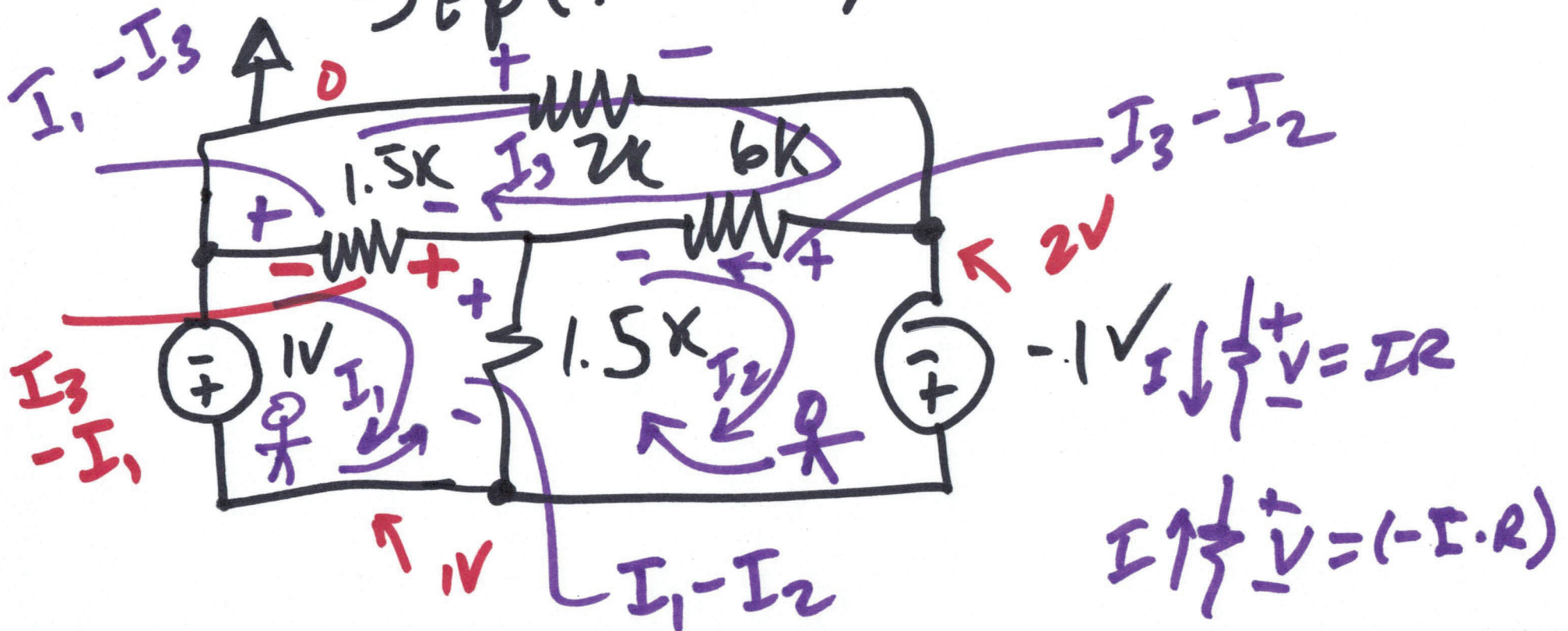


EE 220 circuits 1

Lecture 9

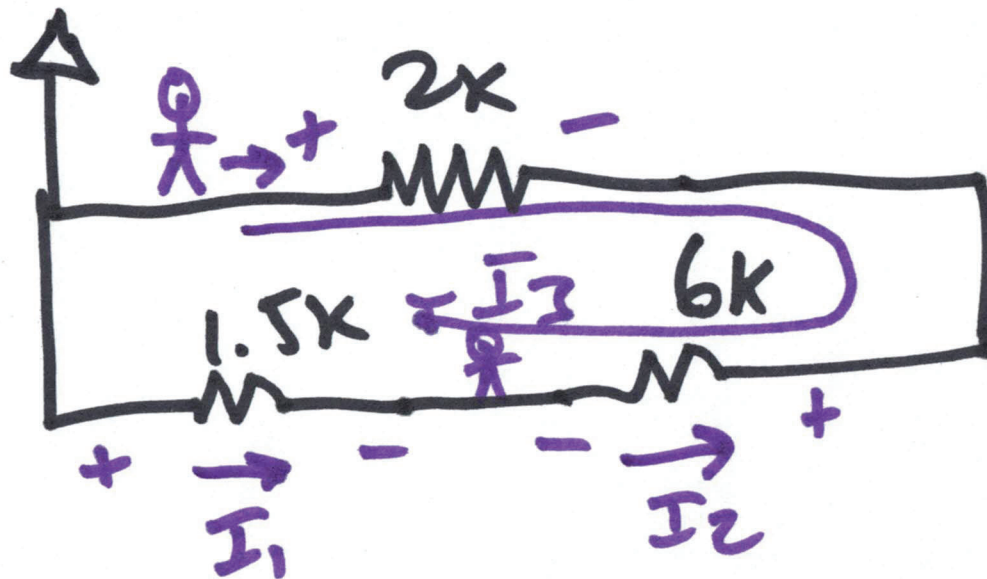
Sept. 22, 2021



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

