Proof Portfolio

Your proof portfolio will be a demonstration of your growth in this class and of your mastery of the material. The final proof portfolio will consist of 10 polished proofs. Together we will work from your first draft to a ``perfect'' proof.

Portfolio Goals

- ***Written communication.*** Perhaps one of the most important goals of the proof portfolio is to work on your ability to write well. I don't know anyone who was born a good mathematical writer. Writing mathematics is decidedly different than writing an essay (just as, you may have noticed, reading a math text is different than reading a novel) and it will take some time to get good at it. The proof portfolio gives you many opportunities to learn from mistakes.
- ***Learning LaTeX.*** Mathematical typesetting in \LaTeX is an important goal in this course. In future courses you'll be able to do your homework faster and better, and it will look more professional. You'll be glad you learned it, trust me!
- ***Time to think individually and to get individual feedback.*** Since collaboration on some of the other assignments is allowed and encouraged, this is an opportunity to rely on yourself and see how much *you* know as an individual. In addition, it's an opportunity for me to get to know you as a mathematician and a writer.
- ***The opportunity to act on feedback.*** You will get lots of feedback on assignments in this course, but there is often no chance to revise and resubmit. This is a chance for you and me to make sure you understand my feedback and correct mistakes.
- ***Seeing a proof through to perfection.*** I hope this will be intensely satisfying.
- ***Celebrating your progress.*** It's important to do this else the constant presentation of new challenges would have us all feeling like failures all the time.
- ***A resource later.*** You will have 10 typed proofs and at least one example of every proof technique we've learned in the course. This could be of use in the event that you ever forget, say, how induction works.

Logistics

Each statement will be written in the form of a conjecture (a mathematical claim) among which you will have some choice. Each conjecture asks you to prove or disprove the conjecture, possibly along with some additional directions. If the proposition is true, your job is to write a complete proof for the proposition. If it is false, you should provide a counterexample *plus* make reasonable modifications to the stated conjecture so that a new proposition is true. Then, write a complete proof of your new proposition. You may want to run your new proposition by me before trying to write a proof - this is allowed and encouraged! See here for a sample problem.

Academic Honesty: The portfolio is an **independent project** in which **no outside resources or collaboration is allowed**. You may not use the math center, ask other professors, or discuss the problems with anyone besides me. You should not discuss even which problem you chose. Violation of this policy is grounds for failing the course. The point is that you need to be confident and competent in writing proofs for your future courses.

Throughout this process remember that I am here to support you.

Submission of Drafts:

An important part of this process is the submission of drafts which allow you to get formative feedback without the pressure of getting a final grade. Important rules are

- You are allowed to submit up to 2 drafts per problem (not counting the final draft).
- You are allowed to submit up to 3 drafts per week. Let's agree each week starts on Monday at 6AM. You may use a token to extend a week to still submit up to 3.
- I will return drafts to you within 3 business days.
- You submit a typeset draft as a PDF to Blackboard under the appropriate proof number.
- Your drafts must be typed in LaTeX. A template for this will be provided. You may use a local version installed on your computer or an online typesetting platform like Overleaf.

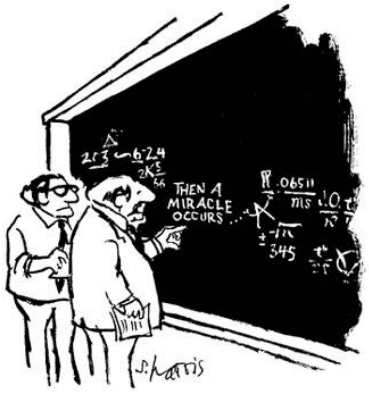
Deadlines:

Group of Problems	Initial Deadline: All drafts submitted after this date are final	Final Deadline: All final drafts are due by this date.
Problems 2-4	Monday 2/17, 11:59PM	Friday 2/21, 11:59PM
Problems 5-8	Monday 3/23, 11:59PM	Friday 3/27, 11:59PM
Problems 1, 9-10	Monday 4/13, 11:59PM	Friday 4/17, 11:59PM

Most weeks during the semester you should submit a draft of a new problem and a revised draft.

Using me:

As stated before you are not allowed to use outside resources or collaborate. You should however use me for help. To aid in this I ask that you work on this semester-long project early and often. Before you visit office hours I expect that you have tried the problem (you should at least know the definitions of terms in the problem and have made an attempt at one type of proof). You can ask me a question at any time (before submitting the first draft of a proof or after you've submitted a draft). I ask that you be respectful of my time. I will at no point walk you through a proof, but I will provide hints!



"I think you should be more explicit here in step two."

Assessment and Evaluation:

The problems are intending to be challenging. They will emphasize critical analysis and writing skills. Portfolio problems are evaluated on the basis of completeness, correctness, and adherence to our writing guidelines. All drafts will be graded according to the following rubric.

Grade	Description
Excellent (E)	The work is complete, precisely written, demonstrates correct reasoning and full support for all claims and computations, is free from mathematical and communication errors, and indicates a high level of understanding of the mathematical concepts involved. The work meets all writing guidelines.
Satisfactory (S)	The work is complete, demonstrates correct reasoning and support for its claims and computations. There may be a few isolated errors in mathematics, writing, reasoning,
Progressing (P)	Partial understanding of the concepts is evident, but there are significant issues with completeness, correctness, precision of language or notation, or logic that can be improved with revision.
Incomplete (I)	The work has significant gaps, omissions, or errors; or, there are widespread significant issues completeness, correctness, precision of language or notation, or logic that require more than just a simple revision.

Level	Requirements
“A” Level	Complete a total of 10 problems with Satisfactory or Excellent grades, including at least 6 excellent grades. Submit a draft of at least 8 problems before the initial deadline and complete the midsemester reflection.
“B” Level	Complete a total of 8 problems with Satisfactory or Excellent grades, including at least 3 Excellent grades. Submit a draft of at least 6 problems before the initial deadline and complete the midsemester reflection.
“C” Level	Complete a total of 6 problems with Satisfactory or Excellent grades. Submit a draft of at least 4 problems before the initial deadline and complete the midsemester reflection.