Chapter 12

School-Home Letter

Dear Family,

During the next few weeks, our math class will be learning transformations and symmetry. We will also learn how to describe a geometric pattern as well as how to make our own geometric patterns and tessellations.

You can expect to see homework that provides practice with identifying and drawing transformations, and also how to identify line and rotational symmetry in shapes.

Here is a sample of how your child will be taught to identify transformations.

Vocabulary

line of symmetry An imaginary line on a shape about which the shape can be folded so that its two parts match exactly

line symmetry What a shape has if it can be folded about a line so that its two parts match exactly

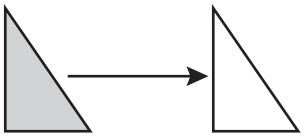
rotational symmetry What a shape has if it can be turned less than 360° about a central point and still look the same in at least two positions

tessellation A repeating pattern of closed shapes that covers a surface with no gaps and no overlaps

MODEL Identify Transformations

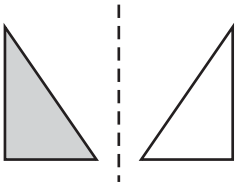
This is how we will be identifying the different movements of shapes.

Translation



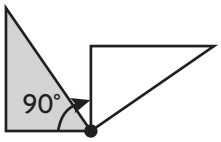
A *translation* is a transformation that slides a shape in a straight line.

Reflection



A *reflection* is a transformation that makes a shape face in the opposite direction. It is also called a *flip*.

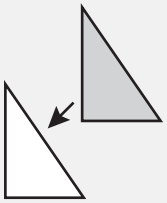
Rotation



A *rotation* is a transformation that turns a shape around a point. The triangle above was rotated 90° clockwise around the point.

Tips

When identifying a translation, remember that it is a slide in a straight line in *any* direction. In the model at the left, the triangle was translated in a horizontal direction to the right, but the model below shows a translation of the same right triangle in another direction.



Capítulo 12

Carta para la casa

Querida familia,

Durante las próximas semanas, en la clase de matemáticas aprenderemos acerca de las transformaciones y la simetría. También aprenderemos a describir un patrón geométrico y cómo hacer nuestros propios patrones geométricos y teselaciones.

Llevaré a la casa tareas para practicar cómo identificar y trazar transformaciones y cómo identificar la simetría axial y rotacional de las figuras.

Este es un ejemplo de la manera como aprenderemos a identificar transformaciones.

Vocabulario

eje de simetría Una línea imaginaria por la que una figura se puede doblar de tal manera que las dos mitades sean exactamente iguales.

simetría axial Cualidad que tiene una figura si se puede doblar por la mitad de tal forma que las dos partes sean exactamente iguales.

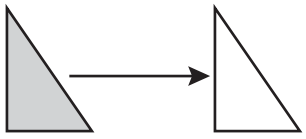
simetría rotacional Cualidad que tiene una figura si se puede rotar menos de $360°$ alrededor de un punto central y todavía se ve igual en por lo menos dos posiciones.

teselación Un patrón de figuras cerradas que se repite y que cubre una superficie sin dejar espacios y sin que haya superposiciones.

MODELO Identificar transformaciones

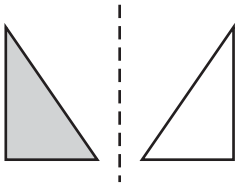
Así es como identificaremos los diferentes movimientos de las figuras.

Traslación



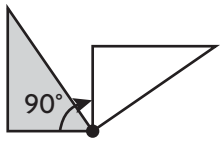
Una *traslación* es una transformación que hace que una figura se desplace sobre una línea recta.

Reflexión



Una *reflexión* es una transformación que hace que una figura esté orientada en la dirección contraria. También se llama un *giro*.

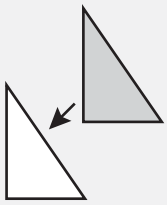
Rotación



Una *rotación* es una transformación que hace girar una figura alrededor de un punto. El triángulo de arriba rotó $90°$ alrededor de un punto, en el sentido de las manecillas del reloj .

Pistas

Al identificar una traslación, recuerda que una figura se desliza sobre una línea recta en *cualquier* dirección. En el modelo de la izquierda, el triángulo se trasladó en dirección horizontal hacia la derecha, pero en el modelo siguiente, el mismo triángulo se en otra dirección.

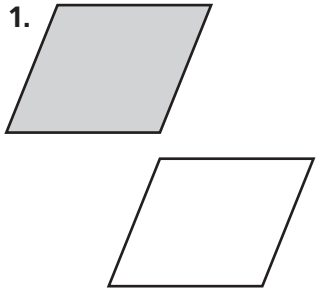


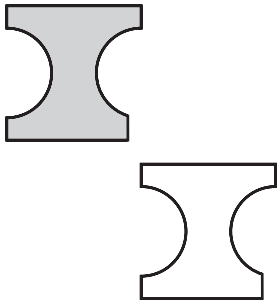
Name _____

Translations

MA.4.G.5.2 Identify and describe the results of translations, reflections, and rotations of 45, 90, 180, 270, and 360 degrees, including figures with line and rotational symmetry.

Tell if only a translation was used to move the shape. Write *yes* or *no*.

1. 
yes

2. 
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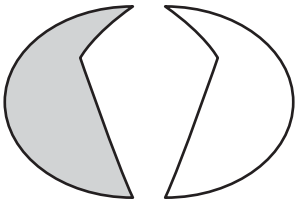
3. 
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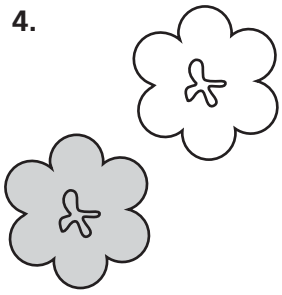
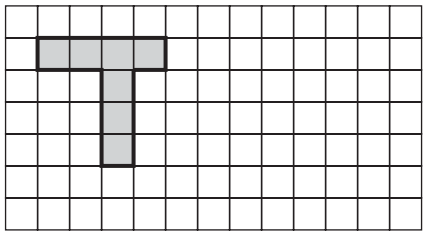
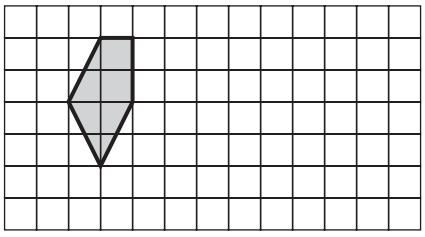
4. 
_____

Translate the shape. Draw the result.

5. 

6. 

Use the shapes at the right for 7–9. Write all the letters that make the statement true.

7. One shape is a translation of another shape.

_____

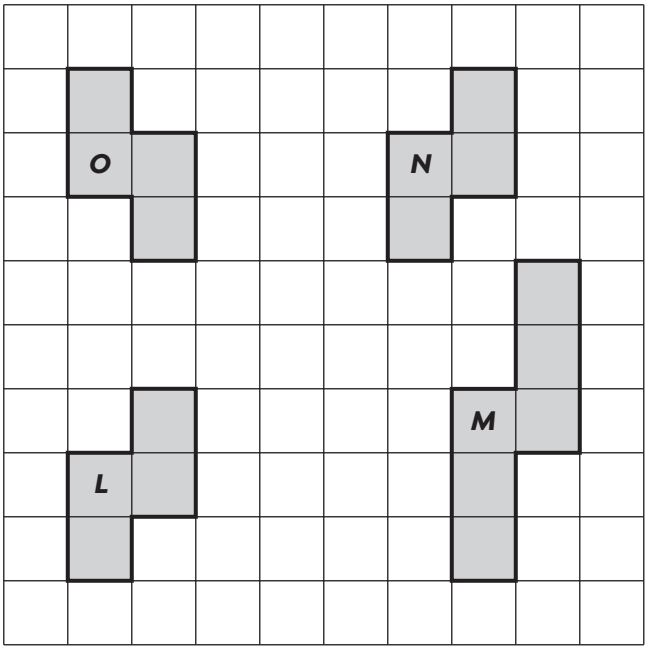
8. The shapes are congruent.

