Skill	Grade 8	Grade 9	F & P 10	Pre-Calculus 20	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.				
Order of Operations		**N9.2:** Demonstrate understanding of rational numbers including: comparing and ordering; relating to other types of numbers; solving situational questions.				
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, concretely, pictorially, and symbolically.					
Exponents & Radicals	**N8.1:** Demonstrate understanding of the square and principle square root of whole numbers concretely or pictorially and symbolically. **SS8.1:** Demonstrate understanding of the Pythagorean Theorem concretely or pictorially and symbolically and by solving problems.	**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. **N9.3:** Extend understanding of square roots to include the square root of positive rational numbers.	**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. **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.			
Preservation of Equality (integrated within course)						
Financial Math						
Polynomials		**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	**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. **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	**PC20.6:** factoring polynomialsExpand 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.		**C30.1:** Extend understanding of functions including: algebraic functions (polynomial, rational, power); transcendental functions (exponential, logarithmic, trigonometric); piecewise functions, including absolute value.
Linear Relations, Equations & Functions	**P8.1:** Demonstrate understanding of linear relations concretely, pictorially (including graphs), physically, and symbolically. **P8.2:** Model and solve problems using linear equations of the form: ax = b; x/a = b, a ≠ 0; ax + b = c; x/a + b = c, a ≠ 0;	**P9.1:** Demonstrate understanding of linear relations including: graphing; analyzing; interpolating and extrapolating; solving situational questions **P9.2:** Model and solve situational questions using linear equations of the	**FP10.6:** Expand and apply understanding of relations and functions including:relating data, graphs, and situations; analyzing and interpreting; distinguishing between relations and functions **FP10.7:** Demonstrate, with and without	**PC20.1:** Demonstrate understanding of the absolute value of real numbers and equations and functions involving the absolute value of linear and quadratic functions.	**PC30.6:** Demonstrate an understanding of operations on, and compositions of, functions.	**C30.1:** Extend understanding of functions including: algebraic functions (polynomial, rational, power); transcendental functions (exponential, logarithmic, trigonometric); piecewise functions, including absolute value.

	a(x + b) = c concretely, pictorially, and symbolically, where a, b, and c are integers.	form:ax = b; x/a = b, a ≠ 0; ax + b = c; x/a + b = c, a ≠ 0; ax = b + cx; a(x + b) = c; ax + b = cx + d; a(bx + c) = d(ex + f); a/x = b, x ≠ 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.	the use of technology, 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.			**C30.2:** Extend understanding of factoring, absolute value, and solving inequalities to include: rational expressions; double inequalities; absolute value inequalities.
Polynomial Equations & Functions, Inequalities				**PC20.1:** Demonstrate understanding of the absolute value of real numbers and equations and functions involving 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.	**PC30.6:** Demonstrate an understanding of operations on, and compositions of, functions. **PC30.10:** Demonstrate understanding of polynomials and polynomial functions of degree greater than 2 (limited to polynomials of degree ≤ 5 with integral coefficients).	**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.
Systems of Equations & Inequalities			**FP10.10:** Solve problems that involve systems of linear equations in two variables, graphically and algebraically**S**	**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	**PC30.11:** Demonstrate understanding of radical and rational functions with restrictions on the domain.	

				one or two radicals).		
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					**PC30.9:** Demonstrate an understanding of logarithms including: evaluating logarithms, relating logarithms to exponents, deriving laws of logarithms, solving equations, graphing.	
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.			
Angles					**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.		**FP10.4:** Develop and apply the primary trigonometric ratios (sine, cosine, tangent) to solve problems that involve right triangles	**PC20.4:** Expand and demonstrate understanding of the primary trigonometric ratios including the use of reference angles ($0° \leq \theta \leq 360°$) and the determination of exact values for trigonometric ratios. **PC20.5:** Demonstrate understanding of the cosine law and sine law, including the ambiguous case.	**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 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	**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			

		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 cylinders, right triangular prisms, to composite 3-D objects	between and within measurement systems.			
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				
Translations		**SS9.4:** Demonstrate understanding of line and rotation symmetry			**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 sensitivity; population or sample on data collection. **SP9.2:** Demonstrate an understanding of the collection, display, and analysis of data through a project.				
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.				
Reasoning						
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.
Skill	**Grade 8**	**Grade 9**	**F & P 10**	**Pre-Calculus 20**	**Pre-Calculus 30**	**Calculus 30**