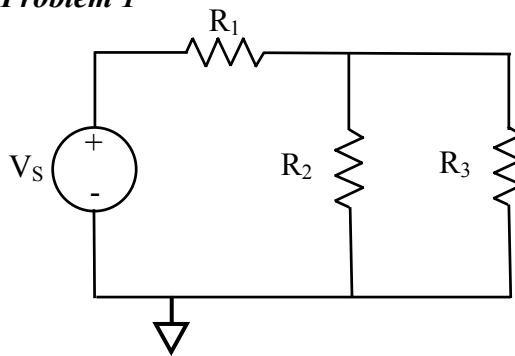


Note: Use Mesh Analysis to solve all problems. Make sure to indicate the current direction and polarity in your answers.

**Problem 1**

Given:

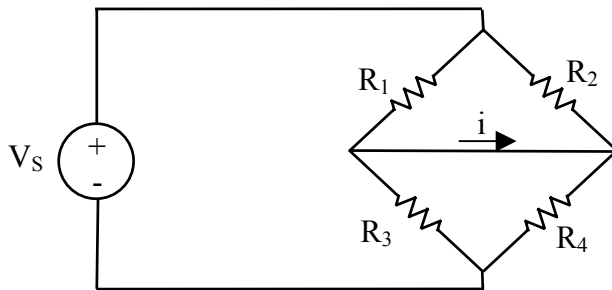
$V_s = 30 \text{ V}$

$R_1 = 500 \ \Omega \quad R_2 = 500 \ \Omega$

$R_3 = 500 \ \Omega$

Find:

1. All mesh currents.
2. The voltage across each resistor
3. The current through each resistor
4. The current through the voltage source.

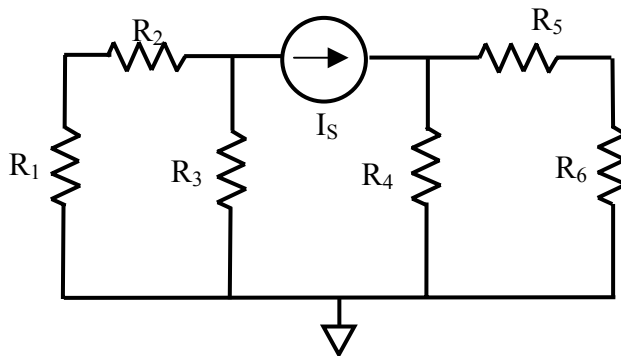
**Problem 2**

Given:

$R_1 = 6 \ \Omega, R_2 = 12 \ \Omega$

$R_3 = 12 \ \Omega, R_4 = 6 \ \Omega, V_s = 10 \text{ V}$

- Find: All the mesh currents,  
The current through  $R_2$   
The voltage across  $R_4$   
The current through  $V_s$   
The current,  $i$

**Problem 3**

Given:

$R_1 = 15 \ \Omega, R_2 = 15 \ \Omega$

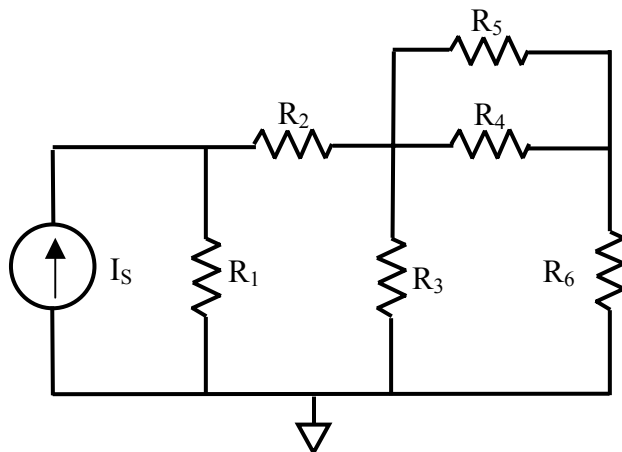
$R_3 = 30 \ \Omega, R_4 = 40 \ \Omega$

$R_5 = 20 \ \Omega, R_6 = 20 \ \Omega$

$I_s = 100 \text{ mA}$

Find:

- All the mesh currents.
- $i_{R_2}, i_{R_4}, V_{R_5}, V_{R_3}$
- The voltage across the current source.

