Area of Learning: Mathematics	**Grade 10 Foundations of Mathematics and Pre-Calculus**
Big Ideas:	Elaborations:
• **Proportional comparisons** can be made among right triangles using trigonometry.	• **Proportional comparisons:** o Geometry and Measurement: Proportional reasoning is used to make sense of multiplicative relationships.
• The meaning of each **operation** including powers, extends to algebraic expressions.	• **operation:** o Computational Fluency: Developing computational fluency comes from a strong sense of number.
• Rate of change is an essential attribute of **linear relations**, and has meaning in the different representations, including equations.	• **linear relations:** o Patterning: Patterns are used to identify regularities and form generalizations.
• Operations between polynomial expressions are **connected** and allow us to make meaning through abstract thinking.	• **connected:** o Number: Algebraic reasoning is used to describe and analyze mathematical relationships.
• Analyzing simulations and **data** allow us to notice trends and relationships.	• **data:** o Data and Probability: Stories can be told using mathematical evidence and reasoning.

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**	• **reasoning and logic**: o inductive and deductive reasoning**,** predicting, generalizing, drawing conclusions through experiences including puzzles, games, and coding • **Estimate:** o being able to defend the reasonableness of an estimate; across mathematical contexts • **fluent and flexible thinking:** o this includes using known facts, benchmarks, partitioning, applying whole number strategies to rational numbers and algebraic expressions • **Model:** o use concrete materials, dynamic interactive technology, representing a situation graphically and/or symbolically • **conceptual understanding:** o developed through playing with ideas, inquiry, and problem solving • **Visualize:**	*Students are expected to know the following:* • operations on **powers** with integral exponents • **relationships** among data, graphs, and situations • **linear relations** including slope and equations of lines • solving **systems** of linear equations • **multiplication** of polynomial expressions • polynomial **factoring** • primary trigonometric ratios	• **powers:** o positive and negative exponents, exponent laws, evaluating, numerical & variable bases • **relationships:** o communicating domain and range in contextualized situations • **linear relations:** o one or more types of equations of lines, parallel and perpendicular, arithmetic sequences • **systems:** o solving graphically and algebraically • **multiplication:** o distributive property between two polynomials

• Develop, demonstrate, and apply **conceptual understanding** of mathematical ideas • **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, and cultural practices and perspectives relevant to local First Peoples communities, as well as 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	o including dynamic visualizations such as graphical relationships, simulations • **flexible strategies:** o from a repertoire of strategies, choose an appropriate strategy to solve problems (e.g., guess and check, model, solve a simpler problem, use a chart, diagrams, role play) • **experiences:** o includes context, strategies and approaches, language across cultures • **many ways:** o oral, written, pictures, use of technology, etc. • **discussions:** o developing a mathematical community in the classroom through discourse-partner talks, small group discussions, teacher-student conferences • **Represent:** o concretely, pictorially, symbolically including using models, tables, graphs, words, numbers and symbols • **Reflect:** o share the mathematical thinking of self and others, including evaluating strategies and solutions, extending, posing new problems and questions • **other areas and personal interests:** o 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, and cross-curricular integration) • **Incorporate:** o Invite local First Peoples Elders and knowledge keepers to share their knowledge • **make connections:** o Bishop's cultural practices: counting, measuring,	• **experimental probability** • **financial literacy:** gross and net pay	• **factoring:** o GCF, intended for simpler cases involving trinomials and difference of squares • **experimental probability:** o simulations through play and creating games and connect to theoretical probability where possible • **financial literacy:** o types of income, income tax and other deductions

Connecting and reflecting • **Reflect** upon 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	locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm) o FNESC Place-Based Themes and Topics: family & ancestory; travel & navigation; games; land, environment & resource management; community profiles; artwork; nutrition; dwellings o http://www.fnesc.ca/resources/math-first-peoples/		

Area of Learning: Mathematics	**Grade 10 Workplace Mathematics**
Big Ideas:	Elaborations:
• **Proportional comparisons** can be made among right triangles using trigonometry.	• **Proportional comparisons:** o Geometry and Measurement: Proportional reasoning is used to make sense of multiplicative relationships.
• Understanding **operations** helps when working with formulae and unit conversions.	• **operations:** o Computational Fluency: Developing computational fluency comes from a strong sense of number.
• Many **relationships** can be modelled and interpreted using graphs.	• **relationships:** o Patterning: Patterns are used to identify regularities and form generalizations.
• *Varying the transversal allows us to notice **angle relationships**.*	• **angle relationships:** o Area of Mathematics: Spatial relationships can be described, measured and compared.
• Analyzing simulations and **data** allow us to notice trends and relationships.	• **data:** o Data and Probability: Stories can be told using mathematical evidence and reasoning.

