



### 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,

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

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,

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

### 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.

$$\begin{aligned}AB &= \sqrt{(9-2)^2 + (1-0)^2} \\&= \sqrt{49+1} \\&= \sqrt{50}\end{aligned}$$

$$\begin{aligned}BC &= \sqrt{(11-9)^2 + (6-1)^2} \\&= \sqrt{4+25} \\&= \sqrt{29}\end{aligned}$$

$$\begin{aligned}CD &= \sqrt{(11-4)^2 + (6-4)^2} \\&= \sqrt{49+4} \\&= \sqrt{53}\end{aligned}$$

$$\begin{aligned}AD &= \sqrt{(4-2)^2 + (4-0)^2} \\&= \sqrt{4+16} \\&= \sqrt{20}\end{aligned}$$

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

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