

	<p><b>School of Arts &amp; Science</b>  <b>MATHEMATICS DEPARTMENT</b>  <b>MATH 115</b>  <b>Precalculus</b>  <b>Quarter or Semester/Year</b></p>
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## COURSE OUTLINE

The course description is online @ <http://camosun.ca/learn/calendar/current/web/math.html>

Ω Please note: the College electronically stores this outline for five (5) years only.  
It is **strongly recommended** you keep a copy of this outline with your academic records.  
You will need this outline for any future application/s for transfer credit/s to other colleges/universities.

### 1. Instructor Information

(a)	Instructor:	Rich Tschritter		
(b)	Office Hours:	8:00 am to 8:20 am, 10:55 to 11:55 am, Monday to Thursday		
(c)	Location:	E-244		
(d)	Phone:	370-3494	Alternative Phone:	475-0659
(e)	Email:	tschritter@camosun.bc.ca		
(f)	Website:	Tschritter.disted.camosun.bc.ca		

### 2. Intended Learning Outcomes

(No changes are to be made to these Intended Learning Outcomes as approved by the Education Council of Camosun College.)

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.

## COURSE OUTLINE FOR MATH 115 Spring 2010

Instructor: Rich Tschritter, Ewing-244 Office hours: Monday to Thursday, 8:00 am to 8:20 am;&  
10:55 am to 11:55 am

Class Times: Monday to Thursday: 8:30 am to 10:50 am, Room E-348.

Email: [tschritter@camosun.bc.ca](mailto:tschritter@camosun.bc.ca)

Website: [tschritter.disted.camosun.bc.ca](http://tschritter.disted.camosun.bc.ca)

Text: Sullivan, M. Algebra & Trigonometry, 8<sup>th</sup> edition

Calculator: Scientific- Sharp EL-531W

### **CHAPTER A: APPENDIX A Review**

#	Text	Time	
1	R-4-5	1.5	Polynomial Expressions
2	R-6	0.5	Synthetic Division
3	R-7	1.5	Rational Exponents & Radicals
4	R-8	1	n <sup>th</sup> roots, Rational Exponents

### **CHAPTER 1: Equations & Inequalities Chapter 2: Graphs**

#	Text	Time	
4	1-2	1	Quadratic Equations

#### **TAKE-HOME TEST # 1**

5	1-4	1	Other Types of Equations
6	2-1	0.5	Distance & Midpoint Formulas
7	2-2	1	Graphs, Intercepts, & Symmetry
8	2-3	1	Lines: graphing, finding equations of lines
9	2-4	3	Conics, Text & Handout

12 hours

#### **1 TEST 1, Lessons 1 to 9**

### **Chapter 3: Functions and Their Graphs**

10	3-1	1	Functions
11	3-2	0.5	Graphs of Functions
12	3-3	1	Properties of Functions
13	3-4	1.5	Library of Functions
14	3-5	3	Transformations
15	3-6	0.5	Building Functions

#### **TAKE-HOME TEST #2**

### **Chapter 4: Quadratic Functions**

16	4-3	1	Quadratic Functions & Their Properties
17	4-4	1	Quadratic Models
18	4-5	1	Inequalities Involving Quadratic Functions

10.5 hours

1 **Test # 2, Lessons 10 to 18**

**CHAPTER 5: POLYNOMIAL AND RATIONAL FUNCTIONS**

#	Text	Time	
19	5-1	1	Polynomial Functions of Higher Degree
20	5-2	1.25	Properties of Rational Functions
21	5-3	1.25	Graph of a Rational Function
22	5-4	1	Rational and Polynomial Inequalities
23	5-5	2	Real Zeros of a Polynomial Function

**Take-Home-Test # 3**

**CHAPTER 6: EXPONENTIAL AND LOGARITHMIC FUNCTIONS**

#	Text	Time	
24	6-1	1	Composite Functions and Their Graphs
25	6-2	1.5	Inverse Functions: 1-1 Functions

9.5 hours

**Test # 3, Lessons 19 to 25**

26	6-3	1	Exponential Functions
27	6-4	2	Logarithmic Equations
28	6-5	1.5	Properties of Logarithmic Functions
29	6-6	1.5	Logarithmic and Exponential Equations
30	6-7	0.75	Compound Interest
31	6-8	1.5	Growth and Decay

**Take-Home-Test # 4**

**CHAPTER 7: TRIGONOMETRIC FUNCTIONS**

#	Text	Time	
32	7-1	1	Angles and Their Measure
33	7-2	1	Right Triangle Trigonometry
34	7-4	2	Trigonometric Functions of Any Angle

12.25 hours

**1 Test # 4, Lessons 26 to 34**

35	7-6	1.5	Graphs of Sine and Cosine Functions
36	7-7	1	Graphs of Other Four Trigonometric Functions
37	7-8	1.5	Phase Shift; Sinusoidal Curve Fitting

**TAKE-HOME-TEST # 5**

**CHAPTER 8: ANALYTIC TRIGONOMETRY**

#	Text	Time	
38	8-1	1.5	Inverse Sine, Cosine and Tangent Functions
39	8-2	0.5	Inverse Trigonometric Functions II

#	Text	Time	
40	8-3	1	Trigonometric Identities
41	8-4	1.5	Sum and Difference Formulas

42	8-5	2	Double and Half Angle Identities
43	8-7	1	Trigonometric Equations I
44	8-8	<u>1</u>	Trigonometric Equations II
		12.5	hours

## 1 TEST 5, Lessons 35 to 44

**CHAPTER 13: SEQUENCES and SERIES** ( This section will be tested on the final exam)

45	13-1	1.5	Sequences
46	13-2	1.25	Arithmetic Sequences and Finite Series
47	13-3	1.25	Geometric Sequences and Series
48	13-5	<u>0.5</u>	Binomial Theorem
		4.5	hours

Total Lecture and class testing Hours = 63

Time permitting, limits, secant line, tangent line, instantaneous velocity, and derivative function **may be** covered!

