Rubi 4.16.1.4 Integration Test Results

on the problems in the test-suite directory "4 Trig functions"

Test results for the 538 problems in "4.1.0 (a sin)^m (b trg)^n.m"

Test results for the 348 problems in "4.1.10 (c+d x)^m (a+b sin)^n.m"

Test results for the 72 problems in "4.1.1.1 (a+b sin)^n.m"

Test results for the 113 problems in "4.1.11 (e x)^m (a+b x^n)^p sin.m"

Test results for the 357 problems in "4.1.12 (e x)^m (a+b sin(c+d x^n))^p.m"

Test results for the 653 problems in "4.1.1.2 (g cos)^p (a+b sin)^m.m"

Problem 648: Result valid but suboptimal antiderivative.

$$\int (e\,\mathrm{Cos}[c+d\,x])^{-3-m}\,(a+b\,\mathrm{Sin}[c+d\,x])^m\,dx$$

Optimal (type 5, 311 leaves, ? steps):

$$\frac{(e\,\mathrm{Cos}[c+d\,x])^{-m}\,\mathrm{Sec}[c+d\,x]^4\,(-1+\mathrm{Sin}[c+d\,x])\,(1+\mathrm{Sin}[c+d\,x])\,(a+b\,\mathrm{Sin}[c+d\,x])^{1+m}}{(a-b)\,d\,e^3\,(2+m)}+\frac{1}{(a-b)^2\,d\,e^3\,m\,(2+m)}$$
$$(-2\,b+a\,(2+m))\,(e\,\mathrm{Cos}[c+d\,x])^{-m}\,\mathrm{Sec}[c+d\,x]^4\,(-1+\mathrm{Sin}[c+d\,x])\,(1+\mathrm{Sin}[c+d\,x])^2\,(a+b\,\mathrm{Sin}[c+d\,x])^{1+m}-$$
$$\frac{1}{(a-b)^3\,d\,e^3\,m\,(1+m)}\,(-b^2+a^2\,(1+m))\,(e\,\mathrm{Cos}[c+d\,x])^{-m}\,\mathrm{Hypergeometric2F1}\left[\frac{m}{2},1+m,2+m,-\frac{2\,(a+b\,\mathrm{Sin}[c+d\,x])}{(a-b)\,(-1+\mathrm{Sin}[c+d\,x])}\right]$$
$$\mathrm{Sec}[c+d\,x]^4\,(1+\mathrm{Sin}[c+d\,x])^3\left(\frac{(a+b)\,(1+\mathrm{Sin}[c+d\,x])}{(a-b)\,(-1+\mathrm{Sin}[c+d\,x])}\right)^{\frac{1}{2}(-2+m)}\,(a+b\,\mathrm{Sin}[c+d\,x])^{1+m}$$

Result (type 5, 420 leaves, 5 steps):

$$-\frac{(e\,\mathrm{Cos}[c+d\,x])^{-2-m}\,(a+b\,\mathrm{Sin}[c+d\,x])^{1+m}}{(a-b)\,d\,e\,(2+m)}-$$
$$\left(b\,(e\,\mathrm{Cos}[c+d\,x])^{-2-m}\,\mathrm{Hypergeometric2F1}\left[1+m,\frac{2+m}{2},2+m,\frac{2\,(a+b\,\mathrm{Sin}[c+d\,x])}{(a+b)\,(1+\mathrm{Sin}[c+d\,x])}\right]\,(1-\mathrm{Sin}[c+d\,x])\,\left(-\frac{(a-b)\,(1-\mathrm{Sin}[c+d\,x])}{(a+b)\,(1+\mathrm{Sin}[c+d\,x])}\right)^{m/2}\right.$$
$$\left.(a+b\,\mathrm{Sin}[c+d\,x])^{1+m}\right)\Big/\left((a^2-b^2)\,d\,e\,(1+m)\,(2+m)\right)+\frac{a\,(e\,\mathrm{Cos}[c+d\,x])^{-2-m}\,(1+\mathrm{Sin}[c+d\,x])\,(a+b\,\mathrm{Sin}[c+d\,x])^{1+m}}{(a^2-b^2)\,d\,e\,(2+m)}+$$
$$\left(2^{-m/2}\,a\,(a+b+a\,m)\,(e\,\mathrm{Cos}[c+d\,x])^{-2-m}\,\mathrm{Hypergeometric2F1}\left[-\frac{m}{2},\frac{2+m}{2},\frac{2-m}{2},\frac{(a-b)\,(1-\mathrm{Sin}[c+d\,x])}{2\,(a+b\,\mathrm{Sin}[c+d\,x])}\right]\right.$$
$$\left.(1-\mathrm{Sin}[c+d\,x])\,\left(\frac{(a+b)\,(1+\mathrm{Sin}[c+d\,x])}{a+b\,\mathrm{Sin}[c+d\,x]}\right)^{\frac{2+m}{2}}\,(a+b\,\mathrm{Sin}[c+d\,x])^{1+m}\right)\Big/\left((a-b)\,(a+b)^2\,d\,e\,m\,(2+m)\right)$$

Test results for the 36 problems in "4.1.13 (d+e x)^m sin(a+b x+c x^2)^n.m"

Test results for the 208 problems in "4.1.1.3 (g tan)^p (a+b sin)^m.m"

Test results for the 837 problems in "4.1.2.1 (a+b sin)^m (c+d sin)^n.m"

Test results for the 1563 problems in "4.1.2.2 (g cos)^p (a+b sin)^m (c+d sin)^n.m"

Problem 1479: Unable to integrate problem.

$$\int \frac{\mathrm{Sec}[e+f\,x]^2\,(a+b\,\mathrm{Sin}[e+f\,x])^{3/2}}{\sqrt{d\,\mathrm{Sin}[e+f\,x]}}\,dx$$

Optimal (type 4, 312 leaves, ? steps):

$$\frac{\text{Sec}[e+f x]\,(b+a\,\text{Sin}[e+f x])\,\sqrt{a+b\,\text{Sin}[e+f x]}}{f\,\sqrt{d\,\text{Sin}[e+f x]}}-$$

$$\frac{(a+b)^{3/2}\sqrt{-\frac{a\,(-1+\text{Csc}[e+f x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Csc}[e+f x])}{a-b}}\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{d}\,\sqrt{a+b\,\text{Sin}[e+f x]}}{\sqrt{a+b}\,\sqrt{d\,\text{Sin}[e+f x]}}\right],-\frac{a+b}{a-b}\right]\text{Tan}[e+f x]}{\sqrt{d}\,f}-$$

$$\left(b\,(a+b)\,\sqrt{-\frac{a\,(-1+\text{Csc}[e+f x])}{a+b}}\,\sqrt{\frac{b+a\,\text{Csc}[e+f x]}{-a+b}}\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{-\frac{b+a\,\text{Csc}[e+f x]}{a-b}}\right],\frac{-a+b}{a+b}\right](1+\text{Sin}[e+f x])\,\text{Tan}[e+f x]\right)\Big/$$

$$\left(f\,\sqrt{\frac{a\,(1+\text{Csc}[e+f x])}{a-b}}\,\sqrt{d\,\text{Sin}[e+f x]}\,\sqrt{a+b\,\text{Sin}[e+f x]}\right)$$

Result (type 8, 37 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{\text{Sec}[e+f x]^2\,(a+b\,\text{Sin}[e+f x])^{3/2}}{\sqrt{d\,\text{Sin}[e+f x]}},x\right]$$

Problem 1480: Unable to integrate problem.

$$\int\frac{\text{Sec}[e+f x]^4\,(a+b\,\text{Sin}[e+f x])^{5/2}}{\sqrt{d\,\text{Sin}[e+f x]}}\,dx$$

Optimal (type 4, 366 leaves, ? steps):

$$\frac{5\,a\,\text{Sec}[e+f x]\,(b+a\,\text{Sin}[e+f x])\,\sqrt{a+b\,\text{Sin}[e+f x]}}{6\,f\,\sqrt{d\,\text{Sin}[e+f x]}}+\frac{\text{Sec}[e+f x]^3\,\sqrt{d\,\text{Sin}[e+f x]}\,(a+b\,\text{Sin}[e+f x])^{5/2}}{3\,d\,f}-$$

$$\frac{5\,a\,(a+b)^{3/2}\sqrt{-\frac{a\,(-1+\text{Csc}[e+f x])}{a+b}}\,\sqrt{\frac{a\,(1+\text{Csc}[e+f x])}{a-b}}\,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{d}\,\sqrt{a+b\,\text{Sin}[e+f x]}}{\sqrt{a+b}\,\sqrt{d\,\text{Sin}[e+f x]}}\right],-\frac{a+b}{a-b}\right]\text{Tan}[e+f x]}{6\,\sqrt{d}\,f}-$$

$$\left(5\,a\,b\,(a+b)\,\sqrt{-\frac{a\,(-1+\text{Csc}[e+f x])}{a+b}}\,\sqrt{\frac{b+a\,\text{Csc}[e+f x]}{-a+b}}\,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{-\frac{b+a\,\text{Csc}[e+f x]}{a-b}}\right],\frac{-a+b}{a+b}\right](1+\text{Sin}[e+f x])\,\text{Tan}[e+f x]\right)\Big/$$

$$\left(6\,f\,\sqrt{\frac{a\,(1+\text{Csc}[e+f x])}{a-b}}\,\sqrt{d\,\text{Sin}[e+f x]}\,\sqrt{a+b\,\text{Sin}[e+f x]}\right)$$

Result (type 8, 87 leaves, 1 step):

$$\frac{\text{Sec}[e+f x]^3 \sqrt{d \text{Sin}[e+f x]} \, (a+b \text{Sin}[e+f x])^{5/2}}{3 d f}+\frac{5}{6} a \,\text{Unintegrable}\left[\frac{\text{Sec}[e+f x]^2 (a+b \text{Sin}[e+f x])^{3/2}}{\sqrt{d \text{Sin}[e+f x]}}, x\right]$$

Problem 1515: Unable to integrate problem.

$$\int \frac{\text{Sec}[e+f x]^6 (a+b \text{Sin}[e+f x])^{9/2}}{\sqrt{d \text{Sin}[e+f x]}} \, dx$$

Optimal (type 4, 502 leaves, ? steps):

$$-\frac{3 a b \left(-2 a^2+b^2\right) \text{Cos}[e+f x] \sqrt{a+b \text{Sin}[e+f x]}}{5 f \sqrt{d \text{Sin}[e+f x]}}+\frac{\text{Sec}[e+f x]^5 \sqrt{d \text{Sin}[e+f x]} \, (a+b \text{Sin}[e+f x])^{9/2}}{5 d f}-\frac{1}{20 d f} 3 a \,\text{Sec}[e+f x]^3 \sqrt{d \text{Sin}[e+f x]} \sqrt{a+b \text{Sin}[e+f x]} \left(-a \left(7 a^2+b^2\right)+2 b \left(-7 a^2+b^2\right) \text{Sin}[e+f x]+5 a \left(a^2-b^2\right) \text{Sin}[e+f x]^2+\left(8 a^2 b-4 b^3\right) \text{Sin}[e+f x]^3\right)-\frac{1}{20 \sqrt{d} f} 3 a (a+b)^{3/2} \left(5 a^2+3 a b-4 b^2\right) \sqrt{-\frac{a (-1+\text{Csc}[e+f x])}{a+b}} \sqrt{\frac{a (1+\text{Csc}[e+f x])}{a-b}} \,\text{EllipticF}\left[\text{ArcSin}\left[\frac{\sqrt{d} \sqrt{a+b \text{Sin}[e+f x]}}{\sqrt{a+b} \sqrt{d \text{Sin}[e+f x]}}\right], -\frac{a+b}{a-b}\right] \text{Tan}[e+f x]-\frac{1}{5 d f \sqrt{a+b \text{Sin}[e+f x]}} 3 b \left(2 a^4-3 a^2 b^2+b^4\right) \sqrt{-\frac{a (-1+\text{Csc}[e+f x])}{a+b}} \,\text{EllipticE}\left[\text{ArcSin}\left[\sqrt{-\frac{b+a \text{Csc}[e+f x]}{a-b}}\right], 1-\frac{2 a}{a+b}\right] \sqrt{d \text{Sin}[e+f x]} \sqrt{-\frac{a \,\text{Csc}[e+f x]^2 (1+\text{Sin}[e+f x]) (a+b \text{Sin}[e+f x])}{(a-b)^2}} \,\text{Tan}[e+f x]$$

Result (type 8, 87 leaves, 1 step):

$$\frac{\text{Sec}[e+f x]^5 \sqrt{d \text{Sin}[e+f x]} \, (a+b \text{Sin}[e+f x])^{9/2}}{5 d f}+\frac{9}{10} a \,\text{Unintegrable}\left[\frac{\text{Sec}[e+f x]^4 (a+b \text{Sin}[e+f x])^{7/2}}{\sqrt{d \text{Sin}[e+f x]}}, x\right]$$

Test results for the 51 problems in "4.1.2.3 (g sin)^p (a+b sin)^m (c+d sin)^n.m"

Test results for the 358 problems in "4.1.3.1 (a+b sin)^m (c+d sin)^n (A+B sin).m"

Test results for the 19 problems in "4.1.4.1 (a+b sin)^m (A+B sin+C sin^2).m"

Test results for the 34 problems in "4.1.4.2 (a+b sin)^m (c+d sin)^n (A+B sin+C sin^2).m"

Test results for the 594 problems in "4.1.7 (d trig)^m (a+b (c sin)^n)^p.m"

Problem 391: Unable to integrate problem.

$$\int \frac{\mathrm{Sec}[c+d\,x]^2}{a+b\,\mathrm{Sin}[c+d\,x]^3}\,dx$$

Optimal (type 3, 299 leaves, ? steps):

$$\frac{2\,(-1)^{2/3}\,b^{2/3}\,\mathrm{ArcTan}\left[\frac{(-1)^{1/3}\,b^{1/3}-a^{1/3}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a^{2/3}-(-1)^{2/3}\,b^{2/3}}}\right]}{3\,a^{2/3}\,\left(a^{2/3}-(-1)^{2/3}\,b^{2/3}\right)^{3/2}\,d}-\frac{2\,b^{2/3}\,\mathrm{ArcTan}\left[\frac{b^{1/3}+a^{1/3}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a^{2/3}-b^{2/3}}}\right]}{3\,a^{2/3}\,\left(a^{2/3}-b^{2/3}\right)^{3/2}\,d}+\frac{2\,(-1)^{1/3}\,b^{2/3}\,\mathrm{ArcTan}\left[\frac{(-1)^{2/3}\,b^{1/3}+a^{1/3}\,\mathrm{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a^{2/3}+(-1)^{1/3}\,b^{2/3}}}\right]}{3\,a^{2/3}\,\left(a^{2/3}+(-1)^{1/3}\,b^{2/3}\right)^{3/2}\,d}+\frac{\mathrm{Sec}[c+d\,x]\,\left(b-a\,\mathrm{Sin}[c+d\,x]\right)}{\left(-a^2+b^2\right)\,d}$$

Result (type 8, 25 leaves, 0 steps):

$$\mathrm{Unintegrable}\left[\frac{\mathrm{Sec}[c+d\,x]^2}{a+b\,\mathrm{Sin}[c+d\,x]^3},\,x\right]$$

Problem 392: Unable to integrate problem.

$$\int \frac{\mathrm{Sec}[c+d\,x]^4}{a+b\,\mathrm{Sin}[c+d\,x]^3}\,dx$$

Optimal (type 3, 1093 leaves, ? steps):

$$-\frac{2\,(-1)^{2/3}\,a^{2/3}\,b^{8/3}\,\text{ArcTan}\left[\frac{(-1)^{1/3}\,b^{1/3}-a^{1/3}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a^{2/3}-(-1)^{2/3}\,b^{2/3}}}\right]}{\sqrt{a^{2/3}-(-1)^{2/3}\,b^{2/3}}\,\left(a^2-b^2\right)^2\,d}-\frac{2\,b^2\,\left(2\,a^2+b^2\right)\,\text{ArcTan}\left[\frac{(-1)^{1/3}\,b^{1/3}-a^{1/3}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a^{2/3}-(-1)^{2/3}\,b^{2/3}}}\right]}{3\,a^{2/3}\,\sqrt{a^{2/3}-(-1)^{2/3}\,b^{2/3}}\,\left(a^2-b^2\right)^2\,d}+\frac{2\,a^{2/3}\,b^{8/3}\,\text{ArcTan}\left[\frac{b^{1/3}+a^{1/3}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{a^{2/3}-b^{2/3}}}\right]}{\sqrt{a^{2/3}-b^{2/3}}\,\left(a^2-b^2\right)^2\,d}+$$

