ODM EDUCATIONAL GROUP
Changing your Tomorrow

COORDINATE GEOMETRY
PPT-3

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

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PREVIOUS KNOWLEDGE TEST

Problems based on geometrical figure.

To show that a given figure is a

1. Parallelogram – prove that the opposite sides are equal.
2. Rectangle – prove that the opposite sides are equal, and the diagonals are equal.
3. Parallelogram but not rectangle – prove that the opposite sides are equal, and the diagonals are not equal.
4. Rhombus – prove that the four sides are equal.
5. Square – prove that the four sides are equal, and the diagonals are equal.
6. Rhombus but not square – prove that the four sides are equal, and the diagonals are not equal.
7. Isosceles triangle – prove any two sides are equal.
8. Equilateral triangle – prove that all three sides are equal.
9. Right triangle – prove that sides of triangle satisfy Pythagoras theorem.

LEARNING OUTCOME

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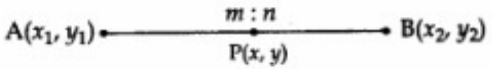
1 . 1.Students will be able to apply section formula to solve on problems based on finding section ratio and section point.

2. Students will be able to apply section formula to solve on problems based on finding points of trisection.

Section Formula ;

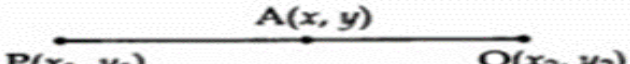
https://youtu.be/XYWpfpbqdbA (10.30)

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



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

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



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

2.Find the coordinates of the point which divides the join of (–1, 7) and (4, –3) in the ratio 2 : 3.

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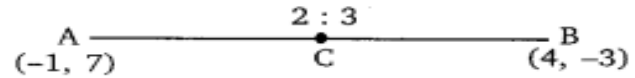
Let the coordinates of point C be (x, y).



$$x\text{-coordinate of C} = \frac{mx_2 + nx_1}{m+n}$$

$$= \frac{2\times 4 + 3\times(-1)}{2+3} = \frac{8-3}{5} = 1.$$

$$y\text{-coordinate of C} = \frac{my_2 + ny_1}{m+n}$$

$$= \frac{2\times(-3) + 3\times(7)}{2+3} = \frac{-6+21}{5} = 3.$$

Hence, the coordinates of C are **(1, 3)**.

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

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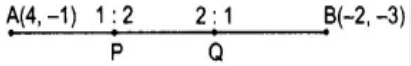
Let points P and Q trisect the line joining the points.



$\therefore$ AP = PQ = QB

P divides AB in the ratio 1: 2 and Q divides AB in the ratio 2:1

$$\text{P } (x\text{-coordinate}) = \frac{1\times(-2)+2\times 4}{1+2} = \frac{-2+8}{3} = \frac{6}{3} = 2$$

$$\text{P } (y\text{-coordinate}) = \frac{1\times(-3)+2\times(-1)}{1+2} = \frac{-3-2}{3} = -\frac{5}{3}$$

The coordinates of P are $\left(2, -\frac{5}{3}\right)$.

$$\text{Q } (x\text{-coordinate}) = \frac{2\times(-2)+1\times(4)}{2+1} = \frac{-4+4}{3} = 0$$

$$\text{Q } (y\text{-coordinate}) = \frac{2(-3)+1\times(-1)}{2+1} = \frac{-6-1}{3} = -\frac{7}{3}$$

The coordinates of Q are $\left(0, -\frac{7}{3}\right)$.

3. A point P divides the line segment joining the points A(3, -5) and B(-4, 8) such that AP/PB=K/1. If P lies on the line x + y = 0, then find the value of K?

4.A point P divides the line segment joining the points A(3, -5) and B(-4, 8) such that AP/PB=K/1. If P lies on the line x + y = 0, then find the value of K?

