

Lesson 8.1 Ratios and Proportions

Ratio: A comparison of two quantities

A ratio can be written in the following ways: a:b a to b or

$\frac{a}{b}$ As long as b does not equal 0



EX. What is the ratio of 2 nickels to 4 dimes?

Ex. What is the ratio of 4 feet to 3 inches?

Proportion: A statement indicating that two ratios are equivalent

$$\frac{a}{b} = \frac{c}{d}$$



Can also be written:

$$a:b = c:d$$

Properties of Proportions:

$$\frac{a}{b} = \frac{c}{d} \text{ is equivalent to}$$

(1) $ad = bc$

(2) $\frac{b}{a} = \frac{d}{c}$

(3) $\frac{a}{c} = \frac{b}{d}$

(4) $\frac{a+b}{b} = \frac{c+d}{d}$

extreme \rightarrow $\frac{a}{b} = \frac{c}{d}$ \leftarrow mean
mean \rightarrow $\frac{a}{b} = \frac{c}{d}$ \leftarrow extreme

In a proportion, the product of the extremes is equal to the product of the means.

$$a \cdot d = b \cdot c \text{ Cross Product Property}$$

Complete each statement if $\frac{x}{y} = \frac{5}{6}$

1. $6x = ?$

3. $\frac{x}{5} = \frac{?}{?}$

2. $\frac{y}{x} = \frac{?}{?}$

4. $\frac{x+y}{y} = \frac{?}{?}$

Solve each proportion:

$$\frac{4}{9} = \frac{x}{5}$$

$$\frac{3t-1}{4} = \frac{7}{8}$$

Ratios can compare three or more numbers.

The expression a:b:c means that the ratio of the first two numbers is a:b, the ratio of the last two numbers is b:c, and the ratio of the first and last numbers is a:c.

Extended Proportion

In a triangle, the ratio of the measures of three sides is 8:7:5 and its perimeter is 240 cm. Find the measure of each side of the triangle?

Scale factor?

In a scale drawing, the scale compares each length in the drawing to the actual length.

You want to make a new scale drawing with a scale of 1 in = 4 ft. What would the dimensions be of your 14 ft by 10 ft bedroom in this scale drawing?

Ex. The ratio of the measures of two consecutive angles between the parallel sides of a trapezoid is 5:7. The ratio of the other two consecutive angle measures between the parallel sides is 1:3. Find the measures of the angles in the trapezoid.