Area of Learning: Mathematics	**Pre-calculus 11**
Big Ideas	Elaborations
• **Proportional comparisons** can be made among triangles and angles on a coordinate plane, using trigonometry.	• **Proportional comparisons:** ○ Geometry and Measurement: Proportional reasoning is used to make sense of multiplicative relationships.
• The meaning of each **operation**, including rational exponents and radicals, extends to algebraic expressions.	• **operation:** ○ Computational Fluency: Development of computational fluency requires a strong sense of number.
• **Functions** allow us to model contextualized situations.	• **Functions:** ○ Patterning: Patterns are used to identify regularities and form generalizations.
• Operations between algebraic expressions equations are **connected** and allow us to make meaning through abstract thinking.	• **connected:** ○ Number: Algebraic reasoning is used to describe and analyze mathematical relationships.

Curricular Competencies	Elaborations	Content	Elaborations

Students are expected to do the following:
Reasoning and analyzing
• 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
 	
Understanding and solving
• Develop, demonstrate, and apply mathematical understanding
	• **reasoning and logic**:
	  ○ inductive and deductive reasoning
	  ○ predicting, generalizing, drawing conclusions through experiences including puzzles, games, and coding
	• **Estimate:**
	  ○ being able to defend the reasonableness of an estimate across mathematical contexts
	• **fluent and flexible thinking:**
	  ○ includes using known facts and benchmarks; partitioning; applying
		Students are expected to know the following:
		• **powers** with rational exponents
		• **radicals** operations and equations
		• **real number** system
		• polynomial **factoring** of the form $ax^2 + bx + c, a^2x^2 - b^2y^2$
		• **rational** expressions and equations
		• quadratic **functions** and quadratic **equations**
		• **systems of inequalities**
		• **trigonometry**, including non–right triangles and angles in standard position
		financial literacy: investments and loans
			• **powers:**
			  ○ exponent laws, evaluating, numerical and variable bases
			• **radicals:**
			  ○ simplifying radicals and operations with radicals, solving simple radical equations
			• **real number:**
			  ○ classification
			• **factoring:**
			  ○ a is not restricted to 1
			• **rational:**
			  ○ simplifying and applying operations to expressions; solving equations algebraically

through play, inquiry, and problem solving
• **Visualize** to explore and illustrate mathematical concepts and relationships
• 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
 	
Communicating and representing
• 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
 	
Connecting and reflecting
• **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
	whole number strategies to rational numbers and algebraic expressions
	• **Model:**
	  ○ using concrete materials and dynamic interactive technology
	  ○ representing a situation graphically and/or symbolically
	• **Visualize:**
	  ○ includes dynamic visualizations such as graphical relationships, simulations
	• **flexible strategies:**
	  ○ 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:**
	  ○ includes context, strategies and approaches, language across cultures
	• **many ways:**
	  ○ including oral, written, visual, use of technology
	• **discussions:**
	  ○ developing a mathematical community in the classroom through discourse — partner talks,
			• **functions:**
			  ○ characteristics of graphs (including domain and range, intercepts, vertex, and symmetry), multiple forms, function notation, extrema
			• **equations:**
			  ○ factoring, quadratic formula, completing the square, graphing (systems?), square root method
			• **systems of inequalities:**
			  ○ could be limited to linear, or extended to quadratic
			  ○ include domain and range restrictions from contextual problems
			• **trigonometry:**
			  ○ sine and cosine law, including ambiguous case, angles 0–360, special angles

mathematical concepts	small-group discussions, teacher-student conferences
	• **Represent:**
	  ○ concretely, pictorially, symbolically, including using models, tables, graphs, words, numbers, symbols
	• **Reflect:**
	  ○ sharing the mathematical thinking of self and others, including evaluating strategies and solutions, extending, posing new problems and questions
	• **other areas and personal interests:**
	  ○ 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:**
	  ○ Collaborate with local First Peoples Elders and knowledge keepers.
	• **make connections:**
	  ○ 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 ○ *Teaching Mathematics in a First Nations Context*, FNESC (http://www.fnesc.ca/resources/math-first-peoples/)		