NCERT Solutions Class 9 Maths
Chapter 2: Polynomials
EXERCISE 2.1

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Quick Summary: In NCERT Solutions Class 9 Maths Chapter 2 Exercise 2.1, students learn the fundamental concepts of polynomials in one variable, including identification, classification, and degree determination. This exercise covers essential polynomial definitions, coefficient identification, and polynomial types which are crucial building blocks for advanced algebra topics in CBSE Class 9 and higher mathematics.

Key Takeaways:

- A polynomial in one variable x has the general form a_n x^n + a_n-1 x^n-1 + ... + a_1 x + a_0 where all exponents are non-negative integers
- Polynomials are classified by degree: constant (degree 0), linear (degree 1), quadratic (degree 2), and cubic (degree 3)
- Polynomials are classified by terms: monomial (1 term), binomial (2 terms), trinomial (3 terms), and polynomial (more than 3 terms)
- The coefficient of a term ax^n is the numerical value a that multiplies the variable part

Complete Solutions

Question 1

QUESTION

Which of the following expressions are polynomials in one variable and which are not? State reasons for your answer:

(i) 4x^2 - 3x + 7
(ii) y^2 + √2
(iii) 3√t + t√2
(iv) y + (2)/(y)
(v) x^10 + y^3 + t^50

SOLUTION

This question tests our understanding of what constitutes a polynomial, particularly focusing on the number of variables and the exponents of those variables.

(i)

Step 1: Check the variable

The expression contains only one variable, .

Step 2: Check the exponents

The exponents of are 2 and 1, which are both whole numbers.

Step 3: Conclude

Since it has only one variable and all exponents are whole numbers, is a polynomial in one variable.

(ii)

Step 1: Check the variable

The expression contains only one variable, .

Step 2: Check the exponents

The exponent of is 2, which is a whole number. Note that is a constant term and does not affect whether the expression is a polynomial.

Step 3: Conclude

Since it has only one variable and all exponents are whole numbers, is a polynomial in one variable.

(iii)

Step 1: Rewrite the expression

We can rewrite as .

Step 2: Check the exponents

The exponent of in the first term is , which is not a whole number.

Step 3: Conclude

Since the exponent is not a whole number, is not a polynomial.

(iv)

Step 1: Rewrite the expression

We can rewrite as .

Step 2: Check the exponents

The exponent of in the second term is -1, which is not a whole number.

Step 3: Conclude

Since the exponent is not a whole number, is not a polynomial.

(v)

Step 1: Check the variables

The expression contains three variables: , , and .

Step 2: Check the exponents

The exponents of , , and are 10, 3, and 50 respectively, which are all whole numbers.

Step 3: Conclude

Since it has three variables and all exponents are whole numbers, is a polynomial in three variables.

Final Answer: (i) and (ii) are polynomials in one variable. (v) is a polynomial in three variables. (iii) and (iv) are not polynomials because their variable exponents are not whole numbers.

ANSWER

(i) and (ii) are polynomials in one variable.

(v) is a polynomial in three variables.

(iii) and (iv) are not polynomials because their variable exponents are not whole numbers.

Question 2

QUESTION

Write the coefficients of x^2 in each of the following:

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

SOLUTION

This question tests our understanding of what a coefficient is in a polynomial expression. Specifically, we need to identify the number that multiplies the term in each given polynomial.

(i)

Step 1: Identify the term containing

In the expression , the term containing is simply .

Step 2: Determine the coefficient

We can rewrite as . Therefore, the coefficient of is 1.

Answer: 1

(ii)

Step 1: Identify the term containing

In the expression , the term containing is .

Step 2: Determine the coefficient

We can rewrite as . Therefore, the coefficient of is -1.

Answer: -1

(iii)

Step 1: Identify the term containing

In the expression , the term containing is .

Step 2: Determine the coefficient

The coefficient of is the number multiplying , which is .

Answer:

(iv)

Step 1: Identify the term containing

In the expression , there is no term. This is the same as saying the coefficient of is 0.

Step 2: Determine the coefficient

We can rewrite the expression as . Therefore, the coefficient of is 0.

