Mathematica 11.3 Integration Test Results

Test results for the 456 problems in "3.1.4 (f x)^m (d+e x^r)^q (a+b log(c x^n))^p.m"

Problem 56: Result more than twice size of optimal antiderivative.

$$\int \frac{x^2 \left(a+b \,\text{Log}\left[c\, x^n\right]\right)}{(d+e\, x)^4}\, dx$$

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

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

Result (type 3, 170 leaves):

$$-\frac{1}{6\, d\, e^3\, (d+e\, x)^3}\Big(2\, a\, d^3+3\, b\, d^3\, n+6\, a\, d^2\, e\, x+7\, b\, d^2\, e\, n\, x+6\, a\, d\, e^2\, x^2+4\, b\, d\, e^2\, n\, x^2-2\, b\, n\, (d+e\, x)^3\, \text{Log}[x]+ 2\, b\, d\, \left(d^2+3\, d\, e\, x+3\, e^2\, x^2\right)\, \text{Log}\left[c\, x^n\right]+2\, b\, d^3\, n\, \text{Log}[d+e\, x]+6\, b\, d^2\, e\, n\, x\, \text{Log}[d+e\, x]+ 6\, b\, d\, e^2\, n\, x^2\, \text{Log}[d+e\, x]+2\, b\, e^3\, n\, x^3\, \text{Log}[d+e\, x]\Big)$$

Problem 64: Result more than twice size of optimal antiderivative.

$$\int \frac{x^6 \left(a+b\, \text{Log}\left[c\, x^n\right]\right)}{(d+e\, x)^7}\, dx$$

Optimal (type 4, 243 leaves, 8 steps):

$$-\frac{x^6 \left(a+b\, \text{Log}\left[c\, x^n\right]\right)}{6\, e\, (d+e\, x)^6}-\frac{x^5 \left(6\, a+b\, n+6\, b\, \text{Log}\left[c\, x^n\right]\right)}{30\, e^2\, (d+e\, x)^5}- \frac{x^2 \left(20\, a+19\, b\, n+20\, b\, \text{Log}\left[c\, x^n\right]\right)}{40\, e^5\, (d+e\, x)^2}-\frac{x \left(20\, a+29\, b\, n+20\, b\, \text{Log}\left[c\, x^n\right]\right)}{20\, e^6\, (d+e\, x)}- \frac{x^4 \left(30\, a+11\, b\, n+30\, b\, \text{Log}\left[c\, x^n\right]\right)}{120\, e^3\, (d+e\, x)^4}-\frac{x^3 \left(60\, a+37\, b\, n+60\, b\, \text{Log}\left[c\, x^n\right]\right)}{180\, e^4\, (d+e\, x)^3}+ \frac{\left(20\, a+49\, b\, n+20\, b\, \text{Log}\left[c\, x^n\right]\right)\, \text{Log}\left[1+\frac{e\, x}{d}\right]}{20\, e^7}+\frac{b\, n\, \text{PolyLog}\left[2,-\frac{e\, x}{d}\right]}{e^7}$$

Result (type 4, 673 leaves):

$$\frac{1}{360 e^7 (d+e x)^6}\Big(882 a d^6+812 b d^6 n+4932 a d^5 e x+4350 b d^5 e n x+11250 a d^4 e^2 x^2+9399 b d^4 e^2 n x^2+13200 a d^3 e^3 x^3+10262 b d^3 e^3 n x^3+8100 a d^2 e^4 x^4+5679 b d^2 e^4 n x^4+2160 a d e^5 x^5+1278 b d e^5 n x^5+882 b d^6 \text{Log}[c x^n]+4932 b d^5 e x \text{Log}[c x^n]+11250 b d^4 e^2 x^2 \text{Log}[c x^n]+13200 b d^3 e^3 x^3 \text{Log}[c x^n]+8100 b d^2 e^4 x^4 \text{Log}[c x^n]+2160 b d e^5 x^5 \text{Log}[c x^n]+360 a d^6 \text{Log}[d+e x]+882 b d^6 n \text{Log}[d+e x]+2160 a d^5 e x \text{Log}[d+e x]+5292 b d^5 e n x \text{Log}[d+e x]+5400 a d^4 e^2 x^2 \text{Log}[d+e x]+13230 b d^4 e^2 n x^2 \text{Log}[d+e x]+7200 a d^3 e^3 x^3 \text{Log}[d+e x]+17640 b d^3 e^3 n x^3 \text{Log}[d+e x]+5400 a d^2 e^4 x^4 \text{Log}[d+e x]+13230 b d^2 e^4 n x^4 \text{Log}[d+e x]+2160 a d e^5 x^5 \text{Log}[d+e x]+5292 b d e^5 n x^5 \text{Log}[d+e x]+360 a e^6 x^6 \text{Log}[d+e x]+882 b e^6 n x^6 \text{Log}[d+e x]+360 b d^6 \text{Log}[c x^n] \text{Log}[d+e x]+2160 b d^5 e x \text{Log}[c x^n] \text{Log}[d+e x]+5400 b d^4 e^2 x^2 \text{Log}[c x^n] \text{Log}[d+e x]+7200 b d^3 e^3 x^3 \text{Log}[c x^n] \text{Log}[d+e x]+5400 b d^2 e^4 x^4 \text{Log}[c x^n] \text{Log}[d+e x]+2160 b d e^5 x^5 \text{Log}[c x^n] \text{Log}[d+e x]+360 b e^6 x^6 \text{Log}[c x^n] \text{Log}[d+e x]-18 b n (d+e x)^6 \text{Log}[x]\left(49+20 \text{Log}[d+e x]-20 \text{Log}\left[1+\frac{e x}{d}\right]\right)+360 b n (d+e x)^6 \text{PolyLog}\left[2,-\frac{e x}{d}\right]\Big)$$

Problem 65: Result more than twice size of optimal antiderivative.

$$\int \frac{x^5 (a+b \text{Log}[c x^n])}{(d+e x)^7} \, dx$$

Optimal (type 3, 136 leaves, 3 steps):

$$-\frac{b d^4 n}{30 e^6 (d+e x)^5}+\frac{5 b d^3 n}{24 e^6 (d+e x)^4}-\frac{5 b d^2 n}{9 e^6 (d+e x)^3}+\frac{5 b d n}{6 e^6 (d+e x)^2}-\frac{5 b n}{6 e^6 (d+e x)}+\frac{x^6 (a+b \text{Log}[c x^n])}{6 d (d+e x)^6}-\frac{b n \text{Log}[d+e x]}{6 d e^6}$$

Result (type 3, 335 leaves):

$$-\frac{1}{360 d e^6 (d+e x)^6}\Big(60 a d^6+137 b d^6 n+360 a d^5 e x+762 b d^5 e n x+900 a d^4 e^2 x^2+1725 b d^4 e^2 n x^2+1200 a d^3 e^3 x^3+2000 b d^3 e^3 n x^3+900 a d^2 e^4 x^4+1200 b d^2 e^4 n x^4+360 a d e^5 x^5+300 b d e^5 n x^5-60 b n (d+e x)^6 \text{Log}[x]+60 b d (d^5+6 d^4 e x+15 d^3 e^2 x^2+20 d^2 e^3 x^3+15 d e^4 x^4+6 e^5 x^5) \text{Log}[c x^n]+60 b d^6 n \text{Log}[d+e x]+360 b d^5 e n x \text{Log}[d+e x]+900 b d^4 e^2 n x^2 \text{Log}[d+e x]+1200 b d^3 e^3 n x^3 \text{Log}[d+e x]+900 b d^2 e^4 n x^4 \text{Log}[d+e x]+360 b d e^5 n x^5 \text{Log}[d+e x]+60 b e^6 n x^6 \text{Log}[d+e x]\Big)$$

Problem 75: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Log}\left[\frac{x}{c}\right]}{c-x} \, dx$$

Optimal (type 4, 10 leaves, 1 step):

$$\text{PolyLog}\left[2,\ 1-\frac{x}{c}\right]$$

Result (type 4, 27 leaves):

$$-\text{Log}\left[\frac{x}{c}\right]\ \text{Log}\left[1-\frac{x}{c}\right]-\text{PolyLog}\left[2,\ \frac{x}{c}\right]$$

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

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

Optimal (type 4, 161 leaves, 5 steps):

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

Result (type 4, 612 leaves):

$$-\frac{(a+b\ (-n\ \text{Log}[x]+\text{Log}[c\ x^n]))^2}{e^3\ (d+e\ x)}+\frac{a^2\ d+2\ a\ b\ d\ (-n\ \text{Log}[x]+\text{Log}[c\ x^n])+b^2\ d\ (-n\ \text{Log}[x]+\text{Log}[c\ x^n])^2}{e^3\ (d+e\ x)^2}+\frac{1}{3\ e^3\ (d+e\ x)^3}\left(-a^2\ d^2-2\ a\ b\ d^2\ (-n\ \text{Log}[x]+\text{Log}[c\ x^n])-b^2\ d^2\ (-n\ \text{Log}[x]+\text{Log}[c\ x^n])^2\right)+$$
$$2\ b\ n\ (a+b\ (-n\ \text{Log}[x]+\text{Log}[c\ x^n]))\left(\frac{\frac{x\ \text{Log}[x]}{d+e\ x}-\frac{\text{Log}[d+e\ x]}{e}}{d\ e^2}-\frac{e\ x\ (2\ d+e\ x)\ \text{Log}[x]-(d+e\ x)\ (-d+(d+e\ x)\ \text{Log}[d+e\ x])}{d\ e^3\ (d+e\ x)^2}+\frac{1}{6\ d\ e^3\ (d+e\ x)^3}\left(2\ e\ x\ (3\ d^2+3\ d\ e\ x+e^2\ x^2)\ \text{Log}[x]-(d+e\ x)\ \left(-d\ (3\ d+2\ e\ x)+2\ (d+e\ x)^2\ \text{Log}[d+e\ x]\right)\right)\right)+$$
$$b^2\ n^2\left(\frac{1}{d\ e^3\ (d+e\ x)}\left(\text{Log}[x]\ \left(e\ x\ \text{Log}[x]-2\ (d+e\ x)\ \text{Log}\left[1+\frac{e\ x}{d}\right]\right)-2\ (d+e\ x)\ \text{PolyLog}\left[2,\ -\frac{e\ x}{d}\right]\right)-\frac{1}{d\ e^3\ (d+e\ x)^2}\left(e\ x\ (2\ d+e\ x)\ \text{Log}[x]^2+2\ (d+e\ x)^2\ \text{Log}\left[1+\frac{e\ x}{d}\right]-2\ (d+e\ x)\ \text{Log}[x]\ \left(e\ x+(d+e\ x)\ \text{Log}\left[1+\frac{e\ x}{d}\right]\right)-2\ (d+e\ x)^2\ \text{PolyLog}\left[2,\ -\frac{e\ x}{d}\right]\right)+\frac{1}{3\ d\ e^3\ (d+e\ x)^3}\left(e\ x\ (3\ d^2+3\ d\ e\ x+e^2\ x^2)\ \text{Log}[x]^2+(d+e\ x)^2\ \left(e\ x+3\ (d+e\ x)\ \text{Log}\left[1+\frac{e\ x}{d}\right]\right)-(d+e\ x)\ \text{Log}[x]\ \left(e\ x\ (4\ d+3\ e\ x)+2\ (d+e\ x)^2\ \text{Log}\left[1+\frac{e\ x}{d}\right]\right)-2\ (d+e\ x)^3\ \text{PolyLog}\left[2,\ -\frac{e\ x}{d}\right]\right)\right)$$

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

$$\int \frac{x\left(a+b\,\text{Log}[c\,x^n]\right)^2}{(d+e\,x)^4}\,dx$$

Optimal (type 4, 210 leaves, 8 steps):

$$\frac{b^2 n^2}{3\,d\,e^2\,(d+e\,x)}-\frac{b\,n\left(a+b\,\text{Log}[c\,x^n]\right)}{3\,e^2\,(d+e\,x)^2}+\frac{b\,n\left(a+b\,\text{Log}[c\,x^n]\right)}{3\,d\,e^2\,(d+e\,x)}+\frac{\left(a+b\,\text{Log}[c\,x^n]\right)^2}{6\,d^2\,e^2}+\frac{d\left(a+b\,\text{Log}[c\,x^n]\right)^2}{3\,e^2\,(d+e\,x)^3}-\frac{\left(a+b\,\text{Log}[c\,x^n]\right)^2}{2\,e^2\,(d+e\,x)^2}-\frac{b\,n\left(a+b\,\text{Log}[c\,x^n]\right)\text{Log}\left[1+\frac{e\,x}{d}\right]}{3\,d^2\,e^2}-\frac{b^2 n^2\,\text{PolyLog}\left[2,-\frac{e\,x}{d}\right]}{3\,d^2\,e^2}$$

Result (type 4, 441 leaves):

$$-\frac{1}{6\,d^2\,e^2\,(d+e\,x)^3}\Big(a^2 d^3+3\,a^2 d^2\,e\,x-2\,a\,b\,d^2\,e\,n\,x+2\,b^2 d^2\,e\,n^2\,x-2\,a\,b\,d\,e^2\,n\,x^2+4\,b^2\,d\,e^2\,n^2\,x^2+2\,b^2\,e^3\,n^2\,x^3+b^2 n^2\,(d+e\,x)^3\,\text{Log}[x]^2+2\,a\,b\,d^3\,\text{Log}[c\,x^n]+6\,a\,b\,d^2\,e\,x\,\text{Log}[c\,x^n]-2\,b^2 d^2\,e\,n\,x\,\text{Log}[c\,x^n]-2\,b^2\,d\,e^2\,n\,x^2\,\text{Log}[c\,x^n]+b^2 d^3\,\text{Log}[c\,x^n]^2+3\,b^2 d^2\,e\,x\,\text{Log}[c\,x^n]^2+2\,a\,b\,d^3\,n\,\text{Log}[d+e\,x]+6\,a\,b\,d^2\,e\,n\,x\,\text{Log}[d+e\,x]+6\,a\,b\,d\,e^2\,n\,x^2\,\text{Log}[d+e\,x]+2\,a\,b\,e^3\,n\,x^3\,\text{Log}[d+e\,x]+2\,b^2 d^3\,n\,\text{Log}[c\,x^n]\,\text{Log}[d+e\,x]+6\,b^2 d^2\,e\,n\,x\,\text{Log}[c\,x^n]\,\text{Log}[d+e\,x]+6\,b^2\,d\,e^2\,n\,x^2\,\text{Log}[c\,x^n]\,\text{Log}[d+e\,x]+2\,b^2\,e^3\,n\,x^3\,\text{Log}[c\,x^n]\,\text{Log}[d+e\,x]-2\,b\,n\,(d+e\,x)^3\,\text{Log}[x]\left(a+b\,\text{Log}[c\,x^n]+b\,n\,\text{Log}[d+e\,x]-b\,n\,\text{Log}\left[1+\frac{e\,x}{d}\right]\right)+2\,b^2 n^2\,(d+e\,x)^3\,\text{PolyLog}\left[2,-\frac{e\,x}{d}\right]\Big)$$

Problem 121: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 113 leaves, 4 steps):

$$-\frac{\text{Log}\left[1+\frac{d}{e\,x}\right]\left(a+b\,\text{Log}[c\,x^n]\right)^3}{d}+\frac{3\,b\,n\left(a+b\,\text{Log}[c\,x^n]\right)^2\text{PolyLog}\left[2,-\frac{d}{e\,x}\right]}{d}+\frac{6\,b^2 n^2\left(a+b\,\text{Log}[c\,x^n]\right)\text{PolyLog}\left[3,-\frac{d}{e\,x}\right]}{d}+\frac{6\,b^3 n^3\,\text{PolyLog}\left[4,-\frac{d}{e\,x}\right]}{d}$$

Result (type 4, 243 leaves):

$$\frac{1}{4 d}\left(4 \text{Log}[x] \left(a - b n \text{Log}[x] + b \text{Log}[c x^n]\right)^3 - 4 \left(a - b n \text{Log}[x] + b \text{Log}[c x^n]\right)^3 \text{Log}[d + e x] + 6 b n \left(a - b n \text{Log}[x] + b \text{Log}[c x^n]\right)^2 \left(\text{Log}[x]^2 - 2 \left(\text{Log}[x] \text{Log}\left[1 + \frac{e x}{d}\right] + \text{PolyLog}\left[2, -\frac{e x}{d}\right]\right)\right) - 4 b^2 n^2 \left(-a + b n \text{Log}[x] - b \text{Log}[c x^n]\right) \left(\text{Log}[x]^2 \left(\text{Log}[x] - 3 \text{Log}\left[1 + \frac{e x}{d}\right]\right) - 6 \text{Log}[x] \text{PolyLog}\left[2, -\frac{e x}{d}\right] + 6 \text{PolyLog}\left[3, -\frac{e x}{d}\right]\right) + b^3 n^3 \left(\text{Log}[x]^4 - 4 \text{Log}[x]^3 \text{Log}\left[1 + \frac{e x}{d}\right] - 12 \text{Log}[x]^2 \text{PolyLog}\left[2, -\frac{e x}{d}\right] + 24 \text{Log}[x] \text{PolyLog}\left[3, -\frac{e x}{d}\right] - 24 \text{PolyLog}\left[4, -\frac{e x}{d}\right]\right)\right)$$