_____

9. The shapes are not congruent.

_____

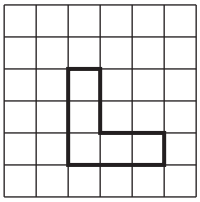
_____

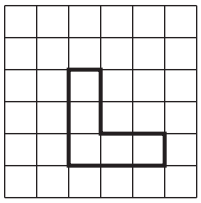


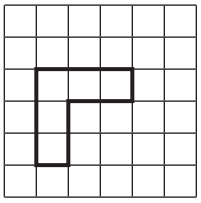
TEST PREP

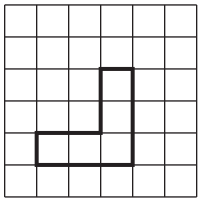
Lesson Check (MA.4.G.5.2)

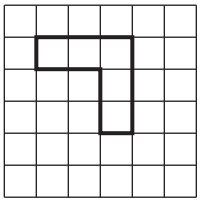
1. Look at the shape on the grid below. Which of the following could be a translation of the shape?



Ⓐ 

Ⓒ 

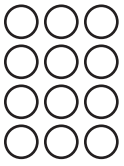
Ⓑ 

Ⓓ 

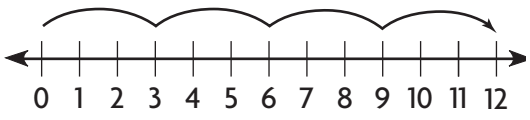
Review Grade 4 (MA.4.A.1.1)

SPIRAL REVIEW

2. Which model below does NOT represent 4×3?

Ⓕ 

Ⓖ $3 + 3 + 3$

Ⓗ 

Ⓘ $3 + 3 + 3 + 3 = 12$

3. Which number sentence shows an incorrect product or quotient?

Ⓐ $5 \times 4 = 20$

Ⓑ $63 \div 7 = 9$

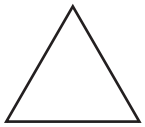
Ⓒ $56 \div 8 = 6$

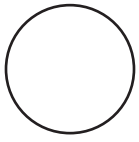
Ⓓ $8 \times 4 = 32$

Look Back (MA.3.G.3.1)

SPIRAL REVIEW

4. Which of the following polygons is a quadrilateral?

Ⓕ 

Ⓗ 

Ⓖ 

Ⓘ 

5. How many right angles does a rectangle have?

Ⓐ 0

Ⓒ 4

Ⓑ 2

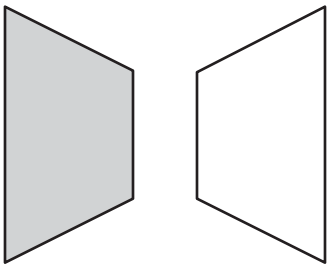
Ⓓ 90

Name _____

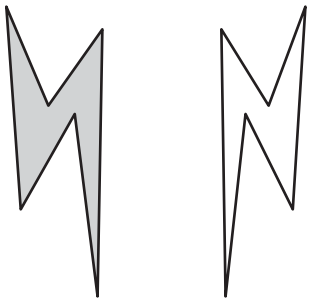
Reflections

MA.4.G.5.2 Identify and describe the results of translations, reflections, and rotations of 45, 90, 180, 270, and 360 degrees, including figures with line and rotational symmetry.

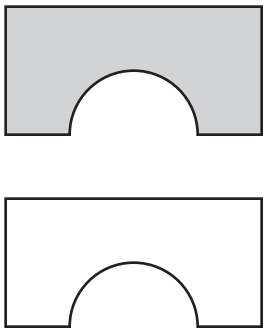
Tell how the shape was moved. Write *translation* or *reflection*.

1. 

reflection

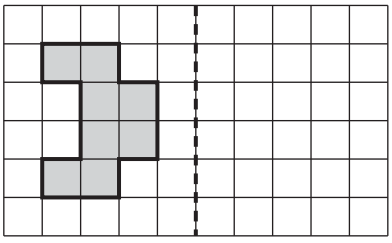
2. 

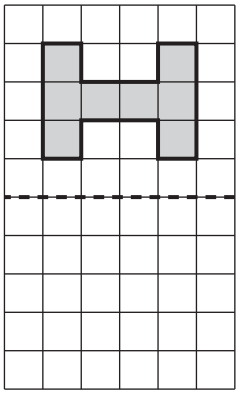
_____

3. 

_____

Reflect the shape across the line of reflection. Draw the result. Label the drawing *reflection*.

4. 

5. 

Problem Solving REAL WORLD

6. Which letters of the alphabet, when reflected over a vertical line, look the same?

_____

_____

7. Which letters of the alphabet, when reflected over a horizontal line, look the same?

_____

_____

Lesson Check (MA.4.G.5.2)

1. Which pair of shapes shows a reflection?

   Ⓐ
   Ⓒ 
   Ⓑ 
   Ⓓ 

2. Which of the following shapes would look the same after a reflection across a vertical AND horizontal line?

   Ⓕ 
   Ⓗ 
   Ⓖ 
   Ⓘ 

Review Grade 4 (MA.4.A.1.2)

SPIRAL REVIEW

3. Mary Ann installs tires on cars at an assembly plant. Today, she installed tires on 133 cars. How many tires did she install?

   Ⓐ 137
   Ⓒ 432
   Ⓑ 422
   Ⓓ 532

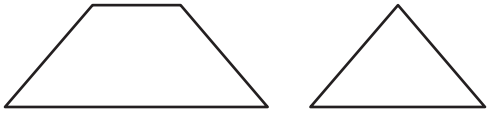
4. The population of Anytown, U.S.A., is 4,395. A nearby town has a population that is 40 times that of Anytown. Which choice below shows a reasonable estimate for the population of the nearby town?

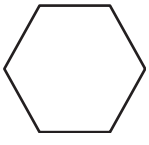
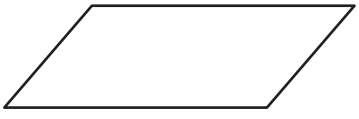
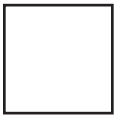
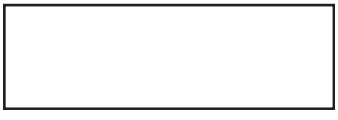
   Ⓕ 1,600
   Ⓗ 16,000
   Ⓖ 12,000
   Ⓘ 170,000

Look Back (MA.3.G.3.3, MA.4.G.5.3)

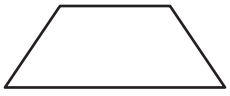
SPIRAL REVIEW

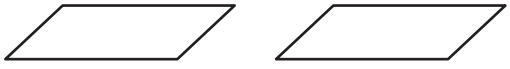
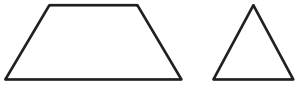
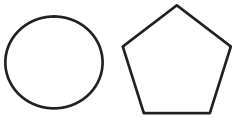
5. Which of the following could be created using only the following two shapes?

   Ⓐ 
   Ⓑ 
   Ⓒ 
   Ⓓ 

6. Which of the following shapes could have been used to create the shape below?

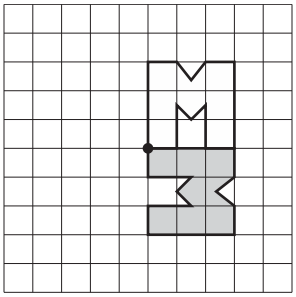
   Ⓕ 
   Ⓖ 
   Ⓗ 
   Ⓘ 

Name _____

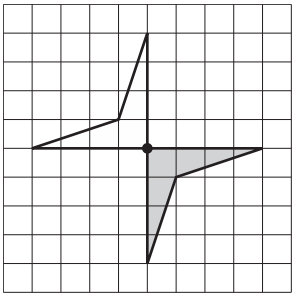
Rotations

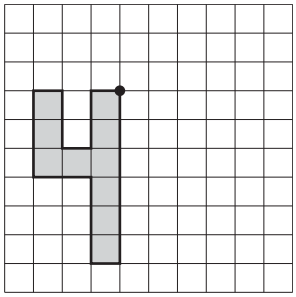
MA.4.G.5.2 Identify and describe the results of translations, reflections, and rotations of 45, 90, 180, 270, and 360 degrees, including figures with line and rotational symmetry.

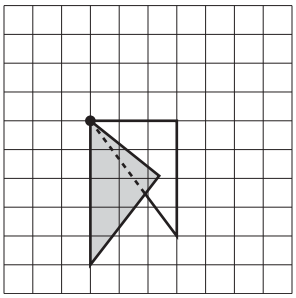
Tell how the shape was rotated. Write *clockwise* or *counterclockwise* and 45°, 90°, 180°, 270°, or 360°.

