

Probability Calculus 2021/2022, Homework 2 (two problems)

Name and Surname Student's number

In the problems below, please use the following: as k – the sum of digits in your student's number; as m – the sum of the two largest digits in your student's number; and as n – the smallest digit in your student's number plus 1. For example, if an index number is 609999: $k = 42$, $m = 18$, $n = 1$.

Please write down the solutions (transformations, substitutions etc.), and additionally provide the final answer in the space specified (the answer should be a number in decimal notation, rounded to four digits).

3. There are $k(m + 1) + 2(n + 5)(m + 1)$ workers employed in company C_1 , of which $k(m + 1)$ have been vaccinated against COVID-19 and the rest have not been vaccinated, while in company C_2 there are $6mk$ vaccinated workers and a certain amount who were not vaccinated. A sanitary inspector performs an inspection in the following way: 1) she selects a company for inspection, with company C_1 chosen with probability n/k , and company C_2 chosen with probability $1 - n/k$; 2) she randomly selects an employee from the selected company. We know that the events: $A = \{\text{company } C_1 \text{ was chosen}\}$ and $B = \{\text{the selected employee is vaccinated against COVID-19}\}$ are independent. How many non-vaccinated workers are there in company C_2 ?

ANSWER:

Solution:

4. Two student groups: G_1 and G_2 , each having a limit of 10 participants, are opened for a course in probability calculus. There will be 20 students enrolling for the subject. Upon registration, each student will specify (independently from other students) which group she wishes to attend; the request will be fulfilled immediately, if only there are free places in the group specified. Based on data for previous years, the Dean's office predicts that group G_1 will be preferred with probability m/k , and group G_2 will be chosen with probability $1 - m/k$. Calculate the probability that when one of the groups becomes full, there will be $n + 2$ free places remaining in the other group.

ANSWER:

Solution: