Extended Mathematics 11

Outcomes

NOVA SCOTIA
NOUVELLE-ÉCOSSE

2022

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Extended Mathematics 11

Prepared by the Department of Education and Early Childhood Development

This is the most recent version of the current curriculum materials as used by teachers in Nova Scotia.

Extended Mathematics 11 Outcomes

M02 Solve problems that involve scale diagrams, using proportional reasoning.

Performance Indicators:

M02.01 Explain, using examples, how scale diagrams are used to model a 2-D shape or a 3-D object.

M02.02 Determine, using proportional reasoning, the scale factor, given one dimension of a 2-D shape or a 3-D object and its representation.

M02.03 Determine, using proportional reasoning, an unknown dimension of a 2-D shape or a 3-D object, given a scale diagram or a model.

M02.04 Draw, with or without technology, a scale diagram of a given 2-D shape according to a specified scale factor (enlargement or reduction).

M02.05 Solve a contextual problem that involves scale diagrams.

M03 Demonstrate an understanding of the relationships among scale factors, areas, surface areas and volumes of similar 2-D shapp.es and 3-D objects.

Performance Indicators:

M03.01 Determine the area of a 2-D shape, given the scale diagram, and justify the reasonableness of the result.

M03.02 Determine the surface area and volume of a 3-D object, given the scale diagram, and justify the reasonableness of the result.

M03.03 Explain, using examples, the effect of a change in the scale factor on the area of a 2-D shape.

M03.04 Explain, using examples, the effect of a change in the scale factor on the surface area of a 3-D object.

M03.05 Explain, using examples, the effect of a change in the scale factor on the volume of a 3-D object.

M03.06 Explain, using examples, the relationships among scale factor, area of a 2-D shape, surface area of a 3-D object, and volume of a 3-D object.

M03.07 Solve a spatial problem that requires the manipulation of formulas.

M03.08 Solve a contextual problem that involves the relationships among scale factors, areas, and volumes.

G02 Students will be expected to solve problems that involve the properties of angles and triangles.

Performance Indicators:

G02.01 Determine the measures of angles in a diagram that involves parallel lines, angles, and triangles and justify the reasoning.

G02.03 Solve a contextual problem that involves angles or triangles.

G03 Solve problems that involve the cosine law and the sine law.

Performance Indicators:

G03.01 Draw a diagram to represent a problem that involves the cosine law or sine law.
G03.02 Explain the steps in a given proof of the sine law or cosine law.
G03.03 Solve a problem involving the cosine law that requires the manipulation of a formula.
G03.05 Solve a problem involving the sine law that requires the manipulation of a formula.
G03.06 Solve a contextual problem that involves the cosine law or the sine law.

LR01 Analyze and prove conjectures, using inductive and deductive reasoning, to solve problems.

Performance Indicators:

LR01.01 Make conjectures by observing patterns and identifying properties, and justify the reasoning.
LR01.02 Explain why inductive reasoning may lead to a false conjecture.
LR01.03 Compare, using examples, inductive and deductive reasoning.
LR01.04 Provide and explain a counterexample to disprove a given conjecture.
LR01.07 Determine if an argument is valid and justify the reasoning.
LR01.09 Solve a contextual problem involving inductive or deductive reasoning.

RF01 Model and solve problems that involve systems of linear inequalities in two variables.

Performance Indicators:

RF01.01 Model a problem using a system of linear inequalities in two variables.
RF01.02 Graph the boundary line between two half planes for each inequality in a system of linear inequalities, and justify the choice of solid or broken lines.
RF01.03 Determine and explain the solution region that satisfies a linear inequality, using a test point when given a boundary line.
RF01.04 Determine, graphically, the solution region for a system of linear inequalities, and verify the solution.
RF01.05 Explain, using examples, the significance of the shaded region in the graphical solution of a system of linear inequalities.
RF01.06 Solve an optimization problem using linear programming.

RF02 Demonstrate an understanding of the characteristics of quadratic functions, including:

- vertex
- intercepts
- domain and range
- axis of symmetry

Performance Indicators:

RF02.01 Determine, with or without technology, the intercepts of the graph of a quadratic function.
RF02.02 Determine, by factoring, the roots of a quadratic equation, and verify by substitution.
RF02.03 Determine, using the quadratic formula, the roots of a quadratic equation.
RF02.04 Explain the relationships among the roots of an equation, the zeros of the corresponding function, and the *x*-intercepts of the graph of the function.
RF02.05 Explain, using examples, why the graph of a quadratic function may have zero, one, or two *x*-intercepts.

