

CLASS 10 MATHS – CHAPTER 2

POLYNOMIALS – ALL FORMULAE

Basic Idea

- Algebraic expressions ka advanced form
- Focus on zeroes & graphs
- Helps in solving equations
- Variables usually x , y use hota hai
- Standard form: $ax^n + bx^{n-1} + \dots + c$
- Used in real-life patterns & modelling

Algebraic Expression

- Variables + constants + operations
- Example: $3x$, $5x^2+2x+1$
- Terms $\rightarrow + / -$ se separate
- Each term = coefficient \times variable
- Like terms can be added/subtracted
- No equality sign (\neq equation)

Polynomial

- Powers = whole numbers
- No variable in denominator
- Example: $x^2 + 2x + 1$
- Finite number of terms
- Coefficients are real numbers
- Can be constant, linear, quadratic etc.

Degree

- Highest power of variable
- Determines type of polynomial
- Example: $x^2 \rightarrow$ degree 2
- Constant polynomial \rightarrow degree 0
- Zero polynomial \rightarrow degree not defined
- Single variable \rightarrow highest power count hoti hai

Zeroes

- $p(k) = 0$
- k is zero of polynomial
- Can be multiple zeroes
- Zeroes = roots of polynomial
- Polynomial value becomes zero
- Helps in factorisation
- Linked with graph points

Graph

- x-axis cut = zeroes
- Linear \rightarrow 1 zero
- Quadratic \rightarrow max 2 zeroes
- Cubic \rightarrow max 3 zeroes
- Touching x-axis \rightarrow 1 repeated zero
- No intersection \rightarrow no real zero
- Graph helps visualize roots

Zeroes Relation

For ax^2+bx+c :

- Sum = $-b/a$
- Product = c/a
- Used to find unknown coefficients
- Helps in forming polynomial
- Based on quadratic roots
- Useful in word problems

Identities

- $(a+b)^2 = a^2+2ab+b^2$
- $(a-b)^2 = a^2-2ab+b^2$
- $a^2-b^2 = (a+b)(a-b)$
- $(x+a)(x+b) = x^2+(a+b)x+ab$
- $a^3-b^3 = (a-b)(a^2+ab+b^2)$
- $a^3+b^3 = (a+b)(a^2-ab+b^2)$
- Used in simplification & factorisation