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

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

$$\frac{2\,b^{4/3}\,\left(a^2+2\,b^2\right)\,\text{ArcTanh}\left[\frac{b^{1/3}+(-1)^{2/3}\,a^{1/3}\,\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]}{\sqrt{(-1)^{1/3}\,a^{2/3}+b^{2/3}}}\right]}{3\,\sqrt{(-1)^{1/3}\,a^{2/3}+b^{2/3}}\,\left(a^2-b^2\right)^2\,d}+\frac{\text{Cos}[c+d\,x]}{12\,(a+b)\,d\,(1-\text{Sin}[c+d\,x])^2}+\frac{\text{Cos}[c+d\,x]}{12\,(a+b)\,d\,(1-\text{Sin}[c+d\,x])}+$$

$$\frac{(a+4\,b)\,\text{Cos}[c+d\,x]}{4\,(a+b)^2\,d\,(1-\text{Sin}[c+d\,x])}-\frac{\text{Cos}[c+d\,x]}{12\,(a-b)\,d\,(1+\text{Sin}[c+d\,x])^2}-\frac{(a-4\,b)\,\text{Cos}[c+d\,x]}{4\,(a-b)^2\,d\,(1+\text{Sin}[c+d\,x])}-\frac{\text{Cos}[c+d\,x]}{12\,(a-b)\,d\,(1+\text{Sin}[c+d\,x])}$$

Result (type 8, 25 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{\text{Sec}[c+d\,x]^4}{a+b\,\text{Sin}[c+d\,x]^3},\,x\right]$$

Test results for the 9 problems in "4.1.8 (a+b sin)^m (c+d trig)^n.m"

Test results for the 19 problems in "4.1.9 trig^m (a+b sin^n+c sin^(2 n))^p.m"

Test results for the 294 problems in "4.2.0 (a cos)^m (b trg)^n.m"

Test results for the 189 problems in "4.2.10 (c+d x)^m (a+b cos)^n.m"

Test results for the 62 problems in "4.2.1.1 (a+b cos)^n.m"

Test results for the 99 problems in "4.2.12 (e x)^m (a+b cos(c+d x^n))^p.m"

Test results for the 88 problems in "4.2.1.2 (g sin)^p (a+b cos)^m.m"

Test results for the 34 problems in "4.2.13 (d+e x)^m cos(a+b x+c x^2)^n.m"

Test results for the 22 problems in "4.2.1.3 (g tan)^p (a+b cos)^m.m"

Test results for the 932 problems in "4.2.2.1 (a+b cos)^m (c+d cos)^n.m"

Test results for the 4 problems in "4.2.2.2 (g sin)^p (a+b cos)^m (c+d cos)^n.m"

Test results for the 1 problems in "4.2.2.3 (g cos)^p (a+b cos)^m (c+d cos)^n.m"

Test results for the 644 problems in "4.2.3.1 (a+b cos)^m (c+d cos)^n (A+B cos).m"

Test results for the 393 problems in "4.2.4.1 (a+b cos)^m (A+B cos+C cos^2).m"

Test results for the 1541 problems in "4.2.4.2 (a+b cos)^m (c+d cos)^n (A+B cos+C cos^2).m"

Test results for the 98 problems in "4.2.7 (d trig)^m (a+b (c cos)^n)^p.m"

Test results for the 21 problems in "4.2.8 (a+b cos)^m (c+d trig)^n.m"

Test results for the 20 problems in "4.2.9 trig^m (a+b cos^n+c cos^(2 n))^p.m"

Test results for the 387 problems in "4.3.0 (a trg)^m (b tan)^n.m"

Test results for the 63 problems in "4.3.10 (c+d x)^m (a+b tan)^n.m"

Problem 17: Unable to integrate problem.

$$\int\left(\frac{x^2}{\sqrt{\text{Tan}\left[a+b\,x^2\right]}}+\frac{\sqrt{\text{Tan}\left[a+b\,x^2\right]}}{b}+x^2\,\text{Tan}\left[a+b\,x^2\right]^{3/2}\right)dx$$

Optimal (type 3, 17 leaves, ? steps):

$$\frac{x\sqrt{\text{Tan}\left[a+b\,x^2\right]}}{b}$$

Result (type 8, 55 leaves, 1 step):

$$\text{Unintegrable}\left[\frac{x^2}{\sqrt{\text{Tan}\left[a+b\,x^2\right]}},x\right]+\frac{\text{Unintegrable}\left[\sqrt{\text{Tan}\left[a+b\,x^2\right]},x\right]}{b}+\text{Unintegrable}\left[x^2\,\text{Tan}\left[a+b\,x^2\right]^{3/2},x\right]$$

Test results for the 66 problems in "4.3.11 (e x)^m (a+b tan(c+d x^n))^p.m"

Test results for the 700 problems in "4.3.1.2 (d sec)^m (a+b tan)^n.m"

Test results for the 91 problems in "4.3.1.3 (d sin)^m (a+b tan)^n.m"

Test results for the 1328 problems in "4.3.2.1 (a+b tan)^m (c+d tan)^n.m"

Test results for the 855 problems in "4.3.3.1 (a+b tan)^m (c+d tan)^n (A+B tan).m"

Test results for the 171 problems in "4.3.4.2 (a+b tan)^m (c+d tan)^n (A+B tan+C tan^2).m"

Test results for the 499 problems in "4.3.7 (d trig)^m (a+b (c tan)^n)^p.m"

Test results for the 51 problems in "4.3.9 trig^m (a+b tan^n+c tan^(2 n))^p.m"

Test results for the 52 problems in "4.4.0 (a trg)^m (b cot)^n.m"

Test results for the 61 problems in "4.4.10 (c+d x)^m (a+b cot)^n.m"

Test results for the 23 problems in "4.4.1.2 (d csc)^m (a+b cot)^n.m"

Test results for the 19 problems in "4.4.1.3 (d cos)^m (a+b cot)^n.m"

Test results for the 106 problems in "4.4.2.1 (a+b cot)^m (c+d cot)^n.m"

Test results for the 64 problems in "4.4.7 (d trig)^m (a+b (c cot)^n)^p.m"

Test results for the 32 problems in "4.4.9 trig^m (a+b cot^n+c cot^(2 n))^p.m"

Test results for the 299 problems in "4.5.0 (a sec)^m (b trg)^n.m"

Test results for the 46 problems in "4.5.10 (c+d x)^m (a+b sec)^n.m"

Test results for the 83 problems in "4.5.11 (e x)^m (a+b sec(c+d x^n))^p.m"

Test results for the 879 problems in "4.5.1.2 (d sec)^n (a+b sec)^m.m"

Problem 286: Result unnecessarily involves higher level functions.

$$\int \text{Sec}[c+d x]^{5/3} \left(a+a \text{Sec}[c+d x]\right)^{2/3} dx$$

Optimal (type 5, 327 leaves, ? steps):

$$-\frac{3\,a\,\text{Sec}[c+d\,x]^{5/3}\,\text{Sin}[c+d\,x]}{2\,d\,\left(a\,\left(1+\text{Sec}[c+d\,x]\right)\right)^{1/3}}+\frac{9\,\text{Sec}[c+d\,x]^{2/3}\,\left(a\,\left(1+\text{Sec}[c+d\,x]\right)\right)^{2/3}\,\text{Sin}[c+d\,x]}{4\,d}-\frac{9\,\left(a\,\left(1+\text{Sec}[c+d\,x]\right)\right)^{2/3}\,\text{Tan}[c+d\,x]}{4\,d\,\left(\frac{1}{1+\text{Cos}[c+d\,x]}\right)^{1/3}\,\left(1+\text{Sec}[c+d\,x]\right)^{7/3}}+$$

$$\left(\text{Hypergeometric2F1}\left[\frac{1}{4},\frac{1}{3},\frac{5}{4},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right]\,\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)^{1/3}\,\left(a\,\left(1+\text{Sec}[c+d\,x]\right)\right)^{2/3}\,\text{Tan}[c+d\,x]\right)\Big/$$

$$\left(8\,d\,\left(\frac{1}{1+\text{Cos}[c+d\,x]}\right)^{1/3}\,\left(1+\text{Sec}[c+d\,x]\right)^{4/3}\right)-$$

$$\left(5\,\text{Hypergeometric2F1}\left[\frac{1}{3},\frac{3}{4},\frac{7}{4},\text{Tan}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right]\,\left(\text{Cos}[c+d\,x]\,\text{Sec}\left[\frac{1}{2}\,(c+d\,x)\right]^4\right)^{1/3}\,\left(a\,\left(1+\text{Sec}[c+d\,x]\right)\right)^{2/3}\,\text{Tan}[c+d\,x]^3\right)\Big/$$

$$\left(8\,d\,\left(\frac{1}{1+\text{Cos}[c+d\,x]}\right)^{1/3}\,\left(1+\text{Sec}[c+d\,x]\right)^{10/3}\right)$$

