

Mathematical Statistics 2020/2021, Homework 1 (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).

1. The changes in the rate of new infections with the COVID-19 virus for the first $m + 1$ months of the pandemic were analyzed. For the first $2n$ months, the number of infections rose by $m\%$ monthly. In the following n months, the number of infections fell by $m\%$ (for the whole n -month period). For the remainder of the studied period, in a second wave of the pandemic, the number of infections rose by $k\%$ monthly. (1) Calculate the average monthly growth rate of the number of new infections for the whole pandemic period. (2) Knowing that in the $m + 1$ st month of the pandemic the number of new infections amounted to m thousand, predict the number of new infections in month $m + 1 + n$ (assume that in the future, the number of infections will grow at the same rate as on average in the analyzed period).

ANSWER:

Avg. growth rate:	Number of infections in month $n + m + 1$:
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Solution:

2. A group of students were interviewed and asked about their weekly expenditures on entertainment (cinemas, bars, clubs, etc.). The results are summarized in the table below:

Amount (in \$)	Number of students
$(0, 10 \cdot n]$	$n + 3$
$(10 \cdot n, 20 \cdot n]$	$m + n$
$(20 \cdot n, 30 \cdot n]$	$2k - 3$
$(30 \cdot n, 40 \cdot n]$	$k + 3$
$(40 \cdot n, 50 \cdot n]$	$m + 3n - 1$
$(50 \cdot n, 60 \cdot n]$	$m - 3$

Approximate the mean, median and mode values of entertainment expenditures in the studied sample.

ANSWER:

Mean:	Median:	Mode:
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Solution: