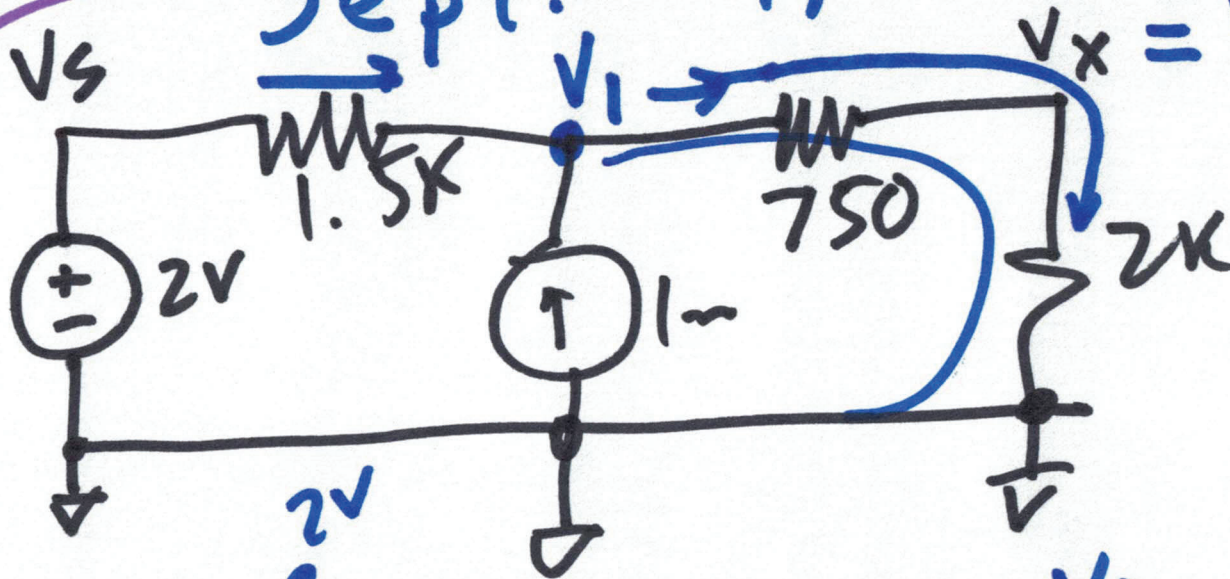


# EE 220 Circuits I

## Lecture 5

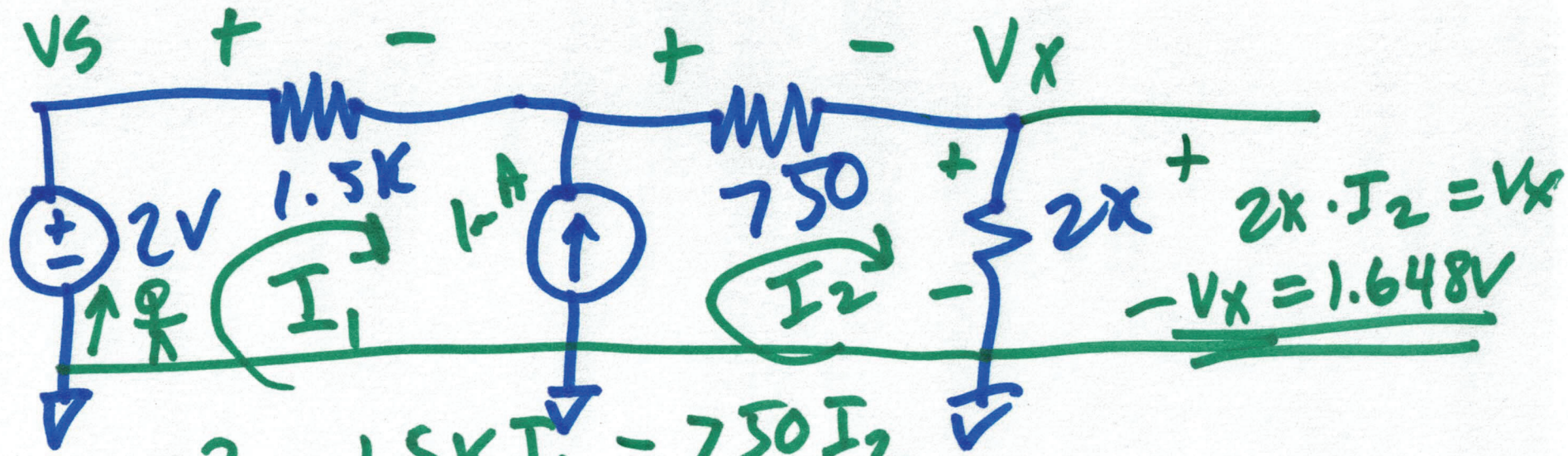
Sept. 14, 2021

$V_s = 2V$



$$V_x = V_1 \cdot \frac{2k}{2k + 750}$$

