UNITED ARAB EMIRATES
MINISTRY OF EDUCATION

YEAR OF
ZAYED

2018 - 2019

8

McGraw-Hill Education

Mathematics

General Stream

United Arab Emirates Edition

Interactive Student Guide

Mc Graw Hill Education

Answer Key

McGraw-Hill Education

Mathematics

General Stream

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Brief Contents

Practice Contents

NAME _____ DATE _____ PERIOD _____

Inquiry Lab Guided Writing

Parallel Lines

WHAT are the angle relationships formed when a third line intersects two parallel lines?

Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

1. Rewrite the question in your own words.
   See students' work.

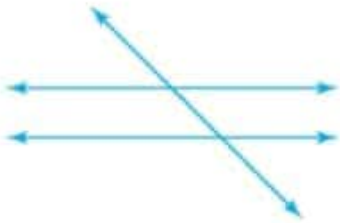
2. What key words do you see in the question?
   angle relationships, intersects, parallel lines

3. Lines in the same plane that never intersect are **parallel** lines.

4. **Intersect** means "cross."

5. Draw two parallel lines in the space provided.

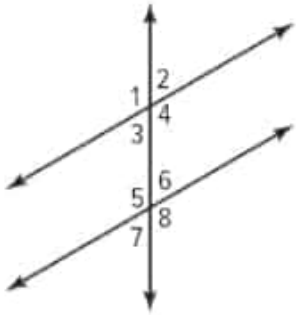
6. Draw a line that intersects the two parallel lines.



7. How many angles are formed? **8**

8. Two angles are supplementary if the sum of their measures is **180°**.

Use the drawing at the right to answer Exercises 9-12.



9. Are angles 1 and 5 equal? **yes**

10. Are angles 5 and 6 equal? **no**

11. Are angles 2 and 3 supplementary? **no**

12. Are angles 6 and 8 supplementary? **yes**

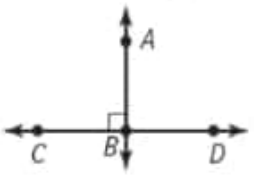
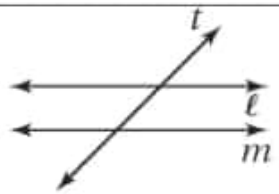
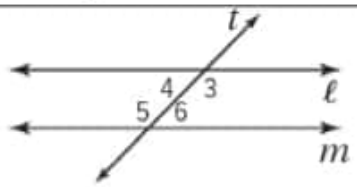
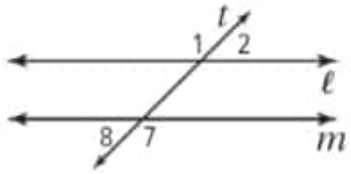
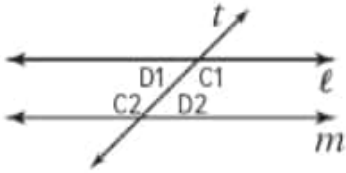
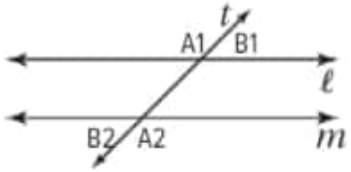
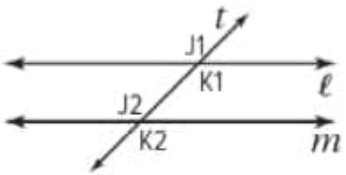
WHAT are the angle relationships formed when a third line intersects two parallel lines?

Eight angles are formed. Some of them add up to 180°, and some of them are equal.

Lesson 1 Vocabulary

Lines

Use the three column chart to write the vocabulary word and definition for each drawing. Sample answers are given.

What I See	Vocabulary Word	Definition
	perpendicular lines	two lines that intersect to form right angles
	parallel lines	Lines in the same plane that never intersect or cross; the symbol ∥ means parallel.
	transversal	a line that intersects two or more other lines
	interior angles	the four inside angles formed when two lines are cut by a transversal
	exterior angles	the four outer angles formed when two lines are cut by a transversal
	alternate interior angles	interior angles that lie on opposite sides of the transversal
	alternate exterior angles	exterior angles that lie on opposite sides of the transversal
	corresponding angles	angles that are in the same position on two parallel lines in relation to a transversal

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Lesson 2 Vocabulary

Geometric Proof

Use the flow chart to review the proof process.
Sample answers are given.

Use inductive and/or deductive reasoning to write a proof.

Define inductive reasoning.
the process of making a conjecture after observing several examples

Define proof.
a logical argument where each statement is justified by a reason

Define deductive reasoning.
use facts, rules, definition, or laws to make conjectures from given situations

Write a paragraph proof or a two-column proof using theorems.

Define paragraph or informal proof.
a paragraph that explains why a statement or conjecture is true

Define theorem.
a conjecture or statement that can be proven

Define two-column or formal proof.
a proof that contains statements and reasons organized in two columns

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Inquiry Lab Guided Writing

Triangles

WHAT is the relationship among the measures of the angles of a triangle?

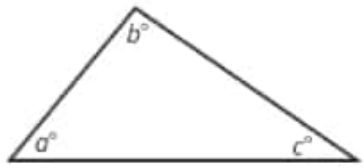
Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

1. Rewrite the question in your own words.
   See students' work.

2. What key words do you see in the question?
   relationship, measures, angles of a triangle

3. How many angles does a triangle have? **three**

Use the figure below to answer Exercises 4-8.