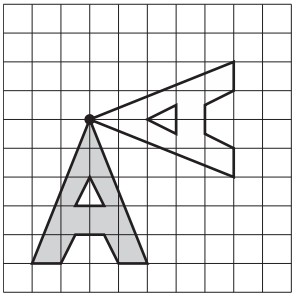
1. 

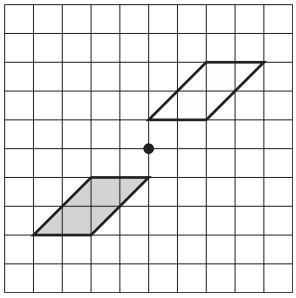
clockwise 90° or counter-clockwise 270°

2. 

3. 

4. 

5. 

6. 

Problem Solving REAL WORLD

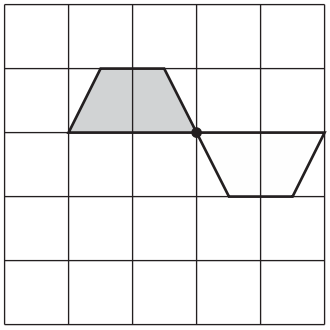
7. Raul is unlocking his door. He slides the latch to the left and then turns it a $\frac{1}{4}$ turn counterclockwise. How could you describe these movements?

8. Macy and Derrick each draw the same right triangle. Macy rotates her triangle $270°$ clockwise, and Derrick rotates his triangle $90°$ counterclockwise. Should their rotated shapes look the same? Explain.

TEST PREP

Lesson Check (MA.4.G.5.2)

1. Which of the following best describes how the shape was transformed?



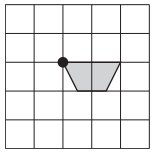
Ⓐ 45° clockwise rotation

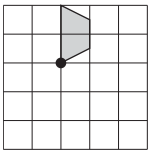
Ⓑ 90° counterclockwise rotation

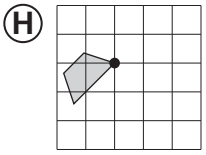
Ⓒ 180° clockwise rotation

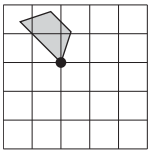
Ⓓ 270° counterclockwise rotation

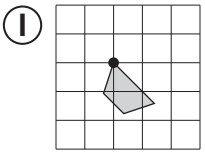
2. If the shape below is rotated 45° clockwise, which of the following shows the transformed shape?



Ⓕ 

Ⓗ 

Ⓖ 

Ⓘ 

Review Grade 4 (MA.4.A.2.2)

SPIRAL REVIEW

3. Alejandro has 1 dollar saved in his coin bank. His sister Margaret has $\frac{1}{10}$ the amount that Alejandro has in her coin bank. Raul has $\frac{1}{10}$ the amount that Margaret has. How much money does Raul have in his coin bank?

Ⓐ $0.01

Ⓑ $0.10

Ⓒ $1

Ⓓ $10

4. The values of the digits in a decimal are as follows:

0.06 5 200 0.9 30

What is the decimal?

Ⓕ 652.93

Ⓖ 235.96

Ⓗ 235.15

Ⓘ 0.23596

Look Back (MA.3.A.6.1, MA.4.A.6.1)

SPIRAL REVIEW

5. Which of the following shows the value of 358?

Ⓐ 3 ones 5 tens 8 hundreds

Ⓑ 35 tens

Ⓒ 3 hundreds 58 tens

Ⓓ 3 hundreds 5 tens, 8 ones

6. Which of the following is seven thousand twenty-one in standard form?

Ⓕ 7,211

Ⓖ 7,210

Ⓗ 7,021

Ⓘ 721

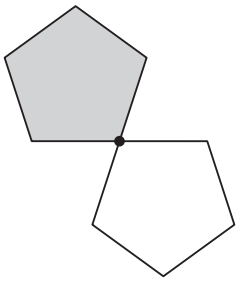
Name _____

Describe the Results of Transformations

MA.4.G.5.2 Identify and describe the results of translations, reflections, and rotations of 45, 90, 180, 270, and 360 degrees, including figures with line and rotational symmetry.

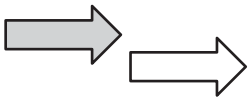
Tell how the shape was moved. Write *translation, reflection,* or *rotation*. For a rotation, write *clockwise* or *counterclockwise* and 45°, 90°, 180°, 270°, or 360°.

1.



2.

3.



rotation, 180° clockwise or counterclockwise; or reflection

Use the trapezoids on the grid for 4–8.

4. Which trapezoid could result from a translation of Trapezoid *A*?

_____

5. Which trapezoid could result from a reflection of Trapezoid *B*?

_____

6. Which trapezoid could result from a rotation of Trapezoid *D*?

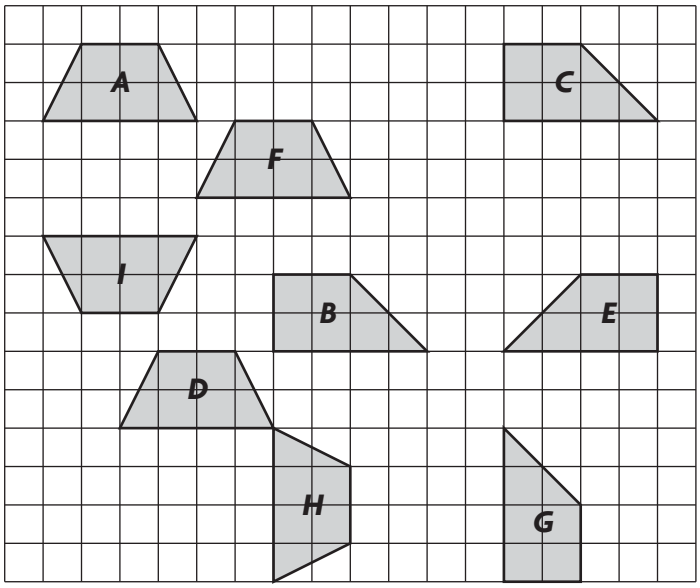
_____

7. Which trapezoid could result from a reflection of Trapezoid *A*?

_____

8. Which trapezoid could result from a translation of Trapezoid *B*?

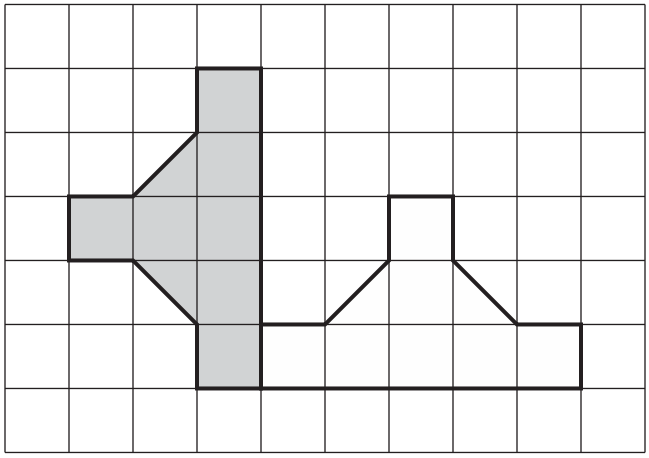
_____



TEST PREP

Lesson Check (MA.4.G.5.2)

1. Which describes the drawing?



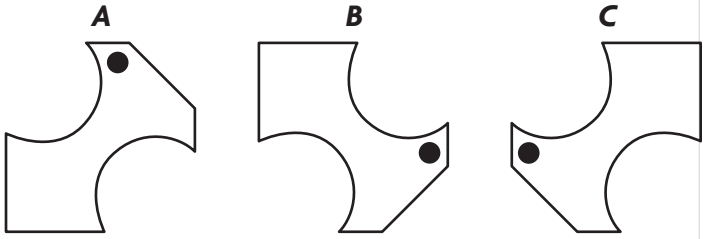
Ⓐ a translation

Ⓑ a reflection

Ⓒ a rotation

Ⓓ not congruent

2. Which type of transformations describe the changes in position of the shape from *A* to *C*?



Ⓕ a rotation 90° clockwise and a rotation 180° clockwise

Ⓖ a rotation 90° clockwise and a reflection

Ⓗ a rotation 180° clockwise and a reflection

Ⓘ a rotation 180° clockwise and a translation

Review Grade 4 (MA.4.A.6.6)

SPIRAL REVIEW

3. In 2008, the number of acres of state conservation land in Florida was 3,343,542. Which number is 3,343,542 rounded to the nearest million?

