Syllabus - Math 1 Fall 2020

1 Course Description

This course is an introduction to 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 reviews relevant techniques from algebra and pre-calculus, covers the manipulation and analysis of functions, including polynomial, trigonometric, logarithmic, and exponential functions, an introduction to convergence and limits, continuity, rates of change and derivatives, differentiation rules, and applications to approximation. Students wishing to continue their study of calculus after Math 1 may take Math 3.

2 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`.

Calculus Volume 2 by OpenStax (ISBN: 978-1-947172-14-2). This textbook is available for free online at `https://openstax.org/details/books/calculus-volume-2`

3 Lectures

Section 1 (Xiao)	Section 2 (Wilson)
(C) MWF 10:20am - 11:25am	(D) MWF 11:45am - 12:50pm
(CX) Th 12:30pm - 1:20pm	(DX) Tu 12:30pm - 1:20pm
Section 3 (Haburcak)	**Section 4 (Molnar)**
(E) MWF 1:10pm - 2:15pm	(F) MWF 2:35pm - 3:40pm
(EX) Tu 1:40pm - 2:30pm	(FX) Th 1:40pm - 2:30pm

4 Instructors

Yao Xiao (she/her/hers)	Alex Wilson (he/him/his)
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Richard Haburcak (he/him/his)	Grant Molnar (he/him/his)
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5 Office Hours

Students from any section can attend any office hours.

Xiao	MWF 9:00 - 10:10am (or by appointment)	Wilson	TTh 9:00-10:10am F 4:00pm - 5:10pm (or by appointment)
Haburcak	M 2:30pm - 3:30pm T 3:30pm - 4:30pm Th 1:30pm - 3:00pm (or by appointment)	Molnar	TWTh 10:30-11:30am (or by appointment)

6 Format

We will have a mix of prerecorded lectures and synchronous problem sessions during class times. We have no plans to use X-hours for lectures. If for some reason that becomes necessary—perhaps because of technical difficulties with Zoom—we will clearly communicate that to you.

- 3 times per week prerecorded lectures (20-30 min) will be uploaded to Canvas according to the table below. Students are responsible for watching the video before the class meets for problem sessions.

Class day:	Monday	Wednesday	Friday
Video shared:	Friday 4pm	Monday 4pm	Wednesday 4pm

- Synchronous problem sessions during class time to go over material and examples, and answer questions. These will be recorded and posed on Canvas for students who could not attend.

- Lectures and Homework will be released at 4pm the day it should be released and is due at 4pm the day it is due.

7 Homework

Homework in this class will be online and will consist of the following. Calculators are allowed on all homework:

- (3 times/week) WebWork that is due before 4pm on the next class day. So after a Monday class, WebWork will be posted at 4pm and will be due before 4pm on the following Wednesday.
- (1 time/week) Written homework which you are encouraged to work on in your study groups. You must submit your own solutions. Opens at 4pm on Monday and due at 4pm on the following Monday.
- (3 times/week) Post on the message board on Canvas after each class.
  - One post responding to the prompt for credit. Additionally, you can respond to other student questions or previous responses. Students who post actively can earn up to 2% extra credit.

8 Exams

We will have 8 weekly written quizzes and 1 final exam. For technical concerns, see our Submission and Late Policy below.

Quizzes and exams will be on GradeScope. Students will download a PDF of the exam, and must submit their solutions within a set time of downloading the course materials. Quizzes will be opened on Wednesdays at 9am, and close on the next day (Thursday) at 7pm. Once you download the quiz, you will have 75 minutes to complete and upload your solutions. **We anticipate you spending 60 minutes or less on the quiz; the remaining 15 minutes are so that you will have time to upload your quiz.** If you have are unable to upload your quiz because you did not give yourself time to do so, we will not accept your quiz late.

Each quiz will cover material from the previous week; for example, a quiz administered on September 23 will cover material from September 14 to September 18. The final is comprehensive. Calculators are not permitted on any quiz or exam.

9 Grading

The course grade will be based upon scores on the homework, quizzes, participation on online forums, and the final exam as follows:

- Homework, graded for accuracy: 40% (20% for WebWork, 20% for written work)
- Quizzes: 30%
- Participation, graded for completion: 10% (Posting on the message board)
- Final: 20%

The lowest homework and lowest quiz grade will be dropped. This grading policy is subject to change, but grades will not decrease as a result of changes.

10 Submission and Late Policy

There will no doubt be technical issues. Please feel free to contact the instructors with any concerns.

- For assignments you upload:
  - Try to upload your file.
  - Clarity and neatness and vital workplace skills, so it is important that your problems are clearly delineated and we can recognize which work corresponds to which problem. The simplest way to ensure this is by doing your problems on separate pages and uploading them individually; however, an organized individual may be able to put all their work on a single sheet without creating ambiguity. **If we as instructors cannot find a problem because of the disorder of your submission, we may deduct 50% of the value of that problem.**
  - Associate each problem in the assignment to the page on which it occurs. If you do not associate a problem to the page it occurs on, we won't be able to grade it properly. **You automatically lose 25% of the value for any assignment where you fail to associate your pages to their respective problems.**

  - Check that your uploaded file opens correctly. If it doesn't open for you, it won't open when it is being graded!
  - If you are still having problems, send an email to your instructor before the assignment is due. Include the file you are trying to upload.
  - If there are outstanding circumstances, contact your instructor as soon as possible to find a way to resolve the issue.

- For each day an assignment is late, 25% will be deducted from the total grade. So an assignment that would have earned $\frac{18}{20}$ points will only earn $\frac{13.5}{20}$ if it is turned in one day late, and $\frac{9}{20}$ if it is turned in two days late.

11 Instructor Tech Issues Plan

In the event that technology does not cooperate with us during a live lecture or presentation:

- We'll try to fix the issue for about 10 minutes.
- If the issue is not resolved we'll end the presentation, then record the presentation and upload it by the end of the day.

12 Student Tech Issues

If you have difficulty accessing course materials, email your instructor as soon as possible. If you have problems using Zoom or connecting during class, try to reconnect. If nothing is working one day, try to fix it, and inform your instructor if the problem persists. This is why we are recording lectures and class periods.

13 Zoom Policy

We will be recording all synchronous components of the course and then posting them on Canvas.

- We ask students with webcams to turn them on if they are comfortable doing so. Seeing people in class will help build a sense of community and also let instructors see how students respond to material.
- We ask students to mute themselves when not speaking, but to feel free to interrupt the instructor with questions at any time either in chat or verbally.
- In all settings, lectures, tutorials, or office hours, practice respect and ask questions thoughtfully: everyone should be able to participate and be comfortable.

14 Consent to Record

- Consent to recording of course and group office hours
  - I affirm my understanding that this course and any associated group meetings involving students and the instructor, including but not limited to scheduled and ad hoc office hours and other consultations, may be recorded within any digital platform used to offer remote instruction for this course;
  - I further affirm that the instructor owns the copyright to their instructional materials, of which these recordings constitute a part, and distribution of any of these recordings in whole or in part without prior written consent of the instructor may be subject to discipline by Dartmouth up to and including expulsion;
  - I authorize Dartmouth and anyone acting on behalf of Dartmouth to record my participation and appearance in any medium, and to use my name, likeness, and voice in connection with such recording; and
  - I authorize Dartmouth and anyone acting on behalf of Dartmouth to use, reproduce, or distribute such recording without restrictions or limitation for any educational purpose deemed appropriate by Dartmouth and anyone acting on behalf of Dartmouth.
- Requirement of consent to one-on-one recordings

– By enrolling in this course, I hereby affirm that I will not under any circumstance make a recording in any medium of any one-on-one meeting with the instructor without obtaining the prior written consent of all those participating, and I understand that if I violate this prohibition, I will be subject to discipline by Dartmouth up to and including expulsion, as well as any other civil or criminal penalties under applicable law.

15 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.

Collaboration on homework is permitted and encouraged, but obviously it is a violation of the honor code for someone to provide the answers for you.