Answer: 0

ANSWER

(i) 1

(ii) -1

(iii) (π)/(2)

(iv) 0

Question 3

QUESTION

Give one example each of a binomial of degree 35, and of a monomial of degree 100.

SOLUTION

This question asks us to provide examples of a binomial with degree 35 and a monomial with degree 100. It tests our understanding of the definitions of binomial, monomial, and degree of a polynomial.

Step 1: Define Binomial

A binomial is a polynomial with exactly two terms. For example, is a binomial.

Step 2: Define Degree of a Polynomial

The degree of a polynomial is the highest power of the variable in the polynomial. For example, the degree of is 3.

Step 3: Construct a Binomial of Degree 35

We need a polynomial with two terms, where the highest power of the variable is 35. A simple example would be to have one term with and another term as a constant. We can choose any coefficients we like.

Example:

Here, the two terms are and . The degree is 35 because that's the highest power of .

Step 4: Define Monomial

A monomial is a polynomial with only one term. For example, is a monomial.

Step 5: Construct a Monomial of Degree 100

We need a polynomial with only one term, and the power of the variable must be 100. Again, we can choose any coefficient.

Example:

Here, we have only one term, , and the degree is 100.

Final Answer:

Example binomial of degree 35:

Example monomial of degree 100:

ANSWER

Example binomial of degree 35: 3x^35 - 4

Example monomial of degree 100: √2 \, y^100

Question 4

QUESTION

Write the degree of each of the following polynomials:

(i) 5x^3 + 4x^2 + 7x
(ii) 4 - y^2
(iii) 5t - √7
(iv) 3

SOLUTION

This question asks us to find the degree of different polynomials. The degree of a polynomial is the highest power of the variable in the polynomial.

(i)

Step 1: Identify the powers of the variable in each term.

The terms are , , and . The powers of are 3, 2, and 1, respectively.

Step 2: Find the highest power.

The highest power of is 3.

Answer: The degree of the polynomial is 3.

(ii)

Step 1: Identify the powers of the variable in each term.

The terms are and . The powers of are 0 (since) and 2, respectively.

Step 2: Find the highest power.

The highest power of is 2.

Answer: The degree of the polynomial is 2.

(iii)

Step 1: Identify the powers of the variable in each term.

The terms are and . The powers of are 1 and 0 (since), respectively.

Step 2: Find the highest power.

The highest power of is 1.

Answer: The degree of the polynomial is 1.

(iv)

Step 1: Rewrite the constant as a term with a variable.

We can rewrite the constant 3 as (or or , etc., since any variable to the power of 0 is 1).

Step 2: Identify the power of the variable.

The power of the variable is 0.

Answer: The degree of the polynomial is 0.

ANSWER

(i) 3

(ii) 2

(iii) 1

(iv) 0

Question 5

QUESTION

Classify the following as linear, quadratic, and cubic polynomials:

(i) x^2 + x
(ii) x - x^3
(iii) y + y^2 + 4
(iv) 1 + x
(v) 3t
(vi) r^2
(vii) 7x^3

SOLUTION

This question tests our understanding of the classification of polynomials based on their degree. We need to identify whether each given polynomial is linear, quadratic, or cubic.

Key Concepts:

- **Linear Polynomial:** A polynomial of degree 1 (highest power of the variable is 1).
- **Quadratic Polynomial:** A polynomial of degree 2 (highest power of the variable is 2).
- **Cubic Polynomial:** A polynomial of degree 3 (highest power of the variable is 3).

(i)

Step 1: Identify the highest power of the variable .

The terms are and . The highest power is 2.

Step 2: Classify based on the degree.

Since the degree is 2, the polynomial is quadratic.

Answer: quadratic

(ii)

Step 1: Identify the highest power of the variable .

The terms are and . The highest power is 3.

Step 2: Classify based on the degree.

Since the degree is 3, the polynomial is cubic.

Answer: cubic

(iii)

Step 1: Identify the highest power of the variable .

The terms are , , and 4. The highest power is 2.

Step 2: Classify based on the degree.

Since the degree is 2, the polynomial is quadratic.

Answer: quadratic

(iv)

Step 1: Identify the highest power of the variable .

The terms are 1 and . The highest power is 1.

