Co-Ordinate Geometry Ex 14.2 Q38

Answer :

TO FIND: Name the quadrilateral formed, if any, by the following points and give reasons for your answer.

(i) A (−1,−2) , B(1,0), C(−1,2), D(−3,0)

Let A, B, C and D be the four vertices of the quadrilateral ABCD.

We know the distance between two points P(x_1, y_1) and Q(x_2, y_2) is given by distance formula:

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

Hence

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

Similarly,

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

Similarly,

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

Also,

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

Hence from above we see that all the sides of the quadrilateral are equal. Hence it is a square.

(ii) A (−3,5) , B(3,1), C(0,3), D(−1,−4)

Let A, B, C and D be the four vertices of the quadrilateral ABCD.

We know the distance between two points P(x_1, y_1) and Q(x_2, y_2) is given by distance formula:

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

Hence

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

$$\Rightarrow AB = \sqrt{(6)^2 + (4)^2}$$

$$\Rightarrow AB = \sqrt{36+16}$$

$$\Rightarrow AB = \sqrt{52}$$

$$\Rightarrow AB = 2\sqrt{13}$$

Similarly,

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

$$\Rightarrow BC = \sqrt{(-3)^2 + (2)^2}$$

$$\Rightarrow BC = \sqrt{9+4}$$

$$\Rightarrow BC = \sqrt{13}$$

Similarly,

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

$$\Rightarrow CD = \sqrt{(-1)^2 + (-7)^2}$$

$$\Rightarrow CD = \sqrt{1+49}$$

$$\Rightarrow CD = \sqrt{50}$$

$$\Rightarrow CD = 5\sqrt{2}$$

Also,

$$\Rightarrow DA=\sqrt{((-1)-(-3))^2+((-4)-5)^2}$$

$$\Rightarrow DA=\sqrt{(2)^2+(-9)^2}$$

$$\Rightarrow DA=\sqrt{4+81}$$

$$\Rightarrow DA=\sqrt{85}$$

Hence from the above we see that it is not a quadrilateral

(iii) A (4, 5), B (7,6), C(4,3), D(1,2)

Let A, B, C and D be the four vertices of the quadrilateral ABCD.

We know the distance between two points P(x_1,y_1) and Q(x_2,y_2) is given by distance formula:

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

Hence

$$\Rightarrow AB=\sqrt{(7-4)^2+(6-5)^2}$$

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

$$\Rightarrow AB=\sqrt{9+1}$$

$$\Rightarrow AB=\sqrt{10}$$

Similarly,

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

$$\Rightarrow BC=\sqrt{(-3)^2+(-3)^2}$$

$$\Rightarrow BC=\sqrt{9+9}$$

$$\Rightarrow BC=\sqrt{18}$$

Similarly,

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

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

$$\Rightarrow CD=\sqrt{9+1}$$

$$\Rightarrow CD=\sqrt{10}$$

Also,

$$\Rightarrow DA=\sqrt{(1-4)^2+(2-5)^2}$$

$$\Rightarrow DA=\sqrt{(-3)^2+(-3)^2}$$

$$\Rightarrow DA=\sqrt{9+9}$$

$$\Rightarrow DA=\sqrt{18}$$

Hence from above we see that

AB = CD and BC = DA

Here opposite sides of the quadrilateral is equal. Hence it is a parallelogram.

Co-Ordinate Geometry Ex 14.2 Q39

Answer :

TO FIND: The equation of perpendicular bisector of line segment joining points (7, 1) and (3, 5)

Let P(x, y) be any point on the perpendicular bisector of AB. Then,

PA=PB

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

$$\Rightarrow(x-7)^2+(y-1)^2=(x-3)^2+(y-5)^2$$

$$\Rightarrow x^2-14x+49+y^2-2y+1=x^2-6x+9+y^2-10y+25$$

$$\Rightarrow -14x+6x+10y-2y+49+1-9-25=0$$

$$\Rightarrow -8x+8y+16=0$$

$$\Rightarrow x-y-2=0$$

$$\Rightarrow \boxed{x-y=2}$$

Hence the equation of perpendicular bisector of line segment joining points (7, 1) and (3, 5) is

$$\boxed{x-y=2}$$

*********** END **********