Math 1 Fall 2024 Syllabus

1   Course Description

This course is an introduction to the fundamental ideas of single variable calculus for students who have not taken calculus before. Students who have seen some calculus, but not enough to place out of Math 3, should take Math 3. Math 1 first reviews relevant techniques from algebra and pre-calculus, such as the manipulation and analysis of functions, including polynomial, trigonometric, logarithmic, and exponential functions. The course then covers limits, continuity, rates of change and derivatives, differentiation rules, and applications. Finally, time permitting, students will be introduced to Riemann sums and the concept of the definite integral. Students wishing to continue their study of calculus after Math 1 should take Math 3.

2   Lectures

Section 2 (Castellano)	Section 3 (Schmidt)
(10) MWF 10:10am - 11:15am, Kemeny 004	(11) MWF 11:30am - 12:35pm, Kemeny 004
(10X) Th 12:15pm - 1:05pm	(11X) Tu 12:15pm - 1:05pm
Section 4 (Dougherty-Bliss)	Section 5 (Rattray)
(12) MWF 12:50pm - 1:55pm, Kemeny 004	(2) MWF 2:10pm - 3:15pm, Kemeny 004
(12X) Tu 1:20pm - 2:10pm	(2X) Th 1:20pm - 2:10pm

3   Instructors

Beth Anne Castellano (she/her/hers)	James A. Schmidt (he/him/his)
Elizabeth.A.Castellano.GR@dartmouth.edu	James.A.Schmidt.GR@dartmouth.edu
Robert Dougherty-Bliss	Jessica Rattray (she/her/hers)
Robert.W.Dougherty-Bliss@dartmouth.edu	Jessica.Rattray.GR@dartmouth.edu

4   Office Hours

Castellano	Kemeny 213	Schmidt	Kemeny 243
	MW 1:30 - 3pm, Th 9:30 - 10:30am		TBA
	(or by appointment)		(or by appointment)
Dougherty-Bliss	Kemeny 212	Rattray	Kemeny 239
	TBA		MW 10:00am - 12:00pm
	(or by appointment)		(or by appointment)

5   Tutorials

Tutorials are drop-in hours available for you to get help on homework, ask questions about course material, and review for quizzes. You are also encouraged to use these as a space to collaborate and study with classmates. These are run by our Graduate TA, Alejandro Galvan Perez-Ilarbe, every Monday, Tuesday, and Thursday from 7-9pm in Kemeny 004.

6   Textbook

Calculus Volume 1 by OpenStax (ISBN: 978-1-947172-13-5). This textbook is available for free online at `https://openstax.org/details/books/calculus-volume-1`.

It is optional but recommended to read the corresponding sections in the textbook before each class (and expected if you miss class).

7   Grading

Your course grade will be based upon the following components:

- Attendance & Engagement: 10%

- Weekly Homework: 40%

- Quizzes: $3 \times 10\%$ (There will be 4 quizzes total, and your lowest quiz grade will be dropped.)

- Final Quiz: 20%

8   Attendance & Engagement

Your attendance and engagement grade is fulfilled by attending class in person and completing the daily problem/question assigned by your instructor, the exact format of which will vary by section.

If you need to miss class, please let your instructor know in advance. Absences for reasons such as sickness, family emergencies, athletic events, co-extracurricular activities, etc. will generally be excused, but this is up to the discretion of your instructor. (For the health and safety of our class community, please do not attend class when you are sick, nor when you have been instructed by Student Health Services to stay home.)

When you are in class, it is expected that you do not using your phone or laptop for any purposes other than note-taking, and that you contribute to any groupwork or classwork activities.

9 Homework

Homework sets will be posted on the Canvas page for the course: `https://canvas.dartmouth.edu/courses/67769` (See also the Canvas "Getting Started Guide": `https://services.dartmouth.edu/TDClient/1806/Portal/KB/ArticleDet?ID=113282`). Homework sets will be submitted via Gradescope at `https://www.gradescope.com/courses/852621`. (For help getting started with Gradescope, see `https://www.gradescope.com/get_started`.)

There will no doubt be technical difficulties associated with homework submissions. Please leave ample time for submissions and contact your instructor with any concerns.

