Mathematica 11.3 Integration Test Results

Test results for the 1301 problems in "5.3.4 u (a+b arctan(c x))^p.m"

Problem 130: Result more than twice size of optimal antiderivative.

$$\int \frac{(a + b \,\text{ArcTan}[c\, x])^3}{x\, (d + i\, c\, d\, x)} \, dx$$

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

$$\frac{(a + b\,\text{ArcTan}[c\,x])^3 \,\text{Log}\left[2 - \frac{2}{1+i\,c\,x}\right]}{d} + \frac{3\,i\,b\,(a + b\,\text{ArcTan}[c\,x])^2\,\text{PolyLog}\left[2, -1 + \frac{2}{1+i\,c\,x}\right]}{2\,d} + \frac{3\,b^2\,(a + b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[3, -1 + \frac{2}{1+i\,c\,x}\right]}{2\,d} - \frac{3\,i\,b^3\,\text{PolyLog}\left[4, -1 + \frac{2}{1+i\,c\,x}\right]}{4\,d}$$

Result (type 4, 268 leaves):

$$-\frac{1}{64\,d}\,i\,\Big(8\,a\,b^2\,\pi^3 + b^3\,\pi^4 + 64\,a^3\,\text{ArcTan}[c\,x] + 192\,a^2\,b\,\text{ArcTan}[c\,x]^2 + 192\,i\,a\,b^2\,\text{ArcTan}[c\,x]^2\,\text{Log}\left[1 - e^{-2\,i\,\text{ArcTan}[c\,x]}\right] + 64\,i\,b^3\,\text{ArcTan}[c\,x]^3\,\text{Log}\left[1 - e^{-2\,i\,\text{ArcTan}[c\,x]}\right] + 192\,i\,a^2\,b\,\text{ArcTan}[c\,x]\,\text{Log}\left[1 - e^{2\,i\,\text{ArcTan}[c\,x]}\right] + 64\,i\,a^3\,\text{Log}[c\,x] - 32\,i\,a^3\,\text{Log}\left[1 + c^2\,x^2\right] - 96\,b^2\,\text{ArcTan}[c\,x]\,(2\,a + b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2, e^{-2\,i\,\text{ArcTan}[c\,x]}\right] + 96\,a^2\,b\,\text{PolyLog}\left[2, e^{2\,i\,\text{ArcTan}[c\,x]}\right] + 96\,i\,a\,b^2\,\text{PolyLog}\left[3, e^{-2\,i\,\text{ArcTan}[c\,x]}\right] + 96\,i\,b^3\,\text{ArcTan}[c\,x]\,\text{PolyLog}\left[3, e^{-2\,i\,\text{ArcTan}[c\,x]}\right] + 48\,b^3\,\text{PolyLog}\left[4, e^{-2\,i\,\text{ArcTan}[c\,x]}\right]\Big)$$

Problem 141: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 598 leaves, 23 steps):

$$\frac{a b d x}{c e^2}+\frac{b^2 x}{3 c^2 e}-\frac{b^2 \text{ArcTan}[c x]}{3 c^3 e}+\frac{b^2 d x \text{ArcTan}[c x]}{c e^2}-\frac{b x^2 (a+b \text{ArcTan}[c x])}{3 c e}+\frac{i d^2 (a+b \text{ArcTan}[c x])^2}{c e^3}-\frac{d (a+b \text{ArcTan}[c x])^2}{2 c^2 e^2}-\frac{i (a+b \text{ArcTan}[c x])^2}{3 c^3 e}+\frac{d^2 x (a+b \text{ArcTan}[c x])^2}{e^3}-\frac{d x^2 (a+b \text{ArcTan}[c x])^2}{2 e^2}+\frac{x^3 (a+b \text{ArcTan}[c x])^2}{3 e}+\frac{d^3 (a+b \text{ArcTan}[c x])^2 \text{Log}\left[\frac{2}{1-i c x}\right]}{e^4}+\frac{2 b d^2 (a+b \text{ArcTan}[c x]) \text{Log}\left[\frac{2}{1+i c x}\right]}{c e^3}-\frac{2 b (a+b \text{ArcTan}[c x]) \text{Log}\left[\frac{2}{1+i c x}\right]}{3 c^3 e}-\frac{d^3 (a+b \text{ArcTan}[c x])^2 \text{Log}\left[\frac{2 c (d+e x)}{(c d+i e) (1-i c x)}\right]}{e^4}-\frac{b^2 d \text{Log}[1+c^2 x^2]}{2 c^2 e^2}-\frac{i b d^3 (a+b \text{ArcTan}[c x]) \text{PolyLog}\left[2, 1-\frac{2}{1-i c x}\right]}{e^4}+\frac{i b^2 d^2 \text{PolyLog}\left[2, 1-\frac{2}{1+i c x}\right]}{c e^3}-\frac{i b^2 \text{PolyLog}\left[2, 1-\frac{2}{1+i c x}\right]}{3 c^3 e}+\frac{i b d^3 (a+b \text{ArcTan}[c x]) \text{PolyLog}\left[2, 1-\frac{2 c (d+e x)}{(c d+i e) (1-i c x)}\right]}{e^4}+\frac{b^2 d^3 \text{PolyLog}\left[3, 1-\frac{2}{1-i c x}\right]}{2 e^4}-\frac{b^2 d^3 \text{PolyLog}\left[3, 1-\frac{2 c (d+e x)}{(c d+i e) (1-i c x)}\right]}{2 e^4}$$

Result (type 1, 1 leaves):

???

Problem 142: Attempted integration timed out after 120 seconds.

$$\int \frac{x^2 (a+b \text{ArcTan}[c x])^2}{d+e x} \, dx$$

Optimal (type 4, 430 leaves, 14 steps):

$$-\frac{a b x}{c e}-\frac{b^2 x \text{ArcTan}[c x]}{c e}-\frac{i d (a+b \text{ArcTan}[c x])^2}{c e^2}+\frac{(a+b \text{ArcTan}[c x])^2}{2 c^2 e}-\frac{d x (a+b \text{ArcTan}[c x])^2}{e^2}+\frac{x^2 (a+b \text{ArcTan}[c x])^2}{2 e}-\frac{d^2 (a+b \text{ArcTan}[c x])^2 \text{Log}\left[\frac{2}{1-i c x}\right]}{e^3}-\frac{2 b d (a+b \text{ArcTan}[c x]) \text{Log}\left[\frac{2}{1+i c x}\right]}{c e^2}+\frac{d^2 (a+b \text{ArcTan}[c x])^2 \text{Log}\left[\frac{2 c (d+e x)}{(c d+i e)(1-i c x)}\right]}{e^3}+\frac{b^2 \text{Log}\left[1+c^2 x^2\right]}{2 c^2 e}+\frac{i b d^2 (a+b \text{ArcTan}[c x]) \text{PolyLog}\left[2,1-\frac{2}{1-i c x}\right]}{e^3}-\frac{i b^2 d \text{PolyLog}\left[2,1-\frac{2}{1+i c x}\right]}{c e^2}-\frac{i b d^2 (a+b \text{ArcTan}[c x]) \text{PolyLog}\left[2,1-\frac{2 c (d+e x)}{(c d+i e)(1-i c x)}\right]}{e^3}-\frac{b^2 d^2 \text{PolyLog}\left[3,1-\frac{2}{1-i c x}\right]}{2 e^3}+\frac{b^2 d^2 \text{PolyLog}\left[3,1-\frac{2 c (d+e x)}{(c d+i e)(1-i c x)}\right]}{2 e^3}$$

Result (type 1, 1 leaves):

???

Problem 143: Attempted integration timed out after 120 seconds.

$$\int \frac{x (a+b \text{ArcTan}[c x])^2}{d+e x} \, dx$$

Optimal (type 4, 323 leaves, 8 steps):

$$\frac{i (a+b \text{ArcTan}[c x])^2}{c e}+\frac{x (a+b \text{ArcTan}[c x])^2}{e}+\frac{d (a+b \text{ArcTan}[c x])^2 \text{Log}\left[\frac{2}{1-i c x}\right]}{e^2}+\frac{2 b (a+b \text{ArcTan}[c x]) \text{Log}\left[\frac{2}{1+i c x}\right]}{c e}-\frac{d (a+b \text{ArcTan}[c x])^2 \text{Log}\left[\frac{2 c (d+e x)}{(c d+i e)(1-i c x)}\right]}{e^2}-\frac{i b d (a+b \text{ArcTan}[c x]) \text{PolyLog}\left[2,1-\frac{2}{1-i c x}\right]}{e^2}+\frac{i b^2 \text{PolyLog}\left[2,1-\frac{2}{1+i c x}\right]}{c e}+\frac{i b d (a+b \text{ArcTan}[c x]) \text{PolyLog}\left[2,1-\frac{2 c (d+e x)}{(c d+i e)(1-i c x)}\right]}{e^2}+\frac{b^2 d \text{PolyLog}\left[3,1-\frac{2}{1-i c x}\right]}{2 e^2}-\frac{b^2 d \text{PolyLog}\left[3,1-\frac{2 c (d+e x)}{(c d+i e)(1-i c x)}\right]}{2 e^2}$$

Result (type 1, 1 leaves):

???

Problem 144: Attempted integration timed out after 120 seconds.

$$\int \frac{(a+b \text{ArcTan}[c x])^2}{d+e x} \, dx$$

Optimal (type 4, 223 leaves, 1 step):

$$-\frac{(a+b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2}{1-i\,c\,x}\right]}{e}+\frac{(a+b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2\,c\,(d+e\,x)}{(c\,d+i\,e)\,(1-i\,c\,x)}\right]}{e}+\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2}{1-i\,c\,x}\right]}{e}-\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2\,c\,(d+e\,x)}{(c\,d+i\,e)\,(1-i\,c\,x)}\right]}{e}-\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2}{1-i\,c\,x}\right]}{2\,e}+\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2\,c\,(d+e\,x)}{(c\,d+i\,e)\,(1-i\,c\,x)}\right]}{2\,e}$$

Result (type 1, 1 leaves):

???

Problem 145: Attempted integration timed out after 120 seconds.

$$\int\frac{(a+b\,\text{ArcTan}[c\,x])^2}{x\,(d+e\,x)}\,dx$$

Optimal (type 4, 369 leaves, 9 steps):

$$\frac{2\,(a+b\,\text{ArcTan}[c\,x])^2\,\text{ArcTanh}\left[1-\frac{2}{1+i\,c\,x}\right]}{d}+\frac{(a+b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2}{1-i\,c\,x}\right]}{d}-\frac{(a+b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2\,c\,(d+e\,x)}{(c\,d+i\,e)\,(1-i\,c\,x)}\right]}{d}-\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2}{1-i\,c\,x}\right]}{d}-\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2}{1+i\,c\,x}\right]}{d}+\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,-1+\frac{2}{1+i\,c\,x}\right]}{d}+\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2\,c\,(d+e\,x)}{(c\,d+i\,e)\,(1-i\,c\,x)}\right]}{d}+\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2}{1-i\,c\,x}\right]}{2\,d}-\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2}{1+i\,c\,x}\right]}{2\,d}+\frac{b^2\,\text{PolyLog}\left[3,-1+\frac{2}{1+i\,c\,x}\right]}{2\,d}-\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2\,c\,(d+e\,x)}{(c\,d+i\,e)\,(1-i\,c\,x)}\right]}{2\,d}$$

Result (type 1, 1 leaves):

???

Problem 146: Attempted integration timed out after 120 seconds.

$$\int\frac{(a+b\,\text{ArcTan}[c\,x])^2}{x^2\,(d+e\,x)}\,dx$$

Optimal (type 4, 473 leaves, 13 steps):

$$-\frac{i c (a+b \text{ArcTan}[c x])^2}{d}-\frac{(a+b \text{ArcTan}[c x])^2}{d x}-\frac{2 e (a+b \text{ArcTan}[c x])^2 \text{ArcTanh}\left[1-\frac{2}{1+i c x}\right]}{d^2}-$$
$$\frac{e (a+b \text{ArcTan}[c x])^2 \text{Log}\left[\frac{2}{1-i c x}\right]}{d^2}+\frac{e (a+b \text{ArcTan}[c x])^2 \text{Log}\left[\frac{2 c (d+e x)}{(c d+i e)(1-i c x)}\right]}{d^2}+$$
$$\frac{2 b c (a+b \text{ArcTan}[c x]) \text{Log}\left[2-\frac{2}{1-i c x}\right]}{d}+\frac{i b e (a+b \text{ArcTan}[c x]) \text{PolyLog}\left[2, 1-\frac{2}{1-i c x}\right]}{d^2}-$$
$$\frac{i b^2 c \text{PolyLog}\left[2, -1+\frac{2}{1-i c x}\right]}{d}+\frac{i b e (a+b \text{ArcTan}[c x]) \text{PolyLog}\left[2, 1-\frac{2}{1+i c x}\right]}{d^2}-$$
$$\frac{i b e (a+b \text{ArcTan}[c x]) \text{PolyLog}\left[2, -1+\frac{2}{1+i c x}\right]}{d^2}-$$
$$\frac{i b e (a+b \text{ArcTan}[c x]) \text{PolyLog}\left[2, 1-\frac{2 c (d+e x)}{(c d+i e)(1-i c x)}\right]}{d^2}-\frac{b^2 e \text{PolyLog}\left[3, 1-\frac{2}{1-i c x}\right]}{2 d^2}+$$
$$\frac{b^2 e \text{PolyLog}\left[3, 1-\frac{2}{1+i c x}\right]}{2 d^2}-\frac{b^2 e \text{PolyLog}\left[3, -1+\frac{2}{1+i c x}\right]}{2 d^2}+\frac{b^2 e \text{PolyLog}\left[3, 1-\frac{2 c (d+e x)}{(c d+i e)(1-i c x)}\right]}{2 d^2}$$

Result (type 1, 1 leaves):

???

Problem 147: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 591 leaves, 21 steps):

$$-\frac{b\,c\,(a+b\,\text{ArcTan}[c\,x])}{d\,x}-\frac{c^2\,(a+b\,\text{ArcTan}[c\,x])^2}{2\,d}+\frac{i\,c\,e\,(a+b\,\text{ArcTan}[c\,x])^2}{d^2}-\frac{(a+b\,\text{ArcTan}[c\,x])^2}{2\,d\,x^2}+\frac{e\,(a+b\,\text{ArcTan}[c\,x])^2}{d^2\,x}+\frac{2\,e^2\,(a+b\,\text{ArcTan}[c\,x])^2\,\text{ArcTanh}\left[1-\frac{2}{1+i\,c\,x}\right]}{d^3}+\frac{b^2\,c^2\,\text{Log}[x]}{d}+\frac{e^2\,(a+b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2}{1-i\,c\,x}\right]}{d^3}-\frac{e^2\,(a+b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2\,c\,(d+e\,x)}{(c\,d+i\,e)\,(1-i\,c\,x)}\right]}{d^3}-\frac{b^2\,c^2\,\text{Log}[1+c^2\,x^2]}{2\,d}-\frac{2\,b\,c\,e\,(a+b\,\text{ArcTan}[c\,x])\,\text{Log}\left[2-\frac{2}{1-i\,c\,x}\right]}{d^2}-\frac{i\,b\,e^2\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2}{1-i\,c\,x}\right]}{d^3}+\frac{i\,b^2\,c\,e\,\text{PolyLog}\left[2,-1+\frac{2}{1-i\,c\,x}\right]}{d^2}-\frac{i\,b\,e^2\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2}{1+i\,c\,x}\right]}{d^3}+\frac{i\,b\,e^2\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,-1+\frac{2}{1+i\,c\,x}\right]}{d^3}+\frac{i\,b\,e^2\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2\,c\,(d+e\,x)}{(c\,d+i\,e)\,(1-i\,c\,x)}\right]}{d^3}+\frac{b^2\,e^2\,\text{PolyLog}\left[3,1-\frac{2}{1-i\,c\,x}\right]}{2\,d^3}-\frac{b^2\,e^2\,\text{PolyLog}\left[3,1-\frac{2}{1+i\,c\,x}\right]}{2\,d^3}+\frac{b^2\,e^2\,\text{PolyLog}\left[3,-1+\frac{2}{1+i\,c\,x}\right]}{2\,d^3}-\frac{b^2\,e^2\,\text{PolyLog}\left[3,1-\frac{2\,c\,(d+e\,x)}{(c\,d+i\,e)\,(1-i\,c\,x)}\right]}{2\,d^3}$$

Result (type 1, 1 leaves) :

???

Problem 217: Result more than twice size of optimal antiderivative.

$$\int x^2\,(c+a^2\,c\,x^2)^{5/2}\,\text{ArcTan}[a\,x]\,dx$$

Optimal (type 4, 418 leaves, 51 steps) :

$$\frac{5\,c^2\,\sqrt{c+a^2\,c\,x^2}}{128\,a^3}+\frac{5\,c\,(c+a^2\,c\,x^2)^{3/2}}{576\,a^3}+\frac{(c+a^2\,c\,x^2)^{5/2}}{240\,a^3}-\frac{(c+a^2\,c\,x^2)^{7/2}}{56\,a^3\,c}+\frac{5\,c^2\,x\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]}{128\,a^2}+\frac{59}{192}\,c^2\,x^3\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]+\frac{17}{48}\,a^2\,c^2\,x^5\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]+\frac{1}{8}\,a^4\,c^2\,x^7\,\sqrt{c+a^2\,c\,x^2}\,\text{ArcTan}[a\,x]+\frac{5\,i\,c^3\,\sqrt{1+a^2\,x^2}\,\text{ArcTan}[a\,x]\,\text{ArcTan}\left[\frac{\sqrt{1+i\,a\,x}}{\sqrt{1-i\,a\,x}}\right]}{64\,a^3\,\sqrt{c+a^2\,c\,x^2}}-\frac{5\,i\,c^3\,\sqrt{1+a^2\,x^2}\,\text{PolyLog}\left[2,-\frac{i\,\sqrt{1+i\,a\,x}}{\sqrt{1-i\,a\,x}}\right]}{128\,a^3\,\sqrt{c+a^2\,c\,x^2}}+\frac{5\,i\,c^3\,\sqrt{1+a^2\,x^2}\,\text{PolyLog}\left[2,\frac{i\,\sqrt{1+i\,a\,x}}{\sqrt{1-i\,a\,x}}\right]}{128\,a^3\,\sqrt{c+a^2\,c\,x^2}}$$

Result (type 4, 1780 leaves) :

$$\frac{1}{a^3} c^2 \left(\frac{89 \sqrt{c\,(1+a^2 x^2)}}{10080 \sqrt{1+a^2 x^2}} - \frac{1}{128 \sqrt{1+a^2 x^2}}\right.$$

$$5 \sqrt{c\,(1+a^2 x^2)}\, \left(\text{ArcTan}[a\,x]\,\left(\text{Log}\left[1-i\, e^{i\,\text{ArcTan}[a\,x]}\right]-\text{Log}\left[1+i\, e^{i\,\text{ArcTan}[a\,x]}\right]\right)+ i\,\left(\text{PolyLog}\left[2,-i\, e^{i\,\text{ArcTan}[a\,x]}\right]-\text{PolyLog}\left[2,i\, e^{i\,\text{ArcTan}[a\,x]}\right]\right)\right)+$$

$$\frac{\sqrt{c\,(1+a^2 x^2)}\ \text{ArcTan}[a\,x]}{128 \sqrt{1+a^2 x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^8}+$$

$$\frac{\sqrt{c\,(1+a^2 x^2)}\,(-3-98\,\text{ArcTan}[a\,x])}{2688 \sqrt{1+a^2 x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6}+$$

$$\frac{\sqrt{c\,(1+a^2 x^2)}\,(178+1575\,\text{ArcTan}[a\,x])}{26880 \sqrt{1+a^2 x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\,(1+a^2 x^2)}\,(-1219-1575\,\text{ArcTan}[a\,x])}{80640 \sqrt{1+a^2 x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{\sqrt{c\,(1+a^2 x^2)}\ \text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{448 \sqrt{1+a^2 x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^7}+$$

$$\frac{89 \sqrt{c\,(1+a^2 x^2)}\ \text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{6720 \sqrt{1+a^2 x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^5}-$$

$$\frac{1219 \sqrt{c\,(1+a^2 x^2)}\ \text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{40320 \sqrt{1+a^2 x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}+$$

$$\frac{89 \sqrt{c\,(1+a^2 x^2)}\ \text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{10080 \sqrt{1+a^2 x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}-$$

$$\frac{\sqrt{c\,(1+a^2 x^2)}\ \text{ArcTan}[a\,x]}{128 \sqrt{1+a^2 x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^8}+$$

$$\frac{\sqrt{c\,(1+a^2 x^2)}\ \text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{448 \sqrt{1+a^2 x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^7}+$$

$$\frac{\sqrt{c\,(1+a^2 x^2)}\,(-3+98\,\text{ArcTan}[a\,x])}{2688 \sqrt{1+a^2 x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6}-$$

$$\frac{89\sqrt{c\left(1+a^2x^2\right)}\ \mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]}{6720\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^5}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ (178-1575\,\mathrm{ArcTan}[a\,x])}{26880\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{1219\sqrt{c\left(1+a^2x^2\right)}\ \mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]}{40320\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^3}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ (-1219+1575\,\mathrm{ArcTan}[a\,x])}{80640\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)^2}-$$

$$\left.\frac{89\sqrt{c\left(1+a^2x^2\right)}\ \mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]}{10080\sqrt{1+a^2x^2}\left(\mathrm{Cos}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]+\mathrm{Sin}\left[\frac{1}{2}\mathrm{ArcTan}[a\,x]\right]\right)}\right)+$$

$$\frac{1}{48\,a^3\sqrt{1+a^2x^2}}\,c^2\sqrt{c\left(1+a^2x^2\right)}\,\Big(-6\,i\,\mathrm{PolyLog}\left[2,\,-i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]+$$
$$6\,i\,\mathrm{PolyLog}\left[2,\,i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]-\frac{1}{4}\left(1+a^2x^2\right)^2\Big(-\frac{2}{\sqrt{1+a^2x^2}}-$$
$$6\,\mathrm{Cos}[3\,\mathrm{ArcTan}[a\,x]]+3\,\mathrm{ArcTan}[a\,x]\Big(-\frac{14\,a\,x}{\sqrt{1+a^2x^2}}+3\,\mathrm{Log}\left[1-i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]+$$
$$4\,\mathrm{Cos}[2\,\mathrm{ArcTan}[a\,x]]\left(\mathrm{Log}\left[1-i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]-\mathrm{Log}\left[1+i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]\right)+$$
$$\mathrm{Cos}[4\,\mathrm{ArcTan}[a\,x]]\left(\mathrm{Log}\left[1-i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]-\mathrm{Log}\left[1+i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]\right)-$$
$$3\,\mathrm{Log}\left[1+i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]+2\,\mathrm{Sin}[3\,\mathrm{ArcTan}[a\,x]]\Big)\Big)\Big)+\frac{1}{720\,a^3\sqrt{1+a^2x^2}}$$

$$c^2\sqrt{c\left(1+a^2x^2\right)}\,\Big(90\,i\,\mathrm{PolyLog}\left[2,\,-i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]-90\,i\,\mathrm{PolyLog}\left[2,\,i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]+$$
$$\frac{1}{16}\left(1+a^2x^2\right)^3\Big(\frac{12}{\sqrt{1+a^2x^2}}+110\,\mathrm{Cos}[3\,\mathrm{ArcTan}[a\,x]]-90\,\mathrm{Cos}[5\,\mathrm{ArcTan}[a\,x]]+15\,\mathrm{ArcTan}[a\,x]$$
$$\Big(\frac{156\,a\,x}{\sqrt{1+a^2x^2}}+30\,\mathrm{Log}\left[1-i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]+3\,\mathrm{Cos}[6\,\mathrm{ArcTan}[a\,x]]\,\mathrm{Log}\left[1-i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]+$$
$$45\,\mathrm{Cos}[2\,\mathrm{ArcTan}[a\,x]]\left(\mathrm{Log}\left[1-i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]-\mathrm{Log}\left[1+i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]\right)+$$
$$18\,\mathrm{Cos}[4\,\mathrm{ArcTan}[a\,x]]\left(\mathrm{Log}\left[1-i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]-\mathrm{Log}\left[1+i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]\right)-$$
$$30\,\mathrm{Log}\left[1+i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]-3\,\mathrm{Cos}[6\,\mathrm{ArcTan}[a\,x]]\,\mathrm{Log}\left[1+i\,e^{i\,\mathrm{ArcTan}[a\,x]}\right]-$$
$$94\,\mathrm{Sin}[3\,\mathrm{ArcTan}[a\,x]]+6\,\mathrm{Sin}[5\,\mathrm{ArcTan}[a\,x]]\Big)\Big)\Big)$$

Problem 316: Result more than twice size of optimal antiderivative.

$$\int x^2\left(c+a^2c\,x^2\right)^{3/2}\mathrm{ArcTan}[a\,x]^2\,dx$$

Optimal (type 4, 531 leaves, 92 steps):

$$\frac{c x \sqrt{c+a^2 c x^2}}{36 a^2}+\frac{1}{60} c x^3 \sqrt{c+a^2 c x^2}+\frac{31 c \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]}{360 a^3}-\frac{19 c x^2 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]}{180 a}-\frac{1}{15} a c x^4 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]+\frac{c x \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^2}{16 a^2}+\frac{7}{24} c x^3 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^2+\frac{1}{6} a^2 c x^5 \sqrt{c+a^2 c x^2}\, \text{ArcTan}[a x]^2+\frac{i c^2 \sqrt{1+a^2 x^2}\, \text{ArcTan}\left[e^{i \text{ArcTan}[a x]}\right] \text{ArcTan}[a x]^2}{8 a^3 \sqrt{c+a^2 c x^2}}-\frac{41 c^{3/2} \text{ArcTanh}\left[\frac{a \sqrt{c} x}{\sqrt{c+a^2 c x^2}}\right]}{360 a^3}-\frac{i c^2 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]\, \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{8 a^3 \sqrt{c+a^2 c x^2}}+\frac{i c^2 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]\, \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{8 a^3 \sqrt{c+a^2 c x^2}}+\frac{c^2 \sqrt{1+a^2 x^2}\, \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]}{8 a^3 \sqrt{c+a^2 c x^2}}-\frac{c^2 \sqrt{1+a^2 x^2}\, \text{PolyLog}\left[3,i e^{i \text{ArcTan}[a x]}\right]}{8 a^3 \sqrt{c+a^2 c x^2}}$$

Result (type 4, 1115 leaves):

$$\frac{1}{11520\, a^3 \sqrt{1+a^2 x^2}} c \sqrt{c+a^2 c x^2}$$

$$\Big(184\, a\, x \sqrt{1+a^2 x^2} + 128\, a^3 x^3 \sqrt{1+a^2 x^2} - 56\, a^5 x^5 \sqrt{1+a^2 x^2} + 252 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x] +$$

$$264\, a^2 x^2 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x] + 12\, a^4 x^4 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x] +$$

$$3690\, a\, x \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2 + 4860\, a^3 x^3 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2 +$$

$$1170\, a^5 x^5 \sqrt{1+a^2 x^2}\, \text{ArcTan}[a x]^2 + 830\, \text{ArcTan}[a x]\, \text{Cos}[3\, \text{ArcTan}[a x]] +$$

$$1770\, a^2 x^2\, \text{ArcTan}[a x]\, \text{Cos}[3\, \text{ArcTan}[a x]] + 1050\, a^4 x^4\, \text{ArcTan}[a x]\, \text{Cos}[3\, \text{ArcTan}[a x]] +$$

$$110\, a^6 x^6\, \text{ArcTan}[a x]\, \text{Cos}[3\, \text{ArcTan}[a x]] - 90\, \text{ArcTan}[a x]\, \text{Cos}[5\, \text{ArcTan}[a x]] -$$

$$270\, a^2 x^2\, \text{ArcTan}[a x]\, \text{Cos}[5\, \text{ArcTan}[a x]] - 270\, a^4 x^4\, \text{ArcTan}[a x]\, \text{Cos}[5\, \text{ArcTan}[a x]] -$$

$$90\, a^6 x^6\, \text{ArcTan}[a x]\, \text{Cos}[5\, \text{ArcTan}[a x]] - 720\, \pi\, \text{ArcTan}[a x]\, \text{Log}[2] + 480\, \pi\, \text{ArcTan}[a x]\, \text{Log}[8] -$$

$$720\, \text{ArcTan}[a x]^2\, \text{Log}\left[1 - i\, e^{i\, \text{ArcTan}[a x]}\right] + 720\, \text{ArcTan}[a x]^2\, \text{Log}\left[1 + i\, e^{i\, \text{ArcTan}[a x]}\right] -$$

$$720\, \pi\, \text{ArcTan}[a x]\, \text{Log}\left[\left(-\frac{1}{2} - \frac{i}{2}\right) e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left(-i + e^{i\, \text{ArcTan}[a x]}\right)\right] +$$

$$720\, \text{ArcTan}[a x]^2\, \text{Log}\left[\left(\frac{1}{2} + \frac{i}{2}\right) e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left(-i + e^{i\, \text{ArcTan}[a x]}\right)\right] -$$

$$720\, \pi\, \text{ArcTan}[a x]\, \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left((1+i) + (1-i)\, e^{i\, \text{ArcTan}[a x]}\right)\right] -$$

$$720\, \text{ArcTan}[a x]^2\, \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i\, \text{ArcTan}[a x]} \left((1+i) + (1-i)\, e^{i\, \text{ArcTan}[a x]}\right)\right] +$$

$$720\, \pi\, \text{ArcTan}[a x]\, \text{Log}\left[-\text{Cos}\left[\frac{1}{4} (\pi + 2\, \text{ArcTan}[a x])\right]\right] +$$

$$1312\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] -$$

$$720\, \text{ArcTan}[a x]^2\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] -$$

$$1312\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] +$$

$$720\, \text{ArcTan}[a x]^2\, \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right] +$$

$$720\, \pi\, \text{ArcTan}[a x]\, \text{Log}\left[\text{Sin}\left[\frac{1}{4} (\pi + 2\, \text{ArcTan}[a x])\right]\right] -$$

$$1440\, i\, \text{ArcTan}[a x]\, \text{PolyLog}\left[2, -i\, e^{i\, \text{ArcTan}[a x]}\right] + 1440\, i\, \text{ArcTan}[a x]\, \text{PolyLog}\left[2, i\, e^{i\, \text{ArcTan}[a x]}\right] +$$

$$1440\, \text{PolyLog}\left[3, -i\, e^{i\, \text{ArcTan}[a x]}\right] - 1440\, \text{PolyLog}\left[3, i\, e^{i\, \text{ArcTan}[a x]}\right] +$$

$$132\, \text{Sin}[3\, \text{ArcTan}[a x]] + 156\, a^2 x^2\, \text{Sin}[3\, \text{ArcTan}[a x]] - 84\, a^4 x^4\, \text{Sin}[3\, \text{ArcTan}[a x]] -$$

$$108\, a^6 x^6\, \text{Sin}[3\, \text{ArcTan}[a x]] - 1065\, \text{ArcTan}[a x]^2\, \text{Sin}[3\, \text{ArcTan}[a x]] -$$

$$2835\, a^2 x^2\, \text{ArcTan}[a x]^2\, \text{Sin}[3\, \text{ArcTan}[a x]] - 2475\, a^4 x^4\, \text{ArcTan}[a x]^2\, \text{Sin}[3\, \text{ArcTan}[a x]] -$$

$$705\, a^6 x^6\, \text{ArcTan}[a x]^2\, \text{Sin}[3\, \text{ArcTan}[a x]] - 52\, \text{Sin}[5\, \text{ArcTan}[a x]] -$$

$$156\, a^2 x^2\, \text{Sin}[5\, \text{ArcTan}[a x]] - 156\, a^4 x^4\, \text{Sin}[5\, \text{ArcTan}[a x]] - 52\, a^6 x^6\, \text{Sin}[5\, \text{ArcTan}[a x]] +$$

$$45\, \text{ArcTan}[a x]^2\, \text{Sin}[5\, \text{ArcTan}[a x]] + 135\, a^2 x^2\, \text{ArcTan}[a x]^2\, \text{Sin}[5\, \text{ArcTan}[a x]] +$$

$$135\, a^4 x^4\, \text{ArcTan}[a x]^2\, \text{Sin}[5\, \text{ArcTan}[a x]] + 45\, a^6 x^6\, \text{ArcTan}[a x]^2\, \text{Sin}[5\, \text{ArcTan}[a x]]\Big)$$

Problem 323: Result more than twice size of optimal antiderivative.

$$\int x^3 \left(c+a^2 c x^2\right)^{5/2} \text{ArcTan}[a x]^2 \, dx$$

Optimal (type 4, 578 leaves, 203 steps):

$$-\frac{115 c^2 \sqrt{c+a^2 c x^2}}{4032 a^4}-\frac{115 c \left(c+a^2 c x^2\right)^{3/2}}{18144 a^4}-\frac{23 \left(c+a^2 c x^2\right)^{5/2}}{7560 a^4}+\frac{\left(c+a^2 c x^2\right)^{7/2}}{252 a^4 c}+\frac{47 c^2 x \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]}{1344 a^3}-\frac{205 c^2 x^3 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]}{6048 a}-\frac{103 a c^2 x^5 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]}{1512}-\frac{1}{36} a^3 c^2 x^7 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]-\frac{2 c^2 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^2}{63 a^4}+\frac{c^2 x^2 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^2}{63 a^2}+\frac{5}{21} c^2 x^4 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^2+\frac{19}{63} a^2 c^2 x^6 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^2+\frac{1}{9} a^4 c^2 x^8 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^2-\frac{115 i c^3 \sqrt{1+a^2 x^2} \text{ArcTan}[a x] \text{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{2016 a^4 \sqrt{c+a^2 c x^2}}+\frac{115 i c^3 \sqrt{1+a^2 x^2} \text{PolyLog}\left[2,-\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{4032 a^4 \sqrt{c+a^2 c x^2}}-\frac{115 i c^3 \sqrt{1+a^2 x^2} \text{PolyLog}\left[2,\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{4032 a^4 \sqrt{c+a^2 c x^2}}$$

Result (type 4, 1381 leaves):

$$-\frac{1}{960 a^4} c^2 \left(1+a^2 x^2\right)^2 \sqrt{c \left(1+a^2 x^2\right)} \left(50-32 \text{ArcTan}[a x]^2+72 \text{Cos}[2 \text{ArcTan}[a x]]+160 \text{ArcTan}[a x]^2 \text{Cos}[2 \text{ArcTan}[a x]]+22 \text{Cos}[4 \text{ArcTan}[a x]]-\frac{110 \text{ArcTan}[a x] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-55 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]-11 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]+\frac{110 \text{ArcTan}[a x] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+55 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]+11 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]-\frac{176 i \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{\left(1+a^2 x^2\right)^{5/2}}+\frac{176 i \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{\left(1+a^2 x^2\right)^{5/2}}+4 \text{ArcTan}[a x] \text{Sin}[2 \text{ArcTan}[a x]]-22 \text{ArcTan}[a x] \text{Sin}[4 \text{ArcTan}[a x]]\right)+\frac{1}{80640 a^4} c^2 \left(1+a^2 x^2\right)^3 \sqrt{c \left(1+a^2 x^2\right)} \left(4116+10944 \text{ArcTan}[a x]^2+6262 \text{Cos}[2 \text{ArcTan}[a x]]-5376 \text{ArcTan}[a x]^2 \text{Cos}[2 \text{ArcTan}[a x]]+\right.$$

$$2764\,\text{Cos}[4\,\text{ArcTan}[a\,x]] + 6720\,\text{ArcTan}[a\,x]^2\,\text{Cos}[4\,\text{ArcTan}[a\,x]] +$$
$$618\,\text{Cos}[6\,\text{ArcTan}[a\,x]] - \frac{10815\,\text{ArcTan}[a\,x]\,\text{Log}\left[1 - i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1 + a^2\,x^2}} -$$
$$6489\,\text{ArcTan}[a\,x]\,\text{Cos}[3\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 - i\,e^{i\,\text{ArcTan}[a\,x]}\right] -$$
$$2163\,\text{ArcTan}[a\,x]\,\text{Cos}[5\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 - i\,e^{i\,\text{ArcTan}[a\,x]}\right] -$$
$$309\,\text{ArcTan}[a\,x]\,\text{Cos}[7\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 - i\,e^{i\,\text{ArcTan}[a\,x]}\right] +$$
$$\frac{10815\,\text{ArcTan}[a\,x]\,\text{Log}\left[1 + i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1 + a^2\,x^2}} +$$
$$6489\,\text{ArcTan}[a\,x]\,\text{Cos}[3\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 + i\,e^{i\,\text{ArcTan}[a\,x]}\right] +$$
$$2163\,\text{ArcTan}[a\,x]\,\text{Cos}[5\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 + i\,e^{i\,\text{ArcTan}[a\,x]}\right] + 309\,\text{ArcTan}[a\,x]$$
$$\text{Cos}[7\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 + i\,e^{i\,\text{ArcTan}[a\,x]}\right] - \frac{19776\,i\,\text{PolyLog}\left[2, -i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\left(1 + a^2\,x^2\right)^{7/2}} +$$
$$\frac{19776\,i\,\text{PolyLog}\left[2, i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\left(1 + a^2\,x^2\right)^{7/2}} - 1266\,\text{ArcTan}[a\,x]\,\text{Sin}[2\,\text{ArcTan}[a\,x]] +$$
$$\left.360\,\text{ArcTan}[a\,x]\,\text{Sin}[4\,\text{ArcTan}[a\,x]] - 618\,\text{ArcTan}[a\,x]\,\text{Sin}[6\,\text{ArcTan}[a\,x]]\right) -$$
$$\frac{1}{46448640\,a^4}\,c^2\,\left(1 + a^2\,x^2\right)^4\,\sqrt{c\,\left(1 + a^2\,x^2\right)}\,\left(657578 - 820224\,\text{ArcTan}[a\,x]^2 +\right.$$
$$1083168\,\text{Cos}[2\,\text{ArcTan}[a\,x]] + 3276288\,\text{ArcTan}[a\,x]^2\,\text{Cos}[2\,\text{ArcTan}[a\,x]] +$$
$$576936\,\text{Cos}[4\,\text{ArcTan}[a\,x]] - 580608\,\text{ArcTan}[a\,x]^2\,\text{Cos}[4\,\text{ArcTan}[a\,x]] +$$
$$184160\,\text{Cos}[6\,\text{ArcTan}[a\,x]] + 483840\,\text{ArcTan}[a\,x]^2\,\text{Cos}[6\,\text{ArcTan}[a\,x]] +$$
$$32814\,\text{Cos}[8\,\text{ArcTan}[a\,x]] - \frac{2067282\,\text{ArcTan}[a\,x]\,\text{Log}\left[1 - i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1 + a^2\,x^2}} -$$
$$1378188\,\text{ArcTan}[a\,x]\,\text{Cos}[3\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 - i\,e^{i\,\text{ArcTan}[a\,x]}\right] -$$
$$590652\,\text{ArcTan}[a\,x]\,\text{Cos}[5\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 - i\,e^{i\,\text{ArcTan}[a\,x]}\right] -$$
$$147663\,\text{ArcTan}[a\,x]\,\text{Cos}[7\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 - i\,e^{i\,\text{ArcTan}[a\,x]}\right] -$$
$$16407\,\text{ArcTan}[a\,x]\,\text{Cos}[9\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 - i\,e^{i\,\text{ArcTan}[a\,x]}\right] +$$
$$\frac{2067282\,\text{ArcTan}[a\,x]\,\text{Log}\left[1 + i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1 + a^2\,x^2}} +$$
$$1378188\,\text{ArcTan}[a\,x]\,\text{Cos}[3\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 + i\,e^{i\,\text{ArcTan}[a\,x]}\right] +$$
$$590652\,\text{ArcTan}[a\,x]\,\text{Cos}[5\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 + i\,e^{i\,\text{ArcTan}[a\,x]}\right] +$$
$$147663\,\text{ArcTan}[a\,x]\,\text{Cos}[7\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 + i\,e^{i\,\text{ArcTan}[a\,x]}\right] +$$
$$16407\,\text{ArcTan}[a\,x]\,\text{Cos}[9\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 + i\,e^{i\,\text{ArcTan}[a\,x]}\right] -$$
$$\frac{4200192\,i\,\text{PolyLog}\left[2, -i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\left(1 + a^2\,x^2\right)^{9/2}} + \frac{4200192\,i\,\text{PolyLog}\left[2, i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\left(1 + a^2\,x^2\right)^{9/2}} +$$
$$78444\,\text{ArcTan}[a\,x]\,\text{Sin}[2\,\text{ArcTan}[a\,x]] - 160452\,\text{ArcTan}[a\,x]\,\text{Sin}[4\,\text{ArcTan}[a\,x]] +$$
$$\left.38172\,\text{ArcTan}[a\,x]\,\text{Sin}[6\,\text{ArcTan}[a\,x]] - 32814\,\text{ArcTan}[a\,x]\,\text{Sin}[8\,\text{ArcTan}[a\,x]]\right)$$

Problem 324: Result more than twice size of optimal antiderivative.

$$\int x^2 \left(c + a^2 c x^2\right)^{5/2} \text{ArcTan}[a x]^2 \, dx$$

Optimal (type 4, 638 leaves, 238 steps):

$$\frac{43 c^2 x \sqrt{c + a^2 c x^2}}{4032 a^2} + \frac{29 c^2 x^3 \sqrt{c + a^2 c x^2}}{1680} + \frac{1}{168} a^2 c^2 x^5 \sqrt{c + a^2 c x^2} + \frac{1373 c^2 \sqrt{c + a^2 c x^2} \text{ArcTan}[a x]}{20160 a^3} - \frac{737 c^2 x^2 \sqrt{c + a^2 c x^2} \text{ArcTan}[a x]}{10080 a} - \frac{83}{840} a c^2 x^4 \sqrt{c + a^2 c x^2} \text{ArcTan}[a x] - \frac{1}{28} a^3 c^2 x^6 \sqrt{c + a^2 c x^2} \text{ArcTan}[a x] + \frac{5 c^2 x \sqrt{c + a^2 c x^2} \text{ArcTan}[a x]^2}{128 a^2} + \frac{59}{192} c^2 x^3 \sqrt{c + a^2 c x^2} \text{ArcTan}[a x]^2 + \frac{17}{48} a^2 c^2 x^5 \sqrt{c + a^2 c x^2} \text{ArcTan}[a x]^2 + \frac{1}{8} a^4 c^2 x^7 \sqrt{c + a^2 c x^2} \text{ArcTan}[a x]^2 + \frac{5 i c^3 \sqrt{1 + a^2 x^2} \text{ArcTan}\left[e^{i \text{ArcTan}[a x]}\right] \text{ArcTan}[a x]^2}{64 a^3 \sqrt{c + a^2 c x^2}} - \frac{397 c^{5/2} \text{ArcTanh}\left[\frac{a \sqrt{c} x}{\sqrt{c+a^2 c x^2}}\right]}{5040 a^3} - \frac{5 i c^3 \sqrt{1 + a^2 x^2} \text{ArcTan}[a x] \text{PolyLog}\left[2, -i e^{i \text{ArcTan}[a x]}\right]}{64 a^3 \sqrt{c + a^2 c x^2}} + \frac{5 i c^3 \sqrt{1 + a^2 x^2} \text{ArcTan}[a x] \text{PolyLog}\left[2, i e^{i \text{ArcTan}[a x]}\right]}{64 a^3 \sqrt{c + a^2 c x^2}} + \frac{5 c^3 \sqrt{1 + a^2 x^2} \text{PolyLog}\left[3, -i e^{i \text{ArcTan}[a x]}\right]}{64 a^3 \sqrt{c + a^2 c x^2}} - \frac{5 c^3 \sqrt{1 + a^2 x^2} \text{PolyLog}\left[3, i e^{i \text{ArcTan}[a x]}\right]}{64 a^3 \sqrt{c + a^2 c x^2}}$$

