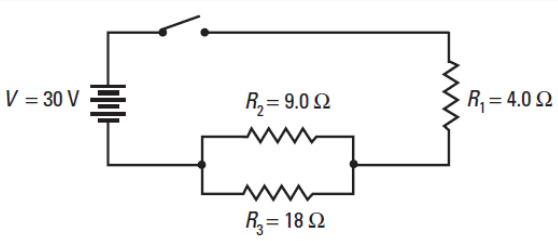
Analyzing Complex Circuits

Resistors in Parallel

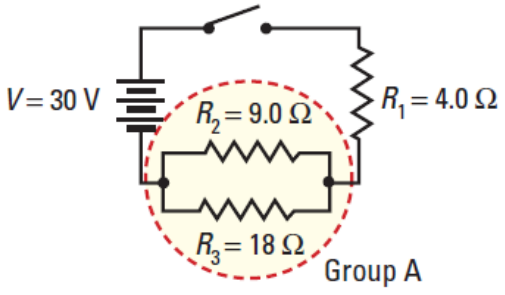
Find the equivalent resistance of the entire circuit shown in the diagram, as well as the current through, and the potential difference across, each load.



$$\frac{1}{R_A} = \frac{1}{R_2} + \frac{1}{R_3}$$

$$\frac{1}{R_A} = \frac{1}{9.0\ \Omega} + \frac{1}{18\ \Omega}$$

$$\frac{1}{R_A} = \frac{2}{18\ \Omega} + \frac{1}{18\ \Omega}$$

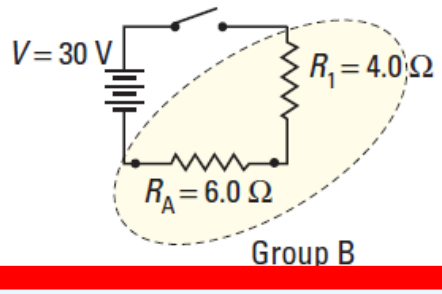


$$\frac{1}{R_A} = \frac{3}{18\ \Omega}$$

$$\frac{1}{R_A} = \frac{1}{6.0\ \Omega}$$

$$R_A = 6.0\ \Omega$$

$$R_B = R_A + R_1$$
$$R_B = 4.0\ \Omega + 6.0\ \Omega$$
$$R_B = 10\ \Omega$$



$$V = IR$$
$$I_S = \frac{V_S}{R_{eq}}$$
$$I_S = \frac{30\ \text{V}}{10\ \Omega}$$
$$I_S = 3.0\ \text{A}$$