Mathematica 11.3 Integration Test Results

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

Problem 39: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

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

Optimal (type 5, 87 leaves, 2 steps):

$$-\frac{1}{b\,f\,(1+n)}(b\,\mathrm{Cot}[e+f\,x])^{1+n}\,\mathrm{Hypergeometric2F1}\left[\frac{1+n}{2},\frac{1}{2}(1-m+n),\frac{3+n}{2},\mathrm{Cos}[e+f\,x]^2\right]$$
$$(a\,\mathrm{Sin}[e+f\,x])^m\,\left(\mathrm{Sin}[e+f\,x]^2\right)^{\frac{1}{2}(1-m+n)}$$

Result (type 6, 2957 leaves):

$$\Bigg(2\,(3+m-n)\,\mathrm{AppellF1}\left[\frac{1}{2}(1+m-n),-n,1+m,\right.$$
$$\left.\frac{1}{2}(3+m-n),\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2$$
$$\mathrm{Cot}\left[\frac{1}{2}(e+f\,x)\right]\mathrm{Cot}[e+f\,x]^n\,(b\,\mathrm{Cot}[e+f\,x])^n\,\mathrm{Sin}[e+f\,x]^m\,(a\,\mathrm{Sin}[e+f\,x])^m\Bigg)\Bigg/$$
$$\Bigg(f\,(1+m-n)\,\Bigg(-2\,n\,\mathrm{AppellF1}\left[\frac{1}{2}(3+m-n),1-n,1+m,\frac{1}{2}(5+m-n),\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.$$
$$\left.-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-2\,(1+m)\,\mathrm{AppellF1}\left[\frac{1}{2}(3+m-n),-n,2+m,\frac{1}{2}(5+m-n),\right.$$
$$\left.\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+(3+m-n)\,\mathrm{AppellF1}\left[\frac{1}{2}(1+m-n),-n,\right.$$
$$\left.1+m,\frac{1}{2}(3+m-n),\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\mathrm{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2\Bigg)$$
$$\Bigg(-\Bigg(\Bigg(2\,(3+m-n)\,n\,\mathrm{AppellF1}\left[\frac{1}{2}(1+m-n),-n,1+m,\frac{1}{2}(3+m-n),\right.$$
$$\left.\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]$$
$$\mathrm{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\mathrm{Cot}\left[\frac{1}{2}(e+f\,x)\right]\mathrm{Cot}[e+f\,x]^{-1+n}\,\mathrm{Sin}[e+f\,x]^{-2+m}\Bigg)\Bigg/$$
$$\Bigg((1+m-n)\,\Bigg(-2\,n\,\mathrm{AppellF1}\left[\frac{1}{2}(3+m-n),1-n,1+m,\frac{1}{2}(5+m-n),\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.$$
$$\left.-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-2\,(1+m)\,\mathrm{AppellF1}\left[\frac{1}{2}(3+m-n),-n,2+m,\frac{1}{2}(5+m-n),\right.$$
$$\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\Big]+(3+m-n)\,\mathrm{AppellF1}\left[\frac{1}{2}(1+m-n),-n,\right.$$

$$1+m,\ \frac{1}{2}\ (3+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\Big]\ \text{Cot}\left[\frac{1}{2}\ (e+f\,x)\right]^2\Big)\Big)\Big)+$$

$$\Big(2\,m\ (3+m-n)\ \text{AppellF1}\left[\frac{1}{2}\ (1+m-n),\ -n,\ 1+m,\ \frac{1}{2}\ (3+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\right.$$

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

$$\text{Cos}[e+f\,x]\ \text{Cot}\left[\frac{1}{2}\ (e+f\,x)\right]\ \text{Cot}[e+f\,x]^n\ \text{Sin}[e+f\,x]^{-1+m}\Big)\Big/$$

$$\Big((1+m-n)\ \Big(-2\,n\ \text{AppellF1}\left[\frac{1}{2}\ (3+m-n),\ 1-n,\ 1+m,\ \frac{1}{2}\ (5+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]-2\ (1+m)\ \text{AppellF1}\left[\frac{1}{2}\ (3+m-n),\ -n,\ 2+m,\ \frac{1}{2}\ (5+m-n),\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]+(3+m-n)\ \text{AppellF1}\left[\frac{1}{2}\ (1+m-n),\ -n,\right.$$

$$\left.1+m,\ \frac{1}{2}\ (3+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Cot}\left[\frac{1}{2}\ (e+f\,x)\right]^2\Big)\Big)-$$

$$\Big(2\ (3+m-n)\ \text{AppellF1}\left[\frac{1}{2}\ (1+m-n),\ -n,\ 1+m,\ \frac{1}{2}\ (3+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Cos}\left[\frac{1}{2}\ (e+f\,x)\right]^2\ \text{Cot}[e+f\,x]^n\ \text{Sin}[e+f\,x]^m\Big)\Big/$$

$$\Big((1+m-n)\ \Big(-2\,n\ \text{AppellF1}\left[\frac{1}{2}\ (3+m-n),\ 1-n,\ 1+m,\ \frac{1}{2}\ (5+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]-2\ (1+m)\ \text{AppellF1}\left[\frac{1}{2}\ (3+m-n),\ -n,\ 2+m,\ \frac{1}{2}\ (5+m-n),\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]+(3+m-n)\ \text{AppellF1}\left[\frac{1}{2}\ (1+m-n),\ -n,\right.$$

$$\left.1+m,\ \frac{1}{2}\ (3+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Cot}\left[\frac{1}{2}\ (e+f\,x)\right]^2\Big)\Big)-$$

$$\Big((3+m-n)\ \text{AppellF1}\left[\frac{1}{2}\ (1+m-n),\ -n,\ 1+m,\ \frac{1}{2}\ (3+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Cot}\left[\frac{1}{2}\ (e+f\,x)\right]^2\ \text{Cot}[e+f\,x]^n\ \text{Sin}[e+f\,x]^m\Big)\Big/$$

$$\Big((1+m-n)\ \Big(-2\,n\ \text{AppellF1}\left[\frac{1}{2}\ (3+m-n),\ 1-n,\ 1+m,\ \frac{1}{2}\ (5+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]-2\ (1+m)\ \text{AppellF1}\left[\frac{1}{2}\ (3+m-n),\ -n,\ 2+m,\ \frac{1}{2}\ (5+m-n),\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]+(3+m-n)\ \text{AppellF1}\left[\frac{1}{2}\ (1+m-n),\ -n,\right.$$

$$\left.1+m,\ \frac{1}{2}\ (3+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Cot}\left[\frac{1}{2}\ (e+f\,x)\right]^2\Big)\Big)+$$

$$\Big(2\ (3+m-n)\ \text{Cos}\left[\frac{1}{2}\ (e+f\,x)\right]^2\ \text{Cot}\left[\frac{1}{2}\ (e+f\,x)\right]\ \text{Cot}[e+f\,x]^n\ \text{Sin}[e+f\,x]^m$$

$$\Big(-\frac{1}{3+m-n}\ (1+m-n)\ n\ \text{AppellF1}\left[1+\frac{1}{2}\ (1+m-n),\ 1-n,\ 1+m,\ 1+\frac{1}{2}\ (3+m-n),\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Sec}\left[\frac{1}{2}\ (e+f\,x)\right]^2\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]-$$

$$\frac{1}{3+m-n}(1+m)\ (1+m-n)\ \text{AppellF1}\left[1+\frac{1}{2}\ (1+m-n),\ -n,\ 2+m,\ 1+\frac{1}{2}\ (3+m-n),\right.$$
$$\left.\left.\left.\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Sec}\left[\frac{1}{2}\ (e+f\,x)\right]^2\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]\right)\right)\Big/$$
$$\left((1+m-n)\ \left(-2\,n\ \text{AppellF1}\left[\frac{1}{2}\ (3+m-n),\ 1-n,\ 1+m,\ \frac{1}{2}\ (5+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\right.\right.\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]-2\ (1+m)\ \text{AppellF1}\left[\frac{1}{2}\ (3+m-n),\ -n,\ 2+m,\ \frac{1}{2}\ (5+m-n),\right.$$
$$\left.\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]+(3+m-n)\ \text{AppellF1}\left[\frac{1}{2}\ (1+m-n),\ -n,\right.$$
$$\left.\left.\left.1+m,\ \frac{1}{2}\ (3+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Cot}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right)\right)-$$
$$\left(2\ (3+m-n)\ \text{AppellF1}\left[\frac{1}{2}\ (1+m-n),\ -n,\ 1+m,\ \frac{1}{2}\ (3+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\right.\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Cos}\left[\frac{1}{2}\ (e+f\,x)\right]^2\ \text{Cot}\left[\frac{1}{2}\ (e+f\,x)\right]\ \text{Cot}[e+f\,x]^n\ \text{Sin}[e+f\,x]^m$$
$$\left(-(3+m-n)\ \text{AppellF1}\left[\frac{1}{2}\ (1+m-n),\ -n,\ 1+m,\ \frac{1}{2}\ (3+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\right.\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Cot}\left[\frac{1}{2}\ (e+f\,x)\right]\ \text{Csc}\left[\frac{1}{2}\ (e+f\,x)\right]^2+(3+m-n)\ \text{Cot}\left[\frac{1}{2}\ (e+f\,x)\right]^2$$
$$\left(-\frac{1}{3+m-n}(1+m-n)\ n\ \text{AppellF1}\left[1+\frac{1}{2}\ (1+m-n),\ 1-n,\ 1+m,\ 1+\frac{1}{2}\ (3+m-n),\right.\right.$$
$$\left.\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Sec}\left[\frac{1}{2}\ (e+f\,x)\right]^2\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]-$$
$$\frac{1}{3+m-n}(1+m)\ (1+m-n)\ \text{AppellF1}\left[1+\frac{1}{2}\ (1+m-n),\ -n,\ 2+m,\ 1+\frac{1}{2}\ (3+m-n),\right.$$
$$\left.\left.\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Sec}\left[\frac{1}{2}\ (e+f\,x)\right]^2\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]\right)-$$
$$2\,n\ \left(-\frac{1}{5+m-n}(1+m)\ (3+m-n)\ \text{AppellF1}\left[1+\frac{1}{2}\ (3+m-n),\ 1-n,\ 2+m,\ 1+\frac{1}{2}\ (5+m-n),\right.\right.$$
$$\left.\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Sec}\left[\frac{1}{2}\ (e+f\,x)\right]^2\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]+$$
$$\frac{1}{5+m-n}(1-n)\ (3+m-n)\ \text{AppellF1}\left[1+\frac{1}{2}\ (3+m-n),\ 2-n,\ 1+m,\ 1+\frac{1}{2}\ (5+m-n),\right.$$
$$\left.\left.\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Sec}\left[\frac{1}{2}\ (e+f\,x)\right]^2\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]\right)-$$
$$2\ (1+m)\ \left(-\frac{1}{5+m-n}(3+m-n)\ n\ \text{AppellF1}\left[1+\frac{1}{2}\ (3+m-n),\ 1-n,\ 2+m,\ 1+\frac{1}{2}\ (5+m-n),\right.\right.$$
$$\left.\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Sec}\left[\frac{1}{2}\ (e+f\,x)\right]^2\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]-$$
$$\frac{1}{5+m-n}(2+m)\ (3+m-n)\ \text{AppellF1}\left[1+\frac{1}{2}\ (3+m-n),\ -n,\ 3+m,\ 1+\frac{1}{2}\ (5+m-n),\right.$$
$$\left.\left.\left.\left.\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2\right]\ \text{Sec}\left[\frac{1}{2}\ (e+f\,x)\right]^2\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]\right)\right)\right)\Big/$$
$$\left((1+m-n)\ \left(-2\,n\ \text{AppellF1}\left[\frac{1}{2}\ (3+m-n),\ 1-n,\ 1+m,\ \frac{1}{2}\ (5+m-n),\ \text{Tan}\left[\frac{1}{2}\ (e+f\,x)\right]^2,\right.\right.\right.$$

