NCERT Solutions Class 9 Maths
Chapter 2: Polynomials
EXERCISE 2.2

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Quick Summary: In NCERT Solutions Class 9 Maths Chapter 2 Exercise 2.2, students learn to find zeroes of polynomials and apply the Remainder and Factor Theorems. This exercise covers polynomial evaluation, finding roots, and understanding the relationship between factors and zeroes, which are essential concepts for CBSE Class 9 board exams and higher mathematics.

Key Takeaways:

- A zero of polynomial p(x) is a value a such that p(a) = 0
- Remainder Theorem: When polynomial p(x) is divided by (x-a), the remainder equals p(a)
- Factor Theorem: (x-a) is a factor of p(x) if and only if p(a) = 0
- Linear polynomials like ax + b have exactly one zero at x = -(b)/(a)

Complete Solutions

Question 1

QUESTION

Find the value of the polynomial 5x - 4x^2 + 3 at:

(i) x = 0
(ii) x = -1
(iii) x = 2

SOLUTION

We are asked to find the value of the polynomial at different values of .

Let . We need to find , , and .

(i) Finding the value at

Step 1: Substitute into the polynomial

We replace every instance of with in the polynomial .

Step 2: Simplify the expression

Therefore, the value of the polynomial at is 3.

(ii) Finding the value at

Step 1: Substitute into the polynomial

We replace every instance of with in the polynomial .

Step 2: Simplify the expression

Therefore, the value of the polynomial at is -6.

(iii) Finding the value at

Step 1: Substitute into the polynomial

We replace every instance of with in the polynomial .

Step 2: Simplify the expression

Therefore, the value of the polynomial at is -3.

Final Answer:

(i) 3

(ii) -6

(iii) -3

ANSWER

(i) 3

(ii) -6

(iii) -3

Question 2

QUESTION

Find p(0), p(1), and p(2) for each of the following polynomials:

(i) p(y) = y^2 - y + 1
(ii) p(t) = 2 + t + 2t^2 - t^3
(iii) p(x) = x^3
(iv) p(x) = (x - 1)(x + 1)

SOLUTION

This question tests the understanding of how to evaluate a polynomial at specific values. We need to substitute the given values (0, 1, and 2) into each polynomial and simplify.

(i)

Step 1: Find

Substitute into the polynomial:

Step 2: Find

Substitute into the polynomial:

Step 3: Find

Substitute into the polynomial:

Answer: , ,

(ii)

Step 1: Find

Substitute into the polynomial:

Step 2: Find

Substitute into the polynomial:

Step 3: Find

Substitute into the polynomial:

Answer: , ,

(iii)

Step 1: Find

Substitute into the polynomial:

Step 2: Find

Substitute into the polynomial:

Step 3: Find

Substitute into the polynomial:

Answer: , ,

(iv)

Step 1: Find

Substitute into the polynomial:

Step 2: Find

Substitute into the polynomial:

Step 3: Find

Substitute into the polynomial:

Answer: , ,

ANSWER

(i) 1, 1, 3

(ii) 2, 4, 4

(iii) 0, 1, 8

(iv) -1, 0, 3

Question 3

QUESTION

Verify whether the following are zeroes of the polynomial, as indicated:

(i) p(x) = 3x + 1, x = -(1)/(3)
(ii) p(x) = 5x - π, x = (4)/(5)
(iii) p(x) = x^2 - 1, x = 1, -1
(iv) p(x) = (x + 1)(x - 2), x = -1, 2
(v) p(x) = x^2, x = 0
(vi) p(x) = lx + m, x = -(m)/(l)
(vii) p(x) = 3x^2 - 1, x = -(1)/(√3), (2)/(√3)
(viii) p(x) = 2x + 1, x = (1)/(2)

SOLUTION

This question tests our understanding of what it means for a value to be a zero (or root) of a polynomial. A value is a zero of a polynomial if . We need to substitute the given values of into the polynomial and check if the result is zero.

(i) ,

Step 1: Substitute the value of x

Substitute into :

Step 2: Simplify

Step 3: Conclude

Since , is a zero of the polynomial .

Answer: Yes

(ii) ,

Step 1: Substitute the value of x

Substitute into :

Step 2: Simplify

Step 3: Conclude

Since , is not a zero of the polynomial .

Answer: No

(iii) ,

Step 1: Substitute x = 1

Step 2: Substitute x = -1

Step 3: Conclude

Since and , both and are zeroes of the polynomial .

Answer: Yes

(iv) ,

Step 1: Substitute x = -1

Step 2: Substitute x = 2

Step 3: Conclude

Since and , both and are zeroes of the polynomial .

Answer: Yes

(v) ,

Step 1: Substitute x = 0

Step 2: Conclude

Since , is a zero of the polynomial .

Answer: Yes

(vi) ,

Step 1: Substitute the value of x

Step 2: Simplify

Step 3: Conclude

Since , is a zero of the polynomial .

Answer: Yes

(vii) ,

Step 1: Substitute

Step 2: Substitute

Step 3: Conclude

Since , is a zero of the polynomial . However, since , is not a zero of the polynomial.

Answer: is a zero, but is not a zero

(viii) ,

Step 1: Substitute the value of x

Step 2: Simplify

Step 3: Conclude

Since , is not a zero of the polynomial .

