Name .....

Polygons

Lesson 1

ESSENTIAL QUESTION
How does geometry help me solve problems in everyday life?

A **polygon** is a closed figure made up of line segments that do not cross each other.

Polygons

Not Polygons

Math in My World

Tutor

Example 1

The building shown is the Pentagon in Washington, D.C. Describe the sides of the figure formed by the red outline. Does the red outline form a polygon?

Describe my sides!

The figure has _____ sides.

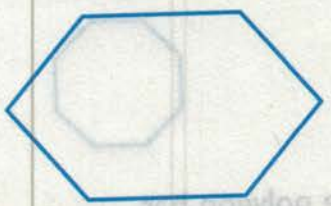
Do the sides ever cross each other? _____

The figure is a polygon.

A **regular polygon** is a polygon with congruent sides and congruent angles. **Congruent sides** are equal in length. **Congruent angles** have the same degree measure.

Example 2

Determine if the polygon appears to be *regular* or *not regular*.



The top and bottom sides appear _____ than the other sides.

Are all six sides of the polygon congruent? _____

It is _____ regular.

Polygons are a subcategory of two-dimensional figures. A *subcategory* is a subdivision that has common characteristics within a larger category.

Example 3

Watch

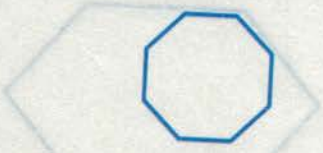
Complete the table below.

Polygon	Regular	Not Regular	Number of Sides	Draw another polygon that is not regular.
Triangle				
Quadrilateral				
Pentagon				
Hexagon				
Octagon				

Guided Practice

Check

1. Name the polygon. Determine if it appears to be *regular* or *not regular*.



The polygon has _____ sides.

The sides appear to be _____.

It is a _____.

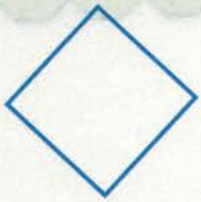
Talk MATH

Is a circle a polygon? Explain.

Name .....

Independent Practice

Mathematical PRACTICE 7 **Identify Structure** Name each polygon. Determine if it appears to be *regular* or *not regular*.

2. 

3. 

4. 

5. 

Draw each polygon.

6. triangle; not regular

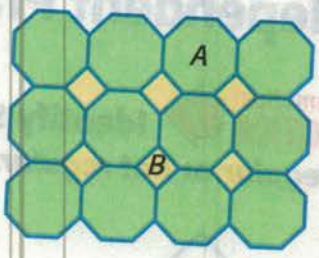
7. pentagon; not regular

8. quadrilateral; not regular

9. triangle; regular

Problem Solving

10. What polygons make up the design?



11. Describe polygon B as *regular* or *not regular.*

For Exercises 12 and 13, use the map shown at the right.

12. Circle the polygon that is a quadrilateral.

13. Describe polygon C as *regular* or *not regular.*

HOT Problems

14. Mathematical PRACTICE 1 **Make Sense of Problems** Explain why every square is a regular polygon.

15. **Building on the Essential Question** How can polygons be considered a subcategory of two-dimensional figures?

Name .....

Geometry
5.G.3, 5.G.4

CCSS

MY Homework

Lesson 1
Polygons

Homework Helper

eHelp

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Name the polygon used to form the greeting card shown. Does the red outline appear to be a regular polygon?

The polygon has four sides.

The top and bottom sides appear to be slightly longer than the other sides.

It is a quadrilateral.

It is not regular.

Practice

Name each polygon. Determine if it appears to be *regular* or *not regular*.

1. 

_____

2. 

_____

Vocabulary Check

Vocab

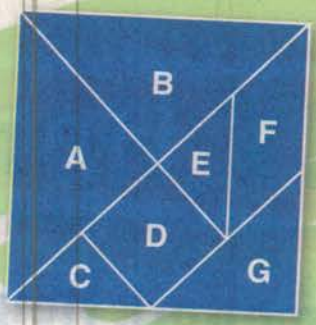
Fill in each blank with the correct word(s) to complete each sentence.

3. A polygon is a _____ figure made up of line segments that do not cross each other.

4. A regular polygon is a polygon with _____ sides and _____ angles.

Problem Solving

For Exercises 5–7, use the tangram pieces shown at the right.



5. Which of the polygon(s) appear to be regular?

6. What polygons are represented in the tangrams?

7. Congruent figures have the same size and shape. Which polygons appear to be congruent?

8. Name the polygon used to form the front of the tent shown. Determine if it appears to be *regular* or *not regular.*

9. Mathematical PRACTICE 1 **Make Sense of Problems**
Explain why the figure is not a polygon.

Test Practice

10. Which of the following figures is a polygon?

Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

Name _____

Geometry
5.G.3, 5.G.4

Hands On
Sides and Angles of Triangles

Lesson 2

ESSENTIAL QUESTION
How does geometry help me solve problems in everyday life?

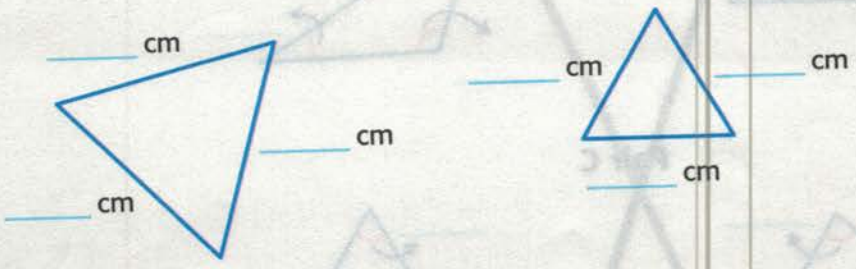
A triangle is a polygon with three sides and three angles.

Measure It

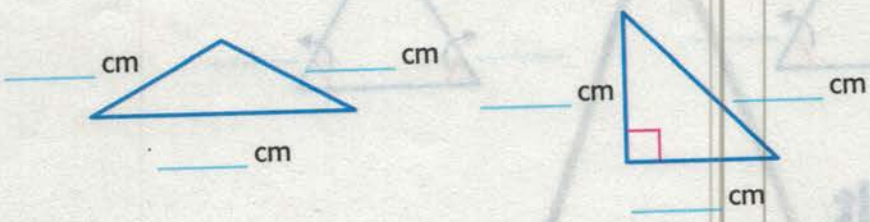
Tools

Measure the sides of each pair of triangles below to the nearest tenth of a centimeter. Then record the measures.

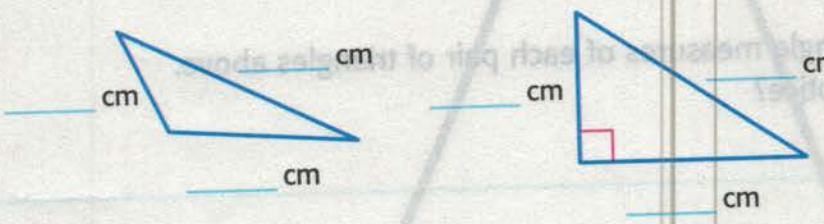
Pair A



Pair B



Pair C



Cut and use this centimeter ruler.

Talk About It

1. Compare the side lengths of each pair of triangles above. What do you notice?

_____

_____

Try It

Measure the angles of each pair of triangles below to the nearest degree. Then record the measures.

Pair A

Pair B

Pair C

Talk About It

2. Compare the angle measures of each pair of triangles above. What do you notice?

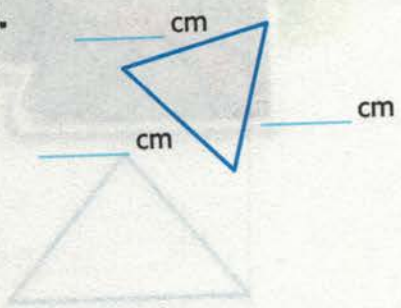
3. Mathematical PRACTICE 1 **Make Sense of Problems** Explain how a triangle is a special kind of polygon.