$$-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]-2\left(1+m\right)\text{AppellF1}\left[\frac{1}{2}\left(3+m-n\right),-n,2+m,\frac{1}{2}\left(5+m-n\right),\right.$$
$$\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]+\left(3+m-n\right)\text{AppellF1}\left[\frac{1}{2}\left(1+m-n\right),-n,\right.$$
$$\left.1+m,\frac{1}{2}\left(3+m-n\right),\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]\text{Cot}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big)^2\Big)\Big)\Big)$$

Problem 46: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\left(d\,\text{Cot}[e+f x]\right)^n\text{Sin}[e+f x]^2\,dx$$

Optimal (type 5, 51 leaves, 2 steps):

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

Result (type 6, 5097 leaves):

$$\Big(8\left(-3+n\right)\text{Cos}\left[\frac{1}{2}\left(e+f x\right)\right]^5\left(d\,\text{Cot}[e+f x]\right)^n\text{Sin}\left[\frac{1}{2}\left(e+f x\right)\right]$$
$$\Big(-\frac{1}{4}\text{Cos}\left[2\left(e+f x\right)\right]^3\text{Cot}[e+f x]^n+\frac{1}{4}\,i\,\text{Cot}[e+f x]^n\,\text{Sin}\left[2\left(e+f x\right)\right]+$$
$$\frac{1}{2}\text{Cot}[e+f x]^n\,\text{Sin}\left[2\left(e+f x\right)\right]^2-\frac{1}{4}\,i\,\text{Cot}[e+f x]^n\,\text{Sin}\left[2\left(e+f x\right)\right]^3+$$
$$\text{Cos}\left[2\left(e+f x\right)\right]^2\left(\frac{1}{2}\text{Cot}[e+f x]^n-\frac{1}{4}\,i\,\text{Cot}[e+f x]^n\,\text{Sin}\left[2\left(e+f x\right)\right]\right)+$$
$$\text{Cos}\left[2\left(e+f x\right)\right]\left(-\frac{1}{4}\text{Cot}[e+f x]^n-\frac{1}{4}\text{Cot}[e+f x]^n\,\text{Sin}\left[2\left(e+f x\right)\right]^2\right)\Big)$$
$$\Big(-\Big(\Big(\text{AppellF1}\left[\frac{1-n}{2},-n,2,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]\text{Sec}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big)\Big/$$
$$\Big(\left(-3+n\right)\text{AppellF1}\left[\frac{1-n}{2},-n,2,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]+$$
$$2\Big(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,2,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]+$$
$$2\,\text{AppellF1}\left[\frac{3-n}{2},-n,3,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]\Big)\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big)\Big)+$$
$$\text{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]\Big/$$
$$\Big(\left(-3+n\right)\text{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]+$$
$$2\Big(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,3,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]+$$
$$3\,\text{AppellF1}\left[\frac{3-n}{2},-n,4,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\right]\Big)$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)\Bigg)\Bigg/\Bigg(f(-1+n)\Bigg(\frac{1}{-1+n}4(-3+n)\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]^6\text{Cot}[e+f x]^n$$

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

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg/\Bigg((-3+n)\,\text{AppellF1}\left[\frac{1-n}{2},-n,2,\frac{3-n}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Bigg(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,2,\right.$$

$$\left.\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3-n}{2},-n,\right.$$

$$\left.3,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)+$$

$$\text{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg/$$

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

$$2\Bigg(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,3,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+3$$

$$\text{AppellF1}\left[\frac{3-n}{2},-n,4,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)-$$

$$\frac{1}{-1+n}8(-3+n)\,n\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]^5\text{Cot}[e+f x]^{-1+n}\text{Csc}[e+f x]^2\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]$$

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

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg/\Bigg((-3+n)\,\text{AppellF1}\left[\frac{1-n}{2},-n,2,\frac{3-n}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\Bigg(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,2,\right.$$

$$\left.\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3-n}{2},-n,\right.$$

$$\left.3,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)+$$

$$\text{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg/$$

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

$$2\Bigg(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,3,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+3$$

$$\text{AppellF1}\left[\frac{3-n}{2},-n,4,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)-$$

$$\frac{1}{-1+n}20(-3+n)\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]^4\text{Cot}[e+f x]^n\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\left(-\left(\left(\text{AppellF1}\left[\frac{1-n}{2},-n,2,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\right)\Big/\left((-3+n)\,\text{AppellF1}\left[\frac{1-n}{2},-n,2,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,2,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3-n}{2},-n,3,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)+\text{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Big/\left((-3+n)\,\text{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,3,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+3\,\text{AppellF1}\left[\frac{3-n}{2},-n,4,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)+$$

$$\frac{1}{-1+n}8\,(-3+n)\,\text{Cos}\left[\frac{1}{2}(e+fx)\right]^5\text{Cot}[e+fx]^n\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]$$

$$\left(-\left(\left(\text{AppellF1}\left[\frac{1-n}{2},-n,2,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\Big/\left((-3+n)\,\text{AppellF1}\left[\frac{1-n}{2},-n,2,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,2,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3-n}{2},-n,3,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)-\left(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\left(-\frac{1}{3-n}(1-n)\,n\,\text{AppellF1}\left[1+\frac{1-n}{2},1-n,2,1+\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]-\frac{1}{3-n}2\,(1-n)\,\text{AppellF1}\left[1+\frac{1-n}{2},-n,3,1+\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\right)\Big/\left((-3+n)\,\text{AppellF1}\left[\frac{1-n}{2},-n,2,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,2,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\,\text{AppellF1}\left[\frac{3-n}{2},-n,3,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)$$

$$\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big)+\Big(-\frac{1}{3-n}(1-n)\;n\;\text{AppellF1}\Big[1+\frac{1-n}{2},\,1-n,\,3,\,1+\frac{3-n}{2},$$

$$\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big]\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\;\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]-$$

$$\frac{1}{3-n}3\;(1-n)\;\text{AppellF1}\Big[1+\frac{1-n}{2},\,-n,\,4,\,1+\frac{3-n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big]\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\;\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\Big]\Big)\Big/$$

$$\Big(\,(-3+n)\;\text{AppellF1}\Big[\frac{1-n}{2},\,-n,\,3,\,\frac{3-n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big]+$$

$$2\;\Big(n\;\text{AppellF1}\Big[\frac{3-n}{2},\,1-n,\,3,\,\frac{5-n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big]+3$$

$$\text{AppellF1}\Big[\frac{3-n}{2},\,-n,\,4,\,\frac{5-n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big]\Big)\;\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big)+$$

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

$$\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\;\Big(2\;\Big(n\;\text{AppellF1}\Big[\frac{3-n}{2},\,1-n,\,2,\,\frac{5-n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big]+2\;\text{AppellF1}\Big[\frac{3-n}{2},\,-n,\,3,\,\frac{5-n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big]\Big)\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\;\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]+$$

$$(-3+n)\;\Big(-\frac{1}{3-n}(1-n)\;n\;\text{AppellF1}\Big[1+\frac{1-n}{2},\,1-n,\,2,\,1+\frac{3-n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big]\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\;\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]-\frac{1}{3-n}2\;(1-n)$$

