

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 $+\dots$).

(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.