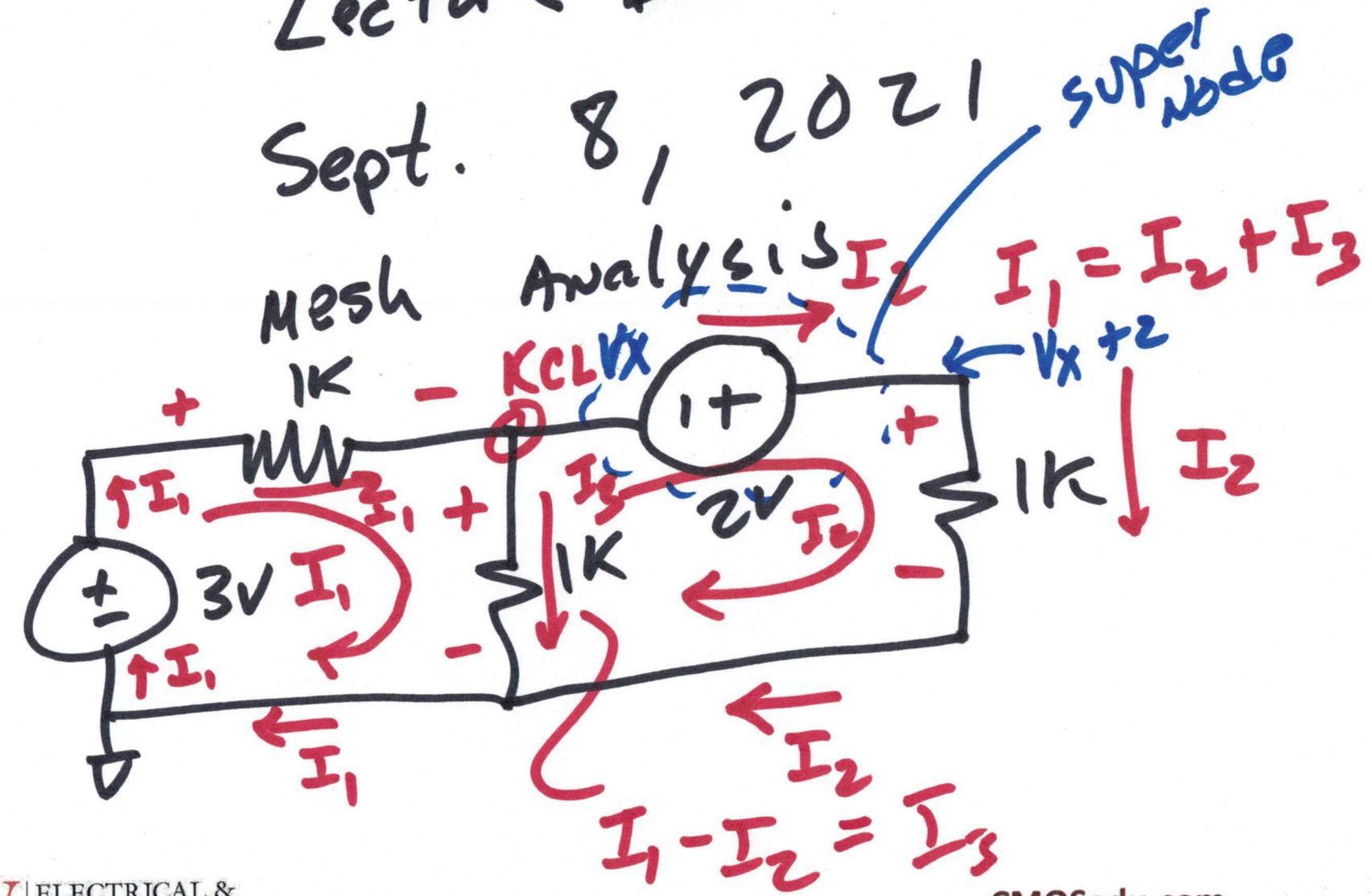