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

$$\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\;\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\Big]\Big)+2\;\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2$$

$$\Big(n\;\Big(-\frac{1}{5-n}2\;(3-n)\;\text{AppellF1}\Big[1+\frac{3-n}{2},\,1-n,\,3,\,1+\frac{5-n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big]\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\;\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]+\frac{1}{5-n}$$

$$(1-n)\;(3-n)\;\text{AppellF1}\Big[1+\frac{3-n}{2},\,2-n,\,2,\,1+\frac{5-n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big]\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\;\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\Big]\Big)+$$

$$2\;\Big(-\frac{1}{5-n}(3-n)\;n\;\text{AppellF1}\Big[1+\frac{3-n}{2},\,1-n,\,3,\,1+\frac{5-n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Big]\;\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\;\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]-\frac{1}{5-n}$$

$$3\;(3-n)\;\text{AppellF1}\Big[1+\frac{3-n}{2},\,-n,\,4,\,1+\frac{5-n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\ \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\Big)\Big)\Big)\Big/$$

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

$$2\Big(n\ \text{AppellF1}\left[\frac{3-n}{2}, 1-n, 2, \frac{5-n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2\ \text{AppellF1}\Big[\frac{3-n}{2}, -n, 3, \frac{5-n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big)\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)^2 -$$

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

$$\Big(2\Big(n\ \text{AppellF1}\left[\frac{3-n}{2}, 1-n, 3, \frac{5-n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$3\ \text{AppellF1}\left[\frac{3-n}{2}, -n, 4, \frac{5-n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)$$

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

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

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\ \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] - \frac{1}{3-n} 3\ (1-n)$$

$$\text{AppellF1}\left[1+\frac{1-n}{2}, -n, 4, 1+\frac{3-n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big) + 2\ \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\Big(n\Big(-\frac{1}{5-n} 3\ (3-n)\ \text{AppellF1}\Big[1+\frac{3-n}{2}, 1-n, 4, 1+\frac{5-n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\ \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + \frac{1}{5-n}$$

$$(1-n)\ (3-n)\ \text{AppellF1}\Big[1+\frac{3-n}{2}, 2-n, 3, 1+\frac{5-n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\ \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big) +$$

$$3\Big(-\frac{1}{5-n}(3-n)\ n\ \text{AppellF1}\Big[1+\frac{3-n}{2}, 1-n, 4, 1+\frac{5-n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\ \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] - \frac{1}{5-n}$$

$$4\ (3-n)\ \text{AppellF1}\Big[1+\frac{3-n}{2}, -n, 5, 1+\frac{5-n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\ \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\Big)\Big)\Big)\Big/$$

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

$$2\Big(n\ \text{AppellF1}\left[\frac{3-n}{2}, 1-n, 3, \frac{5-n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$3\,\text{AppellF1}\left[\frac{3-n}{2},-n,4,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2,-\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\right]\,\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\Big)^2\Big)\Big)\Big)$$

Problem 47: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int\left(d\,\text{Cot}[e+f\,x]\right)^n\,\text{Sin}[e+f\,x]^4\,dx$$

Optimal (type 5, 51 leaves, 2 steps):

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

Result (type 6, 8475 leaves):

$$\Big(2^{5-n}\,(-3+n)\,\text{Cot}[e+f\,x]^{-n}\,\left(d\,\text{Cot}[e+f\,x]\right)^n\,\Big(\text{Cos}\left[4\,(e+f\,x)\right]\,\left(\frac{1}{16}\,\text{Cot}[e+f\,x]^n-\frac{1}{4}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]-\frac{3}{8}\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]^2+\frac{1}{4}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]^3+\frac{1}{16}\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]^4\right)-$$

$$\frac{1}{16}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[4\,(e+f\,x)\right]-\frac{1}{4}\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]\,\text{Sin}\left[4\,(e+f\,x)\right]+$$

$$\frac{3}{8}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]^2\,\text{Sin}\left[4\,(e+f\,x)\right]+$$

$$\frac{1}{4}\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]^3\,\text{Sin}\left[4\,(e+f\,x)\right]-$$

$$\frac{1}{16}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]^4\,\text{Sin}\left[4\,(e+f\,x)\right]+$$

$$\text{Cos}\left[2\,(e+f\,x)\right]^4\,\left(\frac{1}{16}\,\text{Cos}\left[4\,(e+f\,x)\right]\,\text{Cot}[e+f\,x]^n-\frac{1}{16}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[4\,(e+f\,x)\right]\right)+$$

$$\text{Cos}\left[2\,(e+f\,x)\right]^3\,\Big(\text{Cos}\left[4\,(e+f\,x)\right]\,\left(-\frac{1}{4}\,\text{Cot}[e+f\,x]^n+\frac{1}{4}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]\right)+\frac{1}{4}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[4\,(e+f\,x)\right]+\frac{1}{4}\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]\,\text{Sin}\left[4\,(e+f\,x)\right]\Big)+$$

$$\text{Cos}\left[2\,(e+f\,x)\right]^2\,\Big(\text{Cos}\left[4\,(e+f\,x)\right]\,\left(\frac{3}{8}\,\text{Cot}[e+f\,x]^n-\frac{3}{4}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]-\frac{3}{8}\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]^2\right)-\frac{3}{8}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[4\,(e+f\,x)\right]-\frac{3}{4}\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]\,\text{Sin}\left[4\,(e+f\,x)\right]+\frac{3}{8}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]^2\,\text{Sin}\left[4\,(e+f\,x)\right]\Big)+$$

$$\text{Cos}\left[2\,(e+f\,x)\right]\,\Big(\text{Cos}\left[4\,(e+f\,x)\right]\,\Big(-\frac{1}{4}\,\text{Cot}[e+f\,x]^n+\frac{3}{4}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]+\frac{3}{4}\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]^2-\frac{1}{4}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}\left[2\,(e+f\,x)\right]^3\Big)+$$

$$\frac{1}{4} i \operatorname{Cot}[e+f x]^n \operatorname{Sin}[4(e+f x)]+\frac{3}{4} \operatorname{Cot}[e+f x]^n \operatorname{Sin}[2(e+f x)] \operatorname{Sin}[4(e+f x)]-$$
$$\frac{3}{4} i \operatorname{Cot}[e+f x]^n \operatorname{Sin}[2(e+f x)]^2 \operatorname{Sin}[4(e+f x)]-$$
$$\left.\left.\frac{1}{4} \operatorname{Cot}[e+f x]^n \operatorname{Sin}[2(e+f x)]^3 \operatorname{Sin}[4(e+f x)]\right)\right)$$
$$\left(\operatorname{Cot}\left[\frac{1}{2}(e+f x)\right]-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]\right)^n \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]$$
$$\left(-\left(\left(\operatorname{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.\right.\right.$$
$$\left.\left(1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\right)\Big/$$
$$\left(\left(-3+n\right) \operatorname{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$2\left(n \operatorname{AppellF1}\left[\frac{3-n}{2},1-n,3,\frac{5-n}{2},\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.3 \operatorname{AppellF1}\left[\frac{3-n}{2},-n,4,\frac{5-n}{2},\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)$$
$$\left.\left.\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)+\left(2 \operatorname{AppellF1}\left[\frac{1-n}{2},-n,4,\frac{3-n}{2},\right.\right.$$
$$\left.\left.\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\left(1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\Big/$$
$$\left(\left(-3+n\right) \operatorname{AppellF1}\left[\frac{1-n}{2},-n,4,\frac{3-n}{2},\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$2\left(n \operatorname{AppellF1}\left[\frac{3-n}{2},1-n,4,\frac{5-n}{2},\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+4 \operatorname{AppellF1}\left[\right.\right.$$
$$\left.\left.\left.\frac{3-n}{2},-n,5,\frac{5-n}{2},\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)-$$
$$\operatorname{AppellF1}\left[\frac{1-n}{2},-n,5,\frac{3-n}{2},\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big/$$
$$\left(\left(-3+n\right) \operatorname{AppellF1}\left[\frac{1-n}{2},-n,5,\frac{3-n}{2},\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$2\left(n \operatorname{AppellF1}\left[\frac{3-n}{2},1-n,5,\frac{5-n}{2},\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$\left.5 \operatorname{AppellF1}\left[\frac{3-n}{2},-n,6,\frac{5-n}{2},\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)$$
$$\left.\left.\left.\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)\right)\Big/\left(f\,(-1+n)\left(1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^5\right.$$
$$\left(-\frac{1}{(-1+n)\left(1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^6} 5 \times 2^{5-n}(-3+n) \operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right.$$
$$\left(\operatorname{Cot}\left[\frac{1}{2}(e+f x)\right]-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]\right)^n \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$
$$\left(-\left(\left(\operatorname{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.\right.\right.$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\Bigg)\Bigg/\left((-3+n)\,\text{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,3,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+3\,\text{AppellF1}\left[\frac{3-n}{2},-n,4,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\Bigg)+$$

$$\left(2\,\text{AppellF1}\left[\frac{1-n}{2},-n,4,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)\Bigg/\left((-3+n)\,\text{AppellF1}\left[\frac{1-n}{2},-n,4,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,4,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+4\,\text{AppellF1}\left[\frac{3-n}{2},-n,5,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)-$$

$$\text{AppellF1}\left[\frac{1-n}{2},-n,5,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg/\left((-3+n)\,\text{AppellF1}\left[\frac{1-n}{2},-n,5,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,5,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+5\,\text{AppellF1}\left[\frac{3-n}{2},-n,6,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\Bigg)+\frac{1}{(-1+n)\left(1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^5}$$

$$2^{4-n}(-3+n)\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\left(\text{Cot}\left[\frac{1}{2}(e+fx)\right]-\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)^n$$

$$\Bigg(-\Bigg(\Bigg(\text{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\Bigg)\Bigg/\left((-3+n)\,\text{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\left(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,3,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+3\,\text{AppellF1}\left[\frac{3-n}{2},-n,4,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\Bigg)+$$

$$\left(2\,\text{AppellF1}\left[\frac{1-n}{2},-n,4,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\left(1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\right)\Bigg/\Bigg((-3+n)\,\text{AppellF1}\left[\frac{1-n}{2},-n,4,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\Bigg(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,4,\right.$$

