Calculus II - Exam 3 - Fall 2007

November 15, 2006

Name:
Honor Code Statement:

Directions: Justify all answers/solutions. Calculators are not permitted.

1. Test the series for convergence or divergence.

$$\Sigma_{n=1}^{\infty}(-1)^{n-1}\frac{n}{e^n}$$

2. Determine whether the series is absolutely convergent, conditionally convergent, or divergent.

$$\Sigma_{n=1}^{\infty} \frac{(-1)^n \arctan(n)}{n^2}$$

3. Find the radius of convergence and interval of convergence for each of the given power series.

   (a)

$$\Sigma_{n=1}^{\infty}(-1)^n \frac{n^2 x^n}{2^n}$$

(b)

$$\Sigma_{n=1}^{\infty} n!(2x-1)^n$$

4. Find a power series representation for the given function and determine the interval of convergence.

$$f(x) = \frac{1}{x + 10}$$

5. Use a power series to approximate the definite integral. Give an error estimate for your answer. (As calculators are not permitted, you need not compute/simplify the approximation and error estimate.)

$$\int_0^{0.5} \frac{1}{1+x^5}\,dx$$

6. Represent $f(x) = \cos(x)$ as the sum of its Taylor series centered at $\frac{\pi}{2}$.

7. Find the length of the curve, where $x = \frac{y^4}{8} + \frac{1}{4y^2}, \quad 1 \leq y \leq 2.$