$$\frac{V_s - V_1}{1.5k} + 1mA = \frac{V_1}{2.75k}$$



$$+2 - 1.5kI_1 - 750I_2 - 2kI_2 = 0$$

$$I_1 + 1mA = I_2 = 824\mu A$$

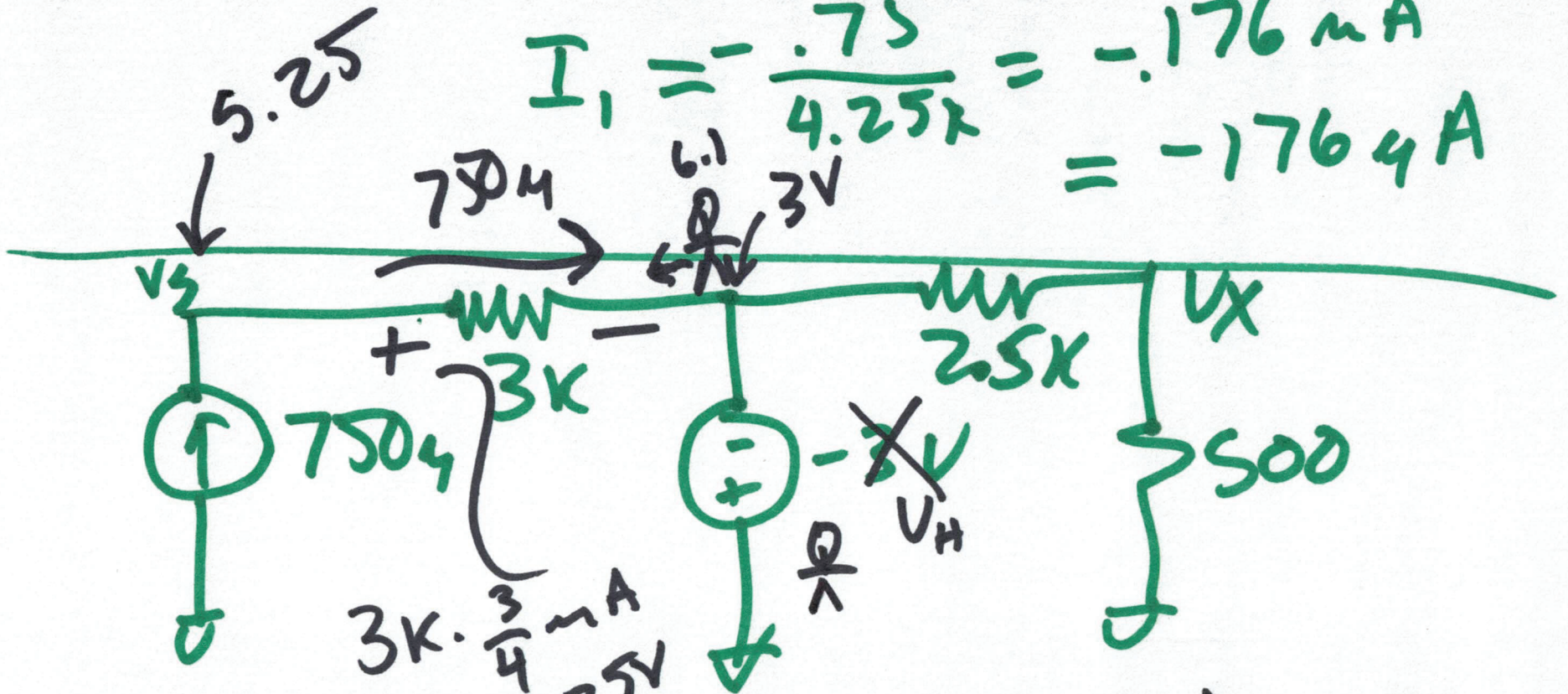
$$2 - \frac{3}{2}kI_1 - 2.75kI_2 = 0$$

