

10th CBSE Math

02. Polynomials

Lecture 1

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M-100, S-97

ANSH VERMA



M-99, S-96

TWO WEEKS OF FREE TRIAL CLASSES

GUARANTEED RESULTS WITHIN 3 MONTHS

100% REFUND IF WILLING TO DISCONTINUE WITHIN 3 MONTHS

V HASNI



M-96, S-94

PON RAAGAVI S



M-94, S-91

6th - 10th - M & S

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Variable

It is a quantity whose value is not fixed.

Eg: x, y, z , etc.

Constant

It is a quantity whose value is fixed.

Eg: $2, 5, 10$, etc.

Algebraic expressions

When the variables & constants are connected by basic arithmetic operations.

$$2x^2 + 5x - 7, \quad \frac{x}{5} + 8, \quad \frac{5}{x} + 8$$

Terms

The quantity separated by + or - are called terms.

$$2x^4 + 5x^3 - 7x^2 + 4x - 8$$

$2x^4$, $5x^3$, $-7x^2$, $4x$, -8 are terms

Coefficient

Coefficient of x^4 is 2

Coefficient of x^3 is 5

" " x^2 is -7

Coefficient of x is 4

$$7xy_3$$

Coefficient of x is $7y_3$

Coefficient of y is $7x_3$

Coefficient of z is $7xy$

Polynomial

When the powers of the variables involved in the algebraic expression are whole numbers, then it is said to be a polynomial.

Polynomial $\leftarrow 5x^3 + 2x^2 - 7x + 8x^0$

\downarrow	\downarrow	\downarrow	\downarrow
3	2	1	0

$$\begin{aligned}x^0 &= 1 \\ 1 &= x^0 \\ 8 &= 8 \times 1 \\ &= 8 \times x^0 \\ 8 &= 8x^0 \\ 8 &= 8x^1\end{aligned}$$

$$\frac{1}{a^m} = a^{-m}$$

$$\frac{1}{x^m} = x^{-m}$$

$$\frac{1}{x^2} = x^{-2}$$

Nota ← polynomial. $x^2 + \frac{3}{x} + 10 \implies x^2 + 3x^{-1} + 10x^0$

$$\begin{array}{ccc} \downarrow & \downarrow & \downarrow \\ 2 & -1 & 0 \end{array}$$

* All the polynomials are algebraic expressions but vice versa is not.

| - "rational are algebraic expressions but vice versa
" is not true.

Degree of a polynomial

The highest power of the variable in the polynomial.

$$2x^3 + 5x^2 + 6x - 7$$

$$D = 3$$



3 2 1 0

$$x^2 + 5$$



$$D = 2$$



$$9 = 9x^0$$



$$D = 0$$



Constant polynomial.

$$5 = 5x^1 = 5x^1 = 5x^1 = 5$$

$$5 = 5x^0$$

Degree of a constant polynomial is zero.

$$0 = 0x^0 = 0$$

$$0 = 0x^1 = 0$$

$$0 = 0x^2 = 0$$

$$0 = 0x^{1000} = 0$$

$$0 = 0x^{10000} = 0$$

⋮

Degree of zero polynomial is not defined.

Classification of Polynomials

I. Based on Degree

(i) Linear polynomial ($D=1$)

$$x+5, x, y+10$$

(ii) Quadratic polynomial ($D=2$)

$$2x^2+5x-7, 5y^2-7y+2$$

(iii) Cubic polynomial ($D=3$)

$$2x^3+5x^2+7x-10$$

(iv) Biquadratic polynomial ($D=4$)

$$5x^4+7x^3+5x^2+3x+2$$

2. Based on number of terms

(i) Monomial (single term)

$$x, 5x, 4x^2$$

(ii) Binomial (two terms)

$$x+5, 2x^2+5, 3x^2+10$$

(iii) Trinomial (three terms)

$$2x^2+5x+7, 5x^2-7x+10$$

(iv) Tetranomial (four terms)

$$5x^4+7x^2+4x-10$$

Y N

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

(i) $4x^2 - 3x + 7$ Y

(ii) $y^2 + \sqrt{2}y^0$ Y

(iii) $3t^{1/2} + t\sqrt{2}$ N

(iv) $y + \frac{2}{y} \Rightarrow y + 2y^{-1}$ N

(v) $x^{10} + y^3 + t^{50}$ N

2 0

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

(i) $2 + x^2 + x$ 1

(ii) $2 - x^2 + x^3$ -1

(iii) $\frac{\pi}{2}x^2 + x$ $\frac{\pi}{2}$

(iv) $\sqrt{2}x - 1 + 0x^2$ 0

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

4. Write the degree of each of the following polynomials:

(i) $5x^3 + 4x^2 + 7x$ 3

(ii) $4 - y^2$ 2

(iii) $5t - \sqrt{7}t^0 \Rightarrow 1$ L Q

(iv) $3 \Rightarrow 0$ L

$x^{35} + 100$

y^{100}

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

(i) $x^2 + x$ Q

(ii) $x - x^3$ C

(iii) $y + y^2 + 4$ Q

(iv) $1 + x$ L

(v) $3t$ L

(vi) t^2 Q

(vii) $7x^3$ C

$$2x^2 + 5x + 7$$

$$2x^2 + 5y' + 7 \longrightarrow$$

$$\sqrt{x} = x^{\frac{1}{2}}$$

$$\sqrt{2} = 2^{\frac{1}{2}} = 1.414 \dots$$

$$\sqrt{t} = t^{\frac{1}{2}}$$