Step 2: Classify based on the degree.

Since the degree is 1, the polynomial is linear.

Answer: linear

(v)

Step 1: Identify the highest power of the variable .

The term is . The highest power is 1.

Step 2: Classify based on the degree.

Since the degree is 1, the polynomial is linear.

Answer: linear

(vi)

Step 1: Identify the highest power of the variable .

The term is . The highest power is 2.

Step 2: Classify based on the degree.

Since the degree is 2, the polynomial is quadratic.

Answer: quadratic

(vii)

Step 1: Identify the highest power of the variable .

The term is . The highest power is 3.

Step 2: Classify based on the degree.

Since the degree is 3, the polynomial is cubic.

Answer: cubic

ANSWER

(i) quadratic

(ii) cubic

(iii) quadratic

(iv) linear

(v) linear

(vi) quadratic

(vii) cubic

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🔢 Key Formulas

Important Formulas for Exercise 2.1

Formula / Concept	Description
Polynomial in One Variable	An algebraic expression where the variable has only non-negative integer exponents. For example, p(x) = ax^n + bx^n-1 + ... + c, where 'a', 'b', 'c' are real numbers and 'n' is a non-negative integer.
Term	Each part of a polynomial separated by a plus or minus sign. For the polynomial x^2 + 5x + 2, the terms are x^2, 5x, and 2.
Coefficient	The numerical part of a term. In the term 5x, the coefficient of x is 5.

Formula / Concept	Description
Degree of a Polynomial	The highest power of the variable in a polynomial. For example, the degree of 5x^3 + 4x^2 + 7x is 3.
Constant Polynomial	A polynomial with only a constant term. For example, p(x) = 7. The degree of a non-zero constant polynomial is zero.
Linear Polynomial	A polynomial of degree one. Example: 2x + 1.
Quadratic Polynomial	A polynomial of degree two. Example: 3x^2 - x + 5.
Cubic Polynomial	A polynomial of degree three. Example: x^3 - 8x.
Monomial	A polynomial with only one term. Example: 5x^2.
Binomial	A polynomial with two terms. Example: x + 4.
Trinomial	A polynomial with three terms. Example: x^2 + 2x - 3.
Remainder Theorem	If a polynomial p(x) is divided by a linear polynomial (x - a), the remainder is p(a).
Factor Theorem	A polynomial p(x) has a factor (x - a) if and only if p(a) = 0.

Top FAQs

Q1. How many questions are in NCERT Solutions Class 9 Maths Chapter 2 Polynomials Exercise 2.1?

NCERT Solutions for Class 9 Maths Chapter 2 Polynomials Exercise 2.1 contains exactly 5 questions. These questions focus on identifying polynomials in one variable and understanding polynomial expressions, making it a fundamental exercise 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 2.1 with step by step solutions?

Free PDF download of NCERT Solutions for Class 9 Maths Chapter 2 Polynomials Exercise 2.1 is available on official NCERT and CBSE websites, as well as trusted educational platforms. These PDFs contain step by step solutions for all 5 questions, updated according to the latest CBSE syllabus 2025-26 with detailed explanations.

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

Polynomials Chapter 2 is part of Unit II - Algebra in CBSE Class 9 Maths, which carries 10 marks in total for the board exam 2025-26. This weightage is shared among multiple algebra chapters, making NCERT Solutions for Class 9 Maths Chapter 2 Polynomials Exercise 2.1 essential for scoring well.

Q4. Which is the most difficult question in NCERT Solutions Class 9 Maths Chapter 2 Polynomials Exercise 2.1?

Question 5 in NCERT Solutions Class 9 Maths Chapter 2 Polynomials Exercise 2.1 is considered the most challenging as it requires deeper understanding of polynomial definitions and variable identification. Students should practice step by step solutions for this question to master the concept of polynomials in one variable for CBSE board exam 2025-26.

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

Remainder Theorem in NCERT Class 9 Maths Chapter 2 Polynomials states that when a polynomial p(x) is divided by (x-a), the remainder is p(a). This concept is crucial for Exercise 2.1 understanding and carries significant weightage in CBSE board exam 2025-26, especially when combined with Factor Theorem applications.

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