Problem 134: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 211 leaves, 12 steps):

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

Result (type 5, 177 leaves):

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

Problem 135: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 221 leaves, 11 steps):

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

Result (type 5, 193 leaves) :

$$\frac{1}{\sqrt{d}\sqrt{1+\frac{d}{e x}}\, x}\left(-2 b \sqrt{d}\, n \sqrt{d+e x}\, \text{HypergeometricPFQ}\left[\left\{\frac{1}{2},\frac{1}{2},\frac{1}{2}\right\},\left\{\frac{3}{2},\frac{3}{2}\right\},-\frac{d}{e x}\right]-b \sqrt{e}\, n \sqrt{x} \sqrt{d+e x}\, \text{ArcSinh}\left[\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right](1+\text{Log}[x])-\sqrt{1+\frac{d}{e x}}\left(\sqrt{d}\sqrt{d+e x}\left(a+b n+b \text{Log}\left[c x^n\right]\right)+e x \text{ArcTanh}\left[\frac{\sqrt{d+e x}}{\sqrt{d}}\right]\left(a-b n \text{Log}[x]+b \text{Log}\left[c x^n\right]\right)\right)\right)$$

Problem 136: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 298 leaves, 16 steps) :

$$-\frac{b n \sqrt{d+e x}}{4 x^2}-\frac{3 b e n \sqrt{d+e x}}{8 d x}-\frac{b e^2 n \text{ArcTanh}\left[\frac{\sqrt{d+e x}}{\sqrt{d}}\right]}{8 d^{3/2}}-\frac{b e^2 n \text{ArcTanh}\left[\frac{\sqrt{d+e x}}{\sqrt{d}}\right]^2}{4 d^{3/2}}-\frac{\sqrt{d+e x}\,\left(a+b \text{Log}\left[c x^n\right]\right)}{2 x^2}-\frac{e \sqrt{d+e x}\,\left(a+b \text{Log}\left[c x^n\right]\right)}{4 d x}+\frac{e^2 \text{ArcTanh}\left[\frac{\sqrt{d+e x}}{\sqrt{d}}\right]\left(a+b \text{Log}\left[c x^n\right]\right)}{4 d^{3/2}}+\frac{b e^2 n \text{ArcTanh}\left[\frac{\sqrt{d+e x}}{\sqrt{d}}\right] \text{Log}\left[\frac{2 \sqrt{d}}{\sqrt{d}-\sqrt{d+e x}}\right]}{2 d^{3/2}}+\frac{b e^2 n \text{PolyLog}\left[2,1-\frac{2 \sqrt{d}}{\sqrt{d}-\sqrt{d+e x}}\right]}{4 d^{3/2}}$$

Result (type 5, 208 leaves) :

$$\left(-16\, b\, d^{3/2}\, n\, \sqrt{d+e\, x}\ \text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},\frac{3}{2},\frac{3}{2}\right\},\left\{\frac{5}{2},\frac{5}{2}\right\},-\frac{d}{e\, x}\right]+\right.$$

$$9\, e^2\, \sqrt{1+\frac{d}{e\, x}}\ x^2\, \text{ArcTanh}\left[\frac{\sqrt{d+e\, x}}{\sqrt{d}}\right]\, \left(a-b\, n\, \text{Log}[x]+b\, \text{Log}\left[c\, x^n\right]\right)-$$

$$9\, \sqrt{d+e\, x}\, \left(-b\, e^{3/2}\, n\, x^{3/2}\, \text{ArcSinh}\left[\frac{\sqrt{d}}{\sqrt{e}\, \sqrt{x}}\right]\, \text{Log}[x]+\right.$$

$$\left.\left.\sqrt{d}\, \sqrt{1+\frac{d}{e\, x}}\, (2\, d+e\, x)\, \left(a+b\, \text{Log}\left[c\, x^n\right]\right)\right)\right)\Big/\left(36\, d^{3/2}\, \sqrt{1+\frac{d}{e\, x}}\ x^2\right)$$

Problem 141: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 255 leaves, 18 steps):

$$-\frac{16}{3}\, b\, d\, n\, \sqrt{d+e\, x}-\frac{4}{9}\, b\, n\, (d+e\, x)^{3/2}+\frac{16}{3}\, b\, d^{3/2}\, n\, \text{ArcTanh}\left[\frac{\sqrt{d+e\, x}}{\sqrt{d}}\right]+$$

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

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

$$4\, b\, d^{3/2}\, n\, \text{ArcTanh}\left[\frac{\sqrt{d+e\, x}}{\sqrt{d}}\right]\, \text{Log}\left[\frac{2\, \sqrt{d}}{\sqrt{d}-\sqrt{d+e\, x}}\right]-2\, b\, d^{3/2}\, n\, \text{PolyLog}\left[2,1-\frac{2\, \sqrt{d}}{\sqrt{d}-\sqrt{d+e\, x}}\right]$$

Result (type 5, 272 leaves):

$$\frac{1}{3\sqrt{1+\frac{e\,x}{d}}}b\,n\sqrt{d+e\,x}\left(-3\,e\,x\,\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},1,1\right\},\{2,2\},-\frac{e\,x}{d}\right]+\right.$$

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

$$b\,d\,n\sqrt{d+e\,x}\left(-4\,\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{2},-\frac{1}{2}\right\},\left\{\frac{1}{2},\frac{1}{2}\right\},-\frac{d}{e\,x}\right]+\right.$$

$$\left.2\sqrt{1+\frac{d}{e\,x}}\,\text{Log}[x]-\frac{2\sqrt{d}\,\text{ArcSinh}\left[\frac{\sqrt{d}}{\sqrt{e}\,\sqrt{x}}\right]\text{Log}[x]}{\sqrt{e}\,\sqrt{x}}\right)+$$

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

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

Problem 142: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 259 leaves, 14 steps):

$$-4\,b\,e\,n\sqrt{d+e\,x}-\frac{b\,d\,n\sqrt{d+e\,x}}{x}+3\,b\sqrt{d}\,e\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x}}{\sqrt{d}}\right]+$$

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

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

$$6\,b\sqrt{d}\,e\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x}}{\sqrt{d}}\right]\text{Log}\left[\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x}}\right]-3\,b\sqrt{d}\,e\,n\,\text{PolyLog}\left[2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x}}\right]$$

Result (type 5, 331 leaves):

$$-\frac{1}{\sqrt{1+\frac{d}{e\,x}}\,\sqrt{x}}2\,b\,\sqrt{e}\,n\,\sqrt{d+e\,x}\left(2\,\sqrt{e}\,\sqrt{x}\,\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{2},-\frac{1}{2}\right\},\left\{\frac{1}{2},\frac{1}{2}\right\},-\frac{d}{e\,x}\right]-\sqrt{e}\,\sqrt{1+\frac{d}{e\,x}}\,\sqrt{x}\,\text{Log}[x]+\sqrt{d}\,\text{ArcSinh}\left[\frac{\sqrt{d}}{\sqrt{e}\,\sqrt{x}}\right]\text{Log}[x]\right)-\frac{1}{\sqrt{1+\frac{d}{e\,x}}\,x}b\,\sqrt{d}\,n\,\sqrt{d+e\,x}\left(2\,\sqrt{d}\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},\frac{1}{2},\frac{1}{2}\right\},\left\{\frac{3}{2},\frac{3}{2}\right\},-\frac{d}{e\,x}\right]+\left(\sqrt{d}\,\sqrt{1+\frac{d}{e\,x}}+\sqrt{e}\,\sqrt{x}\,\text{ArcSinh}\left[\frac{\sqrt{d}}{\sqrt{e}\,\sqrt{x}}\right]\right)(1+\text{Log}[x])\right)-\frac{(d-2\,e\,x)\,\sqrt{d+e\,x}\,(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n])}{x}-3\,\sqrt{d}\,e\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x}}{\sqrt{d}}\right](a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n])$$

Problem 143: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 293 leaves, 16 steps):

$$-\frac{b\,d\,n\,\sqrt{d+e\,x}}{4\,x^2}-\frac{11\,b\,e\,n\,\sqrt{d+e\,x}}{8\,x}-\frac{9\,b\,e^2\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x}}{\sqrt{d}}\right]}{8\,\sqrt{d}}+\frac{3\,b\,e^2\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x}}{\sqrt{d}}\right]^2}{4\,\sqrt{d}}-\frac{3\,e\,\sqrt{d+e\,x}\,(a+b\,\text{Log}[c\,x^n])}{4\,x}-\frac{(d+e\,x)^{3/2}\,(a+b\,\text{Log}[c\,x^n])}{2\,x^2}-\frac{3\,e^2\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x}}{\sqrt{d}}\right](a+b\,\text{Log}[c\,x^n])}{4\,\sqrt{d}}-\frac{3\,b\,e^2\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x}}{\sqrt{d}}\right]\text{Log}\left[\frac{2\,\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x}}\right]}{2\,\sqrt{d}}-\frac{3\,b\,e^2\,n\,\text{PolyLog}\left[2,1-\frac{2\,\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x}}\right]}{4\,\sqrt{d}}$$

Result (type 5, 270 leaves):

$$\frac{1}{36\sqrt{d}\sqrt{1+\frac{d}{e x}}\,x^2}\left(-16\,b\,d^{3/2}\,n\sqrt{d+e x}\,\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},\frac{3}{2},\frac{3}{2}\right\},\left\{\frac{5}{2},\frac{5}{2}\right\},-\frac{d}{e x}\right]-\right.$$
$$9\left(8\,b\sqrt{d}\,e\,n\,x\sqrt{d+e x}\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},\frac{1}{2},\frac{1}{2}\right\},\left\{\frac{3}{2},\frac{3}{2}\right\},-\frac{d}{e x}\right]+\right.$$
$$b\,e^{3/2}\,n\,x^{3/2}\sqrt{d+e x}\,\text{ArcSinh}\left[\frac{\sqrt{d}}{\sqrt{e}\sqrt{x}}\right]\left(4+3\,\text{Log}[x]\right)+$$
$$\sqrt{1+\frac{d}{e x}}\left(3\,e^2\,x^2\,\text{ArcTanh}\left[\frac{\sqrt{d+e x}}{\sqrt{d}}\right]\left(a-b\,n\,\text{Log}[x]+b\,\text{Log}\left[c\,x^n\right]\right)+\right.$$
$$\left.\left.\left.\sqrt{d}\sqrt{d+e x}\left(2\,a\,d+5\,a\,e\,x+4\,b\,e\,n\,x+b\left(2\,d+5\,e\,x\right)\text{Log}\left[c\,x^n\right]\right)\right)\right)\right)$$

Problem 148: Result unnecessarily involves higher level functions.

$$\int\frac{a+b\,\text{Log}\left[c\,x^n\right]}{x\sqrt{d+e x}}\,dx$$

Optimal (type 4, 152 leaves, 7 steps):

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

Result (type 5, 132 leaves):

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

Problem 149: Result unnecessarily involves higher level functions.

$$\int \frac{a + b \operatorname{Log}[c x^n]}{x^2 \sqrt{d + e x}} \, dx$$

Optimal (type 4, 226 leaves, 11 steps):

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

Result (type 5, 191 leaves):

$$\frac{1}{9 d^{3/2} x \sqrt{d+e x}} \left(2 b d^{3/2} n \sqrt{1 + \frac{d}{e x}} \operatorname{HypergeometricPFQ}\left[\left\{\frac{3}{2}, \frac{3}{2}, \frac{3}{2}\right\}, \left\{\frac{5}{2}, \frac{5}{2}\right\}, -\frac{d}{e x}\right] + 9 b e^{3/2} n \sqrt{1 + \frac{d}{e x}} x^{3/2} \operatorname{ArcSinh}\left[\frac{\sqrt{d}}{\sqrt{e} \sqrt{x}}\right] \left(1 + \operatorname{Log}[x]\right) - 9 \sqrt{d} (d + e x) \left(a + b n + b \operatorname{Log}[c x^n]\right) + 9 e x \sqrt{d+e x} \operatorname{ArcTanh}\left[\frac{\sqrt{d+e x}}{\sqrt{d}}\right] \left(a - b n \operatorname{Log}[x] + b \operatorname{Log}[c x^n]\right)\right)$$

Problem 150: Result unnecessarily involves higher level functions.

$$\int \frac{a + b \operatorname{Log}[c x^n]}{x^3 \sqrt{d + e x}} \, dx$$

Optimal (type 4, 304 leaves, 16 steps):

$$-\frac{b n \sqrt{d+e x}}{4 d x^2} + \frac{5 b e n \sqrt{d+e x}}{8 d^2 x} + \frac{7 b e^2 n \operatorname{ArcTanh}\left[\frac{\sqrt{d+e x}}{\sqrt{d}}\right]}{8 d^{5/2}} + \frac{3 b e^2 n \operatorname{ArcTanh}\left[\frac{\sqrt{d+e x}}{\sqrt{d}}\right]^2}{4 d^{5/2}} - \frac{\sqrt{d+e x} \left(a + b \operatorname{Log}[c x^n]\right)}{2 d x^2} + \frac{3 e \sqrt{d+e x} \left(a + b \operatorname{Log}[c x^n]\right)}{4 d^2 x} - \frac{3 e^2 \operatorname{ArcTanh}\left[\frac{\sqrt{d+e x}}{\sqrt{d}}\right] \left(a + b \operatorname{Log}[c x^n]\right)}{4 d^{5/2}} - \frac{3 b e^2 n \operatorname{ArcTanh}\left[\frac{\sqrt{d+e x}}{\sqrt{d}}\right] \operatorname{Log}\left[\frac{2 \sqrt{d}}{\sqrt{d}-\sqrt{d+e x}}\right]}{2 d^{5/2}} - \frac{3 b e^2 n \operatorname{PolyLog}\left[2, 1 - \frac{2 \sqrt{d}}{\sqrt{d}-\sqrt{d+e x}}\right]}{4 d^{5/2}}$$

Result (type 5, 206 leaves):

$$\left(-16\, b\, d^{5/2}\, n \sqrt{1+\frac{d}{e\, x}}\, \text{HypergeometricPFQ}\left[\left\{\frac{1}{2},\frac{5}{2},\frac{5}{2}\right\},\left\{\frac{7}{2},\frac{7}{2}\right\},-\frac{d}{e\, x}\right]-25\left(3\, b\, e^{5/2}\, n\sqrt{1+\frac{d}{e\, x}}\, x^{5/2}\, \text{ArcSinh}\left[\frac{\sqrt{d}}{\sqrt{e}\,\sqrt{x}}\right]\text{Log}[x]+\sqrt{d}\left(2\, d^2-d\, e\, x-3\, e^2 x^2\right)\left(a+b\, \text{Log}\left[c\, x^n\right]\right)+3\, e^2 x^2\sqrt{d+e\, x}\, \text{ArcTanh}\left[\frac{\sqrt{d+e\, x}}{\sqrt{d}}\right]\left(a-b\, n\, \text{Log}[x]+b\, \text{Log}\left[c\, x^n\right]\right)\right)\right)\Big/\left(100\, d^{5/2}\, x^2\sqrt{d+e\, x}\right)$$

Problem 155: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 201 leaves, 11 steps):

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

Result (type 5, 185 leaves):

$$-\left(\left(2\left(2\, b\, d^{3/2}\, n\sqrt{1+\frac{d}{e\, x}}\, \text{HypergeometricPFQ}\left[\left\{\frac{3}{2},\frac{3}{2},\frac{3}{2}\right\},\left\{\frac{5}{2},\frac{5}{2}\right\},-\frac{d}{e\, x}\right]+9\, e\, x\left(b\sqrt{e}\, n\sqrt{1+\frac{d}{e\, x}}\sqrt{x}\, \text{ArcSinh}\left[\frac{\sqrt{d}}{\sqrt{e}\,\sqrt{x}}\right]\text{Log}[x]-\sqrt{d}\left(a+b\, \text{Log}\left[c\, x^n\right]\right)+\sqrt{d+e\, x}\, \text{ArcTanh}\left[\frac{\sqrt{d+e\, x}}{\sqrt{d}}\right]\left(a-b\, n\, \text{Log}[x]+b\, \text{Log}\left[c\, x^n\right]\right)\right)\right)\right)\Big/\left(9\, d^{3/2}\, e\, x\sqrt{d+e\, x}\right)\right)$$

Problem 156: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 253 leaves, 15 steps):

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

Result (type 5, 186 leaves):

$$\left(6\,b\,d^{5/2}\,n\,\sqrt{1+\frac{d}{e\,x}}\,\text{HypergeometricPFQ}\left[\left\{\frac{5}{2},\frac{5}{2},\frac{5}{2}\right\},\left\{\frac{7}{2},\frac{7}{2}\right\},-\frac{d}{e\,x}\right]-5\,\left(2\,b\,d^{5/2}\,n\,\sqrt{1+\frac{d}{e\,x}}\,\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{5}{2},\frac{7}{2},-\frac{d}{e\,x}\right]\,\left(1+\text{Log}[x]\right)+5\,e\,x\,\left(\sqrt{d}\,\left(d+3\,e\,x\right)-3\,e\,x\,\sqrt{d+e\,x}\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x}}{\sqrt{d}}\right]\right)\,\left(a-b\,n\,\text{Log}[x]+b\,\text{Log}\left[c\,x^n\right]\right)\right)\right)\Big/\left(25\,d^{5/2}\,e\,x^2\,\sqrt{d+e\,x}\right)$$

Problem 210: Result unnecessarily involves imaginary or complex numbers.

