SPECTRUM®

Math

GRADE 8

CORRELATED TO Current State Standards CARSONDELLOSA.COM

Focused Practice for Math Mastery

- Rational and irrational numbers
- Linear equations
- Pythagorean Theorem
- Geometry in the coordinate plane
- Probability and statistics
- Answer key

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Table of Contents Grade 8

Chapter 1 Integers and Exponents

Chapter 2 Rational and Irrational Number Relationships

Chapter 3 Linear Equations

Chapter 4 Functions

Chapter 5 Geometry

NAME ______________________________

Check What You Know

Geometry

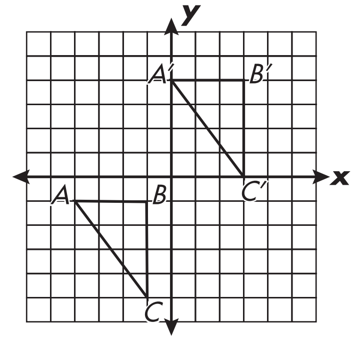
1. What are the coordinates of the preimage?

A (__________), *B* (__________), *C* (__________)

2. What are the coordinates of the image?

A′ (__________), *B*′ (__________), *C*′ (__________)

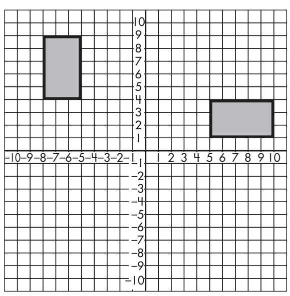
3. What transformation was performed on the figure? __________



Determine if a set of translations exist between figures 1 and 2 to determine if the figures are *similar*, *congruent*, or *not*.

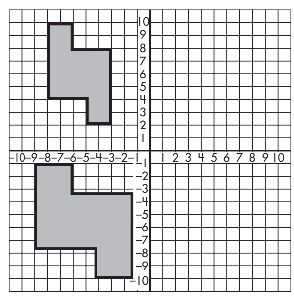
4.

a



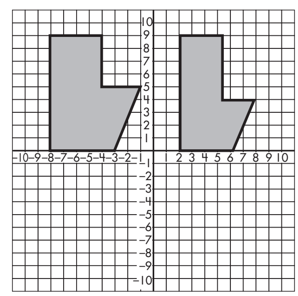
____

b



____

c

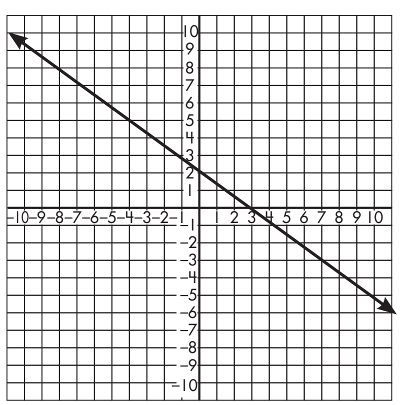


____

Draw similar right triangles to show that each line has a constant slope.

5.

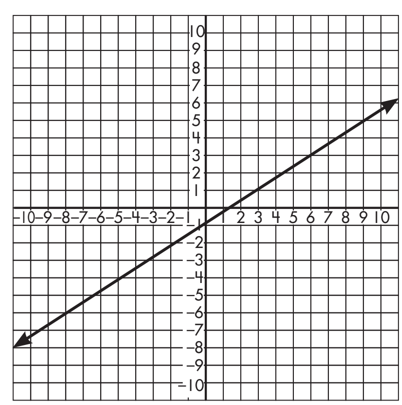
a



Triangle 1 Legs: _______ & _______

Triangle 2 Legs: _______ & _______

b



Triangle 1 Legs: _______ & _______

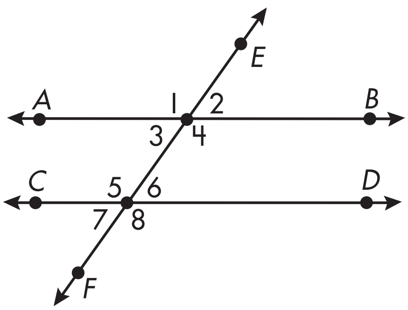
Triangle 2 Legs: _______ & _______

NAME ______________________

Check What You Know

Geometry

Answer each question using letters to name each line and numbers to name each angle.



6. What is the name of the transversal? ______________

7. Which angles are acute? ______________

8. Which angles are obtuse? ______________

9. Which pairs of angles are vertical angles? ______________

10. Which pairs of angles are alternate exterior angles?

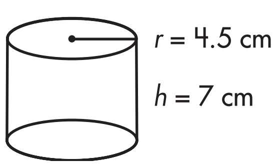
____

11. Which pairs of angles are alternate interior angles? ______________

Find the volume of each figure. Use 3.14 for π. Round answers to the nearest hundredth.

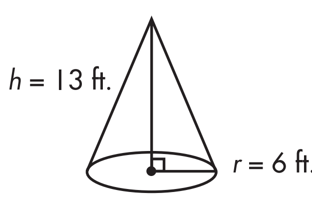
12.

a



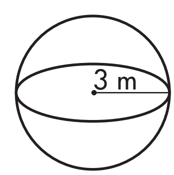
$V =$ ______________ cm^3

b



$V =$ ______________ $ft.^3$

c



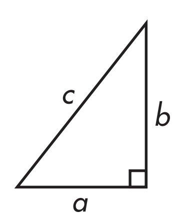
$V =$ ______________ m^3

Use the Pythagorean Theorem to find the unknown lengths.

13. If $a = 8$ and $b = 15$, $c = \sqrt{\quad}$ ______ or ______.

14. If $b = 7$ and $c = 13$, $a = \sqrt{\quad}$ ______ or about ______.

15. If $a = 9$ and $c = 20$, $b = = \sqrt{\quad}$ ______ or about ______.

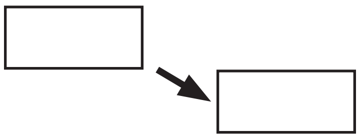


NAME ______________________

Lesson 5.1 Transformations: Translations

A **transformation** is a type of function that describes a change in the position, size, or shape of a figure.

A **translation** is a slide of a figure. The figure can be slid up, down, or sideways. However, the size, shape, and orientation of the figure remain the same.

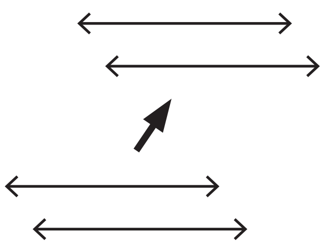


This figure has been translated down and to the right.

State if the figures below represent a translation by writing *yes* or *no*.

1.

a



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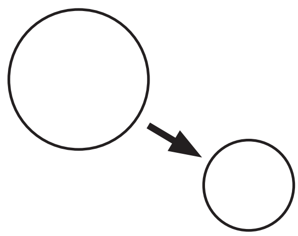
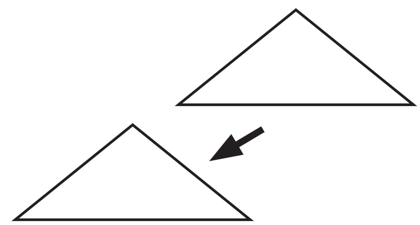
b



____

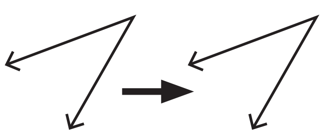
c



____

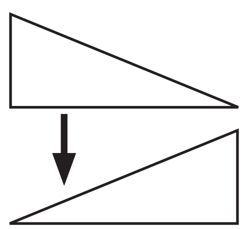
2.

a



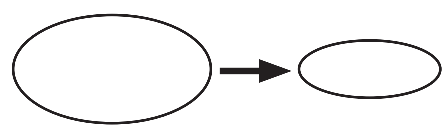
____

b



____

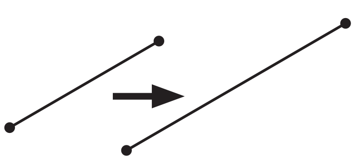
c



____

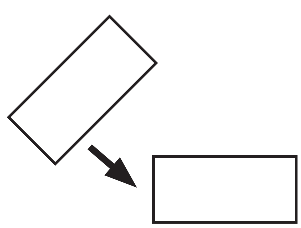
3.

a



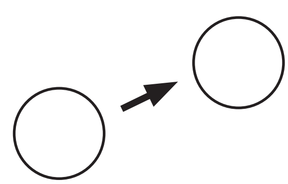
____

b



____

c



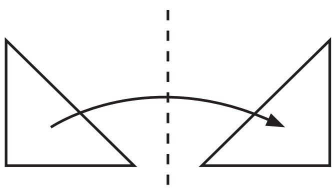
____

NAME ______________________________

Lesson 5.1 Transformations: Reflections

A **transformation** is a type of function that describes a change in the position, size, or shape of a figure.

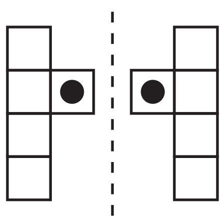
A **reflection** is a flip of a figure. It can be flipped to the side, up, or down.

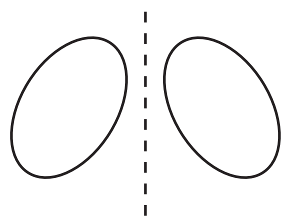


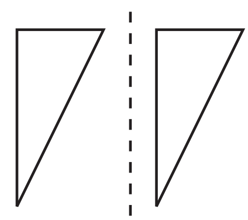
This figure has been flipped horizontally over the dotted line.

State if the figures below represent a reflection by writing *yes* or *no*.

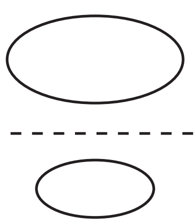
1.

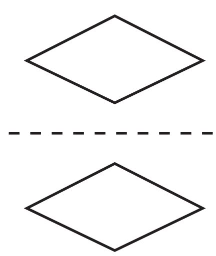
a  ______________

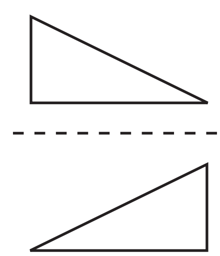
b  ______________

c  ______________

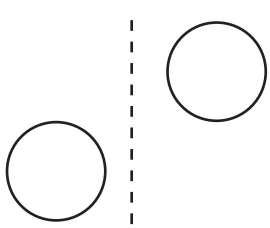
2.

