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

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

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

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

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 than,

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

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,

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

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

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

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,

$$\boxed{q=0}$$

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 than,

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

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,

$$\boxed{k=-8}$$

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