

COURSE SYLLABUS



COURSE TITLE: MATH-097: College Preparatory - Mathematics 2

CLASS SECTION:

TERM: S2022

COURSE CREDITS: 4

DELIVERY METHOD(S): In person

Camosun College campuses are located on the traditional territories of the Lək̓ʷəŋən and W̓SÁNEĆ peoples. We acknowledge their welcome and graciousness to the students who seek knowledge here.

Learn more about Camosun's [Territorial Acknowledgement](#).

For COVID-19 information please visit <https://legacy.camosun.ca/covid19/index.html>.

Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable explanation in advance, you will be removed from the course and the space offered to the next waitlisted student.

INSTRUCTOR DETAILS

NAME: Dr. Torsten Schoeneberg

EMAIL: schoenebergt@camosun.ca

OFFICE: Ewing 252

HOURS: Tuesdays & Wednesdays 11.30am-12.20pm, and by appointment

As your course instructor, I endeavour to provide an inclusive learning environment. However, if you experience barriers to learning in this course, do not hesitate to discuss them with me. Camosun College is committed to identifying and removing institutional and social barriers that prevent access and impede success.

CALENDAR DESCRIPTION

Students will build the knowledge and skills in algebra and trigonometry necessary for entry into technical, vocational and career programs that require Math 12 equivalency as a prerequisite and for future study in higher-level math courses at college/university. Students will improve their knowledge of functions and graphs, expanding knowledge of exponential and trigonometric functions to enable analysis of applied problems.

PREREQUISITE(S):

One of:

C in Pre-calculus 11; C in MATH 073; C in MATH 077; C in MATH 137; C in MATH 139

CO-REQUISITE(S):

Not Applicable

EXCLUSION(S):

Not Applicable

COURSE LEARNING OUTCOMES / OBJECTIVES

The learning outcomes in this course meet the required learning outcomes in ABE Mathematics: Provincial Algebra and Trigonometry outlined in the BC ABE Articulation Handbook 2018/19 Edition.

Upon successful completion of this course a student will be able to:

1. Employ advanced graphing techniques for relations and functions, including discontinuous applications. In particular, students will be able to:

- a. Find the distance between two points in the plane and find the midpoint of a segment,
- b. Apply the distance formula and midpoint formula to solve problems,
- c. Recognize graphs of common functions: linear, constant, quadratic, cubic, square root, absolute value, reciprocal,
- d. Use the vertical line test to identify functions,
- e. Graph functions and analyze graphs of functions, identifying: domain and range; intervals on which the function is increasing, decreasing or constant,
- f. Write formulas of functions to model real life applications,
- g. Determine whether a graph is symmetric with respect to the x-axis, y-axis, and the origin,
- h. Identify even or odd functions and recognize their symmetries,
- i. Graph transformations of functions: translations, reflections, stretchings and shrinkings,
- j. Graph functions defined piecewise,
- k. Find the sum, difference, product and quotient of two functions and determine their domains,
- l. Find the composition of two functions f and g , finding formulas for $f(g(x))$ and $g(f(x))$, identifying the domain of the composition and evaluating the composite function,
- m. Given an equation defining a relation, write an equation of the inverse relation,
- n. Given a graph of a relation or function, sketch a graph of its inverse,
- o. Use the horizontal line test to determine if a function is one-to-one and therefore has an inverse that is a function,
- p. Find a formula for the inverse of a function, and
- q. Find $f^{-1}(f(x))$ and $f(f^{-1}(x))$ for an number x in the domains of the functions when the inverse of a function is also a function.

2. Apply the algebraic and visual properties of polynomial and rational functions to modelling of continuous and discontinuous phenomena. In particular, students will be able to:

- a. Graph quadratic functions and analyze graphs of quadratic functions identifying the vertex, line of symmetry, maximum/minimum values, and intercepts,
- b. Solve applied problems involving maximum and minimum function values,
- c. Determine the behavior of the graphs of polynomial functions of higher degree using the leading coefficient test,
- d. Determine whether a function has a real zero between two real numbers,
- e. Recognize characteristics of the graphs of polynomial functions including real zeros, y-intercept, relative maxima and minima, domain and range,
- f. Divide polynomials using long division,
- g. Use synthetic division to divide a polynomial by $x-r$,

- h. Use the remainder and factor theorems to find function values and factors of a polynomial,
- i. List the possible rational zeros for a polynomial function with integer coefficients,
- j. Factor polynomial functions and find the zeros,
- k. Find a polynomial with specified zeros, and
- l. Solve polynomial and rational inequalities.

