

Mathematica 11.3 Integration Test Results

Test results for the 31 problems in "5.3.3 (d+e x)^m (a+b arctan(c x^n))^p.m"

Problem 6: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 98 leaves, 6 steps):

$$\frac{b c^2 d \operatorname{ArcTan}[c x]}{e (c^2 d^2 + e^2)} - \frac{a + b \operatorname{ArcTan}[c x]}{e (d + e x)} + \frac{b c \operatorname{Log}[d + e x]}{c^2 d^2 + e^2} - \frac{b c \operatorname{Log}[1 + c^2 x^2]}{2 (c^2 d^2 + e^2)}$$

Result (type 3, 115 leaves):

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

Problem 7: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 146 leaves, 7 steps):

$$- \frac{b c}{2 (c^2 d^2 + e^2) (d + e x)} + \frac{b c^2 (c d - e) (c d + e) \operatorname{ArcTan}[c x]}{2 e (c^2 d^2 + e^2)^2} - \frac{a + b \operatorname{ArcTan}[c x]}{2 e (d + e x)^2} + \frac{b c^3 d \operatorname{Log}[d + e x]}{(c^2 d^2 + e^2)^2} - \frac{b c^3 d \operatorname{Log}[1 + c^2 x^2]}{2 (c^2 d^2 + e^2)^2}$$

Result (type 3, 177 leaves):

$$\frac{1}{8} \left(- \frac{4 a}{e (d + e x)^2} - \frac{4 b c}{(c^2 d^2 + e^2) (d + e x)} + \frac{2 b \left(c^2 \left(\frac{1}{(c d - i e)^2} + \frac{1}{(c d + i e)^2} \right) - \frac{2}{(d + e x)^2} \right) \operatorname{ArcTan}[c x]}{e} + \frac{8 b c^3 d \operatorname{Log}[d + e x]}{(c^2 d^2 + e^2)^2} + \frac{i b c^2 \operatorname{Log}[1 + c^2 x^2]}{e (-i c d + e)^2} - \frac{i b c^2 \operatorname{Log}[1 + c^2 x^2]}{e (i c d + e)^2} \right)$$

Problem 8: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 3, 206 leaves, 7 steps):

$$-\frac{b c}{6 (c^2 d^2 + e^2) (d + e x)^2} - \frac{2 b c^3 d}{3 (c^2 d^2 + e^2)^2 (d + e x)} + \frac{b c^4 d (c^2 d^2 - 3 e^2) \operatorname{ArcTan}[c x]}{3 e (c^2 d^2 + e^2)^3} - \frac{a + b \operatorname{ArcTan}[c x]}{3 e (d + e x)^3} + \frac{b c^3 (3 c^2 d^2 - e^2) \operatorname{Log}[d + e x]}{3 (c^2 d^2 + e^2)^3} - \frac{b c^3 (3 c^2 d^2 - e^2) \operatorname{Log}[1 + c^2 x^2]}{6 (c^2 d^2 + e^2)^3}$$

Result (type 3, 211 leaves):

$$\frac{1}{12} \left(-\frac{4 a}{e (d + e x)^3} - \frac{2 b c}{(c^2 d^2 + e^2) (d + e x)^2} - \frac{8 b c^3 d}{(c^2 d^2 + e^2)^2 (d + e x)} + \frac{2 b \left(c^3 \left(\frac{1}{(c d - i e)^3} + \frac{1}{(c d + i e)^3} \right) - \frac{2}{(d + e x)^3} \right) \operatorname{ArcTan}[c x]}{e} + \frac{4 b c^3 (3 c^2 d^2 - e^2) \operatorname{Log}[d + e x]}{(c^2 d^2 + e^2)^3} + \frac{b c^3 \operatorname{Log}[1 + c^2 x^2]}{e (-i c d + e)^3} + \frac{b c^3 \operatorname{Log}[1 + c^2 x^2]}{e (i c d + e)^3} \right)$$

Problem 12: Attempted integration timed out after 120 seconds.

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

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

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

Result (type 1, 1 leaves):

???

Problem 18: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 320 leaves, 1 step):

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

Result (type 1, 1 leaves):

???

Problem 19: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 499 leaves, 10 steps):

$$\frac{i c (a + b \operatorname{ArcTan}[c x])^3}{c^2 d^2 + e^2} + \frac{c^2 d (a + b \operatorname{ArcTan}[c x])^3}{e (c^2 d^2 + e^2)} - \frac{(a + b \operatorname{ArcTan}[c x])^3}{e (d + e x)} -$$

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

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

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

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

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

Result (type 1, 1 leaves):

???

Problem 20: Attempted integration timed out after 120 seconds.

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

Optimal (type 4, 936 leaves, 23 steps):

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

Result (type 1, 1 leaves):

???

Problem 23: Attempted integration timed out after 120 seconds.

$$\int \frac{a + b \operatorname{ArcTan}[c x^2]}{d + e x} dx$$

Optimal (type 4, 501 leaves, 19 steps):

$$\frac{(a + b \operatorname{ArcTan}[c x^2]) \operatorname{Log}[d + e x]}{e} + \frac{b c \operatorname{Log}\left[\frac{e^{(1 - (-c^2)^{1/4} x)}}{(-c^2)^{1/4} d + e}\right] \operatorname{Log}[d + e x]}{2 \sqrt{-c^2} e} +$$

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

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

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

Result (type 1, 1 leaves):

???

