MAT 137 HW #1 Name ______ 1/22/09 (due Wednesday 1/28/09) 10 points Show work or otherwise justify your answers. Unsupported answers (i.e. calculator output) will not receive full credit. You may check your answers

1. Let R be the region bounded by y = 0, y = 1, y = x, and $y = \sqrt{x - 1}$. Set up, but do not evaluate, an integral or a sum of integrals, for the area of R, using

(a) horizontal sections, integrating with respect to y.

with a calculator or computer.

(b) vertical cross sections, integrating with respect to x.

2. (a) Set up (but do not evaluate) an integral expression for the volume of a pyramid of height 6 cm, with base a square of side length 3 cm.

Hint: Cross-sections parallel to the base are squares.

(continued on back)

(b) Suppose the density of the pyramid in part (a) at points x centimeters above the base is $100 - x^2$ grams per cubic centimeter. Set up (but do not evaluate) an integral expression for the total mass of the pyramid.

Note: If the density of an object (such as a horizontal section of the pyramid) is constant, then the mass is equal to density times volume.

3. Set up (but do not evaluate) an integral expression for the volume the solid obtained by rotating the region bounded by y = x, y = 2 - x, and the x axis

(a) about the y axis.

(b) about the *x*-axis. Hint: Use cylindrical shells.

(c) the line x = 2.