

Skill	Grade 8	Grade 9	Mathematics 11 (locally approved)	W & A 10	F & P 10	Mathematics 21 (locally approved)	W & A 20	Foundations 20	Pre-Calculus 20	W & A 30	Foundations 30	Pre-Calculus 30	Calculus 30
Comparing & Ordering Numbers		N9.2: Demonstrate understanding of rational numbers including: comparing and ordering; relating to other types of numbers; solving situational questions.	M11.1 Extend understanding of arithmetic operations to rational numbers to solve problems within the home, money, recreation, and travel themes.										
Order of Operations		N9.2: Demonstrate understanding of rational numbers including: comparing and ordering; relating to other types of numbers; solving situational questions.	M11.1 Extend understanding of arithmetic operations to rational numbers to solve problems within the home, money, recreation, and travel themes.										
Fractions ↔ Decimals ↔ Percents	N8.2: Expand and demonstrate understanding of percents greater than or equal to 0% (including fractional and decimal percents) concretely, pictorially, and symbolically. N8.4: Demonstrate understanding of multiplying and dividing positive fractions and mixed numbers,		M11.1 Extend understanding of arithmetic operations to rational numbers to solve problems within the home, money, recreation, and travel themes.										

	concretely, pictorially, and symbolically.											
Exponents & Radicals	<p>N8.1: Demonstrate understanding of the square and principle square root of whole numbers concretely or pictorially and symbolically.</p> <p>SS8.1: Demonstrate understanding of the Pythagorean Theorem concretely or pictorially and symbolically and by solving problems.</p>	<p>N9.1: Demonstrate (concretely, pictorially, and symbolically) understanding of powers with integral bases (excluding base 0) and whole number exponents including: representing using powers; evaluating powers; powers with an exponent of zero; solving situational questions.</p> <p>N9.3: Extend understanding of square roots to include the square root of positive rational numbers.</p>			<p>FP10.1: Demonstrate understanding of factors of whole numbers by determining the: prime factors; greatest common factor; least common multiple; principal square root; cube root.</p> <p>FP10.2: Demonstrate understanding of irrational numbers in both radical (including mixed radical) and exponent forms through: representing; identifying; simplifying; ordering; relating to rational numbers; applying exponent laws.</p>							
Preservation of Equality (integrated within course)				<p>WA10.1: applying formulas for perimeter, area, Pythagorean Theorem, income & primary trig ratios</p>		<p>M21.1: Extend and apply understanding of the preservation of equality by solving problems that involve the manipulation and application of formulae within home, money, recreation, and travel themes.</p>	<p>WA20.1: Expand and apply understanding of the preservation of equality including solving problems that involve the manipulation and application of formulae for volume and capacity, surface area, slope and rate of change, simple interest, and finance charges.</p>					
Financial Math			<p>M11.7: Demonstrate understanding of proportional reasoning within the home, money, recreation, and travel themes.</p>	<p>WA10.10: proportional reasoning involving currency and unit pricing and currency exchange</p> <p>WA10.11:</p>		<p>M21.8: Demonstrate understanding of budgets.</p> <p>M21.9: Demonstrate understanding of financial institution</p>	<p>WA20.6: Demonstrate understanding of personal budgets and their importance for financial planning.</p> <p>WA20.7:</p>		<p>WA30.6: Demonstrate understanding of options for acquiring a vehicle including: purchasing without credit;</p>	<p>FM30.1 Demonstrate understanding of financial decision making including analysis of: *renting, leasing, and buying</p>		

