Mathematica 11.3 Integration Test Results

Test results for the 198 problems in "8.8 Polylogarithm function.m"

Problem 17: Unable to integrate problem.

$$\int \frac{\text{PolyLog}[3, a x]}{x^3} \, dx$$

Optimal (type 4, 70 leaves, 5 steps):

$$-\frac{a}{8 x}+\frac{1}{8} a^2 \text{Log}[x]-\frac{1}{8} a^2 \text{Log}[1-a x]+\frac{\text{Log}[1-a x]}{8 x^2}-\frac{\text{PolyLog}[2, a x]}{4 x^2}-\frac{\text{PolyLog}[3, a x]}{2 x^2}$$

Result (type 9, 25 leaves):

$$\frac{\text{MeijerG}[\{\{1, 1, 1, 1\}, \{3\}\}, \{\{1, 2\}, \{0, 0, 0\}\}, -a x]}{x^2}$$

Problem 18: Unable to integrate problem.

$$\int \frac{\text{PolyLog}[3, a x]}{x^4} \, dx$$

Optimal (type 4, 80 leaves, 5 steps):

$$-\frac{a}{54 x^2}-\frac{a^2}{27 x}+\frac{1}{27} a^3 \text{Log}[x]-\frac{1}{27} a^3 \text{Log}[1-a x]+\frac{\text{Log}[1-a x]}{27 x^3}-\frac{\text{PolyLog}[2, a x]}{9 x^3}-\frac{\text{PolyLog}[3, a x]}{3 x^3}$$

Result (type 9, 25 leaves):

$$\frac{\text{MeijerG}[\{\{1, 1, 1, 1\}, \{4\}\}, \{\{1, 3\}, \{0, 0, 0\}\}, -a x]}{x^3}$$

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

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

Optimal (type 4, 11 leaves, 1 step):

$$\frac{1}{2} \text{PolyLog}[3, a x^2]$$

Result (type 4, 108 leaves):

$$-\mathrm{Log}[x]^2\,\mathrm{Log}\left[1-\sqrt{a}\,x\right]-\mathrm{Log}[x]^2\,\mathrm{Log}\left[1+\sqrt{a}\,x\right]+\mathrm{Log}[x]^2\,\mathrm{Log}\left[1-a\,x^2\right]-2\,\mathrm{Log}[x]\,\mathrm{PolyLog}\left[2,-\sqrt{a}\,x\right]-2\,\mathrm{Log}[x]\,\mathrm{PolyLog}\left[2,\sqrt{a}\,x\right]+\mathrm{Log}[x]\,\mathrm{PolyLog}\left[2,a\,x^2\right]+2\,\mathrm{PolyLog}\left[3,-\sqrt{a}\,x\right]+2\,\mathrm{PolyLog}\left[3,\sqrt{a}\,x\right]$$

Problem 37: Unable to integrate problem.

$$\int \frac{\mathrm{PolyLog}\left[3,a\,x^2\right]}{x^5}\,dx$$

Optimal (type 4, 78 leaves, 6 steps):

$$-\frac{a}{16\,x^2}+\frac{1}{8}\,a^2\,\mathrm{Log}[x]-\frac{1}{16}\,a^2\,\mathrm{Log}\left[1-a\,x^2\right]+\frac{\mathrm{Log}\left[1-a\,x^2\right]}{16\,x^4}-\frac{\mathrm{PolyLog}\left[2,a\,x^2\right]}{8\,x^4}-\frac{\mathrm{PolyLog}\left[3,a\,x^2\right]}{4\,x^4}$$

Result (type 9, 30 leaves):

$$\frac{\mathrm{MeijerG}\left[\{\{1,1,1,1\},\{3\}\},\{\{1,2\},\{0,0,0\}\},-a\,x^2\right]}{2\,x^4}$$

Problem 38: Unable to integrate problem.

$$\int \frac{\mathrm{PolyLog}\left[3,a\,x^2\right]}{x^7}\,dx$$

Optimal (type 4, 88 leaves, 6 steps):

$$-\frac{a}{108\,x^4}-\frac{a^2}{54\,x^2}+\frac{1}{27}\,a^3\,\mathrm{Log}[x]-\frac{1}{54}\,a^3\,\mathrm{Log}\left[1-a\,x^2\right]+\frac{\mathrm{Log}\left[1-a\,x^2\right]}{54\,x^6}-\frac{\mathrm{PolyLog}\left[2,a\,x^2\right]}{18\,x^6}-\frac{\mathrm{PolyLog}\left[3,a\,x^2\right]}{6\,x^6}$$

Result (type 9, 30 leaves):

$$\frac{\mathrm{MeijerG}\left[\{\{1,1,1,1\},\{4\}\},\{\{1,3\},\{0,0,0\}\},-a\,x^2\right]}{2\,x^6}$$

Problem 48: Result more than twice size of optimal antiderivative.

$$\int \frac{\mathrm{PolyLog}\left[2,a\,x^q\right]}{x}\,dx$$

Optimal (type 4, 11 leaves, 1 step):

$$\frac{\mathrm{PolyLog}\left[3,a\,x^q\right]}{q}$$

Result (type 4, 80 leaves):

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

Problem 52: Unable to integrate problem.

$$\int x^2 \operatorname{PolyLog}\left[3, a x^q\right] dx$$

Optimal (type 5, 88 leaves, 4 steps):

$$-\frac{a q^3 x^{3+q} \operatorname{Hypergeometric2F1}\left[1, \frac{3+q}{q}, 2 + \frac{3}{q}, a x^q\right]}{27 (3+q)} - \frac{1}{27} q^2 x^3 \operatorname{Log}\left[1 - a x^q\right] - \frac{1}{9} q x^3 \operatorname{PolyLog}\left[2, a x^q\right] + \frac{1}{3} x^3 \operatorname{PolyLog}\left[3, a x^q\right]$$

Result (type 9, 41 leaves):

$$-\frac{x^3 \operatorname{MeijerG}\left[\left\{\left\{1, 1, 1, 1, \frac{-3+q}{q}\right\}, \{\}\right\}, \left\{\{1\}, \left\{0, 0, 0, -\frac{3}{q}\right\}\right\}, -a x^q\right]}{q}$$

Problem 53: Unable to integrate problem.

$$\int x \operatorname{PolyLog}\left[3, a x^q\right] dx$$

Optimal (type 5, 88 leaves, 4 steps):

$$-\frac{a q^3 x^{2+q} \operatorname{Hypergeometric2F1}\left[1, \frac{2+q}{q}, 2\left(1 + \frac{1}{q}\right), a x^q\right]}{8 (2+q)} - \frac{1}{8} q^2 x^2 \operatorname{Log}\left[1 - a x^q\right] - \frac{1}{4} q x^2 \operatorname{PolyLog}\left[2, a x^q\right] + \frac{1}{2} x^2 \operatorname{PolyLog}\left[3, a x^q\right]$$

