

# EE 220 Circuits I

Oct. 11, 2017

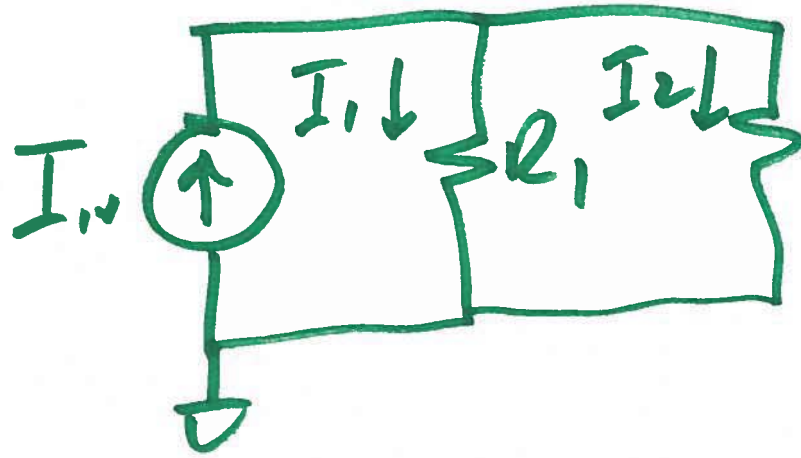
10 ohms 20 ohms Lecture 13



$$\frac{1}{T} = \frac{1}{10} + \frac{1}{20}$$

$$T = \frac{10 \cdot 20}{10 + 20}$$

$$ax^2 + bx + c = 0$$
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



$$I_1 = I_{in} \cdot \frac{R_2}{R_1 + R_2}$$

$$I_2 = I_{in} \cdot \frac{R_1}{R_1 + R_2}$$

$$\frac{V}{R_1} + \frac{V}{R_2} = I_{in}, \quad \underline{V = I_1 R_1 = I_2 R_2}$$

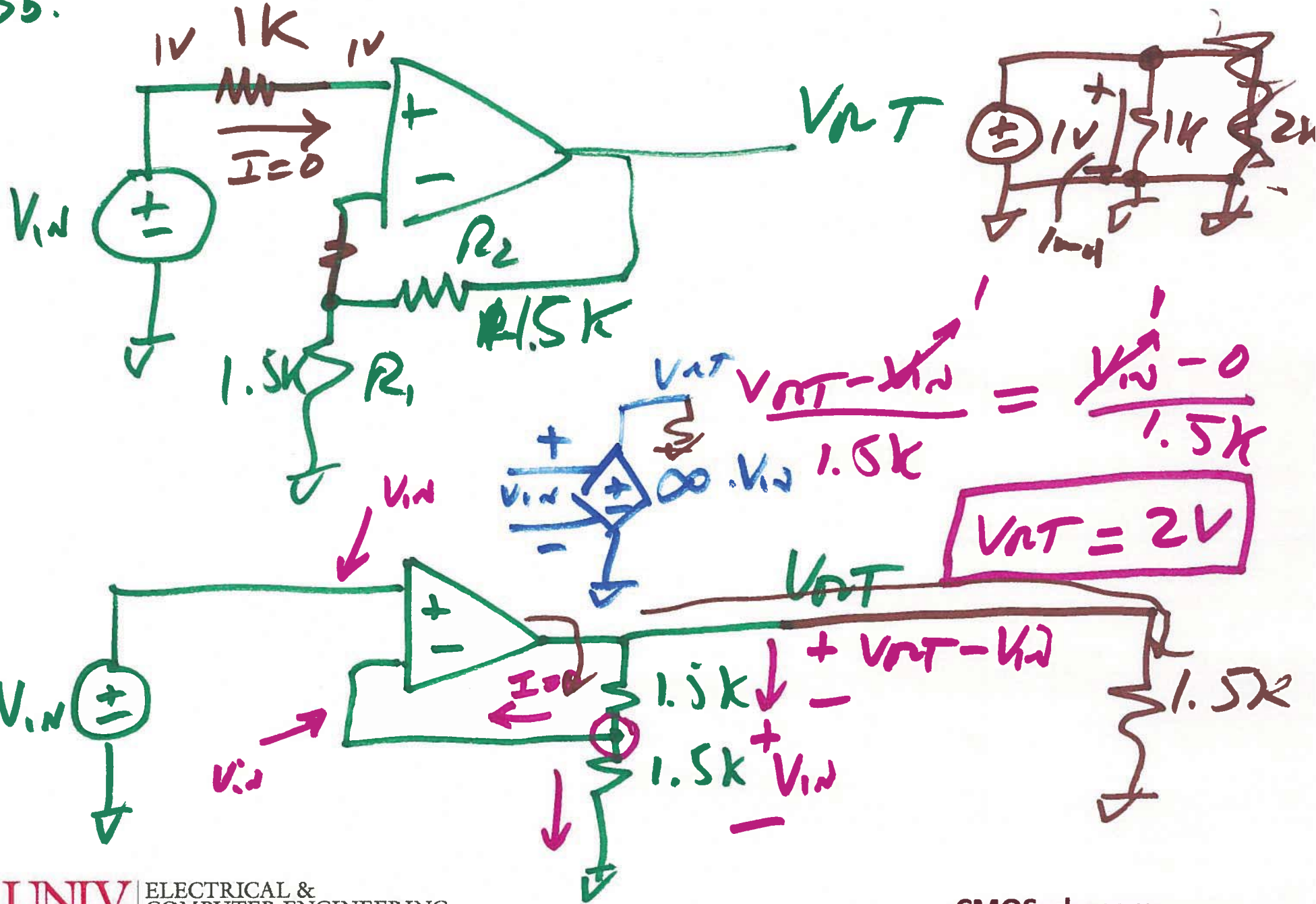
$$I_1 + I_2 = \frac{I_1 R_1}{R_1} + \frac{I_1 R_1}{R_2} = I_{in}$$

