

EXERCISE - STATISTICS FOR AI
Summer Semester 2025 (Mag. Thomas Forstner)

366.591 366.592 366.593 366.594 366.595

20. During a week, the number of hours spent studying each day (rounded to whole hours) were recorded by a student.

5 4 6 7 8 9 10

- a) Calculate the arithmetic mean of the given data. 7
- b) Calculate the median of the given data. 7
- c) Calculate the modal value of the given data. no mode
- d) Calculate the first quartile and third quartile of the given data. 5 , 9
- e) Calculate the variance and standard deviation for this given data. 4 , 2

21. A survey among 200 students of a university regarding the question “How many hours do you study per week” provided the following results:

“Hours of study per week”	relative frequency p_i
0	0.1
5	0.2
10	0.3
15	0.2
20	0.2

- a) Calculate the arithmetic mean. 11
- b) Calculate the median. 10

22. Susi buys different types of rice from various suppliers at a wholesale market. The quantities and prices are given in the table below:

	Supplier A	Supplier B	Supplier C
Quantity [kg]	40	30	20
Price [€/kg]	1.00	1.20	1.50

- a) Calculate the unweighted arithmetic mean of the price of one kilogram rice. 1.23 €/kg
- b) Calculate the quantity-weighted arithmetic mean of the price of one kilogram rice. 1.18 €/kg

23. In a small neighborhood, 7 houses have the following monthly electricity consumption (in kWh):

200 , 220 , 240 , 260 , 280 , 300 , 600

- a) Calculate the arithmetic mean of the monthly electricity consumption. 300 kWh
- b) Calculate the median of the monthly electricity consumption. 260 kWh

24. The 20 employees in a company have an average annual salary of 50,000 \$. After a salary cut, one employee’s annual salary is reduced by 5,000 \$. What’s the new average annual salary now? 49750\$

25. In 2024, a travel agency only sold vacations to two villages on the German North Sea coast (Nordstrand and Neßmersiel). The average price of all the vacations sold during the season was 560 Euro. For the trips to Nordstrand the average price was 580 Euro and for the trips to Neßmersiel the average price was 490 Euro.

What percentage of the travel agency's customers travelled to Neßmersiel? 22.222%

26. To analyze the development of the telephone costs over the last year, the mother of Bärbel asked her to calculate summary statistics for the telephone costs.

telephone costs in Euro:

Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
74.92	74.20	81.60	219.40	76.46	73.68	60.88	63.36	81.08	63.20	70.32	77.88

- a) Calculate the average monthly phone costs. 84.75€
- b) In April was the finale of a casting show and Bärbel has very often called for “her” star using an expensive added value number. She is frightened by the high average of the monthly phone costs and fears a reduction of her monthly allowance. Can you help her with some statistical methods?

April is clearly an outlier and have a strong influence on the mean. She can use the median or evaluate the mean excluding April

27. A young entrepreneur has specialized in the sale of smartphones and accessories for small business owners. The entrepreneur advertises that his prices for smartphones alone have fallen on average by 15% compared to the previous year. At the same time, however, the total prices (smartphones and accessories) have increased on average by 8%. Furthermore, it is known that 50% of the young entrepreneur's total turnover is generated by the sale of accessories and the remaining percentage by the sale of smartphones.

Quantify the average price development (previous year to the current year) just for the accessories. 31%

28. The table below shows a company's annual revenue:

Year	Sales (in millions of euros)
2020	136
2021	145
2022	154
2023	156
2024	146

- a) Calculate the average annual revenue. 147.4
- b) Calculate the average growth rate of the annual revenue. 1.80%

29. A cyclist travels to a destination and back. On the way to the destination, the cyclist travels at 15 km/h, and on the way back, the cyclist travels at 20 km/h. The total distance for the round trip is 70 km (35 km each way). What is the cyclist's average speed for the entire round trip? 17.143 km/h

30. The popular magazine “My Radio and Me” conducts an annual survey regarding the radio listening habits among their readers. In order to answer the question “How many hours a day do you listen to the radio on average?” the participants identified themselves in one of the categories below. The survey results are available for 2 years.

category	2000	2024
[0 , 1)	5	35
[1 , 2)	3	24
[2 , 3)	10	13
[3 , 4)	9	8
[4 , 5)	13	9
[5 , 6)	18	4
[6 , 7)	21	2
[7 , 8)	27	0
[8 , 9)	10	0
[9 , 10)	5	2

- a) Calculate the mean for the year 2024. 2.15
- b) Calculate the median for the year 2000. 6.12
- c) Calculate the value, above which 25% of all cases of the distribution in the year 2024 are? 3.09

31. The frequency distribution of the time in minutes spent reading in a given week for a given population is shown in the table below.

class limits	frequency
[50-150)	20
[150-200)	30
[200-250)	40
[250-300)	10

Below which value are 30% of all cases of this population? 166.667

32. In the table below the body-mass-index (BMI) of a population of 50 people is given.

class limits	frequency
[15 ; 20)	10
[20 ; 25)	15
[25 ; 30)	20
[30 ; 35)	5

- a) Calculate the arithmetic mean for the given data. 24.5
- b) Above which value lies 50% of the distribution mass? 25

Remember: We are using Tukey's Hinges to calculate quantiles for ungrouped raw data.

Please keep the formal guidelines for submitting the homework assignments in mind to avoid losing points unnecessarily.