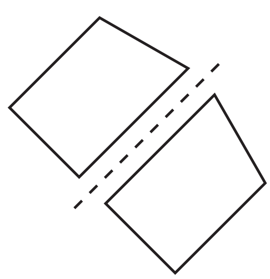
a  ______________

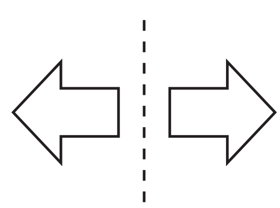
b  ______________

c  ______________

3.

a  ______________

b  ______________

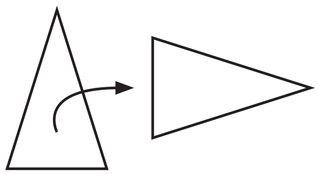
c  ______________

NAME ______________________

Lesson 5.1 Transformations: Rotations

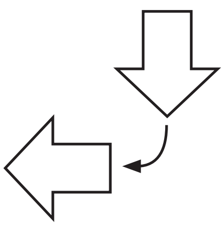
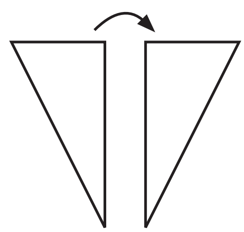
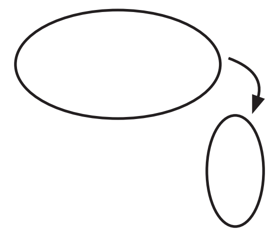
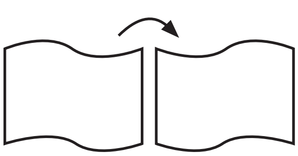
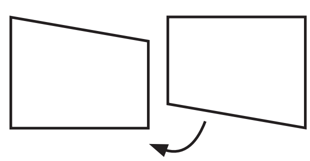
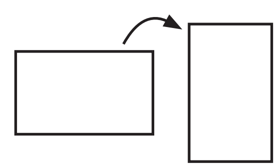
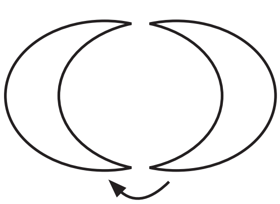
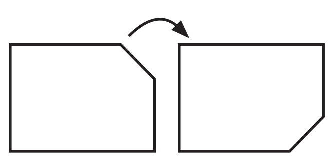
A **transformation** is a type of function that describes a change in the position, size, or shape of a figure.

A **rotation** is a turn of a figure. The figure can be rotated any number of degrees.



This figure has been rotated 90° clockwise about the point. This point is called the **center of rotation**.

State if the figures below represent a rotation by writing *yes* or *no*.

	a	b	c
1.	 ______	 ______	 ______
2.	 ______	 ______	 ______
3.	 ______	 ______	 ______

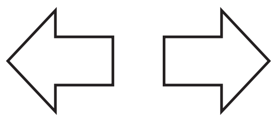
NAME ____________________

Lesson 5.1 Transformations: Rotations, Reflections, and Translations

State if the figures below represent a *rotation*, *reflection*, or *translation*.

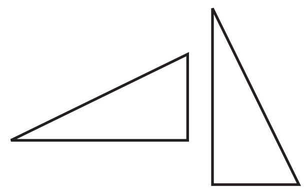
1.

a



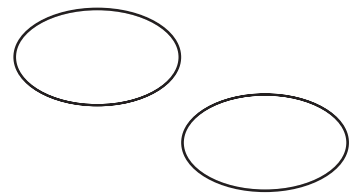
____

b



____

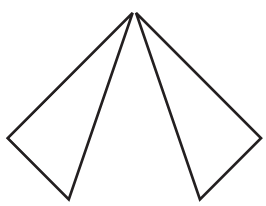
c



____

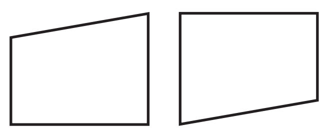
2.

a



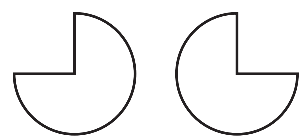
____

b



____

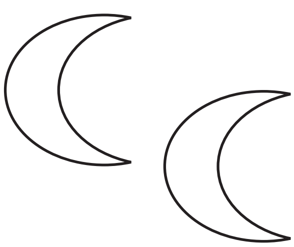
c



____

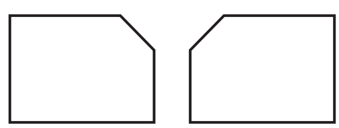
3.

a



____

b



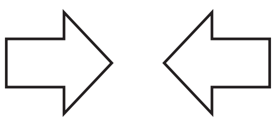
____

c

____

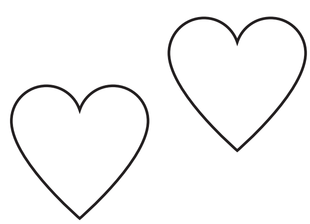
4.

a



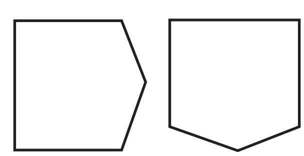
____

b



____

c



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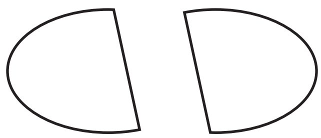
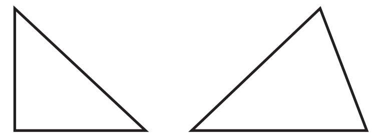
NAME ______________________

Lesson 5.2 Congruence

Two shapes are said to be **congruent** if they are the same size and shape regardless of orientation. If a figure is **rotated**, **translated**, or **reflected** over a line, the two resulting shapes are congruent.

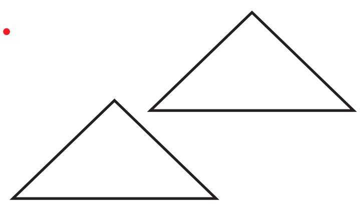
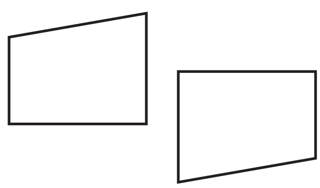
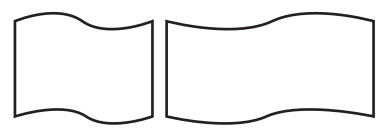
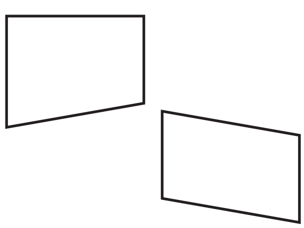
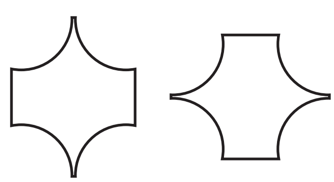
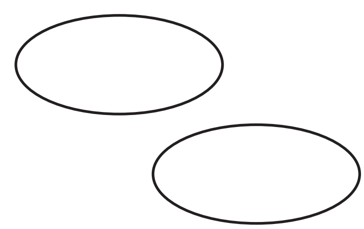
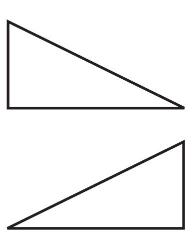
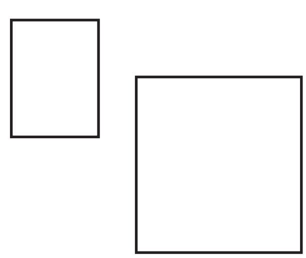


congruent



not congruent

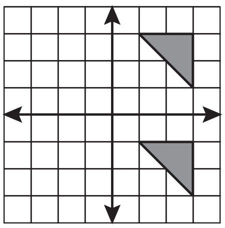
Decide if the figures below are congruent. Write *yes* or *no*.

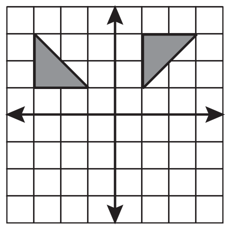
	a	b	c
1.	 ______	 ______	 ______
2.	 ______	 ______	 ______
3.	 ______	 ______	 ______

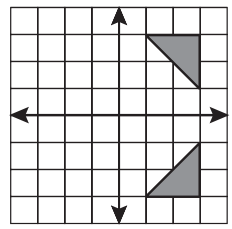
NAME ______________________

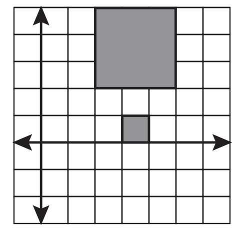
Lesson 5.3 Rotations, Reflections, and Translations in the Coordinate Plane

A **transformation** is a change of the position or size of an image. In a **translation**, an image slides in any direction. In a **reflection**, an image is flipped over a line. In a **rotation**, an image is turned about a point. In a **dilation**, an image is enlarged or reduced. One way to view an image and its transformation is to graph it on a coordinate plane.


translation


rotation

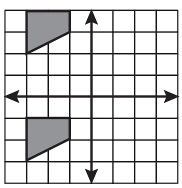

reflection


dilation

Write whether each transformation is a *translation*, *rotation*, *reflection*, or *dilation*.

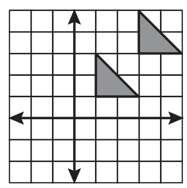
1.

a



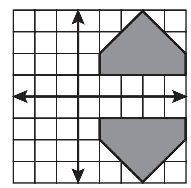
____

b



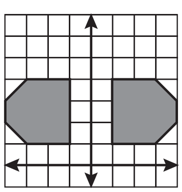
____

c



____

2.



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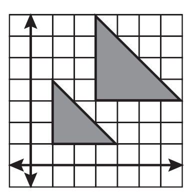
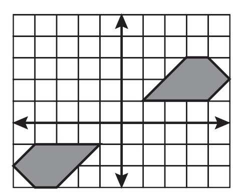
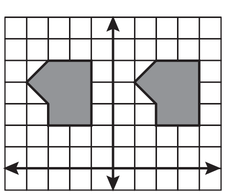


____

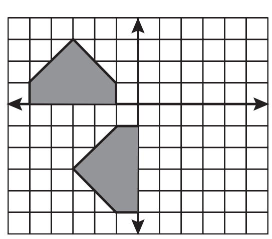


____

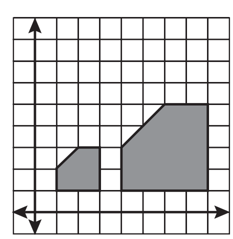
3.



____



____

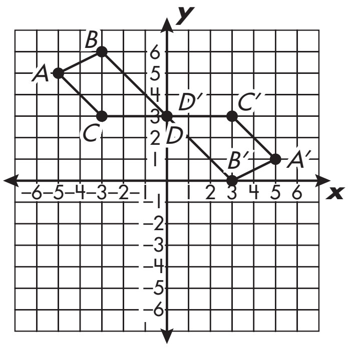


____

NAME ______________________________

Lesson 5.3 Rotations, Reflections, and Translations in the Coordinate Plane

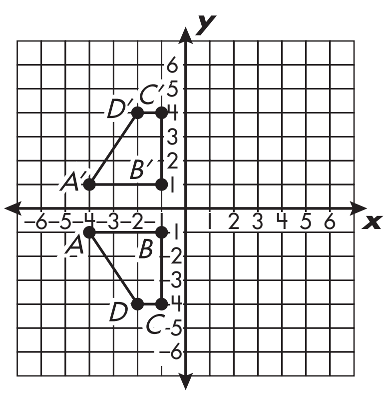
Graphing figures on a coordinate plane helps show how they are transformed. The original figure is called a **preimage.** The transformed figure is called the **image.** Read the numbers on the *x*-axis and *y*-axis to determine the location of the figure.



This figure has been rotated 180° about one point of the figure. As a result, the preimage and the image share a point. The 4 corners of the preimage are points A, B, C, and D. The four corners of the image are also labeled A′, B′, C′, and D′, but note the prime symbol (′) after each.

The coordinates of the preimage are: *A* (−5, 5), *B* (−3, 6) *C* (−3, 3), *D* (0, 3).
The coordinates of the image are: *A*′(5, 1), *B*′(3, 0), *C*′(3, 3), *D*′(0, 3).

The location of each figure is identified by the coordinates of its corners. The first figure, or preimage, has coordinate points labeled *A*, *B*, etc. The transformed figure, or image, has coordinate points labeled *A*′, *B*′, etc.