$$- 1.5k(I_3 - I_1)$$

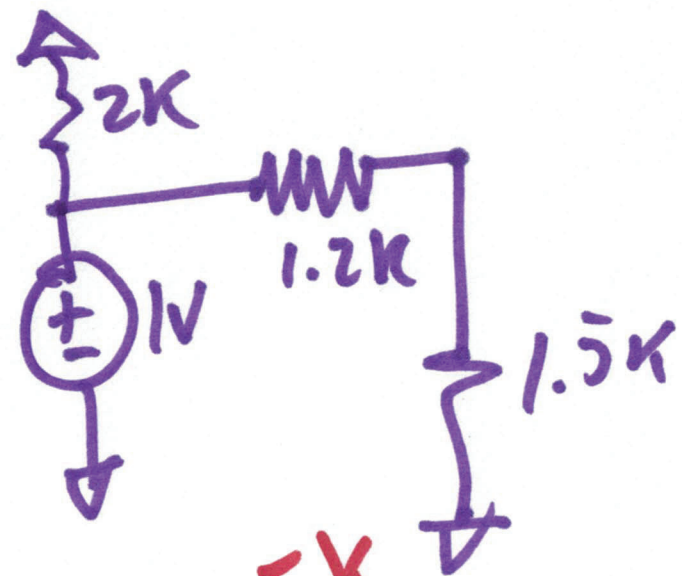
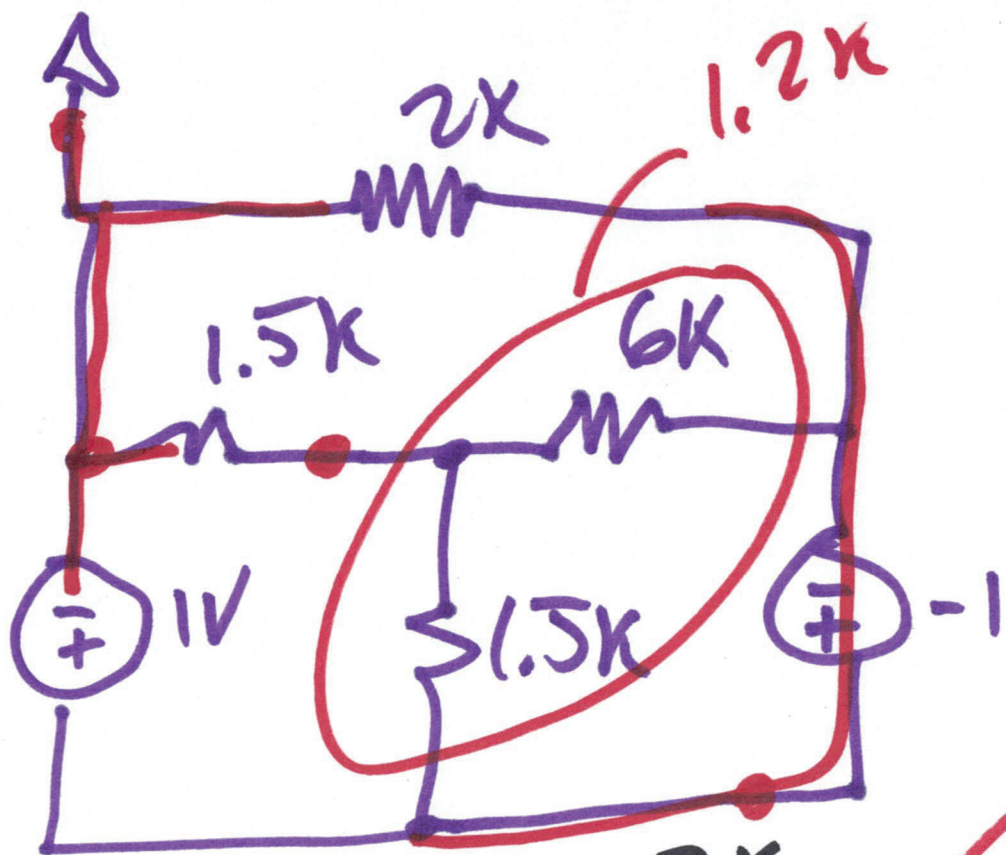
$$+1.5k(I_1 - I_2) + 6k(I_3 - I_2) + (-1V) = 0$$



