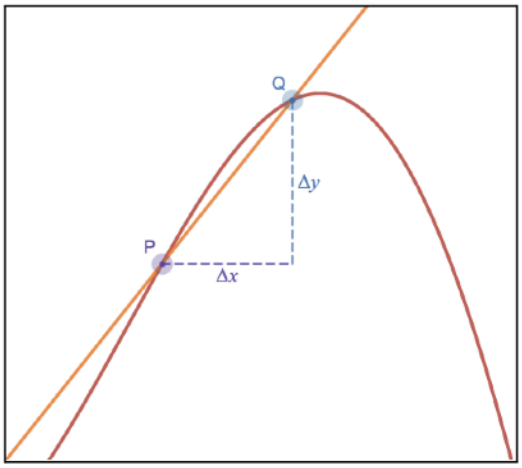
Math 131: Calculus I



Instructor: Dr. Christy Hazel (she/her)[1]
Email: hazelchristy@grinnell.edu
Office: Noyce 2248

Course Meetings:
MWF 8:30-9:50AM in Noyce 3821

MAT 131 Study Session Office Hours:
Thursdays TBD in classroom TBD (do Welcome Survey to help me pick a good time!)

One-on-One Office Hours:
Mondays 2-3:30PM

What is Calculus?

Simply put, ***calculus is the study of change***. Here's an example you're probably familiar with. Suppose a car is traveling at constant speed and travels 40 miles in 30 minutes. We can determine that the car was traveling at a speed of 80 miles per hour. But what if the car wasn't traveling at a constant speed? In the real world, we encounter stop lights, slow drivers, different speed limits, etc. If we have a model for distance traveled, how do we approximate the speed of the car at any given time? If we know the speed at various times, how do we approximate the total distance traveled? Calculus gives us a way to approach these questions!

In this class, we will study the three essential tools of calculus: ***limits***, ***derivatives***, and ***integrals***. ***Derivatives*** tell us the instantaneous rate of change of a function (e.g. how fast is my car going right now?). ***Integrals*** tell us about the accumulation of a function (e.g. how much distance have I traveled given my speed at various points?). Both derivatives and integrals are defined by taking limits. ***Limits*** tell us how the outputs of a function behave as the inputs get really close to some particular input value. Limits are the key tool that lets us move from the simple case of "my car is traveling at a constant speed" to "my car's speed is changing"!

Textbook:

Calculus, 6th edition, James Stewart. We will cover Chapters 2-7 from the textbook.
Stewart has a bunch of different Calculus books, so make sure you have the right book. The 6th edition is not the most recent version of this textbook, so also check that you have the correct edition.

Other Course Materials:

- I strongly recommend getting a three ring binder. We will have daily worksheets that I will hole punch, and a binder is a great way to stay organized with all of the class papers.
- **You do not need to purchase a calculator for this course**. I will provide basic scientific calculators to use in class and to use in exams (these will be the only calculators allowed in exams).

[1] Feel free to call me Christy, or if you prefer, Professor Christy or Professor Hazel.

Contents in this Document

Grading Scheme: How Your Learning Will Be Assessed

Grading scheme: Your letter grade will be assigned based on the following weighted average:

- **Course Engagement 6%**
- **Weekly Homework 22%**
- **Three Best Midterm Exams 42%** (14% each)
- **Lowest Midterm Exam 8%**
- **Final Exam 22%**

More information about each category can be found below. Letter grade assignments will be made according to following scale: 93-100% A, 90-92.9% A-, 87-89.9% B+, 83-86.9% B, 80-82.9% B-, 77-79.9% C+, 70-76.9% C, 60-69.9% D, <59.9% F.

If you ever want to compute a projected final grade, you can use this formula, putting in guesses for future exam scores as need:

Final Weighted Grade = 0.06(Course Engagement) + 0.22(Weekly Homework Average) + 0.14(Highest Midterm) + 0.14(Second Highest Midterm) + 0.14(Third Highest Midterm) + 0.08(Lowest Midterm)+ 0.22(Final Exam Grade).