1. What are the coordinates of the preimage?

A (__________), *B* (__________), *C* (__________), *D* (__________)

2. What are the coordinates of the image?

A′(__________), *B*′(__________), *C*′(__________), *D*′(__________)

3. What transformation was performed on the figure? __________

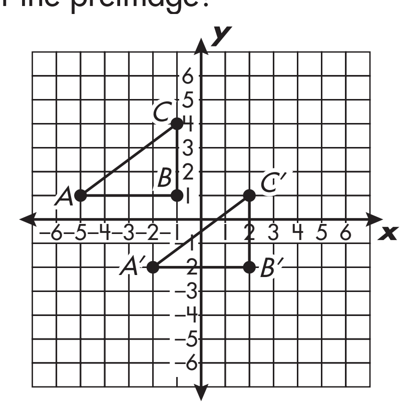
4. What are the coordinates of the preimage?

A (__________), *B* (__________), *C* (__________)

5. What are the coordinates of the image?

A′(__________), *B*′(__________), *C*′(__________),

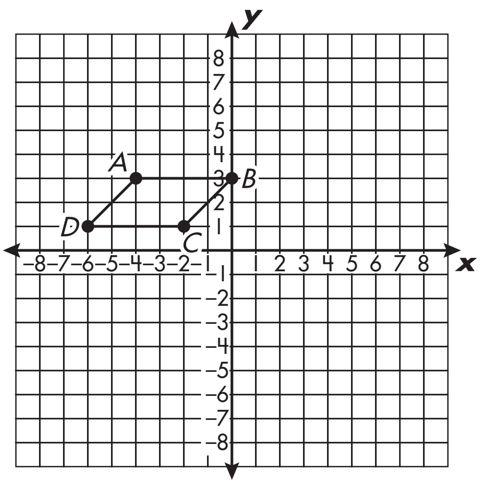
6. What transformation was performed on the figure? __________



NAME ___________________________

Lesson 5.3 Rotations, Reflections, and Translations in the Coordinate Plane

The location of each figure is identified by the coordinates of its corners. The first figure, or preimage, has coordinate points labeled *A*, *B*, etc. The transformed figure, or image, has coordinate points labeled *A*′, *B*′, etc.



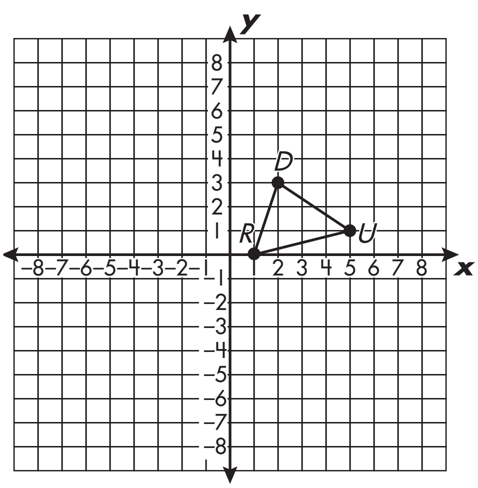
1. What are the coordinates of the preimage?

A(________) *B*(________), *C*(________), *D*(________)

2. Draw a transformed image with the following coordinates:

A′(−1, 4), *B*′(5, 4), *C*′(2, 1), *D*′(−4, 1)

3. What transformation did you perform? ____________



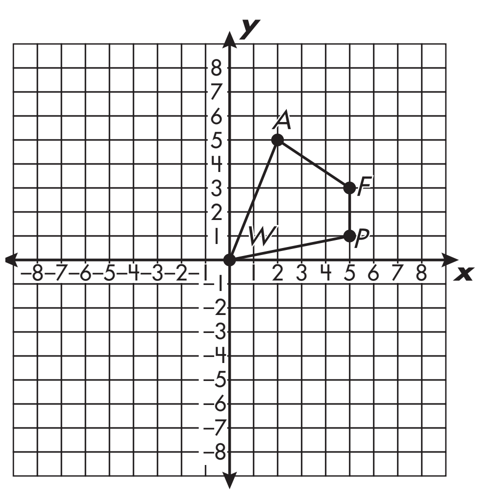
4. What are the coordinates of the preimage?

D (________), *U* (________), *R* (________)

5. Draw a transformed image with the following coordinates:

D′(4, −1), *U*′(2, −4), *R*′(1, 0)

6. What transformation did you perform? ____________



7. What are the coordinates of the preimage?

A (________), *W* (________), *F* (________), *P* (________)

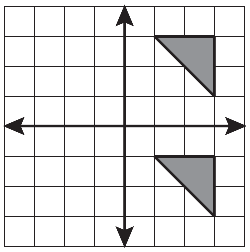
8. Draw a transformed image with the following coordinates:

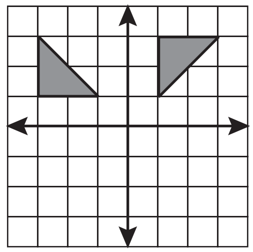
A′(−2, 5), *W*′(0, 0), *F*′(−5, −3), *P*′(−5, 1)

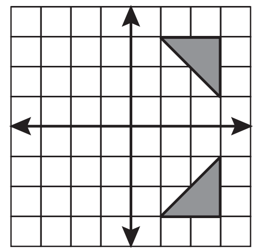
9. What transformation did you perform? ____________

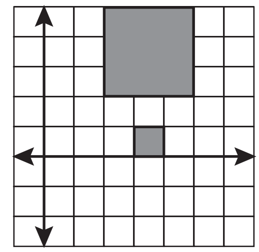
Lesson 5.4 Transformation Sequences

If there exists a sequence of translations, reflections, rotations, and/or dilations that will transform one figure into the other, the two figures are either **similar** or **congruent**. Similar figures are the same shape but not the same size while congruent shapes are both the same shape and the same size. Follow the sequence of transformations to determine if two figures are similar or congruent.


translation


rotation

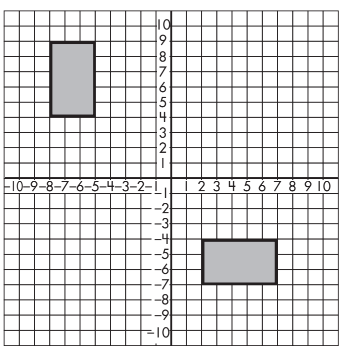

reflection


dilation

Determine if a set of transformations exist between figures 1 and 2. Then, write *similar*, *congruent*, or *neither*.

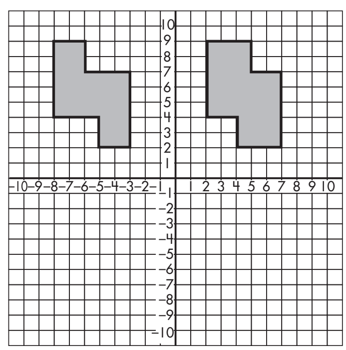
1.

a



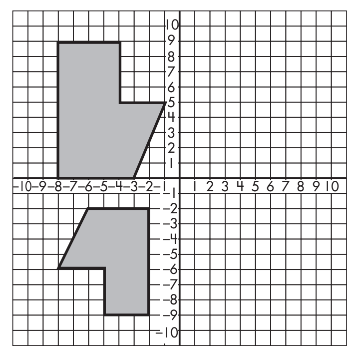
____

b



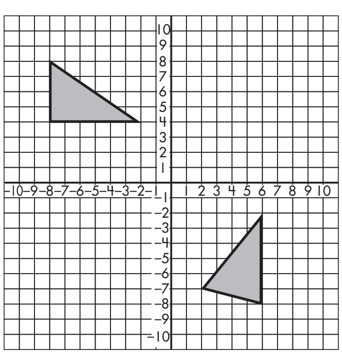
____

c

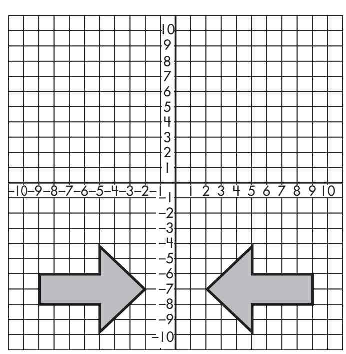


____

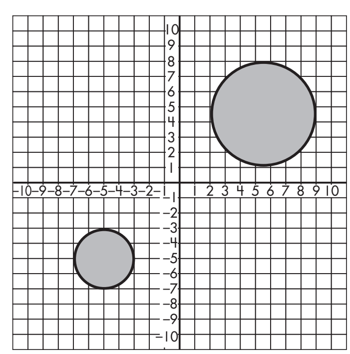
2.



____



____



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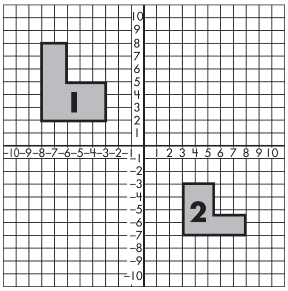
NAME ______________________________

Lesson 5.4 Transformation Sequences

Sometimes the order of the steps in a transformation sequence will vary, but every shape has a specific sequence it must go through in order to be transformed.



Step 1: The figure is reflected across the y-axis.

Step 2: The figure is rotated 90°.

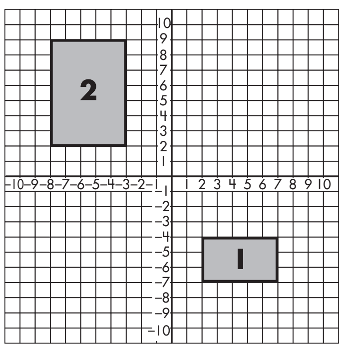
Step 3: The figure is translated by -8 along the y-axis.

Step 4: The figure is decreased by 20% (dilation in reverse).

Write the steps each figure must go through to be transformed from figure 1 to figure 2.

1.

a

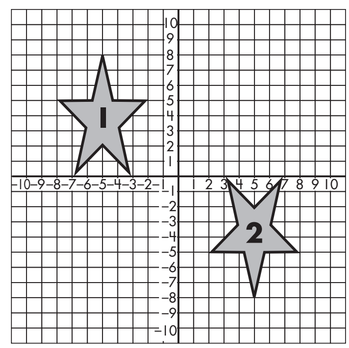


Step 1: ______________________________

Step 2: ______________________________

Step 3: ______________________________

b

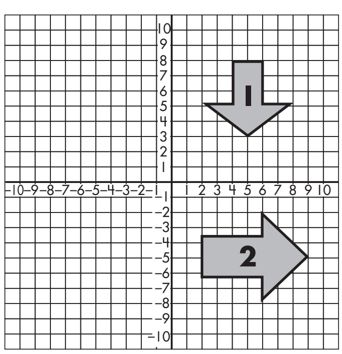


Step 1: ______________________________

Step 2: ______________________________

2.

a

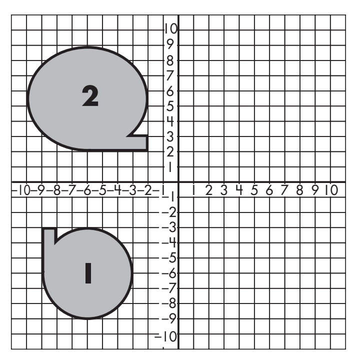


Step 1: ______________________________

Step 2: ______________________________

Step 3: ______________________________

b



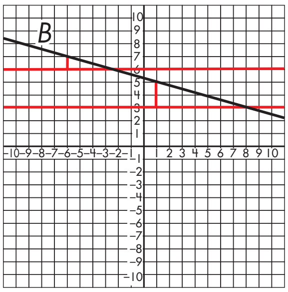
Step 1: ______________________________

Step 2: ______________________________

Step 3: ______________________________

Lesson 5.5 Slope and Similar Triangles

The rate of change, or slope, of a line can be tested for constancy by using similar triangles.



