

5.7 Solving Proportions (Part 1)

An equation stating that two ratios are equivalent is called a **PROPORTION**.

One way to determine if two ratios form a proportion is to check their cross products.

Property of Proportions

The cross products of a proportion are equal.

If $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$.

Example: Solve each proportion.

a.) $\frac{1}{5} = \frac{x}{35}$

$$1 \cdot 35 = 5 \cdot x$$

$$\frac{35}{5} = \frac{5x}{5}$$

$$x = 7$$

b.) $\frac{1}{3} = \frac{6}{s}$

$$1 \cdot s = 3 \cdot 6$$

$$s = 18$$

Example: Solve each proportion.

$$c.) \quad \frac{m}{3} = \frac{14}{21}$$

$$m \cdot 21 = 3 \cdot 14$$

$$\frac{21m}{21} = \frac{42}{21}$$

$$\boxed{m = 2}$$

$$d.) \quad \frac{3}{a} = \frac{18}{24}$$

$$3 \cdot 24 = 18 \cdot a$$

$$\frac{72}{18} = \frac{18a}{18}$$

$$\boxed{a = 4}$$

Example: Solve each proportion.

$$e.) \quad \frac{b}{15} = \frac{66}{90}$$

$$\frac{90b}{90} = \frac{990}{90}$$

$$\boxed{b = 11}$$

$$f.) \quad \frac{3.2}{9} = \frac{n}{36}$$

$$\frac{115.2}{9} = \frac{9n}{9}$$

$$\boxed{n = 12.8}$$

$$\begin{array}{r} 36 \\ \times 3.2 \\ \hline 72 \\ 1080 \\ \hline 115.2 \end{array}$$

$$\begin{array}{r} 12.8 \\ 9 \overline{) 115.2} \\ \underline{90} \\ 25 \\ \underline{18} \\ 72 \\ \underline{72} \\ 0 \end{array}$$

Example: Solve each proportion.

g.) $\frac{x}{4} = \frac{7}{20}$

$$\frac{20x}{20} = \frac{28}{20}$$

$$x = \frac{28 \div 4}{20 \div 4}$$

$$\boxed{x = \frac{7}{5} \text{ or } 1.4}$$

h.) $\frac{7}{14} = \frac{c}{12}$

$$\frac{84}{14} = \frac{14c}{14}$$

$$\boxed{c = 6}$$

Example: Solve each proportion.

i.) $\frac{6.8}{t} = \frac{34}{50}$

$$\begin{array}{r} 6.8 \\ \times 50 \\ \hline 00 \\ +3400 \\ \hline 340.0 \end{array}$$

$$\frac{340}{34} = \frac{34t}{34}$$

$$\boxed{t = 10}$$

j.) $\frac{m}{8.5} = \frac{42}{51}$

$$\begin{array}{r} 8.5 \\ \times 42 \\ \hline 170 \\ +3400 \\ \hline 357.0 \end{array}$$

$$\frac{51m}{51} = \frac{357}{51}$$

$$\boxed{m = 7}$$