Chapter 8 - Similarity

8.1

11/30

Ratios, Proportions, and Similar Polygons

Jan 4-4:13 PM

Ratio - the comparison of a number "a" and a nonzero number "b"

can be written in three ways ...

1.) $\frac{a}{b}$

2.) a:b

3.) a to b

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Example 1

At a class fundraiser 18 girls and 14 boys worked the first shift.

a. find the ratio of girls to boys

$\frac{18}{14} = \frac{9 \cdot 2}{7 \cdot 2} = \frac{9}{7}$

c. girls to stds

$\frac{18}{32} = \frac{9}{16}$

b. find the ratio of boys to girls

$\frac{14}{18}$ $\frac{7}{9}$

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Ex 2 Write the ratio.

An algebra class consists of 10 female students, 14 male students and 2 teachers

1. Female students : teachers $\frac{10}{2} = \frac{5}{1}$
2. Students : teachers $\frac{24}{2} = \frac{12}{1}$
3. Female : male $\frac{10}{14} = \frac{5}{7}$
4. Teachers : male students $\frac{2}{14} = \frac{1}{7}$

Nov 1-8:56 AM

The perimeter of a rectangle is 80 feet. The ratio of the length to the width is 7 to 3. Find the length and the width of the rectangle.

$\frac{7x}{3x}$ length / width

Length / Width $\frac{7.4}{3.4} = \frac{28}{12}$

$7x + 3x + 7x + 3x = 80$

$20x = 80$

$x = 4$

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Ratios & Proportions

Proportion ... an equation that states two ratios are equal

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Using

Cross Product Property

To solve for side lengths of similar polygons

only if =

If $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$

We'll use this all unit long...

Nov 10-3:28 PM

1) Solve the proportion.

a.) $\frac{1}{4} = \frac{4}{x}$

$1 \cdot x = 4 \cdot 4$

$x = 16$

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b.) Solve the proportion.

$\frac{2}{3} \times \frac{x}{9}$

$2 \cdot 9 = 3 \cdot x$

$3 \cdot x = 2 \cdot 9$

$3x = 18$

$x = 6$

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Solve the proportion.

a) $\frac{5}{3} = \frac{y+2}{6}$

$\frac{5}{3} = \frac{(y+2)}{6}$

$5 \cdot 6 = 3(y+2)$

$30 = 3y + 6$

$24 = 3y$

$y = 8$

b.) $\frac{3}{x} = \frac{2}{x-6}$

$3(x-6) = 2x$

$3x - 18 = 2x$

$x = 18$

c.) $\frac{3}{x} = \frac{9}{x-4}$

$3(x-4) = 9x$

$3x - 12 = 9x$

$-12 = 6x$

$x = -2$

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Solve the proportion.

1. $\frac{4}{9} = \frac{10}{x}$
2. $\frac{5}{2} = \frac{6}{x}$
3. $\frac{5}{2} = \frac{2}{x}$
4. $\frac{21}{27} = \frac{x}{18}$
5. $\frac{15}{21} = \frac{20}{y}$
6. $\frac{26}{b} = \frac{39}{9}$

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8.1 Similar Polygons: two polygons are similar if corresponding angles are congruent and corresponding side lengths are ***proportional***

Symbol for similar: ~

What does proportional mean??? ratio of side lengths =

Similarity Statement: $\triangle ABC \sim \triangle DEF$

Jan 10-1:02 PM

Scale Factor: If two polygons are similar, then the ratio of the lengths of two corresponding sides is the **scale factor**.

Nov 11-5:33 PM

These 2 triangles are similar

1. Scale Factor: $\frac{3}{30} = \frac{1}{10}$

2. Similarity Statement

$\triangle ABC \sim \triangle DEF$

left to right

3. List congruent Angles & Proportional Side lengths

$\cong$'s $\angle A \cong \angle D$, $\angle B \cong \angle E$, $\angle C \cong \angle F$

$\frac{AB}{DE} = \frac{AC}{DF} = \frac{BC}{EF}$ Proportional sides

Jan 28-1:38 PM

1. Are these similar?

Similar?? yes

Scale Factor? $\frac{1}{4}$

Similarity Statement? $\triangle NMR \sim \triangle ESH$

Test $\frac{3}{12} \stackrel{?}{=} \frac{5}{20} \stackrel{?}{=} \frac{4}{16}$

$\frac{1}{4} = \frac{1}{4} = \frac{1}{4}$ ✓ Sides Proportional

$\angle N \cong \angle E$, $\angle M \cong \angle S$, $\angle R \cong \angle H$ $\angle$'s $\cong$

Nov 1-8:59 AM

2. Are these similar?

No!

Similar??

Scale Factor?

Similarity Statement?

Test $\frac{8}{4} \neq \frac{15}{5} = \frac{9}{3}$

$\angle D \cong \angle J$, $\angle W \cong \angle H$, $\angle C \cong \angle M$

VU: ?

Nov 1-8:59 AM

Sometimes the book is tricky and flips pictures around...watch out HW #4.

Jan 28-2:07 PM