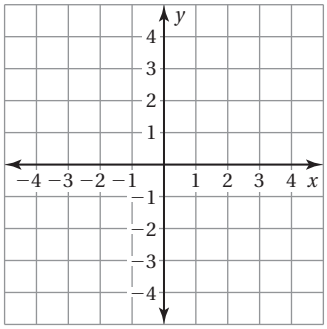
Name_____ Date _____

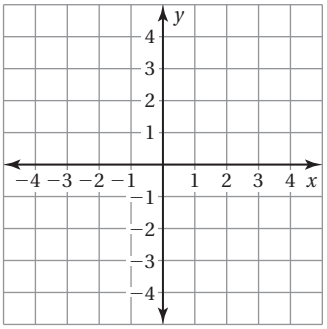
Chapter 2 Fair Game Review

Reflect the point in (a) the *x*-axis and (b) the *y*-axis.

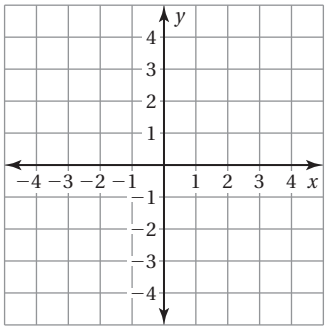
1. $(1, 1)$



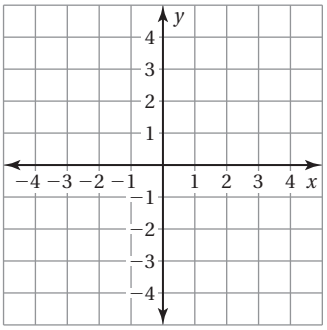
2. $(-2, -4)$



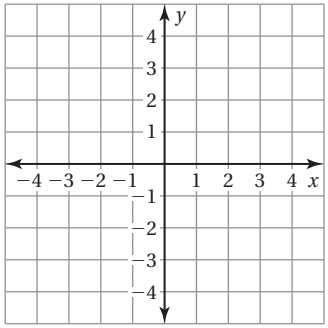
3. $(-3, 3)$



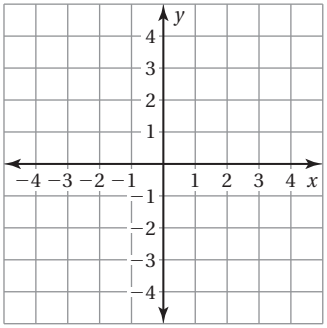
4. $(4, -3)$



5. $(-1, 2)$



6. $(3, 2)$

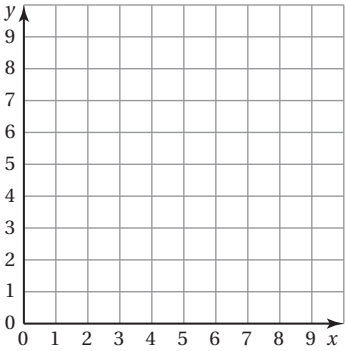


Name _____ Date _____

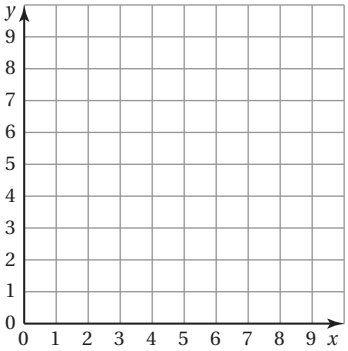
Chapter 2 Fair Game Review (continued)

Draw the polygon with the given vertices in a coordinate plane.

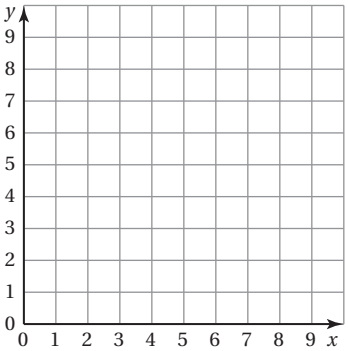
7. $A(2, 2), B(2, 7), C(6, 7), D(6, 2)$



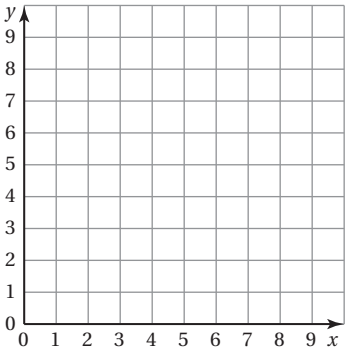
8. $E(3, 8), F(3, 1), G(6, 1), H(6, 8)$



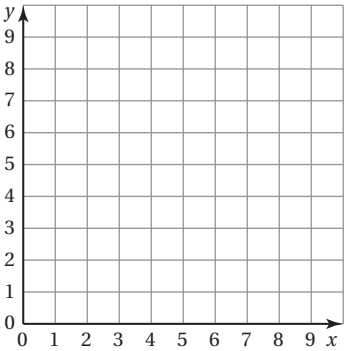
9. $I(7, 6), J(5, 2), K(2, 4)$



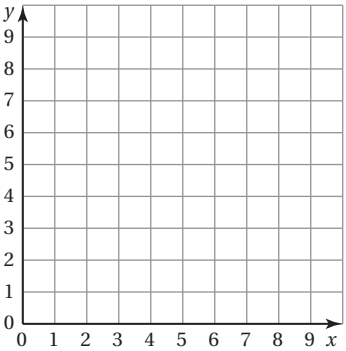
10. $L(1, 5), M(1, 2), N(8, 2)$



11. $O(3, 7), P(6, 7), Q(9, 3), R(1, 3)$



12. $S(9, 9), T(7, 1), U(2, 4), V(4, 7)$



Name_____ Date _____

2.1 Congruent Figures

For use with Activity 2.1

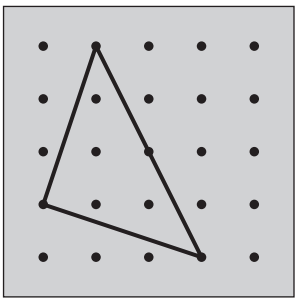
Essential Question How can you identify congruent triangles?

Two figures are congruent when they have the same size and the same shape.

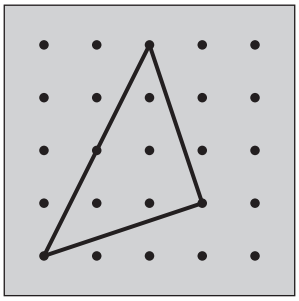
1 ACTIVITY: Identifying Congruent Triangles

Work with a partner.

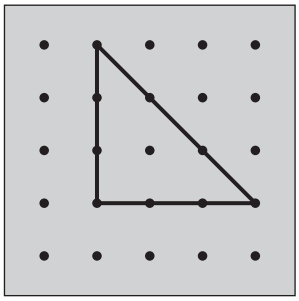
- **Which of the geoboard triangles below are congruent to the geoboard triangle at the right?**



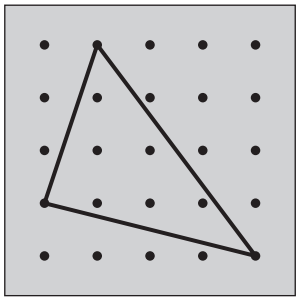
a.



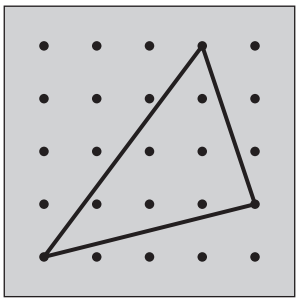
b.



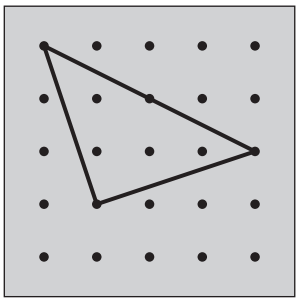
c.



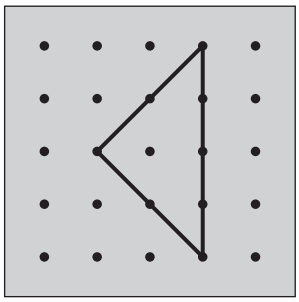
d.



e.



f.



Name _____ Date _____

2.1 Congruent Figures (continued)

- **Form each triangle on a geoboard.**

- **Measure each side with a ruler. Record your results in the table.**

	Side 1	Side 2	Side 3
Given Triangle			
a.			
b.			
c.			
d.			
e.			
f.			

- **Write a conclusion about the side lengths of triangles that are congruent.**

2.1 Congruent Figures (continued)

2 ACTIVITY: Forming Congruent Triangles

Work with a partner.

a. Form the given triangle in Activity 1 on your geoboard. Record the triangle on geoboard dot paper.

b. Move each vertex of the triangle one peg to the right. Is the new triangle congruent to the original triangle? How can you tell?

c. On a 5-by-5 geoboard, make as many different triangles as possible, each of which is congruent to the given triangle in Activity 1. Record each triangle on geoboard dot paper.

What Is Your Answer?

3. IN YOUR OWN WORDS How can you identify congruent triangles? Use the conclusion you wrote in Activity 1 as part of your answer.

4. Can you form a triangle on your geoboard whose side lengths are 3, 4, and 5 units? If so, draw such a triangle on geoboard dot paper.

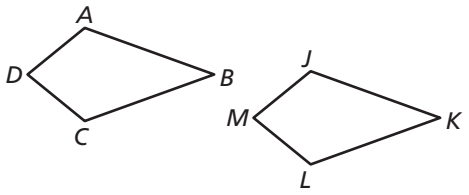
Name _____ Date _____

2.1 Practice

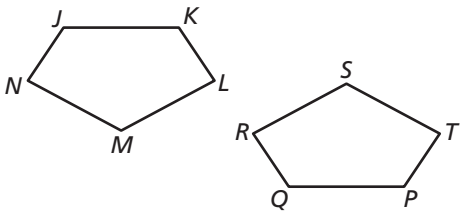
For use after Lesson 2.1

The figures are congruent. Name the corresponding angles and the corresponding sides.

1.

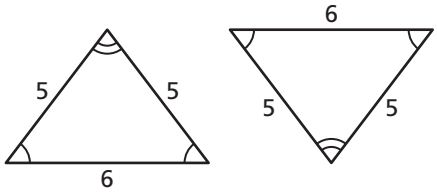


2.

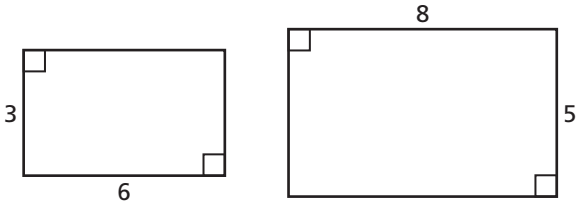


Tell whether the two figures are congruent. Explain your reasoning.

3.



