QUESTION

Calculate the total resistance in the circuit below and the value of $R_1 = 4\Omega$, $R_2 = 1\Omega$, $R_3 = 12\Omega$, $R_4 = 8\Omega$

SOLUTION

Hint: Since the electrical circuit is not given in the task, then how are the resistors with the given resistances arranged, then I will solve this problem using the drawing I found on the Internet.
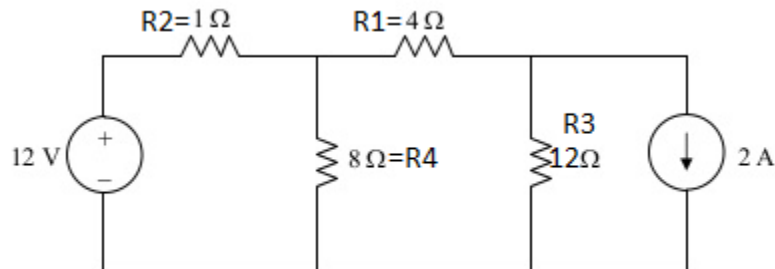
Resistors R_1 and R_3 are connected in series, so they can be replaced with a single resistor with a resistance

$$R_{1-3} = R_1 + R_3 = 4\Omega + 12\Omega = 16\Omega$$

Resistors R_{1-3} and R_4 are connected in parallel, so they can be replaced with a single resistor with a resistance

$$\frac{1}{R_{1-3-4}} = \frac{1}{R_{1-3}} + \frac{1}{R_4} \rightarrow \frac{1}{R_{1-3-4}} = \frac{1}{16} + \frac{1^{\backslash 2}}{8} = \frac{1}{16} + \frac{2}{16} = \frac{3}{16} \rightarrow \frac{1}{R_{1-3-4}} = \frac{3}{16} \rightarrow$$

$$R_{1-3-4} = \frac{16}{3}\Omega$$

Resistors R_{1-3-4} and R_2 are connected in series, so they can be replaced with a single resistor with a resistance

$$R_{1-2-3-4} = 1\Omega + \frac{16}{3}\Omega = \frac{3+16}{3}\Omega \rightarrow \boxed{R_{1-2-3-4} = \frac{19}{3}\Omega \approx 6.33\Omega}$$

ANSWER

$$R_{1-2-3-4} = \frac{19}{3}\Omega \approx 6.33\Omega$$