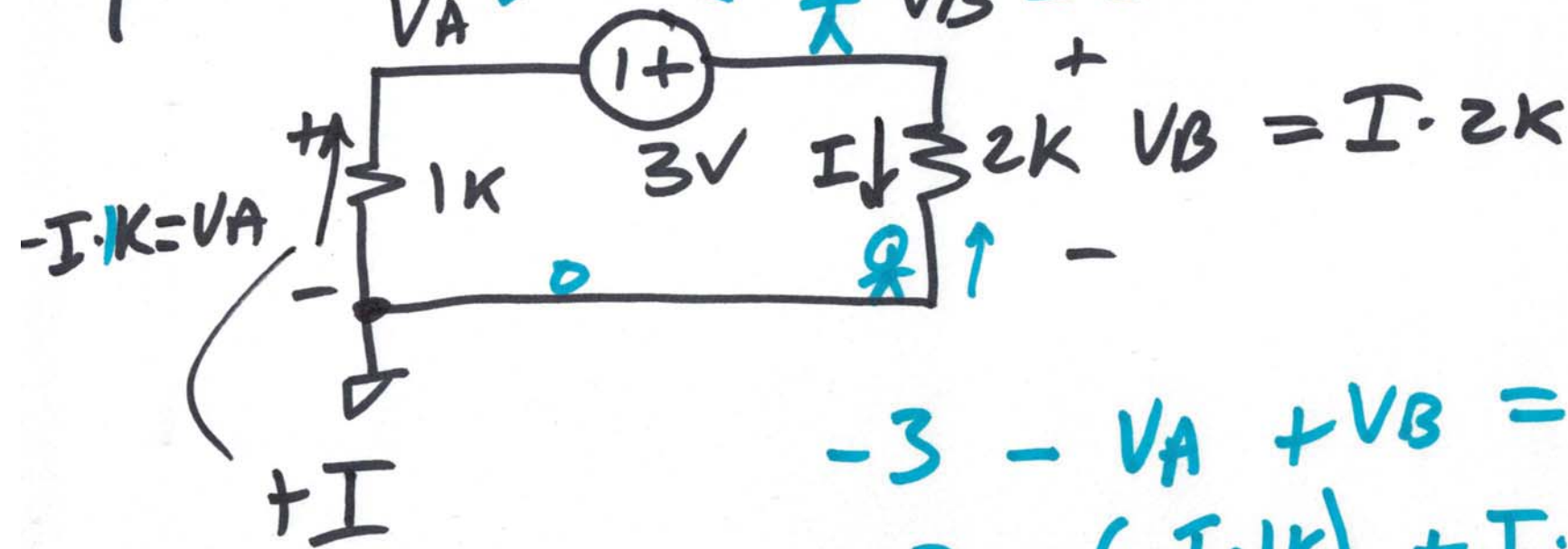


$v = IR$  EE 221 Circuits II

