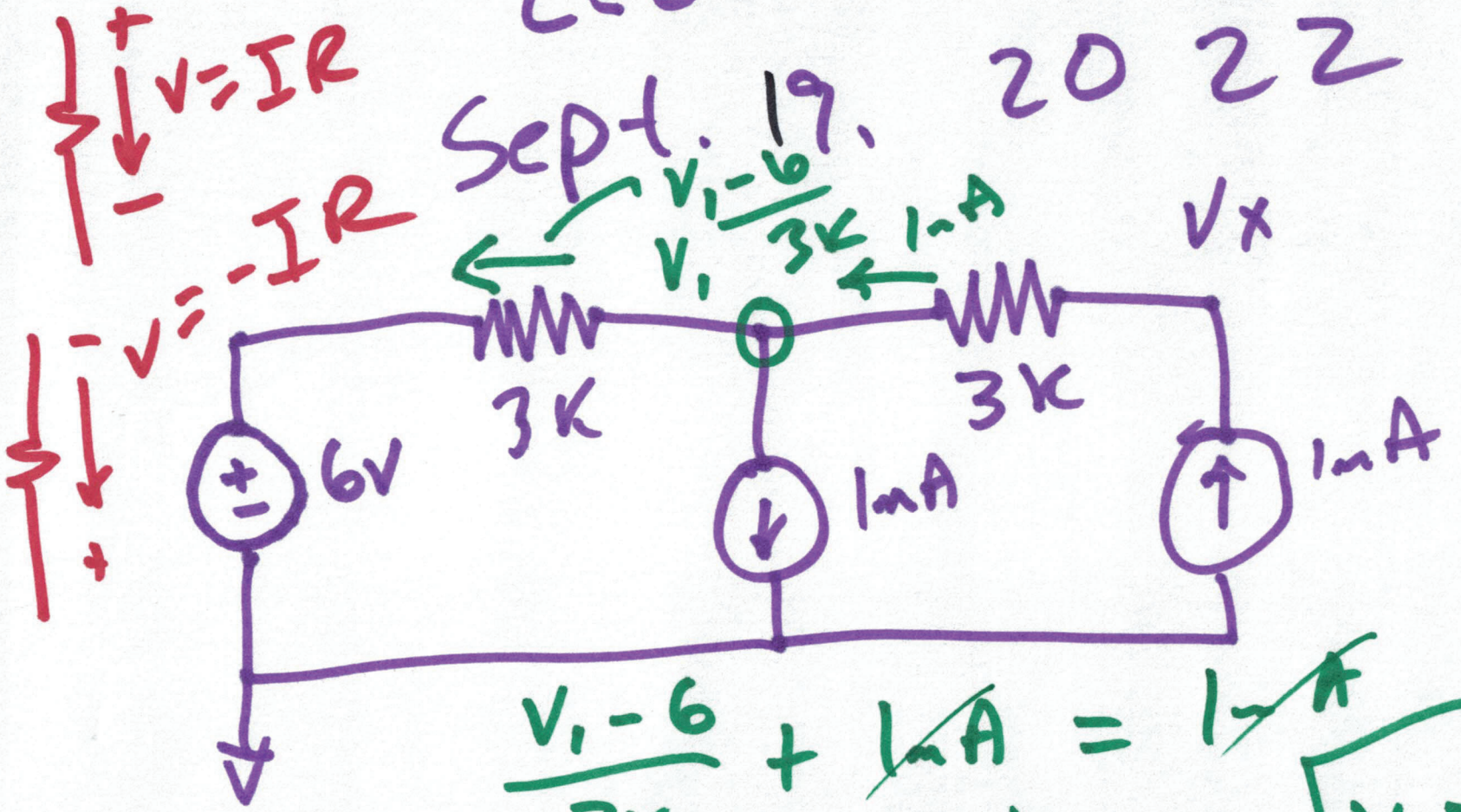
EE 220 Circuits I

Lecture 6

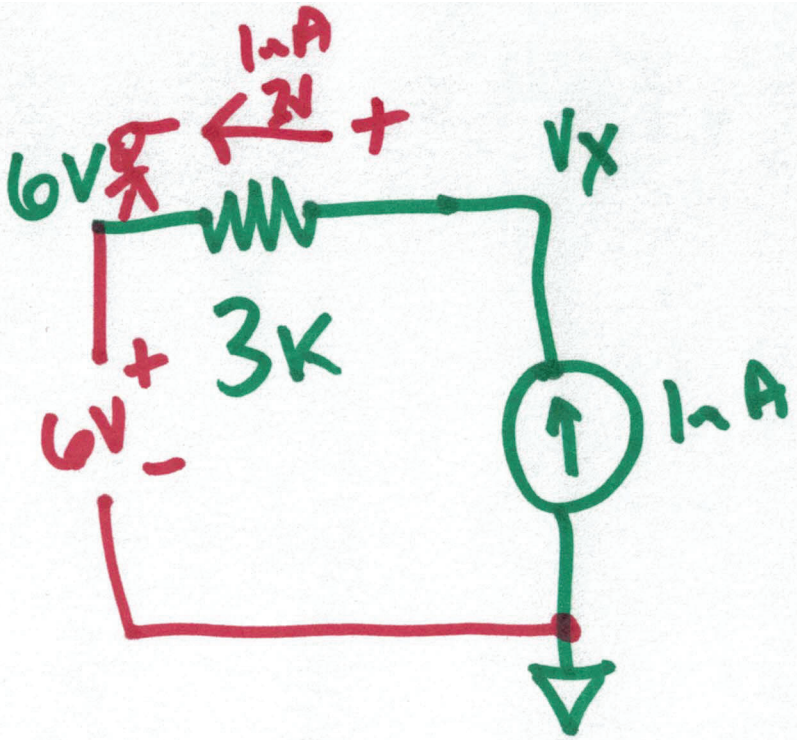
Sept. 19, 2022



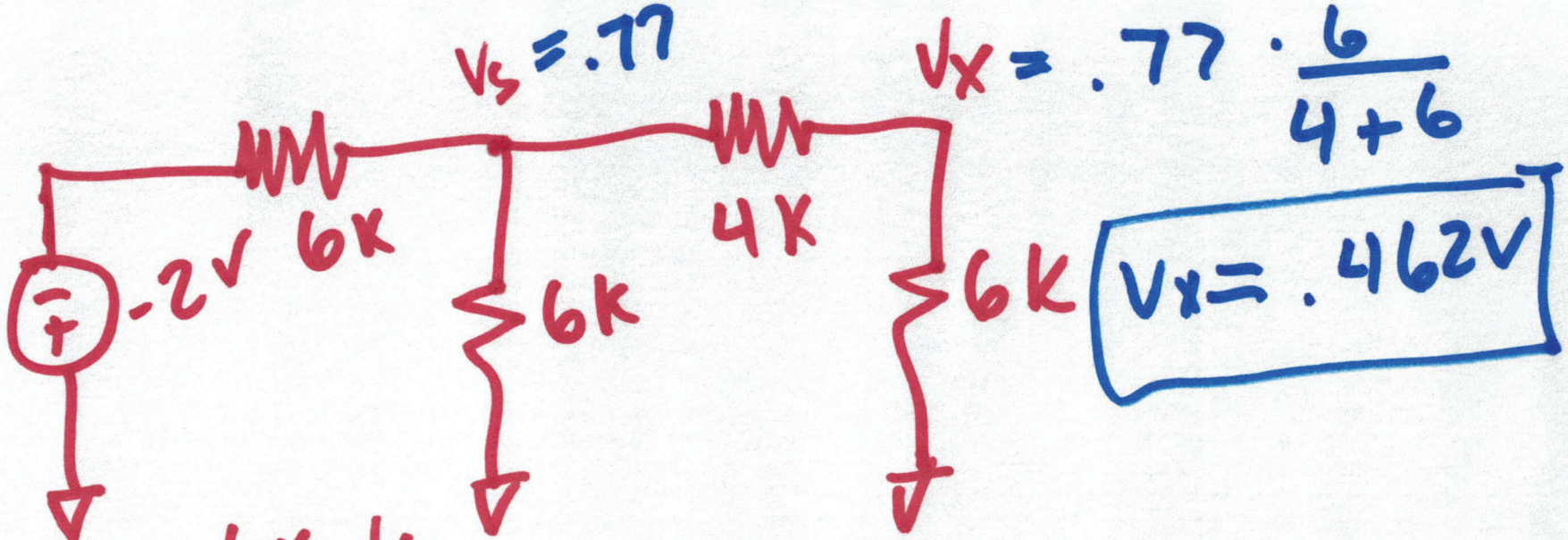
