

MATH 220-905 Writing Assignment  
Fall 2013

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 the end of my office hours on Monday, 16 September 2013. **You must each do a different topic with topics picked on a first come/first served basis.**

1. The golden ratio
2. Fibonacci numbers
3. Pascal's Triangle and its applications
4. Error-correcting codes, especially linear or matrix codes
5. The pigeonhole principal
6. The Tower of Hanoi
7. Euler Characteristic
8. 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.)
9. The Koenigsburg bridge problem (or Eulerian Circuits).
10. Sphere packing problem (Kepler's conjecture).
11. Latin squares (note: latin squares were first used in agricultural experiments)
12. Infinity (Hilbert's discussion of the "Grand Hotel" is a good starting point for this topic)
13. Ciphers or cryptography (secret codes)
14. Game theory and the prisoner's dilemma
15. Platonic solids
16. Crystal structures and symmetry
17. Tilings (e.g., the chess problem of the knights)  
*Feel free to choose another topic as long as you check with me first to be sure the topic is suitable*  
*For example:*
18. A major theorem (e.g. Fermat's Last Theorem)
19. A problem that remains unsolved but has led to substantial mathematical activity (e.g. the Riemann Hypothesis)
20. An important mathematical concept (e.g. the axiom of choice)).