

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

Home Work 4, due on Monday October 1,

Instructor: Prof. Artem Zvavitch

Problem 1. *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, find $\mathbb{E}X$ and $\text{Var}(X)$.*

Problem 2. *Let Y be a Geometric Random Variable with parameter p , find $\mathbb{E}Y$, $\text{Var}(Y)$.*

Problem 3. *Artem plays with his daughter Maya a game: Maya rolls a die, if number 3 appears she gets a dollar, any other number appears she gets nothing. Assume they plan to play 20 times. Let X be a random variable representing the amount of money Maya may win.*

- *What distribution should you use to model X ? Write the formula for distribution (probability mass function) of X .*
- *Find $\mathbb{E}X$, $\text{Var}(X)$, and $\text{SD}(X)$.*
- *Use calculator to compute (approximately!) $\mathbb{P}(X = k)$, for $k = 0, 1, \dots, 20$ and make a graph chart.*

*Assume, Artem decided to make the game more fun and each time Maya play she needs to pay 25 cents. Again they plan to play 20 times and let Y is an amount Maya may get as an income after those 20 games. Please, find $\mathbb{E}Y$, $\text{Var}(Y)$, and $\text{SD}(Y)$. **Never play such games with your kids :)***