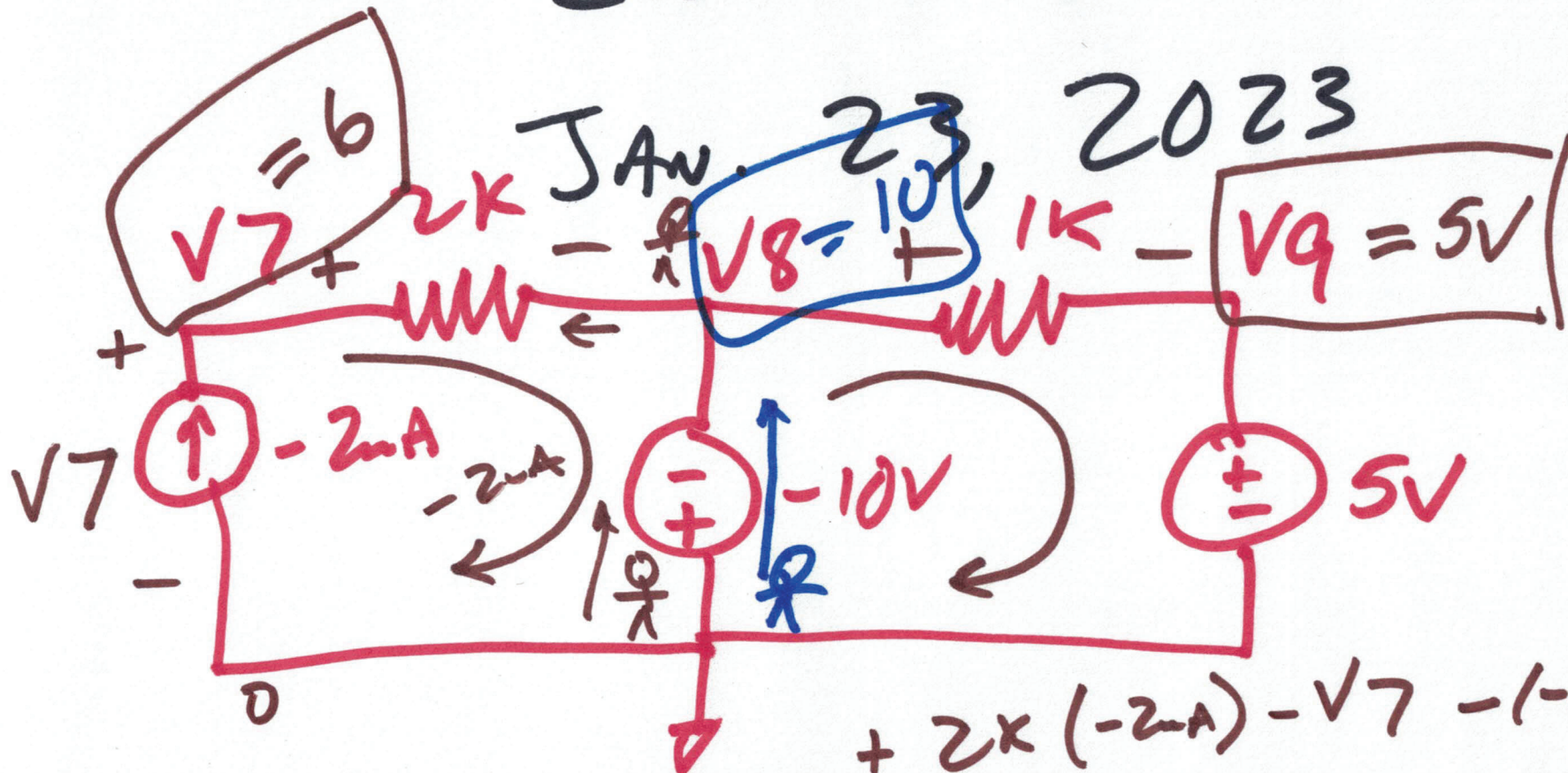


# EE 221 CIRCUITS II

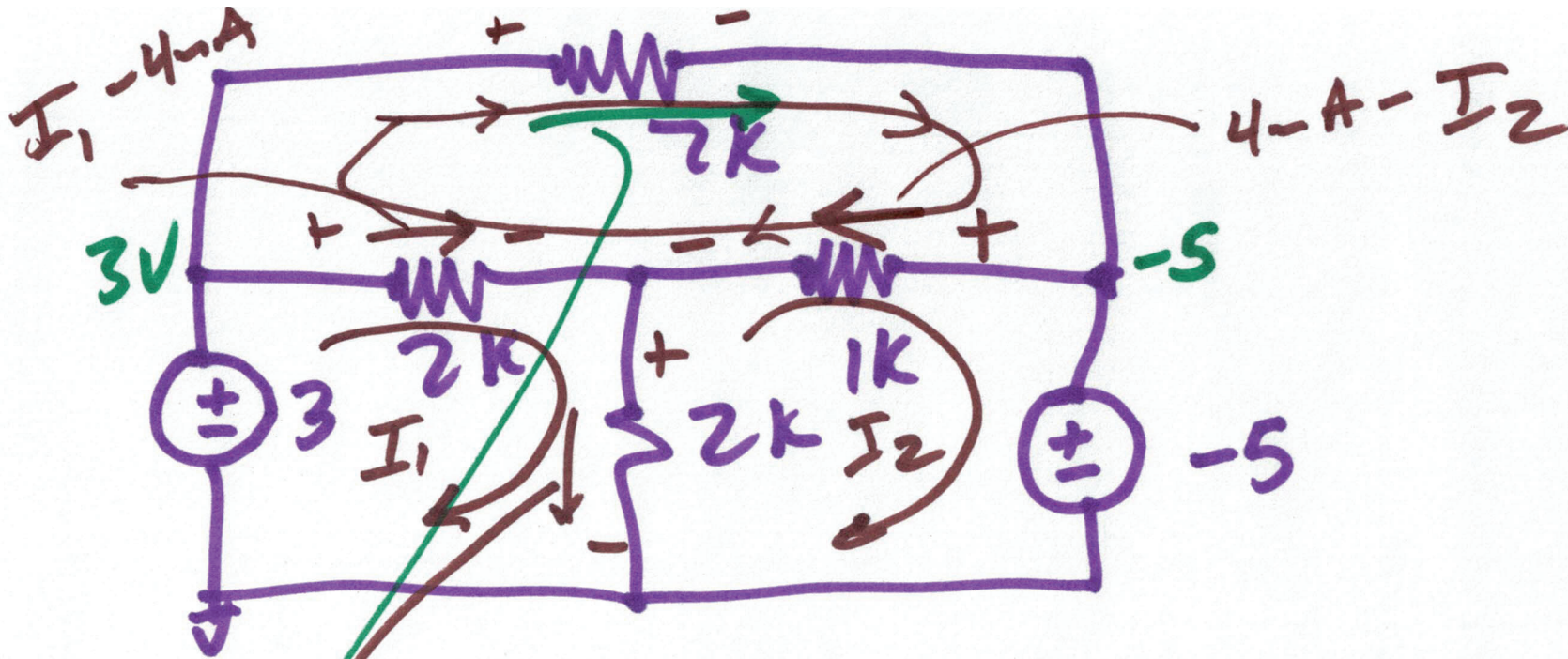
## Lecture 2

JAN. 23, 2023



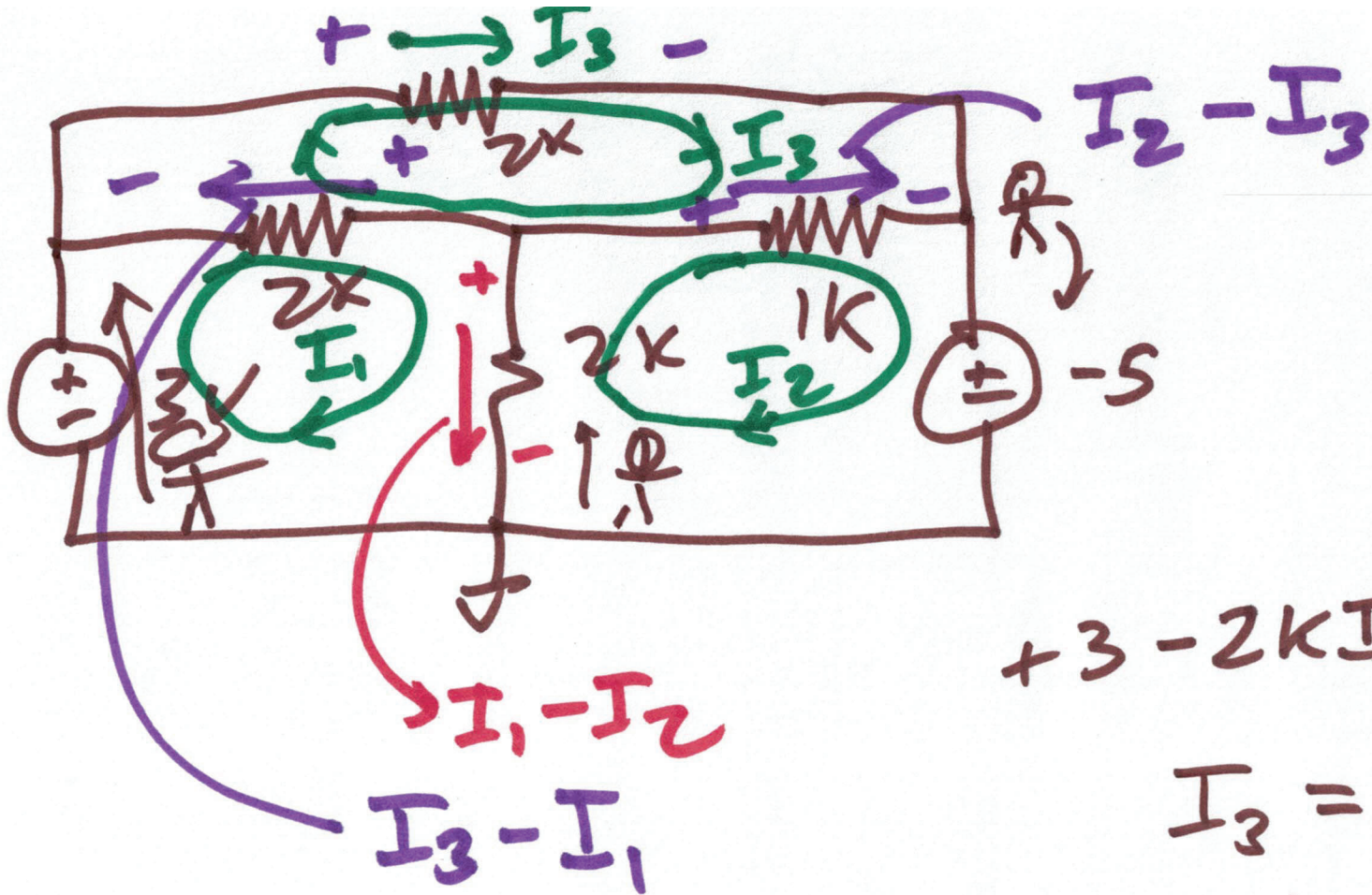
