

# INTRODUCTION TO CALCULUS

MATH 1A

## Syllabus pointers

### INSTRUCTORS

- This spring 2024 course is organized by Oliver Knill ( knill@math.harvard.edu). You find his office in SC 432 near the math common room.
- Oliver's office hours are Tuesday, Thursday, Friday 4-5 PM and by appointment. Good times to meet away from office hours is right after classes or after the regular office hours.
- Course assistants are Maria Eugenia Briano, (mebriano@college), Jota Chamorro (jchamorro@college) and Jacobo Alvarez Martinez (jalvarezmartinez@college) will have MQC time and.

### CLASS MEETINGS

- Our class meetings take place on Monday Wednesday and Fridays 9-10:15 in Room 309. This is in the third floor of the science center.
- During our class meeting, we develop the ideas and techniques together. Class attendance is required. If you should have to be absent, let Oliver know.
- Work together with classmates and contribute actively. Take notes during class. Bring writing utensils so that you can work on problem sets.
- Be intentional about how you communicate: we all have expertise and ideas to share, so we should take space and make space to be sure that everyone is learning.
- Celebrate mistakes! This is when a lot of our learning happens, so be fearless about sharing ideas and incrementally working towards solutions.
- Keep a growth mindset: this course is all about developing new skills and unfamiliar ideas, and that can be uncomfortable. Mistakes really are our best learning opportunities.
- You get the most out of the meeting by staying involved, by doing, by asking questions. Keep track of parts which you need to focus on more.

### HOMEWORK

- Homework is posted on the course website of Oliver.
- Homework is due at the beginning of every class. As for homework, you are encouraged to collaborate with other students, get help from Oliver or the course assistants.

## Single Variable Calculus

- Homework submissions are open for 12 hours past the deadline for emergency only. Late HW submissions come with a penalty.
- You find the assignments on Canvas but you submit homework on gradescope.
- Enroll to Gradescope with the entry code that is given to you. You find the gradescope link on the canvas page.
- The least 3 homework scores will be discarded.
- Even if you have only completed part of a Pset, submit what you have.
- We strictly follow the academic integrity policy stated in the honor code.

## EXAMS

- The first midterm takes place on February 28, 2024
- The second midterm takes place on April 3, 2024
- The final 3 hour exam take place during the exam period and is organized by the registrar.

## ACCESSIBILITY

- If you need accommodation for a documented disability, please get in touch with the Disability Access Office early in the semester as possible so that we can make sure your needs are addressed.
- We have flexibility for university sponsored events like athletic tournament, plays or musical performances, for religious holidays or extenuating circumstances like medical issues or family emergency.

## GRADES

- 30 percent: One component is homework
- 30 percent: A second component are midterm scores, 15 percent each
- 40 percent: A third component is the final exam.

## RESOURCES

- You should focus on the material which is handed out and worked on.
- There are libraries full of calculus books. There is a free textbook Active calculus: <https://activecalculus.org/acs>
- You can use calculators, and online tools like Desmos or Wolfram alpha, or computer algebra systems for homework. If you make use of a tool, then please acknowledge it.
- AI tools like Chat GPT can be used as a chat partner. You are not allowed to use AI output for solving your homework. This would be equivalent to having an other person do the homework for you.

## MATERIAL

The warm-up Unit 0 is due on first class

Mon Jan 22: Unit 1: Introduction

Wed Jan 24: Unit 2: Functions

Fri Jan 26: Unit 3: Rates of change

Mon Jan 29: Unit 4: Limits

Wed Jan 31: Unit 5: Continuity

Fri Feb 2: Unit 6: Derivative

Mon Feb 5: Unit 7: Basic derivatives

Wed Feb 7: Unit 8: Derivative rules

Fri Feb 9: Unit 9: Hospital

Fri Feb 12: Unit 10: Hopital at infinity

Wed Feb 14: Unit 11: Linear Approximation

Fri Feb 16: Unit 12: Maxima and Minima

Mon Feb 19: Presidents day

Wed Feb 21: Unit 13: Absolute maxima

Fri Feb 23: Unit 14: Applications

Mon Feb 26: Unit 15: Review for first midterm

Wed Feb 28: Unit 16: First Midterm

Fri Mar 1: Unit 17: Flashback on midterm

Wed Mar 4: Unit 18: Chain rule

Fri Mar 6: Unit 19: Implicit differentiation

Wed Mar 8: Unit 20: Related rates

Spring Break March 9 -March 17

Fri Mar 19: Unit 21: Intermediate value theorem

Mon Mar 20: Unit 22: Roots and Mean value theorem

Wed Mar 22: Unit 23: Extrema and Catastrophes

Mon Mar 25: Unit 24: Definite integrals

Single Variable Calculus

Wed Mar 27: Unit 25: Fundamental theorem  
Fri Mar 29: Unit 26: Indefinite integrals

Mon Apr 1: Unit 27: Review for second midterm  
Wed Apr 3: Unit 28: Second midterm  
Fri Apr 5: Unit 29: Flashback on midterm

Mon Apr 8: Unit 30: Substitution I  
Wed Apr 10: Unit 31: Substitution II  
Fri Apr 12: Unit 32: Integration by parts

Mon Apr 15: Unit 33: A topic about functions  
Wed Apr 17: Unit 34: A topic about data  
Fri Apr 19: Unit 35: A topic about computer science

Mon Apr 22: Unit 36: A topic about statistics  
Wed Apr 24: Unit 37: A topic about economics