MATH 170

CALCULUS I

FALL 2018
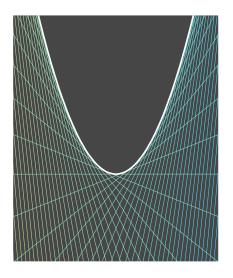
SECTION 01

MTWF

8:00 - 8:50 AM

HIRT 209

INSTRUCTOR

Dr. Lauren Williams

Old Main 404

lwilliams@mercyhurst.edu

(814) 824-2226

OFFICE HOURS

Monday 9:00 - 10:00

Tuesday 12:30 - 1:30

Wednesday 1:00 - 3:00

Thursday 8:00 - 9:00

Friday 1:00 - 2:00

and by appointment

COURSE DESCRIPTION

This is the initial course in a sequence of courses on the fundamental ideas of the calculus of one variable. It is here that truly significant applications of mathematics begin. Topics included are functions, continuity, limits, derivatives, maxima and minima and antiderivatives.

COURSE OBJECTIVES

On successful completion of the course, students will be able to:

- recognize, define, and apply properties of functions, such as their domain, range, intercepts, and inverses;

- be able to evaluate a variety of limits;

- identify discontinuities of a function presented either graphically or algebraically;

- find the derivative of functions using the limit definition;

- find the derivative of sums, products, and quotients of composite polynomial, trigonometric, exponential, and logarithmic functions;

- understand conceptual relationships between derivatives, rates of change, and tangent lines;

- use properties of functions and derivatives to graph functions;

- apply differentiation procedures to solve related rates and extreme value problems;

- identify and evaluate limits involving indeterminate forms;

- compute definite and indefinite integrals using formulas and substitution;

- understand the relationship between the integral and the derivative; and

- read and interpret mathematical theorems, including checking that hypotheses are satisfied and reaching correct conclusions.

COURSE WEBSITE: http://math.mercyhurst.edu/~lwilliams/Math170/index.php
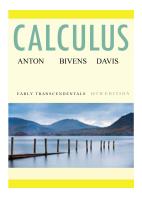
Prerequisites

To remain enrolled in this course, you must satisfy at least one of the following criteria:

- Began studying at Mercyhurst prior to Fall 2016

- Score of 76 or better on the ALEKS Mathematics Placement Assessment

- Passed Math 118 (Math for the Natural Sciences), or transfer credit for equivalent

- Passed both Math 111 (College Algebra) and Math 112 (Trigonometry and Functions), or transfer credit for equivalent

If none of these apply, you should make arrangements to take the ALEKS Math Placement Assessment before the Add/Drop deadline on Monday, August 27th. **Students that do not meet the prerequisites by this deadline may be dropped from the course.** You will be contacted via email by the instructor reminding you to show proof of meeting prerequisites before any action is taken.

Required Materials

Textbook

Calculus, Early Transcendentals by Anton, Bivens, and Davis, 10th Edition. We will be covering chapters 0-5 in the textbook. No other supplies are required for the course.

You will not be expected to bring your textbook to class. If you prefer to purchase or rent an electronic version of the text, you're welcome to do so.

Calculators

You are not required to purchase a calculator for this course, and **you will not be permitted to use a calculator or other electronic device on any quizzes or exams**. You are strongly encouraged to avoid using a calculator while working on homework.

Tutoring

The Department of Mathematics offers **free, drop in tutoring for this course**. You are free to ask tutors questions on any assigned homework and exam review sheets. Be sure when you go that you have your course materials (book, notebook, pencil, paper, etc). The tutors will assist on a first-come, first-served basis. Even if you don't have a question, stop by and work with your classmates.

Day	Mon	Tues	Thurs
Time	6-8 pm	6-8 pm	6-8 pm

Personal tutors may also be arranged, free of charge, through the Mercyhurst University Tutoring Center. Students seeking tutoring can schedule an appointment via TutorTrac, at mercyhurst.go-redrock.com.

Course Components

Quizzes

Keeping up with the homework will ensure that you are prepared for the quizzes, which will feature problems very similar to those in the homework. Quiz grades will not be based strictly on whether or not you found the correct answer. Your work must also be written clearly, and with proper notation, to receive full credit.

