

EE 220

Circuits 1

Sept. 12, 2018

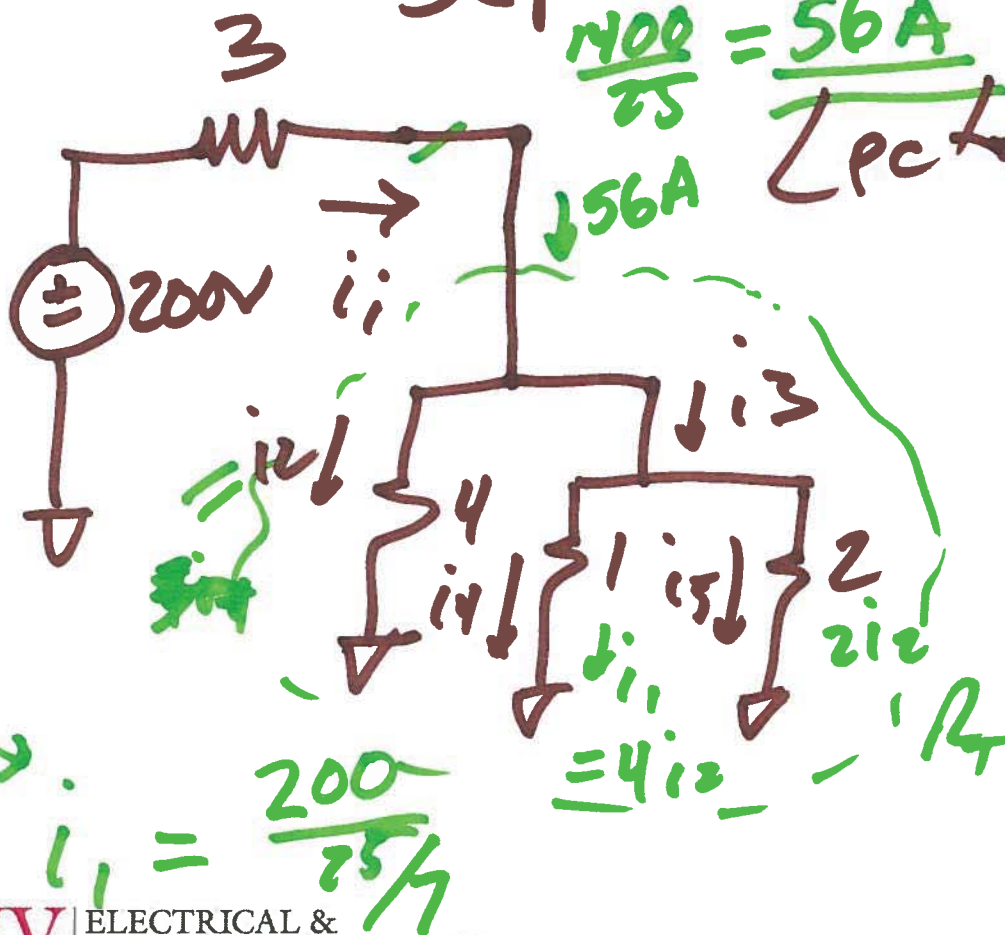
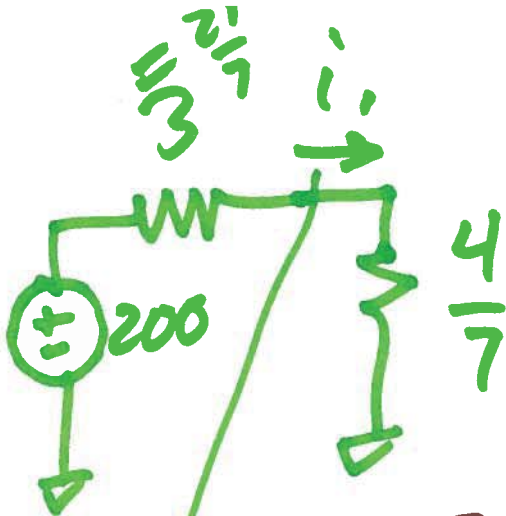
$$\frac{100}{25} = 56A$$

