NCERT Solutions for Class 10 Maths Chapter 7 Exercise 7.1: NCERT Solutions for Class 10 Maths Chapter 7 Coordinate Geometry Exercise 7.1 focus on understanding the Cartesian plane and plotting points on it. This exercise involves solving problems related to the distance formula, midpoint formula, and basic understanding of coordinates.

Students are expected to find the distance between two points, determine the midpoint of a line segment, and use the Pythagorean theorem in the coordinate plane. The solutions provide detailed step-by-step explanations, helping students grasp the concepts with ease and practice problem-solving techniques effectively. These solutions are created to reinforce the understanding of coordinate geometry principles.

NCERT Solutions for Class 10 Maths Chapter 7 Exercise 7.1 Overview

NCERT Solutions for Class 10 Maths Chapter 7 Exercise 7.1 focuses on the foundational concepts of coordinate geometry. In this exercise, students learn about plotting points on the Cartesian plane, understanding the distance between two points, and finding the midpoint of a line segment.

Here's an overview of the key concepts covered in Exercise 7.1:

1. **Plotting Points on the Cartesian Plane**: Students are introduced to the Cartesian coordinate system, where points are represented by their coordinates (x, y). This concept helps in visualizing the relationship between numbers and their corresponding points on the plane.
2. **Distance Formula**: The exercise explains how to calculate the distance between two points using the distance formula, which is derived from the Pythagorean theorem.
3. **Midpoint Formula**: Students learn how to find the midpoint of a line segment given its endpoints. The midpoint formula is used to determine the point that divides the line segment into two equal parts.

NCERT Solutions for Class 10 Maths Chapter 7 Exercise 7.1 PDF

The NCERT Solutions for Class 10 Maths Chapter 7 Exercise 7.1 provide a detailed and step-by-step explanation of important coordinate geometry concepts such as plotting points on the Cartesian plane, calculating the distance between two points, and finding the midpoint of a line segment.

You can easily download the PDF of NCERT Solutions for Exercise 7.1 using the link available below, ensuring you have quick access to detailed solutions for better learning.

NCERT Solutions for Class 10 Maths Chapter 7 Coordinate Geometry Ex 7.1

Below is the NCERT Solutions for Class 10 Maths Chapter 7 Coordinate Geometry Ex 7.1-

Solve the followings Questions.

1. Find the distance between the following pairs of points:

(i) (2, 3), (4,1)

(ii) (–5, 7), (–1, 3)

(iii) (a, b), (–a, –b)

Answer:

(i) Distance between the points is given by

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

Therefore the distance between (2,3) and (4,1) is given by

$$\text{I} = \sqrt{(2-4)^2 + (3-1)^2}$$

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

= √4+4 = √8 = 2√2

(ii)Applying Distance Formula to find distance between points (–5, 7) and (–1, 3), we get

$$\text{I} = \sqrt{(-5-(-1))^2 + (7-3)^2}$$

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

= √16+16 = √32 = 4√2

(iii)Applying Distance Formula to find distance between points (a, b) and (–a, –b), we get

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

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

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

2. Find the distance between the points (0, 0) and (36, 15). Also, find the distance between towns A and B if town B is located at 36 km east and15 km north of town A.

Answer:

Applying Distance Formula to find distance between points (0, 0) and (36, 15), we get

= $\sqrt{(36-0)^2+(15-0)^2}=\sqrt{36^2+15^2}$

= √1296 + 225 = √1521 = 39

Yes, we can find the distance between the given towns A and B.

Assume town A at origin point (0, 0).

Therefore, town B will be at point (36, 15) with respect to town A.

And hence, as calculated above, the distance between town A and B will be 39km.

3. Determine if the points (1, 5), (2, 3) and (–2, –11) are collinear.

Answer:

Let A = (1, 5), B = (2, 3) and C = (–2, –11)

Using Distance Formula to find distance AB, BC and CA.