$$\frac{5-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 4\,\operatorname{AppellF1}\left[\frac{3-n}{2}, -n,$$

$$5, \frac{5-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) -$$

$$\operatorname{AppellF1}\left[\frac{1-n}{2}, -n, 5, \frac{3-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \Big/$$

$$\Big(\left(-3+n\right) \operatorname{AppellF1}\left[\frac{1-n}{2}, -n, 5, \frac{3-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2\,\Big(n\,\operatorname{AppellF1}\left[\frac{3-n}{2}, 1-n, 5, \frac{5-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 5$$

$$\operatorname{AppellF1}\left[\frac{3-n}{2}, -n, 6, \frac{5-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)$$

$$\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big) + \frac{1}{\left(-1+n\right)\left(1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^5}$$

$$2^{5-n}\left(-3+n\right) n \left(-\frac{1}{2}\operatorname{Csc}\left[\frac{1}{2}(e+f x)\right]^2 - \frac{1}{2}\operatorname{Sec}\left[\frac{1}{2}(e+f x)\right]^2\right)$$

$$\left(\operatorname{Cot}\left[\frac{1}{2}(e+f x)\right] - \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]\right)^{-1+n} \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]$$

$$\Big(-\Big(\Big(\operatorname{AppellF1}\left[\frac{1-n}{2}, -n, 3, \frac{3-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\left(1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Big)\Big/\Big(\left(-3+n\right)\operatorname{AppellF1}\left[\frac{1-n}{2}, -n, 3, \frac{3-n}{2},\right.$$

$$\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 2\,\Big(n\,\operatorname{AppellF1}\left[\frac{3-n}{2}, 1-n, 3,\right.$$

$$\frac{5-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 3\,\operatorname{AppellF1}\left[\frac{3-n}{2}, -n,$$

$$4, \frac{5-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)\Big) +$$

$$\Big(2\,\operatorname{AppellF1}\left[\frac{1-n}{2}, -n, 4, \frac{3-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\left(1+\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big)\Big/\Big(\left(-3+n\right)\operatorname{AppellF1}\left[\frac{1-n}{2}, -n, 4, \frac{3-n}{2},\right.$$

$$\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 2\,\Big(n\,\operatorname{AppellF1}\left[\frac{3-n}{2}, 1-n, 4,\right.$$

$$\frac{5-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 4\,\operatorname{AppellF1}\left[\frac{3-n}{2}, -n,$$

$$5, \frac{5-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big) \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big) -$$

$$\operatorname{AppellF1}\left[\frac{1-n}{2}, -n, 5, \frac{3-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \Big/$$

$$\Big(\left(-3+n\right) \operatorname{AppellF1}\left[\frac{1-n}{2}, -n, 5, \frac{3-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +$$

$$2\,\Big(n\,\operatorname{AppellF1}\left[\frac{3-n}{2}, 1-n, 5, \frac{5-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] + 5$$

$$\operatorname{AppellF1}\left[\frac{3-n}{2}, -n, 6, \frac{5-n}{2}, \operatorname{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

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

$$\frac{1}{(-1+n)\left(1+\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^5}\,2^{5-n}\,(-3+n)\left(\mathrm{Cot}\left[\frac{1}{2}(e+f x)\right]-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\right)^n$$

$$\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]$$

$$\Big(-\Big(\Big(2\,\mathrm{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\left(1+\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Big)\Big/$$

$$\Big((-3+n)\,\mathrm{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$2\Big(n\,\mathrm{AppellF1}\left[\frac{3-n}{2},1-n,3,\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$3\,\mathrm{AppellF1}\Big[\frac{3-n}{2},-n,4,\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

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

$$\Big(\Big(-\frac{1}{3-n}(1-n)\,n\,\mathrm{AppellF1}\Big[1+\frac{1-n}{2},1-n,3,1+\frac{3-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]-\frac{1}{3-n}3\,(1-n)$$

$$\mathrm{AppellF1}\left[1+\frac{1-n}{2},-n,4,1+\frac{3-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\left(1+\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2\Big)\Big/$$

$$\Big((-3+n)\,\mathrm{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$2\Big(n\,\mathrm{AppellF1}\left[\frac{3-n}{2},1-n,3,\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+3$$

$$\mathrm{AppellF1}\left[\frac{3-n}{2},-n,4,\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\Big)$$

$$\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big)+\Big(2\,\mathrm{AppellF1}\Big[\frac{1-n}{2},-n,4,\frac{3-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\Big/$$

$$\Big((-3+n)\,\mathrm{AppellF1}\left[\frac{1-n}{2},-n,4,\frac{3-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$2\Big(n\,\mathrm{AppellF1}\left[\frac{3-n}{2},1-n,4,\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+4$$

$$\mathrm{AppellF1}\Big[\frac{3-n}{2},-n,5,\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

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

$$\Big(2\Big(-\frac{1}{3-n}(1-n)\,n\,\mathrm{AppellF1}\Big[1+\frac{1-n}{2},1-n,4,1+\frac{3-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]-\frac{1}{3-n}4\,(1-n)$$

$$\text{AppellF1}\left[1+\frac{1-n}{2},-n,5,1+\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Big)\,\left(1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)\Big)\Big/$$

$$\Big((-3+n)\,\text{AppellF1}\left[\frac{1-n}{2},-n,4,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$2\,\Big(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,4,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+4$$

$$\text{AppellF1}\left[\frac{3-n}{2},-n,5,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Big)$$

$$\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big)-\Big(-\frac{1}{3-n}(1-n)\,n\,\text{AppellF1}\Big[1+\frac{1-n}{2},1-n,5,1+\frac{3-n}{2},$$

$$\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]-$$

$$\frac{1}{3-n}5\,(1-n)\,\text{AppellF1}\Big[1+\frac{1-n}{2},-n,6,1+\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Big)\Big)\Big/$$

$$\Big((-3+n)\,\text{AppellF1}\left[\frac{1-n}{2},-n,5,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$

$$2\,\Big(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,5,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+5$$

$$\text{AppellF1}\Big[\frac{3-n}{2},-n,6,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]\Big)\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big)+$$

$$\Big(\text{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$

$$\left(1+\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right)^2\Big(2\,\Big(n\,\text{AppellF1}\Big[\frac{3-n}{2},1-n,3,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]+3\,\text{AppellF1}\Big[\frac{3-n}{2},-n,4,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]\Big)\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+$$

$$(-3+n)\,\Big(-\frac{1}{3-n}(1-n)\,n\,\text{AppellF1}\Big[1+\frac{1-n}{2},1-n,3,1+\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]-\frac{1}{3-n}3\,(1-n)$$

$$\text{AppellF1}\left[1+\frac{1-n}{2},-n,4,1+\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Big)+2\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$

$$\Big(n\,\Big(-\frac{1}{5-n}3\,(3-n)\,\text{AppellF1}\Big[1+\frac{3-n}{2},1-n,4,1+\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,$$

$$-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{5-n}$$
$$(1-n)\,(3-n)\,\mathrm{AppellF1}\left[1+\frac{3-n}{2},2-n,3,1+\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)+$$
$$3\left(-\frac{1}{5-n}(3-n)\,n\,\mathrm{AppellF1}\left[1+\frac{3-n}{2},1-n,4,1+\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$
$$\left.-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]-\frac{1}{5-n}$$
$$4\,(3-n)\,\mathrm{AppellF1}\left[1+\frac{3-n}{2},-n,5,1+\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.\left.-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\Bigg)\Bigg)\Bigg)\Bigg/$$
$$\Bigg(\left((-3+n)\,\mathrm{AppellF1}\left[\frac{1-n}{2},-n,3,\frac{3-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$2\left(n\,\mathrm{AppellF1}\left[\frac{3-n}{2},1-n,3,\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+\right.$$
$$3\,\mathrm{AppellF1}\left[\frac{3-n}{2},-n,4,\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.\left.\left.-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2-$$
$$\Bigg(2\,\mathrm{AppellF1}\left[\frac{1-n}{2},-n,4,\frac{3-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$
$$\left(1+\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)\Bigg(2\left(n\,\mathrm{AppellF1}\left[\frac{3-n}{2},1-n,4,\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$
$$\left.-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+4\,\mathrm{AppellF1}\left[\frac{3-n}{2},-n,5,\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.\left.-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right)\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]+$$
$$(-3+n)\left(-\frac{1}{3-n}(1-n)\,n\,\mathrm{AppellF1}\left[1+\frac{1-n}{2},1-n,4,1+\frac{3-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$
$$\left.-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]-\frac{1}{3-n}4\,(1-n)$$
$$\mathrm{AppellF1}\left[1+\frac{1-n}{2},-n,5,1+\frac{3-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$
$$\left.\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+2\,\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$
$$\left(n\left(-\frac{1}{5-n}4\,(3-n)\,\mathrm{AppellF1}\left[1+\frac{3-n}{2},1-n,5,1+\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$
$$\left.-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]+\frac{1}{5-n}$$
$$(1-n)\,(3-n)\,\mathrm{AppellF1}\left[1+\frac{3-n}{2},2-n,4,1+\frac{5-n}{2},\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$
$$\left.\left.-\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\mathrm{Sec}\left[\frac{1}{2}(e+f x)\right]^2\mathrm{Tan}\left[\frac{1}{2}(e+f x)\right]\right)+$$

$$4\left(-\frac{1}{5-n}(3-n)\,n\,\text{AppellF1}\left[1+\frac{3-n}{2},1-n,5,1+\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]-\frac{1}{5-n}5(3-n)\,\text{AppellF1}\left[1+\frac{3-n}{2},-n,6,1+\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\right)\Bigg)\Bigg)\Bigg)\Bigg)\Big/$$

$$\Bigg(\Bigg((-3+n)\,\text{AppellF1}\left[\frac{1-n}{2},-n,4,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+2\Bigg(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,4,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+4\,\text{AppellF1}\left[\frac{3-n}{2},-n,5,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)^2+$$

$$\Bigg(\text{AppellF1}\left[\frac{1-n}{2},-n,5,\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg(2\Bigg(n\,\text{AppellF1}\left[\frac{3-n}{2},1-n,5,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+5\,\text{AppellF1}\left[\frac{3-n}{2},-n,6,\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)$$

