

Chapter Review Sheets for
Elementary Differential Equations and Boundary Value Problems, 10e
Chapter 5: Series Solutions of Second Order Equations

Definitions:

- Radius of Convergence, Interval of Convergence
- Analytic
- Recurrence Relation
- Ordinary Point, Singular Point

Theorems:

- Theorem 5.3.1: Existence of series solutions to linear ODE's near ordinary points and their convergence properties. (p. 266)

Important Skills:

- Review power series, how to shift the index of summation, (Ex. 3, p. 251) and tests for convergence. (Ex. 2, p. 249)
- Know how to find the interval of convergence for a power series. (Ex. 2, p. 249)
- Be able to determine all ordinary and singular points for a differential equation. (p. 254 - 255)
- For ordinary points, Eq. (3) on page 255 gives the form of the solution. Be able to derive the recursion relation, as in Example 1. If the recursion relation can be solved, one obtains the two solutions of the homogenous problem. (Ex. 1, p. 255)
- The method described in the second paragraph on page 248 can be used to find the first several terms in each of the homogeneous solutions.
- Be able to determine lower bounds on the radius of convergence of the series solutions. (Ex. 4, p. 268)