

HOME ASSIGNMENT 1 (MATH 184, SPRING 2022)

Read: Bona (Second ed.), sections 1.1-4, 2.1, 2.4.

Solve: Exc 3, 4, 17a, 21, 22 in §1.10, 33, 38, 44, 45 in §2.10, and the following problems:

I. Consider a jar with 30 red, 50 green and 80 black m&m chocolates. Choose randomly 20 of them. Compute:

- a) probability that no red are chosen
- b) probability all three colors are present
- c) probability there are exactly the same number of red as green
- d) probability there are exactly the same number of red as black
- e) expected number of red
- f) expected (number of green minus number of red)
- g) expected (number of red) times (number of green)

II. Let $\sigma \in S_{30}$ is a random permutation. Compute:

- a) probability that $\sigma(1) + 1 = \sigma(2) = \sigma(3) - 1$
- b) probability that $\sigma(1) < 31 - \sigma(2) > \sigma(3)$
- c) probability that $\sigma(1) + \sigma(2) = \sigma(3)$
- d) expected number of i such that $\sigma(i) = \sigma(i) + 1$
- e) expected number of i such that $\sigma(i) = i^2$
- f) expected number of i such that $\sigma(i) \in \{i - 1, i, i + 1\}$
- g) expected number of i such that $\sigma(i) + \sigma(i + 1) \leq 10$

This Homework is due Wednesday April 13, at 2:59:59 pm. (right before class). Please read the collaboration policy on the course web page. Make sure you write your name in the beginning and your collaborators' names at the end.

P.S. Each item above has the same weight.