Mathematica 11.3 Integration Test Results

Test results for the 249 problems in "3.1.5 u (a+b log(c x^n))^p.m"

Problem 22: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 342 leaves, 14 steps):

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

Result (type 4, 770 leaves):

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

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

$$\int \frac{(a + b \operatorname{Log}[c x^n])^3 \operatorname{Log}[1 + e x]}{x^3} \, dx$$

Optimal (type 4, 470 leaves, 22 steps):

$$-\frac{45 b^3 e n^3}{8 x}-\frac{3}{8} b^3 e^2 n^3 \text{Log}[x]-\frac{21 b^2 e n^2 \left(a+b \text{Log}\left[c x^n\right]\right)}{4 x}+$$
$$\frac{3}{4} b^2 e^2 n^2 \text{Log}\left[1+\frac{1}{e x}\right] \left(a+b \text{Log}\left[c x^n\right]\right)-\frac{9 b e n \left(a+b \text{Log}\left[c x^n\right]\right)^2}{4 x}+$$
$$\frac{3}{4} b e^2 n \text{Log}\left[1+\frac{1}{e x}\right] \left(a+b \text{Log}\left[c x^n\right]\right)^2-\frac{e \left(a+b \text{Log}\left[c x^n\right]\right)^3}{2 x}+\frac{1}{2} e^2 \text{Log}\left[1+\frac{1}{e x}\right] \left(a+b \text{Log}\left[c x^n\right]\right)^3+$$
$$\frac{3}{8} b^3 e^2 n^3 \text{Log}[1+e x]-\frac{3 b^3 n^3 \text{Log}[1+e x]}{8 x^2}-\frac{3 b^2 n^2 \left(a+b \text{Log}\left[c x^n\right]\right) \text{Log}[1+e x]}{4 x^2}-$$
$$\frac{3 b n \left(a+b \text{Log}\left[c x^n\right]\right)^2 \text{Log}[1+e x]}{4 x^2}-\frac{\left(a+b \text{Log}\left[c x^n\right]\right)^3 \text{Log}[1+e x]}{2 x^2}-$$
$$\frac{3}{4} b^3 e^2 n^3 \text{PolyLog}\left[2,-\frac{1}{e x}\right]-\frac{3}{2} b^2 e^2 n^2 \left(a+b \text{Log}\left[c x^n\right]\right) \text{PolyLog}\left[2,-\frac{1}{e x}\right]-$$
$$\frac{3}{2} b e^2 n \left(a+b \text{Log}\left[c x^n\right]\right)^2 \text{PolyLog}\left[2,-\frac{1}{e x}\right]-\frac{3}{2} b^3 e^2 n^3 \text{PolyLog}\left[3,-\frac{1}{e x}\right]-$$
$$3 b^2 e^2 n^2 \left(a+b \text{Log}\left[c x^n\right]\right) \text{PolyLog}\left[3,-\frac{1}{e x}\right]-3 b^3 e^2 n^3 \text{PolyLog}\left[4,-\frac{1}{e x}\right]$$

Result (type 4, 1047 leaves) :

$$-\frac{1}{8 x^2}\Big(4 a^3 e x+18 a^2 b e n x+42 a b^2 e n^2 x+45 b^3 e n^3 x+4 a^3 e^2 x^2 \text{Log}[x]+$$
$$6 a^2 b e^2 n x^2 \text{Log}[x]+6 a b^2 e^2 n^2 x^2 \text{Log}[x]+3 b^3 e^2 n^3 x^2 \text{Log}[x]-6 a^2 b e^2 n x^2 \text{Log}[x]^2-$$
$$6 a b^2 e^2 n^2 x^2 \text{Log}[x]^2-3 b^3 e^2 n^3 x^2 \text{Log}[x]^2+4 a b^2 e^2 n^2 x^2 \text{Log}[x]^3+$$
$$2 b^3 e^2 n^3 x^2 \text{Log}[x]^3-b^3 e^2 n^3 x^2 \text{Log}[x]^4+12 a^2 b e x \text{Log}\left[c x^n\right]+36 a b^2 e n x \text{Log}\left[c x^n\right]+$$
$$42 b^3 e n^2 x \text{Log}\left[c x^n\right]+12 a^2 b e^2 x^2 \text{Log}[x] \text{Log}\left[c x^n\right]+12 a b^2 e^2 n x^2 \text{Log}[x] \text{Log}\left[c x^n\right]+$$
$$6 b^3 e^2 n^2 x^2 \text{Log}[x] \text{Log}\left[c x^n\right]-12 a b^2 e^2 n x^2 \text{Log}[x]^2 \text{Log}\left[c x^n\right]-$$
$$6 b^3 e^2 n^2 x^2 \text{Log}[x]^2 \text{Log}\left[c x^n\right]+4 b^3 e^2 n^2 x^2 \text{Log}[x]^3 \text{Log}\left[c x^n\right]+12 a b^2 e x \text{Log}\left[c x^n\right]^2+$$
$$18 b^3 e n x \text{Log}\left[c x^n\right]^2+12 a b^2 e^2 x^2 \text{Log}[x] \text{Log}\left[c x^n\right]^2+6 b^3 e^2 n x^2 \text{Log}[x] \text{Log}\left[c x^n\right]^2-$$
$$6 b^3 e^2 n x^2 \text{Log}[x]^2 \text{Log}\left[c x^n\right]^2+4 b^3 e x \text{Log}\left[c x^n\right]^3+4 b^3 e^2 x^2 \text{Log}[x] \text{Log}\left[c x^n\right]^3+$$
$$4 a^3 \text{Log}[1+e x]+6 a^2 b n \text{Log}[1+e x]+6 a b^2 n^2 \text{Log}[1+e x]+3 b^3 n^3 \text{Log}[1+e x]-$$
$$4 a^3 e^2 x^2 \text{Log}[1+e x]-6 a^2 b e^2 n x^2 \text{Log}[1+e x]-6 a b^2 e^2 n^2 x^2 \text{Log}[1+e x]-$$
$$3 b^3 e^2 n^3 x^2 \text{Log}[1+e x]+12 a^2 b \text{Log}\left[c x^n\right] \text{Log}[1+e x]+12 a b^2 n \text{Log}\left[c x^n\right] \text{Log}[1+e x]+$$
$$6 b^3 n^2 \text{Log}\left[c x^n\right] \text{Log}[1+e x]-12 a^2 b e^2 x^2 \text{Log}\left[c x^n\right] \text{Log}[1+e x]-$$
$$12 a b^2 e^2 n x^2 \text{Log}\left[c x^n\right] \text{Log}[1+e x]-6 b^3 e^2 n^2 x^2 \text{Log}\left[c x^n\right] \text{Log}[1+e x]+$$
$$12 a b^2 \text{Log}\left[c x^n\right]^2 \text{Log}[1+e x]+6 b^3 n \text{Log}\left[c x^n\right]^2 \text{Log}[1+e x]-$$
$$12 a b^2 e^2 x^2 \text{Log}\left[c x^n\right]^2 \text{Log}[1+e x]-6 b^3 e^2 n x^2 \text{Log}\left[c x^n\right]^2 \text{Log}[1+e x]+$$
$$4 b^3 \text{Log}\left[c x^n\right]^3 \text{Log}[1+e x]-4 b^3 e^2 x^2 \text{Log}\left[c x^n\right]^3 \text{Log}[1+e x]-$$
$$6 b e^2 n x^2 \left(2 a^2+2 a b n+b^2 n^2+2 b (2 a+b n) \text{Log}\left[c x^n\right]+2 b^2 \text{Log}\left[c x^n\right]^2\right) \text{PolyLog}[2,-e x]+$$
$$12 b^2 e^2 n^2 x^2 \left(2 a+b n+2 b \text{Log}\left[c x^n\right]\right) \text{PolyLog}[3,-e x]-24 b^3 e^2 n^3 x^2 \text{PolyLog}[4,-e x]\Big)$$

Problem 24: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 180 leaves, 7 steps) :

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

Result (type 4, 356 leaves) :

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

Problem 25: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 114 leaves, 8 steps) :

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

Result (type 4, 286 leaves) :

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

Problem 26: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 39 leaves, 2 steps):

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

Result (type 4, 319 leaves):

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

Problem 27: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 141 leaves, 9 steps):

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

Result (type 4, 252 leaves):

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

Problem 32: Result unnecessarily involves imaginary or complex numbers.

$$\int x^3 \left(a + b \operatorname{Log}\left[c x^n\right]\right)^2 \operatorname{Log}\left[d \left(\frac{1}{d} + f x^2\right)\right] dx$$

Optimal (type 4, 367 leaves, 13 steps):

$$\frac{7 b^2 n^2 x^2}{32 d f} - \frac{3}{64} b^2 n^2 x^4 - \frac{3 b n x^2 \left(a + b \operatorname{Log}\left[c x^n\right]\right)}{8 d f} + \frac{1}{8} b n x^4 \left(a + b \operatorname{Log}\left[c x^n\right]\right) + \frac{x^2 \left(a + b \operatorname{Log}\left[c x^n\right]\right)^2}{4 d f} - \frac{1}{8} x^4 \left(a + b \operatorname{Log}\left[c x^n\right]\right)^2 - \frac{b^2 n^2 \operatorname{Log}\left[1 + d f x^2\right]}{32 d^2 f^2} + \frac{1}{32} b^2 n^2 x^4 \operatorname{Log}\left[1 + d f x^2\right] + \frac{b n \left(a + b \operatorname{Log}\left[c x^n\right]\right) \operatorname{Log}\left[1 + d f x^2\right]}{8 d^2 f^2} - \frac{1}{8} b n x^4 \left(a + b \operatorname{Log}\left[c x^n\right]\right) \operatorname{Log}\left[1 + d f x^2\right] - \frac{\left(a + b \operatorname{Log}\left[c x^n\right]\right)^2 \operatorname{Log}\left[1 + d f x^2\right]}{4 d^2 f^2} + \frac{1}{4} x^4 \left(a + b \operatorname{Log}\left[c x^n\right]\right)^2 \operatorname{Log}\left[1 + d f x^2\right] + \frac{b^2 n^2 \operatorname{PolyLog}\left[2, -d f x^2\right]}{16 d^2 f^2} - \frac{b n \left(a + b \operatorname{Log}\left[c x^n\right]\right) \operatorname{PolyLog}\left[2, -d f x^2\right]}{4 d^2 f^2} + \frac{b^2 n^2 \operatorname{PolyLog}\left[3, -d f x^2\right]}{8 d^2 f^2}$$

Result (type 4, 673 leaves):

$$\frac{1}{64 d^2 f^2}\Big(2 d f x^2 \big(8 a^2 - 4 a b n + b^2 n^2 + 4 b^2 n (n \text{Log}[x] - \text{Log}[c x^n]) + 16 a b (-n \text{Log}[x] + \text{Log}[c x^n]) + 8 b^2 (-n \text{Log}[x] + \text{Log}[c x^n])^2\big) - d^2 f^2 x^4 \big(8 a^2 - 4 a b n + b^2 n^2 + 4 b^2 n (n \text{Log}[x] - \text{Log}[c x^n]) + 16 a b (-n \text{Log}[x] + \text{Log}[c x^n]) + 8 b^2 (-n \text{Log}[x] + \text{Log}[c x^n])^2\big) + 2 d^2 f^2 x^4 \big(8 a^2 - 4 a b n + b^2 n^2 - 4 b (-4 a + b n) \text{Log}[c x^n] + 8 b^2 \text{Log}[c x^n]^2\big) \text{Log}[1 + d f x^2] - 2 \big(8 a^2 - 4 a b n + b^2 n^2 + 4 b^2 n (n \text{Log}[x] - \text{Log}[c x^n]) + 16 a b (-n \text{Log}[x] + \text{Log}[c x^n]) + 8 b^2 (-n \text{Log}[x] + \text{Log}[c x^n])^2\big) \text{Log}[1 + d f x^2] + b n (-4 a + b n + 4 b n \text{Log}[x] - 4 b \text{Log}[c x^n]) \big(4 d f x^2 - d^2 f^2 x^4 - 8 d f x^2 \text{Log}[x] + 4 d^2 f^2 x^4 \text{Log}[x] + 8 \text{Log}[x] \text{Log}[1 - i \sqrt{d} \sqrt{f} x] + 8 \text{Log}[x] \text{Log}[1 + i \sqrt{d} \sqrt{f} x] + 8 \text{PolyLog}[2, -i \sqrt{d} \sqrt{f} x] + 8 \text{PolyLog}[2, i \sqrt{d} \sqrt{f} x]\big) - b^2 n^2 \big(-8 d f x^2 + d^2 f^2 x^4 + 16 d f x^2 \text{Log}[x] - 4 d^2 f^2 x^4 \text{Log}[x] - 16 d f x^2 \text{Log}[x]^2 + 8 d^2 f^2 x^4 \text{Log}[x]^2 + 16 \text{Log}[x]^2 \text{Log}[1 - i \sqrt{d} \sqrt{f} x] + 16 \text{Log}[x]^2 \text{Log}[1 + i \sqrt{d} \sqrt{f} x] + 32 \text{Log}[x] \text{PolyLog}[2, -i \sqrt{d} \sqrt{f} x] + 32 \text{Log}[x] \text{PolyLog}[2, i \sqrt{d} \sqrt{f} x] - 32 \text{PolyLog}[3, -i \sqrt{d} \sqrt{f} x] - 32 \text{PolyLog}[3, i \sqrt{d} \sqrt{f} x]\big)\Big)$$

Problem 33: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 241 leaves, 15 steps):

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

Result (type 4, 519 leaves):

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

Problem 34: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

$$\int\frac{\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)^2\,\mathrm{Log}\left[d\left(\frac{1}{d}+f\,x^2\right)\right]}{x}\,dx$$

Optimal (type 4, 70 leaves, 3 steps):

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

Result (type 4, 484 leaves):

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

Problem 35: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 257 leaves, 11 steps):

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

Result (type 4, 488 leaves):

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

Problem 40: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 591 leaves, 22 steps):

$$-\frac{45 b^3 n^3 x^2}{128 d f}+\frac{3}{64} b^3 n^3 x^4+\frac{21 b^2 n^2 x^2 \left(a+b \text{Log}\left[c x^n\right]\right)}{32 d f}-\frac{9}{64} b^2 n^2 x^4 \left(a+b \text{Log}\left[c x^n\right]\right)-$$
$$\frac{9 b n x^2 \left(a+b \text{Log}\left[c x^n\right]\right)^2}{16 d f}+\frac{3}{16} b n x^4 \left(a+b \text{Log}\left[c x^n\right]\right)^2+\frac{x^2 \left(a+b \text{Log}\left[c x^n\right]\right)^3}{4 d f}-$$
$$\frac{1}{8} x^4 \left(a+b \text{Log}\left[c x^n\right]\right)^3+\frac{3 b^3 n^3 \text{Log}\left[1+d f x^2\right]}{128 d^2 f^2}-\frac{3}{128} b^3 n^3 x^4 \text{Log}\left[1+d f x^2\right]-$$
$$\frac{3 b^2 n^2 \left(a+b \text{Log}\left[c x^n\right]\right) \text{Log}\left[1+d f x^2\right]}{32 d^2 f^2}+\frac{3}{32} b^2 n^2 x^4 \left(a+b \text{Log}\left[c x^n\right]\right) \text{Log}\left[1+d f x^2\right]+$$
$$\frac{3 b n \left(a+b \text{Log}\left[c x^n\right]\right)^2 \text{Log}\left[1+d f x^2\right]}{16 d^2 f^2}-\frac{3}{16} b n x^4 \left(a+b \text{Log}\left[c x^n\right]\right)^2 \text{Log}\left[1+d f x^2\right]-$$
$$\frac{\left(a+b \text{Log}\left[c x^n\right]\right)^3 \text{Log}\left[1+d f x^2\right]}{4 d^2 f^2}+\frac{1}{4} x^4 \left(a+b \text{Log}\left[c x^n\right]\right)^3 \text{Log}\left[1+d f x^2\right]-$$
$$\frac{3 b^3 n^3 \text{PolyLog}\left[2,-d f x^2\right]}{64 d^2 f^2}+\frac{3 b^2 n^2 \left(a+b \text{Log}\left[c x^n\right]\right) \text{PolyLog}\left[2,-d f x^2\right]}{16 d^2 f^2}-$$
$$\frac{3 b n \left(a+b \text{Log}\left[c x^n\right]\right)^2 \text{PolyLog}\left[2,-d f x^2\right]}{8 d^2 f^2}-\frac{3 b^3 n^3 \text{PolyLog}\left[3,-d f x^2\right]}{32 d^2 f^2}+$$
$$\frac{3 b^2 n^2 \left(a+b \text{Log}\left[c x^n\right]\right) \text{PolyLog}\left[3,-d f x^2\right]}{8 d^2 f^2}-\frac{3 b^3 n^3 \text{PolyLog}\left[4,-d f x^2\right]}{16 d^2 f^2}$$

Result (type 4, 1250 leaves) :

$$
\begin{aligned}
&\frac{1}{256\, d^2 f^2}\Big(2\, d\, f\, x^2 \Big(32 a^3 - 24 a^2 b n + 12 a b^2 n^2 - 3 b^3 n^3 + 48 a b^2 n \left(n \text{Log}[x] - \text{Log}\left[c x^n\right]\right) + 96 a^2 b \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right) + \\
&\quad 12 b^3 n^2 \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right) + 96 a b^2 \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right)^2 - 24 b^3 n \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right)^2 + 32 b^3 \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right)^3\Big) - \\
&\quad d^2 f^2 x^4 \Big(32 a^3 - 24 a^2 b n + 12 a b^2 n^2 - 3 b^3 n^3 + 48 a b^2 n \left(n \text{Log}[x] - \text{Log}\left[c x^n\right]\right) + \\
&\quad 96 a^2 b \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right) + 12 b^3 n^2 \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right) + \\
&\quad 96 a b^2 \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right)^2 - \\
&\quad 24 b^3 n \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right)^2 + 32 b^3 \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right)^3\Big) + \\
&\quad 2\, d^2 f^2 x^4 \Big(32 a^3 - 24 a^2 b n + 12 a b^2 n^2 - 3 b^3 n^3 + 12 b \left(8 a^2 - 4 a b n + b^2 n^2\right) \text{Log}\left[c x^n\right] - \\
&\quad 24 b^2 \left(-4 a + b n\right) \text{Log}\left[c x^n\right]^2 + 32 b^3 \text{Log}\left[c x^n\right]^3\Big) \text{Log}\left[1 + d f x^2\right] - \\
&\quad 2 \Big(32 a^3 - 24 a^2 b n + 12 a b^2 n^2 - 3 b^3 n^3 + 48 a b^2 n \left(n \text{Log}[x] - \text{Log}\left[c x^n\right]\right) + \\
&\quad 96 a^2 b \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right) + 12 b^3 n^2 \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right) + \\
&\quad 96 a b^2 \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right)^2 - 24 b^3 n \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right)^2 + \\
&\quad 32 b^3 \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right)^3\Big) \text{Log}\left[1 + d f x^2\right] - \\
&\quad 24 b n \Big(8 a^2 - 4 a b n + b^2 n^2 + 4 b^2 n \left(n \text{Log}[x] - \text{Log}\left[c x^n\right]\right) + \\
&\quad 16 a b \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right) + 8 b^2 \left(-n \text{Log}[x] + \text{Log}\left[c x^n\right]\right)^2\Big) \\
&\quad \Big(\frac{1}{2} d f x^2 - \frac{1}{8} d^2 f^2 x^4 - d f x^2 \text{Log}[x] + \frac{1}{2} d^2 f^2 x^4 \text{Log}[x] + \text{Log}[x] \text{Log}\left[1 - \mathrm{i} \sqrt{d} \sqrt{f} x\right] + \\
&\quad \text{Log}[x] \text{Log}\left[1 + \mathrm{i} \sqrt{d} \sqrt{f} x\right] + \text{PolyLog}\left[2, -\mathrm{i} \sqrt{d} \sqrt{f} x\right] + \text{PolyLog}\left[2, \mathrm{i} \sqrt{d} \sqrt{f} x\right]\Big) + \\
&\quad 3 b^2 n^2 \left(-4 a + b n + 4 b n \text{Log}[x] - 4 b \text{Log}\left[c x^n\right]\right) \\
&\quad \Big(-8 d f x^2 + d^2 f^2 x^4 + 16 d f x^2 \text{Log}[x] - 4 d^2 f^2 x^4 \text{Log}[x] - 16 d f x^2 \text{Log}[x]^2 + \\
&\quad 8 d^2 f^2 x^4 \text{Log}[x]^2 + 16 \text{Log}[x]^2 \text{Log}\left[1 - \mathrm{i} \sqrt{d} \sqrt{f} x\right] + 16 \text{Log}[x]^2 \text{Log}\left[1 + \mathrm{i} \sqrt{d} \sqrt{f} x\right] + \\
&\quad 32 \text{Log}[x] \text{PolyLog}\left[2, -\mathrm{i} \sqrt{d} \sqrt{f} x\right] + 32 \text{Log}[x] \text{PolyLog}\left[2, \mathrm{i} \sqrt{d} \sqrt{f} x\right] - \\
&\quad 32 \text{PolyLog}\left[3, -\mathrm{i} \sqrt{d} \sqrt{f} x\right] - 32 \text{PolyLog}\left[3, \mathrm{i} \sqrt{d} \sqrt{f} x\right]\Big) + \\
&\quad b^3 n^3 \Big(d^2 f^2 x^4 \left(3 - 12 \text{Log}[x] + 24 \text{Log}[x]^2 - 32 \text{Log}[x]^3\right) + \\
&\quad 16 d f x^2 \left(-3 + 6 \text{Log}[x] - 6 \text{Log}[x]^2 + 4 \text{Log}[x]^3\right) - 64 \Big(\text{Log}[x]^3 \text{Log}\left[1 - \mathrm{i} \sqrt{d} \sqrt{f} x\right] + \\
&\quad \text{Log}[x]^3 \text{Log}\left[1 + \mathrm{i} \sqrt{d} \sqrt{f} x\right] + 3 \text{Log}[x]^2 \text{PolyLog}\left[2, -\mathrm{i} \sqrt{d} \sqrt{f} x\right] + \\
&\quad 3 \text{Log}[x]^2 \text{PolyLog}\left[2, \mathrm{i} \sqrt{d} \sqrt{f} x\right] - 6 \text{Log}[x] \text{PolyLog}\left[3, -\mathrm{i} \sqrt{d} \sqrt{f} x\right] - 6 \text{Log}[x] \\
&\quad \text{PolyLog}\left[3, \mathrm{i} \sqrt{d} \sqrt{f} x\right] + 6 \text{PolyLog}\left[4, -\mathrm{i} \sqrt{d} \sqrt{f} x\right] + 6 \text{PolyLog}\left[4, \mathrm{i} \sqrt{d} \sqrt{f} x\right]\Big)\Big)\Big)
\end{aligned}
$$

Problem 41: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 411 leaves, 24 steps):

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

Result (type 4, 990 leaves):

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

Problem 42: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 101 leaves, 4 steps):

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

Result (type 4, 754 leaves):

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

Problem 43: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 425 leaves, 15 steps):

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

Result (type 4, 940 leaves):

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

Problem 63: Result more than twice size of optimal antiderivative.

$$\int \frac{\text{Log}\left[d\left(\frac{1}{d}+f\sqrt{x}\right)\right]\left(a+b\,\text{Log}[c\,x^n]\right)^3}{x^3}\,dx$$

