Math 401 Spring 2026

General information

- Office hours: Monday and Thursday, 2:45pm–4pm, Physics 274E, or by appointment
- My email: danielle.wang@duke.edu
- Required textbook: *Algebra* (2nd Edition) by Michael Artin
- Lectures: Monday and Wednesday, 11:45am–1pm, Gross Hall 304B
- Website: https://danielleywang.github.io/math401-sp26

Exams

Exams will make up 85% of your grade in the class. There will be **two in-class midterms**, worth 25% each, and a **final exam**, worth 35%. The dates for the midterm exams and the final are below.

- Exam 1: Mon Feb 9
- Exam 2: Mon Mar 30
- Final Exam: Fri May 1

Note: the in-class midterms will be held at the same time and location as the regular lectures. The final exam is scheduled for May 1, 2pm–5pm in the usual classroom. The date for the final is decided by Duke and cannot be changed.

Homework

Homework will make up the remaining 15% of your grade in the class.

Problem sets will (tentatively) be due on **Fridays** at 11:30pm and are to be submitted on Gradescope. They will be posted on the course website. The first pset is due on January 16, 2026.

Solutions to homework and exam problems should be logically complete and clearly written in order to receive credit. When appropriate, complete sentences should be used to develop arguments.

Bonus problems

Some problem sets will contain bonus problem(s). These will **not** be graded as part of the homework, and you don't need to submit them. However, at least one problem on each exam is guaranteed to be similar to a bonus problem, so studying the bonus problems and their solutions is strongly recommended.

Collaboration and outside resource policy

Collaboration with classmates on problem sets is allowed, but your solutions must be written by yourself.

At the top of your submission for each problem set, please write "**sources consulted:**" and list all sources other than the textbook and lectures notes which you consulted while doing the problem set. (Write "none" if no sources were used.)

For example, office hours, the names of students with whom you discussed, large language models, `math.stackexchange.com`, Wikipedia, or notes that you find online are things which should be listed.

AI policy

- Use of LLM's for the homework is permitted, although not encouraged. If you do use LLM's, we suggest that you use them to interactively to help you work towards solutions to homework problems (rather than simply copying the entire problem statement and asking for an answer).
- If you use LLM's, you must also include a copy of the prompt log, in addition to including them in "sources consulted".
- Finally, remember that (as a special case of the collaboration policy) the writing of the solution must be in your own words; it is unacceptable to copy-paste the output of an LLM and submit it.

Grading

The midterm and final exams will each be 120 points. Grade cutoffs are targeted at 90 (out of 120) for an A-, 80 for a B-, 70 for a C-. (Cutoffs definitely won't be higher than these marks, but may be lower based on exam difficulty, etc.). The homework is scored out of 100, but with the same cutoffs of 90, 80, 70 for letter grades.

Missed work

Late homework will not be accepted, and missed exams cannot be made up, except in the cases below.

Excused absences

- If a student is too ill to complete an assignment or attend a test, they should inform the instructors as soon as possible using the on-line Short Term Incapacitation Form.
- Students who miss tests or assignments due to a scheduled varsity athletic trip or religious holiday should submit an on-line NOVAP or RHoliday form, respectively, at least a week ahead of time and decide with the instructor how to make up the work.
- Those with a personal emergency or bereavement should inform their academic dean and the instructors. Please contact the instructor as soon as possible after returning to schedule make-up work.

Testing center

This class will use the Testing Center to provide testing accommodations and temporary test-taking supports to undergraduates registered with and approved by the Student Disability Access Office (SDAO) and/or Academic Resource Center (ARC). The Testing Center operates by appointment only and appointments must be made at least 7 consecutive days in advance, but please schedule your appointments as far in advance as possible. You will not be able to make an appointment until you have submitted a Semester Request with the SDAO or completed screening at the ARC and your accommodations or supports have been approved. If you have not already done so, promptly submit a Semester Request to the SDAO or schedule your screening with the ARC in order to make your appointment in time. For instructions on how to register with SDAO, visit their website at `https://access.duke.edu/requests`. For instructions on how to schedule a screening with the ARC, visit their website at `https://arc.duke.edu/ld-adhd/overview`. For instructions on how to make an appointment at the Testing Center, visit their website at `https://testingcenter.duke.edu`.

Academic integrity

Academic dishonesty on tests, plagiarism on homework and projects, copying homework, lying about an illness or absence and other forms of academic dishonesty are a breach of trust with classmates and faculty and will not be tolerated. They also violate Duke's Community Standard and may be referred to the Office of Student Conduct as described here in the Academic Integrity Council. Additionally, there may be penalties applied to the assignment(s) in question and/or to the final course grade.

Topics

Below is the tentative list of topics which we plan to cover this semester.

- Some elementary number theory, basics of group theory (Ch 2)
- Jordan form (Ch 4.7), basis free definition of trace and determinant
- Group actions (Ch 6.7–6.9), Cayley's theorem, conjugacy classes, Sylow theorems (Ch 7.1–7.3, 7.5–7.8)
- Definition of rings and ideals, etc., polynomial rings, ring constructions (Ch 11)
- Fundamental theorem of arithmetic, unique factorization domains, Gauss's lemma (Ch 12)
- Field extensions, algebraic elements, finite fields (Ch 15)
- Splitting fields, fundamental theorem of Galois theory, cubic equations, quintic equations (Ch 16)
- (Time permitting) representations of finite groups, Maschke's theorem, Schur's lemma, orthogonality of characters (Ch 10)