Week 1 **Math 0290** *Differential Equations* - RUBIN - Winter/Spring '09

GUIDELINES FOR HOMEWORK: The homework problems from this handout are due at the end of the quiz on **Monday, January 12th**. I strongly encourage you to start them tonight. On problems that you turn in, you must thoroughly show your work/justify your solutions.

TOPICS:

Chapter 1: Introduction to Differential Equations - key concepts:

1. Differential equations consist of relationships between functions of independent variables, the derivatives of these functions, and the independent variables themselves.
2. Differential equations are extremely useful tools for modeling the real world.
3. An ordinary differential equation (ODE) only includes one independent variable.
4. A solution of an ODE is a function of the independent variable, which satisfies the ODE.
5. Different ODE have different properties that affect what tools we can use to study them and how their solutions behave.

homework: pg. 6, # 1-4,6,8-10

Section 2.1: Differential Equations and Solutions - key concepts:

1. ODE/PDE
2. dependent and independent variables
3. the order of an ODE
4. the normal form for ODE
5. a solution of an ODE and how to check that a function is a solution
6. general solutions and particular solutions
7. initial value problems
8. solution curves/interval of existence for a solution
9. direction field

homework: pg. 25-26, # 3,4,6,12,14-15

Section 2.2: Solutions to Separable Equations - key concepts:

1. separable equations and how to solve them
2. exponential decay/half-life
3. Newton's law of cooling
4. implicit and explicit solutions

homework: pg. 35-37, # 1,2,6,8,13-16,34-35

Additional Assignments:

1. Complete exercise 1 from the Matlab book, pg. 8.
2. A quiz will be held at the start of class on Monday, January 12th. You will be allowed to look at your homework paper when you take the quiz.