Name _____

Lines, Rays, and Angles

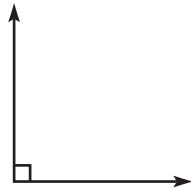| Name	What it looks like	Think
point *D*	*D* •	A **point** names a location in space.
line *AB*; $\overleftrightarrow{AB}$ line *BA*; $\overleftrightarrow{BA}$	•—————• *A* *B*	A **line** extends without end in opposite directions.
line segment *AB*; $\overline{AB}$ line segment *BA*; $\overline{BA}$	•—————• *A* *B*	"Segment" means part. A **line segment** is part of a line. It is named by its two endpoints.
ray *MN*; $\overrightarrow{MN}$ ray *NM*; $\overrightarrow{NM}$	•—————•—→ *M* *N* ←—•—————• *M* *N*	A **ray** has one endpoint and extends without end in one direction. A ray is named using two points. The endpoint is always named first.
angle *XYZ*; ∠*XYZ* angle *ZYX*; ∠*ZYX* angle *Y*; ∠*Y*	*X* *Y* *Z*	Two rays or line segments that share an endpoint form an angle. The shared point is the vertex of the angle.

A **right angle** forms a square corner.	An **acute angle** opens less than a right angle.	An **obtuse angle** opens more than a right angle and less than a straight angle.	A **straight angle** forms a line.

Draw and label an example of the figure.

1. $\overline{PQ}$

2. $\overrightarrow{KJ}$
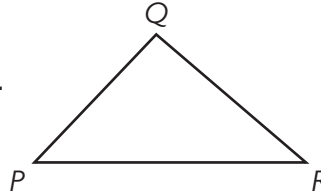
3. obtuse ∠*FGH*

Name _____

Classify Triangles by Angles

A **triangle** is a polygon with __3__ sides
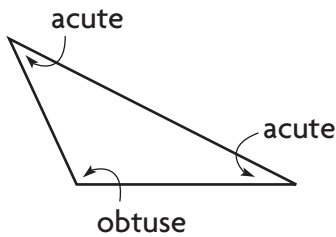and __3__ angles.
Each pair of sides joins at a vertex.

You can name a triangle by its vertices.

ΔPQR   ΔQRP   ΔRPQ
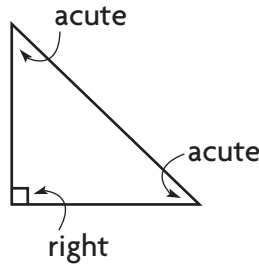ΔPRQ   ΔQPR   ΔRQP

There are __3__ types of triangles. All triangles have
at least __2__ acute angles.

Obtuse triangle
one obtuse angle

Right triangle
one right angle

Acute triangle
three acute angles

acute
acute
obtuse

acute
acute
right
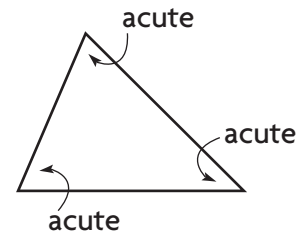
acute
acute
acute
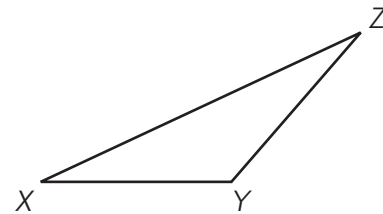
1. Name the triangle. Tell whether each angle is
   acute, *right*, or *obtuse*. A name for the triangle

   is _____.
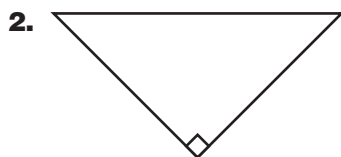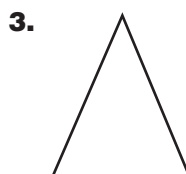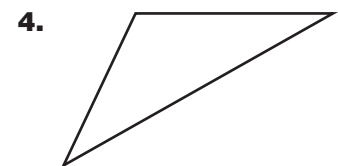
   ∠X is _____.
   ∠Y is _____.
   ∠Z is _____.

