

Proportion

To determine whether a Proportion is True.

A **Proportion** is an expression of the equalities of two ratios or rates.

$$\frac{50\text{miles}}{4\text{gallons}} = \frac{25\text{miles}}{2\text{gallons}}$$

Note that the units of the numerator (miles) are the same as and the units of the denominator are the same (gallons).

$$\frac{3}{6} = \frac{1}{2} \quad \text{This is the equality of two ratios.}$$

Note: Proportion is true if the fractions are equal when written in the lowest term.

Each of the four (4) numbers written in the proportion is called a term, and are numbered as followed.

$$\frac{\text{first}(a)}{\text{Second}(b)} = \frac{(c)\text{third}}{(d)\text{forth}}$$

The first (1st) and the forth (4th) terms of the proportion are called the **Extremes**
The second (2nd) and the third (3rd) terms of the proportion are called the **Means**.

Note 2: In a true proportion problem the product of the means equals the product of the extremes.

This sometimes called “the cross products are equal.”

Example: $\frac{2}{3} = \frac{8}{12}$

$$\frac{3 * 8}{2 * 12} = \frac{24}{24}$$

To Solve Proportions

- (a) Sometimes one of the numbers in a proportion is unknown.
 (b) To solve a proportion, find the number to replace the unknown so that the proportion is true.

Example:	Solve:	$\frac{9}{6} = \frac{3}{n}$	Check:	$\frac{9}{6} = \frac{3}{n}$
	a.	$\frac{9}{6} = \frac{3}{n}$	a.	$(6)3 = (9)2$
	b.	$9n = (6)3$	b.	$18 = 18$
	c.	$9n = 18$		
	d.	$\frac{9n}{9} = \frac{18}{9}$		
	e.	$n = 2$		

To Solve Application Problems

Example: A mason determines that 9 cement blocks are required for a retaining wall 2 feet long. At this rate how many cement blocks are required for a retaining wall that is 24 feet long?

Solution:

$$\frac{9\text{blocks}}{2\text{feet}} = \frac{“n”\text{blocks}}{24\text{feet}}$$

a. $9(24) = 2n$

b. $216 = 2n$

c. $\frac{216}{2} = \frac{2n}{2}$

d. $108 = n$

108 cement blocks are required for a 24 feet retaining wall.