To test if the slope of the line *B* is constant, draw a set of parallel lines that intersect the line.

Then, draw a line segment from each of the parallel lines to line *B* to create a set of right triangles.

Find the length of the legs for each set of triangles. 3 & 1 and 6 & 2

Test the leg lengths for proportionality. $\frac{3}{1} = \frac{6}{2}$

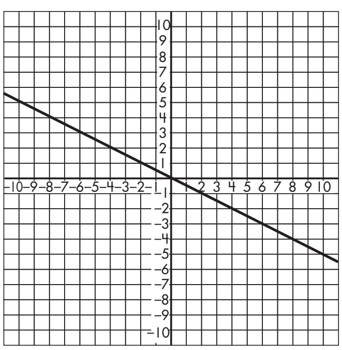
$3 \times 2 = 6$ and $6 \times 1 = 6$

These leg lengths are proportional, so the line has a constant slope.

Use similar right triangles to prove that each line has a constant slope.

1.

a



Triangle 1 Legs:

______ & ______

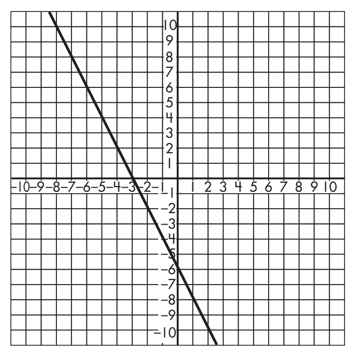
Triangle 2 Legs:

______ & ______

Proportionality Test:

___ = ___

b



Triangle 1 Legs:

______ & ______

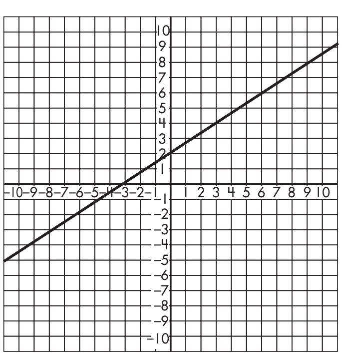
Triangle 2 Legs:

______ & ______

Proportionality Test:

___ = ___

2.



Triangle 1 Legs:

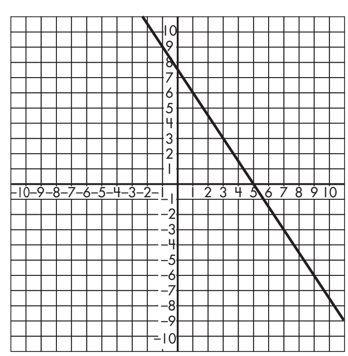
______ & ______

Triangle 2 Legs:

______ & ______

Proportionality Test:

___ = ___



Triangle 1 Legs:

______ & ______

Triangle 2 Legs:

______ & ______

Proportionality Test:

___ = ___

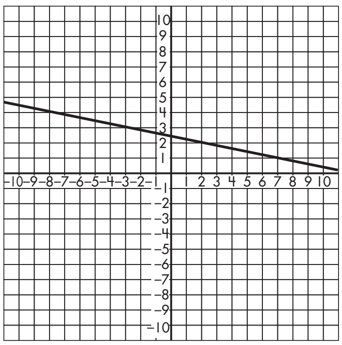
NAME ______________________________

Lesson 5.5 Slope and Similar Triangles

Use similar right triangles to prove that each line has a constant slope.

a

1.



Triangle 1 Legs:

______ & ______

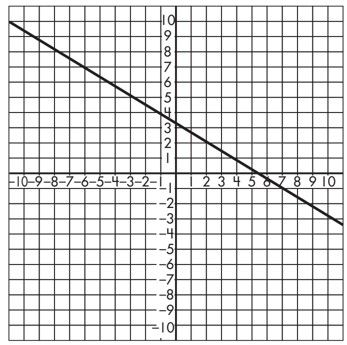
Triangle 2 Legs:

______ & ______

Proportionality Test:

___ = ___

b



Triangle 1 Legs:

______ & ______

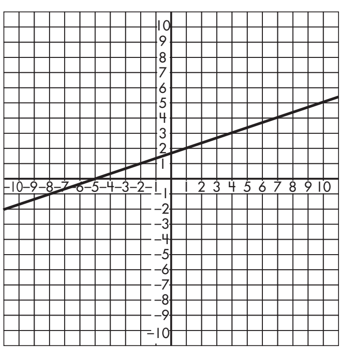
Triangle 2 Legs:

______ & ______

Proportionality Test:

___ = ___

2.



Triangle 1 Legs:

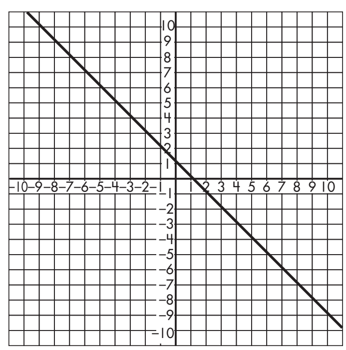
______ & ______

Triangle 2 Legs:

______ & ______

Proportionality Test:

___ = ___



Triangle 1 Legs:

______ & ______

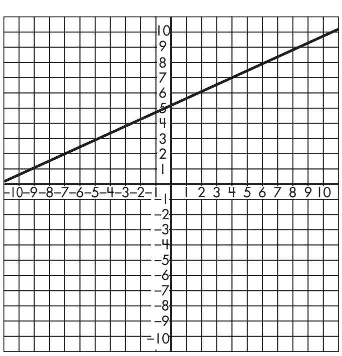
Triangle 2 Legs:

______ & ______

Proportionality Test:

___ = ___

3.



Triangle 1 Legs:

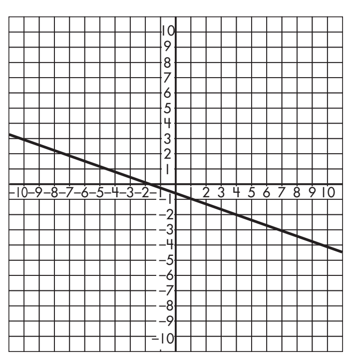
______ & ______

Triangle 2 Legs:

______ & ______

Proportionality Test:

___ = ___



Triangle 1 Legs:

______ & ______

Triangle 2 Legs:

______ & ______

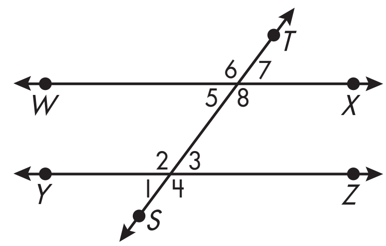
Proportionality Test:

___ = ___

NAME ______________________

Lesson 5.6 Transversals and Calculating Angles

A **transversal** is a line that intersects two or more lines at different points. The angles that are formed are called **alternate interior angles** and **alternate exterior angles**. When a transversal intersects parallel lines, **corresponding angles** are formed.



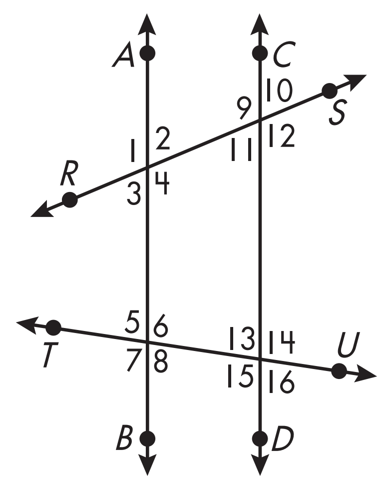
In the figure, $\overleftrightarrow{ST}$ is a transversal. $\overleftrightarrow{WX}$ and $\overleftrightarrow{YZ}$ are parallel.

The alternate interior angles are $\angle 2$ and $\angle 8$, and $\angle 3$ and $\angle 5$.

The alternate exterior angles are $\angle 4$ and $\angle 6$, and $\angle 1$ and $\angle 7$.

The corresponding angles are $\angle 1$ and $\angle 5$, $\angle 2$ and $\angle 6$, $\angle 3$ and $\angle 7$, and $\angle 4$ and $\angle 8$.

Use the figure to the right. Name the transversal that forms each pair of angles. Write whether the angles are *alternate interior, alternate exterior,* or *corresponding*.



1. $\angle 1$ and $\angle 9$ __________ ____________________

2. $\angle 5$ and $\angle 4$ __________ ____________________

3. $\angle 11$ and $\angle 3$ __________ ____________________

4. $\angle 5$ and $\angle 16$ __________ ____________________

5. $\angle 13$ and $\angle 8$ __________ ____________________

6. $\angle 15$ and $\angle 10$ __________ ____________________

7. $\angle 7$ and $\angle 14$ __________ ____________________

8. $\angle 8$ and $\angle 16$ __________ ____________________

9. $\angle 6$ and $\angle 3$ __________ ____________________

10. $\angle 12$ and $\angle 13$ __________ ____________________

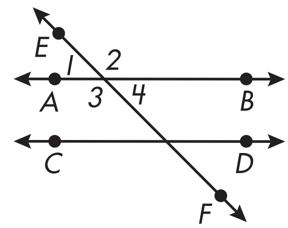
11. $\angle 10$ and $\angle 2$ __________ ____________________

12. $\angle 5$ and $\angle 13$ __________ ____________________

NAME ______________________________

Lesson 5.6 Transversals and Calculating Angles

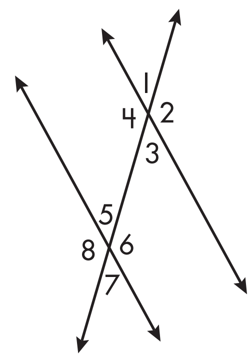
Adjacent angles are any 2 angles that are next to one another. In the figure, ∠1 and ∠2 are adjacent. ∠2 and ∠4 are also adjacent. Adjacent angles share a ray. They also form supplementary angles (180°).



1. Name the pairs of adjacent angles in the figure.

∠___/∠___, ∠___/∠___, ∠___/∠___, ∠___/∠___,

∠___/∠___, ∠___/∠___, ∠___/∠___, ∠___/∠___



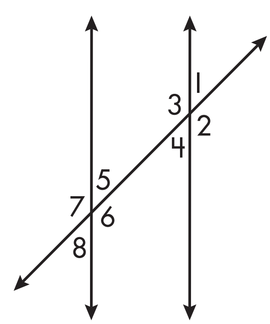
Alternate interior angles are those that are inside the parallel lines and opposite one another. ∠3 and ∠5 are alternate interior angles. Alternate interior angles are congruent.

2. Name another pair of alternate interior angles in the figure. ∠___/∠___

Alternate exterior angles are those that are outside the parallel lines and opposite one another. ∠1 and ∠7 are alternate exterior angles. Alternate exterior angles are also congruent.

3. Name another pair of alternate exterior angles in the figure. ∠___/∠___

Look at the figure. List the following pairs of angles.



