Chapter Review Sheets for

Elementary Differential Equations and Boundary Value Problems, 10e

Chapter 2: First Order Differential Equations

Definitions:

- First Order Ordinary Differential Equation
- Integrating Factor, Integral Curves
- Variation of parameters
- Separable
- Homogeneous differential equations
- Implicit solutions
- Existence and Uniqueness of Solutions General Solutions,
- Integrating factors, Exact equations

Theorems:

- Theorem 2.4.1: Existence and uniqueness of solutions to linear first order ODE's. (p. 69)
- Theorem 2.4.2: Existence and uniqueness of solutions to first order IVP's. (p. 70)

Important Skills:

- Be able to determine if a first order differential equation is linear or nonlinear. Equation (3) on page 32 gives the form for a linear ODE.
- If the differential equation is linear, compute the integrating factor, and then the general solution. (Ex. 4, p. 37)
- If it's nonlinear, is it separable? If it's separable, you will need to compute two different integrals.
- It is crucial to know integration of basic functions and integral methods from your calculus course. For Example, various substitutions, integration by parts, and partial fractions will all be utilized. (Ex. 2 & 3, p. 45 & 46)
- If the differential equation is not separable, is it exact? If so, solve it using the method in section 2.6. (Ex. 2, p. 98)
- Determine the existence and uniqueness of solutions to differential equations. (Ex. 2, p. 71)