Date 2-8-21
Page 3

Ex- 7.1 ch-7 Coordinate Geometry

1. Find the distance between following
(i) (2,3), (4,1)
A. $d = \sqrt{(2-4)^2+(3-1)^2}$
$= \sqrt{(-2)^2+(2)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

(ii) (-5,7), (-1,3)
A. $d = \sqrt{(-5-(-1))^2+(7-3)^2} = \sqrt{(-4)^2+(4)^2} = \sqrt{16+16} = \sqrt{32}$
$= 4\sqrt{2}$

(iii) (a,b) (-a,-b)
A. $d = \sqrt{(a-(-a))^2+(b-(-b))^2} = \sqrt{(2a)^2+(2b)^2} = \sqrt{4a^2+4b^2}$
$= 2\sqrt{a^2+b^2}$

2.A Distance between points (0,0) & (36,15)
$= \sqrt{(36-0)^2+(15-0)^2} = \sqrt{36^2+15^2} = \sqrt{1296+225}$
$= \sqrt{1521} = \sqrt{39}$
Town A at origin point (0,0)
∴ Town B will be at point (36, 15) with respect to town A.
So, Distance between A & B will be 39 km

3A let points (1,5), (2,3) & (-2,-11) be A, B, C
$AB = \sqrt{(1-2)^2+(5-3)^2} = \sqrt{5}$
$BC = \sqrt{(2-(-2))^2+(3-(-11))^2} = \sqrt{4^2+14^2} = \sqrt{16+196} = \sqrt{212}$
$CA = \sqrt{(1-(-2))^2+(5-(-11))^2} = \sqrt{3^2+16} = \sqrt{9+256} = \sqrt{265}$
So, $AB + BC \neq CA$
∴ Points (1,5), (2,3) & (-2,-11) are not collinear

4A let points (5,-2), (6,4), & (7,-2) are A, B & C
$AB = \sqrt{(5-6)^2+(-2-4)^2} = \sqrt{(-1)^2+(-6)^2} = \sqrt{1+36} = \sqrt{37}$

$BC = \sqrt{(6-7)^2+(4-(-2))^2} = \sqrt{(-1)^2+(6)^2} = \sqrt{1+36} = \sqrt{37}$

$CA = \sqrt{(5-7)^2+(-2-(-2))^2} = \sqrt{(-2)^2+0^2} = 2$

$\therefore$ AB = BC , two sides are equal in length
So, ABC is an isosceles Δ

5A A(3,4), B(6,7), C(9,4) & D(6,1) are position of 4 friends

$AB = \sqrt{(3-6)^2+(4-7)^2} = \sqrt{(-3)^2+(-3)^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

$BC = \sqrt{(6-9)^2+(7-4)^2} = \sqrt{(-3)^2+(3)^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

$CD = \sqrt{(9-6)^2+(4-1)^2} = \sqrt{(3)^2+(3)^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

$DA = \sqrt{(3-6)^2+(4-1)^2} = \sqrt{(-3)^2+(3)^2} = \sqrt{9+9} = 18 = 3\sqrt{2}$

Diagonal $AC = \sqrt{(3-9)^2+(4-4)^2} = \sqrt{(-6)^2} = 6$

Diagonal $BD = \sqrt{(6-6)^2+(7-1)^2} = \sqrt{(6)^2} = 6$

So, all sides of quadrilateral ABCD are same length & also diagonal are of same length

H.W 3.8.21 $\therefore$ ABCD is a square & champa was correct

6A (i) (-1,-2), (1,0), (-1,2), (-3,0)

A. let Points (-1,-2), (1,0), (-1,2) & (-3,0) be vertices A, B, C, D of quadrilateral

$AB = \sqrt{(-1-1)^2+(-2-0)^2} = \sqrt{(-2)^2+(-2)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

$BC = \sqrt{(1-(-1))^2+(0-2)^2} = \sqrt{(2)^2+(-2)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

$CD = \sqrt{(-1-(-3))^2+(2-0)^2} = \sqrt{(2)^2+(2)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

$AD = \sqrt{(-1-(3))^2+(-2-0)^2} = \sqrt{(2)^2+(-2)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

Diagonal $AC = \sqrt{(-1-(-1))^2+(-2-2)^2} = \sqrt{0^2+(-4)^2} = \sqrt{16} = 4$

Diagonal $BD = \sqrt{(1-(-3))^2+(0-0)^2} = \sqrt{(4)^2+0^2} = \sqrt{16} = 4$

Given points are vertices of square

(ii) $(-3,5), (3,1), (0,3), (-1,-4)$

A. let points $(-3,5), (3,1), (0,3), (-1,-4)$ be vertices A, B, C, D of quadrilateral

$AB = \sqrt{(-3,-3)^2+(5-1)^2} = \sqrt{(-6)^2+(4)^2} = \sqrt{36+16} = \sqrt{52} = 2\sqrt{13}$

$BC = \sqrt{(3-0)^2+(1-3)^2} = \sqrt{(3)^2+(-2)^2} = \sqrt{9+4} = \sqrt{5} = 5\sqrt{2}$

$CD = \sqrt{0-(-1))^2+(3-(-4))^2} = \sqrt{(1)^2+(7)^2} = \sqrt{1+49} = \sqrt{50} = 5\sqrt{2}$

$AD = \sqrt{(-3-(-1))^2+(5-(-4))^2} = \sqrt{(-2)^2+(9)^2} = \sqrt{4+81} = \sqrt{85}$

All sides of are different lengths. ∴ It can be said that it is only a general quadrilateral.

