National Curriculum of Pakistan 2026

QUANTITATIVE REASONING

Grade 11

NATIONAL CURRICULUM COUNCIL WING
MINISTRY OF FEDERAL EDUCATION AND
PROFESSIONAL TRAINING, ISLAMABAD
GOVERNMENT OF PAKISTAN

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Acknowledgement

The National Curriculum Council (NCC) Wing, Ministry of Federal Education and Professional Training, Government of Pakistan, presents the National Curriculum of Quantitative Reasoning for Grade XI. This curriculum reflects our collective commitment to provide a coherent, relevant, and forward-looking framework for business and commerce education, fostering knowledge, skills, competencies, and professional capabilities to meet evolving academic, professional, and societal needs.

In response to emerging national priorities, global educational trends, and the evolving needs of our learners, the curriculum has been carefully developed to ensure conceptual clarity, and enhanced alignment with 21st-century competencies.

The development process involved extensive consultation with subject experts, curriculum specialists, university professors, teachers, assessment bodies. This curriculum also supports uniform standards of education across provinces and regions while allowing contextual flexibility in implementation.

The National Curriculum Council Wing acknowledges the invaluable contributions of all experts, reviewers, educators, and institutions who participated in development process. Their dedication and professional insight have been instrumental in shaping a curriculum that aspires to excellence, equity, and relevance.

We are confident that this Curriculum will serve as a strong foundation for improving the quality of commerce education in Pakistan and nurturing a generation of economically literate, analytical, and responsible citizens.

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Introduction

Overview

Quantitative Reasoning is a foundational course designed to provide Grade XI students with essential mathematical and statistical tools to solve business and economic problems. Intended for students with no prior background in business mathematics, the course introduces fundamental concepts such as number systems and algebra, commercial arithmetic (ratio, proportion, profit, and commission), equations and marginal analysis, financial mathematics, data analysis, index numbers, correlation and regression, and probability. It equips students with problem-solving, analytical, and logical reasoning skills, forming the basis for advanced studies in business, commerce, and economics.

Rationale

In the modern business environment, decision-making relies heavily on quantitative analysis. This course strengthens students' understanding of mathematical concepts and their application in real-world business scenarios. A dedicated domain on commercial arithmetic — ratio, proportion, pricing, profit and loss, and commission — ensures students first build fluency in everyday trade arithmetic, the precise terminology and calculations that underlie invoicing, discounting, partnership shares, and agency commissions, before progressing to algebraic, financial, and statistical techniques. A foundational Probability domain, covering permutations, combinations, and the basic rules of probability, introduces students to reasoning under uncertainty. By integrating basic mathematics with statistical techniques, students develop the ability to interpret data, evaluate financial information, and make informed business decisions.

Course Objectives

By the end of this course, students will be able to:

- Apply ratio, proportion, profit, loss, discount, and commission calculations to solve everyday trade and business problems, using precise commercial-arithmetic terminology.
- Apply basic mathematical concepts, including number systems and algebra, to solve business-related problems.
- Solve simultaneous and quadratic equations and apply marginal analysis to business break-even, profit-maximisation, and cost-minimisation problems.
- Analyse and interpret data using measures of central tendency, dispersion, and index numbers.
- Understand and calculate probabilities using the fundamental rules of probability, including permutations and combinations.
- Solve business problems using financial mathematics, including simple and compound interest, and time value of money concepts.
- Calculate and interpret correlation and regression coefficients to analyse relationships between business variables.
- Use logical reasoning and quantitative techniques to support decision-making in business and economics.

Section 1: SLO Classification Matrix (Revised Bloom's Taxonomy)

The following matrix presents the distribution of all 68 Student Learning Outcomes (SLOs) across the six cognitive levels of the Revised Bloom's Taxonomy (Anderson and Krathwohl, 2001). Within each domain, SLOs are arranged in ascending order of cognitive complexity: Remembering → Understanding → Applying → Analysing → Evaluating → Creating.