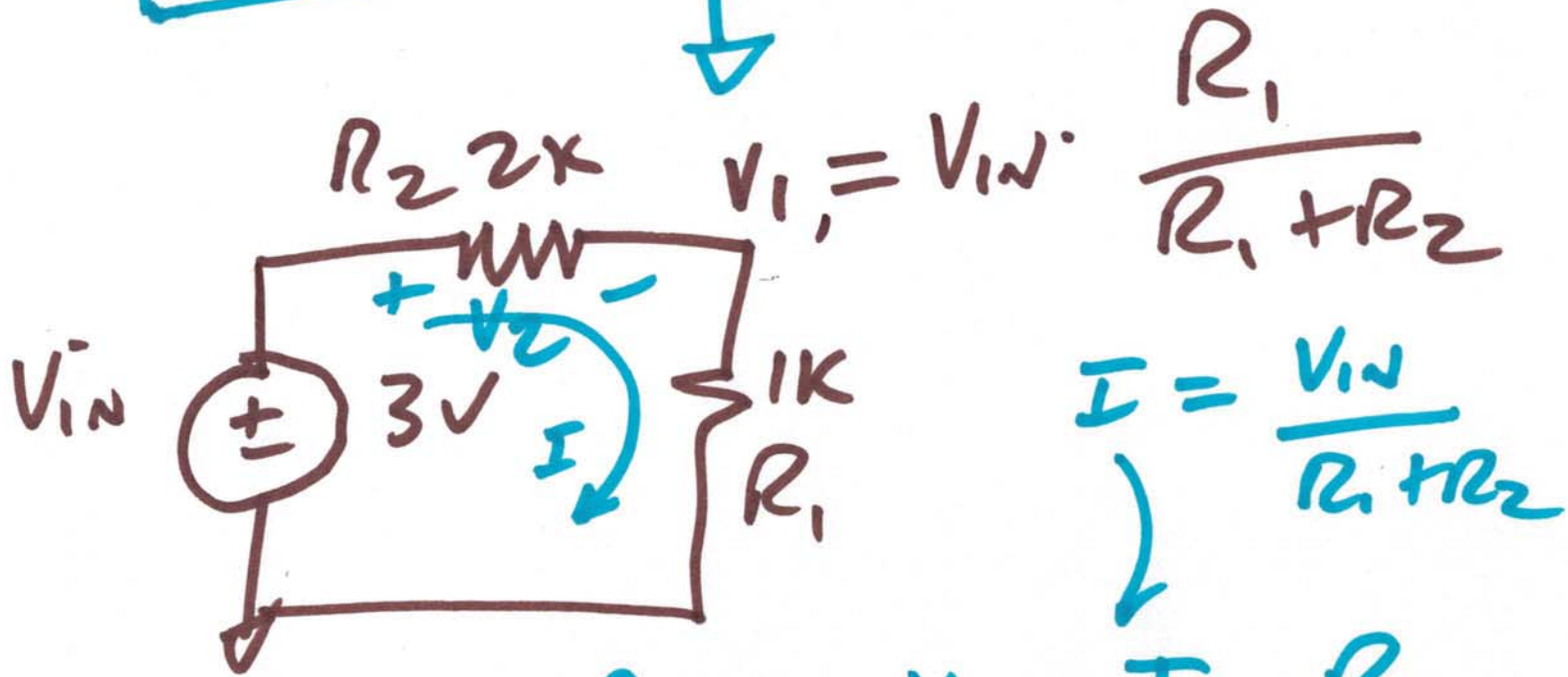
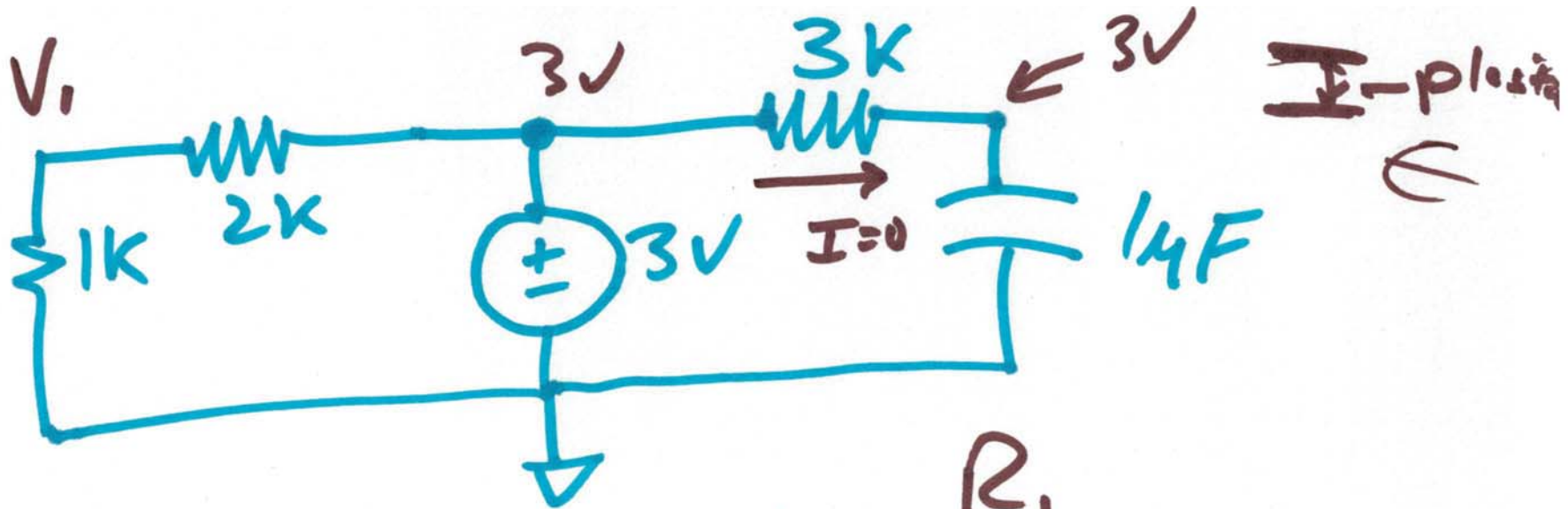
JAN. 22, 2020

