Math 253 GWS 6 - 8.5 Power Series Name:_____

1. Graph the function $f(x) = \dfrac{1}{(1-x)^2}$ and the power series $P(x) = \sum_{n=1}^{\infty} nx^{n-1}$ using the first k-terms where you start with $k = 1$ and up that number until you have a good idea of what the radius of convergence and interval of convergence are. Then find the radius of convergence and interval of convergence of $P(x)$ symbolically. No need to show your graph here, just figure out how to set it up in Desmos.

2. Find the radius of convergence and interval of convergence for the following series.

   a. $\sum_{n=1}^{\infty} \dfrac{10^n x^n}{n^3}$

   b. $\sum_{n=0}^{\infty} (-1)^n \dfrac{x^{2n}}{(2n)!}$

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

d. $\sum_{n=1}^{\infty} \frac{n^2 x^n}{2 \cdot 4 \cdot 6 \cdot \ldots \cdot (2n)}$

3. Suppose that $\sum_{n=0}^{\infty} c_n x^n$ converges when $x = -4$ and diverges when $x = 6$. What can be said about the convergence or divergence of the following series?

a. $\sum_{n=0}^{\infty} c_n$

c. $\sum_{n=0}^{\infty} c_n (-3)^n$

b. $\sum_{n=0}^{\infty} c_n 8^n$

d. $\sum_{n=0}^{\infty} (-1)^n c_n 9^n$