Chapter 11

School-Home Letter

Dear Family,

During the next few weeks, our math class will be learning about angles and angle measures. Students will learn how to classify and name different angles based on their measures. We will also learn how to draw two-dimensional shapes that have these angles.

You can expect to see homework that provides practice with identifying and classifying angle measures and turns.

Here is a sample of how your child will be taught to classify angles based on benchmark angle measures.

Vocabulary

angle A shape that is formed by two line segments or rays that meet at the same endpoint

vertex A shared endpoint of two sides of an angle

degree A unit used for measuring angles

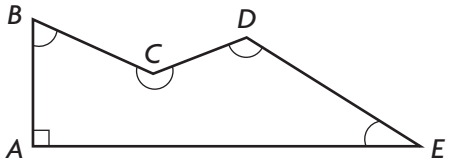
clockwise In the same direction in which the hands of a clock move

counterclockwise In the opposite direction in which the hands of a clock move

protractor A tool for measuring the size of an angle

MODEL Classifying Angles

This is how we will be classifying angles based on their measures.



$\angle A$ measures exactly 90°. It is a *right angle*.	$\angle B$ and $\angle E$ are both greater than 0° and less than 90°. They are *acute angles*.	$\angle C$ is greater than 180° and less than 360°. It is a *reflex angle*.	$\angle D$ is greater than 90° and less than 180°. It is an *obtuse angle*.

Tips

When a protractor is not available, a sheet of paper can always be used to help classify angle measures. Since the corner of the paper makes a 90° angle, other angles can be compared to it to determine if they are greater than or less than 90°.

Straight Angles

All lines are classified as straight angles since any point on the line can be considered a vertex with two rays extending from it in opposite directions. A straight angle, and therefore any line, has a measure of 180°.

Capítulo 11

Carta para la casa

Querida familia,

Durante las próximas semanas, en la clase de matemáticas estudiaremos acerca de los ángulos y medidas de ángulos. Aprenderemos a clasificar y denominar diferentes ángulos de acuerdo con sus medidas, ya trazar figuras bidimensionales que tengan estos ángulos.

Llevaré a la casa tareas con actividades para identificar y clasificar medidas de ángulos y giros.

Este es un ejemplo de la manera como aprenderemos a clasificar ángulos basándonos en los puntos de referencia para las medidas de los ángulos.

Vocabulario

ángulo Una figura formada por dos segmentos o rayos que se unen en un extremo

vértice El punto donde se unen dos lados de un ángulo

grado La unidad que se usa para medir ángulos

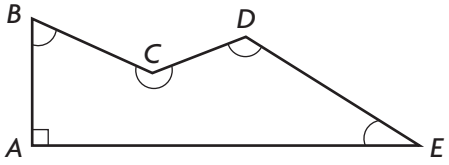
en el sentido de las manecillas del reloj En la misma dirección en la que se mueven las manecillas del reloj

en el sentido contrario al de las manecillas del reloj En la dirección opuesta a la que se mueven las manecillas del reloj

transportador Un instrumento que se usa para medir ángulos

MODELO Clasificar ángulos

Así es como clasificaremos ángulos según sus medidas.



$\angle A$ mide exactamente 90°. Es un *ángulo recto*.	$\angle B$ y $\angle E$ son mayores que 0° y menores que 90°. Son *ángulos agudos*.	$\angle C$ es mayor que 180° y menor que 360°. Es un *ángulo reflexivo*.	$\angle D$ es mayor que 90° y menor que 180°. Es un *ángulo obtuso*.

Pistas

Si no hay un transportador disponible, una hoja de papel puede ayudar a clasificar medidas de ángulos. Ya que la esquina del papel forma un ángulo de 90°, se puede comparar con otros ángulos para determinar si son mayores o menores que 90°.

Ángulos llanos

Todas las líneas se clasifican como ángulos llanos ya que cualquier punto en la línea puede ser considerado un vértice con dos rayos que se desprenden de él en direcciones opuestas. Un ángulo llano, y por lo tanto cualquier línea, mide 180°.

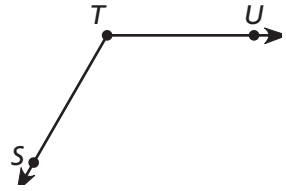
Name _____

Right Angles

MA.4.G.5.1 Classify angles of two-dimensional shapes using benchmark angles (i.e. 45°, 90°, 180°, and 360°).

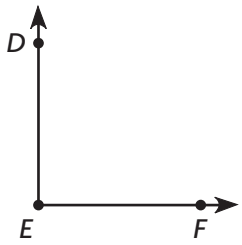
Classify each angle as *greater than 90°*, *90°*, or *less than 90°*.

1.



greater than 90°

2.



