

Math 109 Winter 2015 Homework 3

Due 1/23/10 in HW box in basement of AP&M, by 3pm

Reading

All references will be to the Eccles book. Read Chapters 7-8 and do the end of the chapter exercises (do not write up) as you read along.

Assigned problems from the text (write up and hand in.)

Problems I p. 53: #17, 20, 21.

Problems II p. 115: #2, 4, 5.

(Remark: In class we did not use "truth tables" to prove facts about sets, and I don't find this method very helpful. Ignore the book's advice to use truth tables, and write your proofs of these problems in the style of the proof of Theorem 6.3.4 in the text.)

Additional problem (write up and hand in.)

1. Recall that the n th 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 fact we stated in week 1 that an integer n is odd if and only if $n = 2k + 1$ for some integer k . You may also use that for every integer n , either $n = 3k$ 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.