Polynomials

A zero is an input that makes the polynomial equal to zero. A graph meets the x-axis at its real zeros; the y-intercept is a different idea.

Formulas and methods

For $ax^2 + bx + c$, $a \neq 0$, zeros α and β satisfy $\alpha + \beta = -b/a$ and $\alpha\beta = c/a$.

A quadratic with zeros α and β can be written $k[x^2 - (\alpha + \beta)x + \alpha\beta]$, where $k \neq 0$.

If a quadratic has no real zero, its graph does not meet the x-axis.

Worked examples

Find and verify the zeros of $x^2 - 7x + 12$.

Factor as $(x - 3)(x - 4)$. The zeros are 3 and 4. Their sum is $7 = -(-7)/1$ and their product is $12 = 12/1$.

Construct a quadratic whose zeros are -2 and 5.

Their sum is 3 and product is -10. One polynomial is $x^2 - 3x - 10$. Multiplying this polynomial by any nonzero constant gives the same zeros.

Common mistake

The sum has a minus sign: $-b/a$. The product does not: c/a. Copy signed coefficients before substituting.

Polynomials — practice

Try these without looking at the answers. Show substitutions and units. Difficulty labels describe these questions, not official CBSE classifications.

1. [Foundation] Find the zeros of $x^2 - 9$.

2. [Core] State the sum and product of zeros of $2x^2 + 5x - 3$.

3. [Core] One zero of $x^2 - 6x + k$ is 2. Find k and the other zero.

4. [Challenge] Write a quadratic with zeros 1/2 and −3.

Polynomials — answers

1. Find the zeros of $x^2 - 9$.

$(x - 3)(x + 3) = 0$, so the zeros are 3 and -3.

2. State the sum and product of zeros of $2x^2 + 5x - 3$.

Sum = $-5/2$; product = $-3/2$.

3. One zero of $x^2 - 6x + k$ is 2. Find k and the other zero.

$4 - 12 + k = 0$ gives $k = 8$. The other zero is $6 - 2 = 4$.

4. Write a quadratic with zeros 1/2 and -3.

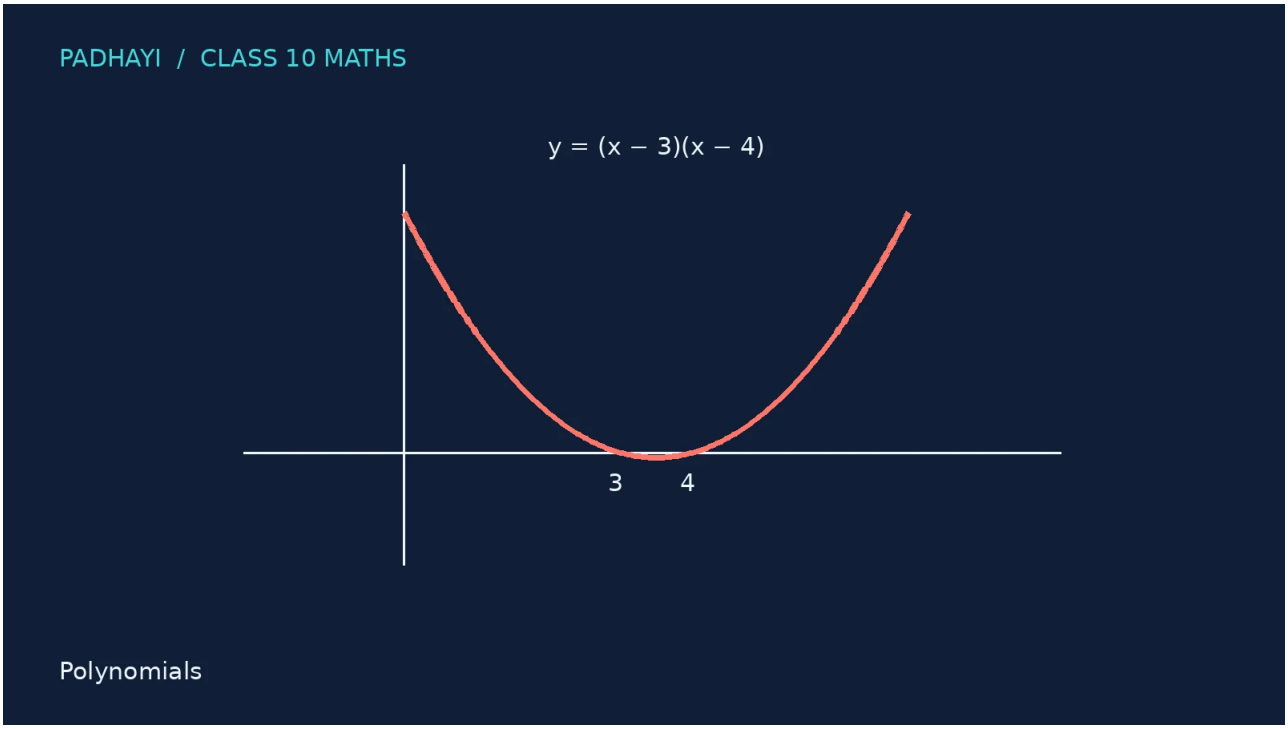
Sum = $-5/2$, product = $-3/2$. Multiplying the monic form by 2 gives $2x^2 + 5x - 3$.

Next step: explain one method aloud, then solve a question from your NCERT textbook without using this sheet.

Original Padhayi revision material. Independent study aid; not an official CBSE or NCERT publication. Syllabus reference: CBSE Mathematics, Class X, 2026–27.

Official CBSE syllabus | NCERT textbooks

Visual reminder



Schematic illustration; diagrams are not necessarily drawn to scale.