$v = -I \cdot R$  Lecture 1  
 $V_A = -1V$   $V_B = 2V$   $V_B - V_A = 3V$



$$\begin{aligned} -3 - V_A + V_B &= 0 \\ -3 - (-I \cdot 1k) + I \cdot 2k &= 0 \\ I &= \frac{3}{3k} = 1\mu A \end{aligned}$$

1)

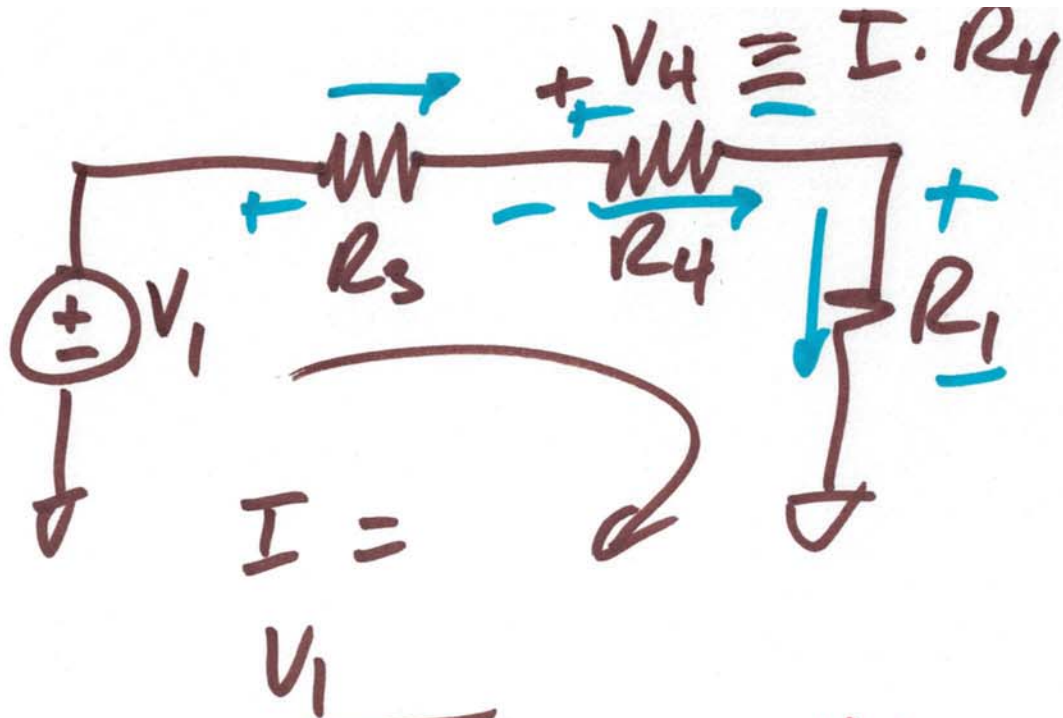


$$V_2 = I \cdot R_2$$

$$V_1 = I \cdot R_1$$

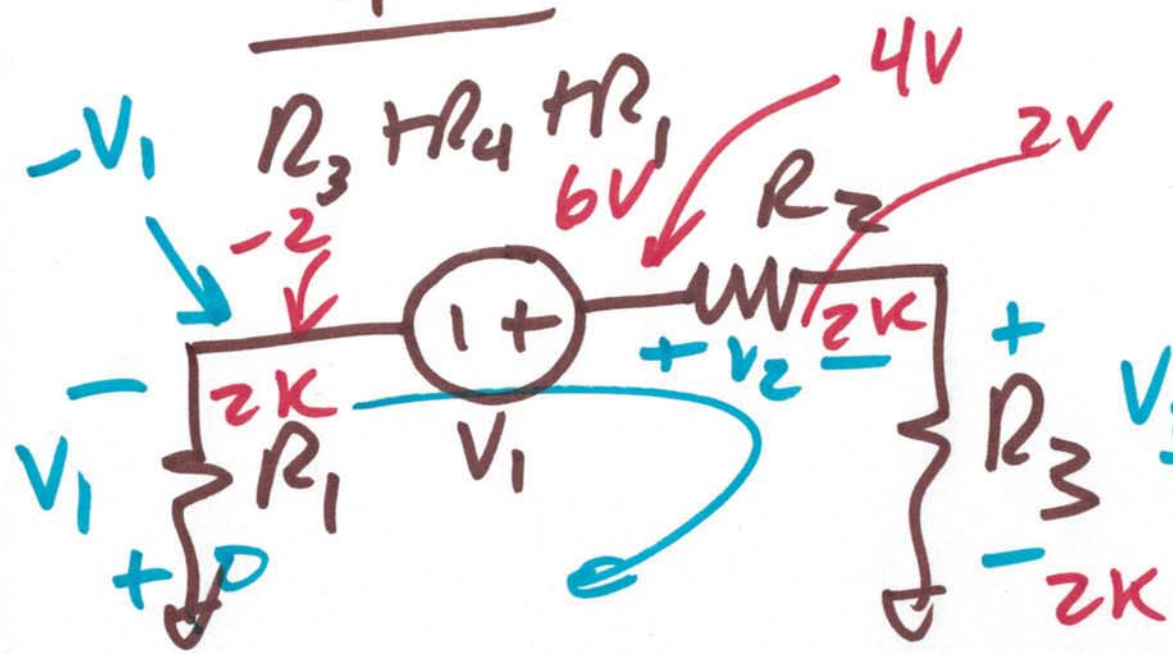
$$V_1 = V_{in} \cdot \frac{R_1}{R_1 + R_2}$$

2)