Lecture 5 1 + .5 + .25

$$\frac{1}{R_T} = \frac{1}{1} + \frac{1}{2} + \frac{1}{4}$$

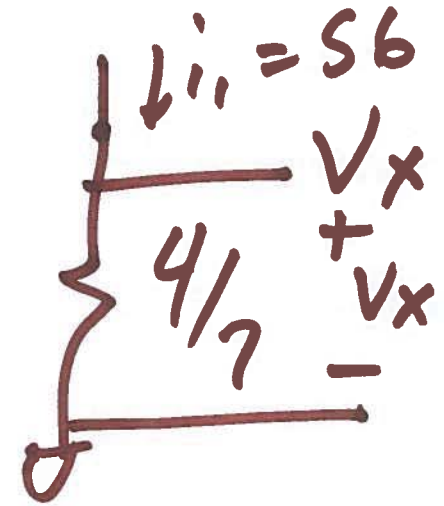
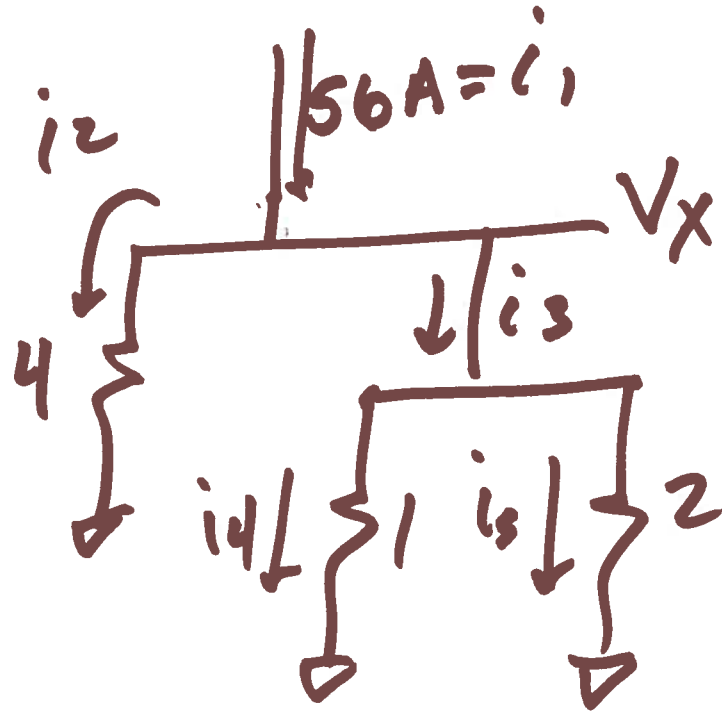
$$\frac{1}{R_T} = 1.75 = \frac{7}{4}$$

$$R_T = \frac{4}{7}$$



1)