$$I_1 \left( \frac{R_1}{R_1 + R_2} + \frac{R_1}{R_2} \right) = I_{in}$$

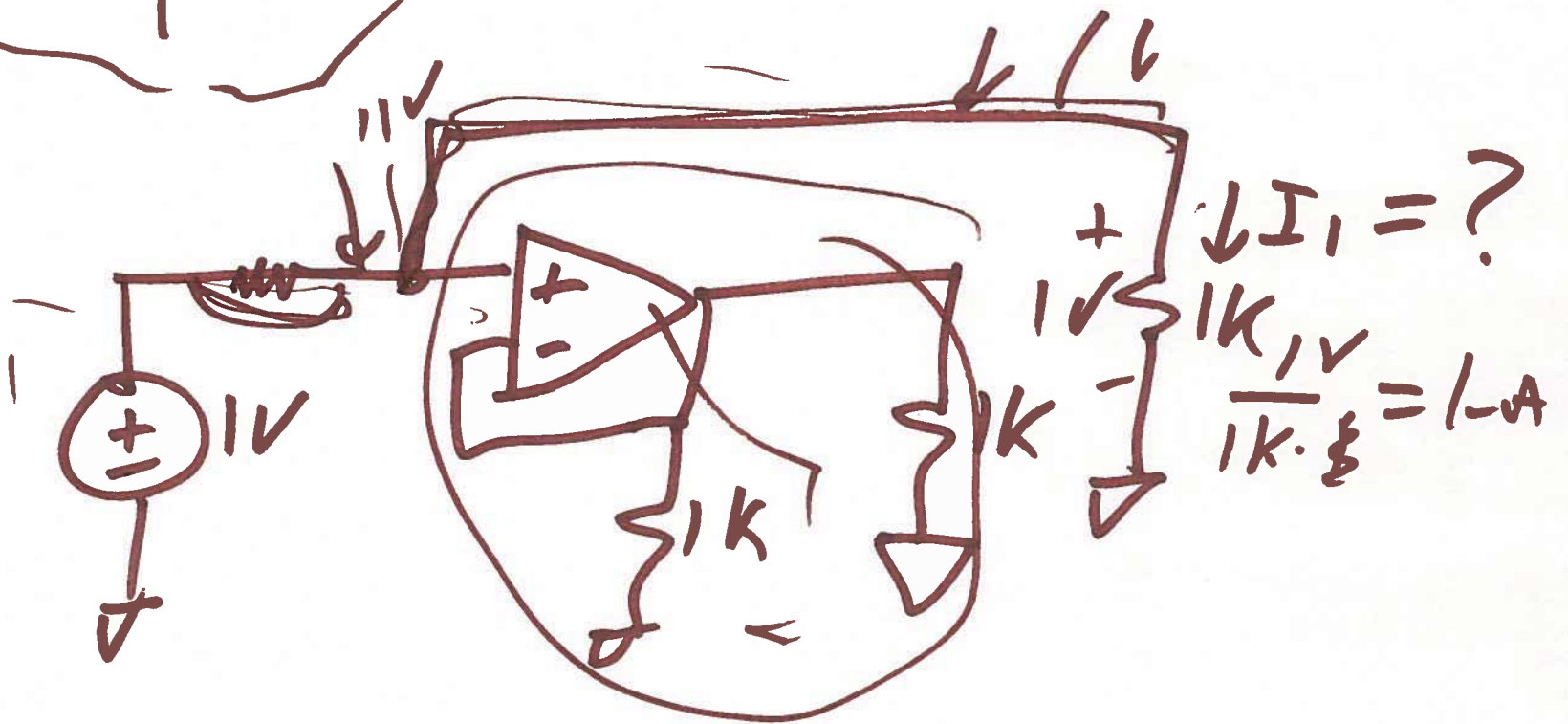
$$I_1 = I_{in} \cdot \frac{R_2}{R_1 + R_2}$$

