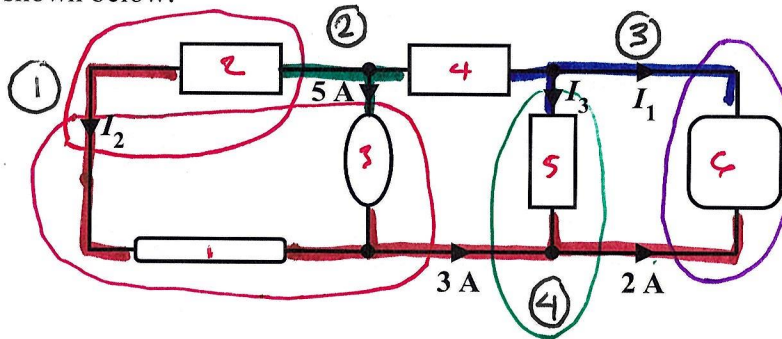


EE 2240  
**Homework Problem #001**

For the circuit shown below:



- a. How many nodes does the circuit have?

4

- b. How many components (also commonly called branches) make up the circuit?

6

- c. Determine the value of  $I_1$ .

$$I_1 + 2A = 0 \Rightarrow I_1 = -2A$$

- d. Determine the value of  $I_2$ .

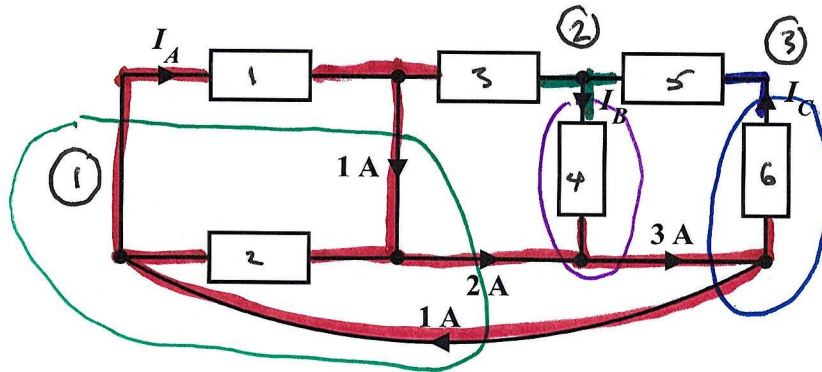
$$I_2 + 5A - 3A = 0 \Rightarrow I_2 = -2A$$

- e. Determine the value of  $I_3$ .

$$I_3 + 3A - 2A = 0 \Rightarrow I_3 = -1A$$

EE 2240  
Homework Problem #002

For the circuit shown below:



a. How many nodes does the circuit have?

3

b. How many branches (components) make up the circuit?

6

c. Determine the value of  $I_A$ .

$$-I_A + 1A - 2A + 1A = 0 \Rightarrow I_A = 0A$$

d. Determine the value of  $I_B$ .

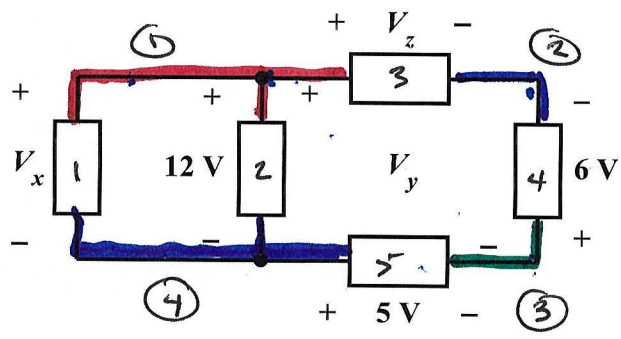
$$I_B + 2A - 3A = 0 \Rightarrow I_B = 1A$$

e. Determine the value of  $I_C$ .

$$-I_C + 3A - 1A = 0 \Rightarrow I_C = 2A$$

EE 2240  
**Homework Problem #003**

For the circuit shown below:



a. How many nodes does the circuit have?

4

b. How many branches (components) make up the circuit?

5

c. Determine the value of  $V_x$ .

$$-V_x + 12V = 0 \Rightarrow V_x = 12V$$

d. Determine the value of  $V_y$ .

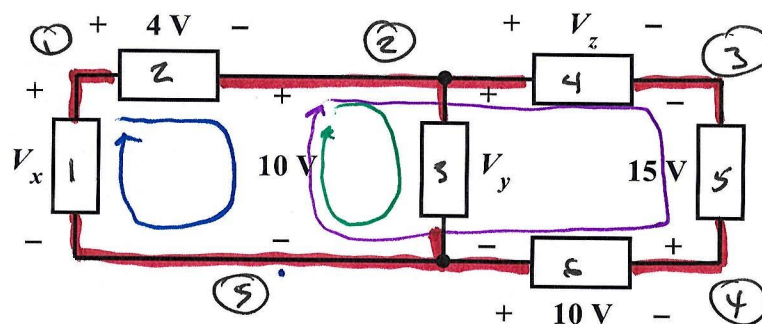
$$V_y - 5V - 12V = 0 \Rightarrow V_y = 17V$$

e. Determine the value of  $V_z$ .

$$V_z - 6V - 5V - 12V = 0 \Rightarrow V_z = 23V$$

EE 2240  
Homework Problem #004

For the circuit shown below:



- a. How many nodes does the circuit have?

5

- b. How many branches make up the circuit?

