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Summer Edition

Geometry

Activity 1

knoxschools.org/kcsathome

This packet includes four sections that cover the major content of Geometry. Each section includes four pages of notes and practice for each topic. For additional support, visit KCS TV on YouTube for instructional videos that accompany each section.

The following content is included in this packet:

	Section			
	Section I **Similarity**	Section II **Quadrilaterals**	Section III **Trigonometry**	Section IV **Circles**
Problem Set 1	Ratios & Proportions	The Polygon Angle-Sum Theorems	The Pythagorean Theorem and Its Converse	Tangent Lines
Problem Set 2	Similar Polygons	Properties of Parallelograms	Special Right Triangles	Chords and Arcs
Problem Set 3	Proving Triangles Similar	Proving That a Quadrilateral is a Parallelogram	Trigonometry and Angles of Elevation & Depression	Inscribed Angles
Problem Set 4	N/A	Properties of Rhombuses, Rectangles, and Squares	Law of Sines and Cosines	Angle Measures and Segments

Geometry

SECTION I

Similarity
• Ratios & Proportions • Similar Polygons • Proving Triangles Similar

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I Similarity

Connecting BIG ideas and Answering the Essential Questions

1 Similarity
You can set up and solve proportions using corresponding sides of similar polygons.

2 Reasoning and Proof
Two triangles are similar if certain relationships exist between two or three pairs of corresponding parts.

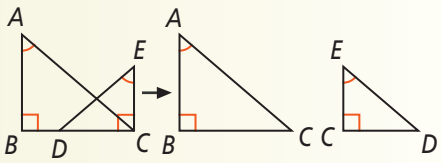
3 Visualization
Sketch and label triangles separately in the same orientation to see how the vertices correspond.

Ratios and Proportions (Lesson 7-1)
The Cross Products Property states that if $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$.

Similar Polygons (Lesson 7-2)
Corresponding angles of similar polygons are congruent, and corresponding sides of similar polygons are proportional.

Proving Triangles Similar (Lesson 7-3)
Angle-Angle Similarity (AA ~) Postulate
Side-Angle-Side Similarity (SAS ~) Theorem
Side-Side-Side Similarity (SSS ~) Theorem

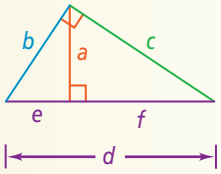
Seeing Similar Triangles (Lessons 7-3 and 7-4)



$\triangle ABC \sim \triangle ECD$

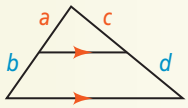
Proportions in Triangles (Lessons 7-4 and 7-5)

Geometric Means in Right Triangles



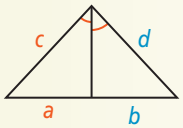
$\frac{e}{a} = \frac{a}{f}$ $\frac{d}{b} = \frac{b}{e}$ $\frac{d}{c} = \frac{c}{f}$

Side-Splitter Theorem



$\frac{a}{b} = \frac{c}{d}$

Triangle-Angle-Bisector Theorem



$\frac{a}{b} = \frac{c}{d}$

Vocabulary

- extended proportion (p. 440)
- extended ratio (p. 433)
- extremes (p. 434)
- geometric mean (p. 462)
- indirect measurement (p. 454)
- means (p. 434)
- proportion (p. 434)
- ratio (p. 432)
- scale drawing (p. 443)
- scale factor (p. 440)
- similar figures (p. 440)
- similar polygons (p. 440)

Choose the correct term to complete each sentence.

1. Two polygons are ? if their corresponding angles are congruent and corresponding sides are proportional.
2. A(n) ? is a statement that two ratios are equal.
3. The ratio of the lengths of corresponding sides of two similar polygons is the ?.
4. The Cross Products Property states that the product of the ? is equal to the product of the ?.

7-1 Ratios and Proportions

Quick Review

A **ratio** is a comparison of two quantities by division. A **proportion** is a statement that two ratios are equal. The **Cross Products Property** states that if $\frac{a}{b} = \frac{c}{d}$, where $b \neq 0$ and $d \neq 0$, then $ad = bc$.

Example

What is the solution of $\frac{x}{x+3} = \frac{4}{6}$?

$6x = 4(x + 3)$	Cross Products Property
$6x = 4x + 12$	Distributive Property
$2x = 12$	Subtract $4x$ from each side.
$x = 6$	Divide each side by 2.

Exercises

5. A high school has 16 math teachers for 1856 math students. What is the ratio of math teachers to math students?

6. The measures of two complementary angles are in the ratio 2 : 3. What is the measure of the smaller angle?

Algebra **Solve each proportion.**

7. $\frac{x}{7} = \frac{18}{21}$

8. $\frac{6}{11} = \frac{15}{2x}$

9. $\frac{x}{3} = \frac{x+4}{5}$

10. $\frac{8}{x+9} = \frac{2}{x-3}$

7-2 and 7-3 Similar Polygons and Proving Triangles Similar

Quick Review

Similar polygons have congruent corresponding angles and proportional corresponding sides. You can prove triangles similar with limited information about congruent corresponding angles and proportional corresponding sides.

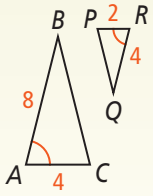
Postulate or Theorem	What You Need
Angle-Angle (AA ~)	two pairs of ≅ angles
Side-Angle-Side (SAS ~)	two pairs of proportional sides and the included angles ≅
Side-Side-Side (SSS ~)	three pairs of proportional sides

Example

Is $\triangle ABC$ similar to $\triangle RQP$? How do you know?

You know that $\angle A \cong \angle R$.

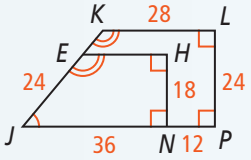
$\frac{AB}{RQ} = \frac{AC}{RP} = \frac{2}{1}$, so the triangles are similar by the SAS ~ Theorem.



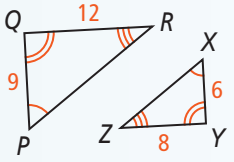
Exercises

The polygons are similar. Write a similarity statement and give the scale factor.

11.



12.

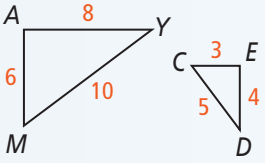


13. **City Planning** The length of a rectangular playground in a scale drawing is 12 in. If the scale is 1 in. = 10 ft, what is the actual length?

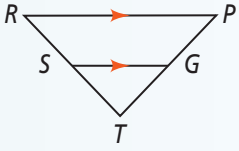
14. **Indirect Measurement** A 3-ft vertical post casts a 24-in. shadow at the same time a pine tree casts a 30-ft shadow. How tall is the pine tree?

Are the triangles similar? How do you know?

15.



16.



Answer Key

Section I - Similarity

1. similar

2. proportion

3. scale factor

4. means, extremes (in either order)

5. $\frac{16}{1856}=\frac{1}{116}$ or $1:116$.

6. 36

7. 6

8. $\frac{55}{4}$ or $13\frac{3}{4}$

9. 6

10. 7

11. $JEHN \sim JKLP$; 3 : 4

12. $\triangle PQR \sim \triangle XYZ$; 3 : 2

13. 120 ft

14. 45 ft

15. The ratio of each corresponding side is 2 : 1, so $\triangle AMY \sim \triangle ECD$ by SSS~.

16. If the lines are $\|$, then corresponding angles are $\cong$. Therefore $\triangle TSG \sim \triangle TRP$ by AA~.