$$\frac{V_1-6}{3K} + 1mA = 1mA$$

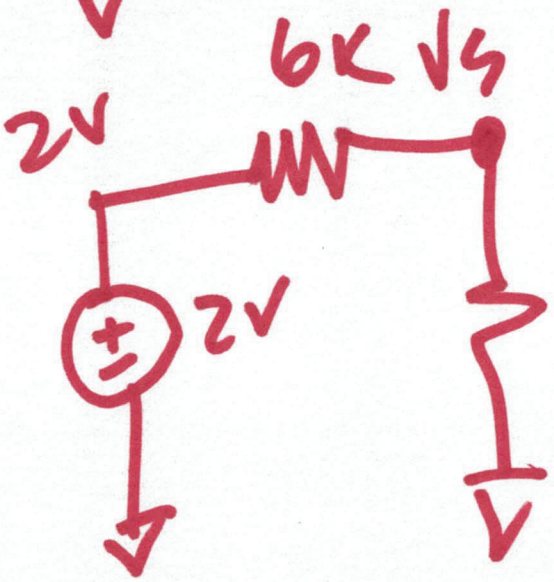
$$\frac{V_1-6}{3K} = 0$$

$$\boxed{V_1 = 6}$$



$6V + 3V = V_X = 9V$





$$V_s = 2 \cdot \frac{3.75}{6 + 3.75}$$

$$= 2 \cdot \frac{3.75}{9.75} = .77V$$

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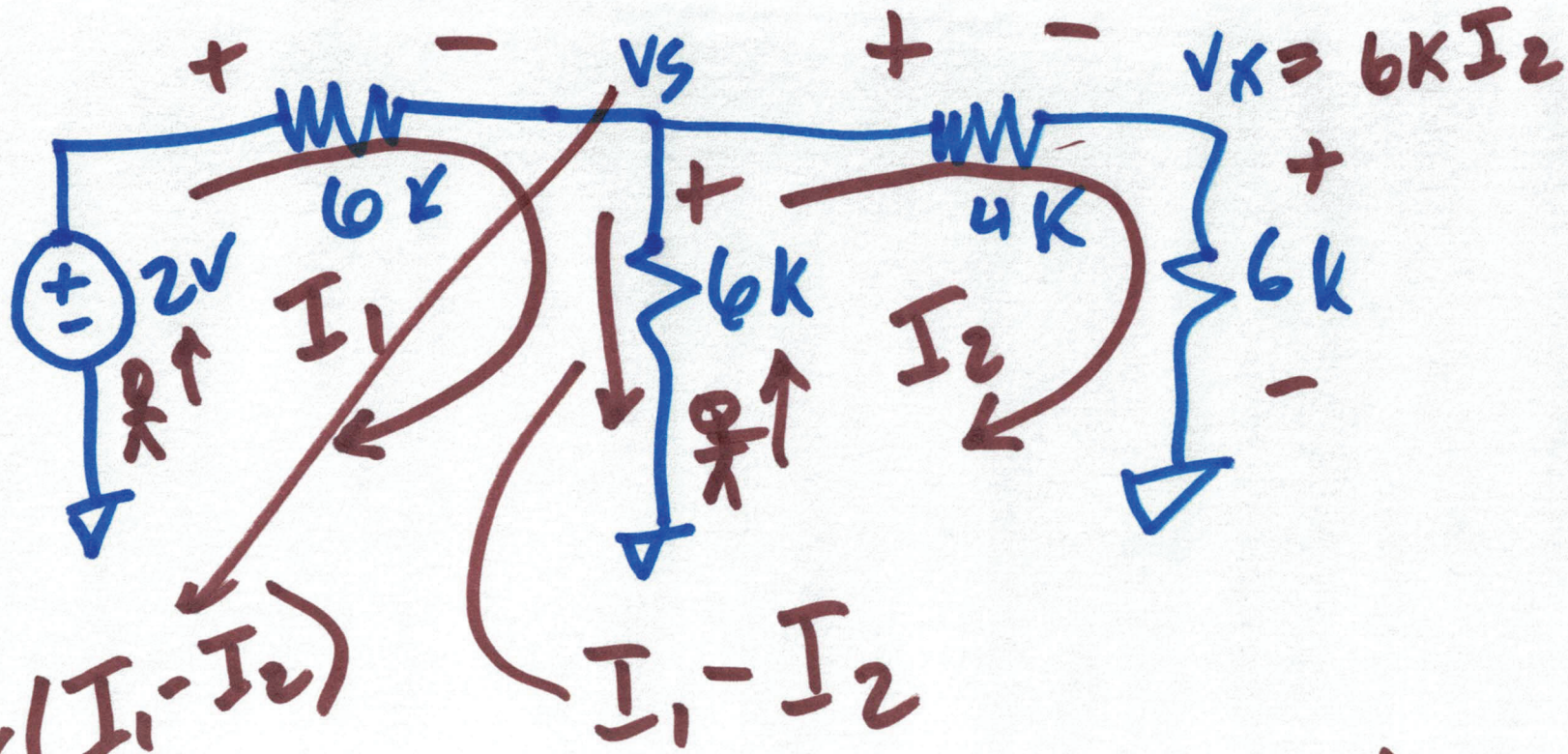
3)



