (b x+a)} c-I\right)}{e^{2 I (b x+a)}-1}\right)}{8}-\frac{I \ln\left(1+I e^{2 I (b x+a)} c\right) x a}{2 b}+\frac{I a \ln\left(1+I e^{I (b x+a)} \sqrt{I c}\right) x}{2 b}$$
$$+\frac{I a \ln\left(1-I e^{I (b x+a)} \sqrt{I c}\right) x}{2 b}-\frac{x^2 \pi \operatorname{csgn}\left(\frac{e^{2 I (b x+a)} (c-I)}{e^{2 I (b x+a)}-1}\right)^2}{8}+\frac{x^2 \pi \operatorname{csgn}\left(\frac{e^{2 I (b x+a)} (c-I)}{e^{2 I (b x+a)}-1}\right)^3}{8}+\frac{a \operatorname{dilog}\left(1+I e^{I (b x+a)} \sqrt{I c}\right)}{2 b^2}$$
$$+\frac{a \operatorname{dilog}\left(1-I e^{I (b x+a)} \sqrt{I c}\right)}{2 b^2}-\frac{I x^2 \ln\left(1+I e^{2 I (b x+a)} c\right)}{4}-\frac{x^2 \pi \operatorname{csgn}\left(\frac{I}{e^{2 I (b x+a)}-1}\right) \operatorname{csgn}(I(c-I)) \operatorname{csgn}\left(\frac{I(c-I)}{e^{2 I (b x+a)}-1}\right)}{8}$$
$$-\frac{x^2 \pi \operatorname{csgn}\left(I e^{2 I (b x+a)}\right) \operatorname{csgn}\left(\frac{I(c-I)}{e^{2 I (b x+a)}-1}\right) \operatorname{csgn}\left(\frac{I e^{2 I (b x+a)} (c-I)}{e^{2 I (b x+a)}-1}\right)}{8}-\frac{a \operatorname{polylog}\left(2,-I e^{2 I (b x+a)} c\right)}{4 b^2}+\frac{x^2 \pi \operatorname{csgn}\left(\frac{I\left(e^{2 I (b x+a)} c-I\right)}{e^{2 I (b x+a)}-1}\right)^3}{8}$$
$$-\frac{x^2 \pi \operatorname{csgn}\left(\frac{I(c-I)}{e^{2 I (b x+a)}-1}\right)^3}{8}-\frac{x^2 \pi \operatorname{csgn}\left(\frac{I e^{2 I (b x+a)} (c-I)}{e^{2 I (b x+a)}-1}\right)^3}{8}-\frac{x \operatorname{polylog}\left(2,-I e^{2 I (b x+a)} c\right)}{4 b}-\frac{I \operatorname{polylog}\left(3,-I e^{2 I (b x+a)} c\right)}{8 b^2}$$
$$-\frac{I x^2 \ln\left(e^{I (b x+a)}\right)}{2}-\frac{b x^3}{6}+\frac{I a^2 \ln\left(1+I e^{I (b x+a)} \sqrt{I c}\right)}{2 b^2}+\frac{I a^2 \ln\left(1-I e^{I (b x+a)} \sqrt{I c}\right)}{2 b^2}+\frac{x^2 \pi \operatorname{csgn}(I(c-I)) \operatorname{csgn}\left(\frac{I(c-I)}{e^{2 I (b x+a)}-1}\right)^2}{8}$$

$$+\frac{x^2\pi\,\mathrm{csgn}\left(I e^{2I(bx+a)}\right)\mathrm{csgn}\left(\frac{I e^{2I(bx+a)}(c-I)}{e^{2I(bx+a)}-1}\right)^2}{8}+\frac{x^2\pi\,\mathrm{csgn}\left(\frac{I(c-I)}{e^{2I(bx+a)}-1}\right)\mathrm{csgn}\left(\frac{I e^{2I(bx+a)}(c-I)}{e^{2I(bx+a)}-1}\right)^2}{8}$$

$$-\frac{x^2\pi\,\mathrm{csgn}\left(I\left(e^{2I(bx+a)}c-I\right)\right)\mathrm{csgn}\left(\frac{I\left(e^{2I(bx+a)}c-I\right)}{e^{2I(bx+a)}-1}\right)^2}{8}+\frac{x^2\pi\,\mathrm{csgn}\left(\frac{I\left(e^{2I(bx+a)}c-I\right)}{e^{2I(bx+a)}-1}\right)\mathrm{csgn}\left(\frac{e^{2I(bx+a)}c-I}{e^{2I(bx+a)}-1}\right)}{8}-\frac{I\ln\left(1+I e^{2I(bx+a)}c\right)a^2}{4b^2}$$

$$-\frac{I a^2\ln\left(-e^{2I(bx+a)}c+I\right)}{4b^2}-\frac{x^2\pi\,\mathrm{csgn}\left(\frac{I e^{2I(bx+a)}(c-I)}{e^{2I(bx+a)}-1}\right)\mathrm{csgn}\left(\frac{e^{2I(bx+a)}(c-I)}{e^{2I(bx+a)}-1}\right)}{8}-\frac{x^2\pi\,\mathrm{csgn}\left(\frac{I\left(e^{2I(bx+a)}c-I\right)}{e^{2I(bx+a)}-1}\right)\mathrm{csgn}\left(\frac{e^{2I(bx+a)}c-I}{e^{2I(bx+a)}-1}\right)^2}{8}$$

$$+\frac{x^2\pi\,\mathrm{csgn}\left(\frac{I}{e^{2I(bx+a)}-1}\right)\mathrm{csgn}\left(\frac{I(c-I)}{e^{2I(bx+a)}-1}\right)^2}{8}-\frac{\pi x^2\,\mathrm{csgn}\left(I e^{2I(bx+a)}\right)^3}{8}-\frac{\pi x^2\,\mathrm{csgn}\left(I e^{I(bx+a)}\right)^2\mathrm{csgn}\left(I e^{2I(bx+a)}\right)}{8}$$

$$+\frac{\pi x^2\,\mathrm{csgn}\left(I e^{I(bx+a)}\right)\mathrm{csgn}\left(I e^{2I(bx+a)}\right)^2}{4}$$

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

$$\int x^2\arctan(c+d\tanh(bx+a))\,dx$$

Optimal(type 4, 305 leaves, 11 steps):

$$\frac{x^3\arctan(c+d\tanh(bx+a))}{3}+\frac{I x^3\ln\left(1+\frac{(I-c-d)e^{2bx+2a}}{I-c+d}\right)}{6}-\frac{I x^3\ln\left(1+\frac{(I+c+d)e^{2bx+2a}}{I+c-d}\right)}{6}+\frac{I x^2\,\mathrm{polylog}\left(2,-\frac{(I-c-d)e^{2bx+2a}}{I-c+d}\right)}{4b}$$

$$-\frac{I x^2\,\mathrm{polylog}\left(2,-\frac{(I+c+d)e^{2bx+2a}}{I+c-d}\right)}{4b}-\frac{I x\,\mathrm{polylog}\left(3,-\frac{(I-c-d)e^{2bx+2a}}{I-c+d}\right)}{4b^2}+\frac{I x\,\mathrm{polylog}\left(3,-\frac{(I+c+d)e^{2bx+2a}}{I+c-d}\right)}{4b^2}$$

$$+\frac{I\,\mathrm{polylog}\left(4,-\frac{(I-c-d)e^{2bx+2a}}{I-c+d}\right)}{8b^3}-\frac{I\,\mathrm{polylog}\left(4,-\frac{(I+c+d)e^{2bx+2a}}{I+c-d}\right)}{8b^3}$$

Result(type ?, 6989 leaves): Display of huge result suppressed!

