

Präsenzaufgabe 9

Exercise 1: Chebyshev-Ungleichung At the famous festival Sommerfest Vorstrasse, people can buy several types of food and drink (<https://sommerfest-vorstrasse.de/food-drinks/>). In this exercise, we consider only the Vegane Wurst. We assume that 6 000 people are coming to Sommerfest Vorstrasse. We assume that each vegan or vegetarian person eats 2 Vegane Würste, and that other people do not eat any Vegane Wurst, with each person having a probability $p = 30\%$ to be vegetarian or vegan.

a) What is the Erwartungswert (expected value) of the number X of Vegane Würste eaten at Sommerfest Vorstrasse?

b) Using the Chebyshev-Ungleichung, give an lower bound on the probability that the number of Vegane Würste eaten at Sommerfest Vorstrasse is between $\mathbb{E}(X) - 400$ and $\mathbb{E}(X) + 400$.

c) How many Vegane Würste do they need to buy so that the probability to run out of Vegane Würste is (according to the Chebyshev-Ungleichung) below 5%?

d) Same question as before, but assuming that 60 000 people are coming to Sommerfest Vorstrasse instead.