MATH 220 Writing Assignment
Fall 2014

The following is a list of possible topics. Feel free to choose another topic as long as you check with me first to be sure the topic is suitable. You must tell me what your topic is by Thursday, 02/05. **You must each do a different topic with topics picked on a first come/first served basis.**

1. Bernoulli numbers
2. Fractal patterns
3. The golden ratio
4. Fibonacci numbers
5. Pascal's Triangle and its applications
6. Error-correcting codes, especially linear or matrix codes
7. The pigeonhole principle
8. The Tower of Hanoi
9. Euler Characteristic
10. The five color problem (All planar graphs can be colored using at most Five colors so that no two countries with a common borderline have the same color. Actually four colors are enough but that is beyond this course.)
11. The Königsberg bridge problem (or Eulerian Circuits).
12. Sphere packing problem (Kepler's conjecture).
13. Latin squares (note: latin squares were first used in agricultural experiments)
14. Infinity (Hilbert's discussion of the "Grand Hotel" is a good starting point for this topic)
15. Ciphers or cryptography (secret codes)
16. Game theory and the prisoner's dilemma
17. Platonic solids
18. Crystal structures and symmetry
19. Tilings (e.g., the chess problem of the knights)
20. Knots and braids
21. Little Fermat's theorem and RSA codes
22. Democratic elections and Arrow theorem
23. Finite automata (including the game Life)
24. Göedel incompleteness theorem

    **Feel free to choose another topic as long as you check with me first to be sure the topic is suitable For example:**

25. A major theorem (e.g. Fermat's Last Theorem)

26. A problem that remains unsolved but has led to substantial mathematical activity (e.g. the Riemann Hypothesis)

27. An important mathematical concept (e.g. the axiom of choice)).

28. Proofs of impossibility (e.g. equations of 5th order, classical Greek problems)