Problem 26: Result more than twice size of optimal antiderivative.

$$\int\arctan(c-(I-c)\tanh(bx+a))\,dx$$

Optimal(type 4, 68 leaves, 5 steps):

$$\frac{I b x^2}{2}+x\arctan(c-(I-c)\tanh(bx+a))-\frac{I x\ln\left(1-I c e^{2bx+2a}\right)}{2}-\frac{I\,\mathrm{polylog}\left(2,I c e^{2bx+2a}\right)}{4b}$$

Result(type 4, 1350 leaves):

$$\frac{\mathrm{I}\operatorname{dilog}\left(\frac{(c-\mathrm{I})\tanh(bx+a)+c+\mathrm{I}}{2c}\right)}{4b(c-\mathrm{I})(\mathrm{I}-c)}+\frac{\operatorname{dilog}\left(-\frac{\mathrm{I}}{2}\left((c-\mathrm{I})\tanh(bx+a)+c+\mathrm{I}\right)\right)c}{2b(c-\mathrm{I})(\mathrm{I}-c)}-\frac{\ln\left((c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}\right)^{2}c}{4b(c-\mathrm{I})(\mathrm{I}-c)}$$

$$+\frac{\operatorname{dilog}\left(\frac{(c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}}{-2\mathrm{I}+2c}\right)c}{2b(c-\mathrm{I})(\mathrm{I}-c)}-\frac{\operatorname{dilog}\left(\frac{(c-\mathrm{I})\tanh(bx+a)+c+\mathrm{I}}{2c}\right)c}{2b(c-\mathrm{I})(\mathrm{I}-c)}$$

$$+\frac{\arctan\left((c-\mathrm{I})\tanh(bx+a)+c\right)\ln\left((c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}\right)}{b(c-\mathrm{I})(2\mathrm{I}-2c)}-\frac{\arctan\left((c-\mathrm{I})\tanh(bx+a)+c\right)\ln\left((c-\mathrm{I})\tanh(bx+a)-c+\mathrm{I}\right)}{b(c-\mathrm{I})(2\mathrm{I}-2c)}$$

$$-\frac{\mathrm{I}\operatorname{dilog}\left(-\frac{\mathrm{I}}{2}\left((c-\mathrm{I})\tanh(bx+a)+c+\mathrm{I}\right)\right)}{4b(c-\mathrm{I})(\mathrm{I}-c)}+\frac{\mathrm{I}\ln\left((c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}\right)^{2}}{8b(c-\mathrm{I})(\mathrm{I}-c)}-\frac{\mathrm{I}\operatorname{dilog}\left(\frac{(c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}}{-2\mathrm{I}+2c}\right)}{4b(c-\mathrm{I})(\mathrm{I}-c)}$$

$$-\frac{\mathrm{I}\ln\left((c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}\right)^{2}c^{2}}{8b(c-\mathrm{I})(\mathrm{I}-c)}+\frac{\mathrm{I}\operatorname{dilog}\left(\frac{(c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}}{-2\mathrm{I}+2c}\right)c^{2}}{4b(c-\mathrm{I})(\mathrm{I}-c)}$$

$$+\frac{\mathrm{I}\ln\left((c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}\right)\ln\left(-\frac{\mathrm{I}}{2}\left((c-\mathrm{I})\tanh(bx+a)+c+\mathrm{I}\right)\right)c^{2}}{4b(c-\mathrm{I})(\mathrm{I}-c)}$$

$$+\frac{\mathrm{I}\ln\left(\frac{(c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}}{-2\mathrm{I}+2c}\right)\ln\left((c-\mathrm{I})\tanh(bx+a)-c+\mathrm{I}\right)c^{2}}{4b(c-\mathrm{I})(\mathrm{I}-c)}$$

$$-\frac{\mathrm{I}\ln\left(\frac{(c-\mathrm{I})\tanh(bx+a)+c+\mathrm{I}}{2c}\right)\ln\left((c-\mathrm{I})\tanh(bx+a)-c+\mathrm{I}\right)c^{2}}{4b(c-\mathrm{I})(\mathrm{I}-c)}+\frac{2\mathrm{I}\arctan\left((c-\mathrm{I})\tanh(bx+a)+c\right)\ln\left((c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}\right)c}{b(c-\mathrm{I})(2\mathrm{I}-2c)}$$

$$-\frac{2\mathrm{I}\arctan\left((c-\mathrm{I})\tanh(bx+a)+c\right)\ln\left((c-\mathrm{I})\tanh(bx+a)-c+\mathrm{I}\right)c}{b(c-\mathrm{I})(2\mathrm{I}-2c)}$$

$$+\frac{\ln\left((c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}\right)\ln\left(-\frac{\mathrm{I}}{2}\left((c-\mathrm{I})\tanh(bx+a)+c+\mathrm{I}\right)\right)c}{2b(c-\mathrm{I})(\mathrm{I}-c)}$$

$$+\frac{\ln\left(\frac{(c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}}{-2\mathrm{I}+2c}\right)\ln\left((c-\mathrm{I})\tanh(bx+a)-c+\mathrm{I}\right)c}{2b(c-\mathrm{I})(\mathrm{I}-c)}-\frac{\ln\left(\frac{(c-\mathrm{I})\tanh(bx+a)+c+\mathrm{I}}{2c}\right)\ln\left((c-\mathrm{I})\tanh(bx+a)-c+\mathrm{I}\right)c}{2b(c-\mathrm{I})(\mathrm{I}-c)}$$

$$-\frac{\arctan\left((c-\mathrm{I})\tanh(bx+a)+c\right)\ln\left((c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}\right)c^{2}}{b(c-\mathrm{I})(2\mathrm{I}-2c)}+\frac{\arctan\left((c-\mathrm{I})\tanh(bx+a)+c\right)\ln\left((c-\mathrm{I})\tanh(bx+a)-c+\mathrm{I}\right)c^{2}}{b(c-\mathrm{I})(2\mathrm{I}-2c)}$$

$$-\frac{\mathrm{I}\operatorname{dilog}\left(\frac{(c-\mathrm{I})\tanh(bx+a)+c+\mathrm{I}}{2c}\right)c^{2}}{4b(c-\mathrm{I})(\mathrm{I}-c)}-\frac{\mathrm{I}\ln\left((c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}\right)\ln\left(-\frac{\mathrm{I}}{2}\left((c-\mathrm{I})\tanh(bx+a)+c+\mathrm{I}\right)\right)}{4b(c-\mathrm{I})(\mathrm{I}-c)}$$

$$-\frac{\mathrm{I}\ln\left(\frac{(c-\mathrm{I})\tanh(bx+a)+c-\mathrm{I}}{-2\mathrm{I}+2c}\right)\ln\left((c-\mathrm{I})\tanh(bx+a)-c+\mathrm{I}\right)}{4b(c-\mathrm{I})(\mathrm{I}-c)}+\frac{\mathrm{I}\ln\left(\frac{(c-\mathrm{I})\tanh(bx+a)+c+\mathrm{I}}{2c}\right)\ln\left((c-\mathrm{I})\tanh(bx+a)-c+\mathrm{I}\right)}{4b(c-\mathrm{I})(\mathrm{I}-c)}$$

$$+\frac{I\,\mathrm{dilog}\left(-\frac{I}{2}\left((c-I)\tanh(bx+a)+c+I\right)\right)c^2}{4b(c-I)(I-c)}$$