We have, AP : PB = K : 1

Coordinates of P $\left(\frac{-4K+3}{K+1}, \frac{8K-5}{K+1}\right)$

P lies on the line $x + y = 0$ ...[Given

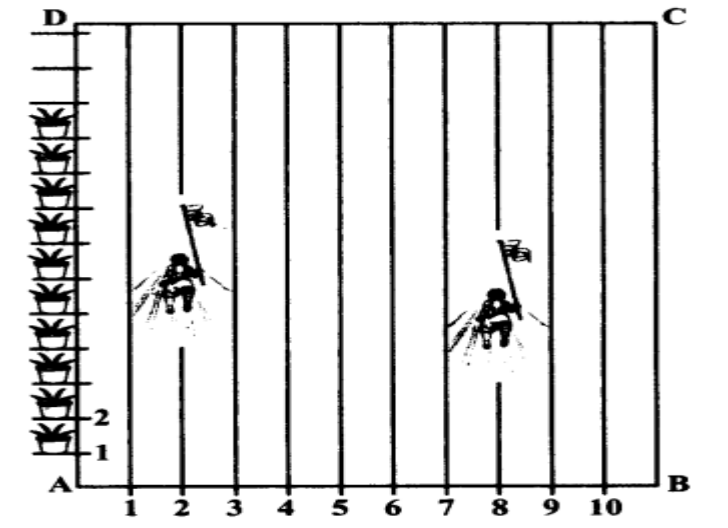
$$\frac{-4K+3}{K+1} + \frac{8K-5}{K+1} = 0$$

$$\frac{-4K+3+8K-5}{K+1} = 0$$

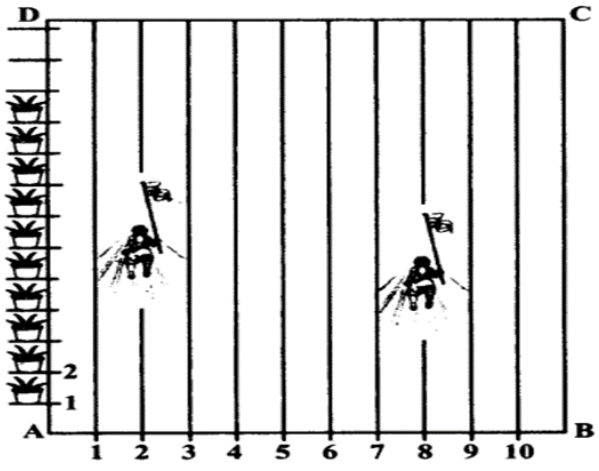
$$4K - 2 = 0 \quad \Rightarrow \quad 4K = 2$$

$$\therefore \quad K = \frac{2}{4} = \frac{1}{2}$$

5.To conduct Sports Day activities, in your rectangular shaped school ground ABCD, lines have been drawn with chalk powder at a distance of 1m each. 100 flower pots have been placed at a distance of 1m from each other along AD, as shown in Fig. 7.12. Niharika runs 1 4 th the distance AD on the 2nd line and posts a green flag. Preet runs 1 5 th the distance AD on the eighth line and posts a red flag. What is the distance between both the flags? If Rashmi has to post a blue flag exactly halfway between the line segment joining the two flags, where should she post her flag?



From the figure, taking A as (0, 0), x- axis along AB and y- axis along AD, we will obtain the coordinates of the green flag and the red flag.



The green flag is at $\frac{1}{4}$th of the total distance

$$= \frac{1}{4} \times 100 = 25 \text{ m in 2nd line.}$$

$\therefore$ The coordinates of green flag are (2, 25).

Similarly, coordinates of red flag are (8, 20).

Distance between two flags,

$$D = \sqrt{(8-2)^2 + (20-25)^2}$$

$$= \sqrt{(6)^2 + (-5)^2} = \sqrt{36+25} = \sqrt{\mathbf{61}} \text{ m.}$$

Now, blue flag is posted at the midpoint of the distance between two flags

$$\therefore \text{ Coordinates of blue flag} = \left(\frac{2+8}{2}, \frac{25+20}{2}\right)$$

$$= (5, 22.5)$$

Hence, the blue flag will be posted in 5th line at a distance of **22.5 m**.

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HOME ASSIGNMENT Ex. 7.2 Q. No 1 to Q3

AHA

1. . Find the ratio in which the y-axis divides the line segment joining the points (5, – 6) and (–1, – 4). Also find the point of intersection
2. : In what ratio does the point (– 4, 6) divide the line segment joining the points A(– 6, 10) and B(3, – 8)

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THANKING YOU

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