Co-Ordinate Geometry Ex 14.2 Q3

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 it is said that the points (2, 1) and (1, −2) are equidistant from (*x*, *y*).

Let d_1 be the distance between (2, 1) and (*x*, *y*).

Let d_2 be the distance between (1, −2) and (*x*, *y*).

So, using the distance formula for both these pairs of points we have

$$d_1 = \sqrt{(2-x)^2 + (1-y)^2}$$

$$d_2 = \sqrt{(1-x)^2 + (-2-y)^2}$$

Now since both these distances are given to be the same, let us equate both d_1 and d_2

$$d_1 = d_2$$

$$\sqrt{(2-x)^2 + (1-y)^2} = \sqrt{(1-x)^2 + (-2-y)^2}$$

Squaring on both sides we have,

$$(2-x)^2 + (1-y)^2 = (1-x)^2 + (-2-y)^2$$

$$4 + x^2 - 4x + 1 + y^2 - 2y = 1 + x^2 - 2x + 4 + y^2 + 4y$$

$$-4x - 2y = -2x + 4y$$

$$-2x - 6y = 0$$

$$x + 3y = 0$$

Hence we have proved that when the points (2, 1) and (1, −2) are equidistant from (*x*, *y*) we have $\boxed{x + 3y = 0}$.

Co-Ordinate Geometry Ex 14.2 Q4

Answer :

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

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

It is said that (*x*, *y*) is equidistant from both (−3,0) and (3,0).

Let d_1 be the distance between (*x*, *y*) and (−3,0).

Let d_2 be the distance between (*x*, *y*) and (3,0).

So, using the distance formula for both these pairs of points we have

$$d_1 = \sqrt{(x+3)^2 + (y-0)^2}$$

$$d_2 = \sqrt{(x-3)^2 + (y-0)^2}$$

Now since both these distances are given to be the same, let us equate both d_1 and d_2.

$$d_1 = d_2$$

$$\sqrt{(x+3)^2 + (y-0)^2} = \sqrt{(x-3)^2 + (y-0)^2}$$

Squaring on both sides we have,

$$(x+3)^2 + (y-0)^2 = (x-3)^2 + (y-0)^2$$

$$x^2 + 9 + 6x + y^2 = x^2 + 9 - 6x + y^2$$

$$12x = 0$$

$$x = 0$$

It is also said that the value of both d_1 and d_2 is 4 units.

Substituting the value of '*x*' in the equation for either d_1 or d_2 we can get the value of '*y*'.

$$d_1 = \sqrt{(x+3)^2 + (y-0)^2}$$

$$4 = \sqrt{(0+3)^2 + (y-0)^2}$$

$$4 = \sqrt{9 + y^2}$$

Squaring on both sides of the equation we have,

$$16 = 9 + y^2$$

$$y^2 = 7$$

$$y = \pm\sqrt{7}$$

Hence the values of 'x' and 'y' are $\boxed{\begin{array}{l} x = 0 \\ y = \pm\sqrt{7} \end{array}}$

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