$$0 = 2 - \frac{3}{2}kI_1 - 2.75kI_1 - 2.75V$$

2)

$$.75V = -4.25K I_1$$

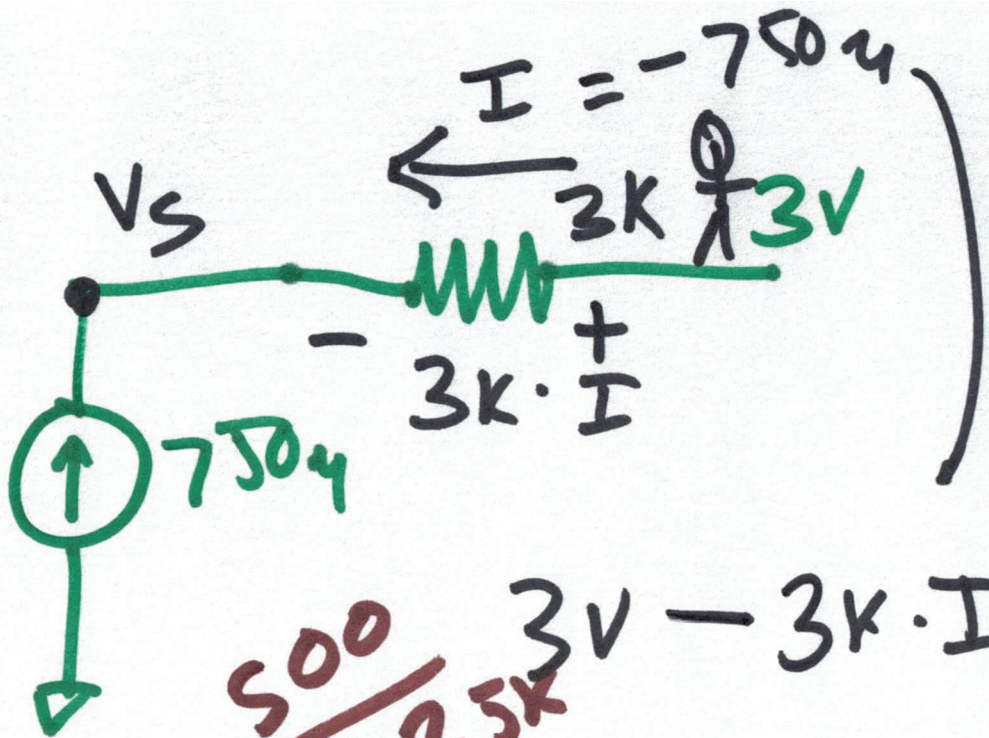
$$I_1 = -\frac{.75}{4.25K} = -.176mA = -176\mu A$$



