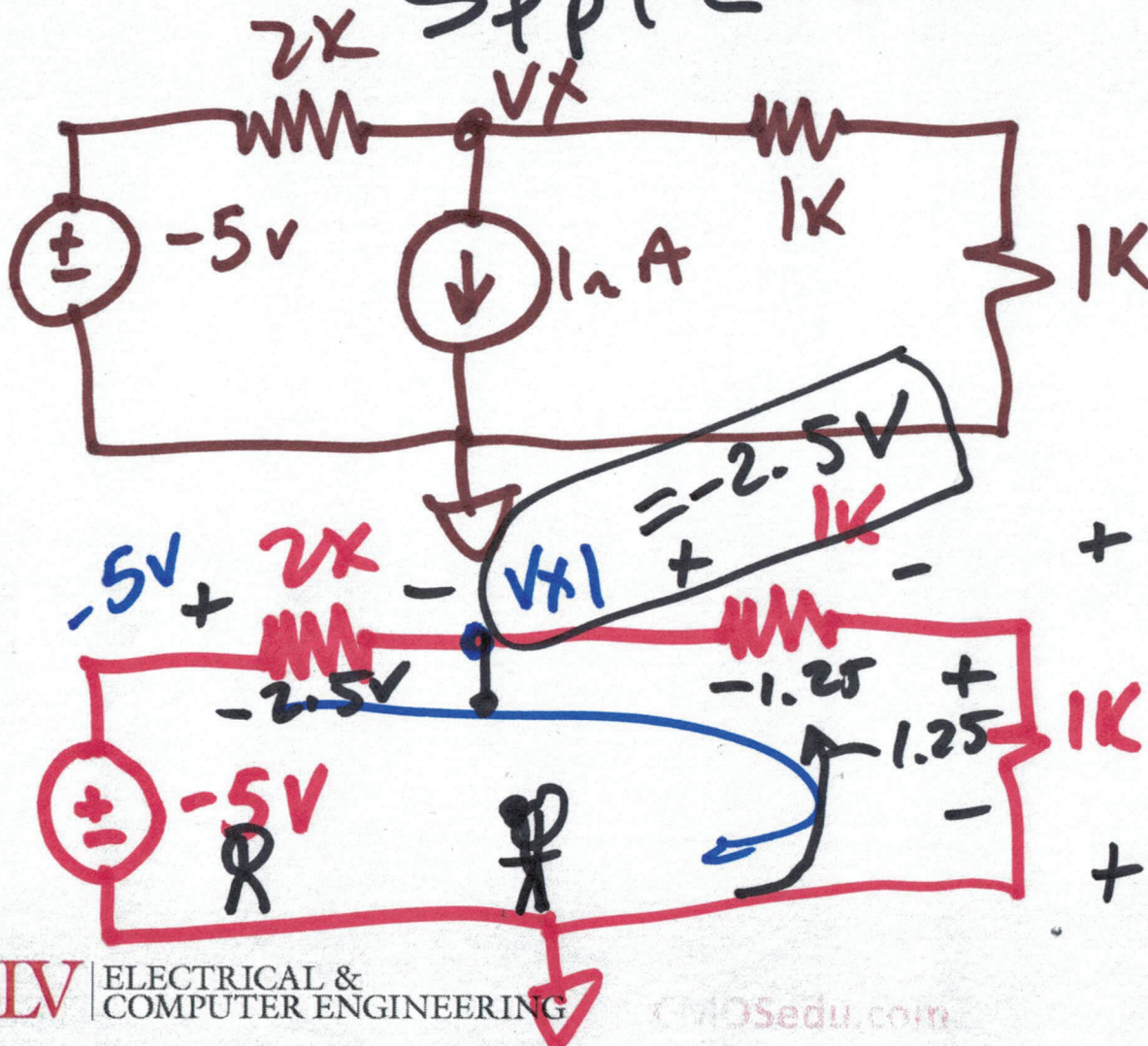


EE 220 Circuits I

Lecture 6

September 18, 2023



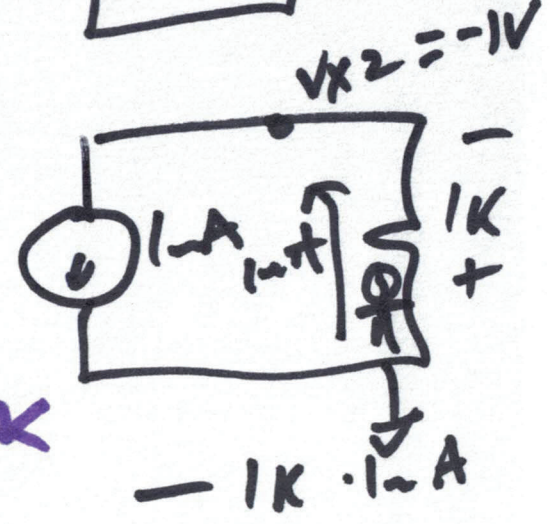
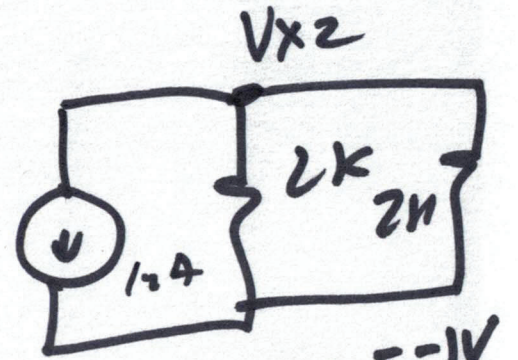
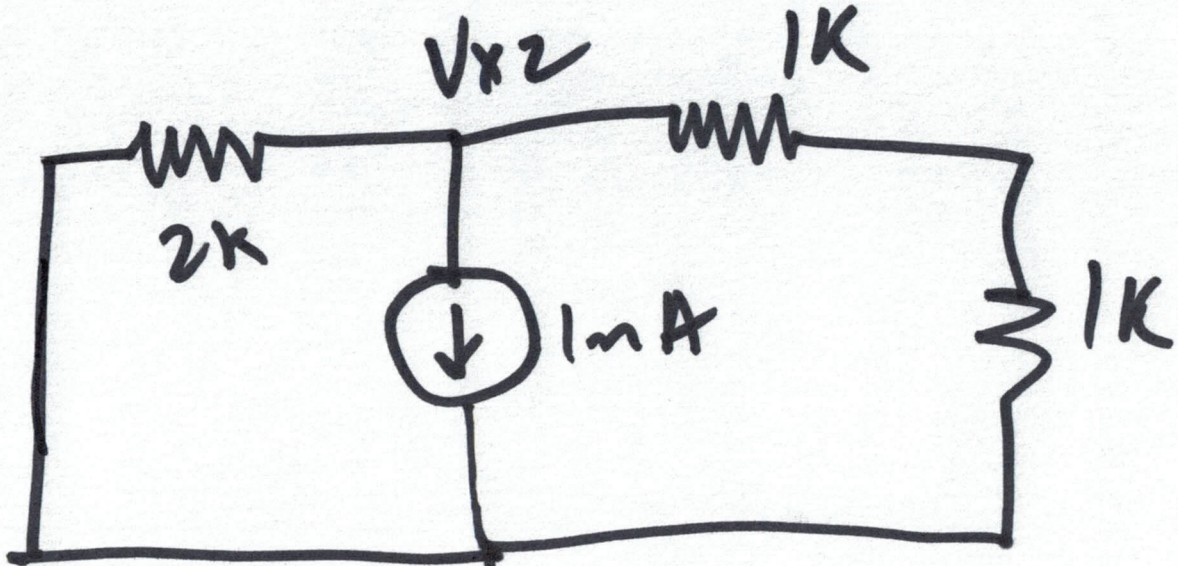
$$-\frac{5}{4k} = -1.25\mu A$$

$$+(-5) - 2kI - 1kI - 1kI = 0$$

$$I = \frac{5}{-4k} = -1.25\mu A$$

$$+ (1k \cdot (-1.25\mu A)) + \frac{1k(-1.25\mu A)}{-1.25V}$$

1)



$R_1 || R_2 = \frac{R_1 R_2}{R_1 + R_2}$
 $R_1 \left\{ \right. R_2$
 $\frac{2k \cdot 2k}{2k + 2k} = \frac{2k \cdot 2k}{2 \cdot 2k} = 1k$

