

# Math 94: Summer Bridge Program

## Summer 2023, Lecture 1

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MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
<p><u>12-1:30pm</u> Boelter 8270</p>	<p><u>9-10:30am</u> Boelter 8270</p> <p><u>12-1:30pm</u> Boelter 8270</p>	<p><u>12-1:30pm</u> Boelter 8270</p>	<p><u>9-10:30am</u> Boelter 8270</p> <p><u>12-1:30pm</u> Hershey 158</p> <p><u>2-4pm</u> 7101 MS (AOS Lab)</p>	<p><u>12-1:30pm</u> 7101 MS (AOS Lab)</p>

*“It seems to me that the poet has only to perceive that which others do not perceive, to look deeper than others look. And the mathematician must do the same thing.” — Sofya Kovalevskaya*

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The dates and topics in this syllabus are subject to change. Any changes will be announced on Canvas.

## Course Description

**How can we describe the physical world mathematically?** How can we use mathematics to describe phenomena in physics, chemistry, or other STEM fields? How should we think about and interpret mathematical formulas?

Mathematics is a language that allows us to describe the geometry of the physical world around us, such as estimating the number of candies in a jar, the trajectory of a baseball, the behavior of chemical reactions, or the amount of water flowing out of a bottle. In this course, you will develop the reasoning and questioning skills needed to explore these calculus concepts and apply them to real-life and STEM situations. Moreover, you will become fluent in communicating your ideas through the language of mathematics.

### Course Materials

- *Active Prelude to Calculus*, and *Active Calculus*, by Boelkins.
- *Guesstimation*, by Weinstein and Adam

The official course textbook is by Boelkins, and is available for free online. *Guesstimation* is supplemental material, and not required. All course materials will be handed out during class, and will be made available online.

### Learning Objectives

*"In mathematics, the art of asking questions is more valuable than solving problems."* — Georg Cantor

The goals of the course are that you:

- (1) develop the reasoning and questioning skills needed to explore STEM topics;
- (2) develop the collaboration and communication skills needed to convey your (mathematical) ideas;
- (3) acquire an understanding of the key concepts of single variable calculus.

Furthermore, this course is designed to show you that mathematics is neither a "spectator sport", nor a solitary endeavor. Mathematics is both a creative and a collaborative process, and *everyone*, especially you, can do mathematics and be a part of the mathematical community. My hope is that by the end of the quarter, you will be proud of the mathematics that you have done in this course.

*"I don't solve quadratic equations to help me with my daily life, but I do use mathematical thinking to help me understand arguments and to empathize with other people. And so pure maths helps me with the entire human world."* — Eugenia Cheng

*Course Schedule*

<b>Learning Outcome:</b>	Dates
<b>B1: Street-fighting mathematics.</b> Interpret questions mathematically. Develop concrete references to orders of magnitude. Use Fermi estimation to make educated guesses.	Week 1
<b>Presentation 1</b>	<b>Aug 14</b>
<b>B2: Function Sense.</b> Geometrically interpret common functions, like polynomials, trig functions, and logarithms/exponential functions. Use these functions to model real-world phenomena.	Week 2
<b>B3: Rates of Change.</b> Explore how common functions change as their inputs change. Estimate and find the tangent lines to common functions. Calculate derivatives of common functions.	Week 3
<b>B4: Using derivatives.</b> Identify appropriate calculus concepts and techniques to mathematically model real-world situations. Use derivatives to solve applied problems.	Week 4
<b>B5: Putting the pieces together.</b> Explore the area underneath the curves of common functions. Explore the relationship of integrals to derivatives. Calculate definite integrals of common functions.	Week 5
<b>B6: Using integrals.</b> Identify appropriate calculus concepts and techniques to mathematically model real-world situations. Use integrals to solve applied problems.	Week 6
<b>Presentation 2</b>	<b>Sep 15</b>

## Course Structure

*"The only way to learn mathematics is to do mathematics."* — Paul Halmos

This course is offered in a in-person, synchronous format. Lectures, discussion sections, and office hours will be held in person. All presentations will be held in person, during class hours.

During class lectures, I plan to use a mix of direct teaching (aka traditional lecturing), as well as active and inquiry-based teaching. Tasks you will be asked to do include: work individually, work in small groups, discuss ideas in small groups, ask questions, and/or present your ideas or solutions to the class.

