Math 142 Exam 3 Fall 2004

PRINT Your Name:________________________________

There are 10 problems on 5 pages. Each problem is worth 10 points. SHOW your work. $\boxed{\textit{CIRCLE}}$ your answer. **NO CALCULATORS! CHECK** your answer whenever possible.

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**.

If you would like, I will leave your exam outside my office after I have graded it. (I will send you an e-mail when I am finished with it.) You may pick it up any time between then and the next class. **Let me know if you are interested.**

I will post the solutions on my website at about 6:00 PM today.

1. Find $\displaystyle\int \cos^3 x\,dx$. Check your answer.

2. Find $\displaystyle\int \cos^2 x\,dx$.

3. Find $\displaystyle\int x \ln x\,dx$. Check your answer.

4. Find $\displaystyle\int \frac{x+1}{(x-3)^2}\,dx$. Check your answer.

5. Find $\displaystyle\int \frac{1}{\sqrt{1+x^2}}\,dx$. Check your answer.

6. Find $\displaystyle\lim_{x\to\frac{\pi}{4}} \frac{\sin x}{x}$.

7. Find the limit of the sequence whose n^{th} term is $a_n = \left(\dfrac{n+3}{n}\right)^n$.

8. Find $\displaystyle\int_1^3 \frac{1}{(x-2)^2}\,dx$.

9. Does the series $\displaystyle\sum_{k=1}^{\infty} \frac{1}{k}$ converge or diverge? If the series converges, what is its sum? Explain your answer.

10. Does the series $\displaystyle\sum_{k=1}^{\infty} \frac{4}{7^k}$ converge or diverge? If the series converges, what is its sum? Explain your answer.