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**	• **reasoning and logic**: o inductive and deductive reasoning**,** predicting, generalizing, drawing conclusions through experiences including puzzles, games, and coding • **Estimate:** o being able to defend the reasonableness of an estimate; across mathematical contexts • **fluent and flexible thinking:** o this includes using known facts, benchmarks, partitioning, applying whole number strategies to rational numbers and algebraic expressions • **Model:** o use concrete materials, dynamic interactive technology, representing a situation graphically and/or symbolically • **conceptual understanding:** o developed through playing with ideas, inquiry, and problem solving • **visualize:** o including dynamic visualizations such as graphical	*Students are expected to know the following:* • **puzzles and games** for computational fluency • create, interpret and critique **graphs** • primary trigonometric ratios • metric and imperial measurement and **conversions** • solve problems involving **surface area and volume** • **angles** • **central tendency** • **experimental probability**	• **puzzles and games:** o kenken, cribbage, kakuro, magic squares • **graphs:** o including a variety of formats, such as line, bar, circle, histogram, pictographs, infographics • **conversions:** o with a focus on linear, mass and capacity • **surface area and volume:** o including prisms, pyramids, cones, spheres, cylinders and formulae manipulation • **angles:** o relationships with respect to parallel lines and

mathematics in contextualized experiences **Understanding and solving** • Develop, demonstrate, and apply **conceptual understanding** of mathematical ideas • **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, and cultural practices and perspectives relevant to local First Peoples communities, as well as other cultures **Communicating and representing** • Communicate mathematical thinking in **many**	relationships, simulations • **flexible strategies:** o from a repertoire of strategies, choose an appropriate strategy to solve problems (e.g., guess and check, model, solve a simpler problem, use a chart, diagrams, role play) • **experiences:** o includes context, strategies and approaches, language across cultures • **many ways:** o oral, written, pictures, use of technology • **discussions:** o developing a mathematical community in the classroom through discourse-partner talks, small group discussions, teacher-student conferences • **Represent:** o concretely, pictorially, symbolically including using models, tables, graphs, words, numbers and symbols • **Reflect:** o share the mathematical thinking of self and others, including evaluating strategies and solutions, extending, posing new problems and questions • **other areas and personal interests:** o 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, and cross-curricular integration) • **Incorporate:** o Invite local First Peoples Elders and knowledge keepers to share their knowledge • **make connections:** o Bishop's cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm) o FNESC Place-Based Themes and Topics: family &	• **financial literacy:** gross and net pay	transversal • **central tendency:** o analysis of measures and discussion of outliers • **experimental probability:** o simulations through play and creating games and connect to theoretical probability where possible • **financial literacy:** o types of income, income tax and other deductions

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** upon 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	ancestory; travel & navigation; games; land, environment & resource management; community profiles; artwork; nutrition; dwellings o http://www.fnesc.ca/resources/math-first-peoples/		