3. Apply the fundamental algebraic and visual properties of exponential and logarithmic functions to simple examples. In particular, students will be able to:

- a. Evaluate exponential functions including functions with base e ,
- b. Recognize the inverse relationship between exponential and logarithmic functions,
- c. Graph exponential and logarithmic functions including transformations and analyze the graphs in terms of: x - or y - intercepts, asymptotes, increasing or decreasing, domain and range,
- d. Convert between exponential and logarithmic equations
- e. Find common and natural logarithms using a calculator
- f. Use basic and inverse properties of logarithms: $\log_b b = 1$, $\log_b 1 = 0$, $\log_b b^x = x$, $b^{\log_b x} = x$,
- g. Use the product rule, quotient rule and power rule to expand or condense logarithmic expressions,
- h. Use the change of base property to find a logarithm with base other than 10 or e ,
- i. Solve exponential and logarithmic equations, and
- j. Use exponential and logarithmic equations to model and solve real-life applications including exponential growth and decay.

4. Apply the fundamental algebraic and visual properties of trigonometric functions to simple examples of periodic phenomena. In particular, students will be able to:

- a. Identify angles in standard position, positive and negative angles, coterminal angles and reference angles,
- b. Convert between degree and radian measures of angles,
- c. Find the length of an arc, radian measure of central angle, or radius of a circle using the formula $s=r\theta$,
- d. Identify special angles on a unit circle,
- e. Determine the six trigonometric functions of an angle in standard position given a point on its terminal side,
- f. Find the exact values of the trigonometric functions of special acute angles 30° ($\pi/6$), 45° ($\pi/4$), and 60° ($\pi/3$) or any angles that are multiples of these special angles,
- g. Graph the six trigonometric functions and state their properties,
- h. Graph transformations of the sine and cosine functions and determine period, amplitude, and phase shift,
- i. Recognize and use the reciprocal, quotient and Pythagorean identities,
- j. Apply the sum or difference formulas and double angle formulas to find exact values and to verify trigonometric identities,
- k. Recognize and use inverse trigonometric function notation,
- l. Use a calculator to evaluate inverse trigonometric functions,
- m. Find exact values of composite functions with inverse trigonometric functions,
- n. Solve trigonometric equations over the interval $(0, 2\pi)$, and
- o. Use trigonometric functions to model and solve real-life problems.

5. Apply the fundamental algebraic properties of sequences and series to describe geometric growth patterns. In particular, students will be able to:

- a. Find terms of sequences given the general or n th term,
- b. Find a formula for the general or n th term of a given sequence,

- c. Use summation notation to write a series and evaluate a series designated in summation notation,
- d. Construct the terms of a sequence defined by a recursive formula,
- e. Recognize and write terms of arithmetic and geometric sequences,
- f. Use nth term formulas for arithmetic and geometric sequences to find a specified term, or to find n when an nth term is given,
- g. Find the sum of the first n terms of arithmetic and geometric sequences,
- h. Find the sum of an infinite geometric series, if it exists, and
- i. Use sequences and series to model and solve real-life problems.

REQUIRED MATERIALS & RECOMMENDED PREPARATION / INFORMATION

- a) **Textbook:** Algebra and Trigonometry, Jay Abramson (senior author), OpenStax: Texas. The textbook can be downloaded at this link: <https://openstax.org/details/books/algebra-and-trigonometry>
- b) **Lecture Notes:** Will be posted as soon as possible after lectures on our **D2L site**.
- c) **Calculator:** Any non-graphing calculator is allowed on tests and the exam, but I will be using and demonstrating things with a Sharp EL-531.

COURSE SCHEDULE, TOPICS, AND ASSOCIATED PREPARATION / ACTIVITY / EVALUATION

The following schedule and course components are subject to change with reasonable advance notice, as deemed appropriate by the instructor.

WEEK or DATE RANGE	ACTIVITY or TOPIC	OTHER NOTES
Week 1	Review (Chapter 1)	
Week 2	Equations and Inequalities (Chapter 2 except 2.4)	
Week 3	Functions and Function Notation (Chapter 3 except 3.6)	
Week 4	Polynomial and Rational Functions (Chapter 5 except 5.7/8)	
Week 5	Exponential and Logarithmic Functions (Chapter 6 except 6.8)	
Week 6	Trigonometric Functions (Chapters 7,8,9 except 9.4)	
Week 7	Sequences and Series (Chapter 13 sections 1-4)	
Exam period (Aug 22-24)	Comprehensive Final Exam	

Students registered with the Centre for Accessible Learning (CAL) who complete quizzes, tests, and exams with academic accommodations have booking procedures and deadlines with CAL where advanced notice is

required. Deadlines can be reviewed on the [CAL exams page](http://camosun.ca/services/accessible-learning/exams.html). <http://camosun.ca/services/accessible-learning/exams.html>

Due to the tight schedule of this class, no make-up tests will be possible. If you have to miss one of the weekly tests due to some serious and exceptional circumstance, you have to inform the instructor as soon as possible. In this case, the weight of a missed test can be moved to the other tests. If you miss more than two of the tests, you should consider applying for a medical/compassionate withdrawal, see below under “college-wide policies”.

EVALUATION OF LEARNING

DESCRIPTION	WEIGHTING
Readiness test after week 1, 35 minutes	5%
Six weekly tests, each Friday, starting in the second week, 35 minutes each	60% (10% each)
Final Exam (in the exam period Aug. 22-Aug 24)	35%
TOTAL	100%

If you have a concern about a grade you have received for an evaluation, please come and see me as soon as possible. Refer to the [Grade Review and Appeals](http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf) policy for more information. <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf>

COURSE GUIDELINES & EXPECTATIONS

It is expected that students follow lectures attentively (asking questions is encouraged and welcome!), but also continuously work on course topics outside of class hours. The recommended exercises are an excellent way to keep up to date with the course material. Students are strongly encouraged to work on extra exercises from the textbook and/or other material provided in class and online as well.

One learns mathematics by solving mathematical problems. The lectures are there to provide you with the tools for that; to acquire the skills, you have to practice them on your own.

SCHOOL OR DEPARTMENTAL INFORMATION

The **Access Math Help Centre** at Lansdowne Campus is located in Ewing 342, and the **Math Lab** in Ewing 224. Both offer drop-in help (first come, first serve) as well as online meetings by appointment, and help via e-mail. For schedules and further information see

<https://camosun.ca/services/academic-supports/help-centres/math-help>

The Math & Stats Department has prepared a handout regarding **academic integrity**. Please read this document carefully and understand what behaviours would fall under what college policy regarding academic integrity and (dis)honesty (like cheating and plagiarism):

<http://georgeballinger.ca/StudentGuidelinesforAcademicIntegrity.pdf>

STUDENT RESPONSIBILITY

Enrolment at Camosun assumes that the student will become a responsible member of the College community. As such, each student will display a positive work ethic, assist in the preservation of College property, and assume responsibility for their education by researching academic requirements and policies; demonstrating courtesy and respect toward others; and respecting expectations concerning attendance, assignments, deadlines, and appointments.

SUPPORTS AND SERVICES FOR STUDENTS

Camosun College offers a number of services to help you succeed in and out of the classroom. For a detailed overview of the supports and services visit <http://camosun.ca/students/>.