Result (type 9, 41 leaves):

$$-\frac{x^2 \operatorname{MeijerG}\left[\left\{\left\{1, 1, 1, 1, \frac{-2+q}{q}\right\}, \{\}\right\}, \left\{\{1\}, \left\{0, 0, 0, -\frac{2}{q}\right\}\right\}, -a x^q\right]}{q}$$

Problem 54: Unable to integrate problem.

$$\int \operatorname{PolyLog}\left[3, a x^q\right] dx$$

Optimal (type 5, 69 leaves, 4 steps):

$$-\frac{a q^3 x^{1+q} \operatorname{Hypergeometric2F1}\left[1, 1 + \frac{1}{q}, 2 + \frac{1}{q}, a x^q\right]}{1+q} - q^2 x \operatorname{Log}\left[1 - a x^q\right] - q x \operatorname{PolyLog}\left[2, a x^q\right] + x \operatorname{PolyLog}\left[3, a x^q\right]$$

Result (type 9, 39 leaves):

$$-\frac{x\,\text{MeijerG}\left[\left\{\left\{1,1,1,1,\frac{-1+q}{q}\right\},\{\}\right\},\left\{\{1\},\left\{0,0,0,-\frac{1}{q}\right\}\right\},-a\,x^q\right]}{q}$$

Problem 56: Unable to integrate problem.

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

Optimal (type 5, 84 leaves, 4 steps):

$$-\frac{a\,q^3\,x^{-1+q}\,\text{Hypergeometric2F1}\left[1,-\frac{1-q}{q},2-\frac{1}{q},a\,x^q\right]}{1-q}+\frac{q^2\,\text{Log}\left[1-a\,x^q\right]}{x}-\frac{q\,\text{PolyLog}\left[2,a\,x^q\right]}{x}-\frac{\text{PolyLog}\left[3,a\,x^q\right]}{x}$$

Result (type 9, 37 leaves):

$$-\frac{\text{MeijerG}\left[\left\{\left\{1,1,1,1,1+\frac{1}{q}\right\},\{\}\right\},\left\{\{1\},\left\{0,0,0,\frac{1}{q}\right\}\right\},-a\,x^q\right]}{q\,x}$$

Problem 57: Unable to integrate problem.

$$\int \frac{\text{PolyLog}\left[3,a\,x^q\right]}{x^3}\,dx$$

Optimal (type 5, 95 leaves, 4 steps):

$$-\frac{a\,q^3\,x^{-2+q}\,\text{Hypergeometric2F1}\left[1,-\frac{2-q}{q},2\left(1-\frac{1}{q}\right),a\,x^q\right]}{8\,(2-q)}+\frac{q^2\,\text{Log}\left[1-a\,x^q\right]}{8\,x^2}-\frac{q\,\text{PolyLog}\left[2,a\,x^q\right]}{4\,x^2}-\frac{\text{PolyLog}\left[3,a\,x^q\right]}{2\,x^2}$$

Result (type 9, 41 leaves):

$$-\frac{\text{MeijerG}\left[\left\{\left\{1,1,1,1,\frac{2+q}{q}\right\},\{\}\right\},\left\{\{1\},\left\{0,0,0,\frac{2}{q}\right\}\right\},-a\,x^q\right]}{q\,x^2}$$

Problem 58: Unable to integrate problem.

$$\int \frac{\text{PolyLog}\left[3,a\,x^q\right]}{x^4}\,dx$$

Optimal (type 5, 93 leaves, 4 steps):

$$-\frac{a\,q^3\,x^{-3+q}\,\text{Hypergeometric2F1}\left[1,-\frac{3-q}{q},2-\frac{3}{q},a\,x^q\right]}{27\,(3-q)}+\frac{q^2\,\text{Log}\left[1-a\,x^q\right]}{27\,x^3}-\frac{q\,\text{PolyLog}\left[2,a\,x^q\right]}{9\,x^3}-\frac{\text{PolyLog}\left[3,a\,x^q\right]}{3\,x^3}$$

Result (type 9, 41 leaves):

$$-\frac{\text{MeijerG}\left[\left\{\left\{1,1,1,1,\frac{3+q}{q}\right\},\{\}\right\},\left\{\{1\},\left\{0,0,0,\frac{3}{q}\right\}\right\},-a\,x^q\right]}{q\,x^3}$$

Problem 74: Result unnecessarily involves higher level functions.

$$\int\frac{\text{PolyLog}\left[2,a\,x^2\right]}{\sqrt{d\,x}}\,dx$$

Optimal (type 4, 115 leaves, 8 steps):

$$-\frac{32\,\sqrt{d\,x}}{d}+\frac{16\,\text{ArcTan}\left[\frac{a^{1/4}\,\sqrt{d\,x}}{\sqrt{d}}\right]}{a^{1/4}\,\sqrt{d}}+\frac{16\,\text{ArcTanh}\left[\frac{a^{1/4}\,\sqrt{d\,x}}{\sqrt{d}}\right]}{a^{1/4}\,\sqrt{d}}+\frac{8\,\sqrt{d\,x}\,\text{Log}\left[1-a\,x^2\right]}{d}+\frac{2\,\sqrt{d\,x}\,\text{PolyLog}\left[2,a\,x^2\right]}{d}$$

Result (type 5, 57 leaves):

$$\frac{1}{2\,\sqrt{d\,x}\,\text{Gamma}\left[\frac{9}{4}\right]}5\,x\,\text{Gamma}\left[\frac{5}{4}\right]\left(-16+16\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},a\,x^2\right]+4\,\text{Log}\left[1-a\,x^2\right]+\text{PolyLog}\left[2,a\,x^2\right]\right)$$

Problem 75: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 103 leaves, 7 steps):

$$-\frac{16\,a^{1/4}\,\text{ArcTan}\left[\frac{a^{1/4}\,\sqrt{d\,x}}{\sqrt{d}}\right]}{d^{3/2}}+\frac{16\,a^{1/4}\,\text{ArcTanh}\left[\frac{a^{1/4}\,\sqrt{d\,x}}{\sqrt{d}}\right]}{d^{3/2}}+\frac{8\,\text{Log}\left[1-a\,x^2\right]}{d\,\sqrt{d\,x}}-\frac{2\,\text{PolyLog}\left[2,a\,x^2\right]}{d\,\sqrt{d\,x}}$$

Result (type 5, 62 leaves):

$$\left(x\,\text{Gamma}\left[\frac{3}{4}\right]\left(16\,a\,x^2\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},a\,x^2\right]+12\,\text{Log}\left[1-a\,x^2\right]-3\,\text{PolyLog}\left[2,a\,x^2\right]\right)\right)\Big/\left(2\,(d\,x)^{3/2}\,\text{Gamma}\left[\frac{7}{4}\right]\right)$$

Problem 76: Result unnecessarily involves higher level functions.