Your lowest quiz grade, including a missed quiz, will be dropped when calculating your final grade.

If you miss a quiz, you must make arragements to take it before the graded quizzes are returned to the class; this will typically be the next class meeting.

Exams

There will be four midterm exams given throughout the semester, in addition to the final exam. The material on the exams will be similar to topics covered on quizzes and homework. You will be given review guides for each exam. All exams should be considered to be cumulative; each exam will include some material from the previous exams.

If you need to miss class during a scheduled exam for a documented, excused reason (illness, family emergency, athletics), you will be able to make up the exam. You must schedule a time to retake any exam within one week of the day the exam was given in class.

Your lowest exam grade (including a missed exam) will be replaced by your final exam grade, if your final exam grade is better. A grade of 0 on an exam due to academic dishonesty will *not* be replaced by the final exam grade.
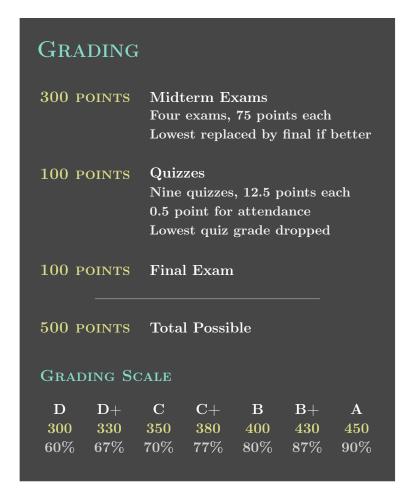
Final Exam

The final exam is cumulative, including material from all sections covered in class. Most questions on the final will be taken (with minor modifications) from homework, quizzes, and previous exams.

You are required to take the final exam for this course regardless of your average on earlier exams or quizzes. If you will not be able to take the final exam at its scheduled time, please make alternate arrangements as soon as possible. Final exams may be made up for excused absences only.

The final exam is scheduled for Wednesday, December 12, 8:00 - 10:00 am.

Progress

Quiz and exam grades will be posted on Blackboard throughout the semester.

Grading

300 POINTS	Midterm Exams
	Four exams, 75 points each
	Lowest replaced by final if better

100 POINTS	Quizzes
	Nine quizzes, 12.5 points each
	0.5 point for attendance
	Lowest quiz grade dropped

100 POINTS	Final Exam

500 POINTS	Total Possible

GRADING SCALE

D	D+	C	C+	B	B+	A
300	330	350	380	400	430	450
60%	67%	70%	77%	80%	87%	90%

Other Course Information

- Please ask questions - in class, office hours, or tutoring - as soon as you feel stuck. Mathematics is a naturally cumulative subject. If you do not understand a particular topic, you will not understand topics that come after.

- There are other textbooks available in the library and in my office. Due to book prices, you may not want to invest in a second book, but it can be helpful to have alternate sources or see topics explained in other ways.

- I do not keep detailed lecture notes. It is highly recommended that you establish contacts among your classmates to get notes in case you miss class.

- I will attempt to answer email as quickly as possible, but please allow up to 24 hours for a response (particularly on weekends).

- Attendance is not required, but coming to class regularly will give you the best chance of earning your desired grade. You are responsible for any work material covered in your absence. Please contact me if you are absent for an extended period.

- You are neither expected nor required to purchase any materials for the course aside from the required textbook. Graphing calculators and mathematical software could be used to check your work, but should not be relied on to do the work for you.

Learning Differences

Mercyhurst University is committed to making reasonable accommodations to assist individuals with disabilities in reaching their academic potential. Students with disabilities requiring accommodations should complete and submit this form:
https://www.mercyhurst.edu/sites/default/files/uploads/%3Cem%3EEdit%20Simple%3C/em%3E%20Student%20Consumer%20Information/accommodation_general.pdf
and the required documentation to the Director of Equal Opportunity Programs (DEOP), 300 Old Main, aagnew@mercyhurst.edu. Accommodations will not be granted prior to approval by the DEOP and will not be provided retroactively. Further information is available by visiting the Learning Differences website:
http://www.mercyhurst.edu/academics/learning-differences-program

Academic Honesty

Students are required to uphold academic integrity throughout the course. In particular, plagiarism of any sort, unauthorized collaboration on exams, quizzes and other assignments, and other incidences of academic dishonesty will be handled according to the policies set forth in the Student Handbook.

