

Unit 9: Introduction to Coordinate Geometry

Overview

Coordinate Geometry:

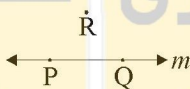
The study of geometrical shapes in a plane is called plane geometry. Coordinate geometry is the study of geometrical shapes in the Cartesian plane (coordinate plane).

Collinear Points:

Two or more than two points which lie on the same straight line are called collinear points with respect to that line.

Non-collinear points:

Two or more points which do not lie on the same straight line are called non-collinear points.



Equilateral Triangle:

If the lengths of all the three sides of a triangle are same, then the triangle is called an equilateral triangle.

An Isosceles Triangle:

An isosceles triangle PQR is a triangle which has two of its sides with equal length while the third side has a different length.

Right Angle Triangle

A triangle in which one of the angles has measure equal to 90° is called a right angle triangle.

Scalene Triangle:-

A triangle is called a scalene triangle if measure of all sides are different.

Square:-

A Square is closed figure formed by four non-collinear points such that lengths of all sides are equal and measure of each angles is 90° .

Rectangle

A figure formed in the plane by four non-collinear points is called a rectangle if,

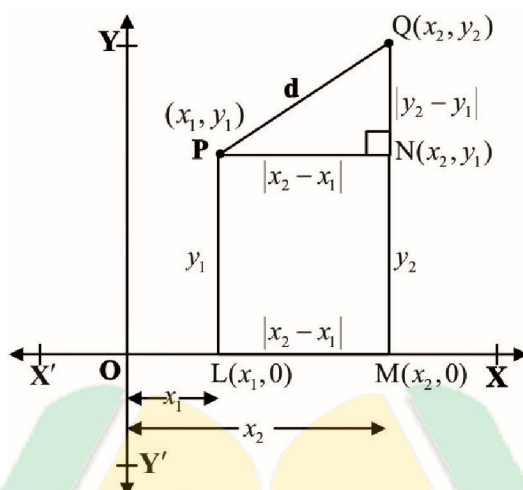
- (i) Its opposite sides are equal in length
- (ii) The angle at each vertex is of measure 90°

Parallelogram

A figure formed by four non-collinear points in the plane is called a parallelogram if

- (i) Its opposite sides are of equal length
- (ii) Its opposite sides are parallel
- (iii) Measure of none of the angles is 90° .

Finding distance between two points.



Let $P(x_1, y_1)$ and $Q(x_2, y_2)$ be two points in the coordinate plane where d is the length of the line segment PQ i.e, $|PQ| = d$

The line segments MQ and LP parallel to y -axis meet x -axis at point M and L respectively with coordinates $M(x_2, 0)$ and $L(x_1, 0)$

The line segment PN is parallel to x -axis

In the right triangle PNQ $|NQ| = |y_2 - y_1|$ and $|PN| = |x_2 - x_1|$

Using Pythagoras theorem

$$(\overline{PQ})^2 = (\overline{PN})^2 + (\overline{QN})^2$$

$$d^2 = |x_2 - x_1|^2 + |y_2 - y_1|^2$$

Taking under root on both side

$$\sqrt{d^2} = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$

$$d = \sqrt{|x_2 - x_1|^2 + |y_2 - y_1|^2}$$

Since $d > 0$ always

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Report any mistake at freeilm786@gmail.com