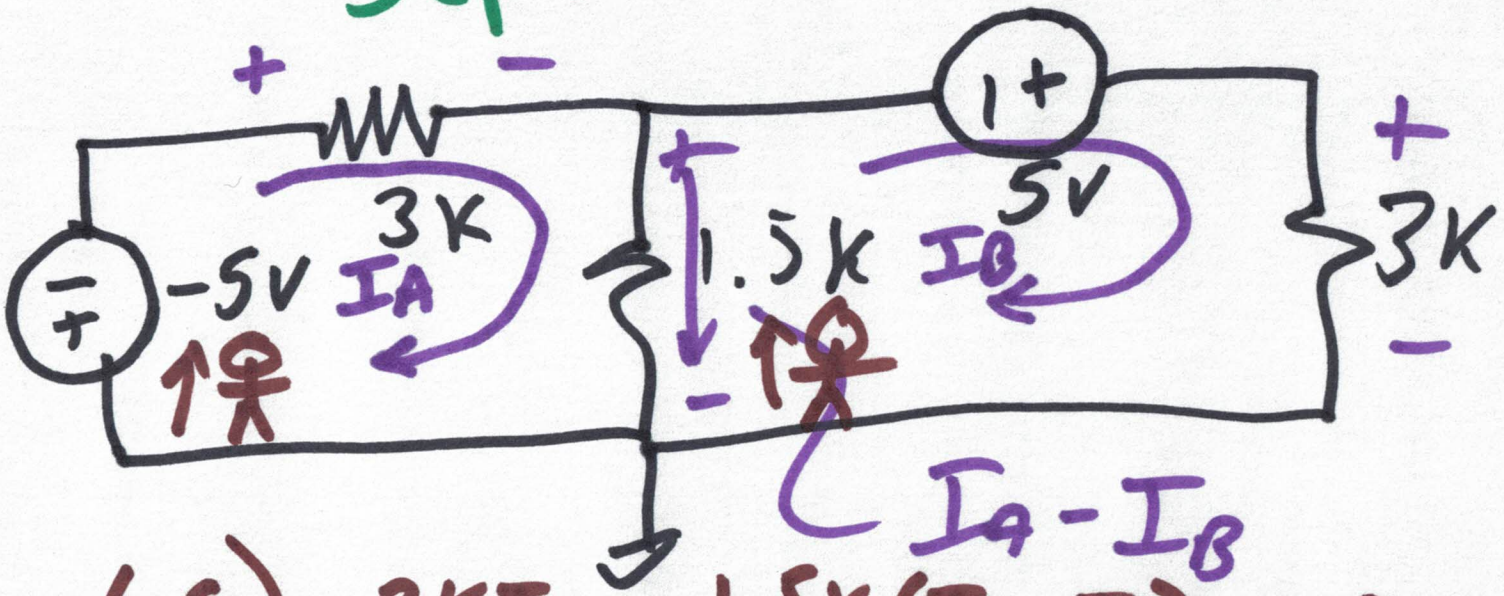
EE 220 Circuits I
Lecture 7
Sept. 21, 2022



