

Mathematics Standard

Original practice in 9 topic units, with explanations, worked examples and answer guidance. Use alongside the prescribed texts and syllabus.



9 practice units

54 tasks with answer guidance

Name / नाम: _____

Original selected-topic practice. Use alongside school lessons and the prescribed textbook. The contents define this book's scope.

CBSE course 041 · 2026–27 · Selected practice, not a complete syllabus or official examination paper.

UNIT 01 / 09 · LEARN & TRY

Factor structure and quadratic reasoning

Name: _____ Date: _____

Goal: Justify number properties and connect coefficients to quadratic zeros.

Learn

Prime factorisation expresses an integer greater than one as a product of prime numbers. Apart from their order, these factors are unique. To find the highest common factor, take the smaller exponent of each common prime. To find the least common multiple, take the larger exponent of every prime present. For two positive integers, their product equals the product of their HCF and LCM. This does not extend unchanged to three integers. A quadratic polynomial has the form $ax^2 + bx + c$ with a nonzero. Its zeros are the values making it zero. If the zeros are α and β , then $\alpha + \beta = -b/a$ and $\alpha\beta = c/a$. Factorisation gives the zeros when the factors are accessible. Check every proposed zero by substitution, and keep a polynomial distinct from an equation that has been set equal to zero.

Worked example

A monic polynomial has zeros whose sum is 9 and product is 20. It is $x^2 - 9x + 20 = (x - 4)(x - 5)$. Substitution confirms both zeros. The coefficient relationships recover the polynomial without guessing its graph.

1. Find HCF and LCM of 84 and 126 by prime factorisation, and verify the product relationship. [3 marks]

2. Two positive integers have HCF 12, LCM 180 and one integer 36. Find the other. [2 marks]

UNIT 01 · PRACTISE · 5–6

Factor structure and quadratic reasoning

5. A monic quadratic has zeros α and β with $\alpha + \beta = -2$ and $\alpha\beta = -15$. Form it and find the zeros. [2 marks]

6. Explain why $2 + \sqrt{3}$ is irrational. [2 marks]

Explain one answer. Choose a question to revisit after a few days.

UNIT 01 · ANSWER GUIDANCE

Factor structure and quadratic reasoning

1. $84 = 2^2 \times 3 \times 7$ and $126 = 2 \times 3^2 \times 7$. HCF = 42, LCM = 252. Both products equal 10584.
2. $a \times b = \text{HCF} \times \text{LCM}$, so $b = 12 \times 180/36 = 60$. HCF(36,60) = 12 and LCM = 180.
3. Suppose $\sqrt{3} = p/q$ in lowest terms, q nonzero. Then $p^2 = 3q^2$, so 3 divides p . Write $p = 3k$: $q^2 = 3k^2$, so 3 also divides q . This contradicts coprimality. Hence $\sqrt{3}$ is irrational.
4. $(2x - 1)(x - 3) = 0$ gives $1/2$ and 3. Sum = $7/2 = -b/a$; product = $3/2 = c/a$.
5. $x^2 + 2x - 15 = (x + 5)(x - 3)$. Zeros are -5 and 3.
6. If $2 + \sqrt{3}$ were rational, subtracting rational 2 would make $\sqrt{3}$ rational, contradicting its irrationality. Therefore $2 + \sqrt{3}$ is irrational.

Teaching note

A proof must expose the contradiction, not merely assert that a square root is irrational.

Curriculum reference: https://cbseacademic.nic.in/web_material/CurriculumMain27/SecPart1/Maths_SecP1X_2026-27.pdf

Selected practice; outcomes are publisher-defined. School practicals, projects and prescribed readings require separate preparation.