Domain	Domain Name	SLOs	Rem.	Under.	Apply.	Analy.	Eval.	Create
A	NUMBER SYSTEMS AND ALGEBRAIC EXPRESSIONS	6	1	2	3	0	0	0
B	COMMERCIAL ARITHMETIC: RATIO, PROPORTION, PROFIT AND COMMISSION	16	3	3	8	1	1	0
C	EQUATIONS AND MARGINAL ANALYSIS	5	0	1	4	0	0	0
D	FINANCIAL MATHEMATICS	8	1	2	4	0	1	0
E	STATISTICAL MEASURES AND DATA ANALYSIS	10	2	3	4	1	0	0
F	INDEX NUMBERS	5	1	1	1	0	1	1
G	CORRELATION COEFFICIENT AND LINEAR REGRESSION	4	0	1	3	0	0	0
H	PROBABILITY AND PROBABILITY DISTRIBUTIONS FOR BUSINESS DECISIONS	7	1	2	4	0	0	0
	Total	61	9	15	31	2	3	1
	Percentage	100%	14.8%	24.6%	50.8%	3.3%	4.9%	1.6%

Key Observations:

- All six cognitive levels are represented in the curriculum as a whole, with no level at zero in the total row.
- The distribution is appropriately weighted towards Applying (48.5%) and Understanding (22.1%), which is suitable for a foundational, computation-heavy Grade XI course.
- Per-domain zeros are unavoidable and expected, because smaller domains (e.g., Domain C, with five SLOs) cannot span all six levels; the no-zero requirement is therefore satisfied at the aggregate level.
- Domain B (Commercial Arithmetic) is deliberately the largest domain by SLO count, reflecting its role as the entry point to business numeracy and its prerequisite relationship to Domains D, F, and G.
- Domain F (Index Numbers) is the only domain that spans all six cognitive levels end-to-end, from defining index numbers through to constructing a deflated or inflated series.

Section 2: Suggested Domain-Wise Weightage

The following table presents each domain's share of the total SLO count, together with its assessment allocation on the 100-mark written paper.

Domain	Domain Name	SLOs	% of SLOs	Marks (/100)	% of Paper
A	Number Systems and Algebraic Expressions	6	9.8%	10	10.0%
B	Commercial Arithmetic: Ratio, Proportion, Profit and Commission	16	26.2%	26	26.0%
C	Equations and Marginal Analysis	5	8.2%	8	8.0%
D	Financial Mathematics	8	13.1%	13	13.0%
E	Statistical Measures and Data Analysis	10	16.4%	16	16.0%
F	Index Numbers	5	8.2%	8	8.0%
G	Correlation Coefficient and Linear Regression	4	6.6%	7	7.0%
H	Probability and Probability Distributions for Business Decisions	7	11.5%	12	12.0%
	Total	61	100%	100	100%

Note: Weightages are expressed as a percentage of the 100-mark written paper and are indicative; they may be adjusted by examination boards within ±5% to accommodate contextual requirements. Domain B (Commercial Arithmetic) carries the highest weightage because it represents the entry-point procedural content of the course. Domain C (Equations and Marginal Analysis) carries a modest weightage reflecting its narrower scope, following the removal of graphing, progressions, and linear programming from this domain.

Section 3: Bloom's Taxonomy Action Verbs with Course-Specific Examples

The following table lists recommended action verbs for each cognitive level of the Revised Bloom's Taxonomy, with examples specific to Quantitative Reasoning. These verbs should be used to draft measurable and observable SLOs.

Important: The verb 'Understand' is not acceptable for SLOs because it is neither observable nor measurable; use 'Explain', 'Describe', 'Classify', or 'Discuss' instead. Similarly, 'Know' should be replaced with 'Define', 'Identify', 'State', or 'List'.

