

Math 216 - Quiz 3

September 15, 2010

Name _____

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (5 points) A 600-gallon tank is filled with 200 gallons of pure water. A spigot is opened above the tank, and a salt water solution containing 1.5 lb of salt per gallon begins flowing into the tank at a rate of 5 gal/min. Simultaneously, a drain is opened at the bottom of the tank allowing the solution to leave the tank at a rate of 2 gal/min. What will be the concentration of salt in the solution at the precise moment when tank reaches its maximum capacity?

2. (3 points) Show that the following equation is exact. Then find the solution that satisfies the given condition.

$$(1 + e^x y + x e^x y) dx + (x e^x + 2) dy = 0, \quad y(0) = 1$$

3. (2 points) Find the orthogonal trajectories of $y = \frac{Cx}{1+x}$.