

Lesson 1-6 Solve Proportional Relationships

A **proportion** is an equation that states that two ratios are equivalent. To determine whether a pair of ratios forms a proportion, use cross products. You can also use cross products to solve proportions.

Example 1

Determine whether the pair of ratios $\frac{20}{24}$ and $\frac{12}{18}$ form a proportion.

Find the cross products.

$$\begin{array}{l} \cancel{20} \cdot \cancel{18} \rightarrow 24 \cdot 12 = 288 \\ \cancel{24} \cdot \cancel{12} \rightarrow 20 \cdot 18 = 360 \end{array}$$

Since the cross products are not equal, the ratios do not form a proportion.

Example 2

Solve $\frac{12}{30} = \frac{k}{70}$.

$$\frac{12}{30} = \frac{k}{70}$$

$$12 \cdot 70 = 30 \cdot k$$

$$840 = 30k$$

$$\frac{840}{30} = \frac{30k}{30}$$

$$28 = k$$

Write the equation.

Find the cross products.

Multiply.

Divide each side by 30.

Simplify.

The solution is 28.

Exercises

Determine whether each pair of ratios forms a proportion.

1. $\frac{17}{10}, \frac{12}{5}$

3. $\frac{8}{12}, \frac{10}{15}$

4. $\frac{7}{15}, \frac{13}{32}$

6. $\frac{8}{24}, \frac{12}{28}$

7. $\frac{4}{7}, \frac{12}{71}$

9. $\frac{18}{24}, \frac{3}{4}$

Solve each proportion.

10. $\frac{x}{5} = \frac{15}{25}$

12. $\frac{6}{9} = \frac{10}{r}$

13. $\frac{16}{24} = \frac{z}{15}$

15. $\frac{14}{t} = \frac{10}{11}$

16. $\frac{w}{6} = \frac{2.8}{7}$

18. $\frac{x}{18} = \frac{7}{36}$

Lesson 1-6 Skills Practice

Solve Proportional

Relationships Determine whether each pair of ratios form a proportion.

1. $\frac{5}{8}, \frac{2}{3}$

3. $\frac{6}{8}, \frac{9}{12}$

4. $\frac{16}{9}, \frac{11}{6}$

6. $\frac{6}{8}, \frac{15}{20}$

7. $\frac{5}{9}, \frac{15}{27}$

9. $\frac{7}{11}, \frac{15}{23}$

10. $\frac{9}{13}, \frac{13}{17}$

12. $\frac{6}{7}, \frac{36}{49}$

Solve each proportion.

13. $\frac{4}{12} = \frac{y}{9}$

15. $\frac{7}{z} = \frac{84}{12}$

16. $\frac{5}{10} = \frac{8}{w}$

18. $\frac{6}{20} = \frac{y}{5}$

19. $\frac{5}{9} = \frac{6}{r}$

21. $\frac{d}{5} = \frac{12}{80}$

22. $\frac{y}{5} = \frac{13}{10}$

24. $\frac{11}{t} = \frac{100}{11}$

25. $\frac{1.2}{m} = \frac{3}{5}$

27. $\frac{3}{7} = \frac{k}{4.2}$

28. $\frac{6.3}{x} = \frac{18}{5}$

30. $\frac{14}{1.5} = \frac{4.2}{y}$