Course Evaluations

Near the end of the semester, you will be asked to complete an online course evaluation. The evaluation will be completed in class during the last two weeks of the semester using any laptop, tablet, or mobile device. The response tool allows you to note aspects of the course that helped you learn, as well as aspects that might be modified to help future students learn more effectively. You will receive an email letting you know when the evaluation window for our class is open. Please note that these course evaluations are anonymous and instructors do not see the results until after the grades for the course are submitted.

SEMESTER SCHEDULE

Monday	Tuesday	Wednesday	Friday
Aug 20	*Aug 21*	**Aug 22** Class Intro, Overview	**Aug 24** 0.1, 0.2: Functions, New Functions from Old
Aug 27 *Add/Drop Deadline* 0.3: Families of Functions	**Aug 28** 0.4: Inverse Functions	**Aug 29** 0.5: Exp and Log Functions	**Aug 30** **Quiz** 1.1: Limits, An Intuitive Approach
Sep 3 *Labor Day*	**Sep 4** 1.2: Computing Limits	**Sep 5** 1.3: Limits at Infinity	**Sep 7** **Quiz** 1.3: Limits at Infinity
Sep 10 1.5: Continuity	**Sep 11** 1.5: Continuity	**Sep 12** 1.6: Continuity of Trig, Exp, and Inverse	**Sep 14** **Quiz** Review/Catch Up Day
Sep 17 2.1: Tangent Lines and Rates of Change	**Sep 18** Review	**Sep 19** Exam I	**Sep 21** 2.2: The Derivative Function
Sep 24 2.2: The Derivative Function	**Sep 25** 2.3: Intro to Differentiation Techniques	**Sep 26** 2.4: The Product and Quotient Rules	**Sep 28** **Quiz** 2.5: Derivatives of Trig Functions
Oct 1 2.6: The Chain Rule	**Oct 2** 3.1: Implicit Differentiation	**Oct 3** **Quiz** 3.1: Implicit Differentiation	*Oct 5* *Fall Break*
Oct 8 3.2: Derivatives of Log Functions	**Oct 9** 3.3: Exp and Inverse Trig Functions	**Oct 10** 3.4: Related Rates	**Oct 12** **Quiz** 3.4: Related Rates
Oct 15 3.5: Local Linear Approximation	**Oct 16** Review	**Oct 17** Exam II	**Oct 19** 3.6: l'Hopital's Rule, Indeterminate Forms
Oct 22 3.6: l'Hopital's Rule, Indeterminate Forms	*Oct 23* *Advising Day*	**Oct 24** 4.1: Increase, Decrease, Concavity	**Oct 26** **Quiz** 4.2: Relative Extrema, Graphing Polynomials
Oct 29 4.2: Relative Extrema, Graphing Polynomials	**Oct 30** 4.3: Rational Functions	**Oct 31** 4.3: Rational Functions	**Nov 2** **Quiz** Review/Catch Up Day
Nov 5 4.4: Absolute Extrema	**Nov 6** 4.5: Applied Min/Max Problems	**Nov 7** 4.5: Applied Min/Max Problems	**Nov 9** **Quiz** 4.6: Rectilinear Motion
Nov 12 4.8: Rolle's and Mean Value Theorems	**Nov 13** Review	**Nov 14** Exam III	**Nov 16** *Last day to withdraw* 5.1: An Overview of the Area Problem
Nov 19 5.2: The Definite Integral	**Nov 20** 5.3: Integration by Substitution	*Nov 21* *Thanksgiving Break*	*Nov 23* *Thanksgiving Break*
Nov 26 5.3: Integration by Substitution	**Nov 27** 5.5: The Definite Integral	**Nov 28** 5.6: The Fundamental Theorem of Calculus	**Nov 30** **Quiz** 5.9: Definite Integrals by Substitution
Dec 3 5.9: Definite Integrals by Substitution	**Dec 4** Review	**Dec 5** Exam IV	**Dec 7** Review, Last Class Meeting
Dec 10 *Reading Day*	*Dec 11*	**Dec 12** **Final Exam 8:00 - 10:00**	

Homework List

Your homework will not be collected, but these problems (and similar questions) are likely to appear on quizzes and exams. Working on additional problems is highly recommended.

