Brown University
Department of Mathematics

Math 1530, Section S01
Summer Term 2021

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Office Hours Location:	Zoom
Office Hours:	TBD
Lecture Room & Time:	Zoom MWF 10:00am-10:50am
Course Canvas Page:	`https://canvas.brown.edu/courses/1085210`

What to expect in Math 1530

Course Description & Prerequisites

If you are interested in learning about rigorous mathematics, then this is a course for you. Math 1530 is a proof-based introduction to the principles and concepts of modern abstract algebra. What does it really mean to add or multiply two numbers? What are numbers anyway? Can we meaningfully add or multiply other objects that aren't numbers? These are just some of the questions that you will ultimately be equipped to explore on your own after having taken Math 1530. Along the way, you will develop your proof-writing skills while learning about the main characters of algebra: groups, rings, and fields, as well some fundamental results about them.

The official prerequisite for this course is one of Math 0520 or Math 0540. Previous proof-writing experience will help you in this course, but we will take some time throughout the discussion to discuss proof-writing and you will, of course, get plenty of time to practice throughout the course!

Course Goals & Expectations

At the end of Math 1530, you will be able to:

- identify and describe algebraic structures such as groups, rings, and fields;
- write your own proofs and incorporate constructive feedback to improve your arguments;

- recover the proofs of key results in algebra;
- proceed with confidence into a variety of other proof-based mathematics courses.

In addition to these specific goals, I hope you will leave Math 1530 with an understanding and appreciation of pure mathematics as a whole which, in my opinion, is the science of abstract thought. After taking this course, you will have a much better sense of what mathematicians do and whether or not you would like to pursue more mathematics.

What should you expect in the classroom?
We meet as a class on Mondays, Wednesdays, and Fridays in Zoom-Space 10:00am-10:50am. During these meetings, you can expect a *semi-flipped* lecture format. Rather than lecture about new content everyday, the lectures will serve primarily as opportunities to expand on assigned reading, explore new examples, and provide space for solving new problems. Of course, there will be standard lectures interspersed throughout. You should be prepared to complete all readings and participate in assigned discussions prior to attending the lecture. These lectures will all be recorded and uploaded to Canvas shortly after each lecture.

What should you expect outside the classroom?
Proof-based mathematics is a very different style than you may be used to from previous calculation-heavy calculus courses, depending on your background. For this reason, Math 1530 will require a lot of time outside of the classroom to support its learning goals. Roughly speaking, I am expecting students to spend approximately 10 hours per week *outside of the lecture* on activities related to Math 1530 including:

- weekly problem sets;
- weekly reflections;
- reading assignments;
- review of content.

Please note that 10 hours a week is a rough estimate and the actual time will vary from student to student.

In addition to time expectations, I would also like to comment on *emotional expectations*. Developing your proof-writing skills will take time and practice and, unlike a standard calculus course, is very much non-algorithmic—you will rarely be given a well-defined sequence of steps to solve a problem or write a proof. As such, you will no doubt find yourself frustrated and discouraged at certain points in the course, as we work to push you outside your comfort zone. This is *normal* and very much *part of the learning process*. If you find yourself frustrated, you are not alone and you should feel welcome to talk it out during office hours with me, with your TA, or with your fellow students. When and if the frustration of solving a problem lifts, be sure to celebrate your achievement. Most importantly, be kind to your fellow classmates and encourage each other to persevere—this is not a competition.

Inclusive Learning Statement:
The mathematical community is historically not a welcoming one. Even today, the community does not reflect the diversity of people, identities, and ideas that make up our society as a whole. It is important to me to work towards creating a more representative community; this work begins (but doesn't end) in my classrooms. I strive to create and maintain an open and inclusive classroom in which you feel safe to share your thoughts, ideas, and experiences, and I welcome you to share your suggestions for how I can better accomplish this.

I am committed to continuing my own education about creating more inclusive and equitable classrooms, and I will continue to advocate for the broadening of participation in mathematics as a member of the Math Department's Diversity and Inclusion Committee.

Resources

Canvas:
Canvas will be the main way that we communicate outside of the classroom and office hours. I will post lecture notes, assignments, and other material on Canvas. Please note that it is your responsibility to consult Canvas for the most recent course information and announcements.

Textbook:
The required textbook for this course is *An Integrated Introduction to Abstract Algebra* by Joseph H. Silverman. This textbook will be made available for free as a .pdf on Canvas and is a working draft that Prof. Silverman has allowed us to use for this course. You are permitted to use and download the book for your personal use, but please do not post any portion of the book on the web! Assignments and readings will be assigned directly out of the textbook.

