OPEN STUDENT FOUNDATION
STD 10 : MATHS
IMPORTANT QUESTION DAY 6

CHAPTER : 7

Date : 22/02/24

Section A

- **Write the answer of the following questions. [Each carries 3 Marks]** **[36]**

1. Check whether (5, – 2), (6, 4) and (7, – 2) are the vertices of an isosceles triangle.
2. Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer : (–1, –2), (1, 0), (–1, 2), (–3, 0)
3. Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer : (–3, 5), (3, 1), (0, 3), (–1, –4)
4. Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer : (4, 5), (7, 6), (4, 3), (1, 2)
5. Find the point on the X-axis which is equidistant from (2, –5) and (–2, 9).
6. If Q(0, 1) is equidistant from P(5, –3) and R(x, 6), find the values of x. Also find the distances QR and PR.
7. Find the coordinates of the points which divide the line segment joining A(–2, 2) and B(2, 8) into four equal parts.
8. If A and B are (– 2, – 2) and (2, – 4), respectively, find the coordinates of P such that AP = $\frac{3}{7}$ AB and P lies on the line segment AB.
9. Find the ratio in which the line segment joining A(1, –5) and B(–4, 5) is divided by the X-axis. Also find the coordinates of the point of division.
10. Find the ratio in which the line segment joining the points (–3, 10) and (6, –8) is divided by (–1, 6).
11. Find the area of a rhombus if its vertices are (3, 0), (4, 5), (–1, 4) and (–2, – 1) taken in order. [Hint : Area of a rhombus = $\frac{1}{2}$ (product of its diagonals)]
12. Find the coordinates of the points of trisection of the line segment joining (4, –1) and (–2, –3).

Section A

- **Write the answer of the following questions.** [Each carries 3 Marks] **[36]**

1. Check whether (5, – 2), (6, 4) and (7, – 2) are the vertices of an isosceles triangle.

➤ Let A(5, –2), B(6, 4) and C(7, –2)

$A(5, -2) = A(x_1, y_1)$

$B(6, 4) = B(x_2, y_2)$

$AB = \sqrt{[(x_1)-(x_2)]^2 + [(y_1)-(y_2)]^2}$

$= \sqrt{[(5)-(6)]^2 + [(-2)-(4)]^2}$

$= \sqrt{(-1)^2 + (-6)^2}$

$= \sqrt{1 + 36}$

$= \sqrt{37}$

➤ $BC = \sqrt{[(6)-(7)]^2 + [(4)-(-2)]^2}$

$= \sqrt{(6-7)^2 + (4+2)^2}$

$= \sqrt{1 + 36}$

$= \sqrt{37}$

In AC, $A(5, -2) = A(x_1, y_1)$

$C(7, -2) = C(x_2, y_2)$

$AC = \sqrt{[(x_1)-(x_2)]^2 + [(y_1)-(y_2)]^2}$

$= \sqrt{[(5)-(7)]^2 + [(-2)-(-2)]^2}$

$= \sqrt{(-2)^2 + (0)^2}$

$= \sqrt{4}$

$= 2$

➤ $AB = \sqrt{37}$, $BC = \sqrt{37}$ and $AC = 2$

$AB = BC \neq AC$

The given points are the vertices of an isosceles triangle.

2. Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer : (–1, –2), (1, 0), (–1, 2), (–3, 0)

➤ A(–1, –2), B(1, 0), C(–1, 2) and D(–3, 0) are given points.

