



Co-Ordinate Geometry Ex 14.3 Q36

Answer :

The co-ordinates of a point which divided two points (x_1, y_1) and (x_2, y_2) internally in the ratio $m : n$ is given by the formula,

$$(x, y) = \left(\left(\frac{mx_2 + nx_1}{m+n} \right), \left(\frac{my_2 + ny_1}{m+n} \right) \right)$$

Here we are given that the point $P(-6, a)$ divides the line joining the points $A(-3, 1)$ and $B(-8, 9)$ in some ratio.

Let us substitute these values in the earlier mentioned formula.

$$(-6, a) = \left(\left(\frac{m(-8) + n(-3)}{m+n} \right), \left(\frac{m(9) + n(1)}{m+n} \right) \right)$$

Equating the individual components we have

$$\begin{aligned} -6 &= \frac{m(-8) + n(-3)}{m+n} \\ -6m - 6n &= -8m - 3n \\ 2m &= 3n \\ \frac{m}{n} &= \frac{3}{2} \end{aligned}$$

We see that the ratio in which the given point divides the line segment is $\boxed{3 : 2}$.

Let us now use this ratio to find out the value of 'a'.

$$(-6, a) = \left(\left(\frac{m(-8) + n(-3)}{m+n} \right), \left(\frac{m(9) + n(1)}{m+n} \right) \right)$$

$$(-6, a) = \left(\left(\frac{3(-8) + 2(-3)}{3+2} \right), \left(\frac{3(9) + 2(1)}{3+2} \right) \right)$$

Equating the individual components we have

$$\begin{aligned} a &= \frac{3(9) + 2(1)}{3+2} \\ a &= \frac{29}{5} \end{aligned}$$

Thus the value of 'a' is $\boxed{\frac{29}{5}}$.

Co-Ordinate Geometry Ex 14.3 Q37

Answer :

We have two points A (3, -4) and B (1, 2). There are two points P (p, -2) and Q $\left(\frac{5}{3}, q \right)$ which trisect

the line segment joining A and B.

Now according to the section formula if any point P divides a line segment joining A (x_1, y_1) and

B (x_2, y_2) in the ratio m: n internally then,

$$P(x, y) = \left(\frac{nx_1 + mx_2}{m+n}, \frac{ny_1 + my_2}{m+n} \right)$$

The point P is the point of trisection of the line segment AB. So, P divides AB in the ratio 1: 2

Now we will use section formula to find the co-ordinates of unknown point A as,

$$\begin{aligned} P(p, -2) &= \left(\frac{2(3) + 1(1)}{1+2}, \frac{2(-4) + 1(2)}{1+2} \right) \\ &= \left(\frac{7}{3}, -2 \right) \end{aligned}$$

Equate the individual terms on both the sides. We get,

$$p = \frac{7}{3}$$

Similarly, the point Q is the point of trisection of the line segment AB. So, Q divides AB in the ratio 2: 1

Now we will use section formula to find the co-ordinates of unknown point A as,

$$Q\left(\frac{5}{3}, q\right) = \left(\frac{2(1)+1(3)}{1+2}, \frac{2(2)+1(-4)}{1+2}\right) \\ = \left(\frac{5}{3}, 0\right)$$

Equate the individual terms on both the sides. We get,

$$q = 0$$

Co-Ordinate Geometry Ex 14.3 Q38

Answer :

We have two points A (2, 1) and B (5, -8). There are two points P and Q which trisect the line segment joining A and B.

Now according to the section formula if any point P divides a line segment joining A (x_1, y_1) and

B (x_2, y_2) in the ratio m: n internally then,

$$P(x, y) = \left(\frac{nx_1 + mx_2}{m+n}, \frac{ny_1 + my_2}{m+n}\right)$$

The point P is the point of trisection of the line segment AB. So, P divides AB in the ratio 1: 2

Now we will use section formula to find the co-ordinates of unknown point A as,

$$P(x_1, y_1) = \left(\frac{1(5)+2(2)}{1+2}, \frac{2(1)+1(-8)}{1+2}\right) \\ = (3, -2)$$

Therefore, co-ordinates of point P is (3, -2)

It is given that point P lies on the line whose equation is

$$2x - y + k = 0$$

So point A will satisfy this equation.

$$2(4) - 0 + k = 0$$

So,

$$k = -8$$

***** END *****