

Area of Learning: Mathematics		Pre-calculus 12	
Big Ideas		Elaborations	
<ul style="list-style-type: none"> Many functions are related through inverse operations. 			
<ul style="list-style-type: none"> Analyzing the characteristics of functions allows us to solve equations, and model and understand relationships. 			
<ul style="list-style-type: none"> Transformations of shapes extend to functions in all of their representations. 			
<ul style="list-style-type: none"> Geometrical thinking and visualization can be used to explore conics and functions. 			
Curricular Competenceies	Elaborations	Content	Elaborations
<p><i>Students are expected to do the following:</i></p> <p>Reasoning and analyzing</p> <ul style="list-style-type: none"> Use reasoning and logic to analyze and apply mathematical ideas Estimate reasonably Demonstrate fluent and flexible thinking of number Use tools or technology to analyze relationships and test conjectures Model mathematics in contextualized experiences <p>Understanding and solving</p> <ul style="list-style-type: none"> Develop, demonstrate, and apply mathematical understanding through play, inquiry, and problem solving Visualize to explore and illustrate mathematical concepts and relationships 	<ul style="list-style-type: none"> reasoning and logic: <ul style="list-style-type: none"> inductive and deductive reasoning predicting, generalizing, drawing conclusions through experiences including puzzles, games, and coding Estimate: <ul style="list-style-type: none"> being able to defend the reasonableness of an estimate across mathematical contexts fluent and flexible thinking: <ul style="list-style-type: none"> includes using known facts and benchmarks; partitioning; applying whole number strategies to rational numbers and algebraic expressions Model: <ul style="list-style-type: none"> using concrete materials 	<p><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> transformations of functions exponential functions and equations sequences and series operations on logarithms: including functions and equations polynomial functions and equations rational functions conics trigonometric functions and equations over the set of real numbers trigonometric identities financial literacy 	<ul style="list-style-type: none"> transformations: <ul style="list-style-type: none"> singular vertical and horizontal expansions, compressions, reflections and translations, inverses, recognizing composed functions (e.g., $y = \sqrt{\sin x}$), operations? Parent functions including radical, rational, trigonometry, absolute value, logarithms, exponential, reciprocal exponential: <ul style="list-style-type: none"> graphing, including transformations, solving, base e series: <ul style="list-style-type: none"> such as geometric, sigma notation, infinite logarithms: <ul style="list-style-type: none"> laws of logarithms,

<ul style="list-style-type: none"> • Apply flexible strategies to solve problems in both abstract and contextualized situations • Engage in problem-solving experiences that are connected to place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures <p>Communicating and representing</p> <ul style="list-style-type: none"> • Communicate mathematical thinking in many ways • Use mathematical vocabulary and language to contribute to mathematical discussions • Represent mathematical ideas in a variety of ways • Explain and justify mathematical ideas <p>Connecting and reflecting</p> <ul style="list-style-type: none"> • Reflect on mathematical thinking • Use mathematics to support personal choices • Connect mathematical concepts to each other and to other areas and personal interests • Incorporate First Peoples worldviews and perspectives to make connections to mathematical concepts 	<p>and dynamic interactive technology</p> <ul style="list-style-type: none"> ○ representing a situation graphically and/or symbolically <ul style="list-style-type: none"> • Visualize: <ul style="list-style-type: none"> ○ includes dynamic visualizations such as graphical relationships, simulations • flexible strategies: <ul style="list-style-type: none"> ○ from a repertoire of strategies, choosing an appropriate strategy to solve problems (e.g., guess and check, model, solve a simpler problem, use a chart, use diagrams, role-play) • experiences: <ul style="list-style-type: none"> ○ includes context, strategies and approaches, language across cultures • many ways: <ul style="list-style-type: none"> ○ including oral, written, visual, use of technology • discussions: <ul style="list-style-type: none"> ○ developing a mathematical community in the classroom through discourse — partner talks, small-group discussions, teacher-student conferences • Represent: <ul style="list-style-type: none"> ○ concretely, pictorially, 		<p>evaluating with different bases</p> <ul style="list-style-type: none"> • polynomial: <ul style="list-style-type: none"> ○ solving, factoring, graphing, characteristics of graphs, function notation • rational: <ul style="list-style-type: none"> ○ characteristics of graphs, including asymptotes, intercepts, point discontinuities • conics: <ul style="list-style-type: none"> ○ transformations and/or locus derivations • functions: <ul style="list-style-type: none"> ○ radian and degree measure; graphing primary trigonometric ratios, including transformations, characteristics, solving, angles in standard position radian measure • identities: <ul style="list-style-type: none"> ○ using Pythagorean, double angle, reciprocal, sum and difference identities to reduce complexity in expressions
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	<p>symbolically, including using models, tables, graphs, words, numbers, symbols</p> <ul style="list-style-type: none"> • Reflect: <ul style="list-style-type: none"> ○ sharing the mathematical thinking of self and others, including evaluating strategies and solutions, extending, posing new problems and questions • other areas and personal interests: <ul style="list-style-type: none"> ○ to develop a sense of how mathematics helps us understand ourselves and the world around us (e.g., daily activities, local and traditional practices, the environment, popular media and news events, social justice, cross-curricular integration) • Incorporate: <ul style="list-style-type: none"> ○ Collaborate with local First Peoples Elders and knowledge keepers. • make connections: <ul style="list-style-type: none"> ○ Bishop's cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm) ○ www.aboriginaleducation.ca 		
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	<ul style="list-style-type: none">○ <i>Teaching Mathematics in a First Nations Context</i>, FNEC (http://www.fnesc.ca/resources/math-first-peoples/)		
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