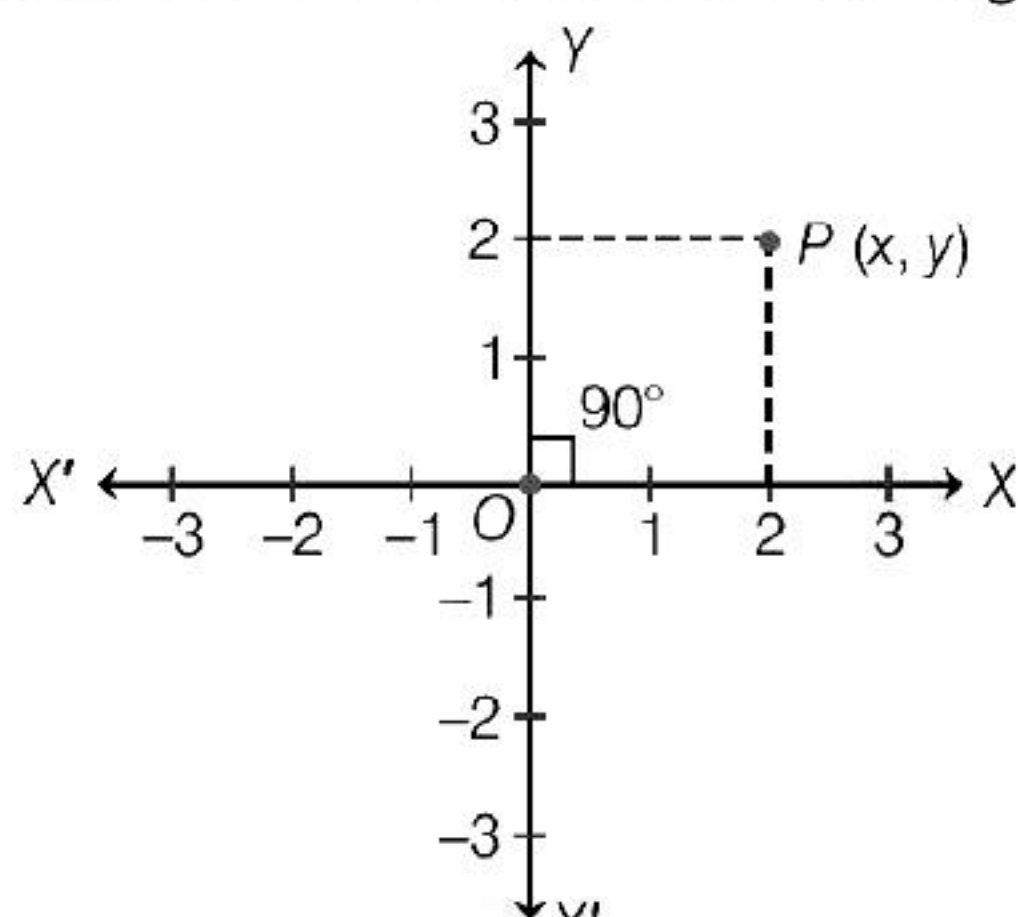


Coordinate Geometry

Quick Revision

Cartesian System

The system used to describe the position of a point in a plane, is called cartesian system. In cartesian system, there are two mutually perpendicular straight lines XX' and YY' , which intersect each other at origin point O .



The horizontal line XOX' is called X -axis (or abscissa) and the vertical line YOY' is called Y -axis (or ordinate).

Distance between Two Points in a Cartesian Plane

The distance between any two points $P(x_1, y_1)$ and $Q(x_2, y_2)$ is given by

$$PQ = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

or
$$PQ = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

i.e.
$$PQ = \sqrt{(\text{Difference of abscissae})^2 + (\text{Difference of ordinates})^2}$$

If one coordinate is at origin say $P(x_1, y_1) = P(0, 0)$, then distance between two points is

$$PQ = \sqrt{x_2^2 + y_2^2}$$

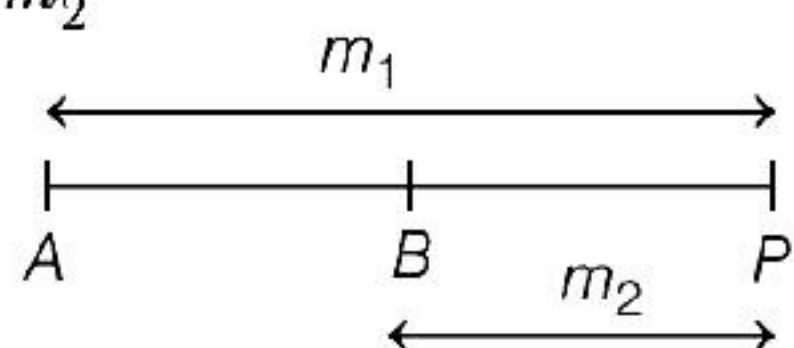
Collinear Points

When three or more than three points lie on a same line, then they are called collinear points.