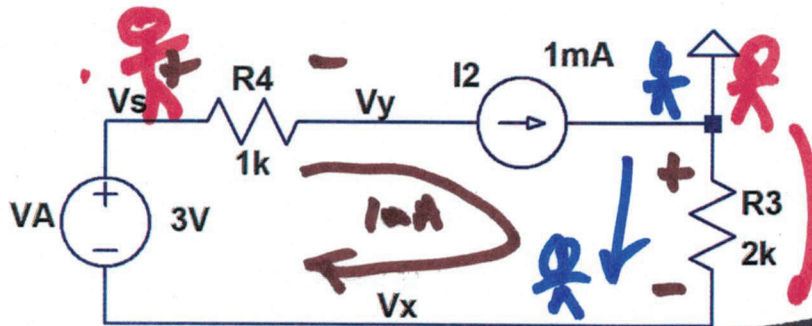
3)

Quiz #5 EE 220 Fall 2022 Name: _____

Closed book and notes.

Show your work for credit! **Put boxes around your answers.**

1. Find the voltages, V_s , V_x , and V_y in the following circuit. (5 point)

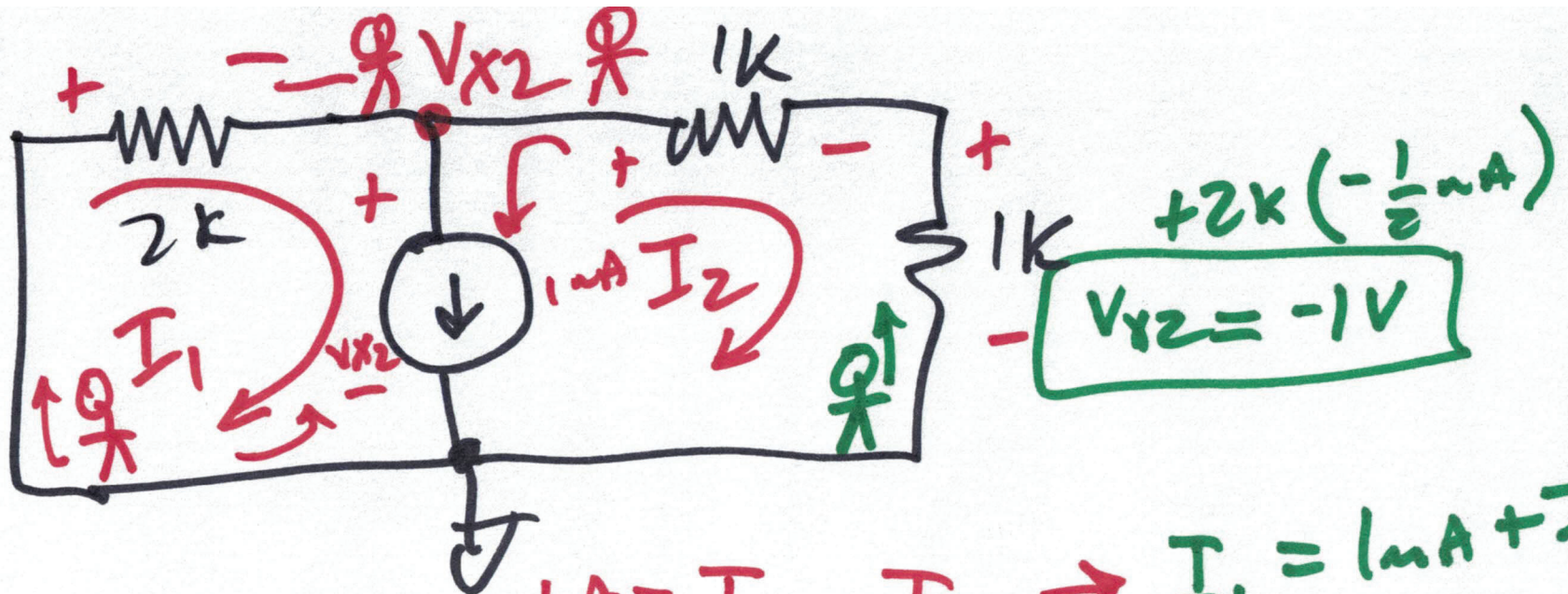


$$-2k \cdot 1mA = \boxed{V_x = -2V}$$

$$-2k \cdot 1mA + 3 = \boxed{V_s = 1V}$$

$$-2k \cdot 1mA + 3 - 1k \cdot 1mA = \boxed{V_y = 0}$$

2)