$$\int \frac{\text{PolyLog}[2, a x^2]}{(d x)^{5/2}} \, dx$$

Optimal (type 4, 111 leaves, 7 steps):

$$\frac{16 a^{3/4} \text{ArcTan}\left[\frac{a^{1/4} \sqrt{d x}}{\sqrt{d}}\right]}{9 d^{5/2}} + \frac{16 a^{3/4} \text{ArcTanh}\left[\frac{a^{1/4} \sqrt{d x}}{\sqrt{d}}\right]}{9 d^{5/2}} + \frac{8 \text{Log}[1 - a x^2]}{9 d (d x)^{3/2}} - \frac{2 \text{PolyLog}[2, a x^2]}{3 d (d x)^{3/2}}$$

Result (type 5, 62 leaves):

$$\left(x \text{Gamma}\left[\frac{1}{4}\right] \left(16 a x^2 \text{Hypergeometric2F1}\left[\frac{1}{4}, 1, \frac{5}{4}, a x^2\right] + 4 \text{Log}[1 - a x^2] - 3 \text{PolyLog}[2, a x^2]\right)\right) \Big/ \left(18 (d x)^{5/2} \text{Gamma}\left[\frac{5}{4}\right]\right)$$

Problem 77: Result unnecessarily involves higher level functions.

$$\int \frac{\text{PolyLog}[2, a x^2]}{(d x)^{7/2}} \, dx$$

Optimal (type 4, 126 leaves, 8 steps):

$$-\frac{32 a}{25 d^3 \sqrt{d x}} - \frac{16 a^{5/4} \text{ArcTan}\left[\frac{a^{1/4} \sqrt{d x}}{\sqrt{d}}\right]}{25 d^{7/2}} + \frac{16 a^{5/4} \text{ArcTanh}\left[\frac{a^{1/4} \sqrt{d x}}{\sqrt{d}}\right]}{25 d^{7/2}} + \frac{8 \text{Log}[1 - a x^2]}{25 d (d x)^{5/2}} - \frac{2 \text{PolyLog}[2, a x^2]}{5 d (d x)^{5/2}}$$

Result (type 5, 70 leaves):

$$-\left(\left(x \text{Gamma}\left[-\frac{1}{4}\right] \left(-48 a x^2 + 16 a^2 x^4 \text{Hypergeometric2F1}\left[\frac{3}{4}, 1, \frac{7}{4}, a x^2\right] + 12 \text{Log}[1 - a x^2] - 15 \text{PolyLog}[2, a x^2]\right)\right) \Big/ \left(150 (d x)^{7/2} \text{Gamma}\left[\frac{3}{4}\right]\right)\right)$$

Problem 78: Result unnecessarily involves higher level functions.

$$\int (d x)^{5/2} \text{PolyLog}[3, a x^2] \, dx$$

Optimal (type 4, 161 leaves, 10 steps):

$$\frac{128 d (d x)^{3/2}}{1029 a} + \frac{128 (d x)^{7/2}}{2401 d} + \frac{64 d^{5/2} \text{ArcTan}\left[\frac{a^{1/4} \sqrt{d x}}{\sqrt{d}}\right]}{343 a^{7/4}} - \frac{64 d^{5/2} \text{ArcTanh}\left[\frac{a^{1/4} \sqrt{d x}}{\sqrt{d}}\right]}{343 a^{7/4}} - \frac{32 (d x)^{7/2} \text{Log}[1 - a x^2]}{343 d} - \frac{8 (d x)^{7/2} \text{PolyLog}[2, a x^2]}{49 d} + \frac{2 (d x)^{7/2} \text{PolyLog}[3, a x^2]}{7 d}$$

Result (type 5, 89 leaves) :

$$-\left(\left(11\,d\,(d\,x)^{3/2}\,\text{Gamma}\left[\frac{11}{4}\right]\left(-448-192\,a\,x^2+448\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},a\,x^2\right]+336\,a\,x^2\,\text{Log}\left[1-a\,x^2\right]+588\,a\,x^2\,\text{PolyLog}\left[2,a\,x^2\right]-1029\,a\,x^2\,\text{PolyLog}\left[3,a\,x^2\right]\right)\right)\Big/\left(14406\,a\,\text{Gamma}\left[\frac{15}{4}\right]\right)\right)$$

Problem 79: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 161 leaves, 10 steps) :

$$\frac{128\,d\,\sqrt{d\,x}}{125\,a}+\frac{128\,(d\,x)^{5/2}}{625\,d}-\frac{64\,d^{3/2}\,\text{ArcTan}\left[\frac{a^{1/4}\sqrt{d\,x}}{\sqrt{d}}\right]}{125\,a^{5/4}}-\frac{64\,d^{3/2}\,\text{ArcTanh}\left[\frac{a^{1/4}\sqrt{d\,x}}{\sqrt{d}}\right]}{125\,a^{5/4}}-\frac{32\,(d\,x)^{5/2}\,\text{Log}\left[1-a\,x^2\right]}{125\,d}-\frac{8\,(d\,x)^{5/2}\,\text{PolyLog}\left[2,a\,x^2\right]}{25\,d}+\frac{2\,(d\,x)^{5/2}\,\text{PolyLog}\left[3,a\,x^2\right]}{5\,d}$$

Result (type 5, 89 leaves) :

$$-\frac{1}{1250\,a\,\text{Gamma}\left[\frac{13}{4}\right]}9\,d\,\sqrt{d\,x}\,\text{Gamma}\left[\frac{9}{4}\right]\left(-320-64\,a\,x^2+320\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},a\,x^2\right]+80\,a\,x^2\,\text{Log}\left[1-a\,x^2\right]+100\,a\,x^2\,\text{PolyLog}\left[2,a\,x^2\right]-125\,a\,x^2\,\text{PolyLog}\left[3,a\,x^2\right]\right)$$

Problem 80: Result unnecessarily involves higher level functions.

$$\int \sqrt{d\,x}\,\text{PolyLog}\left[3,a\,x^2\right]\,dx$$

Optimal (type 4, 146 leaves, 9 steps) :

$$\frac{128\,(d\,x)^{3/2}}{81\,d}+\frac{64\,\sqrt{d}\,\text{ArcTan}\left[\frac{a^{1/4}\sqrt{d\,x}}{\sqrt{d}}\right]}{27\,a^{3/4}}-\frac{64\,\sqrt{d}\,\text{ArcTanh}\left[\frac{a^{1/4}\sqrt{d\,x}}{\sqrt{d}}\right]}{27\,a^{3/4}}-\frac{32\,(d\,x)^{3/2}\,\text{Log}\left[1-a\,x^2\right]}{27\,d}-\frac{8\,(d\,x)^{3/2}\,\text{PolyLog}\left[2,a\,x^2\right]}{9\,d}+\frac{2\,(d\,x)^{3/2}\,\text{PolyLog}\left[3,a\,x^2\right]}{3\,d}$$