2)

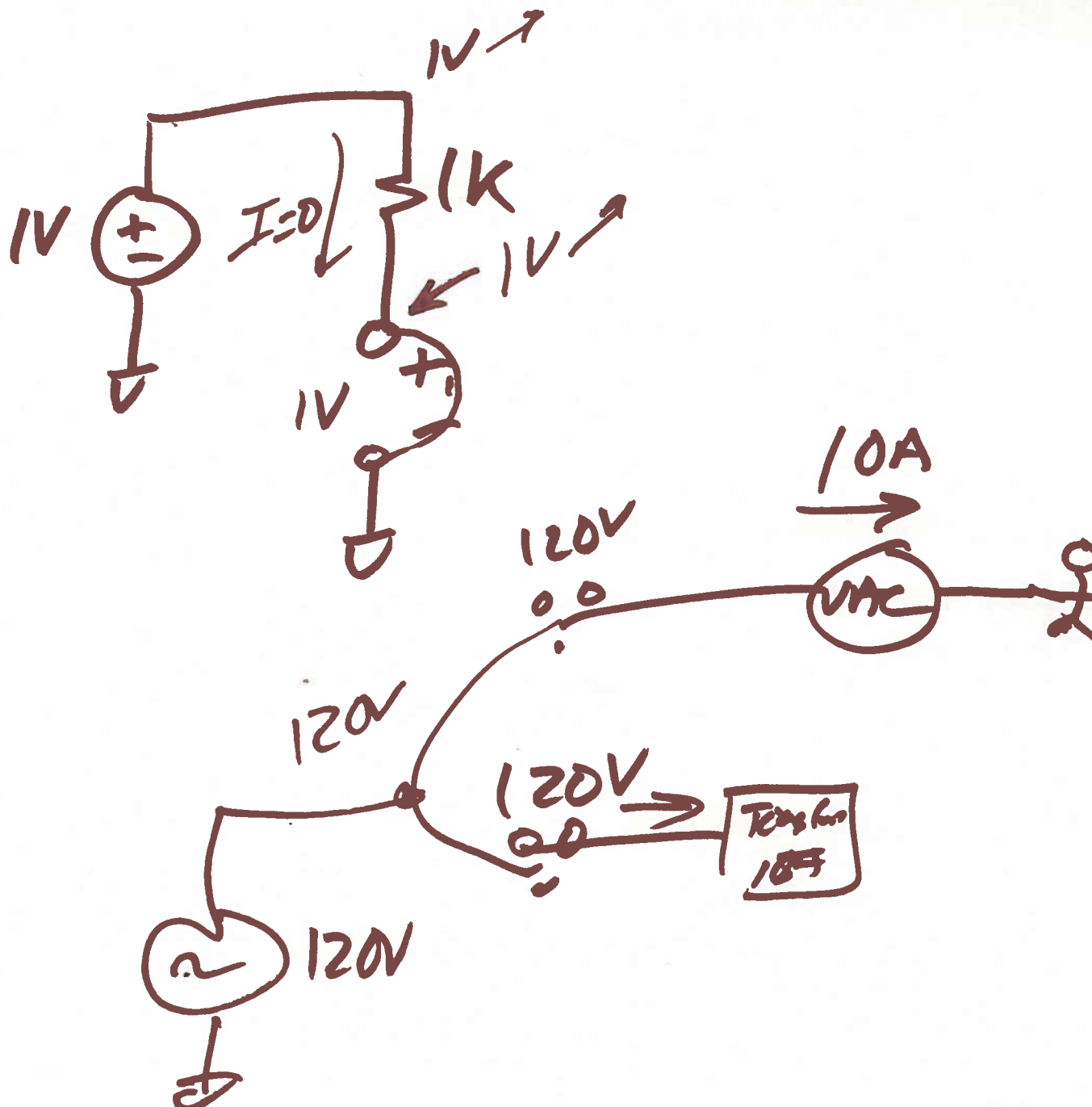
3b.



