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Alberta Mathematics 6-9 Scope and Sequence

Number

Grade	6	7	8	9
Learning Outcome	6N1 Students Investigate magnitude with positive and negative numbers	7N1 Students analyze positive and negative numbers	8N1 Students interpret rational and irrational numbers	9N1 Students analyze sets of real numbers
Number	6N1.1 Integers additive inverses of whole numbers	7N1.1 Additive Inverse of fractions and decimals with the same absolute value and opposite sign Absolute Value of positive and negative numbers including decimal numbers and fractions to their position on the number line Convert between fraction and decimals, including negative numbers Compare and Order positive and negative numbers, fractions and decimals,	8N1.1 Rational Numbers Express rational numbers as fractions and decimal numbers. Classify Natural, Integers and Rational numbers Repeating decimals. Add, subtract, multiply and divide, any two rational numbers Solve Problems involving rational numbers in real-world situation	9N1 Organization of numbers into sets and subsets. Describe a set of numbers as finite or infinite Justify whether a set of numbers is a subset or another Identify the subsets to which a real number belongs

Grade	6	7	8	9
			8N1.2 Irrational numbers Distinguish between rational and irrational numbers Classify the expression of an irrational number as exact or approximate. Approximate an irrational number as a rounded decimal. Compare and order real numbers Relate an irrational number to it's approximate position on the number line.	

Grade	6	7	8	9
Learning Outcome	6N1 Students Investigate magnitude with positive and negative numbers	7N2 Students apply operations to positive and negative numbers		
Number	6N1.2 Understanding of Adding integers 6N1.3 Understanding of Subtracting	7N2.1 Addition and Subtraction of Integers Assess the reasonableness of a sum or difference of two integers. 7N2.2 Multiplying and Dividing Integers Assess the reasonableness of a product or quotient of integers.	No N2 in Grade 8, but 8N1 Requires students to: Add, subtract, multiply, and divide any two rational numbers	No N2 in Grade 9 but operations of integers needed for 9N1 - Sets of Real Numbers - Rational Numbers 9A1 - Polynomials 9A2 - Quadratic Equations

Grade	6	7	8	9
Learning Outcome	6N3 Students analyze numbers using prime factorization and exponentiation	7N3 Students Interpret perfect squares and perfect cubes	8N3 Students interpret Square roots of perfect and non-perfect squares	9N3 Students analyze exponent laws and powers of 10
Number	6N3.1 Associative Property, prime factorization, common factors 6N3.2 Exponents	7N3.1 Square numbers Identify the base and exponent of a perfect square Recall perfect squares within 144 and their square roots (limited to natural numbers) Solve problems involving perimeter and area (limited to side lengths that are natural numbers)	8N3 Square roots of rational and irrational numbers Classify positive rational numbers as perfect squares or non-perfect squares. Express perfect and non-perfect squares as repeated multiplication and as powers. Approximate the square roots of non-perfect squares, within 144. Determine the area of a square, given the side length. Determine the side length of a square, given its area. Solve problems involving perimeter and area of squares.	9N3.1 Exponent laws Investigate the role of parenthesis in powers Justify the zero exponent law and the negative exponent law Simplify expressions that include powers, using exponent laws.

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		7N3.2 Cube numbers Recall perfect cubes and their cube roots within 125, limited to natural numbers.		9N3.2 Powers of 10 Relationship between powers of 10 and place value. Express a power of 10 as a decimal number and as a fraction Scientific Notation Convert between scientific notation and decimal numbers.

Grade	6	7	8	9
Learning Outcome	6N5 Students relate fractions to quotients.	7N4 Students interpret multiplication and division on positive fractions and positive decimal numbers		
Fractions Computations Multiplication and Division	6N5.1 Fractions represent quotients. Convert Fractions to decimals using division. 6N6.1 Add and subtract Fractions 6N7.1 Multiplication of fractions with a natural number Relate the multiplication of a unit fraction to division	 7N4.1 Multiplication of Fractions 7N4.2 Division of Fractions	No 8N4 however 8N1.1 -Add, subtract, multiply, and divide any two rational numbers	No N4 in Grade 9
	6N4.1 Multiply and divide up to 3 digit natural or decimal numbers by 2 digit natural numbers 6A1.1 Conventional Order of Operations using Parenthesis	7N4.3 Multiplication and Division of Decimal Numbers 7N4.4 Order of Operations with integers, fractions and decimal numbers (PEMDAS)	8N1.1 -Add, subtract, multiply, and divide any two rational numbers	

