HOMEWORK 2 - MATH 110
DUE DATE: Friday, September 20
INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each problem is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Suppose that you were able to take a large piece of paper of ordinary thickness and fold it in half 50 times. What is the height of the folded paper? (Look on the web for a reasonable estimate of the "ordinary" thickness.)

2. Suppose that 370 people are attending a party? Are there two people in the party having the same birthday?

3. What proportion of the first 1,000 numbers have a 3 somewhere in them? What proportion of the first 10,000 numbers have a 3? Explain why almost all million-digit numbers contain a 3.

4. By experimenting with numerous examples in search of a pattern, determine a simple formula for $(F_{n+1})^2 + (F_n)^2$, that is a formula for the sum of the squares of two consecutive Fibonacci numbers.

5. By experimenting with numerous examples in search of a pattern, determine a formula for $F_n + L_n$, that is a formula for the sum of a Fibonacci number and the corresponding Lucas number.

6. Let's start with the numbers 0,0,1 and generate future numbers in our sequence by adding up the the previous three numbers. Write out the first 15 terms in this sequence, starting with the first 1. Evaluate the values of the quotients of consecutive terms (dividing the smaller term into the larger one). Do the quotients seem to be approaching a fixed number?