Result (type 4, 1557 leaves):

$$\frac{1}{2580480 a^3 \sqrt{1 + a^2 x^2}} c^2 \sqrt{c + a^2 c x^2} \left(35678 a x \sqrt{1 + a^2 x^2} + 24602 a^3 x^3 \sqrt{1 + a^2 x^2} - 4070 a^5 x^5 \sqrt{1 + a^2 x^2} + 7006 a^7 x^7 \sqrt{1 + a^2 x^2} + 21002 \sqrt{1 + a^2 x^2} \text{ArcTan}[a x] - 49890 a^2 x^2 \sqrt{1 + a^2 x^2} \text{ArcTan}[a x] - 109026 a^4 x^4 \sqrt{1 + a^2 x^2} \text{ArcTan}[a x] - 38134 a^6 x^6 \sqrt{1 + a^2 x^2} \text{ArcTan}[a x] + 1273965 a x \sqrt{1 + a^2 x^2} \text{ArcTan}[a x]^2 + 2168775 a^3 x^3 \sqrt{1 + a^2 x^2} \text{ArcTan}[a x]^2 + 1080135 a^5 x^5 \sqrt{1 + a^2 x^2} \text{ArcTan}[a x]^2 + 185325 a^7 x^7 \sqrt{1 + a^2 x^2} \text{ArcTan}[a x]^2 + 202902 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] + 439768 a^2 x^2 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] + 263172 a^4 x^4 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] + 18648 a^6 x^6 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] - 7658 a^8 x^8 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] - 51310 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] - 164920 a^2 x^2 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] - 186900 a^4 x^4 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] - 84280 a^6 x^6 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] - 10990 a^8 x^8 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] + 3150 \text{ArcTan}[a x] \text{Cos}[7 \text{ArcTan}[a x]] + 12600 a^2 x^2 \text{ArcTan}[a x] \text{Cos}[7 \text{ArcTan}[a x]] + 18900 a^4 x^4 \text{ArcTan}[a x] \text{Cos}[7 \text{ArcTan}[a x]] + 12600 a^6 x^6 \text{ArcTan}[a x] \text{Cos}[7 \text{ArcTan}[a x]] + 3150 a^8 x^8 \text{ArcTan}[a x] \text{Cos}[7 \text{ArcTan}[a x]] - 221760 \pi \text{ArcTan}[a x] \text{Log}[2] + 107520 \pi \text{ArcTan}[a x] \text{Log}[8] - 100800 \text{ArcTan}[a x]^2 \text{Log}\left[1 - i e^{i \text{ArcTan}[a x]}\right] + 100800 \text{ArcTan}[a x]^2 \text{Log}\left[1 + i e^{i \text{ArcTan}[a x]}\right] - \right.$$

$$100800\,\pi\,\text{ArcTan}[a x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right) e^{-\frac{1}{2} i\,\text{ArcTan}[a x]} \left(-i+e^{i\,\text{ArcTan}[a x]}\right)\right] +$$
$$100800\,\text{ArcTan}[a x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right) e^{-\frac{1}{2} i\,\text{ArcTan}[a x]} \left(-i+e^{i\,\text{ArcTan}[a x]}\right)\right] -$$
$$100800\,\pi\,\text{ArcTan}[a x]\,\text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i\,\text{ArcTan}[a x]} \left((1+i)+(1-i)\, e^{i\,\text{ArcTan}[a x]}\right)\right] -$$
$$100800\,\text{ArcTan}[a x]^2\,\text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i\,\text{ArcTan}[a x]} \left((1+i)+(1-i)\, e^{i\,\text{ArcTan}[a x]}\right)\right] +$$
$$100800\,\pi\,\text{ArcTan}[a x]\,\text{Log}\left[-\text{Cos}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a x]\right)\right]\right] +$$
$$203264\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right] -$$
$$100800\,\text{ArcTan}[a x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right] -$$
$$203264\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right] +$$
$$100800\,\text{ArcTan}[a x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right] +$$
$$100800\,\pi\,\text{ArcTan}[a x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a x]\right)\right]\right] -$$
$$201600\, i\,\text{ArcTan}[a x]\,\text{PolyLog}\left[2,-i\, e^{i\,\text{ArcTan}[a x]}\right] +$$
$$201600\, i\,\text{ArcTan}[a x]\,\text{PolyLog}\left[2, i\, e^{i\,\text{ArcTan}[a x]}\right] + 201600\,\text{PolyLog}\left[3,-i\, e^{i\,\text{ArcTan}[a x]}\right] -$$
$$201600\,\text{PolyLog}\left[3, i\, e^{i\,\text{ArcTan}[a x]}\right] + 17622\,\text{Sin}[3\,\text{ArcTan}[a x]] + 11352\, a^2 x^2\,\text{Sin}[3\,\text{ArcTan}[a x]] -$$
$$17916\, a^4 x^4\,\text{Sin}[3\,\text{ArcTan}[a x]] + 600\, a^6 x^6\,\text{Sin}[3\,\text{ArcTan}[a x]] + 12246\, a^8 x^8\,\text{Sin}[3\,\text{ArcTan}[a x]] -$$
$$490455\,\text{ArcTan}[a x]^2\,\text{Sin}[3\,\text{ArcTan}[a x]] - 1484700\, a^2 x^2\,\text{ArcTan}[a x]^2\,\text{Sin}[3\,\text{ArcTan}[a x]] -$$
$$1592010\, a^4 x^4\,\text{ArcTan}[a x]^2\,\text{Sin}[3\,\text{ArcTan}[a x]] - 691740\, a^6 x^6\,\text{ArcTan}[a x]^2\,\text{Sin}[3\,\text{ArcTan}[a x]] -$$
$$93975\, a^8 x^8\,\text{ArcTan}[a x]^2\,\text{Sin}[3\,\text{ArcTan}[a x]] - 15618\,\text{Sin}[5\,\text{ArcTan}[a x]] -$$
$$39176\, a^2 x^2\,\text{Sin}[5\,\text{ArcTan}[a x]] - 23820\, a^4 x^4\,\text{Sin}[5\,\text{ArcTan}[a x]] +$$
$$7416\, a^6 x^6\,\text{Sin}[5\,\text{ArcTan}[a x]] + 7678\, a^8 x^8\,\text{Sin}[5\,\text{ArcTan}[a x]] +$$
$$61845\,\text{ArcTan}[a x]^2\,\text{Sin}[5\,\text{ArcTan}[a x]] + 227220\, a^2 x^2\,\text{ArcTan}[a x]^2\,\text{Sin}[5\,\text{ArcTan}[a x]] +$$
$$310590\, a^4 x^4\,\text{ArcTan}[a x]^2\,\text{Sin}[5\,\text{ArcTan}[a x]] + 186900\, a^6 x^6\,\text{ArcTan}[a x]^2\,\text{Sin}[5\,\text{ArcTan}[a x]] +$$
$$41685\, a^8 x^8\,\text{ArcTan}[a x]^2\,\text{Sin}[5\,\text{ArcTan}[a x]] + 2438\,\text{Sin}[7\,\text{ArcTan}[a x]] +$$
$$9752\, a^2 x^2\,\text{Sin}[7\,\text{ArcTan}[a x]] + 14628\, a^4 x^4\,\text{Sin}[7\,\text{ArcTan}[a x]] + 9752\, a^6 x^6\,\text{Sin}[7\,\text{ArcTan}[a x]] +$$
$$2438\, a^8 x^8\,\text{Sin}[7\,\text{ArcTan}[a x]] - 1575\,\text{ArcTan}[a x]^2\,\text{Sin}[7\,\text{ArcTan}[a x]] -$$
$$6300\, a^2 x^2\,\text{ArcTan}[a x]^2\,\text{Sin}[7\,\text{ArcTan}[a x]] - 9450\, a^4 x^4\,\text{ArcTan}[a x]^2\,\text{Sin}[7\,\text{ArcTan}[a x]] -$$
$$6300\, a^6 x^6\,\text{ArcTan}[a x]^2\,\text{Sin}[7\,\text{ArcTan}[a x]] - 1575\, a^8 x^8\,\text{ArcTan}[a x]^2\,\text{Sin}[7\,\text{ArcTan}[a x]]\Bigg)$$

Problem 325: Result more than twice size of optimal antiderivative.

$$\int x\left(c+a^2 c\, x^2\right)^{5/2}\text{ArcTan}[a x]^2\, dx$$

Optimal (type 4, 387 leaves, 6 steps):

$$\frac{5 c^2 \sqrt{c+a^2 c x^2}}{56 a^2}+\frac{5 c \left(c+a^2 c x^2\right)^{3/2}}{252 a^2}+\frac{\left(c+a^2 c x^2\right)^{5/2}}{105 a^2}-\frac{5 c^2 x \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]}{56 a}-\frac{5 c x \left(c+a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]}{84 a}-\frac{x \left(c+a^2 c x^2\right)^{5/2} \text{ArcTan}[a x]}{21 a}+\frac{\left(c+a^2 c x^2\right)^{7/2} \text{ArcTan}[a x]^2}{7 a^2 c}+\frac{5 i c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{28 a^2 \sqrt{c+a^2 c x^2}}-\frac{5 i c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[2,-\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{56 a^2 \sqrt{c+a^2 c x^2}}+\frac{5 i c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[2,\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{56 a^2 \sqrt{c+a^2 c x^2}}$$

Result (type 4, 1087 leaves) :

$$\frac{1}{12 a^2} c^2 \left(1+a^2 x^2\right) \sqrt{c \left(1+a^2 x^2\right)} \left(2+4 \text{ArcTan}[a x]^2+2 \text{Cos}[2 \text{ArcTan}[a x]]-\frac{3 \text{ArcTan}[a x] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-\text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]+\frac{3 \text{ArcTan}[a x] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+\text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]-\frac{4 i \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{\left(1+a^2 x^2\right)^{3/2}}+\frac{4 i \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{\left(1+a^2 x^2\right)^{3/2}}-2 \text{ArcTan}[a x] \text{Sin}[2 \text{ArcTan}[a x]]\right)-\frac{1}{480 a^2} c^2 \left(1+a^2 x^2\right)^2 \sqrt{c \left(1+a^2 x^2\right)} \left(50-32 \text{ArcTan}[a x]^2+72 \text{Cos}[2 \text{ArcTan}[a x]]+160 \text{ArcTan}[a x]^2 \text{Cos}[2 \text{ArcTan}[a x]]+22 \text{Cos}[4 \text{ArcTan}[a x]]-\frac{110 \text{ArcTan}[a x] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-55 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]-11 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]+\frac{110 \text{ArcTan}[a x] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+55 \text{ArcTan}[a x] \text{Cos}[3 \text{ArcTan}[a x]] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]+11 \text{ArcTan}[a x] \text{Cos}[5 \text{ArcTan}[a x]] \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]-\frac{176 i \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{\left(1+a^2 x^2\right)^{5/2}}+\frac{176 i \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{\left(1+a^2 x^2\right)^{5/2}}+4 \text{ArcTan}[a x] \text{Sin}[2 \text{ArcTan}[a x]]-22 \text{ArcTan}[a x] \text{Sin}[4 \text{ArcTan}[a x]]\right)+$$

$$\frac{1}{161280 a^2} c^2 \left(1+a^2 x^2\right)^3 \sqrt{c \left(1+a^2 x^2\right)} \left(4116+10944 \text{ArcTan}[a x]^2+6262 \text{Cos}[2 \text{ArcTan}[a x]]-5376 \text{ArcTan}[a x]^2 \text{Cos}[2 \text{ArcTan}[a x]]+2764 \text{Cos}[4 \text{ArcTan}[a x]]+6720 \text{ArcTan}[a x]^2 \text{Cos}[4 \text{ArcTan}[a x]]+\right.$$

$$618\,\text{Cos}[6\,\text{ArcTan}[a\,x]] - \frac{10815\,\text{ArcTan}[a\,x]\,\text{Log}\left[1 - i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}} -$$
$$6489\,\text{ArcTan}[a\,x]\,\text{Cos}[3\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 - i\,e^{i\,\text{ArcTan}[a\,x]}\right] -$$
$$2163\,\text{ArcTan}[a\,x]\,\text{Cos}[5\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 - i\,e^{i\,\text{ArcTan}[a\,x]}\right] - 309\,\text{ArcTan}[a\,x]$$
$$\text{Cos}[7\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 - i\,e^{i\,\text{ArcTan}[a\,x]}\right] + \frac{10815\,\text{ArcTan}[a\,x]\,\text{Log}\left[1 + i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}} +$$
$$6489\,\text{ArcTan}[a\,x]\,\text{Cos}[3\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 + i\,e^{i\,\text{ArcTan}[a\,x]}\right] +$$
$$2163\,\text{ArcTan}[a\,x]\,\text{Cos}[5\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 + i\,e^{i\,\text{ArcTan}[a\,x]}\right] + 309\,\text{ArcTan}[a\,x]$$
$$\text{Cos}[7\,\text{ArcTan}[a\,x]]\,\text{Log}\left[1 + i\,e^{i\,\text{ArcTan}[a\,x]}\right] - \frac{19776\,i\,\text{PolyLog}\left[2, -i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\left(1+a^2\,x^2\right)^{7/2}} +$$
$$\frac{19776\,i\,\text{PolyLog}\left[2, i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\left(1+a^2\,x^2\right)^{7/2}} - 1266\,\text{ArcTan}[a\,x]\,\text{Sin}[2\,\text{ArcTan}[a\,x]] +$$
$$360\,\text{ArcTan}[a\,x]\,\text{Sin}[4\,\text{ArcTan}[a\,x]] - 618\,\text{ArcTan}[a\,x]\,\text{Sin}[6\,\text{ArcTan}[a\,x]]\Bigg)$$

Problem 326: Result more than twice size of optimal antiderivative.

$$\int \left(c + a^2\,c\,x^2\right)^{5/2}\,\text{ArcTan}[a\,x]^2\,dx$$

Optimal (type 4, 516 leaves, 21 steps):

$$\frac{17}{180}\,c^2\,x\,\sqrt{c + a^2\,c\,x^2} + \frac{1}{60}\,c\,x\,\left(c + a^2\,c\,x^2\right)^{3/2} - \frac{5\,c^2\,\sqrt{c + a^2\,c\,x^2}\,\text{ArcTan}[a\,x]}{8\,a} -$$
$$\frac{5\,c\,\left(c + a^2\,c\,x^2\right)^{3/2}\,\text{ArcTan}[a\,x]}{36\,a} - \frac{\left(c + a^2\,c\,x^2\right)^{5/2}\,\text{ArcTan}[a\,x]}{15\,a} +$$
$$\frac{5}{16}\,c^2\,x\,\sqrt{c + a^2\,c\,x^2}\,\text{ArcTan}[a\,x]^2 + \frac{5}{24}\,c\,x\,\left(c + a^2\,c\,x^2\right)^{3/2}\,\text{ArcTan}[a\,x]^2 +$$
$$\frac{1}{6}\,x\,\left(c + a^2\,c\,x^2\right)^{5/2}\,\text{ArcTan}[a\,x]^2 - \frac{5\,i\,c^3\,\sqrt{1+a^2\,x^2}\,\text{ArcTan}\left[e^{i\,\text{ArcTan}[a\,x]}\right]\,\text{ArcTan}[a\,x]^2}{8\,a\,\sqrt{c + a^2\,c\,x^2}} +$$
$$\frac{259\,c^{5/2}\,\text{ArcTanh}\left[\frac{a\,\sqrt{c}\,x}{\sqrt{c+a^2\,c\,x^2}}\right]}{360\,a} + \frac{5\,i\,c^3\,\sqrt{1+a^2\,x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2, -i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{8\,a\,\sqrt{c + a^2\,c\,x^2}} -$$
$$\frac{5\,i\,c^3\,\sqrt{1+a^2\,x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2, i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{8\,a\,\sqrt{c + a^2\,c\,x^2}} -$$
$$\frac{5\,c^3\,\sqrt{1+a^2\,x^2}\,\text{PolyLog}\left[3, -i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{8\,a\,\sqrt{c + a^2\,c\,x^2}} + \frac{5\,c^3\,\sqrt{1+a^2\,x^2}\,\text{PolyLog}\left[3, i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{8\,a\,\sqrt{c + a^2\,c\,x^2}}$$

Result (type 4, 1117 leaves):

$$\frac{1}{11520\,a\,\sqrt{1+a^2 x^2}}\,c^2\sqrt{c+a^2 c x^2}$$
$$\Big(424\,a\,x\sqrt{1+a^2x^2}+368\,a^3x^3\sqrt{1+a^2x^2}-56\,a^5x^5\sqrt{1+a^2x^2}-11028\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]+$$
$$504\,a^2x^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]+12\,a^4x^4\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]+$$
$$11970\,a\,x\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]^2+7380\,a^3x^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]^2+$$
$$1170\,a^5x^5\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]^2+1550\,\text{ArcTan}[a\,x]\,\text{Cos}[3\,\text{ArcTan}[a\,x]]+$$
$$3210\,a^2x^2\,\text{ArcTan}[a\,x]\,\text{Cos}[3\,\text{ArcTan}[a\,x]]+1770\,a^4x^4\,\text{ArcTan}[a\,x]\,\text{Cos}[3\,\text{ArcTan}[a\,x]]+$$
$$110\,a^6x^6\,\text{ArcTan}[a\,x]\,\text{Cos}[3\,\text{ArcTan}[a\,x]]-90\,\text{ArcTan}[a\,x]\,\text{Cos}[5\,\text{ArcTan}[a\,x]]-$$
$$270\,a^2x^2\,\text{ArcTan}[a\,x]\,\text{Cos}[5\,\text{ArcTan}[a\,x]]-270\,a^4x^4\,\text{ArcTan}[a\,x]\,\text{Cos}[5\,\text{ArcTan}[a\,x]]-$$
$$90\,a^6x^6\,\text{ArcTan}[a\,x]\,\text{Cos}[5\,\text{ArcTan}[a\,x]]-6480\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}[2]+$$
$$960\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}[8]+3600\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-$$
$$3600\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$$
$$3600\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$$
$$3600\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]+$$
$$3600\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]+$$
$$3600\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$$
$$3600\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[-\text{Cos}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]-$$
$$8288\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]+$$
$$3600\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]+$$
$$8288\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]-$$
$$3600\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]-$$
$$3600\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]+$$
$$7200\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-7200\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]-$$
$$7200\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+7200\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$$
$$372\,\text{Sin}[3\,\text{ArcTan}[a\,x]]+636\,a^2x^2\,\text{Sin}[3\,\text{ArcTan}[a\,x]]+156\,a^4x^4\,\text{Sin}[3\,\text{ArcTan}[a\,x]]-$$
$$108\,a^6x^6\,\text{Sin}[3\,\text{ArcTan}[a\,x]]-1425\,\text{ArcTan}[a\,x]^2\,\text{Sin}[3\,\text{ArcTan}[a\,x]]-$$
$$3555\,a^2x^2\,\text{ArcTan}[a\,x]^2\,\text{Sin}[3\,\text{ArcTan}[a\,x]]-2835\,a^4x^4\,\text{ArcTan}[a\,x]^2\,\text{Sin}[3\,\text{ArcTan}[a\,x]]-$$
$$705\,a^6x^6\,\text{ArcTan}[a\,x]^2\,\text{Sin}[3\,\text{ArcTan}[a\,x]]-52\,\text{Sin}[5\,\text{ArcTan}[a\,x]]-$$
$$156\,a^2x^2\,\text{Sin}[5\,\text{ArcTan}[a\,x]]-156\,a^4x^4\,\text{Sin}[5\,\text{ArcTan}[a\,x]]-52\,a^6x^6\,\text{Sin}[5\,\text{ArcTan}[a\,x]]+$$
$$45\,\text{ArcTan}[a\,x]^2\,\text{Sin}[5\,\text{ArcTan}[a\,x]]+135\,a^2x^2\,\text{ArcTan}[a\,x]^2\,\text{Sin}[5\,\text{ArcTan}[a\,x]]+$$
$$135\,a^4x^4\,\text{ArcTan}[a\,x]^2\,\text{Sin}[5\,\text{ArcTan}[a\,x]]+45\,a^6x^6\,\text{ArcTan}[a\,x]^2\,\text{Sin}[5\,\text{ArcTan}[a\,x]]\Big)$$

Problem 413: Result more than twice size of optimal antiderivative.

$$\int x^2 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3\, dx$$

Optimal (type 4, 747 leaves, 40 steps):

$$-\frac{\sqrt{c+a^2 c x^2}}{4 a^3}+\frac{x \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]}{4 a^2}+\frac{\sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^2}{8 a^3}-\frac{x^2 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^2}{4 a}+\frac{x \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3}{8 a^2}+\frac{1}{4} x^3 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3+\frac{i c \sqrt{1+a^2 x^2}\ \text{ArcTan}\left[e^{i \text{ArcTan}[a x]}\right] \text{ArcTan}[a x]^3}{4 a^3 \sqrt{c+a^2 c x^2}}+\frac{i c \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{a^3 \sqrt{c+a^2 c x^2}}-\frac{3 i c \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]^2\ \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{8 a^3 \sqrt{c+a^2 c x^2}}+\frac{3 i c \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]^2\ \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{8 a^3 \sqrt{c+a^2 c x^2}}-\frac{i c \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[2,-\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{2 a^3 \sqrt{c+a^2 c x^2}}+\frac{i c \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[2,\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{2 a^3 \sqrt{c+a^2 c x^2}}+\frac{3 c \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]}{4 a^3 \sqrt{c+a^2 c x^2}}-\frac{3 c \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[3,i e^{i \text{ArcTan}[a x]}\right]}{4 a^3 \sqrt{c+a^2 c x^2}}+\frac{3 i c \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[4,-i e^{i \text{ArcTan}[a x]}\right]}{4 a^3 \sqrt{c+a^2 c x^2}}-\frac{3 i c \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[4,i e^{i \text{ArcTan}[a x]}\right]}{4 a^3 \sqrt{c+a^2 c x^2}}$$

Result (type 4, 1844 leaves):

$$\frac{1}{a^3}\left(\frac{\sqrt{c\left(1+a^2 x^2\right)}\left(-1+\text{ArcTan}[a x]^2\right)}{4 \sqrt{1+a^2 x^2}}+\frac{1}{2 \sqrt{1+a^2 x^2}}\sqrt{c\left(1+a^2 x^2\right)}\left(-\text{ArcTan}[a x]\left(\text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]-\text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]\right)-i\left(\text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]-\text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]\right)\right)+\frac{1}{8 \sqrt{1+a^2 x^2}}\sqrt{c\left(1+a^2 x^2\right)}\left(-\frac{1}{8}\pi^3 \text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right]\right]-\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+i\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\right)+\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+2 i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.\right.\right.$$

$$2\left(-\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]+\text{PolyLog}\left[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\Bigg)-$$

$$8\left(\frac{1}{64}i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^4+\frac{1}{4}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^4-\right.$$

$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^3\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-$$

$$\frac{1}{8}\pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)-\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)-$$

$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^3\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+$$

$$\frac{3}{8}i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]+$$

$$\frac{3}{4}\pi^2\left(\frac{1}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)\right.$$

$$\left.\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+\frac{1}{2}i\,\text{PolyLog}\left[2,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)+$$

$$\frac{3}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2\text{PolyLog}\left[2,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]-$$

$$\frac{3}{4}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-$$

$$\frac{3}{2}\pi\left(\frac{1}{3}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2\right.$$

$$\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)$$

$$\left.\text{PolyLog}\left[2,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]-\frac{1}{2}\text{PolyLog}\left[3,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)-$$

$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)\text{PolyLog}\left[3,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]-$$

$$\left.\frac{3}{4}i\,\text{PolyLog}\left[4,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\frac{3}{4}i\,\text{PolyLog}\left[4,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)\Bigg)+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a x]^3}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(2\,\text{ArcTan}[a x]-\text{ArcTan}[a x]^2-\text{ArcTan}[a x]^3\right)}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^2}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]}{8\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^3}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a x]^3}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^4}+$$

$$\frac{\sqrt{c\,(1+a^2 x^2)}\ \text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}+$$

$$\frac{\sqrt{c\,(1+a^2 x^2)}\ \left(-2\,\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2+\text{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+$$

$$\left(\sqrt{c\,(1+a^2x^2)}\ \left(\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$

$$\left(4\sqrt{1+a^2x^2}\ \left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)+$$

$$\left(\sqrt{c\,(1+a^2x^2)}\ \left(-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$

$$\left(4\sqrt{1+a^2x^2}\ \left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Bigg)$$

Problem 415: Result more than twice size of optimal antiderivative.

$$\int\sqrt{c+a^2\,c\,x^2}\ \text{ArcTan}[a\,x]^3\,dx$$

Optimal (type 4, 626 leaves, 14 steps):

$$-\frac{3\sqrt{c+a^2\,c\,x^2}\ \text{ArcTan}[a\,x]^2}{2\,a}+\frac{1}{2}x\sqrt{c+a^2\,c\,x^2}\ \text{ArcTan}[a\,x]^3-$$

$$\frac{i\,c\sqrt{1+a^2x^2}\ \text{ArcTan}\left[e^{i\,\text{ArcTan}[a\,x]}\right]\,\text{ArcTan}[a\,x]^3}{a\sqrt{c+a^2\,c\,x^2}}-\frac{6\,i\,c\sqrt{1+a^2x^2}\ \text{ArcTan}[a\,x]\,\text{ArcTan}\left[\frac{\sqrt{1+i\,a\,x}}{\sqrt{1-i\,a\,x}}\right]}{a\sqrt{c+a^2\,c\,x^2}}+$$

$$\frac{3\,i\,c\sqrt{1+a^2x^2}\ \text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{2\,a\sqrt{c+a^2\,c\,x^2}}-$$

$$\frac{3\,i\,c\sqrt{1+a^2x^2}\ \text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{2\,a\sqrt{c+a^2\,c\,x^2}}+\frac{3\,i\,c\sqrt{1+a^2x^2}\ \text{PolyLog}\left[2,-\frac{i\sqrt{1+i\,a\,x}}{\sqrt{1-i\,a\,x}}\right]}{a\sqrt{c+a^2\,c\,x^2}}-$$

$$\frac{3\,i\,c\sqrt{1+a^2x^2}\ \text{PolyLog}\left[2,\frac{i\sqrt{1+i\,a\,x}}{\sqrt{1-i\,a\,x}}\right]}{a\sqrt{c+a^2\,c\,x^2}}-\frac{3\,c\sqrt{1+a^2x^2}\ \text{ArcTan}[a\,x]\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{a\sqrt{c+a^2\,c\,x^2}}+$$

$$\frac{3\,c\sqrt{1+a^2x^2}\ \text{ArcTan}[a\,x]\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{a\sqrt{c+a^2\,c\,x^2}}-$$

$$\frac{3\,i\,c\sqrt{1+a^2x^2}\ \text{PolyLog}\left[4,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{a\sqrt{c+a^2\,c\,x^2}}+\frac{3\,i\,c\sqrt{1+a^2x^2}\ \text{PolyLog}\left[4,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{a\sqrt{c+a^2\,c\,x^2}}$$

Result (type 4, 1524 leaves):

$$\frac{1}{a}\left(-\frac{3\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^2}{2\sqrt{1+a^2x^2}}+\frac{1}{\sqrt{1+a^2x^2}}\right.$$

$$3\sqrt{c\left(1+a^2x^2\right)}\left(\text{ArcTan}[a\,x]\left(\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]\right)+\right.$$

$$\left.i\left(\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\right)\right)+$$

$$\frac{1}{2\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\left(\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right]\right]+\right.$$

$$\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+\right.$$

$$\left.i\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\right)-$$

$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+\right.$$

$$2\,i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+$$

$$\left.2\left(-\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+\text{PolyLog}\left[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\right)+$$

$$8\left(\frac{1}{64}\,i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^4+\frac{1}{4}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^4-\right.$$

$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^3\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$

$$\frac{1}{8}\pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)-\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$

$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+$$

$$\frac{3}{8}\,i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+$$

$$\frac{3}{4}\pi^2\left(\frac{1}{2}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\right.$$

$$\left.\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+\frac{1}{2}\,i\,\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)+$$

$$\frac{3}{2}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\frac{3}{4}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$

$$\frac{3}{2}\pi\left(\frac{1}{3}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\right.$$

$$\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)$$

$$\left.\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-\frac{1}{2}\text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$

$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\left.\left.\frac{3}{4}\,i\,\text{PolyLog}\left[4,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\frac{3}{4}\,i\,\text{PolyLog}\left[4,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)\right)+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a x]^3}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^2}-\frac{3\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]}{2\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}-\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a x]^3}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^2}+\left.\frac{3\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]}{2\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}\right)$$

Problem 420: Result more than twice size of optimal antiderivative.

$$\int x^3\left(c+a^2cx^2\right)^{3/2}\text{ArcTan}[a x]^3\,dx$$

Optimal (type 4, 652 leaves, 200 steps):

$$\frac{c x\sqrt{c+a^2cx^2}}{420a^3}-\frac{c x^3\sqrt{c+a^2cx^2}}{140a}-\frac{163c\sqrt{c+a^2cx^2}\ \text{ArcTan}[a x]}{840a^4}+\frac{c x^2\sqrt{c+a^2cx^2}\ \text{ArcTan}[a x]}{60a^2}+\frac{1}{35}c x^4\sqrt{c+a^2cx^2}\ \text{ArcTan}[a x]+\frac{9c x\sqrt{c+a^2cx^2}\ \text{ArcTan}[a x]^2}{112a^3}-\frac{23c x^3\sqrt{c+a^2cx^2}\ \text{ArcTan}[a x]^2}{280a}-\frac{1}{14}a c x^5\sqrt{c+a^2cx^2}\ \text{ArcTan}[a x]^2-\frac{51 i c^2\sqrt{1+a^2x^2}\ \text{ArcTan}\left[e^{i\,\text{ArcTan}[a x]}\right]\text{ArcTan}[a x]^2}{280a^4\sqrt{c+a^2cx^2}}-\frac{2c\sqrt{c+a^2cx^2}\ \text{ArcTan}[a x]^3}{35a^4}+\frac{c x^2\sqrt{c+a^2cx^2}\ \text{ArcTan}[a x]^3}{35a^2}+\frac{8}{35}c x^4\sqrt{c+a^2cx^2}\ \text{ArcTan}[a x]^3+\frac{1}{7}a^2c x^6\sqrt{c+a^2cx^2}\ \text{ArcTan}[a x]^3+\frac{23c^{3/2}\text{ArcTanh}\left[\frac{a\sqrt{c}\,x}{\sqrt{c+a^2cx^2}}\right]}{120a^4}+\frac{51 i c^2\sqrt{1+a^2x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[2,-i e^{i\,\text{ArcTan}[a x]}\right]}{280a^4\sqrt{c+a^2cx^2}}-\frac{51 i c^2\sqrt{1+a^2x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[2,i e^{i\,\text{ArcTan}[a x]}\right]}{280a^4\sqrt{c+a^2cx^2}}-\frac{51c^2\sqrt{1+a^2x^2}\ \text{PolyLog}\left[3,-i e^{i\,\text{ArcTan}[a x]}\right]}{280a^4\sqrt{c+a^2cx^2}}+\frac{51c^2\sqrt{1+a^2x^2}\ \text{PolyLog}\left[3,i e^{i\,\text{ArcTan}[a x]}\right]}{280a^4\sqrt{c+a^2cx^2}}$$

Result (type 4, 1306 leaves):

$$\frac{1}{a^4}c\left(-\frac{1}{40\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\ \left(11\pi\,\text{ArcTan}[a x]\ \text{Log}[2]-\right.\right.$$

$$11\,\text{ArcTan}[a x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a x]}\right]+11\,\text{ArcTan}[a x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a x]}\right]-$$
$$11\,\pi\,\text{ArcTan}[a x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a x]}\left(-i+e^{i\,\text{ArcTan}[a x]}\right)\right]+$$
$$11\,\text{ArcTan}[a x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a x]}\left(-i+e^{i\,\text{ArcTan}[a x]}\right)\right]-$$
$$11\,\pi\,\text{ArcTan}[a x]\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a x]}\right)\right]-$$
$$11\,\text{ArcTan}[a x]^2\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a x]}\right)\right]+$$
$$11\,\pi\,\text{ArcTan}[a x]\,\text{Log}\left[-\text{Cos}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a x]\right)\right]\right]+$$
$$20\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right]-$$
$$11\,\text{ArcTan}[a x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right]-$$
$$20\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right]+$$
$$11\,\text{ArcTan}[a x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right]+$$
$$11\,\pi\,\text{ArcTan}[a x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a x]\right)\right]\right]-22\,i\,\text{ArcTan}[a x]$$
$$\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a x]}\right]+22\,i\,\text{ArcTan}[a x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a x]}\right]+$$
$$22\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a x]}\right]-22\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a x]}\right]\Bigg)-$$

$$\frac{1}{960}\left(1+a^2x^2\right)^2\sqrt{c\left(1+a^2x^2\right)}\,\Big(150\,\text{ArcTan}[a x]-32\,\text{ArcTan}[a x]^3+$$
$$8\,\text{ArcTan}[a x]\left(27+20\,\text{ArcTan}[a x]^2\right)\text{Cos}[2\,\text{ArcTan}[a x]]+$$
$$66\,\text{ArcTan}[a x]\,\text{Cos}[4\,\text{ArcTan}[a x]]+12\,\text{Sin}[2\,\text{ArcTan}[a x]]+$$
$$6\,\text{ArcTan}[a x]^2\,\text{Sin}[2\,\text{ArcTan}[a x]]+6\,\text{Sin}[4\,\text{ArcTan}[a x]]-$$
$$33\,\text{ArcTan}[a x]^2\,\text{Sin}[4\,\text{ArcTan}[a x]]\Big)\Bigg)+$$

$$\frac{1}{a^4}c\left(\frac{1}{1680\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\,\Big(309\,\pi\,\text{ArcTan}[a x]\,\text{Log}[2]-\right.$$
$$309\,\text{ArcTan}[a x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a x]}\right]+309\,\text{ArcTan}[a x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a x]}\right]-$$
$$309\,\pi\,\text{ArcTan}[a x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a x]}\left(-i+e^{i\,\text{ArcTan}[a x]}\right)\right]+$$
$$309\,\text{ArcTan}[a x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a x]}\left(-i+e^{i\,\text{ArcTan}[a x]}\right)\right]-$$
$$309\,\pi\,\text{ArcTan}[a x]\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a x]}\right)\right]-$$
$$309\,\text{ArcTan}[a x]^2\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a x]}\right)\right]+$$
$$309\,\pi\,\text{ArcTan}[a x]\,\text{Log}\left[-\text{Cos}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a x]\right)\right]\right]+$$
$$518\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right]-$$

$$309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]-$$
$$518\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]+$$
$$309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]+$$
$$309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}\,(\pi+2\,\text{ArcTan}[a\,x])\right]\right]-618\,i\,\text{ArcTan}[a\,x]$$
$$\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+618\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$$
$$618\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-618\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\Bigg)-$$
$$\frac{1}{53760}\,(1+a^2x^2)^3\,\sqrt{c\,(1+a^2x^2)}\,\Big(-4116\,\text{ArcTan}[a\,x]-3648\,\text{ArcTan}[a\,x]^3+$$
$$2\,\text{ArcTan}[a\,x]\,\left(-3131+896\,\text{ArcTan}[a\,x]^2\right)\,\text{Cos}[2\,\text{ArcTan}[a\,x]]-$$
$$4\,\text{ArcTan}[a\,x]\,\left(691+560\,\text{ArcTan}[a\,x]^2\right)\,\text{Cos}[4\,\text{ArcTan}[a\,x]]-$$
$$618\,\text{ArcTan}[a\,x]\,\text{Cos}[6\,\text{ArcTan}[a\,x]]-404\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+$$
$$633\,\text{ArcTan}[a\,x]^2\,\text{Sin}[2\,\text{ArcTan}[a\,x]]-352\,\text{Sin}[4\,\text{ArcTan}[a\,x]]-180\,\text{ArcTan}[a\,x]^2$$
$$\text{Sin}[4\,\text{ArcTan}[a\,x]]-100\,\text{Sin}[6\,\text{ArcTan}[a\,x]]+309\,\text{ArcTan}[a\,x]^2\,\text{Sin}[6\,\text{ArcTan}[a\,x]]\Big)\Bigg)$$

Problem 421: Result more than twice size of optimal antiderivative.

$$\int x^2\,\left(c+a^2\,c\,x^2\right)^{3/2}\,\text{ArcTan}[a\,x]^3\,dx$$

Optimal (type 4, 882 leaves, 108 steps):

$$-\frac{c\sqrt{c+a^2 c x^2}}{30 a^3}-\frac{\left(c+a^2 c x^2\right)^{3/2}}{60 a^3}+\frac{c x \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]}{12 a^2}+$$
$$\frac{1}{20} c x^3 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]+\frac{31 c \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^2}{240 a^3}-$$
$$\frac{19 c x^2 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^2}{120 a}-\frac{1}{10} a c x^4 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^2+$$
$$\frac{c x \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3}{16 a^2}+\frac{7}{24} c x^3 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3+$$
$$\frac{1}{6} a^2 c x^5 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3+\frac{i c^2 \sqrt{1+a^2 x^2}\ \text{ArcTan}\left[e^{i \text{ArcTan}[a x]}\right] \text{ArcTan}[a x]^3}{8 a^3 \sqrt{c+a^2 c x^2}}+$$
$$\frac{41 i c^2 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{60 a^3 \sqrt{c+a^2 c x^2}}-$$
$$\frac{3 i c^2 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]^2\ \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{16 a^3 \sqrt{c+a^2 c x^2}}+$$
$$\frac{3 i c^2 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]^2\ \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{16 a^3 \sqrt{c+a^2 c x^2}}-$$
$$\frac{41 i c^2 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[2,-\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{120 a^3 \sqrt{c+a^2 c x^2}}+\frac{41 i c^2 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[2,\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{120 a^3 \sqrt{c+a^2 c x^2}}+$$
$$\frac{3 c^2 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]}{8 a^3 \sqrt{c+a^2 c x^2}}-$$
$$\frac{3 c^2 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[3,i e^{i \text{ArcTan}[a x]}\right]}{8 a^3 \sqrt{c+a^2 c x^2}}+$$
$$\frac{3 i c^2 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[4,-i e^{i \text{ArcTan}[a x]}\right]}{8 a^3 \sqrt{c+a^2 c x^2}}-\frac{3 i c^2 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[4,i e^{i \text{ArcTan}[a x]}\right]}{8 a^3 \sqrt{c+a^2 c x^2}}$$

Result (type 4, 4015 leaves):

$$\frac{1}{a^3} c \left(\frac{\sqrt{c\left(1+a^2 x^2\right)}\ \left(-1+\text{ArcTan}[a x]^2\right)}{4 \sqrt{1+a^2 x^2}}+\frac{1}{2 \sqrt{1+a^2 x^2}}\right.$$
$$\sqrt{c\left(1+a^2 x^2\right)}\ \left(-\text{ArcTan}[a x]\ \left(\text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]-\text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]\right)-\right.$$
$$\left.i \left(\text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]-\text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]\right)\right)+$$
$$\frac{1}{8 \sqrt{1+a^2 x^2}} \sqrt{c\left(1+a^2 x^2\right)}\ \left(-\frac{1}{8} \pi^3 \text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right]\right]-\right.$$
$$\frac{3}{4} \pi^2 \left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right) \left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.$$
$$\left.i \left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\right)+$$
$$\frac{3}{2} \pi \left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2 \left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.$$

$$2\,i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+$$

$$2\left(-\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+\text{PolyLog}\left[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\Bigg)-$$

$$8\left(\frac{1}{64}\,i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^4+\frac{1}{4}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^4-\right.$$

$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^3\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$

$$\frac{1}{8}\pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)-\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$

$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+$$

$$\frac{3}{8}\,i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+$$

$$\frac{3}{4}\pi^2\left(\frac{1}{2}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\right.$$

$$\left.\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+\frac{1}{2}\,i\,\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)+$$

$$\frac{3}{2}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\frac{3}{4}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$

$$\frac{3}{2}\pi\left(\frac{1}{3}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\right.$$

$$\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)$$

$$\left.\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-\frac{1}{2}\text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$

$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\left.\frac{3}{4}\,i\,\text{PolyLog}\left[4,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\frac{3}{4}\,i\,\text{PolyLog}\left[4,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)\Bigg)+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(2\,\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2-\text{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a x]^2\ \text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]}{8\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^3}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-2\,\text{ArcTan}[a x]-\text{ArcTan}[a x]^2+\text{ArcTan}[a x]^3\right)}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^2}+$$

$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{ArcTan}[a x]^2\ \text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)\right)\Big/$$
$$\left(4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)\right)+$$
$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{ArcTan}[a x]^2\ \text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)\right)\Big/$$
$$\left.\left(4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)\right)\right)+$$

$$\frac{1}{a^3}c\left(\frac{\sqrt{c\left(1+a^2x^2\right)}\left(50-19\,\text{ArcTan}[a x]^2\right)}{240\sqrt{1+a^2x^2}}+\frac{1}{120\sqrt{1+a^2x^2}}\right.$$
$$19\sqrt{c\left(1+a^2x^2\right)}$$
$$\left(\text{ArcTan}[a x]\left(\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a x]}\right]-\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a x]}\right]\right)+\right.$$
$$\left.i\left(\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a x]}\right]-\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a x]}\right]\right)\right)+$$
$$\frac{1}{16\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\left(\frac{1}{8}\pi^3\ \text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right]\right]+\right.$$
$$\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.$$
$$\left.i\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\right)-$$
$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.$$
$$2\,i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+$$
$$\left.2\left(-\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]+\text{PolyLog}\left[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\right)+$$
$$8\left(\frac{1}{64}i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^4+\frac{1}{4}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^4-\right.$$
$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^3\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-$$
$$\frac{1}{8}\pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)-\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)-$$
$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^3\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+$$
$$\frac{3}{8}i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]+$$

$$\frac{3}{4}\pi^2\left(\frac{1}{2}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\right.$$

$$\left.\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+\frac{1}{2}\,i\,\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)+$$

$$\frac{3}{2}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\frac{3}{4}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$

$$\frac{3}{2}\pi\left(\frac{1}{3}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\right.$$

$$\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)$$

$$\left.\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-\frac{1}{2}\text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$

$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\left.\left.\frac{3}{4}\,i\,\text{PolyLog}\left[4,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\frac{3}{4}\,i\,\text{PolyLog}\left[4,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)\right)+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{48\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2-5\,\text{ArcTan}[a\,x]^3\right)}{80\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(-2-52\,\text{ArcTan}[a\,x]+26\,\text{ArcTan}[a\,x]^2+15\,\text{ArcTan}[a\,x]^3\right)\right)\Big/$$

$$\left(480\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2\right)-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{40\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^5}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{48\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{40\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^5}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2+5\,\text{ArcTan}[a\,x]^3\right)}{80\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(-2+52\,\text{ArcTan}[a\,x]+26\,\text{ArcTan}[a\,x]^2-15\,\text{ArcTan}[a\,x]^3\right)\right)\Big/$$

$$\left(480\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2\right)+$$

$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(50\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-19\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$
$$\left(240\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)+$$
$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-13\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$
$$\left(120\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3\right)+$$
$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+13\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$
$$\left(120\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3\right)+$$
$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(-50\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+19\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$
$$\left(240\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Bigg)$$

Problem 422: Result more than twice size of optimal antiderivative.

$$\int x\left(c+a^2c\,x^2\right)^{3/2}\text{ArcTan}[a\,x]^3\,dx$$

Optimal (type 4, 477 leaves, 17 steps):

$$-\frac{c\,x\sqrt{c+a^2c\,x^2}}{20\,a}+\frac{9\,c\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]}{20\,a^2}+\frac{\left(c+a^2c\,x^2\right)^{3/2}\text{ArcTan}[a\,x]}{10\,a^2}-$$
$$\frac{9\,c\,x\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^2}{40\,a}-\frac{3\,x\left(c+a^2c\,x^2\right)^{3/2}\text{ArcTan}[a\,x]^2}{20\,a}+$$
$$\frac{9\,i\,c^2\sqrt{1+a^2x^2}\,\text{ArcTan}\left[e^{i\,\text{ArcTan}[a\,x]}\right]\text{ArcTan}[a\,x]^2}{20\,a^2\sqrt{c+a^2c\,x^2}}+\frac{\left(c+a^2c\,x^2\right)^{5/2}\text{ArcTan}[a\,x]^3}{5\,a^2\,c}-$$
$$\frac{c^{3/2}\,\text{ArcTanh}\left[\frac{a\sqrt{c}\,x}{\sqrt{c+a^2c\,x^2}}\right]}{2\,a^2}-\frac{9\,i\,c^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{20\,a^2\sqrt{c+a^2c\,x^2}}+$$
$$\frac{9\,i\,c^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{20\,a^2\sqrt{c+a^2c\,x^2}}+$$
$$\frac{9\,c^2\sqrt{1+a^2x^2}\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{20\,a^2\sqrt{c+a^2c\,x^2}}-\frac{9\,c^2\sqrt{1+a^2x^2}\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{20\,a^2\sqrt{c+a^2c\,x^2}}$$

Result (type 4, 1188 leaves):

$$\frac{1}{a^2}c\left(\frac{1}{2\sqrt{1+a^2x^2}}\right.$$
$$\sqrt{c\left(1+a^2x^2\right)}\left(\pi\,\text{ArcTan}[a\,x]\,\text{Log}[2]-\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+\text{ArcTan}[a\,x]^2\right.$$

$$\text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]-\pi \text{ArcTan}[a x] \text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right) e^{-\frac{1}{2} i \text{ArcTan}[a x]}\left(-i+e^{i \text{ArcTan}[a x]}\right)\right]+$$
$$\text{ArcTan}[a x]^2 \text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right) e^{-\frac{1}{2} i \text{ArcTan}[a x]}\left(-i+e^{i \text{ArcTan}[a x]}\right)\right]-$$
$$\pi \text{ArcTan}[a x] \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i \text{ArcTan}[a x]}\left((1+i)+(1-i) e^{i \text{ArcTan}[a x]}\right)\right]-$$
$$\text{ArcTan}[a x]^2 \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i \text{ArcTan}[a x]}\left((1+i)+(1-i) e^{i \text{ArcTan}[a x]}\right)\right]+\pi \text{ArcTan}[a x]$$
$$\text{Log}\left[-\text{Cos}\left[\frac{1}{4}(\pi+2 \text{ArcTan}[a x])\right]\right]+2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]-$$
$$\text{ArcTan}[a x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]-$$
$$2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]+$$
$$\text{ArcTan}[a x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]+$$
$$\pi \text{ArcTan}[a x] \text{Log}\left[\text{Sin}\left[\frac{1}{4}(\pi+2 \text{ArcTan}[a x])\right]\right]-$$
$$2 i \text{ArcTan}[a x] \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]+2 i \text{ArcTan}[a x] \text{PolyLog}\left[2, i e^{i \text{ArcTan}[a x]}\right]+$$
$$\left.2 \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]-2 \text{PolyLog}\left[3, i e^{i \text{ArcTan}[a x]}\right]\right)+$$
$$\frac{1}{12}\left(1+a^2 x^2\right) \sqrt{c\left(1+a^2 x^2\right)} \text{ArcTan}[a x]\left(6+4 \text{ArcTan}[a x]^2+\right.$$
$$\left.6 \text{Cos}[2 \text{ArcTan}[a x]]-3 \text{ArcTan}[a x] \text{Sin}[2 \text{ArcTan}[a x]]\right)+$$
$$\frac{1}{a^2} c\left(-\frac{1}{40 \sqrt{1+a^2 x^2}} \sqrt{c\left(1+a^2 x^2\right)}\left(11 \pi \text{ArcTan}[a x] \text{Log}[2]-\right.\right.$$
$$11 \text{ArcTan}[a x]^2 \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]+11 \text{ArcTan}[a x]^2 \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]-$$
$$11 \pi \text{ArcTan}[a x] \text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right) e^{-\frac{1}{2} i \text{ArcTan}[a x]}\left(-i+e^{i \text{ArcTan}[a x]}\right)\right]+$$
$$11 \text{ArcTan}[a x]^2 \text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right) e^{-\frac{1}{2} i \text{ArcTan}[a x]}\left(-i+e^{i \text{ArcTan}[a x]}\right)\right]-$$
$$11 \pi \text{ArcTan}[a x] \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i \text{ArcTan}[a x]}\left((1+i)+(1-i) e^{i \text{ArcTan}[a x]}\right)\right]-$$
$$11 \text{ArcTan}[a x]^2 \text{Log}\left[\frac{1}{2} e^{-\frac{1}{2} i \text{ArcTan}[a x]}\left((1+i)+(1-i) e^{i \text{ArcTan}[a x]}\right)\right]+$$
$$11 \pi \text{ArcTan}[a x] \text{Log}\left[-\text{Cos}\left[\frac{1}{4}(\pi+2 \text{ArcTan}[a x])\right]\right]+$$
$$20 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]-$$
$$11 \text{ArcTan}[a x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]-$$
$$20 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]+$$
$$11 \text{ArcTan}[a x]^2 \text{Log}\left[\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right]+$$

$$11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]-22\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+22\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]+22\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-22\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\Bigg)-$$

$$\frac{1}{960}\left(1+a^2x^2\right)^2\sqrt{c\left(1+a^2x^2\right)}\,\Big(150\,\text{ArcTan}[a\,x]-32\,\text{ArcTan}[a\,x]^3+8\,\text{ArcTan}[a\,x]\left(27+20\,\text{ArcTan}[a\,x]^2\right)\text{Cos}[2\,\text{ArcTan}[a\,x]]+66\,\text{ArcTan}[a\,x]\,\text{Cos}[4\,\text{ArcTan}[a\,x]]+12\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+6\,\text{ArcTan}[a\,x]^2\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+6\,\text{Sin}[4\,\text{ArcTan}[a\,x]]-33\,\text{ArcTan}[a\,x]^2\,\text{Sin}[4\,\text{ArcTan}[a\,x]]\Big)\Bigg)$$