$$1mA = I_1 - I_2 \rightarrow I_1 = 1mA + I_2$$

$$V_{x2} + 2k(1mA + I_2) = 0$$

$$V_{x2} + 2V + 2kI_2 = 0$$

$$-V_{x2} = 2 + 2kI_2$$

$$+V_{x2} + 2kI_1 = 0$$

$$-V_{x2} + 1kI_2 + 1kI_2 = 0$$

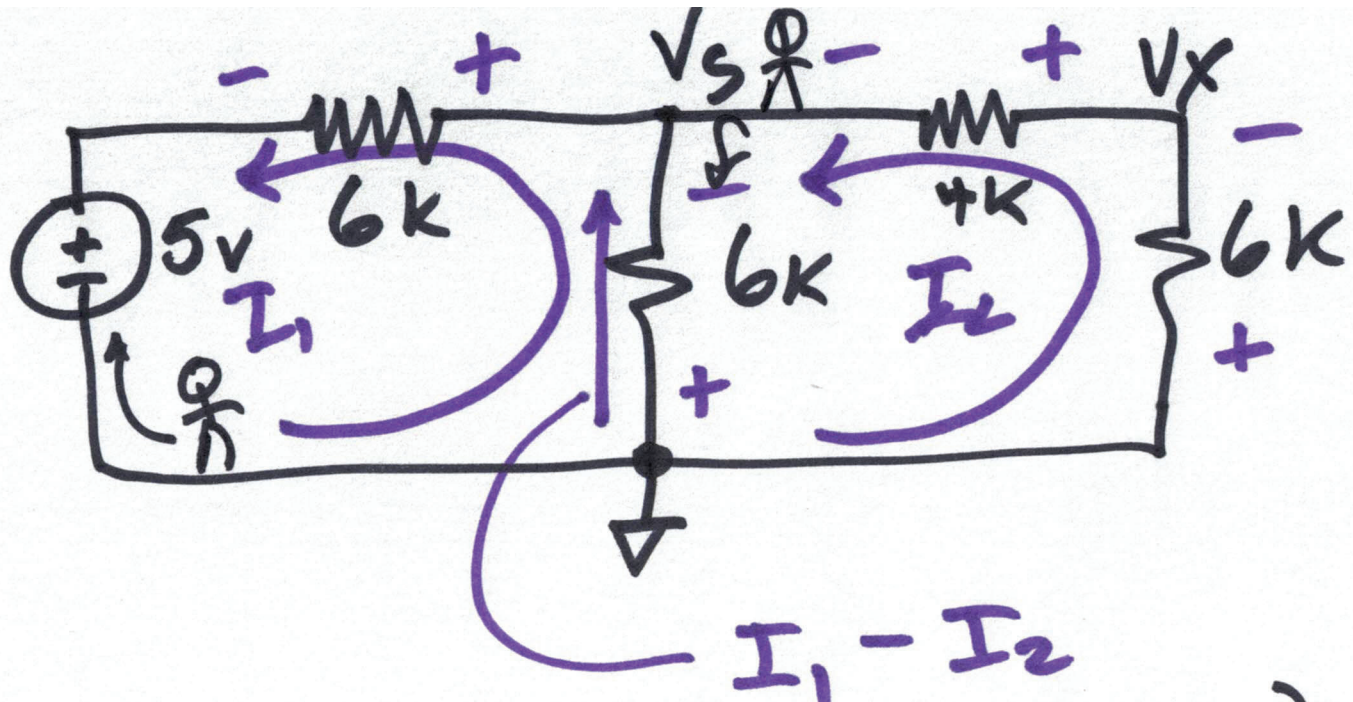
$$2 + 2kI_2 + 1kI_2 + 1kI_2 = 0$$

$$2 + 4kI_2 = 0$$

$$V_x = -2.5 - 1$$

$$V_x = -3.5$$

$$I_2 = \frac{-2}{4k} = -\frac{1}{2}mA$$

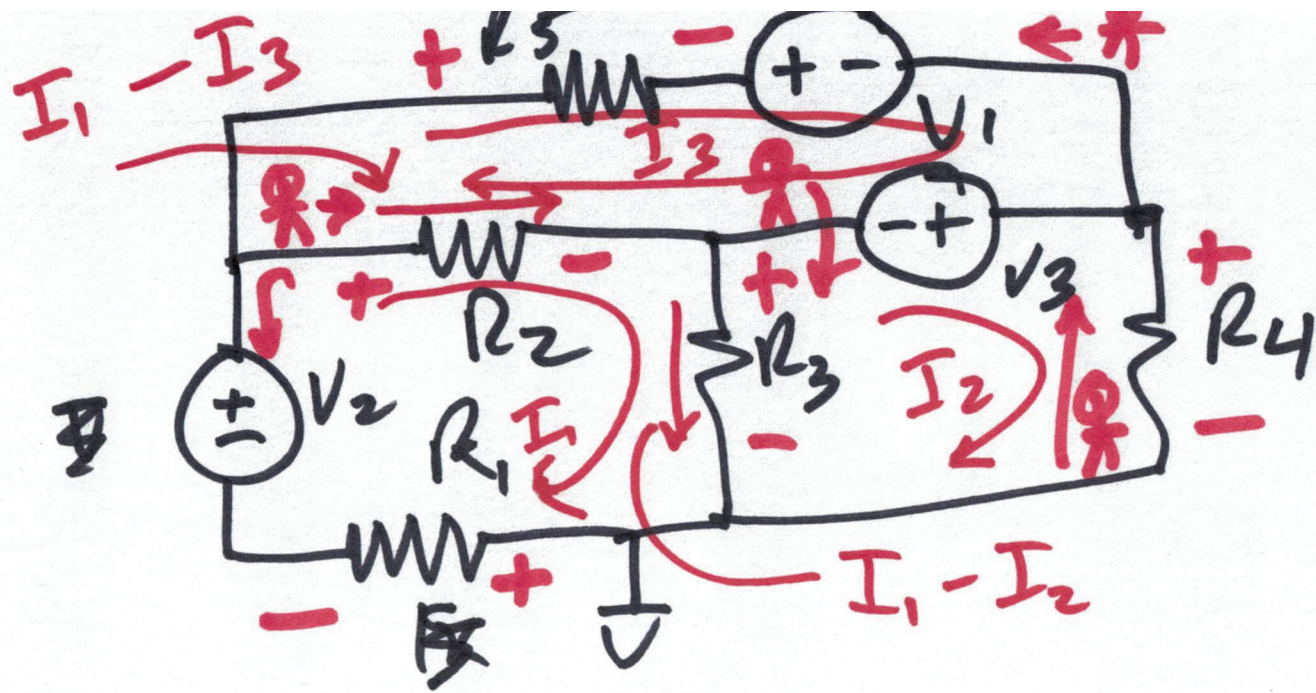


