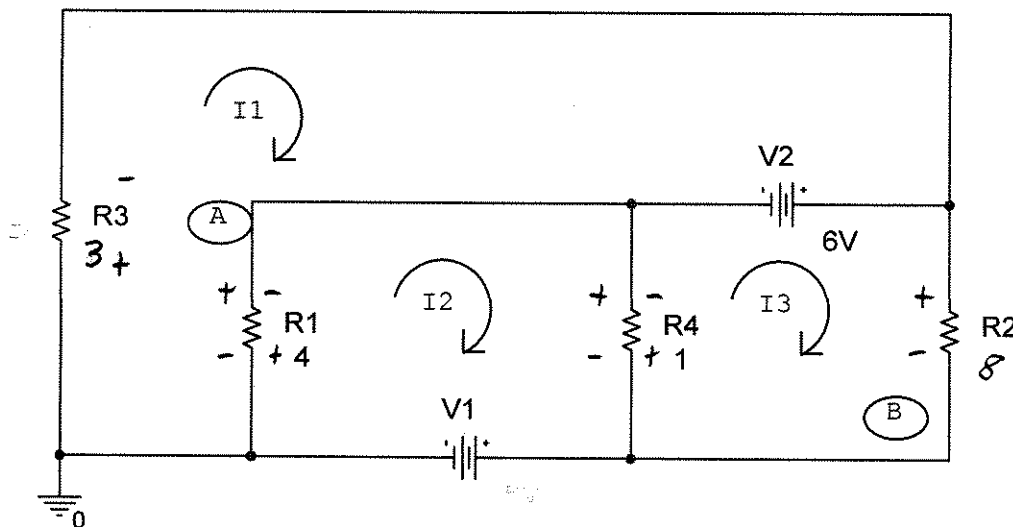


TEAM NAME (printed): * SOLUTIONS *

Team members present (printed):

- 1)
- 2)
- 3)
- 4)
- 5)

All 5 questions are equally weighted, show your work for partial credit and circle or box in your final answers



1. Find the MESH currents in the circuit shown above (I_1 , I_2 , I_3):

Loop 1: $-R_3 I_1 - V_2 - R_1 I_1 + R_1 I_2 = 0$
 $-R_3 I_1 - 4 I_1 + 4 I_2 = 6 \rightarrow -7 I_1 + 4 I_2 + 0 I_3 = 6 \quad (1)$

Loop 2: $-R_1 I_2 + R_1 I_1 - R_4 I_2 + R_4 I_3 - V_1 = 0$
 $4 I_1 - 5 I_2 + I_3 = V_1 \rightarrow 4 I_1 - 5 I_2 + I_3 = V_1 \quad (2)$

Loop 3: $-R_4 I_3 + R_4 I_2 + V_2 - R_2 I_3 = 0$
 $0 I_1 + I_2 - (1 + R_2) I_3 = -6 \rightarrow 0 I_1 + I_2 - 9 I_3 = -6 \quad (3)$

Solving (1) - (3) YIELDS:

$$\begin{aligned} I_1 &= -0.2195 V_1 - 1.4634 \text{ A} \\ I_2 &= -0.3841 V_1 - 1.0609 \text{ A} \\ I_3 &= -0.04268 V_1 + 0.5488 \text{ A} \end{aligned}$$

* (Use your V_1 VALUE TO FIND THE CORRECT #'S)

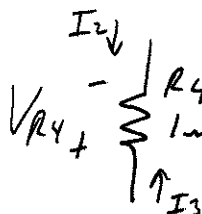
2. Find the power delivered by source V_2 :

$$P_{V_2} = V_2 \cdot I_{\text{source } 2} = V_2 (I_3 - I_1) = 6 (I_3 - I_1) \\ = (1.061 V_1 + 12.07) \text{ W}$$

3. How much power is absorbed by R_3 ?

$$P_{R_3} = (I_{R_3})^2 R_3 = (I_1)^2 R_3 = 0.1446 V_1^2 + 1.9274 V_1 + 6.4247 \text{ W}$$

4. Find the voltage across R_4 ; show the voltage (including polarity) below:



$$V_{R_4} = (I_3 - I_2) R_4 = 0.3415 V_1 + 1.6098 \text{ V}$$

5. Find V_{AB}

$$V_{AB} = V_A - V_B$$

$$V_A = (I_1 - I_2) R_1 = 4 (I_1 - I_2)$$

$$V_B = V_1$$

$$V_{AB} = -(0.3415 V_1 + 1.6098) \text{ V}$$