



Experiments in Algebra

Directors: Professors Jonathan Rosenberg and James A. Schafer

Prerequisite: Math 403. Any of Math 404, 405, or 406 would also be useful but is not required.

Meetings: About once a week.



Experiments in Algebra

Participants will get a chance to do non-trivial calculations in algebra, and to see serious examples of hard theorems.

Calculations will be done with computer programs such as *Magma*, *Magnus*, and *Mathematica*.



Experiments in Algebra: Sample Problems

- Find units in group rings. In working on this problem, you can learn the connection with *Whitehead groups* in topology.
- Find fundamental units, class numbers of number fields. These are problems of great importance in number theory. Along the way, you will get a chance to learn about *Pell's equation* and the *class number formula*.



Experiments in Algebra: More Sample Problems

- Compute *Schur multipliers* of finite groups, and try to find the corresponding central extensions. This is a problem of great importance in group theory, and gives you a chance to learn about group presentations and the extension problem for groups.