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

$$\int \arctan(c+d\coth(bx+a))\,dx$$

```
Optimal(type 4, 150 leaves, 7 steps):
```

$$x\arctan(c+d\coth(bx+a))+\frac{I\,x\ln\left(1-\frac{(I-c-d)\,e^{2bx+2a}}{I-c+d}\right)}{2}-\frac{I\,x\ln\left(1-\frac{(I+c+d)\,e^{2bx+2a}}{I+c-d}\right)}{2}+\frac{I\,\mathrm{polylog}\left(2,\frac{(I-c-d)\,e^{2bx+2a}}{I-c+d}\right)}{4b}$$
$$-\frac{I\,\mathrm{polylog}\left(2,\frac{(I+c+d)\,e^{2bx+2a}}{I+c-d}\right)}{4b}$$

```
Result(type 4, 349 leaves):
```

$$-\frac{\arctan(c+d\coth(bx+a))\ln(d\coth(bx+a)-d)}{2b}+\frac{\arctan(c+d\coth(bx+a))\ln(d\coth(bx+a)+d)}{2b}$$
$$-\frac{I\ln(d\coth(bx+a)-d)\ln\left(\frac{-d\coth(bx+a)+I-c}{I-c-d}\right)}{4b}+\frac{I\ln(d\coth(bx+a)-d)\ln\left(\frac{d\coth(bx+a)+c+I}{I+c+d}\right)}{4b}$$
$$-\frac{I\,\mathrm{dilog}\left(\frac{-d\coth(bx+a)+I-c}{I-c-d}\right)}{4b}+\frac{I\,\mathrm{dilog}\left(\frac{d\coth(bx+a)+c+I}{I+c+d}\right)}{4b}+\frac{I\ln(d\coth(bx+a)+d)\ln\left(\frac{-d\coth(bx+a)+I-c}{I-c+d}\right)}{4b}$$
$$-\frac{I\ln(d\coth(bx+a)+d)\ln\left(\frac{d\coth(bx+a)+c+I}{I+c-d}\right)}{4b}+\frac{I\,\mathrm{dilog}\left(\frac{-d\coth(bx+a)+I-c}{I-c+d}\right)}{4b}-\frac{I\,\mathrm{dilog}\left(\frac{d\coth(bx+a)+c+I}{I+c-d}\right)}{4b}$$

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

$$\int x^2\arctan(c+(I+c)\coth(bx+a))\,dx$$

```
Optimal(type 4, 116 leaves, 7 steps):
```

$$-\frac{I\,b\,x^4}{12}+\frac{x^3\arctan(c+(I+c)\coth(bx+a))}{3}+\frac{I\,x^3\ln\left(1-I\,c\,e^{2bx+2a}\right)}{6}+\frac{I\,x^2\,\mathrm{polylog}\left(2,I\,c\,e^{2bx+2a}\right)}{4b}-\frac{I\,x\,\mathrm{polylog}\left(3,I\,c\,e^{2bx+2a}\right)}{4b^2}$$
$$+\frac{I\,\mathrm{polylog}\left(4,I\,c\,e^{2bx+2a}\right)}{8b^3}$$

```
Result(type 4, 1553 leaves):
```

$$-\frac{\pi x^3\,\mathrm{csgn}\left(\frac{I}{e^{2bx+2a}-1}\right)\mathrm{csgn}\left(I\left(2\,e^{2bx+2a}c+2I\right)\right)\mathrm{csgn}\left(\frac{I\left(2\,e^{2bx+2a}c+2I\right)}{e^{2bx+2a}-1}\right)}{12}$$

$$+\frac{\pi x^3 \operatorname{csgn}\left(\frac{I}{e^{2bx+2a}-1}\right)\operatorname{csgn}\left(I\left(2 I e^{2bx+2a}+2 e^{2bx+2a} c\right)\right)\operatorname{csgn}\left(\frac{I\left(2 I e^{2bx+2a}+2 e^{2bx+2a} c\right)}{e^{2bx+2a}-1}\right)}{12}-\frac{I x \operatorname{polylog}\left(3, I c e^{2bx+2a}\right)}{4 b^2}$$

$$-\frac{I \ln\left(1-I c e^{2bx+2a}\right) a^3}{3 b^3}-\frac{I \operatorname{polylog}\left(2, I c e^{2bx+2a}\right) a^2}{4 b^3}+\frac{I a^3 \ln\left(1-I e^{bx+a}\sqrt{-I c}\right)}{2 b^3}+\frac{I a^3 \ln\left(1+I e^{bx+a}\sqrt{-I c}\right)}{2 b^3}$$

$$+\frac{I a^2 \operatorname{dilog}\left(1-I e^{bx+a}\sqrt{-I c}\right)}{2 b^3}+\frac{I a^2 \operatorname{dilog}\left(1+I e^{bx+a}\sqrt{-I c}\right)}{2 b^3}+\frac{\pi x^3 \operatorname{csgn}\left(I\left(2 e^{2bx+2a} c+2 I\right)\right)\operatorname{csgn}\left(\frac{I\left(2 e^{2bx+2a} c+2 I\right)}{e^{2bx+2a}-1}\right)^2}{12}$$

$$-\frac{\pi x^3 \operatorname{csgn}\left(I\left(2 I e^{2bx+2a}+2 e^{2bx+2a} c\right)\right)\operatorname{csgn}\left(\frac{I\left(2 I e^{2bx+2a}+2 e^{2bx+2a} c\right)}{e^{2bx+2a}-1}\right)^2}{12}+\frac{\pi x^3 \operatorname{csgn}\left(\frac{2 I e^{2bx+2a}+2 e^{2bx+2a} c}{e^{2bx+2a}-1}\right)^3}{12}$$

$$+\frac{\pi x^3 \operatorname{csgn}\left(\frac{2 e^{2bx+2a} c+2 I}{e^{2bx+2a}-1}\right)^3}{12}+\frac{I x^3 \ln\left(1-I c e^{2bx+2a}\right)}{6}-\frac{I \ln\left(1-I c e^{2bx+2a}\right) x a^2}{2 b^2}+\frac{I a^2 \ln\left(1-I e^{bx+a}\sqrt{-I c}\right) x}{2 b^2}$$

