1 Prerequisite material

Mathematics is in general cumulative (as with many fields). I am assuming you already know topics such as the unit circle, the division algorithm, how to solve an equation, etc., and will not list everything that is prerequisite material. Instead, let's focus on two very important college courses that this course relies on.

1.1 Proofs

First, in order to succeed in this course, you **must be able to read, write, and evaluate proofs.** If you aren't feeling too confident about proofs yet after taking MAT 108, that's ok, but be aware that you must work extra hard on getting used to reading and writing proofs as soon as possible. This means that you should pay extra attention to how I structure my proofs in class and in the homework solutions, and give yourself extra time to write out clean proofs on homeworks.

There are also other topics from MAT 108 that will be needed in this class, such as the concept of equivalence relations and partitions. We will still go over these concepts in an accelerated fashion, but I will assume you have seen them before.

1.2 Typing

You are also expected to typeset your homework on LaTeX. This is not a skill that I expect you to already have; my goal is for you to learn this skill in this course. However, you should not try to learn how to typeset while simultaneously thinking about how to structure your proofs; the result of this multi-tasking will be a waste of your valuable time. You must first (on paper, or whatever you normally use) work out your solution, and clarify your argument; you should even write down your proof with the variables you intend to use while typing it up. Only after you have a full argument written down should you start typing up your solution; at this point, the only task you have is to figure out the commands for math symbols you already wrote on paper. Start your homeworks early!

1.3 Writing with proper grammar

Part of the reason for asking you to type up your homework is that you will (hopefully) be forced to write in full sentences and to organize your work more clearly. You are expected to be able to write mathematics in full sentences with proper grammar and **punctuation**! If you submit a sub-par homework solution or exam solution, style points may be deducted. I cannot stress enough how fundamental writing proofs *well* is to your mathematics background.

1.4 Linear algebra

Finally, as this is an algebra class, your background knowledge in linear algebra will be extremely important. If you don't remember basic topics in linear algebra, please go back and review them. In particular, sections 1.1, 1.3, and 1.4 in the book are very relevant to the material we will cover. Here's a non-comprehensive list of concepts off the top of my head that you will need to know:

- matrix addition, multiplication, scalar multiplication, identity
- determinant, invertible matrix, inverse of a 2×2 matrix
- vectors, basis of a vector space
- matrix transpose
- block matrices, block multiplication, diagonal matrix, scalar matrix