1. Determine the radius of convergence for the power series \( \sum_{n=0}^{\infty} \frac{n}{4^n} x^n \).

2. For each of the following, give the Taylor series (based at \( x = 0 \)) along with the values of \( x \) for which equality holds. You may either use summation notation or write out the first four or five nonzero terms (followed by + ...).

   (a) \( e^x = \) 

   (b) \( \cos(x) = \) 

   (c) \( \sin(x) = \) 

   (d) \( \frac{1}{1-x} = \) 

3. Find the power series representation of the function \( f(x) = \frac{1}{1+3x} \). Also give the interval on which equality holds.