

Mathematical Reasoning

Section C - Spring 2017

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Course website:

<http://www.math.washington.edu/~raymonda/math300spring17.html>

Office hours: Monday from 1:30 to 3:30 in Padelford C-432. If you are not available during those times, please e-mail me to schedule an appointment.

Text: We'll first discuss parts of *Mathematics: A Very Short Introduction* by Timothy Gowers (available at the University Book Store), then we'll roughly follow *An Introduction to Mathematical Reasoning* by Matthew Conroy and Jennifer Taggart (available for free online: <https://sites.math.washington.edu/~taggart/m300/m300text.pdf>). Afterwards, we'll dabble in graph theory, number theory, and other topics determined by your interests; we won't use any particular book for these, but I'll send out links (to free resources) if I think there's something you should read.

Course content: This course is unlike anything you have done so far. In some sense, this is your first 'real' math class. You will learn how to write mathematical proofs and develop your skills with logical reasoning while studying a variety of topics.

Grading: The weight for each part of the course is given below.

Category	Weight
Homework	16
Quizzes	24
Midterm	25
Final	35
Total	100

Homework: There will be eight assignments due almost every Wednesday. They will consist of Deceptively Uninspiring Homework (DUH) problems: mechanical tests of your understanding. DUH problems are bite-sized proofs that are easily digestible if you are comfortable with the material, but you should

still take them seriously as an opportunity to practice writing proofs. As their name implies, explaining something that feels obvious is more challenging than one might think.

Quizzes: There will be four quizzes throughout the quarter, always at the end of a lecture on a Wednesday. The quizzes will be significantly harder than the homework in that they require some more thinking and might require some clever insight as well as using many different techniques seen in class. It would be unrealistic to expect you to solve them in a few minutes; that is why I will hand out three Only the Most Galvanizing (OMG) problems two weeks ahead of time, any of which might end up being the problem on the next quiz.

Those two weeks will allow you to let these problems simmer in your mind. Look at them early and ponder them when you are walking across campus or falling asleep. Give your brain time to stumble upon a solution, and then more time to express it as clearly as possible. You most likely want to write down solutions to these problems so that, come quiz time, you do not waste time thinking how to best formulate your answer.

Exams: The midterm will be on April 28 during the normal lecture time. The final exam will be on June 8 from 8:30 to 10:20PM. All exams will be in MGH 287. The exams will mostly resemble DUH problems since it is difficult to produce great mathematical insights in a hurry. However, there will always be a more challenging problem that is very similar to some previous OMG problem.

Cheating: You may discuss both DUH and OMG problems with your classmates, and you should feel free to ask me or anyone else for help—note that the internet is not a person. You should write up the solutions *by yourself*. Ideally, you should wait at least a few hours between discussing problems with someone else and the time you write down your solutions. You should also not use any notes that you may have taken during those discussions. Think of it like a paper for an English class: you might discuss your ideas with someone else, but you wouldn't write your paper with them, because that's a recipe for plagiarism. On top of your homework and of the quiz, you should list the names of the people that you collaborated with. All cheating will be sanctioned.

Exam dates: There won't be any make-ups for homework assignments, quizzes or exams. If you miss a quiz or the midterm due to **unavoidable, compelling, and well-documented** circumstances (e.g., illness, transportation emergency), your final exam may be weighted more heavily. **Contact me immediately if one of these circumstances arises.**

Grading scheme: I will set the grade scale for the course at the end of the quarter. My preliminary estimate is that the scale will be linear, with 4.0 = 95% and 2.0 = 70%. The actual grading scale will be no tougher than this.