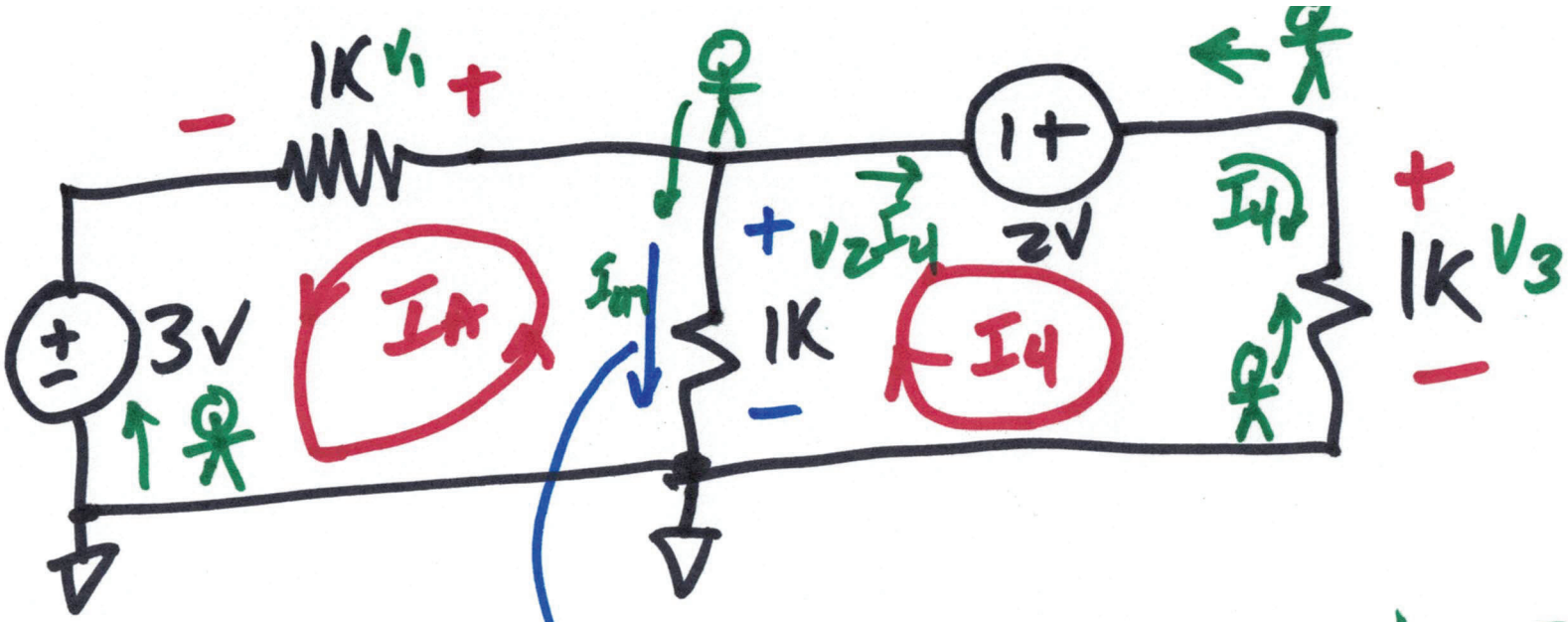
# EE 220 Circuits 1

