Math 121 - Calculus I

Fall 2026

Emily Proctor

212 Warner Hall

Office Hours: M 3:30-4:45pm, Tu 1-2pm, Th 12:30-2:00pm, and by appointment

eproctor@middlebury.edu

Course Description

Calculus is the mathematical study of change. The central question we will explore in this class is: if two variables are in relation with each other and one changes, how does the other change in response?

In general, the relationship between the two variables in question will be described by a function, and the relationship between their instantaneous change is given by the *derviative* of the function. We will spend roughly two-thirds of the course learning about the derivative. We will develop the definition of the derivative, which is based on the important mathematical concept of the *limit*, and place the definition in the larger context of continuity and differentiability. We will then explore the derivative more carefully, considering various ways we can interpret it, compute it, and apply it.

In the final portion of the class, we will turn the question around and ask: if you know the derivative of a function at every point, what can you say about total accumulated change? This will lead us naturally to the definition of the *integral*. We will end the course with a study of the integral and the Fundamental Theorem of Calculus, which explicitly and beautifully relates the derivative and the integral together.

Course Website

The website for this course can be found at:

https://f26.middlebury.edu/MATH0121B/

Here you will find course information and homework assignments.

Course Text and Materials

We will cover most of Chapters 1 through 6 of *(Single Variable) Calculus, Early Transcendentals, 9th ed.* by James Stewart. You can use either a hard copy or an electronic copy of the book, whichever works best for you. You will also need to purchase a subscription to the online homework system Edfinity for the semester. I will explain on the first day of class how to do this.

Course Objectives

The goals of this course are to help you develop:

- familiarity with and understanding of the concepts, notation, and theory of calculus,
- the ability to apply your understanding to solve straightforward and complex problems,
- increasing fluidity and confidence with the tools of mathematics,
- skills in collaboration and communication, and
- the confidence that comes with taking ownership of your learning process.

Course Structure and Homework

Homework will be due for each Monday, Wednesday, and Friday class, with the assignments posted after every non-Tuesday class. Problems will be a mix of Edfinity problems that you will submit online and problems from the book that you will write up and turn in at the start of class. In a typical week, expect to spend about 12 hours on our class including class time, reviewing your notes, reading the text, and carrying out the homework.

Doing your homework diligently is the best way to succeed in this course. Math is most easily absorbed in small, consistent chunks. By looking at the material for a little while each day and keeping up with the problem sets, over time you will build intuition for the subject. If you keep a steady rhythm with the homework, you will learn the material well and be much more well-prepared for exams.

Please **write neatly** and **staple your work**.

If you find yourself struggling with material, or just have questions you want to ask, I am here to help! Please come see me in office hours. I will be very happy to see you there, The CTLR also hosts student-run help sessions for calculus classes on Sunday and Thursday evenings in the Q-Center in BiHall.

You will get immediate auto-graded feedback on your Edfinity homework problems. Your written homework problems will be graded on a 0-2 scale, with a zero given for little or no work shown (even if the answer is correct), a two given for a mostly or totally correct answer, and scores in between for partially completed or correct work.

Please note that late homework will not be accepted. Late homework will receive an overall score of zero. You may however, hand in homework early if a conflict arises. If you are unable to hand in your homework during class, please bring it to my office in Warner Hall by the end of class time. In order to accommodate unexpected circumstances such as illness, when computing your final grade for the course, I will drop your three lowest Edfinity homework scores and your three lowest written homework scores.

Assessment

There will be three midterm exams and one final exam for this class. The midterms will be in class and are scheduled for

Tuesday, October 6,

Tuesday, October 27,

Tuesday, November 17.

I expect you to be in class for the exams. **If you become sick shortly before the exam, please go to the health center to obtain documentation.**

The time of the final exam will be announced once it has been determined by the registrar. Note that **vacation plans are not a legitimate excuse for rescheduling an exam**. Please plan to be on campus for all exams including the final.

Attendance and Etiquette

I expect you to attend all classes. Unless you check with me ahead of time, please arrive on time, put your devices in your bag, and stay in the classroom for the full period. This applies to exams as well as to regular class meetings. This is an active learning class, so your success in this class will depend on your participation. Your attentive presence in class also makes a significant contribution to class as a whole.

Your class participation grade will be based on your attentive and active contribution to our class. You can miss up to three classes, for whatever reason (including illness), without penalty. Further absences will have a negative impact on your class participation grade. If you become so sick that you need to miss more than one class in a row, please stay in touch and we will make a plan to accommodate this.

Honor Code

You may (in fact you are encouraged to!) work together in pairs or groups while you are figuring out homework assignments. However, the final completion of each of your assignments must be your own. I expect you to complete exams entirely on your own.

Our homework and exams are designed to provide you the direct practice needed to develop your mathematical skills and proficiency. Since the use of AI tools goes counter to this, you are strongly discouraged from using them for your homework. All exams will be closed-book and the use of any resources beyond those specifically outlined will be considered a breach of the Honor Code.

Students with Disabilities

Students who have Letters of Accommodation in this class are encouraged to contact me as early in the semester as possible to ensure that such accommodations are implemented in a timely fashion. For those without Letters of Accommodation, assistance is available to eligible students through the Disability Resource Center (DRC). Please contact ADA Coordinators Jodi Litchfield and Peter Ploegman of the DRC at ada@middlebury.edu for more information. All discussions will remain confidential.

Grading

At the end of the semester, I will calculate final averages as follows.

Midterm 1	20%
Midterm 2	20%
Midterm 3	20%
Final	20%
Homework and Class Participation	20%

Tentative Schedule of Topics

Week Beginning	Topics
Sept 14	Working with functions, exponentials, inverses, and logarithms
Sept 21	The tangent and velocity problems, the limit of a function, calculating limits
Sept 28	Continuity, intermediate value theorem, horizontal asymptotes, intro to derivatives
Oct 5	(Exam 1), Derivative as rate of change, derivative as a function
Oct 12	Derivs of polynomials and exponentials, product and quotient rules (Fall Break)
Oct 19	Derivs of trig functions, chain rule, implicit differentiation, derivatives of logarithms
Oct 26	(Exam 2), Linearization, extreme values
Nov 2	Critical numbers, derivatives and graphs, first and second derivative tests
Nov 9	Curve sketching, optimization problems
Nov 16	(Exam 3), Antiderivatives, areas and distance
Nov 23	(Thanksgiving)
Nov 30	The definite integral, the Fundamental Theorem of Calculus, indefinite integrals
Dec 7	The substitution rule, area between curves, average value
Dec 14	Review