4. Adjacent: ∠___/∠___, ∠___/∠___, ∠___/∠___, ∠___/∠___,

∠___/∠___, ∠___/∠___, ∠___/∠___, ∠___/∠___

5. Alternate interior: ∠___/∠___, ∠___/∠___

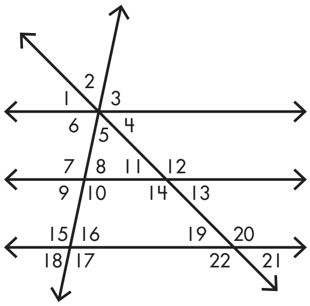
6. Alternate exterior: ∠___/∠___, ∠___/∠___

7. Vertical: ∠___/∠___, ∠___/∠___,

∠___/∠___, ∠___/∠___

Lesson 5.6 Transversals and Calculating Angles

Use the figures below to answer the questions.

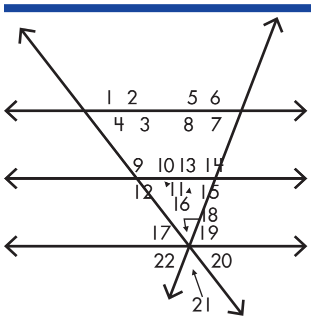


1. If the measure of ∠1 is 45°, what is the measure of ∠4? __________

2. If the measure of ∠12 is 102°, what is the measure of ∠11? __________

3. If the measure of ∠18 is 76°, what is the measure of ∠8? __________

4. If the measure of ∠9 is 97°, what is the measure of ∠10? __________

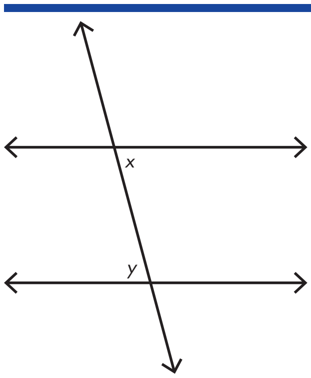


5. If the measure of ∠2 is 115°, what is the measure of ∠12? __________

6. If the measure of ∠6 is 84°, what is the measure of ∠13? __________

7. If the measure of ∠18 is 35°, what is the measure of ∠21? __________

8. If the measure of ∠15 is 102 °, what is the measure of ∠5? __________

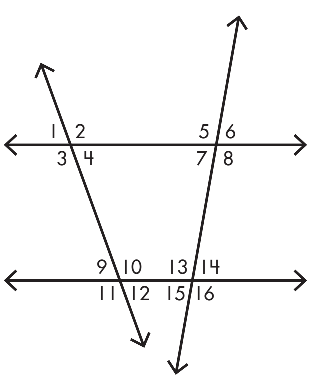


9. If ∠x = 70°, what is the measure of ∠y? __________

10. If ∠x = 80°, what is the measure of ∠y? __________

11. If ∠y = 75°, what is the measure of ∠x? __________

12. If ∠y = 85°, what is the measure of ∠x? __________



13. If ∠5 = 100°, what is the measure of ∠15? __________

14. If ∠6 = 70°, what is the measure of ∠13? __________

15. If ∠2 = 110°, what is the measure of ∠9? __________

16. If ∠4 = 85°, what is the measure of ∠11? __________

17. Can you determine the measure of ∠11 if you know the measure of ∠6? Why or why not?

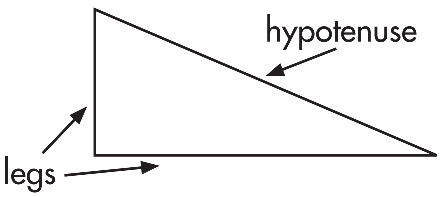
____

____

NAME ____________________

Lesson 5.7 Defining Pythagorean Theorem

The **Pythagorean Theorem** states that if a triangle is a right triangle, then $a^2 + b^2 = c^2$, when *a* and *b* represent the legs of the triangle and *c* represents the hypotenuse.



The Pythagorean Theorem:
If a triangle is a right triangle, then $a^2 + b^2 = c^2$.

Converse of Pythagorean Theorem:
If $a^2 + b^2 = c^2$, then the triangle is a right triangle.

Complete the table below to prove if each set of sides creates a right triangle.

	a	*b*	*c*	Is $a^2 + b^2 = c^2$ true?	Makes a right triangle?
1.	3	4	5		
2.	3	4	6		
3.	4	6	9		
4.	5	12	13		
5.	6	8	13		
6.	7	24	25		
7.	7	13	15		
8.	8	20	25		
9.	8	15	17		
10.	10	27	30		
11.	13	20	30		
12.	13	21	29		

13. Based on the true results in the table above, what pattern can be inferred about the Pythagorean Theorem?

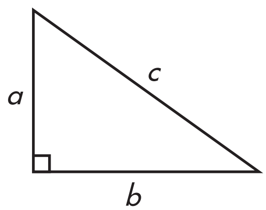
____

____

NAME ____________________

Lesson 5.8 Using Pythagorean Theorem

If *a*, *b*, and *c* are the lengths of the sides of this triangle, $a^2 + b^2 = c^2$.



If $a = 3$ and $b = 4$, what is *c*?

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

$3^2 + 4^2 = c^2$

$9 + 16 = c^2$

$25 = c^2$

$\sqrt{25} = c$

$5 = c$

If $a = 4$ and $b = 6$, what is *b*?

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

$4^2 + 6^2 = c^2$

$16 + 36 = c^2$

$52 = c^2$

$\sqrt{52} = c$

$c =$ *about* 7.21

Use the Pythagorean Theorem to determine the length of *c*. Assume that each problem describes a right triangle. Sides *a* and *b* are the legs and the hypotenuse is *c*.

1. If $a = 9$ and $b = 4$, $c = \sqrt{}$ ________ or about ____________.

2. If $a = 5$ and $b = 7$, $c = \sqrt{}$ ________ or about ____________.

3. If $a = 3$ and $b = 6$, $c = \sqrt{}$ ________ or about ____________.

4. If $a = 2$ and $b = 9$, $c = \sqrt{}$ ________ or ____________.

5. If $a = 5$ and $b = 6$, $c = \sqrt{}$ ________ or about ____________.

6. If $a = 3$ and $b = 5$, $c = \sqrt{}$ ________ or about ____________.

7. If $a = 7$ and $b = 6$, $c = \sqrt{}$ ________ or about ____________.

8. If $a = 8$ and $b = 6$, $c = \sqrt{}$ ________ or ____________.

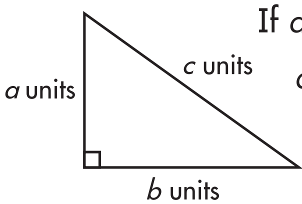
9. If $a = 7$ and $b = 2$, $c = \sqrt{}$ ________ or about ____________.

10. If $a = 8$ and $b = 5$, $c = \sqrt{}$ ________ or about ____________.

NAME ______________________________

Lesson 5.8 Using the Pythagorean Theorem

You can use the Pythagorean Theorem to find the unknown length of a side of a right triangle as long as the other two lengths are known.



If $a = 12$ m and $c = 13$ m, what is b?

$a^2 + b^2 = c^2$ $\quad 12^2 + b^2 = 13^2$

$144 + b^2 = 169$

$144 + b^2 - 144 = 169 - 144$

$b^2 = 25$ $\quad b = \sqrt{25}$ $\quad b = 5$ m

If $b = 15$ ft. and $c = 17$ ft., what is a?

$a^2 + b^2 = c^2$ $\quad a^2 + 15^2 = 17^2$

$a^2 + 225 = 289$

$a^2 + 225 - 225 = 289 - 225$

$a^2 = 64$ $\quad a = \sqrt{64}$ $\quad a = 8$ ft.

Assume that each problem describes a right triangle. Use the Pythagorean Theorem to find the unknown lengths.

1. If $a = 12$ and $c = 20$, $b =$ $\sqrt{\quad}$ __________ or __________.
2. If $b = 24$ and $c = 26$, $a =$ $\sqrt{\quad}$ __________ or __________.
3. If $c = 8$ and $a = 5$, $b =$ $\sqrt{\quad}$ __________ or about __________.
4. If $b = 13$ and $c = 17$, $a =$ $\sqrt{\quad}$ __________ or about __________.
5. If $a = 20$ and $c = 32$, $b =$ $\sqrt{\quad}$ __________ or about __________.
6. If $c = 15$ and $b = 12$, $a =$ $\sqrt{\quad}$ __________ or __________.
7. If $c = 41$ and $b = 40$, $a =$ $\sqrt{\quad}$ __________ or __________.
8. If $a = 36$ and $c = 85$, $b =$ $\sqrt{\quad}$ __________ or __________.
9. If $c = 73$ and $b = 48$, $a =$ $\sqrt{\quad}$ __________ or __________.
10. If $a = 14$ and $c = 22$, $b =$ $\sqrt{\quad}$ __________ or about __________.

NAME ____________________

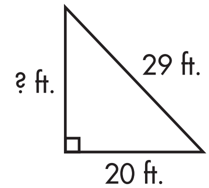
Lesson 5.8 Using the Pythagorean Theorem

SHOW YOUR WORK

Use the Pythagorean Theorem to solve each problem.

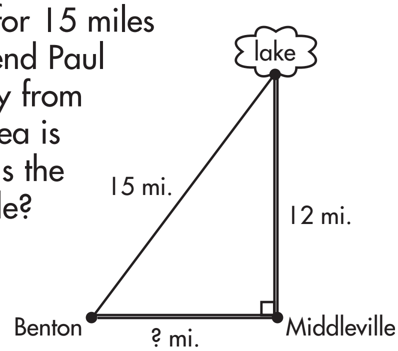
1. A boat has a sail with measures as shown. How tall is the sail?

The sail is ________ feet tall.



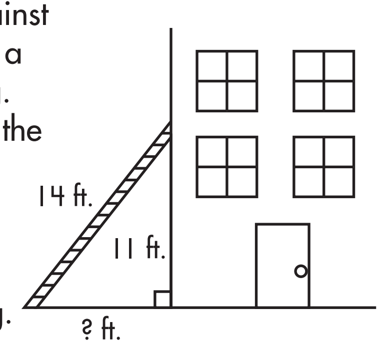
2. Kelsey drove on a back road for 15 miles from Benton to a lake. Her friend Paul drove 12 miles on the highway from Middleville to the lake. This area is shown at the right. How long is the road from Benton to Middleville?

The road is ________ miles long.



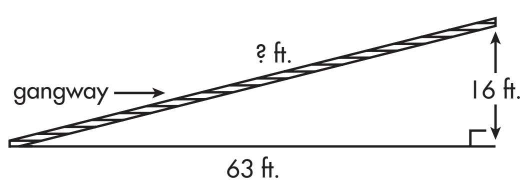
3. A 14-foot ladder is leaning against a building as shown. It touches a point 11 feet up on the building. How far away from the base of the building does the ladder stand?

The ladder stands about ________ feet from the building.



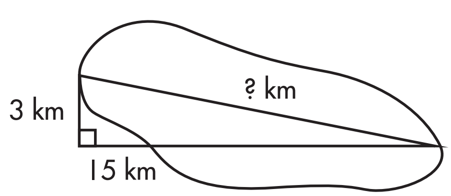
4. This gangway connects a dock to a ship, as shown. How long is the gangway?

The gangway is ________ feet long.



5. About how long is the lake shown at right?

The lake is about ________ km long.



1.

2.

3.

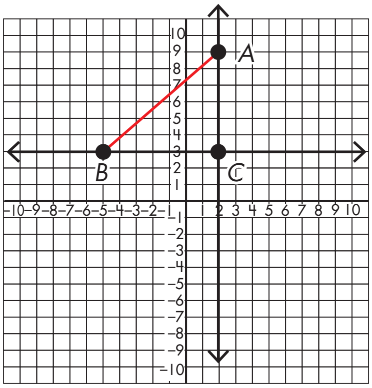
4.