Each side,

$$AB = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$= \sqrt{[(-1) - (1)]^2 + [-2 - 0]^2}$$

$$= \sqrt{(-2)^2 + (-2)^2}$$

$$= \sqrt{4 + 4}$$

$$= \sqrt{8}$$

$$\therefore AB = 2\sqrt{2}$$

$$BC = \sqrt{[1-(-1)]^2 + (0 - 2)^2}$$

$$= \sqrt{(+1 +1)^2 + (-2)^2}$$

$$= \sqrt{(2)^2 + (-2)^2}$$

$$= \sqrt{4 + 4}$$

$$= \sqrt{8}$$

$$\therefore BC = 2\sqrt{2}$$

$$CD = \sqrt{[(-1) - (-3)]^2 + [2-(0)]^2}$$

$$= \sqrt{[(-1) + 3]^2 + (4)^2}$$

$$= \sqrt{(2)^2 + (2)^2}$$

$$= \sqrt{4 + 4}$$

$$= \sqrt{8}$$

$$\therefore CD = 2\sqrt{2}$$

$$AD = \sqrt{[(-1) - (-3)]^2 + [(-2) - (0)]^2}$$

$$= \sqrt{(2)^2 + (-2)^2}$$

$$= \sqrt{8}$$

$$\therefore AD = 2\sqrt{2}$$

Thus, AB = BC = CD = AD (All sides are equal)

Diagonals :

$$AC = \sqrt{[(-1) - (-1)]^2 + [-2 - (2)]^2}$$

$$= \sqrt{(0)^2 + (-4)^2}$$

$$= \sqrt{0 + 16}$$

$$= \sqrt{16}$$

$$\therefore AC = 4$$

$$BD = \sqrt{(1) - (-3)^2 + [(0) - (0)]^2}$$

$$= \sqrt{(1 + 3)^2 + (0)^2}$$

$$= \sqrt{16}$$

$\therefore$ BD = 4

$\therefore$ Diagonal AC = BD

All sides are equal and also the diagonals are equal.

Hence, ABCD is a square.

3. Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer : (–3, 5), (3, 1), (0, 3), (–1, –4)

➤ A(–3, 5), B(3, 1), C(0, 3) and D(–1, –4) are given points.

Each side,

$$AB = \sqrt{[(x_1)-(x_2)]^2 + [(y_1) - (y_2)]^2}$$

$$= \sqrt{[(-3) - (3)]^2 + [5 - (1)]^2}$$

$$= \sqrt{(-6)^2 + (4)^2}$$

$$= \sqrt{36 + 16}$$

$$= \sqrt{52}$$

$\therefore AB = 2\sqrt{13}$

$$BC = \sqrt{[(3) - (0)]^2 + [(1) - (3)]^2}$$

$$= \sqrt{(3)^2 + (-2)^2}$$

$$= \sqrt{9 + 4}$$

$\therefore BC = \sqrt{13}$

$$CD = \sqrt{[(0) - (-1)]^2 + [[(3) - (-4)]^2}$$

$$= \sqrt{(0 + 1)^2 + (3 + 4)^2}$$

$$= \sqrt{(1)^2 + (7)^2}$$

$$= \sqrt{1 + 49}$$

$$= \sqrt{50}$$

$\therefore CD = 5\sqrt{2}$

$$DA = \sqrt{[(-1) - (-3)]^2 + [(-4) - (5)]^2}$$

$$= \sqrt{(2)^2 + (-9)^2}$$

$$= \sqrt{4 + 81}$$

$\therefore DA = \sqrt{85}$

Diagonals :

$AC = \sqrt{[(-3) - (0)]^2 + [5 - (3)]^2}$

$= \sqrt{(-3)^2 + (2)^2}$

$= \sqrt{9 + 4}$

$\therefore AC = \sqrt{13}$

$BD = \sqrt{[(3) - (-1)]^2 + [(1) - (-4)]^2}$

$= \sqrt{(4)^2 + (5)^2}$

$= \sqrt{16 + 25}$

$\therefore BD = \sqrt{41}$

AC + BC = AB

$\sqrt{13} + \sqrt{13} = 2\sqrt{13}$

Thus, the points A, B and C are collinear.

Out of the given four points, three of them are collinear. So they do not form a quadrilateral.

4. Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer : (4, 5), (7, 6), (4, 3), (1, 2)

➤ A(4, 5), B(7, 6), C(4, 3) and D(1, 2) are given points.

