Lesson 6-2

Example 1 Identify Proportions

Determine whether each pair of ratios forms a proportion.

a. $\frac{\mathbf{2}}{\mathbf{5}}, \frac{\mathbf{3}}{\mathbf{8}}$

$\frac{2}{5} \stackrel{?}{=} \frac{3}{8}$ Write a proportion.

$2 \cdot 8 \stackrel{?}{=} 5 \cdot 3$ Cross products

$16 \neq 15$ Simplify.

So, $\frac{2}{5} \neq \frac{3}{8}$.

b. $\frac{\mathbf{3}}{\mathbf{4}}, \frac{\mathbf{5.1}}{\mathbf{6.8}}$

$\frac{3}{4} \stackrel{?}{=} \frac{5.1}{6.8}$ Write a proportion.

$3 \cdot 6.8 \stackrel{?}{=} 4 \cdot 5.1$ Cross products

$20.4 = 20.4$ Simplify.

So, $\frac{3}{4} = \frac{5.1}{6.8}$.

Example 2 Solve Proportions

Solve each proportion.

a. $\frac{\mathbf{5}}{\mathbf{9}} = \frac{\boldsymbol{x}}{\mathbf{36}}$

$\frac{5}{9} = \frac{x}{36}$

$5 \cdot 36 = 9 \cdot x$ Cross products

$180 = 9x$ Multiply.

$\frac{180}{9} = \frac{9x}{9}$ Divide.

$20 = x$

The solution is 20.

b. $\frac{12}{b} = \frac{4}{15.2}$

$\frac{12}{b} = \frac{4}{15.2}$

$12 \cdot 15.2 = 4 \cdot b$ Cross products

$182.4 = 4b$ Multiply.

$\frac{182.4}{4} = \frac{4b}{4}$ Divide.

$45.6 = b$

The solution is 45.6.

Example 3 Use a Proportion to Solve a Problem

MAPS The scale of a map indicated 1 inch on the map equates to 30 miles of actual distance. How many miles of actual distance are shown by 4.2 inches on the map?

Explore You know the actual distance for 1 inch on the map. You need to find the actual distance for 4.2 inches on the map.

Plan Write and solve a proportion using ratios that compare map distance to actual distance. Let d represent the actual distance associated with 4.2 map inches.

Solve $\frac{\text{actual miles}}{1 \text{ inch on map}} = \frac{\text{actual miles}}{4.2 \text{ inches on map}}$

$\frac{30}{1} = \frac{d}{4.2}$ Write a proportion.

$30 \cdot 4.2 = 1 \cdot d$ Cross products

$126 = d$ Multiply.

The actual distance related to 4.2 inches on the map is 126 miles.

Explore Check the cross products. Since $30 \cdot 4.2 = 126$ and $1 \cdot 126 = 126$, the answer is correct.

Example 4 Convert Measurements

PUMPKINS A large pumpkin has a diameter measuring 29 inches. Find the diameter of the pumpkin in centimeters if 1 inch = 2.54 cm.

Let x represent the diameter in centimeters.

customary measurement $\rightarrow$ $\frac{1 \text{ in.}}{2.54 \text{ cm}} = \frac{29 \text{ in.}}{x \text{ cm}}$ $\leftarrow$ customary measurement

metric measurement $\rightarrow$ $\leftarrow$ metric measurement

$1 \cdot x = 2.54 \cdot 29$ Cross products

$x = 73.66$ Simplify.

The diameter of the pumpkin is 73.66 centimeters.