MATH 3310 Quiz 3
September 27, 1999

S. F. Ellermeyer

Instructions. In order to receive full credit on this quiz (10 points), your solutions must be mathematically correct and must be written correctly (using correct notation, etc.) Partial credit will be given for solutions that are leading in the direction of a correct solution. Little or no credit will be given for solutions with insufficient supporting detail (relevant calculations, explanations of your reasoning process, etc.)

A 400 gallon tank initially contains 200 gallons of saltwater solution with a concentration of 20 tablespoons of salt per gallon of solution. Pure water flows into the tank at the rate of 40 gallons per hour through an input pipe while, at the same time, saltwater solution flows out of the tank through an output pipe at the rate of 20 gallons per hour. What will the concentration of salt in the tank when the tank is full?

In solving this problem, you must include the following items:

- a list of the independent variable, dependent variables, and parameters used and what they stand for.
- a differential equation (with initial condition) that models this mixture problem.
- the solution of the initial value problem.
- the answer to the main question being asked (What will the concentration of salt in the tank when the tank is full?).