Result (type 6, 79 leaves, 3 steps):

$$\frac{1}{d\,\left(1+\text{Sec}[c+d\,x]\right)^{7/6}}2\times 2^{1/6}\,\text{AppellF1}\left[\frac{1}{2},-\frac{2}{3},-\frac{1}{6},\frac{3}{2},1-\text{Sec}[c+d\,x],\frac{1}{2}\,\left(1-\text{Sec}[c+d\,x]\right)\right]\,\left(a+a\,\text{Sec}[c+d\,x]\right)^{2/3}\,\text{Tan}[c+d\,x]$$

Test results for the 306 problems in "4.5.1.3 (d sin)^n (a+b sec)^m.m"

Problem 276: Unable to integrate problem.

$$\int \text{Csc}[c+d\,x]^4\,\left(a+b\,\text{Sec}[c+d\,x]\right)^n\,dx$$

Optimal (type 6, 424 leaves, ? steps):

$$-\frac{1}{2\sqrt{2}\,d}3\,\text{AppellF1}\left[-\frac{1}{2},\frac{5}{2},-n,\frac{1}{2},\frac{1}{2}\left(1-\text{Sec}[c+d\,x]\right),\frac{b\left(1-\text{Sec}[c+d\,x]\right)}{a+b}\right]\text{Cot}[c+d\,x]\sqrt{1+\text{Sec}[c+d\,x]}\,\left(a+b\,\text{Sec}[c+d\,x]\right)^n\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{-n}-\frac{1}{6\sqrt{2}\,d}\text{AppellF1}\left[-\frac{3}{2},\frac{5}{2},-n,-\frac{1}{2},\frac{1}{2}\left(1-\text{Sec}[c+d\,x]\right),\frac{b\left(1-\text{Sec}[c+d\,x]\right)}{a+b}\right]\text{Cot}[c+d\,x]^3\left(1+\text{Sec}[c+d\,x]\right)^{3/2}\left(a+b\,\text{Sec}[c+d\,x]\right)^n\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{-n}+\frac{1}{\sqrt{2}\,d\sqrt{1+\text{Sec}[c+d\,x]}}\text{AppellF1}\left[\frac{1}{2},\frac{3}{2},-n,\frac{3}{2},\frac{1}{2}\left(1-\text{Sec}[c+d\,x]\right),\frac{b\left(1-\text{Sec}[c+d\,x]\right)}{a+b}\right]\left(a+b\,\text{Sec}[c+d\,x]\right)^n\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{-n}\text{Tan}[c+d\,x]+\frac{1}{2\sqrt{2}\,d\sqrt{1+\text{Sec}[c+d\,x]}}\text{AppellF1}\left[\frac{1}{2},\frac{5}{2},-n,\frac{3}{2},\frac{1}{2}\left(1-\text{Sec}[c+d\,x]\right),\frac{b\left(1-\text{Sec}[c+d\,x]\right)}{a+b}\right]\left(a+b\,\text{Sec}[c+d\,x]\right)^n\left(\frac{a+b\,\text{Sec}[c+d\,x]}{a+b}\right)^{-n}\text{Tan}[c+d\,x]$$

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

$$\text{Unintegrable}\left[\text{Csc}[c+d\,x]^4\left(a+b\,\text{Sec}[c+d\,x]\right)^n,x\right]$$

Test results for the 365 problems in "4.5.1.4 (d tan)^n (a+b sec)^m.m"

Problem 207: Result valid but suboptimal antiderivative.

$$\int\frac{\text{Tan}[e+f\,x]^2}{\left(a+a\,\text{Sec}[e+f\,x]\right)^{9/2}}\,dx$$

Optimal (type 3, 177 leaves, ? steps):

$$-\frac{2\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{a^{9/2}\,f}+\frac{91\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{32\sqrt{2}\,a^{9/2}\,f}+\frac{\text{Tan}[e+f\,x]}{3\,a\,f\left(a+a\,\text{Sec}[e+f\,x]\right)^{7/2}}+\frac{11\,\text{Tan}[e+f\,x]}{24\,a^2\,f\left(a+a\,\text{Sec}[e+f\,x]\right)^{5/2}}+\frac{27\,\text{Tan}[e+f\,x]}{32\,a^3\,f\left(a+a\,\text{Sec}[e+f\,x]\right)^{3/2}}$$

Result (type 3, 227 leaves, 7 steps):

$$-\frac{2\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{a^{9/2}\,f}+\frac{91\,\text{ArcTan}\left[\frac{\sqrt{a}\,\text{Tan}[e+f\,x]}{\sqrt{2}\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}\right]}{32\,\sqrt{2}\,a^{9/2}\,f}+\frac{27\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Sin}[e+f\,x]}{64\,a^4\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+$$
$$\frac{11\,\text{Cos}[e+f\,x]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^4\,\text{Sin}[e+f\,x]}{96\,a^4\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}+\frac{\text{Cos}[e+f\,x]^2\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^6\,\text{Sin}[e+f\,x]}{24\,a^4\,f\,\sqrt{a+a\,\text{Sec}[e+f\,x]}}$$

Problem 347: Unable to integrate problem.

$$\int \frac{(d\,\text{Tan}[e+f\,x])^n}{a+b\,\text{Sec}[e+f\,x]}\,dx$$

Optimal (type 6, 266 leaves, ? steps):

$$\frac{1}{a\,f\,(1-n)}d\,\text{AppellF1}\left[1-n,\frac{1-n}{2},\frac{1-n}{2},2-n,\frac{a+b}{a+b\,\text{Sec}[e+f\,x]},\frac{a-b}{a+b\,\text{Sec}[e+f\,x]}\right]\left(-\frac{b\,(1-\text{Sec}[e+f\,x])}{a+b\,\text{Sec}[e+f\,x]}\right)^{\frac{1-n}{2}}\left(\frac{b\,(1+\text{Sec}[e+f\,x])}{a+b\,\text{Sec}[e+f\,x]}\right)^{\frac{1-n}{2}}$$
$$(d\,\text{Tan}[e+f\,x])^{-1+n}\left(-\text{Tan}[e+f\,x]^2\right)^{\frac{1-n}{2}+\frac{1}{2}(-1+n)}-\frac{d\,\text{Hypergeometric2F1}\left[1,\frac{1+n}{2},\frac{3+n}{2},-\text{Tan}[e+f\,x]^2\right]\,(d\,\text{Tan}[e+f\,x])^{-1+n}\left(-\text{Tan}[e+f\,x]^2\right)^{\frac{1-n}{2}+\frac{1+n}{2}}}{a\,f\,(1+n)}$$

Result (type 8, 25 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{(d\,\text{Tan}[e+f\,x])^n}{a+b\,\text{Sec}[e+f\,x]},x\right]$$

Test results for the 241 problems in "4.5.2.1 (a+b sec)^m (c+d sec)^n.m"

Problem 217: Unable to integrate problem.

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

Optimal (type 4, 652 leaves, ? steps):

$$-\left(\left(2 c (c+d) \operatorname{Cot}[e+f x] \operatorname{EllipticPi}\left[\frac{a (c+d)}{(a+b) c}, \operatorname{ArcSin}\left[\sqrt{\frac{(a+b) (c+d \operatorname{Sec}[e+f x])}{(c+d) (a+b \operatorname{Sec}[e+f x])}}\right], \frac{(a-b) (c+d)}{(a+b) (c-d)}\right] \sqrt{\frac{(b c-a d) (1+\operatorname{Sec}[e+f x])}{(c-d) (a+b \operatorname{Sec}[e+f x])}} (a+b \operatorname{Sec}[e+f x])^{3/2} \sqrt{\frac{(a+b) (b c-a d) (-1+\operatorname{Sec}[e+f x]) (c+d \operatorname{Sec}[e+f x])}{(c+d)^2 (a+b \operatorname{Sec}[e+f x])^2}}\right) \Big/ \left(a (a+b) f \sqrt{c+d \operatorname{Sec}[e+f x]}\right)\right) +$$

$$\left(2 d (c+d) \operatorname{Cot}[e+f x] \operatorname{EllipticPi}\left[\frac{b (c+d)}{(a+b) d}, \operatorname{ArcSin}\left[\sqrt{\frac{(a+b) (c+d \operatorname{Sec}[e+f x])}{(c+d) (a+b \operatorname{Sec}[e+f x])}}\right], \frac{(a-b) (c+d)}{(a+b) (c-d)}\right] \sqrt{\frac{(b c-a d) (1+\operatorname{Sec}[e+f x])}{(c-d) (a+b \operatorname{Sec}[e+f x])}} (a+b \operatorname{Sec}[e+f x])^{3/2} \sqrt{-\frac{(a+b) (-b c+a d) (-1+\operatorname{Sec}[e+f x]) (c+d \operatorname{Sec}[e+f x])}{(c+d)^2 (a+b \operatorname{Sec}[e+f x])^2}}\right) \Big/ \left(b (a+b) f \sqrt{c+d \operatorname{Sec}[e+f x]}\right) +$$

