MA 238-01 §1.9–2.1	**Quiz #3**	*score*	**Name:** _____ **29 September 1999**

1. Show that the following differential equation is homogeneous and find the general solution. *(7 points)*

$$\frac{dy}{dx} = \frac{xy + y^2}{x^2}$$

---

2. A boat travels along a straight line (neglecting the Earth's curvature). To coordinatise, suppose the boat starts at the point (0,0) and travels along the positive y-axis. At the moment the boat is at the origin, a Coast Guard boat begins pursuing it beginning at the point $(a, 0)$. The Coast Guard boat always maintains a discrete distance of a from the original boat. Write a differential equation with initial condition that describes the location of the Coast Guard boat. NOTE: You do not need to solve the IVP. *(6 points)*

---

3. Use the method of Picard iterates to find approximate solutions to the initial value problem

$$y' = 2t(y + 1), \qquad y(0) = 0$$

You should compute the Picard iterates y_0, y_1, y_2, and y_3. *(7 points)*