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

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

$$\frac{b\,d\,n\,x^2}{4\,e^2}-\frac{b\,n\,x^4}{16\,e}-\frac{d\,x^2\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)}{2\,e^2}+\frac{x^4\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)}{4\,e}+\frac{d^2\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)\,\text{Log}\left[1+\frac{e\,x^2}{d}\right]}{2\,e^3}+\frac{b\,d^2\,n\,\text{PolyLog}\left[2,-\frac{e\,x^2}{d}\right]}{4\,e^3}$$

Result (type 4, 226 leaves):

$$\frac{1}{16 e^3}\left(-8 a d e x^2+4 b d e n x^2+4 a e^2 x^4-b e^2 n x^4-8 b d e x^2 \text{Log}\left[c x^n\right]+4 b e^2 x^4 \text{Log}\left[c x^n\right]+8 b d^2 n \text{Log}[x] \text{Log}\left[1-\frac{i \sqrt{e} x}{\sqrt{d}}\right]+8 b d^2 n \text{Log}[x] \text{Log}\left[1+\frac{i \sqrt{e} x}{\sqrt{d}}\right]+8 a d^2 \text{Log}\left[d+e x^2\right]-8 b d^2 n \text{Log}[x] \text{Log}\left[d+e x^2\right]+8 b d^2 \text{Log}\left[c x^n\right] \text{Log}\left[d+e x^2\right]+8 b d^2 n \text{PolyLog}\left[2,-\frac{i \sqrt{e} x}{\sqrt{d}}\right]+8 b d^2 n \text{PolyLog}\left[2,\frac{i \sqrt{e} x}{\sqrt{d}}\right]\right)$$

Problem 211: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 83 leaves, 5 steps):

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

Result (type 4, 174 leaves):

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

Problem 212: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

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

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

Result (type 4, 111 leaves):

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

Problem 213: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

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

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

Result (type 4, 157 leaves):

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

Problem 214: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 83 leaves, 4 steps):

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

Result (type 4, 217 leaves):

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

Problem 215: Result unnecessarily involves complex numbers and more than

twice size of optimal antiderivative.

$$\int \frac{a+b\,\text{Log}[c\,x^n]}{x^5\,(d+e\,x^2)}\,dx$$

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

$$-\frac{b\,n}{16\,d\,x^4}+\frac{b\,e\,n}{4\,d^2\,x^2}-\frac{a+b\,\text{Log}[c\,x^n]}{4\,d\,x^4}+\frac{e\,(a+b\,\text{Log}[c\,x^n])}{2\,d^2\,x^2}-\frac{e^2\,\text{Log}\left[1+\frac{d}{e\,x^2}\right]\,(a+b\,\text{Log}[c\,x^n])}{2\,d^3}+\frac{b\,e^2\,n\,\text{PolyLog}\left[2,-\frac{d}{e\,x^2}\right]}{4\,d^3}$$

Result (type 4, 276 leaves):

$$\frac{-a-b\,(-n\,\text{Log}[x]+\text{Log}[c\,x^n])}{4\,d\,x^4}+\frac{e\,(a+b\,(-n\,\text{Log}[x]+\text{Log}[c\,x^n]))}{2\,d^2\,x^2}+\frac{e^2\,\text{Log}[x]\,(a+b\,(-n\,\text{Log}[x]+\text{Log}[c\,x^n]))}{d^3}-\frac{e^2\,(a+b\,(-n\,\text{Log}[x]+\text{Log}[c\,x^n]))\,\text{Log}[d+e\,x^2]}{2\,d^3}+b\,n\left(\frac{e^2\,\text{Log}[x]^2}{2\,d^3}+\frac{-\frac{1}{16\,x^4}-\frac{\text{Log}[x]}{4\,x^4}}{d}-\frac{e\left(-\frac{1}{4\,x^2}-\frac{\text{Log}[x]}{2\,x^2}\right)}{d^2}-\frac{e^2\left(\text{Log}[x]\,\text{Log}\left[1+\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]+\text{PolyLog}\left[2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]\right)}{2\,d^3}-\frac{e^2\left(\text{Log}[x]\,\text{Log}\left[1-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]+\text{PolyLog}\left[2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]\right)}{2\,d^3}\right)$$

Problem 221: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{x^5\,(a+b\,\text{Log}[c\,x^n])}{(d+e\,x^2)^2}\,dx$$

Optimal (type 4, 129 leaves, 7 steps):

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

Result (type 4, 426 leaves):

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

Problem 222: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 95 leaves, 6 steps):

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

Result (type 4, 336 leaves):

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

Problem 224: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 82 leaves, 3 steps):

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

Result (type 4, 401 leaves):

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

Problem 225: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 126 leaves, 5 steps):

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

Result (type 4, 337 leaves):

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

Problem 227: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 164 leaves, 14 steps):

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

Result (type 4, 391 leaves):

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

$$b\,n\left(\frac{\frac{\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}{\sqrt{d}\sqrt{e}}+\frac{i\,\text{Log}[x]}{\sqrt{d}\sqrt{e}}-\frac{\text{Log}[x]}{\sqrt{e}\left(-i\sqrt{d}+\sqrt{e}\,x\right)}-\frac{i\,\text{Log}\left[d+e\,x^2\right]}{2\sqrt{d}\sqrt{e}}}{4\,e}+\right.$$

$$\frac{\frac{\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}{\sqrt{d}\sqrt{e}}-\frac{i\,\text{Log}[x]}{\sqrt{d}\sqrt{e}}-\frac{\text{Log}[x]}{\sqrt{e}\left(i\sqrt{d}+\sqrt{e}\,x\right)}+\frac{i\,\text{Log}\left[d+e\,x^2\right]}{2\sqrt{d}\sqrt{e}}}{4\,e}-$$

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

$$\left.\frac{i\left(\text{Log}[x]\,\text{Log}\left[1-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]+\text{PolyLog}\left[2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]\right)}{4\sqrt{d}\,e^{3/2}}\right)$$

Problem 228: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 164 leaves, 7 steps):

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

$$\frac{i\,b\,n\,\text{PolyLog}\left[2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]}{4\,d^{3/2}\sqrt{e}}+\frac{i\,b\,n\,\text{PolyLog}\left[2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]}{4\,d^{3/2}\sqrt{e}}$$

Result (type 4, 391 leaves):

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

$$b\,n\left(-\frac{\frac{\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}{\sqrt{d}\,\sqrt{e}}+\frac{i\,\text{Log}[x]}{\sqrt{d}\,\sqrt{e}}-\frac{\text{Log}[x]}{\sqrt{e}\left(-i\,\sqrt{d}+\sqrt{e}\,x\right)}-\frac{i\,\text{Log}\left[d+e\,x^2\right]}{2\,\sqrt{d}\,\sqrt{e}}}{4\,d}-\right.$$

$$\frac{\frac{\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}{\sqrt{d}\,\sqrt{e}}-\frac{i\,\text{Log}[x]}{\sqrt{d}\,\sqrt{e}}-\frac{\text{Log}[x]}{\sqrt{e}\left(i\,\sqrt{d}+\sqrt{e}\,x\right)}+\frac{i\,\text{Log}\left[d+e\,x^2\right]}{2\,\sqrt{d}\,\sqrt{e}}}{4\,d}-$$

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

$$\left.\frac{i\left(\text{Log}[x]\,\text{Log}\left[1-\frac{i\,\sqrt{e}\,x}{\sqrt{d}}\right]+\text{PolyLog}\left[2,\frac{i\,\sqrt{e}\,x}{\sqrt{d}}\right]\right)}{4\,d^{3/2}\,\sqrt{e}}\right)$$

Problem 229: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 183 leaves, 8 steps):

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

$$\frac{3\,i\,b\,\sqrt{e}\,n\,\text{PolyLog}\left[2,-\frac{i\,\sqrt{e}\,x}{\sqrt{d}}\right]}{4\,d^{5/2}}-\frac{3\,i\,b\,\sqrt{e}\,n\,\text{PolyLog}\left[2,\frac{i\,\sqrt{e}\,x}{\sqrt{d}}\right]}{4\,d^{5/2}}$$

Result (type 4, 398 leaves):

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

Problem 231: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int \frac{x^5 \left(a+b \operatorname{Log}[c x^n]\right)}{\left(d+e x^2\right)^3} \, dx$$

Optimal (type 4, 152 leaves, 10 steps):

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

Result (type 4, 553 leaves):

$$\frac{1}{8 e^3 \left(d+e x^2\right)^2}\Bigg(6 a d^2+b d^2 n+8 a d e x^2+b d e n x^2-6 b d^2 n \text{Log}[x]-12 b d e n x^2 \text{Log}[x]-$$
$$6 b e^2 n x^4 \text{Log}[x]+6 b d^2 \text{Log}\left[c x^n\right]+8 b d e x^2 \text{Log}\left[c x^n\right]+4 b d^2 n \text{Log}[x] \text{Log}\left[1-\frac{i \sqrt{e} x}{\sqrt{d}}\right]+$$
$$8 b d e n x^2 \text{Log}[x] \text{Log}\left[1-\frac{i \sqrt{e} x}{\sqrt{d}}\right]+4 b e^2 n x^4 \text{Log}[x] \text{Log}\left[1-\frac{i \sqrt{e} x}{\sqrt{d}}\right]+$$
$$4 b d^2 n \text{Log}[x] \text{Log}\left[1+\frac{i \sqrt{e} x}{\sqrt{d}}\right]+8 b d e n x^2 \text{Log}[x] \text{Log}\left[1+\frac{i \sqrt{e} x}{\sqrt{d}}\right]+$$
$$4 b e^2 n x^4 \text{Log}[x] \text{Log}\left[1+\frac{i \sqrt{e} x}{\sqrt{d}}\right]+4 a d^2 \text{Log}\left[d+e x^2\right]+3 b d^2 n \text{Log}\left[d+e x^2\right]+$$
$$8 a d e x^2 \text{Log}\left[d+e x^2\right]+6 b d e n x^2 \text{Log}\left[d+e x^2\right]+4 a e^2 x^4 \text{Log}\left[d+e x^2\right]+3 b e^2 n x^4 \text{Log}\left[d+e x^2\right]-$$
$$4 b d^2 n \text{Log}[x] \text{Log}\left[d+e x^2\right]-8 b d e n x^2 \text{Log}[x] \text{Log}\left[d+e x^2\right]-4 b e^2 n x^4 \text{Log}[x] \text{Log}\left[d+e x^2\right]+$$
$$4 b d^2 \text{Log}\left[c x^n\right] \text{Log}\left[d+e x^2\right]+8 b d e x^2 \text{Log}\left[c x^n\right] \text{Log}\left[d+e x^2\right]+4 b e^2 x^4 \text{Log}\left[c x^n\right] \text{Log}\left[d+e x^2\right]+$$
$$4 b n \left(d+e x^2\right)^2 \text{PolyLog}\left[2,-\frac{i \sqrt{e} x}{\sqrt{d}}\right]+4 b n \left(d+e x^2\right)^2 \text{PolyLog}\left[2,\frac{i \sqrt{e} x}{\sqrt{d}}\right]\Bigg)$$

Problem 234: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 115 leaves, 4 steps):

$$\frac{a+b \text{Log}\left[c x^n\right]}{4 d \left(d+e x^2\right)^2}-\frac{\text{Log}\left[1+\frac{d}{e x^2}\right] \left(4 a-3 b n+4 b \text{Log}\left[c x^n\right]\right)}{8 d^3}+$$
$$\frac{4 a-b n+4 b \text{Log}\left[c x^n\right]}{8 d^2 \left(d+e x^2\right)}+\frac{b n \text{PolyLog}\left[2,-\frac{d}{e x^2}\right]}{4 d^3}$$

Result (type 4, 444 leaves):

$$-\frac{1}{16 d^3}\left(\frac{b d n}{d-i\sqrt{d}\sqrt{e}\,x}+\frac{b d n}{d+i\sqrt{d}\sqrt{e}\,x}-\frac{4 a d^2}{\left(d+e x^2\right)^2}-\frac{8 a d}{d+e x^2}-16 a \text{Log}[x]+12 b n \text{Log}[x]-\right.$$
$$\frac{b d n \text{Log}[x]}{\left(\sqrt{d}-i\sqrt{e}\,x\right)^2}-\frac{b d n \text{Log}[x]}{\left(\sqrt{d}+i\sqrt{e}\,x\right)^2}+\frac{5 i b\sqrt{d}\, n \text{Log}[x]}{-i\sqrt{d}+\sqrt{e}\,x}-\frac{5 i b\sqrt{d}\, n \text{Log}[x]}{i\sqrt{d}+\sqrt{e}\,x}+$$
$$\frac{4 b d^2 n \text{Log}[x]}{\left(d+e x^2\right)^2}+\frac{8 b d n \text{Log}[x]}{d+e x^2}+8 b n \text{Log}[x]^2-\frac{4 b d^2 \text{Log}\left[c x^n\right]}{\left(d+e x^2\right)^2}-\frac{8 b d \text{Log}\left[c x^n\right]}{d+e x^2}-$$
$$16 b \text{Log}[x] \text{Log}\left[c x^n\right]+8 b n \text{Log}[x] \text{Log}\left[1-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]+8 b n \text{Log}[x] \text{Log}\left[1+\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]+$$
$$8 a \text{Log}\left[d+e x^2\right]-6 b n \text{Log}\left[d+e x^2\right]-8 b n \text{Log}[x] \text{Log}\left[d+e x^2\right]+$$
$$\left.8 b \text{Log}\left[c x^n\right] \text{Log}\left[d+e x^2\right]+8 b n \text{PolyLog}\left[2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]+8 b n \text{PolyLog}\left[2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]\right)$$

Problem 235: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 162 leaves, 6 steps):

$$-\frac{3 b n}{4 d^3 x^2}+\frac{a+b \text{Log}\left[c x^n\right]}{4 d x^2 \left(d+e x^2\right)^2}+\frac{6 a-b n+6 b \text{Log}\left[c x^n\right]}{8 d^2 x^2 \left(d+e x^2\right)}-\frac{12 a-5 b n+12 b \text{Log}\left[c x^n\right]}{8 d^3 x^2}+$$
$$\frac{e \text{Log}\left[1+\frac{d}{e x^2}\right]\left(12 a-5 b n+12 b \text{Log}\left[c x^n\right]\right)}{8 d^4}-\frac{3 b e n \text{PolyLog}\left[2,-\frac{d}{e x^2}\right]}{4 d^4}$$

Result (type 4, 468 leaves):

$$\frac{1}{16 d^4}\left(24 b e n \text{PolyLog}\left[2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]-\right.$$
$$\frac{1}{x^2 \left(d+e x^2\right)^2} 2 \left(4 a d^3+2 b d^3 n+18 a d^2 e x^2+3 b d^2 e n x^2+12 a d e^2 x^4+b d e^2 n x^4-\right.$$
$$12 b e n x^2 \left(d+e x^2\right)^2 \text{Log}[x]^2+4 b d^3 \text{Log}\left[c x^n\right]+18 b d^2 e x^2 \text{Log}\left[c x^n\right]+$$
$$12 b d e^2 x^4 \text{Log}\left[c x^n\right]-12 a d^2 e x^2 \text{Log}\left[d+e x^2\right]+5 b d^2 e n x^2 \text{Log}\left[d+e x^2\right]-$$
$$24 a d e^2 x^4 \text{Log}\left[d+e x^2\right]+10 b d e^2 n x^4 \text{Log}\left[d+e x^2\right]-12 a e^3 x^6 \text{Log}\left[d+e x^2\right]+$$
$$5 b e^3 n x^6 \text{Log}\left[d+e x^2\right]-12 b d^2 e x^2 \text{Log}\left[c x^n\right] \text{Log}\left[d+e x^2\right]-$$
$$24 b d e^2 x^4 \text{Log}\left[c x^n\right] \text{Log}\left[d+e x^2\right]-12 b e^3 x^6 \text{Log}\left[c x^n\right] \text{Log}\left[d+e x^2\right]+$$
$$2 e x^2 \left(d+e x^2\right)^2 \text{Log}[x] \left(12 a-5 b n+12 b \text{Log}\left[c x^n\right]-6 b n \text{Log}\left[1-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]-6 b n\right.$$
$$\left.\left.\left.\text{Log}\left[1+\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]+6 b n \text{Log}\left[d+e x^2\right]\right)-12 b e n x^2 \left(d+e x^2\right)^2 \text{PolyLog}\left[2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]\right)\right)$$

Problem 236: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 211 leaves, 24 steps):

$$-\frac{b\, n\, x}{8\, e^2 \left(d+e\, x^2\right)}+\frac{b\, n\, \text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]}{2\, \sqrt{d}\, e^{5/2}}+\frac{d\, x \left(a+b\, \text{Log}[c\, x^n]\right)}{4\, e^2 \left(d+e\, x^2\right)^2}-\frac{5\, x \left(a+b\, \text{Log}[c\, x^n]\right)}{8\, e^2 \left(d+e\, x^2\right)}+\frac{3\, \text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right] \left(a+b\, \text{Log}[c\, x^n]\right)}{8\, \sqrt{d}\, e^{5/2}}-\frac{3\, i\, b\, n\, \text{PolyLog}\left[2,-\frac{i \sqrt{e}\, x}{\sqrt{d}}\right]}{16\, \sqrt{d}\, e^{5/2}}+\frac{3\, i\, b\, n\, \text{PolyLog}\left[2,\frac{i \sqrt{e}\, x}{\sqrt{d}}\right]}{16\, \sqrt{d}\, e^{5/2}}$$