### *The Learning Process*

Each assignment in this course plays an important role in the learning process. See below for a detailed description of each assignment!

1. **Pre-class work:** Before coming to lecture, you should download the lecture slides, and read the relevant chapter or section of the textbook. You should not expect to understand everything immediately - this is completely normal! You should bring any questions you have to lecture (and office hours).
2. **Lecture:** During lecture, I will explain and motivate the material by providing examples, geometric intuition, and the context of the material. I will also provide problems for you to actively practice on in small groups.
3. **Post-class work:** After lecture, you should review your notes and/or the lecture slides, and complete as many homework problems as you need in order to become comfortable with the material. If you have questions at this stage, you should ask them in office hours, or on [Campuswire \(Code: 0294\)](#)!
4. **Projects:** These assignments are for you to demonstrate your mastery of the material, and will emphasize critical thinking, rather than memorization of the material. That is, these assignments will emphasize applying what you've learned to new and unique situations. By this point, you should feel comfortable enough with the material to answer complex questions and/or explain concepts in depth.
5. **Reflection:** After any major assignment, it's important to (1) review the feedback on your work, (2) think about what went well, and (3) what changes you need to make (e.g. in your study strategies, your understanding of the material, etc.). This will help you improve on future assignments!

### *Major Assignments*

1. **Homework:** Each learning objective will have accompanying homework problems assigned from the book. **Homework will not be collected**, but is important to help you best practice and understand the material. You are encouraged to work together on the homework problems.
2. **Classwork:** Each class will have worksheets or other materials for you to work on and submit (in groups). These assignments will be graded based on completion.

3. **Projects:** There will be a total of 2 (group) projects given during the course. In these projects, you will apply what you have learned to solve real world problems. The projects have two components: a written submission, and a presentation. You will begin working on these in small groups during lecture, and you will have roughly a week to (1) **submit a polished write up** of your solutions, and to (2) **prepare a presentation** in which you explain your solutions to the rest of the class. These assignments are designed to develop your mathematical reasoning and communication skills.

Project 1 Presentation    Monday Aug 14    12-1:30pm

Project 2 Presentation    Friday Sep 15    12-1:30pm

**If you are sick, or need to quarantine, you should not come to the presentation.** You should let me know ASAP, and we will proceed on a case-by-case basis. **You must give the final project in order to pass the course.** The UCLA student handbook outlines when a make-up final project is permitted.

### *Reflection Assignments*

As noted in the course learning objectives, reflection is an important step in the learning process. As such, there are multiple **optional** assignments in this course for you to reflect on your learning strategies and look for ways to improve.

1. **Project 1 Revision and Reflection:** After Project 1 is graded, you will have the opportunity to reflect on your work and revise your written submission. If you complete this optional assignment, your grade on the written submission **replaces** your original written submission grade. Your letter grade will never be lowered by this assignment. However, it will not necessarily be improved.
2. **End of Quarter Reflection:** This is an **optional** writing assignment to be submitted before the final project. It is designed for you to reflect on what you have learned and achieved in this course.

If you complete this assignment and your course grade is close to a higher grade bracket, I will additionally take into account how thorough, detailed, and thoughtful your responses are to this assignment when assigning a letter grade. Otherwise, your final grade will be determined as outlined below. Your grade will never be lowered by this assignment.

### *Grades*

*"You need to have a conversation with yourself about what is important for you, what you actually need to thrive. And to not fall prey to the belief system that the only thing of value is your mathematics." —*

*Pamela Harris*

Your grade will reflect your performance in the course using the following grading scheme.

Submitted Classwork	20%
Project 1	40%
Project 2	40%

A letter grade will be assigned to percentages via the following brackets.

A	A-	B+	B	B-	C+
[100, 93]	(93, 90]	(90, 87]	(87, 83]	(83, 80]	(80, 77]
C	C-	D+	D	D-	F
(77, 73]	(73, 70]	(70, 67]	(67, 63]	(63, 60]	(60, 0]

Borderline grades may be improved by submitting the **End of Quarter Reflection** as outlined above. I reserve the right to award an A+ for exceptional performance. I also reserve the right to adjust the grade cutoffs dependent on overall class scores at the end of the quarter. This will only ever make it *easier* to obtain a certain letter grade.