Area of Learning: Mathematics	**Grade 11 Pre-Calculus**
Big Ideas:	Elaborations:
• **Proportional comparisons** can be made among triangles, and angles on a coordinate plane using trigonometry.	• **Proportional comparisons:** o 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:** o Computational Fluency: Developing computational fluency comes from a strong sense of number.
• **Functions** allow us to model contextualized situations including financial ones.	• **functions:** o 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:** o 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**	• **reasoning and logic**: o inductive and deductive reasoning**,** predicting, generalizing, drawing conclusions through experiences including puzzles, games, and coding • **Estimate:** o being able to defend the reasonableness of an estimate; across mathematical contexts • **fluent and flexible thinking:** o this includes using known facts, benchmarks, partitioning, applying whole number strategies to rational numbers and algebraic expressions • **Model:** o use concrete materials, dynamic interactive technology, representing a situation graphically and/or symbolically • **conceptual understanding:** o developed through playing with ideas, inquiry, and problem solving • **visualize:** o including dynamic visualizations such as graphical relationships, simulations • **flexible strategies:**	*Students are expected to know the following:* • operations on **powers** with rational exponents and **radicals.** • **real number** system • **exponential** functions • **financial literacy:** investments and loans • polynomial **factoring** of the form $ax^2 + bx + c$, $a^2x^2 - b^2y^2$ • **rational** expressions and equations • **quadratic**	• **powers:** o exponent laws, evaluating, numerical & variable bases • **radicals:** o operations with radicals and simplifying radicals • **real number:** o classification, ordering • **exponential:** o simple exponential functions and their graphs in relation to growth and decay • **financial literacy:** o investments, loans (lease vs buy), credit cards, mortgages, and graphical representations of financial growth • **factoring:** o a is not restricted to 1 • **rational:**

solving • Develop, demonstrate, and apply **conceptual understanding** of mathematical ideas • **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, and cultural practices and perspectives relevant to local First Peoples communities, as well as other cultures **Communicating and representing** • Communicate mathematical thinking in **many ways** • Use mathematical vocabulary and	o from a repertoire of strategies, choose an appropriate strategy to solve problems (e.g., guess and check, model, solve a simpler problem, use a chart, diagrams, role play) • **experiences:** o includes context, strategies and approaches, language across cultures • **many ways:** o oral, written, pictures, use of technology • **discussions:** o developing a mathematical community in the classroom through discourse-partner talks, small group discussions, teacher-student conferences • **Represent:** o concretely, pictorially, symbolically including using models, tables, graphs, words, numbers and symbols • **Reflect:** o share the mathematical thinking of self and others, including evaluating strategies and solutions, extending, posing new problems and questions • **other areas and personal interests:** o 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, and cross-curricular integration) • **Incorporate:** o Invite local First Peoples Elders and knowledge keepers to share their knowledge • **make connections:** o Bishop's cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm) o FNESC Place-Based Themes and Topics: family & ancestory; travel & navigation; games; land, environment & resource management; community profiles; artwork;	**functions** and **quadratic equations** • **trigonometry** including non-right triangles and angles in standard position	o simplifying and applying operations to expressions; solving equations algebraically • **quadratic functions:** o characteristics of graphs (including domain and range, intercepts, vertex, and symmetry), multiple forms, and function notation • **quadratic equations:** o factoring, quadratic formula, completing the square • **trigonometry:** o sine and cosine law including ambiguous case, angles 0-360 and special angles

language to contribute to mathematical **discussions** • **Represent** mathematical ideas in a variety of ways • Explain and justify mathematical ideas **Connecting and reflecting** • **Reflect** upon 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	nutrition; dwellings o (http://www.fnesc.ca/resources/math-first-peoples/)		

Area of Learning: Mathematics	**Grade 11 Foundations of Mathematics**
Big Ideas:	Elaborations:
• **Proportional comparisons** can be made among triangles and angles.	• **Proportional comparisons:** o Geometry and Measurement: Proportional reasoning is used to make sense of multiplicative relationships.
• **Quadratic functions** and systems of equations can be represented in many connected ways.	• **Quadratic functions:** o Patterning: Patterns are used to identify regularities and form generalizations.
• Logical reasoning helps us discover and describe mathematical truths and counterexamples.	
• A statistical **analysis** allows us to notice trends and relationships.	• **analysis:** o Data and Probability: Stories can be told using mathematical evidence and reasoning.