Each side,

$AB = \sqrt{(x_1 - x_2)^2 + [(y_1 - y_2)]^2}$

$= \sqrt{[(4) - (7)]^2 + [5 - (6)]^2}$

$= \sqrt{(4 - 7)^2 + (5 - 6)^2}$

$= \sqrt{(-3)^2 + (-1)^2}$

$= \sqrt{9 + 1}$

$\therefore AB = \sqrt{10}$

$BC = \sqrt{[(7) - (4)]^2 + [(6) - (3)]^2}$

$= \sqrt{(3)^2 + (3)^2}$

$= \sqrt{9 + 9}$

$= \sqrt{18}$

$\therefore BC = 3\sqrt{2}$

$CD = \sqrt{[(4) - (1)]^2 + [(3) - (2)]^2}$

$= \sqrt{(3)^2 + (3 - 2)^2}$

$\therefore CD = \sqrt{10}$

$$DA = \sqrt{[(1) - (4)]^2 + [(2) - (5)]^2}$$

$$= \sqrt{[1 - 4]^2 + [-3]^2}$$

$$= \sqrt{(-3)^2 + (-3)^2}$$

$$= \sqrt{9 + 9}$$

$$= \sqrt{18}$$

$$\therefore DA = 3\sqrt{2}$$

Diagonals :

$$AC = \sqrt{(4 - 4)^2 + (5 - 3)^2}$$

$$= \sqrt{0 + 4}$$

$$= 2$$

$$BD = \sqrt{(7 - 1)^2 + (6 - 2)^2}$$

$$= \sqrt{36 + 16}$$

$$= \sqrt{52}$$

$$= 13\sqrt{2}$$

Here, AB = CD

$\therefore$ BC = DA (opposite sides of a quadrilateral are equal and diagonals AC $\neq$ BD)

$\therefore$ ABCD is a parallelogram.

5. Find the point on the X-axis which is equidistant from (2, –5) and (–2, 9).

➤ We know that the y-coordinate of any point on X-axis is zero.

Let P(x, 0) is a point on X-axis.

The point P is equidistant from A(2, –5) and B(–2, 9).

➤ Now PA = PB

$$PA = \sqrt{[(x_1) - (x_2)]^2 + [(y_1) - (y_2)]^2}$$

$$= \sqrt{[(x) - (2)]^2 + [0 - (-5)]^2}$$

$$= \sqrt{x^2 - 4x + 4 + 25}$$

$$= \sqrt{x^2 - 4x + 29} \quad ....(i)$$

$$PB = \sqrt{\left[(x - (-2)^2\right] + [0 - (9)]^2}$$

$$= \sqrt{(x + 2)^2 + (9)^2}$$

$$= \sqrt{x^2 + 4x + 4 + 81}$$

$$= \sqrt{x^2 + 4x + 85} \quad ....(ii)$$

➤ But PA = PB so,

$\sqrt{x^2 - 4x + 29} = \sqrt{x^2 + 4x + 85}$

$\therefore$ $x^2 - 4x + 29 = x^2 + 4x + 85$ (Taking square root on both sides)

$\therefore$ $x^2 - 4x + 29 - x^2 - 4x - 85 = 0$

$\therefore$ $-8x - 56 = 0$

$\therefore$ $8x = -56$

$\therefore$ $x = -7$

Hence, the required point is P(x, 0) = P(–7, 0)

6. If Q(0, 1) is equidistant from P(5, –3) and R(x, 6), find the values of x. Also find the distances QR and PR.

➤ Q(0, 1) P(5, –3)

Q(x_1, y_1) P(x_2, y_2)

$$QP = \sqrt{[(x_1) - (x_2)]^2 + [(y_1) - (y_2)]^2}$$

$$= \sqrt{[(0) - (5)]^2 + [(1) - (-3)]^2}$$

$$= \sqrt{(25) + (16)}$$

$\therefore$ $QP = \sqrt{41}$

$$QR = \sqrt{[(0) - x]^2 + [(1) - (6)]^2}$$

$$= \sqrt{(x)^2 + (-5)^2}$$

$$QR = \sqrt{x^2 + 25}$$

➤ QP = QR

$\therefore$ $\sqrt{41} = \sqrt{x^2 + 25}$

$\therefore$ $41 = x^2 + 25$ (Taking square root on both sides)

