MATH 152   **EXAM III**   NAME _____

Mrs. Bonny Tighe   100 points

12.5-11.4   Section _____ Wed. 5/10/06

There are 11 problems worth 10 points each.

1. Test the series for convergence or divergence. State and show the test.

$$\sum_{n=1}^{\infty} \frac{(-1)^n \ln n}{\sqrt{n}}$$

2, Test each series for divergence or convergence. State and show the test.

$$\sum_{n=1}^{\infty} \frac{(-1)^n \cos n}{(2n)!}$$

3. Find the radius of convergence and the interval of convergence of the series.

a) $\sum_{n=0}^{\infty} \dfrac{(-1)^n (3x-2)^n}{2(n+1)!}$

b) $\sum_{n=0}^{\infty} \sqrt{n}(x-1)^n$

4. Find a power series representation for the function and determine the radius and interval of convergence. $f(x) = \dfrac{1}{4-x^3}$

5. Evaluate the indefinite integral as an infinite series. $\displaystyle\int \dfrac{\cos x - e^{\sqrt{x}}}{x^2}\, dx$

6. Find the Taylor series for f(x) centered at the given value of $f(x) = \sqrt{x}$ at a = 4 and find the radius of convergence.

7. Find the Maclaurin series of $f(x)$ and its radius of convergence. $f(x) = \dfrac{1}{(x+2)^2}$

8. Expand $\dfrac{1}{(2-x)^3}$ as a power series using the binomial series. State the radius and interval of convergence.

9. Find the length of the curve $x = \dfrac{1}{1+t}$ and $y = \ln(1+t)$ $0 \le t \le 2$

10. a) Find a Cartesian equation for the curve described by the polar equation
   $r = \tan\theta \sec\theta$

b) Convert the Cartesian coordinates (-2, 3) to polar coordinates.

c) Convert the polar coordinates $((3, \dfrac{5\pi}{6})$ to Cartesian coordinates.

11. Sketch the curve of the polar equation $r = 1 + \sin 2\theta$