$$\frac{1}{a b f \sqrt{\frac{(a+b) (c+d \operatorname{Sec}[e+f x])}{(c+d) (a+b \operatorname{Sec}[e+f x])}}} 2 (b c-a d) \operatorname{Cot}[e+f x] \operatorname{EllipticF}\left[\operatorname{ArcSin}\left[\sqrt{\frac{(a+b) (c+d \operatorname{Sec}[e+f x])}{(c+d) (a+b \operatorname{Sec}[e+f x])}}\right], \frac{(a-b) (c+d)}{(a+b) (c-d)}\right] \sqrt{\frac{(b c-a d) (-1+\operatorname{Sec}[e+f x])}{(c+d) (a+b \operatorname{Sec}[e+f x])}} \sqrt{\frac{(b c-a d) (1+\operatorname{Sec}[e+f x])}{(c-d) (a+b \operatorname{Sec}[e+f x])}} \sqrt{a+b \operatorname{Sec}[e+f x]} \sqrt{c+d \operatorname{Sec}[e+f x]}$$

Result (type 8, 31 leaves, 0 steps):

$$\text{Unintegrable}\left[\frac{(c+d \operatorname{Sec}[e+f x])^{3/2}}{\sqrt{a+b \operatorname{Sec}[e+f x]}}, x\right]$$

Test results for the 286 problems in "4.5.2.3 (g sec)^p (a+b sec)^m (c+d sec)^n.m"

Test results for the 634 problems in "4.5.3.1 (a+b sec)^m (d sec)^n (A+B sec).m"

Test results for the 70 problems in "4.5.4.1 (a+b sec)^m (A+B sec+C sec^2).m"

Test results for the 1373 problems in "4.5.4.2 (a+b sec)^m (d sec)^n (A+B sec+C sec^2).m"

Test results for the 470 problems in "4.5.7 (d trig)^m (a+b (c sec)^n)^p.m"

Problem 132: Unable to integrate problem.

$$\int \left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\,(d\,\text{Sin}[e+f\,x])^m\,dx$$

Optimal (type 6, 123 leaves, ? steps):

$$\frac{1}{f\,(1+m)}\text{AppellF1}\left[\frac{1+m}{2},\frac{1}{2}+p,-p,\frac{3+m}{2},\text{Sin}[e+f\,x]^2,\frac{a\,\text{Sin}[e+f\,x]^2}{a+b}\right] \left(\text{Cos}[e+f\,x]^2\right)^{\frac{1}{2}+p}\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p(d\,\text{Sin}[e+f\,x])^m\left(\frac{a+b-a\,\text{Sin}[e+f\,x]^2}{a+b}\right)^{-p}\text{Tan}[e+f\,x]$$

Result (type 8, 27 leaves, 0 steps):

Unintegrable$\left[\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p(d\,\text{Sin}[e+f\,x])^m,x\right]$

Problem 298: Unable to integrate problem.

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

Optimal (type 6, 111 leaves, ? steps):

$$\frac{1}{f\,m}\text{AppellF1}\left[\frac{m}{2},\frac{1}{2},-p,\frac{2+m}{2},\text{Sec}[e+f\,x]^2,-\frac{b\,\text{Sec}[e+f\,x]^2}{a}\right] \text{Cot}[e+f\,x]\,(d\,\text{Sec}[e+f\,x])^m\left(a+b\,\text{Sec}[e+f\,x]^2\right)^p\left(1+\frac{b\,\text{Sec}[e+f\,x]^2}{a}\right)^{-p}\sqrt{-\text{Tan}[e+f\,x]^2}$$

Result (type 8, 27 leaves, 0 steps):

Unintegrable[(d Sec[e + f x])^m (a + b Sec[e + f x]^2)^p, x]

Test results for the 70 problems in "4.6.0 (a csc)^m (b trg)^n.m"

Test results for the 84 problems in "4.6.11 (e x)^m (a+b csc(c+d x^n))^p.m"

Test results for the 59 problems in "4.6.1.2 (d csc)^n (a+b csc)^m.m"

Test results for the 16 problems in "4.6.1.3 (d cos)^n (a+b csc)^m.m"

Test results for the 23 problems in "4.6.1.4 (d cot)^n (a+b csc)^m.m"

Test results for the 24 problems in "4.6.3.1 (a+b csc)^m (d csc)^n (A+B csc).m"

Test results for the 1 problems in "4.6.4.2 (a+b csc)^m (d csc)^n (A+B csc+C csc^2).m"

Test results for the 27 problems in "4.6.7 (d trig)^m (a+b (c csc)^n)^p.m"

Test results for the 254 problems in "4.7.1 (c trig)^m (d trig)^n.m"

Test results for the 294 problems in "4.7.2 trig^m (a trig+b trig)^n.m"

Problem 15: Result valid but suboptimal antiderivative.

$$\int \frac{\text{Sin}[x]^3}{(a\,\text{Cos}[x] + b\,\text{Sin}[x])^2}\,dx$$

Optimal (type 3, 107 leaves, ? steps):

$$\frac{6\,a^2\,b\,\text{ArcTanh}\left[\frac{-b+a\,\text{Tan}\left[\frac{x}{2}\right]}{\sqrt{a^2+b^2}}\right]}{\left(a^2+b^2\right)^{5/2}} + \frac{3\,a\,\left(a^2-b^2\right) + a\,\left(a^2+b^2\right)\,\text{Cos}[2\,x] - b\,\left(a^2+b^2\right)\,\text{Sin}[2\,x]}{2\,\left(a^2+b^2\right)^2\,\left(a\,\text{Cos}[x] + b\,\text{Sin}[x]\right)}$$

Result (type 3, 283 leaves, 19 steps):

$$-\frac{3 a^2 \text{ArcTanh}\left[\frac{b \text{Cos}[x]-a \text{Sin}[x]}{\sqrt{a^2+b^2}}\right]}{b \left(a^2+b^2\right)^{3/2}}-\frac{2 a^2 b \text{ArcTanh}\left[\frac{b-a \text{Tan}\left[\frac{x}{2}\right]}{\sqrt{a^2+b^2}}\right]}{\left(a^2+b^2\right)^{5/2}}+\frac{2 a^2 \left(3 a^2+b^2\right) \text{ArcTanh}\left[\frac{b-a \text{Tan}\left[\frac{x}{2}\right]}{\sqrt{a^2+b^2}}\right]}{b \left(a^2+b^2\right)^{5/2}}-\frac{\text{Cos}[x]}{b^2}+$$

$$\frac{3 a^2 \text{Cos}[x]}{b^2 \left(a^2+b^2\right)}-\frac{2 a \text{Sin}[x]}{b^3}+\frac{3 a^3 \text{Sin}[x]}{b^3 \left(a^2+b^2\right)}-\frac{2 a^3 \text{Cos}\left[\frac{x}{2}\right]^2 \left(2 a b+\left(a^2-b^2\right) \text{Tan}\left[\frac{x}{2}\right]\right)}{b^3 \left(a^2+b^2\right)^2}+\frac{2 a^2 \left(a+b \text{Tan}\left[\frac{x}{2}\right]\right)}{\left(a^2+b^2\right)^2 \left(a+2 b \text{Tan}\left[\frac{x}{2}\right]-a \text{Tan}\left[\frac{x}{2}\right]^2\right)}$$

Problem 23: Result valid but suboptimal antiderivative.

$$\int \frac{\text{Sin}[x]^2}{(a \text{Cos}[x]+b \text{Sin}[x])^3} \, dx$$

Optimal (type 3, 92 leaves, ? steps):

$$-\frac{\left(a^2-2 b^2\right) \text{ArcTanh}\left[\frac{-b+a \text{Tan}\left[\frac{x}{2}\right]}{\sqrt{a^2+b^2}}\right]}{\left(a^2+b^2\right)^{5/2}}+\frac{a \left(3 a b \text{Cos}[x]+\left(a^2+4 b^2\right) \text{Sin}[x]\right)}{2 \left(a^2+b^2\right)^2 (a \text{Cos}[x]+b \text{Sin}[x])^2}$$

