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Maxima 5.21.1 http://maxima.sourceforge.net
using Lisp GNU Common Lisp (GCL) GCL 2.6.7 (a.k.a. GCL)
Distributed under the GNU Public License. See the file COPYING.
Dedicated to the memory of William Schelter.
The function bug_report() provides bug reporting information.
```

Work a complicated antiderivative related to surface area.

(%i6) `f:tan(x);`

(%o6) $\tan(x)$

(%i7) `dfdx:diff(f,x);`

(%o7) $\sec(x)^2$

(%i8) `P:integrate(f*sqrt(1+dfdx^2),x);`

(%o8) $$\int \sqrt{\sec(x)^4+1}\tan(x)\, dx$$

(%i9) `P1:changevar(P,sec(x)^2=u,u,x);`

(%o9) $$\frac{\int \frac{\sqrt{u^2+1}}{u}\, du}{2}$$

(%i10) `P2:ev(P1,nouns);`

(%o10) $$\frac{\sqrt{u^2+1}-\operatorname{asinh}\left(\frac{1}{|u|}\right)}{2}$$

(%i11) `P3:subst(u=sec(x)^2,P2);`

(%o11) $$\frac{\sqrt{\sec(x)^4+1}-\operatorname{asinh}\left(\frac{1}{\sec(x)^2}\right)}{2}$$

(%i12) `F2:diff(P3,x);`

(%o12) $$\frac{\frac{2\sec(x)^4\tan(x)}{\sqrt{\sec(x)^4+1}}+\frac{2\tan(x)}{\sqrt{\frac{1}{\sec(x)^4}+1}\sec(x)^2}}{2}$$

(%i13) `F3:trigsimp(F2);`

(%o13) $$\frac{\sqrt{(\cos x)^4+1}\sin x}{(\cos x)^3}$$

(%i14) `F4:tan(x)*sqrt(1+sec(x)^4);`

(%o14) $$\sqrt{\sec(x)^4+1}\tan(x)$$

(%i15) `trigsimp(F3-F4);`

(%o15) 0

(%i16) `F(x):=ev(P3);`

(%o16) $F(x):=\mathrm{ev}(\mathrm{P3})$

(%i17) `A1:F(2*%pi/5)-F(%pi/7);`

(%o17) $$\frac{\sqrt{\sec\left(\frac{2\pi}{5}\right)^{4}+1}-\operatorname{asinh}\left(\frac{1}{\sec\left(\frac{2\pi}{5}\right)^{2}}\right)}{2}-\frac{\sqrt{\sec\left(\frac{\pi}{7}\right)^{4}+1}-\operatorname{asinh}\left(\frac{1}{\sec\left(\frac{\pi}{7}\right)^{2}}\right)}{2}$$

(%i18) `float(A1);`

(%o18) 4.789770519843985

(%i19) `fpprec:64;`

(%o19) 64

(%i20) `bfloat(A1);`

(%o20) $4.789770519843985097074046348237279068311813968436435413137424254_B\times 10^0$

Find an antiderivative.

(%i21) `kill(all);`

(%o0) **done**

(%i1) `integrate(log(x)^2,x);`

(%o1) $x\left(\log(x)^2-2\log(x)+2\right)$

Work an arc length problem

(%i2) `f:y^3/21+7/(4*y);`

(%o2) $\frac{y^3}{21}+\frac{7}{4\,y}$

(%i3) `dfdy:diff(f,y);`

(%o3) $\frac{y^2}{7}-\frac{7}{4\,y^2}$

(%i4) `integrate(sqrt(dfdy^2+1),y,3,5);`

(%o4) $\frac{49}{10}$

(%i5)