$$+ 2k(-2mA) - V7 - (-10) = 0$$

$$-(-10) = V8 \quad V7 = 10 - 4 = 6$$



$$\frac{3 - (-5)}{2k} = \frac{8}{2k} = 4 - A$$

$I_1 - I_2$



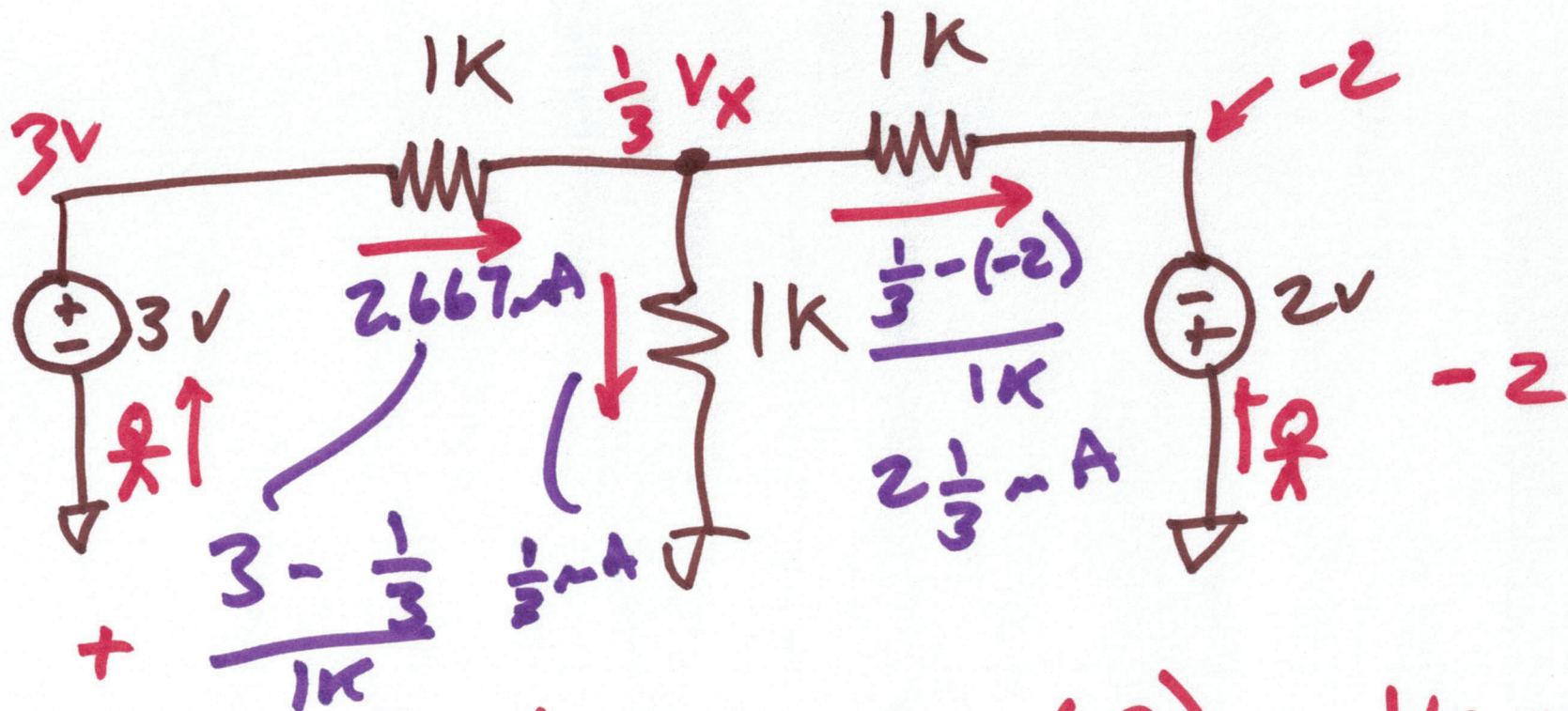
$$+3 - 2kI_3 - (-5) = 0$$

$$I_3 = 4 \text{ mA}$$

$$0 = +3 + 2k(I_3 - I_1) - 2k(I_1 - I_2)$$

$$-(-5) + 2k(I_3 - I_2)$$