Result (type 5, 68 leaves) :

$$-\frac{1}{162\,\text{Gamma}\left[\frac{11}{4}\right]}7\,x\,\sqrt{d\,x}\,\text{Gamma}\left[\frac{7}{4}\right]\left(-64+64\,\text{Hypergeometric2F1}\left[\frac{3}{4},1,\frac{7}{4},a\,x^2\right]+48\,\text{Log}\left[1-a\,x^2\right]+36\,\text{PolyLog}\left[2,a\,x^2\right]-27\,\text{PolyLog}\left[3,a\,x^2\right]\right)$$

Problem 81: Result unnecessarily involves higher level functions.

$$\int \frac{\text{PolyLog}\left[3, a x^2\right]}{\sqrt{d x}} \, dx$$

Optimal (type 4, 134 leaves, 9 steps):

$$\frac{128 \sqrt{d x}}{d} - \frac{64 \,\text{ArcTan}\left[\frac{a^{1/4} \sqrt{d x}}{\sqrt{d}}\right]}{a^{1/4} \sqrt{d}} - \frac{64 \,\text{ArcTanh}\left[\frac{a^{1/4} \sqrt{d x}}{\sqrt{d}}\right]}{a^{1/4} \sqrt{d}} - \frac{32 \sqrt{d x} \,\text{Log}\left[1 - a x^2\right]}{d} - \frac{8 \sqrt{d x} \,\text{PolyLog}\left[2, a x^2\right]}{d} + \frac{2 \sqrt{d x} \,\text{PolyLog}\left[3, a x^2\right]}{d}$$

Result (type 5, 68 leaves):

$$-\frac{1}{2 \sqrt{d x} \,\text{Gamma}\left[\frac{9}{4}\right]} 5 x \,\text{Gamma}\left[\frac{5}{4}\right] \left(-64 + 64 \,\text{Hypergeometric2F1}\left[\frac{1}{4}, 1, \frac{5}{4}, a x^2\right] + 16 \,\text{Log}\left[1 - a x^2\right] + 4 \,\text{PolyLog}\left[2, a x^2\right] - \text{PolyLog}\left[3, a x^2\right]\right)$$

Problem 82: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 122 leaves, 8 steps):

$$-\frac{64 a^{1/4} \,\text{ArcTan}\left[\frac{a^{1/4} \sqrt{d x}}{\sqrt{d}}\right]}{d^{3/2}} + \frac{64 a^{1/4} \,\text{ArcTanh}\left[\frac{a^{1/4} \sqrt{d x}}{\sqrt{d}}\right]}{d^{3/2}} + \frac{32 \,\text{Log}\left[1 - a x^2\right]}{d \sqrt{d x}} - \frac{8 \,\text{PolyLog}\left[2, a x^2\right]}{d \sqrt{d x}} - \frac{2 \,\text{PolyLog}\left[3, a x^2\right]}{d \sqrt{d x}}$$

Result (type 5, 71 leaves):

$$\left(x \,\text{Gamma}\left[\frac{3}{4}\right] \left(64 a x^2 \,\text{Hypergeometric2F1}\left[\frac{3}{4}, 1, \frac{7}{4}, a x^2\right] + 48 \,\text{Log}\left[1 - a x^2\right] - 12 \,\text{PolyLog}\left[2, a x^2\right] - 3 \,\text{PolyLog}\left[3, a x^2\right]\right)\right) \Big/ \left(2 (d x)^{3/2} \,\text{Gamma}\left[\frac{7}{4}\right]\right)$$

Problem 83: Result unnecessarily involves higher level functions.

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

Optimal (type 4, 132 leaves, 8 steps):

$$\frac{64\,a^{3/4}\,\text{ArcTan}\left[\frac{a^{1/4}\sqrt{d\,x}}{\sqrt{d}}\right]}{27\,d^{5/2}}+\frac{64\,a^{3/4}\,\text{ArcTanh}\left[\frac{a^{1/4}\sqrt{d\,x}}{\sqrt{d}}\right]}{27\,d^{5/2}}+\frac{32\,\text{Log}\left[1-a\,x^2\right]}{27\,d\,(d\,x)^{3/2}}-\frac{8\,\text{PolyLog}\left[2,\,a\,x^2\right]}{9\,d\,(d\,x)^{3/2}}-\frac{2\,\text{PolyLog}\left[3,\,a\,x^2\right]}{3\,d\,(d\,x)^{3/2}}$$

Result (type 5, 71 leaves):

$$\left(x\,\text{Gamma}\left[\frac{1}{4}\right]\left(64\,a\,x^2\,\text{Hypergeometric2F1}\left[\frac{1}{4},\,1,\,\frac{5}{4},\,a\,x^2\right]+16\,\text{Log}\left[1-a\,x^2\right]-12\,\text{PolyLog}\left[2,\,a\,x^2\right]-9\,\text{PolyLog}\left[3,\,a\,x^2\right]\right)\right)\Big/\left(54\,(d\,x)^{5/2}\,\text{Gamma}\left[\frac{5}{4}\right]\right)$$

Problem 84: Result unnecessarily involves higher level functions.

$$\int\frac{\text{PolyLog}\left[3,\,a\,x^2\right]}{(d\,x)^{7/2}}\,dx$$

Optimal (type 4, 147 leaves, 9 steps):

$$-\frac{128\,a}{125\,d^3\sqrt{d\,x}}-\frac{64\,a^{5/4}\,\text{ArcTan}\left[\frac{a^{1/4}\sqrt{d\,x}}{\sqrt{d}}\right]}{125\,d^{7/2}}+\frac{64\,a^{5/4}\,\text{ArcTanh}\left[\frac{a^{1/4}\sqrt{d\,x}}{\sqrt{d}}\right]}{125\,d^{7/2}}+\frac{32\,\text{Log}\left[1-a\,x^2\right]}{125\,d\,(d\,x)^{5/2}}-\frac{8\,\text{PolyLog}\left[2,\,a\,x^2\right]}{25\,d\,(d\,x)^{5/2}}-\frac{2\,\text{PolyLog}\left[3,\,a\,x^2\right]}{5\,d\,(d\,x)^{5/2}}$$

Result (type 5, 79 leaves):

$$-\left(\left(x\,\text{Gamma}\left[-\frac{1}{4}\right]\left(-192\,a\,x^2+64\,a^2\,x^4\,\text{Hypergeometric2F1}\left[\frac{3}{4},\,1,\,\frac{7}{4},\,a\,x^2\right]+48\,\text{Log}\left[1-a\,x^2\right]-60\,\text{PolyLog}\left[2,\,a\,x^2\right]-75\,\text{PolyLog}\left[3,\,a\,x^2\right]\right)\right)\Big/\left(750\,(d\,x)^{7/2}\,\text{Gamma}\left[\frac{3}{4}\right]\right)\right)$$

Problem 85: Result unnecessarily involves higher level functions.

