Math 142, Exam 2, Fall 2011

Write everything on the blank paper provided. **You should KEEP this piece of paper.** If possible: return the problems in order (use as much paper as necessary), use only one side of each piece of paper, and leave 1 square inch in the upper left hand corner for the staple. If you forget some of these requests, don't worry about it – I will still grade your exam.

The exam is worth 50 points. SHOW your work. $\boxed{CIRCLE}$ your answer. **CHECK** your answer whenever possible.

No Calculators or Cell phones.

1. (6 points) Define the definite integral. Give a complete definition. Be sure to explain all of your notation. Write in complete sentences.

2. (6 points) Consider the region bounded by $x+3=(y-2)^2$ and $x=1$. Revolve this region about the line $x=1$. Find the volume of the resulting solid. You must draw a meaningful picture.

3. (6 points) Consider the region bounded by $x+3=(y-2)^2$ and $x=1$. Revolve this region about the line $y=-1$. Find the volume of the resulting solid. You must draw a meaningful picture.

4. (6 points) Consider the solid whose base is bounded by $\frac{x^2}{9}+\frac{y^2}{16}=1$ in the xy-plane. Each cross section of the solid perpendicular to the y-axis and perpendicular to the base is an equilateral triangle. Find the volume of the solid. You must draw a meaningful picture.

5. (6 points) Find $\int_0^3 \frac{1}{(x-1)^2}dx$.

6. (6 points) Find $\int \cos^5 x dx$. You must check your answer.

7. (7 points) Find $\int \sec x \tan^2 x dx$. You must check your answer.

8. (7 points) Find $\int \frac{4x^3+6x^2+4x+8}{x^4+4x^2}dx$. You must check your answer.