

Summer 2022

CSE250 – Circuits and Electronics

# Nodes, Branches, Voltage & Current Division rules

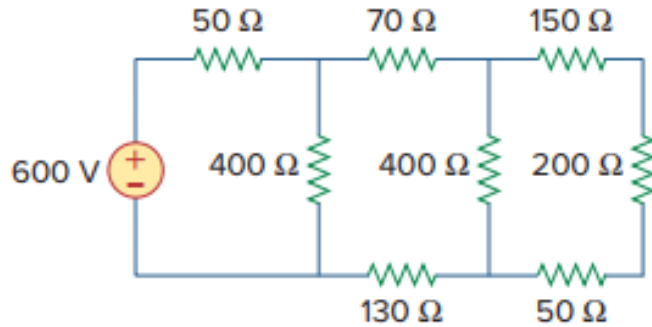


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# Series and Parallel Configuration

# Example 1

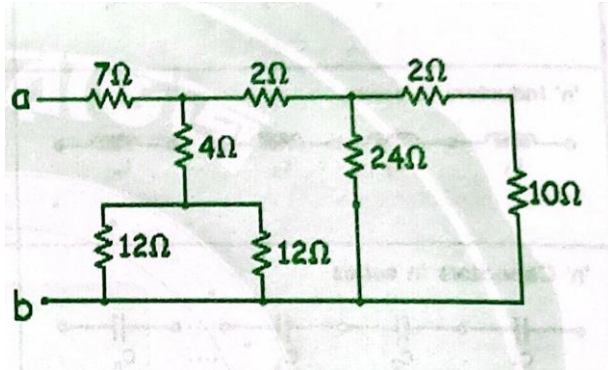
- Using series/parallel resistance combination, find the equivalent resistance seen by the source in the circuit below.



Ans:  $R_{eq} = 250 \Omega$

# Example 2

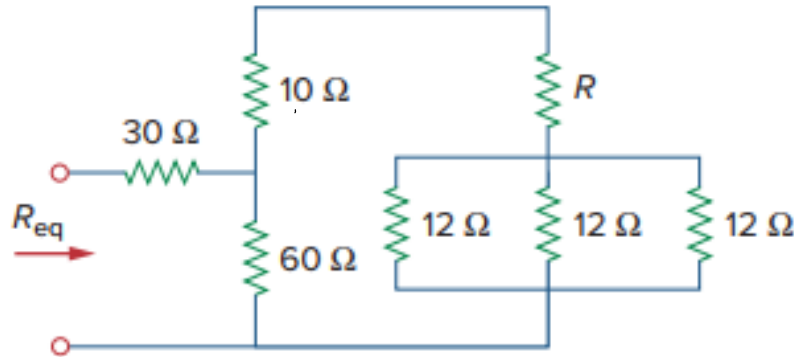
- Find the equivalent resistance between terminals **a** and **b**.



Ans:  $R_{ab} = 12\ \Omega$

# Example 3

- If  $R_{eq} = 50 \Omega$  in the circuit, find  $R$ .



Ans:  $R = 16 \Omega$

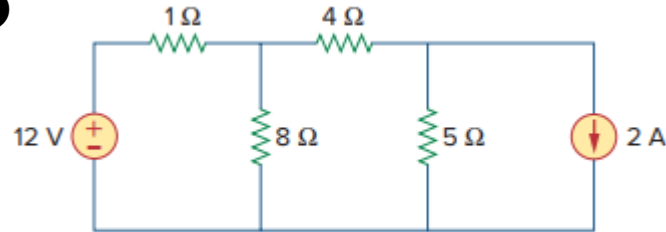
# Nodes, Branches, & Loops

- A **branch** represents a single element such as a voltage source or a resistor. In other words, a branch represents a two-terminal element.
- A **node** is the point of connection between two or more branches.
- A **loop** is a closed path formed by starting at a node, passing through a set of nodes, and returning to the starting node without passing through any node more than once.

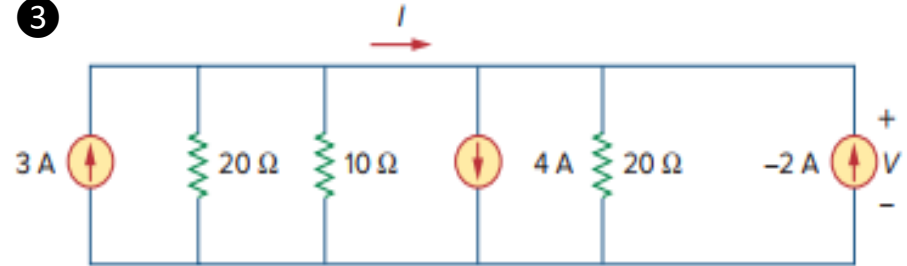
# Example 4

- Determine the number of **branches**, **nodes**, and **loops** in the following circuits

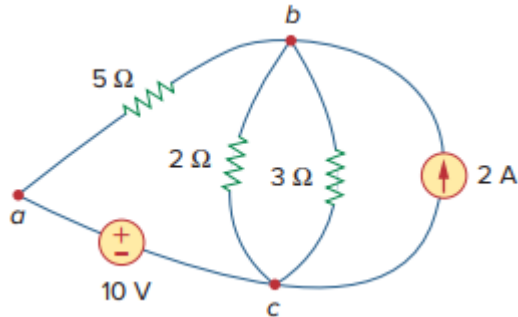
1



3



2

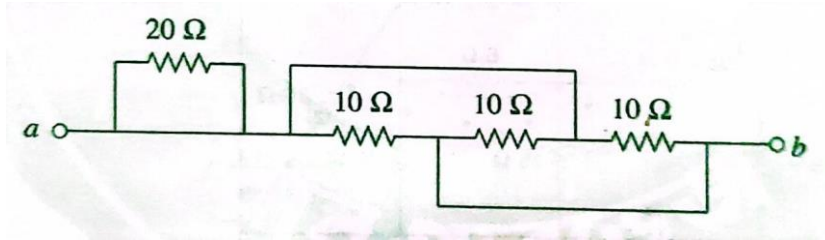


Ans:

- $b = 6; n = 4; l = 3 + 3$
- $b = 5; n = 3; l = 3 + 3$
- $b = 6; n = 2; l = 5 + 10$

# Example 5

- Find the equivalent resistance between terminals **a** and **b**.

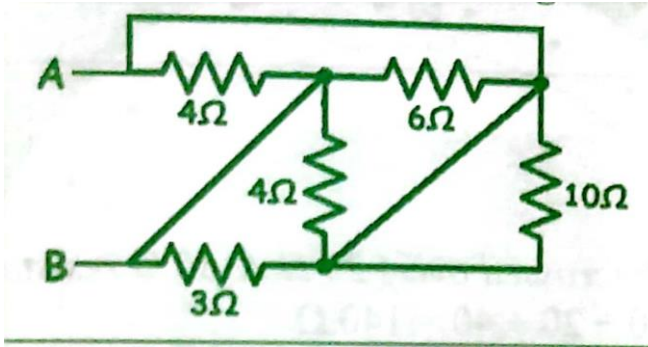


Ans:  $R_{ab} = \frac{10}{3}\ \Omega$



# Example 6

- Find the equivalent resistance between terminals **a** and **b**.



Ans:  $R_{AB} = 1\Omega$

# Series and Parallel Configuration (Revised)

- Two or more elements are in **series** if they exclusively share a single node and consequently carry the same current.
- Two or more elements are in **parallel** if they are connected to the same two nodes and consequently have the same voltage across them.

# Voltage and Current Division Rules

# Thank you for your attention