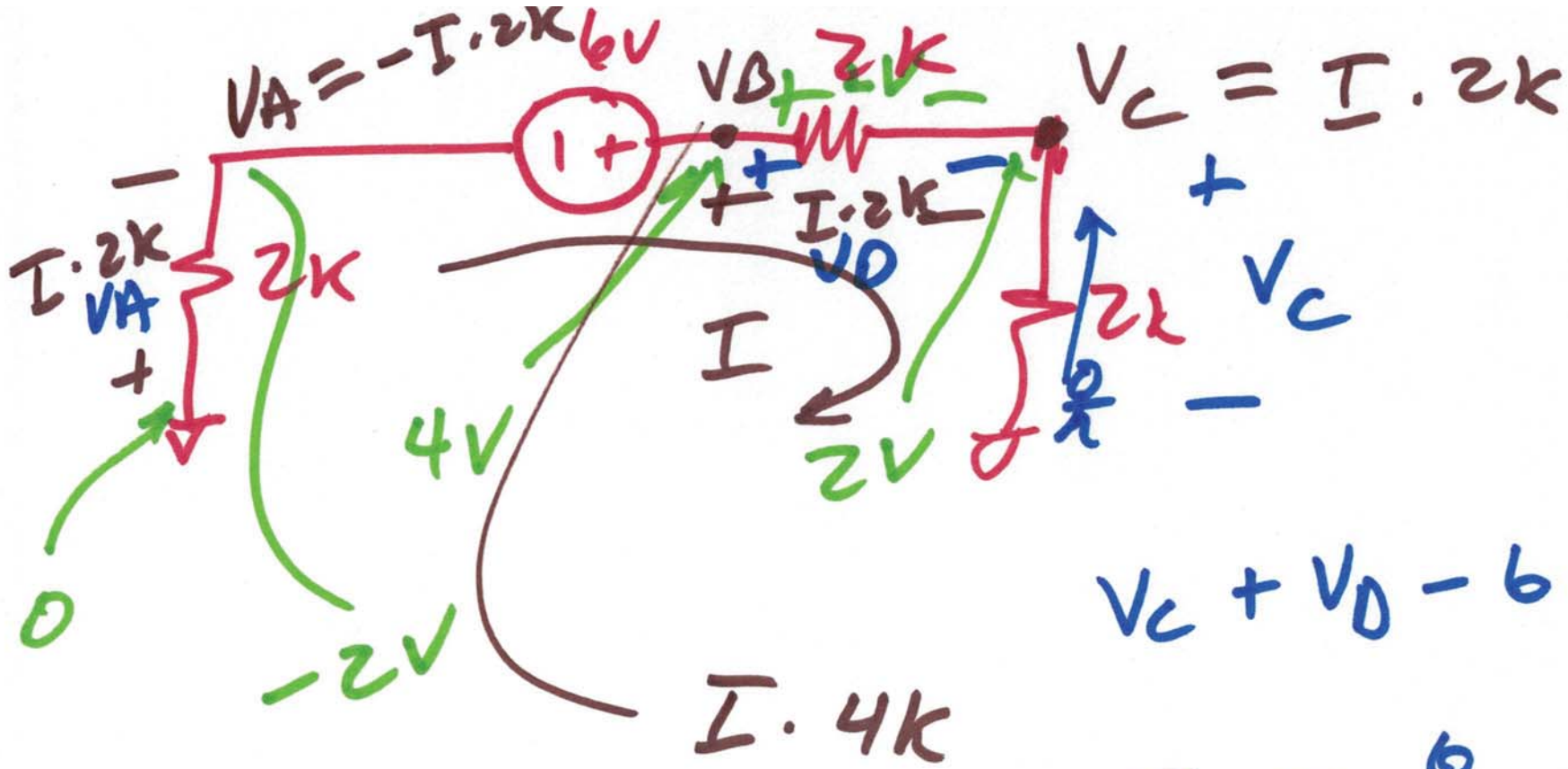
$$V_4 = V_1 \cdot \frac{R_4}{R_3 + R_4 + R_1}$$