Loop 2

$$0 = -2k(I_3) - 6k(I_3 - I_2) + 1.5k(I_1 - I_3)$$

2)

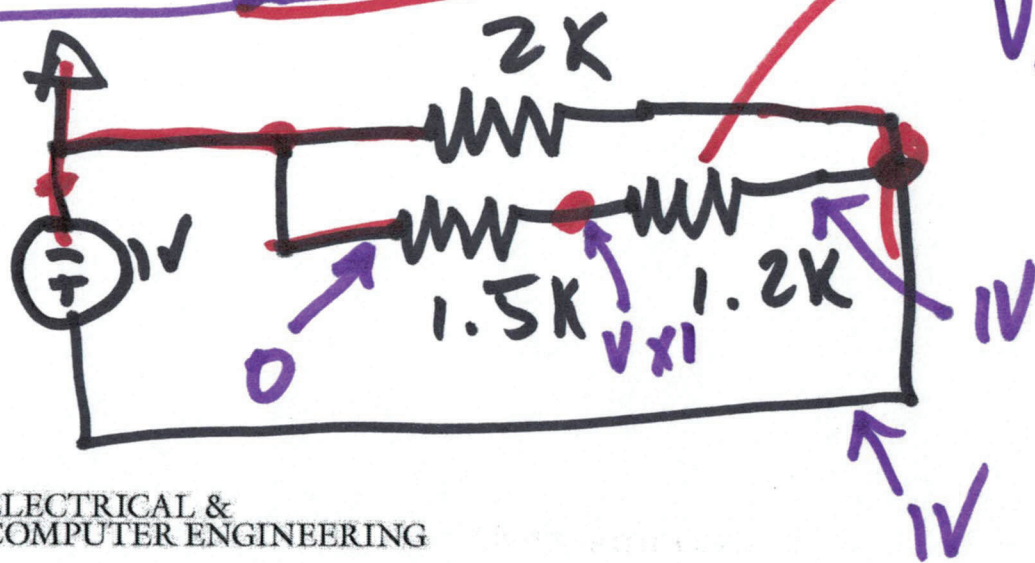


6k || 1.5k

