Math 100a Fall 2015: Abstract Algebra I
MWF 1-1:50pm, HSS 1330
Professor D. Rogalski

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Class web site: *www.math.ucsd.edu/~drogalsk/100a.html*. Check here for announcements, homework assignments, schedule of lectures, and other information.

Office hours: M 2-3pm, F 12-1pm in 5131 AP&M

Section Leader 1: Susan Elle, office 6333 AP&M

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Meeting Time: A03, Mon. 5pm in 2301 AP&M

Office hours: W 11am-1pm in 6333 AP&M

Section Leader 2: Stephan Weispfenning, office 6436 AP&M

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Meeting Time: A01 and A02, Mon. 6pm and Mon. 7pm in 2301 AP&M

Office hours: T 1-3pm, Th 2-4pm in 6436 AP&M

• **Course description**

Math 100a is the first quarter of UCSD's three-quarter abstract algebra course. It is aimed to prepare students for graduate study in mathematics. Compared to Math 103a-b, which is a more basic two-quarter sequence in algebra, Math 100a-c may be thought of as an honors version: it will move more quickly, cover more material, and feature more difficult homework and exams.

• **Prerequisite** The prerequisite is either Math 109 or Math 31CH. It is very important that students taking this course have already obtained some facility and experience in writing proofs, and so the prerequisite will not be waived except in exceptional circumstances. While this is the minimum prerequisite, because the course is so rigorous I generally recommend that among students who have taken Math 109 to satisfy the prerequisite, only those who have obtained a B or higher take Math 100; others should consider taking Math 103 instead.

• **Textbook** The textbook is *Abstract Algebra* by Beachy and Blair, 3rd edition. With material at this level, it is very helpful for you to see difficult concepts (at least) twice, once in class and once in your reading. Sometimes I may also omit from the lectures some less important details or proofs and leave it to you to learn them from your reading. Thus I think it is crucial that you both attend lecture and read the book. We will cover Chapters 1, 2, 3, and part of 7 this quarter. Much of the material in Chapters 1 and 2 is review of Math 109 material and so will be reviewed more quickly along the way rather than covered at the beginning. In particular, we will begin with Chapter 3.

• **Podcasts** After multiple requests I have agreed to have our lectures podcasted this quarter. However, please do not use the availability of podcasts as an excuse for not coming to lecture regularly.

• **Homework**

Homework will be assigned weekly and is to be submitted on Wednesdays by 5pm in the dropbox in the basement of AP&M. The one lowest homework score will be dropped. No late homework will be accepted. It is not acceptable to e-mail a copy of your homework to the TA; all homework that is to be graded must be submitted in the dropbox.

The most important part of the course is the homework, and in my experience students that do little or no homework fail the course, as it is not possible to prepare for the exams properly without working through the homework. Along with more straightforward problems designed to solidify the basic definitions and concepts, the homework will contain some problems which I expect you to find difficult and are meant to challenge you.

Note that solutions to homework problems will not be provided. You can ask the TA's or friends for hints on problems on which you had trouble, but I feel that you learn much less from just reading someone else's solution. I am aware that solutions to the exercises in the text exist online. Handing in a solution copied directly or paraphrased from an online source is academically dishonest. The homework you hand in should reflect your own understanding of the problems.

The exercises in this course demand more creative thinking than the typical exercise in a more computationally-oriented lower division course. Creative mathematical thinking often unfolds over time, with new insights emerging the second time or third time you think about a difficult problem. For this reason it is crucial to start homework early and work on it over the week, and not begin it the day before it is due.

• **Exams**

There will be 2 in-class midterms: on Friday October 23 (week 4) and Friday November 13 (week 7). The final exam will be Monday December 7 from 11:30am-2:30pm. Please bring your own bluebook to each exam. No books, notes, calculators, phones, or other aids may be used during exams. The final exam will be cumulative.

• **Office Hours**

Both I and your TAs will have several office hours a week where we will be available for your questions. These will be announced later and posted on the website. If on an occasional basis you need to see one of us and can not make a scheduled office hour, please e-mail one of us to set up an appointment.

• **Grading**

Your final average will be calculated using the following grading scheme: Homework 20%, Midterm 1 20%, Midterm 2 20%, Final Exam 40%. Makeup midterms will not be given; please let me know as soon as possible if you believe you have a conflict with a midterm or with the final exam.

Your final grade will be at least as good as the grade given by the following standard scale:

97	93	90	87	83	80	77	73	70	60
A+	A	A-	B+	B	B-	C+	C	C-	D

The final grading scale will be curved depending on the class average. The average grade is usually some kind of B.

• Writing Proofs

Mathematical writing is still writing, just of a special kind. You should treat your proofs as you would very short essays for an English class. In particular, you should write in full sentences, with good grammar, and avoid overuse of mathematical symbols.

Here is my suggested strategy for producing good homework write-up. Once you think you have figured out how to do a problem, first write out a draft solution. Often in the process of doing this, you will realize there may be minor gaps in your idea you have to fix. In the draft solution, you can cross things out, start again, insert paragraphs, etc. Once you are satisfied, you can create a neat, organized write-up of your final solution.

The idea of writing a proof is to convince someone else that what you claim is true really is; understanding why it is true yourself is only part of the process. A wandering, disorganized proof, even if it seems to contain some of the right ideas, will not receive credit if the person grading it cannot follow your argument. While Math 109 focuses more on proof writing, continuing to hone your proof writing skills is an important part of Math 100 as well.

• Collaboration and Academic Honesty

You are welcome to discuss the homework problems with other students at the stage when you are still formulating ideas. This may be especially useful if, for example, you are confused about definitions or what the problem is asking. The write-up you hand in should be your work alone in your own words, however, and should be written while you are by yourself. While it is also OK to seek hints from classmates that have figured out problems on which you are stuck, you will learn the most if you think about these problems hard on your own first and don't give up too quickly.

Copying or paraphrasing the finished writeup of a homework problem in whole or in part from a classmate or from any other source such as the internet, and then handing it in as your own work, constitutes academic dishonesty. As usual, copying from or talking with a classmate during an exam, or using books, notes, calculators, phones or any other aids during an exam are also not allowed. I will not hesitate to bring charges of academic dishonesty if necessary in such cases.