Course Plan: Mathematics 12 Pre-Calculus
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Course Description:

OL Math 12 Pre-Calculus is the BC Provincial Pre-Calculus Mathematics 12 course offered in an online setting. The course follows the BC Provincial curriculum and satisfies the requirements for graduation and entrance into many post-secondary institutions or programs. This pathway is designed to provide students with the mathematical understandings and critical-thinking skills identified for entry into post-secondary programs that require the study of theoretical calculus. Topics include binomial theorem, combinations, permutations relations and functions and trigonometry. The seven mathematical processes (communication, connections, mental mathematics and estimation, problem solving, technology and visualization) are interwoven throughout the mathematical topics.

Course Expectations:

It is expected that students will be actively engaged in the online course material. This would include, but is not limited to, viewing online lessons and taking notes, working on practice assignment questions within each unit and completing the learning guide for each unit. Students should have regular access to a computer and have a functioning email address. Teacher-Student communication is essential to a successful course experience, so students need to be good online communicators. The most efficient way of communication is via the messaging system built into the Moodle course environment. Students need to be organized, disciplined and industrious self-motivated learners. Math 12 PC contains 8 units, 57 lessons, designed to be completed in 100-120 hours. The rate at which students can complete this course is dependent on the amount of time available for each student to dedicate to their studies. There is a course completion tracker provided at the start of the course, along with unit completion trackers, to help students meet their self-determined time lines.   At times the course content may be challenging, so students are encouraged to get help and support; however, the onus is on the student to be actively engaged in the online course material in order to be successful.

Time Line

There is continuous enrollment into DL Math 12 PC and there is no specific end date; however, there may be external time restraints placed on the student by post secondary enrolment policies. For example, UBC may be moving towards course completion in early spring, and other institutions request that at least 50% of the course must be completed by March 1st. Other post secondary institutions may have similar timelines.

NOTE: It is the responsibility of the student to become familiar with the entrance timeline and demands of their post secondary of interest.

Enduring Understandings/Big Ideas:

By the end of this course students will be expected to:

- *Develop algebraic reasoning and number sense.*
- *Develop trigonometric reasoning*
- *Develop algebraic and graphical reasoning through the study of relations.*
- *Develop algebraic and numeric reasoning that involves combinatorics.*

Specific Learning Outcomes:

http://www.bced.gov.bc.ca/irp/pdfs/mathematics/WNCPmath1012/2008math1012wncp ccf.pdf Mathematics 12 Pre-Calculus 12 (pages 91-105)

Course Content:

Unit 1 Transformations	Demonstrate an understanding of the effects of horizontal and vertical translations on the graphs of functions and their related equations. Demonstrate an understanding of the effects of horizontal and vertical stretches on the graphs of functions and their related equations. Apply translations and stretches to the graphs and equations of functions. Demonstrate an understanding of the effects of reflections on the graphs of functions and their related equations, including reflections through the: x – axis, y –axis, line y = x .
Unit 2 Graphing Radicals and Rationals	Graph and analyze radical functions (limited to functions involving one radical). Graph and analyze rational functions (limited to numerators and denominators that are monomials, binomials or trinomials).
Unit 3 Polynomials	Demonstrate an understanding of factoring polynomials of degree greater than 2 (limited to polynomials of degree $\leq$ 5 with integral coefficients). Graph and analyze polynomial functions (limited to polynomial functions of degree $\leq$ 5).
Unit 4 Exponents and Logarithms	Demonstrate an understanding of logarithms. Demonstrate an understanding of the product, quotient and power laws of logarithms. Graph and analyze exponential and logarithmic functions. Solve problems that involve exponential and logarithmic equations.
Unit 5 Circular Functions	Demonstrate an understanding of angles in standard position, expressed in degrees and radians. Develop and apply the equation of the unit circle. Solve problems, using the six trigonometric ratios for angles expressed in radians and degrees. Graph and analyze the trigonometric functions sine, cosine and tangent to solve problems
Unit 6 Trigonometric Equations and Identities	Solve, algebraically and graphically, first and second degree trigonometric equations with the domain expressed in degrees and radians. Prove trigonometric identities, using: reciprocal identities, quotient identities, Pythagorean identities, sum or difference identities (restricted to sine, cosine and tangent), double-angle identities (restricted to sine, cosine and tangent).
Unit 7 Permutations and Combinations	Apply the fundamental counting principle to solve problems. Determine the number of permutations of n elements taken r at a time to solve problems. Determine the number of combinations of n different elements taken r at a time to solve problems. Expand powers of a binomial in a variety of ways, including using the binomial theorem (restricted to exponents that are natural numbers).
Unit 8 Function Notation and Operation	Demonstrate an understanding of operations on, and compositions of, functions. Demonstrate an understanding of inverses of relations.