$$-(-5) - 3K I_A - 1.5K(I_A - I_B) = 0$$

$$+1.5K(I_A - I_B) + 5V - 3K I_B = 0$$

$$+5V - 4.5K I_A + 1.5K I_B = 0$$

$$3.33 - 3 I_A + I_B = 0$$

$3\frac{1}{3}\,mA - 3I_A + I_B = 0$

$I_B = 3I_A - 3\frac{1}{3}\,mA$

$3\frac{1}{3} = \frac{10}{3}$

$I_B = 3I_A - \frac{10}{3}\,mA$

$1.5K\,I_A - 4.5K\,I_B + 5 = 0$

$I_A - 3I_B + \frac{10}{3}\,mA = 0$

$I_B = 5/3 - A$

$I_B = 5/3\,mA$

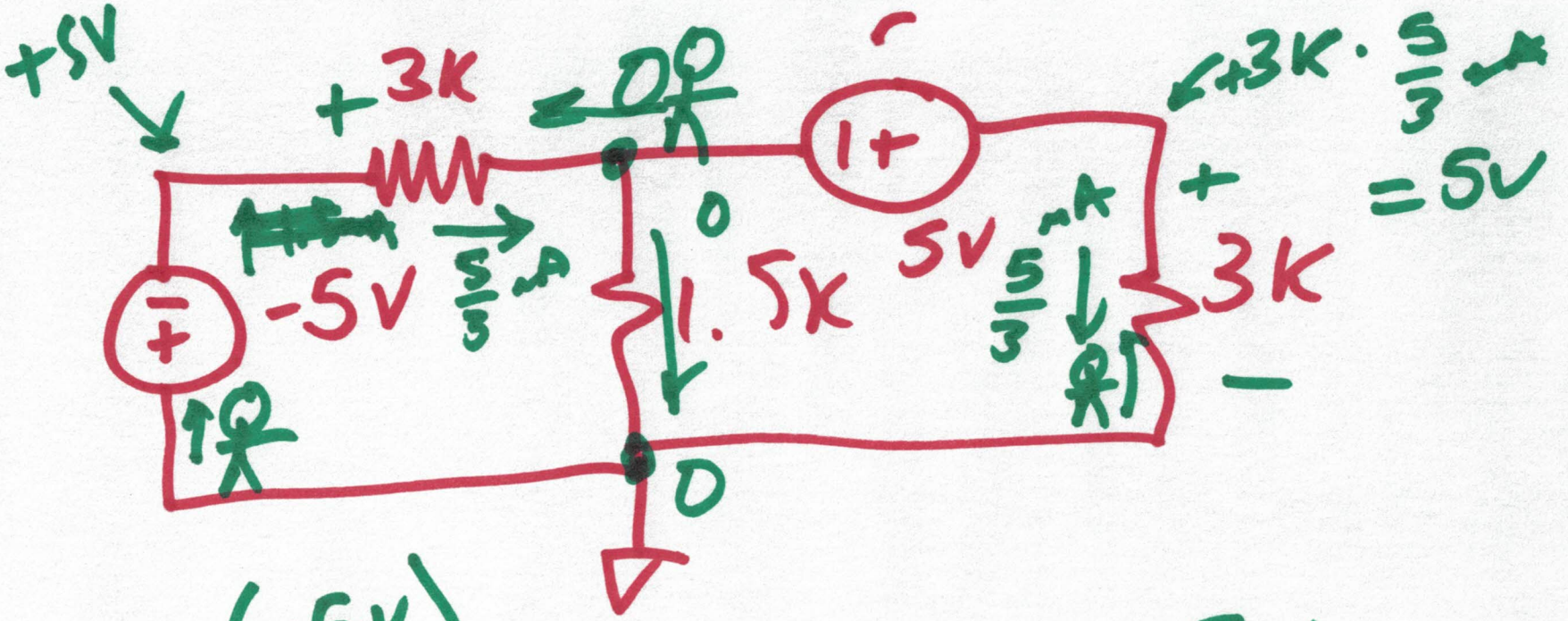
$I_A - 3I_B + \frac{10}{3}\,mA = 0$

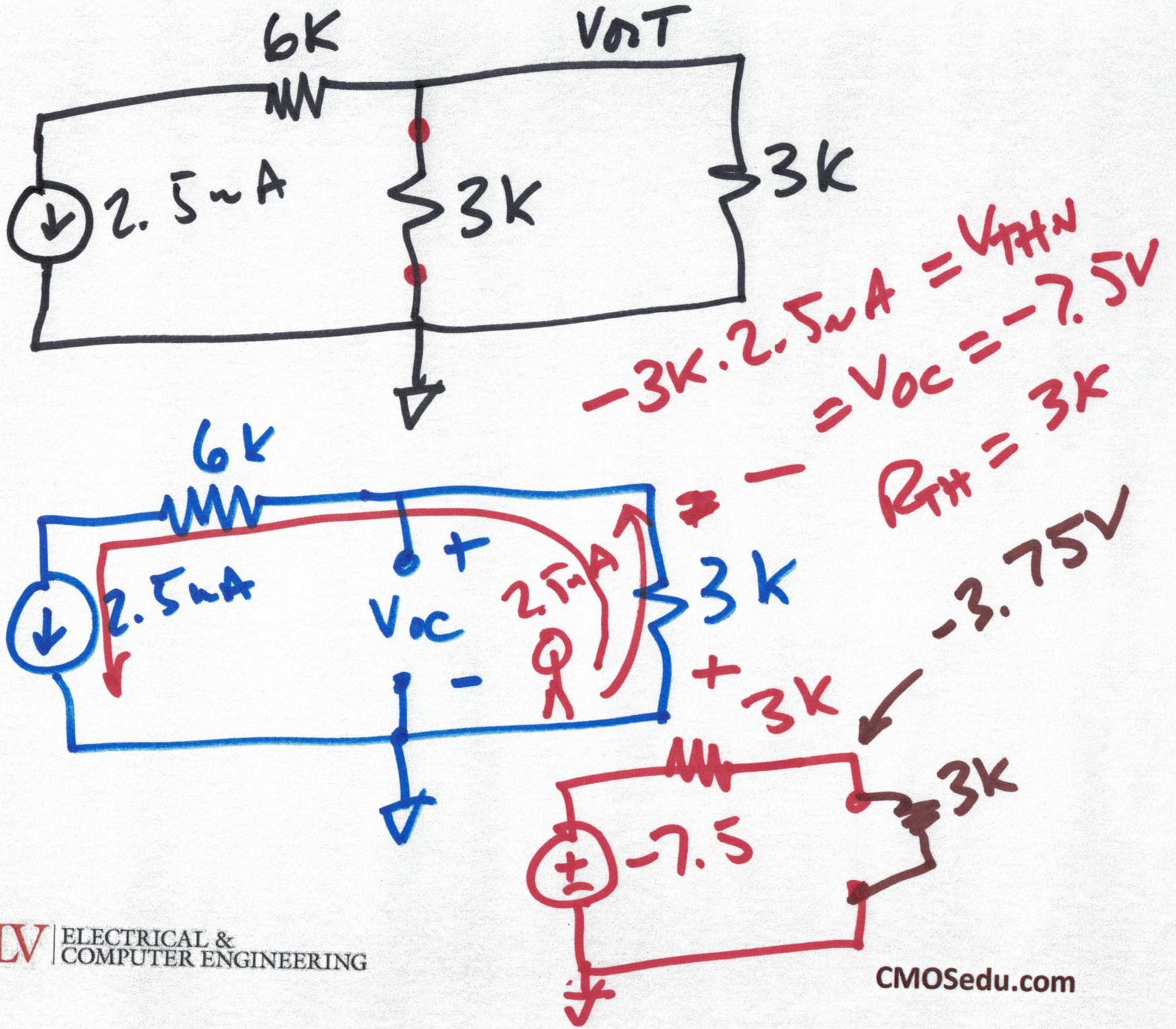
$I_A - 9I_A + \frac{30}{3}\,mA + \frac{10}{3}\,mA = 0$