Ⓐ 4,000,000 Ⓒ 3,343,000

Ⓑ 3,344,000 Ⓓ 3,000,000

4. In 2005, the value of Florida tomatoes sold, to the nearest million dollars, was $805,000,000. What could be the greatest value of Florida tomatoes sold in 2005?

Ⓕ $809,000,000 Ⓗ $804,999,999

Ⓖ $805,499,999 Ⓘ $800,000,000

Look Back (MA.3.A.1.2, MA.4.A.1.2)

SPIRAL REVIEW

5. Which of the following correctly shows the Distributive Property used to solve 6×8?

Ⓐ $(3 \times 8) \times (3 \times 8)$

Ⓑ $(3 \times 4) + (3 \times 4)$

Ⓒ $(3 \times 8) + (3 \times 8)$

Ⓓ $(3 \times 4) \times (3 \times 4)$

6. Which of the following is an example of the Associative Property of Multiplication?

Ⓕ $(3 \times 4) \times 5 = 5 \times (3 \times 4)$

Ⓖ $(3 \times 4) \times 5 = 3 \times (4 \times 5)$

Ⓗ $(3 \times 4) \times 1 = 3 \times 4$

Ⓘ $(3 \times 4) \times 0 = 0$

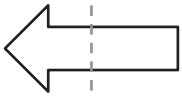
Name _____

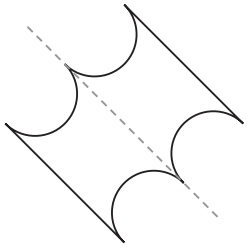
Line Symmetry

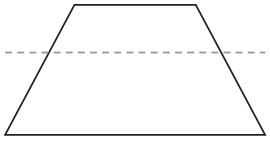
MA.4.G.5.2 Identify and describe the results of translations, reflections, and rotations of 45, 90, 180, 270, and 360 degrees, including figures with line and rotational symmetry.

Tell if the dashed line appears to be a line of symmetry. Write *yes* or *no*.

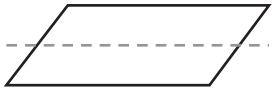
1. 

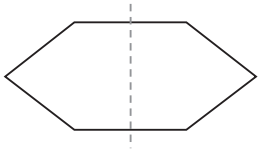
2. 

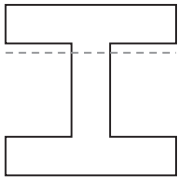
3. 

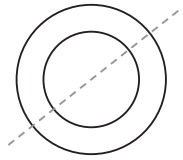
4. 

yes

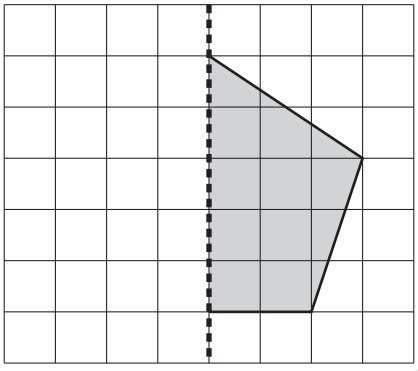
5. 

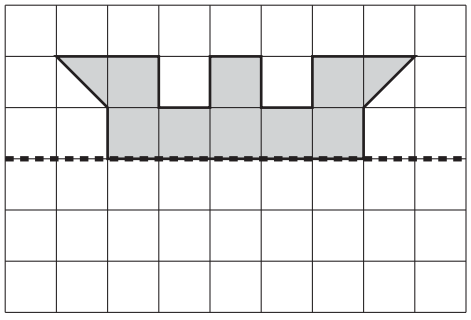
6. 

7. 

8. 

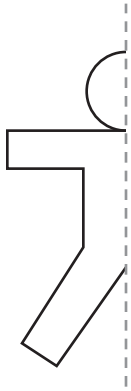
Complete the design by reflecting over the line of symmetry.

9. 

10. 

Problem Solving REAL WORLD

11. Kara uses the pattern at the right to make paper dolls. The dotted line represents a line of symmetry. A complete doll includes the reflection of the pattern over the line of symmetry. Complete the design to show what one of Kara's paper dolls looks like.



TEST PREP

Lesson Check (MA.4.G.5.2)

1. Which best describes the symmetry in the letter D?

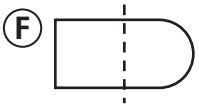
Ⓐ horizontal

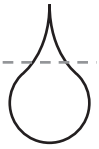
Ⓑ vertical

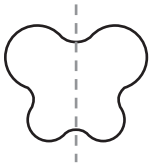
Ⓒ diagonal

Ⓓ half turn

2. Which shape has a correctly drawn line of symmetry?

Ⓕ 

Ⓗ 

Ⓖ 

Ⓘ 

Review Grade 4 (MA.4.A.4.3)

SPIRAL REVIEW

3. When Johnnie played a video game, he scored d points. Mario scored 5 fewer than twice the points Johnnie scored. Which expression represents what Mario scored?

Ⓐ $d - (2 \times 5)$

Ⓑ $5d - 2$

Ⓒ $5 - 2d$

Ⓓ $2d - 5$

4. Which expression below correctly represents the algebraic expression $(5 \div a) + 32$?

Ⓕ five times a plus 32

Ⓖ 5 divided by a increased by 32

Ⓗ the quotient of 5 and 32 plus a

Ⓘ a divided by the quotient of 5 and 32

Look Back (MA.3.G.3.3, MA.4.G.5.2)

SPIRAL REVIEW

5. Which shows the reflected design over the line of symmetry of the shape below?

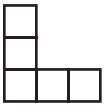
Ⓐ 

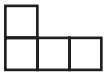
Ⓒ 

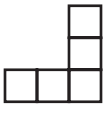
Ⓑ 

Ⓓ 

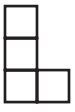
6. Which of the following shapes is congruent to the shape below?



Ⓕ 

Ⓗ 

Ⓖ 

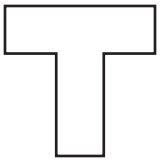
Ⓘ 

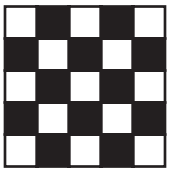
Name _____

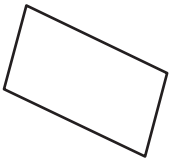
Find and Draw Lines of Symmetry

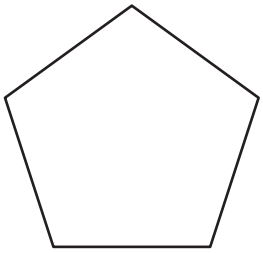
MA.4.G.5.2 Identify and describe the results of translations, reflections, and rotations of 45, 90, 180, 270, and 360 degrees, including figures with line and rotational symmetry.

Tell whether the shape appears to have zero lines, 1 line, or more than 1 line of symmetry. Write *zero,* 1, or *more than* 1.

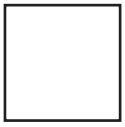
1. 
1

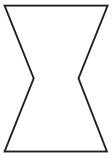
2. 

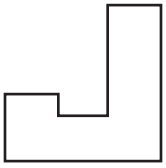
3. 

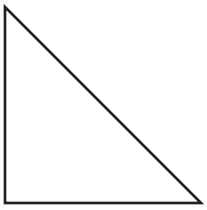
4. 

Does the design have line symmetry? Write *yes* or *no*. If yes, draw all lines of symmetry.

5. 

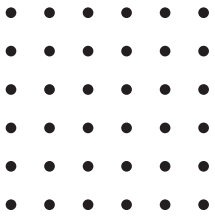
6. 

7. 

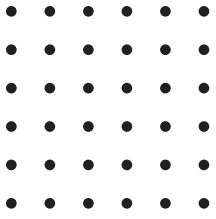
8. 

Draw a shape for the statement. Draw the line or lines of symmetry.

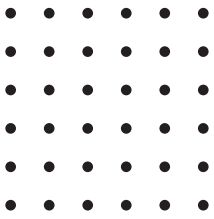
9. zero lines of symmetry



10. 1 line of symmetry



11. 2 lines of symmetry



Problem Solving REAL WORLD

Use the chart for 12–13.

0	2	3	4
5	6	8	9

12. Which number or numbers appear to have only 1 line of symmetry?

_____

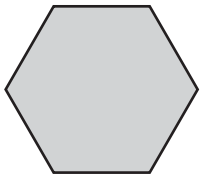
13. Which number or numbers appear to have 2 lines of symmetry?

_____

TEST PREP

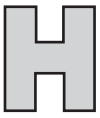
Lesson Check (MA.4.G.5.2)

1. How many lines of symmetry does the hexagon have?



Ⓐ 0
Ⓒ 6
Ⓑ 2
Ⓓ 10

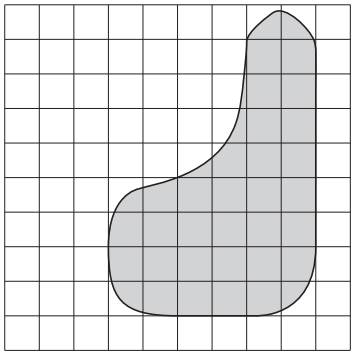
2. Which of the following shapes has exactly 1 line of symmetry?

Ⓕ 
Ⓗ 
Ⓖ 
Ⓘ 

Review Grade 4 (MA.4.G.3.1)

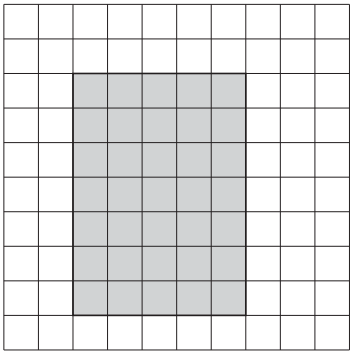
SPIRAL REVIEW

3. Which is the best estimate of the area of the shape below?
□ = 1 square inch



Ⓐ 24 square inches
Ⓑ 26 square inches
Ⓒ 32 square inches
Ⓓ 35 square inches

4. What is the area of the shape below if 1 square is equal to 1 square yard?



Ⓕ 24 square yards
Ⓖ 28 square yards
Ⓗ 35 square yards
Ⓘ 40 square yards

Look Back (MA.3.A.1.3, MA.4.A.1.1)

SPIRAL REVIEW

5. Marcos has 24 stickers. He makes 8 equal groups. Which number sentence can be used to find how many stickers are in each group?

Ⓐ 24 − 8 = ■
Ⓒ ■ ÷ 8 = 24
Ⓑ 24 + 8 = ■
Ⓓ 8 × ■ = 24

6. Thirty-six students wait for museum tour guides. Each tour guide can lead 9 students. Which number sentence can be used to find how many tour guides will be needed for all 36 students?

Ⓕ ■ × 9 = 36
Ⓗ ■ ÷ 9 = 36
Ⓖ ■ − 9 = 36
Ⓘ ■ + 9 = 36

Name _____

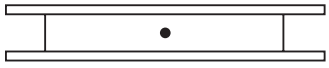
Rotational Symmetry

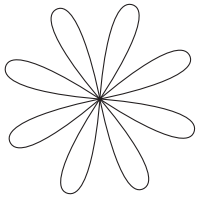
MA.4.G.5.2 Identify and describe the results of translations, reflections, and rotations of 45, 90, 180, 270, and 360 degrees, including figures with line and rotational symmetry.

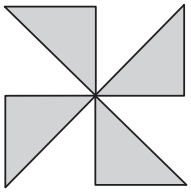
Identify the rotational symmetry as a fraction of a turn and the angle measure of the smallest turn.

1. 

$\frac{1}{4}$; 90°

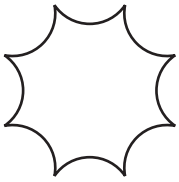
2. 

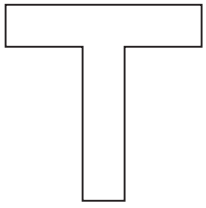
3. 

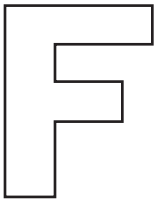
4. 

Tell whether the shape appears to have *line symmetry, rotational symmetry, both,* or *neither*.

5. 

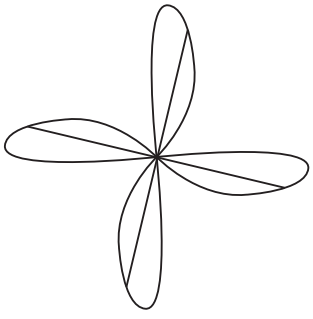
6. 

7. 

8. 

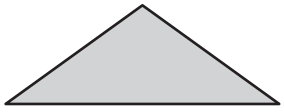
Problem Solving REAL WORLD

9. Ramon has the pinwheel modeled below.

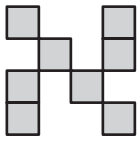


Ramon says his pinwheel has 45° rotational symmetry. Is he correct? Explain.

10. Alison wants to choose a design for her book cover that has both rotational and line symmetry. Which design should Alison choose?

A 

B 

C 

TEST PREP

Lesson Check (MA.4.G.5.2)

1. Armando thinks of a letter that has both rotational and line symmetry. Which of the following could be the letter?

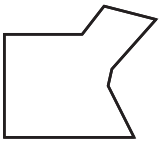
   Ⓐ C

   Ⓑ H

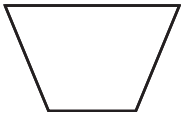
   Ⓒ M

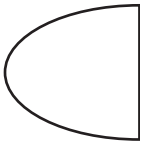
   Ⓓ U

2. Which shape has rotational symmetry?

   Ⓕ 

   Ⓗ 

   Ⓖ 

   Ⓘ 

Review Grade 4 (MA.4.A.4.2)

SPIRAL REVIEW

3. Tito has 413 baseball cards in his collection. His friend Teesha has 17 more than three times the number in Tito's collection. Which expression below represents the number of cards in Teesha's collection?

   Ⓐ $413 + 3 + 17$

   Ⓑ $413 + (17 \times 3)$

   Ⓒ $(3 \times 413) + 17$

   Ⓓ $3 \times 413 \times 17$

4. Which expression below represents "fifteen times the quotient of ten and five"?

   Ⓕ $15 \times (10 \div 5)$

   Ⓖ $(15 \div 10) + 5$

   Ⓗ $15 \times (10 + 5)$

   Ⓘ $15 + (10 \div 5)$

Look Back (MA.3.A.2.3, MA.4.A.2.3)

SPIRAL REVIEW

5. Which of the following statements is true?

   Ⓐ $\frac{4}{5} < \frac{4}{6}$

   Ⓑ $\frac{1}{4} > \frac{1}{3}$

   Ⓒ $\frac{3}{5} < \frac{3}{4}$

   Ⓓ $\frac{2}{5} < \frac{2}{6}$

6. Which of the following correctly shows the fractions in order from least to greatest?

   Ⓕ $\frac{4}{8}, \frac{1}{4}, \frac{2}{2}$

   Ⓖ $\frac{1}{4}, \frac{2}{2}, \frac{4}{8}$

   Ⓗ $\frac{2}{2}, \frac{1}{4}, \frac{4}{8}$

   Ⓘ $\frac{1}{4}, \frac{4}{8}, \frac{2}{2}$

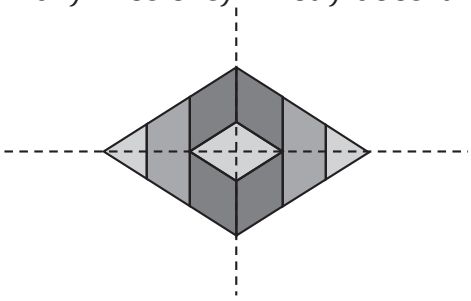
Name _____

Use Manipulatives · Line and Rotational Symmetry

MA.4.G.5.2 Identify and describe the results of translations, reflections, and rotations of 45, 90, 180, 270, and 360 degrees, including figures with line and rotational symmetry.

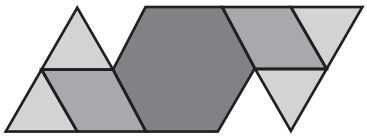
Use pattern blocks to solve the problems.

1. Joanna uses pattern blocks to make the design below. Does the design have line symmetry? If so, how many lines of symmetry does it have?