**Problem 4**

Given:

$R_1 = 20 \ \Omega, R_2 = 10 \ \Omega$

$R_3 = R_4 = R_5 = 20 \ \Omega$

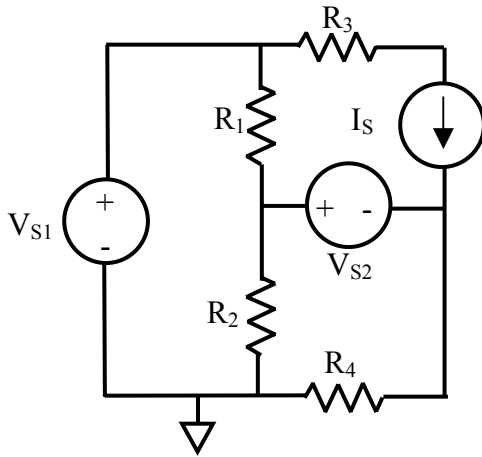
$R_6 = 30 \ \Omega$

$I_s = 5 \text{ A}$

Find:

- All mesh currents.
- The current through  $R_3$  and  $R_4$ .
- The voltage across  $R_1$ .
- The voltage across the source.

**Problem 5**



Given:

$$R_1 = R_2 = 10 \text{ k}\Omega,$$

$$R_3 = 2 \text{ k}\Omega, R_4 = 1 \text{ k}\Omega,$$

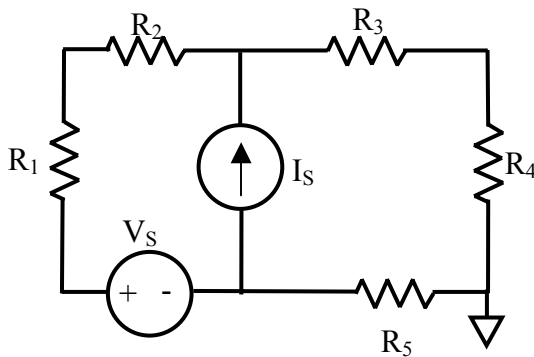
$$V_{S1} = 12 \text{ V}, V_{S2} = 0.5 \text{ V}$$

$$I_S = 2.5 \text{ mA}$$

Find:

- All the mesh currents.
- $i_{R1}, i_{R4}, V_{R3}, V_{R2}$
- The current through the voltage sources.
- The voltage across the current source.

**Problem 6**



Given:

$$V_S = 12 \text{ V}, I_S = 5 \text{ mA}$$

$$R_1 = 300 \Omega, R_2 = 500 \Omega$$

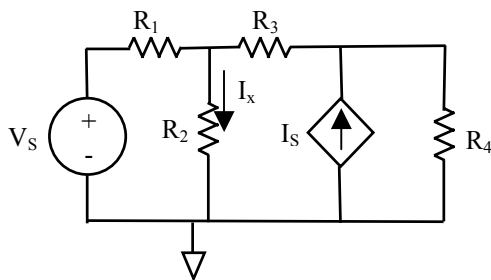
$$R_3 = 60 \Omega, R_4 = 240 \Omega$$

$$R_5 = 180 \Omega$$

Find:

- All the mesh currents.
- $i_{R2}, i_{R3}, V_{R1}, V_{R4}$
- The current through the voltage source.
- The voltage across the current source.

**Problem 7**



Given:

$$R_1 = 10 \Omega, R_2 = 2 \Omega, R_3 = 1 \Omega$$

$$R_4 = 5 \Omega, I_S = 4I_x \text{ A}, V_S = 30 \text{ V}$$

**Find:** All the mesh currents,  
 The current through  $R_3$   
 The voltage across  $R_4$   
 The current through  $V_S$   
 The voltage across  $I_S$   
 $I_S, I_X$

Note:  $I_S$  is handled the same as before except substitute in  $4 \cdot I_x$  and then express  $I_x$  in terms of node voltages.