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

BC = $\sqrt{(2-(-2))^2+(3-(-11))^2}=\sqrt{4^2+14^2}=\sqrt{16+196}=\sqrt{212}$

CA = $\sqrt{(1-(-2))^2+(5-(-11))^2} = \sqrt{3^2+16} = \sqrt{9+256} = \sqrt{265}$

Since AB+BC ≠ CA

Therefore, the points (1, 5), (2, 3), and (−2, −11) are not collinear.

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

Answer:

Let A = (5, –2), B = (6, 4) and C = (7, –2)

Using Distance Formula to find distances AB, BC and CA.

AB = $\sqrt{(5-6)^2+(-2-4)^2} = \sqrt{(-1)^2+(-6)^2} = \sqrt{1+36} = \sqrt{37}$

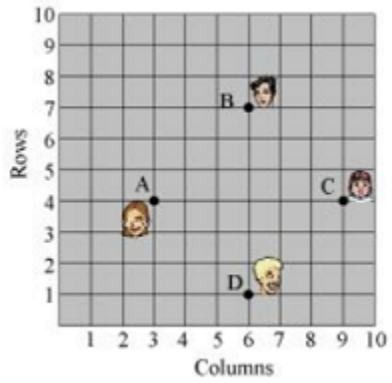
BC = $\sqrt{(6-7)^2+(4-(-2))^2} = \sqrt{(-1)^2+(6)^2} = \sqrt{1+36} = \sqrt{37}$

CA = $\sqrt{(5-7)^2+(-2-(-2))^2} = \sqrt{(-2)^2+0^2} = 2$

Since AB = BC.

Therefore, A, B and C are vertices of an isosceles triangle.

5. In a classroom, 4 friends are seated at the points A (3, 4), B (6, 7), C (9, 4) and D (6, 1). Champa and Chameli walk into the class and after observing for a few minutes Champa asks Chameli. “Don’t you think ABCD is a square?”Chameli disagrees. Using distance formula, find which of them is correct.



Answer:

We have A = (3, 4), B = (6, 7), C = (9, 4) and D = (6, 1)

Using Distance Formula to find distances AB, BC, CD and DA, we get

AB = $\sqrt{(3-6)^2+(4-7)^2} = \sqrt{(-3)^2+(-3)^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

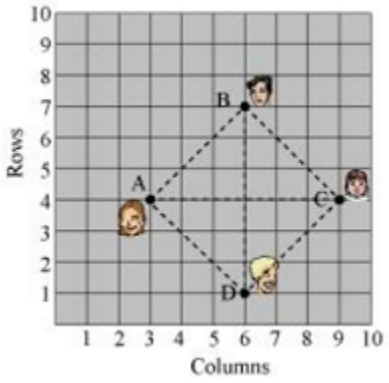
BC = $\sqrt{(6-9)^2+(7-4)^2} = \sqrt{(-3)^2+(3)^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

CD = $\sqrt{(9-6)^2+(4-1)^2} = \sqrt{(3)^2+(3)^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

AD = $\sqrt{(3-6)^2+(4-1)^2} = \sqrt{(-3)^2+(3)^2} = \sqrt{9+9} = \sqrt{18} = 3\sqrt{2}$

Therefore, All the sides of ABCD are equal here

Now, we will check the length of its diagonals.



AC = $\sqrt{(3-9)^2+(4-4)^2} = \sqrt{(-6)^2} = 6$

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

So, Diagonals of ABCD are also equal.

we can definitely say that ABCD is a square.

Therefore, Champa is correct.

6. Name the type of quadrilateral formed, if any, by the following points, and give reasons for your answer.

(i) (–1, –2), (1, 0), (–1, 2), (–3, 0)

(ii) (–3, 5), (3, 1), (0, 3), (–1, –4)

(iii) (4, 5), (7, 6), (4, 3), (1, 2)

Answer:

(i)Let A = (–1, –2), B = (1, 0), C= (–1, 2) and D = (–3, 0)

Using Distance Formula to find distances AB, BC, CD and DA, we get

AB = $\sqrt{(-1-1)^2+(-2-0)^2} = \sqrt{(-2)^2+(-2)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

BC = $\sqrt{(1-(-1))^2+(0-2)^2} = \sqrt{(2)^2+(-2)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

CD = $\sqrt{(-1-(-3))^2+(2-0)^2} = \sqrt{(2)^2+(2)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

AD = $\sqrt{(-1-(3))^2+(-2-0)^2} = \sqrt{(2)^2+(-2)^2} = \sqrt{4+4} = \sqrt{8} = 2\sqrt{2}$

Therefore, all four sides of quadrilateral are equal.