$$+\frac{I a^2 \ln\left(1+I e^{bx+a}\sqrt{-I c}\right) x}{2 b^2}-\frac{I c a^4}{4 b^3 (I+c)}-\frac{I c b x^4}{12 (I+c)}-\frac{\pi x^3 \operatorname{csgn}\left(\frac{I\left(2 e^{2bx+2a} c+2 I\right)}{e^{2bx+2a}-1}\right)\operatorname{csgn}\left(\frac{2 e^{2bx+2a} c+2 I}{e^{2bx+2a}-1}\right)}{12}$$

$$+\frac{\pi x^3 \operatorname{csgn}\left(\frac{I}{e^{2bx+2a}-1}\right)\operatorname{csgn}\left(\frac{I\left(2 e^{2bx+2a} c+2 I\right)}{e^{2bx+2a}-1}\right)^2}{12}-\frac{a^3 \ln\left(e^{bx+a}\right)}{3 b^3 (I+c)}+\frac{x a^3}{3 b^2 (I+c)}-\frac{I a^3 \ln\left(e^{2bx+2a} c+I\right)}{6 b^3}+\frac{I c a^3 \ln\left(e^{bx+a}\right)}{3 b^3 (I+c)}$$

$$-\frac{I c x a^3}{3 b^2 (I+c)}+\frac{x^3 \pi}{6}-\frac{\pi x^3 \operatorname{csgn}\left(\frac{I}{e^{2bx+2a}-1}\right)\operatorname{csgn}\left(\frac{I\left(2 I e^{2bx+2a}+2 e^{2bx+2a} c\right)}{e^{2bx+2a}-1}\right)^2}{12}-\frac{\pi x^3 \operatorname{csgn}\left(\frac{2 e^{2bx+2a} c+2 I}{e^{2bx+2a}-1}\right)^2}{12}$$

$$-\frac{\pi x^3 \operatorname{csgn}\left(\frac{I\left(2 e^{2bx+2a} c+2 I\right)}{e^{2bx+2a}-1}\right)^3}{12}+\frac{\pi x^3 \operatorname{csgn}\left(\frac{I\left(2 I e^{2bx+2a}+2 e^{2bx+2a} c\right)}{e^{2bx+2a}-1}\right)^3}{12}$$

$$+\frac{\pi x^3 \operatorname{csgn}\left(\frac{I\left(2 I e^{2bx+2a}+2 e^{2bx+2a} c\right)}{e^{2bx+2a}-1}\right)\operatorname{csgn}\left(\frac{2 I e^{2bx+2a}+2 e^{2bx+2a} c}{e^{2bx+2a}-1}\right)}{12}+\frac{\pi x^3 \operatorname{csgn}\left(\frac{I\left(2 e^{2bx+2a} c+2 I\right)}{e^{2bx+2a}-1}\right)\operatorname{csgn}\left(\frac{2 e^{2bx+2a} c+2 I}{e^{2bx+2a}-1}\right)^2}{12}$$

$$-\frac{\pi x^3 \operatorname{csgn}\left(\frac{I\left(2 I e^{2bx+2a}+2 e^{2bx+2a} c\right)}{e^{2bx+2a}-1}\right)\operatorname{csgn}\left(\frac{2 I e^{2bx+2a}+2 e^{2bx+2a} c}{e^{2bx+2a}-1}\right)^2}{12}+\frac{a^4}{4 b^3 (I+c)}+\frac{b x^4}{12 (I+c)}-\frac{I x^3 \ln\left(2 e^{2bx+2a} c+2 I\right)}{6}$$

$$+\frac{I x^3 \ln\left(2 I e^{2bx+2a}+2 e^{2bx+2a} c\right)}{6}-\frac{\pi x^3 \operatorname{csgn}\left(\frac{2 I e^{2bx+2a}+2 e^{2bx+2a} c}{e^{2bx+2a}-1}\right)^2}{12}+\frac{I x^2 \operatorname{polylog}\left(2, I c e^{2bx+2a}\right)}{4 b}+\frac{I \operatorname{polylog}\left(4, I c e^{2bx+2a}\right)}{8 b^3}$$

Problem 31: Result more than twice size of optimal antiderivative.

$$\int \arctan\left(e^{b x+a}\right) dx$$

Optimal(type 4, 35 leaves, 4 steps):

$$\frac{I \operatorname{polylog}\left(2, -I e^{b x+a}\right)}{2 b} - \frac{I \operatorname{polylog}\left(2, I e^{b x+a}\right)}{2 b}$$

Result(type 4, 105 leaves):

$$\frac{\ln\left(e^{b x+a}\right) \arctan\left(e^{b x+a}\right)}{b} + \frac{I \ln\left(e^{b x+a}\right) \ln\left(1+I e^{b x+a}\right)}{2 b} - \frac{I \ln\left(e^{b x+a}\right) \ln\left(1-I e^{b x+a}\right)}{2 b} + \frac{I \operatorname{dilog}\left(1+I e^{b x+a}\right)}{2 b} - \frac{I \operatorname{dilog}\left(1-I e^{b x+a}\right)}{2 b}$$

Problem 32: Result more than twice size of optimal antiderivative.

$$\int x \arctan\left(a+b f^{d x+c}\right) dx$$

Optimal(type 4, 200 leaves, 9 steps):

$$\frac{x^2 \arctan\left(a+b f^{d x+c}\right)}{2} - \frac{I x^2 \ln\left(1-\frac{I b f^{d x+c}}{1-I a}\right)}{4} + \frac{I x^2 \ln\left(1+\frac{I b f^{d x+c}}{1+I a}\right)}{4} - \frac{I x \operatorname{polylog}\left(2, \frac{I b f^{d x+c}}{1-I a}\right)}{2 d \ln(f)} + \frac{I x \operatorname{polylog}\left(2, \frac{-I b f^{d x+c}}{1+I a}\right)}{2 d \ln(f)}$$
$$+ \frac{I \operatorname{polylog}\left(3, \frac{I b f^{d x+c}}{1-I a}\right)}{2 d^2 \ln(f)^2} - \frac{I \operatorname{polylog}\left(3, \frac{-I b f^{d x+c}}{1+I a}\right)}{2 d^2 \ln(f)^2}$$

Result(type 4, 651 leaves):