## Lecture 5

## Sept. 8, 2021

### Mesh Analysis






$-I_A - I_4$

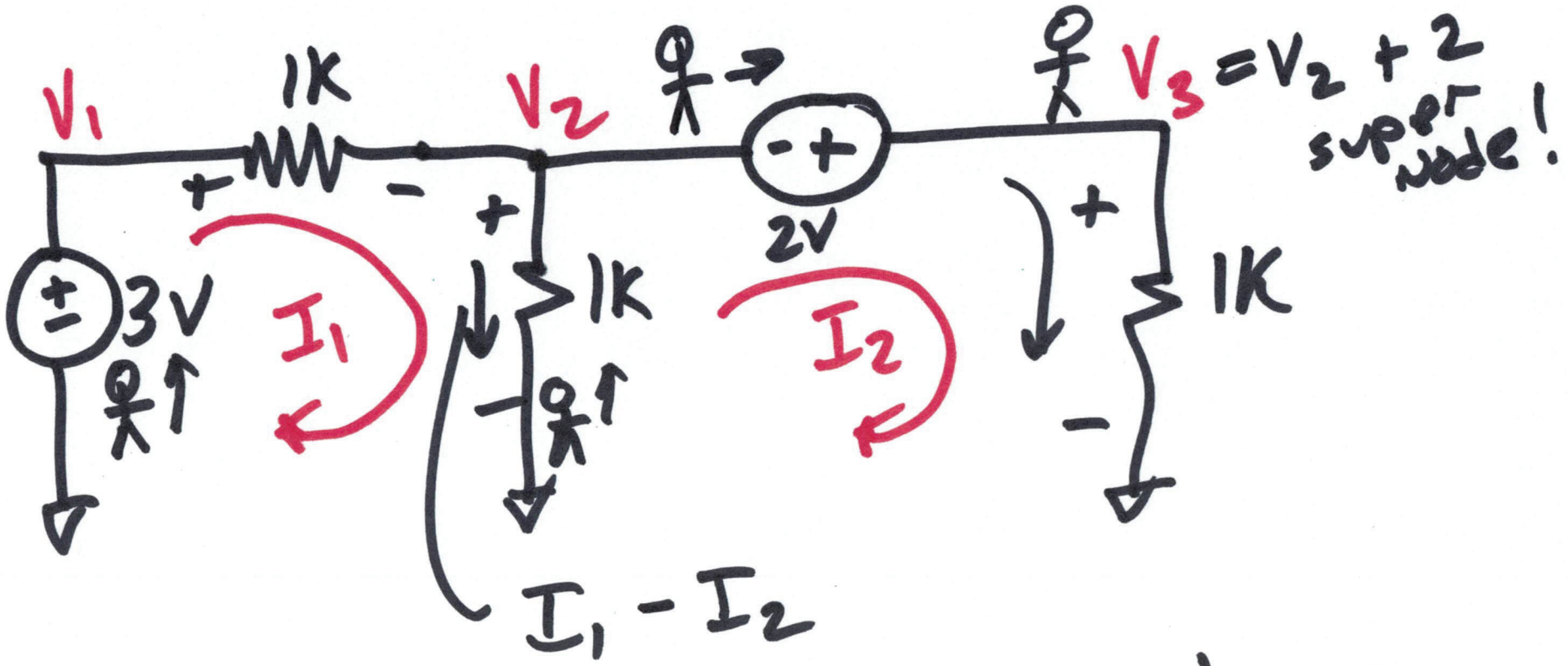
$V_1 = I_A \cdot 1K$

$V_3 = I_4 \cdot 1K$

$-V_2 + V_3 - 2 = 0$

$-V_2 + 3 + V_1 = 0$

$1K(-I_A - I_4) = V_2 = I_{47} \cdot 1K$




$$3 - I_1 \cdot 1K - 1K(I_1 - I_2) = 0$$

$$2 - 1K I_2 + 1K(I_1 - I_2) = 0$$