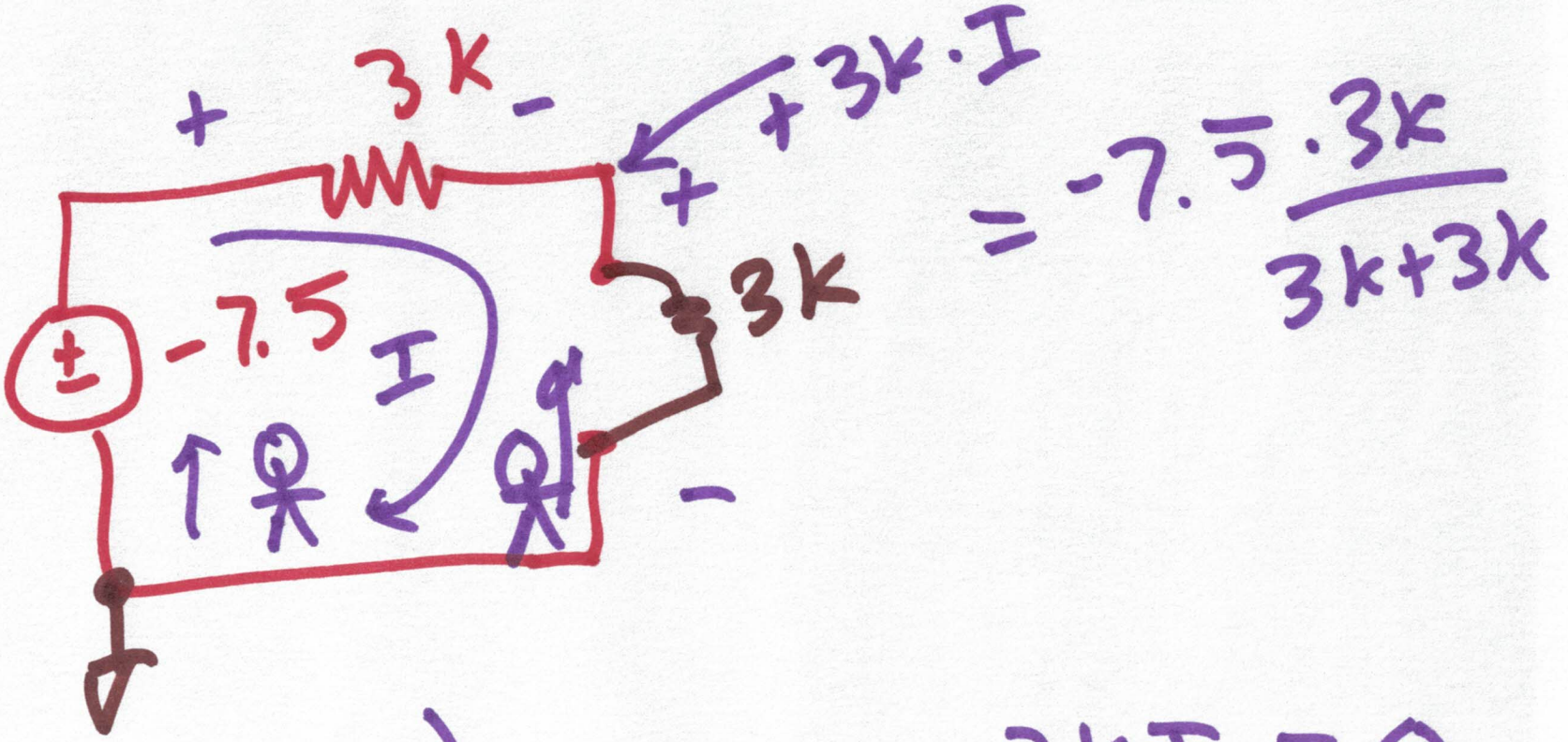
$-8I_A = -\frac{40}{3}\,mA$

$I_A = \frac{40}{3}\,mA$

$I_A = \frac{5}{3}\,mA$


+5V
+3K
0
1+
5V
+3K · 5/3 mA
+
=5V
-5V
5/3 mA
1.5K
5/3 mA
3K
0
−(−5V)
+3K · 5/3 mA = 5V

