🟦 Chapter 7: Coordinate Geometry (Class 10 – NCERT)

🔹 7.1 Introduction

- A point on a plane has two coordinates:
  - **x-coordinate (abscissa)**: Distance from y-axis
  - **y-coordinate (ordinate)**: Distance from x-axis
- Example:
  - Point on x-axis: (x, 0)
  - Point on y-axis: (0, y)

🔹 7.2 Distance Formula

🧠 Concept:

To find the distance between two points **A(x_1, y_1)** and **B(x_2, y_2)**:

✅ Formula:

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

🟢 Special Case:

- From origin (0, 0) to (x, y):
- Distance of point **P(x, y)** from the origin **(0, 0)**: Distance = $\sqrt{(x^2 + y^2)}$

🔥 Important PYQ Trends:

- Finding distance between two points
- Check if three points form a triangle
- Use of converse of Pythagoras theorem

🔹 7.3 Section Formula

🧠 Concept:

If a point P divides the line joining A(x_1, y_1) and B(x_2, y_2) in the ratio $m_1 : m_2$

✅ Formula:

$P(x, y) = \left(\frac{(m_1x_2 + m_2x_1)}{(m_1 + m_2)}, \frac{(m_1y_2 + m_2y_1)}{(m_1 + m_2)} \right)$

🟡 Mid-point Formula (ratio 1:1):

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

✏️ Examples (PYQs)

Q1. Do (3,2), (−2,−3), (2,3) form a triangle?

- Use distance formula to check if the sum of two sides > third side.

Q2. Are (1,7), (4,2), (−1,−1), (−4,4) vertices of a square?

- All sides equal and both diagonals equal ⇒ Square

Q3. Find a point on y-axis equidistant from A(6, 5) and B(−4, 3)

- Let point be (0, y) and use distance formula on both sides

Q4. Find coordinates of a point dividing (4, −3) and (8, 5) in 3:1

- Use section formula

🔺 Frequently Asked Questions (Based on Previous Years):

Topic	**Type of Question**	**Frequency**
Distance formula	Find distance, check triangle	Very Frequent
Collinearity check	Are points collinear?	Frequent
Section formula	Find point dividing a segment	Very Frequent
Midpoint of a segment	Used in parallelogram/diameter problems	Frequent
Square/parallelogram verification	Using side and diagonal lengths	Occasional

📌 Tips for solving questions:

- Always draw a rough figure for 3-point/4-point questions.
- For “equidistant” problems, use distance formula and equate.
- Don’t forget: Square root answer only if distance is asked.

- Double-check calculation signs (negative signs often cause errors).