Result (type 4, 509 leaves):

$$\frac{1}{16\, e^{5/2}}\left(\frac{b\, n}{i \sqrt{d}-\sqrt{e}\, x}-\frac{b\, n}{i \sqrt{d}+\sqrt{e}\, x}+\frac{4\, a\, d \sqrt{e}\, x}{\left(d+e\, x^2\right)^2}-\frac{10\, a \sqrt{e}\, x}{d+e\, x^2}+\frac{6\, a\, \text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]}{\sqrt{d}}+\frac{8\, b\, n\, \text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]}{\sqrt{d}}-\frac{i\, b \sqrt{d}\, n\, \text{Log}[x]}{\left(\sqrt{d}-i \sqrt{e}\, x\right)^2}+\frac{i\, b \sqrt{d}\, n\, \text{Log}[x]}{\left(\sqrt{d}+i \sqrt{e}\, x\right)^2}-\frac{5\, b\, n\, \text{Log}[x]}{-i \sqrt{d}+\sqrt{e}\, x}-\frac{5\, b\, n\, \text{Log}[x]}{i \sqrt{d}+\sqrt{e}\, x}-\frac{4\, b\, d \sqrt{e}\, n\, x\, \text{Log}[x]}{\left(d+e\, x^2\right)^2}+\frac{10\, b \sqrt{e}\, n\, x\, \text{Log}[x]}{d+e\, x^2}-\frac{6\, b\, n\, \text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right] \text{Log}[x]}{\sqrt{d}}+\frac{4\, b\, d \sqrt{e}\, x\, \text{Log}[c\, x^n]}{\left(d+e\, x^2\right)^2}-\frac{10\, b \sqrt{e}\, x\, \text{Log}[c\, x^n]}{d+e\, x^2}+\frac{6\, b\, \text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right] \text{Log}[c\, x^n]}{\sqrt{d}}+\frac{3\, i\, b\, n\, \text{Log}[x]\, \text{Log}\left[1-\frac{i \sqrt{e}\, x}{\sqrt{d}}\right]}{\sqrt{d}}-\frac{3\, i\, b\, n\, \text{Log}[x]\, \text{Log}\left[1+\frac{i \sqrt{e}\, x}{\sqrt{d}}\right]}{\sqrt{d}}-\frac{3\, i\, b\, n\, \text{PolyLog}\left[2,-\frac{i \sqrt{e}\, x}{\sqrt{d}}\right]}{\sqrt{d}}+\frac{3\, i\, b\, n\, \text{PolyLog}\left[2,\frac{i \sqrt{e}\, x}{\sqrt{d}}\right]}{\sqrt{d}}\right)$$

Problem 237: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 187 leaves, 19 steps):

$$\frac{b\, n\, x}{8\, d\, e \left(d+e\, x^2\right)}-\frac{x \left(a+b\, \text{Log}[c\, x^n]\right)}{4\, e \left(d+e\, x^2\right)^2}+\frac{x \left(a+b\, \text{Log}[c\, x^n]\right)}{8\, d\, e \left(d+e\, x^2\right)}+\frac{\text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right] \left(a+b\, \text{Log}[c\, x^n]\right)}{8\, d^{3/2}\, e^{3/2}}-\frac{i\, b\, n\, \text{PolyLog}\left[2,-\frac{i \sqrt{e}\, x}{\sqrt{d}}\right]}{16\, d^{3/2}\, e^{3/2}}+\frac{i\, b\, n\, \text{PolyLog}\left[2,\frac{i \sqrt{e}\, x}{\sqrt{d}}\right]}{16\, d^{3/2}\, e^{3/2}}$$

Result (type 4, 589 leaves):

$$\frac{1}{16\,d^{3/2}\,e^{3/2}\,\left(d+e\,x^2\right)^2}\left(-2\,a\,d^{3/2}\,\sqrt{e}\,x+2\,b\,d^{3/2}\,\sqrt{e}\,n\,x+2\,a\,\sqrt{d}\,e^{3/2}\,x^3+2\,b\,\sqrt{d}\,e^{3/2}\,n\,x^3+2\,a\,d^2\,\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]+\right.$$
$$4\,a\,d\,e\,x^2\,\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]+2\,a\,e^2\,x^4\,\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]-2\,b\,d^2\,n\,\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]\,\text{Log}[x]-$$
$$4\,b\,d\,e\,n\,x^2\,\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]\,\text{Log}[x]-2\,b\,e^2\,n\,x^4\,\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]\,\text{Log}[x]-$$
$$2\,b\,d^{3/2}\,\sqrt{e}\,x\,\text{Log}\left[c\,x^n\right]+2\,b\,\sqrt{d}\,e^{3/2}\,x^3\,\text{Log}\left[c\,x^n\right]+2\,b\,d^2\,\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]\,\text{Log}\left[c\,x^n\right]+$$
$$4\,b\,d\,e\,x^2\,\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]\,\text{Log}\left[c\,x^n\right]+2\,b\,e^2\,x^4\,\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]\,\text{Log}\left[c\,x^n\right]+$$
$$i\,b\,d^2\,n\,\text{Log}[x]\,\text{Log}\left[1-\frac{i\,\sqrt{e}\,x}{\sqrt{d}}\right]+2\,i\,b\,d\,e\,n\,x^2\,\text{Log}[x]\,\text{Log}\left[1-\frac{i\,\sqrt{e}\,x}{\sqrt{d}}\right]+$$
$$i\,b\,e^2\,n\,x^4\,\text{Log}[x]\,\text{Log}\left[1-\frac{i\,\sqrt{e}\,x}{\sqrt{d}}\right]-i\,b\,d^2\,n\,\text{Log}[x]\,\text{Log}\left[1+\frac{i\,\sqrt{e}\,x}{\sqrt{d}}\right]-$$
$$2\,i\,b\,d\,e\,n\,x^2\,\text{Log}[x]\,\text{Log}\left[1+\frac{i\,\sqrt{e}\,x}{\sqrt{d}}\right]-i\,b\,e^2\,n\,x^4\,\text{Log}[x]\,\text{Log}\left[1+\frac{i\,\sqrt{e}\,x}{\sqrt{d}}\right]-$$
$$\left.i\,b\,n\,\left(d+e\,x^2\right)^2\,\text{PolyLog}\left[2,-\frac{i\,\sqrt{e}\,x}{\sqrt{d}}\right]+i\,b\,n\,\left(d+e\,x^2\right)^2\,\text{PolyLog}\left[2,\frac{i\,\sqrt{e}\,x}{\sqrt{d}}\right]\right)$$

Problem 238: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 210 leaves, 10 steps):

$$-\frac{b\,n\,x}{8\,d^2\,\left(d+e\,x^2\right)}-\frac{b\,n\,\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}{2\,d^{5/2}\,\sqrt{e}}+\frac{x\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)}{4\,d\,\left(d+e\,x^2\right)^2}+\frac{3\,x\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)}{8\,d^2\,\left(d+e\,x^2\right)}+$$
$$\frac{3\,\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)}{8\,d^{5/2}\,\sqrt{e}}-\frac{3\,i\,b\,n\,\text{PolyLog}\left[2,-\frac{i\,\sqrt{e}\,x}{\sqrt{d}}\right]}{16\,d^{5/2}\,\sqrt{e}}+\frac{3\,i\,b\,n\,\text{PolyLog}\left[2,\frac{i\,\sqrt{e}\,x}{\sqrt{d}}\right]}{16\,d^{5/2}\,\sqrt{e}}$$

Result (type 4, 533 leaves):

$$\frac{1}{16 d^{5/2}}\left(-\frac{b\sqrt{d}\,n}{-i\sqrt{d}\sqrt{e}+e x}-\frac{b\sqrt{d}\,n}{i\sqrt{d}\sqrt{e}+e x}+\frac{4 a d^{3/2} x}{\left(d+e x^2\right)^2}+\frac{6 a\sqrt{d}\,x}{d+e x^2}+\frac{6 a \text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}{\sqrt{e}}-\frac{8 b n \text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}{\sqrt{e}}+\frac{i b d n \text{Log}[x]}{\sqrt{e}\left(\sqrt{d}+i\sqrt{e}\,x\right)^2}+\frac{i b d n \text{Log}[x]}{\sqrt{e}\left(i\sqrt{d}+\sqrt{e}\,x\right)^2}+\frac{3 b\sqrt{d}\,n \text{Log}[x]}{-i\sqrt{d}\sqrt{e}+e x}+\frac{3 b\sqrt{d}\,n \text{Log}[x]}{i\sqrt{d}\sqrt{e}+e x}-\frac{4 b d^{3/2} n x \text{Log}[x]}{\left(d+e x^2\right)^2}-\frac{6 b\sqrt{d}\,n x \text{Log}[x]}{d+e x^2}-\frac{6 b n \text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right] \text{Log}[x]}{\sqrt{e}}+\frac{4 b d^{3/2} x \text{Log}\left[c x^n\right]}{\left(d+e x^2\right)^2}+\frac{6 b\sqrt{d}\,x \text{Log}\left[c x^n\right]}{d+e x^2}+\frac{6 b \text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right] \text{Log}\left[c x^n\right]}{\sqrt{e}}+\frac{3 i b n \text{Log}[x] \text{Log}\left[1-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]}{\sqrt{e}}-\frac{3 i b n \text{Log}[x] \text{Log}\left[1+\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]}{\sqrt{e}}-\frac{3 i b n \text{PolyLog}\left[2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]}{\sqrt{e}}+\frac{3 i b n \text{PolyLog}\left[2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]}{\sqrt{e}}\right)$$

Problem 239: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 219 leaves, 9 steps):

$$-\frac{15 b n}{8 d^3 x}+\frac{a+b \text{Log}\left[c x^n\right]}{4 d x \left(d+e x^2\right)^2}+\frac{5 a-b n+5 b \text{Log}\left[c x^n\right]}{8 d^2 x \left(d+e x^2\right)}-\frac{15 a-8 b n+15 b \text{Log}\left[c x^n\right]}{8 d^3 x}-\frac{\sqrt{e}\,\text{ArcTan}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]\left(15 a-8 b n+15 b \text{Log}\left[c x^n\right]\right)}{8 d^{7/2}}+\frac{15 i b\sqrt{e}\,n \text{PolyLog}\left[2,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]}{16 d^{7/2}}-\frac{15 i b\sqrt{e}\,n \text{PolyLog}\left[2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]}{16 d^{7/2}}$$

Result (type 4, 591 leaves):

$$\frac{1}{16 d^{7/2}}\left(-\frac{16 a \sqrt{d}}{x}-\frac{16 b \sqrt{d}\, n}{x}+\frac{b \sqrt{d}\, \sqrt{e}\, n}{i \sqrt{d}+\sqrt{e}\, x}+\frac{i b d \sqrt{e}\, n}{d+i \sqrt{d}\, \sqrt{e}\, x}-\frac{4 a d^{3/2} e x}{\left(d+e x^2\right)^2}-\right.$$

$$\frac{14 a \sqrt{d}\, e x}{d+e x^2}-30 a \sqrt{e}\, \text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]+16 b \sqrt{e}\, n \,\text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]+\frac{i b d \sqrt{e}\, n \,\text{Log}[x]}{\left(\sqrt{d}-i \sqrt{e}\, x\right)^2}-$$

$$\frac{i b d \sqrt{e}\, n \,\text{Log}[x]}{\left(\sqrt{d}+i \sqrt{e}\, x\right)^2}-\frac{7 b \sqrt{d}\, \sqrt{e}\, n \,\text{Log}[x]}{-i \sqrt{d}+\sqrt{e}\, x}-\frac{7 b \sqrt{d}\, \sqrt{e}\, n \,\text{Log}[x]}{i \sqrt{d}+\sqrt{e}\, x}+\frac{4 b d^{3/2} e n x \,\text{Log}[x]}{\left(d+e x^2\right)^2}+$$

$$\frac{14 b \sqrt{d}\, e n x \,\text{Log}[x]}{d+e x^2}+30 b \sqrt{e}\, n \,\text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right] \text{Log}[x]-\frac{16 b \sqrt{d}\, \text{Log}\left[c x^n\right]}{x}-$$

$$\frac{4 b d^{3/2} e x \,\text{Log}\left[c x^n\right]}{\left(d+e x^2\right)^2}-\frac{14 b \sqrt{d}\, e x \,\text{Log}\left[c x^n\right]}{d+e x^2}-30 b \sqrt{e}\, \text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right] \text{Log}\left[c x^n\right]-$$

$$15 i b \sqrt{e}\, n \,\text{Log}[x] \,\text{Log}\left[1-\frac{i \sqrt{e}\, x}{\sqrt{d}}\right]+15 i b \sqrt{e}\, n \,\text{Log}[x] \,\text{Log}\left[1+\frac{i \sqrt{e}\, x}{\sqrt{d}}\right]+$$

$$\left.15 i b \sqrt{e}\, n \,\text{PolyLog}\left[2,-\frac{i \sqrt{e}\, x}{\sqrt{d}}\right]-15 i b \sqrt{e}\, n \,\text{PolyLog}\left[2,\frac{i \sqrt{e}\, x}{\sqrt{d}}\right]\right)$$

Problem 240: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 260 leaves, 11 steps):

$$-\frac{35 b n}{72 d^3 x^3}+\frac{35 b e n}{8 d^4 x}+\frac{a+b \,\text{Log}\left[c x^n\right]}{4 d x^3 \left(d+e x^2\right)^2}+\frac{7 a-b n+7 b \,\text{Log}\left[c x^n\right]}{8 d^2 x^3 \left(d+e x^2\right)}-\frac{35 a-12 b n+35 b \,\text{Log}\left[c x^n\right]}{24 d^3 x^3}+$$

$$\frac{e \left(35 a-12 b n+35 b \,\text{Log}\left[c x^n\right]\right)}{8 d^4 x}+\frac{e^{3/2} \,\text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right] \left(35 a-12 b n+35 b \,\text{Log}\left[c x^n\right]\right)}{8 d^{9/2}}-$$

$$\frac{35 i b e^{3/2} n \,\text{PolyLog}\left[2,-\frac{i \sqrt{e}\, x}{\sqrt{d}}\right]}{16 d^{9/2}}+\frac{35 i b e^{3/2} n \,\text{PolyLog}\left[2,\frac{i \sqrt{e}\, x}{\sqrt{d}}\right]}{16 d^{9/2}}$$

Result (type 4, 645 leaves):

$$\frac{1}{144\, d^{9/2}}\left(-\frac{48\, a\, d^{3/2}}{x^3}-\frac{16\, b\, d^{3/2}\, n}{x^3}+\frac{432\, a\, \sqrt{d}\, e}{x}+\frac{432\, b\, \sqrt{d}\, e\, n}{x}+\frac{9\, i\, b\, d\, e^{3/2}\, n}{d-i\,\sqrt{d}\,\sqrt{e}\, x}-\frac{9\, i\, b\, d\, e^{3/2}\, n}{d+i\,\sqrt{d}\,\sqrt{e}\, x}+\right.$$
$$\frac{36\, a\, d^{3/2}\, e^2\, x}{\left(d+e\, x^2\right)^2}+\frac{198\, a\,\sqrt{d}\, e^2\, x}{d+e\, x^2}+630\, a\, e^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]-216\, b\, e^{3/2}\, n\,\text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]-$$
$$\frac{9\, i\, b\, d\, e^{3/2}\, n\,\text{Log}[x]}{\left(\sqrt{d}-i\,\sqrt{e}\, x\right)^2}+\frac{9\, i\, b\, d\, e^{3/2}\, n\,\text{Log}[x]}{\left(\sqrt{d}+i\,\sqrt{e}\, x\right)^2}+\frac{99\, b\,\sqrt{d}\, e^{3/2}\, n\,\text{Log}[x]}{-i\,\sqrt{d}+\sqrt{e}\, x}+$$
$$\frac{99\, b\,\sqrt{d}\, e^{3/2}\, n\,\text{Log}[x]}{i\,\sqrt{d}+\sqrt{e}\, x}-\frac{36\, b\, d^{3/2}\, e^2\, n\, x\,\text{Log}[x]}{\left(d+e\, x^2\right)^2}-\frac{198\, b\,\sqrt{d}\, e^2\, n\, x\,\text{Log}[x]}{d+e\, x^2}-$$
$$630\, b\, e^{3/2}\, n\,\text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]\text{Log}[x]-\frac{48\, b\, d^{3/2}\,\text{Log}[c\, x^n]}{x^3}+\frac{432\, b\,\sqrt{d}\, e\,\text{Log}[c\, x^n]}{x}+$$
$$\frac{36\, b\, d^{3/2}\, e^2\, x\,\text{Log}[c\, x^n]}{\left(d+e\, x^2\right)^2}+\frac{198\, b\,\sqrt{d}\, e^2\, x\,\text{Log}[c\, x^n]}{d+e\, x^2}+630\, b\, e^{3/2}\,\text{ArcTan}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]\text{Log}\left[c\, x^n\right]+$$
$$315\, i\, b\, e^{3/2}\, n\,\text{Log}[x]\,\text{Log}\left[1-\frac{i\,\sqrt{e}\, x}{\sqrt{d}}\right]-315\, i\, b\, e^{3/2}\, n\,\text{Log}[x]\,\text{Log}\left[1+\frac{i\,\sqrt{e}\, x}{\sqrt{d}}\right]-$$
$$\left.315\, i\, b\, e^{3/2}\, n\,\text{PolyLog}\left[2,-\frac{i\,\sqrt{e}\, x}{\sqrt{d}}\right]+315\, i\, b\, e^{3/2}\, n\,\text{PolyLog}\left[2,\frac{i\,\sqrt{e}\, x}{\sqrt{d}}\right]\right)$$

