

## RATIOS AND PROPORTIONS

- Numerical **proportions** compare two numbers. A proportion is usually in the form of  $a:b$  or  $a/b$ .
  - There are 4 parts to a proportion and it can be solved when 3 of the 4 parts are known.
  - Proportions can be solved using the **Cross Product Property**, which states that the cross products of a proportion are equal.
  - Proportion equations can be used only when comparing **equal proportions**.

- **Similar figures** have equal corresponding angles and corresponding



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- 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 only part of another ratio or rate is known.

## How to use ratios and 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  $\frac{3}{4}$ . 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  $\frac{3}{4}$ . Therefore both schools have the same ratio of winning games to total games.
- 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



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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.

- **Similar figures** also use proportion equations. Any object, whether a window, picture frame or pillow can be similar to another object. As long as it is stated that the two objects are similar, a proportion can be used to compare them and solve for any missing measurement.
- When a ratio of an object is found, the **probability** of that ratio happening can also be found. For example, if 29 out of 400 people read the newspaper everyday, there is a  $\frac{29}{400}$  or .0725 probability that a person reads the newspaper everyday.

## Try This!

1. What is the **ratio** of wins to losses for the Hawks if they won 18 games and lost 3 games?
2. If Brian got paid \$52 after working 8 hours, what is his hourly **rate**?

3. What is a better buy, a 4 lb. bag of peanuts for \$2.59 or a 10 lb. bag of p

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6. If eighteen people out of 30 drive to work, what is the probability that a person drives to work? What is the probability that a person does not drive to work?