Math 321 JANUARY 19TH **Winter 2018**

A tank contains 80 gallons of water with 10 pounds of salt dissolved in it. Fluid with a 0.3 pounds per gallon salt concentration is being pumped into the tank at a rate of 7 gallons per minute. The fluid is continually mixed and, at the same time, the fluid is being drained from the tank at a rate of 7 gallons per minute.

1. Draw some sort of picture of this situation. Put all given numbers (with units, of course!) on your picture somehow. Identify which values remain the same and which are changing.
2. What is the initial concentration of salt in the tank?
3. The amount A of salt in the tank is changing; is it increasing, or is it decreasing? How do you know?
4. Is there a limit to how much the amount of salt can increase or decrease to? If so, why, and what is that amount?
5. Is the amount of salt in the tank changing more rapidly at first, or later, or is it changing continually at the same rate?
6. Sketch a graph of the amount A of salt in the tank (vertical axis) versus time t (horizontal axis). Label any number values that you can on whichever axis you can. Do the same for the concentration of salt in the tank.
7. Combine the two given pieces of information about flow into the tank to get the rate (with respect to time) that salt is coming into the tank.
8. Can you do something similar for the salt leaving the tank? Hmmmm...