$$3K \cdot \frac{3}{4} mA = 2.25V$$

$$-V_H = -(-3) = 3V$$

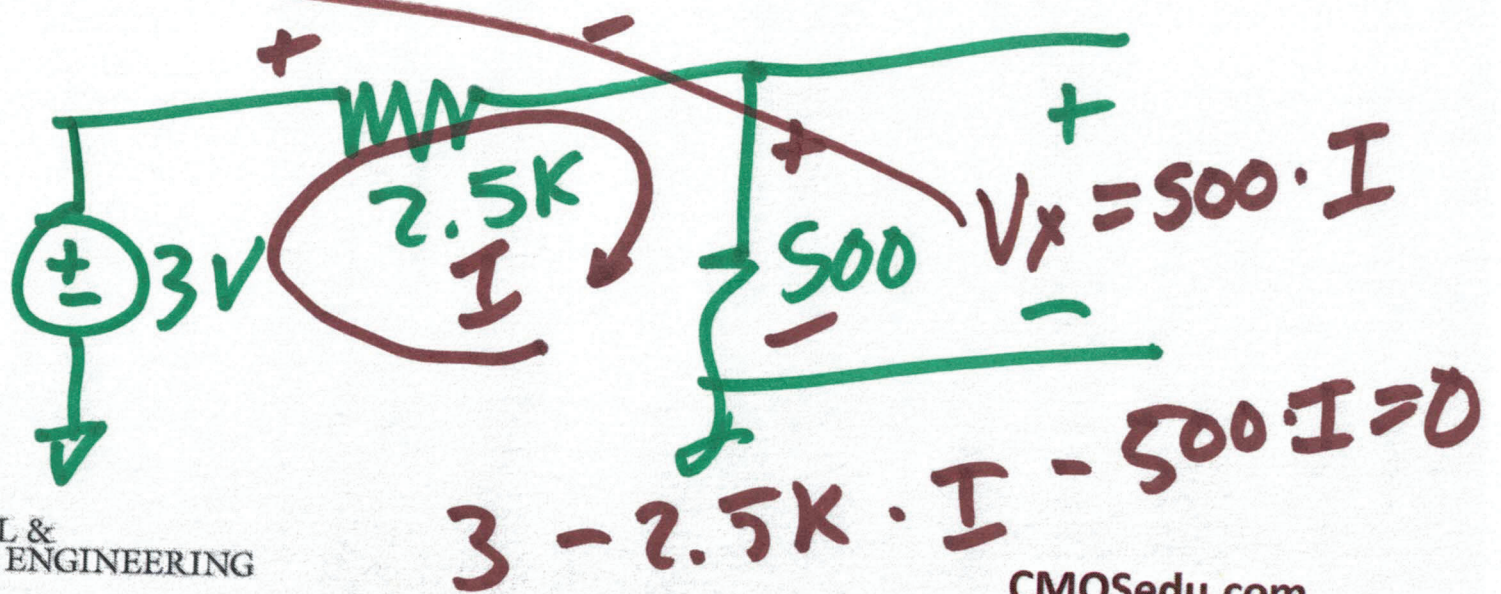
3)