$$-1k(I_2 - I_3) = 0$$



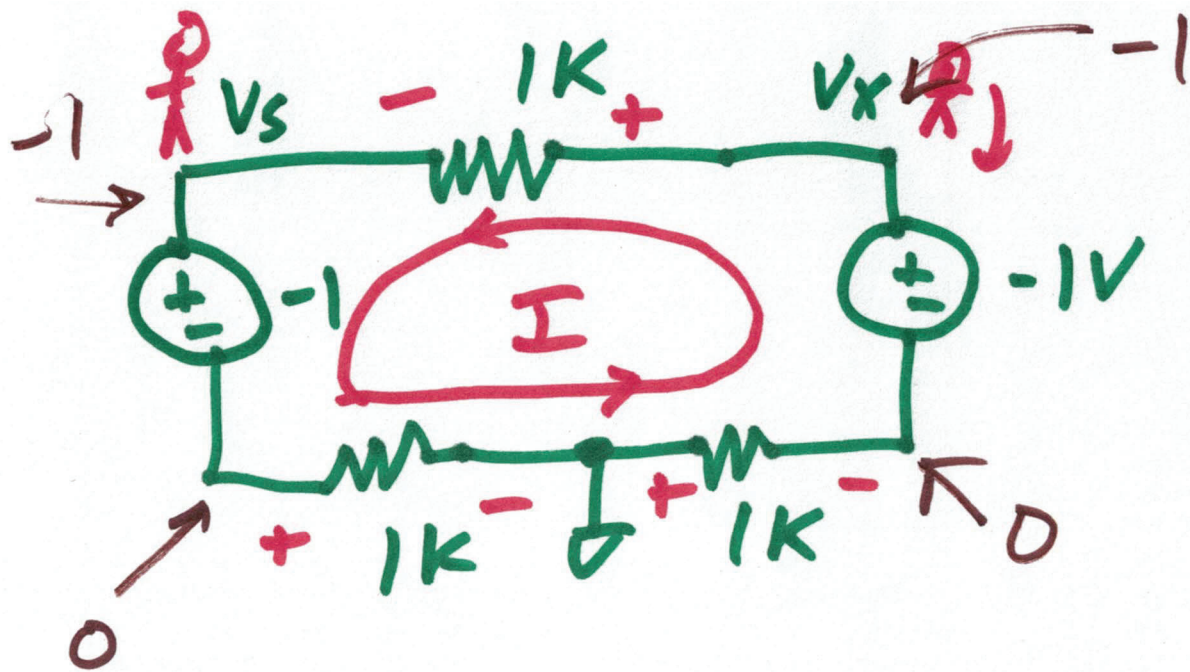
$$\frac{1}{1k} = \frac{1}{10^3} \cdot \frac{10^{-3}}{10^{-3}} 1k = 10^{-3} = \text{milli } 1k$$

