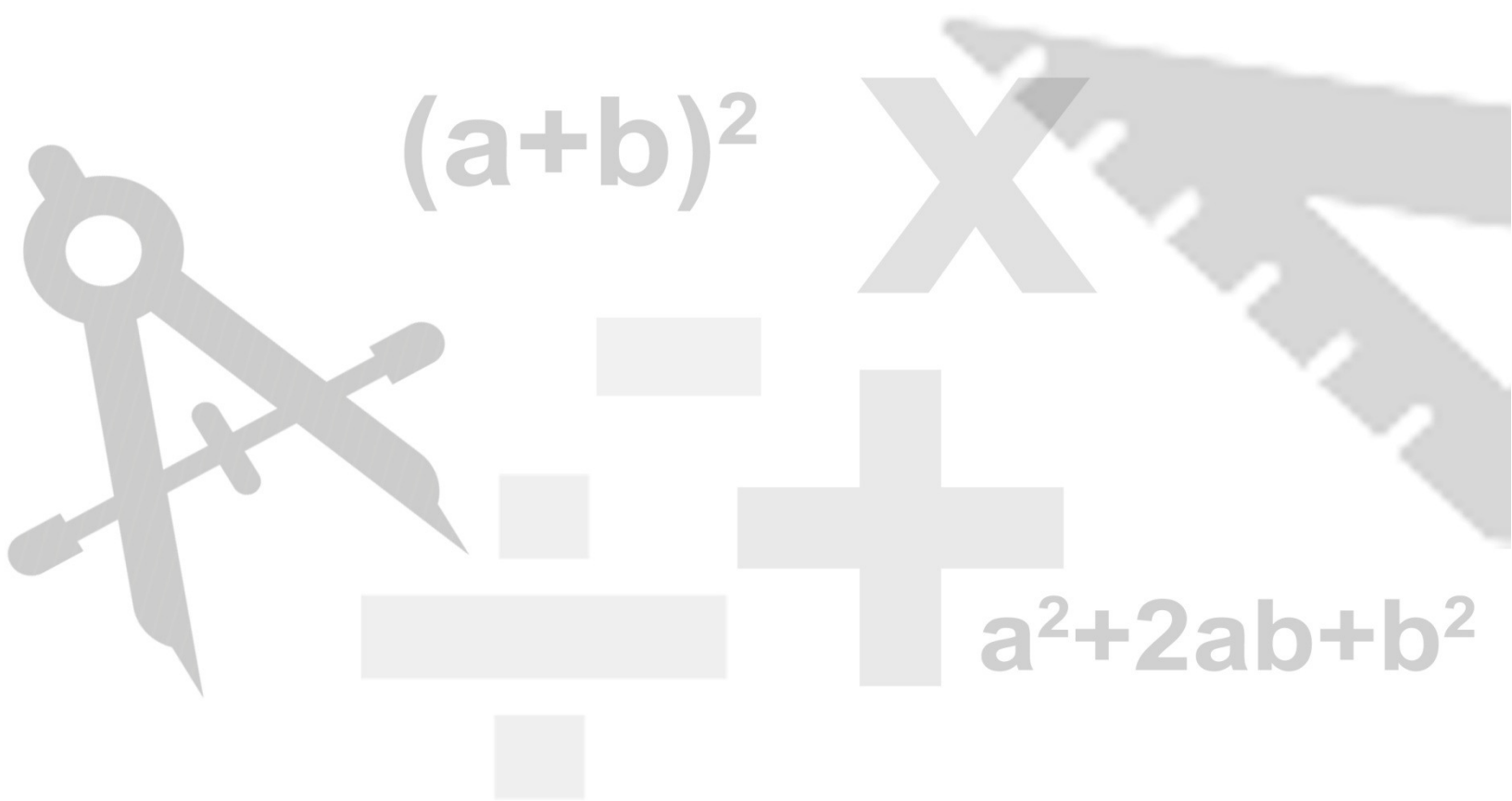
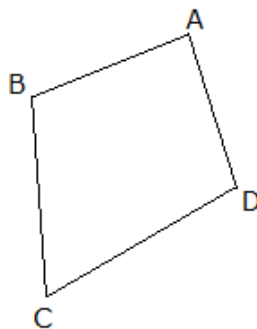