Suppose A , B and C are three points, then the condition for collinearity of three points is

External Division of a Line Segment

If a point P divides line segment AB externally in the ratio $m_1 : m_2$



Then, coordinates of point P are

$$\left(\frac{m_1 x_2 - m_2 x_1}{m_1 - m_2}, \frac{m_1 y_2 - m_2 y_1}{m_1 - m_2} \right)$$

This formula is known as section formula for external division.

Coordinates of Mid-point of Line Segment

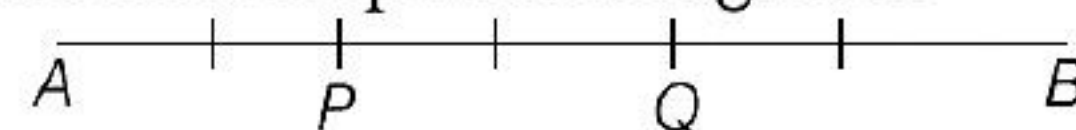
If the point P divides the line segment equally

i.e., $1 : 1$, then the coordinates of P will be

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right).$$
 This is also called **mid-point**

formula.

Note Trisection of the line segment means, a line is divided into three equal line segment

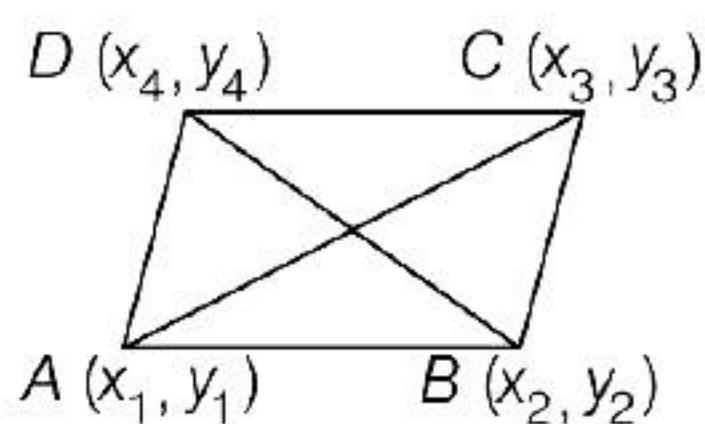
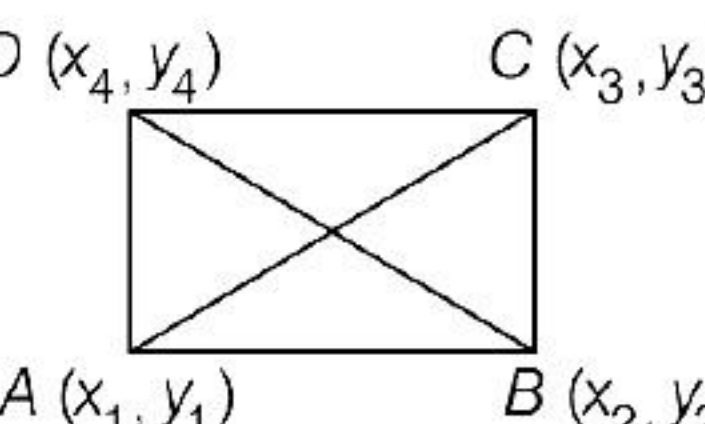
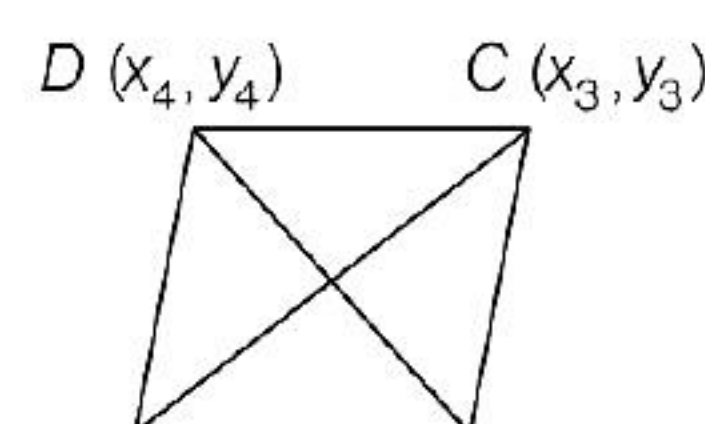
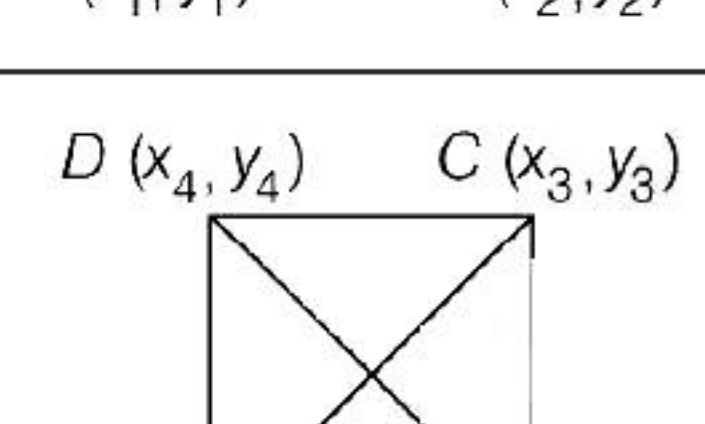