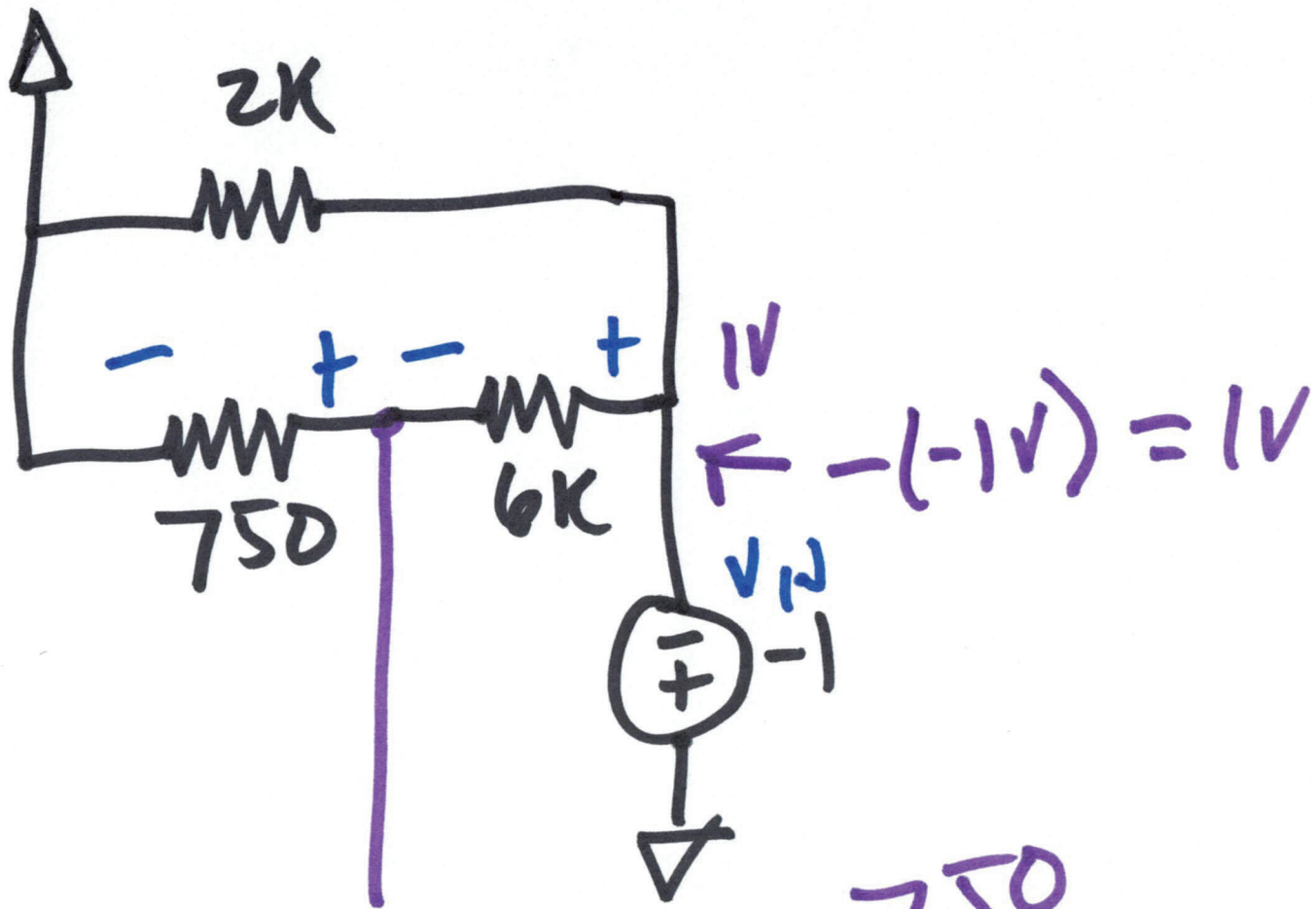
$$V_{x1} = 1V \cdot \frac{1.5k}{1.5k + 1.2k}$$

$$= 555 \text{ mV}$$

$$= \frac{5}{9}$$



3)



