

Maxima 5.13.0 <http://maxima.sourceforge.net>
 Using Lisp GNU Common Lisp (GCL) GCL 2.6.7 (aka GCL)
 Distributed under the GNU Public License. See the file COPYING.
 Dedicated to the memory of William Schelter.
 This is a development version of Maxima. The function bug_report()
 provides bug reporting information.

These are the answers to Quiz 8 from Honor Calculus II redone with Maxima.

```
(%i1) f1:sqrt(x);
      f2:1/2*(x-1);

(%o1)  $\sqrt{x}$ 
(%o2)  $\frac{x-1}{2}$ 

(%i3) a1:integrate((f1+f2)/2*(f1-f2),x,1,3+2*sqrt(2));

(%o5)  $\frac{32\sqrt{2}+45}{12} - \frac{5}{12}$ 

(%i6) expand(a1);

(%o7)  $\frac{4\sqrt{2}}{3} + \frac{5}{3}$ 

(%i8) I1:integrate(y*(2*y+1-1),y,0,1);
      I2:integrate(y*(2*y+1-y^2),y,1,1+sqrt(2));

(%o8)  $\frac{2}{3}$ 
(%o9)  $\frac{16\sqrt{2}+23}{12} - \frac{11}{12}$ 

(%i10) expand(I1+I2);

(%o10)  $\frac{4\sqrt{2}}{3} + \frac{5}{3}$ 

(%i11) A:integrate(1/x-1/2,x,1,2);

(%o11)  $\log(2) - \frac{1}{2}$ 

(%i12) xc:1/A*integrate(x*(1/x-1/2),x,1,2);

(%o13)  $\frac{1}{4\left(\log(2) - \frac{1}{2}\right)}$ 

(%i14) expand(xc);

(%o14)  $\frac{1}{4\log(2) - 2}$ 

(%i15) xc2:1/A*integrate((1+1/y)/2*(1/y-1),y,1/2,1);

(%o17)  $\frac{1}{4\left(\log(2) - \frac{1}{2}\right)}$ 

(%i18) expand(xc2);
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(%o18)  $\frac{1}{4 \log(2) - 2}$ 
(%i19) yc:1/A*integrate(y*(1/y-1),y,1/2,1);
(%o20)  $\frac{1}{8 \left( \log(2) - \frac{1}{2} \right)}$ 
(%i21) expand(yc);
(%o21)  $\frac{1}{8 \log(2) - 4}$ 
(%i22) yc2:1/A*integrate((1/x+1/2)/2*(1/x-1/2),x,1,2);
(%o22)  $\frac{1}{8 \left( \log(2) - \frac{1}{2} \right)}$ 
(%i23) expand(yc2);
(%o23)  $\frac{1}{8 \log(2) - 4}$ 
(%i24) V:2*pi*xc*A;
(%o24)  $\frac{\pi}{2}$ 
(%i25) A:integrate(3*x-x^2,x,0,3);
(%o25)  $\frac{9}{2}$ 
(%i26) P:integrate(sqrt(1+(4-2*x)^2),x,0,3)+3*sqrt(2);
(%o26)  $\frac{\operatorname{asinh} 4 + 4 \sqrt{17}}{4} + \frac{\operatorname{asinh} 2 + 2 \sqrt{5}}{4} + 3 \sqrt{2}$ 
(%i27) f:sqrt(1+(2*x*cos(x^2))^2);
(%o28)  $\sqrt{4 x^2 \cos(x^2)^2 + 1}$ 
(%i29) quad_qags(f,x,0,1);
(%o29) [1.349235228758796, 4.9956529948368953 × 10-13, 21, 0]
(%i30)

```