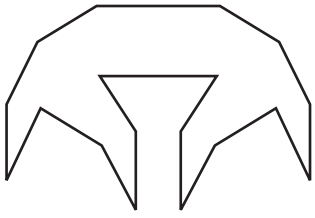


Yes; 2 lines of symmetry

2. Trent makes the following design using pattern blocks. He wants his design to have line symmetry. How can Trent change the pattern blocks so that his design has line symmetry? Describe the transformations used.



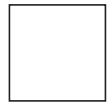
3. Josie makes the crab design outlined below using pattern blocks. Which pattern blocks could she use to make the design? Draw the blocks in the pattern below.

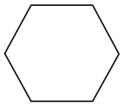


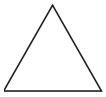
TEST PREP

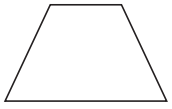
Lesson Check (MA.4.G.5.2)

1. Which pattern block has no rotational symmetry?

Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

2. If the trapezoid pattern block below is reflected over a horizontal line of symmetry, and the resulting shape is put together with the original shape, which other pattern block shape is formed?

Ⓕ parallelogram Ⓗ hexagon

Ⓖ triangle Ⓘ square

Review Grade 4 (MA.4.A.2.3)

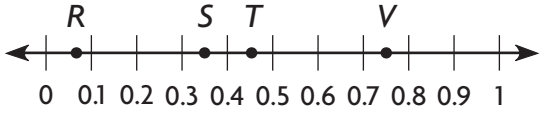
SPIRAL REVIEW

3. At a school pizza party, Franco ate 0.2 of a pizza. Samantha ate 0.4 of a pizza. Jill ate 0.25 of a pizza. Which fraction below shows the amount of pizza Samantha ate?

Ⓐ $\frac{2}{10}$ Ⓒ $\frac{1}{4}$

Ⓑ $\frac{1}{5}$ Ⓓ $\frac{2}{5}$

4. Which point is located at $\frac{3}{4}$ on the number line below?



Ⓕ *R* Ⓗ *T*

Ⓖ *S* Ⓘ *V*

Look Back (MA.3.G.5.1, MA.4.G.3.3)

SPIRAL REVIEW

5. Which of the following is the best estimate of the perimeter of a football field?

Ⓐ 300 feet Ⓒ 300 kilometers

Ⓑ 300 yards Ⓓ 300 miles

6. Hayden wants to find the perimeter of her jewelry box. Which of the following could Hayden use to find the perimeter?

Ⓕ balance scale Ⓗ tape measure

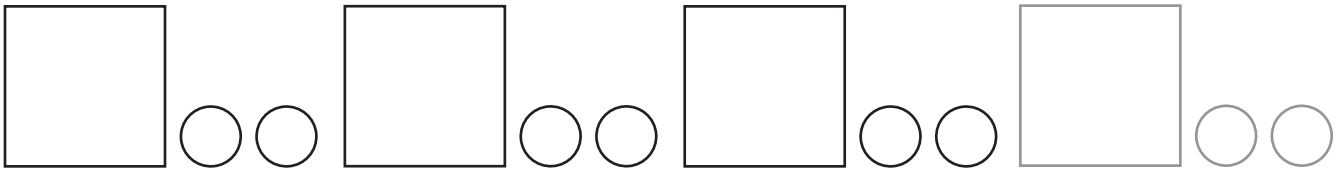
Ⓖ measuring cup Ⓘ thermometer

Name _____

Geometric Patterns

MA.4.A.4.1 Generate algebraic rules and use all four operations to describe patterns, including nonnumeric growing or repeating patterns.

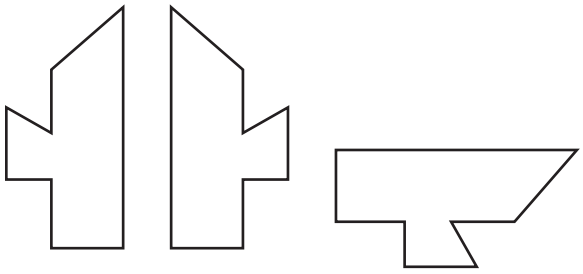
Describe a pattern. Draw the next three figures in your pattern.

1. 

Large square, little circle, little circle

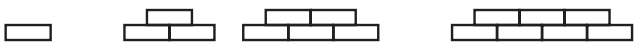
2. 

Describe a pattern. Then draw the missing figure in your pattern.

3. 

Problem Solving REAL WORLD

4. Keegan begins to build a brick wall. The design at the right shows each step. What is a pattern? How many bricks will be in the wall after the eighth step?



TEST PREP

Lesson Check (MA.4.A.4.1)

1. Which might be the next shape in the pattern?

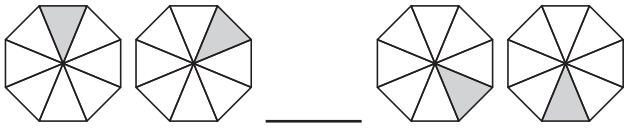
Ⓐ 

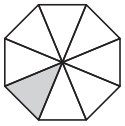
Ⓒ 

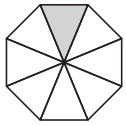
Ⓑ 

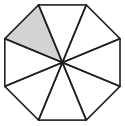
Ⓓ 

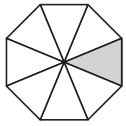
2. Which could be the missing shape from the pattern below?



Ⓕ 

Ⓗ 

Ⓖ 

Ⓘ 

Review Grade 4 (MA.4.A.2.4)

SPIRAL REVIEW

3. For a science experiment, Belinda needed to fill a test tube with less than 0.35 milliliter of water. Which amount should she choose?

Ⓐ 3.5 milliliters
Ⓒ 0.35 milliliter
Ⓑ 0.53 milliliter
Ⓓ 0.099 milliliter

4. Which correctly lists the numbers from greatest to least?

Ⓕ $\frac{3}{4}$, $\frac{2}{5}$, 0.8, 0.09
Ⓖ 0.09, 0.8, $\frac{3}{4}$, $\frac{2}{5}$
Ⓗ 0.8, $\frac{3}{4}$, $\frac{2}{5}$, 0.09
Ⓘ 0.8, $\frac{2}{5}$, $\frac{3}{4}$, 0.09

Look Back (MA.3.A.1.1, MA.4.A.1.1)

SPIRAL REVIEW

5. Ciara's classroom has 4 rows of desks with 5 desks in each row. How many desks are there?

Ⓐ 9
Ⓑ 10
Ⓒ 15
Ⓓ 20

6. Julio can choose to wear black or brown pants and a blue, white, or green shirt. How many combinations of a shirt and pants can Julio make?

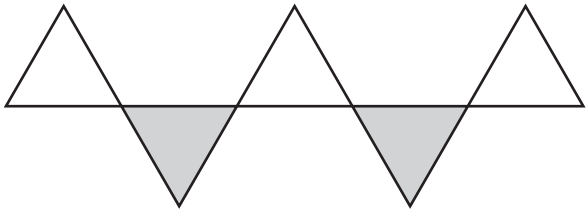
Ⓕ 3
Ⓖ 5
Ⓗ 6
Ⓘ 12

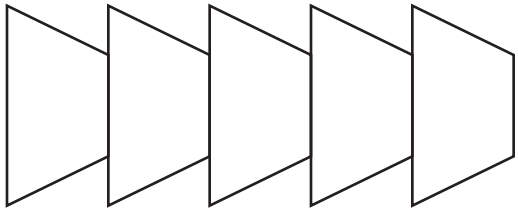
Name _____

Make a Geometric Pattern

MA.4.G.5.2 Identify and describe the results of translations, reflections, and rotations of 45, 90, 180, 270, and 360 degrees, including figures with line and rotational symmetry.

Describe how each pattern might have been made using transformations.

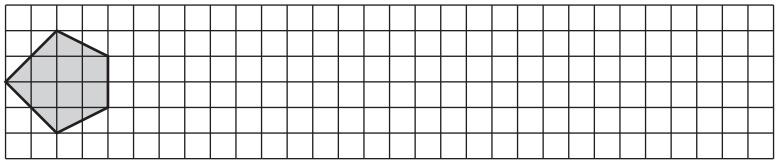
1. 

2. 