$$I = \frac{V_1}{R_1 + R_2 + R_3}$$



$$V_3 = V_1 \cdot \frac{R_3}{R_1 + R_2 + R_3} = 2V$$

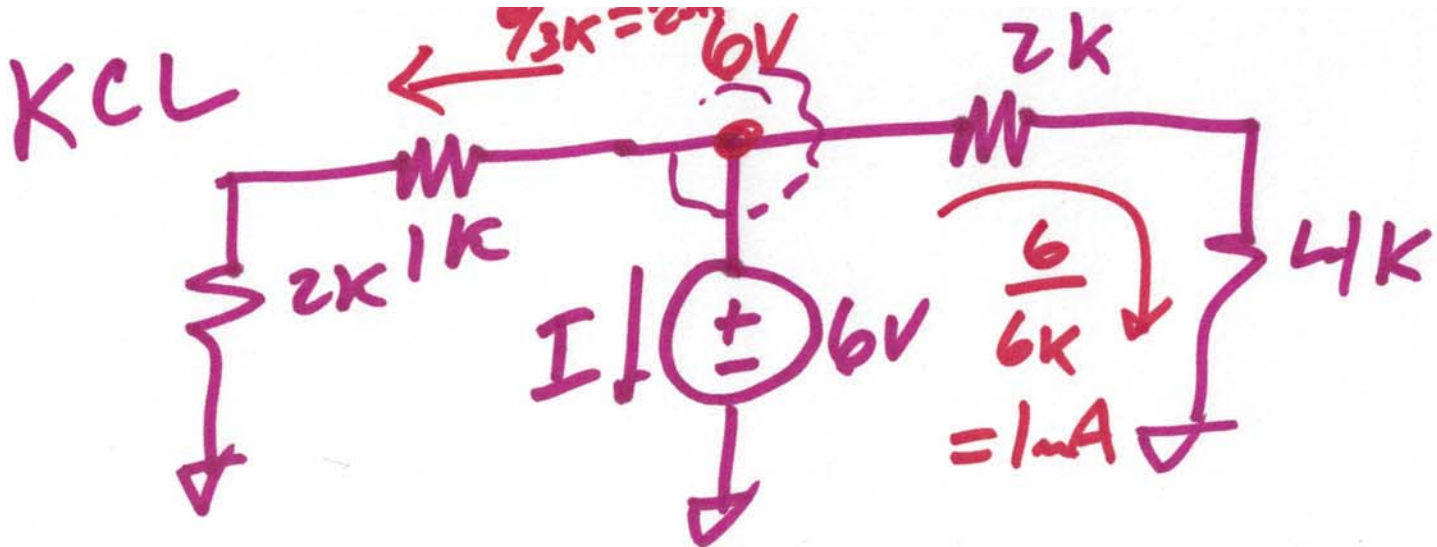
3)



$$V_C + V_D - 6 + V_A = 0$$

$$I = \frac{6}{6k} = 1\mu A$$

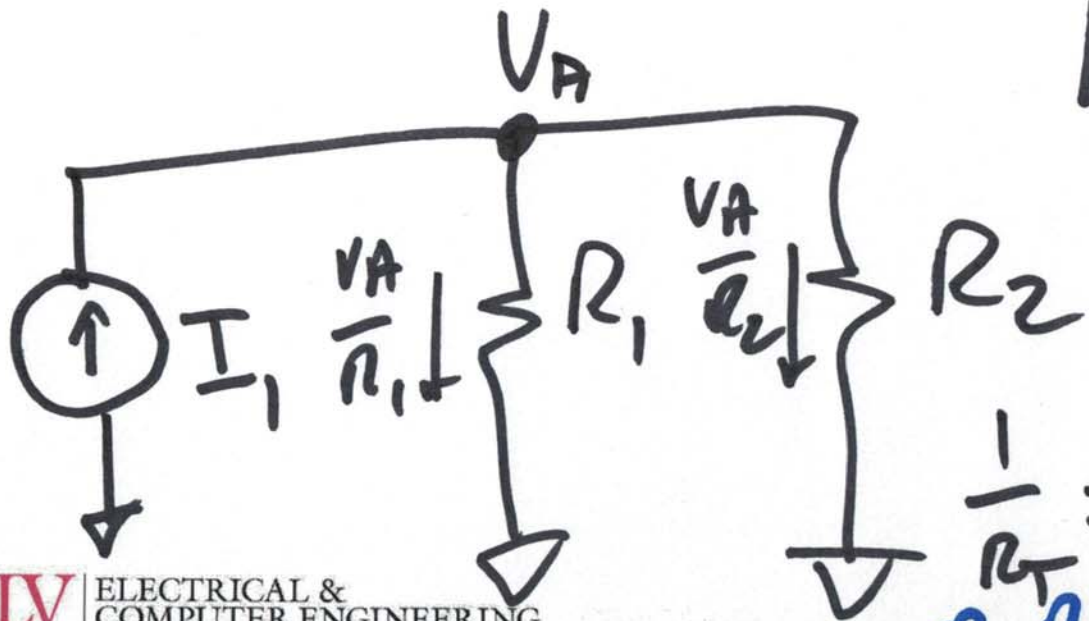
4)



