MATH 170: TOPICS FOR MIDTERM 1

GOOD LUCK!

Rules

- Open notes (you can use your notes freely).
- No use of internet, textbooks, computer algebra systems, calculators.
- No collaboration.
- The exam is 50 min long.
- At the end of the exam, you will have 10 min to scan and upload your work to gradescope.

Scanning

The easiest way to scan is to use the free version of the app "Adobe Scan" that is available for iPhone and Android.

Before the midterm. Download the app and try to use it at least once to create a pdf document out of 5 pages. E.g. scan your lecture notes.

Using the app.

(1) Open the app.
(2) Allow it to access camera.
(3) Now the app should show you the camera and attempt to find a document.
(4) Move your camera so that the document you chose (lecture notes, shopping list, etc.) fits completely into the screen.
(5) The app will highlight the corners of the document with blue dots. Wait till the app makes the photo of the document (no need to press buttons).
(6) Now the app will suggest you to drag the blue dots to adjust the corners of the document.
(7) Click "Continue" to return to the camera mode.
(8) Scan another page. Or if you are done, click the bottom right where you see the miniatures of the scans. You will then be able to review the pdf as it will appear in the file, reorder, crop or apply filters.

(9) When you are done reviewing, click "Save PDF" in the top right corner.

(10) Now you should see your document. Click "Share", choose "Share a copy", then choose any appropriate way of uploading the file to Gradescope. E.g. you can save the file to your file system and upload it from there, email it to yourself and use your laptop to upload, or come up with any other means of uploading the file to Gradescope.

Advice

- **Zeroth principle.** On the day of the midterm, make sure that you have enough sleep (at least 7 hours), and don't forget to eat lunch and drink water beforehand – your brain will thank you for taking care of it.
- **First principle.** Make sure you learn how to present your work properly by looking at the solution / lecture notes for sample writings. Learning to have a style of your own is important. Going over solutions of homework is a good idea.
- Even though you are allowed to use your notes, prepare a cheat sheet with formulas for faster search during the midterm.

List of topics

(1) You will not be asked to prove something completely rigorously but learning how to use arguments such as proof by contradictions will help you to reason through problems in the exam.

(2) Pigeonhole principle:
- Know the statement of the Pigeonhole Principle, including Generalized Pigeonhole Principle.
- Apply to problems similar to that of homework 1 (except number 2).

(3) Numbers:
- Divisibility definitions (divisors, divisibility, gcd);
- Definition of prime numbers;
- Statement of fundamental theorem of arithmetics (without proof);
- Euclid's algorithm, be able to apply it.

(4) Logic:
- Differences between inductive and deductive logic.
- Propositional formulae, logical operators, predicates, quantifiers, truth values.

- You need to know how to assign truth values to a proposition (using rules of logical operators), given certain assumptions– be careful with the "if... then..."
- Be able to identify free variables, bound variables.
- Be able to translate between logical formulae and English.
- Truth tables and logical equivalence, de Morgan's laws for logical operators and quantifiers.