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**	• **reasoning and logic**: o inductive and deductive reasoning**,** predicting, generalizing, drawing conclusions through experiences including puzzles, games, and coding • **Estimate:** o being able to defend the reasonableness of an estimate; across mathematical contexts • **fluent and flexible thinking:** o this includes using known facts, benchmarks, partitioning, applying whole number strategies to rational numbers and algebraic expressions • **Model:** o use concrete materials, dynamic interactive technology, representing a situation graphically and/or symbolically • **conceptual understanding:** o developed through playing with ideas, inquiry, and problem solving • **visualize:** o including dynamic visualizations such as graphical relationships, simulations • **flexible strategies:** o from a repertoire of strategies, choose an appropriate strategy to solve problems (e.g., guess and check,	*Students are expected to know the following:* • Mathematical reasoning and **logic** • **Angle relationships** • graphical **representations** of quadratic functions • graphical **solutions** to systems of equations • solving systems of linear inequalities • **Trigonometry** with oblique angles • **Applications** of probabilities and statistics in the real world • mathematics is a tool when conducting **research**	• **logic:** o conjecturing, inductive and deductive thinking, proofs, and game/puzzle analysis • **Angle relationships:** o properties, proofs, parallel lines and triangles • **representations:** o characteristics of including: end behavior, max/min, vertex, symmetry • **solutions:** o including linear with quadratic and quadratic with quadratic • **Trigonometry:** o triangle decomposition, and sine/cosine laws • **Applications:** o reading about and interpreting surveys with standard deviation, confidence intervals, and distributions

solving • Develop, demonstrate, and apply **conceptual understanding** of mathematical ideas • **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, and cultural practices and perspectives relevant to local First Peoples communities, as well as other cultures **Communicating and representing** • Communicate mathematical thinking in **many ways** • Use mathematical vocabulary and	model, solve a simpler problem, use a chart, diagrams, role play) • **experiences:** o includes context, strategies and approaches, language across cultures • **many ways:** o oral, written, pictures, use of technology • **discussions:** o developing a mathematical community in the classroom through discourse-partner talks, small group discussions, teacher-student conferences • **Represent:** o concretely, pictorially, symbolically including using models, tables, graphs, words, numbers and symbols • **Reflect:** o share the mathematical thinking of self and others, including evaluating strategies and solutions, extending, posing new problems and questions • **other areas and personal interests:** o 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, and cross-curricular integration) • **Incorporate:** o Invite local First Peoples Elders and knowledge keepers to share their knowledge • **make connections:** o Bishop's cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm) o FNESC Place-Based Themes and Topics: family & ancestory; travel & navigation; games; land, environment & resource management; community profiles; artwork; nutrition; dwellings o http://www.fnesc.ca/resources/math-first-peoples/	• **financial literacy**: investments and loans	• **research:** o mathematics used in this course can be used to do a research project of your choice • **financial literacy:** o investments, loans (lease vs buy), credit cards, mortgages, and graphical representations of financial growth

language to contribute to mathematical **discussions** • **Represent** mathematical ideas in a variety of ways • Explain and justify mathematical ideas **Connecting and reflecting** • **Reflect** upon 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			

Area of Learning: Mathematics	**Grade 11 Workplace Mathematics**
Big Ideas:	Elaborations:
• Scale diagrams and rates of change are ways of showing a **proportional relationship**.	• **proportional relationships:** o Geometry and Measurement: Proportional reasoning is used to make sense of multiplicative relationships.
• Mathematics helps us to make informed financial decisions in many situations.	
• **Spatial relationships** can help us describe and represent our real world experience.	• **spatial relationships:** o Geometry and Measurement: Spatial relationships can be described, measured and compared.
• A statistical **analysis** allows us to notice trends and relationships.	• **analysis:** o Data and Probability: Stories can be told using mathematical evidence and reasoning.

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 **conceptual understanding** of	• **reasoning and logic**: o inductive and deductive reasoning**,** predicting, generalizing, drawing conclusions through experiences including puzzles, games, and coding • **Estimate:** o being able to defend the reasonableness of an estimate; across mathematical contexts • **fluent and flexible thinking:** o this includes using known facts, benchmarks, partitioning, applying whole number strategies to rational numbers and algebraic expressions • **Model:** o use concrete materials, dynamic interactive technology, representing a situation graphically and/or symbolically • **conceptual understanding:** o developed through playing with ideas, inquiry, and problem solving • **visualize:** o including dynamic visualizations such as graphical relationships, simulations • **flexible strategies:** o from a repertoire of strategies, choose an appropriate	*Students are expected to know the following:* • **puzzles and games** for computational fluency • how statistics are used in a **contextualized** situation • **3D objects** (views & scale diagrams) • **linear relationships** • slope as a rate of change • **financial literacy**: investments and loans • **personal budgeting** and planning for	• **puzzles and games:** o kenken, cribbage, kakuro, magic squares • **contextualized:** o reading about and interpreting surveys and news reports, understanding statistical vocabulary • **3D objects:** o including exploded diagrams, perspective diagrams, and drawing and constructing 3D objects • **linear relationships:** o graphing, interpolating, extrapolating, writing equations • **financial literacy:** o investments, loans (lease vs buy), credit cards,

