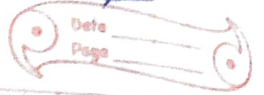


Ex-7.1

Coordinate Geometry



1.(i) Let the given points be  $P(2, 3)$  and  $Q(4, 1)$

Then  $x_1 = 2, y_1 = 3, x_2 = 4$  and  $y_2 = 1$

$$\begin{aligned}\therefore \text{Distance } PQ &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(4 - 2)^2 + (1 - 3)^2} \\ &= \sqrt{(2)^2 + (-2)^2} = \sqrt{4 + 4} \\ &= \sqrt{8} = 2\sqrt{2} \text{ units.}\end{aligned}$$

(ii) Let the given points be  $P(5, 7)$  and  $Q(-1, 3)$

Then  $x_1 = 5, y_1 = 7, x_2 = -1$  and  $y_2 = 3$

$$\begin{aligned}\therefore \text{Distance } PQ &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(-1 - 5)^2 + (3 - 7)^2} \\ &= \sqrt{(-6)^2 + (-4)^2} = \sqrt{36 + 16} \\ &= \sqrt{52} = 4\sqrt{13} \text{ units.}\end{aligned}$$

(iii) Let the given points be  $P(a, b)$  and  $Q(-a, -b)$

Then  $x_1 = a, y_1 = b, x_2 = -a$  and  $y_2 = -b$

$$\begin{aligned}\therefore \text{Distance } PQ &= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \\ &= \sqrt{(-a - a)^2 + (-b - b)^2}\end{aligned}$$



$$= \sqrt{(-2a)^2 + (-2b)^2}$$

$$= \sqrt{4a^2 + 4b^2}$$

$$= 2\sqrt{a^2 + b^2} \text{ units.}$$

2. Let points be A (0, 0) and B (36, 15)

The distance between two points is

$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(36 - 0)^2 + (15 - 0)^2}$$

$$= \sqrt{81296 + 225} = \sqrt{1521} = 39 \text{ units.}$$

3. Determine if the points (1, 5), (2, 3) and (-2, -11) are collinear.

- Let the points are A (1, 5), B (2, 3) and C (-2, -11). Then

$$AB = \sqrt{(2 - 1)^2 + (3 - 5)^2} = \sqrt{(1)^2 + (-2)^2}$$

$$= \sqrt{1 + 4} = \sqrt{5}$$

$$BC = \sqrt{(-2 - 2)^2 + (-11 - 3)^2} = \sqrt{(-4)^2 + (-14)^2}$$

$$= \sqrt{16 + 196} = \sqrt{212} = 2\sqrt{53}$$

$$AC = \sqrt{(-2 - 1)^2 + (-11 - 5)^2} = \sqrt{(-3)^2 + (-16)^2}$$

-  $\sqrt{9 + 256} = \sqrt{265}$ . Since  $AB + BC \neq AC$   
 Hence, the given points are not collinear.

4. Check whether  $(5, -2)$ ,  $(6, 4)$  and  $(7, -2)$  are the vertices of an isosceles triangle.

- Let points be A  $(5, -2)$ , B  $(6, 4)$  and C  $(7, -2)$ .

$$AB = \sqrt{(6-5)^2 + (4+2)^2} = \sqrt{1+36} = \sqrt{37}$$

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

$$AC = \sqrt{(7-5)^2 + (-2+2)^2} = \sqrt{4+0} = 2$$

Here,  $AB = BC$

$\Delta ABC$  is an isosceles triangle.

5. Let the points along with coordinates be A  $(3, 4)$ , B  $(6, 7)$ , C  $(9, 4)$  and D  $(6, 1)$ . Then by distance formula,

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

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

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

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

$$\text{Also, diagonal } AC = \sqrt{(9-3)^2 + (4-4)^2}$$

$$= \sqrt{(6)^2 + (0)^2} = \sqrt{36} = 6$$