

**CBSE Class 10 Maths Notes Chapter 7:** CBSE Class 10 Maths Chapter 7 focuses on Coordinate Geometry, a branch of mathematics that deals with the study of geometric figures using coordinates.

In this chapter, students learn about the Cartesian coordinate system, which consists of a horizontal x-axis and a vertical y-axis intersecting at the origin.

Coordinate Geometry plays an important role in various fields, including engineering, physics, and computer science, making it an essential topic for students to grasp. Through this chapter, students develop problem-solving skills and gain a deeper understanding of geometric concepts in a coordinate plane.

## **CBSE Class 10 Maths Notes Chapter 7 Coordinate Geometry PDF**

You can find the PDF for CBSE Class 10 Maths Notes Chapter 7 on Coordinate Geometry by clicking the link provided below. This chapter is all about understanding geometric shapes using coordinates.

It covers topics like the Cartesian coordinate system, plotting points, finding points in different parts of the graph, distance formula, section formula, and learning about the slope of a line. This PDF will help you grasp Coordinate Geometry concepts better and improve your math skills.

[CBSE Class 10 Maths Notes Chapter 7 Coordinate Geometry PDF](#)

## **CBSE Class 10 Maths Notes Chapter 7 Coordinate Geometry**

### **Introduction to Coordinate Geometry:**

- Coordinate geometry is a branch of mathematics that explores the relationship between geometric figures and their coordinates.
- It involves representing points, lines, and shapes on a coordinate plane using ordered pairs of numbers.

### **Cartesian Coordinate System:**

- The Cartesian coordinate system, introduced by René Descartes, consists of two perpendicular lines known as the x-axis and y-axis.
- Each point on the plane is represented by a unique ordered pair  $(x, y)$ , where  $x$  represents the horizontal position (abscissa) and  $y$  represents the vertical position (ordinate).

## Points on a Cartesian Plane

Coordinates are pairs of numbers used to pinpoint locations on a plane. The abscissa, or x-coordinate, represents the distance of a point from the y-axis. Conversely, the ordinate, or y-coordinate, denotes the distance of a point from the x-axis. Together, these coordinates uniquely identify every point on the plane.

## Distance Formula

The distance between two points along the same axis, whether it's the x-axis or y-axis, is determined by the difference between their coordinates. If the points lie on the y-axis, their distance is calculated by subtracting their y-coordinates. Conversely, if they lie on the x-axis, their distance is determined by subtracting their x-coordinates.

## Section Formula

If the point  $P(x, y)$  **divides** the line segment joining  $A(x_1, y_1)$  and  $B(x_2, y_2)$  **internally** in the **ratio**  $m:n$ , then, the coordinates of  $P$  are given by the **section formula** as:

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

## Area of a Triangle given its vertices

If  $A(x_1, y_1)$ ,  $B(x_2, y_2)$  and  $C(x_3, y_3)$  are the vertices of a  $\Delta ABC$ , then its area is given by

$$A = \frac{1}{2}[x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)]$$

Where  $A$  is the area of the  $\Delta ABC$ .

**Example: Find the area of the triangle ABC whose vertices are  $A(1, 2)$ ,  $B(4, 2)$  and  $C(3, 5)$ .**

Solution:

Using the formula given above,

$$A = \frac{1}{2} [x_1 (y_2 - y_3) + x_2 (y_3 - y_1) + x_3 (y_1 - y_2)]$$

$$A = \frac{1}{2} [1(2 - 5) + 4(5 - 2) + 3(2 - 2)]$$

$$A = \frac{1}{2} [-3 + 12]$$

$$\text{Area} = \frac{9}{2} \text{ square units.}$$

Therefore, the area of a triangle ABC is  $\frac{9}{2}$  square units.

## Collinearity Condition

If three points A, B and C are collinear and B lies between A and C, then,

- $AB + BC = AC$ . AB, BC, and AC can be calculated using the distance formula.
- The ratio in which B divides AC, calculated using the section formula for both the x and y coordinates separately, will be equal.
- The area of a triangle formed by three collinear points is zero.

## Coordinate Geometry for Class 10 Problems

### Example 1:

Determine the distance between the pair of points (a, b) and (-a, -b)

#### Solution:

Let the given points be A(a, b) and B(-a, -b)

We know that the distance formula is:

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

$$(x_1, y_1) = (a, b)$$

$$(x_2, y_2) = (-a, -b)$$

Now, substitute the values in the distance formula, we get

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

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

$$AB = \sqrt{4a^2 + 4b^2}$$

$$AB = \sqrt{4(a^2 + b^2)}$$

$$AB = \sqrt{4} \cdot \sqrt{a^2 + b^2}$$

$$AB = 2 \cdot \sqrt{a^2 + b^2}$$

Hence, the distance between two points (a, b) and (-a, -b) is  $2\sqrt{a^2 + b^2}$ .

### Example 2:

Determine the ratio in which the line segment joining the points A(1, -5) and B(-4, 5) is divided by the x-axis. Also, find the coordinates of the point of division.

**Solution:**

Given that, the point P is on the x-axis. Hence, the y-coordinate is 0. Hence, the point is of the form P(x, 0).

Now, we have to find the ratio. Let the ratio be k:1.

Given Points: A(1, -5) and B = (-4, 5).

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

$$(x_2, y_2) = (-4, 5)$$

$$m_1 = k, m_2 = 1$$

We know that the section formula is:

$$y = [m_1 y_2 + m_2 y_1] / [m_1 + m_2]$$

Now, substitute the values in the section formula, we get

$$y = [k(5) + 1(-5)] / [k+1]$$

$$y = [5k-5] / [k+1]$$

Since, y=0

$$(5k-5)/(k+1) = 0$$

$$5k - 5 = 0$$

$$5k = 5$$

$$k=1$$

Hence, the ratio k:1 = 1:1

**Finding x-coordinate:**

$$x = [m_1 x_2 + m_2 x_1] / [m_1 + m_2]$$

$$x = [k(-4) + 1(1)] / (k+1)$$

Now, substitute k=1 in the above equation, we get

$$x = [1(-4) + 1(1)] / (1+1)$$

$$x = (-4+1)/2$$

$$x = -3/2.$$

Hence, the coordinate of the point is  $P(x, 0) = P(-3/2, 0)$ .

## Benefits of CBSE Class 10 Maths Notes Chapter 7 Coordinate Geometry

The benefits of studying CBSE Class 10 Maths Notes Chapter 7 Coordinate Geometry include:

**Clear Understanding:** The chapter helps students gain a clear understanding of the Cartesian coordinate system and how to represent points in a plane using coordinates.

**Problem-Solving Skills:** By learning concepts like distance formula, section formula, and midpoint formula, students develop strong problem-solving skills that are applicable in various mathematical problems.

**Foundation for Higher Studies:** Understanding Coordinate Geometry lays the foundation for higher-level mathematical studies, including calculus, analytical geometry, and physics.

**Enhanced Problem-Solving Abilities:** By solving problems related to coordinate geometry, students improve their critical thinking and problem-solving abilities, which are valuable skills in academics.