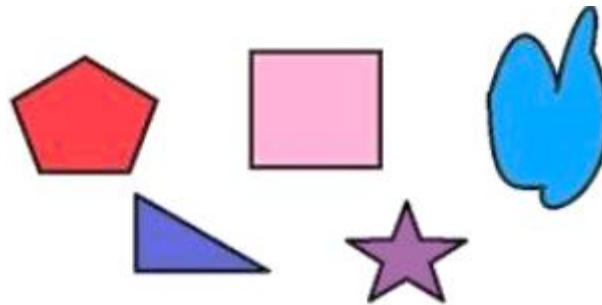Chapter- 16

Understanding Shapes

Plane Surface

A flat surface like paper is a plane surface.

Plane Curve

When we get a curve by joining the number of points without lifting the pencil is a plane curve.
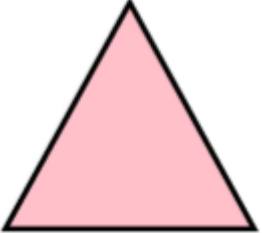
It could be an open or closed curve.

Open Curve

Closed Curve

Polygons

The simple closed curves which are made up of line segments only are called the **Polygons**.

Classification of Polygons

Polygons can be classified by the **number of sides or vertices** they have.

Number of sides	Name of Polygon	Figure
3	Triangle	

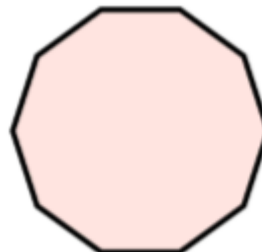|		
4	Quadrilateral	
5	Pentagon	
6	Hexagon	
7	Heptagon	
8	Octagon	
9	Nonagon	
10	Decagon	
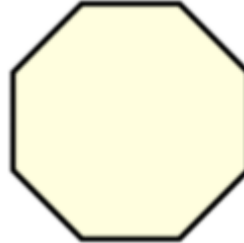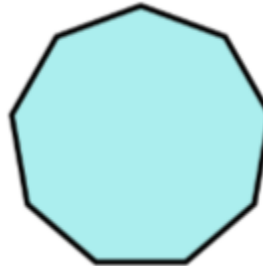
n	n-gon

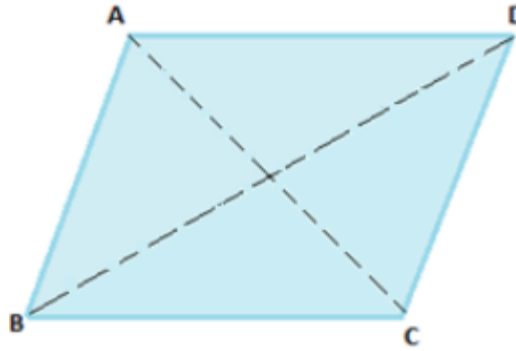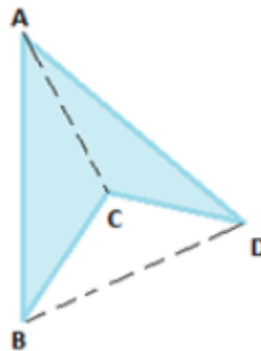## Convex and Concave Polygons

The polygons which have all the diagonals inside the figure are known as **a Convex Polygon**.
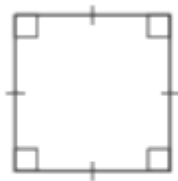

The polygons which have some of its diagonals outside the figure also are known as a **Concave Polygon**.

Regular and Irregular Polygons

Polygons which are equiangular and equilateral are called **Regular Polygons** i.e. a polygon is regular if-

- It's all sides are equal.
- It's all angles are equal.

Regular polygons   Polygons that are not regular

Hence square is a regular polygon but a rectangle is not as its angles are equal but sides are not equal.

Angle Sum Property

The sum of all the interior angles of a polygon remains the same according to the number of sides regardless of the shape of the polygon.

