NCERT Solutions Class 9 Maths
Chapter 3: Coordinate Geometry
EXERCISE 3.3

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Quick Summary: NCERT Solutions Class 9 Maths Chapter 3 Exercise 3.3 introduces students to advanced coordinate geometry concepts, focusing on the distance formula and its applications in the Cartesian plane. This exercise builds upon basic plotting skills and teaches students how to calculate distances between points using the formula d = √(x_2-x_1)^2 + (y_2-y_1)^2, which is fundamental for CBSE Class 9 board exams and higher mathematics.

Key Takeaways:

- Master the distance formula d = √(x_2-x_1)^2 + (y_2-y_1)^2 to find distances between any two points
- Understand how coordinate geometry connects algebra with geometric concepts in the Cartesian system
- Learn to apply distance calculations in real-world problems involving navigation and measurement
- Practice identifying coordinates and using them effectively in mathematical proofs and problem-solving

Complete Solutions

Question 1

QUESTION

Determine which of the following polynomials has (x + 1) as a factor:

(i) x^3 + x^2 + x + 1
(ii) x^4 + x^3 + x^2 + x + 1
(iii) x^4 + 3x^3 + 3x^2 + x + 1
(iv) x^3 - x^2 - (2 + √2)x + √2

SOLUTION

We need to determine if is a factor of the given polynomials. We can use the Factor Theorem, which states that if , then is a factor of the polynomial .

(i) Let . We need to find .

Since , is a factor of .

(ii) Let . We need to find .

Since , is not a factor of .

(iii) Let . We need to find .

Since , is not a factor of .

(iv) Let . We need to find .

Since , is not a factor of .

Final Answer: is a factor of (i), but not a factor of (ii), (iii), and (iv).

ANSWER

(x + 1) is a factor of (i), but not a factor of (ii), (iii), and (iv).

Question 2

QUESTION

Use the Factor Theorem to determine whether g(x) is a factor of p(x) in each case:

(i) p(x) = 2x^3 + x^2 - 2x - 1, g(x) = x + 1
(ii) p(x) = x^3 + 3x^2 + 3x + 1, g(x) = x + 2
(iii) p(x) = x^3 - 4x^2 + x + 6, g(x) = x - 3

SOLUTION

This question tests our understanding of the Factor Theorem, which states that a polynomial is a factor of another polynomial if and only if , where is a root of .

(i) ,

Step 1: Find the root of

We set to find its root:

So, .

Step 2: Evaluate

We substitute into :

Step 3: Conclusion

Since , by the Factor Theorem, is a factor of .

Answer: Yes

(ii) ,

Step 1: Find the root of

We set to find its root:

So, .

Step 2: Evaluate

We substitute into :

Step 3: Conclusion

Since , by the Factor Theorem, is not a factor of .

Answer: No

(iii) ,

Step 1: Find the root of

We set to find its root:

So, .

Step 2: Evaluate

We substitute into :

Step 3: Conclusion

Since , by the Factor Theorem, is a factor of .

Answer: Yes

ANSWER

(i) Yes

(ii) No

(iii) Yes

Question 3

QUESTION

Find the value of k, if x - 1 is a factor of p(x) in each of the following cases:

(i) p(x) = x^2 + x + k
(ii) p(x) = 2x^2 + kx + √2
(iii) p(x) = kx^2 - √2x + 1
(iv) p(x) = kx^2 - 3x + k

SOLUTION

We are asked to find the value of in each case, given that is a factor of the polynomial . This means that according to the Factor Theorem.

(i)

Step 1: Apply the Factor Theorem. Since is a factor, .

Step 2: Substitute into :

Step 3: Set and solve for :

Final Answer:

(ii)

Step 1: Apply the Factor Theorem. Since is a factor, .

Step 2: Substitute into :

Step 3: Set and solve for :

Final Answer:

(iii)

Step 1: Apply the Factor Theorem. Since is a factor, .

Step 2: Substitute into :

Step 3: Set and solve for :

Final Answer:

(iv)

Step 1: Apply the Factor Theorem. Since is a factor, .

