# Quadrilaterals

OLYMPIAD EXCELLENCE BOOK MATHEMATICS

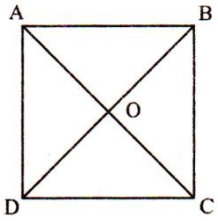
## NOTES

### FUNDAMENTALS

- Quadrilateral is a figure which is bounded by four straight lines. A quadrilateral has four vertices, four sides, four angles and sum of angles is $360^\circ$.

### TYPES OF QUADRILATERAL

- **Square:-**




A quadrilateral which sides are equal and each angle is equal to $90^\circ$ is called square.

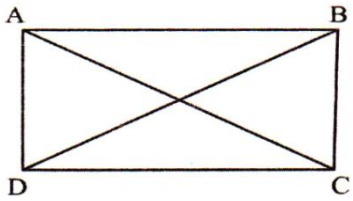
Diagonals of square are equal and cut each other at $90^\circ$.

i.e., $AB = BC = CD = DA$.

$\angle A = \angle B = \angle C = \angle D$

and $AC = CD$.

- **Rectangle**

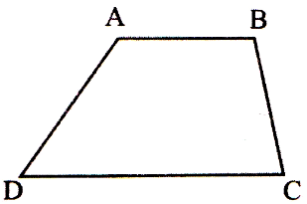



A quadrilateral whose all angles arc right angle and. each pair of opposite sides are equal is called Rectangle.

i.e., $\angle A = \angle \mathbf{B} = \angle C = \angle D = 90^\circ$, and $AB = CD, AD = BC$ The diagonals of rectangle are equal and bisect each other at right angle. Each diagonal divides rectangle into congruent triangles.

i.e., $AC = BD$ and $\Delta ADC = \Delta ABC$, $\Delta ABD = \Delta BCD$

- **Trapezium:** A, **quadrilateral in** which exactly one pair of parallel sides are equal is called a trapezium

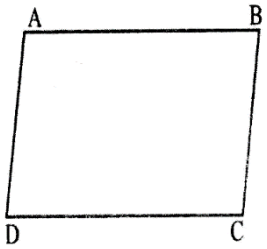



$AB \| CD$

- A trapezium, is an isosceles trapezium if its non - parallel sides are equal.
- ABCD is a isosceles trapezium if

  $AB \| CD$ *and* $AD = BC$.

- **Parallelogram:-** A quadrilateral having both pairs of opposite sides are equal is called a. parallelogram,




- In parallelogram ABCD $AB \| CD$ and $AD = BC$,
- In a parallelogram two opposite *sides* are equal.

  i.e., $AD = BC, AB = CD$
- In a. parallelogram two opposite angles are equal

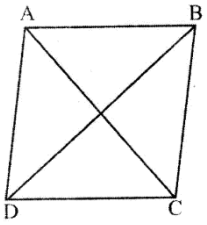
  i.e., $\angle A = \angle C$ and $\angle B = \angle D$.
- In a parallelogram sum of two adjacent angles is $180^\circ$ i.e., $\angle A + \angle B = 180^\circ, \angle B + \angle C = 180^\circ$

  $\angle C + \angle D = 180^\circ$ and $\angle D + \angle A = 180^\circ$
- Each diagonal of a parallelogram divides it into two congruent triangles.

  i.e., $\Delta ABC = \Delta ADC$

  $\Delta ABD = \Delta BCD$

- **Rhombus:-** A quadrilateral which all sides are equal is called a rhombus.




- The opposite side of a rhombus are parallel.

  i.e., $AB \| CD$ and $BC \| 2AD$
- Opposite angles of a rhombus are equal

  i.e., $\angle A = \angle C$ and $\angle B = \angle D$
- Each diagonal of a rhombus divides it into two congruent triangles.