Co-Ordinate Geometry Ex 14.3 Q22

Answer :

We have two points P (3, 3) and Q (6,–6). There are two points A and B which trisect the line segment joining P and Q.

Let the co-ordinate of A be $A(x_1, y_1)$

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 A is the point of trisection of the line segment PQ. So, A divides PQ in the ratio 1: 2

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

$$A(x, y) = \left(\frac{2(3)+1(6)}{1+2}, \frac{2(3)+1(-6)}{1+2}\right)$$
$$= (4, 0)$$

Therefore, co-ordinates of point A is(4, 0)

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

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

So point A will satisfy this equation.

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

So,

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

Co-Ordinate Geometry Ex 14.3 Q23

Answer :

Let ABCD be a parallelogram in which the co-ordinates of the vertices are A (–2,–1); B (1, 0); C (*x*, 3) and D (1, *y*).

Since ABCD is a parallelogram, the diagonals bisect each other. Therefore the mid-point of the diagonals of the parallelogram will coincide.

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

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

The mid-point of the diagonals of the parallelogram will coincide.

So,

Co-ordinate of mid-point of AC = Co-ordinate of mid-point of BD

Therefore,

$$\left(\frac{x-2}{2}, \frac{3-1}{2}\right) = \left(\frac{1+1}{2}, \frac{y+0}{2}\right)$$

Now equate the individual terms to get the unknown value. So,

$$\frac{x-2}{2} = 1$$
$$x = 4$$

Similarly,

$$\frac{y+0}{2} = 1$$
$$y = 2$$

Therefore,

$$\boxed{\begin{array}{l} x = 4 \\ y = 2 \end{array}}$$

Co-Ordinate Geometry Ex 14.3 Q24

Answer :

Let A (2, 0); B (9, 1); C (11, 6) and D (4, 4) be the vertices of a quadrilateral. We have to check if the quadrilateral ABCD is a rhombus or not.

So we should find the lengths of sides of quadrilateral ABCD.

$$\begin{aligned} AB &= \sqrt{(9-2)^2+(1-0)^2} \\ &= \sqrt{49+1} \\ &= \sqrt{50} \\ BC &= \sqrt{(11-9)^2+(6-1)^2} \\ &= \sqrt{4+25} \\ &= \sqrt{29} \\ CD &= \sqrt{(11-4)^2+(6-4)^2} \\ &= \sqrt{49+4} \\ &= \sqrt{53} \\ AD &= \sqrt{(4-2)^2+(4-0)^2} \\ &= \sqrt{4+16} \\ &= \sqrt{20} \end{aligned}$$

All the sides of quadrilateral are unequal. Hence ABCD is not a rhombus.

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