CALCULUS II - 3450:222
TEST #3 SPRING 03

NAME _____

100 Points

Show all your work.

1. (5 pts) Does the following sequence converge or diverge? Show why.

$$a_n = 3 + \left(-\frac{1}{2}\right)^{n-1}$$

5 Points

2. (13 pts) Determine whether the following series converges or diverges. If the series converges find its sum.

$$\sum_{n=1}^{\infty}\left[\frac{1}{2^n} - \frac{1}{3^{n-1}}\right]$$

13 Points

3. (9 pts) State whether the series converges absolutely, converges conditionally, or diverges.

$$\sum_{n=1}^{\infty}(-1)^{n-1}\left(\frac{n}{4n^2-3}\right)$$

9 Points

4. Determine whether the following series converge or diverge. State the test used and how it was used.

a. (8 pts) $\sum_{n=1}^{\infty} \frac{(3n-2)^2}{\sqrt{n^6+2n^4+1}}$

b. (8 pts) $\sum_{n=1}^{\infty} n\, e^{-n}$

c. (6 pts) $\sum_{n=1}^{\infty} [5-(0.2)^n]$

d. (4 pts) $\sum_{n=1}^{\infty} \frac{2\sqrt{n}}{n^3}$

26 Points

4. continued from previous page

e. (8 pts) $\sum_{n=1}^{\infty} \frac{3^n n^2}{n!}$

8 Points

5. a. (3 pts) Write the Maclaurin series for e^x.

b. (5 pts) Use part a to write a power series for e^{-x^2}

c. (7 pts) Use part b to evaluate $\int_0^1 e^{-x^2} dx$. Note your answer will be an infinite series of constants.

15 Points

6. (14 pts) Find the radius and interval of convergence of

$$\sum_{n=1}^{\infty} \frac{(x-4)^n}{n\,5^n}$$

14 Points

7. (10 pts) Find the first 4 terms in the Taylor Series for $f(x) = \ln(x)$ about $a = 2$.

10 Points