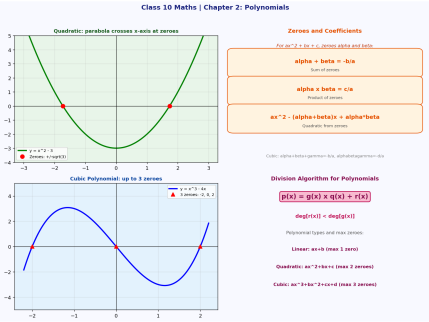
BrainyWorkbook Smart Practice, Sharper Minds

Class 10 **Subject** Maths **Chapter 02** Polynomials **Level** MEDIUM

Name: _____ Date: _____ Score: _____/_____



MEDIUM — Apply your knowledge!

Chapter 02: Polynomials

Time to apply what you know — work through these problems step by step!

Brainy Bonus! The Fundamental Theorem of Algebra guarantees every degree-n polynomial has exactly n roots (counting complex ones). Discovered in 1799 by Carl Friedrich Gauss for his PhD thesis — one of the most elegant results in mathematics!

1. Find the zeros of $p(x) = 6x^2 - 7x - 3$ and verify the relationship between zeros and coefficients.

2. Find a quadratic polynomial whose sum of zeros is 4 and product of zeros is 1.

3. Divide $p(x) = x^3 - 3x^2 + 5x - 3$ by $g(x) = x^2 - 2$. Find the quotient and remainder.

4. If the zeros of the quadratic polynomial $x^2 + (a+1)x + b$ are 2 and -3, find a and b.

5. Find all zeros of $p(x) = 2x^4 - 3x^3 - 3x^2 + 6x - 2$, given that $\sqrt{2}$ and $-\sqrt{2}$ are zeros.

6 If α and β are zeros of $4x^2 + 3x + 7$, find: (a) $1/\alpha + 1/\beta$ (b) $\alpha^2 + \beta^2$

7 Divide $3x^3 + x^2 + 2x + 5$ by $1 + 2x + x^2$. Find quotient and remainder.

8 If one zero of the polynomial $5x^2 + 13x + k$ is the reciprocal of the other, find k.

9 A cricket bat factory in Meerut uses a polynomial model: profit $P(x) = -x^2 + 6x - 8$ (thousands of ₹) where x is the number of bats (hundreds). Find values of x where profit = 0 and the range where profit is positive.

10 Find the quadratic polynomial whose zeros are $(3+\sqrt{5})/2$ and $(3-\sqrt{5})/2$.

11 Using the division algorithm, check whether $4x + 1$ divides $4x^3 + x^2 + x + 1$.

12 Find all zeros of $x^3 + 3x^2 - 2x - 6$, given that -3 is a zero.

13 If α, β, γ are zeros of $x^3 - 5x^2 + 2x + 3$, find $\alpha+\beta+\gamma$, $\alpha\beta+\beta\gamma+\gamma\alpha$, and $\alpha\beta\gamma$.

14 Find a cubic polynomial with sum of zeros = 3, sum of product of pairs = −1, product of all zeros = −3.

15 If one zero of $2x^2 - 5x + (2k+1)$ is twice the other, find k and the zeros.

16 Check if x = 2 is a zero of $p(x) = x^4 - 5x^3 + 2x^2 + 8x - 8$. If yes, find the other zeros.

17. Write the polynomial p(x) if its zeros are −2, 3, and 5, and the leading coefficient is 1.

18. Brainy divides $x^3 - 1$ by $x - 1$ and gets quotient x^2 and remainder −1. Find his mistake.

19. A rectangular field in a village has area = $(2x^2 + 5x - 3)$ sq m and width = $(x + 3)$ m. Find the length as a polynomial in x.

20. For what value of k is $x^3 - kx^2 - 14x + 24$ divisible by $(x - 3)$?

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