$= V_S$

$$+2 - 6kI_1 - 6k(I_1 - I_2) = 0$$

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

$$\frac{1}{3}\text{mA} - I_1 - I_1 + I_2 = 0$$

$$76.74^{\text{A}} = I_2 = 2I_1 - \frac{1}{3}\text{mA}$$

$$I_2 + \frac{2}{3}I_2 - I_1 + I_2 = 0$$

$$I_2\left(\frac{8}{3}\right) - I_1 = 0$$

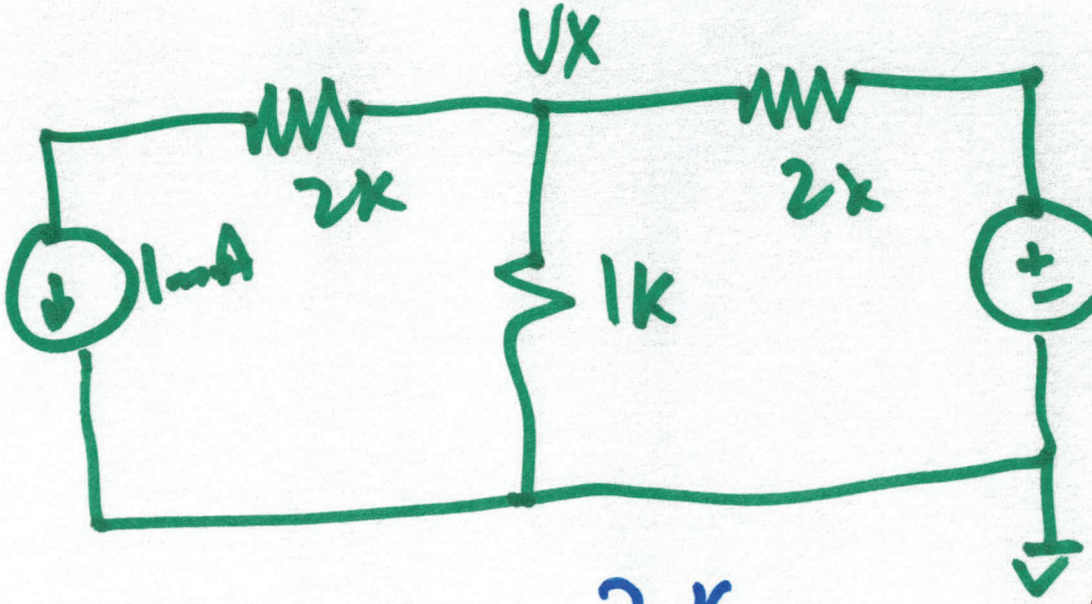
$$\frac{8}{3}\left(2I_1 - \frac{1}{3}\text{mA}\right) - I_1 = 0$$

