Classify Polygons

In geometry, a figure that lies in the 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 segment called **sides**.

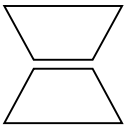
2. Each side intersects exactly two sides, one at each endpoint, so that no two sides with a common endpoint are collinear.

Definition 1
A polygon is convex if no line that contains a side of the polygon contains a point in the interior of the polygon.

Definition 2
Polygon that is not convex is called *non-convex* or concave.

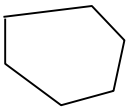
Example 1: Tell whether the figure is a polygon and whether it is *convex* or *concave*

a.



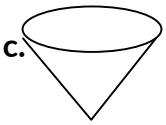
Some segments intersect more than two segments. So it is not a polygon.

b.

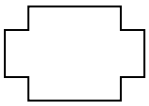


Convex polygon

c.



Part of the figure is not a segment, so it is not a polygon.



Concave polygon.

A polygon is named by a number of its sides.

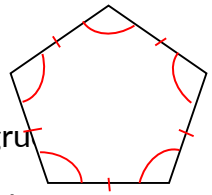
Polygon	Number of sides
Triangle	3
Quadrilateral	4
Pentagon	5
Hexagon	6
Heptagon	7
Octagon	8
Decagon	10
Dodecagon	12
n-gon	*n*

The term ***n*-gon,** where *n* is the number of polygons sides can also be used to named a polygon. For example, a polygon with 14-sided is a 14-gon.

In an **equilateral** polygon, all sides are congruent.

In an **equiangular** polygon, all angles in the interior of the polygon are congru

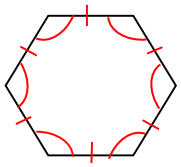
A **regular** polygon is a convex polygon that is both equilateral and equiangular



Regular polygon

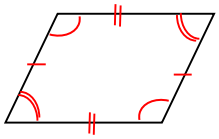
Example 1: Classify the polygon by the number of sides. Tell whether the polygon is equilateral, equiangular, or regular. Explain your reasoning.

a.



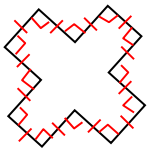
The polygon has 6 sides. It is equilateral and equiangular, so it is a regular polygon.

b.



The polygon has 4 sides, so it is quadrilateral. It is not equilateral or equiangular, so it is not regular.

c.



The polygon has 12 sides, so it is dodecagon. The sides are congruent, so it is equilateral. The polygon is not convex r, so it is not regular.