Math 17B
Vogler
Worksheet 2

Let $S$ represent the amount (in pounds) of salt in each tank at time $t$ minutes. Find a formula for $S$ for each of the following and then answer the particular questions.

1.) A solution containing 1/2 lb. of salt per gallon flows into a tank at the rate of 2 gal./min. and the well-stirred mixture flows out of the tank at the same rate. The tank initially holds 100 gallons of solution containing 5 lbs. of salt.

a.) How much salt is in the tank after 10 minutes ? after 1 hour ?
b.) How much salt do you expect to be in the tank as $t$ gets infinitely large ?

2.) Pure water flows into a tank at the rate of 4 gal./min. and the well-stirred mixture flows out of the tank at the rate of 5 gal./min. The tank initially holds 200 gallons of water containing 50 lbs. of salt.

a.) How many gallons of solution are in the tank after 20 minutes ?
b.) How much salt is in the tank after 20 minutes ? after 2 hours ?
c.) How long will it take the tank to be empty ?

3.) A large tank holds 100 gallons of fluid in which 10 pounds of salt is dissolved. A mixture containg 1/2 lb. of salt per gallon flows into the tank at the rate of 6 gal./min. and the well-stirred mixture flows out of the tank at the rate of 4 gal./min.

a.) How many gallons of solution are in the tank after 10 minutes ? after 1 hour ?
b.) How much salt is in the tank after 10 minutes ? after 1 hour ?
c.) In how many minutes will the tank contain 40 pounds of salt ? (HINT: Use a calculator with an equation solver to solve for t or just estimate the solution by trial-and-error.)

4.) Beer containing 6% alcohol per gallon is pumped into a vat which initially contains 400 gallons of beer at 3% alcohol. Beer is pumped into the tank at

the rate of 3 gal./min. and the well-stirred mixture is is pumped out of the tank at the rate of 4 gal./min.

a.) How many gallons of beer are in the vat after 10 minutes ? after 1 hour ? after 6 hours and 40 minutes ?

b.) What is the percentage of alcohol in the vat after 10 minutes ? after 1 hour ?

c.) When will the percentage of alcohol in the vat be 4% ? (HINT: Use a calculator with an equation solver to solve for t or just estimate the solution by trial-and-error.)