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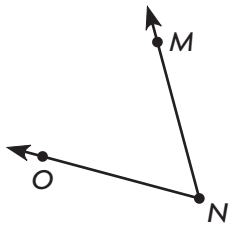

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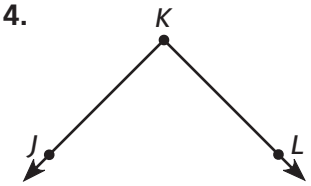
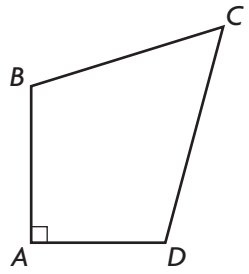


Classify and write the numbers and names of angles *greater than 90°*, *90°*, or *less than 90°*.

5.



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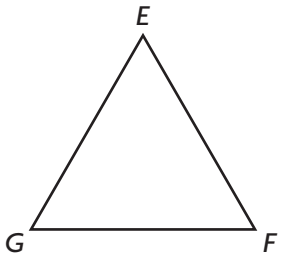
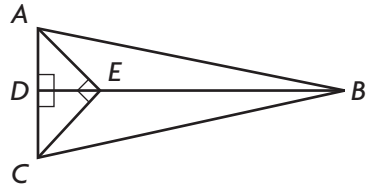


Problem Solving REAL WORLD

Use the paper airplane to answer Exercises 7 and 8.



7. Which angles in the triangles have a measure greater than a right angle?

8. Which triangles have a right angle?

TEST PREP

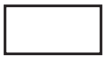
Lesson Check (MA.4.G.5.1)

1. Which of the following shapes has an angle less than a right angle?

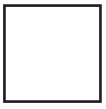
Ⓐ 

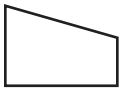
Ⓒ 

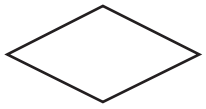
Ⓑ 

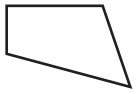
Ⓓ 

2. Trey drew a quadrilateral with exactly one right angle. Which of the following could be Trey's shape?

Ⓕ 

Ⓗ 

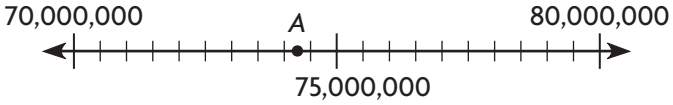
Ⓖ 

Ⓘ 

Review Grade 4 (MA.4.A.6.1)

SPIRAL REVIEW

3. Which number does the point *A* appear to represent on the number line below?



Ⓐ 74,000,025

Ⓑ 74,250,000

Ⓒ 74,600,000

Ⓓ 78,500,000

4. In a 2006–2007 12-month period, over 19,500,000 people visited state parks in Florida. Between which two numbers is 19,500,000 located?

Ⓕ 18,000,000 and 19,000,000

Ⓖ 18,400,000 and 19,400,000

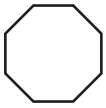
Ⓗ 19,400,000 and 19,600,000

Ⓘ 19,600,000 and 20,000,000

Look Back (MA.3.G.3.1)

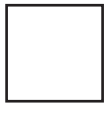
SPIRAL REVIEW

5. Which of the following polygons is a pentagon?

Ⓐ 

Ⓒ 

Ⓑ 

Ⓓ 

6. Jase draws a quadrilateral with one pair of parallel sides. Which of the following could be the quadrilateral that Jase drew?

Ⓕ trapezoid

Ⓖ square

Ⓗ rectangle

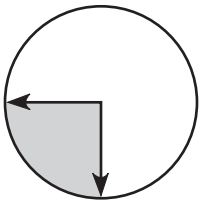
Ⓘ parallelogram

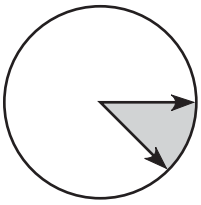
Name _____

Explore Benchmark Angles

MA.4.G.5.1 Classify angles of two-dimensional shapes using benchmark angles (i.e. 45°, 90°, 180°, and 360°).

Tell whether the shaded angle on the circle shows a 45°, 90°, 180°, 270°, or 360° angle.

1. 
90°

2. 
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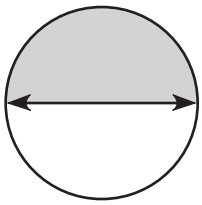
3. 
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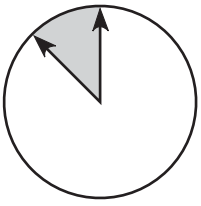
4. 
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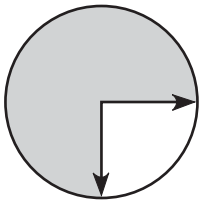
5. 
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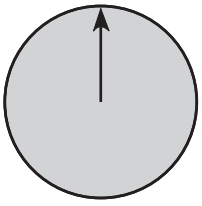
6. 
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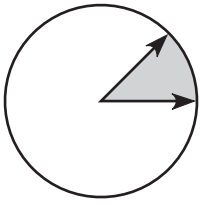
7. 
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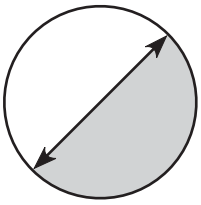
8. 
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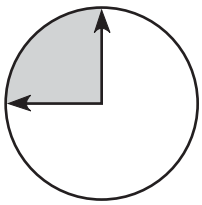
9. 
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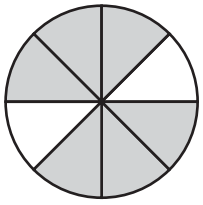
Problem Solving REAL WORLD

10. Shannon and Zane each ate an equal-sized slice of pie. The angle of the slices of pie they ate when put together equals 180°. What is the measure of the angle of each slice of pie Shannon and Zane ate, and what fraction of the pie did they eat all together?

