Prerequisite: Describe the Properties of Shapes

Study the example showing how to describe the sides and angles in shapes. Then solve problems 1–6.

Example

Compare the triangles below. What is the same and different about the shapes?

Same
Both triangles have 3 sides.
Both triangles have 3 angles.

Different
Triangle A has 1 square corner and Triangle B has no square corners.
Triangle A has 0 sides the same length and Triangle B has 2 sides the same length.

1. Look at the shapes below. Read the descriptions in the table. Draw each shape in the column that describes it.

   All square corners and all sides the same length
   Square corners and some sides the same length
   No square corners and no sides the same length

2. Describe the sides and angles of the pentagon at the right.
Solve.

3. Describe how the two shapes shown are alike.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

For problems 4–6, use the shapes at the right.

4. Fill in the table. Write each shape in the column that describes the number of sides and angles it has.

<table>
<thead>
<tr>
<th>Fewer than 4 sides and 4 angles</th>
<th>4 sides and 4 angles</th>
<th>More than 4 sides and 4 angles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Fill in the table. Write each shape in the column that describes the length of its sides.

<table>
<thead>
<tr>
<th>All sides the same length</th>
<th>Some sides the same length</th>
<th>No sides the same length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. Fill in the table below. Write each shape in the column that describes whether it has square corners or has no square corners.

<table>
<thead>
<tr>
<th>Has a square corner</th>
<th>Has no square corners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Identify Points, Lines, Line Segments, and Rays

Study the example that shows a drawing with points, lines, line segments, and rays. Then solve problems 1–9.

**Example**

Amy made a drawing of a letter “A” in her math notebook. Use geometry words to describe the drawing.

There are 4 points on the drawing: point A, point B, point C, and point D.

There is a line segment from point B to point D.  \( \overline{BD} \)

There is a line through points A and C.  \( \overrightarrow{AC} \)

There is a ray from point B through point A.  \( \overrightarrow{BA} \)

**Use the drawing below to answer questions 1–4.**

1. How many lines are in the drawing? ______
2. How many rays are in the drawing? ______
3. Write the name of the line in the drawing.
   ____________________________
4. Write the names of the rays in the drawing.
   ____________________________

5. Look at the shape at the right. How many line segments are in the shape? ______
Solve.

6 Label each sign below. Write line, line segment, or ray.

7 Look at the drawing below. Choose Yes or No to tell whether each line, line segment, ray, or angle is shown in the drawing.

a. \( \overline{XY} \)  
   - Yes  
   - No

b. \( \overrightarrow{XZ} \)  
   - Yes  
   - No

c. \( \overrightarrow{WX} \)  
   - Yes  
   - No

d. \( \overrightarrow{YX} \)  
   - Yes  
   - No

e. \( \overline{ZY} \)  
   - Yes  
   - No

f. \( \angle XYZ \)  
   - Yes  
   - No

8 Use geometry words and symbols to describe the rhombus shown.

9 Read the description of a shape below. Then draw the shape at the right.

- It has 3 line segments, \( \overline{RS} \), \( \overline{ST} \), \( \overline{TR} \).
- Line segments \( \overline{RS} \) and \( \overline{TR} \) are the same length.
- It has 1 square corner, \( \angle R \).
Identify Angles

Study the example identifying angles in a shape. Then solve problems 1–10.

Example

Name and describe the angles in the shape below.

\( \angle A \) is a right angle. It has a shape like a square corner.
\( \angle B \) is also a right angle.
\( \angle C \) is an obtuse angle. It has a wider opening than a right angle.
\( \angle D \) is an acute angle. It has a smaller opening than a right angle.
The shape has 2 right angles, 1 acute angle, and 1 obtuse angle.

Use the shape at the right to answer questions 1–5.

1 How many right angles are in this shape? ______

2 How many acute angles are in this shape? ______

3 How many obtuse angles are in this shape? ______

4 Name the acute angles in the shape.

________________________________________________________________________

5 Name the obtuse angles in the shape.

________________________________________________________________________

6 Look at the shape at the right. Describe the number and kind of angles it has.

________________________________________________________________________
________________________________________________________________________

STOP
Solve.

Jasmine drew this pentagon. She says that all pentagons have 5 sides of equal length and 5 obtuse angles.

7. Draw a pentagon that is different from the one Jasmine drew. Describe the lines and angles of your pentagon.

8. In what way is Jasmine’s thinking correct?

9. In what way is Jasmine’s thinking incorrect?

10. Which of the following statements describes the shape at the right? Circle all that apply.

   A. The shape has acute angles.
   B. The shape has right angles.
   C. The shapes has obtuse angles.
   D. The shape has 6 angles.
Identify Parallel and Perpendicular Lines

Study the example identifying parallel and perpendicular lines and segments. Then solve problems 1−6.

**Example**

Colby drew parallel and perpendicular lines to place the bases and pitcher’s mound on a drawing of a baseball field.

\[ SF \] and \[ TH \] are parallel lines.
\[ ST \] and \[ FH \] are parallel lines.

The pitcher’s mound is one place where perpendicular lines cross. At what point do perpendicular lines cross at the pitcher’s mound?

They cross at point \( P \), where \[ TF \] crosses \[ SH \].

**For problems 1 and 2, use the shape below.**

1. How many pairs of parallel sides does the square appear to have? _____

2. Put Xs on the square where each pair of perpendicular line segments meet.

3. Look at the drawing of a window below. Circle 3 parallel line segments in the drawing.

**Vocabulary**

**parallel lines** two lines that are always the same distance apart and will never cross.

**perpendicular lines** two lines that cross at a 90° angle.
Solve.

4 Look at the line segments in the letters on the tiles to the right. Fill in the table with each letter to identify parallel lines. The first one is done for you.

<table>
<thead>
<tr>
<th>No parallel lines</th>
<th>1 pair of parallel lines</th>
<th>More than 1 pair of parallel lines</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5 Look at the line segments in the letters on the tiles again. Fill in the table to identify perpendicular lines.

<table>
<thead>
<tr>
<th>1 pair of perpendicular lines</th>
<th>2 pairs of perpendicular lines</th>
<th>3 pairs of perpendicular lines</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6 Choose True or False to tell if each statement correctly describes the streets shown on the map.

a. 1st and 3rd Street are perpendicular.  □ True  □ False
b. Main and High Street are parallel.  □ True  □ False
c. 2nd street is perpendicular to Main St.  □ True  □ False
d. 1st street is perpendicular to High St.  □ True  □ False
1. Which of the following describes the drawing below? Circle the letter for all that apply.

   \[ A \quad AB \parallel CD \]
   \[ B \quad AB \perp CD \]
   \[ C \quad BA \text{ is shown.} \]
   \[ D \quad CD \text{ is shown.} \]
   \[ E \quad AC \text{ is shown.} \]

2. Look at the heart shape below. How many angles does the heart shape have?

   \[ A \quad 0 \]
   \[ B \quad 1 \]
   \[ C \quad 2 \]
   \[ D \quad 3 \]

   Mina chose \( C \) as the correct answer. How did she get that answer?

   _________________________________________________________________________
   _________________________________________________________________________
   _________________________________________________________________________
   _________________________________________________________________________
   _________________________________________________________________________
3. Name and describe all the angles in the drawing below.

- Angle ABC
- Angle BCD
- Angle CDE
- Angle DEF

How is an acute angle different than a right angle? How is an obtuse angle different than a right angle?

4. Does the shape below have more pairs of parallel line segments or more pairs of perpendicular line segments? Explain.

- Put an X where the perpendicular lines meet.
- Name the parallel lines.