"There are three kinds of people - those who can count and those who can't."

The Trivial Notions Seminar
Proudly Announces

How to count like Michel Chasles (and not like Jakob Steiner)

A talk by

Jack Huizenga

Abstract

How many plane conics are tangent to each of five fixed plane conics? Jakob Steiner proposed this problem in the early 19th century, and claimed that there were in fact 7,776 of them. His solution was accepted for some sixteen years before Michel Chasles found an error and proved the correct answer was actually 3,264. We will see Steiner's blunder, and discuss two different ways of rectifying it. Our first approach will be to consider an unusual compactification of the parameter space for the problem. Using this new parameter space, we will compute Chasles' answer. We will also discuss another, more modern, approach to the problem. By way of example, suppose we have three surfaces in $\mathbb{P}^3$, of degrees d, e, and f. By Bezout's theorem, we would suspect that they intersect in def points. But what if they intersect in some number k of isolated points and also a curve C? We would like to say that the curve C "counts" for $def - k$ points. What should be surprising is that we can actually say how many points C "counts" for just by knowing what C is. A variant of this idea can be used to solve the five conics problem.

Thursday, September 10^{th} at 2:07 pm
Science Center 507