

4.1 Using Proportional Reasoning

Vocab: Ratio
Proportion
means
extremes
Similar
rate
Congruent

Recall the definition of the word rational.

Any number which can be expressed as a fraction $\frac{a}{b}$, where $b \neq 0$.

Ratio - a comparison of two quantities that uses division.

Ratios are generally expressed in 2 ways:

Example $2:3$ or $\frac{2}{3}$

* In some circumstances ratios can be considered rates.

Two ratios (fractions) which are equal to each other are said to be proportional.

★ Any statement which shows 2 ratios are equal is called a proportion.

Example: $\frac{2}{3} = \frac{6}{9}$

So, when given an equation, how do we know if we have a true proportion.

$\frac{a}{b} = \frac{c}{d}$ can also be written as $a:b = c:d$

First, we need to know more.

$a:b = c:d$
↑ means
↑ extremes

If you have a true proportion, then the product of the means will equal the product of the extremes.

CW Mixed Review
HW. Pg 168
(13-51 Odds)

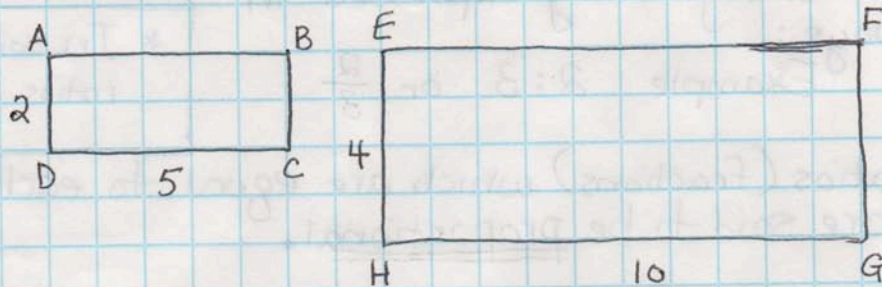
* This is sometimes called the Cross-products.

In Geometry we describe two or more objects (figures) as being similar if those figures have the same shape, but not necessarily the same size.

If figures are similar then the corresponding angles are congruent and the corresponding sides are proportional.

The symbol (\sim) means similar and the vertices of the figures are always named in the order of their correspondence.

Here's what I mean.



Question: Is rectangle $ABCD \sim$ rectangle $EFGH$?

You must set up proportion based on corresponding sides

Notice here that AD corresponds to EH and DC corresponds to HG

$$\frac{AD}{EH} = \frac{DC}{HG} \therefore \frac{2}{5} = \frac{4}{10} \text{ Is that a true proportion?}$$

The product of the means equals the product of the extremes.

$$\begin{aligned} 2(10) &= 5(4) \\ 20 &= 20 \quad \text{Yes!} \end{aligned}$$