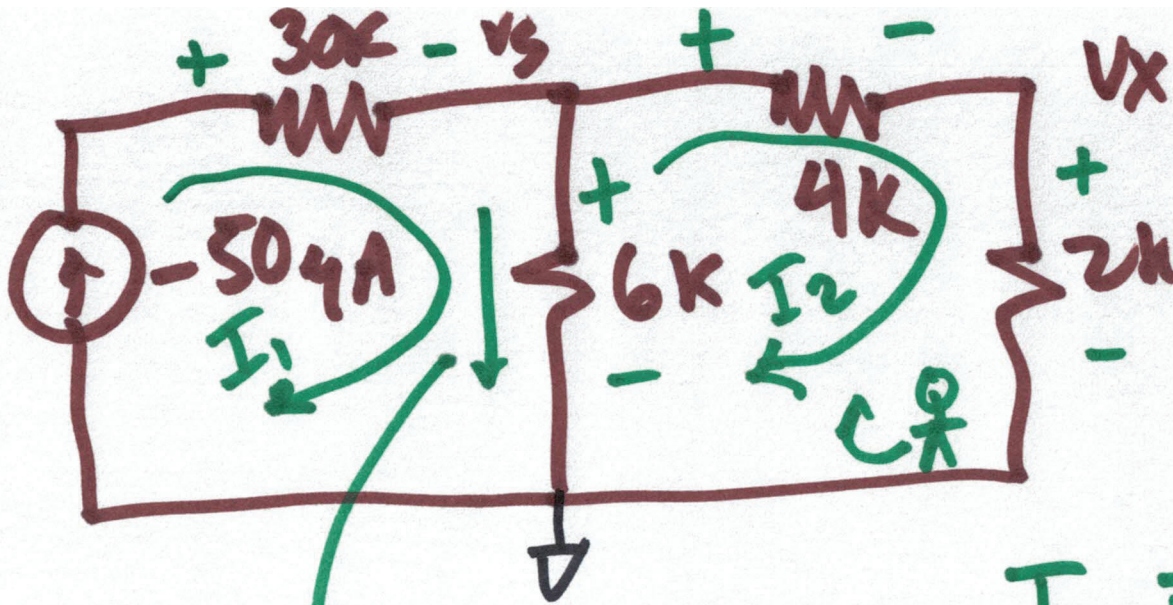


$$3V - 3k \cdot I = V_s$$

$$V_x = 3 \cdot \frac{500}{500 + 2.5k}$$

$$3V - 3k(-750\mu) = V_s = 5.25V$$