Learning Goals

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

- ★ Explain the conceptual meaning of limits and calculate limits using limit laws and properties of limits.
- ★ Explain the conceptual meaning of derivatives and interpret the derivative in modeling

problems
- ★ Compute derivatives using derivative rules and then use derivatives to solve variety of application problems such as related rates problems and optimization problems
- ★ Explain the conceptual meaning of the integral and then compute definite and indefinite integrals using integration rules.
- ★ Set up and compute integrals to solve a variety of application problems such as finding the area of a region or volume of solid.

In addition to becoming proficient in Calculus I concepts, students will…
- ★ Practice communicating technical concepts to their peers in class.
- ★ Develop persistence to continue working on problems even after multiple attempts and failures.
- ★ Develop problem solving techniques and learn strategies to set up and solve problems (e.g. drawing a picture, making a diagram, scaffolding the problem into parts, etc.)
- ★ Develop organization skills to correctly show work in order to communicate their problem-solving process to others.

Communication: How to Contact Me

- ➔ **Homework/Study Session "Office Hours":** These sessions are dedicated time for my calculus students to ask me homework/study questions and to work on calculus homework alone or in groups. I will book a classroom for these sessions.
  - ◆ Come by for any amount of time during this scheduled time.
  - ◆ While it's often more productive if you come with a specific question, you are also welcome to come listen to other students' questions and/or quietly work on the assignment and ask questions as they pop up.
  - ◆ Please do the Welcome Survey to help me find the best time for as many people to attend as possible.

- ➔ **One-on-one Office Hours:** I will also have a set of more traditional office hours each week. These will be held in my office (Noyce 2248) and are open for any students in my classes (not just calculus students).
  - ◆ Students should come in one at a time to ask questions (or you can come in as a group–just make sure everyone in the group is comfortable with that).
  - ◆ If there is a long line, these questions will be limited to 5 minutes to allow the next students to come in to ask questions.
  - ◆ If you have questions about your grade or the course structure, this is a great time to ask these.

- ➔ **Appointments:** If you are unable to attend office hours and want to meet, we can schedule an appointment. If you'd like to schedule an appointment:
  - ◆ Please email me (hazelchristy@grinnell.edu) with your availability for a few different days.

- You shouldn't expect to get an appointment that day. You can include that as an option, but please do not only provide day-of times for an appointment. It is unlikely I'll be able to set up an immediate appointment.

➔ **Email:** You are welcome to email me anytime with any questions or comments (hazelchristy@grinnell.edu).
- Note I usually *don't* check my email between 6PM-8AM on weekdays and only occasionally on the weekends. You are welcome to email me whenever is most convenient for you, but I probably won't respond until normal working hours.
- I will try to always respond within one business day (note if you email Friday afternoon, there's a chance I won't get back to you until Monday).

Classroom Culture and Expectations

This class is built on the belief that anyone can learn mathematics. While you all have the ability to learn the topics in this course, I recognize that you all come to class with your own set of challenges, responsibilities, and pressures that might affect whether you can participate to the best of your abilities in the classroom. Thus it is essential that we all work to create an inclusive and productive learning environment. Here are a few specific things you and I can do to build and maintain this environment.

➔ **Be present.** We have a limited amount of time together in the classroom, so let's use this time productively. For all of us, this means **showing up on time**, being ready to start at the beginning of class, participating in the daily activities, and **not engaging in distracting behaviors** (using cell phones, working on other course work, etc.).

➔ **Recognize that learning is a process and be open to making mistakes.** I do not expect you to be able to do every problem on your first try. Be open to trying new problems and making mistakes. Recognize that **mistakes are a natural part of learning**, and find something to learn from your mistakes. If you see a problem you don't know how to solve, then you should brainstorm ideas, look through your notes, chat with your group for ideas, etc.

➔ **Listen to understand, not to judge.** You will often be discussing mathematics with your classmates both inside and outside of class. Make sure everyone in your group gets a chance to share ideas, and listen to understand and learn from your classmates' ideas, not to judge their abilities. If you disagree with something, share your disagreement respectfully and make sure you are critiquing the ideas and not the person.

More on Assessments

Course engagement (6%)

Learning mathematics requires you to regularly and thoughtfully engage with the course content. Thus a portion of your final grade (6%) will be based on your engagement with the

course. Inside the classroom, you can engage by working with your group on worksheet problems, asking questions, and answering questions. This will constitute most or even all of your engagement score. You can also boost your score by attending homework sessions and office hours (though this isn't necessary to receive a full engagement score).

