CBSE Class 10 Maths Notes Chapter 2: In CBSE Class 10 Maths, Chapter 2 focuses on Polynomials, a fundamental concept in algebra. Polynomials are expressions with one or more terms, where each term is a constant, a variable, or a product of constants and variables.

This chapter talks about the various aspects of polynomials, including their definition, types, degree, and operations such as addition, subtraction, multiplication, and division. Students will learn about factorization techniques, including factor theorem and remainder theorem.

Understanding polynomials is important as they find applications in various fields like science, engineering, and economics. By mastering this chapter, students can enhance their problem-solving skills and build a strong foundation in algebra.

CBSE Class 10 Maths Notes Chapter 2 Polynomials PDF

The PDF link for CBSE Class 10 Maths Notes Chapter 2 Polynomials is provided below. This detailed resource provide explanations, examples, and exercises to help students grasp the concepts covered in the chapter effectively.

By accessing this PDF, students can enhance their understanding of polynomials and strengthen their mathematical skills.

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Algebraic Expressions

An algebraic expression is composed of variables, constants, and mathematical operators, forming the basis of algebraic equations. It consists of a collection of terms, which are essential building blocks in mathematical expressions.

A term represents a product of variables and constants, constituting individual components within an algebraic expression. For instance, terms can be simple constants like '3', or they can involve variables such as 'x' or 'y', or combinations like '2x' or '4xy'.

In each term, the constant factor is known as the coefficient, which influences the magnitude of the term within the expression.

An example of an algebraic expression could be '$3x^2y + 4xy + 5x + 6$', comprising four distinct terms: '$3x^2y$', '$4xy$', '$5x$', and '6'.

Algebraic expressions can contain any number of terms, with coefficients that may be any real number. Moreover, while an expression may include multiple variables, the exponents associated with these variables must be rational numbers.

Polynomial

In algebra, expressions can feature exponents that are rational numbers. However, when it comes to polynomials, these are a specific type of algebraic expression where the exponent on any variable is a whole number.

Let's examine a few examples:

- The expression $5x^3 + 3x + 1$ is both a polynomial and an algebraic expression. Each term in this expression features variables raised to whole number exponents.
- On the other hand, an expression like $2x + 3\sqrt{x}$ is an algebraic expression but not a polynomial. This is because the exponent on 'x' is 1/2, which is not a whole number.

Degree of a Polynomial

For a polynomial in one variable, the degree of the polynomial is determined by the highest exponent on the variable.

For example:

- In the polynomial $x^2 + 2x + 3$, the degree is 2 since the highest power of 'x' in the expression is x^2.
- Another example is the polynomial $x^8 + 2x^6 - 3x + 9$. Here, the degree is 8, as the greatest power of 'x' in the expression is 8.

Types Of Polynomials

Polynomials can be categorized based on the following criteria:

a) Number of Terms

b) Degree of the Polynomial

Types of Polynomials Based on the Number of Terms:

a) Monomial – A polynomial with only one term. Examples include $2x$, $6x^2$, and $9xy$.

b) Binomial – A polynomial consisting of two unlike terms. Examples are $4x^2 + x$ and $5x + 4$.

c) Trinomial – A polynomial comprising three unlike terms. An example is $x^2 + 3x + 4$.

Types of Polynomials Based on Degree:

Linear Polynomial:

A polynomial with a degree of one is termed a linear polynomial. For instance, $2x + 1$ is a linear polynomial.

Quadratic Polynomial:

A polynomial of degree two is known as a quadratic polynomial. For example, $3x^2 + 8x + 5$ is a quadratic polynomial.

Cubic Polynomial:

A polynomial of degree three is referred to as a cubic polynomial. An example is $2x^3 + 5x^2 + 9x + 15$.

Graphical Representations

Let us learn here how to represent polynomial equations on the graph.

Representing Equations on a Graph

Any equation can be represented as a graph on the Cartesian plane, where each point on the graph represents the x and y coordinates of the point that satisfies the equation. An equation can be seen as a constraint placed on the x and y coordinates of a point, and any point that satisfies that constraint will lie on the curve.

For example, the equation $y = x$, on a graph, will be a straight line that joins all the points which have their x coordinate equal to their y coordinate. Example – (1,1), (2,2) and so on.

Geometrical Representation of a Quadratic Polynomial

The graph of a quadratic polynomial resembles a parabola, which has a U-shaped appearance. The direction in which the parabola opens depends on the value of 'a' in the quadratic expression $ax^2 + bx + c$. If 'a' is positive, the parabola opens upwards, while if 'a' is negative, it opens downwards.

The parabola can intersect the x-axis at zero, one, or two points, depending on its positioning and the roots of the quadratic equation.

Factorisation of Polynomials

Quadratic polynomials can be factorized using a method known as splitting the middle term. Let's illustrate this with an example:

Consider the polynomial $2x^2 - 5x + 3$.

To split the middle term:

We need to express the middle term -5x as a sum of two terms, such that their product equals the product of the coefficients of x^2 and the constant term, which is 2 * 3 = 6.

We can express -5 as (-2) + (-3), since (-2) * (-3) = 6 = 2 * 3.

Thus, $2x^2 - 5x + 3$ can be rewritten as $2x^2 - 2x - 3x + 3$.

Next, we identify common factors within each group:

$2x^2 - 2x - 3x + 3 = 2x(x - 1) - 3(x - 1)$.

Taking (x - 1) as the common factor, we can express it as:

$2x(x - 1) - 3(x - 1) = (x - 1)(2x - 3)$.

Relationship between Zeroes and Coefficients of a Polynomial

For a Quadratic Polynomial:

If α and β are the roots of a quadratic polynomial $ax^2 + bx + c$, then,

$\alpha + \beta = -b/a$

Sum of zeroes = -coefficient of x /coefficient of x^2

$\alpha\beta = c/a$

Product of zeroes = constant term / coefficient of x^2

For a Cubic Polynomial:

If α, β, and γ are the roots of a cubic polynomial $ax^3 + bx^2 + cx + d$, then

$\alpha + \beta + \gamma = -b/a$

$\alpha\beta + \beta\gamma + \gamma\alpha = c/a$

$\alpha\beta\gamma = -d/a$

Example:

Calculate the sum of the zeroes and the product of the zeroes of the polynomial $9x^2 – 16x + 20$.

Solution:

Given polynomial: $9x^2 – 16x + 20$

The given polynomial is a quadratic polynomial, as the degree of the polynomial is 2.

We know that the standard form of a quadratic polynomial is $ax^2 + bx + c$.

By comparing the given polynomial and the standard form, we can write.

$a = 9$

$b = -16$

$c = 20$

By using the relationship between zeroes and the coefficients of the polynomial, we can get the following:

For a quadratic polynomial,

The sum of zeroes = -coefficient of x /coefficient of x^2

Now, substitute the values in the formula, we get

Sum of zeroes = $-(-16)/9 = 16/9$.

Similarly, Product of zeroes = constant term / coefficient of x^2

Plugging the values in the above formula, we get

Product of zeroes = $20/9$

Hence, 16/9 and 20/9 are the sum and the product of the zeroes of the polynomial $9x^2 – 16x + 20$.

Benefits of CBSE Class 10 Maths Notes Chapter 2 Polynomials

- Clear explanations of important ideas
- Simplification of difficult subjects for easier comprehension
- Effective study aid for final exam preparation
- Improved recall of essential information

- Essential points and advice for efficient exam preparation
- Time-saving combination of information
- Priority given to significant subjects and inquiries
- Increased exam-taking confidence for students