Optimal (type 4, 849 leaves, 34 steps):

$$-\frac{175\,b^3\,d\,f\,n^3}{216\,x^{3/2}}+\frac{45\,b^3\,d^2\,f^2\,n^3}{16\,x}-\frac{255\,b^3\,d^3\,f^3\,n^3}{8\,\sqrt{x}}+\frac{3}{8}\,b^3\,d^4\,f^4\,n^3\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]-\frac{3\,b^3\,n^3\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]}{8\,x^2}-\frac{3}{16}\,b^3\,d^4\,f^4\,n^3\,\text{Log}[x]+\frac{3}{16}\,b^3\,d^4\,f^4\,n^3\,\text{Log}[x]^2-\frac{37\,b^2\,d\,f\,n^2\left(a+b\,\text{Log}[c\,x^n]\right)}{36\,x^{3/2}}+\frac{21\,b^2\,d^2\,f^2\,n^2\left(a+b\,\text{Log}[c\,x^n]\right)}{8\,x}-\frac{63\,b^2\,d^3\,f^3\,n^2\left(a+b\,\text{Log}[c\,x^n]\right)}{4\,\sqrt{x}}+\frac{3}{4}\,b^2\,d^4\,f^4\,n^2\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]\left(a+b\,\text{Log}[c\,x^n]\right)-\frac{3\,b^2\,n^2\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]\left(a+b\,\text{Log}[c\,x^n]\right)}{4\,x^2}-\frac{3}{8}\,b^2\,d^4\,f^4\,n^2\,\text{Log}[x]\left(a+b\,\text{Log}[c\,x^n]\right)-\frac{7\,b\,d\,f\,n\left(a+b\,\text{Log}[c\,x^n]\right)^2}{12\,x^{3/2}}+\frac{9\,b\,d^2\,f^2\,n\left(a+b\,\text{Log}[c\,x^n]\right)^2}{8\,x}-\frac{15\,b\,d^3\,f^3\,n\left(a+b\,\text{Log}[c\,x^n]\right)^2}{4\,\sqrt{x}}+\frac{3}{4}\,b\,d^4\,f^4\,n\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]\left(a+b\,\text{Log}[c\,x^n]\right)^2-\frac{3\,b\,n\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]\left(a+b\,\text{Log}[c\,x^n]\right)^2}{4\,x^2}-\frac{1}{8}\,d^4\,f^4\left(a+b\,\text{Log}[c\,x^n]\right)^3-\frac{d\,f\left(a+b\,\text{Log}[c\,x^n]\right)^3}{6\,x^{3/2}}+\frac{d^2\,f^2\left(a+b\,\text{Log}[c\,x^n]\right)^3}{4\,x}-\frac{d^3\,f^3\left(a+b\,\text{Log}[c\,x^n]\right)^3}{2\,\sqrt{x}}+\frac{1}{2}\,d^4\,f^4\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]\left(a+b\,\text{Log}[c\,x^n]\right)^3-\frac{\text{Log}\left[1+d\,f\,\sqrt{x}\right]\left(a+b\,\text{Log}[c\,x^n]\right)^3}{2\,x^2}-\frac{d^4\,f^4\left(a+b\,\text{Log}[c\,x^n]\right)^4}{16\,b\,n}+\frac{3}{2}\,b^3\,d^4\,f^4\,n^3\,\text{PolyLog}\left[2,-d\,f\,\sqrt{x}\right]+3\,b^2\,d^4\,f^4\,n^2\left(a+b\,\text{Log}[c\,x^n]\right)\text{PolyLog}\left[2,-d\,f\,\sqrt{x}\right]+3\,b\,d^4\,f^4\,n\left(a+b\,\text{Log}[c\,x^n]\right)^2\text{PolyLog}\left[2,-d\,f\,\sqrt{x}\right]-6\,b^3\,d^4\,f^4\,n^3\,\text{PolyLog}\left[3,-d\,f\,\sqrt{x}\right]-12\,b^2\,d^4\,f^4\,n^2\left(a+b\,\text{Log}[c\,x^n]\right)\text{PolyLog}\left[3,-d\,f\,\sqrt{x}\right]+24\,b^3\,d^4\,f^4\,n^3\,\text{PolyLog}\left[4,-d\,f\,\sqrt{x}\right]$$

Result (type 4, 2009 leaves):

$$-\frac{a^3\,d\,f}{6\,x^{3/2}}-\frac{7\,a^2\,b\,d\,f\,n}{12\,x^{3/2}}-\frac{37\,a\,b^2\,d\,f\,n^2}{36\,x^{3/2}}-\frac{175\,b^3\,d\,f\,n^3}{216\,x^{3/2}}+\frac{a^3\,d^2\,f^2}{4\,x}+\frac{9\,a^2\,b\,d^2\,f^2\,n}{8\,x}+\frac{21\,a\,b^2\,d^2\,f^2\,n^2}{8\,x}+\frac{45\,b^3\,d^2\,f^2\,n^3}{16\,x}-\frac{a^3\,d^3\,f^3}{2\,\sqrt{x}}-\frac{15\,a^2\,b\,d^3\,f^3\,n}{4\,\sqrt{x}}-\frac{63\,a\,b^2\,d^3\,f^3\,n^2}{4\,\sqrt{x}}-\frac{255\,b^3\,d^3\,f^3\,n^3}{8\,\sqrt{x}}+\frac{1}{2}\,a^3\,d^4\,f^4\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]+\frac{3}{4}\,a^2\,b\,d^4\,f^4\,n\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]+\frac{3}{4}\,a\,b^2\,d^4\,f^4\,n^2\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]+\frac{3}{8}\,b^3\,d^4\,f^4\,n^3\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]-\frac{a^3\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]}{2\,x^2}-\frac{3\,a^2\,b\,n\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]}{4\,x^2}-\frac{3\,a\,b^2\,n^2\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]}{4\,x^2}-\frac{3\,b^3\,n^3\,\text{Log}\left[1+d\,f\,\sqrt{x}\right]}{8\,x^2}-\frac{1}{4}\,a^3\,d^4\,f^4\,\text{Log}[x]-$$

$$\frac{3}{8} a^2 b d^4 f^4 n \operatorname{Log}[x] - \frac{3}{8} a b^2 d^4 f^4 n^2 \operatorname{Log}[x] - \frac{3}{16} b^3 d^4 f^4 n^3 \operatorname{Log}[x] + \frac{3}{8} a^2 b d^4 f^4 n \operatorname{Log}[x]^2 +$$
$$\frac{3}{8} a b^2 d^4 f^4 n^2 \operatorname{Log}[x]^2 + \frac{3}{16} b^3 d^4 f^4 n^3 \operatorname{Log}[x]^2 - \frac{1}{4} a b^2 d^4 f^4 n^2 \operatorname{Log}[x]^3 - \frac{1}{8} b^3 d^4 f^4 n^3 \operatorname{Log}[x]^3 +$$
$$\frac{1}{2} b^3 d^4 f^4 n^3 \operatorname{Log}\left[1 + \frac{1}{d f \sqrt{x}}\right] \operatorname{Log}[x]^3 - \frac{1}{2} b^3 d^4 f^4 n^3 \operatorname{Log}\left[1 + d f \sqrt{x}\right] \operatorname{Log}[x]^3 +$$
$$\frac{1}{8} b^3 d^4 f^4 n^3 \operatorname{Log}[x]^4 - \frac{a^2 b d f \operatorname{Log}[c x^n]}{2 x^{3/2}} - \frac{7 a b^2 d f n \operatorname{Log}[c x^n]}{6 x^{3/2}} - \frac{37 b^3 d f n^2 \operatorname{Log}[c x^n]}{36 x^{3/2}} +$$
$$\frac{3 a^2 b d^2 f^2 \operatorname{Log}[c x^n]}{4 x} + \frac{9 a b^2 d^2 f^2 n \operatorname{Log}[c x^n]}{4 x} + \frac{21 b^3 d^2 f^2 n^2 \operatorname{Log}[c x^n]}{8 x} -$$
$$\frac{3 a^2 b d^3 f^3 \operatorname{Log}[c x^n]}{2 \sqrt{x}} - \frac{15 a b^2 d^3 f^3 n \operatorname{Log}[c x^n]}{2 \sqrt{x}} - \frac{63 b^3 d^3 f^3 n^2 \operatorname{Log}[c x^n]}{4 \sqrt{x}} +$$
$$\frac{3}{2} a^2 b d^4 f^4 \operatorname{Log}\left[1 + d f \sqrt{x}\right] \operatorname{Log}\left[c x^n\right] + \frac{3}{2} a b^2 d^4 f^4 n \operatorname{Log}\left[1 + d f \sqrt{x}\right] \operatorname{Log}\left[c x^n\right] +$$
$$\frac{3}{4} b^3 d^4 f^4 n^2 \operatorname{Log}\left[1 + d f \sqrt{x}\right] \operatorname{Log}\left[c x^n\right] - \frac{3 a^2 b \operatorname{Log}\left[1 + d f \sqrt{x}\right] \operatorname{Log}[c x^n]}{2 x^2} -$$
$$\frac{3 a b^2 n \operatorname{Log}\left[1 + d f \sqrt{x}\right] \operatorname{Log}[c x^n]}{2 x^2} - \frac{3 b^3 n^2 \operatorname{Log}\left[1 + d f \sqrt{x}\right] \operatorname{Log}[c x^n]}{4 x^2} -$$
$$\frac{3}{4} a^2 b d^4 f^4 \operatorname{Log}[x] \operatorname{Log}\left[c x^n\right] - \frac{3}{4} a b^2 d^4 f^4 n \operatorname{Log}[x] \operatorname{Log}\left[c x^n\right] - \frac{3}{8} b^3 d^4 f^4 n^2 \operatorname{Log}[x] \operatorname{Log}\left[c x^n\right] +$$
$$\frac{3}{4} a b^2 d^4 f^4 n \operatorname{Log}[x]^2 \operatorname{Log}\left[c x^n\right] + \frac{3}{8} b^3 d^4 f^4 n^2 \operatorname{Log}[x]^2 \operatorname{Log}\left[c x^n\right] - \frac{1}{4} b^3 d^4 f^4 n^2 \operatorname{Log}[x]^3 \operatorname{Log}\left[c x^n\right] -$$
$$\frac{a b^2 d f \operatorname{Log}[c x^n]^2}{2 x^{3/2}} - \frac{7 b^3 d f n \operatorname{Log}[c x^n]^2}{12 x^{3/2}} + \frac{3 a b^2 d^2 f^2 \operatorname{Log}[c x^n]^2}{4 x} + \frac{9 b^3 d^2 f^2 n \operatorname{Log}[c x^n]^2}{8 x} -$$
$$\frac{3 a b^2 d^3 f^3 \operatorname{Log}[c x^n]^2}{2 \sqrt{x}} - \frac{15 b^3 d^3 f^3 n \operatorname{Log}[c x^n]^2}{4 \sqrt{x}} + \frac{3}{2} a b^2 d^4 f^4 \operatorname{Log}\left[1 + d f \sqrt{x}\right] \operatorname{Log}\left[c x^n\right]^2 +$$
$$\frac{3}{4} b^3 d^4 f^4 n \operatorname{Log}\left[1 + d f \sqrt{x}\right] \operatorname{Log}\left[c x^n\right]^2 - \frac{3 a b^2 \operatorname{Log}\left[1 + d f \sqrt{x}\right] \operatorname{Log}[c x^n]^2}{2 x^2} -$$
$$\frac{3 b^3 n \operatorname{Log}\left[1 + d f \sqrt{x}\right] \operatorname{Log}[c x^n]^2}{4 x^2} - \frac{3}{4} a b^2 d^4 f^4 \operatorname{Log}[x] \operatorname{Log}\left[c x^n\right]^2 - \frac{3}{8} b^3 d^4 f^4 n \operatorname{Log}[x] \operatorname{Log}\left[c x^n\right]^2 +$$
$$\frac{3}{8} b^3 d^4 f^4 n \operatorname{Log}[x]^2 \operatorname{Log}\left[c x^n\right]^2 - \frac{b^3 d f \operatorname{Log}[c x^n]^3}{6 x^{3/2}} + \frac{b^3 d^2 f^2 \operatorname{Log}[c x^n]^3}{4 x} -$$
$$\frac{b^3 d^3 f^3 \operatorname{Log}[c x^n]^3}{2 \sqrt{x}} + \frac{1}{2} b^3 d^4 f^4 \operatorname{Log}\left[1 + d f \sqrt{x}\right] \operatorname{Log}\left[c x^n\right]^3 - \frac{b^3 \operatorname{Log}\left[1 + d f \sqrt{x}\right] \operatorname{Log}[c x^n]^3}{2 x^2} -$$
$$\frac{1}{4} b^3 d^4 f^4 \operatorname{Log}[x] \operatorname{Log}\left[c x^n\right]^3 - 3 b^3 d^4 f^4 n^3 \operatorname{Log}[x]^2 \operatorname{PolyLog}\left[2, -\frac{1}{d f \sqrt{x}}\right] +$$
$$\frac{3}{2} b d^4 f^4 n \left(2 a^2 + 2 a b n + b^2 n^2 - 2 b^2 n^2 \operatorname{Log}[x]^2 + 2 b \left(2 a + b n\right) \operatorname{Log}\left[c x^n\right] + 2 b^2 \operatorname{Log}\left[c x^n\right]^2\right)$$
$$\operatorname{PolyLog}\left[2, -d f \sqrt{x}\right] - 12 b^3 d^4 f^4 n^3 \operatorname{Log}[x] \operatorname{PolyLog}\left[3, -\frac{1}{d f \sqrt{x}}\right] -$$
$$12 a b^2 d^4 f^4 n^2 \operatorname{PolyLog}\left[3, -d f \sqrt{x}\right] - 6 b^3 d^4 f^4 n^3 \operatorname{PolyLog}\left[3, -d f \sqrt{x}\right] +$$
$$12 b^3 d^4 f^4 n^3 \operatorname{Log}[x] \operatorname{PolyLog}\left[3, -d f \sqrt{x}\right] -$$

$$12 b^3 d^4 f^4 n^2 \text{Log}\left[c x^n\right] \text{PolyLog}\left[3, -d f \sqrt{x}\right] - 24 b^3 d^4 f^4 n^3 \text{PolyLog}\left[4, -\frac{1}{d f \sqrt{x}}\right]$$

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

$$\int \frac{\left(a+b \text{Log}[c x^n]\right)^4 \text{Log}\left[d \left(\frac{1}{d}+f x^m\right)\right]}{x} \, dx$$

Optimal (type 4, 137 leaves, 5 steps):

$$-\frac{\left(a+b \text{Log}[c x^n]\right)^4 \text{PolyLog}[2, -d f x^m]}{m} + \frac{4 b n \left(a+b \text{Log}[c x^n]\right)^3 \text{PolyLog}[3, -d f x^m]}{m^2} - \frac{12 b^2 n^2 \left(a+b \text{Log}[c x^n]\right)^2 \text{PolyLog}[4, -d f x^m]}{m^3} + \frac{24 b^3 n^3 \left(a+b \text{Log}[c x^n]\right) \text{PolyLog}[5, -d f x^m]}{m^4} - \frac{24 b^4 n^4 \text{PolyLog}[6, -d f x^m]}{m^5}$$

Result (type 4, 1700 leaves):

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

$$\frac{12\,a\,b^3\,n^2\,\text{Log}[x]^2\,\text{Log}[-d\,f\,x^m]\,\text{Log}[c\,x^n]\,\text{Log}[1+d\,f\,x^m]}{m}-\frac{4\,b^4\,n^3\,\text{Log}[x]^3\,\text{Log}[-d\,f\,x^m]\,\text{Log}[c\,x^n]\,\text{Log}[1+d\,f\,x^m]}{m}+6\,a\,b^3\,n\,\text{Log}[x]^2\,\text{Log}\left[c\,x^n\right]^2\,\text{Log}\left[1+d\,f\,x^m\right]-4\,b^4\,n^2\,\text{Log}[x]^3\,\text{Log}\left[c\,x^n\right]^2\,\text{Log}\left[1+d\,f\,x^m\right]+\frac{6\,a^2\,b^2\,\text{Log}[-d\,f\,x^m]\,\text{Log}[c\,x^n]^2\,\text{Log}[1+d\,f\,x^m]}{m}-\frac{12\,a\,b^3\,n\,\text{Log}[x]\,\text{Log}[-d\,f\,x^m]\,\text{Log}[c\,x^n]^2\,\text{Log}[1+d\,f\,x^m]}{m}+\frac{6\,b^4\,n^2\,\text{Log}[x]^2\,\text{Log}[-d\,f\,x^m]\,\text{Log}[c\,x^n]^2\,\text{Log}[1+d\,f\,x^m]}{m}+2\,b^4\,n\,\text{Log}[x]^2\,\text{Log}\left[c\,x^n\right]^3\,\text{Log}\left[1+d\,f\,x^m\right]+\frac{4\,a\,b^3\,\text{Log}[-d\,f\,x^m]\,\text{Log}[c\,x^n]^3\,\text{Log}[1+d\,f\,x^m]}{m}-\frac{4\,b^4\,n\,\text{Log}[x]\,\text{Log}[-d\,f\,x^m]\,\text{Log}[c\,x^n]^3\,\text{Log}[1+d\,f\,x^m]}{m}+\frac{b^4\,\text{Log}[-d\,f\,x^m]\,\text{Log}[c\,x^n]^4\,\text{Log}[1+d\,f\,x^m]}{m}+\frac{1}{m}b\,n\,\text{Log}[x]\,\left(-b^3\,n^3\,\text{Log}[x]^3+4\,b^2\,n^2\,\text{Log}[x]^2\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)-6\,b\,n\,\text{Log}[x]\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)^2+4\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)^3\right)\,\text{PolyLog}\left[2,-\frac{x^{-m}}{d\,f}\right]+\frac{\left(a-b\,n\,\text{Log}[x]+b\,\text{Log}[c\,x^n]\right)^4\,\text{PolyLog}[2,1+d\,f\,x^m]}{m}+\frac{4\,a^3\,b\,n\,\text{PolyLog}\left[3,-\frac{x^{-m}}{d\,f}\right]}{m^2}+\frac{12\,a^2\,b^2\,n\,\text{Log}[c\,x^n]\,\text{PolyLog}\left[3,-\frac{x^{-m}}{d\,f}\right]}{m^2}+\frac{12\,a\,b^3\,n\,\text{Log}[c\,x^n]^2\,\text{PolyLog}\left[3,-\frac{x^{-m}}{d\,f}\right]}{m^2}+\frac{4\,b^4\,n\,\text{Log}[c\,x^n]^3\,\text{PolyLog}\left[3,-\frac{x^{-m}}{d\,f}\right]}{m^2}+\frac{12\,a^2\,b^2\,n^2\,\text{PolyLog}\left[4,-\frac{x^{-m}}{d\,f}\right]}{m^3}+\frac{24\,a\,b^3\,n^2\,\text{Log}[c\,x^n]\,\text{PolyLog}\left[4,-\frac{x^{-m}}{d\,f}\right]}{m^3}+\frac{12\,b^4\,n^2\,\text{Log}[c\,x^n]^2\,\text{PolyLog}\left[4,-\frac{x^{-m}}{d\,f}\right]}{m^3}+\frac{24\,a\,b^3\,n^3\,\text{PolyLog}\left[5,-\frac{x^{-m}}{d\,f}\right]}{m^4}+\frac{24\,b^4\,n^3\,\text{Log}[c\,x^n]\,\text{PolyLog}\left[5,-\frac{x^{-m}}{d\,f}\right]}{m^4}+\frac{24\,b^4\,n^4\,\text{PolyLog}\left[6,-\frac{x^{-m}}{d\,f}\right]}{m^5}$$

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

$$\int \frac{\left(a+b\,\text{Log}[c\,x^n]\right)^3\,\text{Log}\left[d\,\left(\frac{1}{d}+f\,x^m\right)\right]}{x}\,dx$$

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

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

Result (type 4, 1035 leaves):

$$-\frac{1}{2} a^2 b m n \text{Log}[x]^3 + \frac{3}{4} a b^2 m n^2 \text{Log}[x]^4 - \frac{3}{10} b^3 m n^3 \text{Log}[x]^5 -$$
$$a b^2 m n \text{Log}[x]^3 \text{Log}[c x^n] + \frac{3}{4} b^3 m n^2 \text{Log}[x]^4 \text{Log}[c x^n] - \frac{1}{2} b^3 m n \text{Log}[x]^3 \text{Log}[c x^n]^2 -$$
$$\frac{3}{2} a^2 b n \text{Log}[x]^2 \text{Log}\left[1 + \frac{x^{-m}}{d f}\right] + 2 a b^2 n^2 \text{Log}[x]^3 \text{Log}\left[1 + \frac{x^{-m}}{d f}\right] - \frac{3}{4} b^3 n^3 \text{Log}[x]^4 \text{Log}\left[1 + \frac{x^{-m}}{d f}\right] -$$
$$3 a b^2 n \text{Log}[x]^2 \text{Log}[c x^n] \text{Log}\left[1 + \frac{x^{-m}}{d f}\right] + 2 b^3 n^2 \text{Log}[x]^3 \text{Log}[c x^n] \text{Log}\left[1 + \frac{x^{-m}}{d f}\right] -$$
$$\frac{3}{2} b^3 n \text{Log}[x]^2 \text{Log}[c x^n]^2 \text{Log}\left[1 + \frac{x^{-m}}{d f}\right] + \frac{3}{2} a^2 b n \text{Log}[x]^2 \text{Log}[1 + d f x^m] -$$
$$2 a b^2 n^2 \text{Log}[x]^3 \text{Log}[1 + d f x^m] + \frac{3}{4} b^3 n^3 \text{Log}[x]^4 \text{Log}[1 + d f x^m] + \frac{a^3 \text{Log}[-d f x^m] \text{Log}[1 + d f x^m]}{m} -$$
$$\frac{3 a^2 b n \text{Log}[x] \text{Log}[-d f x^m] \text{Log}[1 + d f x^m]}{m} + \frac{3 a b^2 n^2 \text{Log}[x]^2 \text{Log}[-d f x^m] \text{Log}[1 + d f x^m]}{m} -$$
$$\frac{b^3 n^3 \text{Log}[x]^3 \text{Log}[-d f x^m] \text{Log}[1 + d f x^m]}{m} + 3 a b^2 n \text{Log}[x]^2 \text{Log}[c x^n] \text{Log}[1 + d f x^m] -$$
$$2 b^3 n^2 \text{Log}[x]^3 \text{Log}[c x^n] \text{Log}[1 + d f x^m] + \frac{3 a^2 b \text{Log}[-d f x^m] \text{Log}[c x^n] \text{Log}[1 + d f x^m]}{m} -$$
$$\frac{6 a b^2 n \text{Log}[x] \text{Log}[-d f x^m] \text{Log}[c x^n] \text{Log}[1 + d f x^m]}{m} +$$
$$\frac{3 b^3 n^2 \text{Log}[x]^2 \text{Log}[-d f x^m] \text{Log}[c x^n] \text{Log}[1 + d f x^m]}{m} +$$
$$\frac{3}{2} b^3 n \text{Log}[x]^2 \text{Log}[c x^n]^2 \text{Log}[1 + d f x^m] + \frac{3 a b^2 \text{Log}[-d f x^m] \text{Log}[c x^n]^2 \text{Log}[1 + d f x^m]}{m} -$$
$$\frac{3 b^3 n \text{Log}[x] \text{Log}[-d f x^m] \text{Log}[c x^n]^2 \text{Log}[1 + d f x^m]}{m} + \frac{b^3 \text{Log}[-d f x^m] \text{Log}[c x^n]^3 \text{Log}[1 + d f x^m]}{m} + \frac{1}{m}$$
$$b n \text{Log}[x] \left(b^2 n^2 \text{Log}[x]^2 - 3 b n \text{Log}[x] (a + b \text{Log}[c x^n]) + 3 (a + b \text{Log}[c x^n])^2\right) \text{PolyLog}\left[2, -\frac{x^{-m}}{d f}\right] +$$
$$\frac{(a - b n \text{Log}[x] + b \text{Log}[c x^n])^3 \text{PolyLog}[2, 1 + d f x^m]}{m} + \frac{3 a^2 b n \text{PolyLog}\left[3, -\frac{x^{-m}}{d f}\right]}{m^2} +$$
$$\frac{6 a b^2 n \text{Log}[c x^n] \text{PolyLog}\left[3, -\frac{x^{-m}}{d f}\right]}{m^2} + \frac{3 b^3 n \text{Log}[c x^n]^2 \text{PolyLog}\left[3, -\frac{x^{-m}}{d f}\right]}{m^2} +$$
$$\frac{6 a b^2 n^2 \text{PolyLog}\left[4, -\frac{x^{-m}}{d f}\right]}{m^3} + \frac{6 b^3 n^2 \text{Log}[c x^n] \text{PolyLog}\left[4, -\frac{x^{-m}}{d f}\right]}{m^3} + \frac{6 b^3 n^3 \text{PolyLog}\left[5, -\frac{x^{-m}}{d f}\right]}{m^4}$$

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

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

Optimal (type 4, 73 leaves, 3 steps):

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

Result (type 4, 526 leaves):

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

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

$$\int \frac{(a+b\,\mathrm{Log}[c\,x^n])\,\mathrm{Log}\left[d\,\left(\frac{1}{d}+f\,x^m\right)\right]}{x}\,dx$$

Optimal (type 4, 40 leaves, 2 steps):

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

Result (type 4, 207 leaves):

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

Problem 81: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 131 leaves, 5 steps):

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

Result (type 4, 329 leaves):

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

Problem 82: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 248 leaves, 10 steps):

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

Result (type 4, 600 leaves):

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

Problem 83: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 344 leaves, 14 steps):

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

Result (type 4, 796 leaves):

$$-\frac{1}{12 e^2 x^2}\Big(6 a^2 e f m x + 18 a b e f m n x + 21 b^2 e f m n^2 x + 6 a^2 f^2 m x^2 \text{Log}[x] + 6 a b f^2 m n x^2 \text{Log}[x] + 3 b^2 f^2 m n^2 x^2 \text{Log}[x] - 6 a b f^2 m n x^2 \text{Log}[x]^2 - 3 b^2 f^2 m n^2 x^2 \text{Log}[x]^2 + 2 b^2 f^2 m n^2 x^2 \text{Log}[x]^3 + 12 a b e f m x \text{Log}[c x^n] + 18 b^2 e f m n x \text{Log}[c x^n] + 12 a b f^2 m x^2 \text{Log}[x] \text{Log}[c x^n] + 6 b^2 f^2 m n x^2 \text{Log}[x] \text{Log}[c x^n] - 6 b^2 f^2 m n x^2 \text{Log}[x]^2 \text{Log}[c x^n] + 6 b^2 e f m x \text{Log}[c x^n]^2 + 6 b^2 f^2 m x^2 \text{Log}[x] \text{Log}[c x^n]^2 - 6 a^2 f^2 m x^2 \text{Log}[e + f x] - 6 a b f^2 m n x^2 \text{Log}[e + f x] - 3 b^2 f^2 m n^2 x^2 \text{Log}[e + f x] + 12 a b f^2 m n x^2 \text{Log}[x] \text{Log}[e + f x] + 6 b^2 f^2 m n^2 x^2 \text{Log}[x] \text{Log}[e + f x] - 6 b^2 f^2 m n^2 x^2 \text{Log}[x]^2 \text{Log}[e + f x] - 12 a b f^2 m x^2 \text{Log}[c x^n] \text{Log}[e + f x] - 6 b^2 f^2 m n x^2 \text{Log}[c x^n] \text{Log}[e + f x] + 12 b^2 f^2 m n x^2 \text{Log}[x] \text{Log}[c x^n] \text{Log}[e + f x] - 6 b^2 f^2 m x^2 \text{Log}[c x^n]^2 \text{Log}[e + f x] + 6 a^2 e^2 \text{Log}[d (e + f x)^m] + 6 a b e^2 n \text{Log}[d (e + f x)^m] + 3 b^2 e^2 n^2 \text{Log}[d (e + f x)^m] + 12 a b e^2 \text{Log}[c x^n] \text{Log}[d (e + f x)^m] + 6 b^2 e^2 n \text{Log}[c x^n] \text{Log}[d (e + f x)^m] + 6 b^2 e^2 \text{Log}[c x^n]^2 \text{Log}[d (e + f x)^m] - 12 a b f^2 m n x^2 \text{Log}[x] \text{Log}\left[1 + \frac{f x}{e}\right] - 6 b^2 f^2 m n^2 x^2 \text{Log}[x] \text{Log}\left[1 + \frac{f x}{e}\right] + 6 b^2 f^2 m n^2 x^2 \text{Log}[x]^2 \text{Log}\left[1 + \frac{f x}{e}\right] - 12 b^2 f^2 m n x^2 \text{Log}[x] \text{Log}[c x^n] \text{Log}\left[1 + \frac{f x}{e}\right] - 6 b f^2 m n x^2 (2 a + b n + 2 b \text{Log}[c x^n]) \text{PolyLog}\left[2, -\frac{f x}{e}\right] + 12 b^2 f^2 m n^2 x^2 \text{PolyLog}\left[3, -\frac{f x}{e}\right]\Big)$$

Problem 84: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 420 leaves, 19 steps):

$$-\frac{19 b^2 f m n^2}{108 e x^2} + \frac{26 b^2 f^2 m n^2}{27 e^2 x} + \frac{2 b^2 f^3 m n^2 \text{Log}[x]}{27 e^3} - \frac{5 b f m n (a + b \text{Log}[c x^n])}{18 e x^2} + \frac{8 b f^2 m n (a + b \text{Log}[c x^n])}{9 e^2 x} - \frac{2 b f^3 m n \text{Log}\left[1 + \frac{e}{f x}\right] (a + b \text{Log}[c x^n])}{9 e^3} - \frac{f m (a + b \text{Log}[c x^n])^2}{6 e x^2} + \frac{f^2 m (a + b \text{Log}[c x^n])^2}{3 e^2 x} - \frac{f^3 m \text{Log}\left[1 + \frac{e}{f x}\right] (a + b \text{Log}[c x^n])^2}{3 e^3} - \frac{2 b^2 f^3 m n^2 \text{Log}[e + f x]}{27 e^3} - \frac{2 b^2 n^2 \text{Log}[d (e + f x)^m]}{27 x^3} - \frac{2 b n (a + b \text{Log}[c x^n]) \text{Log}[d (e + f x)^m]}{9 x^3} - \frac{(a + b \text{Log}[c x^n])^2 \text{Log}[d (e + f x)^m]}{3 x^3} + \frac{2 b^2 f^3 m n^2 \text{PolyLog}\left[2, -\frac{e}{f x}\right]}{9 e^3} + \frac{2 b f^3 m n (a + b \text{Log}[c x^n]) \text{PolyLog}\left[2, -\frac{e}{f x}\right]}{3 e^3} + \frac{2 b^2 f^3 m n^2 \text{PolyLog}\left[3, -\frac{e}{f x}\right]}{3 e^3}$$

Result (type 4, 909 leaves):

$$-\frac{1}{108\,e^3\,x^3}\Big(18\,a^2\,e^2\,f\,m\,x+30\,a\,b\,e^2\,f\,m\,n\,x+19\,b^2\,e^2\,f\,m\,n^2\,x-36\,a^2\,e\,f^2\,m\,x^2-96\,a\,b\,e\,f^2\,m\,n\,x^2-104\,b^2\,e\,f^2\,m\,n^2\,x^2-36\,a^2\,f^3\,m\,x^3\,\text{Log}[x]-24\,a\,b\,f^3\,m\,n\,x^3\,\text{Log}[x]-8\,b^2\,f^3\,m\,n^2\,x^3\,\text{Log}[x]+36\,a\,b\,f^3\,m\,n\,x^3\,\text{Log}[x]^2+12\,b^2\,f^3\,m\,n^2\,x^3\,\text{Log}[x]^2-12\,b^2\,f^3\,m\,n^2\,x^3\,\text{Log}[x]^3+36\,a\,b\,e^2\,f\,m\,x\,\text{Log}\left[c\,x^n\right]+30\,b^2\,e^2\,f\,m\,n\,x\,\text{Log}\left[c\,x^n\right]-72\,a\,b\,e\,f^2\,m\,x^2\,\text{Log}\left[c\,x^n\right]-96\,b^2\,e\,f^2\,m\,n\,x^2\,\text{Log}\left[c\,x^n\right]-72\,a\,b\,f^3\,m\,x^3\,\text{Log}[x]\,\text{Log}\left[c\,x^n\right]-24\,b^2\,f^3\,m\,n\,x^3\,\text{Log}[x]\,\text{Log}\left[c\,x^n\right]+36\,b^2\,f^3\,m\,n\,x^3\,\text{Log}[x]^2\,\text{Log}\left[c\,x^n\right]+18\,b^2\,e^2\,f\,m\,x\,\text{Log}\left[c\,x^n\right]^2-36\,b^2\,e\,f^2\,m\,x^2\,\text{Log}\left[c\,x^n\right]^2-36\,b^2\,f^3\,m\,x^3\,\text{Log}[x]\,\text{Log}\left[c\,x^n\right]^2+36\,a^2\,f^3\,m\,x^3\,\text{Log}[e+f\,x]+24\,a\,b\,f^3\,m\,n\,x^3\,\text{Log}[e+f\,x]+8\,b^2\,f^3\,m\,n^2\,x^3\,\text{Log}[e+f\,x]-72\,a\,b\,f^3\,m\,n\,x^3\,\text{Log}[x]\,\text{Log}[e+f\,x]-24\,b^2\,f^3\,m\,n^2\,x^3\,\text{Log}[x]\,\text{Log}[e+f\,x]+36\,b^2\,f^3\,m\,n^2\,x^3\,\text{Log}[x]^2\,\text{Log}[e+f\,x]+72\,a\,b\,f^3\,m\,x^3\,\text{Log}\left[c\,x^n\right]\,\text{Log}[e+f\,x]+24\,b^2\,f^3\,m\,n\,x^3\,\text{Log}\left[c\,x^n\right]\,\text{Log}[e+f\,x]-72\,b^2\,f^3\,m\,n\,x^3\,\text{Log}[x]\,\text{Log}\left[c\,x^n\right]\,\text{Log}[e+f\,x]+36\,b^2\,f^3\,m\,x^3\,\text{Log}\left[c\,x^n\right]^2\,\text{Log}[e+f\,x]+36\,a^2\,e^3\,\text{Log}\left[d\,(e+f\,x)^m\right]+24\,a\,b\,e^3\,n\,\text{Log}\left[d\,(e+f\,x)^m\right]+8\,b^2\,e^3\,n^2\,\text{Log}\left[d\,(e+f\,x)^m\right]+72\,a\,b\,e^3\,\text{Log}\left[c\,x^n\right]\,\text{Log}\left[d\,(e+f\,x)^m\right]+24\,b^2\,e^3\,n\,\text{Log}\left[c\,x^n\right]\,\text{Log}\left[d\,(e+f\,x)^m\right]+36\,b^2\,e^3\,\text{Log}\left[c\,x^n\right]^2\,\text{Log}\left[d\,(e+f\,x)^m\right]+72\,a\,b\,f^3\,m\,n\,x^3\,\text{Log}[x]\,\text{Log}\left[1+\frac{f\,x}{e}\right]+24\,b^2\,f^3\,m\,n^2\,x^3\,\text{Log}[x]\,\text{Log}\left[1+\frac{f\,x}{e}\right]-36\,b^2\,f^3\,m\,n^2\,x^3\,\text{Log}[x]^2\,\text{Log}\left[1+\frac{f\,x}{e}\right]+72\,b^2\,f^3\,m\,n\,x^3\,\text{Log}[x]\,\text{Log}\left[c\,x^n\right]\,\text{Log}\left[1+\frac{f\,x}{e}\right]+24\,b\,f^3\,m\,n\,x^3\,\left(3\,a+b\,n+3\,b\,\text{Log}\left[c\,x^n\right]\right)\,\text{PolyLog}\left[2,-\frac{f\,x}{e}\right]-72\,b^2\,f^3\,m\,n^2\,x^3\,\text{PolyLog}\left[3,-\frac{f\,x}{e}\right]\Big)$$

Problem 85: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 603 leaves, 34 steps):

$$\frac{21\,a\,b^2\,e\,m\,n^2\,x}{4\,f}-\frac{45\,b^3\,e\,m\,n^3\,x}{8\,f}+\frac{3}{4}\,b^3\,m\,n^3\,x^2+\frac{21\,b^3\,e\,m\,n^2\,x\,\text{Log}[c\,x^n]}{4\,f}-\frac{9}{8}\,b^2\,m\,n^2\,x^2\,\left(a+b\,\text{Log}[c\,x^n]\right)-$$
$$\frac{9\,b\,e\,m\,n\,x\,\left(a+b\,\text{Log}[c\,x^n]\right)^2}{4\,f}+\frac{3}{4}\,b\,m\,n\,x^2\,\left(a+b\,\text{Log}[c\,x^n]\right)^2+\frac{e\,m\,x\,\left(a+b\,\text{Log}[c\,x^n]\right)^3}{2\,f}-$$
$$\frac{1}{4}\,m\,x^2\,\left(a+b\,\text{Log}[c\,x^n]\right)^3+\frac{3\,b^3\,e^2\,m\,n^3\,\text{Log}[e+f\,x]}{8\,f^2}-\frac{3}{8}\,b^3\,n^3\,x^2\,\text{Log}\left[d\,\left(e+f\,x\right)^m\right]+$$
$$\frac{3}{4}\,b^2\,n^2\,x^2\,\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{Log}\left[d\,\left(e+f\,x\right)^m\right]-\frac{3}{4}\,b\,n\,x^2\,\left(a+b\,\text{Log}[c\,x^n]\right)^2\,\text{Log}\left[d\,\left(e+f\,x\right)^m\right]+$$
$$\frac{1}{2}\,x^2\,\left(a+b\,\text{Log}[c\,x^n]\right)^3\,\text{Log}\left[d\,\left(e+f\,x\right)^m\right]-\frac{3\,b^2\,e^2\,m\,n^2\,\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{Log}\left[1+\frac{f\,x}{e}\right]}{4\,f^2}+$$
$$\frac{3\,b\,e^2\,m\,n\,\left(a+b\,\text{Log}[c\,x^n]\right)^2\,\text{Log}\left[1+\frac{f\,x}{e}\right]}{4\,f^2}-\frac{e^2\,m\,\left(a+b\,\text{Log}[c\,x^n]\right)^3\,\text{Log}\left[1+\frac{f\,x}{e}\right]}{2\,f^2}-$$
$$\frac{3\,b^3\,e^2\,m\,n^3\,\text{PolyLog}\left[2,-\frac{f\,x}{e}\right]}{4\,f^2}+\frac{3\,b^2\,e^2\,m\,n^2\,\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{PolyLog}\left[2,-\frac{f\,x}{e}\right]}{2\,f^2}-$$
$$\frac{3\,b\,e^2\,m\,n\,\left(a+b\,\text{Log}[c\,x^n]\right)^2\,\text{PolyLog}\left[2,-\frac{f\,x}{e}\right]}{2\,f^2}-\frac{3\,b^3\,e^2\,m\,n^3\,\text{PolyLog}\left[3,-\frac{f\,x}{e}\right]}{2\,f^2}+$$
$$\frac{3\,b^2\,e^2\,m\,n^2\,\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{PolyLog}\left[3,-\frac{f\,x}{e}\right]}{f^2}-\frac{3\,b^3\,e^2\,m\,n^3\,\text{PolyLog}\left[4,-\frac{f\,x}{e}\right]}{f^2}$$

Result (type 4, 1431 leaves) :

$$\frac{1}{8 f^2}\Big(4 a^3 e f m x - 18 a^2 b e f m n x + 42 a b^2 e f m n^2 x - 45 b^3 e f m n^3 x - 2 a^3 f^2 m x^2 + 6 a^2 b f^2 m n x^2 - 9 a b^2 f^2 m n^2 x^2 + 6 b^3 f^2 m n^3 x^2 + 12 a^2 b e f m x \, \text{Log}[c x^n] - 36 a b^2 e f m n x \, \text{Log}[c x^n] + 42 b^3 e f m n^2 x \, \text{Log}[c x^n] - 6 a^2 b f^2 m x^2 \, \text{Log}[c x^n] + 12 a b^2 f^2 m n x^2 \, \text{Log}[c x^n] - 9 b^3 f^2 m n^2 x^2 \, \text{Log}[c x^n] + 12 a b^2 e f m x \, \text{Log}[c x^n]^2 - 18 b^3 e f m n x \, \text{Log}[c x^n]^2 - 6 a b^2 f^2 m x^2 \, \text{Log}[c x^n]^2 + 6 b^3 f^2 m n x^2 \, \text{Log}[c x^n]^2 + 4 b^3 e f m x \, \text{Log}[c x^n]^3 - 2 b^3 f^2 m x^2 \, \text{Log}[c x^n]^3 - 4 a^3 e^2 m \, \text{Log}[e + f x] + 6 a^2 b e^2 m n \, \text{Log}[e + f x] - 6 a b^2 e^2 m n^2 \, \text{Log}[e + f x] + 3 b^3 e^2 m n^3 \, \text{Log}[e + f x] + 12 a^2 b e^2 m n \, \text{Log}[x] \, \text{Log}[e + f x] - 12 a b^2 e^2 m n^2 \, \text{Log}[x] \, \text{Log}[e + f x] + 6 b^3 e^2 m n^3 \, \text{Log}[x] \, \text{Log}[e + f x] - 12 a b^2 e^2 m n^2 \, \text{Log}[x]^2 \, \text{Log}[e + f x] + 6 b^3 e^2 m n^3 \, \text{Log}[x]^2 \, \text{Log}[e + f x] + 4 b^3 e^2 m n^3 \, \text{Log}[x]^3 \, \text{Log}[e + f x] - 12 a^2 b e^2 m \, \text{Log}[c x^n] \, \text{Log}[e + f x] + 12 a b^2 e^2 m n \, \text{Log}[c x^n] \, \text{Log}[e + f x] - 6 b^3 e^2 m n^2 \, \text{Log}[c x^n] \, \text{Log}[e + f x] + 24 a b^2 e^2 m n \, \text{Log}[x] \, \text{Log}[c x^n] \, \text{Log}[e + f x] - 12 b^3 e^2 m n^2 \, \text{Log}[x] \, \text{Log}[c x^n] \, \text{Log}[e + f x] - 12 b^3 e^2 m n^2 \, \text{Log}[x]^2 \, \text{Log}[c x^n] \, \text{Log}[e + f x] - 12 a b^2 e^2 m \, \text{Log}[c x^n]^2 \, \text{Log}[e + f x] + 6 b^3 e^2 m n \, \text{Log}[c x^n]^2 \, \text{Log}[e + f x] + 12 b^3 e^2 m n \, \text{Log}[x] \, \text{Log}[c x^n]^2 \, \text{Log}[e + f x] - 4 b^3 e^2 m \, \text{Log}[c x^n]^3 \, \text{Log}[e + f x] + 4 a^3 f^2 x^2 \, \text{Log}[d (e + f x)^m] - 6 a^2 b f^2 n x^2 \, \text{Log}[d (e + f x)^m] + 6 a b^2 f^2 n^2 x^2 \, \text{Log}[d (e + f x)^m] - 3 b^3 f^2 n^3 x^2 \, \text{Log}[d (e + f x)^m] + 12 a^2 b f^2 x^2 \, \text{Log}[c x^n] \, \text{Log}[d (e + f x)^m] - 12 a b^2 f^2 n x^2 \, \text{Log}[c x^n] \, \text{Log}[d (e + f x)^m] + 6 b^3 f^2 n^2 x^2 \, \text{Log}[c x^n] \, \text{Log}[d (e + f x)^m] + 12 a b^2 f^2 x^2 \, \text{Log}[c x^n]^2 \, \text{Log}[d (e + f x)^m] - 6 b^3 f^2 n x^2 \, \text{Log}[c x^n]^2 \, \text{Log}[d (e + f x)^m] + 4 b^3 f^2 x^2 \, \text{Log}[c x^n]^3 \, \text{Log}[d (e + f x)^m] - 12 a^2 b e^2 m n \, \text{Log}[x] \, \text{Log}\Big[1 + \frac{f x}{e}\Big] + 12 a b^2 e^2 m n^2 \, \text{Log}[x] \, \text{Log}\Big[1 + \frac{f x}{e}\Big] - 6 b^3 e^2 m n^3 \, \text{Log}[x] \, \text{Log}\Big[1 + \frac{f x}{e}\Big] + 12 a b^2 e^2 m n^2 \, \text{Log}[x]^2 \, \text{Log}\Big[1 + \frac{f x}{e}\Big] - 6 b^3 e^2 m n^3 \, \text{Log}[x]^2 \, \text{Log}\Big[1 + \frac{f x}{e}\Big] - 4 b^3 e^2 m n^3 \, \text{Log}[x]^3 \, \text{Log}\Big[1 + \frac{f x}{e}\Big] - 24 a b^2 e^2 m n \, \text{Log}[x] \, \text{Log}[c x^n] \, \text{Log}\Big[1 + \frac{f x}{e}\Big] + 12 b^3 e^2 m n^2 \, \text{Log}[x] \, \text{Log}[c x^n] \, \text{Log}\Big[1 + \frac{f x}{e}\Big] + 12 b^3 e^2 m n^2 \, \text{Log}[x]^2 \, \text{Log}[c x^n] \, \text{Log}\Big[1 + \frac{f x}{e}\Big] - 12 b^3 e^2 m n \, \text{Log}[x] \, \text{Log}[c x^n]^2 \, \text{Log}\Big[1 + \frac{f x}{e}\Big] - 6 b e^2 m n \left(2 a^2 - 2 a b n + b^2 n^2 - 2 b (-2 a + b n) \, \text{Log}[c x^n] + 2 b^2 \, \text{Log}[c x^n]^2\right) \text{PolyLog}\Big[2, -\frac{f x}{e}\Big] + 12 b^2 e^2 m n^2 \left(2 a - b n + 2 b \, \text{Log}[c x^n]\right) \text{PolyLog}\Big[3, -\frac{f x}{e}\Big] - 24 b^3 e^2 m n^3 \, \text{PolyLog}\Big[4, -\frac{f x}{e}\Big]\Big)$$

Problem 86: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 473 leaves, 28 steps):

$$-12\,a\,b^2\,m\,n^2\,x+18\,b^3\,m\,n^3\,x-6\,b^2\,m\,n^2\,(a-b\,n)\,x-18\,b^3\,m\,n^2\,x\,\text{Log}\left[c\,x^n\right]+6\,b\,m\,n\,x\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)^2-m\,x\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)^3+\frac{6\,b^2\,e\,m\,n^2\,(a-b\,n)\,\text{Log}[e+f\,x]}{f}+6\,a\,b^2\,n^2\,x\,\text{Log}\left[d\,(e+f\,x)^m\right]-6\,b^3\,n^3\,x\,\text{Log}\left[d\,(e+f\,x)^m\right]+6\,b^3\,n^2\,x\,\text{Log}\left[c\,x^n\right]\,\text{Log}\left[d\,(e+f\,x)^m\right]-3\,b\,n\,x\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)^2\,\text{Log}\left[d\,(e+f\,x)^m\right]+x\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)^3\,\text{Log}\left[d\,(e+f\,x)^m\right]+\frac{6\,b^3\,e\,m\,n^2\,\text{Log}[c\,x^n]\,\text{Log}\left[1+\frac{f\,x}{e}\right]}{f}-\frac{3\,b\,e\,m\,n\,\left(a+b\,\text{Log}[c\,x^n]\right)^2\,\text{Log}\left[1+\frac{f\,x}{e}\right]}{f}+\frac{e\,m\,\left(a+b\,\text{Log}[c\,x^n]\right)^3\,\text{Log}\left[1+\frac{f\,x}{e}\right]}{f}+\frac{6\,b^3\,e\,m\,n^3\,\text{PolyLog}\left[2,-\frac{f\,x}{e}\right]}{f}-\frac{6\,b^2\,e\,m\,n^2\,\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{PolyLog}\left[2,-\frac{f\,x}{e}\right]}{f}+\frac{3\,b\,e\,m\,n\,\left(a+b\,\text{Log}[c\,x^n]\right)^2\,\text{PolyLog}\left[2,-\frac{f\,x}{e}\right]}{f}+\frac{6\,b^3\,e\,m\,n^3\,\text{PolyLog}\left[3,-\frac{f\,x}{e}\right]}{f}-\frac{6\,b^2\,e\,m\,n^2\,\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{PolyLog}\left[3,-\frac{f\,x}{e}\right]}{f}+\frac{6\,b^3\,e\,m\,n^3\,\text{PolyLog}\left[4,-\frac{f\,x}{e}\right]}{f}$$