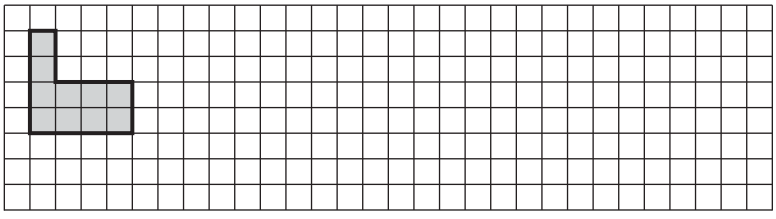
Rotate the shape 180° about the bottom right vertex, then rotate it 180° about the top right vertex.

Transform the shape to make a pattern. Draw the first four shapes in your pattern.

3. Reflect the shape over a vertical line.



4. Rotate the shape 90° clockwise about the bottom right vertex.



Problem Solving REAL WORLD

5. Allen puts some tiles for a design along one wall of his shower. He wants to continue the design in the area he has sectioned off below. Draw the shapes and colors of tile Allen should put up next.

TEST PREP

Lesson Check (MA.4.G.5.2)

1. Study the pattern below.

Which shape might be the next shape in the pattern?

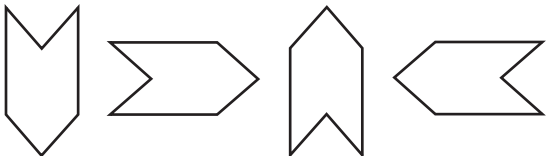
Ⓐ 

Ⓒ 

Ⓑ 

Ⓓ 

2. In what way was the shape below transformed to make the pattern?



Ⓕ rotated 90° clockwise

Ⓖ rotated 90° counterclockwise

Ⓗ reflected over a horizontal line

Ⓘ translated along a vertical line

Review Grade 4 (MA.4.A.6.2)

SPIRAL REVIEW

3. There are 180 students and 12 adults taking 6 buses on a field trip to Sunnyvale Farms. Each bus will take the same number of people to the farm. How many people will ride on each bus?

Ⓐ 32

Ⓒ 28

Ⓑ 30

Ⓓ 24

4. At Janny's Jellybean Shop, Janny has 12 jars filled with jelly beans. If Janny has 768 jelly beans, and each jar contains the same number of jelly beans, how many jelly beans are in each jar?

Ⓕ 34

Ⓗ 64

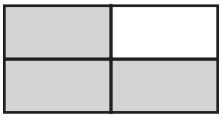
Ⓖ 54

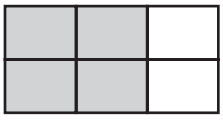
Ⓘ 74

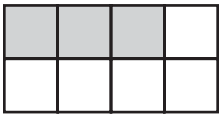
Look Back (MA.3.A.2.1, MA.4.A.2.3)

SPIRAL REVIEW

5. The shaded part of which model represents the fraction $\frac{3}{8}$?

Ⓐ 

Ⓒ 

Ⓑ 

Ⓓ 

6. Six of the 12 cars in the parking lot are silver. Which of the following represents the fraction of the cars that are silver?

Ⓕ 

Ⓗ 

Ⓖ 

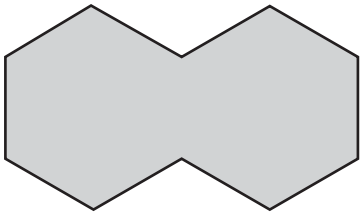
Ⓘ 

Name _____

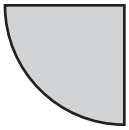
Tessellations

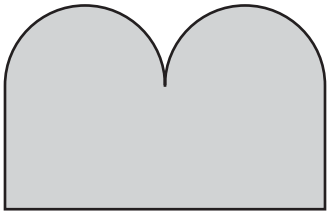
MA.4.G.5.2 Identify and describe the results of translations, reflections, and rotations of 45, 90, 180, 270, and 360 degrees, including figures with line and rotational symmetry.

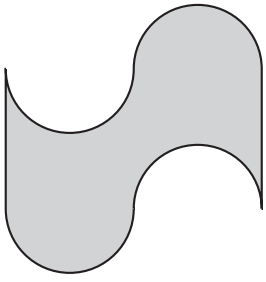
Trace and cut out several of each shape. Tell whether the shape or shapes will tessellate. Write *yes* or *no*.

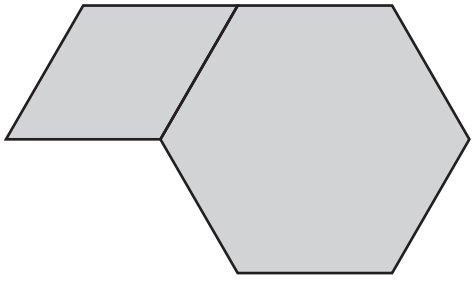
1. 

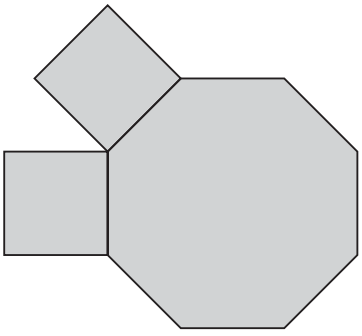
yes

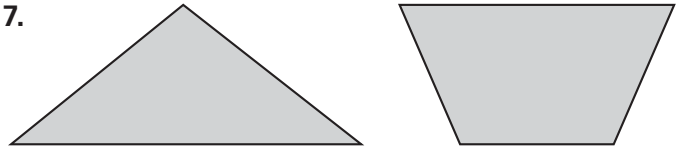
2. 

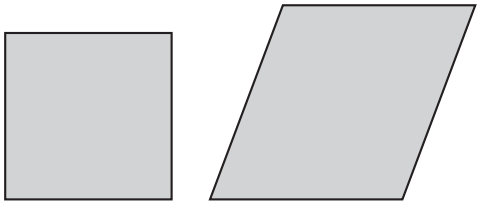
3. 

4. 

5. 

6. 

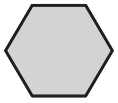
7. 

8. 

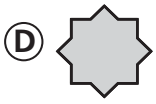
Lesson Check (MA.4.G.5.2)

1. Which of the following shapes will tessellate?

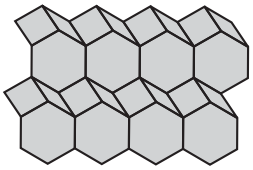
Ⓐ 

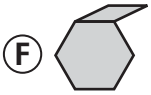
Ⓑ 

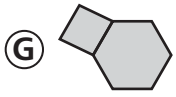
Ⓒ 

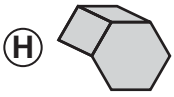
Ⓓ 

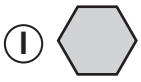
2. What is the pattern unit in the tessellation below?



Ⓕ 

Ⓖ 

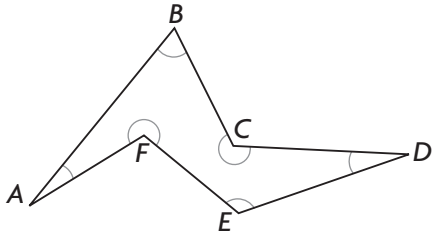
Ⓗ 

Ⓘ 

Review Grade 4 (MA.4.G.5.1)

SPIRAL REVIEW

3. Which angle in the diagram below is an obtuse angle?



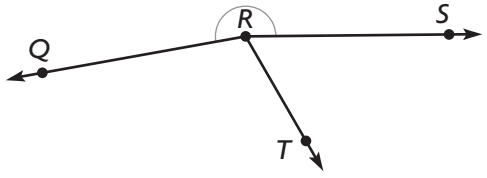
Ⓐ $\angle C$

Ⓑ $\angle D$

Ⓒ $\angle E$

Ⓓ $\angle F$

4. Which is closest to the measure of angle *QRS* in the diagram below?



Ⓕ 0°

Ⓖ 90°

Ⓗ 180°

Ⓘ 360°

Look Back (MA.3.A.4.1, MA.4.A.4.1)

SPIRAL REVIEW

5. Which best describes a rule for the pattern below?

4, 8, 12, 16, 20, 24 . . .

Ⓐ Multiply by 2.

Ⓑ Subtract 1.

Ⓒ Add 4.

Ⓓ Divide by 1.

6. Holly has the following amounts in her savings at the end of each day.

Day	Amount in Savings
1	$ 42
2	$ 39
3	$ 36
4	$ 33

If the pattern continues, how much will be in her savings after Day 6?

