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 $y_2 = 1$

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

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

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

$= \sqrt{8} = 2\sqrt{2}$ units.

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

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

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

$= \sqrt{(-1+5)^2 + (3-7)^2}$

$= \sqrt{(4)^2 + (-4)^2} = \sqrt{16+16}$

$= \sqrt{32} = 4\sqrt{2}$ units.

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

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

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

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

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

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

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

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

The distance between two points is

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

$\sqrt{1296 + 225} = \sqrt{1521} = 39$ 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

∴ ΔABC 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,

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

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

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

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

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

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