Mesh Analysis

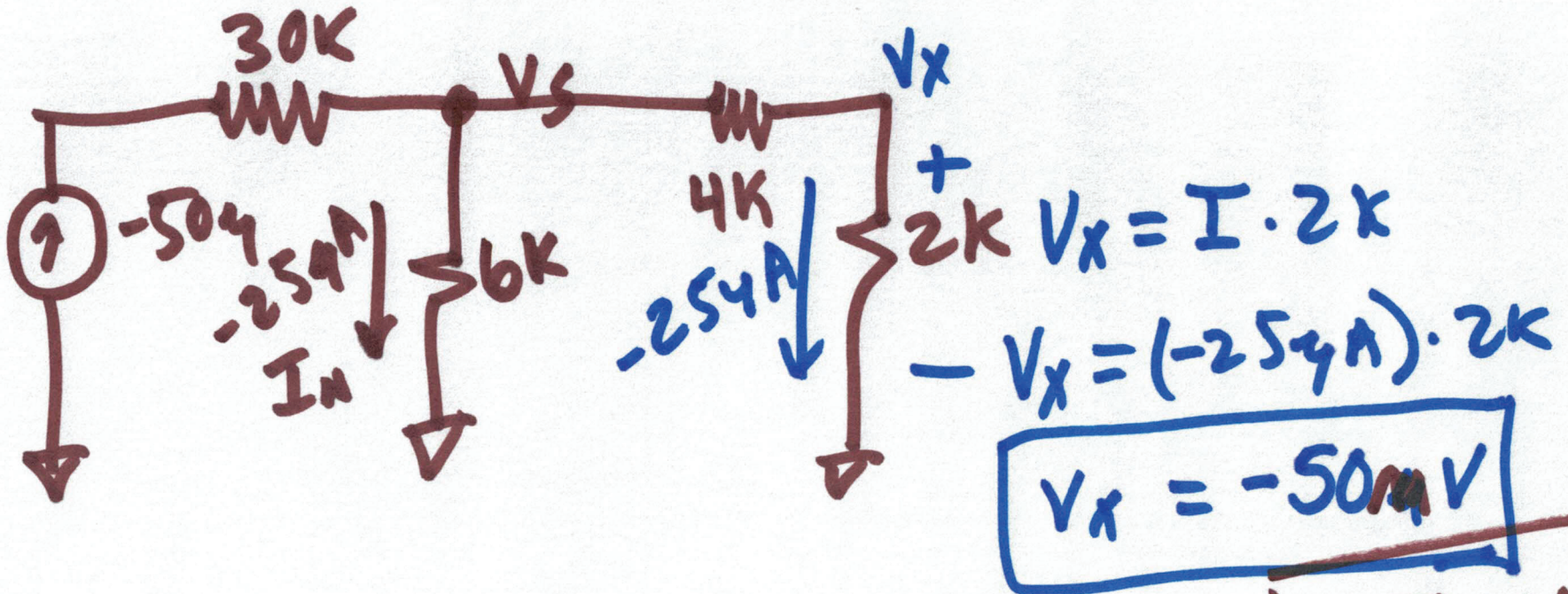
$$I_1 = -504 \text{ A}$$

$$+ 6k(I_1 - I_2) - 4kI_2 - 2kI_2 = 0$$

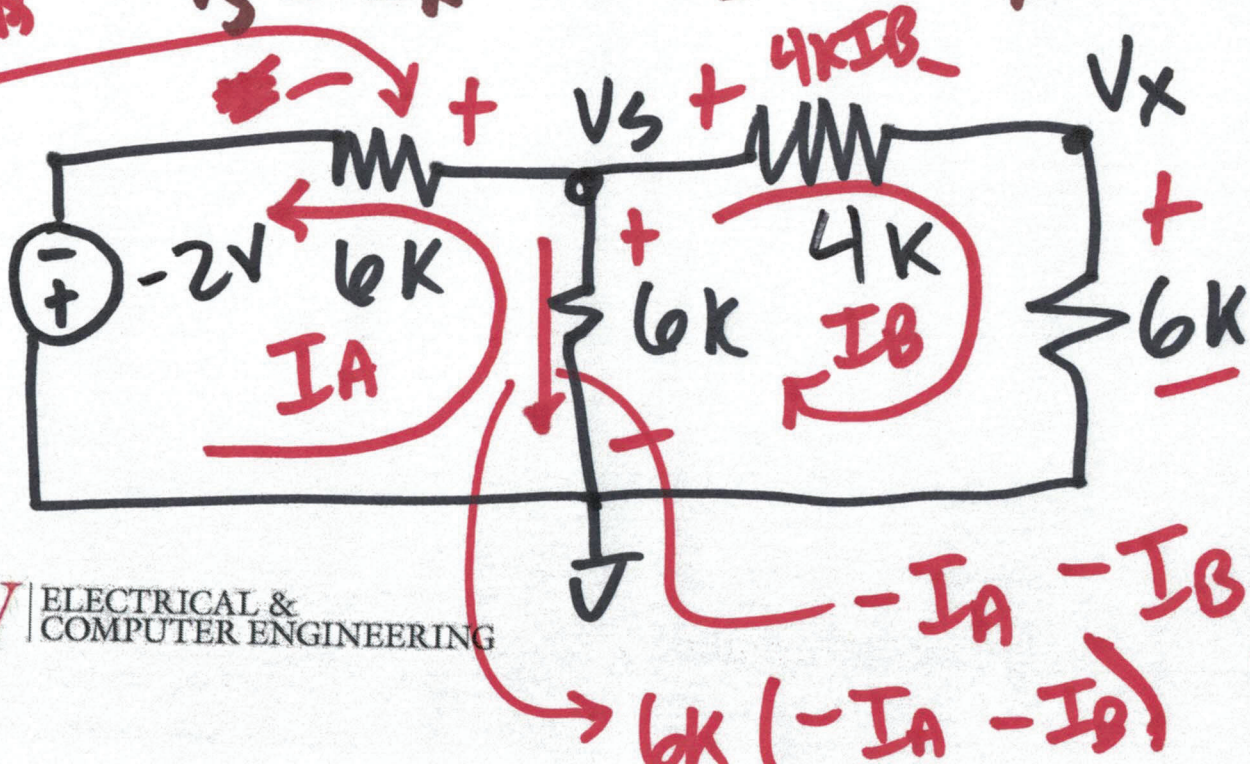