Problem 423: Result more than twice size of optimal antiderivative.

$$\int\left(c+a^2c\,x^2\right)^{3/2}\text{ArcTan}[a\,x]^3\,dx$$

Optimal (type 4, 760 leaves, 18 steps):

$$-\frac{c\sqrt{c+a^2c\,x^2}}{4\,a}+\frac{1}{4}c\,x\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]-\frac{9\,c\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^2}{8\,a}-\frac{\left(c+a^2c\,x^2\right)^{3/2}\text{ArcTan}[a\,x]^2}{4\,a}+\frac{3}{8}c\,x\sqrt{c+a^2c\,x^2}\,\text{ArcTan}[a\,x]^3+$$

$$\frac{1}{4}x\left(c+a^2c\,x^2\right)^{3/2}\text{ArcTan}[a\,x]^3-\frac{3\,i\,c^2\sqrt{1+a^2x^2}\,\text{ArcTan}\left[e^{i\,\text{ArcTan}[a\,x]}\right]\text{ArcTan}[a\,x]^3}{4\,a\sqrt{c+a^2c\,x^2}}-\frac{5\,i\,c^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]\,\text{ArcTan}\left[\frac{\sqrt{1+i\,a\,x}}{\sqrt{1-i\,a\,x}}\right]}{a\sqrt{c+a^2c\,x^2}}+$$

$$\frac{9\,i\,c^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{8\,a\sqrt{c+a^2c\,x^2}}-\frac{9\,i\,c^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{8\,a\sqrt{c+a^2c\,x^2}}+$$

$$\frac{5\,i\,c^2\sqrt{1+a^2x^2}\,\text{PolyLog}\left[2,-\frac{i\sqrt{1+i\,a\,x}}{\sqrt{1-i\,a\,x}}\right]}{2\,a\sqrt{c+a^2c\,x^2}}-\frac{5\,i\,c^2\sqrt{1+a^2x^2}\,\text{PolyLog}\left[2,\frac{i\sqrt{1+i\,a\,x}}{\sqrt{1-i\,a\,x}}\right]}{2\,a\sqrt{c+a^2c\,x^2}}-$$

$$\frac{9\,c^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{4\,a\sqrt{c+a^2c\,x^2}}+\frac{9\,c^2\sqrt{1+a^2x^2}\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{4\,a\sqrt{c+a^2c\,x^2}}-$$

$$\frac{9\,i\,c^2\sqrt{1+a^2x^2}\,\text{PolyLog}\left[4,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{4\,a\sqrt{c+a^2c\,x^2}}+\frac{9\,i\,c^2\sqrt{1+a^2x^2}\,\text{PolyLog}\left[4,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{4\,a\sqrt{c+a^2c\,x^2}}$$

Result (type 4, 3371 leaves):

$$\frac{1}{a}c\left(-\frac{3\sqrt{c\,(1+a^2x^2)}\,\text{ArcTan}[a\,x]^2}{2\sqrt{1+a^2x^2}}+\frac{1}{\sqrt{1+a^2x^2}}\right.$$

$$3\sqrt{c\,(1+a^2x^2)}\,\Big(\text{ArcTan}[a\,x]\,\Big(\text{Log}\big[1-i\,e^{i\,\text{ArcTan}[a\,x]}\big]-\text{Log}\big[1+i\,e^{i\,\text{ArcTan}[a\,x]}\big]\Big)+$$

$$i\,\Big(\text{PolyLog}\big[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\big]-\text{PolyLog}\big[2,i\,e^{i\,\text{ArcTan}[a\,x]}\big]\Big)\Big)+$$

$$\frac{1}{2\sqrt{1+a^2x^2}}\sqrt{c\,(1+a^2x^2)}\,\left(\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right]\right]+\right.$$

$$\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+\right.$$

$$\left.i\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\right)-$$

$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+\right.$$

$$2\,i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+$$

$$\left.2\left(-\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+\text{PolyLog}\left[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\right)+$$

$$8\left(\frac{1}{64}i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^4+\frac{1}{4}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^4-\right.$$

$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^3\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$

$$\frac{1}{8}\pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)-\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$

$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+$$

$$\frac{3}{8}i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+$$

$$\frac{3}{4}\pi^2\left(\frac{1}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\right.$$

$$\left.\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+\frac{1}{2}i\,\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)+$$

$$\frac{3}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\frac{3}{4}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$

$$\frac{3}{2}\pi\left(\frac{1}{3}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\right.$$

$$\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)$$

$$\left.\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-\frac{1}{2}\text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$

$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\frac{3}{4}\,i\,\text{PolyLog}\left[4,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\frac{3}{4}\,i\,\text{PolyLog}\left[4,-e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\Bigg)\Bigg)+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a x]^3}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^2}-$$

$$\frac{3\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]}{2\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a x]^3}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^2}+$$

$$\frac{3\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]}{2\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)}\Bigg)+$$

$$\frac{1}{a}c\left(\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-1+\text{ArcTan}[a x]^2\right)}{4\sqrt{1+a^2x^2}}+\right.$$

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

$$\left(-\text{ArcTan}[a x]\left(\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a x]}\right]-\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a x]}\right]\right)-\right.$$

$$\left.i\left(\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a x]}\right]-\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a x]}\right]\right)\right)+$$

$$\frac{1}{8\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\left(-\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right]\right]-\right.$$

$$\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.$$

$$\left.i\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\right)+$$

$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.$$

$$2\,i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+$$

$$\left.2\left(-\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]+\text{PolyLog}\left[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\right)-$$

$$8\left(\frac{1}{64}\,i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^4+\frac{1}{4}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^4-\right.$$

$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^3\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-$$

$$\frac{1}{8}\pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)-\text{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)-$$

$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^3\text{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+$$

$$\frac{3}{8}\,i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]+$$

$$\frac{3}{4}\pi^2\left(\frac{1}{2}\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\right.$$

$$\left.\text{Log}\left[1+e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+\frac{1}{2}\,\mathbb{i}\,\text{PolyLog}\left[2,-e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)+$$

$$\frac{3}{2}\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\text{PolyLog}\left[2,-e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\frac{3}{4}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\text{PolyLog}\left[3,-e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$

$$\frac{3}{2}\pi\left(\frac{1}{3}\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\right.$$

$$\text{Log}\left[1+e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)$$

$$\left.\text{PolyLog}\left[2,-e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-\frac{1}{2}\,\text{PolyLog}\left[3,-e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$

$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\text{PolyLog}\left[3,-e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\left.\left.\frac{3}{4}\,\mathbb{i}\,\text{PolyLog}\left[4,-e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\frac{3}{4}\,\mathbb{i}\,\text{PolyLog}\left[4,-e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)\right)+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(2\,\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2-\text{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-2\,\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2+\text{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+$$

$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$

$$\left(4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)+$$

$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$

$$\left(4 \sqrt{1 + a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)\right)$$

Problem 425: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(c + a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]^3}{x^2} \, dx$$

Optimal (type 4, 901 leaves, 37 steps) :

$$-\frac{3}{2} a c \sqrt{c+a^2 c x^2} \operatorname{ArcTan}[a x]^2-\frac{c \sqrt{c+a^2 c x^2} \operatorname{ArcTan}[a x]^3}{x}+$$
$$\frac{1}{2} a^2 c x \sqrt{c+a^2 c x^2} \operatorname{ArcTan}[a x]^3-\frac{3 i a c^2 \sqrt{1+a^2 x^2} \operatorname{ArcTan}\left[e^{i \operatorname{ArcTan}[a x]}\right] \operatorname{ArcTan}[a x]^3}{\sqrt{c+a^2 c x^2}}-$$
$$\frac{6 i a c^2 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x] \operatorname{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{\sqrt{c+a^2 c x^2}}-$$
$$\frac{6 a c^2 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x]^2 \operatorname{ArcTanh}\left[e^{i \operatorname{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$
$$\frac{6 i a c^2 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x] \operatorname{PolyLog}\left[2,-e^{i \operatorname{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$
$$\frac{9 i a c^2 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x]^2 \operatorname{PolyLog}\left[2,-i e^{i \operatorname{ArcTan}[a x]}\right]}{2 \sqrt{c+a^2 c x^2}}-$$
$$\frac{9 i a c^2 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x]^2 \operatorname{PolyLog}\left[2,i e^{i \operatorname{ArcTan}[a x]}\right]}{2 \sqrt{c+a^2 c x^2}}-$$
$$\frac{6 i a c^2 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x] \operatorname{PolyLog}\left[2,e^{i \operatorname{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$
$$\frac{3 i a c^2 \sqrt{1+a^2 x^2} \operatorname{PolyLog}\left[2,-\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{\sqrt{c+a^2 c x^2}}-\frac{3 i a c^2 \sqrt{1+a^2 x^2} \operatorname{PolyLog}\left[2,\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{\sqrt{c+a^2 c x^2}}-$$
$$\frac{6 a c^2 \sqrt{1+a^2 x^2} \operatorname{PolyLog}\left[3,-e^{i \operatorname{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-$$
$$\frac{9 a c^2 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x] \operatorname{PolyLog}\left[3,-i e^{i \operatorname{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$
$$\frac{9 a c^2 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x] \operatorname{PolyLog}\left[3,i e^{i \operatorname{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$
$$\frac{6 a c^2 \sqrt{1+a^2 x^2} \operatorname{PolyLog}\left[3,e^{i \operatorname{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-\frac{9 i a c^2 \sqrt{1+a^2 x^2} \operatorname{PolyLog}\left[4,-i e^{i \operatorname{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$
$$\frac{9 i a c^2 \sqrt{1+a^2 x^2} \operatorname{PolyLog}\left[4,i e^{i \operatorname{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}$$

Result (type 4, 2686 leaves):

$$\frac{1}{128 \sqrt{1+a^2 x^2}} a c \sqrt{c\left(1+a^2 x^2\right)} \operatorname{Csc}\left[\frac{1}{2} \operatorname{ArcTan}[a x]\right]$$
$$\left(-\frac{7 i a \pi^4 x}{\sqrt{1+a^2 x^2}}-\frac{8 i a \pi^3 x \operatorname{ArcTan}[a x]}{\sqrt{1+a^2 x^2}}+\frac{24 i a \pi^2 x \operatorname{ArcTan}[a x]^2}{\sqrt{1+a^2 x^2}}-64 \operatorname{ArcTan}[a x]^3-\right.$$

$$\frac{32\, i\, a\, \pi\, x\, \text{ArcTan}[a\,x]^3}{\sqrt{1+a^2 x^2}} + \frac{16\, i\, a\, x\, \text{ArcTan}[a\,x]^4}{\sqrt{1+a^2 x^2}} + \frac{48\, a\, \pi^2\, x\, \text{ArcTan}[a\,x]\, \text{Log}\left[1 - i\, e^{-i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} -$$

$$\frac{96\, a\, \pi\, x\, \text{ArcTan}[a\,x]^2\, \text{Log}\left[1 - i\, e^{-i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} - \frac{8\, a\, \pi^3\, x\, \text{Log}\left[1 + i\, e^{-i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} +$$

$$\frac{64\, a\, x\, \text{ArcTan}[a\,x]^3\, \text{Log}\left[1 + i\, e^{-i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} + \frac{192\, a\, x\, \text{ArcTan}[a\,x]^2\, \text{Log}\left[1 - e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} +$$

$$\frac{8\, a\, \pi^3\, x\, \text{Log}\left[1 + i\, e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} - \frac{48\, a\, \pi^2\, x\, \text{ArcTan}[a\,x]\, \text{Log}\left[1 + i\, e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} +$$

$$\frac{96\, a\, \pi\, x\, \text{ArcTan}[a\,x]^2\, \text{Log}\left[1 + i\, e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} - \frac{64\, a\, x\, \text{ArcTan}[a\,x]^3\, \text{Log}\left[1 + i\, e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} -$$

$$\frac{192\, a\, x\, \text{ArcTan}[a\,x]^2\, \text{Log}\left[1 + e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} + \frac{8\, a\, \pi^3\, x\, \text{Log}\left[\text{Tan}\left[\frac{1}{4}\left(\pi + 2\, \text{ArcTan}[a\,x]\right)\right]\right]}{\sqrt{1+a^2 x^2}} +$$

$$\frac{192\, i\, a\, x\, \text{ArcTan}[a\,x]^2\, \text{PolyLog}\left[2, -i\, e^{-i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} +$$

$$\frac{48\, i\, a\, \pi\, x\, (\pi - 4\, \text{ArcTan}[a\,x])\, \text{PolyLog}\left[2, i\, e^{-i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} +$$

$$\frac{384\, i\, a\, x\, \text{ArcTan}[a\,x]\, \text{PolyLog}\left[2, -e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} + \frac{48\, i\, a\, \pi^2\, x\, \text{PolyLog}\left[2, -i\, e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} -$$

$$\frac{192\, i\, a\, \pi\, x\, \text{ArcTan}[a\,x]\, \text{PolyLog}\left[2, -i\, e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} +$$

$$\frac{192\, i\, a\, x\, \text{ArcTan}[a\,x]^2\, \text{PolyLog}\left[2, -i\, e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} -$$

$$\frac{384\, i\, a\, x\, \text{ArcTan}[a\,x]\, \text{PolyLog}\left[2, e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} +$$

$$\frac{384\, a\, x\, \text{ArcTan}[a\,x]\, \text{PolyLog}\left[3, -i\, e^{-i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} - \frac{192\, a\, \pi\, x\, \text{PolyLog}\left[3, i\, e^{-i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} -$$

$$\frac{384\, a\, x\, \text{PolyLog}\left[3, -e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} + \frac{192\, a\, \pi\, x\, \text{PolyLog}\left[3, -i\, e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} -$$

$$\frac{384\, a\, x\, \text{ArcTan}[a\,x]\, \text{PolyLog}\left[3, -i\, e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} + \frac{384\, a\, x\, \text{PolyLog}\left[3, e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} -$$

$$\left.\frac{384\, i\, a\, x\, \text{PolyLog}\left[4, -i\, e^{-i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}} - \frac{384\, i\, a\, x\, \text{PolyLog}\left[4, -i\, e^{i\, \text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2 x^2}}\right)$$

$$\text{Sec}\left[\frac{1}{2}\, \text{ArcTan}[a\,x]\right] + a\, c \left(-\frac{3\sqrt{c\,\left(1+a^2 x^2\right)}\, \text{ArcTan}[a\,x]^2}{2\sqrt{1+a^2 x^2}} + \frac{1}{\sqrt{1+a^2 x^2}}\right.$$

$$3\sqrt{c\,\left(1+a^2 x^2\right)}\, \left(\text{ArcTan}[a\,x]\, \left(\text{Log}\left[1 - i\, e^{i\, \text{ArcTan}[a\,x]}\right] - \text{Log}\left[1 + i\, e^{i\, \text{ArcTan}[a\,x]}\right]\right) +\right.$$

$$\mathbb{i}\left(\text{PolyLog}\left[2,-\mathbb{i}\,e^{\mathbb{i}\,\text{ArcTan}[a\,x]}\right]-\text{PolyLog}\left[2,\mathbb{i}\,e^{\mathbb{i}\,\text{ArcTan}[a\,x]}\right]\right)\Big)+$$

$$\frac{1}{2\sqrt{1+a^2x^2}}\sqrt{c\,(1+a^2x^2)}\,\left(\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right]\right]+\right.$$

$$\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\left(\text{Log}\left[1-e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{Log}\left[1+e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+\right.$$

$$\left.\mathbb{i}\left(\text{PolyLog}\left[2,-e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\right)-$$

$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\left(\text{Log}\left[1-e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{Log}\left[1+e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+\right.$$

$$2\,\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\left(\text{PolyLog}\left[2,-e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+$$

$$\left.2\left(-\text{PolyLog}\left[3,-e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+\text{PolyLog}\left[3,e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\right)+$$

$$8\left(\frac{1}{64}\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^4+\frac{1}{4}\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^4-\right.$$

$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^3\text{Log}\left[1+e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\frac{1}{8}\pi^3\left(\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)-\right.$$

$$\left.\text{Log}\left[1+e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3\text{Log}\Big[$$

$$1+e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]+\frac{3}{8}\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\text{PolyLog}\left[2,-e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+$$

$$\frac{3}{4}\pi^2\left(\frac{1}{2}\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\text{Log}\Big[\right.$$

$$\left.1+e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]+\frac{1}{2}\mathbb{i}\,\text{PolyLog}\left[2,-e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)+$$

$$\frac{3}{2}\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\text{PolyLog}\left[2,-e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\frac{3}{4}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\text{PolyLog}\left[3,-e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$

$$\frac{3}{2}\pi\left(\frac{1}{3}\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\text{Log}\Big[\right.$$

$$1+e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]+\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\text{PolyLog}\Big[2,$$

$$\left.-e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]-\frac{1}{2}\text{PolyLog}\left[3,-e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$

$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\text{PolyLog}\left[3,-e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\left.\left.\frac{3}{4}\mathbb{i}\,\text{PolyLog}\left[4,-e^{\mathbb{i}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\frac{3}{4}\mathbb{i}\,\text{PolyLog}\left[4,-e^{2\,\mathbb{i}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)\right)+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{3\sqrt{c\,(1+a^2x^2)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{2\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}-$$

$$\frac{\sqrt{c\,(1+a^2 x^2)}\;\text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+$$

$$\left.\frac{3\sqrt{c\,(1+a^2 x^2)}\;\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{2\sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}\right)$$

Problem 428: Result more than twice size of optimal antiderivative.

$$\int x^3\left(c+a^2 c\,x^2\right)^{5/2}\text{ArcTan}[a\,x]^3\,dx$$

Optimal (type 4, 798 leaves, 547 steps):

$$\frac{85\,c^2 x\sqrt{c+a^2 c\,x^2}}{12096\,a^3}-\frac{c^2 x^3\sqrt{c+a^2 c\,x^2}}{240\,a}-\frac{1}{504}a\,c^2 x^5\sqrt{c+a^2 c\,x^2}-$$
$$\frac{6157\,c^2\sqrt{c+a^2 c\,x^2}\;\text{ArcTan}[a\,x]}{60480\,a^4}-\frac{47\,c^2 x^2\sqrt{c+a^2 c\,x^2}\;\text{ArcTan}[a\,x]}{30240\,a^2}+$$
$$\frac{67\,c^2 x^4\sqrt{c+a^2 c\,x^2}\;\text{ArcTan}[a\,x]}{2520}+\frac{1}{84}a^2 c^2 x^6\sqrt{c+a^2 c\,x^2}\;\text{ArcTan}[a\,x]+$$
$$\frac{47\,c^2 x\sqrt{c+a^2 c\,x^2}\;\text{ArcTan}[a\,x]^2}{896\,a^3}-\frac{205\,c^2 x^3\sqrt{c+a^2 c\,x^2}\;\text{ArcTan}[a\,x]^2}{4032\,a}-$$
$$\frac{103\,a\,c^2 x^5\sqrt{c+a^2 c\,x^2}\;\text{ArcTan}[a\,x]^2}{1008}-\frac{1}{24}a^3 c^2 x^7\sqrt{c+a^2 c\,x^2}\;\text{ArcTan}[a\,x]^2-$$
$$\frac{115\,i\,c^3\sqrt{1+a^2 x^2}\;\text{ArcTan}\left[e^{i\,\text{ArcTan}[a\,x]}\right]\text{ArcTan}[a\,x]^2}{1344\,a^4\sqrt{c+a^2 c\,x^2}}-\frac{2\,c^2\sqrt{c+a^2 c\,x^2}\;\text{ArcTan}[a\,x]^3}{63\,a^4}+$$
$$\frac{c^2 x^2\sqrt{c+a^2 c\,x^2}\;\text{ArcTan}[a\,x]^3}{63\,a^2}+\frac{5}{21}c^2 x^4\sqrt{c+a^2 c\,x^2}\;\text{ArcTan}[a\,x]^3+$$
$$\frac{19}{63}a^2 c^2 x^6\sqrt{c+a^2 c\,x^2}\;\text{ArcTan}[a\,x]^3+\frac{1}{9}a^4 c^2 x^8\sqrt{c+a^2 c\,x^2}\;\text{ArcTan}[a\,x]^3+$$
$$\frac{1433\,c^{5/2}\,\text{ArcTanh}\left[\frac{a\sqrt{c}\,x}{\sqrt{c+a^2 c\,x^2}}\right]}{15120\,a^4}+\frac{115\,i\,c^3\sqrt{1+a^2 x^2}\;\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{1344\,a^4\sqrt{c+a^2 c\,x^2}}-$$
$$\frac{115\,i\,c^3\sqrt{1+a^2 x^2}\;\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{1344\,a^4\sqrt{c+a^2 c\,x^2}}-$$
$$\frac{115\,c^3\sqrt{1+a^2 x^2}\;\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{1344\,a^4\sqrt{c+a^2 c\,x^2}}+\frac{115\,c^3\sqrt{1+a^2 x^2}\;\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{1344\,a^4\sqrt{c+a^2 c\,x^2}}$$

Result (type 4, 2044 leaves):

$$\frac{1}{a^4}c^2\left(-\frac{1}{40\sqrt{1+a^2 x^2}}\sqrt{c\,(1+a^2 x^2)}\left(11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}[2]-\right.\right.$$
$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]-$$

$$11\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]+$$
$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$$
$$11\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$$
$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]+$$
$$11\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[-\text{Cos}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]+$$
$$20\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]-$$
$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]-$$
$$20\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]+$$
$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]+$$
$$11\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]-22\,i\,\text{ArcTan}[a\,x]$$
$$\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+22\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$$
$$22\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-22\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\Bigg)-$$
$$\frac{1}{960}\left(1+a^2x^2\right)^2\sqrt{c\left(1+a^2x^2\right)}\,\Big(150\,\text{ArcTan}[a\,x]-32\,\text{ArcTan}[a\,x]^3+$$
$$8\,\text{ArcTan}[a\,x]\left(27+20\,\text{ArcTan}[a\,x]^2\right)\text{Cos}[2\,\text{ArcTan}[a\,x]]+$$
$$66\,\text{ArcTan}[a\,x]\,\text{Cos}[4\,\text{ArcTan}[a\,x]]+12\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+$$
$$6\,\text{ArcTan}[a\,x]^2\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+6\,\text{Sin}[4\,\text{ArcTan}[a\,x]]-$$
$$33\,\text{ArcTan}[a\,x]^2\,\text{Sin}[4\,\text{ArcTan}[a\,x]]\Big)+$$
$$\frac{1}{a^4}2\,c^2\left(\frac{1}{1680\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\,\Big(309\pi\,\text{ArcTan}[a\,x]\,\text{Log}[2]-\right.$$
$$309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]-$$
$$309\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]+$$
$$309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$$
$$309\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$$
$$309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]+$$
$$309\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[-\text{Cos}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]+$$
$$518\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]-$$
$$309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]-$$

$518\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]+$

$309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]+$

$309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}\,(\pi+2\,\text{ArcTan}[a\,x])\right]\right]-618\,i\,\text{ArcTan}[a\,x]$

$\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+618\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$

$618\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-618\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\Big)-$

$\frac{1}{53\,760}\,(1+a^2\,x^2)^3\,\sqrt{c\,(1+a^2\,x^2)}\,\Big(-4116\,\text{ArcTan}[a\,x]-3648\,\text{ArcTan}[a\,x]^3+$

$2\,\text{ArcTan}[a\,x]\,(-3131+896\,\text{ArcTan}[a\,x]^2)\,\text{Cos}[2\,\text{ArcTan}[a\,x]]-$

$4\,\text{ArcTan}[a\,x]\,(691+560\,\text{ArcTan}[a\,x]^2)\,\text{Cos}[4\,\text{ArcTan}[a\,x]]-$

$618\,\text{ArcTan}[a\,x]\,\text{Cos}[6\,\text{ArcTan}[a\,x]]-404\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+633\,\text{ArcTan}[a\,x]^2$

$\text{Sin}[2\,\text{ArcTan}[a\,x]]-352\,\text{Sin}[4\,\text{ArcTan}[a\,x]]-180\,\text{ArcTan}[a\,x]^2\,\text{Sin}[4\,\text{ArcTan}[a\,x]]-$

$100\,\text{Sin}[6\,\text{ArcTan}[a\,x]]+309\,\text{ArcTan}[a\,x]^2\,\text{Sin}[6\,\text{ArcTan}[a\,x]]\Big)\Big)+$

$\frac{1}{a^4}\,c^2\,\Bigg(\frac{1}{120\,960\,\sqrt{1+a^2\,x^2}}\,\sqrt{c\,(1+a^2\,x^2)}\,\Big(16\,407\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-$

$16\,407\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$

$16\,407\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)\,e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}\,\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$

$16\,407\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)\,e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}\,\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]+$

$16\,407\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\frac{1}{2}\,e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}\,\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]+$

$16\,407\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\frac{1}{2}\,e^{-\frac{1}{2}\,i\,\text{ArcTan}[a\,x]}\,\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$

$25\,576\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]+$

$16\,407\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]-$

$16\,407\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[-\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]+$

$25\,576\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]-$

$16\,407\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]-$

$16\,407\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]+$

$32\,814\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-$

$32\,814\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]-$

$32\,814\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+32\,814\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\Big)-$

$\frac{1}{15\,482\,880}\,(1+a^2\,x^2)^4\,\sqrt{c\,(1+a^2\,x^2)}\,\Big(657\,578\,\text{ArcTan}[a\,x]-273\,408\,\text{ArcTan}[a\,x]^3+$

$288\,\text{ArcTan}[a\,x]\,(3761+3792\,\text{ArcTan}[a\,x]^2)\,\text{Cos}[2\,\text{ArcTan}[a\,x]]-$

$216\,\text{ArcTan}[a\,x]\,\left(-2671+896\,\text{ArcTan}[a\,x]^2\right)\,\text{Cos}[4\,\text{ArcTan}[a\,x]]+$
$184\,160\,\text{ArcTan}[a\,x]\,\text{Cos}[6\,\text{ArcTan}[a\,x]]+$
$161\,280\,\text{ArcTan}[a\,x]^3\,\text{Cos}[6\,\text{ArcTan}[a\,x]]+32\,814\,\text{ArcTan}[a\,x]\,\text{Cos}[8\,\text{ArcTan}[a\,x]]+$
$74\,932\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+39\,222\,\text{ArcTan}[a\,x]^2\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+$
$77\,908\,\text{Sin}[4\,\text{ArcTan}[a\,x]]-80\,226\,\text{ArcTan}[a\,x]^2\,\text{Sin}[4\,\text{ArcTan}[a\,x]]+$
$36\,612\,\text{Sin}[6\,\text{ArcTan}[a\,x]]+19\,086\,\text{ArcTan}[a\,x]^2\,\text{Sin}[6\,\text{ArcTan}[a\,x]]+$
$7238\,\text{Sin}[8\,\text{ArcTan}[a\,x]]-16\,407\,\text{ArcTan}[a\,x]^2\,\text{Sin}[8\,\text{ArcTan}[a\,x]]\Big)\Bigg)$

Problem 429: Result more than twice size of optimal antiderivative.

$$\int x^2\,\left(c+a^2\,c\,x^2\right)^{5/2}\,\text{ArcTan}[a\,x]^3\,dx$$

Optimal (type 4, 1019 leaves, 293 steps):

$$\frac{13 c^2 \sqrt{c+a^2 c x^2}}{6720 a^3}-\frac{3 c \left(c+a^2 c x^2\right)^{3/2}}{560 a^3}-\frac{\left(c+a^2 c x^2\right)^{5/2}}{280 a^3}+$$
$$\frac{43 c^2 x \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]}{1344 a^2}+\frac{29}{560} c^2 x^3 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]+$$
$$\frac{1}{56} a^2 c^2 x^5 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]+\frac{1373 c^2 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^2}{13440 a^3}-$$
$$\frac{737 c^2 x^2 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^2}{6720 a}-\frac{83}{560} a c^2 x^4 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^2-$$
$$\frac{3}{56} a^3 c^2 x^6 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^2+\frac{5 c^2 x \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3}{128 a^2}+$$
$$\frac{59}{192} c^2 x^3 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3+\frac{17}{48} a^2 c^2 x^5 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3+$$
$$\frac{1}{8} a^4 c^2 x^7 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3+\frac{5 i c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}\left[e^{i \text{ArcTan}[a x]}\right] \text{ArcTan}[a x]^3}{64 a^3 \sqrt{c+a^2 c x^2}}+$$
$$\frac{397 i c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{840 a^3 \sqrt{c+a^2 c x^2}}-$$
$$\frac{15 i c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]^2\ \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{128 a^3 \sqrt{c+a^2 c x^2}}+$$
$$\frac{15 i c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]^2\ \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{128 a^3 \sqrt{c+a^2 c x^2}}-$$
$$\frac{397 i c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[2,-\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{1680 a^3 \sqrt{c+a^2 c x^2}}+\frac{397 i c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[2,\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{1680 a^3 \sqrt{c+a^2 c x^2}}+$$
$$\frac{15 c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]}{64 a^3 \sqrt{c+a^2 c x^2}}-$$
$$\frac{15 c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[3,i e^{i \text{ArcTan}[a x]}\right]}{64 a^3 \sqrt{c+a^2 c x^2}}+$$
$$\frac{15 i c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[4,-i e^{i \text{ArcTan}[a x]}\right]}{64 a^3 \sqrt{c+a^2 c x^2}}-\frac{15 i c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[4,i e^{i \text{ArcTan}[a x]}\right]}{64 a^3 \sqrt{c+a^2 c x^2}}$$

Result (type 4, 6517 leaves):

$$\frac{1}{a^3} c^2 \left(\frac{\sqrt{c\left(1+a^2 x^2\right)}\ \left(-1+\text{ArcTan}[a x]^2\right)}{4 \sqrt{1+a^2 x^2}}+\frac{1}{2 \sqrt{1+a^2 x^2}}\right.$$
$$\sqrt{c\left(1+a^2 x^2\right)}\ \left(-\text{ArcTan}[a x]\ \left(\text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]-\text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]\right)-\right.$$
$$\left.i\left(\text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]-\text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]\right)\right)+$$
$$\frac{1}{8 \sqrt{1+a^2 x^2}} \sqrt{c\left(1+a^2 x^2\right)}\ \left(-\frac{1}{8} \pi^3 \text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right]\right]-\right.$$

$$\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+\right.$$
$$\left.i\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\right)+$$
$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+\right.$$
$$2\,i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+$$
$$\left.2\left(-\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+\text{PolyLog}\left[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\right)-$$
$$8\left(\frac{1}{64}i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^4+\frac{1}{4}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^4-\right.$$
$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^3\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$
$$\frac{1}{8}\pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)-\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$
$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+$$
$$\frac{3}{8}i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+$$
$$\frac{3}{4}\pi^2\left(\frac{1}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\right.$$
$$\left.\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+\frac{1}{2}i\,\text{PolyLog}\left[2,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)+$$
$$\frac{3}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\text{PolyLog}\left[2,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$
$$\frac{3}{4}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$
$$\frac{3}{2}\pi\left(\frac{1}{3}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\right.$$
$$\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)$$
$$\left.\text{PolyLog}\left[2,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-\frac{1}{2}\text{PolyLog}\left[3,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$
$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\text{PolyLog}\left[3,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$
$$\left.\frac{3}{4}i\,\text{PolyLog}\left[4,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\frac{3}{4}i\,\text{PolyLog}\left[4,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)\right)+$$
$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$
$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(2\,\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2-\text{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]}{8\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^3}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a x]^3}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]}{8\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^3}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-2\,\text{ArcTan}[a x]-\text{ArcTan}[a x]^2+\text{ArcTan}[a x]^3\right)}{16\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^2}+$$

$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)\right)\Big/$$

$$\left(4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)\right)+$$

$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)\right)\Big/$$

$$\left.\left(4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)\right)\right)+$$

$$\frac{1}{a^3}2c^2\left(\frac{\sqrt{c\left(1+a^2x^2\right)}\left(50-19\,\text{ArcTan}[a x]^2\right)}{240\sqrt{1+a^2x^2}}+\right.$$

$$\frac{1}{120\sqrt{1+a^2x^2}}$$

$$19\sqrt{c\left(1+a^2x^2\right)}$$

$$\left(\text{ArcTan}[a x]\left(\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a x]}\right]-\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a x]}\right]\right)+\right.$$

$$\left.i\left(\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a x]}\right]-\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a x]}\right]\right)\right)+$$

$$\frac{1}{16\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\left(\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right]\right]+\right.$$

$$\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.$$

$$\left.i\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\right)-$$

$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.$$

$$2i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+$$

$$\left.2\left(-\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]+\text{PolyLog}\left[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\right)+$$

$$8\left(\frac{1}{64}i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^4+\frac{1}{4}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^4-\right.$$

$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^3\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$
$$\frac{1}{8}\pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)-\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$
$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+$$
$$\frac{3}{8}i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+$$
$$\frac{3}{4}\pi^2\left(\frac{1}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\right.$$
$$\left.\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+\frac{1}{2}i\,\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)+$$
$$\frac{3}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$
$$\frac{3}{4}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$
$$\frac{3}{2}\pi\left(\frac{1}{3}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\right.$$
$$\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)$$
$$\left.\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-\frac{1}{2}\text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$
$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$
$$\left.\left.\frac{3}{4}i\,\text{PolyLog}\left[4,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\frac{3}{4}i\,\text{PolyLog}\left[4,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)\right)+$$
$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{48\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6}+$$
$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2-5\,\text{ArcTan}[a\,x]^3\right)}{80\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$
$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(-2-52\,\text{ArcTan}[a\,x]+26\,\text{ArcTan}[a\,x]^2+15\,\text{ArcTan}[a\,x]^3\right)\right)\Big/$$
$$\left(480\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2\right)-$$
$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{40\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^5}-$$
$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{48\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]}{40\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^5}+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-\text{ArcTan}[a x]-\text{ArcTan}[a x]^2+5\,\text{ArcTan}[a x]^3\right)}{80\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^4}+$$

$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(-2+52\,\text{ArcTan}[a x]+26\,\text{ArcTan}[a x]^2-15\,\text{ArcTan}[a x]^3\right)\right)\Big/$$
$$\left(480\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^2\right)+$$
$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(50\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-19\,\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)\right)\Big/$$
$$\left(240\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)\right)+$$
$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-13\,\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)\right)\Big/$$
$$\left(120\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^3\right)+$$
$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+13\,\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)\right)\Big/$$
$$\left(120\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^3\right)+$$
$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(-50\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+19\,\text{ArcTan}[a x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)\right)\Big/$$
$$\left.\left(240\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)\right)\right)+$$

$$\frac{1}{a^3}c^2\left(\frac{\sqrt{c\left(1+a^2x^2\right)}\left(-567+89\,\text{ArcTan}[a x]^2\right)}{3360\sqrt{1+a^2x^2}}-\frac{1}{1680\sqrt{1+a^2x^2}}\right.$$
$$89\sqrt{c\left(1+a^2x^2\right)}$$
$$\left(\text{ArcTan}[a x]\left(\text{Log}\left[1-\mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a x]}\right]-\text{Log}\left[1+\mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a x]}\right]\right)+\right.$$
$$\left.\mathrm{i}\left(\text{PolyLog}\left[2,-\mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a x]}\right]-\text{PolyLog}\left[2,\mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a x]}\right]\right)\right)-$$
$$\frac{1}{128\sqrt{1+a^2x^2}}5\sqrt{c\left(1+a^2x^2\right)}\left(\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right]\right]+\right.$$
$$\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\left(\text{Log}\left[1-e^{\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.$$
$$\left.\mathrm{i}\left(\text{PolyLog}\left[2,-e^{\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2,e^{\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\right)-$$
$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\left(\text{Log}\left[1-e^{\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.$$
$$2\,\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\left(\text{PolyLog}\left[2,-e^{\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2,e^{\mathrm{i}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+$$

$$2\left(-\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]+\text{PolyLog}\left[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\Bigg)+$$

$$8\left(\frac{1}{64}i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^4+\frac{1}{4}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^4-\right.$$

$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^3\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-$$

$$\frac{1}{8}\pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)-\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)-$$

$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^3\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+$$

$$\frac{3}{8}i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]+$$

$$\frac{3}{4}\pi^2\left(\frac{1}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)\right.$$

$$\left.\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+\frac{1}{2}i\,\text{PolyLog}\left[2,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)+$$

$$\frac{3}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2\text{PolyLog}\left[2,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]-$$

$$\frac{3}{4}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-$$

$$\frac{3}{2}\pi\left(\frac{1}{3}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2\right.$$

$$\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)$$

$$\left.\text{PolyLog}\left[2,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]-\frac{1}{2}\text{PolyLog}\left[3,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)-$$

$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)\text{PolyLog}\left[3,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]-$$

$$\left.\frac{3}{4}i\,\text{PolyLog}\left[4,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\frac{3}{4}i\,\text{PolyLog}\left[4,-e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)\Bigg)+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a x]^3}{128\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^8}+$$

$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(6\,\text{ArcTan}[a x]-9\,\text{ArcTan}[a x]^2-98\,\text{ArcTan}[a x]^3\right)\right)\Big/$$

$$\left(2688\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^6\right)+$$

$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(-4-178\,\text{ArcTan}[a x]+178\,\text{ArcTan}[a x]^2+525\,\text{ArcTan}[a x]^3\right)\right)\Big/$$

$$\left(8960\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^4\right)+$$

$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(170+2438\,\text{ArcTan}[a x]-1219\,\text{ArcTan}[a x]^2-525\,\text{ArcTan}[a x]^3\right)\right)\Big/$$

$$\left(26\,880\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^2\right)-$$

$$\frac{3\sqrt{c\,(1+a^2x^2)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{448\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^7}-$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\text{ArcTan}[a\,x]^3}{128\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^8}+$$

$$\frac{3\sqrt{c\,(1+a^2x^2)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{448\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^7}+$$

$$\left(\sqrt{c\,(1+a^2x^2)}\,\left(-6\,\text{ArcTan}[a\,x]-9\,\text{ArcTan}[a\,x]^2+98\,\text{ArcTan}[a\,x]^3\right)\right)\Big/$$
$$\left(2688\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^6\right)+$$

$$\left(\sqrt{c\,(1+a^2x^2)}\,\left(-4+178\,\text{ArcTan}[a\,x]+178\,\text{ArcTan}[a\,x]^2-525\,\text{ArcTan}[a\,x]^3\right)\right)\Big/$$
$$\left(8960\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4\right)+$$

$$\left(\sqrt{c\,(1+a^2x^2)}\,\left(170-2438\,\text{ArcTan}[a\,x]-1219\,\text{ArcTan}[a\,x]^2+525\,\text{ArcTan}[a\,x]^3\right)\right)\Big/$$
$$\left(26\,880\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2\right)+$$

$$\left(\sqrt{c\,(1+a^2x^2)}\,\left(170\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-1219\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$
$$\left(13\,440\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3\right)+$$

$$\left(\sqrt{c\,(1+a^2x^2)}\,\left(2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-89\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$
$$\left(2240\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^5\right)+$$

$$\left(\sqrt{c\,(1+a^2x^2)}\,\left(567\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-89\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$
$$\left(3360\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)+$$

$$\left(\sqrt{c\,(1+a^2x^2)}\,\left(-567\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+89\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$
$$\left(3360\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)+$$

$$\left(\sqrt{c\,(1+a^2x^2)}\,\left(-2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+89\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$
$$\left(2240\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^5\right)+$$

$$\left(\sqrt{c\,(1+a^2x^2)}\,\left(-170\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+1219\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$

$$\left(13440\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^3\right)\Bigg)$$

Problem 430: Result more than twice size of optimal antiderivative.

$$\int x\left(c+a^2 c x^2\right)^{5/2}\text{ArcTan}[a x]^3\,dx$$

Optimal (type 4, 561 leaves, 22 steps):

$$-\frac{17 c^2 x\sqrt{c+a^2 c x^2}}{420 a}-\frac{c x\left(c+a^2 c x^2\right)^{3/2}}{140 a}+\frac{15 c^2\sqrt{c+a^2 c x^2}\,\text{ArcTan}[a x]}{56 a^2}+$$
$$\frac{5 c\left(c+a^2 c x^2\right)^{3/2}\text{ArcTan}[a x]}{84 a^2}+\frac{\left(c+a^2 c x^2\right)^{5/2}\text{ArcTan}[a x]}{35 a^2}-\frac{15 c^2 x\sqrt{c+a^2 c x^2}\,\text{ArcTan}[a x]^2}{112 a}-$$
$$\frac{5 c x\left(c+a^2 c x^2\right)^{3/2}\text{ArcTan}[a x]^2}{56 a}-\frac{x\left(c+a^2 c x^2\right)^{5/2}\text{ArcTan}[a x]^2}{14 a}+$$
$$\frac{15\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}\left[e^{i\,\text{ArcTan}[a x]}\right]\text{ArcTan}[a x]^2}{56 a^2\sqrt{c+a^2 c x^2}}+\frac{\left(c+a^2 c x^2\right)^{7/2}\text{ArcTan}[a x]^3}{7 a^2 c}-$$
$$\frac{37 c^{5/2}\,\text{ArcTanh}\left[\frac{a\sqrt{c}\,x}{\sqrt{c+a^2 c x^2}}\right]}{120 a^2}-\frac{15\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a x]}\right]}{56 a^2\sqrt{c+a^2 c x^2}}+$$
$$\frac{15\,i\,c^3\sqrt{1+a^2x^2}\,\text{ArcTan}[a x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a x]}\right]}{56 a^2\sqrt{c+a^2 c x^2}}+$$
$$\frac{15 c^3\sqrt{1+a^2x^2}\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a x]}\right]}{56 a^2\sqrt{c+a^2 c x^2}}-\frac{15 c^3\sqrt{1+a^2x^2}\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a x]}\right]}{56 a^2\sqrt{c+a^2 c x^2}}$$

Result (type 4, 1871 leaves):

$$\frac{1}{a^2}c^2\left(\frac{1}{2\sqrt{1+a^2x^2}}\right.$$
$$\sqrt{c\left(1+a^2x^2\right)}\left(\pi\,\text{ArcTan}[a x]\,\text{Log}[2]-\text{ArcTan}[a x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a x]}\right]+\text{ArcTan}[a x]^2\right.$$
$$\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a x]}\right]-\pi\,\text{ArcTan}[a x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a x]}\left(-i+e^{i\,\text{ArcTan}[a x]}\right)\right]+$$
$$\text{ArcTan}[a x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a x]}\left(-i+e^{i\,\text{ArcTan}[a x]}\right)\right]-$$
$$\pi\,\text{ArcTan}[a x]\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a x]}\right)\right]-$$
$$\text{ArcTan}[a x]^2\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a x]}\right)\right]+\pi\,\text{ArcTan}[a x]$$
$$\text{Log}\left[-\text{Cos}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a x]\right)\right]\right]+2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right]-$$
$$\text{ArcTan}[a x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right]-$$

$$2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]+$$
$$\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]+$$
$$\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]-$$
$$2\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+2\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$$
$$2\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-2\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\Bigg)+$$
$$\frac{1}{12}\left(1+a^2x^2\right)\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]\,\Big(6+4\,\text{ArcTan}[a\,x]^2+$$
$$6\,\text{Cos}[2\,\text{ArcTan}[a\,x]]-3\,\text{ArcTan}[a\,x]\,\text{Sin}[2\,\text{ArcTan}[a\,x]]\Big)\Bigg)+$$
$$\frac{1}{a^2}2\,c^2\Bigg(-\frac{1}{40\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\,\Big(11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}[2]-$$
$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]-$$
$$11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]+$$
$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$$
$$11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$$
$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]+$$
$$11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[-\text{Cos}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]+$$
$$20\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]-$$
$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]-$$
$$20\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]+$$
$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]+$$
$$11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]-22\,i\,\text{ArcTan}[a\,x]$$
$$\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+22\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$$
$$22\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-22\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\Big)-$$
$$\frac{1}{960}\left(1+a^2x^2\right)^2\sqrt{c\left(1+a^2x^2\right)}\,\Big(150\,\text{ArcTan}[a\,x]-32\,\text{ArcTan}[a\,x]^3+$$
$$8\,\text{ArcTan}[a\,x]\left(27+20\,\text{ArcTan}[a\,x]^2\right)\text{Cos}[2\,\text{ArcTan}[a\,x]]+$$
$$66\,\text{ArcTan}[a\,x]\,\text{Cos}[4\,\text{ArcTan}[a\,x]]+12\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+$$
$$6\,\text{ArcTan}[a\,x]^2\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+6\,\text{Sin}[4\,\text{ArcTan}[a\,x]]-$$
$$33\,\text{ArcTan}[a\,x]^2\,\text{Sin}[4\,\text{ArcTan}[a\,x]]\Big)\Bigg)+$$

$$\frac{1}{a^2} c^2 \Bigg(\frac{1}{1680\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\,\Big(309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}[2] - 309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right] + 309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right] - 309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right] + 309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right] - 309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right] - 309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right] + 309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[-\text{Cos}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right] + 518\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right] - 309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right] - 518\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right] + 309\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right] + 309\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right] - 618\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right] + 618\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right] + 618\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right] - 618\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\Big) - \frac{1}{53760}\left(1+a^2x^2\right)^3\sqrt{c\left(1+a^2x^2\right)}\,\Big(-4116\,\text{ArcTan}[a\,x] - 3648\,\text{ArcTan}[a\,x]^3 + 2\,\text{ArcTan}[a\,x]\left(-3131+896\,\text{ArcTan}[a\,x]^2\right)\text{Cos}[2\,\text{ArcTan}[a\,x]] - 4\,\text{ArcTan}[a\,x]\left(691+560\,\text{ArcTan}[a\,x]^2\right)\text{Cos}[4\,\text{ArcTan}[a\,x]] - 618\,\text{ArcTan}[a\,x]\,\text{Cos}[6\,\text{ArcTan}[a\,x]] - 404\,\text{Sin}[2\,\text{ArcTan}[a\,x]] + 633\,\text{ArcTan}[a\,x]^2\,\text{Sin}[2\,\text{ArcTan}[a\,x]] - 352\,\text{Sin}[4\,\text{ArcTan}[a\,x]] - 180\,\text{ArcTan}[a\,x]^2\,\text{Sin}[4\,\text{ArcTan}[a\,x]] - 100\,\text{Sin}[6\,\text{ArcTan}[a\,x]] + 309\,\text{ArcTan}[a\,x]^2\,\text{Sin}[6\,\text{ArcTan}[a\,x]]\Big)\Bigg)$$

