NUMERICAL PROPORTIONS

- **Numerical proportions** compare two numbers. The numbers can have the same units such as a ratio or the numbers can have different units such as rates. A proportion is usually in the form of a:b or a/b.

- **Ratios** are used to compare objects, wins and losses, sides of a figure to its area and many more.

- **Rates** are used to compare miles per hour, words per minute, price per pound and many others. A **unit rate** is when the denominator of a proportion is one. Miles per hour is an example of a unit rate. When comparing different unit rates, a better buy decision can be made.

- A **proportion equation** is used when one ratio or rate is known and onl

- There a hen 3 of the 4 p

- **Propor ring equal p**

- Proportion equations can be used to make dimensional analysis in regards to photo enlargement, room dimensions, etc.

How to use numerical proportions:

- A **ratio** is used to compare items with the same unit.
  For example, if School A won 18 out of 24 games, the ratio of winning games to total games would be 3/4. To compare this to School B that won 36 out of 48 games, the ratio would have to be found. The ratio of winning games to total games for School B is also 3/4. Therefore both schools have the same ratio of winning games to total games.

Another example: If there are 10 cats and 5 dogs in a neighborhood, the ratio of cats to dogs is 10:5 or 10/5 or 10 to 5.

- A **rate** is used to compare items with different units.
  For example, if Renee drove 135 miles in 3 hours, her average speed would be 45 miles per hour.

- A **unit rate** is used to determine what a rate would be in one hour, one pound, one ounce etc. When comparing two products, the unit rate can be used to determine the **better buy** or cheaper price.

  Example: ***Which is the better buy?***

  $1.99 for a half dozen apples or $2.49 for a dozen apples

  $\frac{\$1.99}{6} = \frac{x}{1}$ $\frac{\$2.49}{12} = \frac{x}{1}$

  x = .33 for one apple x = .21 for one apple

  buy.

- The **pro** s used when o ratio or rate is k n be solved v

  For exa ng will it take him to read a book with 150 pages?

  Example:

  $\frac{6 \text{ pages}}{5 \text{ minutes}} = \frac{150 \text{ pages}}{x \text{ minutes}}$ $(5)(150) = 6x$

  $750 = 6x$

  $125 = x$, so 125 minutes or about 2 hours

- With proportional equations, it is very important that the correct units are lined up in order to find the correct result.

Try This!

What is the **ratio** of wins to losses for the Hawks if they won 12 games and lost 4 games?

If Brian got paid $52 after working 8 hours, what is his hourly **rate**?

What is a better buy: a 4 lb. bag of peanuts for $2.59 or a 10 lb. bag of peanuts for $5.99?

A recipe for lemonade needs 10 lemons to serve 15 people, if 36 people are coming to a party, how many lemons are needed to make lemonade?

A photogra r wants to enlarge th th be?