

MAT 495: PROBLEM SOLVING SEMINAR

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1. DESCRIPTION

Problem solving is an essential aspect of mathematics, and one which can become neglected when faced with the enormous task of assimilating the undergraduate mathematics curriculum. The purpose of this course is to introduce students to methods of problem solving with an eye towards preparation for the William Lowell Putnam competition. We will cover problems that are relatively elementary yet require a great deal of creativity to solve, which can be developed through systematic training.

2. FORMAT

The class will be highly interactive, as the whole point is to practise solving problems! On Mondays a topic will be introduced and several practise problems will be taken up on the board by me, with help from the students. Then students will split up into groups and work on problems. Later, volunteers will present on the board. Wednesday we will mostly take up solutions to problems, and possibly work on more problems from the same topic as time permits.

Expect plenty of class presentations! Being forced to talk through your thoughts is a great way to improve your problem-solving abilities.

3. GRADING

There will be weekly homework sets, and homework will make up 60% of the course. Each week, each student must submit solutions to 4 problems to be graded. Problems will have a wide range of difficulty, so everyone should be able to find 4 they can solve, regardless of their level. An additional 20% will be class presentations. That is, every student must present a solution on the board at least three times during the course. Finally, there will be a take-home test worth 20%.

Note, the course cannot be taken as CR/NCR.

4. SYLLABUS

The set of topics is to be as follows throughout the weeks:

- (1) Pigeonhole Principle and Induction
- (2) Invariants
- (3) Recurrences

- (4) Games
- (5) Number Theory
- (6) Probability
- (7) Generating Functions
- (8) TBD
- (9) TBD

5. MEETING TIMES

We will meet on Monday 12-2 and Wednesday 12-1 in AP 120.

6. OFFICE HOURS

Tuesday 4-5 in my office (HU 1001 B).

7. CONTACT

If you have questions, please e-mail me at jacobt@math.toronto.edu with MAT495 in the title. This will ensure that I don't miss your e-mail, as there may be many at the beginning!