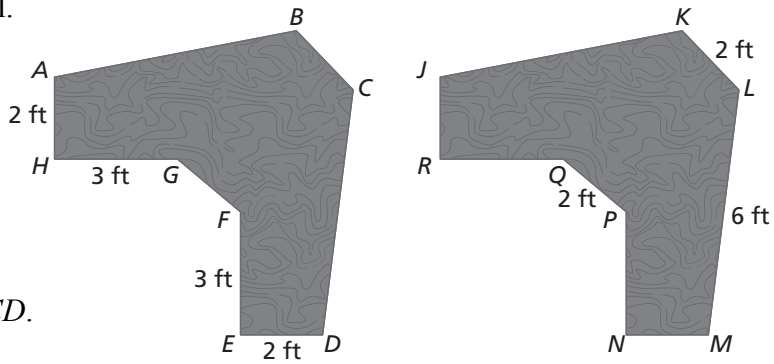
4.



5. The tops of the desks are identical.

a. What is the length of side *NP*?

b. Side *AB* is congruent to side *CD*. What is the length of side *AB*?



Name_____ Date _____

2.2 Translations

For use with Activity 2.2

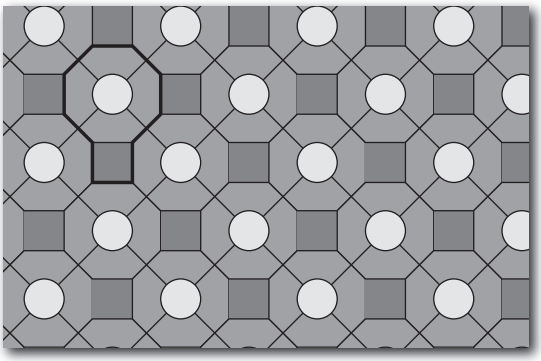
Essential Question How can you arrange tiles to make a tessellation?

1 ACTIVITY: Describing Tessellations

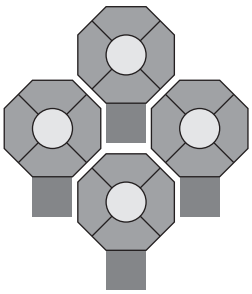
Work with a partner. Can you make the tessellation by translating single tiles that are all of the same shape and design? If so, show how.

a. Sample:

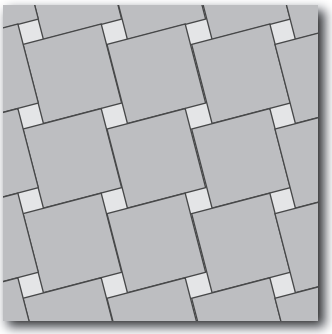
Tile Pattern



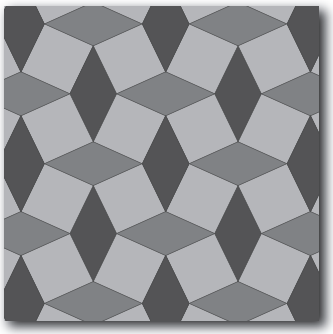
Single Tiles



b.



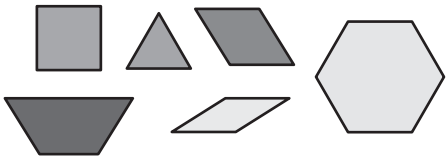
c.



2 ACTIVITY: Tessellations and Basic Shapes

Work with a partner.

a. Which pattern blocks can you use to make a tessellation? For each one that works, draw the tessellation.



b. Can you make the tessellation by translating? Or do you have to rotate or flip the pattern blocks?

3 ACTIVITY: Designing Tessellations

Work with a partner. Design your own tessellation. Use one of the basic shapes from Activity 2.

Sample:

Step 1: Start with a square.

Step 2: Cut a design out of one side.

Step 3: Tape it to the other side to make your pattern.

Step 4: Translate the pattern to make your tessellation.

Step 5: Color the tessellation.

2.2 Translations (continued)

4 ACTIVITY: Translating in the Coordinate Plane

Work with a partner.

a. Draw a rectangle in a coordinate plane. Find the dimensions of the rectangle.

b. Move each vertex 3 units right and 4 units up. Draw the new figure. List the vertices.

c. Compare the dimensions and the angle measures of the new figure to those of the original rectangle.

d. Are the opposite sides of the new figure parallel? Explain.

e. Can you conclude that the two figures are congruent? Explain.

f. Compare your results with those of other students in your class. Do you think the results are true for any type of figure?

What Is Your Answer?

5. IN YOUR OWN WORDS How can you arrange tiles to make a tessellation? Give an example.

6. PRECISION Explain why any parallelogram can be translated to make a tessellation.

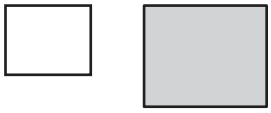
Name _____ Date _____

2.2 Practice

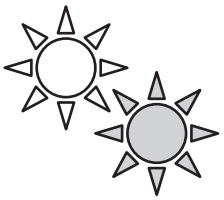
For use after Lesson 2.2

Tell whether the shaded figure is a translation of the nonshaded figure.

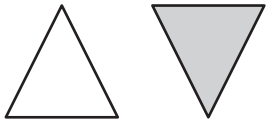
1.



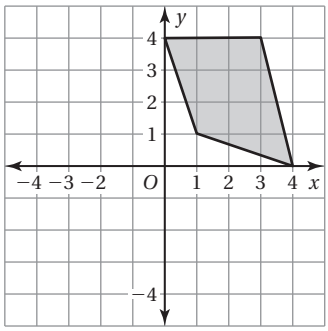
2.