5.

NAME ______________________________

Lesson 5.9 Pythagorean Theorem in the Coordinate Plane

The Pythagorean Theorem can be used to find an unknown distance between two points on a coordinate plane.



Find the distance between points A and B.

Step 1: Draw lines extending from points A and B so that when they intersect they create a right angle. Label the point at which they meet, point C.

Step 2: Find the distance of segment $\overline{AC}$ (7), and segment $\overline{BC}$ (6).

Step 3: Use Pythagorean Theorem to find the length of segment $\overline{AB}$.

$$7^2 + 6^2 = 85$$

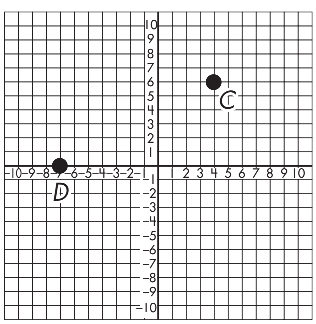
$$(\overline{AB})^2 = 85$$

$$\overline{AB} = \sqrt{85} = 9.22$$

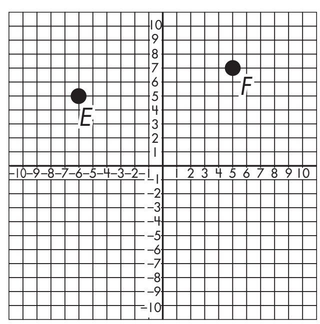
Find the distance between each of the points given below using the Pythagorean Theorem. Round answers to the nearest hundredth.

a **b** **c**

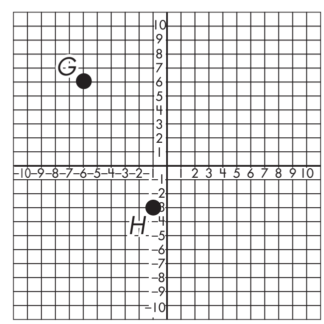
1.



$\overline{CD}$ = ______________

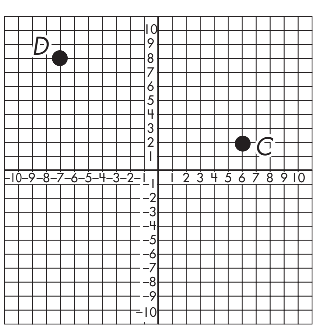


$\overline{EF}$ = ______________

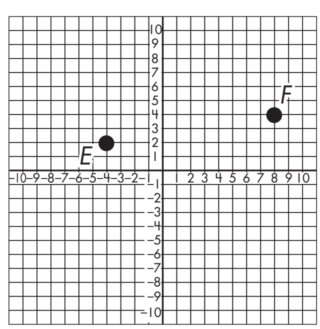


$\overline{GH}$ = ______________

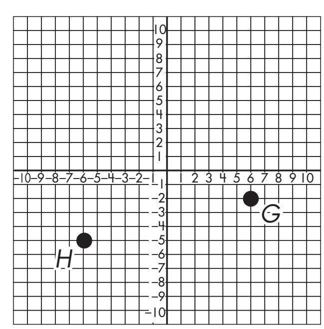
2.



$\overline{CD}$ = ______________



$\overline{EF}$ = ______________



$\overline{GH}$ = ______________

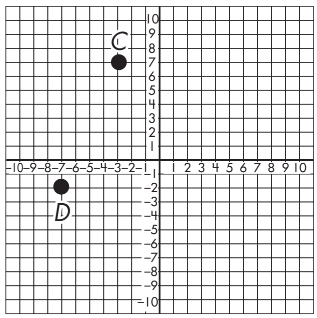
Lesson 5.9 Pythagorean Theorem in the Coordinate Plane

Find the distance between each of the points given below using the Pythagorean Theorem. Round answers to the nearest hundredth.

	a	b	c

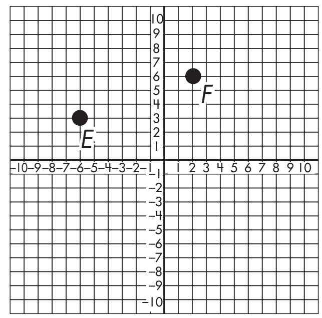
1.

a



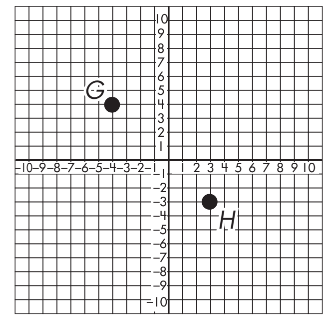
$\overline{CD}$ = ______________

b



$\overline{EF}$ = ______________

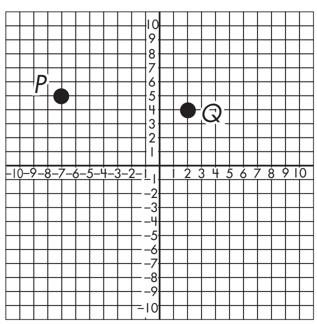
c



$\overline{GH}$ = ______________

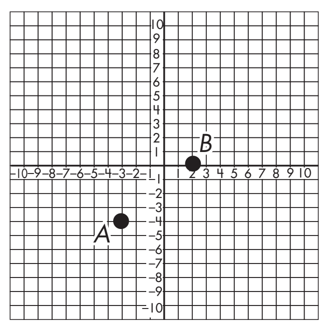
2.

a



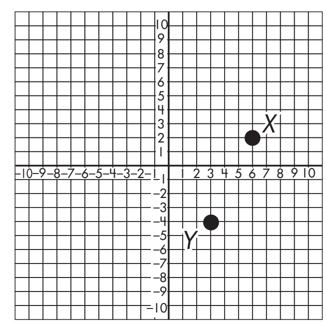
$\overline{PQ}$ = ______________

b



$\overline{AB}$ = ______________

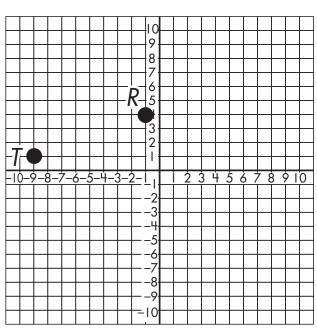
c



$\overline{XY}$ = ______________

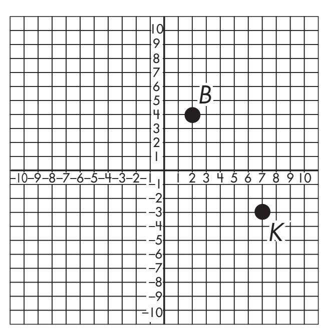
3.

a



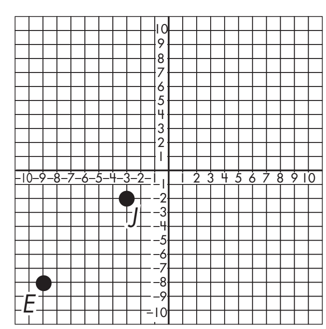
$\overline{TR}$ = ______________

b



$\overline{BK}$ = ______________

c

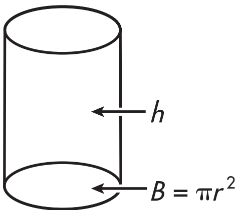


$\overline{JE}$ = ______________

NAME ______________________________

Lesson 5.10 Volume: Cylinders

Volume is the amount of space a three-dimensional figure occupies. You can calculate the **volume of a cylinder** by multiplying the area of the base by the height (Bh).



The area of the base is the area of the circle, πr^2, so volume can be found using the formula: $V = \pi r^2 h$

The volume is expressed in **cubic units**, or **units^3**.

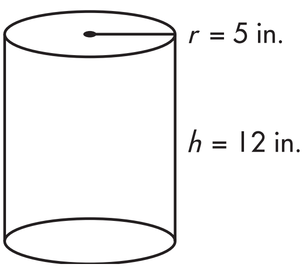
If $r = 3$ cm and $h = 10$ cm, what is the volume? Use 3.14 for π.

$V = \pi r^2 h$ $\quad V = \pi(3^2 \times 10)$ $\quad V = \pi \times 90$ $\quad V = 282.6\text{ cm}^3$

Find the volume of each cylinder. Use 3.14 for π. Remember that $d = 2r$. Round answers to the nearest hundredth.

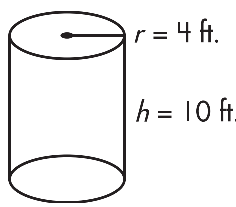
1.

a



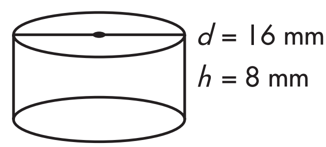
$V =$ ________ in.^{3}

b



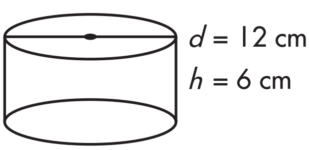
$V =$ ________ ft.^{3}

c

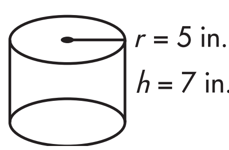


$V =$ ________ mm^3

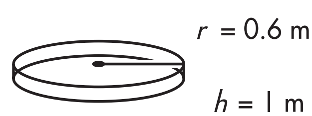
2.



$V =$ ________ cm^3

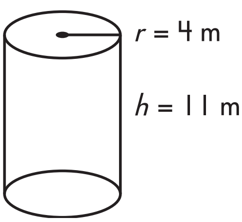


$V =$ ________ in.^{3}

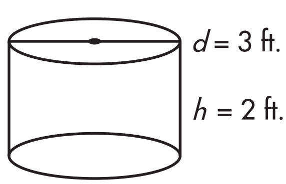


$V =$ ________ m^3

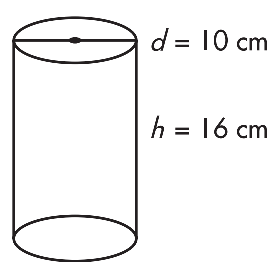
3.



