Co-Ordinate Geometry Ex 14.3 Q32

Answer :

We have to find the distance of a point A (1, 2) from the mid-point of the line segment joining P (6, 8) and Q (2, 4).

In general to find the mid-point $\mathrm{P}(x, y)$ of any two points $\mathrm{A}(x_1, y_1)$ and $\mathrm{B}(x_2, y_2)$ we use section formula as,

$$\mathrm{P}(x, y)=\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

Therefore mid-point B of line segment PQ can be written as,

$$B(x, y)=\left(\frac{6+2}{2}, \frac{4+8}{2}\right)$$

Now equate the individual terms to get,

$x=4$

$y=6$

So co-ordinates of B is (4, 6)

Therefore distance between A and B,

$$\begin{aligned}\mathrm{AB} &= \sqrt{(4-1)^2+(6-2)^2}\\ &= \sqrt{9+16}\\ &= \boxed{5}\end{aligned}$$

Co-Ordinate Geometry Ex 14.3 Q33

Answer :

The co-ordinates of the point dividing two points (x_1, y_1) and (x_2, y_2) in the ratio $m:n$ is given as,

$$(x, y)=\left(\left(\frac{\lambda x_2+x_1}{\lambda+1}\right),\left(\frac{\lambda y_2+y_1}{\lambda+1}\right)\right) \text{ where, } \lambda=\frac{m}{n}$$

Here the two given points are *A*(1,4) and *B*(5,2). Let point *P*(*x*, *y*) divide the line joining '*AB*' in the ratio $3:4$

Substituting these values in the earlier mentioned formula we have,

$$(x, y)=\left(\left(\frac{\frac{3}{4}(5)+(1)}{\frac{3}{4}+1}\right),\left(\frac{\frac{3}{4}(2)+(4)}{\frac{3}{4}+1}\right)\right)$$

$$(x, y)=\left(\left(\frac{\frac{15+4(1)}{4}}{\frac{3+4}{4}}\right),\left(\frac{\frac{6+4(4)}{4}}{\frac{3+4}{4}}\right)\right)$$

$$(x, y)=\left(\left(\frac{19}{7}\right),\left(\frac{22}{7}\right)\right)$$

Thus the co-ordinates of the point which divides the given points in the required ratio are $\boxed{\left(\frac{19}{7}, \frac{22}{7}\right)}$.

Co-Ordinate Geometry Ex 14.3 Q34

Answer :

Let A (1, 0); B (5, 3); C (2, 7) and D (−2, 4) be the vertices of a quadrilateral. We have to prove that the quadrilateral ABCD is a parallelogram.

We should proceed with the fact that if the diagonals of a quadrilateral bisect each other than the quadrilateral is a parallelogram.

Now to find the mid-point $\mathrm{P}(x, y)$ of two points $\mathrm{A}(x_1, y_1)$ and $\mathrm{B}(x_2, y_2)$ we use section formula as,

$$\mathrm{P}(x, y)=\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$$

So the mid-point of the diagonal AC is,

$$\begin{aligned}\mathrm{Q}(x, y) &= \left(\frac{1+2}{2}, \frac{0+7}{2}\right)\\ &= \left(\frac{3}{2}, \frac{7}{2}\right)\end{aligned}$$

Similarly mid-point of diagonal BD is,

$$\begin{aligned}R(x, y) &= \left(\frac{5-2}{2}, \frac{3+4}{2}\right)\\ &= \left(\frac{3}{2}, \frac{7}{2}\right)\end{aligned}$$

Therefore the mid-points of the diagonals are coinciding and thus diagonal bisects each other.

Hence ABCD is a parallelogram.

Co-Ordinate Geometry Ex 14.3 Q35

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 $P(m,6)$ divides the line joining the points $A(-4,3)$ and $B(2,8)$ in some ratio.

Let us substitute these values in the earlier mentioned formula.

$$(m, 6) = \left(\left(\frac{m(2) + n(-4)}{m+n}\right), \left(\frac{m(8) + n(3)}{m+n}\right)\right)$$

Equating the individual components we have

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

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 'm'.

$$(m, 6) = \left(\left(\frac{m(2) + n(-4)}{m+n}\right), \left(\frac{m(8) + n(3)}{m+n}\right)\right)$$
$$(m, 6) = \left(\left(\frac{3(2) + 2(-4)}{3+2}\right), \left(\frac{3(8) + 2(3)}{3+2}\right)\right)$$

Equating the individual components we have

$$m = \frac{3(2) + 2(-4)}{3+2}$$
$$m = -\frac{2}{5}$$

Thus the value of 'm' is $\boxed{-\frac{2}{5}}$.

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