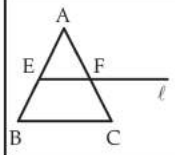
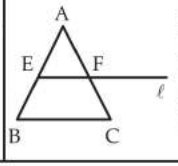
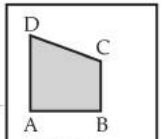
Quadrilaterals

Mid-point theorem

Statement	Figure
The line segment joining the mid-points of two sides of a triangle is parallel to the third side and equal to half of it.	 If E and F are mid-points of AB and AC, then EF || BC and EF $= \frac{1}{2}$ BC
The line drawn through the mid-point of one side of a triangle, parallel to another side bisects the third side	 If E is the mid-point of AB and EF || BC, then AF = FC, i.e., F is the mid-point of AC

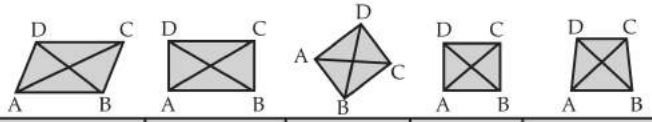
Definition

Figure formed by joining four points in an order → It has four vertices four angles, and four sides.



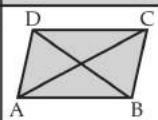
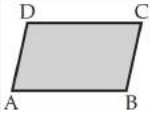
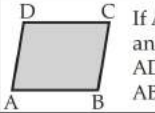
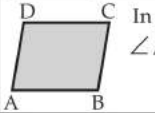
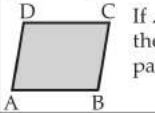
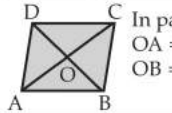
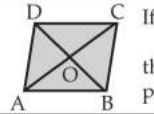
ABCD is a Quadrilateral

Types



Property	Parallelogram	Rectangle	Rhombus	Square	Trapezium
All sides are equal	No	No	Yes	Yes	No
Opposite sides are parallel and equal	Yes	Yes	Yes	Yes	One pair of opposite sides is parallel but not equal
All angles are equal	No	Yes	No	Yes	No
Opposite angles are equal	—	—	—	—	No
Diagonals are equal	Yes	Yes	Yes	Yes	No
Diagonals are perpendicular	No	No	Yes	Yes	No
Diagonals bisect each other	Yes	Yes	Yes	Yes	No
Adjacent angles are supplementary	Yes	Yes	Yes	Yes	Yes

Properties

Statement	Figure
1. A diagonal of a parallelogram divides it into two congruent triangles.	 ABCD is a parallelogram with diagonal AC then ΔABC = ΔADC
2. In a parallelogram, opposite sides are equal and parallel.	 In parallelogram ABCD, AB||DC, AD||BC and AB = DC AD = BC
3. If each pair of opposite sides of a quadrilateral are equal and parallel, then it is a parallelogram.	 If AB || DC, AD || BC, and AB = DC, AD = BC, then ABCD is a parallelogram
4. In a parallelogram, opposite angles are equal.	 In parallelogram ABCD, ∠A = ∠C, ∠B = ∠D
5. If in a quadrilateral, each pair of opposite angle is equal, then it is a parallelogram.	 If ∠A = ∠C, ∠B = ∠D then ABCD is a parallelogram
6. The diagonals of a parallelogram bisect each other.	 In parallelogram ABCD, OA = OC and OB = OD
7. If the diagonals of a quadrilateral bisect each other, then it is parallelogram.	 If OA = OC OB = OD then ABCD is a parallelogram

Trace the Mind Map

▸ First Level ▸ Second Level ▸ Third Level