Result (type 4, 1122 leaves) :

$$\frac{1}{f}\Big(-a^3 f m x+6 a^2 b f m n x-18 a b^2 f m n^2 x+24 b^3 f m n^3 x-3 a^2 b f m x \text{Log}[c x^n]+12 a b^2 f m n x \text{Log}[c x^n]-18 b^3 f m n^2 x \text{Log}[c x^n]-3 a b^2 f m x \text{Log}[c x^n]^2+6 b^3 f m n x \text{Log}[c x^n]^2-b^3 f m x \text{Log}[c x^n]^3+a^3 e m \text{Log}[e+f x]-3 a^2 b e m n \text{Log}[e+f x]+6 a b^2 e m n^2 \text{Log}[e+f x]-6 b^3 e m n^3 \text{Log}[e+f x]-3 a^2 b e m n \text{Log}[x] \text{Log}[e+f x]+6 a b^2 e m n^2 \text{Log}[x] \text{Log}[e+f x]-6 b^3 e m n^3 \text{Log}[x] \text{Log}[e+f x]+3 a b^2 e m n^2 \text{Log}[x]^2 \text{Log}[e+f x]-3 b^3 e m n^3 \text{Log}[x]^2 \text{Log}[e+f x]-b^3 e m n^3 \text{Log}[x]^3 \text{Log}[e+f x]+3 a^2 b e m \text{Log}[c x^n] \text{Log}[e+f x]-6 a b^2 e m n \text{Log}[c x^n] \text{Log}[e+f x]+6 b^3 e m n^2 \text{Log}[c x^n] \text{Log}[e+f x]-6 a b^2 e m n \text{Log}[x] \text{Log}[c x^n] \text{Log}[e+f x]+6 b^3 e m n^2 \text{Log}[x] \text{Log}[c x^n] \text{Log}[e+f x]+3 b^3 e m n^2 \text{Log}[x]^2 \text{Log}[c x^n] \text{Log}[e+f x]+3 a b^2 e m \text{Log}[c x^n]^2 \text{Log}[e+f x]-3 b^3 e m n \text{Log}[c x^n]^2 \text{Log}[e+f x]-3 b^3 e m n \text{Log}[x] \text{Log}[c x^n]^2 \text{Log}[e+f x]+b^3 e m \text{Log}[c x^n]^3 \text{Log}[e+f x]+a^3 f x \text{Log}[d (e+f x)^m]-3 a^2 b f n x \text{Log}[d (e+f x)^m]+6 a b^2 f n^2 x \text{Log}[d (e+f x)^m]-6 b^3 f n^3 x \text{Log}[d (e+f x)^m]+3 a^2 b f x \text{Log}[c x^n] \text{Log}[d (e+f x)^m]-6 a b^2 f n x \text{Log}[c x^n] \text{Log}[d (e+f x)^m]+6 b^3 f n^2 x \text{Log}[c x^n] \text{Log}[d (e+f x)^m]+3 a b^2 f x \text{Log}[c x^n]^2 \text{Log}[d (e+f x)^m]-3 b^3 f n x \text{Log}[c x^n]^2 \text{Log}[d (e+f x)^m]+b^3 f x \text{Log}[c x^n]^3 \text{Log}[d (e+f x)^m]+3 a^2 b e m n \text{Log}[x] \text{Log}\left[1+\frac{f x}{e}\right]-6 a b^2 e m n^2 \text{Log}[x] \text{Log}\left[1+\frac{f x}{e}\right]+6 b^3 e m n^3 \text{Log}[x] \text{Log}\left[1+\frac{f x}{e}\right]-3 a b^2 e m n^2 \text{Log}[x]^2 \text{Log}\left[1+\frac{f x}{e}\right]+3 b^3 e m n^3 \text{Log}[x]^2 \text{Log}\left[1+\frac{f x}{e}\right]+b^3 e m n^3 \text{Log}[x]^3 \text{Log}\left[1+\frac{f x}{e}\right]+6 a b^2 e m n \text{Log}[x] \text{Log}[c x^n] \text{Log}\left[1+\frac{f x}{e}\right]-6 b^3 e m n^2 \text{Log}[x] \text{Log}[c x^n] \text{Log}\left[1+\frac{f x}{e}\right]-3 b^3 e m n^2 \text{Log}[x]^2 \text{Log}[c x^n] \text{Log}\left[1+\frac{f x}{e}\right]+3 b^3 e m n \text{Log}[x] \text{Log}[c x^n]^2 \text{Log}\left[1+\frac{f x}{e}\right]+3 b e m n \left(a^2-2 a b n+2 b^2 n^2+2 b (a-b n) \text{Log}[c x^n]+b^2 \text{Log}[c x^n]^2\right) \text{PolyLog}\left[2,-\frac{f x}{e}\right]-6 b^2 e m n^2 \left(a-b n+b \text{Log}[c x^n]\right) \text{PolyLog}\left[3,-\frac{f x}{e}\right]+6 b^3 e m n^3 \text{PolyLog}\left[4,-\frac{f x}{e}\right]\Big)$$

Problem 87: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 161 leaves, 6 steps):

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

Result (type 4, 602 leaves):

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

Problem 88: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 411 leaves, 14 steps):

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

Result (type 4, 1347 leaves):

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

Problem 89: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 555 leaves, 22 steps):

$$-\frac{45\,b^3\,f\,m\,n^3}{8\,e\,x}-\frac{3\,b^3\,f^2\,m\,n^3\,\text{Log}[x]}{8\,e^2}-\frac{21\,b^2\,f\,m\,n^2\,\left(a+b\,\text{Log}[c\,x^n]\right)}{4\,e\,x}+\frac{3\,b^2\,f^2\,m\,n^2\,\text{Log}\left[1+\frac{e}{f\,x}\right]\,\left(a+b\,\text{Log}[c\,x^n]\right)}{4\,e^2}-\frac{9\,b\,f\,m\,n\,\left(a+b\,\text{Log}[c\,x^n]\right)^2}{4\,e\,x}+\frac{3\,b\,f^2\,m\,n\,\text{Log}\left[1+\frac{e}{f\,x}\right]\,\left(a+b\,\text{Log}[c\,x^n]\right)^2}{4\,e^2}-\frac{f\,m\,\left(a+b\,\text{Log}[c\,x^n]\right)^3}{2\,e\,x}+\frac{f^2\,m\,\text{Log}\left[1+\frac{e}{f\,x}\right]\,\left(a+b\,\text{Log}[c\,x^n]\right)^3}{2\,e^2}+\frac{3\,b^3\,f^2\,m\,n^3\,\text{Log}[e+f\,x]}{8\,e^2}-\frac{3\,b^3\,n^3\,\text{Log}\left[d\,\left(e+f\,x\right)^m\right]}{8\,x^2}-\frac{3\,b^2\,n^2\,\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{Log}\left[d\,\left(e+f\,x\right)^m\right]}{4\,x^2}-\frac{3\,b\,n\,\left(a+b\,\text{Log}[c\,x^n]\right)^2\,\text{Log}\left[d\,\left(e+f\,x\right)^m\right]}{4\,x^2}-\frac{\left(a+b\,\text{Log}[c\,x^n]\right)^3\,\text{Log}\left[d\,\left(e+f\,x\right)^m\right]}{2\,x^2}-\frac{3\,b^3\,f^2\,m\,n^3\,\text{PolyLog}\left[2,-\frac{e}{f\,x}\right]}{4\,e^2}-\frac{3\,b^2\,f^2\,m\,n^2\,\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{PolyLog}\left[2,-\frac{e}{f\,x}\right]}{2\,e^2}-\frac{3\,b\,f^2\,m\,n\,\left(a+b\,\text{Log}[c\,x^n]\right)^2\,\text{PolyLog}\left[2,-\frac{e}{f\,x}\right]}{2\,e^2}-\frac{3\,b^3\,f^2\,m\,n^3\,\text{PolyLog}\left[3,-\frac{e}{f\,x}\right]}{2\,e^2}-\frac{3\,b^2\,f^2\,m\,n^2\,\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{PolyLog}\left[3,-\frac{e}{f\,x}\right]}{e^2}-\frac{3\,b^3\,f^2\,m\,n^3\,\text{PolyLog}\left[4,-\frac{e}{f\,x}\right]}{e^2}$$

Result (type 4, 1736 leaves):

$$-\frac{1}{8 e^2 x^2}\Big(4 a^3 e f m x+18 a^2 b e f m n x+42 a b^2 e f m n^2 x+45 b^3 e f m n^3 x+4 a^3 f^2 m x^2 \text{Log}[x]+6 a^2 b f^2 m n x^2 \text{Log}[x]+6 a b^2 f^2 m n^2 x^2 \text{Log}[x]+3 b^3 f^2 m n^3 x^2 \text{Log}[x]-6 a^2 b f^2 m n x^2 \text{Log}[x]^2-6 a b^2 f^2 m n^2 x^2 \text{Log}[x]^2-3 b^3 f^2 m n^3 x^2 \text{Log}[x]^2+4 a b^2 f^2 m n^2 x^2 \text{Log}[x]^3+2 b^3 f^2 m n^3 x^2 \text{Log}[x]^3-b^3 f^2 m n^3 x^2 \text{Log}[x]^4+12 a^2 b e f m x \text{Log}[c x^n]+36 a b^2 e f m n x \text{Log}[c x^n]+42 b^3 e f m n^2 x \text{Log}[c x^n]+12 a^2 b f^2 m x^2 \text{Log}[x] \text{Log}[c x^n]+12 a b^2 f^2 m n x^2 \text{Log}[x] \text{Log}[c x^n]+6 b^3 f^2 m n^2 x^2 \text{Log}[x] \text{Log}[c x^n]-12 a b^2 f^2 m n x^2 \text{Log}[x]^2 \text{Log}[c x^n]-6 b^3 f^2 m n^2 x^2 \text{Log}[x]^2 \text{Log}[c x^n]+4 b^3 f^2 m n^2 x^2 \text{Log}[x]^3 \text{Log}[c x^n]+12 a b^2 e f m x \text{Log}[c x^n]^2+18 b^3 e f m n x \text{Log}[c x^n]^2+12 a b^2 f^2 m x^2 \text{Log}[x] \text{Log}[c x^n]^2+6 b^3 f^2 m n x^2 \text{Log}[x] \text{Log}[c x^n]^2-6 b^3 f^2 m n x^2 \text{Log}[x]^2 \text{Log}[c x^n]^2+4 b^3 e f m x \text{Log}[c x^n]^3+4 b^3 f^2 m x^2 \text{Log}[x] \text{Log}[c x^n]^3-4 a^3 f^2 m x^2 \text{Log}[e+f x]-6 a^2 b f^2 m n x^2 \text{Log}[e+f x]-6 a b^2 f^2 m n^2 x^2 \text{Log}[e+f x]-3 b^3 f^2 m n^3 x^2 \text{Log}[e+f x]+12 a^2 b f^2 m n x^2 \text{Log}[x] \text{Log}[e+f x]+12 a b^2 f^2 m n^2 x^2 \text{Log}[x] \text{Log}[e+f x]+6 b^3 f^2 m n^3 x^2 \text{Log}[x] \text{Log}[e+f x]-12 a b^2 f^2 m n^2 x^2 \text{Log}[x]^2 \text{Log}[e+f x]-6 b^3 f^2 m n^3 x^2 \text{Log}[x]^2 \text{Log}[e+f x]+4 b^3 f^2 m n^3 x^2 \text{Log}[x]^3 \text{Log}[e+f x]-12 a^2 b f^2 m x^2 \text{Log}[c x^n] \text{Log}[e+f x]-12 a b^2 f^2 m n x^2 \text{Log}[c x^n] \text{Log}[e+f x]-6 b^3 f^2 m n^2 x^2 \text{Log}[c x^n] \text{Log}[e+f x]+24 a b^2 f^2 m n x^2 \text{Log}[x] \text{Log}[c x^n] \text{Log}[e+f x]+12 b^3 f^2 m n^2 x^2 \text{Log}[x] \text{Log}[c x^n] \text{Log}[e+f x]-12 b^3 f^2 m n^2 x^2 \text{Log}[x]^2 \text{Log}[c x^n] \text{Log}[e+f x]-12 a b^2 f^2 m x^2 \text{Log}[c x^n]^2 \text{Log}[e+f x]-6 b^3 f^2 m n x^2 \text{Log}[c x^n]^2 \text{Log}[e+f x]+12 b^3 f^2 m n x^2 \text{Log}[x] \text{Log}[c x^n]^2 \text{Log}[e+f x]-4 b^3 f^2 m x^2 \text{Log}[c x^n]^3 \text{Log}[e+f x]+4 a^3 e^2 \text{Log}[d (e+f x)^m]+6 a^2 b e^2 n \text{Log}[d (e+f x)^m]+6 a b^2 e^2 n^2 \text{Log}[d (e+f x)^m]+3 b^3 e^2 n^3 \text{Log}[d (e+f x)^m]+12 a^2 b e^2 \text{Log}[c x^n] \text{Log}[d (e+f x)^m]+12 a b^2 e^2 n \text{Log}[c x^n] \text{Log}[d (e+f x)^m]+6 b^3 e^2 n^2 \text{Log}[c x^n] \text{Log}[d (e+f x)^m]+12 a b^2 e^2 \text{Log}[c x^n]^2 \text{Log}[d (e+f x)^m]+6 b^3 e^2 n \text{Log}[c x^n]^2 \text{Log}[d (e+f x)^m]+4 b^3 e^2 \text{Log}[c x^n]^3 \text{Log}[d (e+f x)^m]-12 a^2 b f^2 m n x^2 \text{Log}[x] \text{Log}\left[1+\frac{f x}{e}\right]-12 a b^2 f^2 m n^2 x^2 \text{Log}[x] \text{Log}\left[1+\frac{f x}{e}\right]-6 b^3 f^2 m n^3 x^2 \text{Log}[x] \text{Log}\left[1+\frac{f x}{e}\right]+12 a b^2 f^2 m n^2 x^2 \text{Log}[x]^2 \text{Log}\left[1+\frac{f x}{e}\right]+6 b^3 f^2 m n^3 x^2 \text{Log}[x]^2 \text{Log}\left[1+\frac{f x}{e}\right]-4 b^3 f^2 m n^3 x^2 \text{Log}[x]^3 \text{Log}\left[1+\frac{f x}{e}\right]-24 a b^2 f^2 m n x^2 \text{Log}[x] \text{Log}[c x^n] \text{Log}\left[1+\frac{f x}{e}\right]-12 b^3 f^2 m n^2 x^2 \text{Log}[x] \text{Log}[c x^n] \text{Log}\left[1+\frac{f x}{e}\right]+12 b^3 f^2 m n^2 x^2 \text{Log}[x]^2 \text{Log}[c x^n] \text{Log}\left[1+\frac{f x}{e}\right]-12 b^3 f^2 m n x^2 \text{Log}[x] \text{Log}[c x^n]^2 \text{Log}\left[1+\frac{f x}{e}\right]-6 b f^2 m n x^2 \left(2 a^2+2 a b n+b^2 n^2+2 b (2 a+b n) \text{Log}[c x^n]+2 b^2 \text{Log}[c x^n]^2\right) \text{PolyLog}\left[2,-\frac{f x}{e}\right]+12 b^2 f^2 m n^2 x^2 (2 a+b n+2 b \text{Log}[c x^n]) \text{PolyLog}\left[3,-\frac{f x}{e}\right]-24 b^3 f^2 m n^3 x^2 \text{PolyLog}\left[4,-\frac{f x}{e}\right]\Big)$$

Problem 90: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 221 leaves, 9 steps):

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

Result (type 4, 324 leaves):

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

Problem 91: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 148 leaves, 9 steps):

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

Result (type 4, 263 leaves):

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

Problem 92: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

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

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

Result (type 4, 307 leaves):

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

Problem 93: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 195 leaves, 11 steps):

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

Result (type 4, 298 leaves):

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

Problem 94: Result unnecessarily involves imaginary or complex numbers.

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

Optimal (type 4, 248 leaves, 10 steps):

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

Result (type 4, 363 leaves):

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

Problem 100: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 310 leaves, 17 steps):

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

Result (type 4, 814 leaves):

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

Problem 101: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 147 leaves, 5 steps):

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

Result (type 4, 736 leaves):

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

Problem 102: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 276 leaves, 11 steps):

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

Result (type 4, 946 leaves):

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

Problem 103: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 356 leaves, 15 steps):

$$-\frac{7 b^2 f m n^2}{32 e x^2}-\frac{b^2 f^2 m n^2 \text{Log}[x]}{16 e^2}-\frac{3 b f m n \left(a+b \text{Log}\left[c x^n\right]\right)}{8 e x^2}+\frac{b f^2 m n \text{Log}\left[1+\frac{e}{f x^2}\right] \left(a+b \text{Log}\left[c x^n\right]\right)}{8 e^2}-\frac{f m \left(a+b \text{Log}\left[c x^n\right]\right)^2}{4 e x^2}+\frac{f^2 m \text{Log}\left[1+\frac{e}{f x^2}\right] \left(a+b \text{Log}\left[c x^n\right]\right)^2}{4 e^2}+\frac{b^2 f^2 m n^2 \text{Log}\left[e+f x^2\right]}{32 e^2}-\frac{b^2 n^2 \text{Log}\left[d \left(e+f x^2\right)^m\right]}{32 x^4}-\frac{b n \left(a+b \text{Log}\left[c x^n\right]\right) \text{Log}\left[d \left(e+f x^2\right)^m\right]}{8 x^4}-\frac{\left(a+b \text{Log}\left[c x^n\right]\right)^2 \text{Log}\left[d \left(e+f x^2\right)^m\right]}{4 x^4}-\frac{b^2 f^2 m n^2 \text{PolyLog}\left[2,-\frac{e}{f x^2}\right]}{16 e^2}-\frac{b f^2 m n \left(a+b \text{Log}\left[c x^n\right]\right) \text{PolyLog}\left[2,-\frac{e}{f x^2}\right]}{4 e^2}-\frac{b^2 f^2 m n^2 \text{PolyLog}\left[3,-\frac{e}{f x^2}\right]}{8 e^2}$$

Result (type 4, 1111 leaves) :

$$-\frac{1}{96 e^2 x^4}\Bigg(24 a^2 e f m x^2+36 a b e f m n x^2+21 b^2 e f m n^2 x^2+48 a^2 f^2 m x^4 \text{Log}[x]+24 a b f^2 m n x^4 \text{Log}[x]+$$
$$6 b^2 f^2 m n^2 x^4 \text{Log}[x]-48 a b f^2 m n x^4 \text{Log}[x]^2-12 b^2 f^2 m n^2 x^4 \text{Log}[x]^2+16 b^2 f^2 m n^2 x^4 \text{Log}[x]^3+$$
$$48 a b e f m x^2 \text{Log}\left[c x^n\right]+36 b^2 e f m n x^2 \text{Log}\left[c x^n\right]+96 a b f^2 m x^4 \text{Log}[x] \text{Log}\left[c x^n\right]+$$
$$24 b^2 f^2 m n x^4 \text{Log}[x] \text{Log}\left[c x^n\right]-48 b^2 f^2 m n x^4 \text{Log}[x]^2 \text{Log}\left[c x^n\right]+24 b^2 e f m x^2 \text{Log}\left[c x^n\right]^2+$$
$$48 b^2 f^2 m x^4 \text{Log}[x] \text{Log}\left[c x^n\right]^2-48 a b f^2 m n x^4 \text{Log}[x] \text{Log}\left[1-\frac{i \sqrt{f} x}{\sqrt{e}}\right]-$$
$$12 b^2 f^2 m n^2 x^4 \text{Log}[x] \text{Log}\left[1-\frac{i \sqrt{f} x}{\sqrt{e}}\right]+24 b^2 f^2 m n^2 x^4 \text{Log}[x]^2 \text{Log}\left[1-\frac{i \sqrt{f} x}{\sqrt{e}}\right]-$$
$$48 b^2 f^2 m n x^4 \text{Log}[x] \text{Log}\left[c x^n\right] \text{Log}\left[1-\frac{i \sqrt{f} x}{\sqrt{e}}\right]-48 a b f^2 m n x^4 \text{Log}[x] \text{Log}\left[1+\frac{i \sqrt{f} x}{\sqrt{e}}\right]-$$
$$12 b^2 f^2 m n^2 x^4 \text{Log}[x] \text{Log}\left[1+\frac{i \sqrt{f} x}{\sqrt{e}}\right]+24 b^2 f^2 m n^2 x^4 \text{Log}[x]^2 \text{Log}\left[1+\frac{i \sqrt{f} x}{\sqrt{e}}\right]-$$
$$48 b^2 f^2 m n x^4 \text{Log}[x] \text{Log}\left[c x^n\right] \text{Log}\left[1+\frac{i \sqrt{f} x}{\sqrt{e}}\right]-24 a^2 f^2 m x^4 \text{Log}\left[e+f x^2\right]-$$
$$12 a b f^2 m n x^4 \text{Log}\left[e+f x^2\right]-3 b^2 f^2 m n^2 x^4 \text{Log}\left[e+f x^2\right]+48 a b f^2 m n x^4 \text{Log}[x] \text{Log}\left[e+f x^2\right]+$$
$$12 b^2 f^2 m n^2 x^4 \text{Log}[x] \text{Log}\left[e+f x^2\right]-24 b^2 f^2 m n^2 x^4 \text{Log}[x]^2 \text{Log}\left[e+f x^2\right]-$$
$$48 a b f^2 m x^4 \text{Log}\left[c x^n\right] \text{Log}\left[e+f x^2\right]-12 b^2 f^2 m n x^4 \text{Log}\left[c x^n\right] \text{Log}\left[e+f x^2\right]+$$
$$48 b^2 f^2 m n x^4 \text{Log}[x] \text{Log}\left[c x^n\right] \text{Log}\left[e+f x^2\right]-24 b^2 f^2 m x^4 \text{Log}\left[c x^n\right]^2 \text{Log}\left[e+f x^2\right]+$$
$$24 a^2 e^2 \text{Log}\left[d \left(e+f x^2\right)^m\right]+12 a b e^2 n \text{Log}\left[d \left(e+f x^2\right)^m\right]+$$
$$3 b^2 e^2 n^2 \text{Log}\left[d \left(e+f x^2\right)^m\right]+48 a b e^2 \text{Log}\left[c x^n\right] \text{Log}\left[d \left(e+f x^2\right)^m\right]+$$
$$12 b^2 e^2 n \text{Log}\left[c x^n\right] \text{Log}\left[d \left(e+f x^2\right)^m\right]+24 b^2 e^2 \text{Log}\left[c x^n\right]^2 \text{Log}\left[d \left(e+f x^2\right)^m\right]-$$
$$12 b f^2 m n x^4 \left(4 a+b n+4 b \text{Log}\left[c x^n\right]\right) \text{PolyLog}\left[2,-\frac{i \sqrt{f} x}{\sqrt{e}}\right]-$$
$$12 b f^2 m n x^4 \left(4 a+b n+4 b \text{Log}\left[c x^n\right]\right) \text{PolyLog}\left[2,\frac{i \sqrt{f} x}{\sqrt{e}}\right]+$$
$$48 b^2 f^2 m n^2 x^4 \text{PolyLog}\left[3,-\frac{i \sqrt{f} x}{\sqrt{e}}\right]+48 b^2 f^2 m n^2 x^4 \text{PolyLog}\left[3,\frac{i \sqrt{f} x}{\sqrt{e}}\right]\Bigg)$$

Problem 108: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 514 leaves, 26 steps):