$$-\frac{I \operatorname{polylog}\left(2, \frac{I b f^{d x+c}}{1-I a}\right) c}{2 d^2 \ln(f)} + \frac{I \ln\left(1-\frac{I b f^{d x+c}}{-I a-1}\right) c^2}{4 d^2} - \frac{I x^2 \ln\left(1-\frac{I b f^{d x+c}}{1-I a}\right)}{4} - \frac{I c^2 \ln\left(1-I a-I b f^{d x+c}\right)}{4 d^2} - \frac{I \ln\left(1-\frac{I b f^{d x+c}}{1-I a}\right) x c}{2 d}$$
$$+ \frac{I c \operatorname{dilog}\left(\frac{b f^{d x+c}+I+a}{I+a}\right)}{2 d^2 \ln(f)} - \frac{I \ln\left(1-\frac{I b f^{d x+c}}{1-I a}\right) c^2}{4 d^2} + \frac{I x^2 \ln\left(1-I\left(a+b f^{d x+c}\right)\right)}{4} + \frac{I \operatorname{polylog}\left(3, \frac{I b f^{d x+c}}{1-I a}\right)}{2 d^2 \ln(f)^2} + \frac{I \operatorname{polylog}\left(2, \frac{I b f^{d x+c}}{-I a-1}\right) c}{2 d^2 \ln(f)}$$
$$- \frac{I c^2 \ln\left(\frac{b f^{d x+c}+a-I}{-I+a}\right)}{2 d^2} + \frac{I \ln\left(1-\frac{I b f^{d x+c}}{-I a-1}\right) x^2}{4} + \frac{I \ln\left(1-\frac{I b f^{d x+c}}{-I a-1}\right) x c}{2 d} - \frac{I c \ln\left(\frac{b f^{d x+c}+a-I}{-I+a}\right) x}{2 d} - \frac{I c \operatorname{dilog}\left(\frac{b f^{d x+c}+a-I}{-I+a}\right)}{2 d^2 \ln(f)}$$
$$- \frac{I x^2 \ln\left(1+I\left(a+b f^{d x+c}\right)\right)}{4} + \frac{I c^2 \ln\left(1+I a+I b f^{d x+c}\right)}{4 d^2} + \frac{I c \ln\left(\frac{b f^{d x+c}+I+a}{I+a}\right) x}{2 d} + \frac{I \operatorname{polylog}\left(2, \frac{I b f^{d x+c}}{-I a-1}\right) x}{2 d \ln(f)} - \frac{I x \operatorname{polylog}\left(2, \frac{I b f^{d x+c}}{1-I a}\right)}{2 d \ln(f)}$$
$$- \frac{I \operatorname{polylog}\left(3, \frac{I b f^{d x+c}}{-I a-1}\right)}{2 d^2 \ln(f)^2} + \frac{I c^2 \ln\left(\frac{b f^{d x+c}+I+a}{I+a}\right)}{2 d^2}$$

Problem 33: Result more than twice size of optimal antiderivative.

$$\int x^2 \arctan\left(a + b f^{d x + c}\right) dx$$

Optimal(type 4, 268 leaves, 11 steps):

$$\frac{x^3 \arctan\left(a + b f^{d x+c}\right)}{3} - \frac{I x^3 \ln\left(1 - \frac{I b f^{d x+c}}{1 - I a}\right)}{6} + \frac{I x^3 \ln\left(1 + \frac{I b f^{d x+c}}{1 + I a}\right)}{6} - \frac{I x^2 \operatorname{polylog}\left(2, \frac{I b f^{d x+c}}{1 - I a}\right)}{2 d \ln(f)} + \frac{I x^2 \operatorname{polylog}\left(2, \frac{-I b f^{d x+c}}{1 + I a}\right)}{2 d \ln(f)} + \frac{I x \operatorname{polylog}\left(3, \frac{I b f^{d x+c}}{1 - I a}\right)}{d^2 \ln(f)^2} - \frac{I x \operatorname{polylog}\left(3, \frac{-I b f^{d x+c}}{1 + I a}\right)}{d^2 \ln(f)^2} - \frac{I \operatorname{polylog}\left(4, \frac{I b f^{d x+c}}{1 - I a}\right)}{d^3 \ln(f)^3} + \frac{I \operatorname{polylog}\left(4, \frac{-I b f^{d x+c}}{1 + I a}\right)}{d^3 \ln(f)^3}$$

Result(type 4, 735 leaves):

$$-\frac{I c^3 \ln\left(1 + I a + I b f^{d x+c}\right)}{6 d^3} - \frac{I c^2 \operatorname{dilog}\left(\frac{b f^{d x+c} + I + a}{I + a}\right)}{2 d^3 \ln(f)} + \frac{I x^3 \ln\left(1 - I\left(a + b f^{d x+c}\right)\right)}{6} - \frac{I \operatorname{polylog}\left(2, \frac{I b f^{d x+c}}{-I a - 1}\right) c^2}{2 d^3 \ln(f)} - \frac{I \ln\left(1 - \frac{I b f^{d x+c}}{-I a - 1}\right) c^3}{3 d^3} + \frac{I x \operatorname{polylog}\left(3, \frac{I b f^{d x+c}}{1 - I a}\right)}{d^2 \ln(f)^2} + \frac{I \ln\left(1 - \frac{I b f^{d x+c}}{1 - I a}\right) c^3}{3 d^3} + \frac{I c^2 \ln\left(\frac{b f^{d x+c} + a - I}{-I + a}\right) x}{2 d^2} + \frac{I \operatorname{polylog}\left(2, \frac{I b f^{d x+c}}{-I a - 1}\right) x^2}{2 d \ln(f)} - \frac{I \operatorname{polylog}\left(4, \frac{I b f^{d x+c}}{1 - I a}\right)}{d^3 \ln(f)^3} + \frac{I c^3 \ln\left(\frac{b f^{d x+c} + a - I}{-I + a}\right)}{2 d^3} - \frac{I \ln\left(1 - \frac{I b f^{d x+c}}{-I a - 1}\right) x c^2}{2 d^2} - \frac{I x^2 \operatorname{polylog}\left(2, \frac{I b f^{d x+c}}{1 - I a}\right)}{2 d \ln(f)} + \frac{I \ln\left(1 - \frac{I b f^{d x+c}}{-I a - 1}\right) x^3}{6} + \frac{I c^3 \ln\left(1 - I a - I b f^{d x+c}\right)}{6 d^3} - \frac{I x^3 \ln\left(1 + I\left(a + b f^{d x+c}\right)\right)}{6} + \frac{I c^2 \operatorname{dilog}\left(\frac{b f^{d x+c} + a - I}{-I + a}\right)}{2 d^3 \ln(f)} - \frac{I \operatorname{polylog}\left(3, \frac{I b f^{d x+c}}{-I a - 1}\right) x}{d^2 \ln(f)^2} + \frac{I \operatorname{polylog}\left(4, \frac{I b f^{d x+c}}{-I a - 1}\right)}{d^3 \ln(f)^3} - \frac{I c^2 \ln\left(\frac{b f^{d x+c} + I + a}{I + a}\right) x}{2 d^2} + \frac{I \ln\left(1 - \frac{I b f^{d x+c}}{1 - I a}\right) x c^2}{2 d^2} - \frac{I x^3 \ln\left(1 - \frac{I b f^{d x+c}}{1 - I a}\right)}{6} - \frac{I c^3 \ln\left(\frac{b f^{d x+c} + I + a}{I + a}\right)}{2 d^3} + \frac{I \operatorname{polylog}\left(2, \frac{I b f^{d x+c}}{1 - I a}\right) c^2}{2 d^3 \ln(f)}$$

Problem 39: Result more than twice size of optimal antiderivative.

