Math 109 Fall 2016 Homework 3, due 10/14/2016 in HW boxes in the basement of AP&M by 3 pm

1 Reading and practice

Read Chapters 6-8 of Eccles. Do the end of chapter exercises as you read, and check your work against the answers in the back. These exercises are to test your understanding and they are not to be written up and handed in.

2 Exercises to submit on Friday 10/14

Exercises from the text

In the Problems I which begin on page 53, do #25.

In the Problems II which begin on page 115, do #2, 3, 4, 5, 7, 8.
(Remark: Ignore the book's advice to use truth tables in numbers 2 and 5; instead, write your proofs of these problems in the style of the proof of Theorem 6.3.4 in the text.)

Additional problem not from the text

A. Recall that the nth Fibonacci number u_n is defined inductively by putting $u_1 = 1$, $u_2 = 1$, and $u_{n+1} = u_n + u_{n-1}$ for $n \geq 2$. Prove by induction that u_n is even if 3 divides n and u_n is odd if 3 does not divide n. You may use in your proof the following facts: (i) an integer n is odd if and only if $n = 2k + 1$ for some integer k; and (ii) for every integer n, exactly one of the following occurs: $n = 3k$ for some integer k, $n = 3k + 1$ for some integer k, or $n = 3k + 2$ for some integer k. These facts will follow from the main result of Chapter 15 we cover later.