

Syllabus for Math 28, Winter 2008

Introduction to Combinatorics

Instructor: Rebecca Weber

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Office Hours: Mondays 4-5, Wednesdays 2-3, Thursdays 1-2, and by appointment

Webpage: www.math.dartmouth.edu/~m28w08

Course Meets: 12 hour, 12:30-1:35 MWF, Haldeman 028

X-hour: Tuesday 1:00-1:50

Textbook: *Combinatorics Through Guided Discovery*, Ken Bogart (Copy Center)

General Information

Math 28 is a course in combinatorial mathematics. Combinatorics is a branch of mathematics that studies sets (usually finite) of objects that satisfy some properties. In particular, it is concerned with “counting” the objects in a set (enumerative combinatorics), with determining when an object with a required list of properties exist, with constructing and analyzing objects meeting certain properties (as in combinatorial designs and matroid theory), with finding “largest”, “smallest”, or “optimal” objects (extremal combinatorics and combinatorial optimization), and with finding algebraic structures these objects may have (algebraic combinatorics).

Course Organization

Discussion, discussion, presenting at the board, discussion, group work, discussion. “Guided discovery” means learning not by listening to a lecture, but by working carefully-chosen exercises designed to take you from square one to a deep understanding of the material, and then provide you with the vocabulary to discuss your findings. Each day we will have practice problems to discuss; I do not expect you to have perfectly worked all of these out, but you should have worked on all of them to some degree. The simple ones, which I *can* expect you to have fully worked out, may be presented at the board. There will sometimes be overlap between the practice problems and the graded problems, which will hopefully be to your advantage; those problems are often ones which require careful writing even after the content has been worked out.

X-hour will be used the week of January 21 and occasionally for supplemental material as needed.

Exams

There will be one midterm and a final exam. The midterm will be held **Tuesday, February 12, 5-7 PM**. If you have a conflict (excused absence) let me know as soon as possible. At the moment I expect the midterm will cover the material through the February 4th class period; we have a review day scheduled for the 6th and the 8th is Winter Carnival. On February 11th class will be held as usual but the material covered will not be on the midterm. The registrar has scheduled our final exam for **8:00 AM, Tuesday, March 11**. It will be cumulative, though I may explicitly omit topics at that time.

Homework

Homework will be assigned daily (listed as “graded problems” on the website) and due approximately weekly. Please put your name and the due date on each page of your write-up and number the pages. Identify each problem by section and number, and please state the problem before giving your solution (you may abridge or condense when appropriate). Write legibly or type (I am happy to help if you wish to do write-ups in LaTeX, what this syllabus is written in; if you are considering graduate school this is an especially useful bit of knowledge) and leave plenty of room for comments.

Grading (per problem or part) will be on a scale of 0 to 5, as follows:

- 5: The problem and the solution are explained thoroughly, clearly, and completely. It is easy to read and understand, is correct, and contains nothing extraneous. It shows a deep understanding of the problem, includes all necessary details, and addresses any subtleties. Scores of 5 will be assigned very selectively.
- 4: The solution is correct and written up clearly and completely, with at most minor omissions, tangents, or errors.
- 3: Either the solution is correct but unclearly written, or it is clear but only partially correct, with some significant error.
- 2: The solution is only partially correct, with some significant error, and the explanation is also unclear, incomplete, or includes nonsense, irrelevancies, or egregiously misused terminology or notation. A 2 may also be given for a good explanation of a completely incorrect solution, or a strong attempt at a solution which did not get anywhere.
- 1: It is apparent some reasonable attempt was made to solve the problem.
- 0: No attempt was made or what is written is so incoherent that it fails to communicate the fact that an attempt was made.

You may interpret the numbers roughly as letter grades, where 4 is an A, 3 a B, etc.

Attendance and Participation

In a small discussion-oriented course participation is a significant component. Class participation will be part of your grade, and will be based on the following: Are you present in class? Are you prepared? If the class divides into small groups, do you fully participate in your group’s work? Do you contribute to class discussions, or present homework solutions to the class, when you are asked to? Class participation grades are not based on whether you talk a lot or say brilliant things, but whether you contribute regularly and meaningfully.

Grading

Your course grade will be based on:

participation and attendance (10%),
written homework (40%),
midterm exam (20%),
final exam (30%).

Disabilities

I encourage any students with disabilities, including “invisible” disabilities such as chronic diseases and learning disabilities, to discuss appropriate accommodations with me, which might help you with this class, either after class or during office hours. Dartmouth College has an active program to help students with disabilities, and I am happy to do whatever I can to help out, as appropriate.

The Student Disabilities Coordinator, Nancy Pompian, can be reached at 6-2014 if you have any questions. Any student with a documented disability requiring academic adjustments or accommodations is requested to speak with me by the end of the second week of the term. All discussions will remain confidential, although the Academic Skills Center may be consulted to verify the documentation of the disability and advise on an appropriate response to the need. It is important, however, that you talk to me soon, so that I can make whatever arrangements might be needed in a timely fashion.

The Honor Principle

Students are encouraged to work together to do homework problems. What is important is a student’s eventual understanding of homework problems, and not how that is achieved.

The honor principle on homework: What a student turns in as a homework solution is to be his or her own understanding of how to do the problem. Students must state what sources they have consulted, with whom they have collaborated, and from whom they have received help. Students are discouraged from using solutions to problems that may be posted on the web for previous offerings of the course, and as just stated, must reference them if they use them. The solutions you submit must be written by you alone. Any copying (electronic or otherwise) of another person’s solutions, in whole or in part, is a violation of the Honor Code. For instance, it is a breach of the honor code to read the solutions of someone else in order to write your solution.

The honor principle on exams: Students may not give or receive assistance of any kind on an exam from any person except for the professor or someone explicitly designated by the professor to answer questions about the exam.

If you have any questions as to whether some action would be acceptable under the Academic Honor Code, please speak to me and I will be glad to help clarify things. It is always easier to ask beforehand than to have trouble later!