$$I_1 - I_2$$

$$+5 + 6kI_1 + 6k(I_1 - I_2) = 0$$

$$+ 6k(I_1 - I_2) - 6kI_2 - 4kI_2 = 0$$

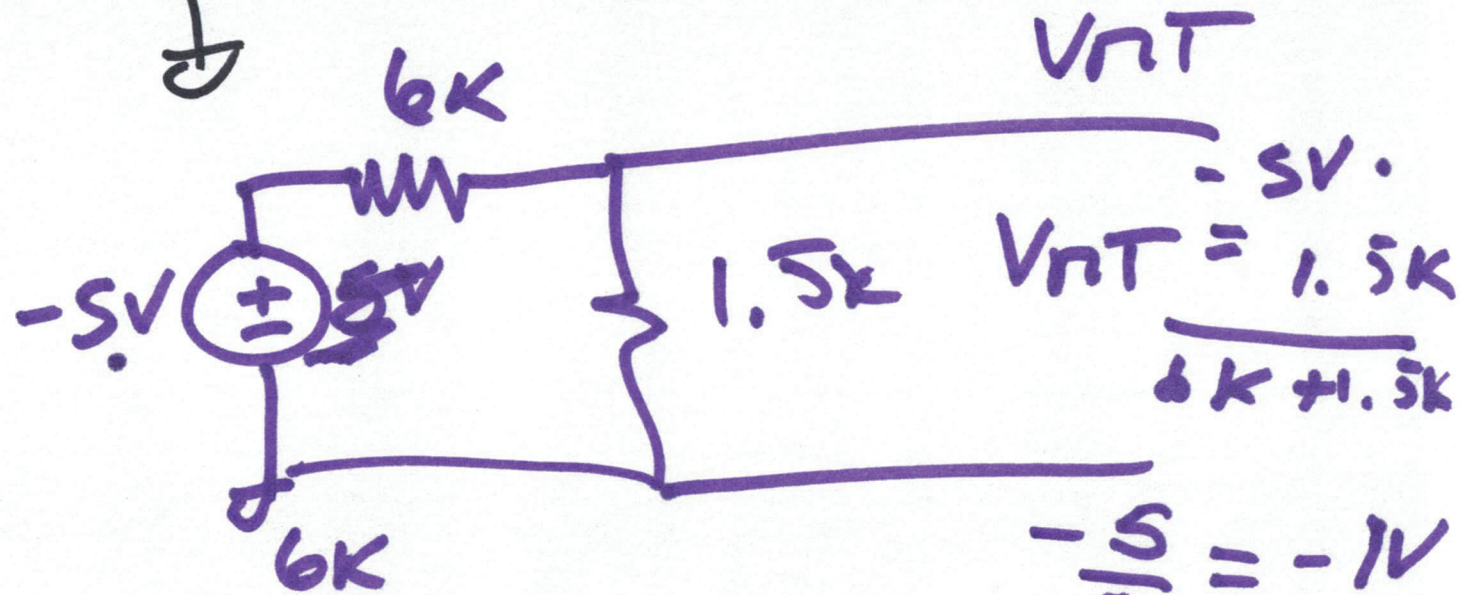
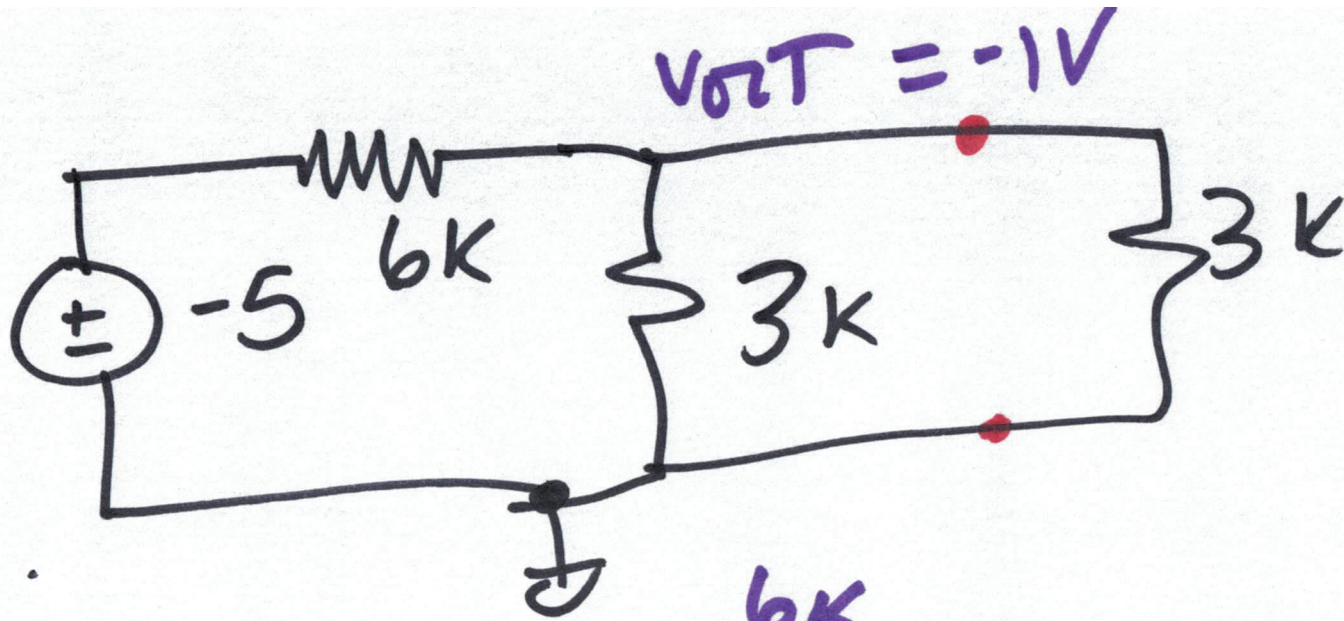
5)



