Math 142, Exam 1, Fall 2006

Write your answers as legibly as you can on the blank sheets of paper provided.

Please leave room in the upper left corner for the staple.

Use only **one side** of each sheet. Be sure to number your pages. Put your solution to problem 1 first, and then your solution to number 2, etc.; although, by using enough paper, you can do the problems in any order that suits you.

The exam is worth a total of 100 points. There are 10 problems. Each problem is worth 10 points.

SHOW your work. $\boxed{CIRCLE}$ your answer. **CHECK** your answer whenever possible. **No Calculators or Cell phones.**

I will post the solutions on my website sometime Wednesday afternoon.

I will grade the exam Wednesday afternoon. If I know your e-mail address, I will e-mail your grade to you. If I don't already know your e-mail address and you want me to know it, then **send me an e-mail**.

1. Define the definite integral. Give a complete definition. Be sure to explain all of your notation.

2. State both parts of the Fundamental Theorem of Calculus. Be sure to explain all of your notation.

3. Find $\displaystyle\int_0^1 \frac{y^2\,dy}{\sqrt{4-3y}}$.

4. Find $\displaystyle\int_0^1 \frac{x\,dx}{\sqrt{4-3x^4}}$.

5. Find $\lim\limits_{x\to\infty} \left(\frac{x-2}{x}\right)^{3x}$.

6. Find the area between $x = y^2$ and $8 = x + 2y$.

7. Find the volume of the solid whose base is the region bounded between the curves $y = x$ and $y = x^2$, and whose cross sections perpendicular to the x-axis are squares.

8. Consider the region bounded by $y = x^2$, the x-axis, and $x = 1$. Rotate the region about the x-axis. Set up an integral which will give the volume of the resulting solid. You do not have to evaluate the integral. You do have to explain your work.

9. Consider the region bounded by $y = x^2$, the x-axis, and $x = 1$. Rotate the region about the y-axis. Set up an integral which will give the volume of the resulting solid. You do not have to evaluate the integral. You do have to explain your work.

10. Consider the region bounded by $y = x^2$, the x-axis, and $x = 1$. Rotate the region about the line $x = -5$. Set up an integral which will give the volume of the resulting solid. You do not have to evaluate the integral. You do have to explain your work.