MATH 152
Mrs. Bonny Tighe

EXAM IIIA

100 points
12.5-11.4

NAME _____

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.

$$\sum_{n=1}^{\infty} \frac{3^n n^2}{n!}$$

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

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

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

a) $\sum_{n=0}^{\infty} \frac{(-1)^n (4x+1)^n}{n^2}$

b) $\sum_{n=0}^{\infty} n^3 (x-3)^n$

4. Find a power series representation for the function and determine the radius and interval of convergence. $f(x) = \dfrac{1}{2-\sqrt{x}}$

5. Evaluate the indefinite integral as an infinite series. $\int \dfrac{\tan^{-1} x - e^{-x}}{x} dx$

6. Find the Taylor series for f(x) centered at the given value of $f(x) = \dfrac{1}{x-1}$ at a = 2 and find the radius of convergence.

7. Find the Maclaurin series of f(x) and its radius of convergence. $f(x) = \frac{4}{(x+1)^3} = \frac{1}{(2x+1)^3}$

8. Expand $\frac{2}{\sqrt{2-x}}$ as a power series using the binomial series. State the radius and interval of convergence.

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

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 $(4, \frac{7\pi}{6})$ to Cartesian coordinates.

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