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Proportions

An equation stating that two ^{fractions} 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: Use cross products to determine whether each pair of ratios forms a proportion.

1.) $\frac{6}{15} = \frac{3}{7}$

$$6 \cdot 7 \stackrel{?}{=} 15 \cdot 3$$

$$42 \neq 45$$

NOT
PROPORTIONAL

2.) $\frac{2}{3} = \frac{8}{12}$

$$2 \cdot 12 \stackrel{?}{=} 8 \cdot 3$$

$$24 = 24$$

PROPORTIONAL

3.) $\frac{8}{9} = \frac{16}{17}$

$$8 \cdot 17 \stackrel{?}{=} 9 \cdot 16$$

$$136 \neq 144$$

NOT
PROPORTIONAL

Example: Solve each proportion.

$$4.) \frac{1}{5} = \frac{x}{35}$$

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

$$35 = 5x$$

$$\div 5 \quad \div 5$$

$$\boxed{x = 7}$$

$$5.) \frac{1}{3} = \frac{6}{s}$$

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

$$\boxed{s = 18}$$

Example: Solve each proportion.

$$6.) \frac{3}{a} = \frac{18}{24}$$

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

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

$$\boxed{a = 4}$$

$$7.) \frac{m}{3} = \frac{14}{21}$$

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

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

$$\boxed{m = 2}$$