$$\int\frac{\text{PolyLog}\left[3,\,a\,x^2\right]}{(d\,x)^{9/2}}\,dx$$

Optimal (type 4, 147 leaves, 9 steps):

$$-\frac{128\,a}{1029\,d^3\,(d\,x)^{3/2}}+\frac{64\,a^{7/4}\,\text{ArcTan}\left[\frac{a^{1/4}\sqrt{d\,x}}{\sqrt{d}}\right]}{343\,d^{9/2}}+\frac{64\,a^{7/4}\,\text{ArcTanh}\left[\frac{a^{1/4}\sqrt{d\,x}}{\sqrt{d}}\right]}{343\,d^{9/2}}+\frac{32\,\text{Log}\left[1-a\,x^2\right]}{343\,d\,(d\,x)^{7/2}}-\frac{8\,\text{PolyLog}\left[2,\,a\,x^2\right]}{49\,d\,(d\,x)^{7/2}}-\frac{2\,\text{PolyLog}\left[3,\,a\,x^2\right]}{7\,d\,(d\,x)^{7/2}}$$

Result (type 5, 84 leaves):

$$-\left(\left(\sqrt{d\,x}\ \text{Gamma}\left[-\frac{3}{4}\right]\left(-64\,a\,x^2+192\,a^2\,x^4\,\text{Hypergeometric2F1}\left[\frac{1}{4},1,\frac{5}{4},a\,x^2\right]+48\,\text{Log}\left[1-a\,x^2\right]-84\,\text{PolyLog}\left[2,a\,x^2\right]-147\,\text{PolyLog}\left[3,a\,x^2\right]\right)\right)\Big/\left(686\,d^5\,x^4\,\text{Gamma}\left[\frac{1}{4}\right]\right)\right)$$

Problem 88: Unable to integrate problem.

$$\int \frac{\text{PolyLog}[2,a\,x^q]}{\sqrt{d\,x}}\,dx$$

Optimal (type 5, 93 leaves, 4 steps):

$$\frac{8\,a\,q^2\,x^q\,\sqrt{d\,x}\ \text{Hypergeometric2F1}\left[1,\frac{\frac{1}{2}+q}{q},\frac{1}{2}\left(4+\frac{1}{q}\right),a\,x^q\right]}{d\,(1+2\,q)}+\frac{4\,q\,\sqrt{d\,x}\ \text{Log}[1-a\,x^q]}{d}+\frac{2\,\sqrt{d\,x}\ \text{PolyLog}[2,a\,x^q]}{d}$$

Result (type 9, 48 leaves):

$$-\frac{x\,\text{MeijerG}\left[\left\{\left\{1,1,1,1-\frac{1}{2\,q}\right\},\{\}\right\},\left\{\{1\},\left\{0,0,-\frac{1}{2\,q}\right\}\right\},-a\,x^q\right]}{q\,\sqrt{d\,x}}$$

Problem 89: Unable to integrate problem.

$$\int \frac{\text{PolyLog}[2,a\,x^q]}{(d\,x)^{3/2}}\,dx$$

Optimal (type 5, 97 leaves, 4 steps):

$$-\frac{8\,a\,q^2\,x^q\,\text{Hypergeometric2F1}\left[1,\frac{1}{2}\left(2-\frac{1}{q}\right),\frac{1}{2}\left(4-\frac{1}{q}\right),a\,x^q\right]}{d\,(1-2\,q)\,\sqrt{d\,x}}+\frac{4\,q\,\text{Log}[1-a\,x^q]}{d\,\sqrt{d\,x}}-\frac{2\,\text{PolyLog}[2,a\,x^q]}{d\,\sqrt{d\,x}}$$

Result (type 9, 48 leaves):

$$-\frac{x\,\text{MeijerG}\left[\left\{\left\{1,1,1,1+\frac{1}{2\,q}\right\},\{\}\right\},\left\{\{1\},\left\{0,0,\frac{1}{2\,q}\right\}\right\},-a\,x^q\right]}{q\,(d\,x)^{3/2}}$$

Problem 90: Unable to integrate problem.

$$\int \frac{\text{PolyLog}[2,a\,x^q]}{(d\,x)^{5/2}}\,dx$$

Optimal (type 5, 105 leaves, 4 steps):

$$-\frac{8\,a\,q^2\,x^{-1+q}\,\text{Hypergeometric2F1}\left[1,\frac{1}{2}\left(2-\frac{3}{q}\right),\frac{1}{2}\left(4-\frac{3}{q}\right),a\,x^q\right]}{9\,d^2\,(3-2\,q)\,\sqrt{d\,x}}+\frac{4\,q\,\text{Log}\left[1-a\,x^q\right]}{9\,d\,(d\,x)^{3/2}}-\frac{2\,\text{PolyLog}\left[2,a\,x^q\right]}{3\,d\,(d\,x)^{3/2}}$$

Result (type 9, 48 leaves):

$$-\frac{x\,\text{MeijerG}\left[\left\{\left\{1,1,1,1+\frac{3}{2\,q}\right\},\{\}\right\},\left\{\{1\},\left\{0,0,\frac{3}{2\,q}\right\}\right\},-a\,x^q\right]}{q\,(d\,x)^{5/2}}$$

Problem 91: Unable to integrate problem.

$$\int (d\,x)^{3/2}\,\text{PolyLog}\left[3,a\,x^q\right]\,dx$$

Optimal (type 5, 125 leaves, 5 steps):

$$-\frac{16\,a\,d\,q^3\,x^{2+q}\,\sqrt{d\,x}\,\text{Hypergeometric2F1}\left[1,\frac{\frac{5}{2}+q}{q},\frac{1}{2}\left(4+\frac{5}{q}\right),a\,x^q\right]}{125\,(5+2\,q)}-\frac{8\,q^2\,(d\,x)^{5/2}\,\text{Log}\left[1-a\,x^q\right]}{125\,d}-\frac{4\,q\,(d\,x)^{5/2}\,\text{PolyLog}\left[2,a\,x^q\right]}{25\,d}+\frac{2\,(d\,x)^{5/2}\,\text{PolyLog}\left[3,a\,x^q\right]}{5\,d}$$

Result (type 9, 50 leaves):

$$-\frac{1}{q}x\,(d\,x)^{3/2}\,\text{MeijerG}\left[\left\{\left\{1,1,1,1,1-\frac{5}{2\,q}\right\},\{\}\right\},\left\{\{1\},\left\{0,0,0,-\frac{5}{2\,q}\right\}\right\},-a\,x^q\right]$$

Problem 92: Unable to integrate problem.

$$\int \sqrt{d\,x}\,\text{PolyLog}\left[3,a\,x^q\right]\,dx$$

Optimal (type 5, 124 leaves, 5 steps):

$$-\frac{16\,a\,q^3\,x^{1+q}\,\sqrt{d\,x}\,\text{Hypergeometric2F1}\left[1,\frac{\frac{3}{2}+q}{q},\frac{1}{2}\left(4+\frac{3}{q}\right),a\,x^q\right]}{27\,(3+2\,q)}-\frac{8\,q^2\,(d\,x)^{3/2}\,\text{Log}\left[1-a\,x^q\right]}{27\,d}-\frac{4\,q\,(d\,x)^{3/2}\,\text{PolyLog}\left[2,a\,x^q\right]}{9\,d}+\frac{2\,(d\,x)^{3/2}\,\text{PolyLog}\left[3,a\,x^q\right]}{3\,d}$$