			<p>M11.8: Demonstrate an understanding of income.</p> <p>M11.9: Demonstrate and understanding of responsible spending habits</p>	Demonstrate understanding of income including: wages; salary; contracts; commissions; piecework; self-employment; gross pay; net pay		<p>services.</p> <p>M21.10: Demonstrate understanding of financial decision making including analysis of renting, leasing, and buying on credit.</p>	Demonstrate understanding of compound interest WA20.8: Demonstrate understanding of financial institution services used to access and manage personal finances, including credit options		<p>purchasing with credit; leasing; leasing to purchase.</p> <p>WA30.7: Explore and critique the viability of small business options with respect to: expenses; sales; profit or loss.</p>	* credit * compound interest * investment portfolios.		
Polynomials		<p>P9.4: Demonstrate understanding of polynomials (limited to polynomials of degree less than or equal to 2) including: modeling; generalizing strategies for addition, subtraction, multiplication, and division; analyzing; relating to context; comparing for equivalency</p>			<p>FP10.1: Demonstrate understanding of factors of whole numbers by determining the: prime factors; greatest common factor; least common multiple; principal square root; cube root.</p> <p>FP10.5: Demonstrate understanding of the multiplication and factoring of polynomial expressions (concretely, pictorially, and symbolically) including: multiplying of monomials, binomials, and trinomials; common factors; trinomial factoring; relating multiplication and factoring of polynomials</p>			<p>PC20.6: factoring polynomials Expand and demonstrate understanding of factoring polynomial expressions including those of the form: $a^2x^2 - b^2y^2$, $a \neq 0$, $b \neq 0$; $a(f(x))^2 - b(f(x)) + c$, $a \neq 0$; $a^2(f(x))^2 - b^2(g(y))^2$, $a \neq 0$, $b \neq 0$ where a, b, and c are rational numbers.</p>			<p>C30.1: Extend understanding of functions including: algebraic functions (polynomial, rational, power); transcendental functions (exponential, logarithmic, trigonometric); piecewise functions, including absolute value.</p>	
Linear Relations, Equations & Functions	<p>P8.1: Demonstrate understanding of linear relations concretely, pictorially (including graphs), physically, and symbolically.</p> <p>P8.2: Model and solve problems using linear equations of the form: $ax = b$; $x/a = b$, $a \neq 0$; $ax + b = c$; $x/a + b = c$, $a \neq 0$; $a(x + b) = c$</p>	<p>P9.1: Demonstrate understanding of linear relations including: graphing; analyzing; interpolating and extrapolating; solving situational questions</p> <p>P9.2: Model and solve situational questions using linear equations of the form: $ax = b$; $x/a = b$, $a \neq 0$; $ax +$</p>			<p>FP10.6: Expand and apply understanding of relations and functions including: relating data, graphs, and situations; analyzing and interpreting; distinguishing between relations and functions</p> <p>FP10.7: Demonstrate, with and without the use of technology,</p>		<p>WA20.9: Demonstrate concretely, pictorially, and symbolically (with and without the use of technology) an understanding of slope with respect to: rise over run; rate of change; solving problems.</p>	<p>PC20.1: Demonstrate understanding of the absolute value of real numbers and equations and functions involving the absolute value of linear and quadratic functions.</p>	<p>WA30.8: Extend and apply understanding of linear relations including: patterns and trends; graphs; tables of values; equations; interpolation and extrapolation; problem solving.</p>		<p>PC30.6: Demonstrate an understanding of operations on, and compositions of, functions.</p>	<p>C30.1: Extend understanding of functions including: algebraic functions (polynomial, rational, power); transcendental functions (exponential, logarithmic, trigonometric); piecewise functions,</p>

	concretely, pictorially, and symbolically, where a , b , and c are integers.	$b = c$; $x/a + b = c$, $a \neq 0$; $ax = b + cx$; $a(x + b) = c$; $ax + b = cx + d$; $a(bx + c) = d(ex + f)$; $a/x = b$, $x \neq 0$ where a , b , c , d , e , and f are rational numbers P9.3: Demonstrate understanding of single variable linear inequalities with rational coefficients including: solving inequalities; verifying; comparing; graphing.			understanding of slope (concretely, pictorially, and symbolically) with respect to: line segments and lines; rate of change; ratio of rise to run; parallel lines; perpendicular lines. FP10.8: Demonstrate understanding of linear relations including: representing in words, ordered pairs, tables of values, graphs, function notation, and equations; determining characteristics including intercepts, slope, domain, and range; relating different equation forms to each other and to graphs. FP10.9: Demonstrate understanding of the writing and application of equations of linear relations, given: a graph of a relation; a point that satisfies a relation and the slope of the relation; two distinct points that satisfy a relation; a point that satisfies the relation and the equation of a line parallel or perpendicular to the relation.							including absolute value. C30.2: Extend understanding of factoring, absolute value, and solving inequalities to include: rational expressions; double inequalities; absolute value inequalities.	
Polynomial Equations & Functions, Inequalities								FM20.9: Demonstrate an understanding of the characteristics of quadratic functions of the form $y = a(x - p)^2 + q$, including: Vertex; intercepts;	PC20.1: Demonstrate understanding of the absolute value of real numbers and equations and functions involving		FM30.7: Demonstrate understanding of the representation and analysis of data using: polynomial functions of degree ≤ 3	PC30.6: Demonstrate an understanding of operations on, and compositions of, functions. PC30.10:	C30.1: Extend understanding of functions including: algebraic functions (polynomial,

