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):

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

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

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

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.

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

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

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

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):

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

$$5\,a\,(a+b)^{3/2}\,\sqrt{-\frac{a\,(-1+\mathrm{Csc}[e+f\,x])}{a+b}}\,\sqrt{\frac{a\,(1+\mathrm{Csc}[e+f\,x])}{a-b}}$$

$$\mathrm{EllipticF}\left[\mathrm{ArcSin}\left[\frac{\sqrt{d}\,\sqrt{a+b\,\mathrm{Sin}[e+f\,x]}}{\sqrt{a+b}\,\sqrt{d\,\mathrm{Sin}[e+f\,x]}}\right],-\frac{a+b}{a-b}\right]\mathrm{Tan}[e+f\,x]-$$

$$\left(5\,a\,b\,(a+b)\,\sqrt{-\frac{a\,(-1+\mathrm{Csc}[e+f\,x])}{a+b}}\,\sqrt{\frac{b+a\,\mathrm{Csc}[e+f\,x]}{-a+b}}\right.$$

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

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

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

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

Problem 1515: Unable to integrate problem.

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

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

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

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

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

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.

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

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

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

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

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

Problem 392: Unable to integrate problem.

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

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

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

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

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

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

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

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

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

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

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

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.

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

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

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

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

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

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):

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

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):

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

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

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

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.

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

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

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

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):

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

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):

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

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

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

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):

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

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):

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

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.

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

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

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

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

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

Problem 123: Result valid but suboptimal antiderivative.

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

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):

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

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

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

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

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

Problem 133: Result valid but suboptimal antiderivative.

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

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

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

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

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

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

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

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):

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

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

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

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) :

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

Problem 260: Result unnecessarily involves higher level functions.

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

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

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

Result (type 5, 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.

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

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):

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

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):

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

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

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

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.

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

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

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

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

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

Problem 32: Unable to integrate problem.

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

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

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

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

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

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.

$$\int e^{\text{Sin}[x]}\,\text{Sec}[x]^{2}\,\left(x\,\text{Cos}[x]^{3}-\text{Sin}[x]\right)\,dx$$

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

$$e^{\text{Sin}[x]}\,\left(-1+x\,\text{Cos}[x]\right)\,\text{Sec}[x]$$

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

$$\text{CannotIntegrate}\left[e^{\text{Sin}[x]}\,x\,\text{Cos}[x],\,x\right]-\text{CannotIntegrate}\left[e^{\text{Sin}[x]}\,\text{Sec}[x]\,\text{Tan}[x],\,x\right]$$

Problem 858: Result valid but suboptimal antiderivative.

$$\int \frac{1}{\text{Cos}[x]^{3/2}\,\sqrt{3\,\text{Cos}[x]+\text{Sin}[x]}}\,dx$$

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

$$\frac{2\,\sqrt{3\,\text{Cos}[x]+\text{Sin}[x]}}{\sqrt{\text{Cos}[x]}}$$

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

$$\frac{2\,\text{Cos}\left[\frac{x}{2}\right]^{2}\,\left(3+2\,\text{Tan}\left[\frac{x}{2}\right]-3\,\text{Tan}\left[\frac{x}{2}\right]^{2}\right)}{\sqrt{\text{Cos}\left[\frac{x}{2}\right]^{2}\,\left(3+2\,\text{Tan}\left[\frac{x}{2}\right]-3\,\text{Tan}\left[\frac{x}{2}\right]^{2}\right)}\,\sqrt{\text{Cos}\left[\frac{x}{2}\right]^{2}\,\left(1-\text{Tan}\left[\frac{x}{2}\right]^{2}\right)}}$$

Problem 859: Unable to integrate problem.

$$\int \frac{\mathrm{Csc}[x] \sqrt{\mathrm{Cos}[x]+\mathrm{Sin}[x]}}{\mathrm{Cos}[x]^{3/2}} \, dx$$

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

$$-\mathrm{Log}[\mathrm{Sin}[x]] + 2\,\mathrm{Log}\left[-\sqrt{\mathrm{Cos}[x]} + \sqrt{\mathrm{Cos}[x]+\mathrm{Sin}[x]}\right] + \frac{2\sqrt{\mathrm{Cos}[x]+\mathrm{Sin}[x]}}{\sqrt{\mathrm{Cos}[x]}}$$

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

$$\mathrm{CannotIntegrate}\left[\frac{\mathrm{Csc}[x]\sqrt{\mathrm{Cos}[x]+\mathrm{Sin}[x]}}{\mathrm{Cos}[x]^{3/2}}, x\right]$$

Problem 860: Result valid but suboptimal antiderivative.

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

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

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

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

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

Problem 912: Result valid but suboptimal antiderivative.

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

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

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

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):

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

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

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

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):

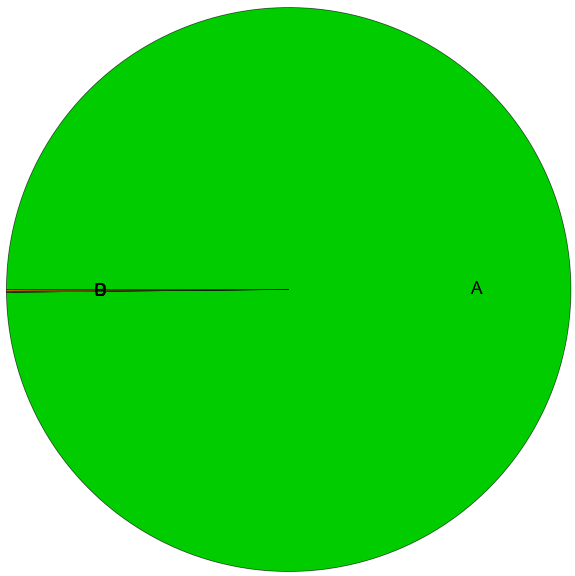
$$\text{Log}\left[1+e^x\,\text{Sin}[x]\right]$$

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