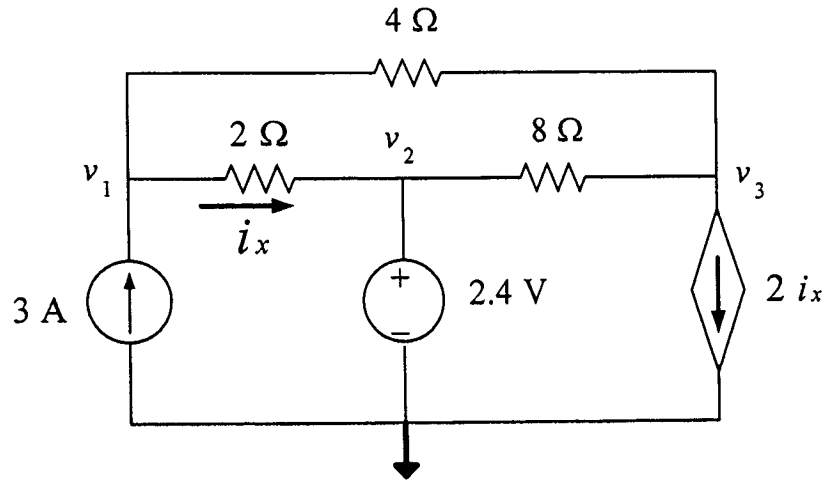
EE 201-01 Fall 2012(121)

QZ 2

SER	ID	NAME	KEY



For the circuit shown above , using the nodal voltage method only find the node voltage v_1, v_2, v_3 ?

$V_2 = 2.4$ (by inspection)

KCL at node V_1 $\quad -3 + \frac{V_1 - V_2}{2} + \frac{V_1 - V_3}{4} = 0$

$\Rightarrow 3V_1 - V_3 = 16.8$ — (1)

KCL at node V_3 $\quad \frac{V_3 - V_2}{8} + \frac{V_3 - V_1}{4} + 2i_x = 0$

$i_x = \frac{V_1 - V_2}{2}$

$\Rightarrow 2V_1 + V_3 = 7.2$ — (2)

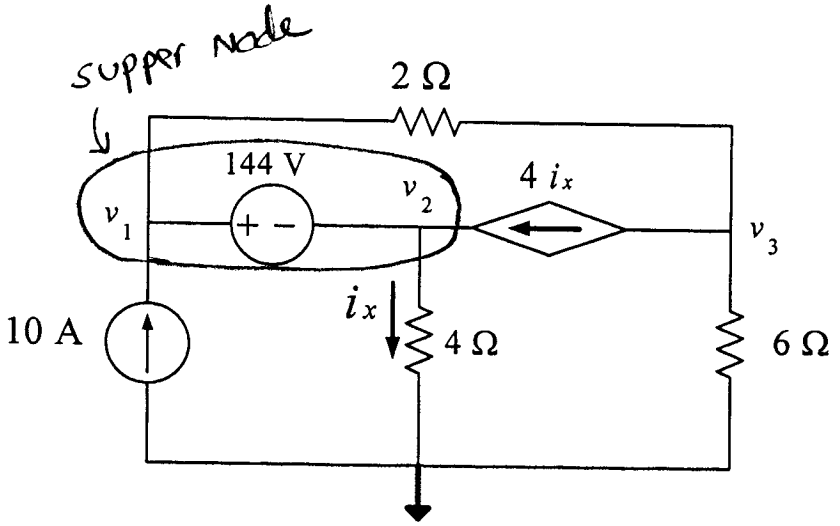
Solving eqs (1) and (2) $\Rightarrow V_1 = 4.8$ V

$V_2 = -2.4$ V

EE 201-02 Fall 2012(121)

QZ 2

SER	ID	NAME KEY



For the circuit shown above , find the nodal equations necessary to solve for the node voltages v_1, v_2, v_3. **Do not solve the equations**

