
Curriculum Outcomes

Curriculum Outcomes Framework

The mathematics curriculum is based on a framework of outcome statements. This framework comprises statements of the essential graduation learnings, general curriculum outcomes, key-stage curriculum outcomes, and specific curriculum outcomes. *The Foundation for the Atlantic Canada Mathematics Curriculum* articulates general curriculum outcomes and key-stage curriculum outcomes. Curriculum guides provide specific curriculum outcomes for each course, together with elaborations and suggestions for related instructional and assessment strategies and tasks. Teachers and administrators use the curriculum outcomes framework to design learning environments and experiences that reflect the needs and interests of the students.

Essential Graduation Learning

Essential graduation learnings are statements describing the knowledge, skills, and attitudes expected of all students who graduate from high school. Essential graduation learnings are cross-curricular in nature and comprise different areas of learning: aesthetic expression, citizenship, communication, personal development, problem solving, technological competence and spiritual and moral development.

Aesthetic Expression

Graduates will be able to respond with critical awareness to various forms of the arts and be able to express themselves through the arts.

Citizenship

Graduates will be able to assess social, cultural, economic, and environmental interdependence in a local and global context.

Communication

Graduates will be able to use the listening, viewing, speaking, reading and writing modes of language(s) and mathematical and scientific concepts and symbols, to think, learn and communicate effectively.

Personal Development

Graduates will be able to continue to learn and to pursue an active, healthy lifestyle.

Problem Solving

Graduates will be able to use the strategies and processes needed to solve a wide variety of problems, including those requiring language, and mathematical and scientific concepts.

Technological Competence

Graduates will be able to use a variety of technologies, demonstrate an understanding of technological applications, and apply appropriate technologies for solving problems.

Spiritual and Moral Development

Graduates will demonstrate an understanding and appreciation of the place of belief systems in shaping the development of moral values and ethical conduct.

See *Foundation for the Atlantic Canada Mathematics Curriculum*, pages 4–6.

General Curriculum Outcomes

General curriculum outcomes are statements that identify what students are expected to know and be able to do upon the completion of study in mathematics. General curriculum outcomes contribute to the attainment of the essential graduation learnings. The seven general curriculum outcomes for mathematics are organized into four content strands: number concepts/number and relationship operations; patterns and relations; shape and space; and data management and probability.

Number Concepts/Number and Relationship Operations

- Students will demonstrate number sense and apply number theory concepts.
- Students will demonstrate operation sense and apply operation principles and procedures in both numeric and algebraic situations.

Patterns and Relations

- Students will explore, recognize, represent and apply patterns and relationships, both informally and formally.

Shape and Space

- Students will demonstrate an understanding of and apply concepts and skills associated with measurement.
- Students will demonstrate spatial sense and apply geometric concepts, properties and relationships.

Data Management and Probability

- Students will solve problems involving the collection, display and analysis of data.
- Students will represent and solve problems involving uncertainty.

Key-Stage Curriculum Outcomes

Key-stage curriculum outcomes (KSCOs) are statements that identify what students are expected to know and be able to do by the end of grades 3, 6, 9, and 12 as a result of their cumulative learning experiences in mathematics.

Specific Curriculum Outcomes

Specific curriculum outcomes are statements identifying what students are expected to know and be able to do at a particular grade level or upon completion of a course which contributes to the achievement of the key-stage curriculum outcomes. The following is a list of specific curriculum outcomes for Mathematics 3103. In Mathematics 3103 students will be expected to:

- A1 identify numbers as belonging to the various subsets of real numbers and recognize situations in which each of these subsets can be applied
- A2 write either a sentence or an inequality to describe domain and range for various problem situations
- A3 apply fraction concepts both mentally and using pencil and paper algorithms including:
 - lowest common denominator (LCD)
 - Equivalent fractions
 - Reducing to simplest form
 - Improper vs mixed fraction
 - Factors
 - Prime factorization to find LCD's
 - Ordering fractions by relative size
- A4 develop place value and rounding concepts for decimal numbers
- A5 convert numbers from:

- percentage to decimal	- decimal to percentage
- percentage to fraction	- fraction to percentage
- decimal to fraction	- fraction to decimal
- B1 add, subtract, multiply and divide fractions (both mentally and using pencil and paper), and work with patterns and graphs based on these operations with fractions
- B2 simplify complex fractions containing rational numbers
- B3 add, subtract, multiply and divide numbers mentally

- B4 solve simple equations involving percentages
- B5 apply percentage increase and decrease in problem solving situations
- B6 apply the order of operations with rational numbers, simple irrational numbers, and algebraic expressions
- B7 apply the Laws of Exponents for both integer and rational exponents
- B8 relate rational exponents to radicals and use this relationship to simplify expressions
- B9 simplify expressions involving radicals
- B10 recognize and use the language of polynomials
- B11 identify, add, subtract, and multiply complex numbers
- B12 verify that complex numbers are the solutions of polynomial equations
- B13 add, subtract, multiply and divide rational expressions
- B14 use the four basic operations to simplify complex fractions
- B15 rearrange formulas to solve for any variable
- B16 simplify problem situations involving functions of two or more variables to functions of one variable
- B17 find the composite, $f(g(x))$ or $g(f(x))$, given two functions $f(x)$ and $g(x)$, and perform calculations involving the composite of two functions in either algebraic or graphical form.
- B18 find the inverse of a linear or quadratic function and determine whether that inverse is a function.
- B19 sketch the inverse graph by interchanging coordinates.
- C1 solve linear equations
- C2 factor polynomial expressions and use factoring to solve polynomial equations in one variable of degree 2 or higher
- C3 solve polynomial equations of degree 3 or 4 using the Rational Roots Theorem to identify a factor and synthetic division to obtain and solve a depressed equation

- C4 recognize basic graphs of polynomial functions to degree 4
- C5 use graphs to obtain precise polynomial functions
- C6 solve equations involving radicals and determine extraneous roots
- C7 solve equations involving rational expressions and determine extraneous roots

Intended Audience

Mathematics 3103 is intended for students who have completed at least Mathematics 1204 and intend to enroll in a post-secondary program requiring a fairly rigorous mathematics, particularly leading to calculus. These students would normally be enrolled concurrently in Academic Mathematics 2204 or 3204. It is recommended that Mathematics 3103 be studied in the final year of high school.

Expectations

Since Mathematics 3103 is primarily a skills-building course that includes building proficiency in mental computation, calculator use is expected to be minimal.

In addition, since the target audience is bound for post-secondary institutions, students are expected to do a *high degree of independent work - including homework*. Students should gain insight into the nature of the commitment in post-secondary mathematics while doing this course. Students who do not commit themselves to this work will have difficulty achieving success in post-secondary mathematics.