Result (type 3, 300 leaves, 13 steps):

$$\frac{2 a^2 \text{ArcTanh}\left[\frac{b \text{Cos}[x]-a \text{Sin}[x]}{\sqrt{a^2+b^2}}\right]}{b^2 \left(a^2+b^2\right)^{3/2}}-\frac{\text{ArcTanh}\left[\frac{b \text{Cos}[x]-a \text{Sin}[x]}{\sqrt{a^2+b^2}}\right]}{b^2 \sqrt{a^2+b^2}}-\frac{a^2 \left(2 a^2-b^2\right) \text{ArcTanh}\left[\frac{b-a \text{Tan}\left[\frac{x}{2}\right]}{\sqrt{a^2+b^2}}\right]}{b^2 \left(a^2+b^2\right)^{5/2}}+$$

$$\frac{2 a}{b \left(a^2+b^2\right) (a \text{Cos}[x]+b \text{Sin}[x])}+\frac{2 \left(a b+\left(a^2+2 b^2\right) \text{Tan}\left[\frac{x}{2}\right]\right)}{a \left(a^2+b^2\right) \left(a+2 b \text{Tan}\left[\frac{x}{2}\right]-a \text{Tan}\left[\frac{x}{2}\right]^2\right)^2}-\frac{4 a^4+3 a^2 b^2+2 b^4+a b \left(5 a^2+2 b^2\right) \text{Tan}\left[\frac{x}{2}\right]}{a b \left(a^2+b^2\right)^2 \left(a+2 b \text{Tan}\left[\frac{x}{2}\right]-a \text{Tan}\left[\frac{x}{2}\right]^2\right)}$$

Problem 123: Result valid but suboptimal antiderivative.

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

Optimal (type 3, 138 leaves, ? steps):

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

Result (type 3, 231 leaves, 11 steps):

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

Problem 131: Result valid but suboptimal antiderivative.

$$\int \frac{\text{Cos}[c+d x]^4}{(a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^3} \, dx$$

Optimal (type 3, 216 leaves, ? steps):

$$-\frac{3 b^2 \left(4 a^2-b^2\right) \text{ArcTanh}\left[\frac{b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2+b^2}}\right]}{\left(a^2+b^2\right)^{7/2} d}+\frac{b \left(3 a^2-b^2\right) \text{Cos}[c+d x]}{\left(a^2+b^2\right)^3 d}+\frac{a \left(a^2-3 b^2\right) \text{Sin}[c+d x]}{\left(a^2+b^2\right)^3 d}+$$
$$\frac{b^4 \text{Sin}[c+d x]}{2 a \left(a^2+b^2\right)^2 d (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])^2}-\frac{b^3 \left(8 a^2+b^2\right)}{2 a \left(a^2+b^2\right)^3 d (a \text{Cos}[c+d x]+b \text{Sin}[c+d x])}$$

Result (type 3, 492 leaves, 15 steps) :

$$-\frac{3 b^4 \left(a^2+2 b^2\right) \text{ArcTanh}\left[\frac{b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2+b^2}}\right]}{a^2 \left(a^2+b^2\right)^{7/2} d}+\frac{4 b^4 \left(3 a^2+2 b^2\right) \text{ArcTanh}\left[\frac{b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2+b^2}}\right]}{a^2 \left(a^2+b^2\right)^{7/2} d}-\frac{2 b^2 \left(6 a^4+3 a^2 b^2+b^4\right) \text{ArcTanh}\left[\frac{b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]}{\sqrt{a^2+b^2}}\right]}{a^2 \left(a^2+b^2\right)^{7/2} d}+$$
$$\frac{2 \left(b \left(3 a^2-b^2\right)+a \left(a^2-3 b^2\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{\left(a^2+b^2\right)^3 d \left(1+\text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}+\frac{2 b^4 \left(a b+\left(a^2+2 b^2\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{a^3 \left(a^2+b^2\right)^2 d \left(a+2 b \text{Tan}\left[\frac{1}{2}(c+d x)\right]-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)^2}-$$
$$\frac{3 b^4 \left(a^2+2 b^2\right) \left(b-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{a^3 \left(a^2+b^2\right)^3 d \left(a+2 b \text{Tan}\left[\frac{1}{2}(c+d x)\right]-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}-\frac{4 b^3 \left(2 a^4-b^4+a b \left(3 a^2+2 b^2\right) \text{Tan}\left[\frac{1}{2}(c+d x)\right]\right)}{a^3 \left(a^2+b^2\right)^3 d \left(a+2 b \text{Tan}\left[\frac{1}{2}(c+d x)\right]-a \text{Tan}\left[\frac{1}{2}(c+d x)\right]^2\right)}$$

Problem 133: Result valid but suboptimal antiderivative.

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

Optimal (type 3, 119 leaves, ? steps):

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

Result (type 3, 225 leaves, 6 steps):

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

Problem 142: Result valid but suboptimal antiderivative.

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

Optimal (type 3, 157 leaves, ? steps):

$$\frac{a\left(2a^2-3b^2\right)\text{ArcTanh}\left[\frac{-b+a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{a^2+b^2}}\right]}{\left(a^2+b^2\right)^{7/2}d}+\frac{-3\left(3a^4b-a^2b^3+b^5\right)\text{Cos}[2(c+d\,x)]+\frac{1}{2}b\left(-9a^2+b^2\right)\left(2\left(a^2+b^2\right)+3\,a\,b\,\text{Sin}[2(c+d\,x)]\right)}{6\left(a^2+b^2\right)^3d\left(a\,\text{Cos}[c+d\,x]+b\,\text{Sin}[c+d\,x]\right)^3}$$

Result (type 3, 362 leaves, 7 steps):

$$-\frac{a\left(2a^2-3b^2\right)\text{ArcTanh}\left[\frac{b-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]}{\sqrt{a^2+b^2}}\right]}{\left(a^2+b^2\right)^{7/2}d}-\frac{8b^3\left(a\left(a^2+2b^2\right)+b\left(3a^2+4b^2\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)}{3a^5\left(a^2+b^2\right)d\left(a+2\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^3}+$$
$$\frac{2b^2\left(b\left(15a^4+18a^2b^2+8b^4\right)+a\left(9a^4+30a^2b^2+16b^4\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)}{3a^5\left(a^2+b^2\right)^2d\left(a+2\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)^2}-$$
$$\frac{b\left(6a^6+9a^4b^2+12a^2b^4+4b^6+a\,b\left(9a^4+6a^2b^2+2b^4\right)\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]\right)}{a^4\left(a^2+b^2\right)^3d\left(a+2\,b\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]-a\,\text{Tan}\left[\frac{1}{2}(c+d\,x)\right]^2\right)}$$

Test results for the 397 problems in "4.7.3 (c+d x)^m trig^n trig^p.m"

Test results for the 9 problems in "4.7.4 x^m (a+b trig^n)^p.m"

Test results for the 330 problems in "4.7.5 x^m trig(a+b log(c x^n))^p.m"

Problem 259: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 3, 41 leaves, ? steps):

$$-x \operatorname{Sec}\left[a+b \operatorname{Log}\left[c x^n\right]\right]+b n x \operatorname{Sec}\left[a+b \operatorname{Log}\left[c x^n\right]\right] \operatorname{Tan}\left[a+b \operatorname{Log}\left[c x^n\right]\right]$$

Result (type 5, 175 leaves, 7 steps):

$$-2 e^{i a} (1-i b n) x \left(c x^n\right)^{i b} \text{Hypergeometric2F1}\left[1, \frac{1}{2}\left(1-\frac{i}{b n}\right), \frac{1}{2}\left(3-\frac{i}{b n}\right), -e^{2 i a} \left(c x^n\right)^{2 i b}\right]+\frac{16 b^2 e^{3 i a} n^2 x \left(c x^n\right)^{3 i b} \text{Hypergeometric2F1}\left[3, \frac{1}{2}\left(3-\frac{i}{b n}\right), \frac{1}{2}\left(5-\frac{i}{b n}\right), -e^{2 i a} \left(c x^n\right)^{2 i b}\right]}{1+3 i b n}$$

Problem 260: Result unnecessarily involves higher level functions.

$$\int x^m \operatorname{Sec}\left[a+2 \operatorname{Log}\left[c x^{\frac{1}{2} \sqrt{-(1+m)^2}}\right]\right]^3 dx$$

Optimal (type 3, 110 leaves, ? steps):

$$\frac{x^{1+m} \operatorname{Sec}\left[a+2 \operatorname{Log}\left[c x^{\frac{1}{2} \sqrt{-(1+m)^2}}\right]\right]}{2 (1+m)}+\frac{x^{1+m} \operatorname{Sec}\left[a+2 \operatorname{Log}\left[c x^{\frac{1}{2} \sqrt{-(1+m)^2}}\right]\right] \operatorname{Tan}\left[a+2 \operatorname{Log}\left[c x^{\frac{1}{2} \sqrt{-(1+m)^2}}\right]\right]}{2 \sqrt{-(1+m)^2}}$$

Result (type 5, 146 leaves, 3 steps):

$$\left(8 e^{3 i a} x^{1+m} \left(c x^{\frac{1}{2} \sqrt{-(1+m)^2}}\right)^{6 i} \text{Hypergeometric2F1}\left[3, \frac{1}{2}\left(3-\frac{i (1+m)}{\sqrt{-(1+m)^2}}\right), \frac{1}{2}\left(5-\frac{i (1+m)}{\sqrt{-(1+m)^2}}\right), -e^{2 i a} \left(c x^{\frac{1}{2} \sqrt{-(1+m)^2}}\right)^{4 i}\right]\right) \Big/ \left(1-i \left(i m-3 \sqrt{-(1+m)^2}\right)\right)$$

Problem 301: Result unnecessarily involves higher level functions and more than twice size of optimal

antiderivative.