KCL at supper node

$$-10 + \frac{V_1 - V_3}{2} + \frac{V_2}{4} - 4i_x = 0$$

$$i_x = \frac{V_2}{4}$$

$$\Rightarrow 2V_1 - 3V_2 - 2V_3 = 40 \quad -(1)$$

KCl at node 3

$$\frac{V_3}{6} + \frac{V_3 - V_1}{2} + 4i_x = 0$$

$$\Rightarrow -3V_1 + 6V_2 + 4V_3 = 0 \quad -(2)$$

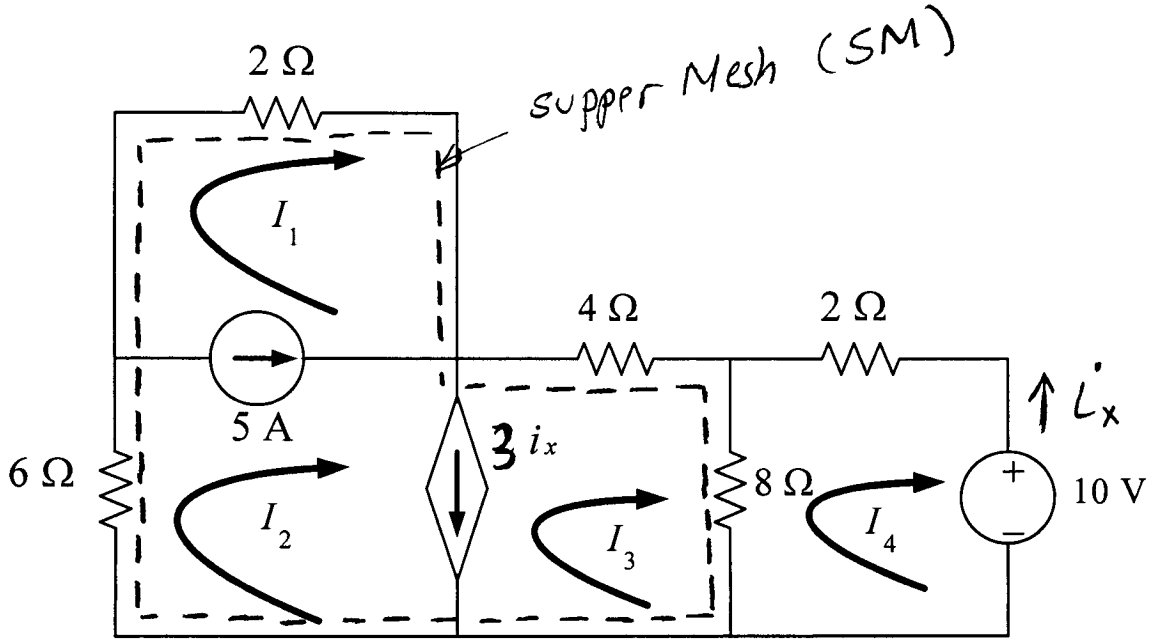
From Independent voltage source, we have

$$V_1 - V_2 = 144 \quad -(3)$$

EE 201-07 Fall 2012(121)

QZ 2

SER	ID	NAME	KEY



For the circuit shown above , find the mesh equations necessary to solve for the mesh currents I_1, I_2, I_3, I_4 ? **Do not Solve the equations**

KVL on (SM)

$$2I_1 + 4I_3 + 8(I_3 - I_4) + 6I_2 = 0$$

$$\Rightarrow I_1 + 3I_2 + 6I_3 - 4I_4 = 0 \quad - (1)$$

KVL on Mesh 4

$$2I_4 + 10 + 8(I_4 - I_3) = 0$$

$$\Rightarrow -4I_3 + 5I_3 = -5 \quad - (2)$$

From Independent current source, we have

$$I_2 - I_1 = 5 \quad - (3)$$

From dependent current source,

$$I_2 - I_3 = 3i_x \qquad i_x = -I_4 \Rightarrow I_2 - I_3 + 3I_4 = 0 \quad - (4)$$