

# 1 Chapter 9: Infinite Series

## 1.1 Section 9.4: Positive Series: Other Tests

Know the three tests for positive series (Ordinary Comparison Test, Limit Comparison Test, Ratio Test) and how to use them to show the convergence/divergence of a positive term series. Read the summary on page 473 to help decide which test to use in each scenario.

## 1.2 Section 9.5: Alternating Series, Absolute Convergence, and Conditional Convergence

Know the difference between an alternating series and a positive term series. Know the alternating series test and how this result is different from the positive series result. Know the absolute convergence test, and the absolute ratio test. Finally know the difference between absolutely convergent and conditionally convergent and have an examples of each type.

## 1.3 Section 9.6: Power Series

Be able to identify a series of functions, and more specifically one of the form  $\sum_{n=0}^{\infty} a_n x^n$  where  $a_n$  is some function of  $n$  which does not depend on  $x$ . Know what the convergence set, radius of convergence, and region of convergence are and how to find them. Know how to find the convergence set, radius of convergence, and region of convergence for a shifted power series of the form  $\sum_{n=0}^{\infty} a_n (x - a)^n$ .

## 1.4 Section 9.7: Operations on Power Series

Know how to differentiate and integrate a power series in order to generate a new power series for a new function. Also be able to substitute to get a new power series from a known existing one.

## 1.5 Section 9.8: Taylor and Maclaurin Series

Understand that each function has a unique infinite polynomial representation and what that means for the Taylor, Maclaurin and Power series representations. Know the formulas for Taylor and Maclaurin series and how they differ from one another. Be able to generate Taylor and Maclaurin series for given functions.

## **1.6 Section 9.9: The Taylor Approximation to a Function**

Understand that while the infinite Taylor and Maclaurin polynomials are exactly equal to the function that any finite Taylor or Maclaurin polynomial is only an approximation of the function. Be able to find the  $n$ th degree Taylor or Maclaurin polynomial for a given function.