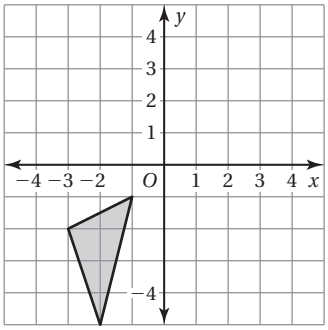
3.



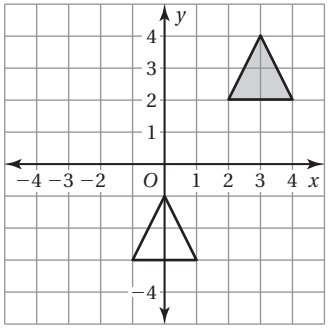
4. Translate the figure 4 units left and 1 unit down. What are the coordinates of the image?



5. Translate the triangle 5 units right and 4 units up. What are the coordinates of the image?



6. Describe the translation from the shaded figure to the nonshaded figure.

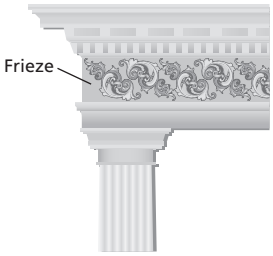


Name_____ Date _____

2.3 Reflections

For use with Activity 2.3

Essential Question How can you use reflections to classify a frieze pattern?

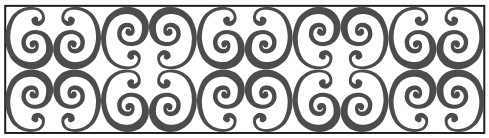


A *frieze* is a horizontal band that runs at the top of a building. A frieze is often decorated with a design that repeats.

- All frieze patterns are translations of themselves.
- Some frieze patterns are reflections of themselves.

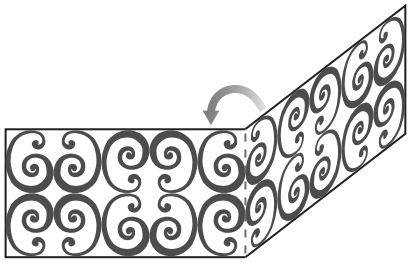
1 ACTIVITY: Frieze Patterns and Reflections

Work with a partner. Consider the frieze pattern shown. *



a. Is the frieze pattern a reflection of itself when folded horizontally? Explain.

b. Is the frieze pattern a reflection of itself when folded vertically? Explain.



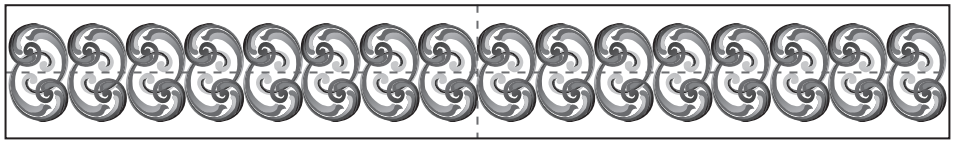
*Cut-outs are available in the back of the Record and Practice Journal.

Name _____ Date _____

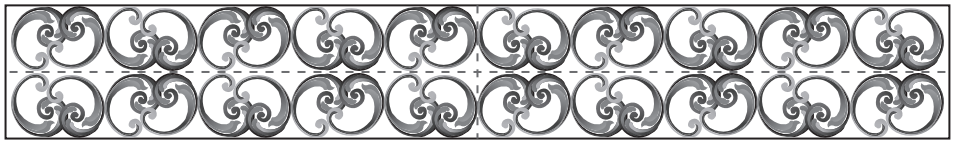
2 ACTIVITY: Frieze Patterns and Reflections

Work with a partner. Is the frieze pattern a reflection of itself when folded *horizontally*, *vertically*, or *neither*?

a.



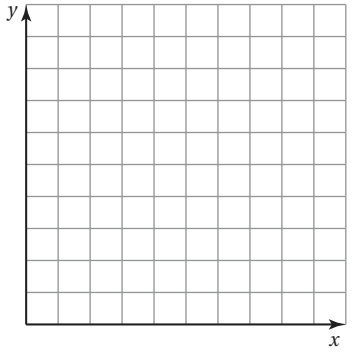
b.



3 ACTIVITY: Reflecting in the Coordinate Plane

Work with a partner.

a. Draw a rectangle in Quadrant I of a coordinate plane. Find the dimensions of the rectangle.



b. Copy the axes and the rectangle onto a piece of transparent paper.

Flip the transparent paper once so that the rectangle is in Quadrant IV. Then align the origin and the axes with the coordinate plane.

Draw the new figure in the coordinate plane. List the vertices.

2.3 Reflections (continued)

c. Compare the dimensions and the angle measures of the new figure to those of the original rectangle.

d. Are the opposite sides of the new figure still parallel? Explain.

e. Can you conclude that the two figures are congruent? Explain.

f. Flip the transparent paper so that the original rectangle is in Quadrant II. Draw the new figure in the coordinate plane. List the vertices. Then repeat parts (c)–(e).

g. Compare your results with those of other students in your class. Do you think the results are true for any type of figure?

What Is Your Answer?

4. IN YOUR OWN WORDS How can you use reflections to classify a frieze pattern?

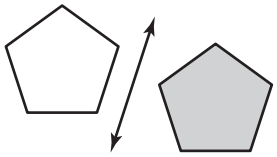
Name _____ Date _____

2.3 Practice

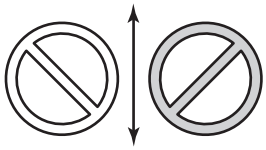
For use after Lesson 2.3

Tell whether the shaded figure is a reflection of the nonshaded figure.

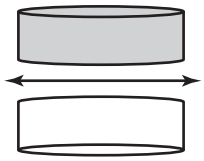
1.



2.

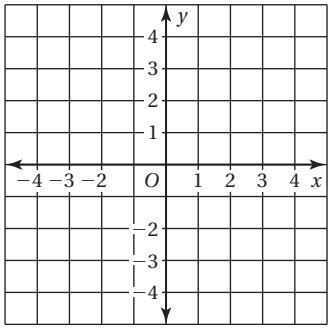


3.

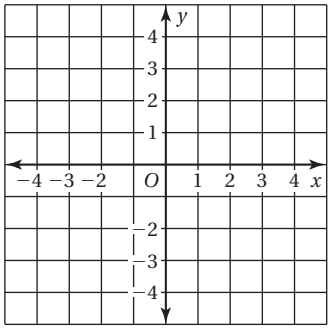


Draw the figure and its reflection in the *x*-axis. Identify the coordinates of the image.

4. $A(1, 2)$, $B(3, 2)$, $C(1, 4)$

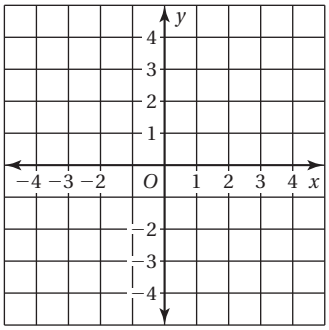


5. $W(3, 1)$, $X(3, 4)$, $Y(1, 4)$, $Z(1, 1)$

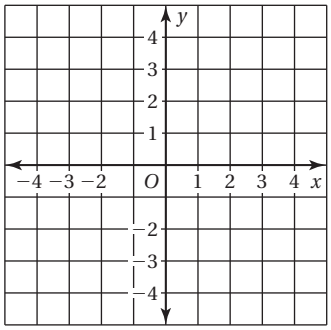


Draw the figure and its reflection in the *y*-axis. Identify the coordinates of the image.

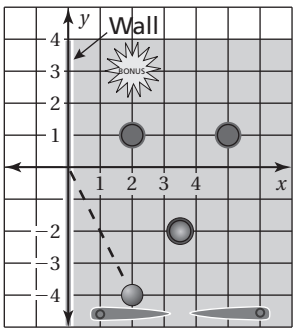
6. $J(3, 4)$, $K(3, 0)$, $L(2, 4)$



7. $M(2, 2)$, $N(2, 3)$, $P(3, 3)$, $Q(4, 1)$



8. In a pinball game, when you perfectly reflect the ball off of the wall, will the ball hit the bonus target?



Name_____ Date _____

2.4 Rotations

For use with Activity 2.4

Essential Question What are the three basic ways to move an object in a plane?

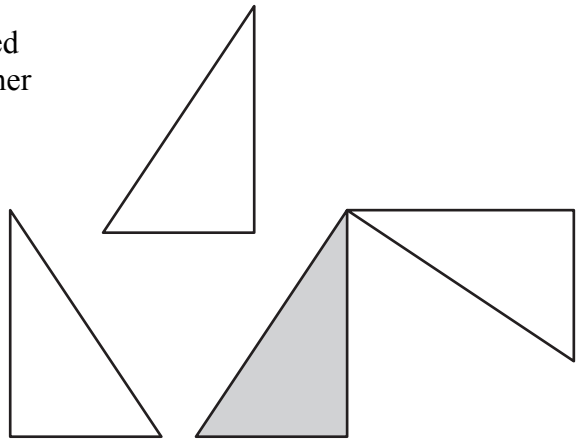
1 ACTIVITY: Three Basic Ways to Move Things

There are three basic ways to move objects on a flat surface.

_____ the object. _____ the object. _____ the object.

Work with a partner.

a. What type of triangle is the shaded triangle? Is it congruent to the other triangles? Explain.



b. Decide how you can move the shaded triangle to obtain each of the other triangles.

c. Is each move a *translation*, a *reflection*, or a *rotation*?

2 ACTIVITY: Rotating in the Coordinate Plane

Work with a partner.

a. Draw a rectangle in Quadrant II of a coordinate plane. Find the dimensions of the rectangle.

b. Copy the axes and the rectangle onto a piece of transparent paper.

Align the origin and the vertices of the rectangle on the transparent paper with the coordinate plane. Turn the transparent paper so that the rectangle is in Quadrant I and the axes align.

Draw the new figure in the coordinate plane. List the vertices.

c. Compare the dimensions and the angle measures of the new figure to those of the original rectangle.

d. Are the opposite sides of the new figure still parallel? Explain.

e. Can you conclude that the two figures are congruent? Explain.

f. Turn the transparent paper so that the original rectangle is in Quadrant IV. Draw the new figure in the coordinate plane. List the vertices. Then repeat parts (c)–(e).

g. Compare your results with those of other students in your class. Do you think the results are true for any type of figure?

What Is Your Answer?

3. IN YOUR OWN WORDS What are the three basic ways to move an object in a plane? Draw an example of each.

4. PRECISION Use the results of Activity 2(b).

a. Draw four angles using the conditions below.

- The origin is the vertex of each angle.
- One side of each angle passes through a vertex of the original rectangle.
- The other side of each angle passes through the corresponding vertex of the rotated rectangle.

b. Measure each angle in part (a). For each angle, measure the distances between the origin and the vertices of the rectangles. What do you notice?

c. How can the results of part (b) help you rotate a figure?