## Policies

### *Student Conduct / Classroom Environment Policy*

*Everyone can have joyful, meaningful, and empowering mathematical experiences.* — Federico Ardila

I strongly believe that EVERYONE is capable of success in this course and in mathematics in general, regardless of the systemic barriers that exist due to race, gender, socio-economic background, or cultural identity.

In fact, I hope to show you all that mathematics can be inspiring, affirming, and even empowering. I strive to create positive and inclusive learning environments where all students feel welcome to ask questions and to voice their ideas. In particular,

- **You belong in this classroom.** Discrimination or harassment of any kind will not be tolerated. Please let the instructor know immediately if you ever feel uncomfortable in class. You may report an incident to the Office of Equity, Diversity and Inclusion [here](#).
- **You deserve to be addressed in the manner that reflects who you are.** If you are comfortable with it, you are welcome to share your pronouns and/or preferred name at any time. Conversely, please address your classmates according to their expressed preferences.
- **You deserve to fully and equitably participate in our learning environment.** During class, I encourage you to interrupt me with questions at any time! Please let me know as soon as possible if you need any classroom accommodations.
- **Be comfortable with asking questions and making mistakes.** Doing so is an essential part of the learning process, and no question is too basic or stupid. I ask you all to respect and be patient with your peers when they are confused.

While studying mathematics can often be challenging intellectually, it can be challenging *emotionally* as well. In my experience, having a strong support network of teachers, mentors, colleagues, peers, and friends that can support you is the best way to help you persevere and succeed in mathematics. To help build an empathetic support network in class, I ask that you all:

- Reach out to people you do not know and actively build new connections;
- Respect and understand that different people may bring differences in background, expertise, and interest;

- Assume the best in others and give them the benefit of the doubt. However, understand that behavior can have an adverse impact on others, even in the absence of malicious intent.
- Do not interrupt your peers; demean them or their ideas; or challenge their competence or mathematical abilities.

### *Covid-19 Policy*

Ensuring a safer campus depends on each of us following the latest UCLA health and safety guidelines. While campus policies must be modified to address changing local, state, and national orders and guidance, the most current information is available at [covid-19.ucla.edu](https://covid-19.ucla.edu).

### *Attendance Policy*

Attendance is required in the sense that assignments that affect your grade will be given during class. If you happen to miss a discussion section for whatever reason, see the late/missed assignment policy.

### *Late/Missed Assignment Policy*

Sometimes we have bad days, bad weeks, or bad quarters. This is especially true in light of the COVID-19 pandemic, and this crisis, as well as any other unexpected, unfortunate personal crisis, should not unduly affect your grade.

- **Submitted classwork:** There is a 48-hour grace period for submitting classwork assignments after the posted deadline. You do not need to notify me or your TA of your use of this grace period. Since classwork is graded only on completion, no late homework will be accepted after this 48-hour late deadline.
- For **project write-ups**, I am using the policy of “time banks” to accommodate any unexpected issues. You may use this policy one of two ways (please choose, and let me know):
  - You may have one 48-hour grace period for one submitted assignment, OR
  - You may have two 24-hour extensions for two different submitted assignments.

You do not have to justify your use of this policy, nor do you need to use it at all. You will not be penalized for using the time bank policy.

However, if you are having consistent problems keeping to the schedule, or if you find yourself struggling with unexpected personal events, I encourage you to reach out and email me ([richardwong@math.ucla.edu](mailto:richardwong@math.ucla.edu)) as soon as possible. I can also give case-by-case flexibility depending on the severity of the issues.

### *Regrading Policy*

Occasionally, I, your TAs, or the graders may make a mistake while grading assignments or exams. If there has been a clerical error (e.g. there was an error in calculating the points you earned, or an error in recording the grades on Canvas), you can contact me or the TAs immediately to fix this error.

For all other grading issues, you should submit a Request for Regrade Form to Canvas anytime within the regrading window for the assignment. Unless announced otherwise, this window lasts for one week, beginning 24 hours after the assignment or exam has been returned.

Please note that the regrading policy is intended to fix serious errors in grading, *not* to argue for extra points. Your grade will not necessarily be improved by the regrade.