mathematical ideas • **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, and cultural practices and perspectives relevant to local First Peoples communities, as well as 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** upon mathematical thinking	strategy to solve problems (e.g., guess and check, model, solve a simpler problem, use a chart, diagrams, role play) • **experiences:** o includes context, strategies and approaches, language across cultures • **many ways:** o oral, written, pictures, use of technology • **discussions:** o developing a mathematical community in the classroom through discourse-partner talks, small group discussions, teacher-student conferences • **Represent:** o concretely, pictorially, symbolically including using models, tables, graphs, words, numbers and symbols • **Reflect:** o share the mathematical thinking of self and others, including evaluating strategies and solutions, extending, posing new problems and questions • **other areas and personal interests:** o 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, and cross-curricular integration) • **Incorporate:** o Invite local First Peoples Elders and knowledge keepers to share their knowledge • **make connections:** o Bishop's cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm) o FNESC Place-Based Themes and Topics: family & ancestory; travel & navigation; games; land, environment & resource management; community profiles; artwork; nutrition; dwellings	significant life purchases	mortgages, and graphical representations of financial growth • **personal budgeting:** o to purchase, own and operate a vehicle or other mode of transportation

• 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	o http://www.fnesc.ca/resources/math-first-peoples/		

Area of Learning: Mathematics	**Grade 12 Pre-Calculus**
Big Ideas:	Elaborations:
• Many functions are related through inverse operations.	
• Analyzing the characteristics of functions allows one to solve equations, and model and understand relationships.	
• Transformations of shapes extends to functions in all of their representations.	
• Geometrical thinking and visualization can be used to explore conics and functions.	

Curricular Competenceies:	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**	• **reasoning and logic**: o inductive and deductive reasoning**,** predicting, generalizing, drawing conclusions through experiences including puzzles, games, and coding • **Estimate:** o being able to defend the reasonableness of an estimate; across mathematical contexts • **fluent and flexible thinking:** o this includes using known facts, benchmarks, partitioning, applying whole number strategies to rational numbers and algebraic expressions • **Model:** o use concrete materials, dynamic interactive technology, representing a situation graphically and/or symbolically • **conceptual understanding:** o developed through playing with ideas, inquiry, and problem solving • **visualize:** o including dynamic visualizations such as graphical relationships, simulations • **flexible strategies:** o from a repertoire of strategies, choose an appropriate strategy to solve problems (e.g., guess and check,	*Students are expected to know the following:* • logarithmic functions and equations • exponential equations • sequences and **series** • operations on **logarithms** • **polynomial** functions and equations • **transformations** of functions, including $y=\sqrt{x}, y=\lvert x\rvert, y=\frac{1}{x}$ • **conics** • **rational** functions • trigonometric **functions** and equations with real numbers • trigonometric **identities**	• **exponential:** o graphing including transformations, solving, base e • **series:** o such as geometric, sigma notation, infinite • **logarithms:** o laws of logarithms, evaluating with different bases • **polynomial:** o solving, factoring, graphing, characteristics of graphs, function notation • **transformations:** o singular vertical & horizontal expansions, compressions, reflections and translations, inverses, and recognizing composed functions eg. $y=\sqrt{sinx}$ • **conics:** o transformations and/or