6

- c. Determine the value of  $V_x$ .

$$4V + 10V - V_x = 0 \Rightarrow V_x = 14V$$

- d. Determine the value of  $V_y$ .

$$V_y - 10V = 0 \Rightarrow V_y = 10V$$

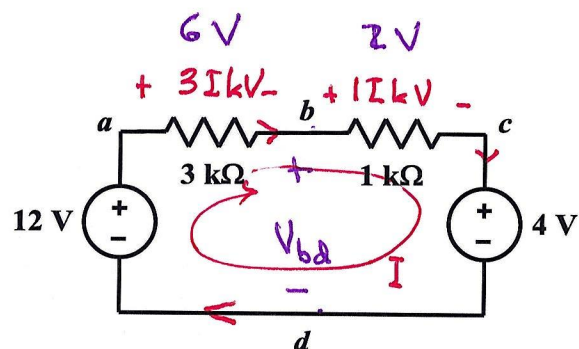
- e. Determine the value of  $V_z$ .

$$V_z - 15V - 10V - 10V = 0$$

$$\Rightarrow V_z = 35V$$

EE 2240  
Problem #01

Find  $V_{bd}$ .



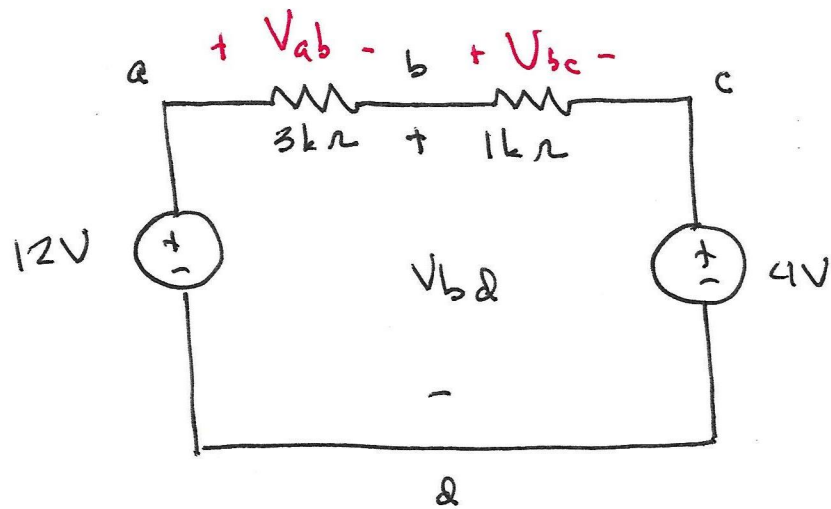
$$\text{KVL: } -12\text{V} + 3I\text{kV} + 1\text{kIV} + 4\text{V} = 0$$

$$4000I\text{V} = 8\text{V}$$

$$I = \frac{8}{4000} = 2\text{mA}$$

$$-12\text{V} + 6\text{V} + V_{bd} = 0$$

$$V_{bd} = 6\text{V}$$



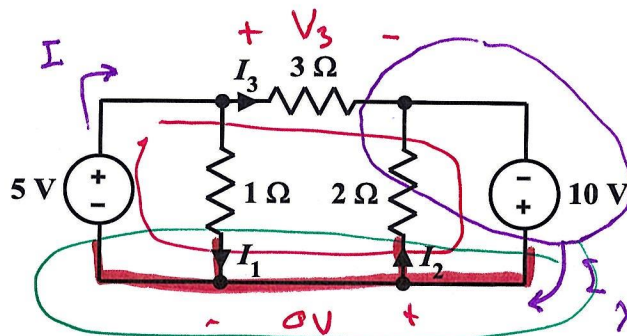
$$V_{ab} = 12 - V_{bd}$$

$$V_{bc} = V_{bd} - 4$$

$$V_{ab} + V_{bc} + 4 - 12 = 0 \quad (\text{KVL})$$

$$12 - V_{bd} + (V_{bd} - 4) + 4 - 12 = 0$$

EE 2240  
Problem #02



- a. Determine the value of  $I_1$ .

$$I_1 = \frac{5V}{1\Omega} = 5A$$

- b. Determine the value of  $I_2$ .

$$I_2 = \frac{10V}{2\Omega} = 5A$$

- c. Determine the value of  $I_3$ .

$$V_3 - 10 - 5 = 0 \Rightarrow V_3 = 15V$$

$$I_3 = \frac{V_3}{3\Omega} = \frac{15V}{3\Omega} = 5A$$

- d. How much power is delivered by the 5 V independent voltage source?

$$I = I_3 + I_1 = 5A + 5A = 10A$$

$$P_{del.} = (5V)(10A) = 50W$$

- e. How much power is delivered by the 10 V independent voltage source?

$$I_x = I_2 + I_3 = 5 + 5 = 10A$$

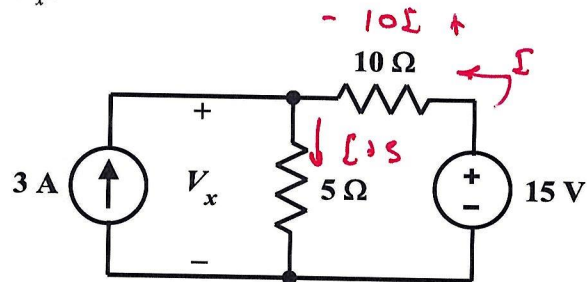
$$P_{del} = (10V)(10A) = 100W$$

$$I_x - I + I_1 - I_2 = 0$$

$$I_x - 10 + 5 - 5 = 0 \Rightarrow I_x = 10A$$

EE 2240  
**Problem #03**

Determine the value of  $V_x$ .



$$10 I + 5(I + 3) = 15$$

$$5I + 15$$

$$10 I + 5 I = 0$$

$$15 I = 0 \Rightarrow I = 0$$

$$I + 3 = 3$$

$$V_x = 5(3A) = 15V$$