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

Result (type 4, 1911 leaves):

$$\frac{1}{8 f} \left(-4 a^3 f m x^2 + 12 a^2 b f m n x^2 - 18 a b^2 f m n^2 x^2 + 12 b^3 f m n^3 x^2 - 12 a^2 b f m x^2 \, \text{Log}\left[c x^n\right] + 24 a b^2 f m n x^2 \, \text{Log}\left[c x^n\right] - 18 b^3 f m n^2 x^2 \, \text{Log}\left[c x^n\right] - 12 a b^2 f m x^2 \, \text{Log}\left[c x^n\right]^2 + 12 b^3 f m n x^2 \, \text{Log}\left[c x^n\right]^2 - 4 b^3 f m x^2 \, \text{Log}\left[c x^n\right]^3 + 12 a^2 b e m n \, \text{Log}[x] \, \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] - 12 a b^2 e m n^2 \, \text{Log}[x] \, \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] + 6 b^3 e m n^3 \, \text{Log}[x] \, \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] - 12 a b^2 e m n^2 \, \text{Log}[x]^2 \, \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] + 6 b^3 e m n^3 \, \text{Log}[x]^2 \, \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] + 4 b^3 e m n^3 \, \text{Log}[x]^3 \, \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] + 24 a b^2 e m n \, \text{Log}[x] \, \text{Log}\left[c x^n\right] \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] - 12 b^3 e m n^2 \, \text{Log}[x] \, \text{Log}\left[c x^n\right] \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] - 12 b^3 e m n^2 \, \text{Log}[x]^2 \, \text{Log}\left[c x^n\right] \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] + 12 b^3 e m n \, \text{Log}[x] \, \text{Log}\left[c x^n\right]^2 \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] + 12 a^2 b e m n \, \text{Log}[x] \, \text{Log}\left[1 + \frac{i \sqrt{f} x}{\sqrt{e}}\right] - 12 a b^2 e m n^2 \, \text{Log}[x] \, \text{Log}\left[1 + \frac{i \sqrt{f} x}{\sqrt{e}}\right] + 6 b^3 e m n^3 \, \text{Log}[x] \, \text{Log}\left[1 + \frac{i \sqrt{f} x}{\sqrt{e}}\right] - 12 a b^2 e m n^2 \, \text{Log}[x]^2 \, \text{Log}\left[1 + \frac{i \sqrt{f} x}{\sqrt{e}}\right] + 6 b^3 e m n^3 \, \text{Log}[x]^2 \, \text{Log}\left[1 + \frac{i \sqrt{f} x}{\sqrt{e}}\right] + \right.$$

$4 b^3 e m n^3 \text{Log}[x]^3 \text{Log}\left[1+\frac{i \sqrt{f} x}{\sqrt{e}}\right]+24 a b^2 e m n \text{Log}[x] \text{Log}[c x^n] \text{Log}\left[1+\frac{i \sqrt{f} x}{\sqrt{e}}\right]-$

$12 b^3 e m n^2 \text{Log}[x] \text{Log}[c x^n] \text{Log}\left[1+\frac{i \sqrt{f} x}{\sqrt{e}}\right]-12 b^3 e m n^2 \text{Log}[x]^2 \text{Log}[c x^n] \text{Log}\left[1+\frac{i \sqrt{f} x}{\sqrt{e}}\right]+$

$12 b^3 e m n \text{Log}[x] \text{Log}[c x^n]^2 \text{Log}\left[1+\frac{i \sqrt{f} x}{\sqrt{e}}\right]+4 a^3 e m \text{Log}[e+f x^2]-6 a^2 b e m n \text{Log}[e+f x^2]+$

$6 a b^2 e m n^2 \text{Log}[e+f x^2]-3 b^3 e m n^3 \text{Log}[e+f x^2]-12 a^2 b e m n \text{Log}[x] \text{Log}[e+f x^2]+$

$12 a b^2 e m n^2 \text{Log}[x] \text{Log}[e+f x^2]-6 b^3 e m n^3 \text{Log}[x] \text{Log}[e+f x^2]+$

$12 a b^2 e m n^2 \text{Log}[x]^2 \text{Log}[e+f x^2]-6 b^3 e m n^3 \text{Log}[x]^2 \text{Log}[e+f x^2]-$

$4 b^3 e m n^3 \text{Log}[x]^3 \text{Log}[e+f x^2]+12 a^2 b e m \text{Log}[c x^n] \text{Log}[e+f x^2]-$

$12 a b^2 e m n \text{Log}[c x^n] \text{Log}[e+f x^2]+6 b^3 e m n^2 \text{Log}[c x^n] \text{Log}[e+f x^2]-$

$24 a b^2 e m n \text{Log}[x] \text{Log}[c x^n] \text{Log}[e+f x^2]+12 b^3 e m n^2 \text{Log}[x] \text{Log}[c x^n] \text{Log}[e+f x^2]+$

$12 b^3 e m n^2 \text{Log}[x]^2 \text{Log}[c x^n] \text{Log}[e+f x^2]+12 a b^2 e m \text{Log}[c x^n]^2 \text{Log}[e+f x^2]-$

$6 b^3 e m n \text{Log}[c x^n]^2 \text{Log}[e+f x^2]-12 b^3 e m n \text{Log}[x] \text{Log}[c x^n]^2 \text{Log}[e+f x^2]+$

$4 b^3 e m \text{Log}[c x^n]^3 \text{Log}[e+f x^2]+4 a^3 f x^2 \text{Log}[d (e+f x^2)^m]-6 a^2 b f n x^2 \text{Log}[d (e+f x^2)^m]+$

$6 a b^2 f n^2 x^2 \text{Log}[d (e+f x^2)^m]-3 b^3 f n^3 x^2 \text{Log}[d (e+f x^2)^m]+$

$12 a^2 b f x^2 \text{Log}[c x^n] \text{Log}[d (e+f x^2)^m]-12 a b^2 f n x^2 \text{Log}[c x^n] \text{Log}[d (e+f x^2)^m]+$

$6 b^3 f n^2 x^2 \text{Log}[c x^n] \text{Log}[d (e+f x^2)^m]+12 a b^2 f x^2 \text{Log}[c x^n]^2 \text{Log}[d (e+f x^2)^m]-$

$6 b^3 f n x^2 \text{Log}[c x^n]^2 \text{Log}[d (e+f x^2)^m]+4 b^3 f x^2 \text{Log}[c x^n]^3 \text{Log}[d (e+f x^2)^m]+$

$6 b e m n \left(2 a^2-2 a b n+b^2 n^2-2 b (-2 a+b n) \text{Log}[c x^n]+2 b^2 \text{Log}[c x^n]^2\right) \text{PolyLog}\left[2,-\frac{i \sqrt{f} x}{\sqrt{e}}\right]+$

$6 b e m n \left(2 a^2-2 a b n+b^2 n^2-2 b (-2 a+b n) \text{Log}[c x^n]+2 b^2 \text{Log}[c x^n]^2\right) \text{PolyLog}\left[2,\frac{i \sqrt{f} x}{\sqrt{e}}\right]-$

$24 a b^2 e m n^2 \text{PolyLog}\left[3,-\frac{i \sqrt{f} x}{\sqrt{e}}\right]+12 b^3 e m n^3 \text{PolyLog}\left[3,-\frac{i \sqrt{f} x}{\sqrt{e}}\right]-$

$24 b^3 e m n^2 \text{Log}[c x^n] \text{PolyLog}\left[3,-\frac{i \sqrt{f} x}{\sqrt{e}}\right]-24 a b^2 e m n^2 \text{PolyLog}\left[3,\frac{i \sqrt{f} x}{\sqrt{e}}\right]+$

$12 b^3 e m n^3 \text{PolyLog}\left[3,\frac{i \sqrt{f} x}{\sqrt{e}}\right]-24 b^3 e m n^2 \text{Log}[c x^n] \text{PolyLog}\left[3,\frac{i \sqrt{f} x}{\sqrt{e}}\right]+$

$24 b^3 e m n^3 \text{PolyLog}\left[4,-\frac{i \sqrt{f} x}{\sqrt{e}}\right]+24 b^3 e m n^3 \text{PolyLog}\left[4,\frac{i \sqrt{f} x}{\sqrt{e}}\right]\Bigg)$

Problem 109: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 181 leaves, 6 steps):

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

Result (type 4, 1348 leaves):

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

$$3 a^2 b m n \text{PolyLog}\left[3, -\frac{i \sqrt{f} x}{\sqrt{e}}\right] + 6 a b^2 m n \text{Log}[c x^n] \text{PolyLog}\left[3, -\frac{i \sqrt{f} x}{\sqrt{e}}\right] + 3 b^3 m n \text{Log}[c x^n]^2 \text{PolyLog}\left[3, -\frac{i \sqrt{f} x}{\sqrt{e}}\right] + 3 a^2 b m n \text{PolyLog}\left[3, \frac{i \sqrt{f} x}{\sqrt{e}}\right] + 6 a b^2 m n \text{Log}[c x^n] \text{PolyLog}\left[3, \frac{i \sqrt{f} x}{\sqrt{e}}\right] + 3 b^3 m n \text{Log}[c x^n]^2 \text{PolyLog}\left[3, \frac{i \sqrt{f} x}{\sqrt{e}}\right] - 6 a b^2 m n^2 \text{PolyLog}\left[4, -\frac{i \sqrt{f} x}{\sqrt{e}}\right] - 6 b^3 m n^2 \text{Log}[c x^n] \text{PolyLog}\left[4, -\frac{i \sqrt{f} x}{\sqrt{e}}\right] - 6 a b^2 m n^2 \text{PolyLog}\left[4, \frac{i \sqrt{f} x}{\sqrt{e}}\right] - 6 b^3 m n^2 \text{Log}[c x^n] \text{PolyLog}\left[4, \frac{i \sqrt{f} x}{\sqrt{e}}\right] + 6 b^3 m n^3 \text{PolyLog}\left[5, -\frac{i \sqrt{f} x}{\sqrt{e}}\right] + 6 b^3 m n^3 \text{PolyLog}\left[5, \frac{i \sqrt{f} x}{\sqrt{e}}\right]$$

Problem 110: Result unnecessarily involves complex numbers and more than twice size of optimal antiderivative.

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

Optimal (type 4, 451 leaves, 15 steps):

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

Result (type 4, 2248 leaves):

$$-\frac{1}{8 e x^2} \left(-8 a^3 f m x^2 \text{Log}[x] - 12 a^2 b f m n x^2 \text{Log}[x] - 12 a b^2 f m n^2 x^2 \text{Log}[x] - 6 b^3 f m n^3 x^2 \text{Log}[x] + 12 a^2 b f m n x^2 \text{Log}[x]^2 + 12 a b^2 f m n^2 x^2 \text{Log}[x]^2 + 6 b^3 f m n^3 x^2 \text{Log}[x]^2 - 8 a b^2 f m n^2 x^2 \text{Log}[x]^3 - 4 b^3 f m n^3 x^2 \text{Log}[x]^3 + 2 b^3 f m n^3 x^2 \text{Log}[x]^4 - 24 a^2 b f m x^2 \text{Log}[x] \text{Log}[c x^n] - \right.$$

$24\,a\,b^2\,f\,m\,n\,x^2\,\text{Log}[x]\,\text{Log}[c\,x^n] - 12\,b^3\,f\,m\,n^2\,x^2\,\text{Log}[x]\,\text{Log}[c\,x^n] +$
$24\,a\,b^2\,f\,m\,n\,x^2\,\text{Log}[x]^2\,\text{Log}[c\,x^n] + 12\,b^3\,f\,m\,n^2\,x^2\,\text{Log}[x]^2\,\text{Log}[c\,x^n] -$
$8\,b^3\,f\,m\,n^2\,x^2\,\text{Log}[x]^3\,\text{Log}[c\,x^n] - 24\,a\,b^2\,f\,m\,x^2\,\text{Log}[x]\,\text{Log}[c\,x^n]^2 -$
$12\,b^3\,f\,m\,n\,x^2\,\text{Log}[x]\,\text{Log}[c\,x^n]^2 + 12\,b^3\,f\,m\,n\,x^2\,\text{Log}[x]^2\,\text{Log}[c\,x^n]^2 -$
$8\,b^3\,f\,m\,x^2\,\text{Log}[x]\,\text{Log}[c\,x^n]^3 + 12\,a^2\,b\,f\,m\,n\,x^2\,\text{Log}[x]\,\text{Log}\left[1 - \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] +$
$12\,a\,b^2\,f\,m\,n^2\,x^2\,\text{Log}[x]\,\text{Log}\left[1 - \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] + 6\,b^3\,f\,m\,n^3\,x^2\,\text{Log}[x]\,\text{Log}\left[1 - \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] -$
$12\,a\,b^2\,f\,m\,n^2\,x^2\,\text{Log}[x]^2\,\text{Log}\left[1 - \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] - 6\,b^3\,f\,m\,n^3\,x^2\,\text{Log}[x]^2\,\text{Log}\left[1 - \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] +$
$4\,b^3\,f\,m\,n^3\,x^2\,\text{Log}[x]^3\,\text{Log}\left[1 - \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] + 24\,a\,b^2\,f\,m\,n\,x^2\,\text{Log}[x]\,\text{Log}[c\,x^n]\,\text{Log}\left[1 - \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] +$
$12\,b^3\,f\,m\,n^2\,x^2\,\text{Log}[x]\,\text{Log}[c\,x^n]\,\text{Log}\left[1 - \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] -$
$12\,b^3\,f\,m\,n^2\,x^2\,\text{Log}[x]^2\,\text{Log}[c\,x^n]\,\text{Log}\left[1 - \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] +$
$12\,b^3\,f\,m\,n\,x^2\,\text{Log}[x]\,\text{Log}[c\,x^n]^2\,\text{Log}\left[1 - \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] + 12\,a^2\,b\,f\,m\,n\,x^2\,\text{Log}[x]\,\text{Log}\left[1 + \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] +$
$12\,a\,b^2\,f\,m\,n^2\,x^2\,\text{Log}[x]\,\text{Log}\left[1 + \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] + 6\,b^3\,f\,m\,n^3\,x^2\,\text{Log}[x]\,\text{Log}\left[1 + \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] -$
$12\,a\,b^2\,f\,m\,n^2\,x^2\,\text{Log}[x]^2\,\text{Log}\left[1 + \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] - 6\,b^3\,f\,m\,n^3\,x^2\,\text{Log}[x]^2\,\text{Log}\left[1 + \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] +$
$4\,b^3\,f\,m\,n^3\,x^2\,\text{Log}[x]^3\,\text{Log}\left[1 + \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] + 24\,a\,b^2\,f\,m\,n\,x^2\,\text{Log}[x]\,\text{Log}[c\,x^n]\,\text{Log}\left[1 + \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] +$
$12\,b^3\,f\,m\,n^2\,x^2\,\text{Log}[x]\,\text{Log}[c\,x^n]\,\text{Log}\left[1 + \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] - 12\,b^3\,f\,m\,n^2\,x^2\,\text{Log}[x]^2$
$\text{Log}[c\,x^n]\,\text{Log}\left[1 + \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] + 12\,b^3\,f\,m\,n\,x^2\,\text{Log}[x]\,\text{Log}[c\,x^n]^2\,\text{Log}\left[1 + \frac{i\sqrt{f}\,x}{\sqrt{e}}\right] +$
$4\,a^3\,f\,m\,x^2\,\text{Log}[e + f\,x^2] + 6\,a^2\,b\,f\,m\,n\,x^2\,\text{Log}[e + f\,x^2] + 6\,a\,b^2\,f\,m\,n^2\,x^2\,\text{Log}[e + f\,x^2] +$
$3\,b^3\,f\,m\,n^3\,x^2\,\text{Log}[e + f\,x^2] - 12\,a^2\,b\,f\,m\,n\,x^2\,\text{Log}[x]\,\text{Log}[e + f\,x^2] -$
$12\,a\,b^2\,f\,m\,n^2\,x^2\,\text{Log}[x]\,\text{Log}[e + f\,x^2] - 6\,b^3\,f\,m\,n^3\,x^2\,\text{Log}[x]\,\text{Log}[e + f\,x^2] +$
$12\,a\,b^2\,f\,m\,n^2\,x^2\,\text{Log}[x]^2\,\text{Log}[e + f\,x^2] + 6\,b^3\,f\,m\,n^3\,x^2\,\text{Log}[x]^2\,\text{Log}[e + f\,x^2] -$
$4\,b^3\,f\,m\,n^3\,x^2\,\text{Log}[x]^3\,\text{Log}[e + f\,x^2] + 12\,a^2\,b\,f\,m\,x^2\,\text{Log}[c\,x^n]\,\text{Log}[e + f\,x^2] +$
$12\,a\,b^2\,f\,m\,n\,x^2\,\text{Log}[c\,x^n]\,\text{Log}[e + f\,x^2] + 6\,b^3\,f\,m\,n^2\,x^2\,\text{Log}[c\,x^n]\,\text{Log}[e + f\,x^2] -$
$24\,a\,b^2\,f\,m\,n\,x^2\,\text{Log}[x]\,\text{Log}[c\,x^n]\,\text{Log}[e + f\,x^2] - 12\,b^3\,f\,m\,n^2\,x^2\,\text{Log}[x]\,\text{Log}[c\,x^n]\,\text{Log}[e + f\,x^2] +$
$12\,b^3\,f\,m\,n^2\,x^2\,\text{Log}[x]^2\,\text{Log}[c\,x^n]\,\text{Log}[e + f\,x^2] + 12\,a\,b^2\,f\,m\,x^2\,\text{Log}[c\,x^n]^2\,\text{Log}[e + f\,x^2] +$
$6\,b^3\,f\,m\,n\,x^2\,\text{Log}[c\,x^n]^2\,\text{Log}[e + f\,x^2] - 12\,b^3\,f\,m\,n\,x^2\,\text{Log}[x]\,\text{Log}[c\,x^n]^2\,\text{Log}[e + f\,x^2] +$
$4\,b^3\,f\,m\,x^2\,\text{Log}[c\,x^n]^3\,\text{Log}[e + f\,x^2] + 4\,a^3\,e\,\text{Log}[d\,(e + f\,x^2)^m] +$
$6\,a^2\,b\,e\,n\,\text{Log}[d\,(e + f\,x^2)^m] + 6\,a\,b^2\,e\,n^2\,\text{Log}[d\,(e + f\,x^2)^m] + 3\,b^3\,e\,n^3\,\text{Log}[d\,(e + f\,x^2)^m] +$

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

Problem 111: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 1092 leaves, 49 steps):

$$\frac{52\,a\,b^2\,e\,m\,n^2\,x}{9\,f}-\frac{160\,b^3\,e\,m\,n^3\,x}{27\,f}+\frac{16}{81}\,b^3\,m\,n^3\,x^3+\frac{4\,b^3\,e^{3/2}\,m\,n^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]}{27\,f^{3/2}}+\frac{52\,b^3\,e\,m\,n^2\,x\,\text{Log}[c\,x^n]}{9\,f}-$$
$$\frac{4}{9}\,b^2\,m\,n^2\,x^3\,\left(a+b\,\text{Log}[c\,x^n]\right)-\frac{4\,b^2\,e^{3/2}\,m\,n^2\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\,\left(a+b\,\text{Log}[c\,x^n]\right)}{9\,f^{3/2}}-$$
$$\frac{8\,b\,e\,m\,n\,x\,\left(a+b\,\text{Log}[c\,x^n]\right)^2}{3\,f}+\frac{4}{9}\,b\,m\,n\,x^3\,\left(a+b\,\text{Log}[c\,x^n]\right)^2+\frac{2\,e\,m\,x\,\left(a+b\,\text{Log}[c\,x^n]\right)^3}{3\,f}-$$
$$\frac{2}{9}\,m\,x^3\,\left(a+b\,\text{Log}[c\,x^n]\right)^3+\frac{b\,(-e)^{3/2}\,m\,n\,\left(a+b\,\text{Log}[c\,x^n]\right)^2\,\text{Log}\left[1-\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{3\,f^{3/2}}-$$
$$\frac{(-e)^{3/2}\,m\,\left(a+b\,\text{Log}[c\,x^n]\right)^3\,\text{Log}\left[1-\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{3\,f^{3/2}}-\frac{b\,(-e)^{3/2}\,m\,n\,\left(a+b\,\text{Log}[c\,x^n]\right)^2\,\text{Log}\left[1+\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{3\,f^{3/2}}+$$
$$\frac{(-e)^{3/2}\,m\,\left(a+b\,\text{Log}[c\,x^n]\right)^3\,\text{Log}\left[1+\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{3\,f^{3/2}}-\frac{2}{27}\,b^3\,n^3\,x^3\,\text{Log}\left[d\,\left(e+f\,x^2\right)^m\right]+$$
$$\frac{2}{9}\,b^2\,n^2\,x^3\,\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{Log}\left[d\,\left(e+f\,x^2\right)^m\right]-\frac{1}{3}\,b\,n\,x^3\,\left(a+b\,\text{Log}[c\,x^n]\right)^2\,\text{Log}\left[d\,\left(e+f\,x^2\right)^m\right]+$$
$$\frac{1}{3}\,x^3\,\left(a+b\,\text{Log}[c\,x^n]\right)^3\,\text{Log}\left[d\,\left(e+f\,x^2\right)^m\right]-\frac{2\,b^2\,(-e)^{3/2}\,m\,n^2\,\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{PolyLog}\left[2,-\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{3\,f^{3/2}}+$$
$$\frac{b\,(-e)^{3/2}\,m\,n\,\left(a+b\,\text{Log}[c\,x^n]\right)^2\,\text{PolyLog}\left[2,-\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{f^{3/2}}+$$
$$\frac{2\,b^2\,(-e)^{3/2}\,m\,n^2\,\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{PolyLog}\left[2,\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{3\,f^{3/2}}-$$
$$\frac{b\,(-e)^{3/2}\,m\,n\,\left(a+b\,\text{Log}[c\,x^n]\right)^2\,\text{PolyLog}\left[2,\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{f^{3/2}}+\frac{2\,i\,b^3\,e^{3/2}\,m\,n^3\,\text{PolyLog}\left[2,-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]}{9\,f^{3/2}}-$$
$$\frac{2\,i\,b^3\,e^{3/2}\,m\,n^3\,\text{PolyLog}\left[2,\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]}{9\,f^{3/2}}+\frac{2\,b^3\,(-e)^{3/2}\,m\,n^3\,\text{PolyLog}\left[3,-\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{3\,f^{3/2}}-$$
$$\frac{2\,b^2\,(-e)^{3/2}\,m\,n^2\,\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{PolyLog}\left[3,-\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{f^{3/2}}-$$
$$\frac{2\,b^3\,(-e)^{3/2}\,m\,n^3\,\text{PolyLog}\left[3,\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{3\,f^{3/2}}+\frac{2\,b^2\,(-e)^{3/2}\,m\,n^2\,\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{PolyLog}\left[3,\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{f^{3/2}}+$$
$$\frac{2\,b^3\,(-e)^{3/2}\,m\,n^3\,\text{PolyLog}\left[4,-\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{f^{3/2}}-\frac{2\,b^3\,(-e)^{3/2}\,m\,n^3\,\text{PolyLog}\left[4,\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{f^{3/2}}$$

Result (type 4, 2544 leaves) :

$$\frac{1}{81\,f^{3/2}}\left(54\,a^3\,e\,\sqrt{f}\,m\,x-216\,a^2\,b\,e\,\sqrt{f}\,m\,n\,x+468\,a\,b^2\,e\,\sqrt{f}\,m\,n^2\,x-480\,b^3\,e\,\sqrt{f}\,m\,n^3\,x-18\,a^3\,f^{3/2}\,m\,x^3+\right.$$

$36\, a^2\, b\, f^{3/2}\, m\, n\, x^3 - 36\, a\, b^2\, f^{3/2}\, m\, n^2\, x^3 + 16\, b^3\, f^{3/2}\, m\, n^3\, x^3 - 54\, a^3\, e^{3/2}\, m\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] +$

$54\, a^2\, b\, e^{3/2}\, m\, n\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] - 36\, a\, b^2\, e^{3/2}\, m\, n^2\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] + 12\, b^3\, e^{3/2}\, m\, n^3\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] +$

$162\, a^2\, b\, e^{3/2}\, m\, n\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x] - 108\, a\, b^2\, e^{3/2}\, m\, n^2\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x] +$

$36\, b^3\, e^{3/2}\, m\, n^3\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x] - 162\, a\, b^2\, e^{3/2}\, m\, n^2\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x]^2 +$

$54\, b^3\, e^{3/2}\, m\, n^3\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x]^2 + 54\, b^3\, e^{3/2}\, m\, n^3\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x]^3 +$

$162\, a^2\, b\, e\, \sqrt{f}\, m\, x\, \text{Log}[c\, x^n] - 432\, a\, b^2\, e\, \sqrt{f}\, m\, n\, x\, \text{Log}[c\, x^n] + 468\, b^3\, e\, \sqrt{f}\, m\, n^2\, x\, \text{Log}[c\, x^n] -$

$54\, a^2\, b\, f^{3/2}\, m\, x^3\, \text{Log}[c\, x^n] + 72\, a\, b^2\, f^{3/2}\, m\, n\, x^3\, \text{Log}[c\, x^n] - 36\, b^3\, f^{3/2}\, m\, n^2\, x^3\, \text{Log}[c\, x^n] -$