_____

11. Lizbeth painted a design on a flying disc like the model below.



What is the sum of the angle measures of the shaded parts of the disc?

_____

TEST PREP

Lesson Check (MA.4.G.5.1)

1. How many degrees are in an angle formed by $\frac{8}{8}$ of a circle?

   Ⓐ $100°$

   Ⓑ $180°$

   Ⓒ $360°$

   Ⓓ $800°$

2. A pizza is cut into equal-sized slices. Luis and Marta share five slices. When the slices they eat are put together, the angle formed is $225°$. What fraction of the pizza do Luis and Marta eat?

   Ⓕ $\frac{5}{5}$

   Ⓖ $\frac{5}{4}$

   Ⓗ $\frac{5}{8}$

   Ⓘ $\frac{5}{16}$

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

SPIRAL REVIEW

3. Which of the following is the fact family for the numbers 4, 9, and 36?

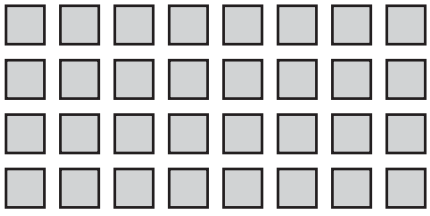
   Ⓐ $4 + 36 = 40$, $36 + 4 = 40$, $36 - 4 = 32$, $40 - 4 = 36$

   Ⓑ $4 \times 9 = 36$, $9 \times 3 = 27$, $36 \div 4 = 9$, $36 \div 9 = 4$

   Ⓒ $4 \times 9 = 36$, $9 \times 4 = 36$, $36 \div 9 = 4$, $36 \div 4 = 9$

   Ⓓ $9 + 4 = 13$, $4 + 9 = 13$, $13 - 9 = 4$, $13 - 4 = 9$

4. Cade made the following array to find the product of 4×8.



   He used the array to find the quotient of $32 \div 8$. What is the quotient?

   Ⓕ 4

   Ⓖ 8

   Ⓗ 9

   Ⓘ 32

Look Back (MA.3.G.3.1, MA.4.G.5.1)

SPIRAL REVIEW

5. Which of the following is a possible measure in degrees for an obtuse angle?

   Ⓐ $20°$

   Ⓑ $90°$

   Ⓒ $120°$

   Ⓓ $190°$

6. Makenna draws a triangle and then finds the measure of each angle. If each angle has the same measure, what type of triangle is it?

   Ⓕ acute

   Ⓖ obtuse

   Ⓗ right

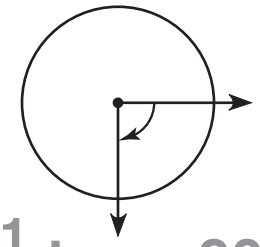
   Ⓘ scalene

Name _____

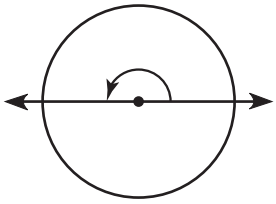
Angles and Turns

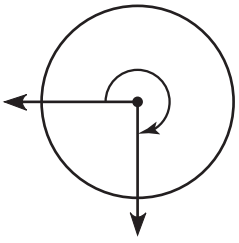
MA.4.G.5.1 Classify angles of two-dimensional shapes using benchmark angles (i.e. 45°, 90°, 180°, and 360°).

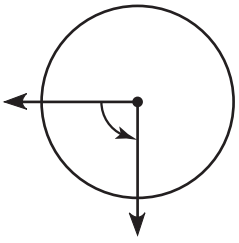
Tell whether the angle on the circle shows a $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, or full turn. Then identify the number of degrees one ray of the angle has been turned clockwise or counterclockwise.

1. 

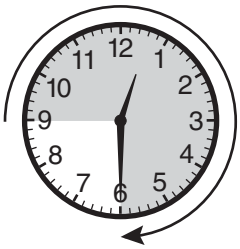
$\frac{1}{4}$ turn; 90° clockwise

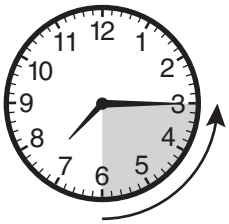
2. 

3. 

4. 

Tell whether the minute hand has been turned 90°, 180°, 270°, or 360° clockwise or counterclockwise.

5. 

6. 

7. 

8. 

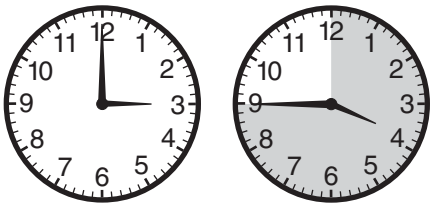
Problem Solving REAL WORLD

9. Vivian turns her door handle $90°$ to open her door. What type of turn does the handle make— $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, or full ?

10. A conductor bows to the audience and makes a $\frac{1}{2}$ turn to face the orchestra. How many degrees did he turn?

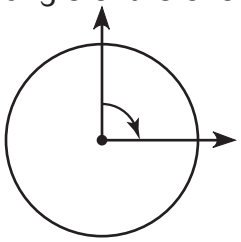
Lesson Check (MA.4.G.5.1)

1. Johnny practices playing the guitar from 3:00 P.M. to 3:45 P.M. How many degrees did the minute hand turn?



Ⓐ 45°
Ⓒ 180°
Ⓑ 90°
Ⓓ 270°

2. How many degrees has one ray of the angle of the circle turned?



Ⓕ 90° clockwise
Ⓖ 90° counterclockwise
Ⓗ 270° clockwise
Ⓘ 270° counterclockwise

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

SPIRAL REVIEW

3. Which of the following represents the Identity Property of Multiplication?

Ⓐ $7 \times 0 = 0$
Ⓒ $7 \times 7 = 49$
Ⓑ $7 \times 1 = 7$
Ⓓ $7 \times 10 = 70$

4. Phillip has 2 grocery bags. In each bag are 4 cartons of eggs. Each carton holds 6 eggs. Which of the following is equal to the number of eggs Phillip has in all?

Ⓕ 12
Ⓗ 36
Ⓖ 24
Ⓘ 48

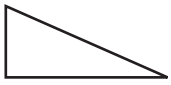
Look Back (MA.3.G.3.3)

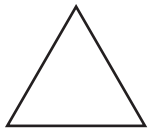
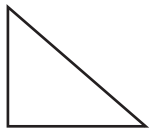
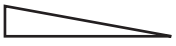
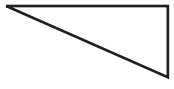
SPIRAL REVIEW

5. How many lines of symmetry does this rectangle have?

Ⓐ 0
Ⓒ 3
Ⓑ 2
Ⓓ 4

6. Which shape appears to be congruent to the shape below?



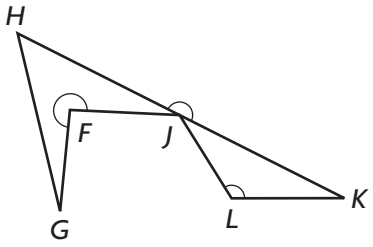
Ⓕ 
Ⓗ 
Ⓖ 
Ⓘ 

Name _____

Classify Angles Using Benchmark Angles

MA.4.G.5.1 Classify angles of two-dimensional shapes using benchmark angles (i.e. 45°, 90°, 180°, and 360°).

Use the diagram for 1–3. Classify each angle. Write *right, acute, straight, obtuse,* or *reflex*.

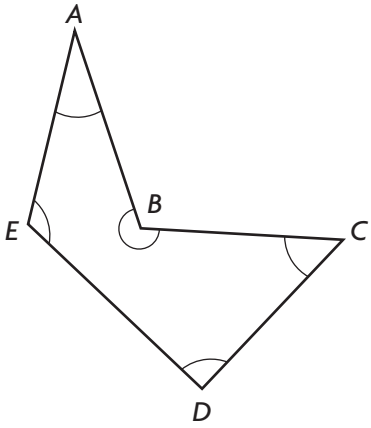


1. ∠*HJK* straight

2. ∠*GFJ* _____

3. ∠*JLK* _____

Use the diagram for 4–7. Name an example of each.



4. an obtuse angle

_____

5. an acute angle

_____

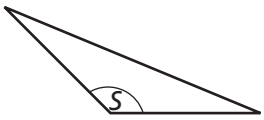
6. a right angle

_____

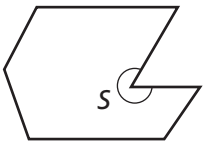
7. a reflex angle

_____

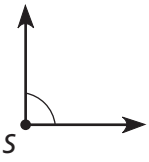
Underline the phrase that best describes angle *S*.

8. 

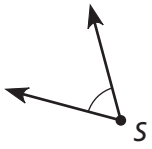
less than 90°
greater than 90°

9. 

greater than 180°
less than 90°

10. 

exactly 90°
exactly 180°

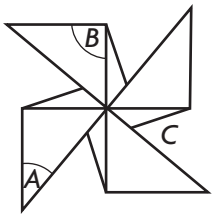
11. 

greater than 90°
less than 180°

Problem Solving REAL WORLD

Use the diagram of the pinwheel for 12–13.

Gerardo uses the diagram below to make a pinwheel.