Problem 431: Result more than twice size of optimal antiderivative.

$$\int \left(c+a^2\,c\,x^2\right)^{5/2}\,\text{ArcTan}[a\,x]^3\,dx$$

Optimal (type 4, 870 leaves, 23 steps) :

$$-\frac{17 c^2 \sqrt{c+a^2 c x^2}}{60 a}-\frac{c \left(c+a^2 c x^2\right)^{3/2}}{60 a}+\frac{17}{60} c^2 x \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]+\frac{1}{20} c x \left(c+a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]-\frac{15 c^2 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^2}{16 a}-\frac{5 c \left(c+a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]^2}{24 a}-\frac{\left(c+a^2 c x^2\right)^{5/2} \text{ArcTan}[a x]^2}{10 a}+\frac{5}{16} c^2 x \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3+\frac{5}{24} c x \left(c+a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]^3+\frac{1}{6} x \left(c+a^2 c x^2\right)^{5/2} \text{ArcTan}[a x]^3-\frac{5 i c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}\left[e^{i \text{ArcTan}[a x]}\right] \text{ArcTan}[a x]^3}{8 a \sqrt{c+a^2 c x^2}}-\frac{259 i c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{60 a \sqrt{c+a^2 c x^2}}+\frac{15 i c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]^2 \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{16 a \sqrt{c+a^2 c x^2}}-\frac{15 i c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]^2 \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{16 a \sqrt{c+a^2 c x^2}}+\frac{259 i c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[2,-\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{120 a \sqrt{c+a^2 c x^2}}-\frac{259 i c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[2,\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{120 a \sqrt{c+a^2 c x^2}}-\frac{15 c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]}{8 a \sqrt{c+a^2 c x^2}}+\frac{15 c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[3,i e^{i \text{ArcTan}[a x]}\right]}{8 a \sqrt{c+a^2 c x^2}}-\frac{15 i c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[4,-i e^{i \text{ArcTan}[a x]}\right]}{8 a \sqrt{c+a^2 c x^2}}+\frac{15 i c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[4,i e^{i \text{ArcTan}[a x]}\right]}{8 a \sqrt{c+a^2 c x^2}}$$

Result (type 4, 5547 leaves):

$$\frac{1}{a} c^2 \left(-\frac{3 \sqrt{c \left(1+a^2 x^2\right)}\ \text{ArcTan}[a x]^2}{2 \sqrt{1+a^2 x^2}}+\frac{1}{\sqrt{1+a^2 x^2}} 3 \sqrt{c \left(1+a^2 x^2\right)}\ \left(\text{ArcTan}[a x] \left(\text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]-\text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]\right)+i \left(\text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]-\text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]\right)\right)+\frac{1}{2 \sqrt{1+a^2 x^2}} \sqrt{c \left(1+a^2 x^2\right)} \left(\frac{1}{8} \pi^3 \text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right]\right]+\frac{3}{4} \pi^2 \left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right) \left(\text{Log}\left[1-e^{i \left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i \left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+i \left(\text{PolyLog}\left[2,-e^{i \left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2,e^{i \left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\right)-\frac{3}{2} \pi \left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2 \left(\text{Log}\left[1-e^{i \left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i \left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.\right.\right.$$

$$2\,i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+$$

$$2\left(-\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+\text{PolyLog}\left[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\Bigg)+$$

$$8\left(\frac{1}{64}\,i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^4+\frac{1}{4}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^4-\right.$$

$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^3\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$

$$\frac{1}{8}\pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)-\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$

$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+$$

$$\frac{3}{8}\,i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+$$

$$\frac{3}{4}\pi^2\left(\frac{1}{2}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\right.$$

$$\left.\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+\frac{1}{2}\,i\,\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)+$$

$$\frac{3}{2}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\frac{3}{4}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$

$$\frac{3}{2}\pi\left(\frac{1}{3}\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\right.$$

$$\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)$$

$$\left.\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-\frac{1}{2}\text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$

$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\left.\frac{3}{4}\,i\,\text{PolyLog}\left[4,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\frac{3}{4}\,i\,\text{PolyLog}\left[4,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)\Bigg)+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{3\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{2\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+$$

$$\left.\frac{3\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{2\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}\right)+$$

$$\frac{1}{a} 2 c^2 \left(\frac{\sqrt{c\left(1+a^2 x^2\right)}\left(-1+\text{ArcTan}[a x]^2\right)}{4 \sqrt{1+a^2 x^2}}+\right.$$

$$\frac{1}{2 \sqrt{1+a^2 x^2}}$$

$$\sqrt{c\left(1+a^2 x^2\right)}$$

$$\left(-\text{ArcTan}[a x]\left(\text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]-\text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]\right)-\right.$$

$$\left.i\left(\text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]-\text{PolyLog}\left[2, i e^{i \text{ArcTan}[a x]}\right]\right)\right)+$$

$$\frac{1}{8 \sqrt{1+a^2 x^2}} \sqrt{c\left(1+a^2 x^2\right)}\left(-\frac{1}{8} \pi^3 \text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\right]\right]-\right.$$

$$\frac{3}{4} \pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.$$

$$\left.i\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2, e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\right)+$$

$$\frac{3}{2} \pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.$$

$$2 i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2, e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+$$

$$\left.2\left(-\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]+\text{PolyLog}\left[3, e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\right)-$$

$$8\left(\frac{1}{64} i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^4+\frac{1}{4} i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^4-\right.$$

$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^3 \text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-$$

$$\frac{1}{8} \pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)-\text{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)-$$

$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^3 \text{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+$$

$$\frac{3}{8} i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2 \text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]+$$

$$\frac{3}{4} \pi^2\left(\frac{1}{2} i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)\right.$$

$$\left.\text{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+\frac{1}{2} i \text{PolyLog}\left[2,-e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)+$$

$$\frac{3}{2} i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2 \text{PolyLog}\left[2,-e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]-$$

$$\frac{3}{4}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right) \text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-$$

$$\frac{3}{2} \pi\left(\frac{1}{3} i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2\right.$$

$$\text{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)$$

$$\left.\text{PolyLog}\left[2,-e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]-\frac{1}{2} \text{PolyLog}\left[3,-e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)-$$

$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\frac{3}{4}\,i\,\text{PolyLog}\left[4,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\frac{3}{4}\,i\,\text{PolyLog}\left[4,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\Bigg)\Bigg)+$$

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\,\text{ArcTan}[a\,x]^3}{16\sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\left(2\,\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2-\text{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}-$$

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\,\text{ArcTan}[a\,x]^3}{16\sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^4}+$$

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{8\sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^3}+$$

$$\frac{\sqrt{c\left(1+a^2 x^2\right)}\left(-2\,\text{ArcTan}[a\,x]-\text{ArcTan}[a\,x]^2+\text{ArcTan}[a\,x]^3\right)}{16\sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+$$

$$\left(\sqrt{c\left(1+a^2 x^2\right)}\left(\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$

$$\left(4\sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)+$$

$$\left(\sqrt{c\left(1+a^2 x^2\right)}\left(-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Big/$$

$$\left(4\sqrt{1+a^2 x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)\right)\Bigg)+$$

$$\frac{1}{a}c^2\left(\frac{\sqrt{c\left(1+a^2 x^2\right)}\left(50-19\,\text{ArcTan}[a\,x]^2\right)}{240\sqrt{1+a^2 x^2}}+\right.$$

$$\frac{1}{120\sqrt{1+a^2 x^2}}$$

$$19\sqrt{c\left(1+a^2 x^2\right)}$$

$$\left(\text{ArcTan}[a\,x]\left(\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]\right)+\right.$$

$$\left.i\left(\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\right)\right)+$$

$$\frac{1}{16\sqrt{1+a^2 x^2}}\sqrt{c\left(1+a^2 x^2\right)}\left(\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right]\right]+\right.$$

$$\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.$$
$$\left.i\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\right)-$$
$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+\right.$$
$$2 i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)+$$
$$\left.2\left(-\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]+\text{PolyLog}\left[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]\right)\right)+$$
$$8\left(\frac{1}{64}i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^4+\frac{1}{4}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^4-\right.$$
$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^3\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-$$
$$\frac{1}{8}\pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)-\text{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)-$$
$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^3\text{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+$$
$$\frac{3}{8}i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)^2\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]+$$
$$\frac{3}{4}\pi^2\left(\frac{1}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)\right.$$
$$\left.\text{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+\frac{1}{2}i\,\text{PolyLog}\left[2,-e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)+$$
$$\frac{3}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2\text{PolyLog}\left[2,-e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]-$$
$$\frac{3}{4}\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-$$
$$\frac{3}{2}\pi\left(\frac{1}{3}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)^2\right.$$
$$\text{Log}\left[1+e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)$$
$$\left.\text{PolyLog}\left[2,-e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]-\frac{1}{2}\text{PolyLog}\left[3,-e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)-$$
$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)\text{PolyLog}\left[3,-e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]-$$
$$\left.\left.\frac{3}{4}i\,\text{PolyLog}\left[4,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a x]\right)}\right]-\frac{3}{4}i\,\text{PolyLog}\left[4,-e^{2 i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a x]\right)\right)}\right]\right)\right)+$$
$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a x]^3}{48\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^6}+$$
$$\frac{\sqrt{c\left(1+a^2x^2\right)}\left(\text{ArcTan}[a x]-\text{ArcTan}[a x]^2-5\,\text{ArcTan}[a x]^3\right)}{80\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a x]\right]\right)^4}+$$
$$\left(\sqrt{c\left(1+a^2x^2\right)}\left(-2-52\,\text{ArcTan}[a x]+26\,\text{ArcTan}[a x]^2+15\,\text{ArcTan}[a x]^3\right)\right)\Big/$$

$$\left(480 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^2\right) - \frac{\sqrt{c\,(1+a^2 x^2)}\, \text{ArcTan}[a x]^2 \,\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]}{40 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^5} - \frac{\sqrt{c\,(1+a^2 x^2)}\, \text{ArcTan}[a x]^3}{48 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^6} + \frac{\sqrt{c\,(1+a^2 x^2)}\, \text{ArcTan}[a x]^2 \,\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]}{40 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^5} + \frac{\sqrt{c\,(1+a^2 x^2)}\, \left(-\text{ArcTan}[a x] - \text{ArcTan}[a x]^2 + 5\, \text{ArcTan}[a x]^3\right)}{80 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^4} + \left(\sqrt{c\,(1+a^2 x^2)}\, \left(-2 + 52\, \text{ArcTan}[a x] + 26\, \text{ArcTan}[a x]^2 - 15\, \text{ArcTan}[a x]^3\right)\right) \Big/ \left(480 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^2\right) + \left(\sqrt{c\,(1+a^2 x^2)}\, \left(50\, \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - 19\, \text{ArcTan}[a x]^2 \,\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)\right) \Big/ \left(240 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)\right) + \left(\sqrt{c\,(1+a^2 x^2)}\, \left(\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - 13\, \text{ArcTan}[a x]^2 \,\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)\right) \Big/ \left(120 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^3\right) + \left(\sqrt{c\,(1+a^2 x^2)}\, \left(-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + 13\, \text{ArcTan}[a x]^2 \,\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)\right) \Big/ \left(120 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] - \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^3\right) + \left(\sqrt{c\,(1+a^2 x^2)}\, \left(-50\, \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + 19\, \text{ArcTan}[a x]^2 \,\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)\right) \Big/ \left(240 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right] + \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)\right)\Bigg)$$

Problem 432: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(c + a^2 c\, x^2\right)^{5/2} \text{ArcTan}[a x]^3}{x} \, dx$$

Optimal (type 4, 845 leaves, 54 steps):

$$-\frac{1}{20} a c^2 x \sqrt{c+a^2 c x^2}+\frac{29}{20} c^2 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]+\frac{1}{10} c \left(c+a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]-\frac{29}{40} a c^2 x \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^2-\frac{3}{20} a c x \left(c+a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]^2+\frac{149 i c^3 \sqrt{1+a^2 x^2} \text{ArcTan}\left[e^{i \text{ArcTan}[a x]}\right] \text{ArcTan}[a x]^2}{20 \sqrt{c+a^2 c x^2}}+c^2 \sqrt{c+a^2 c x^2} \text{ArcTan}[a x]^3+\frac{1}{3} c \left(c+a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]^3+\frac{1}{5} \left(c+a^2 c x^2\right)^{5/2} \text{ArcTan}[a x]^3-\frac{2 c^3 \sqrt{1+a^2 x^2} \text{ArcTan}[a x]^3 \text{ArcTanh}\left[e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-\frac{3}{2} c^{5/2} \text{ArcTanh}\left[\frac{a \sqrt{c} x}{\sqrt{c+a^2 c x^2}}\right]+\frac{3 i c^3 \sqrt{1+a^2 x^2} \text{ArcTan}[a x]^2 \text{PolyLog}\left[2,-e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-\frac{149 i c^3 \sqrt{1+a^2 x^2} \text{ArcTan}[a x] \text{PolyLog}\left[2,-i e^{i \text{ArcTan}[a x]}\right]}{20 \sqrt{c+a^2 c x^2}}+\frac{149 i c^3 \sqrt{1+a^2 x^2} \text{ArcTan}[a x] \text{PolyLog}\left[2,i e^{i \text{ArcTan}[a x]}\right]}{20 \sqrt{c+a^2 c x^2}}-\frac{3 i c^3 \sqrt{1+a^2 x^2} \text{ArcTan}[a x]^2 \text{PolyLog}\left[2,e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-\frac{6 c^3 \sqrt{1+a^2 x^2} \text{ArcTan}[a x] \text{PolyLog}\left[3,-e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+\frac{149 c^3 \sqrt{1+a^2 x^2} \text{PolyLog}\left[3,-i e^{i \text{ArcTan}[a x]}\right]}{20 \sqrt{c+a^2 c x^2}}-\frac{149 c^3 \sqrt{1+a^2 x^2} \text{PolyLog}\left[3,i e^{i \text{ArcTan}[a x]}\right]}{20 \sqrt{c+a^2 c x^2}}+\frac{6 c^3 \sqrt{1+a^2 x^2} \text{ArcTan}[a x] \text{PolyLog}\left[3,e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-\frac{6 i c^3 \sqrt{1+a^2 x^2} \text{PolyLog}\left[4,-e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+\frac{6 i c^3 \sqrt{1+a^2 x^2} \text{PolyLog}\left[4,e^{i \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}$$

Result (type 4, 1739 leaves):

$$\frac{1}{8} c^2 \sqrt{c \left(1+a^2 x^2\right)} \left(-\frac{i \pi^4}{\sqrt{1+a^2 x^2}}+8 \text{ArcTan}[a x]^3+\frac{2 i \text{ArcTan}[a x]^4}{\sqrt{1+a^2 x^2}}+\frac{8 \text{ArcTan}[a x]^3 \text{Log}\left[1-e^{-i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-\frac{24 \text{ArcTan}[a x]^2 \text{Log}\left[1-i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+\frac{24 \text{ArcTan}[a x]^2 \text{Log}\left[1+i e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-\frac{8 \text{ArcTan}[a x]^3 \text{Log}\left[1+e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+\frac{24 i \text{ArcTan}[a x]^2 \text{PolyLog}\left[2,e^{-i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}+\frac{24 i \text{ArcTan}[a x]^2 \text{PolyLog}\left[2,-e^{i \text{ArcTan}[a x]}\right]}{\sqrt{1+a^2 x^2}}-\right.$$

$$\frac{48\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}+\frac{48\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}+$$

$$\frac{48\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[3,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}-\frac{48\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[3,-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}+$$

$$\frac{48\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}-\frac{48\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}-$$

$$\left.\frac{48\,i\,\text{PolyLog}\left[4,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}-\frac{48\,i\,\text{PolyLog}\left[4,-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2x^2}}\right)+$$

$$2\,c^2\left(\frac{1}{2\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\left(\pi\,\text{ArcTan}[a\,x]\,\text{Log}[2]-\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+\right.\right.$$

$$\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]-\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\right.$$

$$\left.\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]+\text{ArcTan}[a\,x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$$

$$\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$$

$$\text{ArcTan}[a\,x]^2\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]+\pi\,\text{ArcTan}[a\,x]$$

$$\text{Log}\left[-\text{Cos}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]+2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]-$$

$$\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]-$$

$$2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]+$$

$$\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]+\pi\,\text{ArcTan}[a\,x]$$

$$\text{Log}\left[\text{Sin}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]-2\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$$

$$2\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]+2\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-$$

$$\left.2\,\text{PolyLog}\left[3,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\right)+\frac{1}{12}\left(1+a^2x^2\right)\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]$$

$$\left.\left(6+4\,\text{ArcTan}[a\,x]^2+6\,\text{Cos}[2\,\text{ArcTan}[a\,x]]-3\,\text{ArcTan}[a\,x]\,\text{Sin}[2\,\text{ArcTan}[a\,x]]\right)\right)+$$

$$c^2\left(-\frac{1}{40\sqrt{1+a^2x^2}}\sqrt{c\left(1+a^2x^2\right)}\left(11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}[2]-\right.\right.$$

$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]-$$

$$11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\left(-\frac{1}{2}-\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]+$$

$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\left(\frac{1}{2}+\frac{i}{2}\right)e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left(-i+e^{i\,\text{ArcTan}[a\,x]}\right)\right]-$$

$$11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]-11\,\text{ArcTan}[a\,x]^2$$

$$\text{Log}\left[\frac{1}{2}e^{-\frac{1}{2}i\,\text{ArcTan}[a\,x]}\left((1+i)+(1-i)\,e^{i\,\text{ArcTan}[a\,x]}\right)\right]+11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\Big[$$

$$-\text{Cos}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\Big]+20\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]-$$
$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]-$$
$$20\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]+$$
$$11\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[\text{Cos}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right]\right]+$$
$$11\,\pi\,\text{ArcTan}[a\,x]\,\text{Log}\left[\text{Sin}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]-22\,i\,\text{ArcTan}[a\,x]$$
$$\text{PolyLog}\left[2,\,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]+22\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,\,i\,e^{i\,\text{ArcTan}[a\,x]}\right]+$$
$$22\,\text{PolyLog}\left[3,\,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-22\,\text{PolyLog}\left[3,\,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\Bigg)-$$
$$\frac{1}{960}\left(1+a^2\,x^2\right)^2\sqrt{c\,\left(1+a^2\,x^2\right)}\,\Big(150\,\text{ArcTan}[a\,x]-32\,\text{ArcTan}[a\,x]^3+8\,\text{ArcTan}[a\,x]$$
$$\left(27+20\,\text{ArcTan}[a\,x]^2\right)\,\text{Cos}[2\,\text{ArcTan}[a\,x]]+66\,\text{ArcTan}[a\,x]\,\text{Cos}[4\,\text{ArcTan}[a\,x]]+$$
$$12\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+6\,\text{ArcTan}[a\,x]^2\,\text{Sin}[2\,\text{ArcTan}[a\,x]]+$$
$$6\,\text{Sin}[4\,\text{ArcTan}[a\,x]]-33\,\text{ArcTan}[a\,x]^2\,\text{Sin}[4\,\text{ArcTan}[a\,x]]\Big)\Bigg)$$

Problem 433: Result more than twice size of optimal antiderivative.

$$\int\frac{\left(c+a^2\,c\,x^2\right)^{5/2}\,\text{ArcTan}[a\,x]^3}{x^2}\,dx$$

Optimal (type 4, 1027 leaves, 56 steps):

$$-\frac{1}{4} a c^2 \sqrt{c+a^2 c x^2}+\frac{1}{4} a^2 c^2 x \sqrt{c+a^2 c x^2} \operatorname{ArcTan}[a x]-\frac{21}{8} a c^2 \sqrt{c+a^2 c x^2} \operatorname{ArcTan}[a x]^2-\frac{1}{4} a c \left(c+a^2 c x^2\right)^{3/2} \operatorname{ArcTan}[a x]^2-\frac{c^2 \sqrt{c+a^2 c x^2} \operatorname{ArcTan}[a x]^3}{x}+\frac{7}{8} a^2 c^2 x \sqrt{c+a^2 c x^2} \operatorname{ArcTan}[a x]^3+\frac{1}{4} a^2 c x \left(c+a^2 c x^2\right)^{3/2} \operatorname{ArcTan}[a x]^3-\frac{15 i a c^3 \sqrt{1+a^2 x^2} \operatorname{ArcTan}\left[e^{i \operatorname{ArcTan}[a x]}\right] \operatorname{ArcTan}[a x]^3}{4 \sqrt{c+a^2 c x^2}}-\frac{11 i a c^3 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x] \operatorname{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{\sqrt{c+a^2 c x^2}}-\frac{6 a c^3 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x]^2 \operatorname{ArcTanh}\left[e^{i \operatorname{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+\frac{6 i a c^3 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x] \operatorname{PolyLog}\left[2,-e^{i \operatorname{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+\frac{45 i a c^3 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x]^2 \operatorname{PolyLog}\left[2,-i e^{i \operatorname{ArcTan}[a x]}\right]}{8 \sqrt{c+a^2 c x^2}}-\frac{45 i a c^3 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x]^2 \operatorname{PolyLog}\left[2,i e^{i \operatorname{ArcTan}[a x]}\right]}{8 \sqrt{c+a^2 c x^2}}-\frac{6 i a c^3 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x] \operatorname{PolyLog}\left[2,e^{i \operatorname{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+\frac{11 i a c^3 \sqrt{1+a^2 x^2} \operatorname{PolyLog}\left[2,-\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{2 \sqrt{c+a^2 c x^2}}-\frac{11 i a c^3 \sqrt{1+a^2 x^2} \operatorname{PolyLog}\left[2,\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{2 \sqrt{c+a^2 c x^2}}-\frac{6 a c^3 \sqrt{1+a^2 x^2} \operatorname{PolyLog}\left[3,-e^{i \operatorname{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-\frac{45 a c^3 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x] \operatorname{PolyLog}\left[3,-i e^{i \operatorname{ArcTan}[a x]}\right]}{4 \sqrt{c+a^2 c x^2}}+\frac{45 a c^3 \sqrt{1+a^2 x^2} \operatorname{ArcTan}[a x] \operatorname{PolyLog}\left[3,i e^{i \operatorname{ArcTan}[a x]}\right]}{4 \sqrt{c+a^2 c x^2}}+\frac{6 a c^3 \sqrt{1+a^2 x^2} \operatorname{PolyLog}\left[3,e^{i \operatorname{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-\frac{45 i a c^3 \sqrt{1+a^2 x^2} \operatorname{PolyLog}\left[4,-i e^{i \operatorname{ArcTan}[a x]}\right]}{4 \sqrt{c+a^2 c x^2}}+\frac{45 i a c^3 \sqrt{1+a^2 x^2} \operatorname{PolyLog}\left[4,i e^{i \operatorname{ArcTan}[a x]}\right]}{4 \sqrt{c+a^2 c x^2}}$$

Result (type 4, 4536 leaves):

$$\frac{1}{128 \sqrt{1+a^2 x^2}} a c^2 \sqrt{c \left(1+a^2 x^2\right)} \operatorname{Csc}\left[\frac{1}{2} \operatorname{ArcTan}[a x]\right]$$

$$\left(-\frac{7\,i\,a\,\pi^4\,x}{\sqrt{1+a^2\,x^2}}-\frac{8\,i\,a\,\pi^3\,x\,\text{ArcTan}[a\,x]}{\sqrt{1+a^2\,x^2}}+\frac{24\,i\,a\,\pi^2\,x\,\text{ArcTan}[a\,x]^2}{\sqrt{1+a^2\,x^2}}-64\,\text{ArcTan}[a\,x]^3-\right.$$

$$\frac{32\,i\,a\,\pi\,x\,\text{ArcTan}[a\,x]^3}{\sqrt{1+a^2\,x^2}}+\frac{16\,i\,a\,x\,\text{ArcTan}[a\,x]^4}{\sqrt{1+a^2\,x^2}}+\frac{48\,a\,\pi^2\,x\,\text{ArcTan}[a\,x]\,\text{Log}\left[1-i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

$$\frac{96\,a\,\pi\,x\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-\frac{8\,a\,\pi^3\,x\,\text{Log}\left[1+i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{64\,a\,x\,\text{ArcTan}[a\,x]^3\,\text{Log}\left[1+i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{192\,a\,x\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{8\,a\,\pi^3\,x\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-\frac{48\,a\,\pi^2\,x\,\text{ArcTan}[a\,x]\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{96\,a\,\pi\,x\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-\frac{64\,a\,x\,\text{ArcTan}[a\,x]^3\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

$$\frac{192\,a\,x\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{8\,a\,\pi^3\,x\,\text{Log}\left[\text{Tan}\left[\frac{1}{4}\,(\pi+2\,\text{ArcTan}[a\,x])\right]\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{192\,i\,a\,x\,\text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,-i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{48\,i\,a\,\pi\,x\,(\pi-4\,\text{ArcTan}[a\,x])\,\text{PolyLog}\left[2,i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{384\,i\,a\,x\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{48\,i\,a\,\pi^2\,x\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

$$\frac{192\,i\,a\,\pi\,x\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{192\,i\,a\,x\,\text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

$$\frac{384\,i\,a\,x\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{384\,a\,x\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[3,-i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-\frac{192\,a\,\pi\,x\,\text{PolyLog}\left[3,i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

$$\frac{384\,a\,x\,\text{PolyLog}\left[3,-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{192\,a\,\pi\,x\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

$$\frac{384\,a\,x\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{384\,a\,x\,\text{PolyLog}\left[3,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

$$\left.\frac{384\,i\,a\,x\,\text{PolyLog}\left[4,-i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-\frac{384\,i\,a\,x\,\text{PolyLog}\left[4,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}\right)$$

$$\text{Sec}\left[\frac{1}{2}\,\text{ArcTan}[a\,x]\right] + 2\,a\,c^2\left(-\frac{3\,\sqrt{c\,\left(1+a^2\,x^2\right)}\;\text{ArcTan}[a\,x]^2}{2\,\sqrt{1+a^2\,x^2}} + \frac{1}{\sqrt{1+a^2\,x^2}}\right.$$

$$3\,\sqrt{c\,\left(1+a^2\,x^2\right)}\;\left(\text{ArcTan}[a\,x]\,\left(\text{Log}\left[1-\mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\right]-\text{Log}\left[1+\mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\right]\right)+\right.$$

$$\left.\mathrm{i}\,\left(\text{PolyLog}\left[2,\,-\mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\right]-\text{PolyLog}\left[2,\,\mathrm{i}\,e^{\mathrm{i}\,\text{ArcTan}[a\,x]}\right]\right)\right)+$$

$$\frac{1}{2\,\sqrt{1+a^2\,x^2}}\,\sqrt{c\,\left(1+a^2\,x^2\right)}\;\left(\frac{1}{8}\,\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right]\right]+\right.$$

$$\frac{3}{4}\,\pi^2\,\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\,\left(\text{Log}\left[1-e^{\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{Log}\left[1+e^{\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+\right.$$

$$\left.\mathrm{i}\,\left(\text{PolyLog}\left[2,\,-e^{\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,\,e^{\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\right)-$$

$$\frac{3}{2}\,\pi\,\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\,\left(\text{Log}\left[1-e^{\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{Log}\left[1+e^{\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+\right.$$

$$2\,\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\,\left(\text{PolyLog}\left[2,\,-e^{\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,\,e^{\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+$$

$$\left.2\,\left(-\text{PolyLog}\left[3,\,-e^{\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+\text{PolyLog}\left[3,\,e^{\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\right)+$$

$$8\,\left(\frac{1}{64}\,\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^4+\frac{1}{4}\,\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^4-\right.$$

$$\frac{1}{8}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^3\,\text{Log}\left[1+e^{\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\frac{1}{8}\,\pi^3\,\left(\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)-\right.$$

$$\left.\text{Log}\left[1+e^{2\,\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3\,\text{Log}\Big[$$

$$1+e^{2\,\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]+\frac{3}{8}\,\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\,\text{PolyLog}\left[2,\,-e^{\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+$$

$$\frac{3}{4}\,\pi^2\,\left(\frac{1}{2}\,\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\,\text{Log}\Big[\right.$$

$$\left.1+e^{2\,\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]+\frac{1}{2}\,\mathrm{i}\,\text{PolyLog}\left[2,\,-e^{2\,\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)+$$

$$\frac{3}{2}\,\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\,\text{PolyLog}\left[2,\,-e^{2\,\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\frac{3}{4}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\,\text{PolyLog}\left[3,\,-e^{\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$

$$\frac{3}{2}\,\pi\,\left(\frac{1}{3}\,\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\,\text{Log}\Big[\right.$$

$$1+e^{2\,\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]+\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\,\text{PolyLog}\Big[2,$$

$$\left.-e^{2\,\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]-\frac{1}{2}\,\text{PolyLog}\left[3,\,-e^{2\,\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$

$$\frac{3}{2}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\,\text{PolyLog}\left[3,\,-e^{2\,\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-$$

$$\left.\left.\frac{3}{4}\,\mathrm{i}\,\text{PolyLog}\left[4,\,-e^{\mathrm{i}\,\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\frac{3}{4}\,\mathrm{i}\,\text{PolyLog}\left[4,\,-e^{2\,\mathrm{i}\,\left(\frac{\pi}{2}+\frac{1}{2}\,\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)\right)+$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{3\sqrt{c\,(1+a^2x^2)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{2\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}-$$

$$\frac{\sqrt{c\,(1+a^2x^2)}\,\text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+$$

$$\left.\frac{3\sqrt{c\,(1+a^2x^2)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{2\sqrt{1+a^2x^2}\,\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}\right)+$$

$$a\,c^2\left(\frac{\sqrt{c\,(1+a^2x^2)}\,\left(-1+\text{ArcTan}[a\,x]^2\right)}{4\sqrt{1+a^2x^2}}+\right.$$

$$\frac{1}{2\sqrt{1+a^2x^2}}\sqrt{c\,(1+a^2x^2)}$$

$$\left(-\text{ArcTan}[a\,x]\left(\text{Log}\left[1-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]\right)-\right.$$

$$\left.i\left(\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]-\text{PolyLog}\left[2,i\,e^{i\,\text{ArcTan}[a\,x]}\right]\right)\right)+$$

$$\frac{1}{8\sqrt{1+a^2x^2}}\sqrt{c\,(1+a^2x^2)}\,\left(-\frac{1}{8}\pi^3\,\text{Log}\left[\text{Cot}\left[\frac{1}{2}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\right]\right]-\right.$$

$$\frac{3}{4}\pi^2\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+\right.$$

$$\left.i\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\right)+$$

$$\frac{3}{2}\pi\left(\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\left(\text{Log}\left[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+\right.$$

$$2\,i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)\left(\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\text{PolyLog}\left[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)+$$

$$\left.2\left(-\text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+\text{PolyLog}\left[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]\right)\right)-$$

$$8\left(\frac{1}{64}i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^4+\frac{1}{4}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^4-\right.$$

$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^3\text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-$$

$$\frac{1}{8}\pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)-\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)-$$

$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3\text{Log}\left[1+e^{2i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+$$

$$\frac{3}{8}i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2\text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]+$$

$$\frac{3}{4}\pi^2\left(\frac{1}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\text{Log}[\right.$$

$$1+e^{2 i \left(\frac{\pi }{2}+\frac{1}{2} \left(-\frac{\pi }{2}+\text{ArcTan}[a x]\right)\right)}\Big]+\frac{1}{2} i\, \text{PolyLog}\left[2,-e^{2 i \left(\frac{\pi }{2}+\frac{1}{2} \left(-\frac{\pi }{2}+\text{ArcTan}[a x]\right)\right)}\right]\Bigg)+$$

$$\frac{3}{2} i \left(\frac{\pi }{2}+\frac{1}{2} \left(-\frac{\pi }{2}+\text{ArcTan}[a x]\right)\right)^2 \text{PolyLog}\left[2,-e^{2 i \left(\frac{\pi }{2}+\frac{1}{2} \left(-\frac{\pi }{2}+\text{ArcTan}[a x]\right)\right)}\right]-$$

$$\frac{3}{4} \left(\frac{\pi }{2}-\text{ArcTan}[a x]\right) \text{PolyLog}\left[3,-e^{i \left(\frac{\pi }{2}-\text{ArcTan}[a x]\right)}\right]-$$

$$\frac{3}{2} \pi \Bigg(\frac{1}{3} i \left(\frac{\pi }{2}+\frac{1}{2} \left(-\frac{\pi }{2}+\text{ArcTan}[a x]\right)\right)^3-\left(\frac{\pi }{2}+\frac{1}{2} \left(-\frac{\pi }{2}+\text{ArcTan}[a x]\right)\right)^2 \text{Log}\Big[$$

$$1+e^{2 i \left(\frac{\pi }{2}+\frac{1}{2} \left(-\frac{\pi }{2}+\text{ArcTan}[a x]\right)\right)}\Big]+i \left(\frac{\pi }{2}+\frac{1}{2} \left(-\frac{\pi }{2}+\text{ArcTan}[a x]\right)\right) \text{PolyLog}\Big[2,$$

$$-e^{2 i \left(\frac{\pi }{2}+\frac{1}{2} \left(-\frac{\pi }{2}+\text{ArcTan}[a x]\right)\right)}\Big]-\frac{1}{2} \text{PolyLog}\left[3,-e^{2 i \left(\frac{\pi }{2}+\frac{1}{2} \left(-\frac{\pi }{2}+\text{ArcTan}[a x]\right)\right)}\right]\Bigg)-$$

$$\frac{3}{2} \left(\frac{\pi }{2}+\frac{1}{2} \left(-\frac{\pi }{2}+\text{ArcTan}[a x]\right)\right) \text{PolyLog}\left[3,-e^{2 i \left(\frac{\pi }{2}+\frac{1}{2} \left(-\frac{\pi }{2}+\text{ArcTan}[a x]\right)\right)}\right]-$$

$$\frac{3}{4} i\, \text{PolyLog}\left[4,-e^{i \left(\frac{\pi }{2}-\text{ArcTan}[a x]\right)}\right]-\frac{3}{4} i\, \text{PolyLog}\left[4,-e^{2 i \left(\frac{\pi }{2}+\frac{1}{2} \left(-\frac{\pi }{2}+\text{ArcTan}[a x]\right)\right)}\right]\Bigg)\Bigg)+$$

$$\frac{\sqrt{c \left(1+a^2 x^2\right)}\, \text{ArcTan}[a x]^3}{16 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^4}+$$

$$\frac{\sqrt{c \left(1+a^2 x^2\right)} \left(2 \text{ArcTan}[a x]-\text{ArcTan}[a x]^2-\text{ArcTan}[a x]^3\right)}{16 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^2}-$$

$$\frac{\sqrt{c \left(1+a^2 x^2\right)}\, \text{ArcTan}[a x]^2 \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]}{8 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^3}-$$

$$\frac{\sqrt{c \left(1+a^2 x^2\right)}\, \text{ArcTan}[a x]^3}{16 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^4}+$$

$$\frac{\sqrt{c \left(1+a^2 x^2\right)}\, \text{ArcTan}[a x]^2 \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]}{8 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^3}+$$

$$\frac{\sqrt{c \left(1+a^2 x^2\right)} \left(-2 \text{ArcTan}[a x]-\text{ArcTan}[a x]^2+\text{ArcTan}[a x]^3\right)}{16 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)^2}+$$

$$\left(\sqrt{c \left(1+a^2 x^2\right)} \left(\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{ArcTan}[a x]^2 \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)\right)\Big/$$

$$\left(4 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)\right)+$$

$$\left(\sqrt{c \left(1+a^2 x^2\right)} \left(-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]+\text{ArcTan}[a x]^2 \text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)\right)\Big/$$

$$\left(4 \sqrt{1+a^2 x^2} \left(\text{Cos}\left[\frac{1}{2} \text{ArcTan}[a x]\right]-\text{Sin}\left[\frac{1}{2} \text{ArcTan}[a x]\right]\right)\right)\Bigg)$$

Problem 435: Result more than twice size of optimal antiderivative.

$$\int \frac{\left(c+a^2 c x^2\right)^{5/2} \text{ArcTan}[a x]^3}{x^4} \, dx$$

Optimal (type 4, 1061 leaves, 86 steps) :

$$-\frac{a^2 c^2 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]}{x}-\frac{3}{2} a^3 c^2 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^2-\frac{a c^2 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^2}{2 x^2}-$$

$$\frac{2 a^2 c^2 \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3}{x}+\frac{1}{2} a^4 c^2 x \sqrt{c+a^2 c x^2}\ \text{ArcTan}[a x]^3-$$

$$\frac{c\left(c+a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]^3}{3 x^3}-\frac{5\, i\, a^3 c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}\left[e^{i\, \text{ArcTan}[a x]}\right] \text{ArcTan}[a x]^3}{\sqrt{c+a^2 c x^2}}-$$

$$\frac{6\, i\, a^3 c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{\sqrt{c+a^2 c x^2}}-$$

$$\frac{13 a^3 c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]^2\ \text{ArcTanh}\left[e^{i\, \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-a^3 c^{5/2}\ \text{ArcTanh}\left[\frac{\sqrt{c+a^2 c x^2}}{\sqrt{c}}\right]+$$

$$\frac{13\, i\, a^3 c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[2,-e^{i\, \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$

$$\frac{15\, i\, a^3 c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]^2\ \text{PolyLog}\left[2,-i\, e^{i\, \text{ArcTan}[a x]}\right]}{2 \sqrt{c+a^2 c x^2}}-$$

$$\frac{15\, i\, a^3 c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]^2\ \text{PolyLog}\left[2, i\, e^{i\, \text{ArcTan}[a x]}\right]}{2 \sqrt{c+a^2 c x^2}}-$$

$$\frac{13\, i\, a^3 c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[2, e^{i\, \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$

$$\frac{3\, i\, a^3 c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[2,-\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{\sqrt{c+a^2 c x^2}}-\frac{3\, i\, a^3 c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[2,\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{\sqrt{c+a^2 c x^2}}-$$

$$\frac{13 a^3 c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[3,-e^{i\, \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-$$

$$\frac{15 a^3 c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[3,-i\, e^{i\, \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$

$$\frac{15 a^3 c^3 \sqrt{1+a^2 x^2}\ \text{ArcTan}[a x]\ \text{PolyLog}\left[3, i\, e^{i\, \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$

$$\frac{13 a^3 c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[3, e^{i\, \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}-\frac{15\, i\, a^3 c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[4,-i\, e^{i\, \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}+$$

$$\frac{15\, i\, a^3 c^3 \sqrt{1+a^2 x^2}\ \text{PolyLog}\left[4, i\, e^{i\, \text{ArcTan}[a x]}\right]}{\sqrt{c+a^2 c x^2}}$$

Result (type 4, 3037 leaves):

$$\frac{1}{64 \sqrt{1+a^2 x^2}} a^3 c^2 \sqrt{c\left(1+a^2 x^2\right)}\ \text{Csc}\left[\frac{1}{2} \text{ArcTan}[a x]\right]$$

$$\left(-\frac{7\,i\,a\,\pi^4\,x}{\sqrt{1+a^2\,x^2}}-\frac{8\,i\,a\,\pi^3\,x\,\text{ArcTan}[a\,x]}{\sqrt{1+a^2\,x^2}}+\frac{24\,i\,a\,\pi^2\,x\,\text{ArcTan}[a\,x]^2}{\sqrt{1+a^2\,x^2}}-64\,\text{ArcTan}[a\,x]^3-\right.$$

$$\frac{32\,i\,a\,\pi\,x\,\text{ArcTan}[a\,x]^3}{\sqrt{1+a^2\,x^2}}+\frac{16\,i\,a\,x\,\text{ArcTan}[a\,x]^4}{\sqrt{1+a^2\,x^2}}+\frac{48\,a\,\pi^2\,x\,\text{ArcTan}[a\,x]\,\text{Log}\left[1-i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

$$\frac{96\,a\,\pi\,x\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-\frac{8\,a\,\pi^3\,x\,\text{Log}\left[1+i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{64\,a\,x\,\text{ArcTan}[a\,x]^3\,\text{Log}\left[1+i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{192\,a\,x\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{8\,a\,\pi^3\,x\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-\frac{48\,a\,\pi^2\,x\,\text{ArcTan}[a\,x]\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{96\,a\,\pi\,x\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-\frac{64\,a\,x\,\text{ArcTan}[a\,x]^3\,\text{Log}\left[1+i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

$$\frac{192\,a\,x\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{8\,a\,\pi^3\,x\,\text{Log}\left[\text{Tan}\left[\frac{1}{4}\left(\pi+2\,\text{ArcTan}[a\,x]\right)\right]\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{192\,i\,a\,x\,\text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,-i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{48\,i\,a\,\pi\,x\,(\pi-4\,\text{ArcTan}[a\,x])\,\text{PolyLog}\left[2,i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{384\,i\,a\,x\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{48\,i\,a\,\pi^2\,x\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

$$\frac{192\,i\,a\,\pi\,x\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{192\,i\,a\,x\,\text{ArcTan}[a\,x]^2\,\text{PolyLog}\left[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

$$\frac{384\,i\,a\,x\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+$$

$$\frac{384\,a\,x\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[3,-i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-\frac{192\,a\,\pi\,x\,\text{PolyLog}\left[3,i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

$$\frac{384\,a\,x\,\text{PolyLog}\left[3,-e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{192\,a\,\pi\,x\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

$$\frac{384\,a\,x\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[3,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}+\frac{384\,a\,x\,\text{PolyLog}\left[3,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-$$

$$\left.\frac{384\,i\,a\,x\,\text{PolyLog}\left[4,-i\,e^{-i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}-\frac{384\,i\,a\,x\,\text{PolyLog}\left[4,-i\,e^{i\,\text{ArcTan}[a\,x]}\right]}{\sqrt{1+a^2\,x^2}}\right)$$

$$\text{Sec}\Big[\frac{1}{2}\text{ArcTan}[a\,x]\Big]+a^3c^2\Bigg(-\frac{3\sqrt{c\,(1+a^2x^2)}\;\text{ArcTan}[a\,x]^2}{2\sqrt{1+a^2x^2}}+\frac{1}{\sqrt{1+a^2x^2}}$$

$$3\sqrt{c\,(1+a^2x^2)}\;\Big(\text{ArcTan}[a\,x]\,\Big(\text{Log}\big[1-i\,e^{i\,\text{ArcTan}[a\,x]}\big]-\text{Log}\big[1+i\,e^{i\,\text{ArcTan}[a\,x]}\big]\Big)+$$

$$i\,\Big(\text{PolyLog}\big[2,-i\,e^{i\,\text{ArcTan}[a\,x]}\big]-\text{PolyLog}\big[2,i\,e^{i\,\text{ArcTan}[a\,x]}\big]\Big)\Big)+$$

$$\frac{1}{2\sqrt{1+a^2x^2}}\sqrt{c\,(1+a^2x^2)}\;\Bigg(\frac{1}{8}\pi^3\,\text{Log}\Big[\text{Cot}\Big[\frac{1}{2}\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)\Big]\Big]+$$

$$\frac{3}{4}\pi^2\Bigg(\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)\Big(\text{Log}\Big[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\Big]-\text{Log}\Big[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\Big]\Big)+$$

$$i\,\Big(\text{PolyLog}\Big[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\Big]-\text{PolyLog}\Big[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\Big]\Big)\Bigg)-$$

$$\frac{3}{2}\pi\Bigg(\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)^2\Big(\text{Log}\Big[1-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\Big]-\text{Log}\Big[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\Big]\Big)+$$

$$2\,i\,\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)\Big(\text{PolyLog}\Big[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\Big]-\text{PolyLog}\Big[2,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\Big]\Big)+$$

$$2\Big(-\text{PolyLog}\Big[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\Big]+\text{PolyLog}\Big[3,e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\Big]\Big)\Bigg)+$$

$$8\Bigg(\frac{1}{64}\,i\,\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)^4+\frac{1}{4}\,i\,\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)^4-$$

$$\frac{1}{8}\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)^3\text{Log}\Big[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\Big]-\frac{1}{8}\pi^3\Big(i\,\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)-$$

$$\text{Log}\Big[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]\Big)-\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)^3\text{Log}\Big[$$

$$1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]+\frac{3}{8}\,i\,\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)^2\text{PolyLog}\Big[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\Big]+$$

$$\frac{3}{4}\pi^2\Bigg(\frac{1}{2}\,i\,\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)^2-\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)\text{Log}\Big[$$

$$1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]+\frac{1}{2}\,i\,\text{PolyLog}\Big[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]\Bigg)+$$

$$\frac{3}{2}\,i\,\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)^2\text{PolyLog}\Big[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]-$$

$$\frac{3}{4}\Big(\frac{\pi}{2}-\text{ArcTan}[a\,x]\Big)\,\text{PolyLog}\Big[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\Big]-$$

$$\frac{3}{2}\pi\Bigg(\frac{1}{3}\,i\,\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)^3-\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)^2\text{Log}\Big[$$

$$1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]+i\,\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)\,\text{PolyLog}\Big[2,$$

$$-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]-\frac{1}{2}\text{PolyLog}\Big[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]\Bigg)-$$

$$\frac{3}{2}\Big(\frac{\pi}{2}+\frac{1}{2}\Big(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\Big)\Big)\,\text{PolyLog}\Big[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]-$$

$$\frac{3}{4}\,i\,\text{PolyLog}\Big[4,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\Big]-\frac{3}{4}\,i\,\text{PolyLog}\Big[4,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\Big]\Bigg)\Bigg)+$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}-$$

$$\frac{3\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{2\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}-$$

$$\frac{\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2}+$$

$$\left.\frac{3\sqrt{c\left(1+a^2x^2\right)}\ \text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{2\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}\right)+$$

$$\frac{1}{24\sqrt{c\left(1+a^2x^2\right)}}a^3$$

$$c^3$$

$$\sqrt{1+a^2x^2}$$

$$\left(-12\,\text{ArcTan}[a\,x]\,\text{Cot}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\right.$$

$$2\,\text{ArcTan}[a\,x]^3\,\text{Cot}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-$$

$$3\,\text{ArcTan}[a\,x]^2\,\text{Csc}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]^2-$$

$$\frac{a\,x\,\text{ArcTan}[a\,x]^3\,\text{Csc}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]^4}{2\sqrt{1+a^2x^2}}+$$

$$12\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1-e^{i\,\text{ArcTan}[a\,x]}\right]-$$

$$12\,\text{ArcTan}[a\,x]^2\,\text{Log}\left[1+e^{i\,\text{ArcTan}[a\,x]}\right]+24\,\text{Log}\left[\text{Tan}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right]+$$

$$24\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,-e^{i\,\text{ArcTan}[a\,x]}\right]-$$

$$24\,i\,\text{ArcTan}[a\,x]\,\text{PolyLog}\left[2,e^{i\,\text{ArcTan}[a\,x]}\right]-$$

$$24\,\text{PolyLog}\left[3,-e^{i\,\text{ArcTan}[a\,x]}\right]+24\,\text{PolyLog}\left[3,e^{i\,\text{ArcTan}[a\,x]}\right]+$$

$$3\,\text{ArcTan}[a\,x]^2\,\text{Sec}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]^2-$$

$$\frac{8\left(1+a^2x^2\right)^{3/2}\text{ArcTan}[a\,x]^3\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]^4}{a^3x^3}-$$

$$\left.12\,\text{ArcTan}[a\,x]\,\text{Tan}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-2\,\text{ArcTan}[a\,x]^3\,\text{Tan}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)$$