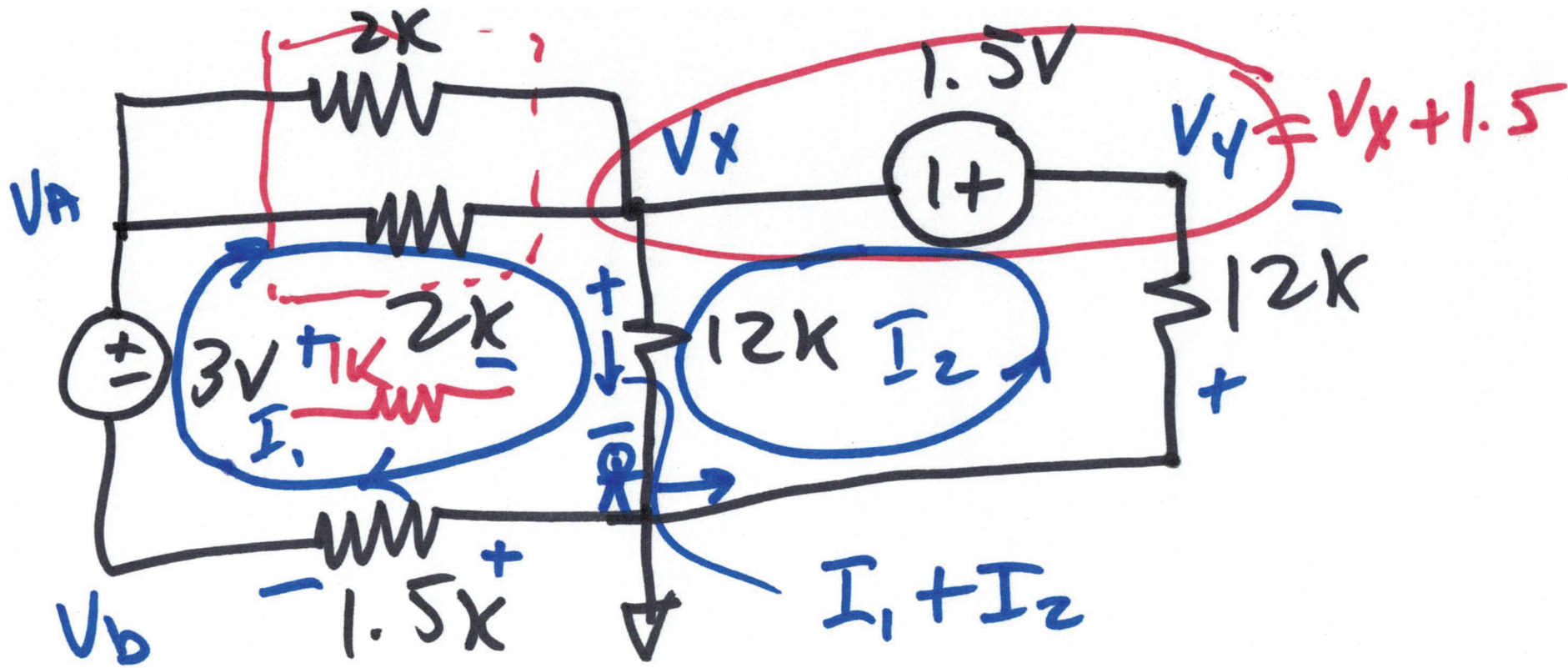
$$V_{x2} = 1 \cdot \frac{750}{6K + 750} = \frac{1}{9} V$$

$$V_{x1} = \frac{5}{9}$$

$$V_x = V_{x1} + V_{x2} = \frac{5}{9} + \frac{1}{9} = \frac{6}{9} = \frac{2}{3} V$$

