

Ratio, Proportion, and Similarity

Objectives

1. Express a ratio in simplest form.
2. Solve for an unknown term in a given proportion.
3. Express a given proportion in an equivalent form.
4. State and apply the properties of similar polygons.

7-1 Ratio and Proportion

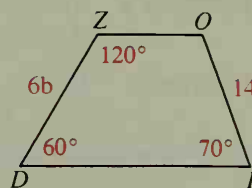
The **ratio** of one number to another is the quotient when the first number is divided by the second. This quotient is usually expressed in *simplest form*.

The ratio of 8 to 12 is $\frac{8}{12}$, or $\frac{2}{3}$.

If $y \neq 0$, the ratio of x to y is $\frac{x}{y}$.

Since we cannot divide by zero, a ratio $\frac{r}{s}$ is defined only if $s \neq 0$. When an expression such as $\frac{r}{s}$ appears in this book, you may assume that $s \neq 0$.

- Example 1**
- a. Find the ratio of OI to ZD .
 - b. Find the ratio of the measure of the smallest angle of the trapezoid to that of the largest angle.



- Solution**
- a. $\frac{OI}{ZD} = \frac{14}{6b} = \frac{7}{3b}$
The ratio of OI to ZD is 7 to $3b$.
 - b. $\angle O$ has measure $180 - 70$, or 110. Thus $\angle D$ is the smallest angle and $\angle Z$ is the largest angle.

$$\frac{m\angle D}{m\angle Z} = \frac{60}{120} = \frac{1}{2}$$

The ratio of the measure of the smallest angle of the trapezoid to that of the largest angle is 1 to 2.

Ratios can be used to compare two numbers. To find the ratio of the lengths of two segments, the segments must be measured in terms of the same unit.