Classify each triangle. Write *acute*, *right*, or *obtuse*.
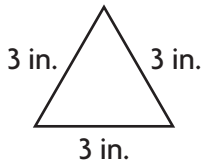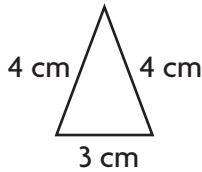
2. _____

3. _____

4. _____

Classify Triangles by Sides

One way to classify triangles is to compare the lengths of their sides.
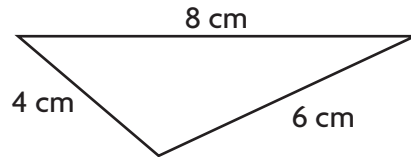
First, decide how many sides of the triangle are the same length. Then classify the triangle based on the number.

3 in. 3 in.
3 in.

4 cm 4 cm
3 cm

8 cm
4 cm 6 cm

equilateral triangle
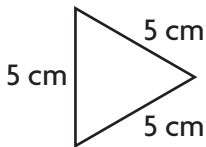3 sides
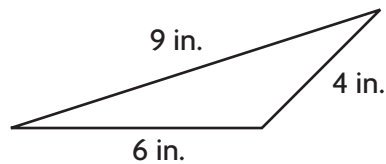have the same length

isosceles triangle
2 sides
have the same length

scalene triangle
no sides
have the same length

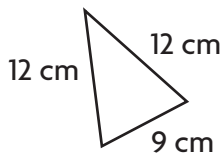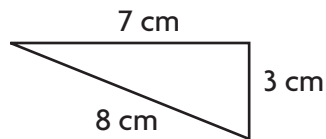**Name the triangle. Write *equilateral, isosceles,* or *scalene*.**

1.

5 cm
5 cm
5 cm

_____

2.

9 in.
4 in.
6 in.

_____

3.

12 cm
12 cm
9 cm
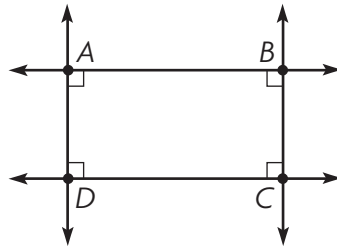
_____

4.

7 cm
3 cm
8 cm

_____

Parallel Lines and Perpendicular Lines

Parallel lines are lines in a plane that are always the same distance apart. Parallel lines or line segments never meet.

In the figure, lines *AB* and *CD*, even if extended, will never meet. The lines are parallel. Write $\overleftrightarrow{AB} \| \overleftrightarrow{CD}$.
Lines __AD__ and __BC__ are also parallel. So, $\overleftrightarrow{AD} \| \overleftrightarrow{BC}$.

Intersecting lines cross at exactly one point. Intersecting lines that form right angles are **perpendicular.**

In the figure, lines __AD__ and __AB__ are perpendicular because they form right angles at vertex *A*. Write $\overleftrightarrow{AD} \perp \overleftrightarrow{AB}$.

Lines __BC__ and __CD__ are also perpendicular. So, $\overleftrightarrow{BC} \perp \overleftrightarrow{CD}$.

Use the figure for 1–3.

1. Name two sides that appear to be parallel.

   _____

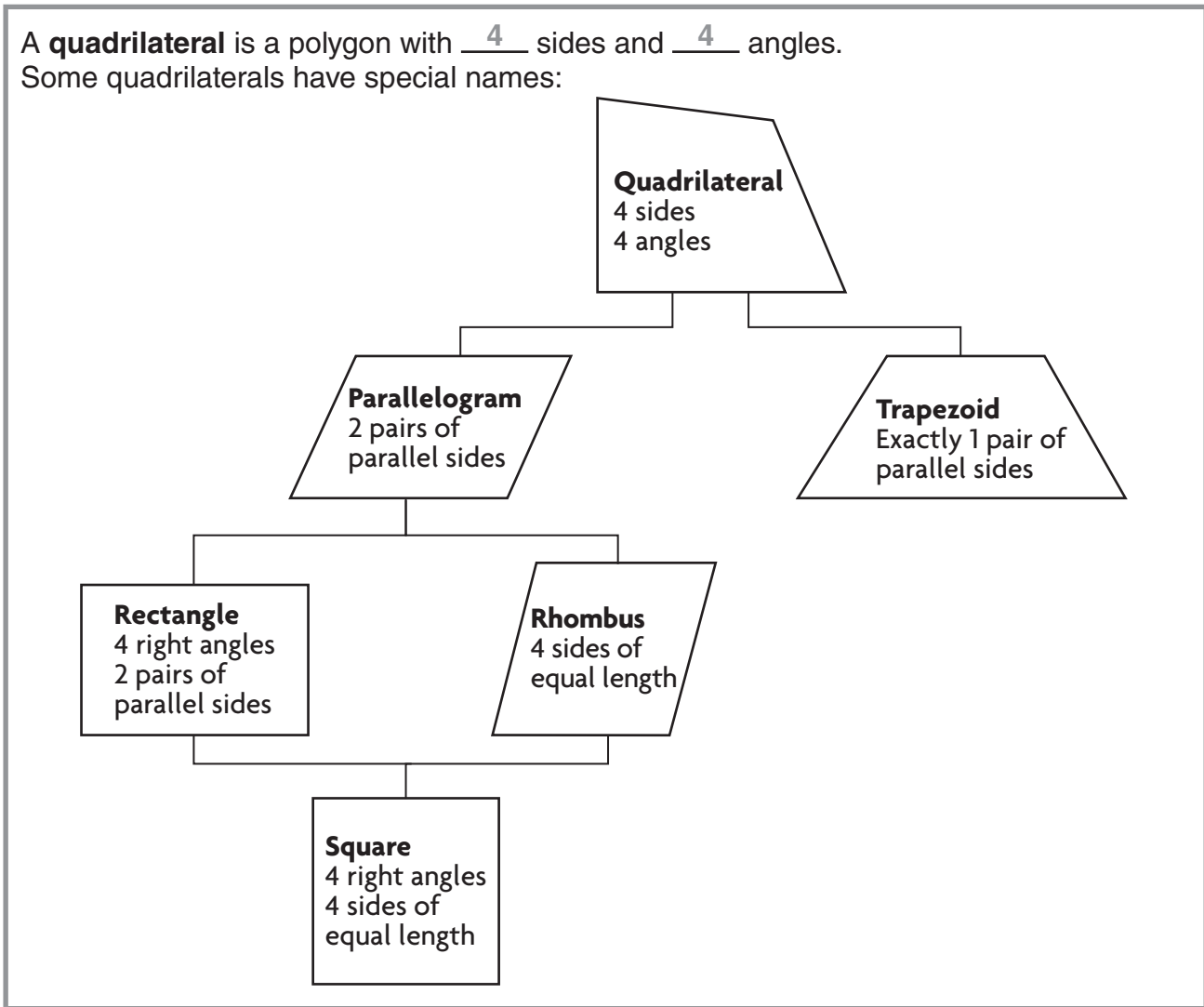2. Name two sides that appear to be perpendicular.

   _____

3. Name two sides that appear to be intersecting, but not perpendicular.

   _____
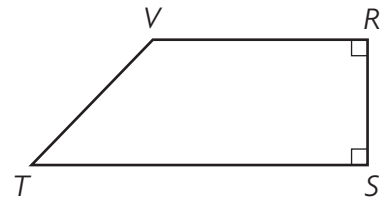
Classify Quadrilaterals

A **quadrilateral** is a polygon with __4__ sides and __4__ angles.
Some quadrilaterals have special names:

Quadrilateral
4 sides
4 angles

Parallelogram
2 pairs of
parallel sides

Trapezoid
Exactly 1 pair of
parallel sides

Rectangle
4 right angles
2 pairs of
parallel sides

Rhombus
4 sides of
equal length
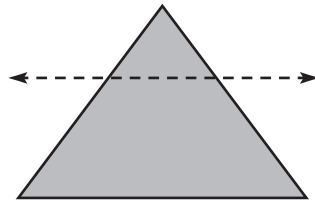
Square
4 right angles
4 sides of
equal length

Classify each figure as many ways as possible. Write
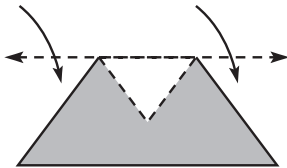*quadrilateral*, *trapezoid*, *parallelogram*, *rhombus*, *rectangle*, or *square*.

1.

_____

_____

_____

2.

_____

_____

_____

3.