Problem 242: Result more than twice size of optimal antiderivative.

$$\int \frac{x\,\text{Log}\left[\frac{x^2}{c}\right]}{c-x^2}\, dx$$

Optimal (type 4, 16 leaves, 2 steps):

$$\frac{1}{2}\,\text{PolyLog}\left[2,1-\frac{x^2}{c}\right]$$

Result (type 4, 37 leaves):

$$-\frac{1}{2}\,\text{Log}\left[\frac{x^2}{c}\right]\,\text{Log}\left[1-\frac{x^2}{c}\right]-\frac{1}{2}\,\text{PolyLog}\left[2,\frac{x^2}{c}\right]$$

Problem 247: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 509 leaves, 16 steps):

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

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

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

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

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

Result (type 4, 666 leaves) :

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

Problem 248: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 711 leaves, 20 steps):

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

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

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

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

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

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

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

Result (type 4, 1104 leaves):

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

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

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

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

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

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

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

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

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

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

$$\left.\frac{2\,i\sqrt{d}\,\text{PolyLog}\left[3,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]}{\sqrt{e}}-\frac{2\,i\sqrt{d}\,\text{PolyLog}\left[3,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]}{\sqrt{e}}\right)+$$

$$\frac{1}{\sqrt{e}}b^3 n^3\left(\frac{\sqrt{e}\,x\,\text{Log}[x]^3}{1-\frac{i\sqrt{e}\,x}{\sqrt{d}}}+\frac{\sqrt{e}\,x\,\text{Log}[x]^3}{1+\frac{i\sqrt{e}\,x}{\sqrt{d}}}-3\,i\sqrt{d}\,\text{Log}[x]^2\,\text{Log}\left[1-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]+\right.$$

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

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

$$3\,i\sqrt{d}\,(-2+\text{Log}[x])\,\text{Log}[x]\,\text{PolyLog}\left[2,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]-6\,i\sqrt{d}\,\text{PolyLog}\left[3,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]+$$

$$6\,i\sqrt{d}\,\text{Log}[x]\,\text{PolyLog}\left[3,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]+6\,i\sqrt{d}\,\text{PolyLog}\left[3,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]-6\,i\sqrt{d}\,\text{Log}[x]$$

$$\left.\left.\text{PolyLog}\left[3,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]-6\,i\sqrt{d}\,\text{PolyLog}\left[4,-\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]+6\,i\sqrt{d}\,\text{PolyLog}\left[4,\frac{i\sqrt{e}\,x}{\sqrt{d}}\right]\right)\right)$$

Problem 254: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 220 leaves, 12 steps):

$$-b\,n\sqrt{d+e\,x^2}+b\sqrt{d}\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]+\frac{1}{2}b\sqrt{d}\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]^2+$$

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

$$b\sqrt{d}\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]\text{Log}\left[\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^2}}\right]-\frac{1}{2}b\sqrt{d}\,n\,\text{PolyLog}\left[2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^2}}\right]$$

Result (type 5, 203 leaves):

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

Problem 255: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 252 leaves, 14 steps):

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

Result (type 5, 303 leaves):

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

Problem 256: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 469 leaves, 19 steps):

$$\frac{7 b d^2 n x\sqrt{d+e x^2}}{192 e^2}-\frac{5 b d n x^3\sqrt{d+e x^2}}{288 e}-\frac{1}{36} b n x^5\sqrt{d+e x^2}+$$
$$\frac{5 b d^{5/2} n\sqrt{d+e x^2}\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}{192 e^{5/2}\sqrt{1+\frac{e x^2}{d}}}+\frac{b d^{5/2} n\sqrt{d+e x^2}\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]^2}{32 e^{5/2}\sqrt{1+\frac{e x^2}{d}}}-$$
$$\frac{b d^{5/2} n\sqrt{d+e x^2}\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]\text{Log}\left[1-e^{2\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}\right]}{16 e^{5/2}\sqrt{1+\frac{e x^2}{d}}}-\frac{d^2 x\sqrt{d+e x^2}\,(a+b\,\text{Log}[c x^n])}{16 e^2}+$$
$$\frac{d x^3\sqrt{d+e x^2}\,(a+b\,\text{Log}[c x^n])}{24 e}+\frac{1}{6} x^5\sqrt{d+e x^2}\,(a+b\,\text{Log}[c x^n])+$$
$$\frac{d^{5/2}\sqrt{d+e x^2}\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right](a+b\,\text{Log}[c x^n])}{16 e^{5/2}\sqrt{1+\frac{e x^2}{d}}}-\frac{b d^{5/2} n\sqrt{d+e x^2}\,\text{PolyLog}\left[2,e^{2\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}\right]}{32 e^{5/2}\sqrt{1+\frac{e x^2}{d}}}$$

Result (type 5, 276 leaves):

$$\frac{1}{1200\, e^{5/2} \sqrt{1+\frac{e x^2}{d}}} \left(-48\, b\, e^{5/2}\, n\, x^5 \sqrt{d+e x^2}\, \text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},\frac{5}{2},\frac{5}{2}\right\},\left\{\frac{7}{2},\frac{7}{2}\right\},-\frac{e x^2}{d}\right] + 75\, b\, d^{5/2}\, n \sqrt{d+e x^2}\, \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right] \text{Log}[x] + 25 \sqrt{1+\frac{e x^2}{d}} \left(a \sqrt{e}\, x \sqrt{d+e x^2} \left(-3 d^2+2 d e x^2+8 e^2 x^4\right)+3 d^3 \left(a-b\, n\, \text{Log}[x]\right) \text{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right] + b\, \text{Log}\left[c x^n\right] \left(\sqrt{e}\, x \sqrt{d+e x^2} \left(-3 d^2+2 d e x^2+8 e^2 x^4\right)+3 d^3\, \text{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]\right)\right)\right)$$

Problem 257: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 409 leaves, 15 steps):

$$-\frac{3\, b\, d\, n\, x \sqrt{d+e x^2}}{32\, e} - \frac{1}{16}\, b\, n\, x^3 \sqrt{d+e x^2} - \frac{b\, d^{3/2}\, n \sqrt{d+e x^2}\, \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]}{32\, e^{3/2} \sqrt{1+\frac{e x^2}{d}}} - \frac{b\, d^{3/2}\, n \sqrt{d+e x^2}\, \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]^2}{16\, e^{3/2} \sqrt{1+\frac{e x^2}{d}}} + \frac{b\, d^{3/2}\, n \sqrt{d+e x^2}\, \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right] \text{Log}\left[1-e^{2\, \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]}\right]}{8\, e^{3/2} \sqrt{1+\frac{e x^2}{d}}} + \frac{d\, x \sqrt{d+e x^2} \left(a+b\, \text{Log}\left[c x^n\right]\right)}{8\, e} + \frac{1}{4} x^3 \sqrt{d+e x^2} \left(a+b\, \text{Log}\left[c x^n\right]\right) - \frac{d^{3/2} \sqrt{d+e x^2}\, \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right] \left(a+b\, \text{Log}\left[c x^n\right]\right)}{8\, e^{3/2} \sqrt{1+\frac{e x^2}{d}}} + \frac{b\, d^{3/2}\, n \sqrt{d+e x^2}\, \text{PolyLog}\left[2, e^{2\, \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]}\right]}{16\, e^{3/2} \sqrt{1+\frac{e x^2}{d}}}$$

Result (type 5, 250 leaves):

$$\frac{1}{72\, e^{3/2} \sqrt{1+\frac{e x^2}{d}}} \Bigg(-8\, b\, e^{3/2}\, n\, x^3 \sqrt{d+e x^2}\, \text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},\frac{3}{2},\frac{3}{2}\right\},\left\{\frac{5}{2},\frac{5}{2}\right\},-\frac{e x^2}{d}\right] -$$
$$9\, b\, d^{3/2}\, n \sqrt{d+e x^2}\, \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right] \text{Log}[x] +$$
$$9 \sqrt{1+\frac{e x^2}{d}} \left(a \sqrt{e}\, x \sqrt{d+e x^2} \left(d+2 e x^2\right) + d^2 \left(-a+b\, n\, \text{Log}[x]\right) \text{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right] +\right.$$
$$\left.\left. b\, \text{Log}\left[c x^n\right] \left(\sqrt{e}\, x \sqrt{d+e x^2} \left(d+2 e x^2\right) - d^2\, \text{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]\right)\right)\right)$$

Problem 258: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 330 leaves, 11 steps):

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

Result (type 5, 237 leaves):

$$\frac{1}{4\sqrt{e}\sqrt{1+\frac{e x^2}{d}}}\left(-2 b \sqrt{e}\, n\, x \sqrt{d+e x^2}\ \text{HypergeometricPFQ}\left[\left\{\frac{1}{2},\frac{1}{2},\frac{1}{2}\right\},\left\{\frac{3}{2},\frac{3}{2}\right\},-\frac{e x^2}{d}\right]+\right.$$

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

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

$$\left.\left.2 b\,\text{Log}[c x^n]\left(\sqrt{e}\, x \sqrt{d+e x^2}+d\,\text{Log}\left[e x+\sqrt{e}\sqrt{d+e x^2}\right]\right)\right)\right)$$

Problem 259: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 345 leaves, 11 steps):

$$-\frac{b n \sqrt{d+e x^2}}{x}+\frac{b\sqrt{e}\, n\sqrt{d+e x^2}\ \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]}{\sqrt{d}\sqrt{1+\frac{e x^2}{d}}}+\frac{b\sqrt{e}\, n\sqrt{d+e x^2}\ \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]^2}{2\sqrt{d}\sqrt{1+\frac{e x^2}{d}}}-$$

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

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

Result (type 5, 183 leaves):

$$\frac{1}{x\sqrt{1+\frac{e x^2}{d}}}$$

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

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

Problem 266: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 260 leaves, 17 steps):

$$-\frac{4}{3} b\, d\, n \sqrt{d+e x^2}-\frac{1}{9} b\, n \left(d+e x^2\right)^{3/2}+\frac{4}{3} b\, d^{3/2}\, n\, \text{ArcTanh}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d}}\right]+\frac{1}{2} b\, d^{3/2}\, n\, \text{ArcTanh}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d}}\right]^2+$$

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

$$b\, d^{3/2}\, n\, \text{ArcTanh}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d}}\right] \text{Log}\left[\frac{2 \sqrt{d}}{\sqrt{d}-\sqrt{d+e x^2}}\right]-\frac{1}{2} b\, d^{3/2}\, n\, \text{PolyLog}\left[2, 1-\frac{2 \sqrt{d}}{\sqrt{d}-\sqrt{d+e x^2}}\right]$$

Result (type 5, 315 leaves):

$$\frac{1}{12\sqrt{1+\frac{e x^2}{d}}} b n \sqrt{d+e x^2} \left(-3 e x^2 \text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},1,1\right\},\{2,2\},-\frac{e x^2}{d}\right]+\right.$$

$$\left.4\left(e x^2 \sqrt{1+\frac{e x^2}{d}}+d\left(-1+\sqrt{1+\frac{e x^2}{d}}\right)\right) \text{Log}[x]\right)+\frac{1}{\sqrt{1+\frac{d}{e x^2}}}$$

$$b d n \sqrt{d+e x^2} \left(-\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{2},-\frac{1}{2}\right\},\left\{\frac{1}{2},\frac{1}{2}\right\},-\frac{d}{e x^2}\right]+\right.$$

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

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

$$d^{3/2} \text{Log}[x] \left(a-b n \text{Log}[x]+b \text{Log}\left[c x^n\right]\right)-$$

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

Problem 267: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 295 leaves, 18 steps):

$$-b e n \sqrt{d+e x^2}-\frac{b d n \sqrt{d+e x^2}}{4 x^2}+\frac{3}{4} b \sqrt{d} e n \text{ArcTanh}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d}}\right]+$$

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

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

$$\frac{3}{2} b \sqrt{d} e n \text{ArcTanh}\left[\frac{\sqrt{d+e x^2}}{\sqrt{d}}\right] \text{Log}\left[\frac{2 \sqrt{d}}{\sqrt{d}-\sqrt{d+e x^2}}\right]-$$

$$\frac{3}{4} b \sqrt{d} e n \text{PolyLog}\left[2,1-\frac{2 \sqrt{d}}{\sqrt{d}-\sqrt{d+e x^2}}\right]$$

Result (type 5, 349 leaves):

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

$$b \sqrt{d} n \sqrt{d+e x^2} \left(2 \sqrt{d} \text{HypergeometricPFQ}\left[\left\{\frac{1}{2},\frac{1}{2},\frac{1}{2}\right\},\left\{\frac{3}{2},\frac{3}{2}\right\},-\frac{d}{e x^2}\right]+\left(\sqrt{d} \sqrt{1+\frac{d}{e x^2}}+\sqrt{e} x \text{ArcSinh}\left[\frac{\sqrt{d}}{\sqrt{e} x}\right]\right) (1+2 \text{Log}[x])\right)-$$

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

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

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

Problem 268: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 464 leaves, 19 steps):

$$-\frac{11 b d^2 n x \sqrt{d+e x^2}}{192 e}-\frac{23}{288} b d n x^3 \sqrt{d+e x^2}-\frac{1}{36} b e n x^5 \sqrt{d+e x^2}-$$
$$\frac{b d^{5/2} n \sqrt{d+e x^2}\ \text{ArcSinh}\left[\frac{\sqrt{e}\ x}{\sqrt{d}}\right]}{192 e^{3/2} \sqrt{1+\frac{e x^2}{d}}}-\frac{b d^{5/2} n \sqrt{d+e x^2}\ \text{ArcSinh}\left[\frac{\sqrt{e}\ x}{\sqrt{d}}\right]^2}{32 e^{3/2} \sqrt{1+\frac{e x^2}{d}}}+$$
$$\frac{b d^{5/2} n \sqrt{d+e x^2}\ \text{ArcSinh}\left[\frac{\sqrt{e}\ x}{\sqrt{d}}\right] \text{Log}\left[1-e^{2 \text{ArcSinh}\left[\frac{\sqrt{e}\ x}{\sqrt{d}}\right]}\right]}{16 e^{3/2} \sqrt{1+\frac{e x^2}{d}}}+\frac{d^2 x \sqrt{d+e x^2}\ (a+b \text{Log}[c x^n])}{16 e}+$$
$$\frac{1}{8} d x^3 \sqrt{d+e x^2}\ (a+b \text{Log}[c x^n])+\frac{1}{6} x^3 (d+e x^2)^{3/2} (a+b \text{Log}[c x^n])-$$
$$\frac{d^{5/2} \sqrt{d+e x^2}\ \text{ArcSinh}\left[\frac{\sqrt{e}\ x}{\sqrt{d}}\right] (a+b \text{Log}[c x^n])}{16 e^{3/2} \sqrt{1+\frac{e x^2}{d}}}+\frac{b d^{5/2} n \sqrt{d+e x^2}\ \text{PolyLog}\left[2, e^{2 \text{ArcSinh}\left[\frac{\sqrt{e}\ x}{\sqrt{d}}\right]}\right]}{32 e^{3/2} \sqrt{1+\frac{e x^2}{d}}}$$

Result (type 5, 331 leaves):

$$\frac{1}{3600 e^{3/2} \sqrt{1+\frac{e x^2}{d}}}$$
$$\left(-400 b d e^{3/2} n x^3 \sqrt{d+e x^2}\ \text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, \frac{3}{2}, \frac{3}{2}\right\}, \left\{\frac{5}{2}, \frac{5}{2}\right\}, -\frac{e x^2}{d}\right]-\right.$$
$$144 b e^{5/2} n x^5 \sqrt{d+e x^2}\ \text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, \frac{5}{2}, \frac{5}{2}\right\}, \left\{\frac{7}{2}, \frac{7}{2}\right\}, -\frac{e x^2}{d}\right]-$$
$$75 \left(3 b d^{5/2} n \sqrt{d+e x^2}\ \text{ArcSinh}\left[\frac{\sqrt{e}\ x}{\sqrt{d}}\right] \text{Log}[x]+\sqrt{1+\frac{e x^2}{d}} \left(-a \sqrt{e}\ x \sqrt{d+e x^2}\right.\right.$$
$$(3 d^2+14 d e x^2+8 e^2 x^4)+3 d^3 (a-b n \text{Log}[x]) \text{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]-$$
$$\left.\left.\left. b \text{Log}[c x^n] \left(\sqrt{e}\ x \sqrt{d+e x^2}\ (3 d^2+14 d e x^2+8 e^2 x^4)-3 d^3 \text{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]\right)\right)\right)\right)$$