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

Optimal(type 3, 27 leaves, 6 steps):

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

Result(type 3, 56 leaves):

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

Problem 41: Unable to integrate problem.

$$\int \frac{\arctan\left(\frac{e x}{\sqrt{-\frac{a e^2}{b} - e^2 x^2}}\right)}{\sqrt{b x^2 + a}}\, dx$$

Optimal(type 3, 60 leaves, 2 steps):

$$\frac{\arctan\left(\frac{e x}{\sqrt{-\frac{a e^2}{b} - e^2 x^2}}\right)^2 \sqrt{-\frac{a e^2}{b} - e^2 x^2}}{2 e \sqrt{b x^2 + a}}$$

Result(type 8, 36 leaves):

$$\int \frac{\arctan\left(\frac{e x}{\sqrt{-\frac{a e^2}{b} - e^2 x^2}}\right)}{\sqrt{b x^2 + a}}\, dx$$

Problem 42: Result more than twice size of optimal antiderivative.

$$\int e^{c (b x + a)} \arctan(\sinh(b c x + a c))\, dx$$

Optimal(type 3, 46 leaves, 5 steps):

$$\frac{e^{b c x + a c} \arctan(\sinh(c (b x + a)))}{c b} - \frac{\ln\left(1 + e^{2 c (b x + a)}\right)}{c b}$$

Result(type 3, 1298 leaves):

$$\frac{2 a}{b} - \frac{\ln\left(1 + e^{2 c (b x + a)}\right)}{c b} - \frac{\pi \operatorname{csgn}\left(I \left(e^{c (b x + a)} + I\right)\right) \operatorname{csgn}\left(I \left(e^{c (b x + a)} + I\right)^2\right)^2 e^{c (b x + a)}}{2 c b}$$
$$- \frac{\pi \operatorname{csgn}\left(I \left(e^{c (b x + a)} + I\right)^2\right) \operatorname{csgn}\left(I e^{-c (b x + a)} \left(e^{c (b x + a)} + I\right)^2\right)^2 e^{c (b x + a)}}{4 c b} + \frac{\pi \operatorname{csgn}\left(I \left(e^{c (b x + a)} + I\right)\right)^2 \operatorname{csgn}\left(I \left(e^{c (b x + a)} + I\right)^2\right) e^{c (b x + a)}}{4 c b}$$
$$+ \frac{\pi \operatorname{csgn}\left(I e^{-c (b x + a)}\right) \operatorname{csgn}\left(I e^{-c (b x + a)} \left(e^{c (b x + a)} - I\right)^2\right)^2 e^{c (b x + a)}}{4 c b} - \frac{\pi \operatorname{csgn}\left(I e^{-c (b x + a)}\right) \operatorname{csgn}\left(I e^{-c (b x + a)} \left(e^{c (b x + a)} + I\right)^2\right)^2 e^{c (b x + a)}}{4 c b}$$
$$- \frac{\pi \operatorname{csgn}\left(I \left(e^{c (b x + a)} - I\right)\right)^2 \operatorname{csgn}\left(I \left(e^{c (b x + a)} - I\right)^2\right) e^{c (b x + a)}}{4 c b} + \frac{\pi \operatorname{csgn}\left(I \left(e^{c (b x + a)} - I\right)\right) \operatorname{csgn}\left(I \left(e^{c (b x + a)} - I\right)^2\right)^2 e^{c (b x + a)}}{2 c b}$$
$$+ \frac{\pi \operatorname{csgn}\left(I \left(e^{c (b x + a)} - I\right)^2\right) \operatorname{csgn}\left(I e^{-c (b x + a)} \left(e^{c (b x + a)} - I\right)^2\right)^2 e^{c (b x + a)}}{4 c b}$$

$$+\frac{\pi \operatorname{csgn}\left(I e^{-c(bx+a)}\left(e^{c(bx+a)}-I\right)^2\right) \operatorname{csgn}\left(e^{-c(bx+a)}\left(e^{c(bx+a)}-I\right)^2\right)^2 e^{c(bx+a)}}{4cb}$$

$$-\frac{\pi \operatorname{csgn}\left(I e^{-c(bx+a)}\left(e^{c(bx+a)}+I\right)^2\right) \operatorname{csgn}\left(e^{-c(bx+a)}\left(e^{c(bx+a)}+I\right)^2\right)^2 e^{c(bx+a)}}{4cb}$$

$$-\frac{\pi \operatorname{csgn}\left(I e^{-c(bx+a)}\left(e^{c(bx+a)}-I\right)^2\right) \operatorname{csgn}\left(e^{-c(bx+a)}\left(e^{c(bx+a)}-I\right)^2\right) e^{c(bx+a)}}{4cb}$$

$$+\frac{\pi \operatorname{csgn}\left(I e^{-c(bx+a)}\left(e^{c(bx+a)}+I\right)^2\right) \operatorname{csgn}\left(e^{-c(bx+a)}\left(e^{c(bx+a)}+I\right)^2\right) e^{c(bx+a)}}{4cb}+\frac{I e^{c(bx+a)} \ln\left(e^{c(bx+a)}+I\right)}{cb}+\frac{e^{c(bx+a)}\pi}{2cb}$$

$$+\frac{\pi \operatorname{csgn}\left(I\left(e^{c(bx+a)}+I\right)^2\right)^3 e^{c(bx+a)}}{4cb}-\frac{\pi \operatorname{csgn}\left(I\left(e^{c(bx+a)}-I\right)^2\right)^3 e^{c(bx+a)}}{4cb}-\frac{\pi \operatorname{csgn}\left(I e^{-c(bx+a)}\left(e^{c(bx+a)}-I\right)^2\right)^3 e^{c(bx+a)}}{4cb}$$

$$+\frac{\pi \operatorname{csgn}\left(e^{-c(bx+a)}\left(e^{c(bx+a)}-I\right)^2\right)^3 e^{c(bx+a)}}{4cb}+\frac{\pi \operatorname{csgn}\left(I e^{-c(bx+a)}\left(e^{c(bx+a)}+I\right)^2\right)^3 e^{c(bx+a)}}{4cb}+\frac{\pi \operatorname{csgn}\left(e^{-c(bx+a)}\left(e^{c(bx+a)}+I\right)^2\right)^3 e^{c(bx+a)}}{4cb}$$

$$-\frac{\pi \operatorname{csgn}\left(e^{-c(bx+a)}\left(e^{c(bx+a)}-I\right)^2\right)^2 e^{c(bx+a)}}{4cb}-\frac{\pi \operatorname{csgn}\left(e^{-c(bx+a)}\left(e^{c(bx+a)}+I\right)^2\right)^2 e^{c(bx+a)}}{4cb}-\frac{I e^{c(bx+a)} \ln\left(e^{c(bx+a)}-I\right)}{cb}$$

$$+\frac{\pi \operatorname{csgn}\left(I\left(e^{c(bx+a)}+I\right)^2\right) \operatorname{csgn}\left(I e^{-c(bx+a)}\right) \operatorname{csgn}\left(I e^{-c(bx+a)}\left(e^{c(bx+a)}+I\right)^2\right) e^{c(bx+a)}}{4cb}$$

$$-\frac{\pi \operatorname{csgn}\left(I\left(e^{c(bx+a)}-I\right)^2\right) \operatorname{csgn}\left(I e^{-c(bx+a)}\right) \operatorname{csgn}\left(I e^{-c(bx+a)}\left(e^{c(bx+a)}-I\right)^2\right) e^{c(bx+a)}}{4cb}$$

Problem 43: Result more than twice size of optimal antiderivative.