$$-300 \text{ mV} - 6kI_2 - 6kI_2 = 0$$

$$-300 = 12kI_2$$

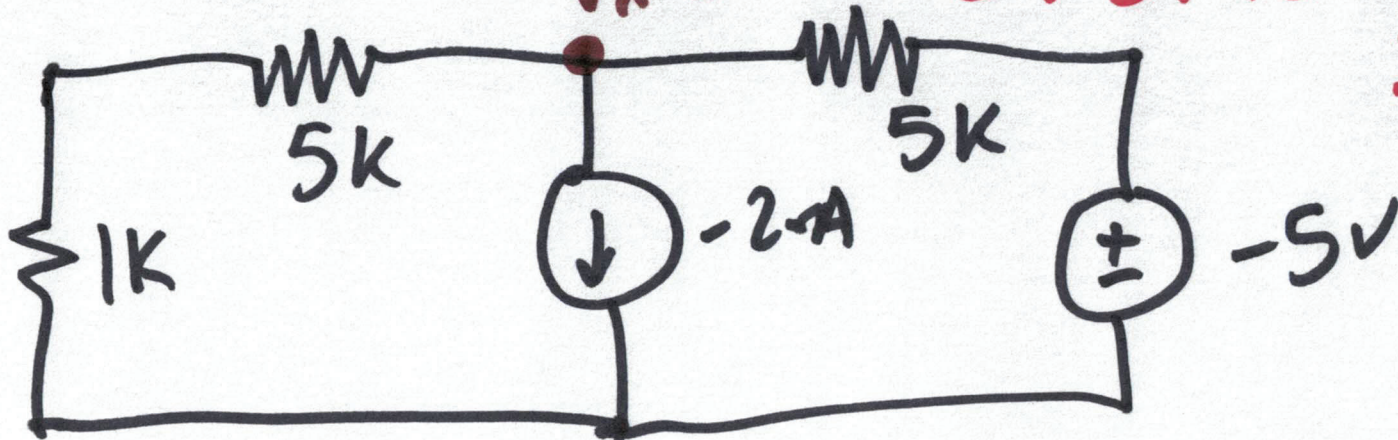
$$I_2 = -0.025 \text{ mA} = -25 \mu\text{A}$$



