172 Homework 12 Name: _____

Find the radius or convergence and the interval of convergence for the following:

1. $\sum_{n=1}^{\infty} \frac{x^n}{3^n}$

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

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

Use differentiation and algebra to find the power series for

1. $f(x) = \frac{1}{(1+x)^2}$
2. $f(x) = \frac{1}{(1+x)^3}$
3. $f(x) = \frac{x^2}{(1+x)^3}$

4. Use the definition to find the first 4 nonzero terms of the Taylor series for

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

at $a = 2$.

Your answer should look like

$$c_0 + c_1(x-2) + c_2(x-2)^2 + c_3(x-2)^3 + c_4(x-2)^4$$

5. Using your answer to number 4, write the actual Taylor series for

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

at $a = 2$. and find the radius of convergence of that series.