$\therefore$ $x^2 + 25 - 41 = 0$

$\therefore$ $x^2 = 16$

$\therefore$ $x^2 = (\pm 4)^2$

$\therefore$ $x = 4$ and $x = -4$; $\therefore$ R(x, 6) = R(–4, 6) or R(4, 6)

Q(0, 1) R(±4, 6)

Q(x_1, y_1) R(x_2, y_2)

$$QR = \sqrt{[(x_1) - (x_2)]^2 + [(y_1) - (y_2)]^2}$$

$$= \sqrt{[(\pm 4) - (0)]^2 + (6 - 1)^2}$$

$$= \sqrt{(\pm 4)^2 + (5)^2}$$

$$= \sqrt{16 + 25}$$

$\therefore$ $QR = \sqrt{41}$

$P(5, -3) \quad R(\pm 4, 6)$

$P(x_1 \; y_1) \quad R(x_2, \; y_2)$

$$PR = \sqrt{[(5) - (\pm 4)]^2 + [-3 - (6)]^2}$$

$$= \sqrt{[5 - (4)]^2 + [-3 - 6]^2} \quad \text{or} \quad \sqrt{[5 - (-4)]^2 + (-3 - 6)^2}$$

$$= \sqrt{(5 - 4)^2 + (-9)^2} \quad \text{or} \quad \sqrt{(5 + 4)^2 + (-3 - 6)^2}$$

$$= \sqrt{(1)^2 + 81} \quad \text{or} \quad \sqrt{(9)^2 + (-9)^2}$$

$$= \sqrt{1 + 81} \quad \text{or} \quad \sqrt{81 + 81}$$

$$= \sqrt{82} \quad \text{or} \quad \sqrt{81 + 81}$$

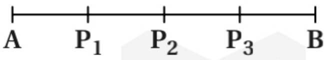
$$\therefore PR = \sqrt{82} \quad \text{or} \quad \sqrt{162}$$

$$\text{or} \quad \sqrt{81 \times 2}$$

$$\text{or} \quad 9\sqrt{2}$$

Thus, $PR = \sqrt{82}$ or $9\sqrt{2}$

7. Find the coordinates of the points which divide the line segment joining A(–2, 2) and B(2, 8) into four equal parts.

➤ 

➤ There are three points which divide AB into four equal parts. Let these points are P_1, P_2 and P_3

➤ P_1 divides $\overline{AB}$ from A's in the ratio $\frac{AP_1}{P_1B} = \frac{k}{3k} = \frac{m_1}{m_2} = \frac{1}{3}$

$\therefore m_1 = 1$ and $m_2 = 3$

$A(x_1 \; y_1) = (-2, 2)$

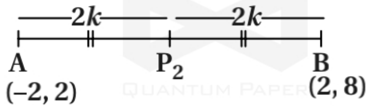
$B(x_2, y_2) = B(2, 8)$ and $P_1 \; (x, y)$.

$\therefore$ x-coordinate of P_1	y-coordinate of P_1
$\therefore x = \frac{m_1x_2 + m_2x_1}{m_1 + m_2}$	$y = \frac{m_1y_2 + m_2y_1}{m_1 + m_2}$
$= \frac{1(2) + 3(-2)}{1 + 3}$	$= \frac{1(8) + 3(2)}{1 + 3}$
$= \frac{-4}{4}$	$= \frac{14}{4}$
$\therefore x = -1$	$\therefore y = \frac{7}{2}$

$\therefore P, \; (x, y) = \left(-1, \frac{7}{2}\right)$ ....(i)

➤ Now $A - P_2 - B$ and $AP_2 = P_2B = 2k$

So P_2 is a midpoint of AB.



