PRACTICE C

Equivalent Resistance

1. For each of the following sets of values, determine the equivalent resistance for the circuit shown in **Figure 16.**

   a. $R_a = 25.0\ \Omega$ $\quad R_b = 3.0\ \Omega$ $\quad R_c = 40.0\ \Omega$
   b. $R_a = 12.0\ \Omega$ $\quad R_b = 35.0\ \Omega$ $\quad R_c = 25.0\ \Omega$
   c. $R_a = 15.0\ \Omega$ $\quad R_b = 28.0\ \Omega$ $\quad R_c = 12.0\ \Omega$

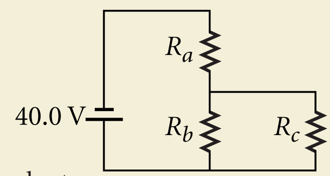

Figure 16

2. For each of the following sets of values, determine the equivalent resistance for the circuit shown in **Figure 17.**

   a. $R_a = 25.0\ \Omega$ $\quad R_b = 3.0\ \Omega$ $\quad R_c = 40.0\ \Omega$
   $R_d = 15.0\ \Omega$ $\quad R_e = 18.0\ \Omega$

   b. $R_a = 12.0\ \Omega$ $\quad R_b = 35.0\ \Omega$ $\quad R_c = 25.0\ \Omega$
   $R_d = 50.0\ \Omega$ $\quad R_e = 45.0\ \Omega$

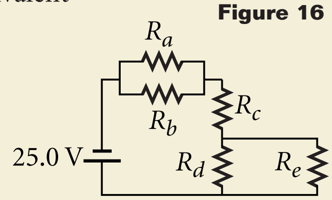

Figure 17

Work backward to find the current in and potential difference across a part of a circuit

Now that the equivalent resistance for a complex circuit has been determined, you can work backward to find the current in and potential difference across any resistor in that circuit. In the household example, substitute potential difference and equivalent resistance in $\Delta V = IR$ to find the total current in the circuit. Because the fuse or circuit breaker is in series with the load, the current in it is equal to the total current. Once this total current is determined, $\Delta V = IR$ can again be used to find the potential difference across the fuse or circuit breaker.

There is no single formula for finding the current in and potential difference across a resistor buried inside a complex circuit. Instead, $\Delta V = IR$ and the rules reviewed in **Table 3** must be applied to smaller pieces of the circuit until the desired values are found.

Table 3 Series and Parallel Resistors

	Series	Parallel
current	same as total	add to find total
potential difference	add to find total	same as total