Math 459, Spring 2006
Senior Project Ideas 2

1. Write an exposition about the proof of Gödel’s incompleteness theorems.

2. The axiom of choice is a somewhat controversial axiom, in particular because it is equivalent to the well ordering axiom (as well as Zorn’s lemma). Explore the proofs of the equivalence of these three axioms, and discuss the controversy surrounding them.

3. There are several additional axioms for ZFC which have been proposed to fill the gap left by the undecidability of the continuum hypothesis. What are these other axioms? What is known about their strengths, weaknesses, equivalences, as well as consistency?

4. As mentioned in the text, there are other axiomatic systems which have been suggested to take the place of ZFC. Describe these other sets of axioms, their weaknesses and strengths, and their acceptance by the mathematical community.

5. One way to get around Gödel’s theorems is to use a different system of logic. What are some of these other proposed systems? What are their weaknesses, strengths, and general acceptance by the mathematical community?