

BIG IDEAS

Proportional comparisons can be made among triangles and angles on a coordinate plane, using trigonometry.

The meaning of each **operation**, including rational exponents and radicals, extends to algebraic expressions.

Functions allow us to model contextualized situations, including financial ones.

Operations between algebraic expressions equations are **connected** and allow us to make meaning through abstract thinking.

Learning Standards

Curricular Competencies	Content
<p><i>Students are expected to be able 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 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, 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><i>Students are expected to know the following:</i></p> <ul style="list-style-type: none"> • 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 functions and quadratic equations • trigonometry, including non-right triangles and angles in standard position

Learning Standards (continued)

Curricular Competencies	Content
<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 	

Big Ideas – Elaborations	MATHEMATICS — Pre-Calculus Grade 11
<p>Proportional comparisons:</p> <ul style="list-style-type: none"> • Geometry and Measurement: Proportional reasoning is used to make sense of multiplicative relationships. <p>operation:</p> <ul style="list-style-type: none"> • Computational Fluency: Development of computational fluency requires a strong sense of number. <p>Functions:</p> <ul style="list-style-type: none"> • Patterning: Patterns are used to identify regularities and form generalizations. <p>connected</p> <ul style="list-style-type: none"> • Number: Algebraic reasoning is used to describe and analyze mathematical relationships. 	

Curricular Competencies – Elaborations

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 whole number strategies to rational numbers and algebraic expressions

Model:

- using concrete materials and dynamic interactive technology
- representing a situation graphically and/or symbolically

conceptual understanding:

- developed through playing with ideas, inquiry, and problem solving

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, 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)

Curricular Competencies – Elaborations

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*, FNEC (<http://www.fnesc.ca/resources/math-first-peoples/>)

Content – Elaborations

powers:

- exponent laws, evaluating, numerical and variable bases

radicals:

- operations with radicals and simplifying radicals

real number:

- classification, ordering

exponential:

- simple exponential functions and their graphs in relation to growth and decay

financial literacy:

- investments, loans (lease versus buy), credit cards, mortgages, and graphical representations of financial growth

factoring:

- a is not restricted to 1

rational:

- simplifying and applying operations to expressions; solving equations algebraically

quadratic functions:

- characteristics of graphs (including domain and range, intercepts, vertex, and symmetry), multiple forms, function notation

quadratic equations:

- factoring, quadratic formula, completing the square

trigonometry:

- sine and cosine law, including ambiguous case, angles 0–360, special angles