Substitute the equivalent resistance value into the equation for current.

$$I = \frac{\Delta V}{R_{eq}} = \frac{9.0\ \text{V}}{18.0\ \Omega}$$

$$\boxed{I = 0.50\ \text{A}}$$

4. EVALUATE For resistors connected in series, the equivalent resistance should be greater than the largest resistance in the circuit.

$$18.0\ \Omega > 7.0\ \Omega$$

PRACTICE A

Resistors in Series

1. A 12.0 V storage battery is connected to three resistors, 6.75 Ω, 15.3 Ω, and 21.6 Ω, respectively. The resistors are joined in series.
   - **a.** Calculate the equivalent resistance.
   - **b.** What is the current in the circuit?
2. A 4.0 Ω resistor, an 8.0 Ω resistor, and a 12.0 Ω resistor are connected in series with a 24.0 V battery.
   - **a.** Calculate the equivalent resistance.
   - **b.** Calculate the current in the circuit.
   - **c.** What is the current in each resistor?
3. Because the current in the equivalent resistor of Sample Problem A is 0.50 A, it must also be the current in each resistor of the original circuit. Find the potential difference across each resistor.
4. A series combination of two resistors, 7.25 Ω and 4.03 Ω, is connected to a 9.00 V battery.
   - **a.** Calculate the equivalent resistance of the circuit and the current.
   - **b.** What is the potential difference across each resistor?
5. A 7.0 Ω resistor is connected in series with another resistor and a 4.5 V battery. The current in the circuit is 0.60 A. Calculate the value of the unknown resistance.
6. Several light bulbs are connected in series across a 115 V source of emf.
   - **a.** What is the equivalent resistance if the current in the circuit is 1.70 A?
   - **b.** If each light bulb has a resistance of 1.50 Ω, how many light bulbs are in the circuit?