Math 142, Fall 2004, Exam 1

PRINT Your Name:______________________________

There are 10 problems on 5 pages. Each problem is worth 10 points. SHOW your work. $\boxed{CIRCLE}$ 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 door tomorrow morning, 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 4:00 PM today.

1. Find $\int e^{5x+9}dx$. Check your answer.

2. Find $\int \frac{1}{x\sqrt{\ln x}}dx$. Check your answer.

3. If $y = e^{\sin(2x^2+5x)}$, then find $\frac{dy}{dx}$.

4. If $y = x^2 \ln(2x^2 + 9x)$, then find $\frac{dy}{dx}$.

5. If $y = x^x$, then find $\frac{dy}{dx}$.

6. Solve $\log_2 x = 1 + \frac{1}{2}\log_2(2x)$. Check your answer.

7. Find the area bounded by $y = e^{2x}$, the x-axis, $x = 0$, and $x = 1$. Sketch a picture.

8. Find the volume of the solid which is obtained by revolving the region bounded by $y = e^{3x}$, the x-axis, $x = 0$, and $x = 1$, about the x-axis. Sketch a picture.

9. Let $f(x) = \frac{x+3}{x-2}$ for $x \neq 2$. Find $f^{-1}(x)$. What is the domain of $f^{-1}(x)$? Verify that $f(f^{-1}(x)) = x$ for all x in the domain of $f^{-1}(x)$.

10. Let $f(x) = x^2 \ln x$. What is the domain of $f(x)$? Where is $f(x)$ increasing, decreasing, concave up, and concave down? Find the local maxima, local minima, and points of inflection of $y = f(x)$. Graph $y = f(x)$.