								domain and range; axis of symmetry.	the absolute value of linear and quadratic functions. PC20.7: Demonstrate understanding of quadratic functions of the form $y = ax^2 + bx + c$ and of their graphs, including: vertex; domain and range; direction of opening; axis of symmetry; x- and y-intercepts. PC20.8: Demonstrate understanding of quadratic equations including the solution of: single variable equations; systems of linear-quadratic and quadratic-quadratic equations in two variables.			Demonstrate understanding of polynomials and polynomial functions of degree greater than 2 (limited to polynomials of degree ≤ 5 with integral coefficients).	rational, power); transcendental functions (exponential, logarithmic, trigonometric); piecewise functions, including absolute value. C30.2: Extend understanding of factoring, absolute value, and solving inequalities to include: rational expressions; double inequalities; absolute value inequalities.
Systems of Equations & Inequalities					FP10.10: Solve problems that involve systems of linear equations in two variables, graphically and algebraically			FM20.8: Demonstrate understanding of systems of linear inequalities in two variables	PC20.8: Demonstrate understanding of quadratic equations including the solution of: single variable equations; systems of linear-quadratic and quadratic-quadratic equations in two variables. PC20.9: Expand and demonstrate understanding of inequalities including: one-variable quadratic				

									inequalities; two-variable linear and quadratic inequalities.				
Radical Equations & Expressions									PC20.2: Expand and demonstrate understanding of radicals with numerical and variable radicands including: computations; solving equations (limited to square roots and one or two radicals).			PC30.11: Demonstrate understanding of radical and rational functions with restrictions on the domain.	
Rational Equations & Expressions									PC20.3: Expand and demonstrate understanding of rational expressions and equations (up to and including degree 2 numerators and denominators) including: equivalent forms of expressions; operations on expressions; solving equations that can be simplified to linear or quadratic equations. PC20.11: Demonstrate understanding of reciprocal functions of: linear functions; quadratic functions.			PC30.11: Demonstrate understanding of radical and rational functions with restrictions on the domain.	C30.1: Extend understanding of functions including: algebraic functions (polynomial, rational, power); transcendental functions (exponential, logarithmic, trigonometric); piecewise functions, including absolute value. C30.2: Extend understanding of factoring, absolute value, and solving inequalities to include: rational expressions; double inequalities; absolute value inequalities.
Exponential & Logarithmic Equations & Functions											FM30.7: Demonstrate understanding of the representation and analysis of data using: logarithmic functions and exponential	PC30.9: Demonstrate an understanding of logarithms including: evaluating logarithms, relating logarithms	