(iii) $(4,5), (7,6), (4,3), (1,2)$

A. let points $(4,5), (7,6), (4,3), (1,2)$ be vertices A, B C & D.

$AB = \sqrt{(4-7)^2+(5-6)^2} = \sqrt{(-3)^2+(-1)^2} = \sqrt{9+1} = \sqrt{10}$

$BC = \sqrt{(7-4)^2+(6-3)^2} = \sqrt{(3)^2+(3)^2} = \sqrt{9+9} = \sqrt{18}$

$CD = \sqrt{(4-1)^2+(3-2)^2} = \sqrt{(3)^2+(1)^2} = \sqrt{9+1} = \sqrt{10}$

$AD = \sqrt{(4-1)^2+(5-2)^2} = \sqrt{(3)^2+(3)^2} = \sqrt{9+9} = \sqrt{18}$

Diagonal $AC = \sqrt{(4-4)^2+(5-3)^2} = \sqrt{(0)^2+(2)^2} = \sqrt{0+4} = 2$

Diagonal $CD = \sqrt{(7-1)^2+(6-2)^2} = \sqrt{(6)^2+(4)^2} = \sqrt{36+16} = \sqrt{52}$
$= 13\sqrt{2}$

Opposite sides of quadrilateral are of same length diagonal are of diffent length. So it is a ||gm

7A y-coordinate = 0

let x axis be $(x,0)$

Distance between $(x,0)$ & $(2,-5)$

$\sqrt{(x-2)^2+(0-(-5))^2} = \sqrt{(x-2)^2+(5)^2}$

Distance between $(x,0)$ & $(-2,9)$ =

$\sqrt{(x-(-2))^2+(0-(-9))^2} = \sqrt{(x+2)^2+(9)^2}$

The distance are equal

$\sqrt{(x-2)^2+(5)^2} = \sqrt{(x+2)^2+(9)^2}$

$\Rightarrow (x-2)^2+25 = (x+2)^2+81$

$\Rightarrow x^2+4-4x+25 = x^2+4+4x+81$

$\Rightarrow 8x = 25-81$

$\Rightarrow 8x = -56 \quad \Rightarrow x = -7$

A8. Distance between $(2,-3)$ & $(10,y)$ is 10

$\sqrt{(2-10)^2+(-3-y)^2} = 10$

$\sqrt{(-8)^2+(3+y)^2} = 10$

$64+(y+3)^2 = 100$

$\Rightarrow (y+3)^2 = 36 \quad \Rightarrow y+3 = \pm 6$

$\Rightarrow y+3 = 6$ or $y+3 = -6$

$y = 3$ or -9

A9. $PQ = QR$

$\sqrt{(5-0)^2+(-3-1)^2} = \sqrt{(0-x)^2+(1-6)^2}$

$\sqrt{(5)^2+(-4)^2} = \sqrt{(-x)^2+(-5)^2}$

$\sqrt{25+16} = \sqrt{x^2+25}$

$\Rightarrow 41 = x^2+25$

$\Rightarrow 16 = x^2 \quad \Rightarrow x = \pm 4$

$\therefore$ Point R is $(4,6)$ or $(-4,6)$

$PR = \sqrt{(5-4)^2+(-3-6)^2} = \sqrt{1^2+(-9)^2} = \sqrt{1+81} = \sqrt{82}$

$QR = \sqrt{(0-4)^2+(1-6)^2} = \sqrt{(-4)^2+(-5)^2} = \sqrt{16+25} = \sqrt{41}$

When point R is $(4,6)$

$PR = \sqrt{(5-(-4))^2+(-3-6)^2} = \sqrt{(9)^2+(-9)^2} = \sqrt{81+81} = 9\sqrt{2}$

$QR = \sqrt{(0-(-4))^2+(1-6)^2} = \sqrt{(4)^2+(-5)^2} = \sqrt{16+25} = \sqrt{41}$

When point is $(-4,6)$

10A Point (x,y) is equidistant from $(3,6)$ & $(-3,4)$

$\therefore \sqrt{(x-3)^2+(y-6)^2} = \sqrt{(x-(-3))^2+(y-4)^2}$

$\Rightarrow \sqrt{(x-3)^2+(y-6)^2} = \sqrt{(x+3)^2+(y-4)^2}$

$\Rightarrow (x-3)^2+(y-6)^2 = (x+3)^2+(y-4)^2$

$\Rightarrow x^2+9-6x+y^2+36-12y = x^2+9+6x+y^2+16-8y$

$\Rightarrow 36-16 = 6x+6x+12y-8y$

$\Rightarrow 20 = 12x+4y \quad \Rightarrow 3x+y = 5$

$\Rightarrow 3x+y-5 = 0$