

MATH-57091 Probability and Statistics for High-School
Teachers.

Home Work 3, due on Monday SEPTEMBER 24,
Instructor: Prof. Artem Zvavitch

Problem 1. Suppose that X is a random variable that takes on one of the values $-1, 0, 1$ and 2 . If

$$\mathbb{P}(X = -1) = .2, \mathbb{P}(X = 0) = .3 \text{ and } \mathbb{P}(X = 1) = .4,$$

Find

- $\mathbb{P}(X = 2)$.
- $\mathbb{P}(X \leq 1)$.
- $\mathbb{P}(X > 0)$.
- $\mathbb{P}(-\frac{1}{2} \leq X < 2)$.
- $\mathbb{E}X$.
- Distribution (Probability Mass function) of X^2 .
- $\mathbb{E}X^2$.
- $\mathbb{E}2^X$.

Also let Y be a random variable that takes on one of the values $-2, 0, 3$. If

$$\mathbb{P}(Y = -2) = .2, \mathbb{P}(Y = 0) = .3 \text{ and } \mathbb{P}(Y = 3) = .5,$$

find

- $\mathbb{E}Y$,
- $\mathbb{E}(X + Y)$.

Problem 2. An insurance agent has two clients each of whom has a life insurance policy that pays 100000 dollars upon death. Their probabilities of dying this year are .05 and .1. Let X denote the total amount of money that will be paid this year to the clients beneficiaries. Assuming that the event that client 1 dies is independent of the event that client 2 dies, determine the probability distribution (probability mass function) of X also $\mathbb{E}X$.

Problem 3. Let $\mathbb{E}X = \mathbb{E}Y = 0$ is it true that then $\mathbb{E}XY = 0$.

Problem 4. Let Y be a Geometric Random Variable with parameter p , find $\mathbb{E}Y$.