

MATH3250 COMBINATORICS READING HW 5

Instruction. Please submit all sections. Both handwritten or typed solutions are accepted.

Read the first two pages of Sec 3.3 Choice Problems in Bóna's "A Walk Through Combinatorics" textbook, pg 50–51. Start with the "lottery drawings in Hungary".

1. BINOMIAL COEFFICIENT DEFINITION

Copy Def 3.15 for the *binomial coefficients* $\binom{n}{k}$.

2. BINOMIAL COEFFICIENT FORMULA

Copy Theorem 3.16 and write down the proof in the book. Add extra sentences to make the proof more clear.

3. COMPLEMENT

- i. Write down Def 3.17.
- ii. Let $S := \{1, 2, 5\} \subset [5]$ and write down S^c , the complement of S .
- iii. What is the complement of $[n]$, as a subset of itself?
- iv. What is the complement of \emptyset , as a subset of $[n]$?

4. AN IDENTITY FOR THE BINOMIAL COEFFICIENTS

Write the statements and proofs for Prop 3.18(1) and (2).

5. OPTIONAL

Read at least the problems given in Example 3.19 and 3.20 (on page 52), so that your brain can start thinking about them.

6. SURVEY

- i. Approximately how much time did you spend on this homework?
- ii. Any questions about this homework?