



### Co-Ordinate Geometry Ex 14.2 Q42

**Answer :**

The distance  $d$  between two points  $(x_1, y_1)$  and  $(x_2, y_2)$  is given by the formula

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

Here we are to find out a point on the  $y$ -axis which is equidistant from both the points  $A(5, -2)$  and  $B(-3, 2)$ .

Let this point be denoted as  $C(x, y)$ .

Since the point lies on the  $y$ -axis the value of its ordinate will be 0. Or in other words we have  $x = 0$ .

Now let us find out the distances from 'A' and 'B' to 'C'

$$\begin{aligned} AC &= \sqrt{(5-x)^2 + (-2-y)^2} \\ &= \sqrt{(5-0)^2 + (-2-y)^2} \end{aligned}$$

$$AC = \sqrt{(5)^2 + (-2-y)^2}$$

$$\begin{aligned} BC &= \sqrt{(-3-x)^2 + (2-y)^2} \\ &= \sqrt{(-3-0)^2 + (2-y)^2} \end{aligned}$$

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

We know that both these distances are the same. So equating both these we get,

$$AC = BC$$

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

Squaring on both sides we have,

$$(5)^2 + (-2-y)^2 = (-3)^2 + (2-y)^2$$

$$25 + 4 + y^2 + 4y = 9 + 4 + y^2 - 4y$$

$$8y = -16$$

$$y = -2$$

Hence the point on the  $y$ -axis which lies at equal distances from the mentioned points is  $(0, -2)$ .

### Co-Ordinate Geometry Ex 14.2 Q43

**Answer :**

The distance  $d$  between two points  $(x_1, y_1)$  and  $(x_2, y_2)$  is given by the formula

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

Let the three given points be  $P(x, y)$ ,  $A(3, 6)$  and  $B(-3, 4)$ .

Now let us find the distance between 'P' and 'A'.

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

Now, let us find the distance between 'P' and 'B'.

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

It is given that both these distances are equal. So, let us equate both the above equations,

$$PA = PB$$

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

Squaring on both sides of the equation we get,

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

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

$$12x + 4y = 20$$

$$3x + y = 5$$

Hence the relationship between 'x' and 'y' based on the given condition is  $3x + y = 5$ .

\*\*\*\*\* END \*\*\*\*\*