Step 2: Substitute into :

Step 3: Set and solve for :

Final Answer:

ANSWER

(i) -2

(ii) $-(2 + \sqrt{2})$

(iii) $\sqrt{2} - 1$

(iv) (3)/(2)

Question 4

QUESTION

Factorise the following:

(i) 12x^2 - 7x + 1
(ii) 2x^2 + 7x + 3
(iii) 6x^2 + 5x - 6
(iv) 3x^2 - x - 4

SOLUTION

This question tests our ability to factorize quadratic polynomials of the form using the splitting the middle term method.

(i) Factorize

Step 1: Split the middle term

We need to find two numbers such that their sum is -7 and their product is . The numbers are -4 and -3.

So, we rewrite the middle term as:

Step 2: Factor by grouping

Group the terms in pairs:

Factor out the greatest common factor (GCF) from each pair:

Step 3: Factor out the common binomial factor

Notice that is a common factor. Factor it out:

Final Answer:

(ii) Factorize

Step 1: Split the middle term

We need to find two numbers such that their sum is 7 and their product is . The numbers are 6 and 1.

So, we rewrite the middle term as:

Step 2: Factor by grouping

Group the terms in pairs:

Factor out the GCF from each pair:

Step 3: Factor out the common binomial factor

Notice that is a common factor. Factor it out:

Final Answer:

(iii) Factorize

Step 1: Split the middle term

We need to find two numbers such that their sum is 5 and their product is . The numbers are 9 and -4.

So, we rewrite the middle term as:

Step 2: Factor by grouping

Group the terms in pairs:

Factor out the GCF from each pair:

Step 3: Factor out the common binomial factor

Notice that is a common factor. Factor it out:

Final Answer:

(iv) Factorize

Step 1: Split the middle term

We need to find two numbers such that their sum is -1 and their product is . The numbers are -4 and 3.

So, we rewrite the middle term as:

Step 2: Factor by grouping

Group the terms in pairs:

Factor out the GCF from each pair:

Step 3: Factor out the common binomial factor

Notice that is a common factor. Factor it out:

Final Answer:

ANSWER

(i) (3x - 1)(4x - 1)

(ii) (x + 3)(2x + 1)

(iii) (2x + 3)(3x - 2)

(iv) (x + 1)(3x - 4)

Question 5

QUESTION

Factorise the following:

(i) x^3 - 2x^2 - x + 2
(ii) x^3 - 3x^2 - 9x - 5
(iii) x^3 + 13x^2 + 32x + 20
(iv) 2y^3 + y^2 - 2y - 1

SOLUTION

This question tests our ability to factorize cubic polynomials using the factor theorem and synthetic division.

(i)

Step 1: Find a factor using the Factor Theorem

We look for a value of that makes the polynomial equal to zero. By trial and error, we find that is a root:

Therefore, is a factor.

Step 2: Divide the polynomial by the factor

We can use synthetic division or polynomial long division. Here, we'll factor by grouping:

Step 3: Factor the remaining quadratic

We recognize as a difference of squares:

Step 4: Write the complete factorization

(ii)

Step 1: Find a factor using the Factor Theorem

By trial and error, we find that is a root:

Therefore, is a factor.

Step 2: Divide the polynomial by the factor

Using synthetic division or polynomial long division, we find:

Step 3: Factor the remaining quadratic

We factor the quadratic :

Step 4: Write the complete factorization

(iii)

Step 1: Find a factor using the Factor Theorem

By trial and error, we find that is a root:

Therefore, is a factor.

Step 2: Divide the polynomial by the factor

Using synthetic division or polynomial long division, we find:

Step 3: Factor the remaining quadratic

We factor the quadratic :

Step 4: Write the complete factorization

(iv)

Step 1: Find a factor using the Factor Theorem

By trial and error, we find that is a root:

Therefore, is a factor.

