Problem Set 1 Applied Mathematics I, MA 531 Due September 29, 2010

Do the following problems from the text, *Advanced Engineering Mathematics*, 2nd edition, by M. Greenberg.

- Section 1.2: 1a, c, h; 6a, d
- Section 1.3: 3

Section 2.2: 2a, e Directions: Find the general solution to each equation and find the largest interval on which the solution exists and is unique.

- Section 2.2: 5a, b; 7b; 9b; 10a
- Section 2.4: 1a, n; 6c Directions: Find the general solution to each equation as well as any singular solutions which do not belong to the family of general solutions. Find the particular solution for the given initial conditions.
- Section 2.5: 1c, f; 5f

In addition, answer the following question.

1. Recall the logistic equation,

$$P'(t) = aP - bP^2, \qquad P(0) = P_0, \ a, b > 0,$$

which we solved in class by separation of variables. Solve the equation by considering it as a Bernoullli equation (see problem 9b of Section 2.2). Express the constant of integration Cin terms of the initial population P_0 and verify that it is the same solution we obtained in class.