Problem 269: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 378 leaves, 16 steps):

$$-\frac{9}{32} b d n x \sqrt{d+e x^2} - \frac{1}{16} b n x \left(d+e x^2\right)^{3/2} + \frac{3 b d^{5/2} n \sqrt{1+\frac{e x^2}{d}} \operatorname{ArcSinh}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right]^2}{16 \sqrt{e} \sqrt{d+e x^2}} - \frac{9 b d^2 n \operatorname{ArcTanh}\left[\frac{\sqrt{e} x}{\sqrt{d+e x^2}}\right]}{32 \sqrt{e}} - \frac{3 b d^{5/2} n \sqrt{1+\frac{e x^2}{d}} \operatorname{ArcSinh}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right] \operatorname{Log}\left[1-e^{2 \operatorname{ArcSinh}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right]}\right]}{8 \sqrt{e} \sqrt{d+e x^2}} + \frac{3}{8} d x \sqrt{d+e x^2} \left(a+b \operatorname{Log}\left[c x^n\right]\right) + \frac{1}{4} x \left(d+e x^2\right)^{3/2} \left(a+b \operatorname{Log}\left[c x^n\right]\right) + \frac{3 d^{5/2} \sqrt{1+\frac{e x^2}{d}} \operatorname{ArcSinh}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right] \left(a+b \operatorname{Log}\left[c x^n\right]\right)}{8 \sqrt{e} \sqrt{d+e x^2}} - \frac{3 b d^{5/2} n \sqrt{1+\frac{e x^2}{d}} \operatorname{PolyLog}\left[2, e^{2 \operatorname{ArcSinh}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right]}\right]}{16 \sqrt{e} \sqrt{d+e x^2}}$$

Result (type 5, 314 leaves):

$$\frac{1}{72 \sqrt{e} \sqrt{1+\frac{e x^2}{d}}} \left(-8 b e^{3/2} n x^3 \sqrt{d+e x^2} \operatorname{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, \frac{3}{2}, \frac{3}{2}\right\}, \left\{\frac{5}{2}, \frac{5}{2}\right\}, -\frac{e x^2}{d}\right] + 9 \left(-4 b d \sqrt{e} n x \sqrt{d+e x^2} \operatorname{HypergeometricPFQ}\left[\left\{\frac{1}{2}, \frac{1}{2}, \frac{1}{2}\right\}, \left\{\frac{3}{2}, \frac{3}{2}\right\}, -\frac{e x^2}{d}\right] + b d^{3/2} n \sqrt{d+e x^2} \operatorname{ArcSinh}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right] \left(-2+3 \operatorname{Log}[x]\right) + \sqrt{1+\frac{e x^2}{d}} \left(\sqrt{e} x \sqrt{d+e x^2} \left(5 a d-2 b d n+2 a e x^2\right) + 3 d^2 \left(a-b n \operatorname{Log}[x]\right) \operatorname{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right] + b \operatorname{Log}\left[c x^n\right] \left(\sqrt{e} x \sqrt{d+e x^2} \left(5 d+2 e x^2\right) + 3 d^2 \operatorname{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]\right)\right)\right)\right)$$

Problem 270: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 400 leaves, 14 steps):

$$-\frac{b\,d\,n\,\sqrt{d+e\,x^2}}{x}-\frac{1}{4}\,b\,e\,n\,x\,\sqrt{d+e\,x^2}+\frac{3\,b\,\sqrt{d}\,\sqrt{e}\,n\,\sqrt{d+e\,x^2}\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}{4\,\sqrt{1+\frac{e\,x^2}{d}}}+\frac{3\,b\,\sqrt{d}\,\sqrt{e}\,n\,\sqrt{d+e\,x^2}\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]^2}{4\,\sqrt{1+\frac{e\,x^2}{d}}}-$$

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

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

$$\frac{3\,b\,\sqrt{d}\,\sqrt{e}\,n\,\sqrt{d+e\,x^2}\,\text{PolyLog}\left[2,\,e^{2\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}\right]}{4\,\sqrt{1+\frac{e\,x^2}{d}}}$$

Result (type 5, 329 leaves):

$$-\frac{1}{x\,\sqrt{1+\frac{e\,x^2}{d}}}b\,\sqrt{d}\,n\,\sqrt{d+e\,x^2}\,\left(\sqrt{d}\,\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2},-\frac{1}{2},-\frac{1}{2}\right\},\left\{\frac{1}{2},\frac{1}{2}\right\},-\frac{e\,x^2}{d}\right]+\right.$$

$$\left.\left(\sqrt{d}\,\sqrt{1+\frac{e\,x^2}{d}}-\sqrt{e}\,x\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]\right)\,\text{Log}[x]\right)+\frac{1}{4\,\sqrt{1+\frac{e\,x^2}{d}}}$$

$$b\,\sqrt{e}\,n\,\sqrt{d+e\,x^2}\,\left(-2\,\sqrt{e}\,x\,\text{HypergeometricPFQ}\left[\left\{\frac{1}{2},\frac{1}{2},\frac{1}{2}\right\},\left\{\frac{3}{2},\frac{3}{2}\right\},-\frac{e\,x^2}{d}\right]+\right.$$

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

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

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

Problem 271: Result unnecessarily involves higher level functions.

$$\int \frac{\left(d+e x^2\right)^{3/2} (a+b \text{Log}[c x^n])}{x^4} \, dx$$

Optimal (type 4, 400 leaves, 13 steps):

$$-\frac{4 b e n \sqrt{d+e x^2}}{3 x}-\frac{b n \left(d+e x^2\right)^{3/2}}{9 x^3}+\frac{4 b e^{3/2} n \sqrt{d+e x^2} \text{ArcSinh}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right]}{3 \sqrt{d} \sqrt{1+\frac{e x^2}{d}}}+\frac{b e^{3/2} n \sqrt{d+e x^2} \text{ArcSinh}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right]^2}{2 \sqrt{d} \sqrt{1+\frac{e x^2}{d}}}-\frac{b e^{3/2} n \sqrt{d+e x^2} \text{ArcSinh}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right] \text{Log}\left[1-e^{2 \text{ArcSinh}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right]}\right]}{\sqrt{d} \sqrt{1+\frac{e x^2}{d}}}-\frac{e \sqrt{d+e x^2} (a+b \text{Log}[c x^n])}{x}-\frac{\left(d+e x^2\right)^{3/2} (a+b \text{Log}[c x^n])}{3 x^3}+\frac{e^{3/2} \sqrt{d+e x^2} \text{ArcSinh}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right] (a+b \text{Log}[c x^n])}{\sqrt{d} \sqrt{1+\frac{e x^2}{d}}}-\frac{b e^{3/2} n \sqrt{d+e x^2} \text{PolyLog}\left[2, e^{2 \text{ArcSinh}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right]}\right]}{2 \sqrt{d} \sqrt{1+\frac{e x^2}{d}}}$$

Result (type 5, 269 leaves):

$$\frac{1}{9 x^3 \sqrt{1+\frac{e x^2}{d}}} \left(b d n \sqrt{d+e x^2} \left(-\text{Hypergeometric2F1}\left[-\frac{3}{2}, -\frac{3}{2}, -\frac{1}{2}, -\frac{e x^2}{d}\right]-3 \left(1+\frac{e x^2}{d}\right)^{3/2} \text{Log}[x]\right)+\frac{1}{x \sqrt{1+\frac{e x^2}{d}}} b e n \sqrt{d+e x^2} \left(-\text{HypergeometricPFQ}\left[\left\{-\frac{1}{2}, -\frac{1}{2}, -\frac{1}{2}\right\}, \left\{\frac{1}{2}, \frac{1}{2}\right\}, -\frac{e x^2}{d}\right]-\sqrt{1+\frac{e x^2}{d}} \text{Log}[x]+\frac{\sqrt{e} x \text{ArcSinh}\left[\frac{\sqrt{e} x}{\sqrt{d}}\right] \text{Log}[x]}{\sqrt{d}}\right)-\frac{\sqrt{d+e x^2} \left(d+4 e x^2\right) (a-b n \text{Log}[x]+b \text{Log}[c x^n])}{3 x^3}+e^{3/2} (a-b n \text{Log}[x]+b \text{Log}[c x^n]) \text{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]\right)$$

Problem 279: Result unnecessarily involves higher level functions.

$$\int \frac{a+b\,\text{Log}[c\,x^n]}{x\sqrt{d+e\,x^2}}\,dx$$

Optimal (type 4, 166 leaves, 8 steps):

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

Result (type 5, 162 leaves):

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

Problem 280: Result unnecessarily involves higher level functions.

$$\int \frac{a+b\,\text{Log}[c\,x^n]}{x^3\sqrt{d+e\,x^2}}\,dx$$

Optimal (type 4, 258 leaves, 14 steps):

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

Result (type 5, 229 leaves):

$$\frac{1}{36\, d^{3/2}}\left(\frac{1}{x^2\sqrt{d+e\,x^2}} b\, n\sqrt{1+\frac{d}{e\,x^2}}\left(2\, d^{3/2}\, \text{HypergeometricPFQ}\left[\left\{\frac{3}{2},\frac{3}{2},\frac{3}{2}\right\},\left\{\frac{5}{2},\frac{5}{2}\right\},-\frac{d}{e\,x^2}\right]+ 9\, e\, x^2\left(-\sqrt{d}\sqrt{1+\frac{d}{e\,x^2}}+\sqrt{e}\, x\, \text{ArcSinh}\left[\frac{\sqrt{d}}{\sqrt{e}\, x}\right]\right)(1+2\,\text{Log}[x])\right)- \frac{18\sqrt{d}\sqrt{d+e\,x^2}\,(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n])}{x^2}-18\, e\, \text{Log}[x]\,(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n])+ 18\, e\,(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n])\,\text{Log}\left[d+\sqrt{d}\sqrt{d+e\,x^2}\right]\right)$$

Problem 281: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 359 leaves, 12 steps):

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

Result (type 5, 205 leaves):

$$\frac{1}{36\, e^2}\left(\frac{1}{\sqrt{d+e\,x^2}} b\, n\sqrt{1+\frac{e\,x^2}{d}}\left(2\, e^2\, x^3\, \text{HypergeometricPFQ}\left[\left\{\frac{3}{2},\frac{3}{2},\frac{3}{2}\right\},\left\{\frac{5}{2},\frac{5}{2}\right\},-\frac{e\,x^2}{d}\right]+ 9\, d\sqrt{e}\left(\sqrt{e}\, x\sqrt{1+\frac{e\,x^2}{d}}-\sqrt{d}\,\text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]\right)(-1+2\,\text{Log}[x])\right)+ 18\, e\, x\sqrt{d+e\,x^2}\,(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n])- 18\, d\sqrt{e}\,(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n])\,\text{Log}\left[e\,x+\sqrt{e}\sqrt{d+e\,x^2}\right]\right)$$

Problem 290: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 209 leaves, 11 steps):

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

Result (type 5, 241 leaves):

$$\left(-b\,d^{3/2}\,n\,\sqrt{1+\frac{d}{e\,x^2}}\,\text{HypergeometricPFQ}\left[\left\{\frac{3}{2},\frac{3}{2},\frac{3}{2}\right\},\left\{\frac{5}{2},\frac{5}{2}\right\},-\frac{d}{e\,x^2}\right]+9\,e\,x^2\left(-b\,\sqrt{e}\,n\,\sqrt{1+\frac{d}{e\,x^2}}\,x\,\text{ArcSinh}\left[\frac{\sqrt{d}}{\sqrt{e}\,x}\right]\,\text{Log}[x]-b\,n\,\sqrt{d+e\,x^2}\,\text{Log}[x]^2+\sqrt{d+e\,x^2}\,\text{Log}[x]\left(a+b\,\text{Log}\left[c\,x^n\right]+b\,n\,\text{Log}\left[d+\sqrt{d}\,\sqrt{d+e\,x^2}\right]\right)+\left(a+b\,\text{Log}\left[c\,x^n\right]\right)\left(\sqrt{d}-\sqrt{d+e\,x^2}\,\text{Log}\left[d+\sqrt{d}\,\sqrt{d+e\,x^2}\right]\right)\right)\right)\Big/\left(9\,d^{3/2}\,e\,x^2\,\sqrt{d+e\,x^2}\right)$$

Problem 291: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 287 leaves, 12 steps):

$$-\frac{b\,n\,\sqrt{d+e\,x^2}}{4\,d^2\,x^2}-\frac{5\,b\,e\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]}{4\,d^{5/2}}-\frac{3\,b\,e\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]^2}{4\,d^{5/2}}-$$

$$\frac{3\,e\,\left(a+b\,\text{Log}[c\,x^n]\right)}{2\,d^2\,\sqrt{d+e\,x^2}}-\frac{a+b\,\text{Log}[c\,x^n]}{2\,d\,x^2\,\sqrt{d+e\,x^2}}+\frac{3\,e\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]\,\left(a+b\,\text{Log}[c\,x^n]\right)}{2\,d^{5/2}}+$$

$$\frac{3\,b\,e\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]\,\text{Log}\left[\frac{2\,\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^2}}\right]}{2\,d^{5/2}}+\frac{3\,b\,e\,n\,\text{PolyLog}\left[2,\,1-\frac{2\,\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^2}}\right]}{4\,d^{5/2}}$$

Result (type 5, 218 leaves):

$$\Bigg(3\,b\,d^{5/2}\,n\,\sqrt{1+\frac{d}{e\,x^2}}\;\text{HypergeometricPFQ}\left[\left\{\frac{5}{2},\frac{5}{2},\frac{5}{2}\right\},\left\{\frac{7}{2},\frac{7}{2}\right\},-\frac{d}{e\,x^2}\right]-$$

$$5\,b\,d^{5/2}\,n\,\sqrt{1+\frac{d}{e\,x^2}}\;\text{Hypergeometric2F1}\left[\frac{3}{2},\frac{5}{2},\frac{7}{2},-\frac{d}{e\,x^2}\right]\,\left(1+2\,\text{Log}[x]\right)-$$

$$25\,e\,x^2\,\left(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n]\right)\,\Big(\sqrt{d}\,\left(d+3\,e\,x^2\right)+3\,e\,x^2\,\sqrt{d+e\,x^2}\,\text{Log}[x]-$$

$$3\,e\,x^2\,\sqrt{d+e\,x^2}\,\text{Log}\left[d+\sqrt{d}\,\sqrt{d+e\,x^2}\right]\Big)\Bigg)\Bigg/\left(50\,d^{5/2}\,e\,x^4\,\sqrt{d+e\,x^2}\right)$$

Problem 292: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 328 leaves, 11 steps):

$$\frac{b\,\sqrt{d}\,n\,\sqrt{1+\frac{e\,x^2}{d}}\;\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}{e^{3/2}\,\sqrt{d+e\,x^2}}+\frac{b\,\sqrt{d}\,n\,\sqrt{1+\frac{e\,x^2}{d}}\;\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]^2}{2\,e^{3/2}\,\sqrt{d+e\,x^2}}-$$

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

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

Result (type 5, 217 leaves):

$$-\left(\left(b\,n\,\sqrt{1+\frac{e\,x^2}{d}}\,\left(e^{3/2}\,x^3\,\left(d+e\,x^2\right)\,\text{HypergeometricPFQ}\left[\left\{\frac{3}{2},\frac{3}{2},\frac{3}{2}\right\},\left\{\frac{5}{2},\frac{5}{2}\right\},-\frac{e\,x^2}{d}\right]+9\,d^2\,\sqrt{e}\,x\,\sqrt{1+\frac{e\,x^2}{d}}\,\text{Log}[x]-9\,d^{3/2}\,\left(d+e\,x^2\right)\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]\,\text{Log}[x]\right)\right)\Big/\left(9\,d\,e^{3/2}\,\left(d+e\,x^2\right)^{3/2}\right)\right)-\frac{x\,\left(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n]\right)}{e\,\sqrt{d+e\,x^2}}+\frac{\left(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n]\right)\,\text{Log}\left[e\,x+\sqrt{e}\,\sqrt{d+e\,x^2}\right]}{e^{3/2}}$$

Problem 301: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 251 leaves, 15 steps):

$$-\frac{b\,n}{3\,d^2\,\sqrt{d+e\,x^2}}+\frac{4\,b\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]}{3\,d^{5/2}}+\frac{b\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]^2}{2\,d^{5/2}}+\frac{1}{3}\left(\frac{1}{d\,\left(d+e\,x^2\right)^{3/2}}+\frac{3}{d^2\,\sqrt{d+e\,x^2}}-\frac{3\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]}{d^{5/2}}\right)\left(a+b\,\text{Log}[c\,x^n]\right)-\frac{b\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]\,\text{Log}\left[\frac{2\,\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^2}}\right]}{d^{5/2}}-\frac{b\,n\,\text{PolyLog}\left[2,1-\frac{2\,\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^2}}\right]}{2\,d^{5/2}}$$