5. PRECISION Repeat the procedure in Question 4 using the results of Activity 2(f).

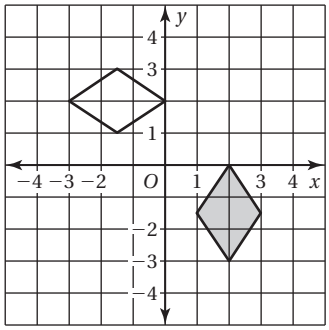
Name _____ Date _____

2.4 Practice

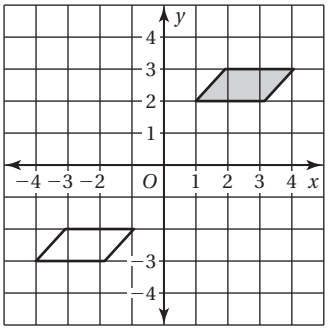
For use after Lesson 2.4

Tell whether the shaded figure is a rotation of the nonshaded figure about the origin. If so, give the angle and the direction of rotation.

1.

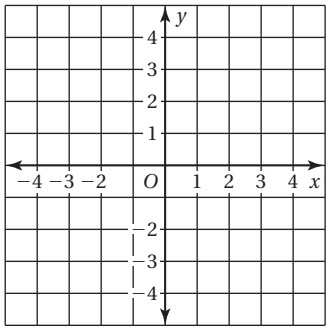


2.

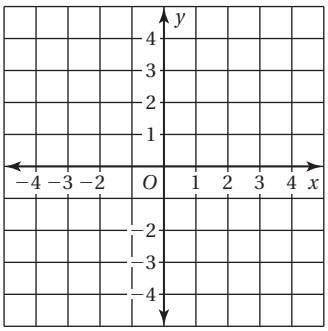


The vertices of a triangle are $A(1, 1)$, $B(3, 1)$, and $C(3, 4)$. Rotate the triangle as described. Find the coordinates of the image.

3. 90° clockwise about the origin



4. 270° counterclockwise about vertex A



5. A triangle is rotated 180° about the origin. Its image is reflected in the x-axis. The vertices of the final triangle are $(-4, -4)$, $(-2, -4)$, and $(-3, -1)$. What are the vertices of the original triangle?

Name_____ Date _____

2.5 Similar Figures

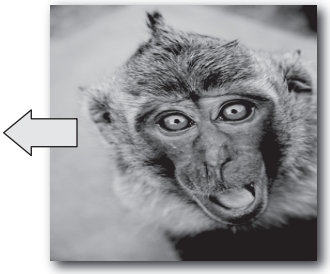
For use with Activity 2.5

Essential Question How can you use proportions to help make decisions in art, design, and magazine layouts?

Original Photograph

In a computer art program, when you click and drag on a side of a photograph, you distort it.

But when you click and drag on a corner of the photograph, the dimensions remain proportional to the original.



Distorted

Distorted

Proportional

1 ACTIVITY: Reducing Photographs

Work with a partner. You are trying to reduce the photograph to the indicated size for a nature magazine. Can you reduce the photograph to the indicated size without distorting or cropping? Explain your reasoning.

a.

b.

2 ACTIVITY: Creating Designs

Work with a partner.

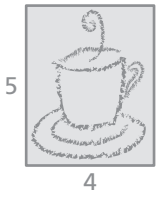
a. Tell whether the dimensions of the new designs are proportional to the dimensions of the original design. Explain your reasoning.

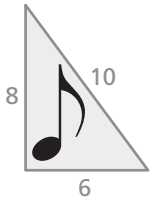
Original

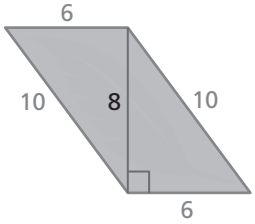
Design 1

Design 2

b. Draw two designs whose dimensions are proportional to the given design. Make one bigger and one smaller. Label the sides of the designs with their lengths.







What Is Your Answer?

3. IN YOUR OWN WORDS How can you use proportions to help make decisions in art, design, and magazine layouts? Give two examples.

4. a. Use a computer art program to draw two rectangles whose dimensions are proportional to each other.

b. Print the two rectangles on the same piece of paper.

c. Use a centimeter ruler to measure the length and the width of each rectangle. Record your measurements here.

"I love this statue. It seems similar to a big statue I saw in New York."

d. Find the following ratios. What can you conclude?

$$\frac{\text{Length of larger}}{\text{Length of smaller}} \qquad \frac{\text{Width of larger}}{\text{Width of smaller}}$$

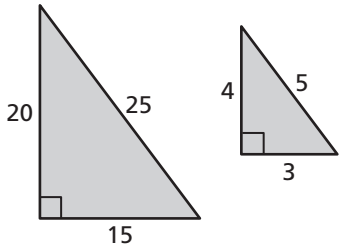
Name _____ Date _____

2.5 Practice

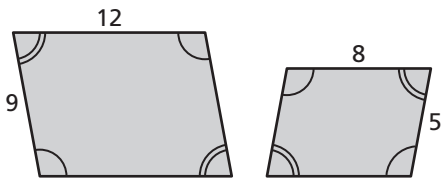
For use after Lesson 2.5

Tell whether the two figures are similar. Explain your reasoning.

1.



2.



