Grade 9 Assessment of Mathematics Blueprint

Grade 9 Mathematics Curriculum Expectation		Number of Questions	Percentage of Questions on the Assessment
B. Number			
B1	**Development of Numbers and Number Sets**	10	$\frac{10}{50}$ = 20% of the questions on the assessment
	demonstrate an understanding of the development and use of numbers, and make connections between sets of numbers		
	Specific Expectations for Overall B1		
	Development and Use of Numbers		
B1.1	research a number concept to tell a story about its development and use in a specific culture, and describe its relevance in a current context		
	Number Sets		
B1.2	describe how various subsets of a number system are defined, and describe similarities and differences between these subsets		
B1.3	use patterns and number relationships to explain density, infinity, and limit as they relate to number sets		
B2	**Powers**		
	represent numbers in various ways, evaluate powers, and simplify expressions by using the relationships between powers and their exponents		
	Specific Expectations for Overall B2		
	Powers		
B2.1	analyse, through the use of patterning, the relationship between the sign and size of an exponent and the value of a power, and use this relationship to express numbers in scientific notation and evaluate powers		
B2.2	analyse, through the use of patterning, the relationships between the exponents of powers and the operations with powers, and use these relationships to simplify numeric and algebraic expressions		
B3	**Number Sense and Operations**		
	apply an understanding of rational numbers, ratios, rates, percentages, and proportions, in various mathematical contexts, and to solve problems		
	Specific Expectations for Overall B3		
	Rational Numbers		
B3.1	apply an understanding of integers to describe location, direction, amount, and changes in any of these, in various contexts		
B3.2	apply an understanding of unit fractions and their relationship to other fractional amounts, in various contexts, including the use of measuring tools		
B3.3	apply an understanding of integers to explain the effects that positive and negative signs have on the values of ratios, rates, fractions, and decimals, in various contexts		
	Applications		
B3.4	solve problems involving operations with positive and negative fractions and mixed numbers, including problems involving formulas, measurements, and linear relations, using technology when appropriate		
B3.5	pose and solve problems involving rates, percentages, and proportions in various contexts, including contexts connected to real-life applications of data, measurement, geometry, linear relations, and financial literacy		

Grade 9 Mathematics Curriculum Expectation		Number of Questions	Percentage of Questions on the Assessment
C. Algebra			
C1	**Algebraic Expressions and Equations**	18	$\frac{18}{50}$ = 36% of the questions on the assessment
	demonstrate an understanding of the development and use of algebraic concepts and of their connection to numbers, using various tools and representations		
	Specific Expectations for Overall C1		
	Development and Use of Algebra		
C1.1	research an algebraic concept to tell a story about its development and use in a specific culture, and describe its relevance in a current context		
	Algebraic Expressions and Equations		
C1.2	create algebraic expressions to generalize relationships expressed in words, numbers, and visual representations, in various contexts		
C1.3	compare algebraic expressions using concrete, numerical, graphical, and algebraic methods to identify those that are equivalent, and justify their choices		
C1.4	simplify algebraic expressions by applying properties of operations of numbers, using various representations and tools, in different contexts		
C1.5	create and solve equations for various contexts, and verify their solutions		
C2	**Coding**		
	apply coding skills to represent mathematical concepts and relationships dynamically, and to solve problems, in algebra and across the other strands		
	Specific Expectations for Overall C2		
	Coding		
C2.1	use coding to demonstrate an understanding of algebraic concepts including variables, parameters, equations, and inequalities		
C2.2	create code by decomposing situations into computational steps in order to represent mathematical concepts and relationships, and to solve problems		
C2.3	read code to predict its outcome, and alter code to adjust constraints, parameters, and outcomes to represent a similar or new mathematical situation		
C3	**Application of Relations**		
	represent and compare linear and non-linear relations that model real-life situations, and use these representations to make predictions		
	Specific Expectations for Overall C3		
	Application of Linear and Non-Linear Relations		
C3.1	compare the shapes of graphs of linear and non-linear relations to describe their rates of change, to make connections to growing and shrinking patterns, and to make predictions		
C3.2	represent linear relations using concrete materials, tables of values, graphs, and equations, and make connections between the various representations to demonstrate an understanding of rates of change and initial values		
C3.3	compare two linear relations of the form $y = ax + b$ graphically and algebraically, and interpret the meaning of their point of intersection in terms of a given context		

