MA 341 REVIEW SHEET FOR TEST 1

- **1.1 Background**
  -Know basic terminology
  -p. 5-6 #1, 5,7, 13, 15,16

- **1.2 Solutions and Initial Value Problems (IVP)**
  -Use the Existence and Uniqueness Theorem (p. 11) ex. p. 14 #23, 25,27, 28
  -Show that a function or relation is or is not a solution. Ex p. 13-14 # 3, 5, 9,10, 11, 12

- **1.3 Direction Fields**
  -Understand that dy/dx gives the slope of the solution curve at each point (x,y).
  -Be able to match curves with their direction fields.
  -Answer basic questions pertaining to a differential equation. ex. p. 22 #6, 7 (draw the phase line for this problem and answer the same questions)

- **Phase Lines p. 33-34**
  -Be able to draw phase lines and classify equilibria
  -Look over the examples done in class
  -Understand what happens to y as t goes to infinity for a given initial condition

- **2.2 Separable Equations**
  -Recognize when a d.e. is separable and be able to solve it
  -See Separable Equations WS
  -Examples: p. 46 # 7, 9, 11,17, 23, 24, 25, 29, 34,36

- **2.3 Linear Equations**
  -Solve linear equations (p. 50)
  -Examples: p. 54 # 7,13,17,21

- **2.4 Exact Equations**
  -Know the test for Exactness
  -Examples: p. 64: #9,11,17,21,22, 29

- **3.2 Mixing Problems**
  -Look at both Mixing Problems Worksheets (WS 1 and WS 2)
  -Be able to set up d.e. when flow rate in=flow rate out & when it doesn't
  -Examples: p. 100: # 1,3,4, 8

- **3.3 Heating and Cooling (Skip this topic if it wasn't covered in class)**
  -Be able to write out and solve the d.e. for Newton's Law as we did in class
  -Examples: p. 107 # 1, 7

- **Applications to Separable Differential Equations**
  -Examples: p. 101 #19, 108 # 15

- **3.4 Newtonian Mechanics (Skip this topic if it wasn't covered in class)**
  -I'll give you v(t) and x(t), you will just need to know what to do with it
  -Examples: p. 115 # 1, 5

- **4.2 Homogeneous Linear Equations**
  -Solve ay''+by'+cy=0 for both cases on p. 174
  -Examples: p. 164 #3, 7,13,15,18, 26, 37,43
  -Be able to solve IVPs (Initial Value Problems) and BVPs (Boundary Value Problems)

- **4.3 Auxillary Equations with Complex Roots**
  -Solve ay''+by'+cy=0 for the complex case
  -Examples: p. 172 #1,3,19, 21, 25
  -Be able to solve IVPs (Initial Value Problems) and BVPs (Boundary Value Problems)