

11.9 Videos Guide

11.9a

Exercises:

- Find a power series representation for $f(x) = \frac{1}{1-x}$.
 - $\frac{1}{1-x} = \sum_{n=0}^{\infty} x^n = 1 + x + x^2 + x^3 + \dots$
- Express $\frac{1}{1+x^2}$ as a power series.

11.9b

Exercises:

- Find a power series representation for the function and determine the interval of convergence.
 - $f(x) = \frac{5}{1-4x^2}$
 - $f(x) = \frac{4}{2x+3}$
 - $f(x) = \frac{x}{2x^2+1}$

11.9c

- More power series representations using term-by-term integration
 - $\ln(1+x) = \sum_{n=1}^{\infty} \frac{(-1)^{n-1}}{n} x^n$
 - $\tan^{-1} x = \sum_{n=0}^{\infty} \frac{(-1)^n}{2n+1} x^{2n+1}$

11.9d

Exercises:

- Find a power series representation for the function and determine the interval of convergence.
 - $f(x) = x^2 \tan^{-1}(x^3)$
 - $f(x) = \left(\frac{x}{2-x}\right)^3$

11.9e

Exercise:

- Use a power series to approximate the definite integral to six decimal places.
$$\int_0^{0.2} x \ln(1+x^2) dx$$