$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+(-3+n)\Bigg(-\frac{1}{3-n}(1-n)\,n\,\text{AppellF1}\left[1+\frac{1-n}{2},1-n,5,1+\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]-\frac{1}{3-n}5(1-n)\,\text{AppellF1}\left[1+\frac{1-n}{2},-n,6,1+\frac{3-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)+2\,\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2$$

$$\Bigg(n\Bigg(-\frac{1}{5-n}5(3-n)\,\text{AppellF1}\left[1+\frac{3-n}{2},1-n,6,1+\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]+\frac{1}{5-n}(1-n)(3-n)\,\text{AppellF1}\left[1+\frac{3-n}{2},2-n,5,1+\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)+$$

$$5\Bigg(-\frac{1}{5-n}(3-n)\,n\,\text{AppellF1}\left[1+\frac{3-n}{2},1-n,6,1+\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]-\frac{1}{5-n}6(3-n)\,\text{AppellF1}\left[1+\frac{3-n}{2},-n,7,1+\frac{5-n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(\Big((-3+n)\,\text{AppellF1}\Big[\frac{1-n}{2},-n,5,\frac{3-n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+2\Big(n\,\text{AppellF1}\Big[\frac{3-n}{2},1-n,5,\frac{5-n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+5\,\text{AppellF1}\Big[\frac{3-n}{2},-n,6,\frac{5-n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2,-\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^2\Big)\Big)$$

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

$$\int (d\,\text{Cot}[e+f x])^n\,\text{Csc}[e+f x]^3\,dx$$

Optimal (type 5, 79 leaves, 1 step):

$$-\frac{1}{d f (1+n)}(d\,\text{Cot}[e+f x])^{1+n}\,\text{Csc}[e+f x]^3\,\text{Hypergeometric2F1}\Big[\frac{1+n}{2},\frac{4+n}{2},\frac{3+n}{2},\text{Cos}[e+f x]^2\Big]\,\big(\text{Sin}[e+f x]^2\big)^{\frac{4+n}{2}}$$

Result (type 5, 190 leaves):

$$-\frac{1}{4 f n (-4+n^2)}(d\,\text{Cot}[e+f x])^n\Big((-2+n)\,n\,\text{Cot}\Big[\frac{1}{2}(e+f x)\Big]^4\,\text{Hypergeometric2F1}\Big[-1-\frac{n}{2},-n,-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+(2+n)\Big(n\,\text{Hypergeometric2F1}\Big[1-\frac{n}{2},-n,2-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]+2(-2+n)\,\text{Cot}\Big[\frac{1}{2}(e+f x)\Big]^2\,\text{Hypergeometric2F1}\Big[-n,-\frac{n}{2},1-\frac{n}{2},\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2\Big]\Big)\Big)\Big(\text{Cos}[e+f x]\,\text{Sec}\Big[\frac{1}{2}(e+f x)\Big]^2\Big)^{-n}\,\text{Tan}\Big[\frac{1}{2}(e+f x)\Big]^2$$

Problem 50: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int (d\,\text{Cot}[e+f x])^n\,\text{Sin}[e+f x]\,dx$$

Optimal (type 5, 73 leaves, 1 step):

$$-\frac{1}{d f (1+n)}(d\,\text{Cot}[e+f x])^{1+n}\,\text{Hypergeometric2F1}\Big[\frac{n}{2},\frac{1+n}{2},\frac{3+n}{2},\text{Cos}[e+f x]^2\Big]\,\text{Sin}[e+f x]\,\big(\text{Sin}[e+f x]^2\big)^{n/2}$$

Result (type 6, 1973 leaves):

$$-\left(\left(4\,(-4+n)\,\text{AppellF1}\left[1-\frac{n}{2},-n,2,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.\right.$$

$$\left.\text{Cos}\left[\frac{1}{2}(e+f x)\right]^4\text{Cot}[e+f x]^n\,(d\,\text{Cot}[e+f x])^n\,\text{Sin}[e+f x]\right)\Big/$$

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

$$4\,\text{AppellF1}\left[2-\frac{n}{2},-n,3,3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+(-4+n)$$

$$\left.\text{AppellF1}\left[1-\frac{n}{2},-n,2,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cot}\left[\frac{1}{2}(e+f x)\right]^2\right)$$

$$\left(\left(4\,(-4+n)\,n\,\text{AppellF1}\left[1-\frac{n}{2},-n,2,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.\right.$$

$$\left.\text{Cos}\left[\frac{1}{2}(e+f x)\right]^4\text{Cot}[e+f x]^{-1+n}\,\text{Csc}[e+f x]^2\right)\Big/$$

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

$$4\,\text{AppellF1}\left[2-\frac{n}{2},-n,3,3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(-4+n)\,\text{AppellF1}\left[1-\frac{n}{2},-n,2,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cot}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)+$$

$$\left(8\,(-4+n)\,\text{AppellF1}\left[1-\frac{n}{2},-n,2,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.$$

$$\left.\text{Cos}\left[\frac{1}{2}(e+f x)\right]^3\text{Cot}[e+f x]^n\,\text{Sin}\left[\frac{1}{2}(e+f x)\right]\right)\Big/$$

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

$$4\,\text{AppellF1}\left[2-\frac{n}{2},-n,3,3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]+$$

$$(-4+n)\,\text{AppellF1}\left[1-\frac{n}{2},-n,2,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Cot}\left[\frac{1}{2}(e+f x)\right]^2\right)\right)-$$

$$\left(4\,(-4+n)\,\text{Cos}\left[\frac{1}{2}(e+f x)\right]^4\text{Cot}[e+f x]^n\left(-\frac{1}{2-\frac{n}{2}}\left(1-\frac{n}{2}\right)n\,\text{AppellF1}\left[2-\frac{n}{2},1-n,2,3-\right.\right.\right.$$

$$\left.\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]-$$

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

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg/$$

$$\Bigg((-2+n)\,\Bigg(2\,n\,\text{AppellF1}\Big[2-\frac{n}{2},1-n,2,3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+$$

$$4\,\text{AppellF1}\Big[2-\frac{n}{2},-n,3,3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]+$$

$$(-4+n)\,\text{AppellF1}\Big[1-\frac{n}{2},-n,2,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Cot}\left[\frac{1}{2}(e+f x)\right]^2\Bigg)\Bigg)+$$

$$\Bigg(4\,(-4+n)\,\text{AppellF1}\Big[1-\frac{n}{2},-n,2,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]$$

$$\text{Cos}\left[\frac{1}{2}(e+f x)\right]^4\text{Cot}[e+f x]^n\,\Bigg(-(-4+n)\,\text{AppellF1}\Big[1-\frac{n}{2},-n,2,2-\frac{n}{2},$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Cot}\left[\frac{1}{2}(e+f x)\right]\text{Csc}\left[\frac{1}{2}(e+f x)\right]^2+$$

$$(-4+n)\,\text{Cot}\left[\frac{1}{2}(e+f x)\right]^2\,\Bigg(-\frac{1}{2-\frac{n}{2}}\left(1-\frac{n}{2}\right)n\,\text{AppellF1}\Big[2-\frac{n}{2},1-n,2,3-\frac{n}{2},$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]-$$

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

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)+$$

$$2\,n\,\Bigg(-\frac{1}{3-\frac{n}{2}}2\,\left(2-\frac{n}{2}\right)\text{AppellF1}\Big[3-\frac{n}{2},1-n,3,4-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

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

$$\text{AppellF1}\Big[3-\frac{n}{2},2-n,2,4-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]$$

$$\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)+4\,\Bigg(-\frac{1}{3-\frac{n}{2}}\left(2-\frac{n}{2}\right)n\,\text{AppellF1}\Big[3-\frac{n}{2},1-n,$$

$$3,4-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\Big[$$

$$\frac{1}{2}(e+f x)\Big]-\frac{1}{3-\frac{n}{2}}3\,\left(2-\frac{n}{2}\right)\text{AppellF1}\Big[3-\frac{n}{2},-n,4,4-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,$$

$$-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\,\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2\text{Tan}\left[\frac{1}{2}(e+f x)\right]\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\left(\left(-2+n\right)\left(2\,n\,\text{AppellF1}\left[2-\frac{n}{2},1-n,2,3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+4\,\text{AppellF1}\left[2-\frac{n}{2},-n,3,3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+(-4+n)\,\text{AppellF1}\left[1-\frac{n}{2},-n,2,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2\right)^2\right)\right)\right)$$

Problem 51: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int(d\,\text{Cot}[e+f\,x])^n\,\text{Sin}[e+f\,x]^3\,dx$$

Optimal (type 5, 79 leaves, 1 step):

$$-\frac{1}{d\,f\,(1+n)}(d\,\text{Cot}[e+f\,x])^{1+n}\,\text{Hypergeometric2F1}\left[\frac{1}{2}(-2+n),\frac{1+n}{2},\frac{3+n}{2},\text{Cos}[e+f\,x]^2\right]\text{Sin}[e+f\,x]^3\left(\text{Sin}[e+f\,x]^2\right)^{\frac{1}{2}(-2+n)}$$