Name _____

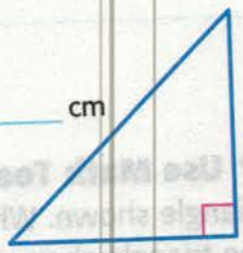
Practice It

Measure the sides of each triangle to the nearest tenth of a centimeter. Then describe the number of congruent sides.

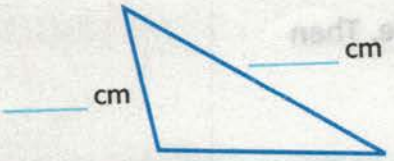
4.



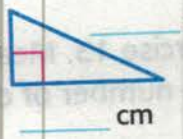
5.



6.



7.



Measure the angles of each triangle to the nearest degree. Then describe the number of acute, right, or obtuse angles.

8.

9.

10.

11.

Apply It

12. In music, the "triangle" is an instrument with three congruent sides. If you know that the perimeter of the triangle is 18 inches, what is the measure of one side?

13. Mathematical PRACTICE 5 **Use Math Tools** Measure the angles in the triangle shown. What type(s) of angles are in the triangle shown?

14. Refer to Exercise 13. Measure the sides of the triangle. Then describe the number of congruent sides.

15. Mathematical PRACTICE 3 **Which One Doesn't Belong?** Circle the triangle that does not belong with the other three. Explain your reasoning.

Write About It

16. How are all triangles the same and how can they be different?

Name .....

Classify Triangles

Lesson 3

ESSENTIAL QUESTION
How does geometry help me solve problems in everyday life?

You can classify triangles using one or more of the following attributes. An **attribute** is a characteristic of a figure like side measures and angle measures.

Math in My World

Watch Tutor

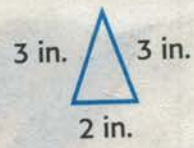
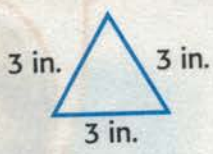
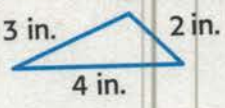
Example 1

The Hammond family traveled from Columbus, Ohio, to Dallas, Texas, and then to Atlanta, Georgia, before returning home. The distance of each flight is shown on the map. Find the number of congruent sides.

The lengths of the sides of the triangle are 924 miles, 573 miles, and _____ miles.

How many sides of the triangle are congruent? _____

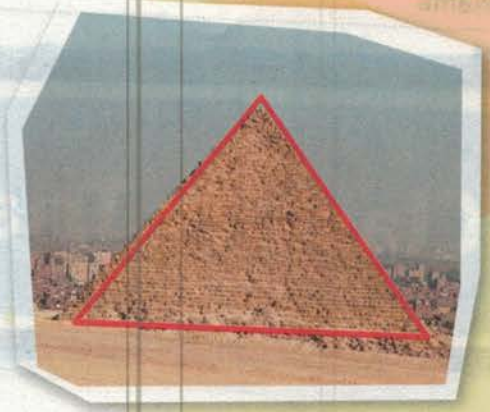
Key Concept Classify Triangles by Sides

Isosceles Triangle	Equilateral Triangle	Scalene Triangle
		
at least two sides congruent	all sides congruent	no sides congruent

So, the triangle formed on the map in Example 1 is a _____ triangle.

Example 2

Triangles form the sides of the Khafre Pyramid in Egypt. Determine the number of acute, obtuse, or right angles in the triangle.