Grade	6	7	8	9
Learning Outcome	6N8 Students apply equivalence to the interpretation of ratios and rates.	7N5 Students analyze multiplicative relationships between equivalent ratios	8N5 Students analyze multiplicative relationships within ratios	
Percents, Rates and Ratios	6N8.1 Unit Rates, Equivalent ratios, percentage of a number	7N5 Equivalent ratios Compare two ratios Percentages less than 1% and greater than 100% Proportional reasoning	8N5 Interpret ratios as a multiplicative comparison (constant of proportionality (k) including slope, unit rate and scale factor) Determine the constant proportionality Determine the missing quantity in a ratio.	

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Algebra

	6	7	8	9
Learning Outcome			8A1 Students interpret powers in single-variable algebraic terms	9A1 Students interpret arithmetic operations, using single variable polynomials
			8A1 Polynomials Polynomial Classification Determine the value of an exponent in an algebraic term Name algebraic terms according to degree Add and Subtract Monomials by combining like terms	9A1 Polynomial operations Multiply monomials Expand and Simplify polynomials with three terms or less Factor polynomials in the form $x^2 + bx + c$. Determine when a polynomial is non factorable.

	6	7	8	9
Learning Outcome	6A1 Students analyze expressions and solve algebraic equations.	7A2 Students apply equivalence to solving linear equations	8A2 Students solve single-variable linear equations involving rational numbers	9A2 Students solve single-variable quadratic equations
	6A1.1 Evaluate Expressions according to Order of Operations that include Powers 6A1.2 Algebraic properties: Commutative and Associative Properties of addition and multiplication -Distributive properties 6A1.3 Solve one or two step linear equations	7A2 Linear Equations Simplify algebraic expressions on both sides of an equation. Solving linear equations Verify solutions Real- world equations	8A2 Linear Equations Solving equations and problems with rational coefficients Express an equation with rational coefficients as an equivalent equation with integers. Solve linear equations, including with parentheses and variables on both sides of the equation.	9A2 Quadratic Equations Solving quadratic equations Determine the number of solutions for a quadratic equation in the form $x^2 = a$ for values of a less than, greater than, and equal to 0. Solve quadratic equations in real-world situations. Solve quadratic equations in the form $x^2 + c = 0$, where c is an integer.

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Learning Outcome			8A3 Students interpret inequalities	9A3 Students define solutions to single-variable linear inequalities
			8A3 Inequalities Inequalities on a number line Strict or non-strict inequalities Verify by substitution Real-world application	9A3 Single-variable linear Inequalities Solve single-variable linear inequalities Determine whether a number is a solution to an inequality. Represent the solution set for an inequality on the number line and using set-builder notation.

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Geometry

	6	7	8	9
Learning Outcomes	6G1 Students analyze shapes through symmetry and congruence.	7G1 Students analyze the structure and relationships of geometric objects	8G1 Students interpret similarity through scale factor	9G1 Students analyze relationships between triangles
Properties of Geometry	6G1.1 Symmetry and Congruency Two transformations Reflection and Rotation Symmetry Symmetry in Tessellations 6G1.2 Symmetry and Congruency of Shapes	7G1.1 Symbols and Symbolic Notation to represent relationship between geometric objects (straight lines, rays, line segments, angles, polygons) 7G1.2 Relationships between geometric objects. (angle relationships, transversals) 7G1.3 Verifying congruence of geometric objects through symbols and symbolic notation	8G1.1 Similarity of Geometric objects and proportions Scale Factor 8G1.2 Transformations of size (Dilations) Dilate on a cartesian plane Determine coordinates of a dilation.	9G1.1 Congruency and similarity of triangles Symbolic Notation to represent congruence of triangles Justify triangle theorems Verify properties of similarity Determine the 3 pairs of equal angles and proportional sides for two triangles.

