



# Ratios and Proportions

Key

**Ratio:** Uses division to compare two quantities.

**Ex 1:** You can write the ratio of two quantities a and b in three ways:

1.  $a:b$
2.  $a$  to  $b$
3.  $\frac{a}{b}$

**Ex 2:** A volleyball team plays 14 home matches and 10 away matches. Of those games they win 17 of them.

- a. Find the ratio of home matches to away matches:
- b. Find the ratio of home matches to ALL matches:
- c. Find the ratio of wins to losses:

24 total

$$\frac{14}{10}$$

$$14 \text{ to } 24$$

$$17:7$$



**Proportions:** An equation that states that two ratios are equivalent.

Solving Proportions

CROSS MULTIPLY

1.  $\frac{11}{6} = \frac{x}{30}$   $x=55$

SHORT CUT!

2.  $\frac{w}{35} = \frac{4}{7}$   $w=20$

3.  $\frac{9}{2} = \frac{m}{12}$   $m=54$

4.  $\frac{8}{x} = \frac{6}{15}$  CROSS MULTIPLY

$$8 \cdot 15 = 6x$$

$$120 = 6x$$

$$20 = x$$

5.  $\frac{y}{6} = \frac{15}{9}$

$$6 \cdot 15 = 9y$$

$$90 = 9y$$

$$10 = y$$

$\frac{y}{6} = \frac{15}{9}$

$$y=10$$

Reducing first can help make the numbers easier to work with 😊

**Putting Phrases into proportions:** Write the sentence as a proportion. Then solve.

1. 5 is to 7 as y is to 49

$$\frac{5}{7} = \frac{y}{49}$$

$$y=35$$

2. y is to 20 as 9 is to 5

$$\frac{y}{20} = \frac{9}{5}$$

$$y=36$$

## Let's take it up a notch!!!

Directions: Solve for x.

1.  $\frac{4}{x} = \frac{8}{x-3}$  ← use parentheses

$$8x = 4(x-3)$$

$$8x = 4x - 12$$

$$4x = -12$$

$$x = -3$$

2.  $\frac{-1}{5} = \frac{k-8}{7+k}$

$$-1(7+k) = 5(k-8)$$

$$-7 - k = 5k - 40$$

$$-6k = -33$$

$$k = \frac{33}{6} = \frac{11}{2}$$

3.  $\frac{-3}{7} = \frac{x}{2x-5}$

$$-3(2x-5) = 7x$$

$$-6x + 15 = 7x$$

$$15 = 13x$$

$$\frac{15}{13} = x$$

## Proportion Word Problems

1. It took 3.2 minutes to upload 54 digital photos from your computer to Facebook. At this rate, how long will it take to upload 200 photos? (Calculator allowed)

$\frac{\text{min}}{\text{photos}}$

$$\frac{3.2}{54} = \frac{x}{200}$$

$$200 \cdot 3.2 = 54x$$

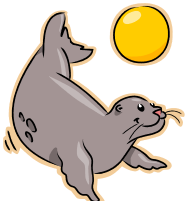
$$640 = 54x$$

$$11.85 = x$$

min



2. Each day, the seals at an aquarium are each fed 8 pounds of food for every 100 pounds of their body weight. A seal at the aquarium weighs about 280 pounds!!! How much food should the seal be fed per day?



$\frac{\text{food}}{\text{body weight}}$

$$\frac{8}{100} = \frac{x}{280}$$

$$100x = 8 \cdot 280$$

$$100x = 2240$$

$$x = 22.4 \text{ lbs. of food!}$$