										functions	to exponents, deriving laws of logarithms, solving equations, graphing.	
Measurement			M11.4: Demonstrate understanding of measurement in the Système International (metric) and Imperial System within the home and travel themes.	WA10.3: Demonstrate using concrete, and pictorial models, and symbolic representations, understanding of measurement systems including: The Système International (SI); The British Imperial system; The US customary system. WA10.4: Demonstrate, using concrete and pictorial models, and symbolic representations, understanding of linear measurement, including units in the SI and Imperial systems of measurement.	FP10.3: Demonstrate understanding of SI and imperial units of measurement including: linear measurement; surface area of spheres, and right cones, cylinders, prisms, and pyramids; volume of spheres, and right cones, cylinders, prisms, and pyramids; relationships between and within measurement systems.					WA30.2: Demonstrate concretely, pictorially, and symbolically an understanding of limitations of measuring instruments including: precision; accuracy; uncertainty; tolerance.		
Angles			M11.5 Demonstrate understanding of angles to solve problems within the home theme.	WA10.9: Demonstrate understanding of angles including: drawing and sketching; replicating and constructing; bisecting; relating to parallel, perpendicular, and transversal lines; solving problems	M21.5: Demonstrate understanding of angles created by parallel, perpendicular, and transversal lines and solve problems within the home theme.			FM20.4: Demonstrate understanding of properties of angles and triangles including: deriving proofs based on theorems and postulates about congruent triangles; solving problems.			PC30.1: Extend understanding of angles to angles in standard position, expressed in degrees and radians.	
Solving Triangles & Trigonometric Functions	SS8.1: Demonstrate understanding of the Pythagorean Theorem concretely or pictorially and symbolically and by solving problems.		M11.6 Demonstrate understanding of the Pythagorean Theorem to solve problems within the home theme.	WA10.6: Apply understanding of the Pythagorean Theorem to solve problems. WA10.8: Demonstrate an understanding of primary trigonometric ratios (sine, cosine, and tangent).	FP10.4: Develop and apply the primary trigonometric ratios (sine, cosine, tangent) to solve problems that involve right triangles	M21.6 Demonstrate an understanding of primary trigonometric ratios (sine, cosine, and tangent) and slope.	WA20.4: Solve problems that involve at least two right triangles.	FM20.5: Demonstrate understanding of the cosine law and sine law (including the ambiguous case).	PC20.4: Expand and demonstrate understanding of the primary trigonometric ratios including the use of reference angles ($0^\circ \leq \theta \leq 360^\circ$) and the determination of	WA30.3: Solve problems that involve the sine law and cosine law, excluding the ambiguous case.	FM30.7: Demonstrate understanding of the representation and analysis of data using sinusoidal functions.	PC30.2: Demonstrate understanding of the unit circle and its relationship to the six trigonometric ratios for any angle in standard position. PC30.3: Demonstrate understanding of

									exact values for trigonometric ratios. PC20.5: Demonstrate understanding of the cosine law and sine law, including the ambiguous case.			the graphs of the primary trigonometric functions. PC30.4: Demonstrate understanding of first- and second-degree trigonometric equations. PC30.5: Demonstrate understanding of trigonometric identities including: reciprocal identities, quotient identities, Pythagorean identities, sum or difference identities (restricted to sine, cosine, and tangent), double-angle identities (restricted to sine, cosine, and tangent)
Shapes/Objects		SS9.1: Demonstrate understanding of circle properties including: perpendicular line segments from the centre of a circle to a chord bisect the chord; inscribed angles subtended by the same arc have the same measure; the measure of a central angle is twice the measure of an inscribed angle subtending the same arc; tangents to a circle are perpendicular to the radius ending at the point of tangency SS9.2: Extend understanding of area to surface area of right rectangular prisms, right	M11.4: Demonstrate understanding of measurement in the Système International (metric) and Imperial System within the home and travel themes.	WA10.5: Demonstrate using concrete and pictorial models, and symbolic representations, understanding of area of 2-D shapes and surface area of 3-D objects including units in SI and Imperial systems of measurement.	FP10.3: Demonstrate understanding of SI and imperial units of measurement including: linear measurement; surface area of spheres, and right cones, cylinders, prisms, and pyramids; volume of spheres, and right cones, cylinders, prisms, and pyramids; relationships between and within measurement systems.		WA20.3: Extend and apply understanding of surface area, volume, and capacity using concrete and pictorial models and symbolic representations (SI or imperial units of measurement). WA20.5: Extend and apply understanding of 3-D objects including: top, bottom, and side views; exploded views; component parts; scale diagrams.			WA30.4: Extend and apply understanding of the properties of triangles, quadrilaterals, and regular polygons to solve problems.		