Result (type 9, 50 leaves):

$$-\frac{1}{q}x\,\sqrt{d\,x}\,\text{MeijerG}\left[\left\{\left\{1,1,1,1,1-\frac{3}{2\,q}\right\},\{\}\right\},\left\{\{1\},\left\{0,0,0,-\frac{3}{2\,q}\right\}\right\},-a\,x^q\right]$$

Problem 93: Unable to integrate problem.

$$\int \frac{\text{PolyLog}[3, a x^q]}{\sqrt{d x}} \, dx$$

Optimal (type 5, 115 leaves, 5 steps):

$$-\frac{16 a q^3 x^q \sqrt{d x} \text{ Hypergeometric2F1}\left[1, \frac{\frac{1}{2}+q}{q}, \frac{1}{2}\left(4+\frac{1}{q}\right), a x^q\right]}{d (1+2 q)} - \frac{8 q^2 \sqrt{d x} \text{ Log}[1-a x^q]}{d} - \frac{4 q \sqrt{d x} \text{ PolyLog}[2, a x^q]}{d} + \frac{2 \sqrt{d x} \text{ PolyLog}[3, a x^q]}{d}$$

Result (type 9, 50 leaves):

$$-\frac{1}{q \sqrt{d x}} x \text{ MeijerG}\left[\left\{\left\{1, 1, 1, 1, 1-\frac{1}{2 q}\right\}, \{\}\right\}, \left\{\{1\}, \left\{0, 0, 0, -\frac{1}{2 q}\right\}\right\}, -a x^q\right]$$

Problem 94: Unable to integrate problem.

$$\int \frac{\text{PolyLog}[3, a x^q]}{(d x)^{3/2}} \, dx$$

Optimal (type 5, 119 leaves, 5 steps):

$$-\frac{16 a q^3 x^q \text{ Hypergeometric2F1}\left[1, \frac{1}{2}\left(2-\frac{1}{q}\right), \frac{1}{2}\left(4-\frac{1}{q}\right), a x^q\right]}{d (1-2 q) \sqrt{d x}} + \frac{8 q^2 \text{ Log}[1-a x^q]}{d \sqrt{d x}} - \frac{4 q \text{ PolyLog}[2, a x^q]}{d \sqrt{d x}} - \frac{2 \text{ PolyLog}[3, a x^q]}{d \sqrt{d x}}$$

Result (type 9, 50 leaves):

$$-\frac{x \text{ MeijerG}\left[\left\{\left\{1, 1, 1, 1, 1+\frac{1}{2 q}\right\}, \{\}\right\}, \left\{\{1\}, \left\{0, 0, 0, \frac{1}{2 q}\right\}\right\}, -a x^q\right]}{q (d x)^{3/2}}$$

Problem 95: Unable to integrate problem.

$$\int \frac{\text{PolyLog}[3, a x^q]}{(d x)^{5/2}} \, dx$$

Optimal (type 5, 129 leaves, 5 steps):

$$-\frac{16 a q^3 x^{-1+q} \text{ Hypergeometric2F1}\left[1, \frac{1}{2}\left(2-\frac{3}{q}\right), \frac{1}{2}\left(4-\frac{3}{q}\right), a x^q\right]}{27 d^2 (3-2 q) \sqrt{d x}} + \frac{8 q^2 \text{ Log}[1-a x^q]}{27 d (d x)^{3/2}} - \frac{4 q \text{ PolyLog}[2, a x^q]}{9 d (d x)^{3/2}} - \frac{2 \text{ PolyLog}[3, a x^q]}{3 d (d x)^{3/2}}$$

Result (type 9, 50 leaves):

$$-\frac{x\,\text{MeijerG}\left[\left\{\left\{1,1,1,1,1+\frac{3}{2q}\right\},\{\}\right\},\left\{\{1\},\left\{0,0,0,\frac{3}{2q}\right\}\right\},-a x^q\right]}{q\,(d x)^{5/2}}$$

Problem 101: Unable to integrate problem.

$$\int\left(\text{PolyLog}\left[-\frac{3}{2},a x\right]+\text{PolyLog}\left[-\frac{1}{2},a x\right]\right)dx$$

Optimal (type 4, 9 leaves, 2 steps):

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

Result (type 8, 17 leaves):

$$\int\left(\text{PolyLog}\left[-\frac{3}{2},a x\right]+\text{PolyLog}\left[-\frac{1}{2},a x\right]\right)dx$$

Problem 103: Unable to integrate problem.

$$\int(d x)^m\,\text{PolyLog}[3,a x]\,dx$$

Optimal (type 5, 102 leaves, 4 steps):

$$-\frac{a\,(d x)^{2+m}\,\text{Hypergeometric2F1}[1,2+m,3+m,a x]}{d^2\,(1+m)^3\,(2+m)}-\frac{(d x)^{1+m}\,\text{Log}[1-a x]}{d\,(1+m)^3}-\frac{(d x)^{1+m}\,\text{PolyLog}[2,a x]}{d\,(1+m)^2}+\frac{(d x)^{1+m}\,\text{PolyLog}[3,a x]}{d\,(1+m)}$$

Result (type 9, 88 leaves):

$$-\Big(\big(x\,(d x)^m\,\text{Gamma}[2+m]\,\big(a\,(1+m)\,x\,\text{Gamma}[1+m]\,\text{HypergeometricPFQRegularized}[\{1,2+m\},\{3+m\},a x]+\text{Log}[1-a x]+(1+m)\,\text{PolyLog}[2,a x]-\text{PolyLog}[3,a x]-2\,m\,\text{PolyLog}[3,a x]-m^2\,\text{PolyLog}[3,a x]\big)\big)\Big/\big((1+m)^4\,\text{Gamma}[1+m]\big)\Big)$$

Problem 104: Unable to integrate problem.

$$\int(d x)^m\,\text{PolyLog}[4,a x]\,dx$$

Optimal (type 5, 121 leaves, 5 steps):

$$\frac{a\,(d\,x)^{2+m}\,\text{Hypergeometric2F1}[1,\,2+m,\,3+m,\,a\,x]}{d^2\,(1+m)^4\,(2+m)}+\frac{(d\,x)^{1+m}\,\text{Log}[1-a\,x]}{d\,(1+m)^4}+\frac{(d\,x)^{1+m}\,\text{PolyLog}[2,\,a\,x]}{d\,(1+m)^3}-\frac{(d\,x)^{1+m}\,\text{PolyLog}[3,\,a\,x]}{d\,(1+m)^2}+\frac{(d\,x)^{1+m}\,\text{PolyLog}[4,\,a\,x]}{d\,(1+m)}$$

