## Worksheet For 10.7 and 10.8

1. Find the interval of convergence. Determine the behavior at the endpoint if exists. **a.**  $\sum_{1}^{\infty} \frac{4^n x^{2n}}{n}$ .

**b.**  $\sum_{1}^{\infty} \frac{n! x^n}{3.6.9...3n}$ 

- 2. Find Taylor Polynomial of order n generated at a **a.**  $f(x) = \ln(1+x), a = 0, n = 3$
- **b.**  $f(x) = \tan x, a = \frac{\pi}{4}, n = 2$
- 3. Find Taylor series generated at a  $f(x) = \frac{-1}{x}, a = -1$

4. Given that the series  $x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} + \frac{x^9}{9} - \dots$  converges to  $\sin x$  for all x a. Find the first 4 terms of a series for  $\cos x$ . For what values of x should the series converge?

**b.** By replacing x by 2x in the series for  $\sin x$ , find a series that converges to  $\sin 2x$  for all x.

c. Using the result of part (a) and series multiplication, calculate the first 4 terms of a series for  $\sin x \cos x$ . Compare with part (b).

**d.** Finding the first 2 nonzero terms of a Maclaurin series for f(x) = $\sin(2x^{10})$