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

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

Optimal (type 4, 1325 leaves, 77 steps):

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

$$\frac{i e (a + b \operatorname{ArcTan}[c x^2])^2}{2 c} + \frac{1}{2} e x^2 (a + b \operatorname{ArcTan}[c x^2])^2 + \frac{2 (-1)^{3/4} a b d \operatorname{ArcTanh}\left[(-1)^{3/4} \sqrt{c} x\right]}{\sqrt{c}} -$$

$$\frac{(-1)^{1/4} b^2 d \operatorname{ArcTanh}\left[(-1)^{3/4} \sqrt{c} x\right]^2}{\sqrt{c}} + \frac{2 (-1)^{1/4} b^2 d \operatorname{ArcTan}\left[(-1)^{3/4} \sqrt{c} x\right] \operatorname{Log}\left[\frac{2}{1 - (-1)^{1/4} \sqrt{c} x}\right]}{\sqrt{c}} -$$

$$\frac{2 (-1)^{1/4} b^2 d \operatorname{ArcTan}\left[(-1)^{3/4} \sqrt{c} x\right] \operatorname{Log}\left[\frac{2}{1 + (-1)^{1/4} \sqrt{c} x}\right]}{\sqrt{c}} +$$

$$\frac{(-1)^{1/4} b^2 d \operatorname{ArcTan}\left[(-1)^{3/4} \sqrt{c} x\right] \operatorname{Log}\left[\frac{\sqrt{2} (-1)^{1/4} + \sqrt{c} x}{1 + (-1)^{1/4} \sqrt{c} x}\right]}{\sqrt{c}} +$$

$$\begin{aligned}
 & \frac{2 (-1)^{1/4} b^2 d \operatorname{ArcTanh} [(-1)^{3/4} \sqrt{c} x] \operatorname{Log} \left[\frac{2}{1 - (-1)^{3/4} \sqrt{c} x} \right]}{\sqrt{c}} - \\
 & \frac{2 (-1)^{1/4} b^2 d \operatorname{ArcTanh} [(-1)^{3/4} \sqrt{c} x] \operatorname{Log} \left[\frac{2}{1 + (-1)^{3/4} \sqrt{c} x} \right]}{\sqrt{c}} + \\
 & \frac{(-1)^{1/4} b^2 d \operatorname{ArcTanh} [(-1)^{3/4} \sqrt{c} x] \operatorname{Log} \left[-\frac{\sqrt{2} (-1)^{3/4} + \sqrt{c} x}{1 + (-1)^{3/4} \sqrt{c} x} \right]}{\sqrt{c}} + \\
 & \frac{(-1)^{1/4} b^2 d \operatorname{ArcTanh} [(-1)^{3/4} \sqrt{c} x] \operatorname{Log} \left[\frac{(1+i) (1 + (-1)^{1/4} \sqrt{c} x)}{1 + (-1)^{3/4} \sqrt{c} x} \right]}{\sqrt{c}} + \\
 & \frac{(-1)^{1/4} b^2 d \operatorname{ArcTan} [(-1)^{3/4} \sqrt{c} x] \operatorname{Log} \left[\frac{(1-i) (1 + (-1)^{3/4} \sqrt{c} x)}{1 + (-1)^{1/4} \sqrt{c} x} \right]}{\sqrt{c}} + \\
 & i a b d x \operatorname{Log} [1 - i c x^2] + \frac{(-1)^{1/4} b^2 d \operatorname{ArcTan} [(-1)^{3/4} \sqrt{c} x] \operatorname{Log} [1 - i c x^2]}{\sqrt{c}} - \\
 & \frac{(-1)^{1/4} b^2 d \operatorname{ArcTanh} [(-1)^{3/4} \sqrt{c} x] \operatorname{Log} [1 - i c x^2]}{\sqrt{c}} - \\
 & \frac{1}{4} b^2 d x \operatorname{Log} [1 - i c x^2]^2 + \frac{b e (a + b \operatorname{ArcTan} [c x^2]) \operatorname{Log} \left[\frac{2}{1 + i c x^2} \right]}{c} - \\
 & i a b d x \operatorname{Log} [1 + i c x^2] - \frac{(-1)^{1/4} b^2 d \operatorname{ArcTan} [(-1)^{3/4} \sqrt{c} x] \operatorname{Log} [1 + i c x^2]}{\sqrt{c}} + \\
 & \frac{(-1)^{1/4} b^2 d \operatorname{ArcTanh} [(-1)^{3/4} \sqrt{c} x] \operatorname{Log} [1 + i c x^2]}{\sqrt{c}} + \frac{1}{2} b^2 d x \operatorname{Log} [1 - i c x^2] \operatorname{Log} [1 + i c x^2] - \\
 & \frac{1}{4} b^2 d x \operatorname{Log} [1 + i c x^2]^2 + \frac{(-1)^{3/4} b^2 d \operatorname{PolyLog} \left[2, 1 - \frac{2}{1 - (-1)^{1/4} \sqrt{c} x} \right]}{\sqrt{c}} + \\
 & \frac{(-1)^{3/4} b^2 d \operatorname{PolyLog} \left[2, 1 - \frac{2}{1 + (-1)^{1/4} \sqrt{c} x} \right]}{\sqrt{c}} - \frac{(-1)^{3/4} b^2 d \operatorname{PolyLog} \left[2, 1 - \frac{\sqrt{2} (-1)^{1/4} + \sqrt{c} x}{1 + (-1)^{1/4} \sqrt{c} x} \right]}{2 \sqrt{c}} + \\
 & \frac{(-1)^{1/4} b^2 d \operatorname{PolyLog} \left[2, 1 - \frac{2}{1 - (-1)^{3/4} \sqrt{c} x} \right]}{\sqrt{c}} + \frac{(-1)^{1/4} b^2 d \operatorname{PolyLog} \left[2, 1 - \frac{2}{1 + (-1)^{3/4} \sqrt{c} x} \right]}{\sqrt{c}} - \\
 & \frac{(-1)^{1/4} b^2 d \operatorname{PolyLog} \left[2, 1 + \frac{\sqrt{2} (-1)^{3/4} + \sqrt{c} x}{1 + (-1)^{3/4} \sqrt{c} x} \right]}{2 \sqrt{c}} - \frac{(-1)^{1/4} b^2 d \operatorname{PolyLog} \left[2, 1 - \frac{(1+i) (1 + (-1)^{1/4} \sqrt{c} x)}{1 + (-1)^{3/4} \sqrt{c} x} \right]}{2 \sqrt{c}} - \\
 & \frac{(-1)^{3/4} b^2 d \operatorname{PolyLog} \left[2, 1 - \frac{(1-i) (1 + (-1)^{3/4} \sqrt{c} x)}{1 + (-1)^{1/4} \sqrt{c} x} \right]}{2 \sqrt{c}} + \frac{i b^2 e \operatorname{PolyLog} \left[2, 1 - \frac{2}{1 + i c x^2} \right]}{2 c}
 \end{aligned}$$