How many angles of the triangle are acute? _____

How many angles of the triangle are obtuse? _____

How many angles of the triangle are right? _____

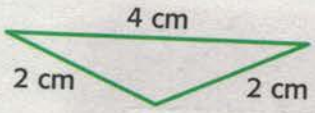
Key Concept Classify Triangles by Angles

Acute Triangle	Right Triangle	Obtuse Triangle
		
3 acute angles	1 right angle, 2 acute angles	1 obtuse angle, 2 acute angles

So, the triangle in Example 2 is a(n) _____.

Guided Practice

1. Classify the triangle based on its sides.



How many sides of the triangle are congruent?

_____

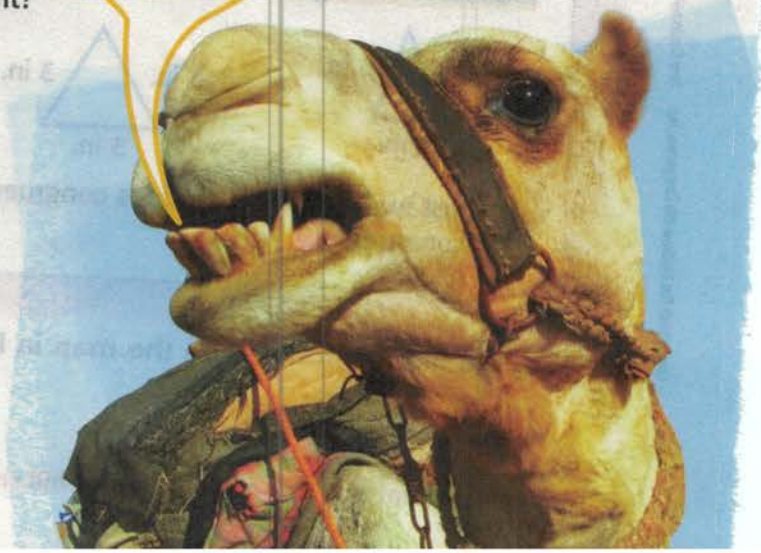
The triangle is a(n) _____.

2. Classify the triangle based on its angles.

The triangle is a(n) _____.

Talk MATH

Describe an isosceles right triangle.

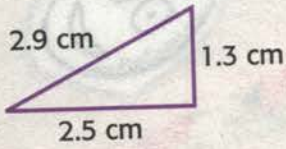


Name .....

Independent Practice

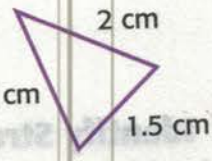
Determine the number of congruent sides for each triangle. Then classify the triangle based on its sides.

3.



_____

4.



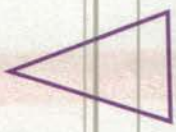
_____

Classify each triangle based on its angles.

5.

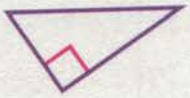
_____

6.



_____

7.



_____

8.

_____

Draw each triangle.

9. equilateral triangle

10. right triangle

Problem Solving

11. Half of a rectangular sandwich looks like a triangle. Classify it based on its angles.

12. Mathematical PRACTICE 7 **Identify Structure** Measure the sides of the sandwich. Classify the triangle based on its sides.

HOT Problems

13. Mathematical PRACTICE 3 **Draw a Conclusion** Emma, Gabriel, Jorge, and Makayla each drew a different triangle. Use the clues below to describe each person's triangle as isosceles, equilateral, or scalene and also as acute, right, or obtuse.

- Gabriel and Jorge each drew a 90° angle in their triangles.
- Gabriel's triangle does not have any congruent sides.
- One angle in Emma's triangle measures greater than 90°.
- Each side of Makayla's triangle and two sides of Emma's and Jorge's triangles are four centimeters long.

14. **Building on the Essential Question** How do I classify triangles using their attributes?

Name .....