RF02.06 Express a quadratic equation in factored form, using the zeros of a corresponding function or the *x*-intercepts of its graph.
RF02.07 Determine, with or without technology, the coordinates of the vertex of the graph of a quadratic function.
RF02.08 Determine the equation of the axis of symmetry of the graph of a quadratic function, given *x*-intercepts of the graph.
RF02.09 Determine the coordinates of the vertex of the graph of a quadratic function, given the equation of the function and the axis of symmetry, and determine if the *y*-coordinate of the vertex is a maximum or a minimum.
RF02.10 Determine the domain and range of a quadratic function.
RF02.11 Sketch the graph of a quadratic function.
RF02.12 Solve a contextual problem that involves the characteristics of a quadratic function.

S01 Analyze, interpret, and draw conclusions from one-variable data using numerical and graphical summaries. (NEW)

Performance Indicators:
S01.01 Recognize that the analysis of one-variable data involves the frequencies associated with one attribute.
S01.02 Determine, using technology, the relevant numerical summaries.
S01.03 Generate, using technology, the relevant graphical summaries of one-variable data based on the type of data provided.
S01.04 Interpret statistical summaries to describe the characteristics of a one-variable data set and to compare two or more related one-variable data sets.
S01.05 Make inferences, and make and justify conclusions, from statistical summaries of one-variable data orally and in writing, using convincing arguments.

S02 Demonstrate an understanding of normal distribution, including:
standard deviation, z-scores.

Performance Indicators:
S01.01 Explain, using examples, the meaning of standard deviation.
S01.02 Calculate, using technology, the population standard deviation of a data set.
S01.03 Explain, using examples, the properties of a normal curve, including the mean, median, mode, standard deviation, symmetry, and area under the curve.
S01.04 Determine if a data set approximates a normal distribution and explain the reasoning.
S01.05 Compare the properties of two or more normally distributed data sets.
S01.06 Explain, using examples that represent multiple perspectives, the application of standard deviation for making decisions in situations such as warranties, insurance, or opinion polls.
S01.07 Solve a contextual problem that involves the interpretation of standard deviation.
S01.08 Determine, with or without technology, and explain the *z*-score for a given value in a normally distributed data set.
S01.09 Solve a contextual problem that involves normal distribution.

S03 Interpret statistical data, using:
- confidence intervals

- confidence levels
- margin of error.

Performance Indicators:

S03.01 Explain, using examples, how confidence levels, margin of error, and confidence intervals may vary depending on the size of the random sample.

S03.02 Explain, using examples, the significance of a confidence interval, margin of error, or confidence level.

S03.03 Make inferences about a population from sample data, using given confidence intervals, and explain the reasoning.

S03.04 Provide examples from print or electronic media in which confidence intervals and confidence levels are used to support a particular position.

S03.05 Interpret and explain confidence intervals and margin of error, using examples found in print or electronic media.

S03.06 Support a position by analyzing statistical data presented in the media.

DA01 Analyse, interpret, and draw conclusions from two-variable data using numerical, graphical, and algebraic summaries.

Performance Indicators:

DA01.01 Recognize that the analysis of two-variable data involves the relationship between two attributes.

DA01.02 Distinguish between situations that involve one variable and situations that involve more than one variable.

DA01.03 Generate scatter plots of two-variable data, by hand and using technology

DA01.04 Determine, by performing a linear regression using technology, the equation of a line that models a suitable two-variable data set

DA01.05 Determine, using technology, the correlation coefficient, and recognize it as a measure of the fit of the data to a linear model

DA01.06 Determine the fit of an individual data point to the linear model by determining its residual, and recognize how a residual plot can be used to determine if a linear equation is a good model for a two-variable data set

DA01.07 Make inferences, and make and justify conclusions, from statistical summaries of two-variable data orally and in writing, using convincing arguments

DA02 Critically analyze society's use of inferential statistics.

Performance Indicators:

DA02.01 Investigate examples of the use of inferential statistics in society

DA02.02 Assess the accuracy, reliability, and relevance of statistical claims in the media by

- identifying examples of bias and points of view, including the use and misuse of statistics to promote a certain point of view
- identifying and describing the data collection methods, including the characteristics of a good sample, some sampling techniques, and principles of primary data collection
- determining if the data is relevant

DA02.03 Recognize and explain why conclusions drawn from statistical studies of the same relationship may differ.
DA02.04 Recognize and explain how the collection and analysis of data has impacted and continues to impact our world.
DA02.05 Create infographics / data visualizations using the design principles of good data visualization.
DA02.06 Identify, discuss, and present multiple sides of the issues with supporting data.

DA03 Analyze data, identify patterns and extract useful information and meaning from large, professionally collected data sets.

Performance Indicators:

DA03.01 Explore and analyze large sets of open data using technology.
DA03.02 Investigate what data is available and open and why some data is open and other data not.
DA03.03 Pose questions that might be answered or further explored with large open data sets.
DA03.04 Present their findings from an investigation of a big data set.