4. If $a = 50°$, $b = 88°$, and $c = 42°$, what is the sum of the angles? **180°**

5. Use the symbols a, b, and c to write a formula for the sum of the measures of the angles of a triangle. **$a + b + c = 180°$**

6. If $a = 70°$ and $b = 65°$, what is the measure of c? **45°**

7. If $b = 83°$ and $c = 39°$, what is the measure of a? **58°**

8. Is the sum of the measures of the angles of a triangle always 180°? **yes**

WHAT is the relationship among the measures of the angles of a triangle?

The sum of the measures of a triangle is 180°.

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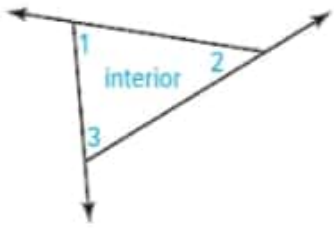
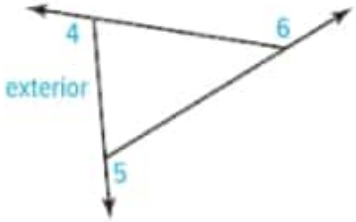
Lesson 3 Vocabulary

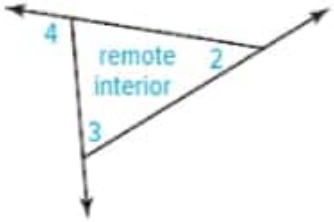
Angles of Triangles

Use the vocabulary squares to write a definition and a sentence. Then label the figure with an example for each vocabulary word.

Sample answers are given.

interior angle	**Definition** the angle formed by the segments that lie inside the triangle
	**Sentence** A triangle has three interior angles.

exterior angle	**Definition** the angle formed by one side of the triangle and the extension of the adjacent side
	**Sentence** A triangle has three exterior angle.

remote interior angles	**Definition** the interior angles of a triangle that are not adjacent to a given exterior angle
	**Sentence** Each exterior angle has two remote interior angles.

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Lesson 4 Vocabulary

Polygons and Angles

Use the definition map to list qualities about the vocabulary word or phrase.
Sample answers are given.

Vocabulary

polygon

Characteristics
What it is

Description

a simple, closed figure formed by three or more line segments

equiangular:

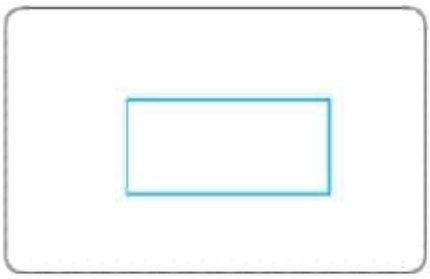
a polygon in which all angles are congruent

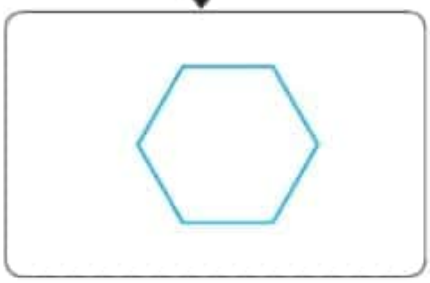
regular:

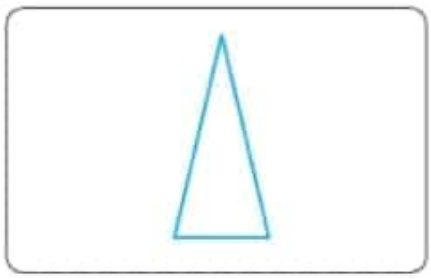
a polygon that is equilateral and equiangular

interior angle sum of a polygon:

$S = (n - 2)180$







Draw three examples of polygons.

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Inquiry Lab Guided Writing

Right Triangle Relationships

WHAT is the relationship among the sides of a right triangle?

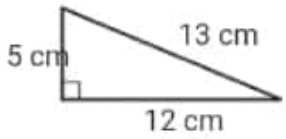
Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

1. Rewrite the question in your own words.
   See students' work.

2. What key words do you see in the question?
   relationship, sides, right triangle

3. A **right** triangle has one 90° angle.

Use the triangle below to answer Exercises 4-8.



4. What are the measures of the two shortest sides? **5 cm and 12 cm**

5. What is the sum of $5^2 + 12^2$? **169**

6. What is the measure of the longest side? **13 cm**

7. What is 13^2? **169**

8. Does the sum of the squares of the two shortest sides equal the square of the longest side? **yes**

WHAT is the relationship among the sides of a right triangle?

The sum of the squares of the two shortest sides is equal to the square of the longest side.

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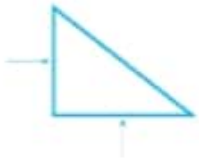
Lesson 5 Vocabulary

The Pythagorean Theorem

Use the vocabulary squares to write a definition, a sentence, and an example for each vocabulary word. Sample answers are given.

legs	**Definition** the sides of a right triangle that form the right angle
Example 	**Sentence** There are two legs in a right triangle.

hypotenuse	**Definition** the side opposite the right angle in a right triangle
Example 	**Sentence** The hypotenuse in a right triangle is the longest side.

Pythagorean Theorem	**Definition** In a right triangle, the square of the length of the hypotenuse c is equal to the sum of the squares of the lengths of the legs a and b.
Example If a triangle is a right triangle, then $a^2 + b^2 = c^2$	**Sentence** When you know two lengths of the three sides of a right triangle, you can use the Pythagorean Theorem to find the unknown side length.

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Inquiry Lab Guided Writing

Proofs About the Pythagorean Theorem

HOW can you prove the Pythagorean Theorem and its converse?

Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

1. Rewrite the question in your own words.

   See students' work

2. What key words do you see in the question?

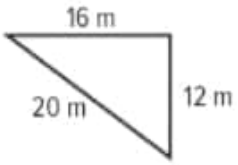
   prove, Pythagorean Theorem, converse

3. Write the Pythagorean Theorem: $a^2 + b^2 = c^2$

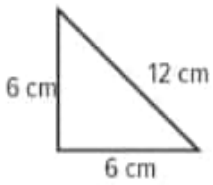
4. If a triangle has side lengths a, b, and c and $a^2 + b^2 = c^2$, then the triangle is a right triangle.

Use the triangles below to answer Exercises 5 and 6.

X



Y



5. Which triangle is a right triangle? X

   How do you know? because $12 + 16 = 20$

6. Which triangle is not a right triangle? Y

   How do you know? because $6 + 6 \neq 12$

7. How does a physical model help you solve problems?

   It helps me see each part of the problem.

HOW can you prove the Pythagorean Theorem and its converse?

You can use a physical model and the properties of mathematics to construc proofs of the Pythagorean Theorem and its converse.

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Lesson 6 Notetaking

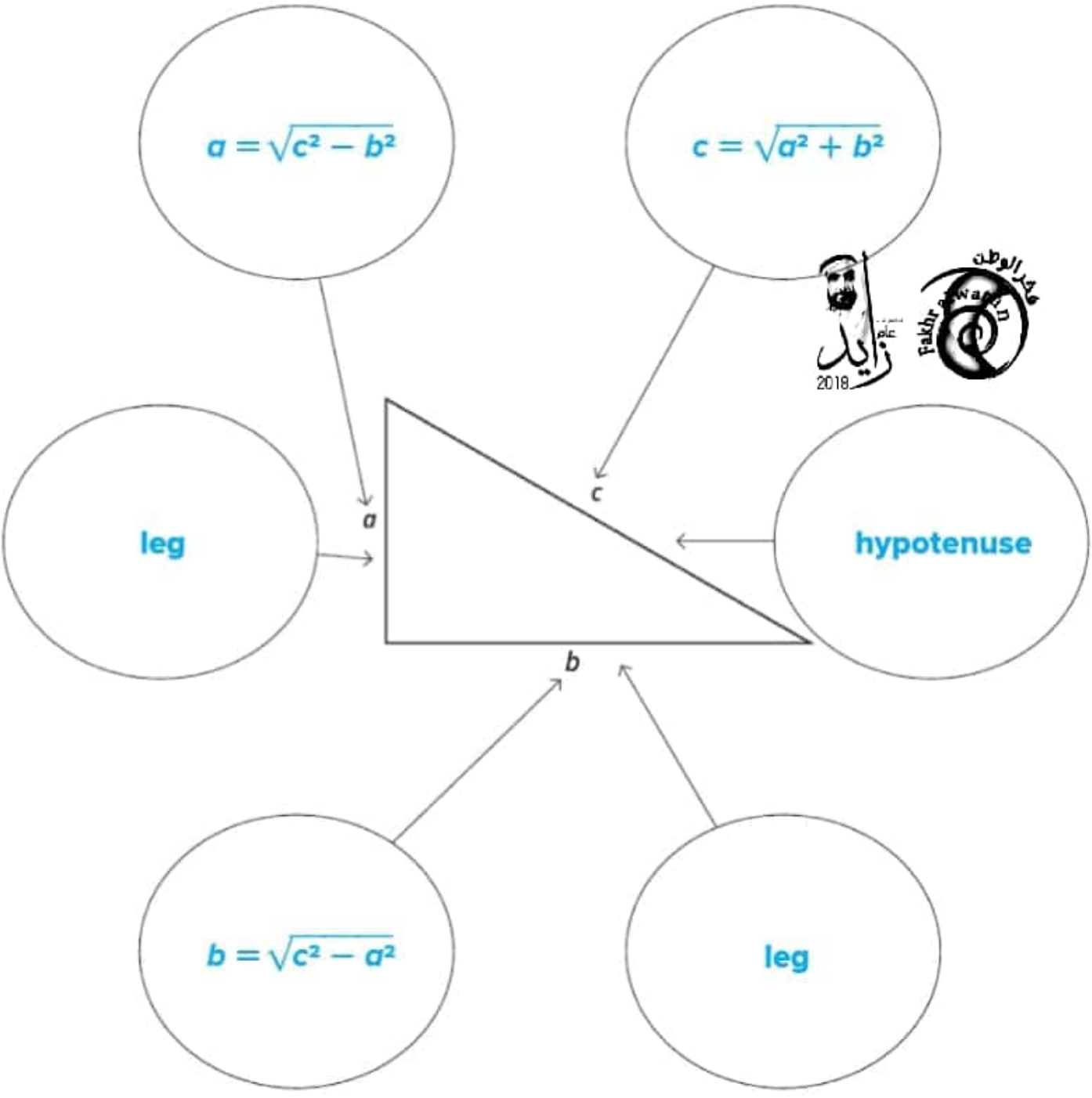
Use the Pythagorean Theorem

Use vocabulary words and the Pythagorean Theorem to identify the parts and side lengths of the right triangle. Sample answers are given.

Word Bank

leg hypotenuse

$a = \sqrt{c^2 - b^2}$ $b = \sqrt{c^2 - a^2}$ $c = \sqrt{a^2 + b^2}$



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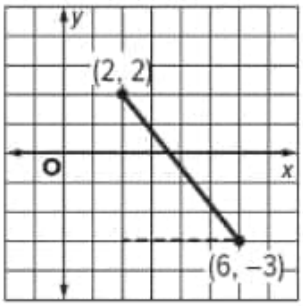
Lesson 7 Notetaking

Distance on the Coordinate Plane

Use the flow chart to review the processes for finding the distance between two points on a coordinate plane. Sample answers are given.