Problem 437: Result more than twice size of optimal antiderivative.

$$\int \frac{x^2 \operatorname{ArcTan}[a x]^3}{\sqrt{c + a^2 c x^2}} \, dx$$

Optimal (type 4, 625 leaves, 15 steps):

$$-\frac{3 \sqrt{c + a^2 c x^2} \operatorname{ArcTan}[a x]^2}{2 a^3 c} + \frac{x \sqrt{c + a^2 c x^2} \operatorname{ArcTan}[a x]^3}{2 a^2 c} + \frac{i \sqrt{1 + a^2 x^2} \operatorname{ArcTan}\left[e^{i \operatorname{ArcTan}[a x]}\right] \operatorname{ArcTan}[a x]^3}{a^3 \sqrt{c + a^2 c x^2}} - \frac{6 i \sqrt{1 + a^2 x^2} \operatorname{ArcTan}[a x] \operatorname{ArcTan}\left[\frac{\sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{a^3 \sqrt{c + a^2 c x^2}} - \frac{3 i \sqrt{1 + a^2 x^2} \operatorname{ArcTan}[a x]^2 \operatorname{PolyLog}\left[2, -i e^{i \operatorname{ArcTan}[a x]}\right]}{2 a^3 \sqrt{c + a^2 c x^2}} + \frac{3 i \sqrt{1 + a^2 x^2} \operatorname{ArcTan}[a x]^2 \operatorname{PolyLog}\left[2, i e^{i \operatorname{ArcTan}[a x]}\right]}{2 a^3 \sqrt{c + a^2 c x^2}} + \frac{3 i \sqrt{1 + a^2 x^2} \operatorname{PolyLog}\left[2, -\frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{a^3 \sqrt{c + a^2 c x^2}} - \frac{3 i \sqrt{1 + a^2 x^2} \operatorname{PolyLog}\left[2, \frac{i \sqrt{1+i a x}}{\sqrt{1-i a x}}\right]}{a^3 \sqrt{c + a^2 c x^2}} + \frac{3 \sqrt{1 + a^2 x^2} \operatorname{ArcTan}[a x] \operatorname{PolyLog}\left[3, -i e^{i \operatorname{ArcTan}[a x]}\right]}{a^3 \sqrt{c + a^2 c x^2}} - \frac{3 \sqrt{1 + a^2 x^2} \operatorname{ArcTan}[a x] \operatorname{PolyLog}\left[3, i e^{i \operatorname{ArcTan}[a x]}\right]}{a^3 \sqrt{c + a^2 c x^2}} + \frac{3 i \sqrt{1 + a^2 x^2} \operatorname{PolyLog}\left[4, -i e^{i \operatorname{ArcTan}[a x]}\right]}{a^3 \sqrt{c + a^2 c x^2}} - \frac{3 i \sqrt{1 + a^2 x^2} \operatorname{PolyLog}\left[4, i e^{i \operatorname{ArcTan}[a x]}\right]}{a^3 \sqrt{c + a^2 c x^2}}$$

Result (type 4, 1527 leaves):

$$\frac{1}{a^3 c} \left(-\frac{3 \sqrt{c \left(1 + a^2 x^2\right)} \operatorname{ArcTan}[a x]^2}{2 \sqrt{1 + a^2 x^2}} + \frac{1}{\sqrt{1 + a^2 x^2}} 3 \sqrt{c \left(1 + a^2 x^2\right)} \left(\operatorname{ArcTan}[a x] \left(\operatorname{Log}\left[1 - i e^{i \operatorname{ArcTan}[a x]}\right] - \operatorname{Log}\left[1 + i e^{i \operatorname{ArcTan}[a x]}\right]\right) + i \left(\operatorname{PolyLog}\left[2, -i e^{i \operatorname{ArcTan}[a x]}\right] - \operatorname{PolyLog}\left[2, i e^{i \operatorname{ArcTan}[a x]}\right]\right)\right) + \frac{1}{2 \sqrt{1 + a^2 x^2}} \sqrt{c \left(1 + a^2 x^2\right)} \left(-\frac{1}{8} \pi^3 \operatorname{Log}\left[\operatorname{Cot}\left[\frac{1}{2} \left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right)\right]\right] - \frac{3}{4} \pi^2 \left(\left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right) \left(\operatorname{Log}\left[1 - e^{i \left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right)}\right] - \operatorname{Log}\left[1 + e^{i \left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right)}\right]\right) + i \left(\operatorname{PolyLog}\left[2, -e^{i \left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right)}\right] - \operatorname{PolyLog}\left[2, e^{i \left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right)}\right]\right)\right) + \frac{3}{2} \pi \left(\left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right)^2 \left(\operatorname{Log}\left[1 - e^{i \left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right)}\right] - \operatorname{Log}\left[1 + e^{i \left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right)}\right]\right) + 2 i \left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right) \left(\operatorname{PolyLog}\left[2, -e^{i \left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right)}\right] - \operatorname{PolyLog}\left[2, e^{i \left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right)}\right]\right) + 2 \left(-\operatorname{PolyLog}\left[3, -e^{i \left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right)}\right] + \operatorname{PolyLog}\left[3, e^{i \left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right)}\right]\right)\right) - 8 \left(\frac{1}{64} i \left(\frac{\pi}{2} - \operatorname{ArcTan}[a x]\right)^4 + \frac{1}{4} i \left(\frac{\pi}{2} + \frac{1}{2} \left(-\frac{\pi}{2} + \operatorname{ArcTan}[a x]\right)\right)^4 - \right.$$

$$\frac{1}{8}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^3 \text{Log}\left[1+e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right] -$$
$$\frac{1}{8}\pi^3\left(i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)-\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right) -$$
$$\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3 \text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right] +$$
$$\frac{3}{8}i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)^2 \text{PolyLog}\left[2,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right] +$$
$$\frac{3}{4}\pi^2\left(\frac{1}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)\right.$$
$$\left.\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+\frac{1}{2}i\,\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right) +$$
$$\frac{3}{2}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2 \text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right] -$$
$$\frac{3}{4}\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right) \text{PolyLog}\left[3,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right] -$$
$$\frac{3}{2}\pi\left(\frac{1}{3}i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^3-\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)^2\right.$$
$$\text{Log}\left[1+e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]+i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)$$
$$\left.\text{PolyLog}\left[2,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]-\frac{1}{2}\text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right) -$$
$$\frac{3}{2}\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right) \text{PolyLog}\left[3,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right] -$$
$$\left.\frac{3}{4}i\,\text{PolyLog}\left[4,-e^{i\left(\frac{\pi}{2}-\text{ArcTan}[a\,x]\right)}\right]-\frac{3}{4}i\,\text{PolyLog}\left[4,-e^{2\,i\left(\frac{\pi}{2}+\frac{1}{2}\left(-\frac{\pi}{2}+\text{ArcTan}[a\,x]\right)\right)}\right]\right)\right) +$$
$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2} -$$
$$\frac{3\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{2\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]-\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)} -$$
$$\frac{\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^3}{4\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)^2} +$$
$$\left.\frac{3\sqrt{c\left(1+a^2x^2\right)}\,\text{ArcTan}[a\,x]^2\,\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]}{2\sqrt{1+a^2x^2}\left(\text{Cos}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]+\text{Sin}\left[\frac{1}{2}\text{ArcTan}[a\,x]\right]\right)}\right)$$

Problem 509: Attempted integration timed out after 120 seconds.

$$\int \frac{x^2}{\left(c+a^2\,c\,x^2\right)^{3/2}\,\text{ArcTan}[a\,x]}\,dx$$

Optimal (type 8, 27 leaves, 0 steps):

$$\text{Int}\left[\frac{x^2}{\left(c+a^2 c x^2\right)^{3/2} \text{ArcTan}[a x]}, x\right]$$

Result (type 1, 1 leaves):

???

Problem 515: Attempted integration timed out after 120 seconds.

$$\int \frac{x^4}{\left(c+a^2 c x^2\right)^{5/2} \text{ArcTan}[a x]} \, dx$$

Optimal (type 8, 27 leaves, 0 steps):

$$\text{Int}\left[\frac{x^4}{\left(c+a^2 c x^2\right)^{5/2} \text{ArcTan}[a x]}, x\right]$$

Result (type 1, 1 leaves):

???

Problem 1171: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 893 leaves, 23 steps):

$$-\frac{b c}{8 d \left(c^2 d-e\right) \left(d+e x^2\right)}+\frac{x \left(a+b \text{ArcTan}[c x]\right)}{4 d \left(d+e x^2\right)^2}+$$

$$\frac{3 x \left(a+b \text{ArcTan}[c x]\right)}{8 d^2 \left(d+e x^2\right)}+\frac{3 \left(a+b \text{ArcTan}[c x]\right) \text{ArcTan}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right]}{8 d^{5/2} \sqrt{e}}+$$

$$\frac{3 i b c \text{Log}\left[\frac{\sqrt{e} \left(1-\sqrt{-c^2} x\right)}{i \sqrt{-c^2} \sqrt{d}+\sqrt{e}}\right] \text{Log}\left[1-\frac{i \sqrt{e} x}{\sqrt{d}}\right]}{32 \sqrt{-c^2} d^{5/2} \sqrt{e}}-\frac{3 i b c \text{Log}\left[-\frac{\sqrt{e} \left(1+\sqrt{-c^2} x\right)}{i \sqrt{-c^2} \sqrt{d}-\sqrt{e}}\right] \text{Log}\left[1-\frac{i \sqrt{e} x}{\sqrt{d}}\right]}{32 \sqrt{-c^2} d^{5/2} \sqrt{e}}-$$

$$\frac{3 i b c \text{Log}\left[-\frac{\sqrt{e} \left(1-\sqrt{-c^2} x\right)}{i \sqrt{-c^2} \sqrt{d}-\sqrt{e}}\right] \text{Log}\left[1+\frac{i \sqrt{e} x}{\sqrt{d}}\right]}{32 \sqrt{-c^2} d^{5/2} \sqrt{e}}+\frac{3 i b c \text{Log}\left[\frac{\sqrt{e} \left(1+\sqrt{-c^2} x\right)}{i \sqrt{-c^2} \sqrt{d}+\sqrt{e}}\right] \text{Log}\left[1+\frac{i \sqrt{e} x}{\sqrt{d}}\right]}{32 \sqrt{-c^2} d^{5/2} \sqrt{e}}-$$

$$\frac{b c \left(5 c^2 d-3 e\right) \text{Log}\left[1+c^2 x^2\right]}{16 d^2 \left(c^2 d-e\right)^2}+\frac{b c \left(5 c^2 d-3 e\right) \text{Log}\left[d+e x^2\right]}{16 d^2 \left(c^2 d-e\right)^2}+$$

$$\frac{3 i b c \text{PolyLog}\left[2,\frac{\sqrt{-c^2} \left(\sqrt{d}-i \sqrt{e} x\right)}{\sqrt{-c^2} \sqrt{d}-i \sqrt{e}}\right]}{32 \sqrt{-c^2} d^{5/2} \sqrt{e}}-\frac{3 i b c \text{PolyLog}\left[2,\frac{\sqrt{-c^2} \left(\sqrt{d}-i \sqrt{e} x\right)}{\sqrt{-c^2} \sqrt{d}+i \sqrt{e}}\right]}{32 \sqrt{-c^2} d^{5/2} \sqrt{e}}+$$

$$\frac{3 i b c \text{PolyLog}\left[2,\frac{\sqrt{-c^2} \left(\sqrt{d}+i \sqrt{e} x\right)}{\sqrt{-c^2} \sqrt{d}-i \sqrt{e}}\right]}{32 \sqrt{-c^2} d^{5/2} \sqrt{e}}-\frac{3 i b c \text{PolyLog}\left[2,\frac{\sqrt{-c^2} \left(\sqrt{d}+i \sqrt{e} x\right)}{\sqrt{-c^2} \sqrt{d}+i \sqrt{e}}\right]}{32 \sqrt{-c^2} d^{5/2} \sqrt{e}}$$

Result (type 4, 1922 leaves):

$$\frac{a x}{4 d \left(d+e x^2\right)^2}+\frac{3 a x}{8 d^2 \left(d+e x^2\right)}+\frac{3 a \text{ArcTan}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right]}{8 d^{5/2} \sqrt{e}}+$$

$$b c^5 \left(\frac{5 \text{Log}\left[1+\frac{\left(c^2 d-e\right) \text{Cos}[2 \text{ArcTan}[c x]]}{c^2 d+e}\right]}{16 c^2 d \left(c^2 d-e\right)^2}-\frac{3 e \text{Log}\left[1+\frac{\left(c^2 d-e\right) \text{Cos}[2 \text{ArcTan}[c x]]}{c^2 d+e}\right]}{16 c^4 d^2 \left(c^2 d-e\right)^2}+\right.$$

$$\frac{1}{32 c^2 d \left(c^2 d-e\right) \sqrt{-c^2 d e}} 3 \left(4 \text{ArcTan}[c x] \text{ArcTanh}\left[\frac{c d}{\sqrt{-c^2 d e} x}\right]+\right.$$

$$2 \text{ArcCos}\left[-\frac{c^2 d+e}{c^2 d-e}\right] \text{ArcTanh}\left[\frac{c e x}{\sqrt{-c^2 d e}}\right]-\left(\text{ArcCos}\left[-\frac{c^2 d+e}{c^2 d-e}\right]-2 i \text{ArcTanh}\left[\frac{c e x}{\sqrt{-c^2 d e}}\right]\right)$$

$$\text{Log}\left[1-\frac{\left(c^2 d+e-2 i \sqrt{-c^2 d e}\right) \left(2 c^2 d-2 c \sqrt{-c^2 d e} x\right)}{\left(c^2 d-e\right) \left(2 c^2 d+2 c \sqrt{-c^2 d e} x\right)}\right]+\left(-\text{ArcCos}\left[-\frac{c^2 d+e}{c^2 d-e}\right]-\right.$$

$$\left.2 i \text{ArcTanh}\left[\frac{c e x}{\sqrt{-c^2 d e}}\right]\right) \text{Log}\left[1-\frac{\left(c^2 d+e+2 i \sqrt{-c^2 d e}\right) \left(2 c^2 d-2 c \sqrt{-c^2 d e} x\right)}{\left(c^2 d-e\right) \left(2 c^2 d+2 c \sqrt{-c^2 d e} x\right)}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c^2 d+e}{c^2 d-e}\right]-2\,\mathbb{i}\left(\text{ArcTanh}\left[\frac{c\,d}{\sqrt{-c^2 d e}\;x}\right]+\text{ArcTanh}\left[\frac{c\,e\,x}{\sqrt{-c^2 d e}}\right]\right)\right)$$

$$\text{Log}\left[\frac{\sqrt{2}\;\sqrt{-c^2 d e}\;e^{-\mathbb{i}\,\text{ArcTan}[c\,x]}}{\sqrt{c^2 d-e}\;\sqrt{c^2 d+e+\left(c^2 d-e\right)\text{Cos}[2\,\text{ArcTan}[c\,x]]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c^2 d+e}{c^2 d-e}\right]+2\,\mathbb{i}\left(\text{ArcTanh}\left[\frac{c\,d}{\sqrt{-c^2 d e}\;x}\right]+\text{ArcTanh}\left[\frac{c\,e\,x}{\sqrt{-c^2 d e}}\right]\right)\right)$$

$$\text{Log}\left[\frac{\sqrt{2}\;\sqrt{-c^2 d e}\;e^{\mathbb{i}\,\text{ArcTan}[c\,x]}}{\sqrt{c^2 d-e}\;\sqrt{c^2 d+e+\left(c^2 d-e\right)\text{Cos}[2\,\text{ArcTan}[c\,x]]}}\right]+$$

$$\mathbb{i}\left(\text{PolyLog}\left[2,\frac{\left(c^2 d+e-2\,\mathbb{i}\sqrt{-c^2 d e}\right)\left(2\,c^2 d-2\,c\sqrt{-c^2 d e}\;x\right)}{\left(c^2 d-e\right)\left(2\,c^2 d+2\,c\sqrt{-c^2 d e}\;x\right)}\right]-\right.$$

$$\left.\left.\text{PolyLog}\left[2,\frac{\left(c^2 d+e+2\,\mathbb{i}\sqrt{-c^2 d e}\right)\left(2\,c^2 d-2\,c\sqrt{-c^2 d e}\;x\right)}{\left(c^2 d-e\right)\left(2\,c^2 d+2\,c\sqrt{-c^2 d e}\;x\right)}\right]\right)\right)-$$

$$\frac{1}{32\,c^4 d^2\left(c^2 d-e\right)\sqrt{-c^2 d e}}\,3\,e\left(4\,\text{ArcTan}[c\,x]\;\text{ArcTanh}\left[\frac{c\,d}{\sqrt{-c^2 d e}\;x}\right]+\right.$$

$$2\,\text{ArcCos}\left[-\frac{c^2 d+e}{c^2 d-e}\right]\text{ArcTanh}\left[\frac{c\,e\,x}{\sqrt{-c^2 d e}}\right]-\left(\text{ArcCos}\left[-\frac{c^2 d+e}{c^2 d-e}\right]-2\,\mathbb{i}\,\text{ArcTanh}\left[\frac{c\,e\,x}{\sqrt{-c^2 d e}}\right]\right)$$

$$\text{Log}\left[1-\frac{\left(c^2 d+e-2\,\mathbb{i}\sqrt{-c^2 d e}\right)\left(2\,c^2 d-2\,c\sqrt{-c^2 d e}\;x\right)}{\left(c^2 d-e\right)\left(2\,c^2 d+2\,c\sqrt{-c^2 d e}\;x\right)}\right]+$$

$$\left(-\text{ArcCos}\left[-\frac{c^2 d+e}{c^2 d-e}\right]-2\,\mathbb{i}\,\text{ArcTanh}\left[\frac{c\,e\,x}{\sqrt{-c^2 d e}}\right]\right)$$

$$\text{Log}\left[1-\frac{\left(c^2 d+e+2\,\mathbb{i}\sqrt{-c^2 d e}\right)\left(2\,c^2 d-2\,c\sqrt{-c^2 d e}\;x\right)}{\left(c^2 d-e\right)\left(2\,c^2 d+2\,c\sqrt{-c^2 d e}\;x\right)}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c^2 d+e}{c^2 d-e}\right]-2\,\mathbb{i}\left(\text{ArcTanh}\left[\frac{c\,d}{\sqrt{-c^2 d e}\;x}\right]+\text{ArcTanh}\left[\frac{c\,e\,x}{\sqrt{-c^2 d e}}\right]\right)\right)$$

$$\text{Log}\left[\frac{\sqrt{2}\;\sqrt{-c^2 d e}\;e^{-\mathbb{i}\,\text{ArcTan}[c\,x]}}{\sqrt{c^2 d-e}\;\sqrt{c^2 d+e+\left(c^2 d-e\right)\text{Cos}[2\,\text{ArcTan}[c\,x]]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c^2 d+e}{c^2 d-e}\right]+2\,\mathbb{i}\left(\text{ArcTanh}\left[\frac{c\,d}{\sqrt{-c^2 d e}\;x}\right]+\text{ArcTanh}\left[\frac{c\,e\,x}{\sqrt{-c^2 d e}}\right]\right)\right)$$

$$\text{Log}\left[\frac{\sqrt{2}\;\sqrt{-c^2 d e}\;e^{\mathbb{i}\,\text{ArcTan}[c\,x]}}{\sqrt{c^2 d-e}\;\sqrt{c^2 d+e+\left(c^2 d-e\right)\text{Cos}[2\,\text{ArcTan}[c\,x]]}}\right]+$$

$$\mathbb{i}\left(\text{PolyLog}\left[2,\frac{\left(c^2 d+e-2\,\mathbb{i}\sqrt{-c^2 d e}\right)\left(2\,c^2 d-2\,c\sqrt{-c^2 d e}\;x\right)}{\left(c^2 d-e\right)\left(2\,c^2 d+2\,c\sqrt{-c^2 d e}\;x\right)}\right]-\right.$$

$$\text{PolyLog}\left[2, \frac{\left(c^2 d + e + 2 i \sqrt{-c^2 d e}\right) \left(2 c^2 d - 2 c \sqrt{-c^2 d e}\, x\right)}{\left(c^2 d - e\right) \left(2 c^2 d + 2 c \sqrt{-c^2 d e}\, x\right)}\right]\Bigg)\Bigg) -$$

$$\left(e \,\text{ArcTan}[c x] \,\text{Sin}[2 \,\text{ArcTan}[c x]]\right) \Big/ \Big(2 c^2 d \left(c^2 d - e\right) \left(c^2 d + e + c^2 d \,\text{Cos}[2 \,\text{ArcTan}[c x]] - e \,\text{Cos}[2 \,\text{ArcTan}[c x]]\right)^2\Big) +$$

$$\Big(2 c^2 d e + 5 c^4 d^2 \,\text{ArcTan}[c x] \,\text{Sin}[2 \,\text{ArcTan}[c x]] - 8 c^2 d e \,\text{ArcTan}[c x] \,\text{Sin}[2 \,\text{ArcTan}[c x]] + 3 e^2 \,\text{ArcTan}[c x] \,\text{Sin}[2 \,\text{ArcTan}[c x]]\Big) \Big/$$

$$\left(8 c^4 d^2 \left(c^2 d - e\right)^2 \left(c^2 d + e + c^2 d \,\text{Cos}[2 \,\text{ArcTan}[c x]] - e \,\text{Cos}[2 \,\text{ArcTan}[c x]]\right)\right)\Bigg)$$

Problem 1173: Result unnecessarily involves imaginary or complex numbers.

$$\int x^3 \sqrt{d + e x^2} \left(a + b \,\text{ArcTan}[c x]\right) dx$$

Optimal (type 3, 223 leaves, 9 steps):

$$-\frac{b \left(c^2 d - 12 e\right) x \sqrt{d + e x^2}}{120 c^3 e} - \frac{b x \left(d + e x^2\right)^{3/2}}{20 c e} - \frac{d \left(d + e x^2\right)^{3/2} \left(a + b \,\text{ArcTan}[c x]\right)}{3 e^2} + \frac{\left(d + e x^2\right)^{5/2} \left(a + b \,\text{ArcTan}[c x]\right)}{5 e^2} + \frac{b \left(c^2 d - e\right)^{3/2} \left(2 c^2 d + 3 e\right) \text{ArcTan}\left[\frac{\sqrt{c^2 d - e}\, x}{\sqrt{d + e x^2}}\right]}{15 c^5 e^2} + \frac{b \left(15 c^4 d^2 + 20 c^2 d e - 24 e^2\right) \text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d + e x^2}}\right]}{120 c^5 e^{3/2}}$$

Result (type 3, 391 leaves):

$$\frac{1}{120 c^5 e^2}\Bigg(-c^2 \sqrt{d + e x^2} \left(8 a c^3 \left(2 d^2 - d e x^2 - 3 e^2 x^4\right) + b e x \left(-12 e + c^2 \left(7 d + 6 e x^2\right)\right)\right) - 8 b c^5 \sqrt{d + e x^2} \left(2 d^2 - d e x^2 - 3 e^2 x^4\right) \text{ArcTan}[c x] - 4 i b \left(c^2 d - e\right)^{3/2} \left(2 c^2 d + 3 e\right) \text{Log}\left[-\frac{60 i c^6 e^2 \left(c d - i e x + \sqrt{c^2 d - e} \sqrt{d + e x^2}\right)}{b \left(c^2 d - e\right)^{5/2} \left(2 c^2 d + 3 e\right) \left(i + c x\right)}\right] + 4 i b \left(c^2 d - e\right)^{3/2} \left(2 c^2 d + 3 e\right) \text{Log}\left[\frac{60 i c^6 e^2 \left(c d + i e x + \sqrt{c^2 d - e} \sqrt{d + e x^2}\right)}{b \left(c^2 d - e\right)^{5/2} \left(2 c^2 d + 3 e\right) \left(-i + c x\right)}\right] + b \sqrt{e} \left(15 c^4 d^2 + 20 c^2 d e - 24 e^2\right) \text{Log}\left[e x + \sqrt{e} \sqrt{d + e x^2}\right]\Bigg)$$

Problem 1175: Result unnecessarily involves imaginary or complex numbers.

$$\int x \sqrt{d + e x^2} \left(a + b \,\text{ArcTan}[c x]\right) dx$$

Optimal (type 3, 140 leaves, 7 steps):

$$-\frac{b x \sqrt{d+e x^2}}{6 c}+\frac{\left(d+e x^2\right)^{3/2} (a+b \text{ArcTan}[c x])}{3 e}-\frac{b \left(c^2 d-e\right)^{3/2} \text{ArcTan}\left[\frac{\sqrt{c^2 d-e}\, x}{\sqrt{d+e x^2}}\right]}{3 c^3 e}-\frac{b \left(3 c^2 d-2 e\right) \text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{6 c^3 \sqrt{e}}$$

Result (type 3, 279 leaves):

$$\frac{1}{6 c^3 e}\left(c^2 \sqrt{d+e x^2} \left(-b e x+2 a c \left(d+e x^2\right)\right)+2 b c^3 \left(d+e x^2\right)^{3/2} \text{ArcTan}[c x]-\right.$$
$$i b \left(c^2 d-e\right)^{3/2} \text{Log}\left[\frac{12 c^4 e \left(-i c d+e x-i \sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \left(c^2 d-e\right)^{5/2} (-i+c x)}\right]+$$
$$i b \left(c^2 d-e\right)^{3/2} \text{Log}\left[\frac{12 c^4 e \left(i c d+e x+i \sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \left(c^2 d-e\right)^{5/2} (i+c x)}\right]+$$
$$\left. b \sqrt{e} \left(-3 c^2 d+2 e\right) \text{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]\right)$$

Problem 1180: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\sqrt{d+e x^2} (a+b \text{ArcTan}[c x])}{x^4} \, dx$$

Optimal (type 3, 137 leaves, 9 steps):

$$-\frac{b c \sqrt{d+e x^2}}{6 x^2}-\frac{\left(d+e x^2\right)^{3/2} (a+b \text{ArcTan}[c x])}{3 d x^3}+\frac{b c \left(2 c^2 d-3 e\right) \text{ArcTanh}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d}}\right]}{6 \sqrt{d}}-\frac{b \left(c^2 d-e\right)^{3/2} \text{ArcTanh}\left[\frac{c \sqrt{d+e x^2}}{\sqrt{c^2 d-e}}\right]}{3 d}$$

Result (type 3, 288 leaves):

$$-\frac{1}{6\,d\,x^3}\left(\sqrt{d+e\,x^2}\,\left(b\,c\,d\,x+2\,a\,\left(d+e\,x^2\right)\right)+2\,b\,\left(d+e\,x^2\right)^{3/2}\,\text{ArcTan}[c\,x]+\right.$$
$$b\,c\,\sqrt{d}\,\left(2\,c^2\,d-3\,e\right)\,x^3\,\text{Log}[x]-b\,c\,\sqrt{d}\,\left(2\,c^2\,d-3\,e\right)\,x^3\,\text{Log}\left[d+\sqrt{d}\,\sqrt{d+e\,x^2}\right]+$$
$$b\,\left(c^2\,d-e\right)^{3/2}\,x^3\,\text{Log}\left[\frac{12\,c\,d\,\left(c\,d-i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\left(c^2\,d-e\right)^{5/2}\,\left(i+c\,x\right)}\right]+$$
$$\left.b\,\left(c^2\,d-e\right)^{3/2}\,x^3\,\text{Log}\left[\frac{12\,c\,d\,\left(c\,d+i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\left(c^2\,d-e\right)^{5/2}\,\left(-i+c\,x\right)}\right]\right)$$

Problem 1182: Result unnecessarily involves imaginary or complex numbers.

$$\int\frac{\sqrt{d+e\,x^2}\,\left(a+b\,\text{ArcTan}[c\,x]\right)}{x^6}\,dx$$

Optimal (type 3, 224 leaves, 10 steps):

$$\frac{b\,c\,\left(12\,c^2\,d-e\right)\,\sqrt{d+e\,x^2}}{120\,d\,x^2}-\frac{b\,c\,\left(d+e\,x^2\right)^{3/2}}{20\,d\,x^4}-$$
$$\frac{\left(d+e\,x^2\right)^{3/2}\,\left(a+b\,\text{ArcTan}[c\,x]\right)}{5\,d\,x^5}+\frac{2\,e\,\left(d+e\,x^2\right)^{3/2}\,\left(a+b\,\text{ArcTan}[c\,x]\right)}{15\,d^2\,x^3}-$$
$$\frac{b\,c\,\left(24\,c^4\,d^2-20\,c^2\,d\,e-15\,e^2\right)\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]}{120\,d^{3/2}}+\frac{b\,\left(c^2\,d-e\right)^{3/2}\,\left(3\,c^2\,d+2\,e\right)\,\text{ArcTanh}\left[\frac{c\,\sqrt{d+e\,x^2}}{\sqrt{c^2\,d-e}}\right]}{15\,d^2}$$

Result (type 3, 413 leaves):

$$\frac{1}{120\,d^2\,x^5}\left(-\sqrt{d+e\,x^2}\,\left(8\,a\,\left(3\,d^2+d\,e\,x^2-2\,e^2\,x^4\right)+b\,c\,d\,x\,\left(7\,e\,x^2+d\,\left(6-12\,c^2\,x^2\right)\right)\right)-\right.$$
$$8\,b\,\sqrt{d+e\,x^2}\,\left(3\,d^2+d\,e\,x^2-2\,e^2\,x^4\right)\,\text{ArcTan}[c\,x]+b\,c\,\sqrt{d}\,\left(24\,c^4\,d^2-20\,c^2\,d\,e-15\,e^2\right)\,x^5\,\text{Log}[x]-$$
$$b\,c\,\sqrt{d}\,\left(24\,c^4\,d^2-20\,c^2\,d\,e-15\,e^2\right)\,x^5\,\text{Log}\left[d+\sqrt{d}\,\sqrt{d+e\,x^2}\right]+$$
$$4\,b\,\left(c^2\,d-e\right)^{3/2}\,\left(3\,c^2\,d+2\,e\right)\,x^5\,\text{Log}\left[-\frac{60\,c\,d^2\,\left(c\,d-i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\left(c^2\,d-e\right)^{5/2}\,\left(3\,c^2\,d+2\,e\right)\,\left(i+c\,x\right)}\right]+$$
$$\left.4\,b\,\left(c^2\,d-e\right)^{3/2}\,\left(3\,c^2\,d+2\,e\right)\,x^5\,\text{Log}\left[-\frac{60\,c\,d^2\,\left(c\,d+i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\left(c^2\,d-e\right)^{5/2}\,\left(3\,c^2\,d+2\,e\right)\,\left(-i+c\,x\right)}\right]\right)$$

Problem 1183: Result unnecessarily involves imaginary or complex numbers.

$$\int x^3\,\left(d+e\,x^2\right)^{3/2}\,\left(a+b\,\text{ArcTan}[c\,x]\right)\,dx$$

Optimal (type 3, 279 leaves, 10 steps):

$$\frac{b\left(3 c^4 d^2+54 c^2 d e-40 e^2\right) x \sqrt{d+e x^2}}{560 c^5 e}-\frac{b\left(13 c^2 d-30 e\right) x\left(d+e x^2\right)^{3/2}}{840 c^3 e}-\frac{b x\left(d+e x^2\right)^{5/2}}{42 c e}-\frac{d\left(d+e x^2\right)^{5/2}(a+b\,\text{ArcTan}[c x])}{5 e^2}+\frac{\left(d+e x^2\right)^{7/2}(a+b\,\text{ArcTan}[c x])}{7 e^2}+\frac{b\left(c^2 d-e\right)^{5/2}\left(2 c^2 d+5 e\right)\text{ArcTan}\left[\frac{\sqrt{c^2 d-e}\, x}{\sqrt{d+e x^2}}\right]}{35 c^7 e^2}+\frac{b\left(35 c^6 d^3+70 c^4 d^2 e-168 c^2 d e^2+80 e^3\right)\text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{560 c^7 e^{3/2}}$$

Result (type 3, 418 leaves):

$$-\frac{1}{1680 c^7 e^2}\Bigg(c^2 \sqrt{d+e x^2}\left(48 a c^5\left(2 d-5 e x^2\right)\left(d+e x^2\right)^2+b e x\left(120 e^2-6 c^2 e\left(37 d+10 e x^2\right)+c^4\left(57 d^2+106 d e x^2+40 e^2 x^4\right)\right)\right)+48 b c^7\left(2 d-5 e x^2\right)\left(d+e x^2\right)^{5/2}\text{ArcTan}[c x]+24\, i\, b\left(c^2 d-e\right)^{5/2}\left(2 c^2 d+5 e\right)\text{Log}\left[-\frac{140\, i\, c^8 e^2\left(c d-i e x+\sqrt{c^2 d-e}\sqrt{d+e x^2}\right)}{b\left(c^2 d-e\right)^{7/2}\left(2 c^2 d+5 e\right)(i+c x)}\right]-24\, i\, b\left(c^2 d-e\right)^{5/2}\left(2 c^2 d+5 e\right)\text{Log}\left[\frac{140\, i\, c^8 e^2\left(c d+i e x+\sqrt{c^2 d-e}\sqrt{d+e x^2}\right)}{b\left(c^2 d-e\right)^{7/2}\left(2 c^2 d+5 e\right)(-i+c x)}\right]-3 b \sqrt{e}\left(35 c^6 d^3+70 c^4 d^2 e-168 c^2 d e^2+80 e^3\right)\text{Log}\left[e x+\sqrt{e}\sqrt{d+e x^2}\right]\Bigg)$$

Problem 1185: Result unnecessarily involves imaginary or complex numbers.

$$\int x\left(d+e x^2\right)^{3/2}(a+b\,\text{ArcTan}[c x])\,dx$$

Optimal (type 3, 181 leaves, 8 steps):

$$-\frac{b\left(7 c^2 d-4 e\right) x \sqrt{d+e x^2}}{40 c^3}-\frac{b x\left(d+e x^2\right)^{3/2}}{20 c}+\frac{\left(d+e x^2\right)^{5/2}(a+b\,\text{ArcTan}[c x])}{5 e}-\frac{b\left(c^2 d-e\right)^{5/2}\text{ArcTan}\left[\frac{\sqrt{c^2 d-e}\, x}{\sqrt{d+e x^2}}\right]}{5 c^5 e}-\frac{b\left(15 c^4 d^2-20 c^2 d e+8 e^2\right)\text{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{40 c^5 \sqrt{e}}$$

Result (type 3, 313 leaves):

$$\frac{1}{40 c^5 e}\left(c^2 \sqrt{d+e x^2}\left(8 a c^3 \left(d+e x^2\right)^2+b e x \left(4 e-c^2 \left(9 d+2 e x^2\right)\right)\right)+8 b c^5 \left(d+e x^2\right)^{5/2} \text{ArcTan}[c x]-4 i b \left(c^2 d-e\right)^{5/2} \text{Log}\left[\frac{20 c^6 e \left(-i c d+e x-i \sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \left(c^2 d-e\right)^{7/2} (-i+c x)}\right]+4 i b \left(c^2 d-e\right)^{5/2} \text{Log}\left[\frac{20 c^6 e \left(i c d+e x+i \sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \left(c^2 d-e\right)^{7/2} (i+c x)}\right]-b \sqrt{e} \left(15 c^4 d^2-20 c^2 d e+8 e^2\right) \text{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]\right)$$

Problem 1192: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 178 leaves, 10 steps):

$$\frac{b c \left(4 c^2 d-7 e\right) \sqrt{d+e x^2}}{40 x^2}-\frac{b c \left(d+e x^2\right)^{3/2}}{20 x^4}-\frac{\left(d+e x^2\right)^{5/2} (a+b \text{ArcTan}[c x])}{5 d x^5}-\frac{b c \left(8 c^4 d^2-20 c^2 d e+15 e^2\right) \text{ArcTanh}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d}}\right]}{40 \sqrt{d}}+\frac{b \left(c^2 d-e\right)^{5/2} \text{ArcTanh}\left[\frac{c \sqrt{d+e x^2}}{\sqrt{c^2 d-e}}\right]}{5 d}$$

Result (type 3, 334 leaves):

$$\frac{1}{40 d x^5}\left(-\sqrt{d+e x^2}\left(8 a \left(d+e x^2\right)^2+b c d x \left(9 e x^2+d \left(2-4 c^2 x^2\right)\right)\right)-8 b \left(d+e x^2\right)^{5/2} \text{ArcTan}[c x]+b c \sqrt{d} \left(8 c^4 d^2-20 c^2 d e+15 e^2\right) x^5 \text{Log}[x]-b c \sqrt{d} \left(8 c^4 d^2-20 c^2 d e+15 e^2\right) x^5 \text{Log}\left[d+\sqrt{d} \sqrt{d+e x^2}\right]+4 b \left(c^2 d-e\right)^{5/2} x^5 \text{Log}\left[-\frac{20 c d \left(c d-i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \left(c^2 d-e\right)^{7/2} (i+c x)}\right]+4 b \left(c^2 d-e\right)^{5/2} x^5 \text{Log}\left[-\frac{20 c d \left(c d+i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \left(c^2 d-e\right)^{7/2} (-i+c x)}\right]\right)$$

Problem 1193: Result unnecessarily involves imaginary or complex numbers.

$$\int x^3 \left(d+e x^2\right)^{5/2} (a+b \text{ArcTan}[c x]) \, dx$$

Optimal (type 3, 345 leaves, 11 steps):

$$\frac{b\left(59 c^6 d^3+712 c^4 d^2 e-1104 c^2 d e^2+448 e^3\right) x \sqrt{d+e x^2}}{8064 c^7 e}-\frac{b\left(69 c^4 d^2-520 c^2 d e+336 e^2\right) x\left(d+e x^2\right)^{3/2}}{12096 c^5 e}-\frac{b\left(33 c^2 d-56 e\right) x\left(d+e x^2\right)^{5/2}}{3024 c^3 e}-\frac{b x\left(d+e x^2\right)^{7/2}}{72 c e}-\frac{d\left(d+e x^2\right)^{7/2}(a+b \operatorname{ArcTan}[c x])}{7 e^2}+\frac{\left(d+e x^2\right)^{9/2}(a+b \operatorname{ArcTan}[c x])}{9 e^2}+\frac{b\left(c^2 d-e\right)^{7/2}\left(2 c^2 d+7 e\right) \operatorname{ArcTan}\left[\frac{\sqrt{c^2 d-e}\, x}{\sqrt{d+e x^2}}\right]}{63 c^9 e^2}+\frac{1}{8064 c^9 e^{3/2}} b\left(315 c^8 d^4+840 c^6 d^3 e-3024 c^4 d^2 e^2+2880 c^2 d e^3-896 e^4\right) \operatorname{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]$$

Result (type 3, 470 leaves):

$$-\frac{1}{24192 c^9 e^2}\left(c^2 \sqrt{d+e x^2}\left(384 a c^7\left(2 d-7 e x^2\right)\left(d+e x^2\right)^3+b e x\left(-1344 e^3+48 c^2 e^2\left(83 d+14 e x^2\right)-8 c^4 e\left(453 d^2+242 d e x^2+56 e^2 x^4\right)+3 c^6\left(187 d^3+558 d^2 e x^2+424 d e^2 x^4+112 e^3 x^6\right)\right)\right)+384 b c^9\left(2 d-7 e x^2\right)\left(d+e x^2\right)^{7/2} \operatorname{ArcTan}[c x]+192 i b\left(c^2 d-e\right)^{7/2}\left(2 c^2 d+7 e\right) \operatorname{Log}\left[-\frac{252 i c^{10} e^2\left(c d-i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b\left(c^2 d-e\right)^{9/2}\left(2 c^2 d+7 e\right)(i+c x)}\right]-192 i b\left(c^2 d-e\right)^{7/2}\left(2 c^2 d+7 e\right) \operatorname{Log}\left[\frac{252 i c^{10} e^2\left(c d+i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b\left(c^2 d-e\right)^{9/2}\left(2 c^2 d+7 e\right)(-i+c x)}\right]+3 b \sqrt{e}\left(-315 c^8 d^4-840 c^6 d^3 e+3024 c^4 d^2 e^2-2880 c^2 d e^3+896 e^4\right) \operatorname{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]\right)$$

Problem 1195: Result unnecessarily involves imaginary or complex numbers.

$$\int x\left(d+e x^2\right)^{5/2}(a+b \operatorname{ArcTan}[c x])\, dx$$

Optimal (type 3, 233 leaves, 9 steps):

$$-\frac{b\left(19 c^4 d^2-22 c^2 d e+8 e^2\right) x \sqrt{d+e x^2}}{112 c^5}-\frac{b\left(11 c^2 d-6 e\right) x\left(d+e x^2\right)^{3/2}}{168 c^3}-\frac{b x\left(d+e x^2\right)^{5/2}}{42 c}+\frac{\left(d+e x^2\right)^{7/2}(a+b \operatorname{ArcTan}[c x])}{7 e}-\frac{b\left(c^2 d-e\right)^{7/2} \operatorname{ArcTan}\left[\frac{\sqrt{c^2 d-e}\, x}{\sqrt{d+e x^2}}\right]}{7 c^7 e}-\frac{b\left(35 c^6 d^3-70 c^4 d^2 e+56 c^2 d e^2-16 e^3\right) \operatorname{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{112 c^7 \sqrt{e}}$$

Result (type 3, 353 leaves) :

$$\frac{1}{336 c^7 e}\left(c^2 \sqrt{d+e x^2}\left(48 a c^5\left(d+e x^2\right)^3-b e x\left(24 e^2-6 c^2 e\left(13 d+2 e x^2\right)+c^4\left(87 d^2+38 d e x^2+8 e^2 x^4\right)\right)\right)+48 b c^7\left(d+e x^2\right)^{7/2} \operatorname{ArcTan}[c x]-24 i b\left(c^2 d-e\right)^{7/2} \operatorname{Log}\left[\frac{28 c^8 e\left(-i c d+e x-i \sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b\left(c^2 d-e\right)^{9/2}(-i+c x)}\right]+24 i b\left(c^2 d-e\right)^{7/2} \operatorname{Log}\left[\frac{28 c^8 e\left(i c d+e x+i \sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b\left(c^2 d-e\right)^{9/2}(i+c x)}\right]+3 b \sqrt{e}\left(-35 c^6 d^3+70 c^4 d^2 e-56 c^2 d e^2+16 e^3\right) \operatorname{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]\right)$$

Problem 1201: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{x^3(a+b \operatorname{ArcTan}[c x])}{\sqrt{d+e x^2}}\, dx$$

Optimal (type 3, 176 leaves, 8 steps) :

$$-\frac{b x \sqrt{d+e x^2}}{6 c e}-\frac{d \sqrt{d+e x^2}(a+b \operatorname{ArcTan}[c x])}{e^2}+\frac{\left(d+e x^2\right)^{3/2}(a+b \operatorname{ArcTan}[c x])}{3 e^2}+\frac{b \sqrt{c^2 d-e}\left(2 c^2 d+e\right) \operatorname{ArcTan}\left[\frac{\sqrt{c^2 d-e}\, x}{\sqrt{d+e x^2}}\right]}{3 c^3 e^2}+\frac{b\left(3 c^2 d+2 e\right) \operatorname{ArcTanh}\left[\frac{\sqrt{e}\, x}{\sqrt{d+e x^2}}\right]}{6 c^3 e^{3/2}}$$

Result (type 3, 377 leaves) :

$$\frac{1}{6\,e^2}\left(-\frac{\sqrt{d+e\,x^2}\,\left(b\,e\,x+a\,c\,\left(4\,d-2\,e\,x^2\right)\right)}{c}+2\,b\,\left(-2\,d+e\,x^2\right)\sqrt{d+e\,x^2}\,\text{ArcTan}[c\,x]-\frac{i\,b\,\left(2\,c^4\,d^2-c^2\,d\,e-e^2\right)\,\text{Log}\left[\frac{12\,i\,c^4\,e^2\,\left(c\,d-i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\sqrt{c^2\,d-e}\,\left(-2\,c^4\,d^2+c^2\,d\,e+e^2\right)\,(i+c\,x)}\right]}{c^3\,\sqrt{c^2\,d-e}}+\frac{i\,b\,\left(2\,c^4\,d^2-c^2\,d\,e-e^2\right)\,\text{Log}\left[-\frac{12\,i\,c^4\,e^2\,\left(c\,d+i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\sqrt{c^2\,d-e}\,\left(-2\,c^4\,d^2+c^2\,d\,e+e^2\right)\,(-i+c\,x)}\right]}{c^3\,\sqrt{c^2\,d-e}}+\frac{b\,\sqrt{e}\,\left(3\,c^2\,d+2\,e\right)\,\text{Log}\left[e\,x+\sqrt{e}\,\sqrt{d+e\,x^2}\right]}{c^3}\right)$$

Problem 1203: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 103 leaves, 6 steps):

