

**Undergraduate Math Club
Fall 2007
2nd floor Nesbitt Common Room
September 13, 4:10-5:00pm
(free pizza and pop, as always)**

The regular 17-gon

Professor Brian Conrad

Abstract

At the end of the 18th century, the teenage Gauss stunned the mathematical world by constructing a new regular polygon with straightedge and compass. Whereas the ancient Greeks could construct regular triangles, squares, and pentagons in this way (and some others easily made from these by bisecting sides, etc.), no further progress had been made in 2000 years on whether or not it was possible to construct a regular 7-gon or beyond. Gauss' insight was that this apparently geometric problem is really a problem in arithmetic, and that to discover new constructions or prove impossibility results in this direction one had to carry out an arithmetic rather than geometric investigation.

In this talk we will explain some basic construction principles that translate the geometric problem into algebra, and then we show how to use some arithmetic to actually carry out the construction of a regular 17-gon.