$$R_T = \frac{4}{7} \Omega$$



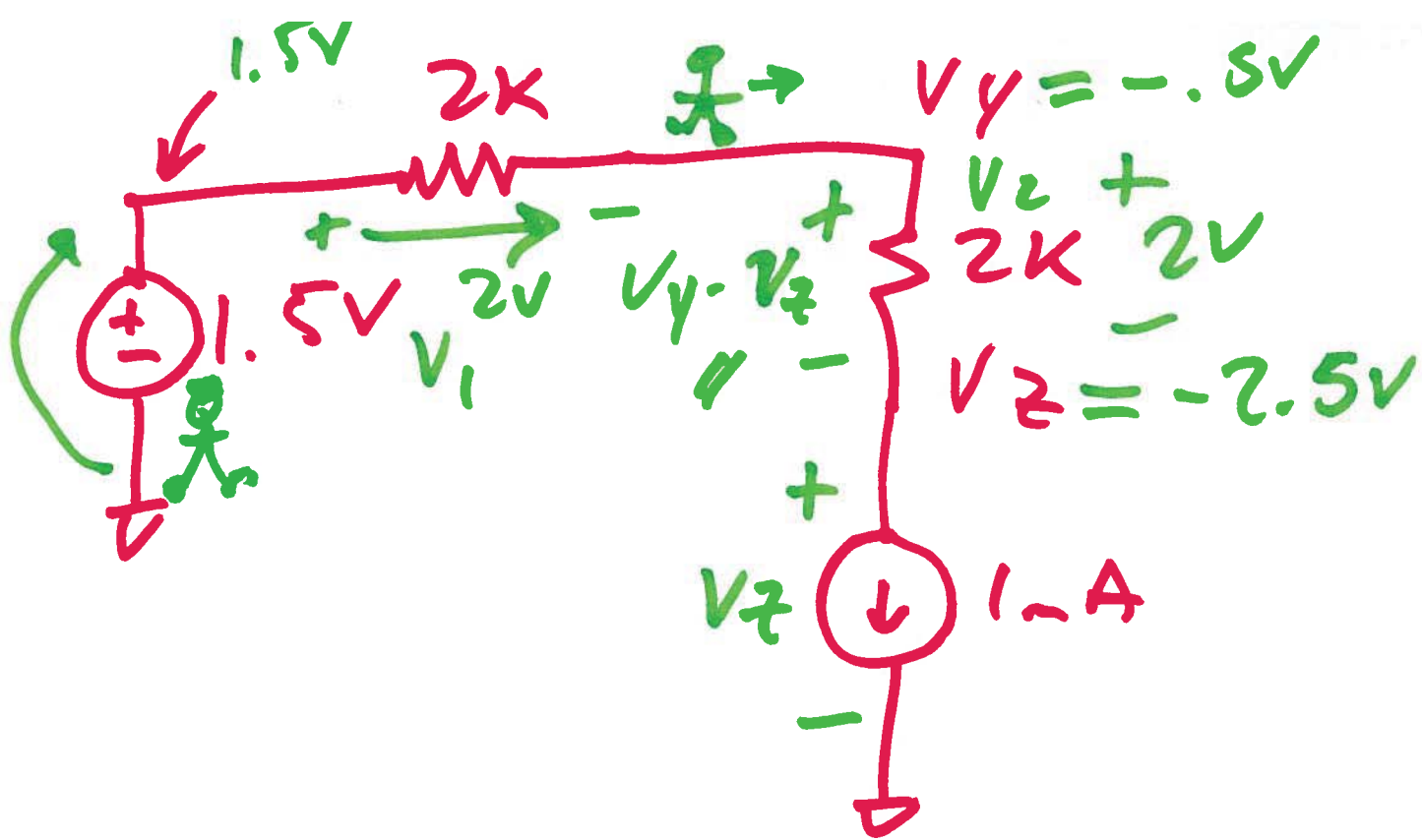
$$i_2 = \frac{V_x}{4}$$

$$i_4 = \frac{V_x}{1}$$

$$i_5 = \frac{V_x}{2}$$

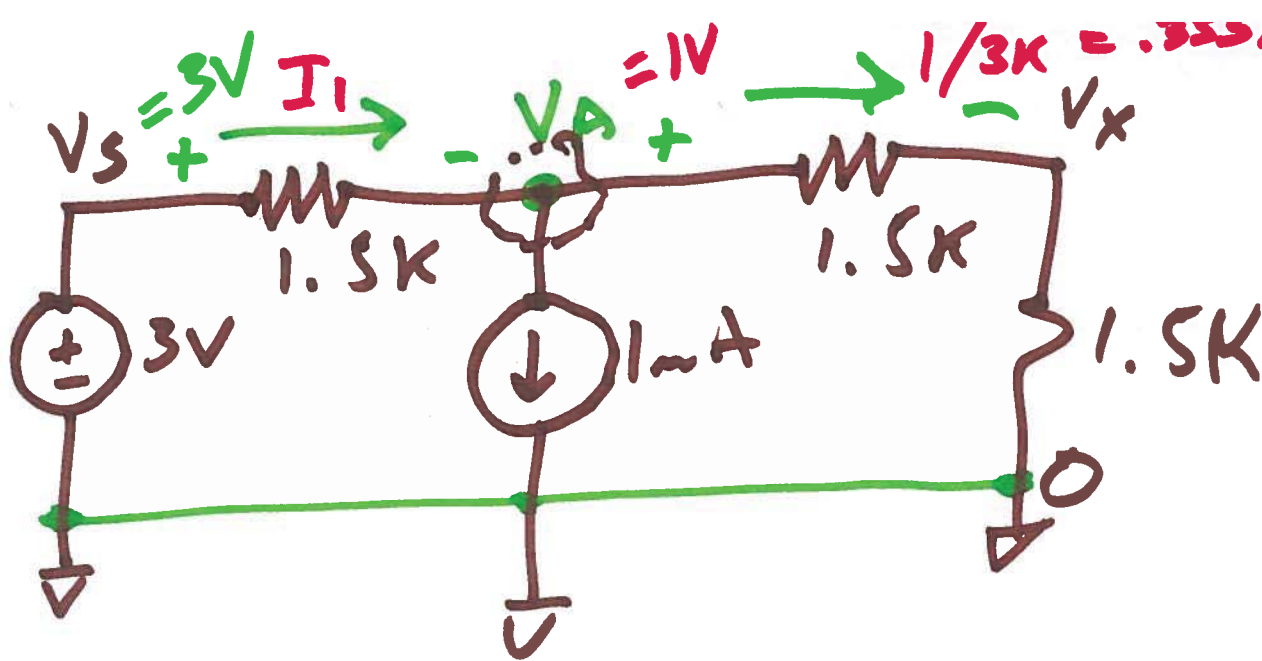
$$i_3 = i_4 + i_5 = V_x(1.5)$$

$$V_x = 56 \cdot \frac{4}{7}$$



$$1.5 - V_1 - V_2 - V_3 = 0$$

$$I \downarrow \left\{ \begin{array}{l} + \\ - \end{array} \right. R V = I \cdot R$$



