

Mathematics 12

Foundational Outcomes

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Outcomes Framework Mathematics 12 (2020-2021)

In September 2020, teachers will be working hard to create a space that is safe and welcoming for all learners no matter the location of their “classroom”. The first weeks will still be a time to establish a sense of community, engage learners in rich interactive experiences to promote critical thinking and create opportunities for collaboration and discussion. This is an opportune time to develop a culture and a climate for mathematics learning, conducive to collaboration, risk taking and inquiry.

The **Foundational Outcomes** identified in this document represent outcomes determined to be relevant for future learning in mathematics. Decisions about foundational outcomes were made in consultation with teachers, provincial mathematics team, Board and Regional Centre staff. The foundational outcomes are meant to guide teachers in making decisions about creating learning experiences that will prepare and engage their learners in a responsive way. However, a teacher’s professional judgment remains the most important guide to effectively responding to the needs of their learners.

Colour coding has been used to identify outcomes and indicators as foundational (**green**), optional (**orange**) or non-foundational (**red**) for the 2020-2021 school year.

FM01 Solve problems that involve compound interest in financial decision making.

Performance Indicators:

- FM01.01 Explain the advantages and disadvantages of compound interest and simple interest.
- FM01.02 Identify situations that involve compound interest.
- FM01.03 Graph and compare, in a given situation, the total interest paid or earned for different compounding periods.
- FM01.04 Determine, given the principal, interest rate, and number of compounding periods, the total interest of a loan.
- FM01.05 Graph and describe the effects of changing the value of one of the variables in a situation that involves compound interest.
- FM01.06 Determine, using technology, the total cost of a loan under a variety of conditions (e.g., different amortization periods, interest rates, compounding periods, and terms).
- FM01.07 Compare and explain, using technology, different credit options that involve compound interest, including bank and store credit cards and special promotions.
- FM01.08 Solve a contextual problem that involves compound interest.

FM02 Analyze costs and benefits of renting, leasing and buying.

Performance Indicators:

- FM02.01 Identify and describe examples of assets that appreciate or depreciate.

- FM02.02 Compare, using examples, renting, leasing and buying.
- FM02.03 Justify, for a specific set of circumstances, if renting, buying, or leasing would be advantageous.
- FM02.04 Solve a problem involving renting, leasing, or buying that requires the manipulation of a formula.
- FM02.05 Solve, using technology, a contextual problem that involves cost-and-benefit analysis

FM03 Analyze an investment portfolio in terms of:

- interest rate
- rate of return
- total return.

Performance Indicators:

- FM03.01 Determine and compare the strengths and weaknesses of two or more portfolios.
- FM03.02 Determine, using technology, the total value of an investment when there are regular contributions to the principal.
- FM03.03 Graph and compare the total value of an investment with and without regular contributions.
- FM03.04 Apply the Rule of 72 to solve investment problems, and explain the limitations of the rule.
- FM03.05 Determine, using technology, possible investment strategies to achieve a financial goal.
- FM03.06 Explain the advantages and disadvantages of long-term and short-term investment options.
- FM03.07 Explain, using examples, why smaller investments over a longer term may be better than larger investments over a shorter term.
- FM03.08 Solve an investment problem.

LR01 Analyze puzzles and games that involve numerical and logical reasoning, using problem-solving strategies.

Performance Indicators:

- LR01.01 Determine, explain, and verify a strategy to solve a puzzle or to win a game; for example, guess and check look for a pattern, make a systematic list, draw or model eliminate possibilities, simplify the original problem, work backward, develop alternative approaches
- LR01.02 Identify and correct errors in a solution to a puzzle or in a strategy for winning a game.
- LR01.03 Create a variation on a puzzle or a game, and describe a strategy for solving the puzzle or winning the game.

LR02 Solve problems that involve the application of set theory.

Performance Indicators: all indicators

LR03 Solve problems that involve conditional statements.

Performance Indicators: all indicators

P01 Interpret and assess the validity of odds and probability statements.

Performance Indicators: all indicators

P02 Solve problems that involve the probability of mutually exclusive and non-mutually exclusive events.

Performance Indicators:

- P02.01 Classify events as mutually exclusive or non-mutually exclusive, and explain the reasoning.
- P02.02 Determine if two events are complementary, and explain the reasoning.
- P02.03 Represent, using set notation or graphic organizers, mutually exclusive (including complementary) and non-mutually exclusive events.
- P02.04 Solve a contextual problem that involves the probability of mutually exclusive or non mutually exclusive events.
- P02.05 Solve a contextual problem that involves the probability of complementary events.
- P02.06 Create and solve a problem that involves mutually exclusive or non-mutually exclusive events.

P03 Solve problems that involve the probability of two events.

Performance Indicators: all indicators

P04 Solve problems that involve the fundamental counting principle.

Performance Indicators: all indicators

P05 Solve problems that involve permutations.(It is intended that circular permutations not be included.)

Performance Indicators:

- P05.01 Represent the number of arrangements of n elements taken n at a time, using factorial notation.
- P05.02 Determine, with or without technology, the value of a factorial.
- P05.03 Simplify a numeric or algebraic fraction containing factorials in both the numerator and denominator.
- P05.04 Solve an equation that involves factorials.
- P05.05 Determine the number of permutations of n elements taken r at a time.

- P05.06 Determine the number of permutations of n elements taken n at a time where some elements are not distinct.
- P05.07 Explain, using examples, the effect on the total number of permutations of n elements when two or more elements are identical.
- P05.08 Generalize strategies for determining the number of permutations of n elements taken r at a time.
- P05.09 Solve a contextual problem that involves probability and permutations.

P06 Solve problems that involve combinations.

Performance Indicators: all indicators

RF01 Represent data, using polynomial functions (of degree ≤ 3), to solve problems.

Performance Indicators: all indicators

RF02 Represent data, using exponential and logarithmic functions, to solve problems.

Performance Indicators: all indicators

RF03 Represent data, using sinusoidal functions, to solve problems.

Performance Indicators: all indicators

MRP01 Research and give a presentation on a topic that involves the application of mathematics.

Performance Indicators: all indicators