Sec.	Page	Problems
0.1	12	1, 3, 5, 7, 9, 15, 19, 23, 27, 29, 31a-c
0.2	24	1, 3, 5, 11, 13, 17, 25, 27, 29, 31, 33, 35, 39, 41, 49, 53, 61, 63
0.3	35	1, 3, 11, 15, 17, 19, 25, 29, 31
0.4	49	1, 3, 5, 9, 13, 17, 19, 25, 27, 31, 39, 41
0.5	61	1, 5, 9, 11, 13, 15, 17, 21, 23, 25, 27, 47, 57
1.1	77	1, 3, 5, 7, 9, 17-20, 21, 23, 25, 31
1.2	87	1, 3, 7, 11, 13, 15, 19, 21, 25, 31
1.3	96	1, 3, 5, 9, 13, 15, 21, 31, 33, 37, 43
1.4	106	You are not responsible for this section (but try 17 and 21 anyway!)
1.5	118	1, 3, 5, 7, 11, 13, 17, 21, 29, 31, 35, 45, 47
1.6	125	1, 7, 9, 13, 17, 19, 21, 23, 27, 31, 37, 49, 67
2.1	141	3, 11, 13, 15, 17, 23
2.2	152	1, 3, 7, 9, 11, 21, 23, 25, 29
2.3	161	1, 3, 5, 7, 9, 13, 15, 17, 21, 23, 29, 37, 39, 41, 43, 45, 49
2.4	168	1, 3, 5, 7, 11, 13, 19, 21, 23, 27, 29, 31, 33, 39
2.5	172	1, 5, 11, 15, 17, 21, 23, 27, 29, 31
2.6	178	3, 7, 9, 11, 15, 17, 19, 23, 27, 35, 37, 39, 45, 49, 51, 53, 77
3.1	190	3, 5, 7, 9, 11, 13, 15, 17, 27
3.2	195	1, 3, 7, 9, 13, 19, 23, 25, 27, 35, 37, 41
3.3	201	15, 17, 19, 21, 23, 25, 37, 43, 51, 65
3.4	208	1, 5, 13, 15, 17, 19, 25, 27
3.5	217	3, 5, 7, 23, 25, 29, 31, 43
3.6	226	1, 7, 9, 11, 13, 17, 21, 23, 27, 29, 33, 57
4.1	241	1, 5, 7, 9, 15, 17, 19, 21, 25, 29, 39
4.2	252	3, 5, 7, 9, 11, 19, 25, 27, 29, 33, 37, 41, 43, 45, 53
4.3	264	1, 3, 5, 9, 13, 19, 23, 25, 31
4.4	272	3, 7, 9, 11, 13, 21, 23, 25, 27, 31, 33
4.5	283	3, 5, 13, 19, 21, 23, 27, 29, 31, 37, 55
4.6	294	1, 3, 13, 17, 19, 33
4.8	308	1, 3, 5, 7, 15, 25, 41
5.1	321	7, 9, 13, 15, 17
5.2	330	5, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 43, 45
5.3	338	1, 3, 7, 9, 11, 15, 17, 21, 23, 27, 31, 33, 39, 41, 47, 53, 55, 61, 69, 71
5.5	360	13, 15, 19, 21, 23, 25, 33
5.6	373	7, 9, 13, 15, 17, 19, 23, 29, 31, 59, 61
5.9	393	1, 5, 9, 15, 17, 19, 21, 31, 33, 35, 37, 43, 45, 49, 53