You will receive a reduced engagement score if you are on your cell phone during class time, have your laptop out[2], regularly show up more than 5 minutes late to class, work on assignments for other classes, or don't engage with the worksheet. Receiving a high engagement score means you regularly showed up to class on time, engaged with the worksheet for the entire class period, and did not engage with other coursework or outside activities during class time.

I will base your engagement grade on my own observations of classroom activities and homework sessions/office hours.

Homework (22%)

You will have a weekly assignment due **each week on Friday at the start of class**. All assignments must be turned in by 8:35AM (5 minutes into class). Any homework after that is considered late. Please see "Lake Homework Policy" for information on when assignments can be accepted after that time and with what penalties. The assignment will be broken into two packets: "Part A" which will have short answer questions and "Part B" which will have longer questions. All homework will be graded for correctness. You will have a chance to revise Part B after it is graded and returned (more information will be given on Blackboard). The first assignment is due **Friday, January 26**. I will pass out the homework packets in class and also post them on our Blackboard page.

Exams (42% Midterms, 22% Final)

We will have four exams during the semester:

- **Exam 1: Wednesday, February 14**
- **Exam 2: Wednesday, March 6**
- **Exam 3: Wednesday, April 10**
- **Exam 4: Wednesday, May 1**

I will post more information about each exam about one week before the exam. Your three highest exam scores will each count as 14% of your final grade, and your lowest exam score will count as 8% of your final grade.

We will have a cumulative final exam on **Friday, May 17 from 2–5PM**. More information about the final exam will be given as we get closer to the exam date. Note you must be present for the final exam. Make sure that your summer travel does not conflict with the exam date. **Early exams will not be given to accommodate early summer travel.**

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[2] Students who have accommodations for recording lectures with their laptop or cell phone are an exception. If you have such an accommodation, you should chat with me so we can find the best way to accommodate you while also minimizing any distractions to the classroom environment.

Late Homework Policy

Homework is due at the beginning of class on Fridays. I will have folders for each packet and for revisions at the front of class. All assignments must be turned in by 8:35am. Below are some common questions about late work.

Question: Can I still turn in my assignment if I show up more than 5 minutes late to class?
Answer: Yes, but if this happens more than once, you will receive a grade penalty. The first time you will receive no penalty. The second time, you will receive a 10% deduction. The third time, you will receive a 20% deduction, and so on.

Question: How should I turn in my assignment if I show up more than 5 minutes late?
Answer: You can hand me the assignment at the end of class. Please do not hand in the assignment in the middle of class. This policy is to avoid disrupting class and to let me focus on current class activities as opposed to accepting and organizing late work. Also do not work on the packet during the class it is due (you will not be able to turn it in if you are still working on it in class, and it is better to turn in a half-completed packet than to turn in no packet).

Question: What happens if I need to miss class because I'm sick or traveling?
Answer: If you wake up feeling sick, please don't come to class. Instead you can email me a pdf completed assignment. The best way to do this is to use a free scanning app such as "Genius Scan" to create a pdf scan of the assignment. You should send the assignment **by 8:35AM on the due date**. If you are struggling to create a pdf, you can instead send pictures (but note I will likely ask you to create a pdf as well later that day so I can print it).

Question: I didn't have enough time to complete the assignment this week. Can I have an extension?
Answer: Every student will be allowed **exactly one** weekend extension over the course of the semester. The late assignment must be turned in *at the beginning of class the following Monday.* I will not accept it at the end of class or later in the day on Monday. You do not need to tell me why you are taking the extension. Just send me a short email that says "I am taking my one homework extension and will turn in the assignment on Monday". You can only do this once.

No further extensions will be granted except in the case of documented accommodations or emergencies. If you are struggling to meet deadlines in this course, then I encourage you to schedule a meeting with me and with your advisor so that we can come up with a plan to help you get through the semester.

Student Resources for Support and Learning

Below are just a few of the resources offered by Grinnell that could be helpful for you. Grinnell has a lot of resources available for students, so it can be hard to stay informed about all of them. The link https://www.grinnell.edu/students has more information on resources.

