Test 2

July 28

Name:

1. Determine whether each of the following series converges or diverges. If a series converges, evaluate the sum, when possible.

   (a)
$$\sum_{n=1}^{\infty} \frac{3^{n+1}}{2^{3n}}$$

(b)

$$\sum_{n=1}^{\infty} ne^{-n^2}$$

(c)

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

(d)

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

(e)

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

2. Determine whether the series

$$\sum_{n=1}^{\infty} \frac{(-1)^n}{\sqrt{n^2+1}}$$

is conditionally convergent, absolutely convergent, or divergent.

3. Find the interval of convergence for the following power series:

$$\sum_{n=1}^{\infty} \frac{(2x-1)^n}{n^{3/2}}$$

4. (a) Let $f(x) = \frac{1}{9+x^2}$. Represent f as a power series and find the interval of convergence for the power series.

   (b) Represent f' as a power series. What is the radius of convergence of this series?

   (c) Represent $g(x) = \frac{x}{9+(2x)^2}$ as a power series.

5. Find the Taylor series for $\cos(2x)$ centered at π.