BAL BHARATI PUBLIC SCHOOL, PITAMPURA, DELHI – 110034

SUBJECT:- MATHEMATICS

CHAPTER:- 2 (Part – 1)

TOPIC:-POLYNOMIALS

GUIDELINES

Dear students

Kindly read the content given below and view the links shared for better understanding.

- **Solve the given questions in the yellow register provided in the notebook set.**

Link for the chapter : http://ncert.nic.in/textbook/textbook.htm?jemh1=3-15

Introduction and explanation of Polynomials

Let us recall algebraic expressions, term, coefficient, monomial, binomial, trinomial, polynomial and degree of a polynomial.

> **Polynomial** comes from *poly-* (meaning "many") and *-nomial* (in this case meaning "term") ... so it says "many terms"

(1) Algebraic Expressions: Any expression containing constants, variables, and the operations like addition, subtraction, etc. is called as an algebraic expression.
For example: 5x, 2x – 3, $x^2 + 1$, etc. are some algebraic expressions.

(2) Polynomials: The expression which contains one or more terms with non-zero coefficient and non-negative power of the variable is called a polynomial. A polynomial can have any number of terms.
For example: 10, a + b, 7x + y + 5, w + x + y + z, etc. are some polynomials.

A single-variable polynomial having degree 'n' has the following **polynomial equation**:

$$a_n x^n + a_{n-1} x^{n-1} + \ldots + a_2 x^2 + a_1 x^1 + a_0 x^0$$

In this, a_0 , a_1 , a_2 , …… a_n are constants and $a_n \neq 0$.Since $x^1 = x$ and $x^0 = 1$,therefore, the above expression can be shortened to

$$a_n x^n + a_{n-1} x^{n-1} + \ldots + a_1 x + a_0$$

General expression of a polynomial : **A polynomial in one variable x of degree n and can be expressed as, $p(x)= a_n x^n + a_{n-1} x^{n-1} + ... + a_1 x + a_0$, where $a_n \neq 0$ and $a_0, a_1, ... a_n$ are constants.**

Degree of a polynomial : **The highest power of the variable in a polynomial is called the degree of the polynomial.**

***For Example*: The degree of $p(x) = x^5 – x^3 + 7$ is 5**

Classification of polynomials on the basis of degree.

	degree	Polynomial	Example
(a)	1	Linear	$x + 1,\ 2x + 3\ etc$
(b)	2	Quadratic	$ax^2 + bx + c$ etc
(c)	3	Cubic	$x^3 - 3x^2 + 1$ etc.
(d)	4	Biquadratic	$x^4 - 1$

Zero Polynomial : The constant polynomial 0 is called zero polynomial.

Constant polynomial : A polynomial containing one constant term only is called a constant polynomial. The degree of non-zero constant polynomial is zero.

A polynomial of degree one is called a linear polynomial.
***For Example*: 2x – 7, s + 5, etc. are some linear polynomials.**

A polynomial having the highest degree of two is called a quadratic polynomial.
***For Example*: x^2– 9, a^2 + 7, etc. are some quadratic polynomials.**

A polynomial having the highest degree of three is called a cubic polynomial.
For E***xample***: x^3– 9x +2, $a^3 + a^2 + a + 7$, etc. are some cubic polynomial.**

Coefficients : In the polynomial $x^3 + 3x^2 + 3x + 1$ coefficients of x^3 , x^2 , x are 1 , 3 , 3 respectively and +1 is the constant term in it.

Note: 1. The degree of a non-zero constant polynomial is zero.
2. Degree of a zero polynomial is not defined.

ZEROES OF A POLYNOMIAL:

Zero or root:

A real number " a" is a zero or root of the polynomial $p(x) = a_0x^n + a_1x^{n-1} + ... + a_n$, if $p(a) = 0$.

For example : $p(x) = x + 4$, zero of polynomial p(x) is -4 ; as $p(- 4) = 0$

Value of a polynomial: **The value of a polynomial p(x) at x = c is obtained by substituting x = c in the given polynomial and is denoted by p(c).**

Key points and important links for reference:-

1. **Terms and coefficients of polynomial:**

   https://examfear.com/free-video-lesson/Class-9/Maths/Polynomials/part-3/Polynomials_Part_3_(Terms_and_Coefficient).htm

2. **Degree of a zero polynomial :**

   https://examfear.com/free-video-lesson/Class-9/Maths/Polynomials/part-6/Polynomials_Part_6_(Degree_of_Zero_polynomial).htm

3.Visit **https://youtu.be/o5NkTlcAXL4** for further reference.

SUMMARY:

A polynomial of one term is called a monomial.

A polynomial of two terms is called a binomial.

A polynomial of three terms is called a trinomial.

A polynomial of degree one is called a linear polynomial.

A polynomial of degree two is called a quadratic polynomial.

A polynomial of degree three is called a cubic polynomial.

Zero or root: A real number 'a' is a zero or root of the polynomial $p(x) = a_0x^n + a_1x^{n-1} + ... + a_n$, if $p(a) = 0$.

ASSIGNMENT :-

Exercice 2.1 and 2.2 from NCERT (To be done in the yellow register)

QUESTIONS FOR PRACTICE

Note : Following questions are for the practice only and should be done in a separate practice register/copy of math

1.Define a Polynomial. Give two examples of expressions which are polynomials and two examples which are not polynomials.

2. Give an example of a trinomial which is a cubic polynomial.

3. Give an example of a quadratic polynomial which is a binomial.

4. Fill in the blanks:

a) A polynomial having three terms is called _____.

b) The degree of quadratic polynomial is_____.

c) The degree of $x^3 – 4x + 7$ is_____.

d) The degree of a non-zero constant polynomial is_____.

e) The coefficient of x^2 in $-2x^2 -3x + 8$ is_____.

f) The zero of zero polynomial is _____ .

5. Which of the following expressions are polynomials in one variable and which are not? Give reason.

a) $x^2 +2x-5$

b) $-3x$

c) $x^{10}+ 10x+ y$

6. (a) Find a zero of the polynomial $p(x) = 2x + 3$.

(b) Check whether -2 & 2 are zeroes of polynomial $x + 2$.

7. Find the value of the polynomial $5x – 4x^2 + 3$ at $x = 2$ and $x = –1$.

8. What is the value of a if degree of polynomial $x^3 + x^{a-4} + x^2 + 1$ is 4?

9. Find the coefficient of x in $(x – 7)(x + 5)$.