i.e. $AP = PQ = QB.$

Different Types of Triangle and Their Conditions

Types of Triangle	Figures	Properties	Conditions
Scalene triangle		All sides are unequal.	$AB \neq BC \neq CA$
Isosceles triangle			

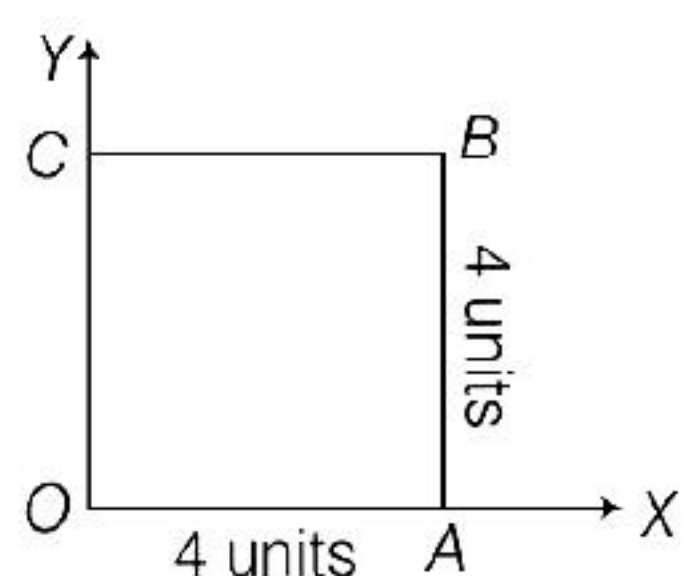
Different Types of Quadrilateral and Their Conditions

Types of Quadrilateral	Figures	Properties	Conditions
Parallelogram		Both pairs of opposite sides are equal. Diagonals bisect each other.	$AB = CD, AD = BC$ and $AC \neq BD$
Rectangle		A parallelogram with equal diagonals. Diagonals bisect each other.	$AB = CD, AD = BC$ and diagonal AC = diagonal BD
Rhombus		A parallelogram with all the sides are equal. Diagonals bisect each other at right angle.	$AB = BC = CD = DA$ and $AC \neq BD$
Square		A rhombus with equal diagonals. Diagonals bisect each other at right angle.	$AB = BC = CD = DA$ and diagonal AC = diagonal BD

Objective Questions

Multiple Choice Questions

1. In the given figure, O is the intersecting point of OA and OC and $OABC$ is a square of side 4 units, then the position of A, B and C is



- (a) $(4, 0)(4, 4)(0, 4)$
 (b) $(4, 0)(0, 4)(4, 4)$
 (c) $(0, 4)(4, 4)(4, 0)$
 (d) None of the above