$$0 = -V_2 + R_1 I_1 + R_3 (I_1 - I_2) + R_2 (I_1 - I_3)$$

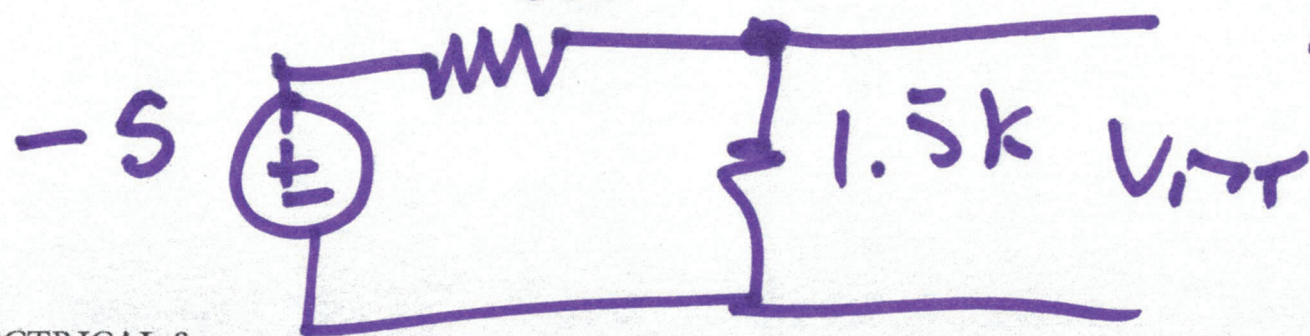
$$0 = -R_2 (I_1 - I_3) + V_3 + V_1 + R_5 \cdot I_3$$

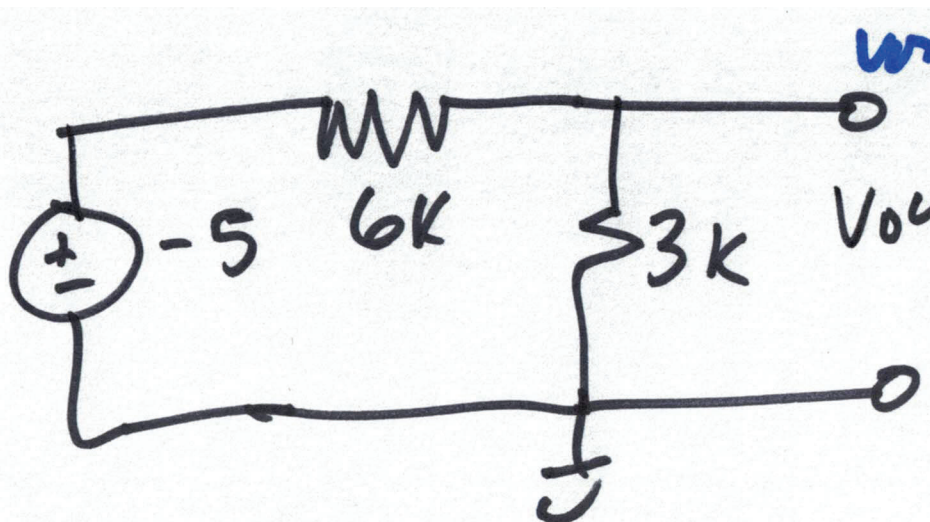
$$0 = -R_3 (I_1 - I_2) + R_4 (I_2) - V_3$$



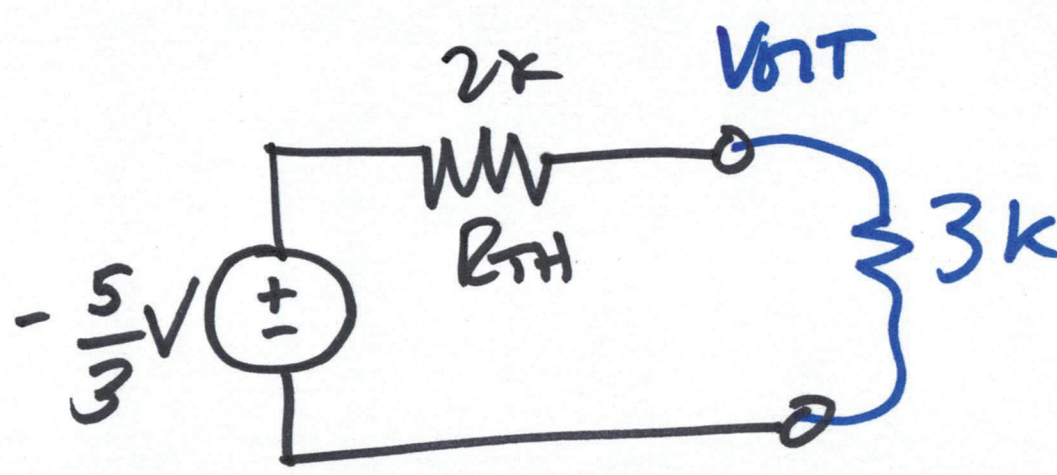
$$V_{\text{OVT}} = \frac{1.5k}{6k + 1.5k} \cdot (-5V)$$

