Chapter 10: Sequences and Infinite Series

Upon successful completion of Chapter 10, the student should be able to:

Illustrate convergence and divergence of sequences graphically.

Given a bound for the difference between the terms of a convergent sequence and its limit, determine the minimal index that achieves that bound.

Carefully define the meaning of convergence/sum of an infinite series of numbers in terms of its partial sums. Use this definition to discuss the behavior of some selected series.

Determine the sum of any geometric series.

Determine whether a series converges or diverges by selecting an appropriate convergence test (nth-term, comparison, integral, p-test, alternating, ratio, absolute convergence) and applying it.

Use partial sums to estimate the sum of a convergent series, and find error bounds where appropriate (e.g., using integrals, the alternating series test and Taylor's remainder).

Use power series to represent functions. Use the ratio test to determine the intervals on which they converge. Do algebra and calculus with power series.

Create Maclaurin series and Taylor series for familiar transcendental functions.

Use Maclaurin series and Taylor series to approximate values of transcendental functions and definite integrals.