

MATH3250 COMBINATORICS READING HW 10

Instruction. Because you will be doing a lot of arithmetic, it might be more convenient to do this homework by hand. Use Bóna’s “A Walk through Combinatorics” textbook.

(OPTIONAL) MORE FIBONACCI/PINGALA NUMBERS

(If you are already very comfortable with Sec 8.1.1, you can skip this exercise.)

Try Ch 8 Exercise 5 in the book. Read and then explain the solution given in the textbook (page 196–197).

1. COMBINATORIAL PROOF FOR EXAMPLE 8.6

Write the problem of Example 8.6 (pg 170). Attempt to find a combinatorial proof using bijection (like in Chapter 3).

Read and then explain the solution given in the textbook (Ch 8 Exercise 13, page 200)

2. SECTION 8.1.2: THE PRODUCT FORMULA

Let f_n be the number of ways to pay n dollars using ten-dollar bills, five-dollar bills, and one-dollar bills only. Find the ordinary generating function $F(x) = \sum_{n=0}^{\infty} f_n x^n$. Use it to find a closed form formula for f_n .

Hints:

- Define three sequences, the number of ways to pay n dollars with tens, fives, and ones.
- Then use the product formula (Theorem 8.5) twice.
- Follow Example 8.6 and Example 8.8. Use partial fractions to complete the second part of the problem.
- Compare your answer with the book’s solution (Ch 8 Exercise 8, pg 198–199).

3. SEC 8.1.3 COMPOSITIONS OF GENERATING FUNCTIONS

Read page 177. Write down just Def 8.12 and Theorem 8.13.

4. EXAMPLE 8.14 USING THEOREM 8.13

Read page 178. Write down the problem ins Example 8.14. Explain *just the first paragraphs* of the solution, how Theorem 8.13 is used to solve this problem (you don’t need to copy the computation from the book).

5. SURVEY

- i. Approximately how much time did you spend on this homework?
- ii. Questions or comments?