The sum of interior angles of a polygon is-

(n - 2) × 180°

Where n = number of sides of the polygon

Example

Polygon	Number of Sides	Sum of Interior Angles
Triangle	3	(3 – 2) × 180° = 180°
Quadrilateral	4	(4 – 2)* × 180° = 360°
n-gon	n	(n – 2) × 180°

Remark: This property is applicable to both convex and concave polygon.
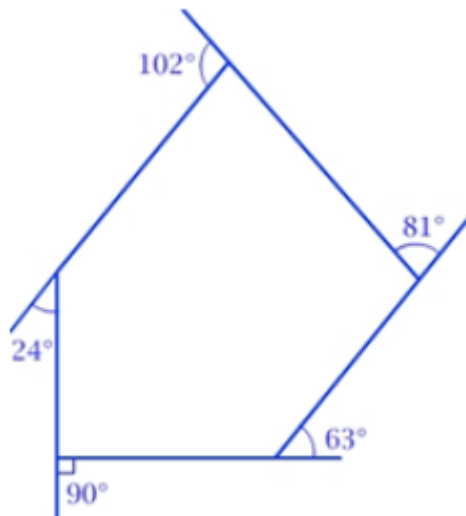
Sum of the Measures of the Exterior Angles of a Polygon

The sum of the exterior angles of any polygon will be 360°.

This is used to find the number of sides in a regular polygon.
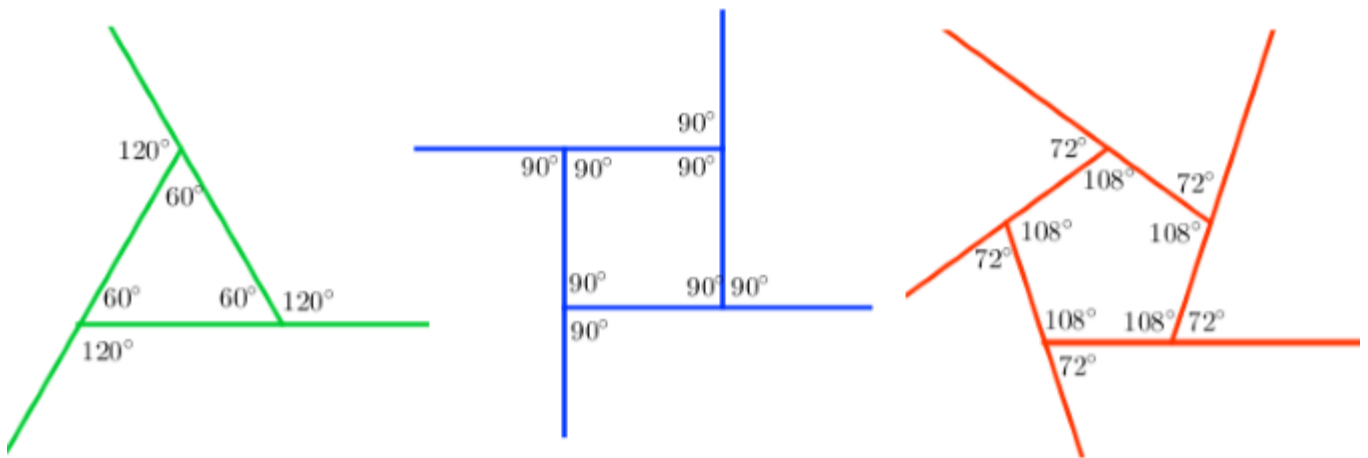
This is applicable to **irregular polygon** also. The sum will remain the same whether it is a regular or irregular, small or large polygon.

Sum of all the exterior angles in the above irregular pentagon is
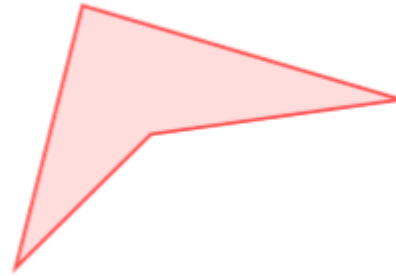
102° + 81° + 63° +90° + 24° = 360°

Quadrilateral

Any closed polygon with four sides, four angles and four vertices are known as Quadrilateral. It could be a regular or irregular polygon.

Regular Quadrilateral

Irregular Quadrilateral

Angle sum property of a Quadrilateral

- Sum of all the interior angles of a Quadrilateral = 360°
- Sum of all the exterior angles of a Quadrilateral = 360°