Answer: No

ANSWER

(i) Yes

(ii) No

(iii) Yes

(iv) Yes

(v) Yes

(vi) Yes

(vii) -(1)/(√3) is a zero, but (2)/(√3) is not a zero

(viii) No

Question 4

QUESTION

Find the zero of the polynomial in each of the following cases:

(i) $p(x) = x + 5$
(ii) $p(x) = x - 5$
(iii) $p(x) = 2x + 5$
(iv) $p(x) = 3x - 2$
(v) $p(x) = 3x$
(vi) $p(x) = ax, a \neq 0$
(vii) $p(x) = cx + d$, where c, d are real numbers

SOLUTION

This question asks us to find the zeros of several polynomials. The zero of a polynomial is the value of for which .

(i)

Step 1: Set the polynomial equal to zero.

Step 2: Solve for .

Subtract 5 from both sides:

The zero of the polynomial is .

(ii)

Step 1: Set the polynomial equal to zero.

Step 2: Solve for .

Add 5 to both sides:

The zero of the polynomial is .

(iii)

Step 1: Set the polynomial equal to zero.

Step 2: Solve for .

Subtract 5 from both sides:

Divide both sides by 2:

The zero of the polynomial is .

(iv)

Step 1: Set the polynomial equal to zero.

Step 2: Solve for .

Add 2 to both sides:

Divide both sides by 3:

The zero of the polynomial is .

(v)

Step 1: Set the polynomial equal to zero.

Step 2: Solve for .

Divide both sides by 3:

The zero of the polynomial is .

(vi) ,

Step 1: Set the polynomial equal to zero.

Step 2: Solve for .

Divide both sides by (since):

The zero of the polynomial is .

(vii) , where are real numbers and

Step 1: Set the polynomial equal to zero.

Step 2: Solve for .

Subtract from both sides:

Divide both sides by (since):

The zero of the polynomial is .

ANSWER

(i) -5

(ii) 5

(iii) -\dfrac{5}{2}

(iv) \dfrac{2}{3}

(v) 0

(vi) 0

(vii) -\dfrac{d}{c}

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📝 Key Formulas

Important Formulas for Exercise 2.2

Formula / Concept	Description
Value of a Polynomial	If p(x) is a polynomial in x, and k is any real number, then the value of the polynomial at x = k is denoted by p(k) and is found by replacing x by k in p(x).
Zero of a Polynomial	A real number 'k' is called a zero (or root) of the polynomial p(x) if the value of the polynomial at 'k' is zero.
Condition for a Zero	k is a zero of p(x) if and only if p(k) = 0.
Zero of a Linear Polynomial	The zero of a linear polynomial of the form p(x) = ax + b, where a ≠ 0, is given by the formula: x = -(b)/(a) This can also be expressed as x = -\textConstant Term\textCoefficient of x.
Remainder Theorem	If a polynomial p(x) of degree greater than or equal to 1 is divided by a linear polynomial x - a, then the remainder is equal to p(a).
Factor Theorem	A linear polynomial (x - a) is a factor of a polynomial p(x) if and only if p(a) = 0. This is a special case of the Remainder Theorem where the remainder is 0.

❓ Top FAQs

Q1. How many questions are in NCERT Solutions for Class 9 Maths Chapter 2 Polynomials Exercise 2.2?

NCERT Solutions for Class 9 Maths Chapter 2 Polynomials Exercise 2.2 contains exactly 4 questions. These questions focus on finding zeroes of polynomials using the Remainder Theorem and Factor Theorem, which are crucial concepts for CBSE board exam 2025-26 preparation.

Q2. Where can I download free PDF of NCERT Solutions for Class 9 Maths Chapter 2 Polynomials Exercise 2.2 with step by step solutions?

You can download free PDF of NCERT Solutions for Class 9 Maths Chapter 2 Polynomials Exercise 2.2 from the official NCERT website or various educational platforms offering step by step solutions. These PDFs are updated according to the latest CBSE syllabus 2025-26 and include detailed explanations for all 4 questions covering zeroes of polynomials.

Q3. How many marks does Polynomials Chapter 2 carry in CBSE Class 9 Maths board exam 2025-26?

Polynomials Chapter 2 carries approximately 10 marks in CBSE Class 9 Maths board exam 2025-26 as part of Unit II - Algebra. Exercise 2.2 specifically covers zeroes of polynomials, Remainder Theorem, and Factor Theorem, which are frequently asked concepts in examinations.

Q4. Which is the most difficult question in NCERT Solutions Class 9 Maths Chapter 2 Polynomials Exercise 2.2?

Question 4 in NCERT Solutions Class 9 Maths Chapter 2 Polynomials Exercise 2.2 is generally considered the most challenging as it requires application of both Remainder Theorem and Factor Theorem together. However, with step by step solutions and proper practice, students can master this question for CBSE board exam 2025-26 preparation.

Q5. What is Remainder Theorem explained in NCERT Solutions for Class 9 Maths Chapter 2 Polynomials Exercise 2.2?

The Remainder Theorem in NCERT Class 9 Maths Chapter 2 Exercise 2.2 states that when a polynomial p(x) is divided by (x - a), the remainder is p(a). This concept is extensively used in Exercise 2.2 to find zeroes of polynomials and is important for CBSE board exam 2025-26, carrying weightage in the 10 marks allocated to Polynomials.

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