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

Optimal (type 3, 42 leaves, ? steps):

$$-x \text{Csc}\left[a+b \text{Log}\left[c x^n\right]\right]-b n x \text{Cot}\left[a+b \text{Log}\left[c x^n\right]\right] \text{Csc}\left[a+b \text{Log}\left[c x^n\right]\right]$$

Result (type 5, 172 leaves, 7 steps):

$$2 e^{i a} (i+b n) x \left(c x^n\right)^{i b} \text{Hypergeometric2F1}\left[1, \frac{1}{2}\left(1-\frac{i}{b n}\right), \frac{1}{2}\left(3-\frac{i}{b n}\right), e^{2 i a} \left(c x^n\right)^{2 i b}\right]-\frac{16 b^2 e^{3 i a} n^2 x \left(c x^n\right)^{3 i b} \text{Hypergeometric2F1}\left[3, \frac{1}{2}\left(3-\frac{i}{b n}\right), \frac{1}{2}\left(5-\frac{i}{b n}\right), e^{2 i a} \left(c x^n\right)^{2 i b}\right]}{i-3 b n}$$

Problem 302: Result unnecessarily involves higher level functions.

$$\int x^m \text{Csc}\left[a+2 \text{Log}\left[c x^{\frac{1}{2}\sqrt{-(1+m)^2}}\right]\right]^3 dx$$

Optimal (type 3, 110 leaves, ? steps):

$$\frac{x^{1+m} \text{Csc}\left[a+2 \text{Log}\left[c x^{\frac{1}{2}\sqrt{-(1+m)^2}}\right]\right]}{2 (1+m)}-\frac{x^{1+m} \text{Cot}\left[a+2 \text{Log}\left[c x^{\frac{1}{2}\sqrt{-(1+m)^2}}\right]\right] \text{Csc}\left[a+2 \text{Log}\left[c x^{\frac{1}{2}\sqrt{-(1+m)^2}}\right]\right]}{2 \sqrt{-(1+m)^2}}$$

Result (type 5, 142 leaves, 3 steps):

$$-\frac{1}{i+i m-3 \sqrt{-(1+m)^2}} 8 e^{3 i a} x^{1+m} \left(c x^{\frac{1}{2}\sqrt{-(1+m)^2}}\right)^{6 i} \text{Hypergeometric2F1}\left[3, \frac{1}{2}\left(3-\frac{i (1+m)}{\sqrt{-(1+m)^2}}\right), \frac{1}{2}\left(5-\frac{i (1+m)}{\sqrt{-(1+m)^2}}\right), e^{2 i a} \left(c x^{\frac{1}{2}\sqrt{-(1+m)^2}}\right)^{4 i}\right]$$

Test results for the 142 problems in "4.7.6 f^(a+b x+c x^2) trig(d+e x+f x^2)^n.m"

Problem 28: Unable to integrate problem.

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

Optimal (type 4, 139 leaves, ? steps):

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

Result (type 8, 24 leaves, 1 step):

$$\text{CannotIntegrate}\left[F^{a c+b c x} (f x)^m \text{Sin}[d+e x], x\right]$$

Problem 32: Unable to integrate problem.

$$\int f F^{c (a+b x)} (f x)^m \left(e x \text{Cos}[d+e x]+\left(1+m+b c x \text{Log}[F]\right) \text{Sin}[d+e x]\right) dx$$

Optimal (type 3, 23 leaves, ? steps):

$$f F^{c (a+b x)} x (f x)^m \text{Sin}[d+e x]$$

Result (type 8, 89 leaves, 6 steps):

$$e \, \text{CannotIntegrate}\left[F^{a c+b c x} (f x)^{1+m} \text{Cos}[d+e x], x\right]+f (1+m) \, \text{CannotIntegrate}\left[F^{a c+b c x} (f x)^m \text{Sin}[d+e x], x\right]+b c \, \text{CannotIntegrate}\left[F^{a c+b c x} (f x)^{1+m} \text{Sin}[d+e x], x\right] \text{Log}[F]$$

Test results for the 950 problems in "4.7.7 Trig functions.m"

Problem 759: Result valid but suboptimal antiderivative.

$$\int \left(\text{Cos}[x]^{12} \text{Sin}[x]^{10}-\text{Cos}[x]^{10} \text{Sin}[x]^{12}\right) dx$$

Optimal (type 3, 12 leaves, ? steps):

$$\frac{1}{11} \text{Cos}[x]^{11} \text{Sin}[x]^{11}$$

Result (type 3, 129 leaves, 25 steps):

$$\frac{3 \text{Cos}[x]^{11} \text{Sin}[x]}{5632}-\frac{3 \text{Cos}[x]^{13} \text{Sin}[x]}{5632}+\frac{1}{512} \text{Cos}[x]^{11} \text{Sin}[x]^3-\frac{7 \text{Cos}[x]^{13} \text{Sin}[x]^3}{2816}+\frac{7 \text{Cos}[x]^{11} \text{Sin}[x]^5}{1280}-\frac{7}{880} \text{Cos}[x]^{13} \text{Sin}[x]^5+\frac{1}{80} \text{Cos}[x]^{11} \text{Sin}[x]^7-\frac{9}{440} \text{Cos}[x]^{13} \text{Sin}[x]^7+\frac{1}{40} \text{Cos}[x]^{11} \text{Sin}[x]^9-\frac{1}{22} \text{Cos}[x]^{13} \text{Sin}[x]^9+\frac{1}{22} \text{Cos}[x]^{11} \text{Sin}[x]^{11}$$

Problem 796: Unable to integrate problem.

$$\int e^{\sin[x]} \sec[x]^2 \left(x \cos[x]^3 - \sin[x]\right) dx$$

Optimal (type 3, 13 leaves, ? steps):

$$e^{\sin[x]} \left(-1 + x \cos[x]\right) \sec[x]$$

Result (type 8, 24 leaves, 2 steps):

$$\text{CannotIntegrate}\left[e^{\sin[x]} x \cos[x], x\right] - \text{CannotIntegrate}\left[e^{\sin[x]} \sec[x] \tan[x], x\right]$$

Problem 858: Result valid but suboptimal antiderivative.

$$\int \frac{1}{\cos[x]^{3/2} \sqrt{3 \cos[x] + \sin[x]}} dx$$

Optimal (type 3, 19 leaves, ? steps):

$$\frac{2 \sqrt{3 \cos[x] + \sin[x]}}{\sqrt{\cos[x]}}$$

Result (type 3, 88 leaves, 5 steps):

$$\frac{2 \cos\left[\frac{x}{2}\right]^2 \left(3 + 2 \tan\left[\frac{x}{2}\right] - 3 \tan\left[\frac{x}{2}\right]^2\right)}{\sqrt{\cos\left[\frac{x}{2}\right]^2 \left(3 + 2 \tan\left[\frac{x}{2}\right] - 3 \tan\left[\frac{x}{2}\right]^2\right)} \sqrt{\cos\left[\frac{x}{2}\right]^2 \left(1 - \tan\left[\frac{x}{2}\right]^2\right)}}$$

Problem 859: Unable to integrate problem.

$$\int \frac{\csc[x] \sqrt{\cos[x] + \sin[x]}}{\cos[x]^{3/2}} dx$$

Optimal (type 3, 44 leaves, ? steps):

$$-\text{Log}[\sin[x]] + 2 \text{Log}\left[-\sqrt{\cos[x]} + \sqrt{\cos[x] + \sin[x]}\right] + \frac{2 \sqrt{\cos[x] + \sin[x]}}{\sqrt{\cos[x]}}$$

