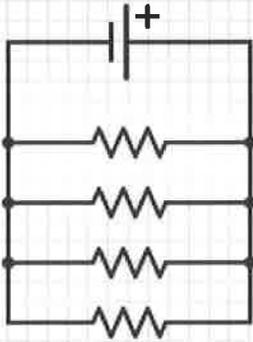


Solutions

Circuit Reduction – The Nine Companions

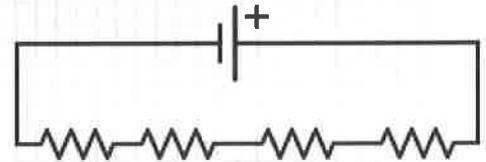
Assume each resistor has a value of 10 Ohms. Find the equivalent resistance of each circuit. Use the space provided to do circuit reductions as necessary.

1.



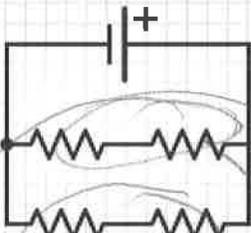
$$\frac{1}{R_{eq}} = \frac{1}{10} + \frac{1}{10} + \frac{1}{10} + \frac{1}{10}$$
$$R_{eq} = \frac{10}{4} \Omega = 2.5 \Omega$$

2.



$$R_{eq} = 10 + 10 + 10 + 10$$
$$= 40 \Omega$$

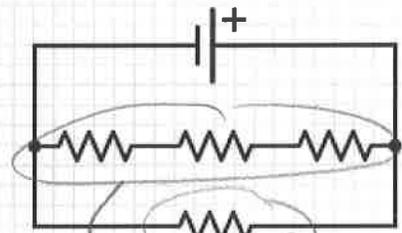
3.



$$R_{eq} = 10 + 10 = 20 \Omega$$

$$\frac{1}{R_{eq}} = \frac{1}{20 \Omega} + \frac{1}{20 \Omega}$$

$$R_{eq} = 10 \Omega$$



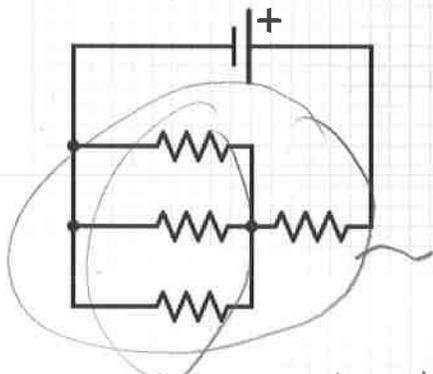
$$R_{eq} = 30 \Omega$$

10 Ω

$$\frac{1}{R_{eq}} = \frac{1}{30 \Omega} + \frac{1}{10 \Omega}$$

$$R_{eq} = \frac{30}{4} \Omega = 7.5 \Omega$$

5.



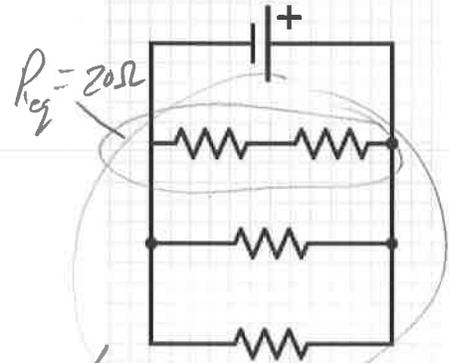
$$R_{eq} = \frac{10}{3} + 10$$

$$= \frac{40}{3} = 13.3 \Omega$$

$$\frac{1}{R_{eq}} = \frac{1}{10} + \frac{1}{10} + \frac{1}{10}$$

$$R_{eq} = 10/3$$

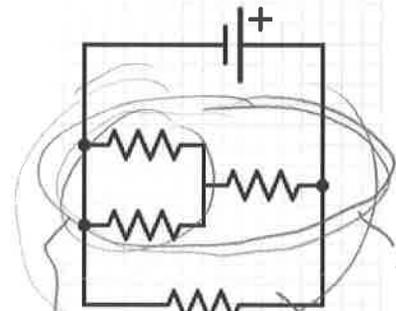
6.



$$R_{eq} = 20 \Omega$$

$$\frac{1}{R_{eq}} = \frac{1}{20} + \frac{1}{10} + \frac{1}{10} \quad R_{eq} = 4 \Omega$$

7.



$$R_{eq} = 5 \Omega + 10 \Omega$$

$$R_{eq} = 15 \Omega$$

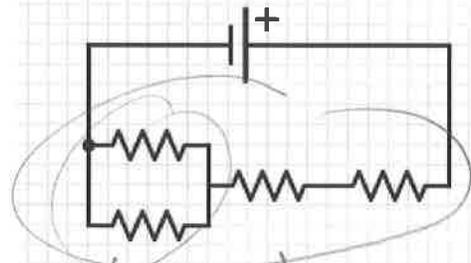
$$\frac{1}{R_{eq}} = \frac{1}{10} + \frac{1}{10}$$

$$R_{eq} = 5 \Omega$$

$$\frac{1}{R_{eq}} = \frac{1}{10} + \frac{1}{15}$$

$$= 6 \Omega$$

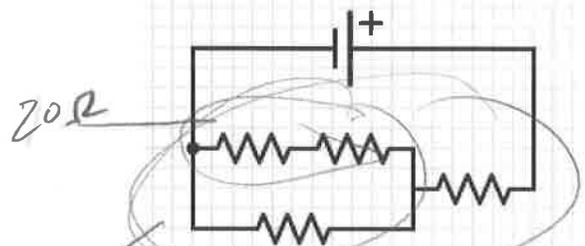
8.



$$R_{eq} = 5 \Omega$$

$$R_{eq} = 5 \Omega + 10 + 10 = 25 \Omega$$

9.



$$\frac{1}{R_{eq}} = \frac{1}{10} + \frac{1}{20} = 6.7 \Omega$$

$$R_{eq} = 6.7 + 10 = 16.7 \Omega$$