Geometry
5.G.3, 5.G.4

MY Homework

Lesson 3
Classify Triangles

Homework Helper

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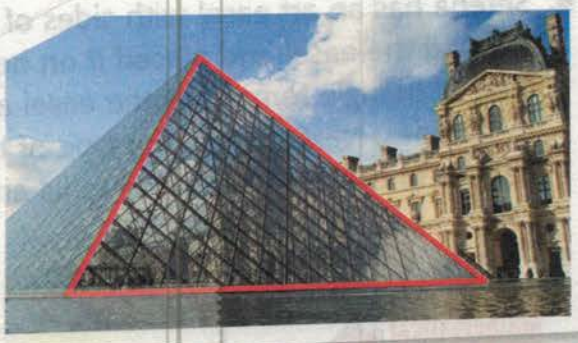
There is a large pyramid standing in front of the Louvre museum in Paris, France. The sides of the pyramid are shaped like triangles. Classify the red triangle based on its angles.

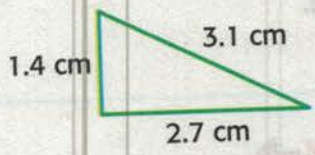


There are three acute angles.

So, the triangle formed by the side of the pyramid is an acute triangle.

Practice

1. Determine the number of congruent sides. Then classify the triangle based on its sides.



How many sides of the triangle are congruent?

_____

The triangle is a _____.

Vocabulary Check

Vocab

Fill in each blank with the correct term(s) or number(s) to complete each sentence.

2. An equilateral triangle is a triangle with _____ congruent sides.

3. An acute triangle is a triangle with _____ angles each less than _____.

4. An obtuse triangle is a triangle with one angle that is greater than _____.

Problem Solving

5. Look at the triangle on the top of the White House in the photo. Describe the sides and angles of the triangle.

6. Serena has an art easel with sides of equal length. She opened the easel and placed it on her desk. Classify the type of triangle formed by the easel and the desk according to its sides. Next, classify the type of triangle formed by the easel and the desk according to its angles.

Mathematical PRACTICE 7

7. **Identify Structure** The image shown at the right contains many triangles. Describe the different types of triangles found in the image.

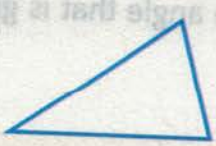
Mathematical PRACTICE 3

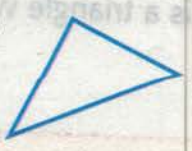
8. **Justify Conclusions** A triangle has two sides that are perpendicular. Could the triangle be isosceles, equilateral, or scalene? Explain.

Test Practice

9. Which of the following figures is an obtuse triangle?

Ⓐ 

Ⓑ 

Ⓒ 

Ⓓ 

Check My Progress

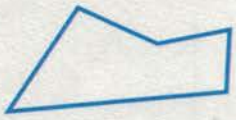
Vocabulary Check

State whether each sentence is *true* or *false*.

1. A triangle with no congruent sides is a **scalene triangle**. _____
2. A polygon that has 4 sides and 4 angles is a **pentagon**. _____
3. Sides or angles with the same measure are **congruent**. _____
4. A **right triangle** is a triangle with two right angles. _____

Concept Check

Name each polygon. Determine if it appears to be *regular* or *not regular*.

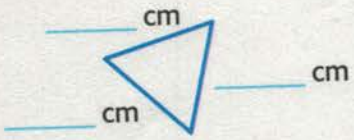
5. 

_____

6. 

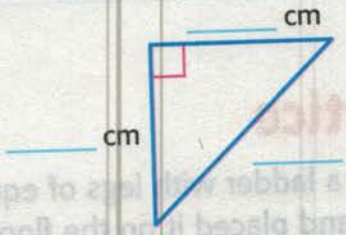
_____

Measure the sides of each triangle to the nearest tenth of a centimeter. Then describe the number of congruent sides.

7. 

_____

_____

8. 

_____

_____

Problem Solving

9. Name the polygon shown by the video game screen at the right. Determine if it appears to be *regular* or *not regular*.