Result (type 6, 5173 leaves):

$$\Big(16\,(-4+n)\,\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^6(d\,\text{Cot}[e+f\,x])^n\,\text{Sin}\left[\frac{1}{2}(e+f\,x)\right]^2\Big(\text{Cos}[3(e+f\,x)]\Big(-\frac{1}{8}\,i\,\text{Cot}[e+f\,x]^n-\frac{3}{8}\text{Cot}[e+f\,x]^n\,\text{Sin}[2(e+f\,x)]+\frac{3}{8}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}[2(e+f\,x)]^2+\frac{1}{8}\text{Cot}[e+f\,x]^n\,\text{Sin}[2(e+f\,x)]^3\Big)-\frac{1}{8}\text{Cot}[e+f\,x]^n\,\text{Sin}[3(e+f\,x)]+\frac{3}{8}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}[2(e+f\,x)]\,\text{Sin}[3(e+f\,x)]+\frac{3}{8}\text{Cot}[e+f\,x]^n\,\text{Sin}[2(e+f\,x)]^2\,\text{Sin}[3(e+f\,x)]-\frac{1}{8}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}[2(e+f\,x)]^3\,\text{Sin}[3(e+f\,x)]+\text{Cos}[2(e+f\,x)]^3\Big(\frac{1}{8}\,i\,\text{Cos}[3(e+f\,x)]\,\text{Cot}[e+f\,x]^n+\frac{1}{8}\text{Cot}[e+f\,x]^n\,\text{Sin}[3(e+f\,x)]\Big)+\text{Cos}[2(e+f\,x)]^2\Big(\text{Cos}[3(e+f\,x)]\Big(-\frac{3}{8}\,i\,\text{Cot}[e+f\,x]^n-\frac{3}{8}\text{Cot}[e+f\,x]^n\,\text{Sin}[2(e+f\,x)]\Big)-\frac{3}{8}\text{Cot}[e+f\,x]^n\,\text{Sin}[3(e+f\,x)]+\frac{3}{8}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}[2(e+f\,x)]\,\text{Sin}[3(e+f\,x)]\Big)+\text{Cos}[2(e+f\,x)]\Big(\text{Cos}[3(e+f\,x)]\Big(\frac{3}{8}\,i\,\text{Cot}[e+f\,x]^n+\frac{3}{4}\text{Cot}[e+f\,x]^n\,\text{Sin}[2(e+f\,x)]-\frac{3}{8}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}[2(e+f\,x)]^2\Big)+\frac{3}{8}\text{Cot}[e+f\,x]^n\,\text{Sin}[3(e+f\,x)]-\frac{3}{4}\,i\,\text{Cot}[e+f\,x]^n\,\text{Sin}[2(e+f\,x)]\,\text{Sin}[3(e+f\,x)]-\frac{3}{8}\text{Cot}[e+f\,x]^n\,\text{Sin}[2(e+f\,x)]^2\,\text{Sin}[3(e+f\,x)]\Big)\Big)$$

$$\Big(-\Big(\Big(\text{AppellF1}\Big[1-\frac{n}{2},\,-n,\,3,\,2-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\,\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)\Big/$$

$$\Big((-4+n)\,\text{AppellF1}\Big[1-\frac{n}{2},\,-n,\,3,\,2-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+$$

$$2\,\Big(n\,\text{AppellF1}\Big[2-\frac{n}{2},\,1-n,\,3,\,3-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+$$

$$3\,\text{AppellF1}\Big[2-\frac{n}{2},\,-n,\,4,\,3-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)\Big)+$$

$$\text{AppellF1}\Big[1-\frac{n}{2},\,-n,\,4,\,2-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\Big/$$

$$\Big((-4+n)\,\text{AppellF1}\Big[1-\frac{n}{2},\,-n,\,4,\,2-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+$$

$$2\,\Big(n\,\text{AppellF1}\Big[2-\frac{n}{2},\,1-n,\,4,\,3-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+$$

$$4\,\text{AppellF1}\Big[2-\frac{n}{2},\,-n,\,5,\,3-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)\Big)\Big)\Big/$$

$$\Big(f\,(-2+n)\,\Big(\frac{1}{-2+n}16\,(-4+n)\,\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]^7\,\text{Cot}[e+f\,x]^n\,\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]$$

$$\Big(-\Big(\Big(\text{AppellF1}\Big[1-\frac{n}{2},\,-n,\,3,\,2-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]$$

$$\text{Sec}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)\Big/\Big((-4+n)\,\text{AppellF1}\Big[1-\frac{n}{2},\,-n,\,3,\,2-\frac{n}{2},$$

$$\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+2\,\Big(n\,\text{AppellF1}\Big[2-\frac{n}{2},\,1-n,\,3,$$

$$3-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+3\,\text{AppellF1}\Big[2-\frac{n}{2},\,-n,$$

$$4,\,3-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)\Big)+$$

$$\text{AppellF1}\Big[1-\frac{n}{2},\,-n,\,4,\,2-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\Big/$$

$$\Big((-4+n)\,\text{AppellF1}\Big[1-\frac{n}{2},\,-n,\,4,\,2-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+$$

$$2\,\Big(n\,\text{AppellF1}\Big[2-\frac{n}{2},\,1-n,\,4,\,3-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]+4$$

$$\text{AppellF1}\Big[2-\frac{n}{2},\,-n,\,5,\,3-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,$$

$$-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]\Big)\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big)\Big)-$$

$$\frac{1}{-2+n}16\,(-4+n)\,n\,\text{Cos}\Big[\frac{1}{2}\,(e+f\,x)\Big]^6\,\text{Cot}[e+f\,x]^{-1+n}\,\text{Csc}[e+f\,x]^2\,\text{Sin}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2$$

$$\Big(-\Big(\Big(\text{AppellF1}\Big[1-\frac{n}{2},\,-n,\,3,\,2-\frac{n}{2},\,\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2,\,-\text{Tan}\Big[\frac{1}{2}\,(e+f\,x)\Big]^2\Big]$$

$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Big/\Bigg((-4+n)\,\text{AppellF1}\left[1-\frac{n}{2},-n,3,2-\frac{n}{2},\right.$$
$$\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]+2\Bigg(n\,\text{AppellF1}\left[2-\frac{n}{2},1-n,3,\right.$$
$$3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]+3\,\text{AppellF1}\left[2-\frac{n}{2},-n,\right.$$
$$4,3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Bigg)+$$
$$\text{AppellF1}\left[1-\frac{n}{2},-n,4,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Big/$$
$$\Bigg((-4+n)\,\text{AppellF1}\left[1-\frac{n}{2},-n,4,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$
$$2\Bigg(n\,\text{AppellF1}\left[2-\frac{n}{2},1-n,4,3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+4$$
$$\text{AppellF1}\left[2-\frac{n}{2},-n,5,3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Bigg)-$$
$$\frac{1}{-2+n}48(-4+n)\,\text{Cos}\left[\frac{1}{2}(e+fx)\right]^5\text{Cot}[e+fx]^n\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]^3$$
$$\Bigg(-\Bigg(\Bigg(\text{AppellF1}\left[1-\frac{n}{2},-n,3,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$
$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Big/\Bigg((-4+n)\,\text{AppellF1}\left[1-\frac{n}{2},-n,3,2-\frac{n}{2},\right.$$
$$\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]+2\Bigg(n\,\text{AppellF1}\left[2-\frac{n}{2},1-n,3,\right.$$
$$3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]+3\,\text{AppellF1}\left[2-\frac{n}{2},-n,\right.$$
$$4,3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Bigg)+$$
$$\text{AppellF1}\left[1-\frac{n}{2},-n,4,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Big/$$
$$\Bigg((-4+n)\,\text{AppellF1}\left[1-\frac{n}{2},-n,4,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+$$
$$2\Bigg(n\,\text{AppellF1}\left[2-\frac{n}{2},1-n,4,3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]+4$$
$$\text{AppellF1}\left[2-\frac{n}{2},-n,5,3-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\Bigg)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg)\Bigg)+$$
$$\frac{1}{-2+n}16(-4+n)\,\text{Cos}\left[\frac{1}{2}(e+fx)\right]^6\text{Cot}[e+fx]^n\,\text{Sin}\left[\frac{1}{2}(e+fx)\right]^2$$
$$\Bigg(-\Bigg(\Bigg(\text{AppellF1}\left[1-\frac{n}{2},-n,3,2-\frac{n}{2},\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]$$
$$\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)\Big/\Bigg((-4+n)\,\text{AppellF1}\left[1-\frac{n}{2},-n,3,2-\frac{n}{2},\right.$$

$$\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big] + 2\left(n\,\text{AppellF1}\left[2-\frac{n}{2}, 1-n, 3, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] + 3\,\text{AppellF1}\left[2-\frac{n}{2}, -n, 4, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Big)\Big) -$$

$$\Bigg(\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\Bigg(-\frac{1}{2-\frac{n}{2}}\left(1-\frac{n}{2}\right) n\,\text{AppellF1}\left[2-\frac{n}{2}, 1-n, 3, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right] - \frac{1}{2-\frac{n}{2}}3\left(1-\frac{n}{2}\right)\text{AppellF1}\left[2-\frac{n}{2}, -n, 4, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)\Bigg)\Bigg/$$

$$\Bigg((-4+n)\,\text{AppellF1}\left[1-\frac{n}{2}, -n, 3, 2-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] + 2\left(n\,\text{AppellF1}\left[2-\frac{n}{2}, 1-n, 3, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] + 3\,\text{AppellF1}\left[2-\frac{n}{2}, -n, 4, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg) + \Bigg(-\frac{1}{2-\frac{n}{2}}\left(1-\frac{n}{2}\right) n\,\text{AppellF1}\left[2-\frac{n}{2}, 1-n, 4, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right] - \frac{1}{2-\frac{n}{2}}4\left(1-\frac{n}{2}\right)\text{AppellF1}\left[2-\frac{n}{2}, -n, 5, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\text{Tan}\left[\frac{1}{2}(e+fx)\right]\Bigg)\Bigg/$$