Grade 9 Mathematics Curriculum Expectation		Number of Questions	Percentage of Questions on the Assessment
C. Algebra (continued)			
C4	**Characteristics of Relations**	Continued from previous page	Continued from previous page
	demonstrate an understanding of the characteristics of various representations of linear and non-linear relations, using tools, including coding when appropriate		
	Specific Expectations for Overall C4		
	Characteristics of Linear and Non-Linear Relations		
C4.1	compare characteristics of graphs, tables of values, and equations of linear and non-linear relations		
C4.2	graph relations represented as algebraic equations of the forms $x = k$, $y = k$, $x + y = k$, $x - y = k$, $ax + by = k$, and $xy = k$, and their associated inequalities, where a, b, and k are constants, to identify various characteristics and the points and/or regions defined by these equations and inequalities		
C4.3	translate, reflect, and rotate lines defined by $y = ax$, where a is a constant, and describe how each transformation affects the graphs and equations of the defined lines		
C4.4	determine the equations of lines from graphs, tables of values, and concrete representations of linear relations by making connections between rates of change and slopes, and between initial values and *y*-intercepts, and use these equations to solve problems		
D. Data			
D1	**Collection, Representation and Analysis of Data**	8	$\frac{8}{50} = 16\%$ of the questions on the assessment
	describe the collection and use of data, and represent and analyse data involving one and two variables		
	Specific Expectations for Overall D1		
	Application of Data		
D1.1	identify a current context involving a large amount of data, and describe potential implications and consequences of its collection, storage, representation, and use		
	Representation and Analysis of Data		
D1.2	represent and statistically analyse data from a real-life situation involving a single variable in various ways, including the use of quartile values and box plots		
D1.3	create a scatter plot to represent the relationship between two variables, determine the correlation between these variables by testing different regression models using technology, and use a model to make predictions when appropriate		
D2	**Mathematical Modelling**		
	apply the process of mathematical modelling, using data and mathematical concepts from other strands, to represent, analyse, make predictions, and provide insight into real-life situations		
	Specific Expectations for Overall D2		
	Application of Mathematical Modelling		
D2.1	describe the value of mathematical modelling and how it is used in real life to inform decisions		
	Process of Mathematical Modelling		
D2.2	identify a question of interest requiring the collection and analysis of data, and identify the information needed to answer the question		
D2.3	create a plan to collect the necessary data on the question of interest from an appropriate source, identify assumptions, identify what may vary and what may remain the same in the situation, and then carry out the plan		

Grade 9 Mathematics Curriculum Expectation		Number of Questions	Percentage of Questions on the Assessment
D. Data (continued)			
D2.4	determine ways to display and analyse the data in order to create a mathematical model to answer the original question of interest, taking into account the nature of the data, the context, and the assumptions made	Continued from previous page	Continued from previous page
D2.5	report how the model can be used to answer the question of interest, how well the model fits the context, potential limitations of the model, and what predictions can be made based on the model		
E. Geometry and Measurement			
E1	**Geometric and Measurement Relationships**	8	$\frac{8}{50}$ = 16% of the questions on the assessment
	demonstrate an understanding of the development and use of geometric and measurement relationships, and apply these relationships to solve problems, including problems involving real-life situations		
	Specific Expectations for Overall E1		
	Geometric and Measurement Relationships		
E1.1	research a geometric concept or a measurement system to tell a story about its development and use in a specific culture or community, and describe its relevance in connection to careers and to other disciplines		
E1.2	create and analyse designs involving geometric relationships and circle and triangle properties, using various tools		
E1.3	solve problems involving different units within a measurement system and between measurement systems, including those from various cultures or communities, using various representations and technology, when appropriate		
E1.4	show how changing one or more dimensions of a two-dimensional shape and a three-dimensional object affects perimeter/circumference, area, surface area, and volume, using technology when appropriate		
E1.5	solve problems involving the side-length relationship for right triangles in real-life situations, including problems that involve composite shapes		
E1.6	solve problems using the relationships between the volume of prisms and pyramids and between the volume of cylinders and cones, involving various units of measure		
F. Financial Literacy			
F1	**Financial Decisions**	6	$\frac{6}{50}$ = 12% of the questions on the assessment
	demonstrate the knowledge and skills needed to make informed financial decisions		
	Specific Expectations for Overall F1		
	Financial Decisions		
F1.1	identify a past or current financial situation and explain how it can inform financial decisions, by applying an understanding of the context of the situation and related mathematical knowledge		
F1.2	identify financial situations that involve appreciation and depreciation, and use associated graphs to answer related questions		
F1.3	compare the effects that different interest rates, lengths of borrowing time, ways in which interest is calculated, and amounts of down payments have on the overall costs associated with purchasing goods or services, using appropriate tools		
F1.4	modify budgets displayed in various ways to reflect specific changes in circumstances, and provide a rationale for the modifications		