Department of Mathematics
Math 2020
Algebra 1, Winter 2016.

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Course website: `http://server.math.umanitoba.ca/~claya/math2020_2016.html`
This website contains all the information on this sheet, but will also contain any notes, assignments, etc.

Textbooks: The course will follow the book *Abstract Algebra: Theory and Applications* by Thomas W. Judson, which is available for free online at this address:

`http://abstract.ups.edu/download/aata-20150812.pdf`.

Course plan (approximate):

Week 1: Chapter 1–Introduction to proofs, basic set theory, functions, equivalence relations.

Week 2: Chapter 2–The integers, including induction, divisibility, GCD, LCM, and unique factorization.

Week 3: Chapter 3–Modular arithmetic and symmetry groups, definitions and examples of groups and subgroups.

Week 4: Chapter 4–Cyclic groups, cyclic subgroups and the lattice of subgroups, complex numbers as an example of a group and roots of unity as a subgroup.

Week 5: Chapter 5–Permutation groups, dihedral groups.

Week 6: Chapter 6–Cosets and Lagrange's theorem, Fermat's and Euler's Theorems if time allows.

Week 7: Chapter 9–Isomorphisms of groups, direct products of groups, beginning of normal subgroups.

Week 8: Chapter 10–Normal subgroups and quotients, simplicity of the alternating group.

Week 9: Chapter 11–Homomorphisms of groups, and introduction to rings (definitions).

Week 10: Chapter 16–Rings and subrings, integral domains and fields, examples.

Week 11: Chapter 16 continued–More supplementary examples, matrix groups, groups of linear operators, ideals and quotient rings.

Week 12: Chapter 17–Polynomial rings, the division algorithm, ideals.

Week 13: Chapter 18–Integral domains, field of fractions.

Marking:
Midterm 1: 25%
Midterm 2: 25%
Final exam: 50%

Academic Dishonesty: The Department of Mathematics, the Faculty of Science and the University of Manitoba regard acts of academic dishonesty in quizzes, tests, examinations or assignments

as serious offenses and may assess a variety of penalties depending on the nature of the offense. Acts of academic dishonesty include bringing unauthorized materials into a test or exam, copying from another student, plagiarism and examination personation. Students are advised to read Section 7 (Academic Integrity) and Section 4.2.8 (Examinations: Personations) in the "General Academic Regulations and Requirements" of the current Undergraduate Calendar. Note, in particular that cell phones and pagers are explicitly listed as unauthorized materials, and hence may not be present during tests or examinations.

Penalties for violation include being assigned a grade of zero on a test or assignment, being assigned a grade of "F" in a course, compulsory withdrawal from a course or program, suspension from a course/program/faculty or even expulsion from the University. For specific details about the nature of penalties that may be assessed upon conviction of an act of academic dishonesty, students are referred to University Policy 1202 (Student Discipline Bylaw) and to the Department of Mathematics policy concerning minimum penalties for acts of academic dishonesty.

The Student Discipline Bylaw is printed in its entirety in the Student Guide, and is also available on-line or through the Office of the University Secretary. Minimum penalties assessed by the Department of Mathematics for acts of academic dishonesty are available on the Department of Mathematics web page.

All Faculty members (and their teaching assistants) have been instructed to be vigilant and report incidents of academic dishonesty to the Head of the Department.