Office Hours:
Office hours are blocks of time that I have specifically set aside for us get to know each other, and reinforce your learning. Perhaps you want to come by and solidify some concepts one-on-one; maybe you want some advice on how to best study and/or complete your homework; or, maybe you have questions outside of the scope of the course. Whatever your reasons are, know that office hours are *your time* and I'd very much like to see you there.

Undergraduate TA:
Alexey Izmailov will be your UTA for the semester. Like me, he's enthusiastic about making sure you feel supported throughout your first semester of Algebra. Alexey and I will be reaching out early in the term to schedule his office hours, and he will be helping me provide feedback to you throughout the semester.

Accessibility and Accommodation:
I strive to create a learning experience that is as accessible, welcoming, and inclusive as

possible for our diverse community of learners. If you anticipate that you may encounter issues related to the format, materials, or requirements of the course, please meet with me to explore our options. I am happy to consider creative solutions as long as they do not compromise the objective of the assessment or learning activity.

Students with disabilities may also wish to work with Student Accessibility Services (SAS) to discuss a range of options to remove barriers in this course, including official accommodations; they may be contacted via email—SAS@brown.edu—or phone—401-863-9588. If you have already been approved for accommodations through the SAS, please meet with me so we can develop an implementation plan together.

Campus Resources:
Brown University have many resources to support the diversity of learners in this class.

- Students Support Services Deans can be a helpful resource to discuss personal, family or health-related concerns, as well as a potential academic and personal plan. They are available for same-day consult and/or scheduled appointment.
- A list of other campus resources can be found here.

Assessment

This course uses a form of Standards-Based-Grading to assign you a final letter grade. The main purpose of this system is to make the way grades are assigned, as well as my high standards for you, transparent. Before describing how the final letter grade is computed, let me describe the different kinds of activities that you will be assessed on.

Problem Sets & Capstone Problem Sets:
You will spend most of your time in Math 1530 working on problems in eight (8) **Problem Sets** and three (3) **Capstone Problem Sets**. The purpose of the problem sets is to sharpen your problem solving skills and develop your proof-writing abilities. Your grader will be giving you feedback on the structure of your arguments, in addition to assessing its general correctness.

Problems in your Problem Sets and Capstone Problem Sets are graded in the same manner. Each problem will be given a grade of E(xcellent), M(eets expectation), R(evisions needed), or N(ot assessible), following the guidelines in Figure 1 below. A more detailed content-specific rubric will be given in Canvas prior to the submission of your first assignment. When you receive your Problem Sets/Capstones back, you will have an opportunity to resubmit one (1) problem the following week that given a score of (R); if the resubmission warrants a grade of E or M, the R will be replaced from the gradebook.

Each Problem Set has five (5) problems for a total of forty (40) problems throughout the semester with eight (8) revision opportunities. Each Capstone Set has six (6) problems for

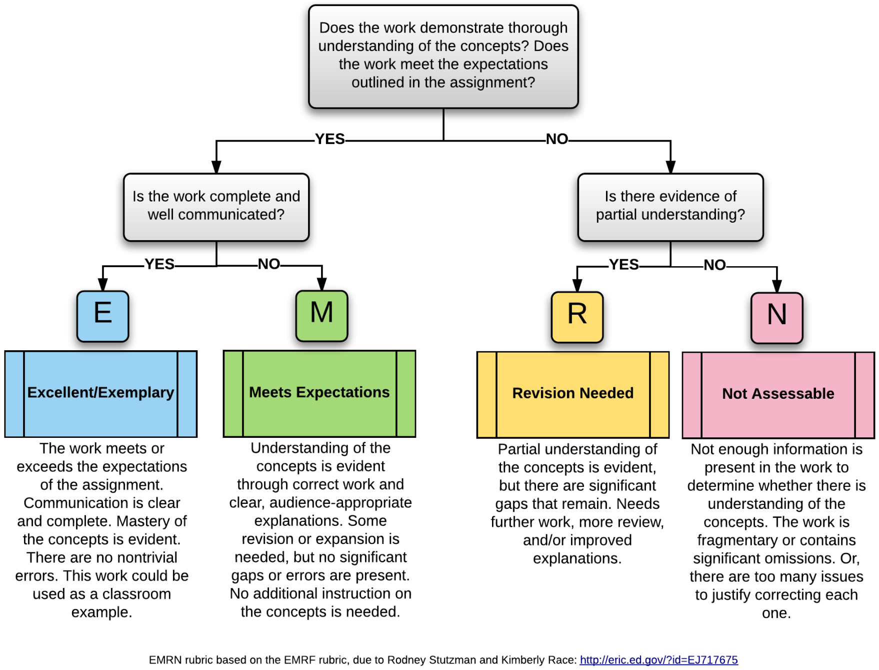

Figure 1: Grading scheme for Problem Sets

a total of eighteen (18) problems. The final Capstone Set will not have an opportunity for revisions, so there only two (2) opportunities for Capstone revisions.