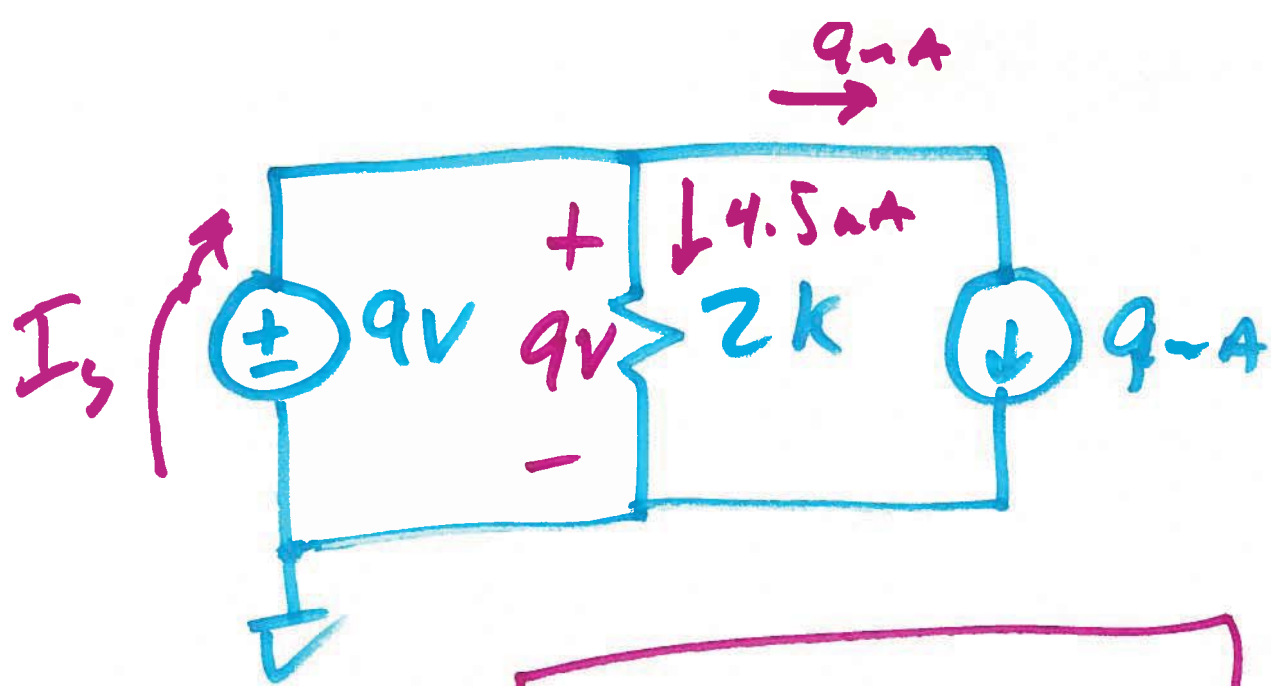
3)



4)

