Rubi 4.16.1.4 Integration Test Results

on the problems in the test-suite directory "3 Logarithms"

Test results for the 193 problems in "3.1.2 (d x)^m (a+b log(c x^n))^p.m"

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

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

Test results for the 314 problems in "3.2.1 (f+g x)^m (A+B log(e ((a+b x) over (c+d x))^n))^p.m"

Test results for the 263 problems in "3.2.2 (f+g x)^m (h+i x)^q (A+B log(e ((a+b x) over (c+d x))^n))^p.m"

Test results for the 108 problems in "3.2.3 u log(e (f (a+b x)^p (c+d x)^q)^r)^s.m"

Problem 39: Result valid but suboptimal antiderivative.

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

Optimal (type 4, 1471 leaves, ? steps):

$$\frac{p q r^2 \text{Log}\left[-\frac{b c-a d}{d (a+b x)}\right] \text{Log}\left[\frac{(b g-a h) (c+d x)}{(d g-c h) (a+b x)}\right]^2}{h}+\frac{p^2 r^2 \text{Log}[a+b x]^2 \text{Log}[g+h x]}{h}+\frac{2 p q r^2 \text{Log}[a+b x] \text{Log}[c+d x] \text{Log}[g+h x]}{h}+$$

$$\frac{q^2 r^2 \text{Log}[c+d x]^2 \text{Log}[g+h x]}{h}-\frac{2 p r \text{Log}[a+b x] \text{Log}\left[e \left(f (a+b x)^p (c+d x)^q\right)^r\right] \text{Log}[g+h x]}{h}-$$

$$\frac{2 q r \text{Log}[c+d x] \text{Log}\left[e \left(f (a+b x)^p (c+d x)^q\right)^r\right] \text{Log}[g+h x]}{h}+\frac{\text{Log}\left[e \left(f (a+b x)^p (c+d x)^q\right)^r\right]^2 \text{Log}[g+h x]}{h}-$$

$$\frac{p^2 r^2 \text{Log}[a+b x]^2 \text{Log}\left[\frac{b (g+h x)}{b g-a h}\right]}{h}-\frac{2 p q r^2 \text{Log}[a+b x] \text{Log}\left[-\frac{h (c+d x)}{d g-c h}\right] \text{Log}\left[\frac{b (g+h x)}{b g-a h}\right]}{h}+\frac{p q r^2 \text{Log}\left[-\frac{h (c+d x)}{d g-c h}\right]^2 \text{Log}\left[\frac{b (g+h x)}{b g-a h}\right]}{h}-$$

$$\frac{2 p q r^2 \text{Log}\left[-\frac{h (c+d x)}{d g-c h}\right] \text{Log}\left[\frac{(b g-a h) (c+d x)}{(d g-c h) (a+b x)}\right] \text{Log}\left[\frac{b (g+h x)}{b g-a h}\right]}{h}+\frac{p q r^2 \text{Log}\left[\frac{(b g-a h) (c+d x)}{(d g-c h) (a+b x)}\right]^2 \text{Log}\left[\frac{b (g+h x)}{b g-a h}\right]}{h}+$$

$$\frac{2 p r \text{Log}[a+b x] \text{Log}\left[e \left(f (a+b x)^p (c+d x)^q\right)^r\right] \text{Log}\left[\frac{b (g+h x)}{b g-a h}\right]}{h}-\frac{2 p q r^2 \text{Log}[a+b x] \text{Log}[c+d x] \text{Log}\left[\frac{d (g+h x)}{d g-c h}\right]}{h}-$$

$$\frac{q^2 r^2 \text{Log}[c+d x]^2 \text{Log}\left[\frac{d (g+h x)}{d g-c h}\right]}{h}+\frac{2 p q r^2 \text{Log}[a+b x] \text{Log}\left[-\frac{h (c+d x)}{d g-c h}\right] \text{Log}\left[\frac{d (g+h x)}{d g-c h}\right]}{h}-\frac{p q r^2 \text{Log}\left[-\frac{h (c+d x)}{d g-c h}\right]^2 \text{Log}\left[\frac{d (g+h x)}{d g-c h}\right]}{h}+$$

$$\frac{2 p q r^2 \text{Log}\left[-\frac{h (c+d x)}{d g-c h}\right] \text{Log}\left[\frac{(b g-a h) (c+d x)}{(d g-c h) (a+b x)}\right] \text{Log}\left[\frac{d (g+h x)}{d g-c h}\right]}{h}+\frac{2 q r \text{Log}[c+d x] \text{Log}\left[e \left(f (a+b x)^p (c+d x)^q\right)^r\right] \text{Log}\left[\frac{d (g+h x)}{d g-c h}\right]}{h}-$$