$$\frac{V_S - V_A}{1.5k} = 1mA + \frac{V_A - V_X}{1.5k}$$

$$\frac{V_A - 0}{3k}$$

$$V_X = \frac{V_A}{2}$$

$$\frac{3 - V_A}{1.5k} = 1mA + \frac{V_A - 0}{3k}$$

$$I_1 = \frac{3 - 1}{1.5k} = \frac{2}{1.5} \mu A$$

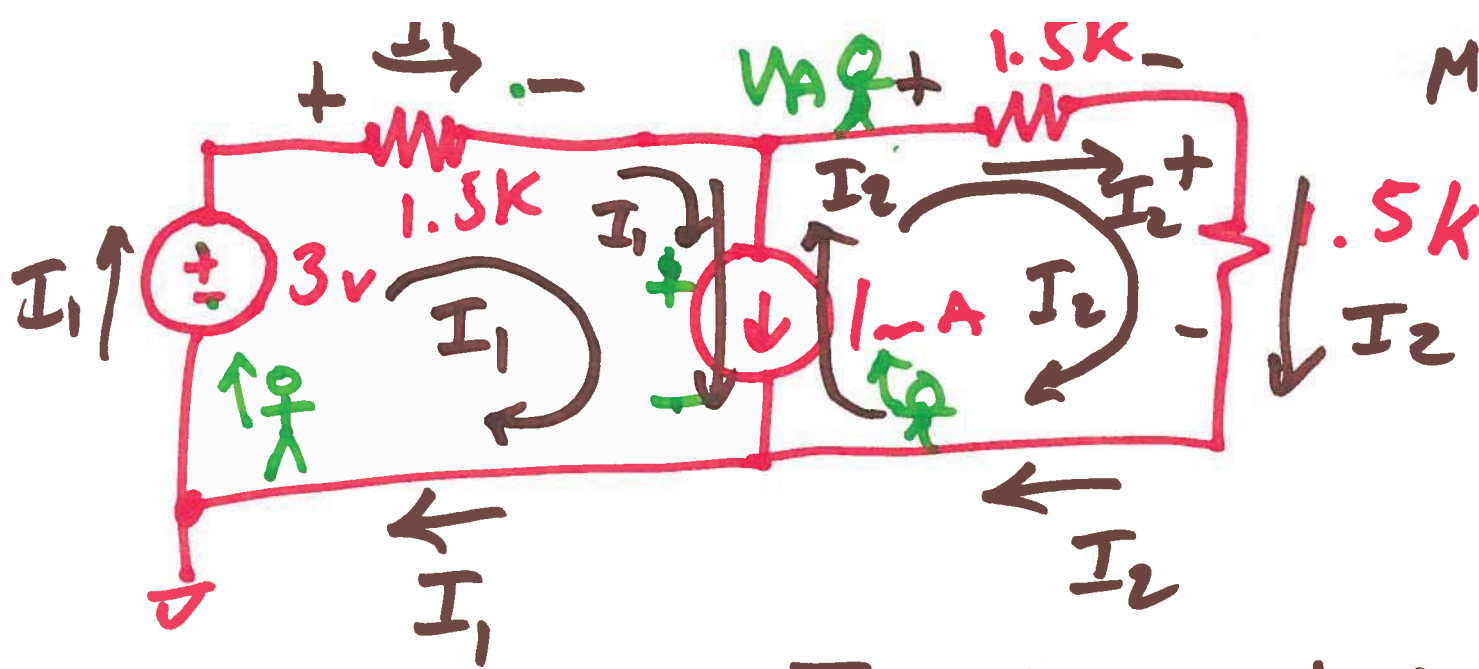
$$6 - 2V_A = \cancel{3} + V_A$$

$$3V = 3V_A$$

$$V_A = 1V$$

