Mathematical Statistics 2020/2021, Homework 5 (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).

9. The amount of time it takes a student to solve a homework problem in mathematical statistics (in minutes) follows a normal distribution with unknown mean μ and a variance equal to m^2. We want to verify the null hypothesis that $\mu = k$ against the alternative that $\mu = 2k$ on the base of a single observation X using the following procedure: if $X > c$, we reject the null. Find c such that the test has a significance level of $n\%$. Calculate the probability of committing an error of the second type for this test.

ANSWER:

value of c:	prob. of error of 2nd kind:

Solution:

10. The amount of time it takes a student to solve a homework problem in mathematical statistics (in minutes) follows a normal distribution with unknown mean μ and a variance equal to m^2. Find the most powerful test to verify the null hypothesis that $\mu = 2k$ against the alternative that $\mu = \frac{3}{2}k$ on the base of k independent observations, at a significance level of $n\%$. Calculate the power of this test (for the alternative hypothesis). What is the decision, based on a sample of observations equal to $k+5, k+6, \ldots, 2k+4$?

ANSWER:

critical region of the test:	Power of the test:	Reject null? (YES/NO):

Solution: