Math 3280 Worksheet 6: Modeling with linear ODEs

Group members (2 to 4): _____

(1) Consider a pair of tanks in which tank 1 drains into tank 2 at a rate of 5 liters/minute. Tank 1 intially contains 100% ethanol, but is being refilled with pure water at a rate of 5 liters/minute. Tank 2 initially has pure water in it and drains at a rate of 5 liters/minute. Tank 1 has a volume of 100 liters, and tank 2 has a volume of 10 liters.

   (a) Write down ODEs for the amount of ethanol in each tank and solve them. (Note that the amount in tank 1 does not depend on the amount in tank 2.)

(b) Find the maximum amount of ethanol present in tank 2 (first find when this happens).