Result (type 4, 5745 leaves):

$$\begin{aligned}
 & a^2 d x + \frac{1}{2} a^2 e x^2 + \frac{a b e \left(c x^2 \operatorname{ArcTan}[c x^2] + \operatorname{Log}\left[\frac{1}{\sqrt{1+c^2 x^4}}\right] \right)}{c} + \frac{1}{c x} \\
 & a b d \sqrt{c x^2} \left(2 \sqrt{c x^2} \operatorname{ArcTan}[c x^2] - \frac{1}{\sqrt{2}} \left(-2 \operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right] + \right. \right. \\
 & \quad \left. \left. 2 \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right] + \operatorname{Log}\left[1 + c x^2 - \sqrt{2} \sqrt{c x^2}\right] - \operatorname{Log}\left[1 + c x^2 + \sqrt{2} \sqrt{c x^2}\right] \right) \right) + \\
 & \frac{1}{2 c} b^2 e \left(\operatorname{ArcTan}[c x^2] \left(-i \operatorname{ArcTan}[c x^2] + c x^2 \operatorname{ArcTan}[c x^2] + 2 \operatorname{Log}\left[1 + e^{2 i \operatorname{ArcTan}[c x^2]}\right] \right) - \right. \\
 & \quad \left. i \operatorname{PolyLog}\left[2, -e^{2 i \operatorname{ArcTan}[c x^2]}\right] \right) + \\
 & \frac{1}{2 c x} b^2 d \sqrt{c x^2} \left(2 \sqrt{c x^2} \operatorname{ArcTan}[c x^2]^2 - 4 \left(\frac{1}{2 \sqrt{2}} \operatorname{ArcTan}[c x^2] \left(-2 \operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right] + \right. \right. \right. \\
 & \quad \left. \left. 2 \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right] + \operatorname{Log}\left[1 + c x^2 - \sqrt{2} \sqrt{c x^2}\right] - \operatorname{Log}\left[1 + c x^2 + \sqrt{2} \sqrt{c x^2}\right] \right) \right) - \\
 & \frac{1}{2 \sqrt{2}} \left(- \left(\operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right] + \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right] \right) \operatorname{Log}\left[1 + c x^2 - \sqrt{2} \sqrt{c x^2}\right] + \right. \\
 & \quad \left(\operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right] + \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right] \right) \operatorname{Log}\left[1 + c x^2 + \sqrt{2} \sqrt{c x^2}\right] - \\
 & \quad \left(\sqrt{c x^2} \left(1 + \left(1 - \sqrt{2} \sqrt{c x^2} \right)^2 \right)^{3/2} \right. \\
 & \quad \left. \left(2 \left(-5 \operatorname{ArcTan}[2 + i] \operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right] + 4 \operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right]^2 + \right. \right. \right. \\
 & \quad \left. \left. \left(1 + 2 i \right) \sqrt{1 + i} e^{-i \operatorname{ArcTan}[2 + i]} \operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right]^2 + \left(1 - 2 i \right) \sqrt{1 - i} \right. \right. \\
 & \quad \left. \left. e^{-\operatorname{ArcTan}[1 + 2 i]} \operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right]^2 - 5 i \operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right] \right. \right. \\
 & \quad \left. \left. \operatorname{ArcTanh}[1 + 2 i] + 5 i \left(-\operatorname{ArcTan}[2 + i] + \operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right] \right) \right. \right. \\
 & \quad \left. \left. \operatorname{Log}\left[1 - e^{2 i \left(-\operatorname{ArcTan}[2 + i] + \operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right] \right)}\right] + 5 \left(-i \operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right] + \right. \right. \right. \\
 & \quad \left. \left. \operatorname{ArcTanh}[1 + 2 i] \right) \operatorname{Log}\left[1 - e^{2 i \operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right] - 2 \operatorname{ArcTanh}[1 + 2 i]}\right] + \right. \\
 & \quad \left. 5 i \operatorname{ArcTan}[2 + i] \operatorname{Log}\left[-\operatorname{Sin}\left[\operatorname{ArcTan}[2 + i] - \operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right]\right]\right] - \right. \\
 & \quad \left. \left. 5 \operatorname{ArcTanh}[1 + 2 i] \operatorname{Log}\left[\operatorname{Sin}\left[\operatorname{ArcTan}\left[1 - \sqrt{2} \sqrt{c x^2}\right] + i \operatorname{ArcTanh}[1 + 2 i]\right]\right] \right) \right) +
 \end{aligned}$$