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Learning Outcome	6CG1 Students explain location and movement in relation to position in the Cartesian plane		8G2 Students analyze and explain triangle problems, using theorems	
Location and Movement of Objects	6CG1.1 Cartesian Plane 6CG1.2 Transformations on a Cartesian Plane -Translation, -Reflection, -Rotation	No CG1 in gr 7 No G2 in gr 7	No CG1 in gr 8 8G2 Justify unknown measures in triangles using theorems. (eg. interior angle sums, Pythagorean)	No CG1 in gr 9 No G2 in gr 9

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Measurement

	6	7	8	9
Learning Outcome	6M1 Students analyze areas of parallelograms and triangles.	7M1 Students interpret and explain area and circumference of circles		
Length, Perimeter and Area Circles	6M1.1 Area of parallelograms and triangles 6M1.2 Area of composite figures	7M1 Size of a circle is determined by its radius. Create circles given the radius using compass or digital geometry Calculate area and circumference Circumference Determine diameter π ,	No M1 in gr 8	No M1 in gr 9

		7	8	9
LEARNING OUTCOME	6M2 Students interpret and express volume.	7M2 Students analyze volume of right prisms and right cylinders	8M2 Students analyze the surface area of right 3-D shapes, using 2-D models	9M2 Students analyze surface area and volume of right composite 3-D shapes
Volume & Surface Area	6M2.1 Volume of prisms	7M2 Name prisms Model volume of prisms Calculate the volume Determine the area of the base of prisms and cylinders	8M2 Polyhedron Surface Area of 2D a using a 2-D model Nets of 3-D shapes Orthographic and isometric drawings to represent 3-D shapes	9M2.1 Surface Area of Composite shapes composed of prisms, pyramids, and cylinders Use of digital geometry Volume of composite 3-D shapes-composed of prisms, pyramids, and cylinders 9M2.2 Relationships between surface area and volume

Functions

	6	7	8	9
	6P1 Students investigate functions to enhance understanding of change.	7F1 Students interpret functions through domain and range	8F1 Students relate linear functions to equations and graphs	9F1 Students connect linear functions to real-world situations
Patterns and Functions	6P1.1 Functions Algebraic expression that represents a function. Various representations of the same function Value of the dependant and independent variable of a function	7F1 Domain and Range Discrete and continuous functions Graph a function	8F1 Calculate Slope Compare slopes Undefined slope Linear vs non-linear functions Rate of change of a linear function Graph linear function Graph horizontal and vertical lines. Express horizontal or vertical lines as an equation	9F1 Function Notation Interpret x- and y- intercepts of linear functions Set-builder notation Representation of linear functions Evaluate functions Input and output values Generate a sequence Interpolation and extrapolation

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Statistics

	6	7	8	9
	6ST1 Students investigate relative frequency using experimental data.	7ST1 Students interpret sample data	8ST1 Students analyze distributions, using shape	9ST1 Students analyze distributions, using spread
Data and Distributions	6ST1.2 Relative frequency 6ST1.2 Likelihood of outcomes. Collect data through experiments Equally likely Outcomes	7ST1.1 Sample Populations Sample vs census Random sampling 7ST1.2 Statistics - Quantitative Data , mean, median, mode, Draw conclusions	8ST1.1 Shape of distributions described by number of modes and whether it is ❖ symmetric, ❖ skewed ❖ uniform Histograms Bar Graphs, Double Bar Graphs Justify: Mean, Median, Mode 8ST1.2 Circle Graphs -Represent Data -Analyze graphs	9ST1 Range Outliers Measures of central tendency Five-Number summary Interquartile range Box Plots

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Probability

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Probability		7PR1 Students interpret theoretical and experimental probability	8PR1 Students interpret probability of independent and dependent events	9PR1 Students interpret the probability of mutually exclusive and non-mutually exclusive events.
	No Probability in K-6	7PR1.1 Events and Probability 7PR1.2 Experimental and theoretical probability. Collect data from trials Simulate situations Determine the experimental probability Compare experimental to theoretical probability	8PR1 Independent and Dependent Events Sample space: set notation, lists, tables Set notation Determine probability Sample Space of compound events - tree diagrams, area models, set notation	9PR1 Multiple events defined by one outcome. (union of sets, complementary events, independent events, intersection of events) Mutually and non-mutually exclusive events Venn Diagrams Calculate the probability of an event - given the probability of it's compliment and vice-versa