COORDINATE GEOMETRY
PPT-4

SUBJECT : MATHEMATICS
CHAPTER NUMBER: 07
CHAPTER NAME : COORDINATE GEOMETRY

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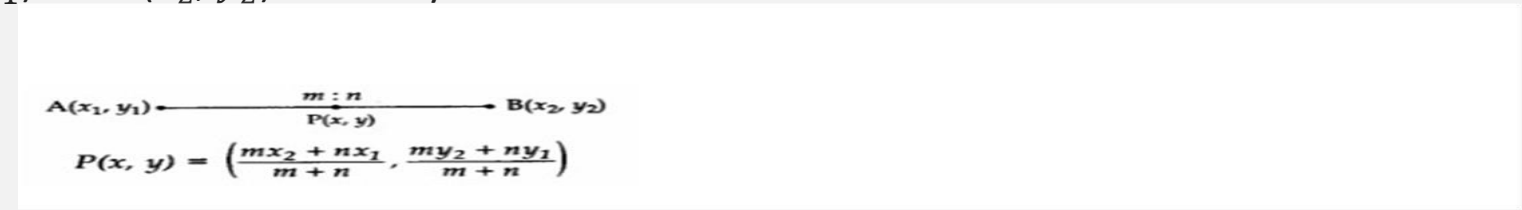
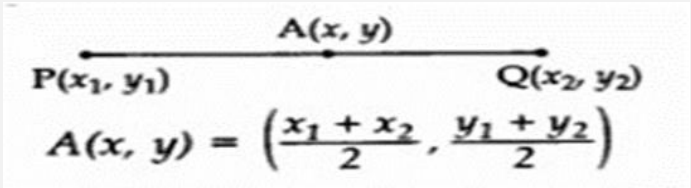
PREVIOUS KNOWLEDGE TEST

1. The coordinates of the point which divides the line segment joiningthe points A(x_1, y_1) and B(x_2, y_2) internally in the ratio m : n are:



2.The mid-point of the line segment joining the points P (x_1, y_1) and Q ((x_2, y_2)



LEARNING OUTCOME

1. . Students will be able to apply section formula to solve on problems based on finding section ratio and section point.
2. Students will be able to apply section formula to solve on problems based on finding points of trisection.
3. Students will be able to apply section formula to solve on problems based on finding the unknown vertex of a geometrical figure..

Problem solving on section formula;

https://youtu.be/fNF3u2rTccY(10.50)

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

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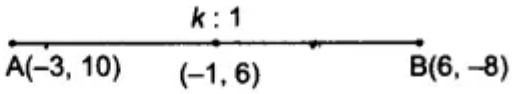
Let the required ratio be k : 1



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

$$-1 = \frac{k \times 6 + 1 \times (-3)}{k + 1}$$

$$-k - 1 = 6k - 3 \Rightarrow 7k = 2 \Rightarrow k = \frac{2}{7}$$

$$y = \frac{m_1y_2 + m_2y_1}{m_1 + m_2} \Rightarrow 6 = \frac{k \times (-8) + 1 \times (10)}{k + 1}$$

$$\Rightarrow \quad 6k + 6 = -8k + 10 \Rightarrow 14k = 4 \Rightarrow k = \frac{4}{14} = \frac{2}{7}$$

The required ratio is 2 : 7.

2. 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.

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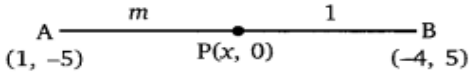
Let p(x, 0) be the point which divides the line segmwnt joining A(1,-5) and B(-4, 5) in the ratio m : 1.



Then using section formula, we get:

$$(x, 0) = \left(\frac{m \times -4 + 1 \times 1}{m+1}, \frac{m \times 5 + 1 \times -5}{m+1}\right)$$

$$\Rightarrow \quad 0 = \frac{m \times 5 + 1 \times (-5)}{m+1} \quad \text{[Taking } y\text{-coordinates]}$$

$$\Rightarrow \quad 5m - 5 = 0 \qquad \Rightarrow \qquad m = 1$$

$$\Rightarrow \quad m : 1 = 1 : 1$$

Hence, the required ratio is **1 : 1**.

Since the ratio is 1 : 1, so P is the mid-point.

$$\therefore x = \frac{1-4}{2} = \frac{-3}{2}.$$

Hence, $\left(-\frac{3}{2}, 0\right)$ is the required point.

3. If (1, 2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, find x and y.

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Mid-point of AC = Mid-point of BD

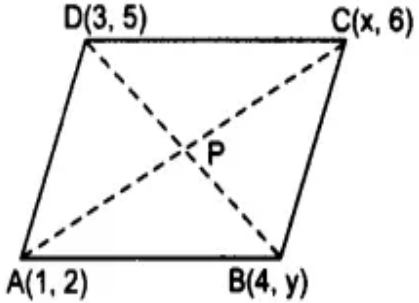
$$\Rightarrow \quad \frac{x+1}{2}, \frac{6+2}{2} = \frac{4+3}{2}, \frac{y+5}{2}$$

$$\Rightarrow \quad \frac{x+1}{2} = \frac{7}{2} \text{ and } \frac{6+2}{2} = \frac{y+5}{2}$$

$$\Rightarrow \quad x + 1 = 7 \text{ and } 8 = y + 5$$

$$\Rightarrow \quad x = 7 - 1 \text{ and } y = 8 - 5 = 3$$

$$\Rightarrow \quad x = 6 \quad \text{and } y = 3$$

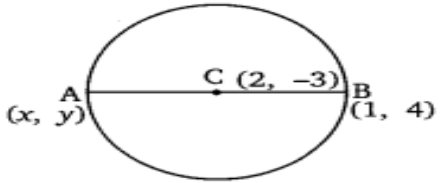


4. Find the coordinates of a point A, where AB is the diameter of a circle whose centre is $(2, -3)$ and B is $(1, 4)$

4. Find the coordinates of a point A, where AB is the diameter of a circle whose centre is (2, – 3) and B is (1, 4)

Let the coordinates of the point A be (x, y).

Then as C(2, –3) is the mid-point of diameter AB.



$\therefore$ Coordinates of C $= \left(\frac{x+1}{2}, \frac{y+4}{2}\right)$

$\Rightarrow \quad 2 = \frac{x+1}{2} \quad \Rightarrow \quad x = 3$

Also, $-3 = \frac{y+4}{2} \quad \Rightarrow \quad y = -10$

Hence, the coordinates of A are **(3, –10)**.

5.If A(5,1),B(1,5) and C(-3,-1) are the vertices of triangle ABC. Find the length of median AD.

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Sol. AD is median of ΔABC

$\therefore$ D is mid-point of BC

Coordinates of D are:

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

$$\text{Length of AD} = \sqrt{(5+1)^2 + (1-2)^2}$$

$$= \sqrt{36+1} = \sqrt{37} \text{ units}$$

HOME ASSIGNMENT Ex. 7.2 Q. No 4 to Q7

AHA

1.If the points A(6, 1), B(8, 2), C(9, 4) and D(p, 3) are the vertices of a parallelogram, taken in order, find the value of p.

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