

UNIVERSITY OF CALIFORNIA-BERKELEY
DEPARTMENT OF MATHEMATICS
Math H90, Fall 04

Lectures/discussions.

Time MF 4-6 p.m.
Place 71 Evans Hall

Instructor.

Name Olga Holtz
Office 821 Evans Hall
Telephone 642-2122
Email holtz@math.berkeley.edu
Office hours MF 11 a.m. to midday
and by appointment

Goals of the course. The main goal is to make every student in class a better problem solver. An important secondary goal is to train those of you who are going to take part in the Putnam to solve Olympiad-type math problems.

Approximate content of the course. Mathematical induction. Integer and prime numbers. Congruence. Rational and irrational numbers. Complex numbers. Progressions and sums. Diophantine equations. Quadratic reciprocity. Basic theorems and techniques from algebra. Polynomials. Inequalities. Extremal problems. Limits. Integrals. Series. Differential equations. Combinatorial counting. Recurrence relations. Generating functions. The inclusion-exclusion principle. The pigeonhole principle. Combinatorial averaging.

Books. We will use a number of problem books from International Olympiads and the Putnam competition. Some are listed on the course website.

Format of the course. My intent is to spend roughly half of each class to discuss informally (no lecturing!) one of the topics covered in the Putnam test and International Olympiads and the other half doing problems. Active participation from every one of you is a must!

Homework and grading. Typical homework will consist of 12 Olympiad/Putnam-type problems per week. Expect harsh grading. Don't take it amiss. It is meant to imitate the actual grading on the Putnam test and to improve your math writing skills. Also, don't despair if you cannot solve some of the problems. Very few undergraduates can solve these problems easily. You will get better if you persevere and keep learning.

This class is not about grades, it is about fun, challenge, and hard work. Naturally, I will (have to) assign grades after all, which will be based on your personal progress in class. You also have the option of taking the class on the P/NP basis if you wish.

Class email. I welcome communication by email and intend to send homework-related email to the class.

Class website. <http://www.cs.berkeley.edu/~oholtz/H90/>