There are two parts to each HW set: (1) the initial submission and (2) the reflection. Each week, **the initial submission will be due on Friday by 11:59pm,** solutions will be posted to Canvas by Saturday at noon, and **your reflection will be due on Monday by 11:59pm.** As solutions will be released very quickly after your initial submission is due, **no late homework will be accepted.**

Initial Submission: Your initial submission is worth 60% of your score on each homework assignment. Half of this (30% of your score) will automatically be rewarded if you attempt each problem in a good faith effort, showing all of your work and explaining your reasoning. The remaining 30% will be awarded based on the correctness of your solutions.

Reflection: Your reflection is worth 40% of your score on each homework assignment. The reflection requires you to do both of the following: (a) correct your work (based on the posted solutions) and (b) reflect on why what you did to solve the homework problems was right or wrong, what misconceptions (if any) you addressed, and what you learned from reflecting on your solutions and comparing them with the posted solutions. Part (b) will also ask you to reflect on your progress in the course that week. Parts (a) and (b) will each be worth 20% of your score. When your solution to a problem is correct, for part (a) you should simply indicate that it is correct, but for part (b), you should reflect on whether your approach differs from the posted solution.

The goal of these homework sets is to provide you with an opportunity for targeted practice of problems above and beyond the practice problems from each chapter, and to encourage metacognition by providing you with an opportunity to analyze and learn from your own work.

10 Quizzes

Quizzes will be given during the X-hour in weeks 3, 5, 7, and 9. If you have an unavoidable conflict with one of these dates, please let your instructor know as soon as possible. (Please make sure not to schedule anything during your X-hour during **any** week of the term. Other X-hours may need to be used to make up missed lectures.)

Each quiz will test you on roughly all of the material we have covered since the previous quiz, up to and including the material covered on the Wednesday the week prior to the quiz. The exact topics covered on each quiz will be announced in advance.

11   The Honor Principle

Academic integrity is at the core of our mission as mathematicians and educators, and we take it very seriously. We also believe in working and learning together.

Dartmouth's Academic Honor Principle applies to all courses, including this one. If you are not familiar with the policy, you should review it here: `https://policies.dartmouth.edu/policy/academic-honor-policy-undergraduate-students-arts-and-sciences`. Violations of the Academic Honor Principle will be referred to the Committee on Standards.

Homework: On homework, you are encouraged to work with your classmates. If you are part of a group of students that produces a solution to a problem, you cannot simply copy that group answer. You must write up the the solution individually and explain your steps in your own words. **You must list the names of everyone you worked with at the top of each homework submission** (this does not include your instructor or TAs).
You are allowed to use our textbook and notes from class, and you are allowed to use other online reference and educational sources such as Wikipedia to reinforce your learning of the concepts covered in class, but you are not allowed to specifically look up solutions to homework problems as a means to avoid thinking about the problem yourself. You are also not allowed to ask for the solution by posting a particular problem on any online Q & A site or help forum.

Quizzes: On quizzes, you may not give or receive help from anyone. Quizzes in this course are closed book, and no notes, calculators or other electronic devices are permitted.

Generative AI: The use of any generative AI (such as ChatGPT) to solve any homework or quiz problems is strictly prohibited and will be considered a violation of the honor principle. As with all other online sources, you are not allowed to look up solutions to the homework problems as a means to avoid thinking about the problem yourself. The use of AI for studying is allowed, for example, to understand concepts and definitions, but consultation with the textbook and other internet sources **first** is encouraged, as generative AI is known to give wrong answers when it comes to mathematics. You are welcome to have a conversation with your instructors during office hours about the use of generative AI in mathematics and our reasoning for prohibiting its use to solve problems.

12   Accommodations

Students requesting disability-related accommodations and services for this course are required to register with Student Accessibility Services (SAS)(get started at `https://students.dartmouth.edu/student-accessibility/students/where-start`) and request that an accommodation email be sent to their instructor in advance of the need for an accommodation. Then, students should schedule a follow-up meeting with their instructor to determine relevant details such as what role SAS or its Testing Center may play in accommodation implementation. This process works best for everyone when completed as early in the quarter as possible. If students have questions about whether they are eligible for accommodations or have concerns about the implementation of their

accommodations, they should contact the SAS office (student.accessibility.services@dartmouth.edu, 603-646-9900). All inquiries and discussions will remain confidential.