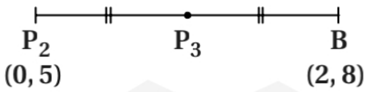
$\therefore\ P_2(x, y) = \left(\frac{-2+2}{2}, \frac{2+8}{2}\right)$

$= (0, 5)$

$\therefore\ P_2\ (x, y) = (0, 5)$ ....(ii)

➤ Also $P_2 - P_3 - B$ and $P_2P_3 = P_3B = k$

So P_3 is the midpoint of P_2B.



$\therefore\ P_3\ (x, y) = \left(\frac{0+2}{2}, \frac{5+8}{2}\right)$

$\therefore\ P_3\ (x, y) = \left(1, \frac{13}{2}\right)$ ....(ii)

Therefore, from equations (i), (ii) and (iii), the coordinate of the points which divide $\overline{AB}$ into four equal parts are (0, 5), $\left(-1, \frac{7}{2}\right)$ and $\left(1, \frac{13}{2}\right)$

8. If A and B are (– 2, – 2) and (2, – 4), respectively, find the coordinates of P such that AP = $\frac{3}{7}$ AB and P lies on the line segment AB.

➤ 

➤ Here, A(–2, –2) and B(2, –4) are given

➤ $AP = \frac{3}{7} AB$

$\therefore\ 7AP = 3AB$

$\therefore\ 7AP = 3(AP + PB)$ $(\because\ A–P–B)$

$\therefore\ 7AP = 3AP + 3PB$

$\therefore\ 7AP - 3AP = 3PB$

$\therefore\ 4AP = 3PB$

$\therefore\ \frac{AP}{PB} = \frac{3}{4}$

➤ Let the coordinates of P is (x, y)

$x = \frac{m_1x_2 + m_2x_1}{m_1 + m_2}$

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

$= \frac{6 - 8}{7}$

$\therefore\ x = -\frac{2}{7}$

$y = \frac{m_1y_2 + m_2y_1}{m_1 + m_2}$

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

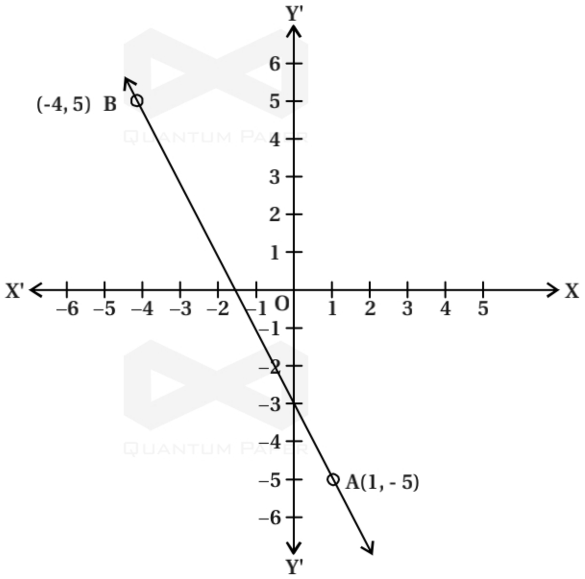
$= \frac{(-12) + (-8)}{7}$

$\therefore\ y = \frac{-20}{7}$

Thus, $P(x, y) = \left(-\frac{2}{7}, \frac{-20}{7}\right)$

9. Find the ratio in which the line segment joining A(1, –5) and B(–4, 5) is divided by the X-axis. Also

find the coordinates of the point of division.

➤ 

➤ The point A(1, –5) lies in the fourth quadrant and the point B(–4, 5) lies in the second quadrant.

➤ Let X-axis divides $\overline{AB}$ in the ratio $k : 1$ at a point.

