Chapter 5 Section 7
Proportion

To determine whether a Proportion is True.

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

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

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

$\frac{3}{6} = \frac{1}{2}$ 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.

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

The first (1^{st}) and the forth (4^{th}) terms of the proportion are called the E**xtremes**
The second (2^{cd}) and the third (3^{rd}) 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. $n = 2$

<u>To Solve Application Problems</u>

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: $\frac{9 blocks}{2 feet} = \frac{"n" blocks}{24 feet}$

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.