University of Connecticut | Department of Mathematics

Math 213: Homework Exercises

Section	Due Date	Practice Exercises	Exercises to turn in
1.1	1/30	2dg, 3degik, 4fij, 5c, 7, 8ac, 10cgik	5bd, 8f, 10fh
1.2	1/30(?)	1 defj, 2 defj, 5ce, 6c, 7g, 8 acdegh, 9b, 13g, 14	4dh, 12, Prove Thm 1.2 part (f) using two methods: (1) a truth table, and (2) an essay style similar to the one for part (e) on page 15 of the text

*for these problems state whether claim is true or false and grade the proof according to directions in book on p.38.

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Math 213, section 2
Transition to Advanced Mathematics
Spring 2008

Instructor:	Dr. David Gross
Office Hours:	Mon 10-11, Tues 11-12 and Thurs 2-3, or by appointment
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Website:	http://www.math.uconn.edu/~dgross/math213s08
Meeting:	Tu,Th 9:30-10:45 am, MSB 403
Text:	*A Transition to Advanced Mathematics* by Smith, Eggen and St. Andre, 6^{th} edition; Books/Cole, 2006

Grading: There are 2 midsemester exams, a comprehensive final exam, homework (graded and nongraded) and quizzes. The exams are tentatively scheduled for Thursday, March 6 and Tuesday, April 22. The final exam is scheduled for Saturday, May 10. Although the grading is not an algorithm cut in stone, here is a rough idea of the relative worth of each of these:

Homework	30%
Two exams	20% each
Final exam	30 %

There are no makeups for missed exams. If an exam is missed and the absence is excused, I will readjust the percentages of the other exams. Please know from the outset, that there are very few reasons why I will excuse an absence. These reasons will generally be on the level of hospitalizations. Not feeling well, not wanting to get out of bed or not setting your alarm is not among them. If you are so ill that you cannot take the exam, then you should be seeing a student health or your own doctor and they can confirm the severity of your illness.

Goals: The goal for the semester is to develop, learn, and understand the basic methods of proof which will prepare you for more advanced mathematics courses – courses like Math 215 (Linear Algebra), 216 (Abstract Algebra), 225 (Differential Geometry), 250 (Topology), 258 (Number Theory) and 273 (Analysis). Thus, you will be learning to prove theorems and the only way to do that is to prove theorems – again and again and again.

Just like when learning to write essays, you have to write a lot of essays. So too when learning to prove theorems, you have to write a lot of proofs. For this reason, this class will be quite different from your other classes so far. In proof writing, there will be no "correct answer". Instead, there will be a whole spectrum of "answers" ranging from incorrect proofs to elegant, concise and correct proofs. Even when correct, I will endeavor to give you feedback as to how you can improve the writing and make it more concise.

Also in preparation for those courses mentioned above, we will cover content areas that are common to all or most. We will cover the concepts of basic logic, proof methods, set theory, relations, functions and cardinality. You should be able to not only prove theorems similar to the ones seen in class and in the homework, but you should have the ability to articulate the ideas presented in the course in a clear and coherent manner as well. Your writing should reflect that clarity of thought that comes with understanding.

Expectations: To achieve the goals of this course you will need to work predominantly outside of class. You should expect to spend between 7 and 10 hours a week outside of class time. The only for you to learn this material in a way that you can easily use, as a foundation for later classes, is to work a lot on it. It is rather cliché, but you cannot learn this material as a spectator. You have to "get your hands dirty" and work at it over and over.

I expect you to come to class everyday, to **not wait** until the last minute to do the homework assigned, to do **ALL** the homework assigned, and not just what will be graded. I expect you to participate in class that means asking questions when clarification is needed, participating actively (and not passively) in class discussions.

To foster an atmosphere where open discussions are possible and anything can be asked and questioned, I expect you to respect you classmates and all that they have to offer the class.

In return, you can expect from me the same level of respect, openness to new ideas, openness to new ways to thinking about things. I will answer you questions without prejudice knowing full well, that there is sometimes a lot of knowledge behind what might seem at the outset to be a silly question. There really isnt any such thing as a silly question. All questions, once answered or discussed, move you forward in your development. This is precisely the point of the class. To move you forward in your development as a mathematician.

If because of time constraints, I cannot answer your questions in class, we can meet outside of class. Although I have posted office hours, those are only the hours I guarantee to be in my office (unless notified to the contrary beforehand). We can meet at other times we can talk and find a time mutually convenient.

