

## MATH 220 Writing Assignment

Fall 2005, Section 903

The writing assignment will consist of a five to ten page paper which is due in final form on December 1. The topic may be a major theorem (e.g., Fermat's last theorem), a problem that remains unsolved but has led to a substantial amount of mathematical activity (e.g., the Riemann hypothesis), or an important mathematical concept (e.g., the axiom of choice). Regardless of the choice of topic, the paper should contain a discussion of at least one major theorem, including an explanation of the proof, an indication of its historical context and significance, and some biographical background on the mathematician(s) involved. A first draft of the paper is due on October 27, a week after which I will return it with some feedback. Your choice of topic is to be submitted to me by September 20.

The following is a list of suggested topics.

- Fermat's last theorem
- Fourier series
- construction of the real numbers
- Szemerédi's theorem
- public key cryptography
- Poincaré conjecture and Thurston's geometrization conjecture
- prime number theorem
- Atiyah-Singer index theorem
- sphere packing problem (Kepler's conjecture)
- four color problem
- Sullivan's dictionary
- Julia and Mandelbrot sets
- Riemann hypothesis
- axiom of choice
- continuity
- the party problem and Ramsey numbers
- Brouwer's fixed point theorem
- aperiodic tilings
- Euler characteristic
- Stirling's approximation
- Ornstein's theorem
- continuum hypothesis