Now, we will check the length of diagonals.

AC = $\sqrt{(-1-(-1))^2+(-2-2)^2} = \sqrt{0^2+(-4)^2} = \sqrt{16} = 4$

BD = $\sqrt{(1-(-3))^2+(0-0)^2} = \sqrt{(4)^2+0^2} = \sqrt{16} = 4$

Therefore, diagonals of quadrilateral ABCD are also equal.

we can say that ABCD is a square.

(ii)Let A = (–3, 5), B= (3, 1), C= (0, 3) and D= (–1, –4)

Using Distance Formula to find distances AB, BC, CD and DA, we get

AB = $\sqrt{(-3,-3)^2+(5-1)^2} = \sqrt{(-6)^2+(4)^2} = \sqrt{36+16} = \sqrt{52} = 2\sqrt{13}$

BC = $\sqrt{(3-0)^2+(1-3)^2} = \sqrt{(3)^2+(-2)^2} = \sqrt{9+4} = \sqrt{13}$

CD = $\sqrt{(0-(-1))^2+(3-(-4))^2} = \sqrt{(1)^2+(7)^2} = \sqrt{1+49} = \sqrt{50} = 5\sqrt{2}$

DA = $\sqrt{(-3-(-1))^2+(5-(-4))^2} = \sqrt{(-2)^2+(9)^2} = \sqrt{4+81} = \sqrt{85}$

We cannot find any relation between the lengths of different sides.

Therefore, we cannot give any name to the quadrilateral ABCD.

(iii)Let A = (4, 5), B= (7, 6), C= (4, 3) and D= (1, 2)

Using Distance Formula to find distances AB, BC, CD and DA, we get

AB = $\sqrt{(4-7)^2+(5-6)^2} = \sqrt{(-3)^2+(-1)^2} = \sqrt{9+1} = \sqrt{10}$

BC = $\sqrt{(7-4)^2+(6-3)^2} = \sqrt{(3)^2+(3)^2} = \sqrt{9+9} = \sqrt{18}$

CD = $\sqrt{(4-1)^2+(3-2)^2} = \sqrt{(3)^2+(1)^2} = \sqrt{9+1} = \sqrt{10}$

DA = $\sqrt{(4-1)^2+(5-2)^2} = \sqrt{(3)^2+(3)^2} = \sqrt{9+9} = \sqrt{18}$

Here opposite sides of quadrilateral ABCD are equal.

We can now find out the lengths of diagonals.

AC = $\sqrt{(4-4)^2+(5-3)^2} = \sqrt{(0)^2+(2)^2} = \sqrt{0+4} = 2$

BD = $\sqrt{(7-1)^2+(6-2)^2} = \sqrt{(6)^2+(4)^2} = \sqrt{36+16} = \sqrt{52} = 13\sqrt{2}$

Here diagonals of ABCD are not equal.

we can say that ABCD is not a rectangle therefore it is a parallelogram.

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

Answer:

Let the point be (x, 0) on x–axis which is equidistant from (2, –5) and (–2, 9).