$$\frac{16}{3}I_1 - \frac{8}{9}\text{mA} - I_1 = 0$$

$$\frac{13}{3}I_1 = \frac{8}{9}\text{mA}$$

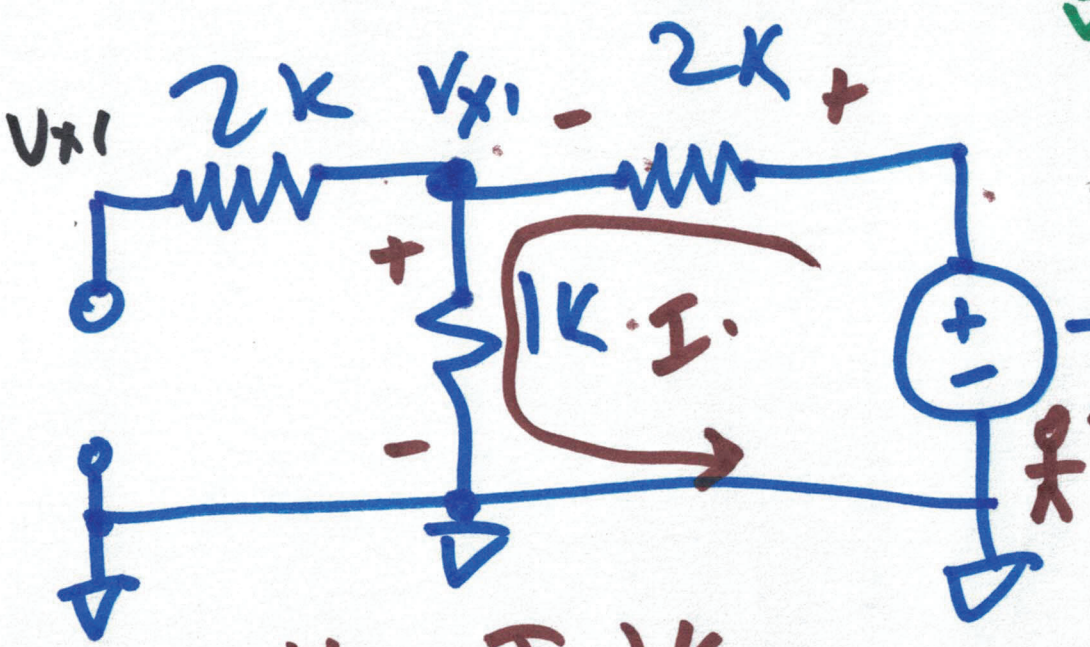
$$I_1 = \frac{24}{117}\text{mA}$$

$$I_1 = .205\text{mA}$$



$V_{x1} \cong 1.667V$