Step 2: Divide the polynomial by the factor

We can factor by grouping:

Step 3: Factor the remaining quadratic

We recognize as a difference of squares:

Step 4: Write the complete factorization

ANSWER

(i) (x - 2)(x - 1)(x + 1)

(ii) (x + 1)(x + 1)(x - 5)

(iii) (x + 1)(x + 2)(x + 10)

(iv) (y - 1)(y + 1)(2y + 1)

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📌 Key Formulas

Important Formulas for Exercise 3.3

Formula / Concept	Description
Cartesian System	A system used to locate a point in a plane by using two perpendicular lines: the x-axis and the y-axis.
Coordinate Axes	The two perpendicular lines in a Cartesian plane. The horizontal line is the x-axis, and the vertical line is the y-axis.
Origin	The point of intersection of the x-axis and the y-axis. Its coordinates are (0, 0).
Ordered Pair (x, y)	A pair of numbers that give the location of a point on a coordinate plane. The order is important: (x, y) ≠ (y, x) unless x = y.
Abscissa (x-coordinate)	The perpendicular distance of a point from the y-axis. It is the first number in the ordered pair (x, y).
Ordinate (y-coordinate)	The perpendicular distance of a point from the x-axis. It is the second number in the ordered pair (x, y).
Quadrants	The four regions into which the coordinate axes divide the plane. They are numbered I, II, III, and IV in a counter-clockwise direction.
Signs in Quadrant I	(+, +). Both the x-coordinate and y-coordinate are positive.
Signs in Quadrant II	(-, +). The x-coordinate is negative, and the y-coordinate is positive.
Signs in Quadrant III	(-, -). Both the x-coordinate and y-coordinate are negative.
Signs in Quadrant IV	(+, -). The x-coordinate is positive, and the y-coordinate is negative.
Point on the x-axis	Any point on the x-axis has coordinates of the form (x, 0).

Formula / Concept	Description
Point on the y-axis	Any point on the y-axis has coordinates of the form (0, y).

Top FAQs

Q1. How many questions are in NCERT Solutions Class 9 Maths Chapter 3 Coordinate Geometry Exercise 3.3?

Exercise 3.3 of NCERT Solutions for Class 9 Maths Chapter 3 Coordinate Geometry contains exactly 5 questions. These questions focus on plotting points in the Cartesian plane and understanding coordinate concepts, making it essential practice for CBSE board exam 2025-26 preparation.

Q2. Where can I download free PDF of NCERT Solutions for Class 9 Maths Chapter 3 Coordinate Geometry Exercise 3.3?

You can download the free PDF of NCERT Solutions for Class 9 Maths Chapter 3 Coordinate Geometry Exercise 3.3 from the official NCERT website or trusted educational portals. These step by step solutions PDF are updated according to the CBSE 2025-26 syllabus and include detailed explanations for all 5 questions.

Q3. How many marks does Coordinate Geometry Chapter 3 carry in CBSE Class 9 Maths board exam 2025-26?

Coordinate Geometry (Chapter 3) carries 4 marks weightage under Unit III in the CBSE Class 9 board exam 2025-26. Students should thoroughly practice NCERT Solutions for Class 9 Maths Chapter 3 Exercise 3.3 to secure full marks in this section.

Q4. Which is the most difficult question in Exercise 3.3 of NCERT Class 9 Maths Chapter 3 Coordinate Geometry?

Question 3 and Question 5 in Exercise 3.3 of Class 9 Maths Chapter 3 Coordinate Geometry are considered relatively challenging as they involve plotting multiple points and understanding the Cartesian system thoroughly. Step by step solutions help students master these questions for CBSE board exam 2025-26 preparation.

Q5. What is Cartesian System explained in NCERT Solutions Class 9 Maths Chapter 3 Coordinate Geometry Exercise 3.3?

The Cartesian System in NCERT Class 9 Maths Chapter 3 Exercise 3.3 refers to the coordinate plane with two perpendicular axes (x-axis and y-axis) that intersect at the origin (0,0). This system helps in locating points using ordered pairs (x, y) and forms the foundation for coordinate geometry concepts tested in CBSE board exam 2025-26.

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