**Hint for problem 10:**

First, consider tank 1 in isolation from tank 2, and solve completely for the amount of salt in tank 1 at time $t$ (perhaps call that $A(t)$ — anything but $S(t)$, which is of course the amount of salt in tank 2).

Then use that you know how much salt is in tank 1 at time $t$ to figure out the rate at which salt flows into tank 2, to help you set up the differential equation for $S(t)$.

**Bonus problem:**

Solve the differential equation (using the given initial condition) to obtain the function $S(t)$. 