Use the Pythagorean Theorem or Distance Formula to find the distance between two points on a coordinate plane.



State the Pythagorean Theorem.

$a^2 + b^2 = c^2$

State the Distance Formula.

$d = \sqrt{(x_2 - x_1)^2 + (y_2 - x_1)^2}$

Find the length of the segment using the Pythagorean Theorem.

$a^2 + b^2 = c^2$

$4^2 + 5^2 = c^2$

$16 + 25 = c^2$

$\sqrt{41} = c$ or about 6.4 units

Find the length of the segment using the Distance Formula.

$c = \sqrt{(6 - 2)^2 + (-3 - 2)^2}$

$= \sqrt{4^2 + (-5)^2}$

$= \sqrt{16 + 25}$

$= \sqrt{41}$

$\approx \pm 6.4$

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Inquiry Lab Guided Writing

Transformations

WHAT are some rigid motions of the plane?

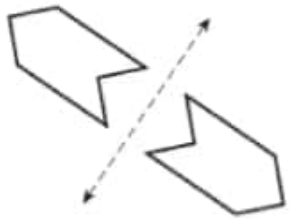
Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

1. Rewrite the question in your own words.
   See students' work.

2. What key words do you see in the question?
   rigid motions, plane

3. In a **rigid** motion of the plane, the shape and size of a figure do not change.

Use the figures at the right to answer Exercises 4 and 5.



4. Do the figures show a flip, slide, or turn? **flip**

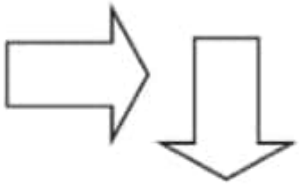
5. Does the shape or size of the figure change? **no**

Use the figures at the right to answer Exercises 6 and 7.

6. Do the figures show a flip, slide, or turn? **slide**

7. Does the shape or size of the figure change? **no**

Use the figures at the right to answer Exercises 8 and 9.



8. Do the figures below show a flip, slide, or turn? **turn**

9. Does the shape or size of the figure change? **no**

WHAT are some rigid motions of the plane?

Slides, flips, and turns are some rigid motions of the plane.

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Lesson 1 Vocabulary

Translations

Use the two column chart to organize the vocabulary in this lesson. Then write the definition of each word. Sample answers are given.

Term	Definition
transformation	an operation that maps a geometric figure, the preimage, onto a new figure, the image
preimage	the original figure before a transformation
image	the resulting figure after a transformation
translation	a transformation that slides a figure from one position to another without turning
congruent	if one image can be obtained by another by a sequence of rotation, reflection, or translations

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Lesson 2 Vocabulary

Reflections

Use the word cards to define each vocabulary word or phrase and give an example.
Sample answers are given.

Word Cards

reflection

Definition

a transformation where a figure is flipped over a line

Example Sentence

A reflection creates a mirror image of the original figure.

When you look in the mirror, you see your reflection.

Word Cards

line of reflection

Definition

the line over which a figure is reflected

Example Sentence

In a reflection, each point of the preimage and its image, are the same distance from the line of reflection.

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Inquiry Lab Guided Writing

Rotational Symmetry

HOW can you identify rotational symmetry?

Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

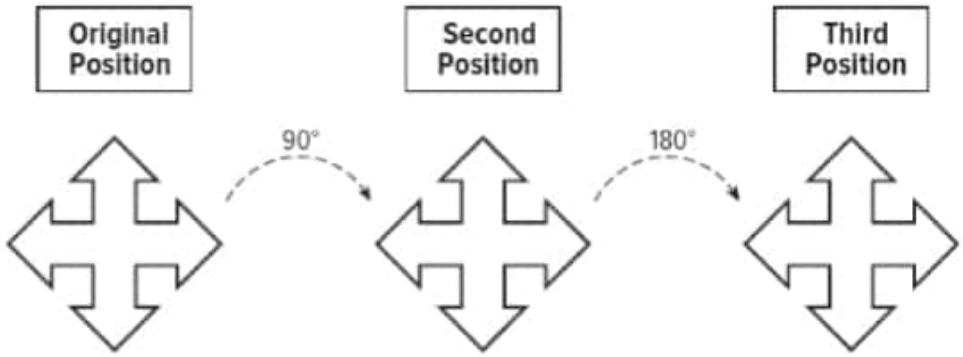
1. Rewrite the question in your own words.
   See students' work.

2. What key words do you see in the question?
   identify, rotational symmetry

3. Write a synonym for the word rotate. **turn**

4. If a figure is turned less than 360° on its center point and looks exactly like the original position, it has **rotational** symmetry.

Use the figures below to answer Exercises 5-7.



5. By how many degrees was the second figure rotated? **90°**
   Does the second figure look exactly like the orginal figure? **yes**

6. By how many degrees was the second figure rotated? **180°**
   Does the third figure look exactly like the orginal figure? **yes**

7. Does the figure have rotational symmetry? **yes**

HOW can you identify rotational symmetry?

You can identify rotational symmetry by turning the figure less than 360° an determining if the figure looks the same as the original.

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Lesson 3 Vocabulary

Rotations

Use the concept web to name the transformation and the parts of the transformation. **Sample answers are given.**

Word Bank	
center of rotation	image
preimage	rotation

preimage

rotation

center of rotation

image

What is the angle of rotation shown in the graph? **180°**

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Inquiry Lab Guided Writing

Dilations

WHAT are the results of a dilation of a triangle?

Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

1. Rewrite the question in your own words.
   See students' work.

2. What key words do you see in the question?
   results, dilation, triangle

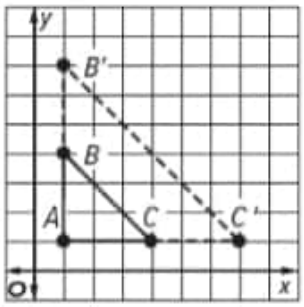
3. A dilation is a transformation that enlarges or reduces a figure.

4. The word *enlarge* means to make bigger.
   The word *reduce* means to make smaller.

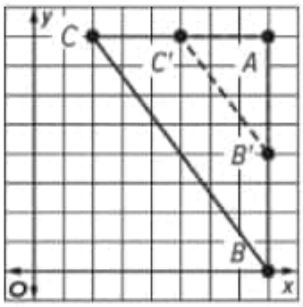
5. A scale factor is the factor by which a figure is enlarged or reduced.

Use the figures below to answer Exercises 6 and 7.

A



B



6. In Figure A, is the dilated triangle larger or smaller than the original? larger
   Are the triangles the same shape? yes

7. In Figure B, is the dilated triangle larger or smaller than the original? smaller
   Are the triangles the same shape in Figure B? yes

WHAT are the results of a dilation of a triangle?

When a triangle is dilated, the resulting triangle has the same shape, but is a different size.

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Lesson 4 Review Vocabulary

Dilations

Use the definition map to list qualities about the vocabulary word or phrase.
Sample answers are given.

Vocabulary

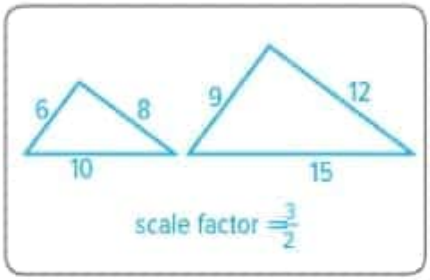
dilation

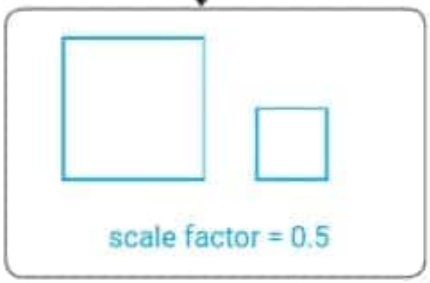
Describe what happens when $k > 1$, $k < 1$, and $k = 1$.

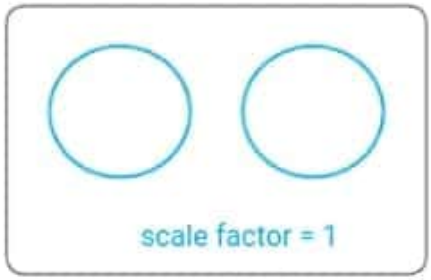
Description

a transformation that enlarges or reduces a figure by a scale factor of k

- **if k > 1, the dilation is an enlargment**
- **if k < 1, the dilation is a reduction**
- **if k = 1, the dilation will be the same size as the original figure**







Draw and label examples for $k > 1$, $k < 1$, and $k = 1$.

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Inquiry Lab Guided Writing

Composition of Transformations

HOW does a combination of transformations differ from a single transformation? How are they the same?

Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

1. Rewrite the question in your own words.
   See students' work.

2. What key words do you see in the question?
   combination, transformations, differ, single, same

3. When more than one transformation is applied to figure, it is called a composition of **transformations** .

Use the transformations below to answer Exercises 4–6.

4. What is the first transformation? **reflection (flip)**
   What is the second transformation? **rotation (turn)**

5. Can the original image look like the last image with only one transformation?
   no

6. Are all of the images the same shape and size? **yes**

HOW does a combination of transformations differ from a single transformation? How are they the same?

A combination of transformations includes more than one transformation, so the imag may not be obtained by a single transformation. They are the same because regardles of the number of transformations, the image is the same shape as the preimage.

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Lesson 1 Review Vocabulary

Congruence and Transformations

Use the definition map to list qualities about the vocabulary word or phrase.
Sample answers are given.

Vocabulary

transformation

Description

an operation that maps a geometric figure, preimage, onto a new figure, image

Describe each transformation.

rotation:

a figure is turned about a fixed point

reflection:

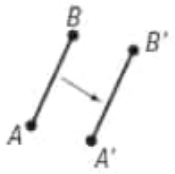
a figure is flipped over a line; also called a flip

translation:

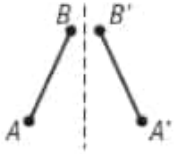
a figure slides from one position to another without turning

Identify each transformation.

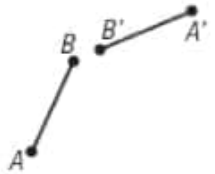
translation



reflection



rotation



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Inquiry Lab Guided Writing

Investigate Congruent Triangles

WHICH three pairs of corresponding parts can be used to show that two triangles are congruent?

