

**Course:** Pre-Calculus 11

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### Course Description:

The Pre-Calculus 11 course is designed to provide students with the mathematical understanding and critical thinking skills identified for entry to university level mathematics, science, engineering, or other mathematically intensive fields of study. Topics include: Solving Quadratic Equations, Analyzing Quadratic Function, Graphing Inequalities & Systems of Equations, Trigonometry, Rational Expressions & Equations, Absolute Value & Reciprocal Functions, and Exponential Functions and Financial Literacy.

### Inquiry Questions:

- Generalize: After solving a problem, can we extend it? Can we generalize it?
- Connections: How are the different operations (+, -, x, ÷, exponents, roots) connected?
- Relationships: How does the predictable pattern of linear functions extend to quadratic functions?
- Proportional Reasoning and Indirect Measurement: Why do we use the comparison of relative size or scale instead of numerical difference? How do we use measurable values to calculate immeasurable values?

### Summer Learning Beliefs:

Summer Learning provides an engaging learning environment where all students can challenge themselves academically and fulfill their learning goals. To ensure this, students will:

- abide by the student Code of Conduct
- adhere to the Academic Honesty Policy
- adhere to the Summer Learning Student Engagement policy
- respect themselves and others
- attend every class and be punctual
- inquire, think, and participate to the best of their ability
- access technology in class when instructed to do so and for learning purposes only
- challenge themselves and have fun learning

*All Summer Learning policies can be accessed at:*

<https://www.sd44.ca/school/summer/policies/Pages/default>.

Course Syllabus:

<p><b>Curricular Competencies</b></p>	<p>What the students will do:</p> <p>Reasoning and modelling</p> <ul style="list-style-type: none"> <li>• Model with mathematics in situational contexts</li> <li>• Develop thinking strategies to solve puzzles and play games</li> <li>• Explore, analyze, and apply mathematical ideas using reason, technology, and other tools</li> </ul> <p>Understanding and solving</p> <ul style="list-style-type: none"> <li>• Develop, demonstrate, and apply conceptual understanding</li> <li>• Visualize to explore and illustrate mathematical concepts and relationships</li> <li>• Apply flexible and strategic approaches to solve problems</li> </ul> <p>Communicating and representing</p> <ul style="list-style-type: none"> <li>• Explain and justify mathematical ideas and decisions in many ways</li> <li>• Represent mathematical ideas in concrete, pictorial, and symbolic forms</li> <li>• Use mathematical vocabulary and language to contribute to discussions in the classroom</li> <li>• Take risks when offering ideas in classroom discourse</li> </ul> <p>Connecting and reflecting</p> <ul style="list-style-type: none"> <li>• Reflect on mathematical thinking</li> <li>• Connect mathematical concepts with each other, with other areas, and with personal interests</li> <li>• Use mistakes as opportunities to advance learning</li> <li>• Incorporate First Peoples worldviews, perspectives, knowledge, and practices to make connections with mathematical concepts</li> </ul>
<p><b>Summative Assessments</b></p>	<p>What the students will understand:</p> <ul style="list-style-type: none"> <li>• Algebra allows us to generalize relationships through abstract thinking.</li> <li>• The meanings of, and connections between, operations extending to powers, radicals, and polynomials.</li> <li>• Quadratic relationships are prevalent in the world around us.</li> <li>• Trigonometry involves using proportional reasoning to solve indirect measurement problems.</li> </ul>

Content	<p>What the students will know:</p> <ul style="list-style-type: none"> <li>• real numbers:             <ul style="list-style-type: none"> <li>▪ classification</li> </ul> </li> <li>• powers:             <ul style="list-style-type: none"> <li>▪ rational exponents</li> <li>▪ exponent laws</li> </ul> </li> <li>• radicals:             <ul style="list-style-type: none"> <li>▪ simplify radicals, irrational numbers</li> <li>▪ perform operations with radicals</li> <li>▪ solve equations algebraically and graphically</li> </ul> </li> <li>• factoring trinomials:             <ul style="list-style-type: none"> <li>▪ of the form <math>ax^2 + bx + c</math></li> <li>▪ <math>a^2x^2 - b^2y^2</math></li> </ul> </li> <li>• rational expressions:             <ul style="list-style-type: none"> <li>▪ simplify rational expressions</li> <li>▪ solve equations</li> </ul> </li> <li>• quadratic:             <ul style="list-style-type: none"> <li>▪ identify characteristics of graphs</li> <li>▪ solve equations (factoring, quadratic formula, completing the square)</li> <li>▪ graph quadratic functions</li> </ul> </li> <li>• inequalities:             <ul style="list-style-type: none"> <li>▪ solve single variable inequalities</li> </ul> </li> <li>• trigonometry:             <ul style="list-style-type: none"> <li>▪ use of sine and cosine laws to solve non-right triangles</li> <li>▪ solve the unit circle, reference and conterminal angles, special angles</li> </ul> </li> <li>• financial literacy :             <ul style="list-style-type: none"> <li>▪ compound interest,</li> <li>▪ investments/loans, buy/lease</li> </ul> </li> </ul>
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**Grade Boundaries:**

An "A" student will/can....

- Demonstrate and apply the curricular competencies
- Analyze the information and synthesize the correct solution
- Discern challenging patterns
- Apply the concepts and extrapolate onto contextualized situations
- Demonstrate superb command of numeracy (no computational error)
- Solve challenging problems in familiar and unfamiliar situations

A "B" student will /can ...

- Sometimes demonstrate and apply the curricular competencies
- Analyze the information and synthesize the solution
- Identify the complex patterns within the context of the problem
- Apply the concepts and understand some details in contextualized situations
- Demonstrate good command of numeracy
- Solve challenging problems in familiar and working towards unfamiliar situations

A "C" student will /can ...

- Demonstrate the curricular competencies
- Organize the information and attempt to interpret the solution
- Identify the patterns within the context of the problem
- Build on learned concepts but is still working on finding details in contextualized situations
- Solve routine two-step problems

### Celebration of Learning:

The 2019 Celebration of Learning is shaped around "Connections". In Pre-Calculus 11, students will be exploring Relationships and Communication.

Relationships:

Students will analyze examples of quadratic relationships in the world around us, and discuss the similarities and differences between them. Students will extend their prior knowledge of linear functions to quadratic functions and investigate relationships between data presentation.

Communication:

Students will focus on effectively exchanging thoughts, messages and information via mathematical vocabulary and language.

Each class will have a sister class who will connect. Each student will complete a connections card and post it in the school.

### Resources:

Pre-Calculus 11 Workbook (purchased on the first day)
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Students will need a scientific <b>and</b> a graphing calculator (TI 83 or 84 is preferred)
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