12. Classify angle *A*.

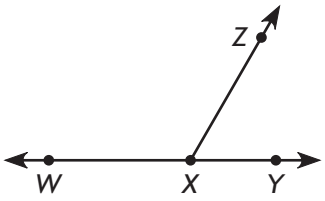
_____

13. Classify angle *B*.

_____

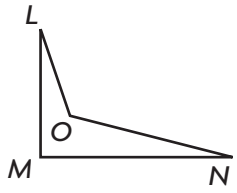
Lesson Check (MA.4.G.5.1)

1. Which is the closest to the measure of angle *WXY* in the diagram below?



Ⓐ 45°
Ⓒ 180°
Ⓑ 90°
Ⓓ 360°

2. Which angle inside the shape below is a reflex angle?



Ⓕ ∠*LMN*
Ⓗ ∠*MNO*
Ⓖ ∠*NOL*
Ⓘ ∠*OLM*

Review Grade 4 (MA.4.A.6.4)

SPIRAL REVIEW

3. Which of the following are all the factors of 18?

Ⓐ 2, 9
Ⓑ 2, 3, 6, 9
Ⓒ 1, 2, 3, 6, 9, 18
Ⓓ 18, 36, 72

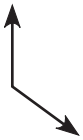
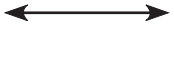
4. Brian divides 42 baseball cards evenly among his friends. Which of the following could be the number of stickers each friend receives?

Ⓕ 4
Ⓖ 7
Ⓗ 12
Ⓘ 24

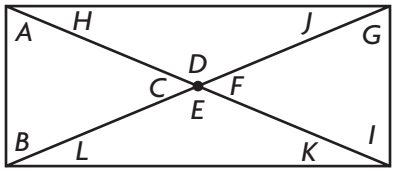
Look Back (MA.3.G.3.1, MA.4.G.5.1)

SPIRAL REVIEW

5. Which of the following shows an acute angle?

Ⓐ 
Ⓒ 
Ⓑ 
Ⓓ 

6. Which angle inside the shape is an obtuse angle?



Ⓕ ∠*ABC*
Ⓗ ∠*HDJ*
Ⓖ ∠*LEA*
Ⓘ ∠*DJH*

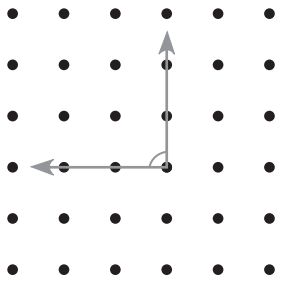
Name _____

Draw Angles in Two-Dimensional Shapes

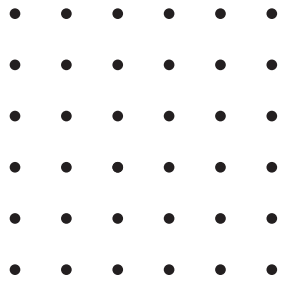
MA.4.G.5.1 Classify angles of two-dimensional shapes using benchmark angles (i.e. 45°, 90°, 180°, and 360°).

Use a straightedge to draw each angle.

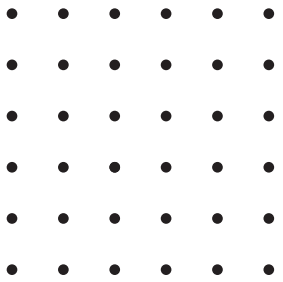
1. 90°



2. 45°

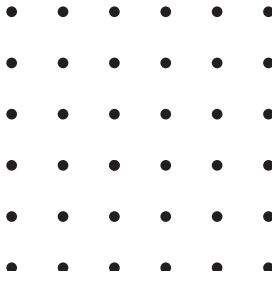


3. 180°

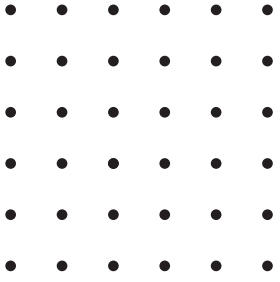


Use a straightedge to draw each shape.

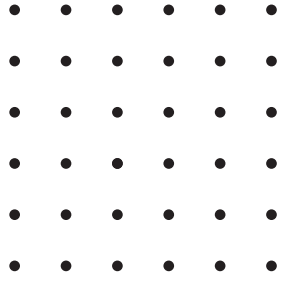
4. a right triangle



5. a quadrilateral with 1 right angle, 1 obtuse angle, and 2 acute angles



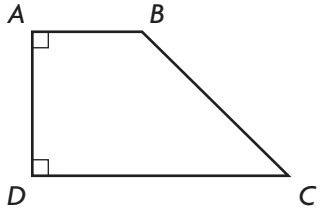
6. a hexagaon with a reflex angle



Problem Solving REAL WORLD

Use the shape below for 7.

Yao drew the trapezoid below. He wants to draw a line segment to connect two of the vertices.