Cognitive Level	Action Verbs	Examples from Quantitative Reasoning
Remembering	Define, Identify, List, Name, State, Recall, Recognise, Classify	Define profit and loss. Identify the types of index numbers. List the properties of a proportion. State the formula for compound interest.
Understanding	Explain, Describe, Compare, Summarise, Discuss	Explain the concept of commission. Explain the difference between mutually exclusive and independent events. Compare trade discount and cash discount.
Applying	Apply, Calculate, Compute, Solve, Prepare, Construct graphs	Calculate profit percentage. Solve a quadratic break-even equation. Compute standard deviation. Calculate the probability of an event using the addition or multiplication rule.
Analysing	Analyse, Differentiate, Examine, Compare and contrast, Categorise	Analyse a combined ratio-and-commission business scenario. Examine variability between two securities.
Evaluating	Evaluate, Assess, Justify, Critique, Judge, Recommend	Evaluate a discount-and-commission pricing structure. Assess the suitability of simple versus compound interest. Evaluate the suitability of an index-number base year for measuring long-term price changes.
Creating	Construct, Design, Produce, Formulate, Develop, Devise	Construct a deflated or inflated price-index series from given index numbers.

Section 4: Progression Grid — Domains and Student Learning Outcomes

Within each domain, SLOs are arranged in ascending order of cognitive complexity following the hierarchy of the Revised Bloom's Taxonomy: Remembering → Understanding → Applying → Analysing → Evaluating → Creating. Each domain has multiple benchmarks, grouped by cognitive level, so that benchmarks progress from foundational recall through to the highest-order skill the domain requires.

Domain A: NUMBER SYSTEMS AND ALGEBRAIC EXPRESSIONS

Standard:

Develop a basic understanding of numbers and algebraic expressions to build a strong foundation for business mathematics.

Benchmark 1: Recognise and classify different types of numbers used in business, and explain the properties of indices, surds, and algebraic expressions. (Covers: QR-11-A-01 to A-03)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-A-01	List and classify different types of numbers (natural, whole, integers, rational, irrational).	Remembering
QR-11-A-02	Explain the properties of indices (exponents) and surds used in business calculations.	Understanding
QR-11-A-03	Explain the properties of algebraic expressions, including like terms, coefficients, and exponents.	Understanding

Benchmark 2: Perform operations, factorisation, and simplification of algebraic expressions. (Covers: QR-11-A-04 to A-06)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-A-04	Perform basic operations (addition, subtraction, multiplication) on algebraic expressions.	Applying
QR-11-A-05	Factorise algebraic expressions using common business-relevant methods (common factor, difference of squares, quadratic trinomials).	Applying
QR-11-A-06	Simplify algebraic fractions involving factorised expressions.	Applying

Domain B: COMMERCIAL ARITHMETIC: RATIO, PROPORTION, PROFIT AND COMMISSION

Standard:

Develop the ability to apply precise commercial-arithmetic terminology and techniques — ratio, proportion, pricing, profit and loss, and commission — to solve everyday business and trade problems.

Benchmark 1: Define ratio and proportion, key commercial pricing terms, and profit-and-loss terminology. (Covers: QR-11-B-01 to B-03)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-B-01	Define ratio and proportion and identify their properties, including continued proportion and mean proportional.	Remembering
QR-11-B-02	Define key commercial-arithmetic terms — cost price, selling price, marked (list) price, invoice price, mark-up, and margin — and distinguish between them.	Remembering
QR-11-B-03	Define profit and loss and describe their relationship to cost price and selling price.	Remembering

Benchmark 2: Explain the relationship between ratio, fractions, and percentages; compare trade and cash discount; and explain commission and brokerage. (Covers: QR-11-B-04 to B-06)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-B-04	Explain the relationship between ratios, fractions, and percentages.	Understanding
QR-11-B-05	Compare trade discount and cash discount, and explain their effect on invoice price and net price.	Understanding
QR-11-B-06	Explain the concept of commission and brokerage and their role in trade and sales transactions.	Understanding

Benchmark 3: Apply ratio, proportion, discount, profit, mark-up, margin, compound/mixed ratios, and commission calculations to business transactions. (Covers: QR-11-B-07 to B-14)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-B-07	Apply ratio and proportion to divide quantities and solve business problems, such as profit-sharing among partners based on capital and time.	Applying
QR-11-B-08	Calculate direct and inverse proportion problems, including time-work and time-distance business scenarios.	Applying
QR-11-B-09	Calculate the net selling price after single and successive (chain) trade discounts.	Applying
QR-11-B-10	Calculate cash discount and the final amount payable under given credit terms.	Applying
QR-11-B-11	Calculate profit, loss, profit percentage, and loss percentage for given business transactions.	Applying

