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*'

$$
\begin{aligned}
AC &= \sqrt{(5-x)^2 + (-2-y)^2} \\
&= \sqrt{(5-0)^2 + (-2-y)^2} \\
AC &= \sqrt{(5)^2 + (-2-y)^2} \\
BC &= \sqrt{(-3-x)^2 + (2-y)^2} \\
&= \sqrt{(-3-0)^2 + (2-y)^2} \\
BC &= \sqrt{(-3)^2 + (2-y)^2}
\end{aligned}
$$

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,

$$
\begin{aligned}
(5)^2 + (-2-y)^2 &= (-3)^2 + (2-y)^2 \\
25 + 4 + y^2 + 4y &= 9 + 4 + y^2 - 4y \\
8y &= -16 \\
y &= -2
\end{aligned}
$$

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

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,

$$
\begin{aligned}
(x-3)^2 + (y-6)^2 &= (x+3)^2 + (y-4)^2 \\
x^2 + 9 - 6x + y^2 + 36 - 12y &= x^2 + 9 + 6x + y^2 + 16 - 8y \\
12x + 4y &= 20 \\
3x + y &= 5
\end{aligned}
$$

Hence the relationship between '*x*' and '*y*' based on the given condition is $\boxed{3x + y = 5}$.

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