Proof Portfolio

Purpose: In this assignment, you will be practicing essential proof writing skills including the following:

- ▷ formulating a clear argument related to each of the main topic areas of the course,
- ▷ writing an argument concisely and precisely, and
- ▷ organizing written information with the appropriate spacing and design.

The goal of this assignment is to establish proof-writing habits which can be used throughout your mathematics career. At any stage of a mathematician's career, one must strive to improve their arguments conciseness and clarity, and they must be conscientious of the audience the writing is for. The audience you are writing for in the proof portfolio assignment is: an undergraduate who has most likely not taken more than one proof course before; however, you will not be required to state definitions, or prove theorems that are applied in the argument. Proof writing is much like regular writing: one must practice writing properly and must continue to revise and improve their writing. As a general rule, one should not be submitting their first draft of a proof to any assignment.

Task: At the end of week one, you will be provided a list of three problems from each of the main areas of this course which are eligible for the proof-portfolio assignment.

1. You must select two problems from each area, carefully craft an argument and write a formal proof using LaTeX.
2. You will receive feedback at the end of week 3 on your proofs in any of the following areas:
    - ▷ the logical reasoning of the argument,
    - ▷ the clarity of the argument, and
    - ▷ the spelling, grammar and organization of the writing itself.
3. You will apply the feedback to your proof and resubmit.

In the final week, you will combine each of your proofs into a single LaTeX document. A template for the final LaTeX submission will be provided.

Rubric: For each proof, there are three criteria for success:

Proof Conventions: In each proof, one must include the following for full credit:

- ▷ write the statement that must be proven,
- ▷ indicate the start of the proof,
- ▷ clearly state the assumptions used in the proof,
- ▷ a concluding statement, and
- ▷ a symbol representing the end of the proof.

Logic & Argument: In each proof, one must have a clear and concise argument. In order to receive full credit, one should check the following:

- ▷ notation is clearly stated and is consistent throughout the proof,
- ▷ every variable used is defined before it is used,
- ▷ each deduction is substantiated with a justification,
- ▷ no additional assumptions are made to prove the statement, and
- ▷ the proof is written using complete sentences, with no logic symbols included.

General Requirements: Your proof portfolio must be completed in LaTeX, the document should include:

  ▷ each of your chosen problems for this assignment,
  ▷ sections for each of the problems, and
  ▷ statement of any theorems and lemmas used in the arguments below the proof.

In your submission, you must provide both a .pdf and .tex file.

Timeline: This is an expected timeline for the proof portfolio assignment:

Week	Monday	Wednesday	Friday
1			Question List given
2			
3			Submit for Feedback
4			
5			Final Submission

Resources:

  ▷ For an easy to use TeX program, please visit and create an account at OverLeaf.com.
  ▷ In the lecture notes, there are commands provided for your convenience
  ▷ For some tips, tricks and general advice about using LaTeX please refer to the LaTeX Best Practices located on Canvas.
  ▷ When in doubt, use Tex Stack Exchange