QR-11-B-12	Calculate mark-up percentage and margin percentage for a given product, and convert between the two.	Applying
QR-11-B-13	Calculate commission, brokerage, and agents' earnings, including graduated (slab-based) commission structures.	Applying
QR-11-B-14	Calculate compound (combined) and mixed ratios, and apply them to multi-party business problems such as profit-sharing among three or more partners.	Applying

Benchmark 4: Analyse combined pricing scenarios and evaluate alternative pricing or commission structures to recommend the optimal business decision. (Covers: QR-11-B-15 to B-16)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-B-15	Analyse business scenarios involving combined ratio, discount, mark-up, and commission calculations to determine an appropriate pricing or profit-sharing decision.	Analysing
QR-11-B-16	Evaluate alternative pricing, discount, or commission structures to recommend the most financially favourable option in a comparative business scenario.	Evaluating

Domain C: EQUATIONS AND MARGINAL ANALYSIS

Standard:

Understand the business relevance of, and apply, simultaneous and quadratic equations and marginal analysis to solve break-even, profit-maximisation, and cost-minimisation problems.

Benchmark 1: Explain the business relevance of, and solve, simultaneous and quadratic equations, and apply marginal analysis to determine break-even, maximum profit, and minimum cost. (Covers: QR-11-C-01 to C-05)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-C-01	Explain the relevance of simultaneous and quadratic equations to business break-even, market-equilibrium, and profit-optimisation problems.	Understanding
QR-11-C-02	Solve two-variable simultaneous linear equations arising in business problems, such as market equilibrium price.	Applying
QR-11-C-03	Solve quadratic equations to determine break-even points, maximum profit, or minimum cost.	Applying
QR-11-C-04	Calculate marginal cost, marginal revenue, and marginal profit using the difference-quotient method ($\Delta TC/\Delta Q$, $\Delta TR/\Delta Q$) for successive output levels.	Applying
QR-11-C-05	Apply marginal analysis, using a difference table, to determine the output level that maximises profit or minimises cost.	Applying

Domain D: FINANCIAL MATHEMATICS

Standard:

Understand and apply simple interest, compound interest, discounting, and compounding techniques to determine the present and future value of business cash flows, and evaluate financing options.

Benchmark 1: Define simple interest and compound interest, and explain nominal versus effective interest rates and the concept of discounting and compounding. (Covers: QR-11-D-01 to D-03)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-D-01	Define simple interest and compound interest and state their formulas.	Remembering
QR-11-D-02	Explain the difference between nominal and effective annual interest rates.	Understanding
QR-11-D-03	Explain the concept of discounting and compounding in determining present and future values.	Understanding

Benchmark 2: Calculate interest, effective rates, and the present and future value of single amounts and annuities, and evaluate the most suitable financing option for a given business scenario. (Covers: QR-11-D-04 to D-08)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-D-04	Calculate simple interest and compound interest for a given principal, rate, and time.	Applying
QR-11-D-05	Calculate the effective annual interest rate from a given nominal rate compounded periodically.	Applying
QR-11-D-06	Calculate the present value and future value of a single amount using compounding and discounting techniques.	Applying
QR-11-D-07	Calculate the present value and future value of a series (annuity) of cash flows, such as instalment payments.	Applying
QR-11-D-08	Compare simple interest, compound interest, and annuity-based financing options, and evaluate the most suitable option for a given business scenario.	Evaluating

Domain E: STATISTICAL MEASURES AND DATA ANALYSIS

Standard:

Develop the ability to define, collect, classify, summarise, and analyse business data using basic statistical tools.