$$\int e^{c(bx+a)} \arctan(\cosh(bcx+ac))\, dx$$

Optimal(type 3, 88 leaves, 8 steps):

$$\frac{e^{bcx+ac} \arctan(\cosh(c(bx+a)))}{cb}-\frac{\ln\left(3+e^{2c(bx+a)}-2\sqrt{2}\right)\left(1-\sqrt{2}\right)}{2cb}-\frac{\ln\left(3+e^{2c(bx+a)}+2\sqrt{2}\right)\left(1+\sqrt{2}\right)}{2cb}$$

Result(type 3, 1350 leaves):

$$-\frac{I e^{c(bx+a)} \ln\left(e^{2c(bx+a)}+1-2I e^{c(bx+a)}\right)}{2cb}-\frac{\pi \operatorname{csgn}\left(I e^{-c(bx+a)}\left(e^{2c(bx+a)}+1-2I e^{c(bx+a)}\right)\right)^3 e^{c(bx+a)}}{4cb}$$

$$+\frac{\pi \operatorname{csgn}\left(I\left(e^{2c(bx+a)}+1-2I e^{c(bx+a)}\right)\right) \operatorname{csgn}\left(I e^{-c(bx+a)}\left(e^{2c(bx+a)}+1-2I e^{c(bx+a)}\right)\right)^2 e^{c(bx+a)}}{4cb}$$

$$+\frac{\pi \operatorname{csgn}\left(I e^{-c(bx+a)}\right) \operatorname{csgn}\left(I e^{-c(bx+a)}\left(e^{2c(bx+a)}+1-2I e^{c(bx+a)}\right)\right)^2 e^{c(bx+a)}}{4cb}$$

$$+\frac{\pi \operatorname{csgn}\left(I e^{-c(bx+a)}\left(e^{2c(bx+a)}+1-2I e^{c(bx+a)}\right)\right) \operatorname{csgn}\left(e^{-c(bx+a)}\left(e^{2c(bx+a)}+1-2I e^{c(bx+a)}\right)\right)^2 e^{c(bx+a)}}{4cb}$$

$$- \frac{\pi \operatorname{csgn}\left(I e^{-c (b x+a)}\right) \operatorname{csgn}\left(I \left(e^{2 c (b x+a)}+1-2 I e^{c (b x+a)}\right)\right) \operatorname{csgn}\left(I e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1-2 I e^{c (b x+a)}\right)\right) e^{c (b x+a)}}{4 c b}$$

$$+ \frac{\pi \operatorname{csgn}\left(e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1-2 I e^{c (b x+a)}\right)\right)^3 e^{c (b x+a)}}{4 c b}$$

$$- \frac{\pi \operatorname{csgn}\left(I \left(e^{2 c (b x+a)}+1+2 I e^{c (b x+a)}\right)\right) \operatorname{csgn}\left(I e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1+2 I e^{c (b x+a)}\right)\right)^2 e^{c (b x+a)}}{4 c b}$$

$$+ \frac{\pi \operatorname{csgn}\left(I e^{-c (b x+a)}\right) \operatorname{csgn}\left(I \left(e^{2 c (b x+a)}+1+2 I e^{c (b x+a)}\right)\right) \operatorname{csgn}\left(I e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1+2 I e^{c (b x+a)}\right)\right) e^{c (b x+a)}}{4 c b}$$

$$+ \frac{\pi \operatorname{csgn}\left(I e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1+2 I e^{c (b x+a)}\right)\right)^3 e^{c (b x+a)}}{4 c b} - \frac{\pi \operatorname{csgn}\left(I e^{-c (b x+a)}\right) \operatorname{csgn}\left(I e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1+2 I e^{c (b x+a)}\right)\right)^2 e^{c (b x+a)}}{4 c b}$$

$$- \frac{\pi \operatorname{csgn}\left(I e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1+2 I e^{c (b x+a)}\right)\right) \operatorname{csgn}\left(e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1+2 I e^{c (b x+a)}\right)\right)^2 e^{c (b x+a)}}{4 c b}$$

$$+ \frac{\pi \operatorname{csgn}\left(e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1+2 I e^{c (b x+a)}\right)\right)^3 e^{c (b x+a)}}{4 c b}$$

$$- \frac{\pi \operatorname{csgn}\left(I e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1-2 I e^{c (b x+a)}\right)\right) \operatorname{csgn}\left(e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1-2 I e^{c (b x+a)}\right)\right) e^{c (b x+a)}}{4 c b}$$

$$- \frac{\pi \operatorname{csgn}\left(e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1-2 I e^{c (b x+a)}\right)\right)^2 e^{c (b x+a)}}{4 c b}$$

$$+ \frac{\pi \operatorname{csgn}\left(I e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1+2 I e^{c (b x+a)}\right)\right) \operatorname{csgn}\left(e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1+2 I e^{c (b x+a)}\right)\right) e^{c (b x+a)}}{4 c b}$$

$$- \frac{\pi \operatorname{csgn}\left(e^{-c (b x+a)} \left(e^{2 c (b x+a)}+1+2 I e^{c (b x+a)}\right)\right)^2 e^{c (b x+a)}}{4 c b} - \frac{\ln\left(e^{2 c (b x+a)}+\left(1+\sqrt{2}\right)^2\right) \sqrt{2}}{2 c b} + \frac{\ln\left(e^{2 c (b x+a)}+\left(\sqrt{2}-1\right)^2\right) \sqrt{2}}{2 c b}$$

$$+ \frac{e^{c (b x+a)} \pi}{2 c b} + \frac{2 a}{b} - \frac{\ln\left(e^{2 c (b x+a)}+\left(1+\sqrt{2}\right)^2\right)}{2 c b} - \frac{\ln\left(e^{2 c (b x+a)}+\left(\sqrt{2}-1\right)^2\right)}{2 c b} + \frac{I e^{c (b x+a)} \ln\left(e^{2 c (b x+a)}+1+2 I e^{c (b x+a)}\right)}{2 c b}$$

Problem 44: Result more than twice size of optimal antiderivative.

$$\int e^{c (b x+a)} \arctan(\operatorname{csch}(b c x+a c))\, dx$$

Optimal(type 3, 45 leaves, 5 steps):

$$\frac{e^{b c x+a c} \arctan(\operatorname{csch}(c (b x+a)))}{c b} + \frac{\ln\left(1+e^{2 c (b x+a)}\right)}{c b}$$