### *Academic Integrity*

UCLA is a community of scholars. In this community, all members including faculty, staff and students alike are responsible for maintaining standards of academic honesty. As a student and member of the University community, you are here to get an education and are, therefore, expected to demonstrate integrity in your academic endeavors. You are evaluated on your own merits. Cheating, plagiarism, collaborative work, multiple submissions without the permission of the professor, or other kinds of academic dishonesty are considered unacceptable behavior and will result in formal disciplinary proceedings usually resulting in failing the course, suspension, or dismissal. See the [Dean of Students website](#) for more information.

### *Calculator Policy*

You are welcome to use calculators or [Wolfram Alpha](#) (a free online calculator) on homework, group quizzes, and challenge problems. However, no calculators will be allowed on any of the exams (or individual quizzes) in this course. You are expected to be able to perform basic arithmetic operations with fractions and decimals by hand, and know common values of trigonometric and log functions.

### *Office Hour Policy*

Office hours will be held in person and occasionally virtually. You are strongly encouraged to come to office hours, both with me and your TA. You might find the course content office hours most helpful if you have specific questions prepared, but I also welcome you to come and listen to your peers' questions.

### *Contact / Email policy*

If you have a course-related question, you are strongly encouraged to post in the course [Canvas](#) or [Campuswire \(Code: 0294\)](#) before emailing me. Others might be able to answer your question, and others might find the answer to your question helpful as well.

Otherwise, the best way to contact me is via email ([richardwong@math.ucla.edu](mailto:richardwong@math.ucla.edu)). To ensure that I see your email, the subject line should include the phrase "**Math 32A**". To ensure I know who you are, the message or signature should include **your name** and **UCLA University ID**.

I will do my best to respond to your email in a timely manner (typically within a few hours). However, if you send an email during the evening or the weekend, do not expect to hear a response until the next weekday morning.

## **Resources**

### *Services for Students with Disabilities*

I am committed to creating an accessible and inclusive learning environment. Please let me know if you experience any barriers to learning so that I can work with you to ensure you have equal opportunity to participate fully in this course.

If you are already registered with the Center for Accessible Education (CAE), please request your Letter of Accommodation in the Student Portal. If you are seeking registration with the CAE, please submit your request for accommodations via the CAE website. Students with disabilities requiring academic accommodations should submit their request for accommodations as soon as possible, as it may take up to two weeks to review the request. For more information,

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please visit the [CAE website](#), visit the CAE at Murphy Hall A255, or contact them by phone at (310) 825-1501.

### *Further Resources*

- UCLA has a multitude of groups, resources, and services available to support your academic success, your social belonging, your physical and mental health, and your overall well-being. You can explore [those resources here](#).
- UCLA provides resources if you are feeling overwhelmed and need personal and/or academic assistance. You can find a [list of resources organized by need here](#).
- If you are experiencing a financial crisis that impacts your academic success at UCLA, the Economic Crisis Response Team (ECRT) may be a helpful resource. ECRT aims to efficiently, compassionately and discreetly offers a seamless and individualized response to UCLA students in extraordinary financial crisis. You may submit a self-assessment form by visiting [this link](#). The self-assessment form will allow the team to assess options and provide resources best suited to address your needs.

### *Title IX*

Please note that Title IX prohibits gender discrimination, including sexual harassment, domestic and dating violence, sexual assault, and stalking. If you have experienced sexual harassment or sexual violence, you can receive confidential support and advocacy at the [CARE Advocacy Office for Sexual and Gender-Based Violence](#), 205 Covell Commons, Los Angeles, CA, 90095; [care@careprogram.ucla.edu](mailto:care@careprogram.ucla.edu); (310) 206-2465.

[Counseling and Psychological Services \(CAPS\)](#) provides confidential counseling to all students and can be reached 24/7 at (310) 825-0768.

I am required under the UC Policy on Sexual Violence and Sexual Harassment to inform the Title IX Coordinator should I become aware that you or any other student has experienced sexual violence or sexual harassment. You can also report sexual violence or sexual harassment directly to the University's Title IX Coordinator, 2255 Murphy Hall, [titleix@equity.ucla.edu](mailto:titleix@equity.ucla.edu), (310) 206-3417. Reports to law enforcement can be made to UCPD at (310) 825-1491.