

Relations and Functions

Where We Are Now

- Week 3 covered these key topics:
 - Binary relations.
 - Graphs of relations
 - Properties of relations: reflexivity, symmetry, transitivity, irreflexivity, asymmetry
 - Equivalence relations
 - Equivalence classes
 - Strict orders
 - Hasse diagrams
 - First-order definitions
 - Functions
 - Domains and codomains
 - Injections, surjections, and bijections
 - Function composition

Where We're Going

- Week 4 continues our exploration of discrete structures:
 - Cardinality and diagonalization (Yesterday)
 - Graphs (Wednesday / Friday)
 - The pigeonhole principle (Friday)
- From yesterday, you should know the formal definition of set cardinality and should start reviewing the proof of Cantor's theorem.

Things You Should Do Today

- Review the checkpoint problem from Problem Set Three and make sure you *completely* and *unambiguously* understand the answers. Ask for help if this isn't the case!
- Read the handout “First-Order Logic and Proofs” on the course website to review how to write proofs about statements in first-order logic.
- Continue working through PS3. Aim to complete Q1 – Q5 by the end of today and to have at least read over Q6 – Q8
- Read the handout “Preparing for the Exam” and follow its advice.
- ***Go to the practice midterm!*** Like, seriously. You need to do this.

Things You Should Do Tomorrow

- Look over your feedback on PS2 and make sure you understand all the feedback you get ***completely*** and ***unambiguously***. Ask the course staff for help, either on Piazza or in office hours, if you don't.
- Continue working on PS3.
- Continue studying for the midterm exam. Work through some number of the practice problems and ask questions. Stop by office hours to have the staff review your answers.
- Look over EPP1 and EPP2, if you have time.

Start working through this week's packet of problems. We'll review some of them together as a group.

Midterm Logistics

Midterm Exam Logistics

- The first midterm exam is next ***Tuesday, May 2nd***, from ***7:00PM - 10:00PM***. Locations are divvied up by last (family) name:
 - Abb – Niu: Go to Hewlett 200.
 - Nor – Vas: Go to Hewlett 201.
 - Vil – Yim: Go to Hewlett 102.
 - You – Zuc: Go to Hewlett 103.
- You're responsible for Lectures 00 – 05 and topics covered in PS1 – PS2. Later lectures and problem sets won't be tested.
- The exam is closed-book, closed-computer, and limited-note. You can bring a double-sided, 8.5" × 11" sheet of notes with you to the exam, decorated however you'd like.

Preparing for the Exam

The Practice Exam

- ***You should go to the practice exam this evening. It's at 7PM in room [[todo this]].***
- This is the best way to get a sense of where you are now and what you can work on before next Tuesday.
- Yes, it's a bit of a time commitment. But it's probably the best way to figure out what you need to focus on.
- Can't make it? We'll post the practice exam online. Find a group and have everyone take it under realistic conditions.

Your Notes Sheet

- You can bring a double-sided, 8.5" × 11" sheet of notes with you when you take the exam.
- ***Recommendation from Anna:*** Try making a study guide for the course as a whole without regards to length, then pare it down to your final notes sheet.
- The act of creating a set of notes will help you solidify your own understanding. Trust us – do this on your own. Don't just get notes from someone else.

Review Your Problem Sets

- Make sure you've reviewed all the feedback you've received on your problem sets and looked over the solution sets.
- Make sure you ***understand*** all the feedback you've received on your problem sets and the solution sets.
- If one of the problems really didn't go well, rewrite your solution from scratch and without looking at the solutions set. Feel free to ask the TAs to look over your work.
- Take some time to review the results you've proved on the problem sets. Results proven on the problem sets are fair game for the midterm.

Leading up to the Exam

- The more practice you can get, the better. Thanks for showing up!
- If you have even a little bit of time this week to work through some extra practice problems, it's probably a good idea.
- That said, please stay healthy and sane:
 - Get a good night's sleep before the exam.
 - Have a snack beforehand - don't go in hungry!

A Few Things to Keep in Mind

The Course Staff Is On Your Side

We want you to do well on this exam. Please ask us for help if you need it. Let us know what we can do to make you feel more prepared.

You've Learned a Ton In Four Weeks

You've gone from zero to probing the nature of infinity in four weeks. That's incredible. You should be proud of that.

This is Not a Test of Innate Ability

We are not trying to test whether you are good at math. We are not trying to test whether you have some special aptitude. We want to see what you learned.