$162\, a^2\, b\, e^{3/2}\, m\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[c\, x^n] + 108\, a\, b^2\, e^{3/2}\, m\, n\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[c\, x^n] -$

$36\, b^3\, e^{3/2}\, m\, n^2\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[c\, x^n] + 324\, a\, b^2\, e^{3/2}\, m\, n\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x]\, \text{Log}[c\, x^n] -$

$108\, b^3\, e^{3/2}\, m\, n^2\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x]\, \text{Log}[c\, x^n] -$

$162\, b^3\, e^{3/2}\, m\, n^2\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x]^2\, \text{Log}[c\, x^n] + 162\, a\, b^2\, e\, \sqrt{f}\, m\, x\, \text{Log}[c\, x^n]^2 -$

$216\, b^3\, e\, \sqrt{f}\, m\, n\, x\, \text{Log}[c\, x^n]^2 - 54\, a\, b^2\, f^{3/2}\, m\, x^3\, \text{Log}[c\, x^n]^2 + 36\, b^3\, f^{3/2}\, m\, n\, x^3\, \text{Log}[c\, x^n]^2 -$

$162\, a\, b^2\, e^{3/2}\, m\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[c\, x^n]^2 + 54\, b^3\, e^{3/2}\, m\, n\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[c\, x^n]^2 +$

$162\, b^3\, e^{3/2}\, m\, n\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x]\, \text{Log}[c\, x^n]^2 + 54\, b^3\, e\, \sqrt{f}\, m\, x\, \text{Log}[c\, x^n]^3 -$

$18\, b^3\, f^{3/2}\, m\, x^3\, \text{Log}[c\, x^n]^3 - 54\, b^3\, e^{3/2}\, m\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[c\, x^n]^3 -$

$81\, i\, a^2\, b\, e^{3/2}\, m\, n\, \text{Log}[x]\, \text{Log}\left[1 - \frac{i\, \sqrt{f}\, x}{\sqrt{e}}\right] + 54\, i\, a\, b^2\, e^{3/2}\, m\, n^2\, \text{Log}[x]\, \text{Log}\left[1 - \frac{i\, \sqrt{f}\, x}{\sqrt{e}}\right] -$

$18\, i\, b^3\, e^{3/2}\, m\, n^3\, \text{Log}[x]\, \text{Log}\left[1 - \frac{i\, \sqrt{f}\, x}{\sqrt{e}}\right] + 81\, i\, a\, b^2\, e^{3/2}\, m\, n^2\, \text{Log}[x]^2\, \text{Log}\left[1 - \frac{i\, \sqrt{f}\, x}{\sqrt{e}}\right] -$

$27\, i\, b^3\, e^{3/2}\, m\, n^3\, \text{Log}[x]^2\, \text{Log}\left[1 - \frac{i\, \sqrt{f}\, x}{\sqrt{e}}\right] - 27\, i\, b^3\, e^{3/2}\, m\, n^3\, \text{Log}[x]^3\, \text{Log}\left[1 - \frac{i\, \sqrt{f}\, x}{\sqrt{e}}\right] -$

$162\, i\, a\, b^2\, e^{3/2}\, m\, n\, \text{Log}[x]\, \text{Log}[c\, x^n]\, \text{Log}\left[1 - \frac{i\, \sqrt{f}\, x}{\sqrt{e}}\right] + 54\, i\, b^3\, e^{3/2}\, m\, n^2\, \text{Log}[x]$

$\text{Log}[c\, x^n]\, \text{Log}\left[1 - \frac{i\, \sqrt{f}\, x}{\sqrt{e}}\right] + 81\, i\, b^3\, e^{3/2}\, m\, n^2\, \text{Log}[x]^2\, \text{Log}[c\, x^n]\, \text{Log}\left[1 - \frac{i\, \sqrt{f}\, x}{\sqrt{e}}\right] -$

$81\,i\,b^3\,e^{3/2}\,m\,n\,Log[x]\,Log[c\,x^n]^2\,Log\left[1-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]+81\,i\,a^2\,b\,e^{3/2}\,m\,n\,Log[x]\,Log\left[1+\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-$

$54\,i\,a\,b^2\,e^{3/2}\,m\,n^2\,Log[x]\,Log\left[1+\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]+18\,i\,b^3\,e^{3/2}\,m\,n^3\,Log[x]\,Log\left[1+\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-$

$81\,i\,a\,b^2\,e^{3/2}\,m\,n^2\,Log[x]^2\,Log\left[1+\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]+27\,i\,b^3\,e^{3/2}\,m\,n^3\,Log[x]^2\,Log\left[1+\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]+$

$27\,i\,b^3\,e^{3/2}\,m\,n^3\,Log[x]^3\,Log\left[1+\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]+162\,i\,a\,b^2\,e^{3/2}\,m\,n\,Log[x]\,Log[c\,x^n]\,Log\left[1+\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-$

$54\,i\,b^3\,e^{3/2}\,m\,n^2\,Log[x]\,Log[c\,x^n]\,Log\left[1+\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-$

$81\,i\,b^3\,e^{3/2}\,m\,n^2\,Log[x]^2\,Log[c\,x^n]\,Log\left[1+\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]+$

$81\,i\,b^3\,e^{3/2}\,m\,n\,Log[x]\,Log[c\,x^n]^2\,Log\left[1+\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]+27\,a^3\,f^{3/2}\,x^3\,Log\left[d\,\left(e+f\,x^2\right)^m\right]-$

$27\,a^2\,b\,f^{3/2}\,n\,x^3\,Log\left[d\,\left(e+f\,x^2\right)^m\right]+18\,a\,b^2\,f^{3/2}\,n^2\,x^3\,Log\left[d\,\left(e+f\,x^2\right)^m\right]-$
$6\,b^3\,f^{3/2}\,n^3\,x^3\,Log\left[d\,\left(e+f\,x^2\right)^m\right]+81\,a^2\,b\,f^{3/2}\,x^3\,Log[c\,x^n]\,Log\left[d\,\left(e+f\,x^2\right)^m\right]-$
$54\,a\,b^2\,f^{3/2}\,n\,x^3\,Log[c\,x^n]\,Log\left[d\,\left(e+f\,x^2\right)^m\right]+18\,b^3\,f^{3/2}\,n^2\,x^3\,Log[c\,x^n]\,Log\left[d\,\left(e+f\,x^2\right)^m\right]+$
$81\,a\,b^2\,f^{3/2}\,x^3\,Log[c\,x^n]^2\,Log\left[d\,\left(e+f\,x^2\right)^m\right]-27\,b^3\,f^{3/2}\,n\,x^3\,Log[c\,x^n]^2\,Log\left[d\,\left(e+f\,x^2\right)^m\right]+$
$27\,b^3\,f^{3/2}\,x^3\,Log[c\,x^n]^3\,Log\left[d\,\left(e+f\,x^2\right)^m\right]+9\,i\,b\,e^{3/2}\,m\,n$

$\left(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2-6\,b\,(-3\,a+b\,n)\,Log[c\,x^n]+9\,b^2\,Log[c\,x^n]^2\right)\,PolyLog\left[2,-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-$

$9\,i\,b\,e^{3/2}\,m\,n\,\left(9\,a^2-6\,a\,b\,n+2\,b^2\,n^2-6\,b\,(-3\,a+b\,n)\,Log[c\,x^n]+9\,b^2\,Log[c\,x^n]^2\right)$

$PolyLog\left[2,\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-162\,i\,a\,b^2\,e^{3/2}\,m\,n^2\,PolyLog\left[3,-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]+$

$54\,i\,b^3\,e^{3/2}\,m\,n^3\,PolyLog\left[3,-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-162\,i\,b^3\,e^{3/2}\,m\,n^2\,Log[c\,x^n]\,PolyLog\left[3,-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]+$

$162\,i\,a\,b^2\,e^{3/2}\,m\,n^2\,PolyLog\left[3,\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-54\,i\,b^3\,e^{3/2}\,m\,n^3\,PolyLog\left[3,\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]+$

$162\,i\,b^3\,e^{3/2}\,m\,n^2\,Log[c\,x^n]\,PolyLog\left[3,\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]+$

$162\,i\,b^3\,e^{3/2}\,m\,n^3\,PolyLog\left[4,-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-162\,i\,b^3\,e^{3/2}\,m\,n^3\,PolyLog\left[4,\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]\Bigg)$

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

$$\int\left(a+b\,Log[c\,x^n]\right)^3\,Log\left[d\,\left(e+f\,x^2\right)^m\right]\,dx$$

Optimal (type 4, 977 leaves, 42 steps):

$$-24\,a\,b^2\,m\,n^2\,x+36\,b^3\,m\,n^3\,x-12\,b^2\,m\,n^2\,(a-b\,n)\,x+\frac{12\,b^2\,\sqrt{e}\,m\,n^2\,(a-b\,n)\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]}{\sqrt{f}}-$$

$$36\,b^3\,m\,n^2\,x\,\text{Log}[c\,x^n]+\frac{12\,b^3\,\sqrt{e}\,m\,n^2\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\,\text{Log}[c\,x^n]}{\sqrt{f}}+12\,b\,m\,n\,x\,(a+b\,\text{Log}[c\,x^n])^2-$$

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

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

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

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

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

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

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

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

$$\frac{6\,i\,b^3\,\sqrt{e}\,m\,n^3\,\text{PolyLog}\left[2,\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]}{\sqrt{f}}+\frac{6\,b^3\,\sqrt{-e}\,m\,n^3\,\text{PolyLog}\left[3,-\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{\sqrt{f}}-$$

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

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

$$\frac{6\,b^3\,\sqrt{-e}\,m\,n^3\,\text{PolyLog}\left[4,-\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{\sqrt{f}}-\frac{6\,b^3\,\sqrt{-e}\,m\,n^3\,\text{PolyLog}\left[4,\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{\sqrt{f}}$$

Result (type 4, 2302 leaves):

$$\frac{1}{\sqrt{f}}\left(-2\,a^3\,\sqrt{f}\,m\,x+12\,a^2\,b\,\sqrt{f}\,m\,n\,x-36\,a\,b^2\,\sqrt{f}\,m\,n^2\,x+48\,b^3\,\sqrt{f}\,m\,n^3\,x+2\,a^3\,\sqrt{e}\,m\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]-\right.$$

$$6 a^2 b \sqrt{e}\, m\, n\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] + 12 a b^2 \sqrt{e}\, m\, n^2\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] - 12 b^3 \sqrt{e}\, m\, n^3\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] -$$

$$6 a^2 b \sqrt{e}\, m\, n\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x] + 12 a b^2 \sqrt{e}\, m\, n^2\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x] -$$

$$12 b^3 \sqrt{e}\, m\, n^3\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x] + 6 a b^2 \sqrt{e}\, m\, n^2\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x]^2 -$$

$$6 b^3 \sqrt{e}\, m\, n^3\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x]^2 - 2 b^3 \sqrt{e}\, m\, n^3\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x]^3 -$$

$$6 a^2 b \sqrt{f}\, m\, x\, \text{Log}\left[c\, x^n\right] + 24 a b^2 \sqrt{f}\, m\, n\, x\, \text{Log}\left[c\, x^n\right] - 36 b^3 \sqrt{f}\, m\, n^2\, x\, \text{Log}\left[c\, x^n\right] +$$

$$6 a^2 b \sqrt{e}\, m\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}\left[c\, x^n\right] - 12 a b^2 \sqrt{e}\, m\, n\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}\left[c\, x^n\right] +$$

$$12 b^3 \sqrt{e}\, m\, n^2\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}\left[c\, x^n\right] - 12 a b^2 \sqrt{e}\, m\, n\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x]\, \text{Log}\left[c\, x^n\right] +$$

$$12 b^3 \sqrt{e}\, m\, n^2\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x]\, \text{Log}\left[c\, x^n\right] + 6 b^3 \sqrt{e}\, m\, n^2\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x]^2\, \text{Log}\left[c\, x^n\right] -$$

$$6 a b^2 \sqrt{f}\, m\, x\, \text{Log}\left[c\, x^n\right]^2 + 12 b^3 \sqrt{f}\, m\, n\, x\, \text{Log}\left[c\, x^n\right]^2 +$$

$$6 a b^2 \sqrt{e}\, m\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}\left[c\, x^n\right]^2 - 6 b^3 \sqrt{e}\, m\, n\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}\left[c\, x^n\right]^2 -$$

$$6 b^3 \sqrt{e}\, m\, n\, \text{ArcTan}\left[\frac{\sqrt{f}\, x}{\sqrt{e}}\right] \text{Log}[x]\, \text{Log}\left[c\, x^n\right]^2 - 2 b^3 \sqrt{f}\, m\, x\, \text{Log}\left[c\, x^n\right]^3 +$$

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

$$6 i a b^2 \sqrt{e}\, m\, n^2\, \text{Log}[x]\, \text{Log}\left[1 - \frac{i \sqrt{f}\, x}{\sqrt{e}}\right] + 6 i b^3 \sqrt{e}\, m\, n^3\, \text{Log}[x]\, \text{Log}\left[1 - \frac{i \sqrt{f}\, x}{\sqrt{e}}\right] -$$

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

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

$$6 i b^3 \sqrt{e}\, m\, n^2\, \text{Log}[x]\, \text{Log}\left[c\, x^n\right] \text{Log}\left[1 - \frac{i \sqrt{f}\, x}{\sqrt{e}}\right] -$$

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

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

$$6 i a b^2 \sqrt{e}\, m\, n^2\, \text{Log}[x]\, \text{Log}\left[1 + \frac{i \sqrt{f}\, x}{\sqrt{e}}\right] - 6 i b^3 \sqrt{e}\, m\, n^3\, \text{Log}[x]\, \text{Log}\left[1 + \frac{i \sqrt{f}\, x}{\sqrt{e}}\right] +$$

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

Problem 113: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 879 leaves, 26 steps):

$$\frac{12\,b^3\sqrt{f}\,m\,n^3\,\mathrm{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]}{\sqrt{e}}+\frac{12\,b^2\sqrt{f}\,m\,n^2\,\mathrm{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\left(a+b\,\mathrm{Log}[c\,x^n]\right)}{\sqrt{e}}+$$

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

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

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

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

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

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

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

$$\frac{6\,i\,b^3\sqrt{f}\,m\,n^3\,\mathrm{PolyLog}\left[2,-\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]}{\sqrt{e}}+\frac{6\,i\,b^3\sqrt{f}\,m\,n^3\,\mathrm{PolyLog}\left[2,\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]}{\sqrt{e}}+$$

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

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

$$\frac{6\,b^3\sqrt{f}\,m\,n^3\,\mathrm{PolyLog}\left[4,-\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{\sqrt{-e}}+\frac{6\,b^3\sqrt{f}\,m\,n^3\,\mathrm{PolyLog}\left[4,\frac{\sqrt{f}\,x}{\sqrt{-e}}\right]}{\sqrt{-e}}$$

Result (type 4, 2166 leaves):

$$\frac{1}{\sqrt{e}\,x}$$

$$\left(2\,a^3\sqrt{f}\,m\,x\,\mathrm{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]+6\,a^2\,b\sqrt{f}\,m\,n\,x\,\mathrm{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]+12\,a\,b^2\sqrt{f}\,m\,n^2\,x\,\mathrm{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]+\right.$$

$$12\,b^3\sqrt{f}\,m\,n^3\,x\,\mathrm{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]-6\,a^2\,b\sqrt{f}\,m\,n\,x\,\mathrm{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\mathrm{Log}[x]-$$

$12 a b^2 \sqrt{f} m n^2 x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}[x] - 12 b^3 \sqrt{f} m n^3 x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}[x] +$

$6 a b^2 \sqrt{f} m n^2 x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}[x]^2 + 6 b^3 \sqrt{f} m n^3 x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}[x]^2 -$

$2 b^3 \sqrt{f} m n^3 x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}[x]^3 + 6 a^2 b \sqrt{f} m x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}\left[c x^n\right] +$

$12 a b^2 \sqrt{f} m n x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}\left[c x^n\right] + 12 b^3 \sqrt{f} m n^2 x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}\left[c x^n\right] -$

$12 a b^2 \sqrt{f} m n x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}[x] \text{Log}\left[c x^n\right] -$

$12 b^3 \sqrt{f} m n^2 x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}[x] \text{Log}\left[c x^n\right] +$

$6 b^3 \sqrt{f} m n^2 x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}[x]^2 \text{Log}\left[c x^n\right] + 6 a b^2 \sqrt{f} m x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}\left[c x^n\right]^2 +$

$6 b^3 \sqrt{f} m n x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}\left[c x^n\right]^2 - 6 b^3 \sqrt{f} m n x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}[x] \text{Log}\left[c x^n\right]^2 +$

$2 b^3 \sqrt{f} m x \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right] \text{Log}\left[c x^n\right]^3 + 3 i a^2 b \sqrt{f} m n x \text{Log}[x] \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] +$

$6 i a b^2 \sqrt{f} m n^2 x \text{Log}[x] \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] + 6 i b^3 \sqrt{f} m n^3 x \text{Log}[x] \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] -$

$3 i a b^2 \sqrt{f} m n^2 x \text{Log}[x]^2 \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] - 3 i b^3 \sqrt{f} m n^3 x \text{Log}[x]^2 \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] +$

$i b^3 \sqrt{f} m n^3 x \text{Log}[x]^3 \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] + 6 i a b^2 \sqrt{f} m n x \text{Log}[x] \text{Log}\left[c x^n\right] \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] +$

$6 i b^3 \sqrt{f} m n^2 x \text{Log}[x] \text{Log}\left[c x^n\right] \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] -$

$3 i b^3 \sqrt{f} m n^2 x \text{Log}[x]^2 \text{Log}\left[c x^n\right] \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] +$

$3 i b^3 \sqrt{f} m n x \text{Log}[x] \text{Log}\left[c x^n\right]^2 \text{Log}\left[1 - \frac{i \sqrt{f} x}{\sqrt{e}}\right] - 3 i a^2 b \sqrt{f} m n x \text{Log}[x] \text{Log}\left[1 + \frac{i \sqrt{f} x}{\sqrt{e}}\right] -$

$6 i a b^2 \sqrt{f} m n^2 x \text{Log}[x] \text{Log}\left[1 + \frac{i \sqrt{f} x}{\sqrt{e}}\right] - 6 i b^3 \sqrt{f} m n^3 x \text{Log}[x] \text{Log}\left[1 + \frac{i \sqrt{f} x}{\sqrt{e}}\right] +$

$3 i a b^2 \sqrt{f} m n^2 x \text{Log}[x]^2 \text{Log}\left[1 + \frac{i \sqrt{f} x}{\sqrt{e}}\right] + 3 i b^3 \sqrt{f} m n^3 x \text{Log}[x]^2 \text{Log}\left[1 + \frac{i \sqrt{f} x}{\sqrt{e}}\right] -$

$i b^3 \sqrt{f} m n^3 x \text{Log}[x]^3 \text{Log}\left[1 + \frac{i \sqrt{f} x}{\sqrt{e}}\right] - 6 i a b^2 \sqrt{f} m n x \text{Log}[x] \text{Log}\left[c x^n\right] \text{Log}\left[1 + \frac{i \sqrt{f} x}{\sqrt{e}}\right] -$

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

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

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

Optimal (type 4, 1007 leaves, 36 steps):

$$-\frac{160 b^3 f m n^3}{27 e x}-\frac{4 b^3 f^{3/2} m n^3 \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right]}{27 e^{3/2}}-\frac{52 b^2 f m n^2 \left(a+b \text{Log}\left[c x^n\right]\right)}{9 e x}-$$

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

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

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

$$\frac{f^{3/2} m \left(a+b \text{Log}\left[c x^n\right]\right)^3 \text{Log}\left[1+\frac{\sqrt{f} x}{\sqrt{-e}}\right]}{3 (-e)^{3/2}}-\frac{2 b^3 n^3 \text{Log}\left[d \left(e+f x^2\right)^m\right]}{27 x^3}-$$

$$\frac{2 b^2 n^2 \left(a+b \text{Log}\left[c x^n\right]\right) \text{Log}\left[d \left(e+f x^2\right)^m\right]}{9 x^3}-\frac{b n \left(a+b \text{Log}\left[c x^n\right]\right)^2 \text{Log}\left[d \left(e+f x^2\right)^m\right]}{3 x^3}-$$

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

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

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

$$\frac{2 i b^3 f^{3/2} m n^3 \text{PolyLog}\left[2,\frac{i \sqrt{f} x}{\sqrt{e}}\right]}{9 e^{3/2}}+\frac{2 b^3 f^{3/2} m n^3 \text{PolyLog}\left[3,-\frac{\sqrt{f} x}{\sqrt{-e}}\right]}{3 (-e)^{3/2}}+$$

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

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

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

Result (type 4, 2488 leaves):

$$\frac{1}{27 e^{3/2} x^3}\left(-18 a^3 \sqrt{e} f m x^2-72 a^2 b \sqrt{e} f m n x^2-156 a b^2 \sqrt{e} f m n^2 x^2-\right.$$

$$160 b^3 \sqrt{e} f m n^3 x^2-18 a^3 f^{3/2} m x^3 \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right]-18 a^2 b f^{3/2} m n x^3 \text{ArcTan}\left[\frac{\sqrt{f} x}{\sqrt{e}}\right]-$$

$$12\,a\,b^2\,f^{3/2}\,m\,n^2\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]-4\,b^3\,f^{3/2}\,m\,n^3\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]+$$

$$54\,a^2\,b\,f^{3/2}\,m\,n\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}[x]+36\,a\,b^2\,f^{3/2}\,m\,n^2\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}[x]+$$

$$12\,b^3\,f^{3/2}\,m\,n^3\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}[x]-54\,a\,b^2\,f^{3/2}\,m\,n^2\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}[x]^2-$$

$$18\,b^3\,f^{3/2}\,m\,n^3\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}[x]^2+18\,b^3\,f^{3/2}\,m\,n^3\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}[x]^3-$$

$$54\,a^2\,b\,\sqrt{e}\,f\,m\,x^2\,\text{Log}\left[c\,x^n\right]-144\,a\,b^2\,\sqrt{e}\,f\,m\,n\,x^2\,\text{Log}\left[c\,x^n\right]-156\,b^3\,\sqrt{e}\,f\,m\,n^2\,x^2\,\text{Log}\left[c\,x^n\right]-$$

$$54\,a^2\,b\,f^{3/2}\,m\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}\left[c\,x^n\right]-36\,a\,b^2\,f^{3/2}\,m\,n\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}\left[c\,x^n\right]-$$

$$12\,b^3\,f^{3/2}\,m\,n^2\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}\left[c\,x^n\right]+108\,a\,b^2\,f^{3/2}\,m\,n\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}[x]\,\text{Log}\left[c\,x^n\right]+$$

$$36\,b^3\,f^{3/2}\,m\,n^2\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}[x]\,\text{Log}\left[c\,x^n\right]-$$

$$54\,b^3\,f^{3/2}\,m\,n^2\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}[x]^2\,\text{Log}\left[c\,x^n\right]-54\,a\,b^2\,\sqrt{e}\,f\,m\,x^2\,\text{Log}\left[c\,x^n\right]^2-$$

$$72\,b^3\,\sqrt{e}\,f\,m\,n\,x^2\,\text{Log}\left[c\,x^n\right]^2-54\,a\,b^2\,f^{3/2}\,m\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}\left[c\,x^n\right]^2-$$

$$18\,b^3\,f^{3/2}\,m\,n\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}\left[c\,x^n\right]^2+54\,b^3\,f^{3/2}\,m\,n\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}[x]\,\text{Log}\left[c\,x^n\right]^2-$$

$$18\,b^3\,\sqrt{e}\,f\,m\,x^2\,\text{Log}\left[c\,x^n\right]^3-18\,b^3\,f^{3/2}\,m\,x^3\,\text{ArcTan}\left[\frac{\sqrt{f}\,x}{\sqrt{e}}\right]\text{Log}\left[c\,x^n\right]^3-$$

$$27\,i\,a^2\,b\,f^{3/2}\,m\,n\,x^3\,\text{Log}[x]\,\text{Log}\left[1-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-18\,i\,a\,b^2\,f^{3/2}\,m\,n^2\,x^3\,\text{Log}[x]\,\text{Log}\left[1-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-$$

$$6\,i\,b^3\,f^{3/2}\,m\,n^3\,x^3\,\text{Log}[x]\,\text{Log}\left[1-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]+27\,i\,a\,b^2\,f^{3/2}\,m\,n^2\,x^3\,\text{Log}[x]^2\,\text{Log}\left[1-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]+$$

$$9\,i\,b^3\,f^{3/2}\,m\,n^3\,x^3\,\text{Log}[x]^2\,\text{Log}\left[1-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-9\,i\,b^3\,f^{3/2}\,m\,n^3\,x^3\,\text{Log}[x]^3\,\text{Log}\left[1-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-$$

$$54\,i\,a\,b^2\,f^{3/2}\,m\,n\,x^3\,\text{Log}[x]\,\text{Log}\left[c\,x^n\right]\text{Log}\left[1-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-$$

$$18\,i\,b^3\,f^{3/2}\,m\,n^2\,x^3\,\text{Log}[x]\,\text{Log}\left[c\,x^n\right]\text{Log}\left[1-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]+$$

$$27\,i\,b^3\,f^{3/2}\,m\,n^2\,x^3\,\text{Log}[x]^2\,\text{Log}\left[c\,x^n\right]\text{Log}\left[1-\frac{i\,\sqrt{f}\,x}{\sqrt{e}}\right]-$$

