1. Dividers for Days

(a) Solve the following circuit for $v_x$.

(b) You have access to two voltage sources, $V_1$ and $V_2$. You can use two resistors (as long as $0 \leq R < \infty$). How would you design a circuit that produces a voltage $v_x = \frac{1}{3}V_1 + \frac{2}{3}V_2$?

(c) You have two current sources $I_1$ and $I_2$. You also have a load resistor $R_L = 6k\Omega$. Similar to the first part, you can use whatever resistors you want (as long as they are finite integer values). How would you design a circuit such that the current running through $R_L$ is $I_L = \frac{2}{5}(I_1 + I_2)$?

2. Redraw and Calculate Equivalent Capacitance (CIRCUIT FROM FA18 MT2 Q6)

(a) (7 points) For the rest of this problem, use the circuit below to model the capacitive touchscreen. You are now given that $C_1 = 8F$, $C_2 = 4F$, and $C_3 = 4F$, $C_4 = 4F$.

(Note: 8F is a very large capacitance. Normal capacitance values would be on the order of nano-Farads, which are $10^{-9}$ of a Farad.)

Calculate the equivalent capacitance of the circuit between terminals $E_1$ and $E_2$. 
3. Modeling an IV Characteristic

IGNORE THIS PROBLEM, THIS PROBLEM HAS BEEN CUT FROM THE DISCUSSION WORKSHEET AND IS NOT IN SCOPE