Academic Advising	http://camosun.ca/advising
Accessible Learning	http://camosun.ca/accessible-learning
Counselling	http://camosun.ca/counselling
Career Services	http://camosun.ca/coop
Financial Aid and Awards	http://camosun.ca/financialaid
Help Centres (Math/English/Science)	http://camosun.ca/help-centres
Indigenous Student Support	http://camosun.ca/indigenous
International Student Support	http://camosun.ca/international/
Learning Skills	http://camosun.ca/learningskills
Library	http://camosun.ca/services/library/
Office of Student Support	http://camosun.ca/oss
Ombudsperson	http://camosun.ca/ombuds
Registration	http://camosun.ca/registration
Technology Support	http://camosun.ca/its
Writing Centre	http://camosun.ca/writing-centre

If you have a mental health concern, please contact Counselling to arrange an appointment as soon as possible. Counselling sessions are available at both campuses during business hours. If you need urgent support after-hours, please contact the Vancouver Island Crisis Line at 1-888-494-3888 or call 911.

COLLEGE-WIDE POLICIES, PROCEDURES, REQUIREMENTS, AND STANDARDS

Academic Accommodations for Students with Disabilities

The College is committed to providing appropriate and reasonable academic accommodations to students with disabilities (i.e. physical, depression, learning, etc). If you have a disability, the [Centre for Accessible Learning](#) (CAL) can help you document your needs, and where disability-related barriers to access in your courses exist, create an accommodation plan. By making a plan through CAL, you can ensure you have the appropriate academic accommodations you need without disclosing your diagnosis or condition to course instructors. Please visit the CAL website for contacts and to learn how to get started:

<http://camosun.ca/services/accessible-learning/>

Academic Integrity

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.13.pdf> for policy regarding academic expectations and details for addressing and resolving matters of academic misconduct.

Academic Progress

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.1.pdf> for further details on how Camosun College monitors students' academic progress and what steps can be taken if a student is at risk of not meeting the College's academic progress standards.

Course Withdrawals Policy

Please visit <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.2.pdf> for further details about course withdrawals. For deadline for fees, course drop dates, and tuition refund, please visit <http://camosun.ca/learn/fees/#deadlines>.

Grading Policy

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf> for further details about grading.

Grade Review and Appeals

Please visit <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.14.pdf> for policy relating to requests for review and appeal of grades.

Mandatory Attendance for First Class Meeting of Each Course

Camosun College requires mandatory attendance for the first class meeting of each course. If you do not attend, and do not provide your instructor with a reasonable reason in advance, you will be removed from the course and the space offered to the next waitlisted student. For more information, please see the "Attendance" section under "Registration Policies and Procedures"

(<http://camosun.ca/learn/calendar/current/procedures.html>) and the Grading Policy at <http://camosun.ca/about/policies/education-academic/e-1-programming-and-instruction/e-1.5.pdf>.

Medical / Compassionate Withdrawals

Students who are incapacitated and unable to complete or succeed in their studies by virtue of serious and demonstrated exceptional circumstances may be eligible for a medical/compassionate withdrawal. Please visit <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.8.pdf> to learn more about the process involved in a medical/compassionate withdrawal.

Sexual Violence and Misconduct

Camosun is committed to creating a campus culture of safety, respect, and consent. Camosun's Office of Student Support is responsible for offering support to students impacted by sexual violence. Regardless of when or where the sexual violence or misconduct occurred, students can access support at Camosun. The Office of Student Support will make sure students have a safe and private place to talk and will help them understand what supports are available and their options for next steps. The Office of Student Support respects a student's right to choose what is right for them. For more information see Camosun's Sexualized Violence and Misconduct Policy: <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.9.pdf> and camosun.ca/sexual-violence. To contact the Office of Student Support: oss@camosun.ca or by phone: 250-370-3046 or 250-3703841

Student Misconduct (Non-Academic)

Camosun College is committed to building the academic competency of all students, seeks to empower students to become agents of their own learning, and promotes academic belonging for everyone. Camosun also expects that all students to conduct themselves in a manner that contributes to a positive, supportive, and safe learning environment. Please review Camosun College's Student Misconduct Policy at <http://camosun.ca/about/policies/education-academic/e-2-student-services-and-support/e-2.5.pdf> to understand the College's expectations of academic integrity and student behavioural conduct.

Changes to this syllabus: Every effort has been made to ensure that information in this syllabus is accurate at the time of publication. The College reserves the right to change courses if it becomes necessary so that course content remains relevant. In such cases, the instructor will give the students clear and timely notice of the changes.