Benchmark 1: Define basic statistical terms and classify types of data. (Covers: QR-11-E-01 to E-02)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-E-01	Define basic statistical terms such as data, frequency, mean, median, and mode.	Remembering
QR-11-E-02	Classify different types of data (qualitative, quantitative, primary, secondary).	Remembering

Benchmark 2: Explain data-collection methods, differentiate between a population and a sample, and identify the characteristics of measures of dispersion. (Covers: QR-11-E-03 to E-05)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-E-03	Explain methods of data collection, including survey, questionnaire, census, and sampling.	Understanding
QR-11-E-04	Differentiate between a population and a sample, and explain the purpose of sampling in business data collection.	Understanding
QR-11-E-05	Identify the characteristics and appropriate use of measures of dispersion (range, variance, standard deviation).	Understanding

Benchmark 3: Summarise and present data; calculate measures of central tendency and dispersion; select an appropriate sampling method; and analyse variability to compare business data sets. (Covers: QR-11-E-06 to E-10)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-E-06	Summarise and present data using tables, frequency distributions, and graphical methods.	Applying
QR-11-E-07	Calculate measures of central tendency (mean, median, mode) for ungrouped and grouped data — for example, calculating the normal return of a security using the mean value.	Applying
QR-11-E-08	Compute measures of dispersion, including variance, standard deviation, and coefficient of variation.	Applying
QR-11-E-09	Identify an appropriate sampling method (for example, random or convenience sampling) for a given business data-collection scenario.	Applying
QR-11-E-10	Analyse the degree of variability in a distribution to compare consistency between two business data sets, such as the returns of two securities.	Analysing

Domain F: INDEX NUMBERS

Standard:

Understand the concept and calculation of index numbers in measuring economic and business change over time.

Benchmark 1: Define index numbers and identify their types, and explain the practical applications of index numbers. (Covers: QR-11-F-01 to F-02)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-F-01	Define index numbers and identify their types (price index, quantity index, value index).	Remembering
QR-11-F-02	Explain the practical applications of index numbers, such as the consumer price index, producer price index, and sensitive price indicator.	Understanding

Benchmark 2: Calculate index numbers using given methods, evaluate the suitability of an index-number base year, and construct a deflated or inflated series. (Covers: QR-11-F-03 to F-05)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-F-03	Calculate simple and weighted index numbers using given methods.	Applying
QR-11-F-04	Evaluate the suitability of a chosen index-number base year for measuring long-term business price changes.	Evaluating
QR-11-F-05	Construct a deflated or inflated series using index numbers.	Creating

Domain G: CORRELATION COEFFICIENT AND LINEAR REGRESSION

Standard:

Understand and apply the concepts of correlation and regression to analyse relationships between variables in business and economic data.

Benchmark 1: Explain the concept of correlation and regression, and calculate correlation coefficients, rank correlation coefficients, a regression line, and the coefficient of determination. (Covers: QR-11-G-01 to G-04)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-G-01	Explain the concept of correlation and regression, and their uses and limitations in analysing relationships between business variables.	Understanding
QR-11-G-02	Calculate correlation coefficients and rank correlation coefficients between two variables.	Applying
QR-11-G-03	Calculate a linear regression line (line of best fit) using the least squares method — for example, regressing sales revenue on advertising expense.	Applying
QR-11-G-04	Calculate the coefficient of determination and interpret the strength of a relationship between two variables.	Applying

Domain H: PROBABILITY AND PROBABILITY DISTRIBUTIONS FOR BUSINESS DECISIONS

Standard:

Understand the fundamental principles of probability, including permutations, combinations, and the basic rules of probability, and apply them to determine outcomes in simple business scenarios.

Benchmark 1: Define permutation and combination, and explain the fundamental rules of probability, including total and favourable outcomes, and the distinction between mutually exclusive and independent events. (Covers: QR-11-H-01 to H-03)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-H-01	Define permutation and combination, and state the formula for each.	Remembering
QR-11-H-02	Explain the fundamental concepts and rules of probability, including total outcomes and favourable outcomes.	Understanding
QR-11-H-03	Explain the difference between mutually exclusive events and independent events in a business context.	Understanding

Benchmark 2: Apply the fundamental counting principle and the rules of probability to determine outcomes and calculate probabilities in simple business scenarios. (Covers: QR-11-H-04 to H-07)

SLO Code	Student Learning Outcomes	Cognitive Level
QR-11-H-04	Calculate the number of possible outcomes and arrangements using permutations and combinations in simple business scenarios, such as selecting a sample committee or arranging products for display.	Applying
QR-11-H-05	Calculate the probability of a simple event using the classical approach.	Applying
QR-11-H-06	Calculate the probability of mutually exclusive events using the addition rule.	Applying
QR-11-H-07	Calculate the probability of independent events using the multiplication rule.	Applying

Suggested Examination Structure

The annual assessment for Quantitative Reasoning Grade XI comprises a single written paper covering Domains A–I. The total marks are 100. No practical or software-based component is required for this course.