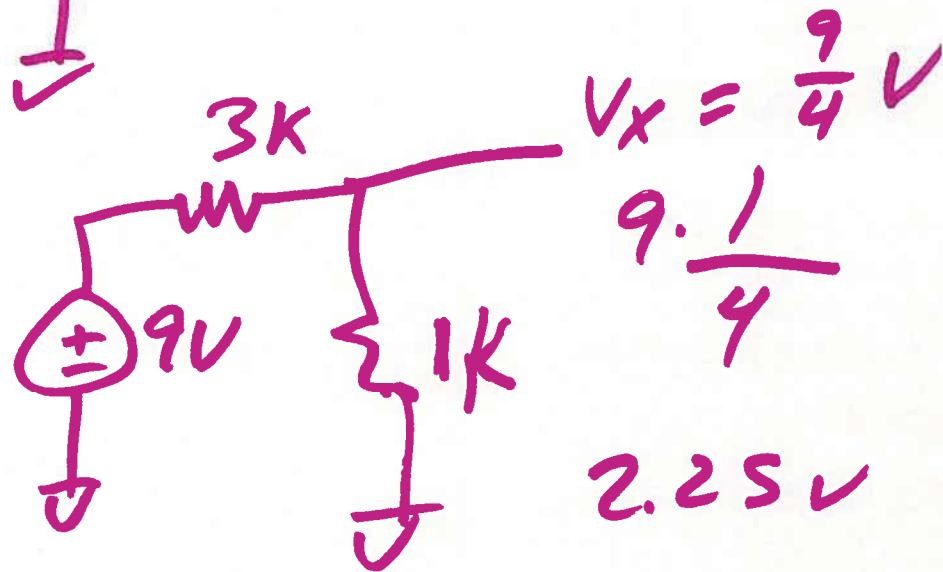
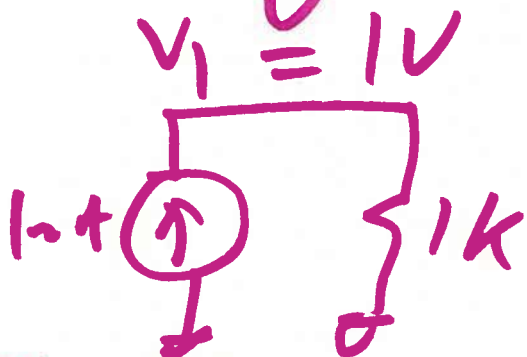
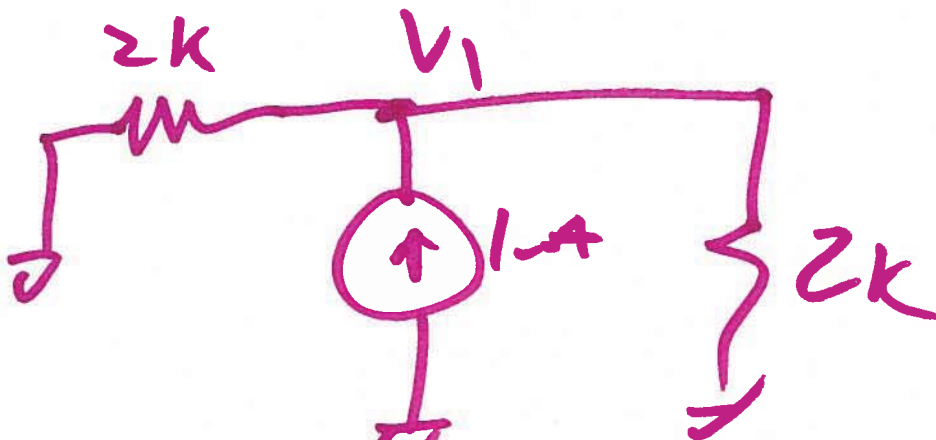
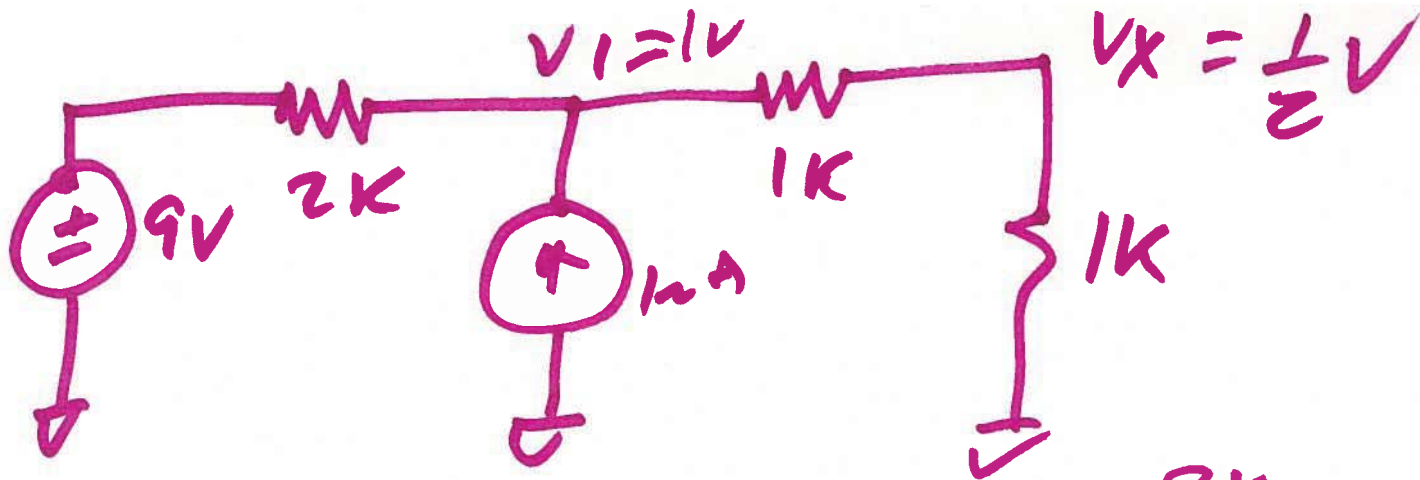