$$\therefore .3mA - I_1 - I_1 + I_2 = 0$$

$$.2mA - I_2 + I_1 - I_2 = 0$$

$$.3mA - 2I_1 + I_2 = 0$$

$$I_1 = 1.5mA + \frac{I_2}{2}$$

$$.2mA - 2I_2 + I_1 = 0$$

$$2mA - 2I_2 + 1.5mA + \frac{I_2}{2} = 0$$

$$3.5mA - 1.5\,I_2 = 0$$

$$I_2 = \frac{3.5}{1.5}\,mA$$

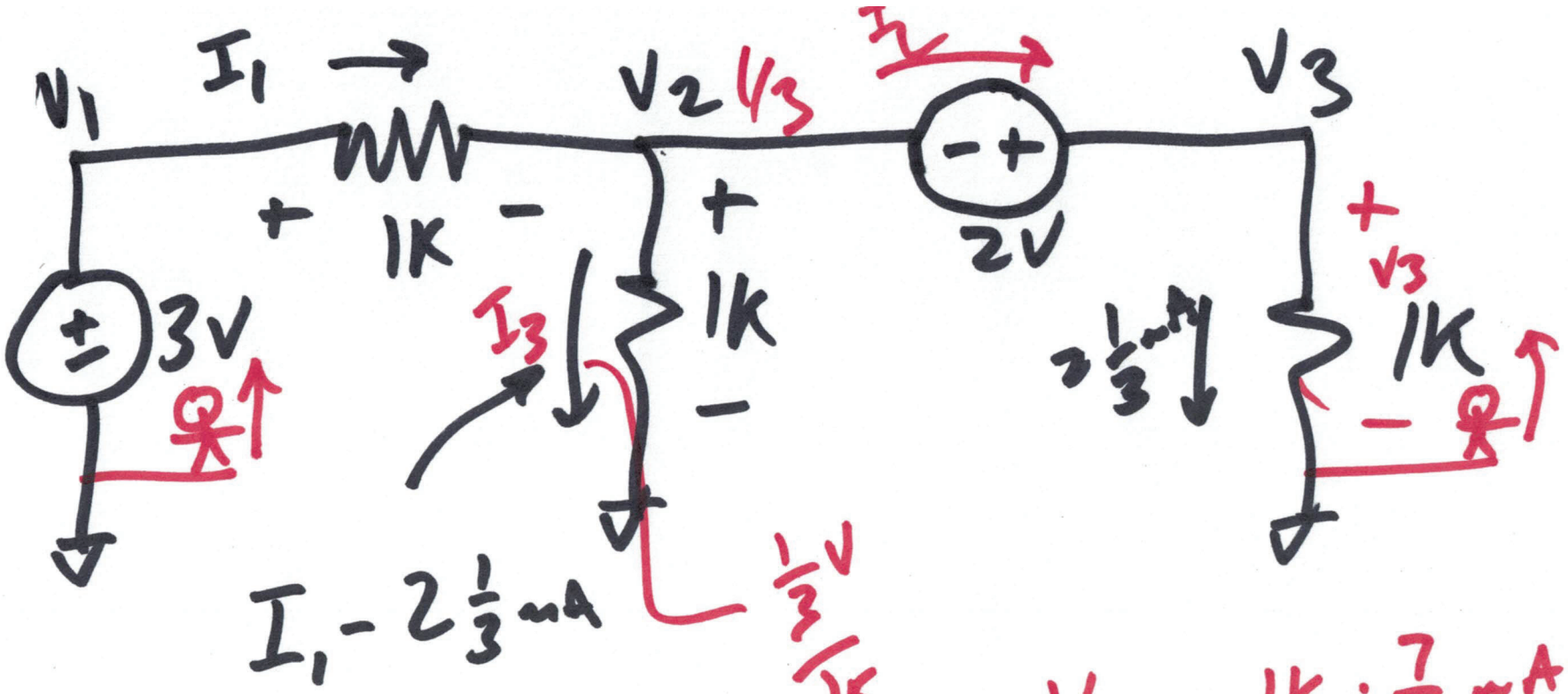
$$I_2 = \frac{7}{3}\,mA$$

$$I_2 = 2.333mA$$





4)




