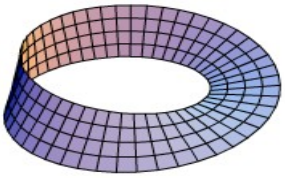
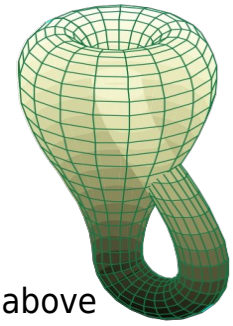
Math 370: Real Analysis



Fall 2013
Instructor: Glen Pugh

The fundamental constructs of calculus, the derivative and the integral, owe their existence to the notion of the limit. In calculus, limits are often explained with a few pictures and a generous dose of hand waving, but what exactly is a limit, and why is it important? The subject of Real Analysis answers these questions by providing the rigorous framework needed to precisely define limits and related concepts. In this course we will begin with some basic set theory on the real numbers, then develop the techniques necessary for the examination of limits, continuous functions, derivatives and integrals. From there we will rigorously establish some of the most important and fundamental results from calculus: the Mean Value Theorem, Taylor's Theorem and the Fundamental Theorem of Calculus.

There is much more to real analysis than mere calculus proofs. Strange and unexpected results emerge which are consequences of the formal definition of the limit: can a function be continuous yet not differentiable at any point? (yes!) Can an increasing function be such that f(0)=0, f(1)=1 yet f has an infinite number of finite jumps between 0 and 1? (again, yes!) These interesting digressions aside, analysis is **THE** language necessary for advanced study in differential equations, complex variables, analytic number theory, probability theory, and the list goes on... take the course to find out more!



Course Details

Prerequisites:

- Math 121/122 or 100/101
- Math 123
- At least 6 credits of math courses numbered 200 or above (excluding Math 203)

Credits: 3; class meets three hours per week

Text: No purchased text required. We will use one of several online texts available and supplementary material will be on library reserve.

Evaluation: Assignments, tests, final exam.