_____

10. Steve has three lengths of fence. He connects them to make a triangular pen for his dog. If the lengths are 5 meters, 6 meters, and 10 meters, what type of triangle is formed by the dog pen?

_____

11. Name the polygon shown by the banner at the right. Determine if it appears to be *regular* or *not regular*.

_____

12. Refer to the art in Exercise 11. Classify the triangle based on its angles.

_____

13. Lindsay was going to visit her grandmother, shop at the mall, and then return home. The route she took was in the shape of a triangle. The distance between each place she visited was 10 miles. What type of triangle is formed by the route she traveled?

_____

Test Practice

14. Miguel has a ladder with legs of equal length. He opened the ladder and placed it on the floor. What type of triangle is formed by the ladder and the floor?

Ⓐ scalene triangle

Ⓑ isosceles triangle

Ⓒ equilateral triangle

Ⓓ obtuse triangle

Name .....

Geometry
5.G.3, 5.G.4

CCSS

Lesson 4

ESSENTIAL QUESTION
How does geometry help me solve problems in everyday life?

Hands On
Sides and Angles of Quadrilaterals

A quadrilateral is a polygon with four sides and four angles.

Measure It

Tools

Measure the sides and angles of each figure to determine if any are congruent. Then determine if any sides are parallel. Complete the table.

Figure 1

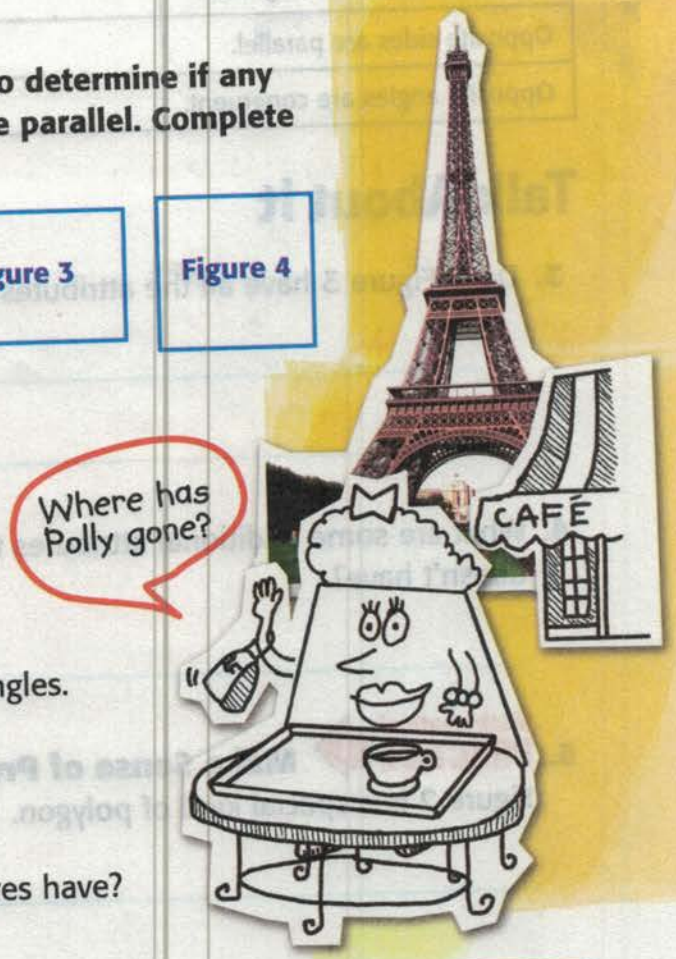
Figure 2

Figure 3

Figure 4

Attribute	Figure(s)
Opposite sides are congruent.	
Opposite sides are parallel.	
Opposite angles are congruent.	

Each figure has _____ sides and _____ angles.