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

Result (type 3, 251 leaves):

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

Problem 1206: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{a + b\,\text{ArcTan}[c\,x]}{x^2\,\sqrt{d + e\,x^2}}\,dx$$

Optimal (type 3, 100 leaves, 7 steps):

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

Result (type 3, 247 leaves):

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

Problem 1208: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{a + b\,\text{ArcTan}[c\,x]}{x^4\,\sqrt{d + e\,x^2}}\,dx$$

Optimal (type 3, 179 leaves, 9 steps):

$$-\frac{b\,c\,\sqrt{d + e\,x^2}}{6\,d\,x^2} - \frac{\sqrt{d + e\,x^2}\,\left(a + b\,\text{ArcTan}[c\,x]\right)}{3\,d\,x^3} + \frac{2\,e\,\sqrt{d + e\,x^2}\,\left(a + b\,\text{ArcTan}[c\,x]\right)}{3\,d^2\,x} + \frac{b\,c\,\left(2\,c^2\,d + 3\,e\right)\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]}{6\,d^{3/2}} - \frac{b\,\sqrt{c^2\,d - e}\,\left(c^2\,d + 2\,e\right)\,\text{ArcTanh}\left[\frac{c\,\sqrt{d+e\,x^2}}{\sqrt{c^2\,d-e}}\right]}{3\,d^2}$$

Result (type 3, 372 leaves):

$$-\frac{1}{6\,d^2}\left(\frac{\sqrt{d+e\,x^2}\,\left(b\,c\,d\,x+2\,a\,\left(d-2\,e\,x^2\right)\right)}{x^3}+\frac{2\,b\,\left(d-2\,e\,x^2\right)\,\sqrt{d+e\,x^2}\,\text{ArcTan}[c\,x]}{x^3}+\right.$$

$$b\,c\,\sqrt{d}\,\left(2\,c^2\,d+3\,e\right)\,\text{Log}[x]-b\,c\,\sqrt{d}\,\left(2\,c^2\,d+3\,e\right)\,\text{Log}\left[d+\sqrt{d}\,\sqrt{d+e\,x^2}\,\right]+$$

$$\frac{b\,\left(c^4\,d^2+c^2\,d\,e-2\,e^2\right)\,\text{Log}\left[\frac{12\,c\,d^2\,\left(c\,d-i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\sqrt{c^2\,d-e}\,\left(c^4\,d^2+c^2\,d\,e-2\,e^2\right)\,(i+c\,x)}\right]}{\sqrt{c^2\,d-e}}+$$

$$\left.\frac{b\,\left(c^4\,d^2+c^2\,d\,e-2\,e^2\right)\,\text{Log}\left[\frac{12\,c\,d^2\,\left(c\,d+i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\sqrt{c^2\,d-e}\,\left(c^4\,d^2+c^2\,d\,e-2\,e^2\right)\,(-i+c\,x)}\right]}{\sqrt{c^2\,d-e}}\right)$$

Problem 1209: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 137 leaves, 7 steps):

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

$$\frac{b\,\left(2\,c^2\,d-e\right)\,\text{ArcTan}\left[\frac{\sqrt{c^2\,d-e}\,x}{\sqrt{d+e\,x^2}}\right]}{c\,\sqrt{c^2\,d-e}\,e^2}-\frac{b\,\text{ArcTanh}\left[\frac{\sqrt{e}\,x}{\sqrt{d+e\,x^2}}\right]}{c\,e^{3/2}}$$

Result (type 3, 321 leaves):

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

Problem 1211: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

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

$$-\frac{a+b \text{ArcTan}[c x]}{e \sqrt{d+e x^2}}+\frac{b c \text{ArcTan}\left[\frac{\sqrt{c^2 d-e}\, x}{\sqrt{d+e x^2}}\right]}{\sqrt{c^2 d-e}\, e}$$

Result (type 3, 210 leaves):

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

Problem 1212: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 70 leaves, 5 steps):

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

Result (type 3, 202 leaves):

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

Problem 1214: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 135 leaves, 8 steps):

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

Result (type 3, 306 leaves):

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

Problem 1216: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 249 leaves, 14 steps):

$$-\frac{b\,c\,\sqrt{d+e\,x^2}}{6\,d^2\,x^2}-\frac{a+b\,\text{ArcTan}[c\,x]}{3\,d\,x^3\,\sqrt{d+e\,x^2}}+\frac{4\,e\,\left(a+b\,\text{ArcTan}[c\,x]\right)}{3\,d^2\,x\,\sqrt{d+e\,x^2}}+\frac{8\,e^2\,x\,\left(a+b\,\text{ArcTan}[c\,x]\right)}{3\,d^3\,\sqrt{d+e\,x^2}}+\frac{b\,c\,e\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]}{6\,d^{5/2}}+\frac{b\,c\,\left(c^2\,d+4\,e\right)\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]}{3\,d^{5/2}}-\frac{b\,\left(c^4\,d^2+4\,c^2\,d\,e-8\,e^2\right)\,\text{ArcTanh}\left[\frac{c\,\sqrt{d+e\,x^2}}{\sqrt{c^2\,d-e}}\right]}{3\,d^3\,\sqrt{c^2\,d-e}}$$

Result (type 3, 405 leaves):

$$-\frac{1}{6\,d^3}\left(\frac{b\,c\,d\,x\,\left(d+e\,x^2\right)+2\,a\,\left(d^2-4\,d\,e\,x^2-8\,e^2\,x^4\right)}{x^3\,\sqrt{d+e\,x^2}}+\frac{2\,b\,\left(d^2-4\,d\,e\,x^2-8\,e^2\,x^4\right)\,\text{ArcTan}[c\,x]}{x^3\,\sqrt{d+e\,x^2}}+b\,c\,\sqrt{d}\,\left(2\,c^2\,d+9\,e\right)\,\text{Log}[x]-b\,c\,\sqrt{d}\,\left(2\,c^2\,d+9\,e\right)\,\text{Log}\left[d+\sqrt{d}\,\sqrt{d+e\,x^2}\right]+\frac{b\,\left(c^4\,d^2+4\,c^2\,d\,e-8\,e^2\right)\,\text{Log}\left[\frac{12\,c\,d^3\,\left(c\,d-i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\sqrt{c^2\,d-e}\,\left(c^4\,d^2+4\,c^2\,d\,e-8\,e^2\right)\,(i+c\,x)}\right]}{\sqrt{c^2\,d-e}}+\frac{b\,\left(c^4\,d^2+4\,c^2\,d\,e-8\,e^2\right)\,\text{Log}\left[\frac{12\,c\,d^3\,\left(c\,d+i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\sqrt{c^2\,d-e}\,\left(c^4\,d^2+4\,c^2\,d\,e-8\,e^2\right)\,(-i+c\,x)}\right]}{\sqrt{c^2\,d-e}}\right)$$

Problem 1218: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{x^3\,\left(a+b\,\text{ArcTan}[c\,x]\right)}{\left(d+e\,x^2\right)^{5/2}}\,dx$$

Optimal (type 3, 143 leaves, 6 steps):

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

Result (type 3, 326 leaves):

$$\Bigg(2 \sqrt{c^2 d-e} \left(b c e x \left(d+e x^2\right)-a \left(c^2 d-e\right) \left(2 d+3 e x^2\right)\right)-2 b \left(c^2 d-e\right)^{3/2} \left(2 d+3 e x^2\right) \text{ArcTan}[c x]-\mathrm{i} b c \left(2 c^2 d-3 e\right) \left(d+e x^2\right)^{3/2} \text{Log}\left[-\frac{12 \mathrm{i} \sqrt{c^2 d-e}\, e^2 \left(c d-\mathrm{i} e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \left(2 c^2 d-3 e\right) (\mathrm{i}+c x)}\right]+\mathrm{i} b c \left(2 c^2 d-3 e\right) \left(d+e x^2\right)^{3/2} \text{Log}\left[\frac{12 \mathrm{i} \sqrt{c^2 d-e}\, e^2 \left(c d+\mathrm{i} e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b \left(2 c^2 d-3 e\right) (-\mathrm{i}+c x)}\right]\Bigg) \Big/ \left(6 \left(c^2 d-e\right)^{3/2} e^2 \left(d+e x^2\right)^{3/2}\right)$$

Problem 1219: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{x^2 (a+b \text{ArcTan}[c x])}{\left(d+e x^2\right)^{5/2}} \, dx$$

Optimal (type 3, 109 leaves, 5 steps):

$$\frac{b c}{3 \left(c^2 d-e\right) e \sqrt{d+e x^2}}+\frac{x^3 (a+b \text{ArcTan}[c x])}{3 d \left(d+e x^2\right)^{3/2}}-\frac{b \text{ArcTanh}\left[\frac{c \sqrt{d+e x^2}}{\sqrt{c^2 d-e}}\right]}{3 d \left(c^2 d-e\right)^{3/2}}$$

Result (type 3, 252 leaves):

$$-\frac{1}{6 d}\left(\frac{2 a d x}{e \left(d+e x^2\right)^{3/2}}-\frac{2 \left(b c d+a \left(c^2 d-e\right) x\right)}{\left(c^2 d-e\right) e \sqrt{d+e x^2}}-\frac{2 b x^3 \text{ArcTan}[c x]}{\left(d+e x^2\right)^{3/2}}+\frac{b \text{Log}\left[\frac{12 c d \sqrt{c^2 d-e} \left(c d-\mathrm{i} e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b (\mathrm{i}+c x)}\right]}{\left(c^2 d-e\right)^{3/2}}+\frac{b \text{Log}\left[\frac{12 c d \sqrt{c^2 d-e} \left(c d+\mathrm{i} e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b (-\mathrm{i}+c x)}\right]}{\left(c^2 d-e\right)^{3/2}}\right)$$

Problem 1220: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 110 leaves, 4 steps):

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

Result (type 3, 259 leaves):

$$\frac{1}{6}\left(-\frac{2\,a}{e\,(d+e\,x^2)^{3/2}}-\frac{2\,b\,c\,x}{(c^2\,d^2-d\,e)\,\sqrt{d+e\,x^2}}-\frac{2\,b\,\text{ArcTan}[c\,x]}{e\,(d+e\,x^2)^{3/2}}-\frac{i\,b\,c^3\,\text{Log}\left[-\frac{12\,i\,\sqrt{c^2\,d-e}\,e\,\left(c\,d-i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,c^2\,(i+c\,x)}\right]}{(c^2\,d-e)^{3/2}\,e}+\frac{i\,b\,c^3\,\text{Log}\left[\frac{12\,i\,\sqrt{c^2\,d-e}\,e\,\left(c\,d+i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,c^2\,(-i+c\,x)}\right]}{(c^2\,d-e)^{3/2}\,e}\right)$$

Problem 1221: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 3, 144 leaves, 7 steps):

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

Result (type 3, 317 leaves):

$$\left(2\sqrt{c^2 d-e}\left(-b c d\left(d+e x^2\right)+a\left(c^2 d-e\right) x\left(3 d+2 e x^2\right)\right)+2 b\left(c^2 d-e\right)^{3/2} x\left(3 d+2 e x^2\right) \text{ArcTan}[c x]+b\left(3 c^2 d-2 e\right)\left(d+e x^2\right)^{3/2} \text{Log}\left[-\frac{12 c d^2 \sqrt{c^2 d-e}\left(c d-i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b\left(3 c^2 d-2 e\right)(i+c x)}\right]+b\left(3 c^2 d-2 e\right)\left(d+e x^2\right)^{3/2} \text{Log}\left[-\frac{12 c d^2 \sqrt{c^2 d-e}\left(c d+i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b\left(3 c^2 d-2 e\right)(-i+c x)}\right]\right)\Big/\left(6 d^2\left(c^2 d-e\right)^{3/2}\left(d+e x^2\right)^{3/2}\right)$$

Problem 1223: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{a+b \text{ArcTan}[c x]}{x^2\left(d+e x^2\right)^{5/2}} \, dx$$

Optimal (type 3, 274 leaves, 13 steps):

$$\frac{b c}{d^2 \sqrt{d+e x^2}}-\frac{8 b e}{3 c d^3 \sqrt{d+e x^2}}-\frac{b\left(3 c^4 d^2-12 c^2 d e+8 e^2\right)}{3 c d^3\left(c^2 d-e\right) \sqrt{d+e x^2}}-\frac{a+b \text{ArcTan}[c x]}{d x\left(d+e x^2\right)^{3/2}}-\frac{4 e x(a+b \text{ArcTan}[c x])}{3 d^2\left(d+e x^2\right)^{3/2}}-\frac{8 e x(a+b \text{ArcTan}[c x])}{3 d^3 \sqrt{d+e x^2}}-\frac{b c \text{ArcTanh}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d}}\right]}{d^{5/2}}+\frac{b\left(3 c^4 d^2-12 c^2 d e+8 e^2\right) \text{ArcTanh}\left[\frac{c \sqrt{d+e x^2}}{\sqrt{c^2 d-e}}\right]}{3 d^3\left(c^2 d-e\right)^{3/2}}$$

Result (type 3, 418 leaves):

$$\frac{1}{6 d^3}\left(-\frac{2 a d e x}{\left(d+e x^2\right)^{3/2}}+\frac{2 e\left(b c d+5 a\left(-c^2 d+e\right) x\right)}{\left(c^2 d-e\right) \sqrt{d+e x^2}}-\frac{6 a \sqrt{d+e x^2}}{x}-\frac{2 b\left(3 d^2+12 d e x^2+8 e^2 x^4\right) \text{ArcTan}[c x]}{x\left(d+e x^2\right)^{3/2}}+6 b c \sqrt{d} \text{Log}[x]-6 b c \sqrt{d} \text{Log}\left[d+\sqrt{d} \sqrt{d+e x^2}\right]+\frac{1}{\left(c^2 d-e\right)^{3/2}} b\left(3 c^4 d^2-12 c^2 d e+8 e^2\right) \text{Log}\left[-\frac{12 c d^3 \sqrt{c^2 d-e}\left(c d-i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b\left(3 c^4 d^2-12 c^2 d e+8 e^2\right)(i+c x)}\right]+\frac{1}{\left(c^2 d-e\right)^{3/2}} b\left(3 c^4 d^2-12 c^2 d e+8 e^2\right) \text{Log}\left[-\frac{12 c d^3 \sqrt{c^2 d-e}\left(c d+i e x+\sqrt{c^2 d-e} \sqrt{d+e x^2}\right)}{b\left(3 c^4 d^2-12 c^2 d e+8 e^2\right)(-i+c x)}\right]\right)$$

Problem 1225: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{a+b\,\text{ArcTan}[c\,x]}{x^4\left(d+e\,x^2\right)^{5/2}}\,dx$$

Optimal (type 3, 423 leaves, 18 steps):

$$-\frac{b\,c\,e}{2\,d^3\,\sqrt{d+e\,x^2}}+\frac{16\,b\,e^2}{3\,c\,d^4\,\sqrt{d+e\,x^2}}-\frac{b\,c\,\left(c^2\,d+6\,e\right)}{3\,d^3\,\sqrt{d+e\,x^2}}+\frac{b\,\left(c^2\,d-2\,e\right)\,\left(c^4\,d^2+8\,c^2\,d\,e-8\,e^2\right)}{3\,c\,d^4\,\left(c^2\,d-e\right)\,\sqrt{d+e\,x^2}}-\frac{b\,c}{6\,d^2\,x^2\,\sqrt{d+e\,x^2}}-\frac{a+b\,\text{ArcTan}[c\,x]}{3\,d\,x^3\,\left(d+e\,x^2\right)^{3/2}}+\frac{2\,e\,\left(a+b\,\text{ArcTan}[c\,x]\right)}{d^2\,x\,\left(d+e\,x^2\right)^{3/2}}+\frac{8\,e^2\,x\,\left(a+b\,\text{ArcTan}[c\,x]\right)}{3\,d^3\,\left(d+e\,x^2\right)^{3/2}}+\frac{16\,e^2\,x\,\left(a+b\,\text{ArcTan}[c\,x]\right)}{3\,d^4\,\sqrt{d+e\,x^2}}+\frac{b\,c\,e\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]}{2\,d^{7/2}}+\frac{b\,c\,\left(c^2\,d+6\,e\right)\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]}{3\,d^{7/2}}-\frac{b\,\left(c^2\,d-2\,e\right)\,\left(c^4\,d^2+8\,c^2\,d\,e-8\,e^2\right)\,\text{ArcTanh}\left[\frac{c\,\sqrt{d+e\,x^2}}{\sqrt{c^2\,d-e}}\right]}{3\,d^4\,\left(c^2\,d-e\right)^{3/2}}$$

Result (type 3, 510 leaves):

$$-\frac{1}{6\,d^4}\left(\frac{2\,a\,\left(d^3-6\,d^2\,e\,x^2-24\,d\,e^2\,x^4-16\,e^3\,x^6\right)}{x^3\,\left(d+e\,x^2\right)^{3/2}}+\frac{b\,c\,d\,\left(e\,\left(-d+e\,x^2\right)+c^2\,d\,\left(d+e\,x^2\right)\right)}{\left(c^2\,d-e\right)\,x^2\,\sqrt{d+e\,x^2}}+\frac{2\,b\,\left(d^3-6\,d^2\,e\,x^2-24\,d\,e^2\,x^4-16\,e^3\,x^6\right)\,\text{ArcTan}[c\,x]}{x^3\,\left(d+e\,x^2\right)^{3/2}}+b\,c\,\sqrt{d}\,\left(2\,c^2\,d+15\,e\right)\,\text{Log}[x]-b\,c\,\sqrt{d}\,\left(2\,c^2\,d+15\,e\right)\,\text{Log}\left[d+\sqrt{d}\,\sqrt{d+e\,x^2}\right]+\frac{1}{\left(c^2\,d-e\right)^{3/2}}b\,\left(c^6\,d^3+6\,c^4\,d^2\,e-24\,c^2\,d\,e^2+16\,e^3\right)\,\text{Log}\left[\frac{12\,c\,d^4\,\sqrt{c^2\,d-e}\,\left(c\,d-i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\left(c^6\,d^3+6\,c^4\,d^2\,e-24\,c^2\,d\,e^2+16\,e^3\right)\,\left(i+c\,x\right)}\right]+\frac{1}{\left(c^2\,d-e\right)^{3/2}}b\,\left(c^6\,d^3+6\,c^4\,d^2\,e-24\,c^2\,d\,e^2+16\,e^3\right)\,\text{Log}\left[\frac{12\,c\,d^4\,\sqrt{c^2\,d-e}\,\left(c\,d+i\,e\,x+\sqrt{c^2\,d-e}\,\sqrt{d+e\,x^2}\right)}{b\,\left(c^6\,d^3+6\,c^4\,d^2\,e-24\,c^2\,d\,e^2+16\,e^3\right)\,\left(-i+c\,x\right)}\right]\right)$$

Problem 1226: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\text{ArcTan}[a\,x]}{\left(c+d\,x^2\right)^{7/2}}\,dx$$

Optimal (type 3, 208 leaves, 8 steps):

$$-\frac{a}{15 c \left(a^2 c-d\right) \left(c+d x^2\right)^{3/2}}-\frac{a \left(7 a^2 c-4 d\right)}{15 c^2 \left(a^2 c-d\right)^2 \sqrt{c+d x^2}}+\frac{x \operatorname{ArcTan}[a x]}{5 c \left(c+d x^2\right)^{5/2}}+\frac{4 x \operatorname{ArcTan}[a x]}{15 c^2 \left(c+d x^2\right)^{3/2}}+\frac{8 x \operatorname{ArcTan}[a x]}{15 c^3 \sqrt{c+d x^2}}+\frac{\left(15 a^4 c^2-20 a^2 c d+8 d^2\right) \operatorname{ArcTanh}\left[\frac{a \sqrt{c+d x^2}}{\sqrt{a^2 c-d}}\right]}{15 c^3 \left(a^2 c-d\right)^{5/2}}$$

Result (type 3, 345 leaves) :

$$\frac{1}{30 c^3}\left(-\frac{2 a c \left(-d \left(5 c+4 d x^2\right)+a^2 c \left(8 c+7 d x^2\right)\right)}{\left(-a^2 c+d\right)^2 \left(c+d x^2\right)^{3/2}}+\frac{2 x \left(15 c^2+20 c d x^2+8 d^2 x^4\right) \operatorname{ArcTan}[a x]}{\left(c+d x^2\right)^{5/2}}+\frac{1}{\left(a^2 c-d\right)^{5/2}}\left(15 a^4 c^2-20 a^2 c d+8 d^2\right) \operatorname{Log}\left[-\frac{60 a c^3 \left(a^2 c-d\right)^{3/2} \left(a c-i d x+\sqrt{a^2 c-d} \sqrt{c+d x^2}\right)}{\left(15 a^4 c^2-20 a^2 c d+8 d^2\right) (i+a x)}\right]+\frac{1}{\left(a^2 c-d\right)^{5/2}}\left(15 a^4 c^2-20 a^2 c d+8 d^2\right) \operatorname{Log}\left[-\frac{60 a c^3 \left(a^2 c-d\right)^{3/2} \left(a c+i d x+\sqrt{a^2 c-d} \sqrt{c+d x^2}\right)}{\left(15 a^4 c^2-20 a^2 c d+8 d^2\right) (-i+a x)}\right]\right)$$

Problem 1227: Result unnecessarily involves imaginary or complex numbers.

$$\int \frac{\operatorname{ArcTan}[a x]}{\left(c+d x^2\right)^{9/2}} \, dx$$

Optimal (type 3, 293 leaves, 8 steps) :

$$-\frac{a}{35 c \left(a^2 c-d\right) \left(c+d x^2\right)^{5/2}}-\frac{a \left(11 a^2 c-6 d\right)}{105 c^2 \left(a^2 c-d\right)^2 \left(c+d x^2\right)^{3/2}}-\frac{a \left(19 a^4 c^2-22 a^2 c d+8 d^2\right)}{35 c^3 \left(a^2 c-d\right)^3 \sqrt{c+d x^2}}+\frac{x \operatorname{ArcTan}[a x]}{7 c \left(c+d x^2\right)^{7/2}}+\frac{6 x \operatorname{ArcTan}[a x]}{35 c^2 \left(c+d x^2\right)^{5/2}}+\frac{8 x \operatorname{ArcTan}[a x]}{35 c^3 \left(c+d x^2\right)^{3/2}}+\frac{16 x \operatorname{ArcTan}[a x]}{35 c^4 \sqrt{c+d x^2}}+\frac{\left(35 a^6 c^3-70 a^4 c^2 d+56 a^2 c d^2-16 d^3\right) \operatorname{ArcTanh}\left[\frac{a \sqrt{c+d x^2}}{\sqrt{a^2 c-d}}\right]}{35 c^4 \left(a^2 c-d\right)^{7/2}}$$

Result (type 3, 450 leaves) :

$$\frac{1}{210\,c^4}\left(-\left(\left(2\,a\,c\,\left(3\,c^2\,\left(-a^2\,c+d\right)^2+c\,\left(11\,a^2\,c-6\,d\right)\,\left(a^2\,c-d\right)\,\left(c+d\,x^2\right)+3\,\left(19\,a^4\,c^2-22\,a^2\,c\,d+8\,d^2\right)\,\left(c+d\,x^2\right)^2\right)\right)\Big/\left(\left(a^2\,c-d\right)^3\,\left(c+d\,x^2\right)^{5/2}\right)\right)+\frac{6\,x\,\left(35\,c^3+70\,c^2\,d\,x^2+56\,c\,d^2\,x^4+16\,d^3\,x^6\right)\,\text{ArcTan}[a\,x]}{\left(c+d\,x^2\right)^{7/2}}+\frac{1}{\left(a^2\,c-d\right)^{7/2}}3\,\left(35\,a^6\,c^3-70\,a^4\,c^2\,d+56\,a^2\,c\,d^2-16\,d^3\right)\,\text{Log}\left[-\frac{140\,a\,c^4\,\left(a^2\,c-d\right)^{5/2}\,\left(a\,c-i\,d\,x+\sqrt{a^2\,c-d}\,\sqrt{c+d\,x^2}\right)}{\left(35\,a^6\,c^3-70\,a^4\,c^2\,d+56\,a^2\,c\,d^2-16\,d^3\right)\,\left(i+a\,x\right)}\right]+\frac{1}{\left(a^2\,c-d\right)^{7/2}}3\,\left(35\,a^6\,c^3-70\,a^4\,c^2\,d+56\,a^2\,c\,d^2-16\,d^3\right)\,\text{Log}\left[-\frac{140\,a\,c^4\,\left(a^2\,c-d\right)^{5/2}\,\left(a\,c+i\,d\,x+\sqrt{a^2\,c-d}\,\sqrt{c+d\,x^2}\right)}{\left(35\,a^6\,c^3-70\,a^4\,c^2\,d+56\,a^2\,c\,d^2-16\,d^3\right)\,\left(-i+a\,x\right)}\right]\right)$$

Problem 1241: Result more than twice size of optimal antiderivative.

$$\int x^{-3-2\,p}\,\left(d+e\,x^2\right)^p\,\left(a+b\,\text{ArcTan}[c\,x]\right)\,dx$$

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

$$-\frac{1}{2\,\left(1+3\,p+2\,p^2\right)}b\,c\,x^{-1-2\,p}\,\left(d+e\,x^2\right)^p\,\left(1+\frac{e\,x^2}{d}\right)^{-p}\,\text{AppellF1}\left[\frac{1}{2}\,\left(-1-2\,p\right),1,-1-p,\frac{1}{2}\,\left(1-2\,p\right),-c^2\,x^2,-\frac{e\,x^2}{d}\right]-\frac{x^{-2\,(1+p)}\,\left(d+e\,x^2\right)^{1+p}\,\left(a+b\,\text{ArcTan}[c\,x]\right)}{2\,d\,\left(1+p\right)}$$

Result (type 6, 566 leaves):

$$-\frac{a\,x^{-2-2p}\left(d+e\,x^2\right)^{1+p}}{2\,d\,(1+p)}+\frac{1}{c}b\,x^{-3-2p}\,(c\,x)^{3+2p}\left(-\left(\left(c^2\,d\,(-1+2\,p)\,(c\,x)^{-1-2p}\left(d+e\,x^2\right)^p \text{AppellF1}\left[-\frac{1}{2}-p,-p,1,\frac{1}{2}-p,-\frac{e\,x^2}{d},-c^2\,x^2\right]\right)\Big/\left(2\,(1+p)\,(1+2\,p)\left(1+c^2\,x^2\right)\left(c^2\,d\,(-1+2\,p)\,\text{AppellF1}\left[-\frac{1}{2}-p,-p,1,\frac{1}{2}-p,-\frac{e\,x^2}{d},-c^2\,x^2\right]+2\,c^2\,x^2\left(-e\,p\,\text{AppellF1}\left[\frac{1}{2}-p,1-p,1,\frac{3}{2}-p,-\frac{e\,x^2}{d},-c^2\,x^2\right]+c^2\,d\,\text{AppellF1}\left[\frac{1}{2}-p,-p,2,\frac{3}{2}-p,-\frac{e\,x^2}{d},-c^2\,x^2\right]\right)\right)\right)\right)-\left(e\,(-3+2\,p)\,(c\,x)^{1-2p}\left(d+e\,x^2\right)^p\text{AppellF1}\left[\frac{1}{2}-p,-p,1,\frac{3}{2}-p,-\frac{e\,x^2}{d},-c^2\,x^2\right]\right)\Big/\left(2\,(1+p)\,(-1+2\,p)\left(1+c^2\,x^2\right)\left(c^2\,d\,(-3+2\,p)\,\text{AppellF1}\left[\frac{1}{2}-p,-p,1,\frac{3}{2}-p,-\frac{e\,x^2}{d},-c^2\,x^2\right]+2\,c^2\,x^2\left(-e\,p\,\text{AppellF1}\left[\frac{3}{2}-p,1-p,1,\frac{5}{2}-p,-\frac{e\,x^2}{d},-c^2\,x^2\right]+c^2\,d\,\text{AppellF1}\left[\frac{3}{2}-p,-p,2,\frac{5}{2}-p,-\frac{e\,x^2}{d},-c^2\,x^2\right]\right)\right)\right)+\left(-\frac{e}{2\,c^2\,d\,(1+p)}-\frac{1}{2\,c^2\,(1+p)\,x^2}\right)(c\,x)^{-2p}\left(d+e\,x^2\right)^p\text{ArcTan}[c\,x]\right)$$

Problem 1243: Result more than twice size of optimal antiderivative.

$$\int x^{-5-2p}\left(d+e\,x^2\right)^p\,(a+b\,\text{ArcTan}[c\,x])\,dx$$

Optimal (type 6, 285 leaves, 8 steps):

$$-\left(\left(b\left(e+c^2\,d\,(1+p)\right)x^{-3-2p}\left(d+e\,x^2\right)^p\left(1+\frac{e\,x^2}{d}\right)^{-p}\text{AppellF1}\left[\frac{1}{2}(-3-2\,p),1,-1-p,\frac{1}{2}(-1-2\,p),-c^2\,x^2,-\frac{e\,x^2}{d}\right]\right)\Big/\left(2\,c\,d\,(1+p)\,(2+p)\,(3+2\,p)\right)\right)+\frac{e\,x^{-2\,(1+p)}\left(d+e\,x^2\right)^{1+p}(a+b\,\text{ArcTan}[c\,x])}{2\,d^2\,(1+p)\,(2+p)}-\frac{x^{-2\,(2+p)}\left(d+e\,x^2\right)^{1+p}(a+b\,\text{ArcTan}[c\,x])}{2\,d\,(2+p)}+\left(b\,e\,x^{-3-2p}\left(d+e\,x^2\right)^p\left(1+\frac{e\,x^2}{d}\right)^{-p}\text{Hypergeometric2F1}\left[\frac{1}{2}(-3-2\,p),-1-p,\frac{1}{2}(-1-2\,p),-\frac{e\,x^2}{d}\right]\right)\Big/\left(2\,c\,d\left(6+13\,p+9\,p^2+2\,p^3\right)\right)$$

Result (type 6, 1108 leaves):

$$\frac{1}{c}b\,x^{-5-2p}\,(c\,x)^{5+2p}$$

$$\Bigg(-\Bigg(\Bigg(c^2 d\,(1+2p)\,(c x)^{-3-2p}\,(d+e x^2)^p\,\text{AppellF1}\Big[-\frac{3}{2}-p,-p,1,-\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]\Bigg)\Big/$$

$$\Bigg(2\,(1+p)\,(2+p)\,(3+2p)\,(1+c^2 x^2)\,\Bigg(c^2 d\,(1+2p)\,\text{AppellF1}\Big[-\frac{3}{2}-p,-p,1,-\frac{1}{2}-p,$$

$$-\frac{e x^2}{d},-c^2 x^2\Big]+2 c^2 x^2\,\Bigg(-e p\,\text{AppellF1}\Big[-\frac{1}{2}-p,1-p,1,\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]+$$

$$c^2 d\,\text{AppellF1}\Big[-\frac{1}{2}-p,-p,2,\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]\Bigg)\Bigg)\Bigg)\Bigg)-$$

$$\Bigg(c^2 d p\,(1+2p)\,(c x)^{-3-2p}\,(d+e x^2)^p\,\text{AppellF1}\Big[-\frac{3}{2}-p,-p,1,-\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]\Bigg)\Big/$$

$$\Bigg(2\,(1+p)\,(2+p)\,(3+2p)\,(1+c^2 x^2)$$

$$\Bigg(c^2 d\,(1+2p)\,\text{AppellF1}\Big[-\frac{3}{2}-p,-p,1,-\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]+$$

$$2 c^2 x^2\,\Bigg(-e p\,\text{AppellF1}\Big[-\frac{1}{2}-p,1-p,1,\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]+$$

$$c^2 d\,\text{AppellF1}\Big[-\frac{1}{2}-p,-p,2,\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]\Bigg)\Bigg)\Bigg)-$$

$$\Bigg(e p\,(-1+2p)\,(c x)^{-1-2p}\,(d+e x^2)^p\,\text{AppellF1}\Big[-\frac{1}{2}-p,-p,1,\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]\Bigg)\Big/$$

$$\Bigg(2\,(1+p)\,(2+p)\,(1+2p)\,(1+c^2 x^2)$$

$$\Bigg(c^2 d\,(-1+2p)\,\text{AppellF1}\Big[-\frac{1}{2}-p,-p,1,\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]+$$

$$2 c^2 x^2\,\Bigg(-e p\,\text{AppellF1}\Big[\frac{1}{2}-p,1-p,1,\frac{3}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]+$$

$$c^2 d\,\text{AppellF1}\Big[\frac{1}{2}-p,-p,2,\frac{3}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]\Bigg)\Bigg)\Bigg)+$$

$$\Bigg(e^2\,(-3+2p)\,(c x)^{1-2p}\,(d+e x^2)^p\,\text{AppellF1}\Big[\frac{1}{2}-p,-p,1,\frac{3}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]\Bigg)\Big/$$

$$\Bigg(2 c^2 d\,(1+p)\,(2+p)\,(-1+2p)\,(1+c^2 x^2)$$

$$\Bigg(c^2 d\,(-3+2p)\,\text{AppellF1}\Big[\frac{1}{2}-p,-p,1,\frac{3}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]+$$

$$2 c^2 x^2\,\Bigg(-e p\,\text{AppellF1}\Big[\frac{3}{2}-p,1-p,1,\frac{5}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]+$$

$$c^2 d\,\text{AppellF1}\Big[\frac{3}{2}-p,-p,2,\frac{5}{2}-p,-\frac{e x^2}{d},-c^2 x^2\Big]\Bigg)\Bigg)\Bigg)-$$

$$\Big((c x)^{-2\,(2+p)}\,(d+e x^2)^p\,\big(c^2 d\,(1+p)-c^2 e x^2\big)\,\big(c^2 d+c^2 e x^2\big)\,\text{ArcTan}[c x]\Big)\Big/$$

$$\Big(2 c^4 d^2\,(1+p)\,(2+p)\Big)\Bigg)-$$

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

$$\text{Hypergeometric2F1}\left[-2-p,-p,-1-p,-\frac{e x^2}{d}\right]$$

Problem 1245: Result more than twice size of optimal antiderivative.

$$\int x^{-7-2p}\left(d+e x^2\right)^p (a+b\,\text{ArcTan}[c x])\,dx$$

Optimal (type 6, 466 leaves, 10 steps):

$$-\left(\left(b\left(2 e^2+2 c^2 d e (1+p)+c^4 d^2\left(2+3 p+p^2\right)\right) x^{-5-2p}\left(d+e x^2\right)^p\left(1+\frac{e x^2}{d}\right)^{-p} \text{AppellF1}\left[\frac{1}{2}(-5-2p),1,-1-p,\frac{1}{2}(-3-2p),-c^2 x^2,-\frac{e x^2}{d}\right]\right)\Big/\left(2 c^3 d^2 (1+p)(2+p)(3+p)(5+2p)\right)\right)-\frac{e^2 x^{-2(1+p)}\left(d+e x^2\right)^{1+p}(a+b\,\text{ArcTan}[c x])}{d^3 (1+p)(2+p)(3+p)}+\frac{e x^{-2(2+p)}\left(d+e x^2\right)^{1+p}(a+b\,\text{ArcTan}[c x])}{d^2 (2+p)(3+p)}-\frac{x^{-2(3+p)}\left(d+e x^2\right)^{1+p}(a+b\,\text{ArcTan}[c x])}{2 d (3+p)}+\left(b e\left(e+c^2 d (1+p)\right) x^{-5-2p}\left(d+e x^2\right)^p\left(1+\frac{e x^2}{d}\right)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}(-5-2p),-1-p,\frac{1}{2}(-3-2p),-\frac{e x^2}{d}\right]\right)\Big/\left(c^3 d^2 (1+p)(2+p)(3+p)(5+2p)\right)-\left(b e^2 x^{-3-2p}\left(d+e x^2\right)^p\left(1+\frac{e x^2}{d}\right)^{-p} \text{Hypergeometric2F1}\left[\frac{1}{2}(-3-2p),-1-p,\frac{1}{2}(-1-2p),-\frac{e x^2}{d}\right]\right)\Big/\left(c d^2 (1+p)(2+p)(3+p)(3+2p)\right)$$

Result (type 6, 1880 leaves):

$$\frac{1}{c} b x^{-7-2p}(c x)^{7+2p}\left(-\left(\left(c^2 d (3+2p)(c x)^{-5-2p}\left(d+e x^2\right)^p \text{AppellF1}\left[-\frac{5}{2}-p,-p,1,-\frac{3}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]\right)\Big/\left((1+p)(2+p)(3+p)(5+2p)\left(1+c^2 x^2\right)\left(c^2 d (3+2p) \text{AppellF1}\left[-\frac{5}{2}-p,-p,1,-\frac{3}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]+2 c^2 x^2\left(-e p\,\text{AppellF1}\left[-\frac{3}{2}-p,1-p,1,-\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]+c^2 d\,\text{AppellF1}\left[-\frac{3}{2}-p,-p,2,-\frac{1}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]\right)\right)\right)\right)-\left(3 c^2 d p (3+2p)(c x)^{-5-2p}\left(d+e x^2\right)^p \text{AppellF1}\left[-\frac{5}{2}-p,-p,1,-\frac{3}{2}-p,-\frac{e x^2}{d},-c^2 x^2\right]\right)\Big/\left(2 (1+p)(2+p)(3+p)(5+2p)\left(1+c^2 x^2\right)\right.$$

$$\left(c^2 d \left(3+2 p\right) \text{AppellF1}\left[-\frac{5}{2}-p, -p, 1, -\frac{3}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right] + 2 c^2 x^2 \left(-e p \text{AppellF1}\left[-\frac{3}{2}-p, 1-p, 1, -\frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right] + c^2 d \text{AppellF1}\left[-\frac{3}{2}-p, -p, 2, -\frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right]\right)\right)\Bigg) -$$

$$\left(c^2 d p^2 \left(3+2 p\right) (c x)^{-5-2 p} \left(d+e x^2\right)^p \text{AppellF1}\left[-\frac{5}{2}-p, -p, 1, -\frac{3}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right]\right) \Bigg/ \left(2 \left(1+p\right) \left(2+p\right) \left(3+p\right) \left(5+2 p\right) \left(1+c^2 x^2\right) \left(c^2 d \left(3+2 p\right) \text{AppellF1}\left[-\frac{5}{2}-p, -p, 1, -\frac{3}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right] + 2 c^2 x^2 \left(-e p \text{AppellF1}\left[-\frac{3}{2}-p, 1-p, 1, -\frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right] + c^2 d \text{AppellF1}\left[-\frac{3}{2}-p, -p, 2, -\frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right]\right)\right)\right) -$$

$$\left(e p \left(1+2 p\right) (c x)^{-3-2 p} \left(d+e x^2\right)^p \text{AppellF1}\left[-\frac{3}{2}-p, -p, 1, -\frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right]\right) \Bigg/ \left(2 \left(1+p\right) \left(2+p\right) \left(3+p\right) \left(3+2 p\right) \left(1+c^2 x^2\right) \left(c^2 d \left(1+2 p\right) \text{AppellF1}\left[-\frac{3}{2}-p, -p, 1, -\frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right] + 2 c^2 x^2 \left(-e p \text{AppellF1}\left[-\frac{1}{2}-p, 1-p, 1, \frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right] + c^2 d \text{AppellF1}\left[-\frac{1}{2}-p, -p, 2, \frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right]\right)\right)\right) -$$

$$\left(e p^2 \left(1+2 p\right) (c x)^{-3-2 p} \left(d+e x^2\right)^p \text{AppellF1}\left[-\frac{3}{2}-p, -p, 1, -\frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right]\right) \Bigg/ \left(2 \left(1+p\right) \left(2+p\right) \left(3+p\right) \left(3+2 p\right) \left(1+c^2 x^2\right) \left(c^2 d \left(1+2 p\right) \text{AppellF1}\left[-\frac{3}{2}-p, -p, 1, -\frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right] + 2 c^2 x^2 \left(-e p \text{AppellF1}\left[-\frac{1}{2}-p, 1-p, 1, \frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right] + c^2 d \text{AppellF1}\left[-\frac{1}{2}-p, -p, 2, \frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right]\right)\right)\right) +$$

$$\left(e^2 p \left(-1+2 p\right) (c x)^{-1-2 p} \left(d+e x^2\right)^p \text{AppellF1}\left[-\frac{1}{2}-p, -p, 1, \frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right]\right) \Bigg/ \left(c^2 d \left(1+p\right) \left(2+p\right) \left(3+p\right) \left(1+2 p\right) \left(1+c^2 x^2\right) \left(c^2 d \left(-1+2 p\right) \text{AppellF1}\left[-\frac{1}{2}-p, -p, 1, \frac{1}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right] +\right.\right.$$

$$2 c^2 x^2 \left(-e\, p\, \text{AppellF1}\left[\frac{1}{2}-p, 1-p, 1, \frac{3}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right] + c^2 d\, \text{AppellF1}\left[\frac{1}{2}-p, -p, 2, \frac{3}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right]\right)\Bigg)\Bigg) -$$

$$\left(e^3 (-3+2p) (c x)^{1-2p} \left(d+e x^2\right)^p \text{AppellF1}\left[\frac{1}{2}-p, -p, 1, \frac{3}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right]\right) \Big/ \left(c^4 d^2 (1+p)(2+p)(3+p)(-1+2p)\left(1+c^2 x^2\right)\right.$$

$$\left(c^2 d (-3+2p)\, \text{AppellF1}\left[\frac{1}{2}-p, -p, 1, \frac{3}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right] + 2 c^2 x^2 \left(-e\, p\, \text{AppellF1}\left[\frac{3}{2}-p, 1-p, 1, \frac{5}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right] + c^2 d\, \text{AppellF1}\left[\frac{3}{2}-p, -p, 2, \frac{5}{2}-p, -\frac{e x^2}{d}, -c^2 x^2\right]\right)\right)\Bigg) -$$

$$\left((c x)^{-2(3+p)} \left(d+e x^2\right)^p \left(c^2 d + c^2 e x^2\right)\left(c^4 d^2 \left(2+3p+p^2\right) - 2 c^4 d e (1+p) x^2 + 2 c^4 e^2 x^4\right) \text{ArcTan}[c x]\right) \Big/ \left(2 c^6 d^3 (1+p)(2+p)(3+p)\right)\Bigg) -$$

$$\frac{1}{2(3+p)} a\, x^{-6-2p} \left(d+e x^2\right)^p \left(1+\frac{e x^2}{d}\right)^{-p} \text{Hypergeometric2F1}\left[-3-p, -p, -2-p, -\frac{e x^2}{d}\right]$$

Problem 1261: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 590 leaves, 11 steps):

$$-\frac{a\,b\,x}{c\,e}-\frac{b^2\,x\,\text{ArcTan}[c\,x]}{c\,e}+\frac{(a+b\,\text{ArcTan}[c\,x])^2}{2\,c^2\,e}+\frac{x^2\,(a+b\,\text{ArcTan}[c\,x])^2}{2\,e}+$$

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

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

$$\frac{b^2\,\text{Log}\left[1+c^2\,x^2\right]}{2\,c^2\,e}-\frac{i\,b\,d\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2}{1-i\,c\,x}\right]}{e^2}+$$

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

$$\frac{i\,b\,d\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2\,c\,\left(\sqrt{-d}+\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}+i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{2\,e^2}+\frac{b^2\,d\,\text{PolyLog}\left[3,1-\frac{2}{1-i\,c\,x}\right]}{2\,e^2}-$$