$V_{x1} = -5 \cdot \frac{1k}{2k+1k}$



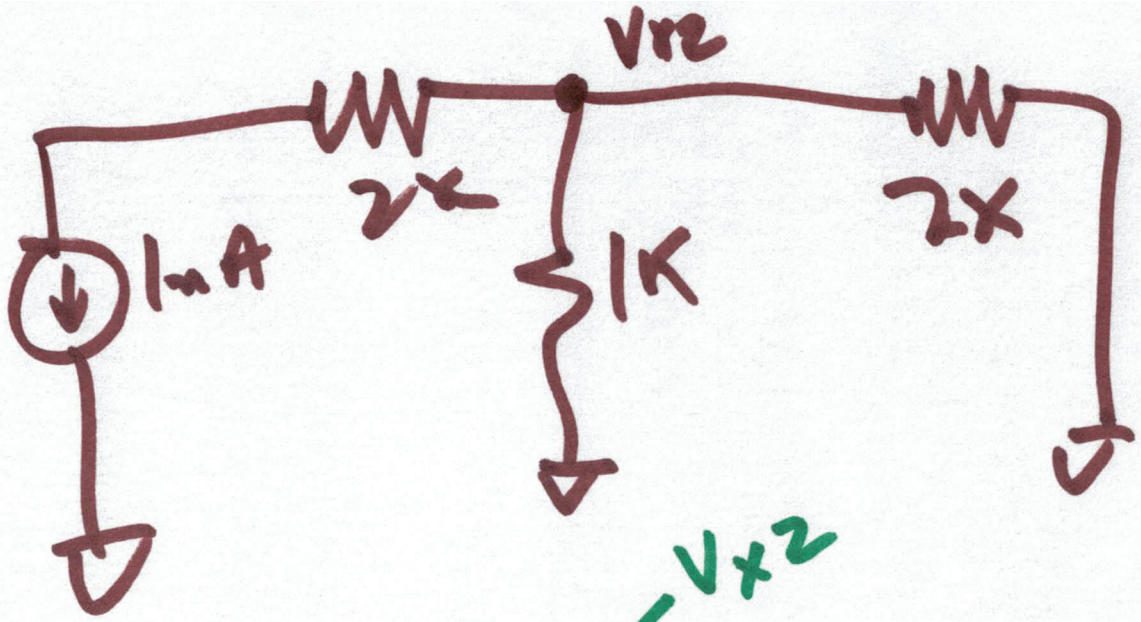
$+(-5V) - 2kI$

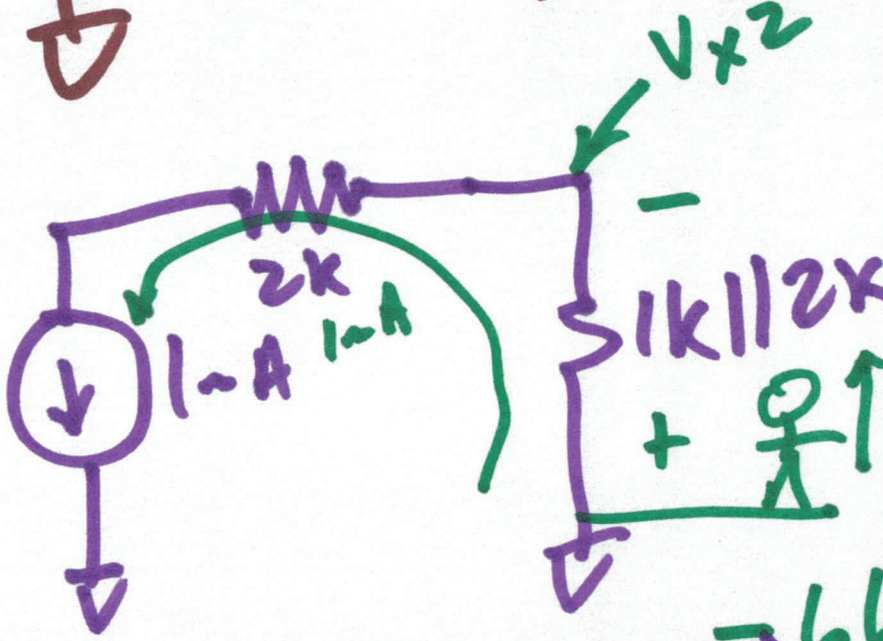
$-1kI = 0$

$V_{x1} = I \cdot 1k$

$I = \frac{-5}{2k+1k}$

6)