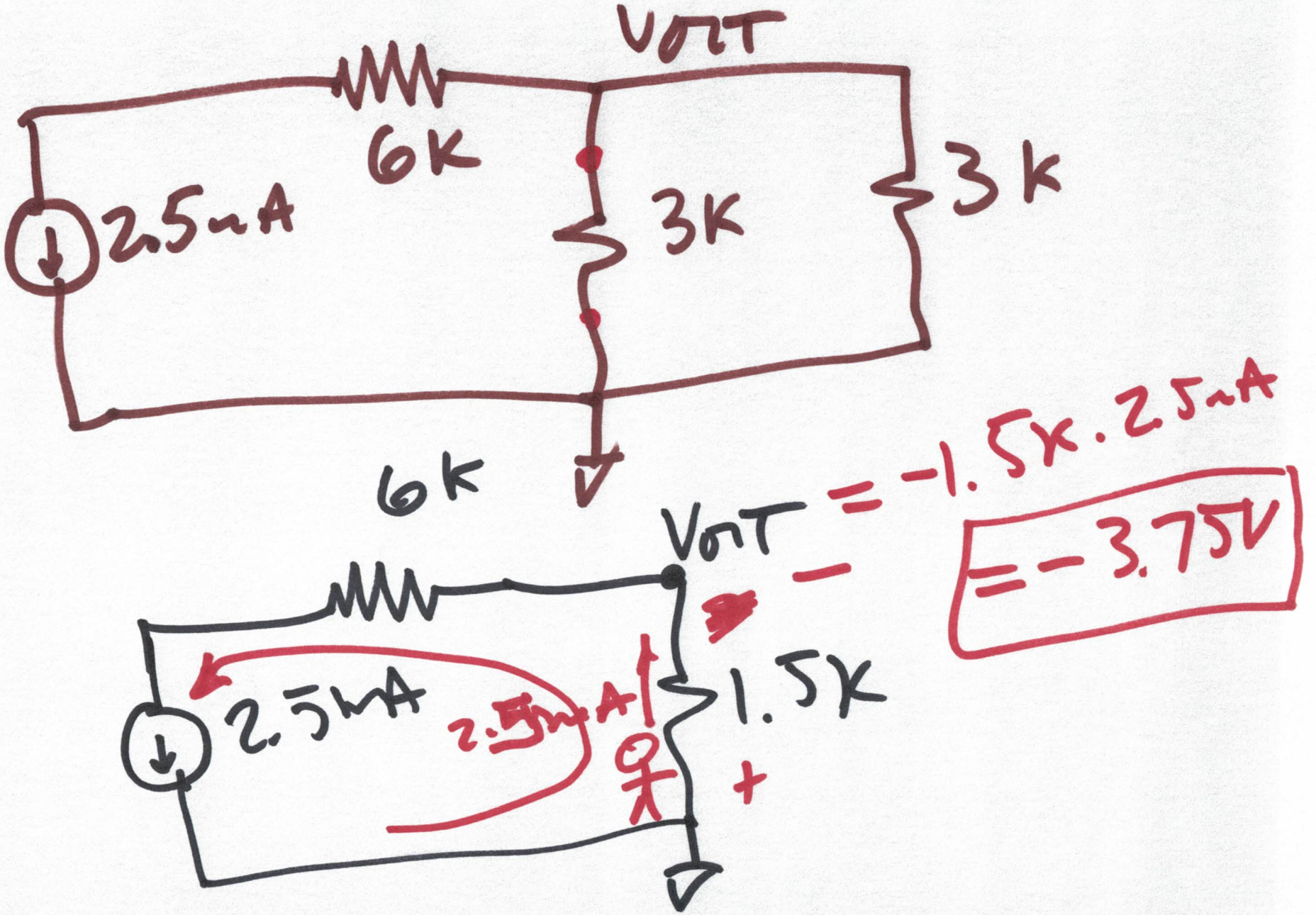

6K
VoT
2.5mA
3K
3K
6K
2.5mA
+
Voc
-
2.5mA
3K
+
3K
-3K.2.5mA = VTHN
=Voc = -7.5V
RTH = 3K
-3.75V
-7.5
3K