MATHS



Quadrilaterals

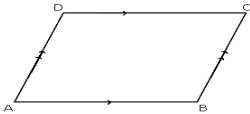
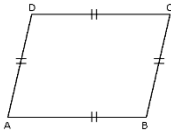
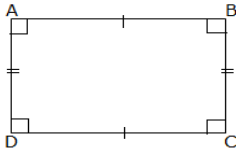
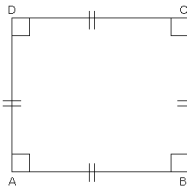
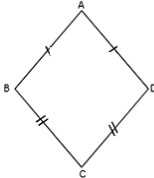
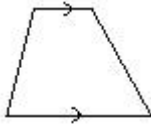
1. A **quadrilateral** is a closed figure obtained by joining four points (with no three points collinear) in an order.



Here, ABCD is a quadrilateral.

2. A quadrilateral has four sides, four angles and four vertices.
3. Two sides of a quadrilateral having no common end point are called its **opposite sides**.
4. Two sides of a quadrilateral having a common end point are called its **adjacent sides**.
5. Two angles of a quadrilateral having common arm are called its **adjacent angles**.
6. Two angles of a quadrilateral not having a common arm are called its **opposite angles**.
7. A **diagonal** is a line segment obtained on joining the opposite vertices.
8. Sum of all the angles of a quadrilateral is 360° . This is known as the **angle sum property of a quadrilateral**.

9. Types of quadrilaterals and their properties:

Name of quadrilateral	Properties
<p>Parallelogram: A quadrilateral with each pair of opposite sides parallel.</p> 	<ul style="list-style-type: none"> i. Opposite sides are equal. ii. Opposite angles are equal. iii. Diagonals bisect one another.
<p>Rhombus: A parallelogram with sides of equal length.</p> 	<ul style="list-style-type: none"> i. All properties of a parallelogram. ii. Diagonals are perpendicular to each other.
<p>Rectangle: A parallelogram with a right angle.</p> 	<ul style="list-style-type: none"> i. All the properties of a parallelogram. ii. Each of the angles is a right angle. iii. Diagonals are equal.
<p>Square: A rectangle with sides of equal length.</p> 	<p>All the properties of a parallelogram, a rhombus and a rectangle.</p>
<p>Kite: A quadrilateral with exactly two pairs of equal consecutive sides.</p> 	<ul style="list-style-type: none"> i. The diagonals are perpendicular to one another. ii. One of the diagonals bisects the other. iii. If ABCD is a kite, then $\angle B = \angle D$ but $\angle A \neq \angle C$.
<p>Trapezium: A quadrilateral with one pair of parallel side is called trapezium.</p> 	<ul style="list-style-type: none"> i. One pair of parallel sides.

10. If the non-parallel sides of trapezium are equal, it is known as **isosceles trapezium**.

11. Square, rectangle and rhombus are all parallelograms.

12. Kite and trapezium are not parallelograms.

13. A square is a rectangle.

14. A square is a rhombus.

15. A parallelogram is a trapezium.

16. Properties of parallelogram:

- i. The opposite sides of a parallelogram are parallel.
- ii. A diagonal of a parallelogram divides it in two congruent triangles.
- iii. The opposite sides of a parallelogram are equal.
- iv. The opposite angles of a parallelogram are equal.
- v. The consecutive angles (conjoined angles) of a parallelogram are supplementary.
- vi. The diagonals of a parallelogram bisect each other.

17. A quadrilateral is a parallelogram if:

- i. each pair of opposite sides of a quadrilateral is equal, or
- ii. each pair of opposite angles is equal, or
- iii. if the diagonals of a quadrilateral bisect other, or
- iv. if a pair of opposite sides is equal and parallel.

18. Mid-Point Theorem

The line segment joining the mid-point of any two sides of a triangle is parallel to the third sides and equal to half of it.

19. Converse of mid-point theorem

The line drawn through the mid-point of one side of a triangle parallel to the another side, bisects the third side.

20. If there are three or more parallel lines and the intercepts made by them on a transversal are equal, then the corresponding intercepts on any other transversal are also equal.