$V_s = I_n \cdot 6k = -254A \cdot 6k = -150mV$



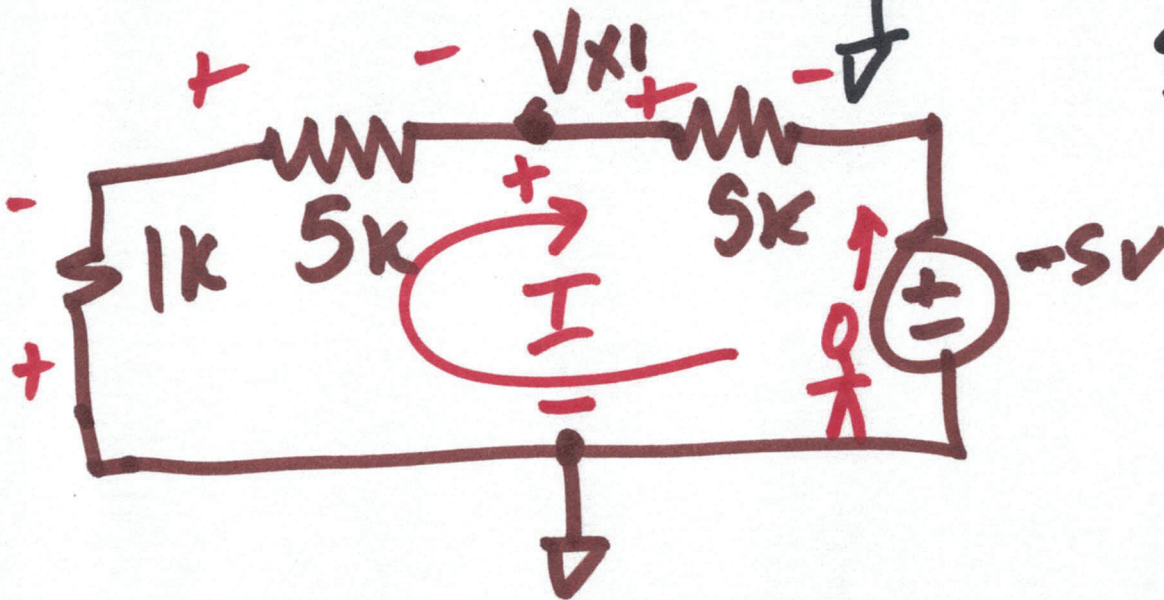
$$V_x = -2.73 + 5.46 = \underline{\underline{2.73V}}$$



Superposition

Look at one source at a time

HELP N ADD

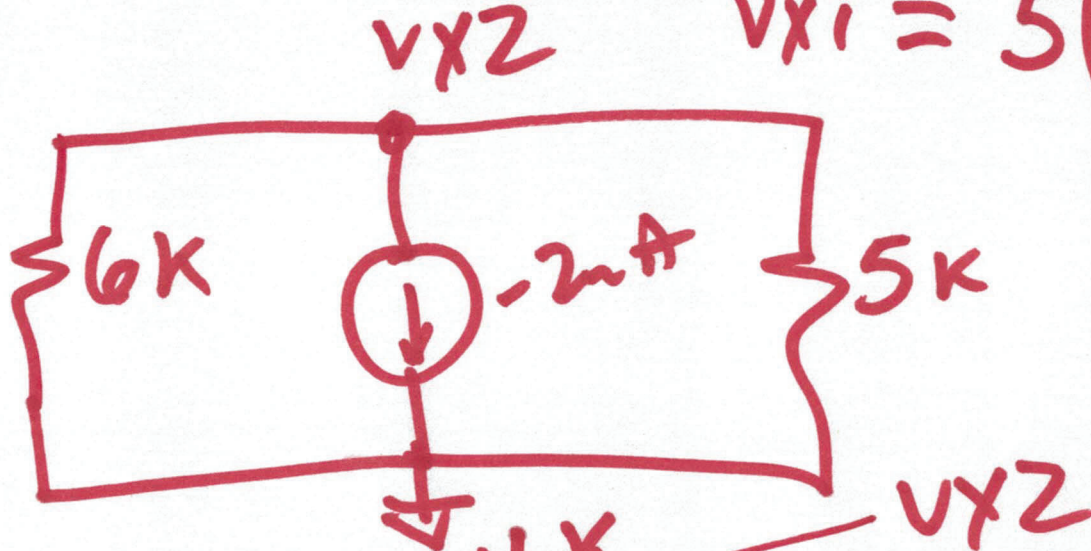


$$-1kI - 5kI - 5kI - (-5V) = 0$$

$$I = \frac{-5}{-11K}$$

$$V_{X1} = +(-5V) + 5K \cdot \frac{5}{11K}$$

$$V_{X1} = 5 \left( \frac{5}{11} - 1 \right) = \frac{-30}{11} = -2.73$$



$$\frac{5 \cdot 6}{5 + 6} K$$

$$V_{X2} = 2mA \cdot 5K \parallel 6K$$

$$= 2mA \cdot 2.7K$$

$$= 5.46V$$