7. What shapes can Yao make by drawing the line segment?

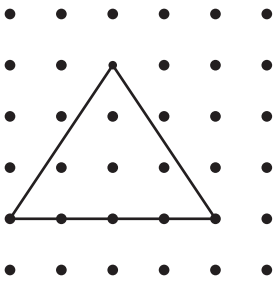
_____

_____

TEST PREP

Lesson Check (MA.4.G.5.1)

1. Hayley draws a shape on dot paper based on a set of clues.



Which could be one of the clues that Hayley follows to draw her shape?

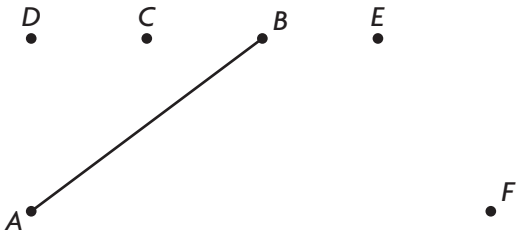
Ⓐ Draw a right angle.

Ⓑ Draw an obtuse angle.

Ⓒ Draw no two sides that are congruent.

Ⓓ Draw an acute angle.

2. Luke wants to make a right triangle. Which two pairs of points should he connect with line segments in the diagram below?



Ⓕ *B* and *C*, *C* and *A*

Ⓖ *B* and *D*, *D* and *A*

Ⓗ *B* and *E*, *E* and *A*

Ⓘ *B* and *F*, *F* and *A*

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

SPIRAL REVIEW

3. Six out of the 10 trees at the park by Skye's house are oak trees. What is the fraction of oak trees in the park, written as a decimal?

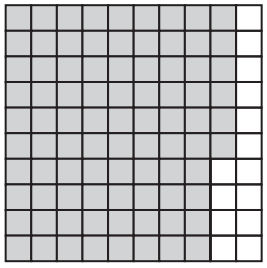
Ⓐ 60.0

Ⓑ 6.0

Ⓒ 0.6

Ⓓ 0.06

4. Which decimal amount is modeled below?



Ⓕ 860.0

Ⓖ 86.0

Ⓗ 8.6

Ⓘ 0.86

Look Back (MA.3.G.3.1)

SPIRAL REVIEW

5. Alicia drew a closed shape that has 6 angles. Which is the shape she drew?

Ⓐ square

Ⓑ pentagon

Ⓒ hexagon

Ⓓ octagon

6. Which is the only angle a parallelogram *cannot* have?

Ⓕ right

Ⓖ obtuse

Ⓗ acute

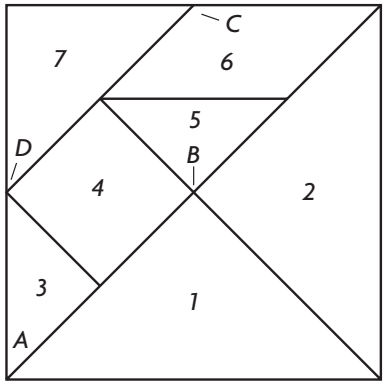
Ⓘ straight

Name _____

Act It Out • Angles

MA.4.G.5.1 Classify angles of two-dimensional shapes using benchmark angles (i.e. 45°, 90°, 180°, and 360°).

Use the tangram puzzle to answer 1–6.



1. What is the measure of angle *A* in shape 3?

Think: I can fold a sheet of paper to make a 90° angle and use the edge of the paper to compare the length of sides.

45°

2. What is the measure of angle *B* in shape 5?

3. What is the measure of angle *C* in shape 6?

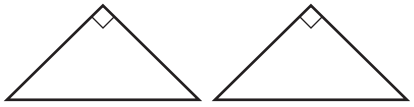
4. What is the sum of the angle measures in shape 4?

5. What is the sum of the six angle measures in shapes 1 and 2?

6. Which labeled angle is congruent to angle *D*?

Lesson Check (MA.4.G.5.1)

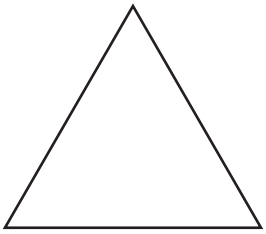
1. The two right triangles below can be put together to form a square.



What is the measure of each acute angle of the triangles?

Ⓐ 45°
Ⓒ 90°
Ⓑ 60°
Ⓓ 180°

2. A triangle has 3 congruent angles.



What is the measure of each angle?

Ⓕ 30°
Ⓗ 60°
Ⓖ 45°
Ⓘ 180°

Review Grade 4 (MA.4.G.3.2)

SPIRAL REVIEW

3. Lindsay needs to find the area of her garden to know how much fertilizer to buy. Her garden is rectangular and has a width of 6 feet and a length of 8 feet. What is the area of Lindsay's garden?

Ⓐ 14 sq feet
Ⓒ 42 sq feet
Ⓑ 28 sq feet
Ⓓ 48 sq feet

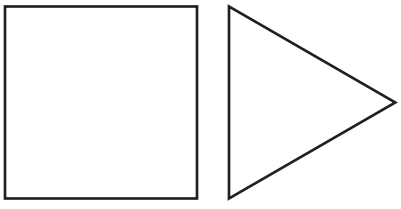
4. Mr. Nichols is taping off the gym floor for a game. Each square section is 1 meter by 1 meter. If the gymnasium is 18 meters long by 12 meters wide, how many square sections will Mr. Nichols make on the floor?