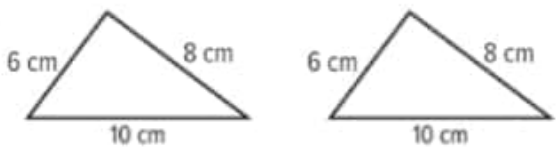
Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

1. Rewrite the question in your own words.
   See students' work.

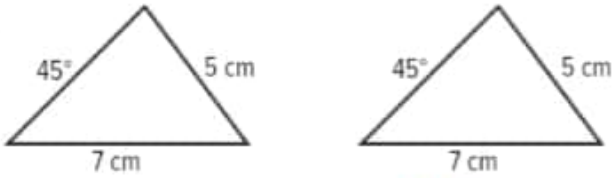
2. What key words do you see in the question?
   three pairs, corresponding parts, triangles, congruent

3. Write a synonym for the word congruent. **matching, the same**

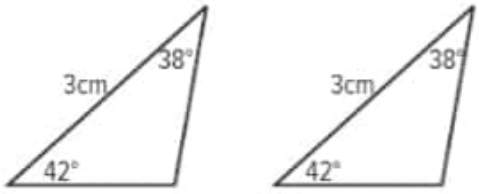
Describe the congruent parts for each set of triangles.

4. 

   three pairs of congruent **sides**

5. 

   two pairs of congruent **sides** and one pair of congruent **angles**

6. 

   two pairs of congruent **angles** and one pair of congruent **sides**

WHICH three pairs of corresponding parts can be used to show that two triangles are congruen
Sample answer: Three pairs of congruent sides, two pairs of congruent sides with the pair of congruent angles between them, and two pairs of congruent angles with the pair of congruent sides between them.

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Lesson 2 Vocabulary

Congruence

Use the word cards to define each vocabulary word or phrase and give an example. **Sample answers are given.**

Word Cards

congruent

Definition

If one image can be obtained by another by a sequence of rotations, reflections, or translations

Example Sentence

If a preimage is flipped, rotated, and/or translated, the image and preimage are congruent.

Word Cards

corresponding parts

Definition

parts of congruent or similar figures that match

Example Sentence

The corresponding parts of congruent figures are congruent.

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Inquiry Lab Guided Writing

Geometry Software

HOW can technology help you show the relationship between transformations and congruence?

Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

1. Rewrite the question in your own words.
   See students' work.

2. What key words do you see in the question?
   technology, relationship, transformations, congruence

3. A **transformation** involves moving a figure so that it is in a different position but has the same size and shape.

4. Two figures are **congruent** if their side and angle measures are the same.

5. Can you use geometry software to draw figures? **yes**

6. What transformations can you perform with geometry software?
   rotations, reflections, and translations

7. Do transformations change the side or angle measures of a figure? **no**

8. If a figure is transformed, is the new figure congruent to the original figure?
   yes

9. How can you prove congruence of two figures?
   compare the measures of the corresponding sides and angles

HOW can technology help you show the relationship between transformations and congruence

You can use geometry software to draw a figure, transform it, and then measure the individual parts to show congruence between the figures.

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Inquiry Lab Guided Writing

Similar Triangles

HOW are two triangles related if they have the same shape but different size

Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

1. Rewrite the question in your own words.

   See students' work.

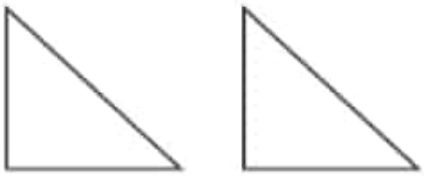
2. What key words do you see in the question?

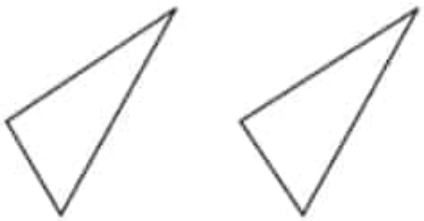
   triangles, related, shape, sizes

3. Figures are similar if they have the same **shape** but different **sizes**.

Write *congruent* or *similar* to describe each pair of triangles.

4.  **similar**

5.  **congruent**

6.  **congruent**

7.  **similar**

HOW are two triangles related if they have the same shape but different sizes?

The triangles are similar.

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Lesson 3 Vocabulary

Similarity and Transformations

Use the definition map to list qualities about the vocabulary word or phrase.

Sample answers are given.

Vocabulary

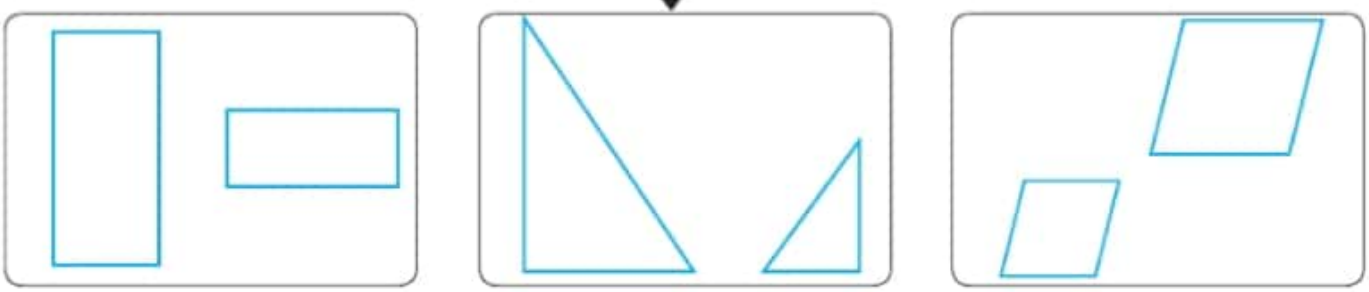
similar

Description

if one image can be obtained from another by a sequence of transformations with at least one dilation

Characteristics of the scale factor

- **If the scale factor is between 0 and 1, the dilated figure is smaller than the original image.**
- **If the scale factor is equal to 1, the dilated figure is the same size as the original image.**
- **If the scale factor is greater than 1, the dilated figure is larger than the original image.**



Draw three pairs of similar figures.