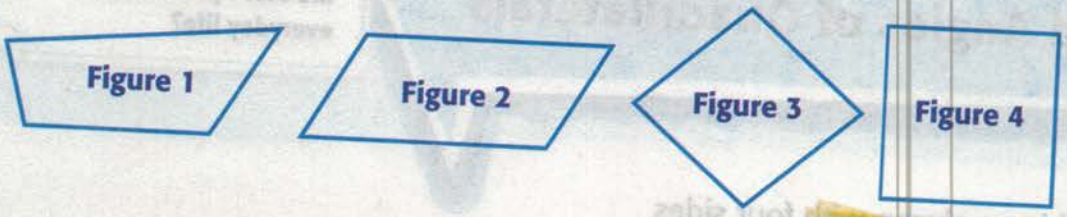
Talk About It

1. What common attributes do all of the figures have?

2. Does Figure 3 have all the attributes of Figure 2? Explain.

Try It

Measure the sides and angles of each figure to determine if any are congruent. Then determine if any sides are parallel. Complete the table.



Attribute	Figure(s)
Opposite sides are congruent.	
Opposite sides are parallel.	
Opposite angles are congruent.	

Talk About It

3. Does Figure 3 have all the attributes of Figure 2? Explain.

4. What are some additional attributes that Figure 4 has that Figure 3 doesn't have?

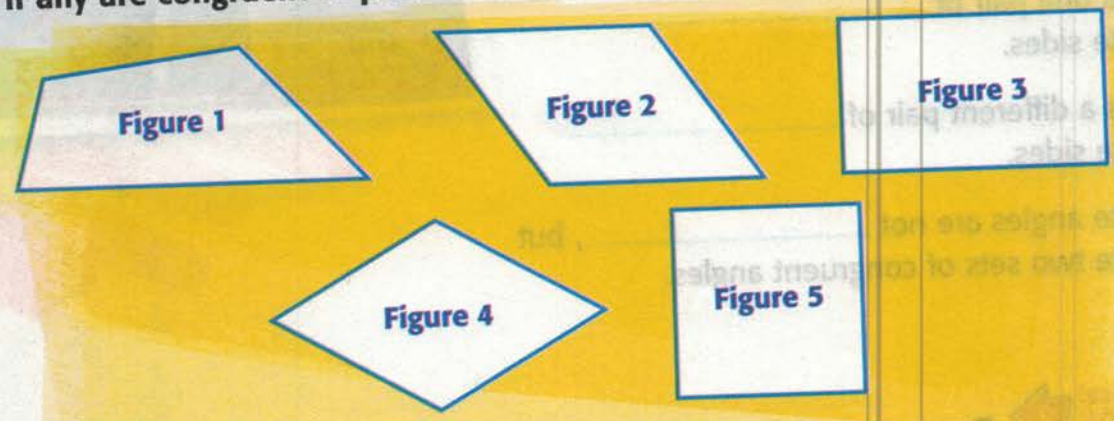
5. Mathematical PRACTICE 1 **Make Sense of Problems** Explain how Figure 2 is a special kind of polygon.

6. Which figure does not have any of the attributes listed in the table?

Name _____

Practice It

Measure the sides and angles of each figure to determine if any are congruent or parallel. Then answer Exercises 7–13.



7. Complete the attributes of Figure 1.

Opposite sides are _____ and _____.

Opposite angles are _____.

The figure has _____ sides and _____ angles.

8. Complete the attributes of Figure 2.

Opposite sides are _____ and _____.

Opposite angles are _____.

The figure has _____ sides and _____ angles.

9. Which figures have all the attributes of Figure 1? _____

10. Which figures have all the attributes of Figure 2? _____

11. Which figures have all the attributes of Figure 3? _____

12. Which figures have four right angles? _____

13. Which figures have four equal sides? _____

Apply It

14. Complete the attributes of the red quadrilateral outlining one side of the Chichen Itza pyramid in Mexico.

There is one pair of _____ opposite sides.

There is a different pair of _____ opposite sides.

Opposite angles are not _____, but there are two sets of congruent angles.