$\therefore \dfrac{BP}{PA} = k \qquad B(x_2, y_2) = B(-4, 5)$ and

$A(x_1, y_1) = A(1, -5)$.

x-coordinate of P

$$x = \frac{m_1x_2 + m_2x_1}{m_1 + m_2}$$

$$x = \frac{-4k + 1}{k + 1}$$

$\therefore x(k + 1) = -4k + 1$

$\therefore x(1 + 1) = -4(1) + 1$ (Putting $k = 1$)

$= -4 + 1$

$\therefore 2x = -3$

$\therefore x = \dfrac{-3}{2}$

y-coordinate of P

$$y = \frac{m_1y_2 + m_2y_1}{m_1 + m_2}$$

$$y = \frac{k \times 5 + 1 \times (-5)}{k + 1}$$

$$0 = \frac{5k - 5}{k + 1}$$

$5k - 5 = 0$

$\therefore 5k = 5$

$\therefore k = \dfrac{5}{5}$

$\therefore k = 1$

Therefore the required ratio is 1 : 1 and the division point is $P(x, 0) = \left(\dfrac{-3}{2}, 0\right)$

10. Find the ratio in which the line segment joining the points (–3, 10) and (6, –8) is divided by (–1, 6).

➤ Let A(–3, 0) and B(6, –8) are given points.

Let P(–1, 6) divides $\overline{AB}$ from A in the ratio $\dfrac{AP}{PB} = \dfrac{m}{n}$.

Here, $A\ (x_1\ y_1) = (-3, 10)$

$B\ (x_2, y_2) = (6, -8)$

x coordinate of P

$$x = \frac{m_1x_2 + m_2x_1}{m_1 + m_2}$$

$$-1 = \frac{m_1(6) + m_2(-3)}{m_1 + m_2}$$

$$= \frac{6m_1 + (-3m_2)}{m_1 + m_2}$$

$$-1 = \frac{6m_1 - 3m_2}{m_1 + m_2}$$

$$-1\ (m_1 + m_2) = 6m_1 - 3m_2$$

$$\therefore -m_1 - m_2 = 6m_1 - 3m_2$$

$$\therefore -m_1 - m_2 - 6m_1 + 3m_2 = 0$$

$$\therefore -7m_1 + 2m_2 = 0$$

$$\therefore 2m_2 = 7m_1$$

$$\therefore \frac{m_1}{m_2} = \frac{2}{7}$$

$$\therefore m_1 : m_2 = 2 : 7$$

y coordinate of P

$$y = \frac{m_1y_2 + m_2y_1}{m_1 + m_2}$$

$$6 = \frac{m_1(-8) + m_2(10)}{m_1 + m_2}$$

$$6 = \frac{-8m_1 + 10m_2}{m_1 + m_2}$$

$$\therefore 6(m_1 + m_2) = -8m_1 + 10m_2$$

$$\therefore 6(m_1 + m_2) = -8m_1 + 10m_2$$

$$\therefore 6m_1 + 6m_2 = -8m_1 + 10m_2$$

$$\therefore 6m_1 + 6m_2 + 8m_1 - 10m_2 = 0$$

$$\therefore 14m_1 - 4m_2 = 0$$

$$\therefore 7m_1 - 2m_2 = 0$$

$$\therefore 7m_1 = 2m_2$$

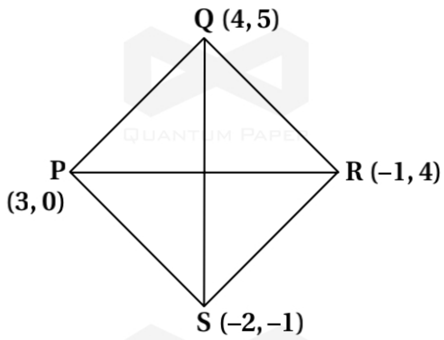
$$\therefore \frac{m_1}{m_2} = \frac{2}{7}$$

$$\therefore m_1 : m_2 = 2 : 7$$

Therefore, the required ratio is 2 : 7.

