

## Lesson 6-7

### Example 1 Use a Map Scale

**MAPS** On a map having a scale of 1 inch = 25 miles, the distance between two cities is 3.2 inches. What is the actual distance between the two cities?

Let  $d$  = the actual distance between the cities. Write and solve a proportion. Use the scale written as a fraction.

$$\begin{array}{l} \text{map} \rightarrow \\ \text{actual} \rightarrow \end{array} \frac{\text{Scale}}{\text{25 miles}} = \frac{\text{Distance}}{d \text{ miles}} \begin{array}{l} \leftarrow \text{map} \\ \leftarrow \text{actual} \end{array}$$
$$1 \cdot d = 25 \cdot 3.2$$
$$d = 80$$

Cross products  
Simplify.

The actual distance between the two cities is 80 miles.

### Example 2 Use a Blueprint Scale

**RECREATION CENTER** On the blueprint of a new recreation center, each square has a side length of 3 centimeters. If the length of the new recreation center on the blueprint is 27 centimeters and the scale reads 3 cm = 15 feet, find the actual length of the recreation center.

The recreation center on the blueprint is 27 centimeters long.

Let  $\ell$  = the actual length of the recreation center. Write and solve a proportion using the scale.

$$\begin{array}{l} \text{blueprint} \rightarrow \\ \text{actual} \rightarrow \end{array} \frac{\text{Scale}}{15 \text{ ft}} = \frac{\text{Length}}{\ell \text{ ft}} \begin{array}{l} \leftarrow \text{blueprint} \\ \leftarrow \text{actual} \end{array}$$
$$3 \cdot \ell = 15 \cdot 27$$
$$3\ell = 405$$
$$\ell = 135$$

Cross products  
Multiply.  
Simplify. Divide each side by 3.

The length of the recreation center is 135 feet.

**Example 3 Use a Scale Model**

**DOLLS** Designers are creating a child-sized version of a doll's dress. If they use a scale of 10 inches = 1 inch and the doll's dress has a length of 4.5 inches, what is the length of the child-sized dress?

Write a proportion using the scale.

$$\begin{array}{rcccl}
 & \text{Scale} & \text{Length} & & \\
 \text{doll} \rightarrow & 10 \text{ inches} & c \text{ inches} & \leftarrow \text{doll} & \\
 \text{actual} \rightarrow & \frac{10 \text{ inches}}{1 \text{ inch}} = & \frac{c \text{ inches}}{4.5 \text{ inches}} & \leftarrow \text{actual} & \\
 & & 10 \cdot 4.5 = 1 \cdot c & \text{Find the cross products.} & \\
 & & 45 = c & \text{Multiply.} & 
 \end{array}$$

The child-sized dress is 45 inches long.

**Example 4 Find a Scale Factor**

**Find the scale factor of a blueprint if the scale is 1 inch = 7 feet.**

Write the ratio of 1 inch to 7 feet in simplest form.

$$\begin{array}{rcl}
 \frac{1 \text{ inch}}{7 \text{ feet}} = \frac{1 \cancel{\text{ inch}}}{84 \cancel{\text{ inches}}} & \text{Convert 7 feet to inches.} & \\
 = \frac{1}{84} & \text{Cancel the units.} & 
 \end{array}$$

The scale factor is  $\frac{1}{84}$ . That is, each measure on the blueprint is  $\frac{1}{84}$  the actual measure.