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

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

$$\frac{2 p q r^2 \text{Log}\left[\frac{(b g-a h) (c+d x)}{(d g-c h) (a+b x)}\right] \text{PolyLog}\left[2,\frac{(b g-a h) (c+d x)}{(d g-c h) (a+b x)}\right]}{h}-\frac{2 p^2 r^2 \text{PolyLog}\left[3,-\frac{h (a+b x)}{b g-a h}\right]}{h}-\frac{2 p q r^2 \text{PolyLog}\left[3,-\frac{h (a+b x)}{b g-a h}\right]}{h}-$$

$$\frac{2 p q r^2 \text{PolyLog}\left[3,-\frac{h (c+d x)}{d g-c h}\right]}{h}-\frac{2 q^2 r^2 \text{PolyLog}\left[3,-\frac{h (c+d x)}{d g-c h}\right]}{h}-\frac{2 p q r^2 \text{PolyLog}\left[3,\frac{b (c+d x)}{d (a+b x)}\right]}{h}+\frac{2 p q r^2 \text{PolyLog}\left[3,\frac{(b g-a h) (c+d x)}{(d g-c h) (a+b x)}\right]}{h}$$

Result (type 4, 2096 leaves, 29 steps):

$$-\frac{\text{Log}\left[(a+b x)^{p r}\right]^2 \text{Log}[g+h x]}{h}-\frac{2 p q r^2 \text{Log}\left[-\frac{d (a+b x)}{b c-a d}\right] \text{Log}[c+d x] \text{Log}[g+h x]}{h}-\frac{2 p q r^2 \text{Log}[a+b x] \text{Log}\left[\frac{b (c+d x)}{b c-a d}\right] \text{Log}[g+h x]}{h}+$$

$$\frac{2 q r \left(p r \text{Log}[a+b x]-\text{Log}\left[(a+b x)^{p r}\right]\right) \text{Log}\left[-\frac{h (c+d x)}{d g-c h}\right] \text{Log}[g+h x]}{h}+\frac{2 p r \text{Log}\left[-\frac{h (a+b x)}{b g-a h}\right] \left(q r \text{Log}[c+d x]-\text{Log}\left[(c+d x)^{q r}\right]\right) \text{Log}[g+h x]}{h}-$$

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

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

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

$$\frac{p\,q\,r^{2}\left(\text{Log}\left[\frac{b\,(c+d\,x)}{b\,c-a\,d}\right]+\text{Log}\left[\frac{b\,g-a\,h}{b\,(g+h\,x)}\right]-\text{Log}\left[\frac{(b\,g-a\,h)\,(c+d\,x)}{(b\,c-a\,d)\,(g+h\,x)}\right]\right)\text{Log}\left[-\frac{(b\,c-a\,d)\,(g+h\,x)}{(d\,g-c\,h)\,(a+b\,x)}\right]^{2}}{h}+$$

$$\frac{p\,q\,r^{2}\left(\text{Log}\left[\frac{b\,(c+d\,x)}{b\,c-a\,d}\right]-\text{Log}\left[-\frac{h\,(c+d\,x)}{d\,g-c\,h}\right]\right)\left(\text{Log}[a+b\,x]+\text{Log}\left[-\frac{(b\,c-a\,d)\,(g+h\,x)}{(d\,g-c\,h)\,(a+b\,x)}\right]\right)^{2}}{h}-$$

$$\frac{p\,q\,r^{2}\left(\text{Log}\left[-\frac{d\,(a+b\,x)}{b\,c-a\,d}\right]+\text{Log}\left[\frac{d\,g-c\,h}{d\,(g+h\,x)}\right]-\text{Log}\left[-\frac{(d\,g-c\,h)\,(a+b\,x)}{(b\,c-a\,d)\,(g+h\,x)}\right]\right)\text{Log}\left[\frac{(b\,c-a\,d)\,(g+h\,x)}{(b\,g-a\,h)\,(c+d\,x)}\right]^{2}}{h}+$$

$$\frac{p\,q\,r^{2}\left(\text{Log}\left[-\frac{d\,(a+b\,x)}{b\,c-a\,d}\right]-\text{Log}\left[-\frac{h\,(a+b\,x)}{b\,g-a\,h}\right]\right)\left(\text{Log}[c+d\,x]+\text{Log}\left[\frac{(b\,c-a\,d)\,(g+h\,x)}{(b\,g-a\,h)\,(c+d\,x)}\right]\right)^{2}}{h}-\frac{2\,p\,q\,r^{2}\left(\text{Log}[g+h\,x]-\text{Log}\left[-\frac{(b\,c-a\,d)\,(g+h\,x)}{(d\,g-c\,h)\,(a+b\,x)}\right]\right)\text{PolyLog}\left[2,-\frac{d\,(a+b\,x)}{b\,c-a\,d}\right]}{h}+$$