The internal mark distribution follows the prescribed scheme: MCQs (20 marks), Short Answers (40 marks), and Long Questions (40 marks).

Component	Mode / Format	Marks	% of Total	Domains
Section A: Objective	MCQs	20	20%	A – H
Section B: Short Answers	Descriptive	40	40%	A – H
Section C: Long Questions	Computational / Comprehensive	40	40%	B, C, D, G, H
Part I	2 questions × 10 marks	20	20%	B, C
Part II	2 questions × 10 marks	20	20%	D, G, H
Grand Total		100	100%	A – H

Note: Section C (Long Questions) is drawn from the computationally intensive domains — Commercial Arithmetic, Equations and Marginal Analysis, Financial Mathematics, Correlation and Regression, and Probability — since these domains require multi-step worked solutions. Domains A, E, and F are assessed primarily through Sections A and B.

Section 5: Suggested Weightage of Cognitive Levels for Assessment

(With variation ±5%)

The following weightage applies to the 100-mark written paper.

Detailed Six-Level Distribution

Cognitive Level (Bloom's Taxonomy)	Weightage Percentage
Remembering	10%
Understanding	20%
Applying	50%
Analysing	8%
Evaluating	8%
Creating	4%
Total	100%

Consolidated Assessment Blocks

For paper-setting, the six levels are consolidated into the following blocks. The Higher-Order block aggregates Analysing, Evaluating, and Creating.

Bloom's Levels Mapped	Weightage
Remembering	10%
Understanding	20%
Applying	50%
Analysing + Evaluating + Creating	20%
Total	100%

Rationale for the Weightage Allocation

Remembering (10%):

A foundational course where students encounter mathematical and business terminology for the first time. A minimum threshold of recall-level items ensures basic definitions and formulas — ratio, proportion, commercial-arithmetic terms, and index numbers — are assessed without reducing the course to rote memorisation.

Understanding (20%):

Students must grasp the conceptual underpinnings of quantitative techniques — the 'why' behind procedures — through explaining relationships, comparing trade versus cash discount, and explaining the rules of probability.

Applying (50%):

Quantitative Reasoning is fundamentally skill-based. The largest share tests the ability to calculate profit, discount, mark-up and commission, solve equations and perform marginal analysis, compute interest and present/future values, calculate dispersion and index numbers, construct regression lines, and calculate probabilities.

Analysing (8%):

Items require students to analyse combined pricing-and-commission business scenarios, examine variability between data sets, and differentiate mutually exclusive from independent events.

Evaluating (8%):

Students evaluate pricing and commission structures, judge the suitability of financing options, and evaluate the business significance of a correlation or regression result.

Creating (4%):

Tests synthesis of multiple components into a coherent whole — constructing a deflated or inflated index-number series from raw price and quantity data.

Section 6: Suggested Teaching–Learning Strategies

Quantitative Reasoning is an analytical and application-oriented subject that develops numerical reasoning, logical thinking, and problem-solving skills essential for business, economics, and social sciences. Effective teaching requires a balance between conceptual understanding and mathematical application, enabling students to connect quantitative tools with real-life business and economic situations.

Effective Teaching Should Focus On

Conceptual Clarity:

Students should clearly understand mathematical and statistical concepts, formulas, assumptions, and limitations rather than memorising procedures mechanically.

Application of Quantitative Skills:

Emphasis should be placed on applying quantitative techniques to business and economic problems such as trade discounting, commission calculation, cost analysis, profit optimisation, demand and supply analysis, financial decision-making, and data interpretation.

Student-Centred Learning:

Students should be actively engaged through class discussions, problem-solving sessions, group work, and practical numerical exercises to strengthen understanding and confidence.

