MA 238-01 §1.4–1.7	**Quiz #2**	*score*	**Name:** _____ **20 September 1999**

1. A 100 gallon tank is filled with water in which 50 pounds of salt is dissolved. A brine solution consisting of 1 pound of salt per gallon begins flowing into the tank at a rate of 2 gallons per minute. Assume that the solution is always thoroughly mixed and that the solution flows out of the tank at the same rate it enters. Write an initial value problem that would result in solution giving the amount of salt in the tank at time t. Be sure to explain what the variables you use are (e.g., say"Let $y(t) = \ldots$"). You do not need to solve the differential equation. Can you predict how much salt will be in the tank after a long time? Explain (briefly). *(10 points)*

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2. Find the particular solution to the given differential equation that satisfies the initial condition $y(1) = 1$. What happens to the solution as t gets large? What if the initial condition is changed to $y(1) = 0$? What is the particular solution then? Explain. *(10 points)*

$$\frac{dy}{dt} = \frac{y^2}{t} \quad (t > 0)$$