

MAT 137 (Calculus II) Prof. Swift

Power Series Representations of Some Functions

Use the known geometric series $\frac{1}{1-x} = 1 + x + x^2 + x^3 + \dots$ to write out the first 4 nonzero terms in a power series representation of the given functions. Fill in the blank with the coefficients in $f(x) = \sum_{n=0}^{\infty} c_n x^n$. Find the radius of convergence of the power series.

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

$c_0 =$, $c_1 =$, $c_2 =$, $c_3 =$. The radius of convergence is $R =$.

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

$c_0 =$, $c_1 =$, $c_2 =$, $c_3 =$, $c_4 =$, $c_5 =$, $c_6 =$. $R =$.

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

$c_0 =$, $c_1 =$, $c_2 =$, $c_3 =$, $c_4 =$, $c_5 =$. $R =$.