$27\,i\,b^3 f^{3/2} m\,n\,x^3 \,\text{Log}[x]\,\text{Log}[c\,x^n]^2\,\text{Log}\left[1-\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]+$

$27\,i\,a^2\,b\,f^{3/2} m\,n\,x^3 \,\text{Log}[x]\,\text{Log}\left[1+\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]+18\,i\,a\,b^2 f^{3/2} m\,n^2 x^3 \,\text{Log}[x]\,\text{Log}\left[1+\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]+$

$6\,i\,b^3 f^{3/2} m\,n^3 x^3 \,\text{Log}[x]\,\text{Log}\left[1+\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]-27\,i\,a\,b^2 f^{3/2} m\,n^2 x^3 \,\text{Log}[x]^2\,\text{Log}\left[1+\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]-$

$9\,i\,b^3 f^{3/2} m\,n^3 x^3 \,\text{Log}[x]^2\,\text{Log}\left[1+\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]+9\,i\,b^3 f^{3/2} m\,n^3 x^3 \,\text{Log}[x]^3\,\text{Log}\left[1+\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]+$

$54\,i\,a\,b^2 f^{3/2} m\,n\,x^3 \,\text{Log}[x]\,\text{Log}[c\,x^n]\,\text{Log}\left[1+\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]+$

$18\,i\,b^3 f^{3/2} m\,n^2 x^3 \,\text{Log}[x]\,\text{Log}[c\,x^n]\,\text{Log}\left[1+\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]-$

$27\,i\,b^3 f^{3/2} m\,n^2 x^3 \,\text{Log}[x]^2\,\text{Log}[c\,x^n]\,\text{Log}\left[1+\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]+$

$27\,i\,b^3 f^{3/2} m\,n\,x^3 \,\text{Log}[x]\,\text{Log}[c\,x^n]^2\,\text{Log}\left[1+\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]-9\,a^3 e^{3/2}\,\text{Log}\left[d\left(e+f\,x^2\right)^m\right]-$

$9\,a^2\,b\,e^{3/2}\,n\,\text{Log}\left[d\left(e+f\,x^2\right)^m\right]-6\,a\,b^2 e^{3/2} n^2\,\text{Log}\left[d\left(e+f\,x^2\right)^m\right]-2\,b^3 e^{3/2} n^3\,\text{Log}\left[d\left(e+f\,x^2\right)^m\right]-$

$27\,a^2\,b\,e^{3/2}\,\text{Log}[c\,x^n]\,\text{Log}\left[d\left(e+f\,x^2\right)^m\right]-18\,a\,b^2 e^{3/2}\,n\,\text{Log}[c\,x^n]\,\text{Log}\left[d\left(e+f\,x^2\right)^m\right]-$

$6\,b^3 e^{3/2} n^2\,\text{Log}[c\,x^n]\,\text{Log}\left[d\left(e+f\,x^2\right)^m\right]-27\,a\,b^2 e^{3/2}\,\text{Log}[c\,x^n]^2\,\text{Log}\left[d\left(e+f\,x^2\right)^m\right]-$

$9\,b^3 e^{3/2}\,n\,\text{Log}[c\,x^n]^2\,\text{Log}\left[d\left(e+f\,x^2\right)^m\right]-9\,b^3 e^{3/2}\,\text{Log}[c\,x^n]^3\,\text{Log}\left[d\left(e+f\,x^2\right)^m\right]+3\,i\,b\,f^{3/2} m\,n\,x^3$

$\left(9\,a^2+6\,a\,b\,n+2\,b^2 n^2+6\,b\,(3\,a+b\,n)\,\text{Log}[c\,x^n]+9\,b^2\,\text{Log}[c\,x^n]^2\right)\,\text{PolyLog}\left[2,-\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]-$

$3\,i\,b\,f^{3/2} m\,n\,x^3\left(9\,a^2+6\,a\,b\,n+2\,b^2 n^2+6\,b\,(3\,a+b\,n)\,\text{Log}[c\,x^n]+9\,b^2\,\text{Log}[c\,x^n]^2\right)$

$\text{PolyLog}\left[2,\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]-54\,i\,a\,b^2 f^{3/2} m\,n^2 x^3\,\text{PolyLog}\left[3,-\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]-$

$18\,i\,b^3 f^{3/2} m\,n^3 x^3\,\text{PolyLog}\left[3,-\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]-54\,i\,b^3 f^{3/2} m\,n^2 x^3\,\text{Log}[c\,x^n]\,\text{PolyLog}\left[3,-\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]+$

$54\,i\,a\,b^2 f^{3/2} m\,n^2 x^3\,\text{PolyLog}\left[3,\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]+18\,i\,b^3 f^{3/2} m\,n^3 x^3\,\text{PolyLog}\left[3,\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]+$

$54\,i\,b^3 f^{3/2} m\,n^2 x^3\,\text{Log}[c\,x^n]\,\text{PolyLog}\left[3,\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]+$

$54\,i\,b^3 f^{3/2} m\,n^3 x^3\,\text{PolyLog}\left[4,-\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]-54\,i\,b^3 f^{3/2} m\,n^3 x^3\,\text{PolyLog}\left[4,\frac{i\sqrt{f}\,x}{\sqrt{e}}\right]\Bigg)$

Problem 125: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 145 leaves, 5 steps):

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

Result (type 4, 368 leaves):

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

Problem 128: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 907 leaves, 36 steps):

$$-\frac{255\,b^3\,e^3\,n^3\,\sqrt{x}}{8\,f^3}-\frac{9\,a\,b^2\,e^2\,n^2\,x}{4\,f^2}+\frac{45\,b^3\,e^2\,n^3\,x}{16\,f^2}-\frac{175\,b^3\,e\,n^3\,x^{3/2}}{216\,f}+\frac{3}{8}\,b^3\,n^3\,x^2+$$
$$\frac{3\,b^3\,e^4\,n^3\,\mathrm{Log}\left[e+f\,\sqrt{x}\right]}{8\,f^4}-\frac{3}{8}\,b^3\,n^3\,x^2\,\mathrm{Log}\left[d\,\left(e+f\,\sqrt{x}\right)\right]+\frac{3\,b^3\,e^4\,n^3\,\mathrm{Log}\left[e+f\,\sqrt{x}\right]\,\mathrm{Log}\left[-\frac{f\,\sqrt{x}}{e}\right]}{2\,f^4}-$$
$$\frac{9\,b^3\,e^2\,n^2\,x\,\mathrm{Log}\left[c\,x^n\right]}{4\,f^2}+\frac{63\,b^2\,e^3\,n^2\,\sqrt{x}\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)}{4\,f^3}-\frac{3\,b^2\,e^2\,n^2\,x\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)}{8\,f^2}+$$
$$\frac{37\,b^2\,e\,n^2\,x^{3/2}\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)}{36\,f}-\frac{9}{16}\,b^2\,n^2\,x^2\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)-$$
$$\frac{3\,b^2\,e^4\,n^2\,\mathrm{Log}\left[e+f\,\sqrt{x}\right]\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)}{4\,f^4}+\frac{3}{4}\,b^2\,n^2\,x^2\,\mathrm{Log}\left[d\,\left(e+f\,\sqrt{x}\right)\right]\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)-$$
$$\frac{15\,b\,e^3\,n\,\sqrt{x}\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)^2}{4\,f^3}+\frac{9\,b\,e^2\,n\,x\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)^2}{8\,f^2}-\frac{7\,b\,e\,n\,x^{3/2}\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)^2}{12\,f}+$$
$$\frac{3}{8}\,b\,n\,x^2\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)^2-\frac{3}{4}\,b\,n\,x^2\,\mathrm{Log}\left[d\,\left(e+f\,\sqrt{x}\right)\right]\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)^2+$$
$$\frac{3\,b\,e^4\,n\,\mathrm{Log}\left[1+\frac{f\,\sqrt{x}}{e}\right]\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)^2}{4\,f^4}+\frac{e^3\,\sqrt{x}\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)^3}{2\,f^3}-$$
$$\frac{e^2\,x\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)^3}{4\,f^2}+\frac{e\,x^{3/2}\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)^3}{6\,f}-\frac{1}{8}\,x^2\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)^3+$$
$$\frac{1}{2}\,x^2\,\mathrm{Log}\left[d\,\left(e+f\,\sqrt{x}\right)\right]\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)^3-\frac{e^4\,\mathrm{Log}\left[1+\frac{f\,\sqrt{x}}{e}\right]\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)^3}{2\,f^4}+$$
$$\frac{3\,b^3\,e^4\,n^3\,\mathrm{PolyLog}\left[2,1+\frac{f\,\sqrt{x}}{e}\right]}{2\,f^4}+\frac{3\,b^2\,e^4\,n^2\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)\,\mathrm{PolyLog}\left[2,-\frac{f\,\sqrt{x}}{e}\right]}{f^4}-$$
$$\frac{3\,b\,e^4\,n\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)^2\,\mathrm{PolyLog}\left[2,-\frac{f\,\sqrt{x}}{e}\right]}{f^4}-\frac{6\,b^3\,e^4\,n^3\,\mathrm{PolyLog}\left[3,-\frac{f\,\sqrt{x}}{e}\right]}{f^4}+$$
$$\frac{12\,b^2\,e^4\,n^2\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)\,\mathrm{PolyLog}\left[3,-\frac{f\,\sqrt{x}}{e}\right]}{f^4}-\frac{24\,b^3\,e^4\,n^3\,\mathrm{PolyLog}\left[4,-\frac{f\,\sqrt{x}}{e}\right]}{f^4}$$

Result (type 4, 1968 leaves):

$$\frac{1}{432\,f^4}$$
$$\Big(216\,a^3\,e^3\,f\,\sqrt{x}-1620\,a^2\,b\,e^3\,f\,n\,\sqrt{x}+6804\,a\,b^2\,e^3\,f\,n^2\,\sqrt{x}-13\,770\,b^3\,e^3\,f\,n^3\,\sqrt{x}-108\,a^3\,e^2\,f^2\,x+$$
$$486\,a^2\,b\,e^2\,f^2\,n\,x-1134\,a\,b^2\,e^2\,f^2\,n^2\,x+1215\,b^3\,e^2\,f^2\,n^3\,x+72\,a^3\,e\,f^3\,x^{3/2}-252\,a^2\,b\,e\,f^3\,n\,x^{3/2}+$$
$$444\,a\,b^2\,e\,f^3\,n^2\,x^{3/2}-350\,b^3\,e\,f^3\,n^3\,x^{3/2}-54\,a^3\,f^4\,x^2+162\,a^2\,b\,f^4\,n\,x^2-243\,a\,b^2\,f^4\,n^2\,x^2+$$
$$162\,b^3\,f^4\,n^3\,x^2-216\,a^3\,e^4\,\mathrm{Log}\left[e+f\,\sqrt{x}\right]+324\,a^2\,b\,e^4\,n\,\mathrm{Log}\left[e+f\,\sqrt{x}\right]-$$
$$324\,a\,b^2\,e^4\,n^2\,\mathrm{Log}\left[e+f\,\sqrt{x}\right]+162\,b^3\,e^4\,n^3\,\mathrm{Log}\left[e+f\,\sqrt{x}\right]+216\,a^3\,f^4\,x^2\,\mathrm{Log}\left[d\,\left(e+f\,\sqrt{x}\right)\right]-$$
$$324\,a^2\,b\,f^4\,n\,x^2\,\mathrm{Log}\left[d\,\left(e+f\,\sqrt{x}\right)\right]+324\,a\,b^2\,f^4\,n^2\,x^2\,\mathrm{Log}\left[d\,\left(e+f\,\sqrt{x}\right)\right]-$$
$$162\,b^3\,f^4\,n^3\,x^2\,\mathrm{Log}\left[d\,\left(e+f\,\sqrt{x}\right)\right]+648\,a^2\,b\,e^4\,n\,\mathrm{Log}\left[e+f\,\sqrt{x}\right]\,\mathrm{Log}[x]-$$
$$648\,a\,b^2\,e^4\,n^2\,\mathrm{Log}\left[e+f\,\sqrt{x}\right]\,\mathrm{Log}[x]+324\,b^3\,e^4\,n^3\,\mathrm{Log}\left[e+f\,\sqrt{x}\right]\,\mathrm{Log}[x]-$$

$$648\, a^2\, b\, e^4\, n\, \text{Log}\left[1+\frac{f\sqrt{x}}{e}\right] \text{Log}[x] + 648\, a\, b^2\, e^4\, n^2\, \text{Log}\left[1+\frac{f\sqrt{x}}{e}\right] \text{Log}[x] -$$
$$324\, b^3\, e^4\, n^3\, \text{Log}\left[1+\frac{f\sqrt{x}}{e}\right] \text{Log}[x] - 648\, a\, b^2\, e^4\, n^2\, \text{Log}\left[e+f\sqrt{x}\right] \text{Log}[x]^2 +$$
$$324\, b^3\, e^4\, n^3\, \text{Log}\left[e+f\sqrt{x}\right] \text{Log}[x]^2 + 648\, a\, b^2\, e^4\, n^2\, \text{Log}\left[1+\frac{f\sqrt{x}}{e}\right] \text{Log}[x]^2 -$$
$$324\, b^3\, e^4\, n^3\, \text{Log}\left[1+\frac{f\sqrt{x}}{e}\right] \text{Log}[x]^2 + 216\, b^3\, e^4\, n^3\, \text{Log}\left[e+f\sqrt{x}\right] \text{Log}[x]^3 -$$
$$216\, b^3\, e^4\, n^3\, \text{Log}\left[1+\frac{f\sqrt{x}}{e}\right] \text{Log}[x]^3 + 648\, a^2\, b\, e^3\, f\, \sqrt{x}\, \text{Log}\left[c\, x^n\right] -$$
$$3240\, a\, b^2\, e^3\, f\, n\, \sqrt{x}\, \text{Log}\left[c\, x^n\right] + 6804\, b^3\, e^3\, f\, n^2\, \sqrt{x}\, \text{Log}\left[c\, x^n\right] - 324\, a^2\, b\, e^2\, f^2\, x\, \text{Log}\left[c\, x^n\right] +$$
$$972\, a\, b^2\, e^2\, f^2\, n\, x\, \text{Log}\left[c\, x^n\right] - 1134\, b^3\, e^2\, f^2\, n^2\, x\, \text{Log}\left[c\, x^n\right] + 216\, a^2\, b\, e\, f^3\, x^{3/2}\, \text{Log}\left[c\, x^n\right] -$$
$$504\, a\, b^2\, e\, f^3\, n\, x^{3/2}\, \text{Log}\left[c\, x^n\right] + 444\, b^3\, e\, f^3\, n^2\, x^{3/2}\, \text{Log}\left[c\, x^n\right] - 162\, a^2\, b\, f^4\, x^2\, \text{Log}\left[c\, x^n\right] +$$
$$324\, a\, b^2\, f^4\, n\, x^2\, \text{Log}\left[c\, x^n\right] - 243\, b^3\, f^4\, n^2\, x^2\, \text{Log}\left[c\, x^n\right] - 648\, a^2\, b\, e^4\, \text{Log}\left[e+f\sqrt{x}\right] \text{Log}\left[c\, x^n\right] +$$
$$648\, a\, b^2\, e^4\, n\, \text{Log}\left[e+f\sqrt{x}\right] \text{Log}\left[c\, x^n\right] - 324\, b^3\, e^4\, n^2\, \text{Log}\left[e+f\sqrt{x}\right] \text{Log}\left[c\, x^n\right] +$$
$$648\, a^2\, b\, f^4\, x^2\, \text{Log}\left[d\left(e+f\sqrt{x}\right)\right] \text{Log}\left[c\, x^n\right] - 648\, a\, b^2\, f^4\, n\, x^2\, \text{Log}\left[d\left(e+f\sqrt{x}\right)\right] \text{Log}\left[c\, x^n\right] +$$
$$324\, b^3\, f^4\, n^2\, x^2\, \text{Log}\left[d\left(e+f\sqrt{x}\right)\right] \text{Log}\left[c\, x^n\right] + 1296\, a\, b^2\, e^4\, n\, \text{Log}\left[e+f\sqrt{x}\right] \text{Log}[x]\, \text{Log}\left[c\, x^n\right] -$$
$$648\, b^3\, e^4\, n^2\, \text{Log}\left[e+f\sqrt{x}\right] \text{Log}[x]\, \text{Log}\left[c\, x^n\right] - 1296\, a\, b^2\, e^4\, n\, \text{Log}\left[1+\frac{f\sqrt{x}}{e}\right] \text{Log}[x]\, \text{Log}\left[c\, x^n\right] +$$
$$648\, b^3\, e^4\, n^2\, \text{Log}\left[1+\frac{f\sqrt{x}}{e}\right] \text{Log}[x]\, \text{Log}\left[c\, x^n\right] - 648\, b^3\, e^4\, n^2\, \text{Log}\left[e+f\sqrt{x}\right] \text{Log}[x]^2\, \text{Log}\left[c\, x^n\right] +$$
$$648\, b^3\, e^4\, n^2\, \text{Log}\left[1+\frac{f\sqrt{x}}{e}\right] \text{Log}[x]^2\, \text{Log}\left[c\, x^n\right] + 648\, a\, b^2\, e^3\, f\, \sqrt{x}\, \text{Log}\left[c\, x^n\right]^2 -$$
$$1620\, b^3\, e^3\, f\, n\, \sqrt{x}\, \text{Log}\left[c\, x^n\right]^2 - 324\, a\, b^2\, e^2\, f^2\, x\, \text{Log}\left[c\, x^n\right]^2 + 486\, b^3\, e^2\, f^2\, n\, x\, \text{Log}\left[c\, x^n\right]^2 +$$
$$216\, a\, b^2\, e\, f^3\, x^{3/2}\, \text{Log}\left[c\, x^n\right]^2 - 252\, b^3\, e\, f^3\, n\, x^{3/2}\, \text{Log}\left[c\, x^n\right]^2 - 162\, a\, b^2\, f^4\, x^2\, \text{Log}\left[c\, x^n\right]^2 +$$
$$162\, b^3\, f^4\, n\, x^2\, \text{Log}\left[c\, x^n\right]^2 - 648\, a\, b^2\, e^4\, \text{Log}\left[e+f\sqrt{x}\right] \text{Log}\left[c\, x^n\right]^2 +$$
$$324\, b^3\, e^4\, n\, \text{Log}\left[e+f\sqrt{x}\right] \text{Log}\left[c\, x^n\right]^2 + 648\, a\, b^2\, f^4\, x^2\, \text{Log}\left[d\left(e+f\sqrt{x}\right)\right] \text{Log}\left[c\, x^n\right]^2 -$$
$$324\, b^3\, f^4\, n\, x^2\, \text{Log}\left[d\left(e+f\sqrt{x}\right)\right] \text{Log}\left[c\, x^n\right]^2 + 648\, b^3\, e^4\, n\, \text{Log}\left[e+f\sqrt{x}\right] \text{Log}[x]\, \text{Log}\left[c\, x^n\right]^2 -$$
$$648\, b^3\, e^4\, n\, \text{Log}\left[1+\frac{f\sqrt{x}}{e}\right] \text{Log}[x]\, \text{Log}\left[c\, x^n\right]^2 + 216\, b^3\, e^3\, f\, \sqrt{x}\, \text{Log}\left[c\, x^n\right]^3 -$$
$$108\, b^3\, e^2\, f^2\, x\, \text{Log}\left[c\, x^n\right]^3 + 72\, b^3\, e\, f^3\, x^{3/2}\, \text{Log}\left[c\, x^n\right]^3 - 54\, b^3\, f^4\, x^2\, \text{Log}\left[c\, x^n\right]^3 -$$
$$216\, b^3\, e^4\, \text{Log}\left[e+f\sqrt{x}\right] \text{Log}\left[c\, x^n\right]^3 + 216\, b^3\, f^4\, x^2\, \text{Log}\left[d\left(e+f\sqrt{x}\right)\right] \text{Log}\left[c\, x^n\right]^3 -$$
$$648\, b\, e^4\, n\left(2\, a^2 - 2\, a\, b\, n + b^2\, n^2 - 2\, b\left(-2\, a + b\, n\right) \text{Log}\left[c\, x^n\right] + 2\, b^2\, \text{Log}\left[c\, x^n\right]^2\right) \text{PolyLog}\left[2, -\frac{f\sqrt{x}}{e}\right] +$$
$$\left.2592\, b^2\, e^4\, n^2\left(2\, a - b\, n + 2\, b\, \text{Log}\left[c\, x^n\right]\right) \text{PolyLog}\left[3, -\frac{f\sqrt{x}}{e}\right] - 10\,368\, b^3\, e^4\, n^3\, \text{PolyLog}\left[4, -\frac{f\sqrt{x}}{e}\right]\right)$$

Problem 129: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 639 leaves, 30 steps):

$$-\frac{90 b^3 e n^3 \sqrt{x}}{f}-6 a b^2 n^2 x+12 b^3 n^3 x+\frac{6 b^3 e^2 n^3 \text{Log}\left[e+f \sqrt{x}\right]}{f^2}-6 b^3 n^3 x \text{Log}\left[d \left(e+f \sqrt{x}\right)\right]+\frac{12 b^3 e^2 n^3 \text{Log}\left[e+f \sqrt{x}\right] \text{Log}\left[-\frac{f \sqrt{x}}{e}\right]}{f^2}-6 b^3 n^2 x \text{Log}\left[c x^n\right]+\frac{42 b^2 e n^2 \sqrt{x} \left(a+b \text{Log}\left[c x^n\right]\right)}{f}-3 b^2 n^2 x \left(a+b \text{Log}\left[c x^n\right]\right)-\frac{6 b^2 e^2 n^2 \text{Log}\left[e+f \sqrt{x}\right] \left(a+b \text{Log}\left[c x^n\right]\right)}{f^2}+6 b^2 n^2 x \text{Log}\left[d \left(e+f \sqrt{x}\right)\right] \left(a+b \text{Log}\left[c x^n\right]\right)-\frac{9 b e n \sqrt{x} \left(a+b \text{Log}\left[c x^n\right]\right)^2}{f}+3 b n x \left(a+b \text{Log}\left[c x^n\right]\right)^2-3 b n x \text{Log}\left[d \left(e+f \sqrt{x}\right)\right] \left(a+b \text{Log}\left[c x^n\right]\right)^2+\frac{3 b e^2 n \text{Log}\left[1+\frac{f \sqrt{x}}{e}\right] \left(a+b \text{Log}\left[c x^n\right]\right)^2}{f^2}+\frac{e \sqrt{x} \left(a+b \text{Log}\left[c x^n\right]\right)^3}{f}-\frac{1}{2} x \left(a+b \text{Log}\left[c x^n\right]\right)^3+x \text{Log}\left[d \left(e+f \sqrt{x}\right)\right] \left(a+b \text{Log}\left[c x^n\right]\right)^3-\frac{e^2 \text{Log}\left[1+\frac{f \sqrt{x}}{e}\right] \left(a+b \text{Log}\left[c x^n\right]\right)^3}{f^2}+\frac{12 b^3 e^2 n^3 \text{PolyLog}\left[2,1+\frac{f \sqrt{x}}{e}\right]}{f^2}+\frac{12 b^2 e^2 n^2 \left(a+b \text{Log}\left[c x^n\right]\right) \text{PolyLog}\left[2,-\frac{f \sqrt{x}}{e}\right]}{f^2}-\frac{6 b e^2 n \left(a+b \text{Log}\left[c x^n\right]\right)^2 \text{PolyLog}\left[2,-\frac{f \sqrt{x}}{e}\right]}{f^2}-\frac{24 b^3 e^2 n^3 \text{PolyLog}\left[3,-\frac{f \sqrt{x}}{e}\right]}{f^2}+\frac{24 b^2 e^2 n^2 \left(a+b \text{Log}\left[c x^n\right]\right) \text{PolyLog}\left[3,-\frac{f \sqrt{x}}{e}\right]}{f^2}-\frac{48 b^3 e^2 n^3 \text{PolyLog}\left[4,-\frac{f \sqrt{x}}{e}\right]}{f^2}$$