Answer

4)



$$-12kI_2 - 1.5 - 12k(I_1 + I_2) = 0$$

$$0 = -1.5kI_1 + 3v - 1k(I_1) - 12k(I_1 + I_2)$$

$$I_2 + \frac{1.5}{12} \mu A + I_1 + I_2 = 0$$

$$-I_1 = 2I_2 + \frac{1}{8} \mu A$$

5)

$$-14.5kI_1 + 3 - 12kI_2 = 0$$

$$\boxed{6914A = I_1} \Leftarrow -I_1 = 2I_2 + \frac{1}{8} \mu A$$

$$0 = +14.5k \left(2I_2 + \frac{1}{8} \mu A \right) + 3 - 12kI_2$$

$$0 = 29kI_2 + 1.8125 + 3 - 12kI_2$$

$$-4.8125 = 17kI_2$$

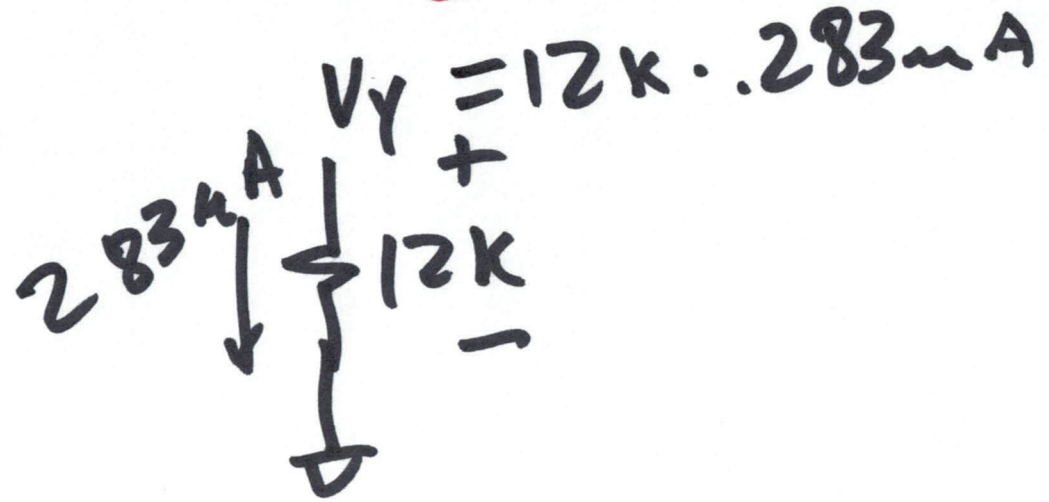
$$I_2 = 2834A$$

$$\boxed{I_2 = 0.283 \mu A}$$

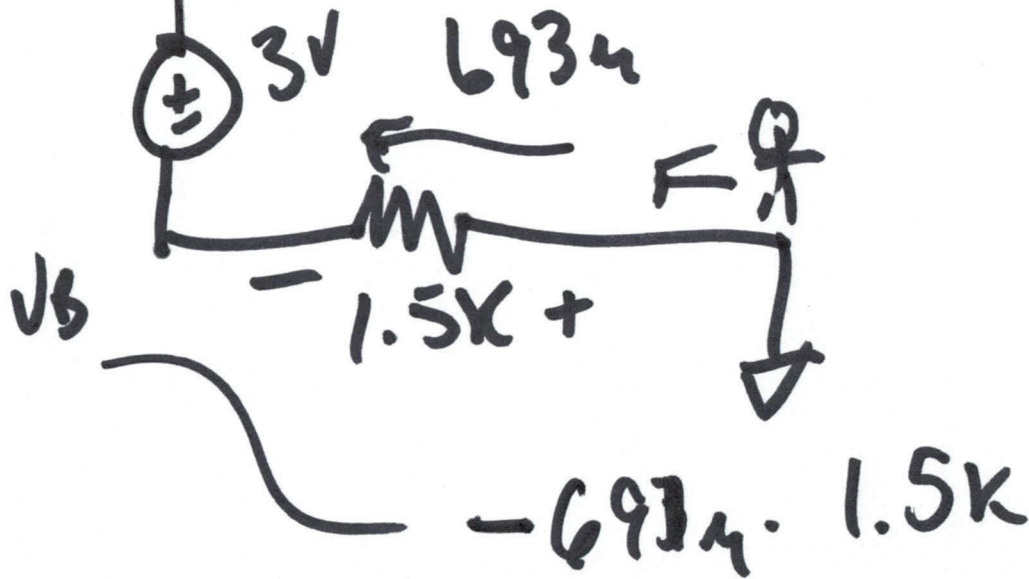
6)