$$\frac{2\,p\,r\,\text{Log}\left[(a+b\,x)^{p\,r}\right]\text{PolyLog}\left[2,-\frac{h\,(a+b\,x)}{b\,g-a\,h}\right]}{h}-\frac{2\,p\,q\,r^{2}\left(\text{Log}[g+h\,x]-\text{Log}\left[\frac{(b\,c-a\,d)\,(g+h\,x)}{(b\,g-a\,h)\,(c+d\,x)}\right]\right)\text{PolyLog}\left[2,\frac{b\,(c+d\,x)}{b\,c-a\,d}\right]}{h}+$$

$$\frac{2\,q\,r\,\text{Log}\left[(c+d\,x)^{q\,r}\right]\text{PolyLog}\left[2,-\frac{h\,(c+d\,x)}{d\,g-c\,h}\right]}{h}+\frac{2\,p\,q\,r^{2}\,\text{Log}\left[-\frac{(b\,c-a\,d)\,(g+h\,x)}{(d\,g-c\,h)\,(a+b\,x)}\right]\text{PolyLog}\left[2,\frac{h\,(a+b\,x)}{b\,(g+h\,x)}\right]}{h}-$$

$$\frac{2\,p\,q\,r^{2}\,\text{Log}\left[-\frac{(b\,c-a\,d)\,(g+h\,x)}{(d\,g-c\,h)\,(a+b\,x)}\right]\text{PolyLog}\left[2,-\frac{(d\,g-c\,h)\,(a+b\,x)}{(b\,c-a\,d)\,(g+h\,x)}\right]}{h}+\frac{2\,p\,q\,r^{2}\,\text{Log}\left[\frac{(b\,c-a\,d)\,(g+h\,x)}{(b\,g-a\,h)\,(c+d\,x)}\right]\text{PolyLog}\left[2,\frac{h\,(c+d\,x)}{d\,(g+h\,x)}\right]}{h}-$$

$$\frac{2\,p\,q\,r^{2}\,\text{Log}\left[\frac{(b\,c-a\,d)\,(g+h\,x)}{(b\,g-a\,h)\,(c+d\,x)}\right]\text{PolyLog}\left[2,\frac{(b\,g-a\,h)\,(c+d\,x)}{(b\,c-a\,d)\,(g+h\,x)}\right]}{h}+\frac{2\,p\,r\left(q\,r\,\text{Log}[c+d\,x]-\text{Log}\left[(c+d\,x)^{q\,r}\right]\right)\text{PolyLog}\left[2,\frac{b\,(g+h\,x)}{b\,g-a\,h}\right]}{h}+$$

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

$$\frac{2\,p\,q\,r^{2}\left(\text{Log}[c+d\,x]+\text{Log}\left[\frac{(b\,c-a\,d)\,(g+h\,x)}{(b\,g-a\,h)\,(c+d\,x)}\right]\right)\text{PolyLog}\left[2,\frac{b\,(g+h\,x)}{b\,g-a\,h}\right]}{h}+\frac{2\,q\,r\left(p\,r\,\text{Log}[a+b\,x]-\text{Log}\left[(a+b\,x)^{p\,r}\right]\right)\text{PolyLog}\left[2,\frac{d\,(g+h\,x)}{d\,g-c\,h}\right]}{h}+$$

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

$$\frac{2\,p\,q\,r^{2}\left(\text{Log}[a+b\,x]+\text{Log}\left[-\frac{(b\,c-a\,d)\,(g+h\,x)}{(d\,g-c\,h)\,(a+b\,x)}\right]\right)\text{PolyLog}\left[2,\frac{d\,(g+h\,x)}{d\,g-c\,h}\right]}{h}+\frac{2\,p\,q\,r^{2}\,\text{PolyLog}\left[3,-\frac{d\,(a+b\,x)}{b\,c-a\,d}\right]}{h}-\frac{2\,p^{2}\,r^{2}\,\text{PolyLog}\left[3,-\frac{h\,(a+b\,x)}{b\,g-a\,h}\right]}{h}+$$