Result (type 4, 1513 leaves):

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

$$3\,b^3\,n\,\mathrm{Log}[x]\,\left(-n\,\mathrm{Log}[x]+\mathrm{Log}[c\,x^n]\right)^2+b^3\,\left(-n\,\mathrm{Log}[x]+\mathrm{Log}[c\,x^n]\right)^3\Big)-$$

$$3\,b\,f\,n\,\Big(a^2-2\,a\,b\,n+2\,b^2\,n^2+2\,a\,b\,\left(-n\,\mathrm{Log}[x]+\mathrm{Log}[c\,x^n]\right)-$$

$$2\,b^2\,n\,\left(-n\,\mathrm{Log}[x]+\mathrm{Log}[c\,x^n]\right)+b^2\,\left(-n\,\mathrm{Log}[x]+\mathrm{Log}[c\,x^n]\right)^2\Big)$$

$$\left(\left(-\frac{e\,\sqrt{x}}{f^2}+\frac{x}{2\,f}+\frac{e^2\,\mathrm{Log}\left[e+f\,\sqrt{x}\right]}{f^3}\right)\left(-2\,\mathrm{Log}\left[\sqrt{x}\right]+\mathrm{Log}[x]\right)+2\left(-\frac{e\,\sqrt{x}\,\left(-1+\mathrm{Log}\left[\sqrt{x}\right]\right)}{f^2}+\right.\right.$$

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

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

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

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

$$4\,\Big(-e\,f\,\sqrt{x}\,\left(2-2\,\mathrm{Log}\left[\sqrt{x}\right]+\mathrm{Log}\left[\sqrt{x}\right]^2\right)+\frac{1}{4}\,f^2\,x\,\left(1-2\,\mathrm{Log}\left[\sqrt{x}\right]+2\,\mathrm{Log}\left[\sqrt{x}\right]^2\right)+e^2\,\Big(\mathrm{Log}\Big[$$

$$1+\frac{f\,\sqrt{x}}{e}\Big]\,\mathrm{Log}\left[\sqrt{x}\right]^2+2\,\mathrm{Log}\left[\sqrt{x}\right]\,\mathrm{PolyLog}\left[2,-\frac{f\,\sqrt{x}}{e}\right]-2\,\mathrm{PolyLog}\left[3,-\frac{f\,\sqrt{x}}{e}\right]\Big)\Big)\Big)-$$

$$\frac{1}{2\,\left(e+f\,\sqrt{x}\right)}b^3\,f\,n^3\,\left(1+\frac{f\,\sqrt{x}}{e}\right)\,x^{3/2}\,\left(\frac{e\,\left(-2\,e\,f\,\sqrt{x}+f^2\,x+2\,e^2\,\mathrm{Log}\left[1+\frac{f\,\sqrt{x}}{e}\right]\right)\,\mathrm{Log}[x]^3}{f^3\,x^{3/2}}-\right.$$

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

$$\frac{6\,e\,\mathrm{Log}[x]\,\left(-8\,e\,f\,\sqrt{x}+f^2\,x-8\,e^2\,\mathrm{PolyLog}\left[3,-\frac{f\,\sqrt{x}}{e}\right]\right)}{f^3\,x^{3/2}}-$$

$$\left.\frac{6\,e\,\left(-16\,e\,f\,\sqrt{x}+f^2\,x-16\,e^2\,\mathrm{PolyLog}\left[4,-\frac{f\,\sqrt{x}}{e}\right]\right)}{f^3\,x^{3/2}}\right)$$

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

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

Optimal (type 4, 178 leaves, 6 steps):

$$\frac{\text{Log}\left[d\left(e+f\sqrt{x}\right)\right]\left(a+b\,\text{Log}\left[c\,x^n\right]\right)^4}{4\,b\,n}-\frac{\text{Log}\left[1+\frac{f\sqrt{x}}{e}\right]\left(a+b\,\text{Log}\left[c\,x^n\right]\right)^4}{4\,b\,n}-2\left(a+b\,\text{Log}\left[c\,x^n\right]\right)^3\text{PolyLog}\left[2,-\frac{f\sqrt{x}}{e}\right]+12\,b\,n\left(a+b\,\text{Log}\left[c\,x^n\right]\right)^2\text{PolyLog}\left[3,-\frac{f\sqrt{x}}{e}\right]-48\,b^2\,n^2\left(a+b\,\text{Log}\left[c\,x^n\right]\right)\text{PolyLog}\left[4,-\frac{f\sqrt{x}}{e}\right]+96\,b^3\,n^3\,\text{PolyLog}\left[5,-\frac{f\sqrt{x}}{e}\right]$$

Result (type 4, 662 leaves):

$$\frac{1}{4}\left(4\,a^3\,\text{Log}\left[d\left(e+f\sqrt{x}\right)\right]\text{Log}[x]-4\,a^3\,\text{Log}\left[1+\frac{f\sqrt{x}}{e}\right]\text{Log}[x]-6\,a^2\,b\,n\,\text{Log}\left[d\left(e+f\sqrt{x}\right)\right]\text{Log}[x]^2+6\,a^2\,b\,n\,\text{Log}\left[1+\frac{f\sqrt{x}}{e}\right]\text{Log}[x]^2+4\,a\,b^2\,n^2\,\text{Log}\left[d\left(e+f\sqrt{x}\right)\right]\text{Log}[x]^3-4\,a\,b^2\,n^2\,\text{Log}\left[1+\frac{f\sqrt{x}}{e}\right]\text{Log}[x]^3-b^3\,n^3\,\text{Log}\left[d\left(e+f\sqrt{x}\right)\right]\text{Log}[x]^4+b^3\,n^3\,\text{Log}\left[1+\frac{f\sqrt{x}}{e}\right]\text{Log}[x]^4+12\,a^2\,b\,\text{Log}\left[d\left(e+f\sqrt{x}\right)\right]\text{Log}[x]\,\text{Log}\left[c\,x^n\right]-12\,a^2\,b\,\text{Log}\left[1+\frac{f\sqrt{x}}{e}\right]\text{Log}[x]\,\text{Log}\left[c\,x^n\right]-12\,a\,b^2\,n\,\text{Log}\left[d\left(e+f\sqrt{x}\right)\right]\text{Log}[x]^2\,\text{Log}\left[c\,x^n\right]+12\,a\,b^2\,n\,\text{Log}\left[1+\frac{f\sqrt{x}}{e}\right]\text{Log}[x]^2\,\text{Log}\left[c\,x^n\right]+4\,b^3\,n^2\,\text{Log}\left[d\left(e+f\sqrt{x}\right)\right]\text{Log}[x]^3\,\text{Log}\left[c\,x^n\right]-4\,b^3\,n^2\,\text{Log}\left[1+\frac{f\sqrt{x}}{e}\right]\text{Log}[x]^3\,\text{Log}\left[c\,x^n\right]+12\,a\,b^2\,\text{Log}\left[d\left(e+f\sqrt{x}\right)\right]\text{Log}[x]\,\text{Log}\left[c\,x^n\right]^2-12\,a\,b^2\,\text{Log}\left[1+\frac{f\sqrt{x}}{e}\right]\text{Log}[x]\,\text{Log}\left[c\,x^n\right]^2-6\,b^3\,n\,\text{Log}\left[d\left(e+f\sqrt{x}\right)\right]\text{Log}[x]^2\,\text{Log}\left[c\,x^n\right]^2+6\,b^3\,n\,\text{Log}\left[1+\frac{f\sqrt{x}}{e}\right]\text{Log}[x]^2\,\text{Log}\left[c\,x^n\right]^2+4\,b^3\,\text{Log}\left[d\left(e+f\sqrt{x}\right)\right]\text{Log}[x]\,\text{Log}\left[c\,x^n\right]^3-4\,b^3\,\text{Log}\left[1+\frac{f\sqrt{x}}{e}\right]\text{Log}[x]\,\text{Log}\left[c\,x^n\right]^3-8\left(a+b\,\text{Log}\left[c\,x^n\right]\right)^3\text{PolyLog}\left[2,-\frac{f\sqrt{x}}{e}\right]+48\,b\,n\left(a+b\,\text{Log}\left[c\,x^n\right]\right)^2\text{PolyLog}\left[3,-\frac{f\sqrt{x}}{e}\right]-192\,a\,b^2\,n^2\,\text{PolyLog}\left[4,-\frac{f\sqrt{x}}{e}\right]-192\,b^3\,n^2\,\text{Log}\left[c\,x^n\right]\text{PolyLog}\left[4,-\frac{f\sqrt{x}}{e}\right]+384\,b^3\,n^3\,\text{PolyLog}\left[5,-\frac{f\sqrt{x}}{e}\right]\right)$$

Problem 139: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 185 leaves, 6 steps):

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

Result (type 4, 1395 leaves):

$$-\frac{1}{2}\,a^2\,b\,m\,n\,r\,\text{Log}[x]^3+\frac{3}{4}\,a\,b^2\,m\,n^2\,r\,\text{Log}[x]^4-\frac{3}{10}\,b^3\,m\,n^3\,r\,\text{Log}[x]^5-a\,b^2\,m\,n\,r\,\text{Log}[x]^3\,\text{Log}[c\,x^n]+\frac{3}{4}\,b^3\,m\,n^2\,r\,\text{Log}[x]^4\,\text{Log}[c\,x^n]-\frac{1}{2}\,b^3\,m\,n\,r\,\text{Log}[x]^3\,\text{Log}[c\,x^n]^2-\frac{3}{2}\,a^2\,b\,n\,r\,\text{Log}[x]^2\,\text{Log}\left[1+\frac{e\,x^{-m}}{f}\right]+2\,a\,b^2\,n^2\,r\,\text{Log}[x]^3\,\text{Log}\left[1+\frac{e\,x^{-m}}{f}\right]-\frac{3}{4}\,b^3\,n^3\,r\,\text{Log}[x]^4\,\text{Log}\left[1+\frac{e\,x^{-m}}{f}\right]-3\,a\,b^2\,n\,r\,\text{Log}[x]^2\,\text{Log}[c\,x^n]\,\text{Log}\left[1+\frac{e\,x^{-m}}{f}\right]+2\,b^3\,n^2\,r\,\text{Log}[x]^3\,\text{Log}[c\,x^n]\,\text{Log}\left[1+\frac{e\,x^{-m}}{f}\right]-\frac{3}{2}\,b^3\,n\,r\,\text{Log}[x]^2\,\text{Log}[c\,x^n]^2\,\text{Log}\left[1+\frac{e\,x^{-m}}{f}\right]-a^3\,r\,\text{Log}[x]\,\text{Log}[e+f\,x^m]+3\,a^2\,b\,n\,r\,\text{Log}[x]^2\,\text{Log}[e+f\,x^m]-3\,a\,b^2\,n^2\,r\,\text{Log}[x]^3\,\text{Log}[e+f\,x^m]+b^3\,n^3\,r\,\text{Log}[x]^4\,\text{Log}[e+f\,x^m]+\frac{a^3\,r\,\text{Log}\left[-\frac{f\,x^m}{e}\right]\,\text{Log}[e+f\,x^m]}{m}-\frac{3\,a^2\,b\,n\,r\,\text{Log}[x]\,\text{Log}\left[-\frac{f\,x^m}{e}\right]\,\text{Log}[e+f\,x^m]}{m}+\frac{3\,a\,b^2\,n^2\,r\,\text{Log}[x]^2\,\text{Log}\left[-\frac{f\,x^m}{e}\right]\,\text{Log}[e+f\,x^m]}{m}-\frac{b^3\,n^3\,r\,\text{Log}[x]^3\,\text{Log}\left[-\frac{f\,x^m}{e}\right]\,\text{Log}[e+f\,x^m]}{m}-3\,a^2\,b\,r\,\text{Log}[x]\,\text{Log}[c\,x^n]\,\text{Log}[e+f\,x^m]+6\,a\,b^2\,n\,r\,\text{Log}[x]^2\,\text{Log}[c\,x^n]\,\text{Log}[e+f\,x^m]-3\,b^3\,n^2\,r\,\text{Log}[x]^3\,\text{Log}[c\,x^n]\,\text{Log}[e+f\,x^m]+\frac{3\,a^2\,b\,r\,\text{Log}\left[-\frac{f\,x^m}{e}\right]\,\text{Log}[c\,x^n]\,\text{Log}[e+f\,x^m]}{m}-\frac{6\,a\,b^2\,n\,r\,\text{Log}[x]\,\text{Log}\left[-\frac{f\,x^m}{e}\right]\,\text{Log}[c\,x^n]\,\text{Log}[e+f\,x^m]}{m}+\frac{3\,b^3\,n^2\,r\,\text{Log}[x]^2\,\text{Log}\left[-\frac{f\,x^m}{e}\right]\,\text{Log}[c\,x^n]\,\text{Log}[e+f\,x^m]}{m}-3\,a\,b^2\,r\,\text{Log}[x]\,\text{Log}[c\,x^n]^2\,\text{Log}[e+f\,x^m]+3\,b^3\,n\,r\,\text{Log}[x]^2\,\text{Log}[c\,x^n]^2\,\text{Log}[e+f\,x^m]+\frac{3\,a\,b^2\,r\,\text{Log}\left[-\frac{f\,x^m}{e}\right]\,\text{Log}[c\,x^n]^2\,\text{Log}[e+f\,x^m]}{m}-\frac{3\,b^3\,n\,r\,\text{Log}[x]\,\text{Log}\left[-\frac{f\,x^m}{e}\right]\,\text{Log}[c\,x^n]^2\,\text{Log}[e+f\,x^m]}{m}-b^3\,r\,\text{Log}[x]\,\text{Log}[c\,x^n]^3\,\text{Log}[e+f\,x^m]+\frac{b^3\,r\,\text{Log}\left[-\frac{f\,x^m}{e}\right]\,\text{Log}[c\,x^n]^3\,\text{Log}[e+f\,x^m]}{m}+a^3\,\text{Log}[x]\,\text{Log}[d\,(e+f\,x^m)^r]-\frac{3}{2}\,a^2\,b\,n\,\text{Log}[x]^2\,\text{Log}[d\,(e+f\,x^m)^r]+a\,b^2\,n^2\,\text{Log}[x]^3\,\text{Log}[d\,(e+f\,x^m)^r]-\frac{1}{4}\,b^3\,n^3\,\text{Log}[x]^4\,\text{Log}[d\,(e+f\,x^m)^r]+3\,a^2\,b\,\text{Log}[x]\,\text{Log}[c\,x^n]\,\text{Log}[d\,(e+f\,x^m)^r]-$$

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

Problem 140: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 150 leaves, 5 steps):

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

Result (type 4, 741 leaves):

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

Problem 141: Result more than twice size of optimal antiderivative.

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

Optimal (type 4, 114 leaves, 4 steps):

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

Result (type 4, 304 leaves):

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

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

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

Optimal (type 4, 114 leaves, 4 steps):

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

Result (type 4, 304 leaves):

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

Problem 166: Result more than twice size of optimal antiderivative.

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

Optimal (type 3, 57 leaves, 4 steps):

$$-\frac{e r (a + b \operatorname{Log}[c x^n])^4}{12 b^2 n^2} + \frac{(a + b \operatorname{Log}[c x^n])^3 (d + e \operatorname{Log}[f x^r])}{3 b n}$$

Result (type 3, 129 leaves):

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

Problem 199: Unable to integrate problem.

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

Optimal (type 4, 104 leaves, 4 steps):

$$\frac{(a + b \operatorname{Log}[c x^n])^3 \operatorname{PolyLog}[1 + k, e x^q]}{q} - \frac{3 b n (a + b \operatorname{Log}[c x^n])^2 \operatorname{PolyLog}[2 + k, e x^q]}{q^2} + \frac{6 b^2 n^2 (a + b \operatorname{Log}[c x^n]) \operatorname{PolyLog}[3 + k, e x^q]}{q^3} - \frac{6 b^3 n^3 \operatorname{PolyLog}[4 + k, e x^q]}{q^4}$$

Result (type 8, 25 leaves):

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

Problem 200: Unable to integrate problem.

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

Optimal (type 4, 72 leaves, 3 steps):

$$\frac{(a + b \operatorname{Log}[c x^n])^2 \operatorname{PolyLog}[1 + k, e x^q]}{q} - \frac{2 b n (a + b \operatorname{Log}[c x^n]) \operatorname{PolyLog}[2 + k, e x^q]}{q^2} + \frac{2 b^2 n^2 \operatorname{PolyLog}[3 + k, e x^q]}{q^3}$$

Result (type 8, 25 leaves):

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

Problem 201: Unable to integrate problem.

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

Optimal (type 4, 40 leaves, 2 steps):

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

Result (type 8, 23 leaves):

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

Problem 205: Unable to integrate problem.

$$\int \frac{\text{Log}[x]\,\text{PolyLog}[n,\,a\,x]}{x}\,dx$$

Optimal (type 4, 20 leaves, 2 steps):

$$\text{Log}[x]\,\text{PolyLog}[1+n,\,a\,x]-\text{PolyLog}[2+n,\,a\,x]$$

Result (type 8, 13 leaves):

$$\int \frac{\text{Log}[x]\,\text{PolyLog}[n,\,a\,x]}{x}\,dx$$

Problem 206: Unable to integrate problem.

$$\int \frac{\text{Log}[x]^2\,\text{PolyLog}[n,\,a\,x]}{x}\,dx$$

Optimal (type 4, 33 leaves, 3 steps):

$$\text{Log}[x]^2\,\text{PolyLog}[1+n,\,a\,x]-2\,\text{Log}[x]\,\text{PolyLog}[2+n,\,a\,x]+2\,\text{PolyLog}[3+n,\,a\,x]$$

Result (type 8, 15 leaves):

$$\int \frac{\text{Log}[x]^2\,\text{PolyLog}[n,\,a\,x]}{x}\,dx$$

Problem 207: Unable to integrate problem.

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

Optimal (type 4, 26 leaves, 2 steps):

$$\frac{\text{PolyLog}[k,\,e\,x^q]}{b\,n\,\left(a+b\,\text{Log}[c\,x^n]\right)}$$

Result (type 8, 59 leaves):

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

Problem 214: Unable to integrate problem.

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

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

$$-\frac{2\,b\,n\,x}{27\,e^2}-\frac{b\,n\,x^2}{36\,e}-\frac{4}{243}\,b\,n\,x^3+\frac{x\,\left(a+b\,\text{Log}[c\,x^n]\right)}{27\,e^2}+\frac{x^2\,\left(a+b\,\text{Log}[c\,x^n]\right)}{54\,e}+\frac{1}{81}\,x^3\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)-\frac{b\,n\,\text{Log}[1-e\,x]}{27\,e^3}+\frac{1}{27}\,b\,n\,x^3\,\text{Log}[1-e\,x]+\frac{\left(a+b\,\text{Log}[c\,x^n]\right)\,\text{Log}[1-e\,x]}{27\,e^3}-\frac{1}{27}\,x^3\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)\,\text{Log}[1-e\,x]+\frac{b\,n\,\text{PolyLog}[2,\,e\,x]}{27\,e^3}+\frac{2}{27}\,b\,n\,x^3\,\text{PolyLog}[2,\,e\,x]-\frac{1}{9}\,x^3\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)\,\text{PolyLog}[2,\,e\,x]-\frac{1}{9}\,b\,n\,x^3\,\text{PolyLog}[3,\,e\,x]+\frac{1}{3}\,x^3\,\left(a+b\,\text{Log}\left[c\,x^n\right]\right)\,\text{PolyLog}[3,\,e\,x]$$

Result (type 8, 21 leaves):

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

Problem 215: Unable to integrate problem.

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

Optimal (type 4, 221 leaves, 15 steps):

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

Result (type 8, 19 leaves):

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

Problem 216: Unable to integrate problem.

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

Optimal (type 4, 131 leaves, 14 steps):

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

Result (type 8, 18 leaves):

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

Problem 217: Unable to integrate problem.

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

Optimal (type 4, 26 leaves, 2 steps):

$$(a+b\,\text{Log}[c\,x^n])\,\text{PolyLog}[4,e\,x]-b\,n\,\text{PolyLog}[5,e\,x]$$

Result (type 8, 21 leaves):

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

Problem 218: Unable to integrate problem.

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

Optimal (type 4, 174 leaves, 19 steps):

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

Result (type 8, 21 leaves):

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

Problem 219: Unable to integrate problem.

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

Optimal (type 4, 238 leaves, 16 steps):

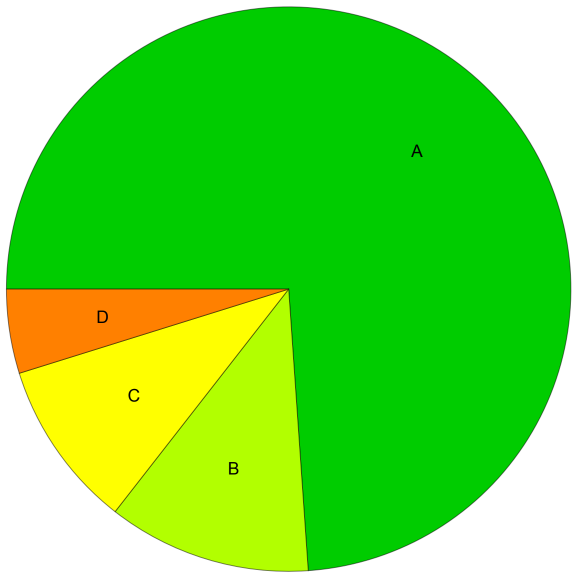
$$-\frac{5\,b\,e\,n}{16\,x}+\frac{3}{16}\,b\,e^2\,n\,\mathrm{Log}[x]-\frac{1}{16}\,b\,e^2\,n\,\mathrm{Log}[x]^2-\frac{e\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)}{8\,x}+\frac{1}{8}\,e^2\,\mathrm{Log}[x]\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)-\frac{3}{16}\,b\,e^2\,n\,\mathrm{Log}[1-e\,x]+\frac{3\,b\,n\,\mathrm{Log}[1-e\,x]}{16\,x^2}-\frac{1}{8}\,e^2\,\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)\,\mathrm{Log}[1-e\,x]+\frac{\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)\,\mathrm{Log}[1-e\,x]}{8\,x^2}-\frac{1}{8}\,b\,e^2\,n\,\mathrm{PolyLog}[2,\,e\,x]-\frac{b\,n\,\mathrm{PolyLog}[2,\,e\,x]}{4\,x^2}-\frac{\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)\,\mathrm{PolyLog}[2,\,e\,x]}{4\,x^2}-\frac{b\,n\,\mathrm{PolyLog}[3,\,e\,x]}{4\,x^2}-\frac{\left(a+b\,\mathrm{Log}\left[c\,x^n\right]\right)\,\mathrm{PolyLog}[3,\,e\,x]}{2\,x^2}$$

Result (type 8, 21 leaves):

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

Summary of Integration Test Results

249 integration problems



A - 184 optimal antiderivatives

B - 29 more than twice size of optimal antiderivatives

C - 24 unnecessarily complex antiderivatives

D - 12 unable to integrate problems

E - 0 integration timeouts