3. In your classroom, a dry erase board is 8 feet long and 4 feet wide. Your teacher makes individual dry erase boards for you to use at your desk that are 11.5 inches long and 9.5 inches wide. Are the boards similar?

4. You have a 4 x 6 photo of you and your friend.

a. You order a 5 x 7 print of the photo. Is the new photo similar to the original?

b. You enlarge the original photo to three times its size on your computer. Is the new photo similar to the original?

Name_____ Date _____

2.6 Perimeters and Areas of Similar Figures

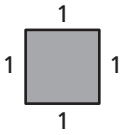
For use with Activity 2.6

Essential Question How do changes in dimensions of similar geometric figures affect the perimeters and the areas of the figures?

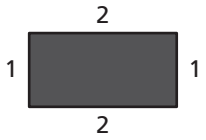
1 ACTIVITY: Creating Similar Figures

Work with a partner. Use pattern blocks to make a figure whose dimensions are 2, 3, and 4 times greater than those of the original figure.*

a. Square



b. Rectangle



2 ACTIVITY: Finding Patterns for Perimeters

Work with a partner. Complete the table for the perimeter *P* of each figure in Activity 1. Describe the pattern.

Figure	Original Side Lengths	Double Side Lengths	Triple Side Lengths	Quadruple Side Lengths
	P = _____			
	P = _____			

*Cut-outs are available in the back of the Record and Practice Journal.

Name _____ Date _____

2.6 Perimeters and Areas of Similar Figures (continued)

3 ACTIVITY: Finding Patterns for Areas

Work with a partner. Complete the table for the area A of each figure in Activity 1. Describe a pattern.

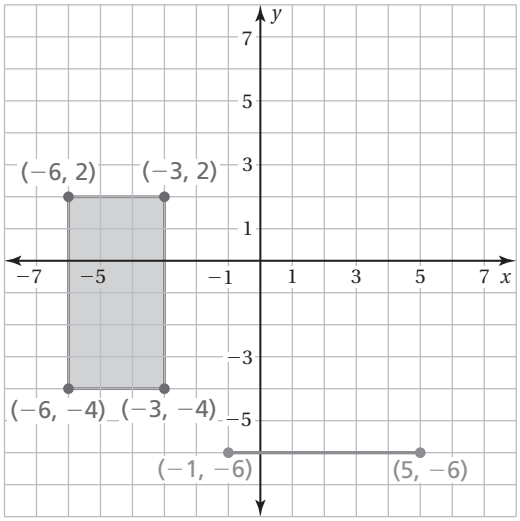
Figure	Original Side Lengths	Double Side Lengths	Triple Side Lengths	Quadruple Side Lengths
	$A =$ _____			
	$A =$ _____			

4 ACTIVITY: Drawing and Labeling Similar Figures

Work with a partner.

a. Find another rectangle that is similar and has one side from $(-1, -6)$ to $(5, -6)$.

Label the vertices.



Check that the two rectangles are similar by showing that the ratios of corresponding sides are equal.

$$\frac{\text{Shaded Length}}{\text{Unshaded Length}} \stackrel{?}{=} \frac{\text{Shaded Width}}{\text{Unshaded Width}}$$

$$\frac{\text{change in } y}{\text{change in } y} \stackrel{?}{=} \frac{\text{change in } x}{\text{change in } x}$$

$$\frac{\square}{\square} \stackrel{?}{=} \frac{\square}{\square}$$

$$\frac{\square}{\square} \stackrel{?}{=} \frac{\square}{\square}$$

The ratios are _____. So, the rectangles are _____.

2.6 Perimeters and Areas of Similar Figures (continued)

b. Compare the perimeters and the areas of the figures. Are the results the same as your results from Activities 2 and 3? Explain.

c. There are three other rectangles that are similar to the shaded rectangle and have the given side.

- Draw each one. Label the vertices of each.

- Show that each is similar to the original shaded rectangle.

What Is Your Answer?

5. IN YOUR OWN WORDS How do changes in dimensions of similar geometric figures affect the perimeters and the areas of the figures?

6. What information do you need to know to find the dimensions of a figure that is similar to another figure? Give examples to support your explanation.

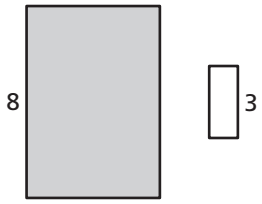
Name _____ Date _____

2.6 Practice

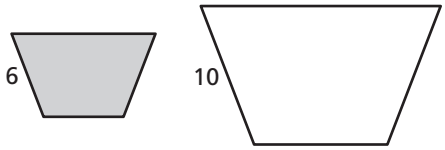
For use after Lesson 2.6

The two figures are similar. Find the ratios (shaded to nonshaded) of the perimeters and of the areas.

1.

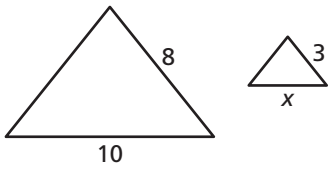


2.



The polygons are similar. Find *x*.

3.



4.

5. You buy two picture frames that are similar. The ratio of the corresponding side lengths is 4 : 5. What is the ratio of the areas?