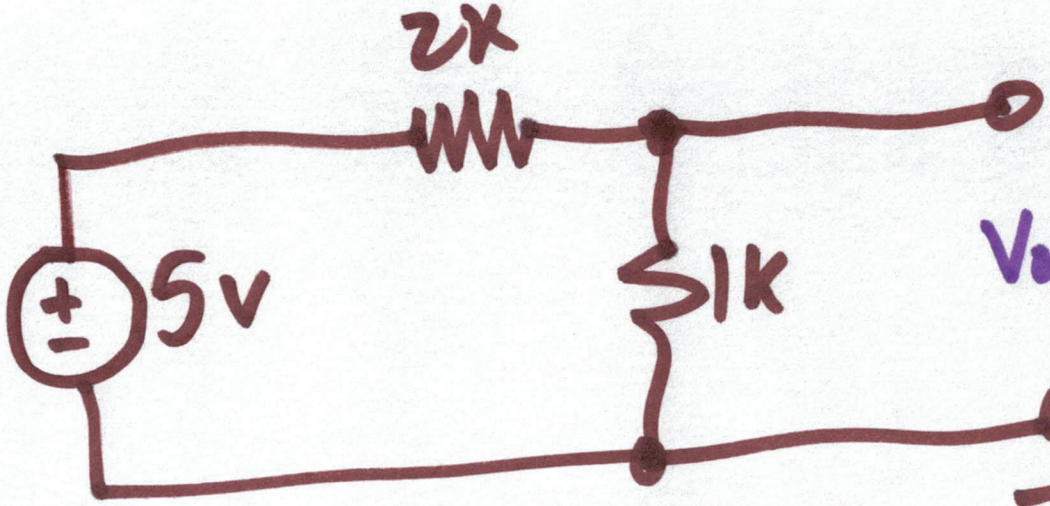


$666 \cdot 1.4 = V_{x2}$

$V_{x2} = -.666V$

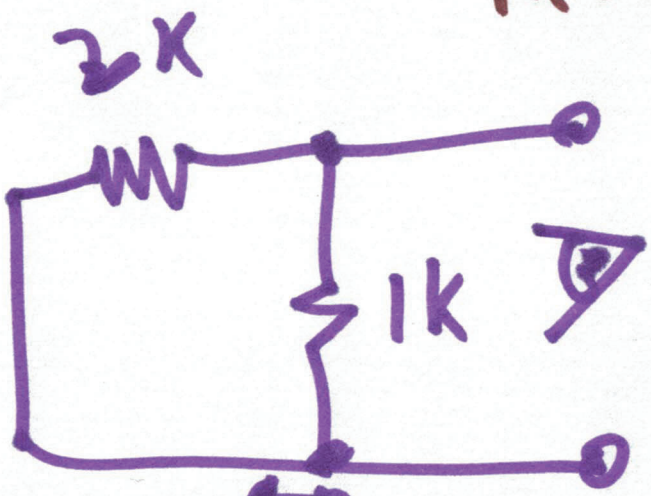
$V_x = -1.667 + (-.667)$

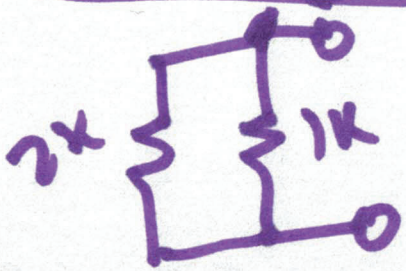
$V_x = -2.333V$



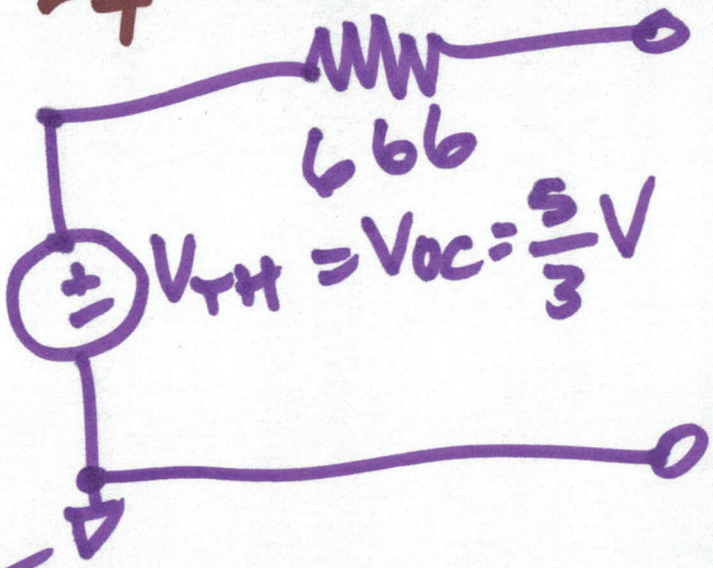
$$V_{oc} = 5 \cdot \frac{1K}{2K + 1K} = \frac{5}{3} V$$