Result (type 9, 119 leaves):

$$\frac{1}{(1+m)^5\,\text{Gamma}[1+m]}\,x\,(d\,x)^m\,\text{Gamma}[2+m]\,\big(a\,(1+m)\,x\,\text{Gamma}[1+m]\,\text{HypergeometricPFQRegularized}[\{1,\,2+m\},\,\{3+m\},\,a\,x]+\text{Log}[1-a\,x]+(1+m)\,\text{PolyLog}[2,\,a\,x]-\text{PolyLog}[3,\,a\,x]-2\,m\,\text{PolyLog}[3,\,a\,x]-m^2\,\text{PolyLog}[3,\,a\,x]+\text{PolyLog}[4,\,a\,x]+3\,m\,\text{PolyLog}[4,\,a\,x]+3\,m^2\,\text{PolyLog}[4,\,a\,x]+m^3\,\text{PolyLog}[4,\,a\,x]\big)$$

Problem 106: Unable to integrate problem.

$$\int (d\,x)^m\,\text{PolyLog}[3,\,a\,x^2]\,dx$$

Optimal (type 5, 118 leaves, 5 steps):

$$-\frac{8\,a\,(d\,x)^{3+m}\,\text{Hypergeometric2F1}\left[1,\,\frac{3+m}{2},\,\frac{5+m}{2},\,a\,x^2\right]}{d^3\,(1+m)^3\,(3+m)}-\frac{4\,(d\,x)^{1+m}\,\text{Log}[1-a\,x^2]}{d\,(1+m)^3}-\frac{2\,(d\,x)^{1+m}\,\text{PolyLog}[2,\,a\,x^2]}{d\,(1+m)^2}+\frac{(d\,x)^{1+m}\,\text{PolyLog}[3,\,a\,x^2]}{d\,(1+m)}$$

Result (type 9, 126 leaves):

$$-\left(\left(2\,x\,(d\,x)^m\,\text{Gamma}\left[\frac{3+m}{2}\right]\left(2\,a\,(1+m)\,x^2\,\text{Gamma}\left[\frac{1+m}{2}\right]\text{HypergeometricPFQRegularized}\left[\left\{1,\,\frac{3+m}{2}\right\},\,\left\{\frac{5+m}{2}\right\},\,a\,x^2\right]+4\,\text{Log}[1-a\,x^2]+2\,(1+m)\,\text{PolyLog}[2,\,a\,x^2]-\text{PolyLog}[3,\,a\,x^2]-2\,m\,\text{PolyLog}[3,\,a\,x^2]-m^2\,\text{PolyLog}[3,\,a\,x^2]\right)\right)\Big/\left((1+m)^4\,\text{Gamma}\left[\frac{1+m}{2}\right]\right)\right)$$

Problem 107: Unable to integrate problem.

$$\int (d\,x)^m\,\text{PolyLog}[4,\,a\,x^2]\,dx$$

Optimal (type 5, 142 leaves, 6 steps):

$$\frac{16\,a\,(d\,x)^{3+m}\,\text{Hypergeometric2F1}\left[1,\,\frac{3+m}{2},\,\frac{5+m}{2},\,a\,x^2\right]}{d^3\,(1+m)^4\,(3+m)}+\frac{8\,(d\,x)^{1+m}\,\text{Log}[1-a\,x^2]}{d\,(1+m)^4}+\frac{4\,(d\,x)^{1+m}\,\text{PolyLog}[2,\,a\,x^2]}{d\,(1+m)^3}-\frac{2\,(d\,x)^{1+m}\,\text{PolyLog}[3,\,a\,x^2]}{d\,(1+m)^2}+\frac{(d\,x)^{1+m}\,\text{PolyLog}[4,\,a\,x^2]}{d\,(1+m)}$$

Result (type 9, 166 leaves) :

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

Problem 109: Unable to integrate problem.

$$\int (d\,x)^m\,\text{PolyLog}\left[3,a\,x^3\right]\,dx$$

Optimal (type 5, 118 leaves, 5 steps) :

$$-\frac{27\,a\,(d\,x)^{4+m}\,\text{Hypergeometric2F1}\left[1,\frac{4+m}{3},\frac{7+m}{3},a\,x^3\right]}{d^4\,(1+m)^3\,(4+m)}-\frac{9\,(d\,x)^{1+m}\,\text{Log}\left[1-a\,x^3\right]}{d\,(1+m)^3}-\frac{3\,(d\,x)^{1+m}\,\text{PolyLog}\left[2,a\,x^3\right]}{d\,(1+m)^2}+\frac{(d\,x)^{1+m}\,\text{PolyLog}\left[3,a\,x^3\right]}{d\,(1+m)}$$

Result (type 9, 126 leaves) :

$$-\left(\left(3\,x\,(d\,x)^m\,\text{Gamma}\left[\frac{4+m}{3}\right]\left(3\,a\,(1+m)\,x^3\,\text{Gamma}\left[\frac{1+m}{3}\right]\,\text{HypergeometricPFQRegularized}\left[\left\{1,\frac{4+m}{3}\right\},\left\{\frac{7+m}{3}\right\},a\,x^3\right]+9\,\text{Log}\left[1-a\,x^3\right]+3\,(1+m)\,\text{PolyLog}\left[2,a\,x^3\right]-\text{PolyLog}\left[3,a\,x^3\right]-2\,m\,\text{PolyLog}\left[3,a\,x^3\right]-m^2\,\text{PolyLog}\left[3,a\,x^3\right]\right)\right)\Big/\left((1+m)^4\,\text{Gamma}\left[\frac{1+m}{3}\right]\right)\right)$$

Problem 110: Unable to integrate problem.

$$\int (d\,x)^m\,\text{PolyLog}\left[4,a\,x^3\right]\,dx$$

Optimal (type 5, 142 leaves, 6 steps) :

$$\frac{81\,a\,(d\,x)^{4+m}\,\text{Hypergeometric2F1}\left[1,\frac{4+m}{3},\frac{7+m}{3},a\,x^3\right]}{d^4\,(1+m)^4\,(4+m)}+\frac{27\,(d\,x)^{1+m}\,\text{Log}\left[1-a\,x^3\right]}{d\,(1+m)^4}+\frac{9\,(d\,x)^{1+m}\,\text{PolyLog}\left[2,a\,x^3\right]}{d\,(1+m)^3}-\frac{3\,(d\,x)^{1+m}\,\text{PolyLog}\left[3,a\,x^3\right]}{d\,(1+m)^2}+\frac{(d\,x)^{1+m}\,\text{PolyLog}\left[4,a\,x^3\right]}{d\,(1+m)}$$