$$\begin{aligned}
 & 5 \operatorname{PolyLog}\left[2, e^{2 i \left(-\operatorname{ArcTan}[2+i]+\operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right)}\right]-5 \operatorname{PolyLog}\left[2, e^{2 i \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]-2 \operatorname{ArcTanh}[1+2 i]}\right]\left(3+2 \operatorname{Cos}\left[2 \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right]-\right. \\
 & \left.2 \operatorname{Sin}\left[2 \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right]\right) / \left(20 \sqrt{2}\left(-1-c x^2+\sqrt{2} \sqrt{c x^2}\right)\right. \\
 & \left.\left(1+c x^2+\sqrt{2} \sqrt{c x^2}\right)\left(\frac{1}{\sqrt{1+\left(1-\sqrt{2} \sqrt{c x^2}\right)^2}}-\frac{1-\sqrt{2} \sqrt{c x^2}}{\sqrt{1+\left(1-\sqrt{2} \sqrt{c x^2}\right)^2}}\right)\right)+ \\
 & \frac{1}{1+c x^2+\sqrt{2} \sqrt{c x^2}}\left(\frac{1}{20}+\frac{i}{20}\right) e^{-i \operatorname{ArcTan}[2+i]-\operatorname{ArcTanh}[1+2 i]}\left(-1-c x^2+\sqrt{2} \sqrt{c x^2}\right) \\
 & \left(\left(5+5 i\right) e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \pi \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]+10 i\right. \\
 & e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}[2+i] \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]+\left(2-4 i\right) \sqrt{1-i} \\
 & e^{i \operatorname{ArcTan}[2+i]} \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]^2+\left(4-2 i\right) \sqrt{1+i} e^{\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]^2- \\
 & \left(8-8 i\right) e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]^2- \\
 & 10 i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right] \operatorname{ArcTanh}[1+2 i]+ \\
 & \left(5-5 i\right) e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \pi \operatorname{Log}\left[1+e^{-2 i \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]}\right]-10 \\
 & e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}[2+i] \operatorname{Log}\left[1-e^{2 i\left(-\operatorname{ArcTan}[2+i]+\operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right)}\right]+ \\
 & 10 e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right] \\
 & \operatorname{Log}\left[1-e^{2 i\left(-\operatorname{ArcTan}[2+i]+\operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right)}\right]-10 i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \\
 & \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right] \operatorname{Log}\left[1-e^{2 i \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]-2 \operatorname{ArcTanh}[1+2 i]}\right]+10 \\
 & e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTanh}[1+2 i] \\
 & \operatorname{Log}\left[1-e^{2 i \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]-2 \operatorname{ArcTanh}[1+2 i]}\right]-\left(5-5 i\right) e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \\
 & \pi \operatorname{Log}\left[\frac{1}{\sqrt{1+\left(1-\sqrt{2} \sqrt{c x^2}\right)^2}}\right]+10 e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}[2+i] \\
 & \operatorname{Log}\left[-\operatorname{Sin}\left[\operatorname{ArcTan}[2+i]-\operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right]\right]-10 e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \\
 & \operatorname{ArcTanh}[1+2 i] \operatorname{Log}\left[\operatorname{Sin}\left[\operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]+i \operatorname{ArcTanh}[1+2 i]\right]\right]-5
 \end{aligned}$$