15. Mathematical PRACTICE 2 **Reason** Explain one way to determine if a quadrilateral has parallel sides.

16. Mathematical PRACTICE 3 **Which One Doesn't Belong?** Circle the quadrilateral that does not belong with the other three. Explain your reasoning.

Write About It

17. How are all quadrilaterals alike and how can they be different?

Name _____

MY Homework

Lesson 4
Hands On: Sides and Angles of Quadrilaterals

Homework Helper

eHelp

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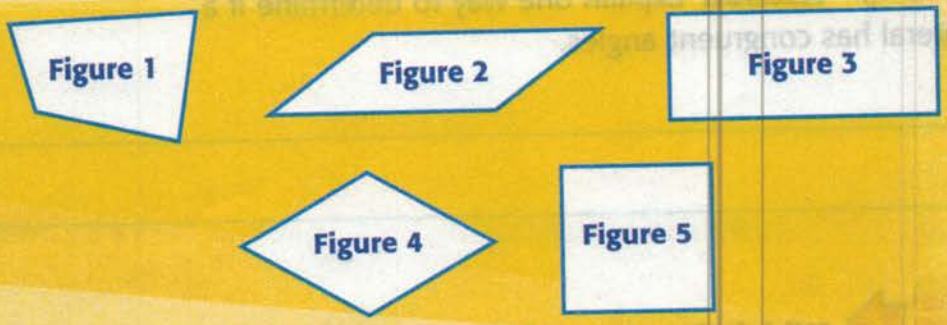
Measure the sides and angles of each figure to determine if any are congruent. Then determine if any sides are parallel. Complete the table.



Attribute	Figure(s)
Opposite sides are congruent.	2, 3, 4, 5
Opposite sides are parallel.	2, 3, 4, 5
Opposite angles are congruent.	2, 3, 4, 5

Each figure has 4 sides and 4 angles.

Practice

Refer to the figures above in the Homework Helper to solve Exercises 1–3.

1. Complete the attributes of Figure 2.

Opposite sides are _____ and _____.

Opposite angles are _____.

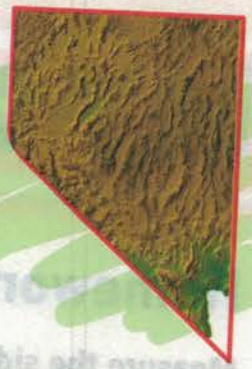
The figure has _____ sides and _____ angles.

2. Which figures have all the attributes of Figure 2? _____

3. Which figures have four right angles? _____

Problem Solving

4. The state of Nevada is in the shape of a quadrilateral. Complete the attributes of the outline of the state of Nevada.



There is one set of _____ opposite sides.

Opposite sides are not _____.

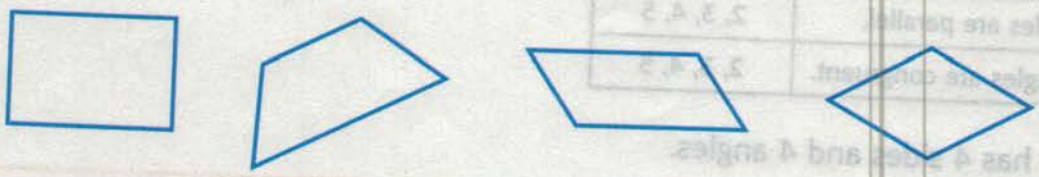
Opposite angles are not _____, but there are two right angles.

5. Mathematical PRACTICE 2 **Reason** Explain one way to determine if a quadrilateral has congruent angles.

_____

_____

6. Mathematical PRACTICE 3 **Which One Doesn't Belong?** Circle the quadrilateral that does not belong with the other three. Explain your reasoning.



_____

_____

Vocabulary Check

Fill in each blank with the correct term or number to complete the sentence.

7. A quadrilateral is a polygon with _____ sides and _____ angles.