Result (type 9, 166 leaves) :

$$\frac{1}{(1+m)^5\,\text{Gamma}\left[\frac{1+m}{3}\right]} 3\,x\,(d\,x)^m\,\text{Gamma}\left[\frac{4+m}{3}\right]$$
$$\left(9\,a\,(1+m)\,x^3\,\text{Gamma}\left[\frac{1+m}{3}\right]\,\text{HypergeometricPFQRegularized}\left[\left\{1,\frac{4+m}{3}\right\},\left\{\frac{7+m}{3}\right\},a\,x^3\right]+\right.$$
$$27\,\text{Log}\left[1-a\,x^3\right]+9\,(1+m)\,\text{PolyLog}\left[2,a\,x^3\right]-3\,\text{PolyLog}\left[3,a\,x^3\right]-$$
$$6\,m\,\text{PolyLog}\left[3,a\,x^3\right]-3\,m^2\,\text{PolyLog}\left[3,a\,x^3\right]+\text{PolyLog}\left[4,a\,x^3\right]+$$
$$\left.3\,m\,\text{PolyLog}\left[4,a\,x^3\right]+3\,m^2\,\text{PolyLog}\left[4,a\,x^3\right]+m^3\,\text{PolyLog}\left[4,a\,x^3\right]\right)$$

Problem 112: Unable to integrate problem.

$$\int (d\,x)^m\,\text{PolyLog}\left[3,a\,x^q\right]\,dx$$

Optimal (type 5, 130 leaves, 5 steps):

$$-\frac{a\,q^3\,x^{1+q}\,(d\,x)^m\,\text{Hypergeometric2F1}\left[1,\frac{1+m+q}{q},\frac{1+m+2\,q}{q},a\,x^q\right]}{(1+m)^3\,(1+m+q)}-$$
$$\frac{q^2\,(d\,x)^{1+m}\,\text{Log}\left[1-a\,x^q\right]}{d\,(1+m)^3}-\frac{q\,(d\,x)^{1+m}\,\text{PolyLog}\left[2,a\,x^q\right]}{d\,(1+m)^2}+\frac{(d\,x)^{1+m}\,\text{PolyLog}\left[3,a\,x^q\right]}{d\,(1+m)}$$

Result (type 9, 50 leaves):

$$-\frac{1}{q}x\,(d\,x)^m\,\text{MeijerG}\left[\left\{\left\{1,1,1,1,1-\frac{1+m}{q}\right\},\{\}\right\},\left\{\{1\},\left\{0,0,0,-\frac{1+m}{q}\right\}\right\},-a\,x^q\right]$$

Problem 113: Unable to integrate problem.

$$\int (d\,x)^m\,\text{PolyLog}\left[4,a\,x^q\right]\,dx$$

Optimal (type 5, 154 leaves, 6 steps):

$$\frac{a\,q^4\,x^{1+q}\,(d\,x)^m\,\text{Hypergeometric2F1}\left[1,\frac{1+m+q}{q},\frac{1+m+2\,q}{q},a\,x^q\right]}{(1+m)^4\,(1+m+q)}+\frac{q^3\,(d\,x)^{1+m}\,\text{Log}\left[1-a\,x^q\right]}{d\,(1+m)^4}+$$
$$\frac{q^2\,(d\,x)^{1+m}\,\text{PolyLog}\left[2,a\,x^q\right]}{d\,(1+m)^3}-\frac{q\,(d\,x)^{1+m}\,\text{PolyLog}\left[3,a\,x^q\right]}{d\,(1+m)^2}+\frac{(d\,x)^{1+m}\,\text{PolyLog}\left[4,a\,x^q\right]}{d\,(1+m)}$$

Result (type 9, 52 leaves):

$$-\frac{1}{q}x\,(d\,x)^m\,\text{MeijerG}\left[\left\{\left\{1,1,1,1,1,1-\frac{1+m}{q}\right\},\{\}\right\},\left\{\{1\},\left\{0,0,0,0,-\frac{1+m}{q}\right\}\right\},-a\,x^q\right]$$

Problem 152: Unable to integrate problem.

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

Optimal (type 4, 33 leaves, 1 step):

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

Result (type 8, 40 leaves):

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

Problem 181: Unable to integrate problem.

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

Optimal (type 4, 2498 leaves, 22 steps):

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

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

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

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

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

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

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

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

$$\frac{b\,h\,n\,\text{Log}[c\,(a+b x)]\,\text{Log}[d+e x]\,\text{Log}[1-c\,(a+b x)]}{a}-$$

$$\frac{e\,h\,n\,\text{Log}[c\,(a+b x)]\,\text{Log}[d+e x]\,\text{Log}[1-c\,(a+b x)]}{d}-$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 8, 29 leaves) :

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

Problem 182: Unable to integrate problem.

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

Optimal (type 4, 3119 leaves, 44 steps) :

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 8, 29 leaves):

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

Problem 183: Unable to integrate problem.

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

Optimal (type 4, 3733 leaves, 78 steps):

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

$$\frac{b^3 g \operatorname{PolyLog}\left[2, c \left(a+b x\right)\right]}{3 a^3}+\frac{b^2 e h n \operatorname{PolyLog}\left[2, c \left(a+b x\right)\right]}{6 a^2 d}+$$

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Result (type 8, 29 leaves) :

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

Problem 196: Unable to integrate problem.

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

Optimal (type 4, 343 leaves, 32 steps) :

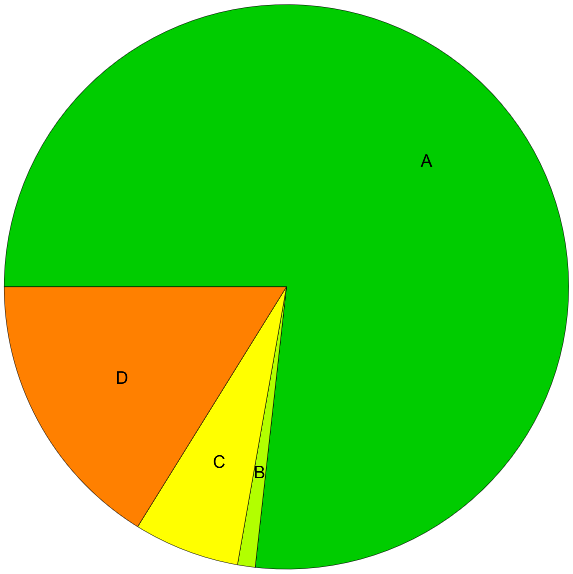
$$-a d^2 \text{Log}[x] + a d^2 \text{Log}[1 - d x] - \frac{a d \text{Log}[1 - d x]}{x} - \frac{1}{4} a d^2 \text{Log}[1 - d x]^2 +$$
$$\frac{a \text{Log}[1 - d x]^2}{4 x^2} + \frac{b (1 - d x) \text{Log}[1 - d x]^2}{x} - \frac{b^2 \text{Log}[d x] \text{Log}[1 - d x]^2}{2 a} +$$
$$\frac{(b + a d)^2 \text{Log}[d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

Result (type 8, 28 leaves):

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

Summary of Integration Test Results

198 integration problems



A - 152 optimal antiderivatives

B - 2 more than twice size of optimal antiderivatives

C - 12 unnecessarily complex antiderivatives

D - 32 unable to integrate problems

E - 0 integration timeouts