Friday, Mar 14, 2008 **STUDENT NAME:** _____

EXAM II – MATH 136, SPRING 2008

READ EACH PROBLEM CAREFULLY! To get full credit, you must show all work!
The exam has 8 problems on 4 pages! Turn in all pages!
NO GRAPHING CALCULATORS ALLOWED!

- **Problem 1**
  Find the area of the region bounded by the curves

$$x = 2y^2, \quad x + y = 1.$$

- **Problem 2**
  Find the volume of the solid obtained by rotating the region bounded by the curves

$$y = x, \quad y = \sqrt{x}, \qquad \text{about the } x\text{-axis.}$$

- **Problem 3**
  Using the method of cylindrical shells, find the volume of the solid obtained by rotating the region bounded by the curves

$$y = e^{-x^2}, \quad y = 0, \quad x = 0, \quad x = 1, \qquad \text{about the } y\text{-axis}$$

- **Problem 4**
  Set up, but DO NOT evaluate, an integral representing the volume of the solid obtained by rotating the region bounded by

$$y = \sin x, \quad y = 0, \quad x = 0, \quad x = \pi, \qquad \text{about the line } x = -1$$

- **Problem 5**
  Find the length of the curve
  $$y = 1 + 6x^{3/2}, \quad 0 \leq x \leq 1$$

- **Problem 6**
  Set up, but DO NOT evaluate, an integral for the length of the curve
  $$y = \ln(\cos x), \quad 0 \leq x \leq \frac{\pi}{4}$$

- **Problem 7**
  Find the centroid of the region bounded by the curves
  $$y = 4 - x^2, \quad y = x + 2.$$

- **Problem 8**
  Solve the differential equation
  $$y' = \frac{(1 + y^2)\cos x}{y}$$