Homework Set 19

(sect 8.6: Functions as Power Series)

Find a power series representation for each function. Be sure to indicate for which x values your power series is valid. You may want to use the following fact:

$$\sum_{n=0}^{\infty} x^n = 1 + x + x^2 + x^3 + \cdots = \frac{1}{1-x}, \quad |x| < 1$$

1. $f(x) = \frac{1}{1-x^4}$

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

3. $f(x) = \frac{7x}{1-x^4}$

4. $f(x) = \frac{x^3}{(1-x)^2}$ Hint: use differentiation

5. $f(x) = \ln(1-x)$ Hint: use integration