

PROJECT DESCRIPTION

IDEAS OF MATH, FALL 2023

1. Description

The goal of this class project is to provide the students a chance to work with the concepts they learn in MATH 102 on certain topics of their chosen. The project must be about a mathematical concept that has not been discussed in class or a specific use of the idea discussed in class to solve certain problem.

The students must produce a mathematical report and a deliverable (video or presentation).

There are two options for the deliverable:

- (1) Create a video
- (2) Create a poster / Powerpoint presentation

2. Timeline

In order to sign up for doing a project, you must follow the following steps:

- (1) Meet with the instructor to discuss your proposal of a project before Friday, October 10. In this meeting, you are expected to outline an idea for your project and how you would approach the project. The instructor will give you feedback and guide you on what to do. Failure to make this deadline will resolve in you not eligible for the project.
- (2) Sketch out detailed plan and necessary steps in a follow up meeting after doing some research/reading about the topic by Nov 17.
- (3) Complete the first draft (written in LaTeX) of your written report by Friday, Dec 1. The first draft will be rejected if it is not written in LaTeX. Failure to make this deadline will disqualify you.
- (4) Video showoff / presentation in class on December 5.
- (5) Final draft due December 15.

Date: Nov 1, 2023.

3. Requirement and evaluation

There are two objectives:

- (1) You must write a full mathematical report.
- (2) You present a mathematical concept to other people.

Both will be evaluated using the following criteria (adapted from a grading Rubric by Kathryn Mann of Cornell):

I. Oral Presentation

a) Content (3/5).

- Appropriate choice of material given the time constraint
- Mathematical concepts (examples, theorem statements, etc.) explained correctly
- Sufficient definitions, illustrations, and/or motivation are given
- The mathematical material is at a level appropriate for math 130 students to understand

b) Clarity and Delivery (2/5).

- Board writing is clear and large enough. (Same for diagrams/pictures if you draw any.)
- Speaking is clear and well-paced; the presenter faces the audience rather than the board when possible
- Concepts are clearly and concisely explained
- The presentation appears rehearsed and is within the time limit. (Note: it is okay – in fact, I encourage you – to have some written notes with you while you present. But ideally, you should not have to look at them very much!)

II. Written Report

a) Mathematical Content (4/10).

- Is the mathematics consistent and correct?
- Is it at a level of sophistication appropriate for this class?
- Are topics and ideas introduced with sufficient explanation?
- If there are pictures, figures, or examples, are they accurate, appropriately used, and do they support the text?

b) Clarity of Mathematical Exposition (3/10).

- Are topics presented in a logical order?
- Does the paper achieve an appropriate balance of conciseness and explanation?
- Are complicated parts/proofs (if any) broken into steps?

c) Style (3/10).

- Is the paper clearly written, in paragraph form?
- Is the grammar, spelling, and sentence construction correct?
- Does the introduction serve its purpose?
- Is the paper readable and does it flow?

4. Possible topics

You can choose one of the following topics, but you are not restricted to them.

- (1) Social: applications of mathematics in arts and music, visualizing math
- (2) Concepts: topology, knots, sums of squares theorems

5. Advice

Start early and meet with the instructor regularly when you have questions.

A guide for math writing: <https://math.berkeley.edu/~kpmann/writingadvice.pdf>