

# Math 2001

## Guidelines for Final Project

Your final project is to write a paper solving one of two problems we studied in class and in group work. Recall that this project is worth 10% of your grade. Your paper should explain the problem, your solution, and a proof of your solution using full, grammatically-correct English and mathematical sentences to completely . Your project may not be hand-written. There is no upper or lower suggested limits on the length of your paper, so use all necessary words and do not put in any extra words. You should explain at a level that can be understood by anyone who has taken MATH 2001 but who might not be familiar with your problem. While you are writing, put yourself squarely into the mind of the reader and imagine how they will hear and interpret your words. I suggest you frequently re-read the sentences and paragraphs that you have written to confirm clarity and accuracy. It often helps to wait a couple of days and then re-read. I also suggest you use your classmates, roommates, friends and family as reading guinea-pigs.

Choices for projects:

- Solve the take-away game we studied in class. A full solution includes a description of the problem, a description of which game positions are winnable, what strategies to use to win, and a proof of your answer. A passing solution completely addresses the one-pile game (first taking away one or two objects, then taking away up to  $r$  objects). An ‘A’ level solution also completely solves the two-pile game. An advanced submission includes some discussion of the multi-pile problem.
- Solve the Mystery Algorithm problem we studied in class. A full solution includes a description of the problem, a conclusion about what the Mystery Algorithm calculates, an intuitive description of why the algorithm works, and a proof. An ideal submission also includes a geometric argument.
- If you prefer another option, there is another one that we did not cover in class. Derive a method to find closed formulas for the summations  $\sum_{i=1}^n i^p$ , where  $p$  is a natural number. If you choose this option, you **must** meet with me to discuss requirements at least two weeks prior to the due date.
- You may choose a project of your own, but you must get prior approval from me, at least two weeks prior to the due date.

Rough drafts:

If you submit a rough draft to me on or before December 4, I will give you feedback, both on your writing and on your mathematics. It would be a shame if you do not avail yourself of this free professional editing service, because it will improve both your learning and your final product.

Due date:

Your final project is due in class on December 13.

Questions? Please contact me.