Co-Ordinate Geometry Ex 14.3 Q1

Answer :

We have A (−1, 3) and B (4,−7) be two points. Let a point $P(x, y)$ divide the line segment joining the points A and B in the ratio 3:4 internally.

Now according to the section formula if point a 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,

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

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

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

$$= \left(\frac{8}{7}, -\frac{9}{7}\right)$$

Therefore, co-ordinates of point P is $\boxed{\left(\frac{8}{7}, -\frac{9}{7}\right)}$

Co-Ordinate Geometry Ex 14.3 Q2

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,

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

The points of trisection of a line are the points which divide the line into the ratio $1:2$.

(i) Here we are asked to find the points of trisection of the line segment joining the points $A(5,-6)$ and $B(-7,5)$.

So we need to find the points which divide the line joining these two points in the ratio $1:2$.

Let $P(x, y)$ be the point which divides the line joining 'AB' in the given ratio.

$$(x, y) = \left(\left(\frac{1(-7)+2(5)}{1+2}\right), \left(\frac{1(5)+2(-6)}{1+2}\right)\right)$$

$$(x, y) = \left(1, -\frac{7}{3}\right)$$

Let $Q(e, d)$ be the point which divides the line joining 'BA' in the given ratio.

$$(e, d) = \left(\left(\frac{1(5)+2(-7)}{1+2}\right), \left(\frac{1(-6)+2(5)}{1+2}\right)\right)$$

$$(e, d) = \left(-3, \frac{4}{3}\right)$$

Therefore the points of trisection of the line joining the given points are $\boxed{\left(1, -\frac{7}{3}\right) \text{ and } \left(-3, \frac{4}{3}\right)}$.

(ii) Here we are asked to find the points of trisection of the line segment joining the points $A(3,-2)$ and $B(-3,-4)$.

So we need to find the points which divide the line joining these two points in the ratio $1:2$.

Let $P(x, y)$ be the point which divides the line joining 'AB' in the given ratio.

$$(x, y) = \left(\left(\frac{1(-3)+2(3)}{1+2}\right), \left(\frac{1(-4)+2(-2)}{1+2}\right)\right)$$

$$(x, y) = \left(1, -\frac{8}{3}\right)$$

Let $Q(e, d)$ be the point which divides the line joining 'BA' in the given ratio.

$$(e, d) = \left(\left(\frac{1(3)+2(-3)}{1+2}\right), \left(\frac{1(-2)+2(-4)}{1+2}\right)\right)$$

$$(e, d) = \left(-1, -\frac{10}{3}\right)$$

Therefore the points of trisection of the line joining the given points are $\boxed{\left(1, -\frac{8}{3}\right) \text{ and } \left(-1, -\frac{10}{3}\right)}$.

(iii) Here we are asked to find the points of trisection of the line segment joining the points $A(2,-2)$ and $B(-7,4)$.

So we need to find the points which divide the line joining these two points in the ratio $1:2$.

Let $P(x, y)$ be the point which divides the line joining 'AB' in the given ratio.

$$(x,y)=\left(\left(\frac{1(-7)+2(2)}{1+2}\right),\left(\frac{1(4)+2(-2)}{1+2}\right)\right)$$

$$(x,y)=(-1,0)$$

Let $Q(e, d)$ be the point which divides the line joining 'BA' in the given ratio.

$$(e,d)=\left(\left(\frac{1(2)+2(-7)}{1+2}\right),\left(\frac{1(-2)+2(4)}{1+2}\right)\right)$$

$$(e,d)=(-4,2)$$

Therefore the points of trisection of the line joining the given points are $\boxed{(-1,0) \text{ and } (-4,2)}$.

Co-Ordinate Geometry Ex 14.3 Q3

Answer :

The co-ordinates of the midpoint (x_m, y_m) between two points (x_1, y_1) and (x_2, y_2) is given by,

$$(x_m,y_m)=\left(\left(\frac{x_1+x_2}{2}\right),\left(\frac{y_1+y_2}{2}\right)\right)$$

In a parallelogram the diagonals bisect each other. That is the point of intersection of the diagonals is the midpoint of either of the diagonals.

Here, it is given that the vertices of a parallelogram are $A(-2,-1)$, $B(1,0)$ and $C(4,3)$ and $D(1,2)$.

We see that 'AC' and 'BD' are the diagonals of the parallelogram.

The midpoint of either one of these diagonals will give us the point of intersection of the diagonals.

Let this point be $M(x, y)$.

Let us find the midpoint of the diagonal 'AC'.

$$(x_m,y_m)=\left(\left(\frac{-2+4}{2}\right),\left(\frac{-1+3}{2}\right)\right)$$

$$(x_m,y_m)=(1,1)$$

Hence the co-ordinates of the point of intersection of the diagonals of the given parallelogram are $\boxed{(1,1)}$.

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