

Probability Calculus 2021/2022, Homework 4 (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).

7. Let X be a random variable from a distribution with a CDF equal to

$$F(t) = \begin{cases} 0 & \text{if } t < -n, \\ \frac{n}{k} & \text{if } -n \leq t < 0, \\ \frac{(n+1)(t+\frac{3}{2})}{k} & \text{if } 0 \leq t < \frac{m}{n+1} - \frac{3}{2}, \\ 1 & \text{if } t \geq \frac{m}{n+1} - \frac{3}{2}. \end{cases}$$

Find $\mathbb{P}(X^2 \in (\frac{1}{25}, n^2])$.

ANSWER:

Solution:

8. Let X be a random variable from a distribution with density

$$g(x) = ne^{-n(x-m)}\mathbf{1}_{[m,\infty)}(x).$$

Find the quantile of rank m/k of variable X .

ANSWER:

Solution: