Review Exercise 9

Q.1 Choose the Correct answer

(i) Distance between point (0 , 0) and (1, 1) is

(a) 0 **(b)** 1

(c) 2 **(d)** $\sqrt{2}$

(ii) Distance between the point (1 , 0) and (0 ,1) is

(a) 0 **(b)** 1

(c) $\sqrt{2}$ **(d)** 2

(iii) Midpoint of the (2, 2) and (0, 0) is

(a) (1, 1) **(b)** (1, 0)

(c) (0, 1) **(d)** (-1, -1)

(iv) Midpoint of the points (2, -2) and (-2 , 2) is

(a) (2, 2) **(b)** (-2, -2)

(c) (0 , 0) **(d)** (1, 1)

(v) A triangle having all sides equal is called

(a) Isosceles **(b)** Scalene

(c) Equilateral **(d)** None of these

(vi) A triangle having all sides different is called

(a) Isosceles **(b)** Scalene

(c) Equilateral **(d)** None of these

ANSWER KEYS

i	ii	iii	iv	v	vi
d	c	a	c	c	b

Q.2 Answer the following which is true and which is false

(i) A line has two end points (False)
(ii) A line segment has one end point (False)
(iii) A triangle is formed by the three collinear points (False)
(iv) Each side of triangle has two collinear vertices. (True)
(v) The end points of each side of a rectangle are Collinear (True)
(vi) All the points that lie on the x-axis are Collinear (True)
(vii) Origin is the only point Collinear with the points of both axis separately (True)

Q.3 Find the distance between the following pairs of points

Solution:

(i) $(6,3)(3,-3)$

$A(6,3), B(3,-3)$

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

$|A\,B|=\sqrt{|3-6|^2+|-3-3|^2}$

$|A\,B|=\sqrt{(-3)^2+(-6)^2}$

$|A\,B|=\sqrt{9+36}$

$|A\,B|=\sqrt{45}$

$|A\,B|=\sqrt{9\times5}$

$|A\,B|=3\sqrt{5}$

(ii) $(7,5),(1,-1)$

$A(7,5), B(1,-1)$

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

$|A\,B|=\sqrt{|7-1|^2+|5-(-1)|^2}$

$|A\,B|=\sqrt{(6)^2+(5+1)^2}$

$|A\,B|=\sqrt{36+(6)^2}=\sqrt{36+36}$

$|A\,B|=\sqrt{72}=\sqrt{36\times2}$

$|A\,B|=6\sqrt{2}$

(iii) $(0,0),(-4,-3)$

$A(0,0), B(-4,-3)$

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

$|A\,B|=\sqrt{|0-4|^2+|0-(-3)|^2}$

$|A\,B|=\sqrt{(-4)^2+(3)^2}$

$|A\,B|=\sqrt{16+9}$

$|A\,B|=\sqrt{25}$

$|A\,B|=5$

Q.4 Find the midpoint between following pairs of points

Solution:

(i) $(6,6),(4,-2)$

$M(x,y)=M\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$

$M(x,y)=M\left(\frac{6+4}{2},\frac{6-2}{2}\right)$

$M(x,y)=M\left(\frac{10}{2},\frac{4}{2}\right)$

$M(x,y)=M(5,2)$

(ii) $(-5,-7),(-7,-5)$

$M(x,y)=M\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$

$M(x,y)=M\left(\frac{-5-7}{2},\frac{-7-5}{2}\right)$

$M(x,y)=M\left(\frac{-12}{2},\frac{-12}{2}\right)$

$M(x,y)=M(-6,-6)$

(iii) $(8,0),(0,-12)$

$M(x,y)=M\left(\frac{x_1+x_2}{2},\frac{y_1+y_2}{2}\right)$

$M(x,y)=M\left(\frac{8+0}{2},\frac{0-12}{2}\right)$

$M(x,y)=M\left(\frac{8}{2},\frac{-12}{2}\right)$

$M(x,y)=M(4,-6)$

Q.5 Define the following

Solution:

(i) Co-ordinate Geometry:-

Co-ordinate geometry is the study of geometrical shapes in the Cartesian plane (or coordinate plane)

(ii) Collinear:-

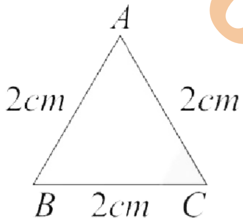
Two or more than two points which lie on the same straight line are called collinear points with respect to that line.

(iii) Non- Collinear:-

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

(iv) Equilateral Triangle:-

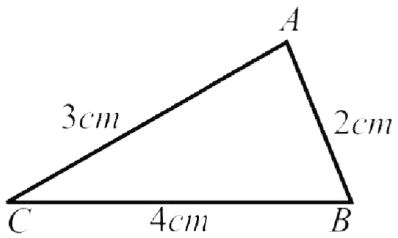
If the length of all three sides of a triangle are same then the triangle is called an equilateral triangle.



ΔABC is an equilateral triangle.

(v) Scalene Triangle:-

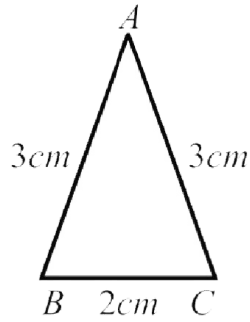
A triangle is called a scalene triangle if measure of all sides are different.



ΔABC is a Scalene triangle.

(vi) Isosceles Triangle:-

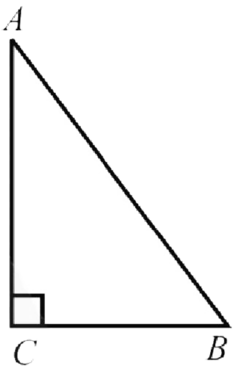
An isosceles triangles is a triangle which has two of its sides with equal length while the third side has different length.



ΔABC is an isosceles triangle

(vii) Right Triangle:-

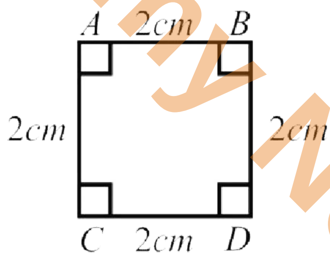
A triangle in which one of the angles has measure equal to 90° is called a right triangle.



ΔABC is a right angled triangle.

(viii) 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°.



$ABCD$ is a square.

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:

Tow or more points which does 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

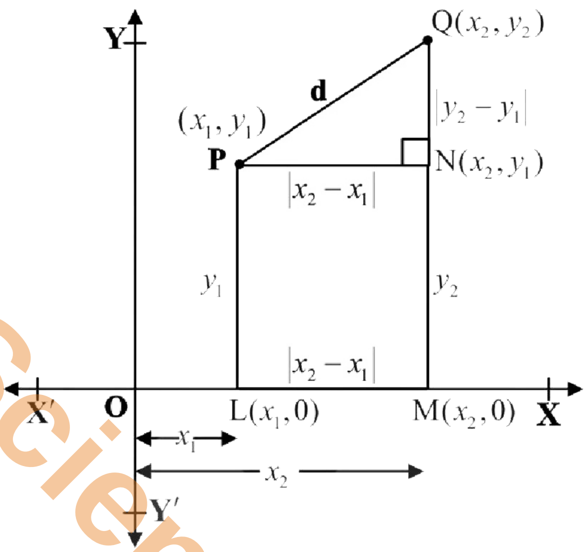
A figure formed by four non-collinear points in the plane is called a parallelogram if

(i) Its opposite sides are of equal length

(ii) Its opposite sides are parallel

(iii) Meausre 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, $|\overline{PQ}| = d$

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

The line segment PN is parallel to x-axis

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

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