Result (type 5, 273 leaves):

$$\left(b\,n\,\sqrt{1+\frac{d}{e\,x^2}}\,\left(-3\,d^{5/2}\,\left(d+e\,x^2\right)^2\,\text{HypergeometricPFQ}\left[\left\{\frac{5}{2},\frac{5}{2},\frac{5}{2}\right\},\left\{\frac{7}{2},\frac{7}{2}\right\},-\frac{d}{e\,x^2}\right]+25\,\sqrt{d}\,e^3\,\sqrt{1+\frac{d}{e\,x^2}}\,x^6\,\left(4\,d+3\,e\,x^2\right)\,\text{Log}[x]-75\,e^{5/2}\,x^5\,\left(d+e\,x^2\right)^2\,\text{ArcSinh}\left[\frac{\sqrt{d}}{\sqrt{e}\,x}\right]\,\text{Log}[x]\right)\right)\Big/\left(75\,d^{5/2}\,e^2\,x^4\,\left(d+e\,x^2\right)^{5/2}\right)+\frac{\left(4\,d+3\,e\,x^2\right)\,\left(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n]\right)}{3\,d^2\,\left(d+e\,x^2\right)^{3/2}}+\frac{\text{Log}[x]\,\left(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n]\right)}{d^{5/2}}-\frac{\left(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n]\right)\,\text{Log}\left[d+\sqrt{d}\,\sqrt{d+e\,x^2}\right]}{d^{5/2}}$$

Problem 302: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 337 leaves, 14 steps):

$$\frac{b\,e\,n}{3\,d^3\,\sqrt{d+e\,x^2}}-\frac{b\,n\,\sqrt{d+e\,x^2}}{4\,d^3\,x^2}-\frac{31\,b\,e\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]}{12\,d^{7/2}}-\frac{5\,b\,e\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]^2}{4\,d^{7/2}}-\frac{5\,e\,(a+b\,\text{Log}[c\,x^n])}{6\,d^2\,(d+e\,x^2)^{3/2}}-\frac{a+b\,\text{Log}[c\,x^n]}{2\,d\,x^2\,(d+e\,x^2)^{3/2}}-\frac{5\,e\,(a+b\,\text{Log}[c\,x^n])}{2\,d^3\,\sqrt{d+e\,x^2}}+\frac{5\,e\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]\,(a+b\,\text{Log}[c\,x^n])}{2\,d^{7/2}}+\frac{5\,b\,e\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^2}}{\sqrt{d}}\right]\,\text{Log}\left[\frac{2\,\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^2}}\right]}{2\,d^{7/2}}+\frac{5\,b\,e\,n\,\text{PolyLog}\left[2,1-\frac{2\,\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^2}}\right]}{4\,d^{7/2}}$$

Result (type 5, 227 leaves):

$$\left(b\,n\,\sqrt{1+\frac{d}{e\,x^2}}\,\left(5\,\text{HypergeometricPFQ}\left[\left\{\frac{7}{2},\frac{7}{2},\frac{7}{2}\right\},\left\{\frac{9}{2},\frac{9}{2}\right\},-\frac{d}{e\,x^2}\right]-7\,\text{Hypergeometric2F1}\left[\frac{5}{2},\frac{7}{2},\frac{9}{2},-\frac{d}{e\,x^2}\right]\,(1+2\,\text{Log}[x])\right)\right)\Big/\left(98\,e^2\,x^6\,\sqrt{d+e\,x^2}\right)-\frac{(3\,d^2+20\,d\,e\,x^2+15\,e^2\,x^4)\,(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n])}{6\,d^3\,x^2\,(d+e\,x^2)^{3/2}}-\frac{5\,e\,\text{Log}[x]\,(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n])}{2\,d^{7/2}}+\frac{5\,e\,(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n])\,\text{Log}\left[d+\sqrt{d}\,\sqrt{d+e\,x^2}\right]}{2\,d^{7/2}}$$

Problem 303: Result unnecessarily involves higher level functions.

$$\int \frac{x^6\,(a+b\,\text{Log}[c\,x^n])}{(d+e\,x^2)^{5/2}}\,dx$$

Optimal (type 4, 443 leaves, 24 steps):

$$\frac{b\,d\,n\,x}{3\,e^3\sqrt{d+e\,x^2}}-\frac{b\,n\,x\sqrt{d+e\,x^2}}{4\,e^3}-\frac{31\,b\,d^{3/2}\,n\sqrt{1+\frac{e\,x^2}{d}}\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}{12\,e^{7/2}\sqrt{d+e\,x^2}}-$$

$$\frac{5\,b\,d^{3/2}\,n\sqrt{1+\frac{e\,x^2}{d}}\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]^2}{4\,e^{7/2}\sqrt{d+e\,x^2}}+\frac{5\,b\,d^{3/2}\,n\sqrt{1+\frac{e\,x^2}{d}}\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]\text{Log}\left[1-e^{2\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}\right]}{2\,e^{7/2}\sqrt{d+e\,x^2}}-$$

$$\frac{x^5\,(a+b\,\text{Log}[c\,x^n])}{3\,e\,(d+e\,x^2)^{3/2}}-\frac{5\,x^3\,(a+b\,\text{Log}[c\,x^n])}{3\,e^2\sqrt{d+e\,x^2}}+\frac{5\,x\sqrt{d+e\,x^2}\,(a+b\,\text{Log}[c\,x^n])}{2\,e^3}-$$

$$\frac{5\,d^{3/2}\sqrt{1+\frac{e\,x^2}{d}}\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right](a+b\,\text{Log}[c\,x^n])}{2\,e^{7/2}\sqrt{d+e\,x^2}}+\frac{5\,b\,d^{3/2}\,n\sqrt{1+\frac{e\,x^2}{d}}\,\text{PolyLog}\left[2,e^{2\,\text{ArcSinh}\left[\frac{\sqrt{e}\,x}{\sqrt{d}}\right]}\right]}{4\,e^{7/2}\sqrt{d+e\,x^2}}$$

Result (type 5, 199 leaves):

$$\frac{1}{98\,d^2\sqrt{d+e\,x^2}}b\,n\,x^7\sqrt{1+\frac{e\,x^2}{d}}\left(5\,\text{HypergeometricPFQ}\left[\left\{\frac{7}{2},\frac{7}{2},\frac{7}{2}\right\},\left\{\frac{9}{2},\frac{9}{2}\right\},-\frac{e\,x^2}{d}\right]+\right.$$

$$\left.7\,\text{Hypergeometric2F1}\left[\frac{5}{2},\frac{7}{2},\frac{9}{2},-\frac{e\,x^2}{d}\right](-1+2\,\text{Log}[x])\right)+$$

$$\frac{x\,(15\,d^2+20\,d\,e\,x^2+3\,e^2\,x^4)\,(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n])}{6\,e^3\,(d+e\,x^2)^{3/2}}-$$

$$\frac{5\,d\,(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n])\,\text{Log}\left[e\,x+\sqrt{e}\sqrt{d+e\,x^2}\right]}{2\,e^{7/2}}$$

Problem 304: Result unnecessarily involves higher level functions.

$$\int\frac{x^4\,(a+b\,\text{Log}[c\,x^n])}{(d+e\,x^2)^{5/2}}\,dx$$

Optimal (type 4, 383 leaves, 13 steps):

$$-\frac{b n x}{3 e^2 \sqrt{d+e x^2}}+\frac{4 b \sqrt{d}\, n \sqrt{1+\frac{e x^2}{d}}\, \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]}{3 e^{5/2} \sqrt{d+e x^2}}+\frac{b \sqrt{d}\, n \sqrt{1+\frac{e x^2}{d}}\, \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]^2}{2 e^{5/2} \sqrt{d+e x^2}}-\frac{b \sqrt{d}\, n \sqrt{1+\frac{e x^2}{d}}\, \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right] \text{Log}\left[1-e^{2 \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]}\right]}{e^{5/2} \sqrt{d+e x^2}}-\frac{x^3 \left(a+b \text{Log}\left[c x^n\right]\right)}{3 e \left(d+e x^2\right)^{3/2}}-\frac{x \left(a+b \text{Log}\left[c x^n\right]\right)}{e^2 \sqrt{d+e x^2}}+\frac{\sqrt{d} \sqrt{1+\frac{e x^2}{d}}\, \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right] \left(a+b \text{Log}\left[c x^n\right]\right)}{e^{5/2} \sqrt{d+e x^2}}-\frac{b \sqrt{d}\, n \sqrt{1+\frac{e x^2}{d}}\, \text{PolyLog}\left[2, e^{2 \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right]}\right]}{2 e^{5/2} \sqrt{d+e x^2}}$$

Result (type 5, 244 leaves):

$$-\left(\left(b n \sqrt{1+\frac{e x^2}{d}} \left(3 e^{5/2} x^5 \left(d+e x^2\right)^2 \text{HypergeometricPFQ}\left[\left\{\frac{5}{2},\frac{5}{2},\frac{5}{2}\right\},\left\{\frac{7}{2},\frac{7}{2}\right\},-\frac{e x^2}{d}\right]+25 d^3 \sqrt{e}\, x \left(3 d+4 e x^2\right) \sqrt{1+\frac{e x^2}{d}}\, \text{Log}[x]-75 d^{5/2} \left(d+e x^2\right)^2 \text{ArcSinh}\left[\frac{\sqrt{e}\, x}{\sqrt{d}}\right] \text{Log}[x]\right)\right)\Big/\left(75 d^2 e^{5/2} \left(d+e x^2\right)^{5/2}\right)\right)-\frac{x \left(3 d+4 e x^2\right) \left(a-b n \text{Log}[x]+b \text{Log}\left[c x^n\right]\right)}{3 e^2 \left(d+e x^2\right)^{3/2}}+\frac{\left(a-b n \text{Log}[x]+b \text{Log}\left[c x^n\right]\right) \text{Log}\left[e x+\sqrt{e} \sqrt{d+e x^2}\right]}{e^{5/2}}$$

Problem 312: Result unnecessarily involves higher level functions.

$$\int \frac{a+b \text{Log}\left[c x^n\right]}{x^3 \sqrt{d-e x} \sqrt{d+e x}} \, dx$$

Optimal (type 4, 489 leaves, 13 steps):

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

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

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

$$\frac{b\,e^2\,n\,\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{ArcTanh}\left[\sqrt{1-\frac{e^2x^2}{d^2}}\right]\text{Log}\left[\frac{2}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right]}{2\,d^2\sqrt{d-e\,x}\,\sqrt{d+e\,x}}-\frac{b\,e^2\,n\,\sqrt{1-\frac{e^2x^2}{d^2}}\,\text{PolyLog}\left[2,-\frac{1+\sqrt{1-\frac{e^2x^2}{d^2}}}{1-\sqrt{1-\frac{e^2x^2}{d^2}}}\right]}{4\,d^2\sqrt{d-e\,x}\,\sqrt{d+e\,x}}$$

Result (type 5, 255 leaves):

$$\frac{1}{36\,d^3}\Bigg(\Bigg(b\,n\,\left(-d^2+e^2x^2\right)\Bigg(2\,d^3\,\text{HypergeometricPFQ}\left[\left\{\frac{3}{2},\frac{3}{2},\frac{3}{2}\right\},\left\{\frac{5}{2},\frac{5}{2}\right\},\frac{d^2}{e^2x^2}\right]+$$

$$9\,e^2x^2\left(d\sqrt{1-\frac{d^2}{e^2x^2}}-e\,x\,\text{ArcSin}\left[\frac{d}{e\,x}\right]\right)\left(1+2\,\text{Log}[x]\right)\Bigg)\Bigg)\Bigg/$$

$$\left(e^2\sqrt{1-\frac{d^2}{e^2x^2}}\;x^4\sqrt{d-e\,x}\,\sqrt{d+e\,x}\right)-\frac{18\,d\sqrt{d-e\,x}\,\sqrt{d+e\,x}\,\left(a-b\,n\,\text{Log}[x]+b\,\text{Log}\left[c\,x^n\right]\right)}{x^2}+$$

$$18\,e^2\,\text{Log}[x]\,\left(a-b\,n\,\text{Log}[x]+b\,\text{Log}\left[c\,x^n\right]\right)-$$

$$18\,e^2\left(a-b\,n\,\text{Log}[x]+b\,\text{Log}\left[c\,x^n\right]\right)\text{Log}\left[d+\sqrt{d-e\,x}\,\sqrt{d+e\,x}\right]\Bigg)$$

Problem 348: Result more than twice size of optimal antiderivative.

$$\int\frac{\text{Log}\left[\frac{a}{x}\right]}{a\,x-x^2}\,dx$$

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

$$\frac{\text{PolyLog}\left[2,1-\frac{a}{x}\right]}{a}$$

Result (type 4, 61 leaves):

$$\frac{1}{2a}\left(2\,\text{Log}\left[\frac{a}{x}\right]\,(\text{Log}[x]-\text{Log}[-a+x])+\text{Log}[x]\left(\text{Log}[x]-2\,\text{Log}[-a+x]+2\,\text{Log}\left[1-\frac{x}{a}\right]\right)+2\,\text{PolyLog}\left[2,\frac{x}{a}\right]\right)$$

Problem 349: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Log}\left[\frac{a}{x^2}\right]}{a\,x-x^3}\,dx$$

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

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

Result (type 4, 104 leaves):

$$\frac{1}{2a}\left(2\,\text{Log}\left[\frac{a}{x^2}\right]\text{Log}[x]+2\,\text{Log}[x]^2+2\,\text{Log}[x]\,\text{Log}\left[1-\frac{x}{\sqrt{a}}\right]+2\,\text{Log}[x]\,\text{Log}\left[1+\frac{x}{\sqrt{a}}\right]-\text{Log}\left[\frac{a}{x^2}\right]\text{Log}\left[-a+x^2\right]-2\,\text{Log}[x]\,\text{Log}\left[-a+x^2\right]+2\,\text{PolyLog}\left[2,-\frac{x}{\sqrt{a}}\right]+2\,\text{PolyLog}\left[2,\frac{x}{\sqrt{a}}\right]\right)$$

Problem 350: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Log}\left[a\,x^{1-n}\right]}{a\,x-x^n}\,dx$$

Optimal (type 4, 26 leaves, 3 steps):

$$-\frac{\text{PolyLog}\left[2,1-a\,x^{1-n}\right]}{a\,(1-n)}$$

Result (type 4, 103 leaves):

$$\frac{1}{2\,a\,(-1+n)}\left(\left(-1+n^2\right)\text{Log}[x]^2+2\,\text{Log}[x]\left(n\,\text{Log}\left[a\,x^{1-n}\right]+(-1+n)\left(\text{Log}\left[1-\frac{x^{-1+n}}{a}\right]-\text{Log}\left[-a\,x+x^n\right]\right)\right)-2\,\text{Log}\left[a\,x^{1-n}\right]\text{Log}\left[-a\,x+x^n\right]+2\,\text{PolyLog}\left[2,\frac{x^{-1+n}}{a}\right]\right)$$

Problem 363: Result more than twice size of optimal antiderivative.

$$\int \frac{(f\,x)^{-1+m}\,(a+b\,\text{Log}[c\,x^n])^2}{d+e\,x^m}\,dx$$

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

$$\frac{x^{1-m}\,(f\,x)^{-1+m}\,(a+b\,\mathrm{Log}[c\,x^n])^2\,\mathrm{Log}\left[1+\frac{e\,x^m}{d}\right]}{e\,m}+\frac{2\,b\,n\,x^{1-m}\,(f\,x)^{-1+m}\,(a+b\,\mathrm{Log}[c\,x^n])\,\mathrm{PolyLog}\left[2,-\frac{e\,x^m}{d}\right]}{e\,m^2}-\frac{2\,b^2\,n^2\,x^{1-m}\,(f\,x)^{-1+m}\,\mathrm{PolyLog}\left[3,-\frac{e\,x^m}{d}\right]}{e\,m^3}$$

Result (type 4, 502 leaves):

$$\frac{1}{3\,e\,f\,m^3}\,x^{-m}\,(f\,x)^m\,\Big(3\,a^2\,m^3\,\mathrm{Log}[x]-6\,a\,b\,m^3\,n\,\mathrm{Log}[x]^2+4\,b^2\,m^3\,n^2\,\mathrm{Log}[x]^3+6\,a\,b\,m^3\,\mathrm{Log}[x]\,\mathrm{Log}[c\,x^n]-6\,b^2\,m^3\,n\,\mathrm{Log}[x]^2\,\mathrm{Log}[c\,x^n]+3\,b^2\,m^3\,\mathrm{Log}[x]\,\mathrm{Log}[c\,x^n]^2+3\,b^2\,m^2\,n^2\,\mathrm{Log}[x]^2\,\mathrm{Log}\left[1+\frac{d\,x^{-m}}{e}\right]+3\,a^2\,m^2\,\mathrm{Log}[d-d\,x^m]-6\,a\,b\,m^2\,n\,\mathrm{Log}[x]\,\mathrm{Log}[d-d\,x^m]+3\,b^2\,m^2\,n^2\,\mathrm{Log}[x]^2\,\mathrm{Log}[d-d\,x^m]+6\,a\,b\,m^2\,\mathrm{Log}[c\,x^n]\,\mathrm{Log}[d-d\,x^m]-6\,b^2\,m^2\,n\,\mathrm{Log}[x]\,\mathrm{Log}[c\,x^n]\,\mathrm{Log}[d-d\,x^m]+3\,b^2\,m^2\,\mathrm{Log}[c\,x^n]^2\,\mathrm{Log}[d-d\,x^m]+6\,a\,b\,m^2\,n\,\mathrm{Log}[x]\,\mathrm{Log}[d+e\,x^m]-6\,b^2\,m^2\,n^2\,\mathrm{Log}[x]^2\,\mathrm{Log}[d+e\,x^m]-6\,a\,b\,m\,n\,\mathrm{Log}\left[-\frac{e\,x^m}{d}\right]\,\mathrm{Log}[d+e\,x^m]+6\,b^2\,m\,n^2\,\mathrm{Log}[x]\,\mathrm{Log}\left[-\frac{e\,x^m}{d}\right]\,\mathrm{Log}[d+e\,x^m]+6\,b^2\,m^2\,n\,\mathrm{Log}[x]\,\mathrm{Log}[c\,x^n]\,\mathrm{Log}[d+e\,x^m]-6\,b^2\,m\,n\,\mathrm{Log}\left[-\frac{e\,x^m}{d}\right]\,\mathrm{Log}[c\,x^n]\,\mathrm{Log}[d+e\,x^m]-6\,b^2\,m\,n^2\,\mathrm{Log}[x]\,\mathrm{PolyLog}\left[2,-\frac{d\,x^{-m}}{e}\right]-6\,b\,m\,n\,(a-b\,n\,\mathrm{Log}[x]+b\,\mathrm{Log}[c\,x^n])\,\mathrm{PolyLog}\left[2,1+\frac{e\,x^m}{d}\right]-6\,b^2\,n^2\,\mathrm{PolyLog}\left[3,-\frac{d\,x^{-m}}{e}\right]\Big)$$