Name_____ Date _____

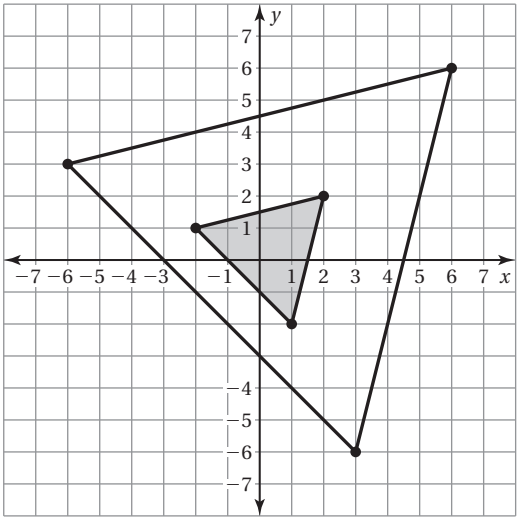
2.7 Dilations

For use with Activity 2.7

Essential Question How can you enlarge or reduce a figure in the coordinate plane?

1 ACTIVITY: Comparing Triangles in a Coordinate Plane

Work with a partner. Write the coordinates of the vertices of the shaded triangle. Then write the coordinates of the vertices of the nonshaded triangle.



a. How are the two sets of coordinates related?

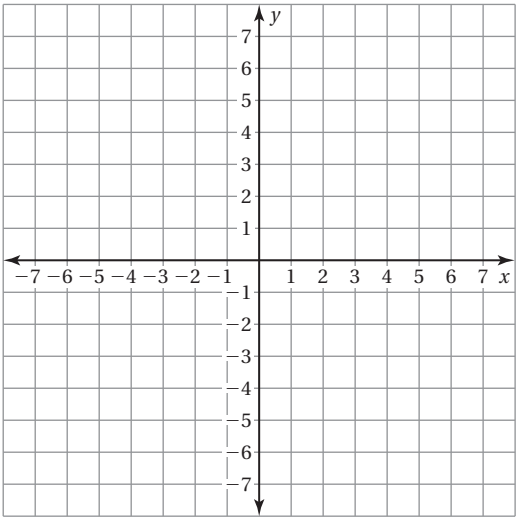
b. How are the two triangles related? Explain your reasoning.

c. Draw a dashed triangle whose coordinates are twice the values of the corresponding coordinates of the shaded triangle. How are the dashed and shaded triangles related? Explain your reasoning.

d. How are the coordinates of the nonshaded and dashed triangles related? How are the two triangles related? Explain your reasoning.

2 ACTIVITY: Drawing Triangles in a Coordinate Plane

Work with a partner.



a. Draw the triangle whose vertices are $(0, 2)$, $(-2, 2)$, and $(1, -2)$.

b. Multiply each coordinate of the vertices by 2 to obtain three new vertices. Draw the triangle given by the three new vertices. How are the two triangles related?

c. Repeat part (b) by multiplying by 3 instead of 2.

3 ACTIVITY: Summarizing Transformations

Work with a partner. Make a table that summarizes the relationships between the original figure and its image for the four types of transformations you studied in this chapter.

What Is Your Answer?

4. IN YOUR OWN WORDS How can you enlarge or reduce a figure in the coordinate plane?

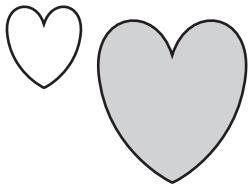
5. Describe how knowing how to enlarge or reduce figures in a technical drawing is important in a career such as drafting.

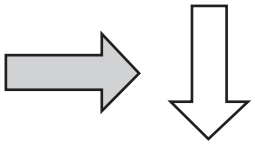
Name _____ Date _____

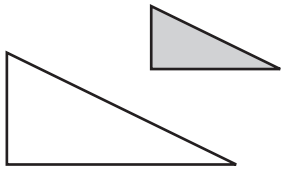
2.7 Practice

For use after Lesson 2.7

Tell whether the shaded figure is a dilation of the nonshaded figure.

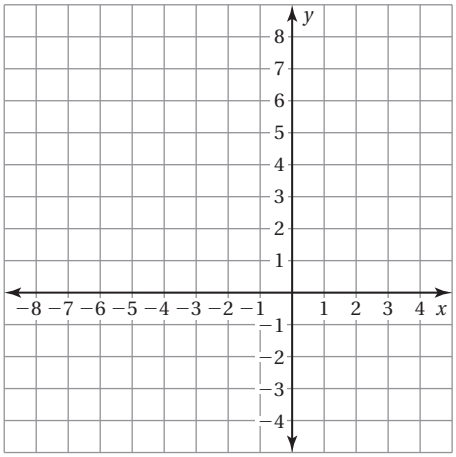
1. 

2. 

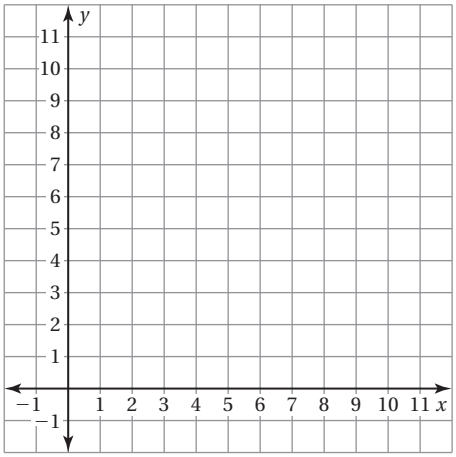
3. 

The vertices of a figure are given. Draw the figure and its image after a dilation with the given scale factor. Identify the type of dilation.

4. $A(-2, 2), B(1, 2), C(1, -1); k = 3$



5. $D(4, 2), E(4, 8), F(8, 8), G(8, 2); k = \frac{1}{2}$



6. A rectangle is dilated using a scale factor of 6. The image is then dilated using a scale factor of $\frac{1}{3}$. What scale factor could you use to dilate the original rectangle to get the final rectangle? Explain.