$$V_X = \frac{1}{2}V$$

MESH ANALYSIS



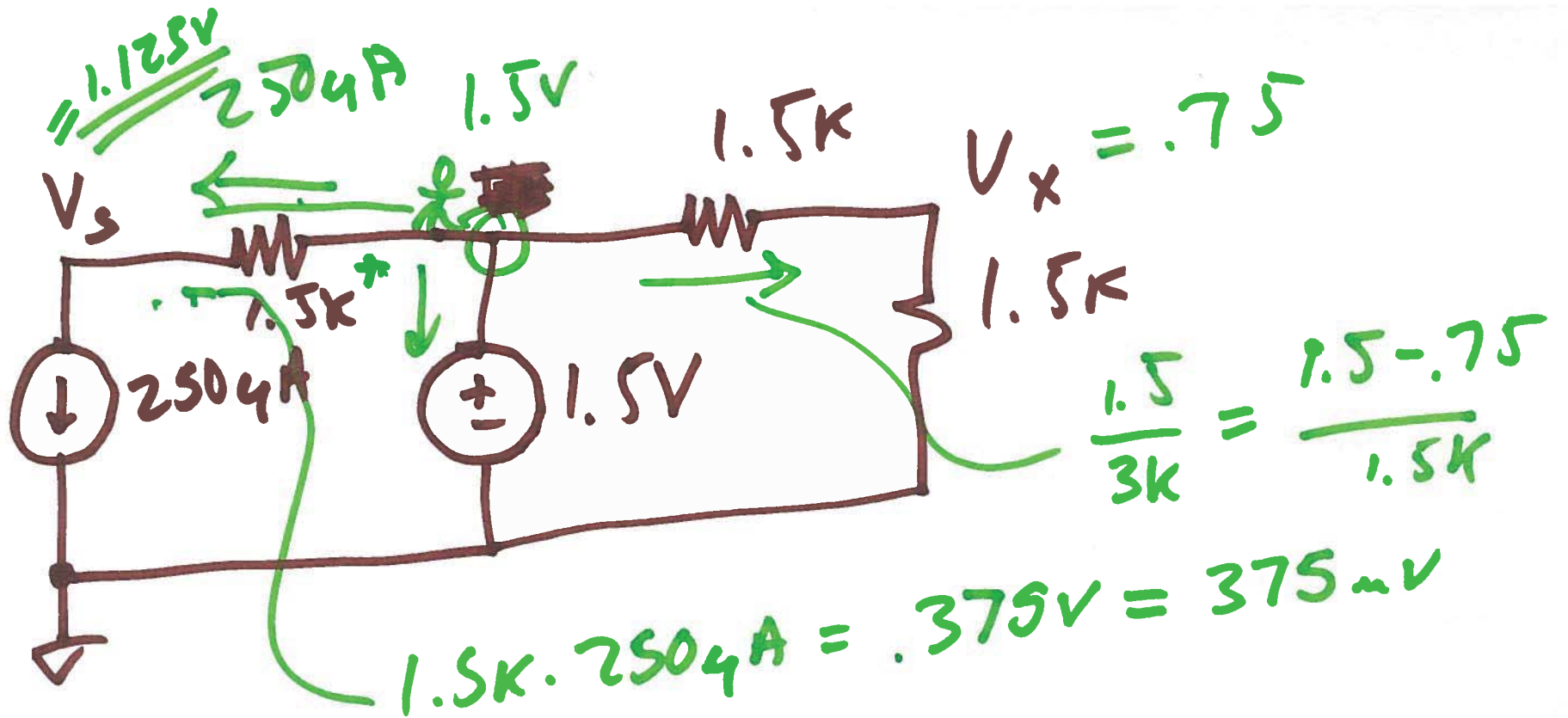
$$I_1 - I_2 = 1 \text{ mA} \quad (1)$$

KVL Loop #1

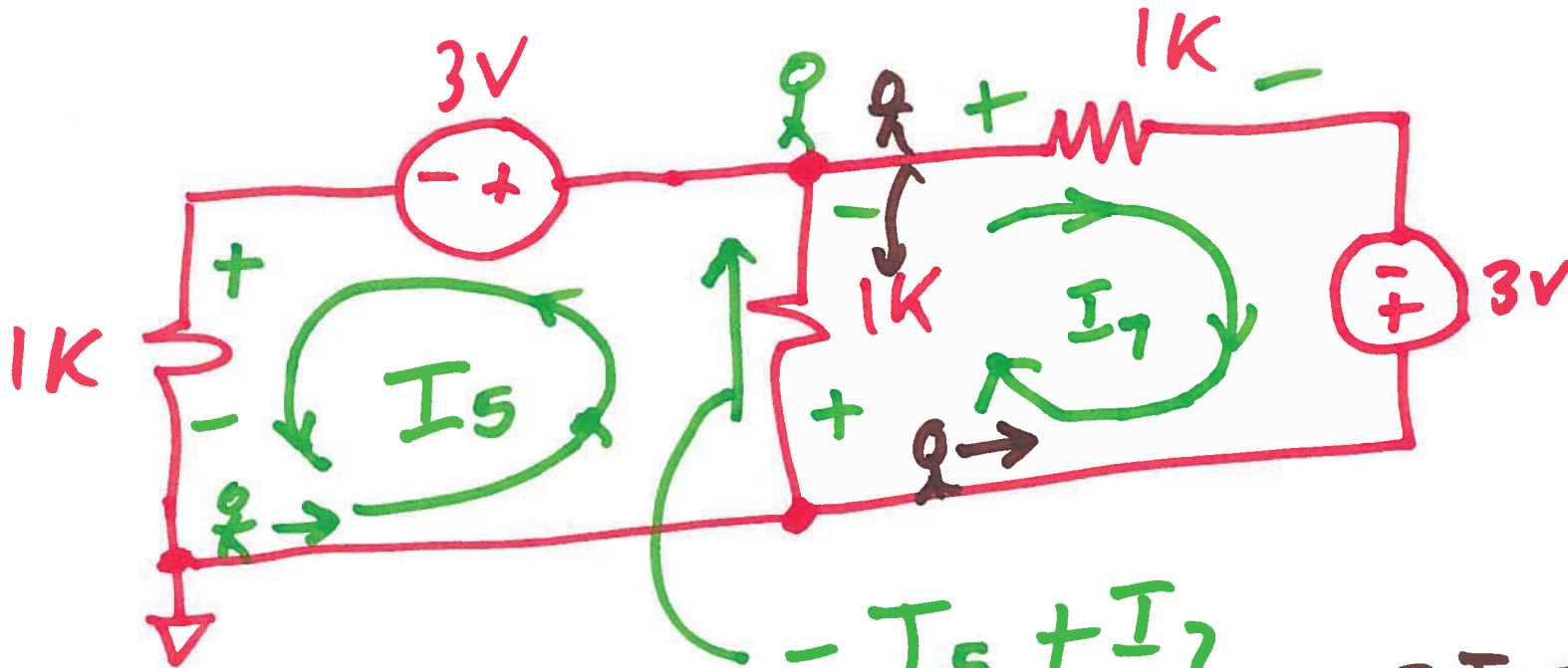
$$3 - I_1 \cdot 1.5 \text{ k} - V_A = 0 \quad (2)$$

KVL Loop #2

$$V_A - I_2 \cdot 1.5 \text{ k} - I_2 \cdot 1.5 \text{ k} = 0 \quad (3)$$



MORE MESH



$= I_5 + I_7$

$-I_5 - I_7 - 3mA - I_5 = 0 \rightarrow -2I_5 - 3mA = I_7$

$-1K(I_5 + I_7) - 3V - 1KI_5 = 0$

$-3V + 1K \cdot I_7 + 1K(I_5 + I_7) = 0$

$-3mA + 2I_7 + I_5 = 0$

$-3mA - 4I_5 - 6mA + I_5 = 0$

$$+ \frac{18mA}{3} - 3mA = I_7$$

$$I_7 = 3mA$$

$$-3I_5 = 9mA$$

$$I_5 = -\frac{9mA}{3}$$

7)