Ⓕ 1,440
Ⓗ 60
Ⓖ 216
Ⓘ 30

Look Back (MA.3.G.3.2, MA.4.G.5.1)

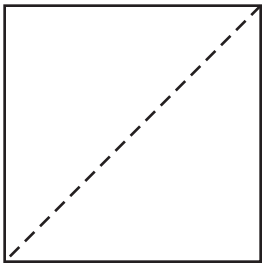
SPIRAL REVIEW

5. Which of the following will the shapes below make?



Ⓐ parallelogram
Ⓒ pentagon
Ⓑ rectangle
Ⓓ hexagon

6. What new shapes do you see in the square?



Ⓕ 2 scalene triangles
Ⓖ 2 obtuse triangles
Ⓗ 2 acute triangles
Ⓘ 2 right triangles

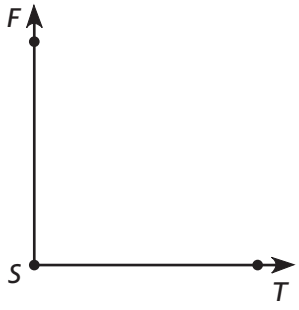
Name _____

Chapter 11 Extra Practice

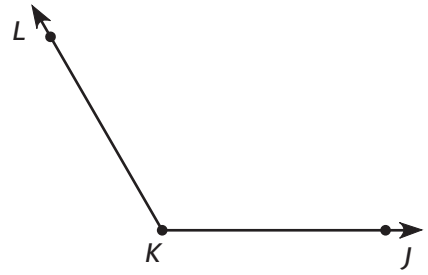
Lesson 11.1 (pp. 445–448)

Classify each angle as *greater than 90°*, *90°*, or *less than 90°*.

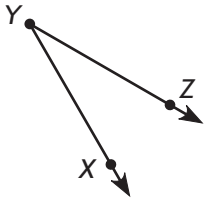
1.



2.



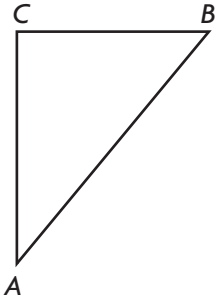
3.



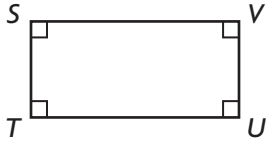
_____ _____ _____

Classify and write the number and names of angles *greater than 90°*, *90°*, or *less than 90°*.

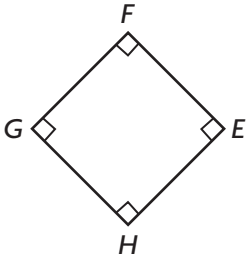
4.



5.



6.



_____ _____ _____

_____ _____ _____

_____ _____ _____

7. Carol made a drawing of a triangle. Two of the angles each measure 45°. What would the third angle measure—greater than 90°, 90°, or less than 90°?

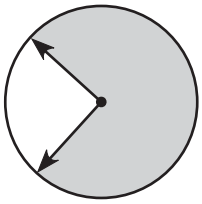
_____

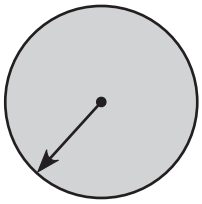
8. Frank's drawing of a triangle shows one angle that measures 110°. What would the other 2 angles measure—greater than 90°, 90°, or less than 90°?

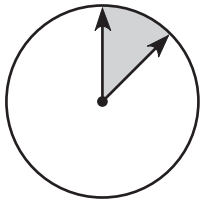
_____

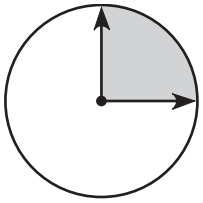
Lesson 11.2 (pp. 449–452)

Tell whether the shaded angle on the circle shows a 45°, 90°, 180°, 270°, or 360° angle.

1. 

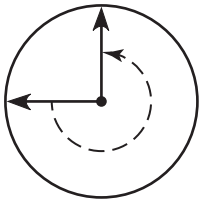
2. 

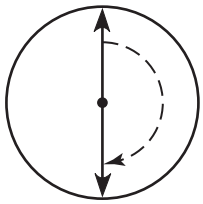
3. 

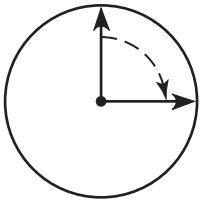
4. 

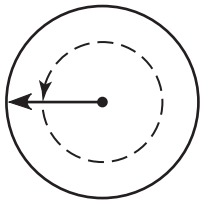
Lesson 11.3 (pp. 453–456)

Tell whether the angle on the circle shows a $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, or full turn. Then identify the number of degrees one ray of the angle has been turned clockwise or counterclockwise.