$$I_1 = 691 \mu A$$

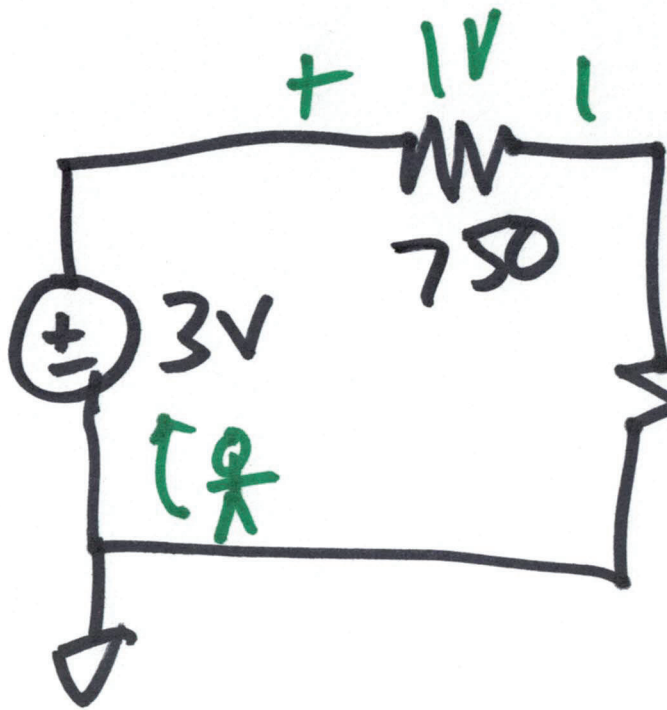
$$I_2 = -283 \mu A$$



$$V_A = V_B + 3$$



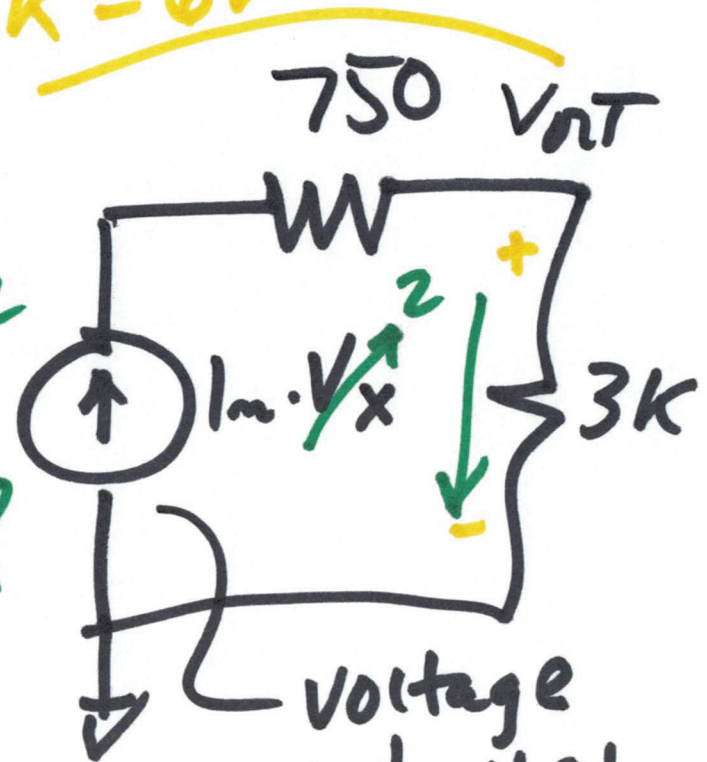
B



$2\mu A \cdot 3K = 6V$

$V_x = 2$

$2\mu A$

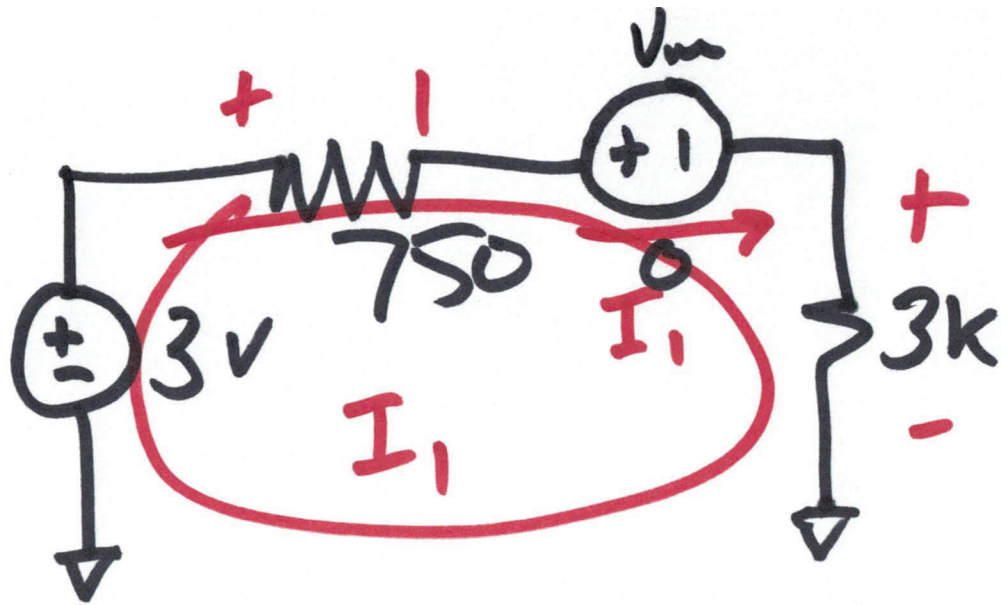


$+3V - 1 - 2 = 0$