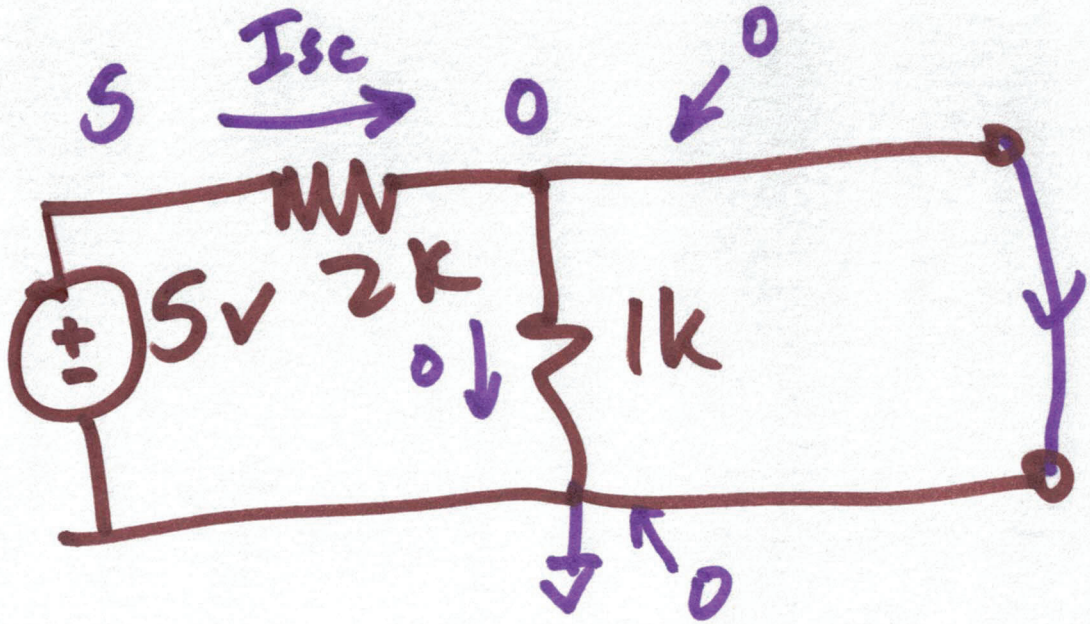
Thevenin Equivalent





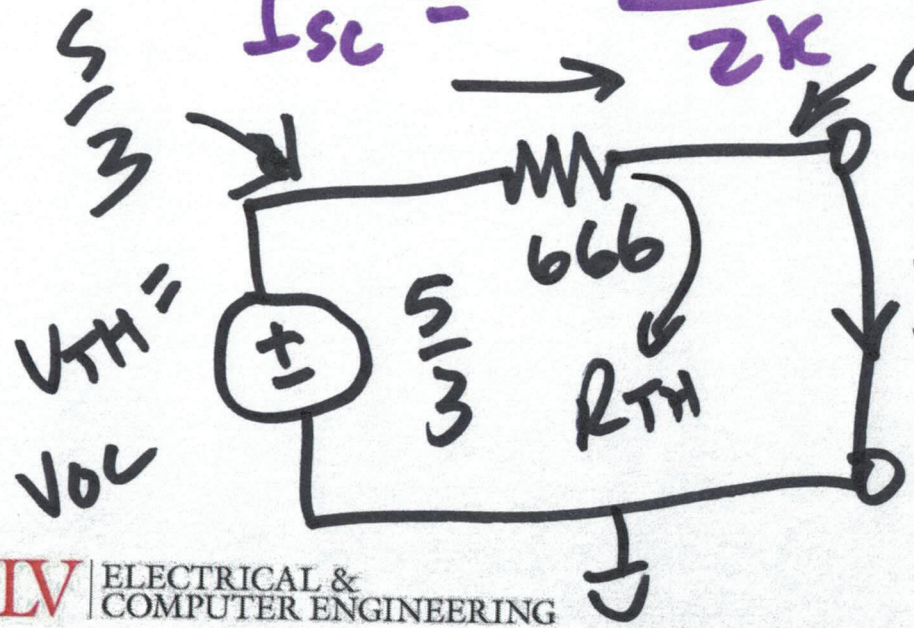
$R_{TH} = 666\,\Omega$





$$I_{SC} = \frac{V_{OC}}{R_{TH}} = \frac{V_{TH}}{R_{TH}}$$

$$I_{SC} = \frac{S-0}{2k} = 2.5mA$$



$$I_{SC} = \frac{\frac{5}{3}}{\frac{2}{3}} = 2.5mA$$

NORTON Equivalent