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

Result (type 4, 1567 leaves):

$$\frac{1}{4\,e^2}\left(2\,a^2\,e\,x^2-2\,a^2\,d\,\text{Log}\left[d+e\,x^2\right]+\right.$$

$$4\,a\,b\left(-\frac{e\,x}{c}-i\,d\,\text{ArcTan}[c\,x]^2+\text{ArcTan}[c\,x]\left(e\left(\frac{1}{c^2}+x^2\right)+2\,d\,\text{Log}\left[1+e^{2\,i\,\text{ArcTan}[c\,x]}\right]\right)-\right.$$

$$\left.i\,d\,\text{PolyLog}\left[2,-e^{2\,i\,\text{ArcTan}[c\,x]}\right]\right)+\frac{1}{2\,c^2\,d-2\,e}\,2\,d\left(-c^2\,d+e\right)\left(-i\,\text{ArcTan}[c\,x]^2+\right.$$

$$2\,i\,\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]\text{ArcTan}\left[\frac{c\,e\,x}{\sqrt{c^2\,d\,e}}\right]+\left(-\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]+\text{ArcTan}[c\,x]\right)$$

$$\text{Log}\left[1+\frac{\left(c^2\,d+e+2\,\sqrt{c^2\,d\,e}\right)\,e^{2\,i\,\text{ArcTan}[c\,x]}}{c^2\,d-e}\right]+\left(\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]+\text{ArcTan}[c\,x]\right)\text{Log}\left[\right.$$

$$\left.\frac{1}{c^2\,d-e}\left(-2\,\sqrt{c^2\,d\,e}\,e^{2\,i\,\text{ArcTan}[c\,x]}+e\left(-1+e^{2\,i\,\text{ArcTan}[c\,x]}\right)+c^2\,d\left(1+e^{2\,i\,\text{ArcTan}[c\,x]}\right)\right)\right]-$$

$$\frac{1}{2}\,i\left(\text{PolyLog}\left[2,-\frac{\left(c^2\,d+e-2\,\sqrt{c^2\,d\,e}\right)\,e^{2\,i\,\text{ArcTan}[c\,x]}}{c^2\,d-e}\right]+\right.$$

$$\text{PolyLog}\left[2,-\frac{\left(c^2 d+e+2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d-e}\right]\Bigg)\Bigg)\Bigg)+$$

$$\frac{1}{c^2} b^2 \Bigg(-4 c e x \text{ArcTan}[c x]+2 e \text{ArcTan}[c x]^2+2 c^2 e x^2 \text{ArcTan}[c x]^2+$$

$$4 c^2 d \text{ArcTan}[c x]^2 \text{Log}\left[1+e^{2 i \text{ArcTan}[c x]}\right]-$$

$$2 c^2 d \text{ArcTan}[c x]^2 \text{Log}\left[1+\frac{\left(c\sqrt{d}-\sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c\sqrt{d}+\sqrt{e}}\right]-$$

$$2 c^2 d \text{ArcTan}[c x]^2 \text{Log}\left[1+\frac{\left(c\sqrt{d}+\sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c\sqrt{d}-\sqrt{e}}\right]+$$

$$2 c^2 d \text{ArcTan}[c x]^2 \text{Log}\left[1+\frac{\left(c^2 d+e-2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d-e}\right]+$$

$$4 c^2 d \text{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d-e}}\right] \text{ArcTan}[c x] \text{Log}\left[1+\frac{\left(c^2 d+e+2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d-e}\right]-$$

$$2 c^2 d \text{ArcTan}[c x]^2 \text{Log}\left[1+\frac{\left(c^2 d+e+2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d-e}\right]-$$

$$4 c^2 d \text{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d-e}}\right] \text{ArcTan}[c x] \text{Log}\left[\frac{1}{c^2 d-e}\left(-2\sqrt{c^2 d e}\, e^{2 i \text{ArcTan}[c x]}+\right.\right.$$

$$\left.\left. e\left(-1+e^{2 i \text{ArcTan}[c x]}\right)+c^2 d\left(1+e^{2 i \text{ArcTan}[c x]}\right)\right)\right]-4 c^2 d \text{ArcTan}[c x]^2$$

$$\text{Log}\left[\frac{1}{c^2 d-e}\left(-2\sqrt{c^2 d e}\, e^{2 i \text{ArcTan}[c x]}+e\left(-1+e^{2 i \text{ArcTan}[c x]}\right)+c^2 d\left(1+e^{2 i \text{ArcTan}[c x]}\right)\right)\right]+$$

$$4 c^2 d \text{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d-e}}\right] \text{ArcTan}[c x] \text{Log}\left[\frac{2 i c^2 d-2 i\sqrt{c^2 d e}+2 c\left(-e+\sqrt{c^2 d e}\right) x}{\left(c^2 d-e\right)(i+c x)}\right]+$$

$$2 c^2 d \text{ArcTan}[c x]^2 \text{Log}\left[\frac{2 i c^2 d-2 i\sqrt{c^2 d e}+2 c\left(-e+\sqrt{c^2 d e}\right) x}{\left(c^2 d-e\right)(i+c x)}\right]+$$

$$2 e \text{Log}\left[1+c^2 x^2\right]-4 c^2 d \text{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d-e}}\right] \text{ArcTan}[c x]$$

$$\text{Log}\left[1+\frac{1}{c^2 d-e}\left(c^2 d+e+2\sqrt{c^2 d e}\right)\left(\text{Cos}[2 \text{ArcTan}[c x]]+i \text{Sin}[2 \text{ArcTan}[c x]]\right)\right]+2$$

$$c^2 d \text{ArcTan}[c x]^2$$

$$\text{Log}\left[1+\frac{1}{c^2 d-e}\left(c^2 d+e+2\sqrt{c^2 d e}\right)\left(\text{Cos}[2 \text{ArcTan}[c x]]+i \text{Sin}[2 \text{ArcTan}[c x]]\right)\right]-$$

$$4 i c^2 d \text{ArcTan}[c x] \text{PolyLog}\left[2,-e^{2 i \text{ArcTan}[c x]}\right]+$$

$$2\,i\,c^2\,d\,\text{ArcTan}[c\,x]\,\text{PolyLog}\left[2,\frac{\left(-c\sqrt{d}+\sqrt{e}\right)e^{2\,i\,\text{ArcTan}[c\,x]}}{c\sqrt{d}+\sqrt{e}}\right]+$$
$$2\,i\,c^2\,d\,\text{ArcTan}[c\,x]\,\text{PolyLog}\left[2,-\frac{\left(c\sqrt{d}+\sqrt{e}\right)e^{2\,i\,\text{ArcTan}[c\,x]}}{c\sqrt{d}-\sqrt{e}}\right]+$$
$$2\,c^2\,d\,\text{PolyLog}\left[3,-e^{2\,i\,\text{ArcTan}[c\,x]}\right]-c^2\,d\,\text{PolyLog}\left[3,\frac{\left(-c\sqrt{d}+\sqrt{e}\right)e^{2\,i\,\text{ArcTan}[c\,x]}}{c\sqrt{d}+\sqrt{e}}\right]-$$
$$\left.\left.c^2\,d\,\text{PolyLog}\left[3,-\frac{\left(c\sqrt{d}+\sqrt{e}\right)e^{2\,i\,\text{ArcTan}[c\,x]}}{c\sqrt{d}-\sqrt{e}}\right]\right)\right)$$

Problem 1262: Unable to integrate problem.

$$\int\frac{x^2\,(a+b\,\text{ArcTan}[c\,x])^2}{d+e\,x^2}\,dx$$

Optimal (type 4, 554 leaves, 10 steps):

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

Result (type 8, 25 leaves):

$$\int\frac{x^2\,(a+b\,\text{ArcTan}[c\,x])^2}{d+e\,x^2}\,dx$$

Problem 1263: Result more than twice size of optimal antiderivative.

$$\int \frac{x\,(a+b\,\text{ArcTan}[c\,x])^2}{d+e\,x^2}\,dx$$

Optimal (type 4, 492 leaves, 4 steps):

$$-\frac{(a+b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2}{1-i\,c\,x}\right]}{e}+\frac{(a+b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2\,c\,\left(\sqrt{-d}-\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}-i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{2\,e}+\frac{(a+b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2\,c\,\left(\sqrt{-d}+\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}+i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{2\,e}+\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2}{1-i\,c\,x}\right]}{e}-\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2\,c\,\left(\sqrt{-d}-\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}-i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{2\,e}-\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2\,c\,\left(\sqrt{-d}+\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}+i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{2\,e}-\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2}{1-i\,c\,x}\right]}{2\,e}+\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2\,c\,\left(\sqrt{-d}-\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}-i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{4\,e}+\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2\,c\,\left(\sqrt{-d}+\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}+i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{4\,e}$$

Result (type 4, 1527 leaves):

$$\frac{1}{4\,e}\left(8\,i\,a\,b\,\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]\,\text{ArcTan}\left[\frac{c\,e\,x}{\sqrt{c^2\,d\,e}}\right]-8\,a\,b\,\text{ArcTan}[c\,x]\,\text{Log}\left[1+e^{2\,i\,\text{ArcTan}[c\,x]}\right]-\right.$$
$$4\,b^2\,\text{ArcTan}[c\,x]^2\,\text{Log}\left[1+e^{2\,i\,\text{ArcTan}[c\,x]}\right]+2\,b^2\,\text{ArcTan}[c\,x]^2\,\text{Log}\left[1+\frac{\left(c\,\sqrt{d}-\sqrt{e}\right)\,e^{2\,i\,\text{ArcTan}[c\,x]}}{c\,\sqrt{d}+\sqrt{e}}\right]+$$
$$2\,b^2\,\text{ArcTan}[c\,x]^2\,\text{Log}\left[1+\frac{\left(c\,\sqrt{d}+\sqrt{e}\right)\,e^{2\,i\,\text{ArcTan}[c\,x]}}{c\,\sqrt{d}-\sqrt{e}}\right]-$$
$$2\,b^2\,\text{ArcTan}[c\,x]^2\,\text{Log}\left[1+\frac{\left(c^2\,d+e-2\,\sqrt{c^2\,d\,e}\right)\,e^{2\,i\,\text{ArcTan}[c\,x]}}{c^2\,d-e}\right]-$$
$$4\,a\,b\,\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]\,\text{Log}\left[1+\frac{\left(c^2\,d+e+2\,\sqrt{c^2\,d\,e}\right)\,e^{2\,i\,\text{ArcTan}[c\,x]}}{c^2\,d-e}\right]+$$
$$4\,a\,b\,\text{ArcTan}[c\,x]\,\text{Log}\left[1+\frac{\left(c^2\,d+e+2\,\sqrt{c^2\,d\,e}\right)\,e^{2\,i\,\text{ArcTan}[c\,x]}}{c^2\,d-e}\right]-$$
$$4\,b^2\,\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]\,\text{ArcTan}[c\,x]\,\text{Log}\left[1+\frac{\left(c^2\,d+e+2\,\sqrt{c^2\,d\,e}\right)\,e^{2\,i\,\text{ArcTan}[c\,x]}}{c^2\,d-e}\right]+$$

$$2 b^2 \text{ArcTan}[c x]^2 \text{Log}\left[1+\frac{\left(c^2 d+e+2 \sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d-e}\right]+$$

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

$$\text{Log}\left[\frac{1}{c^2 d-e}\left(-2 \sqrt{c^2 d e}\, e^{2 i \text{ArcTan}[c x]}+e\left(-1+e^{2 i \text{ArcTan}[c x]}\right)+c^2 d\left(1+e^{2 i \text{ArcTan}[c x]}\right)\right)\right]+$$

$$4 b^2 \text{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d-e}}\right] \text{ArcTan}[c x] \text{Log}\left[\frac{1}{c^2 d-e}\left(-2 \sqrt{c^2 d e}\, e^{2 i \text{ArcTan}[c x]}+e\left(-1+e^{2 i \text{ArcTan}[c x]}\right)+c^2 d\left(1+e^{2 i \text{ArcTan}[c x]}\right)\right)\right]+4 b^2 \text{ArcTan}[c x]^2$$

$$\text{Log}\left[\frac{1}{c^2 d-e}\left(-2 \sqrt{c^2 d e}\, e^{2 i \text{ArcTan}[c x]}+e\left(-1+e^{2 i \text{ArcTan}[c x]}\right)+c^2 d\left(1+e^{2 i \text{ArcTan}[c x]}\right)\right)\right]-$$

$$4 b^2 \text{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d-e}}\right] \text{ArcTan}[c x] \text{Log}\left[\frac{2 i c^2 d-2 i \sqrt{c^2 d e}+2 c\left(-e+\sqrt{c^2 d e}\right) x}{\left(c^2 d-e\right)(i+c x)}\right]-$$

$$2 b^2 \text{ArcTan}[c x]^2 \text{Log}\left[\frac{2 i c^2 d-2 i \sqrt{c^2 d e}+2 c\left(-e+\sqrt{c^2 d e}\right) x}{\left(c^2 d-e\right)(i+c x)}\right]+$$

$$2 a^2 \text{Log}\left[d+e x^2\right]+4 b^2 \text{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d-e}}\right] \text{ArcTan}[c x] \text{Log}\left[1+\frac{1}{c^2 d-e}\left(c^2 d+e+2 \sqrt{c^2 d e}\right)(\text{Cos}[2 \text{ArcTan}[c x]]+i \text{Sin}[2 \text{ArcTan}[c x]])\right]-2 b^2 \text{ArcTan}[c x]^2$$

$$\text{Log}\left[1+\frac{1}{c^2 d-e}\left(c^2 d+e+2 \sqrt{c^2 d e}\right)(\text{Cos}[2 \text{ArcTan}[c x]]+i \text{Sin}[2 \text{ArcTan}[c x]])\right]+$$

$$4 i b (a+b \text{ArcTan}[c x]) \text{PolyLog}\left[2,-e^{2 i \text{ArcTan}[c x]}\right]-$$

$$2 i b^2 \text{ArcTan}[c x] \text{PolyLog}\left[2, \frac{\left(-c \sqrt{d}+\sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c \sqrt{d}+\sqrt{e}}\right]-$$

$$2 i b^2 \text{ArcTan}[c x] \text{PolyLog}\left[2,-\frac{\left(c \sqrt{d}+\sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c \sqrt{d}-\sqrt{e}}\right]-$$

$$2 i a b \text{PolyLog}\left[2,-\frac{\left(c^2 d+e-2 \sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d-e}\right]-$$

$$2 i a b \text{PolyLog}\left[2,-\frac{\left(c^2 d+e+2 \sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d-e}\right]-2 b^2 \text{PolyLog}\left[3,-e^{2 i \text{ArcTan}[c x]}\right]+$$

$$\left.b^2 \text{PolyLog}\left[3, \frac{\left(-c \sqrt{d}+\sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c \sqrt{d}+\sqrt{e}}\right]+b^2 \text{PolyLog}\left[3,-\frac{\left(c \sqrt{d}+\sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c \sqrt{d}-\sqrt{e}}\right]\right)$$

Problem 1264: Unable to integrate problem.

$$\int \frac{(a+b\,\text{ArcTan}[c\,x])^2}{d+e\,x^2}\,dx$$

Optimal (type 4, 460 leaves, 4 steps):

$$\frac{(a+b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2\,c\,\left(\sqrt{-d}-\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}-i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{2\,\sqrt{-d}\,\sqrt{e}}-\frac{(a+b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2\,c\,\left(\sqrt{-d}+\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}+i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{2\,\sqrt{-d}\,\sqrt{e}}-$$
$$\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,\,1-\frac{2\,c\,\left(\sqrt{-d}-\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}-i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{2\,\sqrt{-d}\,\sqrt{e}}+$$
$$\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,\,1-\frac{2\,c\,\left(\sqrt{-d}+\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}+i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{2\,\sqrt{-d}\,\sqrt{e}}+$$
$$\frac{b^2\,\text{PolyLog}\left[3,\,1-\frac{2\,c\,\left(\sqrt{-d}-\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}-i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{4\,\sqrt{-d}\,\sqrt{e}}-\frac{b^2\,\text{PolyLog}\left[3,\,1-\frac{2\,c\,\left(\sqrt{-d}+\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}+i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{4\,\sqrt{-d}\,\sqrt{e}}$$

Result (type 8, 22 leaves):

$$\int \frac{(a+b\,\text{ArcTan}[c\,x])^2}{d+e\,x^2}\,dx$$

Problem 1265: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 637 leaves, 12 steps):

$$\frac{2\,(a+b\,\text{ArcTan}[c\,x])^2\,\text{ArcTanh}\left[1-\frac{2}{1+i\,c\,x}\right]}{d}+$$

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

$$\frac{(a+b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2\,c\,\left(\sqrt{-d}+\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}+i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{2\,d}-\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2}{1-i\,c\,x}\right]}{d}-$$

$$\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2}{1+i\,c\,x}\right]}{d}+\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,-1+\frac{2}{1+i\,c\,x}\right]}{d}+$$

$$\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2\,c\,\left(\sqrt{-d}-\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}-i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{2\,d}+$$

$$\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2\,c\,\left(\sqrt{-d}+\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}+i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{2\,d}+$$

$$\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2}{1-i\,c\,x}\right]}{2\,d}-\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2}{1+i\,c\,x}\right]}{2\,d}+\frac{b^2\,\text{PolyLog}\left[3,-1+\frac{2}{1+i\,c\,x}\right]}{2\,d}-$$

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

Result (type 4, 1410 leaves):

$$\frac{1}{24\,d}\left(24\,a^2\,\text{Log}[x]-12\,a^2\,\text{Log}\left[d+e\,x^2\right]-\right.$$

$$24\,a\,b\left(-i\,\text{ArcTan}[c\,x]^2+2\,i\,\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]\,\text{ArcTan}\left[\frac{c\,e\,x}{\sqrt{c^2\,d\,e}}\right]-\right.$$

$$2\,\text{ArcTan}[c\,x]\,\text{Log}\left[1-e^{2\,i\,\text{ArcTan}[c\,x]}\right]+\left(-\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]+\text{ArcTan}[c\,x]\right)$$

$$\text{Log}\left[1+\frac{\left(c^2\,d+e+2\,\sqrt{c^2\,d\,e}\right)\,e^{2\,i\,\text{ArcTan}[c\,x]}}{c^2\,d-e}\right]+\left(\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]+\text{ArcTan}[c\,x]\right)$$

$$\text{Log}\left[\frac{1}{c^2\,d-e}\left(-2\,\sqrt{c^2\,d\,e}\,e^{2\,i\,\text{ArcTan}[c\,x]}+e\,\left(-1+e^{2\,i\,\text{ArcTan}[c\,x]}\right)+c^2\,d\,\left(1+e^{2\,i\,\text{ArcTan}[c\,x]}\right)\right)\right]+$$

$$i\,\left(\text{ArcTan}[c\,x]^2+\text{PolyLog}\left[2,e^{2\,i\,\text{ArcTan}[c\,x]}\right]\right)-$$

$$\frac{1}{2} i \left(\text{PolyLog}\left[2, -\frac{\left(c^2 d + e - 2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d - e}\right] + \text{PolyLog}\left[2, -\frac{\left(c^2 d + e + 2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d - e}\right]\right)\Bigg) +$$

$$b^2 \Bigg(-i \pi^3 + 16 i \text{ArcTan}[c x]^3 + 24 \text{ArcTan}[c x]^2 \text{Log}\left[1 - e^{-2 i \text{ArcTan}[c x]}\right] - 12 \text{ArcTan}[c x]^2$$

$$\text{Log}\left[1 + \frac{\left(c\sqrt{d} - \sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c\sqrt{d} + \sqrt{e}}\right] - 12 \text{ArcTan}[c x]^2 \text{Log}\left[1 + \frac{\left(c\sqrt{d} + \sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c\sqrt{d} - \sqrt{e}}\right] +$$

$$12 \text{ArcTan}[c x]^2 \text{Log}\left[1 + \frac{\left(c^2 d + e - 2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d - e}\right] +$$

$$24 \text{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d - e}}\right] \text{ArcTan}[c x] \text{Log}\left[1 + \frac{\left(c^2 d + e + 2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d - e}\right] -$$

$$12 \text{ArcTan}[c x]^2 \text{Log}\left[1 + \frac{\left(c^2 d + e + 2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d - e}\right] -$$

$$24 \text{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d - e}}\right] \text{ArcTan}[c x] \text{Log}\left[\frac{1}{c^2 d - e}\left(-2\sqrt{c^2 d e}\, e^{2 i \text{ArcTan}[c x]} + e\left(-1 + e^{2 i \text{ArcTan}[c x]}\right) + c^2 d\left(1 + e^{2 i \text{ArcTan}[c x]}\right)\right)\right] - 24 \text{ArcTan}[c x]^2$$

$$\text{Log}\left[\frac{1}{c^2 d - e}\left(-2\sqrt{c^2 d e}\, e^{2 i \text{ArcTan}[c x]} + e\left(-1 + e^{2 i \text{ArcTan}[c x]}\right) + c^2 d\left(1 + e^{2 i \text{ArcTan}[c x]}\right)\right)\right] +$$

$$24 \text{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d - e}}\right] \text{ArcTan}[c x] \text{Log}\left[\frac{2 i c^2 d - 2 i \sqrt{c^2 d e} + 2 c\left(-e + \sqrt{c^2 d e}\right) x}{\left(c^2 d - e\right)(i + c x)}\right] +$$

$$12 \text{ArcTan}[c x]^2 \text{Log}\left[\frac{2 i c^2 d - 2 i \sqrt{c^2 d e} + 2 c\left(-e + \sqrt{c^2 d e}\right) x}{\left(c^2 d - e\right)(i + c x)}\right] -$$

$$24 \text{ArcSin}\left[\sqrt{\frac{c^2 d}{c^2 d - e}}\right] \text{ArcTan}[c x] \text{Log}\left[1 + \frac{1}{c^2 d - e}\left(c^2 d + e + 2\sqrt{c^2 d e}\right)\left(\text{Cos}[2 \text{ArcTan}[c x]] + i \text{Sin}[2 \text{ArcTan}[c x]]\right)\right] + 12 \text{ArcTan}[c x]^2$$

$$\text{Log}\left[1 + \frac{1}{c^2 d - e}\left(c^2 d + e + 2\sqrt{c^2 d e}\right)\left(\text{Cos}[2 \text{ArcTan}[c x]] + i \text{Sin}[2 \text{ArcTan}[c x]]\right)\right] +$$

$$24 i \text{ArcTan}[c x] \text{PolyLog}\left[2, e^{-2 i \text{ArcTan}[c x]}\right] +$$

$$12 i \text{ArcTan}[c x] \text{PolyLog}\left[2, \frac{\left(-c\sqrt{d} + \sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c\sqrt{d} + \sqrt{e}}\right] +$$

$$12\, i\, \text{ArcTan}[c x]\, \text{PolyLog}\left[2, -\frac{\left(c\sqrt{d}+\sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c\sqrt{d}-\sqrt{e}}\right] + 12\, \text{PolyLog}\left[3, e^{-2 i \text{ArcTan}[c x]}\right] - 6\, \text{PolyLog}\left[3, \frac{\left(-c\sqrt{d}+\sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c\sqrt{d}+\sqrt{e}}\right] - 6\, \text{PolyLog}\left[3, -\frac{\left(c\sqrt{d}+\sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c\sqrt{d}-\sqrt{e}}\right]\Bigg)\Bigg)$$

Problem 1266: Unable to integrate problem.

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

Optimal (type 4, 553 leaves, 9 steps):

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

Result (type 8, 25 leaves):

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

Problem 1267: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 745 leaves, 21 steps):

$$-\frac{b\,c\,(a+b\,\text{ArcTan}[c\,x])}{d\,x}-\frac{c^2\,(a+b\,\text{ArcTan}[c\,x])^2}{2\,d}-\frac{(a+b\,\text{ArcTan}[c\,x])^2}{2\,d\,x^2}-\frac{2\,e\,(a+b\,\text{ArcTan}[c\,x])^2\,\text{ArcTanh}\left[1-\frac{2}{1+i\,c\,x}\right]}{d^2}+\frac{b^2\,c^2\,\text{Log}[x]}{d}-$$

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

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

$$\frac{i\,b\,e\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2}{1-i\,c\,x}\right]}{d^2}+\frac{i\,b\,e\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2}{1+i\,c\,x}\right]}{d^2}-$$

$$\frac{i\,b\,e\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,-1+\frac{2}{1+i\,c\,x}\right]}{d^2}-$$

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

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

$$\frac{b^2\,e\,\text{PolyLog}\left[3,1-\frac{2}{1-i\,c\,x}\right]}{2\,d^2}+\frac{b^2\,e\,\text{PolyLog}\left[3,1-\frac{2}{1+i\,c\,x}\right]}{2\,d^2}-\frac{b^2\,e\,\text{PolyLog}\left[3,-1+\frac{2}{1+i\,c\,x}\right]}{2\,d^2}+$$

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

Result (type 4, 1555 leaves):

$$-\frac{1}{24\,d^2}\left(\frac{12\,a^2\,d}{x^2}+\frac{24\,a\,b\,c\,d}{x}+\frac{24\,a\,b\,d\,\left(1+c^2\,x^2\right)\,\text{ArcTan}[c\,x]}{x^2}+24\,a^2\,e\,\text{Log}[x]-12\,a^2\,e\,\text{Log}\left[d+e\,x^2\right]-\right.$$

$$24\,i\,a\,b\,e\,\left(\text{ArcTan}[c\,x]\,\left(\text{ArcTan}[c\,x]+2\,i\,\text{Log}\left[1-e^{2\,i\,\text{ArcTan}[c\,x]}\right]\right)+\text{PolyLog}\left[2,e^{2\,i\,\text{ArcTan}[c\,x]}\right]\right)-$$

$$\frac{1}{2\,c^2\,d-2\,e}48\,a\,b\,\left(c^2\,d-e\right)\,e\,\left(-i\,\text{ArcTan}[c\,x]^2+2\,i\,\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]\,\text{ArcTan}\left[\frac{c\,e\,x}{\sqrt{c^2\,d\,e}}\right]+\right.$$

$$\left(-\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]+\text{ArcTan}[c\,x]\right)\,\text{Log}\left[1+\frac{\left(c^2\,d+e+2\,\sqrt{c^2\,d\,e}\right)\,e^{2\,i\,\text{ArcTan}[c\,x]}}{c^2\,d-e}\right]+$$

$$\left(\text{ArcSin}\left[\sqrt{\frac{c^2\,d}{c^2\,d-e}}\right]+\text{ArcTan}[c\,x]\right)$$

$$\text{Log}\Big[\frac{1}{c^2 d-e}\Big(-2\sqrt{c^2 d e}\ e^{2 i \text{ArcTan}[c x]}+e\left(-1+e^{2 i \text{ArcTan}[c x]}\right)+c^2 d\left(1+e^{2 i \text{ArcTan}[c x]}\right)\Big)\Big]-$$

$$\frac{1}{2} i\left(\text{PolyLog}\Big[2,-\frac{\left(c^2 d+e-2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d-e}\Big]+\text{PolyLog}\Big[2,-\frac{\left(c^2 d+e+2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d-e}\Big]\right)\Bigg)+$$

$$b^2\Bigg(-i e \pi^3+\frac{24 c d \text{ArcTan}[c x]}{x}+\frac{12 d\left(1+c^2 x^2\right)\text{ArcTan}[c x]^2}{x^2}+8 i e \text{ArcTan}[c x]^3+$$

$$24 e \text{ArcTan}[c x]^2 \text{Log}\left[1-e^{-2 i \text{ArcTan}[c x]}\right]-24 c^2 d \text{Log}\Big[\frac{c x}{\sqrt{1+c^2 x^2}}\Big]+$$

$$24 i e \text{ArcTan}[c x] \text{PolyLog}\left[2, e^{-2 i \text{ArcTan}[c x]}\right]+12 e \text{PolyLog}\left[3, e^{-2 i \text{ArcTan}[c x]}\right]\Bigg)+$$

$$2 b^2 e\Bigg(4 i \text{ArcTan}[c x]^3-6 \text{ArcTan}[c x]^2 \text{Log}\Big[1+\frac{\left(c\sqrt{d}-\sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c\sqrt{d}+\sqrt{e}}\Big]-$$

$$6 \text{ArcTan}[c x]^2 \text{Log}\Big[1+\frac{\left(c\sqrt{d}+\sqrt{e}\right) e^{2 i \text{ArcTan}[c x]}}{c\sqrt{d}-\sqrt{e}}\Big]+$$

$$6 \text{ArcTan}[c x]^2 \text{Log}\Big[1+\frac{\left(c^2 d+e-2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d-e}\Big]+$$

$$12 \text{ArcSin}\Big[\sqrt{\frac{c^2 d}{c^2 d-e}}\Big] \text{ArcTan}[c x] \text{Log}\Big[1+\frac{\left(c^2 d+e+2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d-e}\Big]-$$

$$6 \text{ArcTan}[c x]^2 \text{Log}\Big[1+\frac{\left(c^2 d+e+2\sqrt{c^2 d e}\right) e^{2 i \text{ArcTan}[c x]}}{c^2 d-e}\Big]-$$

$$12 \text{ArcSin}\Big[\sqrt{\frac{c^2 d}{c^2 d-e}}\Big] \text{ArcTan}[c x] \text{Log}\Big[\frac{1}{c^2 d-e}\Big(-2\sqrt{c^2 d e}\ e^{2 i \text{ArcTan}[c x]}+$$

$$e\left(-1+e^{2 i \text{ArcTan}[c x]}\right)+c^2 d\left(1+e^{2 i \text{ArcTan}[c x]}\right)\Big)\Big]-12 \text{ArcTan}[c x]^2$$

$$\text{Log}\Big[\frac{1}{c^2 d-e}\Big(-2\sqrt{c^2 d e}\ e^{2 i \text{ArcTan}[c x]}+e\left(-1+e^{2 i \text{ArcTan}[c x]}\right)+c^2 d\left(1+e^{2 i \text{ArcTan}[c x]}\right)\Big)\Big]+$$

$$12 \text{ArcSin}\Big[\sqrt{\frac{c^2 d}{c^2 d-e}}\Big] \text{ArcTan}[c x] \text{Log}\Big[\frac{2 i c^2 d-2 i\sqrt{c^2 d e}+2 c\left(-e+\sqrt{c^2 d e}\right) x}{\left(c^2 d-e\right)(i+c x)}\Big]+$$

$$6 \text{ArcTan}[c x]^2 \text{Log}\Big[\frac{2 i c^2 d-2 i\sqrt{c^2 d e}+2 c\left(-e+\sqrt{c^2 d e}\right) x}{\left(c^2 d-e\right)(i+c x)}\Big]-$$

$$12 \text{ArcSin}\Big[\sqrt{\frac{c^2 d}{c^2 d-e}}\Big] \text{ArcTan}[c x] \text{Log}\Big[1+\frac{1}{c^2 d-e}$$

$$\left(c^2 d + e + 2\sqrt{c^2 d e}\right) \left(\text{Cos}[2\,\text{ArcTan}[c\,x]] + i\,\text{Sin}[2\,\text{ArcTan}[c\,x]]\right)\Big] + 6\,\text{ArcTan}[c\,x]^2$$

$$\text{Log}\Big[1 + \frac{1}{c^2 d - e}\left(c^2 d + e + 2\sqrt{c^2 d e}\right) \left(\text{Cos}[2\,\text{ArcTan}[c\,x]] + i\,\text{Sin}[2\,\text{ArcTan}[c\,x]]\right)\Big] +$$

$$6\,i\,\text{ArcTan}[c\,x]\,\text{PolyLog}\Big[2, \frac{\left(-c\sqrt{d} + \sqrt{e}\right) e^{2\,i\,\text{ArcTan}[c\,x]}}{c\sqrt{d} + \sqrt{e}}\Big] +$$

$$6\,i\,\text{ArcTan}[c\,x]\,\text{PolyLog}\Big[2, -\frac{\left(c\sqrt{d} + \sqrt{e}\right) e^{2\,i\,\text{ArcTan}[c\,x]}}{c\sqrt{d} - \sqrt{e}}\Big] -$$

$$3\,\text{PolyLog}\Big[3, \frac{\left(-c\sqrt{d} + \sqrt{e}\right) e^{2\,i\,\text{ArcTan}[c\,x]}}{c\sqrt{d} + \sqrt{e}}\Big] - 3\,\text{PolyLog}\Big[3, -\frac{\left(c\sqrt{d} + \sqrt{e}\right) e^{2\,i\,\text{ArcTan}[c\,x]}}{c\sqrt{d} - \sqrt{e}}\Big]\Bigg)\Bigg)$$

Problem 1268: Unable to integrate problem.

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

Optimal (type 4, 943 leaves, 33 steps) :

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

$$\frac{\left(a+b \text{ArcTan}[c x]\right)^2 \text{Log}\left[\frac{2}{1-i c x}\right]}{e^2}-\frac{b c \sqrt{-d} \left(a+b \text{ArcTan}[c x]\right) \text{Log}\left[\frac{2 c \left(\sqrt{-d}-\sqrt{e} x\right)}{\left(c \sqrt{-d}-i \sqrt{e}\right) (1-i c x)}\right]}{2 \left(c^2 d-e\right) e^{3/2}}+$$

$$\frac{\left(a+b \text{ArcTan}[c x]\right)^2 \text{Log}\left[\frac{2 c \left(\sqrt{-d}-\sqrt{e} x\right)}{\left(c \sqrt{-d}-i \sqrt{e}\right) (1-i c x)}\right]}{2 e^2}+$$

$$\frac{b c \sqrt{-d} \left(a+b \text{ArcTan}[c x]\right) \text{Log}\left[\frac{2 c \left(\sqrt{-d}+\sqrt{e} x\right)}{\left(c \sqrt{-d}+i \sqrt{e}\right) (1-i c x)}\right]}{2 \left(c^2 d-e\right) e^{3/2}}+$$

$$\frac{\left(a+b \text{ArcTan}[c x]\right)^2 \text{Log}\left[\frac{2 c \left(\sqrt{-d}+\sqrt{e} x\right)}{\left(c \sqrt{-d}+i \sqrt{e}\right) (1-i c x)}\right]}{2 e^2}+\frac{i b \left(a+b \text{ArcTan}[c x]\right) \text{PolyLog}\left[2, 1-\frac{2}{1-i c x}\right]}{e^2}+$$

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

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

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

$$\frac{i b \left(a+b \text{ArcTan}[c x]\right) \text{PolyLog}\left[2, 1-\frac{2 c \left(\sqrt{-d}+\sqrt{e} x\right)}{\left(c \sqrt{-d}+i \sqrt{e}\right) (1-i c x)}\right]}{2 e^2}-\frac{b^2 \text{PolyLog}\left[3, 1-\frac{2}{1-i c x}\right]}{2 e^2}+$$

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

Result (type 8, 25 leaves):

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

Problem 1269: Unable to integrate problem.

$$\int \frac{x^2 \left(a+b \text{ArcTan}[c x]\right)^2}{\left(d+e x^2\right)^2} dx$$

Optimal (type 4, 1033 leaves, 38 steps):

$$-\frac{i c (a+b \text{ArcTan}[c x])^2}{2 (c^2 d-e) e}+\frac{(a+b \text{ArcTan}[c x])^2}{4 e^{3/2} (\sqrt{-d}-\sqrt{e} x)}-\frac{(a+b \text{ArcTan}[c x])^2}{4 e^{3/2} (\sqrt{-d}+\sqrt{e} x)}+\frac{b c (a+b \text{ArcTan}[c x]) \text{Log}[\frac{2}{1-i c x}]}{(c^2 d-e) e}-\frac{b c (a+b \text{ArcTan}[c x]) \text{Log}[\frac{2}{1+i c x}]}{(c^2 d-e) e}-\frac{b c (a+b \text{ArcTan}[c x]) \text{Log}[\frac{2 c (\sqrt{-d}-\sqrt{e} x)}{(c \sqrt{-d}-i \sqrt{e}) (1-i c x)}]}{2 (c^2 d-e) e}+\frac{(a+b \text{ArcTan}[c x])^2 \text{Log}[\frac{2 c (\sqrt{-d}-\sqrt{e} x)}{(c \sqrt{-d}-i \sqrt{e}) (1-i c x)}]}{4 \sqrt{-d} e^{3/2}}-\frac{b c (a+b \text{ArcTan}[c x]) \text{Log}[\frac{2 c (\sqrt{-d}+\sqrt{e} x)}{(c \sqrt{-d}+i \sqrt{e}) (1-i c x)}]}{2 (c^2 d-e) e}-\frac{(a+b \text{ArcTan}[c x])^2 \text{Log}[\frac{2 c (\sqrt{-d}+\sqrt{e} x)}{(c \sqrt{-d}+i \sqrt{e}) (1-i c x)}]}{4 \sqrt{-d} e^{3/2}}-\frac{i b^2 c \text{PolyLog}[2, 1-\frac{2}{1-i c x}]}{2 (c^2 d-e) e}-\frac{i b^2 c \text{PolyLog}[2, 1-\frac{2}{1+i c x}]}{2 (c^2 d-e) e}+\frac{i b^2 c \text{PolyLog}[2, 1-\frac{2 c (\sqrt{-d}-\sqrt{e} x)}{(c \sqrt{-d}-i \sqrt{e}) (1-i c x)}]}{4 (c^2 d-e) e}-\frac{i b (a+b \text{ArcTan}[c x]) \text{PolyLog}[2, 1-\frac{2 c (\sqrt{-d}-\sqrt{e} x)}{(c \sqrt{-d}-i \sqrt{e}) (1-i c x)}]}{4 \sqrt{-d} e^{3/2}}+\frac{i b^2 c \text{PolyLog}[2, 1-\frac{2 c (\sqrt{-d}+\sqrt{e} x)}{(c \sqrt{-d}+i \sqrt{e}) (1-i c x)}]}{4 (c^2 d-e) e}+\frac{i b (a+b \text{ArcTan}[c x]) \text{PolyLog}[2, 1-\frac{2 c (\sqrt{-d}+\sqrt{e} x)}{(c \sqrt{-d}+i \sqrt{e}) (1-i c x)}]}{4 \sqrt{-d} e^{3/2}}+\frac{b^2 \text{PolyLog}[3, 1-\frac{2 c (\sqrt{-d}-\sqrt{e} x)}{(c \sqrt{-d}-i \sqrt{e}) (1-i c x)}]}{8 \sqrt{-d} e^{3/2}}-\frac{b^2 \text{PolyLog}[3, 1-\frac{2 c (\sqrt{-d}+\sqrt{e} x)}{(c \sqrt{-d}+i \sqrt{e}) (1-i c x)}]}{8 \sqrt{-d} e^{3/2}}$$

Result (type 8, 25 leaves):

$$\int \frac{x^2 (a+b \text{ArcTan}[c x])^2}{(d+e x^2)^2} \, dx$$

Problem 1271: Unable to integrate problem.

$$\int \frac{(a+b\,\text{ArcTan}[c\,x])^2}{(d+e\,x^2)^2}\,dx$$

Optimal (type 4, 1039 leaves, 32 steps):

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

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

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

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

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

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

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

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

$$\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2\,c\,\left(\sqrt{-d}-\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}-i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{8\,(-d)^{3/2}\,\sqrt{e}}+\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2\,c\,\left(\sqrt{-d}+\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}+i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{8\,(-d)^{3/2}\,\sqrt{e}}$$

Result (type 8, 22 leaves):

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

Problem 1272: Unable to integrate problem.

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

Optimal (type 4, 1087 leaves, 39 steps) :

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

$$\frac{2\,(a+b\,\text{ArcTan}[c\,x])^2\,\text{ArcTanh}\left[1-\frac{2}{1+i\,c\,x}\right]}{d^2}+\frac{(a+b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2}{1-i\,c\,x}\right]}{d^2}-$$

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

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

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

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

$$\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2}{1-i\,c\,x}\right]}{d^2}-\frac{i\,b\,(a+b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,1-\frac{2}{1+i\,c\,x}\right]}{d^2}+$$

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

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

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

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

$$\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2}{1-i\,c\,x}\right]}{2\,d^2}-\frac{b^2\,\text{PolyLog}\left[3,1-\frac{2}{1+i\,c\,x}\right]}{2\,d^2}+\frac{b^2\,\text{PolyLog}\left[3,-1+\frac{2}{1+i\,c\,x}\right]}{2\,d^2}-$$

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

Result (type 8, 25 leaves) :

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

Problem 1273: Unable to integrate problem.

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

Optimal (type 4, 1141 leaves, 42 steps):

$$-\frac{i c (a+b \text{ArcTan}[c x])^2}{d^2}-\frac{i c e (a+b \text{ArcTan}[c x])^2}{2 d^2 (c^2 d-e)}-\frac{(a+b \text{ArcTan}[c x])^2}{d^2 x}+$$

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

$$\frac{b c e (a+b \text{ArcTan}[c x]) \text{Log}\left[\frac{2}{1+i c x}\right]}{d^2 (c^2 d-e)}-\frac{b c e (a+b \text{ArcTan}[c x]) \text{Log}\left[\frac{2 c \left(\sqrt{-d}-\sqrt{e} x\right)}{\left(c \sqrt{-d}-i \sqrt{e}\right) (1-i c x)}\right]}{2 d^2 (c^2 d-e)}-$$

$$\frac{3 \sqrt{e} (a+b \text{ArcTan}[c x])^2 \text{Log}\left[\frac{2 c \left(\sqrt{-d}-\sqrt{e} x\right)}{\left(c \sqrt{-d}-i \sqrt{e}\right) (1-i c x)}\right]}{4 (-d)^{5/2}}-$$

$$\frac{b c e (a+b \text{ArcTan}[c x]) \text{Log}\left[\frac{2 c \left(\sqrt{-d}+\sqrt{e} x\right)}{\left(c \sqrt{-d}+i \sqrt{e}\right) (1-i c x)}\right]}{2 d^2 (c^2 d-e)}+$$

$$\frac{3 \sqrt{e} (a+b \text{ArcTan}[c x])^2 \text{Log}\left[\frac{2 c \left(\sqrt{-d}+\sqrt{e} x\right)}{\left(c \sqrt{-d}+i \sqrt{e}\right) (1-i c x)}\right]}{4 (-d)^{5/2}}+\frac{2 b c (a+b \text{ArcTan}[c x]) \text{Log}\left[2-\frac{2}{1-i c x}\right]}{d^2}-$$

$$\frac{i b^2 c e \text{PolyLog}\left[2, 1-\frac{2}{1-i c x}\right]}{2 d^2 (c^2 d-e)}-\frac{i b^2 c \text{PolyLog}\left[2, -1+\frac{2}{1-i c x}\right]}{d^2}-$$

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

$$\frac{3 i b \sqrt{e} (a+b \text{ArcTan}[c x]) \text{PolyLog}\left[2, 1-\frac{2 c \left(\sqrt{-d}-\sqrt{e} x\right)}{\left(c \sqrt{-d}-i \sqrt{e}\right) (1-i c x)}\right]}{4 (-d)^{5/2}}+$$

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

$$\frac{3 i b \sqrt{e} (a+b \text{ArcTan}[c x]) \text{PolyLog}\left[2, 1-\frac{2 c \left(\sqrt{-d}+\sqrt{e} x\right)}{\left(c \sqrt{-d}+i \sqrt{e}\right) (1-i c x)}\right]}{4 (-d)^{5/2}}-$$

$$\frac{3 b^2 \sqrt{e} \text{PolyLog}\left[3, 1-\frac{2 c \left(\sqrt{-d}-\sqrt{e} x\right)}{\left(c \sqrt{-d}-i \sqrt{e}\right) (1-i c x)}\right]}{8 (-d)^{5/2}}+\frac{3 b^2 \sqrt{e} \text{PolyLog}\left[3, 1-\frac{2 c \left(\sqrt{-d}+\sqrt{e} x\right)}{\left(c \sqrt{-d}+i \sqrt{e}\right) (1-i c x)}\right]}{8 (-d)^{5/2}}$$

Result (type 8, 25 leaves) :

$$\int \frac{(a + b\,\text{ArcTan}[c\,x])^2}{x^2\,(d + e\,x^2)^2}\,dx$$

Problem 1274: Unable to integrate problem.