$$2\mu A + I + 1\mu A = 0$$

$$I = ?$$

$$I = -3\mu A$$



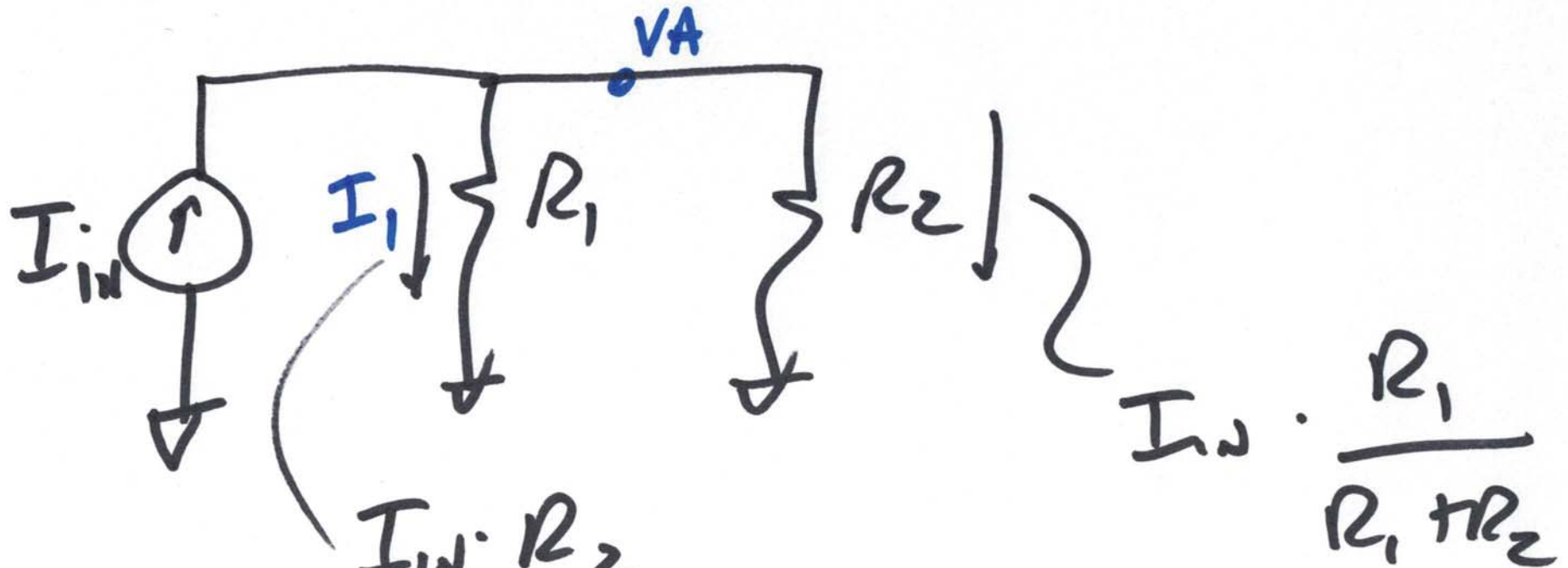
$$I_1 = \frac{V_A}{R_1} + \frac{V_A}{R_2}$$