13 Special Considerations

The academic environment at Dartmouth is challenging, our terms are intensive, and classes are not the only demanding part of your life. There are a number of resources available to you on campus to support your wellness, including your undergraduate dean (`http://www.dartmouth.edu/~upperde/`), Counseling and Human Development (`http://www.dartmouth.edu/~chd/`), and the Student Wellness Center (`http://www.dartmouth.edu/~healthed/`).

Some students may wish to take part in religious observances that occur during this academic term. If you have a religious observance that conflicts with your participation in the course, please meet with your instructor before the end of the second week of the term to discuss appropriate accommodations.

14 Title IX

At Dartmouth, we value integrity, responsibility, and respect for the rights and interests of others, all central to our Principles of Community. We are dedicated to establishing and maintaining a safe and inclusive campus where all have equal access to the educational and employment opportunities Dartmouth offers. We strive to promote an environment of sexual respect, safety, and well-being. In its policies and standards, Dartmouth demonstrates unequivocally that sexual assault, gender-based harassment, domestic violence, dating violence, and stalking are not tolerated in our community.

The Sexual Respect Website (`https://sexual-respect.dartmouth.edu`) at Dartmouth provides a wealth of information on your rights with regard to sexual respect and resources that are available to all in our community. Please note that, as a faculty member, I am obligated to share disclosures regarding conduct under Title IX with Dartmouth's Title IX Coordinator. Confidential resources are also available, and include licensed medical or counseling professionals (e.g., a licensed psychologist), staff members of organizations recognized as rape crisis centers under state law (such as WISE), and ordained clergy (see `https://dartgo.org/titleix_resources`). Should you have any questions, please feel free to contact Dartmouth's Title IX Coordinator. Their contact information can be found on the sexual respect website at: `https://sexual-respect.dartmouth.edu`.

15   Tentative Course Outline

The following is a tentative outline for the course, including quiz dates. It is subject to change, so please refer to the Canvas page for updated information.

Week	Lecture	Sections in Text	Brief Description
1	9/16	2.1	Syllabus overview; Preview of the big ideas of the course
	9/18	1.1	Functions, graphs, domain and range
	9/20	1.1, 1.2	Operations on functions; Linear and absolute value functions
2	9/23	1.2	Classes of functions
	9/25	1.1, 1.2	Transformations of functions; Even and odd functions
	9/27	1.3	Trigonometric functions
3	9/30	1.4	Inverse functions
	10/1		**Quiz 1 in X-hour (Sections 3,4)**
	10/2	1.5	Exponential and logarithmic functions
	10/3		**Quiz 1 in X-hour (Sections 2,5)**
	10/4		Mathematical models; Review of all functions covered
4	10/7	2.2	Limit of a function
	10/9	2.3	Limit laws
	10/11	2.3	Additional limit evaluation techniques; Squeeze Theorem
5	10/14	2.2, 2.3	More limit practice
	10/15		**Quiz 2 in X-hour (Sections 3,4)**
	10/16	2.4	Continuity at a point; Types of discontinuities
	10/17		**Quiz 2 in X-hour (Sections 2,5)**
	10/18	2.4	Continuity on an interval; Intermediate Value Theorem
6	10/21	3.1	Defining the derivative
	10/23	3.1	Finding velocities and rates of change (applications and practice)
	10/25	3.2	The derivative as a function; Graphing derivatives
7	10/28	3.2	Continuity and differentiability; Higher order derivatives
	10/29		**Quiz 3 in X-hour (Sections 3,4)**
	10/30	3.3	Basic rules for derivatives
	10/31		**Quiz 3 in X-hour (Sections 2,5)**
	11/1	3.3, 3.5	Product and quotient rules; Derivatives of trig functions
8	11/4	3.6	The chain rule; Differentiation practice
	11/6	4.2	Application: linear approximations
	11/8	4.3	Application: maxima and minima
9	11/11	5.1	Approximating area under a curve; Summation notation
	11/12		**Quiz 4 in X-hour (Sections 3,4)**
	11/13	5.2	Definition of the definite integral; Calculating with geometric formulas
	11/14		**Quiz 4 in X-hour (Sections 2,5)**
	11/15	5.2	Applications: finding displacement given velocity, area of a circle
10	11/18		Final Quiz Review
	11/22		**Final Quiz** 3:00pm in Rockefeller Room 1