

	<p>School of Arts & Science MATHEMATICS DEPARTMENT</p> <p>MATH 115-section 001 Pre-Calculus Semester/Year, 2010W</p>
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COURSE OUTLINE

The Approved Course Description is available on the web @ _____

Ω Please note: this outline will be electronically stored for five (5) years only.
It is strongly recommended students keep this outline for your records.

1. Instructor Information

(a)	Instructor:	Nick Marsden		
(b)	Office Hours:	Monday-Friday 9:30-10:20am		
(c)	Location:	Ewing 258		
(d)	Phone:	250-370-3499	Alternative Phone:	
(e)	Email:	nmarsden@camosun.bc.ca		
(f)	Website:			

2. Intended Learning Outcomes

(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)

Upon completion of this course the student will be able to:

1. Read and write mathematics at a level sufficient for entry into first-year calculus.
2. Factor and simplify expressions with rational exponents.
3. Write equations of circles and ellipses in standard form and graph these relations.
4. Define the term function. Determine if relations are functions. Find the domains of functions. Define even and odd functions and test functions to determine if they are even, odd or neither. Form and simplify difference quotients and explain their graphical interpretation and significance.
5. Identify the graphs of common algebraic functions. Evaluate and graph piecewise defined functions.
6. Construct algebraic functions to model simple real-life problems.
7. Translate verbal descriptions of transformations to function notation and vice versa. Interpret and graph multiple transformations of functions.
8. Analyze and graph quadratic functions. Solve optimization problems modelled with quadratic functions.
9. Graph polynomial functions using end behaviour and behaviour near their x-intercepts. Analyze graphs of polynomial functions and construct possible equations.
10. Graph rational functions using symmetry, asymptotes, behaviour near their x-intercepts and tables of signs. Analyze graphs of rational functions and construct possible equations.
11. Solve polynomial and rational inequalities.
12. State the Remainder, Factor and Rational Zeros Theorems and use these theorems to factor polynomials and find their real zeros.
13. Compose and decompose functions. State the definition of an inverse function. Verify that two functions are inverses using the definition. Find inverse functions algebraically and graphically.
14. Explain the relationship between exponential and logarithmic functions. Graph exponential and logarithmic functions and their transformations.
15. Prove the properties of logarithms and use these properties to simplify expressions and solve equations.
16. Solve applied problems involving pH, the Richter scale, decibels, compound interest, exponential growth, exponential decay and logistic growth.
17. Define a radian and work with radian measure. Convert between degree and radian measure.

18. State the unit circle definitions for the sine and cosine functions. Using the definitions, deduce properties of the sine and cosine functions and sketch their graphs. Graph transformations of these functions. Analyze sinusoidal graphs and construct possible equations.
19. Define the tangent, cotangent, secant and cosecant functions in terms of the sine and cosine functions. Graph the tangent, cotangent, secant and cosecant functions using the sine and cosine graphs.
20. State the right triangle definitions for the trigonometric functions. Use reference triangles to find exact values of trigonometric functions.
21. Derive the Pythagorean identities, the sum and difference identities, the double angle identities, the power reducing identities, and the half angle identities. Use these identities to simplify expressions and verify other identities.
22. Graph the inverse sine, cosine and tangent functions. Find exact values for compositions of trigonometric and inverse trigonometric functions. Write compositions as algebraic expressions.
23. Find exact and approximate solutions of trigonometric equations, including equations involving identities and multiples of angles.
24. Identify patterns in sequences and write formulas for the general terms. Write the terms of recursively defined sequences. Express sums using summation notation. Simplify and evaluate basic sums of sequences.
25. Identify geometric sequences and series. Derive formulas for the n th terms of arithmetic and geometric sequences and for the sums of the first n terms of these sequences. Solve word problems involving arithmetic and geometric sequences and series.
26. Expand binomials using Pascal's triangle.

3. Required Materials

(a)	Texts	Text: Sullivan, M. Algebra & Trigonometry, 8 th edition
(b)	Other	MathXL for the above text (optional)

4. Course Content and Schedule

(Can include: class hours, lab hours, out of class requirements and/or dates for quizzes, exams, lectures, labs, seminars, practicums, etc.)

CHAPTER R: Review

#	Text	Time	
1	R.4,R.5	1	Polynomial Expressions, Pascal's Triangle
2	R.7	1	Rational Expressions
3	R.8	1	n th Roots; Rational Exponents
			TAKE-HOME TEST

CHAPTER 1: Equations and Inequalities

#	Text	Time	
4	1.2	1	Quadratic Equations
5	1.4	1	Radical Equations; Equations Quadratic in Form; Factorable Equations

CHAPTER 2: Graphs

#	Text	Time	
6	2.1	.5	The Distance and Midpoint Formulas
7	2.2	1	Graphs of Equations in Two Variables; Intercepts; Symmetry
8	2.3	1	Lines
			TAKE-HOME TEST
9	2.4	2.5	Conics (includes a handout)
		1	TEST 1, Lessons 1 to 9

CHAPTER 3: Functions and Their Graphs

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10	3.1	1	Functions
11	3.2	.5	The Graph of a Function
12	3.3	1	Properties of Functions
13	3.4	1	Library of Functions; Piecewise-defined Functions
14	3.5	2	Graphing Techniques: Transformations
15	3.6	1.5	Mathematical Models: Building Functions
			TAKE-HOME TEST

