

## MATH 173, FALL 2022, HOMEWORK #10

ALEX IOSEVICH

### 1. PROBLEMS NOT FROM THE BOOK

**Problem:** Consider, for example, a finite sequence of numbers 1, 2, 5, 9. Taking the sum of consecutive numbers, we obtain 3, 7, 14. Taking the sum of consecutive numbers again, we obtain 10, 21. You guessed it... we do this again and obtain 31.

The first row of the Pascal triangle contains 1, the second row has 1, 1, the third row 1, 2, 1 and the fourth has 1, 3, 3, 1. Observe that

$$1 \cdot 1 + 3 \cdot 2 + 3 \cdot 5 + 1 \cdot 9 = 1 + 6 + 15 + 9 = 31.$$

Is this a coincidence? Write the down the general statement of this phenomenon and prove that it works. We will put it to use later in the semester.

### 2. PROBLEMS FROM THE BOOK

Section 3.4, problem 12

Section 3.5, problems 1,2,3,4