		cylinders, right triangular prisms, to composite 3-D objects										
Similarity	N8.3: Demonstrate understanding of rates, ratios, and proportional reasoning concretely, pictorially, and symbolically	SS9.3: Demonstrate understanding of similarity of 2-D shapes		WA10.7: Demonstrate understanding of similarity of convex polygons, including regular and irregular polygons		M21.4 Demonstrate and extend understanding of similarity and proportional reasoning related to scale factors, scale drawing, scale models, surface area, and volume.	WA20.10: Extend and apply proportional thinking to solve problems that involve unit analysis and scale.	FM20.3: Expand and demonstrate understanding of proportional reasoning related to: rates; scale diagrams; scale factor; area; surface area; volume.				
Translations		SS9.4: Demonstrate understanding of line and rotation symmetry								WA30.5: Extend and apply understanding of transformations on 2-D shapes and 3-D objects including: translations; rotations; reflections; dilations.		PC30.7: Extend understanding of transformations to include functions (given in equation or graph form) in general, including horizontal and vertical translations, and horizontal and vertical stretches. PC30.8: Demonstrate understanding of functions, relations, inverses and their related equations resulting from reflections through the: x-axis, y-axis, line $y = x$.
Sequences and Series									PC20.10: Demonstrate understanding of arithmetic and geometric (finite and infinite) sequences and series.			
Data Analysis		SP9.1: Demonstrate understanding of the effect of: bias; use of language • ethics; cost; time and timing; privacy; cultural	M11.3: Demonstrate understanding of data collection and analysis within the home, recreation, and travel themes.			M21.3 Extend and apply understanding of measures of central tendency to analyze data. M21.7 Demonstrate	WA20.11: Extend and apply understanding of representing data using graphs including: bar graphs;	FM20.1: Demonstrate understanding of the mathematics involved in an historical event or an area of		WA30.9: Extend and apply understanding of measures of central tendency to solve problems including:	FM30.3: Demonstrate understanding of set theory and its applications. FM30.8: Research and give a presentation of a	

		sensitivity; population or sample on data collection. SP9.2: Demonstrate an understanding of the collection, display, and analysis of data through a project.				understanding of the mathematics involved in an area of interest.	histograms; line graphs; circle graphs	interest. FM20.6: Demonstrate an understanding of normal distribution, including standard deviation and z-scores. FM20.7: Demonstrate understanding of the interpretation of statistical data, including: confidence intervals; confidence levels; margin of error.		mean; median; mode; weighted mean; trimmed mean. WA30.10: Demonstrate understanding of percentiles.	current event or an area of interest that requires data collection and analysis.		
Permutations & Combinations											FM30.6: Demonstrate understanding of combinatorics including: the fundamental counting principle, permutations (excluding circular permutations), combinations. PC30.12: Demonstrate understanding of permutations, including the fundamental counting principle. PC30.13: Demonstrate understanding of combinations of elements, including the application to the binomial theorem.		
Probability		SP9.3: Demonstrate an understanding of the role of probability in society. SP9.4: Research and present how First Nations and Métis peoples, past and present, envision, represent, and make use of probability and statistics.								WA30.11: Extend and apply understanding of probability.	FM30.4: Extend understanding of odds and probability. FM30.5: Extend understanding of the probability of two events, including events that are: mutually exclusive, non-mutually exclusive, dependent, independent.		
Reasoning			M11.2 Demonstrate understanding of reasoning by analyzing puzzles	WA10.2: Analyze puzzles and games that involve spatial reasoning using		M21.2: Demonstrate understanding of numerical reasoning and	WA20.2: Demonstrate the ability to analyze puzzles and	FM20.2: Demonstrate understanding of inductive and		WA30.1: Analyze puzzles and games that involve logical	FM30.2: Demonstrate understanding of inductive and		

			and games.	problem solving strategies.		problem solving strategies by analyzing puzzles and games.	games that involve numerical reasoning and problem solving strategies.	deductive reasoning including: analyzing conjectures; analyzing spatial puzzles and games; providing conjectures; solving problems.		reasoning using problem solving strategies.	deductive reasoning including: analysis of conditional statements; analysis of puzzles and games involving numerical and logical reasoning; making and justifying decisions; solving problems.		
Limit & Continuity													C30.3 Demonstrate understanding of limits and continuity.
Differentiation													C30.4: Demonstrate understanding of differentiation based on slope as a rate of change C30.5: Extend understanding of curve sketching by applying differentiation and limits.. C30.6: Demonstrate understanding of the application of derivatives to solve problems including: optimization; rates of change; related rates. C30.7: Demonstrate understanding of transcendental function derivatives and their applications.
Integration													C30.8: Demonstrate understanding of indefinite and

													definite integration: by sight; by substitution; as used in the Fundamental Theorem of Calculus.
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