5/4)



$$I_s = 13.5mA \text{ yeah!}$$

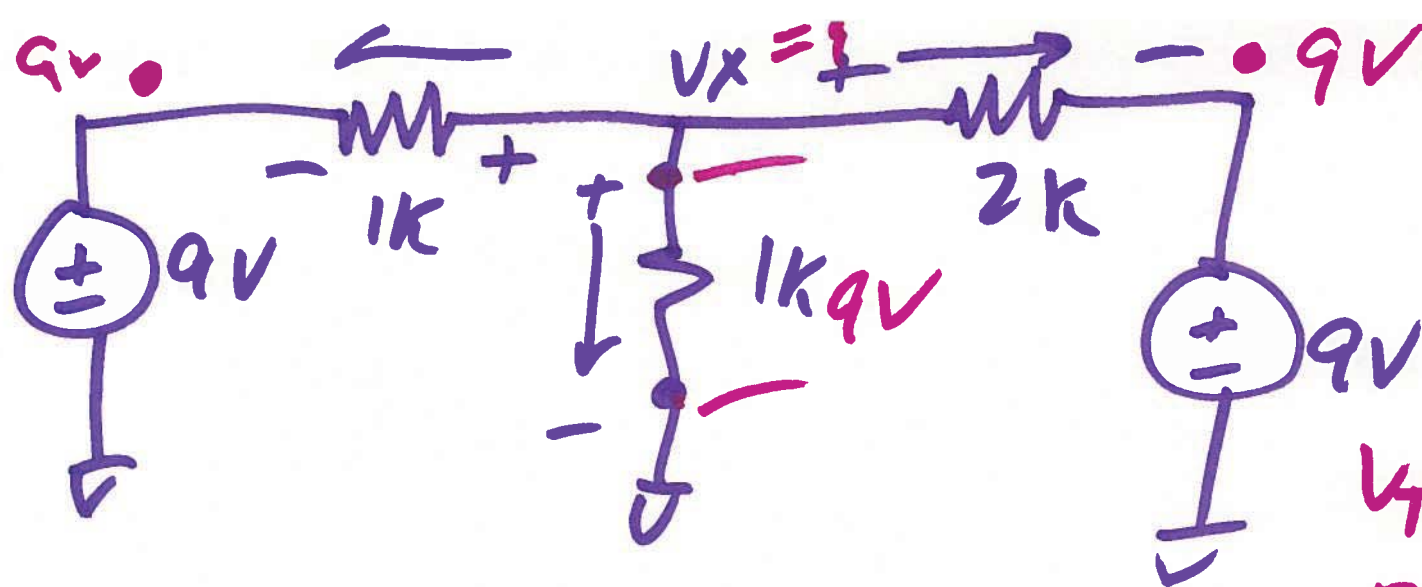
b)