$$\begin{aligned}
 & \left. \begin{aligned}
 & i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{PolyLog}\left[2, e^{2 i\left(-\operatorname{ArcTan}[2+i]+\operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right)}\right]-5 \\
 & e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{PolyLog}\left[2, e^{2 i \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]-2 \operatorname{ArcTanh}[1+2 i]}\right]
 \end{aligned} \right) \\
 & \left(3+2 \operatorname{Cos}\left[2 \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right]-2 \operatorname{Sin}\left[2 \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right]\right)+ \\
 & \left(\left(\frac{1}{40}+\frac{i}{40}\right) c e^{-i \operatorname{ArcTan}[2+i]-\operatorname{ArcTanh}[1+2 i]} x^2\left(1+\left(1-\sqrt{2} \sqrt{c x^2}\right)^2\right)\right. \\
 & \left.\left(\left(5+5 i\right) e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \pi \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]+ \right. \right. \\
 & 10 e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}[2+i] \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]+ \\
 & (4+2 i) \sqrt{1-i} e^{i \operatorname{ArcTan}[2+i]} \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]^2- \\
 & (2+4 i) \sqrt{1+i} e^{\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]^2+(4-4 i) \\
 & e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]^2+10 e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \\
 & \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right] \operatorname{ArcTanh}[1+2 i]+(5-5 i) e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \\
 & \pi \operatorname{Log}\left[1+e^{-2 i \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]}\right]+10 i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}[2+i] \\
 & \operatorname{Log}\left[1-e^{2 i\left(-\operatorname{ArcTan}[2+i]+\operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right)}\right]-10 i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \\
 & \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right] \operatorname{Log}\left[1-e^{2 i\left(-\operatorname{ArcTan}[2+i]+\operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right)}\right]+ \\
 & 10 e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right] \\
 & \operatorname{Log}\left[1-e^{2 i \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]-2 \operatorname{ArcTanh}[1+2 i]}\right]+10 i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \\
 & \operatorname{ArcTanh}[1+2 i] \operatorname{Log}\left[1-e^{2 i \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]-2 \operatorname{ArcTanh}[1+2 i]}\right]- \\
 & (5-5 i) e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \pi \operatorname{Log}\left[\frac{1}{\sqrt{1+\left(1-\sqrt{2} \sqrt{c x^2}\right)^2}}\right]- \\
 & 10 i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}[2+i] \operatorname{Log}\left[\right. \\
 & \quad \left. -\operatorname{Sin}\left[\operatorname{ArcTan}[2+i]-\operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right]\right]-10 i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \\
 & \operatorname{ArcTanh}[1+2 i] \operatorname{Log}\left[\operatorname{Sin}\left[\operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]+i \operatorname{ArcTanh}[1+2 i]\right]\right]- \\
 & 5 e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{PolyLog}\left[2, e^{2 i\left(-\operatorname{ArcTan}[2+i]+\operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right)}\right]-
 \end{aligned}
 \end{aligned}$$

$$\begin{aligned}
& \left. 5 i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{PolyLog}\left[2, e^{2 i \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]-2 \operatorname{ArcTanh}[1+2 i]}\right]\right) \\
& \left. \left(3+2 \operatorname{Cos}\left[2 \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right]-2 \operatorname{Sin}\left[2 \operatorname{ArcTan}\left[1-\sqrt{2} \sqrt{c x^2}\right]\right]\right)\right) / \\
& \left(\left(-1-c x^2+\sqrt{2} \sqrt{c x^2}\right)\left(1+c x^2+\sqrt{2} \sqrt{c x^2}\right)\left(\frac{1}{\sqrt{1+\left(1-\sqrt{2} \sqrt{c x^2}\right)^2}}-\frac{1-\sqrt{2} \sqrt{c x^2}}{\sqrt{1+\left(1-\sqrt{2} \sqrt{c x^2}\right)^2}}\right)^2\right. \\
& \left.-\left(\sqrt{c x^2}\left(1+\left(1+\sqrt{2} \sqrt{c x^2}\right)^2\right)^{3/2}\right)\right) \\
& \left(2\left(-5 \operatorname{ArcTan}[2+i] \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]+4 \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]^2+\right.\right. \\
& \quad \left.\left.(1+2 i\right) \sqrt{1+i} e^{-i \operatorname{ArcTan}[2+i]} \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]^2+\left(1-2 i\right) \sqrt{1-i} e^{-\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]^2-5 i \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right] \operatorname{ArcTanh}[1+2 i]\right. \\
& \quad \left.+5 i\left(-\operatorname{ArcTan}[2+i]+\operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]\right)\right) \\
& \quad \left.\operatorname{Log}\left[1-e^{2 i\left(-\operatorname{ArcTan}[2+i]+\operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]\right)}\right]+5\left(-i \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]+\operatorname{ArcTanh}[1+2 i]\right)\right) \\
& \quad \left.\operatorname{Log}\left[1-e^{2 i \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]-2 \operatorname{ArcTanh}[1+2 i]}\right]+5 i \operatorname{ArcTan}[2+i] \operatorname{Log}\left[-\operatorname{Sin}\left[\operatorname{ArcTan}[2+i]-\operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]\right]\right]-\right. \\
& \quad \left.5 \operatorname{ArcTanh}[1+2 i] \operatorname{Log}\left[\operatorname{Sin}\left[\operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]+i \operatorname{ArcTanh}[1+2 i]\right]\right]\right) + \\
& \quad \left.5 \operatorname{PolyLog}\left[2, e^{2 i\left(-\operatorname{ArcTan}[2+i]+\operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]\right)}\right]-5 \operatorname{PolyLog}\left[2, e^{2 i \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]-2 \operatorname{ArcTanh}[1+2 i]}\right]\right) \\
& \left. \left(3+2 \operatorname{Cos}\left[2 \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]\right]-2 \operatorname{Sin}\left[2 \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]\right]\right)\right) /
\end{aligned}$$

