

MA322/422 Abstract Algebra Summer 2007

Instructor: Louis Friedler

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Office Hours: As posted

Text: Joseph A. Gallian, *Contemporary Abstract Algebra*, 6th Edition, Houghton Mifflin, 2002.

Text webpage: <http://www.d.umn.edu/~jgallian>

Prerequisite: Linear Algebra

Objectives: The objective of this course is to introduce the student to algebraic systems, especially groups. In addition, the student will be expected to use the language and symbols of these systems, give specific examples of abstract concepts, construct proofs within the system, and develop an appreciation of the beauty of such systems.

This is a second course in proof-techniques; it is assumed that the student has had a course in linear algebra in which he/she learned to prove that a given system satisfied a particular property. The student will reinforce this "template" approach and develop strategies to attack new problems. These strategies will prove useful in other courses and for general mathematical problem-solving.

Mathematicians value clear and concise writing. The student will improve his/her mathematical writing by listening to the instructor's critiques, by studying the examples of good writing which appear in the text or are presented in class, and by completing the assigned problems. Each student will be judged on his/her logical reasoning as expressed in writing. The ability to listen, to reason, and to write and speak clearly and concisely is more valued in this course than the ability to respond quickly.

Grades: Grades will be based on two exams, a final exam, and quizzes and written assignments. Homework will be regularly assigned and may be done with other students except when the instructor indicates that it will be collected and graded; then it must be solely the work of the individual student. (See the section on Academic Honesty.) Parts of the exams may be "take-home" and so will also follow these guidelines. Late papers will not be accepted. "C" students should be able to do mechanical problems, "B" students should be able to write "template" proofs, and "A" students should be able to begin proofs of new results.

Attendance: There are only 11 class sessions this summer. (**Note that class will not meet on Memorial Day.**) Missing one class is equivalent to missing more than one week of classes during the semester. As a result, each student is expected to regularly attend class.

Academic Honesty: Each student must follow Arcadia University's Principles of Academic Honesty. These principles apply to in-class exams and to any out of class work which is counted toward the grade. These principles include, but are not limited to, the following: you may not communicate with any other person, copy or paraphrase a proof from any book, or read any one else's proof of an assigned problem. The first violation of these principles will result in a zero on

that assignment or exam. The second will result in an F for the course.

Cell phone policy: Each time a cell phone rings during class or a student leaves class to check a cell phone, that student will deposit one dollar in a basket. The resulting money will be used for class refreshments. (The instructor is not exempt from this policy.)

Food: It is fine to bring food to class, as long as you clean up after yourself.

Help: Help is available from me during posted office hours or by email.

Abstract Algebra
Summer 2007
Tentative Assignments

Text: J Gallian, *Contemporary Abstract Algebra*, 6th Edition.

All assignments are due the next class after the material has been covered in class.

Chapter 0: Preliminaries.

Problems: 2,7,9,13,16,18,19,22,48,50 + others to be assigned

Chapter 1: Introduction to Groups

Problems: 3-6,11,13,15

Chapter 2: Groups

Problems: 1,3,4,7a,9,11,13,14,16,17,24,28,33,37.

Computer exercises: 2

Chapter 3: Finite Groups; Subgroups

Problems: 1be,4-6,8,9,12,14,15,17,20,21,28,33,35,38a, 43,47

Computer exercises: to be assigned

Chapter 4: Cyclic Groups

Problems: 1,3,5,6,7,11,13,14,21,22,23,40,42,45,51,53,54,

Computer exercises: 1

Chapter 5: Permutation Groups

Problems: 1-4,9a,12,15,17,18,19,25,26,41,46,55

Chapter 6: Isomorphisms

Problems: 1,2,4,6,9,10,14,15,16,18,25,30,41

Chapter 7: Cosets and Lagrange's Theorem

Problems: 1,2,13,18,21,23,25,26,30

Chapters 8: External Direct Products

Problems: 1,2,4,5,6,8,23,47,57+ others to be assigned

Computer exercises: 4

Chapters 9-11: Normal subgroups, Fundamental Theorem of Abelian Groups

Problems to be assigned as time allows

Chapter 12: Introduction to Rings

Problems: 1,2,6,14,15,17,37,43 + others to be assigned

Computer exercises: 1

Chapter 13: Integral Domains

Problems to be assigned as time allows.

Tentative dates for exams: June 6, June 25. Final exam: June 27