

## 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



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### 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

$$\underline{\$1.99} = \underline{\quad}x$$

$$\underline{\$2.49} = \underline{\quad}x$$

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

$$(5)(150) = 6x$$

$$750 = 6x$$

$$125 = x, \text{ so } 125 \text{ minutes or about } 2 \text{ hours}$$

- 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?



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