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

Optimal (type 4, 1181 leaves, 47 steps):

$$-\frac{b\,c\,(a + b\,\text{ArcTan}[c\,x])}{d^2\,x} - \frac{c^2\,(a + b\,\text{ArcTan}[c\,x])^2}{2\,d^2} +$$

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

$$\frac{e\,(a + b\,\text{ArcTan}[c\,x])^2}{4\,d^3\left(1 + \frac{\sqrt{e}\,x}{\sqrt{-d}}\right)} - \frac{4\,e\,(a + b\,\text{ArcTan}[c\,x])^2\,\text{ArcTanh}\left[1 - \frac{2}{1+i\,c\,x}\right]}{d^3} + \frac{b^2\,c^2\,\text{Log}[x]}{d^2} -$$

$$\frac{2\,e\,(a + b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2}{1-i\,c\,x}\right]}{d^3} - \frac{b\,c\,e^{3/2}\,(a + b\,\text{ArcTan}[c\,x])\,\text{Log}\left[\frac{2\,c\,(\sqrt{-d} - \sqrt{e}\,x)}{(c\,\sqrt{-d} - i\,\sqrt{e})\,(1 - i\,c\,x)}\right]}{2\,(-d)^{5/2}\,(c^2\,d - e)} +$$

$$\frac{e\,(a + b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2\,c\,(\sqrt{-d} - \sqrt{e}\,x)}{(c\,\sqrt{-d} - i\,\sqrt{e})\,(1 - i\,c\,x)}\right]}{d^3} +$$

$$\frac{b\,c\,e^{3/2}\,(a + b\,\text{ArcTan}[c\,x])\,\text{Log}\left[\frac{2\,c\,(\sqrt{-d} + \sqrt{e}\,x)}{(c\,\sqrt{-d} + i\,\sqrt{e})\,(1 - i\,c\,x)}\right]}{2\,(-d)^{5/2}\,(c^2\,d - e)} +$$

$$\frac{e\,(a + b\,\text{ArcTan}[c\,x])^2\,\text{Log}\left[\frac{2\,c\,(\sqrt{-d} + \sqrt{e}\,x)}{(c\,\sqrt{-d} + i\,\sqrt{e})\,(1 - i\,c\,x)}\right]}{d^3} - \frac{b^2\,c^2\,\text{Log}[1 + c^2\,x^2]}{2\,d^2} +$$

$$\frac{2\,i\,b\,e\,(a + b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,\,1 - \frac{2}{1-i\,c\,x}\right]}{d^3} +$$

$$\frac{2\,i\,b\,e\,(a + b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,\,1 - \frac{2}{1+i\,c\,x}\right]}{d^3} -$$

$$\frac{2\,i\,b\,e\,(a + b\,\text{ArcTan}[c\,x])\,\text{PolyLog}\left[2,\,-1 + \frac{2}{1+i\,c\,x}\right]}{d^3} +$$

$$\frac{i\,b^2\,c\,e^{3/2}\,\text{PolyLog}\left[2,\,1 - \frac{2\,c\,(\sqrt{-d} - \sqrt{e}\,x)}{(c\,\sqrt{-d} - i\,\sqrt{e})\,(1 - i\,c\,x)}\right]}{4\,(-d)^{5/2}\,(c^2\,d - e)} -$$

$$\frac{i\,b\,e\,\left(a+b\,\text{ArcTan}[c\,x]\right)\,\text{PolyLog}\left[2,\,1-\frac{2\,c\,\left(\sqrt{-d}-\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}-i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{d^3}-$$

$$\frac{i\,b^2\,c\,e^{3/2}\,\text{PolyLog}\left[2,\,1-\frac{2\,c\,\left(\sqrt{-d}+\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}+i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{4\,\left(-d\right)^{5/2}\,\left(c^2\,d-e\right)}-$$

$$\frac{i\,b\,e\,\left(a+b\,\text{ArcTan}[c\,x]\right)\,\text{PolyLog}\left[2,\,1-\frac{2\,c\,\left(\sqrt{-d}+\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}+i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{d^3}-$$

$$\frac{b^2\,e\,\text{PolyLog}\left[3,\,1-\frac{2}{1-i\,c\,x}\right]}{d^3}+\frac{b^2\,e\,\text{PolyLog}\left[3,\,1-\frac{2}{1+i\,c\,x}\right]}{d^3}-\frac{b^2\,e\,\text{PolyLog}\left[3,\,-1+\frac{2}{1+i\,c\,x}\right]}{d^3}+$$

$$\frac{b^2\,e\,\text{PolyLog}\left[3,\,1-\frac{2\,c\,\left(\sqrt{-d}-\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}-i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{2\,d^3}+\frac{b^2\,e\,\text{PolyLog}\left[3,\,1-\frac{2\,c\,\left(\sqrt{-d}+\sqrt{e}\,x\right)}{\left(c\,\sqrt{-d}+i\,\sqrt{e}\right)\,(1-i\,c\,x)}\right]}{2\,d^3}$$

Result (type 8, 25 leaves):

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

Problem 1281: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\text{ArcTan}[x]\,\text{Log}\left[1+x^2\right]}{x^2}\,dx$$

Optimal (type 4, 41 leaves, 8 steps):

$$\text{ArcTan}[x]^2-\frac{\text{ArcTan}[x]\,\text{Log}\left[1+x^2\right]}{x}-\frac{1}{4}\,\text{Log}\left[1+x^2\right]^2-\frac{1}{2}\,\text{PolyLog}\left[2,\,-x^2\right]$$

Result (type 4, 190 leaves):

$$\frac{1}{4}\left(4\,\text{ArcTan}[x]^2-4\,\text{Log}[1-i\,x]\,\text{Log}[x]-4\,\text{Log}[1+i\,x]\,\text{Log}[x]+\right.$$
$$\text{Log}[-i+x]^2+2\,\text{Log}[-i+x]\,\text{Log}\left[-\frac{1}{2}\,i\,\left(i+x\right)\right]+2\,\text{Log}\left[\frac{1}{2}\,\left(1+i\,x\right)\right]\,\text{Log}[i+x]+$$
$$\text{Log}[i+x]^2-\frac{4\,\text{ArcTan}[x]\,\text{Log}\left[1+x^2\right]}{x}+4\,\text{Log}[x]\,\text{Log}\left[1+x^2\right]-$$
$$2\,\text{Log}[-i+x]\,\text{Log}\left[1+x^2\right]-2\,\text{Log}[i+x]\,\text{Log}\left[1+x^2\right]+2\,\text{PolyLog}\left[2,\,\frac{1}{2}+\frac{i\,x}{2}\right]-$$
$$\left.4\,\text{PolyLog}[2,\,-i\,x]-4\,\text{PolyLog}[2,\,i\,x]+2\,\text{PolyLog}\left[2,\,-\frac{1}{2}\,i\,\left(i+x\right)\right]\right)$$

Problem 1283: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{ArcTan}[x] \, \text{Log}\left[1+x^2\right]}{x^4} \, dx$$

Optimal (type 4, 81 leaves, 18 steps):

$$-\frac{2\,\text{ArcTan}[x]}{3\,x}-\frac{\text{ArcTan}[x]^2}{3}+\text{Log}[x]-\frac{1}{2}\,\text{Log}\left[1+x^2\right]-\frac{\text{Log}\left[1+x^2\right]}{6\,x^2}-\frac{\text{ArcTan}[x]\,\text{Log}\left[1+x^2\right]}{3\,x^3}+\frac{1}{12}\,\text{Log}\left[1+x^2\right]^2+\frac{1}{6}\,\text{PolyLog}\left[2,-x^2\right]$$

Result (type 4, 238 leaves):

$$\frac{1}{12}\left(-\frac{8\,\text{ArcTan}[x]}{x}-4\,\text{ArcTan}[x]^2+4\,\text{Log}[x]+4\,\text{Log}[1-i\,x]\,\text{Log}[x]+4\,\text{Log}[1+i\,x]\,\text{Log}[x]-\text{Log}[-i+x]^2-2\,\text{Log}[-i+x]\,\text{Log}\left[-\frac{1}{2}\,i\,\left(i+x\right)\right]-2\,\text{Log}\left[\frac{1}{2}\,\left(1+i\,x\right)\right]\,\text{Log}[i+x]-\text{Log}[i+x]^2+8\,\text{Log}\left[\frac{x}{\sqrt{1+x^2}}\right]-2\,\text{Log}\left[1+x^2\right]-\frac{2\,\text{Log}\left[1+x^2\right]}{x^2}-\frac{4\,\text{ArcTan}[x]\,\text{Log}\left[1+x^2\right]}{x^3}-4\,\text{Log}[x]\,\text{Log}\left[1+x^2\right]+2\,\text{Log}[-i+x]\,\text{Log}\left[1+x^2\right]+2\,\text{Log}[i+x]\,\text{Log}\left[1+x^2\right]-2\,\text{PolyLog}\left[2,\frac{1}{2}+\frac{i\,x}{2}\right]+4\,\text{PolyLog}[2,-i\,x]+4\,\text{PolyLog}[2,i\,x]-2\,\text{PolyLog}\left[2,-\frac{1}{2}\,i\,\left(i+x\right)\right]\right)$$

Problem 1285: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{\text{ArcTan}[x] \, \text{Log}\left[1+x^2\right]}{x^6} \, dx$$

Optimal (type 4, 114 leaves, 26 steps):

$$-\frac{7}{60\,x^2}-\frac{2\,\text{ArcTan}[x]}{15\,x^3}+\frac{2\,\text{ArcTan}[x]}{5\,x}+\frac{\text{ArcTan}[x]^2}{5}-\frac{5\,\text{Log}[x]}{6}+\frac{5}{12}\,\text{Log}\left[1+x^2\right]-\frac{\text{Log}\left[1+x^2\right]}{20\,x^4}+\frac{\text{Log}\left[1+x^2\right]}{10\,x^2}-\frac{\text{ArcTan}[x]\,\text{Log}\left[1+x^2\right]}{5\,x^5}-\frac{1}{20}\,\text{Log}\left[1+x^2\right]^2-\frac{1}{10}\,\text{PolyLog}\left[2,-x^2\right]$$

Result (type 4, 315 leaves):

$$-\frac{1}{60 x^5}\Big(7 x^3+4 x^5+8 x^2 \text{ArcTan}[x]-24 x^4 \text{ArcTan}[x]-12 x^5 \text{ArcTan}[x]^2+ 18 x^5 \text{Log}[x]+12 x^5 \text{Log}[1-i x] \text{Log}[x]+12 x^5 \text{Log}[1+i x] \text{Log}[x]-3 x^5 \text{Log}[-i+x]^2- 6 x^5 \text{Log}[-i+x] \text{Log}\left[-\frac{1}{2} i (i+x)\right]-6 x^5 \text{Log}\left[\frac{1}{2} (1+i x)\right] \text{Log}[i+x]- 3 x^5 \text{Log}[i+x]^2+32 x^5 \text{Log}\left[\frac{x}{\sqrt{1+x^2}}\right]+3 x \text{Log}\left[1+x^2\right]-6 x^3 \text{Log}\left[1+x^2\right]- 9 x^5 \text{Log}\left[1+x^2\right]+12 \text{ArcTan}[x] \text{Log}\left[1+x^2\right]-12 x^5 \text{Log}[x] \text{Log}\left[1+x^2\right]+ 6 x^5 \text{Log}[-i+x] \text{Log}\left[1+x^2\right]+6 x^5 \text{Log}[i+x] \text{Log}\left[1+x^2\right]-6 x^5 \text{PolyLog}\left[2,\frac{1}{2}+\frac{i x}{2}\right]+ 12 x^5 \text{PolyLog}[2,-i x]+12 x^5 \text{PolyLog}[2,i x]-6 x^5 \text{PolyLog}\left[2,-\frac{1}{2} i (i+x)\right]\Big)$$

Problem 1291: Unable to integrate problem.

$$\int \frac{(a+b \text{ArcTan}[c x]) \left(d+e \text{Log}\left[1+c^2 x^2\right]\right)}{x} \, dx$$

Optimal (type 4, 282 leaves, 18 steps):

$$a d \text{Log}[x]+\frac{1}{2} i b e \text{Log}[i c x] \text{Log}[1-i c x]^2- \frac{1}{2} i b e \text{Log}[-i c x] \text{Log}[1+i c x]^2+\frac{1}{2} i b d \text{PolyLog}[2,-i c x]- \frac{1}{2} i b e \left(\text{Log}[1-i c x]+\text{Log}[1+i c x]-\text{Log}\left[1+c^2 x^2\right]\right) \text{PolyLog}[2,-i c x]- \frac{1}{2} i b d \text{PolyLog}[2,i c x]+ \frac{1}{2} i b e \left(\text{Log}[1-i c x]+\text{Log}[1+i c x]-\text{Log}\left[1+c^2 x^2\right]\right) \text{PolyLog}[2,i c x]- \frac{1}{2} a e \text{PolyLog}\left[2,-c^2 x^2\right]+i b e \text{Log}[1-i c x] \text{PolyLog}[2,1-i c x]- i b e \text{Log}[1+i c x] \text{PolyLog}[2,1+i c x]-i b e \text{PolyLog}[3,1-i c x]+i b e \text{PolyLog}[3,1+i c x]$$

Result (type 8, 28 leaves):

$$\int \frac{(a+b \text{ArcTan}[c x]) \left(d+e \text{Log}\left[1+c^2 x^2\right]\right)}{x} \, dx$$

Problem 1292: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{(a+b \text{ArcTan}[c x]) \left(d+e \text{Log}\left[1+c^2 x^2\right]\right)}{x^2} \, dx$$

Optimal (type 4, 100 leaves, 6 steps):

$$\frac{c\,e\,(a+b\,\text{ArcTan}[c\,x])^2}{b}-\frac{(a+b\,\text{ArcTan}[c\,x])\,(d+e\,\text{Log}[1+c^2\,x^2])}{x}+\frac{1}{2}\,b\,c\,(d+e\,\text{Log}[1+c^2\,x^2])\,\text{Log}\left[1-\frac{1}{1+c^2\,x^2}\right]-\frac{1}{2}\,b\,c\,e\,\text{PolyLog}\left[2,\frac{1}{1+c^2\,x^2}\right]$$

Result (type 4, 362 leaves):

$$\frac{1}{4\,x}\Big(-4\,a\,d-4\,b\,d\,\text{ArcTan}[c\,x]+8\,a\,c\,e\,x\,\text{ArcTan}[c\,x]+4\,b\,c\,e\,x\,\text{ArcTan}[c\,x]^2+4\,b\,c\,d\,x\,\text{Log}[x]+b\,c\,e\,x\,\text{Log}\left[-\frac{i}{c}+x\right]^2+b\,c\,e\,x\,\text{Log}\left[\frac{i}{c}+x\right]^2+2\,b\,c\,e\,x\,\text{Log}\left[-\frac{i}{c}+x\right]\text{Log}\left[\frac{1}{2}(1-i\,c\,x)\right]-4\,b\,c\,e\,x\,\text{Log}[x]\,\text{Log}[1-i\,c\,x]+2\,b\,c\,e\,x\,\text{Log}\left[\frac{i}{c}+x\right]\text{Log}\left[\frac{1}{2}(1+i\,c\,x)\right]-4\,b\,c\,e\,x\,\text{Log}[x]\,\text{Log}[1+i\,c\,x]-4\,a\,e\,\text{Log}[1+c^2\,x^2]-2\,b\,c\,d\,x\,\text{Log}[1+c^2\,x^2]-4\,b\,e\,\text{ArcTan}[c\,x]\,\text{Log}[1+c^2\,x^2]+4\,b\,c\,e\,x\,\text{Log}[x]\,\text{Log}[1+c^2\,x^2]-2\,b\,c\,e\,x\,\text{Log}\left[-\frac{i}{c}+x\right]\text{Log}[1+c^2\,x^2]-2\,b\,c\,e\,x\,\text{Log}\left[\frac{i}{c}+x\right]\text{Log}[1+c^2\,x^2]-4\,b\,c\,e\,x\,\text{PolyLog}[2,-i\,c\,x]-4\,b\,c\,e\,x\,\text{PolyLog}[2,i\,c\,x]+2\,b\,c\,e\,x\,\text{PolyLog}\left[2,\frac{1}{2}-\frac{i\,c\,x}{2}\right]+2\,b\,c\,e\,x\,\text{PolyLog}\left[2,\frac{1}{2}+\frac{i\,c\,x}{2}\right]\Big)$$

Problem 1294: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{(a+b\,\text{ArcTan}[c\,x])\,(d+e\,\text{Log}[1+c^2\,x^2])}{x^4}\,dx$$

Optimal (type 4, 189 leaves, 15 steps):

$$-\frac{2\,c^2\,e\,(a+b\,\text{ArcTan}[c\,x])}{3\,x}-\frac{c^3\,e\,(a+b\,\text{ArcTan}[c\,x])^2}{3\,b}+b\,c^3\,e\,\text{Log}[x]-\frac{1}{3}\,b\,c^3\,e\,\text{Log}[1+c^2\,x^2]-\frac{b\,c\,(1+c^2\,x^2)\,(d+e\,\text{Log}[1+c^2\,x^2])}{6\,x^2}-\frac{(a+b\,\text{ArcTan}[c\,x])\,(d+e\,\text{Log}[1+c^2\,x^2])}{3\,x^3}-\frac{1}{6}\,b\,c^3\,(d+e\,\text{Log}[1+c^2\,x^2])\,\text{Log}\left[1-\frac{1}{1+c^2\,x^2}\right]+\frac{1}{6}\,b\,c^3\,e\,\text{PolyLog}\left[2,\frac{1}{1+c^2\,x^2}\right]$$

Result (type 4, 420 leaves):

$$-\frac{1}{12 x^3}\left(4 a d+2 b c d x+4 b d \operatorname{ArcTan}[c x]+4 b c^3 d x^3 \operatorname{Log}[x]-\right.$$
$$2 b c^3 d x^3 \operatorname{Log}\left[1+c^2 x^2\right]+4 a e\left(2 c^2 x^2\left(1+c x \operatorname{ArcTan}[c x]\right)+\operatorname{Log}\left[1+c^2 x^2\right]\right)+$$
$$b e\left(4 c^2 x^2\left(2 \operatorname{ArcTan}[c x]+c x \operatorname{ArcTan}[c x]^2-2 c x \operatorname{Log}\left[\frac{c x}{\sqrt{1+c^2 x^2}}\right]\right)-\right.$$
$$2 c^3 x^3\left(2 \operatorname{Log}[x]-\operatorname{Log}\left[1+c^2 x^2\right]\right)+$$
$$2 \operatorname{Log}\left[1+c^2 x^2\right]\left(c x+2 \operatorname{ArcTan}[c x]+2 c^3 x^3 \operatorname{Log}[x]-c^3 x^3 \operatorname{Log}\left[1+c^2 x^2\right]\right)-$$
$$4 c^3 x^3\left(\operatorname{Log}[x]\left(\operatorname{Log}[1-i c x]+\operatorname{Log}[1+i c x]\right)+\operatorname{PolyLog}[2,-i c x]+\operatorname{PolyLog}[2, i c x]\right)+$$
$$c^3 x^3\left(\operatorname{Log}\left[-\frac{i}{c}+x\right]^2+\operatorname{Log}\left[\frac{i}{c}+x\right]^2-2\left(\operatorname{Log}\left[-\frac{i}{c}+x\right]+\operatorname{Log}\left[\frac{i}{c}+x\right]-\operatorname{Log}\left[1+c^2 x^2\right]\right)\right.$$
$$\operatorname{Log}\left[1+c^2 x^2\right]+2\left(\operatorname{Log}\left[\frac{i}{c}+x\right] \operatorname{Log}\left[\frac{1}{2}(1+i c x)\right]+\operatorname{PolyLog}\left[2, \frac{1}{2}-\frac{i c x}{2}\right]\right)+$$
$$\left.\left.\left.2\left(\operatorname{Log}\left[-\frac{i}{c}+x\right] \operatorname{Log}\left[\frac{1}{2}(1-i c x)\right]+\operatorname{PolyLog}\left[2, \frac{1}{2}+\frac{i c x}{2}\right]\right)\right)\right)\right)$$

Problem 1296: Unable to integrate problem.

$$\int \frac{\left(a+b \operatorname{ArcTan}[c x]\right)\left(d+e \operatorname{Log}\left[1+c^2 x^2\right]\right)}{x^6} \, dx$$

Optimal (type 4, 248 leaves, 24 steps):

$$-\frac{7 b c^3 e}{60 x^2}-\frac{2 c^2 e\left(a+b \operatorname{ArcTan}[c x]\right)}{15 x^3}+\frac{2 c^4 e\left(a+b \operatorname{ArcTan}[c x]\right)}{5 x}+\frac{c^5 e\left(a+b \operatorname{ArcTan}[c x]\right)^2}{5 b}-$$
$$\frac{5}{6} b c^5 e \operatorname{Log}[x]+\frac{19}{60} b c^5 e \operatorname{Log}\left[1+c^2 x^2\right]-\frac{b c\left(d+e \operatorname{Log}\left[1+c^2 x^2\right]\right)}{20 x^4}+$$
$$\frac{b c^3\left(1+c^2 x^2\right)\left(d+e \operatorname{Log}\left[1+c^2 x^2\right]\right)}{10 x^2}-\frac{\left(a+b \operatorname{ArcTan}[c x]\right)\left(d+e \operatorname{Log}\left[1+c^2 x^2\right]\right)}{5 x^5}+$$
$$\frac{1}{10} b c^5\left(d+e \operatorname{Log}\left[1+c^2 x^2\right]\right) \operatorname{Log}\left[1-\frac{1}{1+c^2 x^2}\right]-\frac{1}{10} b c^5 e \operatorname{PolyLog}\left[2, \frac{1}{1+c^2 x^2}\right]$$

Result (type 8, 28 leaves):

$$\int \frac{\left(a+b \operatorname{ArcTan}[c x]\right)\left(d+e \operatorname{Log}\left[1+c^2 x^2\right]\right)}{x^6} \, dx$$

Problem 1297: Result more than twice size of optimal antiderivative.

$$\int x\left(a+b \operatorname{ArcTan}[c x]\right)\left(d+e \operatorname{Log}\left[f+g x^2\right]\right) dx$$

Optimal (type 4, 562 leaves, 21 steps):

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

$$\frac{b\,e\,(c^2\,f-g)\,\text{ArcTan}[c\,x]\,\text{Log}\left[\frac{2}{1-i\,c\,x}\right]}{c^2\,g}+\frac{b\,e\,(c^2\,f-g)\,\text{ArcTan}[c\,x]\,\text{Log}\left[\frac{2\,c\,\left(\sqrt{-f}-\sqrt{g}\,x\right)}{\left(c\,\sqrt{-f}-i\,\sqrt{g}\right)\,(1-i\,c\,x)}\right]}{2\,c^2\,g}+$$

$$\frac{b\,e\,(c^2\,f-g)\,\text{ArcTan}[c\,x]\,\text{Log}\left[\frac{2\,c\,\left(\sqrt{-f}+\sqrt{g}\,x\right)}{\left(c\,\sqrt{-f}+i\,\sqrt{g}\right)\,(1-i\,c\,x)}\right]}{2\,c^2\,g}-\frac{b\,e\,x\,\text{Log}[f+g\,x^2]}{2\,c}-$$

$$\frac{b\,e\,(c^2\,f-g)\,\text{ArcTan}[c\,x]\,\text{Log}[f+g\,x^2]}{2\,c^2\,g}+\frac{e\,(f+g\,x^2)\,(a+b\,\text{ArcTan}[c\,x])\,\text{Log}[f+g\,x^2]}{2\,g}+$$

$$\frac{i\,b\,e\,(c^2\,f-g)\,\text{PolyLog}\left[2,1-\frac{2}{1-i\,c\,x}\right]}{2\,c^2\,g}-\frac{i\,b\,e\,(c^2\,f-g)\,\text{PolyLog}\left[2,1-\frac{2\,c\,\left(\sqrt{-f}-\sqrt{g}\,x\right)}{\left(c\,\sqrt{-f}-i\,\sqrt{g}\right)\,(1-i\,c\,x)}\right]}{4\,c^2\,g}-$$

$$\frac{i\,b\,e\,(c^2\,f-g)\,\text{PolyLog}\left[2,1-\frac{2\,c\,\left(\sqrt{-f}+\sqrt{g}\,x\right)}{\left(c\,\sqrt{-f}+i\,\sqrt{g}\right)\,(1-i\,c\,x)}\right]}{4\,c^2\,g}$$

Result (type 4, 1138 leaves):

$$\frac{1}{4\,c^2\,g}\Bigg(-2\,b\,c\,d\,g\,x+6\,b\,c\,e\,g\,x+2\,a\,c^2\,d\,g\,x^2-2\,a\,c^2\,e\,g\,x^2+2\,b\,d\,g\,\text{ArcTan}[c\,x]-$$

$$2\,b\,e\,g\,\text{ArcTan}[c\,x]+2\,b\,c^2\,d\,g\,x^2\,\text{ArcTan}[c\,x]-2\,b\,c^2\,e\,g\,x^2\,\text{ArcTan}[c\,x]-$$

$$4\,b\,c\,e\,\sqrt{f}\,\sqrt{g}\,\text{ArcTan}\left[\frac{\sqrt{g}\,x}{\sqrt{f}}\right]+4\,i\,b\,c^2\,e\,f\,\text{ArcSin}\left[\sqrt{\frac{c^2\,f}{c^2\,f-g}}\right]\,\text{ArcTan}\left[\frac{c\,g\,x}{\sqrt{c^2\,f\,g}}\right]-$$

$$4\,i\,b\,e\,g\,\text{ArcSin}\left[\sqrt{\frac{c^2\,f}{c^2\,f-g}}\right]\,\text{ArcTan}\left[\frac{c\,g\,x}{\sqrt{c^2\,f\,g}}\right]-4\,b\,c^2\,e\,f\,\text{ArcTan}[c\,x]\,\text{Log}\left[1+e^{2\,i\,\text{ArcTan}[c\,x]}\right]+$$

$$4\,b\,e\,g\,\text{ArcTan}[c\,x]\,\text{Log}\left[1+e^{2\,i\,\text{ArcTan}[c\,x]}\right]+2\,b\,c^2\,e\,f\,\text{ArcSin}\left[\sqrt{\frac{c^2\,f}{c^2\,f-g}}\right]$$

$$\text{Log}\left[\frac{1}{c^2\,f-g}\left(c^2\,\left(1+e^{2\,i\,\text{ArcTan}[c\,x]}\right)\,f+\left(-1+e^{2\,i\,\text{ArcTan}[c\,x]}\right)\,g-2\,e^{2\,i\,\text{ArcTan}[c\,x]}\,\sqrt{c^2\,f\,g}\right)\right]-$$

$$2\,b\,e\,g\,\text{ArcSin}\left[\sqrt{\frac{c^2\,f}{c^2\,f-g}}\right]\,\text{Log}\left[\frac{1}{c^2\,f-g}\left(c^2\,\left(1+e^{2\,i\,\text{ArcTan}[c\,x]}\right)\,f+\left(-1+e^{2\,i\,\text{ArcTan}[c\,x]}\right)\,g-\right.\right.$$

$$\left.\left.2\,e^{2\,i\,\text{ArcTan}[c\,x]}\,\sqrt{c^2\,f\,g}\right)\right]+2\,b\,c^2\,e\,f\,\text{ArcTan}[c\,x]\,\text{Log}\left[\frac{1}{c^2\,f-g}\right.$$

$$\left(c^2 \left(1+e^{2 i \text{ArcTan}[c x]}\right) f+\left(-1+e^{2 i \text{ArcTan}[c x]}\right) g-2 e^{2 i \text{ArcTan}[c x]} \sqrt{c^2 f g}\right)\Big]-2 b e g \text{ArcTan}[c x]$$

$$\text{Log}\Big[\frac{1}{c^2 f-g}\left(c^2 \left(1+e^{2 i \text{ArcTan}[c x]}\right) f+\left(-1+e^{2 i \text{ArcTan}[c x]}\right) g-2 e^{2 i \text{ArcTan}[c x]} \sqrt{c^2 f g}\right)\Big]-$$

$$2 b c^2 e f \text{ArcSin}\Big[\sqrt{\frac{c^2 f}{c^2 f-g}}\Big] \text{Log}\Big[1+\frac{e^{2 i \text{ArcTan}[c x]} \left(c^2 f+g+2 \sqrt{c^2 f g}\right)}{c^2 f-g}\Big]+$$

$$2 b e g \text{ArcSin}\Big[\sqrt{\frac{c^2 f}{c^2 f-g}}\Big] \text{Log}\Big[1+\frac{e^{2 i \text{ArcTan}[c x]} \left(c^2 f+g+2 \sqrt{c^2 f g}\right)}{c^2 f-g}\Big]+$$

$$2 b c^2 e f \text{ArcTan}[c x] \text{Log}\Big[1+\frac{e^{2 i \text{ArcTan}[c x]} \left(c^2 f+g+2 \sqrt{c^2 f g}\right)}{c^2 f-g}\Big]-$$

$$2 b e g \text{ArcTan}[c x] \text{Log}\Big[1+\frac{e^{2 i \text{ArcTan}[c x]} \left(c^2 f+g+2 \sqrt{c^2 f g}\right)}{c^2 f-g}\Big]+2 a c^2 e f \text{Log}\left[f+g x^2\right]-$$

$$2 b c e g x \text{Log}\left[f+g x^2\right]+2 a c^2 e g x^2 \text{Log}\left[f+g x^2\right]+2 b e g \text{ArcTan}[c x] \text{Log}\left[f+g x^2\right]+$$

$$2 b c^2 e g x^2 \text{ArcTan}[c x] \text{Log}\left[f+g x^2\right]+2 i b e \left(c^2 f-g\right) \text{PolyLog}\left[2,-e^{2 i \text{ArcTan}[c x]}\right]-$$

$$i b e \left(c^2 f-g\right) \text{PolyLog}\Big[2,-\frac{e^{2 i \text{ArcTan}[c x]} \left(c^2 f+g-2 \sqrt{c^2 f g}\right)}{c^2 f-g}\Big]-$$

$$i b c^2 e f \text{PolyLog}\Big[2,-\frac{e^{2 i \text{ArcTan}[c x]} \left(c^2 f+g+2 \sqrt{c^2 f g}\right)}{c^2 f-g}\Big]+$$

$$\left.i b e g \text{PolyLog}\Big[2,-\frac{e^{2 i \text{ArcTan}[c x]} \left(c^2 f+g+2 \sqrt{c^2 f g}\right)}{c^2 f-g}\Big]\right)$$

Problem 1298: Result more than twice size of optimal antiderivative.

$$\int (a+b \text{ArcTan}[c x]) \left(d+e \text{Log}\left[f+g x^2\right]\right) dx$$

Optimal (type 4, 656 leaves, 28 steps):

$$-2 a e x - 2 b e x \text{ArcTan}[c x] + \frac{2 a e \sqrt{f} \text{ArcTan}\left[\frac{\sqrt{g} x}{\sqrt{f}}\right]}{\sqrt{g}} +$$

$$\frac{i b e \sqrt{-f} \text{Log}[1 + i c x] \text{Log}\left[\frac{c\left(\sqrt{-f} - \sqrt{g} x\right)}{c \sqrt{-f} - i \sqrt{g}}\right]}{2 \sqrt{g}} - \frac{i b e \sqrt{-f} \text{Log}[1 - i c x] \text{Log}\left[\frac{c\left(\sqrt{-f} - \sqrt{g} x\right)}{c \sqrt{-f} + i \sqrt{g}}\right]}{2 \sqrt{g}} +$$

$$\frac{i b e \sqrt{-f} \text{Log}[1 - i c x] \text{Log}\left[\frac{c\left(\sqrt{-f} + \sqrt{g} x\right)}{c \sqrt{-f} - i \sqrt{g}}\right]}{2 \sqrt{g}} - \frac{i b e \sqrt{-f} \text{Log}[1 + i c x] \text{Log}\left[\frac{c\left(\sqrt{-f} + \sqrt{g} x\right)}{c \sqrt{-f} + i \sqrt{g}}\right]}{2 \sqrt{g}} +$$

$$\frac{b e \text{Log}\left[1 + c^2 x^2\right]}{c} + x \left(a + b \text{ArcTan}[c x]\right) \left(d + e \text{Log}\left[f + g x^2\right]\right) -$$

$$\frac{b \text{Log}\left[-\frac{g\left(1 + c^2 x^2\right)}{c^2 f - g}\right] \left(d + e \text{Log}\left[f + g x^2\right]\right)}{2 c} - \frac{i b e \sqrt{-f} \text{PolyLog}\left[2, \frac{\sqrt{g}(i - c x)}{c \sqrt{-f} + i \sqrt{g}}\right]}{2 \sqrt{g}} +$$

$$\frac{i b e \sqrt{-f} \text{PolyLog}\left[2, \frac{\sqrt{g}(1 - i c x)}{i c \sqrt{-f} + \sqrt{g}}\right]}{2 \sqrt{g}} + \frac{i b e \sqrt{-f} \text{PolyLog}\left[2, \frac{\sqrt{g}(1 + i c x)}{i c \sqrt{-f} + \sqrt{g}}\right]}{2 \sqrt{g}} -$$

$$\frac{i b e \sqrt{-f} \text{PolyLog}\left[2, \frac{\sqrt{g}(i + c x)}{c \sqrt{-f} + i \sqrt{g}}\right]}{2 \sqrt{g}} - \frac{b e \text{PolyLog}\left[2, \frac{c^2\left(f + g x^2\right)}{c^2 f - g}\right]}{2 c}$$

Result (type 4, 1362 leaves) :

$$a d x - 2 a e x + b d x \text{ArcTan}[c x] + \frac{2 a e \sqrt{f} \text{ArcTan}\left[\frac{\sqrt{g} x}{\sqrt{f}}\right]}{\sqrt{g}} - \frac{b d \text{Log}\left[1 + c^2 x^2\right]}{2 c} +$$

$$a e x \text{Log}\left[f + g x^2\right] + b e \left(x \text{ArcTan}[c x] - \frac{\text{Log}\left[1 + c^2 x^2\right]}{2 c}\right) \text{Log}\left[f + g x^2\right] +$$

$$\frac{1}{c} b e g \left(\frac{\left(-\text{Log}\left[-\frac{i}{c} + x\right] - \text{Log}\left[\frac{i}{c} + x\right] + \text{Log}\left[1 + c^2 x^2\right]\right) \text{Log}\left[f + g x^2\right]}{2 g} + \right.$$

$$\frac{\text{Log}\left[-\frac{i}{c} + x\right] \text{Log}\left[1 - \frac{\sqrt{g}\left(-\frac{i}{c} + x\right)}{-i \sqrt{f} - \frac{i \sqrt{g}}{c}}\right] + \text{PolyLog}\left[2, \frac{\sqrt{g}\left(-\frac{i}{c} + x\right)}{-i \sqrt{f} - \frac{i \sqrt{g}}{c}}\right]}{2 g} +$$

$$\frac{\text{Log}\left[-\frac{i}{c} + x\right] \text{Log}\left[1 - \frac{\sqrt{g}\left(-\frac{i}{c} + x\right)}{i \sqrt{f} - \frac{i \sqrt{g}}{c}}\right] + \text{PolyLog}\left[2, \frac{\sqrt{g}\left(-\frac{i}{c} + x\right)}{i \sqrt{f} - \frac{i \sqrt{g}}{c}}\right]}{2 g} +$$

$$\frac{\text{Log}\left[\frac{i}{c} + x\right] \text{Log}\left[1 - \frac{\sqrt{g}\left(\frac{i}{c} + x\right)}{-i \sqrt{f} + \frac{i \sqrt{g}}{c}}\right] + \text{PolyLog}\left[2, \frac{\sqrt{g}\left(\frac{i}{c} + x\right)}{-i \sqrt{f} + \frac{i \sqrt{g}}{c}}\right]}{2 g} +$$

$$\left.\frac{\text{Log}\left[\frac{i}{c}+x\right]\,\text{Log}\left[1-\frac{\sqrt{g}\,\left(\frac{i}{c}+x\right)}{i\,\sqrt{f}+\frac{i\,\sqrt{g}}{c}}\right]+\text{PolyLog}\left[2,\,\frac{\sqrt{g}\,\left(\frac{i}{c}+x\right)}{i\,\sqrt{f}+\frac{i\,\sqrt{g}}{c}}\right]}{2\,g}\right)-$$

$$\frac{1}{2\,c}\,b\,e\,\left(4\,c\,x\,\text{ArcTan}[c\,x]+4\,\text{Log}\left[\frac{1}{\sqrt{1+c^2\,x^2}}\right]+\frac{1}{\sqrt{-c^2\,f\,g}}\right.$$

$$c^2\,f\,\left(4\,\text{ArcTan}[c\,x]\,\text{ArcTanh}\left[\frac{\sqrt{-c^2\,f\,g}}{c\,g\,x}\right]-2\,\text{ArcCos}\left[-\frac{c^2\,f+g}{c^2\,f-g}\right]\,\text{ArcTanh}\left[\frac{c\,g\,x}{\sqrt{-c^2\,f\,g}}\right]-\right.$$

$$\left(\text{ArcCos}\left[-\frac{c^2\,f+g}{c^2\,f-g}\right]-2\,i\,\text{ArcTanh}\left[\frac{c\,g\,x}{\sqrt{-c^2\,f\,g}}\right]\right)\,\text{Log}\left[-\frac{2\,c^2\,f\,\left(i\,g+\sqrt{-c^2\,f\,g}\right)\,\left(-i+c\,x\right)}{\left(c^2\,f-g\right)\,\left(c^2\,f-c\,\sqrt{-c^2\,f\,g}\,x\right)}\right]-$$

$$\left(\text{ArcCos}\left[-\frac{c^2\,f+g}{c^2\,f-g}\right]+2\,i\,\text{ArcTanh}\left[\frac{c\,g\,x}{\sqrt{-c^2\,f\,g}}\right]\right)\,\text{Log}\left[\frac{2\,i\,c^2\,f\,\left(g+i\,\sqrt{-c^2\,f\,g}\right)\,\left(i+c\,x\right)}{\left(c^2\,f-g\right)\,\left(c^2\,f-c\,\sqrt{-c^2\,f\,g}\,x\right)}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c^2\,f+g}{c^2\,f-g}\right]-2\,i\,\text{ArcTanh}\left[\frac{\sqrt{-c^2\,f\,g}}{c\,g\,x}\right]+2\,i\,\text{ArcTanh}\left[\frac{c\,g\,x}{\sqrt{-c^2\,f\,g}}\right]\right)$$

$$\text{Log}\left[\frac{\sqrt{2}\,e^{-i\,\text{ArcTan}[c\,x]}\,\sqrt{-c^2\,f\,g}}{\sqrt{-c^2\,f+g}\,\sqrt{-c^2\,f-g+\left(-c^2\,f+g\right)\,\text{Cos}[2\,\text{ArcTan}[c\,x]]}}\right]+$$

$$\left(\text{ArcCos}\left[-\frac{c^2\,f+g}{c^2\,f-g}\right]+2\,i\,\text{ArcTanh}\left[\frac{\sqrt{-c^2\,f\,g}}{c\,g\,x}\right]-2\,i\,\text{ArcTanh}\left[\frac{c\,g\,x}{\sqrt{-c^2\,f\,g}}\right]\right)$$

$$\text{Log}\left[\frac{\sqrt{2}\,e^{i\,\text{ArcTan}[c\,x]}\,\sqrt{-c^2\,f\,g}}{\sqrt{-c^2\,f+g}\,\sqrt{-c^2\,f-g+\left(-c^2\,f+g\right)\,\text{Cos}[2\,\text{ArcTan}[c\,x]]}}\right]+$$

$$i\,\left(-\text{PolyLog}\left[2,\,\frac{\left(c^2\,f+g-2\,i\,\sqrt{-c^2\,f\,g}\right)\,\left(c^2\,f+c\,\sqrt{-c^2\,f\,g}\,x\right)}{\left(c^2\,f-g\right)\,\left(c^2\,f-c\,\sqrt{-c^2\,f\,g}\,x\right)}\right]+\right.$$

$$\left.\left.\left.\text{PolyLog}\left[2,\,\frac{\left(c^2\,f+g+2\,i\,\sqrt{-c^2\,f\,g}\right)\,\left(c^2\,f+c\,\sqrt{-c^2\,f\,g}\,x\right)}{\left(c^2\,f-g\right)\,\left(c^2\,f-c\,\sqrt{-c^2\,f\,g}\,x\right)}\right]\right)\right)\right)$$

Problem 1301: Result more than twice size of optimal antiderivative.

$$\int \frac{(a + b\,\text{ArcTan}[c\,x])\,(d + e\,\text{Log}[f + g\,x^2])}{x^3}\,dx$$

Optimal (type 4, 528 leaves, 22 steps):

$$\frac{b\,c\,e\,\sqrt{g}\,\text{ArcTan}\left[\frac{\sqrt{g}\,x}{\sqrt{f}}\right]}{\sqrt{f}} + \frac{a\,e\,g\,\text{Log}[x]}{f} - \frac{b\,e\,(c^2 f - g)\,\text{ArcTan}[c\,x]\,\text{Log}\left[\frac{2}{1-i\,c\,x}\right]}{f} +$$
$$\frac{b\,e\,(c^2 f - g)\,\text{ArcTan}[c\,x]\,\text{Log}\left[\frac{2\,c\,(\sqrt{-f} - \sqrt{g}\,x)}{(c\,\sqrt{-f} - i\,\sqrt{g})\,(1-i\,c\,x)}\right]}{2\,f} +$$
$$\frac{b\,e\,(c^2 f - g)\,\text{ArcTan}[c\,x]\,\text{Log}\left[\frac{2\,c\,(\sqrt{-f} + \sqrt{g}\,x)}{(c\,\sqrt{-f} + i\,\sqrt{g})\,(1-i\,c\,x)}\right]}{2\,f} - \frac{a\,e\,g\,\text{Log}[f + g\,x^2]}{2\,f} -$$
$$\frac{b\,c\,(d + e\,\text{Log}[f + g\,x^2])}{2\,x} - \frac{1}{2}\,b\,c^2\,\text{ArcTan}[c\,x]\,(d + e\,\text{Log}[f + g\,x^2]) -$$
$$\frac{(a + b\,\text{ArcTan}[c\,x])\,(d + e\,\text{Log}[f + g\,x^2])}{2\,x^2} + \frac{i\,b\,e\,g\,\text{PolyLog}[2, -i\,c\,x]}{2\,f} - \frac{i\,b\,e\,g\,\text{PolyLog}[2, i\,c\,x]}{2\,f} +$$
$$\frac{i\,b\,e\,(c^2 f - g)\,\text{PolyLog}\left[2, 1 - \frac{2}{1-i\,c\,x}\right]}{2\,f} - \frac{i\,b\,e\,(c^2 f - g)\,\text{PolyLog}\left[2, 1 - \frac{2\,c\,(\sqrt{-f} - \sqrt{g}\,x)}{(c\,\sqrt{-f} - i\,\sqrt{g})\,(1-i\,c\,x)}\right]}{4\,f} -$$
$$\frac{i\,b\,e\,(c^2 f - g)\,\text{PolyLog}\left[2, 1 - \frac{2\,c\,(\sqrt{-f} + \sqrt{g}\,x)}{(c\,\sqrt{-f} + i\,\sqrt{g})\,(1-i\,c\,x)}\right]}{4\,f}$$

Result (type 4, 1213 leaves):

$$-\frac{1}{4\,f\,x^2}\Bigg(2\,a\,d\,f + 2\,b\,c\,d\,f\,x + 2\,b\,d\,f\,\text{ArcTan}[c\,x] + 2\,b\,c^2\,d\,f\,x^2\,\text{ArcTan}[c\,x] -$$
$$4\,b\,c\,e\,\sqrt{f}\,\sqrt{g}\,x^2\,\text{ArcTan}\left[\frac{\sqrt{g}\,x}{\sqrt{f}}\right] - 4\,i\,b\,c^2\,e\,f\,x^2\,\text{ArcSin}\left[\sqrt{\frac{c^2 f}{c^2 f - g}}\right]\,\text{ArcTan}\left[\frac{c\,g\,x}{\sqrt{c^2 f\,g}}\right] +$$
$$4\,i\,b\,e\,g\,x^2\,\text{ArcSin}\left[\sqrt{\frac{c^2 f}{c^2 f - g}}\right]\,\text{ArcTan}\left[\frac{c\,g\,x}{\sqrt{c^2 f\,g}}\right] - 4\,b\,e\,g\,x^2\,\text{ArcTan}[c\,x]\,\text{Log}\left[1 - e^{2\,i\,\text{ArcTan}[c\,x]}\right] +$$
$$4\,b\,c^2\,e\,f\,x^2\,\text{ArcTan}[c\,x]\,\text{Log}\left[1 + e^{2\,i\,\text{ArcTan}[c\,x]}\right] - 2\,b\,c^2\,e\,f\,x^2\,\text{ArcSin}\left[\sqrt{\frac{c^2 f}{c^2 f - g}}\right]$$
$$\text{Log}\left[\frac{1}{c^2 f - g}\left(c^2\,(1 + e^{2\,i\,\text{ArcTan}[c\,x]})\,f + (-1 + e^{2\,i\,\text{ArcTan}[c\,x]})\,g - 2\,e^{2\,i\,\text{ArcTan}[c\,x]}\,\sqrt{c^2 f\,g}\right)\right] +$$

$$2\,b\,e\,g\,x^2\,\text{ArcSin}\left[\sqrt{\frac{c^2\,f}{c^2\,f-g}}\right]$$

$$\text{Log}\left[\frac{1}{c^2\,f-g}\left(c^2\,\left(1+e^{2\,i\,\text{ArcTan}[c\,x]}\right)\,f+\left(-1+e^{2\,i\,\text{ArcTan}[c\,x]}\right)\,g-2\,e^{2\,i\,\text{ArcTan}[c\,x]}\,\sqrt{c^2\,f\,g}\right)\right]-$$

$$2\,b\,c^2\,e\,f\,x^2\,\text{ArcTan}[c\,x]\,\text{Log}\left[\frac{1}{c^2\,f-g}\left(c^2\,\left(1+e^{2\,i\,\text{ArcTan}[c\,x]}\right)\,f+\right.\right.$$

$$\left.\left.\left(-1+e^{2\,i\,\text{ArcTan}[c\,x]}\right)\,g-2\,e^{2\,i\,\text{ArcTan}[c\,x]}\,\sqrt{c^2\,f\,g}\right)\right]+2\,b\,e\,g\,x^2\,\text{ArcTan}[c\,x]$$

$$\text{Log}\left[\frac{1}{c^2\,f-g}\left(c^2\,\left(1+e^{2\,i\,\text{ArcTan}[c\,x]}\right)\,f+\left(-1+e^{2\,i\,\text{ArcTan}[c\,x]}\right)\,g-2\,e^{2\,i\,\text{ArcTan}[c\,x]}\,\sqrt{c^2\,f\,g}\right)\right]+$$

$$2\,b\,c^2\,e\,f\,x^2\,\text{ArcSin}\left[\sqrt{\frac{c^2\,f}{c^2\,f-g}}\right]\,\text{Log}\left[1+\frac{e^{2\,i\,\text{ArcTan}[c\,x]}\,\left(c^2\,f+g+2\,\sqrt{c^2\,f\,g}\right)}{c^2\,f-g}\right]-$$

$$2\,b\,e\,g\,x^2\,\text{ArcSin}\left[\sqrt{\frac{c^2\,f}{c^2\,f-g}}\right]\,\text{Log}\left[1+\frac{e^{2\,i\,\text{ArcTan}[c\,x]}\,\left(c^2\,f+g+2\,\sqrt{c^2\,f\,g}\right)}{c^2\,f-g}\right]-$$

$$2\,b\,c^2\,e\,f\,x^2\,\text{ArcTan}[c\,x]\,\text{Log}\left[1+\frac{e^{2\,i\,\text{ArcTan}[c\,x]}\,\left(c^2\,f+g+2\,\sqrt{c^2\,f\,g}\right)}{c^2\,f-g}\right]+$$

$$2\,b\,e\,g\,x^2\,\text{ArcTan}[c\,x]\,\text{Log}\left[1+\frac{e^{2\,i\,\text{ArcTan}[c\,x]}\,\left(c^2\,f+g+2\,\sqrt{c^2\,f\,g}\right)}{c^2\,f-g}\right]-4\,a\,e\,g\,x^2\,\text{Log}[x]+$$

$$2\,a\,e\,f\,\text{Log}\left[f+g\,x^2\right]+2\,b\,c\,e\,f\,x\,\text{Log}\left[f+g\,x^2\right]+2\,a\,e\,g\,x^2\,\text{Log}\left[f+g\,x^2\right]+$$

$$2\,b\,e\,f\,\text{ArcTan}[c\,x]\,\text{Log}\left[f+g\,x^2\right]+2\,b\,c^2\,e\,f\,x^2\,\text{ArcTan}[c\,x]\,\text{Log}\left[f+g\,x^2\right]-$$

$$2\,i\,b\,c^2\,e\,f\,x^2\,\text{PolyLog}\left[2,-e^{2\,i\,\text{ArcTan}[c\,x]}\right]+2\,i\,b\,e\,g\,x^2\,\text{PolyLog}\left[2,e^{2\,i\,\text{ArcTan}[c\,x]}\right]+$$

$$i\,b\,c^2\,e\,f\,x^2\,\text{PolyLog}\left[2,-\frac{e^{2\,i\,\text{ArcTan}[c\,x]}\,\left(c^2\,f+g-2\,\sqrt{c^2\,f\,g}\right)}{c^2\,f-g}\right]-$$

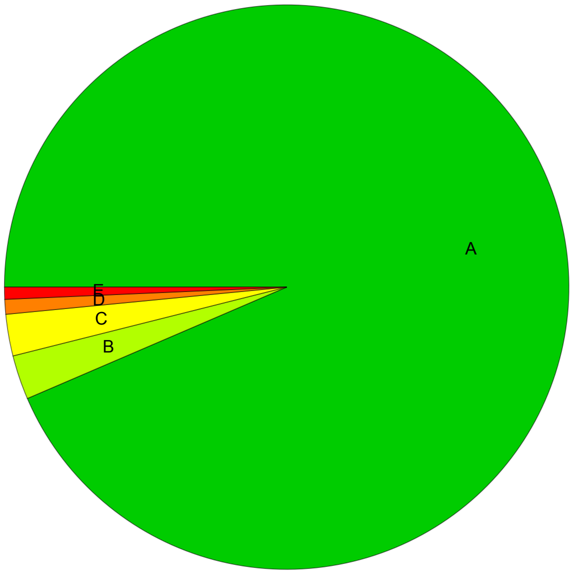
$$i\,b\,e\,g\,x^2\,\text{PolyLog}\left[2,-\frac{e^{2\,i\,\text{ArcTan}[c\,x]}\,\left(c^2\,f+g-2\,\sqrt{c^2\,f\,g}\right)}{c^2\,f-g}\right]+$$

$$i\,b\,c^2\,e\,f\,x^2\,\text{PolyLog}\left[2,-\frac{e^{2\,i\,\text{ArcTan}[c\,x]}\,\left(c^2\,f+g+2\,\sqrt{c^2\,f\,g}\right)}{c^2\,f-g}\right]-$$

$$\left.i\,b\,e\,g\,x^2\,\text{PolyLog}\left[2,-\frac{e^{2\,i\,\text{ArcTan}[c\,x]}\,\left(c^2\,f+g+2\,\sqrt{c^2\,f\,g}\right)}{c^2\,f-g}\right]\right)$$

Summary of Integration Test Results

1301 integration problems



A - 1217 optimal antiderivatives

B - 33 more than twice size of optimal antiderivatives

C - 31 unnecessarily complex antiderivatives

D - 11 unable to integrate problems

E - 9 integration timeouts