Name ____

1. Given the function and its power series below, use several power series operations in a row to find the series for the desired function at the bottom of the page. Tell which operations are used.

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n$$

$$\frac{d}{dx}\frac{x^5}{1+x^3}$$

2. Given the function and its power series below, use several power series operations in a row to find the series for the desired function at the bottom of the page. Tell which operations are used.

$$\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n$$

ln(x+1)

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

$$\sum_{n=0}^{\infty} \frac{5^n}{2^n(n+1)}(x-4)^n$$

4. Consider the function $f(x) = \dfrac{1}{x^2}$ and the value a = 1.

a) Give the Taylor polynomial $P_4(x)$ expanded about a = 1.

b) Give the remainder $R_4(x)$.

c) Approximate $\dfrac{1}{(1.6)^2}$ using $P_4(x)$ above.

d) Give an upper bound for $| R_4(1.6) |$ using Taylor's inequality.

e) Give the infinite Taylor series in sigma notation.

5. Use the binomial series to expand the function $f(x) = \frac{1}{\sqrt{1-x^2}}$ as a power series. State the radius of convergence. Then integrate the function and its power series to find a power series for the inverse sine function.