1. 

2. 

3. 

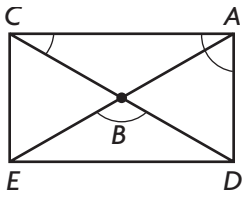
4. 

5. Brenda exercised from 3:00 P.M. to 3:45 P.M. How many degrees did the minute hand turn?

6. As Josh faced the mailbox the flag was pointing left. He then turned the flag straight up. In which direction has the flag been turned? How many degrees has it turned?

Lesson 11.4 (pp. 459–462)

Use the diagram for 1–3. Classify each angle. Write *right*, *acute*, *straight*, *obtuse*, or *reflex*.



1. $\angle EBD$

_____

2. $\angle DAC$

_____

3. $\angle ACB$

_____

Use the diagram for 4–6. Name an example of each.

4. a acute angle

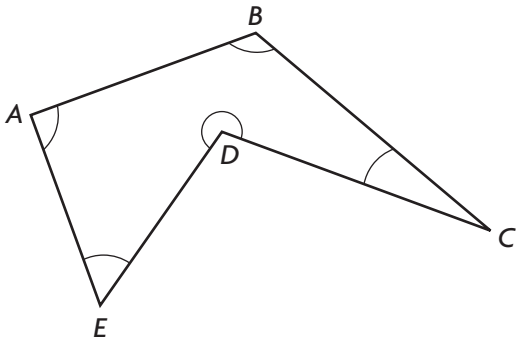
_____

5. an obtuse angle

_____

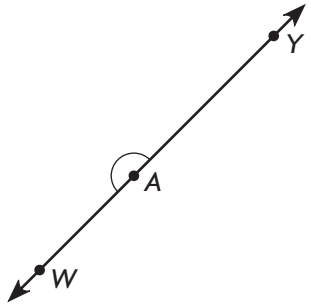
6. a right angle

_____



Underline the phrase that best describes angle *A*.

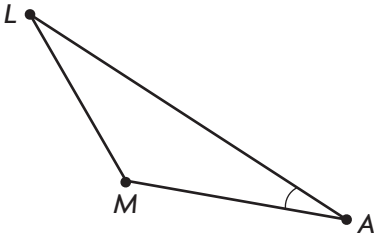
7.



less than 180°

exactly 180°

8.



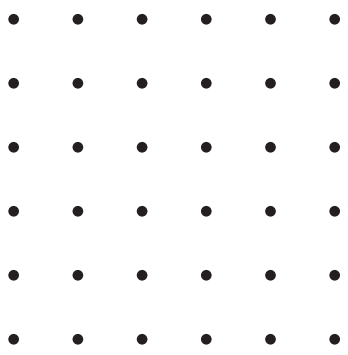
less than 90°

greater than 90°

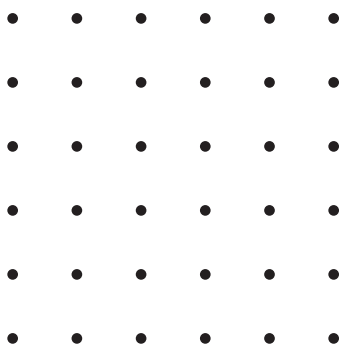
Lesson 11.5 (pp. 463–466)

Use a straightedge to draw each shape.

1. a quadrilateral with one acute angle and one obtuse angle

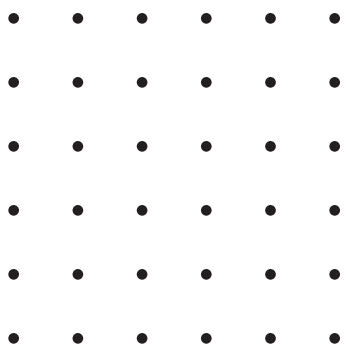


2. an acute triangle

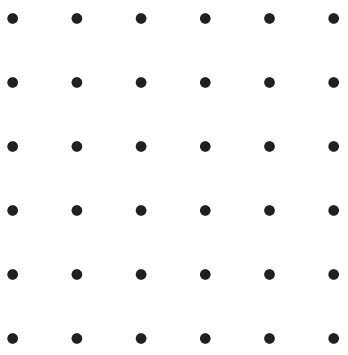


Use a straightedge to draw each angle.

3. an angle whose measure is $45°$



4. an angle whose measure is between $90°$ and $180°$



Lesson 11.6 (pp. 467–470)

1. Lisa has 2 shirts, 3 pairs of shorts, and 2 sweaters. How many outfits can she make? Make a drawing to show the number of outfits.

2. Tim is arranging 20 swimming ribbons on his wall. He wants to put the ribbons in equal rows. In what ways can he arrange the ribbons? Make a drawing to show each way.

3. Ella uses a straightedge to draw a shape. Opposite sides are equal. All 4 sides have a right angle. Which shape did she draw? Make a drawing of the shape.

4. Kyle has 120 photos from his vacation. His album can hold 4 photos on a page. How many pages will he use?