$$\frac{2\,p\,q\,r^{2}\,\text{PolyLog}\left[3,\frac{b\,(c+d\,x)}{b\,c-a\,d}\right]}{h}-\frac{2\,q^{2}\,r^{2}\,\text{PolyLog}\left[3,-\frac{h\,(c+d\,x)}{d\,g-c\,h}\right]}{h}+\frac{2\,p\,q\,r^{2}\,\text{PolyLog}\left[3,\frac{h\,(a+b\,x)}{b\,(g+h\,x)}\right]}{h}-\frac{2\,p\,q\,r^{2}\,\text{PolyLog}\left[3,-\frac{(d\,g-c\,h)\,(a+b\,x)}{(b\,c-a\,d)\,(g+h\,x)}\right]}{h}+$$

$$\frac{2\,p\,q\,r^2\,\text{PolyLog}\left[3,\frac{h\,(c+d\,x)}{d\,(g+h\,x)}\right]}{h}-\frac{2\,p\,q\,r^2\,\text{PolyLog}\left[3,\frac{(b\,g-a\,h)\,(c+d\,x)}{(b\,c-a\,d)\,(g+h\,x)}\right]}{h}+\frac{2\,p\,q\,r^2\,\text{PolyLog}\left[3,\frac{b\,(g+h\,x)}{b\,g-a\,h}\right]}{h}+\frac{2\,p\,q\,r^2\,\text{PolyLog}\left[3,\frac{d\,(g+h\,x)}{d\,g-c\,h}\right]}{h}$$

Problem 74: Unable to integrate problem.

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

Optimal (type 3, 45 leaves, ? steps):

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

Result (type 8, 152 leaves, 3 steps):

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

Problem 75: Unable to integrate problem.

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

Optimal (type 3, 45 leaves, ? steps):

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

Result (type 8, 154 leaves, 3 steps):

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

Test results for the 547 problems in "3.3 u (a+b log(c (d+e x)^n))^p.m"

Problem 370: Unable to integrate problem.

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

Optimal (type 4, 823 leaves, ? steps):

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

Result (type 8, 72 leaves, 1 step):

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

Problem 371: Unable to integrate problem.

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

Optimal (type 4, 607 leaves, ? steps):

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

Result (type 8, 28 leaves, 0 steps):

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

Problem 372: Unable to integrate problem.

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

Optimal (type 4, 939 leaves, ? steps):

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

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

$$\frac{b^2 e^2 n^2 \text{Log}[f x^m]\,\text{Log}[d+e x]}{d^2} - \frac{b^2 e n^2 \text{Log}[f x^m]\,\text{Log}[d+e x]}{d x} - \frac{b^2 e^2 n^2 \text{Log}[x]\,\text{Log}[f x^m]\,\text{Log}[d+e x]}{d^2} + \frac{b^2 e^2 m n^2 \text{Log}[d+e x]^2}{4 d^2} -$$

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

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

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

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

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

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

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

Result (type 8, 28 leaves, 0 steps):

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

Problem 374: Unable to integrate problem.

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

Optimal (type 4, 519 leaves, ? steps):

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

Result (type 8, 40 leaves, 1 step):

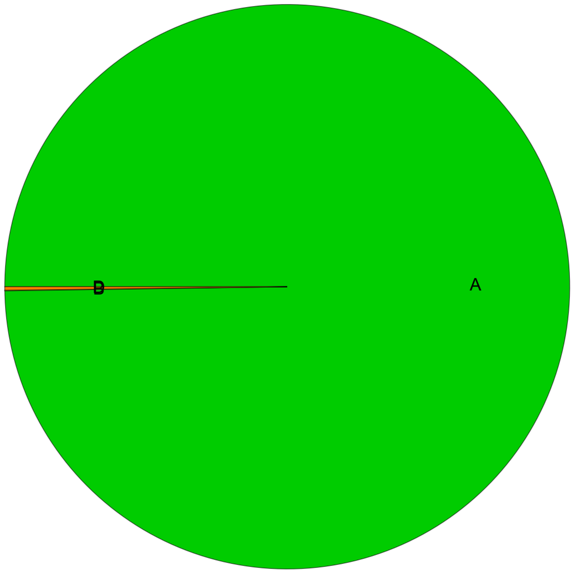
$$\frac{1}{2}\,\text{Log}[x]^2\,\text{Log}[a+b\,x]^2-b\,\text{Unintegrable}\left[\frac{\text{Log}[x]^2\,\text{Log}[a+b\,x]}{a+b\,x},x\right]$$

Test results for the 641 problems in "3.4 u (a+b log(c (d+e x^m)^n))^p.m"

Test results for the 314 problems in "3.5 Logarithm functions.m"

Summary of Integration Test Results

3085 integration problems



A - 3078 optimal antiderivatives

B - 1 valid but suboptimal antiderivatives

C - 0 unnecessarily complex antiderivatives

D - 6 unable to integrate problems

E - 0 integration timeouts

F - 0 invalid antiderivatives