Syllabus for MATH 300 – Problem Solving Seminar
Winter 2009
Monday 3:30−5:30pm, Towers 117

Lecturer: Mr. Matthew McMullen
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The prerequisite for this class is a B or better in MATH 180, or permission of the instructor.

Office hours: MWF 9−9:50am, TR 11−11:50am, and by appointment. Please do not hesitate to visit me during my office hours, or anytime I am in my office, if you need extra help. In addition to this, I will be tutoring in the Math Lab on the second floor of the library MTWRF 12−1pm. You can also email me or call me with whatever problems you may have.

Course: The title of this course is "Mathematical Problem Solving Seminar." We will be studying problem solving techniques and the major mathematical ideas behind second year undergraduate-level problems. You will have extensive practice solving and presenting such problems individually and in groups. Our main goal is to prepare for the ECC (East Central Colleges) Math Competition held in the spring, which all of you are strongly encouraged to attend.

Materials: There is no official textbook for this course, but *How to Solve It*, by George Pólya is an excellent reference.

Attendance: You are expected to be present at all classes. This is especially important since we meet only once a week.

Grades: The course is graded pass/fail, so grades are not really a concern for us. Also, since this course is one credit hour, there won't be a heavy workload homework-wise. We will not be having a final exam in this course.

Academic integrity: It goes without saying that cheating and plagiarism is not tolerated in this course, or any other. If you are guilty of such an act, you will receive a zero for the assignment and I will report the offense to Academic Affairs. More information about this policy can be found in the student handbook.

Closing remarks: In preparing for this course, I have made a short and incomplete list of the tools that are needed by any serious math problem solver at the undergraduate level. In no particular order:

- pigeon-hole principle
- induction (strong and weak forms)
- differential calculus (esp. L'Hospital's rule)
- integral calculus
- sequences and series (geometric, arithmetic, telescoping, Riemann sums)
- harmonic/geometric/arithmetic mean inequality
- number theory (incl. modular arithmetic)
- geometry and trigonometry
- probability and statistics

I intend to cover many of these topics as they relate to problem solving; but, beyond that, I hope that you come away from this course with a better understanding and appreciation of mathematics.