Math 7: Week of April 27th

Lesson 8: Similar and Congruent Figures

Targets:

#1 Geometrical terminology (vocabulary)
#2 Recognize congruent and similar figures.
#3 Find the scale factor of similar figures.

Directions:

- Go through the slides (notes) and work through the examples on a separate piece of paper.
- Complete the practice problems on a separate piece of paper.
- Check your answers with the key given at the end of the lesson.
- Check Google Classroom for the schedule of online help sessions.

Day 1: Vocabulary	Day 3: Practice Odds Only
Day 2: Examples	Day 4: Practice Evens Only
Answers: Last Slide	

Basic Geometry Terms

line

a straight path of points that continues without end in BOTH directions

DRAW IT	READ IT	WRITE IT
B C	line BC line CB	$\overleftrightarrow{BC}$ $\overleftrightarrow{CB}$

Basic Geometry Terms

line segment

part of a line between two end points

DRAW IT	READ IT	WRITE IT
D E	line segment DE line segment ED	$\overline{DE}$ $\overline{ED}$

Basic Geometry Terms

angle

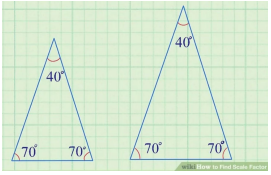
Formed by two rays or line segments that have the same endpoint. The shared endpoint is called a vertex.

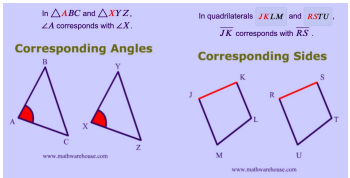
DRAW IT	READ IT	WRITE IT
F G H	angle FGH angle HGF angle G	$\angle FGH$ $\angle HGF$ $\angle G$

Vocabulary/Symbols

Similar Figures: Two figures that have the exact same shape, but not necessarily the exact same size.

Symbol for Similar: $\sim$





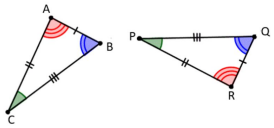
Corresponding Parts: The *angles* and *sides* in similar or congruent figures that *match*.

Vocabulary/Symbols

Congruent: Equal in measure. *Symbol:* $\cong$

Congruent Figures:

Two figures are **congruent** if they are the **same size** and **shape**.
Their corresponding angles and sides are equal.



Triangle ABC is congruent to triangle RQP

$\Delta ABC \cong \Delta RQP$

$\angle A = \angle R$ $\quad \overline{AB} = \overline{QR}$

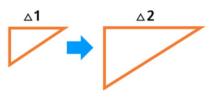
$\angle B = \angle Q$ $\quad \overline{BC} = \overline{PQ}$

$\angle C = \angle P$ $\quad \overline{AC} = \overline{PR}$

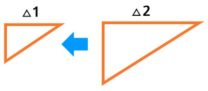
Vocabulary/Symbols

Scale Factor: The ***ratio*** of corresponding sides in two similar figures.

The Order is Important!



Getting Bigger:
The scale factor of △1 to △2 is larger than 1.



Getting Smaller:
The scale factor of △2 to △1 is a fraction smaller than 1.

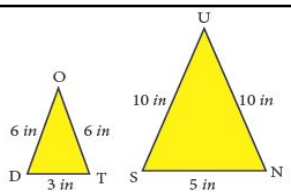
Two Shapes are Similar if:

1. Corresponding angles are congruent.
2. The measures of corresponding sides are proportional.

Example 1

ΔDOT is similar to ΔSUN.

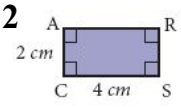
Find the scale factor from ΔDOT to ΔSUN.

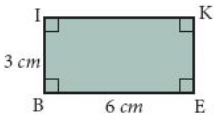


1. Write a ratio of corresponding sides. (It doesn't matter which set you choose.) $\frac{6}{10}$
2. Simplify the ratio. $\frac{6}{10} = \frac{3}{5}$

The scale factor from ΔDOT to ΔSUN is $\frac{3}{5}$ or 3 : 5.

Example 2





Determine whether rectangle CARS is similar to rectangle BIKE. If so, find the scale factor.

1. All corresponding *angles* are congruent. $\frac{CA}{BI} = \frac{2}{3}$
2. Find the ratio of corresponding heights.
3. Find the ratio of corresponding lengths. $\frac{SC}{EB} = \frac{4}{6} = \frac{2}{3}$

The corresponding angles are congruent **and** the corresponding sides have equal ratios so CARS ~ BIKE.

The scale factor is $\frac{2}{3}$ or 2 : 3.

Example 3

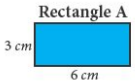
Consider the two squares above. Are the two squares similar? Explain.

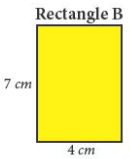
1. Each angle is 90º, all corresponding angles are equal.
2. The ratio of any two corresponding sides is:

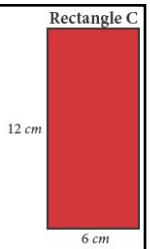
$$\frac{5}{5} = \frac{1}{1}$$

Yes, the squares are similar. Scale factor of 1 : 1.

Example 4a







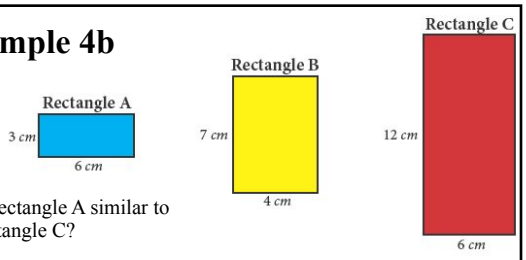
Is Rectangle A similar to Rectangle B?