11. Find the area of a rhombus if its vertices are (3, 0), (4, 5), (–1, 4) and (–2, – 1) taken in order. [Hint : Area of a rhombus = $\frac{1}{2}$ (product of its diagonals)]

➤



Area of the rhombus = $\frac{1}{2}$ (Product of its diagonals)

$$= \frac{1}{2}\left[\sqrt{[(x_1) - (x_2)]^2 + \left[(y_1 - y_2)\right]^2} \times \sqrt{[(x_1) - (x_2)]^2 + [(y_1) - (y_2)]^2}\right]$$

$$= \frac{1}{2}\sqrt{[(3) - (-1)]^2 + [0 - 4]^2} \times \sqrt{(4)-(-2)^2 + [(5)-(-1)]^2}$$

$$= \frac{1}{2}\sqrt{\left[(3 + 1)^2 + (-4)\right]^2} \times \sqrt{\left[(4 + 2)^2\ (5 + 1)\right]^2}$$

$$= \frac{1}{2}\sqrt{\left[(4)^2 + (4)^2\right]} \times \sqrt{[(6) + (6)]^2}$$

$$= \frac{1}{2}\sqrt{16 + 16} \times \sqrt{36 + 36}$$

$= \frac{1}{2} \times \sqrt{32} \times \sqrt{72}$

$= \frac{1}{2} \times \sqrt{16 \times 2} \times \sqrt{36 \times 2}$

$= \frac{1}{2} \left(4\sqrt{2} \times 6\sqrt{2}\right)$

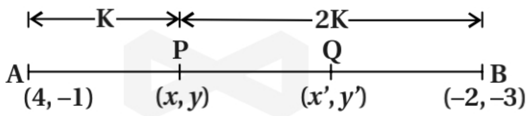
$= \frac{1}{2} \times 4\sqrt{2} \times 6\sqrt{2}$

$= \frac{1}{2} \times 4 \times 6 \times 2$

$= 24$

Therefore, the area of the rhombus is 24 sq. units.

12. Find the coordinates of the points of trisection of the line segment joining (4, –1) and (–2, –3).

➤ 

A(4, –1) and B(–2, –3) are given points.

Let the points P and Q divide AB into three equal parts.

P divides AB from A in the ratio A : 2.

$\therefore \frac{AP}{PB} = \frac{k}{2k} = \frac{1}{2} = \frac{m}{n}$ where $k > 0$

$\therefore m = 1$ and $n = 2$

A(4, –1) = A (x_1, y_1)

B(–2, –3) = B (x_2, y_2)

$\therefore$ x-coordinate of P

$x = \frac{mx_2 + nx_1}{m + n}$

$= \frac{1(-2) + 2(4)}{1 + 2}$

$= \frac{-2 + 8}{3} = 2$

$\therefore$ y-coordinate of P

$y = \frac{my_2 + ny_1}{m + n}$

$= \frac{1(-3) + 2(-1)}{1 + 2}$

$= \frac{-3 - 2}{3} = \frac{-5}{3}$

$P(x, y) = P\left(2, \frac{-5}{3}\right)$

➤ Now P–Q–B and PQ = QB = K so Q is the midpoint of $\overline{PB}$.

➤ Let the coordinates of Q is (x', y').

➤ Q is the midpoint of $\overline{PB}$ $P\left(2, -\frac{5}{3}\right)$ and B(–2, –3)

$\therefore Q(x', y') = \left(\frac{x + (-2)}{2}, \frac{y + (-3)}{2}\right)$

$= \left(\frac{2 + (-2)}{2}, \frac{-\frac{5}{3} + (-3)}{2}\right)$

$$= \left(\frac{0}{2}, \frac{-5 - 9}{2 \times 3}\right)$$

$$= \left(0, \frac{-14}{6}\right)$$

$$= \left(0, \frac{-7}{3}\right)$$

Therefore, the required trisection points are $\left(2, \frac{-5}{3}\right)$ and $\left(0, \frac{-7}{3}\right)$.