Homework 2 (MATH 2310-04) **Name (Print):**

Due date: Thursday, Feb. 13, 2014

1. Solve the given differential equations:

   a) $\frac{dy}{dx} + y^2 \sin(x) = 0$

   b) $\frac{dy}{dx} = \frac{x^2}{y(1+x^3)}$

2. Solve the following initial value problem and determine where the solution attains its maximum value.

   $\frac{dy}{dx} = \frac{2 - e^x}{3 + 2y} \qquad y(0) = 0$

3. A tank initially contains 120 liters of pure water. A mixture containing a concentration of γ g/liter of salt enters the tank at a rate of 2 liters /min, and the well-stirred mixture leaves the tank at the same rate. Find an expression in terms of γ for the amount of salt in the tank at any time t. Also find the limiting amount of salt in the tank as $t \to \infty$.