Math 142, Exam 1, Spring 2006

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

There are 10 problems. Each problem is worth 10 points. SHOW your work. Make your work be coherent and clear. Write in complete sentences whenever this is possible. $\boxed{\textit{CIRCLE}}$ your answer. **CHECK** your answer whenever possible. **No Calculators.**

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**.

I will post the solutions on my website a few hours after the exam is finished.

1. Find $\int_{\frac{\pi}{12}}^{\frac{\pi}{9}} \sec^2 3\theta d\theta$.

2. Find $\int_{-1}^{1} \frac{x^2 dx}{\sqrt{x^3+9}}$.

3. Find $\int_{0}^{\frac{\sqrt{\pi}}{2}} 5x\cos(x^2)dx$.

4. State BOTH parts of the Fundamental Theorem of Calculus.

5. Find $\lim_{x\to\infty}(1-\frac{1}{2x})^x$.

6. Find ALL of the area between $y = x^3$ and $y = x$.

7. Find the length of $x = \frac{1}{8y^2} + \frac{y^4}{4}$ from $y = 1$ to $y = 2$.

8. Consider the region bounded by $y = 2x^2$ and $y = 2\sqrt{x}$. Revolve this region about $x = 5$. Set up an integral that gives the volume of the resulting solid? You do not have to evaluate the integral.

9. Consider the region bounded by $y = 2x^2$ and $y = 2\sqrt{x}$. Revolve this region about $y = -5$. Set up an integral that gives the volume of the resulting solid? You do not have to evaluate the integral.

10. Consider the solid whose base in the xy plane is bounded by $y = x^2$, $y = 0$, and $x = 1$. Each cross section of this solid perpendicular to the x-axis is an equilateral triangle. Set up an integral that gives the volume of the resulting solid? You do not have to evaluate the integral.