Concept Map Grade 9 – 12 Mathematics

Skill	Grade 9	Grade 10 — Mathematics 11	Grade 10 — Workplace 10	Grade 10 — Foundations & Pre-Calculus 10	Grade 11 — Mathematics21	Grade 11 — Workplace 20	Grade 11 — Foundations 20	Grade 11 — Pre-Calculus 20	Grade 12 — Workplace 30	Grade 12 — Foundations 30	Grade 12 — Pre-Calculus 30	Grade 12 — Calculus 30
Comparing & Ordering Numbers	**N9.2:** rational numbers, fractions, decimals, integers & square roots	**M11.1:** rational numbers & integers (rounding decimals)										
Order of Operations	**N9.2:** rational numbers & integers	**M11.1:** rational number & integers										
Fractions ↔ Decimals ↔ Percents		**M11.1:** convert, compare & percent of a percent										
Exponents & Radicals	**N9.1:** exponent laws (×, ÷, power of power) and evaluating powers **N9.3:** perfect squares, square roots including benchmarks of rational numbers			**FP10.1:** perfect square roots & cube roots **FP10.2:** all exponent laws and converting improper numbers to exponents								
Preservation of Equality (integrated within course)			**WA10.1:** applying formulas for perimeter, area, Pythagorean Theorem, income & primary trig ratios		**M21.1:** applying formulas for volume, capacity, surface area, slope, rate of change primary trigonometric ratios, finance charges & income	**WA20.1:** applying formulas for volume, capacity, surface area, slope & rate of change						
Financial Math		**M11.7:** proportional reasoning involving unit rate, unit cost & currency **M11.8:** income **M11.9:** responsible spending habits	**WA10.10:** proportional reasoning involving currency and unit pricing and currency exchange **WA10.11:** income		**M21.8:** budgets **M21.9:** financial institution services **M21.10:** credit, renting, leasing, buying	**WA20.6:** budgets & financial planning **WA20.7:** compound interest **WA20.8:** personal finances, financial institutions & credit options			**WA30.6:** acquiring a vehicle **WA30.7:** small business options	**FM30.1:** investments & loans: simple & compound interest,		
Polynomials	**P9.4:** terms, operations & representing			**FP10.1:** prime factors, gcf & lcm **FP10.5:** multiplying polynomials & factoring binomials & trinomials				**PC20.6:** factoring polynomials				**C30.1:** algebraic, transcendental, piecewise (including absolute value) functions
Linear Relations, Equations & Functions	**P9.1:** graphing, interpolation & extrapolation of linear relations **P9.2:** solve linear equations **P9.3:** solve, compare, graph inequalities			**FP10.6:** graphing tables, domain & range, relation vs. function **FP10.7:** slope **FP10.8:** characteristics & graphing of linear relations **FP10.9:** writing equations of linear relations	**M21.4:** slope	**WA20.9:** slope		**PC20.1:** absolute value	**WA30.8:** linear relations: patterns & trends, graphs, table of values, equations, interpolation/extrapolation, problem solving		**PC30.6:** operations & composition of functions	**C30.1:** understanding **C30.2:** factoring, absolute value & double inequalities
Polynomial Equations & Functions, Inequalities							**FM20.9:** quadratic functions in the form $y = a(x-p)^2 + q$: graph, vertex, intercepts, domain & range, axis of symmetry	**PC20.7:** quadratic functions of the form $y = ax^2 + bx + c$: graph, vertex, domain & range, direction of opening, axis of symmetry, intercepts **P20.8:** solve by factoring, completing the square, quadratic formula & graphing **P20.1:** absolute value		**FM30.7:** Polynomial functions of degree ≤3	**PC30.6:** operations & composition of functions **PC30.10:** polynomial functions of degree 3-5, long & synthetic division, factor & remainder theorem	**C30.1:** understanding quadratic functions **C30.2:** factoring & solving absolute value & double inequalities

