1. Find a power series representation for the function and determine the interval of convergence:
   a) \( f(x) = \frac{2}{3-x} \)
   
   b) \( f(x) = \frac{x}{9+x^2} \).

2. a) Use differentiation to find a power series representation for \( f(x) = \frac{1}{(1+x)^2} \). What is the radius of convergence?

   b) Use part (a) to find a power series for \( f(x) = \frac{1}{(1+x)^3} \).

   c) Use part (b) to find a power series for \( f(x) = \frac{x^2}{(1+x)^4} \).
3. a) Find a power series representation for the function \( f(x) = \ln(1 - x) \). What is the radius of convergence?

b) Use part (a) to find a power series for \( f(x) = x \ln(1 - x) \).