Review: 2-3 hours

### **Final exam, Lessons 1 to 48**

NOTE: for the conic sections an interesting website to look at which shows the intersection of a plane and a cone is:

<http://clem.mscd.edu/~talman1/HTML/ConicSections.html>

### FIRST DAY HANDOUT FOR MATH 115 STUDENTS

Welcome to my class. I hope that the term goes well for you. Please take some time to read the following. I think you will find it helpful and informative.

#### **A. SOME GENERAL COMMENTS**

1. HOW IMPORTANT IS REGULAR ATTENDANCE? It is essential that you attend every class. If for some reason you miss a class, you will need to act quickly to get caught up. Get a copy of the notes from one of your classmates. Work through the notes very carefully.
2. HOW MUCH TIME SHOULD I BE SPENDING ON MATH EVERY WEEK? If up to date, a typical student will need to spend a minimum of 1 to 3 hours per day. It is highly preferable that this be done before the next class.
3. **TEXTBOOK.** We have just moved to the eighth edition of Algebra & Trigonometry by Sullivan. Every student who buys a book will receive an access code to an online system called **MathXL**. The system provides you with many exercises and practice problems. This is the first year we are using **MathXL**, so it is an add-on to the course. Students are strongly encouraged to use this resource to help with problems similar to assignment problems, and in areas where they need extra assistance. In future it may be used for electronic assignments and other class work.

4. CALCULATORS. Scientific- Sharp EL-531W. Graphing and programmable calculators **may not be used** on any test or on the final exam.

## B. HOW TO GET HELP

1. Please ask questions in class. While we may not have enough time in class to answer all questions we can arrange time for help outside class.
2. Please come to my office (Ewing-244) for help. You may make an appointment, or just drop in. My official office hours are from 8:00 am-8:20 am Monday to Thursday, and 10:55 am to 11:55 am Monday to Thursday
3. I strongly urge you to find one or more people in this class who you can study with. For many people, learning mathematics in a social setting with their peers can be very rewarding and productive.
4. Free tutoring is available in The Mathlab, Tech 142, on Interurban campus and in Ewing 224 and 342 at Lansdowne campus. The lab is open **(see schedule posted on doors)**

## C. EVALUATION PROCEDURES FOR THE COURSE

1. TERM MARK. You will be doing a number of take-home tests (5). 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 10% mark deduction on your score.

The term mark is the average of the scores on your in-class tests and take-home-tests (5). The take-home-tests are worth 15% and the class tests are 35% and the final exam is 50%. However, if your take-home test scores are satisfactory (overall average is at least 60%), you will be allowed to throw out your worst class test before the average is calculated, provided **that you have handed in all HW assignments on time and have written all class Tests!**

If you miss an in-class test for ANY reason, you must contact me (e-mail) as soon as possible to make other arrangements or you will get a zero. There will be no make-ups.

2. FINAL EXAM. The final exam for this course is to be written by all students on the day and time scheduled. The examinations for this term will be held June 21-23, 2010. Please make sure you are available during this period. The exam schedule should be posted in **late May for the day of our final EXAM!**

3. MARK FOR THE COURSE. **Providing you have met all the requirements listed above** your course mark is the larger of:

- a) The average of your term mark and your final exam mark (each is worth 50%)
- b) Your final exam mark

4. LETTER GRADE. Your course mark is then translated to a letter grade using the following table:

A+ 90-100%	B+ 77-79.5%	C+ 65-69.5%	F <49.5%
A 86-89.5%	B 73-76.5%	C 60-64.5%	
A- 80-85.5%	B- 70-72.5%	D 50-59.5%	

## D. USING THIS COURSE AS A PREREQUISITE

You will need a recent B in this course in order to proceed to Math 100.  
You should be advised that the success rate for students in Math 100 who

have not received at least a B in Math 115 or Math 12 is very low.

You will also need a recent B in order to proceed to Math 110.

A Recent C in Math 115 is sufficient for entry to Math 108, but you can expect with this sort of mark to have to work very hard.

### **E ONE MORE THING**

In order to make the class lecture more useful it is absolutely essential that you do all HW from the Text and ask questions in class as well and seek extra help as soon as possible. I hope you will take advantage of all help that is available and see me for any questions or help that you might need. Good luck and may the Math be with you!

### **F HOW TO GET THE MOST OUT OF THIS COURSE!**

1. Your success in this course rests largely with you.
2. Please do not be afraid to ask questions and be patient with other members of the class who may be struggling with this course.
3. Only one person should talk at a time. Please avoid private conversations while someone else is talking.
4. My objective is to make this course as useful to you as possible.

### **6. Grading System**

*(No changes are to be made to this section unless the Approved Course Description has been forwarded through the Education Council of Camosun College for approval.)*

#### **Standard Grading System (GPA)**

<b>Percentage</b>	<b>Grade</b>	<b>Description</b>	<b>Grade Point Equivalency</b>
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	1

		prerequisite.	
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 E-1.5 at [camosun.ca](http://camosun.ca) for 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.
IP	<i>In progress:</i> A temporary grade assigned for courses that, due to design may require a further enrollment in the same course. No more than two IP grades will be assigned for the same course. <i>(For these courses a final grade will be assigned to either the 3<sup>rd</sup> course attempt or at the point of course completion.)</i>
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.

### 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](http://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 the College web site in the Policy Section.

ADDITIONAL COMMENTS AS APPROPRIATE OR AS REQUIRED