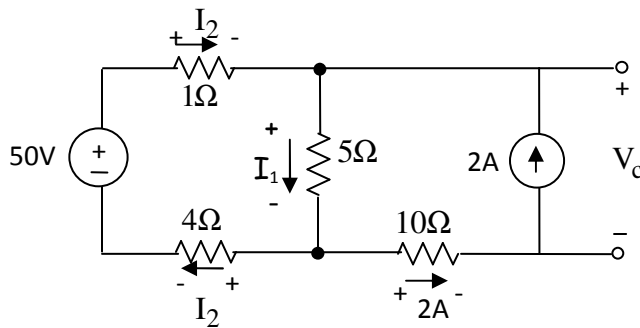


6. Use Kirchoff's laws and Ohm's Law to find the value of V_c .



Step 1. Label all R's with current and label polarity

Step 2. Kirchoff's Voltage Loops(KVL):

$$\text{(Eq. 1) } +50 - I_2(1) - I_1(5) - I_2(4) = 0$$

$$\text{(Eq. 2) } +50 - I_2(1) - V_c + (2)(10) - I_2(4) = 0$$

$$\text{(Eq. 3) } +I_1(5) - V_c + 2(10) = 0$$

Step 3. Kirchoff's Current Summation(KCL): (top node)

$$\text{(Eq. 4) } -2A + I_1 - I_2 = 0$$

Solving Eq. 4 for I_1 gives:

$$+I_1 = I_2 + 2$$

Using this equation and plugging it into Eq. 1 gives:

$$+50 - I_2(1) - (I_2 + 2)(5) - I_2(4) = 0$$

$$+50 - I_2(5) - 5I_2 - 10 = 0$$

$$40 = 10 I_2$$

$$I_2 = 4A$$

$$+I_1 = I_2 + 2 = 4 + 2 = 6$$

$$\text{From Eq. 3} \Rightarrow +(6)(5) - V_c + 2(10) = 0 \quad \Rightarrow V_c = 30 + 20 = 50V$$