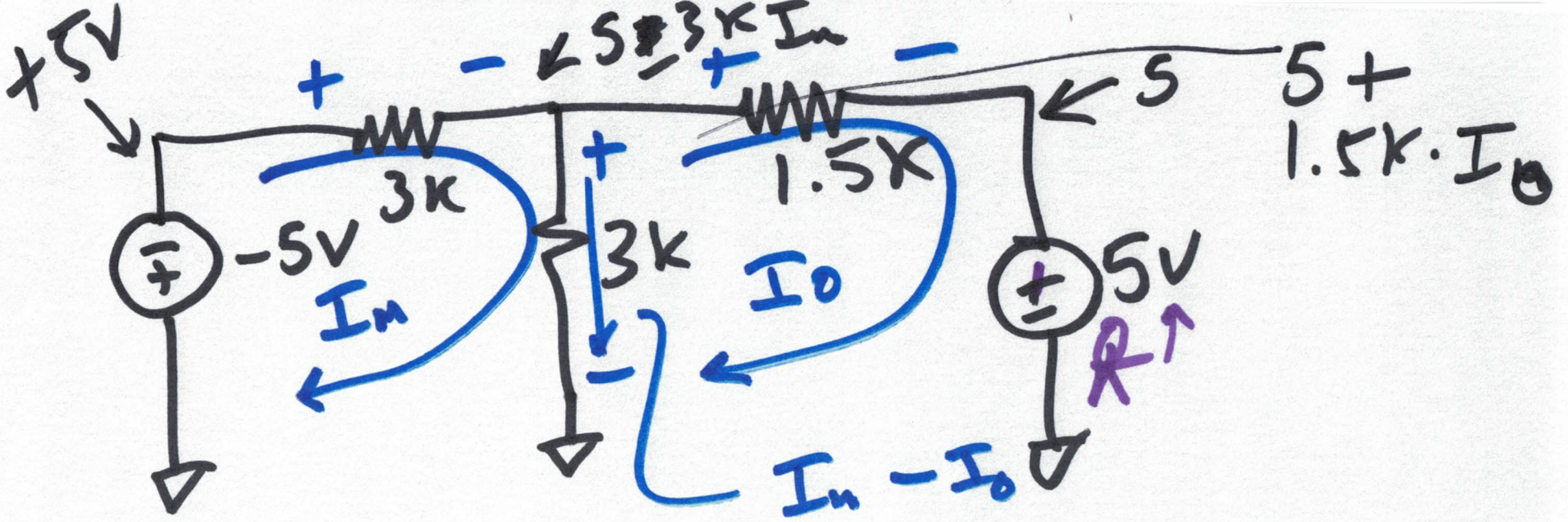


$$= -7.5 \frac{3k}{3k+3k}$$

$$+(-7.5) - 3kI - 3kI = 0$$

$$I = \frac{-2.5}{3k+3k}$$


VOUT
6K
2.5mA
3K
3K
6K
VOUT = -1.5K . 2.5mA
= -3.75V
VOUT
2.5mA
2.5mA
1.5K
-
+



$$-(-5) - 3k I_m - 3k(I_m - I_0) = 0$$

$$+5 + 1.5k I_0 - 3k(I_m - I_0) = 0$$

$$5 - 6k I_m + 3k I_0 = 0$$

$$\frac{5}{3}mA - 2I_m + I_0 = 0$$

$$I_{0\Sigma} = 2I_m - \frac{5}{3}mA$$

$$5 + 4.5k I_o - 3k I_m = 0$$

$$0 = 5 + 4.5k\left(2I_m - \frac{5}{3}mA\right) - 3k I_m$$

$$0 = 5 + 9k I_m - 4.5k \cdot \frac{5}{3}-A - 3kI$$

$$0 = 5 + 6k I_m - 7.5\,V$$

$$2.5 = 6k\, I_m$$

$$I_m = \frac{2.5}{6k} = 416.74A$$

$$I_o = 2\cdot(416.74A) - \frac{5}{3}\sim A$$

$$\boxed{I_o = -833.4A}$$