I really mean for you to use the office hours. They are not meant for me to sit twiddling my thumbs and working on sudoku puzzles. They are meant for us to get together whenever necessary for you to gain a better understanding of the material. An added benefit is that you will get to know me better and I will get to know you better.

If you must miss a class, I expect you to find out what happened, either from your classmates or from me. You are responsible for everything that goes on in class.

Homework: One of the most important aspects of this class is the homework. To write good proofs, you will have to practice, practice and practice some more. Just as you write many drafts of a paper, you will often find that you need many drafts of a proof before you get one that is mathematically correct, follows a logical order, and is easy to read. To facilitate this process, each week I will assign some homework problems for practice and some that need to be turned in as part of your grade. These will be announced in class and posted on the course homepage. I will return your homework with comments at the next class period, at which point you will have the opportunity to rewrite any proofs where points were taken off (this is not a requirement). You must turn in the rewrite along with the original work at the next class period. Your new score for each problem will be the average of your two scores.

We may not have much class time to devote to discussion homework problems. Therefore it is imperative that you seek help outside of class time as soon as possible if you do not understand a problem. As already mentioned above, you can always come to my office. I guarantee to be there (unless notified beforehand) during my posted office hours, but anytime Im there is fair game. We can of course make appointments to meet at other times, but I am generally around.

I encourage you to put a lot of effort into thinking about a problem before consulting me or a classmate. This gives you greater insight into both the problem and your own thought processes. Finally, remember there is more than one way to write a correct proof.

Guidelines to use when writing up your homework:

- Although it is ok to receive help or hints from your classmates on homework after you have already thought about the problem on your own, you must write your own proofs and turn in your own work.
- Please double space your writing and leave a few lines between problems so that I have room to put in comments and give you feedback on your work.
- Write neatly! It is hard to grade a problem I cant read.
- If you haven't gotten the idea yet, proofs are essays. You should use complete sentences and proper English; employing mathematical and English grammar.

Course Policy on Academic Integrity: A fundamental tenet of all educational institutions is academic honesty; academic work depends upon respect for and acknowledgment of the work and ideas of others. Misrepresenting someone else's work as one's own is a serious offense in any academic setting and it will not be condoned.

Academic misconduct includes, but is not limited to, providing or receiving assistance in a manner not authorized by the instructor in the creation of work to be submitted for academic evaluation (e.g. papers, projects, examinations and assessments - whether online or in class); presenting, as one's own, the ideas, words or calculations of another for academic evaluation; doing unauthorized academic work for which another person will receive credit or be evaluated; using unauthorized aids in preparing work for evaluation (e.g. unauthorized formula sheets, unauthorized calculators, unauthorized programs or formulas loaded into your calculator, etc.); and presenting the same or substantially the same papers or projects in two or more courses without the explicit permission of the instructors involved.

A student who knowingly assists another student in committing an act of academic misconduct shall be equally accountable for the violation, and shall be subject to the sanctions and other remedies described in The Student Code, http://www.dos.uconn.edu/student_code.html, see parts IV and Appendix A.

Sanctions shall include, but are not limited to, a letter sent to the Dean of Students of the University; a grade of 0 on the assignment, quiz or exam; a grade of F for the course.

Course Topics

Section	Topic
1.1	Propositions and Connectives
1.2	Conditionals and Biconditionals
1.3	Quantifiers
1.4	Basic Proof Methods I
1.5	Basic Proof Methods II
1.6	Proofs Involving Quantifiers
1.7	Additional Examples of Proof
2.1	Basic Concepts of Set Theory
2.2	Set Operations
2.3	Extended Set Operations and Indexed Families of Sets
2.4	Induction
2.5	Equivalent Forms of Induction
3.1	Cartesian Products and Relations
3.2	Equivalence Relations
3.3	Partitions
3.4	Ordering Relations
4.1	Functions as Relations
4.2	Constructions of Functions
4.3	Functions That Are Onto; One-to-One Functions
4.4	Images of Sets
5.1	Equivalent Sets; Finite Sets
5.2	Infinite Sets
5.3	Countable Sets

Important Dates: Exam 1 & 2 dates are *HIGHLY* tentative.

Thurs. Mar. 6	Exam 1
Tues. April 22	Exam 2
Mon. Feb. 4	Add/Drop Deadline
Mar. 10 - Mar. 14	Spring Break - Classes Cancelled
Mon. Mar. 24	Registration Begins
Mon. Mar. 31	Withdrawal Deadline