1.6 Classify Polygons

Goal • Classify polygons.

Your Notes

VOCABULARY

Polygon

Sides

Vertex

Convex

Concave

n-gon

Equilateral

Equiangular

Regular

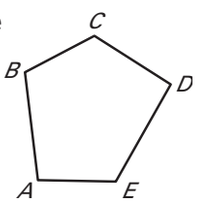
Your Notes

IDENTIFYING POLYGONS

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

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

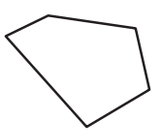
Each endpoint of a side is a _____ of the polygon. The plural of vertex is *vertices*. A polygon can be named by listing the vertices in consecutive order. For example, *ABCDE* and *CDEAB* are both correct names for the polygon at the right.

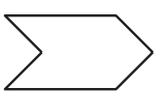


Example 1 ***Identify polygons***

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

a. 

b. 

c. 

A *plane figure* is two-dimensional. Later, you will study three-dimensional *space figures* such as prisms and cylinders.

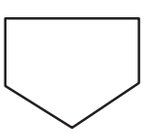
Solution

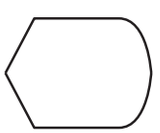
a. Some segments intersect more than two segments, so it is _____.

b. The figure is _____.

c. The figure is _____.

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

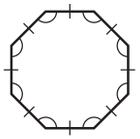
1. 

2. 

Your Notes

Example 2 ***Classify polygons***

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

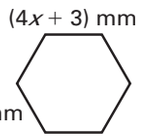


Solution

The polygon has ___ sides. It is equilateral and equiangular, so it is a _____.

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.



Hexagonal means "shaped like a hexagon."

Solution

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

_____ = _____ **Write an equation.**

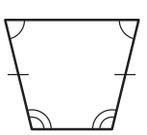
___ = ___ **Simplify.**

Then evaluate one of the expressions to find a side length when x = ___. $4x + 3 = 4(\_\_\_) + 3 =$ _____

The length of a side is _____ millimeters.

✔ ***Checkpoint*** **Complete the following exercises.**

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



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.

Homework