Result(type 3, 884 leaves):

$$- \frac{I e^{c (b x+a)} \ln\left(e^{c (b x+a)}+I\right)}{c b} - \frac{\pi \operatorname{csgn}\left(I \left(e^{c (b x+a)}+I\right)^2\right)^3 e^{c (b x+a)}}{4 c b} + \frac{\pi \operatorname{csgn}\left(I \left(e^{c (b x+a)}+I\right)\right) \operatorname{csgn}\left(I \left(e^{c (b x+a)}+I\right)^2\right)^2 e^{c (b x+a)}}{2 c b}$$

$$-\frac{\pi \operatorname{csgn}\left(I\left(e^{c(bx+a)}+I\right)\right)^2 \operatorname{csgn}\left(I\left(e^{c(bx+a)}+I\right)^2\right) e^{c(bx+a)}}{4cb}+\frac{\pi \operatorname{csgn}\left(I\left(e^{c(bx+a)}+I\right)^2\right) \operatorname{csgn}\left(\frac{I\left(e^{c(bx+a)}+I\right)^2}{e^{2c(bx+a)}-1}\right)^2 e^{c(bx+a)}}{4cb}$$

$$-\frac{\pi \operatorname{csgn}\left(I\left(e^{c(bx+a)}+I\right)^2\right) \operatorname{csgn}\left(\frac{I}{e^{2c(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{I\left(e^{c(bx+a)}+I\right)^2}{e^{2c(bx+a)}-1}\right) e^{c(bx+a)}}{4cb}$$

$$+\frac{\pi \operatorname{csgn}\left(I\left(e^{c(bx+a)}-I\right)\right)^2 \operatorname{csgn}\left(I\left(e^{c(bx+a)}-I\right)^2\right) e^{c(bx+a)}}{4cb}-\frac{\pi \operatorname{csgn}\left(I\left(e^{c(bx+a)}-I\right)\right) \operatorname{csgn}\left(I\left(e^{c(bx+a)}-I\right)^2\right)^2 e^{c(bx+a)}}{2cb}$$

$$+\frac{\pi \operatorname{csgn}\left(I\left(e^{c(bx+a)}-I\right)^2\right)^3 e^{c(bx+a)}}{4cb}+\frac{\pi \operatorname{csgn}\left(I\left(e^{c(bx+a)}-I\right)^2\right) \operatorname{csgn}\left(\frac{I}{e^{2c(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{I\left(e^{c(bx+a)}-I\right)^2}{e^{2c(bx+a)}-1}\right) e^{c(bx+a)}}{4cb}$$

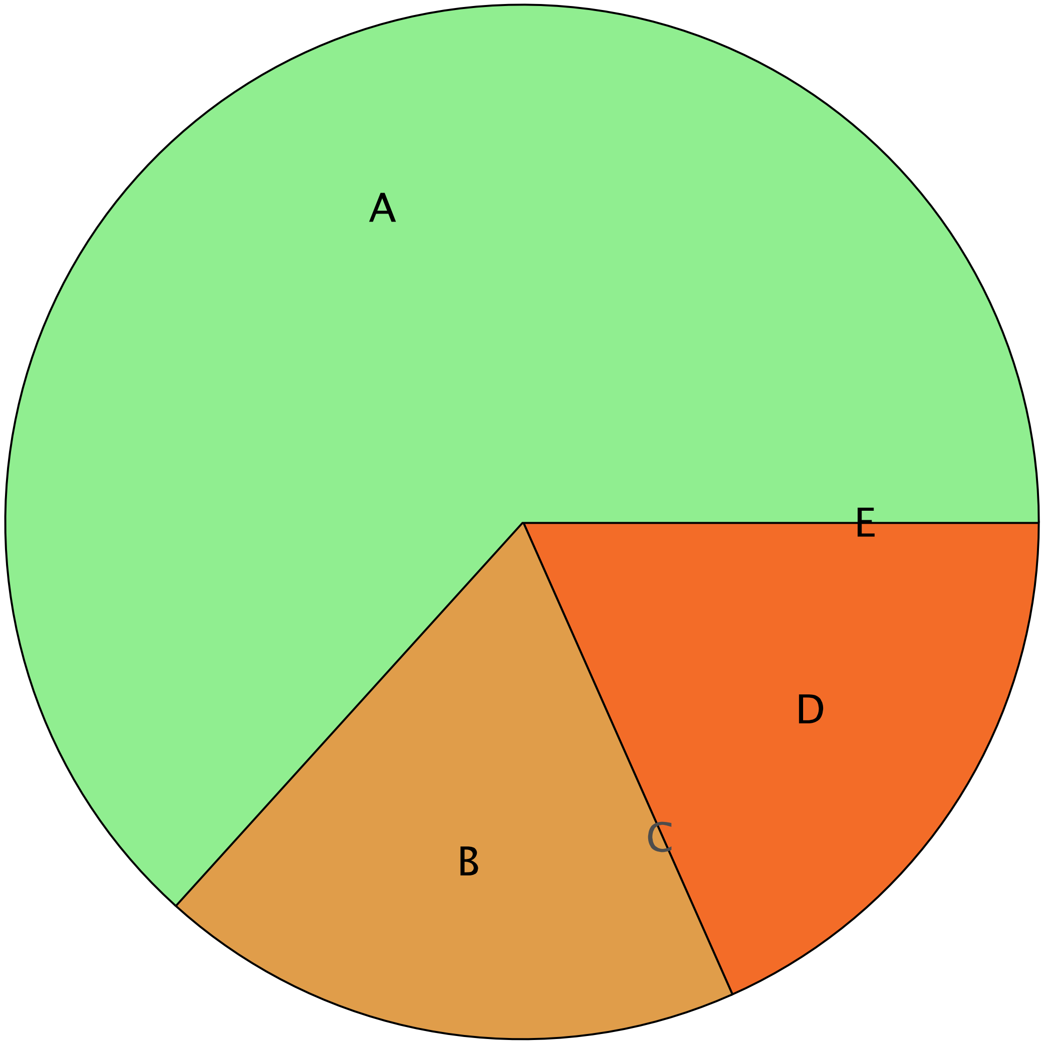
$$-\frac{\pi \operatorname{csgn}\left(I\left(e^{c(bx+a)}-I\right)^2\right) \operatorname{csgn}\left(\frac{I\left(e^{c(bx+a)}-I\right)^2}{e^{2c(bx+a)}-1}\right)^2 e^{c(bx+a)}}{4cb}-\frac{\pi \operatorname{csgn}\left(\frac{I\left(e^{c(bx+a)}+I\right)^2}{e^{2c(bx+a)}-1}\right)^3 e^{c(bx+a)}}{4cb}$$

$$+\frac{\pi \operatorname{csgn}\left(\frac{I}{e^{2c(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{I\left(e^{c(bx+a)}+I\right)^2}{e^{2c(bx+a)}-1}\right)^2 e^{c(bx+a)}}{4cb}-\frac{\pi \operatorname{csgn}\left(\frac{I}{e^{2c(bx+a)}-1}\right) \operatorname{csgn}\left(\frac{I\left(e^{c(bx+a)}-I\right)^2}{e^{2c(bx+a)}-1}\right)^2 e^{c(bx+a)}}{4cb}$$

$$+\frac{\pi \operatorname{csgn}\left(\frac{I\left(e^{c(bx+a)}-I\right)^2}{e^{2c(bx+a)}-1}\right)^3 e^{c(bx+a)}}{4cb}-\frac{2a}{b}+\frac{\ln\left(1+e^{2c(bx+a)}\right)}{cb}+\frac{I e^{c(bx+a)} \ln\left(e^{c(bx+a)}-I\right)}{cb}$$

Summary of Integration Test Results

572 integration problems



A - 362 optimal antiderivatives
B - 105 more than twice size of optimal antiderivatives
C - 0 unnecessarily complex antiderivatives
D - 105 unable to integrate problems
E - 0 integration timeouts