MA202:004 Problem set 4

February 16, 1999

Below are the problems that have not been collected yet. No new problems are assigned. I am handing out this revised sheet to correct errors and provide a few hints. We will discuss problems on Thursday and I will collect notebooks on Tuesday, 16 February. I hope to collect the rest of set 3 and part of set 4. I will give a list of problems to be finished at the end of class on Thursday.

Set 3.

3. Section 1.4 #13 and 16.

   In #13, explain how the Fibonacci numbers arise in your answer. What is the relation between covering a $2 \times n$ diagram and covering smaller diagrams?

4. Section 1.5, #2 and 15.

   Hint: In #15, what is really important about the numbers and what part can you ignore? It might help to list pairs of numbers whose sum or difference is divisible by 10.

Set 4.

1. Carry out the sieve of Eratosthenes to find the primes up to 144. Explain what you have done.

2. Section 4.1, #26. In addition, try to explain why your guesses in part c) are correct. Can you find a formula to express F_m in terms of F_{m-2} and F_{m-3}?

3. If today is Wednesday, what day of the week will it be in 7^{950} days? What day will it be in 6^{950} days? What about 2^{333} days?

   Hint: As you are working on this problem, you might want to consider what day of the week it will be in 6^2, 6^4 days and so on. The number 6^{950} is too large for your calculator. What do we need to know to answer this question?

4. This problem is part of question 2.

5. If we take two consecutive Fibonacci numbers, F_{n-1} and F_n, what is the greatest common divisor, $GCD(F_{n-1}, F_n)$. Hint: Compute the GCD of pairs of Fibonacci numbers. What happens if you use the Euclidean algorithm?