Your final grade in Math 1530 will take into consideration the number of problems you solve that Meet or Exceed expectations, as detailed in the table below. Assignment due-dates and instructions for their submission are found on the Canvas page for Math 1530.

The main differences between the Problem Sets and Capstone sets are the collaboration policies and the person who is giving you feedback. For the student problem sets, you should feel welcome to collaborate with your peers, but keep in mind that I expect you to turn in work that represents your own thoughts, ideas, and understanding. For example, it is generally best practice for you to talk verbally about the problems, or work together at a blackboard, but then for all students working in a group to write up their solutions independently. In contrast, I expect you to complete the Capstone Problem Sets entirely on your own, without any aid that is external to the course—more details will be given later. Lastly, while your UTA will be giving you feedback on Problem Sets, I will be giving you feedback personally on your Capstone work.

Reflections:
Each week, you will be expected to upload a short, written reflection about your experiences in Math 1530. These reflections are an opportunity for you to think critically about which aspects of the course are going well for you, and which areas require some additional attention. The prompts for these reflections may vary from week-to-work and precise information

about each one will be made available on Canvas. Reflections are graded on completion, with precise guidelines for what counts as a complete submission being posted on Canvas.

Readings:
Throughout the term, you will be assigned reading assignments out of the textbook using *hypothesis*, an app that is integrated into Canvas that allows you to annotate the reading and have a discussion in a small group. Reading assignments are grading on completion, with precise guidelines for what counts as a complete submission being posted on Canvas.

Course Grade Breakdown:
Your course grade is determined by how many activities you complete that Meet or Exceed expectations. In order to achieve a particular letter grade, you must meet or exceed the number of to-standard tasks in the corresponding column.

	Grade			
Course Component	A	B	C	NC
Problem Sets Problems (40 Total)	≥ 36	$32 - 35$	$28 - 31$	< 28
Capstone Problems (18 Total)	≥ 15	$12 - 14$	$8 - 11$	< 8
Reading Assignments (10 Total)	≥ 9	8	7	< 7
Reflections (10 Total)	≥ 9	8	7	< 7

I have high standards and I believe you are capable of meeting them. The standards in this course will not be raised at any point—if you meet the criteria in this syllabus, you will get the corresponding letter grade. Depending on a variety of factors, it may be necessary to adjust these thresholds; if such a a decision is made in the middle of the term, it will be communicated with you appropriately.

Late Policies:

1. Late assignments will not be accepted; please ensure your work is uploaded to gradescope before the deadline and submitted to the correct assignment.
2. Requests for extensions on assignments will be considered if accompanied by a written memo from a Dean or from Health Services.

STUDENT EXPECTATIONS

Academic Integrity:
Brown University is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. In particular, please read the following excerpt from the Academic Code:

> A student's name on any exercise (e.g., a theme, report, notebook, performance, computer program, course paper, quiz, or examination) is regarded as assurance that the exercise is the result of the student's own thoughts and study, stated in his or her own words, and produced without assistance, except as quotation marks, references, and footnotes acknowledge the use of printed sources or other outside help.

All forms of dishonesty are unacceptable at the University. Cheating, plagiarism and misrepresentation of facts are serious offenses. Anyone who engages in these practices will receive at minimum a grade of zero for the exam or paper in question and no opportunity will be given to replace the grade or redistribute the weights.

Collaboration on Assignments:
Collaboration on written assignments is encouraged, but it is important that each student writes up their own solutions independently. Every term there are several students who receive academic penalties for copying assignments. Here are some tips to avoid copying on assignments:

1. Do not write down something that you cannot explain to your TA or instructor.
2. When you are helping other students, avoid showing them your work directly. Instead, explain your solution verbally. Students whose work is copied also receive academic sanctions.
3. If you find yourself reading another student's solution, do not write anything down. Once you understand how to solve the problem, remove the other person's work from your sight and then write up the solution to the question yourself. Looking back and forth between someone else's paper and your own paper is almost certainly copying and will result in academic sanctions for both you and your fellow student.
4. If the instructor or TA writes down part of a solution in order to help explain it to you or the class, you cannot copy it and hand it in for credit; treat it the same way you would treat another student's work with respect to copying, that is, remove the explanation from your sight and then write up the solution yourself.

5. There is often more than one way to solve a problem. Choose the method that makes the most sense to you rather than the method that other students happen to use. If none of the ideas in your solution are your own, there is a good chance it will be flagged as copying.