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Lesson 4 Vocabulary

Properties of Similar Polygons

Use the word cards to define each vocabulary word or phrase and give an example. Sample answers are given.

Word Cards

similar polygons

Definition

polygons that have the same shape

Example Sentence

The polygons are similar, so the 

corresponding angles are congruent.

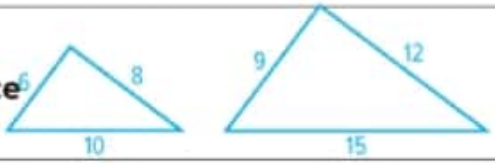
Word Cards

scale factor

Definition

the ratio of the lengths of two corresponding sides of two similar polygons

Example Sentence



The triangles shown have a scale factor of $\frac{3}{2}$

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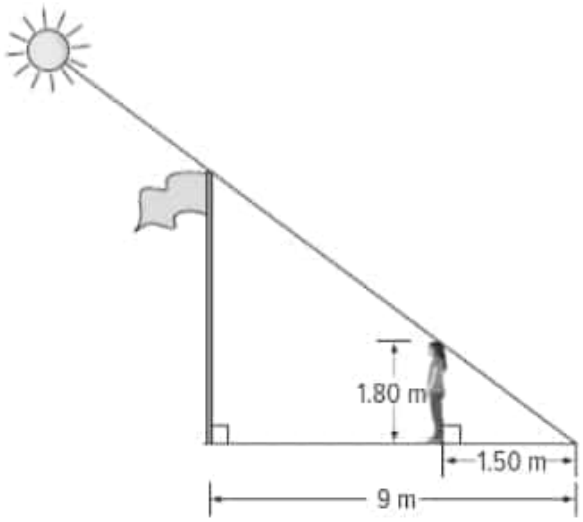
Lesson 5 Vocabulary

Similar Triangles and Indirect Measurement

Use the flow chart to solve a problem using indirect measurement.
Sample answers are given.



Indirect Measurement

Define indirect measurement.
a technique using properties of similar polygons to find distances or lengths that are difficult to measure directly

Shadow Reckoning

Two objects and their shadows form two sides of right triangles.	A flagpole casts a 9-meter shadow. A 1.8 meters tall man casts a 1.5-meter shadow.
Name the unknown.	**the height of the flagpole**
Set up a proportion using corresponding sides.	$\frac{h}{1.8} = \frac{9}{1.5}$
Solve the proportion to find the missing measurement.	$h =$ **10.8 meters**

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Lesson 6 Review Vocabulary

Slope and Similar Triangles

Use the word cards to define each vocabulary word or phrase and give an example. Sample answers are given.

Word Cards

slope

Definition

the ratio of the rise, or vertical change, to the run, or horizontal change

Example Sentence

The ratios of the rise to the run of two similar slope triangles are equal to the slope of the line.

Word Cards

similar

Definition

if one image can be obtained from another by a sequence of transformations and dilations

Example Sentence

Slope triangles are similar triangles.

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Lesson 7 Notetaking

Area and Perimeter of Similar Figures

Use Cornell notes to better understand the lesson's concepts. Complete each sentence by filling in the blanks with the correct word or phrase.

Questions	Notes
1. How can I use the scale factor to find the perimeter of similar figures?	If figure B is **similar** to figure A by a **scale factor**, then the perimeter of B is **equal** to the perimeter of A times the **scale factor**.
2. How can I use the scale factor to find the area of similar figures?	If figure B is **similar** to figure A by a **scale factor**, then the area of B is **equal** to the area of A times the **square** of the **scale factor**.

Summary

If you know two figures are similar and you are given the area of both figures, how can you determine the scale factor of the similarity? **See students' work.**

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Inquiry Lab Guided Writing

Three-Dimensional Figures

HOW are some three-dimensional figures related to circles?

Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

1. Rewrite the question in your own words.
   See students' work.

2. What key words do you see in the question?
   circles, related, three-dimensional figures

3. What words describe a circle? **round, diameter, radius**

4. Name two real-life objects that are circles. **jar lid, DVD**

5. A **three dimensional figure** is a figure that has length, width, and height.

6. Name three real-life three-dimensional objects that have circles as part of them.
   cup, can, ball

7. What kinds of figures are those objects? **cylinder, sphere**

8. Is a circle a three-dimensional figure? **no**

9. Are cylinders and spheres three-dimensional figures? **yes**

HOW are some three-dimensional figures related to circles?

Cylinders and cones have circles as their base.

A sphere is like a three-dimensional circle.

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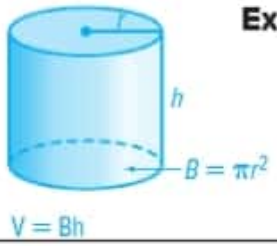
Lesson 1 Vocabulary

Volume of Cylinders

Use the vocabulary squares to write a definition, a sentence, and an example for each vocabulary word. Sample answers are given.

volume	**Definition** the measure of the space occupied by a solid; standard measures are cubic units such as cm^3 or m^3
Example  $V = Bh$	**Sentence** The volume of a cylinder is the area of the base multiplied by the height of the cylinder.

cylinder	**Definition** a three-dimensional figure with two parallel congruent circular bases connected by a curved surface
Draw a cylinder. 	**Sentence** A real world example of a cylinder is a can of soup.

composite solids	**Definition** an object made up of more than one type of solid
Draw a composite solid. 	**Sentence** To find the volume of composite solids, cut the figure into solids with volumes you know.