Ⓕ $32

Ⓖ $30

Ⓗ $27

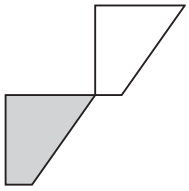
Ⓘ $24

Name _____

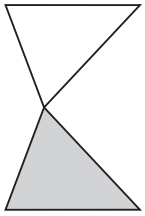
Chapter 12 Extra Practice

Lesson 12.2 (pp. 481–484)

Tell how the shape was moved. Write *translation* or *reflection*.

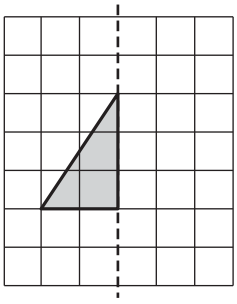
1. 

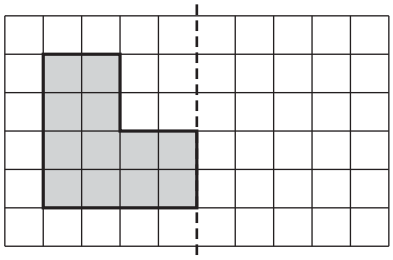
2. 

3. 

_____ _____ _____

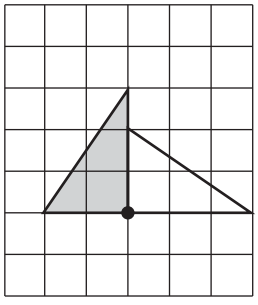
Reflect the shape over the line of reflection. Draw the result. Label the drawing *reflection*.

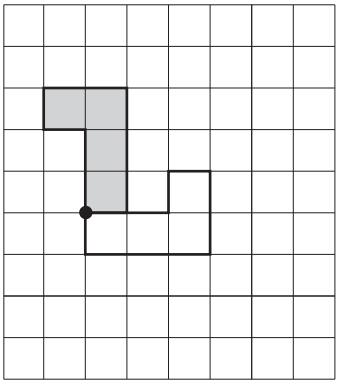
4. 

5. 

Lesson 12.3 (pp. 485–488)

Tell how the shape was rotated. Write *clockwise* or *counterclockwise* and *45°*, *90°*, *180°*, *270°*, or *360°*.

1. 

2. 

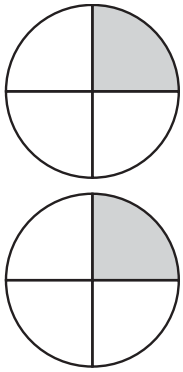
_____ _____

_____ _____

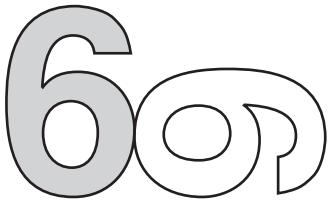
Lesson 12.4 (pp. 489–492)

Tell how the shape was moved. Write *translation, reflection, or rotation*. For a rotation, write *clockwise* or *counterclockwise* and *45°*, *90°*, *180°*, *270°*, or *360°*.

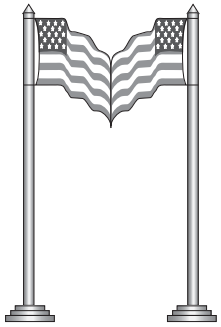
1.



2.



3.



_____ _____ _____

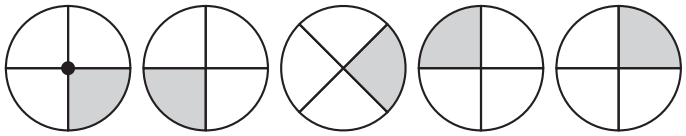
Use the circles for 4–5.

4. Which circle could result from a reflection of Circle *A*?

_____

5. Which circle could result from a 270° rotation of Circle *A*?

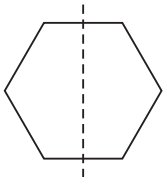
_____



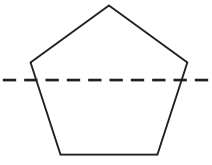
Lesson 12.5 (pp. 493–496)

Tell if the dashed line appears to be a line of symmetry. Write *yes* or *no*.

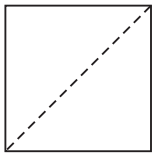
1.



2.



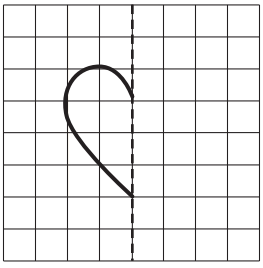
3.



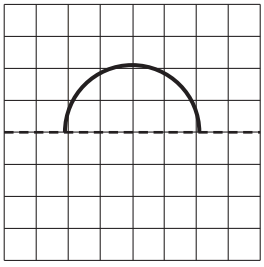
_____ _____ _____

Complete the design by reflecting across the line of symmetry.

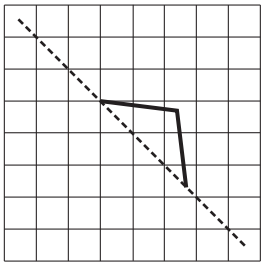
4.



5.

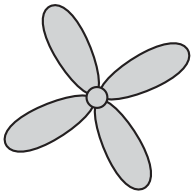


6.



Lesson 12.6 (pp. 497–500)

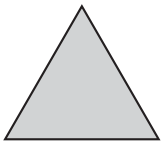
Tell whether the shape appears to have zero lines, 1 line, or more than 1 line of symmetry. Write zero, *1*, or *more than 1*.

1. 

_____

2. 

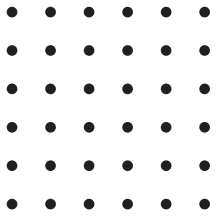
_____

3. 

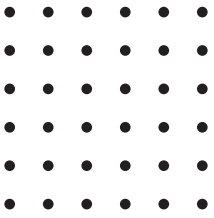
_____

Draw a shape for the statement. Draw the line or lines of symmetry.

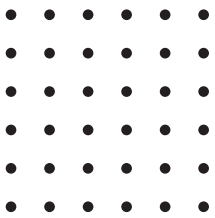
4. 2 lines of symmetry



5. 0 lines of symmetry

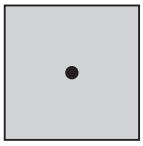


6. 1 line of symmetry

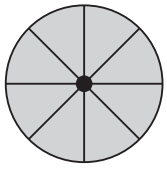


Lesson 12.7 (pp. 501–504)

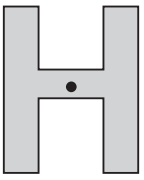
Identify the rotational symmetry as a fraction of a turn and the angle measure of the smallest turn.

1. 

_____

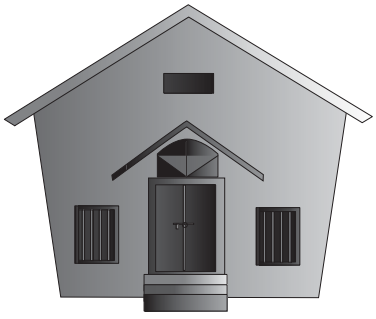
2. 

_____

3. 

_____

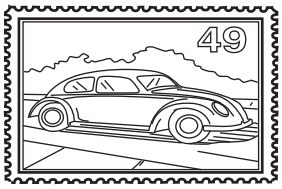
Tell whether the shape appears to have *line symmetry, rotational symmetry, both,* or *neither*.

4. 

_____

5. 

_____

6. 

_____

Lesson 12.8 (pp. 505–508)

1. Chris is making a necklace using shaped beads. Her pattern is a rectangle, a square, and a triangle. What is the 9^{th} shape in the pattern?

2. Sam draws a pattern with triangles. The first row has 3 triangles. The second row has 6 triangles. The third row has 9 triangles. What is the number of triangles in the 7 row?

3. Jack is painting a border of shapes on his wall. His pattern is 2 circles, 3 triangles, and 1 star. What is the 25^{th} shape in the pattern?

4. Natalie makes a number game. She adds 2 to a number, multiplies the sum by 5, and divides the product by 6. The final number is 5. What number does Natalie begin with?

Lesson 12.9 (pp. 511–514)

Describe a pattern. Draw the next three figures in your pattern.

1. 

Describe a pattern. Then draw the missing figure in your pattern.

2. 

3.