Name: _____ Class: _____ Date: _____ ID: A

Midterm 1: February 13, 2008

Free Response

1. Sketch the region enclosed by $y = 4 - x^2$ and $y = x^2 - 2$. Decide whether to integrate with respect to x or y. Find the area of the region.

2. Find the volume of the solid obtained by rotating the region bounded by $y = x$ and $y = x$ about the line $y = 0$.

3. The linear density of a 15 m long rod is $(x) = \frac{8}{(3 + x)^2}$ kg/m, where x is measured in meters from one end of the rod. Find the average density of the rod.

4. Use the method of cylindrical shells to find the volume of a solid obtained by rotating the region bounded by the given curves about the y axis.
$y = 3x - x^2, y = 0$

Multiple Choice

Identify the choice that best completes the statement or answers the question.

____ 5. A spring has a natural length of 22 cm. If a force of 15 N is required to keep it stretched to a length of 32 cm, how much work is required to stretch it from 22 cm to 40 cm? Force to pull spring is given by $F(x) = k(x - x_0)$

Select the correct answer.

a. 3.43 J
b. 1.93 J
c. 2.93 J
d. 3.93 J
e. 2.43 J