Using Distance Formula and according to given conditions we have:

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

$$\Rightarrow \sqrt{(x-(-2))^2+(0-(-9))^2}=\sqrt{(x+2)^2+(9)^2}$$

Squaring both sides, we get

$$\Rightarrow \sqrt{(x-2)^2+(5)^2}=\sqrt{(x+2)^2+(9)^2}$$

$(x-2)^2 + 25 = (x+2)^2 + 81$

$x^2 + 4 - 4x + 25 = x^2 + 4 + 4x + 81$

$8x = - 25 - 81$

$8x = -56$

$x = - 7$

Therefore, point on the x–axis which is equidistant from (2, –5) and (–2, 9) is (–7, 0)

8. Find the values of y for which the distance between the points P (2, –3) and Q (10, y) is 10 units.

Answer:

Using Distance formula, we have

$$\sqrt{(2-10)^2+(-3-y)^2}=10$$

$$\Rightarrow \sqrt{(-8)^2+(3+y)^2}=10$$

⇒ 64 + (y +3)² = 100

⇒ (y+3)² = 100-64 = 36

⇒ y+3 = ± 6

⇒ y+3=6 or y+3 = - 6

Therefore y = 3 or -9

9. 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.

Answer:

It is given that Q is equidistant from P and R. Using Distance Formula, we get

PQ = RQ

$$\sqrt{(5-0)^2+(-3-1)^2} = \sqrt{(0-x)^2+(1-6)^2}$$

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

⇒√25+16 = √x² + 25

⇒41 = x² + 25

16 = x²

x = ± 4

Thus, R is (4, 6) or (–4, 6).

When point R is (4,6)

PR = $\sqrt{(5-4)^2+(-3-6)^2} = \sqrt{\left(1^2+(-9)^2\right)} = \sqrt{1+81} = \sqrt{82}$

QR = $\sqrt{(0-4)^2+(1-6)^2} = \sqrt{(-4)^2+(-5)^2} = \sqrt{16+25} = \sqrt{41}$

When point R is (- 4,6)

PR = $\sqrt{(5-(-4))^2+(-3-6)^2} = \sqrt{(9)^2+(-9)^2} = \sqrt{81+81} = 9\sqrt{2}$

QR = $\sqrt{(0-(-4))^2+(1-6)^2} = \sqrt{(4)^2+(-5)^2} = \sqrt{16+25} = \sqrt{41}$

10. Find a relation between x and y such that the point (x, y) is equidistant from the point (3, 6) and (–3, 4).

Answer:

It is given that (x, y) is equidistant from (3, 6) and (–3, 4).

Using Distance formula, we can write

$$\sqrt{(x-3)^2+(y-6)^2} = \sqrt{(x-(-3))^2+(y-4)^2}$$

$$\Rightarrow \sqrt{(x-3)^2+(y-6)^2} = \sqrt{(x+3)^2+(y-4)^2}$$

⇒ (x-3)² + (y-6)² = (x+3)² + (y-4)²

⇒ x² + 9 -6x + y² + 36 - 12y = x² + 9 + 6x + y² + 16 - 8y

⇒36- 16 = 6x + 6x + 12y - 8y

⇒20 = 12x + 4y

⇒3x + y = 5

⇒3x + y - 5 = 0

Benefits of Solving NCERT Solutions for Class 10 Maths Chapter 7 Coordinate Geometry Ex 7.1

1. **Concept Clarity**: This exercise helps students understand the fundamentals of coordinate geometry, including plotting points, calculating distances, and determining midpoints. These concepts form the foundation for more advanced topics in mathematics.

2. **Improved Problem-Solving Skills**: By practicing a variety of problems in this exercise, students can enhance their analytical and problem-solving skills, making them more confident in tackling similar problems in exams.
3. **Formula Application**: This exercise provides a clear understanding of how to apply essential coordinate geometry formulas, like the distance formula and midpoint formula, which are crucial for solving related problems.
4. **Boosts Exam Preparation**: Working through NCERT solutions ensures that students are well-prepared for exams by reinforcing their understanding of key concepts and improving speed and accuracy in solving problems.
5. **Builds Strong Foundation**: Coordinate geometry is a topic that is frequently tested in competitive exams. Solving this exercise ensures that students build a strong foundation, helping them in future mathematical studies.
6. **Structured Learning**: The step-by-step approach in the solutions provides structured learning, allowing students to break down complex problems into manageable steps, making the topic less intimidating.