$V =$ ________ m^3



$V =$ ________ ft.^{3}



$V =$ ________ cm^3

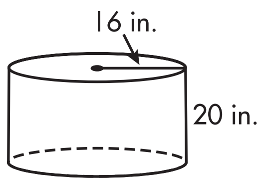
NAME ______________________________

Lesson 5.10 Volume: Cylinders

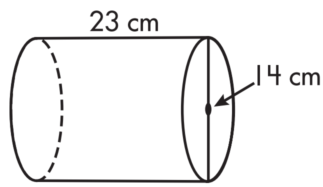
Find the volume of each cylinder. Use 3.14 for π. Round answers to the nearest hundredth.

	a	b	c

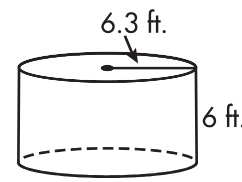
1.

a


$V =$ ________ in.^3

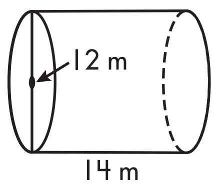
b


$V =$ ________ cm^3

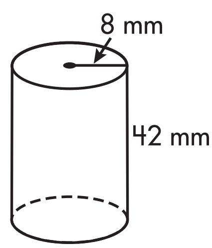
c


$V =$ ________ ft.^3

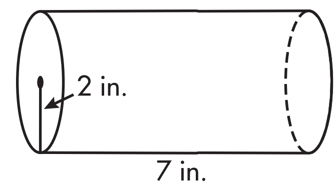
2.

a


$V =$ ________ m^3

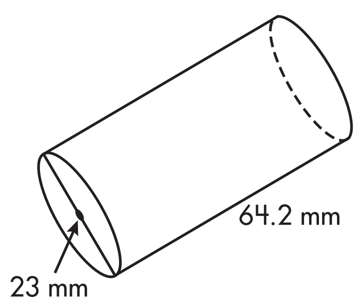
b


$V =$ ________ mm^3

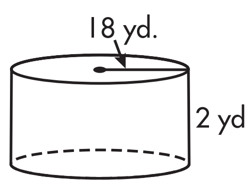
c


$V =$ ________ in.^3

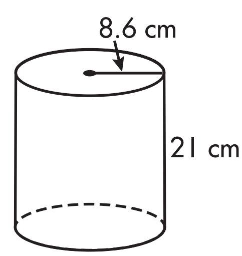
3.

a


$V =$ ________ mm^3

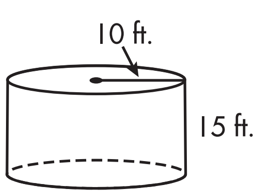
b


$V =$ ________ yd.^3

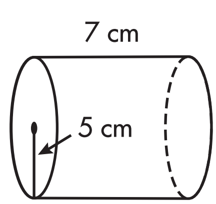
c


$V =$ ________ cm^3

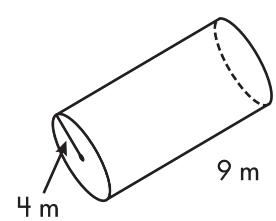
4.

a


$V =$ ________ ft.^3

b


$V =$ ________ cm^3

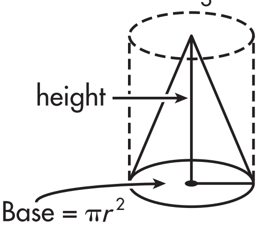
c


$V =$ ________ m^3

NAME ______________________________

Lesson 5.11 Volume: Cones

Volume is the amount of space a three-dimensional figure occupies. The **volume of a cone** is calculated as $\frac{1}{3}$ base $\times$ height.

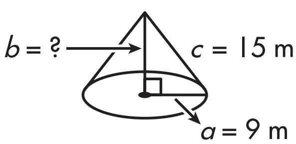


This is because a cone occupies $\frac{1}{3}$ of the volume of a cylinder of the same height. Base is the area of the circle, πr^2.

$V = \frac{1}{3}\pi r^2 h$ Volume is given in **cubic units**, or **units³**.

If the height of a cone is 7 cm and radius is 3 cm, what is the volume?

Use 3.14 for π. $V = \frac{1}{3}\pi 3^2 7$ $V = \frac{\pi 63}{3}$ $V = \pi 21$ $V = 65.94$ cm^3



If you do not know the height but you do know the radius and the length of the side, you can use the Pythagorean Theorem to find the height.

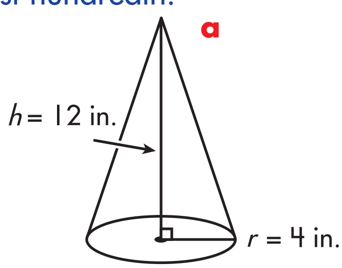
What is b? $a^2 + b^2 = c^2$ $81 + b^2 = 225$ $b^2 = 144$ $b = 12$ m

$V = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi\ 9^2\ 12 = \frac{972\pi}{3} = 324\pi = 1{,}017.36$ m^3

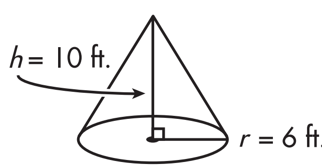
Find the volume of each cone. Use 3.14 for π. Remember that $d = 2r$. Round answers to the nearest hundredth.

a **b** **c**

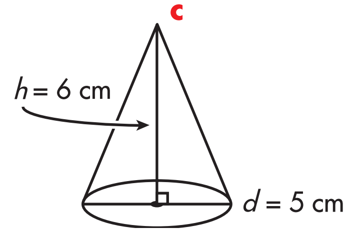
1.



$V =$ ________ in.^{3}

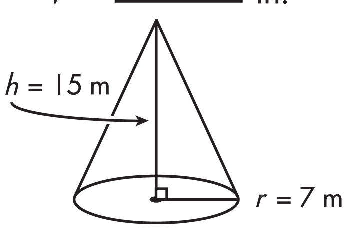


$V =$ ________ ft.^{3}

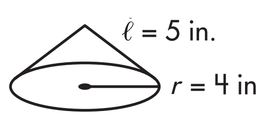


$V =$ ________ cm^3

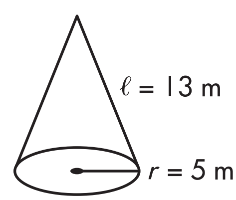
2.



$V =$ ________ m^3

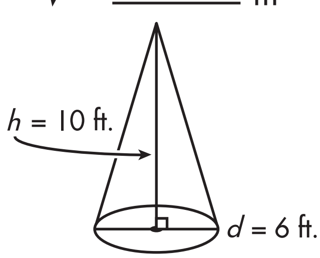


$V =$ ________ in.^{3}

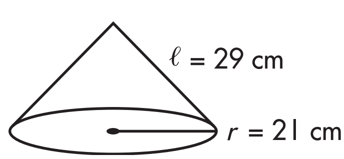


$V =$ ________ m^3

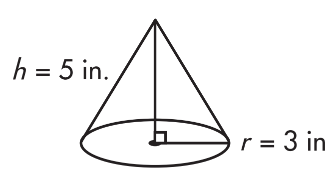
3.



$V =$ ________ ft.^{3}



$V =$ ________ cm^3



$V =$ ________ in.^{3}

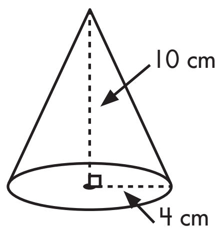
NAME ______________________________

Lesson 5.11 Volume: Cones

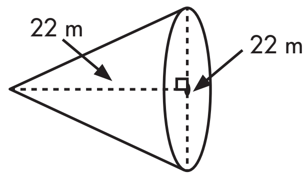
Find the volume of each cone. Use 3.14 for π. Round answers to the nearest hundredth.

	a	b	c

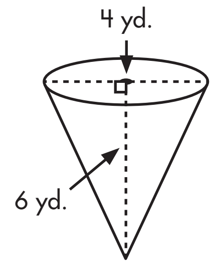
1.

a 

$V =$ ________ cm^3

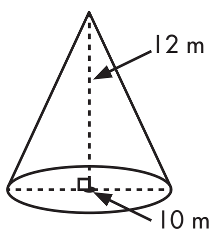
b 

$V =$ ________ m^3

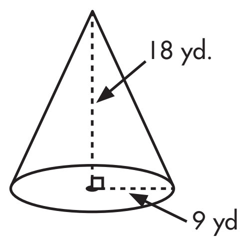
c 

$V =$ ________ $yd.^3$

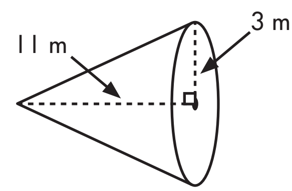
2.

a 

$V =$ ________ m^3

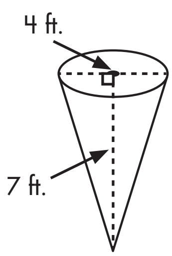
b 

$V =$ ________ $yd.^3$

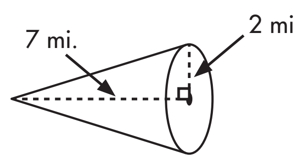
c 

$V =$ ________ m^3

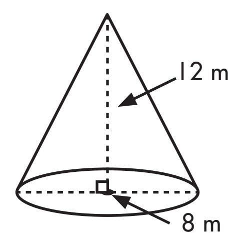
3.

a 

$V =$ ________ $ft.^3$

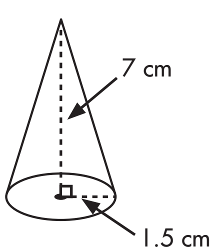
b 

$V =$ ________ $mi.^3$

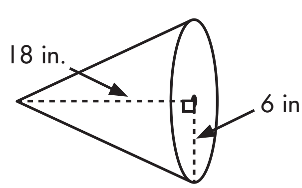
c 

$V =$ ________ m^3

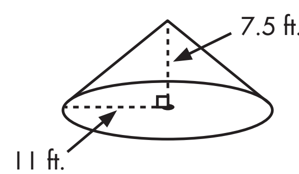
4.

a 

$V =$ ________ cm^3

b 

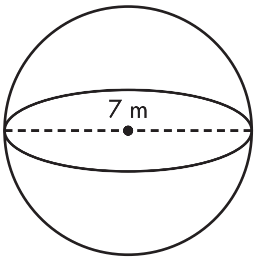
$V =$ ________ $in.^3$

c 

$V =$ ________ $ft.^3$

Lesson 5.12 Volume: Spheres

Volume is the amount of space a three-dimensional figure occupies. The **volume of a sphere** is calculated as $V = \frac{4}{3}\pi r^3$. When the diameter of a sphere is known, it can be divided by 2 and then the formula for the volume of a sphere can be used.



$V = \frac{4}{3}\pi r^3$ Volume is given in **cubic units** or **units^3**.

The radius of a sphere is half of its diameter. Find the radius, then calculate the volume.

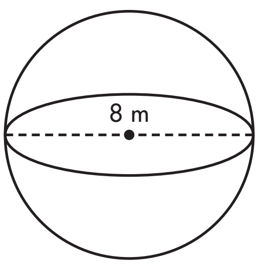
$r = \frac{1}{2}d = \frac{1}{2}(7) = \frac{7}{2} = 3.5$

$V = \frac{4}{3}\pi(3.5)^3 = \frac{4}{3}\pi(42.875) = 179.5$ cubic meters

Find the volume of each sphere. Use 3.14 to represent π. Round answers to the nearest hundredth.

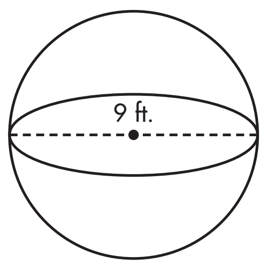
1.

a



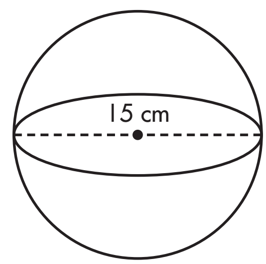
$V =$ ________ m^3

b



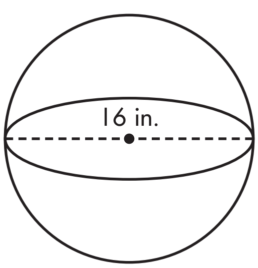
$V =$ ________ ft.^{3}

c

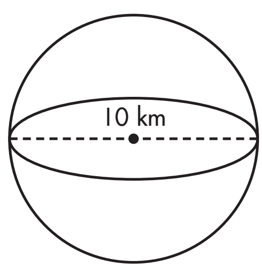


$V =$ ________ cm^3

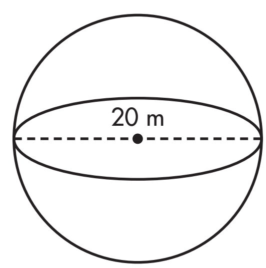
2.