$$\left(20 \sqrt{2} \left(-1 - c x^2 + \sqrt{2} \sqrt{c x^2} \right) \left(1 + c x^2 + \sqrt{2} \sqrt{c x^2} \right) \right.$$

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

$$\frac{1}{-1 - c x^2 + \sqrt{2} \sqrt{c x^2}} \left(\frac{1}{20} + \frac{i}{20} \right) e^{-i \operatorname{ArcTan}[2+i] - \operatorname{ArcTanh}[1+2 i]} \left(1 + c x^2 + \sqrt{2} \sqrt{c x^2} \right)$$

$$\left((5 + 5 i) e^{i \operatorname{ArcTan}[2+i] + \operatorname{ArcTanh}[1+2 i]} \pi \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right] + 10 i \right.$$

$$e^{i \operatorname{ArcTan}[2+i] + \operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}[2 + i] \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right] + (2 - 4 i)$$

$$\sqrt{1 - i} e^{i \operatorname{ArcTan}[2+i]} \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right]^2 + (4 - 2 i) \sqrt{1 + i}$$

$$e^{\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right]^2 - (8 - 8 i) e^{i \operatorname{ArcTan}[2+i] + \operatorname{ArcTanh}[1+2 i]}$$

$$\operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right]^2 - 10 i e^{i \operatorname{ArcTan}[2+i] + \operatorname{ArcTanh}[1+2 i]}$$

$$\operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right] \operatorname{ArcTanh}[1 + 2 i] + (5 - 5 i) e^{i \operatorname{ArcTan}[2+i] + \operatorname{ArcTanh}[1+2 i]}$$

$$\pi \operatorname{Log}\left[1 + e^{-2 i \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right]}\right] - 10 e^{i \operatorname{ArcTan}[2+i] + \operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}[2 + i]$$

$$\operatorname{Log}\left[1 - e^{2 i \left(-\operatorname{ArcTan}[2+i] + \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right]\right)}\right] + 10 e^{i \operatorname{ArcTan}[2+i] + \operatorname{ArcTanh}[1+2 i]}$$

$$\operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right] \operatorname{Log}\left[1 - e^{2 i \left(-\operatorname{ArcTan}[2+i] + \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right]\right)}\right] - 10$$

$$i e^{i \operatorname{ArcTan}[2+i] + \operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right]$$

$$\operatorname{Log}\left[1 - e^{2 i \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right] - 2 \operatorname{ArcTanh}[1+2 i]}\right] + 10 e^{i \operatorname{ArcTan}[2+i] + \operatorname{ArcTanh}[1+2 i]}$$

$$\operatorname{ArcTanh}[1 + 2 i] \operatorname{Log}\left[1 - e^{2 i \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right] - 2 \operatorname{ArcTanh}[1+2 i]}\right] - (5 - 5 i)$$

$$e^{i \operatorname{ArcTan}[2+i] + \operatorname{ArcTanh}[1+2 i]} \pi \operatorname{Log}\left[\frac{1}{\sqrt{1 + \left(1 + \sqrt{2} \sqrt{c x^2} \right)^2}}\right] + 10$$

$$e^{i \operatorname{ArcTan}[2+i] + \operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}[2 + i]$$

$$\operatorname{Log}\left[-\operatorname{Sin}\left[\operatorname{ArcTan}[2 + i] - \operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right]\right]\right] - 10 e^{i \operatorname{ArcTan}[2+i] + \operatorname{ArcTanh}[1+2 i]}$$

$$\operatorname{ArcTanh}[1 + 2 i] \operatorname{Log}\left[\operatorname{Sin}\left[\operatorname{ArcTan}\left[1 + \sqrt{2} \sqrt{c x^2}\right] + i \operatorname{ArcTanh}[1 + 2 i]\right]\right] - 5$$

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

$$\left. e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{PolyLog}\left[2, e^{2 i \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]-2 \operatorname{ArcTanh}[1+2 i]}\right]\right)$$