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

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

Optimal (type 4, 94 leaves, 3 steps):

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

Result (type 4, 270 leaves):

$$-\frac{1}{d\,r^3}\Big(a^2\,r^2\,\mathrm{Log}[d-d\,x^r]-2\,a\,b\,r^2\,(n\,\mathrm{Log}[x]-\mathrm{Log}[c\,x^n])\,\mathrm{Log}[d-d\,x^r]+b^2\,r^2\,(-n\,\mathrm{Log}[x]+\mathrm{Log}[c\,x^n])^2\,\mathrm{Log}[d-d\,x^r]-2\,a\,b\,n\,r\,\left(\frac{1}{2}\,r^2\,\mathrm{Log}[x]^2+\left(-r\,\mathrm{Log}[x]+\mathrm{Log}\left[-\frac{e\,x^r}{d}\right]\right)\,\mathrm{Log}[d+e\,x^r]+\mathrm{PolyLog}\left[2,1+\frac{e\,x^r}{d}\right]\right)+2\,b^2\,n\,r\,(n\,\mathrm{Log}[x]-\mathrm{Log}[c\,x^n])\,\left(\frac{1}{2}\,r^2\,\mathrm{Log}[x]^2+\left(-r\,\mathrm{Log}[x]+\mathrm{Log}\left[-\frac{e\,x^r}{d}\right]\right)\,\mathrm{Log}[d+e\,x^r]+\mathrm{PolyLog}\left[2,1+\frac{e\,x^r}{d}\right]\right)+b^2\,n^2\,\left(r^2\,\mathrm{Log}[x]^2\,\mathrm{Log}\left[1+\frac{d\,x^{-r}}{e}\right]-2\,r\,\mathrm{Log}[x]\,\mathrm{PolyLog}\left[2,-\frac{d\,x^{-r}}{e}\right]-2\,\mathrm{PolyLog}\left[3,-\frac{d\,x^{-r}}{e}\right]\right)\Big)$$

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

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

Optimal (type 4, 182 leaves, 7 steps):

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

Result (type 4, 397 leaves):

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

Problem 433: Unable to integrate problem.

$$\int \frac{(d+e\,x^r)^{5/2}\,(a+b\,\text{Log}[c\,x^n])}{x}\,dx$$

Optimal (type 4, 327 leaves, 23 steps):

$$-\frac{92\, b\, d^2\, n\, \sqrt{d+e\, x^r}}{15\, r^2}-\frac{32\, b\, d\, n\, \left(d+e\, x^r\right)^{3/2}}{45\, r^2}-\frac{4\, b\, n\, \left(d+e\, x^r\right)^{5/2}}{25\, r^2}+\frac{92\, b\, d^{5/2}\, n\, \text{ArcTanh}\left[\frac{\sqrt{d+e\, x^r}}{\sqrt{d}}\right]}{15\, r^2}+\frac{2\, b\, d^{5/2}\, n\, \text{ArcTanh}\left[\frac{\sqrt{d+e\, x^r}}{\sqrt{d}}\right]^2}{r^2}+\frac{2}{15}\left(\frac{15\, d^2\, \sqrt{d+e\, x^r}}{r}+\frac{5\, d\, \left(d+e\, x^r\right)^{3/2}}{r}+\frac{3\, \left(d+e\, x^r\right)^{5/2}}{r}-\frac{15\, d^{5/2}\, \text{ArcTanh}\left[\frac{\sqrt{d+e\, x^r}}{\sqrt{d}}\right]}{r}\right)\left(a+b\, \text{Log}\left[c\, x^n\right]\right)-\frac{4\, b\, d^{5/2}\, n\, \text{ArcTanh}\left[\frac{\sqrt{d+e\, x^r}}{\sqrt{d}}\right]\, \text{Log}\left[\frac{2\, \sqrt{d}}{\sqrt{d}-\sqrt{d+e\, x^r}}\right]}{r^2}-\frac{2\, b\, d^{5/2}\, n\, \text{PolyLog}\left[2,\, 1-\frac{2\, \sqrt{d}}{\sqrt{d}-\sqrt{d+e\, x^r}}\right]}{r^2}$$

Result (type 8, 27 leaves):

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

Problem 434: Unable to integrate problem.

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

Optimal (type 4, 284 leaves, 17 steps):

$$-\frac{16\, b\, d\, n\, \sqrt{d+e\, x^r}}{3\, r^2}-\frac{4\, b\, n\, \left(d+e\, x^r\right)^{3/2}}{9\, r^2}+\frac{16\, b\, d^{3/2}\, n\, \text{ArcTanh}\left[\frac{\sqrt{d+e\, x^r}}{\sqrt{d}}\right]}{3\, r^2}+\frac{2\, b\, d^{3/2}\, n\, \text{ArcTanh}\left[\frac{\sqrt{d+e\, x^r}}{\sqrt{d}}\right]^2}{r^2}+\frac{2}{3}\left(\frac{3\, d\, \sqrt{d+e\, x^r}}{r}+\frac{\left(d+e\, x^r\right)^{3/2}}{r}-\frac{3\, d^{3/2}\, \text{ArcTanh}\left[\frac{\sqrt{d+e\, x^r}}{\sqrt{d}}\right]}{r}\right)\left(a+b\, \text{Log}\left[c\, x^n\right]\right)-\frac{4\, b\, d^{3/2}\, n\, \text{ArcTanh}\left[\frac{\sqrt{d+e\, x^r}}{\sqrt{d}}\right]\, \text{Log}\left[\frac{2\, \sqrt{d}}{\sqrt{d}-\sqrt{d+e\, x^r}}\right]}{r^2}-\frac{2\, b\, d^{3/2}\, n\, \text{PolyLog}\left[2,\, 1-\frac{2\, \sqrt{d}}{\sqrt{d}-\sqrt{d+e\, x^r}}\right]}{r^2}$$

Result (type 8, 27 leaves):

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

Problem 435: Unable to integrate problem.

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

Optimal (type 4, 240 leaves, 12 steps):

$$-\frac{4\,b\,n\,\sqrt{d+e\,x^r}}{r^2}+\frac{4\,b\,\sqrt{d}\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]}{r^2}+\frac{2\,b\,\sqrt{d}\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]^2}{r^2}+$$

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

$$\frac{4\,b\,\sqrt{d}\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]\,\text{Log}\left[\frac{2\,\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^r}}\right]}{r^2}-\frac{2\,b\,\sqrt{d}\,n\,\text{PolyLog}\left[2,\,1-\frac{2\,\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^r}}\right]}{r^2}$$

Result (type 8, 27 leaves):

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

Problem 436: Unable to integrate problem.

$$\int\frac{a+b\,\text{Log}\left[c\,x^n\right]}{x\,\sqrt{d+e\,x^r}}\,dx$$

Optimal (type 4, 174 leaves, 8 steps):

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

$$\frac{4\,b\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]\,\text{Log}\left[\frac{2\,\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^r}}\right]}{\sqrt{d}\,r^2}-\frac{2\,b\,n\,\text{PolyLog}\left[2,\,1-\frac{2\,\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^r}}\right]}{\sqrt{d}\,r^2}$$

Result (type 8, 27 leaves):

$$\int\frac{a+b\,\text{Log}\left[c\,x^n\right]}{x\,\sqrt{d+e\,x^r}}\,dx$$

Problem 437: Unable to integrate problem.

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

Optimal (type 4, 225 leaves, 11 steps):

$$\frac{4\,b\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]}{d^{3/2}\,r^2}+\frac{2\,b\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]^2}{d^{3/2}\,r^2}+$$

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

$$\frac{4\,b\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]\text{Log}\left[\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^r}}\right]}{d^{3/2}\,r^2}-\frac{2\,b\,n\,\text{PolyLog}\left[2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^r}}\right]}{d^{3/2}\,r^2}$$

Result (type 8, 27 leaves):

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

Problem 438: Unable to integrate problem.

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

Optimal (type 4, 271 leaves, 15 steps):

$$-\frac{4\,b\,n}{3\,d^2\,r^2\sqrt{d+e\,x^r}}+\frac{16\,b\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]}{3\,d^{5/2}\,r^2}+\frac{2\,b\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]^2}{d^{5/2}\,r^2}+$$

$$\frac{2}{3}\left(\frac{1}{d\,r\left(d+e\,x^r\right)^{3/2}}+\frac{3}{d^2\,r\sqrt{d+e\,x^r}}-\frac{3\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]}{d^{5/2}\,r}\right)\left(a+b\,\text{Log}\left[c\,x^n\right]\right)-$$

$$\frac{4\,b\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]\text{Log}\left[\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^r}}\right]}{d^{5/2}\,r^2}-\frac{2\,b\,n\,\text{PolyLog}\left[2,1-\frac{2\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^r}}\right]}{d^{5/2}\,r^2}$$

Result (type 8, 27 leaves):

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

Problem 439: Unable to integrate problem.

$$\int\frac{a+b\,\text{Log}\left[c\,x^n\right]}{x\left(d+e\,x^r\right)^{7/2}}\,dx$$

Optimal (type 4, 314 leaves, 20 steps):

$$-\frac{4\,b\,n}{15\,d^2\,r^2\,\left(d+e\,x^r\right)^{3/2}}-\frac{32\,b\,n}{15\,d^3\,r^2\,\sqrt{d+e\,x^r}}+\frac{92\,b\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]}{15\,d^{7/2}\,r^2}+\frac{2\,b\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]^2}{d^{7/2}\,r^2}+$$

$$\frac{2}{15}\left(\frac{3}{d\,r\,\left(d+e\,x^r\right)^{5/2}}+\frac{5}{d^2\,r\,\left(d+e\,x^r\right)^{3/2}}+\frac{15}{d^3\,r\,\sqrt{d+e\,x^r}}-\frac{15\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]}{d^{7/2}\,r}\right)\left(a+b\,\text{Log}\left[c\,x^n\right]\right)-$$

$$\frac{4\,b\,n\,\text{ArcTanh}\left[\frac{\sqrt{d+e\,x^r}}{\sqrt{d}}\right]\,\text{Log}\left[\frac{2\,\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^r}}\right]}{d^{7/2}\,r^2}-\frac{2\,b\,n\,\text{PolyLog}\left[2,\,1-\frac{2\,\sqrt{d}}{\sqrt{d}-\sqrt{d+e\,x^r}}\right]}{d^{7/2}\,r^2}$$

Result (type 8, 27 leaves):

$$\int \frac{a+b\,\text{Log}\left[c\,x^n\right]}{x\,\left(d+e\,x^r\right)^{7/2}}\,dx$$

Problem 456: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 295 leaves, 11 steps):

$$-\frac{3\,b\,\left(e\,f-d\,g\right)\,n\,x\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)^2}{2\,d^2\,e\,\left(d+e\,x\right)}+\frac{f^2\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)^3}{2\,d^2\,\left(e\,f-d\,g\right)}-$$

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

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

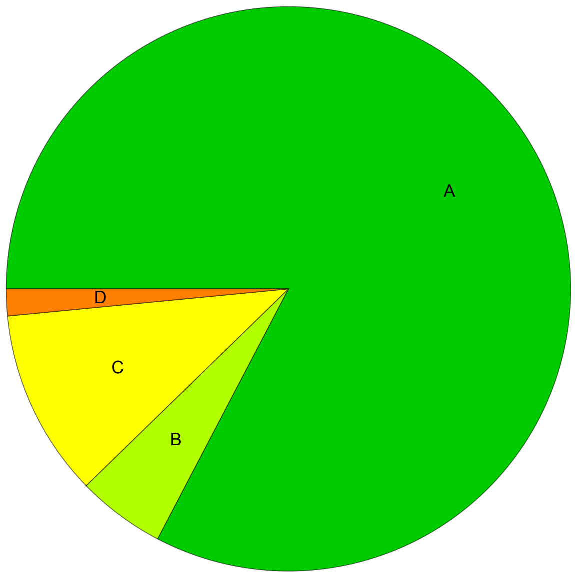
$$\frac{3\,b^2\,\left(e\,f+d\,g\right)\,n^2\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)\,\text{PolyLog}\left[2,\,-\frac{e\,x}{d}\right]}{d^2\,e^2}+\frac{3\,b^3\,\left(e\,f+d\,g\right)\,n^3\,\text{PolyLog}\left[3,\,-\frac{e\,x}{d}\right]}{d^2\,e^2}$$

Result (type 4, 674 leaves):

$$-\frac{1}{2 d^2 e^2 (d+e x)^2}\Big(-3 b (e f+d g) n (d+e x)^2 \mathrm{Log}[x] (a-b n \mathrm{Log}[x]+b \mathrm{Log}[c x^n])^2+$$
$$3 b d^2 n (d g+e (f+2 g x)) \mathrm{Log}[x] (a-b n \mathrm{Log}[x]+b \mathrm{Log}[c x^n])^2-$$
$$d^2 (-e f+d g) (a-b n \mathrm{Log}[x]+b \mathrm{Log}[c x^n])^3+d (d+e x) (a-b n \mathrm{Log}[x]+b \mathrm{Log}[c x^n])^2$$
$$(2 a d g-3 b e f n+3 b d g n+2 b d g (-n \mathrm{Log}[x]+\mathrm{Log}[c x^n]))+$$
$$3 b (e f+d g) n (d+e x)^2 (a-b n \mathrm{Log}[x]+b \mathrm{Log}[c x^n])^2 \mathrm{Log}[d+e x]+$$
$$3 b^2 d g n^2 (a-b n \mathrm{Log}[x]+b \mathrm{Log}[c x^n]) \Big(-e^2 x^2 \mathrm{Log}[x]^2+2 (d+e x)^2 \mathrm{Log}\Big[1+\frac{e x}{d}\Big]+$$
$$2 (d+e x) \mathrm{Log}[x] \Big(-e x+(d+e x) \mathrm{Log}\Big[1+\frac{e x}{d}\Big]\Big)+2 (d+e x)^2 \mathrm{PolyLog}\Big[2,-\frac{e x}{d}\Big]\Big)+$$
$$3 b^2 e f n^2 (a-b n \mathrm{Log}[x]+b \mathrm{Log}[c x^n]) \Big(-e x (2 d+e x) \mathrm{Log}[x]^2-2 (d+e x)^2 \mathrm{Log}\Big[1+\frac{e x}{d}\Big]+$$
$$2 (d+e x) \mathrm{Log}[x] \Big(e x+(d+e x) \mathrm{Log}\Big[1+\frac{e x}{d}\Big]\Big)+2 (d+e x)^2 \mathrm{PolyLog}\Big[2,-\frac{e x}{d}\Big]\Big)+$$
$$b^3 e f n^3 \Big(-e x (2 d+e x) \mathrm{Log}[x]^3+3 (d+e x) \mathrm{Log}[x]^2 \Big(e x+(d+e x) \mathrm{Log}\Big[1+\frac{e x}{d}\Big]\Big)-$$
$$6 (d+e x)^2 \mathrm{Log}[x] \Big(\mathrm{Log}\Big[1+\frac{e x}{d}\Big]-\mathrm{PolyLog}\Big[2,-\frac{e x}{d}\Big]\Big)-$$
$$6 (d+e x)^2 \mathrm{PolyLog}\Big[2,-\frac{e x}{d}\Big]-6 (d+e x)^2 \mathrm{PolyLog}\Big[3,-\frac{e x}{d}\Big]\Big)+$$
$$b^3 d g n^3 \Big(\mathrm{Log}[x] \Big(-e^2 x^2 \mathrm{Log}[x]^2+6 (d+e x)^2 \mathrm{Log}\Big[1+\frac{e x}{d}\Big]+$$
$$3 (d+e x) \mathrm{Log}[x] \Big(-e x+(d+e x) \mathrm{Log}\Big[1+\frac{e x}{d}\Big]\Big)\Big)+$$
$$6 (d+e x)^2 (1+\mathrm{Log}[x]) \mathrm{PolyLog}\Big[2,-\frac{e x}{d}\Big]-6 (d+e x)^2 \mathrm{PolyLog}\Big[3,-\frac{e x}{d}\Big]\Big)\Big)$$

Summary of Integration Test Results

456 integration problems



A - 377 optimal antiderivatives

B - 23 more than twice size of optimal antiderivatives

C - 49 unnecessarily complex antiderivatives

D - 7 unable to integrate problems

E - 0 integration timeouts