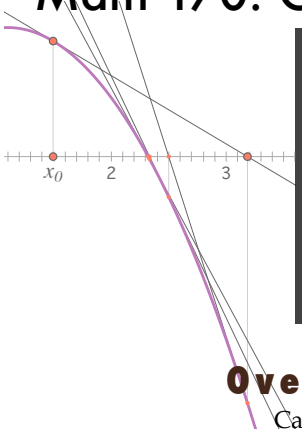
Math 170: Calculus and Analytic Geometry I — Fall 2011



Instructor:	Kevin Hartshorn Department of Mathematics and Computer Science hartshorn@math.moravian.edu
Student Advisor:	Some Student
Course Meeting:	MWF 10:20am – 11:30am PPHAC 232
Office Hours:	Tuesdays 8:00-10:00am and 1:00-3:00pm PPHAC 215

Overview

Calculus is the key tool to understanding and modeling many aspects of the real world. Measuring rates of change, speed, area, length, and volume are all in the purview of calculus, as is computing averages, finding centers of mass, or plotting trajectories. It is arguably the most important intellectual tool developed in the past 400 years, finding use in virtually every area of science, including physics, chemistry, biology, sociology, business, medicine, architecture, engineering, psychology, and astronomy.

Main Ideas for the course

- Continuous changes can be modeled by discrete processes.
- Linearization is the key to understanding many functions.
- Solving problems requires finding the right model.
- Calculus is about the concept of the infinite – it is *not* about equations.

Course Objectives

In working toward internalizing these main ideas for the course, we will work to meet the following objectives:

- differentiation and integration methods and the concepts behind them,
- how to work with functions graphically, algebraically, numerically, and verbally,
- how to apply the methods of calculus to real world problems, and
- how to discuss and present solutions to mathematical problems in written and oral form.

Required materials and texts

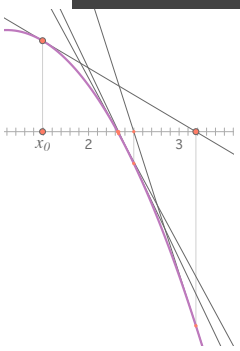
Jon Rogawski's *Calculus* (2nd Edition) is the only required text (ISBN 978-1-4292-3183-1). Note that we are using the Early Transcendentals version of the text, and only require the Single Variable portion.. This course will cover most of the first 5 chapters of the text. Math 171 (Calculus II) will cover chapters 6–10 of the text.

A graphic calculator will also be needed for this course. The TI-83 is the standard used at Moravian. Students using a different calculator will bear the responsibility of making it emulate the TI-83.

In this class, we will be taking advantage of two free on-line resources: *Khan Academy* and *WebWork*. Details will be provided on a separate document on how to access and use these resources.

Grading and Assessment

Your course grade will be computed based on a raw percentage score, broken down as shown in the table below.



10%	Class preparation and participation
15%	On-line assessments
15%	Homework and problem sets
5%	Culture Points
5%	Limit proficiency test
10%	Derivative proficiency test
20%	Average of two in-class exams
20%	Final Exam

When computing your score at the end of the semester, an A (+ or –) is typically given to a score of 85% or above, a B (+ or –) to a score between 70% and 85%, a C (+ or –) to a score between 60% and 70%, and a D (+ or –) to a score between 50% and 60%. These values are subject to change and are meant only as a rough guideline, and the final assignment of grades will be determined based on the performance of the entire class and the judgement of the professor.

Class preparation and participation

Time in class will be spent working in small groups and discussing material with the entire class. In order to get the most out of the class, you need to be prepared for each class meeting.

Class preparation will include reading the text as well as watching videos on the class YouTube channel. There will be assessments of your preparation – some to be submitted as homework, some to be completed in class.

For every class meeting, you will receive a class participation score: √ (roughly 80%) for adequate participation/preparation, √+ (roughly 100%) for truly exceptional engagement, or √– (roughly 10%) or 0% for inadequate participation/engagement. Your preparation/participation score will be computed by averaging your daily score.

On-line assessments

Over the course of the semester, you will be asked to complete several on-line assessments through *Khan Academy* and *WebWork*. These can be completed from any computer, but you will need to log in to the appropriate web pages.

Khan Academy will provide a review of the mathematics that is expected of all students who are planning to take calculus. There will be five points in the semester at which I will be checking on your progress in completing the assessment activities. Details on this will be provided in a separate handout.

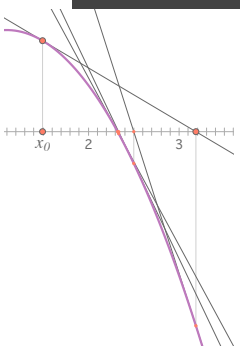
WebWork is an on-line homework system. This will be used through the semester to check your understanding o basic mathematical techniques (e.g.: methods of differentiation). Starting in the third week of classes, there will be a *WebWork* assignment due roughly once per week (for a total of 10 over the semester). Details on *WebWork* will be provided in a separate handout.

All on-line assignments will be scored on a 10-point scale and averaged to determine the on-line assessment score for your final grade.

Homework and problem sets

At least once a week, there will be some sort of homework set due. While you are welcome to work with classmates on these problems, final submission of all homework sets should be done in your own handwriting and in your own words. For all homework sets, please observe the following guidelines:

- Your name must be legible on the front page. If there are multiple pages, they must be stapled (there are staplers in the Math/CS Office and the Math/CS Reading Room on the second floor of PPHAC).
- Problems must be answered in the order listed in the original assignment.
- Unless specifically told otherwise, you must always show your work on all homework problems. Your work should be neat and easy to follow.



