

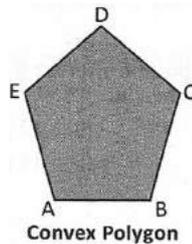
# Geometry

## Polygon

Any figure bounded by three or more line segments is called a polygon. A regular polygon is one in which all sides are equal and all angles are equal. A regular polygon can be inscribed in a circle. The name of polygons with three, four, five, six, seven, eight, nine and ten sides are respectively triangle, quadrilateral, pentagon, hexagon, heptagon, octagon, nonagon and decagon.

## Convex Polygon

In a convex polygon, a line segment between two points on the boundary never goes outside the polygon. More precisely, in a convex polygon no interior angle can be more than  $180^\circ$ .

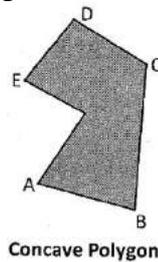


## Concave Polygon

In a concave polygon, a line segment between two points on the boundary goes outside the polygon.

or

In a concave polygon atleast one of the interior angle is more than  $180^\circ$ .



## Some important Formulae

(i) Sum all the angles in a convex polygon is  $(2n - 4)90^\circ$ .

(ii) Exterior angle of a regular polygon is  $\frac{360^\circ}{n}$ .

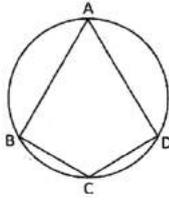
(iii) Interior angle of a regular polygon is  $\left(180^\circ - \frac{360^\circ}{n}\right)$ , where n is number of sides of the polygon

(iv) Number of diagonals of a convex polygon of n sides is  $\frac{n(n-3)}{2}$ .

## Quadrilaterals

A plane closed figured bounded by four segments is called quadrilateral.

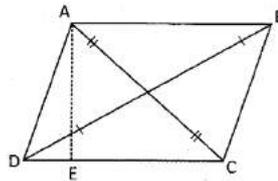
1. The sum of four angles of a quadrilateral is equal to  $360^\circ$ .
2. If the four vertices of a quadrilateral lie on the circumference of a circle i.e. if the quadrilateral can be inscribed in a circle it is called a cyclic quadrilateral. In a cyclic quadrilateral, the sum of opposite angles =  $180^\circ$ , i.e.  $A + C = 180^\circ$  and  $B + D = 180^\circ$



### Parallelogram

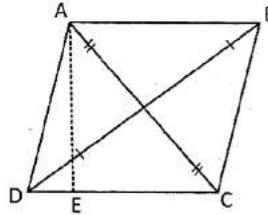
A quadrilateral having opposite sides are parallel is called a parallelogram. In a parallelogram,

- (i) opposite sides are equal.
- (ii) opposite angles are equal.
- (iii) each diagonal divides the parallelogram into two congruent triangles.
- (iv) sum of any two adjacent angles is  $180^\circ$ .
- (v) the diagonals bisect each other.



### Rhombus

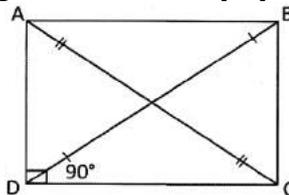
A parallelogram is a rhombus is which every pair of adjacent sides are equal (all four sides of a rhombus are equal).



Since, a parallelogram is a rhombus, all the properties of a parallelogram apply to a rhombus. Further, in a rhombus, the diagonals are perpendicular to each other.

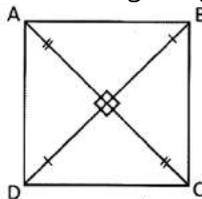
### Rectangle

A parallelogram is a rectangle in which each of the angles is equal to  $90^\circ$ . The diagonals of a rectangle are equal. A rectangle is also a special type of parallelogram and hence all properties of parallelogram apply to rectangles also.



### Square

A rectangle is a square in which all four sides are equal (a rhombus in which all four angles are equal, all are right angles). Hence, the diagonals are equal and they bisect at right angles.



### Trapezium

If one pair of opposite sides of a quadrilateral are parallel, then it is called a trapezium. In the figure, side AD is parallel to BC. Any trapezium is said to be an isosceles trapezium, if  $CD = AB$ .