$$V_x = \frac{1}{2} + 2 \frac{1}{4} V$$

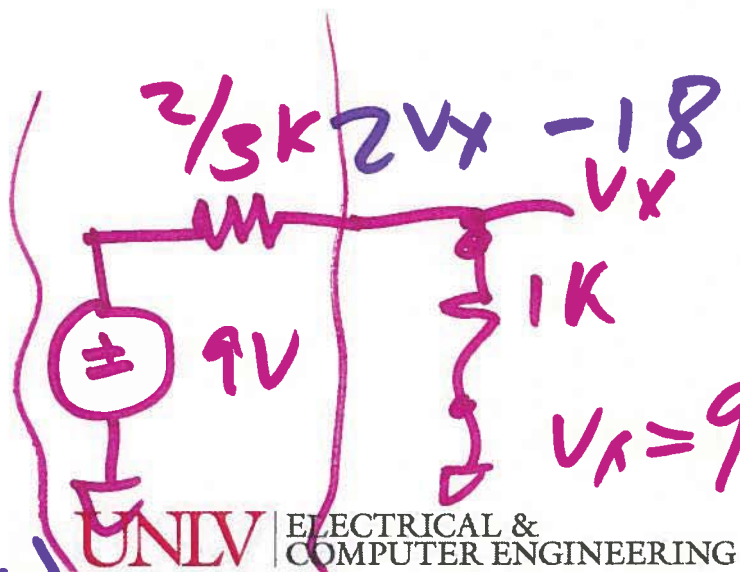
$$= 2.75 V$$

7)



