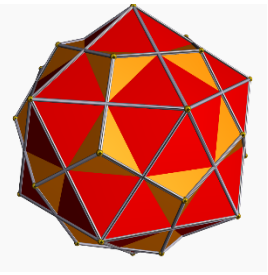
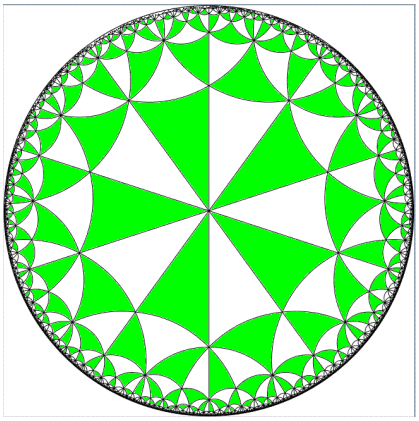
UNIVERSITY OF NEBRASKA AT OMAHA



MATH 4110/8116 Abstract Algebra I

TR 5:30-6:45pm PM | Dr. Griff Elder

Topic: Group Theory past Cayley's Theorem and through the Sylow Theorems.



Pre-requisites:
MATH 4050/MATH 8056 with a C- or better or MATH 4560/MATH 8566 with a C- or better or permission of instructor.

Course Description: Group Theory is the study of symmetry in the broad sense of "reversible transformations that preserve some kind of structure." While applications are not the focus of the course, they abound. Symmetries appear everywhere: In geometries and in formulas; in physical laws, molecules and crystals; and of course, in music and in art.

Group Theory is also the first topic covered in Abstract Algebra. The other two, which are covered next Spring Semester, are Ring and Field Theory. Groups have one operation. Cayley's Theorem says that this operation is functional composition. Rings and fields have two: one called addition and the another called multiplication.

For More Information:

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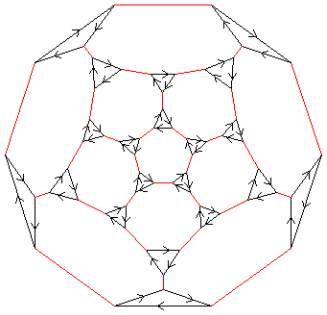
Abstract Algebra is where one discovers that the "normal" algebra that we use on the Real and Complex Numbers is only one of many algebras. This is similar to learning that the stars in the sky are really "suns" in their own right. That something that you thought was unique (the Sun) is only one of an almost infinite class of similar object. Abstract Algebra unifies many topics learned at earlier stages of mathematics: Matrices, polynomials, vector spaces, and modular arithmetic. It filters out technical details, while focusing on features that unify. This is of great value. Once you learn about groups, rings, fields; it becomes impossible to "un-see" them.

Textbook: *Contemporary Abstract Algebra* by Gallian, 8th edition. **Note:** This is not the current edition. The 9th edition contains errors that the 8th doesn't have.

Workload: Mathematics requires active engagement. In a typical week, there will be one day devoted to the presentation of new material, and one day devoted to the solving of problems that build towards a weekly Proof Set of 6 proofs (7 for graduate students). Proof is how we communicate. I will communicate to you through proof. You will communicate back to me through proof.



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