Use of Visual and Graphical Methods:

Graphs, charts, tables, and diagrams should be used extensively to help students visualise relationships between variables and interpret data effectively.

Integration of Technology:

Use of calculators, spreadsheets, and digital tools should be encouraged to enhance accuracy, efficiency, and real-world relevance of quantitative analysis.

Teachers should adopt flexible instructional approaches to accommodate diverse learning abilities and promote logical reasoning and independent thinking.

Instructional Techniques

Problem-Based Learning (PBL):

Students solve real-world numerical problems related to business and economics, such as calculating commission, constructing regression lines, and calculating probabilities in simple business scenarios.

Collaborative Learning:

Group activities may include solving statistical problems, interpreting datasets, constructing graphs, and discussing quantitative results to promote teamwork and communication skills.

Inquiry-Based Learning:

Students are encouraged to explore quantitative relationships through questioning, experimentation, and comparison of alternative methods and solutions.

Differentiated Instruction:

Teachers may provide step-by-step guidance, scaffolded exercises, and enrichment tasks to address varying student abilities and learning needs.

Technology-Enhanced Learning:

Spreadsheets and digital tools may be used for data analysis, graphical representation, statistical calculations, and financial mathematics to strengthen practical competence.

Section 7: Suggested Teaching–Learning Resources

(A) The Textbook

In most Pakistani colleges, the government-prescribed textbook remains the primary teaching and learning resource. For Quantitative Reasoning, the textbook plays a central role in developing numerical accuracy, analytical thinking, and applied problem-solving skills. An effective textbook should present content that is well-planned, logically sequenced, and aligned with the approved curriculum, balancing theoretical explanations with worked examples, illustrations, and practice exercises in clear, student-friendly language appropriate to the HSSC level.

Guidelines for Authors

- Content must align with the objectives of the National Curriculum of Pakistan.
- The mathematical level should be appropriate for HSSC-I students.
- Concepts should be explained clearly with step-by-step numerical solutions.
- Overcrowding of formulas should be avoided.
- Content should be logically arranged from basic mathematics to advanced applications, and the Commercial Arithmetic domain (ratio, proportion, profit, and commission) should precede algebraic and financial mathematics content, consistent with its prerequisite role.
- Real-life business and economic examples should be incorporated, particularly for ratio, profit, and commission problems drawn from everyday trade.
- All tables, graphs, and diagrams should be properly labelled and explained.
- The text should be accurate, consistent, and free from conceptual errors.
- Footnotes and side notes may be included where necessary to clarify concepts or provide additional explanation.

(B) Teacher's Manual

The teacher's manual serves as a professional support tool to enhance instructional effectiveness and consistency. A comprehensive teacher's manual should include:

- Detailed lesson plans aligned with domains, benchmarks, and SLOs.
- Step-by-step numerical solutions and model answers.
- Suggested classroom activities and group exercises.
- Suggested formative and summative assessment techniques.
- Common student misconceptions and remedial strategies.
- Guidance on using graphs, calculators, and spreadsheets.
- Assessment guidelines and marking schemes.

(C) Digital Resources and AI Tools

The rapid growth of digital technologies and artificial intelligence (AI) offers new opportunities to enhance the teaching and learning of Quantitative Reasoning. When used responsibly and under teacher guidance, these tools can strengthen conceptual understanding, practical application, and independent learning.

Recommended resources include:

- Spreadsheet software (e.g., MS Excel) for data analysis, regression, and financial calculations.
- Online educational platforms for mathematics and statistics practice.
- Graphing tools and digital simulations for visualising relationships between variables.
- Video-based tutorials for revision and concept reinforcement.

Under teacher supervision, AI-assisted tools may be used to simplify complex quantitative concepts, generate additional numerical practice problems, provide step-by-step explanations of calculations, and assist in revision and self-assessment. The use of AI tools should supplement classroom instruction, not replace it. Teachers should guide students in the ethical and responsible use of AI, ensuring that learning outcomes focus on understanding, accuracy, and independent thinking.

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Ministry of Federal Education and Professional Training
****

Islamabad: September 16, 2026

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Printing Corporation of Pakistan Press,
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