$V_{TH} = 9V$   
 $R_{TH} = 666\Omega$

$$\frac{V_x - 9}{1k} + \frac{V_x}{1k} + \frac{V_x - 9}{2k} = 0$$

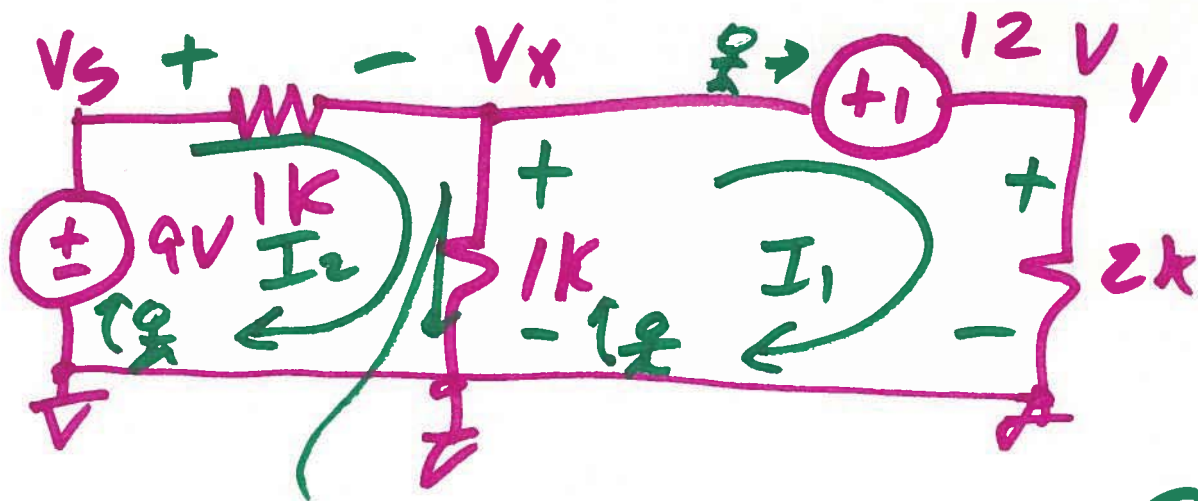


$$\frac{2}{3}k \cdot 2V_x - 18 + 2V_x + V_x - 9 = 0$$

$$5V_x = 27$$

$$V_x = 9 \cdot \frac{1k}{1k + \frac{2}{3}k} = \frac{27}{5} = 5.4V$$





$$V_x = 6V$$

$$(3 - (-3)) / 1k$$

$$V_x = (I_2 - I_1) 1k$$

$$I_2 - I_1$$

$$2I_2 - 9A = I_1$$

$$-9A + I_2 + I_2 = I_1$$

$$9 - 1k \cdot I_2 - 1k(I_2 - I_1) = 0$$

$$I_1 = -3mA$$

$$1k(I_2 - I_1) - 12 - 2k \cdot I_1 = 0$$

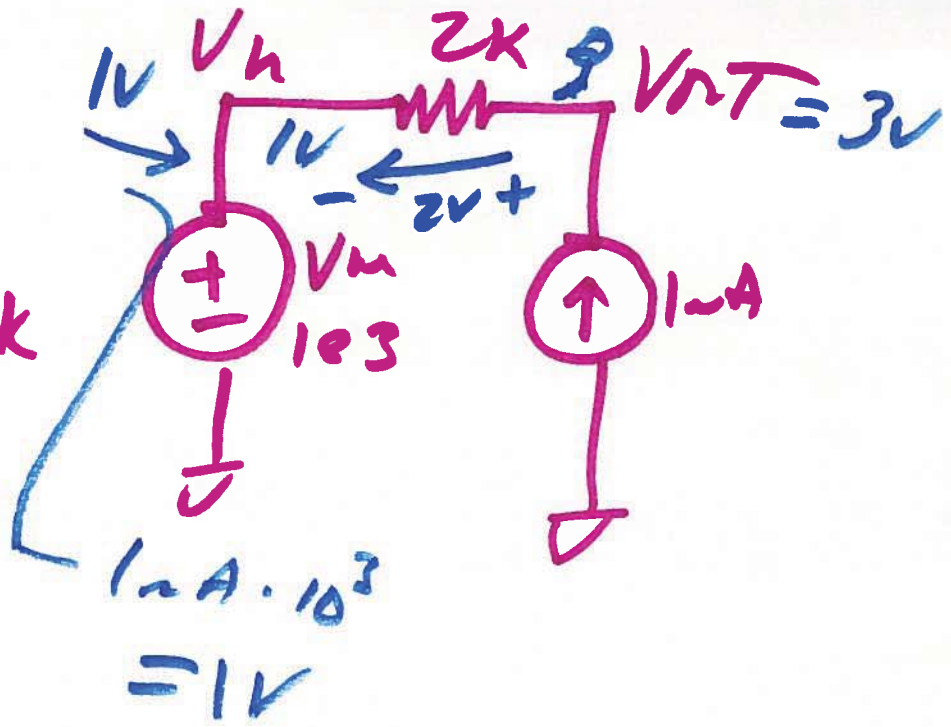
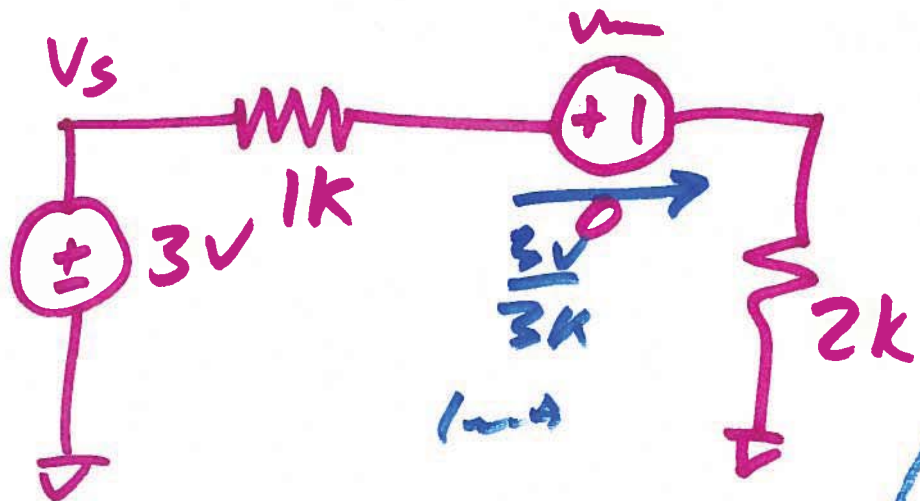
$$I_2 = 3mA$$

$$1k(I_2 - 2I_2 + 9A) - 12 - 2k(2I_2 - 9A) = 0$$

$$-I_2 + 9A - 12A - 4I_2 + 18A = 0$$

$$5I_2 = 15mA$$

9)



$V_{Th} = 3V$

10)