$$\frac{3 - V_x}{1k} = \frac{V_x - (-2)}{1k} + \frac{V_x - 0}{1k}$$

$$3 - V_x = V_x + 2 + V_x$$

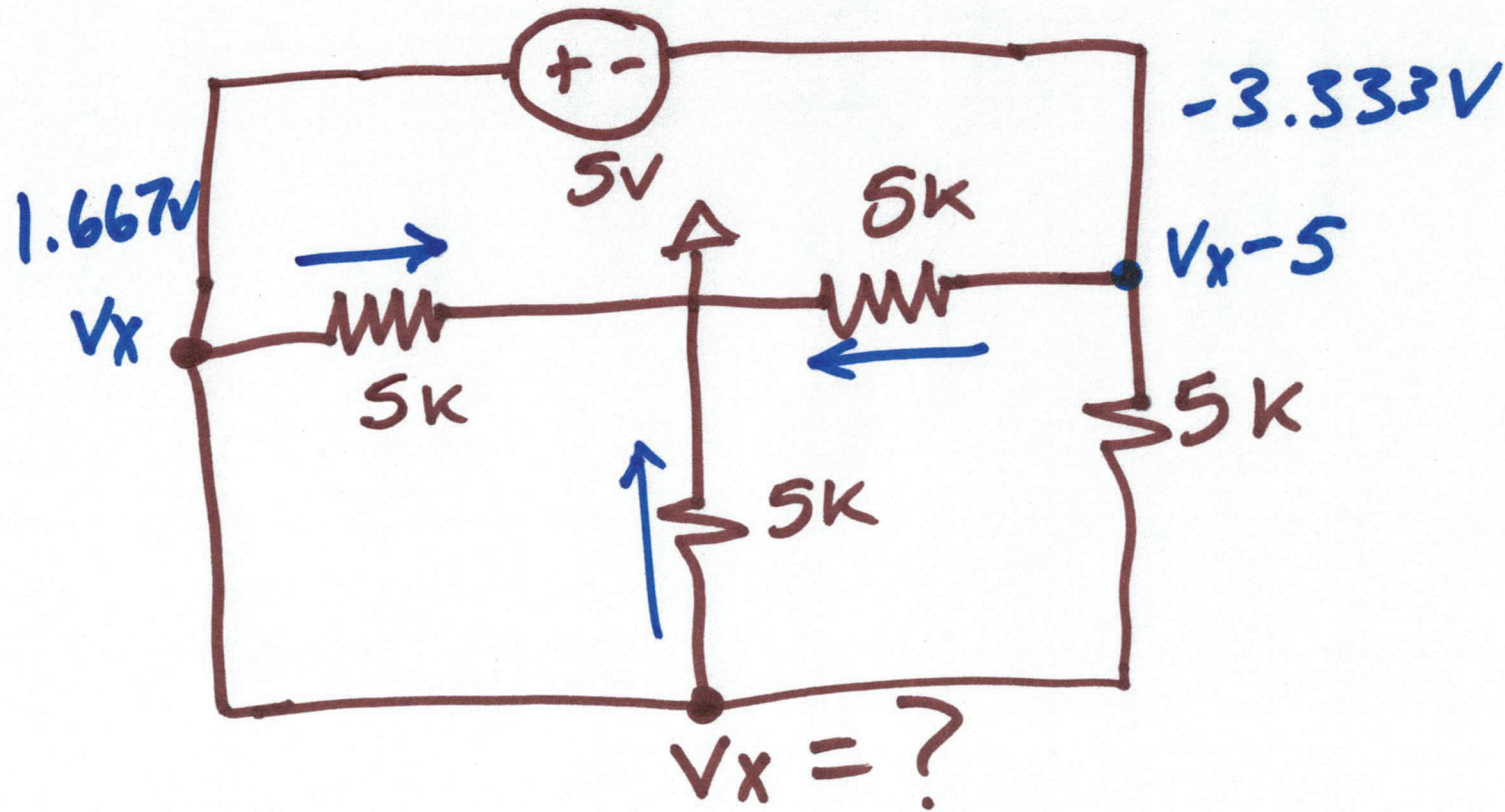
$$1 = 3V_x$$

$$\boxed{V_x = \frac{1}{3} V}$$



$$0 = -(-1) + 1kI + 1kI + (-1) + 1kI$$

$$0 = 3kI \quad I = 0$$

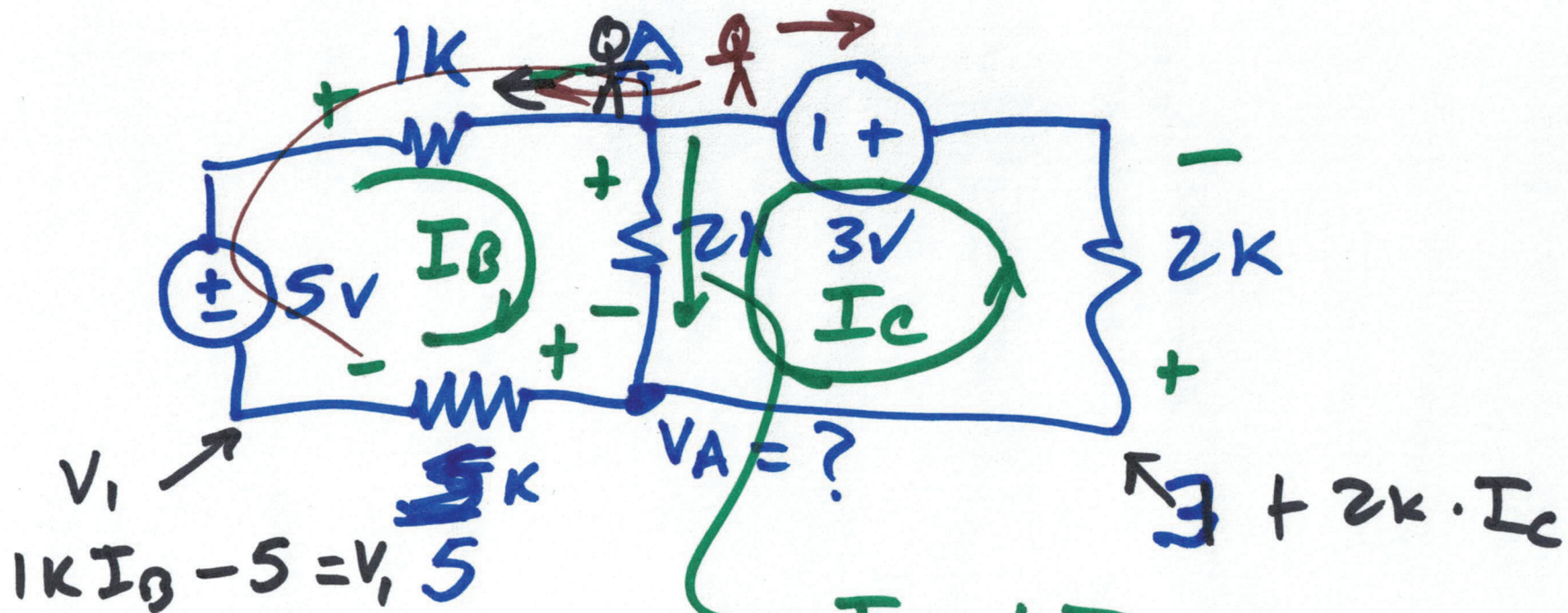


$$\frac{V_x}{5k} + \frac{V_x}{5k} + \frac{V_x - 5}{5k} = 0$$

$$V_x + V_x + V_x - 5 = 0$$

$$3V_x = 5$$

$$V_x = \frac{5}{3} V$$



$$I_B + I_C$$

$$+3 + 2kI_C + 2k(I_B + I_C) = 0$$

$$+1kI_B - 5 + 5kI_B + 2k(I_B + I_C) = 0$$

$$3 + 4kI_C + 2kI_B = 0$$

$$8kI_B + 2kI_C = 5$$

$$1.5 \mu\text{A} + 2I_c + I_B = 0$$

$$4I_B + I_c = 2.5 \mu\text{A}$$

$$I_B = -1.5 \mu\text{A} - 2I_c$$

$$4(-1.5 \mu\text{A} - 2I_c) + I_c = 2.5 \mu\text{A}$$

$$-6 \mu\text{A} - 8I_c + I_c = 2.5 \mu\text{A}$$

$$-7I_c = 8.5 \mu\text{A}$$

$$I_c = -\frac{8.5}{7} \mu\text{A}$$