$V =$ ________ in.^{3}

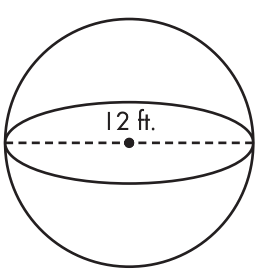


$V =$ ________ km^3

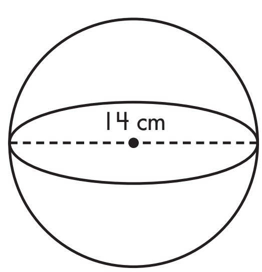


$V =$ ________ m^3

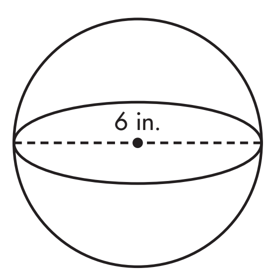
3.



$V =$ ________ ft.^{3}



$V =$ ________ cm^3



$V =$ ________ in.^{3}

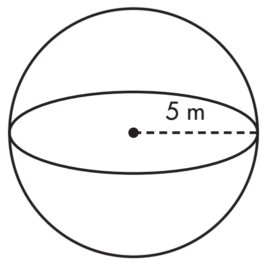
NAME ____________________

Lesson 5.12 Volume: Spheres

Find the volume of each sphere. Use 3.14 to represent π. Round answers to the nearest hundredth.

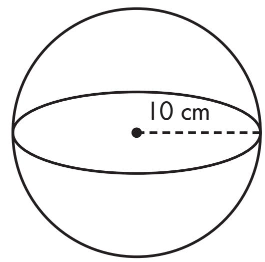
1.

a



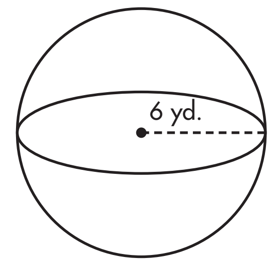
$V =$ ________ m^3

b



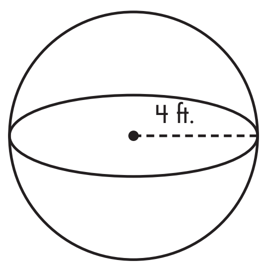
$V =$ ________ cm^3

c

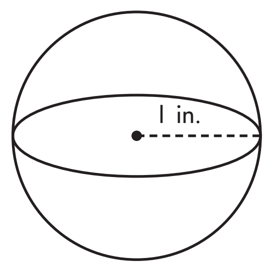


$V =$ ________ $yd.^3$

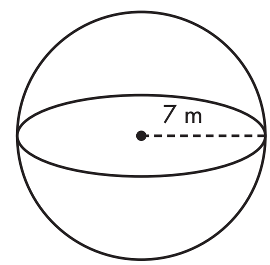
2.



$V =$ ________ $ft.^3$

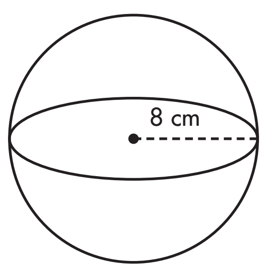


$V =$ ________ $in.^3$

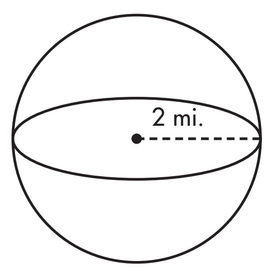


$V =$ ________ m^3

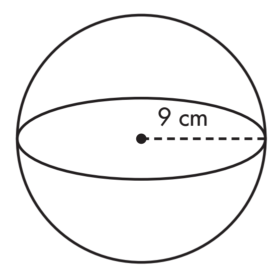
3.



$V =$ ________ cm^3

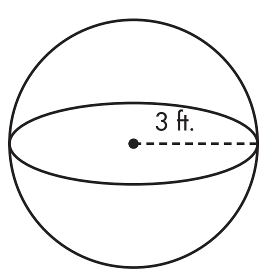


$V =$ ________ $mi.^3$

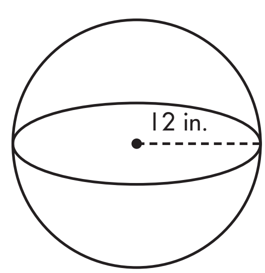


$V =$ ________ cm^3

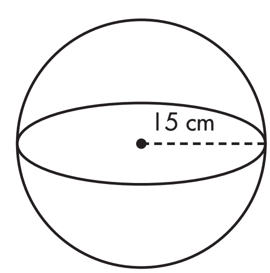
4.



$V =$ ________ $ft.^3$



$V =$ ________ $in.^3$



$V =$ ________ cm^3

NAME ______________________________

Lesson 5.13 Problem-Solving with Volume

SHOW YOUR WORK

Solve each problem. Use 3.14 for π. Round answers to the nearest hundredth.

1. Jermaine has a mailing cylinder for posters that measures 18 inches long and 6 inches in diameter. What volume can it hold?

The cylinder can hold ________________ cubic inches.

2. An oatmeal container is a cylinder measuring 16 centimeters in diameter and 32 centimeters tall. How much oatmeal can the container hold?

The container can hold ________________ cubic centimeters of oatmeal.

3. Trina is using 2 glasses in an experiment. Glass A measures 8 centimeters in diameter and 18 centimeters tall. Glass B measures 10 centimeters in diameter and 13 centimeters tall. Which one can hold more liquid? How much more?

Glass ________________ can hold ________________ more cubic centimeters of liquid.

4. Paul completely filled a glass with water. The glass was 10 centimeters in diameter and 17 centimeters tall. He drank the water. What volume of water did he drink?

Paul drank ________________ cubic centimeters of water.

5. An ice-cream cone has a height of 6 inches and a diameter of 3 inches. How much ice cream can this cone hold?

The cone can hold ________________ cubic inches of ice cream.

6. A beach ball that is 10 inches in diameter must be inflated. How much air will it take to fill the ball?

It will take ________________ cubic inches of air to fill the ball.

1.

2.

3.

4.

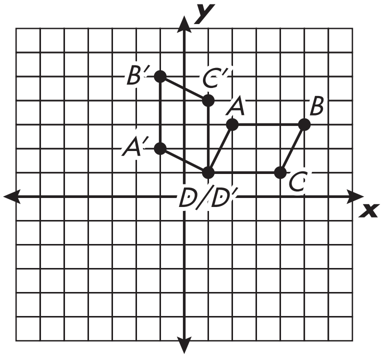
5.

6.

NAME ______________________

Check What You Learned

Geometry



1. What are the coordinates of the preimage?

A(________), *B*(________), *C*(________), *D*(________)

2. What are the coordinates of the image?

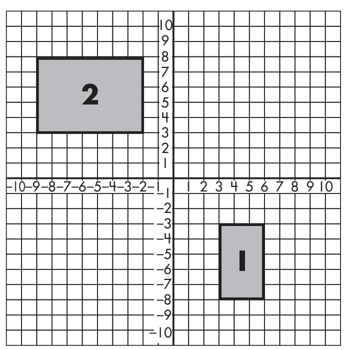
A′(________), *B′*(________), *C′*(________), *D′*(________)

3. What transformation did you perform? ____________

Write the steps each figure must go through to be transformed from figure 1 to figure 2.

4.

a

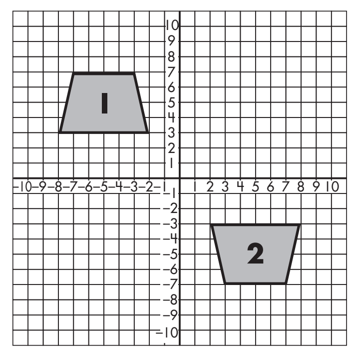


Step 1: ____________________________

Step 2: ____________________________

Step 3: ____________________________

b

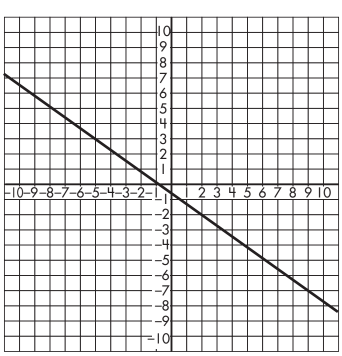


Step 1: ____________________________

Step 2: ____________________________

Draw similar right triangles to show that each line has a constant slope.

5.

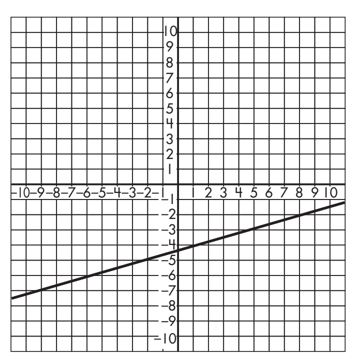


Triangle 1 Legs:

______ & ______

Triangle 2 Legs:

______ & ______



Triangle 1 Legs:

______ & ______

Triangle 2 Legs:

______ & ______

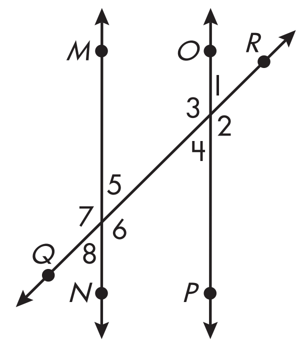
CHAPTER 5 POSTTEST

NAME ____________________

Check What You Learned

Geometry

Answer each question using letters to name each line and numbers to name each angle.



6. Which 2 lines are parallel? ____________

7. What is the name of the transversal? ____________

8. Which angles are acute? ____________

9. Which angles are obtuse? ____________

10. Which pairs of angles are vertical angles? ________________

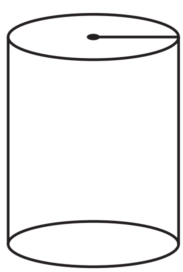
11. Which pairs of angles are alternate exterior angles? ________________

12. Which pairs of angles are alternate interior angles? ________________

Find the volume of each figure. Use 3.14 for π. Round answers to the nearest hundredth.

13.

a

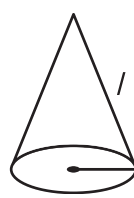


$r = 6$ in.

$h = 14$ in.

$V =$ ________ in.^{3}

b

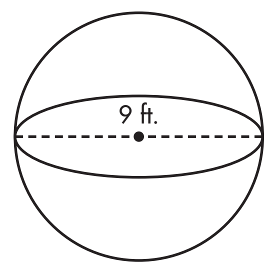


$l = 13$ m

$r = 5$ m

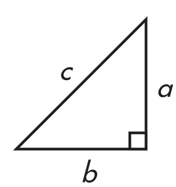
$V =$ ________ m^3

c



$V =$ ________ ft.^{3}

Use the Pythagorean Theorem to find the unknown lengths.



14. If $a = 7$ and $b = 10$, $c = \sqrt{\quad}$ ________ or about ____________.

15. If $a = 11$ and $c = 18$, $b = \sqrt{\quad}$ ________ or about ____________.

Solve each problem.

16. A flagpole and a telephone pole cast shadows as shown in the figure. How tall are the poles?

The flagpole is ____________ feet tall.

The telephone pole is ____________ feet tall.