MDS Probability theory seminar 2

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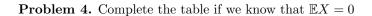
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Problem 1. Assume that we have a box with 5 white balls and 4 black balls. We take 3 random balls from the box. Let X be the number of white balls taken. Write probability distribution of X.

Problem 2. During the transmission of a message each symbol is distorted with probability 0.1. A message consisting of 5 symbols is send.

- 1. What is the probability that no symbols will be distorted?
- 2. What is the probability that there will be at least two distorted symbols?
- 3. What is the probability that there will be more non-distorted symbols than distorted ones?

Problem 3. In the evening restaurant accepts only guests who made a reservation beforehand. The owner knows that 10% of people who made a reservation, ultimately don't come. The restaurant has 28 tables and the owner received 30 reservations. Calculate the probability that there will be a problem - the number of clients that made a reservation and came will be greater than the number of tables.



Problem 5. We toss 2 dice independently. Let X be the sum of points on them. Find probability distribution of X and $\mathbb{E}X$.

Problem 6. Complete the table if $\mathbb{E}X = 0$, Var(X) = 5.4.

Problem 7. In a lottery you choose a three-digit number from 000 to 999. If you guess one digit (for example, the winning number is 366 and your number is 436, then you guessed only the right digit) – you get 5 dollars. If you guessed two digits you get 50 dollars, if you guessed all three digits you get 500 dollars. Let X be a random variable - your payoff in the lottery. Construct a pmf for X and write it in tabular form. Calculate an expected payoff and answer the question: how much should a lottery ticket cost?