_____

_____

_____
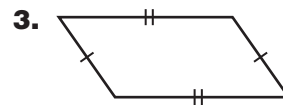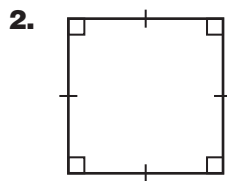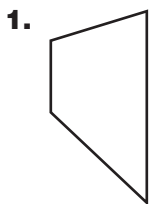
Line Symmetry

**Tell whether the parts on each side of the line match.
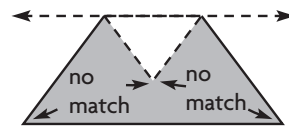Is the line a line of symmetry?**

Step 1 Trace and cut out the shape.

Fold the shape along the dashed line.

Step 2 Tell whether the parts on each side match.

Compare the parts on each side.

no match   no match

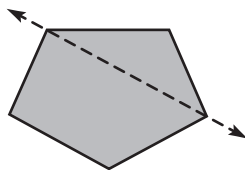**The parts do not match.**

Step 3 Decide if the line is a line of symmetry.
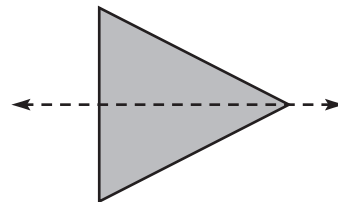
The parts on each side of the line do not match.

So, the line **is not** a line of symmetry.

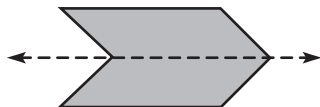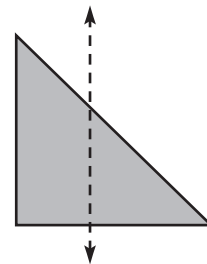**Tell if the line appears to be a line of symmetry. Write *yes* or *no*.**

1. _____

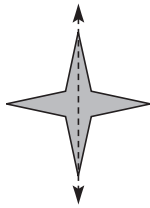**2.** _____

3. _____

4. _____

Find and Draw Lines of 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*.

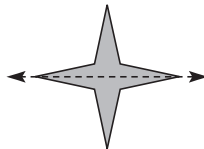**Step 1** Decide if the shape has a line of symmetry.

Trace and cut out the shape. Fold the shape along a vertical line.

Do the two parts match exactly? ___*yes*___

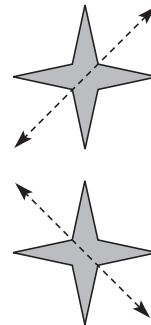**Step 2** Decide if the shape has another line of symmetry.

Open the shape and fold it along a horizontal line.

Do the two parts match exactly? ___*yes*___

Step 3 Find any other lines of symmetry.

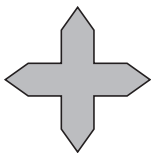**Think:** Can I fold the shape in other ways so that the two parts match exactly?

I can fold the paper diagonally two different ways, and the parts match exactly.
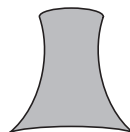
So, the shape appears to have ____*more than 1*____ line of symmetry.

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.

_____

2.

_____

3.

_____

Problem Solving • Shape Patterns

Use the strategy *act it out* to solve pattern problems.

What might be the next three figures in the pattern below?

△ △ ■ △ ■ △ △ ■ △ ■ △ △ ■ △ ■ △ △

Read the Problem		
What do I need to find? I need to find the next three <u>figures</u> in the pattern.	**What information do I need to use?** I need to look for <u>a group of figures</u> that repeat.	**How will I use the information?** I will use pattern blocks to model the <u>pattern</u> and act out the problem.
Solve the Problem		
Look for a group of figures that repeat and circle that group. The repeating group is <u>triangle</u>, <u>triangle</u>, <u>square</u>, <u>triangle</u>, <u>square</u>. I used <u>triangles</u> and <u>squares</u> to model and continue the pattern by repeating the figures in the group. These are the next three figures in the pattern: ■ △ ■		

1. Describe the pattern shown at right. Draw what might be the next figure in the pattern.

   _____

   _____

   _____

   _____
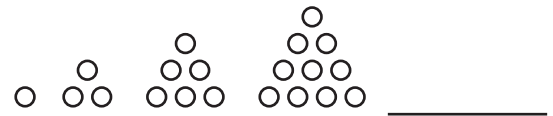
2. Use the pattern. How many circles will be in the sixth figure?

   _____