**Name:**_____ **4/30/2015**

**Math 202 Quiz 3**

**Directions** Answer all questions in the space provided and box your final answers. Good luck!

1. Use the comparison theorem to determine if each of the following integrals converges or diverges.

   (a) (8 points) $\displaystyle\int_1^\infty \frac{1+\sin^2 x}{\sqrt{x}}\,dx$

   (b) (8 points) $\displaystyle\int_1^\infty \frac{\arctan x}{\sqrt{1+x^3}}\,dx$

2. (8 points) Sketch the region enclosed by the curves

$$y = |x| + 1 \quad \text{and} \quad y = x^2 - 5,$$

and find the area of the region.

3. Sketch the region enclosed by the curves

$$y = \frac{1}{x}, \quad y = 0, \quad x = 1, \quad \text{and} \quad x = 3$$

and find the volume of the solid obtained by rotating the region about the the line $x = -1$ in two ways.

(a) (8 points) By using the method of disks and washers.

(b) (8 points) By using the method of cylindrical shells.

4. (8 points) Find the length of the curve

$$y = \frac{x^3}{4} + \frac{1}{3x}, \quad 1 \leq x \leq 4.$$