- This is a college-level submission. While solving a problem can be a messy business, take the time to rewrite your solution so that what you present to me is neat and well-organized.
- While I will collect homework in class on the date due, the final deadline for submission is 4:00pm of the due date. Work submitted after that time, but before the graded assignment is returned to the class, will be accepted with a 30% penalty. Work will not be accepted after the graded assignment has been returned to the class.

Homework that does not follow these requirements will be penalized or returned ungraded.

Culture Points

An important aspect of the calculus sequence is to introduce you to the idea of what a "mathematician" is and does. Frankly, this is not effectively done within the classroom — calculus is but a tiny portion of mathematical thought, and we are only studying the topmost surface of calculus. To provide a broader perspective on the role of calculus in mathematics (and the role of mathematics in the world), I will be asking you to participate in mathematically-oriented activities throughout the semester. Details on this will be provided on a separate handout.

Limit and Derivative Proficiency Tests

In addition to the regular exams, there will be two proficiency exams: a *Limit Proficiency* and a *Derivative Proficiency*. If you score less than 80% on either of these, your score will be entered as a 0% in the gradebook. However, you may retake the exam as often as you want within 4 weeks of the original exam — the gradebook will reflect the highest score you achieved on the exam (assuming it is 80% or better).

The first Limit Proficiency exam will be on Friday, September 24, and retakes may be done through Friday, October 22. The first Derivative Proficiency exam will be on Friday, October 29, and retakes may be done through Wednesday, December 1.

Retakes for either proficiency exam may be done at any time outside of class using the *WebWork* homework system. Details on how to use *WebWork* to complete the proficiency exam retakes will be provided when the first limit proficiency exams are returned to you.

Exams

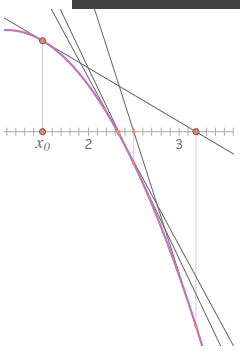
There will be two exams in the course and a final exam. The dates for the midterms are Monday, October 3, 2011, and Monday, November 14, 2011. Details on the midterms will be provided as these dates approach. The final exam will be on Tuesday, December 13, 2011. at 8:30 AM. The final exam takes place in our regular meeting room.

Be sure to mark these dates on your calendar. Remember, **flight or vacation plans are not acceptable reasons to miss an exam date**. As a general rule, make-up exams are not given. If you have a truly exceptional situation, be sure to see me ***before*** the exam date to discuss your dilemma.

Course policies and information

Attendance

There are 40 class meetings this semester. Each class is important -- each class covers vital information for the course. Note that your absence can harm not only you, but also your teammates as your contribution to the group discussions will be missing. However, there are unavoidable circumstances every semester. Thus I will allow up to 3 absences without penalty (although you are still responsible for any work due). For the fourth absence you will be assessed a 5% penalty to your final course grade. Each subsequent absence will garner an additional 10% penalty to your final course grade.



Attendance is your responsibility. If you miss a class, you will receive a 0 on any in-class activity that takes place. I do not distinguish between "excused" or "unexcused" absences. If you overslept, if your team has a tournament, if you have to attend a funeral, if you were at the health center, if you simply did not want to come to class – any reason has the same effect. A missed class is a missed class.

If you know that you will be missing a class (due to sports or other planned activities), let me know ahead of time. Together, we will decide whether alternate arrangements can be made for quizzes or exams or other activities.

Get to know your classmates! If you will miss a class due to a family emergency or sickness, have a classmate bring your homework in for you. As a rule, late work will not be accepted (see "Late Work" below).

In all cases, **you** are responsible for any missed work.

Late work

All assignments will be collected at the *beginning* of class on the date due. If you do not have your work with you (e.g.: you forgot it in your dorm room), I will accept work in my office any time before 4:00pm on the date due. After that point, I will deduct 30% from the final grade on the assignment.

Once I return a graded assignment to the class, I will not accept late assignments for any reason.

Academic Honesty

Students will be expected to adhere to the standard of the Academic Honesty policy as described in the Student Handbook (*http://www.moravian.edu/studentlife/handbook/academic/academic2.html*). Any violations of this will result in severe penalties on the assignment, a report to the Dean, and the very real possibility of failing the course.

Team projects: You may freely discuss team projects with other members of your team. However, you may not discuss team projects with anyone else from the course. Teams may visit me in my office as a group or send a representative to ask questions about the projects.

Problem sets: You may work with any of your classmates on the problem sets. However, you must write your own solutions to each problem for submission. Keep in mind that for the exams, you will be on your own. Copying from your friend helps no one.

Other reminders, tips, suggestions

- **Visit my office:** I would love to help address individual issues or answer questions you have about the course or to hear feedback about which aspects of the course are or are not going well. You have a great deal of power to determine the path this class takes -- take advantage of it.
  You can also communicate with me via e-mail (hartshorn@math.moravian.edu).
- Take advantage of the tutoring center. Beginning around the second week of class, the math tutoring center is open Monday through Thursday evenings in the Math/CS reading room (PPHAC 238).
- This syllabus is subject to change through the semester. The most recent version of the syllabus can be found at *http://www.math.moravian.edu/hartshorn/math170/*.
- If you are in need of special accommodations due to a disability, please contact the Learning Services Office as soon as possible. We can only accommodate your special needs if we are made aware of them.
- Final determination of your course grade is subject to my discretion as professor of the course.