Name: _____

Section: _____

R·I·T School of Mathematical Sciences

Homework 4

MATH 211

1. Find the general solution to the first order linear equation.

$$\sec x \frac{dy}{dx} + y = 1$$

2. Solve the following initial value problem.

$$x\frac{dy}{dx} + y = x,\ y(1) = 3$$

3. A 50 gallon tank full of a salt solution initally contains 2 pounds of salt. Pure water is added at a rate of 5 gallons per minute. If the salt solution is flowing out of the tank at the same rate, find the amount of salt in the tank as a function of time.

4. A car of mass 500 kilograms is guided along a track by a motor exerting a force of 25 N and is subject to a resistant force numerically equal to half the velocity. If the initial velocity is 2 meters per second, find the velocity v as a function of time t.

5. Suppose that in a simple circuit the resitance is 6Ω and the inductance is 2H. If a battery gives a constant voltage of $E(t) = 20e^{-3t}\sin(30t)$ volts and the switch is closed with $t = 0$ so the initial current is 0, find the current as a function of time.