CHAPTER 4: Linear and Quadratic Functions

#	Text	Time	
16	4.1	.5	Linear Functions and Their Properties
17	4.3	.5	Quadratic Functions and Their Properties
18	4.4	1	Quadratic Models
		1	TEST 2, Lessons 10 to 18

CHAPTER 5: Polynomial and Rational Functions

#	Text	Time	
19	5.1	.5	Polynomial Functions of Higher Degree
20	5.2	1.5	Properties of Rational Functions
21	5.3	1.5	The Graph of a Rational Function
22	5.4	1.5	Polynomial and Rational Inequalities
23	R.6	1	Synthetic Division
24	5.5	2	The Real Zeros of a Polynomial Function
			TAKE-HOME TEST

CHAPTER 6: Exponential and Logarithmic Functions

#	Text	Time	
25	6.1	1	Composite Functions
26	6.2	1	One-to-One Functions; Inverse Functions
		1	TEST 3, Lessons 19 to 26

27	6.3	1	Exponential Functions
28	6.4	2	Logarithmic Functions
29	6.5	1.5	Properties of Logarithms
30	6.6	1.5	Logarithmic and Exponential Equations
31	6.7	1	Compound Interest
32	6.8	1	Exponential Growth and Decay
			TAKE-HOME TEST

CHAPTER 7: Trigonometric Functions

#	Text	Time	
33	7.1	.5	Angles and Their Measure
34	7.2	1.5	Right Triangle Trigonometry
35	7.3	.5	Computing the Values of Trigonometric Functions of Acute Angles
36	7.4	1.5	Trigonometric Functions of General Angles
37	7.5	.5	Unit Circle Approach; Properties of the Trigonometric Functions
38	7.6	1.5	Graphs of the Sine and Cosine Functions
			TAKE-HOME TEST
39	7.7	1	Graphs of the Other Four Trigonometric Functions
40	7.8	1	Phase Shift; Sinusoidal Curve Fitting
		1	TEST 4, Lessons 19 to 40

CHAPTER 8: Analytic Trigonometry

#	Text	Time	
41	8.1	1.5	The Inverse Sine, Cosine and Tangent Functions

42	8.2	.5	The Inverse Trigonometric Functions (Continued)
43	8.3	1	Trigonometric Identities
44	8.4	1.5	Sum and Difference Formulas
45	8.5	1.5	Double-angle and Half-angle Formulas TAKE-HOME TEST
46	8.7	1.5	Trigonometric Equations I
47	8.8	.5	Trigonometric Equations II
		1	TEST 5, Lessons 41 to 47

CHAPTER 13: Sequences and Series

#	Text	Time	
48	13.1	1	Sequences
49	13.2	1.5	Arithmetic Sequences and Finite Series
50	13.3	1.5	Geometric Sequences and Series

5. Basis of Student Assessment (Weighting)

(Should be linked directly to learning outcomes.)

(a)	Other <i>(eg, Attendance, Project, Group Work)</i>	See below
(b)	Assignments	See below
(c)	Term tests	50%. Will throw out worse test if class participation and assignments are satisfactory
(d)	Final exam	50%. or 100% if higher than term mark

1. TERM MARK. You will be doing a number of take-home tests. These can be done in consultation with other students in your class, but with the help of nobody else. They will be overdue if not handed in at the beginning of the class on the due date, but can be handed in up to one day late with only a one mark deduction.

The term mark is the average of the scores on your in-class tests. However, if the average of your take-home test scores is at least 70% AND your in-class participation is satisfactory, I will throw out your worst test before I calculate the average.

If you miss an in-class test for ANY reason, you will get a zero. There will be no make-ups. But with decent take-home test scores and class participation, that zero will be tossed out.

2. FINAL EXAM. The final exam for this course is to be written by all students on the day and time scheduled.
3. MARK FOR THE COURSE. Your course mark is the larger of:
 - a) The average of your term percentage and your final exam percentage
 - b) Your final exam percentage

The Math Department reserves the right to raise your course mark if it is judged that your in-class tests and final exam were more difficult than those in other years or other sections.

6. Grading System

(No changes are to be made to this section, unless the Approved Course Description has been forwarded through EDCO for approval.)

Standard Grading System (GPA)

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D	Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite.	1
0-49	F	Minimum level has not been achieved.	0

Temporary Grades

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy at camosun.ca or information on conversion to final grades, and for additional information on student record and transcript notations.

Temporary Grade	Description
I	<i>Incomplete:</i> A temporary grade assigned when the requirements of a course have not yet been completed due to hardship or extenuating circumstances, such as illness or death in the family.
CW	<i>Compulsory Withdrawal:</i> A temporary grade assigned by a Dean when an instructor, after documenting the prescriptive strategies applied and consulting with peers, deems that a student is unsafe to self or others and must be removed from the lab, practicum, worksite, or field placement.

Temporary grades are assigned for specific circumstances and will convert to a final grade according to the grading scheme being used in the course. See Grading Policy E-1.5 at camosun.ca for information on conversion to final grades, and for additional information on student record and transcript notations.

7. Recommended Materials or Services to Assist Students to Succeed Throughout the Course

LEARNING SUPPORT AND SERVICES FOR STUDENTS

There are a variety of services available for students to assist them throughout their learning. This information is available in the College calendar, at Student Services or the College web site at camosun.ca.

STUDENT CONDUCT POLICY

There is a Student Conduct Policy **which includes plagiarism**. It is the student's responsibility to become familiar with the content of this policy. The policy is available in each School Administration Office, at Student Services and on the College web site in the Policy Section.