

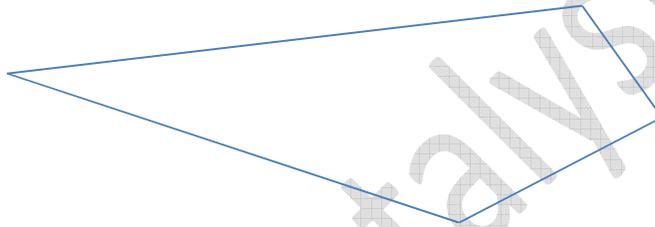
Quadrilaterals

Quadrilateral

A quadrilateral is the union of four line-segments determined by four distinct coplanar points of which no three are collinear and the line-segments intersect only at end points.

For ABCD to be quadrilateral, following condition are required

- The four points A, B, C and D must be distinct and co-planar.
- No three of points A, B, C and D are co-linear.
- Line segments i.e. AB, BC, CD, DA intersect at their end points only.



A quadrilateral is a four-sided polygon with four angles. There are many kinds of quadrilaterals. The five most common types are the parallelogram, the rectangle, the square, the trapezoid, and the rhombus.

Angle Property of Quadrilateral

- Sum of all the interior angles is 360°
- Sum of all the exterior angles is 360°

Parallelogram

A quadrilateral which has both pairs of opposite sides parallel is called a parallelogram.

Its properties are:

- The opposite sides of a parallelogram are equal.
- The opposite angles of a parallelogram are equal.
- The diagonals of a parallelogram bisect each other.
- The diagonal of a parallelogram divide into two congruent triangles



A quadrilateral is said to a parallelogram if

Opposite sides are equal **OR** Opposite angles are equal **OR** Diagonal bisects each other **OR** A pair of opposite are parallel and equal

Trapezium

A quadrilateral which has one pair of opposite sides parallel is called a trapezium.

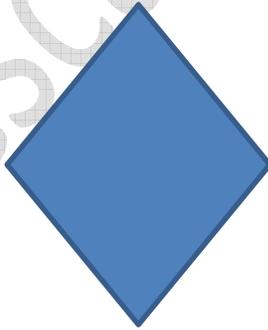


Rhombus

Rhombus is a parallelogram in which any pair of adjacent sides is equal.

Properties of a rhombus:

- All sides of a rhombus are equal
- The opposite angles of a rhombus are equal
- The diagonals of a rhombus bisect each other at right angles.



Rectangle

A parallelogram which has one of its angles a right angle is called a rectangle.

Properties of a rectangle are:

- The opposite sides of a rectangle are equal
- Each angle of a rectangle is a right-angle.
- The diagonals of a rectangle are equal.
- The diagonals of a rectangle bisect each other.



Square

A quadrilateral, all of whose sides are equal and all of whose angles are right angles.

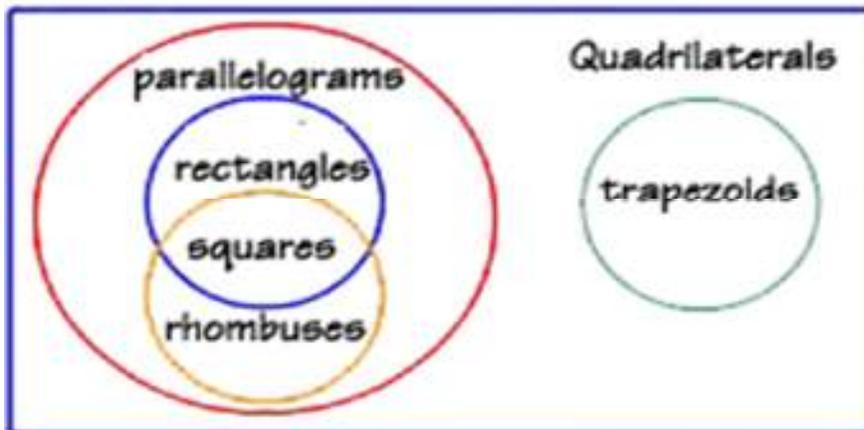
Properties of square are:

- All the sides of a square are equal.
- Each of the angles measures 90° .
- The diagonals of a square bisect each other at right angles.
- The diagonals of a square are equal.



All the quadrilaterals can be shown in Venn diagram like this

Venn Diagram



Some important facts

a) A square is always a parallelogram.

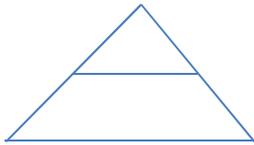
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- b) A square is always a rectangle.
- c) A rhombus can be square.
- e) A rectangle has four right angles.

Mid-point Theorem for Triangles

Theorem-I

The line segment joining the mid points of the two sides of the triangle is parallel to the third side



Theorem-II

A line drawn through mid point of one side of a triangle and parallel to another side bisect the third side of the triangle