$$\frac{1}{R_T} = \frac{I_1}{V_A} = \frac{1}{R_1} + \frac{1}{R_2}$$

$$R_T = \frac{R_1 R_2}{R_1 + R_2}$$

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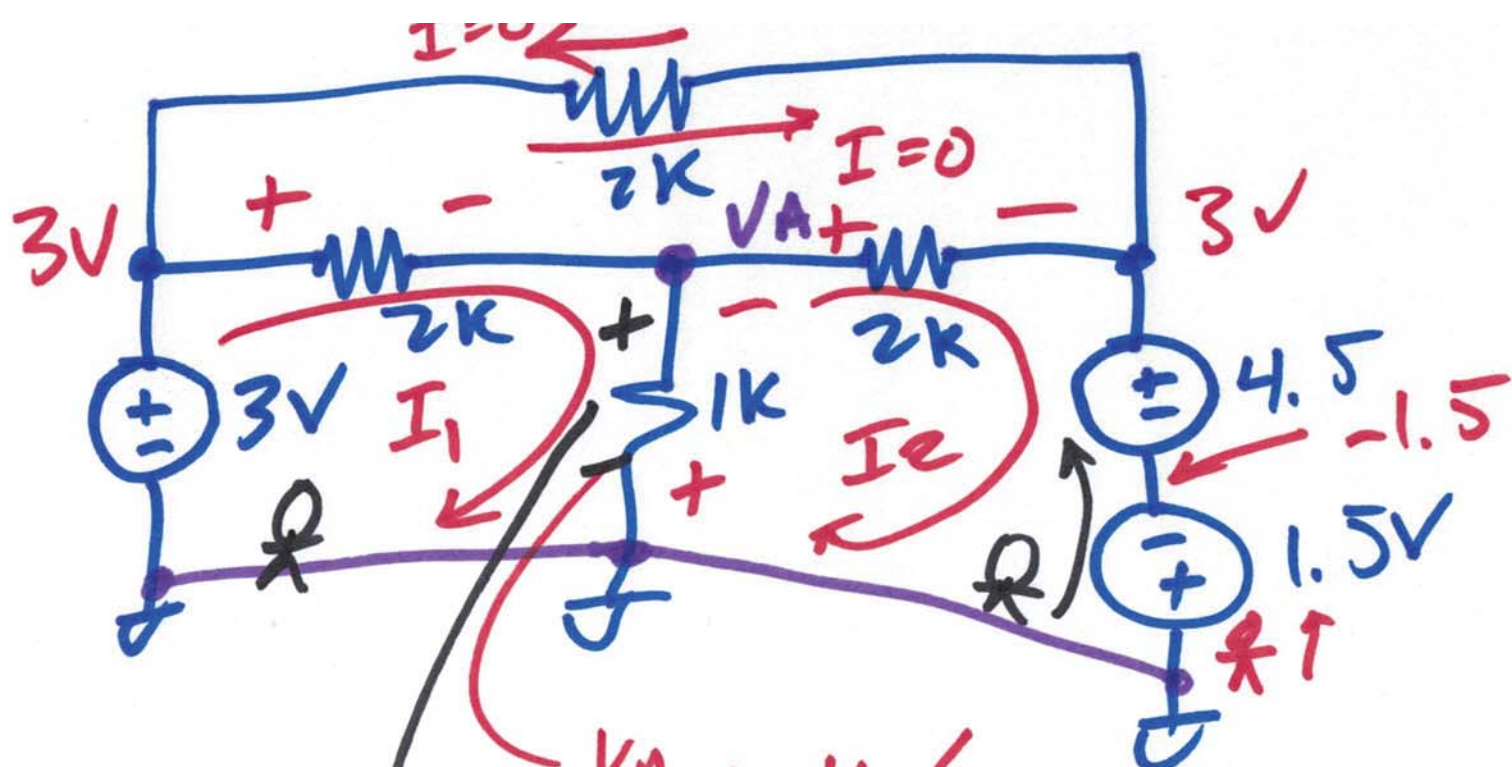
# Current divider



$$\frac{1}{T} = \frac{1}{10} + \frac{1}{20} \frac{R_1 + R_2}{R_1 + R_2}$$

$$V_A = I_{in} \cdot R_T$$

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



$$-V_A = 1K(I_2 - I_1)$$

$$V_A = 1K(I_1 - I_2)$$

$$3V - 2I_1 - 1K(I_1 - I_2) = 0$$

$$-1.5V + 4.5 + 2KI_2 - 1K(I_1 - I_2) = 0$$

b)