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

$$\left(\left(\frac{1}{40}+\frac{i}{40}\right) c e^{-i \operatorname{ArcTan}[2+i]-\operatorname{ArcTanh}[1+2 i]} x^2\left(1+\left(1+\sqrt{2} \sqrt{c x^2}\right)^2\right)\right)$$

$$\left(\left(5+5 i\right) e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \pi \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]+$$

$$10 e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}[2+i] \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]+$$

$$(4+2 i) \sqrt{1-i} e^{i \operatorname{ArcTan}[2+i]} \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]^2-$$

$$(2+4 i) \sqrt{1+i} e^{\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]^2+(4-4 i)$$

$$e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]^2+10 e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]}$$

$$\operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right] \operatorname{ArcTanh}[1+2 i]+(5-5 i) e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]}$$

$$\pi \operatorname{Log}\left[1+e^{-2 i \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]}\right]+10 i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}[2+i]$$

$$\operatorname{Log}\left[1-e^{2 i\left(-\operatorname{ArcTan}[2+i]+\operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]\right)}\right]-10 i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]}$$

$$\operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right] \operatorname{Log}\left[1-e^{2 i\left(-\operatorname{ArcTan}[2+i]+\operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]\right)}\right]+$$

$$10 e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]$$

$$\operatorname{Log}\left[1-e^{2 i \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]-2 \operatorname{ArcTanh}[1+2 i]}\right]+10 i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]}$$

$$\operatorname{ArcTanh}[1+2 i] \operatorname{Log}\left[1-e^{2 i \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]-2 \operatorname{ArcTanh}[1+2 i]}\right]-$$

$$(5-5 i) e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \pi \operatorname{Log}\left[\frac{1}{\sqrt{1+\left(1+\sqrt{2} \sqrt{c x^2}\right)^2}}\right]-$$

$$10 i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{ArcTan}[2+i] \operatorname{Log}\left[$$

$$-\operatorname{Sin}\left[\operatorname{ArcTan}[2+i]-\operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]\right]\right]-10 i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]}$$

$$\operatorname{ArcTanh}[1+2 i] \operatorname{Log}\left[\operatorname{Sin}\left[\operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]+i \operatorname{ArcTanh}[1+2 i]\right]\right]-$$

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

$$\left. \begin{aligned} & 5 i e^{i \operatorname{ArcTan}[2+i]+\operatorname{ArcTanh}[1+2 i]} \operatorname{PolyLog}\left[2, e^{2 i \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]-2 \operatorname{ArcTanh}[1+2 i]}\right] \\ & \left(3+2 \operatorname{Cos}\left[2 \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]\right]-2 \operatorname{Sin}\left[2 \operatorname{ArcTan}\left[1+\sqrt{2} \sqrt{c x^2}\right]\right]\right) / \\ & \left(\left(-1-c x^2+\sqrt{2} \sqrt{c x^2}\right)\left(1+c x^2+\sqrt{2} \sqrt{c x^2}\right)\right. \\ & \left.\left(\frac{1}{\sqrt{1+\left(1+\sqrt{2} \sqrt{c x^2}\right)^2}}-\frac{1+\sqrt{2} \sqrt{c x^2}}{\sqrt{1+\left(1+\sqrt{2} \sqrt{c x^2}\right)^2}}\right)\right) \right) \end{aligned} \right)$$

Problem 26: Attempted integration timed out after 120 seconds.

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

Optimal (type 8, 23 leaves, 0 steps):

$$\operatorname{Int}\left[\frac{(a+b \operatorname{ArcTan}[c x^2])^2}{d+e x}, x\right]$$

Result (type 1, 1 leaves):

???

Problem 28: Attempted integration timed out after 120 seconds.

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

Optimal (type 3, 315 leaves, 24 steps):

$$\begin{aligned}
 & -\frac{b d e \operatorname{ArcTan}\left[c^{1/3} x\right]}{c^{2/3}} - \frac{b d^3 \operatorname{ArcTan}\left[c x^3\right]}{3 e} + \frac{(d+e x)^3 (a+b \operatorname{ArcTan}\left[c x^3\right])}{3 e} + \\
 & \frac{b d e \operatorname{ArcTan}\left[\sqrt{3}-2 c^{1/3} x\right]}{2 c^{2/3}} - \frac{b d e \operatorname{ArcTan}\left[\sqrt{3}+2 c^{1/3} x\right]}{2 c^{2/3}} + \frac{\sqrt{3} b d^2 \operatorname{ArcTan}\left[\frac{1-2 c^{2/3} x^2}{\sqrt{3}}\right]}{2 c^{1/3}} + \\
 & \frac{b d^2 \operatorname{Log}\left[1+c^{2/3} x^2\right]}{2 c^{1/3}} - \frac{\sqrt{3} b d e \operatorname{Log}\left[1-\sqrt{3} c^{1/3} x+c^{2/3} x^2\right]}{4 c^{2/3}} + \\
 & \frac{\sqrt{3} b d e \operatorname{Log}\left[1+\sqrt{3} c^{1/3} x+c^{2/3} x^2\right]}{4 c^{2/3}} - \frac{b d^2 \operatorname{Log}\left[1-c^{2/3} x^2+c^{4/3} x^4\right]}{4 c^{1/3}} - \frac{b e^2 \operatorname{Log}\left[1+c^2 x^6\right]}{6 c}
 \end{aligned}$$

Result (type 1, 1 leaves):

???