1. All corresponding angles are equal (90º).
2. Find ratio of *long* sides. $\frac{6}{7}$
3. Find ratio of *short* sides. $\frac{3}{4}$

Ratios not equal so sides are not proportional.

Rectangle A is NOT similar to Rectangle B.

Example 4b



Is Rectangle A similar to Rectangle C?

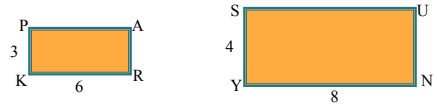
1. All corresponding angles are equal (90º).
2. Find ratio of *long* sides. $\frac{6}{12}=\frac{1}{2}$
3. Find ratio of *short* sides: $\frac{3}{6}=\frac{1}{2}$

Ratios are equal so sides are proportional.

Yes, Rectangle A is similar to Rectangle C.

Example 5

Find the corresponding *sides* and corresponding *angles* to the ones given for the pair of similar figures.



$\overline{PA}$ corresponds to $\overline{SU}$ $\quad \angle P \cong \angle S$

$\overline{AR}$ corresponds to $\overline{UN}$ $\quad \angle A \cong \angle U$

$\overline{RK}$ corresponds to $\overline{NY}$ $\quad \angle R \cong \angle N$

$\overline{KP}$ corresponds to $\overline{YS}$ $\quad \angle K \cong \angle Y$

Practice Problems: Worksheet

Lesson 8 ~ Similar and Congruent Figures

Check your work!

Worksheet Answers Provided Here!

If you're stuck, ASK! Help sessions are provided each week. Check Google Classroom for dates and times.

Worksheet 8

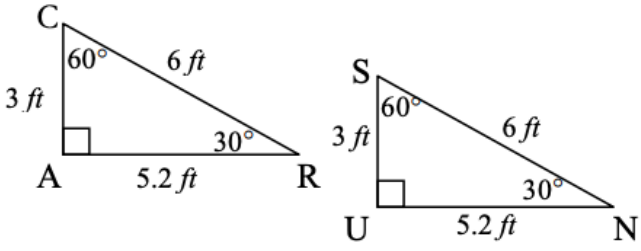
1. $\overline{CA}$ corresponds to $\overline{SU}$
   $\overline{AR}$ corresponds to $\overline{UN}$
   $\overline{CR}$ corresponds to $\overline{SN}$
   $\angle C \cong \angle S$
   $\angle A \cong \angle U$
   $\angle R \cong \angle N$
   The triangles are congruent because all pairs of corresponding sides are equal and all pairs of corresponding angles are equal.
2. $\overline{DA}$ corresponds to $\overline{CA}$
   $\overline{DG}$ corresponds to $\overline{AT}$
   $\overline{DG}$ corresponds to $\overline{CT}$
   $\angle D \cong \angle C$
   $\angle O \cong \angle A$
   $\angle G \cong \angle T$
   The triangles are similar because all pairs of corresponding sides have the ratio $\frac{1}{2}$ and all pairs of corresponding angles are equal.
3. 4 : 3
4. 1 : 2
5. 5 : 8
6. 5 : 3
7. 1 : 3
8. 4 : 7

Lesson 8 ~ Similar and Congruent Figures

Name_____ Period_____ Date_____

For each pair of figures below, find the corresponding sides and corresponding angles to the ones identified.

1.



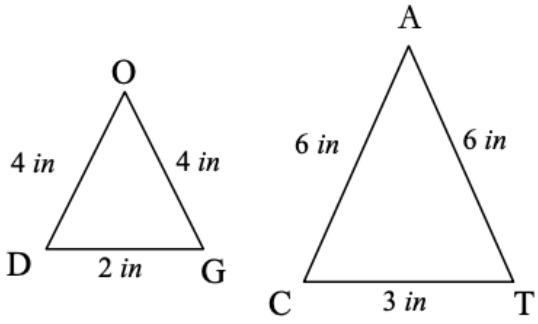
$\overline{CA}$ corresponds to _____ $\angle C \cong \angle$ ____

$\overline{AR}$ corresponds to _____ $\angle A \cong \angle$ ____

$\overline{CR}$ corresponds to _____ $\angle R \cong \angle$ ____

Are the triangles congruent or similar? Explain.

2.



$\overline{DO}$ corresponds to _____ $\angle D \cong \angle$ ____

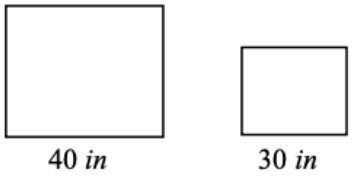
$\overline{OG}$ corresponds to _____ $\angle O \cong \angle$ ____

$\overline{DG}$ corresponds to _____ $\angle G \cong \angle$ ____

Are the triangles congruent or similar? Explain.

Determine the scale factor for each pair of similar figures.

3.



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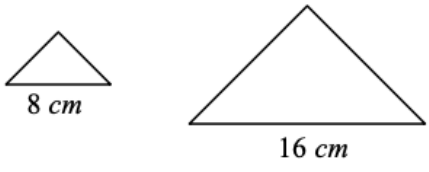

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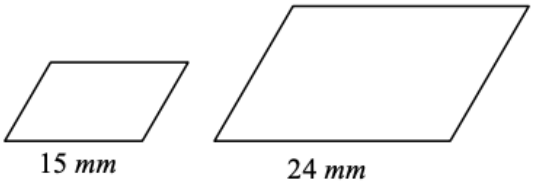

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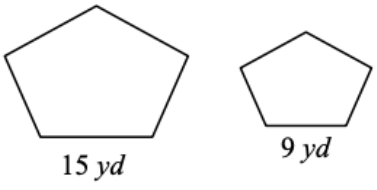

7.

8.