$$\Bigg((-4+n)\,\text{AppellF1}\left[1-\frac{n}{2}, -n, 4, 2-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] + 2\left(n\,\text{AppellF1}\left[2-\frac{n}{2}, 1-n, 4, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] + 4\,\text{AppellF1}\left[2-\frac{n}{2}, -n, 5, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\right)\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\Bigg) + \Bigg(\text{AppellF1}\left[1-\frac{n}{2}, -n, 3, 2-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right]\text{Sec}\left[\frac{1}{2}(e+fx)\right]^2\Bigg(2\Bigg(n\,\text{AppellF1}\left[2-\frac{n}{2}, 1-n, 3, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+fx)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+fx)\right]^2\right] + 3\,\text{AppellF1}\left[2-\frac{n}{2}, -n, 4, 3-\frac{n}{2},$$

$$\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\Big]\Big) \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] +$$

$$(-4+n)\left(-\frac{1}{2-\frac{n}{2}}\left(1-\frac{n}{2}\right) n \,\text{AppellF1}\left[2-\frac{n}{2}, 1-n, 3, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] - \frac{1}{2-\frac{n}{2}} 3\left(1-\frac{n}{2}\right)$$

$$\text{AppellF1}\left[2-\frac{n}{2}, -n, 4, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]$$

$$\left.\text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right) + 2\,\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2$$

$$\left(n\left(-\frac{1}{3-\frac{n}{2}} 3\left(2-\frac{n}{2}\right) \text{AppellF1}\left[3-\frac{n}{2}, 1-n, 4, 4-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] + \frac{1}{3-\frac{n}{2}}$$

$$(1-n)\left(2-\frac{n}{2}\right) \text{AppellF1}\left[3-\frac{n}{2}, 2-n, 3, 4-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right) +$$

$$3\left(-\frac{1}{3-\frac{n}{2}}\left(2-\frac{n}{2}\right) n \,\text{AppellF1}\left[3-\frac{n}{2}, 1-n, 4, 4-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right] - \frac{1}{3-\frac{n}{2}}$$

$$4\left(2-\frac{n}{2}\right) \text{AppellF1}\left[3-\frac{n}{2}, -n, 5, 4-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] \text{Sec}\left[\frac{1}{2}(e+f x)\right]^2 \text{Tan}\left[\frac{1}{2}(e+f x)\right]\right)\right)\right)\right) \Big/$$

$$\left((-4+n)\,\text{AppellF1}\left[1-\frac{n}{2}, -n, 3, 2-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +\right.$$

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

$$3\,\text{AppellF1}\left[2-\frac{n}{2}, -n, 4, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2,\right.$$

$$\left.\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right) \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right)^2 -$$

$$\left(\text{AppellF1}\left[1-\frac{n}{2}, -n, 4, 2-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right]\right.$$

$$\left(2\left(n\,\text{AppellF1}\left[2-\frac{n}{2}, 1-n, 4, 3-\frac{n}{2}, \text{Tan}\left[\frac{1}{2}(e+f x)\right]^2, -\text{Tan}\left[\frac{1}{2}(e+f x)\right]^2\right] +\right.\right.$$

$$4\,\text{AppellF1}\left[2-\frac{n}{2},\,-n,\,5,\,3-\frac{n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\Big)$$

$$\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]+(-4+n)\,\Bigg(-\frac{1}{2-\frac{n}{2}}\left(1-\frac{n}{2}\right)\,n\,\text{AppellF1}\left[2-\frac{n}{2},\right.$$

$$\left.1-n,\,4,\,3-\frac{n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2$$

$$\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]-\frac{1}{2-\frac{n}{2}}4\,\left(1-\frac{n}{2}\right)\,\text{AppellF1}\left[2-\frac{n}{2},\,-n,\,5,\,3-\frac{n}{2},\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\Bigg)+$$

$$2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\Bigg(n\,\Bigg(-\frac{1}{3-\frac{n}{2}}4\,\left(2-\frac{n}{2}\right)\,\text{AppellF1}\left[3-\frac{n}{2},\,1-n,\,5,\,4-\frac{n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+\right.\right.$$

$$\left.\left.f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]+$$

$$\frac{1}{3-\frac{n}{2}}(1-n)\,\left(2-\frac{n}{2}\right)\,\text{AppellF1}\left[3-\frac{n}{2},\,2-n,\,4,\,4-\frac{n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\Bigg)+$$

$$4\,\Bigg(-\frac{1}{3-\frac{n}{2}}\left(2-\frac{n}{2}\right)\,n\,\text{AppellF1}\left[3-\frac{n}{2},\,1-n,\,5,\,4-\frac{n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\right.$$

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

$$5\,\left(2-\frac{n}{2}\right)\,\text{AppellF1}\left[3-\frac{n}{2},\,-n,\,6,\,4-\frac{n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\,\text{Sec}\left[\frac{1}{2}\,(e+f\,x)\right]^2\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]\Bigg)\Bigg)\Bigg)\Bigg)\Bigg/$$

$$\Bigg((-4+n)\,\text{AppellF1}\left[1-\frac{n}{2},\,-n,\,4,\,2-\frac{n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+$$

$$2\,\Bigg(n\,\text{AppellF1}\left[2-\frac{n}{2},\,1-n,\,4,\,3-\frac{n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\,-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]+$$

$$4\,\text{AppellF1}\left[2-\frac{n}{2},\,-n,\,5,\,3-\frac{n}{2},\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\right]\Bigg)\,\text{Tan}\left[\frac{1}{2}\,(e+f\,x)\right]^2\Bigg)^2\Bigg)\Bigg)\Bigg)$$

Problem 52: Result unnecessarily involves higher level functions and more than twice size of optimal antiderivative.

$$\int (b\,\text{Cot}[e+f\,x])^n\,(a\,\text{Csc}[e+f\,x])^m\,dx$$

Optimal (type 5, 83 leaves, 1 step):

$$-\frac{1}{b\,f\,(1+n)}(b\,\text{Cot}[e+f\,x])^{1+n}\,(a\,\text{Csc}[e+f\,x])^m\,\text{Hypergeometric2F1}\left[\frac{1+n}{2},\frac{1}{2}(1+m+n),\frac{3+n}{2},\text{Cos}[e+f\,x]^2\right]\left(\text{Sin}[e+f\,x]^2\right)^{\frac{1}{2}(1+m+n)}$$

Result (type 6, 3166 leaves):

$$-\left(\left(\left(2\,(-3+m+n)\,\text{AppellF1}\left[\frac{1}{2}(1-m-n),-n,1-m,\frac{1}{2}(3-m-n),\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\right.\right.\right.$$
$$\left.\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]\text{Cot}[e+f\,x]^n\,(b\,\text{Cot}[e+f\,x])^n\,\text{Csc}[e+f\,x]^m\,(a\,\text{Csc}[e+f\,x])^m\right)\Big/$$
$$\left(f\,(-1+m+n)\left(2\,n\,\text{AppellF1}\left[\frac{1}{2}(3-m-n),1-n,1-m,\frac{1}{2}(5-m-n),\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.\right.\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-2\,(-1+m)\,\text{AppellF1}\left[\frac{1}{2}(3-m-n),-n,2-m,\frac{1}{2}(5-m-n),\right.$$
$$\left.\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+(-3+m+n)\,\text{AppellF1}\left[\frac{1}{2}(1-m-n),-n,\right.$$
$$\left.\left.1-m,\frac{1}{2}(3-m-n),\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2\right)$$
$$\left(\left(2\,(-3+m+n)\,\text{AppellF1}\left[\frac{1}{2}(1-m-n),-n,1-m,\frac{1}{2}(3-m-n),\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.\right.\right.$$
$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Cos}\left[\frac{1}{2}(e+f\,x)\right]^2\,\text{Cot}[e+f\,x]^n\,\text{Csc}[e+f\,x]^m\right)\Big/$$
$$\left((-1+m+n)\left(2\,n\,\text{AppellF1}\left[\frac{1}{2}(3-m-n),1-n,1-m,\frac{1}{2}(5-m-n),\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.\right.\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-2\,(-1+m)\,\text{AppellF1}\left[\frac{1}{2}(3-m-n),-n,2-m,\frac{1}{2}(5-m-n),\right.$$
$$\left.\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+(-3+m+n)\,\text{AppellF1}\left[\frac{1}{2}(1-m-n),-n,\right.$$
$$\left.\left.\left.1-m,\frac{1}{2}(3-m-n),\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2\right)\right)+$$
$$\left(\left((-3+m+n)\,\text{AppellF1}\left[\frac{1}{2}(1-m-n),-n,1-m,\frac{1}{2}(3-m-n),\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.\right.\right.$$
$$\left.\left.-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]\text{Cot}\left[\frac{1}{2}(e+f\,x)\right]^2\,\text{Cot}[e+f\,x]^n\,\text{Csc}[e+f\,x]^m\right)\Big/$$
$$\left((-1+m+n)\left(2\,n\,\text{AppellF1}\left[\frac{1}{2}(3-m-n),1-n,1-m,\frac{1}{2}(5-m-n),\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,\right.\right.\right.$$
$$\left.-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]-2\,(-1+m)\,\text{AppellF1}\left[\frac{1}{2}(3-m-n),-n,2-m,\frac{1}{2}(5-m-n),\right.$$
$$\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2,-\text{Tan}\left[\frac{1}{2}(e+f\,x)\right]^2\right]+(-3+m+n)\,\text{AppellF1}\left[\frac{1}{2}(1-m-n),-n,$$

$$1-m,\ \frac{1}{2}\left(3-m-n\right),\ \mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]\ \mathrm{Cot}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big)\Big)+$$

$$\Big(2\,m\left(-3+m+n\right)\mathrm{AppellF1}\Big[\frac{1}{2}\left(1-m-n\right),\ -n,\ 1-m,\ \frac{1}{2}\left(3-m-n\right),$$