Problem 30: Attempted integration timed out after 120 seconds.

$$\int \frac{a+b \operatorname{ArcTan}\left[c x^3\right]}{d+e x} d x$$

Optimal (type 4, 739 leaves, 25 steps):

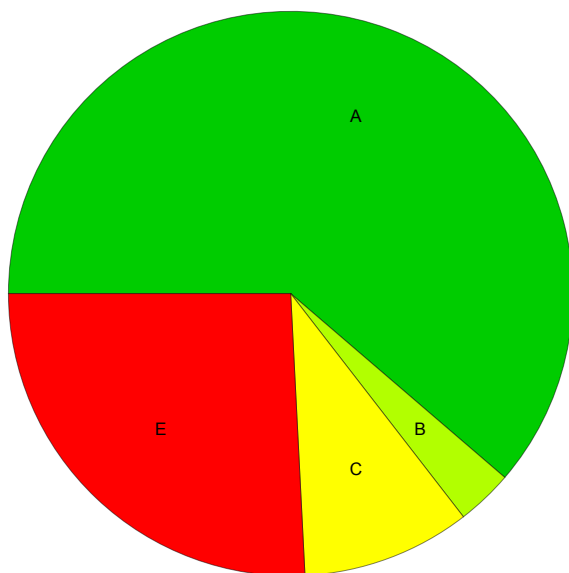
$$\begin{aligned}
 & \frac{(a+b \operatorname{ArcTan}\left[c x^3\right]) \operatorname{Log}[d+e x]}{e} + \frac{b c \operatorname{Log}\left[\frac{e\left(1-\left(-c^2\right)^{1/6} x\right)}{\left(-c^2\right)^{1/6} d+e}\right] \operatorname{Log}[d+e x]}{2 \sqrt{-c^2} e} - \\
 & \frac{b c \operatorname{Log}\left[-\frac{e\left(1+\left(-c^2\right)^{1/6} x\right)}{\left(-c^2\right)^{1/6} d-e}\right] \operatorname{Log}[d+e x]}{2 \sqrt{-c^2} e} + \frac{b c \operatorname{Log}\left[-\frac{e\left(\left(-1\right)^{1/3}+\left(-c^2\right)^{1/6} x\right)}{\left(-c^2\right)^{1/6} d-\left(-1\right)^{1/3} e}\right] \operatorname{Log}[d+e x]}{2 \sqrt{-c^2} e} - \\
 & \frac{b c \operatorname{Log}\left[-\frac{e\left(\left(-1\right)^{2/3}+\left(-c^2\right)^{1/6} x\right)}{\left(-c^2\right)^{1/6} d-\left(-1\right)^{2/3} e}\right] \operatorname{Log}[d+e x]}{2 \sqrt{-c^2} e} + \frac{b c \operatorname{Log}\left[\frac{\left(-1\right)^{2/3} e\left(1+\left(-1\right)^{1/3}\left(-c^2\right)^{1/6} x\right)}{\left(-c^2\right)^{1/6} d+\left(-1\right)^{2/3} e}\right] \operatorname{Log}[d+e x]}{2 \sqrt{-c^2} e} - \\
 & \frac{b c \operatorname{Log}\left[\frac{\left(-1\right)^{1/3} e\left(1+\left(-1\right)^{2/3}\left(-c^2\right)^{1/6} x\right)}{\left(-c^2\right)^{1/6} d+\left(-1\right)^{1/3} e}\right] \operatorname{Log}[d+e x]}{2 \sqrt{-c^2} e} - \frac{b c \operatorname{PolyLog}\left[2, \frac{\left(-c^2\right)^{1/6}(d+e x)}{\left(-c^2\right)^{1/6} d-e}\right]}{2 \sqrt{-c^2} e} + \\
 & \frac{b c \operatorname{PolyLog}\left[2, \frac{\left(-c^2\right)^{1/6}(d+e x)}{\left(-c^2\right)^{1/6} d+e}\right]}{2 \sqrt{-c^2} e} + \frac{b c \operatorname{PolyLog}\left[2, \frac{\left(-c^2\right)^{1/6}(d+e x)}{\left(-c^2\right)^{1/6} d-\left(-1\right)^{1/3} e}\right]}{2 \sqrt{-c^2} e} - \frac{b c \operatorname{PolyLog}\left[2, \frac{\left(-c^2\right)^{1/6}(d+e x)}{\left(-c^2\right)^{1/6} d+\left(-1\right)^{1/3} e}\right]}{2 \sqrt{-c^2} e} - \\
 & \frac{b c \operatorname{PolyLog}\left[2, \frac{\left(-c^2\right)^{1/6}(d+e x)}{\left(-c^2\right)^{1/6} d-\left(-1\right)^{2/3} e}\right]}{2 \sqrt{-c^2} e} + \frac{b c \operatorname{PolyLog}\left[2, \frac{\left(-c^2\right)^{1/6}(d+e x)}{\left(-c^2\right)^{1/6} d+\left(-1\right)^{2/3} e}\right]}{2 \sqrt{-c^2} e}
 \end{aligned}$$

Result (type 1, 1 leaves):

???

Summary of Integration Test Results

31 integration problems



A - 19 optimal antiderivatives

B - 1 more than twice size of optimal antiderivatives

C - 3 unnecessarily complex antiderivatives

D - 0 unable to integrate problems

E - 8 integration timeouts