Math 220: Mathematical Reasoning and Proof

Fall 2023

Instructor:	David Zureick-Brown ("DZB")	**Office:**	502 Seeley Mudd
Email:	dzureickbrown@amherst.edu	**Office hours:**	Mondays 3-4 (in person)
Time:	MWF 1:00 – 1:50		Thursdays 2:30-3:30 (via zoom)
Place:	204 Seeley Mudd		Thursdays 3:30-5:30 (in person)

Textbook: "How to Prove It: A Structured Approach," 3rd Edition by Daniel J. Velleman

Course website: https://dmzb.github.io/teaching/2023Fall220/

Zoom link: https://emory.zoom.us/j/97540680666

Math Fellows:	Gillian Campbell	gcampbell24@amherst.edu	Mon	7-7:30	Thu	6-7:30
			SM	204	SM	006
	Nathaniel Thomas	nthomas25@amherst.edu	Sun	7:30-9	Thu	7:30-9
			SM	204	SM	006
Q Center:	Allison Tanguay	atanguay@amherst.edu	Tue	1-4	Wed	9-11 (Zoom)
		Seeley Mudd 208	Thu	1-4	Fri	12-2

Q Center Zoom link:

https://amherstcollege.zoom.us/j/94446399260?pwd=U2FoM1NscWlUM0h5UkROM0tidUVKZz09

Tanguay appointment link: https://calendly.com/atanguay-qcenter

QCenter website: https://www.amherst.edu/academiclife/support/moss_quantitative_center

Prerequisites: Instructor permission.

Learning objectives: we will cover the following topics.

- Logic – statements, negation, converse, contrapositive, quantifiers.
- Mathematical prose and rigor – how to write mathematics correctly and in complete sentences.
- Techniques of proof – "direct" proofs, proof by contradiction, induction, proof by "cases".
- Sets, relations, functions – the building blocks of mathematics.
- Some additional topics (e.g., cardinality, different sizes of infinity).

Homework is **due Fridays at 12:55pm**, via Gradescope. The assignment should be submitted as a single file. Please be kind to our dear graders and take care to make the assignment legible. See the document here

https://dmzb.github.io/teaching/2023Fall220/assignments-math-220.pdf

for a list of all assigned work and a weekly breakdown of the course content.

Grading: Your grade will consist of the following. Your lowest weekly assignment will be dropped.

Weekly Homework Assignments	40%
2 midterms and a comprehensive final exam	60% =
Best exam	30%+
Second best exam	20%+
Third best exam	10%+

Grade scale: A lower bound on your final grade is given by the following table.

A = 93-100	B+ = 87-90	C+ = 77-80	D+ = 67-70	F = 0-63
A- = 90-93	B = 83-87	C = 73-77	D = 63-67	
	B- = 80-83	C- = 70-73		

Typical rubric: Proofs will typically be graded on the following rubric (out of 10 points).

10	Flawless
9	Basically correct, but not literally 100% correct
7	Mostly correct, but with at least one error
5	Numerous errors
2	Proof contains a fundamental misunderstanding
0	No part of the proof was correct

Assignment and exam dates:

Weekly Assignments	Generally due Fridays at 12:55pm via Gradescope.
Midterm 1	Friday, October 13
Midterm 2	Friday, November 17
Final Exam	Monday, December 18, 2-5pm in the usual room (SMUD 204)
	in the usual room (SMUD 204)

Exam problems will be extremely similar to the (easier and medium difficulty) homework problems.

If you have any conflict with these test dates, PLEASE let me know at least two weeks in advance.

Getting help

Office Hours: Please stop by to see me (in Seeley Mudd 502) during my scheduled office hours; you can stop by unannounced during these times! If you have scheduling conflicts with my office hours then you are also welcome to make appointments to see me (outside of my regularly scheduled office hours) at a time which is mutually convenient. To schedule an appointment simply send me an email! (In which case, please include your availability in your message.)

Math Fellows: Visit our TAs' office hours, too (see above).

The QCenter: Allison Tanguay of the the Moss Quantitative Center offers Math 220 help, including both appointments and unscheduled drop-ins.

Tutoring: If you need regular one-on-one help from a tutor, we can (probably) help to set that up. To do so, please send me an email.

Rewrites will be allowed (and encouraged) on weekly graded assignments; and students can recover up to half of the missed points. Rewrites are to be submitted through Gradescope. You may rewrite a problem multiple times, and you may resubmit a rewrite as late as you like (including right before the final exam).

When you submit a rewrite, please make it clear which problems you are rewriting.

Late submissions. Any assignment submitted after the due date will be treated as a "rewrite" (you can receive up to half credit for the assignment).

Honor Code: Remember that copying another student's work is a violation of the Honor Code and will be treated as such. Please review Amherst College's Honor Code, available here.

You are free to consult any sources (animate or inanimate) while doing your homework; working in groups is encouraged! On the other hand, you are expected to make an honest attempt to do every problem on your own before consulting other sources. Learning and retaining knowledge is a back and forth process of trying problems on your own and asking for help or for a small hint.

Plagiarism: a good rule of thumb to avoid plagiarism is the following – when doing the final write up of a problem, do not have any textbooks, web pages, or classmate's write up open in front of you. If you get stuck when writing up an assignment, go back and look again; just make sure that you organize the mathematics in your head before writing a proof rather than copying a solution from some source. **This is a generous homework policy. Please do not abuse it.**

Calculators, notes, and textbooks are not allowed during exams. If you must leave class during an exam for **any reason**, please leave all of your belongings (**including your ~~handheld supercomputer~~ phone!**).

Inclusivity: I put great value in welcoming each and every student into the classroom, regardless of their sex, race, nationality, gender identity, socioeconomic status, ability (intellectual or physical), religious beliefs, or sexual orientation. Each student brings with them to the classroom a unique set of experiences and I expect everyone to contribute to providing an inclusive environment. If, at any time, you experience a situation within this course that you feel challenges your sense of inclusion or accurate assessment of achievement, then please notify me as soon as possible.

Accessibility and accomodations. Amherst College complies with the regulations of the Americans with Disabilities Act of 1990 and offers accommodations to students with disabilities. Please do not hesitate to ask for accommodations or to contact me about accommodations. (Please also do so as soon as possible.) For more information, please go here.

Attendance policy. Attendance is always optional (except for exams). If you are sick, I would prefer that you stay home from class and get notes from a classmate.