On written homework, you are encouraged to work together, and you may get help from others, but you must write up the answers yourself. If you are part of a group of students that produces an answer to a problem, you cannot then copy that group answer. You must write up the answer individually, in your own words.

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

16 Tutorials

The TA for this course is Matt Ellison. Tutorial assistance for this course and help with your homework will be available Tuesday, Thursday, and Sunday evenings 7-9pm online. Tutorial times are subject to change to allow more students to participate.

17 Special Considerations

Students with disabilities who may need disability-related academic adjustments and services for this course are encouraged to see their professor privately as early in the term as possible. Students requiring disability-related

academic adjustments and services must consult the Student Accessibility Services office (Carson Hall, Suite 125, 646-9900). Once SAS has authorized services, students must show the originally signed SAS Services and Consent Form and/or a letter on SAS letterhead to their professor. As a first step, if students have questions about whether they qualify to receive academic adjustments and services, they should contact the SAS office. All inquiries and discussions will remain confidential.

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.

18 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.

19 Tentative Course Outline

The following is a tentative outline for the course. This page will be updated irregularly. Please refer to the Canvas page for updated assignments, and recorded lectures for up to date material.

Lectures	**Sections in Text**	**Brief Description**	**Practice Problems**
9/14	1.1	Functions and Graphs	1.1: 1, 3, 7, 11, 13, 23, 25
9/16	1.1	Operations on Functions; Even and Odd Functions	1.1: 29, 33, 37, 39, 43
9/18	1.2	Library of Functions	1.2: 75, 81, 87, 89, 101
9/21	1.2, 2.1	Average Rate of Change; Constructing a Function Which Describes a Model	1.1: 55; 1.2: 67, 73, 103, 107
9/23	1.2	Transformations of Functions	1.2: 83, 89, 91, 93
9/25	1.3	Trigonometric Functions	1.3: 123, 125, 133, 155
9/28	1.4	Inverse Functions	1.4: 185, 187, 191, 199, 207
9/30	1.5	Exponential and Logarithmic Functions	1.5: 231, 235, 239, 249, 267, 285
10/2	Vol. 2, 5.1	Sequences	Vol. 2 5.1: 1, 3, 11
10/5	Vol. 2, 5.1	Limit of a Sequence	Vol. 2 5.1: 23, 25
10/7	Vol. 2, 5.1	Bounded and Convergent Sequences	Vol. 2 5.1: 33
10/9	2.3	Limit of a Function	2.2: 39, 43, 47, 61

Lectures	**Sections in Text**	**Brief Description**	**Practice Problems**
10/12	2.3	Limit Laws	2.3: 83, 87, 93, 107, 115
10/14	2.4	Continuity	2.4: 131, 133, 155
10/16	2.3, 2.4	Continuity; Intermediate Value Theorem; Squeeze Theorem	2.4: 161, 163, 167
10/19	3.1	Defining the Derivative	3.1: 1, 3, 11
10/21	3.2	The Derivative as a Function	3.1: 35, 47, 49; 3.2: 55, 59, 85
10/23		Limits, Continuity, and Differentiability	3.2: 75, 79, 87
10/26	3.3	Basic Rules for Derivatives	3.3: 107, 109, 111
10/28	3.3	Product and Quotient Rules	3.3: 111, 113, 123, 127
10/30	3.5	Derivatives of Trig Functions	3.5: 175, 179, 181
11/2	3.6	The Chain Rule	3.6: 215, 221, 223, 229, 235
11/4	3.8	Implicit Differentiation	3.8: 301, 307, 319, 329
11/6	3.9	Derivatives of Log Functions	3.9: 331, 333, 335, 343
11/9	3.7	Derivatives of Inverse Functions	3.7: 265, 269, 289
11/11	4.3	Maxima and Minima	4.3: 90, 96, 108, 130
11/13	4.8	L'Hôspital's Rule	3.8: 356, 362, 372, 388

Lectures	Sections in Text	Brief Description	Practice Problems
11/16	Everything	Review for Final Exam	
11/30-12/4		Final Exam	