

Name: _____ Date: _____
 Geometry Worksheet 8.1: Introduction to Similarity, Ratios, and Proportions

★ **Definition:** A ratio is a comparison of 2 numbers, generally expressed as a quotient in lowest terms.

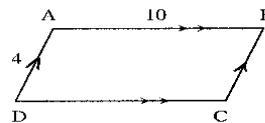
★ It can be written as: **a to b** or **a : b** or **a/b**

★ **Realistic Applications:**

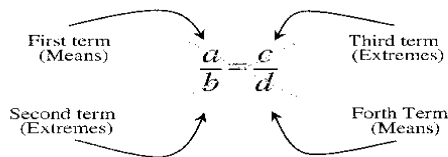
- gambling and odds... "The odds against the horse winning the race are 3 to 1." [3 : 1]
- cooking... "Add 2 cups of water for every cup of rice." [2 : 1]
- maps... "Every inch represents 200 miles." [1 : 200]

Example 1. Find each ratio based on the diagram given. (be sure to simplify)

- a. AD : AB = _____
- b. DC : BC = _____
- c. AB : DC = _____
- d. Perimeter ABCD : AD = _____



★ **Definition:** A proportion is an equation stating that 2 or more ratios are equal.



★ **Properties of Proportions:**

If $\frac{a}{b} = \frac{c}{d}$, then $\frac{b}{a} = \frac{d}{c}$. Overturning Property

If $\frac{a}{b} = \frac{c}{d}$, then $\frac{a}{c} = \frac{b}{d}$. Sideways Property

If $\frac{a}{b} = \frac{c}{d}$, then $\frac{a+b}{b} = \frac{c+d}{d}$. Crazy Property

★ **Mean-extremes Theorem:** the product of the means equals the product of the extremes. (cross-multiplication) If $\frac{m}{n} = \frac{y}{z}$, then $m \cdot z = n \cdot y$.

Example 2. Solve for x expressing your solution as a mixed fraction. $\frac{9}{7} = \frac{5}{x}$