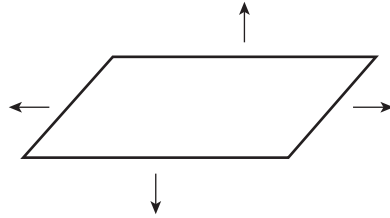# Two-Dimensional Figures

A plane is a flat surface that extends infinitely in all directions. A parallelogram like the one below is often used to model a plane, but remember that a plane—unlike a parallelogram—has no boundaries or sides.

A *plane figure* or *two-dimensional figure* is a figure that lies completely in one plane. When you draw, either by hand or with a computer program, you draw two-dimensional figures. Blueprints are two-dimensional models of real-life objects.

Polygons are closed, two-dimensional figures formed by three or more line segments that intersect only at their endpoints. These figures are polygons.
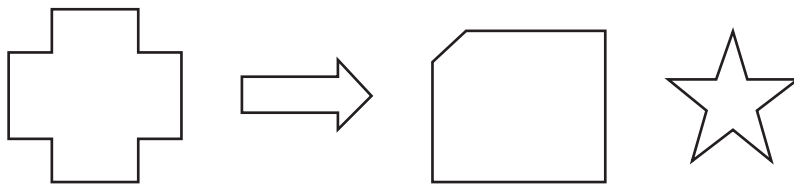
These figures are not polygons.

This is not a polygon because it is an open figure.
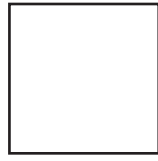
A heart is not a polygon because it is has curves.

A circle is not a polygon because it is made of a curve.

Polygons are named by the number of sides and angles they have. A polygon always has the same number of sides as angles. Listed on the next page are the most common polygons. Each of the polygons shown is a regular polygon. All the angles of a regular polygon have the same measure and all the sides are the same length.
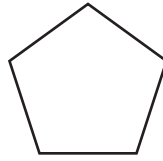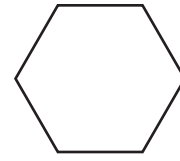
Two-Dimensional Figures (continued)
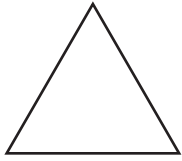
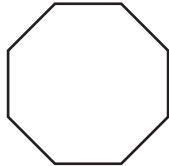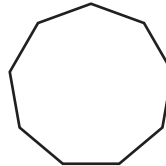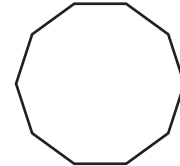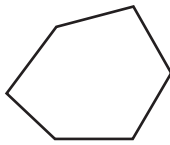|			
Triangle 3 sides; 3 angles	Quadrilateral 4 sides; 4 angles	Pentagon 5 sides; 5 angles	Hexagon 6 sides; 6 angles
Heptagon 7 sides; 7 angles	Octagon 8 sides; 8 angles	Nonagon 9 sides; 9 angles	Decagon 10 sides; 10 angles

EXAMPLE A

Classify the polygon.

Step 1: Count the number of sides.

Step 2: Identify a polygon with 6 sides.
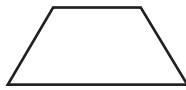
The polygon has 6 sides.

A hexagon has 6 sides.
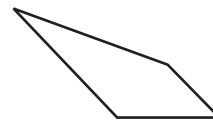
Solution: The polygon is a hexagon.

Quadrilaterals are classified by the number of pairs of parallel sides that they have. Parallel sides never meet and remain the same distance apart.
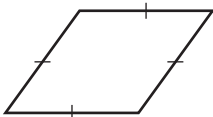
Parallelogram
(2 pairs of parallel sides)

Trapezoid
(1 pair of parallel sides)

Neither a parallelogram
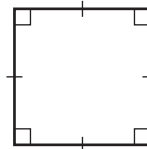nor a trapezoid
(0 pairs of parallel sides)

Parallelograms can further be classified by the number of equal sides and by the number of right angles that they have.

Rhombus
(4 equal sides)
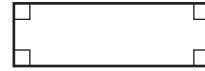
Rectangle
(4 right angles)

Square
(4 equal sides and 4 right angles)

Two-Dimensional Figures (continued)

EXAMPLE B

Classify the quadrilateral at right in as many ways as you can.

Step 1: Determine if the quadrilateral is a parallelogram.

The figure is a parallelogram because it has two pairs of parallel sides.

Step 2: Determine if the parallelogram is a rectangle.

It is a rectangle because it has 4 right angles.

Step 3: Determine if the rectangle is a square or rhombus.

It is neither a square nor a rhombus because it does not have 4 equal sides.

Solution: The quadrilateral is a parallelogram and rectangle.
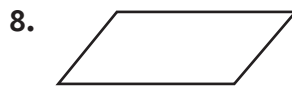

PRACTICE

Determine if each shape is a polygon.

1.

2.

3.
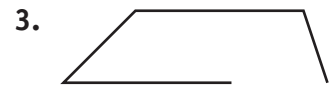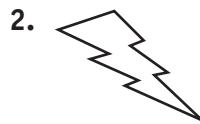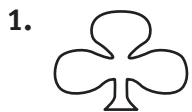
Name each two-dimensional figure.

4.

5.

6.
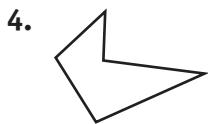
Classify each quadrilateral in as many ways as you can.

7.

8.

9.

10. Adrian said that a square is always a rectangle. Curtis said a rectangle is always a square. Is either of the boys correct? Explain your answer.