Name:_____ Teacher:_____ Date:_____

Classifying Polygons

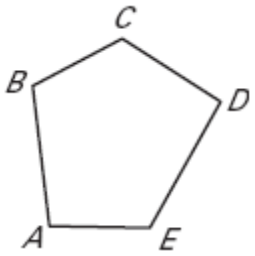
Guided Notes: TEACHERS EDITION (Just Delete the Answers and pass out to students)

IDENTIFYING POLYGONS

In geometry, a figure that lies in a plane is called a *plane figure.* A _polygon_ is a closed plane figure with the following properties.

1. It is formed by three or more line segments called _sides_.
2. Each side intersects exactly _two_ sides, one at each endpoint, so that no two sides with a common endpoint are _collonear_.

Each endpoint of a side is a _vertex_ of the polygon. The plural of vertex is *vertices.* A polygon can be named by listing the vertices in consecutive order. For example, *ABCDE* and *CDEAB* are both correct names for the polygon at the right.

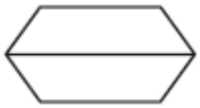


Example 1

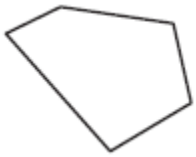
Identify polygons

Tell whether the figure is a polygon and whether it is convex or concave

a.



b.



c.

Solution

a. Some segments intersect more than two segments, so it is _not a polygon_.

b. The figure is _a convex polygon_.

c. The figure is _a concave polygon_.

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Tell whether the figure is a polygon and whether it is *convex* or *concave*.

1. 

convex polygon

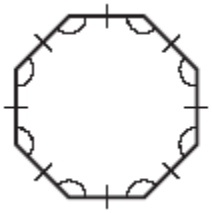
2. 

not a polygon

Example 2

Classify Polygons

Classify the polygon by the number of sides. Tell whether the polygon is *equilateral, equiangular,* or *regular.*



Solution

The polygon has _8_ sides. It is equilateral and equiangular, so it is a _regular octagon_.

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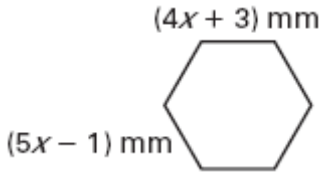
Example 3

Find side lengths



The head of a bolt is shaped like a regular hexagon. The expressions shown represent side lengths of the hexagonal bolt. Find the length of a side.

Solution

First, write and solve an equation to find the value of x. Use the fact that the sides of a regular hexagon are _congruent_.

$\_4x + 3\_ = \_5x - 1\_$ **Write on equation.**

$\_4\_ = \_x\_$ **Simplify.**

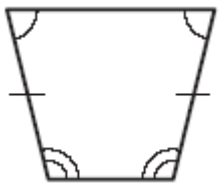
Then evaluate one of the expressions to find a side length

when $x =$ _4_ $4x + 3 = 4(\_4\_) + 3 =$ _19_

The length of a side is _19_ millimeters.

Complete the following exercises.

3. Classify the polygon by the number of sides. Tell whether the polygon is *equilateral, equiangular,* or *regular.*



quadrilateral

4. The expressions $(4x + 8)°$ and $(5x - 5)°$ represent the measures of two of the congruent angles in Example 3. Find the measure of an angle.

60°

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