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

$$\mathrm{Cos}[e+f x]\ \mathrm{Cot}\left[\frac{1}{2}\left(e+f x\right)\right]\mathrm{Cot}[e+f x]^n\,\mathrm{Csc}[e+f x]^{1+m}\Big)\Big/$$

$$\Big(\left(-1+m+n\right)\Big(2\,n\,\mathrm{AppellF1}\Big[\frac{1}{2}\left(3-m-n\right),\ 1-n,\ 1-m,\ \frac{1}{2}\left(5-m-n\right),\ \mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,$$

$$-\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]-2\left(-1+m\right)\mathrm{AppellF1}\Big[\frac{1}{2}\left(3-m-n\right),\ -n,\ 2-m,\ \frac{1}{2}\left(5-m-n\right),$$

$$\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]+\left(-3+m+n\right)\mathrm{AppellF1}\Big[\frac{1}{2}\left(1-m-n\right),\ -n,$$

$$1-m,\ \frac{1}{2}\left(3-m-n\right),\ \mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]\ \mathrm{Cot}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big)\Big)+$$

$$\Big(2\,n\left(-3+m+n\right)\mathrm{AppellF1}\Big[\frac{1}{2}\left(1-m-n\right),\ -n,\ 1-m,\ \frac{1}{2}\left(3-m-n\right),$$

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

$$\mathrm{Cos}\left[\frac{1}{2}\left(e+f x\right)\right]^2\mathrm{Cot}\left[\frac{1}{2}\left(e+f x\right)\right]\mathrm{Cot}[e+f x]^{-1+n}\,\mathrm{Csc}[e+f x]^{2+m}\Big)\Big/$$

$$\Big(\left(-1+m+n\right)\Big(2\,n\,\mathrm{AppellF1}\Big[\frac{1}{2}\left(3-m-n\right),\ 1-n,\ 1-m,\ \frac{1}{2}\left(5-m-n\right),\ \mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,$$

$$-\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]-2\left(-1+m\right)\mathrm{AppellF1}\Big[\frac{1}{2}\left(3-m-n\right),\ -n,\ 2-m,\ \frac{1}{2}\left(5-m-n\right),$$

$$\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]+\left(-3+m+n\right)\mathrm{AppellF1}\Big[\frac{1}{2}\left(1-m-n\right),\ -n,$$

$$1-m,\ \frac{1}{2}\left(3-m-n\right),\ \mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]\ \mathrm{Cot}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big)\Big)-$$

$$\Big(2\left(-3+m+n\right)\mathrm{Cos}\left[\frac{1}{2}\left(e+f x\right)\right]^2\mathrm{Cot}\left[\frac{1}{2}\left(e+f x\right)\right]\mathrm{Cot}[e+f x]^n\,\mathrm{Csc}[e+f x]^m$$

$$\Big(-\frac{1}{3-m-n}\left(1-m-n\right)n\,\mathrm{AppellF1}\Big[1+\frac{1}{2}\left(1-m-n\right),\ 1-n,\ 1-m,\ 1+\frac{1}{2}\left(3-m-n\right),$$

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

$$\frac{1}{3-m-n}\left(1-m\right)\left(1-m-n\right)\mathrm{AppellF1}\Big[1+\frac{1}{2}\left(1-m-n\right),\ -n,\ 2-m,\ 1+\frac{1}{2}\left(3-m-n\right),$$

$$\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]\ \mathrm{Sec}\left[\frac{1}{2}\left(e+f x\right)\right]^2\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]\Big)\Big)\Big/$$

$$\Big(\left(-1+m+n\right)\Big(2\,n\,\mathrm{AppellF1}\Big[\frac{1}{2}\left(3-m-n\right),\ 1-n,\ 1-m,\ \frac{1}{2}\left(5-m-n\right),\ \mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,$$

$$-\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]-2\left(-1+m\right)\mathrm{AppellF1}\Big[\frac{1}{2}\left(3-m-n\right),\ -n,\ 2-m,\ \frac{1}{2}\left(5-m-n\right),$$

$$\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2,\ -\mathrm{Tan}\left[\frac{1}{2}\left(e+f x\right)\right]^2\Big]+\left(-3+m+n\right)\mathrm{AppellF1}\Big[\frac{1}{2}\left(1-m-n\right),\ -n,$$

$$1-m,\ \frac{1}{2}\left(3-m-n\right),\ \text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\right]\ \text{Cot}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\Big)\Big)+$$

$$\Big(2\left(-3+m+n\right)\text{AppellF1}\left[\frac{1}{2}\left(1-m-n\right),\ -n,\ 1-m,\ \frac{1}{2}\left(3-m-n\right),\ \text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\right]\text{Cos}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\text{Cot}\left[\frac{1}{2}\left(e+f\,x\right)\right]\text{Cot}\left[e+f\,x\right]^n$$

$$\text{Csc}\left[e+f\,x\right]^m\Big(-\left(-3+m+n\right)\text{AppellF1}\left[\frac{1}{2}\left(1-m-n\right),\ -n,\ 1-m,\ \frac{1}{2}\left(3-m-n\right),\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\right]\text{Cot}\left[\frac{1}{2}\left(e+f\,x\right)\right]\text{Csc}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2+$$

$$\left(-3+m+n\right)\text{Cot}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\Big(-\frac{1}{3-m-n}\left(1-m-n\right)n\,\text{AppellF1}\left[1+\frac{1}{2}\left(1-m-n\right),\right.$$

$$\left.1-n,\ 1-m,\ 1+\frac{1}{2}\left(3-m-n\right),\ \text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\right]$$

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

$$\text{AppellF1}\left[1+\frac{1}{2}\left(1-m-n\right),\ -n,\ 2-m,\ 1+\frac{1}{2}\left(3-m-n\right),\ \text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\right]\text{Sec}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]\Big)+2\,n\Big(-\frac{1}{5-m-n}$$

$$\left(1-m\right)\left(3-m-n\right)\text{AppellF1}\left[1+\frac{1}{2}\left(3-m-n\right),\ 1-n,\ 2-m,\ 1+\frac{1}{2}\left(5-m-n\right),\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\right]\text{Sec}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]+$$

$$\frac{1}{5-m-n}\left(1-n\right)\left(3-m-n\right)\text{AppellF1}\left[1+\frac{1}{2}\left(3-m-n\right),\ 2-n,\ 1-m,\ 1+\frac{1}{2}\left(5-m-n\right),\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\right]\text{Sec}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]\Big)-$$

$$2\left(-1+m\right)\Big(-\frac{1}{5-m-n}\left(3-m-n\right)n\,\text{AppellF1}\left[1+\frac{1}{2}\left(3-m-n\right),\ 1-n,\ 2-m,\right.$$

$$\left.1+\frac{1}{2}\left(5-m-n\right),\ \text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\right]$$

$$\text{Sec}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]-\frac{1}{5-m-n}\left(2-m\right)\left(3-m-n\right)$$

$$\text{AppellF1}\left[1+\frac{1}{2}\left(3-m-n\right),\ -n,\ 3-m,\ 1+\frac{1}{2}\left(5-m-n\right),\ \text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2,\right.$$

$$\left.-\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\right]\text{Sec}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]\Big)\Big)\Big)\Big)\Big/$$

$$\Big(\left(-1+m+n\right)\Big(2\,n\,\text{AppellF1}\left[\frac{1}{2}\left(3-m-n\right),\ 1-n,\ 1-m,\ \frac{1}{2}\left(5-m-n\right),\right.$$

$$\left.\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\right]-2\left(-1+m\right)\text{AppellF1}\left[\frac{1}{2}\left(3-m-n\right),\right.$$

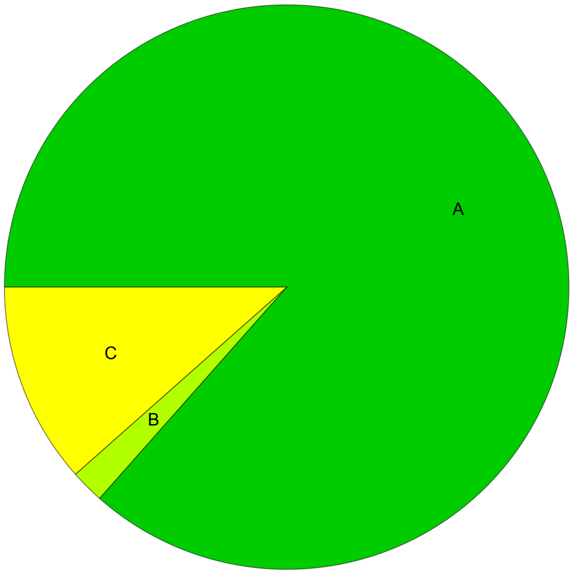
$$\left.-n,\ 2-m,\ \frac{1}{2}\left(5-m-n\right),\ \text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\right]+$$

$$\left(-3+m+n\right)\text{AppellF1}\left[\frac{1}{2}\left(1-m-n\right),\ -n,\ 1-m,\ \frac{1}{2}\left(3-m-n\right),\right.$$

$$\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2,\ -\text{Tan}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\right]\ \text{Cot}\left[\frac{1}{2}\left(e+f\,x\right)\right]^2\Big)^2\Big)\Big)\Big)\Big)$$

Summary of Integration Test Results

52 integration problems



A - 45 optimal antiderivatives

B - 1 more than twice size of optimal antiderivatives

C - 6 unnecessarily complex antiderivatives

D - 0 unable to integrate problems

E - 0 integration timeouts