

19. The potential difference across each resistor is  $V = 25.0\text{ V}$ . Since the resistors are identical, the current in each one is  $i = V/R = (25.0\text{ V})/(18.0\ \Omega) = 1.39\text{ A}$ . The total current through the battery is then  $i_{\text{total}} = 4(1.39\text{ A}) = 5.56\text{ A}$ . One might alternatively use the idea of equivalent resistance; for four identical resistors in parallel the equivalent resistance is given by

$$\frac{1}{R_{\text{eq}}} = \sum \frac{1}{R} = \frac{4}{R} .$$

When a potential difference of  $25.0\text{ V}$  is applied to the equivalent resistor, the current through it is the same as the total current through the four resistors in parallel. Thus  $i_{\text{total}} = V/R_{\text{eq}} = 4V/R = 4(25.0\text{ V})/(18.0\ \Omega) = 5.56\text{ A}$ .