$$-\frac{5}{5} = -1V$$

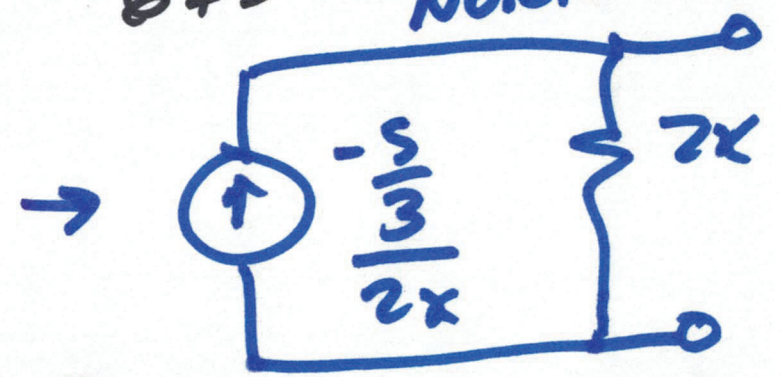




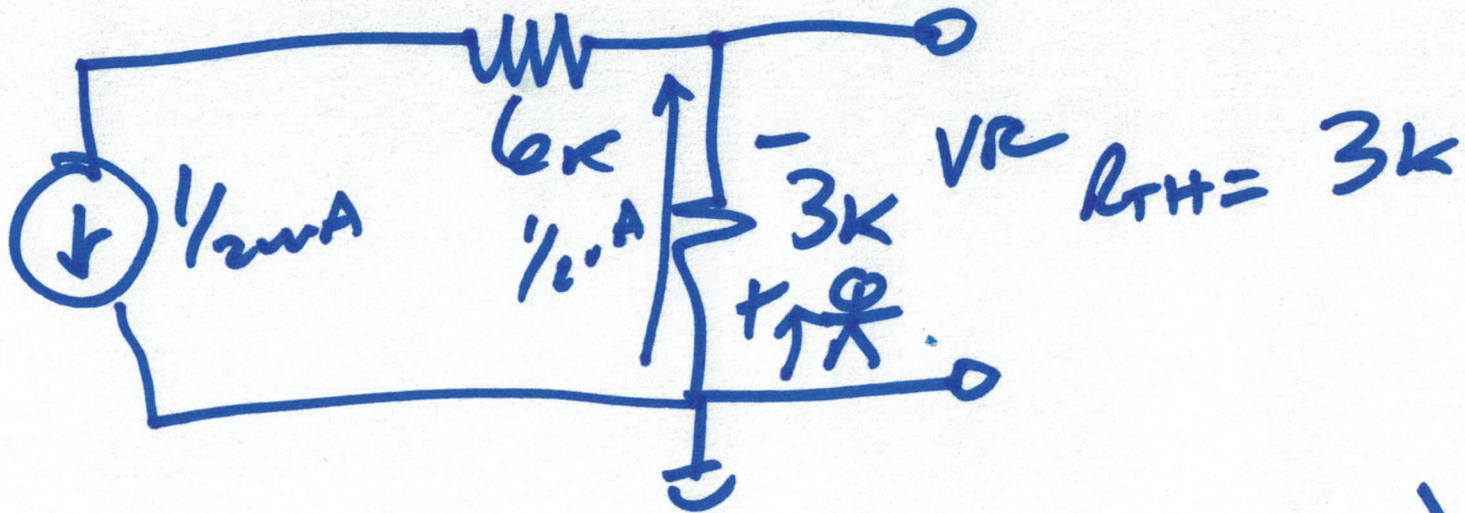
$V_{TH} = -5 \cdot \frac{3}{3+6} = -\frac{5}{3}$
 ← Theveninize this ckt



$\frac{6 \cdot 3}{6+3} = 2k$
 NORTON



$V_{out} = -\frac{5}{3} \cdot \frac{3k}{2k+3k} = \underline{\underline{-1V}}$



$$V_{OC} = -3k \left(\frac{1}{2} \mu A \right)$$

$$= -1.5V = V_{TH}$$

