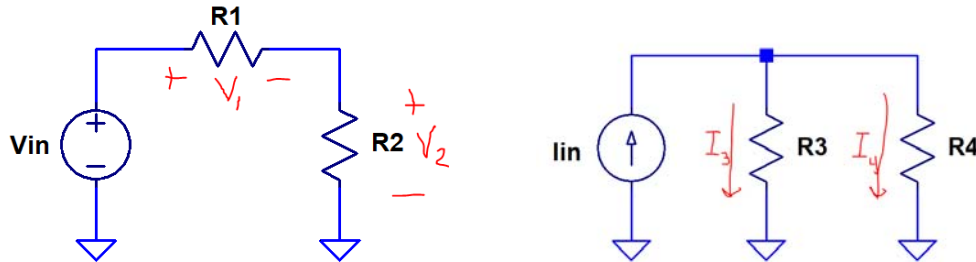


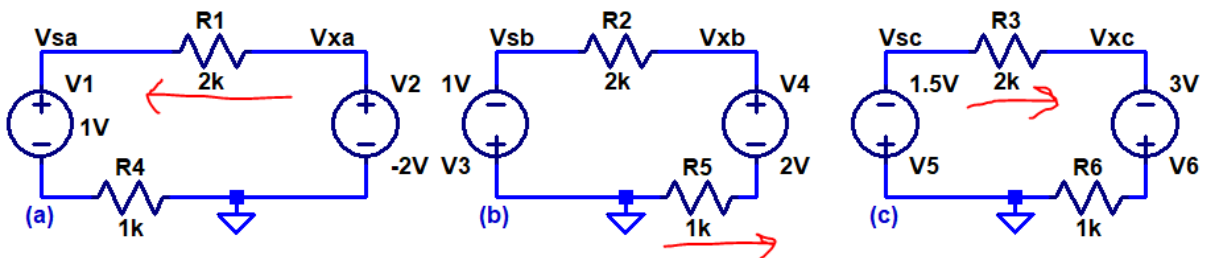
H.W. #1 EE 221 Spring 2020

Show your work for credit and put a box around each of your answers (follow the hw guidelines!)

1. Show how to derive the voltage divider (i.e.,  $V_1 = V_{in} \cdot (R_1 / (R_1 + R_2))$  and  $V_2 = V_{in} \cdot (R_2 / (R_1 + R_2))$ ) and current divider equations (i.e.,  $I_3 = I_{in} \cdot (R_4 / (R_3 + R_4))$  and  $I_4 = I_{in} \cdot (R_3 / (R_3 + R_4))$ ) using the following circuits. Show using LTspice and assuming  $R_1 = R_4 = 1k$ ,  $R_2 = R_3 = 2k$ ,  $V_{in} = 9V$ , and  $I_{in} = 1mA$ , that these equations are correct. (5 points)



2. What happens, in the preceding current divider circuit (how do the current divider equations change), if you put a resistor in series with  $I_{in}$ ? Verify your answer with LTspice. (1 point)
3. Find the current flowing in the following circuits in the directions indicated. Also find the voltages  $V_s$  and  $V_x$  in each circuit. Verify your answers using LTspice. (6 points)



4. Find the voltages  $V_s$ ,  $V_x$ , and the current, in the direction indicated, flowing in the following circuits. Verify your answers with LTspice. (4 points)

