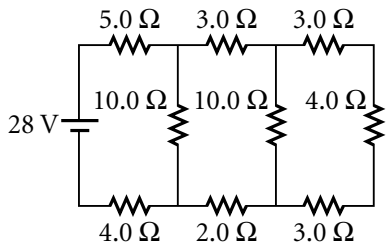
44. Two resistors, *A* and *B*, are connected in series to a 6.0 V battery. A voltmeter connected across resistor *A* measures a potential difference of 4.0 V. When the two resistors are connected in parallel across the 6.0 V battery, the current in *B* is found to be 2.0 A. Find the resistances of *A* and *B*.

45. Draw a schematic diagram of nine 100 Ω resistors arranged in a series-parallel network so that the total resistance of the network is also 100 Ω. All nine resistors must be used.

46. For the circuit below, find the following:

a. the equivalent resistance of the circuit

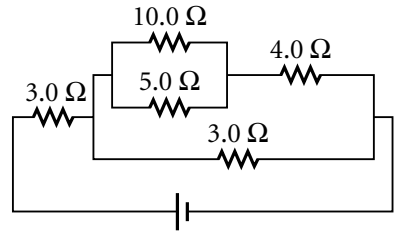
b. the current in the 5.0 Ω resistor



47. The power supplied to the circuit shown below is 4.00 W. Determine the following:

a. the equivalent resistance of the circuit

b. the potential difference across the battery



48. Your toaster oven and coffee maker each dissipate 1200 W of power. Can you operate both of these appliances at the same time if the 120 V line you use in your kitchen has a circuit breaker rated at 15 A? Explain.

49. An electric heater is rated at 1300 W, a toaster is rated at 1100 W, and an electric grill is rated at 1500 W. The three appliances are connected in parallel across a 120 V emf source.

a. Find the current in each appliance.

b. Is a 30.0 A circuit breaker sufficient in this situation? Explain.

Graphing Calculator Practice

Parallel Resistors

Electric circuits are often composed of combinations of series and parallel circuits. The overall resistance of a circuit is determined by dividing the circuit into groups of series and parallel resistors and determining the equivalent resistance of each group. As you learned earlier in this chapter, the equivalent resistance of parallel resistors is given by the following equation:

$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \cdots$$

One interesting consequence of this equation is that the equivalent resistance for resistors in parallel will always be less than the smallest resistor in the group.

In this graphing calculator activity, you will determine the equivalent resistance for various resistors in parallel. You will confirm that the equivalent resistance is always less than the smallest resistor, and you will relate the number of resistors and changes in resistance to the equivalent resistance.

Visit go.hrw.com and type in the keyword **HF6CIRX** to find this graphing calculator activity. Refer to **Appendix B** for instructions on downloading the program for this activity.