The Math Lab

The Math Lab is an excellent resource and I encourage you to visit the Math Lab throughout the term. The Math Lab offers free drop-in tutoring services for students in Math 131 (as well as all other calculus courses, Introductory Statistics, and Applied Statistics). The Math Lab is located in **Noyce 2012**.
Please visit https://grinco.sharepoint.com/sites/MathLab for a current tutoring schedule.

Academic Accommodations Based on a Disability

Everyone in this class deserves an equitable opportunity to learn and engage with the material. I encourage students to reach out to me with any distinctive learning needs. Students with documented disabilities should also communicate with and provide documentation to the Coordinator for Student Disability Resources, Jae Baldree, located on the 1st floor of Steiner Hall (x3089). If you have any questions about accommodations in this course, please feel free to reach out to me.

Counseling and Wellness

Student Health and Wellness (SHAW) provides a variety of services to support the physical, mental, and social well-being of Grinnell students. Find more information by visiting their website (https://www.grinnell.edu/about/leadership/offices-services/student-health/counseling), including information about counseling services that are available to Grinnell students. They also offer a 24/7 counseling hotline at 641-269-4404 that connects you to a trained counseling professional who is also familiar with the range of resources available at Grinnell.

Academic Advising Support

If you have other needs that aren't addressed through the above resources, please let me know soon so that we can work together for the best possible learning environment. In some cases, I will recommend consulting with the Academic Advising staff. They are an excellent resource for developing strategies for academic success and can connect you with other campus resources as well: http://www.grinnell.edu/about/offices-services/academic-advising.

If I notice that you are encountering difficulty (for example, if you fail an exam, quit attending class, or miss multiple homework assignments), then in addition to communicating with you directly about it, I will also submit an academic alert via Academic Advising's SAL portal. This reminds you of my concern, and it notifies the Academic Advising team and your adviser(s) so that they can reach out to you with additional offers of support.

Academic Honesty

All of you have worked hard to become students at Grinnell, and you bring valuable and unique skills to the classroom. Unfortunately, the stress and workload of college can sometimes cause anxiety and make you feel isolated. Such feelings can make it seem like plagiarism is your only way forward. Despite that feeling, academic dishonesty is never the answer and it harms everyone in our learning community. It negates the work of the person whose answers were

copied, it devalues the work of your peers that submitted their own ideas, and it misleads me to think more students in the class understand a concept than really do.

Sometimes there's confusion about what counts as academic dishonesty in a math class. So to be clear, here are some examples of things that *are* considered academic dishonesty:

- Looking up a solution to a homework problem online and copying the work/answer on your own assignment (this includes, but isn't limited to, using online calculators/tools that do calculus for you and looking up answers/solutions on an online forum).
- Copying a classmate's solution to a homework problem, whether the solution is communicated in writing, verbally, over email/text, etc.

The above are just some examples of academic dishonesty. Visit https://catalog.grinnell.edu/content.php?catoid=32&navoid=5208#Honesty_in_Academic_Work for a more complete description. If you're ever unsure if something counts as cheating, ask me first. There is no penalty for asking.

To clarify, you are very much encouraged to work on assignments with your peers. But you should make sure everyone is contributing ideas and that the solutions you submit are your own.

Here are some alternatives to academic dishonesty for when you are feeling overwhelmed:

- **Communicate with someone in the class**. You can reach out to me for homework help or reach out to classmates to organize a study/homework session.
- **Visit the Math Lab.**
- **Seek support through Grinnell resources**. See the section Student Resources for Support for more information.
- Lastly, if you're just feeling overwhelmed and do not know how to proceed in the course, please **reach out to me**, and we'll come up with a plan.

Class Schedule

See PWeb for a schedule of daily topics, sections covered, etc.

Important Course Days and Dates:

- ★ Every Friday at the start of class (starting Fri, Jan 26): HW due[3]
- ★ Wednesday, February 14 during class: Exam 1
- ★ Wednesday, March 6 during class: Exam 2
- ★ Wednesday, April 10 during class: Exam 3
- ★ Wednesday, May 1 during class: Exam 4
- ★ Friday, May 17 2-5PM: Final Exam

[3] No HW due during spring break