SM 2

Objective: Ratios and Proportion

Ratio: A comparison of a number **a** and a nonzero number **b** using division.

Example: Ratios can be written in three forms: As a   fraction $\dfrac{a}{b}$,   or *a:b*,   or *a* to *b*.

Simplify the following ratios:

60 cm:200 cm $\rightarrow$ $\dfrac{60cm}{200cm} = \dfrac{3}{10}$

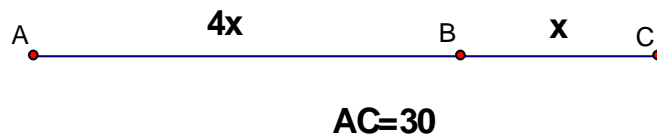$\dfrac{3\,ft}{18in}$ (units must be the same) so, $\dfrac{3\,ft}{18in} = \dfrac{36in}{18in} = \dfrac{2}{1}$

Using ratios:

Using the figure at the right,

Find AB and BC, if AB:BC is 4:1.

AB + BC = AC $\rightarrow$ 4x + x = 30

$$AC=30$$

Example:

The perimeter of a rectangle is 80 ft. The ratio of the length to the width is 7:3.
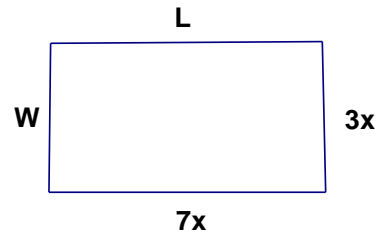
Find the length and the width of the rectangle.

Perimeter of a rectangle = 2w + 2L so,

P = 2(3x) + 2(7x)

80 = 6x + 14x

80 = 20x

4 = x

L

W   3x

7x

Solving a proportion

Proportion: **an equation** that states that two ratios are equal.

Example: $\dfrac{a}{b} = \dfrac{c}{d}$

Means of a proportion: numbers b and c. Extremes of a proportion: numbers a and d.

Cross product property: In a proportion the product of the extremes is equal to the product of the means.

Example: If $\dfrac{a}{b} = \dfrac{c}{d}$, then $ad = bc$.

Solve each proportion.

a. $\dfrac{15}{9} = \dfrac{10}{x}$

b. $\dfrac{7}{10} = \dfrac{a}{4}$

c. $\dfrac{9}{6} = \dfrac{m}{3}$

d. $\dfrac{8}{7} = \dfrac{k}{10}$

e. $\dfrac{2}{x-1} = \dfrac{4}{8}$

f. $\dfrac{k+5}{6} = \dfrac{2}{3}$

g. $\dfrac{8}{2x+5} = \dfrac{5}{3}$

h. $\dfrac{2}{9} = \dfrac{4}{3x+2}$

Solve each problem using a proportion. Show your work.

a. The money used in Western Samoa is called the Tala. The exchange rate is 17 Tala to $6. How many dollars would you receive if you exchanged 51 Tala?

b. A model satellite has a scale of 3 cm: 2 m. If the model satellite is 24 cm wide, then how wide is the real satellite?

c. A baby giraffe standing near a flagpole casts a shadow that is 25.5 ft. long. If the 17.4-ft.-tall flagpole casts a shadow that is 76.6 ft. long, how tall is the baby giraffe?