$V_1 = 3v$

$I_3 = \frac{1}{3}$ mA

$V_3 = 1K \cdot \frac{7}{3}$ mA

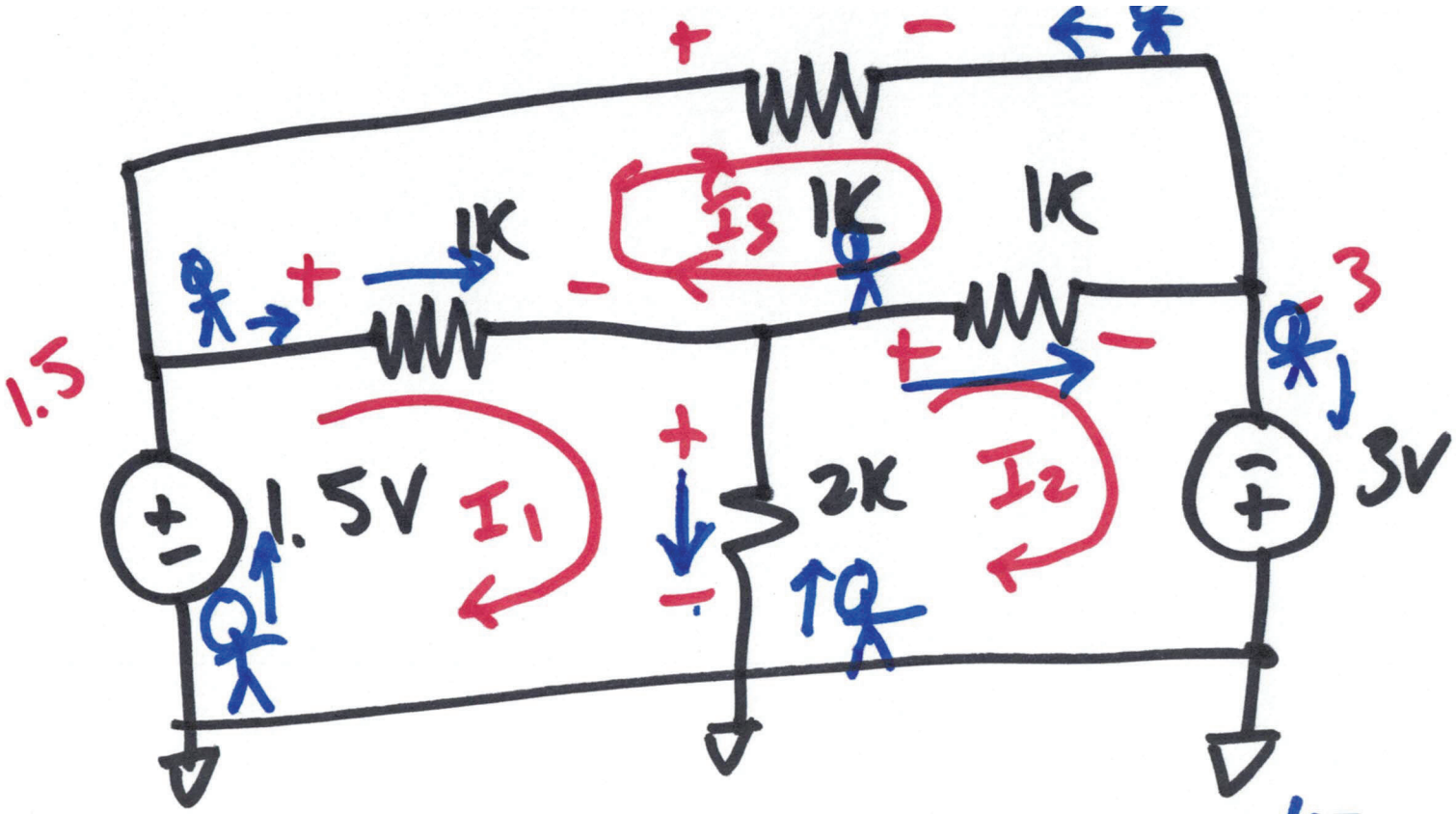
$V_3 = \frac{7}{3}V$

$I_1 = \frac{1}{3}$ mA $+ \frac{7}{3}$ mA

$I_1 = \frac{8}{3}$ mA

$I_1 = 2.666$ mA

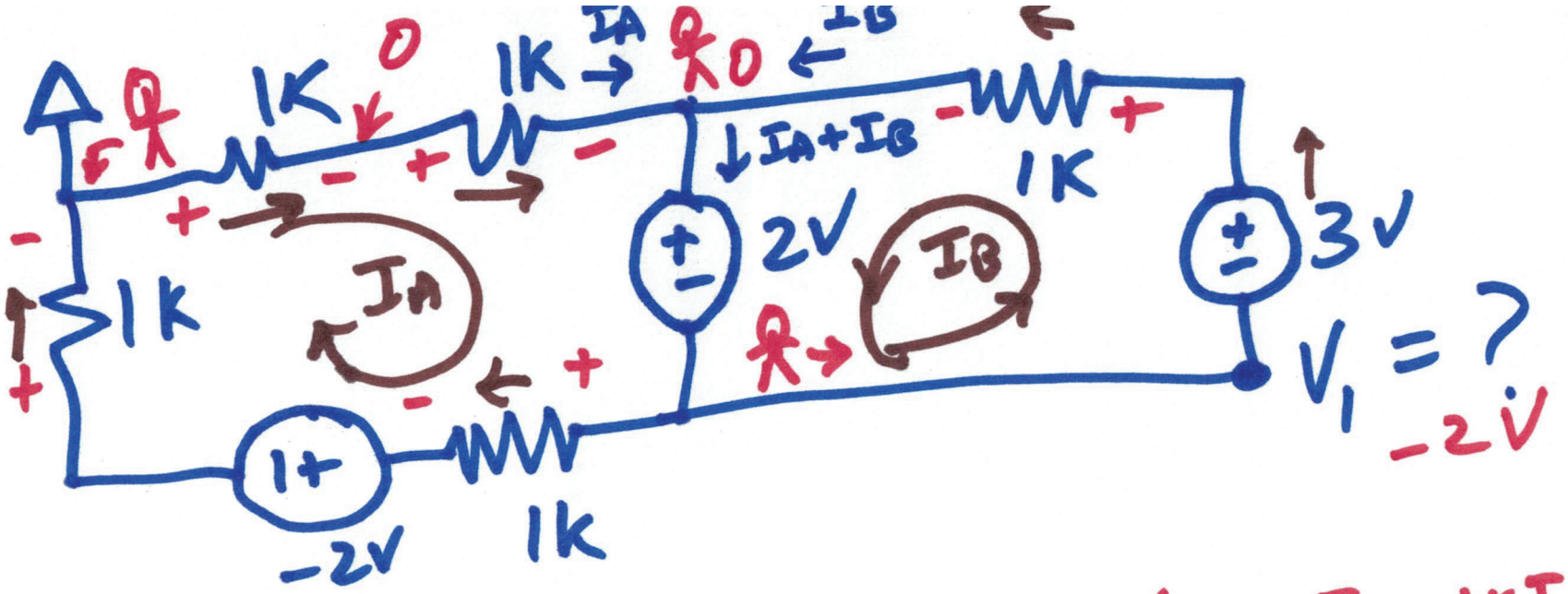
$V_2 = V_3 - 2 = \frac{1}{3}V = V_2$




$$I_3 \cdot 1K - (I_1 - I_3) \cdot 1K - 1K(I_2 - I_3) = 0$$

$$-1K(I_1 - I_3) - 2K(I_1 - I_2) + 1.5 = 0$$

$$+3 + 2K(I_1 - I_2) - 1K(I_2 - I_3) = 0$$




$$0 = +1K \cdot I_A + (-2V) + 1K\,I_A + 2 + 1K\,I_A + 1K\,I_A$$

$$0 = 4K\,I_A \rightarrow I_A = 0$$

$$+3 - 1K\,I_B - 2 = 0$$

$$I_B = 1mA$$