solving • Develop, demonstrate, and apply **conceptual understanding** of mathematical ideas • **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, and cultural practices and perspectives relevant to local First Peoples communities, as well as other cultures **Communicating and representing** • Communicate mathematical thinking in **many ways** • Use mathematical	model, solve a simpler problem, use a chart, diagrams, role play) • **experiences:** o includes context, strategies and approaches, language across cultures • **many ways:** o oral, written, pictures, use of technology • **discussions:** o developing a mathematical community in the classroom through discourse-partner talks, small group discussions, teacher-student conferences • **Represent:** o concretely, pictorially, symbolically including using models, tables, graphs, words, numbers and symbols • **Reflect:** o Share the mathematical thinking of self and others, including evaluating strategies and solutions, extending, posing new problems and questions • **other areas and personal interests:** o 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, and cross-curricular integration) • **Incorporate:** o Invite local First Peoples Elders and knowledge keepers to share their knowledge • **make connections:** o Bishop's cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm) o FNESC Place-Based Themes and Topics: family & ancestory; travel & navigation; games; land, environment & resource management; community profiles; artwork; nutrition; dwelling o http://www.fnesc.ca/resources/math-first-peoples/		locus derivations • **rational:** o characteristics of graphs, asymptotes, intercepts and point discontinuities • **functions:** o radian measure, graphing primary trig ratios including transformations, characteristics, solving • **identities:** o using Pythagorean, double angle, reciprocal, sum and difference identities to reduce complexity in expressions

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** upon 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			

Area of Learning: Mathematics	**Grade 12 Foundations of Mathematics**
Big Ideas:	Elaborations:
• Developing computational fluency comes from a strong sense of number: *Combinatorics provides efficient strategies for counting.*	
• Patterns are used to identify regularities and form generalizations. *Understanding the characteristics of a variety of functions helps in modelling data*.	
• Logical reasoning helps us pose, organize and defend arguments.	
• Using spatial relationships, we can create, measure and describe objects in geometry.	
• Stories can be told using mathematical evidence and reasoning: *Counting strategies and organizational tools allow us to calculate probabilities.*	

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**	• **reasoning and logic**: o inductive and deductive reasoning**,** predicting, generalizing, drawing conclusions through experiences including puzzles, games, and coding • **Estimate:** o being able to defend the reasonableness of an estimate; across mathematical contexts • **fluent and flexible thinking:** o this includes using known facts, benchmarks, partitioning, applying whole number strategies to rational numbers and algebraic expressions • **Model:** o use concrete materials, dynamic interactive technology, representing a situation graphically and/or symbolically • **conceptual understanding:** o developed through playing with ideas, inquiry, and problem solving • **visualize:** o including dynamic visualizations such as graphical relationships, simulations	*Students are expected to know the following:* • Transformations with iterations to create fractals • graphical **representations** of polynomial, logarithmic, exponential and sinusoidal functions • **regressions** • regression **analysis** • set theory and conditional statements • **combinatorics** • **odds, probability** and expected value • mathematics is a tool	• **representation:** o using characteristics of a graph to identify these functions. • **regressions:** o polynomial, exponential, sinusoidal • **analysis:** o apply the appropriate regression based on the characteristics of data set of graph. • **combinatorics:** o permutations, combinations, pathways and binomial expansion • **odds, probability:** o mutually exclusive, non-mutually exclusive, conditional probability, binomial probability

mathematics in contextualized experiences **Understanding and solving** • Develop, demonstrate, and apply **conceptual understanding** of mathematical ideas • **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, and cultural practices and perspectives relevant to local First Peoples communities, as well as other cultures **Communicating and representing** • Communicate mathematical	• **flexible strategies:** o from a repertoire of strategies, choose an appropriate strategy to solve problems (e.g., guess and check, model, solve a simpler problem, use a chart, diagrams, role play) • **experiences:** o includes context, strategies and approaches, language across cultures • **many ways:** o oral, written, pictures, use of technology • **discussions:** o developing a mathematical community in the classroom through discourse-partner talks, small group discussions, teacher-student conferences • **Represent:** o concretely, pictorially, symbolically including using models, tables, graphs, words, numbers and symbols • **Reflect:** o share the mathematical thinking of self and others, including evaluating strategies and solutions, extending, posing new problems and questions • **other areas and personal interests:** o 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, and cross-curricular integration) • **Incorporate First Peoples:** o Invite local First Peoples Elders and knowledge keepers to share their knowledge • **make connections:** o Bishop's cultural practices: counting, measuring, locating, designing, playing, explaining (http://www.csus.edu/indiv/o/oreyd/ACP.htm_files/abishop.htm) o FNESC Place-Based Themes and Topics: family & ancestory; travel & navigation; games; land, environment	when conducting **research**	• **research:** o mathematics used in this course can used to do a research project of your choice

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** upon 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	& resource management; community profiles; artwork; nutrition; dwellings o (http://www.fnesc.ca/resources/math-first-peoples/)		