CLASS 9 MATHS – CHAPTER 2

POLYNOMIALS – ALL FORULAE AND IDENTITIES

Types of Polynomials (According to Degree)

- **Constant Polynomial**

$p(x) = a (a \neq 0)$

- **Linear Polynomial**

$p(x) = ax + b$

- **Quadratic Polynomial**

$p(x) = ax^2 + bx + c$

- **Cubic Polynomial**

$p(x) = ax^3 + bx^2 + cx + d$

Theorems

1. Remainder Theorem

- If polynomial $p(x)$is divided by $(x-a)$, then

Remainder $= p(a)$

2. Factor Theorem

- $(x-a)$is a **factor** of polynomial $p(x)$**if and only if**

$p(a) = 0$

Square Identities

1. $(\boldsymbol{a+b})^{\boldsymbol{2}} = a^2 + 2ab + b^2$
2. $(\boldsymbol{a-b})^{\boldsymbol{2}} = a^2 - 2ab + b^2$
3. $\boldsymbol{a^2 - b^2} = (a+b)(a-b)$

Product Identities

1. $(\boldsymbol{x-a})(\boldsymbol{x-b}) = x^2 - (a+b)x + ab$
2. $(\boldsymbol{x+a})(\boldsymbol{x-a}) = x^2 - a^2$

Cube Identities

1. $(\boldsymbol{a+b})^{\boldsymbol{3}} = a^3 + b^3 + 3ab(a+b)$
2. $(\boldsymbol{a-b})^{\boldsymbol{3}} = a^3 - b^3 - 3ab(a-b)$
3. $\boldsymbol{a^3 + b^3} = (a+b)(a^2 - ab + b^2)$
4. $\boldsymbol{a^3 - b^3} = (a-b)(a^2 + ab + b^2)$

Types of Polynomials (No. of Terms)

1. **Monomial**
   - **Definition:** A polynomial with **only one term**.
2. **Binomial**
   - **Definition:** A polynomial with **two terms**.
3. **Trinomial**
   - **Definition:** A polynomial with **three terms**.