$V_x = 3 \cdot \frac{1.5K}{750 + 1.5K}$

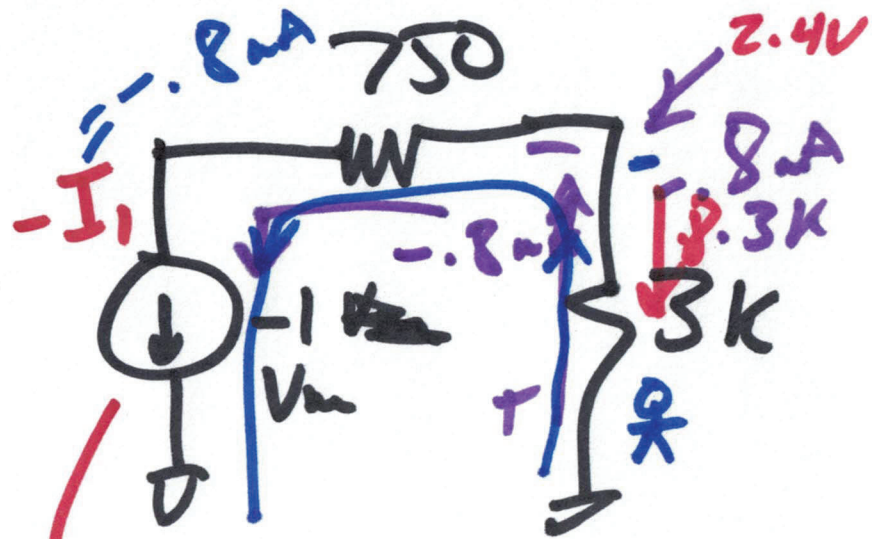
$= 3 \cdot \frac{2.750 \text{ source}}{2.750 + 750}$
 $= 3 \cdot \frac{2}{2+1} = 2V$

8)



$$I_1 = \frac{3}{3.75k} = 0.8 \mu A$$

$$3 - 750I - 3kI = 0$$



Current
Dependent
Current
Source

a)