

6-6**Study Guide and Intervention****Algebra: Solving Proportions**

A **proportion** is an equation stating that two ratios are equivalent. Since rates are types of ratios, they can also form proportions. In a proportion, a **cross product** is the product of the numerator of one ratio and the denominator of the other ratio.

Example 1 Determine whether $\frac{2}{3}$ and $\frac{10}{15}$ form a proportion.

$$\frac{2}{3} \stackrel{?}{=} \frac{10}{15}$$

Write a proportion.

$$2 \times 15 \stackrel{?}{=} 3 \times 10$$

Find the cross products.

$$30 = 30 \quad \checkmark$$

Multiply.

The cross products are equal, so the ratios form a proportion.

Example 2 Solve $\frac{8}{a} = \frac{10}{15}$.

$$\frac{8}{a} = \frac{10}{15}$$

Write the proportion.

$$8 \times 15 = a \times 10$$

Find the cross products.

$$120 = 10a$$

Multiply.

$$\frac{120}{10} = \frac{10a}{10}$$

Divide each side by 10.

$$12 = a$$

Simplify.

The solution is 12.

Exercises

Determine if the quantities in each pair of ratios are proportional. Explain.

1. $\frac{8}{10} = \frac{4}{5}$ **yes**

2. $\frac{9}{4} = \frac{11}{6}$ **no**

3. $\frac{6}{14} = \frac{9}{21}$ **yes**

4. $\frac{15}{12} = \frac{9}{6}$ **no**

5. $\frac{\$2.48}{4 \text{ oz}} = \frac{\$3.72}{6 \text{ oz}}$ **yes**

6. $\frac{125 \text{ mi}}{5.7 \text{ gal}} = \frac{120 \text{ mi}}{5.6 \text{ gal}}$ **no**

Solve each proportion.

7. $\frac{y}{7} = \frac{16}{28}$ **4**

8. $\frac{5}{15} = \frac{15}{w}$ **45**

9. $\frac{20}{b} = \frac{70}{28}$ **8**

10. $\frac{52}{8} = \frac{m}{9}$ **58.5**