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Lesson 2 Vocabulary

Volume of Cones

Use the word cards to define each vocabulary word or phrase and give an example. **Sample answers are given.**

Word Cards

cone

Definition

a three-dimensional figure with one circular base connected by a curved surface to a vertex

Example Sentence

Sometimes, a party hat is cone shaped.

Word Cards

vertex

Definition

the point at the tip of a cone

Example Sentence

Every cone has exactly one vertex.

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Lesson 3 Vocabulary

Volume of Spheres

Use the definition map to list qualities about the vocabulary word or phrase.
Sample answers are given.

Vocabulary

sphere

Description

the set of all points in space that are a given distance from a given point called the center

Characteristics

volume of a sphere:

$V = \frac{4}{3}\pi r^3$

relation to hemisphere:

one of two congruent halves of a sphere

volume of a hemisphere:

$V = \frac{1}{2}\left(\frac{4}{3}\pi r^3\right)$

sphere

basketball

soccer ball

Draw and label three examples of spheres.

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Inquiry Lab Guided Writing

Surface Area of Cylinders

HOW can the surface area of a cylinder be determined?

Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

1. Rewrite the question in your own words.
   See students' work.

2. What key words do you see in the question?
   surface area, cylinder

3. What shape is the base of a cylinder? **circle**

4. What is the formula for finding the area of a circle? $A = \pi r^2$

5. How many bases does a cylinder have? **two**

6. What shape is the curved side of a cylinder when it is flattened? **rectangle**

7. What is the formula for finding the area of a rectangle? $A = \ell w$

8. To find the surface area of a cylinder, add the areas of the two **bases** and the area of the **curved side** .

HOW can the surface area of a cylinder be determined?

Calculate the area of one circular base, then multiply it by 2 since there are two bases. Add the area of the curved side.

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Lesson 4 Vocabulary

Surface Area of Cylinders

Use the word cards to define each vocabulary word or phrase and give an example. Sample answers are given.

Word Cards

lateral area

Definition

the sum of the areas of the lateral faces of a solid

Example Sentence

The label on a can of soup covers the lateral area of the can of soup.

Word Cards

total surface area

Definition

the sum of the areas of the surfaces of a solid

Example Sentence

The total surface area of a cylinder is the sum of the curved surface's area and the area of the two circular bases.

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Inquiry Lab Guided Writing

Nets of Cones

HOW can the surface area of a cone be found?

Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

1. Rewrite the question in your own words.
   See students' work.

2. What key words do you see in the question?
   surface area, cone

3. How many bases does a cone have? **one**

4. What shape is the base of a cone? **circle**

5. What is the formula for finding the area of a circle? $A = \pi r^2$

6. The area that forms the curved side of a cone is the **lateral** surface area.

7. The formula $A = \pi r\ell$ is used for finding the lateral surface area of a **cone** .

8. What does the "ℓ" stand for in the formula $A = \pi r\ell$? **slant height**

9. A cone has a base surface area of 2.46 cm^2 and a lateral surface area of 18.84 cm^2.
   How do you find the total surface area of the cone? **Add 2.46 cm^2 and 18.84 cm^2** .

HOW can the surface area of a cone be found?

The surface area of a cone can be found by multiplying pi times the radius times the slant height and adding the area of the base.

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Lesson 5 Notetaking

Surface Area of Cones

Use Cornell notes to better understand the lesson's concepts. Complete each sentence by filling in the blanks with the correct word or phrase.

Questions	Notes
1. How do I find the lateral area of a cone?	The lateral area of a cone is π times the radius times ℓ, the slant height.
2. How do I find the surface area of a cone?	The surface area of a cone is the lateral area plus the area of the circular base.

Summary

How does the volume of a three-dimensional figure differ from its surface area?
See students' work.

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Inquiry Lab Guided Writing

Changes in Scale

HOW does multiplying the dimensions of a three-dimensional figure by a scale factor affect its volume and surface area?

Use the exercises below to help answer the Inquiry Question. Write the correct word or phrase on the lines provided. Sample answers are given.

1. Rewrite the question in your own words.
   See students' work.

2. What key words do you see in the question?
   multiplying, dimensions, scale factor, volume, surface area

3. A **scale factor** is the ratio of an enlarged or reduced figure to the original figure.

4. **Volume** is measured in cubic units.
   Surface area is measured in square units.

Use the table to complete Exercises 5–7.

	Small Cube	Large Cube
Volume	125 cm^3	1,000 cm^3
Surface Area	150 cm^2	600 cm^2

Scale factor = 2

5. The volume of the small cube is multiplied by **8** to find the volume of the large cube.

6. The surface area of the small cube is multiplied by **4** to find the surface area of the large cube.

7. What is the scale factor cubed? **8**
   What is the scale factor squared? **4**

HOW does multiplying the dimensions of a three-dimensional figure by a scale factor affect its volume and surface area?

The volume of the figure is multiplied by the cube of the factor; the surface area is multiplied by the square of the factor.

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Lesson 6 Vocabulary

Changes in Dimensions

Use the word cards to define each vocabulary word or phrase and give an example. Sample answers are given.

Word Cards

similar solids

Definition

solids that have exactly the same shape, but not necessarily the same size

Example Sentence

A board game has a piece shaped like a top hat. The game piece and a real-world top hat are similar solids.

Word Cards

scale factor

Definition

the ratio of the length of two corresponding sides of two similar polygons

Example Sentence

The side measures of similar solids are proportional by a scale factor.