

MA 170 AN INTRODUCTION TO MATHEMATICAL PROBLEM-SOLVING (FALL 2014)



Time and Place. T, Th 9:30-10:30, E382

Instructor. Dr. Gabriela Sanchis, 384 G Esbenshade Hall, Office Phone: 361-1339

E-mail. sanchisgr@etown.edu

Office Hours. M: 1:30-3:30; T: 1:30-3:00; W:9:30-10:50; Th: 1:30-2:30; and by appointment.

Prerequisites. Placement

Content. The course does not include any new mathematical content, but rather seeks to teach students how the mathematics they already know can be useful for solving new and interesting problems. Students will learn strategies, tactics and tools useful for solving a variety of mathematics problems.

Learning Outcomes.

- Students will be able to intelligently apply problem-solving strategies to solve many different types of problems.
- Students will gain an appreciation for the qualities that are necessary to succeed in solving mathematics problems, such as persistence, self-confidence, and a willingness to think of and try a different approach (or several approaches) when the first one fails
- Students will be able to communicate solutions to problems, both orally and in writing, in a way that is understandable to their peers.

Attendance. You are expected to attend all classes. Class presentations and discussions are a significant part of the course, and the class only meets two hours each week, so more than two absences during the semester will result in a lower grade. If you do miss a class, it is your responsibility to obtain from a classmate any notes, assignments, handouts, or anything else you may have missed.

Problem Sets. There will be weekly problem sets.

- Each Thursday a new set of problems will be handed out. Students will work on these problems during class. At the end of class I will collect your solutions.
- I will then divide you up into teams of 2 (or 3). Each team will continue to work on problems to complete (together) a minimum of ten problems (including the ones solved in class, which you should teach each other). They will then choose 2 (or 3) of those problems and make video presentations of the solutions, upload the videos to YouTube, and post the link on Blackboard (add a thread for each team). You should make a separate video for each problem. This should be done by Monday evening. Go to the Google spreadsheet posted on Blackboard and enter your problem list and the problems that you intend to make videos for. This way you can see which videos each team intends to make. Try to pick problems for your videos that others have not picked, so we get a good representation.
- On Tuesday, each team will be asked to present the solution to one (randomly chosen) problem from their list (other than the ones for which they made videos). We will also discuss problems that nobody got.

Exams. There will be two in-class exams (October 2 and November 13). Most of the problems will be identical (except for changing numbers) to ones discussed in class. Ten percent of each test will consist of new problems, but their solutions will involve tools and techniques discussed in class.

Final Exam. The comprehensive final exam is schedule for Thursday December 11, 7:30 to 10:30 a.m. It will have the same format as the two in-class exams.

Grading.

- – Problem sets, videos, and presentations (45%):
 - * Problems in each problem set carry a point value according to their difficulty (1, 2, or 3 points). You will be awarded the corresponding point value for each problem you solve in class, and one point for each problem you solve outside of class. You should solve the problems yourself and not Google for solutions (but if you do you must confess). However discussing with classmates and/or with me is allowed and encouraged.
 - * Each video you submit will be graded out of five points. To receive full credit, your solutions must be clear, correct, and polished (so rehearse it once or twice before filming). Make sure any writing is legible, any pictures are labeled, and you enunciate clearly.
 - * Each class presentations will also be graded out of 5 points. To obtain full credit, solutions must be clear and correct, and both members of the team must participate in the presentation (so when you get together during the week to work on problems and make your videos, you should plan out how you are going to present).
 - * Additional points can be earned as follows (you can work either alone or in a team of 2):
 - You may submit a video presentation from past problem sets for a problem for which no one else has done a video. (a maximum of 4 points can be earned for each video). Use the sign-up sheet on Blackboard, so other students will know not to do the same problem.
 - You may solve a bonus problem (that no one else has solved) and make either a video or in-class presentation (number of points awarded will be decided on a case-by-case basis, but generally speaking a correct solution to a journal problem can be worth up to 10 points, especially if you are willing to write up the solution (with my help) for submission to the journal). For these problems I will allow teams of up to 3 students.
 - * For this part of your grade, 250 points will be regarded as a perfect score.
- Two in-class exams (15% each)
- Final Exam (25%)
- Course grades will be calculated according to the following weighting:
94-100 A; 90-93 A-; 87-89 B+; 83-86 B; 80-82 B-; 77-79 C+; 73-76 C; 70-72 C-; 67-69 D+; 63-66 D; 60-62 D-; below 60 F

Academic Integrity. All work must be one's own and must comply with the Standards of Academic Integrity defined in the Elizabethtown College Catalog (see <http://catalog.etown.edu/> and then click on **Academic Policies** in the menu on the left, and then on **Academic Judicial System**). In particular, solutions to problems should be your own. You are discouraged from Googling for solutions, but if you do you should include the citation in your presentation.

Disability. Elizabethtown College welcomes otherwise qualified students with disabilities to participate in all of its courses, programs, services, and activities. If you have a documented disability and would like to request accommodations in order to access course material, activities, or requirements, please contact the Director of Disability Services, Lynne Davies, by phone (361-1227) or e-mail daviesl@etown.edu. If your documentation meets the colleges documentation guidelines, you will be given a letter from Disability Services for each of your professors. Students experiencing certain documented temporary conditions, such as post-concussive symptoms, may also qualify for temporary academic accommodations and adjustments. As early as possible in the semester, set up an appointment to meet with me, the instructor, to discuss the academic adjustments specified in your accommodations letter as they pertain to my class.