Student Learning Activities and Strategies:

- *Interactive Flash Video Lessons with Audio and Colourful graphics*
- *Note Taking Supplements to accompany the video lessons*
- *Practice Assignment questions for each lesson, with answers*
- *Worked out Video Solutions to every Practice Assignment question*
- *Formative lesson quizzes and unit quizzes*
- *Comprehensive Learning Guide for each unit, with answers*
- *Summative Unit tests and a Final exam.*
- *Full DL Centre access: computers, work space, and teacher support*

Assessment:

The course grade is calculated from Lesson Quizzes (6%), Unit Quizzes (5%), Unit Learning Guides (7%), Portfolio / Course Engagement (5%), Unit Tests (59%), Midterm, Project and Final Exam (17%).

Lesson-Quizzes 6%

These quizzes are short and designed to test your knowledge of the lessons. You may have a few tries at each quiz with the highest grade being used towards your grade. This is an uncontrolled test but is timed. Try to do the quizzes without assistance to see how well you know the material. This will help you when you get to a major test, which will be both controlled and worth a lot more marks.

Unit-Quizzes 5%

These quizzes are taken online at the convenience of the student. These quizzes are timed, so it is important to be prepared and cognizant of the time when writing the quiz. To ensure that you are ready to take a unit-quiz, review the content pertaining to the quiz and take the practice quiz questions built into the end of each chapter. These practice questions can be taken in an online interactive format with access to answers and complete video solutions.

Unit Learning Guides 7%

There is a comprehensive learning guide provided at the beginning of each unit. These learning guides are designed to be completed, with full solutions, as students work their way through the online lessons. Once the learning guide has been completed, it is to be corrected using the answer key provided at the back. It is common practice for students to bring their learning guide with them when they come to the DL Centre to write a Unit Test. Any corrections or clarifications can then be made before the test is written.

Portfolio / Course Engagement 5%

The portfolio assessment is designed to give students an opportunity to gain credit for the work that they have been doing within the online course. The portfolio consists of a collection of notes, practice assignments, and study materials that accumulate during the participation part of the course.   This collection of work is to demonstrate student engagement in the online course material. Note: active participation in the online lessons and course material is a requirement.

Unit Tests 59%

The Unit Tests are to be written in the Distributed Learning Centre, room 411 Mountainside Secondary. When you are ready to write a Unit Test, schedule your test using the Sign Up Genius located on the Homepage and in the course. There are 8 Unit Tests to be written and a Final Exam. Note: students attending a SD44 High School may be able to make arrangements, in advance, to write their test a satellite DL Centre in their Homeschool.

NOTE: In order to meet the prescribed learning outcomes for this course, you are required to pass every written unit test. If you receive a failing grade on any written test, the mark on your corresponding formative assignment will be excluded. You must contact your instructor to discuss a re-test option and to reinstate your formative assignment mark.

Unit 1 Transformations
Unit 2 Graphing Radicals and Rationals
Unit 3 Polynomials
Unit 4 Exponents and Logarithms
Midterm Exam + Project (start)
Unit 5 Circular Functions
Unit 6 Trigonometric Equations and Identities
Unit 7 Permutations and Combinations
Unit 8 Function Notation and Operation
Final Exam + Project (Due)

The Distributed Learning Centre is open on Monday to Friday; check the DL Schedule on the main Homepage for specific hours of operation. It is not necessary that your teacher is there for you to write an exam, but it is important that you make arrangements with your teacher to ensure that your test will be available when you arrive at your scheduled time. The test sign up, Sign Up Genius, is on the homepage along with teacher specific schedules.

Midterm, Project and Final Exam 17%

The Midterm and Final Exams will be comprehensive exams covering material from the relevant components of the course. These tests will be written in the DL Centre once the course requirements have been completed. When you are ready to write the midterm or final exam, schedule your test using the Math Test Sign Up and let your instructor know the time you have selected.

The Project is designed for students to demonstrate technological literacy in mathematics. Students are to choose a section of curriculum from the course and create an online lesson that explains the material. The design of the project is to be determined by the interest of the student, but may use screen casting, animation, iMovie, explain everything or many others.

Evaluation:

Based on performance standards and criteria:

Learning Activity	Assessment Type	Percentage of final Mark
Lesson Quizzes	Formative	6%
Unit Quizzes	Formative	5%
Unit Learning Guides	Formative	5%
Portfolio / Course Engagement	Formative	5%
Unit Tests	Summative	59%
Midterm, Project, Final Exam	Summative	20%
Total		100%

Resources:

There is no textbook required for this course as all of the lessons, notes, assignments, practice quizzes and solutions are contained within the online course. If necessary, and on the recommendation of the teacher, there is a supplemental textbook associated with the course, **Mathematics 12 Pre-Calculus.** This optional resource can be picked up at anytime during the course along with a required deposit.