Math 142, Exam 4, Fall 1998

PRINT Your Name:_____ Recitation Time:_____

There are 10 problems on 5 pages. Each problem is worth 10 points. SHOW your work. $\boxed{CIRCLE}$ your answer. **CHECK** your answer whenever possible.

NO CALCULATORS!

1. Find $\int_{-8}^{1} \frac{1}{\sqrt[3]{x}} dx$.

2. Find $\int \sin^3 x \cos^4 x dx$.

3. Find $\int \frac{\ln x}{x^3} dx$.

4. Does the series $\sum_{n=1}^{\infty} \frac{n}{e^n}$ converge or diverge? Justify your answer.

5. Does the series $\sum_{n=1}^{\infty} \frac{2n-1}{n^3+1}$ converge or diverge? Justify your answer.

6. Where does the function $f(x) = \sum_{n=1}^{\infty} (x-7)^n$ converge?

7. Approximate sum of the series $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}}{n^4}$ with an error of at most $\frac{1}{100}$. (Be sure to explain what you are doing.)

8. A ball is dropped from the height of 10 feet. Each time it hits the floor it rebounds to $\frac{2}{3}$ its previous height. Find the total distance it travels.

9. Let $f(x) = xe^{3x}$. 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 $y = f(x)$.

10. Use Simpson's rule to estimate the area of the following shape. All measurements are in feet.