Result (type 8, 20 leaves, 0 steps):

$$\text{CannotIntegrate}\left[\frac{\csc[x] \sqrt{\cos[x] + \sin[x]}}{\cos[x]^{3/2}}, x\right]$$

Problem 860: Result valid but suboptimal antiderivative.

$$\int \frac{\text{Cos}[x] + \text{Sin}[x]}{\sqrt{1 + \text{Sin}[2x]}} \, dx$$

Optimal (type 3, 19 leaves, ? steps):

$$\frac{x \sqrt{1 + \text{Sin}[2x]}}{\text{Cos}[x] + \text{Sin}[x]}$$

Result (type 3, 72 leaves, 17 steps):

$$\frac{2 \, \text{ArcTan}\left[\text{Tan}\left[\frac{x}{2}\right]\right] \text{Cos}\left[\frac{x}{2}\right]^2 \left(1 + 2 \, \text{Tan}\left[\frac{x}{2}\right] - \text{Tan}\left[\frac{x}{2}\right]^2\right)}{\sqrt{\text{Cos}\left[\frac{x}{2}\right]^4 \left(1 + 2 \, \text{Tan}\left[\frac{x}{2}\right] - \text{Tan}\left[\frac{x}{2}\right]^2\right)^2}}$$

Problem 912: Result valid but suboptimal antiderivative.

$$\int \frac{\text{Cos}[x] + \text{Sin}[x]}{\sqrt{\text{Cos}[x]} \sqrt{\text{Sin}[x]}} \, dx$$

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

$$-\sqrt{2} \, \text{ArcTan}\left[1 - \frac{\sqrt{2} \sqrt{\text{Sin}[x]}}{\sqrt{\text{Cos}[x]}}\right] + \sqrt{2} \, \text{ArcTan}\left[1 + \frac{\sqrt{2} \sqrt{\text{Sin}[x]}}{\sqrt{\text{Cos}[x]}}\right]$$

Result (type 3, 243 leaves, 22 steps):

$$\frac{\text{ArcTan}\left[1 - \frac{\sqrt{2} \sqrt{\text{Cos}[x]}}{\sqrt{\text{Sin}[x]}}\right]}{\sqrt{2}} - \frac{\text{ArcTan}\left[1 + \frac{\sqrt{2} \sqrt{\text{Cos}[x]}}{\sqrt{\text{Sin}[x]}}\right]}{\sqrt{2}} - \frac{\text{ArcTan}\left[1 - \frac{\sqrt{2} \sqrt{\text{Sin}[x]}}{\sqrt{\text{Cos}[x]}}\right]}{\sqrt{2}} + \frac{\text{ArcTan}\left[1 + \frac{\sqrt{2} \sqrt{\text{Sin}[x]}}{\sqrt{\text{Cos}[x]}}\right]}{\sqrt{2}} -$$

$$\frac{\text{Log}\left[1 + \text{Cot}[x] - \frac{\sqrt{2} \sqrt{\text{Cos}[x]}}{\sqrt{\text{Sin}[x]}}\right]}{2 \sqrt{2}} + \frac{\text{Log}\left[1 + \text{Cot}[x] + \frac{\sqrt{2} \sqrt{\text{Cos}[x]}}{\sqrt{\text{Sin}[x]}}\right]}{2 \sqrt{2}} + \frac{\text{Log}\left[1 - \frac{\sqrt{2} \sqrt{\text{Sin}[x]}}{\sqrt{\text{Cos}[x]}} + \text{Tan}[x]\right]}{2 \sqrt{2}} - \frac{\text{Log}\left[1 + \frac{\sqrt{2} \sqrt{\text{Sin}[x]}}{\sqrt{\text{Cos}[x]}} + \text{Tan}[x]\right]}{2 \sqrt{2}}$$

Problem 914: Unable to integrate problem.

$$\int \left(10 \, x^9 \, \text{Cos}\left[x^5 \, \text{Log}[x]\right] - x^{10} \left(x^4 + 5 \, x^4 \, \text{Log}[x]\right) \text{Sin}\left[x^5 \, \text{Log}[x]\right]\right) dx$$

Optimal (type 3, 11 leaves, ? steps):

$x^{10}\,\text{Cos}[x^5\,\text{Log}[x]]$

Result (type 8, 48 leaves, 4 steps):

$10\,\text{CannotIntegrate}[x^9\,\text{Cos}[x^5\,\text{Log}[x]],x] - \text{CannotIntegrate}[x^{14}\,\text{Sin}[x^5\,\text{Log}[x]],x] - 5\,\text{CannotIntegrate}[x^{14}\,\text{Log}[x]\,\text{Sin}[x^5\,\text{Log}[x]],x]$

Problem 915: Unable to integrate problem.

$$\int \text{Cos}\left[\frac{x}{2}\right]^2 \text{Tan}\left[\frac{\pi}{4}+\frac{x}{2}\right] dx$$

Optimal (type 3, 27 leaves, ? steps):

$$\frac{x}{2}-\frac{\text{Cos}[x]}{2}-\text{Log}\left[\text{Cos}\left[\frac{\pi}{4}+\frac{x}{2}\right]\right]$$

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

$$\text{CannotIntegrate}\left[\text{Cos}\left[\frac{x}{2}\right]^2 \text{Tan}\left[\frac{\pi}{4}+\frac{x}{2}\right],x\right]$$

Problem 931: Unable to integrate problem.

$$\int \left(\frac{x^4}{b\sqrt{x^3+3\,\text{Sin}[a+b\,x]}}+\frac{x^2\,\text{Cos}[a+b\,x]}{\sqrt{x^3+3\,\text{Sin}[a+b\,x]}}+\frac{4\,x\sqrt{x^3+3\,\text{Sin}[a+b\,x]}}{3\,b}\right) dx$$

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

$$\frac{2\,x^2\sqrt{x^3+3\,\text{Sin}[a+b\,x]}}{3\,b}$$

Result (type 8, 82 leaves, 1 step):

$$\frac{\text{CannotIntegrate}\left[\frac{x^4}{\sqrt{x^3+3\,\text{Sin}[a+b\,x]}},x\right]}{b}+\text{CannotIntegrate}\left[\frac{x^2\,\text{Cos}[a+b\,x]}{\sqrt{x^3+3\,\text{Sin}[a+b\,x]}},x\right]+\frac{4\,\text{CannotIntegrate}\left[x\sqrt{x^3+3\,\text{Sin}[a+b\,x]},x\right]}{3\,b}$$

Problem 933: Unable to integrate problem.

$$\int \frac{\text{Cos}[x]+\text{Sin}[x]}{e^{-x}+\text{Sin}[x]}\,dx$$

Optimal (type 3, 9 leaves, ? steps):

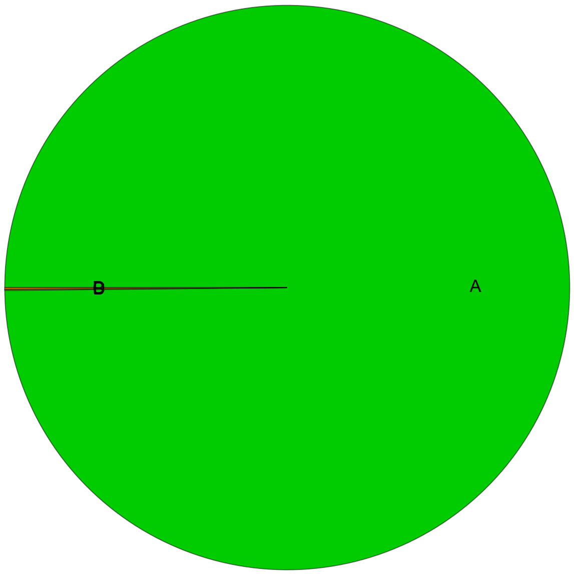
$$\text{Log}[1+e^x\,\text{Sin}[x]]$$

Result (type 8, 36 leaves, 5 steps) :

$$x - \text{CannotIntegrate}\left[\frac{1}{1 + e^x \,\text{Sin}[x]}, x\right] - \text{CannotIntegrate}\left[\frac{\text{Cot}[x]}{1 + e^x \,\text{Sin}[x]}, x\right] + \text{Log}[\text{Sin}[x]]$$

Summary of Integration Test Results

22551 integration problems



A - 22515 optimal antiderivatives

B - 12 valid but suboptimal antiderivatives

C - 5 unnecessarily complex antiderivatives

D - 19 unable to integrate problems

E - 0 integration timeouts

F - 0 invalid antiderivatives