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		Mathematics 11	Workplace 10	Foundations & Pre-Calculus 10	Mathematics21	Workplace 20	Foundations 20	Pre-Calculus 20	Workplace 30	Foundations 30	Pre-Calculus 30	Calculus 30
Systems of Equations & Inequalities				FP10.10: solve graphically & algebraically in two variables			FM20.8: systems of linear inequalities, graphing & optimization	PC20.8: linear & quadratic equations PC20.9: systems of linear inequalities				
Radical Equations & Expressions								PC20.2: simplify, solve & non-permissible values			PC30.11: domain, range & solve by graphing	
Rational Equations & Expressions								PC20.3: simplify, solve & non-permissible values PC20.11: reciprocal functions of linear and quadratic functions			PC30.11: domain, range, holes asymptotes & solve by graphing	C30.1: understanding C30.2: factoring & solving absolute value & double inequalities
Exponential & Logarithmic Equations & Functions										FM30.7: exponential and logarithmic functions	PC30.9: logarithmic functions, laws, equations, logs ↔ exponential, graphing	
Measurement		M11.4: converting and applying SI↔ imperial	WA10.3: understanding measurement systems WA10.4: linear measurement - SI↔ imperial: converting & applying	FP10.3: SI↔ Imperial: converting & applying					WA30.2: precision, accuracy, uncertainty & tolerance of measuring instruments			
Angles			WA10.9: constructing, bisecting, solving angles in parallel lines		M21.5: solving angles		FM20.4: solving angles in triangles and parallel lines, properties of angles& triangles: proof & solve				PC30.1: angles in standard position, degree ↔ radians, coterminal	
Solving Triangles & Trigonometric Functions		M11.6: applying Pythagorean Theorem to solve triangles	WA10.6: Pythagorean Theorem to solve triangles WA10.8: primary trigonometric ratios to solve triangles	FP10.4: applying Pythagorean Theorem & trigonometric ratios to solve triangles	M21.6: properties of triangles & applying primary trigonometric ratios	WA20.4: problems with right triangles	FM20.5: sine & cosine law (including ambiguous case)	PC20.5: sine & cosine law (including ambiguous case) PC20.4: sin, cos & tan ratios, exact values of special triangles & quadrantal angles	WA30.3: sine & cosine law (excluding ambiguous case)	FM30.7: sinusoidal functions	PC30.2: 6 trigonometric ratios PC30.3: graphing primary trigonometric functions PC30.4: solving trigonometric equations PC30.5: trigonometric identities	
Shapes/Objects	SS9.1: circle properties SS9.2: surface area & volume of 3-D objects	M11.4: perimeters & areas of rectangles, triangles, circles & composite	WA10.5: area of 2-D and surface area of 3-D	FP10.3: surface area & volume of 3-D		WA20.3: surface area, volume & capacity SI & imperial WA20.5: understanding 3-D objects: views and scale diagrams			WA30.4: properties of triangles, quadrilaterals and regular polygons			
Similarity	SS9.3: 2-D shapes		WA10.7: similarity of convex polygons		M21.7: similarity & proportional reasoning: scale factor, scale drawings, scale models, surface area & volume	WA20.10: proportional thinking to unit analysis and scale	FM20.3: proportional reasoning related to rates, scale diagrams, scale factor, area, surface area, perimeter					
Translations	SS9.4: line & rotation symmetry								WA30.5: translations, rotations, reflections & dilations (on 2-D & 3-D objects)		PC30.7: vertical & horizontal stretches & translations PC30.8: reflections	

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Sequences and Series								PC20.10: arithmetic and geometric (finite and infinite)				
Data Analysis	SP9.1: terminology & data collection SP9.2: data collection & representation	M11.3: data collection and analysis			M21.3: measures of central tendency M21.11: mathematics area of interest	WA20.11: representing data using graphs	FM20.1: mathematics as an area of interest FM20.6: normal distribution (including standard deviation & z-scores) FM20.7: interpreting stats (confidence intervals, confidence levels & margins of error)		WA30.9: weighted and trimmed mean WA30.10: percentiles	FM30.3: set theory FM30.8: area of interest in data collecting & analysis		
Permutations & Combinations										FM30.6: fundamental counting principle & permutations, combinations	PC30.12: permutations, & fundamental counting principle PC30.13: combinations including binomial theorem	
Probability	SP9.3: probability & statistics in society SP9.4: : probability & statistics in First Nations & Metis culture								WA30.11: applications, from a data set, odds for/against, experimental/theoretical /subjective judgements	FM30.4: probability versus odds FM30.5: mutually exclusive & independent		
Reasoning		M11.2: puzzles and games involving reasoning	WA10.2: puzzles and games involving spatial reasoning		M21.2: puzzles and games involving numeric reasoning & problem solving strategies	WA20.2: puzzles and games involving numeric reasoning	FM20.2: inductive & deductive reasoning		WA30.1: puzzles and games involving logical reasoning	FM30.2: inductive and deductive reasoning: conditional statements & numerical & logical reasoning		
Limit & Continuity												C30.3: on graphs & expressions
Differentiation												C30.4: on slope as average & instantaneous rate of change, definition of derivative & power, product, quotient, & chain rules C30.5: 1st derivative- critical points, increasing & decreasing, 2nd derivative- inflection points & concavity C30.6: problems- optimization, rates of change & related rates C30.7: transcendental function derivatives
Integration												C30.8: definite and indefinite integration by sight, substitution & Fundamental Theorem of Calculus